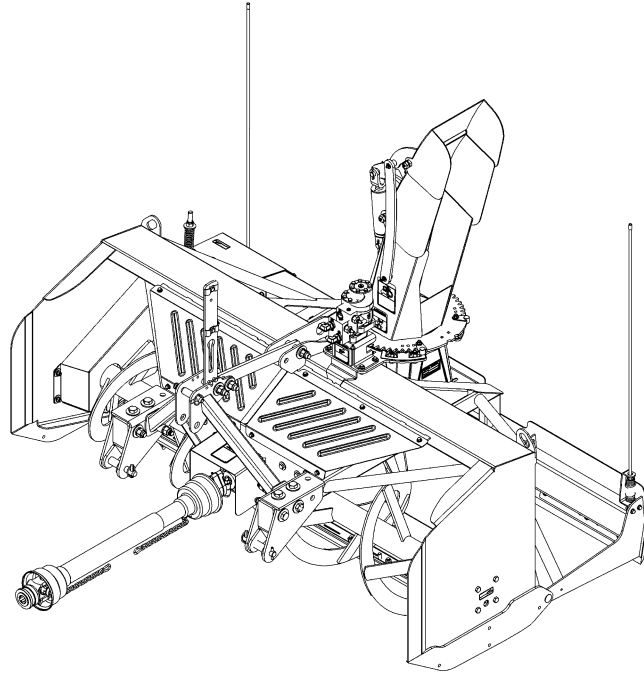


BER-VAC



OPERATORS MANUAL

**80" Commercial Inverted Snowblower –
SA80I**

**92" Commercial Inverted Snowblower –
SA92IB**

SERIAL NO 22500001 AND UP

**35 HP @ 80 HP (PTO) : SA80I
60 HP @ 100 HP (PTO) : SA92IB**

INTRODUCTION

TO THE PURCHASER

All products are designed to give safe, dependable service if they are operated and maintained according to instructions. **Read and understand this manual before operation, and keep it in your files for further reference.**

This manual has been prepared to assist the owner and operators in the safe operation and suitable maintenance of the equipment. The information is applicable to products at the time of manufacture and does not include modifications made afterwards.

Read and understand this operator's manual before attempting to put equipment into service. Familiarize yourself with the operating instructions **AND ALL THE SAFETY RECOMMENDATIONS** contained in this manual and those labeled on the equipment and on the machine. Follow the safety recommendations and make sure that those with whom you work follow them.

TO THE DEALER

Give this manual to the owner upon delivery of the equipment.

TO THE PURCHASER AND THE DEALER

Illustrations

The illustrations may not necessarily reproduce the full detail and the exact shape of the parts or depict the actual models, but are for reference only.

Direction Reference

All references to right and left, forward or rearward are from the operator seat.

To assist your dealer in handling your needs, please record hereafter the model number and serial number of your equipment and machine. It is also advisable to supply them to your insurance company. It will be helpful in the event that equipment or machine is lost or stolen

MODEL: _____

SERIAL NUMBER: _____

DATE OF PURCHASE: _____

DEALER NAME: _____

DEALER TELEPHONE NUMBER: _____

All products are designed to give safe, dependable service if they are operated and maintained according to instructions. **Read and understand this manual before operation**. It is the owner's responsibility to be certain anyone operating this product reads this manual, and all other applicable manuals, to become familiar with this equipment and all safety precautions. Failure to do so could result in serious personal injury or equipment damage. If you have any questions, consult your dealer.



SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.



DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING : Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT : Indicates that equipment or property damage could result if instructions are not followed.

NOTE : Gives helpful information.

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TABLE OF CONTENTS

INTRODUCTION.....	1
TABLE OF CONTENTS	3
SAFETY INFORMATION	5
SPECIFICATIONS.....	10
ESTIMATED ASSEMBLY TIME	13
ASSEMBLY	14
Tractor Preparation.....	14
Snowblower Assembly SA80I & SA92IB	14
Installation of the Chute	14
Adjustment of the 3-Point Hitch	16
Hydraulic Installation.....	20
Markers Installation.....	22
Installation of the Snowblower on the Tractor with Three Point Hitch	23
Installation of the Snowblower on the Tractor with Quick Hitch.....	24
FOR SA80I SNOWBLOWER	24
FOR SA92IB SNOWBLOWER	24
Preparation of the Driveline	25
Recommendations for driveline angles	25
Determining Driveline Length.....	26
Driveline Installation.....	28
Removing the Snowblower from the Tractor.....	29
With 3-point hitch.....	29
With quick hitch.....	30
OPERATION	31
General Preparation	31
Controls	31
Raising and Lowering the Snowblower.....	31
Work and Travel Speed.....	31
Engaging the Drive Mechanism.....	31
Chute Rotation.....	31
Chute Deflector.....	31
Adjustments.....	32
Markers Adjustment.....	32
Adjustment of the Rear Blade Chains.....	32
Chute Door Adjustment	32
SNOW REMOVAL METHODS.....	33

MAINTENANCE 34

 MAINTENANCE SCHEDULE..... 35

 LUBRICATION 36

 Gearbox..... 37

 Oil Change..... 37

 Adjustment of the Chain Tension..... 38

 Drum skid shoe..... 39

TROUBLESHOOTING 40

DRIVELINE TROUBLESHOOTING 41

STORAGE..... 44

PARTS 45

 INVERTED SNOWBLOWER 80"-92" - FRONT..... 45

 INVERTED SNOWBLOWER 80"-FRONT 46

 INVERTED SNOWBLOWER 92" - FRONT 48

 INVERTED SNOWBLOWER 80" - REAR 50

 INVERTED SNOWBLOWER 92" - REAR 52

 REAR BLADE - INVERTED SNOWBLOWER 80"- 92" 54

 REAR BLADE - INVERTED SNOWBLOWER 80"..... 55

 REAR BLADE - INVERTED SNOWBLOWER 92"..... 56

 CHUTE BASE - SNOWBLOWER 80" 57

 CHUTE BASE - SNOWBLOWER 92 " 57

 CHUTE WITH DEFLECTOR - SNOWBLOWER 80"-92" 58

 CHUTE WITH DEFLECTOR - INVERTED SNOWBLOWER 80" 59

 CHUTE WITH DEFLECTOR - INVERTED SNOWBLOWER 92" 59

 THREE POINT HITCH - INVERTED SNOWBLOWER 80"- 92" 60

 THREE POINT HITCH - INVERTED SNOWBLOWER 80" 61

 THREE POINT HITCH - INVERTED SNOWBLOWER 92" 61

 CHAIN IDLER - INVERTED SNOWBLOWER 80"- 92" 62

 CHAIN IDLER - INVERTED SNOWBLOWER 80"..... 63

 CHAIN IDLER - INVERTED SNOWBLOWER 92"..... 63

 HYDRAULIC ROTATION AND DEFLECTOR – INVERTED SNOWBLOWER 80"-92" 64

 GEARBOX – IDENTIFIED "662195" 66

 GEARBOX – IDENTIFIED "COMER" 67

 DRIVELINE - 662538..... 68

 DRIVELINE – M8682..... 69

 AVAILABLE OPTIONS 70

TORQUE SPECIFICATION TABLE 72

ADAPTER INSTALLATION PROCESS 73

SAFETY INFORMATION

Children

Tragic accidents can occur if the operator is not alert to the presence of children. Children are generally attracted to machines and the work being done. Never assume children will remain where you last saw them

1. Keep children out of the operating area and under the watchful eye of another responsible adult.
2. Be alert and turn machine off if children enter the work area.
3. Before and when backing, look behind for small children.
4. Never carry children while operating the machine. They may fall off and be seriously injured or interfere with the safe operation of the machine.
5. Never allow children to play on the machine or attachment even when the machine is turned off.
6. Never allow children to operate the machine even under adult supervision.
7. Use extra care when approaching blind corners, shrubs, trees, or other obstructions that might hide children from sight.

Before Operation

1. Read and understand both the machine AND implement operator's manual before using the snowblower. Know how to operate all controls and how to stop the unit and disengage the controls quickly. Lack of knowledge can lead to accidents.
2. Park the machine/implement on level ground, set the parking brake, lower the implement to the ground, place all control levers in neutral, shut off the engine and remove the ignition key and allow the rotating parts to stop BEFORE making any implement adjustments, repairs or inspections.
3. Keep clear of all rotating parts. Do not put hands or feet under, or into snowblower and subframe with engine running.

4. For your safety, do not work under any hydraulically supported machine elements, they may creep down, suddenly drop or be accidentally lowered. Do not use loader, quick hitch, or an implement as a jack for servicing.
5. Do not operate the machine/implement that is defective or has missing parts. Make sure that all recommended maintenance procedures are completed before operating the unit.
6. Keep the machine/implement clean. Snow, dirt or ice build-up can lead to malfunction or personal injury from thawing and refreezing in garage. Inspect and clean every rotating parts.
7. Do not modify or alter this implement or any of its components, or any implement function without first consulting your dealer. The manufacturer will not claim responsibility for fitment of unapproved parts and/or accessories and any damages as a result of their use.
8. Verify that all machine/implement safety protective devices are in place. Shields, guards and covers must be correctly installed at all times. When necessary to remove these for servicing, cleaning, or repair work, they must be reinstalled immediately.
9. Always make sure all implement components are properly installed and securely fastened.
10. Check that all machine/implement drivelines are in good working order.
11. Check for moving parts excessive wear regularly. ALWAYS USE GENUINE PARTS WHEN REPLACEMENT PARTS ARE REQUIRED.
12. Prior to operation, clear work area and mark all curbs, pipes, etc. that cannot be moved.
13. Inspect the machine/implement after striking any foreign object to assure that all machine/implement parts are safe and secure and not damaged.
14. Handle fuel with care, as it is highly flammable. Use approved fuel container.
15. Never add fuel to a running engine or a hot engine.
16. Fill fuel tank outdoors with extreme care. Never fill fuel tank indoors. Replace fuel cap securely and wipe up spilled fuel. Always refuel using a properly grounded system.

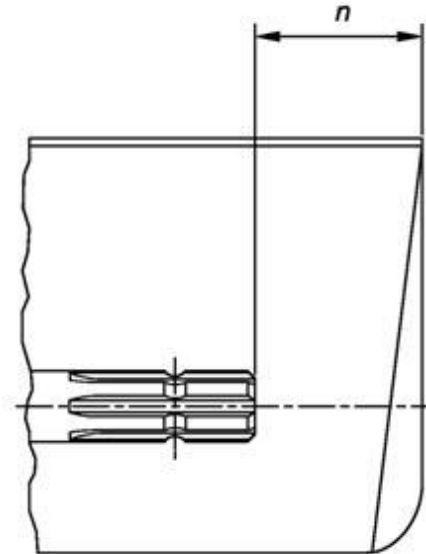
17. Check all machine controls regularly and adjust where necessary. Make sure that the brakes are evenly adjusted. Periodically check all nuts and bolts for tightness, especially wheel hub and rim nuts.
 18. Make sure the machine is counterweighted and has tire chains for better traction and stability as recommended by your dealer. Weights provide the necessary balance to improve stability, traction and steering. Use only those recommended by your dealer.
 19. Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable noises.
8. Park the machine/implement on level ground, place the transmission in neutral, set the parking brake, disengage the driving system, lower the equipment to the ground, place all levers including auxiliary control levers in neutral, shut off the engine and remove the ignition key **BEFORE LEAVING THE MACHINE.**
 9. Always drive the machine at speeds compatible with safety, especially when operating over rough ground, crossing ditches, slippery surface or when turning.
 10. Operate only with good visibility and during daylight hours, or when the area is well lit with bright artificial light.
 11. Do not run the engine indoors except when starting engine and transporting attachment in or out of building. Carbon monoxide gas is colorless, odorless and deadly.

During Operation

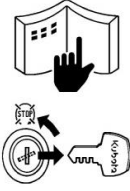













1. Never allow anyone to operate the machine and implement until they have read the manuals completely and are thoroughly familiar with their basic operation. Lack of operating knowledge can lead to accidents.
 2. Do not allow anyone to ride on the machine/implement at any time. The only one allowed is the operator that **MUST** sit in the driver seat.
 3. Never allow anyone near the work area. The debris that can be thrown could cause serious personal injuries.
 4. Never stand alongside of the implement while the engine is running.
 5. Never operate the implement without safety protective devices in place. All machine/implement shields, guards and covers must be correctly installed at all times.
 6. Keep clear of all rotating parts. Do not put hands or feet under, or into the implement with engine running.
 7. If the implement starts to vibrate abnormally, disengage the PTO, stop the engine immediately and check for cause. Excessive vibration is generally a sign of trouble.
12. Exercise extreme caution when operating on or crossing a gravel drive, walks, or roads. Stay alert for hidden hazards or traffic.
 13. Use extra caution when backing up.
 14. Operate up and down (not across) intermediate slopes. Avoid sudden starts and stops. Drive machine backwards up steeper slopes with the implement off. Then operate as you travel down the slope.
 15. Never park the machine on a steep slope. Do not attempt to operate on steep slopes. If operating on slopes is necessary, exercise extreme caution when changing direction.
 16. Disengage power to implement when transporting or when not in use
 17. Do not drive the vehicle or perform any maneuver with any accessory using a cellular phone or other electronic device or by sending a text message.


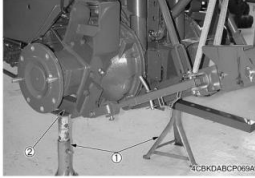



Stay Clear of Rotating Drivelines

1. Entanglement in rotating driveline can cause serious injury or death.
2. Keep tractor master shield and driveline shields in place at all times. Make sure rotating shields turn freely.
3. Wear close fitting clothing. Stop the engine and be sure that PTO driveline is stopped before making adjustments, connections, or cleaning out PTO driven equipment.
4. Do not install any adapter device between the tractor and the primary implement PTO drive shaft that will allow a 1000 rpm tractor shaft to power a 540 rpm implement at speeds higher than 540 rpm.
5. Do not install any adapter device that results in a portion of the rotating implement shaft, tractor shaft, or the adapter to be unguarded. The tractor master shield shall overlap the end of the splined shaft and the added adaptor device as outlined in the table.



PTO Type	Diameter	Splines	$n \pm 5 \text{ mm (0.20 in.)}$
1	35 mm (1.378 in.)	6	85 mm (3.35 in.)
2	35 mm (1.378 in.)	21	85 mm (3.35 in.)
3	45 mm (1.772 in.)	20	100 mm (4.00 in.)

	<p>BEFORE YOU START SERVICE</p> <ul style="list-style-type: none"> • Read all instructions and safety instructions in this manual and on your machine safety decals. • Clean the work area and machine. • Park the machine on a stable and level ground, and set the parking brake. • Lower the implement to the ground. • Stop the engine, then remove the key. • Disconnect the battery negative cable. • Hang a "DO NOT OPERATE" tag in the operator station. 		<p>No Smoking or Open Flames while Fueling</p> <ul style="list-style-type: none"> • Fuel is extremely flammable and dangerous. Never smoke near fuel. If fuel is spilled on the machine, its engine, or electrical parts, it may cause a fire. If fuel is spilled, wipe it all up immediately. • Never smoke while filling the machine with fuel. And always tighten the fuel cap securely and wipe up any spilled fuel.
	<ul style="list-style-type: none"> • When performing maintenance on the equipment, hang the DO NOT OPERATE sign where it will be obvious from and around the driver's seat. • When performing maintenance or repairs, always lower attachments to the ground, stop the engine and secure the tracks with blocks. • When performing maintenance on the equipment, always disconnect the negative battery cable. • Before using tools, make sure you understand how to use them correctly and use tools in good condition and of the right size for the job. 		<ul style="list-style-type: none"> • Before getting on/off of the machine, clean off around the steps so there is no mud on them. Always give yourself 3-point support when getting on/off the machine. <p>CAUTION</p> <ul style="list-style-type: none"> • 3-point support means using both legs and one hand or both hands and one leg as you climb up/down.
	<p>START SAFELY</p> <ul style="list-style-type: none"> • Do not do the procedures below when you start the engine. <ul style="list-style-type: none"> – short across starter terminals – bypass the safety start switch • Do not alter or remove any part of machine safety system. • Before you start the engine, make sure that all shift levers are in neutral positions or in disengaged positions. • Do not start the engine when you stay on the ground. Start the engine only from operator's seat. 		<ul style="list-style-type: none"> • Do not remove the radiator cap when the engine operates, or immediately after it stops. If not, hot water can spout out from the radiator. Only remove the radiator cap when it is at a sufficiently low temperature to touch with bare hands. Slowly loosen the cap to release the pressure before you remove it fully.
	<p>Starting the Machine Safely</p> <ul style="list-style-type: none"> • Before starting the engine, always sit in the driver's seat and make sure the area is safe and clear. • As it is dangerous, never start the engine from anywhere but the driver's seat. • Always check and make sure control lever(s) are not engaged before starting the engine. • Never start the engine by hot-wiring the starter circuit. This is not only dangerous, but may damage the machine. 		<ul style="list-style-type: none"> • The engine, muffler, radiator, hydraulic line, etc., have parts that remain very hot even after the engine has been stopped. Be sure to avoid these parts, as touching them can result in burns. Radiator coolant, hydraulic fluid and oil also remain hot. Therefore, do not attempt to remove caps and plugs, etc., before these fluids have sufficiently cooled. • Make sure the coolant temperature has dropped sufficiently before opening the radiator cap. Also, since the inside of the radiator is pressurized, when removing the cap, first loosen it to release the pressure before removing the cap completely.
	<ul style="list-style-type: none"> • Wear clothes appropriate for working on equipment. Do not wear loose-fitting clothes as they may catch on the machine controls. • When working on the equipment, use all safety gear, such as a helmet, safety glasses and shoes, that are required by law or regulation. • Never perform maintenance while drowsy or under the influence of alcohol or drugs. 		<ul style="list-style-type: none"> • Grease is under high pressure inside the hydraulic cylinder. It is very dangerous to loosen a grease nipple quickly as it may shoot off. Always loosen grease nipples slowly. • And never face a grease nipple while loosening it.
	<p>Be Ready for an Emergency</p> <ul style="list-style-type: none"> • Keep a first-aid kit and fire extinguisher close at hand so you can use it when needed. • Keep emergency contact information for doctors, hospitals and ERs handy. 		<p>PREVENT A FIRE</p> <ul style="list-style-type: none"> • Fuel is very flammable and explosive under some conditions. Do not smoke or let flames or sparks in your work area. • To prevent sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last. • The battery gas can cause an explosion. Keep the sparks and open flame away from the top of battery, especially when you charge the battery. • Make sure that you do not spill fuel on the engine.
	<p>KEEP A GOOD AIRFLOW IN THE WORK AREA</p> <ul style="list-style-type: none"> • If the engine is in operation, make sure that the area has good airflow. Do not operate the engine in a closed area. The exhaust gas contains poisonous carbon monoxide. 		<p>Dispose of Waste Fluids Properly</p> <ul style="list-style-type: none"> • Never dispose of waste fluids on the ground, in the gutter, a river, pond or lake. Always dispose of hazardous substances like waste oil, coolant and electrolytic fluid in accordance with the relevant environmental protection regulations. • Keep the safety plates clean so they can be read. If a safety plate is damaged and comes off or becomes illegible, put a plate with the same warnings back in its place.

	<ul style="list-style-type: none"> The pressure in the hydraulic circuit stays at pressure even after the engine stops. Before removing parts, such as hydraulic devices from the machine, first release the pressure. Please note that when releasing residual pressure, the machine itself and/or implements may move without warning, so be very careful when releasing the pressure. Oil gushing out under pressure is extremely dangerous as it may pierce your skin or your eyes. Similarly, oil leaking out of pinholes is not visible. So when checking for oil leaks, always wear safety glasses and gloves and use a piece of cardboard or a wood block to shield yourself from oil. 		<ul style="list-style-type: none"> When you need to access the underside of the machine for maintenance purposes, but sure to support the machine with a safety stand. Getting under the machine while supporting the machine by machine's own hydraulic cylinder or using a hydraulic jack can be extremely dangerous in the event of a hydraulic fluid leakage or similar mishap. <p>(1) Safety stand (2) Secure point for safety stand</p>
	<ul style="list-style-type: none"> Do not open a fuel system under high pressure. The fluid under high pressure that stays in fuel lines can cause serious injury. Do not disconnect or repair the fuel lines, sensors, or any other components between the fuel pump and injectors on engines with a common rail fuel system under high pressure. Put on an applicable ear protective device (earmuffs or earplugs) to prevent injury against loud noises. Be careful about electric shock. The engine generates a high voltage of more than DC100 V in the ECU and is applied to the injector. 		<ul style="list-style-type: none"> Whenever it is necessary to open the engine covers or hood in order to service the machine, always prop them open. If it is absolutely necessary to run the engine while working on the machine, make sure you are clear of all rotating or moving parts. Also take care not to leave anything, such as tools or rags, near any moving parts.
	<ul style="list-style-type: none"> Engage the loader control valve lock to prevent accidental actuation when the implement is not in use or during transport. Do not utilize the valve lock for machine maintenance or repair. Do not perform machine maintenance with loader in the air. If possible, follow loader instructions to remove loader before performing maintenance. If the machine has a backhoe, engage swing and boom locks. 		

SPECIFICATIONS

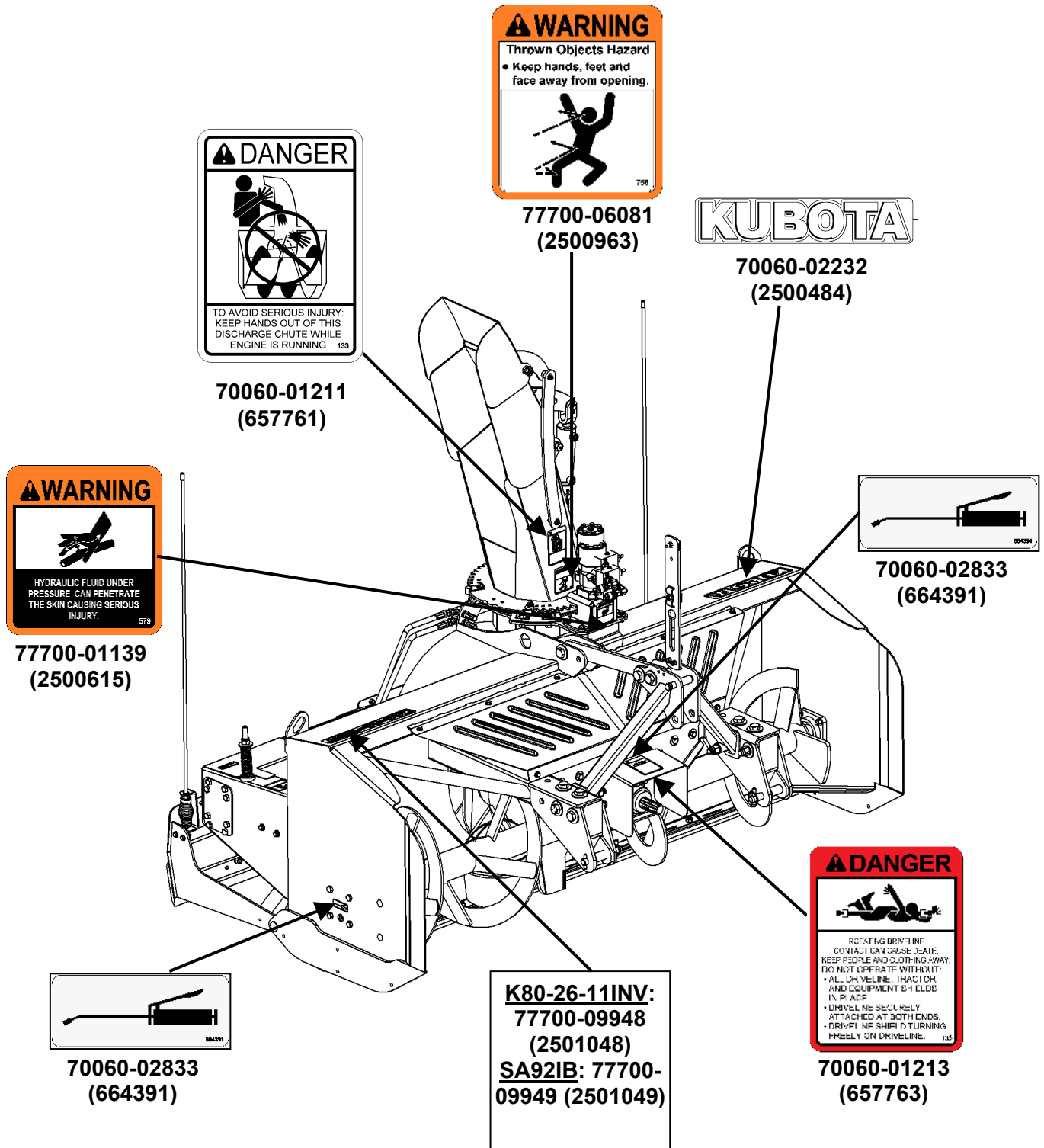
Specifications	SA80	SA92IB
General		
Type	2 stages	2 stages
Direction of impeller rotation	CW	CW
PTO power requirements	35 - 80 Hp	60 - 100 Hp
Shipping weight	1745 Lbs	2025 Lbs
Operating weight, incl. chute and rear scraper	1370 Lbs	1850 Lbs
Set-up time	100 min	100 min
Working width	80 1/2"	92 1/2"
Working height	31"	35"
Overall width	80 1/2"	92 1/2"
Overall height (without chute)	36 1/2"	40"
Overall height (with three part chute closed)	65"	76"
Overall length (with scraper blade)	54"	57 1/2"
Impeller		
Impeller diameter	26"	30"
Impeller width	11"	12"
Number of impeller blade	4	4
Impeller shaft diameter	1 9/16"	1 9/16"
Height - impeller center	16 1/4"	18"
Impeller RPM	540 R.P.M.	540 R.P.M.
Auger		
Auger - Single / dual	Single	Single
Main auger diameter	18"	20"
Auger driven system	Chain No.60H	Chain No.80
Shaft diameter	1 1/4"	1 1/2"
Second auger diameter	N/A	N/A
Second auger driven system	N/A	N/A
Auger RPM	205 R.P.M.	225 R.P.M.
Rear blade		
Adjustable rear blade	Yes	Yes
Adjustment	Chain (hydraulic in option)	Chain (hydraulic in option)
Cutting edge material	Carbon steel (other material available)	Carbon steel (other material available)
Rear corner marker	Yes	Yes
Drum		
Rotating drum	No	No
Rotation of drum	N/A	N/A
Flow restrictor	N/A	N/A
Housing		
Housing thickness	12 Ga.	11 Ga.
Side panel thickness	3/16"	1/4"
Impeller housing thickness	3/16" Hardened steel	3/16" Hardened steel
Chute		
Chute position	Right	Right
Rotation of the chute	Hydraulic by motor	Hydraulic by motor
Rotation angle	265° @ 320° adjustable	240° @ 300° adjustable
Flow restrictor (rotation)	Yes	Yes
Flow restrictor (deflector)	Yes	Yes
Hoses support	Yes	Yes
Deflector adjustment (2 part chute)	N/A	N/A
Deflector adjustment (3 part chute)	Hydraulic	Hydraulic
Cutting edge		
Replacable et reversible cutting edge	Yes	Yes
Cutting edge material	Carbon steel (other material available)	Carbon steel (other material available)
Cutting edge dimension	1/2" x 3"	1/2" x 4"
Skid shoe		
Replacable et reversible skid shoe	Optional	Optional
Skid shoe material	Tivar or Hardened steel	Tivar or Hardened steel
Drive and hitch		
Main driving system	Driveline series 60	Driveline series 60
Chain idler	Twin sprokets with compression spring	Twin sprokets with compression spring
Number of auger shearbolt	1 (on the driving shaft)	1 (on the driving shaft)
Number of impeller shearbolt	1 (on the driveline)	1 (on the driveline)
Type of hitch	3 pts, cat. 1	3 pts, cat. 2
Compatibility with quick hitch	Cat. 1	Cat. 2
Parking stand	No	No
Drum skid shoe	Yes	Yes
Splash guard	Yes	Yes

SAFETY LABELS

IMPORTANT: Keep all decals clean and legible. Replace all missing, illegible, or damaged decals.

IMPORTANT: Decal placement locations shown are approximate; decals should not be placed in a location where the operator's field of view is impeded and should not cover any portion of other decals installed in the same vicinity.

INSTALLING OR REPLACING DECALS: Thoroughly clean the area where decal is to be placed using mild soap and water. Allow the surface to fully dry. Remove the backing from the decal, exposing the adhesive surface. Apply the decal to the recommended position shown in the diagram below and smooth out any bubbles.



SAFETY LABELS

WARNING

To Prevent Serious Injury or Death:

- Read operator's manual before operating, setting up or repairing equipment. Follow all safety standards, instructions, warnings and labels on the equipment.
- Never allow riders or cry action of equipment.
- Keep bystanders away from equipment during operation.
- Operate from a secure location.
- Keep all feet as close as possible in good position.
- Disengage PTO, lower equipment to ground, set parking brake, stop engine and remove key before disconnecting trailer.
- Look for all moving parts to stop before starting to adjust, lubricate, clean or overhaul the machine.
- Never direct discharge toward bystanders.
- Never allow discharge or return of contents to contact equipment.

