

ARCTIC

SNOWPLOWS ❁ CHASSE-NEIGE

SD2 Owner's Manual

ARCTIC

SNOWPLOWS ❁ CHASSE-NEIGE

KEY-POINTS

- Arctic Snowplows is the Top Canadian Manufacturer of light truck mounted plows.
- Arctic has been manufacturing the toughest, most reliable snowplows since 1969.
- Arctic is the only plow manufacturer using Heavy Armor Galvanizing for their entire product line.
- Arctic plows are built to outlast the vehicles they are put on— over 78% of Arctic plows ever sold are still in service today!
- Using high quality components, Arctic has the lowest cost of ownership over the longest period of time- with higher resale value.
- Arctic has the easiest on / off attachment system.
- All Arctic blades are power up and angle, gravity down.
- Poly plows have zero friction. With UV inhibiting materials, poly requires less maintenance than painted steel blades.
- All Arctic Commercial grade plows come standard with skid shoes, curved deflector and blade guides.
- Some manufacturers trip edge blade base angles double as a “cutting edge”- ALL Arctic trip edge blades include a hardened steel cutting edge bolted to the base angle.

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* QUIK*LINK™ is a trademark of Arctic Equipment Manufacturing Corporation

Safety and warnings

Before attempting any procedure in this book, read and understand all the safety information contained in this section. In addition, ensure all individuals working with you are also familiar with these safety precautions.

For your safety, warning and information decals have been placed on this product to remind the operator to take safety precautions. It is important that these decals are in place and are legible before operation begins. New decals can be obtained from Arctic Equipment Manufacturing or your local dealer.

Remember it is the owner's responsibility for communicating information on the safe use and proper maintenance of this equipment. The careful operator is the best operator. Most accidents are caused by human error. Certain precautions must be observed to prevent the possibility of injury to operator or bystanders and/or damage to equipment.

-Servicing the snowplow (hydraulic power system, hoses, hydraulic cylinders, controllers, wiring harnesses, lights, blade frame, blade moldboard, A-frame, quadrant, lift frame and vehicle undercarriage) without special tools and knowledge could result in personal injury. See an authorized Arctic dealer for service.

-Do not allow hands, hair, or clothing to get near any moving parts such as fan blades, belts and pulleys.

-Do not wear neckties or loose clothing when working on the vehicle. These things can catch on moving parts or cause an electrical short circuit that could result in personal injury. Do not wear wrist watches, rings or other jewellery when working on the vehicle or individual equipment

-Do not allow unauthorized person to operate this unit.

-Do not exceed 70 km/h (45 mph) when snowplow is attached to vehicle. Braking distances may be reduced, and handling characteristics may be impaired at speeds above 70 km/h.

-Do not exceed 15 km/h (10 mph) when plowing. Excessive speed may cause serious injury and damage of equipment and property if an unseen obstacle is encountered while plowing.

-All new vehicles are equipped with an airbag sensor, mounted on front of them. Do not alter the position of that sensor or any other component related to the operation of airbag.

-Careless or high-speed driving with a plow attached, which results in vehicle's deceleration may activate airbag sensor, resulting in airbag deployment.

-Do not place fingers in A-frame or mount lug holes to check alignment when attaching snowplow. Sudden motion of the plow could severely injure a finger.

-Do not stand between the vehicle and the blade or directly in front of blade when it is being raised, lowered, or angled. Clearance between vehicle and blade decreases as blade is operated and injury or death can result from the blade striking a body or dropping on hands or feet.

- Due to weight constraints, it is recommended to have only one person (200 lbs) in vehicle's cab when snowplow is attached to the truck.
- Remove the snowplow from vehicle after plowing. Do not travel when snowplow attached, plow is for residential use only.
- Do not work on a vehicle without having a fully serviced fire extinguisher available. (Dry chemical unit specified for gasoline, chemical or electrical fires).
- Do not smoke while working on the vehicle. Gasoline and battery acid vapours are extremely flammable and explosive.
- Do not alter the snowplow, or any part without written approval of Arctic Equipment Manufacturing Corporation.
- Do not use your hands to search for hydraulic fluid leaks; escaping fluid under pressure can be invisible and can penetrate the skin and cause injury.
- Inspect bolts and pins whenever attaching or detaching the snowplow, and before travelling. Also inspect the snowplow periodically for defects. Worn or damaged components could result in the plow dropping to the pavement while driving, causing an accident. Parts that are loose, broken, missing, or plainly worn must be tightened or replaced immediately.
- Keep hands and feet clear of blade and A-frame when attaching or detaching plow.
- Check the job site for terrain hazards, obstructions, and people. Check surrounding area for hazardous obstacles before operating this unit.
- Wear safety goggles when working on the vehicle to protect your eyes from battery acid, gasoline, and dust or dirt from flying off moving engine parts.
- Be aware of and avoid contact with hot surfaces such as engine, radiator, and hoses.
- Wear safety glasses with side shields when striking metal against metal. Failure to heed could result in injury to the eye(s) or other parts of the body.
- Position blade so it does not block path of headlamps beam. Do not change blade positions while travelling. An incorrect plow position blocking headlamp beam may result in an accident.
- Shut off the vehicle engine, place the transmission in neutral or park, turn the ignition switch to the "off" position, firmly apply the parking brake of the vehicle before attaching or detaching the blade from the vehicle or when making adjustments to the blade.
- Be sure that the plow is properly attached before moving the vehicle.
- To prevent accidental activation of a plow, turn a controller off when a plow is not in use.

Snow plow Warranty

ARCTIC Snowplows are guaranteed to be free from defects in material or workmanship under normal use and service for 2 (two) years after the date of purchase of a complete snow plow package (complete snow plow package includes: hydraulic power system, hoses, hydraulic cylinders, controllers, wiring harnesses, lights, blade frame, blade moldboard, A-frame, quadrant, lift frame and vehicle undercarriage).

Arctic Equipment Manufacturing Corporation (Arctic Equipment) will replace or repair, at its election, without charge, any part which becomes defective within the period described. The maintenance reports and a bill of sale/sales receipt will be requested in the event of a claim.

Warranty does not cover:

- Problems caused by failure to follow instructions and failure to maintain the product as described in the owner's manual.
- Damage to the product that has been subject to misuse, neglect, accident, or improper installation, maintenance, care or storage.
- Damage caused by parts not used in accordance with their intended purpose.
- Paint or surface coating deterioration, expendable parts such as, but not limited to, pins, springs, cutting edges, controller keypad, bushings, shoes, blade guides, seal beams, light bulbs, nuts and bolts or tightening nuts and bolts which are considered normal maintenance.
- Damage resulting from rust, corrosion, freezing or overheating; failure to maintain proper fluid/lubrication levels, failure to retighten fasteners, or operation of the plow without shoes.
- Damage due to abrasion of wiring harnesses or hydraulic hoses.
- Travel time incurred to and from dealers or suppliers, accommodations, meals, cost of tax, freight to/from dealers, storage charges, environmental charges, solvents, sealants, lubricants, or any other normal shop supplies.
- Problems caused by accessories and parts that are not supplied by Arctic Equipment.
- Liability for damage to the property, or injury to, or death of any person arising out of the operation, maintenance or use of the covered product.
- Damages on the plow or the truck caused by excessive stacking of snow (All Arctic snowplows have a stop built in, to prevent the blade from contacting the bottom of the bumper. If the blade is pushed too high on the snowbank, the stop will bind and cause the truck's weight to be supported by the plow. This can cause damage to the A-frame, cylinders, lift frame and mounting kit, as well as the trucks bumper and frame. Don't stockpile. Leave that for the loaders. Excessive stacking of snow causes undue stress to the snowplow components and the vehicle, which can result in the failure of the plow components and damage to the vehicle.)
- Arctic Equipment makes no warranty, either express or implied, with regard to the deployment of any safety airbag.

Arctic Product's Liability is expressly limited to repair or replacement of defective parts. Arctic Equipment 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 on any strict liability theory.

The customer must register their snowplow with Arctic using the online registration system found on the Arctic Equipment website www.arcticsnowplows.com within 60 days from the day of purchase. For the customer to be eligible for warranty for two years, the snowplow, inclusive of all components, must be returned to an authorized Arctic dealer every spring for preventative maintenance (it is done at the customer's expense). Failure to do so will nullify any future warranty claims.

Replacement parts installed by Arctic dealer will be covered 90 days under the warranty or balance of original purchase warranty, if greater than 90 days. Also, individual parts, components, or accessories are covered 90 days under the warranty (no labour).

All installations, warranty and preventive maintenance work must be completed by an authorized dealer and/or installer approved by Arctic Equipment as otherwise warranty will be deemed null and void.

This warranty is made only to the original purchaser. There is no other warranty expressed, implied, or statutory.

Arctic Equipment reserves the right to change specification without prior notice.

Customer Responsibility

The loaded vehicle, including all aftermarket accessories, the snowplow, passengers and cargo, MUST NOT exceed the gross vehicle weight ratings (GAWR), front gross axle weight rating (FGAWR) or rear gross axle weight rating (RGAWR) specified on the Safety Compliance Certification Label located in the driver's side door opening. It is the operator's responsibility to verify that these ratings are not exceeded. To determine the Gross Axle Weights for your vehicle, including all aftermarket accessories, the snowplow, passengers and cargo, take your loaded vehicle and the snowplow to a scale. With the snowplow attached, place the front wheels of the vehicle on the scale to get the front gross axle weight (FGAW). To get the rear gross axle weight (RGAW), place the back wheels of the vehicle on the scale.

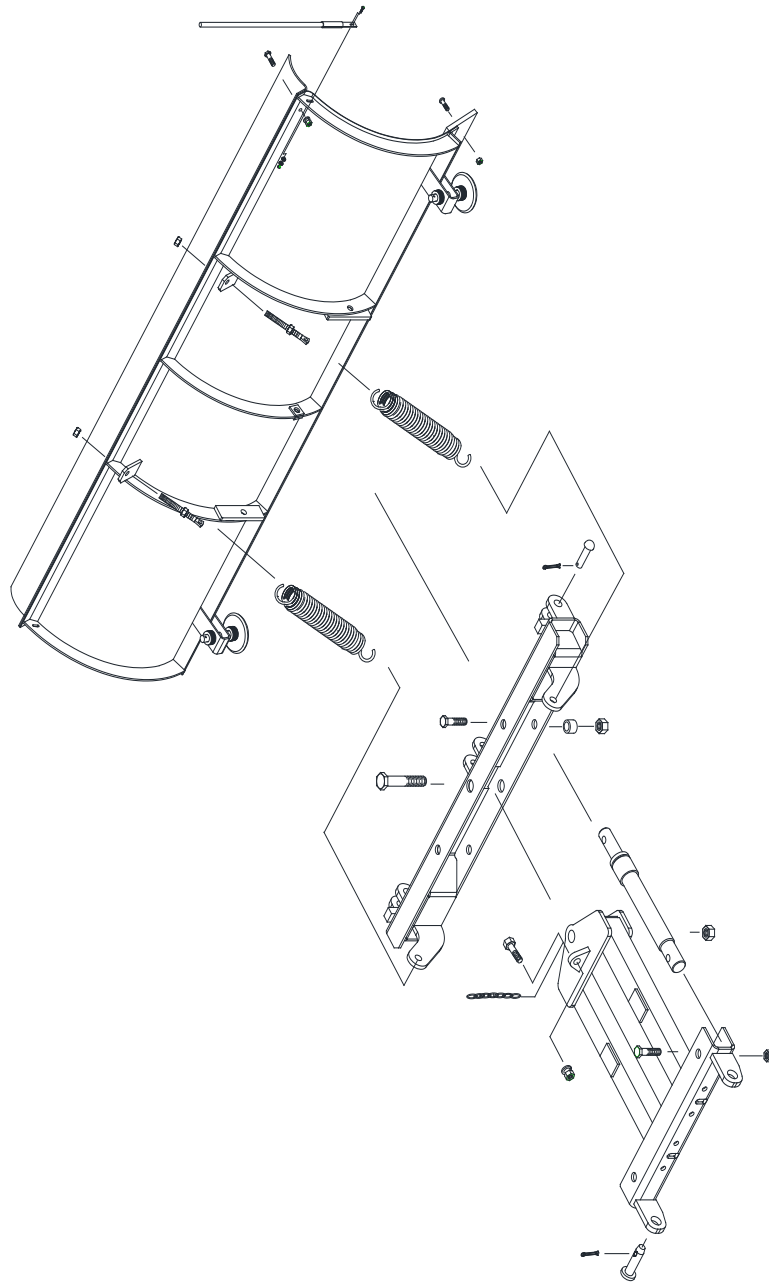
The addition of ballast weight placed rearward of the rear axle may be required to prevent exceeding the FGAWR and provide good vehicle braking and handling. When ballast is required it must be secured behind the rear wheels in a manner, which prevents it from sliding during normal driving.

Disclaimer notice

Arctic Equipment Manufacturing Corporation (Arctic) does not assume liability for damage to your motor vehicle resulting from the attachment or use of an Arctic snowplow. The purchaser assumes all vehicle risk associated with the attachment and operation of this snowplow.

The Arctic snowplow you purchase must be used only on vehicles equipped with the manufacturer's snowplow preparation packages. Snow plowing without the original plow preparation package may damage your vehicle. The added weight may impair the operation and control of your vehicle. Snow plowing with a vehicle not recommended for that purpose by the manufacturer may void your new vehicle warranty. If your vehicle is not equipped with an original snow plow preparation package, additional equipment may be necessary before snow plowing. Please consult your vehicle and snowplow dealers prior to the purchase and installation of the snowplow. The installation of such parts however is not a full substitute for the original equipment snowplow preparation package.

