

SNO-WAY®

SNOW & ICE CONTROL EQUIPMENT

OWNER'S MANUAL

**SKID STEER STRAIGHT BLADE
SNOW PLOWS
SERIES 29SKD, 29RSKD, 29THDSKD**

FOR PLOW SERIAL NUMBERS AFTER:
29SKD100000, 29RSKD100000, 29THDSKD100000

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INTRODUCTION

This manual was written for the assembly, installation and maintenance of your new Sno-Way Skid Steer Plow. Most importantly, this manual provides an operating plan for safe use. Refer to the Table of Contents for an outline of this manual.

Please keep this manual with your machine at all times as reference material and so it can be passed on to the next owner if the machine is sold.

We require that you read and understand the contents of this manual COMPLETELY, especially the chapter on SAFETY, before attempting any procedure contained in this manual.



The Society of Automotive Engineers has adopted this SAFETY ALERT SYMBOL to pinpoint characteristics that, if NOT carefully followed, can create a safety hazard. When you see this symbol in this manual or on the machine itself, BE ALERT!, your personal safety and the safety of others, is involved.

• Defined in the next column, are the SAFETY ALERT messages and how they will appear in this manual.

	WARNING
FAILURE TO FOLLOW CAN RESULT IN INJURY OR DEATH.	

	CAUTION
Information, that if not carefully followed, can cause minor injury or damage to equipment!	

NOTE: Additional information concerning the equipment or the procedure that may or may not be contained elsewhere in this manual.

BE AWARE! It is illegal to remove, deface or otherwise alter the safety decals mounted on this equipment.

Record the A-Frame Serial Number, Blade Model Number and Blade Serial Number in the space provided below as a handy record for quick reference. The Blade Serial Number is located on one of the middle ribs of the blade.

These plates contain information that your Dealer needs to answer questions or to order replacement parts, if needed, for your unit.

NAME PLATE DATA	
A-FRAME SERIAL NUMBER	_____
BLADE MODEL NUMBER	_____
BLADE SERIAL NUMBER <small>(Located on Blade Frame)</small>	_____
(FILL IN)	

DEALER	
NAME	_____
ADDRESS	_____
CITY	_____ STATE _____ ZIP _____
PHONE () -	_____
(FILL IN)	

ORIGINAL PURCHASER	
NAME	_____
ADDRESS	_____
CITY	_____ STATE _____ ZIP _____
PHONE () -	_____
(FILL IN)	

We reserve the right to make changes or improve the design or construction of any part(s) without incurring the obligation to install such parts or make any changes on any unit previously delivered.

Graphics and illustrations may be used which may show equipment and/or options not included in every installation without incurring the obligation to install such parts or make changes on units previously delivered.

Sno-Way Service Parts Manuals are available on-line or at your authorized Sno-Way dealer. Request part number 97102057 for the 29SKD, 29RSKD, and 29THDSKD Snow Plow. Factory contact information is available at www.snoway.com.



SAFETY



BEFORE ATTEMPTING ANY PROCEDURE IN THIS BOOK, READ AND UNDERSTAND ALL THE SAFETY INFORMATION CONTAINED IN THIS SECTION. IN ADDITION, ENSURE ALL INDIVIDUALS WORKING WITH YOU ARE ALSO FAMILIAR WITH THESE SAFETY PRECAUTIONS.

For your safety Warning and Information Decals have been placed on this product to remind the operator to take safety precautions. It is important that these decals are in place and are legible before operation begins. New decals can be obtained from Sno-Way or your local dealer.

REMEMBER The careful operator is the best operator. Most accidents are caused by human error. Certain precautions must be observed to prevent the possibility of injury to operator or bystanders and/or damage to equipment.

NEVER operate plow when under the influence of alcohol, drugs or other medications that could hamper your judgement and reactions. An accident may result in serious injury or death to other persons or yourself.

ALWAYS operate vehicle in a well-ventilated area. The carbon monoxide in exhaust gas is highly toxic and can cause serious injury or death.

NEVER allow hands, hair or clothing to get near any moving parts such as fan blades, belts and pulleys. Never wear neckties or loose clothing when working on the vehicle.

NEVER wear wrist watches, rings or other jewelry when working on the vehicle or individual equipment. These things can catch on moving parts or cause an electrical short circuit that could result in serious personal injury.

ALWAYS wear safety goggles when working on the vehicle to protect your eyes from battery acid, gasoline, and dust or dirt from flying off of moving engine parts.

ALWAYS be aware of and avoid contact with hot surfaces such as engine, radiator, and hoses.

ALWAYS wear safety glasses with side shields when striking metal against metal! In addition, it is recommended that a softer (non-chipable) metal material be used to cushion the blow. Failure to heed could result in serious injury to the eye(s) or other parts of the body.

NEVER allow children or unauthorized person to operate this unit.

ALWAYS lock the vehicle when unattended to prevent unauthorized operation of the plow.

ALWAYS check the job site for terrain hazards, obstructions and people.

NEVER exceed 10 m.p.h. when plowing. Excessive speed may cause serious injury and damage of equipment and property if an unseen obstacle is encountered while plowing.

ALWAYS position blade so it does not block path of headlamps beam. Do not change blade positions while traveling. An incorrect plow position blocking headlamp beam may result in an accident.

ALWAYS check surrounding area for hazardous obstacles before operating this unit.

ALWAYS inspect the unit periodically for defects. Parts that are broken, missing or plainly worn must be replaced immediately. The unit, or any part of it should not be altered without prior written approval of the manufacturer.

ALWAYS shut off the vehicle engine, place the transmission in Neutral or Park, turn the ignition switch to the "OFF" position and firmly apply the parking brake of the vehicle before attaching or detaching the blade from the vehicle or when making adjustments to the blade.

ALWAYS inspect lift system bolts and pins whenever attaching or detaching the plow, and before traveling. Worn or damaged components could result in the plow dropping to the pavement while driving, causing an accident.

ALWAYS keep hands and feet clear of blade and A-Frame when attaching or detaching plow.

NEVER place fingers in A-frame or mount lug holes to check alignment when attaching snow plow. Sudden motion of the plow could severely injure a finger.

NEVER stand between the vehicle and blade or directly in front of blade when it is being raised, lowered or angled. Clearance between vehicle and blade decreases as blade is operated and serious injury or death can result from blade striking a body or dropping on hands or feet.

NEVER work on the vehicle without having a fully serviced fire extinguisher available. A 5 lb or larger CO² or dry chemical unit specified for gasoline, chemical or electrical fires, is recommended.

NEVER smoke while working on the vehicle. Gasoline and battery acid vapors are extremely flammable and explosive.

NEVER use your hands to search for hydraulic fluid leaks; escaping fluid under pressure can be invisible and can penetrate the skin and cause a serious injury! If any fluid is injected into the skin, see a doctor at once! Injected fluid **MUST BE** surgically removed by a doctor familiar with this type of injury or gangrene may result.

REMEMBER it is the owner's responsibility for communicating information on the safe use and proper maintenance of this machine.

THEORY AND PLOWING OPERATION

29SKD and 29THDSKD Skid Steer

The Skid Steer Straight Blade Snow Plow functions as an accessory for a skid steer or any vehicle that has a Universal Mount system.

The plow is mounted to the Universal Mount system, and the auxiliary hydraulics lines are connected to the swing cylinders circuit. The plow is raised or lowered using the loader arms. The blade is angled when the auxiliary hydraulics are turned on. The fluid pressure from the auxiliary hydraulics causes one of the angling cylinders to become pressurized and therefore extend. The extended cylinder causes the blade to angle. The fluid from the retracting cylinder returns to the skid steer fluid reservoir tank via the other auxiliary hydraulics port. To cause the blade to angle in the opposite direction, the auxiliary hydraulics flow is reversed. The connection of the hoses for left to right orientation is vehicle dependent as to which auxiliary port connects to which cylinder.

To move main blade right, press right on the auxiliary hydraulic toggle. (See Figure 1-1)

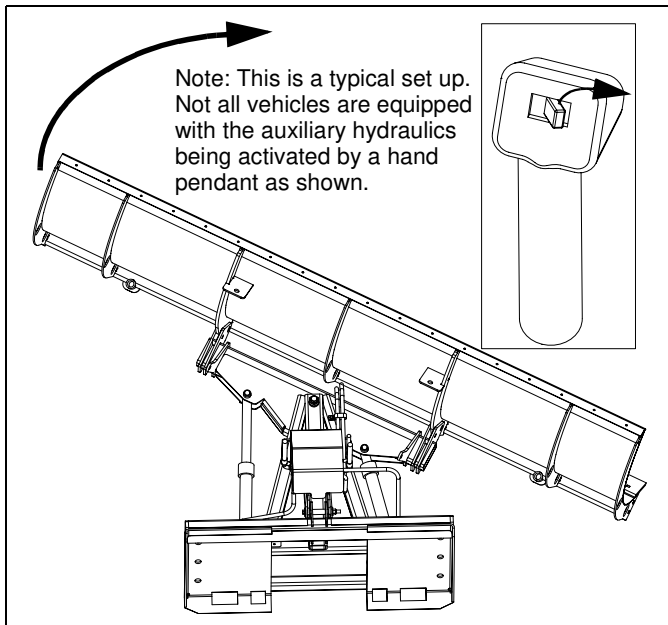


Figure 1-1

To limit the angling speed of the blade, an orifice is located in the left cylinder elbow.

NOTE: Any altering or removal of this orifice voids the warranty.

A cross over relief system protects the unit from potential damage. When the blade hits an obstacle it causes the blade to angle. If the load in the cylinder is higher than the cross-over relief pressure, then the cylinder rod retracts via the cross over relief, and protects the blade from potential damage. The blade, however, is not protected if the cylinder is fully retracted and against the stops. Potential damage to the blade and the stops can occur if significant obstacles are encountered while the blade is against a stop.

29R Skid Steer

The 29R Skid Steer Blade Snow Plow functions similar to the skid steer straight blade, but also has wing functions as well. These wing functions operate by activating the auxiliary hydraulics, but also pushing a button on the control at the same time.

To move main blade right, press right on the auxiliary hydraulic toggle. (See Figure 1-2)

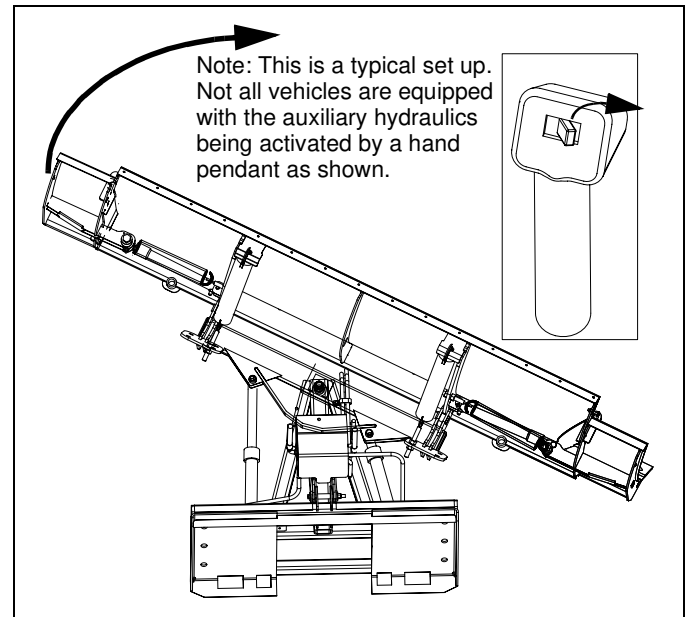


Figure 1-2

The wings are activated by pressing simultaneously the wing extend control button in the cab (See Figure 1-3), and activating the auxiliary hydraulics (See Figure 1-4).

