1ST THE WORLD OVER IN LIGHT WEIGHT SNOW PLOW TECHNOLOGY.

SNO-WAY™ PLOWS

OWNER'S MANUAL

THANK YOU FOR PURCHASING A SNO-WAY SNOWPLOW.

THIS BOOKLET IS INTENDED TO ASSIST YOU, IT IS IMPORTANT THAT YOU READ THIS MATERIAL CAREFULLY AND UNDERSTAND IT COMPLETELY. PLEASE PAY PARTICULAR ATTENTION TO ALL WARNINGS AND CAUTIONS. THE SNO-WAY SNOWPLOW, PROPERLY USED, WILL GIVE YOU MANY YEARS OF EXCELLENT SNOWPLOWING PERFORMANCE

BE SURE YOUR WARRANTY REGISTRATION CARD IS FILLED IN PROPERLY AND MAILED TO THE FACTORY FOR PROPER VALIDATION.

91C20-HA

SNO-WAY INTERNATIONAL, INC.

FORM SW901 7-88 Price $3.00

MOUNTING SNOWPLOW TO VEHICLE

1. Drive your vehicle to the location of the stored plow, and position the front of the vehicle as close as possible to the plow mechanism.

2. Put vehicle in park, set or lock the emergency brake system and turn the ignition off.

WARNING: Failure to fully set or lock emergency brake system or to turn ignition off may cause vehicle to unexpectly move forward, causing serious bodily injury or death when attempting to remove or attach snow plow assembly.

3. Connect snow plow A-Frame mounting lugs to vehicle sub-frame, using two (2) pivot pins and insert (2) lynch pins to secure the pivot pins in place. (Fig. 1)*

WARNING: Do not place fingers in A-Frame or mount lug holes to check alignment. Sudden motion of the plow could severly injure a finger.

4. Connect snow plow electrical quick disconnect to vehicle quick disconnect. (Fig. 2)* Turn vehicle ignition switch to "accessory", put snow plow control box switch in "down" or "float" position.

5. Pull upward on bell crank-lift bar assembly on the snow plow and align hole in lift bar assembly with lift hole on sub-frame. Insert pivot pin, then insert hairpin cotter in pivot pin to secure in place. (Fig. 3)*

WARNING: Inspect lift system bolts and pins whenever attaching or detaching the plow, and before traveling. Worn or damaged components could result in the plow dropping to the pavement while driving, causing an accident.

6. Raise, lower and angle the plow in both directions to assure that all systems are in working order.

WARNING: DO NOT stand between the vehicle and 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. Serious bodily injury can result from blade striking a body or dropping on feet or hands.

7. Before operating your snow plow read the remainder of this owners manual, especially all safety and warning instructions.

* SEE PAGE 13

DRIVING WITH BLADE ATTACHED

Whenever the plow is raised and the operator is not engaged in plowing, safety practice requires that the cylinder lock clamp be attached to the ram of the lift cylinder. Install the cylinder lock clamp as follows:

1. Raise the blade to the full up position.

2. Turn the ignition switch off and activate the vehicle emergency brake system.

WARNING: Failure to activate parking brake and turning ignition switch off could allow the plow to abruptly fall without warning, causing serious injury to hands and feet. Since children or other unqualified persons may attempt to operate the switches and activate the snow plow during the cylinder clamp installation, it is essential that the ignition be "OFF".

3. Remove the pivot pins from the cylinder lock clamp and spread it apart; then wrap it around the chrome rod portion of the snow plow lift cylinder. Reinstall the pivot pins though the lip portion of the cylinder lock clamp and insert the hairpin cotters through the pivot pins. (see figure 4) *

WARNING: In the event of hose rupture or pump failure, driving vehicle without the cylinder lock clamp in place on the lift cylinder, could cause the plow to abruptly fall without warning, causing serious injury or accident. Since children or other unqualified persons may attempt to operate the switches or activate the snow plow while driving, it is essential that the cylinder lock clamp be used.

4. Under ideal road conditions, you should not exceed 45 mph when driving your vehicle with the snow plow attached.

WARNING: When snow plow is attached to vehicle, braking distances may be reduced, and handling characteristics may be impaired at speeds above 45 mph.

5. Reduce speed when crossing railroad tracks, road irregularities, or as road conditions deteriorate.

* SEE PAGE 13

DRIVING WITH BLADE ATTACHED (continued)

6. Whenever driving extended distances where the temperature is above 40 degrees Fahrenheit, it may be necessary to remove snow plow. Failure to do so obstructs air circulation past the vehicle radiator and may cause engine damage due to overheating.

WARNING:  Before traveling, position blade so it does not block path of headlamp beam. Do not change blade position while traveling. An incorrect plow position blocking headlamp beam may result in an accident.

COUNTDOWN FOR PLOWING

Before the first snow falls, check your equipment and make sure it's ready for action. Here's a countdown for getting your equipment set for the snowplowing season:

Check hydraulic system for leaks and cracked or damaged hoses. Check oil level (see maintenance instructions). Replace worn or defective parts.

Check springs and all small parts (bolts, nuts, washers, etc.) to assure proper plow operation.

Check all mountings, using rust resistant, high grade enamel, touch-up blade and support members with Sno-Way paint available in aerosol or quart can.

Check windshield wipers, heaters, radiator system, headlights and auxiliary lights.

Install auxiliary and flashing lights for safety. Regular vehicle headlamps should be aimed without plow attached to the vehicle. Special plow headlamps should be aimed with plow attached and in raised position.

WARNING:  Inspect lift system bolts and pins whenever attaching or detaching the plow, and before traveling. Worn or damaged components could result in the plow dropping to the pavement while driving, causing an accident.

PLOWING LIKE A PRO

1. Be familiar with the area you are going to plow. Be sure to mark potential hazards before it snows. Many immovable objects seem to disappear with a covering of snow. Plan out your snow removal area so you can avoid equipment damage or damage obstacles, shrubs, curbs, etc.. Be sure to allow sufficient room to pile the snow out of the traffic area, with plenty of room for the next snowfall.

PLOWING LIKE A PRO (Continued)

2. It is recommended not to exceed 10 mph while plowing for the sake of your equipment, your vehicle and yourself. Most "Pros", even with larger and more expensive equipment, will plow at the lowest speeds possible for safe and efficient snow removal. Your snowplow is not a "ram" or "bull-dozer". Your snowplow is designed and engineered for your vehicle and will give you many years of safe and efficient operation if used properly and maintained properly.

WARNING:  Exceeding 10 mph may cause serious damage to people, equipment and property, should an unseen obstruction be encountered while snow plowing.

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

WARNING:  Driver must always wear seat belt when plowing snow. A hidden obstruction could cause the vehicle to stop suddenly. Head, neck, or body injury can result from hitting the windshield, dash, or steering wheel.

3. Plow with the storm. The "Pros" are out early moving snow. They know from hard experience how difficult and costly it can be to wait until the storm is over. The removal of several inches at a time (even if you have to repeat operations) can avoid severe snow removal problems. By letting snow pile up to unmanageable levels, which may require bigger and heaver equipment soon as like front end loaders. Keep pushing the snow out of the way allow for repeat plowing operations. If you let the snow pile up into drifts of a few feet, etc., you will not only have a difficult task ahead of you, but you will be taxing both your equipment and your vehicle.

4. Adjust the shoe assemblies on your snow plow blade to meet the road conditions (1/4" to 1/2" off the ground for hard surfaces, 1" to 2" for gravel roads etc.) After a few times plowing, and you will find the right height for your operating conditions. Adjust the shoe assemblies by simply removing the clip pin and trading washers to the top from the bottom of the bracket; this will yield a blade closer to the ground. If you wish to higher the the blade from ground clearance, add more washers on the bottom from the top of the bracket. (see figure 5)*

5. For better clean up of hard-packed snow, raise the disc shoes so that the cutting edge of blade comes into direct contact with the pavement. Use lowest vehicle gear to place maximum power behind cutting edge.

The two most common snowplowing sites are driveways and parking lots. General instructions for clearing both areas are detailed below.

* SEE PAGE 13

PLOWING LIKE A PRO (continued)

Clearing Driveways:

1. Head into drive with blade angled so that you plow snow away from any buildings. Continue to widen drive path by rolling snow away from buildings on successive passes.

2. If garage is at end of driveway, plow to within several vehicle lengths of garage. Then push as much snow as possible off driveway.

3. With raised straight blade, drive through remaining snow to building. Drop blade and "back-drag" snow away from garage door at least one and one-half vehicle lengths. Repeat as necessary.

4. Back vehicle to garage door and plow forward toward street, removing remaining snow from driveway. Check municipal ordinances for any restrictions on disposal of snow.

Clearing Parking Lots:

1. First clear areas in front of buildings. "Back-drag" near walls. Work away from buildings towards outer edges of lot.

2. Plow a single path down center in the longest direction.

3. Angle plow toward the exterior sides, continue with successive passes 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 and stack snow at selected intermediate positions.

NOTE: Stacking snow: As the "stacking" location is approached, begin to raise the blade to facilitate the ride-up onto the stack.

CAUTION: Never pile snow more than 18" high with the blade angled more than halfway. Doing so causes undue strain and stress to the snow plow components.

Auxiliary headlights and directional lights provide added safety and better lighting for night work. They are also a National Highway Traffic Safety Administration (NHTSA) requirement. Before transit, adjust the raised blade height for maximum illumination from auxiliary lights.

WARNING: Never operate a snowplow when under the influence of alcohol, drugs or other medications which could hamper your judgement and reactions, thereby causing an possibly accident which may result in serious injury or death to other persons or yourself. Equipment which is in good operating condition and a clear head go hand in hand for safe-efficient snowplowing. With reasonable care and use, your equipment will give you many years of safe and efficient snow removal.

REMOVING SNOW PLOW FROM VEHICLE

1. Drive your vehicle to the desired snow plow storage area. It is recommend to be a sheltered area.

2. Making sure all people and property are out of the way, straighten and lower the plow assembly.

WARNING: DO NOT stand between the vehicle and 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. Serious bodily injury can result from the blade striking a body or dropping on feet or hands.

3. Put vehicle in park. Fully set or lock the emergency brake system.

4. Turn ignition switch off.

WARNING: Failure to fully set or lock emergency brake system and turning ignition switch off may cause vehicle to unexpectly move forward, causing serious bodily injury or death when attempting to detach snow plow assembly.

5. Turn vehicle ignition switch to accessory position only.

6. Put control box toggle switch in "down" or "float" position. This is done to allow the "down" valve in the hydraulic pump to remain activated (or open), which will allow the the snow plow lift cylinder to collapse, thereby allowing easy removal of the lift pin.

7. Pull upward on bell crank-lift bar assembly until lift pin can be easily removed. (Fig. 3)

8. Lift the cover or lid on the vehicle end of the electrical quick disconnect plug to unlock the snow plow end of the electrical quick disconnect plug and pull it out. (Fig. 2) Tuck the snow plow end of the plug in a area on the snow plow where it's not exposed to potential damage such as crushing.

9. Remove the two (2) snow plow A-Frame pivot pins. (Fig. 1)

10. Pull snow plow assembly away from vehicle.

WARNING: Keep hands and feet clear of blade and A-frame when detaching or attaching plow. Moving or falling assemblies can cause serious bodily injury.

11. To simplify the removal and mounting of the snow plow from the vehicle, and for easy transport of snow plow on hard surfaces in the removed position, Sno-Way suggests you purchase our snow plow dolly part #6076, available at your authorized Sno-Way dealer.

12. Refer to your maintenance and storage instructions for additional information.

MAINTENANCE AND STORAGE INSTRUCTIONS / SAFETY GUIDELINES

TO PREVENT ACCIDENTS THAT COULD RESULT IN SERIOUS INJURY AND/OR DAMAGE TO YOUR VEHICLE OR EQUIPMENT, CAREFULLY FOLLOW THESE SAFETY RULES AND TEST PROCEDURES - WHEN MAINTAINING YOUR SNO-WAY PLOW.

GENERAL

Be sure to disconnect the plow prior to performing any tests or making adjustment.

Scratching, denting or marring of machined surfaces can make parts non-serviceable. Cleanliness is essential when servicing the unit.

SAFETY EQUIPMENT

FIRE EXTINGUISHER

Never work on your vehicle without having a suitable fire extinguisher handy. A 5 lb. or larger CO2 or dry chemical unit specified for gasoline/chemical/electrical fires is recommended.

SAFETY GOGGLES

We recommend wearing safety goggles when working on your vehicle to protect your eyes from battery acid, gasoline, and dust and dirt flying off moving engine parts.

LOOSE CLOTHING AND LONG HAIR (Moving Parts)

Be very careful not to get your hand, hair, or clothing near any moving parts such as fan blades, belts, and pulleys. Never wear neckties or loose clothing when working on your vehicle.

JEWELRY

Never wear wrist watches, rings, or other jewelry when working on your vehicle. You'll avoid the possibility of catching on moving parts or causing an electrical short circuit which could shock or burn you.

VENTILATION

The carbon monoxide in exhaust gas is highly toxic. To avoid asphyxiation, always operate vehicle in a well ventilated area. If vehicle is in an enclosed area, exhaust should be routed directly to the outside via leak proof exhaust hose.

SETTING THE BRAKE

Make sure that your vehicle is in park or neutral and the parking brake is firmly set.

SAFETY GUIDELINES (continued)

HOT SURFACES

Avoid contact with hot surfaces such as the engine, radiator, and hoses.

SMOKING AND OPEN FLAMES

Never smoke while working on your vehicle. Gasoline vapor is highly flammable, and the gas formed in a charging battery is explosive.

BATTERY

Do not lay tools or equipment on the battery. Accidentally grounding the "POS + "battery terminal can shock or burn you and damage wiring, the battery or your tools and testers. Battery-acid can burn holes in your clothing and burn your skin or eyes. Disconnect the cable from the negative battery terminal before replacing the motor, or motor solenoid.

HYDRAULIC SAFETY

Be sure to replace frayed, kinked, cracked or otherwise damage hydraulic components.

Your Sno-Way snowplow is designed for rugged, dependable service. But like the vehicle on which it is mounted, it needs a certain amount of care and maintenance. To insure continued good service, the following should be checked or performed regularly.

1. Never tip the snowplow or end or the blade face down see (figure) as this will allow the oil in the hydraulic power unit to drain out of the breather/filler cap.

2. Hydraulic and electrical connections....make sure they are tight! And show no signs of excessive wear.

   Annually clean and retighten positive and negative connections at vehicle battery.

3. At beginning of the plowing season, inspect and test your battery. Recharge or replace, if necessary. Suggested MINIMUM vehicle electrical system: 70 amp hr./550 CCA battery, 55 amp alternator.

4. Tightness of all bolts should be checked every 10 plowing hours to ensure proper operations.

DISC SHOE ADJUSTMENT

To adjust shoes, raise blade and place on blocking.

