Manual # AA07-0024

EBLING BACK BLADE

HYDRAULIC & FIXED WING OWNERS MANUAL

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1. INTRODUCTION

You have just purchased The Best Back Blade available in the snowplow industry today. Your new Ebling Back Blade has been designed and built to provide many years of durable service. Used properly, it will increase your productivity and allow you to plow more snow more efficiently than ever before.

This manual provides safety, operation, and maintenance information for your new Ebling Back Blade. Please read this manual before operating the unit, and follow the instructions and recommendations to keep your back blade in top operating condition all winter long. Failure to do so may affect your warranty coverage.

Ebling Snowplows and your local dealer will be your sources for replacement parts and service as they become necessary over the life of your back blade. Feel free to contact us for maintenance, service, replacement parts, or any other assistance we can provide. We are here for you!

2. SAFETY PRECAUTIONS

Improper installation or operation of your back blade could cause injury, equipment damage, and/or property damage. Please read and understand the information in this manual before installing, operating, or making adjustments to this equipment.

Throughout this manual, safety-related information and precautions are noted by one of the two safety symbols below, based on the severity of potential injury as defined.

WARNING: Indicates a hazard that, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazard that, if not avoided, may result in minor or moderate injury, or lead to equipment damage and/or property damage.

3. BACK BLADE FEATURES

3.1 Back Blade Plow Mount

The Ebling Back Blade is attached to the plow vehicle using a plow mount, which is a welded framework that is bolted to the vehicle's frame. A typical plow mount, shown in Figure 1, is designed to be a low-profile, under-bumper configuration with minimal

protrusion outside the rear of the vehicle. The plow mount is custom-designed for the vehicle model and is generally not interchangeable with other vehicle models. The plow mount has a welded pocket on each side that accepts the solid steel *Quick-Detach* arms for mounting the back blade onto the vehicle. The plow mount replaces the factory trailer hitch on many vehicle applications. For those applications, the plow mount is manufactured with an integral, V-5 tested and rated hitch receiver, so that the vehicle will still be equipped with a trailer hitch for use when the back blade is not attached to the vehicle. Many custom plow mount configurations not shown in this manual are also available for specialized vehicle applications.

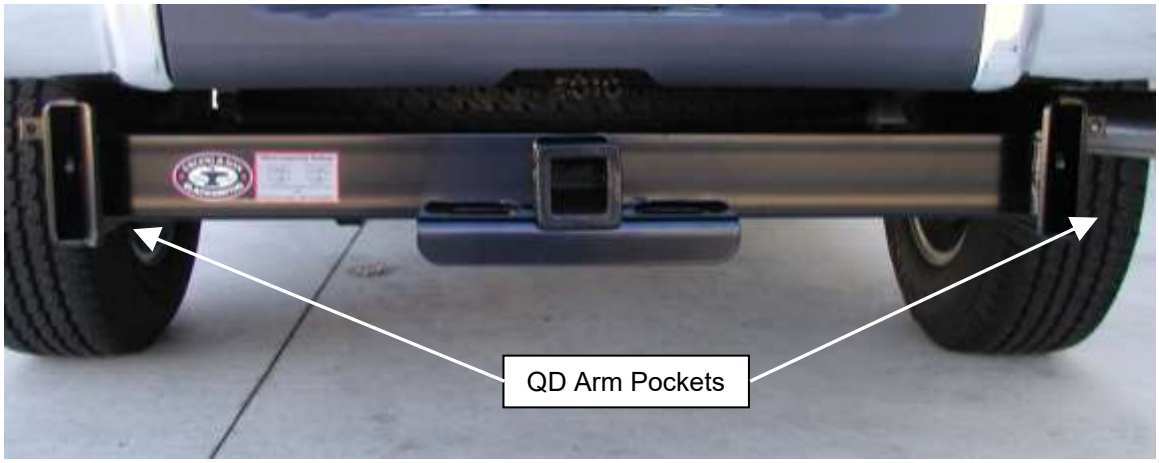


Figure 1

Back Blade Plow Mount

> ***CAUTION***: Do not cut, drill, weld, or otherwise modify the hitch receiver on the plow mount. Doing so may affect the safety integrity of the hitch receiver and will void the warranty.

3.2 *Quick-Detach* System

The back blade plow mount has a pocket on each side that will accept the solid steel mounting arms on the *Quick-Detach* system framework. The mounting arms slide into the plow mount pockets and are automatically aligned, and then are locked into position using two 1" steel pins. In addition to the plow attachment provisions, the typical *Quick-Detach* system shown in Figure 2 includes a 4-bar parallel linkage which guides the back blade straight up and down, the hydraulic lift cylinder, a spring bar to stabilize the back blade, and a plow stand used when de-mounting the back blade.

Figure 2

Quick-Detach System

3.3 Moldboard & Wings – Hydraulic Wing Models

The Ebling Back Blade moldboard is designed and constructed to be one of the most rugged in the industry. A single moldboard design will accept any size hydraulic wing to provide flexibility and future upgradeability. Each hydraulic wing includes a breakaway feature, which is based on a shear bolt that is intended to be a sacrificial “weak link” that reduces the possibility of damage to the wing, if an obstruction is hit hard enough to break the shear bolt. See Figure 3 for illustration of the shear bolt joint.

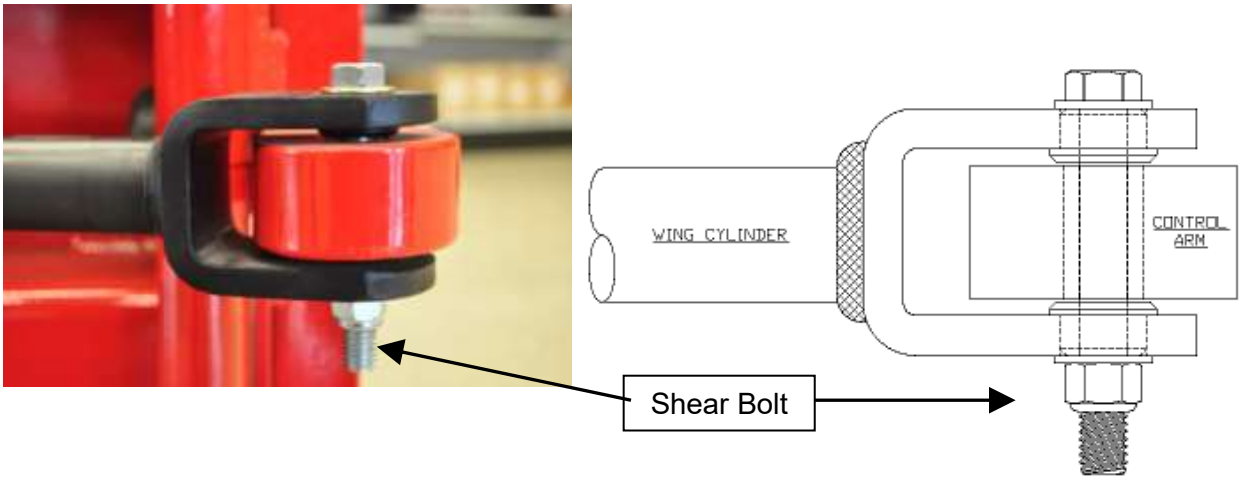


Figure 3

Shear Bolt Joint

If the shear bolt breaks, this will allow the wing to rotate backward out of the way to clear the obstruction. Plowing can be resumed immediately after replacing the shear bolt instead of heading for the repair shop. The size of the shear bolt is based on the expected snow load and frictional forces for the wing size, with a safety factor to minimize nuisance breakage

HW21X90X12 - Uses 7/16” shear bolt (Grade 2 or less)

HW21X90X14 - Uses 7/16” shear bolt (Grade 2 or less)

HW21X90X16 - Uses 1/2” shear bolt (Grade 2 or less)

NOTE: Due to the many variables present in any snowplowing application, the breakaway feature is not intended nor is it guaranteed to be a 100% solution in every situation where an obstruction is hit. The shear bolt is designed to work with wing open. Avoid “riding” curbs with wings less than 90 degrees open, damage will occur if an obstruction is hit.

3.4 Cutting Edges

Unless you ordered custom cutting edges for your back blade, the standard moldboard cutting edge is made from durable carbon steel, and the wing cutting edges are tough, durable polyurethane material as standard. To minimize snow leakage at the corners between the moldboard and wing cutting edges, a polyurethane corner edge on each wing is designed to close against a block at each moldboard corner in order to maintain a minimal gap at the corner regardless of the wing position through the entire wing travel from fully closed to fully open position (see Figure 4).

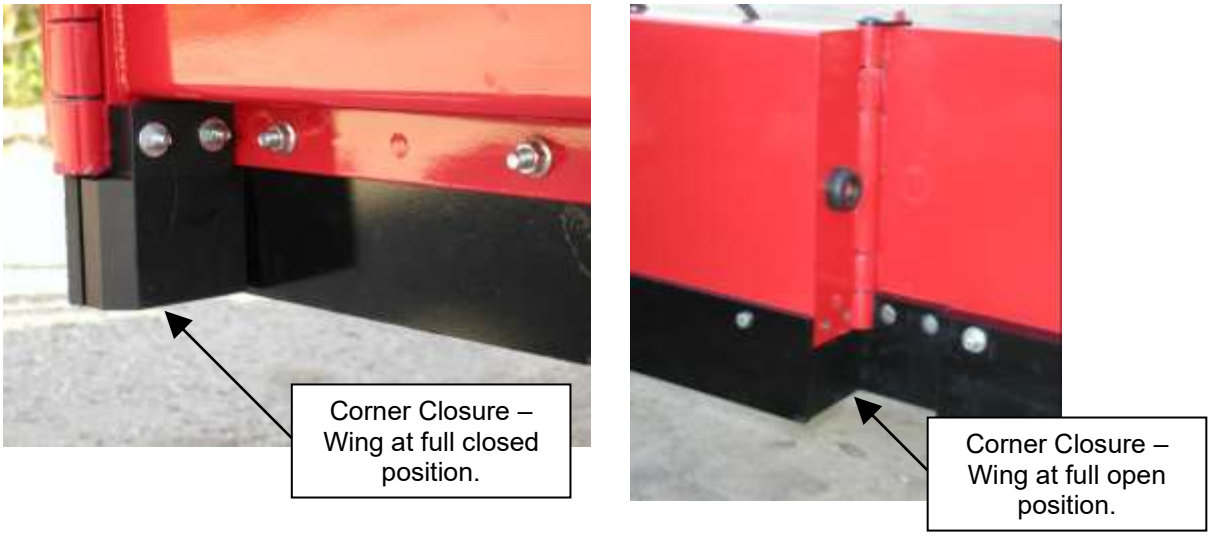


Figure 4

Maintaining proper alignment of your back blade is important to be able to get maximum life out of the cutting edges. When maintained properly, the wing cutting edges and the corner closure blocks will wear evenly along with the moldboard cutting edge. The upper linkage arms are preset for the proper initial alignment at the factory, but over the life of the cutting edges, depending on the wear you observe due to the plowing application, site conditions, and operator plowing methods, the upper arms may need to be adjusted to allow more even wear of the cutting edges. Refer to the *Back Blade Maintenance* section of this manual for additional details on making alignment adjustments to the back blade.

The fixed wing models use the same cutting edge combination as the hydraulic wing models with the exception of not needing the corner closure blocks.

4. ELECTRICAL SYSTEM & CONTROLS

The Ebling Back Blade is powered by the plow vehicle's electrical system. Refer to the following sections of this manual for specific information regarding the back blade electrical system:

1. *Back Blade Maintenance* section: Fuse replacement, recommended maintenance items.
2. *Operating The Back Blade* section: Controller functions and detailed operating procedures.
3. *Specifications* section: Electrical system technical specifications.
4. *Schematics* section: Electrical connection diagrams.

4.1 Controllers

The Ebling Back Blade comes available with an in-cab controller. The controllers for the hydraulic wing model are shown in Figure 5. The controllers come "loose", ready for you to mount in your preferred position in the cab of your vehicle.

The controllers includes a main power ON/OFF switch, and (3) additional switches to control the RAISE & LOWER and WING IN & OUT functions. The power circuit runs through and is controlled by the vehicle ignition switch, and is also protected by a circuit breaker. Regardless of the main power switch position, power to the back blade controller is off whenever the vehicle ignition switch is off. When the vehicle ignition switch is on, the main power switch allows you to turn power off to the back blade hydraulic unit, so that back blade movement is prevented when the plow is not in use. The RAISE/LOWER and IN/OUT switches control those respective blade functions. The control switch for each wing is independent of the other side, and they can also be operated simultaneously. All three control switches are momentary-contact type, such that the function is powered

only when the control switch is held in the position desired, and motion stops as soon as the control switch is released or when the maximum movement is reached. Refer to the *Back Blade Operation* section of this manual for additional information on operating your back blade.

The available fixed wing controllers (figure 6) have the same construction as the hydraulic wing controllers with the exception of having a handheld version.

Hydraulic Wing Controllers

Figure 5

Fixed Wing Controllers

Figure 6

> ***WARNING***: Always switch the ON/OFF switch to the OFF position whenever the back blade is not in use to prevent inadvertent movement of the back blade.

4.2 Remote *RAISE/LOWER* Switch

The Ebling Back Blade also comes standard with a remote RAISE/LOWER switch that is mounted at the rear of the vehicle (see Figure 6).

Figure 6

Typical Remote Switch Mounting, Shown On GM Pick-up Installation

The remote switch is powered by a fused circuit that also runs through the vehicle ignition switch, and it allows the back blade to be raised and lowered while standing close to the unit instead of being required to use the in-cab controls. It is provided to assist in positioning the back blade height for mounting and de-mounting the back blade to/from the vehicle. Refer to the *Mounting Back Blade To Vehicle* and the *Back Blade Removal* sections of this manual for additional information on mounting and de-mounting the back blade.

> ***WARNING***: If the back blade hits you or drops on you it could cause serious injury. Be aware of the operating envelope of the blade, and stay clear of the back blade when operating the remote controls.

5. HYDRAULIC SYSTEM

The back blade standard hydraulic system is powered by an electric motor. The hydraulic pump delivers a controlled flow of oil for fast, smooth raising and lowering of the plow and opening/closing of the wings. A typical power unit is shown in Figure 7.

Figure 7
Hydraulic Wings Pump Above
Fixed Wing Pump On Right

Refer to the following sections of this manual for specific information regarding the back blade hydraulic system:

12. *Back Blade Maintenance* section: Recommended hydraulic fluid type, filling instructions, and maintenance procedures.
16. *Specifications* section: Hydraulic system technical specifications.
17. *Schematics* section: Hydraulic plumbing connection diagrams.

6. MOUNTING BACK BLADE TO VEHICLE

> ***WARNING***: Always inspect all back blade components and fasteners for wear and/or damage before mounting back blade onto vehicle. Worn or damaged parts may fail unexpectedly, which could cause serious injury.

> ***CAUTION***: Due to limited visibility of rear of vehicle from the driver's seat, it is recommended that steps 1-3 be completed with an observer at the rear of the vehicle to provide assistance, not by yourself. Make sure observer stands at a safe position to avoid pinch/drop points. If you must do this by yourself, use extreme care.

1. Back plow vehicle into position close to the back blade so that the *Quick-Detach* arms are lined up with the pockets on the plow mount (see Figure 8).

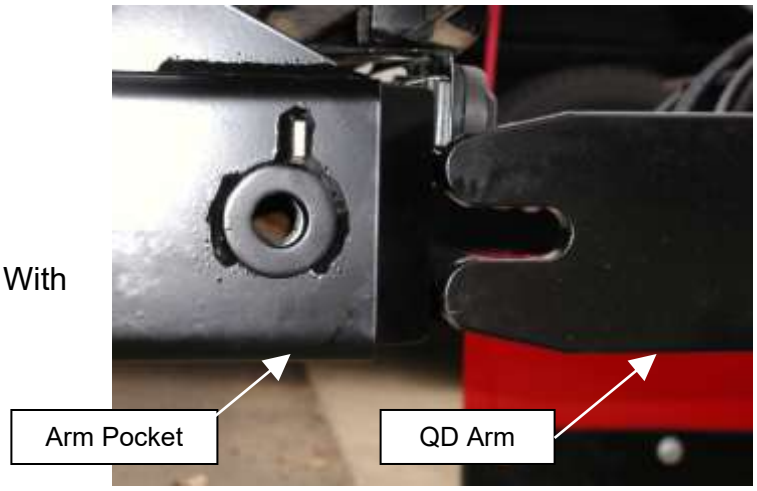


Figure 8
Quick-Detach Arms Lined Up With Plow Mount Pockets

2. Route the back blade wiring harness as shown and then connect the plugs to the mating receptacles on the vehicle. (see Figure 9).

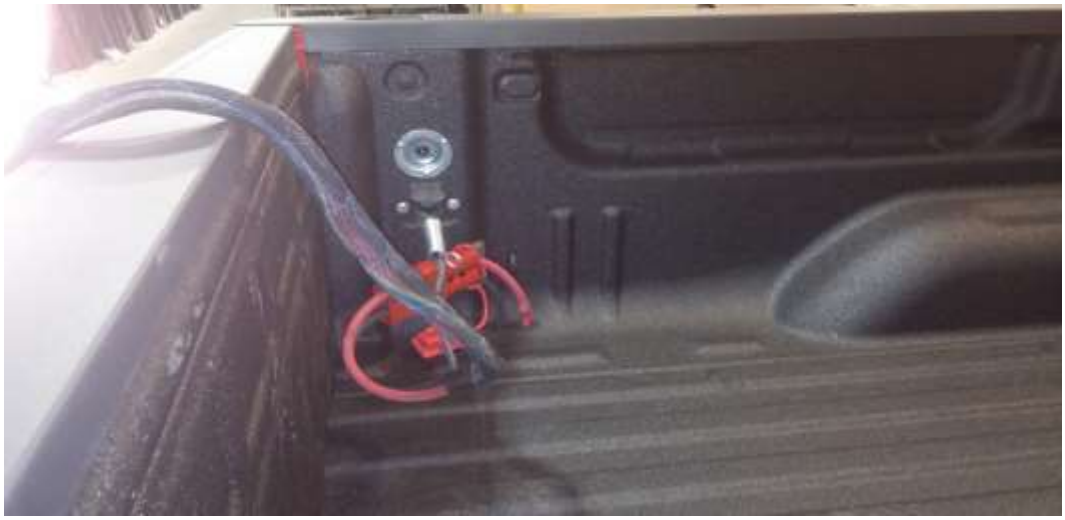


Figure 9

3. Verify that the height of the *Quick-Detach* arms matches the plow mount height. If the height matches (refer back to Figure 8), then skip step 4.

NOTE: Adjustment is not normally necessary unless the vehicle height is substantially different than when the back blade was last removed from the vehicle.

4. If minor height adjustment is necessary, complete steps 12 & 13 at this point, and then use the remote RAISE/LOWER switch to raise or lower the *Quick-Detach* arms to the correct height for engagement into the mount pockets.

   NOTE: If a major height adjustment is necessary, it is recommended to perform the adjustment manually, with help from an assistant, before attempting to engage the Quick-Detach arms in the mount pockets (the arm angle will be too extreme for proper engagement using hydraulics only).

5. Back vehicle up slowly to engage the *Quick-Detach* arms in the plow mount pockets until they are up against the alignment pins at the ends of the plow mount pockets.

   NOTE: Arms are fully engaged when the lock pin hole in each arm lines up with the hole in the plow mount pocket.

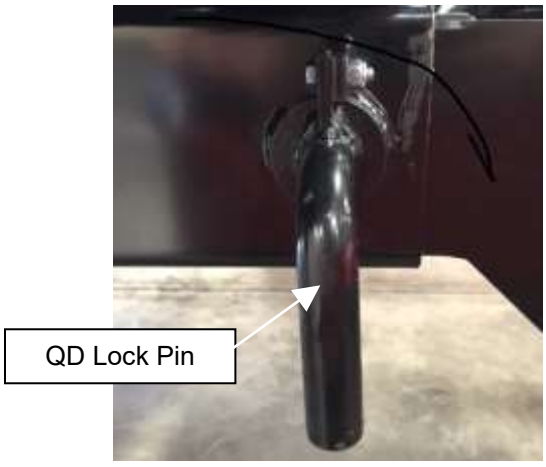
6. Insert the two QD lock pins, one into the hole in each plow mount pocket, and rotate lock pin into the vertical position to bring the tab on the lock pin together with the tab on the plow mount pocket.

7. For each lock pin, insert a 5/16 bolt and nylock nut through both tabs (on lock pin and on plow mount pocket) to retain the lock pin in position and prevent it from coming back out (see Figure 10).

Figure 10

QD Lock Pin, Installed With Bolt

And Nylock Nut



8. Loosen the T-bolt and move the plow stand to the full “up” position (see Figure 11), then re-tighten the T-bolt.

Figure 11
Plow Stand With Removable Foot

9. Remove the snap pin and foot from the stand. Loosen T-bolt and remove stand, store the stand on the QD bracket provided.
10. Turn the vehicle ignition key to the ON or ACCESSORY position.
11. Actuate the ON/OFF switch on the in-cab controller to the ON position.
12. Actuate and hold the remote RAISE/LOWER switch to raise the back blade, and release the switch when the back blade reaches the fully-raised position.

> ***CAUTION***: Release the remote RAISE/LOWER switch once the maximum back blade travel is reached. Continuing to hold the remote switch in the RAISE or LOWER direction after maximum blade travel is reached will cause excessive current draw on the pump motor and may overheat system components.

13. Verify that the back blade does not block the view of the vehicle's tail lights from the rear of the vehicle.

> ***CAUTION***: The back blade plow mount is designed to accommodate nearly all OEM equipment, but some after-market lighting may not fully comply with this requirement. If the view of the vehicle's tail lights is blocked, you will need to modify the lighting.

14. Check the alignment of the back blade to the plow vehicle before operating the back blade to plow snow. Refer to the *Maintenance* section in this manual for instructions on checking alignment and making adjustments, if required.

7. OPERATING THE BACK BLADE

> ***WARNING***: Always switch the ON/OFF switch to the OFF position whenever the back blade is not in use to prevent inadvertent movement when the back blade is not in use.

1. Actuate the vehicle ignition switch to the “ON” or “ACCESSORY” position.
2. Actuate the main power ON/OFF switch to the ON position to turn power on to the back blade hydraulic unit.
3. To raise or lower the blade, actuate and hold the RAISE/LOWER control lever in the desired direction. Movement occurs only when the control lever is actuated, and movement will stop as soon as the control lever is released.

> ***CAUTION***: The back blade RAISE/LOWER function does not have a “float” position like many front plows do. The RAISE/LOWER function is designed to utilize hydraulic down pressure for better scraping and clean-up, and as such the position of the blade will be maintained when the control lever is released, it will not “float” to follow the terrain being plowed. (unless float kit installed, see section 9.6)

> ***CAUTION***: The back pressure in the hydraulic system is sufficient in many cases to raise the rear wheels of the plow vehicle off the ground. As such, be aware that using a lowered blade position that raises the vehicle even partially will reduce traction on the vehicle’s rear wheels.

> ***CAUTION***: Release the RAISE/LOWER control lever once the maximum blade travel is reached. Continuing to hold the control lever in the RAISE or LOWER direction after maximum blade travel is reached will cause excessive current draw on the pump motor and may overheat system components.

4. To open or close the hydraulic wings, actuate and hold the proper IN/OUT control lever(s) in the direction desired. Note that the left (*driver's side*) wing control lever is to the left of the RAISE/LOWER control lever, and the right (*passenger side*) wing control lever is to the right of the RAISE/LOWER control lever. Each wing control lever is independent of the other. The wing moves only while the control lever is held, and wing motion stops as soon as the control lever is released. Each wing may be positioned anywhere in its range of travel from fully closed to fully open positions.

> ***CAUTION***: Release the IN/OUT control lever(s) once the maximum wing travel is reached. Continuing to hold the control lever(s) in the IN or OUT direction after maximum wing travel is reached will cause excessive current draw on the pump motor and may overheat system components.

5. When finished operating the back blade, actuate the wings to the fully closed position, then actuate the main power switch to the OFF position to prevent inadvertent movement when the back blade is not in use.

8. TRANSPORTING & DRIVING CONSIDERATIONS

1. Before transporting the back blade to and from plowing jobs, always put the back blade into the proper transport condition as follows:
   - Raise the back blade to the fully-raised position to prevent the bottom of the plow from striking the pavement when encountering potholes or other road obstacles.
   - Close both wings to the fully-closed position to minimize the width of the back blade profile when traveling down the road.
   - Verify that the main power switch is in the OFF position to prevent inadvertent back blade motion during transporting.

> ***WARNING***: Always switch the ON/OFF switch to the OFF position whenever the back blade is not in use to prevent inadvertent movement when the back blade is not in use.

2. Always drive defensively and be aware of the additional size and weight of the equipment that you are transporting with regard to turning radius, passing clearance, braking distance, etc.

> ***WARNING***: Always lower the back blade when the vehicle is parked to prevent the blade from dropping unexpectedly due to hydraulic pressure changes or damaged system components. Keep clear of the blade's drop zone at all times. Failure to observe these safety precautions could result in serious personal injury.

9. PLOWING CONSIDERATIONS

> ***WARNING***: Plowing speed should not exceed 10 mph (16 km/h). Transport speed should not exceed 45 mph (72km/h). Further reduce speed as weather conditions warrant.

1. Before plowing at a site, make sure you are aware of any obstructions that could be hidden beneath the snow, such as curbs, sidewalk edges, bumper stops, low shrubs, or other landscaping obstacles. Marking hard-to-see obstructions or other hazards before plowing season can help identify them when they are covered with snow.

> ***WARNING***: Always wear your seat belt when plowing snow. Striking a hidden obstruction could cause the vehicle to stop or swerve suddenly, which could result in serious personal injury if you are not wearing your seat belt.

2. Plow at a reasonable speed given the overall site layout and the weather conditions at time of plowing.

> ***CAUTION***: Your back blade is designed to pull snow, so using your back blade to push snow with the vehicle in reverse is not recommended. **Do not "run" curbs with wings partially open, if an obstruction is hit in this position the shear bolt will not function and damage to the hinge knuckles and cylinder will occur not covered by warranty.**

3. When plowing around obstructions, it is recommended to keep your hydraulic wings fully or almost fully closed to minimize the potential for wing damage.