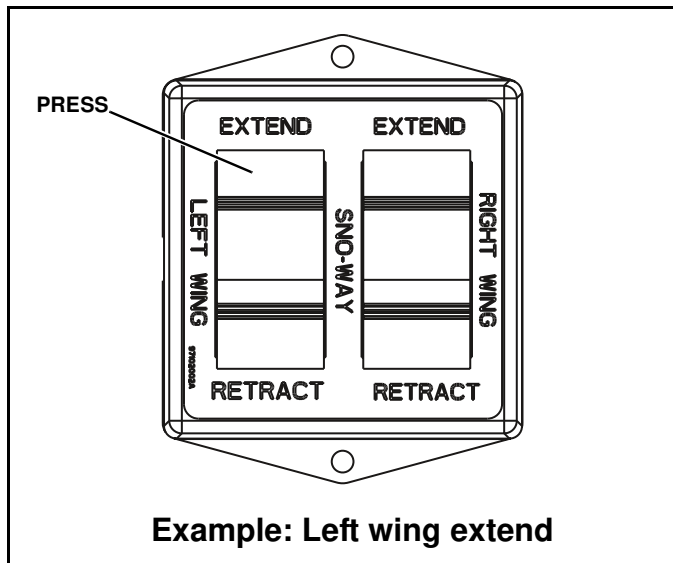


Figure 1-3

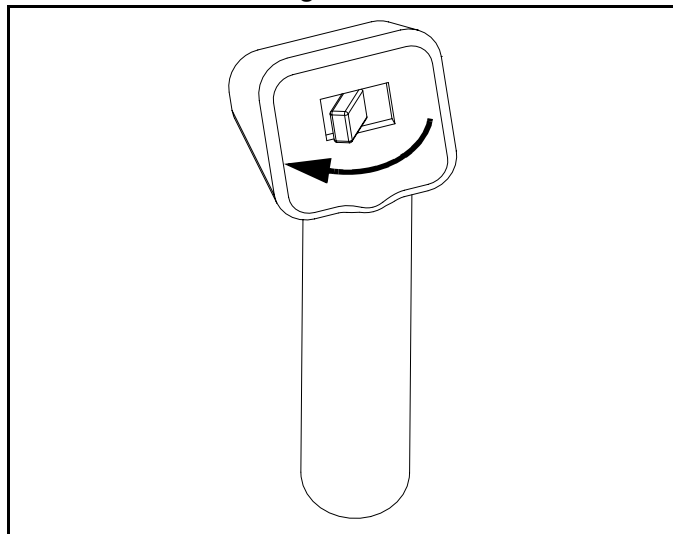


Figure 1-4

The wing selected will extend if the auxiliary hydraulics is activated for the angling side chosen. (IE, if the main blade is angling CW, then the Left Wing button if pressed will cause the left wing to extend.) Only one wing may be extended at a time.

To extend left wing, press left on the auxiliary hydraulic toggle and press "EXTEND" on control box. (See Figure 1-5)

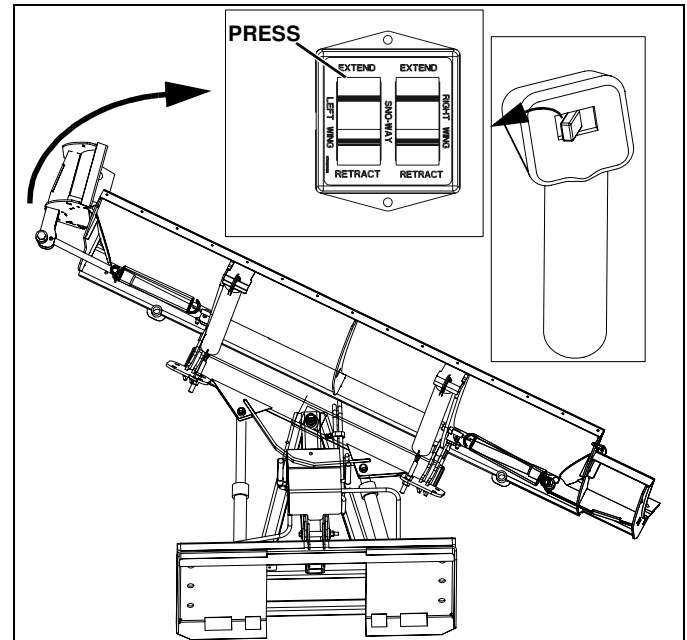


Figure 1-5

To retract left wing, press "RETRACT" on control box. (See Figure 1-6)

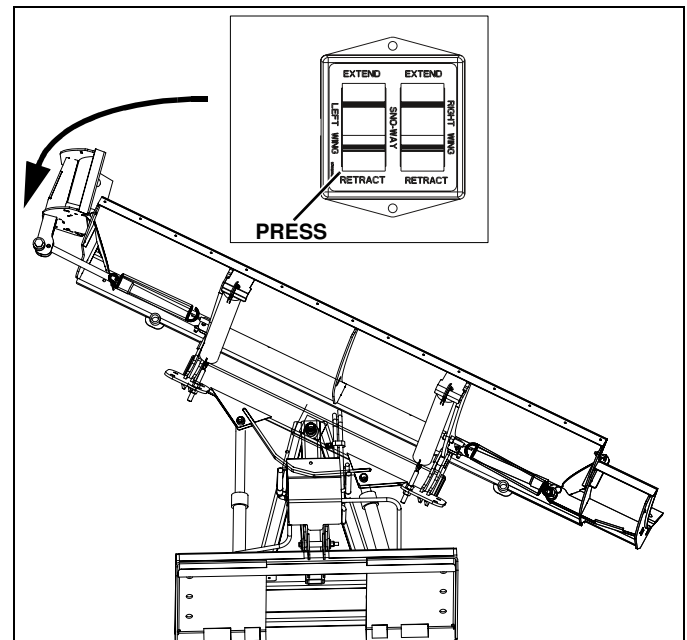


Figure 1-6

To retract the wing at any time, press the retract button, this will cause the wing to retract with spring pressure. The hydraulic oil from the wing cylinders will go to tank. Both wings can be retracted at the same time.

Each wing has its own relief valve. If an obstacle is hit the wing will collapse the cylinder, the oil will bypass a relief valve and then go through the case drain to tank. There are no reliefs for back dragging, so the wings may extend during back dragging and suddenly retract when the main blade is picked up. This is normal operation.

Plow Operational Limits

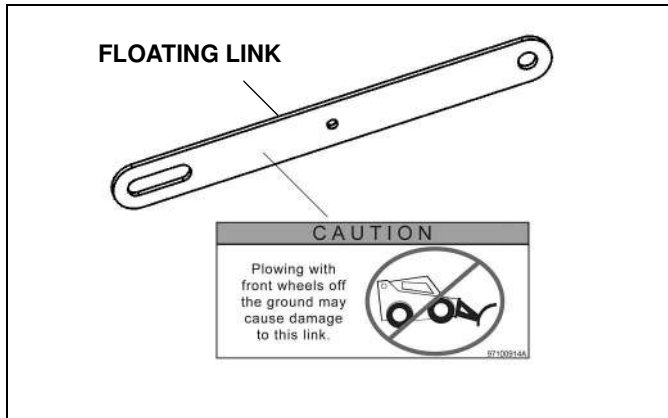


Figure 1-7

The Sno-Way Skid Steer Plows are designed to plow snow within certain operational limits. A pair of floating links enable the plow to "float" over the contours of an uneven grade during operation. In addition, these links are designed to be the "weakest link" of the plow system. If excessive loading is encountered the links will collapse, requiring replacement. Plowing with all four skid steer wheels "on the ground" is recommended for optimum plowing performance and reduced loading on plow components.

Plowing Operation

Before The Season Begins

1. Inspect safety equipment for proper operation; headlights and windshield wipers.
2. Inspect the plow, plow frame and all attaching hardware for wear and corrosion. Replace worn or damaged parts and clean and repaint exposed metal parts with a high quality, corrosion resistant enamel.
3. Inspect all fasteners to insure that they are properly tightened. If any fasteners are loose, re-tighten to the proper torque (refer to the Torque Specification Chart in this manual) and carefully inspect the adjacent area for damage or wear as well as carefully inspecting all adjacent fasteners for proper torque.
4. Apply a small amount of light oil to the Hitch Pins and pivots, to Pivot Pins between the Blade Assembly and the Swing Frame, between Swing Cylinder pivot Pins and the Lift Linkage.
5. Check for excessive free play between the A-Frame and Swing Frame Pivot. If there is excessive free play adjust the Swing Frame Pivot Pin as described in the "BREAK-IN PERIOD" section of this manual.
6. If wear is noticed between the A-Frame and Swing Frame apply a good quality Anti-Seize lubricant to this area.

Clearing Driveways

NOTE: For better clean up of hard-packed snow, raise the disc shoes so that the cutting edge of the blade comes into direct contact with pavement.

1. Head into driveway with the blade angled to plow snow away from buildings. Continue to widen drive path by rolling snow away from buildings on successive passes.
2. If there is a garage at the end of the driveway, plow to within several vehicle lengths of the garage. Then push as much snow as possible off the driveway.
3. With a raised straight blade, drive through remaining snow to building. Drop blade and "back-drag" snow away from garage door at least one and one-half vehicle lengths. Repeat as necessary.
4. Back vehicle to garage door and plow forward toward street, removing the remaining snow.

Clearing Parking Lots

NOTE: For better clean up of hard-packed snow, raise the disc shoes so that the cutting edge of the blade comes into direct contact with pavement. Use the lowest possible gear to place maximum power behind the cutting edge.

1. "Back drag" areas in front of buildings and near walls then work away from buildings towards the outer edges of the lot.
2. Plow a single path down the center in the longest direction.

NOTE: Stacking snow; As the "stacking" location is approached, begin raising the blade to facilitate the ride-up onto the stack.

Angle plow toward the exterior sides, and continue with successive passes until area is cleared and snow is "stacked" around outer edges. If snow is too deep to clear in the above manner, clear main traffic lanes as much as possible and stack snow at selected intermediate positions.

Mounting Snow Plow To Vehicle

1. Drive up to the snow plow and tilt the universal mount slightly forward.
2. Hook the top of the universal mount under the lip on the skid steer adapter plate of the snow plow.
3. Position the snow plow so that it rests flush against the universal mount and lock the snow plow in place.
4. Connect the hydraulic hoses to the auxiliary hydraulic connectors on the vehicle. Connect the electrical connections if applicable

Removing Snow Plow From Vehicle

1. Lower the snow plow to the ground.
2. Disconnect the hydraulic hoses and electrical connections from the vehicle.
3. Unlock the universal mount from the snow plow and slowly back away from the snow plow, while tilting the universal mount slightly forward.

Transporting Vehicle With Plow Attached

1. Position the blade out of the beam path of the headlights before driving.
2. Inspect plow and plow attaching hardware for wear or damage before transporting and beginning plow operations.

Plowing Like A Pro



WARNING

- **Never exceed 10 mph when plowing! Serious personal injury can result, as well as damage to equipment and property, if an unseen obstruction is encountered while plowing.**
- **Wear your seat belt! Contact with a hidden obstruction can cause serious personal injury from bodily contact within the vehicle cab or whiplash from sudden stops.**

FAILURE TO FOLLOW CAN RESULT IN INJURY OR DEATH.

1. Become familiar with the area to be plowed and mark potential hazards before the snow falls. Many immovable objects cannot be seen when covered with snow. Developing a plan early can save valuable time and equipment damage. Allow sufficient room to pile snow, out of the traffic area, with enough space for snow when the next storm comes.

2. Plow with the storm. The “Pros” are out early removing only several inches of snow at a time. Allowing snow to accumulate to unmanageable levels can cause difficult removal problems and can be costly in terms of “wear and tear” on equipment. The plow is not a “Ram or Bulldozer”. If used properly, it will give you many years of safe and reliable service.

Research municipal ordinances for restrictions on the disposal of snow. Many municipalities do not allow snow to be placed in roads or throughway.

