

**Arctic Equipment Manufacturing Corporation**  
M683 Hydraulic Power Unit

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# M683

**Note:** This unit will not fit under hood of most new vehicles.

\*M683 will fit in the M3593 box shown on page for **Hi Mount Mounting Plate Kit**.



## **GENERAL INFORMATION**

The Monarch "Dyna-Ramic" Model M-683 series power units are specially designed for the snow plow application. These units have a 3-way/4-way (single/double acting) function incorporating internal solenoid valving for maximum protection and efficiency.

## **WARRANTY IDENTIFICATION**

For purposes of warranty consideration, it is necessary to record the serial number of the power unit. This serial number is displayed on a label affixed to the reservoir section of the power unit. Serial numbers prefixed by the letter "F" were built after August 1, 1986.

## **MOTOR IDENTIFICATION**

Should a motor replacement become necessary at some point, it is recommended that the same motor be used in order to ensure optimum performance. If a substitution is desired, it is recommended that you consult with the factory.

Older M-683 models will be equipped with 4.5" diameter motors bearing the Prestolite part number MHN-4001. This motor was subsequently used and identified with the Monarch part number 8080. The MHN motor can be readily identified by its one piece cast iron body with stamped metal end cap.

Subsequent versions of the M-683 have incorporated the "belly band" 2 piece body version of the 8111 motor, the 8112 motor which can be identified by its one piece ribbed body construction and the latest "one piece body" version of the 8111 motor incorporating an aluminum end cap.

In addition to the 4.5" diameter motors, a small number of M-683's were equipped with 3" diameter motors. These types are generally found on earlier Arctic-X snow plows.

## **GENERAL MAINTENANCE**

Under normal operating conditions, the M-683 should not require servicing during the plowing season, provided periodic post season maintenance has been carried out.

## **POST SEASON MAINTENANCE**

It is recommended that after the first season or 100 hours, whichever comes first, the hydraulic fluid be changed. This may require the removal of the unit from under the hood. The

replacement fluid recommended is "DEXTRON" automatic transmission fluid. If unit is not under the hood (mounted out front on lift frame J13 (UNIVIS HVI13 is recommended.

Subsequent oil changes may be carried out at less frequent intervals. The recommended time period is 200 hours or bi-seasonal. Care should be taken that with the lift cylinder fully retracted, the oil level in the reservoir is to within 1/2" of the top.

When draining the hydraulic fluid, the hoses at the cylinders should be disconnected and drained. With the hoses disconnected, the cylinders should be collapsed.

When refilling the system, it is recommended that the hoses and cylinders be bled by loosening the hydraulic fittings at the cylinders until they leak. Power angle plow repeatedly from side to side until fluid flows steadily from leaking fittings. **Care should be taken in maintaining the fluid level in the reservoir during this operation.**

When the hydraulic fluid is changed, the port filters in the M-683 should be cleaned. These filters are retained in each of the outlet ports in the manifold by 1/4" allen retaining screws. The screens on the internal solenoid valves are generally not cleaned until and unless the valve module has to be removed for major servicing. Oil changes as recommended should prevent the silting of these screens, under normal conditions.

## **ELECTRICAL SYSTEM**

Frequently problems develop due to an undersized electrical charging and storage system. Generally, the heavier the usage, the heavier the system. For a moderately light duty, the battery should not be less than 70 ampere-hours and the alternator should charge at a rate of not less than 60 amperes. For heavy usage and in the case where a number of other devices are run off the battery simultaneously, heavier ratings are strongly recommended.

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

## **OTHER PROTECTION**

When the hydraulic system is not used for an extended period of time such as in the off season, all exposed chrome rod surfaces should be coated with an axle grease.

## **DYNARAMIC —683 COMPONENTS**

Four 12 volt DC, 4.5" diameter motors have been used over time. Physically all are interchangeable, however since the original motors were matched with certain pump sizes,

optimum performance is achieved only if motors are replaced with the identical part number. All 4.5" motors are electromagnetic series wound.

#### **MHN-4001 / MONARCH 8080 MOTOR**

This motor was the only one used on all Dyanramic models up to 1983. It is a four pole electromagnetic motor consisting primarily of an armature/commutator, four field coils, four pole pieces, four brushes in a brush holder set, and a one piece steel frame. This motor can be used with either a negative ground or positive ground electrical system.

Power units with this motor will generally be equipped with pump number 51, although pump number 05 was also used on a more limited basis.

#### **MONARCH 8111 MOTOR**

This motor was used extensively on the Dynaramic series in 1984 and 1985. It is a four pole electromagnetic motor consisting of an armature/commutator, two field coils, four pole pieces, four brushes in a brush holder set, and a two piece steel frame consisting of a tube and belly band. This motor can also be used with both negative and positive ground systems.

Power units with this motor are equipped with both pumps 03 and 51, with the former offering the most optimum performance.

#### **MONARCH 8112 MOTOR**

This motor was introduced on Dynaramic power units in 1986. It is identical in construction to the 8080 with the physical difference being in the ribbed appearance of the one piece frame. The performance of the motors are not identical however, and for this reason all M-683's with the 8112 motor will have the 03 pump.

As with the 8080 and 8111 motors, the 8112 is compatible with both positive and negative ground systems.

#### **MONARCH 8111 - ONE PIECE FRAME MOTOR**

This motor replaces the earlier version of the 8111 motor and differs only in appearance of the frame and end cap. Its performance and usage specifications are the same as that of the earlier version of this motor.

#### **MONARCH 8110 - 3' DIAMETER MOTOR**

In addition to the 4.5" diameter motors, a small number of M-683's were built with a 3" motor with the Monarch part number 8110. This motor consists of a 3" diameter steel frame, an armature/commutator, brushes and four ceramic permanent magnet fields. These motors cannot be used on vehicles with positive grounds.

## **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 unmesh, 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.

## **PRESSURE RELIEF VALVE**

The basic pressure relief valve consists of a poppet or ball, a retaining spring and a seat. The poppet or ball is exposed to the pressure in the outlet line from the pump. This pressure acting on the exposed area of the poppet, causes a force on the retaining spring. When the pressure is such that the force on the poppet or ball exceeds the force in the spring (due to a preset amount of compression) the poppet or ball lifts off the seat and the fluid from the outlet of the pump is allowed to flow back to the reservoir. In some systems the fluid is allowed to flow back to the suction line. The "standard setting" for the M-683 is 2000 psi.

## **SOLENOID VALVES**

The M-683 Dyanramic circuit contains 4 solenoid valves. These are identified as "A", "B", "C", and "D".

Solenoid valves "A" and "B" are 2 way / 2 position normally closed poppet (check) type valves. The "C" valve is also a 2 way / 2 position normally closed valve but is of a spool type construction. The "D" valve is a 4 way / 2 position valve also of a spool type construction.

A basic solenoid valve consists of a valve cartridge and a coil.

The valve cartridge is comprised of an armature attached to a valve mechanism. This armature is controlled electrically by way of a coil. The cartridge screws into a modular valve manifold.

The coil consists of a certain length of wire wrapped around a spool and often surrounded by a metal can. When current is put through the coil, magnetic forces are set up causing the armature to be pulled further into the coil. The armature pulls a poppet or spool into its energized position. A coil spring is compressed in this position, hence when the current ceases and the magnetic field has collapsed, this spring pushes the armature back to its de-energized (normal) position.

### **SOLENOID VALVE "A"**

Valve "A" is a 2 way / 2 position poppet valve which is closed in the non-energized position. When the plow is angled by extending the cylinder connected to C1, the cylinder connected to C2 must be allowed to retract. This is accomplished by opening solenoid valve "A".

In its normal de-energized position, valve "A" acts as a check valve preventing the cylinder connected to C2 from collapsing when forces are placed upon it during the plowing operation.

### **SOLENOID VALVE "B"**

Valve "B" is identical to valve "A". Its purpose in the circuit is to check the oil from the lift cylinder thereby holding the plow up when not in use. To lower the plow, this valve must be energized to the open position. This allows fluid from the lift cylinder to return to the reservoir.

Valve "B" is also energized while plowing snow. In this manner the plow is allowed to "float" and follow the contour of the ground.

### **SOLENOID VALVE "C"**

The "C" valve is a 2 way / 2 position poppet valve. In the normal or de-energized position it is closed, allowing no flow in any direction. In the M-683 circuit it functions as a selector valve (in combination with valve "A").

In the de-energized state valve "C" prevents fluid from entering the lift circuit while the angling side is being operated. When valve "C" is energized and with valve "A" being normally closed, fluid flows to the lift circuit and will cause the lift cylinder to extend. Note that valve "B" is also normally closed.

### **SOLENOID VALVE "D"**

Solenoid valve "D" is a 4 way / 2 position spool valve. In its normal position, pressurized pump flow is directed through the valve to C1 allowing this cylinder to extend. Valve "A" must be

energized simultaneously thereby allowing fluid from C2 to be returned through it and valve "D" and thence to the reservoir.

When valve "D" is energized, pressurized fluid flows through valve "A" to the C2 cylinder causing it to extend. Note that valve "A" is not energized as its poppet check type construction does not allow flow in one direction, as would be the case with a check valve.

Return flow from C1 passes through a pilot operated check valve and valve "D" back to reservoir.

## **CHECK VALVES**

The M683 incorporates one check valve and one pilot operated check valve.

### **CHECK VALVE**

A simple check valve allows fluid to flow in one direction only. No fluid can pass through in the opposite direction only. A simple check valve is located between the "C" solenoid valve and port C3. Fluid can flow from the pump through the check valve into the lift cylinder, however no flow can occur from the lift cylinder back through this valve.

### **PILOT OPERATED CHECK VALVE**

A pilot operated check valve (p.o. check valve) allows flow in one direction. The flow path in the opposite direction is closed or checked. This opposite flow path however can be opened by way of pilot pressure. When the checked flow path is opened, pilot pressure acts on top of a piston which has a pin connected to it at the opposite end. The pressure moves the piston causing the pin to make contact with and unseat the ball of the check valve. In this manner flow can occur through the checked position. The M-683 has a p.o. check valve located between solenoid valve "D" and angling port C1. The return flow from C2 does not involve the operation of the p.o. check valve. When C2 is extended, the return flow from C1 must pass through the p.o. check valve. As pressurized fluid is fed to C2, a pilot pressure line to the top of the piston of the p.o. check valve opens the check valve and allows return flow from C1 back to the reservoir.

## **CROSSOVER RELIEF VALVES**

The modular valve body of the M-683 has built into it two cross over relief valves which, when activated, bleed fluid from C1 to C2 or vice versa. The cross over relief valves are similar in construction to a regular direct acting relief valve. They are there to help protect the valving in the power pack as well as allowing for the absorption of all but the most severe impact forces



that may occur during the plowing operation. In this manner both the angling cylinders, the plow frame and the truck frame are protected from the normal impact forces associated with plowing. The cross over relief valves are adjustable and are normally set at about 2500 psi.

## **CONTROL SWITCHES**

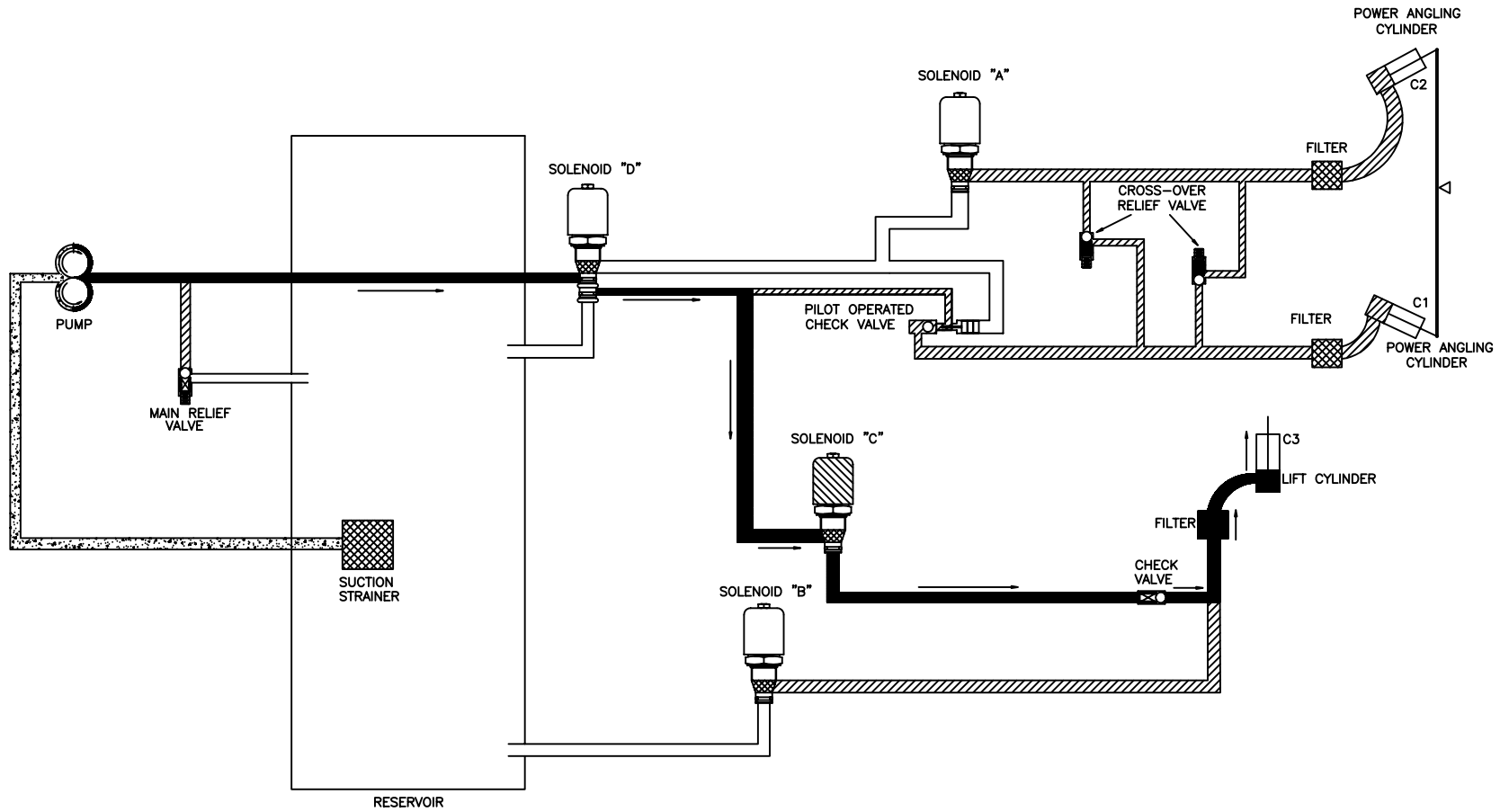
The M-683 uses two rocker switches mounted in a control station. Later models also have a pressure release switch mounted in the top of the control station.