77700-04190
(2500869)

DANGER

AVOID INJURY FROM ROTATING GEARS:

- KEEP HANDS AND CLOTHING AWAY
- STOP ENGINE AND REMOVE IGNITION KEY BEFORE COMING NEAR ROTATING GEARS
- DO NOT ATTEMPT TO INSTALL OR REMOVE ROTATING GEARS WITHOUT READING OPERATOR'S MANUAL

70060-04325
(2500329)

WARNING

Thrown Objects Hazard

- Keep hands, feet and face away from opening.

77700-06081
(2500963)

DANGER

AVOID INJURY FROM ROTATING AUGER
KEEP HANDS, FEET AND CLOTHING AWAY

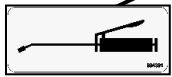
70060-01212
(657762)

77700-04101
(668611)

4

STOP ENGINE BEFORE LUBRICATING.
LUBRICATE CHAIN EVERY 4 HOURS WITH CHAIN SAW CHAIN LUBRICANT

70060-01674
(657804)



70060-02833
(664391)

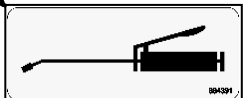
DANGER

77700-01986
(664383)

DANGER

AVOID INJURY FROM ROTATING AUGER
KEEP HANDS, FEET AND CLOTHING AWAY

70060-01212
(657762)



70060-02833
(664391)

IMPORTANT

Before using:

- Oil level must be checked
- Fill with SAE 80W90, "AGMA 5 EP" extreme pressure oil or equivalent
- Read instructions manual

70060-01040
(655683)

WARNING

PINCH POINT
AVOID INJURY FROM FRAME PIVOT AND STOPS.

- KEEP HANDS AND FEET AWAY

70060-03033
(658710)

ESTIMATED ASSEMBLY TIME

Refer to the following table for the estimated assembly time to open the package and assemble the equipment and options.

	Time
Estimated installation time, snowblower only	100 min
2nd installation time (on the tractor)	10 min
Estimated installation time of the hard cutting edge (M8650 and M8653)	25 min
Estimated installation time of the TIVAR cutting edge (M8651 and M8654)	25 min
Estimated installation time of the stainless cutting edge (M8652 and M8655)	25 min
Estimated installation time of the TIVAR skid shoes (M8656 and M8657)	10 min
Estimated installation time of the TIVAR scraper cutting edge (M8658 and M8680)	20 min
Estimated installation time of the stainless scraper cutting edge (M8659 and M8681)	20 min
Estimated installation time of the HD driveline (M8682)	25 min
Estimated installation time of the hydraulic cylinder for rear blade (M8683)	45 min
Estimated installation time of the hard skid shoes (M8684 and M8685)	10 min

The assembly times of the table are only a reference under normal conditions according to the following assumptions:

1. The assembly is done by a competent person who is familiar with the equipment.
2. The following tools and materials are prepared:
 - Wrench set (flat wrenches)
 - Ratchet & socket set
 - Grinder with cutting wheel
 - Screwdriver kit
 - Hammer
 - Long nose pliers
 - Cutting pliers
 - Security gloves

ASSEMBLY

⚠ WARNING: To avoid serious injury or death: Read and understand SAFETY INFORMATION on previous pages before installation and operation. Perform all assembly with the assembly properly secured and supported.

Tractor Preparation

See Dealer for Tractor Preparation information.

SNOWBLOWER ASSEMBLY SA80I & SA92IB

The snowblower is assembled at the factory except for the parts in the hardware bucket provided with the snowblower, the chute and the options if appropriate. Use the present manual and lay out all parts for assembly. Separate bolts and nuts into various sizes. After assembly, torque all the bolts according to the *Torque Specification Table* at the end of the manual.

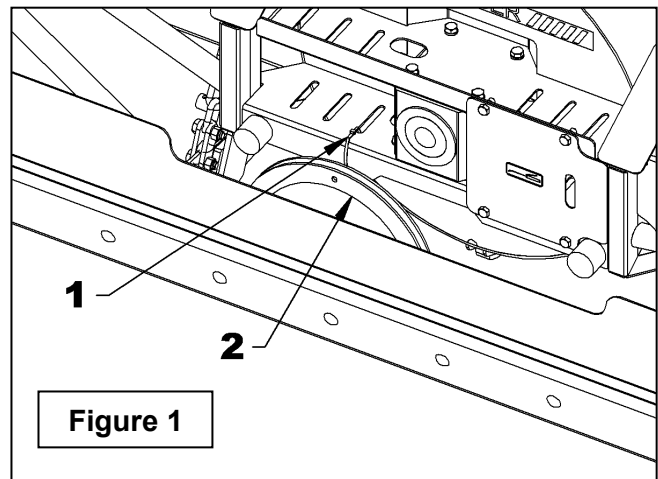
⚠ WARNING: To avoid serious personal injury or death: Park the vehicle on level ground, place the transmission in neutral, set the parking brake, place all control levers in neutral, shut off the engine, remove the ignition key and allow the rotating parts to stop BEFORE working on the vehicle.

UNPACKING: After unpacking the snowblower, replace the two cutting edge bolts used to attach the snowblower to the pallet using two 1/2"NC x 1 1/2" plow bolts and two 1/2"NC stover locknuts, included in the hardware bucket.

NOTE: The inverted snowblowers don't have any adjustable parking stand. They have a drum skid shoes located under the snowblower which prevent the equipment from tipping. However, if the snowblower is not stable enough to do the installation of the different parts, it is recommended to add some pieces of wood (or other available material) under each side of the snowblower.

Installation of the Chute

1. **Figure 1:** Cut the nylon tie wrap (item 1) and remove the two antifriction plates (item 2).



2. **Figure 2:** Install the hydraulic motor assembly (item 1) on the snowblower using four 5/16" x 1 1/4" hex bolts, eight 5/16" (3/8" hole) flat washers, four 5/16" lockwashers and four 5/16" nylon insert locknuts (items 2-3-4-5).

3. **Figure 3:** Assemble the two antifriction plates (item 1) and place them on the snowblower frame so that they are centered with the drum output. There are two cap screws which serve as a guide for positioning the anti-friction plates (item1).

4. **Figure 3:** Install the two retaining plates on motor sides (item 2) with two 1/2"NC x 1 1/2" hex bolts, 1/2" lockwashers and 1/2"NC nylon insert locknuts (items 3-4-5). Insert the chute guides (item 6) in the retaining plates (item 2).

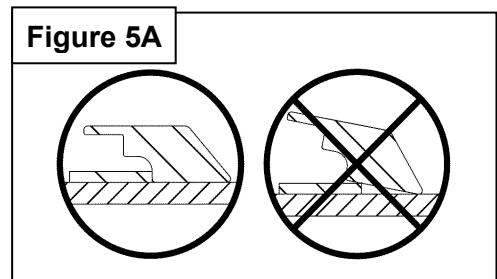
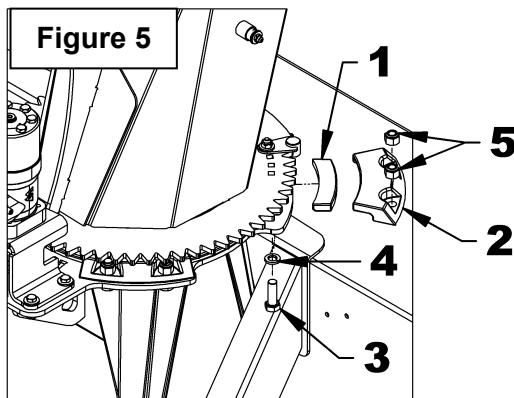
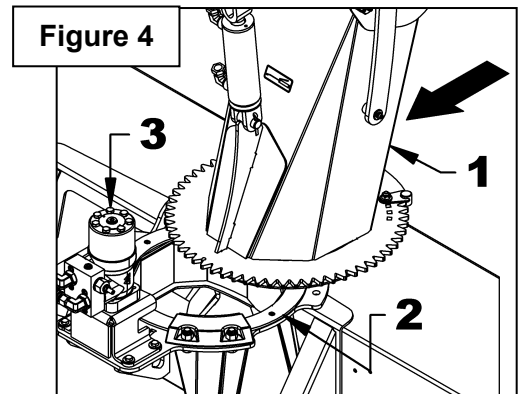
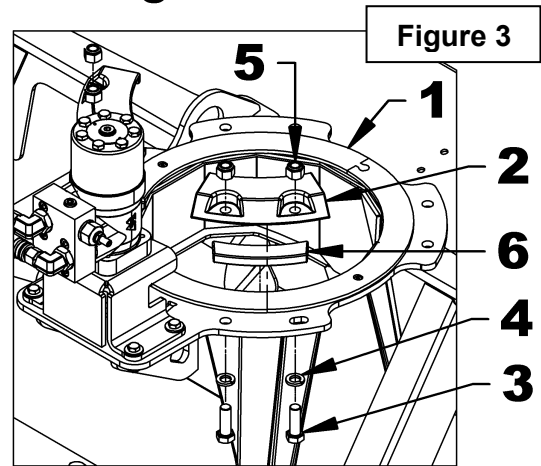
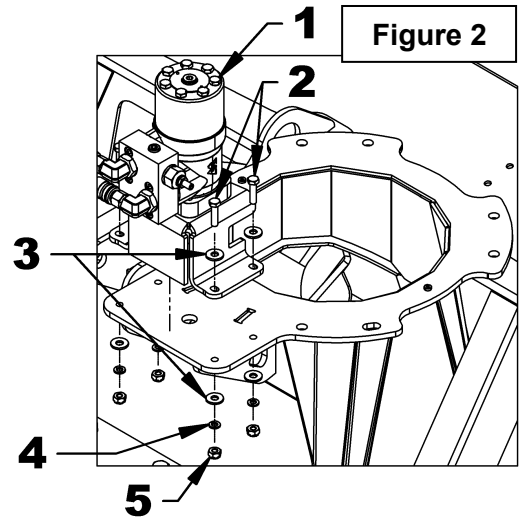
NOTE: Make sure that the chamfer of the guides (item 4) is downwards.

5. **Figure 4:** Place the chute (item 1) on the antifriction plates assembly (item 2). and push the chute toward the rotation motor (item 3). If needed, rotate the chute to properly engage the two gears together.

6. **Figure 5:** Place the other two chute guides (item 1) on the chute base. Install the two retaining plates (item 2) using two 1/2"NC x 1 1/2" hex bolts, 1/2" lockwashers, and 1/2"NC nylon insert locknuts (items 3-4-5).

7. **Figure 5A:** Make sure that the chute is always centered with the snowblower drum output during assembly of the other retainer plates. The antifriction plates (item 1, **fig.3**) must not be below the retaining plates (item 2, **fig.3**).

NOTE: Make sure the motor gear is secure by checking that the bolt that secures the gear to the motor is tightened.

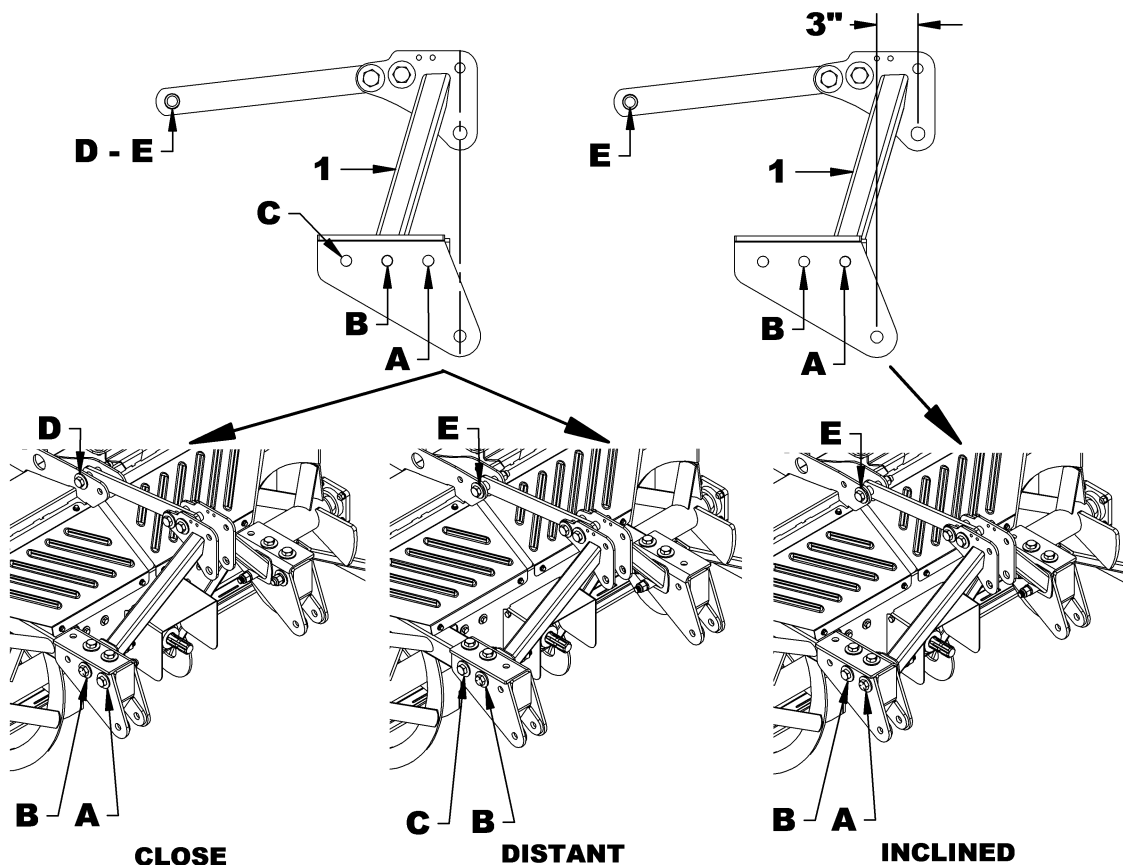


Adjustment of the 3-Point Hitch

NOTE : Do not tighten the bolts during assembly. The bolts will be tightened at the last step.

NOTE : The 3-point hitch can be installed in three positions: close to the tractor, distant from the tractor and an inclined position

- A **close** adjustment gives better maneuverability for the tractor and the snowblower but reduces the life of the driveline (positions A, B and D).
- A **distant** adjustment increases the life of the driveline, but reduces the maneuverability for the tractor and the snowblower (positions B, C and E).
- An **inclined** adjustment gives better maneuverability for the tractor and the snowblower, increases the adjustment range of the upper link, but reduces the life of the driveline (positions A, B and E).



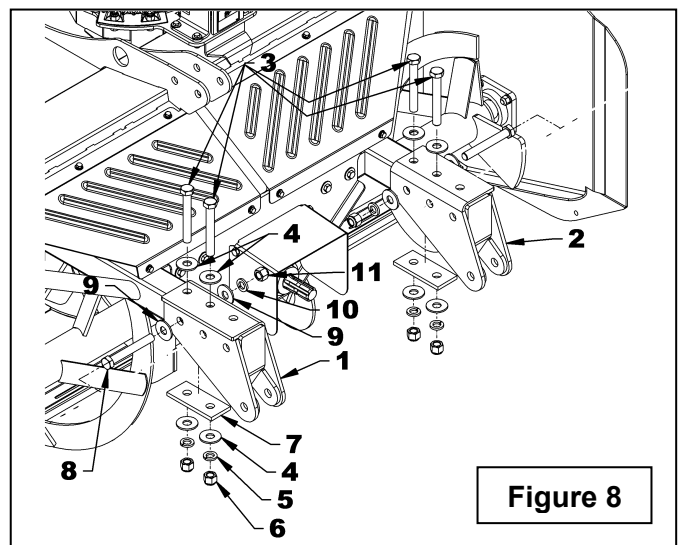
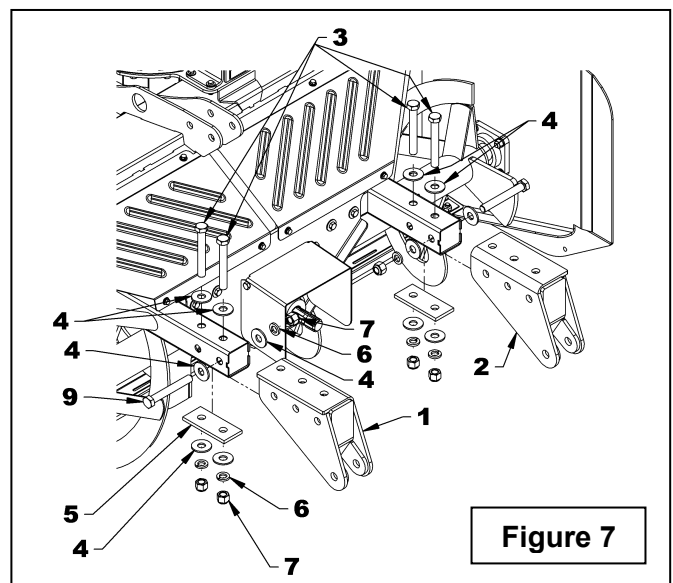
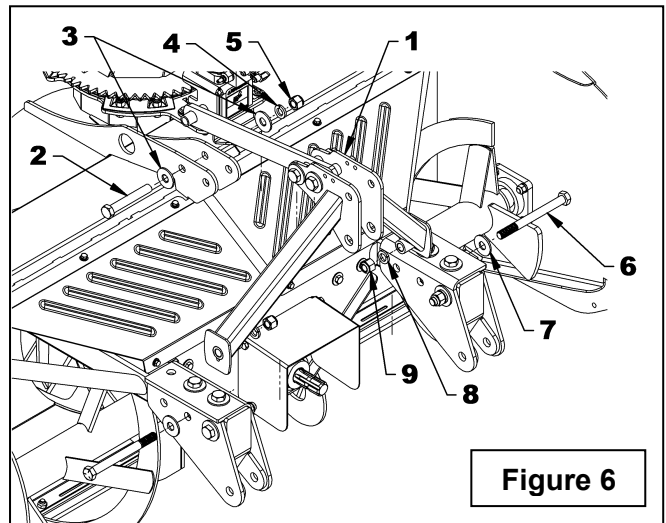
The snowblowers are assembled at the factory in **close** position, if you wish to keep this position go to the "Hydraulic Installation" section. If you wish to change position, perform the following steps:

CLOSE POSITION to DISTANT POSITION

1. Make sure the snowblower is stable on the ground. See note in page 14.
2. **Figure 6:** Remove the upper assembly of the 3 point hitch (item 1) by removing the 3/4"NC x 5" hex bolts (item 2), two 3/4" flat washers (item 3), the 3/4" lockwashers (item 4) and the 3/4" nylon insert locknuts (item 5). Take apart from the lower arm by removing also the two 3/4"NC x 8" hex bolts (item 6), four 3/4" flat washers (item 7), two 3/4" lockwashers (item 8) and two 3/4" nylon insert locknuts (item 9).
3. **Figure 7:** Remove the lower hitches (items 1-2) by removing the 3/4"NC x 5 1/2" hex bolts (item 3), the 3/4" flat washers (item 4), the 3/4" lockwashers (item 6), the 3/4" nylon insert locknuts (item 7) and the reinforcement plates (item 5).

NOTE: Do not tighten the bolts during assembly. The bolts will be tightened at the last step.

4. **Figure 8:** Install the lower hitches (items 1-2) in the "distant" position by installing the 3/4"NC x 5 1/2" top hex bolts (item 3) in the two rear holes, the 3/4" flat washers (item 4), the reinforcement plates (item 7), the 3/4" lockwashers (item 5) and the 3/4" nylon insert locknuts (item 6). Then install the 3/4"NC x 5 1/2" side hex bolts (item 8) in the rear hole, the 3/4" flat washers (item 9), the 3/4" lockwashers (item 10) and the 3/4" nylon insert locknuts (item 11).



- Figure 9:** Install the upper assembly of the 3 pt hitch (item 1) by installing the 3/4"NC x 8" hex bolts (item 2) in the middle hole, the 3/4" flat washers (item 3), the 3/4" lockwashers (item 4) and the 3/4" nylon insert locknuts (item 5). Secure the upper link by installing the 3/4"NC x 5" hex bolts (item 6) in the front hole, the 3/4" flat washers (item 7), the 3/4" lockwashers (item 8) and the 3/4" nylon insert locknuts (item 9).
- Tighten all bolts according to the **Torque Specification Table** at the end of the manual.

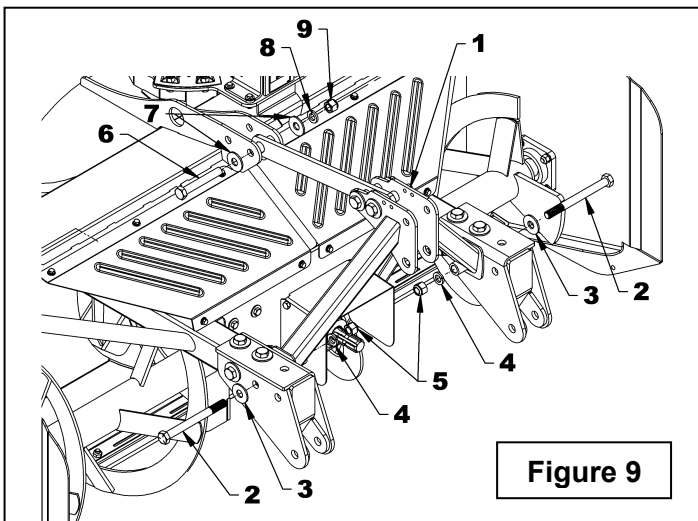


Figure 9

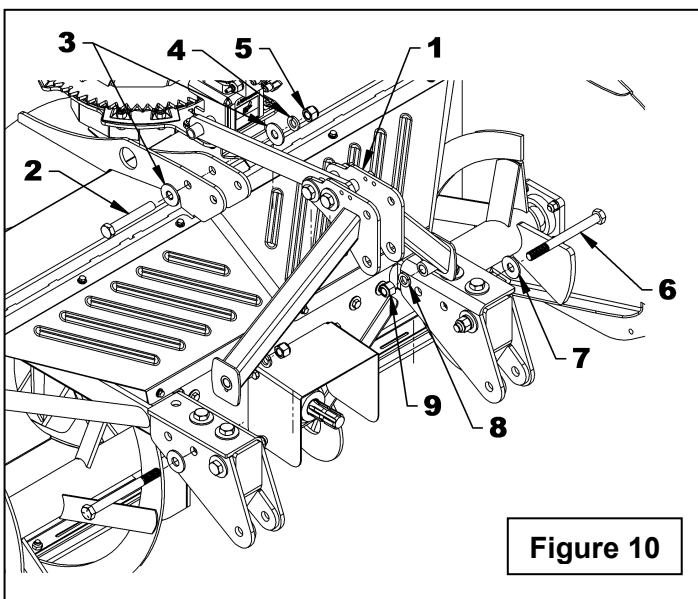


Figure 10

CLOSE POSITION to INCLINED POSITION

- Make sure the snowblower is stable on the ground. See note in page 14.
- Figure 10:** Remove the upper assembly of the 3 point hitch (item 1) by removing the 3/4"NC x 5" hex bolts (item 2), two 3/4" flat washers (item 3), the 3/4" lockwashers (item 4) and the 3/4" nylon insert locknuts (item 5). Take apart from the lower arm by removing also the two 3/4"NC x 8" hex bolts (item 6), four 3/4" flat washers (item 7), two 3/4" lockwashers (item 8) and two 3/4" nylon insert locknuts (item 9).
- Figure 11:** Remove the 3/4"NC x 5 1/2" side hex bolts (item 1) of the lower hitches, the 3/4" flat washers (item 2), the 3/4" lockwashers (item 3) and the 3/4" nylon insert locknuts (item 4).

NOTE : Do not tighten the bolts during assembly. The bolts will be tightened at the last step.

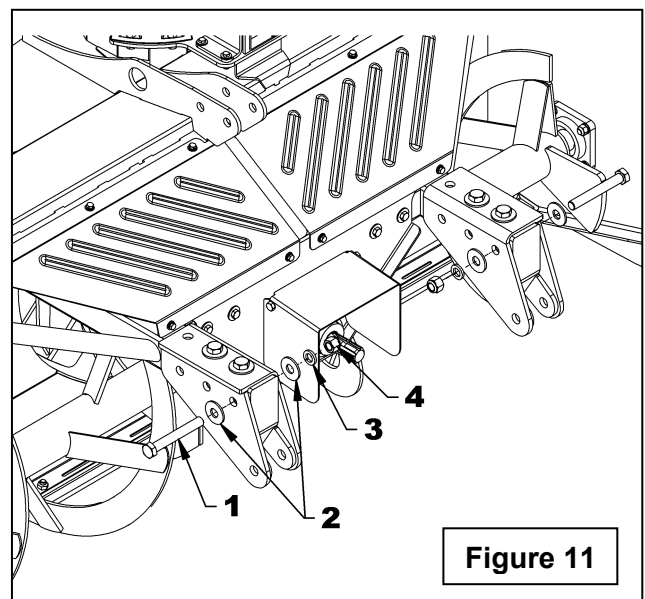


Figure 11

4. **Figure 12:** Install the 3/4"NC x 5 1/2" side hex bolts (item 1) in the middle holes of the lower hitches, the 3/4" flat washers (item 2), the 3/4" lockwashers (item 3) and the 3/4" nylon insert locknuts (item 4).
5. **Figure 13:** Install the upper assembly of the 3 pts hitch (item 1) by installing the 3/4"NC x 8" hex bolts (item 2) in the front hole, the 3/4" flat washers (item 3), the 3/4" lockwashers (item 4) and the 3/4" nylon insert locknuts (item 5). Secure the upper link by installing the 3/4"NC x 5" hex bolts (item 6) in the front hole, the 3/4" flat washers (item 7), the 3/4" lockwashers (item 8) and the 3/4" nylon insert locknuts (item 9).

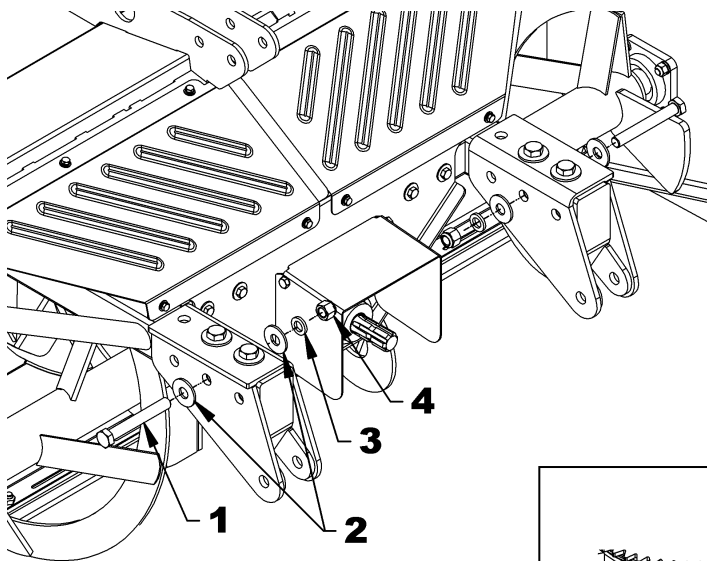


Figure 12

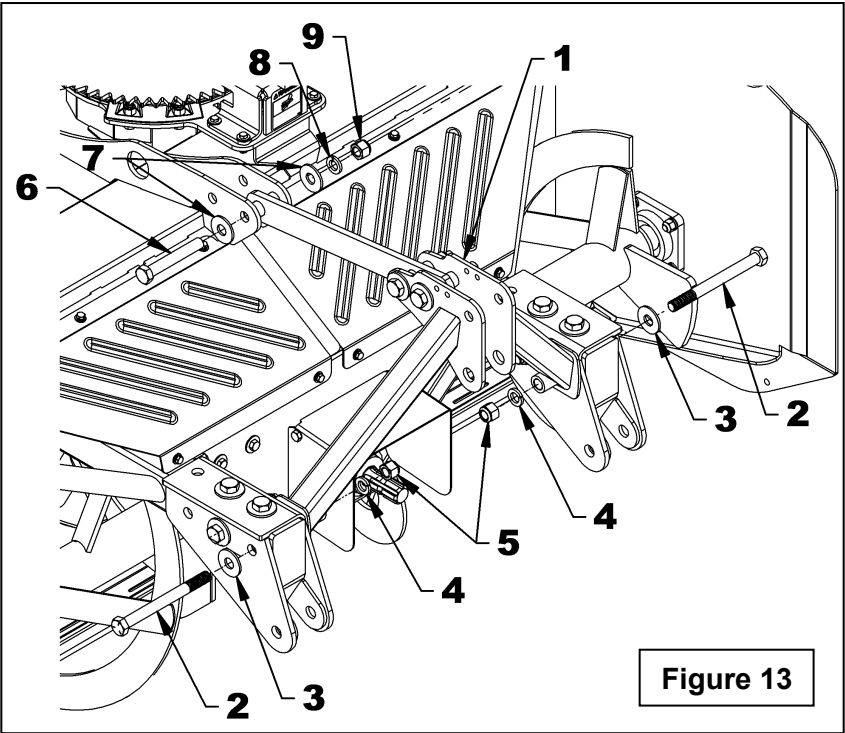
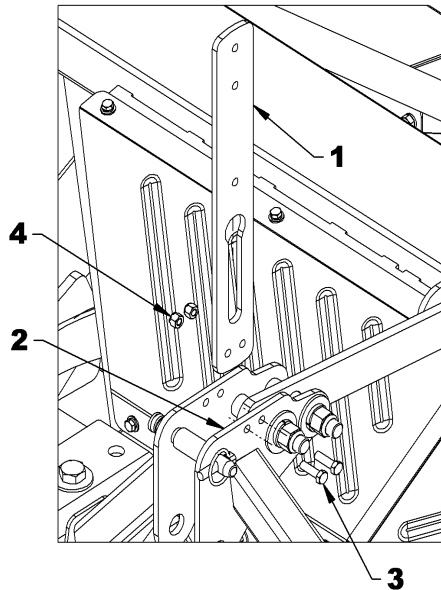


Figure 13

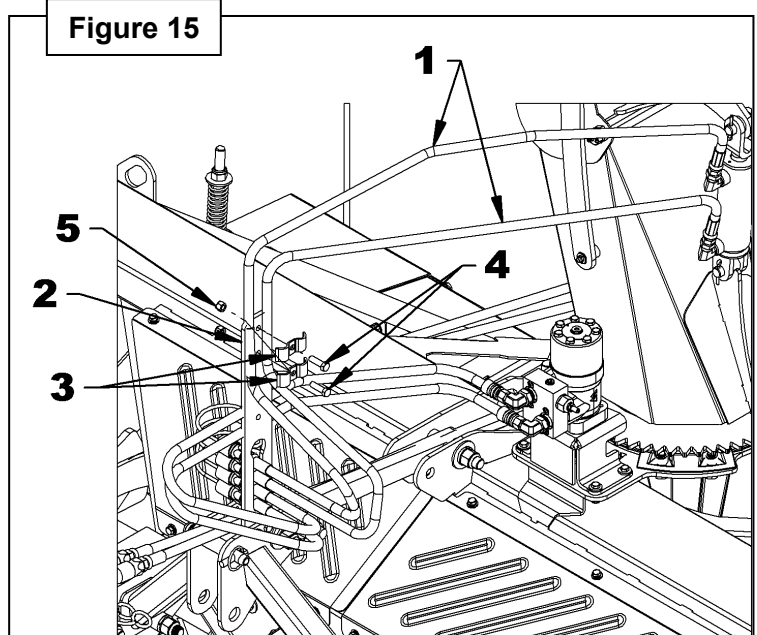
Hydraulic Installation

1. **Figure 14:** Install the hose support (item 1) inside the left hitch (item 2) using two 3/8"NC x 1 1/4" hex bolts (item 3) and two 3/8" nylon insert locknuts (item 4).