INSTALLATION

Mechanical Installation

IMPORTANT: Graphics and illustrations may be used which may show equipment and/or options not included in every installation.

Assemble Blade, Swing Frame and Trip Springs (29, 29HD & 29R Series)

1. Open the power pack carton, remove the blade parts bag (part number 96107662, 29, & 29HD Series) and the trip stop bag (part number 96107395, 29 & 29HD Series). Face plates are in the bag with the stop blocks.

2. Slide the metal face plates into the slot in the blade stops from the side. Place the stops between the lugs on the swing frame. Secure with 3/8" x 2-1/2" bolts and locking nuts. (See Figure 2-1.) Bolts and nuts are in the blade parts bag.

NOTE: The 29 Series blade uses green stops. Make sure the proper stops are installed for the blade being used.

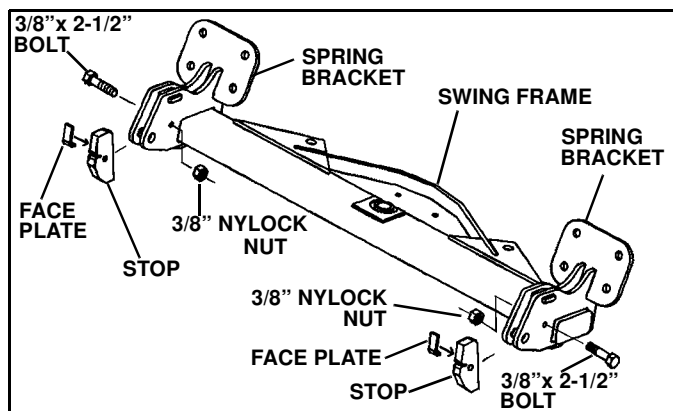


Figure 2-1

3. Lay blade face down on floor, using cardboard or similar material to prevent paint damage.

4. Place swing frame on blade and insert 3/4" x 2" clevis pin from blade parts bag. The ribs on either side of the center rib should be between the swing frame lugs. (See Figure 2-2)

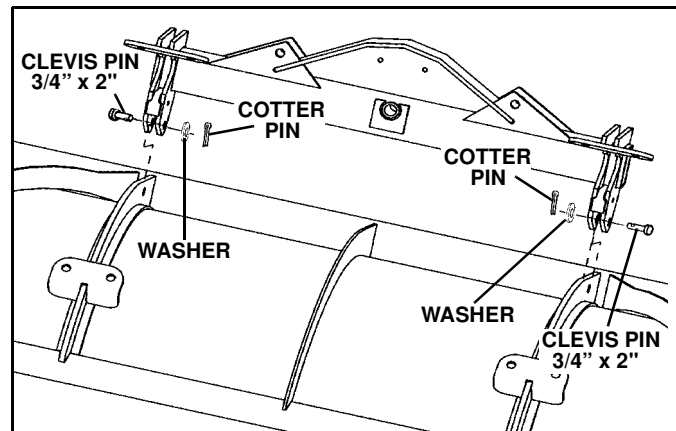


Figure 2-2

5. Insert washer on end of clevis pin and secure pin with cotter pin.

NOTE: Make sure cotter pin is properly bent or pin may work loose (See Figure 2-3)

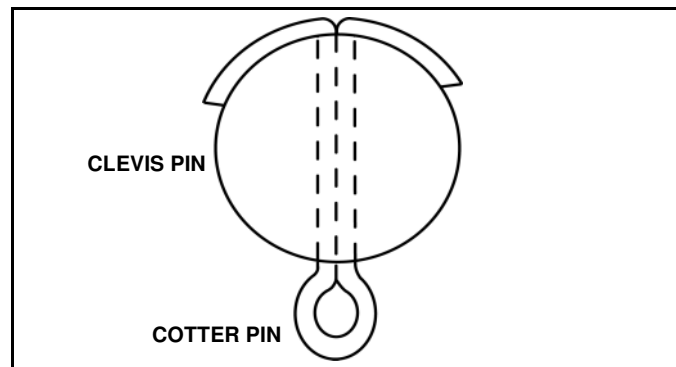


Figure 2-3

6. Remove the springs from the power pack carton. Two springs are needed for all 29 Series blades.

7. Hook springs onto blade with open end of loop facing up. (See Figure 2-4, and Figure 2-5)

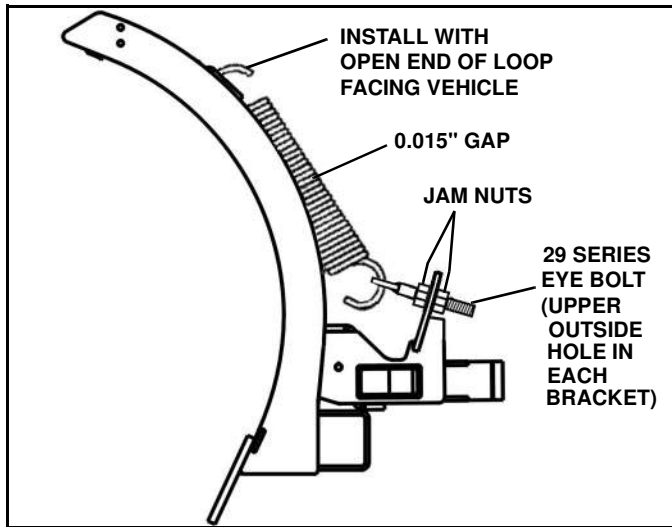


Figure 2-4(29 Series)

8. **29 SERIES BLADES:** Hook other end of spring onto eyebolt. Insert one eyebolt on each side of the blade into the single upper hole on the swing frame spring bracket. Use a jam nut on either side of bracket to secure. (See Figure 2-4 and Figure 2-5)

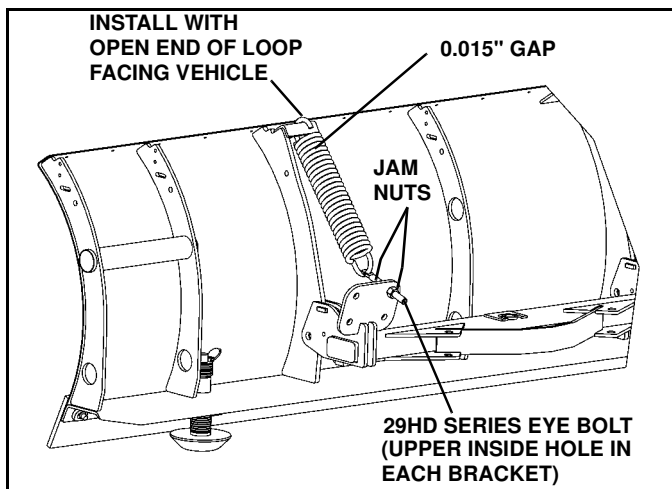


Figure 2-5(29 HD and 29R Series)

9. Tighten springs until a 0.015" feeler gauge can pass between two or more coils (a 3x5 postcard is approximately 0.015").



CAUTION

Do not over tighten trip springs. If more than .015" (1/64") gap appears between coils damage could occur during plowing.

Spring must be installed with open end of top loop facing vehicle. Bottom loop position will vary.

Assemble Blade Trip Springs (29THD Series)

1. Open the power pack carton and remove the blade parts bag (part number 96114724).
2. Lay blade face down on floor, using cardboard or similar material to prevent paint damage.

Assemble and Install the Trip Springs

1. Install three 3/4" nuts onto the long threaded end of the spring trip rod (See Figure 2-6)

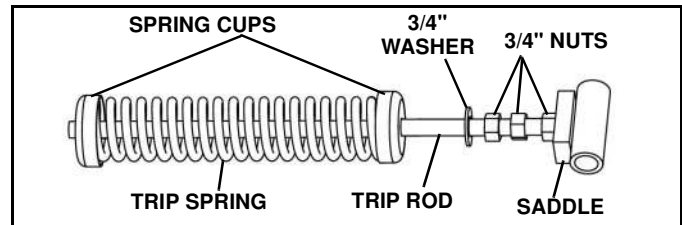


Figure 2-6

2. Install the long threaded end of the trip rod into the saddle completely.
3. Tighten the closest 3/4" nut closest to the saddle.
4. Thread the two remaining 3/4" nuts down toward the saddle as far as they will go (this puts minimum pressure on the spring for following steps).
5. Install the 3/4" washer, spring cup, trip spring and second spring cup on the free end of the trip rod.
6. Slide the trip rod assembly into a trip rod guide hole in the blade (See Figure 2-7)

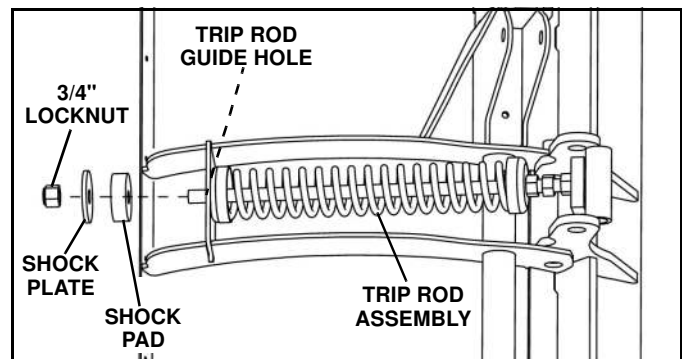


Figure 2-7

7. Install the shock pad and shock plate onto the free end of the trip rod.
8. Loosely install a 3/4" locknut on the free end of the trip rod.

9. Apply a thin coating of grease to the main trip bolt shank (See Figure 2-8)

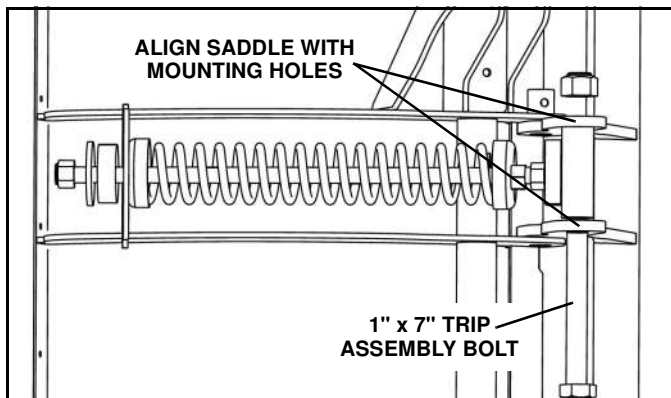


Figure 2-8

10. With an assistant and pry board or other suitable tool, apply pressure to the lower part of the saddle until it aligns with the mounting holes in the blade.

11. Install the greased 1" x 7" trip assembly bolt through the blade and saddle.

12. Rotate the trip bolt to ensure that grease has covered the inside surfaces of the saddle.

13. Install a 1" locknut on the trip bolt. Tighten the nut to remove all freeplay from the bolt, but still allow it to spin in the mounting holes and saddle (See Figure 2-9)

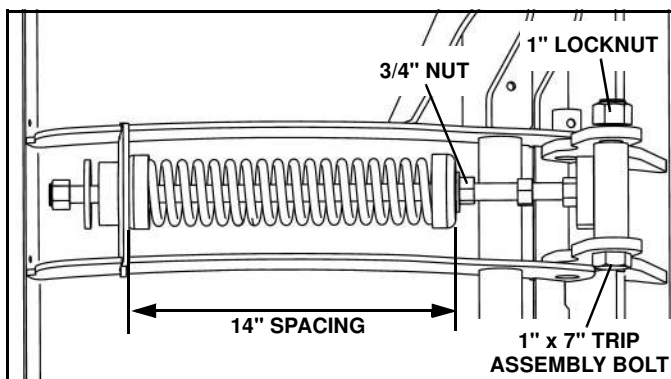


Figure 2-9

14. Tighten the 3/4" nut against the washer and lower spring cup until the distance between both spring cups is 14 inches.

