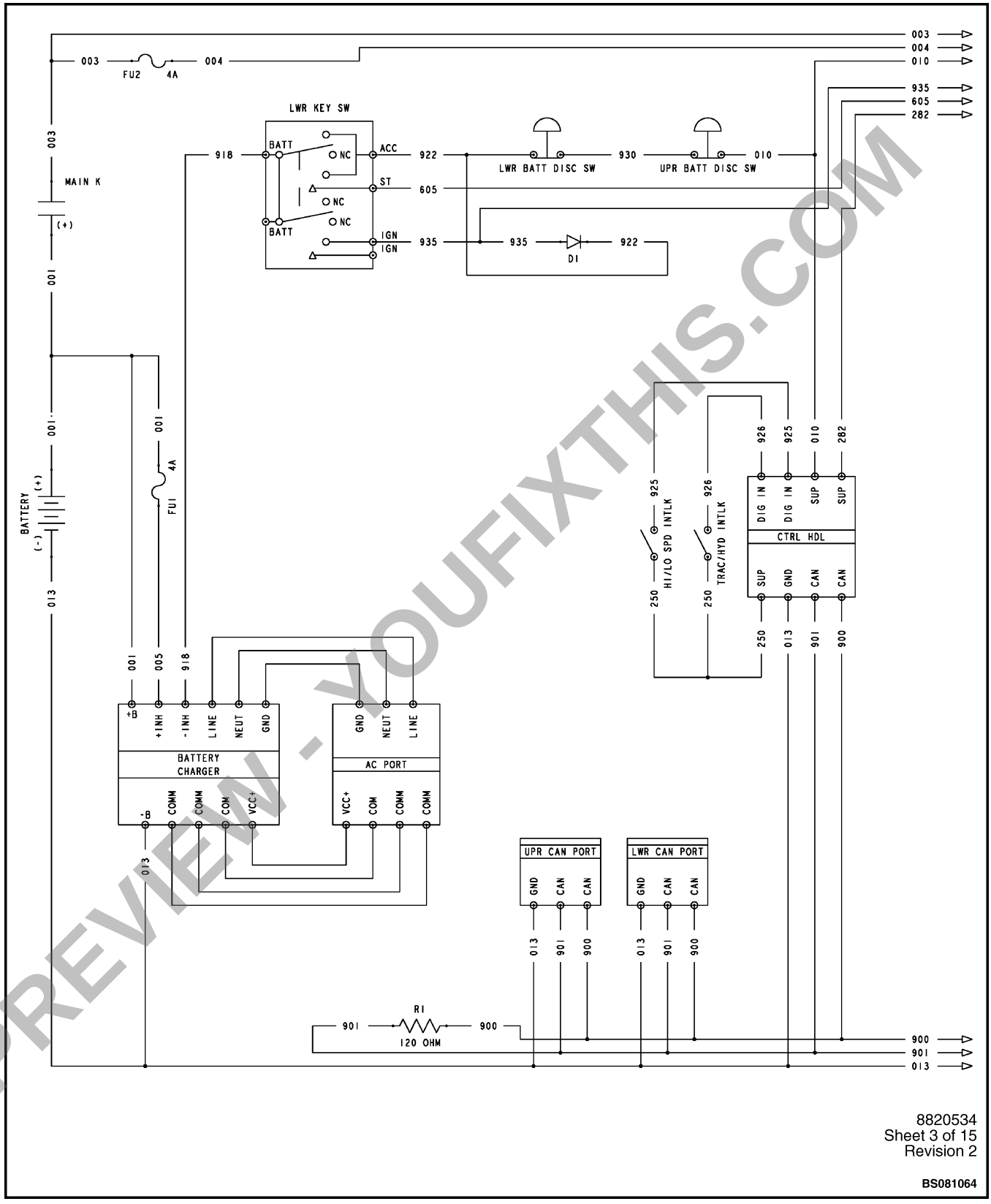
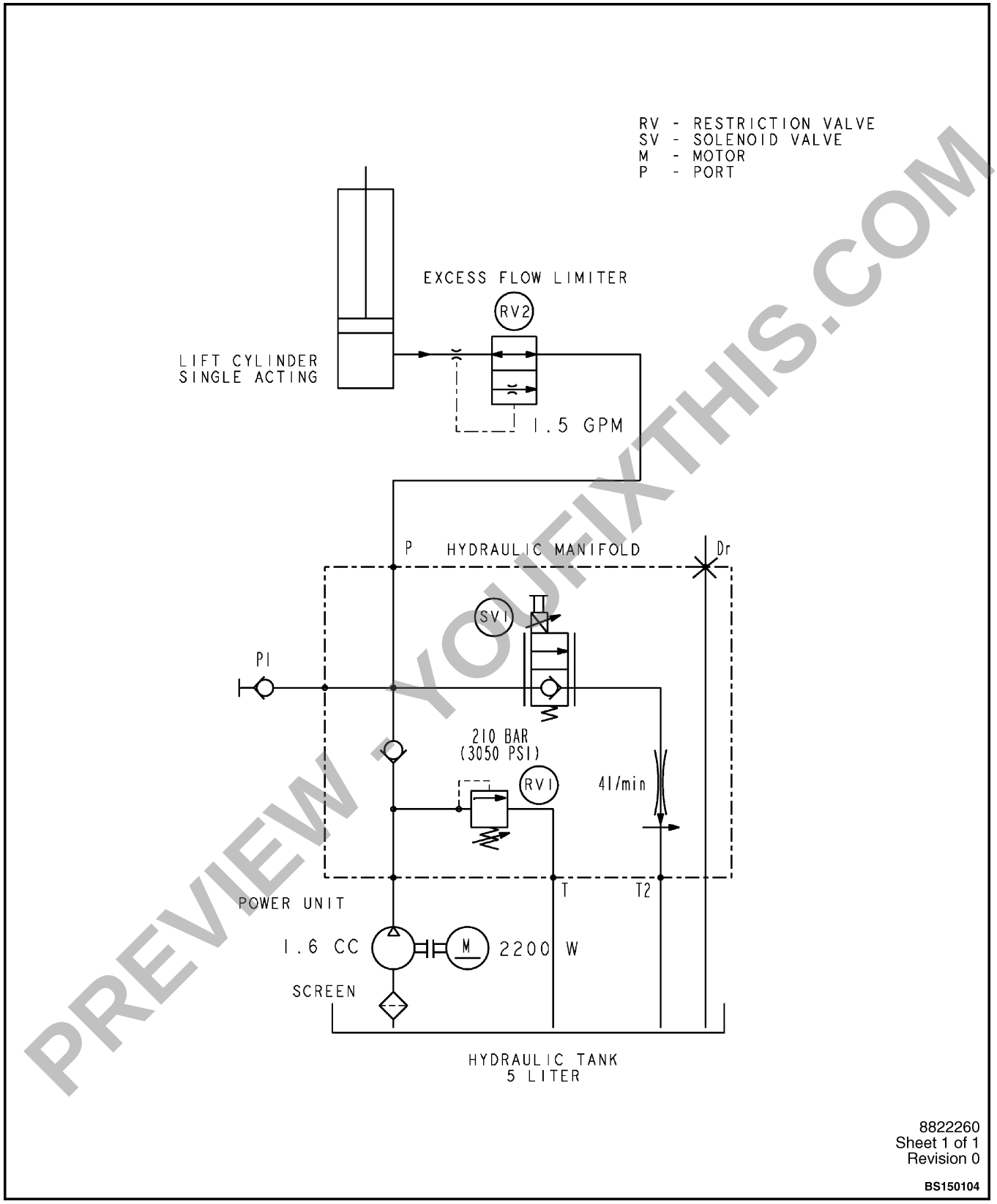