Figure 14

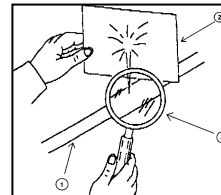
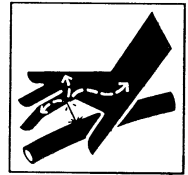


2. **Figure 15:** Run the hydraulic cylinder hoses (item 1) over the snowblower with enough radius of bend but ensure they do not come in contact with sharp edges of the housing/chute or interfere with the maintenance of the snowblower. Keep in place in the two upper holes of the hose support (Item 2) on the left side with two hose clamps (item 3) and two 3/8"NC x 1 1/4" hex bolts (item 4) and two nylon insert locknuts (item 5). Do not over-tighten so as not to damage hoses.



⚠ WARNING: To avoid serious personal injury. Escaping hydraulic/ diesel fluid under pressure can penetrate the skin causing serious injury.

- Do not use your hands to check for leaks. Use a piece of cardboard or paper to search for leaks.



- (1) Hydraulic hose
- (2) Cardboard
- (3) Magnifying glass

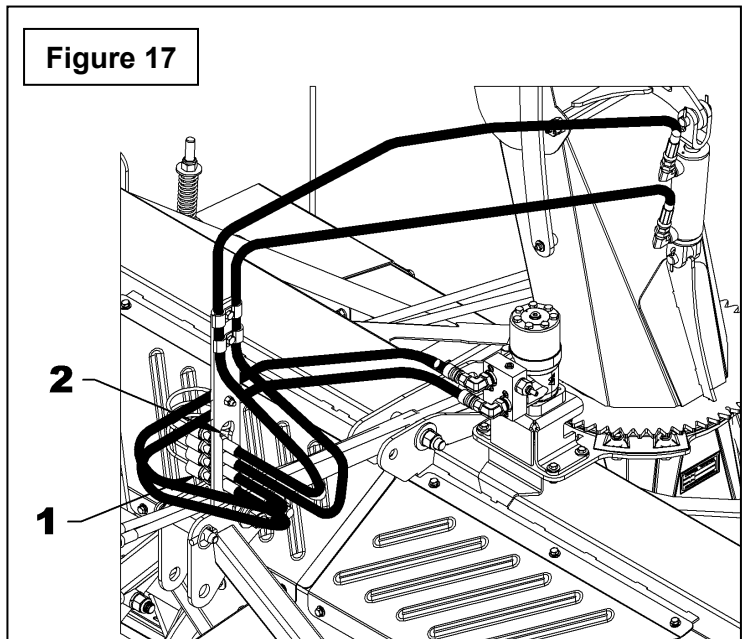
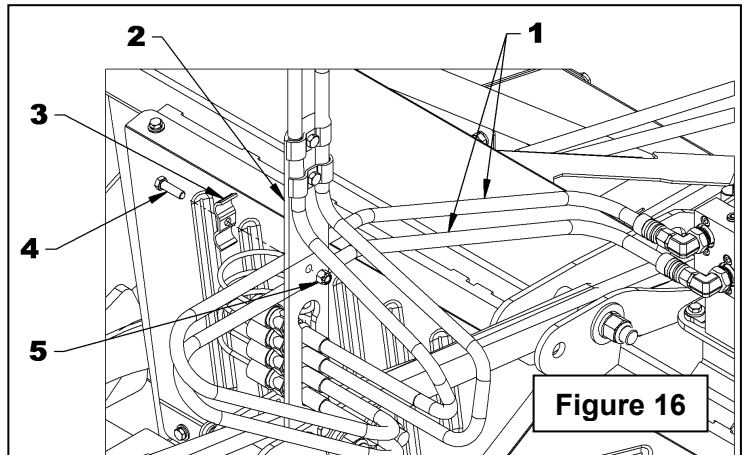
- Stop engine and relieve pressure before connecting or disconnecting lines.
- Tighten all connections before starting engine or pressurizing lines.

If any fluid is injected into the skin, obtain medical attention immediately.

3. **Figure 16:** Route the hoses of the hydraulic motor (item 1) to the hose support (item 2). Keep in place in the lower hole of the hose support (item 2) on the left side with a hose clamp (item 3), a 3/8"NC x 1 1/4" hex bolt (item 4) and a 3/8"NC nylon insert locknut (item 5) Do not over tighten so as not to damage the hoses.

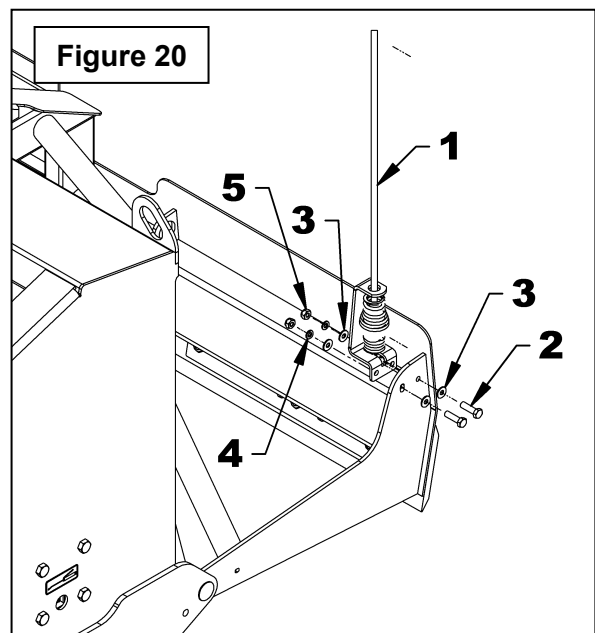
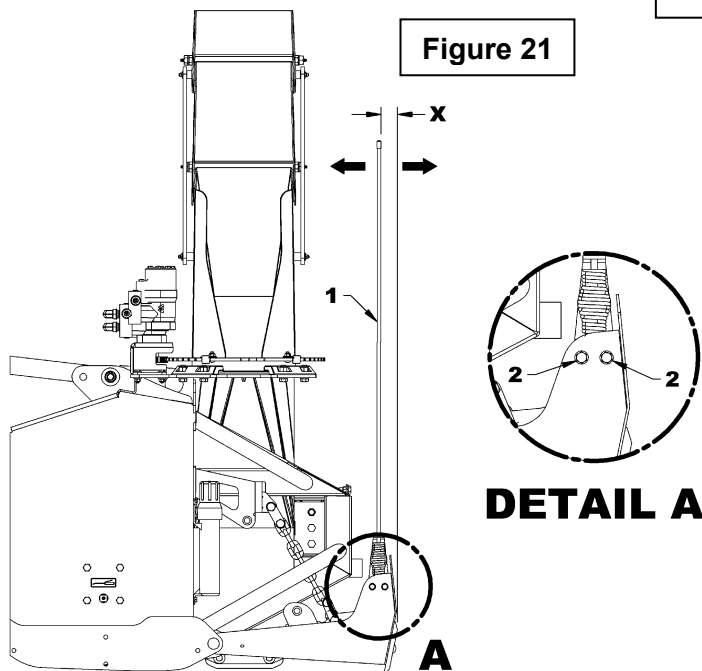
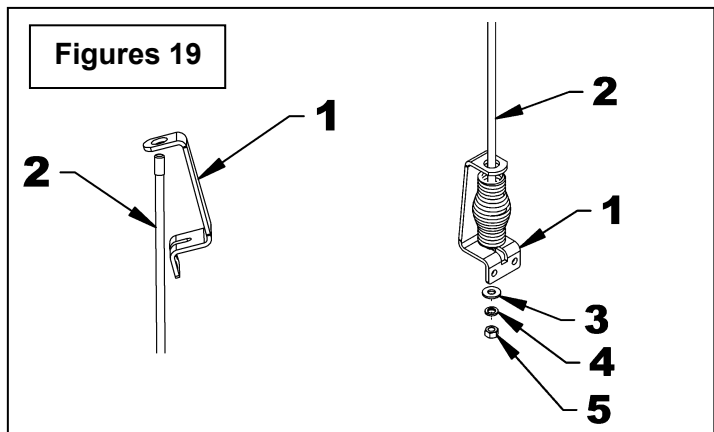
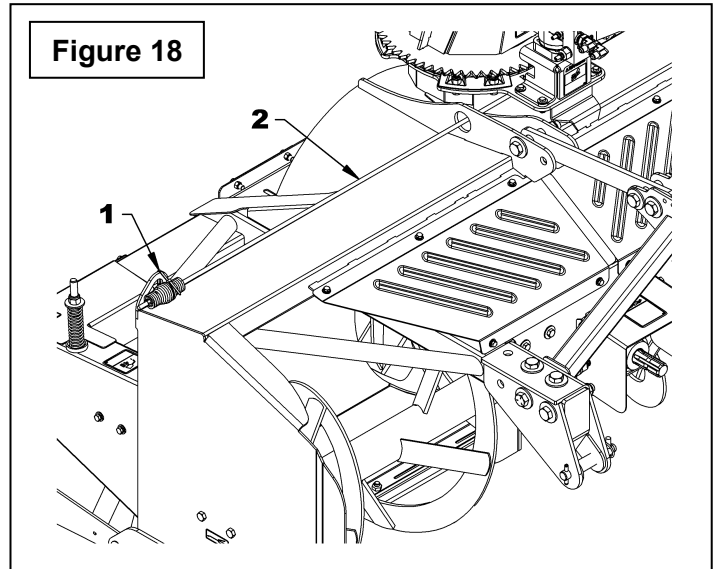
NOTE: This is a suggested representation for the routing of the hoses. In this way, there is less risk for the hoses interfering with the chute rotation. However, other configurations are also possible. In all cases, ensure there is enough slack in the hoses so that the chute can turn to the maximum right and left without forcing on the hoses.

NOTE Figure 17: The hose support is equipped with a hose storage. When disconnecting the quick couplers from the tractor, install the protective caps on the quick couplers (item 1). Insert the hoses with the protective cap into the top opening (item 2) of the hose support and down into the notch.



Markers Installation

1. **Figure 18:** Cut the nylon tie wrap (item 1) and remove the marker (item 2) from the top of the snowblower. There is one marker on each side of the snowblower.
2. **Figures 19:** Insert the support (item 1) over the marker (item 2) and slide it up to the spring base.
3. **Figures 19:** Secure the support (item 1) to the marker (item 2) by installing the 5/16" (3/8" hole) flat washers (item 3), the 3/8" lockwashers (item 4) and the 3/8" hex nut (item 5).
4. **Figure 20:** Install the markers assemblies (item 1) on each side of the rear blade with two 5/16"NC x 1 1/4" hex bolts (item 2), four 1/4" (5/16" hole) flat washers (item 3), two 5/16" lockwashers (item 4) and two 5/16" nylon insert locknuts (item 5).
5. **Figure 21:** If the distance "X" between the marker (item 1) and the end of the rear blade is not appropriate, it can be adjusted toward the front or the rear by loosening both bolts (item 2) of the marker support, pushing the base of the marker in the direction desired and retightening the bolts (item 2).



Installation of the Snowblower on the Tractor with Three Point Hitch

1. Make sure the snowblower is stable on the ground. See note in page 14.
2. **Figure 14:** Attach the tractor lower arms (item 2) to the lower hitches (item 4) with the two pins (item 1) and secure with a $\varnothing 7/16$ " linchpins (item 3).

Figure 14: For SA80I snowblower

On some tractors, the hole of the lower arm could be a Cat. 2 dimensions. In this case, insert a 1 1/8" OD x 2 1/2" Lg. bushing (item 8) in each lower arm of the tractor to the lower hitches (item 4) and secure the arms (item 2) with the two pins (item 1) and the $\varnothing 7/16$ " linchpins (item 3).

3. **Figure 14:** Attach the tractor upper arm (item 5) between the snowblower upper attaching plates (item 7) with the pin (item 6) and the linchpin (item 3).

Figure 14: For SA80I snowblower

On some tractors, the hole of the upper arm could be a Cat. 2 dimensions. Insert a 1" OD x 2" Lg. bushing (item 9) in the tractor upper arm (item 5). Then attach the tractor upper arm between the snowblower upper attaching plates (item 7) with the pin (item 6) and the linchpin (item 3).

4. **Figure 14:** Adjust the snowblower with the tractor upper arm (item 5) in a way that the snowblower is perpendicular to the ground.
5. **Figure 14:** Adjust the anti-sway arms of the tractor to prevent lateral swinging of the snowblower. Make sure there is no contact with the tires.
6. Go to "**Preparation of the Driveline**" section for further installation of the snowblower.
7. Connect the hoses to the tractor and make sure to raise and lower the snowblower and rotate the chute into all positions to see if the hoses are long enough and do not interfere with any component. Attach the hoses with nylon tie wraps between the cylinder and the hoses support, of which one just above the upper elbow of the cylinder. The hoses can also be attached with a nylon tie wrap between the hose support and the tractor if necessary.



CAUTION

Before connecting snowblower driveline to tractor drive shaft, make sure driveline is not too long in raised, lowered and middle position. If the driveline is too long it must be shortened, to avoid damages to the tractor. See pages 25 to 27 for instructions.

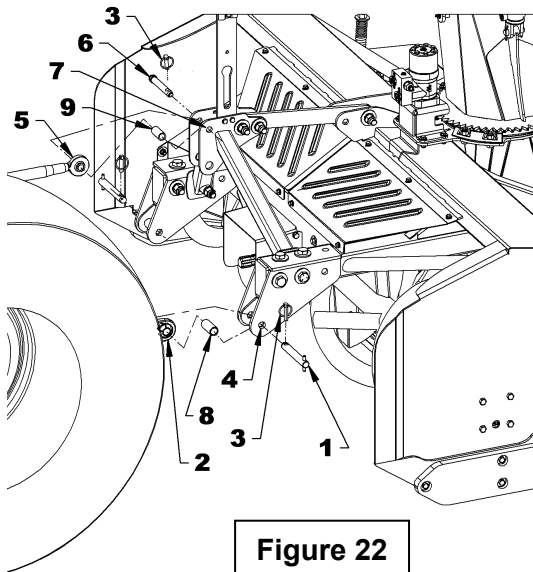


Figure 22

Installation of the Snowblower on the Tractor with Quick Hitch

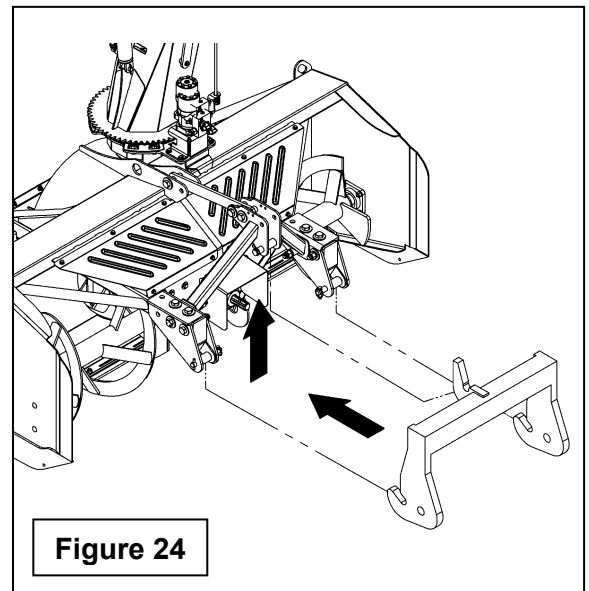
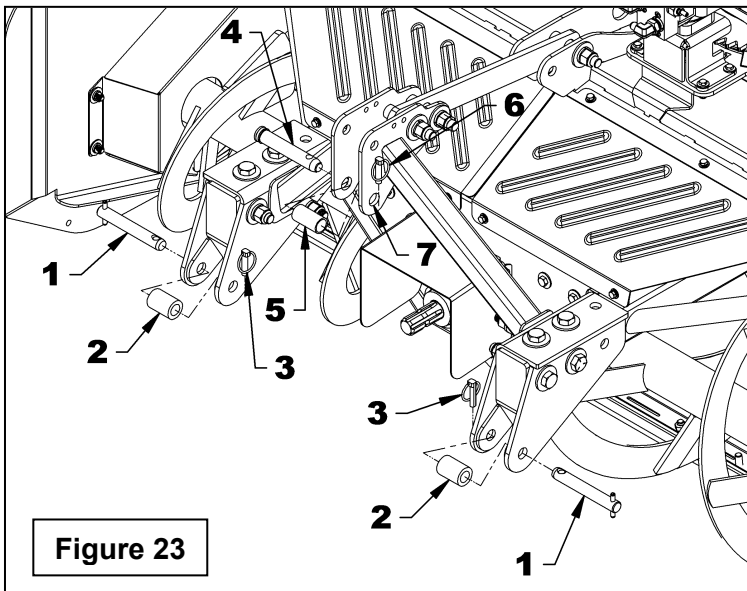
FOR SA80I SNOWBLOWER

1. **Figure 23:** Insert the lower hitch pins (item 1) and Quick hitch bushings (item 2, sold separately, **part # 668059**) and secure with the $\varnothing 7/16$ " linchpins (item 3).
2. **Figure 23:** Insert the upper hitch pin Cat. 2 (item 4, sold separately, **part # 460052**) and a Quick hitch bushing (item 5, sold separately, **part # 668607**) in the lower hole (item 7) of the upper hitch and secure with the $\varnothing 7/16$ " linchpin (item 6).
3. **Figure 24:** Make sure the quick hitch latches are closed. Lower the three point so the quick hitch hooks are lower than the hitch pins of the snowblower. Move back slowly the tractor toward the snowblower until hooks are below the hitch pins of the snowblower. Raise the three point until the quick hitch latches close on the snowblower hitch pins to lock the system.

FOR SA92IB SNOWBLOWER

1. **Figure 23:** Insert the lower hitch pins (item 1) and a Quick hitch bushing (item 2, sold separately, **part # 668608**) and secure with the $\varnothing 7/16$ " linchpins (item 3).
2. **Figure 23:** Insert the upper hitch pin (item 4) and a Quick hitch bushing (item 5, sold separately, **part # 668607**) in the lower hole (item 7) of the upper hitch and secure with the $\varnothing 7/16$ " linchpins (item 6).
3. **Figure 24:** Make sure the quick hitch latches are closed. Lower the three point so the quick hitch hooks are lower than the hitch pins of the snowblower. Move back slowly the tractor toward the snowblower until hooks are below the hitch pins of the snowblower. Raise the three point until the quick hitch latches close on the snowblower hitch pins to lock the system.

⚠ CAUTION Before connecting snowblower driveline to tractor drive shaft, make sure driveline is not too long in raised, lowered and middle position. If the driveline is too long it must be shortened, to avoid damages to the tractor. See pages 25 to 27 for instructions.

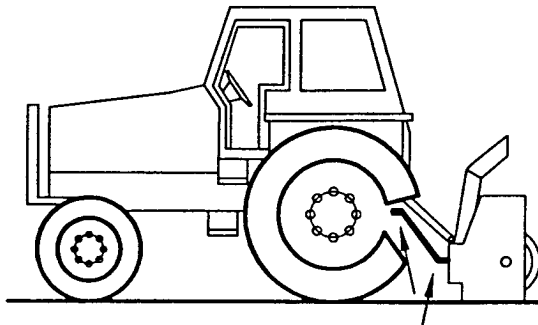


Preparation of the Driveline

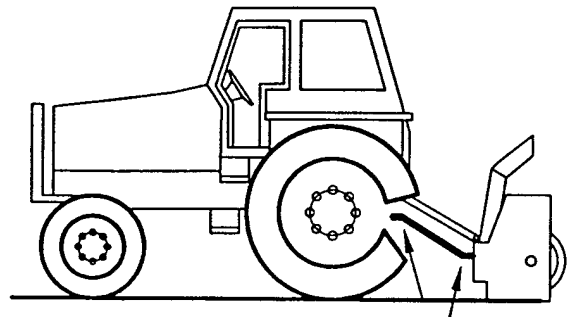
Recommendations for driveline angles

IMPORTANT: To obtain the proper universal joint angles, it is recommended to adjust the 3-Point hitch at the furthest point from the tractor recommended by the manufacturer.

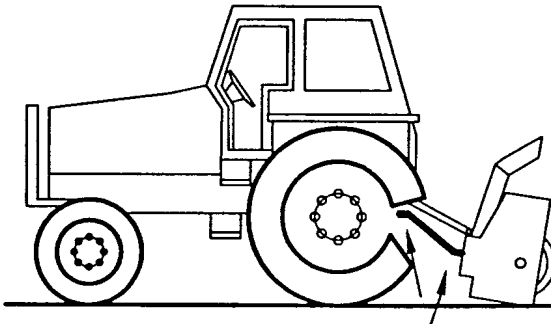
The universal joint angle is directly related with the life of driveline. To reduce the angle, it is necessary to increase the distance between the snowblower and the tractor.



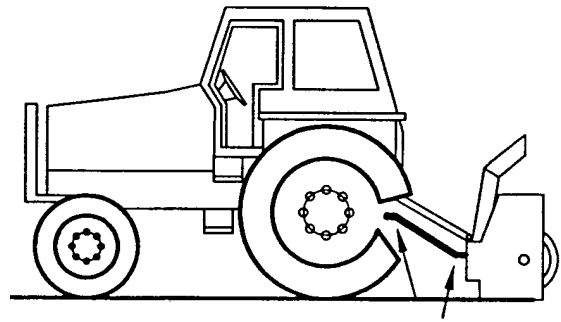
Angles of Driveline Joints Too Large
Avoid



Reasonable Angles of Driveline Joints
Acceptable



Unequal Angles at Driveline Joints
Avoid



Equal Angles at Driveline Joints
Recommended

Angles at each end of driveline

A popular habit is to change the snowblower angle to obtain a better scraping effect. This practice can become harmful to the driveline since the angle at each end is unequal. This results in a fan speed variation as well as a drastic increase of load on cross and bearings. To be avoided: It is recommended to always keep tractor driveline and snowblower input shaft parallel.

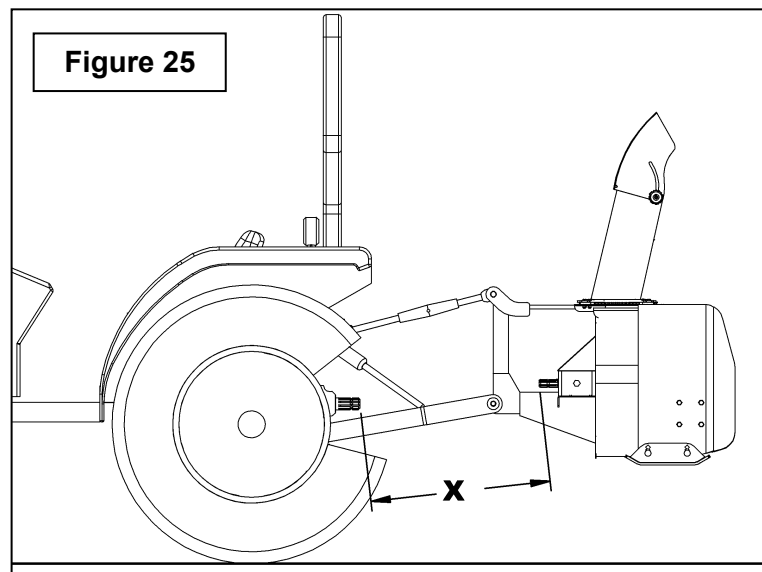
Determining Driveline Length

IMPORTANT: Before using the equipment, make sure the driveline is not too long. At working, the two half drivelines must intersect each other sufficiently to insure maximum efficiency but there must not be any interference.

- 1. Figure 25:** To determine the "L" length for your tractor model first find the "X" factor by measuring the horizontal distance between the end of the tractor's drive shaft and the end of the snowblower's driven shaft when the snowblower is in transport position as shown in figure.
- 2.** Choose in the table below the "Y" factor according to the driveline series and deduct that number from "X" measured previously to determine "L" (fig.26) which is the center-to-center length between the universal joints.

NOTE : The driveline series is inscribed on the plastics guards.

L = X - Y		
DRIVELINE SERIES	Y	MINIMUM CROSSING
60 Series	6"	8"
80 Series	7"	8"

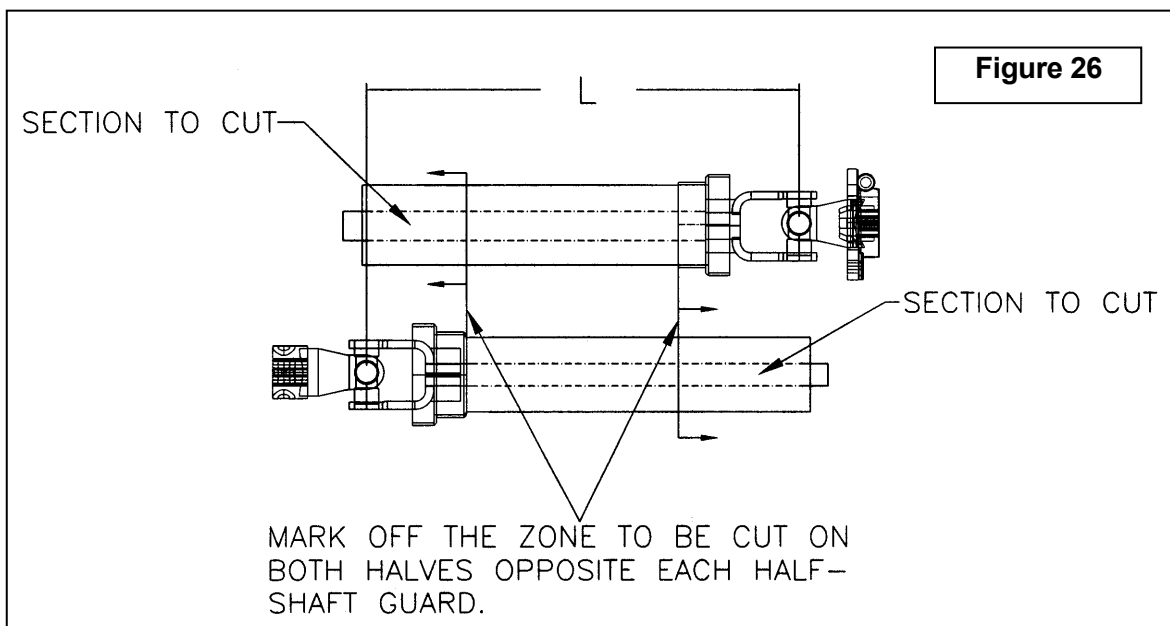
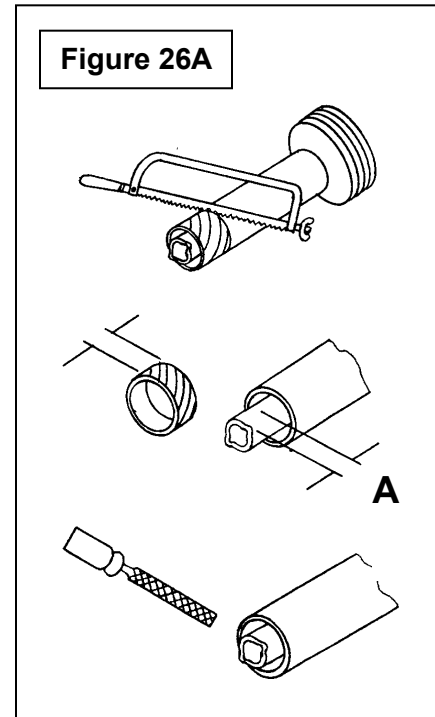


3. **Figure 26:** Hold the two half-shaft side by side and locate the "L" length between the two center-to-center half-shaft universal joints. Mark off the zone to be cut on both halves opposite each half-shaft guard as shown in figure.
4. **Figure 26A:** Cut off inner and outer guard tubes as well as the inner and outer telescopic sections.
5. **Figure 26A:** Cut the guard a second time leaving the same distance between the end of the guard and the end of the shaft as existed before. To obtain the proper distance "A" shown in figure, cut the guard according to the following table:

DISTANCE A	
Male PTO	Female PTO
1 3/4"	1 1/4"

6. **Figure 26A:** File down tubes and remove chips.
7. Apply grease to inside of outer telescopic section.