The rocker switches are both 3 position with only the down position on the up/down switch not being spring returned.

Then the plow is raised, the switch permits current to the C-valve as well as the motor solenoid. When the plow is lowered or in the float position, only the B-valve sees current.

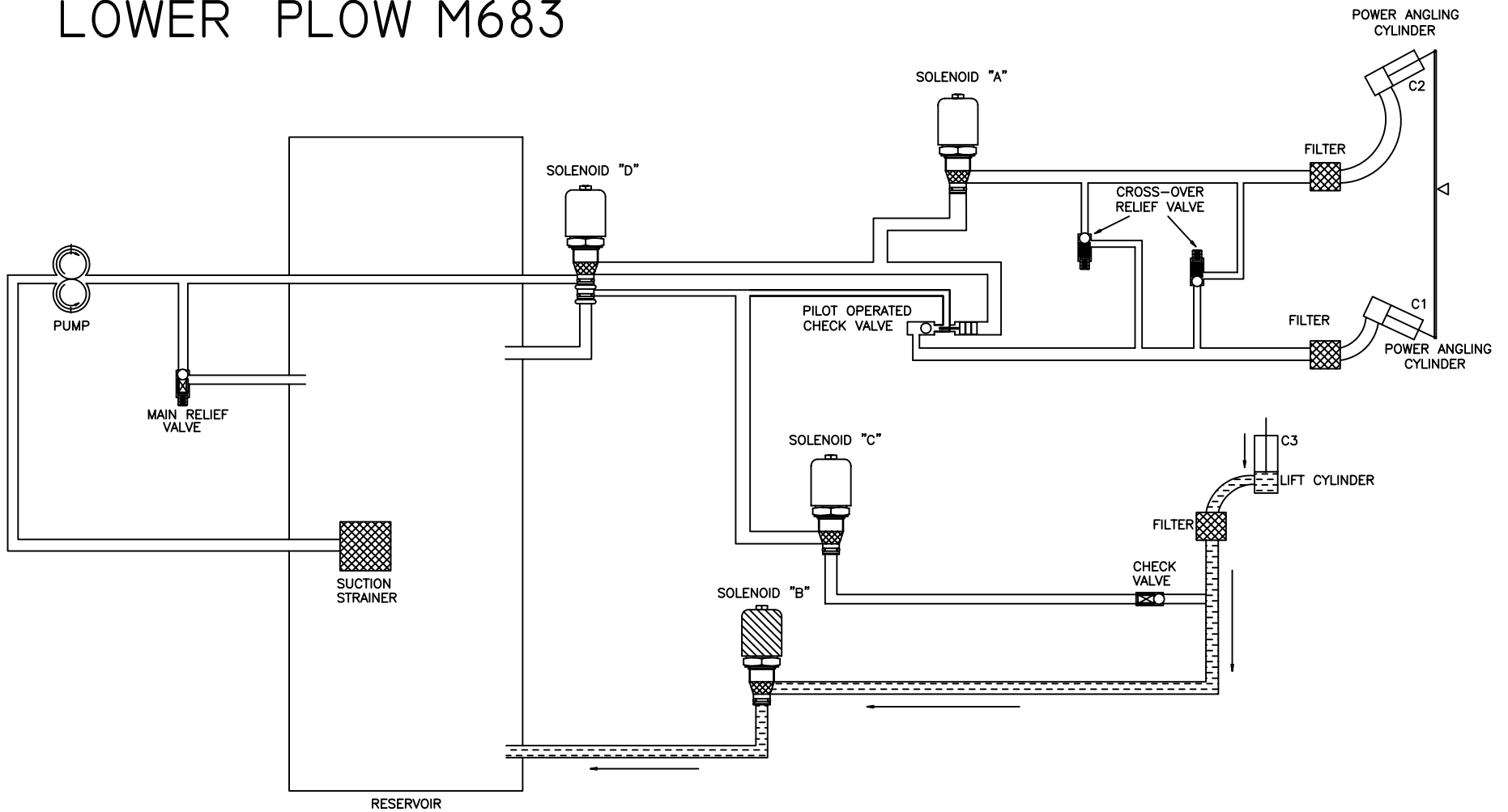
For angling to the right, C1 is extended. The angling switch then permits current to flow to valve A and the motor start solenoid. For angling left requiring the extension of C2, current flows through the D-valve and the motor start solenoid.






# RAISE PLOW M683



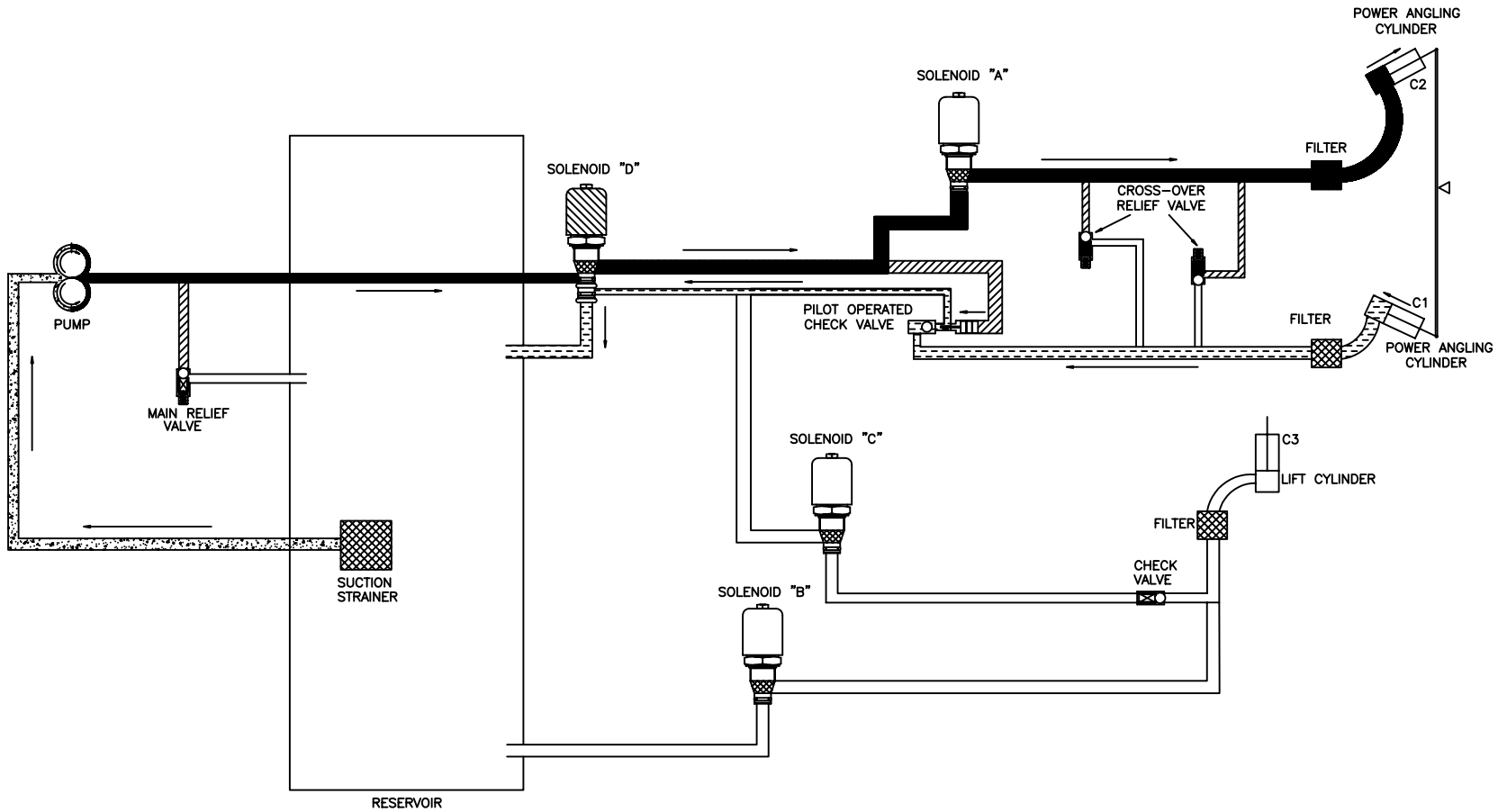
-  PRESSURIZED FLOW
-  RETURN FLOW
-  PRESSURIZED FLUID (STATIC)
-  ENERGIZED SOLENOID
-  INTAKE FLOW






# LOWER FLOW M683



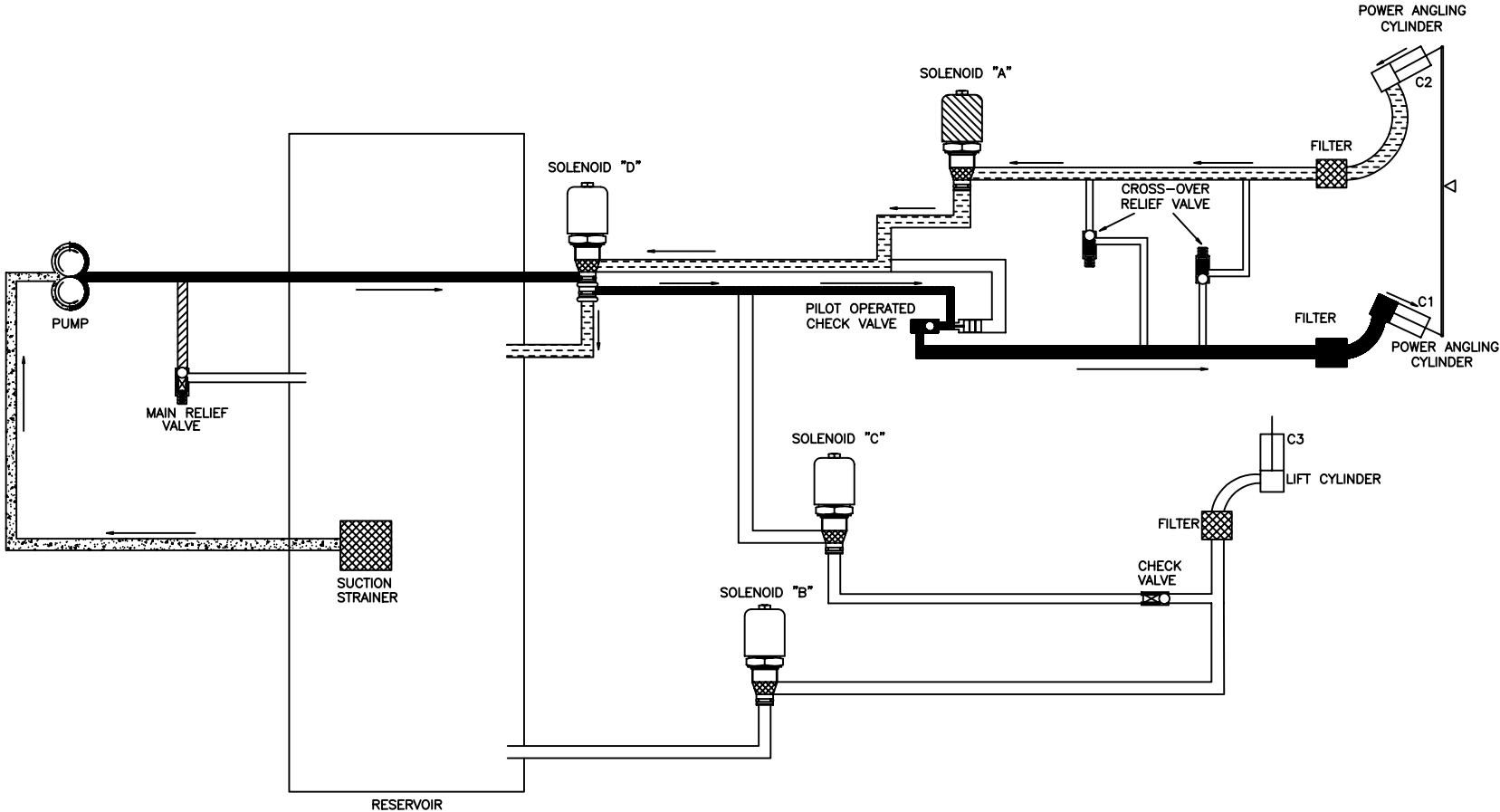
-  PRESSURIZED FLOW
-  RETURN FLOW
-  PRESSURIZED FLUID (STATIC)
-  ENERGIZED SOLENOID
-  INTAKE FLOW