4. When entering or exiting a driveway (or any other sloped surface with a valley) with the back blade raised, be aware of the difference in blade position with respect to the vehicle's tires. The back blade may bottom out as the vehicle passes through the low spot.
5. When entering or exiting a driveway (or any other sloped surface with a valley) with the back blade lowered, it is recommended that the hydraulic wings are in the fully open or almost fully open position when possible, in order to minimize the potential for premature wear on the leading corners of the wing cutting edges and to prevent snow escaping underneath the moldboard as the back blade passes through the low spot.
6. A "float" option is available for all 2014 and newer Ebling backblades with a vertical pump. Adding this option allows the blade to float over uneven surfaces without having to reposition the raise/lower switch. This feature is very useful for negotiating steep driveway approaches and speed bumps. The float can be easily turned on and off as situations arise.
   2013-2017 Hyd wing with single control plug #BA16-FL01.
   2018+ Hyd wing with double control plug #BA16- FL05.
   2013-2017 Fixed wing with single control plug #BA16- FL03.
   2018+ Fixed wing with double control plug #BA16- FL04.

10. REMOVING BACK BLADE FROM VEHICLE

1. Move vehicle into position where back blade is to be removed. A flat area with sufficient maneuvering room is recommended for back blade removal and more importantly, for ease of re-attaching the back blade later.
2. Actuate the vehicle ignition switch to the "ON" or "ACCESSORY" position.
3. Actuate the ON/OFF switch on the in-cab controller to the ON position.
4. Actuate and hold the remote RAISE/LOWER switch to lower the back blade to the ground. Release the switch as soon as the back blade contacts the ground and the weight is off the vehicle.

> ***CAUTION***: Releasing the remote switch before the pump begins to raise the rear of the vehicle is important for ease of pulling the vehicle out once the *Quick-Detach* system is unclamped. If the rear of the vehicle is raised a significant amount, it may drop unexpectedly or bind the *Quick-Detach* arms in the plow mount pockets.

5. Disconnect the back blade wiring harness and coil the harness around the power unit for storage.

   NOTE: Re-apply dielectric grease to the harness and vehicle plug electrical terminals for anti-corrosion protection.

6. Install plug cover on vehicle power plug.
7. Remove the safety snap pin from the plow stand and replace it into the top hole on the plow stand.
8. Loosen the T-bolt and lower the plow stand to the ground, then re-tighten the T-bolt.
9. Remove the linch pin from the two *Quick-Detach* lock pins, then remove the lock pins (rotating the lock pins while pulling may assist in removal).
10. Pull the vehicle ahead slowly to dis-engage the *Quick-Detach* arms from the plow mount pockets. The plow will stay in place on the plow stand with the *Quick-Detach* arms at the proper height for re-attachment.

> ***CAUTION***: Due to limited visibility of rear of vehicle from the driver's seat, it is recommended that steps 1-3 be completed with an observer at the rear of the vehicle to provide assistance, not by yourself. Make sure observer stands at a safe position to avoid pinch/drop points. If you must do this by yourself, use extreme care.

NOTE: When completed correctly, the back blade removal process will make the re-attachment procedure much easier. Unless the vehicle height changes substantially, the *Quick-Detach* arms should be at the correct height for re-engagement in the plow mount pockets by having already removed the back blade at that same vehicle height.

11. Store the lock pins separately, or replace the lock pins in the *Quick-Detach* arm holes, and replace the bolt and nylock nut in the tab holes for safekeeping.
12. Disconnect the controller wire harness in the cab, if desired, and store the controller in a safe location.

11. OFF-SEASON STORAGE

1. Choose your off-season storage location carefully. A flat, dry, out-of-the-way surface is recommended, and storing the blade inside out of the weather is preferable to outside storage when possible.
2. Remove back blade from vehicle per the procedures outlined in the *Removing Back Blade From Vehicle* section of this manual.
3. Complete the steps in the *Post-Season Checklist* section of this manual.

12. BACK BLADE MAINTENANCE

12.1 Pre-Season Checklist

It is recommended that you complete the following list before the snow season to make sure your equipment is in top working condition prior to plowing:

1. Inspect entire blade assembly for worn or damaged parts, especially cutting edges, shear bolts, and moving parts.
2. Replace any worn or damaged parts.
3. Check all mounting points on back blade and vehicle, and make sure all cotter pins are still in place.
4. Check all fasteners and re-tighten to proper torque as necessary.
5. Check all cutting edges for amount of wear, and replace cutting edges as necessary.
6. Touch up painted surfaces as necessary to protect the metal and maintain back blade finish and appearance. Touchup paint is available from Ebling Snowplows or your local dealer.
7. Check hydraulic system for leaks and cracked or damaged hoses, tighten fittings and replace hoses as necessary.
8. Drain hydraulic system and re-fill with the recommended hydraulic fluid. Refer to *Annual Hydraulic Fluid Change* later in this section for instructions and recommended fluid types. Clean and tighten all electrical connections, and apply dielectric grease to prevent corrosion.
9. Inspect and test vehicle battery, and re-charge or replace as necessary.

12.2 In-Season Periodic Maintenance

The following items should be checked frequently during the plowing season:

1. Check all fasteners for wear, re-tighten to proper torque as necessary.
2. Check all hydraulic connections for leaks, re-tighten and repair as necessary.
3. Check hydraulic fluid reservoir and add fluid as necessary to keep full.
4. Check all electrical connections to make sure they are clean, tight, and corrosion-free. Re-apply dielectric grease as necessary for anti-corrosion protection.
5. Check condition of all cutting edges to make sure they are wearing evenly. Re-align back blade and/or replace cutting edges as necessary. Refer to section 12.8, *Back Blade Alignment* for alignment instructions.

12.3 Post-Season Checklist

It is recommended that you complete the following preventive maintenance items prior to storing your back blade for the off-season:

1. Wash the back blade with a good automotive-grade detergent to clean off road grime and salt build-up.

> ***CAUTION***: Before spraying the hydraulic unit, remove the vent cap and replace with matching threaded hydraulic plug. This is necessary to prevent water from entering the system. Be sure to replace vent cap after washing. Failure to replace vent cap may damage hydraulic unit.

2. Touch up painted surfaces as necessary to protect the metal and maintain back blade finish and appearance. Touchup paint is available from Ebling Snowplows or your local dealer.
3. Lubricate all mounting points (all clevis pins) with a general purpose lithium base grease.
4. With the back blade on the ground, remove the wing hinge pins, grease the pins, and then re-install with the washers and cotter pins.
5. Cover the back blade with a tarp to prevent dust and dirt accumulation, and to keep the back blade dry if stored outside.

12.4 Hydraulic System Adjustments

1. The hydraulic relief pressure is factory set and tested at 2,300 psi. The drop speed of the blade is also factory set.
2. Both of these items are non-adjustable! If you have any concerns with either of these items contact Ebling Snowplows for directions. Any adjustment attempted may void warranty!

12.5 Hydraulic System Fluid Level

1. The hydraulic fluid level must be checked with the vehicle on a level surface and the back blade fully raised with both wings fully open (so that all cylinders are fully retracted).
2. Proper "full" fluid level in the fluid reservoir is about 1" down from the top of the reservoir (see Figure 12).

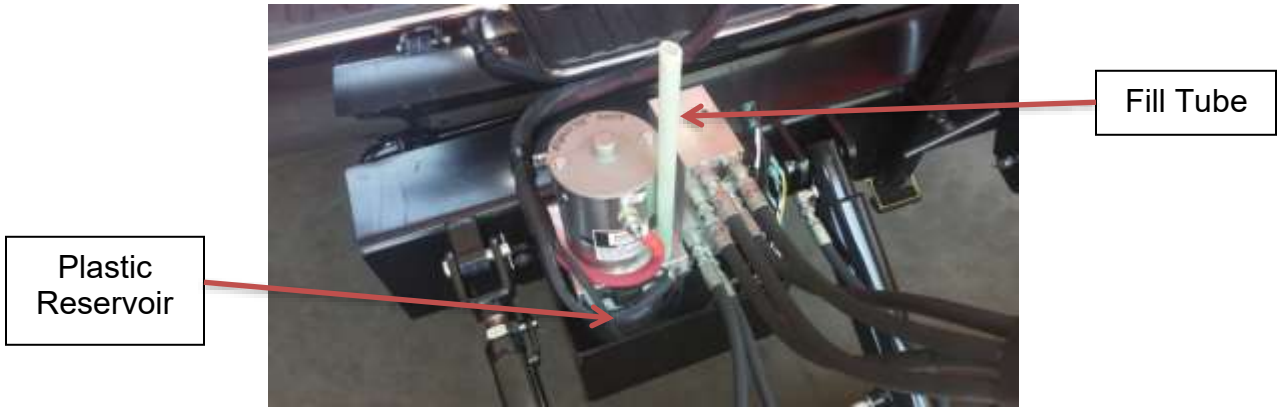


Figure 12

3. To fill the fluid reservoir, unscrew hex plug next to electric motor on the hydraulic manifold and screw in plastic fill tube included. (see Figure 12). Add fluid slowly until level is 1" down from top of plastic reservoir. A work light to illuminate the reservoir will aid in viewing the fluid level. Remove fill tube and replace the hex plug before running the pump. For fluid recommendations, see section 12.6, *Annual Hydraulic Fluid Change*.

> ***CAUTION***: Do not mix different types of hydraulic fluid. Some fluids are not compatible and, if mixed, may cause equipment damage and/or performance problems.

12.6 Annual Hydraulic Fluid Change

> ***CAUTION***: The fluid change should be done at the beginning of each plowing season (reference the *Pre-Season Checklist* included in this manual) to prevent the use of fluid that contains condensation build-up from the off-season.

1. Raise the back blade to the fully raised position and open both wings to the full open position (so that all cylinders are fully retracted).
2. Place safety blocks underneath the back blade to prevent it from inadvertently dropping to the ground while you are working on it.

> ***WARNING***: If the back blade hits you or drops on you it could cause serious injury. Be aware of the operating envelope of the blade, and stay clear of the back blade when operating the remote controls.

3. Remove pump cover and unbolt pump shield from QD channel
4. Position a container to collect the used oil underneath the fluid reservoir.
5. Loosen the fluid reservoir hose clamp and carefully slide the reservoir down to unseal it from the pump manifold and allow the fluid to drain out.
6. Remove the reservoir completely from the pump manifold block and wipe it out with a clean cloth to remove any contamination and clean it.

> ***CAUTION***: Remove the reservoir carefully to avoid damaging the suction tube and suction filter inside the reservoir cavity.

7. Remove the suction filter and clean it to remove any contamination.
8. After cleaning the suction filter and reservoir, if you suspect you might have a serious fluid contamination problem, contact Ebling Snowplows for additional instructions before completing the remaining fluid change steps.

9. Re-install the suction filter.
10. Re-install the fluid reservoir and tighten the hose clamp.
11. Fill the fluid reservoir with fresh hydraulic fluid to 1” below top of reservoir.

NOTE: Use of the following fluids is recommended:
Ebling supplied Blue Low-Temp Fluid

> ***CAUTION***: Do not mix different types of hydraulic fluid. Some fluids are not compatible and, if mixed, may cause equipment damage and/or performance problems.

12. Dispose of the used hydraulic fluid properly per local ordinance requirements.

12.7 Electrical System

1. The main power circuit is protected by a circuit breaker, typically mounted under hood. If you are installing your back blade, refer to the separate *Back Blade installation instructions* provided with your back blade.
2. The control circuit wiring harness is protected by an inline mini-blade type 15-amp fuse.

> ***CAUTION***: If an electrical problem occurs that requires fuse replacement, the replacement fuse must be the same type and amperage as the original fuse. Use of a fuse with a higher amperage rating could damage the system and may cause a fire.

3. Refer to the electrical diagrams at the back of this manual for the electrical system power, control harness, controller, and pump connection diagrams.

12.8 Back Blade Alignment

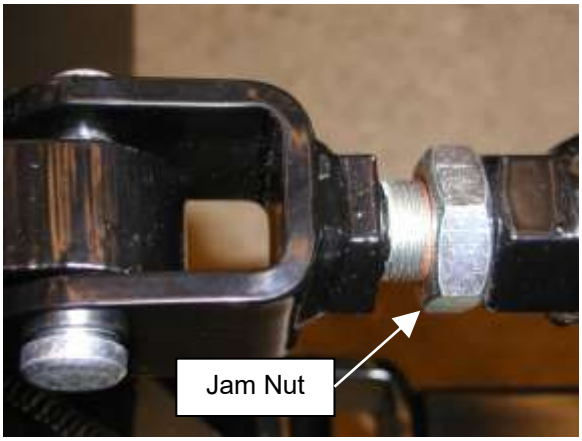
1. Front-To-Back Alignment – The upper linkage arm adjustment is preset at the factory to provide the proper amount of upward angle on the wing cutting edges that will offset the friction force that will work to align the blade once the cutting edges contact the pavement and the blade moves forward. Depending on the plowing application, site conditions, and operator plowing methods, over the life

   of the cutting edges the upper arms may need to be adjusted periodically to provide more even wear of the wing cutting edges. If you observe the front surfaces of the

wing cutting edges to be “rounding off” or wearing more rapidly than the rest of the cutting edge, then the upper arms need to be adjusted to compensate for the uneven wear. To adjust the upper arms:

- With the blade in the fully raised position, observe the angle of the wing cutting edge bottom surfaces to determine the approximate amount and direction of correction needed.
- Lower the blade to the ground using the remote RAISE/LOWER switch.
- Loosen the jam nuts on the two upper linkage arms (see Figure 13).

Figure 13
Upper Linkage Arm Jam Nut & Adjustable Clevis



- For each upper arm, remove the clevis pin attaching the clevis to the QD frame, then turn the clevis end ½ turn in the direction of correction – see note below. (A full turn goes a long way, but may be needed in some cases.)

NOTE: If the wing cutting edge leading corners are too *low*, turn the adjustable clevis *out* to make the upper linkage arm *longer*. If the wing cutting edge leading corners are too *high*, turn the adjustable clevis *in* to make the upper linkage arm *shorter*.

- Replace the clevis pin and re-insert the cotter pin.
- Repeat the adjustment for the other upper linkage arm.
- Raise and lower the back blade a few times, re-check the level, and re-adjust, if necessary, until the desired alignment is achieved.
- Tighten the jam nut on both upper linkage arms.

2. Side-To-Side Alignment – The moldboard cutting edge should be roughly parallel to the rear of the truck in order to obtain the most even cutting edge wear. If the

back blade is observed to be out of alignment with the truck, most of the time this can be corrected by making the adjustment below:

- With the blade in the fully raised position, determine the approximate amount and direction of correction needed.
- Loosen the four spring stabilizer bar mounting bolts (see Figure 14).

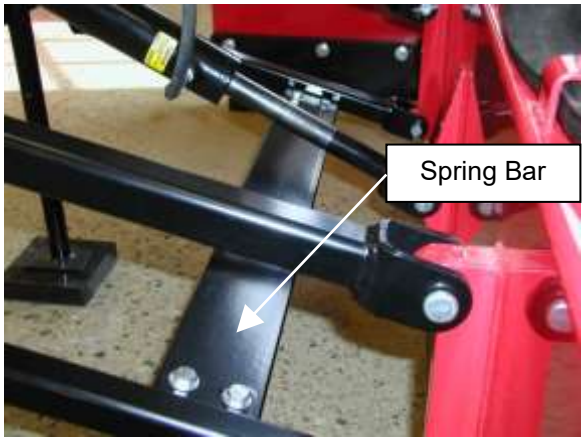


Figure 14
Spring Bar Location

- Press down on the side of the back blade that is too high until the back blade is “pre-loaded” past level the other way to allow for some spring-back.
- While holding the back blade in this position, re-tighten the spring bar mounting bolts (an assistant may be required to help with this).
- Release the “pre-load” to let the spring bar stabilize the blade in the new position, and then check the alignment again.
- Re-adjust if necessary with more or less “pre-load” for the degree of correction needed, and then re-check alignment.

NOTE: If proper side-to-side alignment cannot be achieved after attempting this adjustment, please contact Ebling Snowplows for servicing or replacement instructions.

3. Adjustment can also be made to the wing cylinders. With wings fully closed check if the wing is 90 degrees to the moldboard. If not, open the wing slightly and remove the clevis pin on the moldboard side of the cylinder. Loosen the jam nut and turn the threaded end of the cylinder counterclockwise to make the wing close more or clockwise to make the wing close less. Make adjustments in half turn increments until a true 90 is achieved when wing is fully closed. At 90 the rubber bumper will compress slightly. Open wing slightly and make sure cylinder hoses are straight up, replace clevis pin and cotter pin. Tighten cylinder jam nut. Check periodically to make sure wings stay in their 90 degree position.

13. SPARE PARTS & EMERGENCY PREPARATION

1. In addition to a kit containing the most common emergency items (flashlight, first aid kit, fire extinguisher, hand tools, etc.), it is recommended that you carry the following spare parts in case of breakdown while plowing with your back blade:
    - Shear bolt kit – one spare shear bolt kit (2 bolts with washers and hex nuts) are included with the back blade
    - 15-amp fuses, mini-blade type
    - Hydraulic fluid
    - Hydraulic hoses
2. The spare parts listed above are available from Ebling Snowplows or your local dealer.
3. Other spare/replacement parts may be deemed necessary based on your past experience or your particular plowing application. Make sure you are as prepared as possible before you get caught out in the middle of a snowstorm!

14. BACK BLADE SERVICE

1. If you have followed all of the guidelines and instructions in this manual and still cannot correct problems with the operation of your back blade, contact Ebling Snowplows or your local dealer for troubleshooting and repair information.
2. If service becomes necessary, it is recommended that you have your back blade serviced at Ebling Snowplows or your local dealer. Failure to use an authorized service center could affect the warranty coverage on your back blade.

15. WARRANTY

Ebling Snowplows offers a limited warranty for all snowplows and accessories. Refer to the warranty document provided with your back blade for warranty information.

16. BACK BLADE SPECIFICATIONS

TECHNICAL SPECIFICATION - 12', 14' & 16' HYDRAULIC WING BACK BLADES			
MODEL NUMBER	**HW21X90X12**	**HW21X90X14**	**HW21X90X16**
Vehicle Application Guideline	3/4 -Ton, 1-Ton 4X4 Pickups		
Blade Height	21"		
Blade Width (Wings Full Closed)	95-3/4"		
Blade Width (Wings Full Open)	12'	14'	16'
Plow Weight*	715 lbs.	775 lbs.	825 lbs.
Plow Finish	Powdercoat		
Moldboard Cutting Edge (Std.)	1/2" X 6" Steel		
Wing Cutting Edges (Std.)	1-1/2" X 6 Poly		
Shear Bolt (A307A / Grade 2)	7/16" X 3-1/2"	7/16" X 3-1/2"	1/2" X 4"
Linkage Arm Clevis Pins	3/4" X 2-3/4"		
Lift Cylinder Bore Diameter	2.25"		
Lift Cylinder Stroke	8.5"		
Lift Cylinder Clevis Pin	3/4" X 3-1/2"		
Wing Cylinder Bore Diameter	2.25"		
Wing Cylinder Stroke	6.0"		
Wing Cylinder Clevis Pin	3/4" X 3-1/2"		
Hydraulic Unit Motor	12 VDC		
Hydraulic Pump Displacement	0.125 cu.in./rev		
Hydraulic System Relief Pressure	2,300 psi		
Pump Delivery (at 2,300 psi)	1.2 gpm		
Hydraulic Reservoir Capacity	1 quart		
Total System Fluid Capacity	2.5 quarts		

* Estimated weight, does not include truck mount

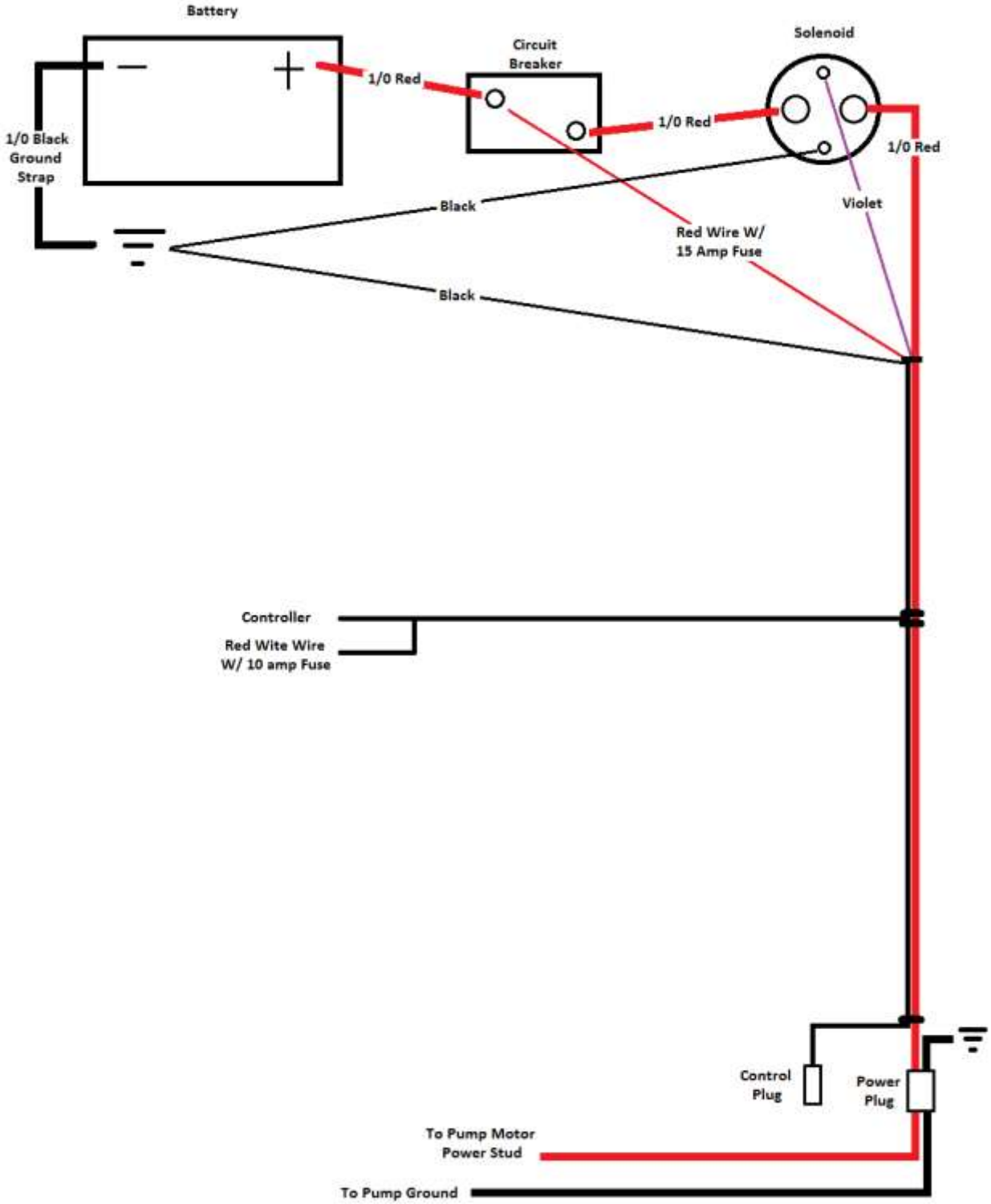
TECHNICAL SPECIFICATIONS - FIXED WING MODELS			
MODEL NUMBER	**FW21X90**	**FW21X96**	
Vehicle Application Guideline	3/4-Ton, 1-Ton 4X4 Pickups		
Blade Height	21"	21"	
Blade Width	90"	96"	
Wing Length (from rear of plow)	24"	24"	
Plow Weight *	590 lbs.	610 lbs.	
Plow Finish	Powdercoat	Powdercoat	
Moldboard Cutting Edge (Std.)	½" x 6" Steel	½" x 6" Steel	
Wing Cutting Edges (Std.)	1½" x 6" Poly	1½" x 6" Poly	
Linkage Arm Clevis Pins	3/4 dia x 2-3/4"	3/4 dia x 2-3/4"	
Lift Cylinder Bore Diameter	2.25"	2.25"	
Lift Cylinder Stroke	8.5"	8.5"	
Lift Cylinder Clevis Pin	3/4 dia x 3-1/2"	3/4 dia x 3-1/2"	
Hydraulic Unit Motor	12 VDC	12 VDC	
Hydraulic Pump Displacement	0.125 cu.in./rev	0.125 cu.in./rev	
Hydraulic System Relief Pressure	2,300 psi	2,300 psi	
Pump Delivery (at 2,300 psi)	1.2 gpm	1.2 gpm	
Hydraulic Reservoir Capacity	1 quart	1 quart	
Total System Fluid Capacity	1.5 quarts	1.5 quarts	

* Estimated weight, does not include truck mount

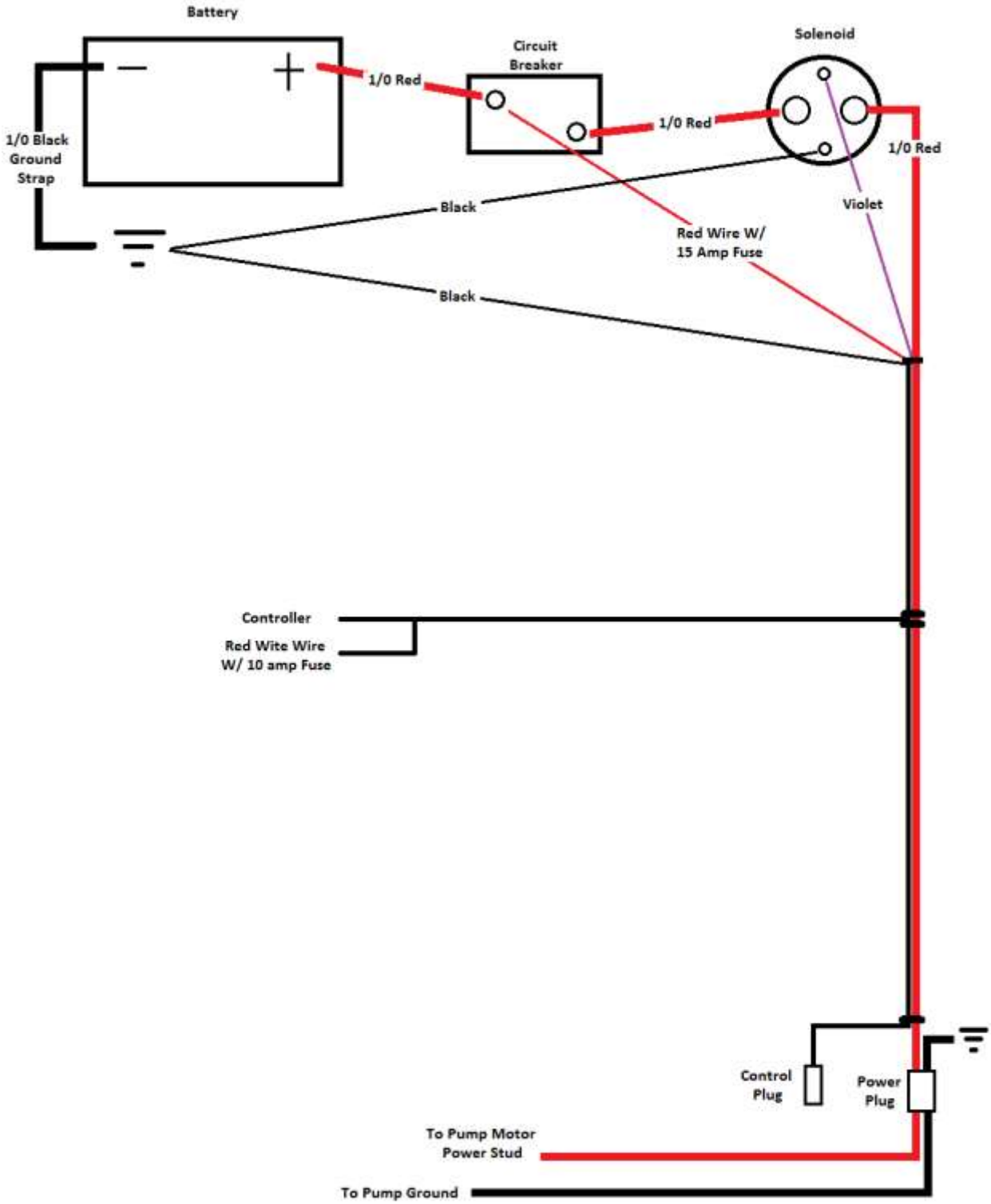
17. SCHEMATICS

For your reference, the following pages contain the hydraulic plumbing and electrical wiring connection diagrams for your back blade.