IMPORTANT: Work with fully guarded shafts only!



Driveline Installation

1. **Figure 27:** Remove the paint from the gearbox shaft (item 1) and grease if needed. Grease also the sliding surfaces and yoke (item 2) of the driveline.
2. **Figure 27:** Remove the bolts (item 3) from the yoke (item 2) and connect the yoke to the gearbox shaft (item 1). Secure the driveline by reinstalling the bolts and nuts (items 3-4) in the order shown. Tighten all bolts, including the shearbolt, according to the ***Torque Specification Table*** at the end of the manual.
3. **Figure 27:** Install the driveline (item 2) on the tractor shaft.

IMPORTANT: If this is a first installation, make sure that the PTO shaft is not too long while raising the snowblower to the highest position and making sure that there is still some play. Also make sure the crossing is acceptable in the lowest position.

4. **Figure 27:** Attach the safety chain (item 5), snowblower side, around the right or left hitch to prevent driveline shield from rotating. Attach the safety chain, tractor side, to the tractor appropriate location.



CAUTION

To avoid serious injuries or death: This shaft rotates at high revolution (RPM). If the quick release system is not securely locked on the tractor shaft (a click must be heard) or if the coupling to the snowblower is not secured correctly, the driveline can be released with force which can cause serious injury or death.

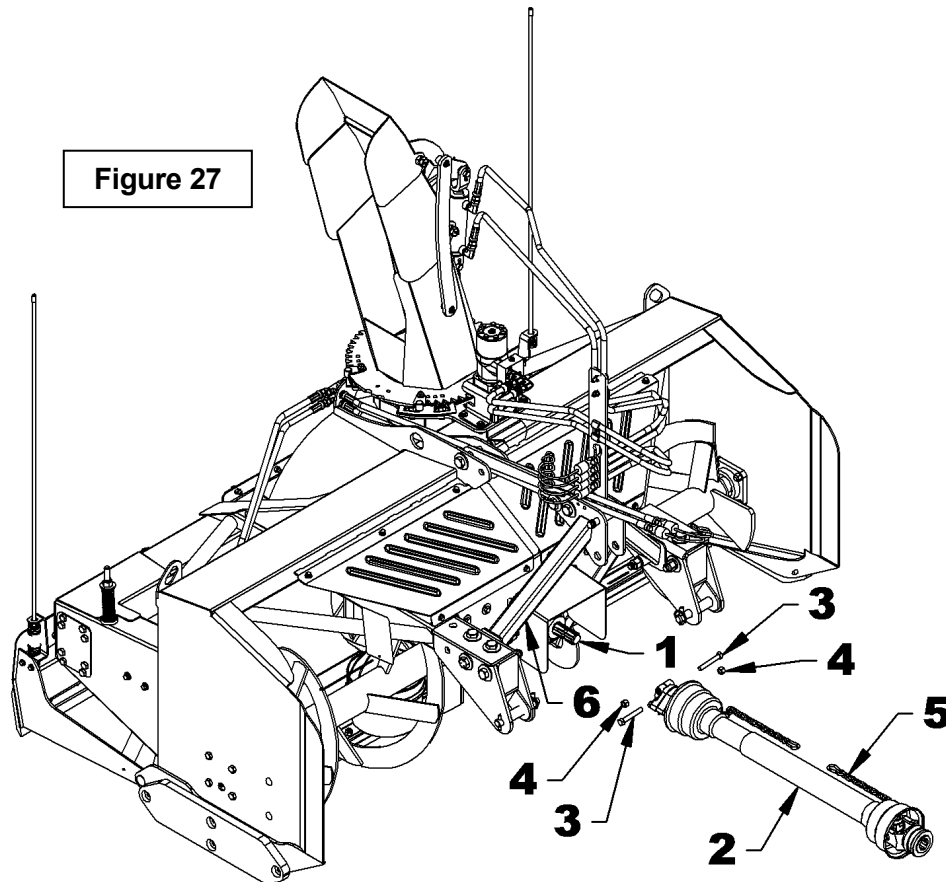


Figure 27

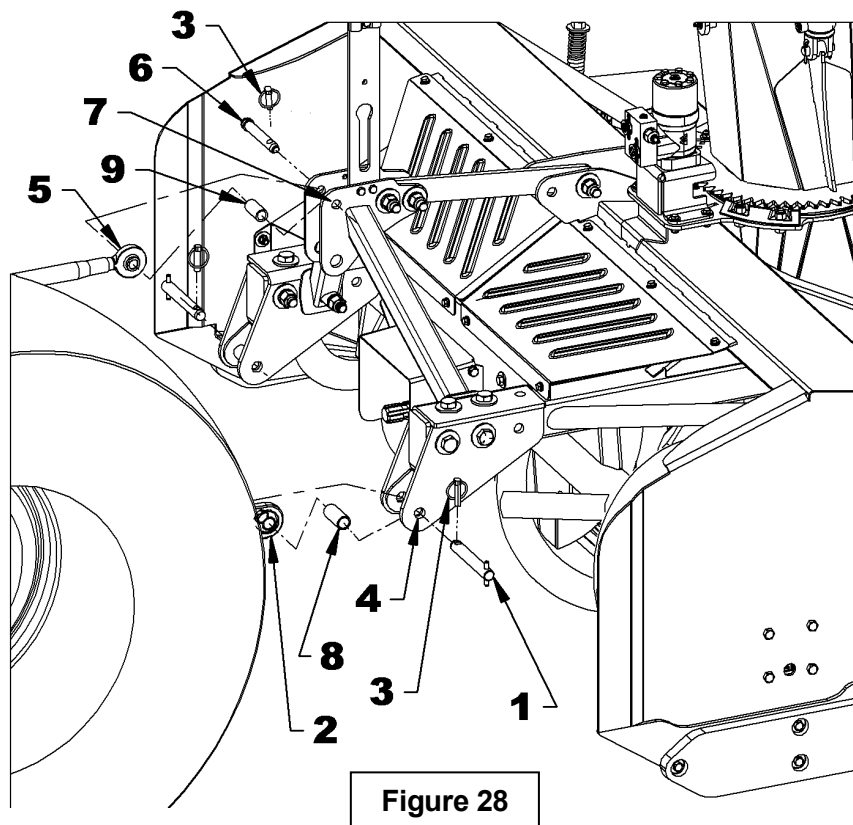
Removing the Snowblower from the Tractor

⚠ WARNING: To avoid serious personal injury or death: Park the vehicle on level ground, place the transmission in neutral, set the parking brake, place all control levers in neutral, shut off the engine, remove the ignition key and allow the rotating parts to stop **BEFORE** working on the vehicle.

With 3-point hitch

1. Disconnect the hydraulic hoses from the tractor hydraulic outputs. The hoses support is equipped with a hose storage. When disconnecting the quick couplers from the tractor, install the protective caps on the quick couplers. Insert the hoses with the protective cap into the top opening of the hose support and down into the notch.
2. **Figure 28:** Detach the upper arm (item 5) by removing the linchpin and the pin (items 3-6). Insert the pin (item 6) in the upper hole (item 7) and place the upper arm in his storage location on the tractor if equipped.
3. **Figure 28:** Detach the driveline from the tractor and attach the safety chain to the snowblower for storage.
4. **Figure 28:** Detach the lower arms (item 2) by removing the linchpins (items 3) and the hitch pins (item 1).
5. **Figure 28:** Insert the pins (items 1) in the hole of the lower hitches (item 4) and install the linchpin (item 3).
6. **Figure 28: For SA80I snowblower ONLY:** if the snowblower is installed with Cat.2 bushings (items 8-9), it is important to remove them and store them on the pins (items 1-6).

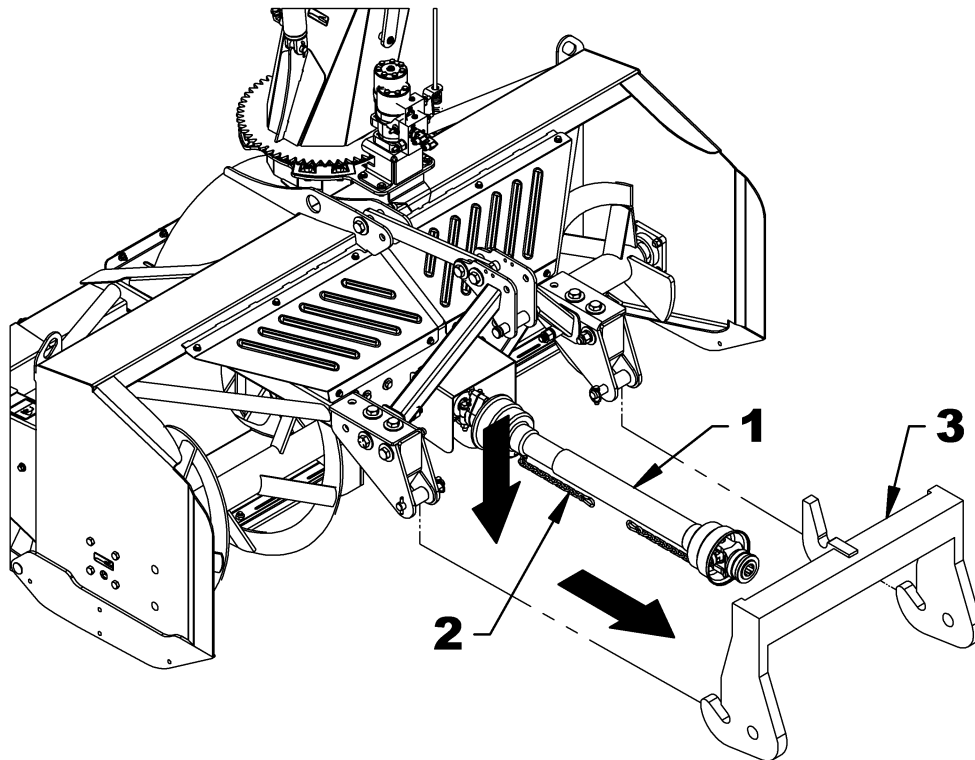
IMPORTANT: To avoid damaging the snowblower, tighten all the bolts after the first 10 hours of operation.



With quick hitch

1. Set parking brake and turn engine off.
2. Disconnect all the hydraulic hoses from the tractor. Install the dust caps on each quick coupler and store the hoses in the hoses support notch or in an appropriate location.
3. **Figure 29:** Disconnect the driveline (item 1) from the tractor and attach the driveline safety chain (item 2) to an appropriate location on the snowblower.
4. **Figure 29:** Open the lower latches with the quick hitch lever (item 3). Lower the three point until the quick hitch hooks are lower than the hitch pins of the snowblower. Slowly move forward the tractor away from the snowblower until the hooks are detached from the snowblower hitch pins. Close the quick hitch latches.

Figure 29



OPERATION

GENERAL PREPARATION

1. Read the operator's manual carefully before using the tractor and snowblower. Be thoroughly familiar with the controls and proper use of the equipment. Know how to stop the unit and disengage the controls quickly.
2. Wear adequate winter outer garments while operating the equipment.
3. Make sure the snowblower is clear of snow and other material before engaging the snowblower.
4. Make sure the auger and fan operate freely.
5. Check the oil level in the gearbox and if necessary, add AGMA 5EP, SAE 80W90 gear oil or equivalent.
6. Check the shear bolts for proper tightness.

CONTROLS

Raising and Lowering the Snowblower

Use the control lever of the 3-Point hitch. RAISE the snowblower by pulling on the lever and LOWER by pushing on the valve lever.

Work and Travel Speed

Working ground speed will depend on the depth and density of the snow to be cleared. Normally, ground speed will range from 4 to 7 mph for light, dry snowfalls from 3" to 6", and from 1 to 3 mph for heavy, wet or drifted snow. To move, disengage the PTO and raise the snowblower to its maximum height.

Engaging the Drive Mechanism

Refer to the tractor's operating manual for instructions.

Chute Rotation

This blower is equipped with a chute rotation by hydraulic motor. The motor is equipped with flow restrictors which limit the speed of rotation of the chute. Make sure that the hoses are properly connected to the hydraulic outputs of the tractor. Activate the appropriate tractor controls to activate the appropriate outputs and thereby activate the chute rotation. Reverse the hoses if the movement of the chute is not in the desired direction.

Chute Deflector

This snowblower is equipped with a hydraulic deflector. The cylinder is equipped with flow restrictors which limit the movement speed of the chute cylinder. Make sure that the hoses are properly connected to the hydraulic outputs of the tractor. Activate the appropriate tractor controls to activate the appropriate outputs and thereby activate the deflector. Reverse the hoses if the movement of the deflector is not in the desired direction.

ADJUSTMENTS

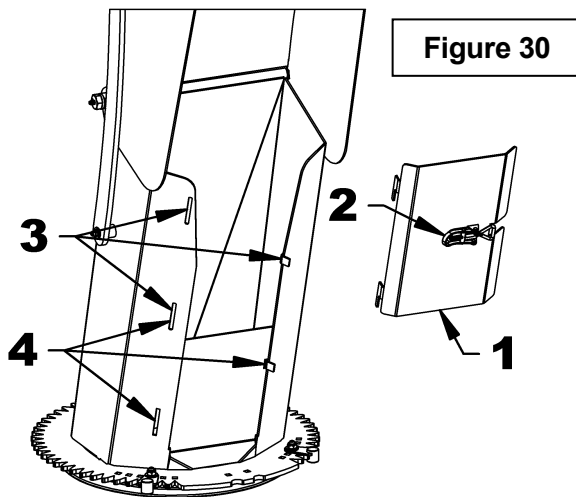
⚠ WARNING To avoid serious personal injury or death: Make sure tractor engine and snowblower come to a complete stop and tractor drive mechanism is disengaged **BEFORE** making any adjustments.

Markers Adjustment

The angle of the markers on the rear blade can be adjusted according to your needs. Depending on the type of blade retaining system (chain or hydraulic cylinder), the distance between the top of the markers and the back of the rear blade can be too small or too big. To adjust the angle, refer to the section "Markers Installation" on page 22.

Adjustment of the Rear Blade Chains

The chains that hold the rear blade can be adjusted in length. If the blade goes too low or not enough, the number of links can be changed by inserting the top bolt into the appropriate link.



Chute Door Adjustment

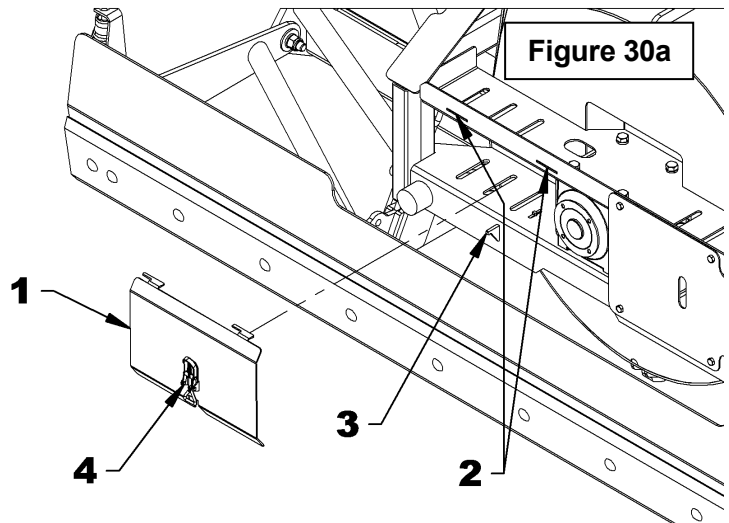
For Snowblower SA92IB only

Figure 30: The chute has a removable access door at the front. To remove it, just open the lock (item 2) and pull up the door (item 1). The use of this door increases visibility when a curtain of snow comes out of the front of the chute, which is often the case when blowing powdery snow.

Figure 30: For best results, place the door (item 1) in the up position (item 3). However, having the door at this position can cause a problem of clogging the chute if the snow is denser,

Figure 30: The door can also be placed in the low position (item 4). This position gives a lower quality of visibility but can greatly reduce the risk of clogging.

Figure 30a: In the event that the door is not used, there is a storage location in the back of the snowblower. Simply hook the door (item 1) to the notches (item 2) on the snowblower and secure the door by closing the locking device (item 4) on the small hook (item 3). If needed, the locking device can be adjusted to clamp properly the door.



SNOW REMOVAL METHODS

When removing snow, do not use the snowblower as a dozer blade to push snow. Let the snowblower work its way through deep drifts. If the speed of your tractor is too fast, the snowblower may become overloaded and clog. For best results, raise the snowblower and remove a top layer of snow. A second pass with the snowblower will remove the remaining snow.

IMPORTANT: Use full RPM power when removing wet, sticky snow. Low RPM power will tend to clog the chute.

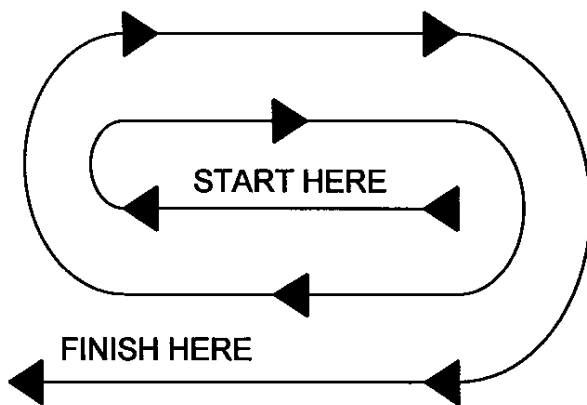
WARNING

Do not use hands or feet to unclog chute. Do not attempt to clear clogged chute of snow while tractor engine is running. If the chute clogs, disengage the drive shaft, shut off the tractor engine, remove the ignition key, wait for all movement to stop, and then clear the snow from the chute.

A definite pattern of operation is required to thoroughly clean the snow area. These patterns will avoid throwing snow in unwanted places as well as eliminating a second removal of snow

PATTERN 1

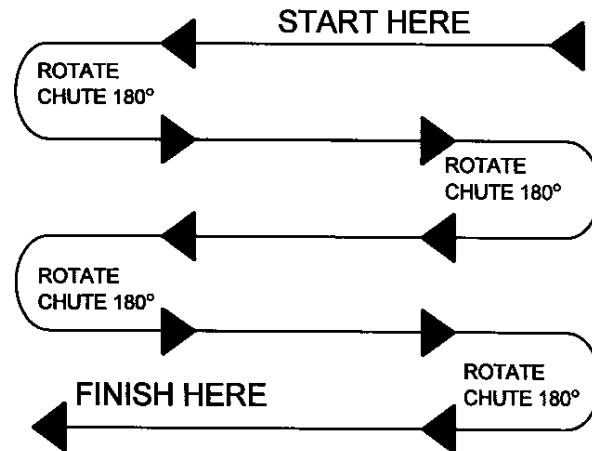
DISCHARGE SNOW BOTH SIDES



DISCHARGE SNOW BOTH SIDES

Where it is possible to throw the snow to the left and right (above), as on a long driveway, it is advantageous to start in the middle. Plow from one end to the other, throwing snow to both sides without changing the direction of the discharge guide

PATTERN 2



DISCHARGE SNOW THIS SIDE ONLY

If the snow can only be thrown to one side of the driveway or sidewalk (above), start on the opposite side. At the end of the first pass, rotate the discharge guide 180 degrees for the return pass. At the end of each succeeding pass, rotate the discharge guide 180 degrees to maintain direction of throw in the same **area**.

MAINTENANCE

ALWAYS USE GENUINE PARTS WHEN REPLACEMENT PARTS ARE REQUIRED

1. Keep the tractor and snowblower properly maintained.
2. Park the tractor/snowblower on level ground, place the transmission in neutral, set the parking brake, disengage the PTO, lower the snowblower to the ground, place all control levers in neutral, shut off the engine and remove the ignition key and allow the rotating parts to stop BEFORE making any snowblower adjustments.
3. To avoid injury, do not adjust, unblock the driving system, or service the snowblower with the tractor engine running.
4. Keep the tractor/snowblower clean. Snow, dirt or ice build-up can lead to malfunction or personal injury from thawing and refreezing in garage.
5. Always wear eye protection when cleaning or servicing the snowblower or subframe.
6. DO NOT service the tractor while the engine is running or hot, or if the unit is in motion. Always lower snowblower to the ground. If necessary to service snowblower in raised position, securely support with stands or suitable blocking before working underneath. Do not rely on hydraulically supported devices for your safety. They can settle suddenly, leak down, or be accidentally lowered.
7. Do not attempt to service machine, clear obstructions or unclog the snowblower with the engine running. Always shut off engine and allow all motion to cease.
8. The manufacturer will not claim responsibility for fitment of unapproved parts and/or accessories and any damages because of their use.
9. Make sure all shields and guards are securely in place following all service, cleaning, or repair work.
10. Do not modify or alter this snowblower or any of its components or operating functions. If you have questions concerning modifications, consult with your dealer.
11. Do not operate a snowblower that is defective or has missing parts. Make sure that all recommended maintenance procedures are completed before operating the snowblower.
12. Check all controls regularly and adjust where necessary. Make sure that the brakes are evenly adjusted.
13. Periodically check all nuts and bolts for tightness, especially wheel hub and rim nuts.
14. A hydraulic/diesel fluid that escapes under pressure can penetrate the skin and cause severe injury. Do not use hands to look for a leak, use a piece of paper or cardboard. If liquid is injected into the skin, seek immediate medical attention.
15. Stop the engine and remove pressure before connecting or disconnecting the hydraulic hoses. Tighten all connections before starting the engine or putting pressure back into the hoses.

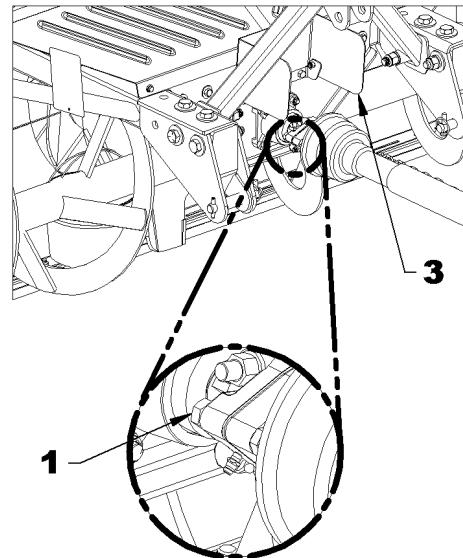
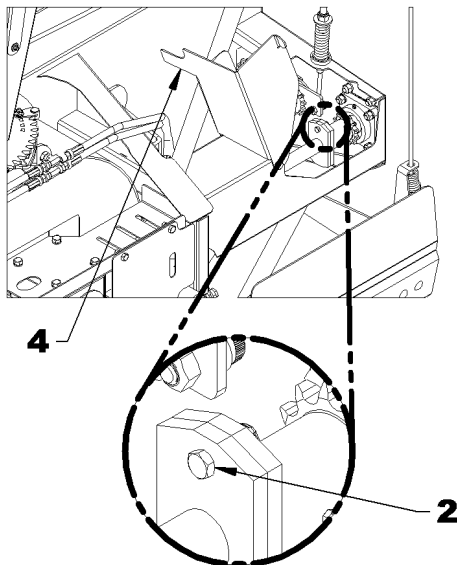
⚠ WARNING: To avoid serious personal injury or death: Provide adequate blocking before working under the snowblower when in raised position.

<u>MAINTENANCE SCHEDULE</u>		
DESCRIPTION	INTERVAL	REQUIRED MAINTENANCE
Hardware	After the first 8 hours of operation	Tighten all nuts and bolts according to <i>the Torque Specification Table</i> .
	40 hours of operation	
Hydraulic Connection	Before each equipment connection	Visual inspection of the connectors hydraulic/electric. Clean if necessary.
Shearbolts	As needed	See Table and the figure below
Lubrication	See Chart next page	See Chart next page
Chain Tension	10 hours of operation	See page 38
Drum skid shoe	40 hours of operation	Visual inspection of the wear. Rotate or replace the skid shoe if needed. (See page 39)

Shearbolts

At regular intervals, check the tightening of the shearbolts shown in the figure below to ensure proper operation of the snowblower. To access the shearbolts (items 1 and 2), lift the guards (items 3 and 4). If a bolt has broken, ensure the fan or the auger turn freely. Check around to make sure that no debris hard enough to break a shearbolt can enter in the snowblower. If the bolts need to be replaced, use the following parts only:

	SA80I	SA92IB (with T60 series driveline)	SA92IB (with T80 series driveline)
Driveline (item 1)	657199	657199	662296
Drive shaft (item 2)	665548	671821	671821



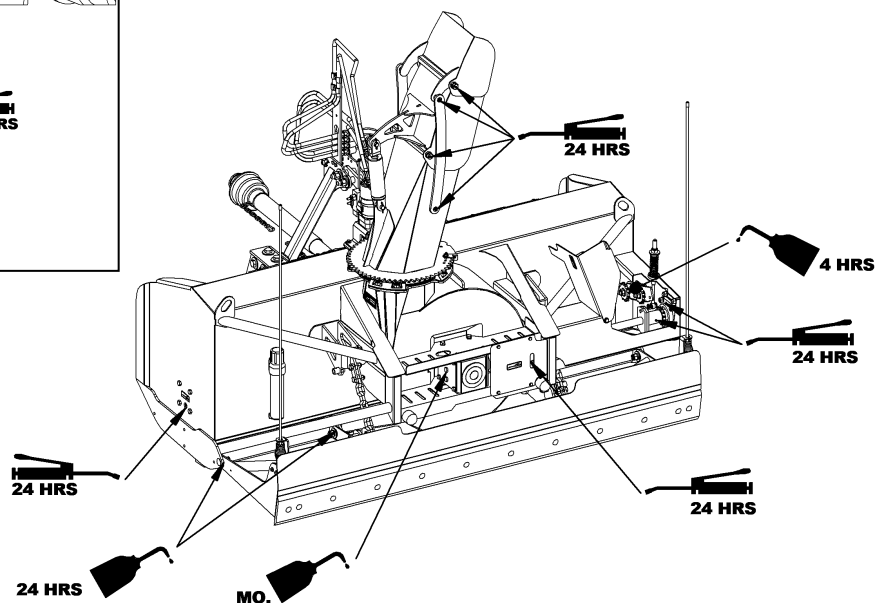
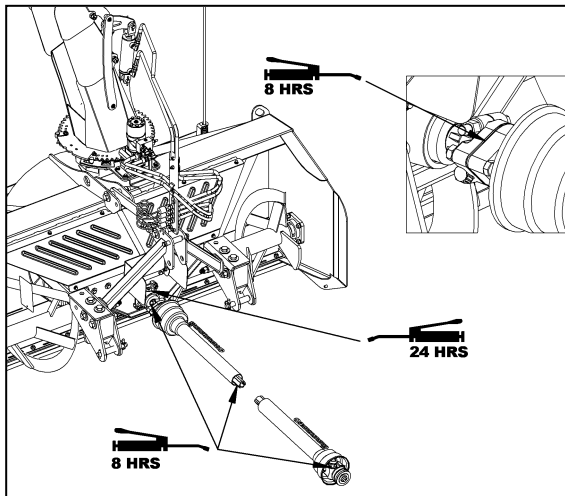
LUBRICATION

Use a grease gun and lubricate as follows:

DESCRIPTION	INTERVAL	REQUIRED LUBRICATION
Gearbox	Monthly	Check oil level. If needed, add extreme pressure oil, SAE 80W90 gear oil or equivalent. See page 37 for more detail.
	Once a year	Replace oil (Add 1.1 L or up to the middle plug of SAE 80W90 gear oil or equivalent). See page 37 for more detail.
Drive chain	4 hours and after each operation	Lubricate with chain and cable saw lubricant.
Drive shaft	24 hours of operation	Grease at the shear plate and the gearbox coupling with the grease fittings. Use a Shell Gadus S5 V100 grease or equivalent.
Bearings	24 hours of operation	Grease each bearing. Use a Shell Gadus S5 V100 grease or equivalent.
Chute	24 hours of operation	Grease the pivot points on each side of the chute. Use a Shell Gadus S5 V100 grease or equivalent.
Driveline	8 hours	Grease each universal joint and the shearplate. Separate the sliding parts and cover each with grease.
	Once a year	Oil the quick connect yokes.
Rear blade	24 hours of operation	Oil each pivot.

