



939 Sno-Thro

Service Manual

Models 939001, 939002, 939300

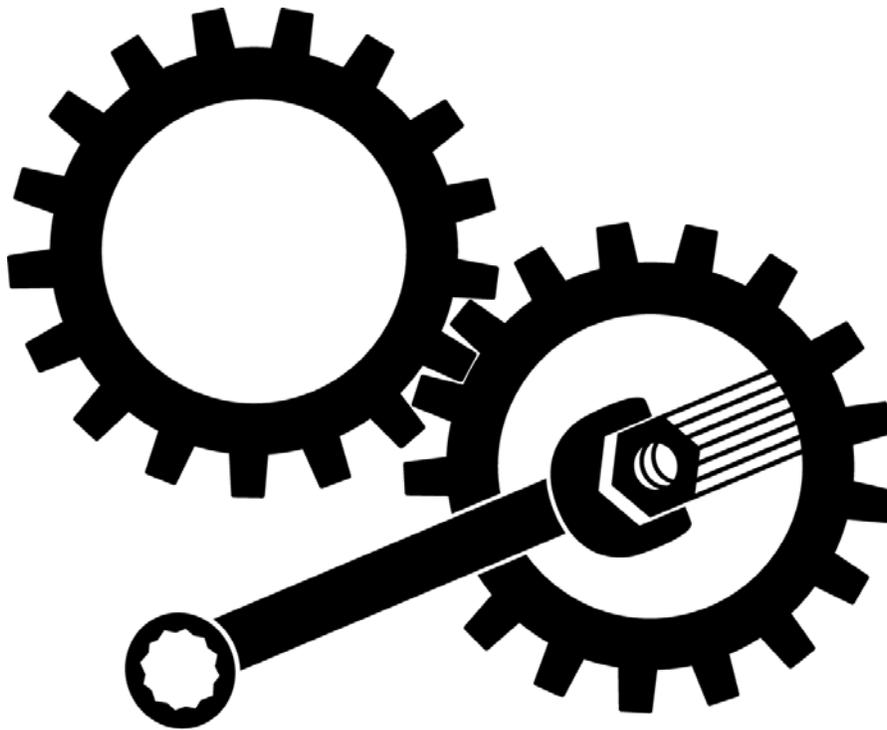


TABLE OF CONTENTS

1.0 Introduction	1-5	5.2 Discharge Chute	5-17
1.1 The Manual	1-5	5.3 Runners	5-18
1.2 Service and Replacement Parts	1-5	5.4 Attachment Clutch/Brake Adjustment ..	5-18
1.3 Product Registration	1-5	5.5 Traction Drive Clutch Adjustment	5-19
1.4 Unauthorized Replacement Parts	1-5	6.0 HandleBars & Controls	6-20
1.5 Disclaimer	1-5	6.1 Inspect Lower Handlebar	6-20
1.6 Technical Service Communications	1-5	6.2 Replace Lower Handlebar	6-20
2.0 Safety	2-6	6.3 Traction Drive Clutch Lever and Cable ..	6-20
2.1 Safety Alerts	2-6	6.4 Attachment Control Lever and Cable ...	6-21
2.2 Notations	2-6	7.0 Engine	7-22
2.3 Practices and Laws	2-6	7.1 Engine Troubleshooting	7-22
2.4 Required Operator Training	2-6	7.2 Engine Removal	7-25
2.5 Safety Decals and Locations	2-6	7.3 Engine Installation	7-25
2.6 Preparation	2-7	8.0 Transmission	8-26
2.7 Service Position	2-7	8.1 Transmission Removal	8-26
2.8 Cleaning and Storage	2-8	8.2 Transmission Installation	8-26
Safety Rules 8		9.0 Auger/Impeller	9-27
3.0 Specifications	3-10	9.1 Auger/Impeller Repair	9-27
4.0 General Maintenance & Adjustments ..	4-11	9.2 Shear Bolts	9-27
4.1 Controls and Features	4-11	9.3 Discharge Chute	9-28
4.2 Service Position	4-12	9.4 Discharge Chute Crank	9-29
4.3 Stopping in an Emergency	4-12	9.5 Runner and Scraper	9-30
4.4 Starting and Shutting Off	4-12	10.0 Gear Case	10-31
4.5 Fuel Tank	4-13	10.1 Aluminum Gear Case	10-31
4.6 Pre-Start	4-13	Service Parts List	32
4.7 Maintenance Schedule	4-14		
4.8 Attachment Drive Belt Replacement ...	4-15		
4.9 Traction Drive Belt Replacement	4-16		
4.10 Shear Bolts	4-17		
4.11 Tire Pressure	4-17		
5.0 Service and Adjustments	5-17		
5.1 Discharge Chute Deflector	5-17		



Ariens Company
 655 West Ryan Street
 P.O. Box 157
 Brillion, Wisconsin 54110-
 0157 USA
 Telephone
 (920) 756-2141
 Facsimile
 (920) 756-2407

EC DECLARATION OF CONFORMITY ISSUED BY THE MANUFACTURER DÉCLARATION
 DE CONFORMITÉ CE ÉMISE PAR LE FABRICANT –
 EU-ÜBEREINSTIMMUNGSKLÄRUNG DES HERSTELLERS – DICHIARAZIONE DI
 CONFORMITÀ CE RILASCIATA DAL PRODUTTORE – DECLARACIÓN DE
 CONFORMIDAD CE EMITIDA POR EL FABRICANTE – EF-SAMSVARSKLÆRING FRA
 PRODUSENTEN – EG-DEKLARATIONEN OM ÖVERENSSTÄMMELSE UTFÄRDAD
 AV TILLVERKAREN –
 VALMISTAJAN ANTAMA EY-VAATIMUSTENMUKAISUUSVAKUUTUS – DEKLARACJA
 ZGODNOŒCI Z PRZEPISAMI EC WYDANA PRZEZ PRODUCENTA – PROHLÁŠENÍ O SHODI
 CE, VYDANÉ VÝROBCEM

We the undersigned, ARIENS COMPANY, certify that: Nous, soussignés ARIENS COMPANY, certifions que : Der
 Unterzeichnete, ARIENS COMPANY, bescheinigt, dass: La sottoscritta società ARIENS COMPANY certifica che: Nosotros,
 los abajo firmantes, ARIENS COMPANY, certificamos que: Undertegnede, ARIENS COMPANY, bekrefter at: Undertecknad,
 ARIENS COMPANY, intyggar att: Allekirjoittanut, ARIENS COMPANY, vakuuttaa, että: My, niĀej podpisani, ARIENS
 COMPANY, oœwiadczy, że: My, niŹepodepsani, ARIENS COMPANY, prohlašujeme, Źe:

Type: Type : Typ: Tipo: Tipo: Type: Typ: Tyypit: Typ: Typ:	WALK BEHIND SNOW THROWER – LES CHASSES-NEIGE AUTOTRACTÉS – HANDGEFÜHRTE SCHNEEFRÄSE – SPAZZANEVE SEMOVENTE – CAMINAR POR DETRÁS DE LA LANZADORA DE NIEVE – SNØFRESER – SJÄLVGÅENDE SNÖSLUNGA – KÄSINOHJAITAVA LUMILINKO – ODGARNIACZ (ENIEGU DO PROWADZENIA PRZED SOBŹ – SNĀHOVÁ FRÉZA S POJEZDEM
Trade Name: Appellation commerciale : Handelsbezeichnung: Nome commerciale: Nombre comercial: Handelsnavn: Handelsbeteckning: Kauppanimi: Nazwa handlowa: Obchodní název:	Ariens
Model: Modèle : Modell: Modello: Modelo: Modell: Modell: Malli: Model: Model:	939300

Conforms to: Est conforme à : Mit den Anforderungen der folgenden Richtlinien übereinstimmt: È conforme a: Cumple con:
 Er i samsvar med: Överensstämmer med: Täyttää seuraavat vaatimukset: Jest zgodny z: Odpovídá normi:

98/37/EC, 89/336/EEC,

2000/14/EC Conformity Assessment Annex V. Annexe V de l'évaluation de conformité. Konformitätsbewertung, Anhang V.
 Annesso V della valutazione di conformità. Anexo V de la evaluación de la conformidad. Samsvarsvurdering etter vedlegg V.
 Bedömning av överensstämmelse Bilaga V. Vaatimustenmukaisuuden arviointi, liite V. Dodatek V, Ocena zgodnoœci. Posouzení
 shody příloha V.

Representative Measured Sound Power Level (L _{wa}) – Niveau de puissance acoustique représentatif mesuré (L _{wa}) – Repräsentativer gemessener Geräuschpegel (L _{wa}) – Livello di potenza sonora rappresentativo rilevato (L _{wa}) – Nivel de potencia acústica representativo medido (L _{wa}) – Representativt målt lyeffektnivå (L _{wa}) – Representativ uppmätt ljudnivå (L _{wa}) – Tyypillinen mitattu äänitehotaso (L _{wa}) – Zmierzony reprezentatywny poziom mocy akustycznej (L _{wa}) – Representativní hodnota změřené hladiny hlouènosti (L _{wa}) –	Guaranteed Sound Power Level (L _{wa}) – Niveau de puissance acoustique garanti (L _{wa}) – Garantierter Geräuschpegel (L _{wa}) – Livello di potenza sonora garantito (L _{wa}) – Nivel de potencia acústica garantizado (L _{wa}) – Garantert lyeffektnivå (L _{wa}) – Garanterad uppmätt ljudnivå (L _{wa}) – Taattu äänitehotaso (L _{wa}) – Gwarantowany reprezentatywny poziom mocy akustycznej (L _{wa}) – Zaruèovaná hodnota hladiny hlouènosti (L _{wa}) –
939300: xxx dB _A	939300: xxx dB _A

Fred J. Moreaux:
 Quality and Conformance Manager
 (Keeper of Technical File)
 Responsable de la qualité et de la
 conformité des produits (Dépositaire
 de la fiche technique) Manager
 Qualitätssicherung und Konformität
 (Archivar der technischen Akte)
 Responsabile della qualità e della
 conformità del prodotto
 (Depositario del file tecnico) Gerente
 de calidad y conformidad
 (Depositario del archivo técnico)
 Kvalitet- og samsvarsansvarlig
 (innehaver av tekniske data) Chef för
 kvalitet och produktöverensstämmelse
 (Innehavare av tekniska data)
 Laadusta ja
 vaatimustenmukaisuudesta vastaava
 päällikkö (Teknisen tiedoston haltija)
 Kierownik do spraw jakości i zgodności
 (Przechowuj¹cy Dokumentację
 Techniczn¹) Manager jakości a shody
 (správce technické dokumentace)



Ariens Company
 Brillion, WI 54110-0157 USA
 Signature Signature Unterschrift
 Firma Firma Signatur Namnteckning
 Allekirjoitus Podpis Podpis

xx/xx/2006
 Date Date Datum Data Fecha Dato
 Datum Päiväys Data Datum

**CE Sound and Vibration – Niveau sonore et vibration CE – CE-Geräuschpegel und
 Vibrationswerte – Livello sonoro e vibrazioni CE – Sonido y vibración CE – CE-lydnivå og
 Vibrasjonsmåling – CE ljudnivå och Vibrations-mätning – CE-melutaso Tärinä – CE DŮwiêku i
 Wibracji – CE zvuk a vibrace**

Model: – Modèle : – Modell: – Modello: – Modelo: – Modell: – Modell: – Malli: – Model: – Model:	939300
Oper. Ear Sound Pressure (L_{pa}) in dB_A – Pression acoustique Pression sonore à aux oreilles de l'opérateur (L_{pa}) en dB_A – Geräuschstärke am Ohr des Bedieners (L_{pa}) in dB_A – Potenza sonora percepita dall'operatore (L_{pa}) in. dB_A – Presión de sonido en el oído (L_{pa}) in dB_A – Lydtrykk i førerens øre (L_{pa}) in. dB_A – vid förarens position (L_{wa}) i dB_A – Kuljettajan korvaan kohdistuva äänipaine (L_{pa})/ dB_A – Robocze ciśnienie akustyczne na uchu (L_{pa}) w decybelach $_A$ – Provozní hladina akustického tlaku (L_{pa}) v dB_A	xx
Vibration Measure (m/sec^2) @ Operator Hands – Niveau de vibrationaux mains de l'opérateur – Vibrationswerte An den Händen des Bedieners – Misura delle vibrazioni alle mani dell'operatore – Cantidad de vibración en las manos del operador – Vibrasjonsmåling ved brukerens hender – Vibrationsmätning vid förarens händer – Tärinä kuljettajan käsissä – Pomiar wibracji (m/sec^2) na rękach operatora – Hodnota vibrací (m/s^2) na rukou obsluhy	x.x

SECTION 1 - INTRODUCTION

1.1 THE MANUAL

This manual provides complete instructions for service, maintenance, disassembly, repair, and installation of the mechanical components for the 939 Snow-Thro.

Dealer trained service personnel should use this manual as a supplement to and reminder of the training sessions conducted by the company.

Read all information for servicing a part of system before repair work is started to avoid needless disassembly.

Operation

Before operation of the unit, carefully and completely read manuals supplied with the unit. The contents will provide you with an understanding of safety instructions and controls during normal operation and maintenance.

Safety Messages

For your safety and the safety of others always read, understand, and follow all DANGER, WARNING, and CAUTION messages found in manuals and on safety decals.

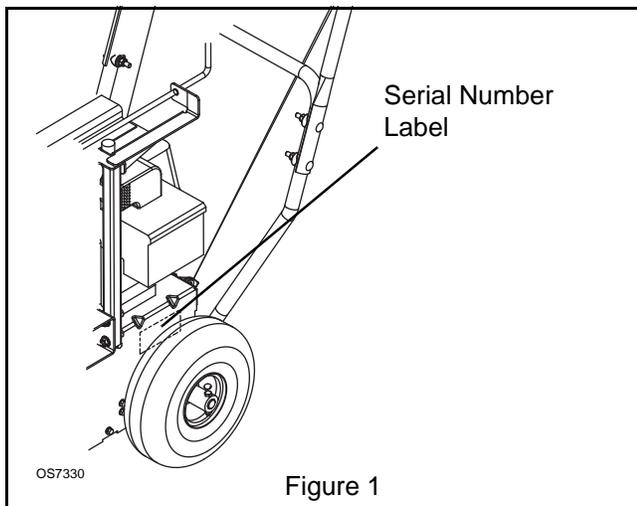
Directional Reference

All reference to left, right, front, or rear are given from the operator in the operator position and facing the direction of forward travel.

1.2 SERVICE AND REPLACEMENT PARTS

When ordering publications, replacement parts, or making service inquiries, know the Model and Serial numbers of your unit and engine.

Product model and serial numbers are located on the product registration form in the unit literature package. They are printed on a serial number label, located on the frame of your unit as shown in Figure 1.



1.3 PRODUCT REGISTRATION

The Ariens dealer must register the product at the time of purchase. Registering the product will help the company process warranty claims or contact you with the latest service information. All claims meeting requirements during the limited warranty period will be honored, whether or not the product registration card is returned. Keep a proof of purchase if you do not register your unit.