Arctic Standard duty steel blade S2-90S 90"



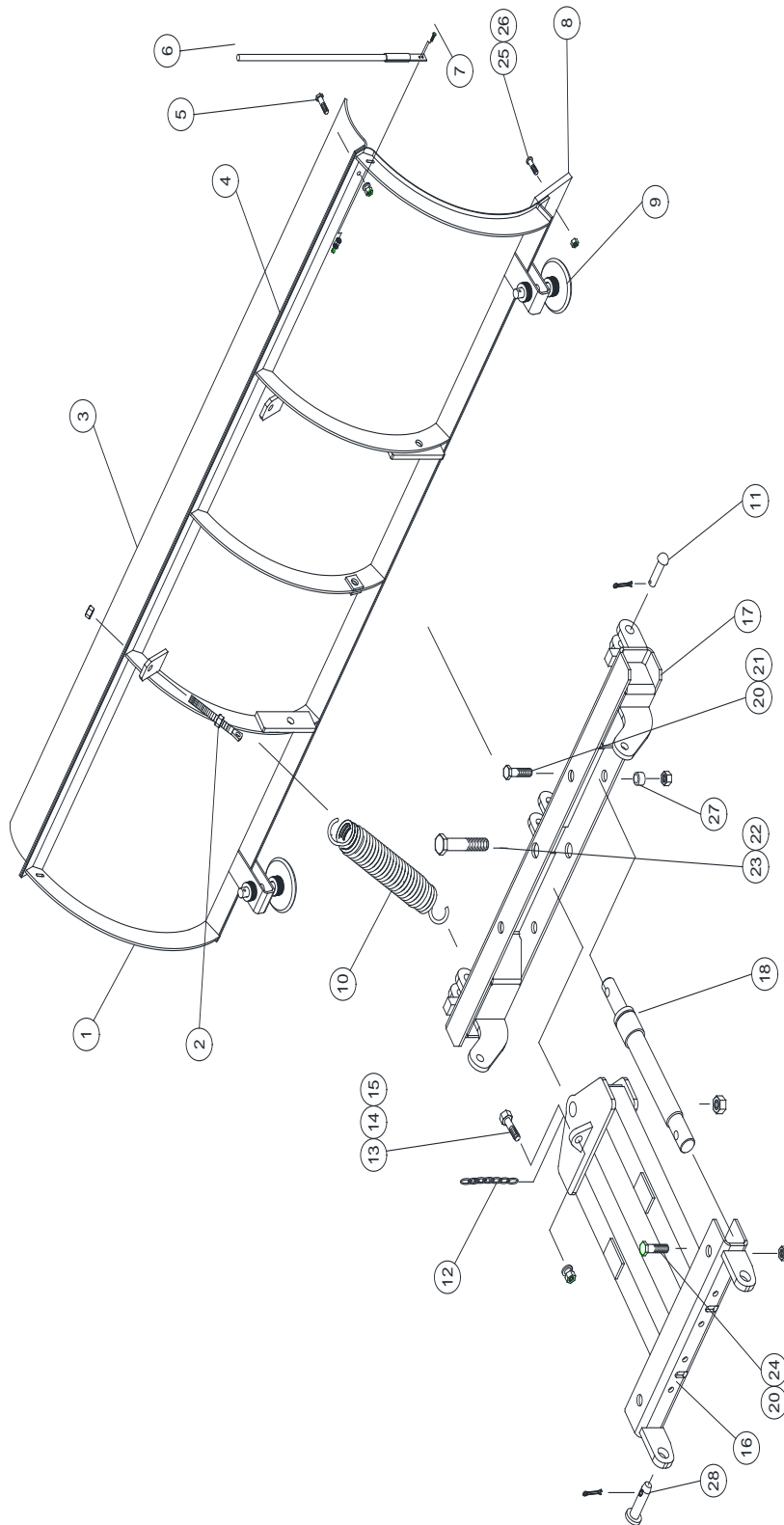
Warning
Lower the blade when the vehicle is parked. Temperature changes could change hydraulic pressure, causing the blade to drop unexpectedly or damaging hydraulic components. Failure to do this can result in serious personal injury.

Warning
Do not stand between the vehicle and the blade or within 10' of a moving blade. A moving or falling blade could cause personal injury.

Warning
Keep hands and feet clear of the blade, frame, and rollers when mounting or removing the snowplow. Moving or falling assemblies could cause personal injury. Never use a finger to check an alignment. Moving or falling assemblies could crush your finger.

Warning
Inspect snowplow components and bolts for wear before mounting or removing snowplow and before traveling.

Warning
Do not exceed GVWR or GVWR, including the weight of the snowplow, on the driver side vehicle floor cross.

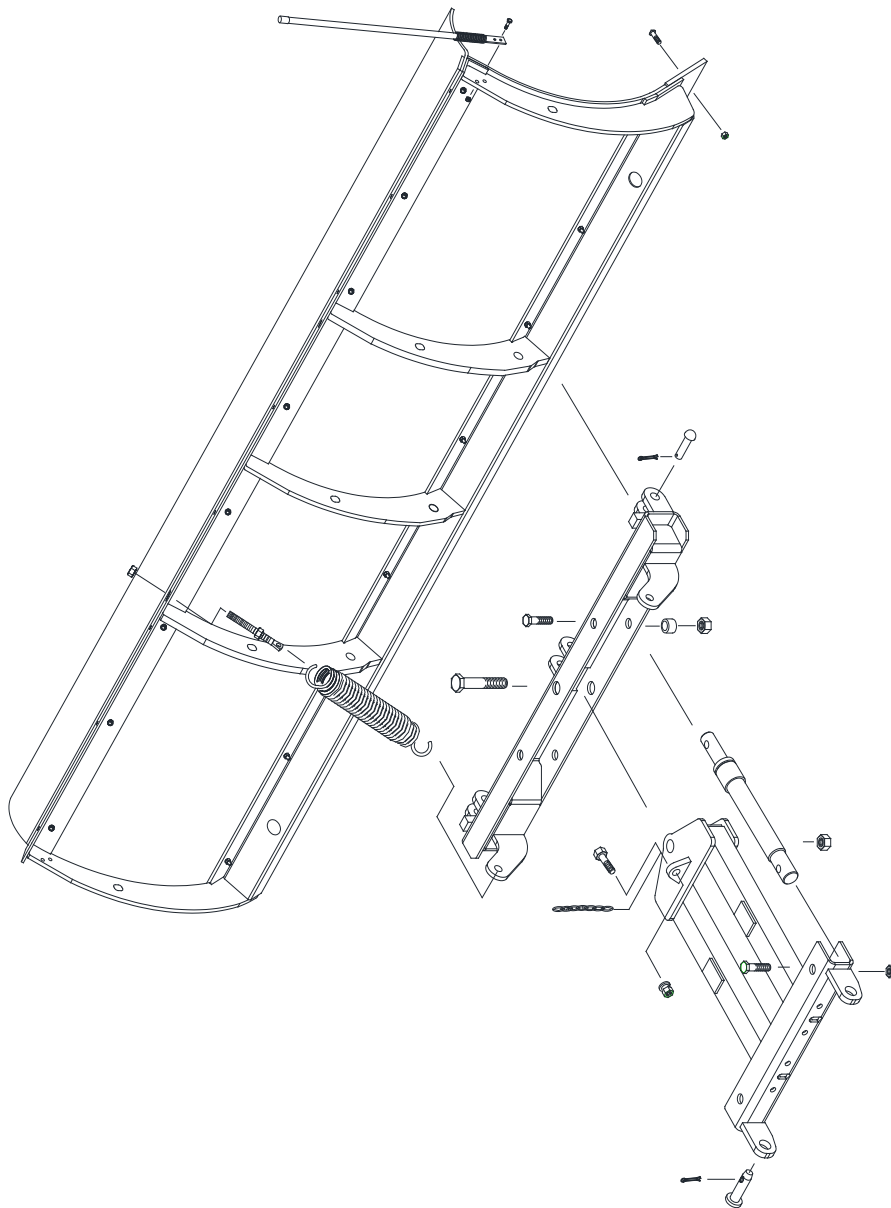


STANDARD DUTY STEEL BLADE S2-90S 90"

Item	Part number	Description	Quantity
1	53769-SE	90" Blade Assembly c/w Cutting Edge	1
2	50191-M	Eye Bolt Assy	1
3	52245-CR	Curved Deflector 90"	1
4	52239-M	Strap 90"	1
5	52288-M	Deflector Bolt Bag Kit	1
6	50999-B	Blade Guides	2
7	GB001	Guide Bolt Assy	4
8	53801-B	3/8" x 4" Steel Cutting Edge	1
9	50037-B	Shoe Assy (Optional)	2
10	50180-C	Trip Spring	2
11	50232-M	3/4" x 3" Rivet Assy	3
12	55018-02-M	Chain	1
13	HH-00972-090	1/2" -20 x 1 1/2" HHCS	1
14	HH-00460-002	1/2" - 20 Hex nut	1
15	HH-00457-001	1/2" Lock washer	1
16	53863-D	T frame	1
17	53862-D	Quadrant	1
18	CS150-10.00-NRS	1 1/2" x 10" Angling Cylinder	2
19	HH-00233-001	1/4"-28 Grease Fittings	1
20	HH-00973-007	3/4" Nylon Inserts	4
21	HH-00972-156	3/4" - 16 x 4 1/2" HHCS	2
22	HH-00972-191	1" -14 x 5" HHCS	1
23	HH-00540-009	1" Nylon Inserts	1
24	HH-00972-153	3/4" -16 x 3 1/2" HHCS	2
25	HH-00971-137G8	1/2" x 1 3/4" Carriage Bolt	8
26	HH-00340-003	1/2" Nylon Inserts	8
27	52712-N-GA	Spacer for Angling Cylinder	2
28	53325-M	T-frame Rivet	2

Item	Part number	Description	Quantity
24	53003-B-GA	Quadrant Galvanized	1
25	CS150-10.00-NRS	1 ½" x 10" Cylinder	2
26	HH-00233-001	¼" - 28 Grease fittings	1
27	HH-00973-007	¾" Nylon Inserts	4
28	HH-00972-153	¾" - 16 x 3 ½" HHCS	2
29	HH-00972-156	¾" - 16 x 4 ½" HHCS	2
30	HH-00972-192	1" - 14 x 5 ½" HHCS	1
31	HH-00540-009	1" Nylon Inserts	1

Arctic Standard duty poly blade S2-90P 90"



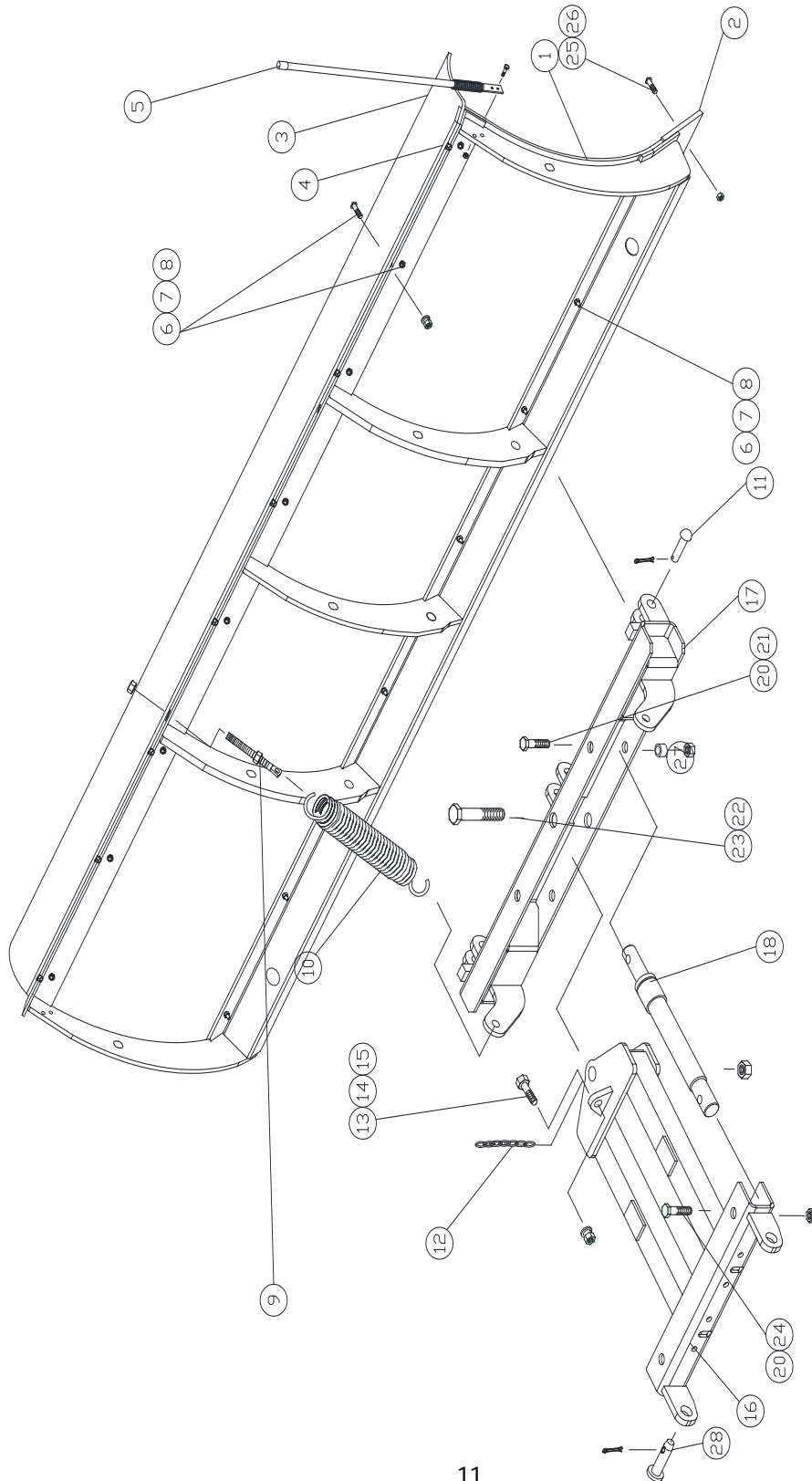
▲ Warning
Lower the blade when the vehicle is parked. Temperature changes could cause the hydraulic pressure in the blade cylinders to increase, which could cause the blade to rise unexpectedly or damaging hydraulic components. Failure to do this can result in serious personal injury.

▲ Warning
Do not stand between the vehicle and the blade or within 10' of a moving blade. A moving or falling blade could cause personal injury.

▲ Warning
Keep hands and feet clear of the blade, A-frame and cylinders when mounting or removing the snowplow. Moving or falling blade assemblies could cause personal injury or crush your finger.

▲ Warning
Inspect snowplow components and bolts for wear and damage when mounting or removing snowplow and before traveling.

