June 15, 2010 Lit. No. 44229, Rev. 07







MVP PLUS™ Snowplow

Installation Instructions

A CAUTION

Read this document before installing the snowplow.

A CAUTION

See your WESTERN® outlet/Web site for specific vehicle application recommendations before installation. The Selection List has specific vehicle and snowplow requirements.

SAFETY DEFINITIONS

A WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious personal injury.

A CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

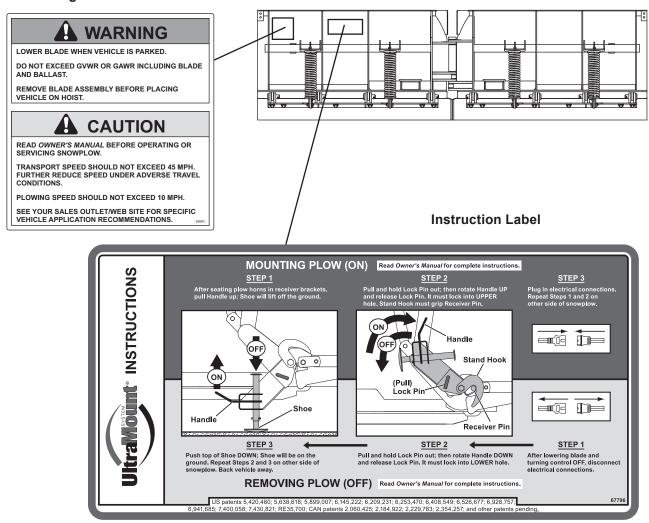
NOTE: Indicates a situation or action that can lead to damage to your snowplow and vehicle or other property. Other useful information can also be described.

WARNING/CAUTION AND INSTRUCTION LABELS

Become familiar with and inform users about the warning/caution and instruction labels on the back of the blade.

NOTE: If labels are missing or cannot be read, see your sales outlet.

Warning and Caution Label



SAFETY PRECAUTIONS

Improper installation and operation could cause personal injury and/or equipment and property damage. Read and understand labels and the Owner's Manual before installing, operating or making adjustments.

A WARNING

Lower blade when vehicle is parked.
Temperature changes could change
hydraulic pressure, causing the blade to
drop unexpectedly or damaging hydraulic
components. Failure to do this could result in
serious personal injury.

WARNING

The driver shall keep bystanders clear of the blade when it is being raised, lowered or angled. Do not stand between the vehicle and the blade or within 8 feet of a moving blade. A moving or falling blade could cause personal injury.

A WARNING

Keep hands and feet clear of the blade and T-frame when mounting or removing the snowplow. Moving or falling assemblies could cause personal injury.

A WARNING

Do not exceed GVWR or GAWR including blade and ballast. The rating label is found on driver-side vehicle door cornerpost.

A WARNING

To prevent accidental movement of the blade, always turn the control OFF whenever the snowplow is not in use. The power indicator light will turn OFF.

A WARNING

Remove blade assembly before placing vehicle on hoist.

A CAUTION

Refer to the current Selection List for minimum vehicle recommendations and ballast requirements.

HYDRAULIC SAFETY

A WARNING

Hydraulic fluid under pressure can cause skin injection injury. If you are injured by hydraulic fluid, get medical attention immediately.

- Always inspect hydraulic components and hoses before using. Replace any damaged or worn parts immediately.
- If you suspect a hose leak, DO NOT use your hand to locate it. Use a piece of cardboard or wood.

FUSES

The WESTERN® electrical and hydraulic systems contain several blade-style automotive fuses. If a problem should occur and fuse replacement is necessary, the replacement fuse must be of the same type and amperage rating as the original. Installing a fuse with a higher rating can damage the system and could start a fire. Fuse Replacement, including fuse ratings and locations, is located in the Maintenance Section of the Owner's Manual.

