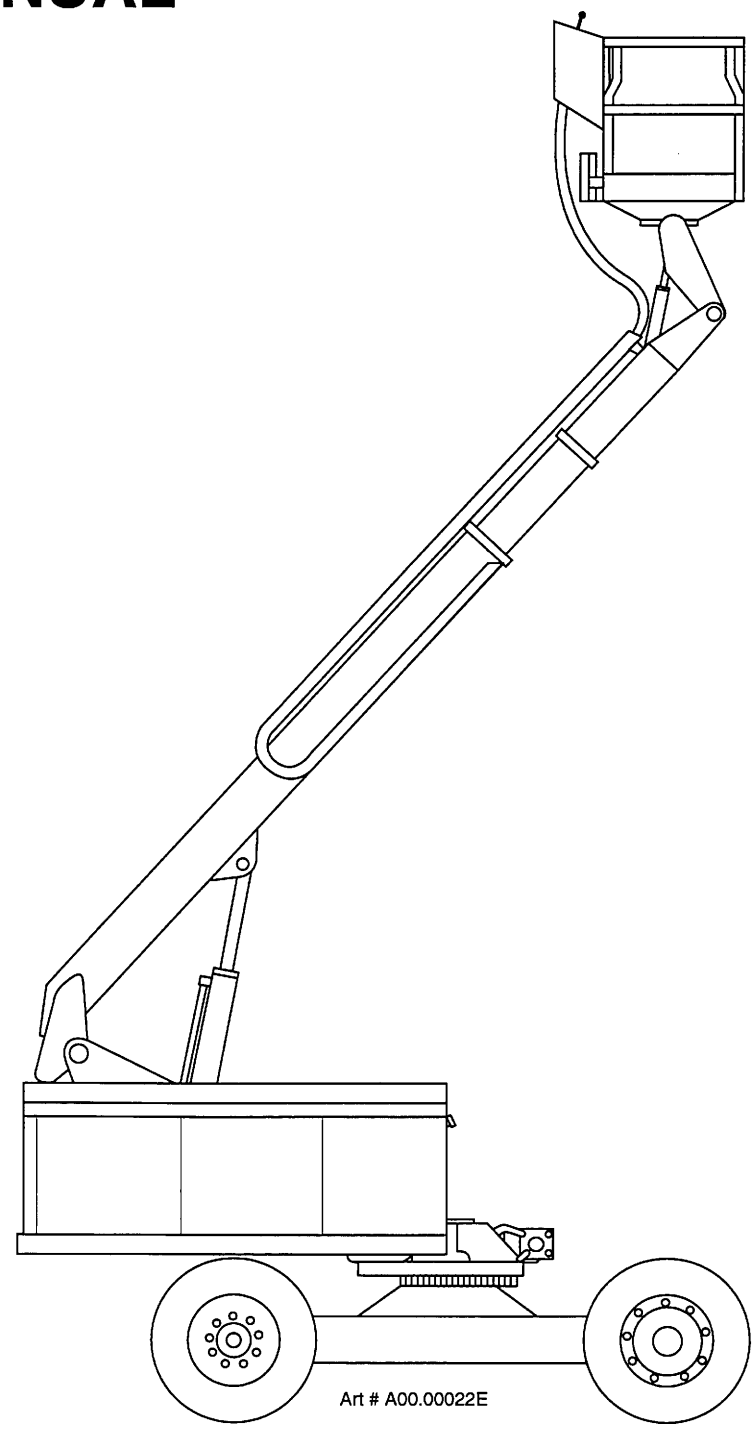
SIMON AERIALS INC.
10600 W. Brown Deer Road
Milwaukee, Wisconsin 53224
Phone (414) 355-0802
TWX: 910-262-3310
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Cable: SIMON MIL

SIMON

SERVICE MANUAL

MODEL
MP

FULL HYDRAULIC



Art # A00.00022E

PART NO. 89-100107

Introduction

THIS MANUAL CONTAINS INSTRUCTIONS FOR THE SERVICE, ADJUSTMENTS AND MAINTENANCE OF THE MP SERIES SIMON AERIAL BOOM LIFT.

IT IS INTENDED TO BE USED IN CONJUNCTION WITH AND AS A SUPPLEMENT TO THE OPERATORS, PARTS AND COMPONENT REPAIR MANUALS WHICH ARE PROVIDED SEPARETELY.

THE MP SERIES MOBILE PLATFORM HAS BEEN DESIGNED AND BUILT TO PROVIDE THE CUSTOMER WITH MANY YEARS OF DEPENDABLE SERVICE. THE FULL BENEFITS PROVIDED BY THIS MACHINE CAN BE DERIVED ONLY BY FOLLOWING THE PROPER OPERATING AND MAINTENANCE PROCEDURES. ONLY TRAINED AND AUTHORIZED PERSONNEL SHOULD OPERATE AND SERVICE THIS EQUIPMENT. OPERATORS AND SERVICE PERSONNEL SHOULD STUDY THESE MANUALS TO ASSURE THAT THEY HAVE A THOROUGH UNDERSTANDING OF THE CONTENTS WHICH PERTAIN TO THEIR PARTICULAR RESPONSIBILITIES.

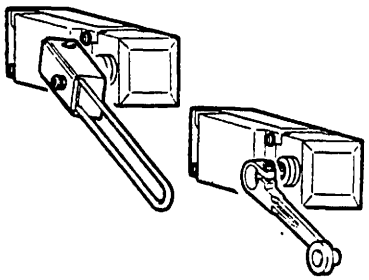
OPERATORS MUST ALSO UNDERSTAND ALL WARNINGS AND INSTRUCTIONS ON THE BODY OF THE MACHINE AND CONTROL CONSOLES.

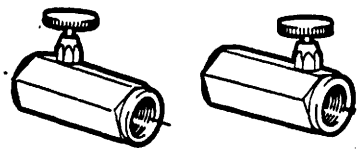
MODIFICATIONS FROM THE ORIGINAL DESIGN OF THIS EQUIPMENT ARE STRICTLY FORBIDDEN WITHOUT WRITTEN PERMISSION FROM SIMON AERIALS, INC.

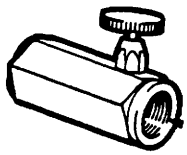
SIMON AERIALS, INC. RESERVES THE RIGHT TO IMPROVE AND EXPAND PRODUCT FEATURES ON ITS EQUIPMENT. THEREFORE, SPECIFICATIONS AND/OR EQUIPMENT IS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE. THESE MANUALS ARE PERIODICALLY UPDATED TO REFLECT ANY CHANGES THAT OCCURED BETWEEN PRINTINGS. IT IS THEREFORE RECOMMENDED THAT USERS CONTACT SIMON AERIALS, INC. FOR LATEST INFORMATION REGARDING THIS EQUIPMENT.

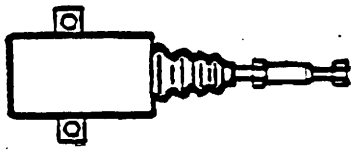
Service Manual Table Of Contents

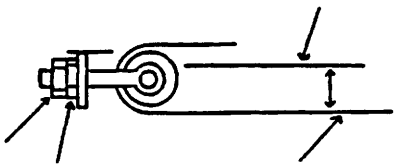
Section Name	Sec. NO.
ADJUSTMENTS	1
LUBRICATION	2
HYDRAULIC FLUID RECOMMENDATIONS & MAINT.	3
HYDRAULIC PUMP OPERATION	4
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EMERGENCY DESCENT CIRCUIT (OPTION)	14
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ELECTRICAL SCHEMATIC (S)	
HYDRAULIC SCHEMATIC (S)	











ADJUSTMENTS

Two Speed Drive Limit Switches - are located at the front end of the base boom. Adjust the limit switch lever arms for proper operation. Refer to the Drive System section for specifications.

Low Speed Drive - is adjusted by two adjustable flow control valves located at the drive directional control valve. By loosening the lock nut, speeds can be increased or decreased as needed by turning the knurled knob.

Brakes - are set at the factory for shipment of the unit only! They should be reset for ground operation upon receipt of the unit. Proper ground operation setting should be approx. 1½ turns from the closed position.

Platform Rotate - is controlled by a variable flow check valve located under the basket control panel. This valve controls the leveling speed and should be set for approx. 20 seconds rotation from one extreme position to the other.

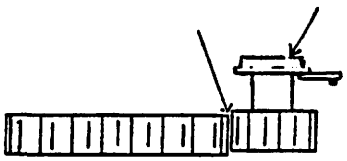
Solenoid Actuators - MUST be bottomed out for full throw of the linkage. When bottomed out, the rod activates a hold coil relieving the high amperage pull coil. If the pull coil does not disengage, the solenoid will burn out.

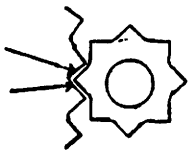
Boom Extend Chain Adjustment - should be as follows: one inch of droop or chain sag for every ten feet of the unit. Example: 6" = 60' Adjustment is accomplished by tightening or loosening the chain anchor adjusting bolts located on the mid boom section.

IMPORTANT!!! MAINTAIN EQUAL TENSION ON BOTH CHAINS WHEN ADJUSTING.

Swing Gear & Pinion Shaft Backlash - should be set with ZERO BACKLASH! Also note, NO PRE-LOAD of the pinion shaft to the swing bearing is allowed! To adjust, loosen the gear box side lock bolts and adjust the front lock bolts until the proper backlash is attained. After proper adjustment has been made, retighten the side lock bolts and re-torque the foot mount plate bolts.

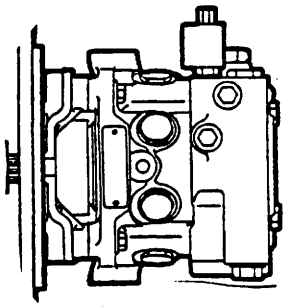
Vertical Swing Reducer Adjustment -





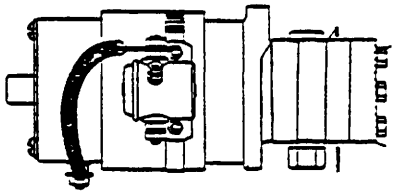
When adjusting the vertical swing reducer assembly, the essentric bushing located under the reducer must be turned. To accomplish this, remove the locking "T" plate which locks the essentric bushing in place. This is located on the superstructure in front of the swing reducer. Loosen the foot mount plate bolts and turn the essentric bushing by means of a screwdriver or any flat object. NOTE: NO BACKLASH OR PINION PRE-LOAD IS ALLOWED IN ADJUSTMENTS!!!!!! After adjustment has been completed, replace the locking "T" plate and retorque the foot plate bolts.

Main Pump Adjustment: John Deere Pump -

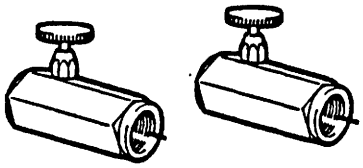


To adjust the system pressure, locate the adjusting screw on the side of the main pump adapter plate. Loosen the lock nut and while viewing the pressure guage, set system pressure to setting specified on the unit serial number tag. After system pressure has been attained, lock the adjustment screw in place. Again re-stroke the pump and check setting on the pressure gauge.

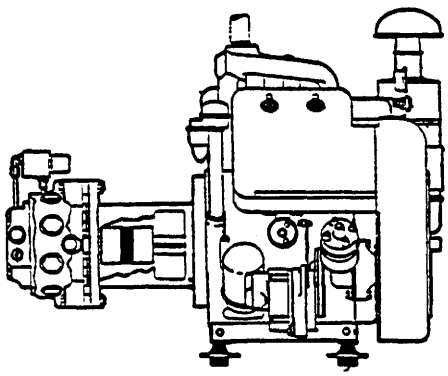
Emergency Pump System Pressure Adjustment -



System pressure is adjusted on the emergency pump by removing the cap over the adjustment screw and turning the screw in or out to increase or decrease pressure accordingly. NOTE: SYSTEM PRESSURE MUST NOT BE ADJUSTED WITHOUT THE USE OF A PRESSURE GUAGE!!!!!!!

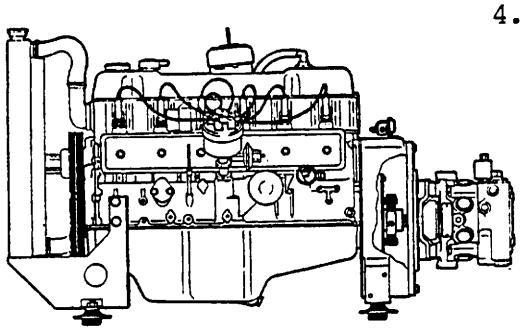


Function Speed Adjustment - is located on both the upper and lower valve bank assemblies. By loosening the locking jam nut and turning the knurled thumb screw in or out, will increase or decrease function speed. A chart showing function speeds can be found in this manual. Unit speeds are factory set, however; some modification may be needed after receipt of the unit.



Engine RPM's -------

Wisconsin V465 65HP	----------	2500 RPM
VH4D 30HP	----------	2500 RPM
W4-1770 35HP	----------	2600 RPM
Duetz Diesel	---------- Idle	1800 RPM
	---------- High	2500 RPM
Ford	---------- Idle	RPM
2.3 Litre 4 Cylinder & 4.9 Litre 6 Cylinder	----- High	2750 RPM



Bolt Torque Specification For Current Production Models

Model	Upper Bearing & Lower Bearing
MPN 30	9/16-12 Grade 8 bolt w/hardened flatwasher torque to 120 ft/lbs.
MPN 40 MP 40 MP 50 MPN 55	5/8-11 Grade 8 bolts w/hardened flatwasher torque to 170 ft/lbs
MP 60 MPH 60 MP 70 MP 80 MP 80N	3/4-16 Grade 8 bolts w/hardened flatwasher torque to 340 ft/lbs

Wheel Torque

Model	Front Wheel	Rear Wheel
MPN 30	9/16-18 Grade 5 stud w/lug nut and flatwasher. Torque to 95 ft/lbs	1/2-13 Grade 8 bolt w/ lockwasher,torque to 85 ft/lbs.
MPN 40 MP 40 MP 50	9/16-18 Grade 5 stud w/ lug nut & flatwasher Torque to 95 ft/lbs	1/2-20 Grade 5 stud w/ lug nut and flatwasher Torque to 70 ft/lbs
MPN 55 MP 60 MPL 60 MP 70 MP 80	3/4-16 Grade 5 stud w/ lug nut. Torque to 200 ft/lbs.	3/4-16 Grade 5 stud w/ lug nut. Torque to 200 ft/lbs

NOTE: ALL BOLT TORQUES ARE CALCULATED USING A LUBRICATED TORQUE SPEC. LUBRICATE ALL BOLTS BEFORE INSTALLATION.

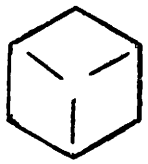
Model	Drive Hub Torque
MPN 30	5/8-11 Grade 5 bolts w/lockwasher torque to 120 ft/lbs
MPN 40 MP 40 MP 50	1/2-13 Grade 8 bolts w/lockwasher torque to 85 ft/lbs
MPN 55 MP 60 MPL 60 MP 70 MP 80 MP 80N	5/8-11 Grade 5 bolts w/lockwasher torque to 120 ft/lbs

Recommended Torque Specification

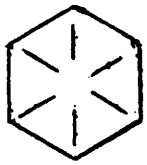
TORQUE IN (LBS.—FT.)

BOLTS, CAPSCREWS, STUDS AND NUTS

Grade 5 Identification, 3 Radial Dashes 120° Apart on Head of Bolt



Grade 8 Identification, 6 Radial Dashes 60° Apart on Head of Bolt



COARSE THREADS	Grade 5 Dry	Grade 5 Lubricated or Plated	Grade 8 Dry	Grade 8 Lubricated or Plated
3/8 — 16	31 — 34	23 — 25	44 — 48	33 — 36
7/16 — 14	49 — 54	37 — 41	70 — 77	52 — 57
1/2 — 13	75 — 83	57 — 63	106 — 117	80 — 88
9/16 — 12	109 — 120	82 — 90	153 — 168	115 — 127
5/8 — 11	150 — 165	113 — 124	212 — 233	159 — 175
3/4 — 10	266 — 293	200 — 220	376 — 414	282 — 310
7/8 — 9	394 — 433	296 — 326	606 — 667	455 — 501
1 — 8	591 — 649	443 — 489	909 — 1000	682 — 750
1 1/8 — 7	794 — 873	596 — 656	1288 — 1417	966 — 1063
1 1/4 — 7	1120 — 1232	840 — 924	1817 — 1999	1360 — 1496

FINE THREADS	Dry	Lubricated or Plated	Dry	Lubricated or Plated
3/8 — 24	35 — 39	26 — 29	49 — 54	37 — 41
7/16 — 20	55 — 61	41 — 45	78 — 86	58 — 64
1/2 — 20	85 — 94	64 — 70	120 — 132	90 — 99
9/16 — 18	121 — 133	91 — 100	171 — 188	128 — 141
5/8 — 18	170 — 187	128 — 141	240 — 264	180 — 198
3/4 — 16	297 — 327	223 — 245	420 — 462	315 — 347
7/8 — 14	434 — 477	326 — 359	668 — 735	501 — 550
1 — 12	646 — 711	485 — 534	995 — 1096	746 — 821
1 1/8 — 12	891 — 980	668 — 735	1445 — 1590	1083 — 1191
1 1/4 — 12	1240 — 1364	931 — 1024	2012 — 2213	1509 - 1660

APPROVED BY AXLE ENGINEERING

REVISED JANUARY 8th, 1962

FUNCTION	MP40	MPN40	MP60	MPL60	MP80
High speed Drive- 5 Revolutions	10-13	10-13	12-15	18-21	12-15
Low speed Drive- 5 Revolutions	60-75	60-75	75-100	90-110	75-100
Boom Up Function	36-40	36-40	75-80	65-70	90-95
Boom Down Function	47-53	47-53	82-89	72-82	105-110
Boom Extend	32-35	32-35	45-50	38-47	60-65
Boom Retract	53-57	53-57	45-50	56-72	60-65
Swing - 90 Degrees Right & Left Within 6%	30-33	30-33	40-45	40-45	60-65

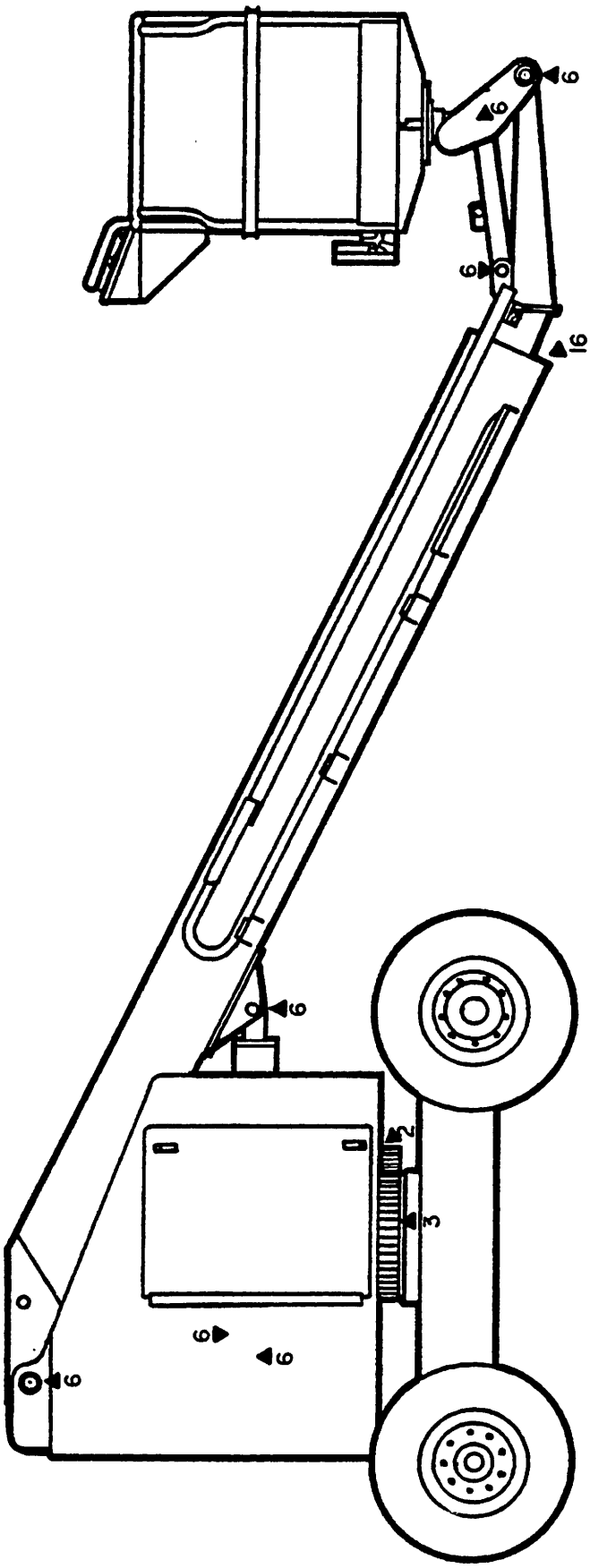
Note: These speeds may vary per unit due to special construction applications. The speeds listed above are for current standard production models manufactured from current Simon specification data sheets.

Nomenclature	Specification and Level Fill	Interval	Fig. Item
Drive Wheel Power Hubs	SAE 90 SAE 85-140 ½ Full	Initial 100 HRS. then yearly or 1000 HRS, whichever comes first	1
Engine Oil	Summer SAE 10W40 Winter SAE 10W30 To Full mark on Dip Stick	Initial 50 HRS. then every 100 HRS. or sooner if the oil is dirty	8
Hydraulic Fluid	To Full mark on gauge with boom down and retracted Mobil DTE-13 Petro Prod. DTE-13 after Aug.1983	Analysis for serviceability 6 months, change every year	11
Boom Wear Pads	Spray Silicone	Every 6 months	16
Turntable Swing Bearing	Til new grease comes out at 45° intervals EP N.L.G.i. #2	Monthly or 100 HRS. whichever comes first	3
Cylinder Pins	Til new grease comes out EP N.L.G.i.#2	Monthly or 100 HRS. whichever comes first	6
Gasoline	Regular		9
Diesel Fuel	Type II		10
Steering Spindles	Til new grease comes out EP N.L.G.i. #2	Monthly or 100 HRS. whichever comes first	4
Wheel Bearings	Clean and repack EP N.L.G.i. #2	Yearly or 1000 HRS. whichever comes first	7

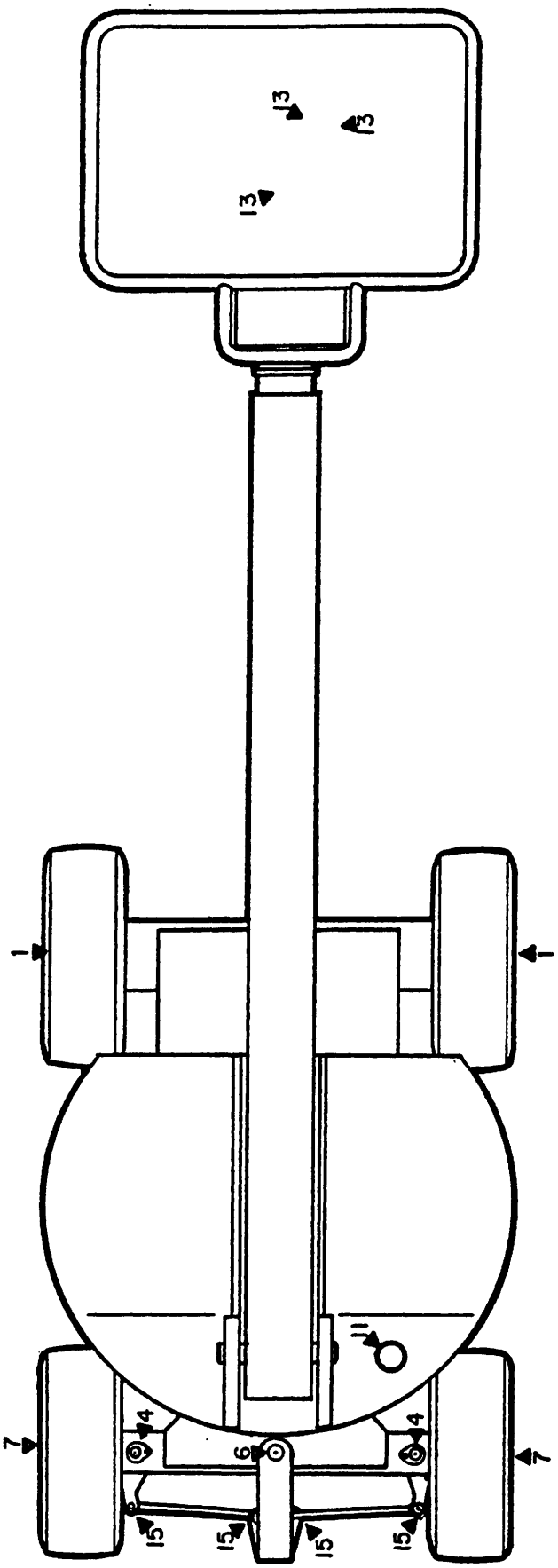
Lubrication Chart

2.2

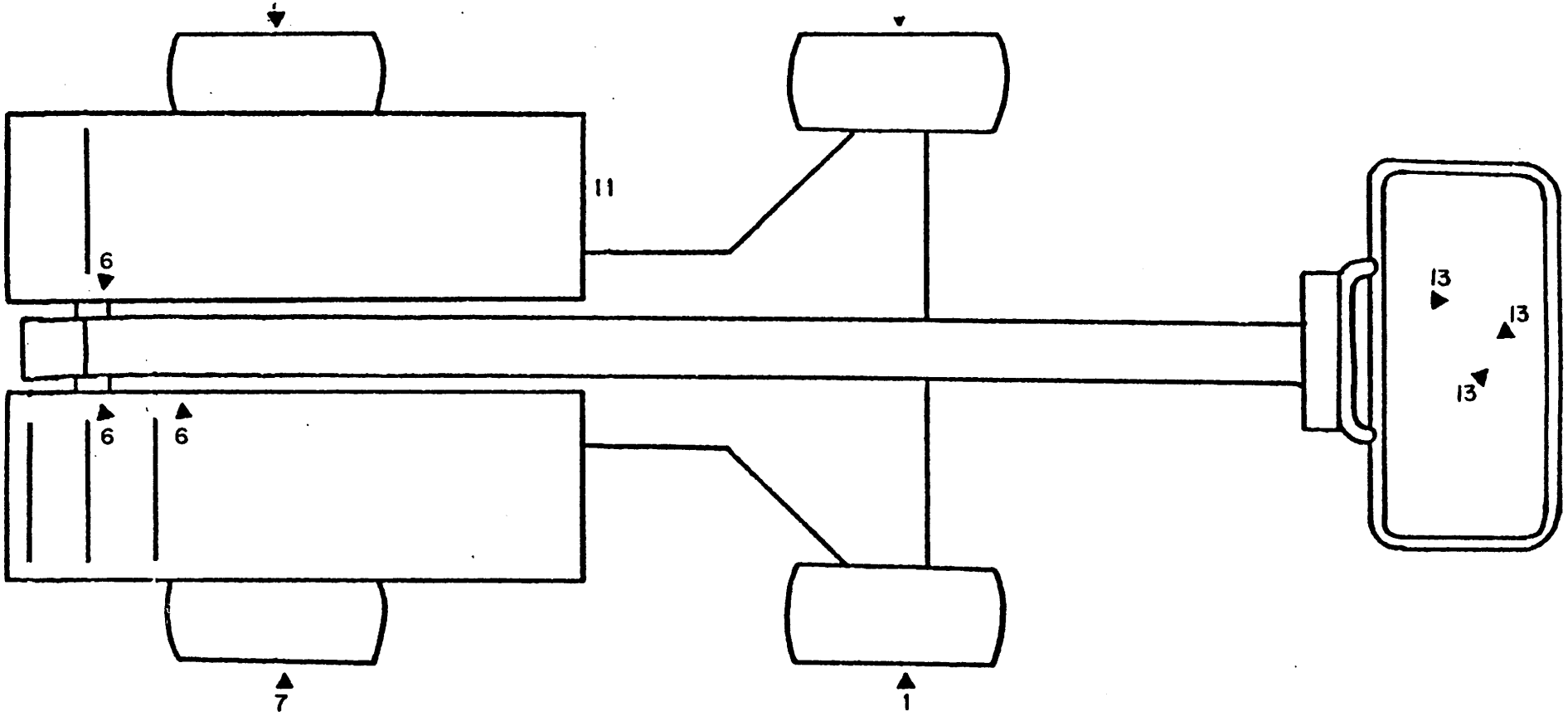
NOMENCLATURE	SPECIFICATION & FILL LEVEL	INTERVAL	
SWING REDUCER (SWING DRIVE)	OIL SAE 85-140 SAE 90W OR GREASE EP N.L.G.I. #1 WINTER EP N.G.L.I. #0	INITIAL 100 HRS. THEN EVERY YEAR OR 2000 HRS. WHICHEVER COMES FIRST	2
BOOM CHAIN SPROCKETS OF SHEAVES	EP N.G.L.I. #2 UNTILL NEW GREASE COMES OUT	MONTHLY OR 100 HRS. WHICHEVER COMES FIRST	5
BOOM CHAIN	WD 40 OR PENETRATING OIL	MONTHLY OR 100 HRS. WHICHEVER COMES FIRST	12
PLATFORM ROTATE MECHANISM	MULTI PURPOSE N.G.L.I. #2 UNTILL NEW GREASE COMES OUT	MONTHLY OR 100 HRS. WHICHEVER COMES FIRST	13
PLATFORM ROTATE TRUNNION (EARLY MODEL MACHINES)	MULTI PURPOSE N.G.L.I. #2 UNTILL NEW GREASE COMES OUT	MONTHLY OR 100 HRS. WHICHEVER COMES FIRST	14
STEERING TIE ROD ENDS	EP N.G.L.I. #2 UNTILL NEW GREASE COMES OUT	MONTHLY OR 100 HRS. WHICHEVER COMES FIRST	15



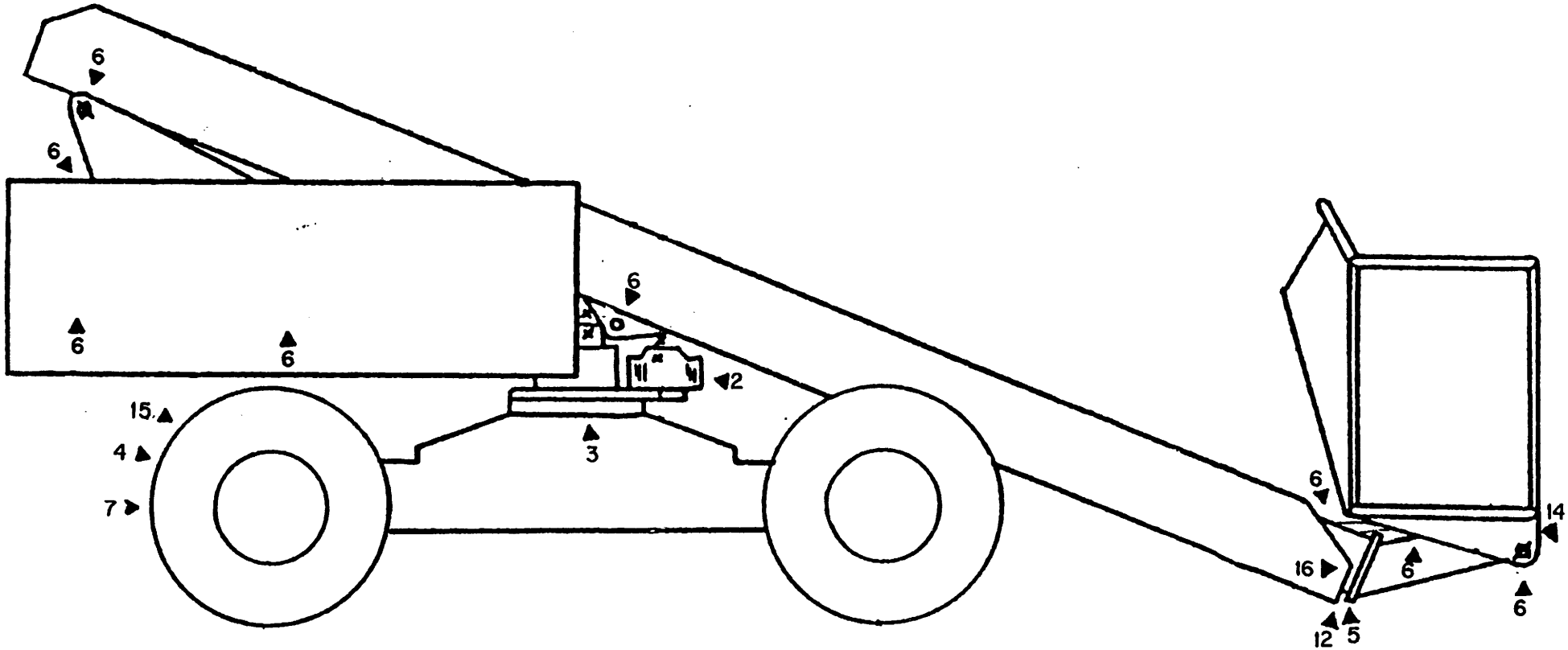
LUBRICATION DIAGRAM



LUBRICATION DIAGRAM



LUBRICATION DIAGRAM



LUBRICATION DIAGRAM

Mobil D.T.E.® 10 Series

PREMIUM HYDRAULIC OILS

The Mobil D.T.E. 10 Series of hydraulic oils was developed specifically to meet the requirements of modern hydraulic systems that must operate at low ambient temperatures or under widely varying ambient temperature conditions. In the marine trade, hydraulically operated deck and cargo handling equipment may be required to operate under tropic conditions at one port and under arctic conditions at the next port within a short period of time. These conditions require that the fluid has sufficiently low viscosity to permit start up of the equipment at the subzero ambient temperatures encountered, yet has sufficiently high viscosity to maintain system efficiency and minimize internal leakage when the system is fully warmed up or high ambient temperatures are encountered. These requirements can be met only by fluids with viscosity indices considerably higher than those of normal petroleum oils, and the fluids must be formulated so that mechanical shearing in the pumps and hydraulic elements does not cause excessive loss of VI and viscosity in service. In addition, these fluids must have the antiwear characteristics required for modern, high pressure hydraulic systems, give long service life, prevent rusting, separate readily from water, and resist foaming in service.