Customer Note: If the dealer does not register your product, please fill out, sign, and return the product registration card to Ariens or go to www.ariens.com.

1.4 UNAUTHORIZED REPLACEMENT PARTS

Use only Ariens replacement parts. The replacement of any part on this vehicle with anything other than an Ariens authorized replacement part may adversely affect the performance, durability, or safety of this unit and may void the warranty. Ariens disclaims liability for any claims or damages, whether warranty, property damage, personal injury, or death arising out of the use of unauthorized replacement parts.

1.5 DISCLAIMER

Ariens reserves the right to discontinue, make changes to, and add improvements upon its products at any time without public notice or obligation. The descriptions and specifications contained in this manual were in effect at printing. Equipment described within this manual may be optional. Some illustrations may not be applicable to your unit.

1.6 TECHNICAL SERVICE COMMUNICATIONS

Ariens Technical Service communicates information to the field using Service Letters, Service Bulletins, Product Notices, and Campaigns. Each communication signifies a type of information and priority. The dealer is responsible to carry out the directive provided in the communication. The types of communication are:

Service Letter - General technical information for the dealer. Technical information on how to service the product and product improvements.

Service Bulletin - Notification to update products to resolve certain issues or a notification of a policy change.

Product Notices - Notification of limited product located in a certain region. This is a limited distribution to only those who received the product involved.

Campaigns - Notification of a safety related issue. All product must be updated and are tracked by the factory until all units are corrected.

SECTION 2 - SAFETY

2.1 SAFETY ALERTS

 **WARNING:** To avoid injury to hands and feet, always disengage clutches, shut off engine, and wait for all movement to stop before unclogging or working on snow thrower.

Hand contact with the rotating impeller is the most common cause of injury associated with snow throwers. Never use your hand to clean out the discharge chute.

Keep hands and feet away from auger and impeller.

 Look for these symbols to point out important safety precautions. They mean:

Attention!

 Personal Safety Is Involved!
Become Alert!
Obey The Message!

The safety alert symbols above and signal words below are used on decals and in this manual. Read and understand all safety messages.

 **DANGER: IMMINENTLY HAZARDOUS SITUATION!** If not avoided, WILL RESULT in death or serious injury.

 **WARNING: POTENTIALLY HAZARDOUS SITUATION!** If not avoided, COULD RESULT in death or serious injury.

 **CAUTION: POTENTIALLY HAZARDOUS SITUATION!** If not avoided, MAY RESULT in minor or moderate injury. It may also be used to alert against unsafe practices.

2.2 NOTATIONS

NOTE: General reference information for proper operation and maintenance practices.

IMPORTANT: Specific procedures or information required to prevent damage to unit or attachment.

2.3 PRACTICES AND LAWS

Practice usual and customary safe working precautions, for the benefit of yourself and others. Understand and follow all safety messages. Be alert to unsafe conditions and the possibility of minor, moderate, or serious injury or death. Learn applicable rules and laws in your area. Always follow the practices set forth in this manual.

2.4 REQUIRED OPERATOR TRAINING

Original purchaser of this unit was instructed by the seller on safe and proper operation. If unit is to be used by someone other than original purchaser; loaned, rented or sold, ALWAYS provide this manual and any needed safety training before operation.

2.5 SAFETY DECALS AND LOCATIONS

ALWAYS replace missing or damaged Safety Decals. Refer to Figure 2 for Safety Decal locations.

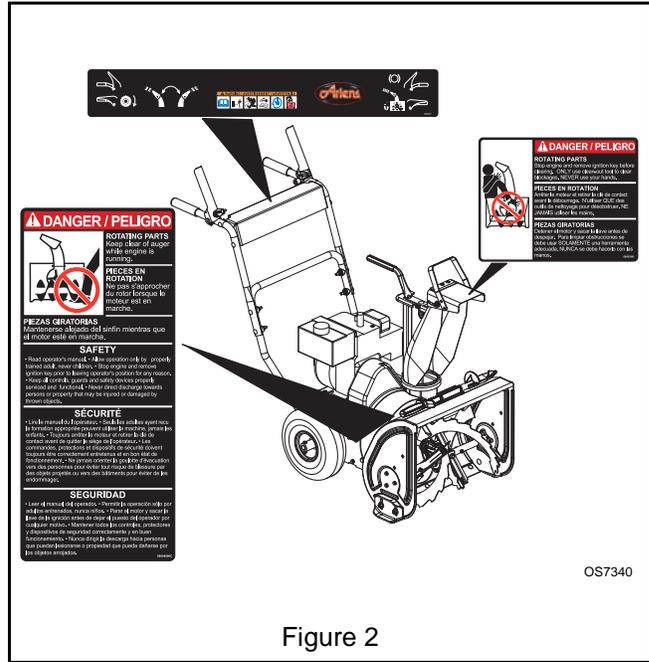


Figure 2

WARNING!



OL1801

Read Owner/Operator Manual.



OL4370

Keep people away from unit while operating. Keep children out of work area and under watchful care of a responsible adult.



OL0910

Never direct discharge towards persons or property that may be injured or damaged by thrown objects.



OL4010

Stop engine, remove key, read manual before making any repairs or adjustments.



OL4690

Wear appropriate hearing protection.



OL6610

ONLY use clean-out tool to clear blockages. **NEVER** use your hands.

2. DANGER!



OS6610

ROTATING PARTS! ONLY use clean-out tool to clear blockages. **NEVER** use your hands. **High speed impeller rotates below discharge opening. Wait for all moving parts to stop before removing clogs or servicing.**

DANGER!



OS2080

ROTATING PARTS. Keep clear of auger while engine is running.

- Read Operator's Manual.
- Allow operation only by properly trained adult, never children.
- Stop engine and remove ignition key prior to leaving the operator's position for any reason.
- Keep all controls, guards and safety devices properly serviced and functional.
- Never direct discharge towards persons or property that may be injured or damaged by thrown objects.

2.6 PREPARATION

Proper preparation is very important for efficient work before you start to remove any parts. A clean work area at the beginning of each job will allow you to perform service repairs easily and quickly.

To reduce the incidence of misplaced tools or parts, place removed components with all attaching hardware in the disassembly order on a clean work surface. Organization is a key part of proper reassembly.

Tools, instruments, and parts needed for the job should be gathered before work is started. Interrupting a job to locate tools or parts is a needless delay.

2.7 SERVICE POSITION



WARNING: ALWAYS block wheels and know that jack stands or blocks used are stable, strong, secure and will hold the weight of the unit during maintenance.

To ensure the unit is positioned in the proper service position place unit on a flat level surface. ALWAYS stop engine. Assure unit is secure and will not tip over. Strap and clamp onto lift if used.

See *Service Position* in General Maintenance for specific instructions.

2.8 CLEANING AND STORAGE



WARNING: AVOID SHARP EDGES which can cut. Movement of parts can cut off fingers or a hand. Wear gloves, and use extreme caution when servicing.

IMPORTANT: Never spray unit with water or store unit outdoors to help prevent sealed bearing rust or corrosion. Water can seep into sealed bearings and reduce component life. Bearings are sealed against dirt and debris only.

A unit that is excessively dirty should be cleaned before work starts. Cleaning will occasionally uncover trouble sources. Dirt and abrasive dust reduce the efficient work life of parts and can lead to costly replacement.

When taking unit out of extended storage:

1. Check for any damage or loose parts. Repair, replace, or tighten hardware before operation.
2. If a preservative fluid was used in fuel tank, drain and discard. Fill fuel tank with fresh new fuel.



ROTATING PARTS.
Keep clear of auger while engine is running.

- Read Operator's Manual.
- Allow operation only by properly trained adult, never children.
- Stop engine and remove ignition key prior to leaving the operator's position for any reason.
- Keep all controls, guards and safety devices properly serviced and functional.
- Never direct discharge towards persons or property that may be injured or damaged by thrown objects.

2.9 SAFETY RULES

Read, understand, and follow all safety practices in Owner/Operator Manual before beginning assembly or operating. Failure to follow instructions could result in personal injury and/or damage to unit.

ALWAYS remove key and/or wire from spark plug before assembly, maintenance or service. Unintentional engine start up can cause death or serious injury.

Complete a walk around inspection of unit and work area to understand:

- Work area • Your unit • All safety decals

ALWAYS check overhead and side clearances carefully before operation. ALWAYS be aware of traffic when operating along streets or curbs.

Keep children and people away. Keep children out of work area and under watchful care of a responsible adult.

NEVER allow children to operate or play on or near unit. Be alert and shut off unit if children enter area.

DO NOT allow adults to operate unit without proper training. Only trained adults may operate unit. Training includes actual operation.

Keep area of operation clear of all toys, pets, and debris. Thrown objects can cause injury.

Check for weak spots on docks, ramps or floors. Avoid uneven work areas and rough terrain. Stay alert for hidden hazards.

DO NOT operate near drop-offs, ditches, or embankments. Unit can suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.

Falling snow, fog, etc. can reduce vision and cause an accident. Operate unit only when there is good visibility and light.

NEVER operate unit after or during the use of medication, drugs or alcohol. Safe operation requires your complete and unimpaired attention at all times.

NEVER allow anyone to operate this unit when his or her alertness or coordination is impaired.

DO NOT operate unit without wearing adequate winter outer garments. Wear adequate safety gear, including safety glasses with side shields, and protective gloves. Wear proper footwear to improve footing on slippery surfaces.

DO NOT wear loose clothing or jewelry and tie back hair that may get caught in rotating parts.

Protect eyes, face and head from objects that may be thrown from unit. Wear appropriate hearing protection.

Avoid sharp edges. Sharp edges can cut. Moving parts can cut off fingers or a hand.

ALWAYS keep hands and feet away from all rotating parts during operation. Rotating parts can cut off body parts.

NEVER place your hands or any part of your body or clothing inside or near any moving part while unit is running.

ALWAYS keep hands away from all pinch points.

DO NOT touch unit parts which might be hot from operation. Allow parts to cool before attempting to maintain, adjust or service.

Never direct discharge towards persons or property that may be injured or damaged by thrown objects. Use extreme caution on gravel surfaces. Stay alert for hidden hazards or traffic. Adjust runners so scraper blade does not contact gravel. DO NOT use on gravel or crushed rock surfaces.

DO NOT throw snow any higher than necessary.

Deflected materials can cause injury and property damage.

Always stand clear of the discharge area when operating this unit.

Fumes from engine exhaust can cause injury or death. DO NOT run engine in an enclosed area. Always provide good ventilation.

ALWAYS disengage attachment, stop unit and engine, remove key and allow moving parts to stop before leaving operator's position.

ROTATING IMPELLER AUGER CAN CAUSE SERIOUS INJURY. NEVER ATTEMPT TO UNCLOG OR CLEAN UNIT WHILE ENGINE IS RUNNING.

Read, understand, and follow all instructions in the manual and on the machine before starting.

Understand:

- How to operate all controls.
- The functions of all controls.
- How to STOP in an emergency.

Before starting engine, disengage control(s).

Use only approved extension cords and receptacles when starting units equipped with electric starter. DO NOT connect electric starter cord to any wiring system that is not a three-wire grounded system.

ALWAYS allow unit and engine to adjust to outdoor temperatures before clearing snow.

Always be sure of your footing, especially when operating in reverse or leaving the operator's position. Walk, never run, during operation.

DO NOT overload the machine capacity by attempting to clear snow at too fast a rate.

Slow down and turn corners slowly.

Do not operate in reverse unless absolutely necessary. ALWAYS back up slowly. Always look down and behind before and while backing.

Disengage attachment drive when traveling from one work area to another.

Abnormal vibrations are a warning of trouble. Striking a foreign object can damage unit. Immediately stop unit and engine. Remove key and wait for all moving parts to stop. Remove wire from spark plug. Inspect unit and make any necessary repairs before restart.

Before cleaning, removing clogs or making any inspections, repairs, etc.: disengage clutch(es), stop unit and engine, remove key, allow moving parts to stop. Allow hot parts to cool.

Run unit a few minutes after clearing snow to prevent freeze-up of attachment.

Never leave a running unit unattended. Shut off engine before leaving unit. ALWAYS remove key to prevent unauthorized use.

Never carry passengers.

Check clutch and brake operation frequently. Adjust and service as required. All motion of drive wheels and auger/impeller must stop quickly when control levers are released.

DO NOT operate on steep slopes. DO NOT clear snow across the face of slopes. Keep all movement on slopes slow and gradual. DO NOT make sudden changes in speed or direction. Use a slow speed to avoid stops or shifts on slopes. Avoid starting or stopping on a slope.

DO NOT park unit on a slope unless absolutely necessary. When parking on a slope always block the wheels.

Use extra care when loading or unloading unit onto trailer or truck.

Secure unit chassis to transport vehicle. NEVER secure from rods or linkages that could be damaged.

DO NOT transport machine while engine is running.

Keep unit free of ice or other debris. Clean up oil or fuel spills.

This product is equipped with an internal combustion type engine. DO NOT use unit on or near any unimproved, forest-covered or brush covered land unless exhaust system is equipped with a spark arrester meeting applicable local, state or federal laws. A spark arrester, if it is used, must be maintained in effective working order by operator.

Fuel is highly flammable and its vapors are explosive. Handle with care. Use an approved fuel container.

NO smoking, NO sparks, NO flames. ALWAYS allow engine to cool before servicing.

NEVER fill fuel tank when engine is running or hot from operation.

NEVER fill or drain fuel tank indoors.

Replace fuel cap securely and clean up spilled fuel.

Never fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before filling.

When practical, remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.

Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.

If fuel is spilled on clothing, change clothing immediately.

Before tipping unit up onto housing, remove fuel so no spills will occur. Ensure unit is secure and will not tip over during maintenance.

ALWAYS keep protective structures, guards, and panels in good repair, in place and securely fastened. NEVER modify or remove safety devices.

DO NOT change engine governor settings or over-speed engine.

Fumes from engine exhaust can cause injury or death. DO NOT run engine in an enclosed area. Always provide good ventilation.

ALWAYS maintain unit in safe operating condition. Damaged or worn out muffler can cause fire or explosion.

Keep all hardware properly tightened. Check shear bolts frequently. Check slip clutch on units so equipped.

Maintain or replace safety and instruction labels, as necessary.

NEVER store unit with fuel in fuel tank, inside a building where any ignition sources are present such as hot water heaters, space heaters, or clothes dryers. Allow the engine to cool before storing in any enclosure.

For extended storage, clean unit thoroughly. See Engine Manual for proper storage.

Use only attachments or accessories designed for your unit.

Check components frequently. If worn or damaged, replace with manufacturer's recommended parts.