PREVIEW - YOUFIXTHIS.COM

Figure 1. Electrical Schematic (Sheet 3 of 15)

Download full manual at youfixthis.com



PREVIEW - YOUFIXTHIS.COM

Figure 2. Hydraulic Schematic

Download full manual at youfixthis.com

NOTES

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Table 9030-03-1. Nodes 10 and 13 Status Codes

NODE	STATUS	DESCRIPTION
XX	*099*	*The Display has detected an Internal Fault.* *****
10,13	100	The Display has detected a loss of CAN communication with the Combination Controller.
10,13	102	The Display has detected a loss of CAN communication with the Traction Controller.
10,13	109	Loss of Display CAN communication.
***** *Any Node or system that detects an internal fault is capable of reporting a 099 Status Code. Refer to the xx099 Status Code troubleshooting procedures for all Internal Fault Codes regardless of what Node has reported the fault.*		

Table 9030-03-2. Node 30 Status Codes (Traction)

NODE	STATUS	DESCRIPTION
30	035	The Traction Controller has detected a fault in the left hand Brake Coil circuit.
30	036	The Traction Controller has detected a short in the left hand Brake Coil circuit.
30	060	The Traction Controller has detected a fault in the left hand Traction Motor or Traction Motor circuit.
30	061	The Traction Controller has detected a short in the left hand Traction Motor or circuit.
30	062	The Traction Controller has detected a left hand motor Encoder fault.
30	069	The Traction Controller has detected a fault in Capacitor charge.
30	079	The Traction Controller has detected a fault in the left hand Temperature Sensor circuit.
30	086	The Traction Controller has detected Low DC Bus Voltage or a fault in the DC Bus circuit.
30	087	The Traction Controller has detected High DC Bus Voltage or a fault in the DC Bus circuit.
30	227	The Traction motor has stalled.

Table 9030-03-3. Node 32 Status Codes (Combination)

NODE	STATUS	DESCRIPTION
32	003	The Combination Controller has detected a fault in the Lower Coil circuit.
32	004	The Combination Controller has detected a short in the Lower Coil circuit.
32	033	The Combination Controller has detected a fault in the Main Contactor Coil circuit.
32	034	The Combination Controller has detected a short in the Main Contactor Coil circuit.
32	035	The Combination Controller has detected a fault in the right hand Brake Coil circuit.
32	036	The Combination Controller has detected a short in the right hand Brake Coil circuit.
32	060	The Combination Controller has detected a fault in the right hand Traction Motor or Traction Motor circuit.
32	061	The Combination Controller has detected a short in the right hand Traction Motor or circuit.