15. Tighten the 3/4" jam nut against the adjustment nut to secure the 14" spring cup spacing. (See Figure 2-10)

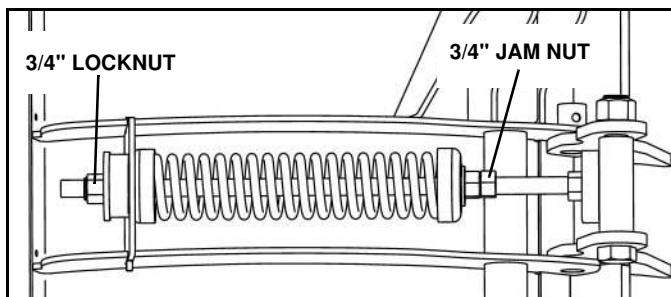


Figure 2-10

16. Tighten the top 3/4" locknut on the trip rod against the shock plate and shock pad until the lower trip assembly bolt can be spun with minimal effort with a wrench.

NOTE: The shock plate keeps the lower blade and cutting edge from slamming into the stops on the main blade. Minimal pretension on the shock bushing is required to keep the blade from this impact. The ability to spin the lower trip assembly bolt with minimal effort indicates proper preload on the trip spring assembly.

17. Repeat these steps to install the second trip spring on the opposite side of the blade (See Figure 2-11)

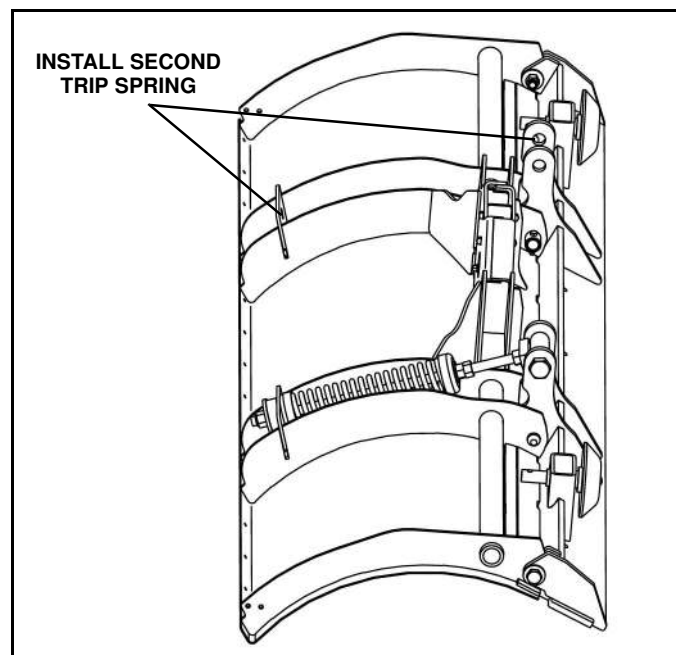


Figure 2-11

Assemble Blade Wings, Wing Cylinders and Return Springs (29R Series Only)

1. Align right wing with blade. Coat pin with grease and insert completely through blade and wing. Install a 5/16"-13 x 1-3/4" hex head cap screw and one 5/16" flat washer through the pin, a second 5/16" flat washer and the blade. Secure with a 5/16" locknut. Tighten the nut, but do not torque. (See Figure 2-12)

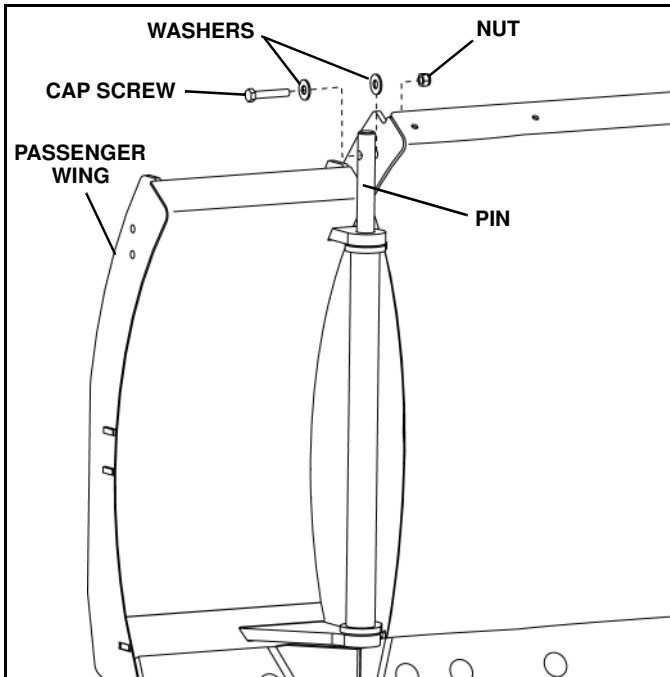


Figure 2-12

2. Position the base of one wing cylinder, with the hydraulic port facing the rear, on the passenger side of the blade. Install a 1/2" x 3-1/2" hex head cap screw and secure with a 1/2" locknut. (See Figure 2-13)

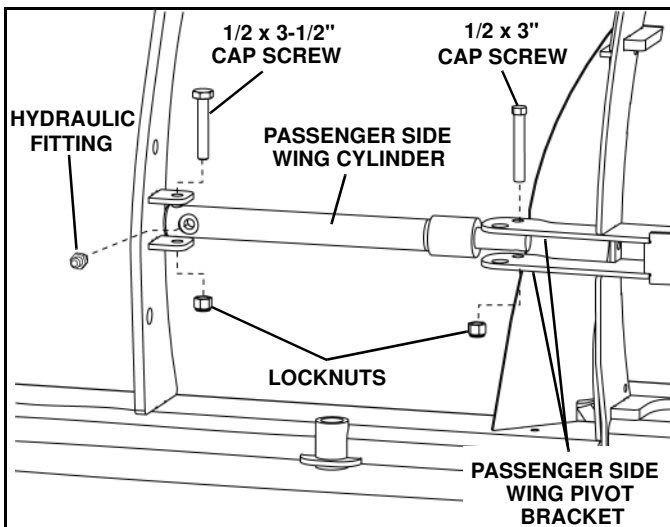


Figure 2-13

3. Slightly extend the cylinder rod to align it with the right wing pivot bracket. Install a 1/2" x 3" hex head cap screw and secure with a 1/2" locknut.

4. Install a straight hydraulic fitting into the cylinder port and tighten securely.

5. Install a 3/4" x 6-1/2" capscrew and 3/4" flat washer through the closed loop of the retract spring. Install a second 3/4" washer and spacer on the bolt. Insert the bolt/spring assembly through the top wing pivot bracket and begin to thread a 3/4" nut onto the bolt. Continue threading the nut on the bolt until it bottoms on the bolt threads. Install a 3/4" locknut on the bolt below the lower wing pivot bracket and tighten securely (See Figure 2-14)

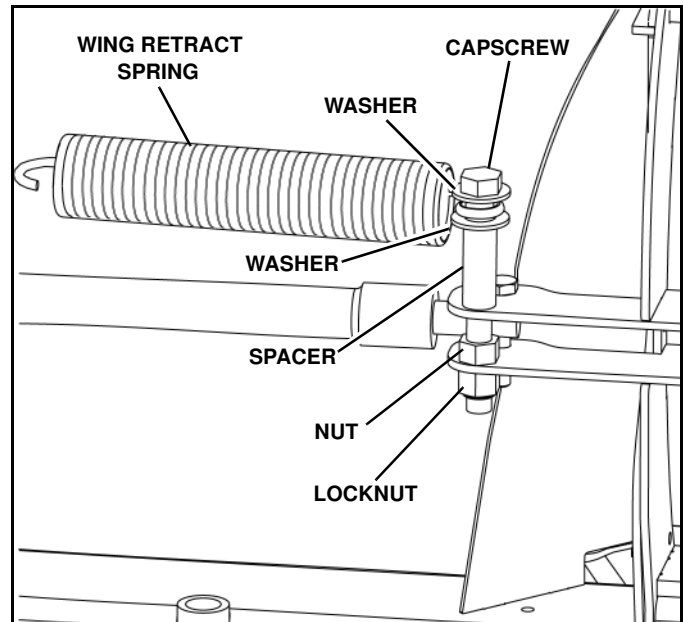


Figure 2-14

6. Install a 5/8" x 4-1/2" eyebolt on the opened side of the spring. Thread a 5/8" nut onto the eyebolt one half way down the threads. Insert the eyebolt into the blade rib and thread a second 5/8" nut onto the eyebolt. Tighten the nut until a 0.015" feeler gauge can pass between two or more coils of the retract spring. DO NOT exceed a maximum clearance of 0.030" between the coils. (See Figure 2-15)

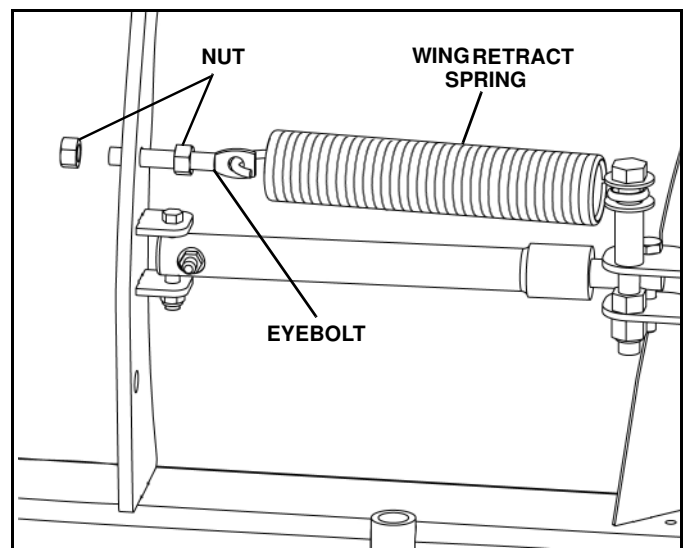


Figure 2-15

7. Tighten the nut on the spring side to secure the adjustment.

8. Repeat the previous steps to install the driver side wing, cylinder and wing retract spring.

9. Install left and right wing wearstrips using 1/2" x -1 3/4 carriage bolts and 1/2" locknuts.

10. Hydraulic hoses will be connected to the wing cylinders after A-frame installation.

11. Optional Accessory: Attach a plow marker to each wing and wing link as shown and secure using 5/16 x 1" cap screws and locknuts. (See Figure 2-16)

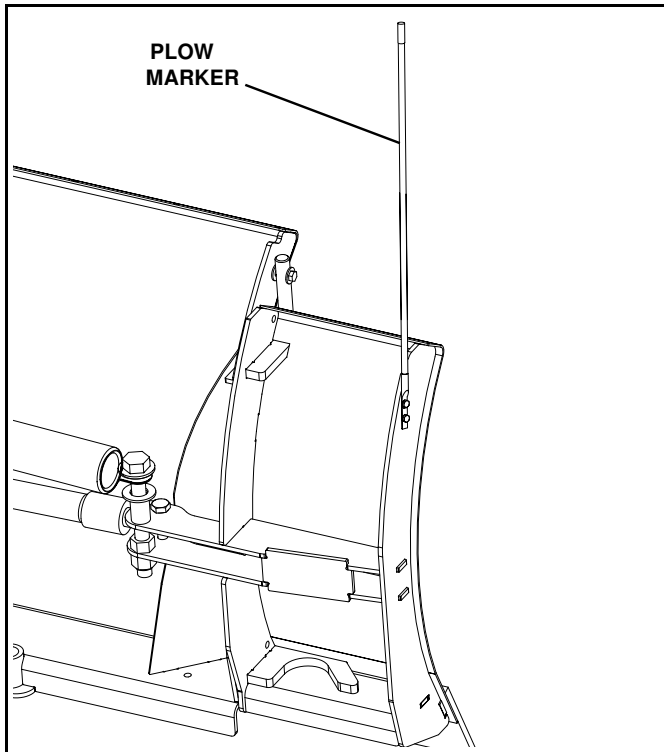


Figure 2-16

Final Assembly

1. Install A-frame into Universal Skid Steer Adapter into center hole with 1x8-12" bolt and 1" locknut. (See Figure 2-17)

