



the snowplow professionals

Minute
Mount[®]
SYSTEM

**Electric Clutch/
Solenoid Valve
Belt Drive Hydraulic System**

**OWNER'S MANUAL
AND
MECHANIC'S GUIDE**

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PREFACE

This manual has been prepared to acquaint you with the operation and maintenance of your new FISHER® Snowplow. It also provides safety information. We urge you to read this manual carefully and to follow all recommendations. This will help ensure profitable and trouble-free operation of your snowplow. Keep this manual accessible. It is a handy reference in case a minor service problem arises.

When service is necessary, bring your snowplow to your local Fisher Dealer or Distributor. They know your plow best and are interested in your complete satisfaction.

Fisher Engineering offers a one year limited warranty for all snowplows, accessories, parts and labor; except for Electric Clutch/Solenoid Valve hydraulic components. They are covered by a two year limited warranty. Please refer to the warranty sheet for more information.

Fisher Engineering does not warranty non-FISHER service parts or accessories; and the damage caused by the use of these unauthorized items.

Fisher Engineering and/or the vehicle manufacturer may require and/or recommend optional equipment for snowplows.

SAFETY RULES

These warnings must be followed for your own protection and safety. Failure to do so could result in serious bodily injury to yourself or others.

⚠ WARNING

Read all instructions, including safety information, before performing any service or maintenance on your snowplow.

⚠ WARNING

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

BEFORE YOU BEGIN

- Park the vehicle on a level surface, place shift lever in PARK or NEUTRAL and set parking brake.
- Leave the plow mounted on the vehicle for most service procedures.

PERSONAL SAFETY

- Wear only snug-fitting clothing while working on your vehicle or snowplow.
- Do not wear jewelry or a necktie and secure long hair.
- Be especially careful near moving parts such as fan blades, pulleys, and belts.
- Wear safety goggles to protect your eyes from battery acid, gasoline, dirt and dust.
- Avoid touching hot surfaces such as engine, radiator, exhaust pipes and hoses.
- Always have a fire extinguisher rated for flammable liquids and electrical fires (BC) handy.

VENTILATION

⚠ DANGER

Vehicle exhaust contains deadly carbon monoxide (CO) gas. Breathing in even low concentrations can cause death. Never operate vehicle in an enclosed area without properly venting exhaust.

If you work on vehicle or plow in a garage or other enclosed area, be sure to vent exhaust gas directly to the outside through a leakproof exhaust hose.

SAFETY RULES

FIRE AND EXPLOSION

⚠ WARNING

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

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

BATTERY SAFETY

⚠ WARNING

A charging battery gives off gases that can explode if brought into contact with spark or flame. Cover top of battery with electrically nonconductive material to keep sparks from testing operations away from battery gases.

- Never lay tools or equipment on the battery. You could accidentally ground the POSITIVE (+) battery terminal, resulting in electrical shock, burns or damage to the vehicle or equipment.

- Avoid contact with battery acid. It can burn your eyes or skin and holes in clothing.
- Always disconnect the battery before removing or replacing electrical components such as the motor relay or battery cables.

HYDRAULIC SAFETY

⚠ WARNING

Hydraulic oil under pressure can cause skin injection injury. If left untreated, these injuries can result in amputation or death. If you are injured by hydraulic oil, get medical treatment immediately.

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

GETTING TO KNOW YOUR SNOWPLOW

MINUTE MOUNT® SYSTEM

The Minute Mount System allows quick and easy removal of the plow, a-frame and headgear assemblies during the off-season and between storms. Experience the freedom from the weight and bulk of the headgear and still maintain the original "showroom" appearance of your new truck.

BLADE

The Fisher difference, the integral trip-edge design, is available for both the H.S. Series and L-Series blades. When an obstacle is encountered only the edge trips, not the entire blade. Because the blade remains upright, the snow in front of the blade stays put, the load is not dumped and you keep on plowing with no stops and starts.

L- SERIES

For full size vehicles, our L-Series blade is available in 7', 7-1/2', 8' and 9' widths. Speedcast moldboard, with the unique trip edge, is backed with wear resistant bars.* Improved location of the moldboard bottom bar makes the L-Series even tougher than the earlier G & H Series.

The 7-1/2, 8 and 9 foot blades are available with replaceable cutting edges.

- * These are two 1/2" x 2-1/2" x 12" special steel wear-bars welded at the corners behind the base angle.

ACCESSORIES AND OPTIONS

SNOFOIL®

A rigid extension to your snowplow blade to deflect light snow away from the windshield. It improves visibility, efficiency and speed. The SnoFoil bolts onto your existing blade with ease. Available for 7', 7-1/2', 8' and 9' blades.

DEFLECTOR

Keeps fluffy snow from flowing over the top of the snowplow blade. It fits FISHER® L-Series blades. Easily installed and attractively priced.

REPLACEABLE CUTTING EDGE

3/8" or 1/2" cutting edges made of high carbon steel that bolt onto your base angle for maximum blade life. Intended for the commercial plow and available in 7-1/2', 8' and 9' sizes.

ANTI-WEAR SHOES

These shoes are offered for maximum protection against blade wear. The more the blade is used, the more important the shoes become.

TOUCH-UP PAINT

FISHER touch-up paint is available to keep your plow looking like new and protected from rust.

MINUTE MOUNT® SYSTEM SKID PLATES

These off-season inserts for the Minute Mount System pushplates offer protection by filling and covering the receiver portion of the pushplates. They also add to the vehicle's off-season appearance.

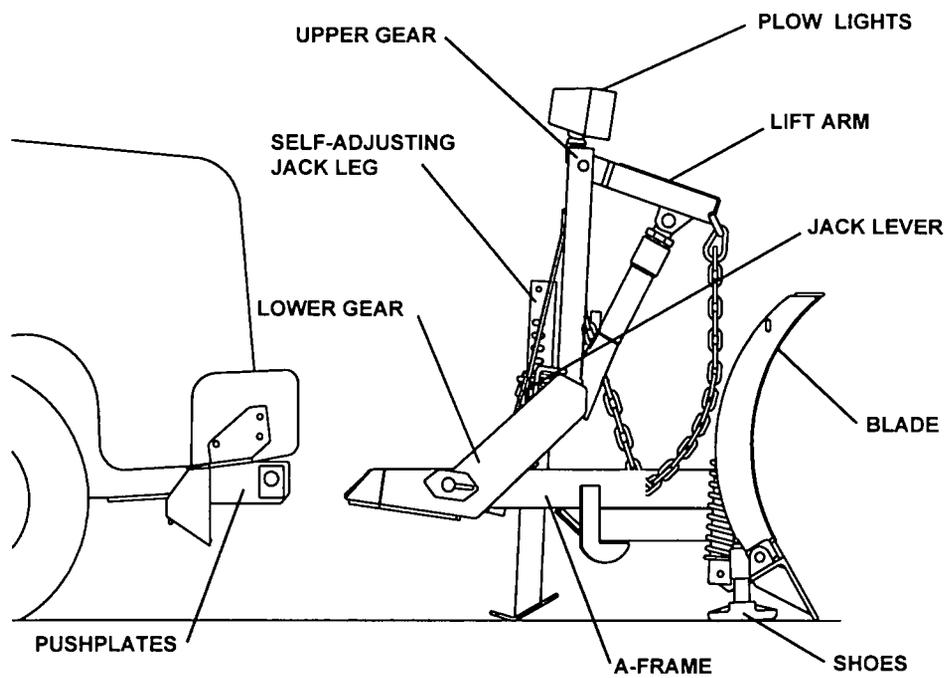
FISH-STIK™ HAND-HELD CONTROL

The Fish-Stik hand-held control can be used with either the FISHER Solenoid Electric Hydraulic Pak or Electric Clutch/Solenoid Valve hydraulic system. The Fish-Stik offers a comfortable, ergonomically designed handle for use in either hand with easy push button controls.

FISHER HIGH PERFORMANCE HYDRAULIC FLUID

Improve your system's performances, especially in extremely cold weather, with FISHER High Performance Hydraulic Fluid. Special antiwear and antifoaming additives keep your system running longer and smoother.

PLOW COMPONENTS



COMMON ATTACHMENT KIT

PLOW LIGHTS

The Common Attachment Kit is composed of the a-frame, upper and lower gear, jack and lift arm.

A-FRAME

The a-frame is attached to the blade assembly with a centered pivot pin. The pivot pin allows the blade assembly to angle left or right at 28 degrees; providing excellent snow displacement. The heavy 1" pivot pin is shear-proof under normal operation; assuring a solid connection.

UPPER GEAR, LOWER GEAR & LIFT ARM

The upper gear, lower gear and lift arm are the primary link between the snowplow and the vehicle. The upper and lower gear are connected to the pushplates, which are mounted directly to the vehicle frame. The upper gear provides the mounting framework for the lift cylinder and the lift arm. The lift arm raises and lowers the blade via the lift cylinder and lift chain.

WARNING

Before traveling, position blade so it does not block headlamp beam. Do not change blade position while traveling.

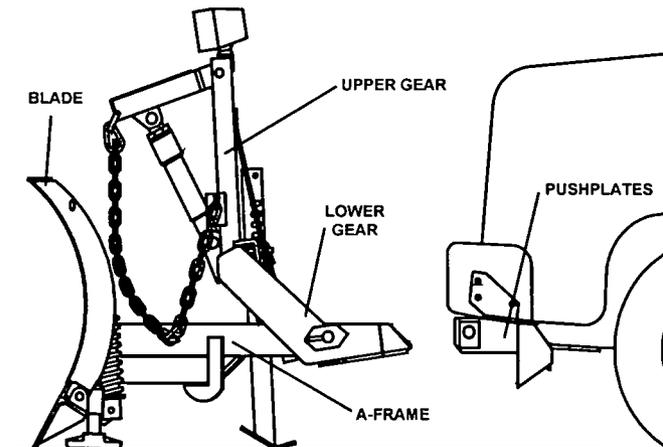
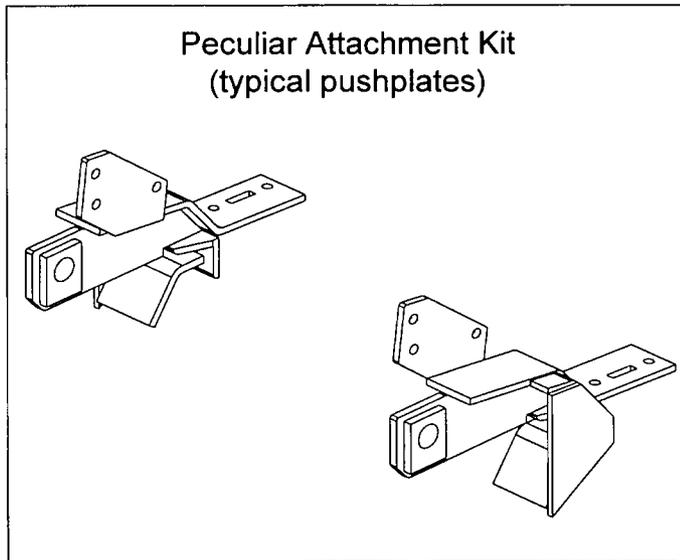
The plow lights include a set of rectangular dual-beam halogen headlamps, combination park and turn signals and prewired with a plug-in harness. These lights conform to the Federal Motor Vehicle Safety Standards (FMVSS).

When the plow plugs are **connected** during plow mounting, the headlamps will automatically switch to the plow lights when turned on. When the plow plugs are **disconnected** during plow removal, the headlamps will automatically switch back to the vehicle headlamps.

ATTACHMENTS

Fisher has designed a custom peculiar attachment kit for most vehicles. Due to the differences between vehicle models, the kits are generally not interchangeable.

The peculiar attachment kit is fastened to the underside of the vehicle frame. It is engineered to provide the primary connecting points between the snowplow and the vehicle. The weight of the Minute Mount® System is distributed to your vehicle's frame.



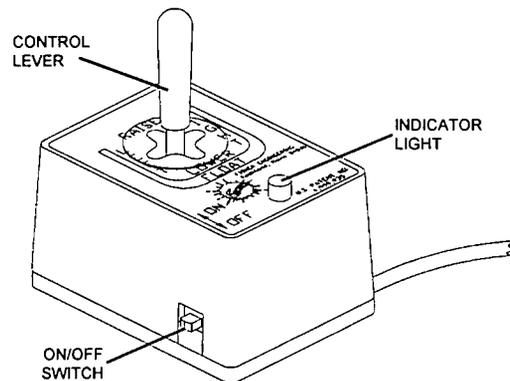
SOLENOID CONTROLS

⚠ WARNING

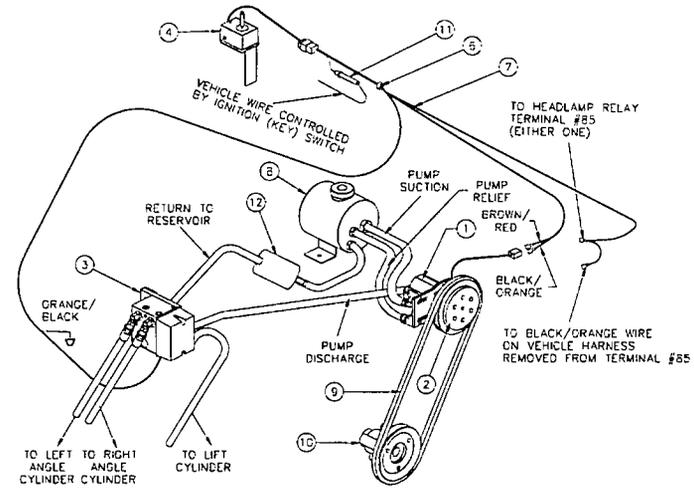
To prevent accidental movement of the blade, always turn the ON/OFF switch to OFF whenever the plow is not in use.

JOYSTICK CONTROL

The solenoid control receives power from a switched accessory line and is protected by a replaceable 10 amp in-line fuse. The ON/OFF switch allows you to turn off the control and prevent blade movement even when the ignition is on.



The Solenoid Control actuates the valve spools to raise, lower or angle the plow.



* This illustration is for instruction purposes only and may not depict your actual installation.

- | | |
|---------------------|------------------|
| 1. Pump | 8. Reservoir |
| 2. Electric Clutch | 9. V-Belt |
| 3. Solenoid Valve | 10. Drive Sheave |
| 4. Solenoid Control | 11. Fuse Holder |
| 6. Grommet | 12. Filter |
| 7. Control Harness | |

SOLENOID CONTROLS

FISH-STIK™ HAND-HELD CONTROL

The optional Fish-Stik hand-held control is electrically powered through the ignition (key) switch of your vehicle, and is protected by a replaceable 6 amp in-line fuse. The ON/OFF switch allows you to turn off the control and prevent blade movement even when the ignition is on.



HYDRAULIC POWER

The heart of any snowplow system is the hydraulics. No one offers more hydraulic options than Fisher!

UNDER-HOOD HYDRAULICS

The major hydraulic components are mounted under the hood of your vehicle; protected from snow, ice and possible theft. The engine heat helps keep the hydraulic oil at optimum operating temperature; ensuring consistent hydraulic performance.

