# RT3 POWER-V BLADE WITH SMARTHITCH™ INSTALLATION MANUAL

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BOSS PRODUCTS / Northern Star Industries, Inc. reserves the right under its continuous product improvement policy to change construction or design details and furnish equipment when so altered without reference to illustrations or specifications used herein.

This product is covered under one or more of the following patents:

5,568,694 4,074,448 4,658,519 6,108,946 6,170,178 6,134,814

Other Patents Pending
WARNING
Many newer trucks are equipped with air bags. DO NOT under any circumstances disable or remove or relocate any sensors or other components related to the operation of the air bags.

WARNING
Always follow the vehicle manufacturer’s recommendations relating to snowplow installation. For recommended vehicle models refer to the BOSS Snowplow Application Chart and Selection Guide.

WARNING
Vehicles equipped with air bags are designed such that the air bags will be activated in a frontal collision equivalent to hitting a solid barrier (such as a wall) at approximately 14 mph or more, or, roughly speaking, a frontal perpendicular collision with a parked car or truck of similar size at approximately 28 mph or more. Careless or high speed driving while plowing snow, which results in vehicle decelerations equivalent to or greater than the air bag deployment threshold described above, would deploy the air bag.

WARNING
Read this manual carefully before operating this snowplow.

WARNING
When transporting, position plow so as not to block vision or plow headlights.

WARNING
DO NOT change blade position when traveling.

WARNING
DO NOT exceed 40 mph when transporting plow.

WARNING
DO NOT exceed 14 mph when plowing.

WARNING
Always lower blade when vehicle is not in use.

WARNING
Make sure plow is properly attached before moving vehicle.

WARNING
To comply with Federal Regulations and to assure a safe vehicle, the Front Gross Axle Weight Rating (FGAWR), Rear Gross Axle Weight Rating (RGAWR), and the Gross Vehicle Weight Rating (GAWR) must not be exceeded at any time.

WARNING
Due to the variety of equipment that can be installed on this vehicle, it is necessary to verify that the Front Gross Axle Weight Rating (FGAWR), Rear Gross Axle Weight Rating (RGAWR), and the Gross Vehicle Weight Rating (GAWR) are not exceeded at any time. This may require weighing the vehicle and adding ballast as necessary. It may also limit payload capacity of the vehicle. It is the operator’s responsibility to verify that these ratings are not exceeded.
Figure 1. Mounting and Removal Instructions
Snowplow Assembly Procedure

Note: This manual is used for the installation of all V-Plows. Part numbers and illustrations may vary.

1. Begin the assembly procedure by cutting down each corner of the plow box so that each wall of the box will lie flat on the floor. The box can be used as a mat and will help prevent scratching the blade halves during installation.

2. Remove Left Blade Half (5) and Right Blade Half (4) from the crate. Lay each blade half flat on the box, face down.

3. Align the center bushings on Left Blade Half (5) with the center bushings on Right Blade Half (4). Position CHA09716 Center Section (2) on top of both blades so that all bushings align.

4. Insert MSC01507 Center Hinge Pin (15) through Left Blade Half (5), Right Blade Half (4) and Center Section (2).

5. Secure Center Hinge Pin (15) to the top of Center Section (2) using one HDW01771 3/8”-16 X 1 ¼” Hex Head Cap Screw (93), and one HDW01718 3/8” Split Lock Washer (108).

Note: Plow shoes are optional. If added they should be mounted flush with the bottom of the cutting edge when the plow is mounted on the vehicle. When plowing on a solid level area (parking lots, roads, and driveways) plow shoes can be raised up to increase cutting edge contact on the plowed surface. When plowing dirt, gravel, or grass plow shoes should be lowered below the cutting edge surface to prevent the plow from digging into the plowed surface.
Snowplow Assembly Procedure

6. Stand Blade Assembly and Center Section (2) on the Cutting Edges with both wings forward in the scoop position.

7. Remove the loose Horizontal Hinge Pin (102C) that is inserted in the Center Section (2).

8. Slide TFR09708 Push Frame (3) into Center Section (2). Re-insert Horizontal Hinge Pin (102C) through Center Section (2) and Push Frame (3) then secure with washer (102B) and nut (102A).

9. Attach Lift Cylinder (42) to Push Frame (3) with HDW05563 Clevis Pin (104) and HDW05544 Hairpin Cotter (103).

10. Hook MSC04200 Spring Yoke (11) to the cross rod inside Center Section (2).

11. Hook one end of MSC01509 Trip Spring (18) to Spring Yoke (11). Attach the opposite end of Trip Spring (18) to the rear angle of Push Frame (3) using HDW05601 Eyebolts (98), 5/8" Flat Washers (112) and 5/8" Self-Locking Nuts (111). Tighten Self-Locking Nuts (111) finger tight.

12. Attach HYD09731 Angle Cylinders (40) to Center Section (2) using HDW01706 5/8"-11 X 4" Hex Head Cap Screws (90) and HDW01709 5/8"-11 Self Locking Nuts (111). DO NOT over-tighten the nuts.

Note: You should be able to slightly slide the cylinder up and down on the bolt after it has been tightened.

13. Pull both wings back into the ‘V’ position.

14. Hook one end of Return Spring (19) to the top hole on Center Section (2). Hook the opposite end of Return spring (19) to the blade spring mounting bracket using ½" Spadebolt (97A), ½" Flat Washer (97C), and ½" Self-Locking Nut (97B). Tighten Spring (19) until there is a 1/32" space between spring coils. Repeat this process for Return Spring (19) on the opposite side of the plow.

Note: Be sure Push Nut Retainer’s flanges are pointing away from the Eyebolt and toward the open end of the Return Spring.