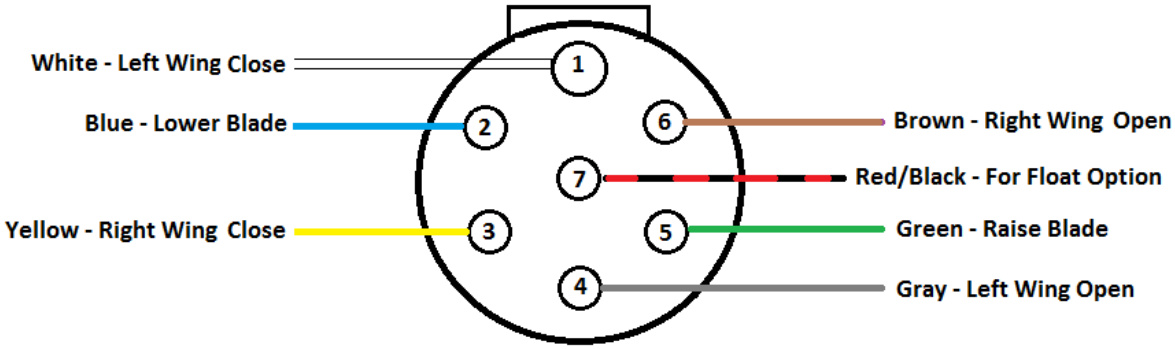
17.1 Truck Side Power Connections – Hydraulic Wings



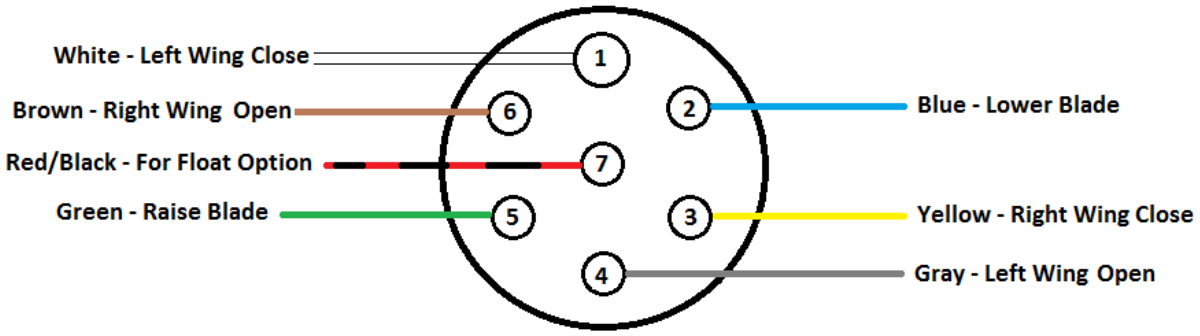
17.2 Truck Side Power Connections – Fixed Wings



17.3 Truck & Plow Side Control Plug Connections



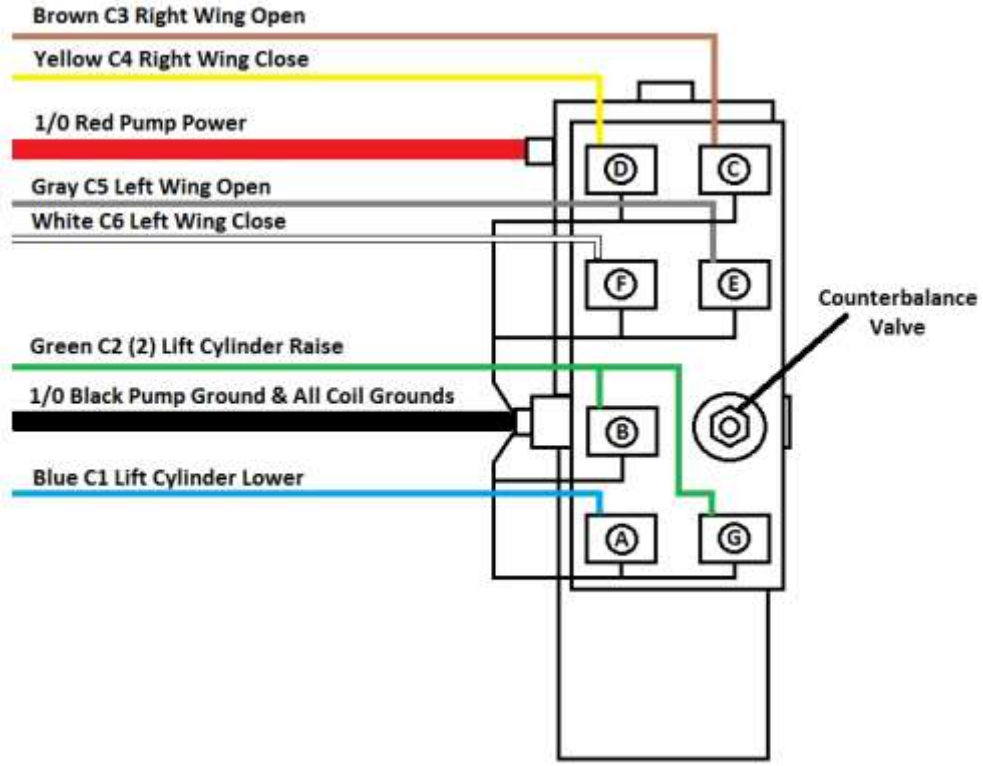
View Is REAR Of Truckside
7-Way Control Plug

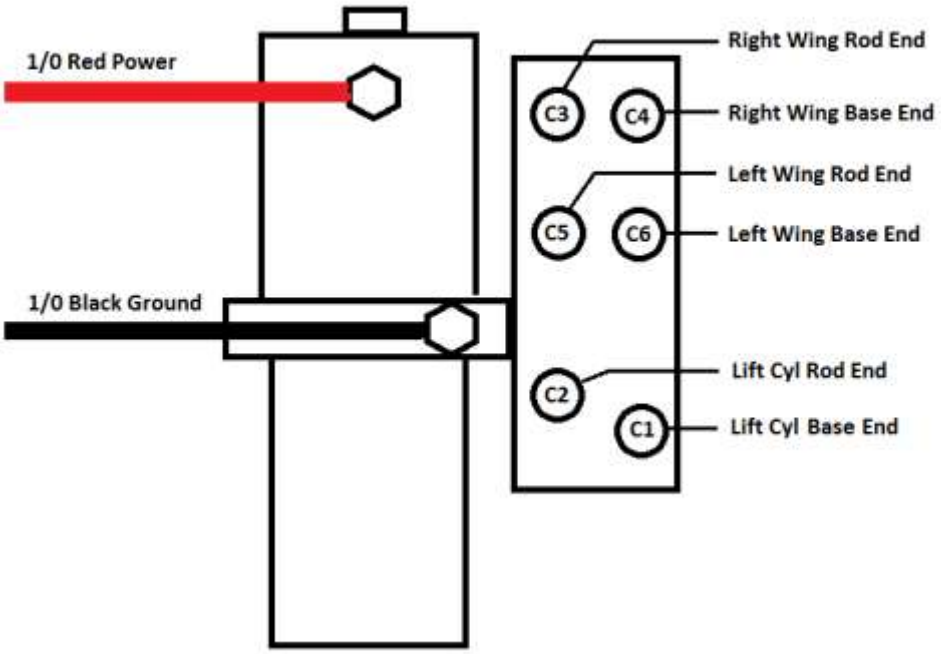


View Is REAR Of Plow Side
7-Way Control Plug

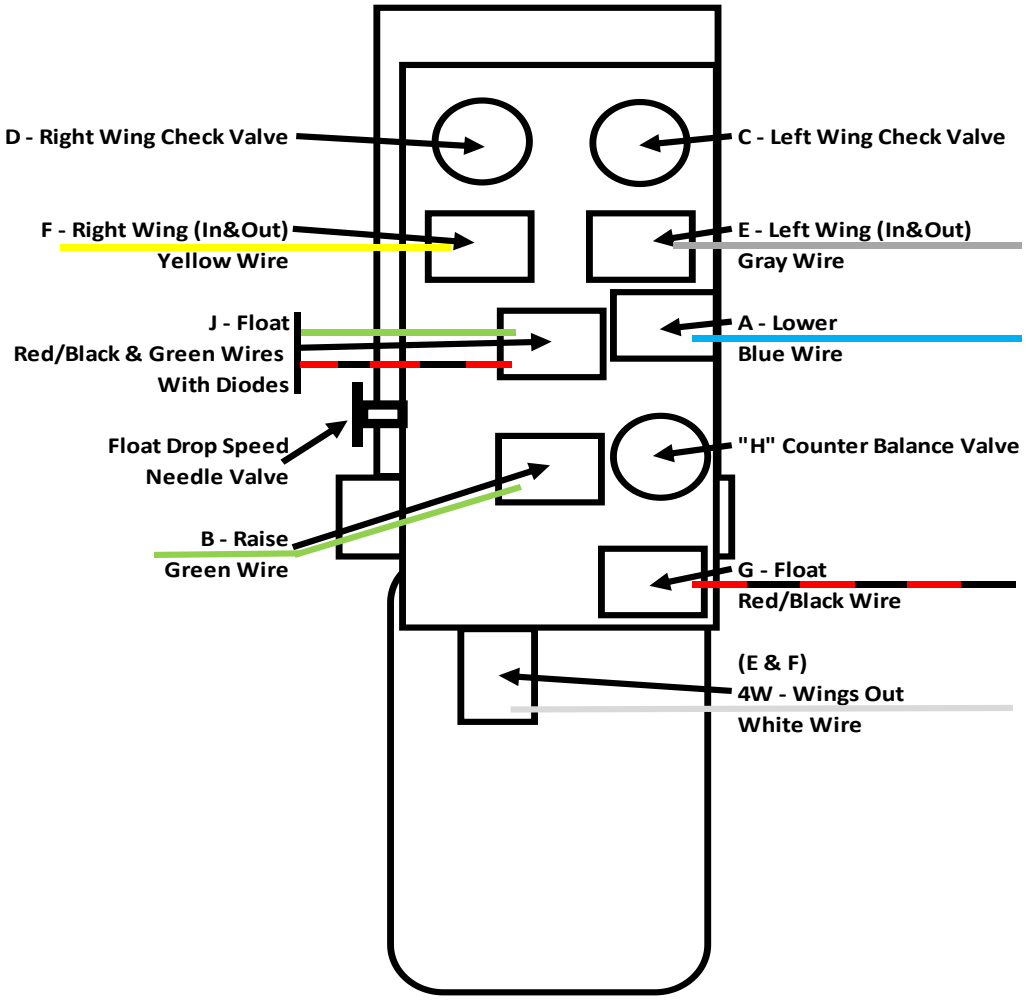
17.4 Pump Hydraulic & Electrical Connections

Gen 1-AA02-0007 Standard Hyd Wing Pump Connections

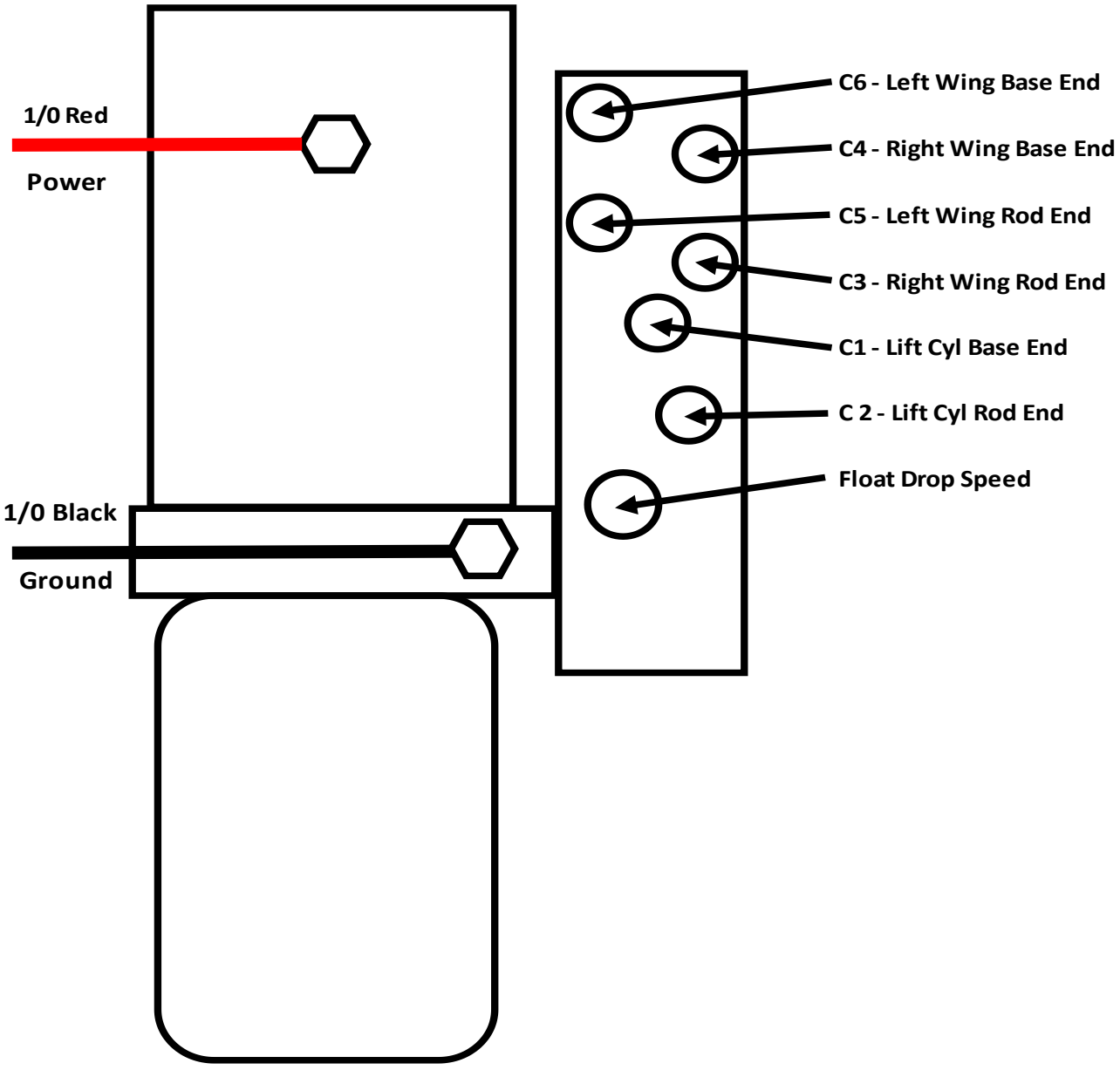




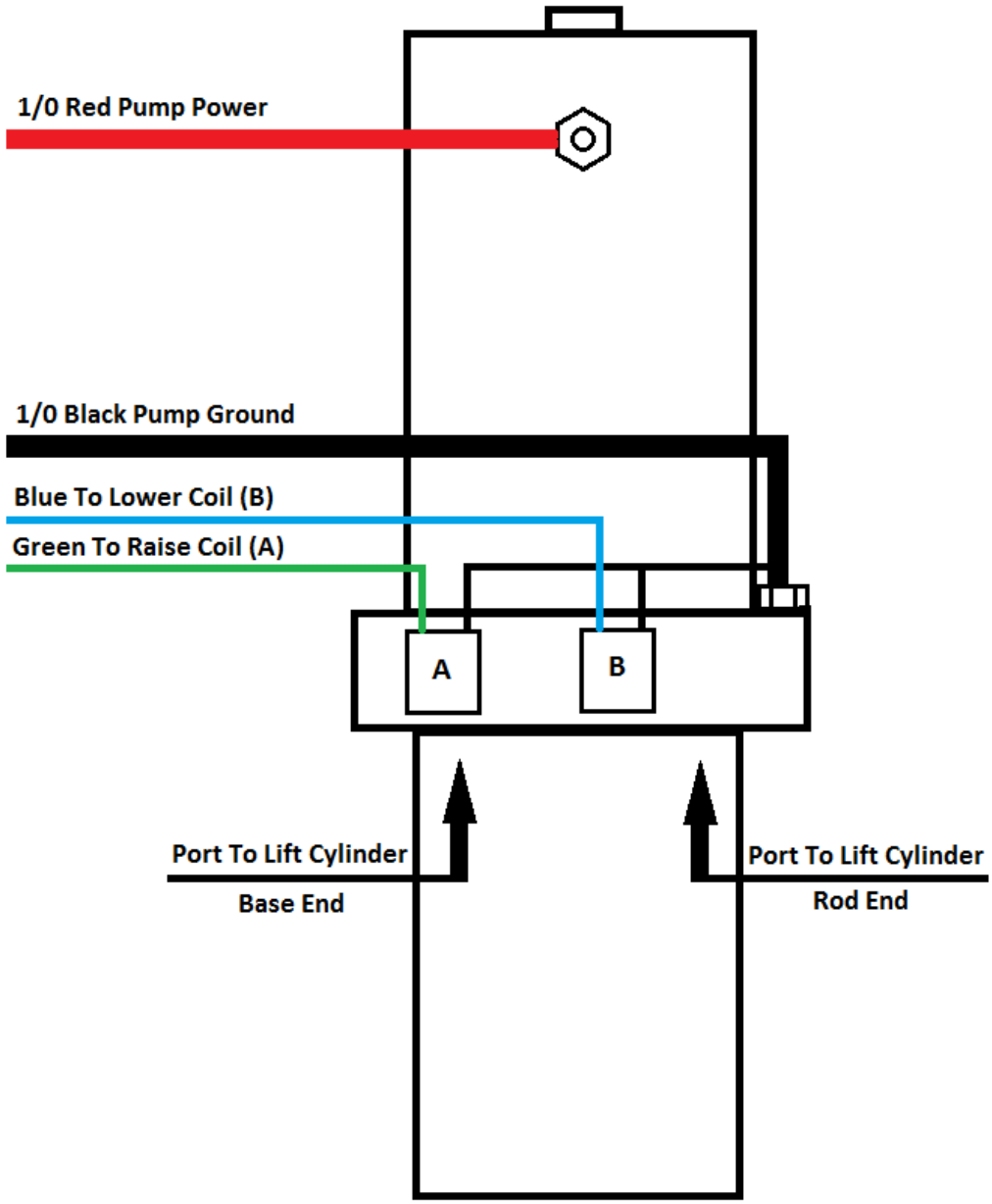
Gen 2-AA02-0007-F Hyd Wing Float Pump Connections



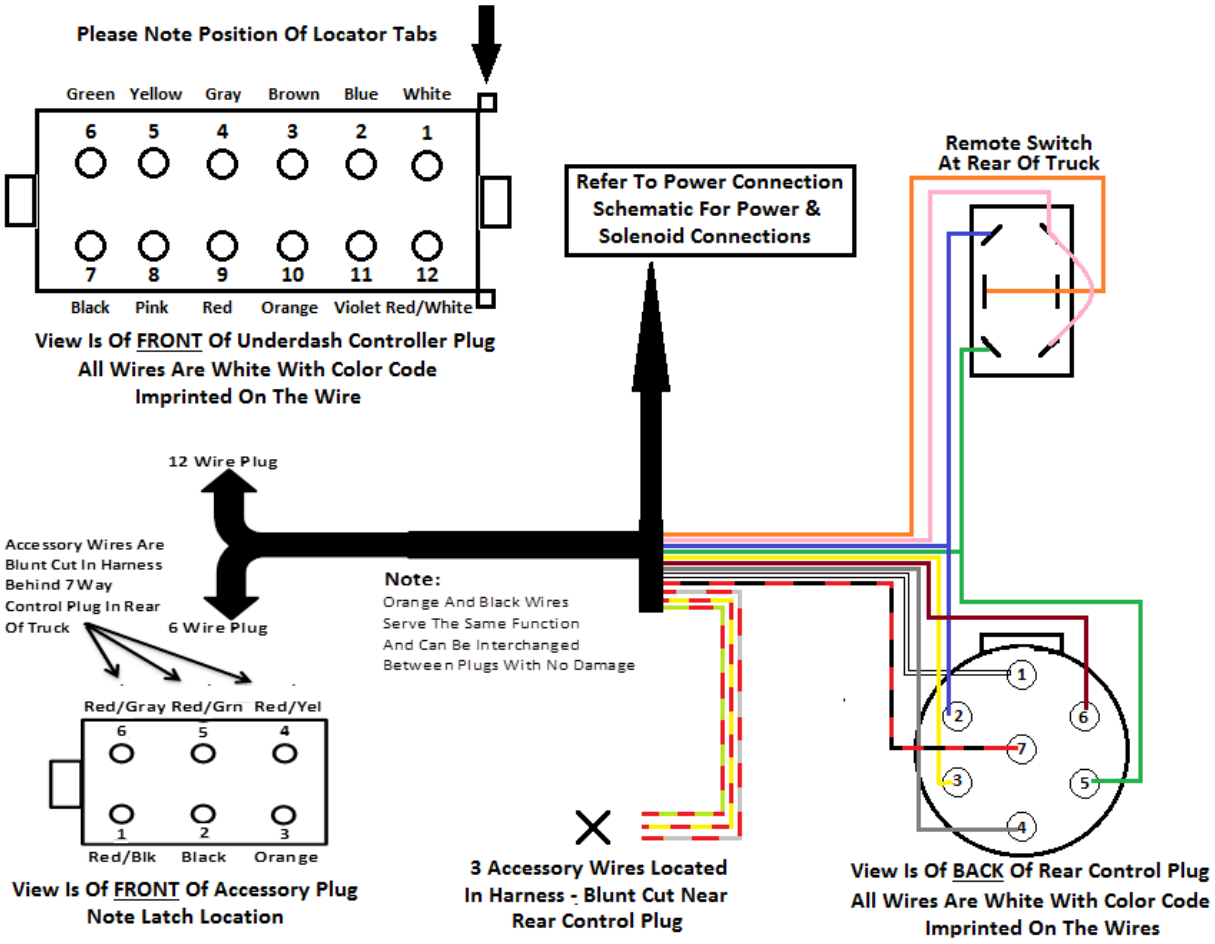
Gen 2-AA02-0007-F Hyd Wing Float Pump Connections



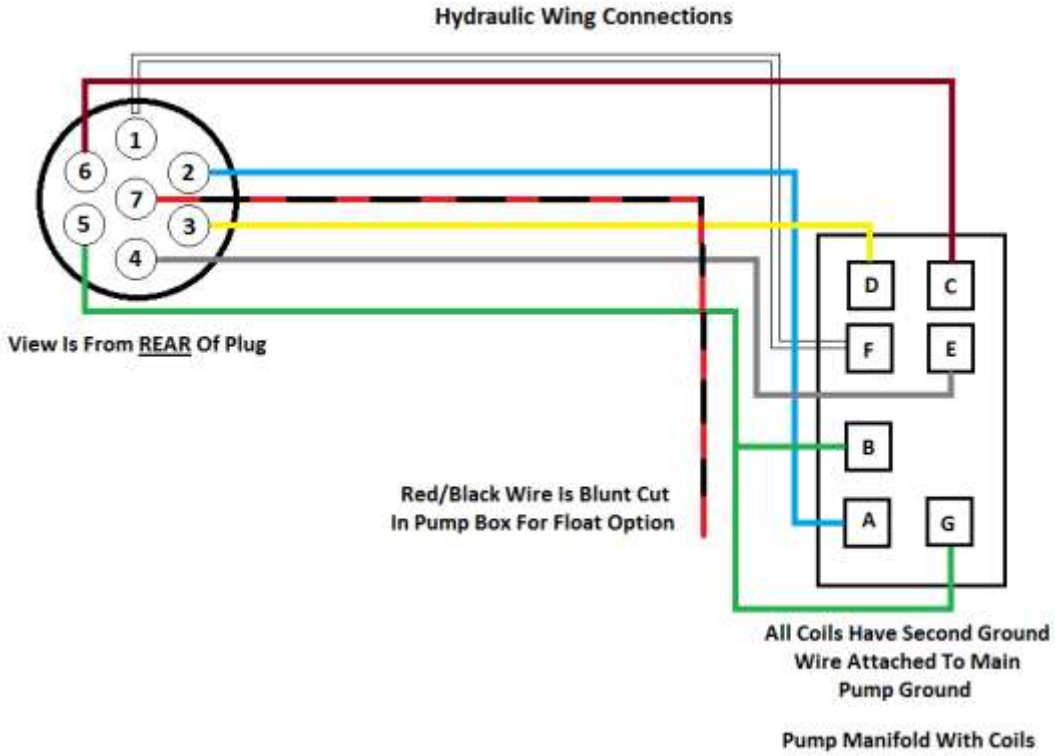
17.5 Pump Hydraulic & Electrical Connections – Fixed Wings