PREVIEW - YOUFIXTHIS.COM

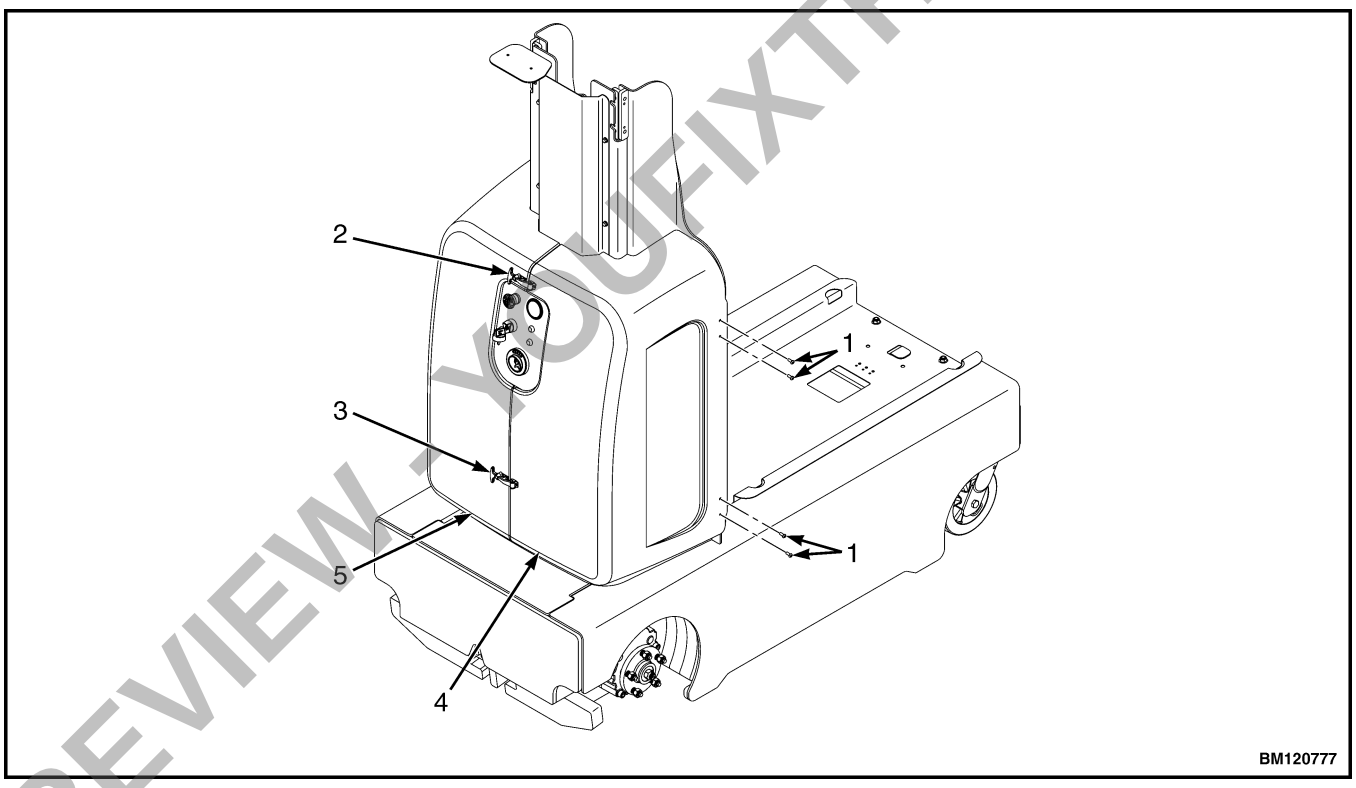
Download full manual at youfixthis.com

Service Doors, Covers, and Mounting Brackets

SERVICE DOORS

Remove

1. Disconnect the batteries and discharge the capacitors. See Discharging the Capacitors for procedures.
2. Unlatch top and bottom service door handles. Swing right service door to open position. See Figure 5.
3. Remove four capscrews from side of right service door and remove right service door from frame. See Figure 5.
4. Remove four nuts, washers, and capscrews from two right service door hinges. Remove hinges from right frame channel on sail weldment. See Figure 6.
5. Perform Step 1 through Step 4 for left service door.
6. If either service door handles need to be removed, see Service Door Handles for procedures.



1. CAPSCREW
2. TOP SERVICE DOOR HANDLE
3. BOTTOM SERVICE DOOR HANDLE
4. RIGHT SERVICE DOOR
5. LEFT SERVICE DOOR

Figure 5. Service Doors, Remove and Install

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Troubleshooting

LIFT ASSEMBLIES

PROBLEM	POSSIBLE CAUSE	PROCEDURE OR ACTION
Work platform fails to elevate.	Oil in the hydraulic reservoir is low.	Fill reservoir to correct level. Check for leaks.
	Faulty hydraulic equipment.	See Hydraulic Power Unit.
	Deformed lifting components.	Disassemble and/or replace damaged parts.
	The manual lowering valve may be open and engaged.	Check to see if needle valve is fully closed.
Slow lifting speed and insufficient handling capacity.	Oil in the hydraulic reservoir is low.	Fill reservoir to correct level. Check for leaks.
	Faulty hydraulic equipment.	See Hydraulic Power Unit.
	Deformed lifting components.	Disassemble and replace damaged parts.
	Relief valve setting is too low.	Test pressure and replace relief valve if incorrect.
	Hydraulic power unit is over heated and performance is reduced.	Stop all hydraulic functions and allow unit to cool.
	Mast not properly lubricated.	Lubricate the mast. See the Periodic Maintenance manual listed in the General section of this manual for procedures.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Truck Weight

Model	Weight
AP20Z	1545 kg (3400 lb)
NOTE: Weight is with batteries and no load on the lift platform.	