MAINTENANCE and STORAGE INSTRUCTIONS

Adjust the shoe assemblies on your snow plow blade to meet the road conditions. 1/4" to 1/2" off the ground for hard surfaces, 1" to 2" for gravel roads, etc.. A few times plowing and you will find the right height for your operating conditions. Adjust the shoe assemblies by simply removing shoe mounting pin. Add more washers on top of the bracket and this will yield a blade closer to the ground. If you wish higher blade to ground clearance add more washers on the bottom of the bracket. (see figure 5)

CUTTING EDGE

Replace cutting edge when worn to the bottom of the blade skin. To equalize wear, on snow plows equiped with reverable wearstrip, turn end for end and reinstall. Sno-Way suggests when performing this operation that you install new high quality wearstrip mounting hardware. For the proper wearstrip mounting hardware kit, see the parts breakdown for your plow model.

TRIP SPRING ADJUSTMENT

Trip springs are adjusted by tightening the eyebolts located at the rear of the springs. Springs are correctly adjusted when the coils begin to separate, approximately 1/16" of a inch. To adjust tension, back-off nut closest to spring. Tighten other nut to correct tension and lock in place with first nut. Spring tension should be checked every 10 plowing hours. Adjust tension as needed.

OIL LEVEL

When snow plow is installed on the vehicle you can check the hydraulic power unit fluid level by: Removing the (4) pump cover mounting screws which secure the pump cover on the swing frame. Position the pump cover out of way. Remove the breather/filter cap located on center top of the hydraulic power unit. The oil reservoir should be 5/8" to 3/4" below the full capacity.

NOTE: Do not fill reservoir to the top; this will cause oil to over-flow out of breather/filter cap.

Sno-Way suggests using its "Snoil" cold climate oil. (Quarts #5029; Gallon #5030. Snoil has the following advantages: Keeps oil viscosity thin in cold temperatures, which reduces battery drain for optimum plow performance. It also increases life expectancy of the most expensive part of your plow: the hydraulic power unit. In emergency situations, substitute Snoil with only Dextron II automatic transmission fluid. Failure to use Snoil or Dextron II may cause the hydraulic pump to fail.

MAINTENANCE and STORAGE INSTRUCTIONS (continued)

HYDRAULIC POWER UNIT SYSTEM OIL CHANGE

For the commercial plower it is recommended to change the fluid in the hydraulic system once a season. For the home owner and light commercial plower, once every two years. Perform the oil change as follows:

1. Remove the snow plow from your vehicle following the "Removing Snow Plow From Vehicle" instructions.

2. Remove the pump cover.

3. Remove the hydraulic pump worm gear mounting clamps. Note: before removing clamps, mark their functional location on the hydraulic pump.

4. Remove the breather/filter cap located on center top of hydraulic pump, and carefully tip the hydraulic pump upside down and drain the fluid into a drain pan.

5. Once drained, re-position the hydraulic pump back on the swing frame saddle bracket, making sure the hydraulic pump oil filler hole is vertically on top.

6. Reposition the worm gear clamps in their original position, (prior to removal) and tighten clamps to 100 inch pounds.

7. Carefully remove the hoses from the angle and lift cylinder. Caution: the hydraulic cylinders are under high pressure. When loosening hoses, turn hose fitting 1 revolution at a time, allowing 1 minute to elapse in between revolutions. This will allow the pressure in the system to relieve itself.

NOTE: Identify and label which hose goes to which cylinder prior to removal.

8. Completely compress the chrome rod portion of both angle and lift cylinders to purge cylinder of fluid.

9. Re-connect and tighten hoses to the hydraulic cylinders where they were previously connected. Use Loctite pipe thread sealant with Teflon on hose fitting threads.

10. Connect the snow plow to your vehicle following the "Mounting Snow Plow To Vehicle" instructions.

11. Fill the hydraulic pump reservoir all the way to the top of the filler hole, using "Snoil" sold in quarts (#5029) or gallons (#5030).

12. Making sure all people are cleared away from the snow plow blade and raise the plow up and down 3 or 4 times.

MAINTENANCE and STORAGE INSTRUCTIONS (continued)

WARNING: DO NOT stand between the vehicle and 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. Serious bodily injury can result from blade striking a body or dropping on feet or hands.

WARNING:  Keep hands and feet clear of blade and A-Frame when removing or attaching plow. Moving or falling assemblies can cause serious bodily injury.

13. Lower snow plow, and refill hydraulic pump reservoir all the way to the top.

14. Making sure all people are cleared away from the snow plow, raise the snow plow, then angle full right to left 3 times. Then lower the plow.

15. Fill the hydraulic pump reservoir 5/8" TO 3/4" below the full capacity, and reinstall the breather/filter cap.

16. Reinstall the pump cover.

17. If desired, disconnect the snow plow from your vehicle following the "removing snow plow from vehicle" instruction.

HYDRAULIC CYLINDERS

Whenever snow plow is disconnected from vehicle for a extended period of time, coat the exposed portions of the power angling and lift cylinder chrome rods with light grease to protect them from corrosion.

ELECTRICAL QUICK DISCONNECT PLUG

Make certain that both vehicle end and snow plow end of the electrical quick disconnect plug terminals are always coated with a thin film of Die Electric grease. This will minimize corrosion which might form due to salt laden moisture.

During the winter season, lubricate monthly with light oil the return spring on the lid/cover of the vehicle end quick disconnect plug.

TROUBLE SHOOTING

Refer to Quick Reference Trouble Shooting Guide, and Trouble Shooting Manual.

TROUBLE-SHOOTING

REFER TO QUICK REFERENCE TROUBLE SHOOTING GUIDE AND TROUBLE-SHOOTING MANUAL.

FIG. 1

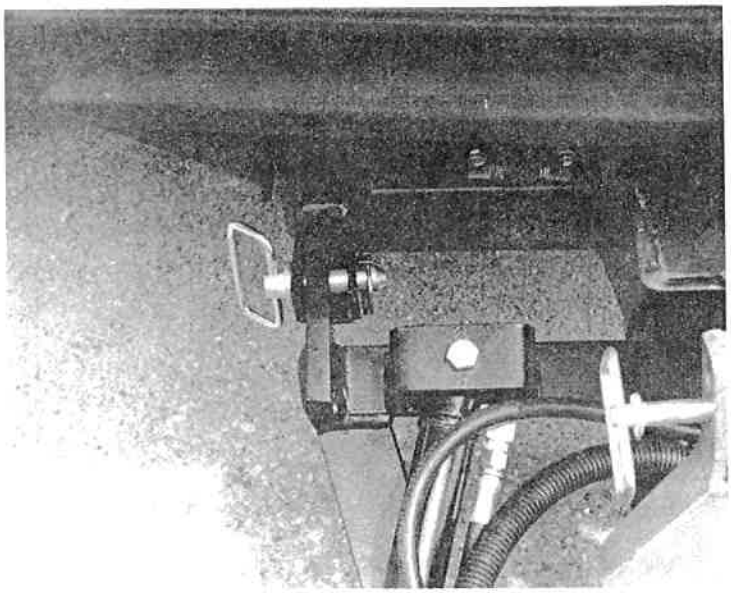


FIG. 2

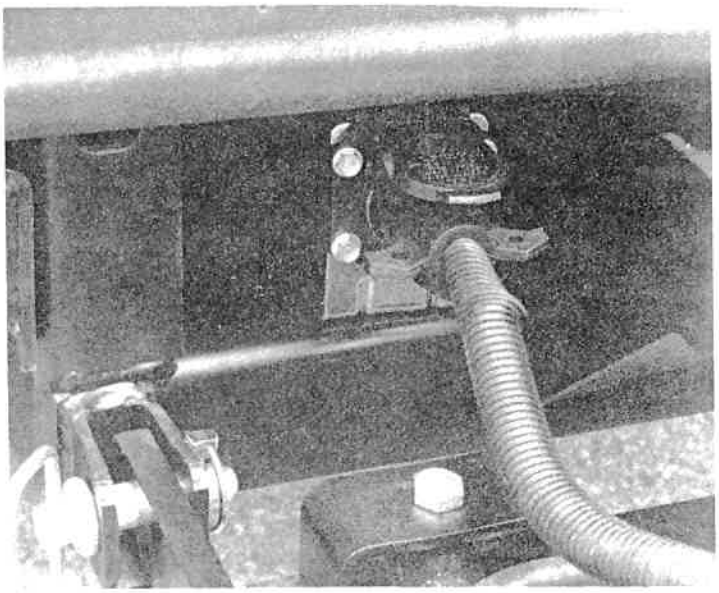


FIG. 3

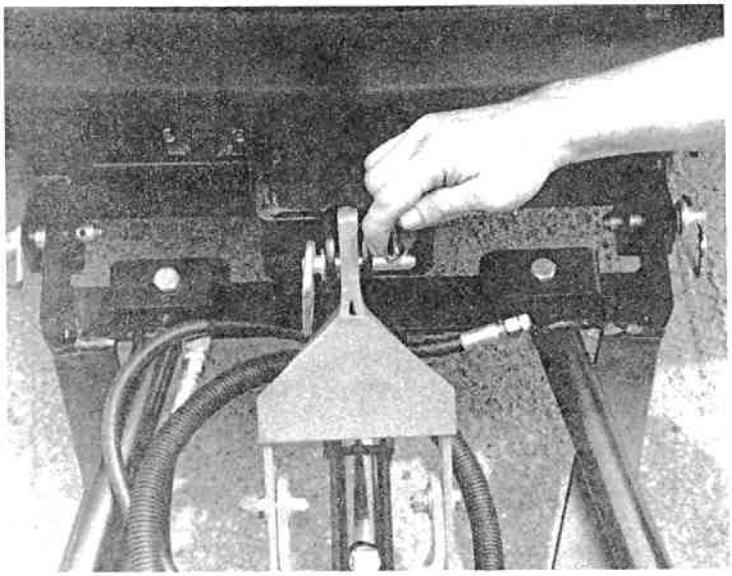


FIG. 4

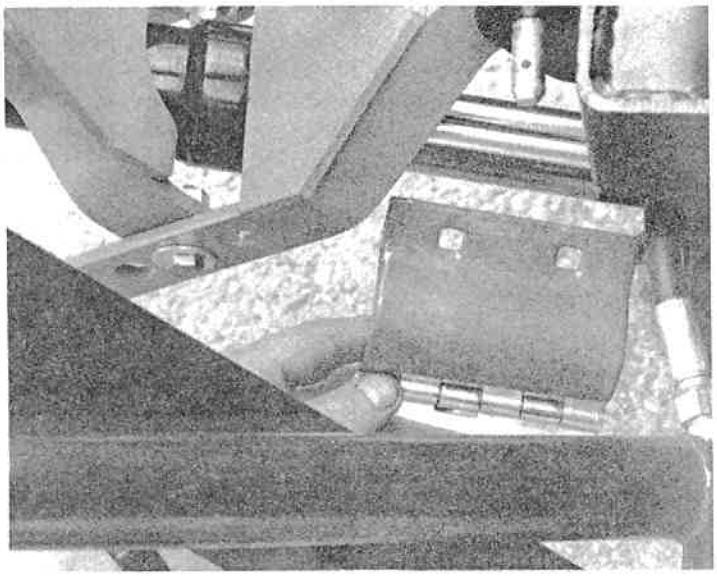
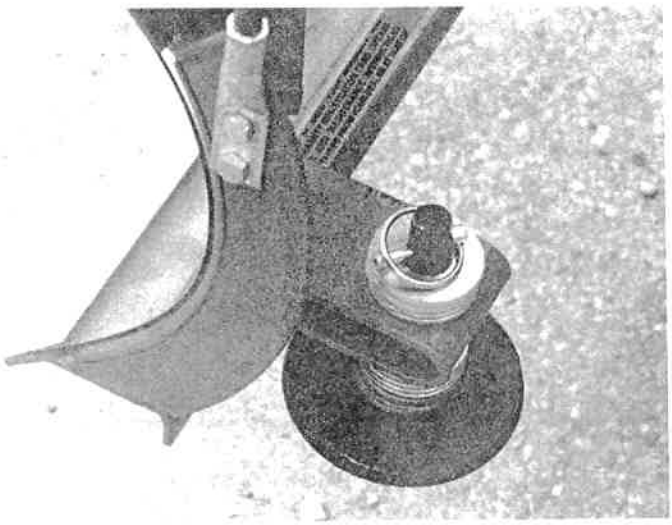
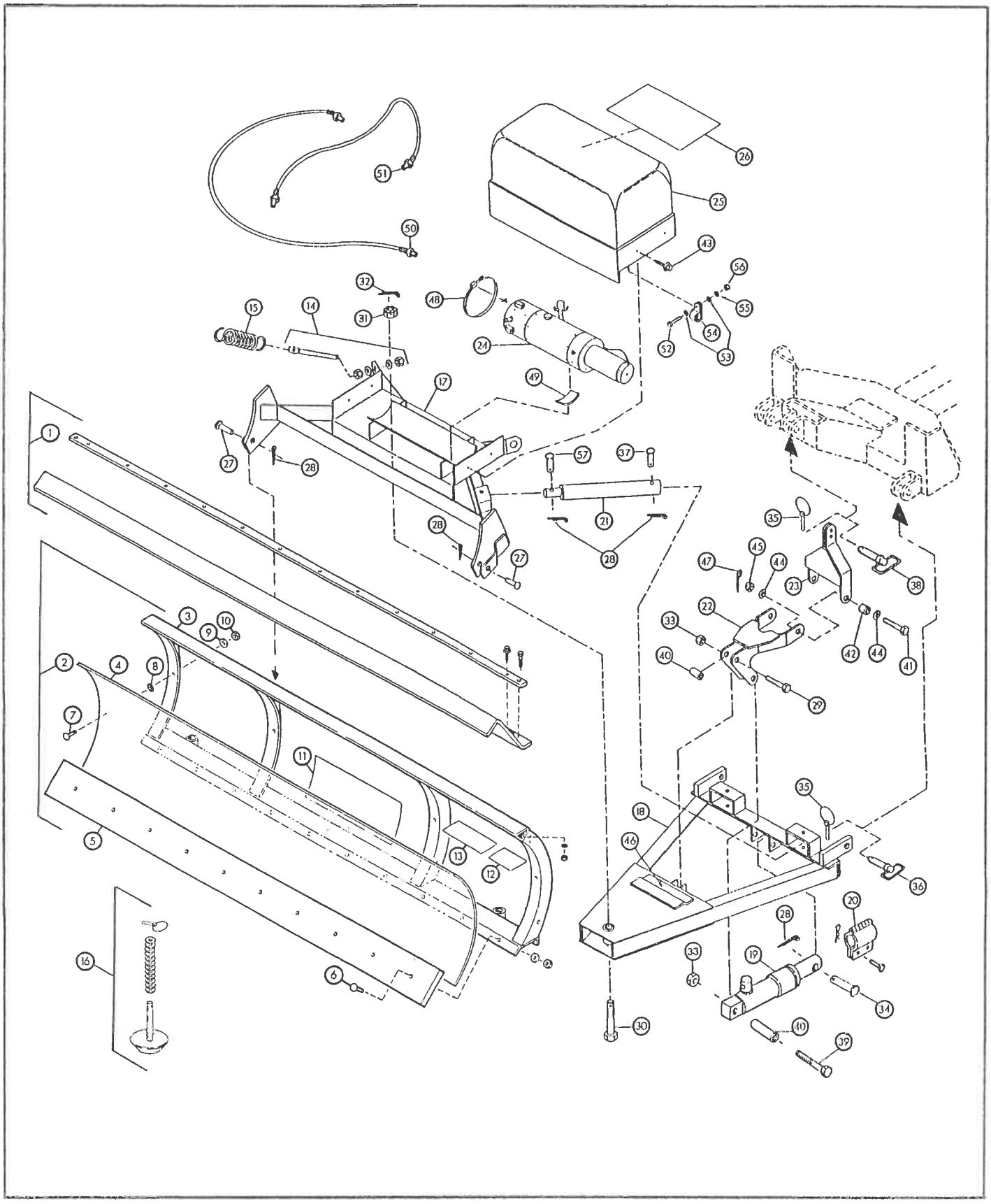


