



OWNER'S MANUAL

ST SERIES SNOW PLOW
MT SERIES SNOW PLOW
HT SERIES SNOW PLOW

FOR PLOW SERIAL NUMBERS AFTER

STD200000

STG200000

MTD200000

MTG200000

HTD200000

HTG200000

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INTRODUCTION

This manual was written for the assembly, installation and maintenance of your new Sno-Way 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 HEED CAN RESULT IN SERIOUS 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 Power Pack Model Number, Power Pack Serial Number, Controller Serial Number, Blade Model Number, Blade Serial Number And The Pump Serial Number in the space provided below as a handy record for quick reference. The Power Pack Serial Number is located on the A-Frame of the Power Pack, the blade serial number is

located on one of the middle ribs of the blade. This plate contains information that your Dealer needs to answer questions or to order replacement parts, if needed, for your unit.

NAME PLATE DATA

POWER PACK MODEL NUMBER _____

POWER PACK SERIAL NUMBER _____
(Located on A-Frame of Power Pack)

CONTROLLER SERIAL NUMBER _____

BLADE MODEL NUMBER _____

BLADE SERIAL NUMBER _____
(Located on Blade Frame)

PUMP SERIAL NUMBER _____

(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.

Sno-Way snow plow Service Parts Manuals are available for purchase from your authorized Sno-Way dealer. Sno-Way snow plow Service Parts Manuals may also be ordered from the address on the back of this manual by requesting part number 97100740.



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.

NEVER exceed 45 m.p.h. when snow plow is attached to vehicle. Braking distances may be reduced and handling characteristics may be impaired at speeds above 45 m.p.h.

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 insert the cylinder lock when plow is not in use. If the cylinder lock is not installed, the plow blade could inadvertently drop and cause serious injury.

ALWAYS shut off the vehicle engine, place the transmission in Neutral or Park, turn the ignition switch to the "OFF" position, firmly apply the parking brake of the vehicle and turn "OFF" the plow controller 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 OF OPERATION

Hydraulic Power Unit

The hydraulic power unit consists of:

- 12V DC Motor
- Hydraulic pump rated at 1.27 GPM @ 1500 PSI
- 1.35 quart capacity reservoir
- fine mesh intake filter
- Filter screens on all outlet ports

The fluid supply line for the pump is submerged in the hydraulic fluid reservoir and is equipped with a fine mesh intake filter screen.

The 12V DC motor is protected electrically by 150 amp circuit breaker located between the battery and the motor solenoid.

The hydraulic pump is protected by a 1750 PSI system relief valve.

If this unit is equipped with a down pressure option, this will allow the operator to selectively switch the system to provide additional hydraulic force to the cutting edge of the plow.

IMPORTANT: The electric coils, which operate the solenoid valves, require a minimum of 9-1/2 volts DC for proper operation. Lower voltage will cause erratic operation, or failure to operate.

Hydraulic Controls

The hydraulic controls consist of:

- System pressure relief valve, set to 1750 PSI
- One crossover relief valve, set to 2000 PSI
- Two three-way two position hydraulic valves for angle left or right functions
- Two single acting hydraulic cylinders for angle left and right functions
- One three-way two position, one two-way two position valve, and one check valve for raise and lower function for gravity plows
- One three-way two position, three two-way two position valves and two check valves for raise, lower and down pressure functions for down pressure plows
- One down pressure relief valve for down pressure plows

Electro-Hydraulic Operation

All hydraulic functions are controlled by the 12V DC electrical system which actuates solenoids on the hydraulic valves and the solenoid for the electric motor of the power unit.

12V DC power is fed from the battery post of the motor start solenoid to a control circuit board on the plow and from the circuit board to each solenoid.

Each solenoid is actuated by completing a circuit to ground through the solenoid and the circuit board by means of a signal to the circuit board from the hand-held controller in the vehicle, either by a wire transmitted signal or a radio signal.

Raise Mode Of Operation

Actuating the 'Raise' switch on the hand-held controller sends a signal to the control circuit board on the plow, which then actuates the motor start solenoid and the solenoid for the 'C' valve.

Actuating the start solenoid sends current to the power unit motor to cause the power unit to pump hydraulic fluid. Hydraulic fluid under pressure is directed through the 'C' valve to the lift cylinder causing it to extend and raise the plow. On down pressure plows, the 'F' valve is also actuated to allow fluid in the rod end of the double acting raise cylinder to return to the reservoir.

When the 'Raise' switch on the hand-held controller is released, the start solenoid circuit is broken, the motor stops, the circuit to the solenoid for the 'C' valve and (if a down pressure plow) the 'F' valve is broken and these valves go to their normally closed positions.

Lower Mode Of Operation - Gravity Down and Float

Actuating the 'Lower' switch on the hand-held controller sends a signal to the control circuit board on the plow. This actuates the solenoid for the 'B' valve and (if a down pressure plow) the 'F' valve, allowing hydraulic fluid to flow from the lift cylinder to the reservoir.

Once the 'Lower' switch has been actuated, the system will stay in this mode until the 'Raise' function is actuated, allowing hydraulic fluid to flow between the reservoir and the lift cylinder. This allows the lift cylinder to extend and retract as necessary to follow ground contours while plowing.

Down Pressure (DP) System

This system operates only when the 'DP' switch and the 'Lower' switch on the hand-held controller is actuated.

Actuating the 'DP' switch actuates the pressure switch, the 'B' valve solenoid, the 'E' valve solenoid and, through the pressure switch, the start solenoid as required. When the 'E' is actuated and the hydraulic pump operates, hydraulic fluid is directed to the rod end of the lift cylinder, compressing the cylinder and forcing the plow down.

The pressure switch in this system senses the pressure of the fluid in the lift cylinder and closes when the pressure becomes low, allowing the motor and the pump to pump fluid into the rod end of the cylinder. When the pressure reaches the proper level the switch opens, shutting off the motor and the pump.

The system is protected by a relief valve, which relieves excess pressure if the plow is forced up, such as by a bump or obstacle in the roadway. Once any obstacle is cleared, the plow can return to a lower position, which will also lower the pressure. If the pressure becomes too low, the pressure switch will activate the motor and pump as mentioned above to return pressure to normal levels.

The down pressure system is overridden any time the plow control is placed in the 'Raise' mode, but will resume when placed back in the 'Lower' position.

Also, note that the 'E' valve is deactivated anytime an angle function is activated, but returns to its previous condition as soon as the angle function is completed.

Angle Left or Right Mode of Operation

Actuating the 'Angle Right' switch on the hand-held controller sends a signal to the control circuit board on the plow. This actuates the start solenoid and the solenoid for the 'A' valve, allowing hydraulic fluid under pressure to flow through the 'A' valve to the swing cylinder. At the same time, the hydraulic fluid passing through the 'A' valve unseats a check valve in the circuit for the 'D' valve, allowing hydraulic fluid to flow from the opposite swing cylinder through the 'D' valve and back to the reservoir.

Actuating the 'Angle Left' switch on the hand-held controller sends a signal to the control circuit board on the plow. This actuates the start solenoid and the solenoid for the 'D' valve, allowing hydraulic fluid under pressure to flow to the swing cylinder. This fluid also unseats a check valve in the circuit for the 'A' valve, allowing fluid to flow from the opposite swing cylinder through the 'A' valve and back to the reservoir.

The angle circuits are protected by a crossover relief valve set to relieve pressure on the circuit a 2000 PSI. If the blade of the plow contacts an obstacle during plowing operations, the crossover relief valves will allow fluid to flow out of the swing cylinder on the side encountering the

obstacle, allowing the cylinder to compress and allowing the blade to adjust its angle to relieve the force from the outside.

Circuit Breaker

A 150 amp circuit breaker is located near the battery in the primary 12V DC positive power circuit and is in place to protect the electrical system. A high amp draw condition will cause the breaker element in the circuit breaker to interrupt current flow to the plow. The circuit breaker will automatically reset after it cools down.

PLOWING OPERATION

Operating Classes

ST Series

The ST series Sno-Way plow is specifically designed for personal snow plowing with small and mid-size 4x4 trucks and sport utility vehicles

MT Series

The MT Series Sno-Way plow is specifically designed for light duty snow plowing with full size 1/2, 3/4 ton and midsize 4x4's. This plow can also be used for some light commercial applications such as lot cleanup, drives and sidewalks.