Master Drive Unit (MDU)

Function	Specification
Drive Motor	24 Volts AC
Drive Motor IP Rating	54
Insulation Class	H
Drive Motor Speed	1000 rpm
Power (TBD)	1 kW (1.34 hp)
Stator Resistance	1.78 - 2.07 milliohms
Gear Ratio	22:1 reduction
Drive Wheel Load (Both Drive Tires)	1079.5 kg (2380 lb)
Fluid Type	Mobilgear 600XP grade 220
Gearbox Fluid Capacity (to correct fill point)	0.30 liter (10.24 oz)
Brake Specifications	
Static Torque	20 N•m (14.8 lbf ft)
Torque at Drive Wheel After Gear Reduction	440 N•m (324.5 lbf ft)
Hold on Grade (Rated Load)	10% Grade

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Table 2. Maintenance Schedule

Item No.	Item	8 Hr/ 1 day[8]	250 Hr/ 2 Mo[8]	500 hr/ 3 Mo[8]	2000 Hr/ 1 yr[8]	Procedure or Quantity	Specification
	Inspect Operating Manuals and Labels	X				Check for Placement and Condition	See Parts Manual
	Pre-start Inspection "Walk-Around"	X				Check Condition	See Checks and Inspection Procedures section
10, 11	Lift and Lower Operation						
	Lift	X				Check Function No Load	Use lower control panel. Raise to 5944 mm (234 in.) at 60 ft/min.
	Lower	X				Check Function	Lower at no more than 40 ft/min.
3	Object Sensing System	X				Check Function	Verify all 7 sensors are operational.
	Oil Leaks	X				Check for Leaks	
6	Drive Tires and Wheels	X				Check for Excessive Wear	Drive Wheel Wear Marking
1	Traction Controls	X				Check Function	Motion matches commands.
	Loose Hardware Inspection	X				Check Hardware	
1	Control Handle Inspection		X			Check Function	Inspect handle for damage and proper function.
5	Batteries						
	Battery Condition		X			Check Level/ Life[3]	
	Battery Connections		X			Check Connections	
	Charger Inspection		X			Check Function	
	Electrical Wiring Connections		X			Check Connections	

X=Check C=Change L=Lubricate
NOTE: Never use steam to clean electrical parts.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