FIG. 5



LEXAN PLOW ASSEMBLY MODEL: 1572L-1580L

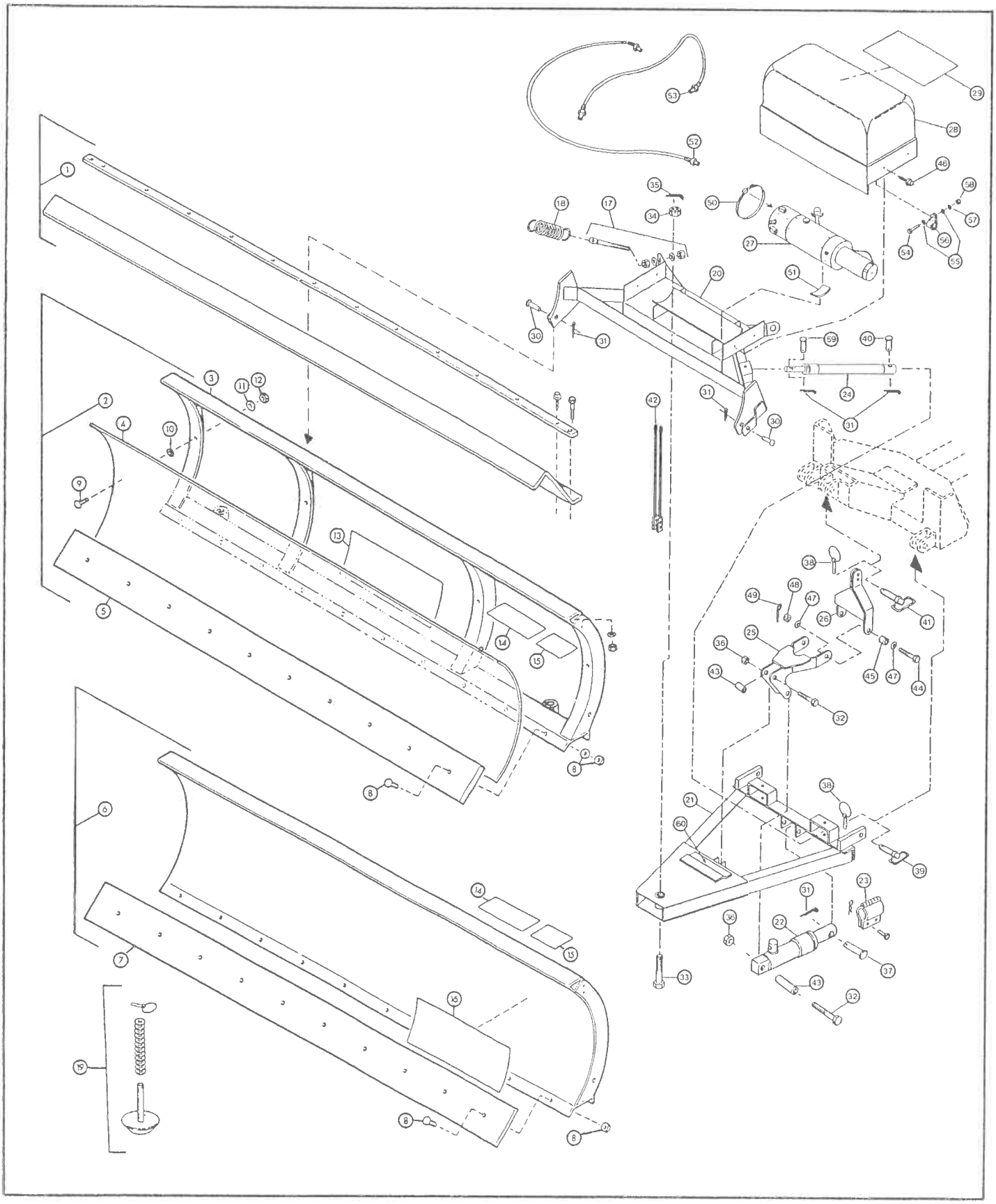


PARTS BREAKDOWN, SERIAL #4747 ONWARD

ITEM	PART NO.	DESCRIPTION	QTY.
1	6071 6072	KIT, DEFLECTOR 72 in. KIT, DEFLECTOR 80 in.	1
2	1363 1365	BLADE ASSEMBLY, 72 in. BLADE ASSEMBLY, 80 in.	1
3	1362 1364	BLADE FRAME, 72 in. BLADE FRAME, 80 in.	1
4	6091 6092	BLADE, LEXAN FORMED, 72 in. BLADE, LEXAN FORMED, 80 in.	1
5	6058 6059	WEARSTRIP, POLYMER 72 in. WEARSTRIP, POLYMER 80 in.	1
6	6042	HARDWARE KIT, WRSTP. L-1572 & 80	1
7	9016	BOLT, CARRIAGE .375-16NC x 1.00	4
8	9101	GROMMET, RUBBER	4
9	9008	WASHER, LOCK .375	4
10	9077	NUT, .375-16NC	4
11	7211	DECAL, SNO-WAY	1
12	7221	DECAL, CAUTION	1
13	7222	DECAL, IMPORTANT OWNER INFO.	1
14	9037	EYEBOLT ASS'Y., .625	4
15	1355	SPRING, TRIP	4
16	1191	SHOE ASSEMBLY	2
17	1353	FRAME, SWING	1
18	1069	A - FRAME	1
19	1043	CYLINDER, LIFT	1
20	1192	LOCK CLAMP ASS'Y.	1
21	1044	CYLINDER, ANGLE (SEE HYDRUALIC CYL. BREAKDOWN FORM #SW043)	1
22	1087	BELL CRANK	1
23	1379	LIFT BAR	1
24	1358	POWER UNIT, HYDRAULIC (SEE BREAKDOWN FORM NO. SW040)	1
25	1024	COVER, PUMP	1
26	7220	DECAL, 1st THE WORLD OVER	1
27	1038	PIN, CLEVIS .75 x 2.50	2
28	9085	PIN, COTTER	6
29	9017	CAPSCREW, .50-13NC x 3.00	1
30	9153	CAPSCREW, 1.00-12NF x 4.50	1
31	9068	NUT, HEX CASTLE 1.00-12NF	1
32	9069	PIN, COTTER .187 x 2.00	1
33	9013	NUT, SELF LOCKING .50-13NC	2
34	9163	PIN, PIVOT .75 x 3.75	1
35	9167	LYNCH PIN	5
36	9168	PIN, CLEVIS .75 x 2.50	2
37	9165	PIN, CLEVIS .50 x 2.625	2
38	9167	PIN, CLEVIS .50 x 2.87	1
39	9017	CAPSCREW, .50-13NC x 3.00	1
40	1037	SPACER, .75 O.D. x 1.563	1
41	9155	CAPSCREW, .375-16NC x 1.25	2
42	1089	SPACER, .625 O.D. x .594	2
43	9072	SCREW, HEX, SELFTAPPING	4
44	9032	WASHER, PLAIN .375	4
45	9157	NUT, HEX, SLOTTED .375-16NC	2
46	****	SERIAL NUMBER LOCATION	*
47	9159	PIN, COTTER .063 x 1.00	2
48	9138	CLAMP, WORM GEAR	2
49	1354	CUSHION, NEOPREAN	2
50	1125	HOSE, 38 in. (DRIVER SIDE CYL.)	1
51	1126	HOSE, 27.25 in. (PASSENGER SIDE AND LIFT CYLINDER)	2
52	9063	SLOTTED ROUND HEAD 10-24NC x .75	1
53	9064	FLATWASHER, .187	2
54	9118	CLAMP, HARNESS HOLDER, .75	1
55	9065	LOCKWASHER, .187	1
56	9066	NUT, HEX 10-24	1
57	9166	PIN, CLEVIS .50 x 2.50	2

PLEASE SPECIFY SERIAL NUMBER WHEN
ORDERING REPAIR / REPLACEMENT PARTS.

STEEL & LEXAN PLOW ASSEMBLY MODEL: 2380-2388 S & L



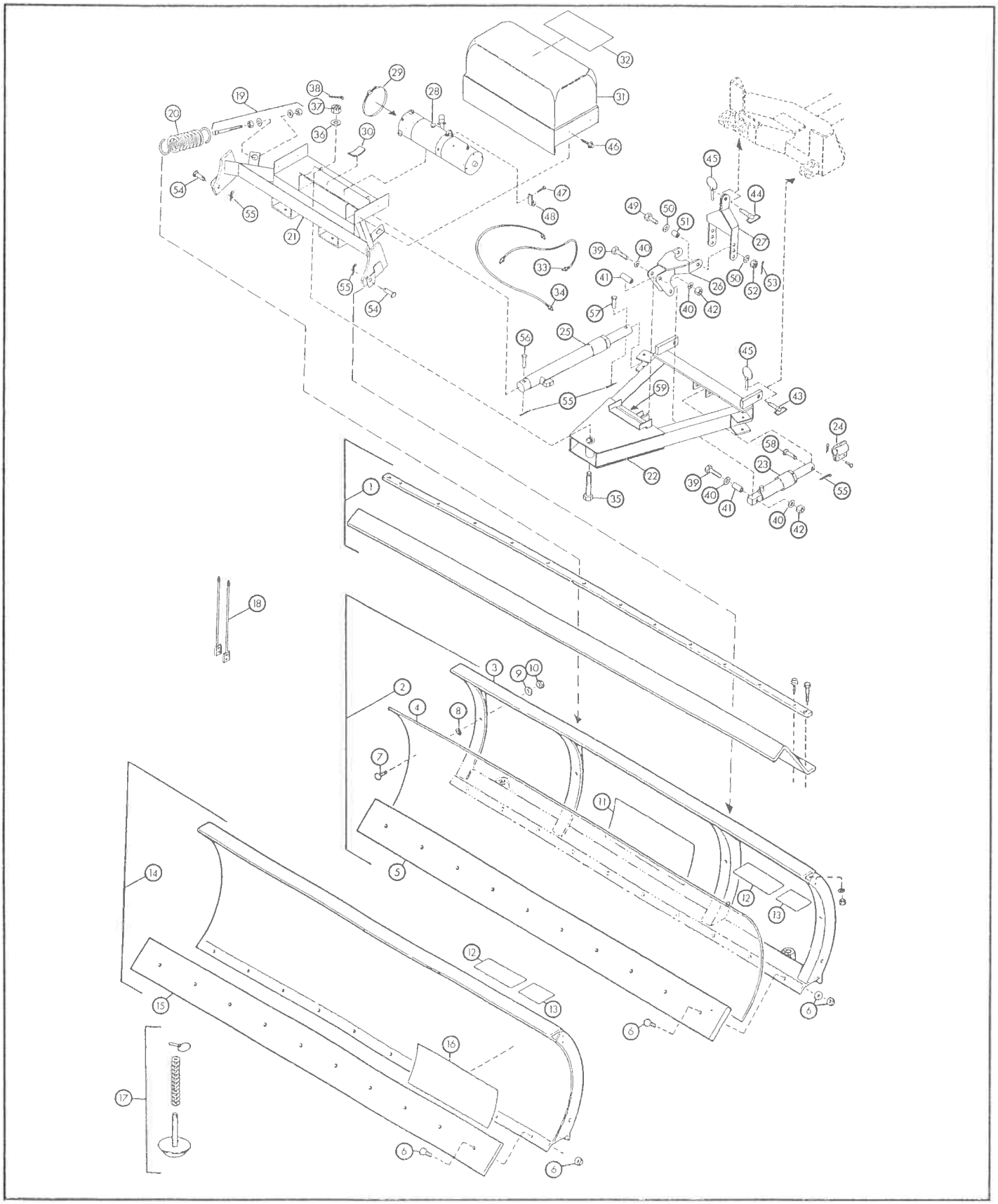
PARTS BREAKDOWN, SERIAL #4747 ONWARD*

ITEM	PART NO.	DESCRIPTION	QTY.
1	6072	KIT, DEFLECTOR 80in. (Optional)	1
	6073	KIT, DEFLECTOR 88in. (Optional)	
2	1315	BLADE ASSEMBLY, 2380 L	1
	1309	BLADE ASSEMBLY, 2388 L	
3	1314	BLADE FRAME, 2380 L	1
	1308	BLADE FRAME, 2388 L	
4	6105	BLADE, LEXAN FORMED 80in.	1
	6103	BLADE, LEXAN FORMED 88in.	
5	6104	WEARSTRIP, POLYMER 80in.	1
	6102	WEARSTRIP, POLYMER 88in.	
6	1238	BLADE ASSEMBLY, 2380 S	1
	1239	BLADE ASSEMBLY, 2388 S	
7	1105	WEARSTRIP, STEEL 80in.	1
	1073	WEARSTRIP, STEEL 88in.	
8	6134	HARDWARE KIT, WRSTRP. (2380L)	1
	6135	HARDWARE KIT, WRSTRP. (2388L)	
	6136	HARDWARE KIT, WRSTRP. (2380S)	
	6044	HARDWARE KIT, WRSTRP. (2388S)	
9	9016	CARRIAGE BOLT, .375-16NC x 1.00	4
10	9101	NEOPREAN WASHER	4
11	9008	LOCK WASHER, .375	4
12	9077	NUT, .375-16NC	4
13	7211	DECAL, SNO-WAY (LEXAN)	1
14	7221	DECAL, CAUTION	1
15	7222	DECAL, IMPORTANT OWNER INFO.	1
16	7219	DECAL, SNO-WAY (STEEL)	1
17	9037	EYEBOLT ASS'Y. , .625	2
18	1045	TRIP SPRING	2
19	1191	SHOE ASSEMBLY	2
20	1353	SWING FRAME	1
21	1069	A-FRAME	1
22	1261	LIFT CYLINDER	1
23	1297	CYLINDER LOCK CLAMP ASS'Y.	1
24	1044	ANGLE CYLINDER (SEE HYDRAULIC CYL. BREAKDOWN FORM #SW043)	2
25	1087	BELL CRANK	1
26	1379	LIFT BAR	1
27	1358	POWER UNIT, HYDRAULIC (SEE BREAKDOWN FORM NO. #SW040)	1
28	1024	PUMP COVER	1
29	7220	DECAL, 1st THE WORLD OVER	1