15. Install one Push Nut Retainer (97D) on each end of the Return Spring (19).

16. Bolt the rod end of Angle Cylinder (40) to each blade half using 5/8"-11 X 4" Hex Head Bolt (90) and 5/8"-11 Self Locking Nuts (111). DO NOT over tighten bolts. Repeat this process for Angle Cylinder (40) on the opposite side of the plow.

Note: You should be able to slightly slide the cylinder up and down on the bolt after it has been tightened.
17. Align pivot holes of Coupler Assembly (1) and pivot holes of Push Frame (3).

18. Insert 1" X 2 ½" Pivot Pin (100A) through Coupler Assembly (1) and Push Frame (3). Secure with 1" Flat Washer (100B) and 3/16" Cotter Pin (100C).

Note: The 10’ V-Blade plow uses a 5/16” x 2” Bolt and a 5/16” Locknut in place of 3/16” Cotter Pin (100C).

19. Tighten the four Trip Springs (18) on Push Frame (3) until there is a 1/32” space between each spring coil.

20. Remove the plug from the top end of Lift Cylinder (42).

21. Attach one end of Hydraulic Hose (50) to Lift Cylinder (42). Be sure to apply thread sealant compound to the pipe threads on Hydraulic Hose (50). Tighten connection securely.

22. Attach the top end of Lift Cylinder (42) to Coupler Assembly (1) using HDW05563 Clevis Pin (104) and HDW05544 Hairpin Cotter (103).

23. Route Hydraulic Hose (50) in “S” shape and connect the loose end to the rear Hydraulic Fitting (54). Tighten connection securely.
Snowplow Assembly Procedure

24. Attach one end of Hydraulic Hose (49) to the lower port of Lift Cylinder (42). Attach the opposite end of Hydraulic Hose (49) to the center Hydraulic Fitting (54). Tighten connection securely.

25. Apply thread sealant compound (do not use Teflon Tape) to the threads of the 3/8" MNPT end of HYD07042 Hydraulic Hose (52). Thread the hose into the port on Angle Cylinder (40) and tighten securely.

**Note:** Do not apply thread compound to the ¼" end of the hose.

**Note:** Do not get thread compound on the end of the hose as the thread compound will contaminate the hydraulic system.

26. Attach the loose end of HYD07042 Hydraulic Angle Hose (52) to the corresponding fitting on the hydraulic manifold. Tighten all hydraulic connections securely.

27. Attach Light Bar (13) to the top of Coupler Assembly (1) using two Hex Head Cap Screws (91) and Hex Head Self Locking Nuts (109).

**Note:** The light bar should be positioned as close to the Coupler Tower as possible. Only two holes will be aligned for normal installations. Only two bolts per side are needed to secure the light bar.

**Note:** Figure 9 illustrates that the Coupler Assembly and Light Bar have two sets of 1 inch adjustment holes for mounting on different vehicles. These adjustment holes may be needed in order to move the light bar away from the vehicle’s hood.
28. Check that End Cap (79) is properly inserted into Light Bar (13).

29. Place Driver Side Headlight Bracket (82) below Light Bar (13) and secure with one 3/8”-16 X 1” Hex Head Shoulder Bolt (76A), one 3/8” Flat Washer (76B), and one 3/8” Nylon Lock Nut (76C).

30. Fasten Driver Side Headlight (84) to Driver Side Headlight Bracket (82) using four ¼”-20 X ¾” Hex Head Bolts (76D), four ¼” Split Lock Washers (76E), and four ¼” Flat Washers (76F). Leave fasteners finger tight until Headlight orientation has been completed. See Figure 10 for proper fastener placement.

31. Repeat Steps 28 through 30 for Passenger Side Headlight Bracket (83) and Passenger Side Headlight (85).

32. Secure Wiring Harness (61) to Light Bar (13) using wire ties as shown above.

33. Attach headlight connectors to headlight bulbs by inserting the connectors up through the bottom of the headlight housings.

**Note:** See Headlight Aiming Procedure within this manual for proper adjustment of the headlights.

34. Attach Blade Guides (16) to Blade Assembly (4) using Hex Head Cap Screws (94) and Self Locking Nuts (115).
**Electrical System Wiring Procedure**

**WARNING!**
Before starting any Electrical Wiring Procedure make sure that the engine is not running and that the engine has had sufficient time to cool down. Failure to do so may result in serious bodily injury or death.

**WARNING!**
Before starting any Electrical Wiring Procedure make sure to disconnect the battery. Failure to do so may result in serious bodily injury or death.

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**Figure 13. Driver Side Headlight**

**Note:** Dielectric grease should be applied to all electrical connections.

1. Disconnect the driver side headlight connector plug (C) from the back of the driver side vehicle headlight.

2. Connect the Blue Sealed Beam Connector (A) from Wiring Harness (60) into the back of the driver side vehicle headlight.

3. Connect the Black Rubber Connector (B) from Wiring Harness (60) into the OEM Wiring Harness (C). OEM Wiring Harness (C) is the vehicle connector that was unplugged from the back of the headlight in Step 1.

**Note:** If your connectors do not match the connectors on the wiring harness or you have a four-headlight system a Headlight Adapter Kit will be needed. If you are installing a Headlight Adapter Kit, See “Headlight Adapter Installation Procedure” located in this manual.

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**Figure 14. Passenger Side Headlight**

4. Disconnect the passenger side OEM Wiring Harness (F) from the back of the passenger side vehicle headlight.

5. Connect the Blue Sealed Beam Connector (D) from Wiring Harness (60) into the back of the passenger side vehicle headlight.