# EXTEND C2 (ANGLE RIGHT) M683



-  PRESSURIZED FLOW
-  RETURN FLOW
-  PRESSURIZED FLUID (STATIC)
-  ENERGIZED SOLENOID
-  INTAKE FLOW

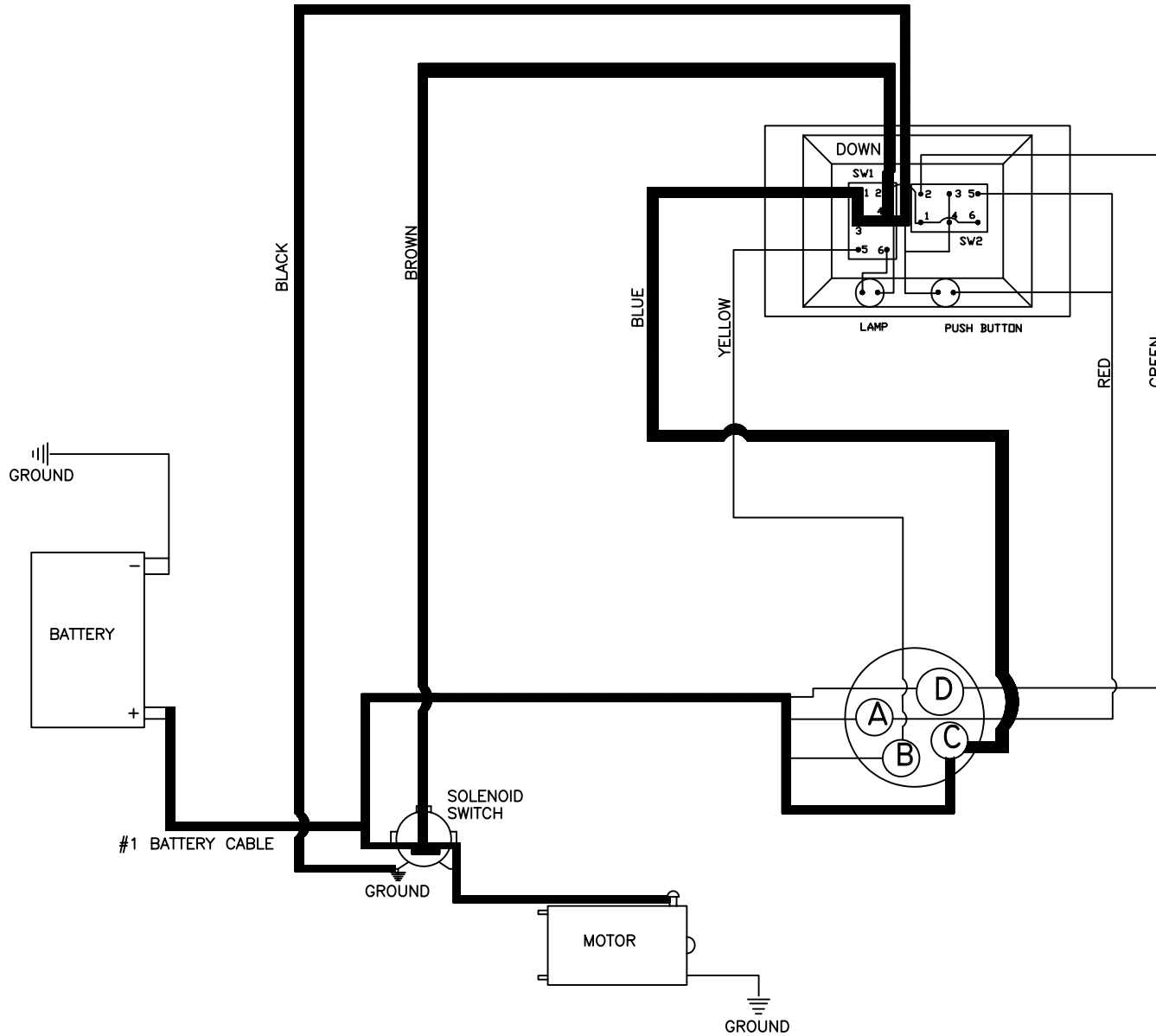
# EXTEND CI (ANGLE LEFT) M683



-  PRESSURIZED FLOW
-  RETURN FLOW
-  PRESSURIZED FLUID (STATIC)
-  ENERGIZED SOLENOID
-  INTAKE FLOW

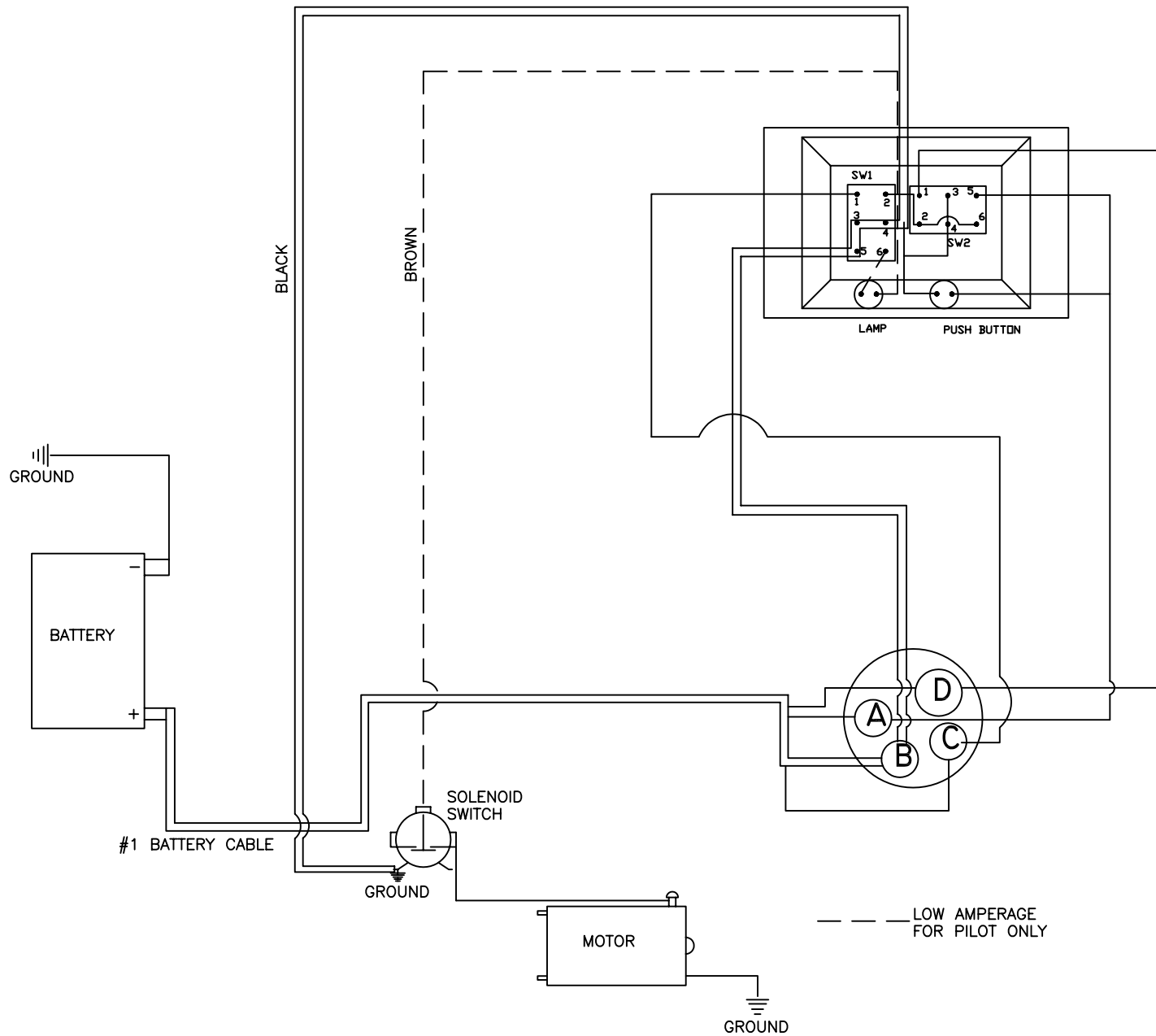
# RAISE PLOW M683

MOTOR & SOLENOID "C" ENERGIZED



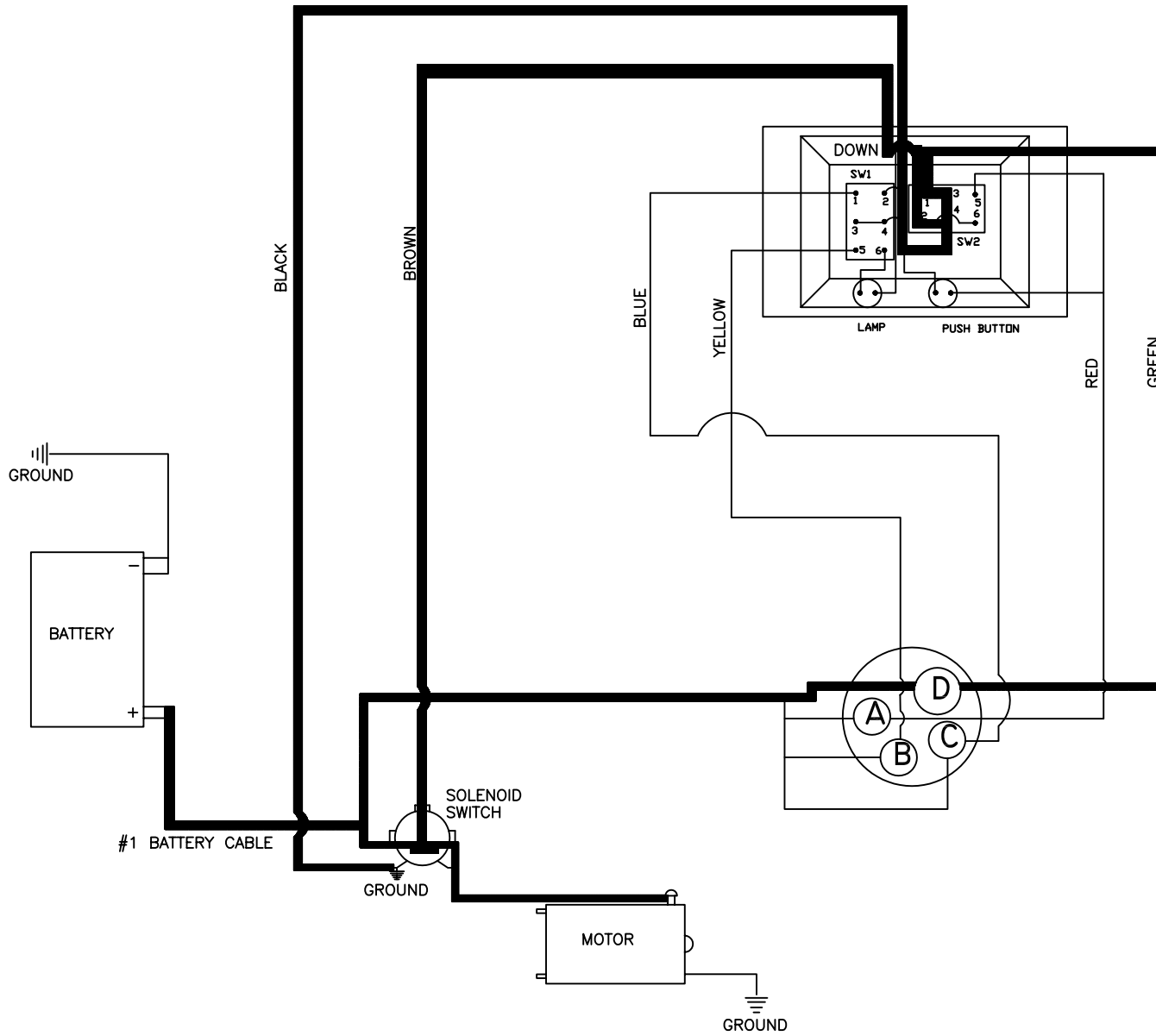
# LOWER & FLOAT PLOW M683

SOLENOID "B" ENERGIZED



# EXTEND C2 (ANGLE RIGHT) M683

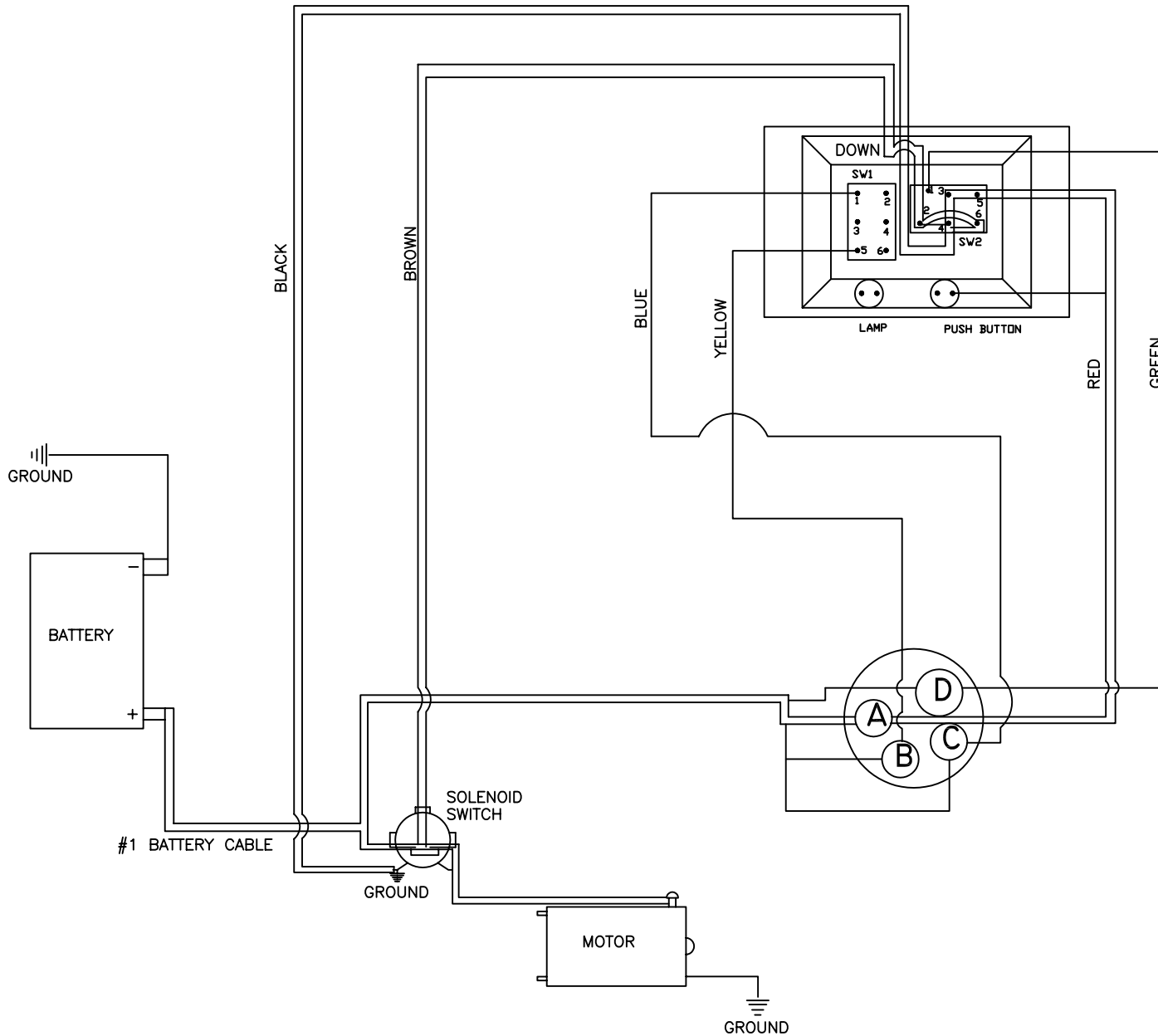
MOTOR & SOLENOID "D" ENERGIZED





# EXTEND CI (ANGLE LEFT) M683

MOTOR & SOLENOID "A" ENERGIZED



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**ARCTIC M683 HYDRAULIC INSTALLATION**