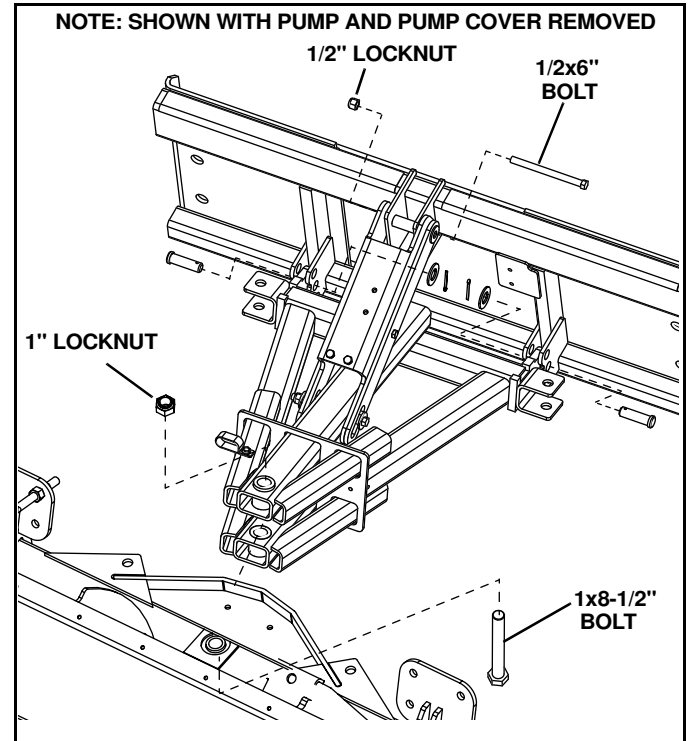


Figure 2-17

2. Connect slider link to upper mount holes in the Universal Adapter Plate with 1/2x6" bolt and 1/2" locknut. (See Figure 2-17)

3. 29SKD and 29THDSKD: Install cross over relief block to face of Universal Adapter Plate. (See Figure 2-18)

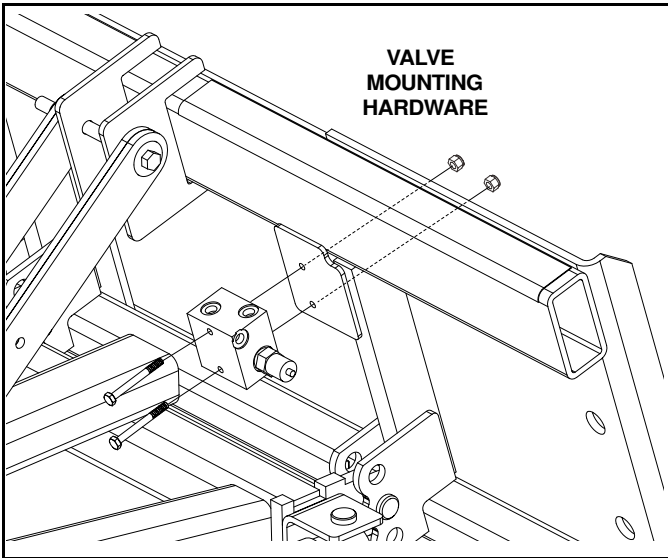


Figure 2-18

4. 29SKD and 29THDSKD Only: Connect hoses to swing cylinders from cross over relief.

5. 29R SKD ONLY: Connect the hydraulic hose from port marked PSW on the valve block to the right (passenger side) wing cylinder. Connect the hose from port marked DSW on the valve block to the left (driver side) wing cylinder (See Figure 2-19)

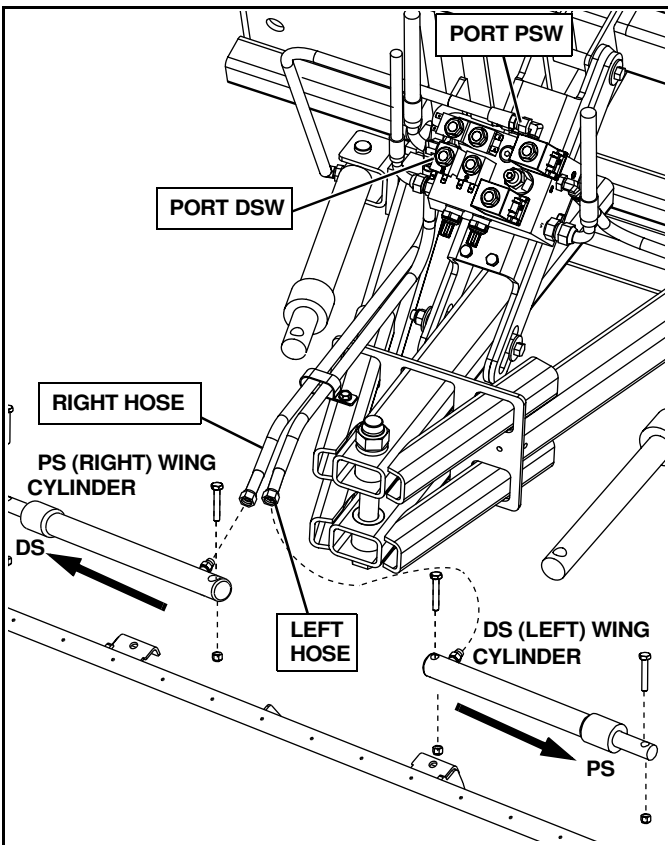


Figure 2-19

6. 29R SKD Only: Connect right (passenger side) angle cylinder to the hose from the port marked PS. Connect the left (driver side) angle cylinder to the hose from the port marked DS. (See Figure 2-20)

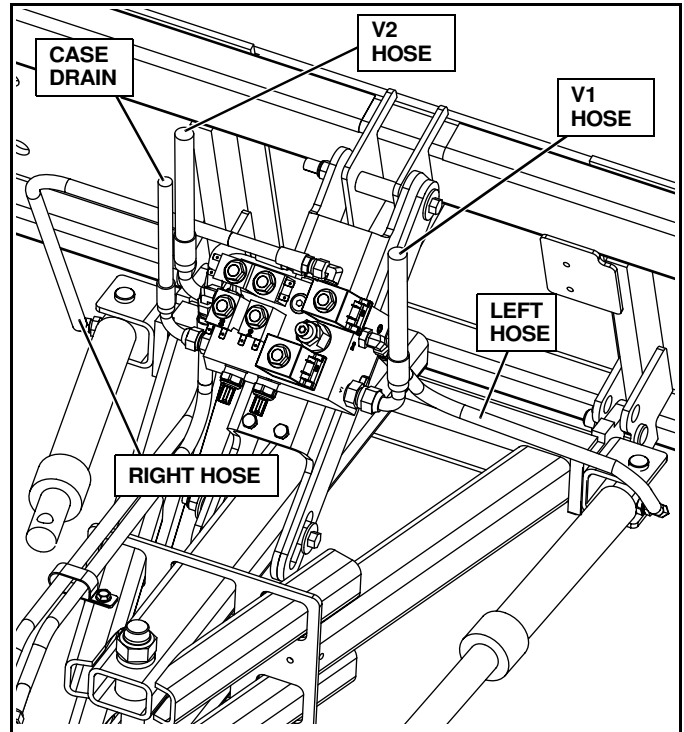


Figure 2-20

7. 29R SKD only: Connect couplers to end of the auxiliary hydraulic hoses. These hoses are connected to the ports marked V1 and V2. (See Figure 2-20)

8. 29R SKD Only: connect a coupler to the hose the comes from the port marked CD (Case Drain). This hose drains the excess overflow to the skid steer case drain. (See Figure 2-20)

IMPORTANT: Review the "Break In Period" section on page 17 of the Maintenance section to determine if the 1" pivot bolt and lock nut installed in step 3 are tightened appropriately.

Trip Spring Adjustment (All Except 29THDSKD Series)

1. Lower plow to the full down position.
2. Insure that blade springs are installed as illustrated with open end of top loop facing vehicle.
3. Adjust springs by loosening jam nuts on end of the eye bolts and turning opposing nut in proper direction.

NOTE: Springs are properly adjusted when two or more coils allow a 0.010" feeler gauge to just pass between the separated coils. (A 3 x 5 post card is approximately the same thickness.)



CAUTION

- Do not overtighten springs. If more than 0.015" (1/64") gap appears between coil with plow at rest damage could occur to equipment during plowing.
- Springs must be installed with open end of top loop facing vehicle. Bottom loop position will vary.

NOTE: Eyebolts must be installed in the correct spring bracket mounting holes for proper operation and spring tension. See specific model information below.

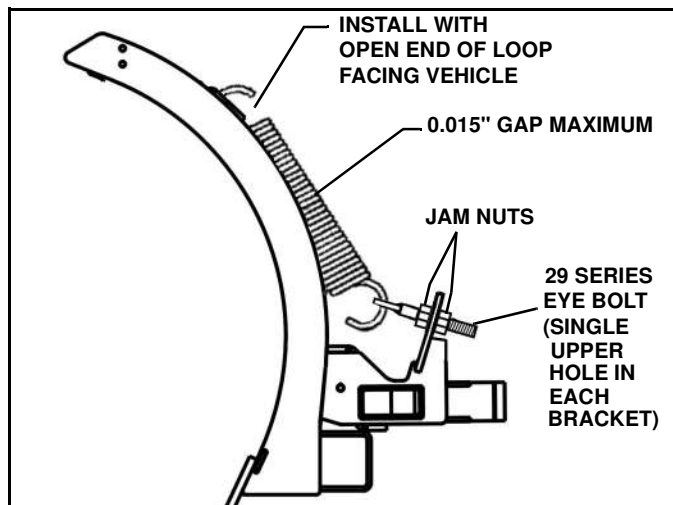


Figure 2-21

4. **29SKD SERIES BLADE ONLY:** Three eyebolt mounting holes are present in each swing frame spring bracket on this model. Only one spring and eyebolt are used on each side of the plow, and must be secured in the single upper hole of each spring bracket. A jam nut on either side of the spring bracket secures each eyebolt and provides for adjustment. (See Figure 2-21).

5. Tighten springs until a 0.010" feeler gauge can pass between two or more coils (a 3x5 postcard is approximately 0.010").

Trip Spring Adjustment (29THDSKD Series)

1. Loosen the 3/4" locknut on the top of the trip rod and the 3/4" jam nut below the lower spring cup. (See Figure 2-23)

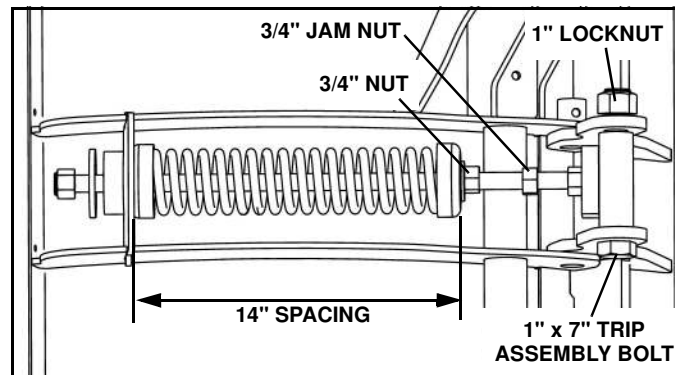


Figure 2-22

2. Tighten the lower 3/4" nut against the washer and lower spring cup until the distance between both spring cups is 14 inches.
3. Tighten the 3/4" jam nut against the adjustment nut to secure the 14" spring cup spacing. (See Figure 2-23)

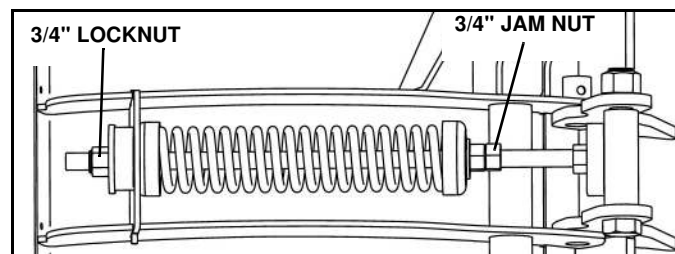


Figure 2-23

4. Tighten the top 3/4" locknut on the trip rod against the shock plate and shock pad until the lower trip assembly bolt can be spun with minimal effort with a wrench.