6. Connect the Black Rubber Connector (E) from Wiring Harness (60) into the OEM Wiring Harness (F). OEM Wiring Harness (F) is the vehicle connector that was unplugged from the back of the headlight in Step 1.
NOTICE
Before splicing into any electrical circuit, identify the circuit with a test lamp. Failure to test circuits may result in vehicle damage.

11. Pull the two BLACK wires (H), BLACK/RED wire (I), and the 9 Pin Molex connector (G) from the engine compartment into the cab through the 1-1/4" diameter hole in the firewall.

12. Install MSC03761 Split Rubber Grommet (Not Shown) into the hole that was cut in the firewall.

13. Connect the Two Tab Connectors (H) to MSC04747 Headlight Toggle Switch (77A) as illustrated in the figure above.

NOTICE
Position the switch where it will not interfere with driver’s ability to see and where it will not affect the driver’s ability to operate the motor vehicle.

14. Choose an area of the vehicle’s dashboard for the light toggle switch to be mounted. Clean the area thoroughly. Allow the area to dry completely.

15. Remove the adhesive backing and apply the switch to the clean area of the dashboard. Apply pressure for 30 seconds.
16. Secure the 9 Pin Molex Connector (G) and wire loom underneath the dashboard.

17. Plug the controller into the 9 Pin Molex Connector (G).

18. Mount the plow control in a location that is comfortable for the operator to reach, and where the operator will not contact the control in the event of a crash. (See “V-Blade Controller Mounting Instructions” located in this manual.)

19. Connect the BLACK/RED wire (I) to a “keyed” 12V+ ignition source.

**Note:** This 12V+ source should only be active when the key is in the ON position. Failure to wire to a “keyed” source can allow a condition to occur causing the battery to drain.

20. Connect the WHITE/BLACK wire (J) of Wiring Harness (60) to the small terminal on Pump Solenoid (64).

21. Connect the BROWN wire (K) of Wiring Harness (60) to the small terminal on Pump Solenoid (64).

**Note:** Location of the wires on the small terminals does not matter.

22. Attach Power Unit Solenoid (64) securely inside the engine compartment. The Power Unit Solenoid should be mounted in the upright position as illustrated above.

**Note:** The solenoid must be installed so that the solenoid posts do not contact the body, hood, or any other conductive material on the vehicle.

23. Attach the eyelet end of RED Power/Ground Cable (62) to the top of Pump Solenoid (64).

24. Connect Battery Cable (66) to the top post of Pump Solenoid (64).

25. Attach the eyelet end (N) of BLACK Power/Ground Cable (62) to the negative battery terminal.

26. Connect the BROWN wire (Q) to the negative battery terminal.

27. Connect the unattached end (P) of Battery Cable (66) to the positive battery terminal.

28. Connect the RED Fused wire (O) to the positive battery terminal.

**NOTICE**
Be sure the wire loom does not interfere with the operation of the vehicle’s pedals.

![Figure 17. Solenoid Connections](G10145)

![Figure 18. Battery Connections](G10146)
29. Mount the Black 15 Pin Control Harness Connector to the lower area of the bumper using MSC03813 Control Harness Mounting Bracket.

30. Mount the BLACK and RED 2 Pin Power Ground Connector to the lower area of the bumper using MSC03491 Power Ground Mounting Bracket.

Note: Installation location will vary depending on truck.

31. Attach the Relay Pack securely to the inside of the engine compartment using four HDW01766 Sheet Metal Screws. The relays should be positioned upright as illustrated above.
Electrical System Wiring Procedure

**NOTICE**

All plow wiring should be secured within the engine compartment in a position that provides sufficient room so that hot or moving parts will not be contacted. Vehicle damage could occur if wires are not properly secured.

32. Locate vehicle option connector. Align the connector so that the Vehicle Option Connector is positioned to match the vehicle it is installed on. This is illustrated in Figure 21.

**Note:** If your vehicle is not listed in the above figure use the Standard Orientation. If the Vehicle Option Connector is not properly connected the lights on the plow will not function correctly.

33. Connect RED/WHITE wire (R) to the correct battery terminal for your vehicle. See Figure 22 for proper placement for your vehicle.

34. Secure all plow harness wiring.

35. Attach the snowplow to the vehicle. Use the “Snowplow Mounting Procedure” that is located in this manual to properly attach the snowplow to the vehicle.

36. Test for the proper operation of the Headlight Wiring Harness. Follow the procedures below.

**Note:** To test plow lights, the **IGNITION** must be in the **ON** position.

- **LOW BEAM (Truck Lights)**
  - Vehicle Headlight Switch – ON
  - Low Beam Lights on Truck Indicator
  - Plow Headlight Toggle Switch – TRUCK

**RESULTS** - Only vehicle low beam headlights should be illuminated.

- **HIGH BEAM (Truck Lights)**
  - Vehicle Headlight Switch – ON
  - High Beam Indicator Light – ON
  - Plow Headlight Toggle Switch – TRUCK

**RESULTS** - Only vehicle high beam headlights should be illuminated.

- **LOW BEAM (Plow Lights)**
  - Ignition - ON
  - Vehicle Headlight Switch – ON
  - Low Beam Lights on Truck Indicator
  - Plow Headlight Toggle Switch - PLOW

**RESULTS** - Only plow low beam headlights should be illuminated.

- **HIGH BEAM (Plow Lights)**
  - Ignition - ON
  - Vehicle Headlight Switch – ON
  - High Beam Indicator Light – ON
  - Plow Headlight Toggle Switch – PLOW