HT Series

The HT Series Sno-Way plow is specifically designed for heavy duty snow plowing with full size 1/2, 3/4 and 1 ton 4x4's.

Before The Season Begins

1. Inspect vehicle safety equipment for proper operation; brakes, headlights, plowing lights, windshield wipers, flashers, etc.

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 raise and swing cylinder pivot pins and the lift linkage pivots.

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 on page 16 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.

7. Check the reservoir oil level (see maintenance instructions) and repair any oil leaks and worn hoses.

8. Inspect electrical connectors. Make sure the contacts are clean, and apply a small amount of dielectric grease.

9. Install auxiliary and flashing lights (if not equipped). Ensure auxiliary lights are aimed properly (with plow in full UP position).

10. If ballast is required, position and secure ballast behind rear wheels, for optimum performance.

Transporting Vehicle With Plow Attached



WARNING

Ensure ignition switch is OFF before installing or removing the cylinder lock clamp. Equipment failure or inadvertent operation of the control switches could allow the plow blade to fall, resulting in serious injury.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH.

1. Always install the cylinder lock clamp when the plow is raised and the operator is not engaged in plowing operations.

NOTE: If cylinder lock clamp is not installed during transport equipment failure or inadvertent operation of the control switches while driving could allow the plow to fall.



CAUTION

Remove the plow when driving extended distances at temperatures above 40° F, the plow blocks enough airflow to the vehicle's radiator to cause it to overheat at temperatures above 40° F.

2. Do not exceed 45 m.p.h. when driving with the snow plow attached. Braking distance is increased and handling is impaired dramatically at speeds above 45 m.p.h.

3. Reduce speed when crossing railroad tracks or when road conditions deteriorate.

4. Never change blade angle or height while driving.

5. Position the blade out of the beam path of the headlights before driving.

6. Inspect plow and plow attaching hardware for wear or damage before transporting and beginning plow operations.

Plowing Like A Pro



WARNING

- **Never exceed 10 m.p.h. when plowing! Serious personal injury can result, as well as damage to equipment and property, if an unseen obstruction is encountered while plowing.**
- **Never plow with your head protruding from the vehicle side window. Serious head or neck injuries can result from sudden stops or coming into contact with tree branches, signs or other stationary objects.**

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH



WARNING

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 HEED CAN RESULT IN SERIOUS INJURY OR DEATH

NOTE: The vehicle air bag is factory set to deploy at a pre-determined level of impact. The air bag will deploy with the plow attached if an obstruction is hit with enough force to reach this level. Always plow within the recommended plowing speeds and know the area you are plowing to avoid any obstructions.

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.

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

Using The Down Pressure (DP) Hydraulic System - (STD, MTD & HTD Plows)

The DP system was designed for removing hard packed snow from hard surfaces that have had traffic on them prior to being plowed.

The system should be turned OFF when plowing surfaces such as gravel, dirt, sand, etc., to prevent cutting into the surface being plowed.

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.

Activating the system applies down pressure to the down side of the hydraulic raise cylinder. This down pressure will force the blade through the hard-packed snow and down to the pavement. If down pressure decreases, (results if a valley or low spot is encountered by the blade), more down pressure is applied to lower side of the raise cylinder and the blade will follow the contour of the valley. When a hill or a high spot is encountered by the blade, the down pressure will be relieved on the down side of the raise cylinder, this will allow the blade to follow the contour of the hill without lifting the front of the vehicle off the ground.

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. Use the lowest possible gear to place maximum power behind the cutting edge.

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 plow 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



CAUTION

Excessive stacking of snow causes undo stress to the snowplow and components. Repeated loading of this nature may, in time, result in the failure of certain components which are designed to protect the snowplow and vehicle from major damage.

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.

3. 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. Plow must be on a level surface, supported by the jack stand. Drive truck towards plow and align lugs on plow to fit inside the lugs on each side of the truck sub-frame. Continue to pull forward towards plow until the plow lugs ride up into position on the sub-frame inserts located between the sub-frame lugs.



WARNING

Be sure all plow functions are OFF on ALL plow controls in the vehicle cab before making ANY electrical connections.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH.



WARNING

• Ensure engine is OFF and set parking brake before mounting snow plow to vehicle. Vehicle movement, equipment failure, or inadvertent operation of the control switches during installation could result in serious injury.

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

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH.

2. Remove the protective plastic covers from the snow plow and vehicle harnesses and store them inside the vehicle for installation when the plow is removed.



WARNING

The power cable on the front of the truck is wired directly to the battery. The power cable is always energized, even if the truck is turned off. Always replace the protective cap after disconnecting the plow power cable. Allowing an unprotected plug to contact metal parts of the truck may cause electrical component damage. Never use a metal object to clean the plug contacts.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH.

3. Connect the plow end of the power harness to the vehicle end of the power harness.

4. Remove the hand-held controller from the vehicle to use it near the plow while mounting the plow to the vehicle. Disconnect the hand-held controller from the harness at the connector inside the vehicle. Connect it to the connector at the end of the plow control harness. Turn the hand-held controller on after connecting it to the plow control harness.



WARNING

When using the hand-held controller to raise or lower the plow A-frame for mounting the plow to the vehicle, be especially careful of the movement of the light bar, if so equipped. This movement will occur when raising or lowering the A-frame on the jackstand.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH.

5. If needed, the hand-held controller can be used to raise or lower the A-frame to precisely align the pinholes. To raise the plow, press the 'UP' function on the controller. To lower the plow, turn on down pressure and press the 'LOWER' function. The 'UP' function must be pressed to stop the downward motion once it begins. To lower plows without down pressure, place the plow in float and push up on the light bar (Pulling down on the light bar raises the A-frame), or push down on the A-frame if no light bar is used.



WARNING

Pressing the blade angle functions will result in the A-frame swinging if it is not secured to the truck. Do not press the angle function during plow installation.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH.

6. Place the plow in float (turn off the down pressure) and insert the lower hitch pins on each side of the plow. Secure the hitch pins with lynch pins.



CAUTION

NEVER move the vehicle while plow electrical harnesses are connected and the plow is not fully attached to the vehicle.

NOTE: If the plow and vehicle are not level with each other, install one lower hitch pin and then, using the 'Raise' or 'Lower' switch on the hand-held controller, adjust the A-frame height to allow installation of the second lower hitch pin.

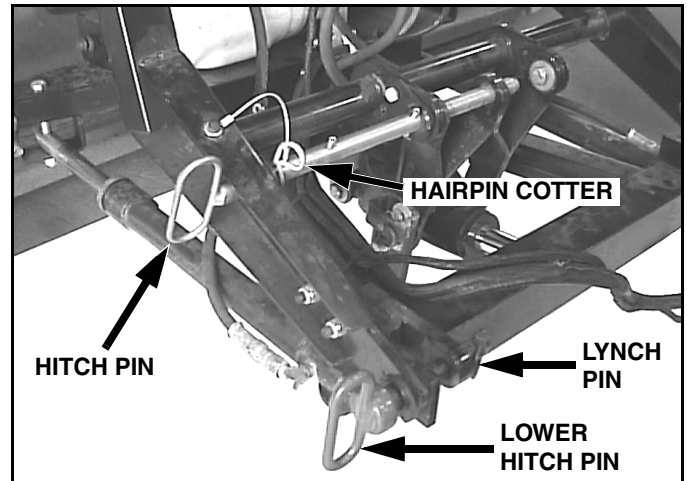


Figure 1-1

7. After the lower hitch pins and lynch pins have been installed, turn on the down pressure function (if the plow is equipped with down pressure hydraulics) and use the 'Lower' switch on the hand-held controller to raise the lift link and light bar. If the plow is not equipped with down pressure hydraulics, press the 'Lower' button to put the plow in float mode and raise the lift link and light bar manually. Raise the lift link and light bar until it contacts the nose piece.

8. Set the hand-held controller to float (turn off the down pressure). Slide the hitch pin through the mounting lugs. You may need to move the light bar back and forth to precisely align the holes. After installing the hitch pin, lock it in place by inserting the hairpin cotter into the hole in the hitch pin just to the inside of the left arm of the light bar. If the light bar is not installed, install the lynch pin in the end of the hitch pin.

9. Unlatch the jackstand from its lowered position and rotate the jackstand forward and upward, then latch it in transport position with the spring loaded pin.