PERSONAL SAFETY

- Remove ignition key and put the vehicle in park or in gear to prevent others from starting the vehicle during installation or service.
- Wear only snug-fitting clothing while working on your vehicle or snowplow.
- Do not wear jewelry or a necktie, and secure long hair.
- Wear safety goggles to protect your eyes from battery acid, gasoline, dirt and dust.
- Avoid touching hot surfaces such as the engine, radiator, hoses and exhaust pipes.
- Always have a fire extinguisher rated BC handy, for flammable liquids and electrical fires.

FIRE AND EXPLOSION

A WARNING

Gasoline is highly flammable and gasoline vapor is explosive. Never smoke while working on vehicle. Keep all open flames away from gasoline tank and lines. Wipe up any spilled gasoline immediately.

Be careful when using gasoline. Do not use gasoline to clean parts. Store only in approved containers away from sources of heat or flame.

CELL PHONES

A driver's first responsibility is the safe operation of the vehicle. The most important thing you can do to prevent a crash is to avoid distractions and pay attention to the road. Wait until it is safe to operate Mobile Communication Equipment such as cell phones or two-way radios.

VENTILATION

A WARNING

Vehicle exhaust contains lethal fumes. Breathing these fumes, even in low concentrations, can cause death. Never operate a vehicle in an enclosed area without venting exhaust to the outside.

BATTERY SAFETY

A CAUTION

Batteries normally produce explosive gases which can cause personal injury. Therefore, do not allow flames, sparks or lit tobacco to come near the battery. When charging or working near a battery, always cover your face and protect your eyes, and also provide ventilation.

Batteries contain sulfuric acid which burns skin, eyes and clothing.

Disconnect the battery before removing or replacing any electrical components.

TORQUE CHART

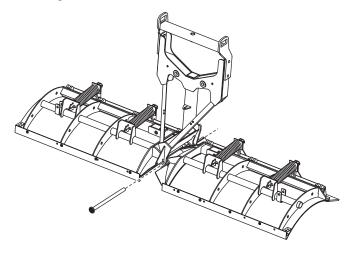
A CAUTION

Read instructions before assembling.
Fasteners should be finger tight until instructed to tighten according to torque chart. Use standard methods and practices when attaching snowplow including proper personal protective safety equipment.

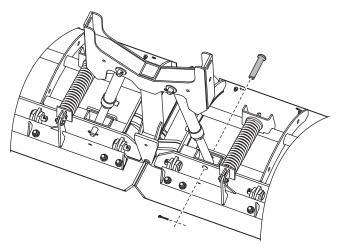
Recommended Fastener Torque Chart (ft-lb)				
Size	SAE Grade 2	SAE Grade 5	SAE Grade 8	
1/4-20 5/16-18 3/8-16 3/8-24 7/16-14 1/2-13 9/16-12 5/8-11 3/4-10 7/8-9 1-8	6 11 19 24 30 45 66 93 150 150 220	9 18 31 46 50 75 110 150 250 378 583	13 28 46 68 75 115 165 225 370 591 893	
Metric Grade 8.8 (ft-lb)				
Size	Torque	Size	Torque	
M 6 M 8 M 10	7 17 35	M 12 M 14 M 16	60 95 155	
These torque values apply to fasteners except those noted in the instruction.				

BLADE TO T-FRAME

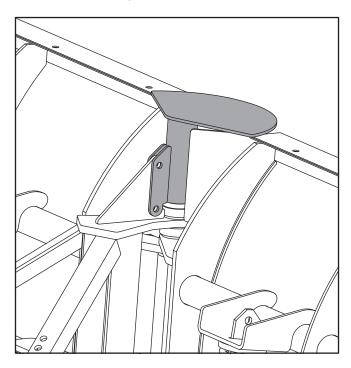
- Remove headlamp box and small parts box from carton. Remove carton wall sleeve by sliding it up and over box contents. Remove and discard the four corner tubes and place sleeve flat on the floor. Remove lift frame and power unit assembly from the box and place it on carton sleeve. Remove T-frame assembly and place it on carton sleeve.
- 2. Place some cardboard or wood on the floor where blade will be assembled. Remove blade wings from pallet and place them face down with hinges facing each other. Push blade wings together so holes in hinges are aligned. Position T-frame assembly between blade wings so holes in T-frame hinges are aligned with holes in wings. Insert pivot pin (from top to bottom) through all hinges as shown.