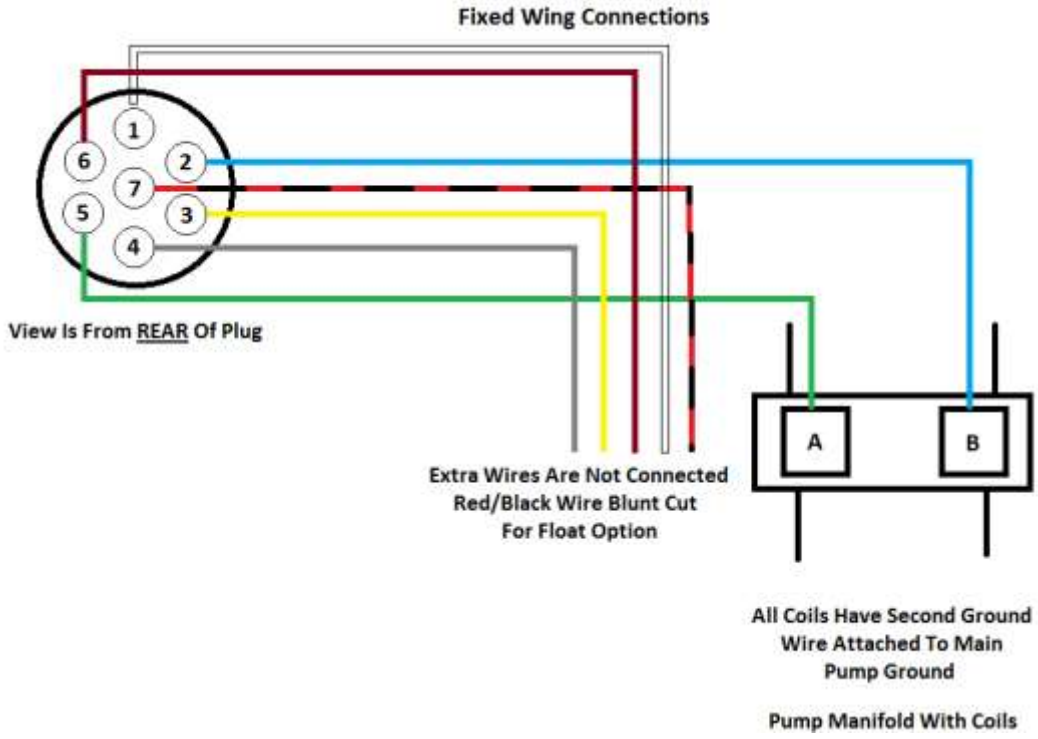


17.6 Truck Side Control Harness

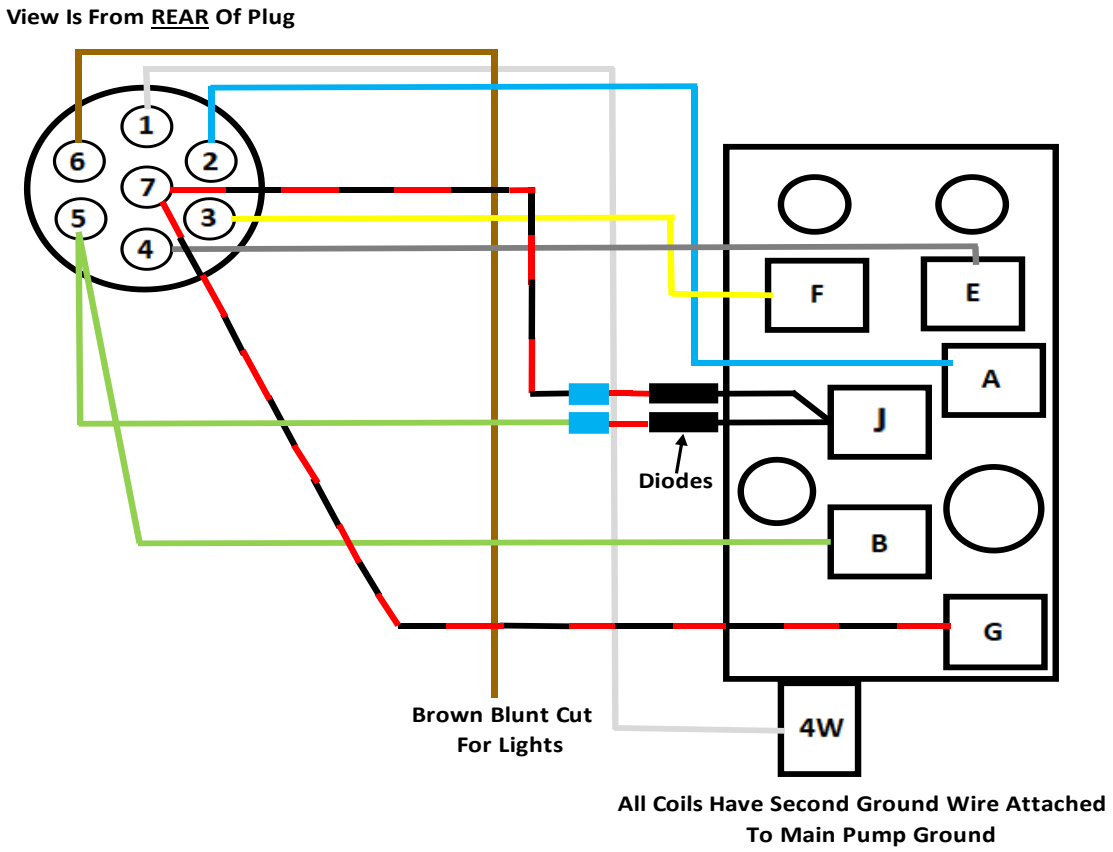


17.7 Pump Side Wiring Harness



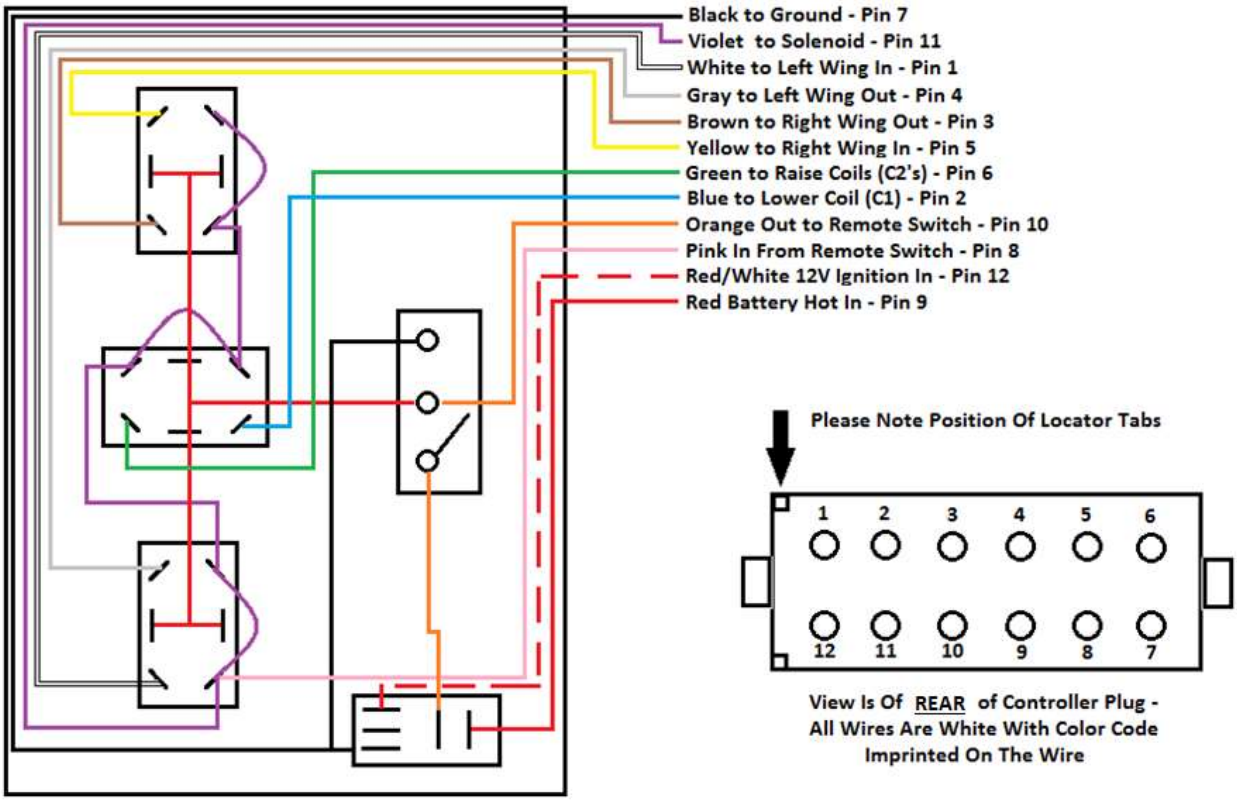


Gen 2-AA02-0007-F Hyd Pump Side Harness Connections

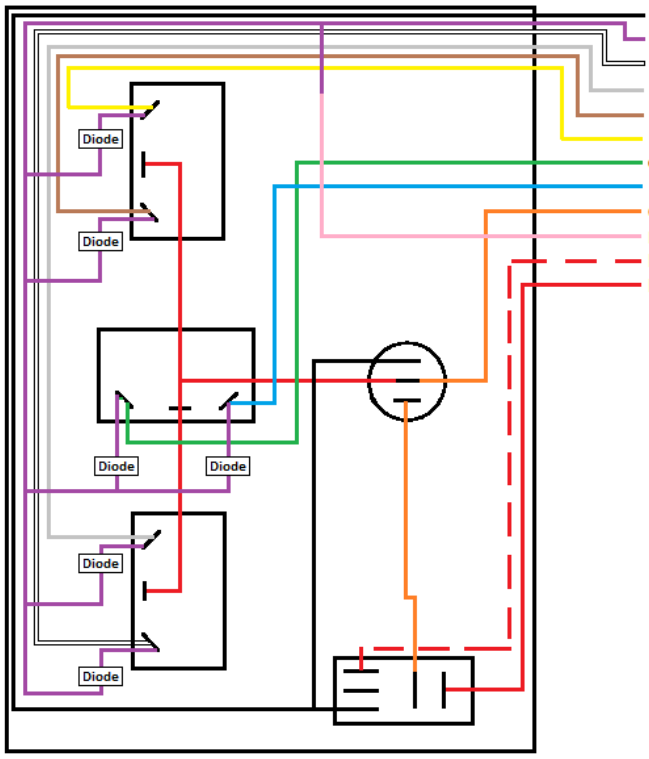


17.8 Hydraulic Wing Controllers

Controller Switch Wiring – Hydraulic Wing – 2 Pole Toggle Switches



Controller Switch Wiring – Hydraulic Wing – 1 Pole Toggle Switches

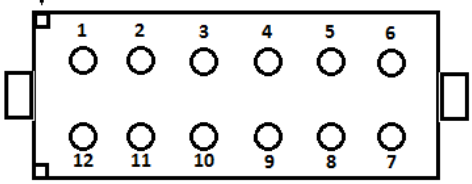


View Is Of Back Side Of Switches

Black to Ground - Pin 7
Violet to Solenoid - Pin 11
White to Left Wing In - Pin 1
Gray to Left Wing Out - Pin 4
Brown to Right Wing Out - Pin 3
Yellow to Right Wing In - Pin 5
Green to Raise Coils (C2's) - Pin 6
Blue to Lower Coil (C1) - Pin 2
Orange Out to Remote Switch - Pin 10
Pink In From Remote Switch - Pin 8
Red/White 12V Ignition In - Pin 12
Red Battery Hot In - Pin 9

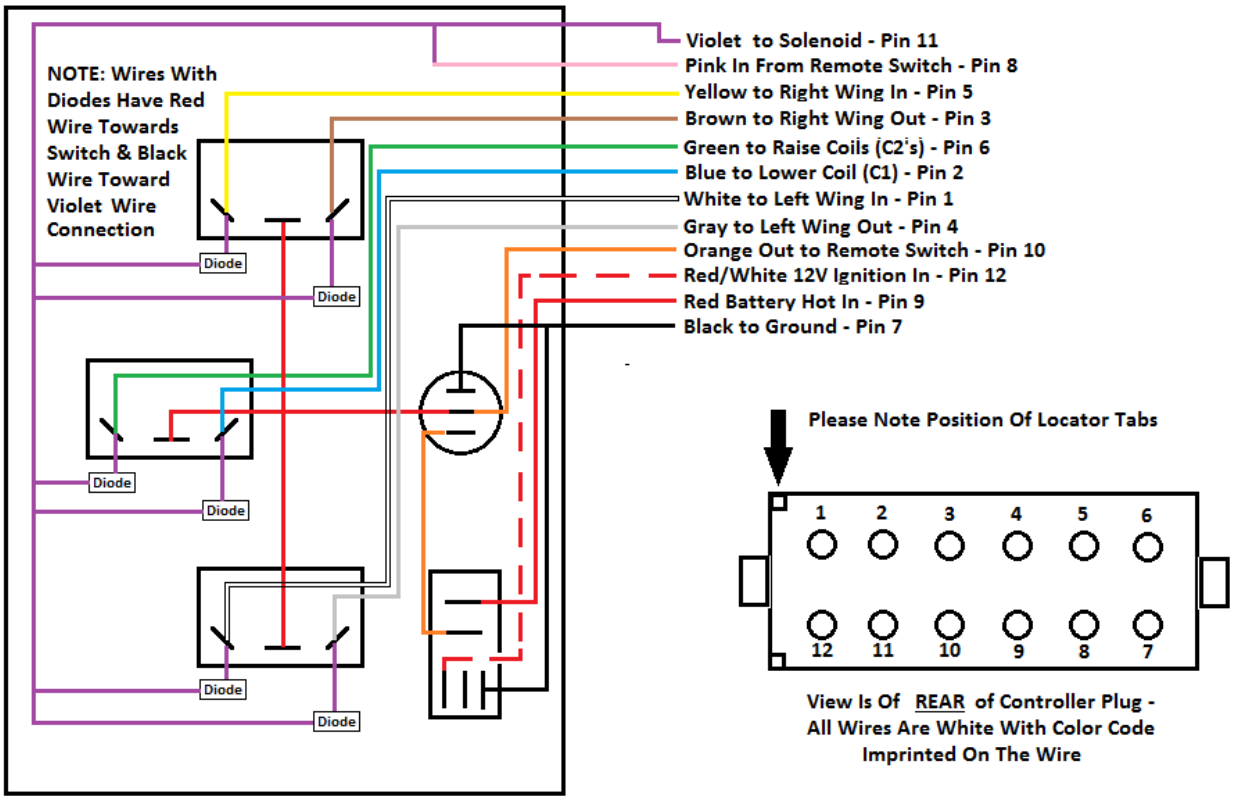
NOTE: Wires With Diodes Have Red Wire Toward Switch & Black Wire Toward Violet Connection

Please Note Position Of Locator Tabs



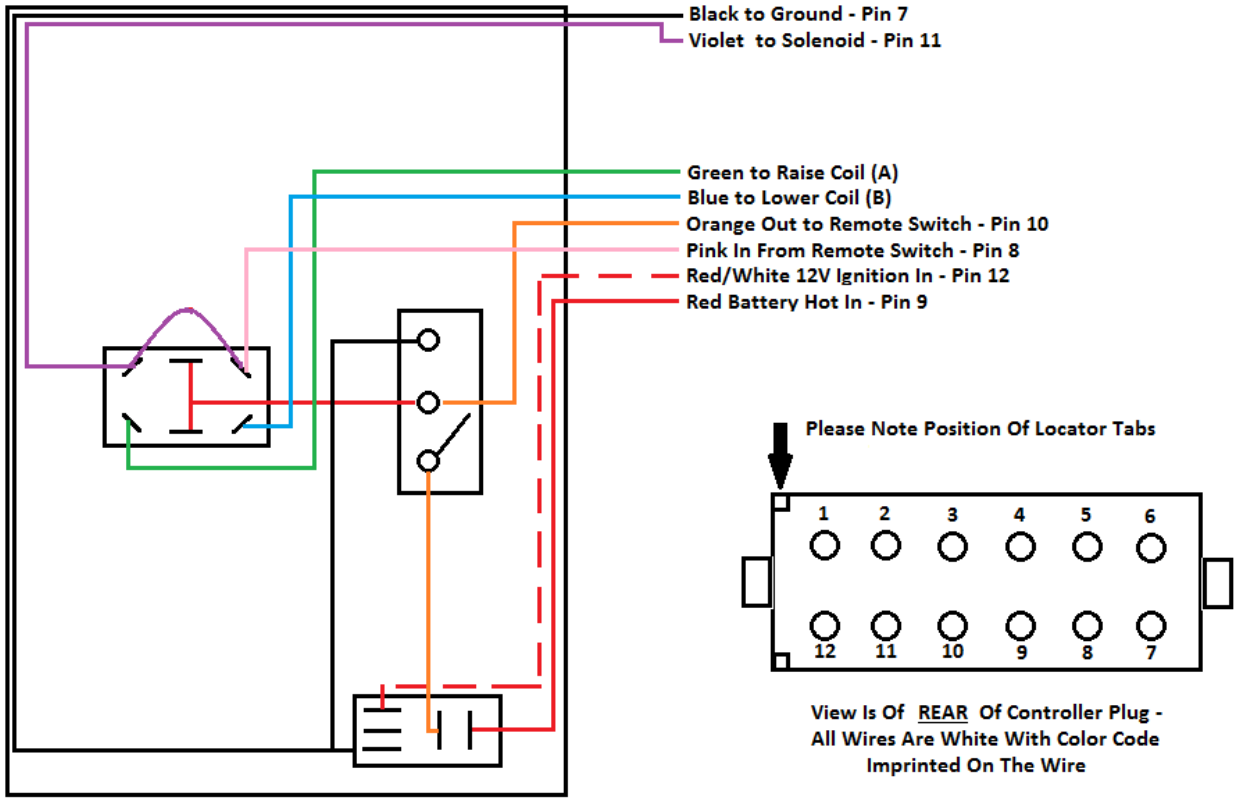
View Is Of REAR of Controller Plug - All Wires Are White With Color Code Imprinted On The Wire

Controller Switch Wiring – Hydraulic Wing – 1 Pole Rocker Switches

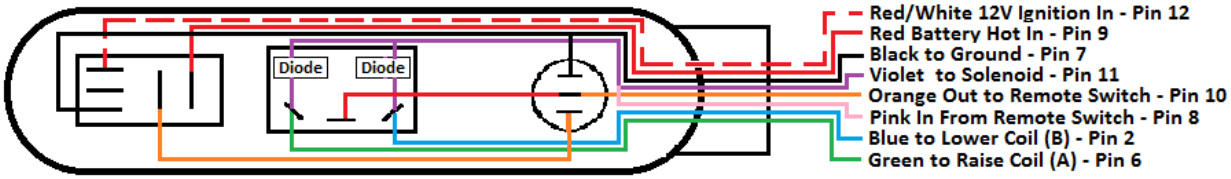


17.9 Fixed Wing Controllers

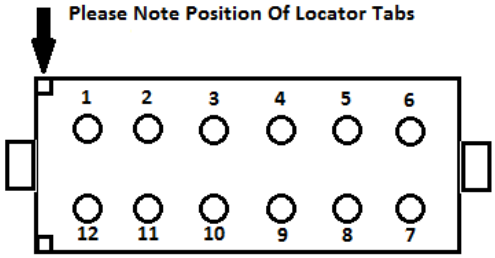
Controller Switch Wiring – Fixed Wing – 2 Pole Toggle Switch



Controller Switch Wiring – Fixed Wing – 1 Pole Rocker Switch

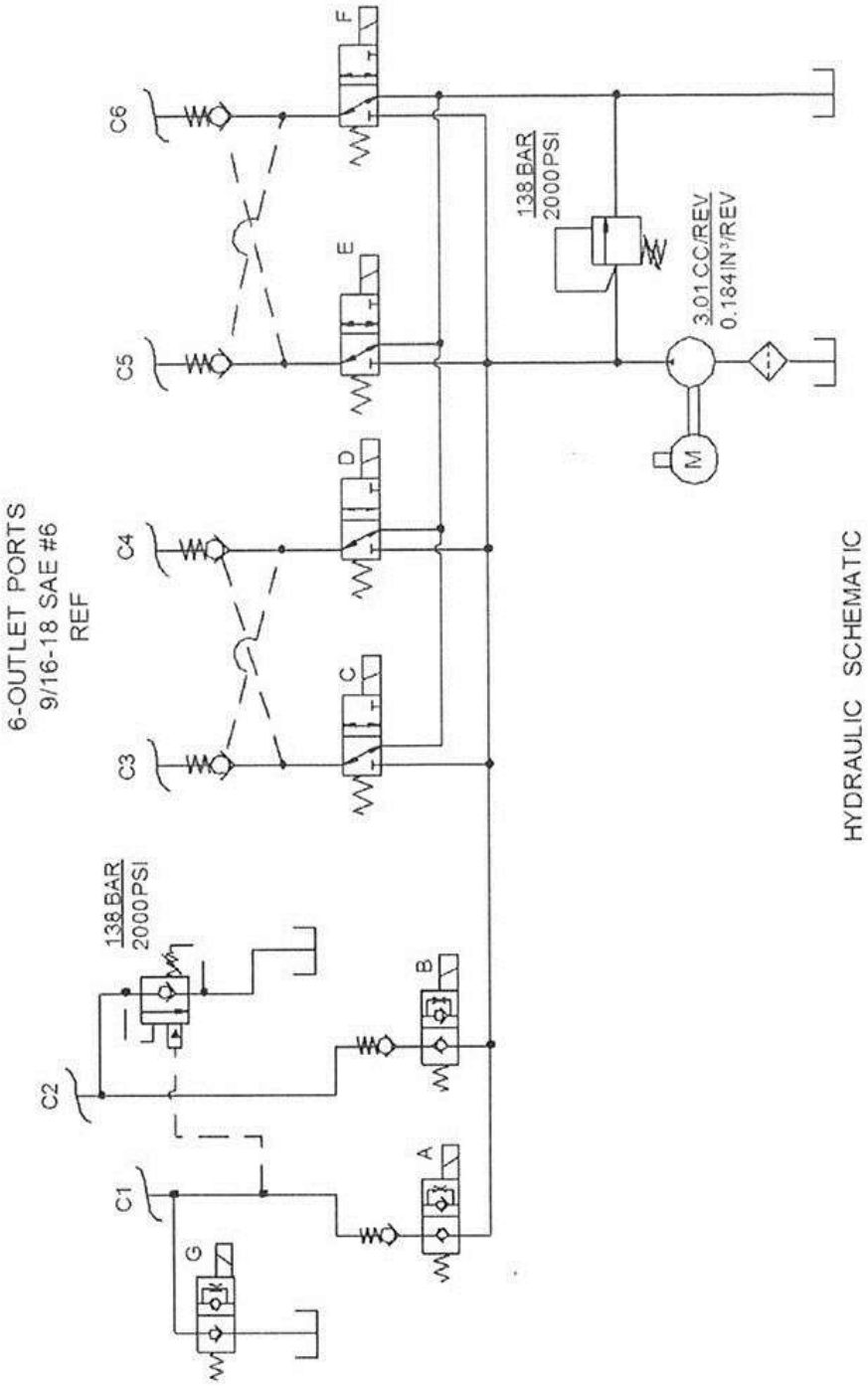


NOTE: Wires With Diodes Have Red Wire Toward Switch & Black Wire Toward Violet Connection

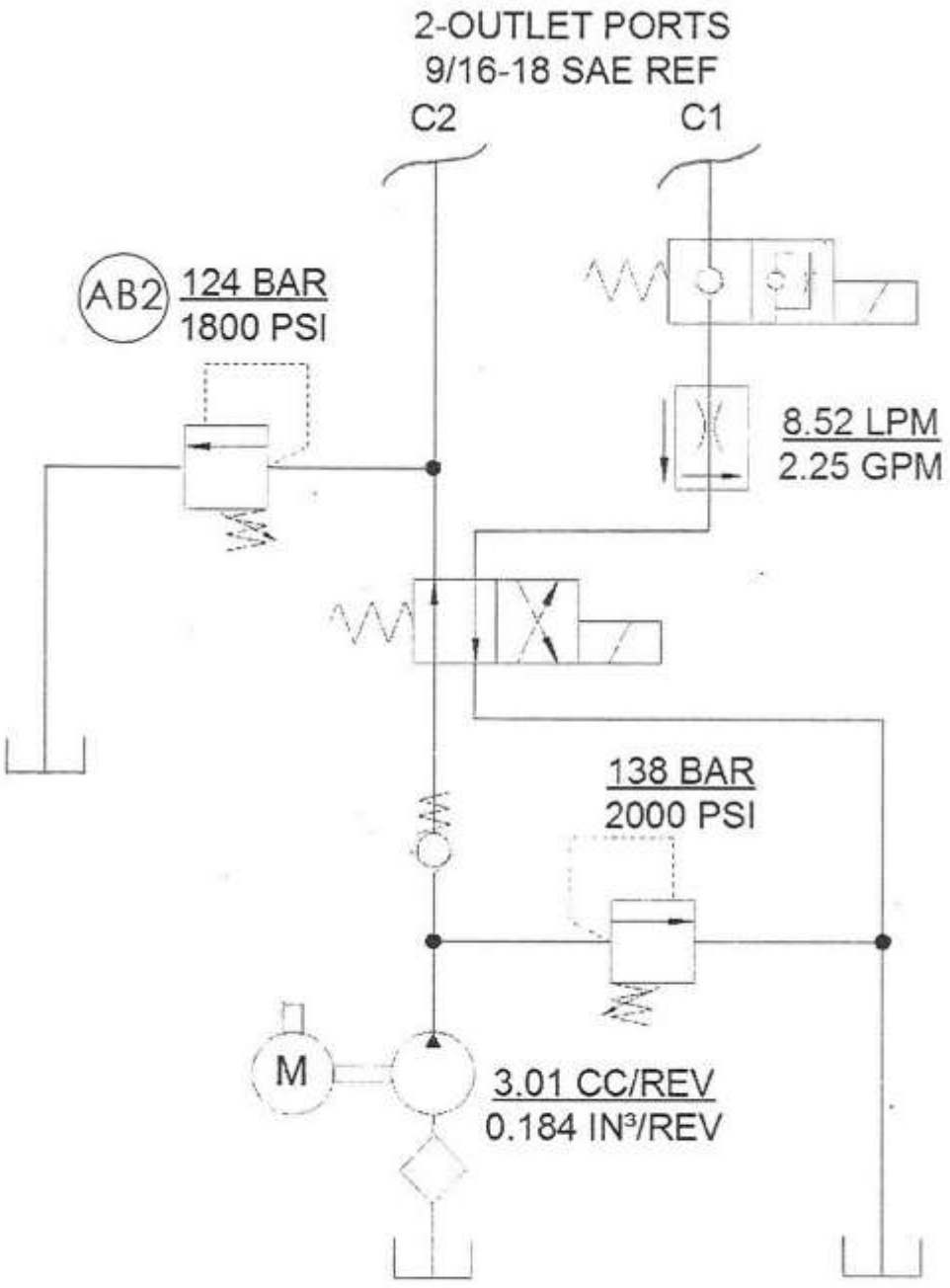


View Is Of REAR Of Controller Plug - All Wires Are White With Color Code Imprinted On The Wire