The FISHER® Electric Clutch/Solenoid Valve belt drive hydraulic system is the most advanced hydraulic system available to power a snowplow. The hydraulic pump is powered by a drive pulley with an electrically operated clutch. It delivers oil to the control valve, where it is directed to the lift cylinder or either angle cylinder. The pulley is usually connected to the engine crank shaft.

You avoid possible electrical system overload by using belt drive hydraulics. This can be especially important during nighttime plowing when electrical demands on your battery are high. The electric clutch prevents the pump from rotating unnecessarily; minimizing wear. This results in prolonged component life and greater reliability.

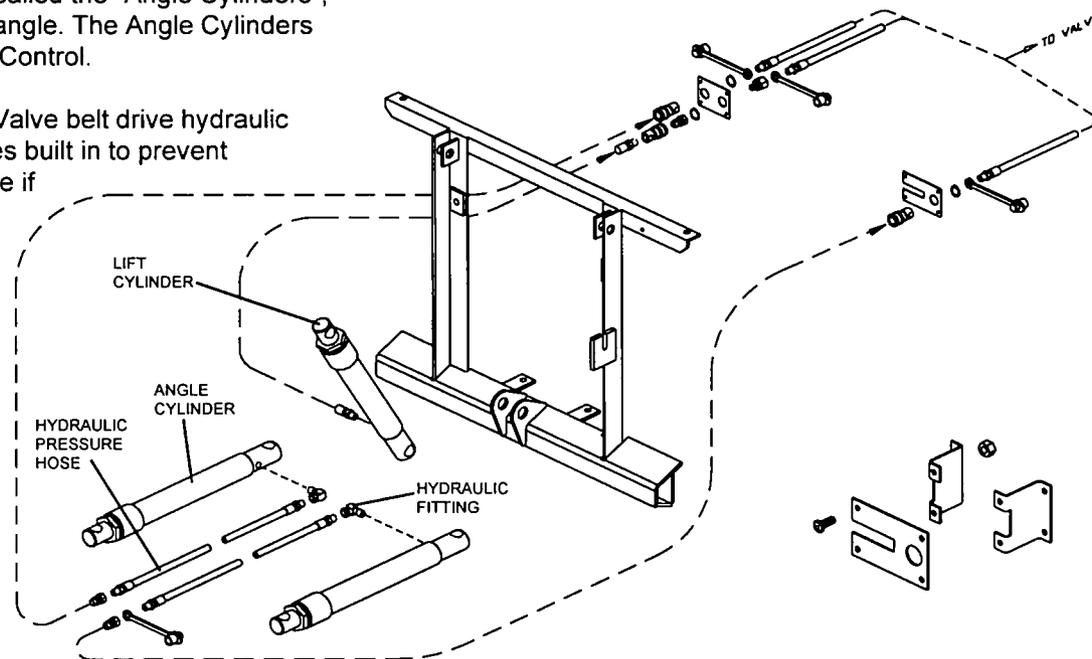
HYDRAULIC POWER

ANGLING

The Belt Drive Hydraulics power angling gives you full control of the plow from within the cab of the vehicle. Two single acting hydraulic rams, called the "Angle Cylinders", hold the blade at the desired angle. The Angle Cylinders are operated by the Solenoid Control.

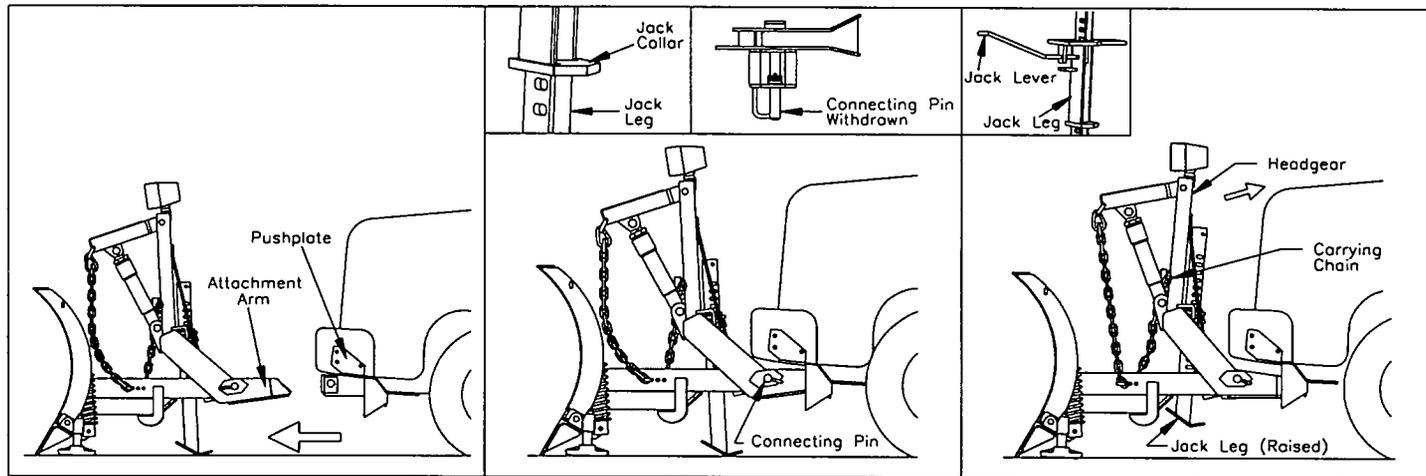
The Electric Clutch/Solenoid Valve belt drive hydraulic system has two cushion valves built in to prevent damage to the blade or vehicle if obstacles are hit. When force against the blade causes pressure in an extended ram to exceed set limits the relief

opens allowing oil to escape and the ram plunger to retract. Oil from the retracting cylinder dumps to the opposite angle cylinder as it extends.



MOUNTING SNOWPLOW TO VEHICLE

*For Removal instructions, see page 18.



* This illustration is for instruction purposes only and may not depict your actual plow installation.

⚠ WARNING

Inspect plow components and bolts for wear or damage whenever mounting or removing the plow. Worn or damaged components could permit plow to drop unexpectedly.

⚠ WARNING

Never put a finger in A-frame ear or coupling lug holes to check alignment. If the plow moved, your finger could be crushed.

MOUNTING SNOWPLOW TO VEHICLE

STEP A

1. Drive vehicle forward fully engaging pushplates into attachment arms.

STEP B

1. Twist connecting pin to release tension.
2. Remove electrical and hydraulic covers on vehicle.
3. Attach electrical connector to corresponding connector on vehicle.
4. Repeat steps B 1-3 on passenger side of vehicle.
5. Connect hydraulic hoses to quick disconnects.

STEP C

1. Release carrying chain and reattach it leaving plenty of slack.
2. Push headgear upward toward vehicle until connecting pins snap in place.
3. Pull jack lever outward and raise the jackstand.

NOTE: Adequate chain slack is necessary for connecting pin hole alignment.

OPERATING YOUR SNOWPLOW

CONTROLLING THE BLADE

⚠ CAUTION

DO NOT hold the control in RAISE, ANGLE LEFT or ANGLE RIGHT position more than 5 seconds after blade has reached desired position. To do so could result in the hydraulic fluid overheating.

Turn vehicle ignition switch on. Turn control power on. The control indicator light should light.

RAISE: Place the control in the RAISE position until the blade has reached the desired height. Blade movement will stop when either the control is released or the blade reaches its upper limit.

ANGLE RIGHT: Placing the control in the RIGHT position will angle the blade right. Release the control when you reach the desired angle.

ANGLE LEFT: Placing the control in the LEFT position will angle the blade left. Release the control when you reach the desired angle.

OPERATING YOUR SNOWPLOW

LOWER/FLOAT: Placing the control in the LOWER position for 1 second will allow the blade to go into the float mode: the blade will follow the contour of the surface being plowed.

Solenoid Control: Moving the lever to the LOWER position will automatically lower the blade to the surface and actuate the float mode.



Fish Stik Only: Pressing and releasing the LOWER button for less than one second will allow you to "inch" the blade down.



Both: Float can be canceled by momentarily placing the control to the RAISE position, turning off the control or turning off the vehicle ignition. Angling left or right will not cancel float.

⚠ WARNING
To prevent accidental movement of the blade, always turn the ON/OFF switch to OFF whenever the plow is

Lock Blade: Turn the control off to lock the blade. This prevents accidental blade movement.

LIGHT CHECK

⚠ WARNING
Make sure blade does not block headlight beams.

With both plow plugs connected, check the operation of all vehicle and plow lights as follows:

Parking Lamps: Both vehicle and plow lamps should be on.

Right Turn Signal: Both vehicle and plow lamps should be on.

Left Turn Signal: Both vehicles and plow lamps should be on.

Headlamps: With the vehicle headlamp switch "on", connecting and disconnecting the 12 pin plow plug should switch between the vehicle and plow headlamps as follows:

- 12 pin plow plug DISCONNECTED - Vehicle headlamps should be on.
- 12 pin plow plug CONNECTED - Plow headlamps should be on.

OPERATING YOUR SNOWPLOW

Aim plow headlamps with plow mounted and raised to travel position. Aim vehicle headlamps with plow removed from vehicle.

PARKING WITH PLOW ATTACHED

⚠ WARNING

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

Lower blade to the ground whenever you park your vehicle.

TRANSPORTING PLOW

⚠ WARNING

Never exceed posted road speeds. Under bad weather conditions or when driving on uneven surfaces such as railroad tracks or bumpy roads reduce speed.

⚠ WARNING

Your vehicle must be equipped with plow headlights and directional lights. Be sure the plow lights are operating properly before traveling.

1. Raise blade.
2. Adjust blade and carrying chain for maximum plow light illumination.
3. Adjust blade to straight position.
4. Move solenoid control ON/OFF switch to OFF to lock blade in place.
5. Monitor vehicle operating temperature. Overheating is unlikely under normal driving conditions. Occasionally the plow may be positioned where it deflects air away from the radiator. If this occurs, stop the vehicle and raise or lower the plow slightly to correct overheating.

NOTE: These instructions are for driving short distances to and from plowing jobs. For long trips, remove plow from front of vehicle.

NOTE: For vehicles with less than 3/4 ton rating: only the driver should be in the vehicle during transport when the plow is attached.

PLOWING SNOW

GENERAL INSTRUCTIONS

⚠ WARNING
Always wear seat belt when plowing snow. A hidden obstruction could cause the vehicle to stop suddenly, throwing you forward and injuring you.

⚠ WARNING
Never plow with head out of the vehicle window. Sudden stops or protruding objects could cause severe neck or head injuries.

⚠ CAUTION
To prevent damage to plow or vehicle, flag any obstructions that are hard to locate.

1. Before plowing, make sure you know of any obstructions hidden beneath the snow, such as: bumper stops in parking lots, curbs, sidewalk, shrubs, fences or pipes sticking up from the ground.
2. Only the driver should be in the vehicle when the plow is attached.
3. Plow during the storm rather than letting snow accumulate.

4. When you are stacking snow, begin raising the blade as you come close to the stack. This will let the blade ride up the stack.

SPECIAL SNOW CONDITIONS

Hard-packed Snow

1. On all L-Series Blades and H.S. Blades equipped with a shoe kit, raise the disc shoes so that the cutting edge comes into direct contact with the pavement. (See Regular Maintenance and Adjustments, page 20)
2. Use lowest gear to place maximum power behind cutting edge.
3. An angled blade is more effective to remove hard-packed snow.

Deep Snow

1. Shear off top layers by plowing with the blade raised 3 to 4 inches for the initial pass.
2. Bite into the edges using only partial blade width until job is cut down to size for full blade plowing. Rule of thumb: 6" snow may be plowed with entire blade width; 9" with 3/4 blade; 12" with 1/2 blade. Experience and "feel" are the best guides.

PLOWING SNOW

3. When plowing deep snow, be sure to keep vehicle moving.
4. Ballast is suggested for maximum traction. (See Preseason Check, page 20)
5. For increased traction use tire chains.

CLEARING DRIVEWAYS

1. Head into the driveway with the blade angled and plow the snow away from any buildings. Widen driveway by rolling snow away from any buildings.
2. If a building is at the end of the driveway, plow to within a vehicle length of the building. Push as much snow as possible off the driveway.
3. With a raised straight blade, drive through remaining snow to building. Drop blade and "back-drag" snow away from the building at least one vehicle length. Repeat if necessary.
4. Back vehicle to the building and plow forward, removing the remaining snow from the driveway. Check municipal ordinances for proper disposal of snow.

CLEARING PARKING LOTS

1. Clear areas in front of buildings first. Drive up to the building with the blade raised. Drop the blade and "back-drag" the snow away from building. When snow is away from the buildings, turn the vehicle around and push the snow.
2. Plow a single path down the center going the long direction.
3. Angle the plow toward the long sides. Plow successive strips lengthwise until area is cleared and snow is stacked around outer edges.
4. If snow is too deep to clear in above manner, clear main traffic lanes as much as possible.

PLOW SPEED CAUTION LABEL

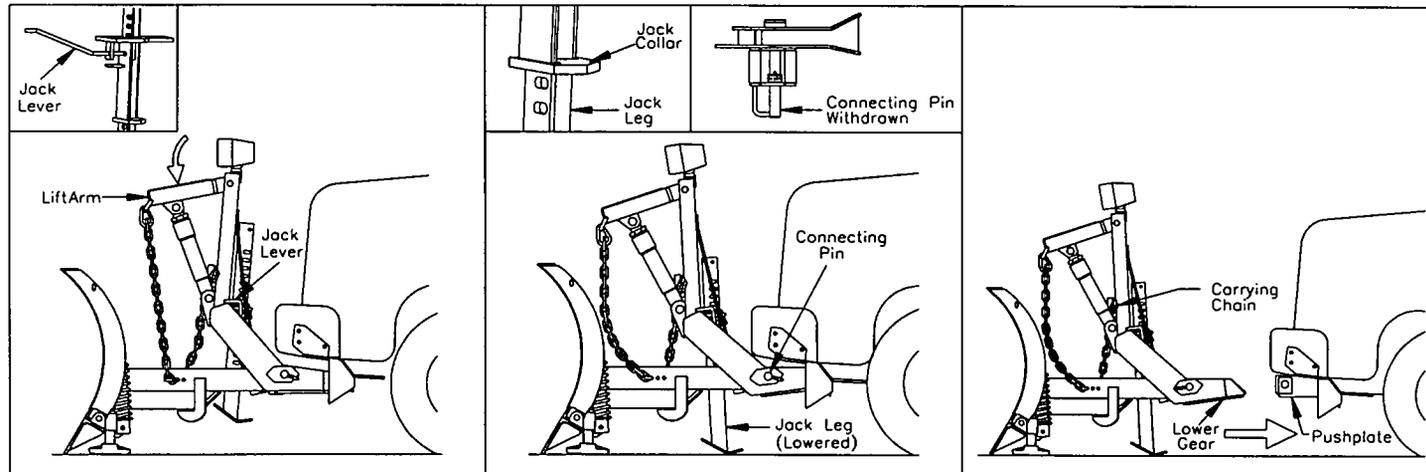
CAUTION

1. Drive slowly while blade is attached.
2. Attach carrying chain for "Over the road travel".
3. Lower blade whenever vehicle is unattended.
4. Use warning flasher when blade is attached.