**RESULTS** - Both plow high beam and low beam headlights should be illuminated.

- **TURN SIGNALS (Plow and Truck)**
  - Left Turn Signal Indicator – ON

**RESULTS** - Both Left Plow and Left Truck turn signal bulbs should be flashing.

- **Right Turn Signal Indicator – ON**

**RESULTS** - Both Right Plow and Right Truck turn signal bulbs should be flashing.

- **PARK LIGHTS (Plow and Truck)**
  - Park Lights on Vehicle – ON

**RESULTS** - All Four, Left Plow, Right Plow, Left Truck, and Right Truck Park Lights should be on.

**Note:** If any of the lights are not working properly, re-check the wiring against the “Electrical Wiring Diagram” located in this manual and make any necessary corrections.
Headlight Adapter Installation Procedure

1. Disconnect the OEM Headlight Connector Plug (A) from the back of the vehicle headlight.
2. Connect one end of Headlight Adapter (73A) into the back of the vehicle headlight.
3. Connect the Black Rubber Female Socket (B) of Headlight Adapter (73A) into the plow wiring harness.
4. Connect the Blue Sealed Beam Connector (C) of Headlight Adapter (73B) into the plow wiring harness.
5. Connect the opposite end of Headlight Adapter (73B) into the OEM Headlight Connector Plug (A).
6. Repeat Steps 1 through 5 for the opposite side headlight.

Note: In some older vehicles it is not necessary to pull power from both sides of the headlights. In this case only three adapters will be needed. Follow the Headlight Adapter Installation Instructions that are packaged with the Headlight Adapter Kit.

7. Continue with the Step 7 of “Electrical System Wiring Procedure” located in this manual.

Note: This is a general diagram for most 2-headlight vehicles. All vehicles and headlight adapters may not be identical. Installation will be very similar.

1. Disconnect OEM Headlight Connector Plugs (A and D) from the back of the vehicle headlight.
2. Connect two ends of Headlight Adapter (73A) into the back of the vehicle headlights.
3. Connect the Black Rubber Female Socket (B) of Headlight Adapter (73A) into the plow wiring harness.
4. Connect the Blue Sealed Beam Connector (C) of Headlight Adapter (73B) into the plow wiring harness.
5. Connect the opposite end of Headlight Adapter (73B) into the OEM Wiring Harness (A).
6. Grease, tuck, and secure OEM Connector Plug (D). This connector is not used.
7. Repeat Steps 1 through 6 for the opposite side headlight.
Figure 25. Electrical System Wiring Schematic (Plow Side)
**SmartHitch 2™ Wiring Diagram**

**Figure 28. HYD07044 with SmartHitch™ Wiring Diagram**

<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Wire Function</th>
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<tbody>
<tr>
<td>Green</td>
<td>Right Wing In</td>
</tr>
<tr>
<td>Red</td>
<td>Right Wing Out</td>
</tr>
<tr>
<td>White</td>
<td>Lift</td>
</tr>
<tr>
<td>Orange</td>
<td>Lower</td>
</tr>
<tr>
<td>Red/Black</td>
<td>Left Wing In</td>
</tr>
<tr>
<td>Blue</td>
<td>Left Wing Out</td>
</tr>
<tr>
<td>Black</td>
<td>SmartHitch™ (12V)</td>
</tr>
<tr>
<td>White/Black</td>
<td>Pump Solenoid</td>
</tr>
<tr>
<td>Brown</td>
<td>Ground</td>
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</table>
### Hydraulic Valve Assembly Parts List

<table>
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<tr>
<th>Ref.</th>
<th>Description</th>
<th>Part Number</th>
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<tr>
<td>31</td>
<td>Valve Manifold, RT3 V-Blade w/ SmartHitch™ (7'6&quot;, 8'2&quot;, &amp; 9'2&quot; Power-V)</td>
<td>HYD07092</td>
<td>1</td>
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<tr>
<td>31</td>
<td>Valve Manifold, RT3 V-Blade w/ SmartHitch™ (10'0&quot; Power-V)</td>
<td>HYD07044</td>
<td>1</td>
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<td>31A</td>
<td>Valve, Lift / Angle</td>
<td>HYD01637</td>
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<td>31B</td>
<td>Valve, SmartHitch2™ Attach</td>
<td>HYD07047</td>
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</tr>
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<td>31C</td>
<td>Valve, Flow Control</td>
<td>HYD07048</td>
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<tr>
<td>31D</td>
<td>Valve, Relief V-Blade (2800psi)</td>
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<td>31E</td>
<td>Valve, Check</td>
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<td>31F</td>
<td>Valve Coil</td>
<td>HYD01638</td>
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<td>31H</td>
<td>Coil Nut</td>
<td>HYD07059</td>
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<td>Orifice Disc, 0.08&quot; ID (HYD07092 only)</td>
<td>HYD07108</td>
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<tr>
<td>31N</td>
<td>Ground Strap, Power-V</td>
<td>MSC08850</td>
<td>1</td>
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<tr>
<td>54</td>
<td>Hydraulic Swivel Fitting</td>
<td>HYD01620</td>
<td>4</td>
</tr>
</tbody>
</table>

**Figure 29.** Hydraulic Valve Manifold Assembly.
Headlight Aiming Procedure

**NOTICE**
The installer of these snowplow lights must certify that installation conforms to applicable Federal Motor Vehicle Safety Standards.

1. Place the vehicle on a level surface 25 feet in front of a matte-white screen, such as a garage door. The screen should be perpendicular to both the ground and the vehicle.

2. The vehicle should be equipped for normal operation. The snowplow blade should be in place and in the raised position.

3. Below are some points listed by the Society of Automotive engineers (SAE) pertinent to headlight aiming. These points can be found in publication #SAEJ5991D.