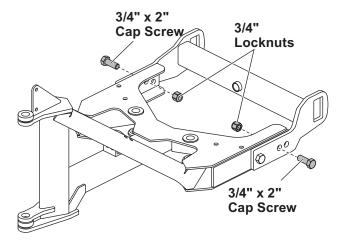
- 3. Cut the tie holding the angle rams to the T-frame. Remove the dust caps on the angle rams. Swing the T-frame to one side so that the holes in the rod end of the angle ram and the blade are aligned.
- 4. Install a 1" x 4-3/4" clevis pin from the top down. Swing the T-frame to the other side and secure the second angle ram in the same manner. Secure the angle rams by installing 1/4" x 1-1/2" cotter pins in the two clevis pins.



- 5. Stand the blade and T-frame upright and support in a level position using block under the main T-frame tube. Install the blade guides.
- 6. Install the center snow deflector using two 3/8" x 1-1/4" cap screws, and 3/8" locknuts.



7. Rotate the pushbeam and fasten in the middle position using two 3/4" x 2" cap screws and 3/4" locknuts. Tighten until assembly is secure, but do not torque at this time.

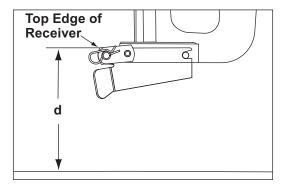


PIVOT PLATES TO PIVOT BAR

IMPORTANT! Before assembling pivot plates to ends of pivot bar, pivot plate orientation and pivot hole position must be determined using the following procedure.

Before measuring vehicle mount height, vehicle mount and receiver brackets must be installed, ballast must be installed if required, and vehicle must be parked on a level surface.

 Measure the distance "d" from the ground to the top edge of the receiver bracket. Measure both sides and determine average value "d".



Use dimension "d" from Step 1 and the following chart to determine the proper pivot plate mounting position and pivot hole selection.

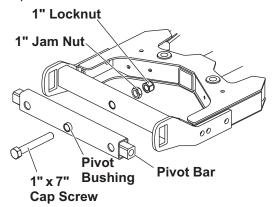
Pivot Plate Configuration Chart				
Dimension "d"	Configuration	Stacking Stop		
13.0" – 14.5"	1	No		
14.5" – 16.0"	2	No		
16.0" – 17.5"	3	No		
17.5" — 19.0"	4	Yes		

- 3. Before assembly, apply grease to the pivot pin holes in each end of the pivot bar and to each pivot pin.
- 4. Assemble the pivot plates to the ends of the pivot bar, using the appropriate plate orientation and hole position for the configuration determined in Step 2.

There are two pivot plates (A and B) which are mirror images of each other. They can be turned upside down and switched from one side of the pivot bar to the other to provide two different mounting positions.

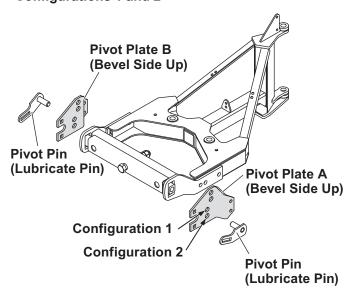
In each pivot plate mounting position, the pivot bar pins may be installed through one of the two lower holes in the pivot plates. This provides four different height adjustment positions. For all configurations, pivot pins must be positioned with the notches in the pivot pins facing up and the slots in the pivot pins aligned with the bottom holes at the rear of the pivot plates. Note that the pivot bar pins are never installed in either of the two upper holes in the pivot plates.