ITEM	PART NO.	DESCRIPTION	QTY.
30	1038	PIN, CLEVIS .75 x 2.50	2
31	9085	PIN, COTTER	6
32	9017	CAPSCREW, .50-13NC x 3.00	2
33	9153	CAPSCREW, 1.00-14NF x 4.5	1
34	9068	NUT, HEX CASTLE 1.00-14NF	1
35	9069	PIN, COTTER .187 x 2.00	1
36	9013	NUT, SELF LOCKING .50-13NC	2
37	9163	PIN, CLEVIS .75 x 3.75	1
38	9169	LYNCH PIN	5
39	9168	PIN, HANDLE .75 x 2.50	2
40	9165	PIN, CLEVIS .50 x 2.625	1
41	9167	PIN, HANDLE .50 x 2.87	1
42	6002	BLADE GUIDE KIT	1
43	1037	SPACER, .75 O.D. x 1.563	2
44	9155	CAPSCREW, .375-16NC x 1.25	2
45	1089	SPACER, .625 O.D. x .594	2
46	9072	SCREW, HEX SELFTAPPING	4
47	9032	WASHER, PLAIN .375	4
48	9157	NUT, HEX CASTLE .375-16NC	2
49	9159	PIN, COTTER	2
50	9138	WORM GEAR CLAMP	2
51	1354	NEOPREAN CUSHION	2
52	1125	HOSE, 38in. (DRIVER SIDE CYL.)	1
53	1126	HOSE, 27.25in. (PASSENGER SIDE AND LIFT CYLINDER)	2
54	9063	SLOTTED ROUND HEAD 10-24NC x .75	1
55	9064	FLATWASHER, .187	2
56	9118	CLAMP, HARNESS HOLDER	1
57	9065	LOCKWASHER, .187	1
58	9066	NUT, HEX 10-24NC	1
59	9166	PIN, CLEVIS .50 x 2.50	1
60	----	SERIAL NUMBER LOCATION	-

* - INCLUDES SERIAL NO. 2380-251 THRU 2380-500

STEEL & LEXAN PLOW ASSEMBLY MODEL: 2596 S & L

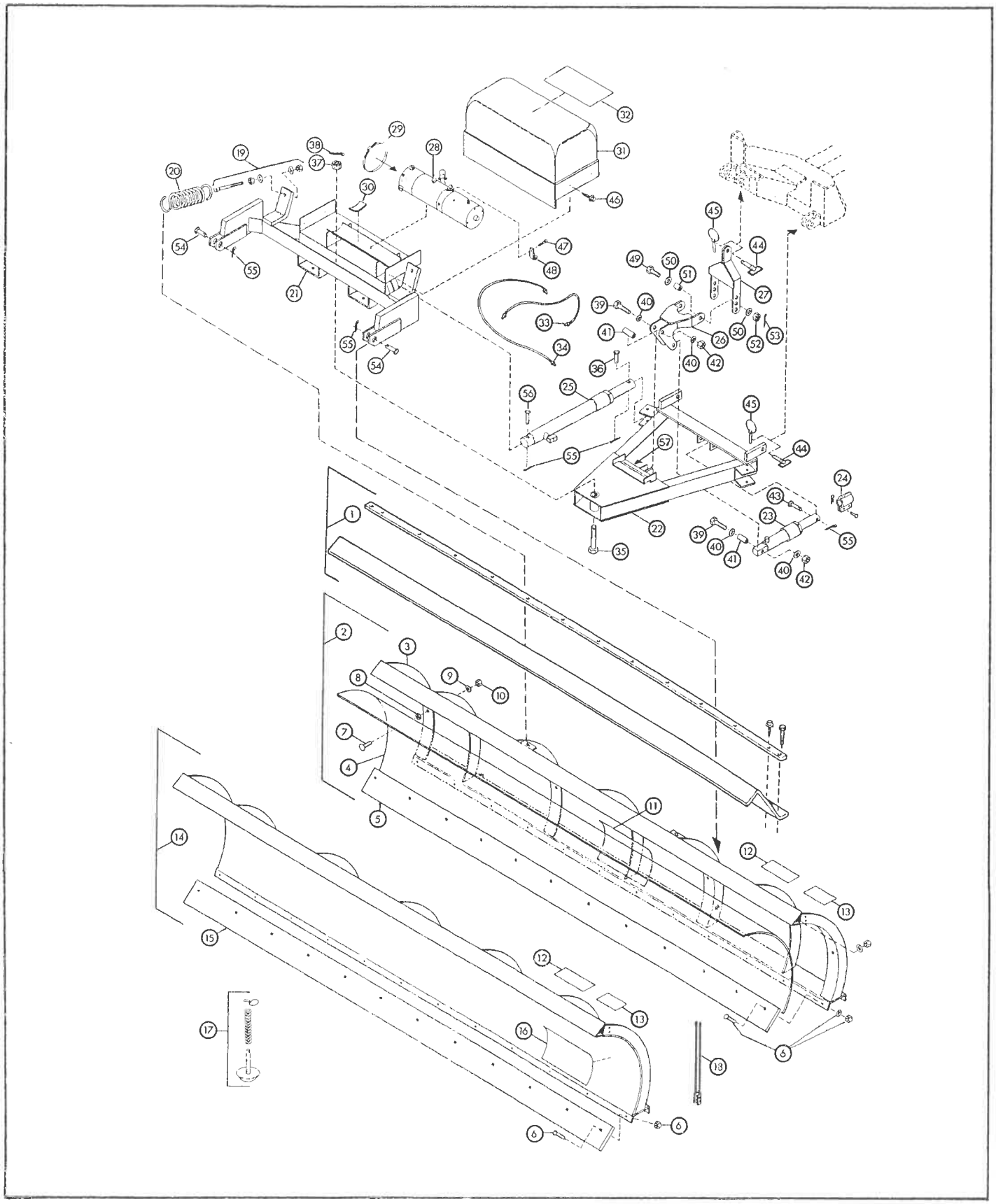


PARTS BREAKDOWN

ITEM	PART NO.	DESCRIPTION	QTY.
1	6120	KIT, DEFLECTOR (OPTIONAL)	1
2	1264	BLADE ASSEMBLY, 2596 L	1
3	1254	BLADE FRAME, 2596 L	1
4	6081	BLADE, LEXAN FORMED	1
5	6085	WEARSTRIP, POLYMER	1
6	6131 6132	HARDWARE KIT, WRSTRP (2596 L) HARDWARE KIT, WRSTRP (2596 S)	1
7	9016	BOLT, CARRRIAGE .375-16NC x 1.00	4
8	9101	NEOPREAN WASHER	4
9	9008	WASHER, PLAIN .375	4
10	9077	NUT, .375-16NC	4
11	7211	DECAL, SNO-WAY (LEXAN)	1
12	7221	DECAL, CAUTION	1
13	7222	DECAL, IMPORTANT OWNER INFO.	1
14	1265	BLADE ASSEMBLY, 2596 S	1
15	1263	WEARSTRIP, STEEL	1
16	7219	DECAL, SNO-WAY (STEEL)	1
17	1410	SHOE ASSEMBLY, HEAVY DUTY	2
18	6002	KIT, BLADE GUIDE	2
19	1393	EYEBOLT ASSEMBLY, .625	2
20	1392	TRIP SPRING	2
21	1359	SWING FRAME	1
22	1255	A-FRAME	1
23	1261	LIFT CYLINDER	1
24	1297	LOCK CLAMP ASSEMBLY	1
25	1262	ANGLE CYLINDER	2
26	1258	BELL CRANK	1
27	1259	LIFT BAR	1
28	1366	POWER UNIT (SEE HYDRAULIC BREAKDOWN FORM #SW040)	1
29	9138	WORM GEAR CLAMP	3

ITEM	PART NO.	DESCRIPTION	QTY.
30	1354	NEOPREAN CUSHION	3
31	1281	PUMP COVER	1
32	7220	DECAL, 1st THE WORLD OVER	1
33	1126	HOSE, 27.50in. (PASSENGER SIDE AND LIFT CYLINDER)	2
34	1126	HOSE, 38.00in. (DRIVER SIDE ANGLE CYLINDER)	1
35	9106	CAPSCREW, 1.00-14NF x 5.50	1
36	9162	PIN, CLEVIS .625 x 3.00	2
37	9068	NUT, SLOTTED HEX, 1.00-14NF	1
38	9069	PIN, COTTER .156 x 2.00	1
39	9036	CAPSCREW, .50-13NC x 3.50	2
40	9011	FLATWASHER, .50	4
41	9107	SPACER, .75 O.D. x 2.375	2
42	9013	NUT, NYLOCK .50-13NC	2
43	9163	PIN, CLEVIS .75 x 3.75	1
44	9168	PIN, HANDLE	3
45	9169	PIN, LYNCH	3
46	9072	CAPSCREW, SELF TAPPING	4
47		CAPSCREW,	1
48	9118	CLAMP, HARNESS HOLDER	1
49	9156	CAPSCREW, .50-13NC x 1.50	2
50	9011	FLATWASHER	2
51	9108	SPACER, .75 O.D. x .60	2
52	9158	NUT, SLOTTED HEX .50-13NC	2
53	9085	PIN, COTTER .125 x 1.50	2
54	9175	PIN, CLEVIS .75 x 2.50	2
55	9085	PIN, COTTER .125 x 1.50	7
56	9164	PIN, CLEVIS .625 x 3.50	2
57	------	SERIAL NUMBER LOCATION	-----

BAD'GRRR® PLOW ASSEMBLY MODELS: 2590LHD-2596LHD (LEXAN)
2590SHD-2596SHD (STEEL)



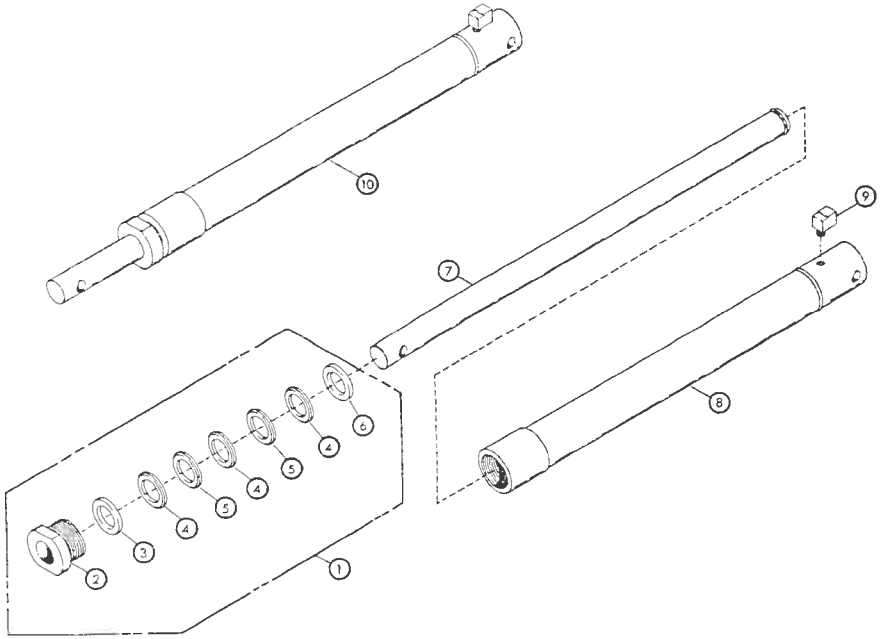
PARTS BREAKDOWN

ITEM	PART NO.	DESCRIPTION	QTY.
1	6120	KIT, DEFLECTOR 90in.	1
	6084	KIT, DEFLECTOR 96in.	
2	1406	BLADE ASSEMBLY, 2590 LHD	1
	1408	BLADE ASSEMBLY, 2596 LHD	
3	1401	BLADE FRAME, 2590 LHD	1
	1403	BLADE FRAME, 2596 LHD	
4	6128	BLADE, LEXAN FORMED, 90in.	1
	6081	BLADE, LEXAN FORMED, 96in.	
5	6129	WEARSTRIP, POLYMER 90in.	1
	6130	WEARSTRIP, POLYMER 96in.	
6	6131	HARDWARE KIT, WRSTRP 2590LHD - 2596LHD	1
	6132	HARDWARE KIT, WRSTRP 2590SHD - 2596SHD	
7	9016	BOLT, CARRRIAGE .375-16NC x 1.00	4
8	9101	NEOPREAN WASHER	4
9	9008	WASHER, PLAIN .375	4
10	9077	NUT, .375-16NC	4
11	7263	DECAL, BAD'GRRR	1
12	7221	DECAL, CAUTION	1
13	7222	DECAL, IMPORTANT OWNER INFO.	1
14	1405	BLADE ASSEMBLY, 2590 SHD	1
	1407	BLADE ASSEMBLY, 2596 SHD	
15	1414	WEARSTRIP, STEEL 90in.	1
	1415	WEARSTRIP, STEEL 96in.	
16	7264	DECAL, BAD'GRRR	1
17	1410	SHOE ASSEMBLY, HEAVY DUTY	2
18	6002	KIT, BLADE GUIDE	2
19	1393	EYEBOLT ASSEMBLY, .625	2
20	1392	TRIP SPRING	2
21	1386	SWING FRAME	1
22	1255	A-FRAME	1
23	1261	LIFT CYLINDER	1
24	1297	LOCK CLAMP ASSEMBLY	1
25	1262	ANGLE CYLINDER	2
26	1258	BELL CRANK	1