   Preparation for Headlight Aim or Inspection
   Before checking beam aim, the inspector shall:
   
   - Remove ice or mud from under fenders.
   - See that no tire is noticeably deflated.
   - Check vehicle springs for sag or broken leaves.
   - See that there is no load in the vehicle other than the driver.
   - Check functioning of any “level-ride” controls.
   - Clean lenses and aiming pads.
   - Check for bulb burnout, broken mechanical aiming pads, and proper beam switching.
   - Stabilize suspension by rocking vehicle sideways.

4. Mark (or tape) the vehicle centerline of the headlights and the vehicle itself on the screen. Mark the horizontal centerline of the headlights on the screen (distance from ground to headlight centers).

5. The correct visual aim for Type 2 headlights is with the top edge of the high intensity zone of the lower beam below the horizontal centerline and the left edge of the high intensity zone on the vertical centerline. See diagram above.

![Headlight Aiming Diagram](image-url)
Hydraulic Power Unit Fill Procedure

Step 1 of the following fill procedure is intended for a new plow with an empty hydraulic system.

**Initial Plow Position:** Start with the plow un-attached from the vehicle and the lift cylinder completely collapsed. The light tower will be tilted forwarded.

1. Remove Fill Cap (30F) from Street Elbow (30G) and fill with Boss High Performance Hydraulic Fluid. Continue to fill Street Elbow (30G) until no more fluid will be accepted. (Approx. 2 quarts.)

2. Attach the plow to the vehicle.

3. Raise the plow.

4. With the plow in the raised position, extend and retract the right wing.

5. With the plow in the raised position, extend and retract the left wing.

6. Lower the plow to the ground.

**Note:** If your plow will not lower, Flow Control Valve (31C) is completely closed. Refer to Step 8 to adjust Flow Control Valve (31C).

7. With both wings retracted and the plow lowered to the ground, check the fluid level. Fluid should be visible in the external fill port. If fluid is not visible, fill until visible. Your reservoir should now be properly filled.

**Note:** Hydraulic fluid should be replaced annually with BOSS Snowplow High Performance Hydraulic Fluid.

**Note:** If your plow is equipped with SmartHitch2™ you must hydraulically power the light tower down. Do not manually pull the tower down. Failure to hydraulically power the light tower down will create an air pocket in the hydraulic system. Oil will spill out of your internal filler cap.

**WARNING!**

When adjusting Flow Control Valve (31C) make sure all appendages are clear of the plow blade and observers are standing a safe distance away from the plow blade. The plow may drop if your controller is in the FLOAT position. Make sure your controller is in the OFF position before attempting to adjust the plow. Failure to follow this warning could result in bodily harm.

8. Adjust Flow Control Valve (31C) to obtain the speed desired for lowering the plow by loosening the jam nut, then adjusting the set screw. Counter-clockwise adjustment will increase the speed the plow descends. Retighten the jam nut when the desired speed is obtained.
Joystick Control Operating Instructions

1. Toggle the ON/OFF switch to the ON position. A red indicator light will illuminate on the switch. The joystick is now active.

2. To RAISE the blade of the plow, toggle the switch on the joystick handle upward.

3. To LOWER the blade of the plow, toggle the switch on the joystick handle downward.

4. To FLOAT the blade along the contour of the plowing surface, toggle the switch on the joystick handle downward until the switch reaches the detent position. (You will feel the switch click into the detent position.) The switch will stay in the FLOAT position until the switch is physically re-centered.

5. To move the RIGHT wing OUT, push the controller stick to the right and forward.

6. To move the LEFT wing OUT, push the controller stick to the left and forward.

7. To SCOOP (Both LEFT and RIGHT wings OUT), push the controller stick directly forward.

8. To move the RIGHT wing IN, pull the controller stick to the right and backward.

9. To move the LEFT wing IN, pull the controller stick to the left and backward.

10. To VEE (Both LEFT and RIGHT wings IN), pull the controller stick directly backward.

11. To angle the entire blade LEFT (Right Wing out – Left Wing In) push the controller stick directly to the left.

12. To angle the entire blade RIGHT (Right Wing in – Left Wing out) push the controller stick directly to the right.

13. The control should be turned off when not in use. It can then be unplugged and stored.

Figure 33. V-Blade Control Operation  G10157
JOYSTICK CONTROL
UNIVERSAL MOUNTING KIT MSC04026

Figure 34. Joystick Control Universal Mounting Kit Components

<table>
<thead>
<tr>
<th>Reference Number</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>40A</td>
<td>Joystick, Intermediate Mounting Bracket</td>
<td>MSC04028</td>
</tr>
<tr>
<td>40B</td>
<td>Joystick, Mounting Bracket</td>
<td>MSC04029</td>
</tr>
<tr>
<td>40C</td>
<td>Joystick, Spring Clip</td>
<td>MSC04027</td>
</tr>
<tr>
<td>40D</td>
<td>Pad, Foam</td>
<td>MSC04038</td>
</tr>
<tr>
<td>A</td>
<td>Screw, #8-32 X 1/4 Machine Black</td>
<td>HDW05591</td>
</tr>
<tr>
<td>B</td>
<td>Washer, #10 Flat washer Black</td>
<td>HDW05592</td>
</tr>
<tr>
<td>C</td>
<td>Nut, #8-32 X 3/16 Alum Binding Post</td>
<td>HDW05593</td>
</tr>
</tbody>
</table>
ON/OFF: Push the ON/OFF switch to the left ON position to turn the control on. Green LED indicators will light up on the control. Push the ON/OFF switch to the right OFF position to turn the control off.

RAISE: To raise the blade of the plow, quickly press the center button upward twice. You can also press and hold the center button upward until the blade is fully raised.