PRODUCT DESCRIPTION

The Mobil D.T.E. 10 Series are very high VI oils with carefully controlled low temperature flow properties. They are manufactured from highly refined base oils combined with selected VI improvers. Antiwear agents, rust and oxidation inhibitors, and a defoamant are also included. All components are selected and balanced to maintain, as nearly as possible, the good air release and water separation properties of the base oils.

In the development of the Mobil D.T.E. 10 Series particular attention was paid to the requirements of systems that must operate under widely varying ambient temperature conditions. A survey was conducted with major builders of marine hydraulic equipment and, based on their requirements, the viscosities of the series were selected. The survey uncovered a requirement for fluids with low, controlled viscosities at subzero temperatures, and viscosities high enough at the maximum anticipated operating temperatures to maintain system efficiency and minimize internal leakage. These desired viscosity-temperature characteristics are obtained in the Mobil D.T.E. 10 Series by selection of base oils with excellent low temperature flow properties and high VI and by the addition of a shearstable VI improver to the base blends. The VI improver used is selected for high resistance to shearing and viscosity loss under the conditions encountered in hydraulic systems. This shear resistance is illustrated by the results of a severe Diesel Injector Shear Test in which no member of the series exceeded 10 to 15 percent loss in viscosity at 100 °F (38 °C) after 10 passes through the injector.

Characteristic	Mobil D.T.E. 11	Mobil D.T.E. 13	Mobil D.T.E. 15	Mobil D.T.E. 16	Mobil D.T.E. 18	Mobil D.T.E. 19
API Gravity	31.9	29.2	28.6	27.8	27.5	27.1
Specific Gravity	0.866	0.881	0.884	0.888	0.890	0.892
Flash Point, °C	165	165	165	165	185	165
°F	329	329	329	329	329	329
Pour Point, max, °C	-45	-45	-45	-45	-40	-40
°F	-50	-50	-50	-50	-40	-40
Viscosity						
cSt 40 °C	15.0/18.5	32/34	48/49	68/72	100/104	145/151
100 °C	4.12	6.37	8.38	10.87	12.87	17.23
cSt 100 °F (37.8 °C)	17.41	36.05	52.42	76.91	113.02	165.9
210 °F(98.9 °C)	4.20	6.51	8.56	11.14	13.22	17.78
Viscosity Index, min	145	145	145	135	120	120
Brookfield Viscosity						
cP @ 0 °F, max	500	1250	2500	4500	9500	20,000
@ 0 °F, typ	350	940	1730	3390	7790	18,770
@ -20 °F, max	1250	3650	6900	18,000	67,750	263,000
@ -20 °F, typ	1130	3300	6250	16,500	61,600	239,000
@ -30 °F, typ	3200	7680	13,500	43,800	220,000	—
@ -40 °F, typ	10,500	19,300	57,800	161,000	—	—
Low-Temperature Pumpability						
Delivery @ 0 °F(-18 °C), gpm	8.2	6.8	4.7	2.7	1.5	0.5
Efficiency @ 0 °F(-18 °C), %	99	88	63	36	20	7
Total Acid No., min	0.8	0.8	0.8	0.8	0.8	0.8
Zinc, % wt. min	0.06	0.06	0.06	0.06	0.06	0.06
Rust Test, ASTM D665, Synthetic Sea Water	Pass	Pass	Pass	Pass	Pass	Pass
Emulsion Test, ASTM D1401, min to 40-37-3	30	30	30	30	30	30
Foam Test, ASTM D892 Tendency, Stability, ml Seq. I, II, III	20/0	20/0	20/0	20/0	20/0	20/0

Contamination Checks:

A. Comply with a contamination analysis using the following as a guide in determining the requirement. By utilizing a hydraulic system check, the life of the Simon Aerial's lift will be enhanced.

1. Change the hydraulic fluid any time the engine driven pump is changed.

2. If fluid discoloration is evident in the reservoir sight glass, change hydraulic fluid and flush complete hydraulic system.

3. After the first 50 hours of operation the high pressure filter element indicates a plugged condition (Schroeder filter only). Remove and replace the element to again filter full fluid flow.

4. Change the hydraulic oil whenever the high pressure filter indicates a high metal content.

5. Change hydraulic oil if the valves in the main valve bank assembly have a continuous problem with the spools sticking. Note: Valve stack hold down bolts should be torqued to 15 ft/lbs.

6. Hydraulic fluid should be changed once a year under normal conditions.

7. Hydraulic fluid should be changed every 6 months under dirty or dusty conditions.

B. If the above schedule is followed, it will prevent premature system component wear to include cylinder seals, drive motors and early failure of the pump. It will also decrease unit down time.

C. A contamination anaysis should be accomplished by a qualified laboratory with the following information to insure a proper analysis and recommendations.

1. Type of oil (the type of oil at initial fill is Mobil DTE-13)
2. Serial number of the unit having the analysis and the type of unit, ie: mobile aerial platform.
3. Purpose of the analysis, ie: pump failure, discolored oil, etc
4. Type of analysis, ie: complete to show additive breakdown, acid build-up, viscosity, type and percent of contaminants, etc. There should also be a comparison to new oil data specs plus analysis recommendations.

D. If flushing and replacement of hydraulic fluid is recommended, refer to flushing procedures.

A. Drain, flush and refill the main hydraulic tank

If the hydraulic system is severely contaminated, several system flushings may be needed.

B. Remove the system return hose from the hydraulic oil tank. Cap the hydraulic tank fitting and put the open system return hose in an empty container to catch the contaminated system fluid.

NOTE: it is recommended to use a filter cart and external pumping in the following procedures. The main engine driven pump may be used but CAUTION should be used to insure that the pump does not cavitate. In either case, during flushing, the system pressure should be between 600 and 1000 PSI during flushing except for boom lift which you may need to increase to move the boom. The engine RPM's should also be set at 1650 RPM to reduce the GPM.

C. Remove the brake return hoses at the drive motors and allow 1 quart of fluid to drain from each hose with a fresh supply coming from the reservior. Reinstall brake return hoses.

NOTE: If a pumping unit is being used, connect the output to the engine pump pressure hose. Start the pump being used and run until gallons of fluid are drained.

CAUTION - MAKE SURE THAT THE MAIN HYDRAULIC PUMP KEEPS A PRIME!!!

D. While standing at the ground controls, activate the destroke toggle switch (main pump / aux. pump). This will bring the pump on line causing fluid flow.

NOTE: During the following steps, hydraulic fluid will be exiting from the open system return hose which MUST be in a suitable containing reservior. If this hose is not contained, hydraulic fluid will drain on the ground. Continuous monitoring of the reservior fluid level or fresh hydraulic oil supply MUST be maintained to prevent cavitation. Also, when servicing the hydraulic system from an external drum, keep the pickup tube at least one (1) inch above the bottom of the drum to keep from picking up drum contaminants.

ALL CYLINDERS MUST BE IN THEIR STOWED POSITIONS <u>BEFORE</u> STARTING THIS PROCEDURE.

E. Raise the boom 3 feet then lower it completely 3 times

Raise the boom to full extention

Lower the boom 3 feet then raise it back to the fully raised position twice.

F. Extend the boom for 5 seconds then retract it completely 2 times.

Extend boom fully.

Retract the boom for 5 seconds then extend it to the full out position twice.

G. Reconnect the system return hose to the pump, retract and lower the boom.

CAUTION: MONITOR THE RESERVIOR FLUID LEVEL WHEN LOWERING AND RETRACTING THE BOOM TO PREVENT THE RESERVIOR FROM OVER FILLING AS MORE HYDRAULIC FLUID ENTERS THE RESERVIOR THAN WHAT IS LEAVING.

H. Disconnect the system return hose as in step. B

I. Extend the boom until high speed drive disengages and raise the drive tires from the ground. Operate the drive until 5 gallons of oil pass through the return hose. Then reverse the drive for 5 more gallons to pass in the reverse mode of operation. Lower the unit to the ground.

J. Cycle the steer cylinder to the full stroke position in both directions twice.

K. Cycle any remaining cylinders twice except platform rotate and platform level.

L. Reconnect all removed hoses to their respective positions.

M. Disconnect the return hose at the free flow end of the check valve under the platform control panel. Plug this line. Install another hose on the check valve and put the loose end in an empty container.

N. Cycle platform rotate two full times then cycle platform level for two more full cycles.

O. Disconnect the master leveling cylinder hoses at the master cylinder and operate the manual leveling valve in both directions until at least 1½ gallons of oil have passed through each disconnected hose. Reconnect the rod end hose and bleed air from the hose before tightening the hose fitting.

P. Raise the boom to its full up position catching the fluid passing out of the blind end port of the master leveling cylinder.

Q. Reconnect the blind end hose to the master leveling cylinder bleeding the air from the hose before tightening the hose fitting.

R. While lowering the boom, use the manual selector for platform leveling through 2 complete cycles of operation.

S. Restore unit to full operating capacity by reconnecting all hoses and resetting system pressure. Fill the hydraulic reservior to the full mark on the sight guage.

T. Operate all functions to their extreme positions and insure that the platform levels properly when booming up and down.

U. Check to make certain that reservior pressurization is operating by pressing the red button on the hydraulic reservior cap. Escaping air should be heard when the button is depressed.

V. If all the systems are operating properly, check for leaks and repair as needed.

A VARIABLE DISPLACEMENT PRESSURE COMPENSATED RADIAL PISTON PUMP

This pump has 8 inlet and 8 discharge valves, 8 pistons, 8 piston springs, a cam, crankcase control valve, crankcase pressure control orifice and pressure regulator (compensator). It is obvious that as the shaft turns, the pistons move upward and downward.

On the downward piston stroke fluid is drawn into the piston from the reservoir through the inlet valve; on the upstroke the fluid is exausted through the outlet valve and into the system.

On this pump the displacement is varied by reducing the piston travel. How is this accomplished? First let us examine the piston and its spring in relation to the crankcase pressure. Observing that the force applied downward inside the piston (i.e. toward the cam) is the spring force; and also, noting that the force upward (away from the cam) is the pressure force, (crankcase pressure) acting on the piston, it follows then that whenever the pressure force is greater than the spring force, the piston will be suspended some distance away from the cam, of course dependent on the magnitude of the crankcase pressure. Consequently the piston would be in equilibrium. Of course as the crankcase pressure is further increased, the piston stroke will be reduced even more and vice-versa.

The next question that would seem to arise is: How is crankcase pressure increased and decreased to change the piston stroke? This change is accomplished by the pressure compensator and the crankcase orifice. Let's examine the compensator first. On our generalized pump drawing we see a hollow poppet type valve with a spring holding the poppet on the seat. The system pressure is acting on the poppet lip with a force equal to the spring force on the poppet. If the poppet were preloaded against the seat by the spring then the poppet would not move away from the seat untill the pressure force acting on the poppet were greater than the spring force. Of course as the poppet moves away from the seat, a flow path is open to the crankcase from the discharge side of the pump (system pressure). Observe that the exit from the crankcase is restricted by the crankcase orifice, resulting in as increase in crankcase pressure as the fluid passes from the crankcase orifice and back to the pump inlet. As stated earlier, the increase in crankcase pressure reduces the piston stroke.

The compensator poppet has a hollow center. It is through this passage that we maintain throttle control of the pump by changing the flow rate to the pump crankcase, via the foot pedal or ground handle. This procedure is effective until system pressure reaches compensator poppet cracking pressure at this point, (200-250 PSI below system pressure setting). The pump will be able to deliver its peak or maximum volume dependent only upon system demand for this volume. As system pressure increases past this point, the pressure acts on the compensator poppet gradually allowing the poppet to open, in turn adding fluid to the crankcase overcoming the capacity of the 60 thous-

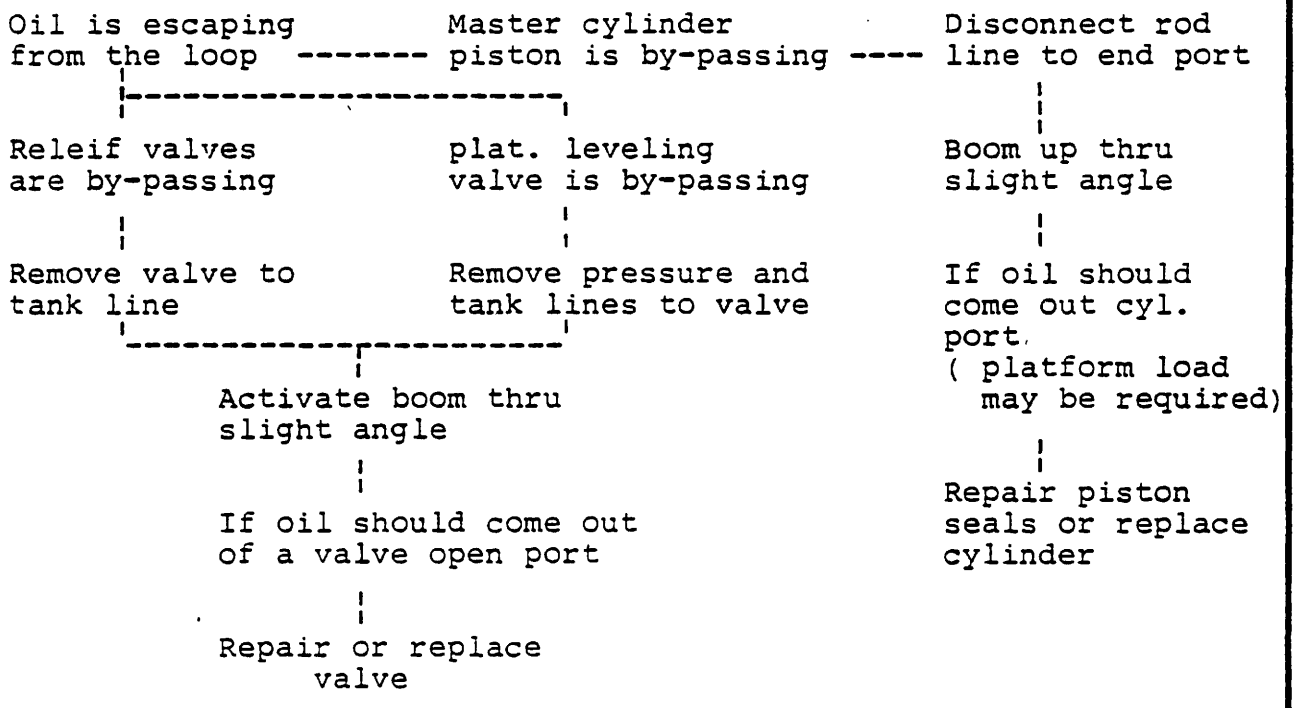
sanths orifice and building up crankcase pressure until the pump pistons are suspended far enough from the cam to allow only the fluid needed to keep the pump in a static state (1GPM).

As system pressure is lowered from compensator cracking pressure, volume and pressure capabilities of the pump are reduced until only the pressure required to keep the pistons off the cam and allowing 1 GPM volume flow are met.

Platform Ratchets or Does Not Level Properly

Platform does not stay level while booming up or down.

1. Check for platform drifting
2. Check for damaged parts such as bent pins or elongated pin holes



Platform Drifting

With engine off, platform does not stay level

Oil is escaping from the slave cylinder ---- Internal leak ---- Disconnect lines to cylinder (place load in platform if needed to create drifting)

External Leak

Tighten or replace part

No oil leakage. Platform only drifts a short distance.

Repair piston seals or replace cylinder

Oil comes out retract port

Tighten, repair or replace holding valve.

Oil comes out extend port

Repair piston seals or replace cylinder. Also, repair and/or replace holding valve.

PROBLEM:

1. Boom trac cross braces breaking.
   A. Check for hose skiving in the boom trac. If skiving is noted, proceed to step B.
   B. If system pressure is too high, it will cause the boom hoses to shrink more than normal. If pressure is normal, proceed to step C.
   C. If the hydraulic system pressure is normal, the hoses are run too tight in the trac. To achieve proper hose tension, it may be necessary to adjust the hoses 3 or 4 times, (hoses too loose may get pinched under the trac).

2. Boom trac sagging.
   A. The lowest portion of a sagging trac has the pin holes stretched usually caused by a damaged 'I' beam support (high spots and twisting). If the unit is equipped with an overhead guard, the trac could also get caught on a damaged guard which could also tear off the moving anchor.
   B. Lack of lubrication and cleaning.

3. Boom extend and retract is rough (3 piece boom only).
   A. Check boom chain tension, extend the boom fully, then retract approx. 12 to 18 inches. Check the lowest point of the chain from the mid boom. The chain should be 1 inch for every 10 foot of unit model, i.e. MP-80 and 8 inch sag. If too loose, the chain sprockets may be destroyed.
   B. Excessive sand or grit inside the boom.
   C. Grease on boom collecting grit. The booms are dry running and should require no greasing. Use bonded silicone spray only.
   D. The inside chain anchor block is worn and has sharp edges grabbing the lower base boom when retracting.
   E. The lower extend holding valve is out of adjusment or other internal hydraulic adjustment, i.e. the flow valves on the extend control valve.
   F. The inner or outer chain has frozen or has stiff links. Clean and lubricate with a penetrating oil, it may be necessary to soak the chain overnight to remove the kinks and stiff links.

4. Cabs equipped with a center rotate trunnion loose.
   Loose trunnion bolts.

5. Boom will only raise if the cab rotate, leveling flow valve is closed.

   A. The cab rotate or leveling valve is leaking internally causing system pressure to be reduced by fluid bypassing

6. Boom will not retract from the fully extended position only.

   A. Hydraulic system pressure filter dirty, Schroeder filter only.

   B. Hydraulic system pressure low.

   C. Grit on boom sections, it may be necessary to lubricate the bottom of the mid and tip boom with a dry-type silicone lubricant.

7. Unit will not go into high speed drive with boom retracted and lowered.

   A. Filter dirty (Schroeder filter only, see filter element in specifications).

   B. On units equipped with only one high speed drive valve, and the low speed drive valve is inoperative. The low speed will bypass drive fluid slowing down drive speed somewhat (see item 9).

8. Unit will not drive with the emergency pump.

   The low speed drive valve is inoperative.

9. Snap-Tite selector valves cracking the body or blowing the body seal.

   A. Caused by back pressure on the return port. Insure that the pressure and return hoses are connected properly.

   B. Check for blocked or partially blocked return hoses.

   C. For the cab rotate and leveling vlaves, insure that the check valve is installed with the arrow pointing down (away from the selector valves). Check for internal leakage of the check valve.

10. Valves sticking in valve bank.

   A. Too much valve body bolt torque and/or uneven torque. The nuts should be torqued to 15 foot pounds.

   B. Valve body facing not milled square causing uneven valve stack and resulting in a distorted valve body.

   C. Improper hydraulic oil in the unit. Many fluids will not mix properly causing different additives to break down and disturbing varnishes on moving and unmoving surfaces resulting in eventual failure of a component.

   D. Contaminated hydraulic fluid, or old fluid. A sample should be examined and measured against original specifications of the fluid used. All fluids will get tired with age and abuse.

   E. On older units, the spring in the low speed drive needle flow valve may have gotten into a drive valve jamming the spool.

WHEEL DRIVE MOTOR FAILURE

11. CAUSE OF FAILURE

A) Contamination - If one motor failed, the internal loose pieces will eventually flow into the opposite motor causing that motor to fail.

B) Improper installation of needle bearings.

C) Excessive bearing loads caused by high speed braking with brakes set for full application.

D) Useful bearing life exceeded caused by braking loads.

E) System not flushed or protected properly after components failure within the drive circuit.

F) Use of poor quality oils or worn-out oil will decrease the life of any component.

G) Towing machine with hubs engaged.

H) Cavitation - Motor running faster than input is available causing ratcheting.

I) Motor stopping unit, i.e. brake adjustment closed too far, low speed flow valve has a malfunctioning check valve.

12. SWING GEAR PINION SHAFT, TOOTH AND/OR RING BEARING FAILURE

CAUSE OF FAILURE

Shock = excessive side loading of boom. Unit throttling not being used, causing instant on and off of the swing motion i.e. foot pedal being blocked to the on position, the foot pedal being operated before the controller or the hydra-port control not being maintained for throttle control. Lack of gear lube causing gears to bind. Pinion gear too tight (no backlash to ring gear). Gear box loose causing the load to be at the ends of the gears instead of being evenly distributed over the teeth of the pinion which will also cause ring gear teeth wear due to slippage. Foreign objects caught between the teeth forcing the pinion away from the ring gear.

13. HYDRAULIC PUMP COUPLING FAILURE

A. Hayes Coupling: Splined coupling not locked to splined shaft, causing coupling to move away from insert resulting in insert destruction and ensuing coupling failure.

B. Browning Coupling: The splined half will move on the spline, eventually working into the back of the pump and destroying the spline. A stop should be welded into the coupling to prevent it from moving into the pump.

14. Low speed drive valve inoperative in low speed drive mode only.

    A. Spool sticking.

    B. A low resistance in one of the high speed drive valve coils. Each coil should have 4 ohms resistance, if a high speed drive valve has less than 4 ohms resistance, excessive voltage will feed across the coil to the opposite coil of the low speed valve trying to be operated. Thus both coils are trying to actuate.

15. One tire leaves the ground when the boom is extended over a corner of the unit.

    A. The unit is not on level ground.

    B. The unit capacity has been exceeded.

    C. Tires are under-serviced with calcium chloride solution. This condition could also rust out the rims, as the normal liquid level is over the top of the rim to reduce oxygen concentration.

EXCESSIVE HEAT Excessive heat will cause excessive wear on seals and metal parts due to lowered viscosity.

Symptoms = Pump case turns brown, darkens or hydraulic oil darkens. Premature pump failure.

Causes:
1. Excessive water content in the oil.
2. Improper oil viscosity.
3. Pump cam bearing failure.
4. Lack of lubrication, worn out oil, improper oil.
5. Stroke flow valve opened.
6. Foot pedal blocked closed.

Corrective Action:
1. Drain and flush system, rebuild pump as required.
2. Close pump stroke valve.

WATER IN FLUID

Symptoms = Pitting and etching of pump pistons with eventual pump piston cam wear causing heat build up and premature pump failure.

Corrective Action: Drain and flush system. Replace worn pump components. Check reservoir pressurization.

THE MOST COMMON CAUSES OF HYDRAULIC SYSTEM MALFUNCTIONS IN ORDER

1. Incompatible hydraulic oils mixed, destroying the additives and causing varnish build up resulting in the valves to stick.

2. Water in the oil due to a damp climate and reservoir pressurization inoperative.

3. Improper oil used; viscosity too high cold climates, viscosity too low warm climates. Note: Mobil DTE-13 is a multiple viscosity oil that is light enough for cold climates and resists thinning in warm climates.

4. Fuel in the oil, lowers the viscosity and lubricity of the oil.

VARNISH Varnish is the dark brownish residue left from oxidation of hydraulic fluids.

Symptoms = This residue will cause pistons and spools to stick and will hang up moving parts with close tolerances.

Causes:
1. Mixing incompatible oils or use of poor quality oils.
2. Excessive heating of the oil.

Corrective Action: Drain and flush system.

CAVITATION Cavitation is a gaseous condition within the fluid stream where the pressure is reduced to the vapor pressure of the fluid. The higher the system pressure the more violent the reaction will be.

Symptoms = Pitting and etching of pump pistons.

Causes:
1. Low reservoir fluid level.
2. Air leaks in suction line.
3. Oil viscosity too high, improper oil used.
4. Cold hydraulic fluid.
5. Pump speed too high.
6. Vaporization of water.

Corrective Action:
1. Warm up system before using full system pressure or adjust system as required.
2. Have fluid analyzed regularly and use proper hydraulic fluid.
3. Repair any suction hose leaks.
4. Insure reservoir pressurization is operating properly.

POOR LUBRICATION Parts break through lubricant causing metal to metal contact.

Symptoms = Heads of pump pistons worn to shape of cam. Excessive heat build up.

Causes:
1. Fluid viscosity too low.
2. Lack of anti wear additives in the oil.
3. Fluid contaminated with water or other low viscosity liquid.
4. Improper or poor grade oil used.

Corrective Action: Drain and flush system, install recommended hydraulic oil.

Ref #

1 Hydraulic Directional Control Valve - Ground Control

This valve is a 3 position, 4 port valve which is manually operated to its seperate work ports. This directional control valve selects fluid pressure to the lift function there by raising or lowering the boom.

2 Hydraulic Directional Control Valve - Platform Control

This valve is also 3 position, 4 port valve which is manually operated to its seperate work ports. This directional control valve will also select fluid pressure to the lift cylinder.

3 Shuttle Valves -

The shuttle valves allow fluid pressure to pass from the actuating directional control valve to the extend cylinder without pressurizing the opposite control spool.

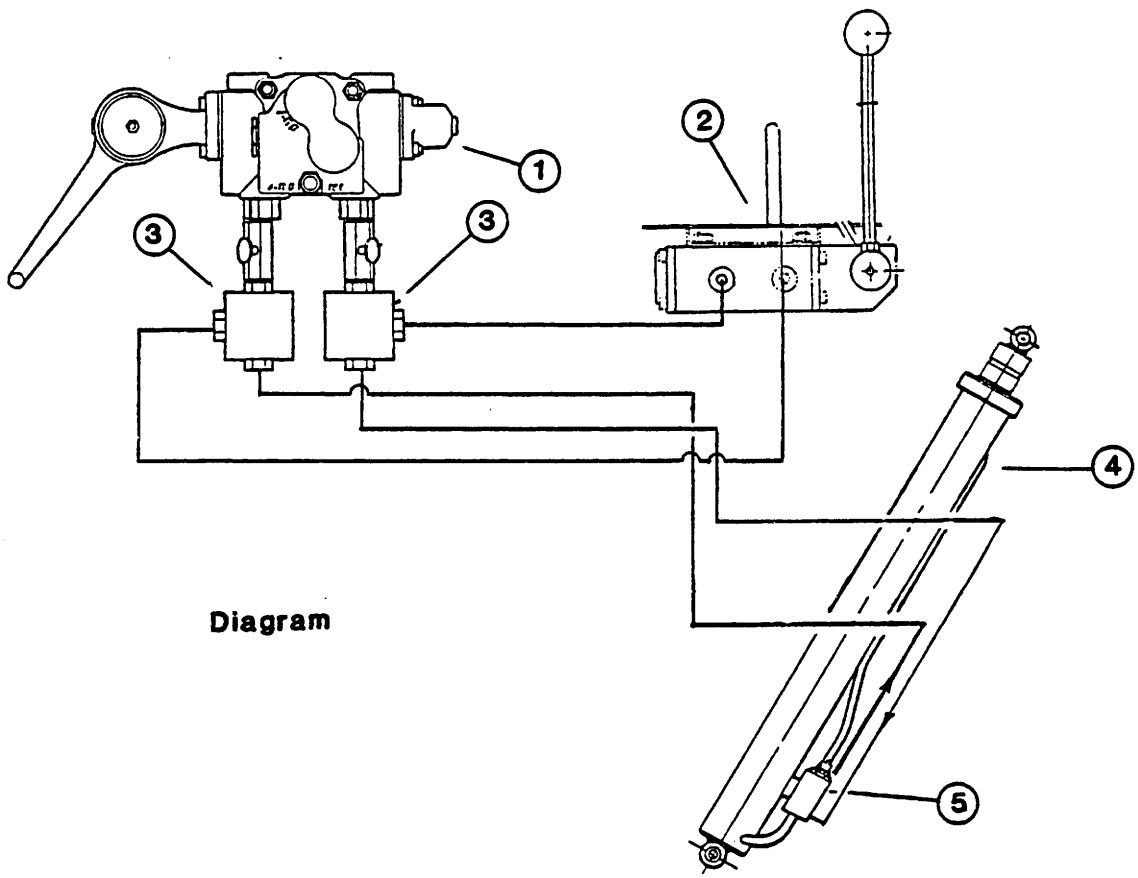
4 Lift (Hoist) Cylinder -

This cylinder is a double acting type which powers the boom up and down. This cylinder also supports the weight of the telescoping boom.