NOTE: The shock plate keeps the lower blade and cutting edge from slamming into the stops on the main blade. The ability to spin the lower trip assembly bolt with minimal effort indicates proper preload on the trip spring assembly.

Control Wiring Installation

1. Position the control box in cab. Secure the control box using hook and loop fastener provided.
2. Connect the power adapter to the in-cab power receptacle. The power cable may need to be wrapped around the back of the seat. (See Figure 2-24)

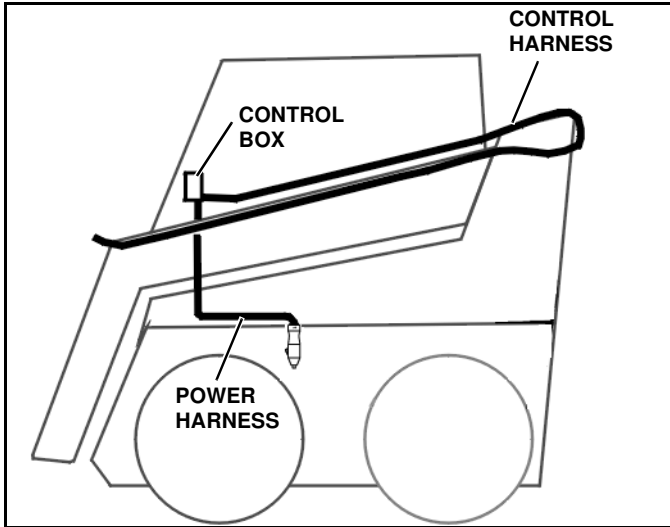


Figure 2-24

3. Route the control harness lead around the pivot point on the loader arms on the back of the Skid Steer and down the top of the loader arms to the front. Allow enough slack when routing wire so that wiring is not put in tension when the loader arms are moved. Position the wiring to prevent pinching when loader arms pivot, and secure with cable ties. (See Figure 2-25).

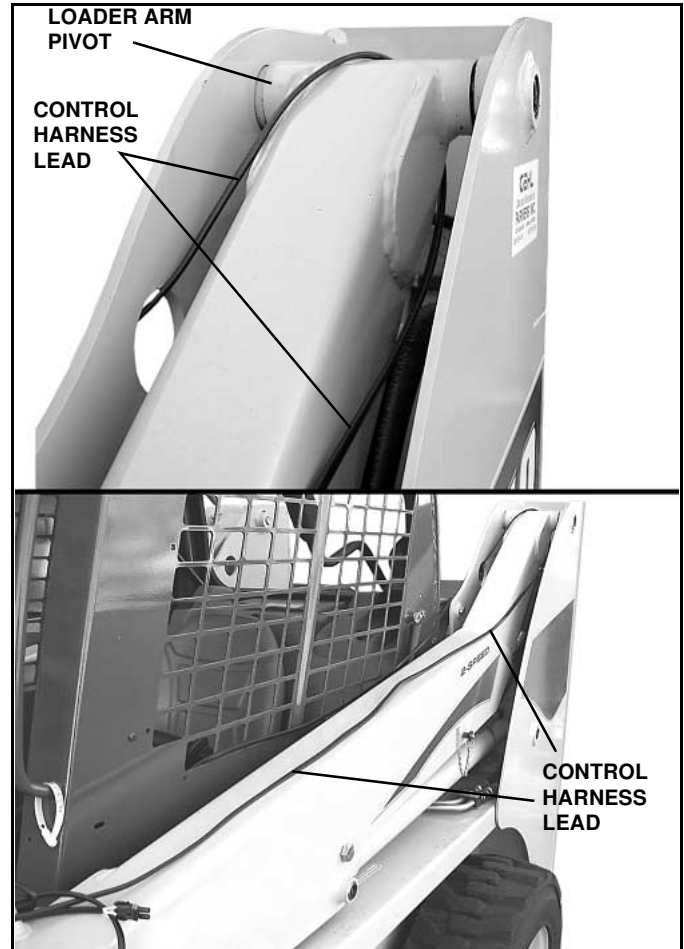


Figure 2-25

Control Bracket Installation

1. Install Plow Control Bracket onto skid steer window with three tie straps. (See Figure 26)

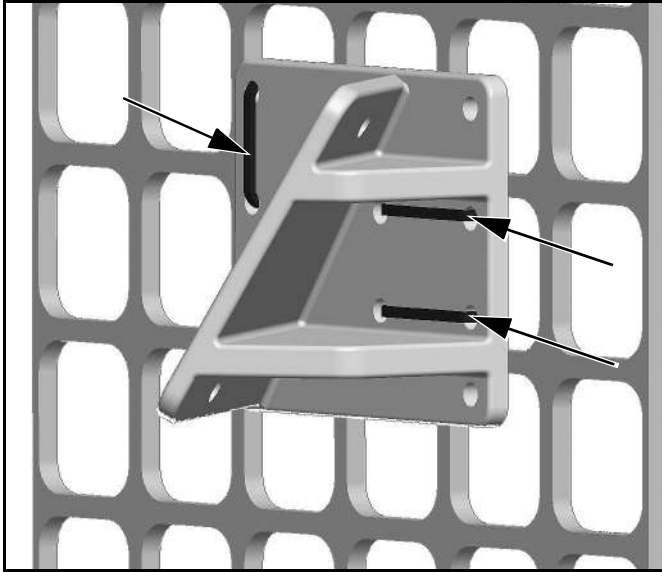


Figure 26

2. Route harness through opening in side window and connect to back of Plow Control Box. (See Figure 27) (29R Skid Steer Control Shown)

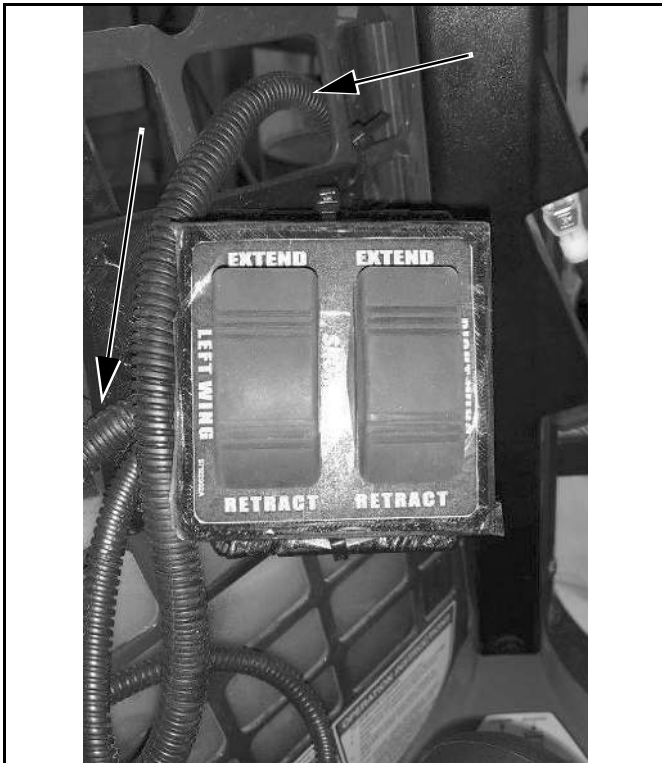


Figure 27

3. Secure Plow Control Box with two tie straps. (See Figure 28)

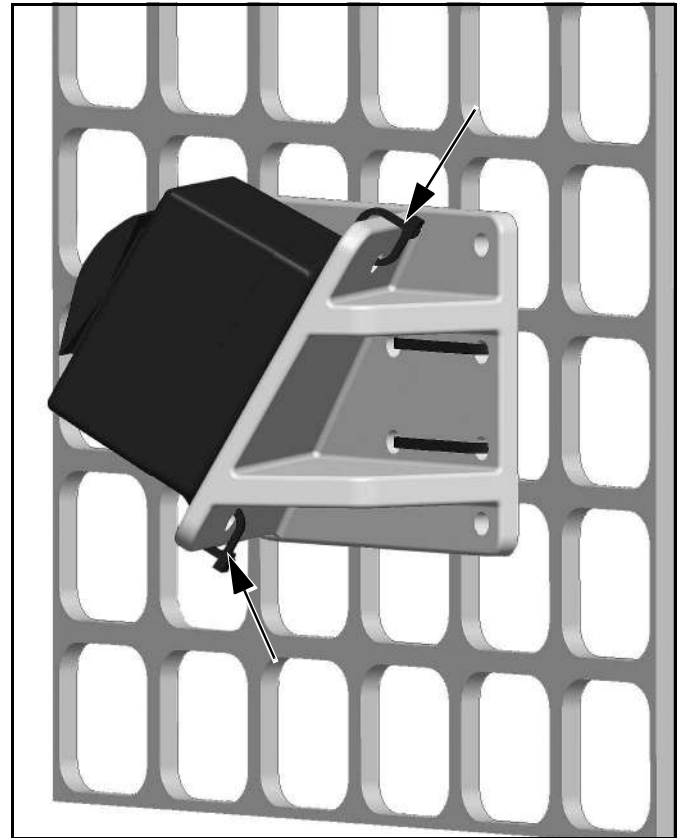


Figure 28

MAINTENANCE

General

• **Before operating, perform a thorough visual inspection of the equipment. Look for fluid leaks, cracked, bent or broken components, loose nuts, bolts or attachments and proper fluid levels.**

• **A clean hydraulic system is essential to long pump life and proper performance.**

• **When adding oil to the reservoir, wipe the area around the filler port clean before removing the breather cap. Use clean oil and a clean funnel, (DO NOT use a cloth or rag to strain the oil).**

• **The operational environment for snow plows is an extremely harsh and corrosive one.**

• **To prevent rust from forming, clean and repaint exposed metal surfaces.**

• **NEVER operate the equipment with the protective covers or guards removed.**

Break In Period

During the first few hours of operation the Plow will go through a break in period during which mating surfaces of the A-Frame and Swing Frame pivots will settle in. After 15 to 20 hours of operation check for free play of the A-Frame and Swing Frame Pivot.

To check for free play:

- raise the plow
- push down on end of blade, either right or left side, as far as it will go
- using a tape measure, measure and record the distance from the ground to the bottom edge of the wear strip
- Pull upwards on the same end of the plow until edge of blade is raised as far as it will go
- measure and record the distance from the ground to the bottom edge of the wear strip
- Subtract the two measurements to determine the amount of free play between the Swing Frame Pivot and the A-Frame

NOTE: Allowable free play range is 1/2" to 1-1/2". If free play exceeds this range it must be adjusted using the following steps.

To remove any excessive free play:

- tighten the Pivot Bolt Lock Nut (typically 1/6 to 1/3 turn, one or two flats)

Periodic Inspection

After approximately every 20 hours of operation perform the following inspections procedures:

1. Inspect the plow assembly for any damage or excessive wear. Also inspect all fasteners to insure that they are properly tightened. If any fasteners are loose re-tighten to the proper torque (Refer to the Torque Specification chart in this manual). Also carefully inspect adjacent area for damage or wear as well as carefully inspecting all adjacent fasteners for proper torque.

2. Apply a small amount of light oil to the Hitch Pins and pivots, to Pivot Pins between the Blade Assembly and the Swing Frame, between Swing Cylinder pivot Pins and the Linkage Pivots.