IMPORTANT: The end of the spring-loaded latch pin fits into a short tube on the side of the bellcrank assembly. If the pin is not retained in this tube, the jackstand may become loose and fall down during plowing or transport.

10. Disconnect the hand-held controller from the plow control harness, and connect the plow control harness to the vehicle control harness. Re-connect the hand-held controller to the control harness, inside the vehicle. If the snow plow is equipped with lights, connect the light wiring harness at this time.

11. Raise plow to the full up position. Check to make sure that the snow plow head lamp beam is not being impaired by the top of the blade assembly. If the head lamp beam is being impaired, adjust the upper light bar to a higher position. To prevent the headlights from interfering with

driver visibility, DO NOT raise the upper light bar higher than necessary to avoid impairment of the headlight beam when the plow is fully raised.

Installing The Cylinder Lock Clamp



WARNING

- Always install the cylinder lock clamp when the plow blade is raised and the operator is not engaged in plowing operations. Equipment failure or inadvertent operation of the control switches while driving could allow the plow blade to fall, resulting in serious injury.

- Ensure engine is OFF and set parking brake before installing the cylinder lock clamp. Vehicle movement, equipment failure, or inadvertent operation of the control switches during installation could allow the plow blade to fall, resulting in serious injury.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH.

1. Raise the plow to the full UP position.
2. Turn ignition switch OFF and apply the emergency brake.
3. Turn OFF the hand-held controller.
4. Remove the pin from the cylinder lock clamp.
5. Position the cylinder lock clamp around the exposed (chrome) portion of the lift cylinder and install the pin. (See Figure 1-2)

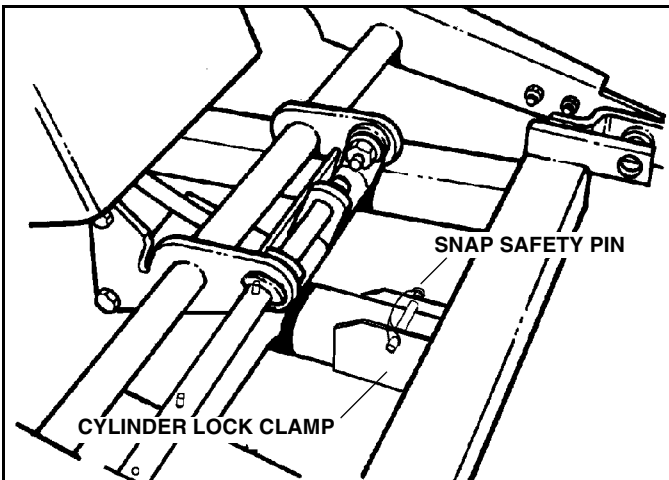


Figure 1-2

Removing Snow Plow From Vehicle

Choose a location for the plow storage which will allow the plow to be removed from the vehicle and not moved after removal. Also, choose a location which will not allow the stand to sink into the ground during storage.

1. Drive vehicle to the desired snow plow storage area. It is recommended that the plow be stored in a dry, protected area.

NOTE: Plow should be thoroughly cleaned of all grime and road salt before it is put into storage.

2. Lower the plow to the ground, put vehicle in park, turn off the engine and set the park brake.



WARNING

- Ensure engine is OFF and parking brake is set before removing snow plow from vehicle. Vehicle movement, equipment failure or inadvertent operation of the control switches during removal could result in serious injury.

- Ensure all personnel are clear of the area surrounding the plow storage location before angling or lowering the plow to prevent serious injury.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH



CAUTION

When disconnecting the plow control harness, turn the locking nut at the end of the connector only. Do not turn the threaded boot. Turning the threaded boot will break the wires in the harness and cause the controller to stop functioning. See figure 1-3

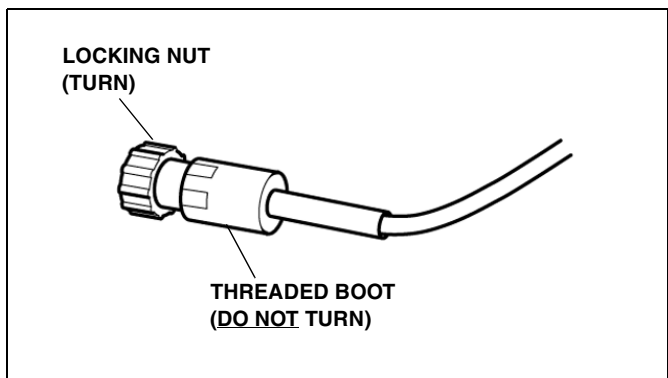


Figure 1-3

3. Remove the hand-held controller from the cab of the vehicle. Disconnect the plow control harness from the vehicle control harness at the front of the vehicle, and connect the hand-held controller to the plow control harness.

IMPORTANT: Disconnect the light wiring harness at this time, and install the protective caps over the ends of the harness.



WARNING

When using the hand-held controller to raise or lower the plow A-frame, be especially careful of movement of the light bar. This occurs during raising and lowering of the A-frame on the jackstand

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH

4. Pull the spring-loaded latch pin on the jackstand to release the jackstand from the transport position. Rotate the jackstand down to a vertical position and insert the second spring-loaded latch pin into the hole in the lift bar to hold the jackstand in a vertical position.

5. Turn hand-held controller on, then turn Down Pressure System ON and then OFF to release load on the top hitch pin. Pull the lock-pin (hairpin cotter) from the upper hitch pin and slide the upper hitch pin out to disconnect the lift arm and light bar from the upper (center) hitch point of the sub-frame. Make sure the plow light harness is disconnected.



WARNING

Keep hands and feet clear of A-frame when detaching the plow. Moving or falling assemblies could result in serious injury.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH

6. Using the hand-held controller, place the jackstand firmly on the ground by using the 'Raise' switch of the controller.

7. Place plow in float (turn off the down pressure), remove the lynch pins, and then remove the hitch pins.

8. After the lower hitch pins are removed, raise the rear of the A-frame (using the 'Raise' switch on the controller) to allow the A-frame to be raised clear of the mounting points of the sub-frame.

9. After the plow is positioned satisfactorily for storage, disconnect the power harness from the vehicle at the connector at the front of the vehicle. Disconnect the hand-held controller from the plow control harness. Move the hand-held controller back to the cab of the vehicle.



WARNING

The power cable on the front of the truck is wired directly to the battery. The power cable is always energized, even if the truck is turned off. Always replace the protective cap after disconnecting the plow power cable. Allowing an unprotected plug to contact metal parts of the truck may cause electrical component damage. Never use a metal object to clean the plug contacts.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH.

10. Place protective caps (normally kept in the vehicle) on the vehicle half of the snow plow control harness and the power harness. Also, place protective caps on the plow half of the snow plow control harness and the power harness. Place the vehicle harnesses in a location on the front of the vehicle where they will not be exposed to potential damage and, if necessary, tie the harness ends in position.

11. After all of the mechanical and electrical connections have been disconnected, back the vehicle away from the snow plow.

Plow Storage

1. If the plow will not be stored on a firm surface (i.e. concrete or asphalt), place a board or piece of plywood, etc. under the jackstand to prevent the jackstand foot from sinking into the ground.

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

3. Grease all pivot points.

4. Fill hydraulic reservoir to fill line to minimize trapped air.

5. Make sure that protective caps are on all electrical connections. Apply a small amount of dielectric grease to ensure a moisture proof seal on the caps.

6. Check and replace any worn and/or damaged component, such as cutting edges or deflectors. Performing preventative maintenance tasks in the spring when plow is stored will ensure that you will be ready to plow in the fall.

TROUBLE SHOOTING 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. Also, there are repair manuals available from your local dealer. However, before attempting the servicing of your plow, you should possess good mechanical abilities and a total understanding of the mechanism.



CAUTION

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

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 have the following information available.
 - A. Date snow plow was originally installed.
 - B. Power Pack Model Number.
 - C. Power Pack Serial Number.
 - D. Controller Serial Number.
 - E. Blade Model Number.
 - F. Blade Serial Number.
 - G. Pump Serial Number.

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

Trouble Shooting

Quick Reference - General

1. Check all wiring to be sure that battery terminals are clean and connections to battery, circuit breaker, solenoid, switches and all connectors on plow harness are clean and tight.
2. Check oil level in hydraulic system reservoir.
3. Check for external leakage at cylinders, hoses and power unit.
4. Check the voltage at the coils which operate the solenoid valves to be sure that the voltage at the coils is a minimum of 9-1/2 volts DC.
5. Check vehicle electrical system for proper operation.