SECTION 3 - SPECIFICATIONS

Model Number	939001	939002	939300
Description	ST520E	ST520	ST520
Engine - Tecumseh	LH195SA	LH195SA	OH195SA
Engine Power – hp (kW) at Maximum RPM	5.0 (3.7)	5.0 (3.7)	5.9 (3.7)
Fast Idle Speed-RPM (min^{-1})	3600 \pm 150		
Displacement - in. (cc)	11.88 (195)		
Electric Start	120V	Recoil	Recoil
Fuel	See Engine Manual		
Tank Capacity - qt. (L)	2.0 (1.96)		3.0 (2.8)
Snow Clearing Width - in. (cm)	20 (50.8)		
Chute			
Rotation Angle	200°		
Impeller			
Diameter - in. (cm)	12 (30.5)		
Speed-RPM-Max (min^{-1})	1200		
Auger			
Diameter - in. (cm)	11.0 (27.98)		
Speed-RPM-Max (min^{-1})	120		
Auger Brake	Yes		
Drive	Clutching Wet Sump Gearbox		
Speeds	1 Forward		
Pneumatic Tires - in.	10		
Size and Weight			
Height - in. (cm)	43.13 (109.53)		
Length - in. (cm)	51.25 (130.18)		
Width - in. (cm)	22.38 (56.84)		
Weight - lb (Kg)	125 (56.7)	120 (54.4)	121 (54.8)

SECTION 4 - GENERAL MAINTENANCE & ADJUSTMENTS

4.1 CONTROLS AND FEATURES

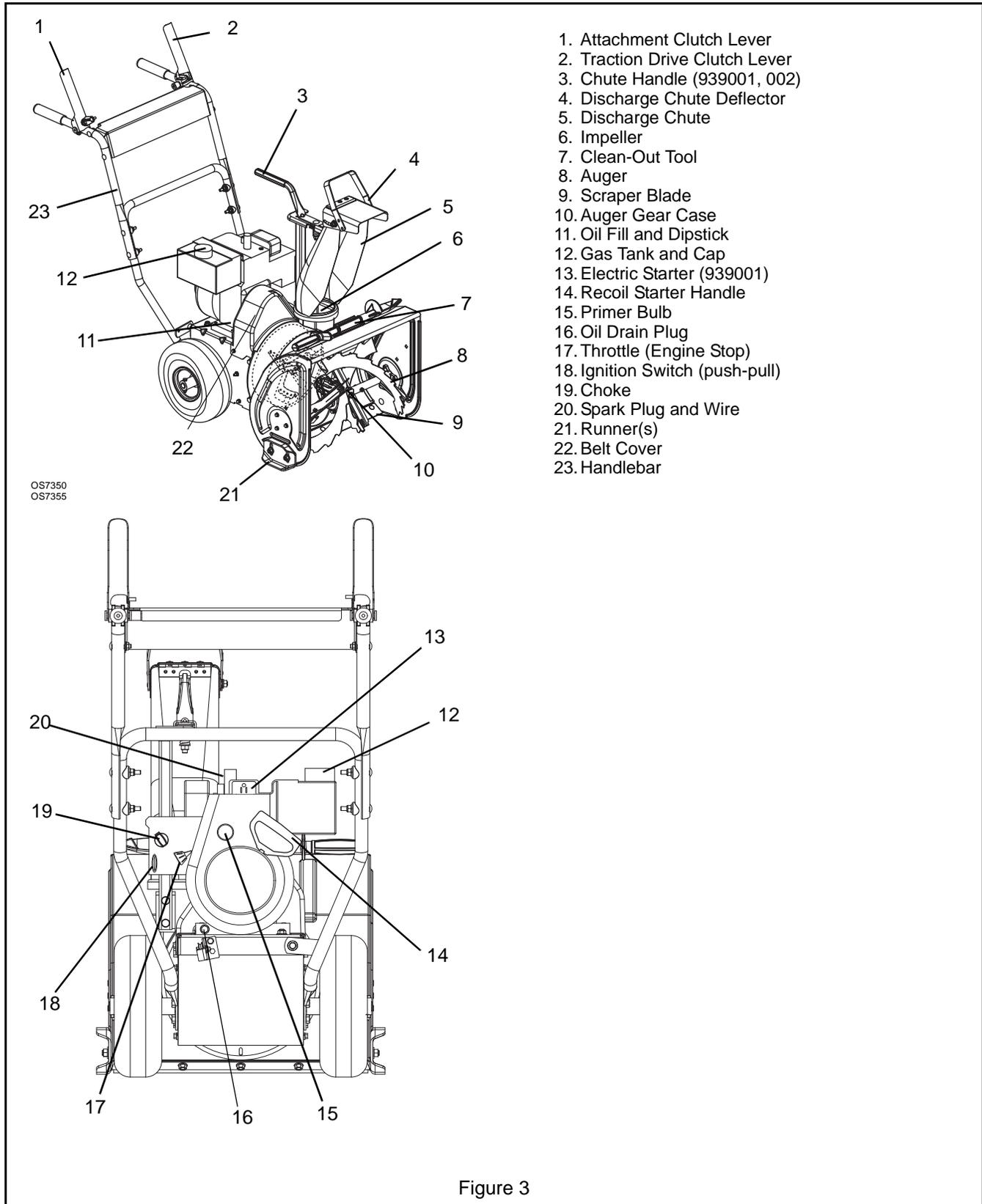


Figure 3

Ariens dealers provide any service or adjustments required to keep your unit operating at peak efficiency. Should engine service be required, contact an Ariens dealer or an authorized engine manufacturer's service center.



WARNING: AVOID INJURY. Read and understand the entire *Safety* section before proceeding.

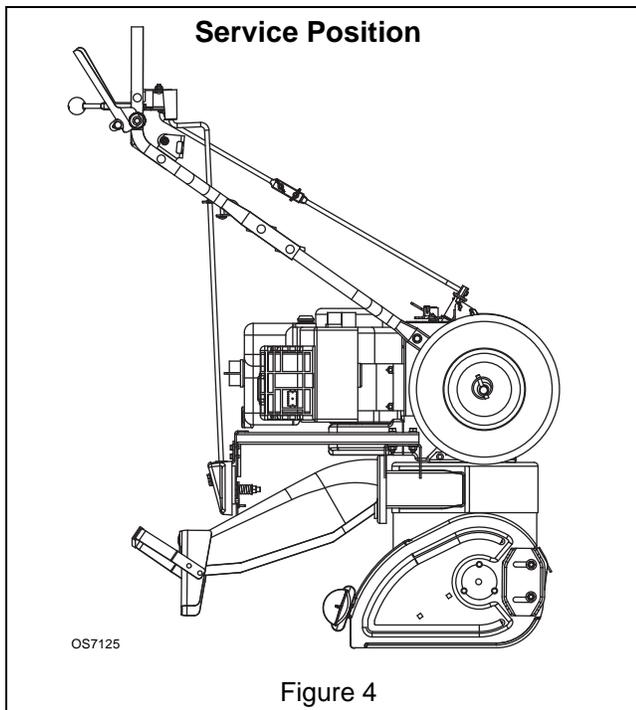
4.2 SERVICE POSITION



WARNING: Before tipping unit up onto housing, remove fuel so no spills will occur and remove battery (if equipped). Ensure unit is secure and will not tip over during maintenance.

Place unit on a flat level surface. Tip machine forward onto front of impeller housing for service as shown in Figure 4. Assure unit is secure and will not tip over. Strap and clamp onto bench if needed.

NOTE: Machine should remain in horizontal position to service attachment and drive belts. Do not tip machine forward.



4.3 STOPPING IN AN EMERGENCY

Immediately release both control levers to stop unit in an emergency. Stop engine, remove key and wait for all rotating parts to stop before leaving operator's position.

4.4 STARTING AND SHUTTING OFF



WARNING: FAILURE TO FOLLOW INSTRUCTIONS could result in personal injury and/or damage to unit. DO NOT attempt to start your unit at this time. Read entire Owner/Operator Manual and the Engine Manual first.

IMPORTANT: Allow unit and engine to adjust to outdoor temperatures before clearing snow. Before shut-off, run the attachment a few minutes to prevent freeze-up.

IMPORTANT: Try each control without the engine running to see how it works and what it does.

Manual Start

1. Turn discharge chute straight ahead.
2. Make sure that the traction clutch and attachment drive clutch levers are fully disengaged.
3. Push primer bulb 2 or 3 times for cold engine.

NOTE: When temperature is below -15°F (-26°C) additional priming may be needed.

4. If engine is cold, apply choke. See Engine Manual for detailed instructions.

NOTE: A warm engine requires less choking than a cold engine.

5. Set throttle to proper starting position.
6. Insert key into ignition switch and push into RUN position. DO NOT twist key after it is inserted.
7. Grasp starter handle and pull rope out slowly until it pulls harder. Let rope rewind slowly.
8. Pull rope with a rapid continuous full arm stroke. Let rope rewind slowly.

IMPORTANT: DO NOT let starter handle snap against starter.

9. Repeat steps 7 and 8 until engine starts. (If engine does not start, refer to *Troubleshooting*.)
10. Adjust choke as needed.
11. Set throttle to PART THROTTLE or SLOW position for adaptation to outside temperature or travel. Set throttle to FAST position for normal operation.

Electric Start

1. Connect extension cord to prongs on starter.

IMPORTANT: Prevent damage to unit. Know voltage of your starter and use only matching outlets.

2. Plug extension cord into 120V or 240V 3-wire, grounded outlet.
3. Turn discharge chute straight ahead.
4. Make sure that the traction clutch and attachment drive clutch levers are fully disengaged.
5. Push primer bulb 2 or 3 times for cold engine.

NOTE: When temperature is below -15°F (-26°C) additional priming may be needed.

6. Insert key into ignition switch on engine and push into RUN position. DO NOT twist key after it is inserted.
 7. If engine is cold, apply choke. A warm engine requires less choking than a cold engine. See Engine Manual for detailed instructions.
 8. Set throttle to proper starting position.
 9. Press starter button on engine until engine starts.
- IMPORTANT:** DO NOT operate starter more than 15 seconds per minute, as overheating and damage can occur. (If engine does not start, refer to *Troubleshooting*.)
10. Adjust choke as needed.
 11. Disconnect extension cord from outlet first, then starter.
 12. Set throttle to PART THROTTLE or SLOW position for travel or adaptation to outside temperature. Once achieved, set throttle to FAST position for normal operation.

Shut Off

1. Release traction drive clutch lever and allow unit to come to a complete stop.
2. Run Impeller a few minutes after use to keep impeller from freezing up.
3. Release attachment clutch lever and wait for all moving parts to come to a complete stop.
4. Move throttle to STOP position.
5. Remove key.

4.5 FUEL TANK

To add fuel to the fuel tank:

1. ALWAYS place unit in open or well-ventilated area.
2. Stop engine and allow to cool.
3. Clean fuel cap and surrounding area to prevent dirt from entering fuel tank.
4. Remove cap.

IMPORTANT: DO NOT use gasohol or gasoline containing alcohol. See Engine Manual for correct type and grade of fuel.

5. Fill fuel tank to within 1/2 in. (1.2 cm) below bottom of filler neck with unleaded gasoline.

NOTE: Tank capacity is 2.0 (1.96) for 939001 or 939002, 3.0 (2.8) for 939300.

6. Replace fuel cap and tighten.

7. ALWAYS clean up any spilled fuel.



WARNING: POTENTIAL HAZARD! Fuel is extremely flammable and highly explosive. Personal injury and property damage may result if not handled properly.

- Fill the fuel tank outdoors in an open area.
- Do not fill when the engine is hot. Wipe up any fuel spills.
- Never fill the fuel tank completely full. Empty space in tank allows fuel to expand.
- Never smoke when handling fuel. Stay away from open flames. Fuel fumes can be ignited by sparks.

4.6 PRE-START

Frozen Impeller

IMPORTANT: Before starting engine, check impeller to be sure it is not frozen.

To check impeller:

1. With key in STOP position, squeeze attachment clutch lever to engaged position.
2. Pull recoil starter handle. If you cannot pull handle, impeller is frozen.
3. If impeller is frozen, move unit to a heated area and thaw to prevent possible damage.

4.7 MAINTENANCE SCHEDULE

The chart below shows the recommended maintenance schedule that should be performed on a regular basis. More frequent service may be required.

Service Performed	Each Use	Every 5 hr	Every 25 hr	Yearly
Check Fasteners	•			
Check Clutch Operation	•			
Check Clutch Spring Adjustments		*	•	
Clean Engine	•			
Check Engine Oil		•		
Change Engine Oil		**	•	
Check Tire Pressure			•	
Check Auger Gear Case			•	•
General Lubrication			•	•

* After first five hours of operation.

** After first two hours of operation.

Check Fasteners

Make sure all hardware is tightened properly.

Check Clutch Operation

Auger and impeller must stop within 3 seconds when attachment clutch/impeller brake lever is released.

Wheels must stop quickly when traction drive clutch lever is released.

If clutches do not engage or disengage properly, adjust or repair before operation (see "Attachment Clutch/Brake Adjustment" on page 18 or "Traction Drive Clutch Adjustment" on page 19).

Check Clutch Spring Adjustment

Make sure the attachment clutch and traction drive clutch are adjusted to the range specified in "Attachment Clutch/Brake Adjustment" on page 18 or "Traction Drive Clutch Adjustment" on page 19

Clean Engine

Refer to Engine Manual for detailed instructions.

Check Engine Oil

Check engine crankcase oil every 5 hours of operation. Oil level **MUST** be maintained in safe operating range on dipstick at all times or engine damage will result (See Engine Manual).

Park unit on a level surface. Refer to Engine Manual for detailed instructions.

Change Engine Oil

Change oil after first 2 hours of operation; thereafter, change oil every 25 hours (more often if required). Refer to Engine Manual for detailed instructions.

Run engine a few minutes just before changing oil. Warm oil will flow more freely and carry away more contamination. Place a suitable container under the oil drain plug. Remove the oil drain plug from the rear of the unit and tip the unit back to help drain all the oil.

Check Tire Pressure

Keep tires at pressure listed on the tire sidewall.

Check Auger Gear Case

IMPORTANT: Proper oil level must be maintained.

Gear cases are filled to the correct level at the factory. Unless there is evidence of leakage, no additional lubricant should be required. Check oil level each season or every 25 hours of operation.

To ensure adequate lubricant level:

1. Remove filler plug (Figure 5). Lubricant must be at least up to bottom of lubricant filler hole with unit resting on a level-surface.
2. Add lubricant if required. Allow oil to drain to level of plug and replace plug.

IMPORTANT: Use only Ariens special gear lubricant L-2 (Part Number 00008000). Gear case filler plug may require an application of Loc-Tite® 565 thread sealant with repeated servicing.