ITEM	PART NO.	DESCRIPTION	QTY.
27	1259	LIFT BAR	1
28	1366	POWER UNIT (SEE HYDRAULIC BREAKDOWN FORM #SW040)	1
29	9138	WORM GEAR CLAMP	3
30	1354	NEOPREAN CUSHION	3
31	1281	PUMP COVER	1
32	7220	DECAL, 1st THE WORLD OVER	1
33	1126	HOSE, 27.50in. (PASSENGER SIDE AND LIFT CYLINDER)	2
34	1126	HOSE, 38.00in. (DRIVER SIDE ANGLE CYLINDER)	1
35	9106	CAPSCREW, 1.00-14NF x 5.50	1
36	9162	PIN, CLEVIS .625 x 3.00	2
37	9068	NUT, SLOTTED HEX, 1.00-14NF	1
38	9069	PIN, COTTER .156 x 2.00	1
39	9036	CAPSCREW, .50-13NC x 3.50	2
40	9011	FLATWASHER, .50	4
41	9107	SPACER, .75 O.D. x 2.375	2
42	9013	NUT, NYLOCK .50-13NC	2
43	9163	PIN, CLEVIS .75 x 3.75	1
44	9168	PIN, HANDLE	3
45	9169	PIN, LYNCH	3
46	9072	CAPSCREW, SELF TAPPING	4
47	9152	CAPSCREW, .313-18NC x .50	1
48	9118	CLAMP, HARNESS HOLDER	1
49	9156	CAPSCREW, .50-13NC x 1.50	2
50	9011	FLATWASHER	2
51	9108	SPACER, .75 O.D. x .60	2
52	9158	NUT, SLOTTED HEX .50-13NC	2
53	9085	PIN, COTTER .125 x 1.50	2
54	9175	PIN, CLEVIS .75 x 2.50	2
55	9085	PIN, COTTER .125 x 1.50	7
56	9164	PIN, CLEVIS .625 x 3.50	2
57	******	SERIAL NUMBER LOCATION	*****

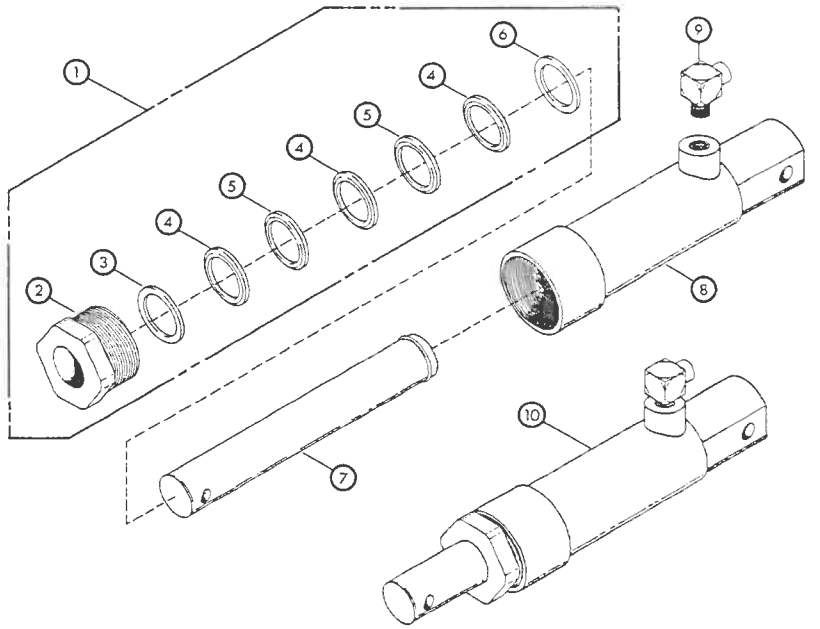
HYDRAULIC CYLINDER PARTS BREAKDOWN

ANGLE CYLINDER #1044



ITEM	PART NO.	DESCRIPTION	QTY.
1	5035	SEAL KIT, Incl. lines 2 thru 6	1
2	----	GLAND NUT	1
3	----	PLASTIC WASHER	1
4	----	SEAL, Tapered, Black	3
5	----	SEAL, Tapered, White	2
6	----	WASHER, Metal	1
7	----	CYL. ROD, 1.0Dia.x17.0	1
8	----	CYL. ROD HOUSING	1
9	1003	90° 1/4" ELBOW FITTING	1
10	1044	ANGLE CYLINDER, Complete, Incl. lines 1 thru 9	

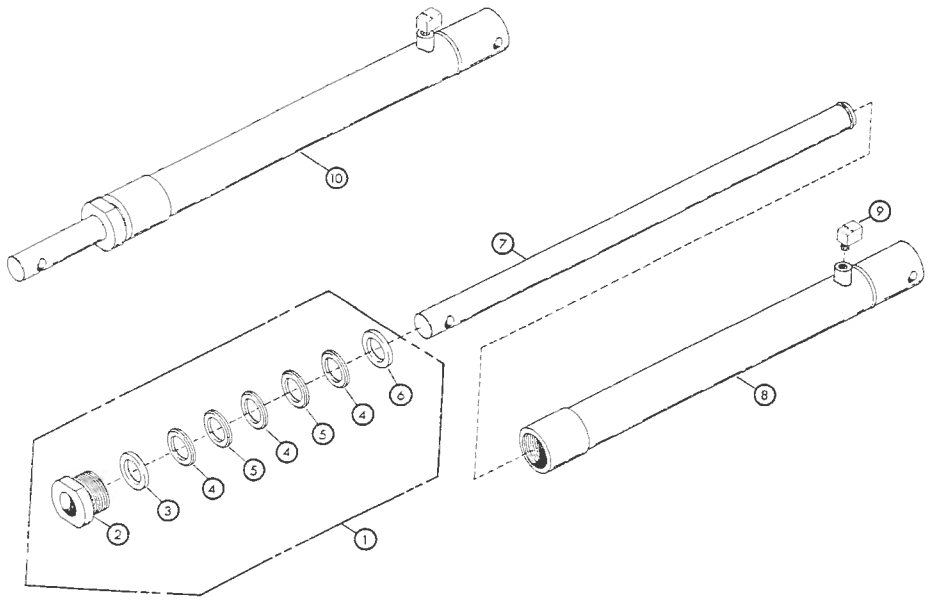
LIFT CYLINDER #1043



ITEM	PART NO.	DESCRIPTION	QTY.
1	5034	SEAL KIT, Incl. lines 2 thru 6	1
2	----	GLAND NUT	1
3	----	PLASTIC WASHER	1
4	----	SEAL, Tapered, Black	3
5	----	SEAL, Tapered, White	2
6	----	WASHER, Metal	1
7	----	CYL. ROD, 1.50Dia.x9.0	1
8	----	CYL. ROD HOUSING	1
9	1003	90° 1/4" ELBOW FITTING	1
10	1043	LIFT CYLINDER, Complete, Incl. lines 1 thru 9	

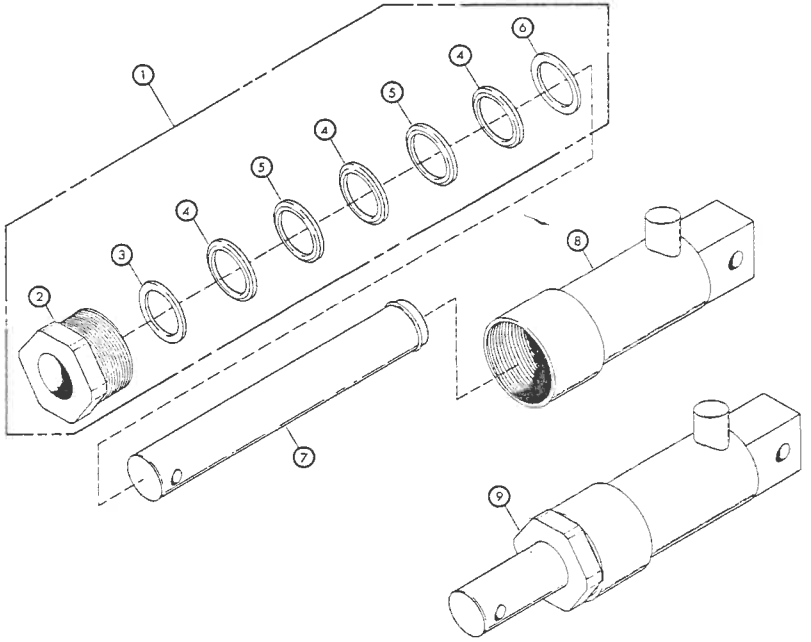
HYDRAULIC CYLINDER PARTS BREAKDOWN

ANGLE CYLINDER #1262



ITEM	PART NO.	DESCRIPTION	QTY.
1	5045	SEAL KIT, Incl. lines 2 thru 6	1
2	----	GLAND NUT	1
3	----	PLASTIC WASHER	1
4	----	SEAL, TAPERED, BLACK	3
5	----	SEAL, TAPERED, WHITE	2
6	----	WASHER, METAL	1
7	----	CYL. ROD, 1.50 Dia. x 18.00	1
8	----	CYL. ROD HOUSING	1
9	1003	90 1/4in. ELBOW FITTING	1
10	1262	ANGLE CYLINDER, COMPLETE (Incl. lines 1 thru 9)	

LIFT CYLINDER #1261



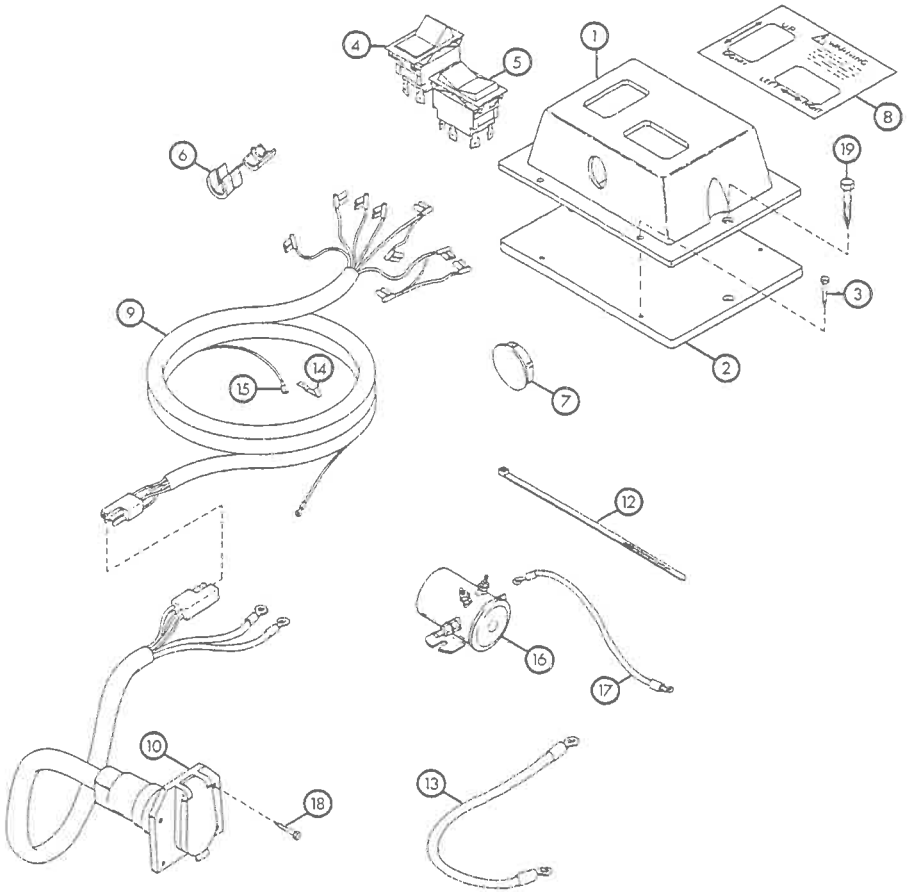
ITEM	PART NO.	DESCRIPTION	QTY.
1	5046	SEAL KIT, Incl. lines 2 thru 6	1
2	----	GLAND NUT	1
3	----	PLASTIC WASHER	1
4	----	SEAL, TAPERED, BLACK	3
5	----	SEAL, TAPERED, WHITE	2
6	----	WASHER, METAL	1
7	----	CYL. ROD, 2.00 DIA. x 8.00	1
8	----	CYL. ROD HOUSING	1
9	1261	LIFT CYLINDER, COMPLETE (Incl. lines 1 thru 9)	

#2087 CONTROL BOX ASS'Y. BREAKDOWN

ITEM	PART NO.	DESCRIPTION	QTY.
1	2015	CONTROL BOX	1
2	2015-1	BASE PLATE	1
3	9172	SCREW, SELFTAPPING #10 x .375	4
4	2013	ROCKER SWITCH (UP/DOWN)	1
5	2014	ROCKER SWITCH (LEFT/RIGHT)	1
6	2075	STRAIN RELIEF BUSHING	1
7	2074	PLUG, .875 PLASTIC	1
8	7262	DECAL, CONTROL BOX	1
9	2034	HARNESS, CONTROL BOX END	1
10	2072	HARNESS ASS'Y., PLUG END	1
****	SW034	WARNING LABEL, 3.00 x 5.00	1