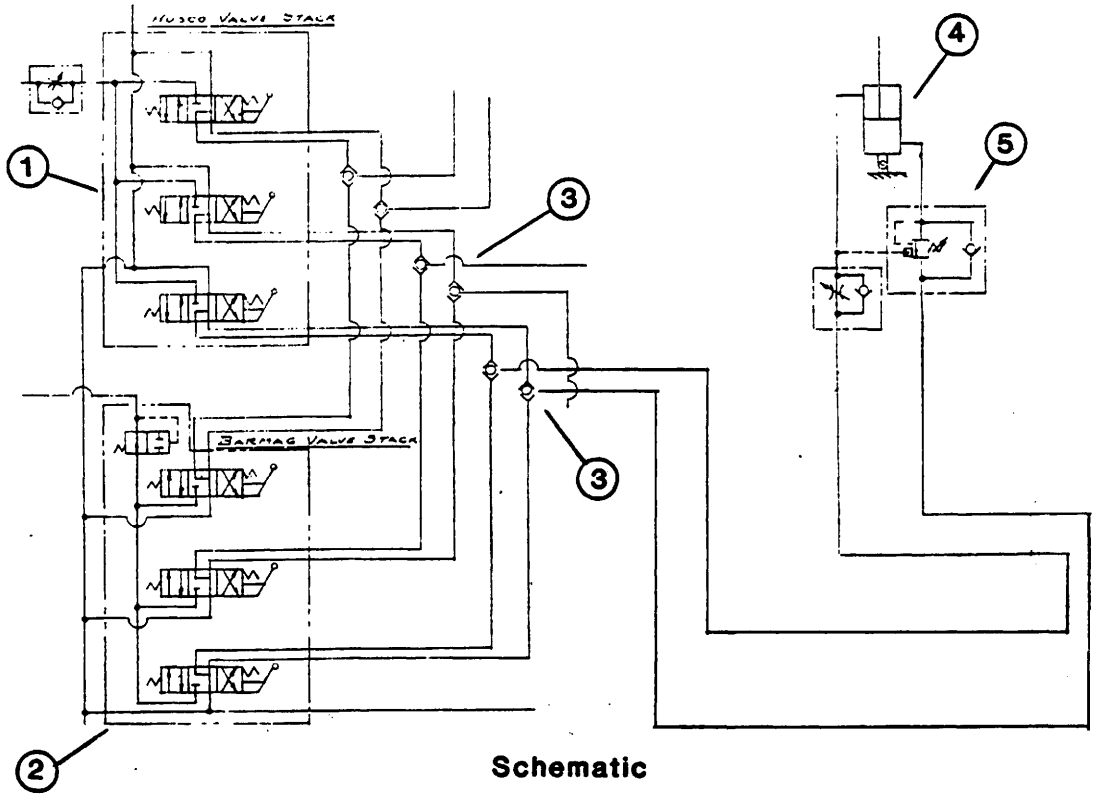
5 Holding Valve -

The holding valve prevents unintentional boom movement. It allows free fluid flow into the blind end of the lift cylinder raising the boom thus causing the up function. However; the holding valve will not allow fluid to pass from the blind end of the lift cylinder until pressure in the rod end overcomes a pilot spring force opening the pilot spool. This in turn causes the boom down function.

ITEM	TROUBLE SHOOTING	ADJUSTMENTS	REPAIR	MISC.	PARTS
Selector Valve	**m5.4**				
Holding Valve					D9
Lift Cylinder					D9
Flow Control Valve		M1.3			D9



Diagram



Schematic

Ref #

1 Hydraulic Directional Control Valve - Ground Control

This valve is a 3 position, 4 port valve which is manually operated to its seperate work ports. This directional control valve selects fluid pressure to the telescope function there by extending and retracting the boom.

2 Hydraulic Directional Control Valve - Platform Control

This valve is also a 3 position, 4 port valve which is manually operated to its seperate work ports. This directional control valve will also select fluid pressure to the extend / retract mode of operation.

3 Shuttle Valves -

The shuttle valves allow fluid pressure to pass from the activating directional control valve to the extend cylinder without pressurizing the opposite control spool.

4 Telescope Cylinder -

The telescope cylinder controls the extend and retract of the boom. On larger units, the cylinder is trunion mounted, allowing the cylinder barrel to extend with the mid boom. This cylinder is a double acting type cylinder which allows fluid to pass through drilled passages extending the entire length of the telescope rod. The advantage to this is there is no tranfer tube externally mounted on the cylinder.

On smaller units, the telescope cylinder is conventionally mounted with the barrel stationary while extending with the rod. This cylinder has a transfer tube externally mounted on the cylinder barrel and the telescope rod is not thru drilled.

5 Holding Valves -

Two load holding valves are utilized in the extend / retract circuits. This is done to prevent unintentional boom movement.

Ref #

6 Pressure Reducing Valve -

The pressure reducing valve utilized in conjuntion with the telescope circuit is designed to be intregal part of the extend function. While not being directly related to the retract mode, the pressure reducing valve allows only a predetermined pressure to be seen on the extend side of the cylinder. This predetermined pressure is factory set at Simon Aerials and MUST NOT BE CHANGED!

Mechanical Extend Function -

On three piece booms, the third section is chain or cable operated depending on the model.

The second section of the boom is cylinder driven as the cylinder is connected between the first and second boom sections. This is called a trunion mounted cylinder application.

The first boom section is the base boom. This section holds the second and third boom sections and allows them to extend and retract.

The Simon two piece booms utilize a base boom and a telescoping fly section. The fly section is extended by means of the extend cylinder rod while the base of the cylinder is directly mounted to the base boom. This cylinder also has a transfer tube so as the hydraulic fluid may pass to the far end of the cylinder.

Ref #

7 Wire Rope Replacement (for MPH-80, MP-95, or MP-110 with Three-Piece or Four-Piece CABLE Operated Boom)

Disassembly Procedure

NOTE: BOOM SECTIONS MUST BE FULLY RETRACTED BEFORE PERFORMING THE FOLLOWING PROCEDURE.

Remove mid and tip booms (as one unit) from the base boom assembly. This will require disconnecting:

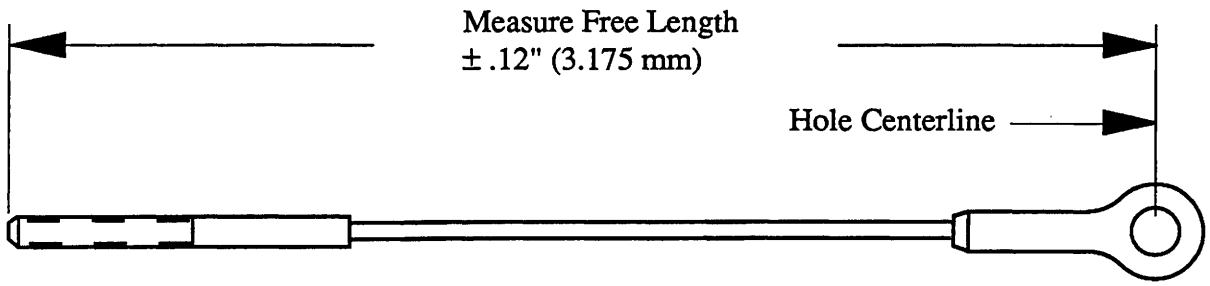
- the hoses to the rod end of the telescope (extend) cylinder,
- the telescope cylinder rod end pin,
- the EXTEND ropes to the front (lower) end of the BASE BOOM section,
- the bottom boom slide (wear) pad and tapped block from the front (lower) end of the MID BOOM section (or sections, for models with 4-piece boom),
- all wear pads from the upper (rear) end of the BASE BOOM section, and
- the bolted block anchoring the RETRACT ropes to the top of the BASE BOOM section upper (rear) end.

Remove the bolted bracket anchoring the ends of the retract and extend ropes on the lower (front) end of the TIP BOOM section. Remove the split half trunnion brackets which attach the telescope cylinder housing (case) to the MID BOOM section (LOWER MID BOOM section on models with 4-piece booms). Lift and slide the telescope cylinder out the lower end of the MID BOOM section.

Remove all of the rope guides on the boom sections, and on the housing of the telescope cylinder, to allow the removal of the extend and retract wire ropes from the boom.

Disassembly Procedure (Continued)

Stretch out the new replacement ropes, and measure the free length of each rope (see chart and illustration below).



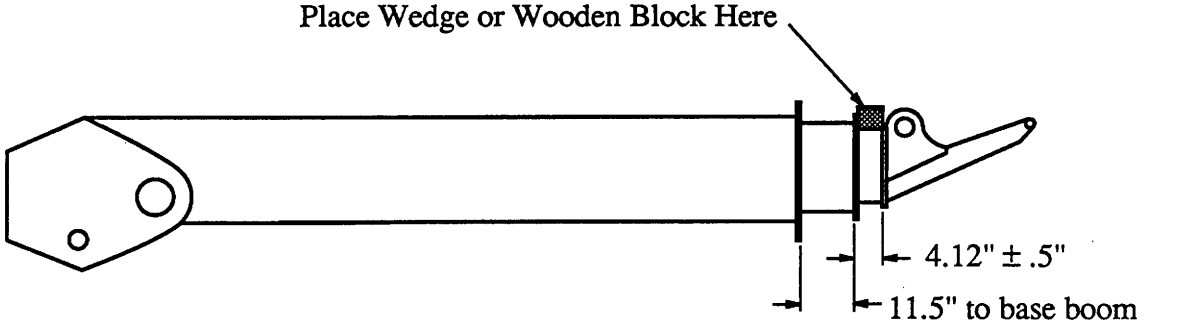
MODEL	EXTEND ROPE		RETRACT ROPE	
	DIA.	LENGTH	DIA.	LENGTH
MPH-80 (MP80-1)	5/8" (16mm)	585.00" (14.859 M)	3/8" (10mm)	343.00" (8.712 M)
MP-95	5/8" (16mm)	705.00" (17.907 M)	3/8" (10mm)	411.00" (10.439 M)
MP-110 Tip Boom	1/2" (12.7mm)	385.63" (9.795 M)	3/8" (10mm)	391.38" (9.941 M)
Upper (Rear) Mid Boom	1/2" (12.7mm)	378.63" (9.617 M)	3/8" (10mm)	378.63" (9.617 M)

Re-assembly Procedure

Re-assemble the boom by reversing the procedures outlined in the previous steps. TAKE CARE TO PREVENT CROSSING THE WIRE ROPES AS THEY ARE RE-INSTALLED IN THE BOOM.

Wire Rope Adjustment

Attach the extend and retract ropes to the BASE BOOM, and tighten the adjusting nuts to remove all visible slack from the ropes. With the telescope cylinder fully retracted, the boom sections should be positioned relative to each other as shown below.



Note: Boom shown with telescope cylinder fully retracted.

The position of the tip boom section RELATIVE TO THE MID BOOM is dependent on the adustment of the extend and retract ropes. To extend the tip boom, tighten the extend ropes. To retract the tip boom, tighten the retract ropes.

NOTE: DO NOT ALLOW THE ENDS OF THE WIRE ROPES TO TWIST WHILE MAKING THESE INITIAL ADJUSTMENTS.

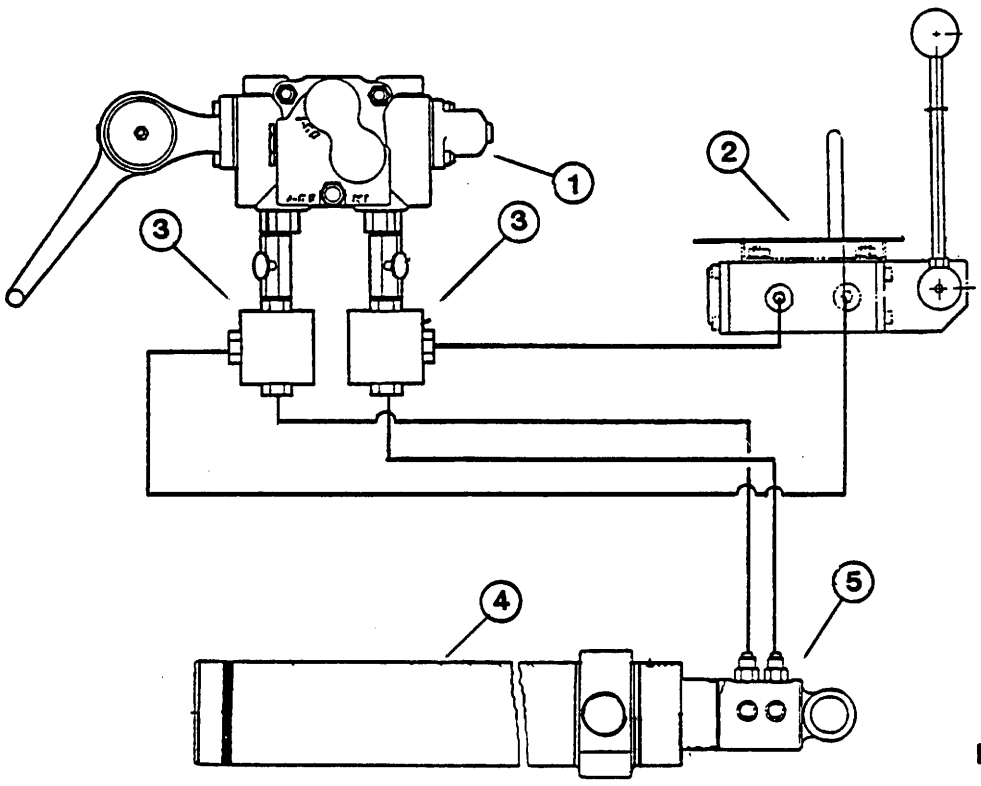
Extend the tip boom approximately 2" (50mm), which will cause increased slack in the retract ropes. Using a wedge or block of wood as shown in the above illustration, lock the tip boom in this slightly extended position. Tighten the retract ropes EQUALLY to remove any slack in the ropes.

With the tip boom section still blocked, try to retract the boom. This will cause increased slack in the extend ropes. Re-tighten the extend ropes EQUALLY to remove any slack in the ropes.

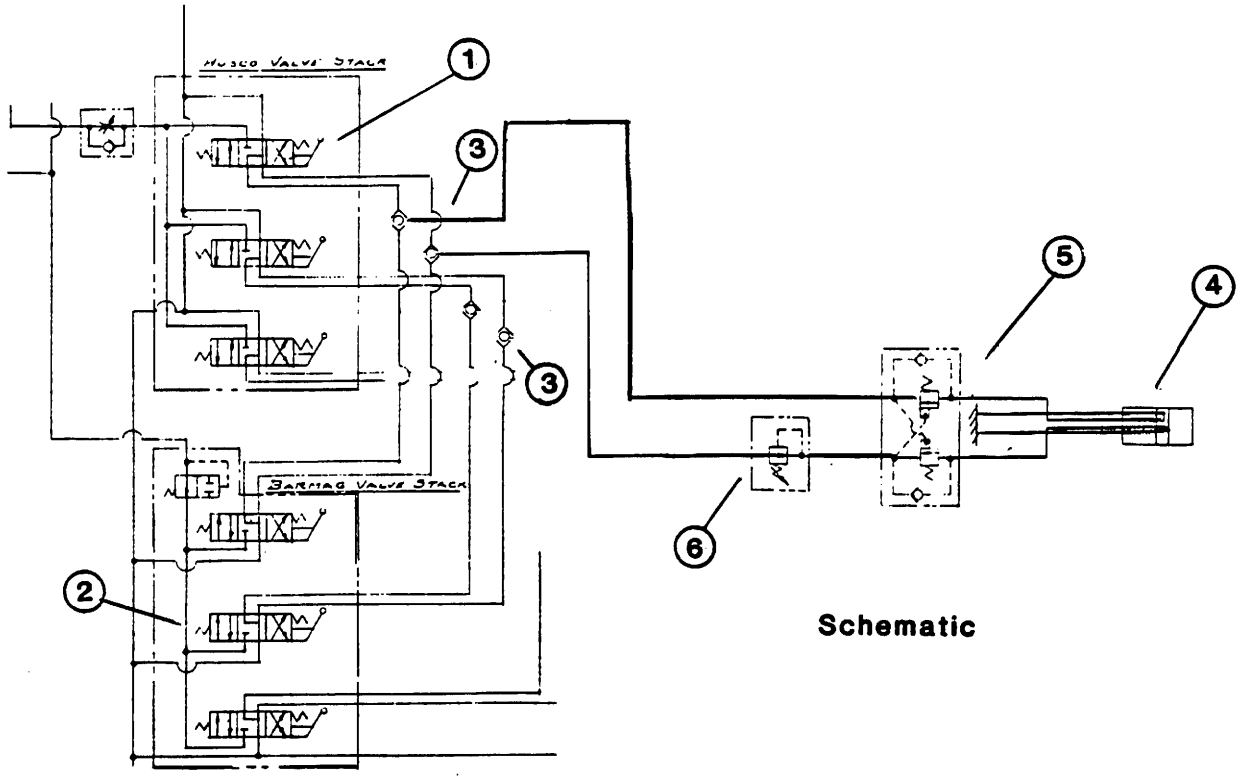
Remove the wedge or wood block, and retract the boom. The tip boom section should be positioned relative to the mid boom section as shown in the illustration above. If not, repeat the above wire rope adjustment procedure.

Fully extend the boom, then retract about 2" (50mm) and stop. Look inside the boom to determine the amount of slack in the EXTEND ropes. With the boom in this position, the extend ropes should be tight enough so they do not lay loosely on the bottom inside surface of the boom. If the extend ropes have too much slack, tighten the adjusting nuts as necessary to insure both extend ropes are tensioned EQUALLY.

ITEM	TROUBLE SHOOTING	ADJUSTMENTS	REPAIR	MISC.	PARTS
Selector Valve	m5.4				
Flow Control Valves		M1.3			C2
Holding Valves					B3
Extend Cylinder	m5.3				D19



Diagram



Schematic

Ref #

1 Hydraulic Directional Control Valve - Ground Control

This valve is a 3 position, 4 port valve which is manually operated to its seperate work ports. This directional control valve selects fluid pressure to the swing function for clockwise or counter-clockwise superstructure movement.

2 Hydraulic Directional Control Valve - Platform Control

This valve is also a 3 postion, 4 port valve which is manually operated to its seperate work ports. This directional control valve will also select fluid pressure to the swing function for clockwise or couter-clockwise rotation.

3 Shuttle Valves -

The shuttle valves allow fliud pressure to pass from the activating directional control valve to the swing motor assembly without pressurizing the opposite directional control spool.

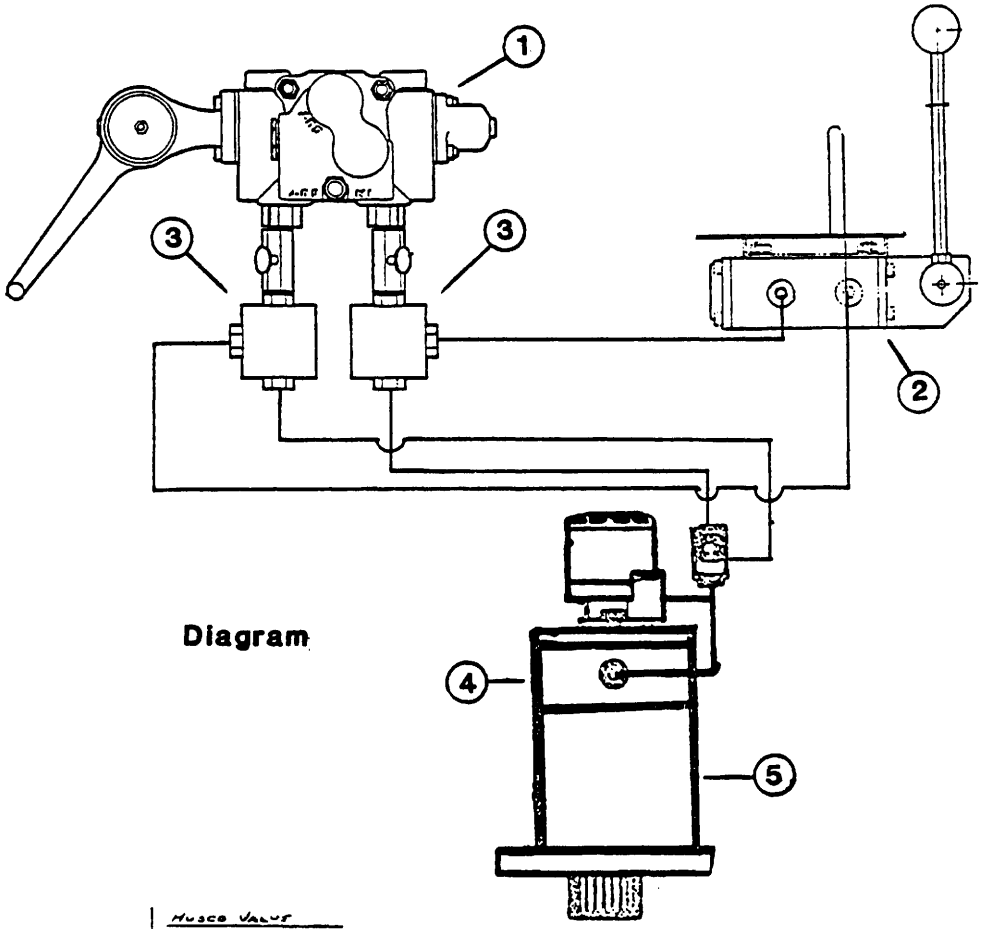
4 Intregal Brake Assembly -

The brake used with the swing drive assembly is incorporated as an intregal part of the swing drive. It is spring applied hydraulic released at a pressure of approximately 250 PSI. Hydraulic fluid flow is transfered through a shuttle assembly located on the swing drive so that which ever function is selected, clockwise or counter-clockwise, fluid flow will be diverted to release the brake.

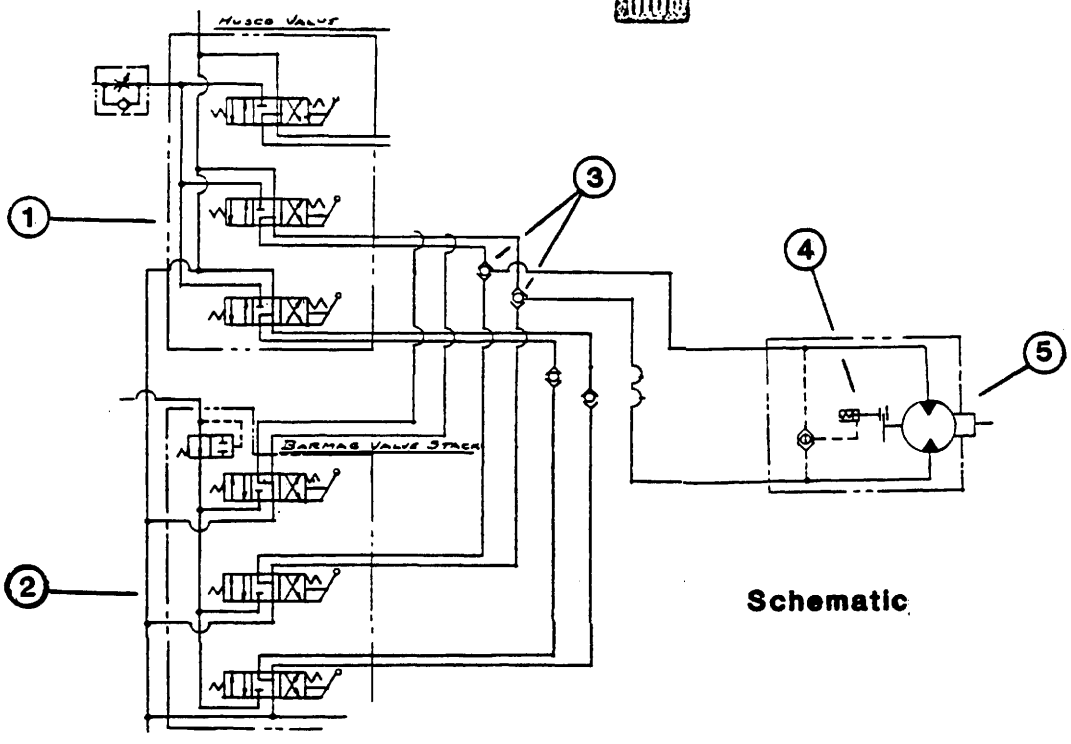
5 Swing Reducer / Drive Assembly -

The swing reducer/drive assembly allows the rotating motor power to be reduced to a fractional speed thus increasing motor torque. This then allows the superstructure to rotate at a controlled speed when fluid power is applied to the swing drive.

ITEM	TROUBLE SHOOTING	ADJUSTMENTS	REPAIR	MISC.	PARTS
Selector Valve	m5.4				
Flow Valve	M5.4	m1.3			B2
Shuttle Valve					B2
Swing Motor		m1.2	D6		D6
Swing Brake					F2



Diagram



Schematic

Ref #

1 Motion Control Valve -

The motion control valve found in the drive system has a two fold purpose. It shuttles hydraulic oil flow to the intregal brake assemblies plus it produces a back pressure in the drive system so that unit run away is impossible. This is accomplished by two (2) counterbalance valves located in the motion control valve. Proper brake adjustment - open 1½ turns from the closed position.

2 Flow Divider Combiner -

The flow divider combiner provides a differential action for the drive motors. In a turning situation, hydraulic fluid will force the internal spools to channel fluid to the driving wheel. It also has a great impact on driving characteristics when one wheel becomes lite.

3 Globe Valve -

The Globe valve has one function. It allows hydraulic fluid to pass from one drive wheel to the other when the unit is in a turning situation. It can be adjusted as to the amount of oil requested to pass but the correct setting should be approximately 1½ turns open from the closed position. In this position, the units engine will load slightly and allow a metered flow of hydraulic fluid to pass to the driving wheel.

4 Drive Motors & Brake Assembly -

The brake assembly used on the Simon boom lift is a disc type brake. It is a wetted disc which is spring applied with hydraulic release. The drive motor is keyed to a shaft which in turn is splined on both ends. One end of the splined shaft is used for the brake while the other end is inserted into the gear reducer assembly.

NOTE: Motor internal leakage passed through the brake disc's and back to the main hydraulic reservior thru the two (2) case drain lines thereby cooling the brake and preventing brake disc wear.

Ref #

5. Low Speed Drive - Flow Control Valves -

The flow control valves are located at the rear of the directional control valve and are used to control the fluid flow through the directional control valve. This in turn controls function speed. These valves are factory set but may be readjusted to adjust to work conditions.

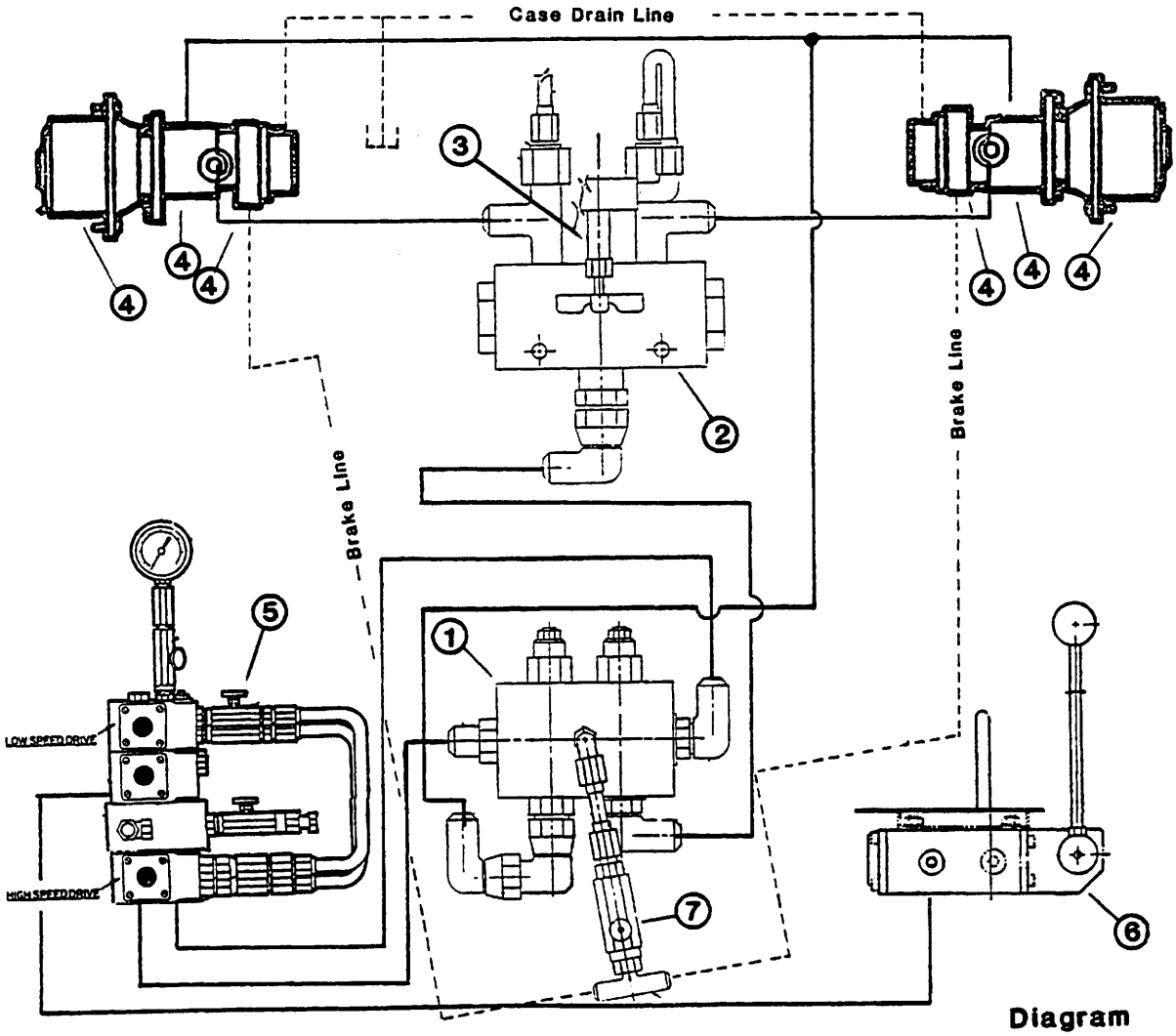
6. Platform/Ground Control Handle -

The platform/ground control handle is proportional in nature due to the direct control of the hydraulic fluid flow. Any handle movement is directly related to function movement.