17.10 Hydraulic Schematic – Hydraulic Wings



17.11 Hydraulic Schematic – Fixed Wings

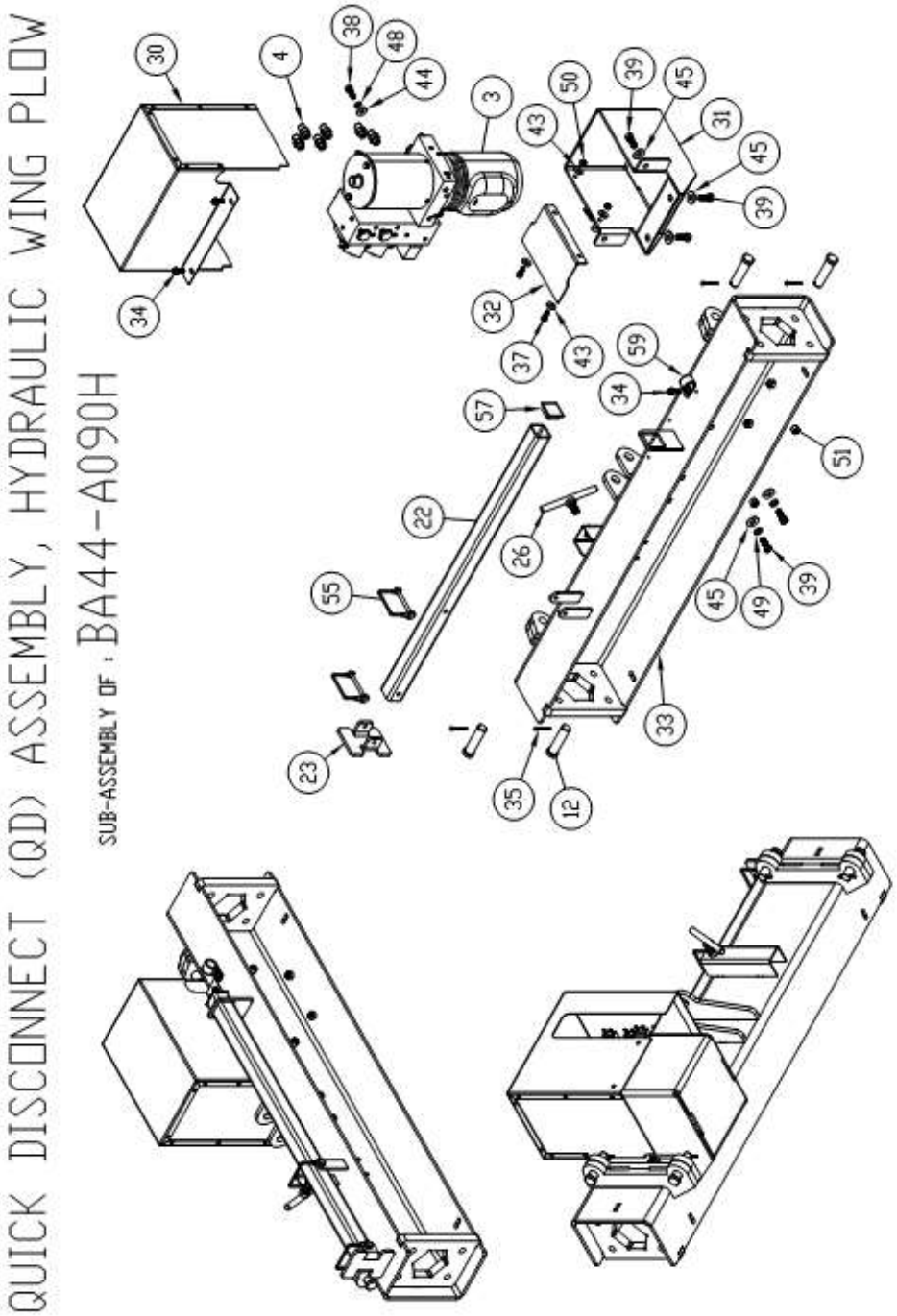


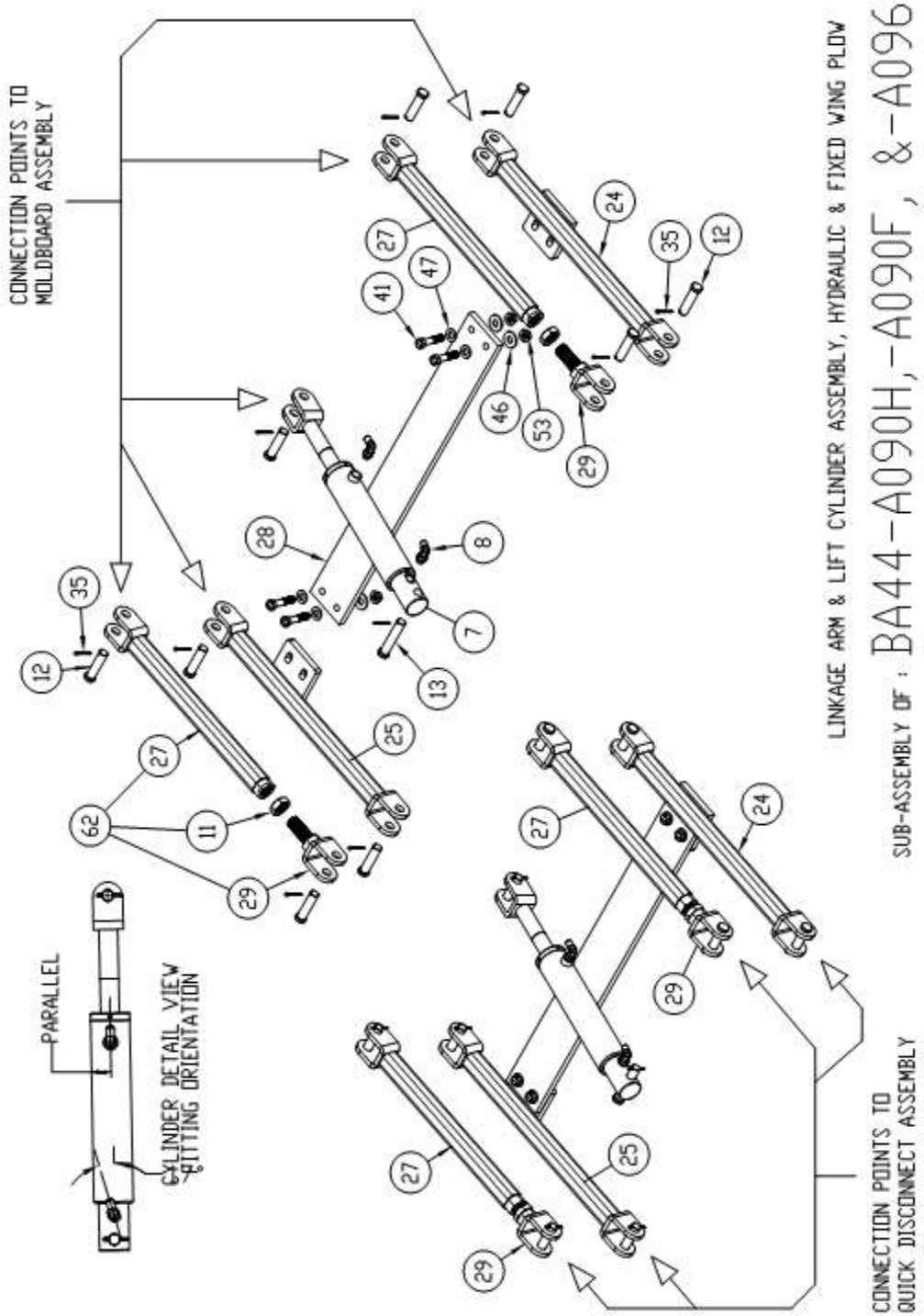
SCHEMATIC

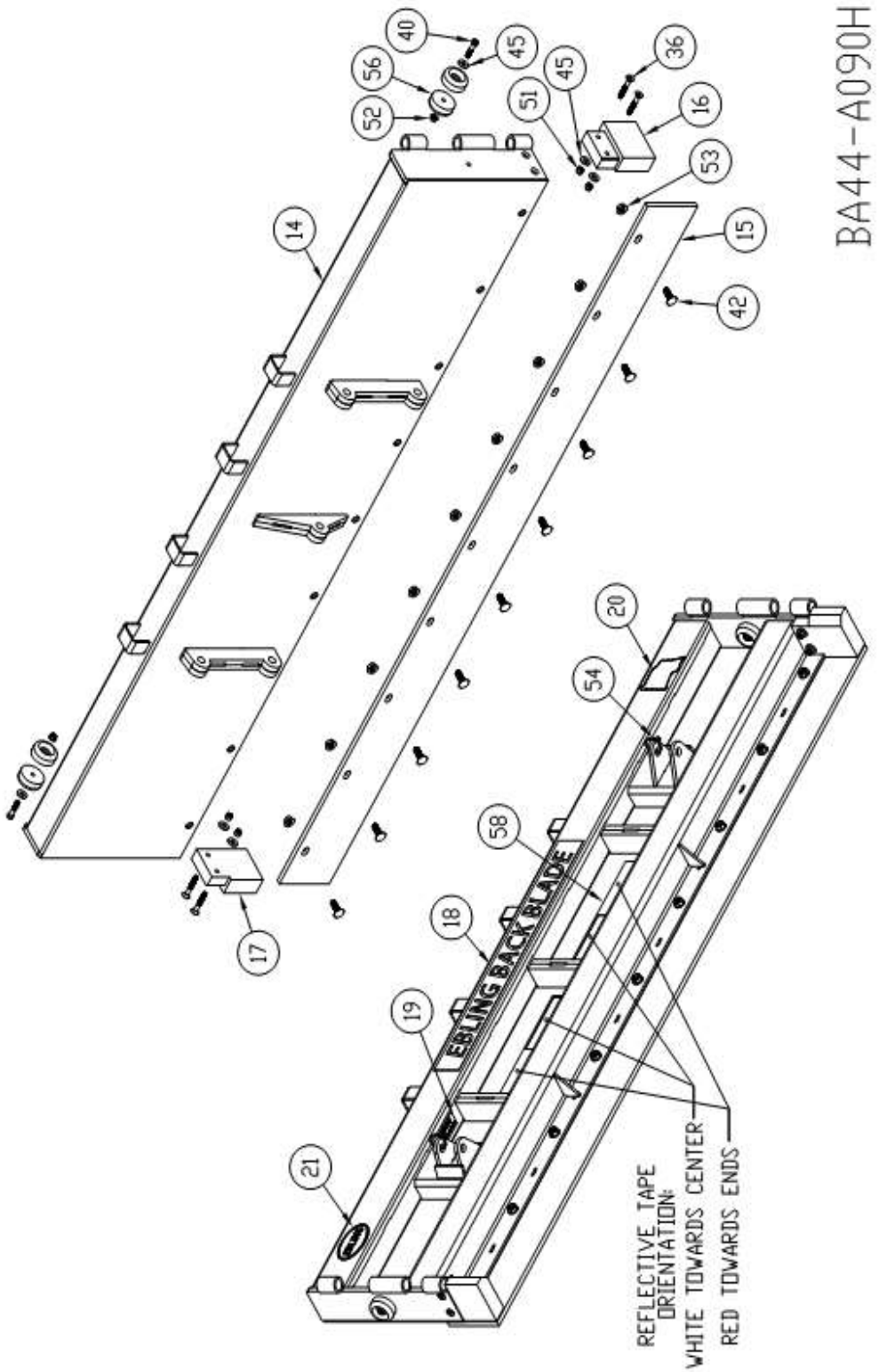
18. Exploded Views & Part Numbers

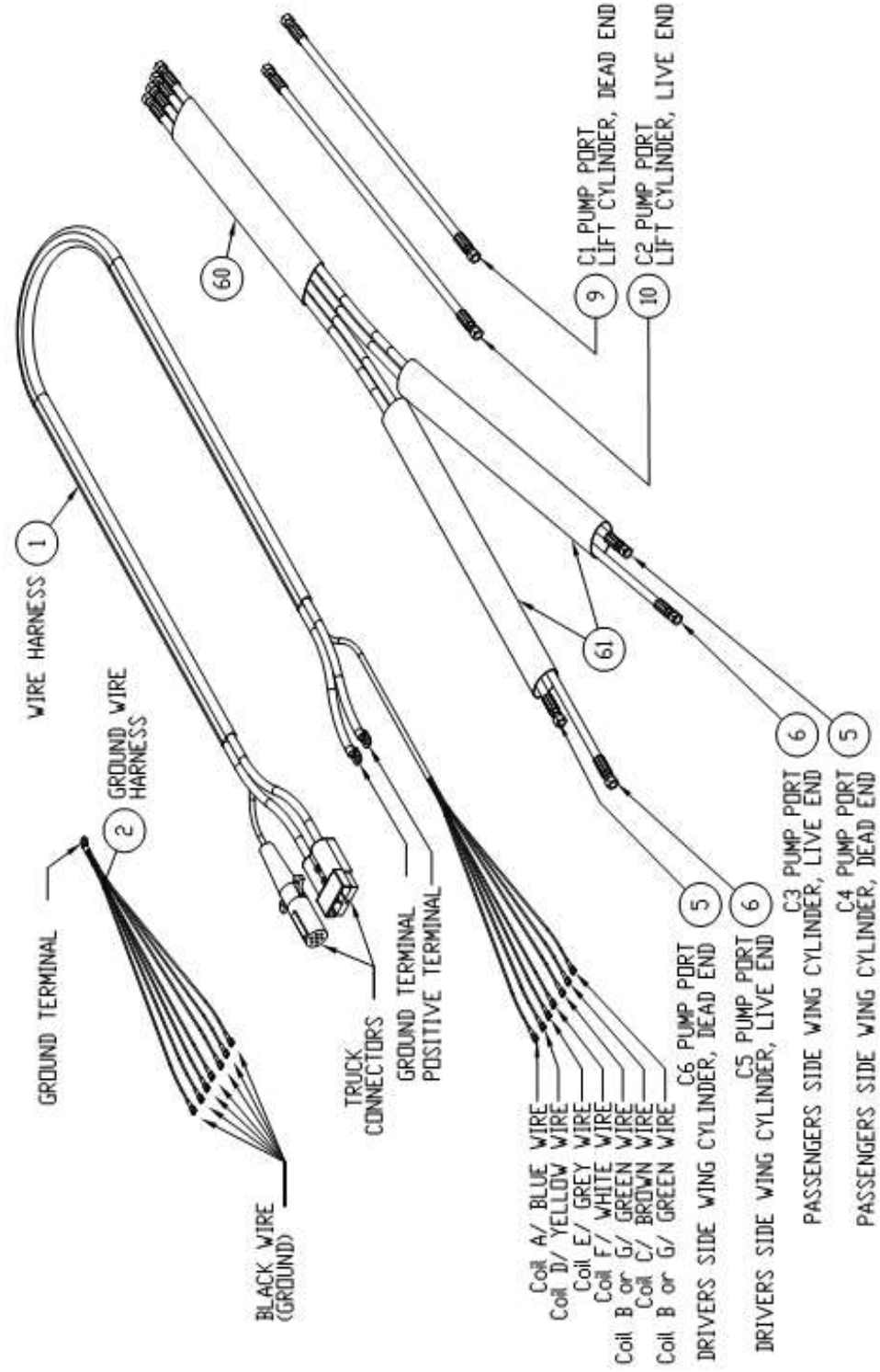
These exploded views are for parts ID only. Part numbers can change, Not all individual electrical parts are shown. Call for details

18.1 Hydraulic Wing Back Blade – BA44-090H




CONNECTION POINTS TO
MOLDBOARD ASSEMBLY
LINKAGE ARM & LIFT CYLINDER ASSEMBLY, HYDRAULIC & FIXED WING PLOW
SUB-ASSEMBLY OF : BA44-A090H,-A090F, &-A096F
CONNECTION POINTS TO
QUICK DISCONNECT ASSEMBLY
CYLINDER DETAIL VIEW
FITTING ORIENTATION
PARALLEL


BA44-A090H
40
45
56
52
51
45
36
16
53
15
42
14
20
54
58
18
19
21
17
EBLING BACK BLADE
REFLECTIVE TAPE
ORIENTATION:
WHITE TOWARDS CENTER
RED TOWARDS ENDS

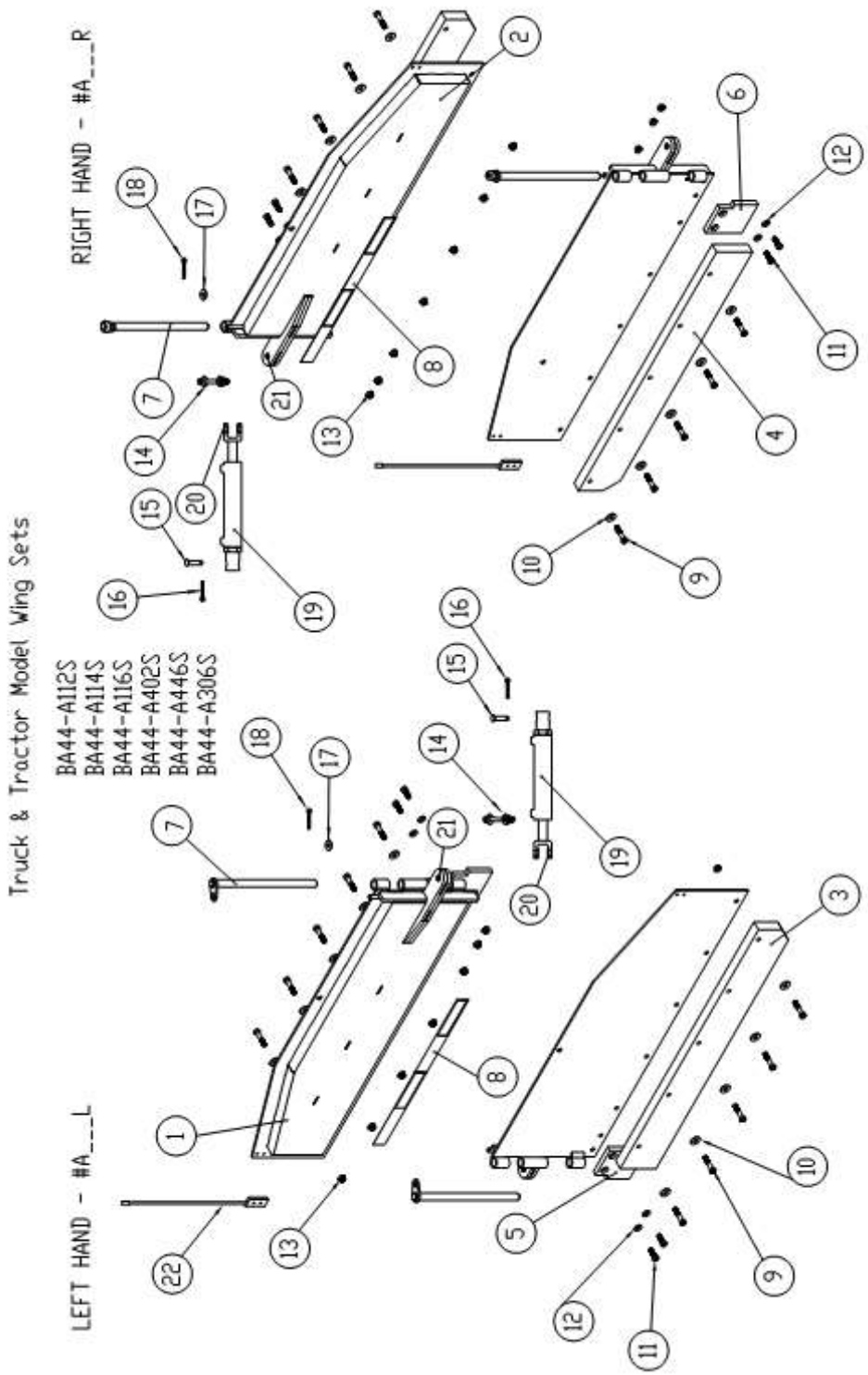


PLOW SIDE WIRING KIT (#AA01-0006) & HOSE ASSEM. - HYDRAULIC WING PLOW

Parts Listing
BA44-A090H

Item #	Part #	Description	Qty
1	AA01-0006	Wiring Kit Plow Side	1
2	AA01-0012	Coil Ground Harness	1
3	AA02-0007	Power Unit 3V Vertical	1
4	AA02-0036	Hydraulic Adapter	6
5	AA02-0041	Hose Assembly	2
6	AA02-0042	Hose Assembly	2
7	AA02-0053	Lift Cylinder SAE Ports	1
8	AA02-0055	Hydraulic Adapter	2
9	AA02-0056	Hose Assembly	1
10	AA02-0057	Hose Assembly	1
11	AA03-0001	Jam Nut	2
12	AA03-0004	Clevis Pin	9
13	AA03-0005	Clevis Pin	1
14	AA04-0002	Moldboard Weldment	1
15	AA05-0004	Moldboard Cutting Edge	1
16	AA05-0028	Corner Closure Block Left	1
17	AA05-0029	Corner Closure Block Left	1
18	AA07-0002	Ebling Back Blade Decal	1
19	AA07-0003	Serial Number Decal	1
20	AA07-0004	Flag Decal	1
21	AA07-0011	Ebling Oval Decal	1
22	AA16-0002	Plow Stand Post	1
23	AA16-0003	Plow Stand Foot	1
24	AA16-0020	Lower Linkage Arm Left	1
25	AA16-0021	Lower Linkage Arm Right	1
26	AA16-0026	T- Bolt	1
27	AA16-0027	Upper Linkage Arm Weldment	2
28	AA16-0047	Spring Bar	1
29	AA16-0055	Adjustable Clevis Weldment	1
30	AA16-0103	Pump Box Top	1
31	AA16-0105	Pump Box Bottom	1
32	AA16-0107	Filler Plate	1
33	BA04-QDC	QD Channel Weldment	1
34	HK03-0001	1/4-20x3/4 SS Flange Bolt	4
35	HK03-0004	5/32x1 1/4 Cotter Pin	10
36	HK03-0005	3/8-16x2 1/2 Hex Drive Flat Head	4
37	HK03-0008	1/4-2x3/4 HHC Grd 5	2
38	HK03-0013	5/16-18x1 HHC Grd 5	1
39	HK03-0017	3/8-16x1 HHC Grd 5	6
40	HK03-0020	3/8-16x1 3/4 HHC Grd 5	2
41	HK03-0031	1/2-13x2 1/2 HHC Grd 5	4
42	HK03-0035	1/2-13x1 1/2 Carriage Bolt	9

			Qty
43	HK03-0060	1/4 USS Flat Washer	4
44	HK03-0061	5/16 USS Flat Washer	1
45	HK03-0062	3/8 USS Flat Washer	12
46	HK03-0073	1/2 USS Flat Washer	4
47	HK03-0075	1/2 SAE Flat Washer	4
48	HK03-0084	5/16 Lock Washer	1
49	HK03-0085	3/8 Lock Washer	2
50	HK03-0100	1/4-20 Nylock	2
51	HK03-0102	3/8-16 Nylock	8
52	HK03-0107	3/8-16 Flange Nut	2
53	HK03-0108	1/2-13 Flange Nut	13
54	HK07-0005	4" Black Zip Tie	6
55	KJ03-0002	Keeper Pin	2
56	KJ03-0006	Rubber Bumper	2
57	KJ03-0009	Plow Stand Cap	1
58	KJ07-0003	Conspicuacy Tape	2
59	KK00-0009	Clamp	1
60	KK00-0013	Abrasion Wrap 18"	1
61	KK00-0014	Abrasion Wrap 24"	2
62	AA16-0028	Upper Linkage Arm Assy	2
63	AA16-0004	Plow Stand Assy	1


Truck & Tractor Model Wing Sets
BA44-A112S
BA44-A114S
BA44-A116S
BA44-A402S
BA44-A446S
BA44-A306S
RIGHT HAND - #A__R
LEFT HAND - #A__L

Parts Listing

BA44-A112S - 12' Truck Wings

Item #	Part #	Description	Qty
1	AA04-0013	Wing Weldment Left	1
2	AA04-0014	Wing Weldment Right	1
3	AA05-0015	Poly Cutting Edge Left	1
4	AA05-0045	Poly Cutting Edge Right	1
5	AA05-0032	Corner Edge Left	1
6	AA05-0033	Corner Edge Right	1
7	AA16-0019	Hinge Pin Weldment	1
8	KJ07-0003	Conspicuity Tape	1
9	HK03-0031	1/2-13x2 1/2 HHC	6
10	HK03-0064	1/2 USS Flat Washer	6
11	HK03-0028	1/2-13x1 1/2 HHC	2
12	HK03-0075	1/2 SAE Flat Washer	2
13	HK03-0108	1/2-13 Flange Nut	10
14	AA03-0002	7/16 Shear Bolt Assy	2
15	AA03-0005	Clevis Pin	2
16	HK03-0004	5/32x1 1/4 Cotter Pin	2
17	HK03-0080	9/16 SAE Flat Washer	2
18	HK03-0003	5/32x3/4 Cotter Pin	2
19	AA02-0052	Wing Cylinder 7/16 Bushings	2
20	AA16-0040	Wing Clevis Shear Bushing	4
21	AA16-0042	Control Arm Shear Bushing	2
22	AH09-0001	Marker Set	1