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Motor will not run	Motor brushes worn/commutator worn or dirty	Refer to dealer
	Seal between motor and pump damaged allowing oil to enter motor housing	Refer to dealer
	Circuit breaker failed	Refer to dealer
	Motor solenoid failed	Refer to dealer
	Motor seized	Refer to dealer
Motor continues to run and will not shut-off	Wires shorted out at solenoid or damaged receiver or transmitter	Refer to dealer
Blade will not lift (motor runs)	Hydraulic fluid level low	See Maintenance section
	Raise/lower switch shorted out	Refer to dealer
	Improper main pressure relief valve pressure setting or debris causing valve to stick	Refer to dealer
	Breather cap plugged	See Maintenance section
	Lower valve stuck in lower position	Refer to dealer
	Raise cylinder binding	Refer to dealer
	Pick-up tube filter plugged	See Maintenance section
	Worn/failed pump	Refer to dealer
	Pick-up tube is not submerged in fluid	See Maintenance section
	Down pressure valve stuck shifted	Refer to dealer
Blade lifts slowly	Hydraulic fluid level low	See Maintenance section
	Breather cap plugged	See Maintenance section
	Improper main relief pressure setting or debris causing valve to stick.	Refer to dealer
	Pick-up tube filter plugged	See Maintenance section
	Improper oil viscosity for outside air temperature, unit not at normal operating temperature	See Maintenance section
	Weak system pump	Refer to dealer
	Low battery voltage	Refer to dealer
	Cylinder packing over torqued or dry	Refer to dealer
Unit lifts but does not hold - first action.	Dirt in check valve or lower solenoid valve	Cycle raise and lower system to flush debris
	Lower solenoid valve sticking	Cycle raise and lower system to un-stick valve
Unit lifts but does not hold- Second action.	Dirt or debris in check valve	Refer to dealer
	Lower solenoid valve sticking or stuck	Refer to dealer
	Seals, O-ring(s) on lower solenoid valve damaged	Refer to dealer
	Current available at lower solenoid without activating function	Refer to dealer
	Piston seals leaking on raise cylinder	Refer to dealer

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Unit will not lower (Down pressure switch OFF)	Plugged breather cap	See Maintenance section
	Low or no current available at lower solenoid coil	Refer to dealer
	Lower valve sticking or stuck	Refer to dealer
	Lower solenoid coil inoperative	Refer to dealer
	Raise cylinder damaged allowing movement in one direction only	Refer to dealer
Unit will not lower Or Unit will not apply Down pressure (Down pressure switch ON)	Motor not running	Refer to dealer
	Down pressure valve stuck shifted	Refer to dealer
	Lower valve sticking or stuck	Refer to dealer
	Inoperative down pressure, pressure switch	Refer to dealer
	Down pressure relief valve setting to low	Refer to dealer
	Broken wire/ open circuit in down pressure electrical circuit	Refer to dealer
Blade will not angle (motor runs)	Hydraulic fluid level low	See Maintenance section
	Crossover pressure relief valve setting too low	Refer to dealer
	Low or no current available at angle solenoid	Refer to dealer
	Angle solenoid coil inoperative	Refer to dealer
	Angle cylinder binding or bent	Refer to dealer
	Pick-up tube not submerged in fluid	See Maintenance section
	Angle valve not operating	Refer to dealer
Unit angles very slowly	Hydraulic fluid level low	See Maintenance section
	Crossover relief valve pressure setting too low	Refer to dealer
	Improper oil viscosity for outside air temperature, unit not at normal operating temperature	See Maintenance section
	Damaged cylinder	Refer to dealer
	Cylinder packing improperly torqued or dry	Refer to dealer
Unit angles in one direction only	Crossover relief valve sticking or stuck	Refer to dealer
	Angle solenoid coil inoperative	Refer to dealer
	Low or no current available at angle solenoid	Refer to dealer
	Angle valve stuck/sticking	Refer to dealer
	Angle cylinder binding	Refer to dealer
Unit does not hold angle. Note: This problem is usually noted when pushing snow or when plow is being transported.	Crossover relief valve pressure setting too low	Refer to dealer
	Crossover relief valve sticking or stuck	Refer to dealer
	Angle valve stuck/shifted	Refer to dealer

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Fluid leaking at pump assembly	Hydraulic fittings not torqued properly (too tight, too loose)	Refer to dealer
	O-rings between valve block and base are worn/missing or not seating properly	Refer to dealer
	O-rings between base and reservoir worn or not seating properly	Refer to dealer
	Reservoir over-full	See Maintenance section
	Pump shaft seal leaking	Refer to dealer
	Valve block Cap Screws loose	Refer to dealer
	Reservoir fasteners loose	Refer to dealer

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).

IMPORTANT: Hydraulic unit comes from factory charged with Type 5606. If additional oil is added it must be compatible with Type 5606. If another type of oil has been used in the system the same type of oil must be used for topping off system.

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

- Ensure all electrical connections are clean and tight.

- 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 and install the transport lock. See "Installing The Cylinder Lock Clamp" on page 10.
- 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:

- Remove the 3/8" cap screw and lock nut which holds the lock plate to the pump platform
- Tighten the pivot bolt nut (typically 1/6 to 1/3 turn, one or two flats)
- Replace the lock plate and secure with the 3/8" cap screw and lock nut.

Periodic Inspection

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

1. Inspect the plow assembly including the subframe 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 lift and swing cylinder pivot pins and the lift linkage pivots.

3. Check for excessive free play between the A-frame and swing frame pivot. See "Break In Period", this page. If there is excessive free play adjust the swing frame pivot pin as described in the "Break In Period", this page.

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 lift and angle cylinders with a light grease.

Electrical Quick Disconnect Plug

Install protective covers on quick disconnect ends to prevent corrosion from forming on terminal ends during storage or when plow is disconnected from vehicle.

Polycarbonate Blade Care

- DO NOT use abrasive or highly alkaline cleaners on polycarbonate blade.

- Never scrape polycarbonate blade with squeegees, razor blades or other sharp instruments.

- Benzene, gasoline, acetone or carbon tetrachloride should never be used on polycarbonate blade.

- DO NOT clean polycarbonate blade in hot sun or at elevated temperatures.

Polycarbonate Blade Cleaning Instructions

Wash with a mild soap or detergent and luke-warm water using a clean cloth or soft sponge. Dry thoroughly with a chamois or moist cellulose sponge to prevent water spots.

Service Intervals

It is recommended that the fluid in the hydraulic system be changed once a season.

Fluid Requirements

IMPORTANT: Hydraulic unit comes from factory charged with Type 5606. If additional oil is added it must be compatible with Type 5606.

NOTE: Type 5606 oil is rated to – 60° F, when Type 5606 is not available Exxon UNIVIS J13 or equivalent may be used.



CAUTION

- Using the proper oil increases the life expectancy of the most critical part of your plow; the hydraulic power unit.
- Failure to use the proper oil can cause extensive damage to the power unit, seals and hydraulic rams.

Changing Oil and Cleaning Filter Screen



CAUTION

Using the proper oil increases the life expectancy of the most critical part of your unit; the hydraulic power unit.

NOTE: We recommend cleaning the filter screen at every oil change, this will help ensure maximum life and maximum performance from the pump assembly.



WARNING

- Allow the system to cool down before draining oil or handling system components. Serious burns can result from contact with hot oil.

- Never disconnect any hydraulic line or fitting with the unit in the raised position. Always lower the unit and relieve pressure before removing any lines or caps.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH

1. Move the plow to the desired area for the oil change, preferably a clean, dry area with a solid surface. Lower the plow to the ground, put the vehicle in park, turn off the engine and vehicle ignition switch, set the park brake and turn off the plow controller.

2. To prevent any inadvertent short circuit or electrical shock, disconnect the power harness and the control harness (if so equipped) at the vehicle bumper harness connection point.