IMPORTANT: Perform all the maintenance section without considering the hours given in the following cases:

- At least once a year if the snowblower is used less than 20 hours annually.
- After each storage period.
- After each wash.



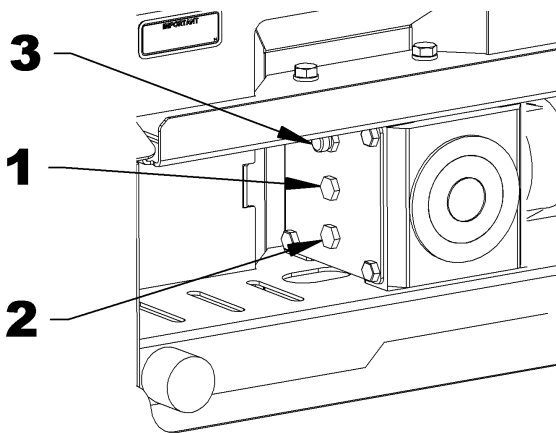


WARNING

To avoid serious personal injury:

- Before cleaning, adjusting or repairing the snowblower: bring the tractor to a complete stop, lower the implement, shut off the engine and remove the ignition key.
- Never park the tractor inside a building where an open flame or sparks are present. Allow the engine to cool down before storing in any enclosure.
- Run the snowblower a few minutes after blowing snow to prevent freeze up of auger and fan.
- Always use safety stand under the snowblower if you need to raise the snowblower to work on it.

Figure 31



Gearbox

Oil Level – Oil Fill Up

(Figure 31)

To check oil level.

1. Remove oil level plug (item 1).
2. If the oil is not flush with the bottom of the hole, remove the breather (item 3) and fill with the oil SAE 80W90, the AGMA 5EP extreme pressure or equivalent. Continue to fill until oil flows through the oil level plug hole.
3. Reinstall the plug (item 1) and the breather (item 3).

Oil Change

(Figure 31)

1. Place a suitable container under the snowblower to collect the used oil.
2. Remove the breather (item 3).
3. Remove the drain plug (item 2).
4. Dispose of used oil safely.
5. Reinstall the drain plug (item 2).
6. Remove the oil level plug (item 1)
7. Fill the gearbox with SAE 80W90 oil, AGMA 5EP extreme pressure oil or equivalent. Add 1.1 liters or fill until the oil flows through the hole in the oil level plug (item 1).
8. Reinstall the oil level plug (item 1) and the breather (item 3).

NOTE: When the gearbox is opened, the seal must be re-established. To do this, clean the contours of the gearbox, then apply a layer of silicone to the surface of the casing before closing it. Allow the silicone to dry for at least 24 hours before filling with oil.

Adjustment of the Chain Tension (Figure 32)

IMPORTANT: Tightening too tight can cause premature wear of the chain.
It is important not to over-tighten the chain.

A – ADJUSTMENT OF THE TENSION

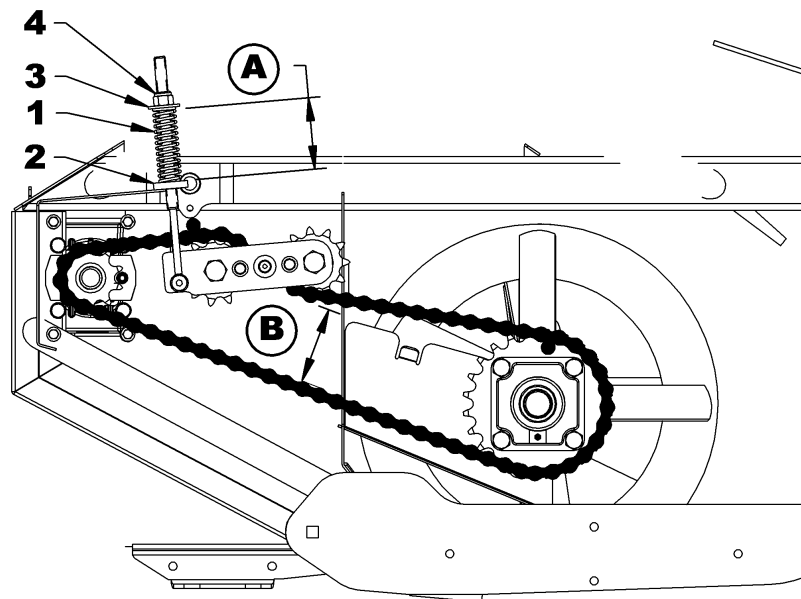
1. Every ten operating hours check the height of the compression spring (item 1), to have chain idler maximal efficiency.
2. Adjust the distance from the top of the welded bushing (item 2) to the bottom of the flat washer (item 3) by tightening the nut (item 4), to obtain **A= 4"**.

B – VERIFICATION OF THE WEAR

1. At the end of the operating season, check the chain elongation by measuring the distance "B" between the two strands of the chain, as shown on figure.
2. The distance should be as follow:
 - SA80I: B= min 3"
 - SA92IB: B= min 2 ½"

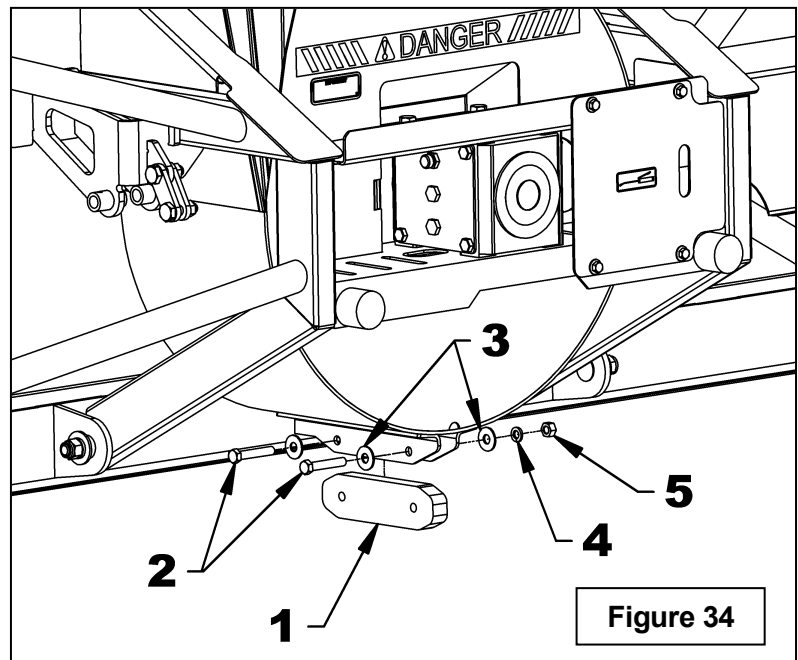
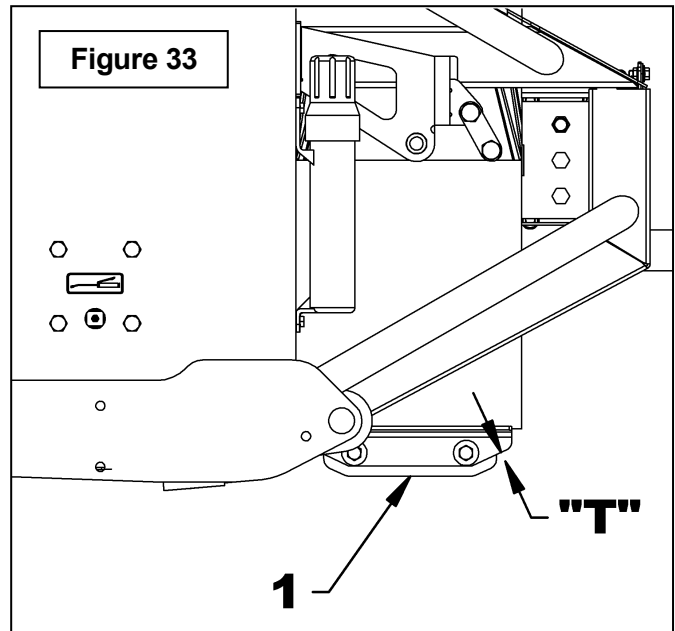
If less than that, the chain is too stretched or worn and may cause premature wear of the sprockets. It needs to be changed.

Figure 32



Drum skid shoe

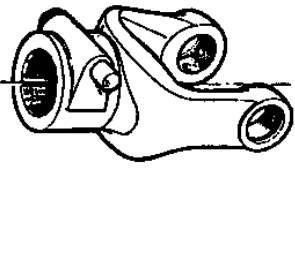
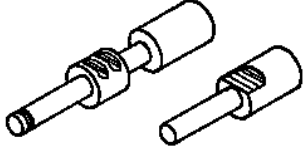
1. **Figure 33:** To check the wear on the drum skid shoe (item 1), verify the thickness ("T") of the Tivar material relative to the steel support in the back.
2. If the skid shoe (item 1) is too worn, it can be reversed front to rear and also down to up. This give a possibility of four positions available before the replacement of the part.
3. **Figure 34:** To reverse or replace the skid shoe (item 1), remove the two 7/16"NC x 2 1/2" hex bolts (item 2), four 7/16" flat washers (item 3), the 7/16" lockwashers (item 4) and the 7/16" hex nut (item 5).
4. **Figure 34:** Reverse or replace the skid shoe (item 1) by a new one and reinstall with the same hardware as described in the step 3.





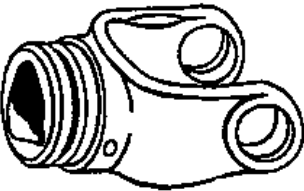
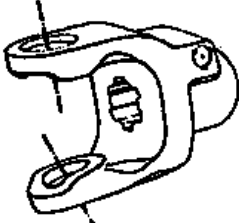
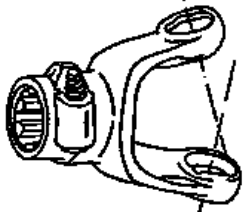
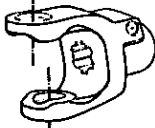
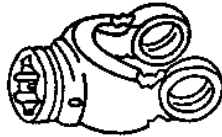
TROUBLESHOOTING

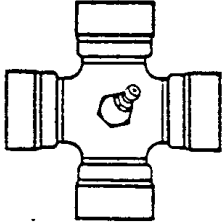
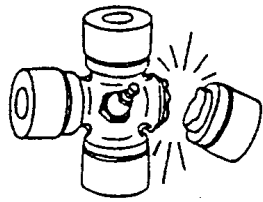
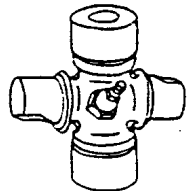
PROBLEM	CORRECTIVE MEASURES
1. Auger and/or fan not turning	<ul style="list-style-type: none"> • Check if an object is blocking the auger or fan • Check that PTO is engaged • Check that the drive system is in the engaged position • Check if chain is broken • Check if shearbolts are broken and replace if necessary • Gearbox lacking oil and is seized. Replace gearbox.
2. Snow is not being ejected from the chute	<ul style="list-style-type: none"> • Check if the fan is turning, refer to problem # 1 • Check if the snow output is obstructed, unplug with a 36" stick
3. Snowblower clogs up easily	<ul style="list-style-type: none"> • Engine is not at full RPM • Check that the chute is not obstructed • Reduce travel speed
4. Snow doesn't enter the snowblower properly	<ul style="list-style-type: none"> • Engine is not at full RPM • Check if shearbolts are broken and replace if necessary
5. Snow is not thrown very far	<ul style="list-style-type: none"> • Engine is not at full RPM • Reduce travel speed • Check that the chute is not obstructed
6. Snowblower doesn't scrape the ground well or leaves some snow	<ul style="list-style-type: none"> • The snowblower cutting edge is worn. Reverse or replace the cutting edge.
7. The rear blade is hopping	<ul style="list-style-type: none"> • The cutting edge is too worn and/or there is no more sharp edge. Reverse or replace the cutting edge.

DRIVELINE TROUBLESHOOTING

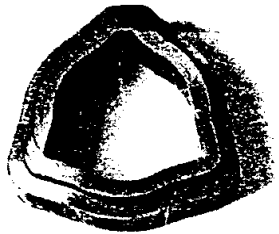

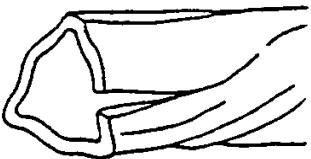

	AVOIDABLE DAMAGES	POSSIBLE CAUSES	CORRECTIVE ACTIONS
<p>QUICK-DISCONNECT YOKE</p> 	<p>1. ♦ Quick-disconnect pin tight or completely seized.</p> <ul style="list-style-type: none"> ♦ Quick-disconnect pin damaged (broken or bent) ♦ Quick-disconnect pin damaged in the locking portion. 	<ul style="list-style-type: none"> ♦ Quick-disconnect pin dirty (insufficient maintenance). ♦ Quick-disconnect pin defective (forced engagement, incorrect handling) ♦ Excessive shaft length. ♦ Axial loads too high. 	<ul style="list-style-type: none"> ♦ Clean, oil and follow service instructions. ♦ Replace quick-disconnect pin. ♦ Shorten shaft length (cut both telescopic tubes as well as shield and remove burrs). ♦ Replace quick-disconnect pin. ♦ Clean and grease telescopic tubes, and replace both tubes, if necessary. ♦ Replace quick-disconnect pin.

Note: Quick-disconnect pins must be cleaned and greased every 16 hours.

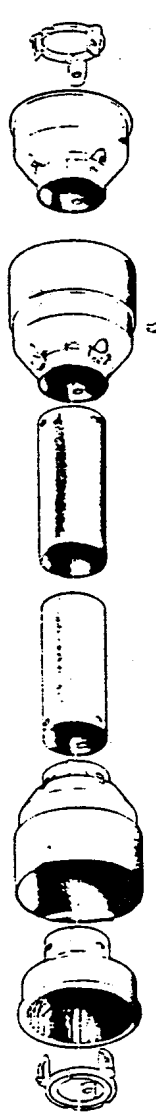
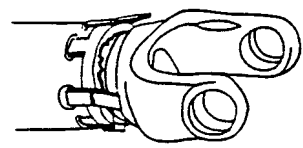
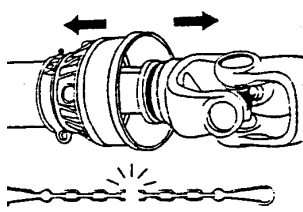
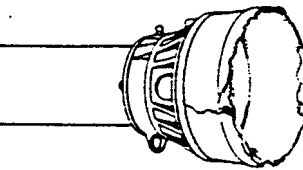
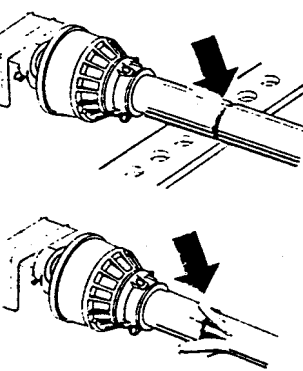
	AVOIDABLE DAMAGES	POSSIBLE CAUSES	CORRECTIVE ACTIONS
<p>YOKE</p>   	<ul style="list-style-type: none"> ♦ Yoke ears deformation  	<ul style="list-style-type: none"> ♦ Excessive shaft length. ♦ Axial loads too high. ♦ Excessive working angle and torque. 	<ul style="list-style-type: none"> ♦ Shorten shaft length (cut both telescopic tubes as well as shields and remove burrs). ♦ Replace defective yokes. ♦ Clean and grease telescopic tubes, and replace both tubes, if necessary. ♦ Replace defective yokes. ♦ Verify compatibility between shaft and working conditions (torque vs. angle). ♦ Disengage tractor driveline during cornering or when lifting or lowering the implement. ♦ Change to a larger driveline size. ♦ Replace defective yokes.
	<ul style="list-style-type: none"> ♦ Yoke ears distorted. 	<ul style="list-style-type: none"> ♦ Overload caused by high starting and peak torques. 	<ul style="list-style-type: none"> ♦ Engage driveline more carefully. ♦ Use appropriate safety devices. ♦ Replace defective yokes.
	<p>Yoke ears worn or pounded.</p> 	<ul style="list-style-type: none"> ♦ Excessive working angle. 	<ul style="list-style-type: none"> ♦ Avoid excessive working angle. ♦ Disengage tractor driveline during cornering. ♦ Replace defective yokes.

	AVOIDABLE DAMAGES	POSSIBLE CAUSES	CORRECTIVE ACTIONS
CROSS KIT 	<ul style="list-style-type: none"> ◆ Cross arms broken. 	<ul style="list-style-type: none"> ◆ Extreme torque peak or shock load. ◆ Axial loads too high. 	<ul style="list-style-type: none"> ◆ Use appropriate safety device. ◆ Change to a larger driveline size. ◆ Shorten driveline shaft. ◆ Replace defective cross bearings.
	<ul style="list-style-type: none"> ◆ Bearing caps turning in their cross journal. ◆ Overheated bearing caps. 	<ul style="list-style-type: none"> ◆ Excessive continuous torque and/or excessive working angle. ◆ Inadequate greasing. 	<ul style="list-style-type: none"> ◆ Verify compatibility between shaft and working conditions. ◆ Carefully follow greasing instructions. ◆ Replace defective cross bearings.
	<ul style="list-style-type: none"> ◆ Accelerated wear of cross kit. 	<ul style="list-style-type: none"> ◆ Excessive continuous torque and/or excessive working angle. ◆ Inadequate greasing. 	<ul style="list-style-type: none"> ◆ Verify compatibility between shaft and working conditions. ◆ Carefully follow greasing instructions. ◆ Replace defective cross bearings.

Note: Cross bearings must be greased every 8 working hours.

	AVOIDABLE DAMAGES	POSSIBLE CAUSES	CORRECTIVE ACTIONS
TELESCOPIC TUBES  	<ul style="list-style-type: none"> ◆ Telescopic tubes failure or twisting. 	<ul style="list-style-type: none"> ◆ Extreme torque peak or shock load. ◆ Short tube engagement. 	<ul style="list-style-type: none"> ◆ Use appropriate safety device. ◆ Change to a larger driveline size. ◆ Replace the driveline drive shaft with one having adequate length. ◆ Replace defective tubes.
	<ul style="list-style-type: none"> ◆ Accelerated wear of telescopic tubes. 	<ul style="list-style-type: none"> ◆ Extreme load when sliding. ◆ Short tube engagement. ◆ Inadequate greasing. ◆ Dirt 	<ul style="list-style-type: none"> ◆ Change to a driveline with rilsan coated inner tube. ◆ Replace the driveline with one having adequate length. ◆ Carefully follow greasing instructions. ◆ Replace defective tubes.

Note: Telescopic tubes must be cleaned and greased every 8 working hours.

	AVOIDABLE DAMAGES	POSSIBLE CAUSES	CORRECTIVE ACTIONS
<p>SHIELD</p> 	<ul style="list-style-type: none"> Excessive wear of shield bearings. 	<ul style="list-style-type: none"> Insufficient lubrication. Incorrect chain mounting. Shield interfering with implement. 	<ul style="list-style-type: none"> Follow lubrication instructions. Mount chain to allow maximum angularity. Avoid contact of the shields with fixed parts of the machine or tractor. Replace shield bearings.
	<ul style="list-style-type: none"> Chain moving or failure. 	<ul style="list-style-type: none"> Shield interfering with implement. Incorrect chain mounting. 	<ul style="list-style-type: none"> Avoid contact of the shields with fixed parts of the machine or tractor. Mount chain to allow maximum angularity. Replace defective parts.
	<ul style="list-style-type: none"> Shield cone damaged. 	<ul style="list-style-type: none"> Shield cone in contact with components on the tractor and/or implement. Excessive angularity. 	<ul style="list-style-type: none"> Eliminate interference between Shield cones and any part on the tractor and/or implement. Avoid excessive angle during cornering or when lifting or lowering the implement. Replace damaged Shield cones.
	<ul style="list-style-type: none"> Shield tubes damaged (deformed and split at one side). 	<ul style="list-style-type: none"> Shields in contact with components on the tractor and/or implement. Shield tubes overlap too short or no overlap at all with extended driveline. 	<ul style="list-style-type: none"> Eliminate interference between Shield cones and any part on the tractor and/or implement. Replace damaged tubes. Adjust Shield tubes length with longer tubes.

Note: Shield bearings must be greased every 8 working hours.

STORAGE

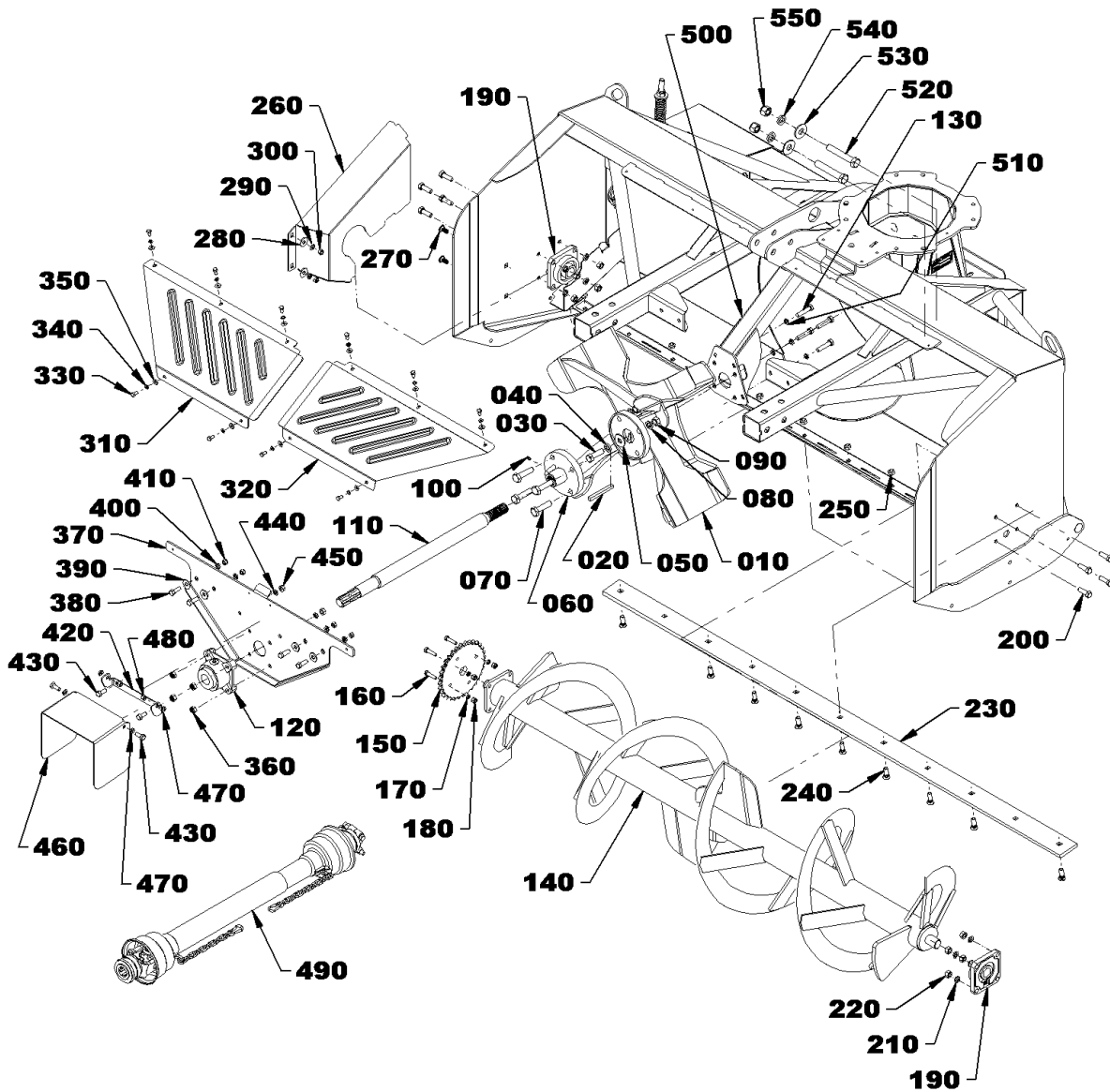
Before storing the snowblower, certain precautions should be taken to protect it from deterioration.

1. Clean the subframe and snowblower thoroughly.
2. Make all the necessary repairs.
3. Replace all safety signs that are damaged, lost, or otherwise become illegible. If a part to be replaced has a label on it, obtain a new safety label from your dealer and install it in the same place as on the removed part.
4. Repaint all parts from which paint has worn or peeled.
5. Lubricate the snowblower as instructed under "**Lubrication**" section.
6. When the snowblower is dry, oil all moving parts. Apply oil liberally to all surfaces to protect against rust.
7. Store the hydraulic hoses in the storage provided for this purpose.
8. Install the chain of the driveline shaft to support it.
9. Store in a dry place.

PARTS

INVERTED SNOWBLOWER 80"-92" - FRONT

REFER TO THE PARTS LIST CORRESPONDING TO YOUR MODEL.