SNOWPLOWING IS CONSIDERED HAZARDOUS

Vehicle speed should not exceed
5 MPH while plowing.

REMOVING SNOWPLOW & STORAGE



* This illustration is for instruction purposes only and may not depict your actual plow installation.

⚠ WARNING

Inspect plow components and bolts for wear or damage whenever mounting or removing the plow. Worn or damaged components could permit plow to drop unexpectedly.

⚠ WARNING

Never put a finger in A-frame ear or coupling lug holes to check alignment. If the plow moved, your finger could be crushed.

REMOVING SNOWPLOW & STORAGE

⚠ WARNING

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

STEP A

1. Place cab control in "LOWER/FLOAT."
2. Push lift arm down.
3. Pull jack lever outward. Jack leg will adjust to proper height.

STEP B

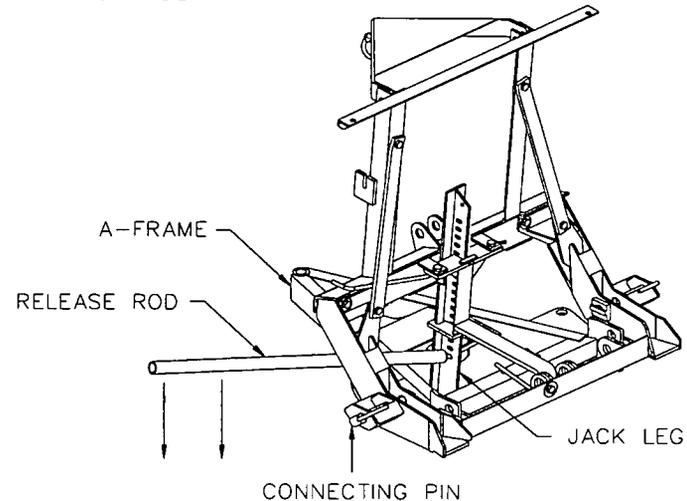
1. Disconnect electrical connector and reinsert in protective cover.
2. Insert tip of release rod in lowest hole on jack leg above a-frame.
3. Push down on release rod as you pull and twist connecting pin.
4. Repeat steps B1-3 on passenger side.
5. Disconnect hydraulic hose couplings and cover with dust plugs. (Belt Drive Only)

STEP C

1. Remove slack from carrying chain and reattach.
2. Back vehicle away from plow.

NOTE: The solenoid control and bracket can be removed for off-season storage. Disconnect the molded connector in the cab and slide control off of bracket. Store the control in glove box of vehicle.

RELEASE ROD



NOTE: DO NOT push release rod all the way down. This will create pressure on the connecting pins.

MAINTENANCE

PRESEASON CHECK

Before the snow season, check your equipment and make sure it's in working condition. Here are some tips for getting your equipment ready:

- Check hydraulic system for leaks and cracked or damaged hoses.
- Check oil level.
- Replace worn or defective parts.
- Check all mountings and tighten fasteners.
- Repaint blade assembly and attachments, as necessary, to protect the metal from adverse conditions.
- Install auxiliary and flashing lights for safety in accordance with local regulations.
- Check headlights and auxiliary lights.
- Counterbalancing may be necessary, or beneficial, on some vehicles to provide maximum traction.
- Any counterbalancing material (sand, blocks, etc.) must be solidly secured to the vehicle preventing it from moving under harsh plowing conditions.

- DO NOT exceed the Gross Vehicle Weight (GVW) or the Gross Axle weight Rating (GAWR) of your vehicle.

REGULAR MAINTENANCE AND ADJUSTMENTS

Your FISHER® snowplow is designed for rugged, dependable service. Though, like the vehicle on which it is mounted, it needs regular care and maintenance.

Check that all fasteners, mounting bolts, hydraulic and electrical connections are tight before each storm and frequently throughout season. Also check all plugs and seals for leaks. Repair as necessary.

MUSHROOM SHOE ADJUSTMENT

The disc shoes should be adjusted to provide 1/4" to 1/2" clearance between cutting edge and surface. Place the supplied spacer rings between the shoe bracket and the blade shoe bracket to obtain this clearance. DO NOT store unused spacers on top of shoe bracket.

MAINTENANCE

CUTTING EDGE

- Replace cutting edge on your L-Series blade when it is worn within 1" of the carriage bolts.
- Lubricate all pivot points. (i.e. connecting pin assembly, lower spring anchor, etc.)

ANNUAL FLUID CHANGE

It is important to change the hydraulic fluid at the start of each plowing season.

EMERGENCY PARTS

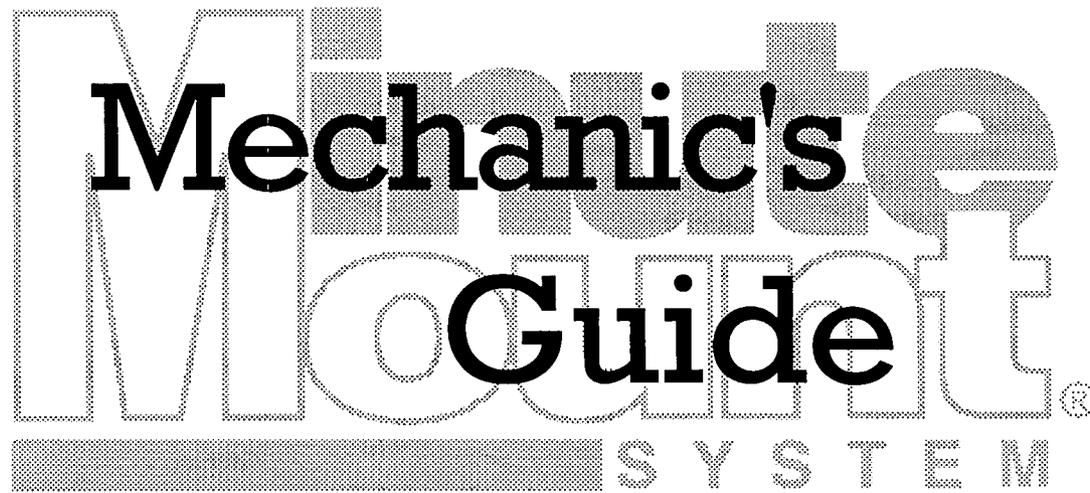
It is suggested that the following items be kept in the vehicle for emergency use:

- 1 - 6817 Pivot Pin 1" x 6"
- 1 - 90013 Cotter Pin 1/4" x 2"
- 1 - 10" Adjustable Wrench
- 1 - Medium Screw Driver
- 1 - Pair of Pliers
- 1 - Quart FISHER® High Performance Hydraulic Fluid.



POSTSEASON MAINTENANCE

- Clean and paint blade assembly as needed.
- Connect angle hose male and female disconnects together and apply a light grease to exposed cylinder rods.
- If blade is to be left in one location for an extended period of time - place blocks under the cutting edge and shoes to eliminate ground contact. This will reduce the chances of rust on the lower part of the plow.
- Collapse lift cylinder so that cylinder rod is not exposed.
- Drain and flush hydraulic system and refill with FISHER High Performance Hydraulic Fluid.
- Coat terminals of grill plug and plow plug with dielectric grease.

The logo for Minute Mount SYSTEM. It features the word "Minute" in a large, bold, black serif font, with "Mount" in a smaller, bold, black serif font directly below it. The word "SYSTEM" is written in a smaller, bold, black sans-serif font, spaced out, below "Mount". A thick, solid black horizontal bar is positioned below the word "Mount". The background of the logo is a light gray halftone pattern.

Minute
Mount
SYSTEM

SAFETY RULES

These warnings must be followed for your own protection and safety. Failure to do so could result in serious bodily injury to yourself or others.

⚠ WARNING
Read all instructions, including safety information, before performing any service or maintenance on your snowplow.

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

BEFORE YOU BEGIN

- Park the vehicle on a level surface, place shift lever in PARK or NEUTRAL and set parking brake.
- Leave the plow mounted on the vehicle for most service procedures.

PERSONAL SAFETY

- Wear only snug-fitting clothing while working on your vehicle or snowplow.
- Do not wear jewelry or a necktie and secure long hair.
- Be especially careful near moving parts such as fan blades, pulleys, and belts.
- Wear safety goggles to protect your eyes from battery acid, gasoline, dirt and dust.
- Avoid touching hot surfaces such as engine, radiator, exhaust pipes and hoses.
- Always have a fire extinguisher rated for flammable liquids and electrical fires (BC) handy.

VENTILATION

⚠ DANGER
Vehicle exhaust contains deadly carbon monoxide (CO) gas. Breathing in even low concentrations can cause death. Never operate vehicle in an enclosed area without properly venting exhaust.

If you work on vehicle or plow in a garage or other enclosed area, be sure to vent exhaust gas directly to the outside through a leakproof exhaust hose.

SAFETY RULES

FIRE AND EXPLOSION

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

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

BATTERY SAFETY

⚠ WARNING
A charging battery gives off gases that can explode if brought into contact with spark or flame. Cover top of battery with electrically nonconductive material to keep sparks from testing operations away from battery gases.

- Never lay tools or equipment on the battery. You could accidentally ground the POSITIVE (+) battery terminal, resulting in electrical shock, burns or damage to the vehicle or equipment.

- Avoid contact with battery acid. It can burn your eyes or skin and holes in clothing.
- Always disconnect the battery before removing or replacing electrical components such as the motor relay or battery cables.

HYDRAULIC SAFETY

⚠ WARNING
Hydraulic oil under pressure can cause skin injection injury. If left untreated, these injuries can result in amputation or death. If you are injured by hydraulic oil, get medical treatment immediately.

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

THEORY OF OPERATION

The control performs four functions:

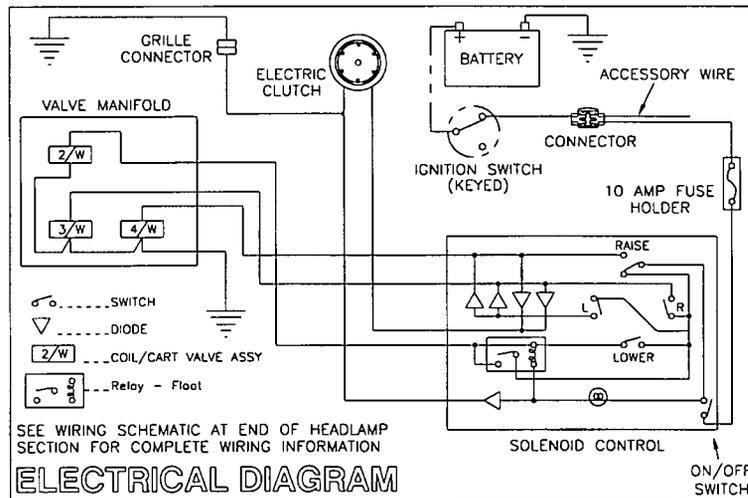
RAISE
LOWER
ANGLE RIGHT
ANGLE LEFT

All functions require that the vehicle ignition (key) switch be in the run position or the accessory position and the

ON/OFF switch on the control be in the "ON" position. Three functions—RAISE, ANGLE RIGHT, ANGLE LEFT—require the operation of the clutch to drive the hydraulic pump and the shifting of cartridge valve spools. The fourth function, LOWER, requires only the shifting of a cartridge valve spool.

ELECTRICAL OPERATION OF THE CLUTCH

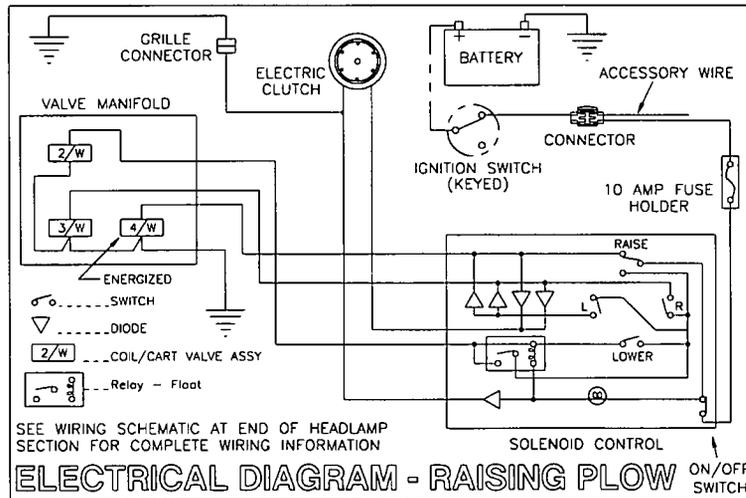
When the control is moved to the RAISE, LEFT, or RIGHT position, a switch inside the control is closed to allow electrical current to flow through the switch to the Clutch, through the ground and back to the battery. This causes the clutch to engage.



THEORY OF OPERATION

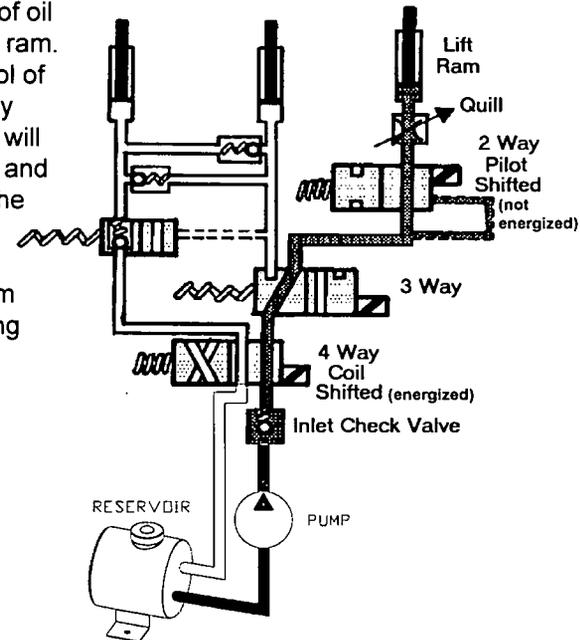
RAISING PLOW

Moving the control to the RAISE position closes a switch in the control. This switch provides current to operate the clutch. It also provides current to the coil of the 4-way cartridge valve. This current causes a magnetic field that will shift the spool of the valve directing flow of oil from the pump through the shifted 4-way spool, through the 3-way cartridge valve and to the 2-way cartridge valve spool.



The fluid pushes open the spring loaded spool of the 2-way cartridge and flows into the lift ram pushing the plunger up. When the control lever is moved back to neutral, the clutch and the 4-way cartridge valve coil are deactivated, stopping the flow of oil to the lift ram.

The spool of the 2-way valve will close and trap the oil in the lift ram holding it up.