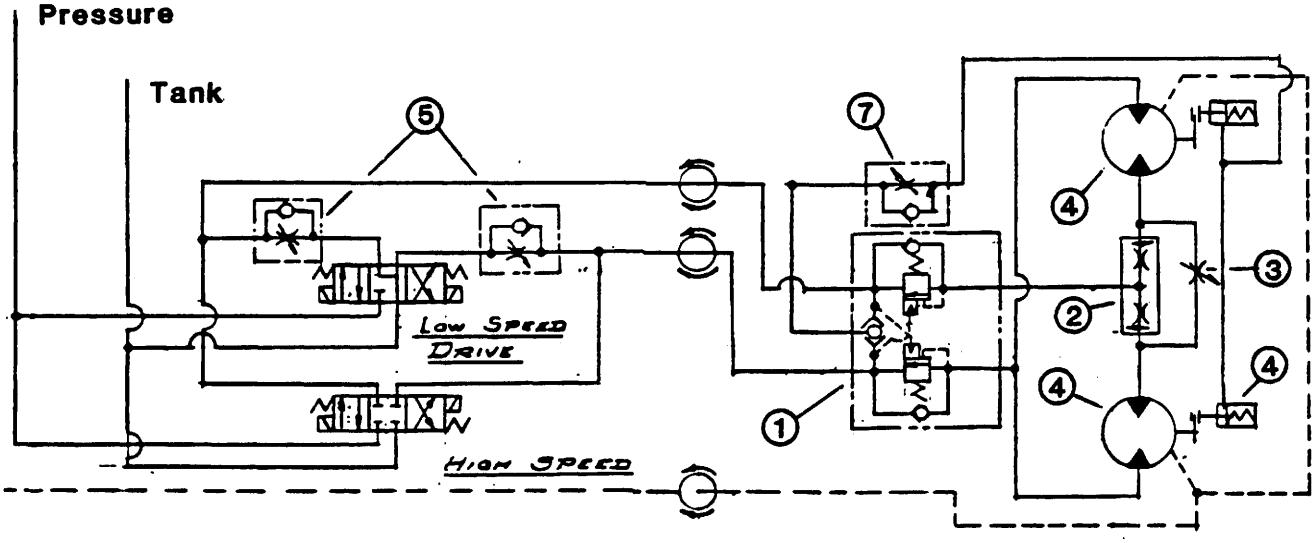
7 Brake adjustment Valve -

The brake adjustment valve utilized in the drive circuit has only one (1) function. It meters the hydraulic fluid flow released from the spring applied brake assemblies thereby giving a smooth braking action. This valve is set at the factory at the wide open position for shipment of the unit however; it should be reset upon receipt of the unit at 1½ turns from the closed position. Being set at this position will allow the operator a smooth braking function.

NOTE: THIS VALVE MAY BE RESET TO FIT CURRENT WORKING TERRAIN AND ENVIRONMENT.



Diagram



Schematic

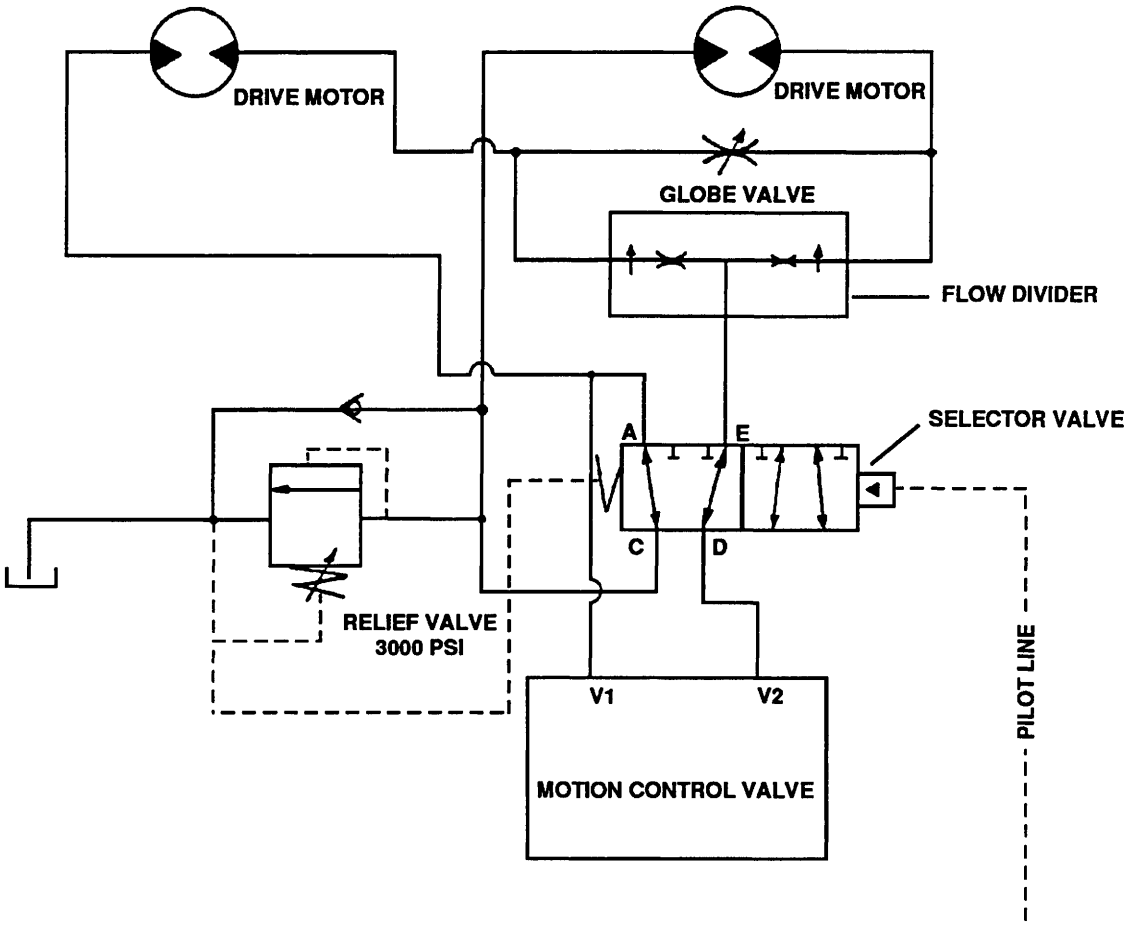
Ref #

8 Selector Valve - (Series / Parallel)

The selector valve used in the Simon drive system allows for a pilot pressure to shift the directional control spool changing the drive system flow from series flow to parallel flow.

9 Relief Valve -

The relief valve utilized in this drive system is set at 3,000 P. S. I. and adds assurance that the drive system will see only this pressure during the drive mode.



Ref #

1 Hydraulic Directional Control Valve - Platform Control

This valve is a 3 position, 4 port valve which is manually operated to its seperate work ports. This directional control valve selects fluid pressure to the steer function be it left or right movement.

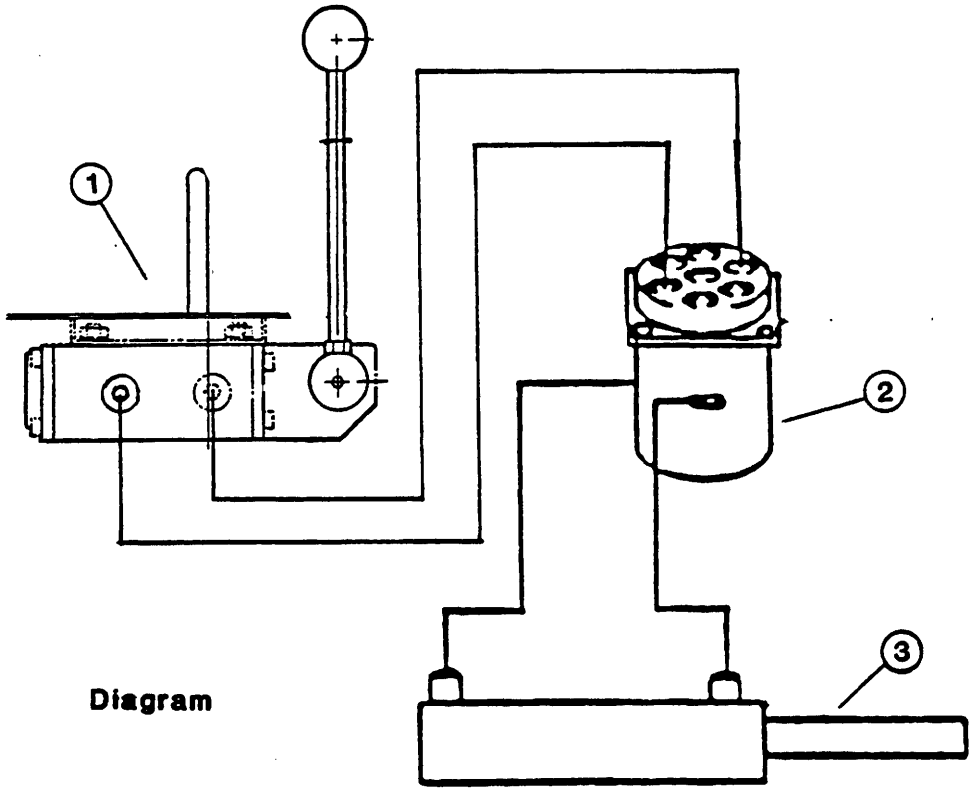
2 Hydraulic Swivel -

The swivel allows passage of fluid flow under pressure from the directional control valve. Return flow is also passed between the upper and lower assemblies of the unit. The swivel also allows for 360 degrees of rotation which is continuous in either direction.

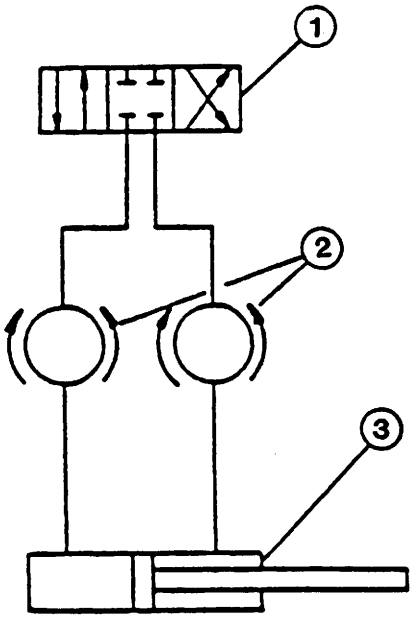
3 Steer Cylinder -

The steer cylinder is double acting and is directly connected to the steering linkage assembly. This cylinder powers all steering movements.

ITEM	TROUBLE SHOOTING	ADJUSTMENTS	REPAIR	MISC.	PARTS
1 Selector Valve	m5.4				
2 Swivel					D-2
3 Steer Cylinder					D-1



Diagram



Schematic

Ref #

1. Flow Valve -

This adjustable control valve varies the volume of hydraulic fluid entering the rotate and platform leveling circuits. By decreasing the flow to these circuits, this prevents the destruction of the rotating hardware.

2. Leveling Selector Valve -

This is a manually operated, 3 position 4 port, normally closed valve. It selects fluid flow to the leveling circuit for servicing and controlling the platform level position.

3. Slave Leveling Cylinder -

The cylinder is a 2 port double acting cylinder connected between the tip boom and the platform. This cylinder controls the position of the platform relative to the tip boom.

4. Master Leveling Cylinder -

This cylinder is also a 2 port double acting cylinder with the same displacement as the slave cylinder. This cylinder is located between the upper frame and the boom or boom lift cylinder. Whenever the boom is raised or lowered, the master cylinder is forced to move. The fluid displacement from the master cylinder is in turn sent up the boom to the slave cylinder. This forces the slave cylinder to move the same distance as the master cylinder.

5. Leveling System Holding Valves -

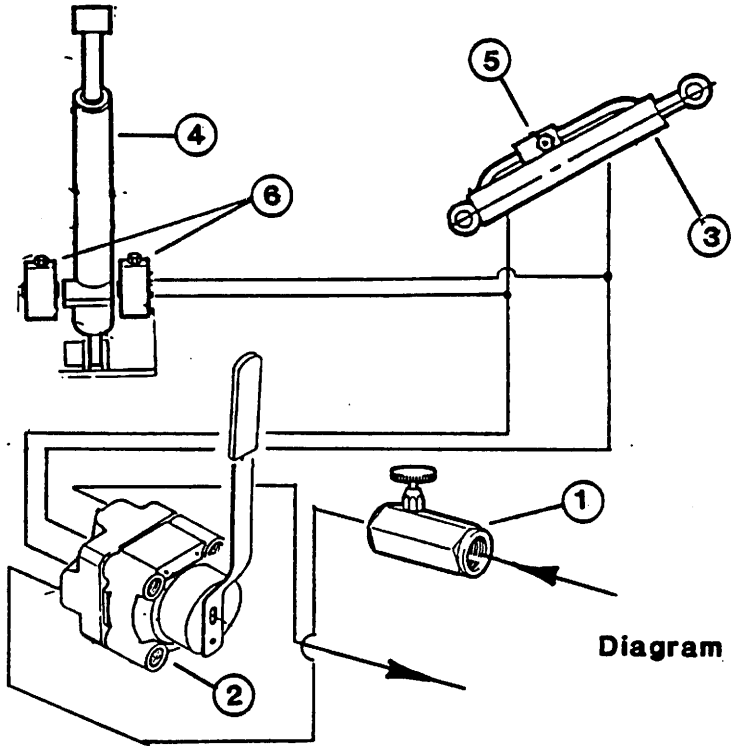
These are pilot adjustable and prevent platform movement. In the event of hose failure, the holding valve does not allow fluid to leave the slave cylinder unless imput pressure allows the pilot valve to open.

Ref #

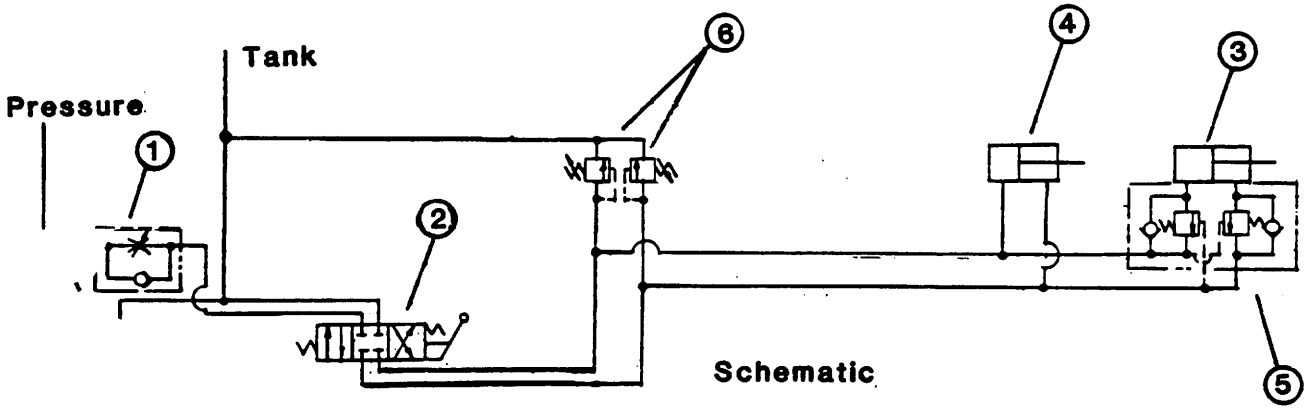
6 Relief Valve -

This valve is adjustable and prevents high pressure spikes in the leveling circuit that could result in component damage. The pressure spikes occur when the slave cylinder is serviced manually by the selector valve and is not leveled which will cause the cylinder to bottom out before the master cylinder stops moving as the boom is lowered.

ITEM	TROUBLE SHOOTING	ADJUSTMENTS	REPAIR	MISC.	PARTS
Flow Valve		M1.1		M6.2	B4
Selector Valve	m5.4				D14
Slave Cylinder					D21
Holding Valves					D21
Master Cylinder					D10
Relief Valves	m5.1 &5.2	M1.1			



Diagram



Schematic

Ref #

1. Flow Valve -

This adjustable control valve varies the volume of hydraulic fluid entering the platform rotate and leveling circuits. By decreasing the flow to these circuits, this prevents the destruction of the rotating hardware.

2. Rotating Selector Valve -

This is a manually operated, 3 position 4 port, normally closed valve. It selects fluid flow to the rotate circuit for servicing and controlling the platform rotate function.

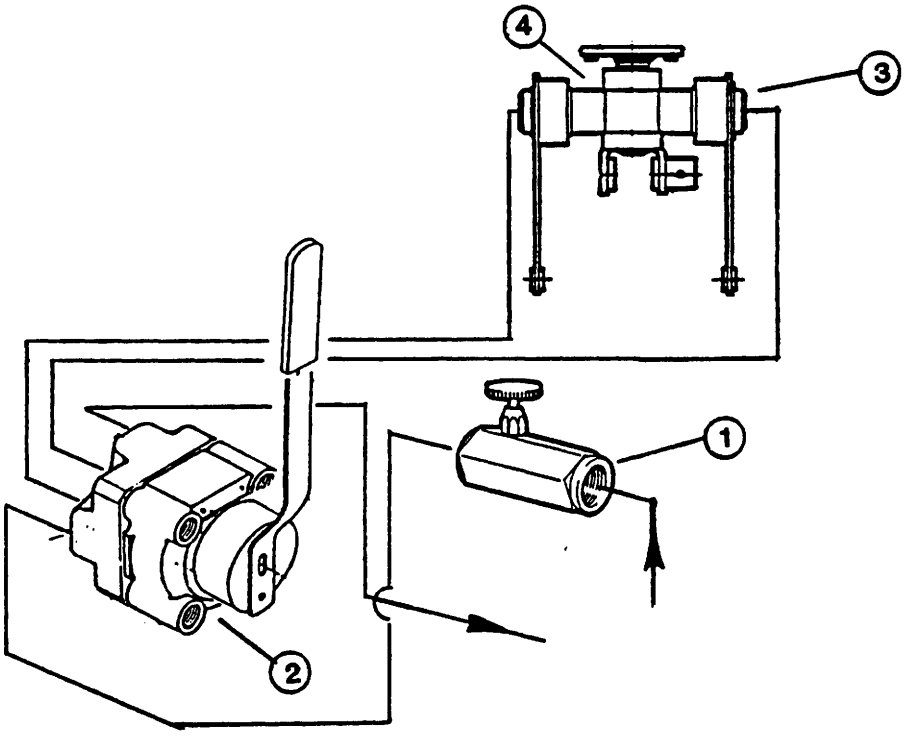
3. Rotary Actuator -

The rotary actuator utilized in the Simon boom lift is of the rack and pinion type. Hydraulic fluid enters the actuator from either side, depending on the desired rotation, and powers the rack in the opposite direction causing the pinion shaft to rotate.

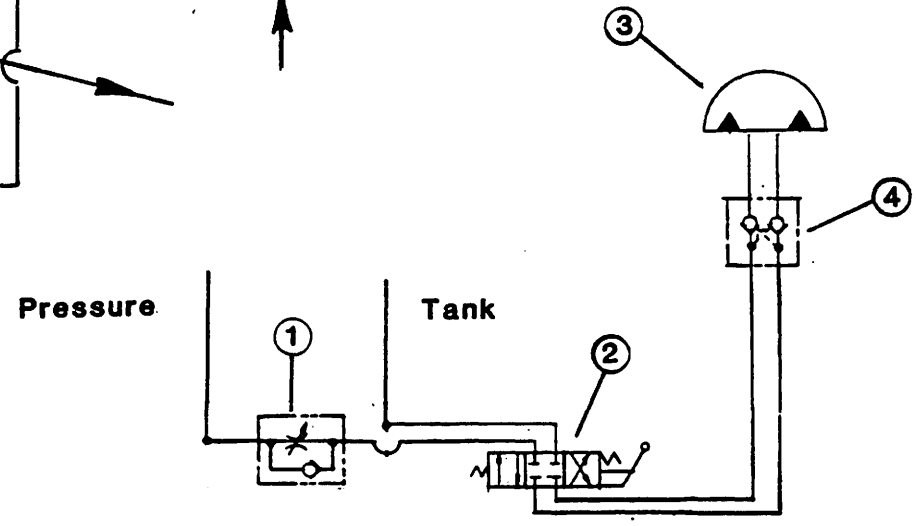
4. Double Pilot Operated Check Valve -

The double pilot operated check valve used with the rotary actuator is mounted as an intregal part of the actuator. Its purpose is to act as the locking componet so the actuator does not rotate while not in use. When the rotate circuit is powered by hydraulic fluid, partial fluid flow is piloted over to the return side to unseat the check ball.

ITEM	TROUBLE SHOOTING	ADJUSTMENTS	REPAIR	MISC.	PARTS
					B4
Flow Valve		M1.1			B4
Selector Valve	m5.4				D14
Rotate Cylinder	m5.4				



Diagram



Schematic

Ref #

1. Hydraulic Pump - (Main Pump)

Simon utilizes a radial piston, pressure compensated pump to power the main hydraulic system. This pump delivers maximum flow at full engine rpm's and incorporates a compensator section which when set, delivers system pressure.

2 Hydraulic Filter -

The hydraulic filter utilized on the Simon boom is non - bypassing in nature. This type of filter allows maximum fluid flow as long as the filter element is free of contaminants. When clogged, the filter will shut down the hydraulic flow but will not crush the filter element due to a relief built into the filter housing.

3 Emergency Pump & Motor Assembly - (Aux. Pump)

The auxilary pump is driven by a 12VDC motor which is non - continuous in nature. The pump should only be utilized for emergency situations only! The auxilary pump is a gear pump which delivers low flow to the hydraulic system to facilitate emergency procedures.

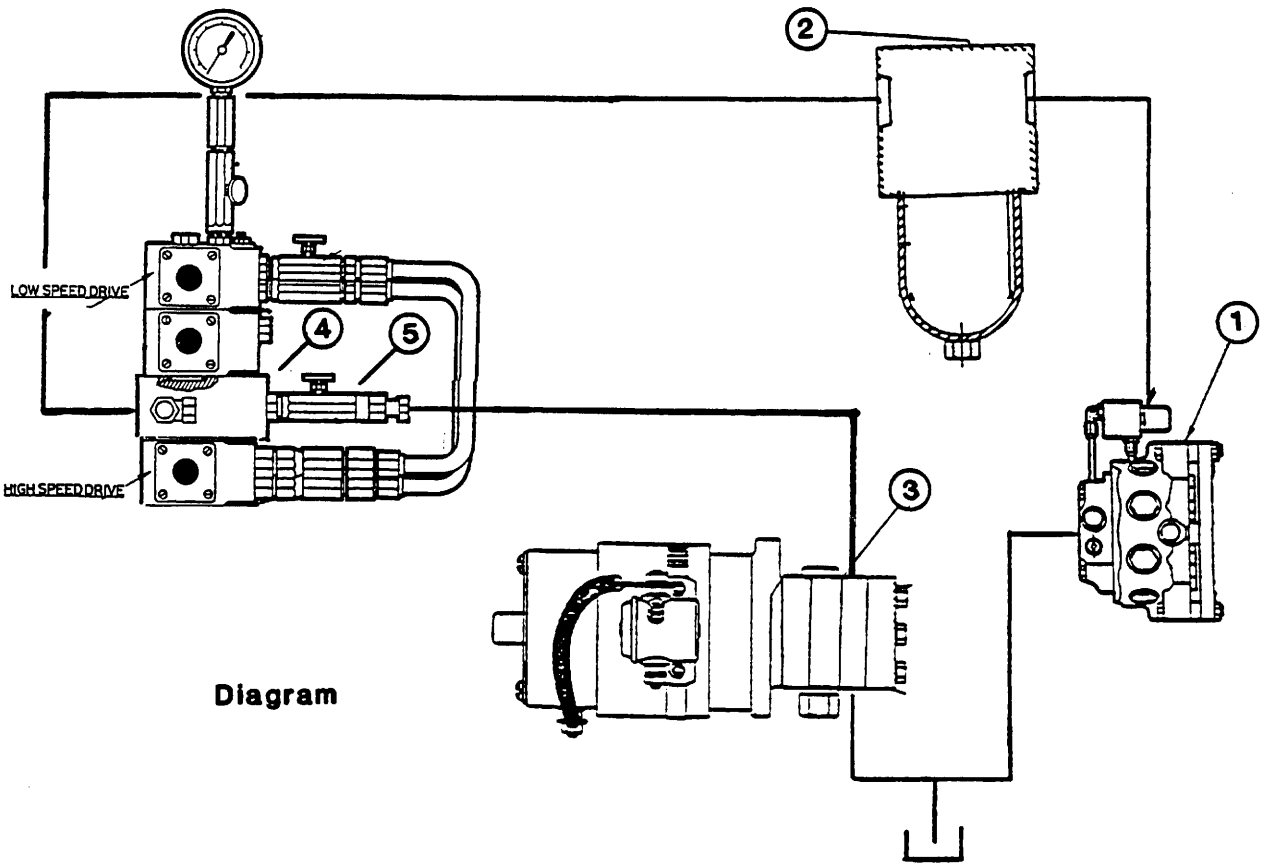
4 Check Valve Assembly -

The check valve assembly is incorporated in the diverter valve modual. Its primary purpose is to prevent fluid flow to the main pump when the auxilary pump is activated. When the main pump is activated the check valve is in the free flow mode of operation.

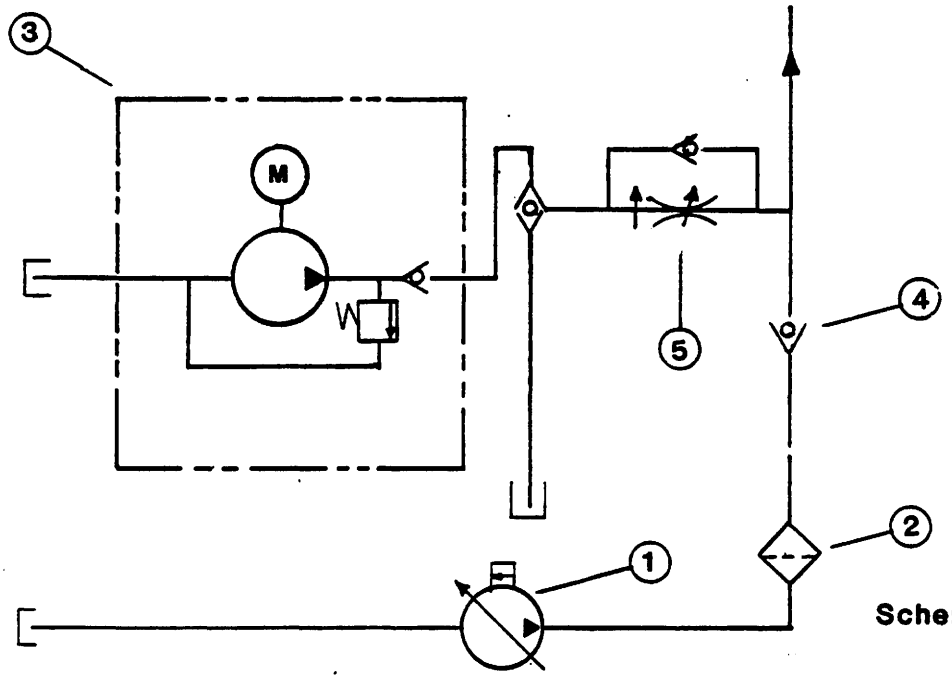
5 Flow Control Valve Assembly -

This valve assembly is located on the diverter valve modual. Its purpose is two fold in nature. When the auxilary pump is activated, fluid flow passes through the free flow side of the flow control valve. At the same time, this flow shifts a shuttle ball to prevent fluid to pass directly to the main hydraulic tank. However; when the main pump is activated, fluid passes through the controlled orifice and passes through the shuttle valve assembly to tank. This fluid flow is only to prevent system charge after unit shut down.
NOTE: IF THIS VALVE IS OPEN FULLY, ALL PLATFORM BOOM FUNCTIONS WILL CEASE!!!
This valve, when properly set, should only be cracked open to allow minimal fluid flow.

ITEM	TROUBLE SHOOTING	ADJUSTMENTS	REPAIR	MISC.	PARTS
1 Main Hydraulic Pump		M1.2	D8	M4	D8
2 Filter			D11	M3	D11
3 Emergency Pump		M1.2	D7		D7
4 Check Valve					C2



Diagram



Schematic

The emergency descent package incorporates three (3) manually operated control valves.