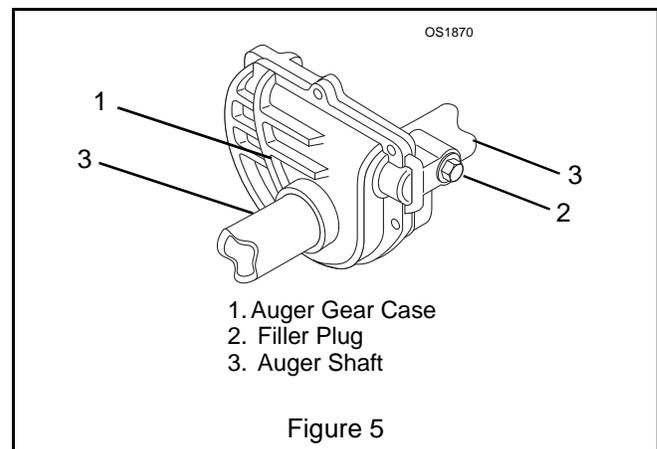


Figure 5

General Lubrication

IMPORTANT: Wipe each fitting clean before and after lubrication. Do not wipe gear case filler plug; wiping the gear case filler plug may remove thread sealant and cause leaks.

IMPORTANT: DO NOT allow grease or oil to get on the belts.

NOTE: Apply Ariens Hi-Temp Grease or equivalent to the lubrication fittings. See "Service Parts List" on page 32.

Lubricate Sno-Thro at the beginning of the season or every 25 operating hours, whichever comes first.

Auger Shaft

To grease auger shaft, remove shear bolt nuts and shear bolts. Apply grease at the grease zerks and then rotate the auger shaft. Replace shear bolts per instructions in "Shear Bolts" on page 17.

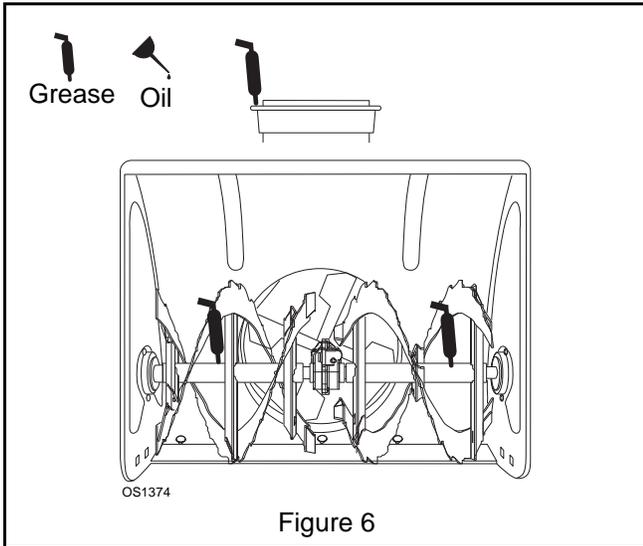


Figure 6

4.8 ATTACHMENT DRIVE BELT REPLACEMENT

Remove Attachment Drive Belt

(Figures 7 and 8)

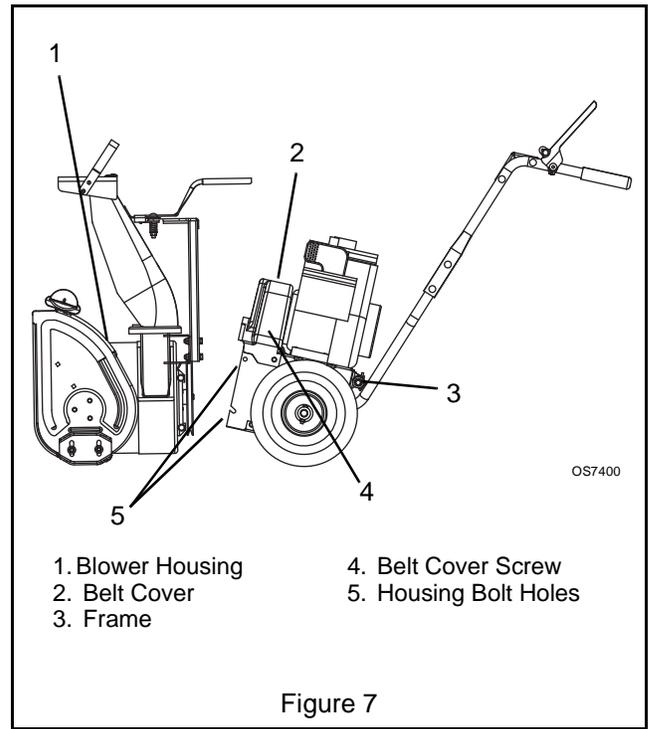
1. Shut off engine, remove key, disconnect spark plug wire and allow unit to cool completely.
2. Remove two screws securing belt cover to unit and remove belt cover.
3. Remove belt fingers by removing cap screws mounting belt fingers to engine (Figure 8).



CAUTION: Always support Sno-Thro frame and housing when loosening the cap screws holding them together. Never loosen cap screws while unit is in service position.

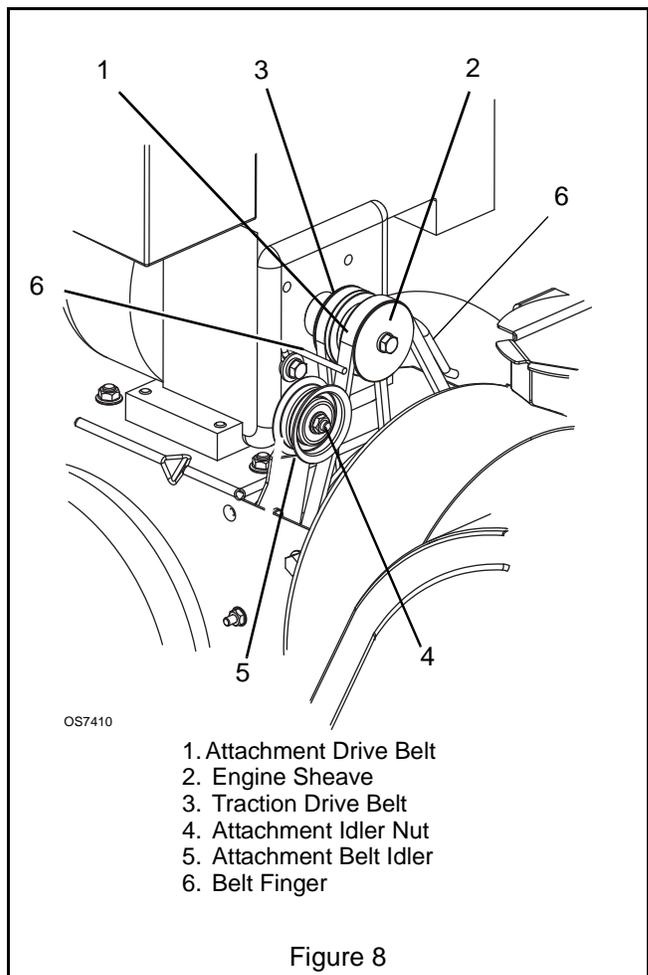
IMPORTANT: To avoid bending bottom cover, remove the cover before separating the blower housing from the unit.

4. Support Sno-Thro frame and housing.
5. Remove top two cap screws and loosen lower two cap screws holding blower housing to frame (one on each side).
6. Remove attachment drive belt from engine sheave (it may be necessary to turn engine sheave using recoil starter handle).
7. Separate housing from unit. Lower handlebar to floor.
8. Remove attachment drive belt from lower pulley.



- | | |
|-------------------|-----------------------|
| 1. Blower Housing | 4. Belt Cover Screw |
| 2. Belt Cover | 5. Housing Bolt Holes |
| 3. Frame | |

Figure 7



- | |
|--------------------------|
| 1. Attachment Drive Belt |
| 2. Engine Sheave |
| 3. Traction Drive Belt |
| 4. Attachment Idler Nut |
| 5. Attachment Belt Idler |
| 6. Belt Finger |

Figure 8

Replace Attachment Drive Belt

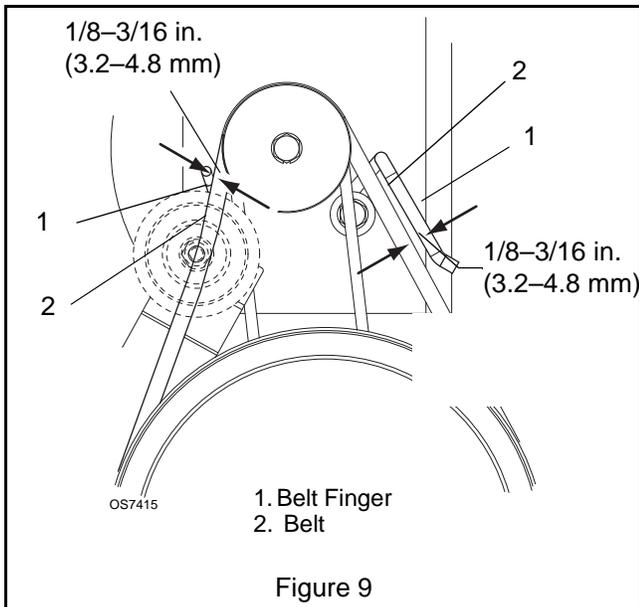
1. Place new belt onto lower pulley.
2. While holding brake out of way, tip unit together.

NOTE: Engage attachment clutch lever while connecting housing to frame to hold brake out of the way.

3. Attach blower housing to frame with cap screws removed in step 5 of “Remove Attachment Drive Belt” on page 15.
4. Place belt onto engine sheave.
5. Replace belt fingers.

IMPORTANT: BELT FINGERS MUST BE SET as shown in Figure 9. Improper adjustment may cause impeller to rotate while attachment clutch is disengaged.

6. Adjust clutch per instructions under “Attachment Clutch/Brake Adjustment” on page 18.
7. Replace belt cover and secure with cap screws.



4.9 TRACTION DRIVE BELT REPLACEMENT

NOTE: Housing and frame must be tipped apart and attachment drive belt removed from engine sheave in order to change traction drive belt (Figure 7).



CAUTION: Always support Sno-Thro frame and blower housing when loosening the cap screws holding them together. Never loosen cap screws while unit is in service position.

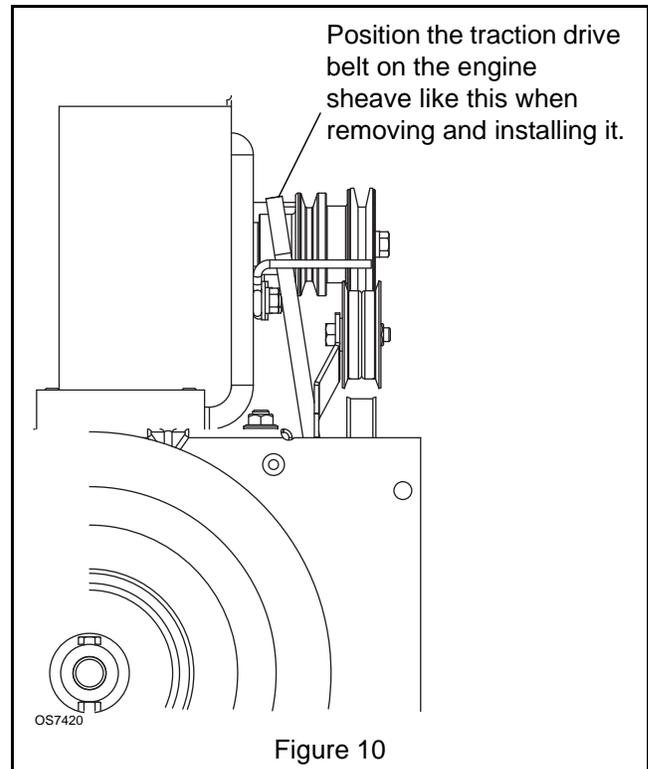
1. Shut off engine, remove key, disconnect spark plug wire and allow unit to cool completely.
2. Remove attachment drive belt (See “Remove Attachment Drive Belt” on page 15).
3. Push the traction drive belt off the engine pulley toward the engine as shown in Figure 10.

NOTE: To make belt removal easier, slowly pull the recoil starter while pushing the traction drive belt off the engine pulley.

4. Remove traction drive belt from the unit and discard.
5. Place new traction drive belt on engine pulley between the engine and pulley groove as shown in Figure 10.
6. Place new traction drive belt on transmission pulley
7. Push the new traction drive belt onto the grooves in the engine pulley.

NOTE: Slowly pull the recoil starter while pushing the traction drive belt onto the engine pulley. Make sure the belt seats properly in the grooves of the transmission and engine pulleys.

8. Replace attachment drive belt (See “Traction Drive Belt Replacement” on page 16).
9. Check traction drive clutch adjustment. See “Traction Drive Clutch Adjustment” on page 19.



4.10 SHEAR BOLTS

IMPORTANT: Use only Ariens shear bolts for replacement. Use of any other type of shear bolt may result in severe damage to unit.

Occasionally a foreign object entering the blower housing may jam the auger and break the shear bolts (Figure 11) that secure the auger to the shaft. Breaking the shear bolts prevents damage to the gear drive by allowing the auger to turn freely on the shaft.

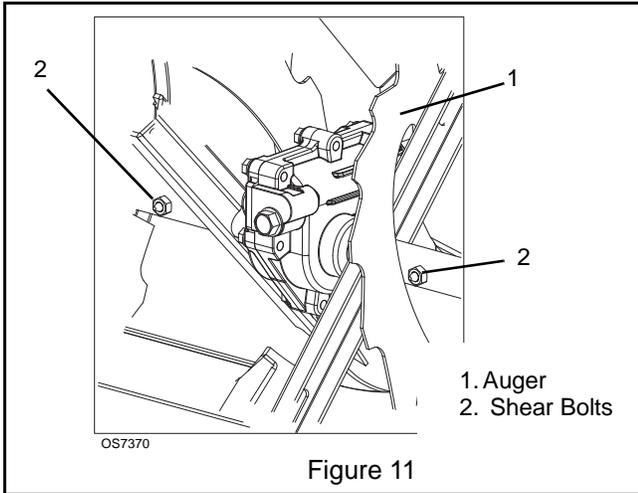


Figure 11

Shear Bolt Replacement

1. Align shear bolt holes in auger with shear bolt holes in shaft.
2. Drive shear bolt through hole. (If shear bolt was broken, this will drive remaining part from shaft.)
3. Secure shear bolt with nut.

NOTE: DO NOT overtighten the shear bolt. Tighten shear bolt to 5.8 – 12.2 lbf-ft (7.9 – 16.5 N•m).

4.11 TIRE PRESSURE

Keep tires inflated to pressure listed on the tire sidewall.

SECTION 5 - SERVICE AND ADJUSTMENTS

5.1 DISCHARGE CHUTE DEFLECTOR

The deflector must stay in selected position while throwing snow.

To adjust, loosen then retighten hardware to desired deflector drag force (Figure 12).