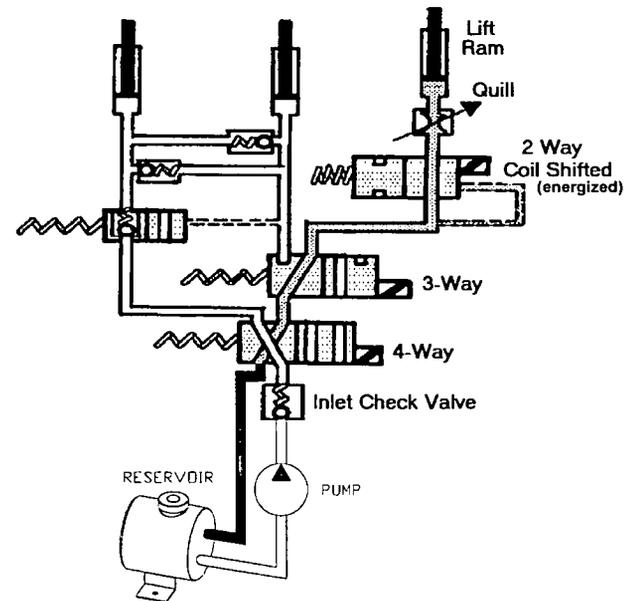
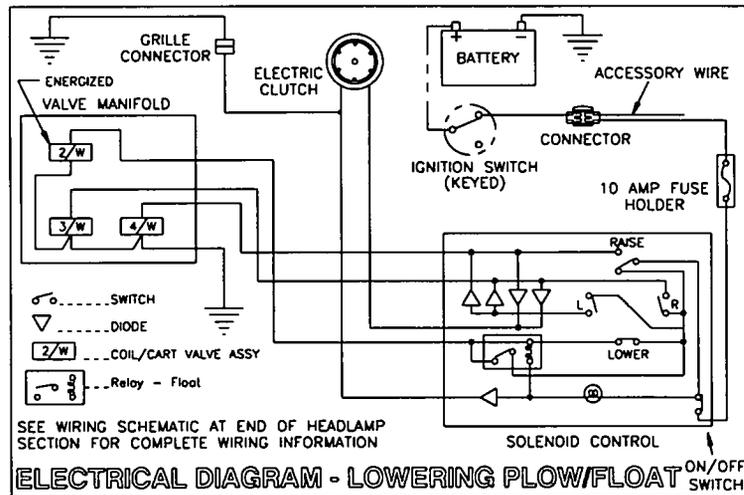


THEORY OF OPERATION

LOWERING PLOW-FLOAT

Moving the control into the LOWER/FLOAT position closes a switch. This switch allows current to flow to the 2-way valve coil and the float relay coil. The current flow causes a magnetic field which shifts the 2-way spool to allow oil to escape from the lift ram. The oil passes the adjustable quill, which controls the rate of blade lowering,

through the 3-way and 4-way cartridge valves back to the reservoir. The float relay closes and continues to power the 2-way valve until the control is moved to RAISE. Thus the plow will lower to the surface and continue to float after the control is returned to NEUTRAL. It will remain in this condition until the control is moved to RAISE.



THEORY OF OPERATION

CANCELING PLOW FLOAT

ACTION: Move control to lower and release.

SYSTEM RESPONSE:

1. Lower switch in control closes.
2. Current flows to 2-way cartridge valve coil (shifting spool) and through float relay coil (closing normally open contacts).
3. When control is released — lower switch in control opens. Current flows through the closed contacts of the float relay to the 2-way cartridge valve coil (holding spool shifted) and to the float relay coil (holding contacts closed).
4. The 2-way spool remains shifted, which permits the blade to follow the road contour, or "float".

CANCELING PLOW FLOAT

ACTION: Move control momentarily to the RAISE position to cancel "float".

SYSTEM RESPONSE:

1. The normally closed contacts of the raise switch are opened.
2. Current flow to the 2-way cartridge valve coil stops (spool closes) trapping oil in lift ram and holding it in position.
3. Current flow through the float relay coil stops (relay contacts open).

Whenever the control is moved to lower the plow, the plow will be in float until:

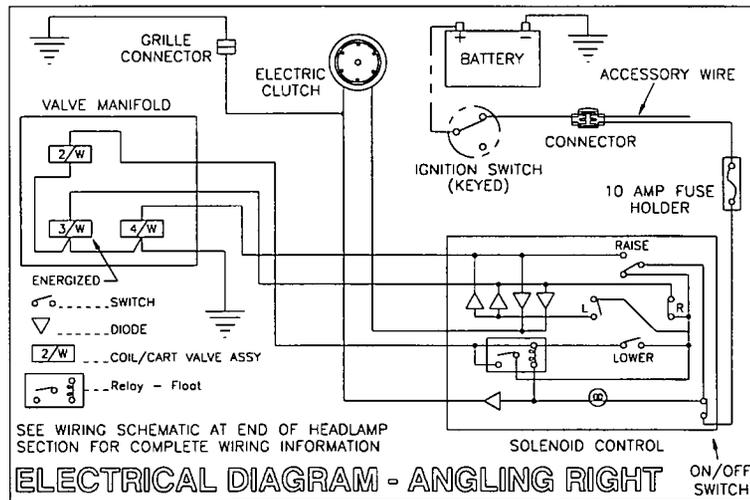
- The control is moved to RAISE.
- The control ON/OFF switch is turned off.
- The vehicle ignition (key) switch is turned off.

NOTE: The plow can be angled while in float. If the float relay fails, the blade will still lower and float as long as the lever is manually held in lower position.

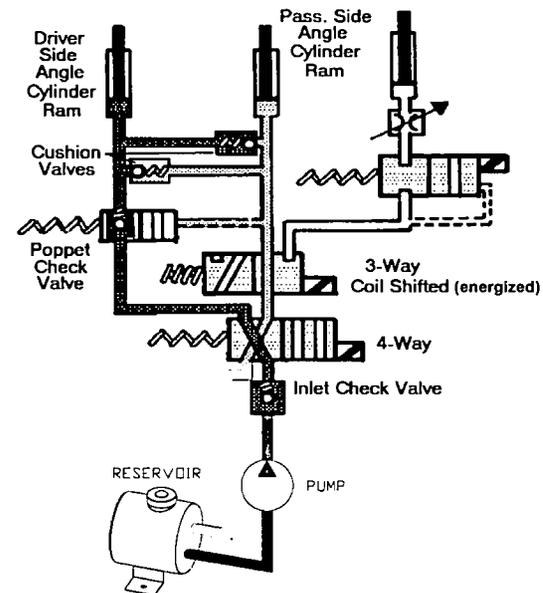
THEORY OF OPERATION

ANGLE RIGHT

Moving the control to the ANGLE RIGHT position closes a switch. This switch operates the clutch and also provides current to the 3-way cartridge valve coil. This current flow causes a magnetic field which shifts the 3-way spool. Oil from the pump flows through the 4-way cartridge valve, pushes open the poppet check valve, and flows into the driver-side angle cylinder ram to angle



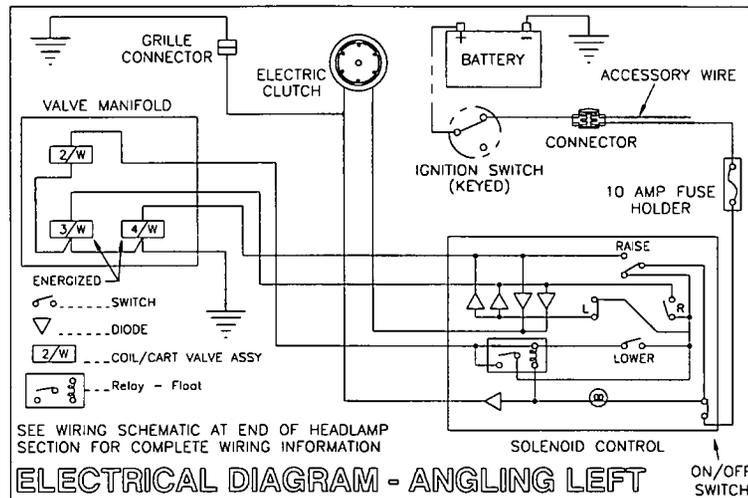
the blade to the right side. As the driver-side angle cylinder ram extends, the passenger-side angle cylinder ram must collapse. This pushes oil into the manifold, through the shifted 3-way spool, through the 4-way cartridge valve and back to the reservoir.



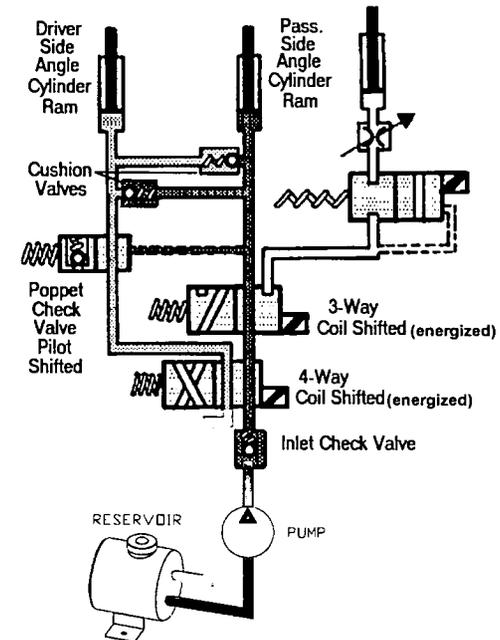
THEORY OF OPERATION

ANGLE LEFT

Moving the control to the ANGLE LEFT position closes a switch. This switch also operates the clutch and provides current to the 3-way and 4-way cartridge valve coils. This current flow causes magnetic fields in the coils to shift the 3-way and 4-way spools. Oil from the pump flows through the shifted 4-way spool, through the shifted 3-way spool to the passenger-side angle cylinder ram to angle the blade



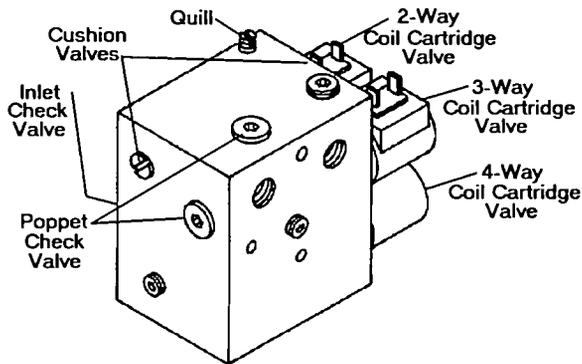
to the left side. The oil flow to the passenger-side angle cylinder ram also causes the poppet check valve spool to shift holding open the poppet located in the manifold port for the driver-side cylinder. As the passenger-side angle cylinder ram extends, the driver-side angle cylinder ram must collapse, pushing oil into the manifold.



THEORY OF OPERATION

CUSHION VALVES

While plowing, oil is trapped in the extended angle cylinder rams. When the blade meets an object, pressure rises in one angle cylinder ram. As pressure exceeds the spring force holding the checkball against the seat, the checkball unseats allowing oil to flow to the opposite ram. Hence, the blade angles to prevent damage to the hydraulic system, blade or vehicle. Oil is trapped in the passenger-side ram by the 3-way cartridge valve and in the driver-side ram by the poppet check valve.

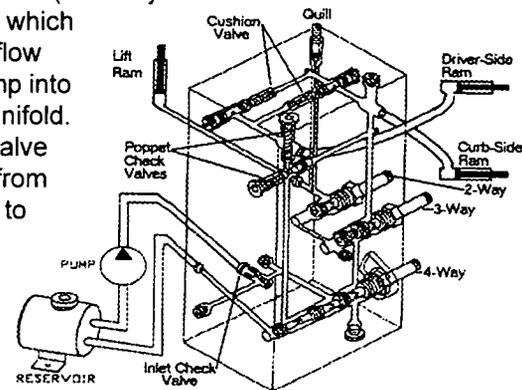


POPPET CHECK VALVE

This check valve prevents flow of oil out of the driver-side angle cylinder ram while the blade is being raised. Without this check valve, when raising the blade during "stacking" of snow, the shifted 4-way cartridge valve spool would allow oil from the driver-side ram to flow directly back to the reservoir.

INLET CHECK VALVE

The pump supply passage in the valve manifold has an inlet check valve (one way check valve) which allows oil to flow from the pump into the valve manifold. This check valve prevents oil from flowing back to reservoir anytime the pump is not in operation.



TROUBLESHOOTING GUIDE - General

Condition	Possible Cause	Correction
Blade will not angle or angles too slowly (side to side 4 sec.)	A. Low oil level	a. Check oil level; fill with FISHER High Performance Hydraulic Fluid.
	B. Low pump pressure or volume	a. Check pump pressure b. Replace filter.
	C. No electrical power	a. Check in-line control fuse. b. Check clutch relay c. Check solenoid control d. Repair/replace harness
	D. Coil cartridges inoperative or contaminated	a. Perform coil cartridge test b. Check system for contaminants.
Blade will not raise or raises slowly (approximately 3 seconds)	A. Low oil level	a. Check oil level
	B. Low pump pressure or volume	a. Check pump pressure b. Replace filter
	C. No electrical power	a. Check in-line control fuse b. Check clutch relay c. Check solenoid control d. Repair/replace harness
	D. Coil cartridges inoperative or contaminated	a. Perform coil cartridge test b. Check system for contaminants
	E. Lift cylinder packing nut too tight	a. Loosen and adjust packing nut.
	F. Drop quill adjusted incorrectly	a. Turn quill "out" (Counterclockwise)
Blade will not lower or lowers slowly.	A. Coil cartridges inoperative or contaminated.	a. Perform coil cartridge test. b. Check system for contaminants.
	B. Lift cylinder packing nut too tight.	a. Loosen and adjust packing nut.
	C. Drop quill adjusted incorrectly.	a. Turn quill "out" (Counterclockwise).

TROUBLESHOOTING GUIDE - General

Condition	Possible Cause	Correction
Blade will not remain angled while plowing.	A. Cushion valve(s) out of adjustment	a. Inspect and adjust cushion valve(s)
	B. Coil cartridge energized or contaminated	a. Perform coil cartridge test b. Check system for contaminants
	C. Poppet check valve damaged	a. Remove and inspect poppet check valve
Blade angles to left while raising and stacking snow.	A. Poppet check valve damaged	a. Remove and inspect poppet check valve
Blade lowers in neutral.	A. 2-way cartridge receiving wrong electrical signal	a. Check control. b. Perform coil cartridge test
	B. 2-way cartridge contaminated	a. Check system for contaminants
Base angle/cutting edge wearing excessively	A. Mushroom shoes not adjusted properly	a. Mushroom shoes should be adjusted to provide 1/4" to 1/2" clearance between cutting edge and surface. Place the supplied spacer rings between the shoe bracket to obtain this clearance. DO NOT store unused spacers on top of shoe bracket.
Pump shaft seal leaks	A. Reservoir overfilled	a. Refer to "Pump Section"
	B. Shaft seal worn or defective	a. Install new shaft seal
Pump overheats, fluid boils	A. Low on fluid	a. Fill to "Full" mark. DO NOT OVERFILL
	B. Pump on relief for extended periods	a. Make sure valve centers properly (refer to "Valve Section")

TROUBLESHOOTING GUIDE - General

Condition	Possible Cause	Correction
Noisy Belt	A. Loose belt	a. Tighten to proper tension
	B. Worn or cracked belt	a. Replace Belt
	C. Worn or rusted pulleys	a. Replace pulleys
	D. Misalignment of pump and drive pulleys	a. Realign pulleys
	E. Oily belt	a. Repair hydraulic leaks to prevent premature belt failure or slippage. Do not apply belt dressing.
Hose Leaks	A. Loose fittings	a. Seal and tighten fittings
	B. Worn hose or fittings	a. Replace hose. Do not attempt to repair

TROUBLESHOOTING GUIDE - Belt Drive Pump

Condition	Possible Cause	Correction
Pump leaks	A. Leaky shaft seal	a. Reservoir probably overfilled. Install new shaft seal and fill to full mark on dipstick. (Be sure lift cylinder is fully collapsed before filling.)
	B. Leaks at fittings or ports	a. Tighten fittings using pipe thread sealant
Noisy pump	A. Low on fluid	a. Fill to full mark with lift cylinder fully collapsed. DO NOT OVERFILL.
	B. Loose bolts	a. Tighten all bolts
	C. Loose belt	a. Tighten belt
	D. Worn or cracked belt	a. Replace belt
	E. Worn or rusted pulleys	a. Replace pulleys
	F. Misaligned pulleys	a. Realign pulleys
	G. Oily belt	a. Repair hydraulic leaks. Never use belt dressing.
	H. Contaminated fluid filter	a. Drain fluid and flush system. Refill with FISHER® High Performance Hydraulic Fluid.
Low pump pressure	A. Low on fluid	a. Fill to full mark with lift cylinder fully collapsed. DO NOT OVERFILL.
	B. Restricted hoses, fittings or disconnect	a. Check and replace as required
	C. Loose belt	a. Tighten or replace belt

TROUBLESHOOTING GUIDE - Belt Drive Pump

Condition	Possible Cause	Correction
Low pump pressure	D. Check pressure	a. Normal pressure 1400-1700 psi. Lower pressure may be acceptable for smaller blades without affecting performance.
Pump shaft will not turn	A. Contamination jamming gears	a. Replace pump
	B. Bearings seized	a. Replace pump
Pump overheats, fluid boils	A. Low on fluid	a. Fill to "Full" mark with lift cylinder fully collapsed. DO NOT OVERFILL.
	B. Pump on relief for extended periods	a. Check control to assure that it is in "Neutral" position.