3. Loosen the four screws which fasten the pump cover to the pump platform and remove the pump cover.

4. Remove the nut and lockwasher from the power stud on the motor and remove the red power lead between the start solenoid and the motor. Remove the black wire of the power harness and the black ground wire to the control receiver from the 3/8" screw in the center section of the power unit. Disconnect the 12-pin connector of the power unit valve wire harness. Remove the red/black #1 wire and the red wire of the power harness from the 5/16" terminal of the start solenoid, remove the red/white #2 wire from the #10 terminal of the start solenoid and remove the brown #3 wire from the #10 terminal of the start solenoid. Mark the wire and terminal locations for reference to aid later re-installation of wires after the oil change is completed (See Figure 2-1).

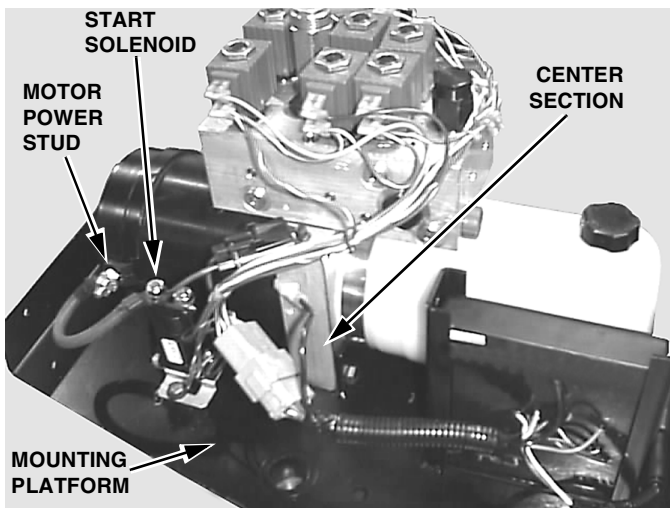


Figure 2-1

5. Using a suction gun, drain the oil (most of it) from the power unit reservoir.

6. Remove the two 5/16" capscrews which fasten the center section of the power unit to the pump platform (See Figure 2-1).

7. Lift the power unit and rotate it toward the rear of the pump platform (See Figure 2-2).

NOTE: If the oil has not been previously removed from the reservoir, the power unit can be rotated and tipped to allow most of the oil to be drained out of the reservoir filler hole, once the filler cap is removed.

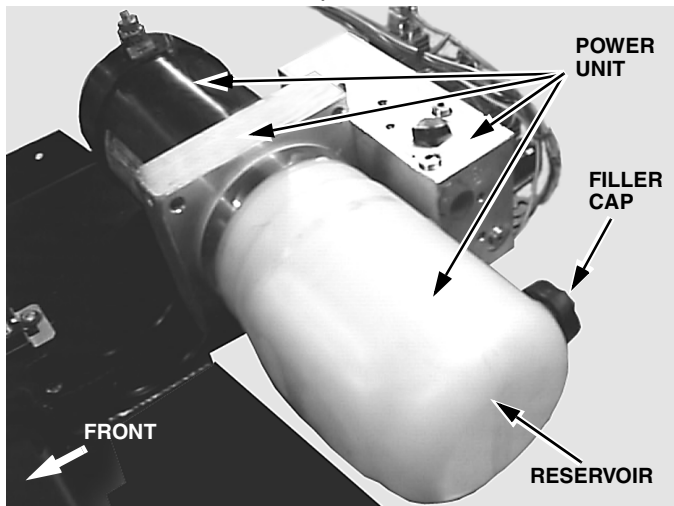


Figure 2-2

8. Using a screwdriver, loosen the band clamp which holds the reservoir onto the center section of the power unit. Then, while twisting and pulling the reservoir, remove it from the center section of the power unit. Place a pan or other container on the ground underneath the power unit to catch any oil which spills from the reservoir as it is pulled off. Note the position of the reservoir oil

pick-up tube and be sure to keep the tube in this same position as the filter is removed and installed (See Figures 2-2, 2-3).

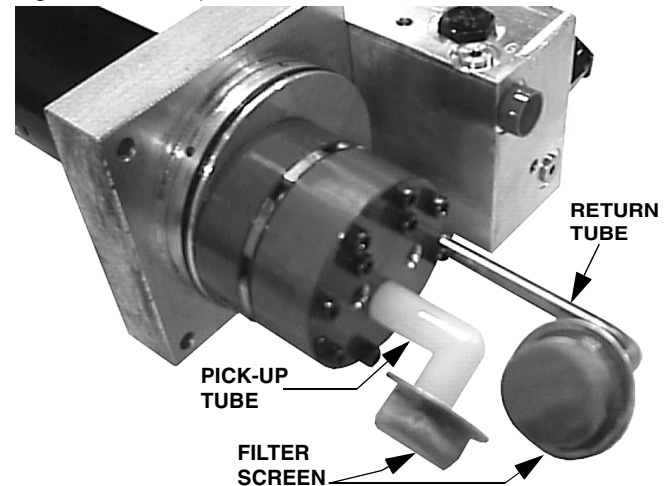


Figure 2-3

9. After the reservoir has been removed, clean the inside and outside of the reservoir with a suitable solvent.

10. Unscrew the filter screens from the reservoir oil pick-up tube and return tube and clean them with a suitable solvent. Blow dry the filter from the inside with low pressure air (See Figure 2-3).

11. Carefully reinstall the filter screens and tighten by hand. Use care when handling the screens to avoid damage.

12. Inspect the "O" ring between the reservoir and the power unit center section for damage and replace if necessary. Wipe the surface of the "O" ring with fresh oil and then push the reservoir onto the center section of the power unit. Be sure to position the reservoir so that the oil filler cap is in the same location / orientation that it was before removal.

13. Using screwdriver, tighten the band holding the reservoir onto the power unit center section to 80-120 lb-in. torque.

14. Rotate the power unit back into position on the pump platform and reinstall the two 5/16" capscrews holding the power unit to the pump platform. Use new locknuts and torque to 22-25 lb-ft. torque.

15. Reinstall all of the electrical wires which were previously removed.

16. Remove the lift cylinder hose(s) from the 45 degree fittings in the valve block. If it is a down pressure plow, be sure to mark the hoses and fittings prior to removal to be certain that the hoses are reinstalled to the proper fittings. Also, remove the angle cylinder hoses at the fittings to the valve block, again marking the hoses and port locations to insure reinstallation into the proper port.

17. Place the loose hose ends in a suitable container to catch the oil that is expelled from the hoses. Manually cycle the lift and angle cylinders through their entire stroke to drain the oil remaining in the cylinders.

18. Reconnect the hoses in their correct position and torque the lift cylinder hoses to 20-25 lb-ft. and the angle cylinder hoses to 12-15 lb-ft.



CAUTION

DO NOT use teflon tape or pipe dope on hydraulic fittings. These can dislodge and jam valves in the hydraulic system.

19. Fill the hydraulic reservoir with type 5606 hydraulic fluid until the fluid registers full on the reservoir sight line.

NOTE: Vehicle must be parked on level ground and plow must be in lowered position in order to properly check the reservoir oil level. Checking the oil level with the plow in a raised position will give an incorrect reading.

20. Refer to plow operation instructions and operate the plow to purge all air from the hydraulic system. Replenish the oil in the reservoir as necessary while purging the system.

21. Operate the system and check for leaks. Repair or replace any components as necessary.

Disk Shoe Adjustment

1. Raise the plow to the full 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 serious injury.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH

4. Turn ignition switch OFF and apply the emergency brake.

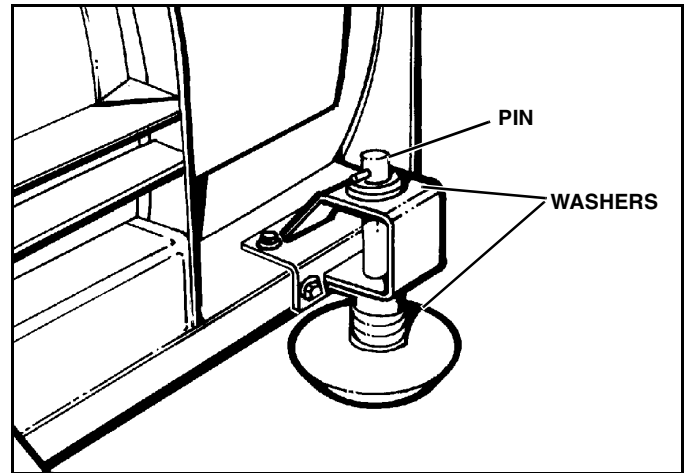


Figure 3-4

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 3-4)

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

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 to the full UP position.
2. Place suitable blocking under A-frame of plow to allow at least 6" of clearance to the ground.
3. Lower plow onto blocking.