3. Check for excessive looseness between the A-Frame and Swing Frame Pivot. If there is excessive looseness adjust the Swing Frame Pivot Pin as described in the "BREAK-IN PERIOD" section of this manual.


4. If wear is noticed between the A-Frame and Swing Frame apply a good quality Anti-Seize lubricant to this area.

Hydraulic Cylinders

To avoid corrosion during storage, coat the exposed (chrome) portion of the angle cylinders with a light grease.

Disk Shoe Adjustment

1. Raise the plow to the UP position.
2. Place suitable blocking under plow to allow at least 10" of clearance to the ground.
3. Lower plow onto blocking.

	WARNING
Keep hands and feet clear of blade and A-Frame when setting blocking and lowering plow. Moving or falling assemblies could result in injury.	
FAILURE TO FOLLOW CAN RESULT IN INJURY OR DEATH.	

4. Turn ignition switch OFF and apply the emergency brake.
5. Adjust shoe assemblies by removing Shoe Mounting Pin and adding or subtracting washers on the top or bottom of the shoe mounting bracket. (See Figure 3-1)

NOTE: Adjust shoe assemblies to meet road conditions. 1/4" to 1/2" off the ground for hard surfaces, 1" to 2" for gravel roads, etc.

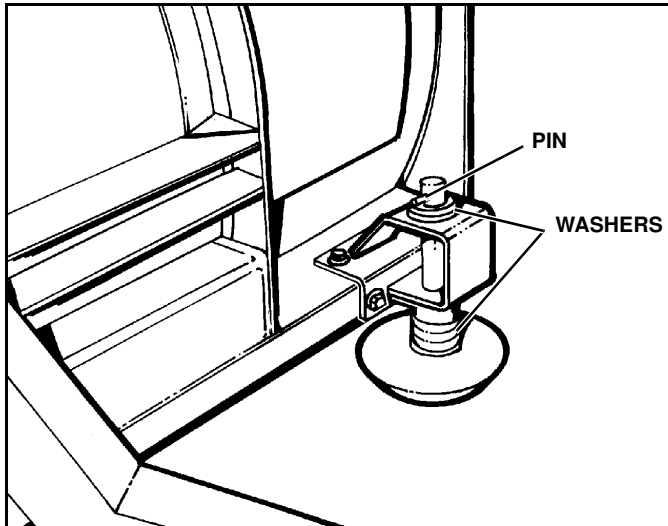



Figure 3-1


6. After the Disk Shoe position is properly adjusted, place washers on the Disk Shoe Stem - above the Disk Shoe Mounting Bracket, and below the Retaining Pin - to remove all up and down movement of the Disk Shoe in the Bracket. Failure to do this will result in excessive wear of the holes in the Disk Shoe Mounting Bracket and will also result in bending the Disk Shoe Stem.

Cutting Edge

NOTE: Cutting Edge must be replaced when it is worn to the bottom edge of the frame.

1. Raise the plow UP 8".
2. Place suitable blocking under A-Frame of plow to allow at least 6" of clearance to the ground.
3. Lower plow onto blocking.
4. Remove mounting bolts holding old Cutting Edge to blade. Discard old Cutting Edge and hardware.
5. Consult Parts Manual for proper replacement Cutting Edge.
6. Install new Cutting Edge using new hardware.

	WARNING
Keep hands and feet clear of blade and A-Frame when setting blocking and lowering plow. Moving or falling assemblies could result in injury.	
FAILURE TO FOLLOW CAN RESULT IN INJURY OR DEATH.	

	CAUTION
Cutting edge may be sharp. Handle with care to avoid injury.	

TROUBLESHOOTING GUIDE

Introduction

Whenever service is necessary, your local dealer knows your plow best and is interested in your complete satisfaction. Return your snow plow to your local dealer for Maintenance service or any other assistance you may require. If you are unable to do so, this trouble Shooting Guide should help you determine the problem. Before attempting the servicing of your plow, you should possess good mechanical abilities and a total understanding of the mechanism.

PLEASE: Before calling parts and service personnel be certain that:

1. You have read this guide carefully and are certain that all of the suggestions pertaining to your problem have been attempted.
2. You should have the following information available.
 - A. Date snow plow was originally installed.
 - B. A-Frame Serial Number.
 - C. Blade Model Number.
 - D. Blade Serial Number.

This information should be recorded on page 2 of this Owners Manual.



CAUTION

First read all warning instruction, the safety messages, and directions before attempting any adjustments or repairs to your unit!

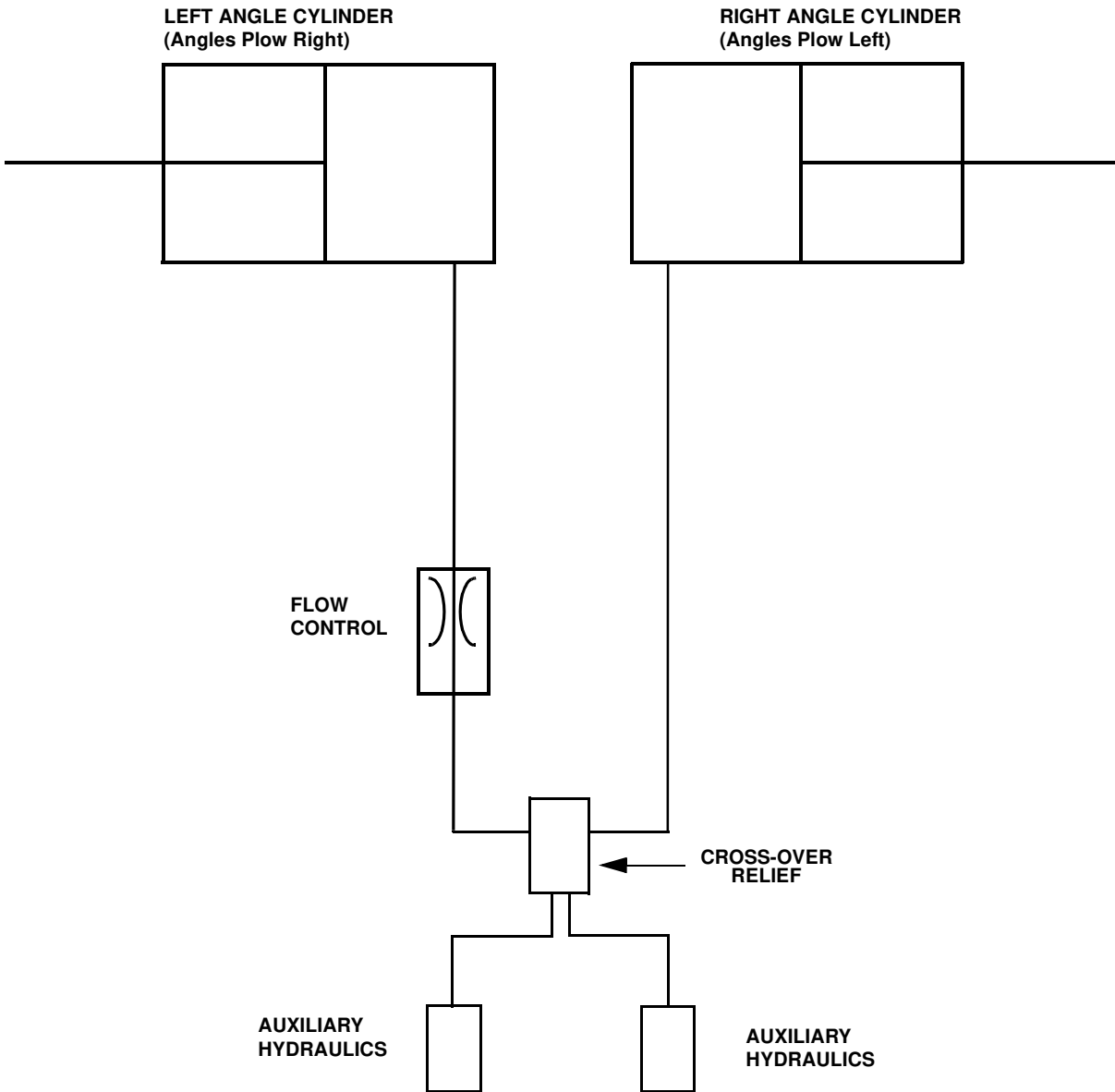
Trouble Shooting-Quick Reference General

1. Check oil level in hydraulic system reservoir.
2. Check for external leakage at cylinders, hoses and power unit.

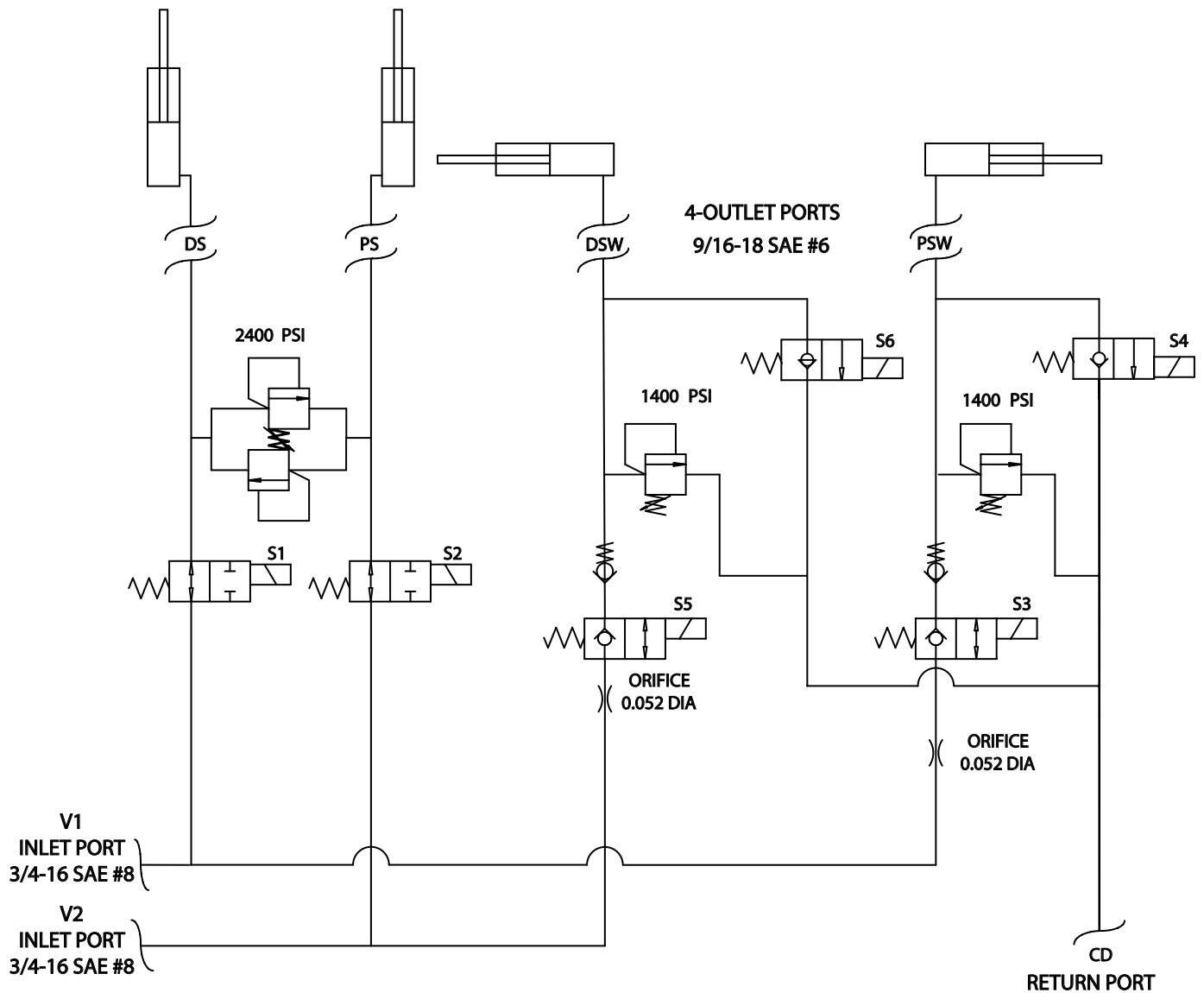
PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Blade will not angle	Hydraulic fluid level low	Check fluid level on skid steer, and add oil if needed.
	Crossover pressure relief valve setting too low	Replace the cross over relief valve.
	Angle cylinder binding or bent	Find the cause of binding and or interference in the plow a-frame and angle cylinders. Replace components if necessary.
	Faulty skid loader valve	The auxiliary hydraulics valving may be at fault. Bring the skid steer to dealer to check the auxiliary hydraulics circuit.
Unit angles very slowly	Hydraulic fluid level low	Check fluid level on skid steer, and add oil if needed.
	Crossover relief valve sticking or stuck	Replace cross over relief valve.
	Crossover relief valve pressure setting too low	Replace cross over relief valve.
	Improper oil viscosity for outside air temperature, unit not at normal operating temperature	Check oil viscosity, color and water content. Change oil if needed. Refer to equipment maintenance manual for proper oil conditions.
Unit angles in one direction only	Crossover relief valve sticking or stuck	Replace cross over relief valve.
	Crossover relief valve pressure setting too low	Replace cross over relief valve.
	Angle cylinder binding	Find the cause of binding and or interference in the plow a-frame and angle cylinders. Replace components if necessary.
	Faulty skid loader valve	The auxiliary hydraulics valving may be at fault. Bring the skid steer to dealer to check the auxiliary hydraulics circuit.