INVERTED SNOWBLOWER 80"-FRONT

REF.	QTY	DESCRIPTION	PART #
010	1	Fan	672188
020	1	Key 3/8" x 3/8" x 4" Lg.	4500075
030	1	Hex bolt ø5/8" NC x 2" Lg. Gr.5, Plated	0100095
040	1	Lockwasher ø5/8" Plated	1200007
050	1	Flat washer 11/16" trou Plated	1400008
060	1	Coupling shaft	672212
070	4	Hex bolt ø5/8" NC x 2 1/2" Lg. Gr.5, Plated	0100097
080	4	Lockwasher 5/8" Plated	1200007
090	4	Stover locknut ø5/8" NC, Plated	1100007
100	1	Grease fitting ø1/4" NF, straight	654106
110	1	Input shaft	672180
120	1	Cone bearing for 1 7/16" dia. shaft	4300142
130	4	Hex bolt 12mm x 1.75 x 55 mm Lg., full thread Gr.8.8 Plated	0200034
140	1	Auger	672237
150	1	Sprocket #60A32, ø1 1/4" hole	654167
160	4	Hex bolt ø3/8"NC x 1 1/2" Lg. Gr.5 Plated	0100040
170	4	Lockwasher ø3/8" Plated	1200004
180	4	Nylon insert locknut ø3/8" NC Plated	1000006
190	2	Flange bearing ø1 1/4" w/ two grease fittings	4300001
200	8	Hex bolt ø1/2" NC x 1 1/2" Lg. Gr.5 Plated	0100070
210	8	Lockwasher ø1/2" Plated	1200006
220	8	Hex nut ø1/2" NC, Plated	0900006
230	1	Cutting edge	672245
240	11	Plow bolt ø1/2" NC x 1 1/2" Lg. Gr.5 Plated	0400006
250	11	Stover lock nut 1/2" NC Plated	1100006
260	1	Chain guard	672244
270	2	Carriage bolt ø7/16" NC x 1" Lg. Gr.5 Plated	0300018
280	2	Flat washer ø1/2" hole Plated	1400005
290	2	Lockwasher ø7/16" Plated	1200005
300	2	Nylon insert locknut ø7/16" NC Plated	1000009
310	1	Right auger guard	672251
320	1	Left auger guard	672250
330	10	Hex bolt ø5/16" NC x 5/8" Lg. Gr.5 Plated	0100017
340	10	Lockwasher ø5/16" Plated	1200003
350	10	Flat washer ø5/16" hole Plated	1400002

INVERTED SNOWBLOWER 80"-FRONT

REF.	QTY	DESCRIPTION	PART #
360	4	Nylon insert locknut ø12mm x 1.75mm Plated	1000022
370	1	Support for bearing	672243
380	4	Hex bolt ø7/16" NC x 1 1/4" Lg. Gr. 5 Plated	0100057
390	4	Flat washer ø1/2" hole Plated	1400005
400	4	Lockwasher ø7/16" Plated	1200005
410	4	Nylon insert locknut ø7/16" NC Plated	1000009
420	1	Driveline shield bracket	671703
430	4	Hex bolt ø7/16" NC x 1" Lg. Gr. 5 Plated	0100056
440	2	Lockwasher ø7/16" Plated	1200005
450	2	Hex nut ø7/16" NC Plated	0900005
460	1	Driveline shield	673015
470	4	Nylon flat washer ø7/16" hole	658468
480	4	Nylon insert locknut ø7/16" NC Plated	1000009
490	1	Driveline 06 series, 28" c/c closed	662538
500	1	Reinforcement for bearing	672193
510	4	Lockwasher 12mm Plated	1200019
520	2	Hex bolt ø3/4"NC x 4 1/2"Lg. Gr.5 Plated	0100125
530	2	Flat washer ø3/4" (13/16" int) Plated	1400010
540	2	Lockwasher ø3/4" Plated	1200008
550	2	Nylon insert locknut ø3/4" NC Plated	1200013

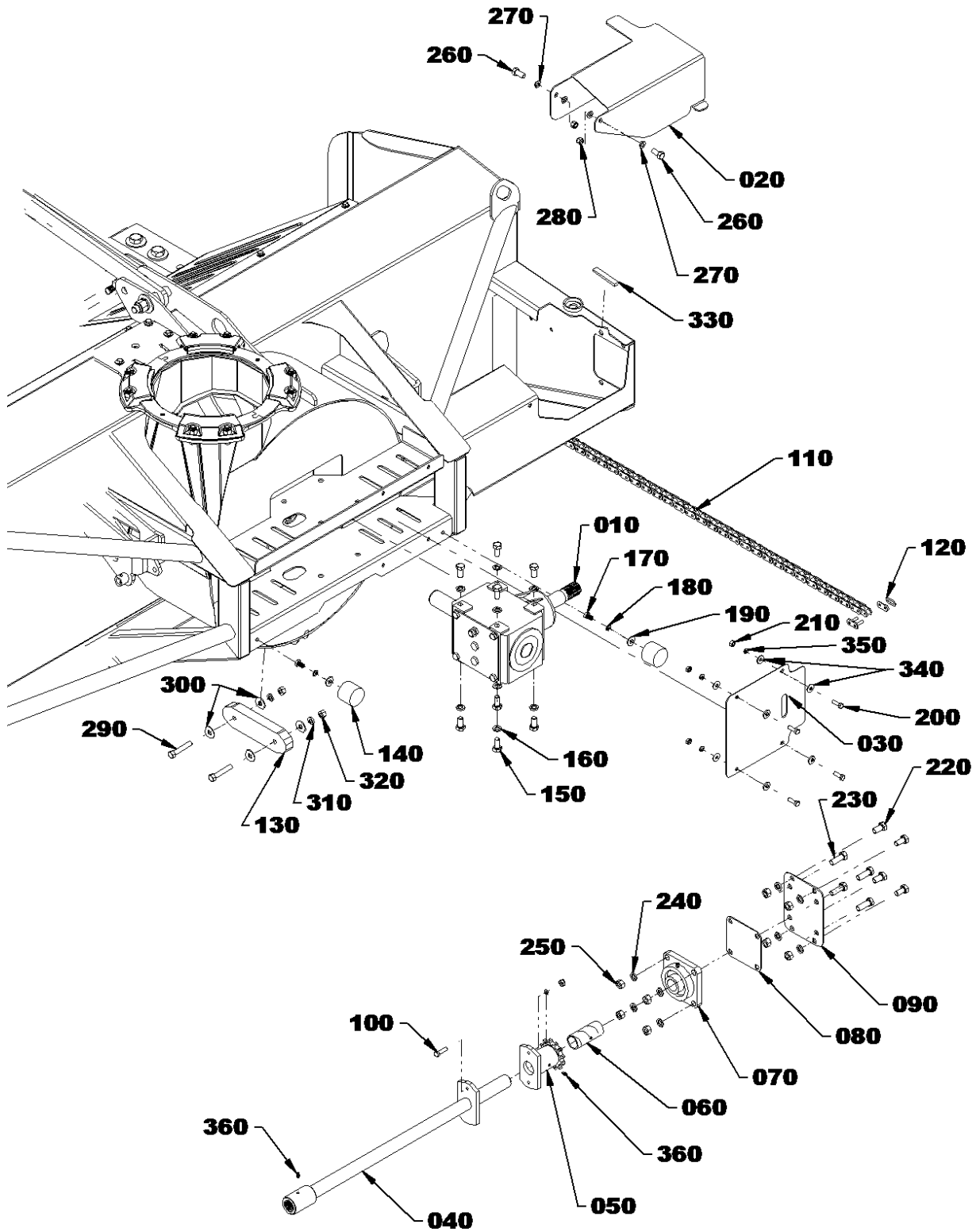
INVERTED SNOWBLOWER 92" - FRONT

REF.	QTY	DESCRIPTION	PART #
010	1	Fan	672345
020	1	Key 3/8" x 3/8" x 4" Lg.	4500075
030	1	Hex bolt \varnothing 5/8" NC x 2" Lg. Gr.5 Plated	0100095
040	1	Lockwasher \varnothing 5/8" Plated	1200007
050	1	Flat washer \varnothing 11/16" trou Plated	1400008
060	1	Coupling shaft	672212
070	4	Hex bolt \varnothing 5/8" NC x 2 1/2" Lg. Gr.5, Plated	0100097
080	4	Lockwasher \varnothing 5/8" Plated	1200007
090	4	Stover locknut \varnothing 5/8" NC, Plated	1100007
100	1	Grease fitting \varnothing 1/4" NF, straight	654106
110	1	Input shaft	672183
120	1	Cone bearing shaft 1 7/16" dia.	4300142
130	4	Hex bolt 12mm x 1.75 x 55 mm Lg. full thread Gr.8.8 Plated	0200034
140	1	Auger	672376
150	1	Sprocket #80A24, \varnothing 1 1/2" hole	3300074
160	4	Hex bolt \varnothing 7/16" NC x 1 1/2" Lg. Gr.5 Plated	0100058
170	4	Lockwasher \varnothing 7/16", Plated	1200005
180	4	Nylon insert locknut \varnothing 7/16" NC Plated	1000009
190	2	Flange bearing \varnothing 1 1/2" w/ two grease fittings	4300018
200	8	Hex bolt \varnothing 5/8" NC x 1 3/4" Lg. Gr.5, Plated	0100094
210	8	Lockwasher \varnothing 5/8", Plated	1200007
220	8	Hex nut 5/8" NC, Plated	0900007
230	1	Cutting edge	672352
240	13	Plow bolt \varnothing 1/2" NC x 1 1/2" Lg. Gr.5 Plated	0400006
250	13	Stover locknut \varnothing 1/2" NC Plated	1100006
260	1	Chain guard	672351
270	2	Carriage bolt \varnothing 7/16" NC x 1" Lg. Gr.5 Plated	0300018
280	2	Flat washer \varnothing 1/2" hole Plated	1400005
290	2	Lockwasher \varnothing 7/16" Plated	1200005
300	2	Nylon insert locknut \varnothing 7/16" NC Plated	1000009
310	1	Right auger guard	672356
320	1	Left auger guard	672357
330	10	Hex bolt \varnothing 5/16" NC x 5/8" Lg. Gr.5 Plated	0100017
340	10	Lockwasher \varnothing 5/16" Plated	1200003
350	10	Flat washer \varnothing 5/16" hole Plated	1400002

INVERTED SNOWBLOWER 92" - FRONT

REF.	QTY	DESCRIPTION	PART #
360	4	Nylon insert locknut ø12mm x 1.75mm Plated	1000022
370	1	Support for bearing	672360
380	4	Hex bolt ø7/16"NC x 1 1/4" Lg. Gr.5 Plated	0100057
390	4	Flat washer ø1/2" hole Plated	1400005
400	4	Lockwasher ø7/16" Plated	1200005
410	4	Nylon insert locknut ø7/16" NC Plated	1000009
420	1	Drive line shield bracket	671703
430	4	Hex bolt ø7/16" NC x 1" Lg. Gr.5 Plated	0100056
440	2	Lockwasher ø7/16" Plated	1200005
450	2	Hex nut 7/16" NC Plated	0900005
460	1	Drive line shield	673015
470	4	Nylon flat washer ø7/16" hole	658468
480	4	Nylon insert locknut ø7/16"NC Plated	1000009
490	1	Driveline 06 series, 28" c/c closed	662538
500	1	Reinforcement for bearing	672193
510	4	Lockwasher 12mm Plated	1200019
520	2	Hex bolt ø3/4"NC x 4 1/2" Lg. Gr.5 Plated	0100125
530	2	Flat washer ø3/4" (13/16" int) Plated	1400010
540	2	Lockwasher ø3/4" Plated	1200008
550	2	Nylon insert locknut ø3/4" NC Plated	1200013

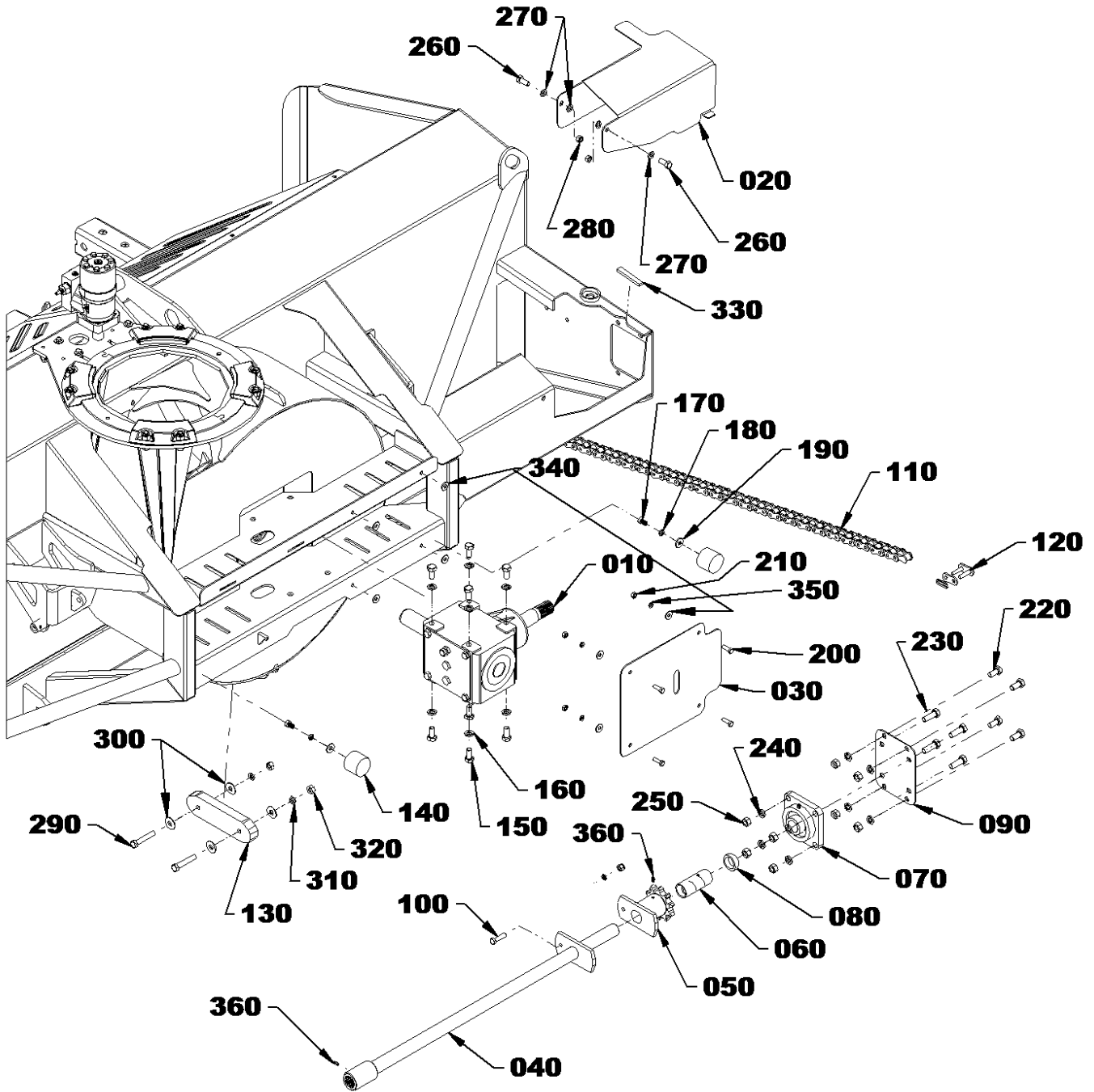
INVERTED SNOWBLOWER 80" - REAR



INVERTED SNOWBLOWER 80" - REAR

REF.	QTY	DESCRIPTION	PART #
010	1	Gearbox	667976
020	1	Access panel	672252
030	1	Protective plate	672249
040	1	Driving shaft	671692
050	1	Shear plate & sprocket	671801
060	1	Oilite bushing	4300131
070	1	Flange bearing ϕ 1 1/4" w/two grease fittings	4300001
080	1	Spacer plate	669694
090	1	Driving shaft support	671697
100	1	Shear bolt ϕ 5/16" x 1 1/4 Gr.5, lock & nut	665548
110	1	Chain #60H X 86 links (incl. connecting link)	3300073
120	1	Connecting link #60H	662029
130	1	Rear skid shoe - TIVAR	672253
140	2	Rubber stopper 2" dia. x 1.614"	2200055
150	8	Hex bolt ϕ 1/2" NC x 1" Lg. Gr.5, Plated	0100068
160	8	Lockwasher ϕ 1/2" Plated	1200006
170	2	Hex bolt ϕ 3/8" NC x 5/8" Gr.5 Plated	0100276
180	2	Lockwasher ϕ 3/8" Plated	1200004
190	2	Flat washer ϕ 7/16" hole Plated	1400004
200	4	Hex bolt ϕ 5/16" NC x 1" Lg. Gr.5 Plated	0100019
210	4	Hex nut 5/16" NC Plated	0900002
220	4	Hex bolt ϕ 1/2" NC x 1" Lg. Gr.5 Plated	0100068
230	4	Hex bolt ϕ 1/2" NC x 1 1/2" Lg. Gr.5 Plated	0100070
240	8	Lockwasher ϕ 1/2" Plated	1200006
250	8	Hex nut ϕ 1/2" NC Plated	0900006
260	2	Hex bolt ϕ 7/16" NC x 1" Lg. Gr.5 Plated	0100056
270	4	Nylon flat washer ϕ 7/16" hole	658468
280	2	Nylon insert locknut ϕ 7/16" NC Plated	1000009
290	2	Hex bolt ϕ 7/16" NC x 2 1/2" Lg. Gr.5 Plated	0100061
300	4	Flat washer ϕ 1/2" hole Plated	1400005
310	2	Lockwasher ϕ 7/16" Plated	1200005
320	2	Hex nut ϕ 7/16" NC, Plated	0900005
330	1	Adhesive strip 1" large (neoprene)	671654
340	8	Flat washer ϕ 7/16" hole Plated	1400003
350	4	Lockwasher ϕ 5/16" Plated	1200003
360	4	Grease fitting ϕ 1/4"NF	654106

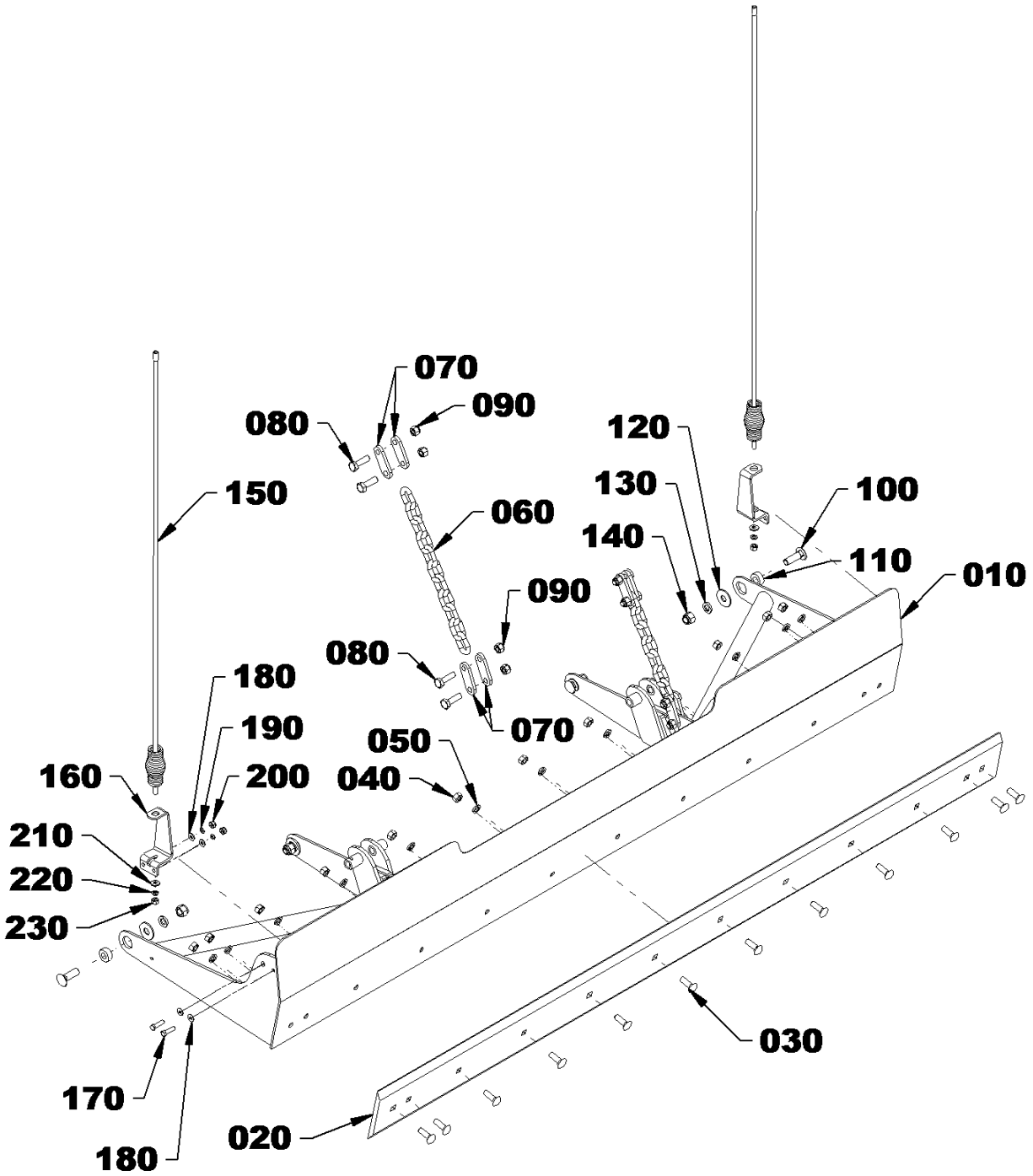
INVERTED SNOWBLOWER 92" - REAR



INVERTED SNOWBLOWER 92" - REAR

REF.	QTY	DESCRIPTION	PART #
010	1	Gearbox	667976
020	1	Access panel	672358
030	1	Protective plate	672355
040	1	Driving shaft	671772
050	1	Shear plate & sprocket	671219
060	1	Oilite bushing	4300129
070	1	Flange bearing \varnothing 1 1/4" w/two grease fittings	4300001
080	1	Spacer plate	672377
090	1	Driving shaft support	671697
100	1	Shear bolt \varnothing 3/8" x 1 1/2 full thread Gr5. lock & nut	671821
110	1	Chain #80 X 69 links (incl. 1/2 link + connecting link)	3300072
120	1	Connecting link #80	655549
130	1	Drum skid shoe - TIVAR	672253
140	2	Rubber stopper 2" dia. X 1.614"	2200055
150	8	Hex bolt \varnothing 1/2" NC x 1" Lg. Gr.5, Plated	0100068
160	8	Lockwasher \varnothing 1/2" Plated	1200006
170	2	Hex bolt \varnothing 3/8" NC x 5/8" Gr.5, Plated	0100276
180	2	Lockwasher \varnothing 3/8" Plated	1200004
190	2	Flat washer \varnothing 7/16" hole Plated	1400004
200	4	Hex bolt \varnothing 5/16" NC x 1" Lg. Gr.5, Plated	0100019
210	4	Hex nut \varnothing 5/16" NC Plated	0900002
220	4	Hex bolt \varnothing 1/2" NC x 1" Lg. Gr.5, Plated	0100068
230	4	Hex bolt \varnothing 1/2" NC x 1 1/2" Lg. Gr.5, Plated	0100070
240	8	Lockwasher \varnothing 1/2" Plated	1200006
250	8	Hex nut \varnothing 1/2" NC Plated	0900006
260	2	Hex bolt \varnothing 7/16" NC x 1" Lg. Gr.5, Plated	0100056
270	4	Nylon flat washer \varnothing 7/16" hole	658468
280	2	Nylon insert locknut \varnothing 7/16" NC Plated	1000009
290	2	Hex bolt \varnothing 7/16" NC x 2 1/2" Lg. Gr.5, Plated	0100061
300	4	Flat washer \varnothing 1/2" hole Plated	1400005
310	2	Lockwasher \varnothing 7/16" Plated	1200005
320	2	Hex nut \varnothing 7/16" NC, Plated	0900005
330	1	Adhesive strip 1" large (neoprene)	671654
340	8	Flat washer \varnothing 7/16" hole Plated	1400003
350	4	Lockwasher \varnothing 5/16" Plated	1200003
360	4	Grease fitting \varnothing 1/4"NF	654106

REAR BLADE - INVERTED SNOWBLOWER 80" - 92"
REFER TO THE PARTS LIST CORRESPONDING TO YOUR MODEL.



REAR BLADE - INVERTED SNOWBLOWER 80"

REF.	QTY	DESCRIPTION	PART #
010	1	Rear blade 80"	672192
020	1	Cutting edge	672246
030	12	Carriage bolt \varnothing 1/2"NC x 1 1/2" Lg. Gr.5, Plated	0300024
040	12	Hex nut \varnothing 1/2"NC Plated	0900006
050	12	Lockwasher \varnothing 1/2" Plated	1200006
060	2	Chain 3/8 X 16 3/4" Lg. STD Plated Gr.30	672242
070	8	Chain support Plated	672241
080	8	Hex bolt \varnothing 1/2"NC x 1 3/4" Lg. Gr.5, Plated	0100071
090	8	Nylon insert locknut \varnothing 1/2"NC Plated	1000011
100	4	Carriage bolt \varnothing 5/8"NC x 2" Lg. Gr.5, Plated	0300045
110	4	Bushing \varnothing 1 1/4" X 1/2" thick	672239
120	4	Flat washer \varnothing 11/16" hole Plated	1400008
130	4	Lockwasher \varnothing 5/8" Plated	1200007
140	4	Nylon insert locknut \varnothing 5/8"NC Plated	1000012
150	2	Marker with spring	4200065
160	2	Marker support	672247
170	4	Hex bolt \varnothing 5/16"NC x 1 1/4" Lg. Gr.5 Plated	0100020
180	8	Flat washer \varnothing 5/16" hole Plated	1400002
190	4	Lockwasher \varnothing 5/16" Plated	1200003
200	4	Nylon insert locknut \varnothing 1/2"NC Plated	1000005
210	2	Flat washer \varnothing 3/8" hole Plated	1400003
220	2	Lockwasher \varnothing 3/8" Plated	1200004
230	2	Hex nut \varnothing 3/8"NC Plated	0900003

REAR BLADE - INVERTED SNOWBLOWER 92"

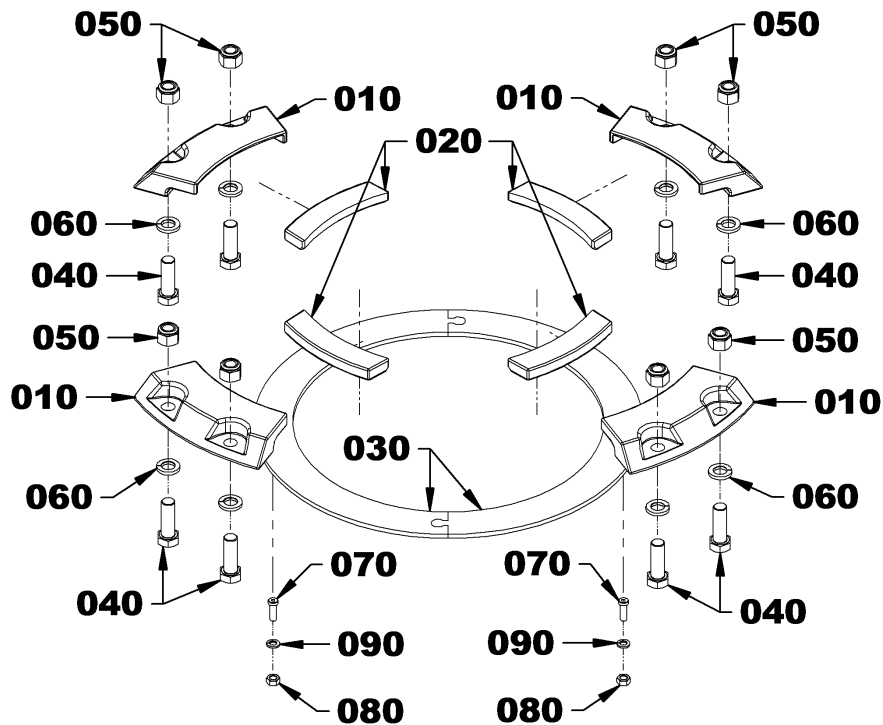
REF.	QTY	DESCRIPTION	PART #
010	1	Rear blade 92"	672346
020	1	Cutting edge	672353
030	13	Carriage bolt \varnothing 1/2" NC x 1 3/4" Lg. Gr.5, Plated	0300025
040	13	Hex nut \varnothing 1/2"NC Plated	0900006
050	13	Lockwasher \varnothing 1/2" Plated	1200006
060	2	Chain 3/8 X 16 3/4"Lg. STD Plated Gr.30	672242
070	8	Chain support Plated	672241
080	8	Hex bolt \varnothing 1/2"NC x 1 3/4" Lg. Gr.5, Plated	0100071
090	8	Nylon insert locknut \varnothing 1/2" NC Plated	1000011
100	4	Carriage bolt \varnothing 5/8" NC x 2 1/2" Lg. Gr.5 Plated	0300041
110	4	Bushing \varnothing 1 1/4" X 1/2" thick	672239
120	4	Flat washer \varnothing 11/16" hole Plated	1400008
130	4	Lockwasher \varnothing 5/8" Plated	1200007
140	4	Nylon insert locknut \varnothing 5/8"NC Plated	1000012
150	2	Marker with spring	4200065
160	2	Marker support	672247
170	4	Hex bolt \varnothing 5/16"NC x 1 1/4" Lg. Gr.5 Plated	0100020
180	8	Flat washer \varnothing 5/16" hole Plated	1400002
190	4	Lockwasher \varnothing 5/16" Plated	1200003
200	4	Nylon insert locknut \varnothing 1/2"NC Plated	1000005
210	2	Flat washer \varnothing 3/8" hole Plated	1400003
220	2	Lockwasher \varnothing 3/8" Plated	1200004
230	2	Hex nut \varnothing 3/8"NC Plated	0900003

CHUTE BASE - SNOWBLOWER 80"

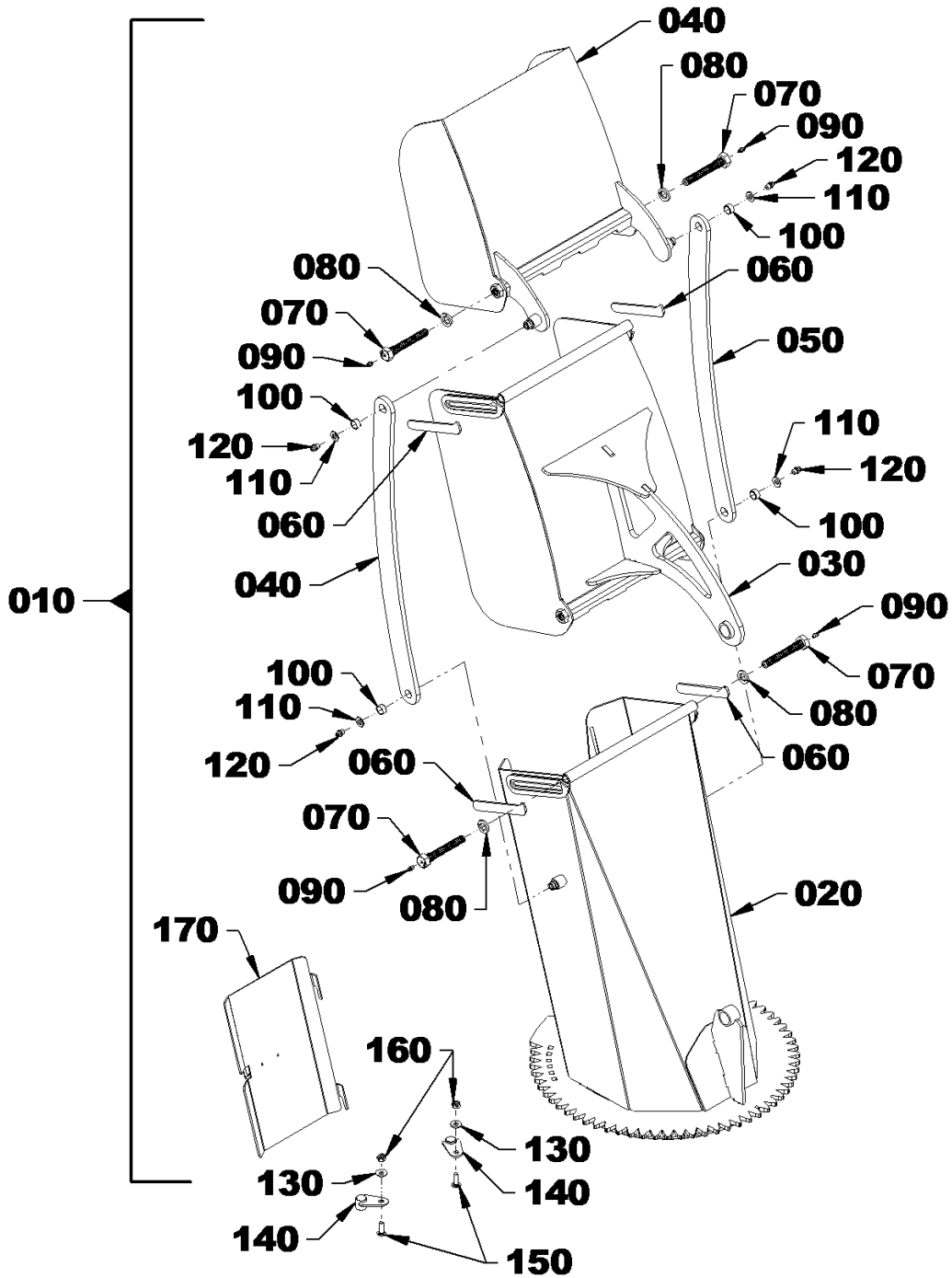
REF.	QTY	DESCRIPTION	PART #
010	4	Retaining plate	670933
020	4	Chute guide	670944
030	2	Antifriction plate	671608
040	8	Hex bolt $\varnothing 1/2$ "NC x 1 1/2" Gr.5, Plated	0100070
050	8	Nylon insert locknut $\varnothing 1/2$ "NC Plated	1000011
060	8	Lockwasher $\varnothing 1/2$ " Plated	1200006
070	2	Low profile socket head cap screw $\varnothing 1/4$ "NC x 3/4" Plated	0800059
080	2	Hex nut $\varnothing 1/4$ "NC Plated	0900001
090	2	Lockwasher $\varnothing 1/4$ " Plated	1200002

CHUTE BASE - SNOWBLOWER 92 "

REF.	QTY	DESCRIPTION	PART #
010	4	Retaining plate	670933
020	4	Chute guide	670944
030	2	Antifriction plate	670945
040	8	Hex bolt $\varnothing 1/2$ "NC x 1 1/2" Gr.5, Plated	0100070
050	8	Nylon insert locknut $\varnothing 1/2$ "NC Plated	1000011
060	8	Lockwasher $\varnothing 1/2$ " Plated	1200006
070	2	Low profile socket head cap screw $\varnothing 1/4$ "NC x 3/4" Plated	0800059
080	2	Hex nut $\varnothing 1/4$ "NC Plated	0900001
090	2	Lockwasher $\varnothing 1/4$ " Plated	1200002



CHUTE WITH DEFLECTOR - SNOWBLOWER 80"-92"
REFER TO THE PARTS LIST CORRESPONDING TO YOUR MODEL.