NOTE: If plow is equipped with lexan blade the blade must be retained prior to removing the cutting edge. This can be accomplished by using a pair of 6" C-clamps located at the center of the curved portion of the blade.

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 serious injury.

FAILURE TO HEED CAN RESULT IN SERIOUS INJURY OR DEATH



CAUTION

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

Trip Spring Adjustment

1. Lower plow to the full down position.
2. Insure that blade spring is installed as illustrated with open end of top loop facing vehicle. (See Figure 4-5)

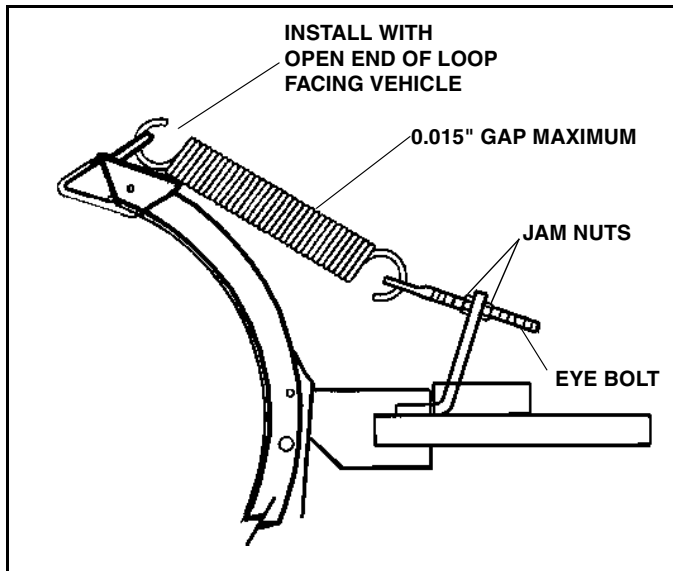


Figure 4-5

3. Adjust springs by loosening jam nuts on end of the eye bolts and turning opposing nut in proper direction. (See Figure 4-5)

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

NOTES

TORQUE SPECIFICATIONS

SAE Grade and Head Markings	1 or 2 No Marks 	5 5.1 5.2 	8 8.2 
SAE Grade and Nut Markings	2 No Marks 	5 	8 

	Grade 1		Grade 2		Grade 5, 5.1 or 5.2		Grade 8 or 8.2	
	Lubricated ^a	Dry ^b	Lubricated ^a	Dry ^b	Lubricated ^a	Dry ^b	Lubricated ^a	Dry ^b
SIZE	lb-ft	lb-ft	lb-ft	lb-ft	lb-ft	lb-ft	lb-ft	lb-ft
8-32			14*	19*	22*	30*	31*	42*
10-24			21*	27*	32*	43*	45*	60*
1/4	2.8	3.5	4.5	5.5	7	9	10	12.5
5/16	5.5	7	9	11	15	18	21	26
3/8	10	13	16	20	26	33	36	46
7/16	16	20	26	32	41	52	58	75
1/2	25	31	39	50	63	80	90	115
9/16	36	45	56	70	90	115	130	160
5/8	50	62	78	100	125	160	160	225
3/4	87	110	140	175	225	280	310	400
7/8	140	175	140	175	360	450	500	650
1	210	270	210	270	540	675	750	975

DO NOT use these values if a different torque value or tightening procedure is given for a specific application.

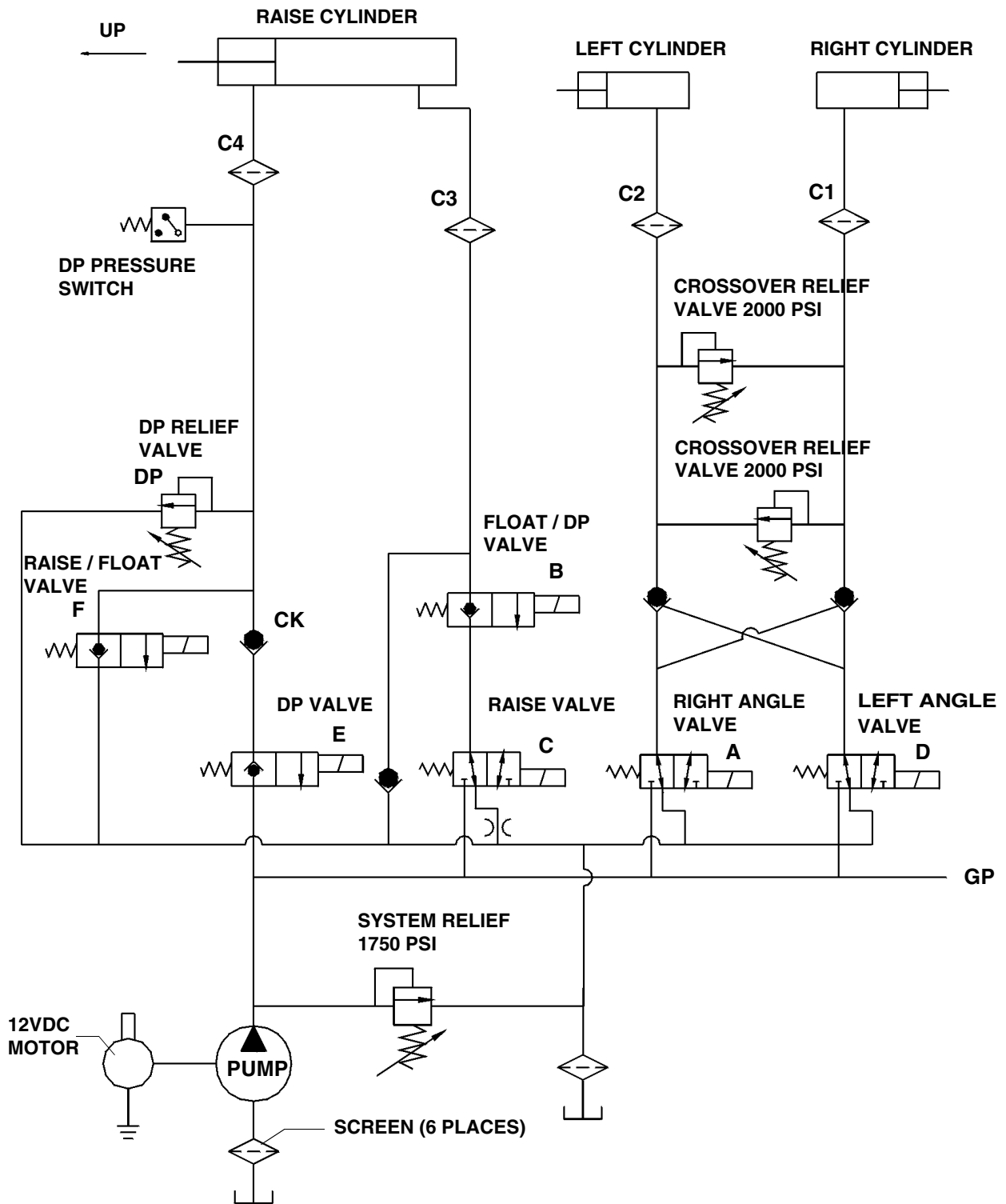
Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

^a "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.