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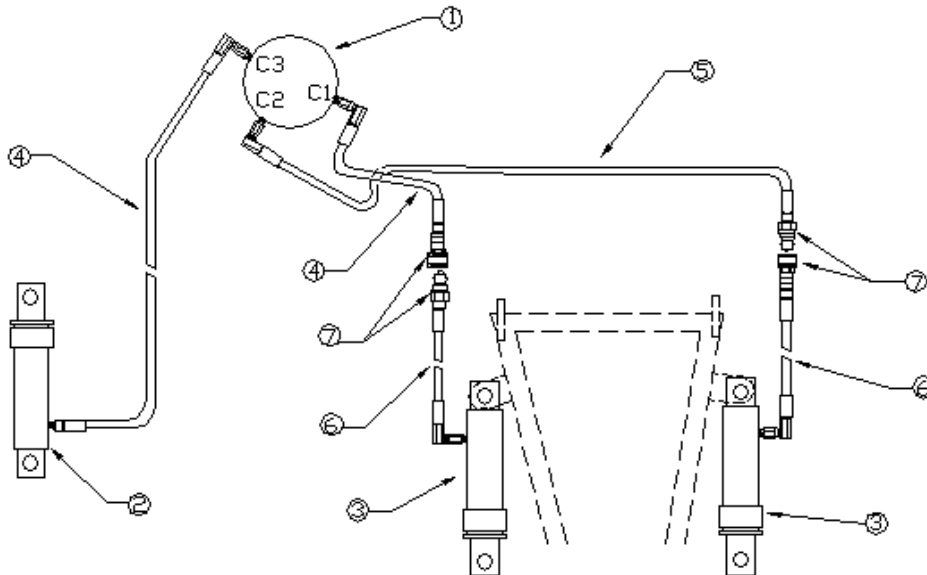
**Warning:**

- Top of battery needs to be protected. If positive side of battery is accidentally grounded person could be burnt or wiring system can be damaged, or battery gasses could explode causing injuries.
  - Disconnect cable from negative battery terminal before replacing the motor or solenoid.
  - Always wear eye protection and protective clothing when working around hydraulic systems.
  - Remove jewelry 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.
  - Hydraulic hoses and electrical cables (harnesses) must be tied and routed safely to avoid any damage and pinching (away from hot places, sharp objects etc.).
- 

1. The hydraulic kit contains 5 hoses. - see diagram
  - 2 - 18" hoses to attach to the angling cylinders
  - 1 - 66" hose from pump to quick disconnect at the end of the 18" hose on the opposite side of the truck as pump.
  - 2 - 54" hoses - one to go to the lift cylinder, the other to quick disconnect at the end of the 18" hose on the same side of the truck as the pump.
2. Before installing the pump, put the elbows into the ports.
3. Connect 1 - 54" hose from lift port C3 to lift cylinder. The hose should be mounted to the cylinder first, then routed through the grill and attached to the pump with the swivel. Use the 66" hose and the other 54" hose to go from the angling ports C1 and C2 to the angling cylinders. Route the hoses to clear any sharp or moving objects under the hood.
4. Attach the pump plug to the cable from the control box (electrical) in the cab.
5. Connect the battery cable to the positive terminal on the solenoid and the positive terminal on the battery. Also connect the brown wire and the black wire from the control box to the top post on the solenoid and a solenoid mounting screw respectively.
6. Install blade assembly to the vehicle.
7. Install the 18" hoses into the angling cylinders. Attach the quick disconnects to the hose ends so that 1 male and 1 female are on both the blade assembly and on the truck. When the blade is off the truck, the couplers should be put together to prevent dirt from entering the system.
8. Fill the reservoir with automatic transmission fluid. It is recommended to add 1 oz. of arctic anti-freeze to the fluid.

9. To activate the system:

1. Raise the blade approximately 6" off the floor.
2. Jog the angling buttons alternately side to side moving the blade slightly farther each



- time. Do not angle the blade fully on the first movement.
3. Once the full swing of the blade has finally been accomplished, bring the blade back to the centre and lower.
  4. Collapse lift cylinder and refill pump.

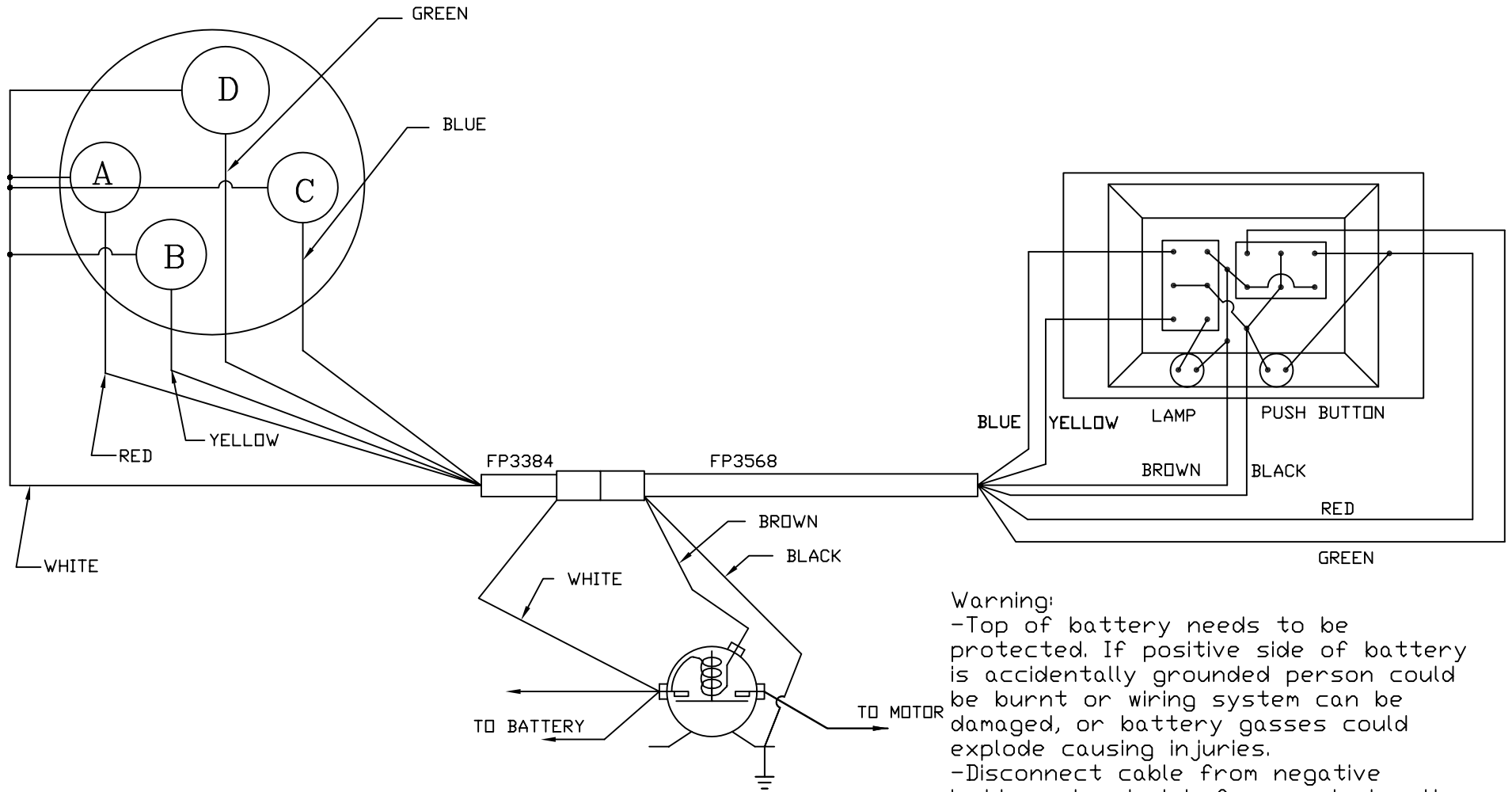
**Arctic Equipment Manufacturing Corporation**  
M683 Hydraulic Installation

R05  
Sept 06, 2002

<b>ITEM</b>	<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>
1	50931-M	M-683 Hydraulic Pump	1
2	CS150-06.00-NRS	Lift Cylinder	1
3	CS150-10.00-NRS	Angling Cylinder	2
4	51333-M	54" Hydraulic Hose Assembly	2
5	51334-M	66" Hydraulic Hose Assembly	1
6	51002-M	18" Hydraulic Hose Assembly	2
7	51003-M	Quick Disconnect	2
8	HH-00790-002	90 Degree swivel elbow	3
9	HH-00794-003	1/4" pipe to pipe internal swivel	1
*10	51335-M	4 gauge battery cable 78"	1
*11	1306110	36" power cable	1

\*Items not shown on drawing

# WIRING DIAGRAM M-683, 4 PRONG TOGGLE

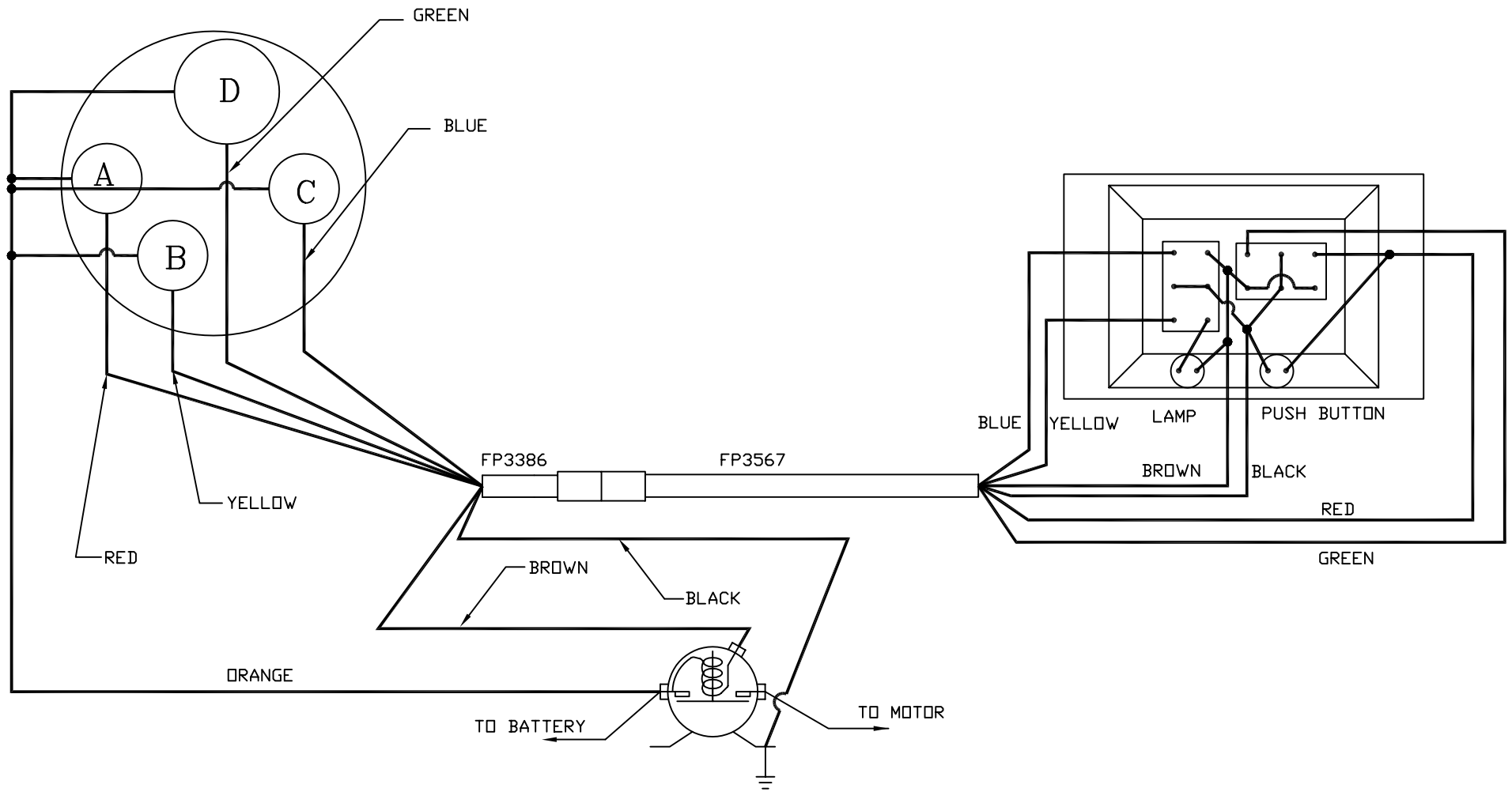


IN THIS CIRCUIT, THE VALVES AND SOLENOID ARE WIRED TO THE '+' TERMINAL OF THE BATTERY. THE CONTROL BOX SWITCHES ACTIVATE THE VALVES AND SOLENOID BY PROVIDING A CONNECTION TO GROUND.

## Warning:

- Top of battery needs to be protected. If positive side of battery is accidentally grounded person could be burnt or wiring system can be damaged, or battery gasses could explode causing injuries.
- Disconnect cable from negative battery terminal before replacing the motor or solenoid.
- Always wear eye protection and protective clothing when working around hydraulic systems.
- Remove jewelry 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.