LOWER: To lower the blade of the plow, quickly push the center button downward twice. You can also press and hold the center button downward until the blade is fully lowered.

FLOAT: The plow will automatically activate the FLOAT feature when the center button is quickly pressed downward twice. (The center LED indicator will turn RED). You can also press and hold the center button downward for 2 seconds. (The center LED indicator will turn RED). Press the raise button to turn the FLOAT function off.

“What Is FLOAT?”: The FLOAT feature allows the plow blade to follow the contour of the ground. Press the raise button to turn FLOAT function off.

Note: The control MUST be in FLOAT to use SmartHitch2™ to attach or detach the snowplow.

ANGLE LEFT: To plow snow to the left, press and hold the left wing out and left wing in buttons simultaneously until the blades are fully angled.

ANGLE RIGHT: To plow snow to the right, press and hold the right wing out and right wing in buttons simultaneously until the blades are fully angled.

VEE: To create the Vee shape with the plow blades, press both the left wing in and right wing in buttons simultaneously until the blades are fully retracted.

SCOOP: To create the Scoop shape with the plow, press both the left wing out and right wing out buttons simultaneously until the blades are fully extended.

Note: The control should be turned off when not in use. It can then be unplugged and stored.

SLEEP mode: If the controller is ON but not used for 20 minutes, the automatic SLEEP mode will be activated. The controller LED lights will flash green and red when the controller is in SLEEP mode. Turn the controller OFF to deactivate SLEEP mode.
1. Remove the Swivel Mount and Tab from the MSC05058 Swivel Mount Kit.

2. Use the enclosed alcohol wipe to clean a spot on the vehicle interior where you want to place the SmartTouch2™ Control. Wipe dry immediately with a cloth or paper towel.

3. Do not apply when the surface temperatures are lower than +60°F (Working temperature range of the adhesive is -40°F to +200°F).

4. Peel off the paper backing on one side of the adhesive and apply to Swivel Mount. Apply maximum pressure to all areas.

5. Apply the Swivel Mount onto the spot of the interior that was just cleaned. (MAKE SURE IT IS IN THE CORRECT PLACE) Once it is placed it cannot be removed without destroying the adhesive.

6. Clean the back of the SmartTouch2™ Control with the alcohol wipe.

7. Peel off adhesive backing of tape, apply to Tab, and press firmly.

8. Remove remaining backing and apply the Tab to the back of the SmartTouch2™ Control. Apply pressure for 30 seconds.

---

**NOTICE**

After attaching the Swivel Mount, let it sit unused for 72 hours before attaching the SmartTouch2™ Control to allow the adhesive to bond to the surface and ensure secure mounting.

9. Place SmartTouch2™ Control on the Swivel Mount.

**Note:** Other mounting options are available. Contact your BOSS Snowplow dealer for more information.
Troubleshooting Guide

Glossary of Problems:

1. Pump motor does not run.
2. Pump continues to run with switch in neutral.
3. Pump will not lower.
4. Plow will not raise or raises slowly, motor runs.
5. While trying to raise the plow, blades extend and wings will not retract.
6. Wings drift back when extended.
7. Plow lowers too fast.
8. Wing(s) will not extend, but motor runs.
9. Wing(s) will extend, but will not retract or retract slowly.
10. Wing(s) retract too easily while plowing.
11. Oil leaks from cylinders.
12. Battery goes dead with all switches in neutral.
13. Plow lights are dim, will not come on or flicker.
14. Turn signals flash at a rapid rate.
15. High beam indicator light not functioning properly.
16. Blade digs into the ground in the V position.
17. Blade does not lay flat against the ground in the scoop position.
18. Blade trips too easily.
19. Plow does not clean-up snow from low areas.
20. Oil runs out of fill cap of hydraulic pump.
21. Pump chatters when raising the plow or extending wings.
22. SmartHitch™ will not attach plow.
23. Plow lights and truck lights are on at the same time.
24. Plow and truck High and Low beam lights are on at the same time.
25. Plow High beam turns off Plow Low beam bulbs.