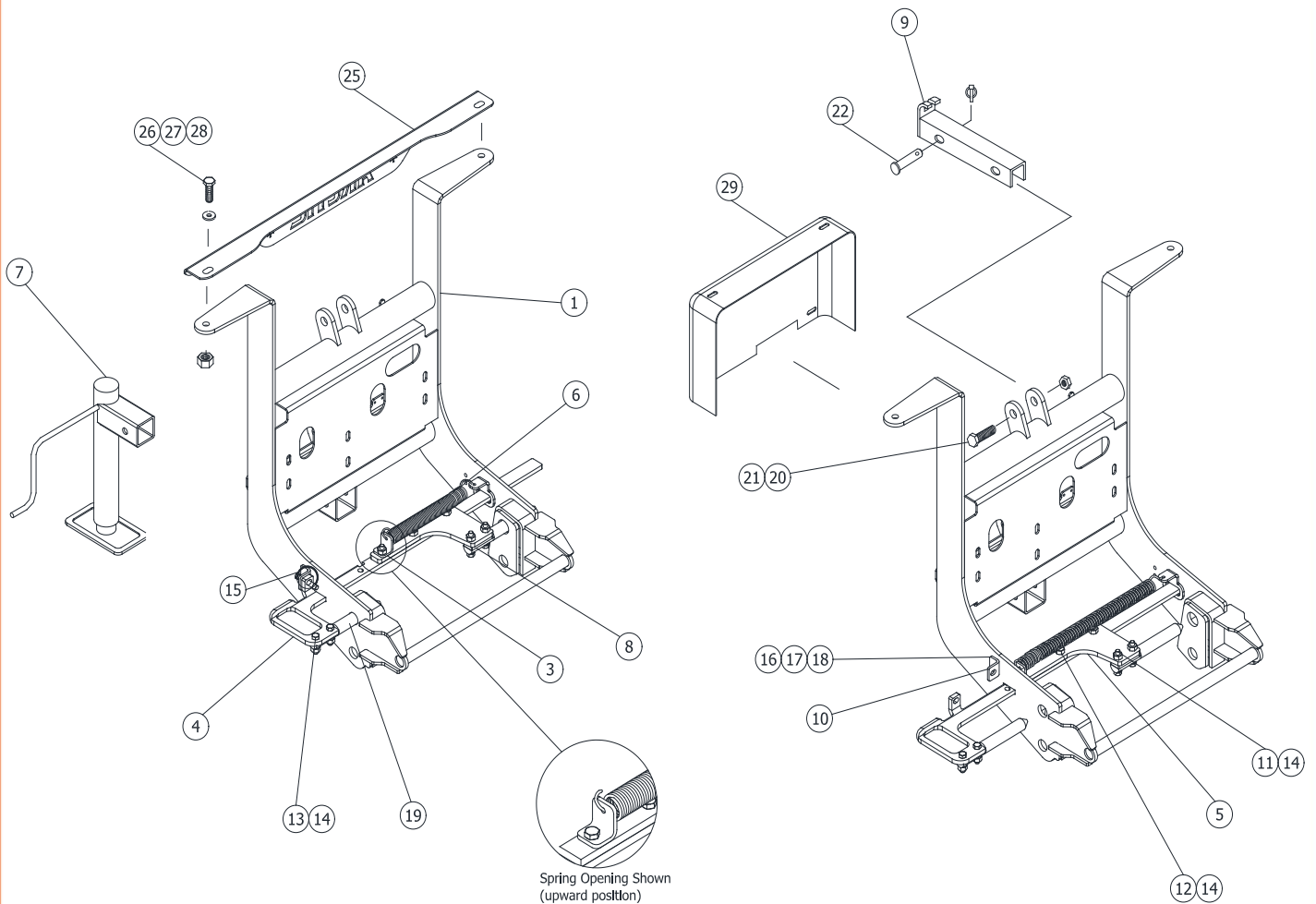
▲ Warning
Do not exceed GVWR or GAWR, including blade and ballast. The rating label is found on the driver side vehicle door corners.



STANDARD DUTY POLY BLADE S2-90P 90"

Item	Part number	Description	Quantity
1	53849-D	Poly Skin	1
2	53752-B	3/8" x 6" Steel Cutting Edge	1
3	52995-CR	Curved Deflector 90"	1
4	52996-M	Strap 90"	1
5	50999-B	Blade Guides	2
6	HH-00971-043	5/16" -18x1" Carriage bolt	16
7	HH-00294-002	5/16" Hex nut	16
8	HH-00457-007	5/16" Lock washer	16
9	50191-M	Eye Bolt Assy	2
10	50180-C	Trip Springs	2
11	50232-M	3/4" x 3" Rivet Assy	3
12	55018-02-M	Chain	1
13	HH-00972-090	1/2" -20x1 1/2" HHCS	1
14	HH-00460-002	1/2" -20 hex nut	1
15	HH-00457-001	1/2" Lock washer	1
16	53863-D	T frame	1
17	53862-D	Quadrant	1
18	CS150-10.00-NRS	1 1/2" x 10" Angling Cylinder	2
19	HH-00233-001	1/4"-28 Grease Fittings	1
20	HH-00973-007	3/4" Nylon Inserts	4
21	HH-00972-156	3/4" -16x4 1/2" HHCS	2
22	HH-00972-191	1" -14x5" HHCS	1
23	HH-00540-009	1" Nylon Inserts	1
24	HH-00972-153	3/4" -16x3 1/2" HHCS	2
25	HH-00971-138	1/2"x2" Carriage Bolt	8
26	HH-00340-003	1/2" Nylon Inserts	8
27	52712-N-GA	Spacers for Angling Cylinders	2
28	53325-M	T-frame Rivets	2

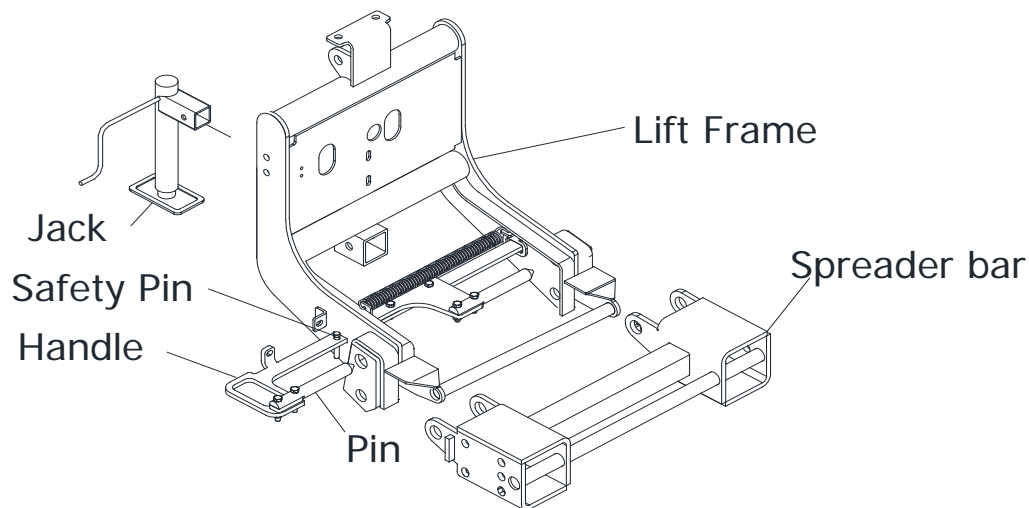
Lift frame Quik*Link™ QL-SD2 (Standard Duty Plow)



SD2 LIFT FRAME QL-SD2			
Item	Part number	Description	Quantity
1	53853-HANDLE	QLIV SD2 Lift Frame	1
2	53704-M	QL-HOP Parts Box	1
53704-M QL-SD2 Parts Box			
3	53179-M	Lift frame Spring Bracket	1
4	53864-M	QLIV Lock Handle	1
5	53178-M	Top Plate QLIII Lock	1
6	53182-N	Lock Spring	1
7	52373-M	Jack Ass'y	1
8	53180-M	Lock Spacer	1
9	50069-C-GA	Lift Channel Galvanized	1
10	53174-M	Lock Bracket	1
11	HH-00293-050	3/8-16x1.1/4 Hex Head Cap Screw	2
12	HH-00293-051	3/8-16x1.1/2 Hex Head Cap Screw	3
13	HH-00293-053	3/8-16x2 Hex Head Cap Screw	2
14	HH-00340-001	3/8-16 Nut (Nylon Insert)	7
15	53183-N	Hitch Pin	1
16	HH-00294-001	1/4-20 Hex Nut	2
17	HH-00457-006	1/4 Lock washer	2
18	HH-00293-006	1/4-20x1 Hex Head Cap Screw	2
19	53181-B	Lift frame Pin	2
20	HH-00972-153	3/4" x 3½" UNF Cap screw	1
21	HH-00973-007	3/4" UNF Thin Collar Locknut	1
22	52757-M	Pin Ass'y	1
23*	HH-00972-156	3/4" x 4½" UNF Cap screw	1

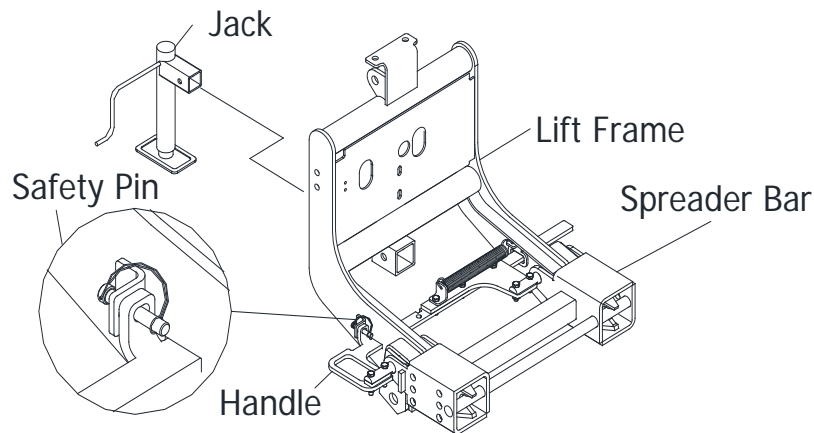
SD2 LIFT FRAME OL-SD2			
Item	Part number	Description	Quantity
24*	50999-B	Blade guides	2
25	53858-03-B	Arctic Logo Plate	1
26	HH-00293-088	1/2 -20x1 Hex Head Cap Screw	2
27	HH-00341-006	1/2 Flat washer	2
28	HH-00340-003	1/2 Nylon Insert Lock nut	2
29	53865-C	Power Unit Cover	1

Blade removal with QUIK*LINK™ III / QLIV attachment



1. Locate a spot that is as level as possible. With the blade positioned at 90° to the truck lower the blade and leave the switch in the float position.
2. Insert the jack into the receiver on the lift frame and lower the leg while holding and pulling slightly on the spring loaded handle, until the handle pulls out easily and locks in place.
NOTE: If the jack is lowered too far it will "wedge" the lift frame into the spreader bar. Lock the handle in the open position and secure with the safety pin down through the handle.
3. Unplug the lights, power unit and battery cables from the truck.
4. Back the truck away from the plow assembly. It may be necessary to accelerate the truck back with a quick "snap" in order to allow the truck to break free from the plow.
5. Return control to neutral or shut off switch. Install dummy plugs into harnesses.

Blade reinstall with QUIK*LINK™ III / IV attachment



1. Drive up to plow assembly until spreader bar is about to make contact with lift frame.
2. Get out of truck to check that the lift frame is aligned with the spreader bar. If necessary use jack to adjust the height or move truck to align sideways.
3. Drive truck forward until you start to push the plow.
4. With plow fully engaged, pull out the safety pin on the spring loaded handle and let it fully engage the pins in place, and reinsert the safety pin to lock the handle. Remove the jack.
5. Remove dummy plugs and reconnect battery cables, power unit and lights.

NOTE: Aligning the truck to the plow is made easier by establishing a reference point on the hood of the truck to line up the lights on the plow.

Warning: Before traveling be sure that pins, all bolts and spring are in place. Safety pin must be in place and locked all the time.

General information about power unit M3493

Warning

- Fluid under pressure can pierce the skin and enter the bloodstream resulting in serious injury or death.
- Eye protection and protective clothing must be worn when working on any portion of the snowplow.
- Remove any jewellery (rings, bracelets, watches, necklaces) that could conduct electricity while working with electrical system.
- Lifted blade should be securely propped or immobilized while working on it or any other suspended part so it cannot fall.
- Do not operate blade when anyone is within a 10 foot radius of it.
- Do not use Teflon tape on hydraulic fittings as it can easily jam valves and plug the filters in the system.
- Use of any fluid other than J13 will void warranty

Warranty Identification

For purposes of warranty consideration, recording the serial number of the power unit is necessary. This serial number is displayed on the reservoir of the power unit.

Maintenance

Under normal operating conditions, the M3493 should not require servicing during the plowing season, provided post season maintenance has been carried out. Periodically, and during post season maintenance, make sure the electrical connections are very well greased. The terminals, coils and all connectors must be covered with dielectric grease.

After every season the hydraulic fluid has to be changed. (For the first 7 years after purchase a preventive maintenance schedule must be performed in the spring in order to extend your warranty-please see your dealer for details). The replacement fluid is **UNIVIS J13 (HVI 13)** hydraulic fluid. Automatic transmission fluid is not recommended for this system and may lead to aeration of the oil in very cold weather conditions. Use of any fluid other than J13 will void warranty.

The oil level in the reservoir is to be within ½" from the top surface (when lift cylinder is collapsed).

When draining the hydraulic fluid, the hoses at the cylinders should be disconnected and drained. With the hose disconnected, the cylinders should be collapsed to displace the oil out of the cylinder.

Periodically, and during post season maintenance, make sure the electrical connections are tight and free of corrosion. The terminals must be covered with grease for additional protection from corrosion.

Electrical System

Frequently problems develop due to an undersized electrical charging and storage system. Generally, the heavier the usage, the heavier the system should be. For heavy usage and in the case where a number of other devices are run off the battery simultaneously, heavier ratings are strongly recommended.

Electric Motor

The 8111-I electric motor is a one pole electromagnetic motor, consisting primarily of an armature/commutator, two field coils, and four brushes in a brush holder set, and a tubular steel body with cast end cap. The motor is grounded through the body.

Hydraulic Pump

The hydraulic pump converts mechanical energy transmitted by the prime mover (in this case a 12 volt DC electric motor) into hydraulic energy. The hydraulic energy is due to flow (kinetic energy) and pressure (potential energy). The rate of energy output is expressed in horsepower.

At the inlet, as the gears un-mesh, the volume in the cavity increases thereby causing fluid to enter. This fluid is then carried between the gears and the housing to the other side of the gears into the outlet cavity. At this point the gear teeth mesh. The outlet cavity volume decreases, causing fluid to flow into the system. Note that without a load, the pressure at the outlet port is nil.

The pressure at the outlet of the pump is due to external loads placed on the system. These loads can be transmitted through cylinders and linear actuators as well as hydraulic motors and rotary actuators. In practice, system components by virtue of orifice and line sizes, offer some resistance to the flow of fluid. This translates into pressure at the outlet of the pump.

Valve Information

Pressure Relief Valve

The pressure relief valve consists of a ball, a retaining spring and a seat. The ball is exposed to the pressure in the outlet line from the pump. This pressure acting on the exposed area of the ball causes a force on the retaining spring. When the pressure is such that the force on the ball exceeds the force in the spring (due to a preset amount of pre compression) the ball lifts off the seat and the fluid from the outlet of the pump is allowed to flow back to the reservoir. "Standard relief valve setting" for the M3493 is 2000 psi.

Directional Valves

The M3493 circuit contains 4 directional valves identified as 'A', 'B', 'C' and 'D'. Valves 'A', 'C' and 'D' are 3 way, 2 position spool valves. Valve 'B' is a 2 way, 2 position normally closed poppet valve.

A basic directional valve consists of a valve cartridge and a coil. Inside the cartridge valve, an armature is attached to the valve mechanism.