5. **IMPORTANT!** The fasteners securing the pivot bar to the pushbeam are installed from the factory, but are not fully tightened. Tighten the 1" jam nut to 25 ft-lb, then loosen it 1/16 turn. Hold the 1" cap screw and jam nut to prevent rotation, and securely tighten the 1" locknut according to the torque chart.

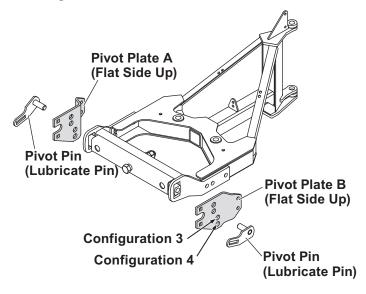


NOTE: When properly adjusted, the pivot bar should pivot freely without any looseness.

Pivot Plate Mounting and Hole Positions for Configurations 1 and 2



Pivot Plate Mounting and Hole Positions for Configurations 3 and 4

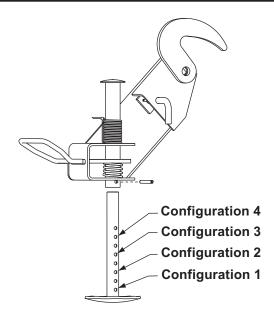


STAND SHOE

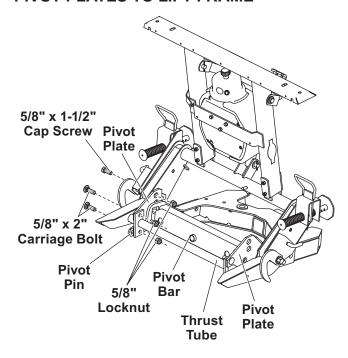
Initial stand shoe height adjustment is based on height configuration chart. A final adjustment of stand shoe will be made after attaching snowplow to vehicle.

- Slide stand shoe into stand tube and align 1/4" hole in stand tube with 1/4" hole in stand shoe determined from height configuration chart and illustration below.
- 2. Insert 1/4" roll pin.
- 3. Do not cut spring tie until after final stand shoe adjustment.
- 4. Remove receivers from lift frame.

Pivot Plate Configuration Chart				
Dimension "d"	Configuration	Stacking Stop		
13.0" – 14.5"	1	No		
14.5" – 16.0"	2	No		
16.0" – 17.5"	3	No		
17.5" – 19.0"	4	Yes		

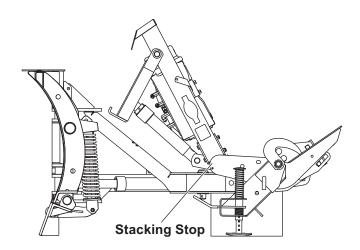


PIVOT PLATES TO LIFT FRAME



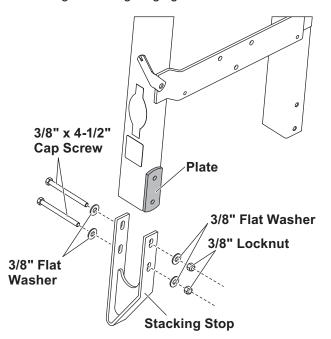
Refer to figure above for steps below.

 Place the lift frame assembly on top of the T-frame assembly so the lift frame is tipped forward and resting on the T-frame. Position the lift frame outside the pivot plates with the notch in the pivot plates around the thrust tube on the lower lift frame and align 5/8" mounting holes (3 per side).



- Insert two 5/8" x 2" carriage bolts from the outside into the rear holes of the pivot plate. The top bolt passes through the pivot plate and attaching lug. The bottom bolt passes first through the slot in the pivot pin, then through the pivot plate and attaching lug. Retain using locknuts (hand tighten only). Repeat on other side.
- Rotate stand assembly downward until clearance hole is visible. Insert one 5/8" x 1-1/2" cap screw through clearance hole in lower lift frame and top hole in the front of pivot plate. Retain with a locknut. Repeat on other side.
- 4. Tighten all fasteners according to torque chart.
- 5. If the snowplow is going to be assembled using configuration 4, the stacking stops must be installed onto the lift frame. The 3/8" x 4" cap screws must be replaced with the 3/8" x 4-1/2" cap screws located in the loose parts kit.