#2084 MOUNTING HARDWARE KIT

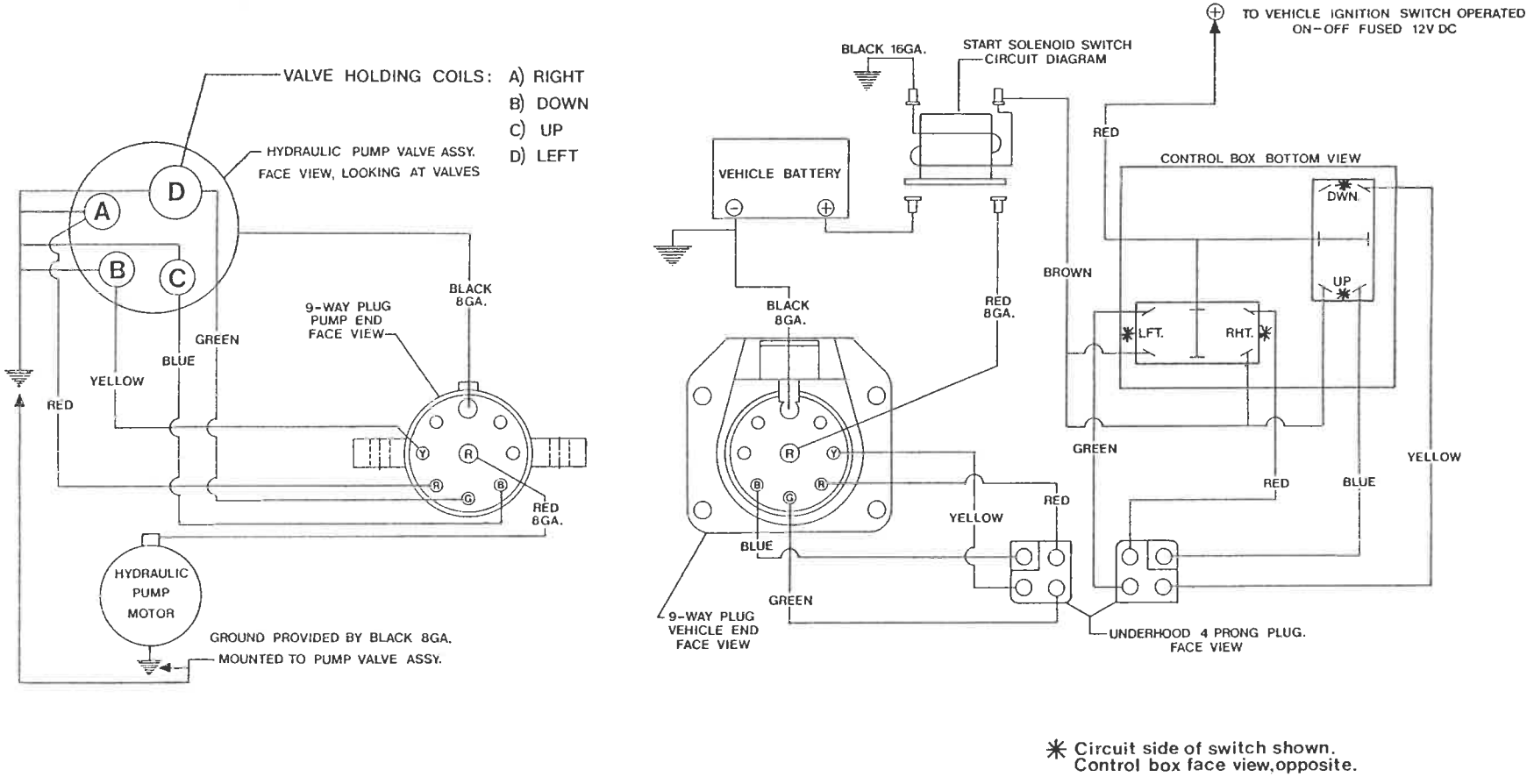
ITEM	PART NO.	DESCRIPTION	QTY.
12	1227	STRAP, NYLON TIE	5
13	2044	CABLE, POSITIVE BATTERY	1
14	2083	AUTO FUSE TAP-IN .25in.	1
15	2085	TERMINAL, .25in. FEMALE SPADE	1
16	2086	SOLENOID SWITCH	1
17	2090	SOLENOID GROUND WIRE, 16GA.	1
18	9092	SCREW, SELF-DRILLING .25 x 1.00	6
19	9071	SCREW, SELF-DRILLING .25 x 1.50	2



Snow Plow Serial Numbers
4881 Onward. (Located on
Snow Plow A--Frame).

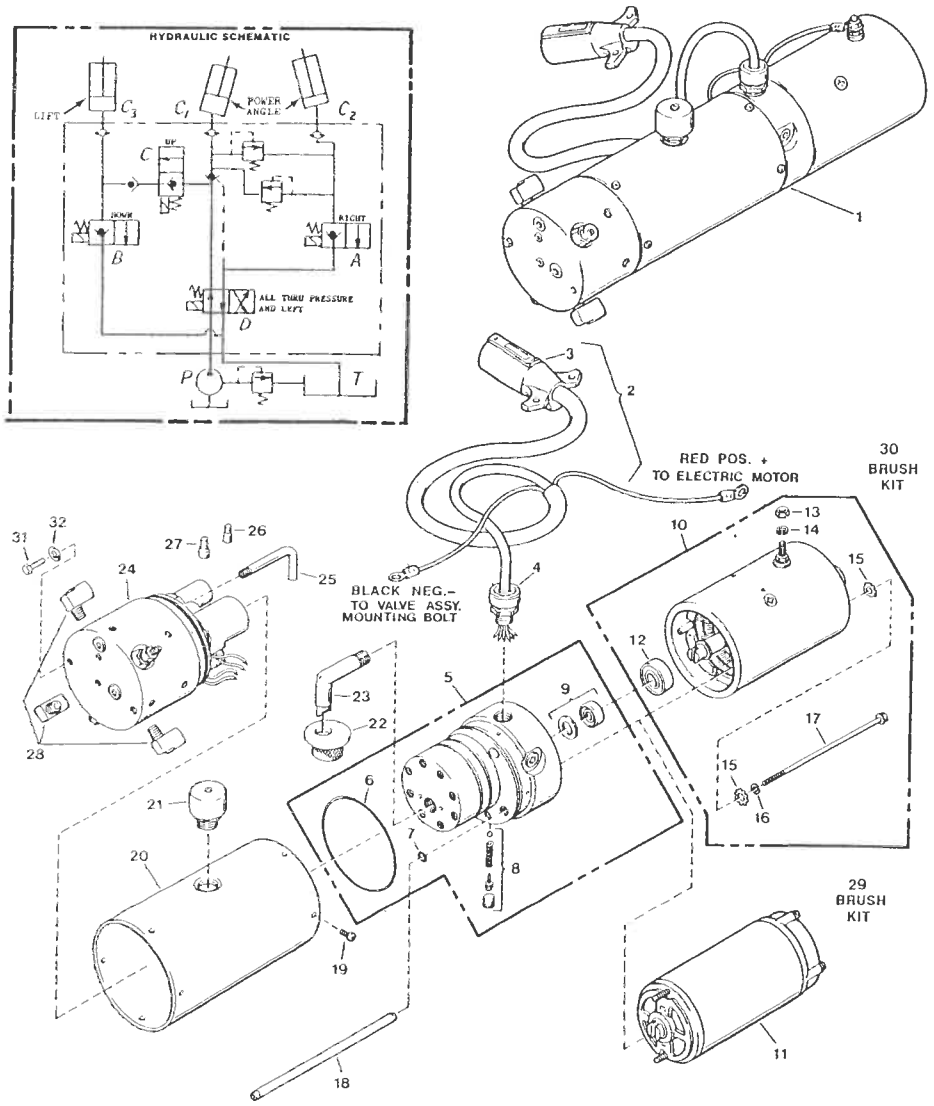
SYSTEM WIRING DIAGRAM

Snow Plow Serial Numbers
4881 Onward. (Located on
Snow Plow A--Frame).



✳ Circuit side of switch shown.
Control box face view, opposite.

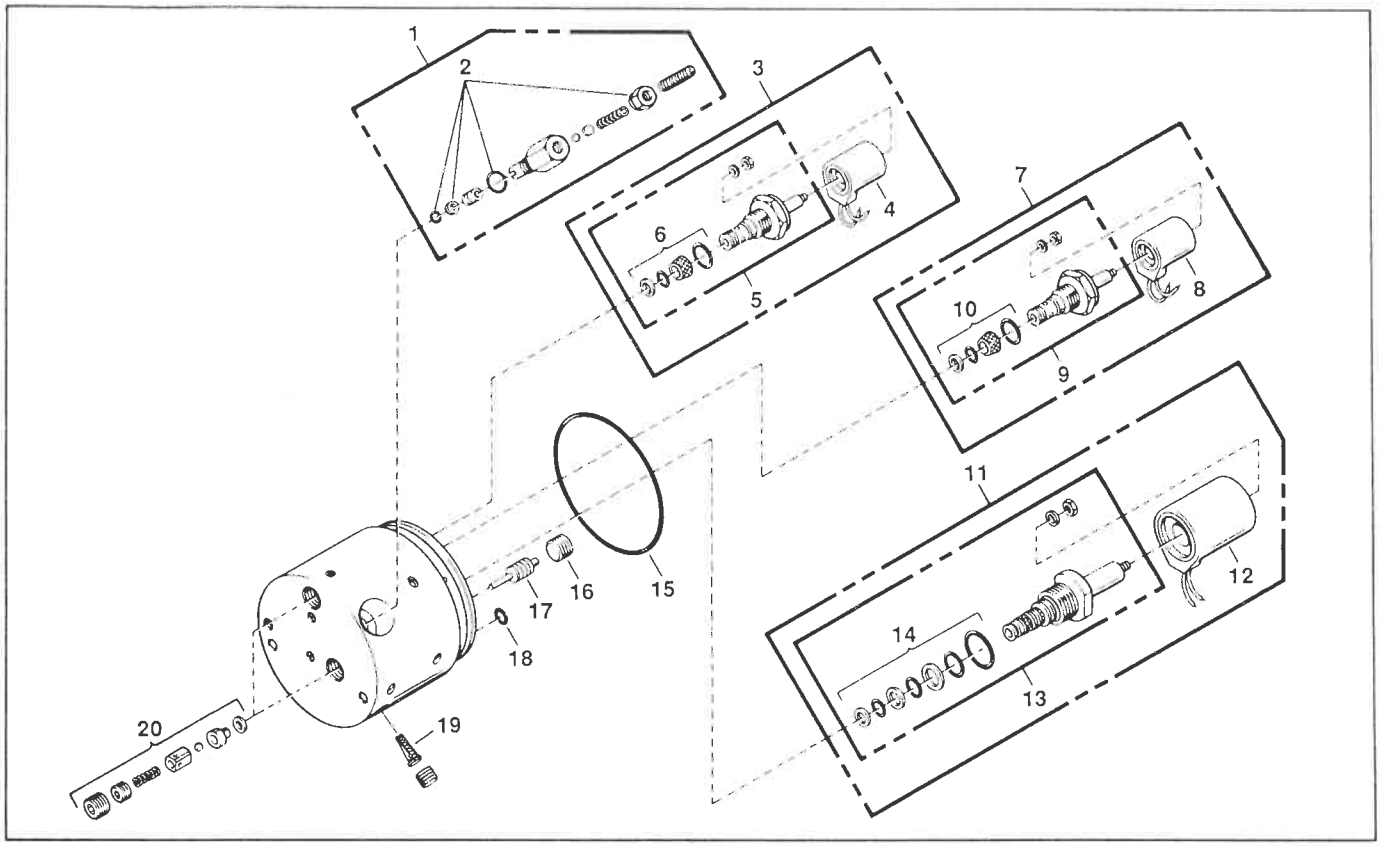
POWER UNIT PARTS BREAKDOWN



Snow Plow Serial Numbers 4881 Onward. (Located on Snow Plow A--Frame).

ITEM	PART NO.	DESCRIPTION	QTY.
1	1358	HYDRAULIC POWER UNIT ASSY. 3in.	1
	1366	HYDRAULIC POWER UNIT ASSY. 4.5in.	
2	2088	HARNESS, PUMP END (COMPLETE)	1
3	2060	PLUG, PUMP END	1
4	683-01433	FITTING, STRAIN RELIEF SLOTTED	1
5	683-02992	PUMP ASSY. GEAR CODE 42 (#1358)	1
	683-02689	PUMP ASSY. GEAR CODE 03 (#1366)	
6	683-02352	O-RING, INDSTRL. 3-5/8x3-7/8x1/8	1
7	683-00122	O-RING, INDSTRL. 3/8x9/16x3/32	1
8	683-02222	PARTS KIT, RELIEF VALVE	1
9	683-02330	PARTS KIT, SEAL & GASKET	1
10	2058	MOTOR, ELECTRIC 12VDC 4-1/2in.	1
11	2019	MOTOR, ELECTRIC 12VDC 3in.	1
12	683-02318	BEARING, BASE MOTOR 4-1/2in.	1
13	683-07625	NUT, HEX 5/16-24	1
14	683-07781	WASHER, LOCK 5/16	1
15	683-07737	WASHER, STAR 1/4	4
16	683-07795	WASHER, LOCK 1/4	2
17	683-07738	SCREW, HEX HEAD CAP 1/4-20x6-1/2	2
18	683-01451	TUBE, PRESSURE, IN-LINE INTERNAL	1
19	683-07708	SCREW, SELF-TAPPING 10-24x3/8	12
20	683-06993	RESERVOIR, 4-1/2 x 7in.	1
21	683-01143	PLUG, VENT (PLASTIC)	1
22	683-01134	SCREEN, FILTER (SUCTION)	1
23	683-01209	TUBE, FILTER SUCTION 3/8in. NPT 90 (PLASTIC)	1
24	683-00838	VALVE ASSY., 12VDC, 3-WAY/4-WAY W/CROSS-OVER, SEE BREAKDOWN FOR PARTS	1
25	683-01274	TUBE, RETURN (1/8in.)	1
26	683-01339	TERMINAL, CLOSED END, CONNECTOR (SMALL)	1
27	683-01338	TERMINAL, CLOSED END, CONNECTOR (LARGE)	1
28	1003	FITING, ELBOW 90 1/4in.	3
29	2027	PARTS KIT, BRUSH SET	1
30	2064	PARTS KIT, BRUSH SET	1
31	9152	CAPSCREW, 5/16-18 x 1/2	1
32	9025	LOCKWASHER, 5/16	1

Valve Assembly



Ref. No.	Part No.	Description	No. Req.
1	683-03641	PARTS KIT, Valve, cross-over relief (for use with valve assemblies)	2
2	683-03694	PARTS KIT, Cross-Over Relief Valve (Seals)	2
3	683-00094	VALVE, 2 Way - 2 Position, poppet 12 VDC	2
4	683-00089	COIL, 12 VDC 2 Way - 2 Position	3
5	683-00262	CARTRIDGE, 2 Way - 2 Position poppet valve 12 VDC & 24 VDC	2
6	683-00121	PARTS KIT, 2 Way - 2 Position, cartridge valve	3
7	683-00367	VALVE, 2 Way - 2 Position, spool 12 VDC	1
8	683-00089	COIL, 12 VDC 2 Way - 2 Position	1
9	683-00368	CARTRIDGE, 2 Way - 2 Position, spool valve 12 VDC & 24 VDC	1
10	683-00121	PARTS KIT, 2 Way - 2 Position, cartridge valve	1

Ref. No.	Part No.	Description	No. Req.
11	683-00095	VALVE, 4 Way - 2 Position 12 VDC	1
12	683-00096	COIL, 12 VDC 4 Way - 2 Position	1
13	683-00266	CARTRIDGE, 4 Way - 2 Position 12 VDC & 24 VDC	1
14	683-00112	PARTS KIT, 4 Way - 2 Position cartridge valve	1
15	683-02352	O-RING,Industrial (3-5/8 x 3-7/8 x1/8)	1
16	683-02349	PLUG, Pipe, flush 3/8 NPT	1
17	683-00061	PISTON ASSEMBLY, Pilot Check	1
18	683-00122	O-RING, Industrial (3/8 x 9/16 x 3/32)	1
19	683-01316	FILTER, Screen Pressure Ports	3
20	683-03624	PARTS KIT, Valve Assembly, poppet/ball check	2

PLEASE SPECIFY SERIAL NUMBER LOCATED ON RESERVOIR WHEN ORDERING PARTS

SNO-WAY T/S (TROUBLE-SHOOTING) MANUAL

TABLE OF CONTENTS

INTRODUCTION

When ever service is necessary, your local Sno-Way Distributor knows your plow best and is interested in your complete satisfaction. Return your snowplow to him for maintenance service or any other as-assistance you may require. If you are unable to do so, this T/S Guide should help you in correcting both minor and major service problems. However, before attempting the disassembly of intricate components such as the hydraulic power unit, you should possess good mechanical abilities and a total understanding of the mechanism.