The coil consists of a wire wrapped around a spool. When power is applied to the coil (the coil is energized), the magnetic field created by coil pulls the armature into the coil. The armature shifts the valve mechanism into the energized position. When power is removed from the coil, a spring inside the valve cartridge pushes the armature and valve mechanism to the de-energized position.

Directional Valve 'B'

Valve 'B' is a 2 way 2 positions normally closed poppet valve which is used for lowering the plow. In the de-energized position, valve B acts as a check valve allowing pump flow to the lift cylinder but preventing return flow from the lift cylinder to the reservoir. Energizing valve B opens the valve and allows flow from the lift cylinder to the reservoir thereby lowering the plow. See figure 2. Note: the lift cylinder is connected to C3.

Directional Valves 'A', 'C' & 'D'

Directional Valves 'A', 'C' and 'D' are 3 way, 2 position spool valves. Directional Valve 'C' operates the lift cylinder on C3 port (See Figure 1). Directional Valves 'A' and 'D' operate the left and right angling cylinders. Valve 'A' operates the angling cylinder on the right side of vehicle on C2 port (See Figure 3). Valve 'D' operates the angling cylinder on the left side of vehicle on C1 port (See Figure 4).

In the de-energized position, the valves block flow from pump to the cylinder but allow return flow from the cylinder to the reservoir. In the energized position, flow from the pump to the cylinder is permitted but flow from the cylinder to the reservoir is not.

Note: When angling the plow, one cylinder is extending and the other is retracting therefore one cylinder is receiving oil from the pump and the other is returning oil to the reservoir. Valves 'A' and 'D' must work together.

Pressure Compensated Flow Control

When B valve is energized oil from a lift cylinder is going through the pressure compensated flow control in the tank. A pressure compensated flow control valve automatically compensates for pressure changes and maintains its setting even as work load changes.

Crossover relief valve

The crossover relief valves are provided to protect the valves and manifold from the pressure spikes created when the plow strikes an object. The crossover relief valves are similar in construction to a regular direct acting relief valve. Cross over valves when activated bleeds fluid from C1 to C2 or vice versa. In this manner, the angling cylinders plow frame and truck frame are offered some protection from the normal impact forces associated with plowing. Striking a fixed object while plowing at high speeds will damage the cylinders and perhaps the plow. The cross over relief valves are adjustable and are normally set at about 3,000 psi. See figure 3 and 4.

Pilot Operated (PO) Check Valve

A dual pilot operated check valve (PO Check Valve) is provided on ports C1 and C2 to hold the plow at the desired angle. Without the PO Check valves, leakage through directional valves 'A' and 'D' would allow the plow to drift.

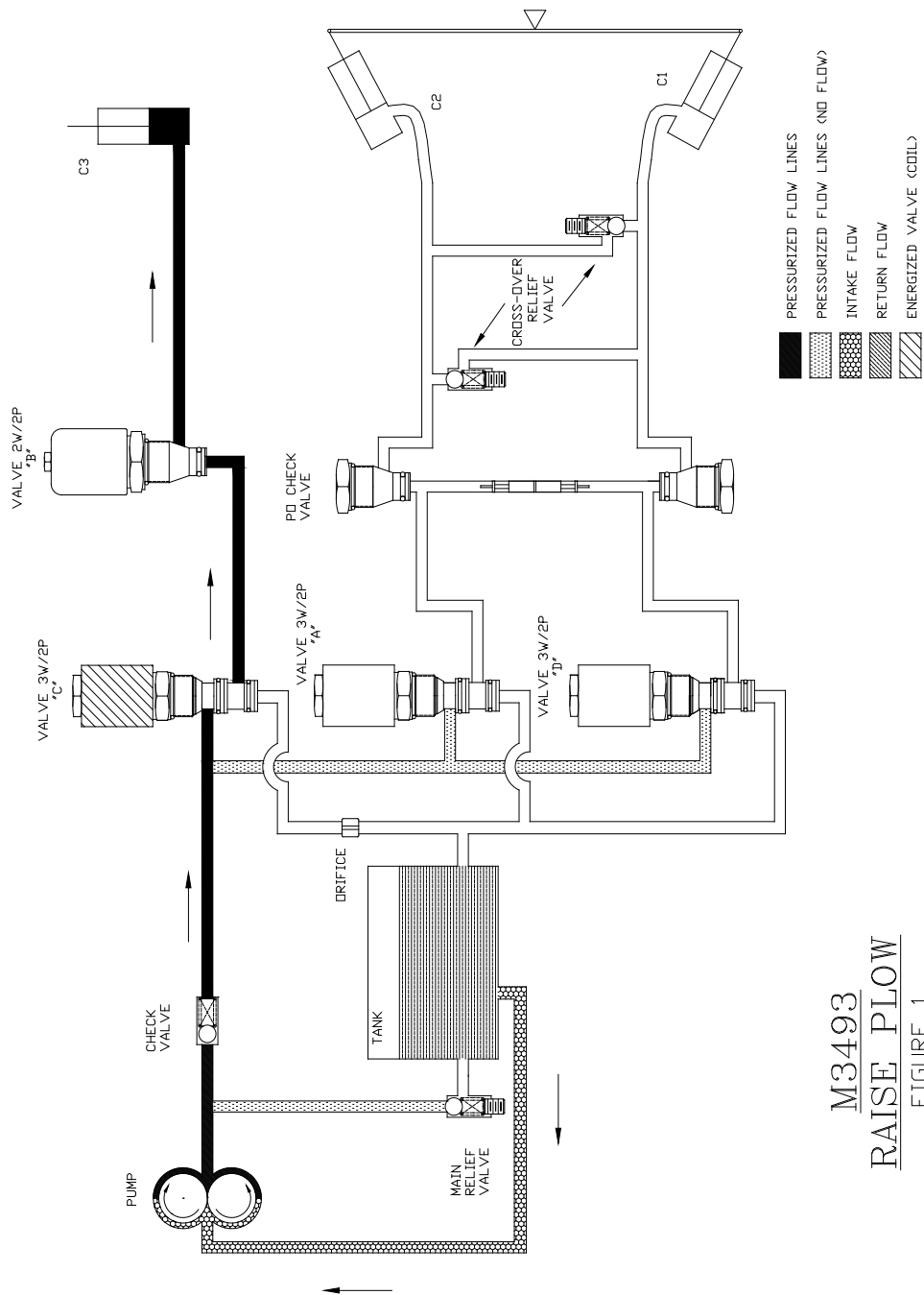
Without pilot pressure, a pilot operated check valve (PO check valve) allows flow in only one direction. In the free flow direction, oil flowing through the valve lifts the poppet off the seat. In the opposite direction, returning oil pushes the poppet against the seat thereby blocking flow. When pressure is applied to the pilot piston, the poppet is lifted off the seat and flow in both directions is permitted. When angling, pilot pressure is provided for the check valve returning oil to the reservoir. For example; when valve 'D' is energized pump flows oil to C1. Oil is allowed to return through the check valve to the reservoir because the pressure on C1 is acting on the pilot piston of the C2 PO Check Valve. See figures 3 & 4.

Control Switch

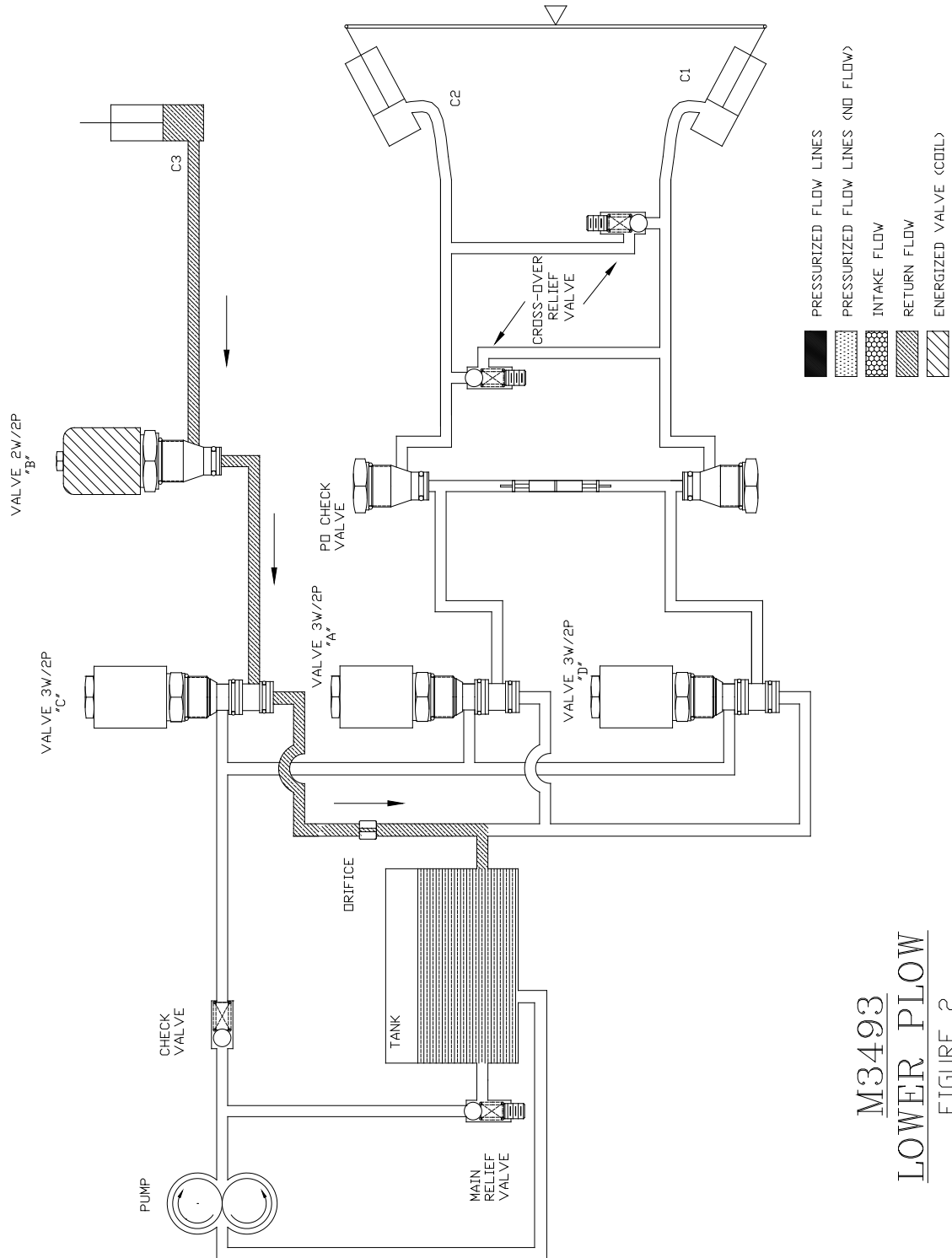
The M3493 uses four different control boxes: control box with rocker switches, touchpad control box, joystick control box and handheld controller. Each control box performs same functions: up, down, angle left and angle right.

Handheld controller - all control functions automatically time out (shut off) after 6-8 seconds. This helps to reduce wear on the motor and to prevent battery drain. After being idle for approximately 20 minutes the controller will automatically turn off and the indicator light located at the center of the keypad will blink from red to green. To restart the control, turn the control OFF (ON/OFF switch) and then back ON.