# WIRING DIAGRAM M-683, 6 PRONG



IN THIS CIRCUIT, THE VALVES AND SOLENOID ARE WIRED TO THE '+' TERMINAL OF THE BATTERY. THE CONTROL BOX SWITCHES ACTIVATE THE VALVES AND SOLENOID BY PROVIDING A CONNECTION TO GROUND.

# High Mount Conversion Kit M683 52519-M

High Mount Conversion Kit M683 52519-M			
Item	Part #	Description	Quantity
1*	52377-01-M	M683 Mounting Plate Kit	1
2	1306340	22" Battery Power Cable	1
3	HH-00915-001	Swivel, 45 deg., 1/4" male & 1/4" female NPTF	2
4	52428-N	Black Terminal Protector	1
5	52427-N	Red Terminal Protector	1
7	3004665	Cable and Plug Assembly	1
8	13061221	54" Ground Cable	1
9	1306120	Power Cable 63"	1
10	0203300	Weather cover for power and ground cable	1

\*Note: See information about 52377-01-M on drawing 52377-01/02-M. (Hi Mount Mounting Plate Kit)



# Hi-Mount Mounting Plate Kit 52377-01-M

(M683 hydraulic power unit fits in this mounting plate)

**Arctic Equipment Manufacturing Corporation**  
 Hi-Mount Mounting Plate Kit 52377-01-M

R02  
 April 2, 2002

<b>52377-01-M M683 Mounting Plate Kit</b>							
<b>Item</b>	<b>Part #</b>	<b>Description</b>	<b>MKB</b>	<b>MKB-QLII</b>	<b>MKPB</b>	<b>MKPB-QLII</b>	<b>52377-01-M M683 Mounting Plate Kit</b>
1	52162-C	Q-Link I Lift Frame	1				
1a*	52365-D	Lift Frame, QLII		1			
2	52166-C	Q-Link I Spreader Bar			1		
2a*	52310-D	Ford Q-Link I Spreader Bar					
2b*	52363-C	Spreader Bar QLII				1	
2c*	52364-C	Ford Spreader Bar QLII					
3	52435-N	Grommet 1 ½" x 3/16" x 1 3/4"					2
4	52548-B	Mounting Bracket Support					2
5	50069-C	Lift Channel	1				
6	52208-B	Light Brace	2				
7	HH-00972-090	½" x 1½" Capscrew				4	
8	HH-00457-001	½" Lockwasher				4	
9	HH-00460-002	½" Hexnut				4	
10	HH-00972-153	¾" x 3½" UNF Cap screw				1	
12	HH-00973-007	¾" UNF Thin Collar Locknut				1	
13	52348-A	Mounting Pin		2			

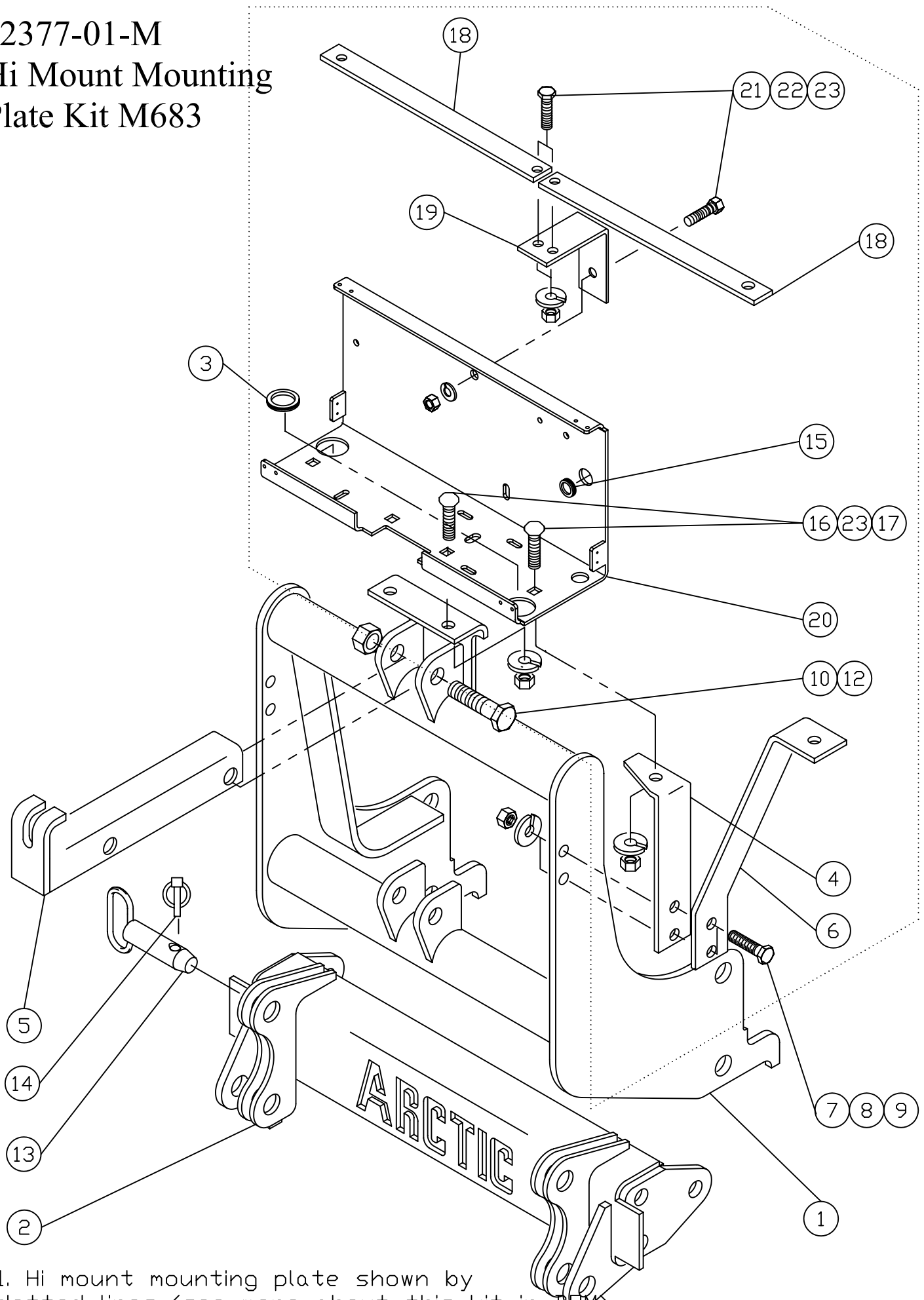
**Arctic Equipment Manufacturing Corporation**  
 Hi-Mount Mounting Plate Kit 52377-01-M

R02  
 April 2, 2002

<b>52377-01-M M683 Mounting Plate Kit</b>							
<b>Item</b>	<b>Part #</b>	<b>Description</b>	<b>MKB</b>	<b>MKB-QLII</b>	<b>MKPB</b>	<b>MKPB-QLII</b>	<b>52377-01-M M683 Mounting Plate Kit</b>
13a	WA-34704	Mounting Pin, QLI	2				
14	50040-A	Lynch Pin	2				
15	52522-N	Grommet 11/16" x 3/16" x 1"					1
16	HH-00971-136	½"-13 x 1 ½" Carriage Bolt					4
17	HH-00294-005	½" - 13 Hex nut					4
18	52513-A	Light Cross Bar					2
19	52514-A	Light Support					1
20	52377-C	Pump Mounting Plate					1
21	HH-00972-089	½" - 20 X 1 1/4" Hex Head Cap Screw					3
22	HH-00460-002	½" - 20" Hex Head Nut					3
23	HH-00457-001	½" Lock washer					7
*25	52378-A	Adapter for M683					1
*26	52375-C	Power unit Cover					1
*27	52378-M BB	m683 mtg plate bolt bag					1

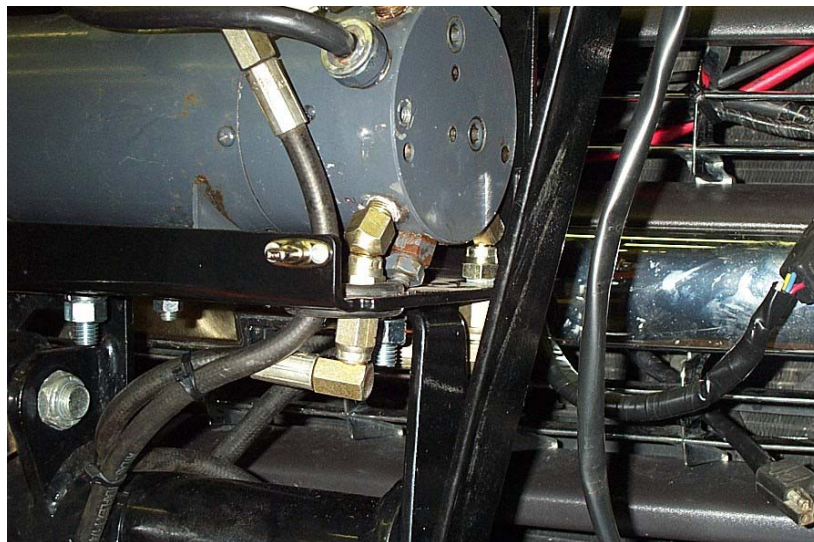
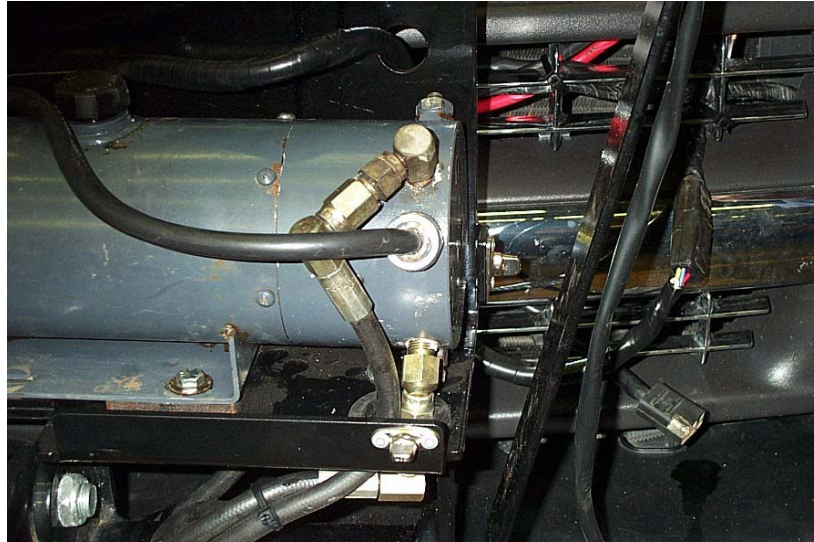
\*Note: These items are not show on DWG.