If your Sno-Way plow is still under warranty, you should contact the Distributor/Dealer from whom you purchased it. Disassembling certain components, such as your hydraulic pump, will void your warranty. If proven to be defective, they must be replaced untampered and as a complete assembly.

First, read all warning instructions, the safety guide-lines, and your Sno-Way Owners Manual. Follow them explicitly.

PLEASE: Before calling Sno-Way parts and service personnel be certain that:

1. You have read this guide carefully and are certain that all of the suggestions pertaining to your problem have been attempted.

2. You have the following information available:

   A. Approximate date snow plow was originally installed.
   B. Snow plow model number I.E. 2380-S.
   C. Serial number of plow assembly (located on A-frame hold down plate).
   D. Serial number of hydraulic pump (located on oil reservoir).
   E. Hydraulic pump electric motor diameter.

Sno-Way parts and service hot line is 1-800-423-1048 outside Wisconsin. (1-414-673-7200 inside Wisconsin) 7:00 a.m. to 4:00 p.m. C.S.T.. For same day parts shipments, order must be received before 11:00 a.m. C.S.T..

SECTION 2

TEST EQUIPMENT

The following is a list of the test equipment required to troubleshoot D.C. powered hydraulic systems.

Continue on next page

1. Pressure Gauge

A small 0-3000 P.S.I. pressure gauge, preferably glycerine filled, is a very valuable and relatively inexpensive tool for checking pressure in the various sections of the circuit.

2. D.C. Test Light

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 "HOT" electrical component. They are easily obtained from automotive jobbers or discount stores.

3. Continuity Light

A continuity light is similar to a test light, but contains its own battery power source. It is used for testing electrical circuits when the components are not connected to a battery. They are easily obtained from discount stores or electrical jobbers at modest cost.

4. Volt Meter

A D.C. volt meter, as used in the automotive repair business, is a good investment for troubleshooting problems that are related to low voltage. They are used in two ways. First: one probe is grounded while the other is used to probe the "HOT" leads. The meter shows the voltage available at the point where the second probe is connected. Second: they can be used to measure a voltage drop in a wire. One probe is connected to one end and the remaining probe to the other end, the respective reading is the voltage drop.

5. OHM Meter

An ohm meter is used to measure resistance and is a very useful tool when working on wiring circuits and solenoid coils. On some coils, the wire resistance is up to a level where a D.C. test light might show an opening circuit but it really is not so. An "infinite" meter reading on any test shows that the circuit is open. A coil test, however, will always show some value of resistance, but it must not be "infinite". All tests conducted with an ohm meter must be done with the vehicle battery disconnected from the system.

6. Assorted Hoses, High Pressure Fittings

These can be used to connect and/or isolate certain parts of a hydraulic circuit to a pressure gauge or a shutoff valve for diagnosing hydraulic problems.

Continue on next page

GEAR PUMPS

1. Type and Repair

The Sno-Way Monarch pump is of the external gear type. It is not complex in construction and if properly maintained, will give years of trouble free service. Before disassembling the pump because of failure, make certain all other possibilities have been considered, as the close tolerances can be disrupted by disassembly.

A. Pump Disassembly

1. Loosen and remove the eight 1/4" - 20 socket head cap screws.
2. Remove suction plate.

NOTE: Watch for thrust ball on drive shaft.

3. Remove idler gear and shaft as an assembled unit.
4. Remove the "spiral lock" from remaining drive shaft.
5. Remove drive gear.
6. Remove key on drive shaft.
7. Remove cylinder plate.
8. Remove dowels.
9. Remove remaining "spiral lock" on drive shaft.
10. Remove wear plate.
11. Remove drive shaft through base.
12. Replace seal in base whenever rebuilding the gear pump. (See Section B below)
13. Use care when installing shaft back through seal so as not to cut lip. (Grease seal lip before installing shaft).
14. Install all remaining parts in reverse order replacing those that are scored or damaged.
15. Torque socket head cap screws to 125-150 in. lbs..-IN.

B. Pump Shaft Seal Failure

A cut or damaged lip in the seal, a bad fit on the outside diameter, or a seal that is "blown" partially out of the seal cavity will allow air to be drawn into the pump and will be evidenced by foaming oil and a pump that will not reach high pressures. Repair as outlined above in Section A.

2. New Installations

New system installations, as well as those that are disassembled for repair, require proper priming to avoid possible pump failure. A pump is said to be "primed" when the internal cavity is full of oil and the air has been expelled.

Continue on next page

A. Prime a pump as follows:

1. "Crack" or remove the high pressure line at or near the cylinder.
2. "Jog" the unit until oil flow is clear. (Air is absent).
3. Retighten or replace hose.

3. On Systems that Fail to Prime or that Lose Their Prime, Check for the Following:

A. Correct mounting position of the unit is necessary, and failure to mount in proper manner could mean pump cannot prime (pick up oil) because the suction pickup tube is not submerged in the oil at all times. Breather/Filler hole should be vertical.
B. Partially clogged suction filter. (See Filter Section)
C. A loose or improperly installed pick up tube.
D. A bad front pump seal. (See Pump Section)
E. A solid fill plug in reservoir with no vent.
F. Oil that is too thick or contaminated with water.
G. Occasionally a pump will not prime itself because a check valve spring in the high pressure port is too "stiff" or the spring retainer is turned down too far. If this condition is encountered, loosen the spring retainer (It is found in the 3/8 high pressure outlet port on the face end of the valve assembly). Energize the pump to prime it, and then turn the retainer back to the correct depth. (See Section on Check Valves)

SECTION 4

FILTERS
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1. Suction Filters

The Sno-Way Monarch hydraulic pump has suction filters which must be cleaned periodically or whenever flow is slow or sluggish. Some filters can be washed in cleaning solvent and blown dry with compressed air. Those which cannot be cleaned properly should be replaced.

2. Additional System Filters

The M-683 series models also have port and cartridge filters. The port filters are located just below the surface in each outlet port with the stamped markings (C1, C2, C3). To clean or replace proceed as follows:

Continue on next page

A. Remove the fittings and hoses from the valve body.
B. Remove the filter retainer screws with a 1/4" Allen key.
C. Remove and clean or replace filters as required.
D. Reassemble in reverse order.

NOTE: Do not use Teflon tape on hydraulic fittings as it can easily jam valves and plug the filters in the system. Use Locktite pipe thread sealant.

SECTION 5

ELECTRICAL PROBLEMS

WARNING: REMOVE ALL RINGS, WATCHES, ETC. PRIOR TO DOING ANY ELECTRICAL WORK.

1. Low Voltage

Operating direct current (D.C.) power units efficiently requires proper voltage. Any attempt to operate below the minimum required voltage could cause system failure.

A. Signals which point to low voltages are:

1. Motor running at reduced speed.
2. Solenoid valves not shifting.

B. Minimum acceptable voltage readings are as follows:

1. The minimum voltage between the motor stud and ground is 8.0 volts at maximum load conditions. (1750-1800 P.S.I.)
2. The minimum voltage between the valve solenoid power wire ("hot wire") and ground is 8.0 volts at maximum load conditions.

C. Causes for low voltage are:

1. Battery capacity too small.
2. Cable ends not electrically secure to battery cable.
3. Bad joints where cable ends are bolted to battery, motor solenoid, starter switch, ground etc.

D. Check for low voltage as follow: (A volt meter will be required).

Continue on next page

1. On vehicles equipped with an alternator, the voltage should be approximately 13.5 volts with no electrical accessories operating and the engine running. Check it.
2. Operate pump unit under maximum conditions. This would be either under full load or when pump is running over relief (cylinder dead headed). Use the volt meter to probe each connection, cable end, and cable from the battery all the way back to the motor stud and note the voltage losses. Make the necessary repairs. Increase the voltage to a level above the minimum required.

NOTE: Check the ground side as well. Paint, rust, and dirt are insulators, remove them.

2. Electric Motor

Motors should be serviced periodically to insure good performance. Service as follows:

A. Remove head assembly from motor.
B. Check sleeve bearing in head assembly for wear.
C. Place a few drops of oil on sleeve bearing in head assembly.
D. Check brush set for wear, and replace if necessary.
E. Blow dirt and dust out of motor housing and check for shorts, burnt wires, or open circuits in the field coil assembly.
F. Check armature and commutator for shorts or open circuits.
G. Check ball bearing on motor shaft. A growling motor can be caused by bad bearings. (4 1/2" dia. motor)
H. Check for excessive "end play" of armature and add thrust washers as required.
I. If there is an excessive amount of water, condensation or rust in the motor, a small drain hole may be drilled in the motor case on the low side of the motor. Consult with factory for additional information.

NOTE: A motor that does not turn in freezing weather could be caused by water that has frozen inside the housing.

J. All Sno-Way Monarch D.C. motors turn counterclockwise when viewed from drive end -- check it when replacing motor with new one.
K. If motor fails to turn the pump, check the pump by turning drive shaft by hand -- it may be "set up." (See Pump Section)

3. Electrical Switches

Defective switches are a common cause of electrical malfunction. What seems to be a serious system defect can often be caused simply by a faulty switch, especially where the switch controls two functions, what is: start the motor, and shift a valve.

Continue on next page

In such cases, one half of the switch might be defective while the other half operates correctly; therefore the fault appears to be with some other component.

Troubleshooting can be done by any one of three methods:

1. Use a "continuity light" to test switch. (See Test Equipment Section)
2. Use a circuit "test light" to test switch. (See Equipment Section)
3. Remove the wires from the switch and "touch" them together in the proper order to operate system.

4. Motor Start Solenoid Switches

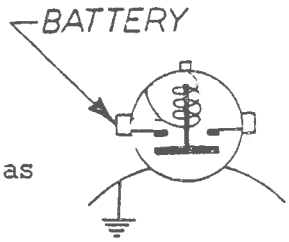

FIG. 1

Found on Sno-Way Monarch systems are one of the following two types:
3-Post Solenoid Switch (See Fig. 1)

A. The three post solenoid switch is wired and constructed as follows:

1. The large post marked "Bat" must be attached to the cable leading from the battery.
2. The small post connects to the control circuit. (toggle switch)
3. The remaining large post attaches to cable leading from the motor.

NOTE: Do not attach motor cable to post marked "Bat" as solenoid will not operate properly.

4. Internally, the coil is constructed with one end connected to the can, (or body of the switch) and the other end to the small center top post. The solenoid switch is energized by sending positive current to the small post; switch in turn closes the main contacts and starts the motor.

B. Testing for a faulty solenoid switch:

When testing, use an ohm meter, continuity light, or test light, and check all functions as described above. (See Test Equipment Section)

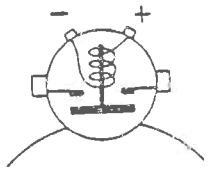

FIG. 2

4-Post Solenoid Switch (See Fig. 2)

A. The four post solenoid switch is constructed as follows:

1. One large switch post is connected to the battery cable. (Either one)
2. The remaining large post is connected to the motor cable.

Continue on next page

3. The 2 small posts are connected to the coil, one post to each end. To energize the coil, one lead has to be positive and the other end negative.

B. Testing for a faulty solenoid switch:

When testing use an ohm meter, continuity light, or test light, and check all connections as described above. (See Test Equipment Section)

5. Shorts and "Open" Circuits

In control wiring, shorts can only occur when "hot" lines (lines connected directly to the battery) come in contact with ground. A short will either cause a fuse to blow, (if there is one), or burn the wire off at its weakest point. Likely spots for shorts are switches, electrical strain reliefs, electrical junction plugs and control cord that has been pinched or cut.

An "open" circuit is simply a break which prohibits current flow. Likely spots for "open" circuits are the same as shorts -- See above.

6. Holding Coils

Coils are used in solenoid operated valves and solenoid start switches. Failures can be caused by vibration, water, improper voltage or corrosion. The best way to test a coil is with an ohm meter. The meter should read some value of ohms and an infinite reading means that the coil has an "open circuit".

SECTION 6

RELIEF VALVES

1. The Purpose of a Relief Valve is to:

A. Limit the maximum pressure in the system to safe level.
B. Keep the amperage draw and battery drain at a minimum when the cylinder "dead heads" (reaches full stroke).

Continue on next page

2. Internal Relief Valve (Gear Pump Section)

An "internal" cavity is drilled into the pump base into which the following parts are inserted to make up the relief valve assembly. (See item #19 pump parts breakdown)

A. Ball or cone
B. Heavy spring
C. Adjusting screw

3. Diagnosing and Repairing Internal Relief Valve (Gear Pump Section)

IMPORTANT NOTE: 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).

A. Relief valve pressure too high
Symptoms:

1. Amperage draw and battery drain is excessive when system is "dead headed."
2. Motor RPM is slow in comparison to full load system operation.

B. Relief valve pressure too low
Symptoms:

1. Motor RPM is "faster" than normal.
2. Lift cylinder will not extend, plow will not lift.
3. Excessive turbulence in the reservoir.

C. Repair procedure

NOTE: On the "internal" relief valve, the flush 1/4" pipe plug will have to be removed to reach the adjusting screw (See label on gear pump section of hydraulic pump).

Using a flat head screw driver, turn relief valve adjusting screw counterclockwise using a gauge (tee'd into the C3 pressure line) to record the proper pressure setting at 1750-1800 P.S.I.

There are two possible causes for lack of pressure.

1. The adjusting screw has backed up.
2. Foreign matter or "dirt" is trapped between the seat and the ball or cone.

Continue on next page

Repairs as follows:

Using a gauge (tee'd into the lift circuit (C3) pressure line) turn the adjusting screw clockwise a turn or two and watch the gauge; if it goes up, continue to turn the screw until 1750-1800 P.S.I. is reached. If the screw does not remain in the correct position replace it with one that has a locking patch. (In an emergency, the screw threads can be deformed slightly with a small prick punch and hammer to hold the setting).

If the pressure does not climb when the adjusting screw is tightened; turn the adjusting screw counterclockwise all the way out; energize the pump to "flush" the dirt past the seat; (Caution: use hand or a piece of hose to divert oil into a container. Do not look into the port).

Inspect the cone or ball for nicks and replace if necessary; reseat the ball or cone using a small drift punch and hammer with a light tap; reinstall spring and screw and reset the pressure.

NOTE: In an emergency, if a pressure gauge is not available, turn the relief valve screw in until the cylinder moves under worst conditions and then tighten 1/2 to 3/4 additional turns clockwise.

If the above mentioned procedure fails to increase the relief valve setting, check for a worn pump (See Pump Section) or leaking cylinder (See Cylinder Section).

NOTE: Do not use Teflon tape on hydraulic fittings as it can easily jam valves and plug the filters in the system. Use Locktite pipe thread sealant.