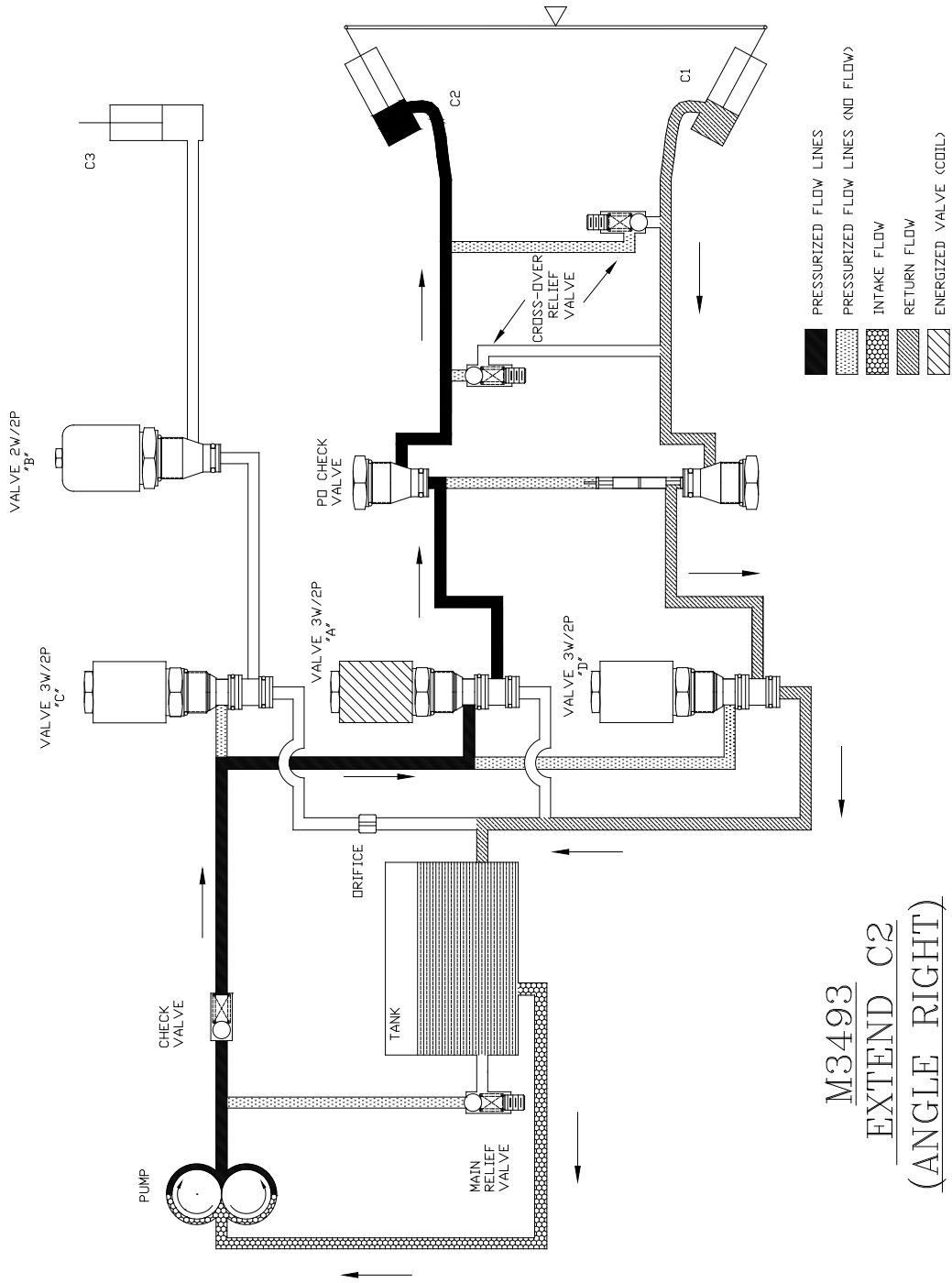
Hydraulic operation diagrams



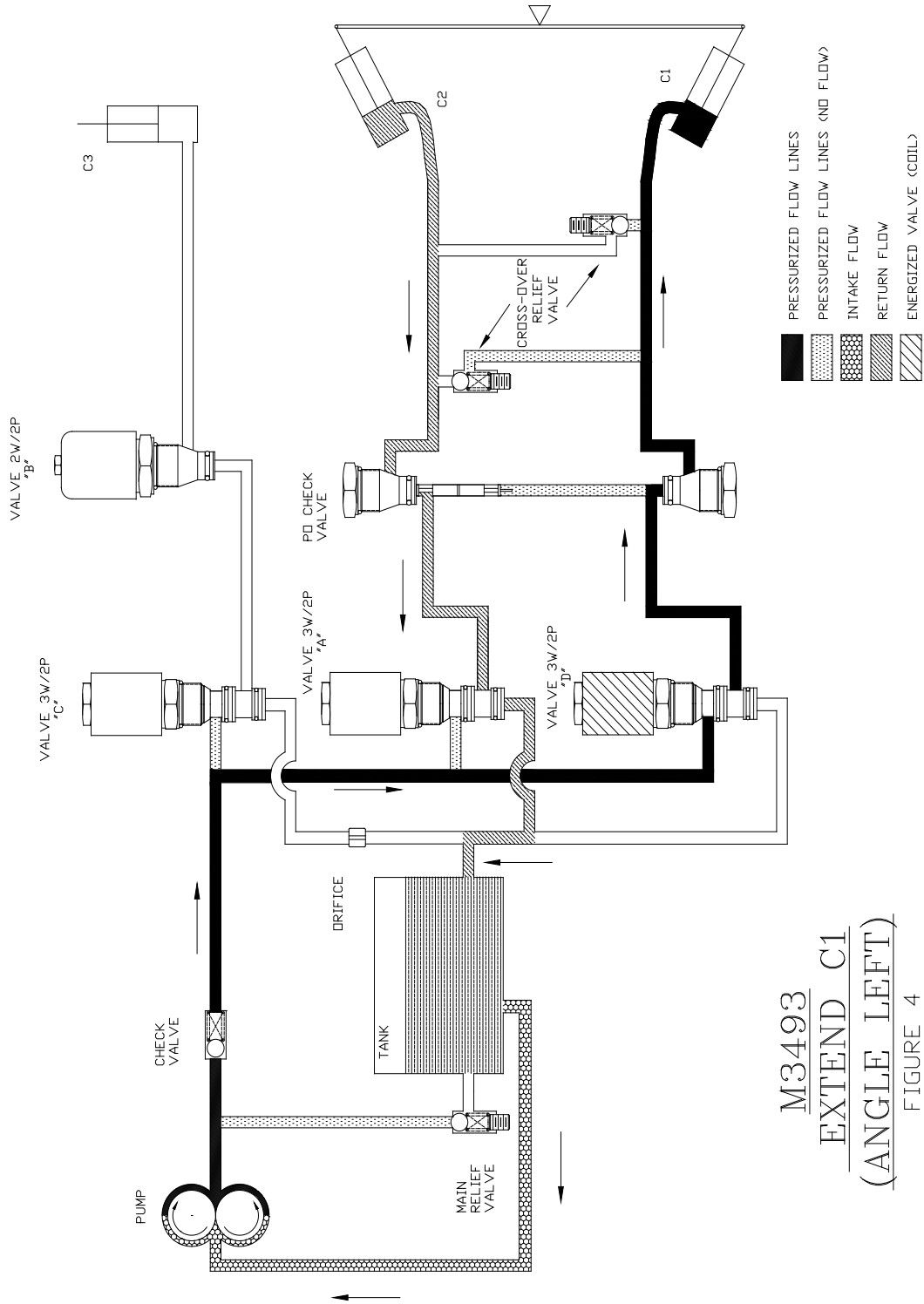
M3493
RAISE PLOW
FIGURE 1



M3493
LOWER PLOW
FIGURE 2

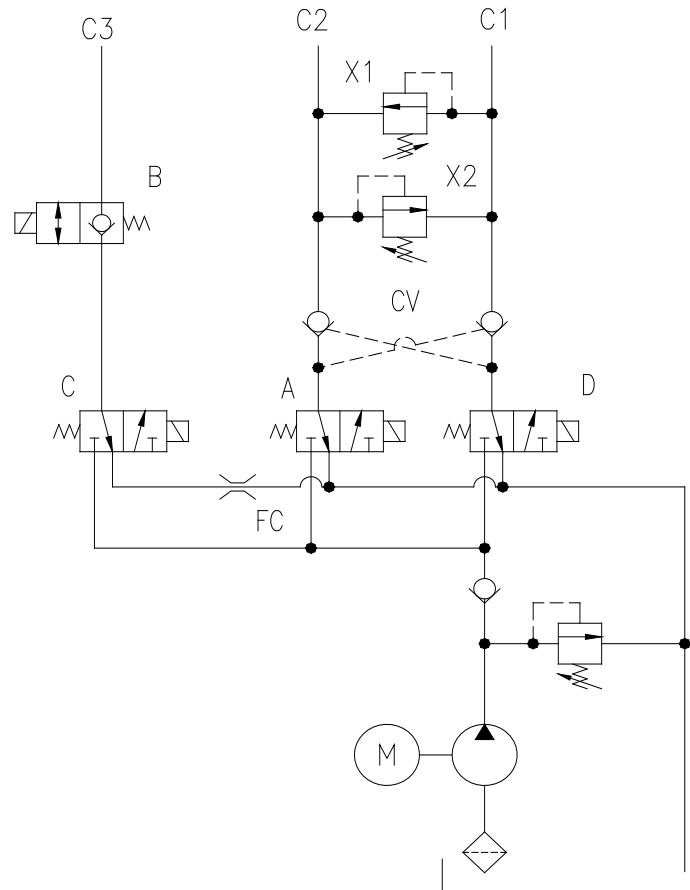


M3493
EXTEND C2
(ANGLE RIGHT)
FIGURE 3



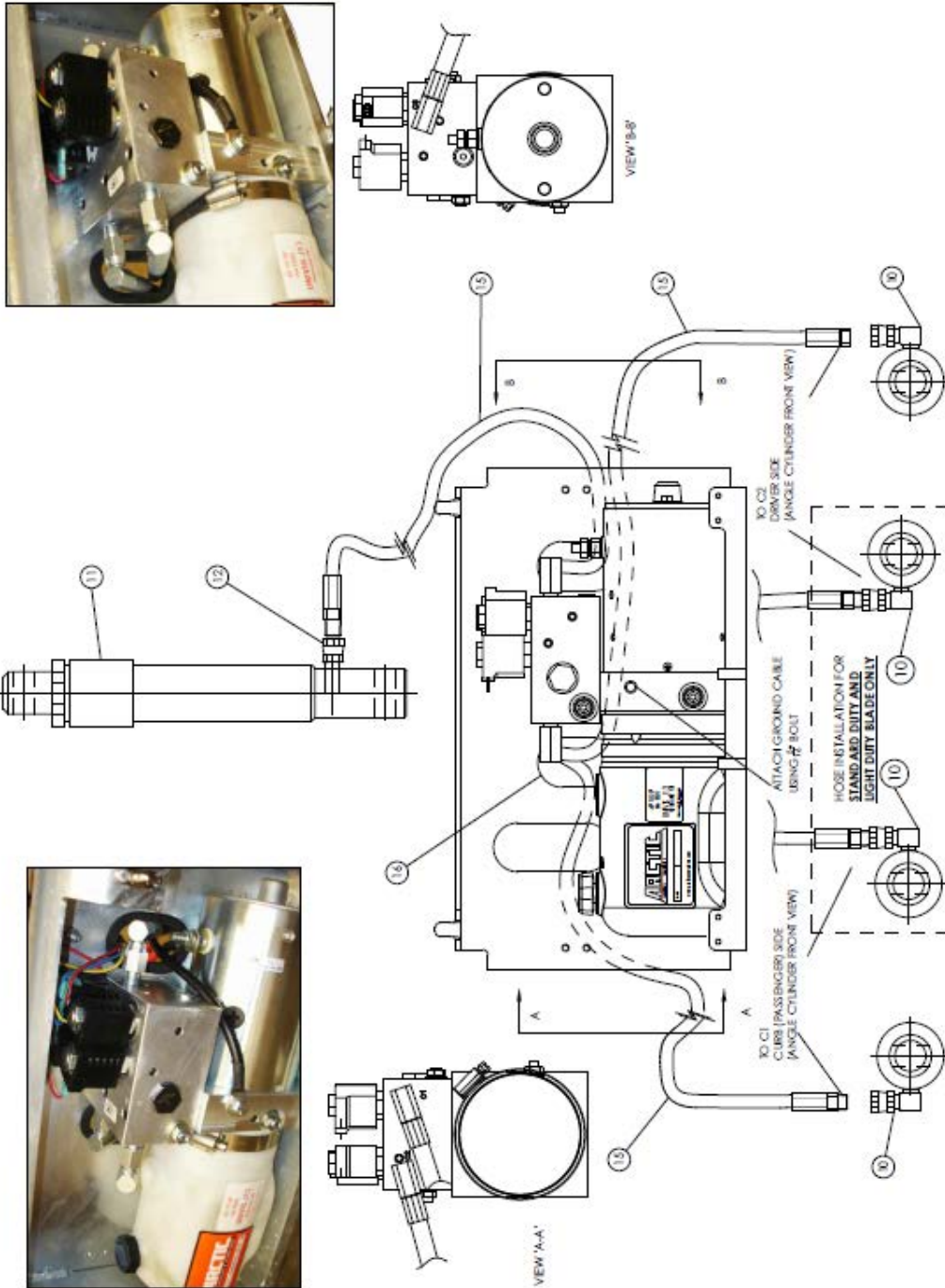
M3493
EXTEND C1
(ANGLE LEFT)
FIGURE 4

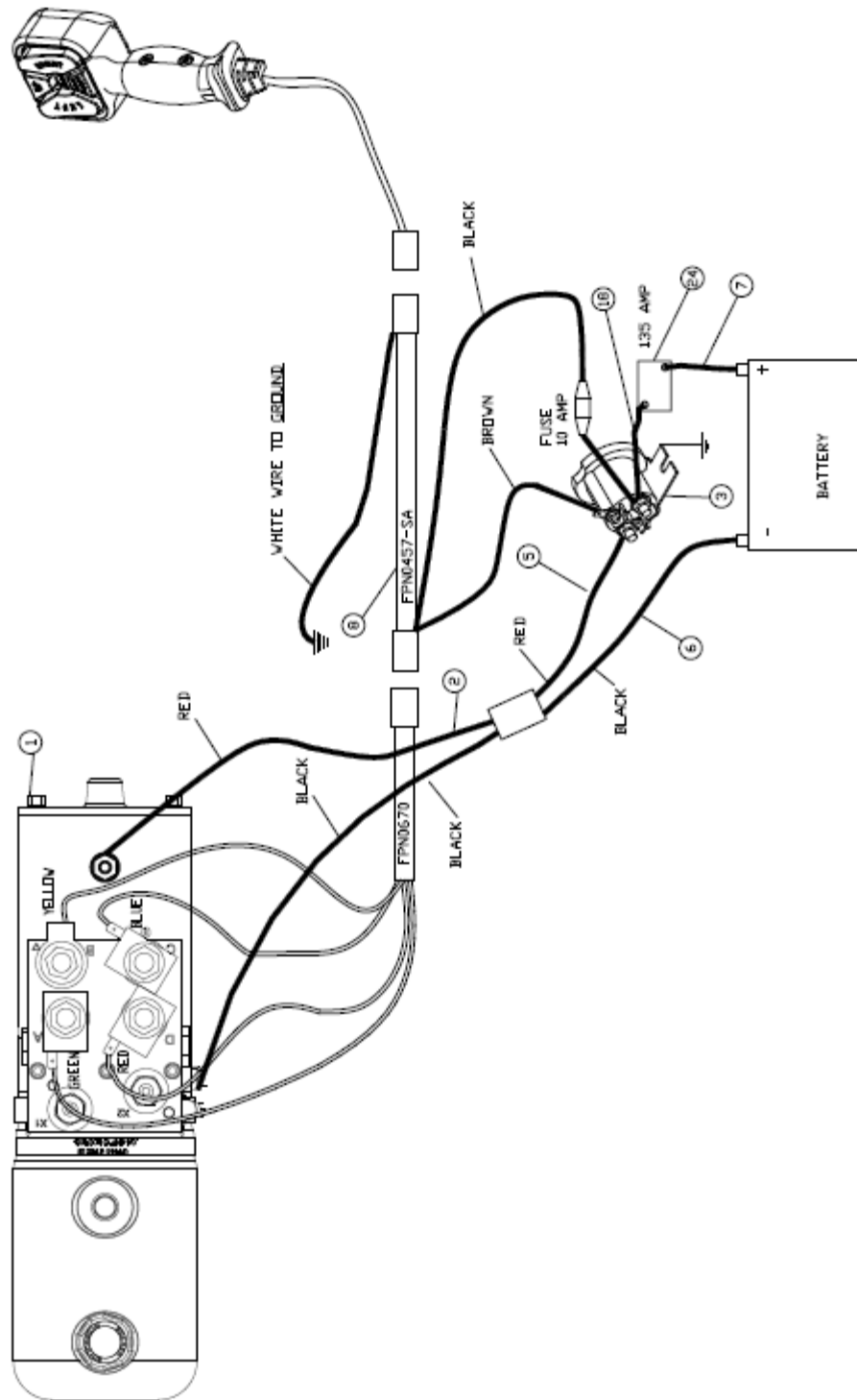
HYDRAULIC SCHEMATIC M3493



ELEC DEVICE	FUNCTION			
	RAISE	LOWER	ANGLE RIGHT	ANGLE LEFT
MOTOR	ON		ON	ON
A			ON	
B		ON		
C	ON			
D				ON

Hydraulic installation

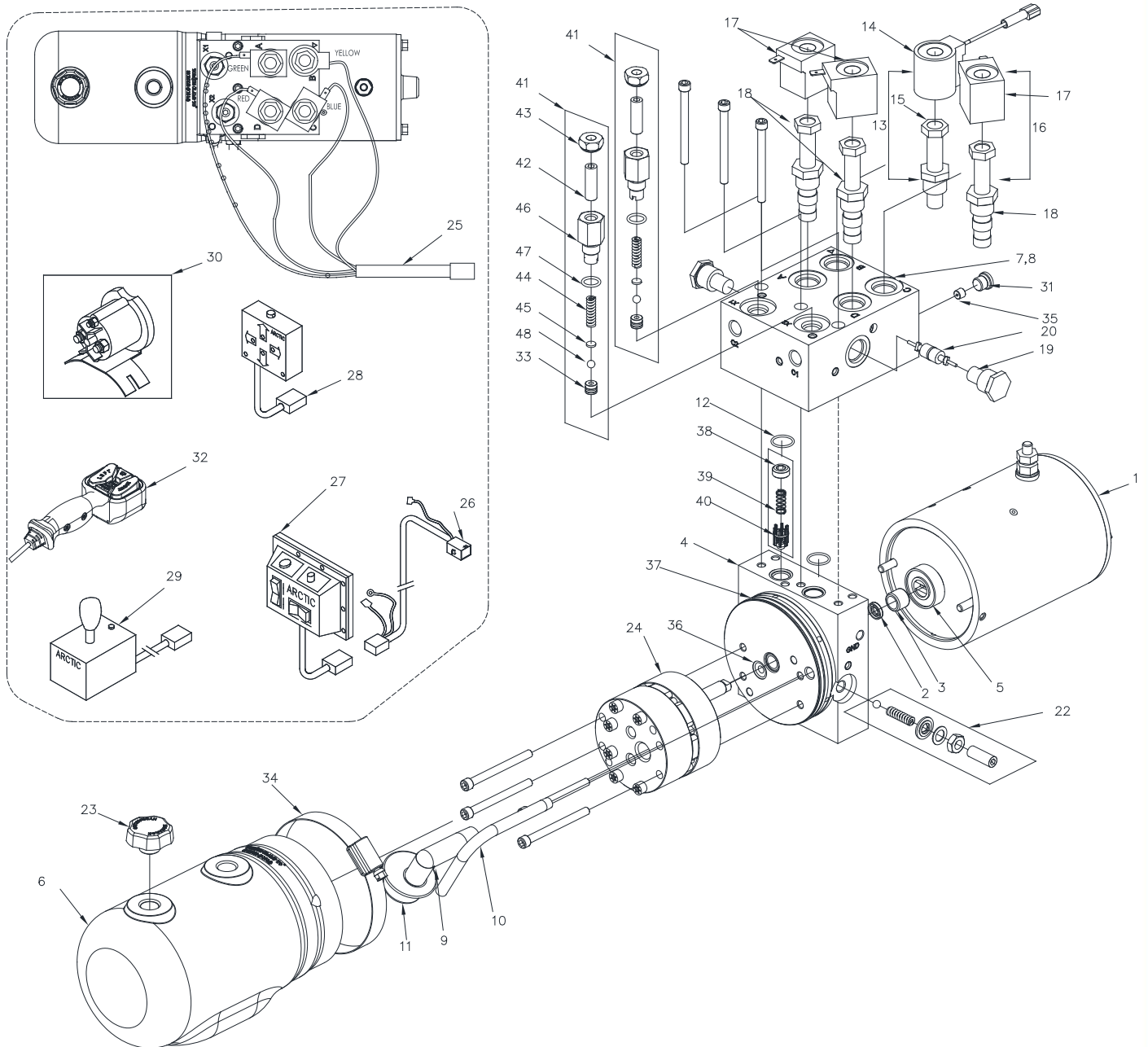




HYDRAULIC INSTALLATION

Item	Part number	Description	Quantity
1	M3493	M3493 Power Unit	1
2	53476-B	Cable and plug Assembly	1
3	FP17757	Solenoid	1
4	52427-N	Red Terminal Protector	1
5	53478-B	Power Cable 90"	1
6	53477-B	Ground Cable 90"	1
7	51335-22-M	22" Power Cable	1
8	FPN0457-SA	Intermediate harness	1
9	53420-C	Power Unit Cover for Low mount lift frame	1
9a	52429-01-C	Power Unit Cover for Homeowner lift frame	1
9b	53865-C	Power Unit Cover for SD2 lift frame	1
10	HH-00790-002	Swivel Elbow 90deg	2
11	CS150-06.00-NRS	Lift Cylinder 1 ½" x 6"	1
12	HH-00794-003	¼" Pipe to Pipe Swivel	1
13	0203300	Weather Cover for power and ground cables	1
14	52315-N	Dummy Plug for intermediate harness	1
15	51904-M	Hose Assembly 29"	3
16	52700-N	Grommet 1/8 X 2.1/8 X 2.7/8 (Fits Hole 2.1/2 Dia)	2
17	52700-01-N	Grommet 1/8 X 3 X 3.625 (Fits Hole 3.25 Dia)	1
18	51335-56-M	56" Power Cable	1
19	HH-00341-004	3/8 Flat washer	2
20	HH-00293-049	3/8-16x1 HHCS	2
21	HH-00457-004	3/8 Lockwasher	2
22	HH-00293-026	5/16 x ¾" HHCS	1
23	HH-00457-007	5/16 Lockwasher	1
24	53608-N	Circuit Breaker / Fuse 135 Amps	1

Power unit M3493



POWER UNIT M3493 PARTS LIST

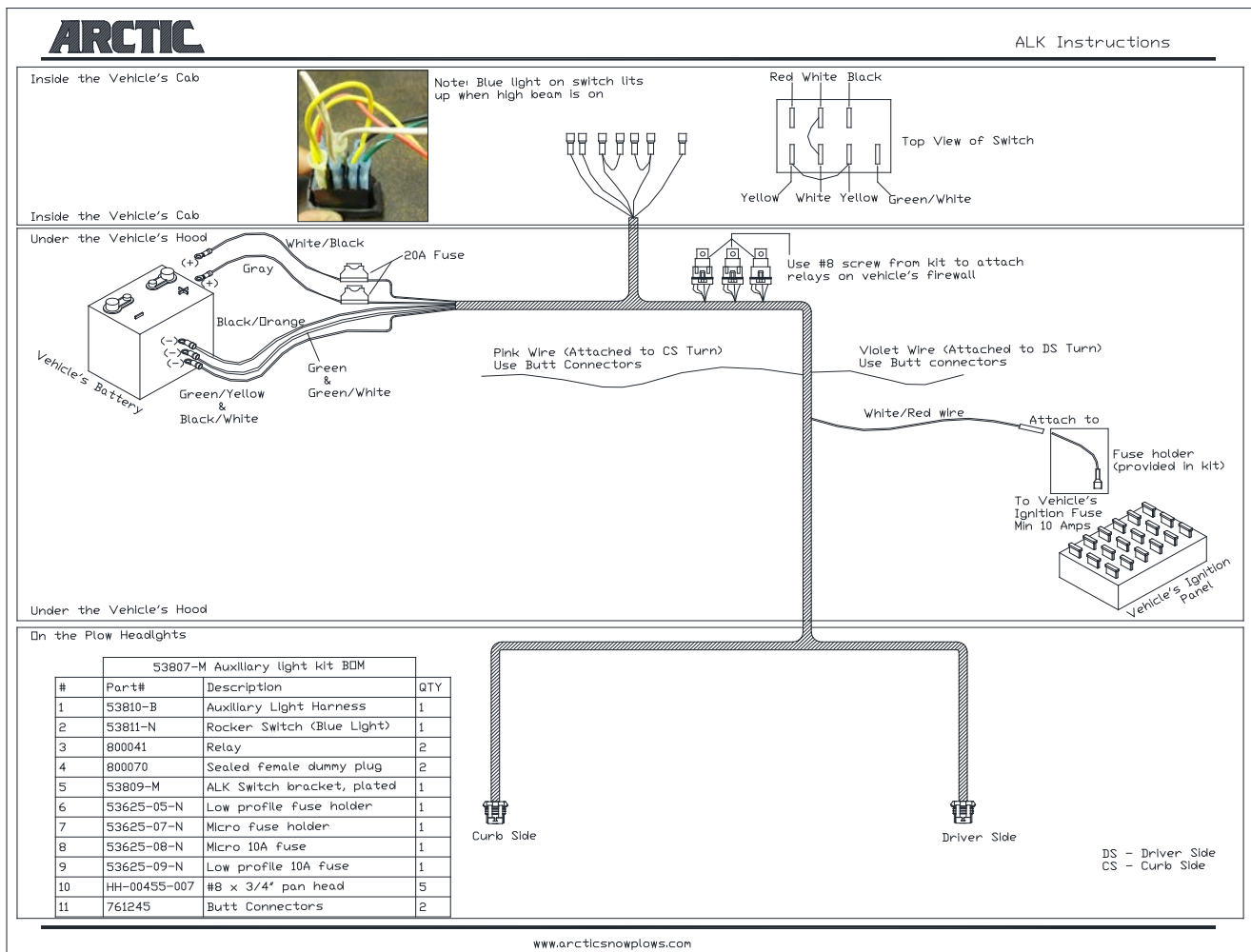
Item	Part number	Description	Quantity
1	FP8111-I	Motor, 12 VDC	1
2	FP2159	Pump Shaft Seal	1
3	FP7985	Needle Bearing (Pump Shaft to Pump Base)	2
4	FP21115	Pump base assembly, M3493	1
5	FP2318	Bearing, Motor to Pump Base	1
6	FP6102	Reservoir	1
7	FP21812	Manifold assembly	1
8	FP21811	Manifold only	1
9	FP1209	Suction tube	1
10	FP13058	Return tube	1
11	FP1134	Suction filter	1
12	FP0118	O-ring, 5/8 x 3/4 x 1/16, -016	2
13	FP0490-D	Valve, #8 2W / 2P, valve assembly (14,15)	1
14	FP10861-D	Coil #8 2W / 2P,	1
15	FP10907-D	Valve, cartridge, 2W/2P	1
16	FP7249-D	Valve, #8, 3W / 2P, valve assembly (17,18)	3
17	FP18835-D	Coil, 12VDC, 3W/2P	1
18	FP0679-D	Valve cartridge, 3W / 2P	1
19	FP7217	Check Valve	2
20	FP7218	Piston	1
21	FP7526	Check valve kit	1
22	FP7527	Relief valve kit	1
23	FPN0571	Breather	1
24	FPK12171-250	Pump assembly kit	1
25	FPN0670	Harness valve section	1
26	FPN0457-SA	Harness center section	1
27	FPN0455-SA	Control station, rocker switch	1