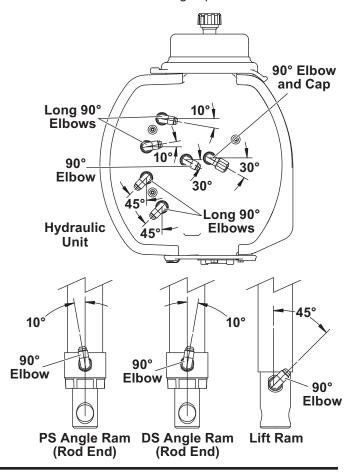
Remove the plates from the front of the upper lift frame and discard. Position the plate on the back of the lift frame and slide the stacking stop over the plate and align the holes. Install a 3/8" flat washer onto a 3/8" x 4-1/2" cap screw, inserting it from the front. Secure with a 3/8" flat washer and locknut. Tighten the bottom nut first to 31 ft-lb torque, then tighten the top nut to 31 ft-lb. Verify that the rectangular tubing of the upper lift frame has collapsed, as indicated by the 3" sides of the rectangular tubing bulging outward.



HYDRAULIC FITTINGS

Do not use thread sealant/tape on hoses and fittings. This could damage the product. Install all fittings into rams and hydraulic unit using the following procedure and fitting orientation illustrations:

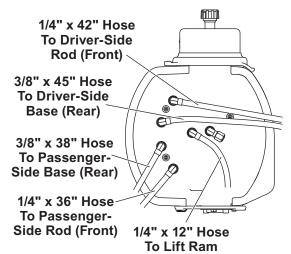
- Remove plug from ram or manifold port. Use a rag to catch residual fluid when removing manifold plugs.
- 2. Turn the jam nut on the fitting as far back as possible.
- 3. Lubricate the O-ring with clean hydraulic fluid.
- Screw fitting into port by hand as far as it will go.
 The washer should contact port face and shoulder of the jam nut threads.
- Unscrew fitting to proper position, no more than one full turn.
- 6. Use one wrench to hold the fitting body in position and tighten the jam nut with another wrench until the washer again contacts port face. Tighten 1/8–1/4 turn to lock fitting in place.

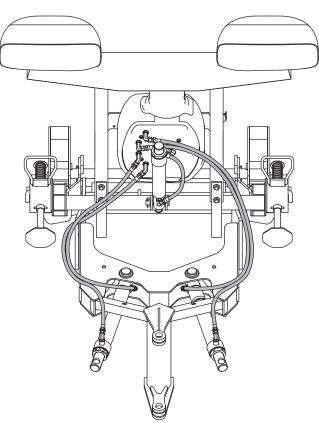


HYDRAULIC HOSES

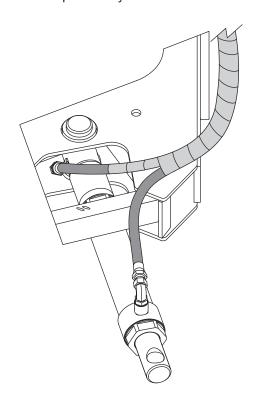
Do not use thread sealant/tape on hoses and fittings. This could damage product.

1. Attach all hoses to fittings, routing hoses as shown. Leave hoses finger tight at this time.





 Wrap angle ram hoses with protective hose wrap as shown. Start wrap on base end hose so wrap covers diagonal brace. Group hoses away from brace and continue wrapping, forming a smooth outward loop to the hydraulic unit.



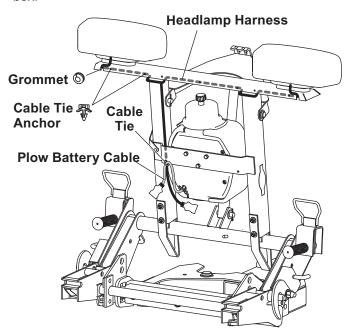
3. Using a wrench to hold the hose end in position, tighten all hose fittings 1/8–1/4 turn past finger tight.