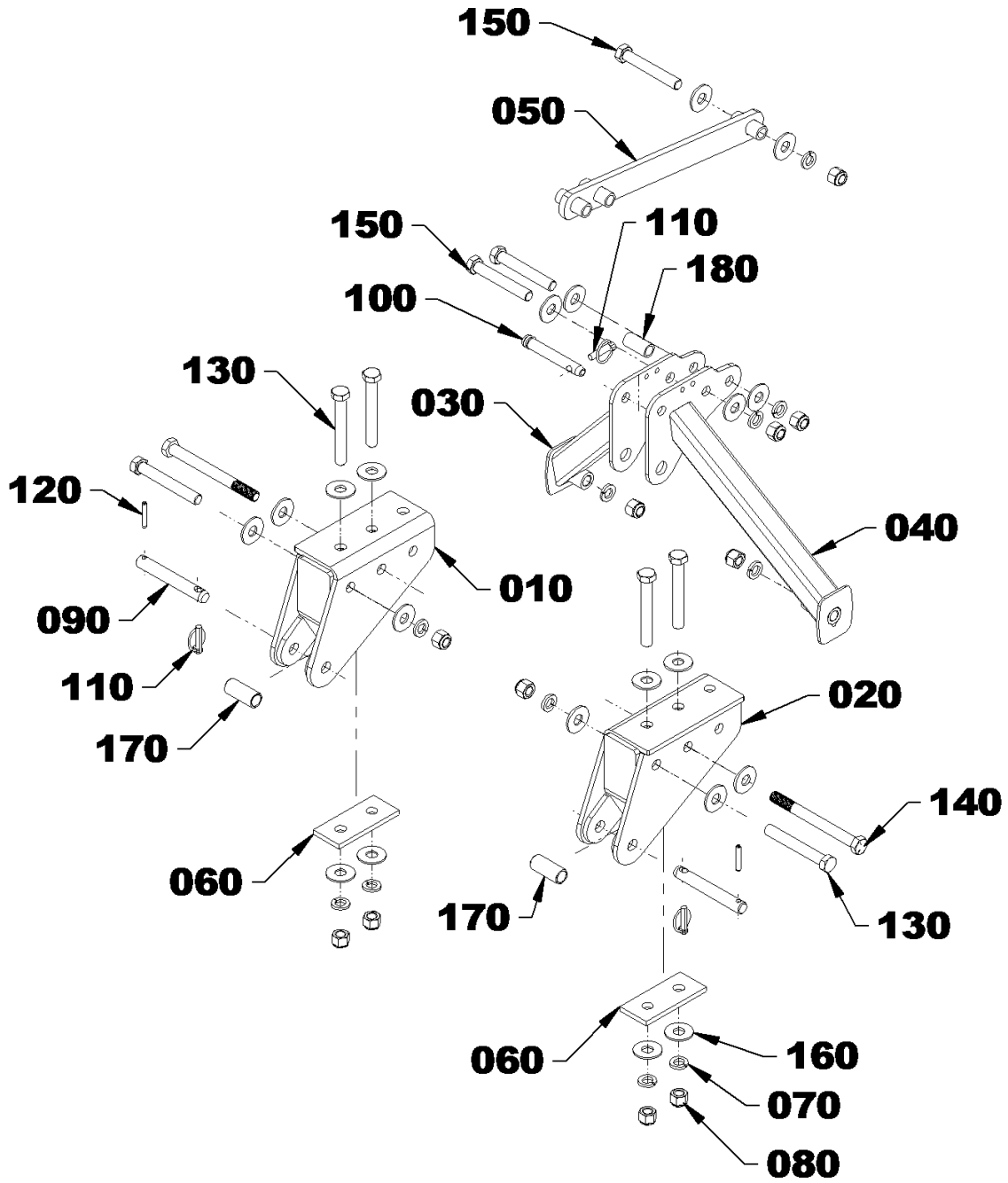
CHUTE WITH DEFLECTOR - INVERTED SNOWBLOWER 80"

REF.	QTY	DESCRIPTION	PART #
010	1	Chute assembly with English decals	671737
020	1	Chute base	671738
030	1	Middle deflector	671605
040	1	Upper deflector	671606
050	2	Chute lever	671607
060	4	Antifriction plate	671609
070	4	Hinge bolt	671610
080	4	Lockwasher $\varnothing 5/8$ " Plated	1200007
090	4	Grease fitting $\varnothing 1/4$ "NF	654106
100	4	Plastic bushing	4300124
110	4	Flat washer 10mm Plated	1400019
120	4	Grease fitting $\varnothing 1/8$ NPT	656493
130	2	Flat washer $\varnothing 5/16$ " Plated	1400003
140	2	Stopper	671611
150	2	Carriage bolt $\varnothing 5/16$ "NC x 1" Plated	0300003
160	2	Nylon insert locknut $\varnothing 5/16$ "NC Plated	1000005

CHUTE WITH DEFLECTOR - INVERTED SNOWBLOWER 92"

REF.	QTY	DESCRIPTION	PART #
010	1	Chute assembly with English decals	671760
020	1	Chute base	671761
030	1	Middle deflector	671762
040	1	Upper deflector	671763
050	2	Chute lever	671764
060	4	Antifriction plate	671609
070	4	Hinge bolt	671610
080	4	Lockwasher $\varnothing 5/8$ " Plated	1200007
090	4	Grease fitting $\varnothing 1/4$ "NF	654106
100	4	Plastic bushing	4300124
110	4	Flat washer 10mm Plated	1400019
120	4	Grease fitting $\varnothing 1/8$ NPT	656493
130	2	Flat washer $\varnothing 5/16$ " Plated	1400003
140	2	Stopper	671611
150	2	Carriage bolt $\varnothing 5/16$ "NC x 1" Plated	0300003
160	2	Nylon insert locknut $\varnothing 5/16$ "NC Plated	1000005
170	1	Chute door	671766

THREE POINT HITCH - INVERTED SNOWBLOWER 80" - 92"
REFER TO THE PARTS LIST CORRESPONDING TO YOUR MODEL.



THREE POINT HITCH - INVERTED SNOWBLOWER 80"

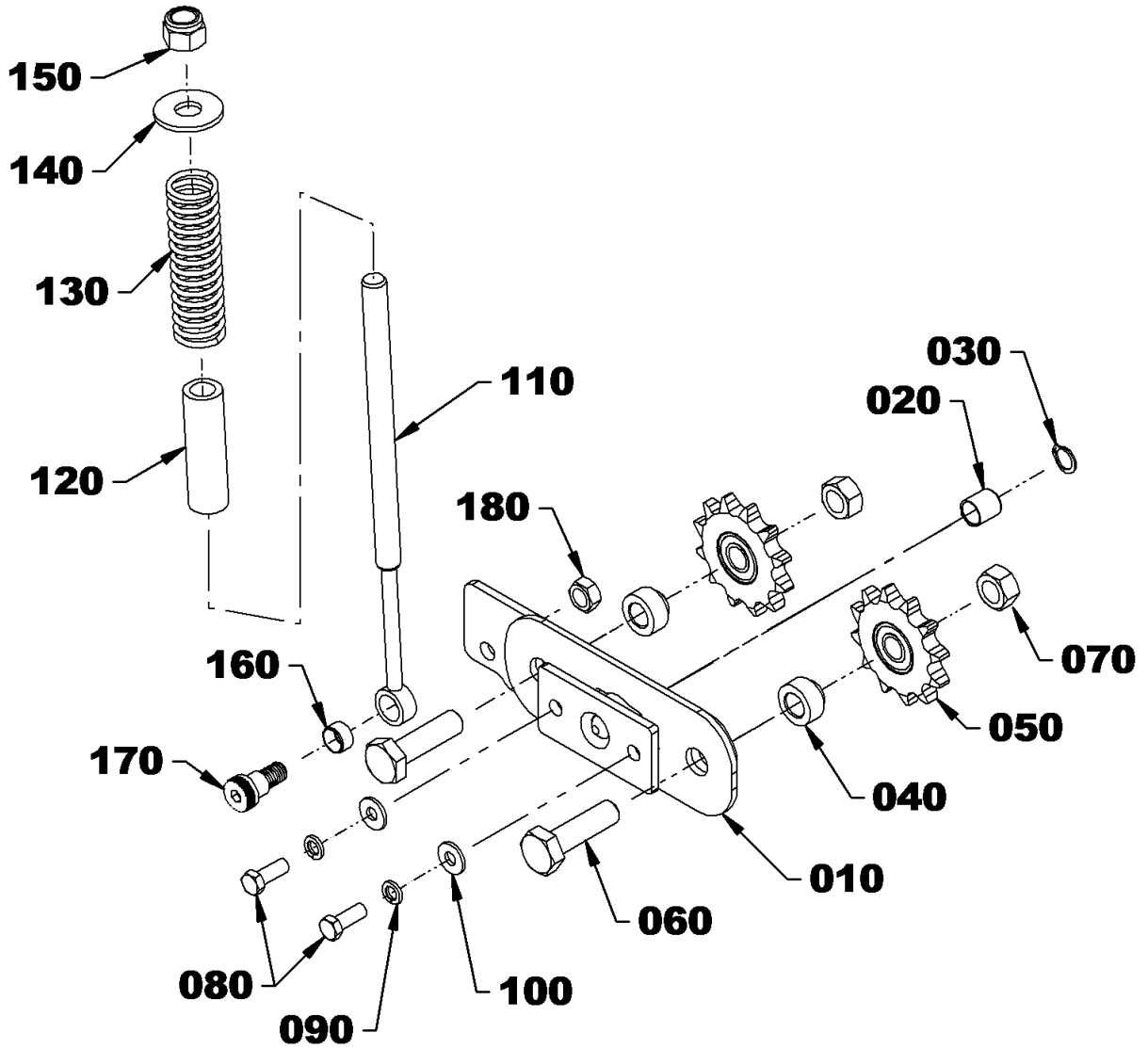
REF.	QTY	DESCRIPTION	PART #
010	1	Right lower hitch	672209
020	1	Left lower hitch	672210
030	1	Right hitch	672187
040	1	Left hitch	672186
050	1	Upper hitch	672211
060	2	Reinforcement plate	668117
070	11	Lockwasher ø3/4" Plated	1200008
080	11	Nylon insert locknut ø3/4" NC Plated	1000013
090	2	Pin ø7/8" x 6 1/4" Lg. Cat. 1, Plated	4600043
100	1	Pin ø3/4" x 5 7/16" Lg. Cat. 1, Plated	4600051
110	3	Linchpin ø7/16" Plated	1900003
120	2	Spring pin ø5/16" x 2" Lg. black	1600034
130	6	Hex bolt ø3/4" NC x 5 1/2" Lg. Gr.5, Plated	0100127
140	2	Hex bolt ø3/4" NC x 8" Lg. Gr.5, Plated	0100131
150	3	Hex bolt ø3/4" NC x 5" Lg. Gr.5, Plated	0100126
160	20	Flat washer ø13/16" Plated	1400010
170	2	Bushing Cat.1 & 2 (7/8" int. x 1 1/8" ext. x 2 1/2" Lg.)	4600066
180	1	Bushing Cat.1 & 2 (3/4" dia int. x 1" dia. ext X 2" Lg.)	4600056

THREE POINT HITCH - INVERTED SNOWBLOWER 92"

REF.	QTY	DESCRIPTION	PART #
010	1	Right lower hitch	672347
020	1	Left lower hitch	672348
030	1	Right hitch	672344
040	1	Left hitch	672343
050	1	Upper hitch	672349
060	2	Reinforcement plate	668117
070	11	Lockwasher ø3/4" Plated	1200008
080	11	Nylon insert locknut ø3/4" NC Plated	1000013
090	2	Pin ø1 1/8" x 6 1/4" Lg. Cat. 2 Plated	4600042
100	1	Pin ø1" x 6 1/16" Lg. Cat. 2, Plated	4600052
110	3	Linchpin ø7/16" Plated	1900003
120	2	Spring pin ø5/16" x 2" Lg. black	1600034
130	6	Hex bolt ø3/4" NC x 5 1/2" Lg. Gr.5, Plated	100127
140	2	Hex bolt ø3/4" NC x 8" Lg. Gr.5, Plated	100131
150	3	Hex bolt ø3/4" NC x 5" Lg. Gr.5, Plated	100126
160	20	Flat washer ø13/16" Plated	1400010

CHAIN IDLER - INVERTED SNOWBLOWER 80" - 92"

REFER TO THE PARTS LIST CORRESPONDING TO YOUR MODEL



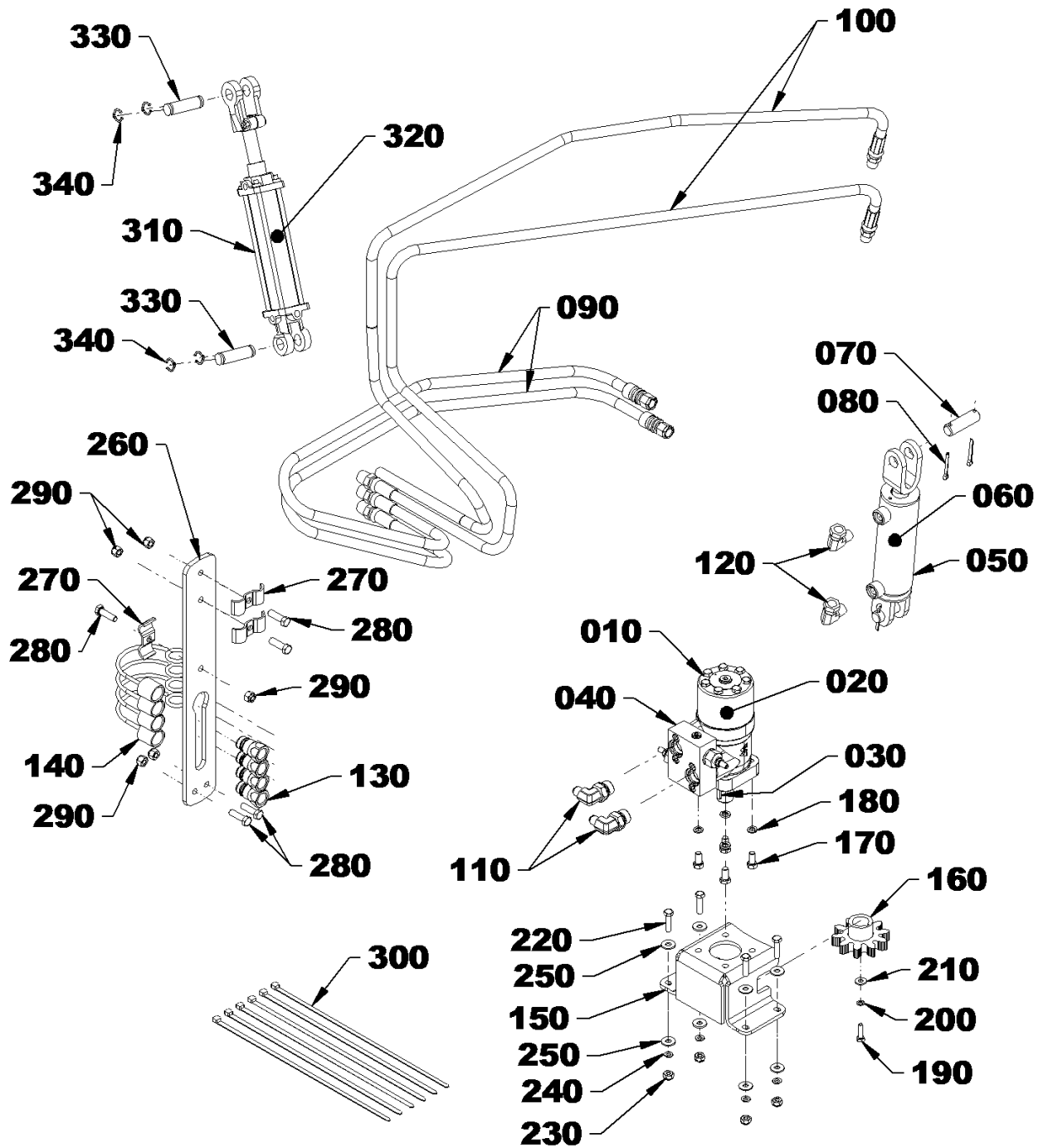
CHAIN IDLER - INVERTED SNOWBLOWER 80"

REF.	QTY	DESCRIPTION	PART #
010	1	Chain idler ass'y (includes 020 & 030)	670405
020	1	- Plastic bushing	4300111
030	1	- Retaining ring ø5/8" x 0.050"	4300110
040	2	Spacer ring	671715
050	2	Idler sprocket 60A12	3300022
060	2	Hex bolt ø5/8"NC x 2 1/4", Gr.5, Plated	0100096
070	2	Stover nut ø5/8"NC Plated	1100007
080	2	Hex bolt ø3/8"NC x 1", Gr.5, Plated	0100038
090	2	Lockwasher ø3/8" Plated	1200004
100	2	Flat washer ø5/16"(3/8" int.) Plated	1400003
110	1	Idler lever	670865
120	1	Spring guide	669396
130	1	Compression spring	664876
140	1	Flat washer ø5/8" Plated	1400008
150	1	Nylon insert locknut ø5/8"NC Plated	1000012
160	1	Plastic bushing	4300124
170	1	Shoulder screw 5/8" x 1/2"	3200023
180	1	Stover nut ø1/2"NC Plated	1100006

CHAIN IDLER - INVERTED SNOWBLOWER 92"

REF.	QTY	DESCRIPTION	PART #
010	1	Chain idler ass'y (includes 020 & 030)	670405
020	1	- Plastic bushing	4300111
030	1	- Retaining ring 5/8" x 0.050"	4300110
040	2	Spacer ring	671715
050	2	Idler sprocket 80A11	654756
060	2	Hex bolt ø3/4"NC x 2 3/4" Gr.5, Plated	100120
070	2	Stover nut ø3/4"NC Plated	1100008
080	2	Hex bolt ø3/8"NC x 1", Gr.5, Plated	100038
090	2	Lockwasher ø3/8" Plated	1200004
100	2	Flat washer ø5/16" Plated	1400003
110	1	Idler lever	670865
120	1	Spring guide	669396
130	1	Compression spring	664876
140	1	Flat washer ø5/8" Plated	1400008
150	1	Nylon insert locknut ø5/8"NC Plated	1000012
160	1	Plastic bushing	4300124
170	1	Shoulder screw ø5/8" x 1/2"	3200023
180	1	Stover nut ø1/2"NC Plated	1100006

HYDRAULIC ROTATION AND DEFLECTOR - INVERTED SNOWBLOWER 80"-92"

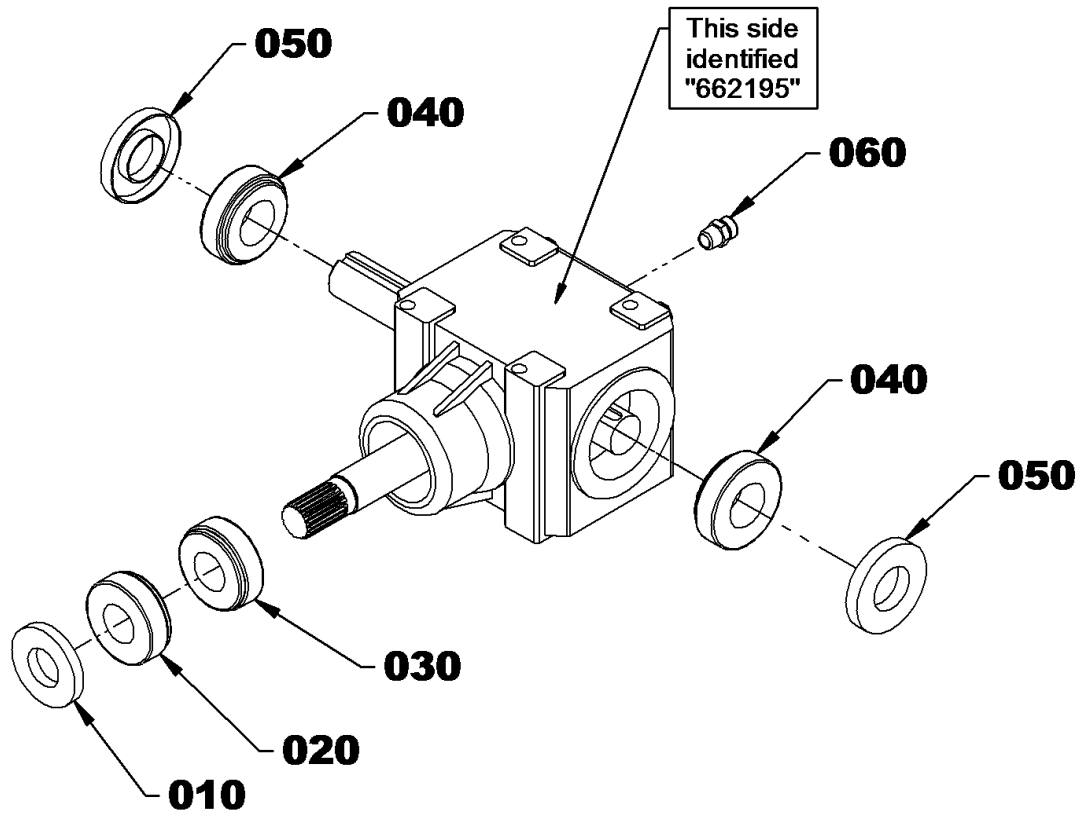


HYDRAULIC ROTATION AND DEFLECTOR - INVERTED SNOWBLOWER 80"-92

REF.	QTY	DESCRIPTION	PART #
010	1	Hydraulic motor 315cc with safety valve M+S	3910105
020	1	Seal kit, safety valve O-ring included	3910104
030	1	Key 1/4" x 1/4" x 1 1/4"	654643
040	1	Safety valve (included with 010)	3910100
050	1	Cylinder 2" x 5" for SA80I	665433
060	1	-Seal kit	665434
070	2	-Pin 1"	665235
080	4	-Cotter pin ø3/16" x 1 1/2"	1500013
090	2	Hose 3/8" x 80" 3000psi - 9/16JIC SWF x 1/2 NPT M With sheath	3700426
100	2	Hose 3/8" x 108" 3000psi - 3/8 NPT M x 1/2 NPT M With sheath	3700425
110	2	Flow restrictor .125", 90° elbow 7/8"ORB M x 9/16"JIC M	3900502
120	2	Flow restrictor .063", 90° elbow 3/8"NPT M x 3/8"NPT SWF	3900204
130	4	Quick coupler 1/2"NPT M	656480
140	4	Protective cap	664898
150	1	Gear guard	670895
160	1	Motor gear	665930
170	4	Hex bolt ø3/8"NC x 3/4" Gr.5, Plated	0100037
180	4	Lockwasher ø3/8" Plated	1200004
190	1	Hex bolt ø1/4"NC x 1" Gr.5, Plated	0100004
200	1	Lockwasher ø1/4" Plated	1200002
210	1	Flat washer ø1/4" Plated	1400002
220	4	Hex bolt ø5/16"NC x 1 1/4" Gr.5, Plated	0100020
230	4	Nylon insert locknut ø5/16"NC Plated	1000005
240	4	Lockwasher ø5/16" Plated	1200003
250	8	Flat washer ø5/16" Plated	1400003
260	1	Hose support	671716
270	3	Double hose clamp	666583
280	5	Hex bolt ø3/8"NC x 1 1/4" Gr.5, Plated	0100039
290	5	Nylon insert locknut ø3/8"NC Plated	1000006
300	6	Nylon tie-wrap ø1/4" lrg x 15" Lg. black	2100009
310	1	Cylinder 2" x 8" for SA92IB	3900022
320	1	-Seal kit	3900205
330	2	-Pin 1"	3900504
340	4	-Hairpin 1"	1800013

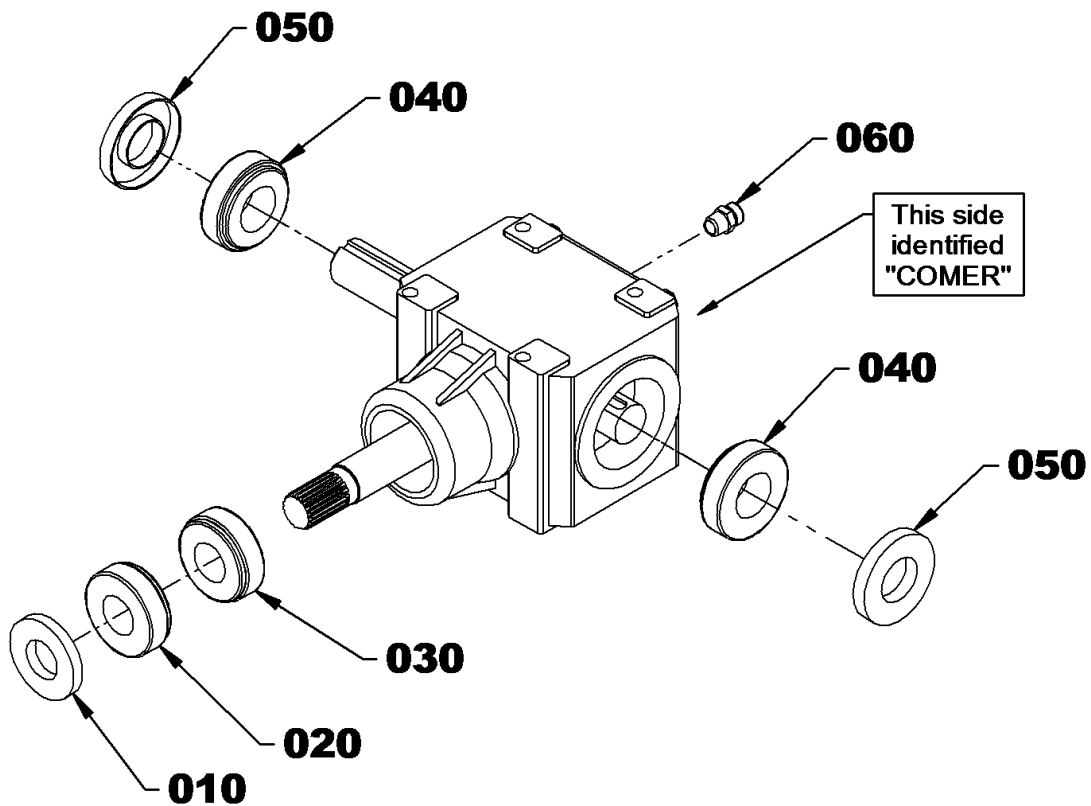
GEARBOX -- IDENTIFIED "662195"