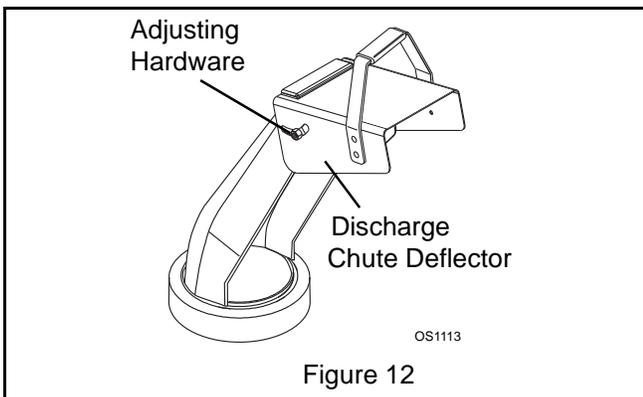
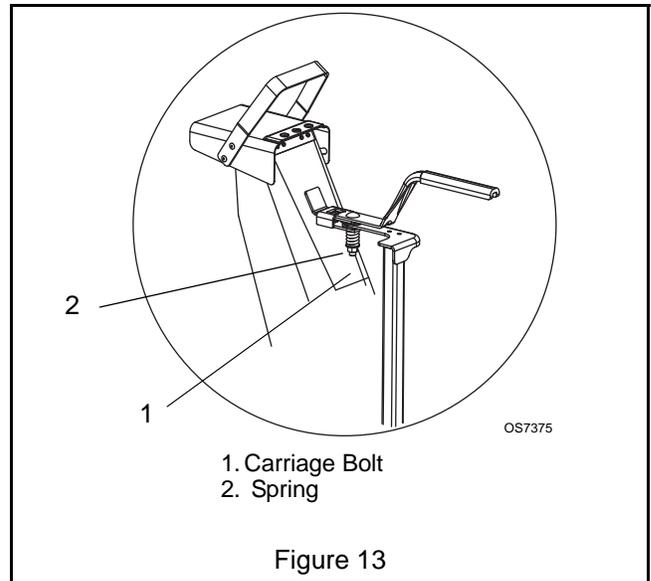


Figure 12

5.2 DISCHARGE CHUTE

If chute does not stay in position while operating, tighten nut on carriage bolt at pivot point to increase tension on spring (Figure 13).



1. Carriage Bolt
2. Spring

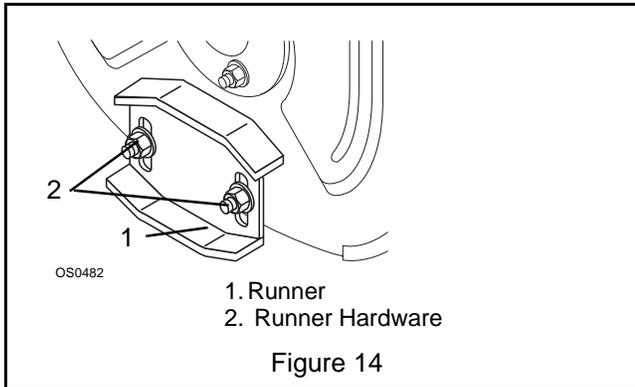
Figure 13

5.3 RUNNERS

Runners should be adjusted as conditions require (Figure 14).

1. Position unit on a hard, flat, smooth level surface.
2. Adjust runners by inserting a spacer of desired thickness under center of scraper blade, loosen runner hardware, slide runners to flat surface. Allow 1/8 in. (3 mm) between scraper blade and hard smooth surfaces. Allow 1-1/4 in. (30 mm) between scraper blade and uneven or gravel surfaces. Retighten hardware.

NOTE: Keep housing level by adjusting runners equally.



5.4 ATTACHMENT CLUTCH/BRAKE ADJUSTMENT

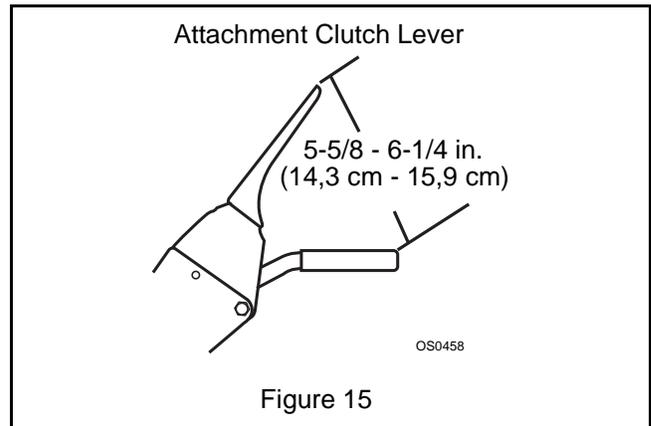


WARNING: IMPROPER ADJUSTMENT could result in unexpected movement of auger and impeller, causing death or serious injury. AUGER / IMPELLER MUST STOP within 3 seconds when Attachment Clutch/ Impeller Brake Lever is released.



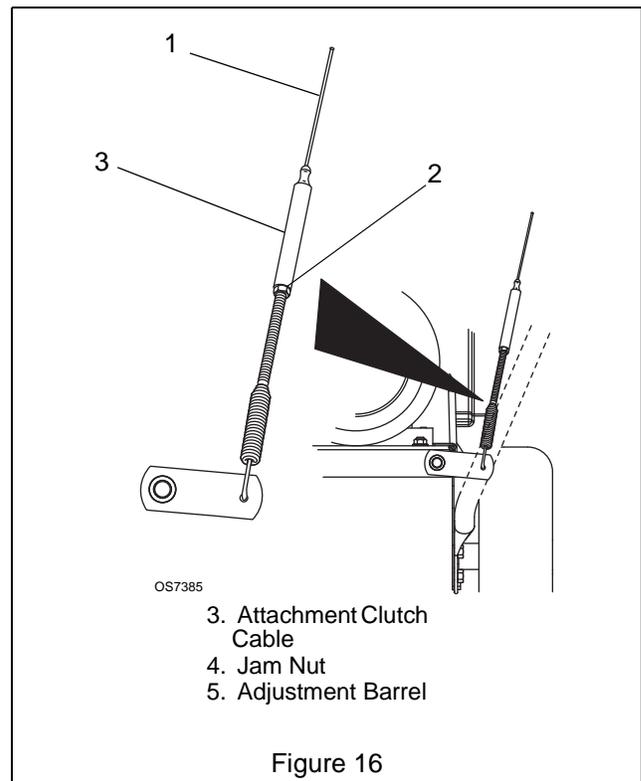
WARNING: Adjustment procedure requires running engine with the belt cover off. AVOID INJURY. Read and understand the entire *Safety* section before proceeding.

1. Check attachment clutch lever measurement:
 - a. Start engine and run at full throttle.
 - b. Slowly squeeze the attachment clutch lever until auger shaft begins to rotate.
 - c. Measure the distance from the end of clutch lever to the handlebar as shown in Figure 15. The distance between the end of the clutch lever and the handlebar should be 5-5/8 - 6-1/4 in. (14.3 - 15.9 cm).
 - d. Shut off engine.
 - e. If clutch lever measurement is within specified range, no adjustment is necessary. If clutch lever measurement is outside the specified range, follow steps 2 - 7.



CAUTION: The attachment clutch cable must be slightly slack when the clutch lever is disengaged. The attachment brake will not function properly if the cable is too taut.

2. Loosen jam nut on attachment clutch cable adjustment barrel (Figure 16).
Turn adjustment barrel up the cable to decrease the distance between clutch lever and handlebar.
Turn the adjustment barrel down the cable to increase the distance between clutch lever and handlebar.



3. Check attachment clutch lever measurement and tighten the jam nut on the attachment clutch cable adjustment barrel when the clutch lever measurement is in range. Proceed to step 6.
If clutch cannot be adjusted to specified range with the cable adjustment alone, perform steps 4 - 5.

4. Remove two screws securing belt cover to unit and remove belt cover.
5. Adjust the attachment idler position.
 - a. Loosen attachment idler nut (Figure 8).
 - b. To increase distance between clutch lever and handlebar, move the idler towards the attachment belt.
 - c. To decrease the distance between the clutch lever and handlebar, move the idler away from the attachment belt.
 - d. Tighten idler adjustment nut.
 - e. Check clutch lever measurement.

6. Check Brake

When the clutch lever is disengaged, the brake must contact the attachment belt.

When the clutch lever is engaged, the brake must be more than 1/16 in. (1.6 mm) away from the belt and must not contact the frame (Figure 17).

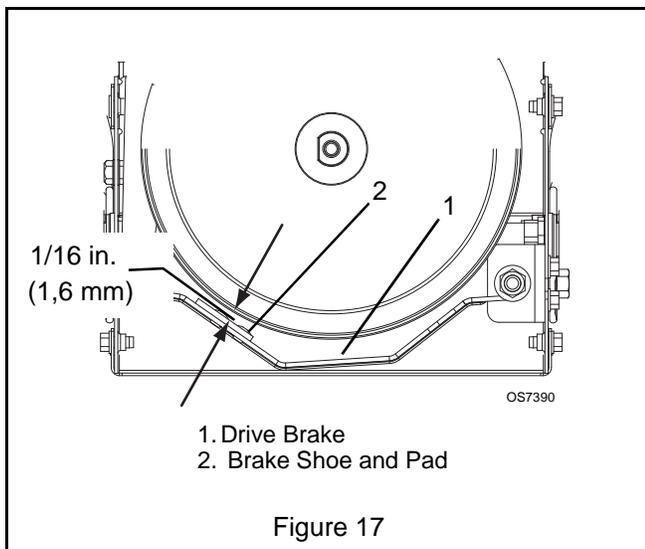


Figure 17

7. Repeat steps 5 – 6 until attachment clutch lever distance and brake contact are correct.

IMPORTANT: If attachment clutch/brake cannot be adjusted within tolerances, see your Dealer for repairs.

8. Check belt finger clearance.

With clutch lever engaged, belt fingers should be positioned as shown in Figure 9. Adjust belt fingers as necessary.

9. Replace belt cover.

10. Check that auger/impeller stops within 3 seconds after attachment clutch/impeller brake lever is released.

5.5 TRACTION DRIVE CLUTCH ADJUSTMENT

IMPORTANT: Operating the unit with the traction drive clutch improperly adjusted will damage the transmission. Make sure the clutch is adjusted to the specifications listed.

To test traction clutch (Figure 18):

1. Without engine running, push unit forward while slowly moving the traction drive clutch lever toward the handlebar.
2. Measure distance between lever and handlebar when the wheels begin to brake. If distance is not 6-1/8 – 6-3/4 in. (15.5 – 17.1 cm), adjust the traction clutch.

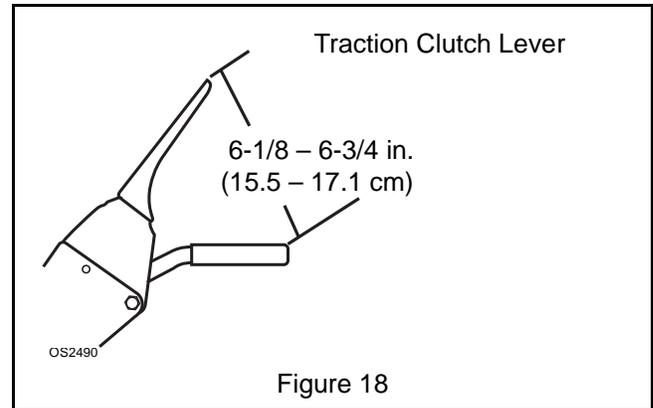


Figure 18

To adjust traction clutch (Figure 19):

1. Loosen jam nut on traction clutch cable adjustment barrel.

Turn adjustment barrel up the cable to decrease the distance between clutch lever and handlebar.

Turn the adjustment barrel down the cable to increase the distance between clutch lever and handlebar.
2. Check traction clutch lever distance and repeat adjustment steps if necessary.
3. Tighten jam nut on traction cable adjustment barrel.

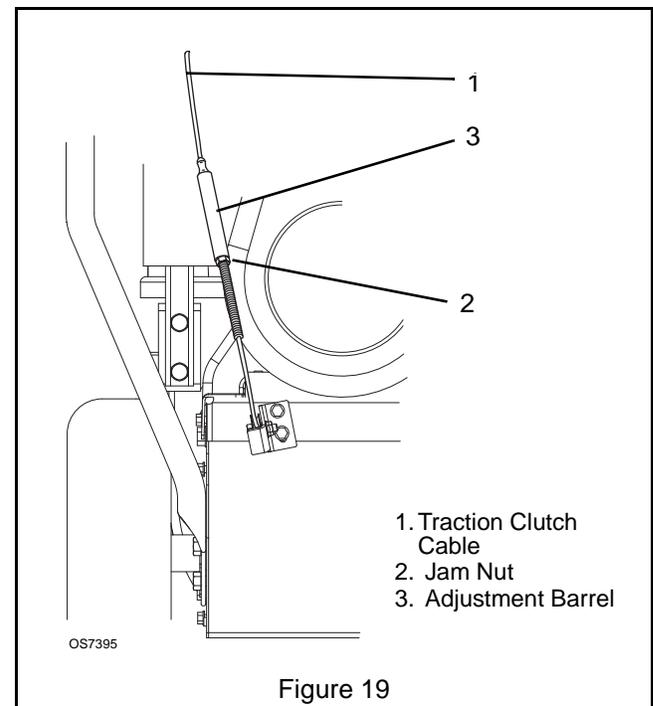
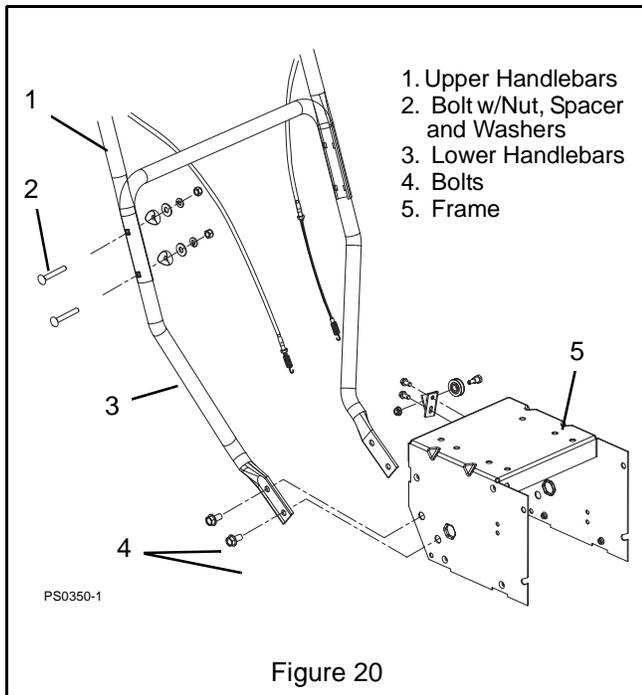


Figure 19

SECTION 6 - HANDLEBARS & CONTROLS

6.1 INSPECT LOWER HANDLEBAR

1. Remove bolts attaching lower handlebar to each side of frame (2 places, each side) (see Figure 20).
2. Remove handlebar assembly.
3. Check lower handlebar parts for wear or replacement
4. Assemble, using reverse procedure.



6.2 REPLACE LOWER HANDLEBAR

Figure 20

1. Remove locking nuts, lock washers, washers, and spacers from bolt attaching upper handlebars to lower handlebars (2 places, each side).
2. Lay upper handlebars and control panel on bench or ground.