28*	FPN0478-SA	Control station, touch pad	1
29	52388-M	Large joystick	1
30	FP17757	Solenoid, switch	1
31	53220-N	Plug, SAE #4 (7/16")	1
32	53282-N	Handheld controller	1
33*	53185-N	Small joystick	1
34	FP7900	Clamp (torque up to 80inlb)	1

POWER UNIT M3493 PARTS LIST

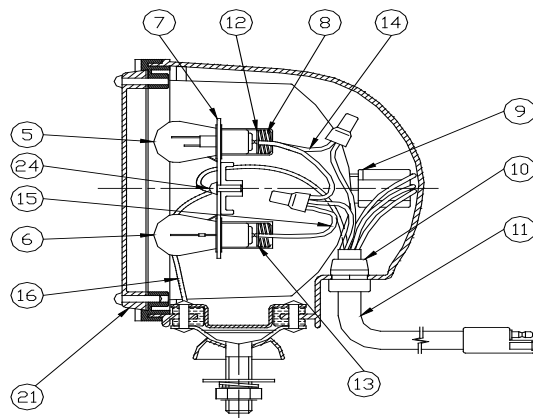
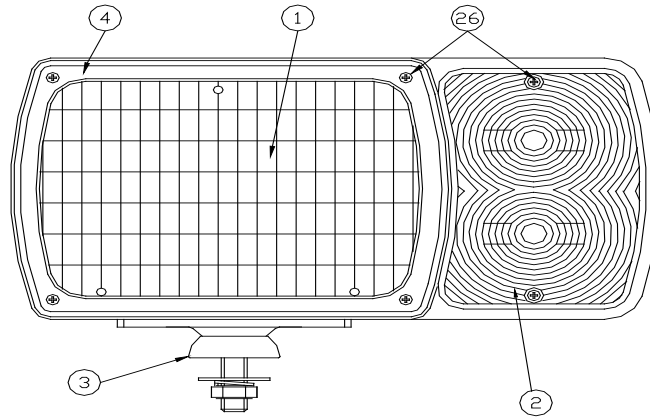
Item	Part number	Description	Quantity
35	FP4371	Orifice	1
36	FP0120	O-ring, 1/2 x 5/8 x 1/16, -014	1
37	FP2352	O-ring, 3 3/4 x 4 x 1/8, -240	1
38	FP7732	Screw, spring retainer 9/16" -18	1
39	FP0130	Spring	1
40	FP18391	Poppet	1
41	FP13023	Cross over relief valve assembly	2
42	FP7899	Screw	1
43	FP0386	Sealing nut	1
44	FP0147	Spring	1
45	FP1288	Plate	1
46	FP0379	Housing	1
47	FP0114	O-ring	1
48	FP0012	Ball	1
49	FP0378	Seat	1
Items marked with * are not showing on drawing			

Optional Auxiliary Light Kit (ALK) 53807-M

Electrical Light harness (53810-B) installation instructions



Headlight assembly 800084-ALK (c/w 53807-M)



ALK RECTANGULAR HEADLIGHT KIT 800084-ALK

Item	Part Number	Description	Quantity
1	465091XV	Sealed beam	2
2	732467	Amber lens	2
3	739006	Mounting swivel assembly	2
4	298110-36	Sealed beam retaining ring	2
5	460028	Double contact bulb	2
6	460027	Single contact bulb	2
7	280392-00	Socket and bracket assembly	2
8	535003	Spring	4
9	420943	Sealed beam connector	2
10	190055	Strain relief bushing	2
11	421061-2	Light Harness	2
12	320185-01	Double contact disc	2
13	320104-01	Single contact disc	2
14	520014-09	Brown wire 7"	2
15	520013-11	Red wire 7"	4
16	520019-84	Black wire ground	2
19	251098-00	Housing and grommet assembly LH	1
20	251099-01	Housing and grommet assembly RH	1
21	251104-66	Bezel	2
22	410197	Gasket for amber lens	2
23	410198	Gasket for seal beam	2
24	124002-01	Screw, #8 x 5/8", pan head	2
25	124090-02	Screw, #8 x 1", pan head	12
26	124713-00	Screw, #8 x 1 1/4", pan head	12
27	53807-M	Auxiliary light kit (wiring only)	1

Headlight assembly 800086-ALK (c/w 53807-M)



ALK RECTANGULAR HEADLIGHT KIT 800086-ALK

Item	Part Number	Description	Quantity
1	800073-01-D	Low Beam Halogen Bulb H7 55W	1
2	800073-02-D	High Beam Halogen Bulb H1 55W	1
3	800074	Amber Signal Bulb	1
4	421061-2	Harness, light section	1
5	53807-M	Auxiliary light kit (wiring only)	1

Headlight assembly 800086LED-ALK (c/w 53807-M)



ALK RECTANGULAR HEADLIGHT KIT 800086-LED-ALK

Item	Part Number	Description	Quantity
1	800086-LED-01	Driver Side Headlight	1
2	800086-LED-02	Curb Side Headlight	1
3	800074	Amber Signal Bulb	1
4	421061-2	Harness, light section	1
5	53807-M	Auxiliary light kit (wiring only)	1

Handheld controller

1. Turn the ON/OFF switch on the control to the ON position. The control keypad will glow green, indicating the control is on.