# 52377-01-M Hi Mount Mounting Plate Kit M683

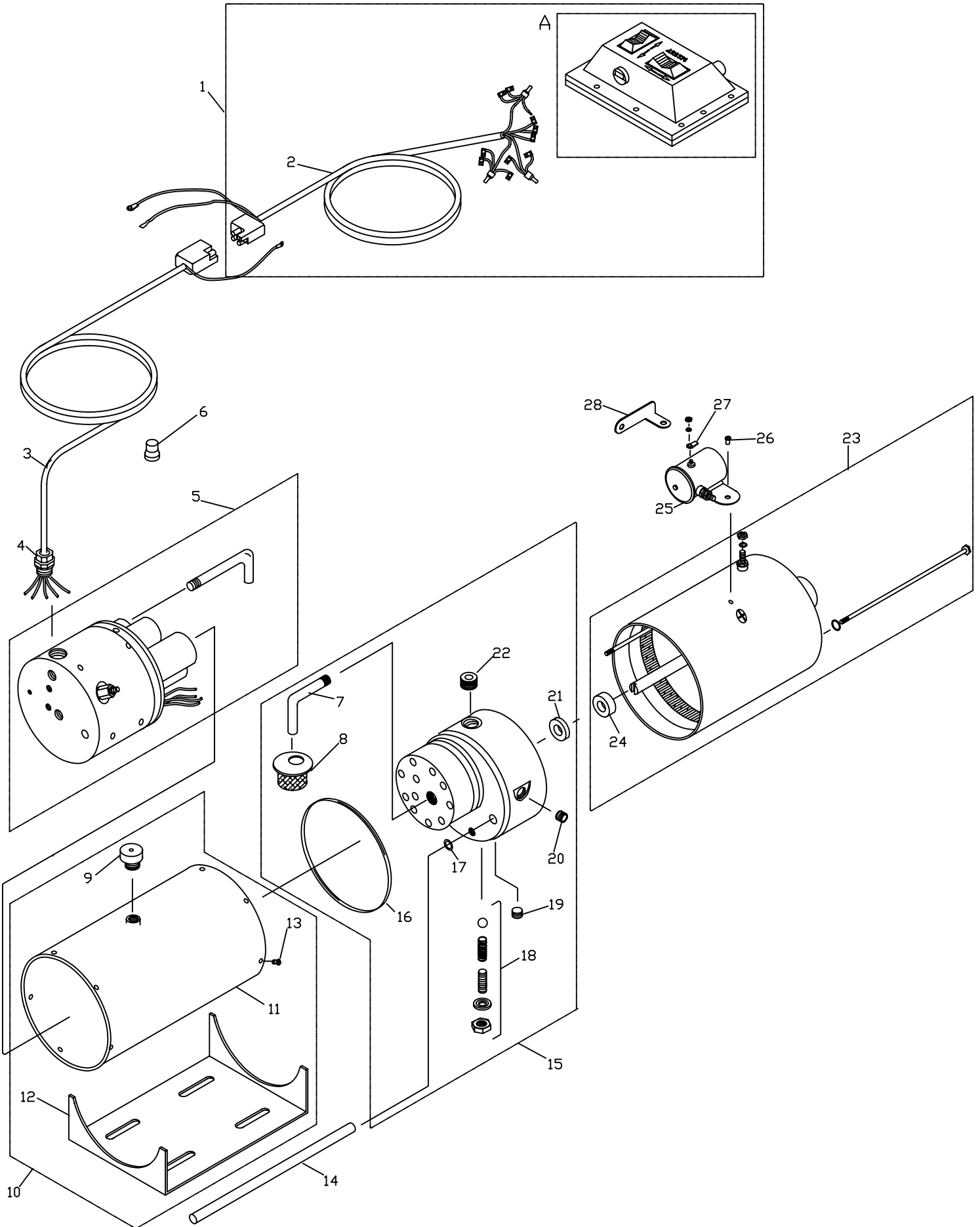


1. Hi mount mounting plate shown by dotted lines (see more about this kit in BOM)

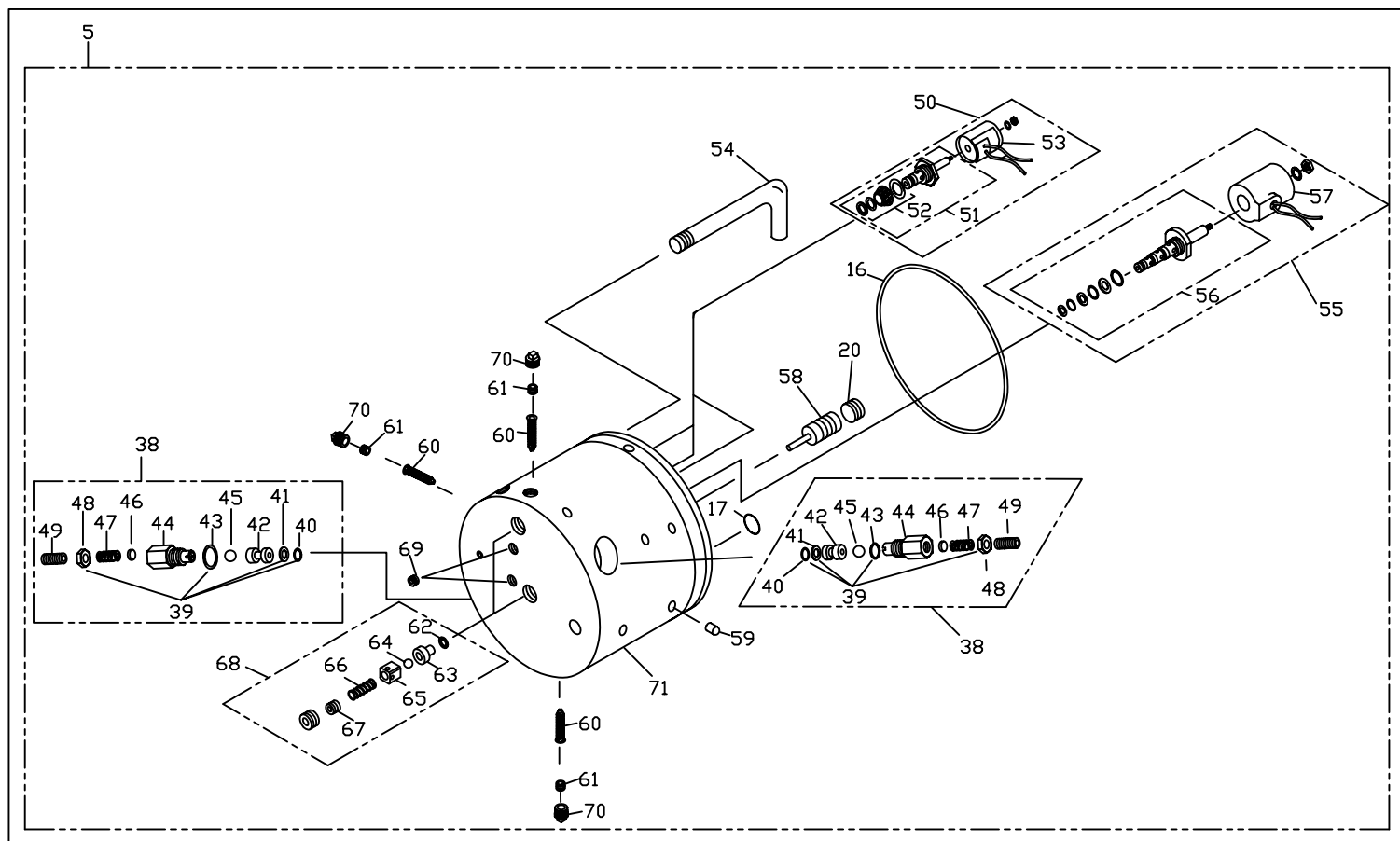
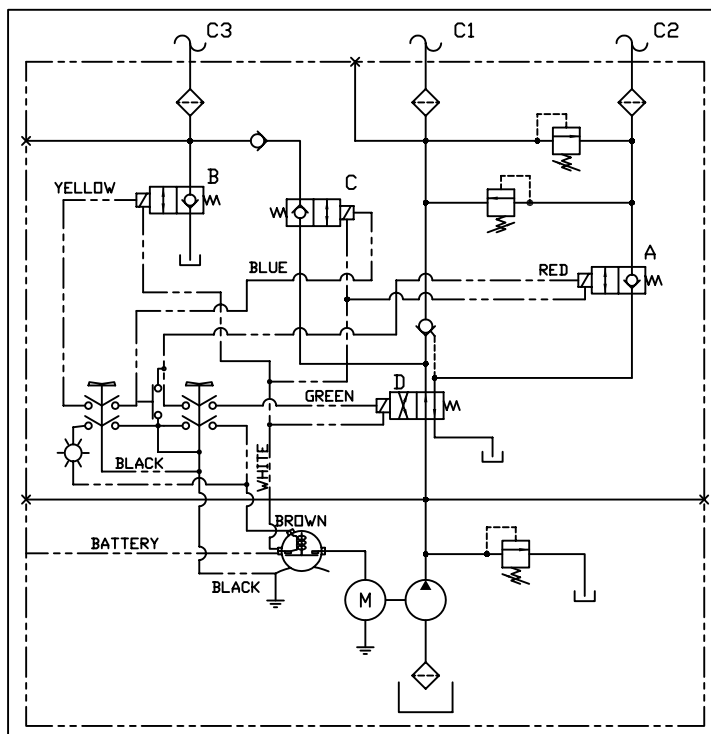
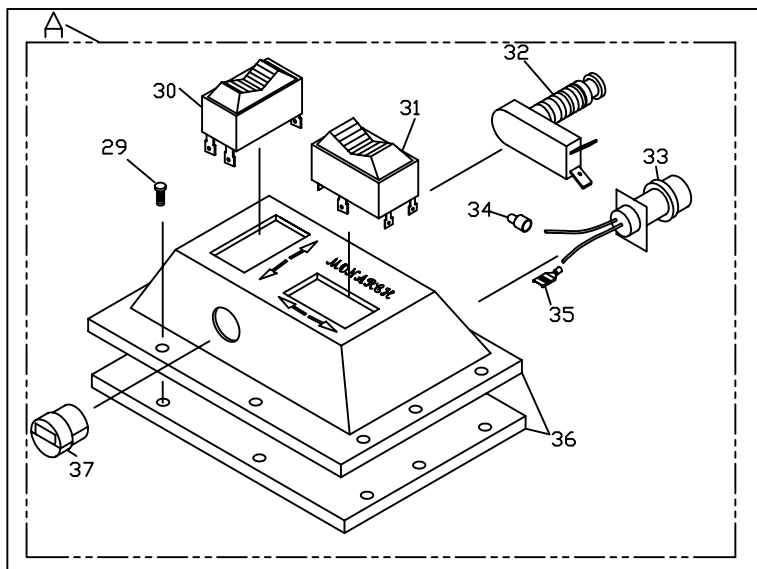
## Installation of M683



M683-016-05C05E  
M683-018-05C05E



M683-016-05C05E and  
M683-018-05C05E



**Arctic Equipment Manufacturing Corporation**  
**M683 BOM (M683-016-05C05E thru M683-018-05C50E)**

M683 BOM R04

SEQ #	ITEM #	DESCRIPTION	QUANT.	SEQ#	ITEM #	DESCRIPTION	QUANT.
1	FPN0065-SA-1	Control Station 4 Prong Harness	1	16	FP2352	'O'-Ring, 3 5/8" x 3-7/8" x 1/8"	2
	FPN0064-SA	Control Station 6 Prong Harness					
2	FP3568	Harness, 4 Prong Plug, Control End	1	17	FP0122	'O'-Ring, 3/8" x 9/16" x 3/32"	2
	FP3567	Harness, 6 Prong Plug, Control End					
3	FP3384	Harness, 4 Prong Plug Valve End	1	18	FP7527	Relief Valve Kit (with ball inside/shown)	1
	FP3386	Harness, 6 Prong Plug Valve End			FP2222	Relief Valve Kit (with cone inside)	
4	FP1413	Fitting, Strain Relief	1	19	FP2350	Plug, Pipe, Flush 1/4" NPT	1
5	FP0838-SA	Manifold Ass'y with all valves	1	20	FP2349	Plug, Pipe, Flush 3/8" NPT	4
6	-	-	-	21	FP2159	Seal	1
7	FP1209	Tube, Suction 3/8"NPT , 90 Degrees	1	22	FP2348	Plug, Pipe, Flush 1/2" NPT	1
8	FP1134	Screen, Filter, Suction	1	23	FP8111	Motor 12V DC for M683-016-05C05E	1
9	FP1143	Vent Plug, Plastic, 3/4" NPT	1		FP8112	Motor 12V DC for M683-018-05C05E	
10	FPN0151-SA	Reservoir With Welded Mounting Saddle	1	24	FP2318	Bearing, Motor to Base	1
11	FP6703	Reservoir 4 1/2" Dia. x 8", 60 Cu. In. Useable	1	25	FP3336	Switch, Solenoid, 12V DC	1
12	FPN0013	Base Bracket, M683	1	26	FP7683	Screw, Round Head Machine, 10-32 x 1/4	2
13	FP7703	Screw, Self Tapping 10-24 x 3/8"	12	27	FP3414	Terminal, Male Tab 1/4" Slip On	1
14	FP1452	Tube, Pressure, Transfer	1	28	FP1349	Strap, Motor-Solenoid Connecting	1
15	FP12471	Pump Base	1				
15a	FP12171-250-SA	Pump Assembly (inc. modular pump, suction strainer etc.)	1				



**Arctic Equipment Manufacturing Corporation**  
**M683 BOM (M683-016-05C05E thru M683-018-05C50E)**

M683 BOM R04

SEQ#	ITEM #	DESCRIPTION	QUANT.	SEQ#	ITEM #	DESCRIPTION	QUANT.
29	FP7710	Screw, Self Tapping	8	51	FP0262	Valve, Cartridge, 12V DC	3
30	FP3395	Switch, Rocker, Lift W/Float	1	52	FP0121	'O'-Ring and Screen Kit for 3W Directional Valve	3
31	FP3397	Switch, Rocker, Angling	1	53	FP0089	Valve Coil 12V DC	3
32	FPN0053	N.O. Push Button Switch	1	54	FP1274	Tube, Return	1
33	FPN0015	Red Light w/Clip	1	55	FP0095	Valve, N.C. , 4W/2P 12V DC	1
34	FPN0002	Connector, Panduit JN-418	1	56	FP0266	Valve, Cartridge, 12V DC	1
35	FPN0016	Terminal, Female 1/4"Tab	1	57	FP0096	Valve, Coil, 12V DC	1
36	FPN0014	Control Box, Grey Arctic Style w/Back Plate	1	58	FP0061	Piston, Ass'y, Pilot Check Valve	1
37	FP1414	Fitting, Plastic Strain Relief	1	59	FP2395	Plug, Expander, Ball	12
38	FP13023	Parts Kit, X-Over Relief Valve	2	60	FP1316	Filter, Screen	3
39	FP3694	Seal Kit, X-Over Relief Valve	2	61	FP7624	Screw, Filter Retainer	3
40	FP0007	'O'-Ring 1/4" x 3/8" x 1/16"	2	62	FP3507	Gasket, Poppet Seat	1
41	FP0346	Ring, Back Up, for 0007 'O'-Ring	2	63	FP2424	Seat, Poppet	1
42	FP0378	Seat, X-Over Rel. Valve, Ball Type	2	64	FP0126	Ball 5/16"	1
43	FP0114	'O'- Ring, 0.468" ID x 0.078W	2	65	FP2680	Poppet, Ball Retainer	1
44	FP0379	Housing Adj. Relief Valve, Ball Type	2	66	FP0130	Spring, Light, Check Valve	1
45	FP0012	Ball 1/4"	2	67	FP7732	Screw, Spring Retainer, 5/16-18	1
46	FP1288	Shim, Spacer, Adj. X-Over Relief Valve	2	68	FP3624	Parts Kit, Check Valve Assembly	2
47	FP2221	Spring, Relief Valve	2	69	FP7669	Plug, Pipe, Flush 1/16" NPT	4
48	FP0386	Nut, Sealing, 3/8"-16UNC	2	71	FPN0027-SA	Manifold Ass'y comes with X over valves only, No Valves	1
49	FP0387	Screw, S Set, Oval P, 3/8 x 16 x 1	2				
50	FP0094	Valve N.C., 2W/2P, Poppet 12V DC	3				

## M683 valves

New M683 with 1/2" stem Deltrol valves (2010—up) is shown on the picture #1. Older model is shown on the picture #2.

If you replace "A", "C", or "B" valve cartridge or a coil in old M683 with new valve 1/2" stem, you have to replace both parts, a cartridge and a coil (see next page). "D" valve in old model can't be replaced with new "D" valve.