HEADLAMPS

A WARNING

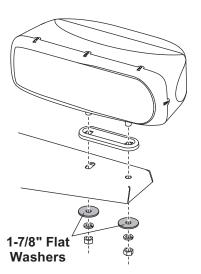
Your vehicle must be equipped with snowplow headlamps and directional lights.

Headlamps, hardware and instructions are found in the headlamp box. Additional hardware (four 1-7/8" OD flat washers) are found in the loose parts box.



Refer to figure above for the following instructions.

1. With wire harness behind the lift frame, attach headlamps to the hole and slot in the headlamp channel by following the instructions included with the headlamps. Install 1-7/8" OD washers between the headlamp channel and the lock washers.



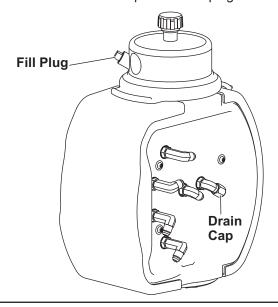
- Insert seven cable tie anchors into 1/4" holes on rear of headlamp channel from inside channel, with locking tabs horizontal.
- 3. Install a split rubber grommet on each headlamp wire 3" from headlamp and insert grommet and wire into slot on rear of channel.
- Route wires underneath channel, in back of vertical supports, and down along inside of driver side vertical support, securing wires to anchors with cable ties.
- Attach harness to front of hydraulic unit cross member at driver side vertical support with a cable tie through hole in cross member.
- 6. Cable tie harnesses and battery cable to the lift frame as shown in illustration.
- 7. Install cable boot onto the upper lift frame.

FILLING HYDRAULIC UNIT

A WARNING

Keep 8' clear of the blade when it is being raised, lowered or angled. Do not stand between the vehicle and blade or directly in front of the blade. If the blade hits or drops on you, you could be seriously injured.

- Attach the snowplow to the vehicle according to the instructions on the back of the blade.
- 2. With the snowplow wings and lift ram fully retracted, fill the reservoir with WESTERN® High Performance Hydraulic Fluid to -40°F (-40°C), or other fluid conforming to Military Specification MIL-H-5606A, such as Mobil Aero HFA or Shell AeroShell® Fluid 4. Replace the fill plug.



NOTE: Add fluid only when all rams are retracted.

A WARNING

To prevent accidental movement of the blade, always turn the control OFF whenever the snowplow is not in use. The power indicator light will turn OFF.

Turn the control ON and completely extend and retract the driver-side wing several times. With all rams fully retracted, turn the control OFF.

A CAUTION

DO NOT raise blade during fill process as this may cause pump cavitation.

A CAUTION

Do not mix different types of hydraulic fluid. Some fluids are not compatible and may cause performance problems and product damage.

4. With the lift ram fully retracted, fill the reservoir with hydraulic fluid. Replace the fill plug.

NOTE: Remove fill plug slowly to relieve any pressure in reservoir.

- 5. Repeat Steps 3 and 4 for the passenger-side wing.
- 6. Turn the control ON and raise and lower the snowplow several times. Activate the control FLOAT function and manually collapse the lift ram all the way after each lowering of the blade. With all rams fully retracted, turn the control OFF.
- 7. Fill the reservoir to the top of the fill hole and replace the fill plug.

FLUID CAPACITY

• FloStat® Unit Reservoir 1-3/4 quarts

• FloStat System Total 2-3/8 to 2-3/4 quarts

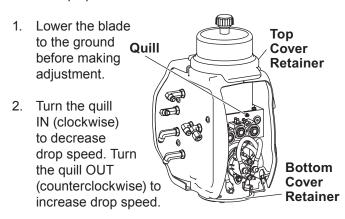
AeroShell® is a registered trademark (®) of Shell Oil Company.