NOTE: The ON/OFF switch can be used as an emergency stop when required.

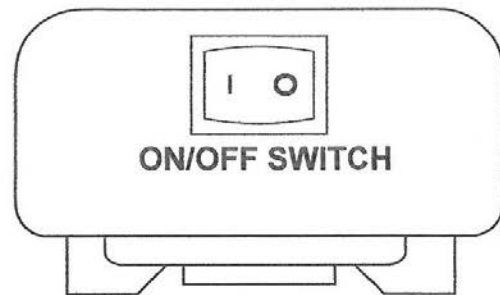
2. Press the DOWN button for 1.3 seconds to engage the FLOAT mode. The FLOAT indicator light, located in the center of the keypad (logo), will change from green to red. To cancel the FLOAT mode, momentarily press the UP button. FLOAT mode will automatically cancel after 17 minutes, and the FLOAT indicator light will turn back to green. To restart FLOAT mode, repeat step 2.

Blade Operation Time Outs

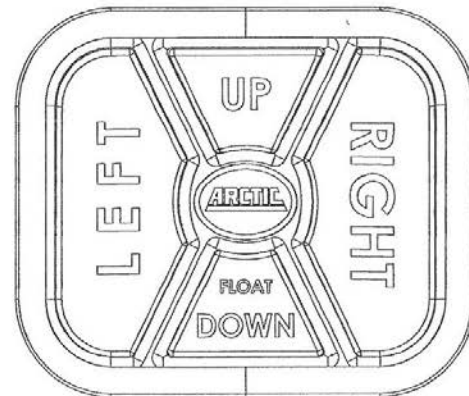
All control functions automatically time out (shut off) after a period of time. This helps reduce wear on the pump motor and prevent unnecessary battery drain. All functions will time out after 8.0 seconds.

Automatic Shutdown

After being idle for approx. 22 minutes, the control will automatically turn off and the indicator light located at the center of the keypad (logo) will blink from red to green. To restart the control, turn the control OFF (ON/OFF switch) and then back ON.



(LOCATED ON TOP OF HANDHELD CONTROL)



KEYPAD

Troubleshooting flow chart for power unit M3493

Safety and warnings

Servicing the snowplow (hydraulic power system, hoses, hydraulic cylinders, controllers, wiring harnesses, lights, blade frame, blade moldboard, A-frame, quadrant, lift frame and vehicle undercarriage) without special tools and knowledge could result in personal injury. See an authorized Arctic dealer for service.

- Fluid under pressure can pierce the skin and enter the bloodstream resulting in serious injury or death.
- Eye protection and protective clothing must be worn when working on any portion of the snowplow.
- Remove any jewellery (rings, bracelets, watches, necklaces) that could conduct electricity while working with electrical system.
- Lifted blade should be securely propped or immobilized while working on it or any other suspended part so it cannot fall.
- Do not operate blade when anyone is within a 10 foot radius of it.
- Use of any fluid other than J13 will void warranty

Tips

- Pump shaft can be turned freely (smoothly) using two fingers. If it can't be turned replace pump. Proper pump rotation is clockwise looking from the motor end.
- Use a screwdriver to check magnetism of solenoid coils. Place screwdriver on the nut securing the coil and have the switch operated. Strong magnetic attraction should be felt.
- Measure pump pressure at an angle hose (at full angle) it has to be 2000 psi (assuming that cross over relief valve setting is 2500 psi, if X-over relief valve setting is less than relief valve setting pressure gage will read lowest reading). The most accurate reading of system pressure is reading pressure on lift cylinder. When testing or making adjustments on the relief valve the system must be "dead headed" (cylinder at full stroke or in a position where cylinder movement is zero).
- AMP draw of motor should be measured at maximum raise or maximum angle when motor is running at 2000 psi.
- Use volt meter or test light to test for power in a harness or continuity in a switch. A test light is simply a light bulb which has one end connected by a wire to an alligator clip and the other end connected to a metal probe. It is used to check the electrical circuit when the battery is connected to the system. The alligator clip is grounded and the light glows when the probe comes in contact with a "live" electrical component.
- Do not screw cartridge valves into cavity too fast; use a back and forth motion and have O-rings well lubricated.

-Clean all parts thoroughly before assembly and lubricate with clean oil.

-Do not use Teflon tape on hydraulic connections as it can easily jam the valves and plug the filters in the system, use pipe sealant. Never apply pipe sealant at the end of fitting, always 2- 3 threads back.

-X-over pressure could be set using hand (hydraulic) pump. Example: If you want to set the pressure at x-over X1 insert hand pump hose in the C1 port together with pressure gauge. Loosen the jam nut and turn adjusting screw clockwise a turn or two and watch the gauge; if it goes up, continue to turn the screw until the required setting is reached. Retighten the jam nut. To set X-over X2 repeat the same steps as setting X1.

To adjust relief valve:

-Loosen jam nut counter-clockwise. Turn screw clockwise to increase pressure or turn screw counter-clockwise to decrease pressure. Tighten jam nut clockwise to 50in.lb. torque. Check system pressure after jam nut is tight. Readjust pressure if screw is moved during tightening of jam nut.

Specification:

-Max Amp Draw 220 AMP (AMP draw of motor should be measured at maximum raise or maximum angle when motor is running at pressure setting at 2000 psi).

Note: Do not operate motor continuously for more than 30 sec.

-Relief valve setting 2000 psi.

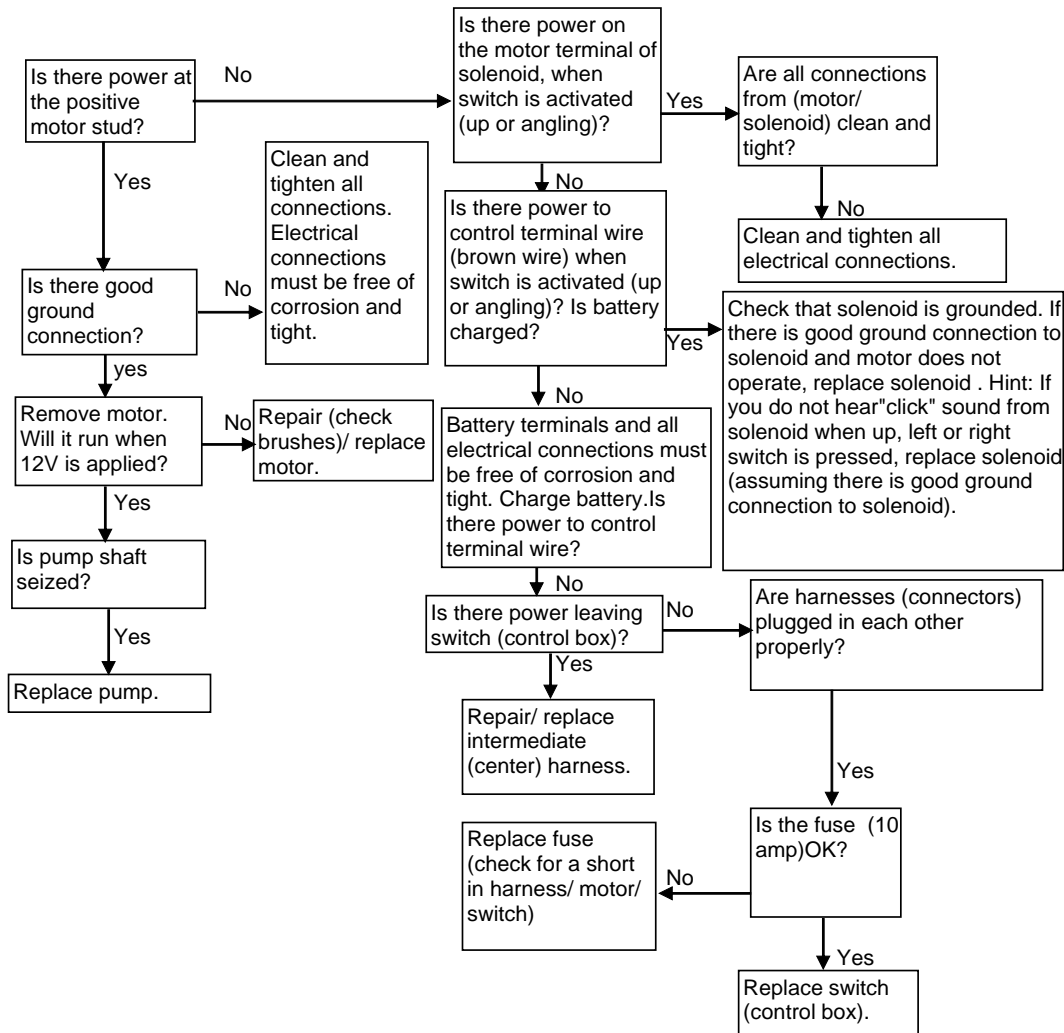
-X-over relief valve setting 2500 psi.

-Troubleshooting tips

- Motor does not operate.
- Motor operates continuously
- Snow plow does not raise.
- Snow plow raises up very slowly.
- Snow plow will not lower.
- Snow plow leaks down.
- Snow plow angles before going up when up switch is pressed.
- Snow plow when is fully angled going up when angle switch is pressed.
- Snow plow does not angle to right.
- Snow plow does not angle to left.

Note: Quick couplers are an optional item. If unit is not equipped with quick couplers, disregard troubleshooting steps involving them.

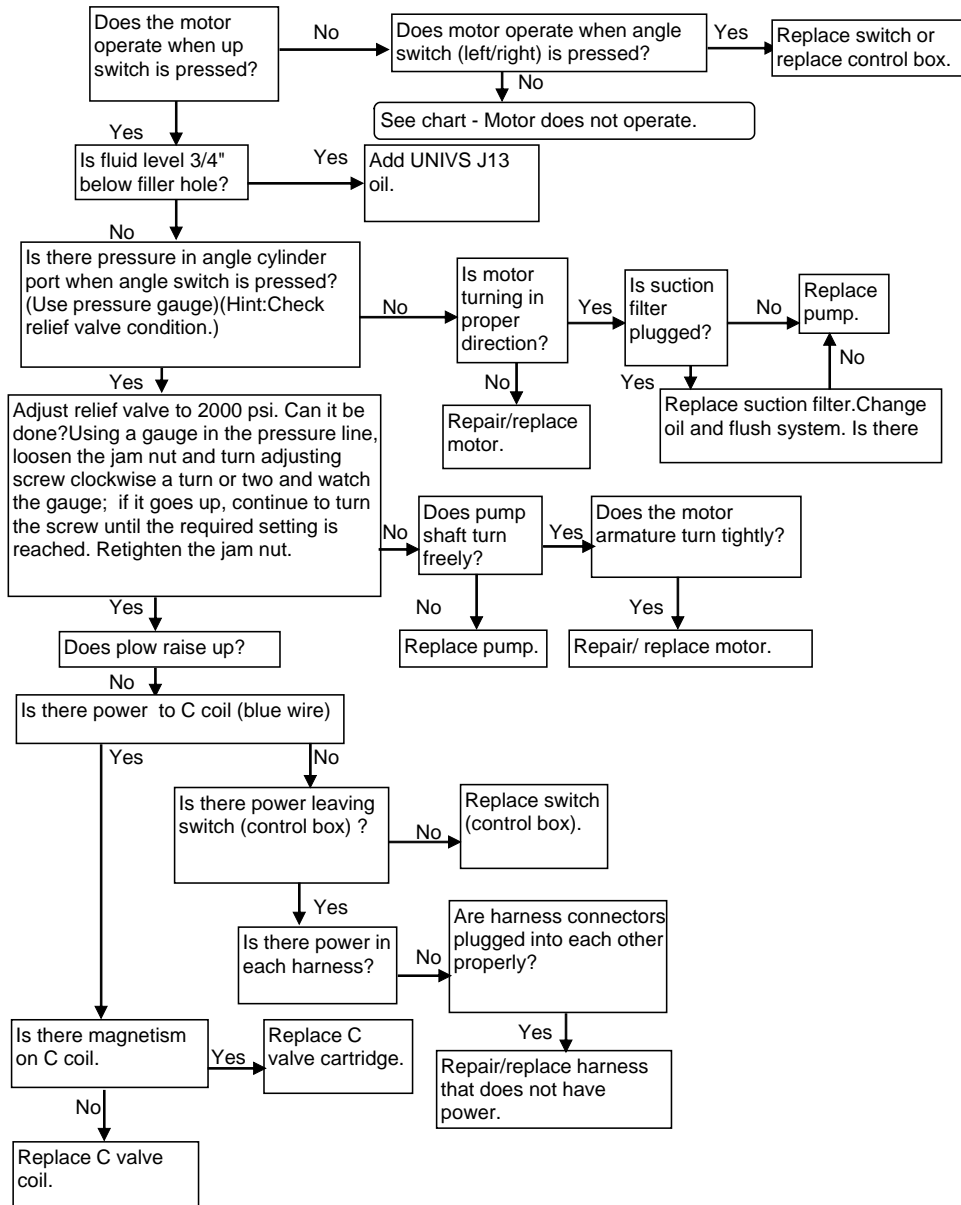
MOTOR DOES NOT OPERATE M3493



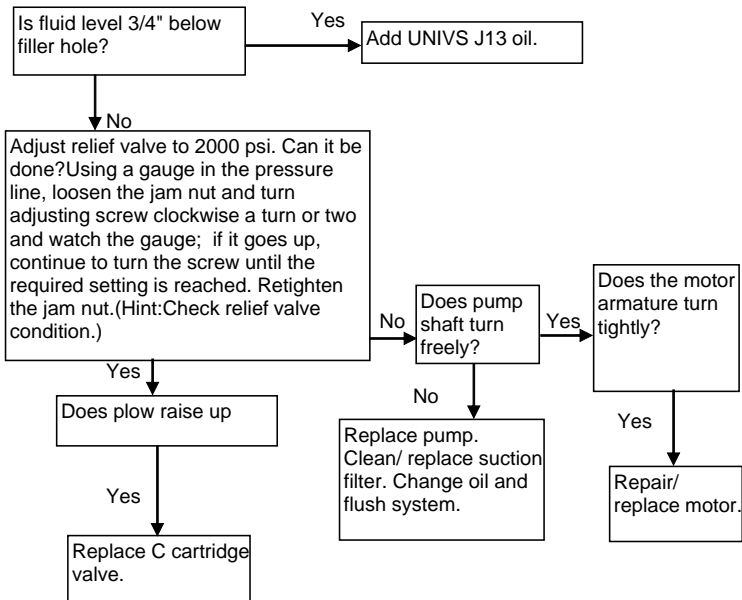
MOTOR OPERATES CONTINUOUSLY M3593

If motor operates continuously, change solenoid.