Parts Listing

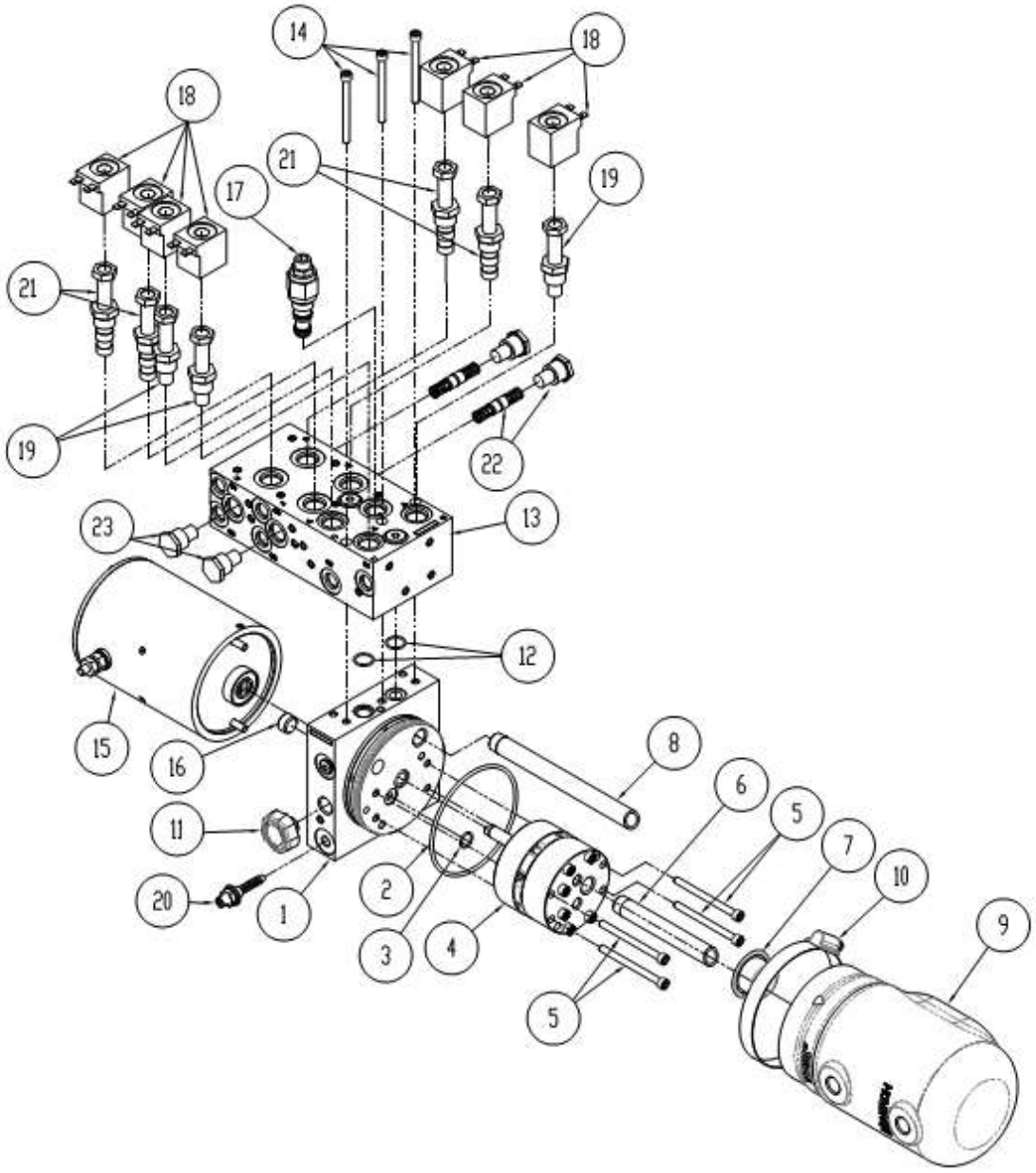
BA44-A114S - Truck 14' Wings

Item #	Part #	Description	Qty
1	AA04-0015	Wing Weldment Left	1
2	AA04-0016	Wing Weldment Right	1
3	AA05-0017	Poly Cutting Edge Left	1
4	AA05-0047	Poly Cutting Edge Right	1
5	AA05-0032	Corner Edge Left	1
6	AA05-0033	Corner Edge Right	1
7	AA16-0019	Hinge Pin Weldment	1
8	KJ07-0004	Conspicuity Tape	1
9	HK03-0031	1/2-13x2 1/2 HHC	8
10	HK03-0064	1/2 USS Flat Washer	8
11	HK03-0028	1/2-13x1 1/2 HHC	2
12	HK03-0075	1/2 SAE Flat Washer	2
13	HK03-0108	1/2-13 Flange Nut	12
14	AA03-0002	7/16 Shear Bolt Assy	2
15	AA03-0005	Clevis Pin	2
16	HK03-0004	5/32x1 1/4 Cotter Pin	2
17	HK03-0080	9/16 SAE Flat Washer	2
18	HK03-0003	5/32x3/4 Cotter Pin	2
19	AA02-0052	Wing Cylinder 7/16 Bushings	2
20	AA16-0040	Wing Clevis Shear Bushing	4
21	AA16-0042	Control Arm Shear Bushing	2
22	AH09-0001	Marker Set	1

Parts Listing

BA44-A116S - Truck 16' Wings

Item #	Part #	Description	Qty
1	AA04-0017	Wing Weldment Left	1
2	AA04-0018	Wing Weldment Right	1
3	AA05-0019	Poly Cutting Edge Left	1
4	AA05-0049	Poly Cutting Edge Right	1
5	AA05-0032	Corner Edge Left	1
6	AA05-0033	Corner Edge Right	1
7	AA16-0019	Hinge Pin Weldment	1
8	KJ07-0005	Conspicuity Tape	1
9	HK03-0031	1/2-13x2 1/2 HHC	10
10	HK03-0064	1/2 USS Flat Washer	10
11	HK03-0028	1/2-13x1 1/2 HHC	2
12	HK03-0075	1/2 SAE Flat Washer	2
13	HK03-0108	1/2-13 Flange Nut	14
14	AA03-0003	1/2 Shear Bolt Assy	2
15	AA03-0005	Clevis Pin	2
16	HK03-0004	5/32x1 1/4 Cotter Pin	2
17	HK03-0080	9/16 SAE Flat Washer	2
18	HK03-0003	5/32x3/4 Cotter Pin	2
19	AA02-0054	Wing Cylinder 1/2 Bushings	2
20	AA16-0041	Wing Clevis Shear Bushing	4
21	AA16-0043	Control Arm Shear Bushing	2
22	AH09-0001	Marker Set	1

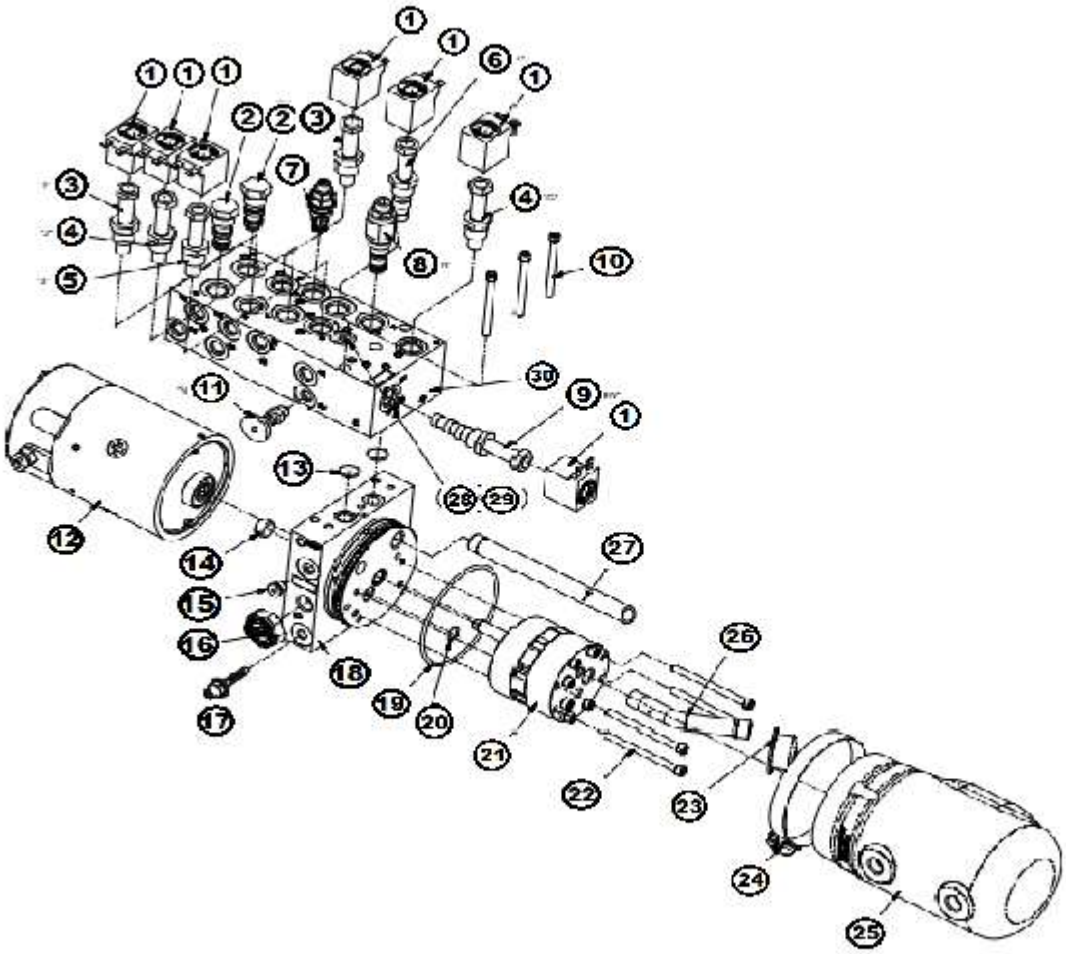


Hydraulic Wing Power Unit, 3 Function, AA02-0007

Parts Listing

AA02-0007 - Hydraulic Power Unit - Truck Hydraulic Wings

Item #	Part #	Description	Qty
1	N/A	Pump Base - Not Avaliable	1
2	AA02-0082	O-Ring	1
3	AA02-0083	O-Ring	1
4	AA02-0080	Pump Assy	1
5	AA03-0048	Screw 1/4-20x3	4
6	AA02-0016	Suction Tube	1
7	AA02-0020	Filter Screen	1
8	AA02-0017	Return Tube	1
9	AA02-0038	Reservoir Tank	1
10	AA03-0049	Screw Clamp	1
11	AA02-0021	Vent Cap	1
12	AA02-0081	O-Ring	2
13	N/A	Manifold - Not Avaliable	1
14	AA03-0051	Screw 1/4-20x2 3/4	3
15	AA01-0007	Motor	1
16	AA03-0050	Fill Plug	1
17	AA02-0084	Valve Counterbalance	1
18	AA01-0001	Coil	7
19	AA02-0013	Cartridge Valve	3
20	AA02-0085	Pressure Relief Valve	1
21	AA02-0012	Cartridge Valve	4
22	AA02-0039	Check Valve Set	2



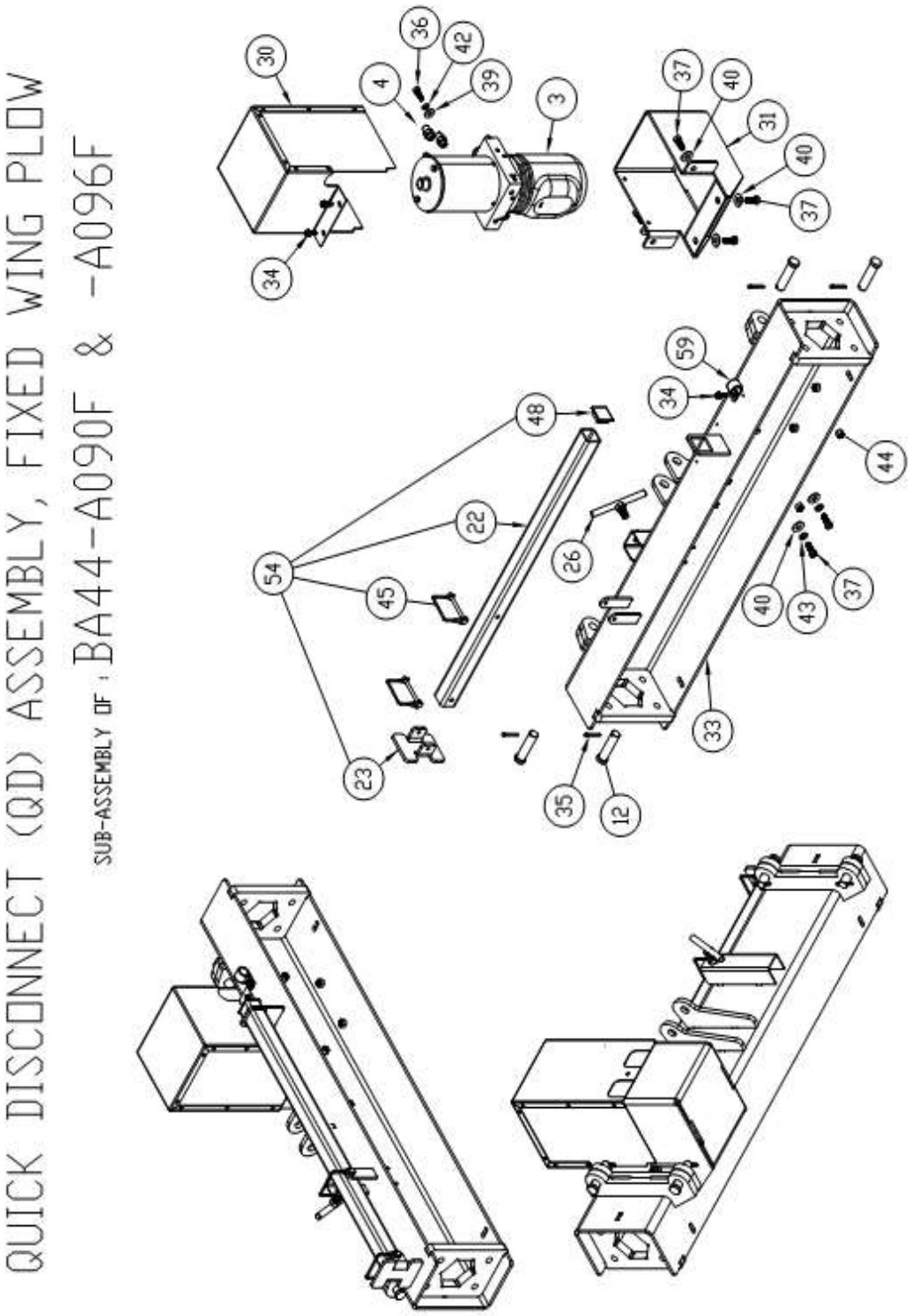
AA02-0007-F
Gen 2 Hydraulic Float Pump

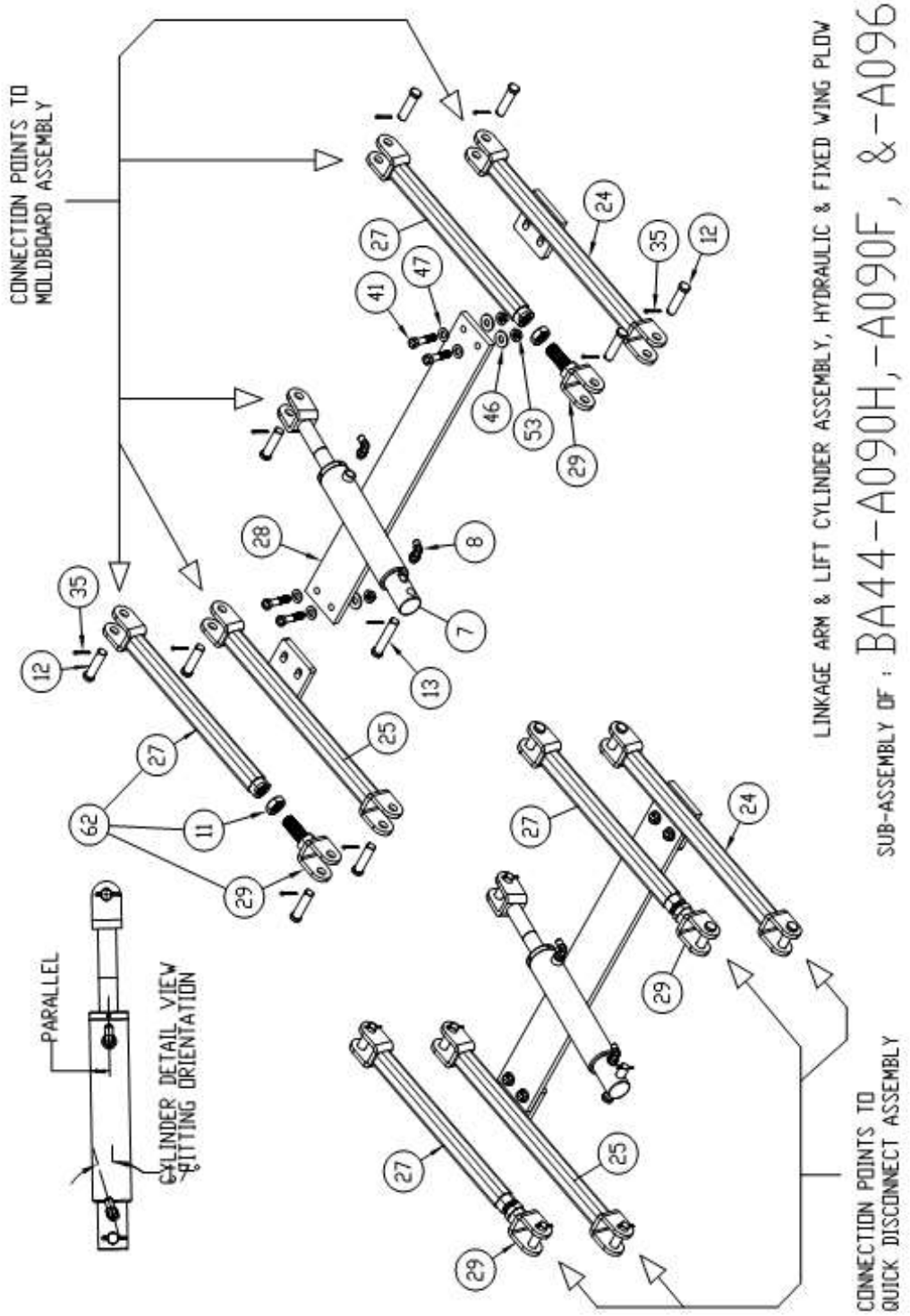
Parts Listing

AA02-0007-F - Hydraulic Power Unit - Gen 2 Float

Item #	Part #	Description	Qty
1	AA01-0001-HD	Coil Heavy Duty	7
2	AA02-0149	Wing Check Valve	2
3	AA02-0152	Wing In/Out Valves	2
4	AA02-0151	Float Valve	2
5	AA02-0156	Raise Valve	1
6	AA02-0160	Lower Valve	1
7	AA02-0159	Relief Valve	1
8	AA02-0139	Counter Balance Valve	1
9	AA02-0153	4W Wings Out Valve	1
10	N/A	Screw	3
11	AA02-0155	Float Drop Speed Valve	1
12	AA01-0039	HD Motor	1
13	AA02-0081	O-Ring	2
14	N/A	Bushing	1
15	N/A	SAE O-Ring Plug	1
16	AA02-0021	Vent Cap	1
17	AA02-0085	Pressure Relief	1
18	N/A	Pump Block	1
19	N/A	O-Ring	1
20	N/A	O-Ring	1
21	AA02-0150	Internal Pump - Float	1
22	N/A	Screw	4
23	AA02-0020	Filter	1
24	AA03-0049	Screw Clamp	1
25	AA02-0038	Reservoir Tank	1
26	N/A	Pick Up Tube, 30 Degree	1
27	N/A	Suction Tube	1
28	AA02-0088	Poppet Valve Assembly	1
29	N/A	SAE O-Ring Plug	1
30	N/A	Manifold Block	1

18.2 Fixed Wing Back Blade BA44-090F & BA44-096F




CONNECTION POINTS TO
MOLDBOARD ASSEMBLY
LINKAGE ARM & LIFT CYLINDER ASSEMBLY, HYDRAULIC & FIXED WING PLOW
SUB-ASSEMBLY OF : BA44-A090H,-A090F, &-A096F
CONNECTION POINTS TO
QUICK DISCONNECT ASSEMBLY
CYLINDER DETAIL VIEW
FITTING ORIENTATION
PARALLEL
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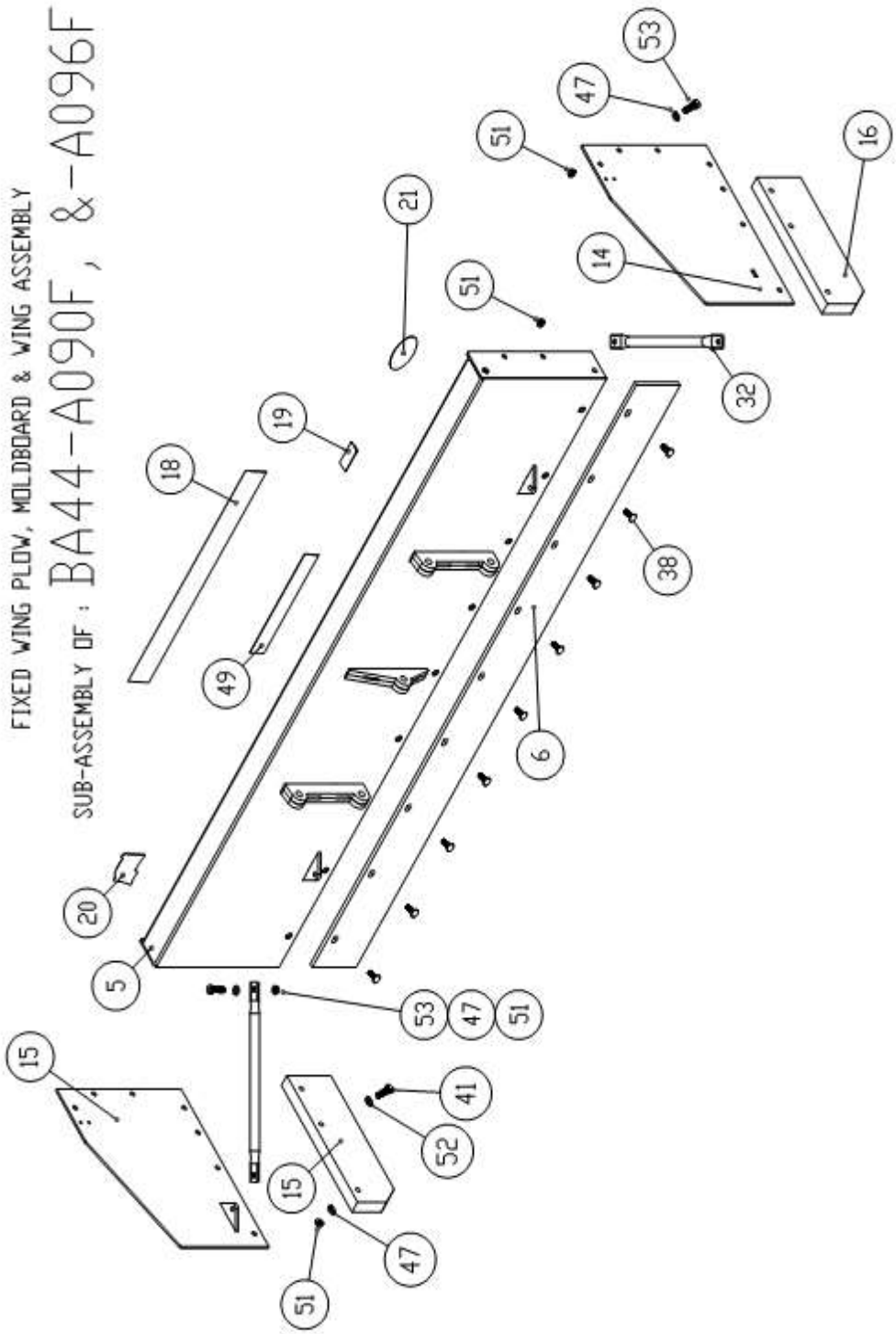
FIXED WING PLOW, MOLDBOARD & WING ASSEMBLY
SUB-ASSEMBLY OF : BA44-A090F, &-A096F
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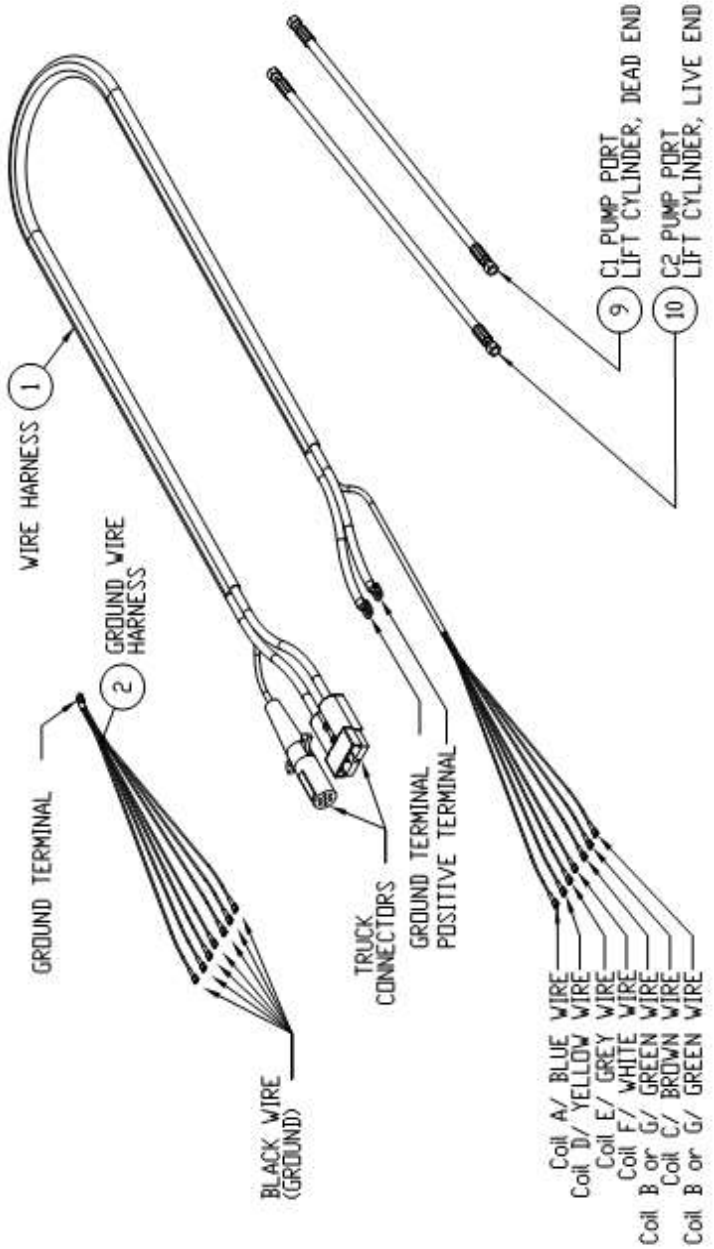
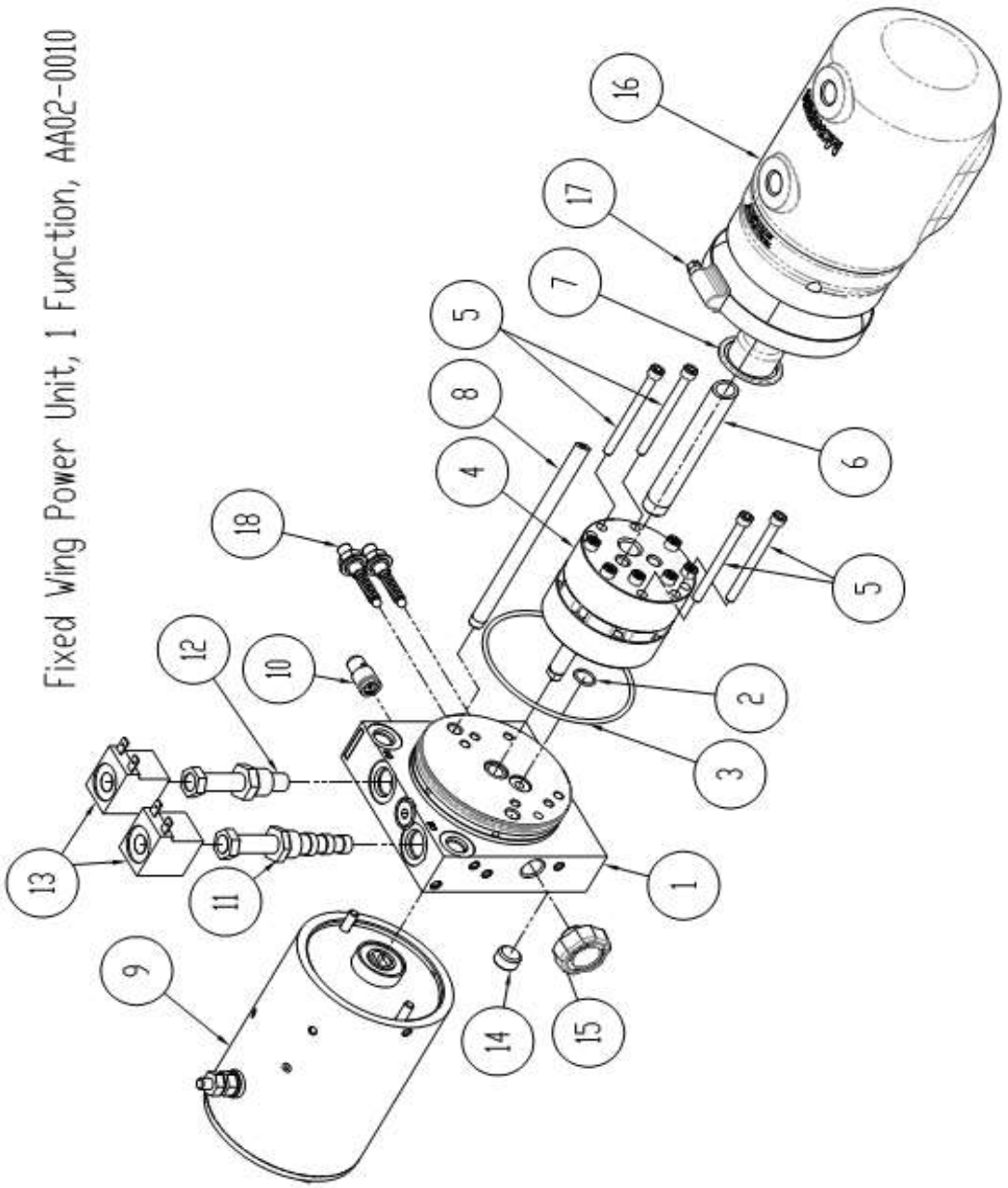