4. External Relief Valves (Override Angle Relief)

The relief valves mounted outside the valve body of the pump are called an external style (in line) Item #1 pump parts break-valve assembly. It is made up of the following parts:

A. Ball or cone
B. Heavy spring
C. Adjusting screw
D. Housing - (hex-shaped)

Diagnosing and repairing angle override relief valve:

A. Override relief valve pressure set too low
Symptoms:

1. Angle cylinders will not hold plow in straight position.

Continue on next page

2. When a light load is applied to opposite end of angled position, blade releases and will not hold desired angle position.

B. Repair procedure
There are two possible causes for lack of pressure hold.

1. The adjusting screw has backed up.
2. Foreign matter or "dirt" is trapped between the seat and the ball or cone.

Repair as follows:

Loosen the hex head jam nut, and turn adjusting screw with 1/4" Allen key clockwise 1 turn. Lock the jam nut and plow to see if the "hold" position has been obtained.

If the plow does not hold when the adjusting screw is tightened, turn the adjusting screw counterclockwise all the way out; energize the pump to "flush" the dirt past the seat; (Caution: use hand or a piece of hose to divert oil into a container. (Do not look into the port).

Inspect the cone or ball for nicks and replace if necessary; reseat the ball or cone using a small drift punch and hammer with a light tap; reinstall spring and screw and reset the pressure.

IMPORTANT: You want the "hold" position to release when heavy loads of snow are applied to blade ends. Setting over-ride relief to high will cause structural damage to both snowplow and vehicle. The override relief setting should not exceed 1750 P.S.I..

SECTION 7

CHECK VALVES
---

1. Purpose

The purpose of a check valve is to allow free flow in one direction but block reverse flow. A ball type check valve is made up of the following:

A. Ball
B. Light spring
C. Spring retainer

A cavity is drilled in the valve assembly of the pump into which the parts are assembled (Inside 3/8" pipe port cavity). Item #20 pump parts breakdown - valve assembly.

Continue on next page

2. Troubleshooting And Repairing Check Valve Failures

A. Load drift failure
Symptoms:

In most cases a check valve will fail such that the blade will drift or angle when the unit is in the "hold" position.

NOTE: Check cylinder for leakage past piston seals (See Cylinder Section). A bad piston seal will give the same symptom.

B. Repair procedure

1. Remove the spring retainer.

NOTE: Measure the depth of retainer so it can be reassembled to the same depth after repair.

2. Remove spring.
3. Remove ball or poppet.
4. Start pump to "flush" dirt from seat area. (Caution: use hand or a piece of hose to divert oil into a container -- Do not look into the port).
5. Inspect ball for damage and replace if necessary.
6. Reinstall ball.
7. "Seat" the ball using a small drift punch and hammer with a light tap.
8. Reinstall the spring.
9. Replace the spring retainer to the correct depth notated in step 1.

C. Blocked flow failure
Symptoms:

Once in a while a ball type check valve will restrict flow to the point where the spring will collapse and the flow will be greatly reduced (even blocked) causing flow over relief.

D. Repair Procedure

1. Remove the check valve components and replace the spring.
2. If the problem persists replace the ball check valve.

NOTE: Do not use Teflon tape on hydraulic fittings as it can easily jam valves and plug the filters in the system. Use Locktite pipe thread sealant.

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SECTION 8

DIRECTIONAL CONTROL VALVES

1. Cartridge D.R. Style Valve (Two Way - Two Position)

Two styles of solenoid operated valves are used on the Sno-Way/Monarch hydraulic pump.

Two 2-way position valves. (A) left turn, (C) up, (B) down on hydraulic schematic. Items 9 & 5 on pump parts breakdown - valve assembly.

These valves allow free flow in one direction (from the bottom port to the side ports) at all times and a checked flow in the opposite direction until the solenoid coil is energized.

2. Troubleshoot and repair as follows:

If the valve does not shift, check for and repair the following:

A. The valve "hot" wire. (See Section on "Open" Circuits.)
B. The valve ground wire. (See Section on "Open" Circuits.)
C. The switch controlling the valve. (See Section on Electrical Switches.)
D. Low voltage (See Section on Low Voltage.)
E. The solenoid coil. (See Section on Solenoid Coils.)
F. Dirt in the valve cartridge. This can be checked by energizing the valve without starting the motor and listening for the valve to shift (A definite "click" is heard when the coil is energized). If the valve does not shift, remove the cartridge from the valve body. Blow compressed air through the cartridge, in both directions, while holding the plunger off its seat (Use a blunt object inserted through bottom of cartridge). It will help to have the "body" filter removed.

NOTE: The cartridge itself cannot be disassembled in the field, as the proper tolerances cannot be duplicated. If the dirt cannot be removed, the cartridge will have to be replaced.

3. Cartridge D.R. Valve (Four 2-Way Position Valve)

(D) right turn, in hydraulic schematic. Item #13 on pump parts breakdown - valve assembly.

In the unshifted position, oil in these valves flows directly from the pressure port to one cylinder port, while the other cylinder port returns oil to the reservoir port. In the shifted position (coil is energized) the cylinder port that received oil originally returns to the reservoir port, while the other cylinder port is connected to the pressure port.

Continue on next page

4. Troubleshoot and Repair

If the valve does not shift, check for and repair the following:

A. The valve "hot" wire. (See Section on Open Circuits.)
B. The valve ground wire. (See Section on Open Circuits.)
C. The switch controlling the valve. (See Section on Electrical Switches.)
D. Low voltage. (See Section on Low Voltage.)
E. The solenoid coil. (See Section on Solenoid Coils.)
F. Dirt in the valve cartridge. This can be checked by energizing the valve without starting the motor and listening for the "valve shift". If it cannot be heard, remove the cartridge from the valve body. Blow compressed air through all parts to dislodge dirt. If it cannot be removed, disassemble the valve by removing the retaining ring at the base of the valve "tower" and pull the cartridge apart. Clean all parts in solvent, blow dry, lubricate and reassemble.

If the valve does not return to the "neutral" or unshifted position, check for and repair the following:

A. The ground wire for a "ground fault". This can be done by removing the "hot" line from the motor start solenoid switch post marked "Bat" and striking it against the post watching for a small arc; if it arcs there is a ground fault. (See Section on Ground Faults).

B. Dirt in the valve cartridge. (This can be done in the same manner as 1-f above.)

SECTION 9

HYDRAULIC CYLINDERS
---

1. Diagnosing and Troubleshooting

A. Single Acting (Lift and angle cylinders)

1. Most failures are caused by one of the following reasons:

A. Excessive side load
B. Stroking the rod to full extension

2. Excessive side load can be diagnosed by observing the following:

A. Cracked gland nut
B. Gouged rod
C. A cocked or bent rod that will not retract back into the tube.

Continue on next page

3. Over stroking can be diagnosed by observing the following:

    A. Premature leakage past the V-rings.
    B. System filters that become prematurely clogged with pieces of rubber due to V-ring crushing. (See Section on Filters.)

2. Repairing Hydraulic Cylinders

A. Remove cylinder from the snow plow, disconnect hose line(s) and drain oil.
B. Remove gland nut, rod, spreader and packing assembly from the tube assembly.
C. Clean internal tube and inspect chrome rod for gouges, scratches, or wear. Replace if necessary.
D. Place chrome rod back into tube assembly.
E. Insert steel spreader.
F. Grease the V-ring set on the inside and outside diameters.
G. Reinstall one V-ring at a time making sure each V-ring lies flat on the ring prior to it.
H. Replace the gland nut complete with a new wiper ring if worn and thread it down until it makes contact with the V-ring then tighten an additional 1-1/2 to 2 turns. The distance between top of threaded collar and the bottom of large section on gland nut should be 5/16" to 1/4". Do not over tighten.

NOTE: If it is possible to stroke the cylinder after repair, turn gland nut until it contacts V-rings, stroke the cylinder to allow rings to seat and align, then retighten as described above.

QUICK REFERENCE TROUBLE SHOOTING GUIDE

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Plow lifts slowly Elec. motor runs	1. Low fluid level	Add snoil hydraulic fluid per "Maintenance Instructions"
	2. Low voltage to elec. motor	Clean electrical connections, check battery (see T/S Sec. 5)
	3. Gear pump relief valve setting to low	Perform adjustment item #19 pump parts breakdown (also see T/S Sec. 3)
	4. Pump C3 port filter or gear pump suction filter plugged	Clean or replace item #19 "Valve Assy." item #33 pump parts breakdown (see also T/S Sec. 4)
	5. Deteriorated hydraulic fluid	Change hydraulic fluid per "Maintenance Instructions"
	6. Worn gear pump	Replace gear pump item #16 pump parts breakdown (See also T/S Sec. 3)
Plow does not lift No pressure at C3 pump port. Elec. motor runs	1. Low fluid level	Add snoil hydraulic fluid per "maintenance instructions"
	2. Low voltage to elec.	Clean electrical connections-check battery See T/S Sec. 5
	3. Defective up-down switch not directing current to (C) up valve in pump.	Replace switch (See T/S Sec. 5)
	4. "Open" circuit in wiring system (blue wire)	Locate "open" circuit and repair (See T/S Sec. 5)
	5. Gear pump relief valve setting to low	Perform adjustment or replace relief valve (See T/S Sec. 6)
	6. Pump C3 port filter or gear pump suction filter plugged	Clean or replace filter (See section 4)
	7. Defective holding coil on (C) up valve	Replace coil (See T/S Sec. 5)
	8. Defective (C) up valve Stuck closed	Clean or replace valve (See T/S Sec. 8)
	9. Defective (B) down valve-stuck open	Clean or replace valve (See T/S Sec. 8)
	10. Defective (D) right valve-stuck open	Clean or replace valve (See T/S Sec. 8)

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Plow raises but creeps down	1. Defective/leaking check valve	Clean or replace check valve (See T/S guide Sec. 7)
	2. Defective (B) down valve-partial stuck	Clean or replace valve (See T/S Sec. 8)
	3. Leaking seal on lift-cylinder	Install new seal kit (See T/S Sec. 9)
Plow does not angle left/elec. motor runs	1. Low fluid level	Add snoil hydraulic fluid per "Maintenance Instructions"
	2. Low voltage to elec. motor	Clean motor elec. connections, check battery (See T/S Sec. 5)
	3. Defective left/right switch not directing current to (A) right valve in pump.	Replace switch (See T/S Sec. 5)
	4. "Open" circuit in wiring system (red wire)	Locate open circuit (See T/S Sec. 5)
	5. Defective (A) holding coil on (A) right valve	Replace coil (See T/S Sec. 5)
	6. Defective (A) right valve-stuck closed	Clean or replace valve (See T/S Sec. 8)
	7. Defective (D) left valve-stuck open	Clean or replace valve (See T/S Sec. 8)
	8. Angle cross-over relief leaking or stuck open	Clean or replace cross-over relief (See T/S Sec. 6)
Plow does not angle right/elec. motor runs	1. Low fluid level	Add snoil hydraulic fluid per "Maintenance Instructions"
	2. Low voltage to elec. motor	Clean electrical connection, check battery (See T/S Sec. 5)
	3. Left-right switch not directing current to (D) left valve in pump	Replace switch (See T/S Sec. 5)
	4. "Open" circuit in wiring system (green wire)	Locate "open" circuit and repair (See T/S Sec. 5)

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Plow does not angle right/elec. motor runs (CON'T)	5. Defective (D) holding coil on (D) left valve	Repair holding coil (See T/S Sec. 5)
	6. Defective (D) left valve, stuck open	Clean or replace valve (See T/S Sec. 8)
	7. Angle cross-over relief leaking or stuck open	Clean or replace cross-over relief (See T/S Sec. 6)
Plow will not hold angled position	1. Leaking cross-over relief valves	Clean or replace cross-over relief (See T/S Sec. 6)
	2. Improper cross-over relief valve setting	Adjust cross-over relief (See T/S Sec. 6)
	3. Leaking or open angle circuit check valve	Clean or replace check valve (See T/S Sec. 7)
Plow does not lower	1. Defective up-down switch not directing current to (B) down valve in pump	Replace switch (See T/S Sec. 5)
	2. "Open" circuit in wiring system (yellow wire)	Locate and repair "open" circuit (See T/S Sec. 5)
	3. Defective (B) holding coil on (B) down valve	Replace holding coil (See T/S Sec. 5)
	4. Defective (B) down valve, stuck closed	Clean or replace valve (See T/S Sec. 8)
Elec. motor does not run	1. Low voltage to elec. motor	Clean elec. connection, check battery (See T/S Sec. 5)
	2. Defective up-down or left-right switch not directing current to start solenoid switch	Replace switch (See T/S Sec. 5)
	3. "Open" circuit in wiring system (brown wire)	Locate and repair "open" circuit (See T/S Sec. 5)
	4. Defective start solenoid switch	Replace start solenoids switch (See T/S Sec. 5)
	5. Defective Electric	Replace Motor (See T/S Sec. 5)

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Elec. motor does not shut off	1. Up-left,right positions on rocker switch stuck in ON position	Replace switch (See T/S Sec. 5)
	2. Defective start solenoid switch stuck in ON position	Replace start solenoid switch (See T/S Sec. 5)

SNO-WAY PLOWS
LIMITED ONE-YEAR WARRANTY

Sno-Way guarantees to the original retail purchaser for a period of one (1) year from the date of delivery from an authorized Sno-Way dealer that your new Sno-Way Plow is free from defects in materials and workmanship. (Sno-Way Plows used by a dealer as a demonstrator shall be warranted only for the period of one (1) year from the date of delivery to said dealer and the first subsequent purchaser shall be entitled to the remaining warranty protection.) To validate this warranty, you or your dealer must complete the enclosed Warranty Registration Card and return it to your authorized Sno-Way distributor (whose name must be obtained from your authorized dealer) within ten (10) days following delivery of your new Plow.

To obtain warranty service, promptly return your Plow or any defective part at your expense to any authorized Sno-Way dealer during the warranty period. Replacement or repair of defective or inadequate parts shall be performed without charge for labor or material by such dealer at his regular place of business after inspection and determination that the warranty applies.

This warranty and any implied warranty shall not apply to any Plow which has been abused, misused or improperly installed or maintained. To the fullest extent allowed by law, **SNO-WAY SHALL NOT BE LIABLE FOR LOSS OF USE, INCONVENIENCE OR ANY OTHER INCIDENTAL, INDIRECT, CONSEQUENTIAL OR SPECIAL DAMAGES.** There is no other express warranty on your Sno-Way Plow. **ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS IS LIMITED TO THE ONE YEAR DURATION OF THIS LIMITED WARRANTY.** Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

SNO-WAY PLOWS INTERNATIONAL

SNO-WAY™ PLOWS WORLD WIDE PATENT PENDING

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