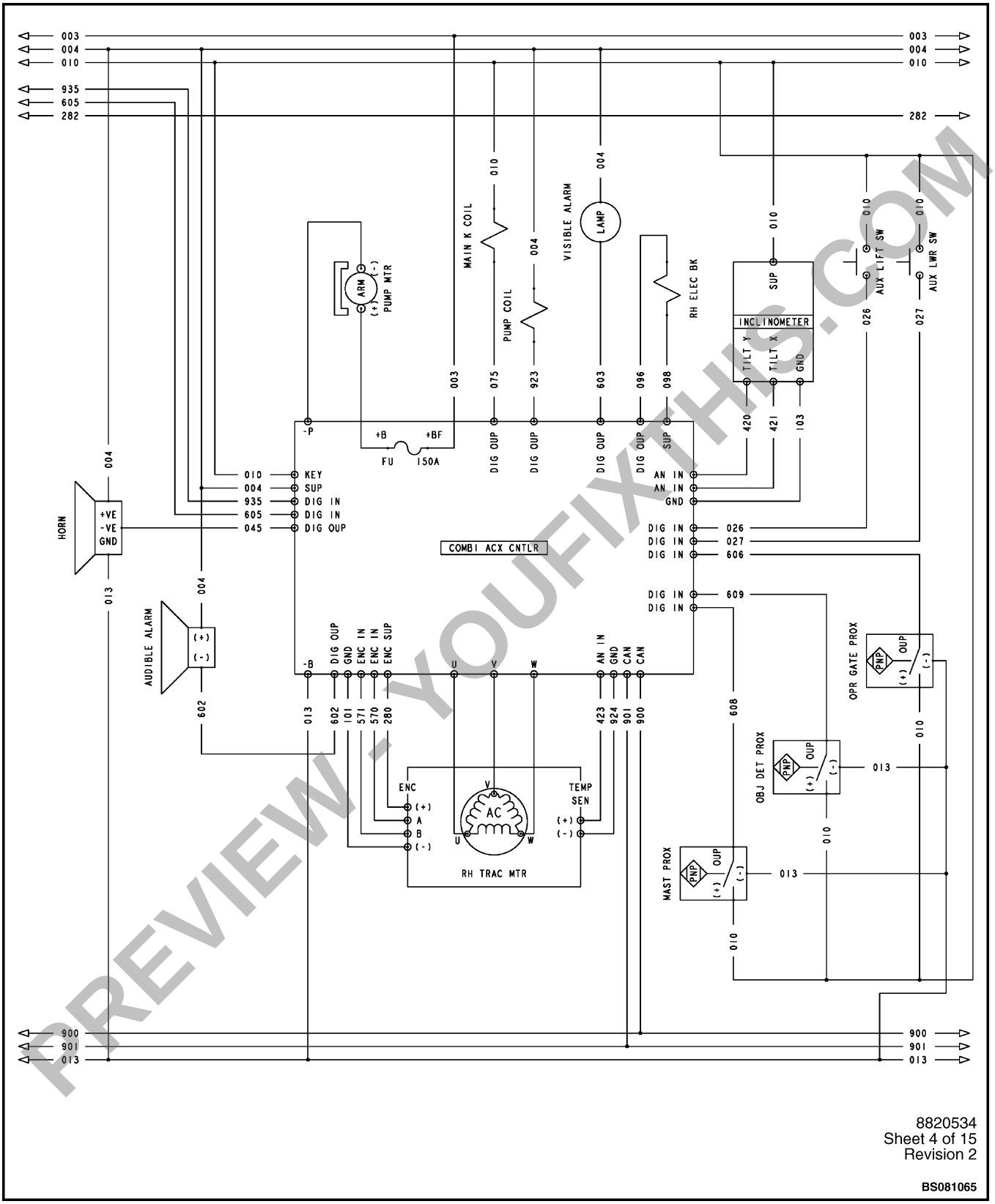


Figure 1. Electrical Schematic (Sheet 4 of 15)

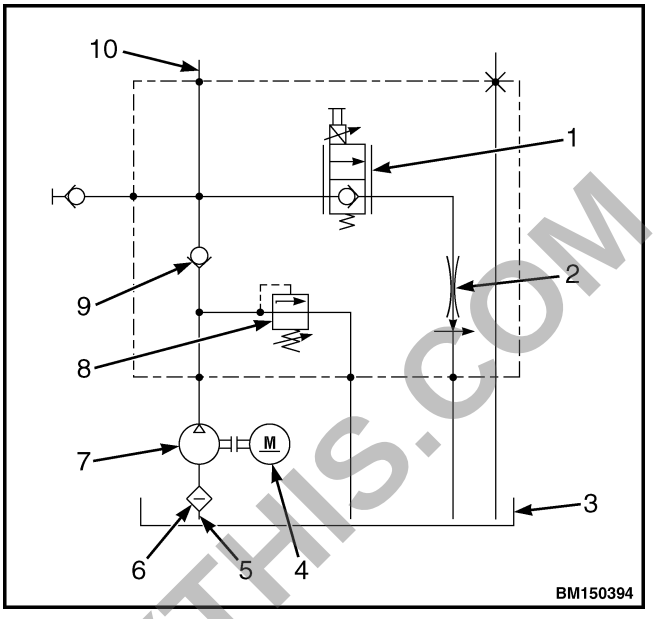
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

The hydraulic pump provides the flow of the hydraulic oil which activates the cylinder.

The lift cylinder rod extends to operate the lift linkages to raise the operator compartment.

The connecting tubing connect the various hydraulic components in the aerial work platform to complete the hydraulic circuit. See Figure 5.



1. LOWERING PROPORTIONAL CONTROL
2. FLOW RESTRICTION VALVE
3. RESERVOIR
4. PUMP MOTOR
5. INLET LINE
6. SCREEN
7. LIFT PUMP
8. RELIEF VALVE
9. CHECK VALVE
10. TO LIFT CYLINDER

Figure 4. Lift Pump and Motor Assembly Schematic

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

FASTENER TORQUE TABLES

Table 5. Torque Values for Metric Fasteners*

Size and Pitch	Property Class 5.8[1]		Grade 8.8[2]		Grade 10.9[3]	
	N•m	lbf ft	N•m	lbf ft	N•m	lbf ft
M3 × 0.5 M3.5 × 0.6 M4 × 0.7 M5 × 0.8 M6 × 1	0.62 0.97 1.44 2.91 4.94	0.5 0.7 1.1 2.1 3.6	0.99 1.55 2.30 4.65 7.90	0.7 1.1 2.1 3.6 6	1.34 2.11 3.13 6.33 10.8	1.0 1.6 2.3 4.7 8
M8 × 1.25 M8 × 1 M10 × 1.5 M10 × 1.25	12.0 12.8 23.8 25.1	9 9 18 19	19.2 20.5 38.0 40.1	14 15 28 30	26.1 27.9 52 55	19 21 38 41
M12 × 1.75 M12 × 1.25 M14 × 2 M14 × 1.5	41.4 45.3 66 72	31 33 49 53	66 72 105 115	49 53 77 85	90 98 145 155	66 72 105 115
M16 × 2 M16 × 1.5 M20 × 2.5 M20 × 1.5	105 110 200 225	77 81 150 165	165 175 320 355	122 130 235 260	225 240 435 485	165 175 320 360
M24 × 3 M24 × 2 M27 × 3 M27 × 2	345 375 505 550	255 275 370 405	555 605 810 875	410 445 600 645	755 820 1,100 1,190	560 605 810 880
M30 × 3.5 M30 × 3 M30 × 2 M33 × 3.5 M33 × 2	690 715 765 940 1,030	510 530 565 695 760	1,100 1,140 1,220 1,500 1,640	810 840 900 1,100 1,210	1,500 1,550 1,660 2,040 2,240	1,100 1,140 1,230 1,510 1,660
M36 × 4 M36 × 3 M39 × 4 M39 × 3	1,200 1,280 1,560 1,640	885 945 1,150 1,210	1,930 2,040 2,490 2,630	1,430 1,510 1,840 1,940	2,620 2,780 3,390 3,570	1,940 2,050 2,500 2,640
M42 × 4.5 M42 × 3 M45 × 4.5 M45 × 3 M48 × 5 M48 × 3	1,930 2,070 2,410 2,580 2,900 3,160	1,430 1,530 1,780 1,910 2,140 2,330	3,080 3,320 3,850 4,120 4,630 5,040	2,280 2,450 2,840 3,040 3,420 3,720	4,200 4,510 5,240 5,610 6,300 6,860	3,100 3,330 3,870 4,140 4,650 5,060