TROUBLESHOOTING GUIDE - Valves

Condition	Possible Cause	Correction
Hydraulic leaks at fittings	A. Fittings are loose	a. Fittings on control valve are O-ring and must not be overtightened (torque to 24-26 ft. lbs.)
	B. Fittings too tight	a. Fittings on control valve are O-ring sealed. If O-rings are damaged, replace (torque fittings to 24-26 ft. lbs.)
	C. Broken fittings	a. Replace fittings as necessary

TROUBLESHOOTING GUIDE - Lights & Wiring Harness

Condition	Possible Cause	Correction
Turn signals flash weakly.	A. Flasher	a. Replace flasher with H.D. flasher.
	B. Bulb	a. Check bulb for correct type (#1157-plow). b. Bulb defective (filaments reversed). Replace bulb
	C. Wiring reversed	a. Plow/vehicle harness installed wrong. Check installation.
	D. Poor connection	a. Check bulb/flasher connection. Clean/repair.
Turn signals flash rapidly	A. Flasher	a. Need H.D. flasher.
Turn/Park lights one or both not working.	A. Bulb(s) defective—filament(s) open.	a. Replace bulb.
	B. Bulb/socket connection no good.	a. Check/clean.
	C. Connection at tap connector broken or corroded.	a. Check/clean/repair.
	D. Ground wire not connected.	a. Check ground connection—7-pin under hood; 9/12-pin SEHP motor (headgear). b. Check SEHP power cable. Must be connected at grille (9/12-pin SEHP installation).
	E. Broken/shorted/damaged wire inside plow or vehicle harness.	a. Check harness with test light. Replace.
	F. Bent, broken/missing or corroded pins or sockets at grille plugs.	a. Visual inspection of plugs. Replace harnesses.
	G. Vehicle directional/headlamp switch defective.	a. Check switch. Replace if necessary.

TROUBLESHOOTING GUIDE - Lights & Wiring Harness

Condition	Possible Cause	Correction
Turn/Park lights one or both not working.	H. Blown fuse(s).	a. Check/replace fuse(s). Check wiring for problems.
	I. Fuses blow when turn/brake/ hazard lights are on.	a. Circuit overload. Connect turn signals to extra relays supplied with vehicle, or install FISHER [®] Turn Lamp Relay Kit #8035.
Turn signals reversed.	A. Wiring incorrect.	a. Check wiring per installation instructions./
	B. Wires crossed inside plow/vehicle harness .	a. Check with test light. Replace harness.
	C. Headlights reversed during installation (turn signals inboard rather than outboard).	a. Reverse headlights.
Headlamps—one or both low/high beam not functioning.	A. Bulb(s) defective—filament(s) open.	a. Check/Replace bulb.
	B. Vehicle/peculiar harness—wired wrong at relays	a. Check wiring per installation instructions.
	C. Ground wire not connected.	a. Check ground connection—7-pin under hood; 9/12-pin SEHP motor (headgear). Check SEHP power cable. Must be connected at grille (9/12-pin installation).
	D. Peculiar harness—wrong harness for vehicle.	a. Installed incorrectly. Not plugged into vehicle feed from headlight switch.

TROUBLESHOOTING GUIDE - Lights & Wiring Harness

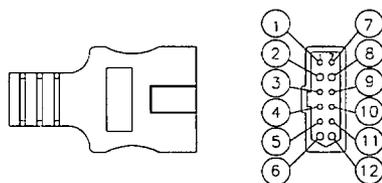
Condition	Possible Cause	Correction
Headlamps—one or both low/high beam not functioning	E. Vehicle harness (headlamp kit) wrong for vehicle.	a. Vehicle may have DRLs and kit used may not support DRLs.
	F. Relays not being energized. Headlamp will not switch.	a. Broken/corroded/damaged brown wire at tap connector (bullet connector). Check/clean/repair. b. Broken/corroded/damaged ground wire at tap connector (bullet connector). Check/clean/repair. c. Grille connector(s) bent/broken/corroded or missing pin(s) or sockets. Visual inspection. Replace harness. d. Defective relay—check relay with test light. Replace if defective. e. Grille plug not connected. f. Vehicle headlamp switch defective. Check/replace. g. Brown wire not connected to park light feed wire.
	G. Vehicle dimmer switch.	a. Check switch and replace in necessary.
Plow lights dim; vehicle lights OK.	A. Relays not energized when grille plugs are mated.	a. See above: F. Relays not being energized...
Plow lights OK; vehicle lights one/both beam(s) dim or out.	A. Peculiar harness installed incorrectly.	a. Check installation instructions.
	B. Wrong peculiar harness installed.	a. Check Kit Selection Guide for correct harness.

TROUBLESHOOTING GUIDE - Lights & Wiring Harness

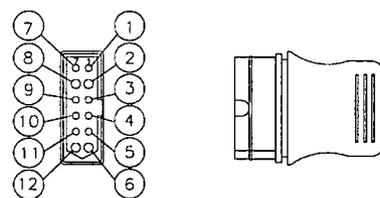
Condition	Possible Cause	Correction
Plow lights intermittent.	A. Grille plugs not mating correctly.	a. Check plugs fro bent/damaged corroded contacts. Replace harness.
	B. Rubber boot and retaining clip either not installed or not being used.	a. Check installation of rubber boot and retaining clip.
	C. Broken filament(s).	a. Replace bulb.
	D. Damaged/corroded wire(s) inside plow vehicle harness(es).	a. Check with test light. Replace defective harness(es).
	E. Damaged/corroded -brown parking light wire. -black/orange ground wire.	a. Check/clean repair.
Headlights reversed. High beam on when low beam should be on. Low beam on when high beam should be on.	A. Plow headlamp wiring reversed.	a. Check wiring and repair.
	B. Wiring of relays incorrect.	a. Check wiring per installation instructions.
	C. Bulb(s) defective	a. Filaments reversed inside bulb. Replace bulb.

TROUBLESHOOTING GUIDE - Grille Plug Pin Chart

Pin No.	Function	7 Pin-8418 Plow-20110(8612) Vehicle-8611	9 Pin-8416 Plow-20111(8246) Vehicle-8275	12 Pin-8417 Plow-20112(8273) Vehicle-8276
1	2 Way Valve	* N/C	White/Yellow	White/Yellow
2	Low Beam	Black	Black	-----
2	Passenger-Side Low Beam	-----	-----	Black
3	3 Way Valve	* N/C	Light Green	Light Green
4	4 Way Valve	* N/C	Light Blue	Light Blue
5	Ground	Black/Orange	Black/Orange	Black/Orange
6	High Beam	White	White	White
7	Driver-Side Low Beam	* N/C	* N/C	Black/White
8	Passenger-Side Headlight Ground	* N/C	* N/C	Dark Blue/Orange
9	Driver-Side Turn Signal	Gray	Gray	Gray
10	Passenger-Side Turn Signal	Purple	Purple	Purple
11	Parking Lights	Brown	Brown	Brown
12	Ground	Orange/Black	* N/C	-----
12	Driver-Side Headlight Ground	-----	-----	Light Blue/Orange



PLOW SIDE



VEHICLE SIDE

TROUBLESHOOTING GUIDE - Cylinders

Condition	Possible Cause	Correction
Leaking cylinder at cylinder nut	A. Loose cylinder nut	a. Tighten cylinder nut
	B. Worn packing	a. Replace packing
	C. Cracked cylinder nut	a. Replace cylinder nut
Leaking cylinder at weld	A. Pinhole in weld	a. Replace as necessary
Leaking cylinder at pressure port fitting	A. Fitting not tightened	a. Tighten fitting
	B. Pipe thread sealant not used on threads of fitting	a. Remove fitting from cylinder and liberally apply pipe sealant on threads of fitting. Reinstall fitting in pressure port of cylinder. We do not recommend the use of Teflon tape.
Rusted/pitted rod	A. Cylinder has not been used for a long period of time	a. Using emery/crocus cloth, clean rod. Lightly oil or grease rod. If cleaning does not remove rust and pits, replace cylinder rod.
Fitting broken in pressure port	A. Hose and fitting not installed between cylinder and A-frame as specified	a. Remove broken fitting from pressure port. b. Install new fitting in pressure port. Reinstall cylinder with hose and fitting between cylinder and A-frame assembly
Rod seized in cylinder assembly	A. Wiper ring wedged between nut and rod	a. Remove nut and replace wiper.
	B. Guide segments wedged in barrel	a. Remove rod if possible. Replace worn parts b. Replace cylinder if necessary

TROUBLESHOOTING GUIDE - Clutch

Condition	Possible Cause	Correction
Clutch will not disengage	A. The air gap between the hub/armature and the rotor/pulley is too small	a. Return unit to your Fisher dealer or distributor.
	B. The current is always on	a. Check the electrical system
	C. Rotor/pulley snap ring not installed correctly	a. Return unit to your Fisher dealer or distributor.
Clutch will not engage	A. The air gap between the hub/armature and the rotor/pulley is too big	a. Return unit to your Fisher dealer or distributor.
	B. Field coil electrical wiring is not connected.	a. Connect field coil wiring
	C. Faulty field Coil	a. Check field coil for continuity
	D. Less than 10.8 volts supplied to field coil (all accessories on)	a. Check electrical system
Clutch is noisy	A. Field coil or rotor pulley snap rings are not installed correctly	a. Return unit to your Fisher dealer or distributor.
	B. Belts too loose	a. Tighten belts per service manual
	C. Bearing noisy (new clutch only)	a. Return to manufacturer
	D. Clutch not burnished	a. Return unit to your Fisher dealer or distributor.
Clutch slips	A. Belts too loose	a. Tighten belts per service manual
	B. Voltage to all field coil less than 10.8 volts (all accessories on)	a. Check electrical system
	C. Improper wiring or connections.	a. Check electrical system
	D. Oil or grease on friction surfaces	a. Return unit to your Fisher dealer or distributor.
	E. Clutch not burnished	a. Return unit to your Fisher dealer or distributor.

Contact an authorized Fisher dealer or distributor for assistance with any issues not covered in this guide.

SOLENOID CONTROL TEST

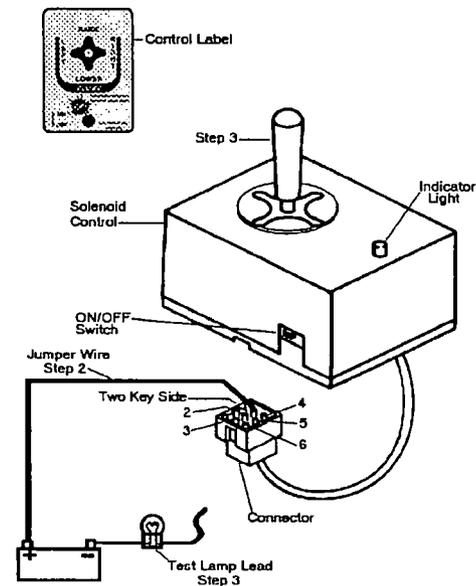
NOTE: DO NOT use continuity testers for this test.

1. Disconnect the solenoid control connector. Turn control ON/OFF switch ON.
2. Attach 12-volt power supply to terminal shown in diagram.
3. In each position of the lever indicated in the chart below, use a grounded circuit tester light to test each numbered terminal. The chart indicates the condition of the circuit tester light.

Position	2	3	4	5	6
Neutral	Off	*	Off	Off	Off
Raise	Off	*	On	Off	Off
Lower	Off	*	Off	Off	On
Right	On	*	On	Off	Off **
Left	On	*	On	On	Off **

- * Indicator light will be on and the circuit tester light will not be as bright.
- ** If on, move lever to raise. Retest angle right and left. If tester light is now out, control is OK.

4. **IF solenoid control tests OK**, check harness for broken wires and/or corroded connections.
IF test light is OFF when chart indicates it should be ON, replace printed circuit board in control box.
IF test light is ON when chart indicates it should be OFF, replace printed circuit board in control box.



PUMP PRESSURE TEST

1. Disconnect the quick-disconnect coupling for the driver-side angle cylinder.
2. Attach a 1/4" male quick-disconnect fitting to a 2000 PSI (minimum) gauge. Insert this gauge into the vehicle-side quick-disconnect for the driver-side angle cylinder.
3. Start engine and hold solenoid control in angle right position and read gauge. Shut off the engine.
4. If pressure is 1450-1850 PSI, pump pressure is "OK". If pressure is low, first ensure that there is an adequate amount of fluid in the system. If there is sufficient fluid, then attempt to adjust the pressure with the adjusting screw. Each clockwise 1/4 turn of the adjusting screw will increase pressure by approximately 225 psi.
5. Remove the gauge and reconnect the hose.

COIL CARTRIDGE TEST

1. Disconnect motor cable plug from grill connector (disables motor). Connect a jumper wire between hydraulic unit ground clip and battery ground.
2. Move control to position in chart and test coil cartridge assembly stem for good magnetic pull (energized) using a steel screwdriver. Follow sequence shown in chart.

Position	2 Way	3 Way	4 Way
Raise	No	No	Yes
Lower	Yes	No	No
Right	No *	Yes	No
Left	No *	Yes	Yes

* If yes, move lever to raise, pull should stop.