BLADE DROP SPEED ADJUSTMENT

A WARNING

Keep 8' clear of the blade drop zone when it is being raised, lowered or angled. Do not stand between the vehicle and blade or directly in front of blade. If the blade hits you or drops on you, you could be seriously injured.

The quill in the top of the valve manifold adjusts the blade drop speed.



NOTE: To access the quill on the MVP PLUS™ hydraulic unit, raise top cover retainer, remove bottom cover retainer and remove side cover.

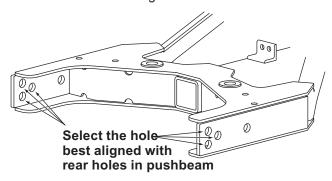
- 3. Stand 8' clear of the blade drop zone when checking adjustment.
- 4. On the MVP PLUS unit, replace cover and reinstall O-ring and top cover seal.

LEVELING ADJUSTMENT PROCEDURE

1. With snowplow attached to the properly ballasted vehicle and blade lowered to ground, the T-frame should be parallel with the ground. If not, place the snowplow in the scoop position.

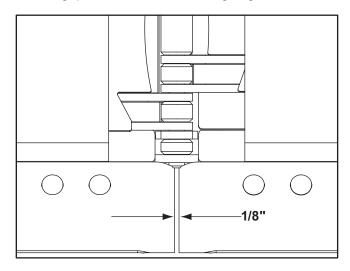
Push T-Frame Beam Front Fasteners

- 2. Loosen the front fasteners for the pushbeam to T-frame connection, but do not remove them. Next remove the rear fasteners from the pushbeam to T-frame connection. Level the T-frame.
- Select the hole in the rear of the T-frame that is aligned closest to the rear hole in the pushbeam.
 Reassemble the previously removed fasteners into the rear holes and tighten all fasteners.



CUTTING EDGE GAP ADJUSTMENT

1. With the wings in the straight position, measure the gap between the two cutting edges.



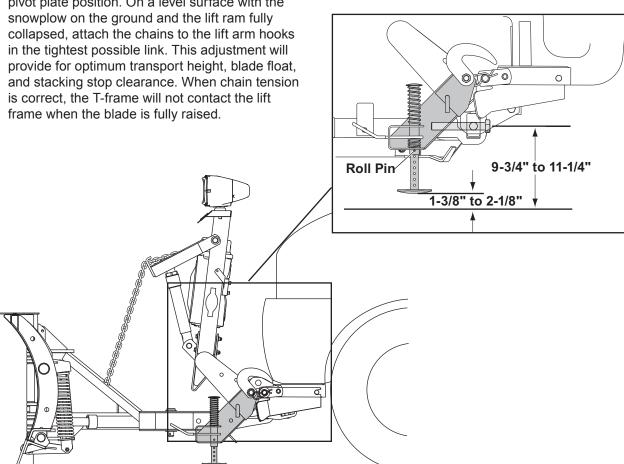
- 2. If the gap between the cutting edges is not 1/8" (centered on main pivot pin), raise the blade and support it safely on solid block. Loosen all of the cutting edge fasteners and slide the cutting edges to obtain the proper dimension.
- 3. Once the measurement is correct, fully tighten cutting edge fasteners according to the torque chart.

FINAL INSPECTION AND ADJUSTMENT

- 1. Attach snowplow to the vehicle mount. With snowplow lowered to the ground and on level pavement, measure the dimension from the ground to the center of the pivot bar cap screw. This dimension must be 9-3/4" to 11-1/4".
- 2. With the snowplow attached and on the ground, place the stand arm in the lower position with the lock pin engaged and with the stand shoe fully retracted in the "UP" position. Measure the distance from the ground to the bottom of the stand shoe. This distance should be 1-3/8" to 2-1/8". The stand can be adjusted to achieve this dimension by removing the roll pin and selecting the proper hole in the stand stem. When the stand height is correct, cut and remove the spring tie.
- 3. Final lift chain link adjustment must be made after the snowplow is assembled with the proper pivot plate position. On a level surface with the snowplow on the ground and the lift ram fully collapsed, attach the chains to the lift arm hooks in the tightest possible link. This adjustment will provide for optimum transport height, blade float, and stacking stop clearance. When chain tension is correct, the T-frame will not contact the lift