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>DIAGNOSTIC CHECK</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pump motor does not run.</td>
<td>Check that power/ground cables and control cables are connected properly.</td>
<td>Connect.</td>
</tr>
<tr>
<td></td>
<td>Check for voltage at pump motor while ignition switch is on and LIFT control button is pushed.</td>
<td>If voltage is present, pump motor has failed or pump has seized. Motor brushes may be replaced, otherwise replace pump/motor assembly.</td>
</tr>
<tr>
<td></td>
<td>Check for power to the solenoid by testing for voltage between both large terminals and ground.</td>
<td>If voltage is not present between one large terminal and ground, the cable between the battery and solenoid is disconnected or broken.</td>
</tr>
<tr>
<td>PROBLEM</td>
<td>DIAGNOSTIC CHECK</td>
<td>RESULT</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Check for voltage between the other large terminal of the solenoid and ground while jumping power to the small terminals with the white wire.</td>
<td>If NO voltage is present, solenoid has failed and must be replaced. If voltage is present, wire from small terminal of solenoid to ground may be disconnected or broken.</td>
<td></td>
</tr>
<tr>
<td>Test power to the control box by checking voltage between black wire and ground at the white 9-pin connector.</td>
<td>If NO voltage is present, power from relay has become disconnected. If voltage is present check wiring and controller switches.</td>
<td></td>
</tr>
<tr>
<td>2. Pump continues to run with switch in neutral. Disconnect control box, ignition ON.</td>
<td>If pump continues to run, solenoid has failed in the closed position. Quickly remove power to the pump by disconnecting the power/ground cables to the plow. Replace solenoid.</td>
<td></td>
</tr>
<tr>
<td>If pump stops running, check wiring of controller for short between black and white/black wire in controller, or failed switch.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Plow will not lower. Check power/ground cables and control cables are connected properly. Connect.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check flow control valve.</td>
<td>If flow control valve is completely closed, place RAISE/LOWER switch in NEUTRAL, then open the flow control valve.</td>
<td></td>
</tr>
<tr>
<td>Check wiring on valve block for proper connections. Refer to the wiring diagram in this manual.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check for voltage between solenoid valve terminal and ground with ignition switch on and control switch in FLOAT position.</td>
<td>If voltage is present solenoid valve or valve coil has failed. Replace valve.</td>
<td></td>
</tr>
<tr>
<td>Test power to the control box by checking voltage between black wire and ground at the white 9-pin connector.</td>
<td>If NO voltage is present, power from relays has become disconnected. If voltage is present, check wiring and switch of controller.</td>
<td></td>
</tr>
<tr>
<td>4. Plow will not raise or raises slowly (pump motor runs). Check hydraulic fluid level.</td>
<td>Hydraulic fluid level should be within ¾” from top of reservoir when lowered and in the V-position.</td>
<td></td>
</tr>
<tr>
<td>PROBLEM</td>
<td>DIAGNOSTIC CHECK</td>
<td>RESULT</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Check power/ground cables and control cable are connected properly.</td>
<td>Connect.</td>
<td></td>
</tr>
<tr>
<td>Check wiring on valve block for proper connections.</td>
<td>Refer to the manifold wiring diagram in this manual.</td>
<td></td>
</tr>
<tr>
<td>Load test battery.</td>
<td>Replace battery if weak or defective.</td>
<td></td>
</tr>
<tr>
<td>Check pressure at pressure port of pump.</td>
<td>If pressure is less than 2500 psi (at end of lift). Motor brushes may be defective, pump pressure relief valve may be contaminated, damaged, or set less than 2500 psi, pump may be worn.</td>
<td></td>
</tr>
<tr>
<td>Check LIFT Solenoid Valve.</td>
<td>Lift solenoid valve not opening completely. Replace.</td>
<td></td>
</tr>
<tr>
<td>Check wiring and switch box control.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. While trying to raise plow, wing(s) extend prior to raising plow and will not retract.</td>
<td>Check the pressure and return line routing.</td>
<td>Pressure line MUST be connected from P on pump to P on valve manifold. Return line MUST be connected from R on pump to T on valve manifold.</td>
</tr>
<tr>
<td>6. Wings drift back when extended.</td>
<td>Check wing return solenoid valve on manifold Check pressure</td>
<td>If solenoid valve is contaminated, clean or replace. If pressure relief valve is contaminated, clean or replace.</td>
</tr>
<tr>
<td>8. Wing(s) will not extend or extend slowly, motor runs.</td>
<td>Check hydraulic fluid level.</td>
<td>Hydraulic fluid level should be within 3/4&quot; from top of reservoir when lowered and in the V-position.</td>
</tr>
<tr>
<td></td>
<td>Check power/ground cables and control cable are connected properly.</td>
<td>Connect.</td>
</tr>
<tr>
<td></td>
<td>Check wiring on valve block for proper connections.</td>
<td>Refer to the wiring diagram in this manual.</td>
</tr>
<tr>
<td></td>
<td>Load test battery.</td>
<td>Replace battery if weak or defective.</td>
</tr>
<tr>
<td>PROBLEM</td>
<td>DIAGNOSTIC CHECK</td>
<td>RESULT</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Check pressure at pressure port of pump.</td>
<td>If pressure is less than 2500 psi (at end of lift). Motor brushes may be defective, pump pressure relief valve may be contaminated, damaged, or set less than 2500 psi, pump may be worn.</td>
<td></td>
</tr>
<tr>
<td>Check WING OUT solenoid valve.</td>
<td>WING OUT solenoid valve not opening completely. Replace.</td>
<td></td>
</tr>
<tr>
<td>Check wiring and control box.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check power/ground cables and control cables are connected properly.</td>
<td>Connect.</td>
<td></td>
</tr>
<tr>
<td>Check wiring on valve block for proper connections.</td>
<td>Refer to the wiring diagram in this manual.</td>
<td></td>
</tr>
<tr>
<td>Check for voltage between solenoid valve terminal and ground with ignition switch on and control switch in WING IN position.</td>
<td>If voltage is present, solenoid valve or valve coil has failed. Replace valve. If NO voltage is present, check wiring and switch box control.</td>
<td></td>
</tr>
<tr>
<td>Pressure relief valve pressure set too low.</td>
<td>See an Authorized BOSS Dealer for pressure relief valve adjustment.</td>
<td></td>
</tr>
<tr>
<td>Loose packing.</td>
<td>Tighten packing 1/8-turn increments until leak stops.</td>
<td></td>
</tr>
<tr>
<td>Check rod condition.</td>
<td>If rods are pitted or rough, polish with copus cloth or extra fine steel wool.</td>
<td></td>
</tr>
<tr>
<td>Possible short in switches.</td>
<td>Inspect wiring of control box switches, replace switch(es).</td>
<td></td>
</tr>
<tr>
<td>Possible short in wiring harness.</td>
<td>Repair damaged wire.</td>
<td></td>
</tr>
<tr>
<td>Possible short in valve coils.</td>
<td>Replace coils.</td>
<td></td>
</tr>
<tr>
<td>Check electrical connections.</td>
<td>Clean and repair any corroded or damaged terminals.</td>
<td></td>
</tr>
<tr>
<td>Check headlight adapter wires.</td>
<td>Verify proper headlight adapters are being used and are correctly installed.</td>
<td></td>
</tr>
<tr>
<td>Check relays for corrosion and function.</td>
<td>Relays should click when energized.</td>
<td></td>
</tr>
<tr>
<td>Check flasher.</td>
<td>Replace original vehicle flasher with heavy-duty six-lamp flasher provided.</td>
<td></td>
</tr>
</tbody>
</table>