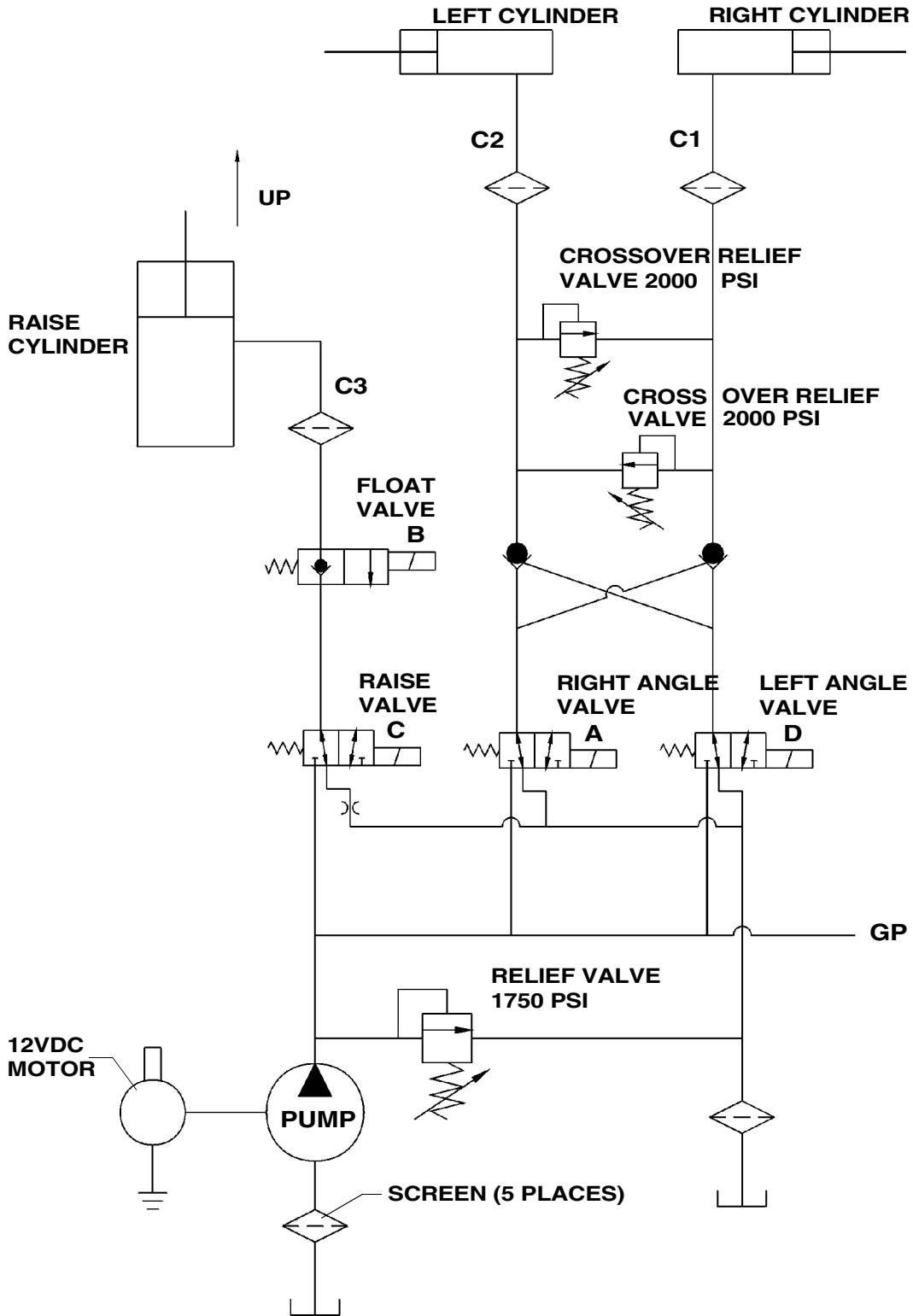
^b "Dry" means plain or zinc plated without any lubrication

* Values with asterisk are in lb-in.

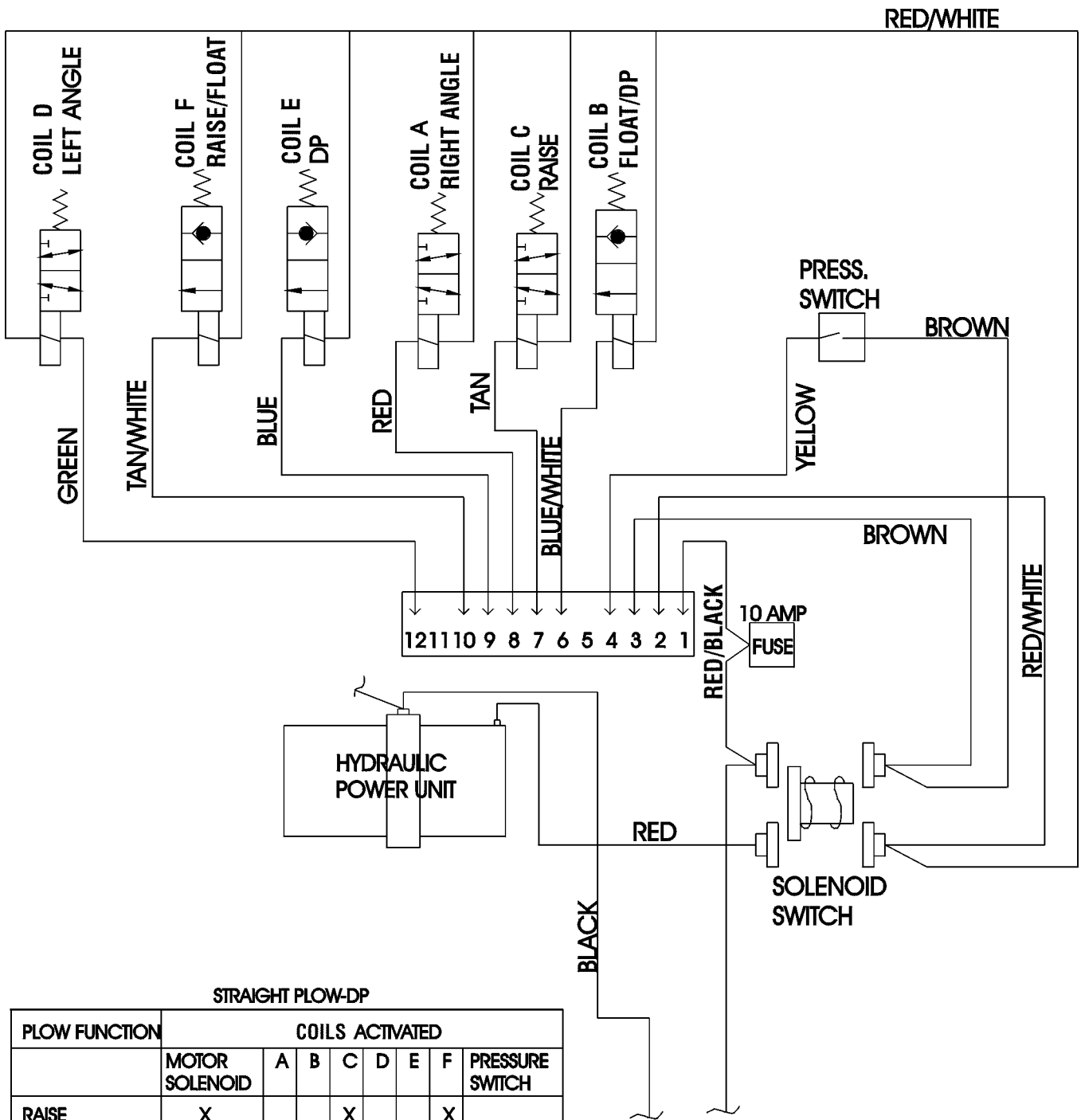
HYDRAULIC SCHEMATIC (Down Pressure System)



HYDRAULIC SCHEMATIC (Gravity Down System)



WIRING SCHEMATIC (Down Pressure System)