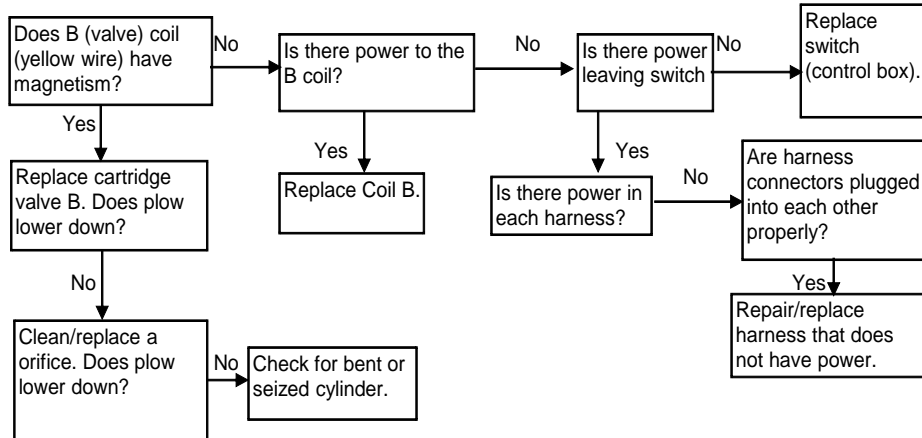
SNOW PLOW DOES NOT RAISE M3493



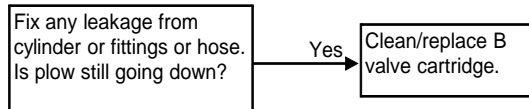
SNOW PLOW RAISES VERY SLOWLY M3493



SNOW PLOW WILL NOT LOWER M3493



SNOW PLOW LEAKS DOWN M3493

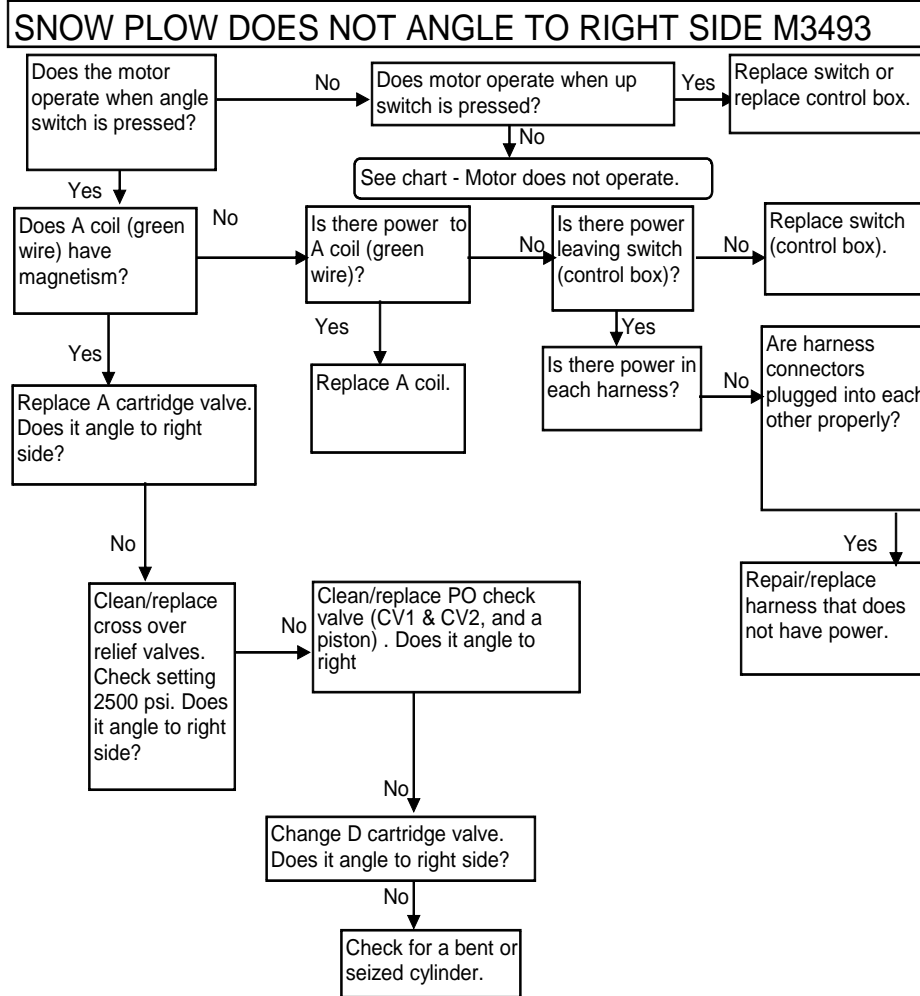


SNOW PLOW ANGLES BEFORE GOING UP WHEN UP SWITCH IS PRESSED M3493

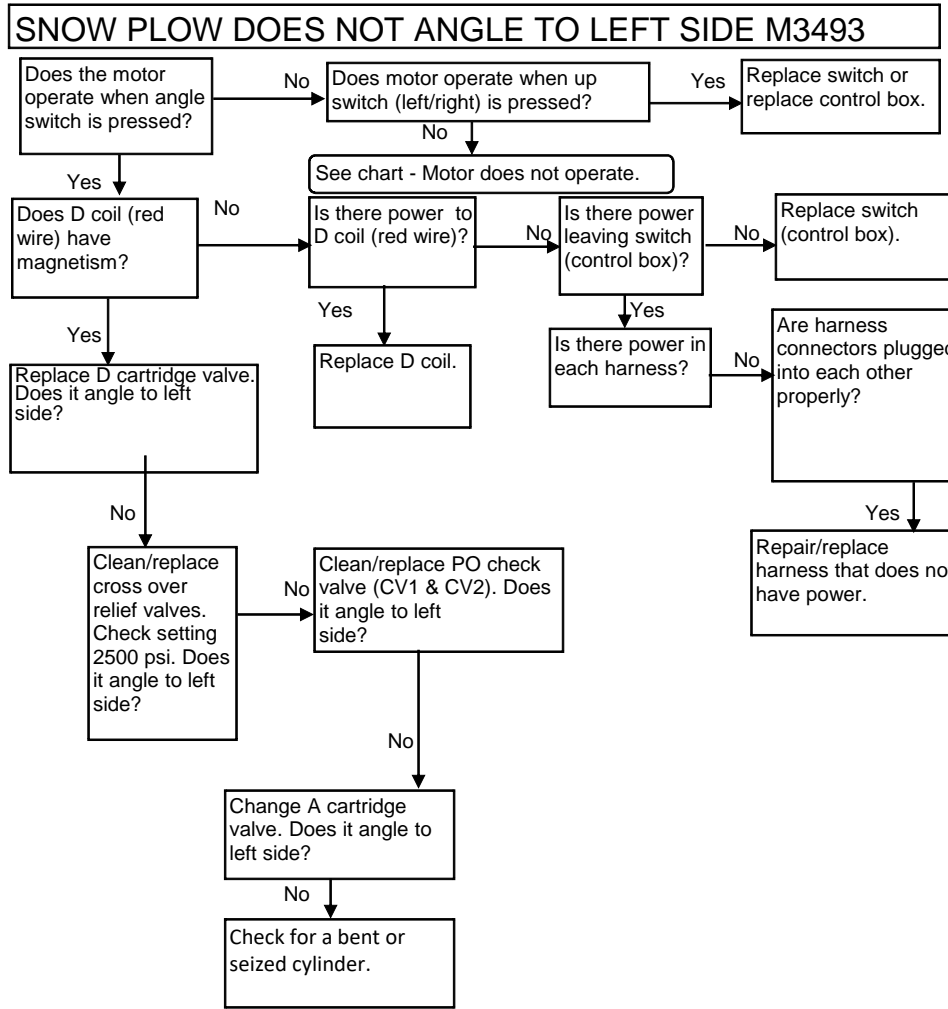
If snow plow angles left before going up change D valve and if snow plow angles to right side change A valve.

SNOW PLOW WHEN FULLY ANGLED GOES UP (WHEN ANGLE SWITCH IS PRESSED) M3493

Change C Valve cartridge.

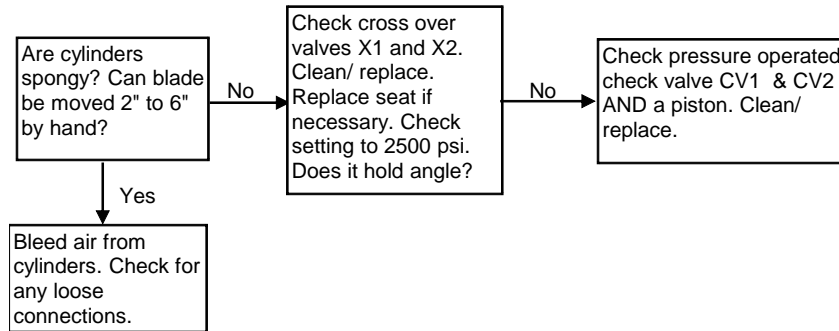


Note: Before start troubleshooting check that plow moves up and down. If plow does not move up and down see "plow does not raise".



Note: Before start troubleshooting check that plow moves up and down. If plow does not move up and down see "plow does not raise".

PLOW DOES NOT HOLD ANGLE M3493



Snow Plow Maintenance

In order for the customer to be eligible for warranty every year, the snowplow, inclusive of all components, must be returned to an authorized Arctic dealer every spring for preventative maintenance. Warranty work must be performed by an authorized Arctic dealer. Failure to do so will nullify any future warranty claims.

Warning

Inspect the snowplow components and bolts for wear or damage before mounting or removing the snowplow and before travelling and be sure that the plow is properly attached before moving the vehicle.

-Servicing the snowplow (hydraulic power system, hoses, hydraulic cylinders, controllers, wiring harnesses, lights, blade frame, blade moldboard, A-frame, quadrant, lift frame and vehicle undercarriage) without special tools and knowledge could result in personal injury. See an authorized Arctic dealer for service.

- Make sure you know all obstructions (bumper stops, curbs, fire hydrants etc.) before it snows, because it will be very hard to see these obstructions after it snows. If necessary mark them with flags to avoid possible damage to your plow or vehicle.

- Do not let snow accumulate, always plow with the storm.

- Always wear seatbelts when a vehicle is in motion.

- Always lower the blade when the vehicle is not in use.

-Always wear eye protection and protective clothing when working around hydraulic systems.

-Remove jewellery and objects that might conduct electricity while working on power units.

-Fluid under pressure can pierce the skin and enter the bloodstream causing death or serious injury.

- When adjusting the relief valve be sure to use a pressure gauge. Failure to accurately set the relief valve can cause failure resulting in damage to the equipment or cause bodily harm.

Inspect on a regular basis

After every 18 hours of plowing perform the following inspection:

-Inspect all fasteners, mounting bolts, hydraulic and electrical connections for tightness.

-Inspect the plow assembly (the blade, A-frame, lift frame, spreader bar and mounting kit) for any damage. (Replace part as necessary)

Post season maintenance

- Inspect the plow assembly (the blade, A-frame, lift frame, spreader bar and mounting kit, all fasteners, pins, retainers, nuts and bolts for tightness) for any damage (cracks, abnormal wear, etc.) and repair or replace part as necessary. Tighten all undercarriage bolts. Apply grease to the centre pin (if applicable).
- Check all electrical connections, control harness and power/ground cable connectors for corrosion and repair or replace part as necessary. Disconnect all electrical plugs and coat each connection with dielectric grease. Install all dummy plugs provided.
- Check power unit and hydraulic system (check hydraulic hoses for cracks and leaks, check for any leaks from the system (fittings)).
- Drain and flush hydraulic system and refill with UNIVIS HVI 13 hydraulic fluid. Fill up power unit with new oil. Lift cylinder rod must be all the way down (put control box switch in float position and push cylinder rod down by hands - cylinder must be all the way down). Jog up and down switch for lift cylinder. Also jog left and right for angling cylinders.
- Refill power unit so that oil level is $\frac{3}{4}$ " from the top of the reservoir. Clean up any spilled oil and check all functions several times making sure there is not excessive foaming in the reservoir. Compress the lift cylinder and double check the oil level. Check for leaks at all fittings and reinstall filler plug.
- Collapse lift cylinder. Cover exposed rod of the lift cylinder and angle cylinders with water resistant grease.
- Clean and paint the blade assembly as needed.

Preseason check

Before the snow season check your equipment to make sure it is in working condition

- Check power unit, control switch, lights for proper operation.
- Check all fasteners, pins, retainers, nuts and bolts for tightness. Apply grease to the centre pin (if applicable).
- Check all electrical connections, control harness and power/ground cable connectors for corrosion. Coat all electrical connections with dielectric grease (apply dielectric grease to all electrical connections at least once per month during the plow season).
- Inspect and test your battery.
- Check the ballast. The loaded vehicle MUST NOT exceed vehicle gross vehicle axle weight ratings (GAWR), front gross axle weight rating (FGAWR) or rear gross axle weight rating (RGAWR).
- Inspect the plow assembly (the blade, A-frame, lift frame, spreader bar and mounting kit, all fasteners, pins, retainers, nuts, and bolts for tightness) for any damage (cracks, abnormal wear, etc.)

- Tighten all undercarriage bolts. Apply grease to the centre pin (if applicable).
- Check all electrical connections, control harness and power/ground cable connectors for corrosion. Coat each connection with dielectric grease. Check lights for proper operation.
- Check power unit and hydraulic system (check hydraulic hoses for cracks and leaks check for any leaks from the system (fittings). Drain and flush hydraulic system and refill with UNIVIS HVI 13 hydraulic fluid. -

Grease exposed cylinder rods.

Clearing Driveways and Parking Lots

Clearing Driveways (Residential)

- Straighten and raise the blade and drive up to the garage. Drop the blade and back drag the snow away from the garage at least one vehicle length. Repeat if necessary.
- Back the vehicle to the garage and push the remaining snow from the driveway, either to the side (blade angled) or into the designated spot (blade straight).

Clearing Parking Lots

- Clear the areas in front of the buildings first. Back drag if necessary and work away from the buildings toward the outer edges of the lot.
- Plow a single pass down the centre in the long direction.
- Angle the plow towards the long sides until the area is cleared.
- If the snow is too deep, clear only the main traffic areas of snow for later handling by heavy equipment.

NOTE: All Arctic snowplows have a stop built in, to prevent the blade from contacting the bottom of the bumper. If the blade is pushed too high on the snow bank, the stop will bind and cause the truck's weight to be supported by the plow. This can cause damage to the A-frame, cylinders, and mounting kit, as well as the trucks bumper and frame. Please "Don't Stockpile". Leave that for the loaders.

Warning

Excessive stacking of snow causes undue stress to the snowplow and the vehicle. It may result in the failure of the plow components and it can cause damage to the vehicle.