* Unless otherwise specified [1] Approximately equal to Grade 2 [2] Approximately equal to Grade 5 [3] Approximately equal to Grade 8

PREVIEW - YOUFIXTHIS.COM

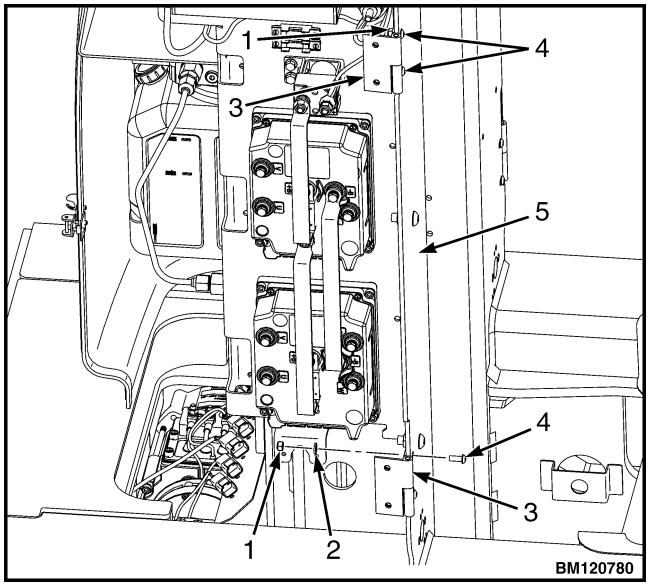
Download full manual at youfixthis.com

Table 9030-03-3. Node 32 Status Codes (Combination) (Continued)

NODE	STATUS	DESCRIPTION
32	060	The Combination Controller has detected a fault in the Pump Motor circuit.
32	061	The Combination Controller has detected a short in the Pump Motor or circuit.
32	062	The Combination Controller has detected a right hand motor encoder fault.
32	067	The Combination Controller has detected that the Main Contactor is stuck closed or has welded tips.
32	068	The Combination Controller has detected that the Main Contactor is not closed or stuck open.
32	069	The Combination Controller has detected a fault in the Capacitor charge.
32	079	The Combination Controller has detected a fault in the right hand Temperature Sensor circuit.
32	086	The Combination Controller has detected Low DC Bus Voltage or a fault in the DC Bus circuit.
32	087	The Combination Controller has detected High DC Bus Voltage or a fault in the DC Bus circuit.
32	227	The Combination Controller has detected that the right hand Traction motor has stalled.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



NOTE: RIGHT SIDE SHOWN.

1. NUT
2. WASHER
3. HINGE
4. CAPSCREW
5. RIGHT FRAME CHANNEL (PART OF SAIL WELDMENT)

Figure 6. Service Door Hinge Removal

Install

1. Install two hinges to right frame channel on sail weldment using four capscrews, washers, and nuts. See Figure 6.

2. Install right service door to hinge with four capscrews.

3. Latch top and bottom service door handles to secure service doors in the close position.

4. If service door handle was removed, see Service Door Handles for installation procedures.

5. Connect the batteries.

Service Door Handles

Remove

1. Disconnect the batteries and discharge the capacitors. See Discharging the Capacitors for procedures.

2. Remove two rivets from service door handle. Remove service door handle from lock plate and service door. Remove two spacers and back plate from inside of service door. See Figure 7.

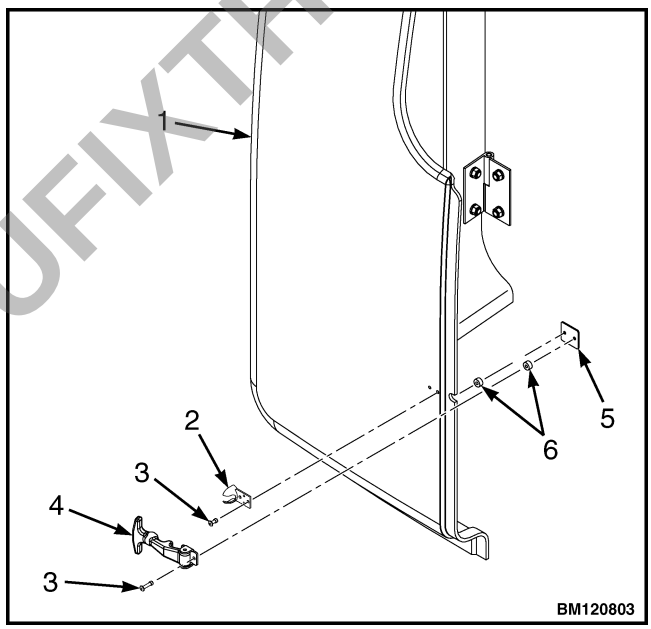
3. Remove rivet from lock plate and remove lock plate from service door.