- Fully raise the blade and verify that it does not block the headlamp beams. If the blade blocks the headlamp beams, lower the blade to the ground. collapse the lift ram and lengthen each chain by one link. Repeat this process, lengthening the chains by one link each time, until the blade does not block the headlamp beams.
- 5. Raise and lower the snowplow in "Retract (vee)" position to verify hydraulic hoses bow outward and do not interfere with snowplow components.

NOTE: Ensure base-end angle ram hoses are wrapped over the diagonal brace. Adjust hoses, fittings and wraps as necessary.



VEHICLE LIGHTING CHECK

- 1. Verify the operation of all vehicle front lighting prior to connecting the snowplow harness.
- 2. Check the operation of the snowplow lights with snowplow mounted to vehicle and all harnesses connected.

Turn signals and parking lamps

Parking lamps ON:

 Both vehicle and snowplow parking lamps should be ON at the same time.

Driver-side turn signal ON:

• Both vehicle and snowplow driver-side turn signal lamps should flash at the same time.

Passenger-side turn signal ON:

• Both vehicle and snowplow passenger-side turn signal lamps should flash at the same time.

Headlamps

Move vehicle headlamp switch to the "ON" position. Connecting and disconnecting the snowplow lighting harness plug should switch the lights between vehicle and snowplow as follows:

Snowplow lighting harness DISCONNECTED:

- · Vehicle headlamps should be ON.
- · Snowplow headlamps should be OFF.

Snowplow lighting harness CONNECTED:

- · Snowplow headlamps should be ON.
- · Vehicle headlamps should be OFF.

Dimmer switch should toggle headlamps between high and low beams. The high beam indicator on the dash should light when headlamps are placed in high beam.

Daytime Running Lamps (DRLs)

An operational check of the vehicle and snowplow DRLs will depend on the vehicle model, vehicle DRL system and type of Isolation Module installed. Due to the variations in the OEM DRL systems and the different Isolation Module options available, checking the functionality of the snowplow DRLs will depend on the type of module installed on the vehicle.

With headlamp switch OFF, activate the vehicle DRLs.

Snowplow lighting harness DISCONNECTED:

- · Vehicle DRLs should be ON.
- · Snowplow headlamps should be OFF.

Snowplow lighting harness CONNECTED and vehicle in DRL mode:

 Check snowplow DRL function per the type of Isolation Module installed.

Refer to the Mechanic's Guide for information on the Isolation Module DRL functions.

Joystick Control or CabCommand Control

The snowplow plugs **do** need to be connected to the vehicle harness connectors. The control power indicator light should light whenever the control ON/OFF switch and the ignition (key) switches are both in the "ON" position.

- 3. Connect all snowplow and vehicle harnesses.
 Raise the snowplow and aim snowplow
 headlamps according to the Snowplow Headlamp
 Beam Aiming instructions included with the
 headlamps and any state or local regulations.
- Check aim of vehicle headlamps with snowplow removed.

A CAUTION

On 2-plug electrical systems, plug covers shall be used whenever snowplow is disconnected. Vehicle Battery Cable is 12-volt unfused source.

 When the snowplow is removed from the vehicle, install plug covers on the vehicle battery cable and lighting harness. Insert the snowplow battery cable and lighting harness into the cable boot on the snowplow.

OWNER'S MANUAL PACKET

If the completed snowplow will be delivered immediately, the Owner's Manual should be reviewed with and given to the purchaser according to the snowplow checklist.

If the snowplow is completed prior to delivery to the purchaser, attach the Owner's Manual Packet to the electrical cable of the cab control for safekeeping.



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