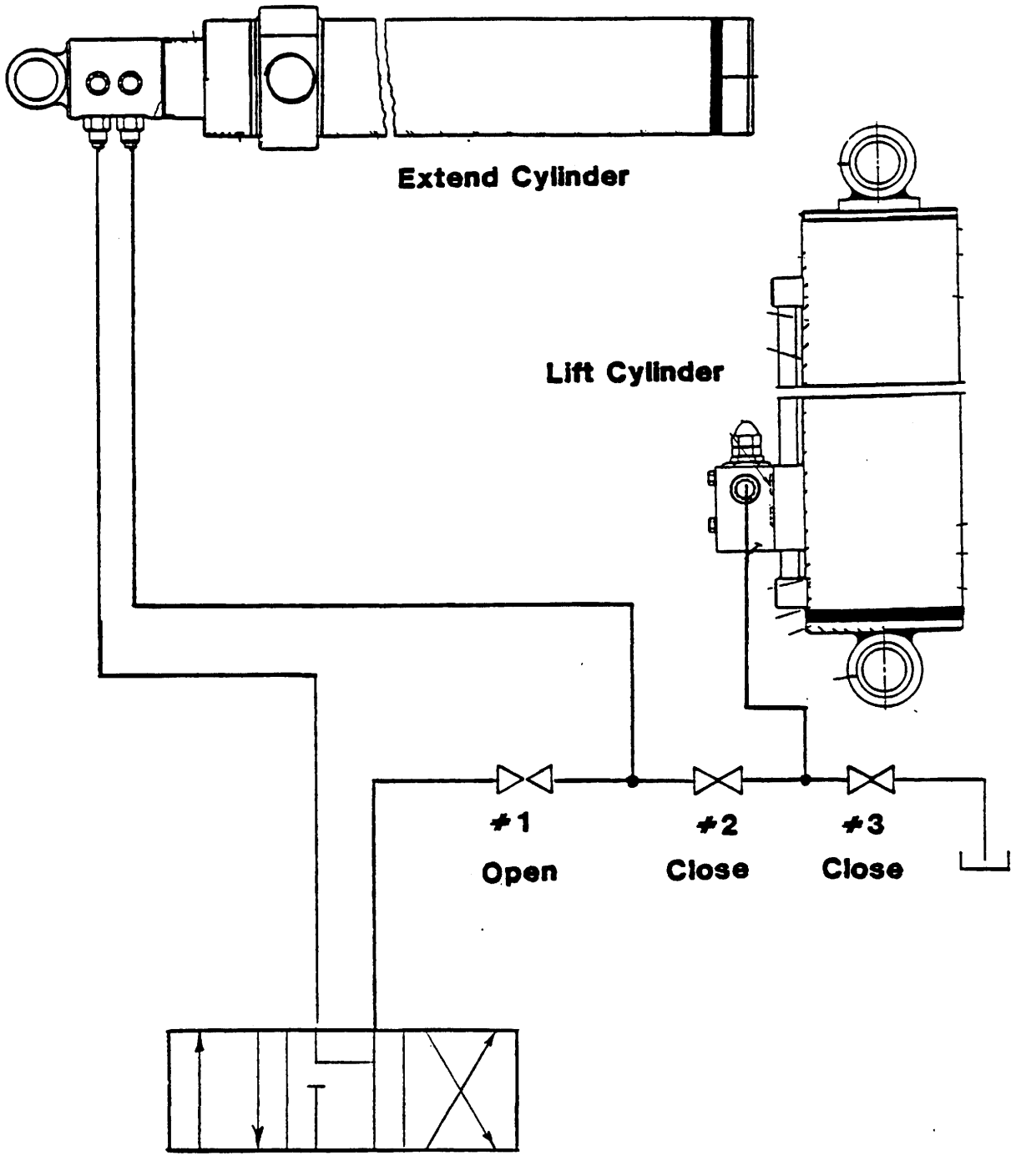
During normal operation, these valves allow hydraulic fluid to pass to various function cylinders as directed. In normal operation, the #1 control valve is in the " OPEN " mode while #2 and #3 control valves are to be in the " Closed " mode. This will allow hydraulic fluid to pass through the #1 control valve to the extend cylinder while hydraulic flow is stopped from entering the lift cylinder and the main hydraulic reservoir through the #2 and #3 control valves.

However; if the main hydraulic power source becomes inoperative and/or the auxilary power source also fails, the emergency descent package can be used. This can be accomplished by " CLOSING " the #1 control valve while " OPENING " the #2 control valve. This will allow hydraulic fluid, under pressure from the raised boom, to flow freely thru the #2 control valve to the extend cylinder causing the extend cylinder to retract.

After the boom has stopped lowering and retracting under its own weight, to continue to lower the boom " OPEN " #3 control valve. This will allow excess hydraulic fluid to pass freely to the main hydraulic reservoir.

NOTE: #3 control valve should only be " OPENED " AFTER the extend cylinder has fully retracted or the boom no longer descends under its own weight.

The emergency retract application for the extend cylinder will only operate when the boom is above horizontal.



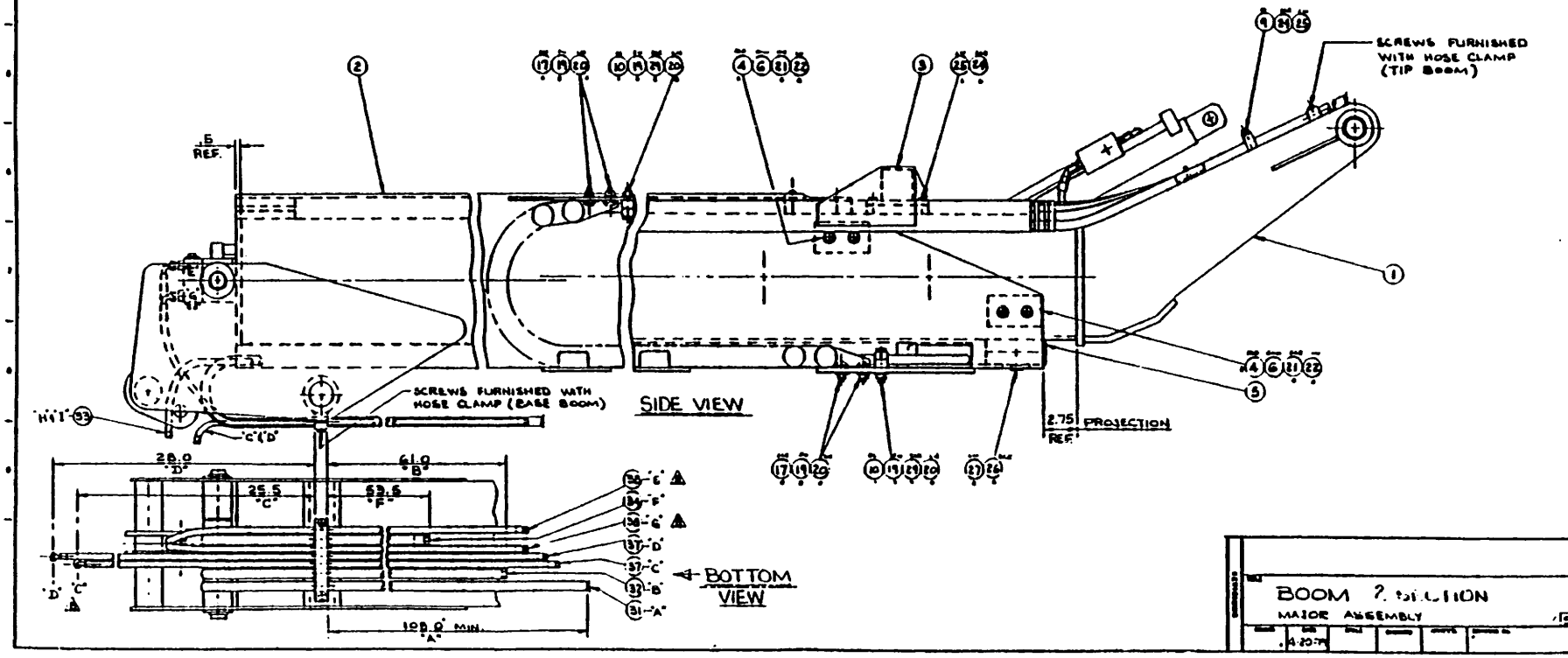
Manual Descent Package - Normal Operation

ITEM	QTY	PART NO	DESCRIPTION	MATL	WT.
31	1	B470-911	CABLE 24C 7/8"	"A"	
32	1	05-341001	HOSE ASSY 3/8 I.D. - 57.5	"B"	
33	2	05-278001	HOSE ASSY 1/4 I.D. - 47.4	HYT	
34	1	05-343001	HOSE ASSY 3/8 I.D. - 56.1	"B"	
35	2	05-238001	HOSE ASSY 1/8 I.D. - 40	-	
36	2	05-321001	HOSE ASSY 1/4 I.D. - 29.6	-	
37	2	05-217001	HOSE ASSY 1/4 I.D. - 109.5	"C" "D"	
38	2	05-218001	HOSE ASSY 1/4 I.D. - 96	"E" "F"	
39	A/R	08-640001	TIE WRAPS		
40	1	A-440-906	RUBBER PAD		
41					
42					
43					
44					
45					

ITEM	QTY	PART NO	DESCRIPTION	MATL	WT.
16	2	08-401001	SNAP RING 1 1/4		30.
17	8	07-170051	SCR, BUT HD 1/4 NC x 1 1/2		
18	2	07-620351	FLATWASHER 1 1/4 (HVY)		
19	20	07-620141	FLATWASHER 1/4 (HVY)		
20	12	07-500141	LOCKNUT 1/4 NC		
21	6	07-030841	SCR, HHCS 1/2 NC x 1 1/2		
22	8	07-680181	LOCKWASHER 1/4		
23	2	07-170881	SCR, BUT HD 1/2 NC x 1 3/4		
24	7	07-030451	SCR, HHCS 1/2 NC x 1 1/2		
25	7	07-680161	LOCKWASHER 1/2		
26	5	07-031281	SCR, HHCS 5/8 NC x 1 3/4		
27	2	07-681321	LOCKWASHER 5/8		
28	1	08-001001	HOSE TRACK		
29	4	07-030101	SCR, HHCS 1/4 NC x 1 1/2		
30					

BILL OF MATERIAL

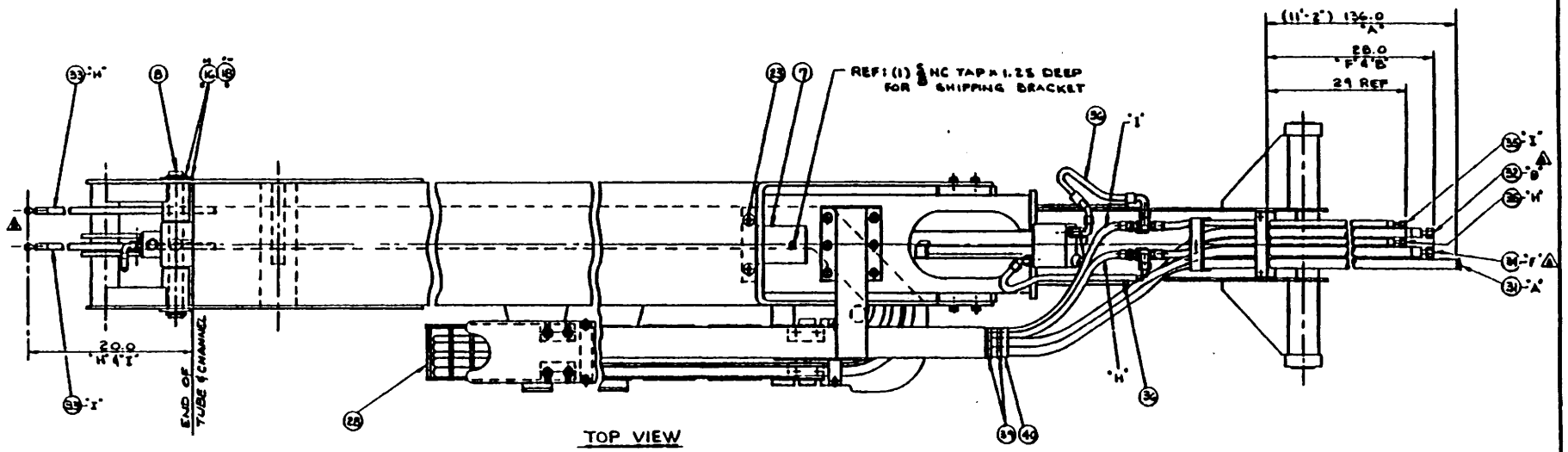
ITEM	QTY	PART NO	DESCRIPTION	MATL	WEIGHT
1	1	D440-307	POINT BOOM SUB-ASSY		
2	1	D440-206	BASE BOOM - WELDED		1,077
3	1	D440-201	TUBE - WELDED		37.
4	4	B440-301	SLIDER PAD		1.6
5	1	B440-302	SLIDER PAD		1.9
6	AS REQ	B440-901	SHIM - SLIDE PAD		.19
7	1	B440-910	SPACER		6.9
8	1	B440-904	PIN - TELESCOPE CYL		4.1
9	1	B450-924	CLAMP - BOOM POINT		.3
10	2	B440-210	CLAMP - HOSE TRACK		3.
11					
12					
13					
14					
15					



BOOM SECTION
MAJOR ASSEMBLY
SH 1 OF 2
4-20-79

BILL OF MATERIAL

ITEM	QTY.	PART NO.	DESCRIPTION	UNIT	REMARKS
			REFER TO SH. 1		

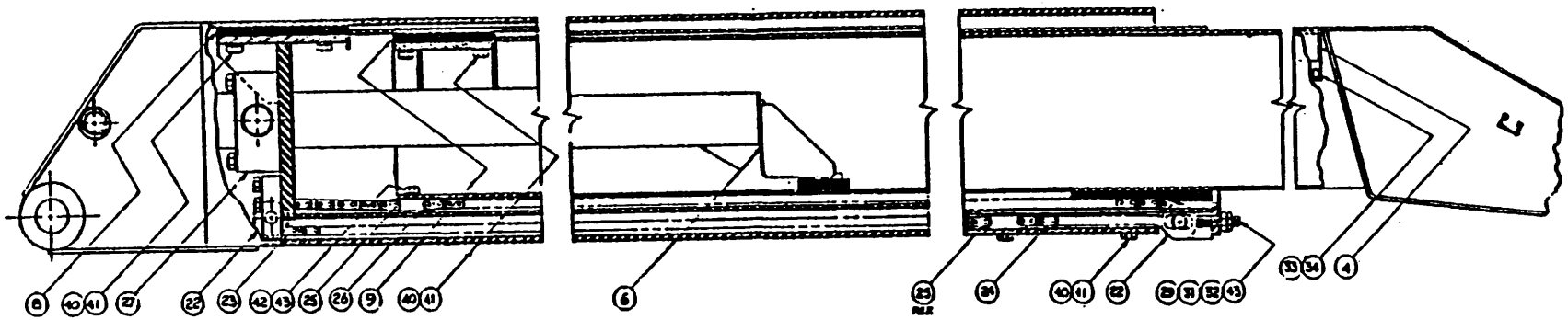


BOOM 2 SECTION

MAJOR ASSY.

SH 2 OF 2

4-20-79



SIMON

MAJOR BOOM ASSEMBLY
SECTION

ENGINEERING DRAWING SEQUENCE:
MP Full Hydraulic Service Manual

1.	SDS-212464-0	Hydraulic Schematic, MP	11" x 17"
2.	SDS-231704-0	Hydraulic Schematic, MP 40 thru MP 80 2WD	11" x 17"
3.	SDS-231705-0	Hydraulic Schematic, MP 40 thru MP 80 2WD, 2 Speed	11" x 17"
4.	SDS-231706-0	Hydraulic Schematic, MP 40 thru MP 80 4WD, 2 speed	11" x 17"
5.	SES-232287-0	Hydraulic Schematic, MPH80 and MP95	11" x 17"
6.	SCS-212458-0	Hydraulic Schematic, 2 Wheel Drive	8-1/2" x 11"
7.	SCS-213752-0	Hydraulic Schematic, 2 Wheel Drive (Shift on the go)	8-1/2" x 11"
8.	SCS-212460-0	Hydraulic Schematic, 2 WD to 4WD (Shift on the go)	8-1/2" x 11"
9.	SCS-212457-0	Hydraulic Schematic, Series/ Parallel Drive	8-1/2" x 11"
10.	SCS-212466-0	Electrical Schematic, MP	8-1/2" x 11"
11.	SDS-215077-0	Electrical Schematic, MP 80/ 95 Full Hyd. w/ ext. axles	11" x 17"
12.	SCS-212427-0	Electrical Schematic, Deutz 2 Cyl. Diesel	8-1/2" x 11"
13.	SCS-212426-0	Electrical Schematic, Deutz 3 & 4 Cyl. Diesel	8-1/2" x 11"
14.	SCS-231409-0	Electrical Schematic, Deutz L1011	11" x 17"
15.	SCS-212445-0	Electrical Schematic, Ford 2.3 L Gas	8-1/2" x 11"
16.	SCS-212444-0	Electrical Schematic, Ford 2.3 L Dual Fuel	8-1/2" x 11"
17.	SDS-211192-0	Electrical Schematic, Ford 300 c.i. Gas	11" x 17"
18.	SDS-218933-0	Electrical Schematic, MP80 w/ Hatz Diesel	11" x 17"
19.	SDS-232071-0	Electrical Schematic, Isuzu C-240	11" x 17"
20.	SCS-212432-0	Electrical Schematic, Murphy 3 Cyl. Diesel	8-1/2" x 11"
21.	SCS-212443-0	Electrical Schematic, Perkins Diesel	8-1/2" x 11"
22.	SCS-231408-0	Electrical Schematic, Wisconsin 35 HP	11" x 17"
23.	SCS-212419-0	Electrical Schematic, Wisconsin 35 H.P. Gas	8-1/2" x 11"
24.	SCS-212420-0	Electrical Schematic, Wisconsin 35 H.P. Propane	8-1/2" x 11"
25.	SCS-212421-0	Electrical Schematic, Wisconsin 35 H.P. Dual Fuel	8-1/2" x 11"
26.	SCS-212430-0	Electrical Schematic, Wisconsin 65 H.P. Gas	8-1/2" x 11"
27.	SCS-212429-0	Electrical Schematic, Wisconsin 65 H.P. Propane	8-1/2" x 11"
28.	SCS-212428-0	Electrical Schematic, Wisconsin 65 H.P. Dual Fuel	8-1/2" x 11"
29.	SDS-232290-0	Electrical Schematic, MPH80 & MP95, Duetz L912	11" x 17"

MPN machines use the same schematics as the MP with the appropriate engine.

ENERGY INPUT

CONTROLS

HUSCO VALVE STACK

10 MICRON

BARMAG VALVE STACK

DRIVE CONTROLLER

EXTEND CYLINDER

HOIST CYLINDER

SWING MOTOR

CAB LEVEL

MASTER CYLINDER

SLAVE CYLINDER

STEER CYLINDER

ROTARY ACTUATOR

LOW SPEED DRIVE

HIGH SPEED DRIVE

4

5

1

2

3

NOTE:

(X) INDICATES PORT NUMBER FOR HYDRAULIC SWIVEL

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE HYDRAULIC SCHEMATIC
FULL HYDRAULIC

REVISION

DRNG. NO. SDS-212464-0

PRESSURE SETTINGS	MP-40 MP-60	MP-50	MP-70 MP-80	MPN-60 MP-60Z	MPN-40	MPH-42	MPH-60
MAIN PUMP COMPENSATOR	2500 PSI	2300 PSI	3000 PSI	3000 PSI	2300 PSI	2300 PSI	2500 PSI
EMERGENCY PUMP	2500 PSI	2500 PSI	2500 PSI	2500 PSI	2500 PSI	2500 PSI	2500 PSI
MASTER LEVEL CYLINDER RELIEFS	3250 PSI	3250 PSI	3250 PSI	3250 PSI	3250 PSI	3250 PSI	3250 PSI
BOOM CYLINDER COUNTER BALANCE	3000 PSI	5000 PSI	5000 PSI	5000 PSI	5000 PSI	5000 PSI	5000 PSI
BOOM TELESCOPE COUNTER BALANCE	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI
SLAVE LEVEL CYLINDER COUNTER BALANCE	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI
PLATFORM ROTATOR RELIEF	700 PSI	700 PSI	700 PSI	700 PSI	700 PSI	700 PSI	700 PSI

STEERING CYLINDER
COUNTER BALANCE VALVE
HYDRAULIC MOTOR BRAKE ASSEMBLY
FLOW CONTROL
FLOW DIVIDER
HYDRAULIC RESERVOIR
MAIN PUMP
EMERGENCY PUMP
10u FILTER
3000 PSI GAUGE
MASTER LEVEL CYLINDER
SWING DRIVE
C2
C1
6:1 PILOT
BOOM HOIST CYLINDER
BOOM EXTEND CYLINDER
SLAVE LEVEL CYLINDER
DRIVE CONTROL
CAB CONTROLS
ROTARY ACTUATOR
HOIST
SWING
EXTEND
LOW SPEED DRIVE
LOWER/UPPER SUPPLY
HIGH SPEED DRIVE
STEER
BOOM HOIST
SWING
BOOM EXTEND
LOWER CONTROL VALVE
1500 PSI
SHUTTLE VALVES
HOSES THRU CATRAC
PRESS
TANK
.021
CAB LEVEL
.021
CAB ROTATE
4 5 1 2 3 6

REFERENCE: MP FULL HYDRAULIC 40 THRU 80
2 WHEEL DRIVE

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE
HYDRAULIC SCHEMATIC

REVISION

DWG. NO. SDS-2317040

PRESSURE SETTINGS	MP-40 MP-60	MP-50	MP-70 MP-80	MPH-60 MP-60Z	MPH-40	MPH-42	MPH-60
MAIN PUMP COMPENSATOR	2500 PSI	2300 PSI	3000 PSI	3000 PSI	2300 PSI	2300 PSI	2500 PSI
EMERGENCY PUMP	2500 PSI	2500 PSI	2500 PSI	2500 PSI	2500 PSI	2500 PSI	2500 PSI
MASTER LEVEL CYLINDER RELIEFS	3250 PSI	3250 PSI	3250 PSI	3250 PSI	3250 PSI	3250 PSI	3250 PSI
BOOM CYLINDER COUNTER BALANCE	3000 PSI	5000 PSI	5000 PSI	5000 PSI	5000 PSI	5000 PSI	5000 PSI
BOOM TELESCOPE COUNTER BALANCE	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI
SLAVE LEVEL CYLINDER COUNTER BALANCE	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI
PLATFORM ROTATOR RELIEF	700 PSI	700 PSI	700 PSI	700 PSI	700 PSI	700 PSI	700 PSI

STEERING CYLINDER
HYDRAULIC MOTOR BRAKE ASSEMBLY
COUNTER BALANCE VALVE
FLOW CONTROL
FLOW DIVIDER
HYDRAULIC RESERVOIR
MAIN PUMP
RELIEF VALVE SET AT 3000 PSI
EMERGENCY PUMP
10u FILTER
3000 PSI GAUGE
MASTER LEVEL CYLINDER
SWING DRIVE
C2
C1
6:1 PILOT
BOOM HOIST CYLINDER
BOOM EXTEND CYLINDER
SLAVE LEVEL CYLINDER
DRIVE CONTROL
CAB CONTROLS
ROTARY ACTUATOR
HOIST
SWING
EXTEND
LOW SPEED DRIVE
LOWER/UPPER SUPPLY
BOOM HOIST
SWING
BOOM EXTEND
1500 PSI
SHUTTLE VALVES
HOSES THRU CATRAC
PRESS
TANK
.021
CAB LEVEL
.021
CAB ROTATE
3 WAY VALVE 2 SPEED DRIVE
HIGH SPEED DRIVE
STEER
LOWER CONTROL VALVE
4 5 1 2 3 6
AUX

REFERENCE: MP FULL HYDRAULIC 40 THRU 80
2 WHEEL DRIVE 2 SPEED

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE
HYDRAULIC SCHEMATIC

REVISION

DWG. NO. SDS-2317050

PRESSURE SETTINGS	MP-40 MP-60	MP-50	MP-70 MP-80	MPH-60 MP-60Z	MPH-40	MPH-42	MPH-60
MAIN PUMP COMPENSATOR	2500 PSI	2300 PSI	3000 PSI	3000 PSI	2300 PSI	2300 PSI	2500 PSI
EMERGENCY PUMP	2500 PSI	2500 PSI	2500 PSI	2500 PSI	2500 PSI	2500 PSI	2500 PSI
MASTER LEVEL CYLINDER RELIEFS	3250 PSI	3250 PSI	3250 PSI	3250 PSI	3250 PSI	3250 PSI	3250 PSI
BOOM CYLINDER COUNTER BALANCE	3000 PSI	5000 PSI	5000 PSI	5000 PSI	5000 PSI	5000 PSI	5000 PSI
BOOM TELESCOPE COUNTER BALANCE	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI
SLAVE LEVEL CYLINDER COUNTER BALANCE	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI
PLATFORM ROTATOR RELIEF	700 PSI	700 PSI	700 PSI	700 PSI	700 PSI	700 PSI	700 PSI

STEERING CYLINDER
COUNTER BALANCE VALVE
HYDRAULIC RESERVOIR
MAIN PUMP
EMERGENCY PUMP
10u FILTER
3000 PSI GAUGE
MASTER LEVEL CYLINDER
SWING DRIVE
C2
C1
6:1 PILOT
BOOM HOIST CYLINDER
BOOM EXTEND CYLINDER
SLAVE LEVEL CYLINDER
DRIVE CONTROL
CAB CONTROLS
ROTARY ACTUATOR
HOIST
SWING
EXTEND
LOW SPEED DRIVE
LOWER/UPPER SUPPLY
HIGH SPEED DRIVE
STEER
BOOM HOIST
SWING
BOOM EXTEND
LOWER CONTROL VALVE
1500 PSI
SHUTTLE VALVES
HOSES THRU CATRAC
PRESS
TANK
.021
CAB LEVEL
.021
CAB ROTATE
4 5 1 2 3 6
3 WAY VALVE
2 SPEED DRIVE

NOTE: SOME MACHINES WILL HAVE A THIRD DRIVE VALVE

REFERENCE: MP FULL HYDRAULIC 40 THRU 80
4 WHEEL DRIVE 2 SPEED

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE
HYDRAULIC SCHEMATIC

REVISION

DRWG. NO. SDS-2317060

TWO SPEED DRIVE

WHEEL DRIVE MOTORS/ BRAKES

DOUBLE COUNTERBALANCE VALVE SET @ 2000 P.S.I. 10:1 PILOT

AXLE STEER SELECTOR

STEERING CYLINDER

AXLE EXTEND CYLINDERS

ROTARY SWIVEL

HYDRAULIC RESERVOIR

BOOM PUMP

MASTER LEVEL CYLINDER

10 u FILTER

SWING DRIVE MOTOR/ BRAKE

DOUBLE COUNTERBALANCE VALVES SET @ 3000 P.S.I. 6:1 PILOT

BOOM TELESCOPE CYLINDER

SLAVE LEVEL CYLINDER

DRIVE CONTROL

CAB CONTROLS

HOIST

SWING

EXTEND

ROTARY ACTUATOR

HOSES THRU HOSE TRACK

PRESS

TANK

.021

CAB LEVEL

.021

CAB ROTATE

TELESCOPE LOAD VALVE

GROUND JUNCTION CONTROLS

BOOM EXTEND | SWING | BOOM HOIST

SET @ 1100 P.S.I.