Install

1. Install lock plate to service door with rivet.

2. Use two rivets and two spacers, install service door handle to lock plate and back plate on service door. See Figure 7.

3. Connect the batteries.



NOTE: BOTTOM SERVICE DOOR HANDLE SHOWN. TOP SERVICE DOOR HANDLE IS THE SAME.

1. SERVICE DOOR (LEFT SHOWN)
2. LOCK PLATE
3. RIVET
4. SERVICE DOOR HANDLE
5. BACK PLATE
6. SPACERS

Figure 7. Latch Handle, Remove and Install

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PROBLEM	POSSIBLE CAUSE	PROCEDURE OR ACTION
Work platform fails to lower.	Deformed lifting components.	Disassemble, repair, or replace.
	Bent lift cylinder piston rod.	See the Lift Cylinders manual listed in the General section of this manual for procedures.
	Loss of electrical control.	Open manual lowering valve to lower aerial work platform safely.
	Aerial work platform runs into an obstacle.	Lower the lift using lower controls panel, and move lift away from obstacle.
	Mast is blocked	Make sure all blocks or blocking material is removed from under the mast channels in the frame.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Electrical Specifications

Traction Controller	
IP Rating	IP54
Operating Temp	-40°C to +40°C
Storage Temp	-40°C to +85°C
Maximum Heatsink Temp	-85°C
Inverter Max Current	240A (RMS) for 2 min.
Continuous Current	90A (RMS)
Logic Supply Current	300 mA (Continuous)
Combination Controller	
IP Rating	IP54
Operating Temp	-40°C to +40°C
Storage Temp	-40°C to +85°C
Maximum Heatsink Temp	-85°C
Inverter Max Current	240A (RMS) for 2 min.
Continuous Current	90A (RMS)
Logic Supply Current	300 mA (Continuous)
DC Chopper Max Current	270A for 2 min.
DC Chopper Operating Frequency	16khz

Hydraulic System

Hydraulic Pump	
Displacement	1.6 cc/rev
Operating Temperature	-15 to 70°C (5 to 158°F)
Max Continuous Pressure	21.03 MPa (3050 psi)
Filtration Screen	90 micron
Max Peak Pressure	26.89 MPa (3900 psi)
Max Speed at Pressure	6000 RPM
Min Speed at Pressure	1000 RPM
Running Viscosity	15 to 120 Cst minimum
Starting Viscosity	60 Cst
Relief Valve	19.0 to 22.1 MPa (2800 to 3200 psi)
Tank Capacity (To Full Mark)	5 liter (5.3 qt)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Table 2. Maintenance Schedule (Continued)

Item No.	Item	8 Hr/ 1 day[8]	250 Hr/ 2 Mo[8]	500 hr/ 3 Mo[8]	2000 Hr/ 1 yr[8]	Procedure or Quantity	Specification
12	Lift Chain Inspection		X			Check Condition	Look for cracks and excessive wear. Inspect for chain stretch (replace if more than 3% of chain length).
11	Mast Channel Cleaning		X			Remove excess debris	
13	Phasing Cable System Inspection		X			Check Function and Condition	
9	Controls						
	Emergency Stops		X			Check Function	
	Key Switch		X			Check Function	
	Horn		X			Check Function	
7	Brakes						
	Regen Braking		X			Check Function	
	Parking Brake		X			Check Function	
	Drive Speeds - Operator Compartment Stowed		X			Check Function	
	Drive Speeds - Operator Compartment Raised		X			Check Function	
	Audible Alarm		X			Check Function	
	Visible Alarm		X			Check Function	
8	Hydraulic Oil Analysis		X[4]			Check Condition	

X=Check C=Change L=Lubricate
NOTE: Never use steam to clean electrical parts.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