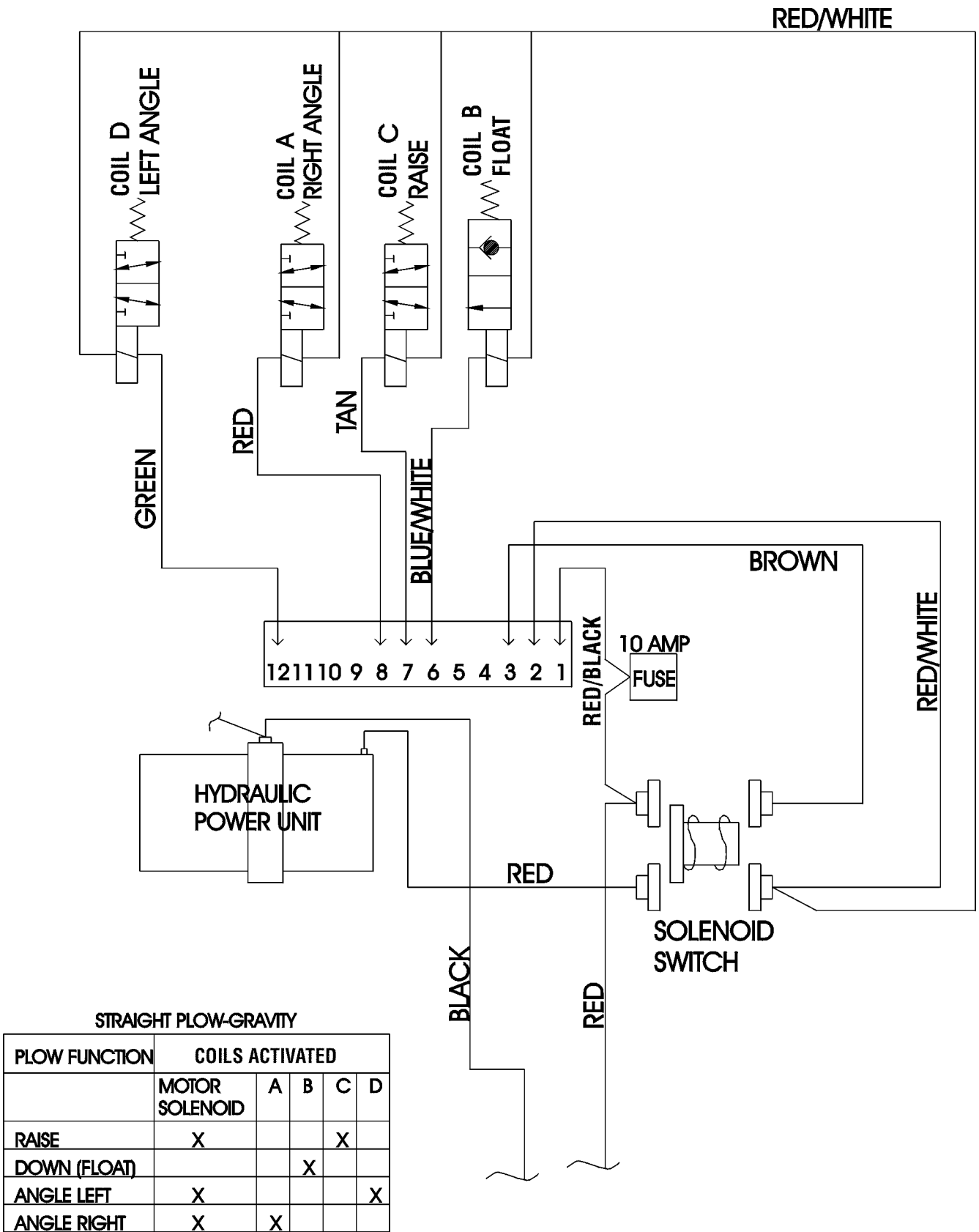


STRAIGHT PLOW-DP

PLOW FUNCTION	COILS ACTIVATED							
	MOTOR SOLENOID	A	B	C	D	E	F	PRESSURE SWITCH
RAISE	X			X			X	
DOWN (FLOAT)			X				X	
DOWN PRESSURE	X		X			X		X
ANGLE LEFT	X				X			
ANGLE RIGHT	X	X						

NOTE: COIL E MUST BE DEACTIVATED FOR ANGLE FUNCTIONS

WIRING SCHEMATIC (Gravity Down System)



SNO-WAY PLOWS - LIMITED WARRANTY

FIVE YEAR STRUCTURAL LIMITED WARRANTY COVERAGE

The Sno-Way snow plow structural elements are warranted to be free from defects in materials and workmanship for a period of five years from date of delivery from an authorized Sno-Way Dealer. The Sno-Way Warranty Registration card for the product must be properly filled out and mailed to Sno-Way within 30 days of date of purchase to obtain benefits of this section of warranty.

Structural elements are defined for this warranty as: *Blade frames, A-frames, Swing Frames, vehicle sub frames, and structural components (weldments) of Sno-Way snow plows.*

TWO YEAR STANDARD LIMITED WARRANTY COVERAGE

The Sno-Way snow plow nonstructural components are warranted to be free from defects in workmanship for a period of two years from date of delivery from an authorized Sno-Way Dealer. The Sno-Way Warranty Registration card for the product must be properly filled out and mailed to Sno-Way within 30 days of date of purchase to obtain the benefits of this section of warranty.

Nonstructural product components are defined for this warranty as: *Blade inserts (Lexan/Hyzod or steel) and the SM01 Hydraulic power system and control module.*

ONE YEAR STANDARD LIMITED WARRANTY ACCESSORIES / SERVICE PARTS / COMPONENTS.

Sno-Way International, Inc. Warrants accessories, service parts and components purchased separately for a period of one year after original purchase to be free from defects in material and workmanship.

DEFINITION OF PRODUCT:

Product as used throughout this warranty means the Sno-Way line of Predator snow plows, straight blades and "V" blades and components thereof.

EXCLUSIONS UNDER THIS WARRANTY PROGRAM:

1. The installation of product must be an approved installation in accordance with the Sno-Way Vehicle Application Guide, Installation Instructions Manual and the Owner's Manual.
2. The "use" of the Sno-Way product must be in conformity with the operating and maintenance instructions as set forth in the Owner's Manual.
3. Damage as a result of accident, misuse and/or negligence is not covered.
4. The polycarbonate moldboard under the two year warranty does not cover: *Puncture, Hazing, Abrasion, Yellowing, Scratching or Chemical Damage.*
5. Normal wear items are excluded (Without limitation): *Paint finish-corrosion/contamination, Bushings and bearings, Plow shoes, Plow cutting edges, Blade markers/pins/clips, Accessory items and non-standard attachments - or any damage caused by the addition of non-standard attachments not sold by Sno-Way.*
6. Specific exclusions relating to items covered under the Two Year Warranty: *Fasteners and damage caused by failure to retighten fasteners, Electric contact corrosion - damage or abrasion of wiring harness, Control key pads/contacts, Any damage resulting from a failure to properly service and maintain the product as prescribed in the Owner's Manual.*
7. General exclusions:
 - (A) Any and all damage from the improper installation of product, misapplication of product, abusive use of vehicle and/or product, failure to properly maintain and service, improper repair, service or alteration of product, and any damage as a result of accident or misuse.
 - (B) Sno-Way will not be liable for any expense not related to defects in materials and workmanship. The attachment of product to or upon a vehicle, including any necessary modification of product or vehicle, is entirely at the purchaser's risk and expense, and compliance with applicable motor vehicle rules and regulations is the responsibility of the installer.
 - (C) This Warranty when applicable applies to the "first" purchaser of product installed in accordance with Sno-Way Application Guides, Installation and Owner's Manuals, and to the transfer of the product by the "first" purchaser to another approved vehicle application by an authorized Sno-Way Dealer.
 - (D) The "repair" and/or replacement of any part or component is at the option of Sno-Way.
 - (E) Indirect costs incurred while "product" is being repaired during the warranty period are excluded such as; lost time, equipment rental, transportation charges, and similar incidental charges incurred.

OBTAINING WARRANTY SERVICE

To obtain warranty service, promptly return the product or any defective part at your expense to any authorized Sno-Way Dealer during the warranty period. Replacement or repair of defective or inadequate parts shall be performed without charge for labor or materials by such Dealer at his regular place of business during regular business hours after inspection and determination that the warranty applies.

Purchaser shall prepay all freight charges for returning Product or component to Dealer, Sno-Way or any other location designated by Sno-Way.

Note: The Sno-Way Technical Services help line is designed to service Sno-Way Dealers. Sno-Way Technical and Customer Service will help you locate your nearest Sno-Way Dealer.

Please also use the Sno-Way web site with the Dealer locator: www.snoway.com

DISCLAIMERS:

1. Sno-Way warrants its Products only as set forth in this warranty. Sno-Way makes no other warranties, express or implied, and disclaims all other warranties, including any implied warranty of merchantability or fitness for any particular purpose.
2. Sno-Way's obligations under this warranty are limited to those expressed in this warranty, and Sno-Way shall not be liable to the purchaser or any third party for any direct or indirect, incidental or consequential damage or loss.
3. No person is authorized to modify or add to this warranty in any manner.
4. If any Sno-Way product is improperly installed, altered, misused, damaged or otherwise tampered with, this warranty shall lapse and become null and void.

LEGAL RIGHTS:

Some states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damages, so the above limitations or exclusions may not apply fully to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. All "other" provisions and "limitations" not altered by local law shall continue to apply.

ENFORCEMENT/CONSTRUCTION

This Warranty shall be enforced and construed under the laws of the State of Wisconsin.

SNO-WAY[®] INTERNATIONAL, INC.



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