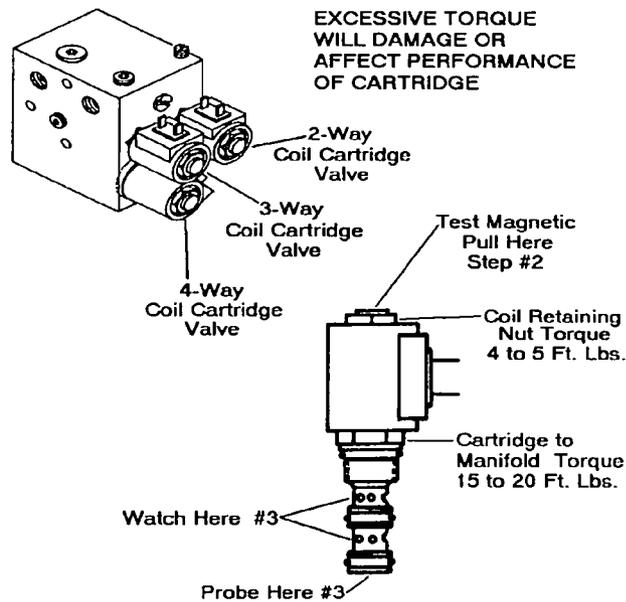
Wire connections at coils:

2-Way – White Wire
3-Way – Green Wire

4-Way – Blue Wire
Ground – Black Wire

COIL CARTRIDGE TEST

- IF coil activation MATCHES the above chart - proceed to Step 3.
- IF coil activation DOES NOT match chart - test for voltage at coil spade (part of plow harness) connections on valve.



- IF voltage is present—use a jumper wire to create a good ground at coil spade terminals with black/ orange wires attached.
- IF coil energizes—repair ground at coil spade or motor ground.
- IF coil not energized—replace coil.
- IF current not available—see Solenoid Control Test, page 45.

3. Remove coils from cartridges and remove cartridges from manifold. Inspect cartridges for visible contamination or damaged seals. Check for stuck spools using a non-marring or scratching (plastic, aluminum or soft brass) probe to push spring loaded spool.

NOTE: Using probe to move spool may shear contamination which was affecting spool movement.

- IF stuck - replace cartridge.
- IF free - install coil on stem. Bench test using jumper wires to energize coil while watching for spool movement.
- IF no movement seen - replace cartridge.
- IF movement seen - clean and oil cartridge. Reinstall cartridge and coil. Torque as shown.

CUSHION VALVE INSPECTION & ADJUSTMENT

Apply anti-seize compound or grease to threads of stems before assembly.

Disassembly and Inspection:

1. Remove cushion valve stem. Use a magnet to remove ball, spring spacer and spring. Inspect parts.
2. Replace O-Rings or complete assembly if damaged.
3. If OK, place ball on hard wood block, hold stem seat on ball and lightly strike stem with a hammer.

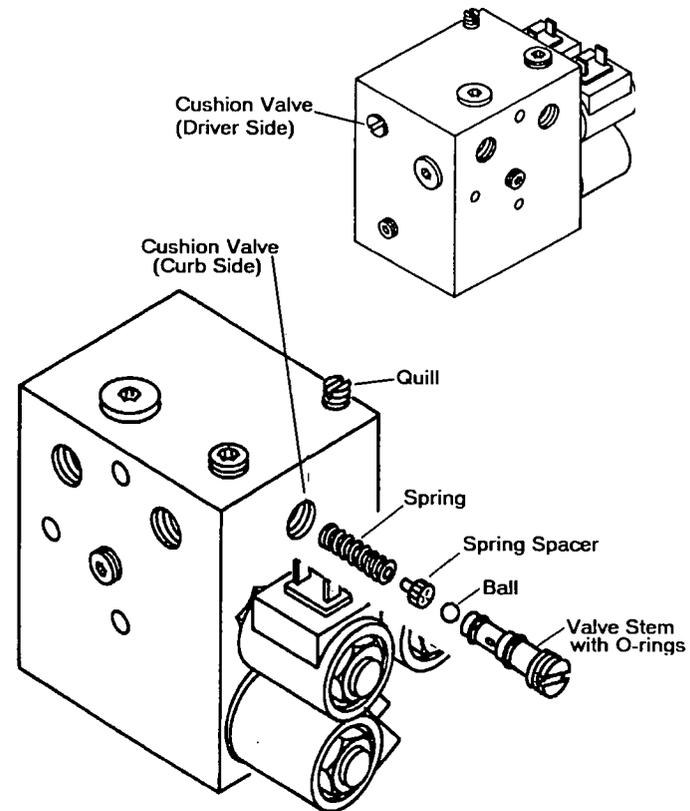
NOTE: Stem can be bent by not striking squarely.

4. Reassemble components into manifold.

Adjustment:

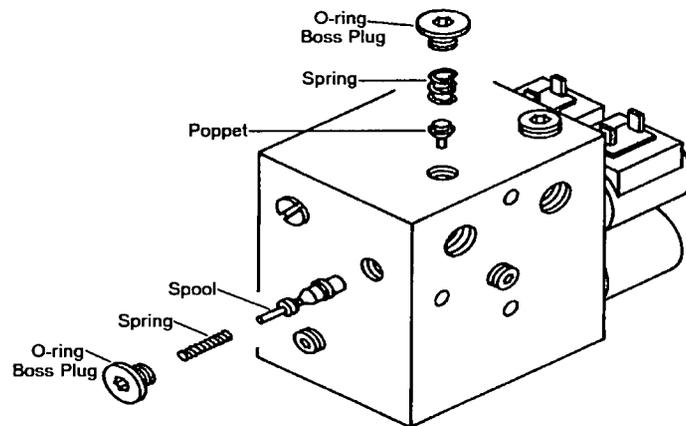
Adjust by tightening cushion valve stem until spring is fully compressed then unscrew the stem as follows:

Lift Cylinder Ram (Dia. x Stroke)	Back Off Valve Stem (CCW) No. of Turns	Approximate Cushion Valve Pressure (PSI)
1-1/2" x 6"	1-3/4	2500
1-1/2" x 10"	1-1/4	4000



POPPET CHECK VALVE

1. Remove o-ring boss plug, spring and poppet from the top of the valve manifold.
2. Remove o-ring boss plug, spring and spool with o-ring from front side of valve manifold (use needle nose pliers to remove spool).
3. Inspect parts, poppet seat and spool bore for damage or contamination.
4. Install spool in bore. Spool must insert smoothly.
5. Install poppet, springs and o-ring boss plugs.



QUILL ADJUSTMENT

⚠ WARNING

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

To adjust blade drop speed:

1. Lower blade to ground before making adjustment.
2. Sensitive Adjustment—Max. 1/8 Turn at a time.
 - Turn quill IN (clockwise) to slow drop speed.
 - Turn quill OUT (counterclockwise) to increase drop speed.

NOTE: Turning quill too far IN can slow raise time.

3. Stand clear of blade when checking adjustment.

PLOW HEADLAMPS

THEORY OF OPERATION

The headlamp switching circuit uses two single pole double throw (SPDT) relays. When combined with a Minute Mount® System plug-in headlamp harness and the vehicle harness, the relays will automatically switch between vehicle and plow headlamps as the plow plugs are connected and disconnected.

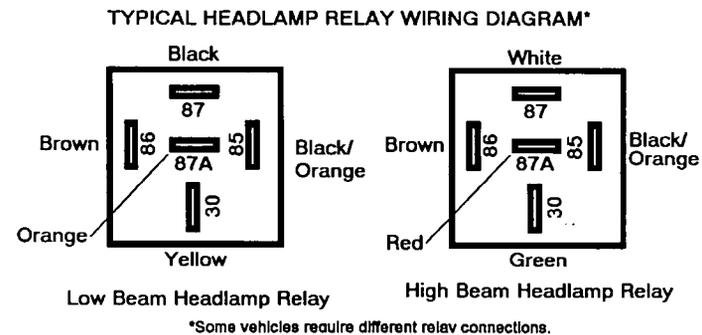
WITHOUT DAYTIME RUNNING LAMPS

The vehicle harness has a brown wire that is connected to the vehicle parking lamp circuit. It feeds the plow park lamps through the grill connector. This wire also powers the coil of both relays. The other terminal of each relay coil is connected to a black/orange wire which goes to the grill connector. When the plow plug is connected to the grill connector, a ground is completed for the relay coils.

When the vehicle park lamps are on and the plug is connected, the relay coils will be activated. This causes the relays to switch the headlamp feed from the normally closed contacts which power the vehicle headlamps to the normally open contacts which power the plow headlamps.

It should be noted that:

- The relay with the yellow, orange and black wires operates the low beam headlamps.
- The relay with the green, red and white wires operates the high beam headlamps.
- Both relays are activated at the same time.



** See page 56 for complete wiring schematic **

PLOW HEADLAMPS

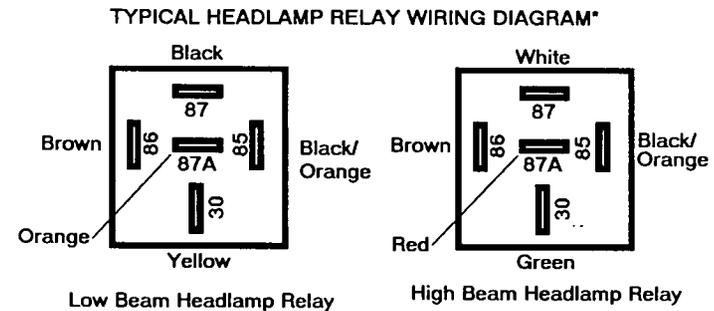
WITH DAYTIME RUNNING LAMPS

A fused pink wire is connected to a circuit controlled by the ignition switch. This wire powers the coil of both relays. The other terminal of each relay coil is connected to a black/orange wire which goes to the grill connector. When the plow plug is connected to the grill connector, a ground is completed for the relay coils.

When the ignition switch is on and the plug is connected, the relay coils will be activated. This causes the relays to switch the headlamp feed from the normally closed contacts which power the vehicle headlamps to the normally open contacts which power the plow headlamps.

It should be noted that:

- The relay with the yellow, orange and black wires operates the low beam headlamps.
- The relay with the green, red and white wires operates the high beam headlamps.
- Both relays are activated at the same time.



*Some vehicles require different relay connections.

- The black/orange wire from the clutch harness is connected to relay terminal and black/orange light harness wire (at either relay)

CHEVY/GMC VEHICLES with Daytime Running Lamps

Note: Canadian vehicles-check the Kit Selection Guide for correct light kit/peculiar harness information.

Domestic GM vehicle's with DRLs:

S/T Series Trucks - Requires a 12 pin plow/ vehicle harness, extra relay and the DRL adapter kit #8282.

C/K Series Trucks only require the addition of the #8282 DRL adapter kit.

Note: The #8282 kit replaces the brown wire from the vehicle harness. This kit supplies switched 12V to relay terminal #86.

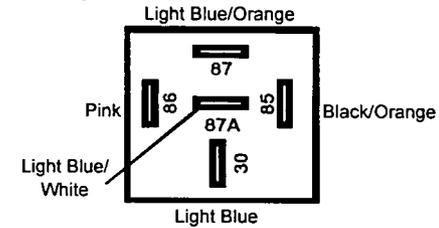
Black/White (receptacle) to Black/White wire (blade).
(Both wires are part of the vehicle harness)

Black wire (receptacle part of the vehicle harness). To yellow and orange wire (blade part of the peculiar harness), or orange wire only.

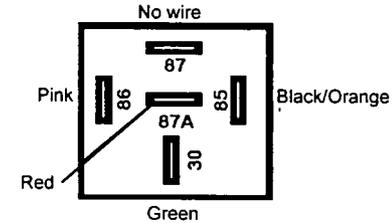
White wire (receptacle part of the vehicle harness) to the green wire (part of the peculiar harness).