REF.	QTY	DESCRIPTION	PART #
010	1	Seal 35 x 72 x 10	659845
020	1	Bearing	659844
030	1	Bearing	656647
040	2	Bearing	656641
050	2	Seal 40 x 80 x 10	4500170
060	1	Filler plug	4500169



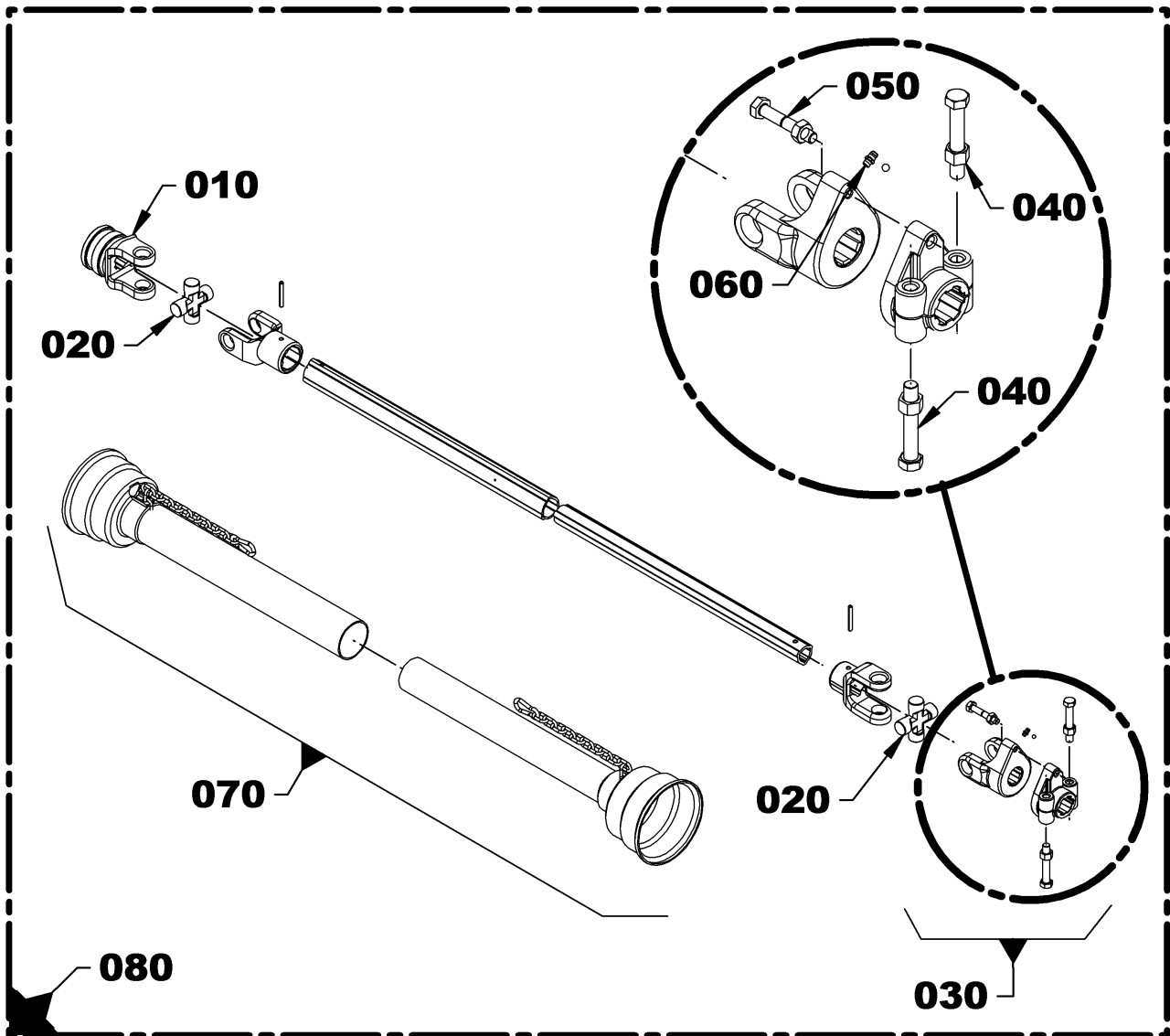
GEARBOX -- IDENTIFIED "COMER"

REF.	QTY	DESCRIPTION	PART #
010	1	Seal 35 x 72 x 10	659845
020	1	Bearing	659844
030	1	Bearing	656647
040	2	Bearing	656641
050	2	Seal 40 x 80 x 12	656643
060	1	Filler plug	4500169



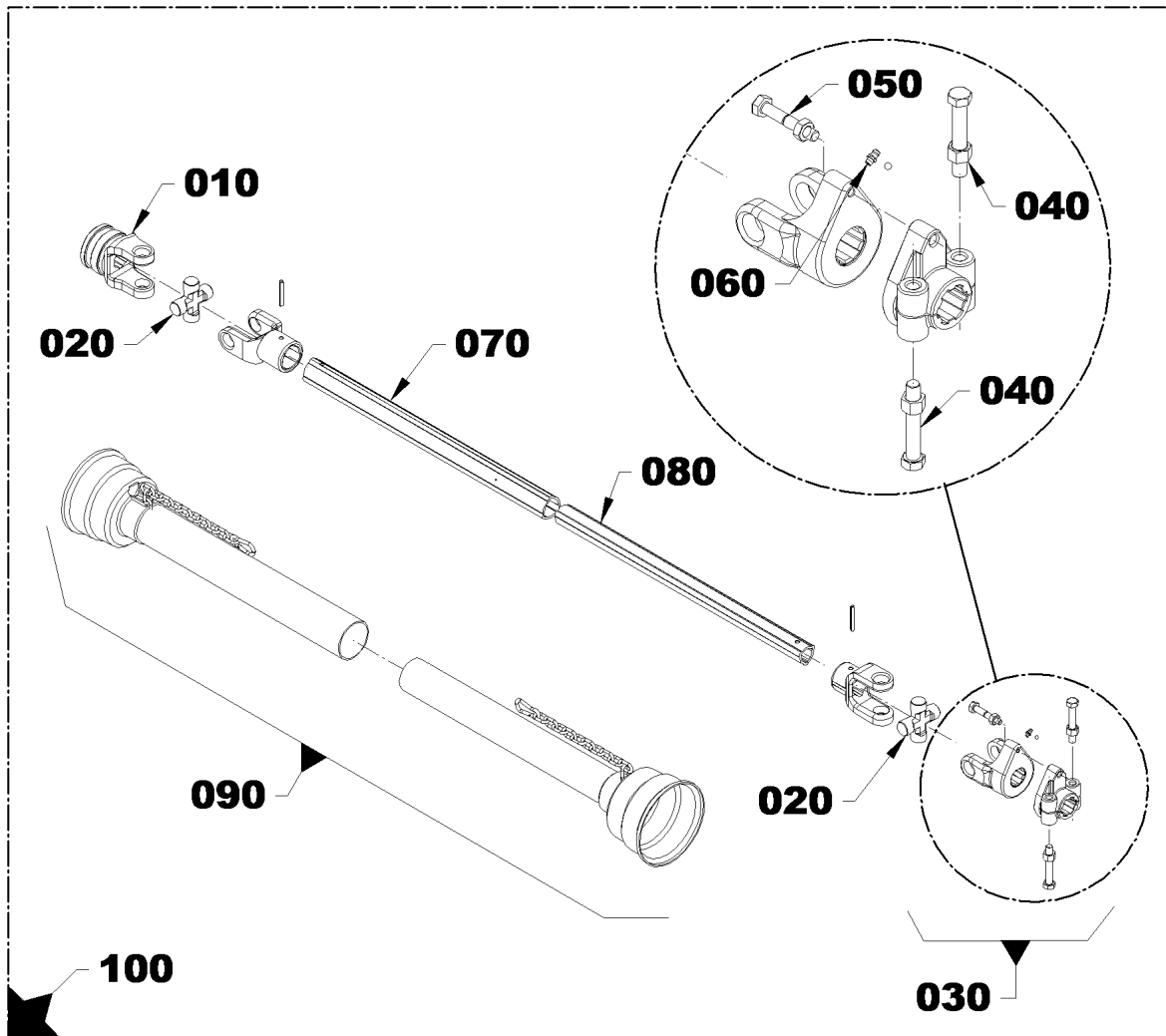
DRIVELINE - 662538

REF.	QTY	DESCRIPTION	PART #
010	1	Yoke assembly	4700083
020	2	Universal joint kit	663134
030	1	Yoke and hub assembly	663145
040	2	Bolt M12 x 1.25 x 70mm Gr.8.8 and nut	662199
050	1	Shearbolt M10 x 55mm Gr.8.8 & nut	657199
060	1	Grease fitting	663148
070	1	Shields with safety chain	663150
080	1	Driveline 60 series	662538



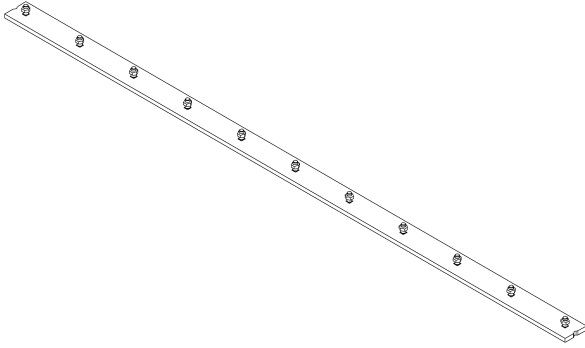
DRIVELINE – M8682

REF.	QTY	DESCRIPTION	PART#
010	1	Slide collar yoke assembly	4700091
020	2	Journal cross	662023
030	1	Yoke and hub assembly	664573
040	2	Bolt M12 x 1.25 x 70mm Gr.8.8 & nut	662199
050	1	Shearbolt M12 x 65mm Gr. 10.9 and nut	662296
060	1	Grease fitting	663148
070	1	Outer tube – female part	4700348
080	1	Inner tube – male part	4700349
090	1	Shields with safety chain	4700347
100	1	Driveline 80 series	8030



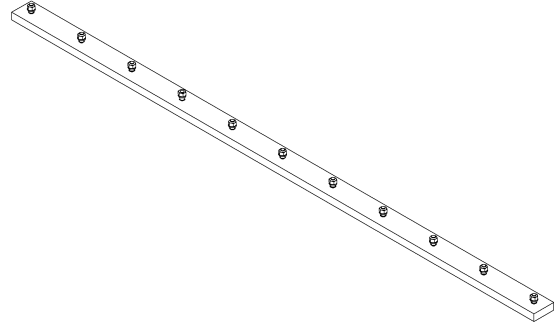
AVAILABLE OPTIONS

HARDEN STEEL CUTTING EDGE



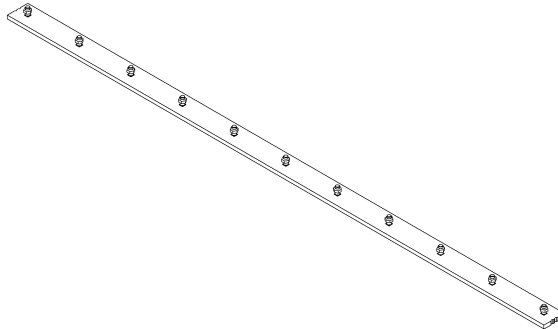
**SA80I 80" - M8650
SA92IB 92" - M8653**

TIVAR CUTTING EDGE



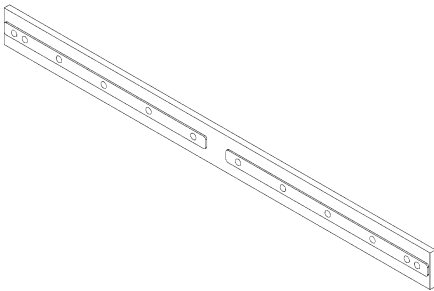
**SA80I 80" - M8651
SA92IB 92" - M8654**

STAINLESS CUTTING EDGE



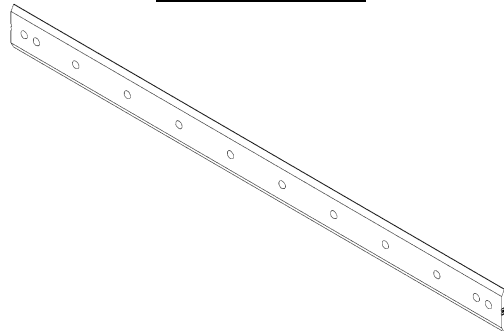
**SA80I 80" - M8652
SA92IB 92" - M8655**

**TIVAR CUTTING EDGE
REAR BLADE**



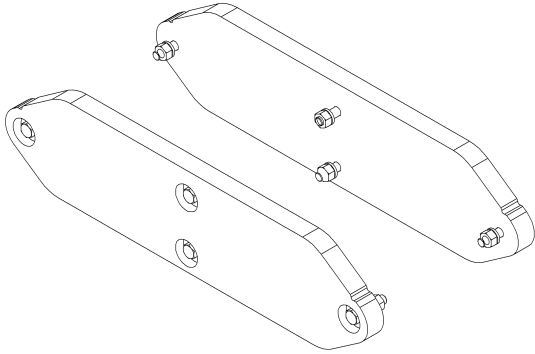
**SA80I 80" - M8658
SA92IB 92" - M8680**

**STAINLESS CUTTING EDGE
REAR BLADE**



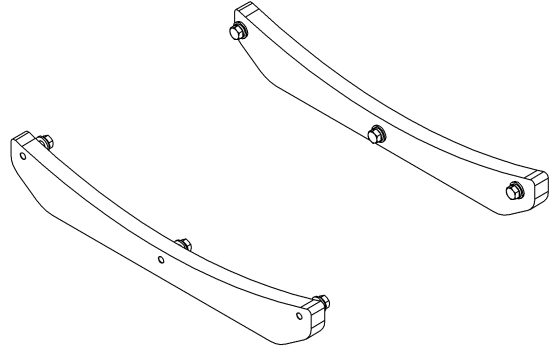
**SA80I 80" - M8659
SA92IB 92" - M8681**

TIVAR SKID SHOES



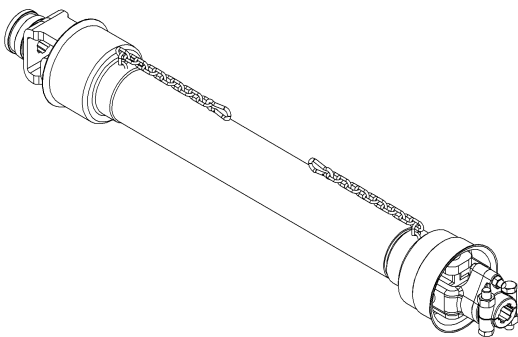
**SA80I 80" - M8656
SA92IB 92" - M8657**

HARDEN STEEL SKID SHOES



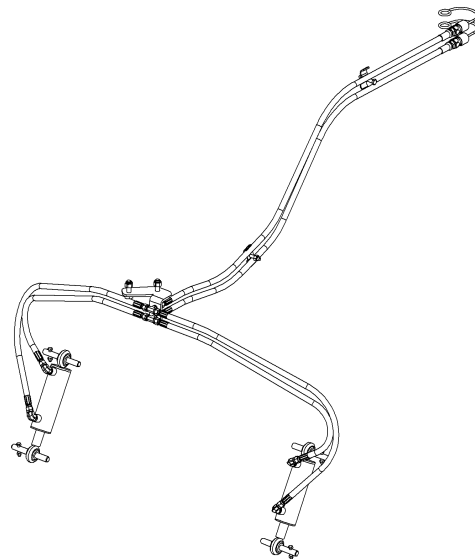
**SA80I 80" - M8684
SA92IB 92" - M8685**

HD DRIVELINE



SA92IB 92" - M8682

**HYDRAULIC CYLINDER
REAR BLADE**



**SA80I 80" - M8683
SA92IB 92" - M8683**







TORQUE SPECIFICATION TABLE

GENERAL SPECIFICATION TABLE

USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN

Note: These values apply to fasteners as received from supplier dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly sulphide greases or other extreme pressure lubricants are used. These values apply to dry conditions; under lubricated conditions reduce by 25% the torques in this table.

BOLT HEAD IDENTIFICATION

INCHES Bolt Size	 Grade 2		 Grade 5		 Grade 8		METRIC Bolt Size	 5.8 Class 5.8		 8.8 Class 8.8		 10.9 Class 10.9	
	in-tpi ¹	N-m ²	lbs-ft ³	N-m	lbs-ft	N-m		lbs-ft	mm.pitch ⁴	N-m	lbs-ft	N-m	lbs-ft
1/4" - 20NC	7.4	5.6	11	8	16	12	M 5 X 0.8	4	3	6	5	9	7
1/4" - 28NF	8.5	6	13	10	18	14	M 6 X 1	7	5	11	8	15	11
5/16" - 18NC	15	11	24	17	33	25	M 8 X 1.25	17	12	26	19	36	27
5/16" - 24NF	17	13	26	19	37	27	M 8 X 1	18	13	28	21	39	29
3/8" - 16NC	27	20	42	31	59	44	M10 X 1.5	33	24	52	39	72	53
3/8" - 24NF	31	22	47	35	67	49	M10 X 0.75	39	29	61	45	85	62
7/16" - 14NC	43	32	67	49	95	70	M12 X 1.75	58	42	91	67	125	93
7/16" - 20NF	49	36	75	55	105	78	M12 X 1.5	60	44	95	70	130	97
1/2" - 13NC	66	49	105	76	145	105	M12 X 1	90	66	105	77	145	105
1/2" - 20NF	75	55	115	85	165	120	M14 X 2	92	68	145	105	200	150
9/16" - 12NC	95	70	150	110	210	155	M14 X 1.5	99	73	155	115	215	160
9/16" - 18NF	105	79	165	120	235	170	M16 X 2	145	105	225	165	315	230
5/8" - 11NC	130	97	205	150	285	210	M16 X 1.5	155	115	240	180	335	245
5/8" - 18NF	150	110	230	170	325	240	M18 X 2.5	195	145	310	230	405	300
3/4" - 10NC	235	170	360	265	510	375	M18 X 1.5	220	165	350	260	485	355
3/4" - 16NF	260	190	405	295	570	420	M20 X 2.5	280	205	440	325	610	450
7/8" - 9NC	225	165	585	430	820	605	M20 X 1.5	310	230	650	480	900	665
7/8" - 14NF	250	185	640	475	905	670	M24 X 3	480	355	760	560	1050	780
1" - 8NC	340	250	875	645	1230	910	M24 X 2	525	390	830	610	1150	845
1" - 12NF	370	275	955	705	1350	995	M30 X 3.5	960	705	1510	1120	2100	1550
1 1/8" - 7NC	480	355	1080	795	1750	1290	M30 X 2	1060	785	1680	1240	2320	1710
1 1/8" - 12NF	540	395	1210	890	1960	1440	M36 X 3.5	1730	1270	2650	1950	3660	2700
1 1/4" - 7NC	680	500	1520	1120	2460	1820	M36 X 2	1880	1380	2960	2190	4100	3220
1 1/4" - 12NF	750	555	1680	1240	2730	2010							
1 3/8" - 6NC	890	655	1990	1470	3230	2380							
1 3/8" - 12NF	1010	745	2270	1670	3680	2710							
1 1/2" - 6NC	1180	870	2640	1950	4290	3160							
1 1/2" - 12NF	1330	980	2970	2190	4820	3560							

¹ in-tpi = nominal thread diameter in inches-threads per inch

² N-m = newton-meters

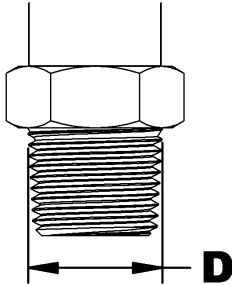
³ lbs-ft= pounds-foot

⁴ mm x pitch = nominal thread diameter in millimeters x thread Pitch

*Torque tolerance +0%, -15% of torquing values. Unless otherwise specified use torque values listed above

ADAPTER INSTALLATION PROCESS

NPT THREAD IDENTIFICATION & TORQUE



D		Identification of adapter	Number of turns to do after manual tightening
in	mm		
0.375	9.5	1/8 NPT	2.0 - 3.0
0.500	12.5	1/4 NPT	2.0 - 3.0
0.625	15.9	3/8 NPT	2.0 - 3.0
0.780	19.8	1/2 NPT	2.0 - 3.0
0.988	25.1	3/4 NPT	2.0 - 3.0
1.236	31.4	1 NPT	1.5 - 2.5
1.583	40.2	1 1/4 NPT	1.5 - 2.5
1.823	46.3	1 1/2 NPT	1.5 - 2.5

RECOMMENDED ASSEMBLY

The method used to assemble fittings with NPT threads is done in two stages. First firmly tighten by hand then tighten once again according to the number of turns listed in the above table. The following steps are recommended to minimize the risks of leaks and/or damages to the parts.

STEP 1: Inspect threads and tapping to make sure they are clean.

STEP 2: Measure the diameter (D) of the adapter and take note of the size taken.

STEP 3: Apply a sealant/lubricant product to the NPT threads (teflon covered threads are preferable to other lubricating products). If PTFE tape (teflon) is used, make between 1.5 or 2 turns clockwise, when viewed by the fitting end, keeping free the two first threads.

CAUTION: More than 2 turns can cause distortion or cracks in the orifice.

STEP 4: Tighten the fitting manually.

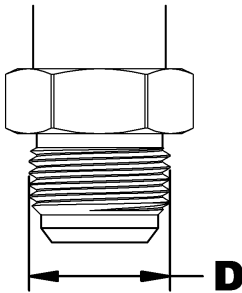
STEP 5: Screw the fitting the number of turns listed on the above table making sure that in the case of an elbow fitting the end is aligned to the desired position to connect the tube or hose. **Never unscrew a fitting to obtain the proper alignment.**

STEP 6: If a leak is detected after having followed the preceding instructions, check that the threads are not damaged and the number of seated threads is fulfilled (see details in next paragraph).

If the threads are damaged, replace the fitting. If the tapping is damaged, retap if possible or replace the part.

Usually, the number of threads seated is between 3.5 and 6. If the range is different it would indicate that the fitting was tightened too much or not enough or that the tightening was not within thread tolerances. If the fitting is not tight enough, tighten but never more than one turn. If it's too tight, control the threading and tapping and replace the section that has threads that are not within tolerances.

JIC THREAD IDENTIFICATION & TORQUE



D		Identification of adapter	TORQUE	
in	mm		lbs-ft	N-m
-	-	5/16 JIC	6-7	8-10
-	-	3/8 JIC	6-9	8-12
0.433	11	7/16 JIC	9-12	12-16
0.496	12.6	1/2 JIC	14-15	19-21
0.559	14.2	9/16 JIC	18-20	24-27
0.740	18.8	3/4 JIC	27-39	37-53
0.870	22.1	7/8 JIC	36-63	49-85
1.055	26.8	1 1/16 JIC	65-88	88-119
1.185	30.1	1 3/16 JIC	75-103	102-140
1.307	33.2	1 5/16 JIC	85-113	115-153
1.618	41.1	1 5/8 JIC	115-133	156-180
1.870	47.5	1 7/8 JIC	125-167	169-226
2.492	63.3	2 1/2 JIC	190-258	258-350

JIC flare fittings seal with metal to metal contact between the flared nose of the fitting and the flared tube face in the female connection.

The minimum torque values listed are to provide a benchmark that give optimum results for leak free connections. Actual torque values should be based on individual application.

NOTE: Do not apply thread sealant (teflon tape) on the JIC threads.

Leaks can result from vibration, thermal cycling and from loads being supported by the connection (i.e. using the fitting in the connection to support mechanical loads).

IMPORTANT: Use the lowest torque value from the chart when wet torquing.

RECOMMENDED ASSEMBLY

STEP 1: Inspect for possible contamination or damage from shipping or handling. Sealing surface should be smooth.

STEP 2: Lubricate the threads and the entire surface of the cone with hydraulic fluid or a light lubricant.

STEP 3: Align mating components for hand connection and turn flare nut until sealing surfaces make full contact.

STEP 4: Torque nut to the values shown in the above table.

STEP 5: When torquing nut onto a straight flared fitting, it may be necessary to also place a wrench on the flared fitting wrench pad to prevent it from turning during assembly.

ALTERNATE ASSEMBLY METHOD

STEP 1: Inspect for possible contamination or damage from shipping or handling. Sealing surface should be smooth.

STEP 2: Lubricate the threads and the entire surface of the cone with hydraulic fluid or a light lubricant.

STEP 3: Align mating components for hand connection and turn flare nut until sealing surfaces make full contact.

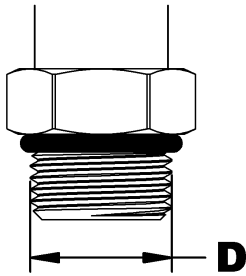
STEP 4: Lightly wrench tighten the nut until there is resistance.

STEP 5: Place a wrench on wrench pad next to nut as near the 6 o'clock position as possible.

STEP 6: Place second wrench on nut as near the 3 o'clock position as possible.

STEP 7: Turn nut clockwise to no less than the 4 o'clock position, but no more than the 6 o'clock position. Required rotation generally decreases as size increases.

ORB (O-RING BOSS) THREAD IDENTIFICATION & TORQUE



D		Identification of adapter	TORQUE	
in	mm		lbs-ft	N-m
-		3/8 ORB	8-9	12-13
0.433	11	7/16 ORB	13-15	18-20
0.496	12.6	1/2 ORB	14-15	19-21
0.559	14.2	9/16 ORB	23-24	32-33
0.740	18.8	3/4 ORB	40-43	55-57
0.870	22.1	7/8 ORB	43-48	59-64
1.055	26.8	1 1/16 ORB	68-75	93-101
1.185	30.1	1 3/16 ORB	83-90	113-122
1.307	33.2	1 5/16 ORB	112-123	152-166
1.618	41.1	1 5/8 ORB	146-161	198-218
1.870	47.5	1 7/8 ORB	154-170	209-230
2.492	63.3	2 1/2 ORB	218-240	296-325

SAE O-rings (O-Ring Boss) are straight thread fittings that seal using an O-ring between the thread and the wrench flats of the fitting. The O-ring seals against the machined seat on the female port.

O-ring fittings can be either adjustable or non-adjustable. Non adjustable fittings are screwed into a port where no alignment is needed. Adjustable fittings can be oriented in a specific direction.

Fittings with O-rings offer advantages over metal-to-metal fittings. Under or over-tightening any fitting can allow leakage, but all-metal fittings are more susceptible to leakage because they must be tightened to a higher and narrower torque range. This makes it easier to strip threads or crack or distort fitting components, which prevents proper sealing.

NOTE: Do not apply thread sealant (teflon tape) on the ORB threads.

Leaks can also result from vibration, thermal cycling and from loads being supported by the connection (i.e. using the fitting in the connection to support mechanical loads).

IMPORTANT: Use the lowest torque value from the chart when wet torquing.

RECOMMENDED ASSEMBLY **ORB (O-RING) NON-ADJUSTABLE**

STEP 1: Inspect all components for damage or contamination.

STEP 2: Lubricate O-ring and threads on fitting with your hydraulic system fluid.

STEP 3: Turn fitting into port until finger tight, then torque to the value shown in the following table.

NOTE: Use the lowest torque value from the chart when wet torquing.

RECOMMENDED ASSEMBLY **ORB (O-RING) ADJUSTABLE**

STEP 1: Inspect all components for damage or contamination.

STEP 2: Lubricate O-ring and threads on fitting with your hydraulic system fluid.

STEP 3: Looking at fitting from the male ORB end, turn manually the nut as far as possible from the O-ring.

STEP 4: Using wrench, turn fitting into port until the washer touches thread nearest wrench pad.

STEP 5: Back off fitting counterclockwise not exceeding one revolution until it is oriented in the correct position.

STEP 6: Place wrench on the wrench pad of fitting to prevent fitting from turning, and torque nut to the value shown in the above table.

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