NOTE: Removing control cables is not necessary to replace lower handlebars.

3. Remove bolts attaching lower handlebar to each side of frame (2 places, each side).
4. Remove lower handlebar.
5. Install new lower handlebar using reverse procedure.
6. Attach upper handlebars to lower handlebars.

6.3 TRACTION DRIVE CLUTCH LEVER AND CABLE

Clutch Lever

Figure 21

1. Remove jam nut and flat washer from bolt.
2. Remove bushings and torsion spring.
3. Remove retaining ring and traction cable
4. Remove clutch lever.
5. Check parts for wear or replacement.
6. Assemble, using reverse procedure. Attach cable to bolt during assembly.
7. Adjust clutch lever position if necessary (see "Traction Drive Clutch Adjustment" on page 19).

Traction Drive

Figure 21

1. Remove clutch lever from upper handlebar (See preceding Clutch Lever for procedure.)
2. Slide cable off bolt.
3. Disconnect cable spring from control under frame.
4. Check cable for wear. Replace if necessary
5. Assemble, using reverse procedure.

NOTE: BE sure to route cable over small pulley mounted to frame

6. Adjust clutch lever position if necessary (see "Traction Drive Clutch Adjustment" on page 19).

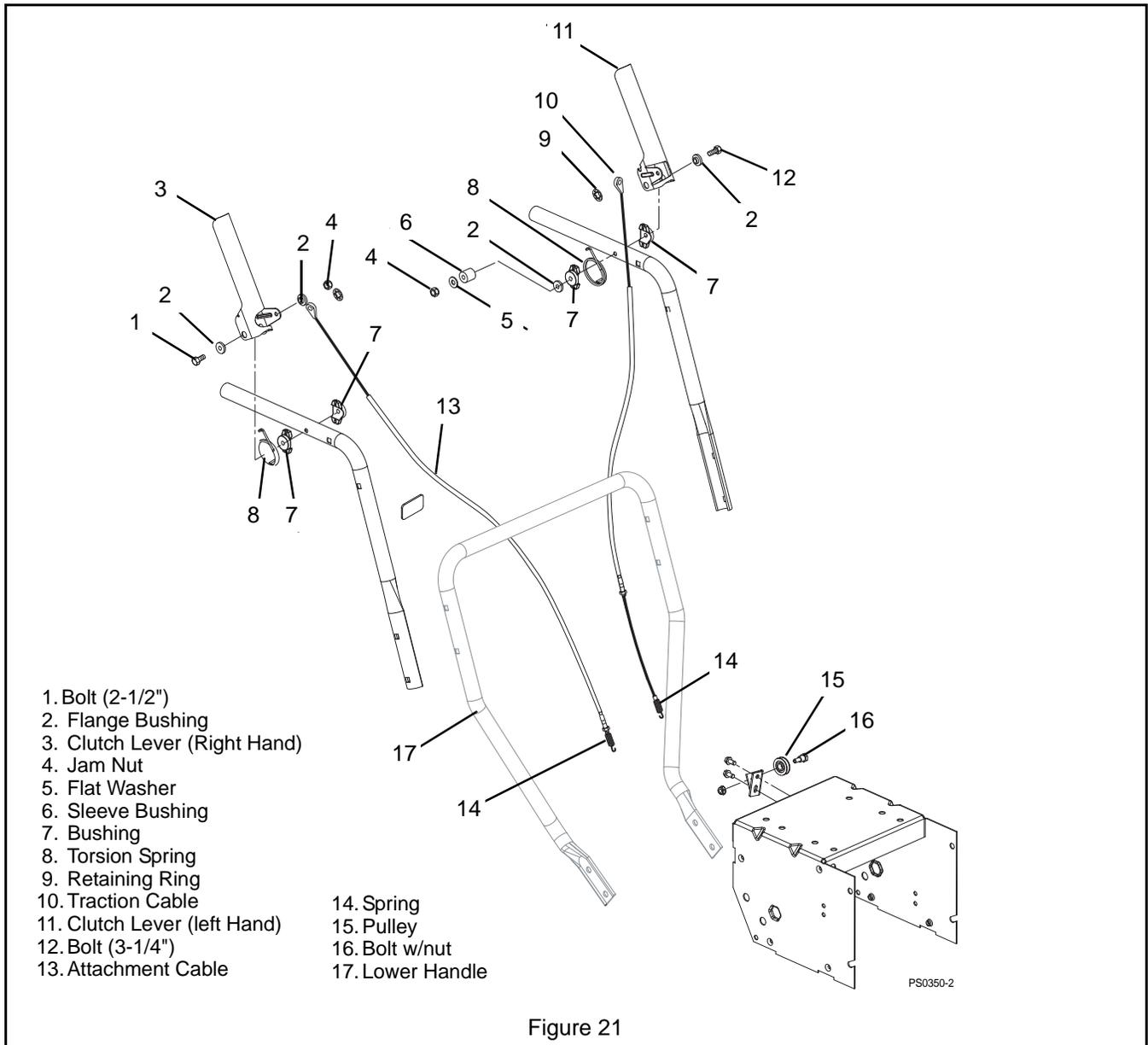


Figure 21

6.4 ATTACHMENT CONTROL LEVER AND CABLE

Attachment Lever

Figure 21

1. Remove jam nut and flat washer from bolt.
2. Remove bushings and torsion spring.
3. Remove retaining ring and traction cable
4. Remove clutch lever.
5. Assemble, using reverse procedure. Attach cable to bolt during assembly.
6. Adjust clutch lever position if necessary (see "Attachment Clutch/Brake Adjustment" on page 18).

Attachment Cable

Figure 21

1. Remove clutch lever from upper handlebars (See preceding Attachment Lever for procedure.)
2. Slide cable off bolt.
3. Disconnect cable spring from control under frame.
4. Check parts for wear or replacement.
5. Assemble, using reverse procedure.
6. Adjust clutch lever position if necessary (see "Attachment Clutch/Brake Adjustment" on page 18).

SECTION 7 - ENGINE

7.1 ENGINE TROUBLESHOOTING

The following troubleshooting chart is to be used to isolate engine problems and give possible causes and corrective action responses.

The troubleshooting key is generic and can be used for several types of engines. Use only those possible causes and corrective actions that apply to the unit.

ENGINE TROUBLESHOOTING		
PROBLEM	PROBABLE CAUSE	CORRECTION
Black Exhaust	Restriction in air cleaner	Remove obstruction
	Poor compression	Repair per instructions in manufacturer's manual
	Incorrect grade of fuel	Use fuel recommended in manufacturer's manual
	Leaking cylinder head gasket	Replace per instructions in manufacturer's manual
	Sticking valves	Repair per instructions in manufacturer's manual
	Worn cylinder bores	Repair per instructions in manufacturer's manual
	Pitted valves and seats	Repair per instructions in manufacturer's manual
Blue/White Exhaust	Broken, worn, or sticking piston rings	Repair per instructions in manufacturer's manual
	Incorrect grade of lubricating oil	Use oil recommended in manufacturer's manual
	Poor compression	Repair per instructions in manufacturer's manual
	Leaking cylinder head gasket	Replace per instructions in manufacturer's manual
	Worn cylinder bores	Repair per instructions in manufacturer's manual
	Worn valve stem guides	Repair per instructions in manufacturer's manual
Difficult Starting	Broken, worn, or sticking piston rings	Repair per instructions in manufacturer's manual
	Restriction in air cleaner	Remove obstruction
	Low cranking speed	Check connections to electric start (if applicable)
	Controls not in correct operating position	Reset controls
	Blocked fuel feed line	Remove obstruction
	Choked fuel filter	Clean or replace filter
	Poor compression	Repair per instructions in manufacturer's manual
	Blocked fuel tank vent	Remove obstruction
	Incorrect grade of fuel	Use fuel recommended in manufacturer's manual
	Sticking valves	Repair per instructions in manufacturer's manual
	Worn cylinder bores	Repair per instructions in manufacturer's manual
	Pitted valve stems and seats	Repair per instructions in manufacturer's manual
Erratic Running	Broken, worn, or sticking piston rings	Repair per instructions in manufacturer's manual
	Restriction in air cleaner	Remove obstruction
	Controls not in correct operating position	Reset controls
	Blocked fuel feed line	Remove obstruction
	Choked fuel filter	Clean or replace filter
	Poor compression	Repair per instructions in manufacturer's manual
	Blocked fuel tank vent	Remove obstruction
	Sticking throttle/restricted movement	Lubricate or replace
	Overheating	Allow to cool; determine cause
	Sticking valves	Repair per instructions in manufacturer's manual
	Broken, worn, or sticking piston rings	Repair per instructions in manufacturer's manual
	Broken valve spring	Repair per instructions in manufacturer's manual
Bad spark plugs	Install new spark plugs	

ENGINE TROUBLESHOOTING		
PROBLEM	PROBABLE CAUSE	CORRECTION
Excessive Fuel Consumption	Restriction in air cleaner	Remove obstruction
	Poor compression	Repair per instructions in manufacturer's manual
	Incorrect grade of fuel	Use fuel recommended in manufacturer's manual
	Sticking throttle/restricted movement	Lubricate or replace
	Leaking cylinder head gasket	Repair per instructions in manufacturer's manual
	Worn oil pump	Repair per instructions in manufacturer's manual
	Worn cylinder bores	Repair per instructions in manufacturer's manual
	Pitted valve stems and seats	Repair per instructions in manufacturer's manual
High Oil Pressure	Broken, worn, or sticking piston rings	Repair per instructions in manufacturer's manual
	Incorrect grade of lubricating oil	Use oil recommended in manufacturer's manual
High Oil Pressure	Pressure relief valve sticking closed	Repair or replace spring
	Knocking	Use fuel recommended in manufacturer's manual
Knocking	Overheating	Allow to cool; determine cause
	Sticking valves	Repair per instructions in manufacturer's manual
	Worn cylinder bores	Repair per instructions in manufacturer's manual
	Broken, worn, or sticking piston rings	Repair per instructions in manufacturer's manual
	Worn or damaged bearings	Repair per instructions in manufacturer's manual
	Incorrect piston height	Adjust per instructions in manufacturer's manual
	Broken valve spring	Replace per instructions in manufacturer's manual
	Loss of Power or System	Restriction in air cleaner
Blocked fuel feed line		Remove obstruction
Choked fuel filter		Remove obstruction
Poor compression		Repair per instructions in manufacturer's manual
Blocked fuel tank vent		Remove obstruction
Incorrect grade of fuel		Use fuel recommended in manufacturer's manual
Sticking throttle/restricted movement		Lubricate or replace
Leaking cylinder head gasket		Replace per instructions in manufacturer's manual
Overheating		Allow to cool; determine cause
Worn cylinder bores		Repair per instructions in manufacturer's manual
Pitted valve stems and seats		Repair per instructions in manufacturer's manual
Broken, worn, or sticking piston rings		Repair per instructions in manufacturer's manual
Low Cranking Power	Bad electrical connection	Check connections to electric start (if applicable)
	Faulty starter motor (if applicable)	Replace per instructions in manufacturer's manual
	Incorrect grade of lubricating oil	Use oil recommended in manufacturer's manual
Low Oil Pressure	Incorrect grade of lubricating oil	Use oil recommended in manufacturer's manual
	Worn or damaged bearings	Replace per instructions in manufacturer's manual
	Insufficient oil in sump	Refill with oil
	Oil pump worn	Replace per instructions in manufacturer's manual
Misfiring	Choked fuel filter	Remove obstruction
	Poor compression	Repair per instructions in manufacturer's manual
	Leaking cylinder head gasket	Replace per instructions in manufacturer's manual
	Overheating	Allow to cool; determine cause
	Incorrect tappet adjustment	Adjust per instructions in manufacturer's manual
	Sticking valves	Repair per instructions in manufacturer's manual
	Pitted valves and seats	Repair per instructions in manufacturer's manual
Overheating	Restriction in air cleaner	Remove obstruction
	Incorrect valve timing	Adjust per instructions in manufacturer's manual
	Leaking cylinder head gasket	Replace per instructions in manufacturer's manual

ENGINE TROUBLESHOOTING		
PROBLEM	PROBABLE CAUSE	CORRECTION
Poor Compression	Leaking cylinder head gasket Incorrect tappet adjustment Sticking valves Worn cylinder bores Pitted valves and seats Broken, worn, or sticking piston ring(s) Worn valve stems and guides Broken valve spring	Replace per instructions in manufacturer's manual Adjust per instructions in manufacturer's manual Repair per instructions in manufacturer's manual Replace per instructions in manufacturer's manual
Starts and Stops	Restriction in air cleaner Fuel tank empty Choked fuel filter Bad spark plugs	Remove obstruction Fill tank Remove obstruction Replace spark plugs; see manufacturer's manual for recommendations
Vibration	Poor compression Sticking throttle/restricted movement Leaking cylinder head gasket Overheating Sticking valves Broken, worn, or sticking piston rings Incorrectly aligned flywheel and/or flywheel housing	Repair per instructions in manufacturer's manual Lubricate or replace Replace per instructions in manufacturer's manual Allow to cool; determine cause Repair per instructions in manufacturer's manual Repair per instructions in manufacturer's manual Adjust per instructions in manufacturer's manual
Will Not Crank	Bad electrical connection	Check connections to electric start (if applicable)
Will Not Start	Restriction in air cleaner Choked fuel filter Bad spark plugs	Remove obstruction Remove obstruction Replace spark plugs; see manufacturer's manual for recommendations

7.2 ENGINE REMOVAL

Figure 22



CAUTION: Remove fuel from fuel tank before removing engine.

1. Drain gasoline.
2. Separate blower housing from frame (see Figure 7).
3. Block frame front and back so it will not tip.
4. Remove belt cover.
5. Remove attachment belt and drive belt from the engine pulleys. For instructions, see "Attachment Drive Belt Replacement" on page 15 and "Traction Drive Belt Replacement" on page 16.
6. Remove bolt, lock washer, and flat washer securing pulleys to engine shaft.
7. Loosen and slide pulleys off engine shaft.
8. If the unit has a bracket at the top of the engine for chute/deflector controls, unbolt it.
9. If the unit is equipped with electric starting, remove the starter.

10. Remove the four mounting bolts from the engine base.

11. Lift engine from mounting base and set to side.

7.3 ENGINE INSTALLATION

Figure 22

1. Block frame so it will not tip.
2. Position engine in frame.
3. Insert mounting bolts and tighten.
4. If equipped with electric start, install the starter.
5. Re-attach any brackets for chute/deflector controls.
6. Install pulleys on engine shaft.
7. Install belts. For instructions, see "Attachment Drive Belt Replacement" on page 15 and "Traction Drive Belt Replacement" on page 16.
8. Adjust engine pulleys to align with attachment and drive pulleys.
9. Tighten pulleys
10. Install belt cover.
11. Connect blower housing to frame.