HEADLAMP RELAY WIRING DIAGRAM

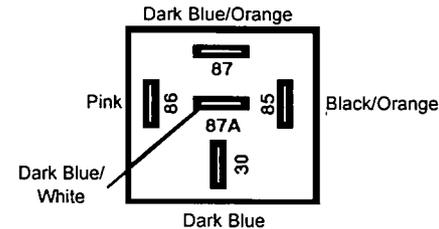
Driver-Side Headlamp Relay



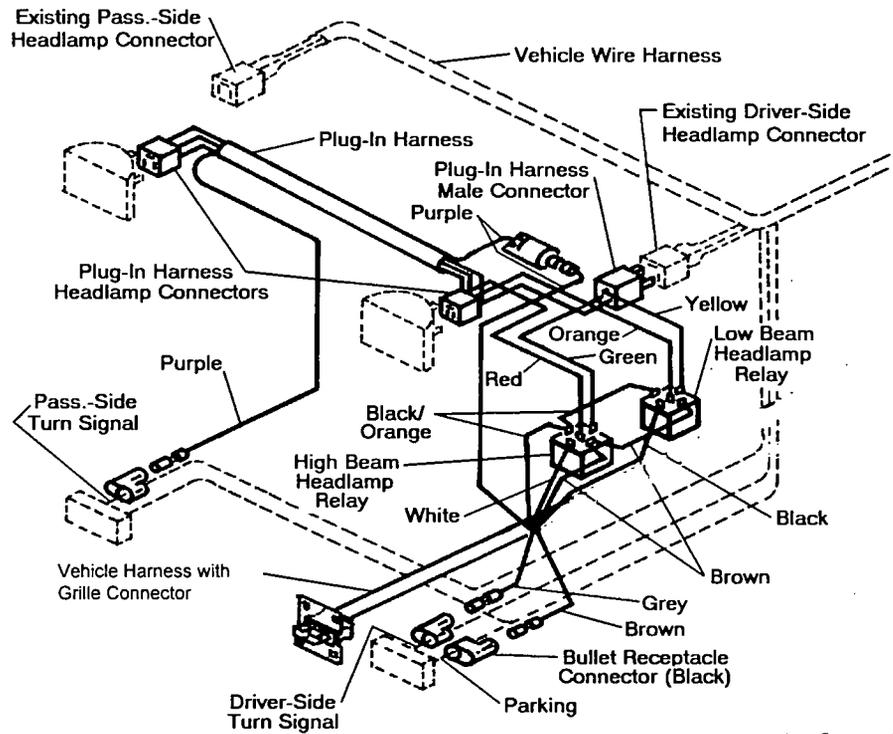
Vehicle High Beam Headlamp Relay



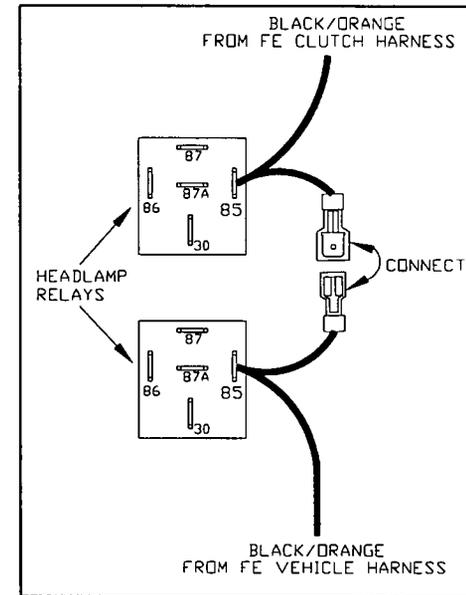
Passenger-Side Headlamp Relay



VEHICLE HEADLAMP WIRING DIAGRAM without Daytime Running Lamps

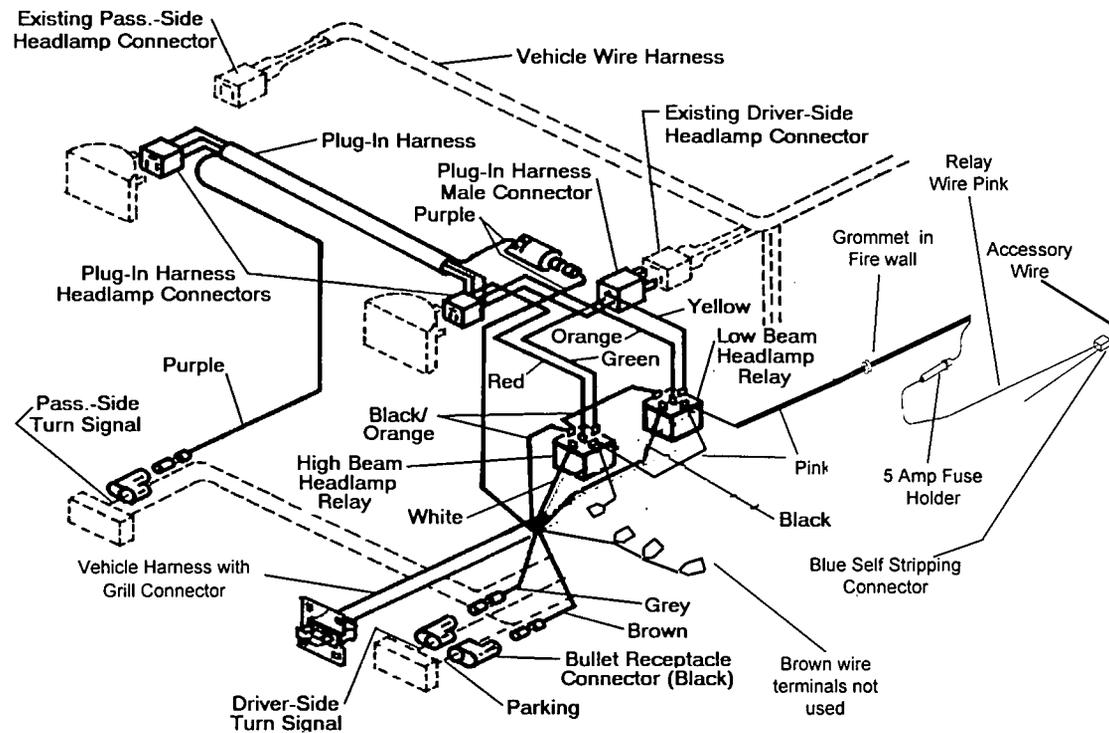


Relay Diagram



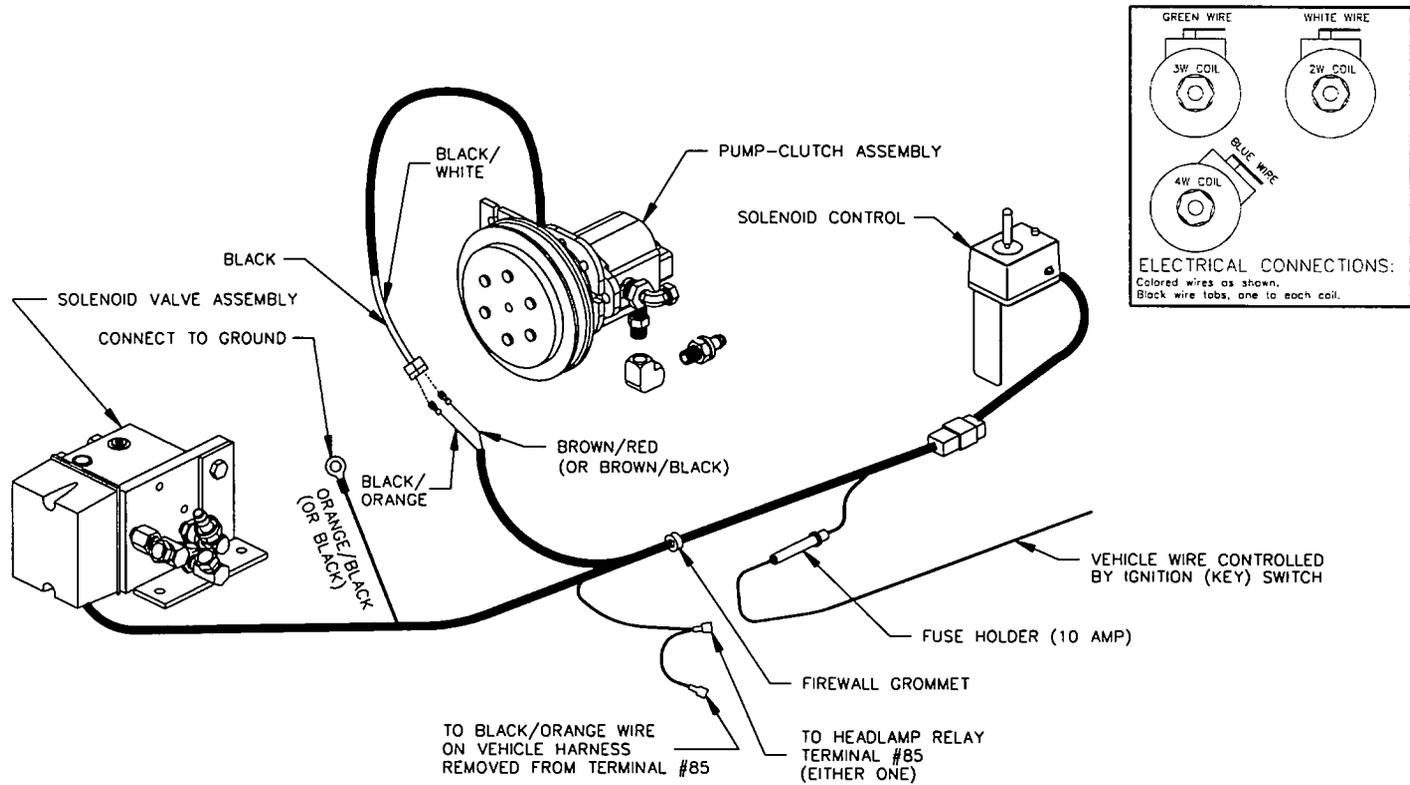
* Some vehicles may require different relay connections.

VEHICLE HEADLAMP WIRING DIAGRAM - FORD & DODGE with Daytime Running Lamps

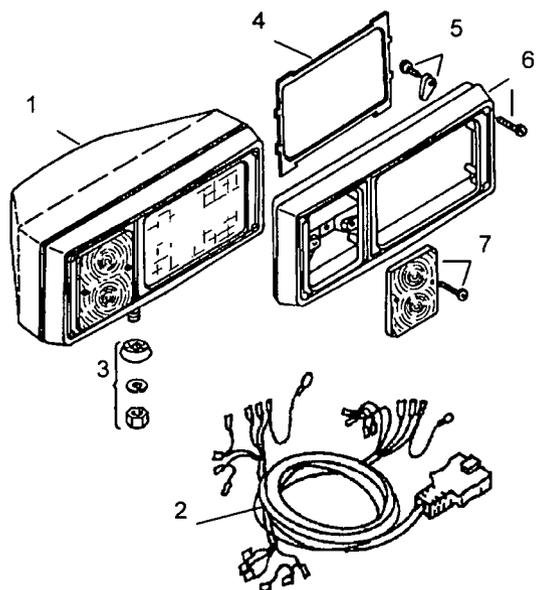


* Some vehicles may require different relay connections.

VEHICLE PLOW CONTROL WIRING DIAGRAM



PLOW LAMP COMPONENTS PARTS LIST



USE ONLY GENUINE FISHER®
REPLACEMENT PARTS

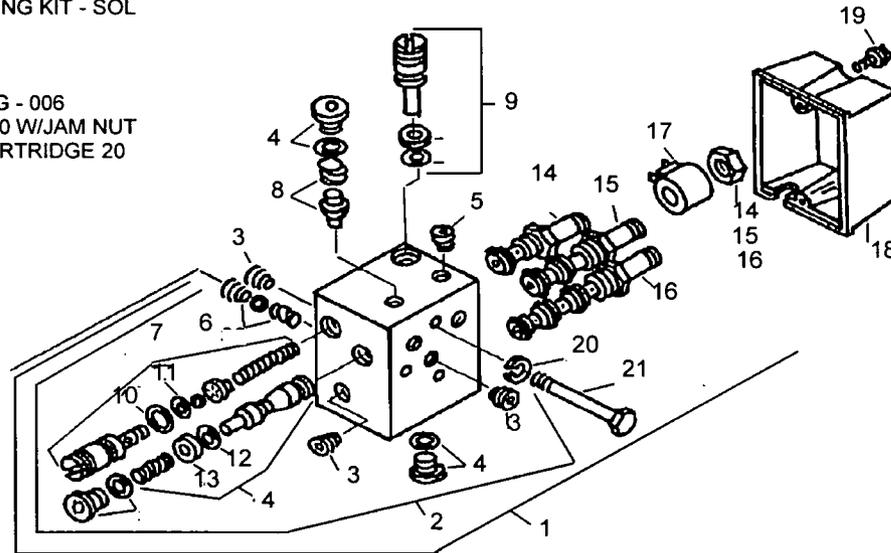
ITEM	PART #	QTY	DESCRIPTION
1	8328	1	HEADLAMP - REPLACEMENT M (DR or PASS)
2	8612	1	PLOW HARNESS - 7 PIN M
	or 8273	1	PLOW HARNESS - 12 PIN M
3	6128	1	HEADLAMP SWIVEL & FASTENERS
4	6664	1	GASKET SET - SEALED BEAM
5	A6153	2	2E1 RET FINGERS W/SCREWS (4EA)
6	6122	2	BEZEL W/FASTENERS (DR OR PASS)
7	6123	2	LENS W/FASTENERS (DR OR PASS)

ABBREVIATIONS

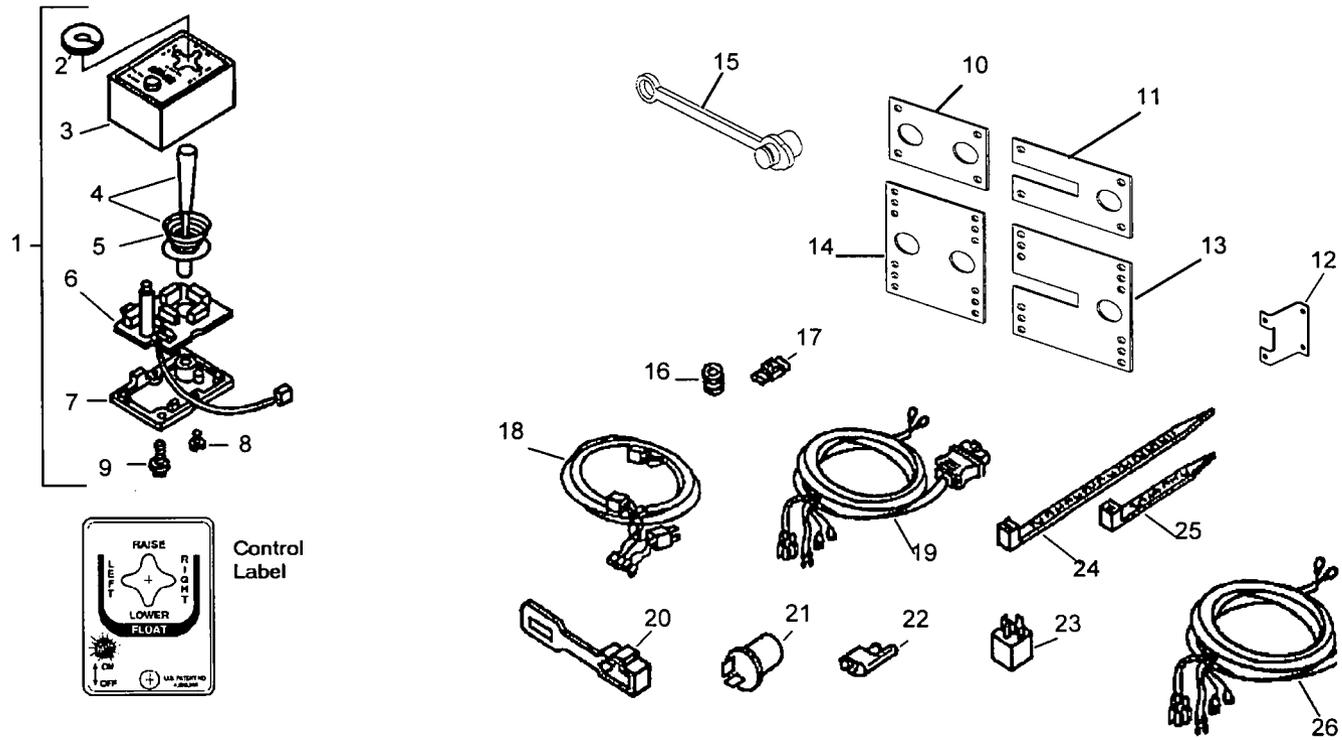
ADT	Adapter
ASSY	Assembly
CS	Cap Screw
CYL	Cylinder
DEG	Degree
DR	Driver Side
EA	Each
HX	Hex
HXW	Hex Washer
LK	Lock
M	Minute Mount® System
NPSM	American Standard Straight Pipe Threads for Mechanical Joints
NPT	National Pipe Thread (Fluid)
PASS	Passenger Side
RET	Retaining
SL	Slotted
SOL	Solenoid
STD	Standard
STR	Straight
SWV	Swivel
TFTS	Thread Forming Tapping Screw
TRTS	Thread Rolling Tapping Screw
TY	Type
W/	With
ZP	Zinc Plate

SOLENOID VALVE DIAGRAM & PARTS LIST

ITEM	PART #	QTY	DESCRIPTION	ITEM	PART#	QTY	DESCRIPTION
1	7921	1	SOL-VALVE MANIFOLD ASSY. 4000 PSI	15	7636	1	CARTRIDGE 30 W/JAM NUT
2	7922	1	MANIFOLD ASSY. SOL - 4000 PSI	16	7637	1	CARTRIDGE 40 W/JAM NUT
3	7622	3	PLUG 1/8 NPTF HX SO		7638	2	SEAL KIT - CARTRIDGE 30, 33, & 40
4	7625	3	3/8-24 HX SO O-RING BOSS PLUG	17	7639	3	COIL W/SPADE TERMINALS
5	7627	1	PLUG 1/4 NPTF HX SO	18	7649	1	COVER ASSY
6	7628	1	INLET CHECK VALVE KIT	19	90650	2	#8-18X1/2 SL HXW TFTS TY B ZP
7	7629	1	CUSHION VALVE REPAIR KIT - SET	20	90359	3	1/4 SP LK WASHER ZP
8	7630	1	POPPET CHECK VALVE KIT	21	90652	3	1/4-20X3-1/4 HX CS G5 ZP
9	7631	1	QUILL ASSY				
	7632	1	BACK-UP/O-RING KIT - SOL				
10	7085	2	O-RING - 010				
11	5833	2	O-RING - 008				
12	2605	2	O-RING - 006				
13	7633	2	BACK-UP RING - 006				
14	7634	1	CARTRIDGE 20 W/JAM NUT				
	7635	1	SEAL KIT - CARTRIDGE 20				