PLOW SIDE WIRING KIT (#AA01-0006) & HOSE ASSEM. - FIXED WING PLOW

Parts Listing
BA44-A090F, BA44-A096F

Item #	Part #	Description	Qty
1	AA01-0006	Wiring Kit Plow Side	1
2	AA01-0012	Coil Ground Harness	1
3	AA02-0010	Power Unit 1V Vertical	1
4	AA02-0036	Hydraulic Adapter	6
5* 90"	AA04-0004	Moldboard Weldment	1
5* 96"	AA04-0005	Moldboard Weldment	1
6* 90"	AA05-0004	Moldboard Cutting Edge	1
6* 96"	AA05-0058	Moldboard Cutting Edge	1
7	AA02-0053	Lift Cylinder SAE Ports	1
8	AA02-0055	Hydraulic Adapter	2
9	AA02-0058	Hose Assembly	1
10	AA02-0059	Hose Assembly	1
11	AA03-0001	Jam Nut	2
12	AA03-0004	Clevis Pin	9
13	AA03-0005	Clevis Pin	1
14	AA04-0023	Wing, Left	1
15	AA04-0024	Wing, Right	1
16	AA05-0054	Wing Cutting Edge, Poly, Left	1
17	AA05-0055	Wing Cutting Edge, Poly, Right	1
18	AA07-0002	Ebling Back Blade Decal	1
19	AA07-0003	Serial Number Decal	1
20	AA07-0004	Flag Decal	1
21	AA07-0011	Ebling Oval Decal	1
22	AA16-0002	Plow Stand Post	1
23	AA16-0003	Plow Stand Foot	1
24	AA16-0020	Lower Linkage Arm Left	1
25	AA16-0021	Lower Linkage Arm Right	1
26	AA16-0026	T- Bolt	1
27	AA16-0027	Upper Linkage Arm Weldment	2
28	AA16-0047	Spring Bar	1
29	AA16-0055	Adjustable Clevis Weldment	1
30	AA16-0104	Pump Box Top	1
31	AA16-0105	Pump Box Bottom	1
32	AA16-0085	Wing Support Arm	2
33	BA04-QDC	QD Channel Weldment	1
34	HK03-0001	1/4-20x3/4 SS Flange Bolt	4
35	HK03-0004	5/32x1 1/4 Cotter Pin	10
36	HK03-0013	5/16-18x1 HHC Grd 5	1
37	HK03-0017	3/8-16x1 HHC Grd 5	6
38* 90"	HK03-0035	1/2-13x1 1/2 Carriage Bolt	9
38* 96"	HK03-0035	1/2-13x1 1/2 Carriage Bolt	11
39	HK03-0061	5/16 USS Flat Washer	1

			Qty
40	HK03-0062	3/8 USS Flat Washer	12
41	HK03-0031	1/2-13x2 1/2 HHC Grd 5	4
42	HK03-0084	5/16 Lock Washer	1
43	HK03-0085	3/8 Lock Washer	2
44	HK03-0102	3/8-16 Nylock	8
45	KJ03-0002	Keeper Pin	2
46	HK03-0073	1/2 USS Flat Washer, Grd 8	4
47	HK03-0075	1/2 SAE Flat Washer	22
48	KJ03-0009	Plow Stand Cap	1
49	KJ07-0003	Conspicuacy Tape	2
51* 90"	HK03-0108	1/2-13 Flange Nut	29
51* 96"	HK03-0108	1/2-13 Flange Nut	31
52	HK03-0064	1/2 USS Flat Washer, Grd 5	6
53	HK03-0028	1/2-13x1 1/2 HHC Grd 5	12
54	AA16-0004	Plow Stand Assy	1
59	KK00-0009	Clamp	1
62	AA16-0028	Upper Linkage Arm Assy	2


Fixed Wing Power Unit, 1 Function, AA02-0010
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Parts Listing

AA02-0010 - Hydraulic Power Unit - Truck Fixed Wing

Item #	Part #	Description	Qty
1	N/A	Pump Base - Not Avaliable	1
2	AA02-0083	O-Ring	1
3	AA02-0082	O-Ring	1
4	AA02-0080	Pump Assy	1
5	AA03-0048	Screw 1/4-20x3	4
6	AA02-0016	Suction Tube	1
7	AA02-0020	Filter Screen	1
8	AA02-0017	Return Tube	2
9	AA01-0007	Motor	1
10	AA02-0088	Poppet Valve Assy	1
11	AA02-0089	Cartridge Valve 4W/2P	1
12	AA02-0013	Cartridge Valve	1
13	AA01-0001	Coil	2
14	AA03-0050	Fill Plug	1
15	AA02-0021	Vent Cap	1
16	AA02-0038	Reservoir Tank	1
17	AA03-0049	Screw Clamp	1
18	AA02-0085	Pressure Relief Valve	2

19. INSTALLATION INSTRUCTIONS

These installation instructions are for the current 2019 version. Can be subject to change, Not all possible scenarios are shown. Call for any situations not covered in these instructions.

Ebling Back Blade/Standard Wiring/Vertical Pump
Truck Side Electrical Installation
REV 3 – 12/23/2021

Step 1 –

Locate Suitable Mounting Location for Circuit Breaker & Solenoid Near the Battery (Primary Battery in Dual Battery Systems).

Step 2 –

Attach 43" Red Cable from Positive Terminal of Battery to Battery Side of Circuit Breaker (With Breaker Turned Off, Cables Can Be Resized For Cleaner Look)

Step 3 –

Attach 32" Red Cable from Auxiliary Side of Circuit Breaker to Large Post of Solenoid (Either Post, Cables Can Be Resized For Cleaner Look)

Step 4 –

Choose Location to Mount Remote Switch and Control/Power Plugs on Drivers Side Rear of Bed. Check Plug Clearance Before Choosing Plate or Box Wall Mount. (Refer to Illustration #2) If a Bed Liner is Present it Will Need to be Trimmed to Expose Bed Wall or Clearance For Plugs/Switches on Switch Plate.

Step 5 –

Drill Holes Needed for Control Plug, Remote Switch, Power Plug Bracket & Cables and Switch Plate If Used.

If Switch Plate is Used a 1 1/4" Hole Needs To Be Drilled to Accommodate Harness and Grommet, 2-7/8" Holes Are Needed For The Power and Ground Cables, In Addition to 9/32 Holes Needed for Plate & Plug Mounting Hardware.

If Switch Plate is Not Used, 2-2 1/8" Holes Are Needed For Remote Switch and Control Plug, 2-7/8" Holes Are Needed For The Power and Ground Cables, In Addition to 9/32 Holes Needed for Plate & Plug Mounting Hardware.

Step 6 –

Route Control Harness / Power Cable Bundle Through Box Wall & Switch Plate if Used. (Refer to Illustration #2)

Step 7 –

Attach Remote Switch to Recessed Switch Plate, Using Weather Resistant Boot and Plug into Main Harness. **(Note: There are 3 Wires Blunt Cut and Taped to Main Harness Near the 7-Way Control Plug, These Wires Run Into the Cab to the 6 Wire Plug. The Wires Have Been Added to the Harness as a Convenience if You Need to Have Wires Available at the Rear of the Truck for Accessories Such as Lights.)**

Step 8 –

Bolt Control Plug & Recessed Switch Plate to Box Wall or Mounting Plate (Refer to Illustration #2)

Step 9 –

Feed Red and Black Cables from Underneath Through Holes in Bed and Connect to Power Plug (Be sure to connect red to + and black to -)
(Refer to Illustration #2)

Step 10 –

Find Suitable Place on Frame to Attach Black Ground Cable, Making Sure Frame is Ground Bare and Clean for Good Ground Connection.

Step 11 –

Route Control Harness / Power Cable Bundle Along Drivers Side of Frame to Firewall, Wire Tie and Shield Bundle to Avoid any Sharp Edges.

Step 12 –

Feed Controller Wire Bundles through Appropriate Opening in Firewall and into Cab.

Step 13 –

Connect Wire Labeled “Red/White” w/ In-Line Fuse to an Ignition Switched Power Source.

Step 14 –

Plug Controller Individual Wires into Controller Plug (12 Pin) as Labeled (Wire Color Code to Numbered Position) as Shown in Illustration #3. Plug Controller Individual Wires into Controller Plug (6 Pin) as Labeled (Wire Color Code to

Numbered Position) as Shown in Illustration #3. Wire Tie Harness Under Dash Leaving Controller Plug Accessible & Plug in Control Box.

Step 15 –

Route Power Harness Under Hood to Solenoid Installed in Step 1, Making Sure to Route Away from Heat Sources & Sharp Edges. Wire Tie Securely.

Step 16 –

Attach Red Power Cord to Empty Large Post On Solenoid, Small "Violet" Wire to Small Post on Solenoid (either post), Small "Black" Wire to Battery Ground, Small "Red" Wire w/ In-line Fuse to Battery Positive (or Battery Side of Circuit Breaker). Install Individual Small "Black" Wire From Parts Bag Between Remaining Small Terminal On Solenoid to Suitable Ground. See illustration #4.

Step 17 –

Install 32" (1/0) Ground Cable from either Engine Block or Negative Battery Post to Frame. This Cable Insures a Solid Ground to Pump.

Step 18 –

Reset Circuit Breaker Installed in Step 1. Installation is Complete.

Illustration #1

Install Circuit Breaker and Solenoid on Bracket as Shown. If Bracket Cannot be Used Choose a Location Where Circuit Breaker and Solenoid Will Be Protected From Being Damaged or Terminals Contacting Parts of Vehicle.

Typical GM Installation on Passenger Side of Engine Compartment

Typical Ford Installation on Passenger Side of Engine Compartment
2016 and Prior

Typical Ford Installation on Passenger Side of Engine Compartment
2017 - Current

Typical Dodge Installation on Driver Side of Engine Compartment

Illustration #2

Install Remote Switch and Plugs on Drivers Side, Inside of Box, At Rear.

Typical In Box Wall Installation

Typical Switch Plate Installation

Typical Flatbed Installation

New Ram Box Installation

Remote Switch & Control Plug

GM, Most Dodge Models & 2017-Current Fords can be Mounted Directly to the Truck Box Wall with Two – 2-1/8” Holes.

Ford 2016 & Prior and Late Model Dodges Require a Switch Mount Panel (included in the mount box) with 1-1/4” Hole in Inner Truck Box Side for Routing Control Harness to Frame Area.

Dodge With Ram Box Option See Illustration #2

Power Plug and Bracket

Bend Power Plug Bracket as Needed to Fit Inner Bed Wall. Bracket is Bolted to Bed Wall with 2 – 1/4” Bolts, Washers & Nylocks. 2 – 7/8” Holes Will Need to be Drilled to Accommodate Power Cables & Grommets. Power Plug is Attached to Bracket with 2 – Hex Socket Head Bolts & Nylocks.

Illustration #3

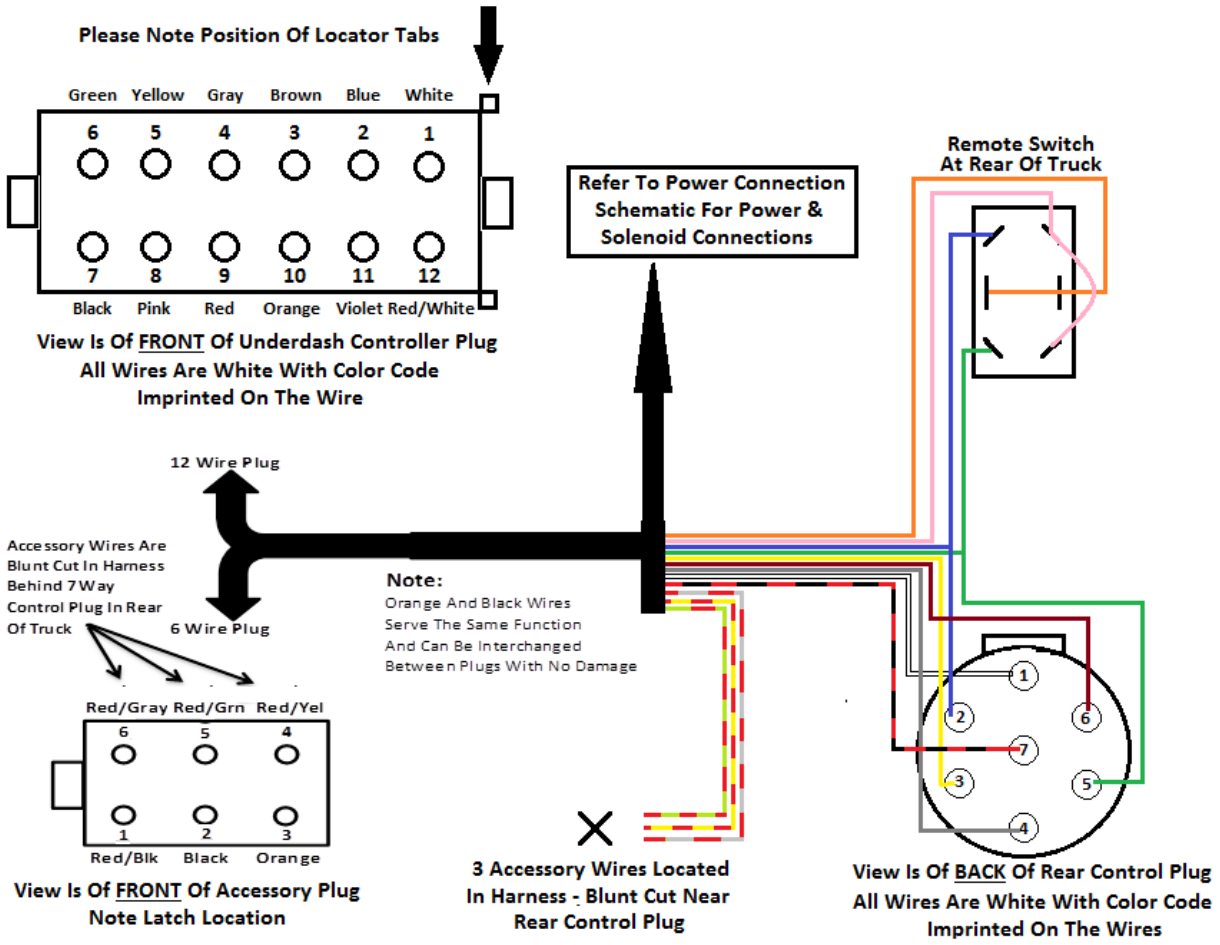
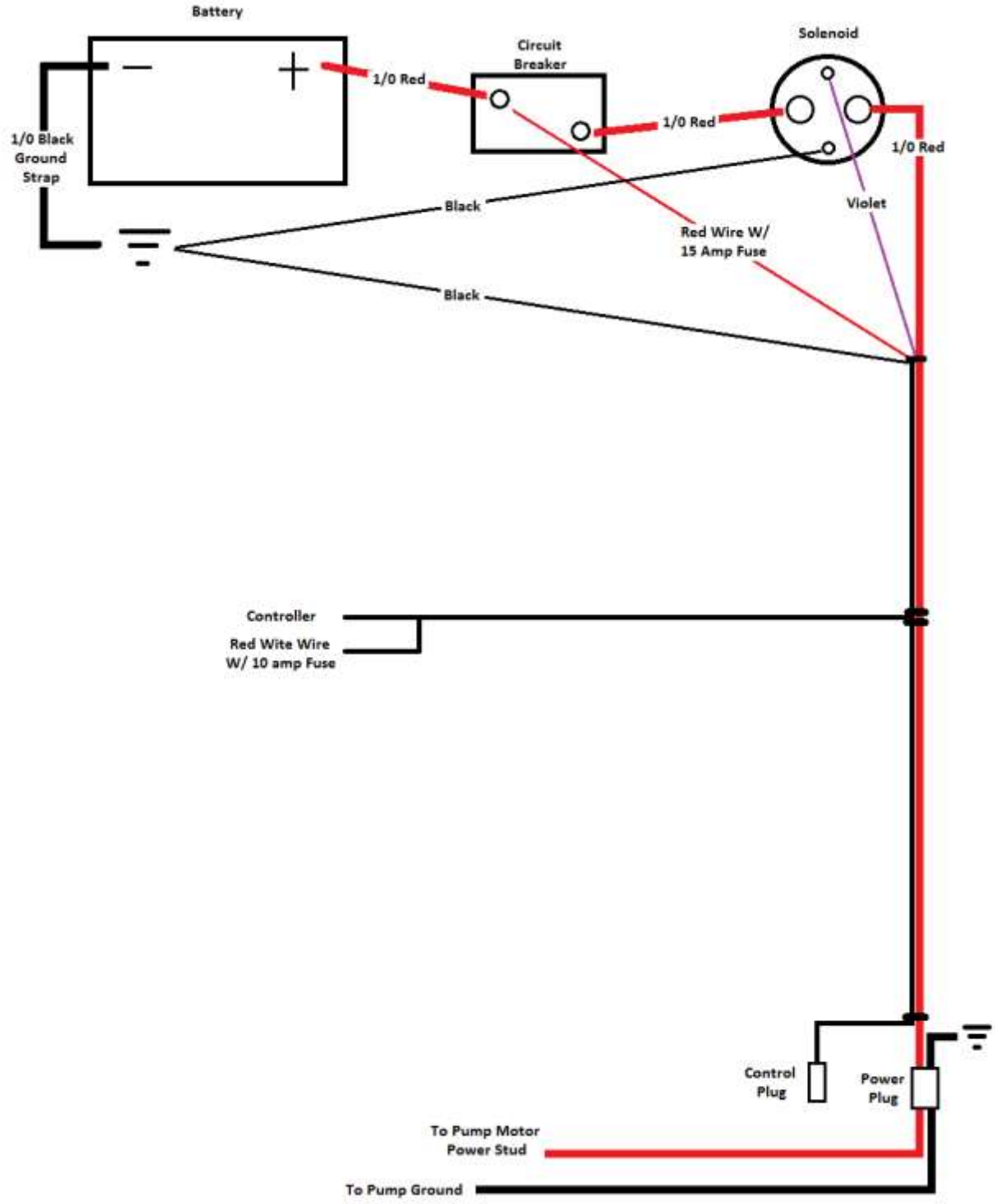


Illustration #4



19.2 Final Assembly – Hydraulic Wings

Final Assembly Instructions - Truck Hydraulic Wing Back Blade

Step 1

You should receive the following for complete assembly

1 - Crate with moldboard/QD/Hyd Pump assembly.

1 - Box with truck mount and QD arms specific to your installation.

1 or 2 - Wing boxes specific to the size of back blade to be assembled.

Make sure all containers are accounted for and are the correct sizes for your installation.

Step 2

Disassemble top framing of crate, leaving moldboard on crate. DO NOT unbolt QD channel from crate.

Step 3

Open wing and truck mount boxes to familiarize yourself with the contents to be assembled.

Step 4

Install mount on truck as per instructions in mount box. Also install electrical harness and switches / plugs as shown in electrical instructions.

Step 5

Its time to remove the blade from the crate. With an assistant remove the 2 lag bolts holding down the QD channel. Ebling recommends lifting the blade with a machine equipped with pallet forks like a forklift. It is recommended that 3 straps be used for proper balance of the blade while lifting. Ebling recommends strapping to both upper linkage arm clevis's where they meet the moldboard and to one upper linkage arm clevis where it meets the QD channel. Do NOT strap to the hydraulic hose guides. Lift the blade up just enough to remove the crate then slowly lower it down to the ground.

Use extreme Caution while lifting. Be sure to use properly rated strapping

capable of lifting the load. This 3 point strapping system also works well for moving the blade around with the wings attached.

Step 6

Take the QD arms and any spacers out of the mount box and refer to the vehicle specific Truck mount and Arm setting sheet. Assemble QD arms to the QD channel as stated for your truck. Coat hex blocks with anti-seize for future adjustments. Torque bolts as shown in torque chart.

Step 7

This step will require an assistant since wings are heavy and bulky.
Remove hinge pin from wing and spread grease up and down it.
Spread grease on the inside of the hinge barrels of the wing and moldboard.
Position wing in hinge barrels of moldboard with wing parallel to moldboard and reinstall hinge pin. Fasten with 9/16" SAE flat washer and secure with 5/32" x 3/4" cotter pin. Bend pin over.

Step 8

Hold dead end of hydraulic cylinder to clevis on back of moldboard and insert 3/4 x 3 1/2" clevis pin and secure with 5/32" x 1 1/4" cotter pin.

Step 9

Now line up live end of cylinder with wing arm and insert shear bolt with 1 flat washer from top down, finish with 1 flat washer and nylock on bottom. Tighten until washers are against clevis surfaces but do not overtighten.

Step 10

Remove plugs from cylinder ports and pull wing forward.
You will check / adjust for 90 degrees in an upcoming step**.**

Step 11

Place hydraulic fittings in cylinder ports and tighten. Then connect hoses to fittings and tighten. Do not overtighten.

Step 12
Repeat steps 6 - 10 for other wing.

Step 13
Fill hydraulic pump with 1 QT of fluid provided as shown in owners manual section 12.5.3. Position truck with mount pockets just in front of QD arms (2-3 inches). Plug in control and power connections to truck.

Step 14
Run pump using remote switch (ignition must be on). Move switch down to raise arms and up to lower arms until QD arms are lined up with pockets on truck mount. Back the truck up until arms are fully inserted into QD pockets.

Step 15
Install QD pins and secure them to the mount with 5/16"x1" bolts and nylocks. You may need to "bump" remote switch up or down to align holes for pins.

Step 16
Once QD pins are bolted in place, raise the blade and add 1 more QT of Fluid.
Now run blade up and down fully a couple of times to remove any air from the hydraulic system.
Now with blade fully up run each wing separately fully open and closed a couple times to purge air out of the system.
Top off the pump with another aprox 0.75 QT of fluid.
Total fluid capacity is aprox 2.85 QTS

Note:
Proper fluid level is 1" down from top of reservoir WITH BLADE FULLY UP AND BOTH WINGS FULLY OPEN (a light will be useful in seeing fluid level), if level is adjusted with wings closed or blade down, fluid will be forced out of the vent when blade is activated.

Step 17

With the wings closed and the blade in the down position, with no down pressure, the tips of the wings should be approx 1" off the ground. This is to account for down pressure and any play in arm pins.
Refer to owners manual sec 12.8.1 for adjustment instructions.

Step 18

With wings fully closed check wing alignment to moldboard. Wing should be 90 degrees to moldboard. If this needs to be adjusted refer to owners manual sec 12.8.3 for instructions.

Step 19

Attach wing marker flags to both wings.

Step 20

Now check all functions with the in cab controller and the rear remote switch. Backblade is now installed and adjusted for plowing. Be sure to check cutting edge wear as using and make any adjustments necessary to prolong the life of the edges.

Final Assembly Instructions - Truck Fixed Wing Back Blade

Step 1

You should receive the following for a complete assembly

1 - Crate with moldboard/QD/Hyd Pump assembly.

1 - Mount box with QD arms specific to your installation.

Step 2

Disassemble top framing of crate, leaving moldboard on crate. Unbolt QD channel from crate lockdown position (2 lag bolts) and any strapping holding moldboard to shipping skid.

Step 3

Open mount box and familiarize yourself with the contents to be assembled.

Step 4

Install mount on truck as per instructions in mount box. Also install electrical harness and switches / plugs as shown in electrical instructions.

Step 5

Take the QD arms and any spacers out of the mount box and refer to the vehicle specific QD arm chart. Assemble QD arms to the QD channel as stated for your truck. You may want to coat hex blocks with anti-seize for future adjustments. Torque bolts as shown in torque chart.