GROUND/ PLATFORM

LOW DRIVE

SHUTTLE VALVES

DRIVE

STEER

BOOM HOIST CYLINDER

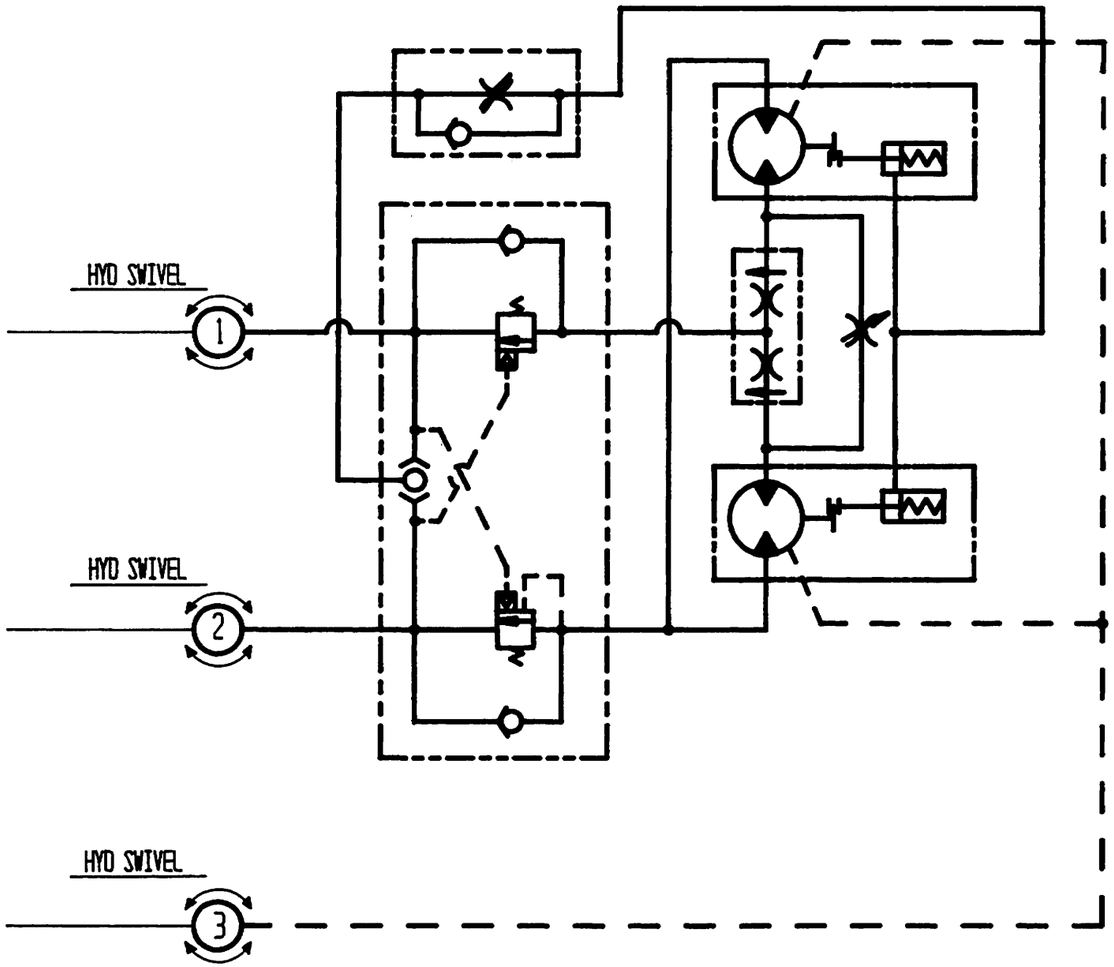
MPH-80 & MP-95 FULL HYDRAULIC

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE
HYDRAULIC SCHEMATIC

REVISION

DRWG. NO.
SES 2322870



NOTE:

(X) INDICATES PORT NUMBER ON HYDRAULIC SWIVEL

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

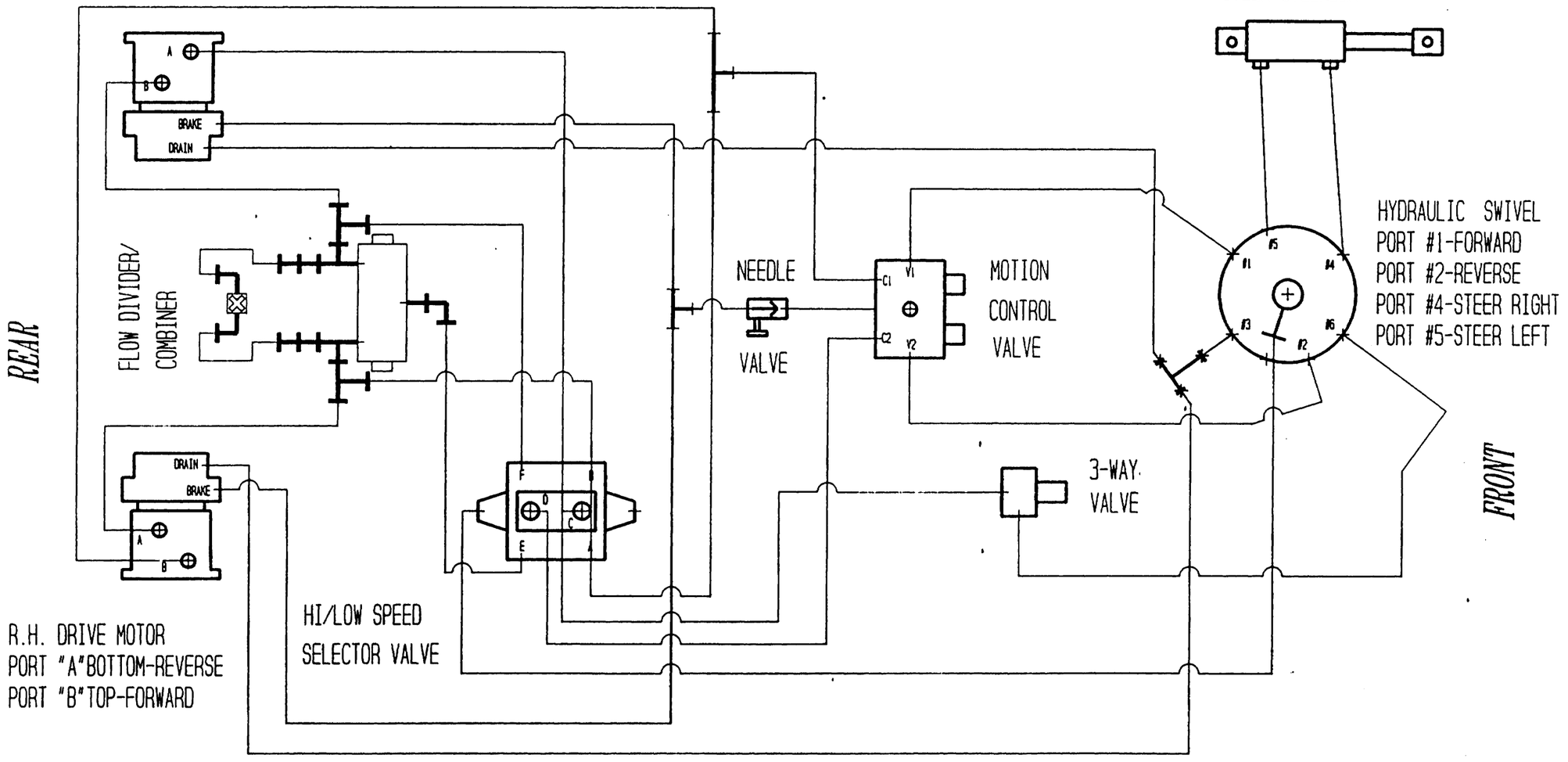
TITLE: HYDRAULIC SCHEMATIC
2 WHEEL DRIVE

REVISION:

DRWG. NO. SCS-212458-0

L.H. DRIVE MOTOR
PORT "B"BOTTOM-REVERSE
PORT "A"TOP-FORWARD

LEFT SIDE



RIGHT SIDE

VIEWED FROM BOTTOM OF UNDERCARRIAGE

REV	BY	DATE	DESCRIPTION
			DO NOT SCALE PRINT

ALL WELDS MUST BE IN ACCORDANCE WITH A.W.S. STANDARDS D1.1-1972,D14.1-78 OR D10.9-69

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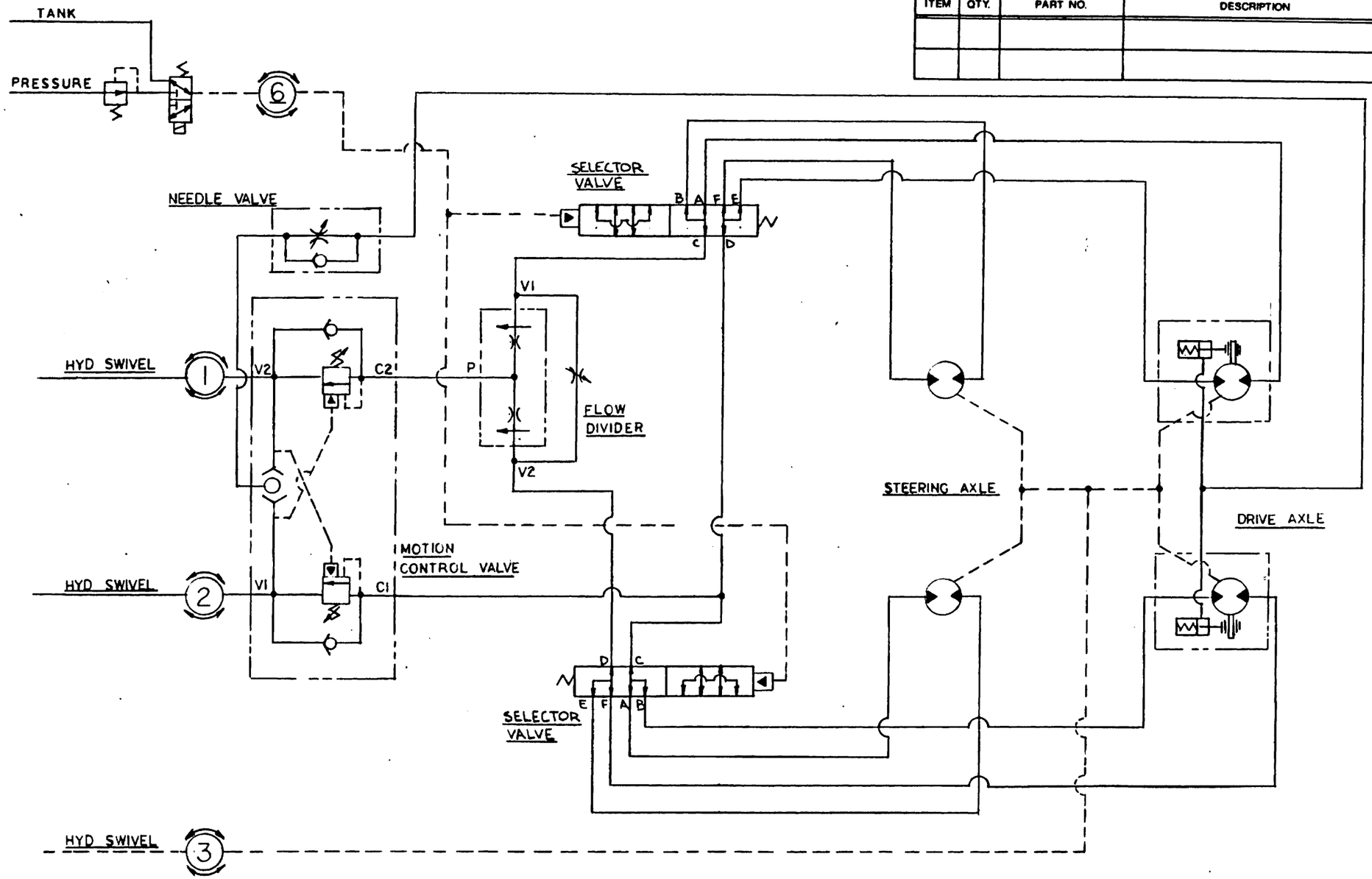
SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: HYDRAULIC DIAGRAM
2-WHEELDRIVE (SHIFT-ON-THE-GO)
CADKEY DRAWING DO NOT REVISE MANUALLY

SCALE	DRAWN	DATE	CHECKED	APPROVED	DRAWING NO.
N/A	DLB	2-5-88			2137520

UNLESS TOLERANCE	
X.X	± .1
X.XX	± .05
X.XXX	± .015
FRACTIONAL	± 1/8
ANGULAR	± 0.5 deg.

BILL OF MATERIAL				TOTAL WT.	
ITEM	QTY.	PART NO.	DESCRIPTION	MAT'L.	WT.



SCHEMATIC DRAWN IN THE DE-ENERGIZED POSITION - PARALLEL DRIVE

NOTE

(X) INDICATES PORT NUMBER FOR HYDRAULIC SWIVEL

BTB 1-25-89 CHANGED SELECTOR VALVES TO SHOW DE-ENERGIZED POSITION

REVISION	BY	DATE	DESCRIPTION

SIMON-AERIALS INC. MILWAUKEE, WI 53224

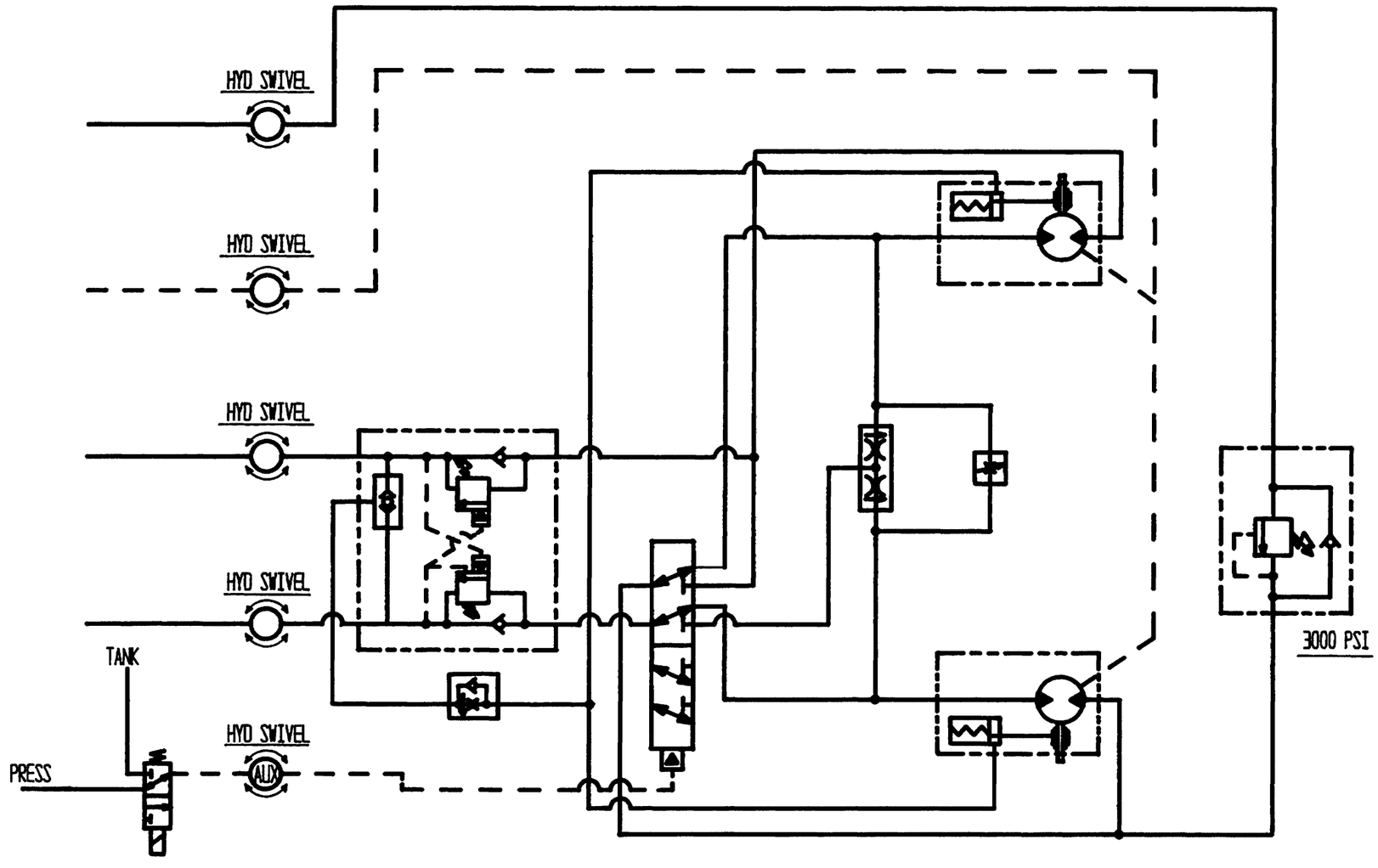
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ALL WELDS MUST BE IN ACCORDANCE WITH AWS STANDARDS D1.1-1972, D14.1-70 OR D16.0-69

IMPLIED TOLERANCE	
X.X	±.1
X.XX	±.06
X.XXX	±.015
FRACTIONAL	±1/8
ANGULAR	±0.5°
SCALE	DO NOT SCALE PRINT

TITLE HYDRAULIC SCHEMATIC
2WD TO 4WD SHIFT ON THE GO

DRAWN	DATE	CHECKED	APPROVED	DRAWING NO
GH	4-8-87	MJC	MJC	SCS 212460-0



NOTE:

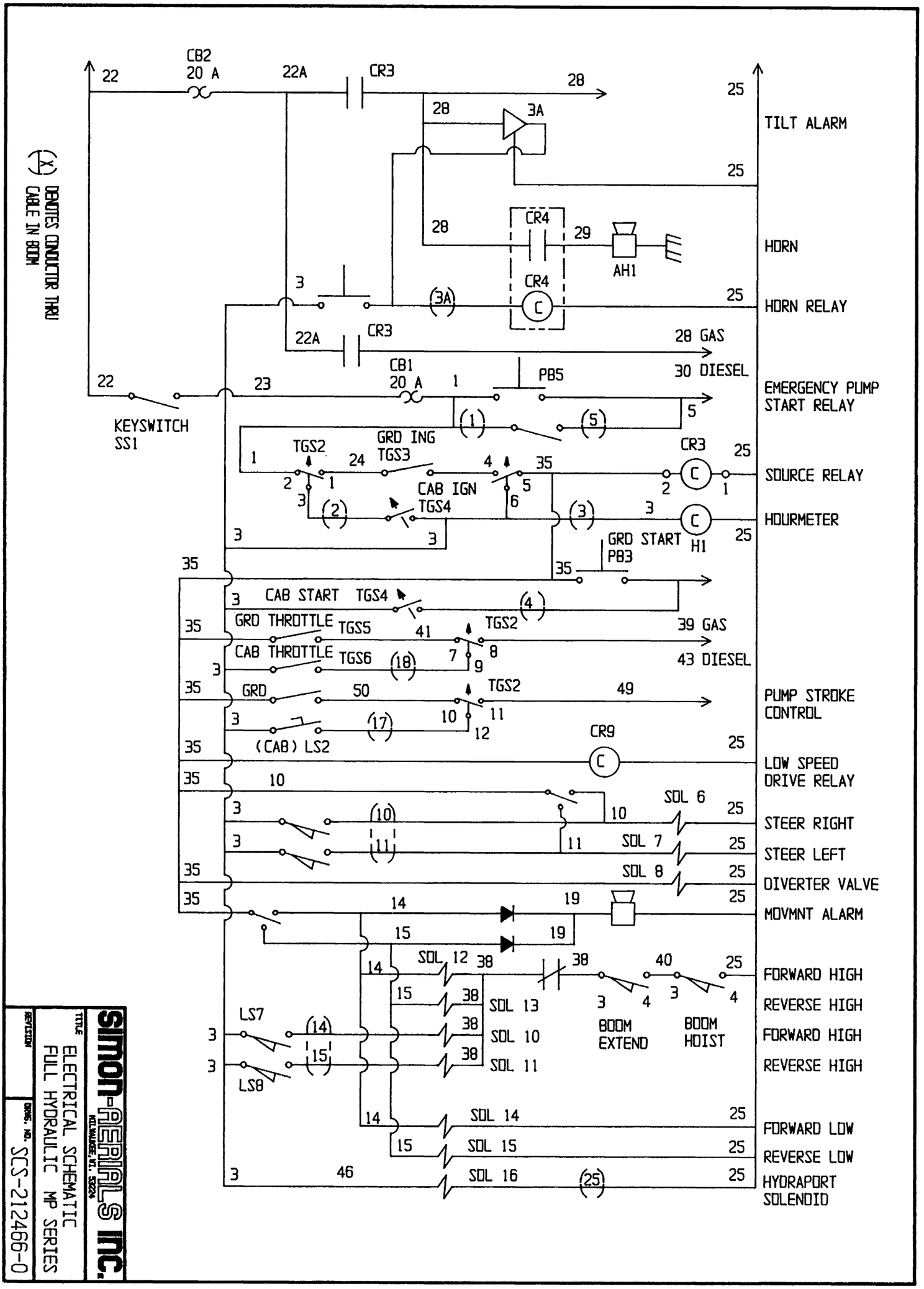
(X) INDICATES PORT NUMBER ON HYDRAULIC SWIVEL

SIMON-AERIALS INC.

TITLE: HYDRAULIC SCHEMATIC SERIES/PARALLEL DRIVE

APPROVED

DRWG. NO. SCS-212457-0

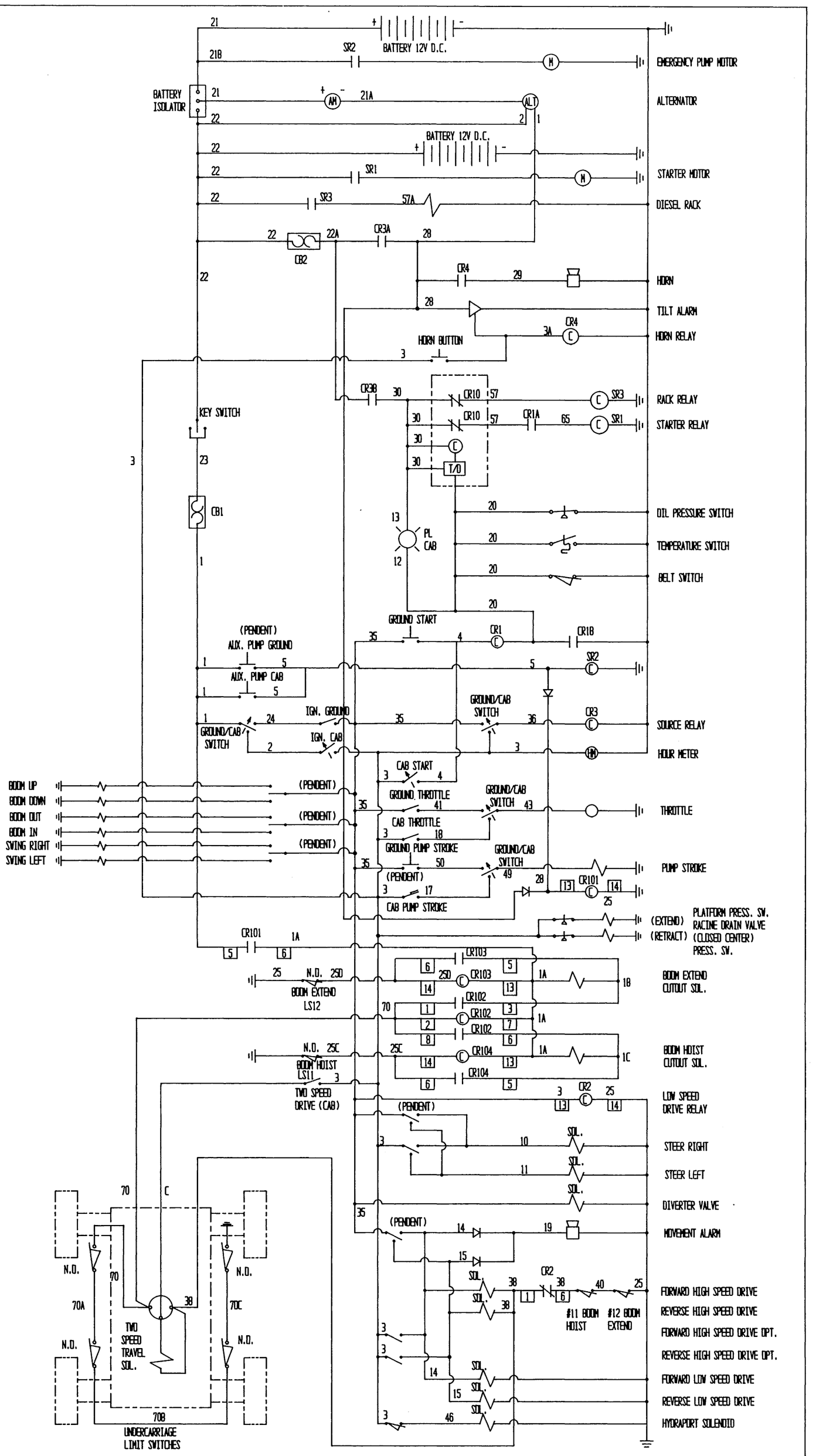


SIMON-AERIALS INC.
MILWAUKEE, WI. 53209

TITLE
ELECTRICAL SCHEMATIC
FULL HYDRAULIC MP SERIES

REVISION

DRWG. NO.
SCS-212466-0

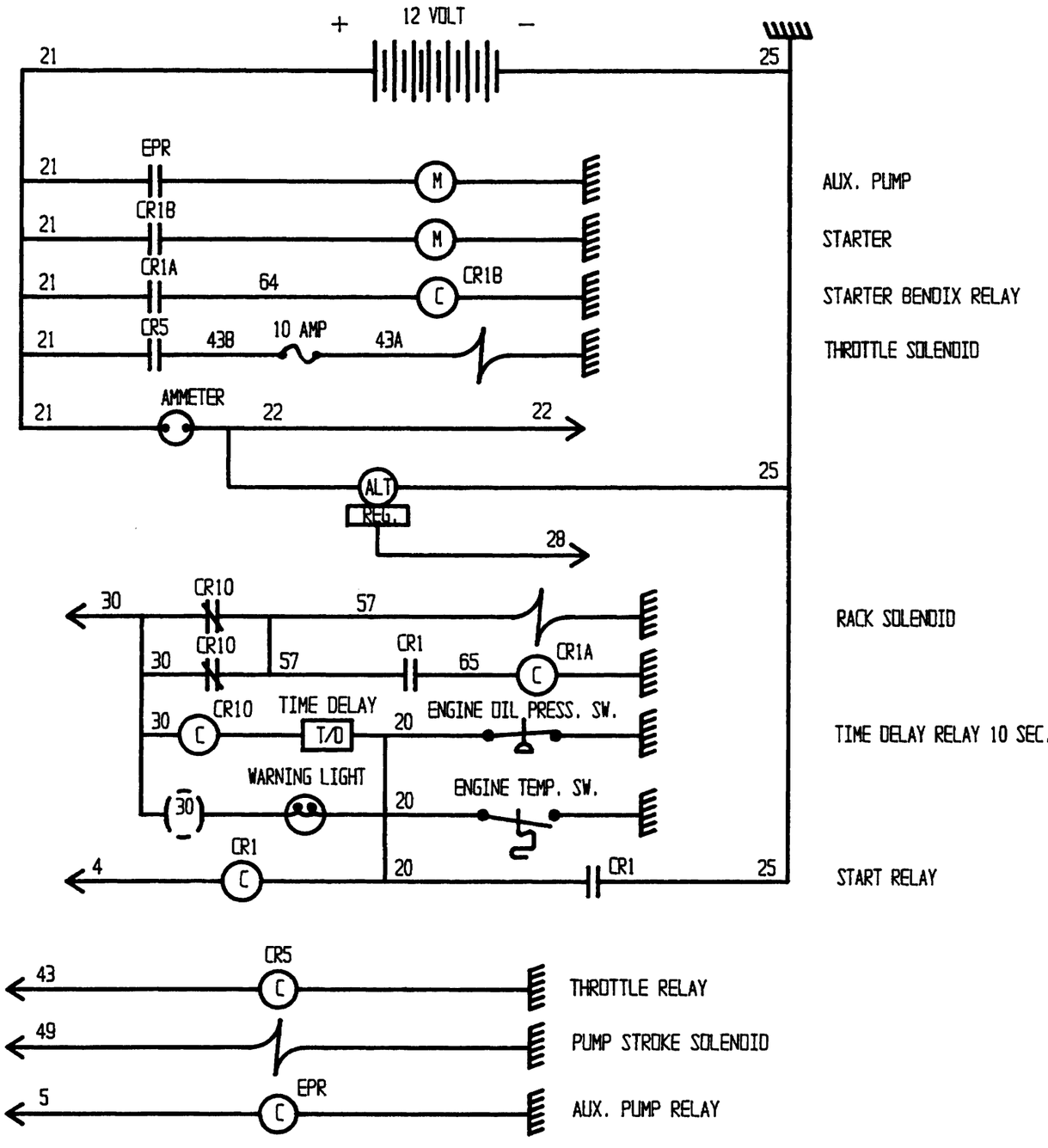


SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE
ELECTRICAL SCHEMATIC
M-80 & 95 / FULL HYD. (W/ EXT. AXLES)

REVISION

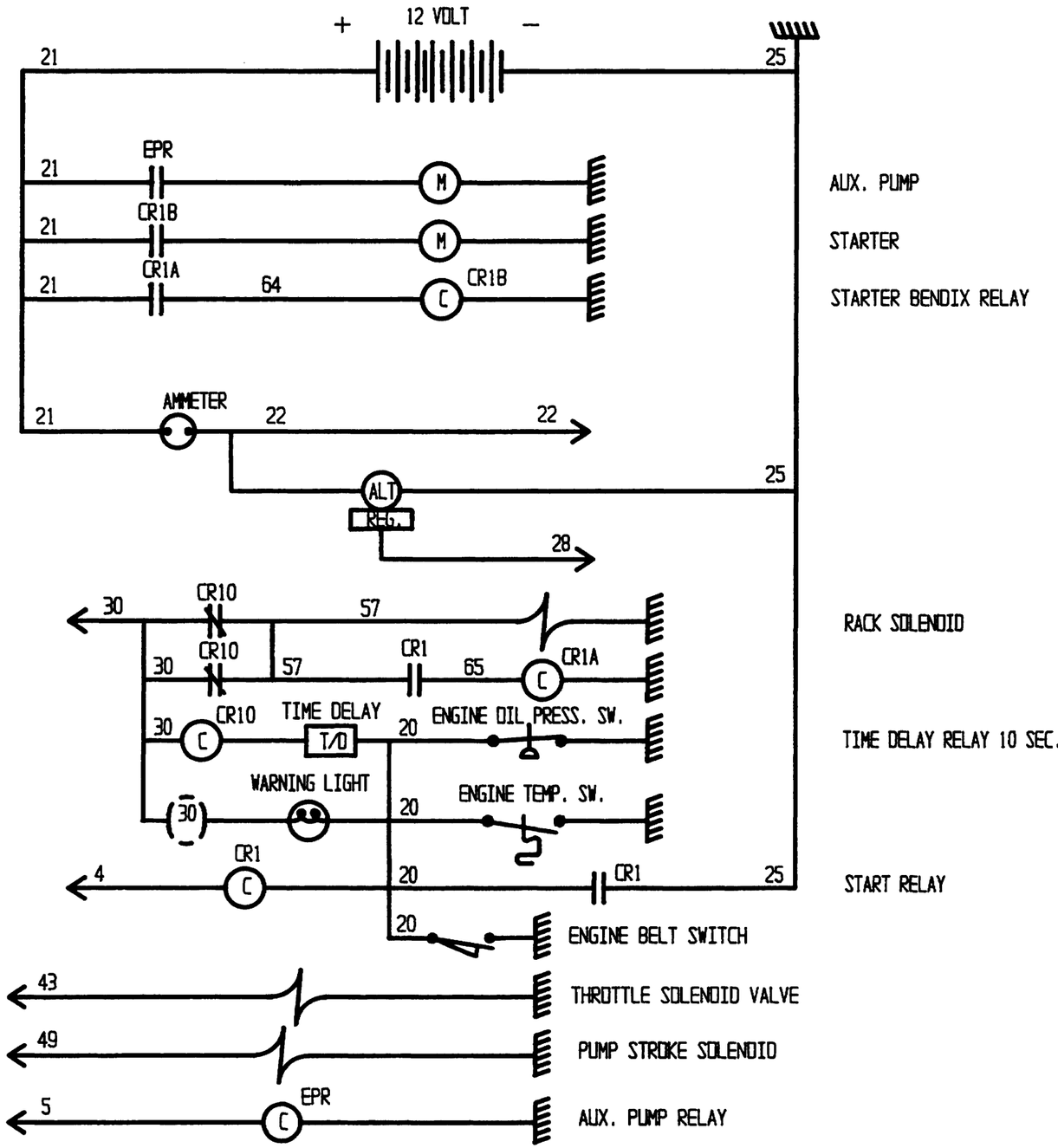
DRWG. NO.
SDS-215077-0



ENGINE RPM IDLE 1200—1500
HIGH 2500

simon-AERIALS INC.
MILWAUKEE, WI. 53224

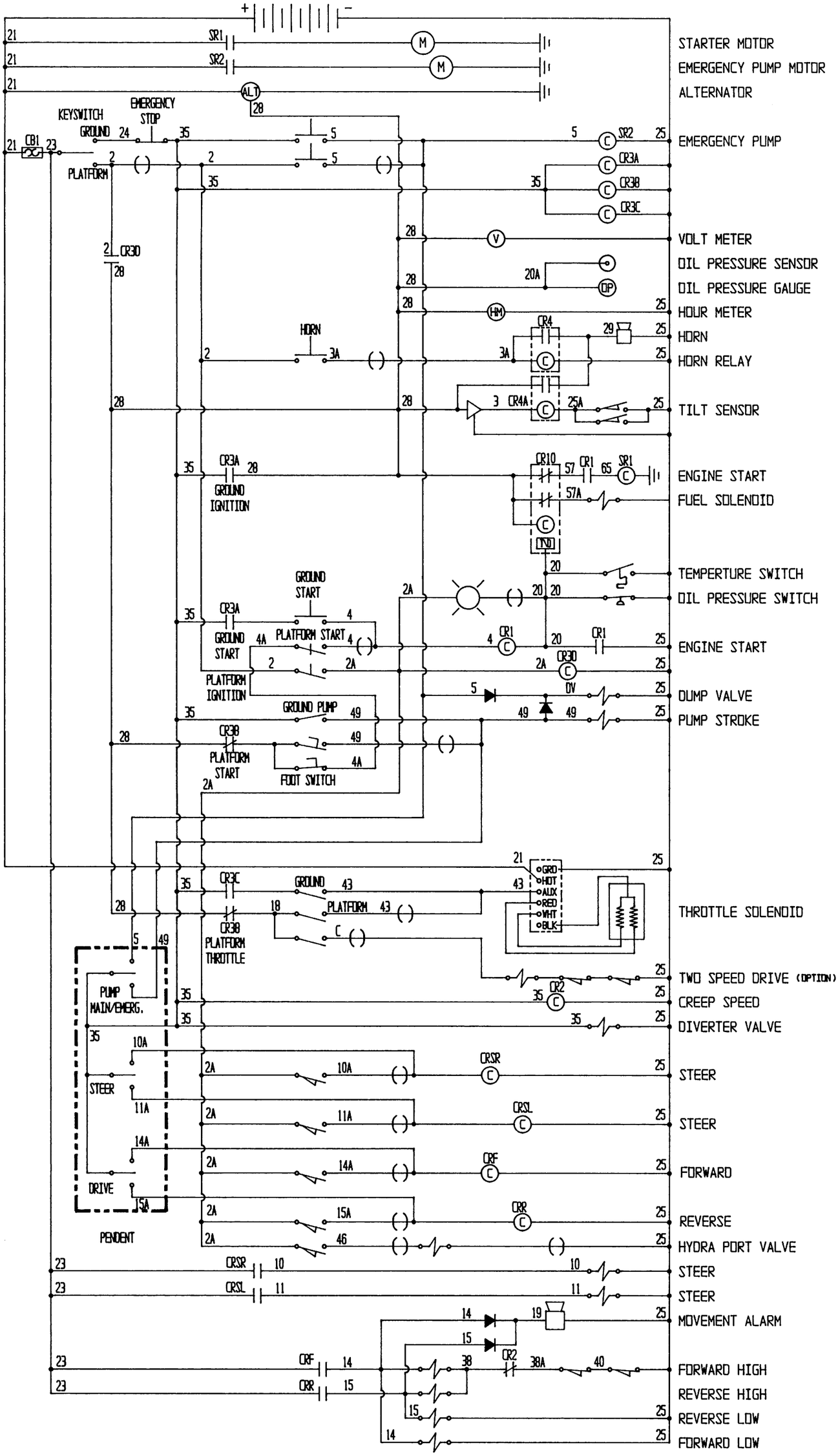
TITLE	ELECTRICAL SCHEMATIC DEUTZ DIESEL 2 CYL.
REVISION	DRWG. NO. SCS-212427-0



ENGINE RPM IDLE 1200--1500
HIGH 2500

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE	ELECTRICAL SCHEMATIC DEUTZ DIESEL 3 & 4 CYL.
REVISION	DRWG. NO. SCS-212426-0