Picture 1 (**New M683** (2010—present))

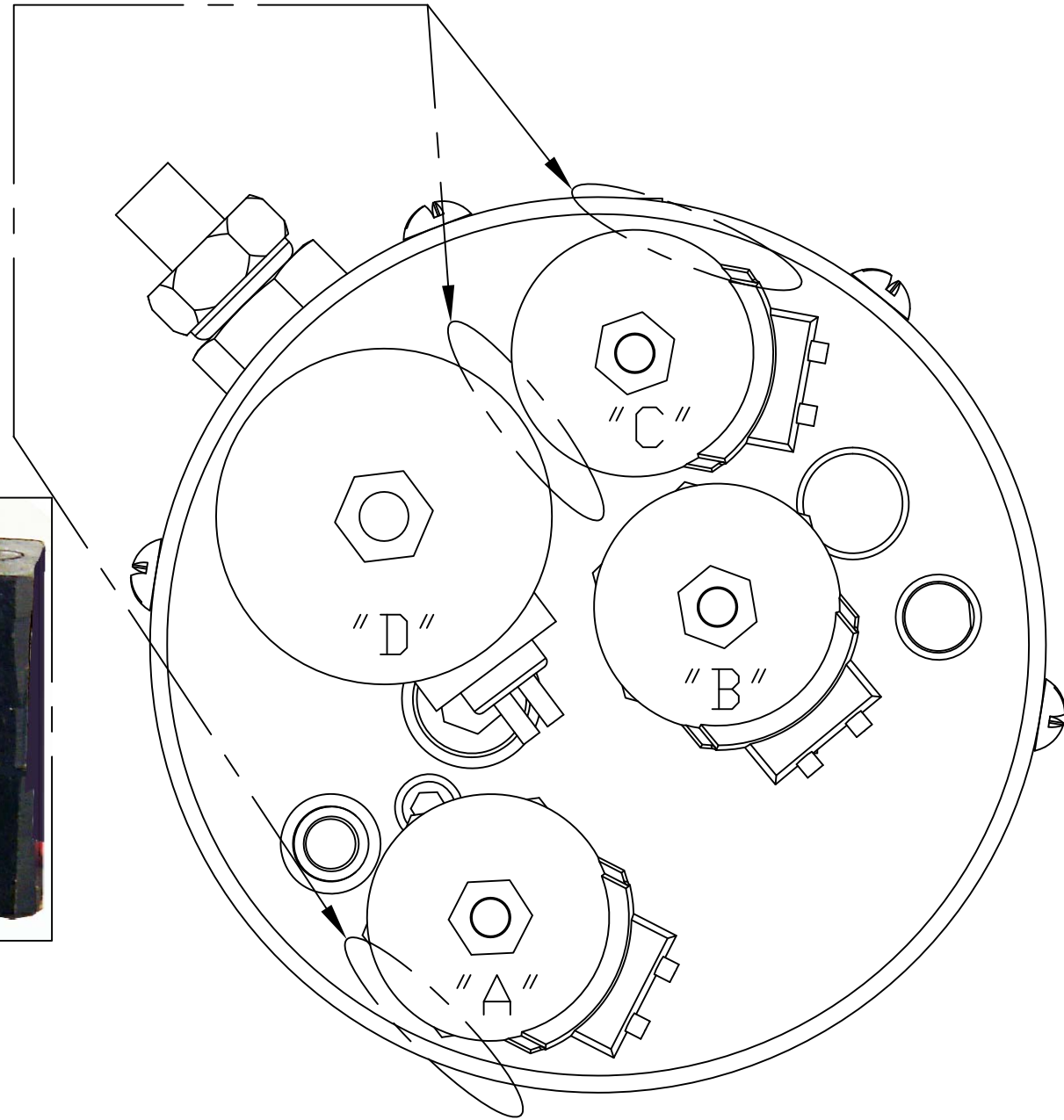
Coil "A", "B", "C" part#: FP0089LS; Cartridge "A", "B", "C" part#:FP0262LS; Valve assembly (coil + cartridge) "A", "B", "C" part#: FP0094LS  
Coil "D" part#: FP0096LS Cartridge "D" part#: FP0266LS Valve assembly (coil + cartridge) "D" part#: FP0095LS



Picture 2 (**Old M683** (prior 2010))

Coil "A", "B", "C" part#: FP0089 ; Cartridge "A", "B", "C" part#:FP0262; Valve assembly (coil + cartridge) "A", "B", "C" part#: FP0094  
Coil "D" part#: FP0096 ; Cartridge "D" part#: FP0266; Valve assembly (coil + cartridge) "D" part#: FP0095

If you are replacing "A" or "C" valve (3/8" stem), with a new valve (1/2" stem), a new coil ***may*** interfere with "D" valve or a reservoir. If that is case you may slightly "shave" a new coil to make proper fit.



## Valves 2 way /2 position (2w/2p) cavity (O-ring) change

1. Power units manufactured prior to 2010

Typically manufactured with "Monarch-style" valve cavity, identifiable by:

- a) Cavity without identification mark (without Greek letter delta (triangle)) (see picture 1)
- b) Black O-ring, with 0.070" cross-section (see picture 3)

2. Units manufactured in 2010 and beyond

Typically manufactured with "Industry standard" valve cavity, identifiable by:

- a) Cavity with identification mark - Greek letter delta (triangle) (see picture 2)
- b) Blue O-ring, with 0.087" cross-section (see picture 3)



### Valve replacement

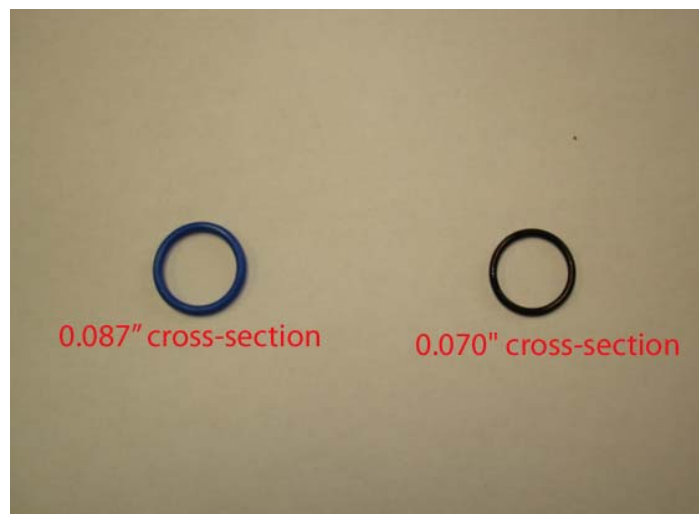
- a) Cavity and O-ring **must be selected correctly** for proper sealing function, the rest of the valve is the same. If necessary, replace O-ring with the proper O-ring to match the valve cavity:
- b) Cavity without identification mark requires black O-ring, with 0.070" cross-section (see picture 3)
- c) Cavity with identification mark requires blue O-ring, with 0.087" cross-section (see picture 3)



Picture 1



Picture 2



Picture 3

## Troubleshooting flow chart for power unit M683

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

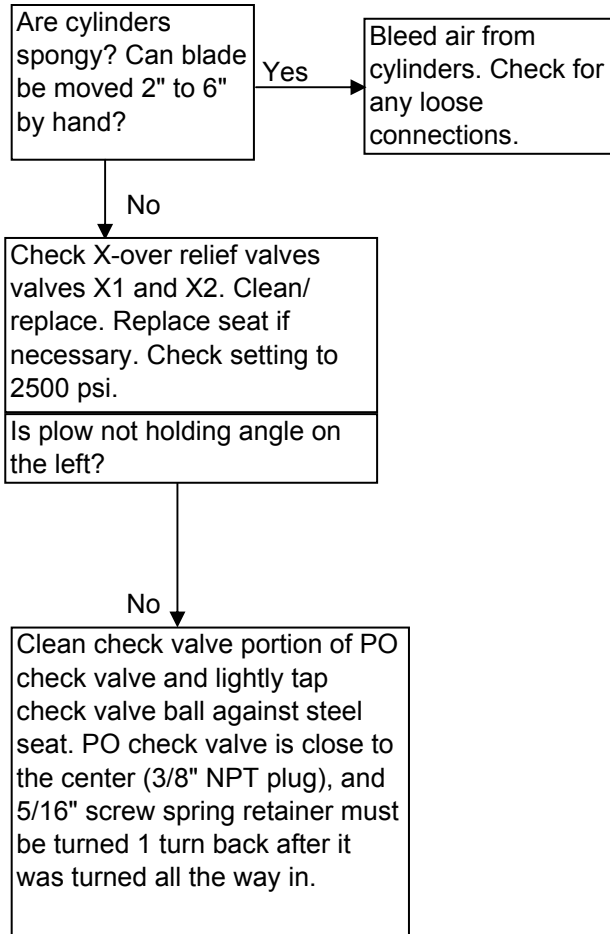
### **Warning:**

- Top of battery needs to be protected. If positive side of battery is accidentally grounded person could be burnt or wiring system can be damaged, or battery gasses could explode causing injuries.
- Disconnect cable from negative battery terminal before replacing the motor or solenoid.
- Always wear eye protection and protective clothing when working around hydraulic systems.
- Remove jewelry 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.

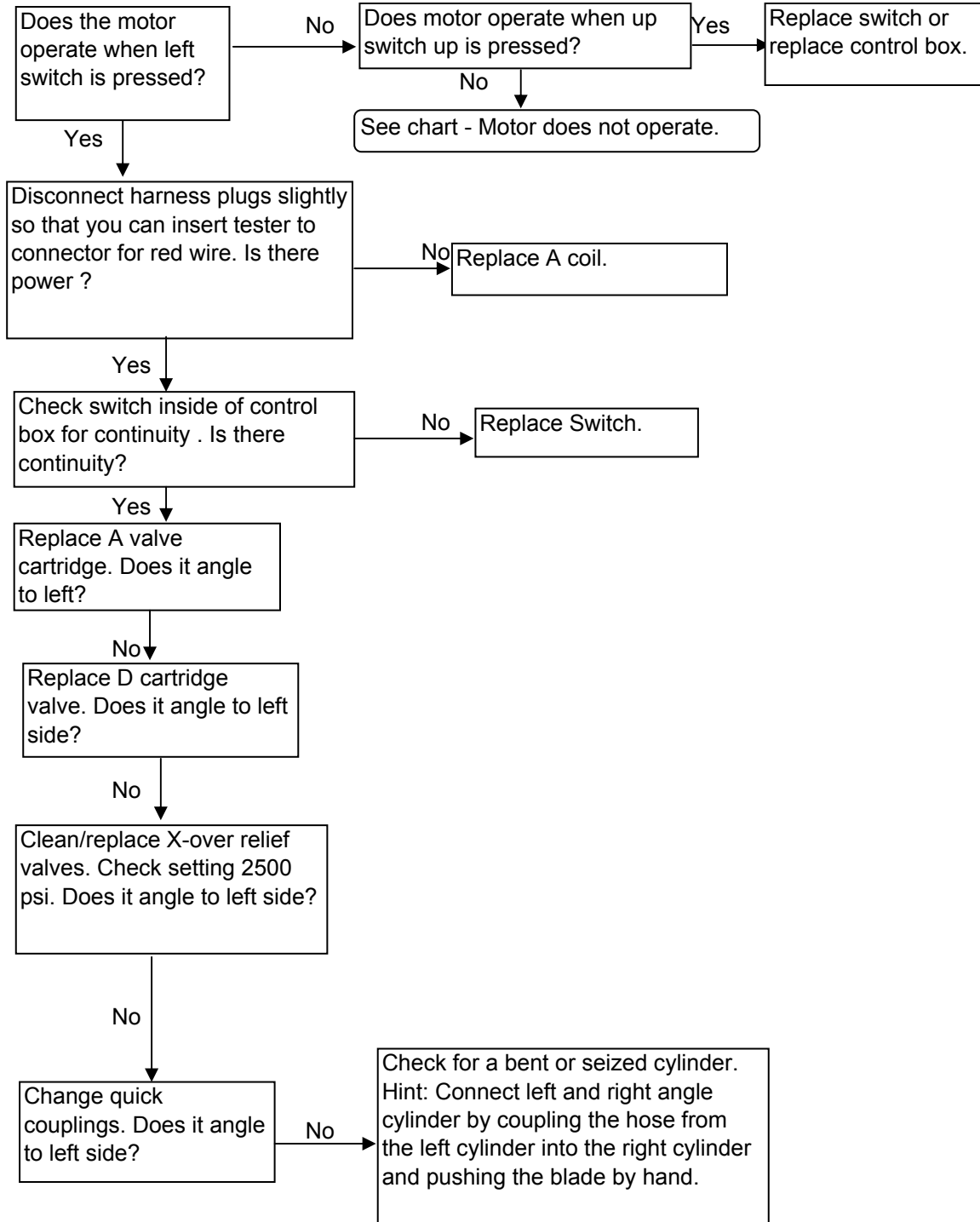
### Specification:

- Max Amp Draw 210 AMP,
- Note: Do not operate motor continuously for more than 30 sec.
- Relief valve setting 2000 psi.
  - X-over relief valve setting 2500 psi.