Step 6

Fill hydraulic pump with fluid provided as shown in owners manual sec 12.5.3.
Position truck with mount pockets just in front of QD arms (2-3 inches).
Plug in control and power connections to truck.

Step 7
Run pump using remote switch (ignition must be on). Move switch down to raise arms and up to lower arms until QD arms are lined up with pockets on truck mount. Back the truck up until arms are fully inserted into QD pockets.

Step 8
Install QD pins and secure them to the mount with 5/16"x1" bolts and nylocks. You may need to "bump" remote switch up or down to align holes for pins.

Step 9
Once QD pins are bolted in place raise blade fully and remove shipping crate. Now run blade up and down fully a couple of times to remove any air from the hydraulic system.

Note: Proper fluid level is 1" down from top of reservoir WITH BLADE FULLY UP (a light will be useful in seeing fluid level), if level is adjusted with blade down, fluid will be forced out of the vent when blade is activated.

Step 10
With the blade in the down position, with no down pressure, the tips of the wings should be approx 1/2" off the ground. This is to account for down pressure and any play in arm pins. If arms need to be adjusted refer to owners manual sec 12.8.1

Step 11
Attach wing marker flags to both wings.

Step 12
Now check all functions with the in cab controller and the rear remote switch. Back Blade is now installed and adjusted for plowing. Be sure to check cutting edge wear occasionally and make any adjustments necessary to prolong the life of the edges.

19.4 QD Channel Arm Settings

Truck Mount Fit Guide

The Following Truck Mounts Are Approved By Ebling For The Model, Year, Make And Frame Style Shown. Any Back Blade Installed On A Custom Or Modified Mount May Void Warranty

Truck Mount/QD Arm Settings

Mount	Vehicle (1)	Vehicle Rating	Arm Length	Arm Position	Arm Flat Edge	Inside Arm Width	QD w/ Single Hex Plate Spacer (3)
1A (4)	Dodge 03-10 Long Box	3/4 or 1 Ton	25 1/4"	Inside	Down	37"	5/16"&1/2"
1B (4)	Dodge 03-10 Short Box	3/4 or 1 Ton	25 1/4"	Inside	Down	37"	5/16"&1/2"
1F (2) (4)	Dodge 11- (No Longer Available)	3/4 or 1 Ton	23 1/4"	Inside	Up (2)	37"	5/16"&1/2"
1J (2)(4)(5)	Dodge 11- (No Longer Available)	3/4 or 1 Ton*	23 1/4"	Inside	Up (2)	37"	5/16"&1/2"
1K (2)(4)(5)	Dodge 11-Cur 2500/11-Cur 3500*	1 Ton ONLY*	23 1/4"	Inside	Up (2)	37"	5/16"&1/2"
2A	Ford 99-07 All	3/4 or 1 Ton	25 1/4"	Inside	Down	38"	5/16"
2B	Ford 08-16 All	3/4 or 1 Ton	23 1/4"	Inside	Down	38"	5/16"
2M (2)	Ford 17-Current All	3/4 or 1 Ton	23 1/4"	Outside	Up (2)	42 1/4"	5/16"
3A	GM 01-07 Long Box Classic	3/4 or 1 Ton	23 1/4"	Outside	Down	42 1/4"	5/16"
3B	GM 01-07 Short Box Classic	3/4 or 1 Ton	23 1/4"	Outside	Down	42 1/4"	5/16"
3C	GM 07.5-10 Long Box	3/4 or 1 Ton	23 1/4"	Outside	Down	42 1/4"	5/16"
3D	GM 07.5-10 Short Box	3/4 or 1 Ton	23 1/4"	Outside	Down	42 1/4"	5/16"
3L	GM 11-14 Long Box	3/4 or 1 Ton	23 1/4"	Outside	Down	42 1/4"	5/16"
3M	GM 11-14 Short Box	3/4 or 1 Ton	23 1/4"	Outside	Down	42 1/4"	5/16"
3O	GM 15-Current Long Box	3/4 or 1 Ton	23 1/4"	Inside	Down	36 3/4"	5/16"&5/8"
3R	GM 15-Current Short Box	3/4 or 1 Ton	23 1/4"	Inside	Down	36 3/4"	5/16"&5/8"
3W (4)	GM 20-Current Long/Short Box	3/4 or 1 Ton	23 1/4"	Inside	Down	36 3/4"	5/16"&5/8"

(1) NOTE - ALL FRAMES MUST BE PICK UP BOX FRAMES OR BOX DELETE - CAB & CHASSIS NOT STANDARD DUALLY, CAB & CHASSIS AND FLATBED TRUCKS MAY BE COMPATABLE WITH THE EBLING BACK BLADE. CONTACT EBLING FOR ADDITIONAL INFORMATION.

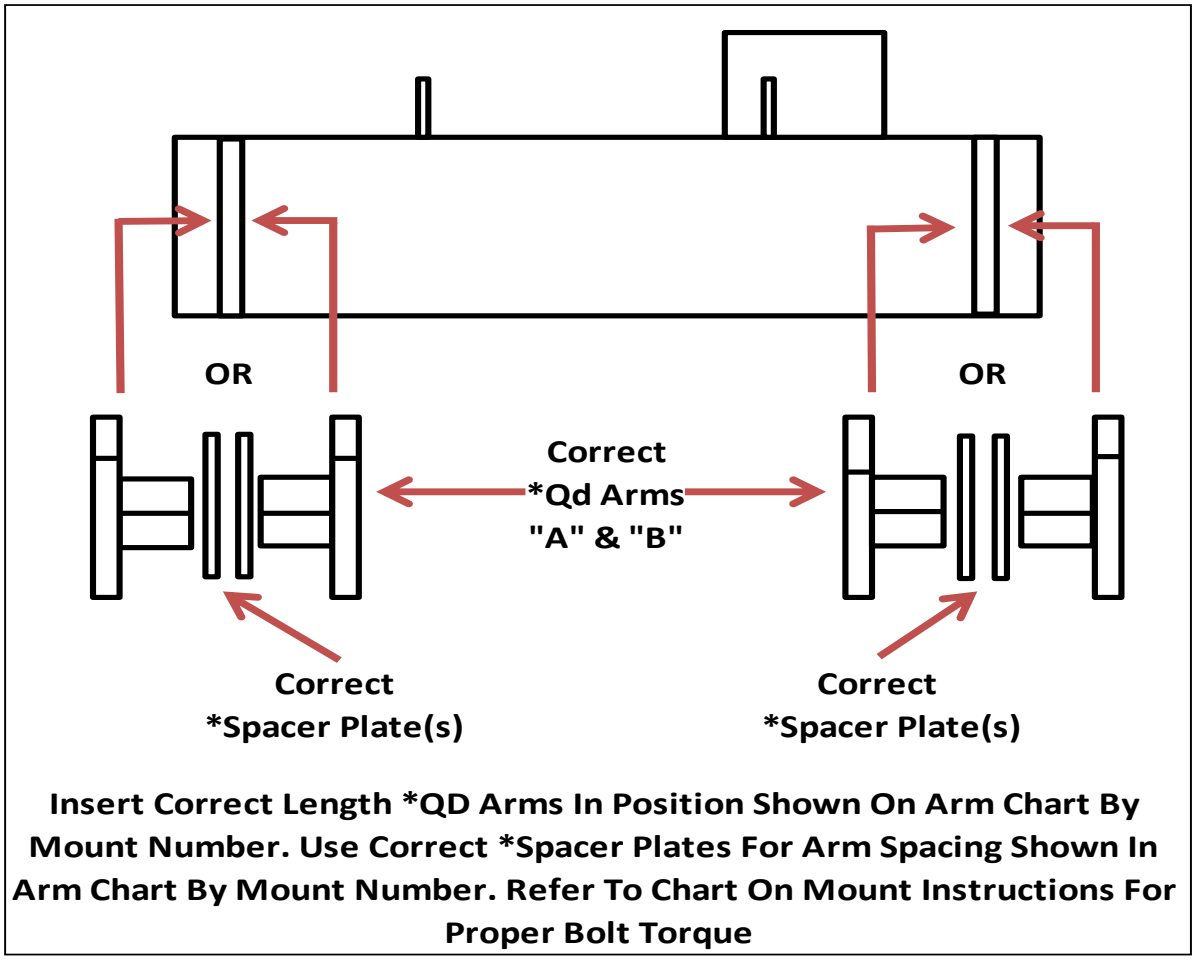
(2) NOTE - 17-CURRENT FORD 2M MOUNTS, 2018-CURRENT DODGE 1K MOUNTS MUST BE INSTALLED WITH FLAT SIDE OF ARM UP FOR TAILGATE CLEARANCE.

(3) NOTE - ALL OLD STYLE (-2015) QDS W/ DOUBLE HEX PLATES DO NOT REQUIRE THE 5/16" SPACER PLATES. THESE QDS MUST USE BEVELED EDGED ARMS TO CLEAR WELDS. CONTACT EBLING FOR ADDITIONAL INFORMATION.

(4) NOTE - ALL DODGE AND 2020 GM BACK BLADE MOUNTS ARE USED IN CONJUNCTION WITH THE OEM RECEIVER HITCH. EBLING V-5 HITCH NOT INCLUDED ON DODGE OR 2020 GM MOUNTS

(5) NOTE - ALL DODGES WITH REAR BUMPER LOWER PLASTIC FASCIA MUST REMOVE OR TRIM FOR MOUNT CLEARANCE

Follow Directions For Your Particular Mount On The Truck Mount Fit Guide



Insert Correct Length *QD Arms In Position Shown On Arm Chart By Mount Number. Use Correct *Spacer Plates For Arm Spacing Shown In Arm Chart By Mount Number. Refer To Chart On Mount Instructions For Proper Bolt Torque

Flat Side Of QD Arm

20. TROUBLE SHOOTING GUIDE

These trouble shooting steps are meant to be a guide for finding the source of a particular problem in an Ebling Back Blade. Can be subject to change, Not all possible scenarios are listed. Call for any situations not covered in this guide.

20.1 Hydraulic and Fixed Wings

Troubleshooting Guide

Problem	Steps to take
Pump will not run, solenoid clicks	* Circuit breaker tripped? * Is power crossing solenoid posts when activated? * Check to see if power is at power plug when activated, making sure plug terminals are fully seated in housing. * Check ground at rear of truck frame. * Check if power is reaching pump motor. * Pump ground hooked up? * Hooked to primary battery? Charge level?
Pump will not run, solenoid does not click	* Is controller on? Plugged in? * Is controller fuse/power source good? * Is solenoid getting signal on violet wire? * Is solenoid grounded?
Pump runs, no movement on any functions	* Control harness plugged in? * Control harness damaged? * Coil ground harness attached at pump ground?
Pump runs, no movement on certain function	* Is coil magnetizing? * Is signal reaching coil? * Is signal reaching that functions stud in control plug? * Control harness damaged? * Is valve stuck (not shifting). * Bad DPDT switch?
Wing will open but not close or will close but not open/Blade will go up but not down or will go down but not up	* Is coil magnetizing? * Is signal reaching coil? * Is signal reaching that functions stud in control plug? * Control harness damaged? * Is valve stuck (not shifting). * Is check valve damaged or missing? * Bad DPDT switch? * Bad SPDT switch diode?
Pump runs but functions not correct	* Are under dash controller plug connections in correct positions? * Are coil wires in correct positions? * Are rear truck side and plow side control plug wires in correct positions?

Remote switch not working	* Is controller on? * Is switch plugged in? * Is there signal on pin 8 of the under dash controller plug when activated? * Switch bad? Try plugging in new switch.
Pump won't shut off	* Bad solenoid? * Bad remote switch? Unplug to test. * Stuck controller switch?
Blades drifts down slowly.	* Hose Leaking? * Check lift/lower valves for wear, damage or contamination. * Counterbalance valve contamination? * Counterbalance valve worn? Contact Ebling for additional repair instructions. * Lift cylinder packings worn?
Circuit breaker trips	* Is rear frame ground good? * Pump motor drawing too many amps? * Power harness chaffed (short) under truck? * Weak breaker?
When stored off truck the QD drifts down slowly	* Pump not designed to hold QD up. Must use stand when stored position.
Blade lowers very fast (drops)	* Lift cylinder hoses reversed.
Excessive fluid leak from pump when blade is raised or wings opened	* Reservoir is overfilled - Check fluid level with blade fully up and wings fully open - Drain fluid as needed.
Pump runs, wings work normal but blade lifts slowly	* Motor weak or loose connections? * Bad/weak ground on frame? * Check lift/lower valves for wear, damage or contamination. * Contact Ebling for additional repair instructions.
Wing cutting edges wearing on tips	* Check for damage to wing or moldboard * Adjust upper linkage arms.
Wings not closing to 90 degrees	* Check for damage to wing or moldboard * Shear bolt partially sheared/bent? * Check for obstruction * Cylinder out of adjustment?
Moldboard not level to truck	* Check for damage to moldboard/linkage arms * Are spring bar bolts tight? * Is spring bar damaged/twisted? * Truck frame damaged?

Blade "chatters" going up or down	* Adjust counterbalance valve screw in one half turn at a time until "chatter" disappears * Call Ebling for more possible solutions
QD arms not correct width	* Check mount/arm guide for correct spacer plates/width for the application. * Does QD have single or double hex plates welded in each side? * If double, refer to mount/arm guide.

Contact us for further instructions at:
616-532-8400 Parts Dept. or
parts@eblingsnowplows.com

21. WARRANTY DETAILS

Ebling Snowplows Warranty Guidelines

Non-Covered Wear Items

* All Wing Edges (including corner edges)
* All Moldboard Edges (including corner edges)
* Moldboard Rubber Bumpers
* Plow Markers
* Hardware Including Shear Bolts
* Hydraulic Hoses

Warranty Process

* Product Must Be Registered
* Must Call Ebling Prior To Any Warranty Repair
* No Diagnoses Time Is Covered, Contact Ebling To Aid In Diagnoses
* All Repair Labor Is Subject To The Preset Labor Chart
* Warranty Parts Will Be Invoiced To Dealers Account, Or Paid For By End User At Time Of Shipment, Credit Will Be Issued Upon Receipt Of Parts, If Required, And As Approved By Ebling
* Ebling Will Pay For Shipment Of Warranty Parts Returned To Dealer or End User, Standard Shipping Rates Only
* No Warranty Will Be Given For A Product Used Outside The Operating Instructions Or Any Service Bulletins Issued By Ebling Snowplows. In Addition, Back Blades Not Mounted As Recommended Or Mounted On Any Vehicle Not Listed In Ebling Manuals Or Mounted With A Custom Or Modified Mount May Not Be Eligible For Warranty
  - Contact Ebling For Any Manuals Or Applicable Service Bulletins Needed

All Ebling Snowplow Products Are Warrantied For One Year From Date Of Purchase. Must Be Registered At Time Of Purchase. Products Not Registered May Not Be Eligible For Warranty

21.1 Commercial Warranty Details

EBLING BACK BLADE COMMERCIAL WARRANTY

THE FOLLOWING WARRANTIES ARE EXCLUSIVE IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES (EXCEPT OF TITLE), INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE.

Ebling & Son Inc. (Ebling) warrants to each purchaser of an Ebling Back Blade (including accessories and components) for other than personal, family or household use that the Back Blade will, for a period of two (2) years, after the date of the original purchase, be free from defects in material and workmanship. If within such warranty period any part thereof is proved to Ebling's satisfaction as defective, such part shall be repaired by Ebling or their authorized distributor or, at Ebling's option, replaced at Ebling's place of business without charge, including labor costs at their standard rate incurred while repairing said Back Blade. Ebling's obligation hereunder shall be limited to such repair or replacement and shall be further conditioned upon Ebling receiving written notice of any alleged defect and proof of original purchase within ten (10) days after its discovery and at Ebing's option, the return of the allegedly defective part to Ebling's place of business or to their authorized dealer.

The foregoing warranty shall not apply to parts not manufactured by Ebling or any damage caused by such parts or to parts which have been repaired or altered by anyone other than Ebling or an authorized Ebling distributor so as, in Ebling's judgment, adversely to affect the same, or which have been subject to other than normal use or service for snow removal, negligence, accident or improper installation, maintenance, care or storage. With respect to parts furnished but not manufactured by Ebling, Ebling shall pass on to their commercial customers the warranty extended to Ebling by the supplier of such parts. Ebling will not be responsible for any expense related to parts or labor which is unrelated to defects in material or workmanship of an Ebling Back Blade.

WHAT IS NOT COVERED

This warranty does not cover any parts not manufactured by Ebling or any damage caused by such parts, nor does it cover any Back Blade subjected to misuse, neglect, accident, other than ordinary use or service for snow removal, improper installation, maintenance or storage, or repair or alteration by anyone except Ebling or an authorized Ebling distributor.

Further, attachment of an Ebling Back Blade to a vehicle, including any necessary modification of the Back Blade and/or the vehicle, is entirely at the purchasers risk and expense and compliance with applicable motor vehicle regulations is the responsibility of the purchaser. Ebling with not be responsible for any expense related to parts or labor, which is unrelated to defects in material or workmanship of an Ebling Back Blade. Ebling does not assume any liability for any damage to a motor vehicle resulting from the attachment or from the use of

Ebling's Back Blade, including inconvenience, motor violations, or fees. Ebling does not assume any liability for the cost of modification of the Back Blade or the vehicle required to attach the Back Blade, if necessary.

In addition this Warranty does not cover:

- Problems caused by failure to follow the product instruction.
- Unit, Component, or Part failure due to improper maintenance or storage
- Paint / Powder Coat / Finishes of the Back Blade
- Products with missing or altered serial numbers
- Any Unit, Component, or Part which has been modified or altered in any way.
- Problems caused by contamination, interference or restriction of moving parts, rust, corrosion, freezing or overheating.
- Expendable / Wear Items such as, but not limited to; pins, cutting edges, wing closure blocks & edges, and markers.
- Damage to any vehicle to which the products are mounted, or the suitability of any product for vehicles which are not fitted with the appropriate parts.
- Damage caused by usage that is not in accordance with the intended Back Blade use. (Use of the Back Blade for any purpose other than plowing snow is considered misuse and abuse)
- Any Unit, Component, or Part which has been modified or altered in any way.
- Problems caused by using accessories, parts, or components not supplied by Ebling and Son.
- Cost of Tax
- Cost of Freight (To or From Ebling or its Supplier) Including Transportation or Storage Charges such as but limited to; fuel or labor.
- Environmental charges, solvents, sealants, lubricants, or any other normal / standard shop supply or the cleanup, care, or storage of such items.
- Problems caused by collision, fire, theft, vandalism, riot, explosion, lightning, earthquake, windstorm, hail, water, flood, or any other Acts of God.
- Liability for damaged to property, or injury to, or death of any person arising out of the operation, maintenance or use of the Back Blade.
- Additional hardship or loss of income due to lack of, or inability of use of Back Blade due to Unit, Component, or Part failure, whether the failure is covered by Warranty or Denied.

REMEDY FOR DEFECTIVE BACK BLADE

Upon receipt by Ebling or an authorized Ebling distributor of any defective Back Blade Unit, Component, or Part, referred to below as "Part", covered by this warranty, Ebling will, at its option, repair or replace the defective "Part" at its expense including labor costs as its standard rate incurred while repairing said "Part", provided the purchaser of the "Part" has followed procedure for obtaining warranty performance set forth below. The "Part" so repaired or supplied as a replacement will be shipped to the purchaser of the defective "Part", with transportation charges being the responsibility of the purchaser. Any damage in transit will be the responsibility of the carrier or at the risk of the purchaser. During the time of warranty

evaluation of the "Part" presented to Ebling & Son or its Authorized Dealer, the customer may choose to receive a replacement "Part", and / or repair of "Part". The customer will be invoiced for the "Part" or repair including the part(s) and associated labor and freight and paid to Ebling & Son, Inc. with the customers standard payment terms. Upon completion of the warranty evaluation the customer will be notified of warranty evaluation results. If the warranty evaluation results in acceptance, a credit for the "Part", only, will be returned to the customer by check or credit to account. Note above policy in regards to labor and freight / shipping charges.

EBLING'S LIABILTY IS EXPRESSLY LIMITED TO THE REPAIR AND REPLACEMENT OF DEFECTIVE PARTS AS HEREIN PROVIDED, EBLING SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL OR CONTINGENT DAMAGES WHATSOEVER, WHETHER FOR BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHER TORT, OR ANY STRICT LIABILITY THEORY.

This warranty is not offered to purchasers of Back Blades for personal, family, or household purposes. A separate "limited" Consumers warranty is offered to such purchasers.

21.2 Consumer Warranty Details

EBLING BACK BLADE
LIMITED WARRANTY
TO CONSUMERS

THIS WARRANTY IS OFFERED IN LIEU OF ANY OTHER EXPRESS WARRANTY; AND EXCEPT TO THE EXTENT OF PROHIBITED BY APPLICABLE LAW, ALL IMPLIED WARRANTIES, INCLUDING (BUT NOT LIMITED TO) THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.

Some states do not allow limits on how long an implied warrant lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

Ebling & Son Inc. (Ebling) warrants to each initial purchaser of an Ebling Back Blade for personal, family, or household use that the Back Blade will, for a period of two (2) years, after original purchase, be free from defects in material and workmanship. Ebling does not authorize any party, including its authorized distributors, to offer any other warranty on behalf of Ebling. Upon expiration of the warranty period, Ebling will have no further liability related to the Back Blade, except with respect to warranty claims arising during the warranty period. The term "Back Blade" includes accessories and components manufactured by Ebling.

WHAT IS NOT COVERED

This warranty does not cover any parts not manufactured by Ebling or any damage caused by such parts, nor does it cover any Back Blade subjected to misuse, neglect, accident, other than ordinary use or service for snow removal, improper installation, maintenance or storage, or repair or alteration by anyone except Ebling or an authorized Ebling distributor.

Further, if not performed by Ebling or an authorized Ebling distributor, attachment of a Back Blade to a vehicle, including any necessary modification of the Back Blade and/or the vehicle, is entirely at the purchasers risk and expense and compliance with applicable motor vehicle regulations is the responsibility of the operator. Ebling with not be responsible for any expense related to parts or labor, which is unrelated to defects in material or workmanship of an Ebling Back Blade.

In addition this Warranty does not cover:

- Problems caused by failure to follow the product instruction.

- Unit, Component, or Part failure due to improper maintenance or storage.

- Problems caused by contamination, interference or restriction of moving parts, rust, corrosion, freezing or overheating.
- Paint / Powder Coat / Finishes of the Back Blade
- Expendable / Wear Items such as, but not limited to; pins, cutting edges, wing closure blocks & edges, and markers.
- Damage to any vehicle to which the products are mounted, or the suitability of any product for vehicles which are not fitted with the appropriate parts.
- Damage caused by usage that is not in accordance with the intended Back Blade use. (Use of the Back Blade for any purpose other than plowing snow is considered misuse and abuse)
- Any Unit, Component, or Part which has been modified or altered in any way.
- Problems caused by using accessories, parts, or components not supplied by Ebling and Son.
- Cost of Tax
- Cost of Freight (To or From Ebling or its Supplier) Including Transportation or Storage Charges such as but limited to; fuel or labor.
- Environmental charges, solvents, sealants, lubricants, or any other normal / standard shop supply or the cleanup, care, or storage of such items.
- Problems caused by collision, fire, theft, vandalism, riot, explosion, lightning, earthquake, windstorm, hail, water, flood, or any other Acts of God.
- Liability for damaged to property, or injury to, or death of any person arising out of the operation, maintenance or use of the Back Blade.
- Products with missing or altered serial numbers.
- Additional hardship or loss of income due to lack of, or inability of use of Back Blade due to Unit, Component, or Part failure, whether the failure is covered by Warranty or Denied.

REMEDY FOR DEFECTIVE BACK BLADE

Upon receipt by Ebling or an authorized Ebling distributor of any defective Back Blade Unit, Component, or Part, referred to below as "Part", covered by this warranty, Ebling will, at its option, repair or replace the defective "Part" at its expense including labor costs as its standard rate incurred while repairing said "Part", provided the purchaser of the "Part" has followed procedure for obtaining warranty performance set forth below. The "Part" so repaired or supplied as a replacement will be shipped to the purchaser of the defective "Part", with transportation charges being the responsibility of the purchaser. Any damage in transit will be the responsibility of the carrier or at the risk of the purchaser.

PURCHASER'S REMEDIES FOR A DEFECTIVE BACK BLADE, EXCEPT TO THE EXTENT PROHIBITED BY THE APPLICABLE LAW, ARE LIMITED TO THE REMEDY PROVIDED BY THIS WARRANTY; AND, EXCEPT TO THE EXTENT PROHIBITED BY

APPLICABLE LAW, EBLING WILL IN NO EVENT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGE ARISING OUT OF THE USE

OF, OR INABLITY TO USE, THE BACK BLADE, WHETHER BASED ON BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE OR STRICT LIABLILITY.

Some states do not allow the exclusion of limitation of consequential or incidental damages, so the above limitation or exclusion may not apply to you.

PROCEDURE FOR OBTAINING WARRANTY PERFORMANCE

Within ten (10) days after defect in a Back Blade arising during the warranty period becomes known, the purchaser of the Back Blade must notify Ebling or the authorized Ebling distributor, of the claimed defect, in writing, and provide proof of original purchase including documentation of the original serial number. If Ebling or authorized distributor requests, for proper inspection of damaged "Part" the purchaser must return the "Part" with all transportation charges prepaid to the authorized distributor. Any damage in transit will be the responsibility of the carrier or at the risk of purchaser.

During the time of warranty evaluation of the "Part" presented to Ebling & Son or its Authorized Dealer, the consumer may choose to receive a replacement "Part", and / or repair of "Part". The consumer will be invoiced for the "Part" or repair including the part(s) and associated labor and freight and paid to Ebling & Son, Inc. with the consumers standard payment terms. Upon completion of the warranty evaluation the consumer will be notified of warranty evaluation results. If the warranty evaluation results in acceptance, a credit for the "Part", only, will be returned to the consumer by check or credit to account. Note above policy in regards to labor and freight / shipping charges.

NOTES:

Manufactured in U.S.A. by:

Ebling Snowplows
4484 Roger B. Chaffee SE
Kentwood, MI 49548
Phone: (616) 532-8400
www.eblingsnowplows.com

Ebling Snowplows reserves the right to change the design and/or construction details of its products at any time and as such furnish equipment that may differ from the illustrations and specifications in this literature. Ebling Snowplows offers a limited warranty for all snowplows and accessories. See separate printed warranty document for warranty information. Ebling Snowplows or the vehicle manufacturer may require or recommend optional equipment on the vehicle for snow removal. Do not exceed gross vehicle weight ratings with a snowplow installed.