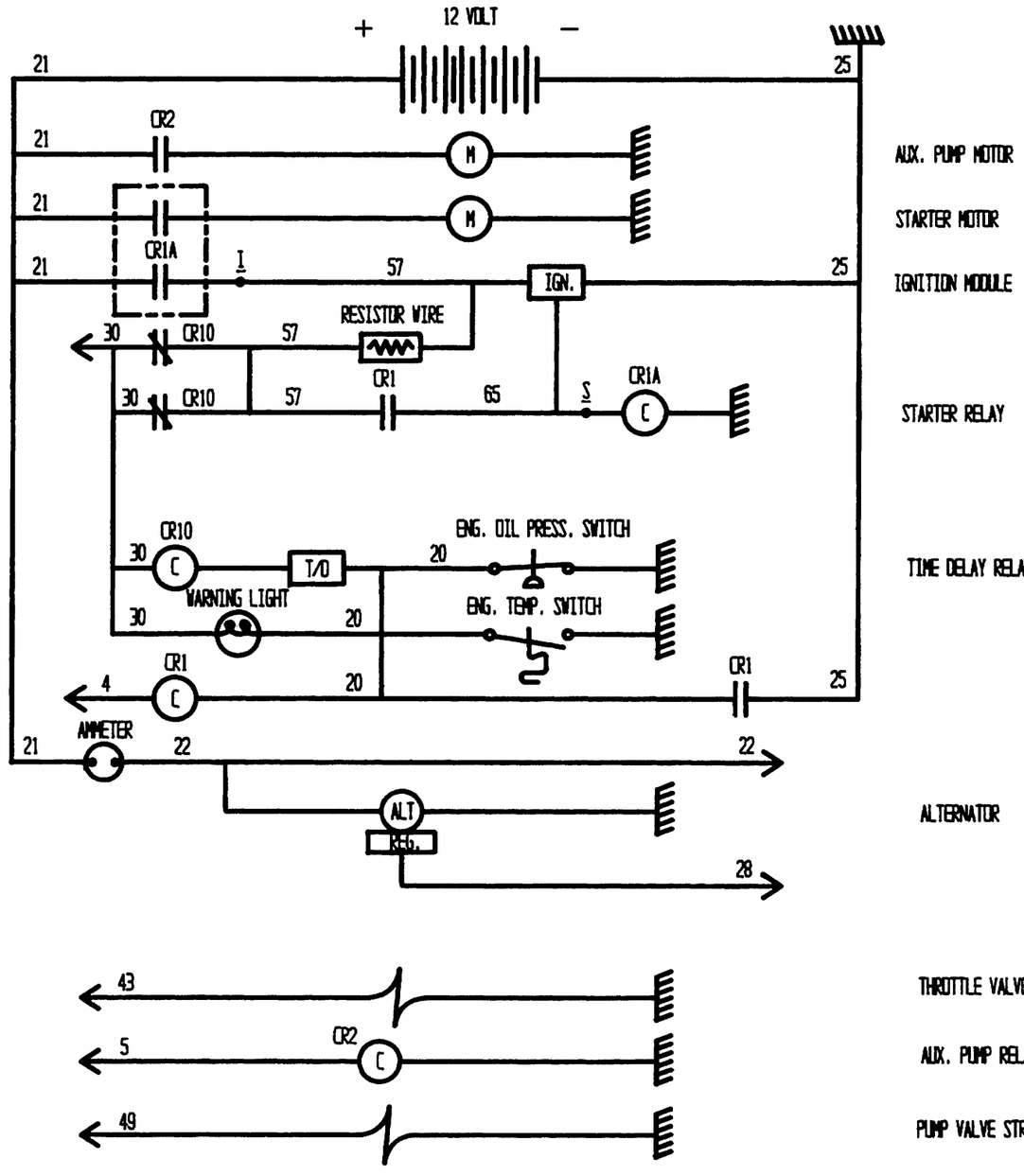
REF: MP W/ DEUTZ L1011

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC
FULL HYDRAULIC

REVISION: A

DWG. NO.: SDS 2314090

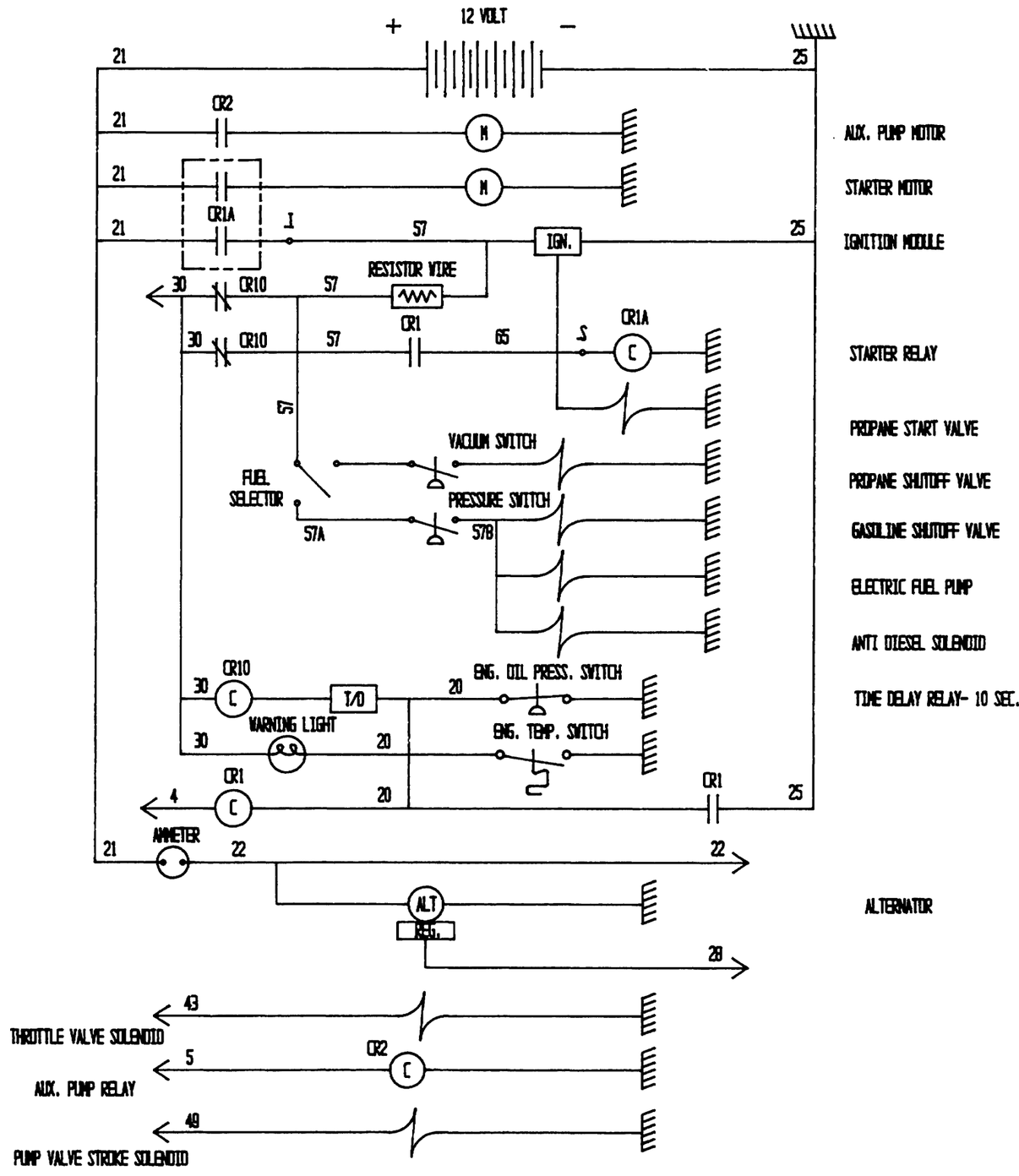


SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC
FORD 2.3 LITER GASOLINE

REVISION

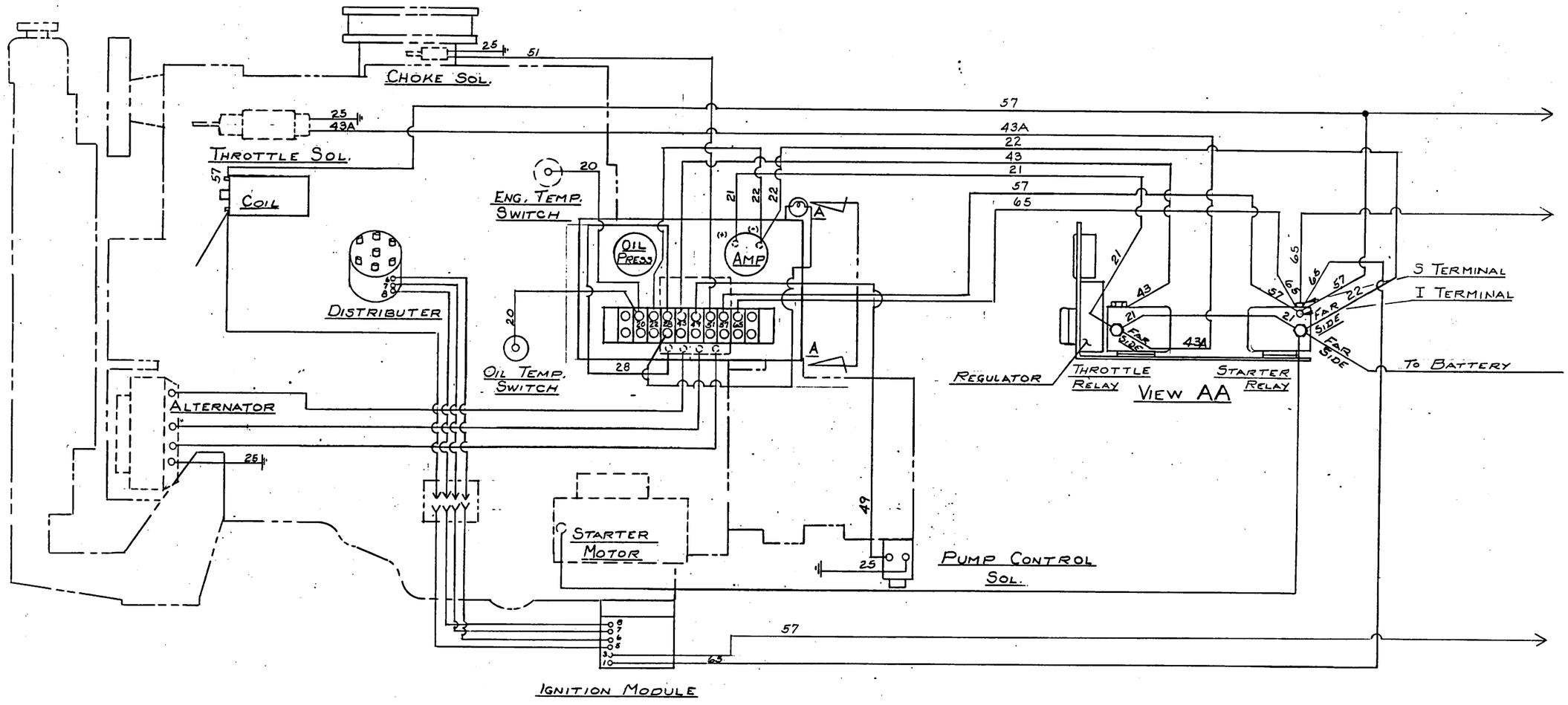
DRWG. NO. SCS-212445-0



SIMON AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC FORD 2.3L DUAL FUEL	
REVISION: A	DRWG. NO.: SCS-2124440

BILL OF MATERIAL				TOTAL WT.	
ITEM	QTY.	PART NO.	DESCRIPTION	MAT'L.	WT.



VIEWED FROM RIGHT SIDE OF SUPERSTRUCTURE

REVISION	BY	DATE	DESCRIPTION

SIMON-AERIALS INC. MILWAUKEE, WI 53224

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IMPLIED TOLERANCE	
X.X	±.1
X.XX	±.06
X.XXX	±.015
FRACTIONAL	±1/8
ANGULAR	±0.5°

TITLE: ELECTRICAL DIAGRAM FORD 300 IN³ GAS

SCALE: ~ DO NOT SCALE PRINT

DRAWN	DATE	CHECKED	APPROVED	DRAWING NO
DTF	8-21-84			SDS 211920

INDICATOR LIGHT LOW OIL PRESS. HI WATER TEMP.
HORN
TILT ALARM
HORN RELAY
SOURCE RELAY
CAB START
THROTTLE
PUMP STROKE
GLOW PLUG
LOW SPEED DRIVE RELAY
STEER RIGHT
STEER LEFT
DIVERTER VALVE
MOVEMENT ALARM
FORWARD HIGH SPEED DRIVE
REVERSE HIGH SPEED DRIVE
FORWARD HIGH SPEED DRIVE
REVERSE HIGH SPEED DRIVE
FORWARD LOW SPEED DRIVE
REVERSE LOW SPEED DRIVE
HYDRA PORT SOLENOID

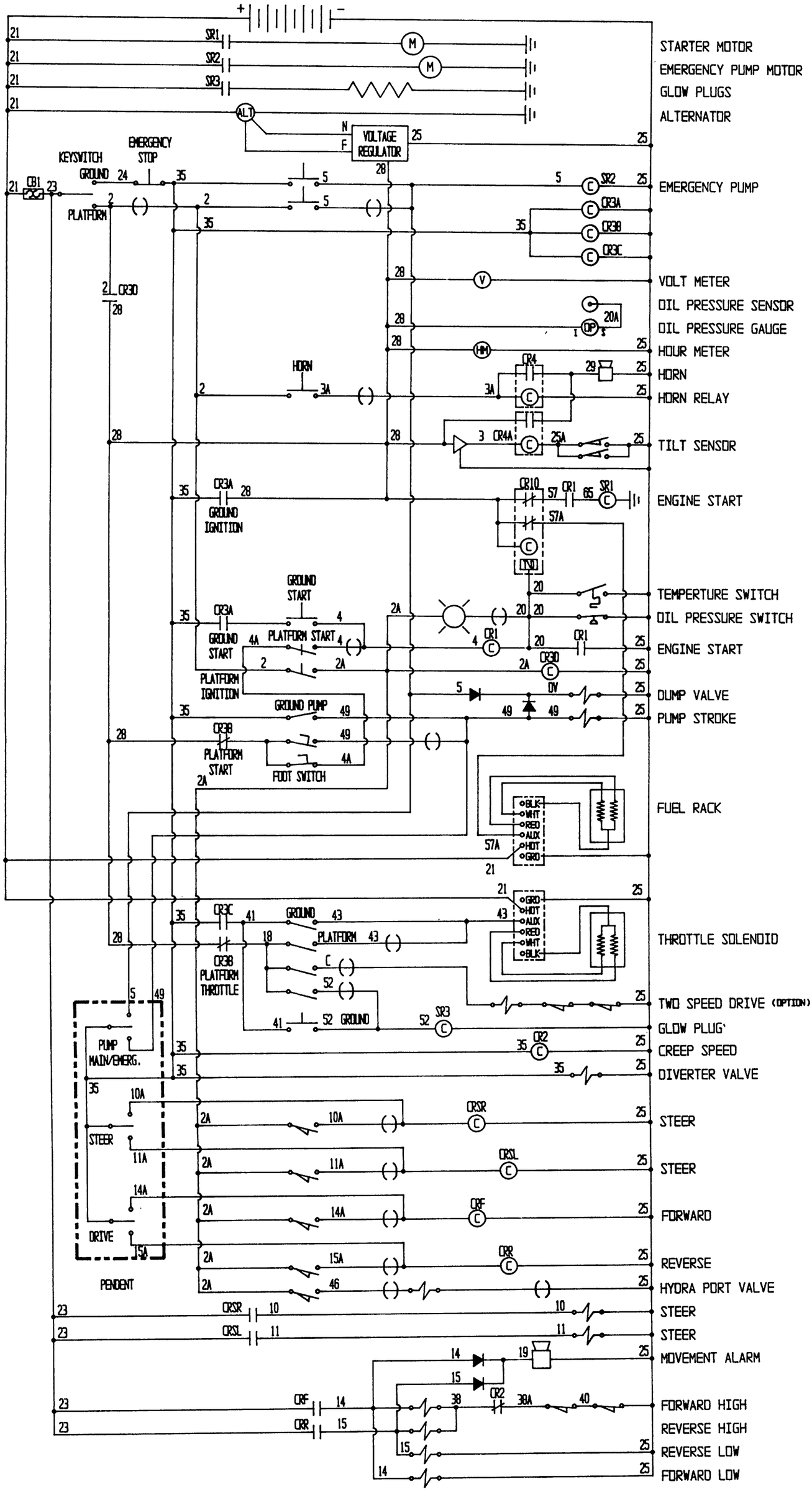
AIR CLEANER ALARM
GLOW PLUG
PRE-HEAT INDICATOR
FUEL RACK SOLENOID
GLOW PLUG
PRE-HEAT INDICATOR
WATER TEMP. SWITCH
OIL PRESS. SWITCH
STARTER MOTOR
BATTERY
ALTERNATOR
INDICATOR LIGHT
THROTTLE SOLENOID
GROUND KEY SWITCH
1 AUX. PUMP
SR2
CR4
INDICATOR LIGHT
HORN BUTTON
SR2
CR3
GROUND CAB SWITCH
FOOT SWITCH
GROUND THROTTLE
GROUND CAB SWITCH
CAB THROTTLE
GROUND PUMP STROKE
CR9
CR4
CR3
CB2
CB1 20A
AUX. PUMP GROUND
AUX. PUMP CAB
IGN. GROUND
IGN. CAB
GROUND CAB SWITCH
SOL.
BOOM HOIST
BOOM EXTEND
CR9
PENDANT
PENDANT

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE
ELECTRICAL SCHEMATIC
MP-80 W/ HATZ DIESEL (GERMANY)

REVISION

DRWG. NO.
SDS-218933-0



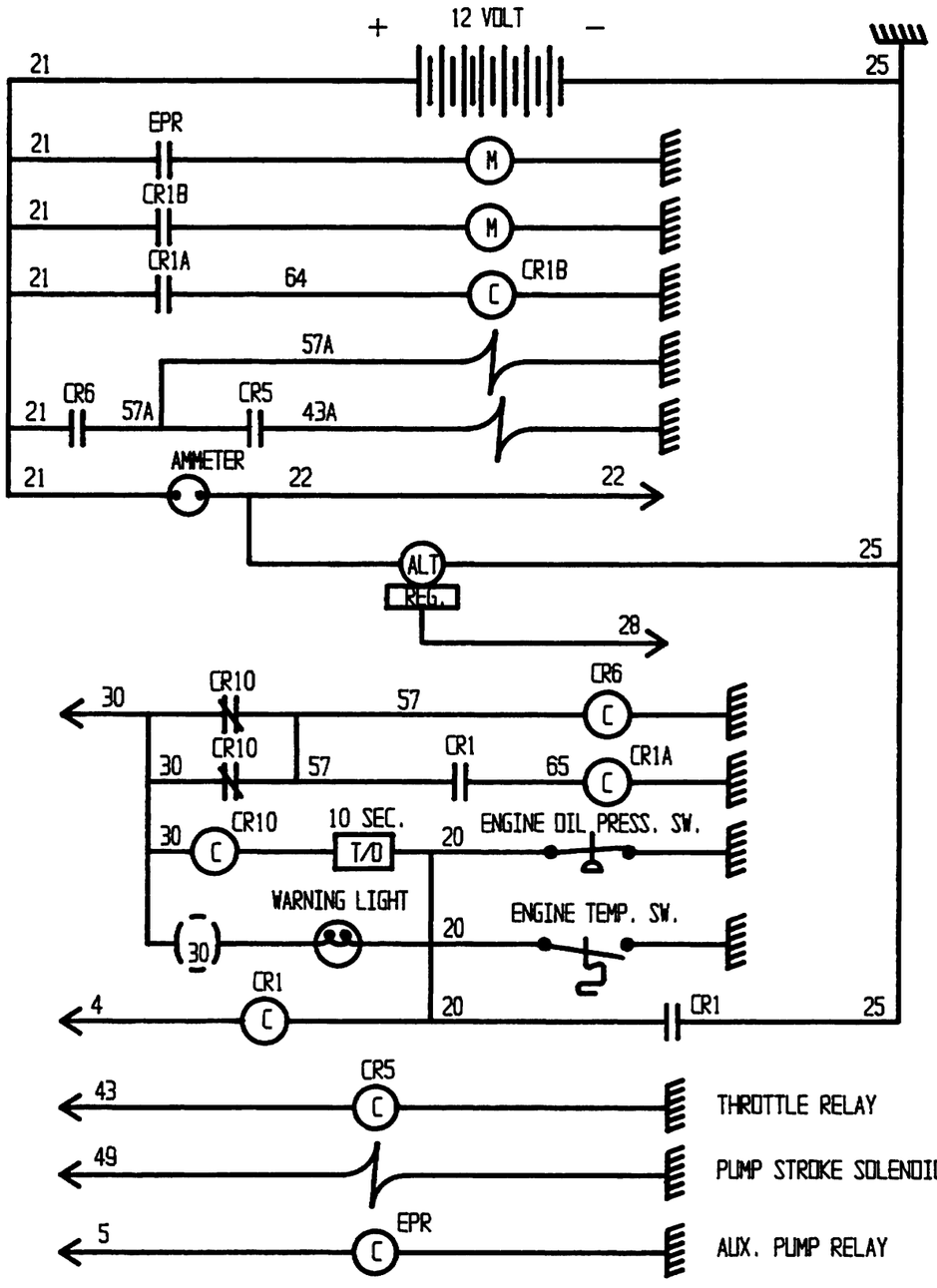
REF: MP W/ ISUZU C-240

SIMON-AERIALS INC.

TITLE: ELECTRICAL SCHEMATIC FULL HYDRAULIC

DRWG. NO. SDS 2320710

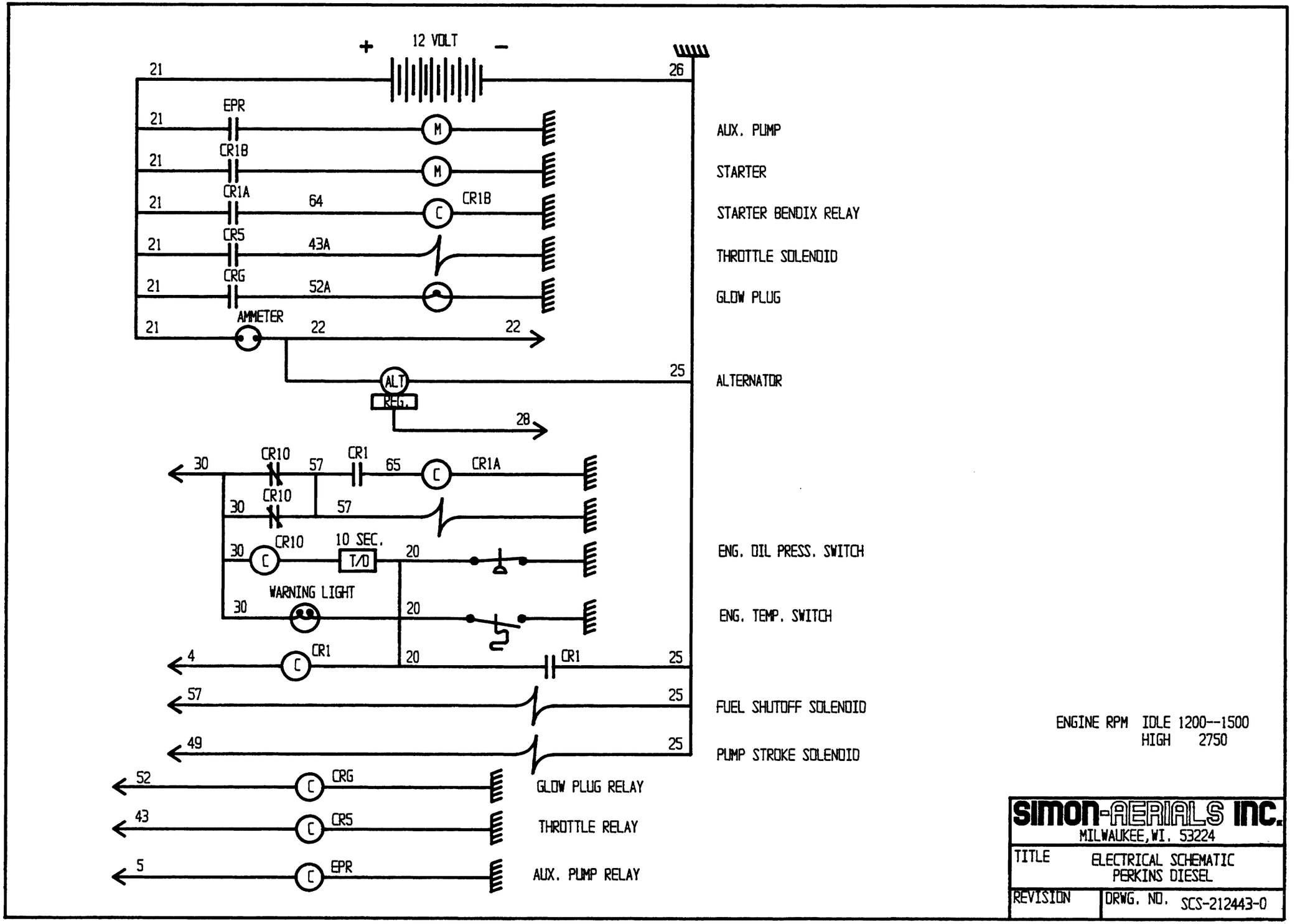
REVISION



ENGINE RPM IDLE 1200--1500
HIGH 2650

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

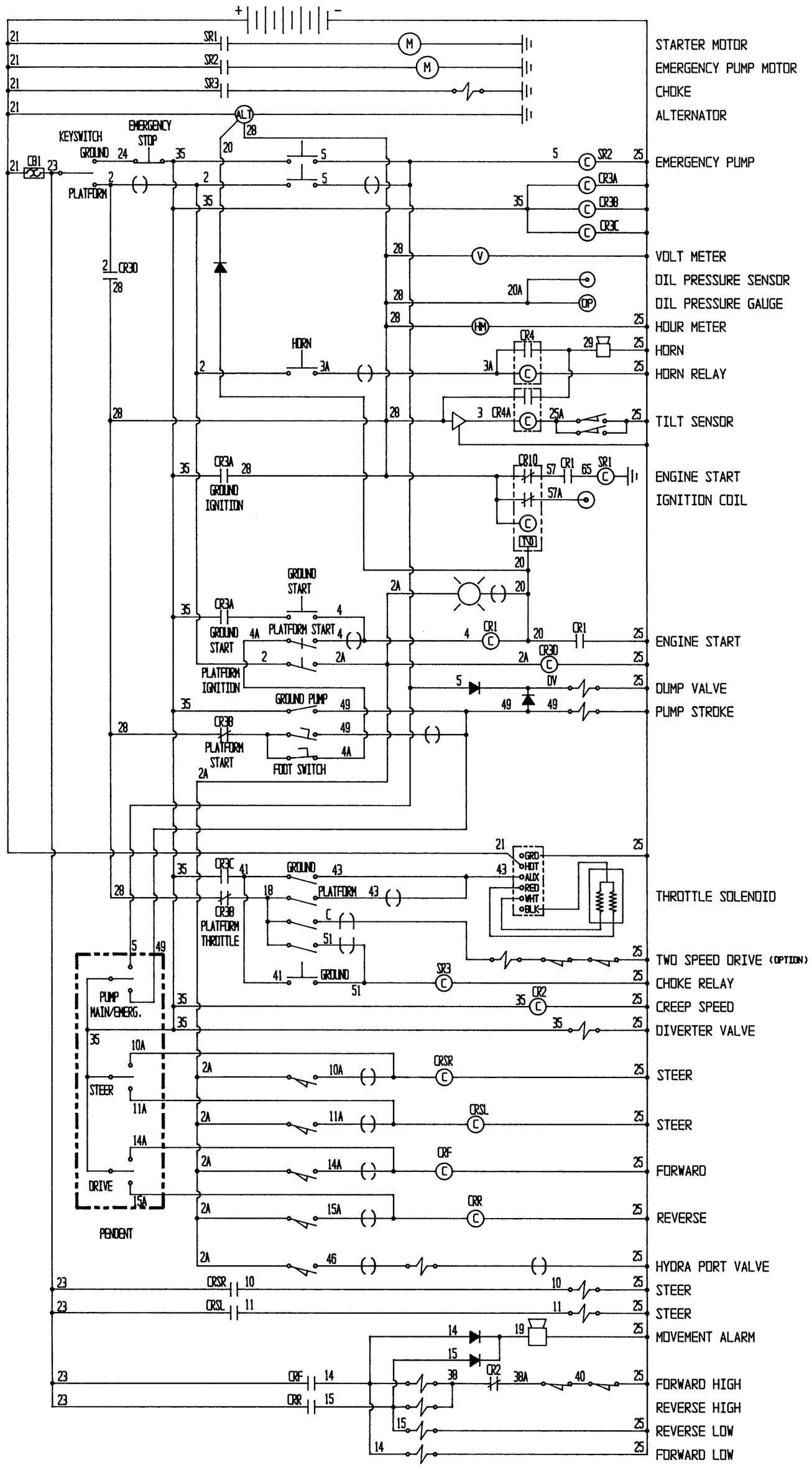
TITLE	ELECTRICAL SCHEMATIC MURPHY DIESEL 3 CYL.
REVISION	DRWG. NO. SCS-212432-0



ENGINE RPM IDLE 1200--1500
HIGH 2750

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE	ELECTRICAL SCHEMATIC PERKINS DIESEL
REVISION	DRWG. NO. SCS-212443-0