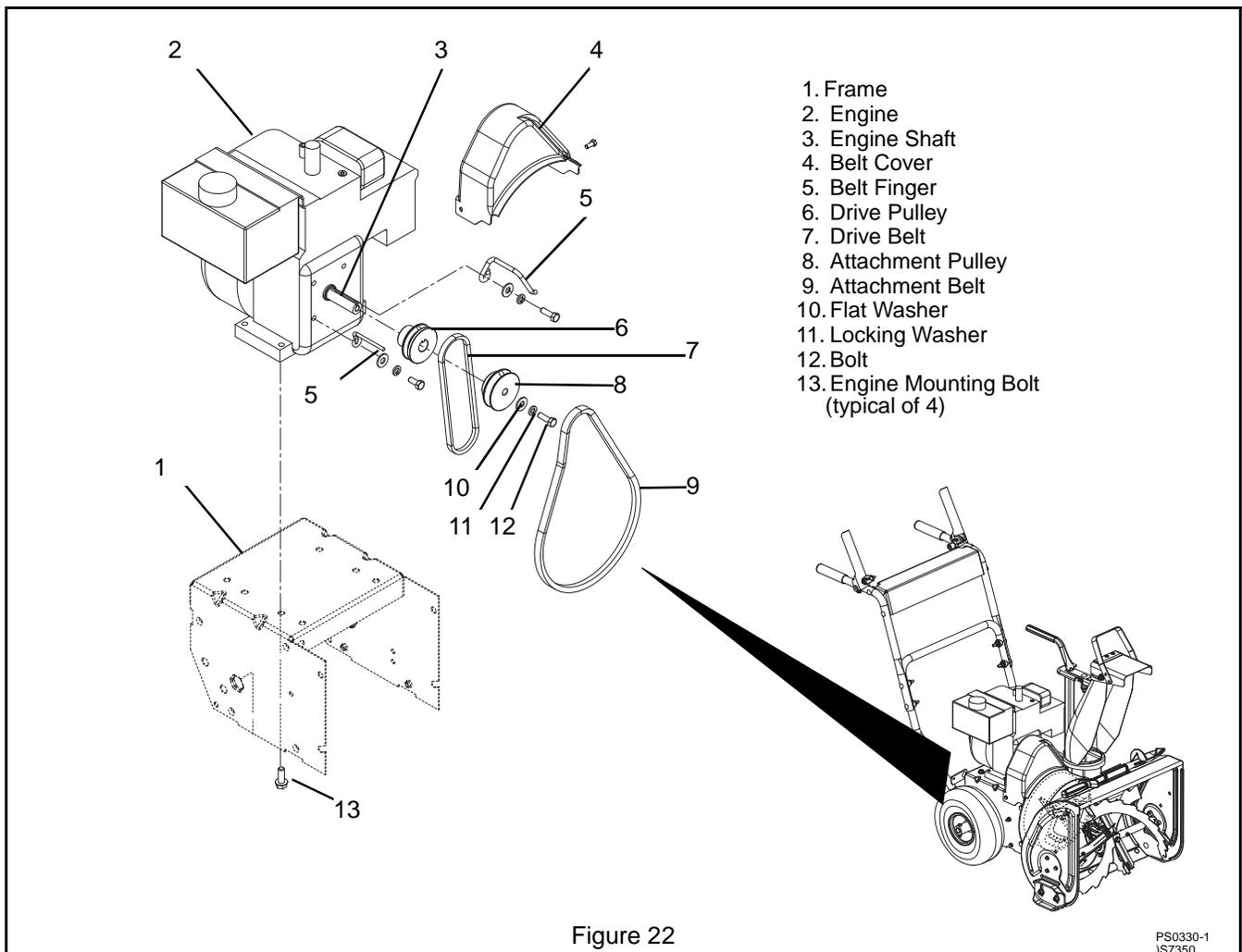


Figure 22

PS0330-1
JS7350

SECTION 8 - TRANSMISSION

The transmission has no dealer-serviceable parts. If defective, it must be replaced as a unit.

8.1 TRANSMISSION REMOVAL

Figure 23

1. Shut off engine, remove key, disconnect spark plug wire, and allow unit to cool completely.



CAUTION: Remove fuel from fuel tank before placing unit in service position.

2. Drain gasoline.
3. Place machine on a level surface, and tip up into service position (see Figure 4 on page 12).
4. Remove both wheels.
5. Remove nut and bolt holding axle gear in place.
6. Remove axle bushings. Discard if worn.
7. Remove axle
8. Remove drive belt from transmission pulley
9. Remove bolts securing transmission to frame
10. Remove transmission.

8.2 TRANSMISSION INSTALLATION

Figure 23

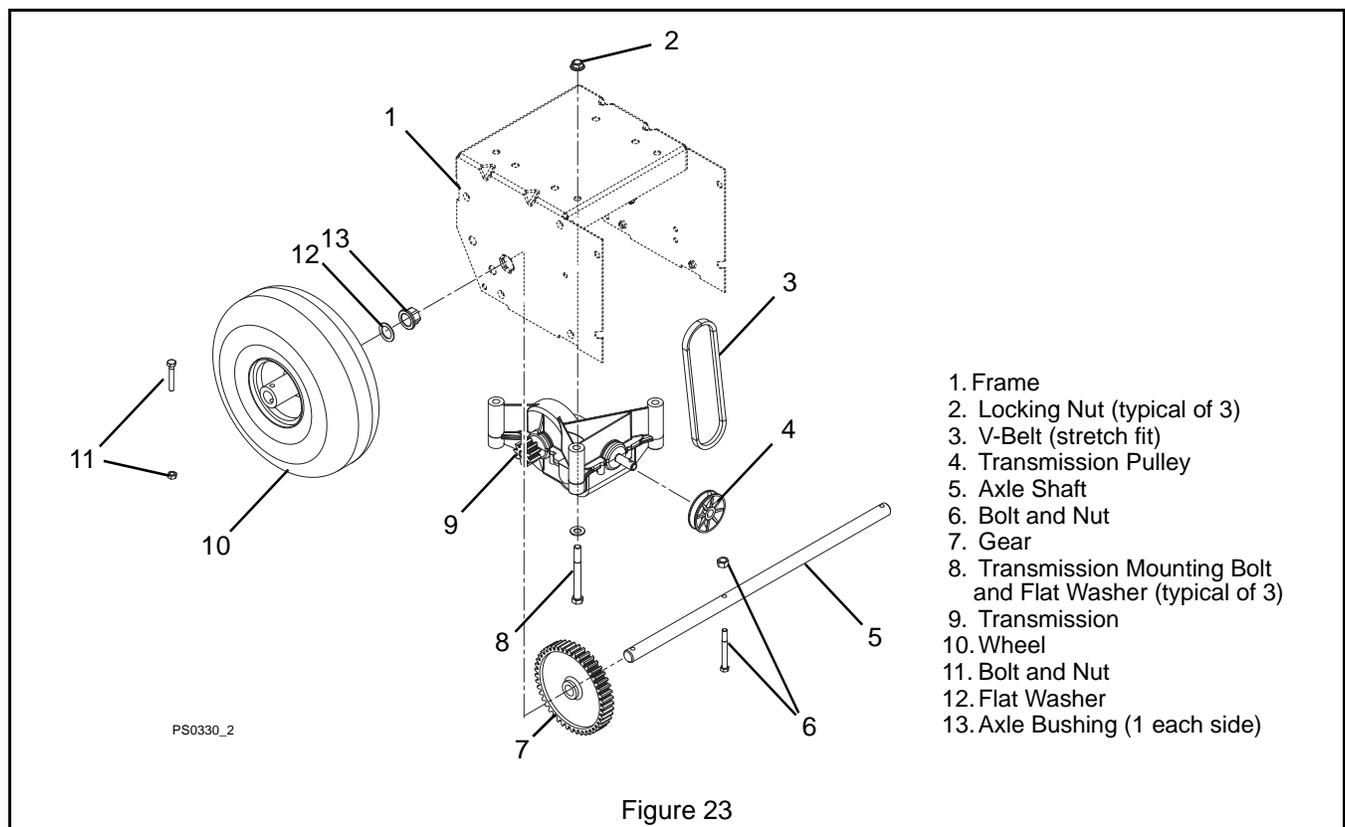
IMPORTANT: Before beginning installation, make sure that:

- Key is removed from switch.
- Spark plug is disconnected.
- Machine is cool.
- Gasoline has been drained from tank.

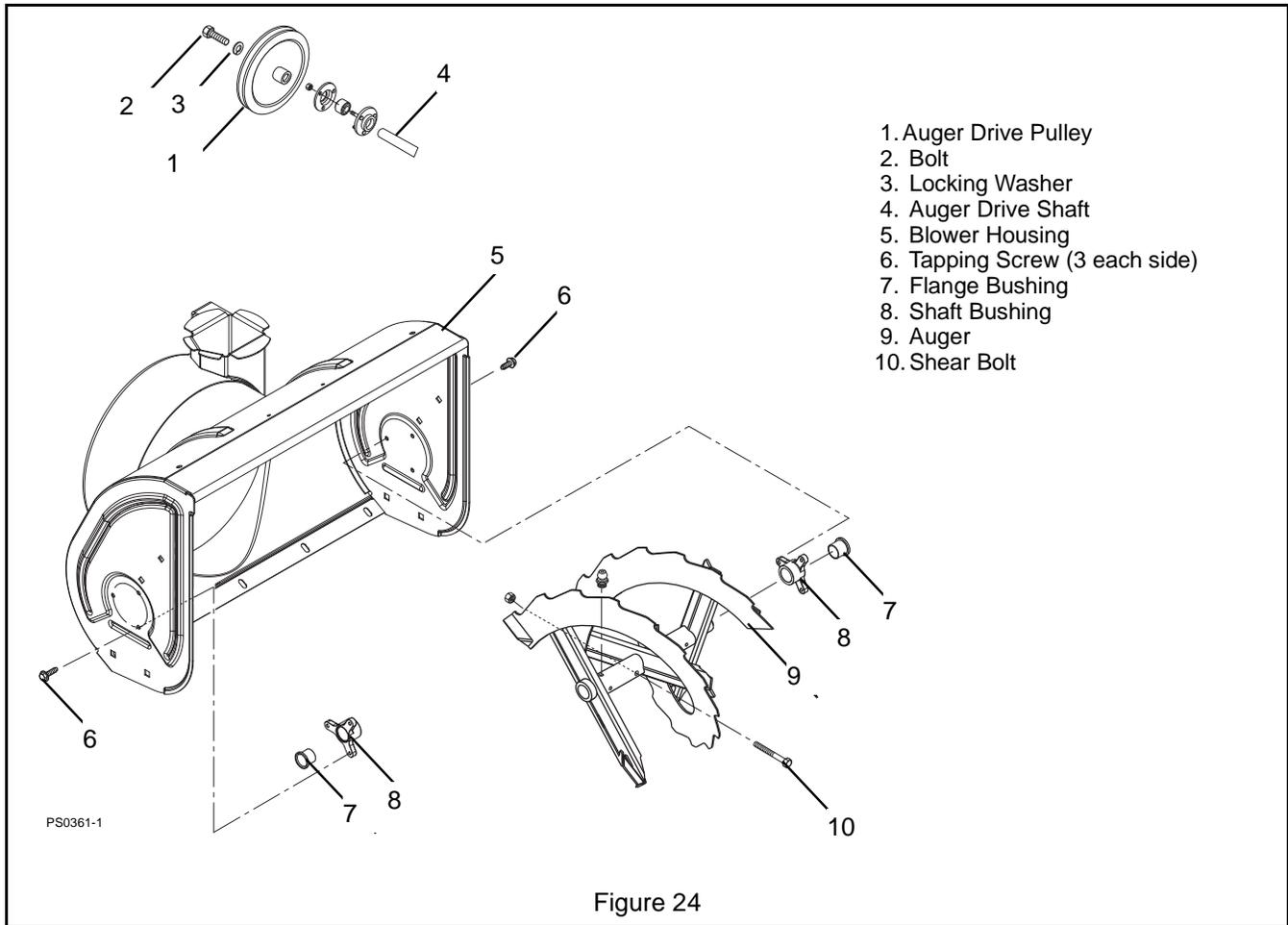
1. If necessary, place machine on a level surface, and tip up into service position (see Figure 4 on page 12).
2. Bolt transmission to frame.
3. Attach drive belt to transmission pulley.

IMPORTANT: Make sure drive belt is properly aligned with transmission pulley and engine pulley.

4. Install axle gear on axle. Do not tighten nut onto bolt.
5. If necessary, install new axle bushings.
6. Install axle.
7. Align axle gear with transmission sprocket as required.
8. Tighten nut onto bolt holding gear to axle.
9. Install wheels.



SECTION 9 - AUGER/IMPELLER



WARNING: Stop engine, remove key, wait for moving parts to stop and remove wire from spark plug before leaving operator's position and attempting to maintain or inspect auger.

9.1 AUGER/IMPELLER REPAIR

1. Place machine on a flat, level surface.

NOTE: Placing blocking under the runners on the blower housing may make auger removal easier.

2. Remove bolt holding auger drive pulley to shaft and remove pulley.
3. Remove three tapping screws holding shaft bushing to blower housing and remove flange on each side.
4. Grasp auger assembly and pull gear case and auger/impeller assembly free of housing.
5. Remove shear bolts and remove auger from shaft.
6. Check all parts for wear or replacement.
7. Assemble, using reverse procedure.

9.2 SHEAR BOLTS

IMPORTANT: Use only Ariens shear bolts for replacement. Use of any other type of shear bolt may result in severe damage to unit.

Occasionally an object may enter auger/impeller housing and jam auger, breaking shear bolts which secures auger to shaft. This prevents damage to gear drive by allowing auger to turn freely on shaft.

To replace shear bolt:

1. Slide auger outward and align hole in shaft with hole in auger (Figure 24). The holes in shaft for roll pins and shear bolts will line up.
2. Drive the new shear bolt through hole (if shear bolt was broken this will drive remaining part from shaft).
3. Secure with nut.

9.3 DISCHARGE CHUTE

Models 939001 and 939002.