10. Wing(s) retract too easily while plowing.  
11. Oil leaks from cylinders.  
12. Battery goes dead with all switches in neutral.  
13. Plow lights are dim, will not come on or flicker.  
14. Turn signals flash at a rapid rate.
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>DIAGNOSTIC CHECK</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. No high beam indicator or does not function properly.</td>
<td>Check headlight adapters.</td>
<td>Verify proper headlight adapters are being used and are correctly installed.</td>
</tr>
<tr>
<td>16. Blade digs into the ground in the V-position.</td>
<td>Center shoe adjusted too low.</td>
<td>Add washers to the center shoe to raise the tip of the plow.</td>
</tr>
<tr>
<td></td>
<td>Push beam installed too high.</td>
<td>Lower the push beam.</td>
</tr>
<tr>
<td>17. Blade does not lay flat against the ground in the scoop position.</td>
<td>Center Shoe Adjusted too High.</td>
<td>Remove washers from the center shoe to raise the tip of the plow.</td>
</tr>
<tr>
<td></td>
<td>Push beam installed too low.</td>
<td>Raise the push beam. If push beam is at highest setting, Adjust the Bumper Stop further into the center section.</td>
</tr>
<tr>
<td>18. Blade trips too easily.</td>
<td>Check trip spring adjustment.</td>
<td>Tighten springs. Replace springs if permanently deformed or damaged.</td>
</tr>
<tr>
<td>19. Plow does not clean-up snow from low areas.</td>
<td>UP/DOWN switch not in FLOAT position.</td>
<td>Place switch in FLOAT position.</td>
</tr>
<tr>
<td></td>
<td>Plowing on steeply inclined terrain.</td>
<td>Avoid too steeply sloped areas.</td>
</tr>
<tr>
<td></td>
<td>Pump reservoir over filled.</td>
<td>Reservoir should be filled to $\frac{3}{4}$&quot; from top.</td>
</tr>
<tr>
<td></td>
<td>Hitting snowbanks too hard.</td>
<td>Do not plow recklessly. Place plow in V-position and break up hard snowbanks.</td>
</tr>
<tr>
<td>21. Pump chatters when raising plow or extending wing(s).</td>
<td>Hydraulic fluid low.</td>
<td>Add hydraulic fluid. Reservoir should be filled to $\frac{3}{4}$&quot; from top.</td>
</tr>
<tr>
<td>22. SmartHitch$^{TM}$ will not attach plow.</td>
<td>Make sure key is on and controller is in FLOAT.</td>
<td>Turn key on and put controller in FLOAT.</td>
</tr>
<tr>
<td></td>
<td>Make sure controller is staying in the Float position</td>
<td>If controller comes out of Float when using the SmartHitch$^{TM}$ switch, replace the controller.</td>
</tr>
<tr>
<td></td>
<td>Check valve block and SmartHitch$^{TM}$ switch for proper connections.</td>
<td>Refer to manifold wiring diagram located within this manual.</td>
</tr>
<tr>
<td>23. Plow lights and truck lights are on at the same time.</td>
<td>Check vehicle harness wiring to truck headlights.</td>
<td>Refer to electrical system wiring instructions located within this manual. Ensure OEM is not plugged into truck headlight.</td>
</tr>
<tr>
<td>PROBLEM</td>
<td>DIAGNOSTIC CHECK</td>
<td>RESULT</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>24. Plow and truck High beam and Low beam are on at the same time.</td>
<td>Check headlight adapters for correct connections.</td>
<td>Light adapters for GM trucks can be plugged in two ways. Make sure all four adapters are connected in the proper orientation for your vehicle.</td>
</tr>
<tr>
<td>25. Plow High beam turns off Plow Low beam bulbs.</td>
<td>Check vehicle option connector and RED/WHITE wire.</td>
<td>Refer to electrical system wiring instructions located within this manual. RED/WHITE wire may need to be placed on opposite battery terminal.</td>
</tr>
</tbody>
</table>
Recommended Push Beam Height

Figure 37. Recommended Push Beam Height

Recommended Bolt Torque

<table>
<thead>
<tr>
<th>DIAMETER / PITCH</th>
<th>GRADE 5</th>
<th>GRADE 8</th>
<th>GRADE 8.8</th>
<th>GRADE 10.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4–20</td>
<td>6</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/16–18</td>
<td>14</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8–16</td>
<td>23</td>
<td>33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/16–14</td>
<td>38</td>
<td>53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2–13</td>
<td>56</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/16–12</td>
<td>82</td>
<td>116</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8–11</td>
<td>113</td>
<td>159</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4–10</td>
<td>201</td>
<td>283</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M10 X 1.25</td>
<td></td>
<td></td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>M10 X 1.5</td>
<td></td>
<td></td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>M12 X 1.75</td>
<td></td>
<td></td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>M14 X 2.0</td>
<td></td>
<td></td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

ALL TORQUE VALUES ARE IN FOOT–POUNDS (FT.–LB.)

Figure 38. Recommended Bolt Torque

NOTE: The torque values listed above are based on dry, coated bolts, variables such as oil, or other lubrications may appreciably alter these values and must be taken into consideration.

NOTICE: IT IS IMPORTANT THAT ALL FASTENERS BE PROPERLY TORQUED TO ASSURE A SAFE OPERATING PLOW.