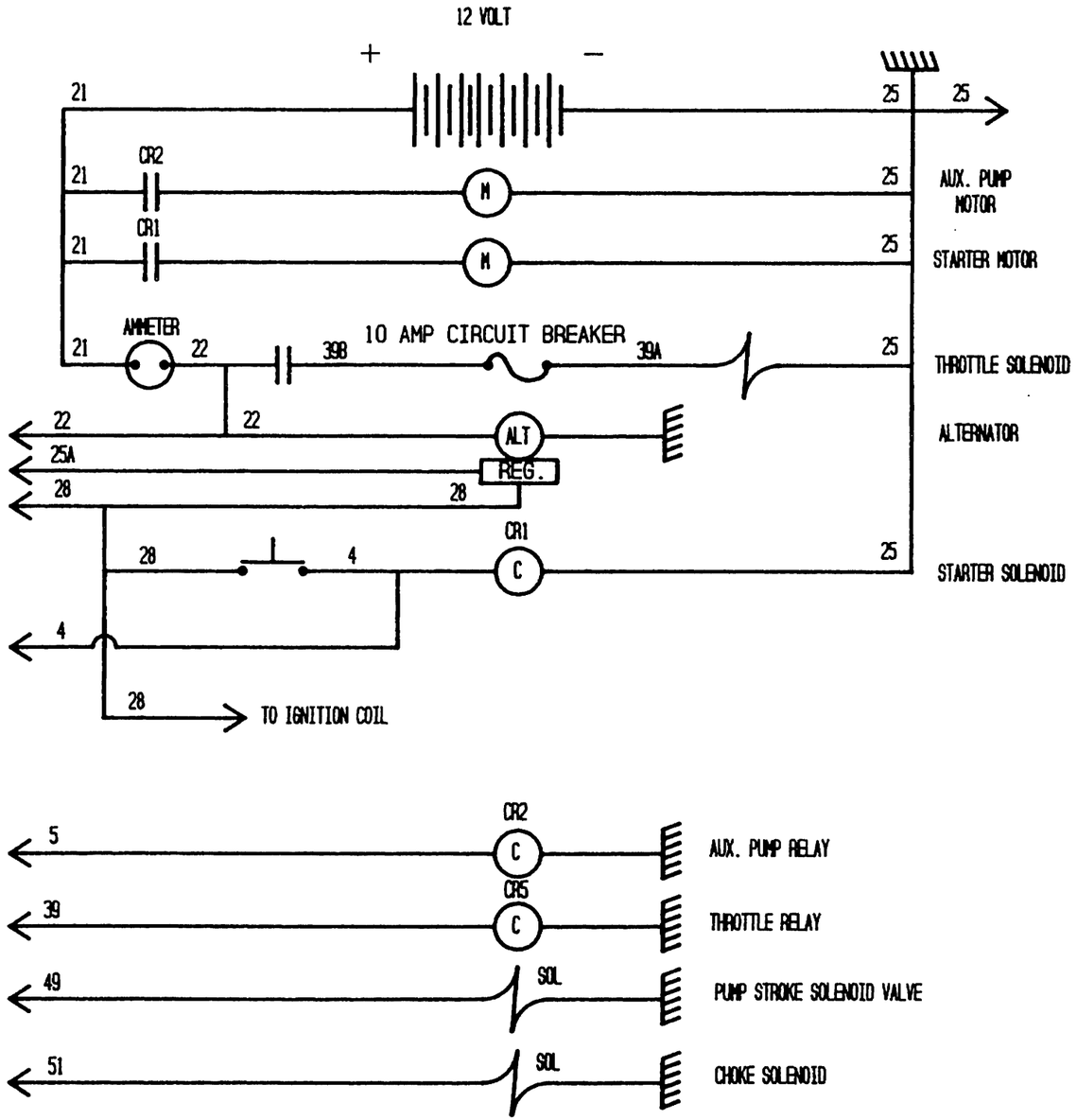
REF: MP W/ WISCONSIN 35 HP. ENGINE

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC
FULL HYDRAULIC

REVISION: A

DWG. NO.: SDS 2314080

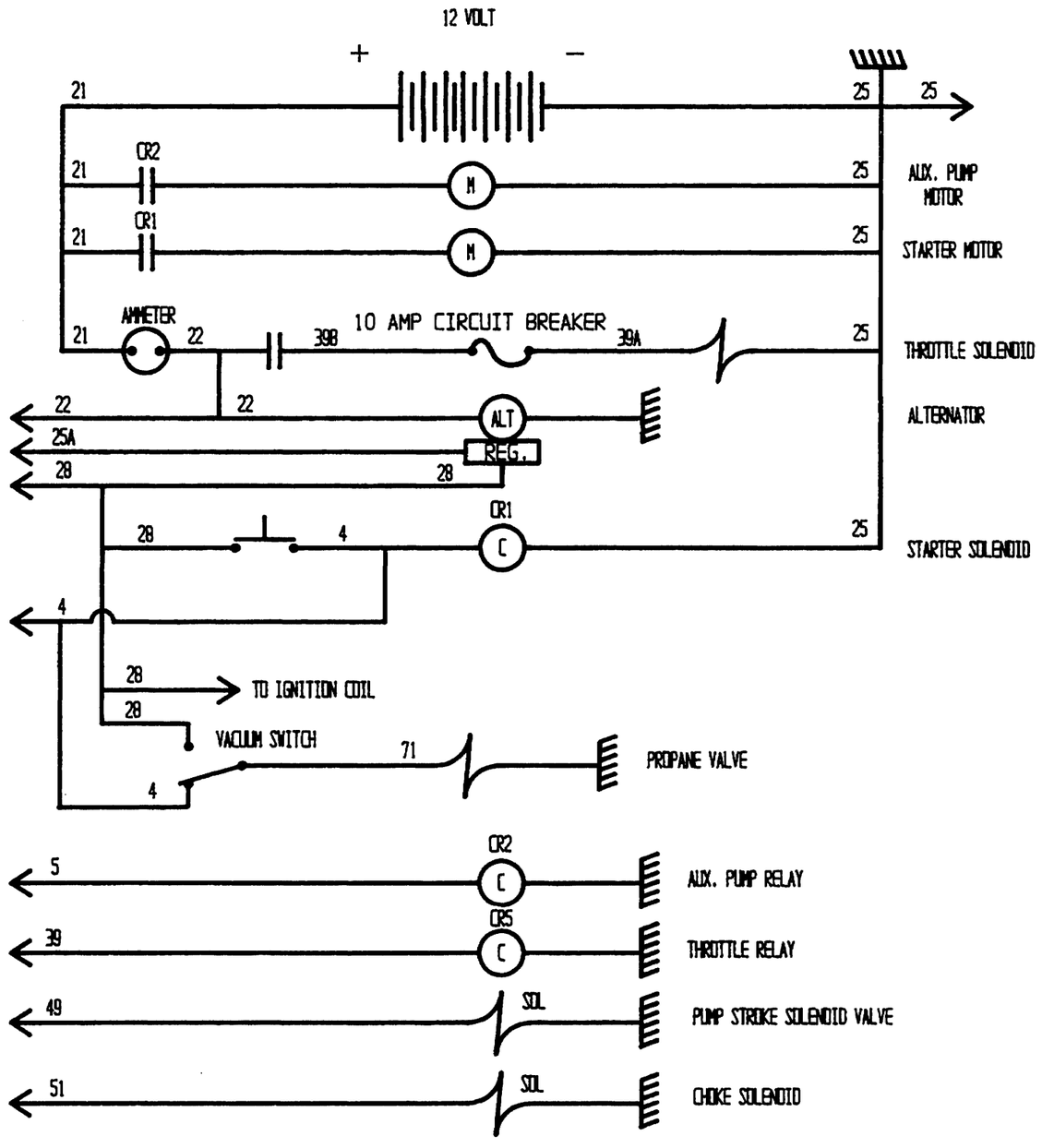


SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC
35 H.P. GASOLINE

REVISION:

DRWG. NO.: SCS-212419-0

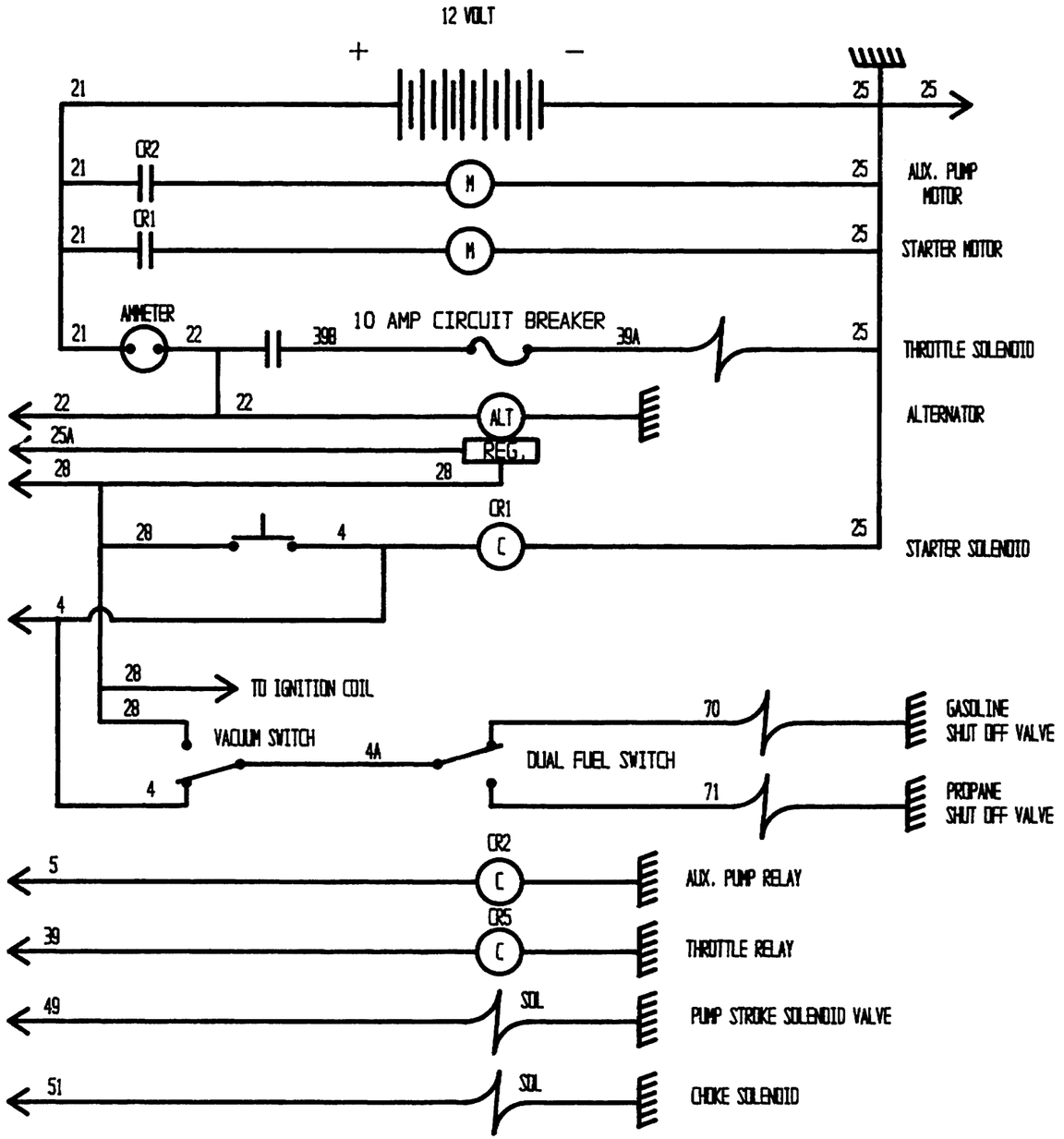


SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC
35 H.P. PROPANE

REVISION

DRWG. NO. SCS-212420-0

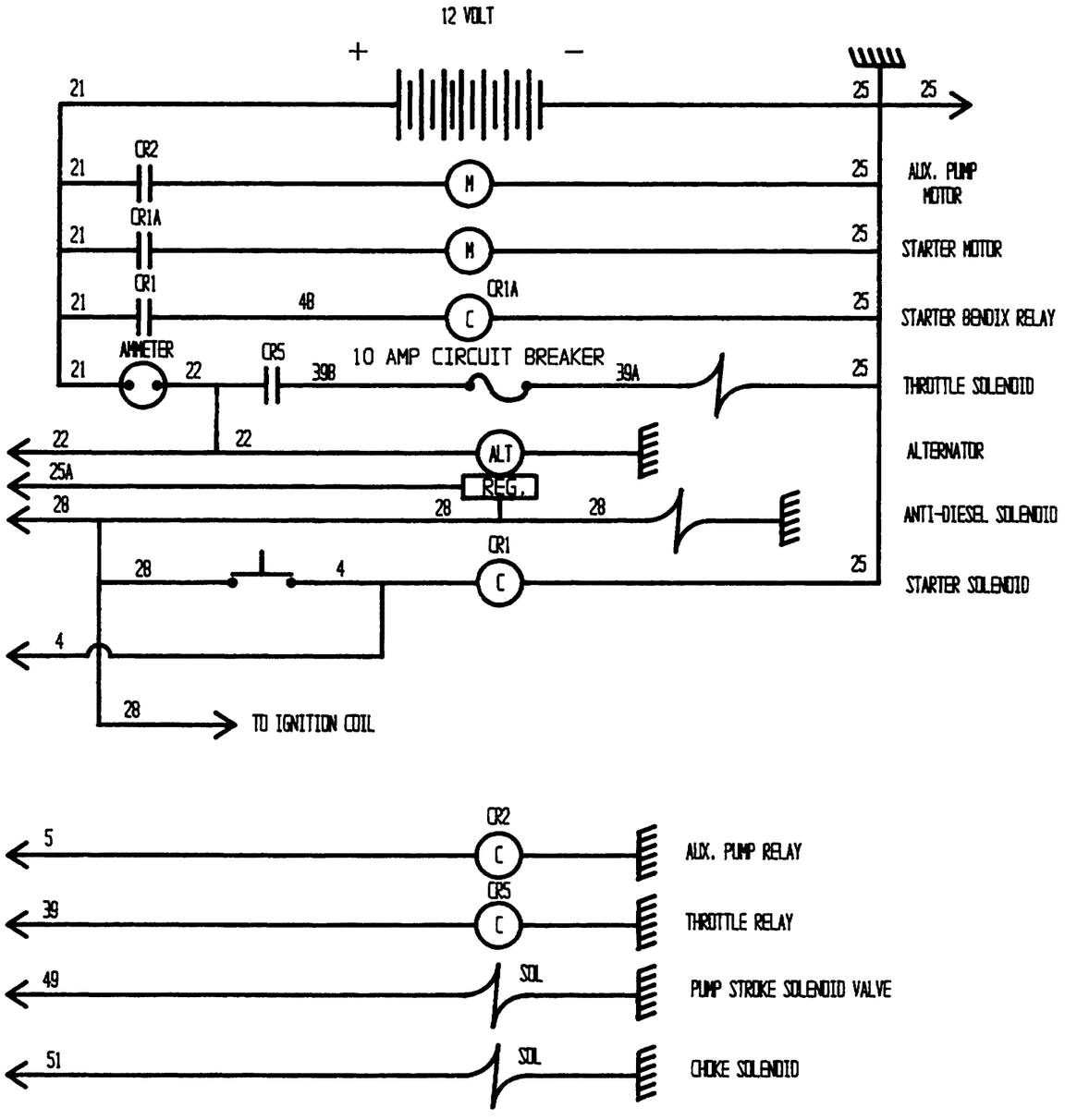


SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC
35 H.P. DUAL FUEL

REVISION:

DRWG. NO. SCS-212421-0

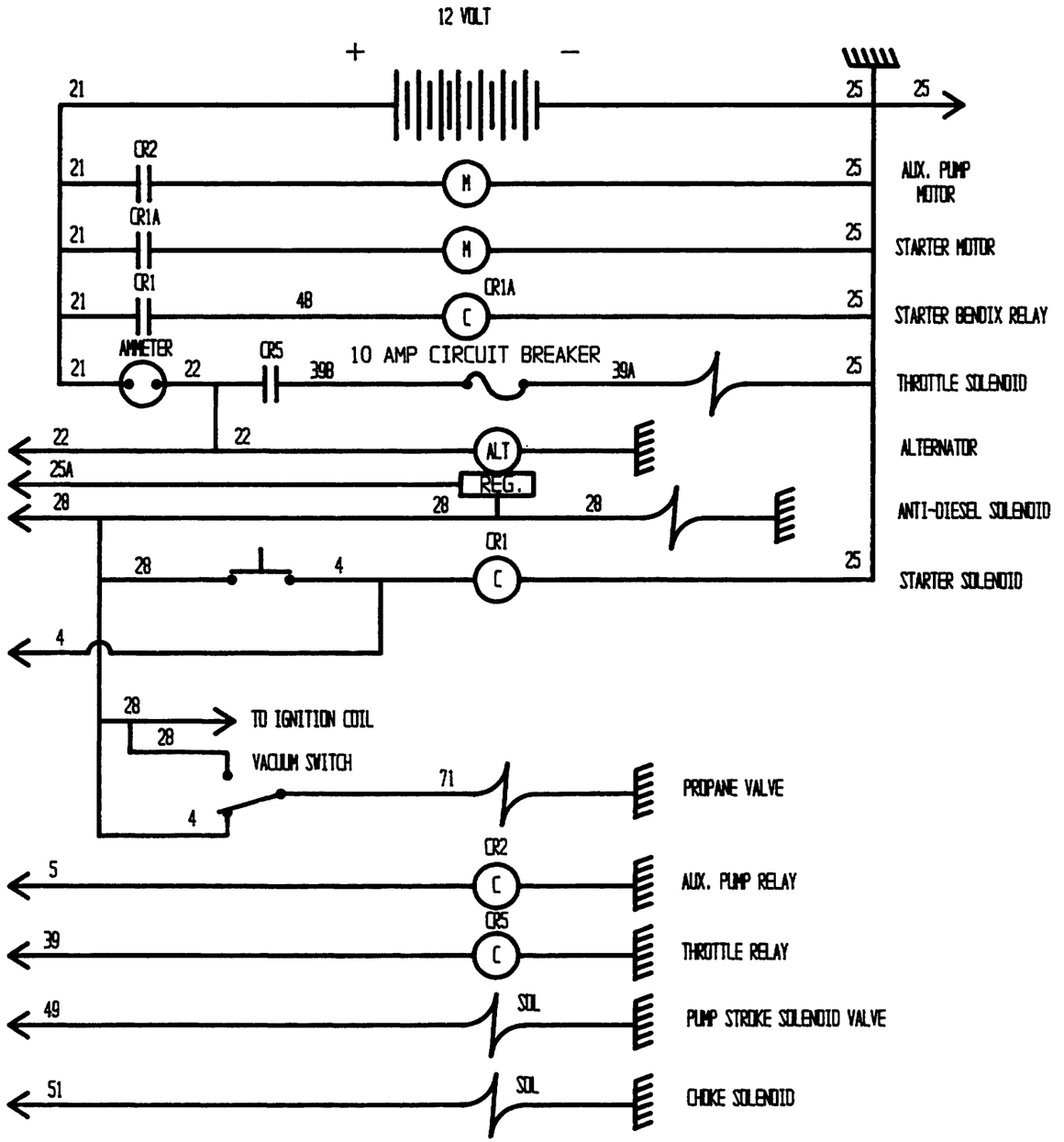


SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE ELECTRICAL SCHEMATIC
65 H.P. GASOLINE

REVISION

DRWG. NO. SCS-212430-0

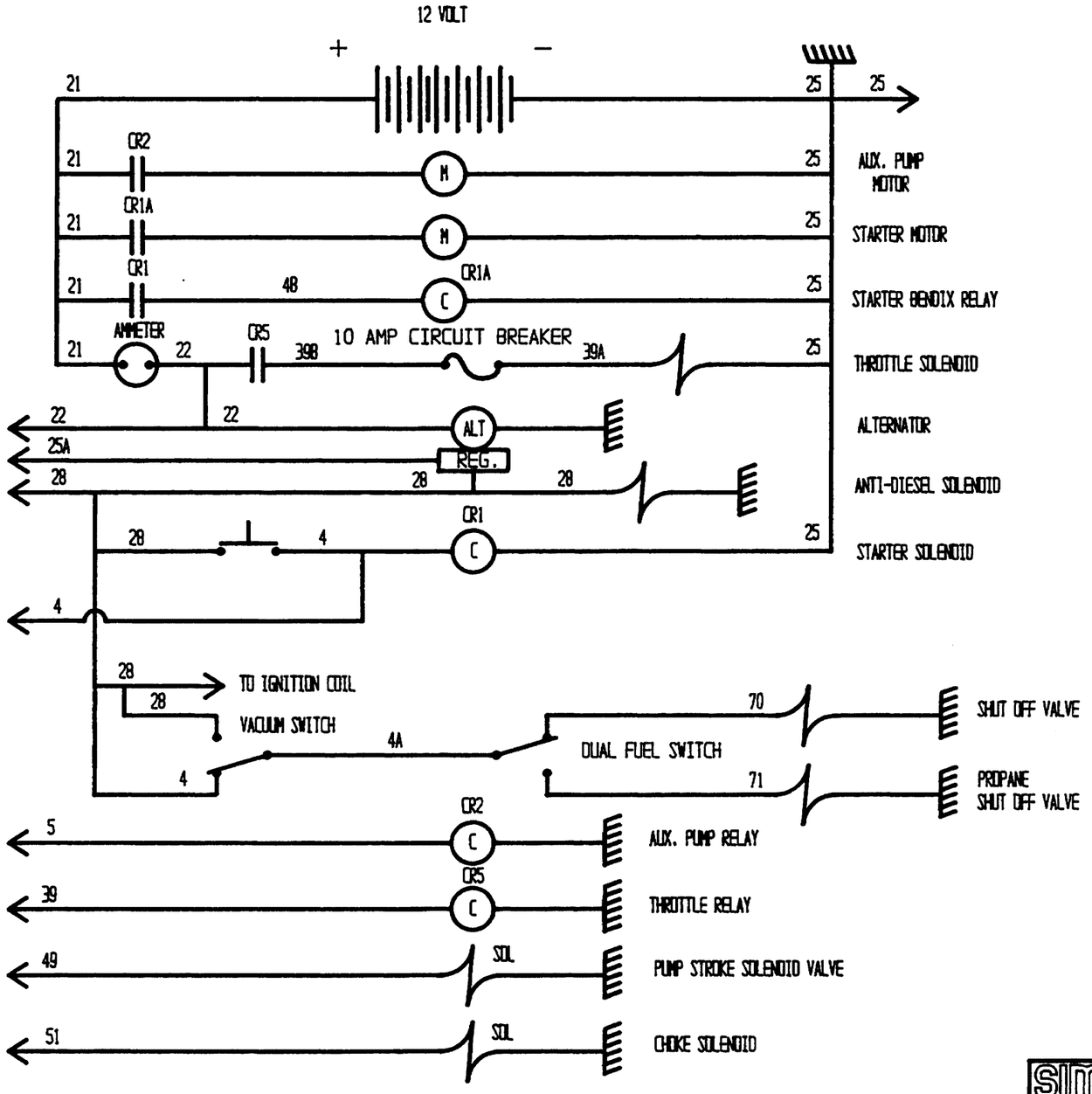


simon-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC
65 H.P. PROPANE

REVISION:

DRWG. NO. SCS-212429-0

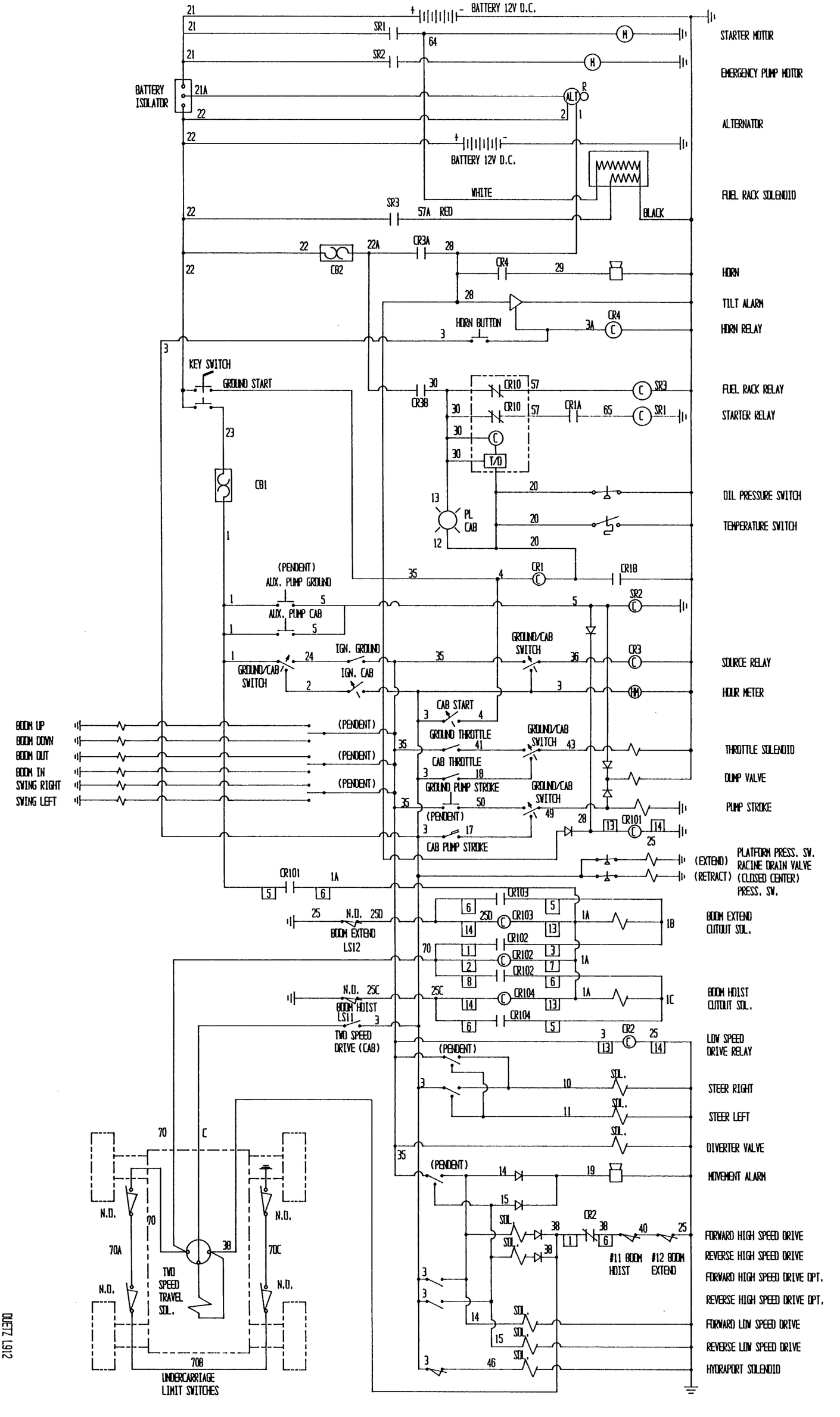


SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC
65 H.P. DUAL FUEL

REVISION

DRWG. NO. SCS-212428-0



DUETZ L912

SIMON-AERIALS INC.
MILWAUKEE, WI. 53204

TITLE: ELECTRICAL SCHEMATIC
MPH80 & 95 / FULL HYD. (W/ EXT. AXLES)

REVISION

DWG. NO. SDS 2322900