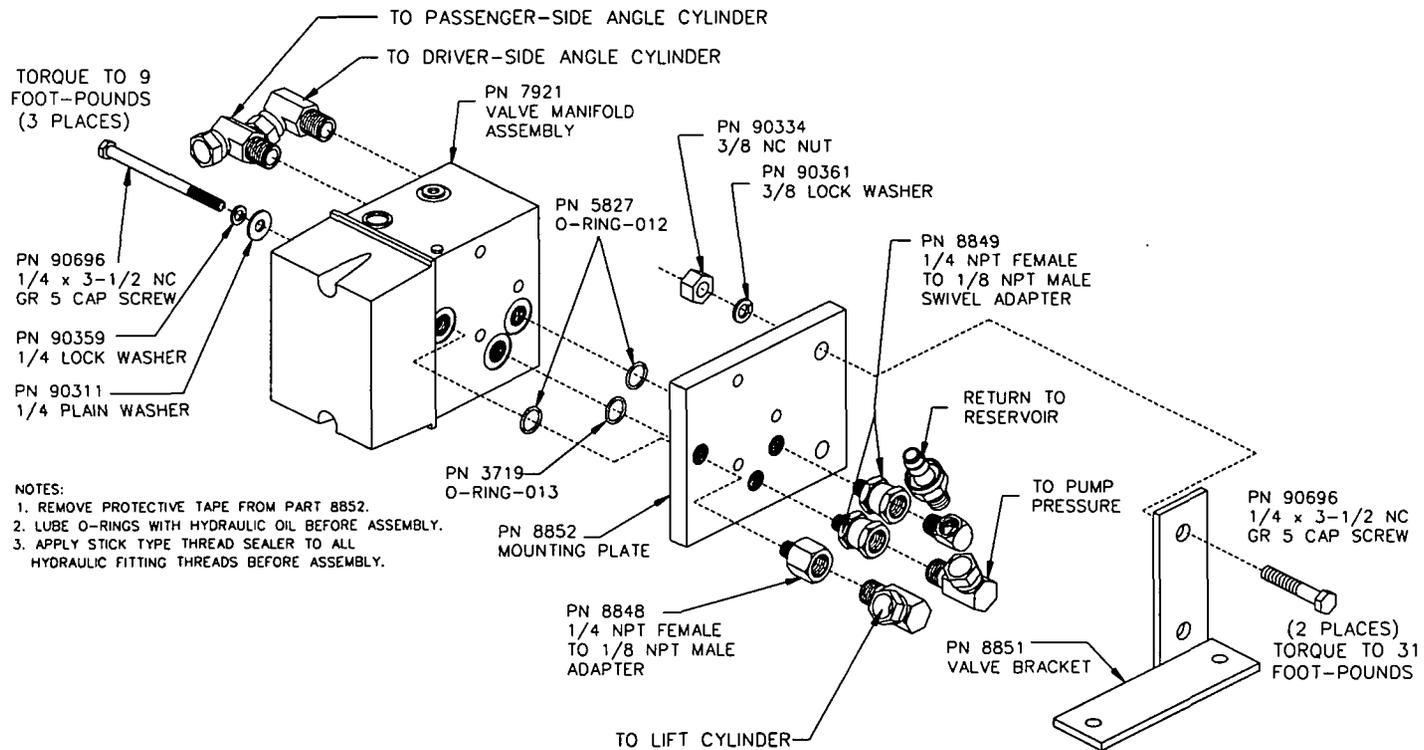
CONTROL COMPONENTS PARTS DIAGRAM



CONTROL COMPONENTS PARTS LIST

ITEM	PART #	QTY	DESCRIPTION
1	8292	1	SOLENOID CONTROL - STYLE 3
2	7641	1	SHIELD
3	8333	1	BODY W/LABEL & LENS
4	8330	1	LEVER, SPRING & ACTUATOR
5	7644	1	SPRING - CONICAL
6	8334	1	PC BOARD ASSEMBLY
7	7646	1	BASE
8	90653	2	#6-19X3/8 SL HXW TFTS HI-LO
9	9800	2	#8-18X5/8 SL HXW TFTS HI-LO BPO
10	8686	1	2 QD PLATE (SHORT)
11	8688	1	QD/ELECTRIC PLATE (SHORT)
12	8687	2	STANDOFF LEG
13	8599	1	QD/ELECTRIC PLATE (LONG)
14	8600	1	2 QD PLATE (LONG)
15	1588	3	DUST PLUG
16	3042	2	GROMMET - RUBBER, SPLIT
17	4302	1	IN-LINE CONNECTOR-INSULATED
18		1	PECULIAR HARNESS (VARIES w/ VEHICLE)
19	8611	1	VEHICLE HARNESS-7 PIN
or	8276	1	VEHICLE HARNESS-12 PIN
20	8291	2	PLUG COVER
21	5972	1	FLASHER - HEAVY-DUTY
22	5776	3	BULLET RECEPTACLE CONNECTOR
23	8293	2	HEADLAMP RELAY SPDT
24	8324	8	CABLE TIE - LONG
25	3666	8	HOSE TIE, NYLON-3/16 X 8
26	20040	1	CLUTCH/SOLENOID VALVE HARNESS

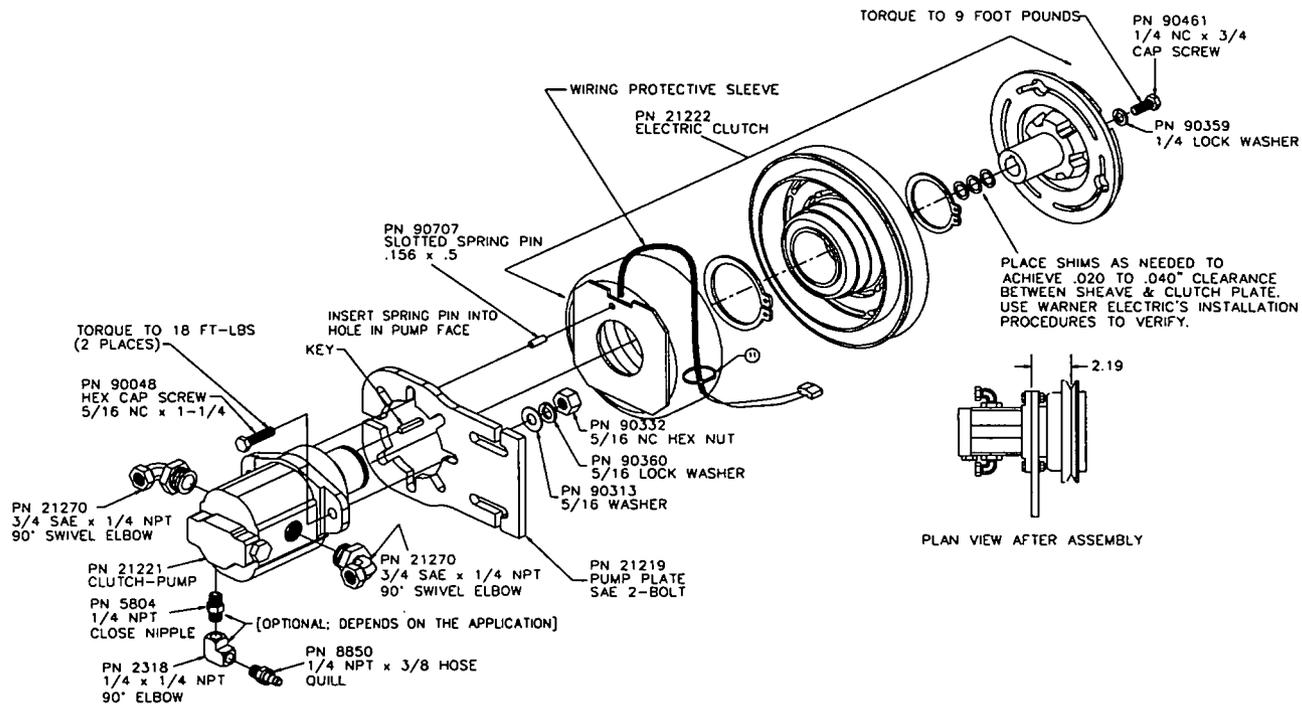
VALVE ASSEMBLY DIAGRAM- #8843



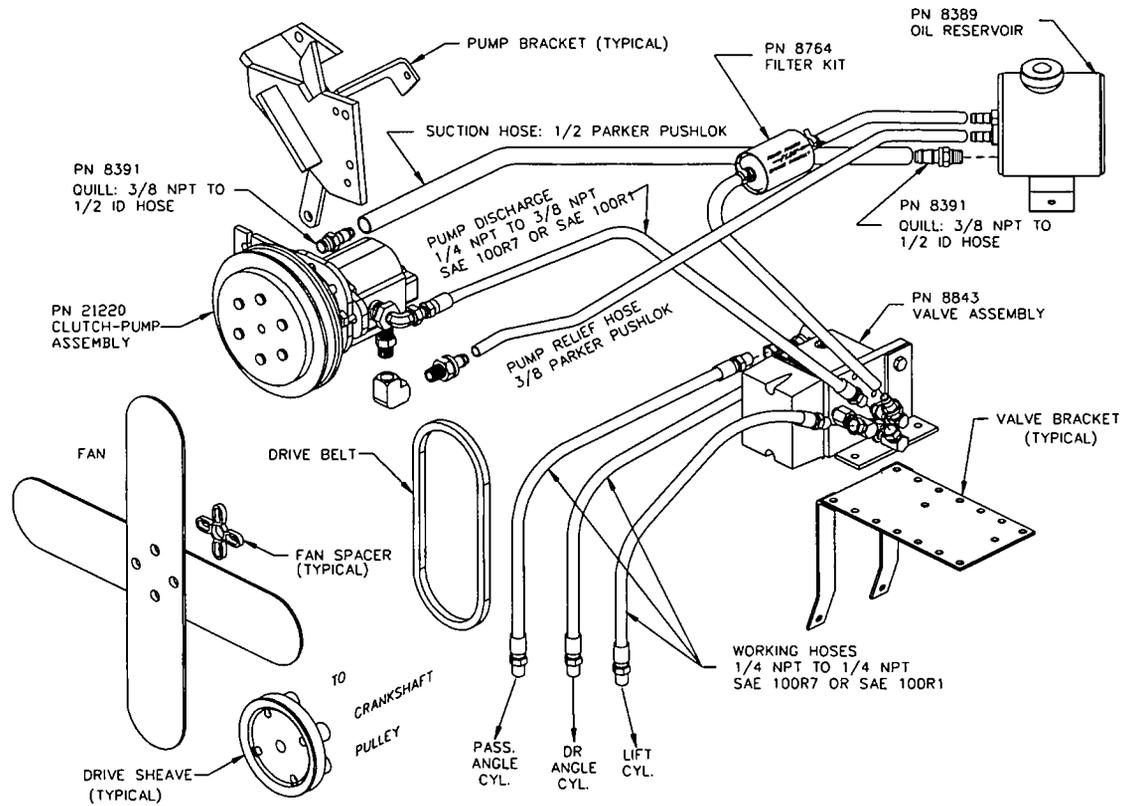
PUMP-CLUTCH ASSEMBLY DIAGRAM- #21220

NOTES

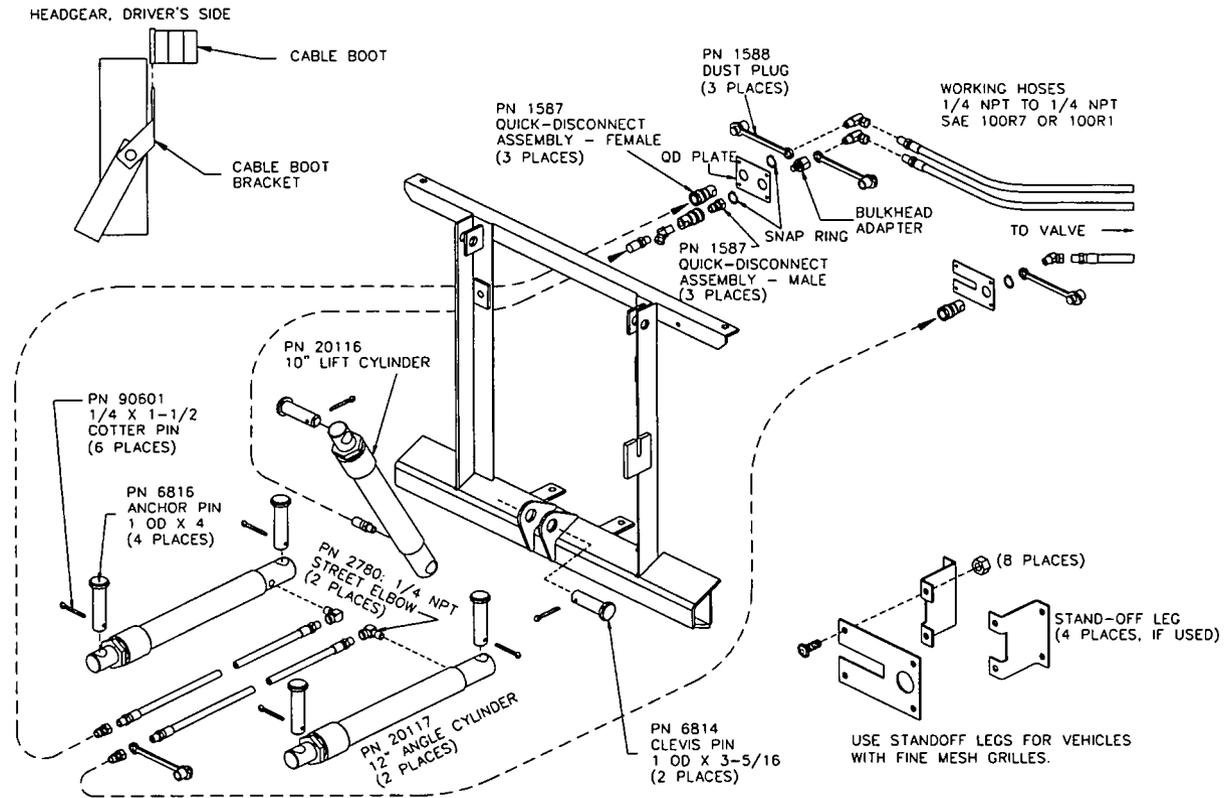
1. USE WARNER-ELECTRIC SERVICE INSTALLATION INSTRUCTIONS #819-0316 TO ASSEMBLE ELECTRIC CLUTCH.
2. USE A PLASTIC TIE-WRAP TO HOLD THE CLUTCH'S WIRING SLEEVE IN POSITION TO PREVENT CHAFING ON THE PUMP PLATE.



TYPICAL ELECTRIC CLUTCH HYDRAULICS SYSTEM DIAGRAM



TYPICAL ELECTRIC CLUTCH HYDRAULICS SYSTEM DIAGRAM



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