Figure 25

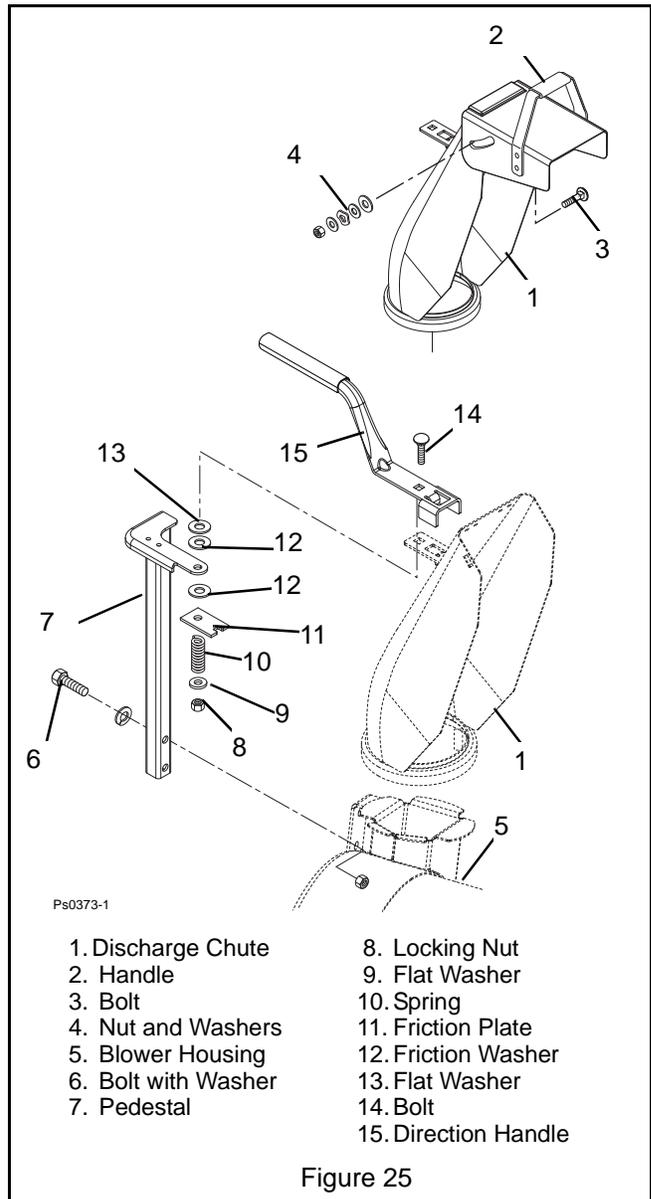


WARNING: DO NOT put hands or feet near or under rotating parts. Keep clear of discharge opening at all times.



WARNING: NEVER direct discharge of material toward bystanders nor allow anyone in front of equipment while unit is in operation. Be familiar with area of operation.

1. Remove bolts holding chute pedestal to blower housing.
2. Lift chute and pedestal from housing.
3. Check parts for wear, and replace as needed.
4. Assemble in reverse order.



9.4 DISCHARGE CHUTE CRANK

Model 939300 only or if kit 73900100, Crank Kit, is installed.

Figure 26

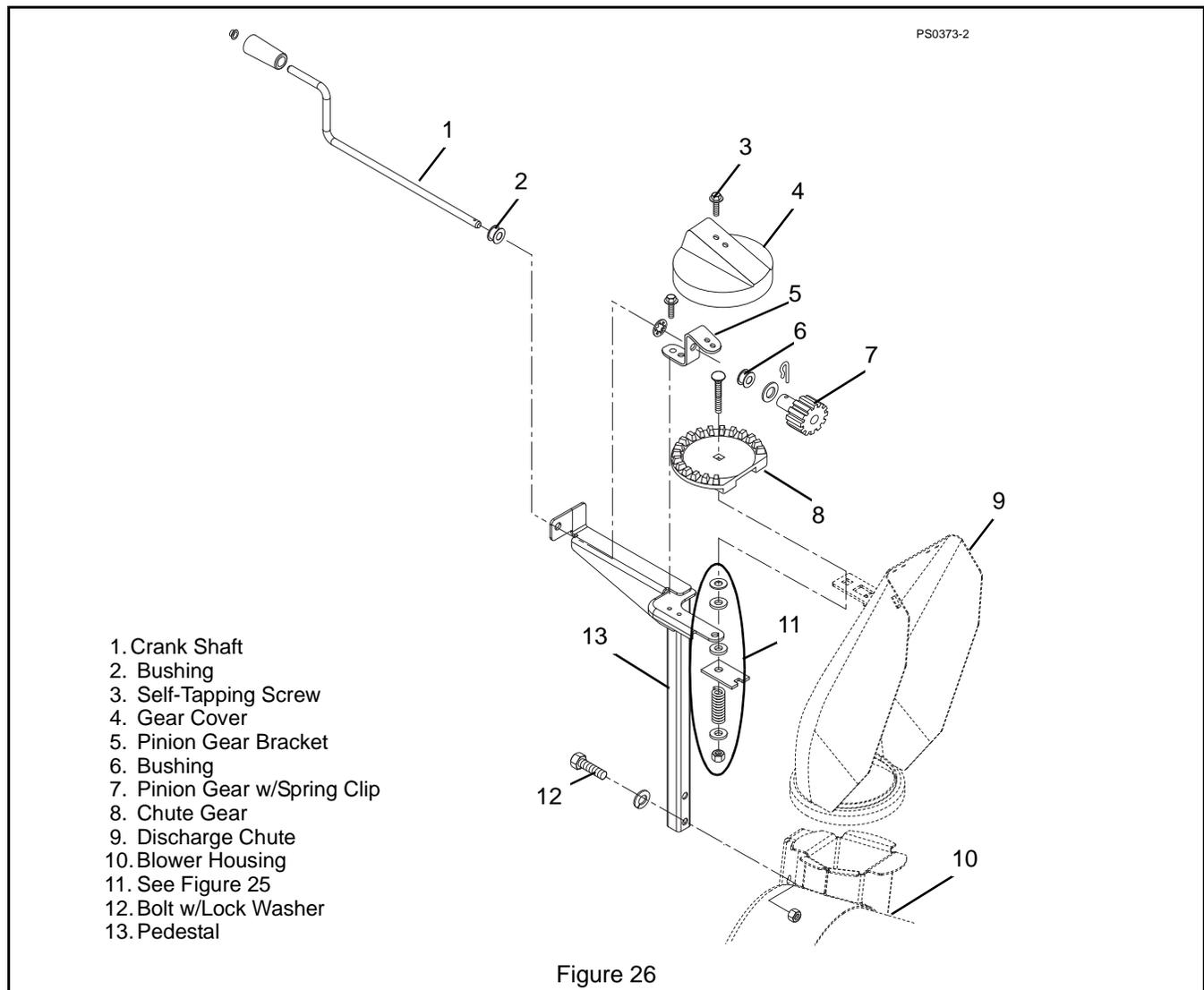


WARNING: DO NOT put hands or feet near or under rotating parts. Keep clear of discharge opening at all times.



WARNING: NEVER direct discharge of material toward bystanders nor allow anyone in front of equipment while unit is in operation. Be familiar with area of operation.

1. Remove the cover over the chute gear.
 2. Remove the spring clip from the pinion gear, and slide the gear, thrust washer, and bushing off the crank shaft.
 3. Slide the crank shaft back through the pinion gear bracket and bracket on the pedestal weldment.
 4. Remove bolts holding chute pedestal to blower housing.
 5. Lift chute and pedestal from housing.
- NOTE:** The chute gear is attached to the chute and is removed with the chute and pedestal.
6. Check parts for wear, and replace as needed.
 7. Assemble in reverse order.



9.5 RUNNER AND SCRAPER



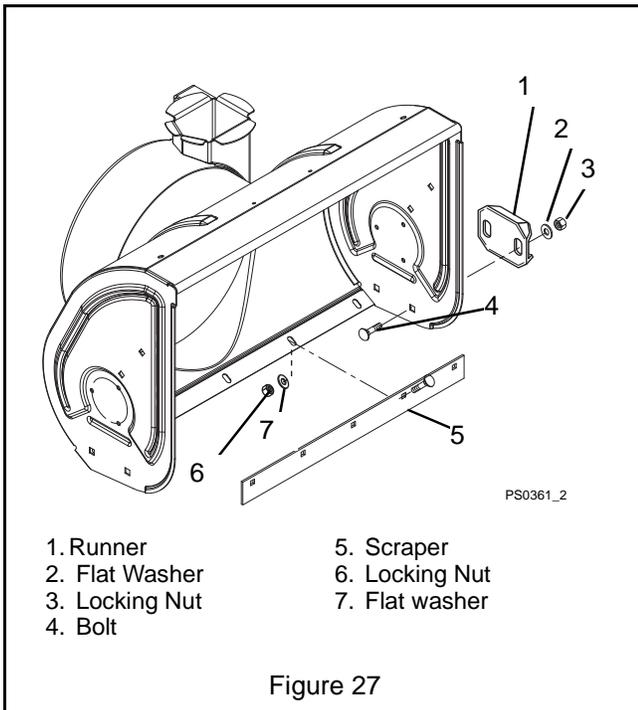
CAUTION: Adjust auger/impeller housing height to clear gravel or crushed rock surfaces.

Runners should be adjusted as conditions require (Figure 27). Raising or lowering runners controls distance scraper blade is held above surface being cleared.

When operating machine on gravel surface, lower runners so the housing will not pick up gravel. On concrete, blacktopped or packed down snow surfaces, raise runners so that scraper blade scrapes clean.

Position unit on a flat level surface. Adjust runners by inserting a spacer of desired thickness under center of scraper blade, loosen hardware, slide runners to flat surface and retighten hardware.

NOTE: Above method keeps housing level by adjusting runners equally. Uneven runners make machine difficult to steer and results in uneven clearing.



SECTION 10 - GEAR CASE

10.1 ALUMINUM GEAR CASE

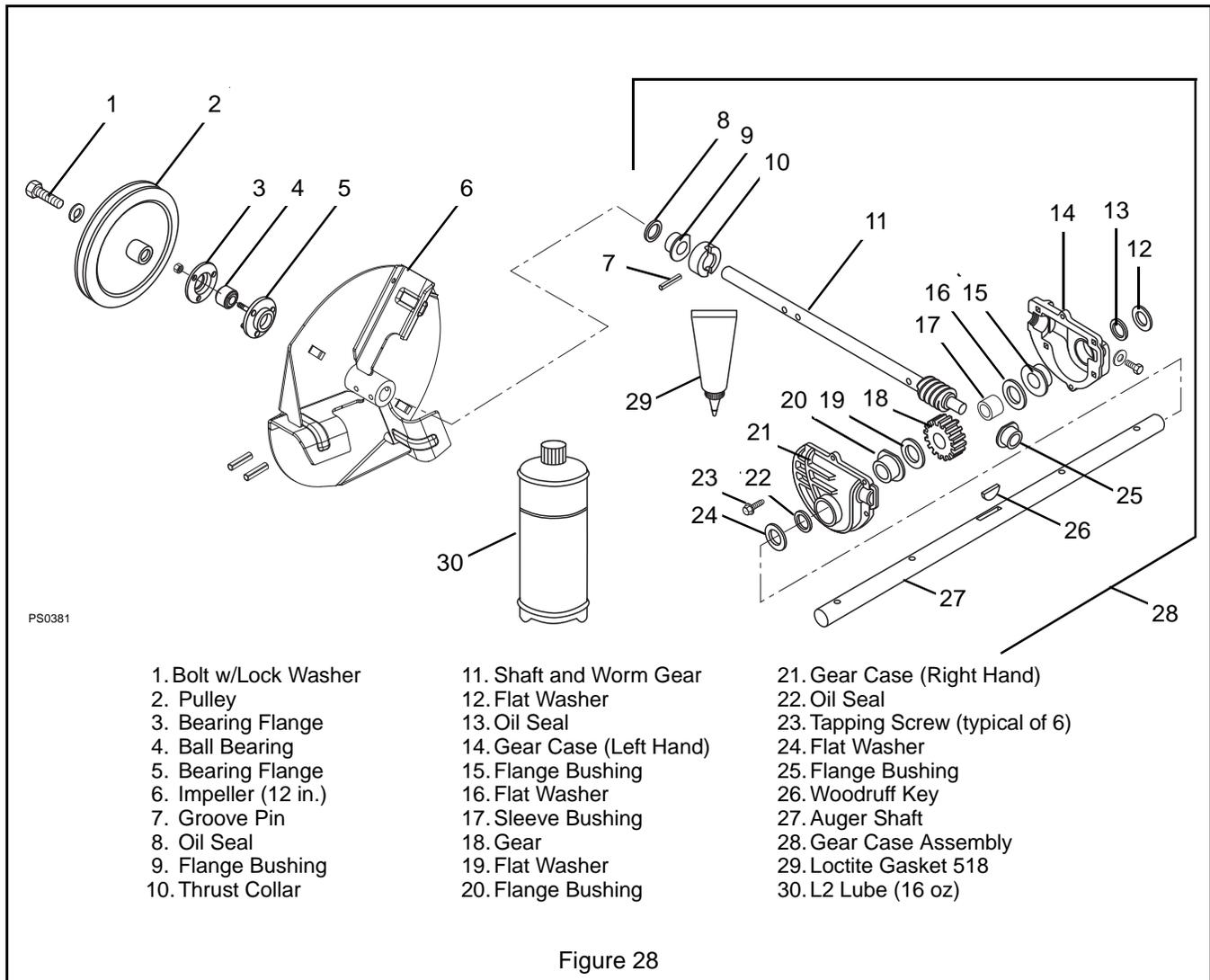


Figure 28

1. Remove auger/impeller and gear case from housing (see Auger/Impeller Repair on page 27).
2. Remove six tapping screws that hold right and left gear case halves together (Figure 28).
3. If flange bushings need replacement:
 - a. Remove oil seals from outside of gear case halves with a screwdriver.
 - b. Very lightly, press flange bushings from outside in with a bearing driver. Make sure the flat on the flange of bushing fits in the inside notch of the case.
 - c. Replace oil seals.
4. Check all internal parts for wear, and replace if necessary.

NOTE: A woodruff key holds the worm gear on rake shaft.

5. Slide bronze bushing off front of worm gear shaft. Replace if necessary. A flat on the bushing flange positions the bearing inside the gear case.
6. Replace the seal behind the rear bronze bushing. It fits into a groove in gear case.
7. Replace the rear bushing if necessary. It is a larger diameter than one in front, but it is identical in design.
8. If thrust collar needs replacing, drive out groove pin in direction of least resistance.
9. Inspect worm gear shaft for burrs or black coloration. If either show up, replace shaft.

10. Before re-assembling gear case:

- a. Clean mating surfaces of gear case.
- b. Apply Loctite gasket to cleaned surface.
- c. Allow to cure for 24 hours.
- d. Make sure the flats on the bushings are in their proper places.

11. Reassemble gear case.

After assembly is complete you should be able to turn input shaft freely.

12. Fill gear case with lubricating oil (Ariens L-2, P/N 00008000):

- a. Remove filler plug.
- b. Fill gear case with oil.
- c. With machine sitting level, check oil level. Lubricating oil should be even with filler plug hole.

NOTE: Inserting a wire into the hole may be necessary to check level. Over-lubricating will not damage the gear case.

Service Parts List

Order the following parts through your Dealer:

Part No.	Description
00036800	Ariens Hi-Temp Grease (3, 3 oz. cartridges)
21533400	Spark Plug (939001, 002)
21533500	Spark Plug (939300)
07200108	Impeller Belt
07200109	Stretch Fit Traction Belt
53200500	Shear Bolts



Ariens Company
655 West Ryan Street
P.O. Box 157
Brillion, WI 54110-0157
920-756-2141
Fax 920-756-2407
www.ariens.com