# PLOW DOES NOT HOLD ANGLE M683

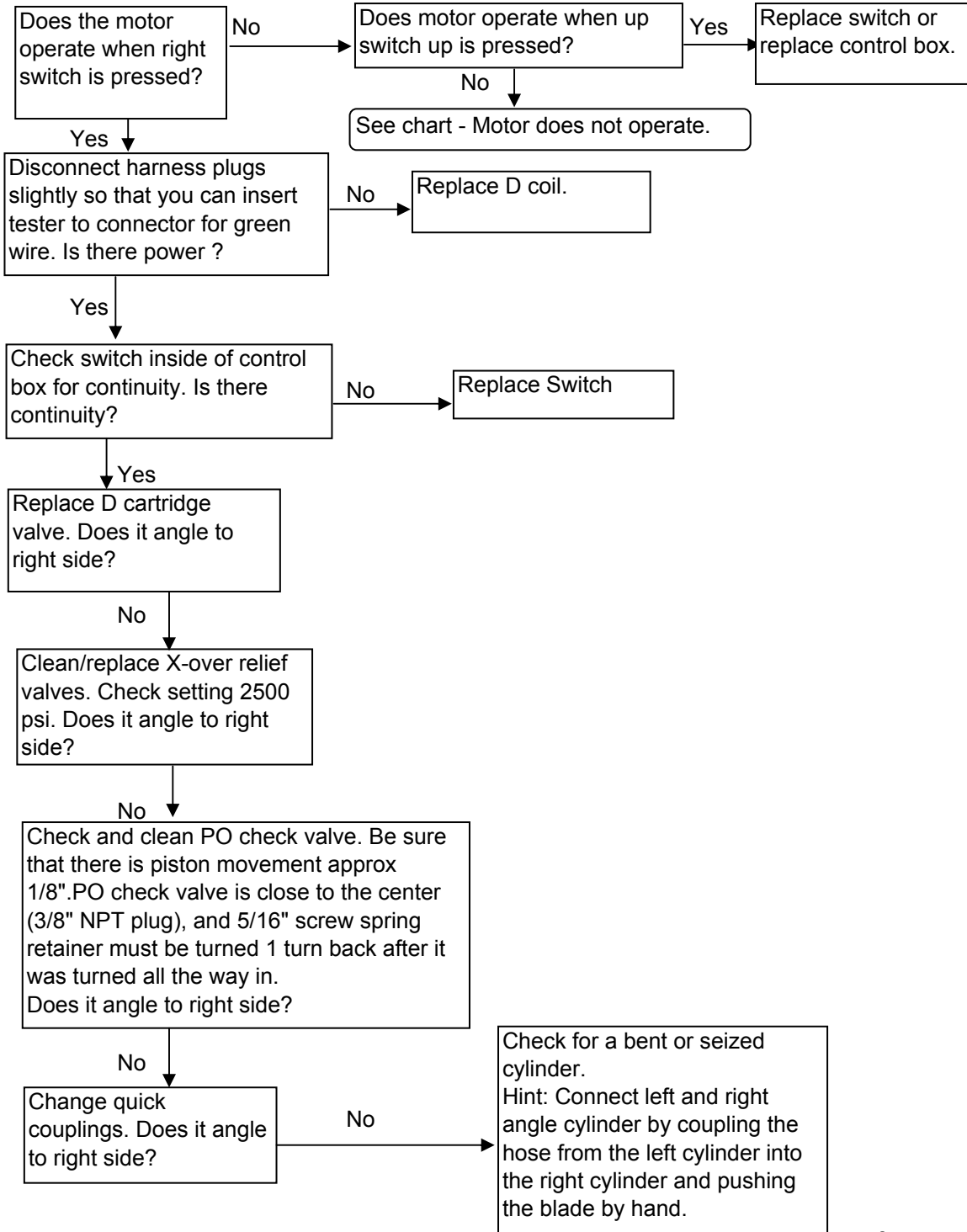


# SNOW PLOW DOES NOT ANGLE TO LEFT SIDE M683



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

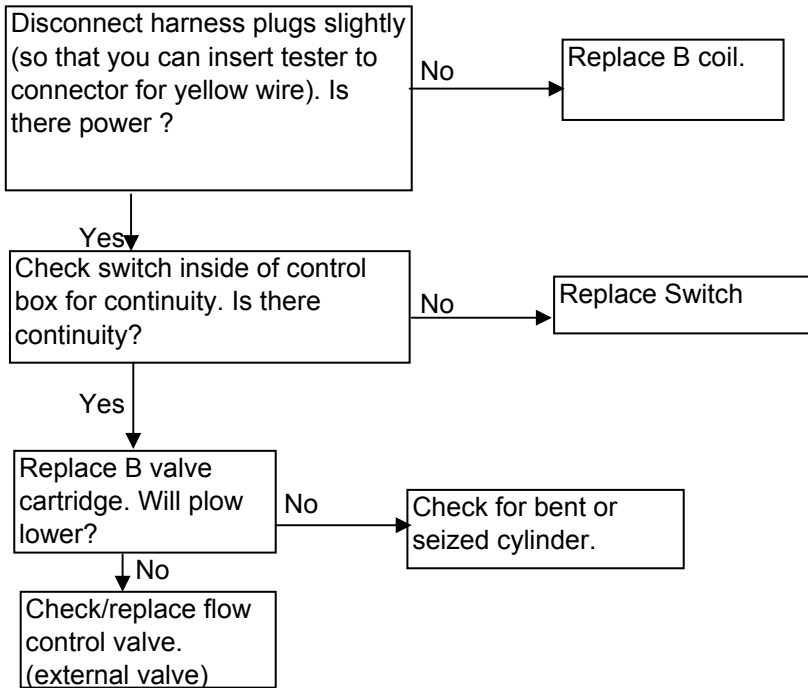
# SNOW PLOW DOES NOT ANGLE TO RIGHT SIDE M683



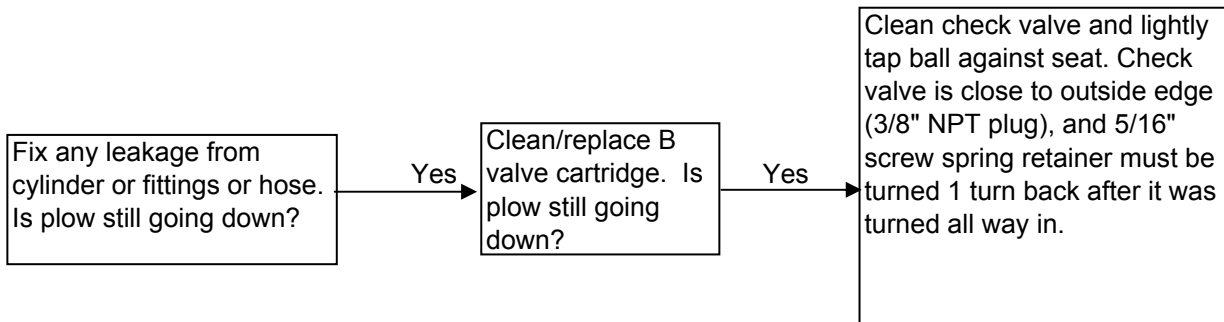
Note: Before start troubleshooting check that plow moves up and down. If plow does not move up and down see "plow does not raise".



## SNOW PLOW WILL NOT LOWER M683



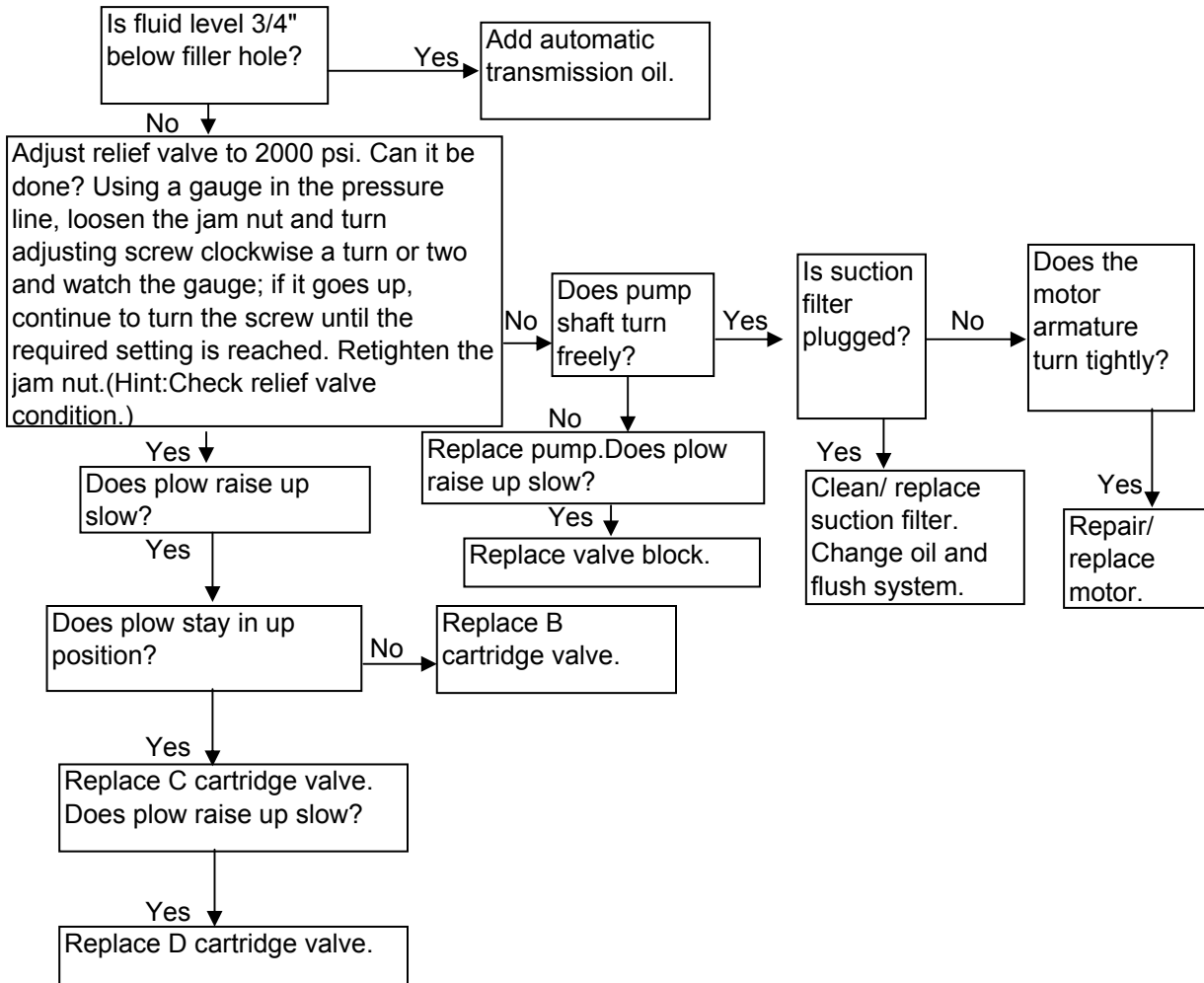
## SNOW PLOW LEAKS DOWN M683



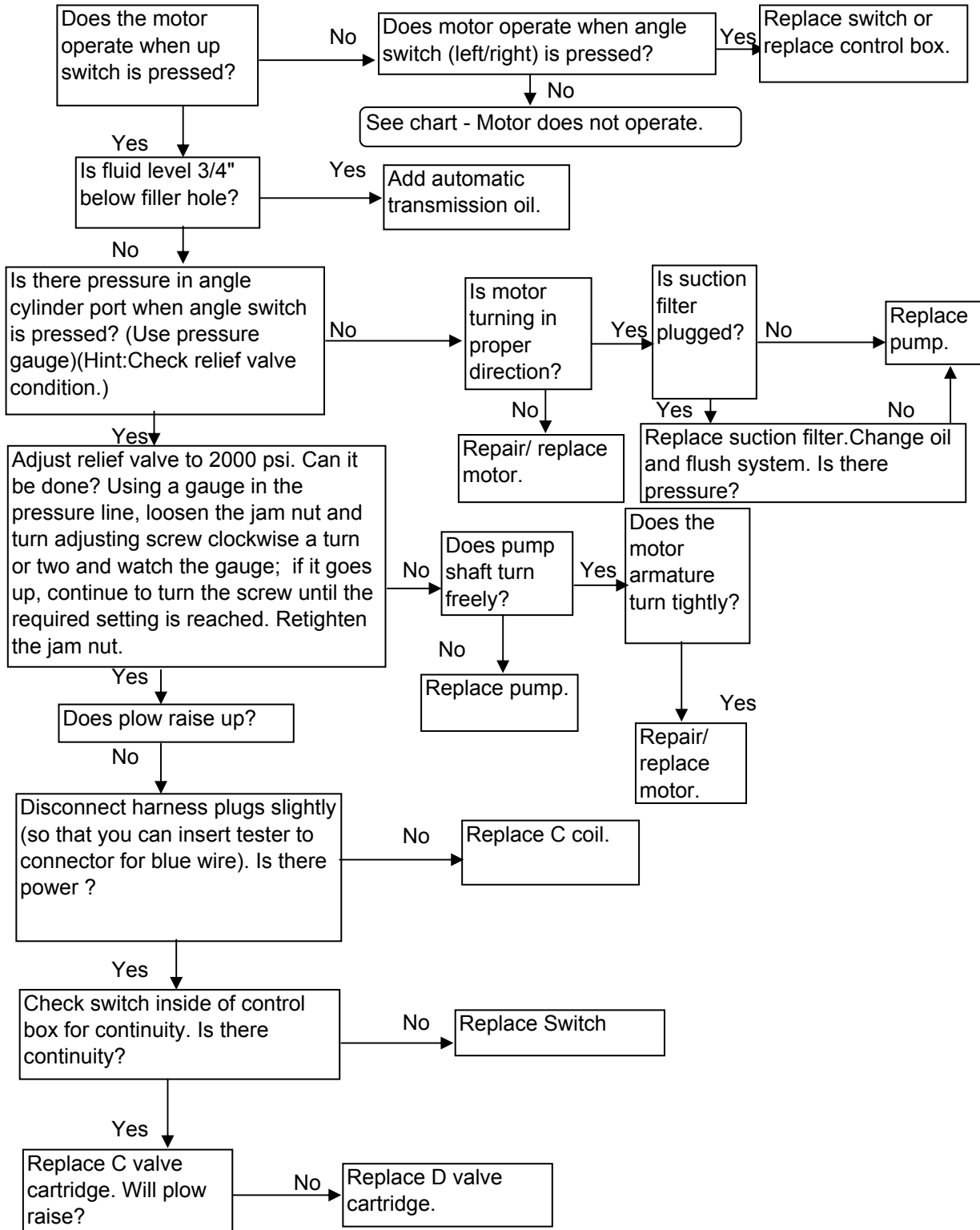
## SNOW PLOW ANGLES BEFORE GOING UP WHEN UP SWITCH IS PRESSED M683

If snow plow angles left before going up change A valve.

# SNOW PLOW RAISES UP VERY SLOWLY M683



# SNOW PLOW DOES NOT RAISE M683





Troubleshooting tips for M683:

1. 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.
2. 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.
3. Measure pump pressure at an angle hose (at full angle) it has to be 2000 psi (assuming that X-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).
4. AMP draw of motor should be measured at maximum raise or maximum angle when motor is running at 2000psi.
5. 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.
6. Do not screw cartridge valves into cavity too fast; use a back and forth motion and have O-rings well lubricated.
7. Clean all parts thoroughly before assembly and lubricate with clean oil.
8. 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.
9. 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 gage. 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.