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Unit does not hold angle: <i>Note this problem is usually noted when pushing snow or when plow is being transported.</i>	Crossover relief valve pressure setting too low	Replace cross over relief valve.
	Crossover relief valve sticking or stuck	Replace cross over relief valve.
	Snow too heavy/wet	Loading conditions may be more than the plow is designed to move. The blade is designed to move if the conditions are above design limits.
	Faulty skid loader valve	The auxiliary hydraulics valving may be at fault. Bring the skid steer to dealer to check the auxiliary hydraulics circuit.
Wings angle out but don't return	Case Drain line not hooked up	Connect the case drain to the skid steer. The case drain is needed to drain excess oil from wing returns.
	Return valve solenoid bad or a faulty wiring connection	Check the wiring and hydraulic schematics found in the owners manual 97102056 on page 21 and 22. Verify the wiring is correct. Refer to parts manual 97102057 for parts list.
Main blade only angles and wings do not work	Control box not plugged in	The wings are activated by solenoid valves that require a power source. Make sure the main harness is plugged into the control harness.
	Power to control box not plugged into power supply	Make sure the control box power is plugged in. Check the in-line fuse to make sure power is getting to the valves.
Wings move out when blade hits snowbank	Case Drain line not hooked up	Because the wings expel oil when retracted, the oil needs to go somewhere. As a result, the oil will go to the other wing, if the case drain is disconnected. Connect case drain to third return line on skid steer.
Wings return when pressing extend and activating auxiliary hydraulics	Wrong wing is being activated	Check the wiring and hydraulic schematics found in the owners manual 97102056 on page 21 and 22. Verify the wiring is correct. Refer to parts manual 97102057 for parts list.
When one wing is out and hits a snow bank, the other wing extends	Case Drain line not hooked up	Check the wiring and hydraulic schematics found in the owners manual 97102056 on page 21 and 22. Verify the wiring is correct. Refer to parts manual 97102057 for parts list.

29 SKD HYDRAULIC SCHEMATIC



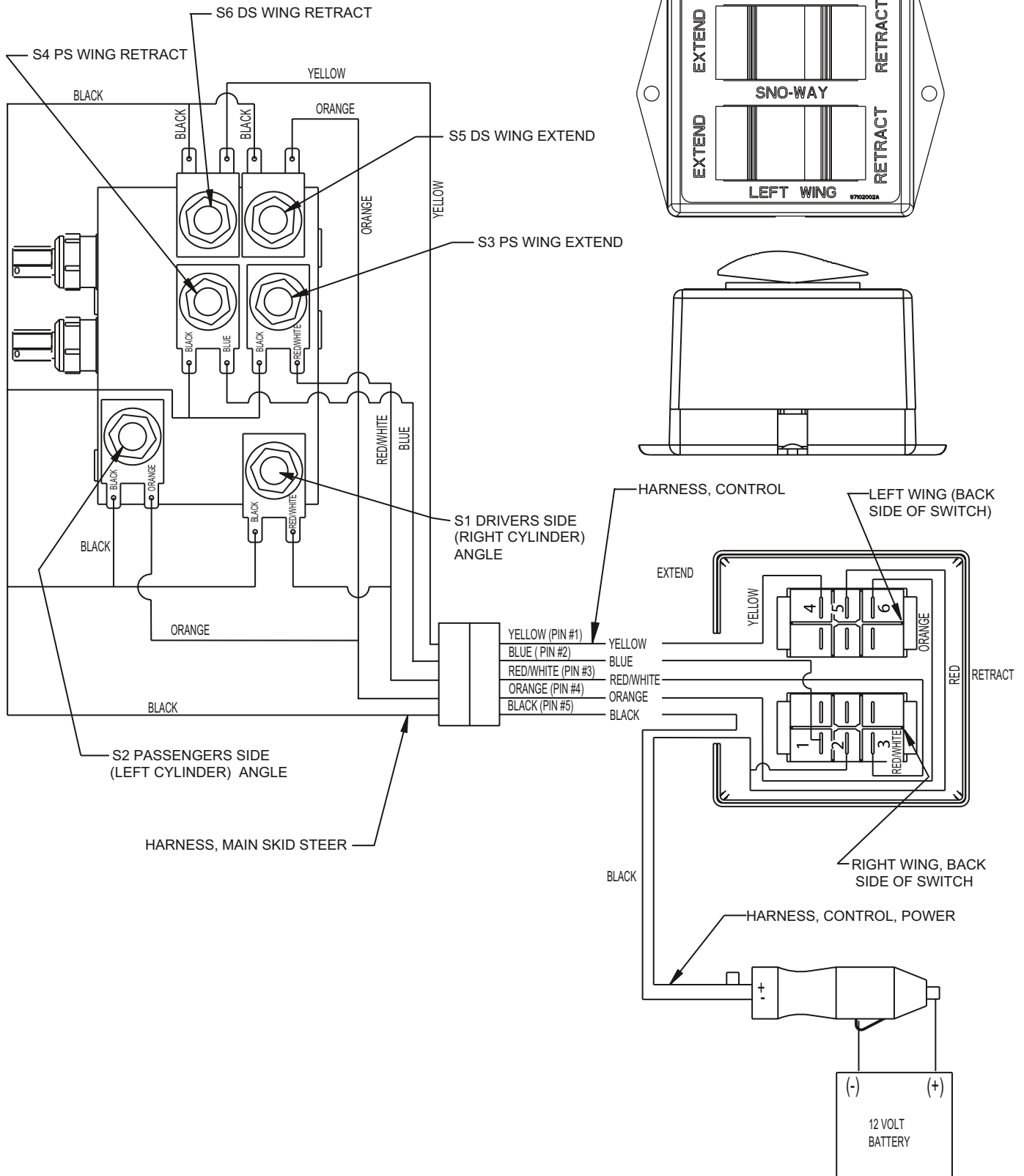
29R SKD HYDRAULIC LAYOUT



29R SKD Function Matrix

Blade Action Description	V1	V2	S1 (NO)	S2 (NO)	S3 (NC)	S4 (NC)	S5 (NC)	S6 (NC)
Wire Color			Red/White	Orange	Red/White	Blue	Orange	Yellow
Angle Blade DS (CW)	IN	OUT						
Angle Blade DS (CCW)	OUT	IN						
DS WING EXTEND	OUT	IN		X			X	
DS WING RETRACT								X
PS WING EXTEND	IN	OUT	X		X			
PS WING RETRACT						X		







29R SKD ELECTRICAL LAYOUT



TORQUE SPECIFICATIONS

NOTE: Use these torque values when tightening Sno-Way hardware (excluding: Locknuts and Self-tapping, thread Forming and Sheet Metal Screws) unless specified otherwise.

All torque values are in Lb-Ft except those marked with an * which are Lb-In
(For metric torque value Nm, multiply Lb-Ft value by 1.355 or Lb-In value by 0.113)

Unified National Thread	Grade 2 		Grade 5 		Grade 8 	
	Dry	Lubed	Dry	Lubed	Dry	Lubed
8-32	19*	14*	30*	22*	41*	31*
8-36	20*	15*	31*	23*	43*	32*
10-24	27*	21*	43*	32*	60*	45*
10-32	31*	23*	49*	36*	68*	51*
1/4-20	66*	50*	9	75*	12	9
1/4-28	76*	56*	10	86*	14	10
5/16-18	11	9	17	13	25	18
5/16-24	12		19	14		20
3/8-16	20	15	30	23	45	35
3/8-24	23	17	35	25	50	
7/16-14	32	24	50	35	70	55
7/16-20	36	27	55	40	80	60
1/2-13	50	35	75	55	110	80
1/2-20	55	40	90	65	120	90
9/16-12	70	55	110	80	150	110
9/16-18	80	60	120	90	170	130
5/8-11	100	75	150	110	220	170
5/8-18	110	85	180	130	240	180
3/4-10	175	130	260	200	380	280
3/4-16	200	150	300	220	420	320
7/8-9	170	125	430	320	600	460
7/8-14	180	140	470	360	660	500
1-8	250	190	640	480	900	680
1-14	270	210	710	530	1000	740
Metric Course Thread	Grade 8.8 		Grade 10.9 		Grade 12.9 	
	Dry	Lubed	Dry	Lubed	Dry	Lubed
M6-1	8	6	11	8	13.5	10
M8-1.25	19	14	27	20	32.5	24
M10-1.5	37.5	28	53	39	64	47
M12-1.75	65	48	91.5	67.5	111.5	82
M14-2	103.5	76.5	145.5	108	176.5	131
M16-2	158.5	117.5	223.5	165.5	271	200

NOTES

NOTES

DEALER PRE DELIVERY CHECKLIST

The following inspections **MUST** be accomplished prior to delivering the snowplow to the customer. Place an X in the box after accomplishing each item on the checklist.

CHECK THAT:

- Parts have not been damaged in shipment. Repair or replace items that are loose, dented or missing.
- All decals are in place.
- All pivot pins and cotters are installed and secure.
- Trip springs are adjusted.
- Disk Shoe assemblies are installed and adjusted.

Start the vehicle engine and place an X in the box after accomplishing each item on the checklist.

CHECK THAT:

- Cylinders, hoses and fittings **DO NOT** leak.
- Blade swings.
- No abnormal noises or vibrations are present; Repair or replace as necessary.

DELIVERY CHECKLIST

The following checklist is to be accomplished with the customer present, Place an X in the box after accomplishing each item on the checklist.

- After giving the Customer his Owner's Manual, instruct him to read it **PRIOR** to operating the Snow Plow. If he has any questions or does not understand part(s) of the Manual, ask him to contact the Dealer for answers or explanations **BEFORE** operating the unit.
- Record the Serial Numbers, Date of Purchase, Purchaser's Name and Address, and the Dealers Name, Address and Phone Number in the space provided on Page 1 of the Owner's Manual.
- Explain connect and disconnect procedures.
- Explain the necessity of Disk Shoe usage at all times to ensure optimum plow performance.
- Fill out Warranty Registration Card and mail COPY 1 to the factory to validate Warranty. NO Warranty claims can be honored if the Warranty Card is not on file at the factory.**

97102056A

SNO-WAY® INTERNATIONAL, INC.

SNO-WAY
SNOW & ICE CONTROL EQUIPMENT

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