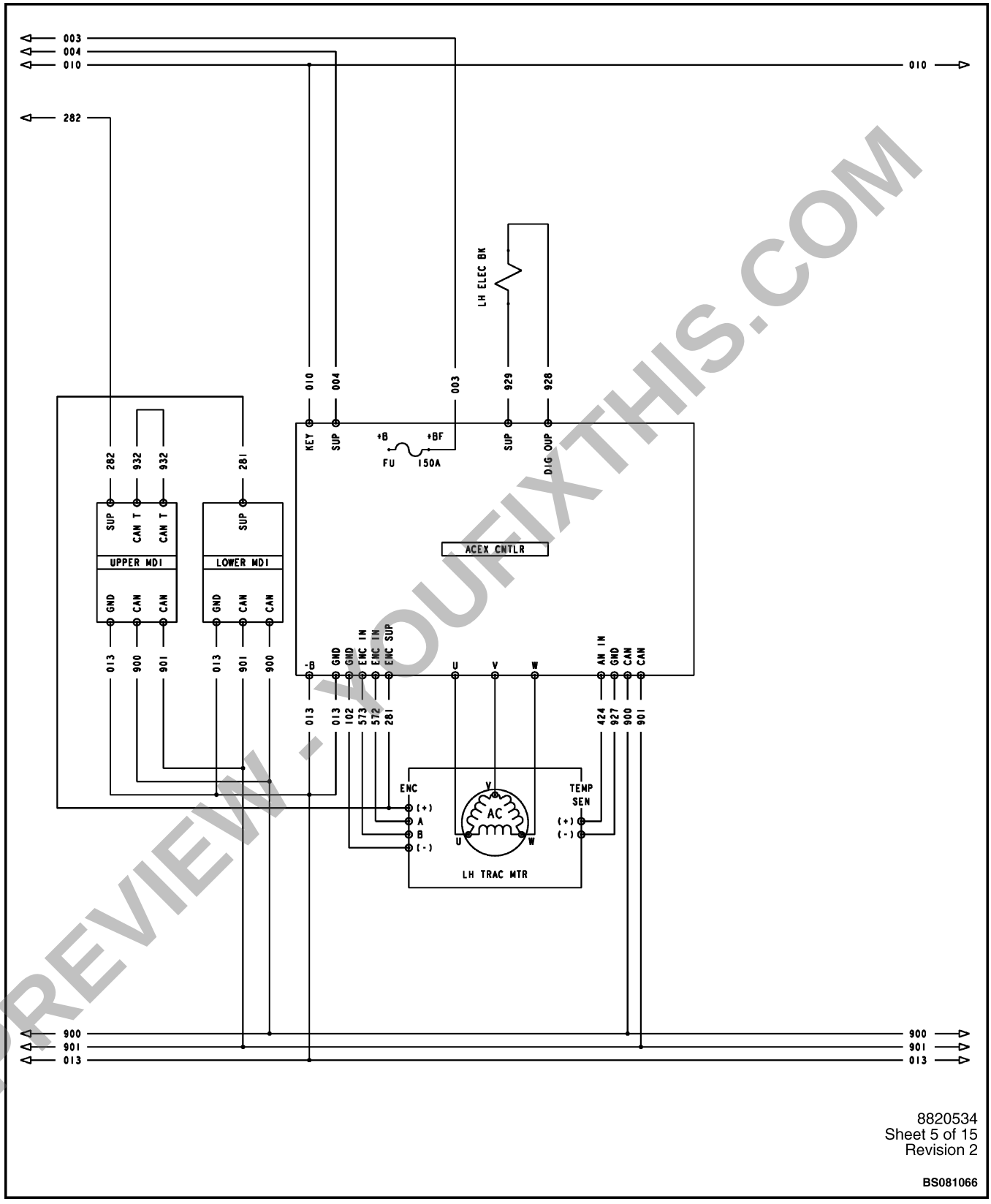


Figure 1. Electrical Schematic (Sheet 5 of 15)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Table 6. Torque Values for Inch Fasteners*

Size and Pitch		Grade 2[1]		Grade 5[2]		Grade 8[3]	
		lbf ft	N•m	lbf ft	N•m	lbf ft	N•m
1/4 1/4	20 UNC 28 UNF	4 5	6 6	6 7	9 10	9 10	12 14
5/16 5/16	18 UNC 24 UNF	8 9	11 13	13 14	18 20	18 20	25 28
3/8 3/8	16 UNC 24 UNF	15 17	20 23	23 26	31 36	33 37	44 50
7/16 7/16	14 UNC 20 UNF	24 27	33 36	37 41	50 56	52 58	71 79
1/2 1/2	13 UNC 20 UNF	37 41	50 56	57 85	77 115	80 90	110 120
9/16 9/16	12 UNC 18 UNF	53 59	72 80	82 91	110 125	115 130	155 175
5/8 5/8	11 UNC 18 UNF	73 83	99 110	115 130	155 175	160 180	215 245
3/4 3/4	10 UNC 16 UNF	130 145	175 195	200 225	270 300	280 315	380 425
7/8 7/8	9 UNC 14 UNF	125 140	170 185	320 355	435 480	455 500	615 680
1 1	8 UNC 14 UNF	185 210	255 285	485 540	655 735	680 765	925 1,040
1-1/8 1-1/8	7 UNC 12 UNF	265 300	360 405	595 670	805 905	965 1,080	1,310 1,470
1-1/4 1-1/4	7 UNC 12 UNF	375 415	510 565	840 930	1,140 1,260	1,360 1,500	1,850 2,050
1-3/8 1-3/8	6 UNC 12 UNF	490 560	665 760	1,100 1,250	1,490 1,700	1,780 2,040	2,420 2,760
1-1/2 1-1/2	6 UNC 12 UNF	650 735	885 995	1,460 1,650	1,980 2,230	2,370 2,670	3,210 3,620

* Unless otherwise specified [1] Approximately equal to metric Property Class 5.8 [2] Approximately equal to metric Property Class 8.8 [3] Approximately equal to metric Property Class 10.9

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 18 of 390 pages

The full manual includes:

- All 390 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Hyster AP20Z Service Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual