Component Identifiers (CID[1]) Module Identifier (MID[2]) Engine Control System (MID No. 036)	
CID	**Component**
0001	Fuel Injector Solenoid #1
0002	Fuel Injector Solenoid #2
0003	Fuel Injector Solenoid #3
0004	Fuel Injector Solenoid #4
0005	Fuel Injector Solenoid #5
0006	Fuel Injector Solenoid #6
0041	ECM 8V DC Supply
0091	Throttle Sensor
0094	Fuel Pressure Sensor
0100	Oil Pressure Sensor
0110	Engine Coolant Temperature Sensor
0168	Electrical Power Supply
0172	Intake Manifold Air Temperature Sensor
0174	Fuel Temperature Sensor
0190	Engine Speed Sensor
0253	Personality Module
0261	Engine Speed Sensor
0262	5 Volt Sensor Supply
0267	Engine Shutdown Switch
0268	Check Programmable Parameters
0274	Atmospheric Pressure Sensor
0275	Right Turbo Inlet Pressure Sensor
0283	Filter Restrict Lamp
0291	Engine Cooling Fan Solenoid
0296	Transmission ECM
0342	Camshaft Position Sensor
0596	Implement Control
1639	Machine Security System
1785	Intake Manifold Pressure Sensor
2417	Start Aid Solenoid

[1] The CID is a diagnostic code that indicates which circuit is faulty.

[2] The MID is a diagnostic code that indicates which electronic control module diagnosed the fault.

Failure Mode Identifiers (FMI)[1]	
FMI No.	**Failure Description**
0	Data valid but above normal operational range.
1	Data valid but below normal operational range.
2	Data erratic, intermittent, or incorrect.
3	Voltage above normal or shorted high.
4	Voltage below normal or shorted low.
5	Current below normal or open circuit.
6	Current above normal or grounded circuit.
7	Mechanical system not responding properly.
8	Abnormal frequency, pulse width, or period.
9	Abnormal update.
10	Abnormal rate of change.
11	Failure mode not identifiable.
12	Bad device or component.
13	Out of calibration.
14	Parameter failures.
15	Parameter failures.
16	Parameter not available.
17	Module not responding.
18	Sensor supply fault.
19	Condition not met.
20	Parameter failures.

[1]The FMI is a diagnostic code that indicates what type of failure has occurred.

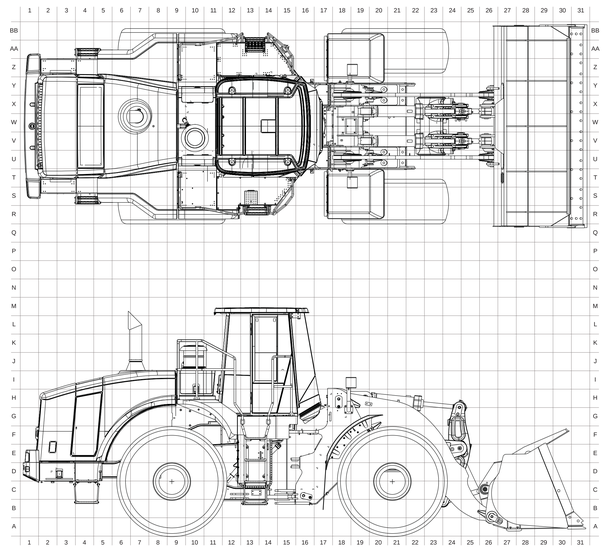
Event Codes Engine Control	
Event Code	**Condition**
E096	High Fuel Pressure
E172	High Air Filter Restriction
E194	High Exhaust Temperature
E265	User Defined Shutdown
E360	Low Engine Oil Pressure
E362	Engine Overspeed
E363	High Fuel Temperature
E390	Fuel Filter Restriction
E441	Idle Elevated to Increase Battery Voltage
E539	High Intake Manifold Air Temperature

Related Electrical Service Manuals	
Title	**Form Number**
Alternator: 177-9953 (Denso HD8 80A)	SENR4130
197-8820 (Denso HD8 95A)	
Electric Starting Motor: 165-4619 (Delco 42MT)	SENR3581
Engine Control:	RENR9318

Wire Description					
Wire Number	**Wire Color**	**Description**	**Wire Number**	**Wire Color**	**Description**
		Power Circuits			**Control Circuits**
101	RD	Bat (+)	G790	PK	Not Used
102	RD	Htd Lmp	G791	BR	Not Used
103	YL	Auto Lube Pump to Auto Lube Pressure Sw.	H702	PU	Implement Control Reversing Fan Sw (N.O.)
106	WH	Tilt/Lift Position Sensors	H703	YL	Implement Control Reversing Fan Sw (N.C.)
110	RD	Engine ECM	H704	PK	Auto Reversing Fan Solenoid
112	PU	Main Power Rly Output	H713	PK	Implement Control Lift Proportional Sol
114	RD	Warning Horn (forward)	H714	OR	Implement Control Lower Proportional Sol
124	GN	Auto Lube Pump to Auto Lube Pressure Sw.	H717	BR	Implement Control Pilot Press Sol
129	RD	Fuel Priming Pump to Machine Interface	H718	GY	Implement Control Tilt Cyl Position
136	GN	Supplemental Steering	H746	YL	Variable Speed Fan Solenoid
138	GN	Auto Lube Pump To PCS	H747	BR	Variable Speed Fan Solenoid
141	RD	Beacon / Heated Mirrors	H795	PK	Engine Digital Sensor (Return)
147	RD	ECAP / Center Dash Indicator Panel	J764	BR	Transmission Switch/Sensor Return #1
150	OR	Implement/Transmission/Engine ECM	K737	BR	Not Used
174	RD	Unswitched Bus Power	K738	GN	Not Used
175	RD	Hood Actuator	K739	BU	Not Used
199	RD	Hood Actuator	N707	PU	Fuel Differential Pressure (Return)
		Ground Circuits	R746	PK	Atmospheric Pressure Sensor (Ground)
200	BK	Main Chassis	R747	GY	Boost Pressure Sensor Signal
201	BK	Operator Monitor Return	T725	WH	Fuel Differential Pressure Signal
202	BK	Xmsn Ctrl	Y794	OR	Expanded Can Data Link +
229	BK	Engine ECM	Y795	GN	Expanded Can Data Link -
261	BK	Brake Oil Pressure Sw.	838	YL	Belly Guard Actuator
C216	BK	Implement Return	839	BU	Belly Guard Actuator
		Basic Machine Circuits	A893	OR	Fuel Priming Sw.
304	WH	Starter Relay to Starter Motor	G828	WH	Engine +5V Sensor Supply
306	GN	Starter Relay Coil to Transmission Control	G829	GN	Engine Sensor Ground
308	YL	Main Power Relay Coil	G833	PK	Fuel Temperature Sensor (Ground)
321	BR	Backup Alarm Lamp Travel Alarm	G850	BU	Inlet Air Heater
322	GY	Warning Horn (Forward)	G856	WH	Timing/Cal. Probe (+)
326	PU	Key Sw 'C' Term.	G857	YL	Timing/Cal. Probe (-)
397	OR	Hood Actuator Motor (Lower)	J807	BK	Proportional Return (1-3)
398	BU	Hood Actuator Motor (Raise)	J808	BK	Proportional Return (4/Rev)
A300	GN	Lower Hood	J809	BK	Proportional Return (Forward)
A303	WH	Raise Hood	J813	BK	Implement Proportional Return
A307	GY	Throttle Position	J814	BK	Implement Proportional Return
X337	WH	Not Used	J815	BK	Ride Control Solenoids Proportional Return
		Monitoring Circuits	J843	BK	Turbo Inlet Pressure Sensor (Ground)
403	GN	Alternator (R) Term.	J844	GY	Turbo Inlet Pressure Sensor (+ Battery)
416	DB	Supplemental Steering Sw	T859	GY	Fuel Injector Solenoid #1/4 Common
417	GY	Primary Steering Sw	T859	WH	Fuel Injector Solenoid #3/4 Common
419	YL	Opr Mon Parking Brake	T860	OR	Fuel Injector Solenoid #5/6 Common
426	BR	Opr Mon Power Train Oil Filter	900	PU	Xmsn Shift Sol No. 5 Ctr 4
430	BU	Opr Mon Air Filter	901	WH	Xmsn Shift Sol No. 6
432	PK	Opr Mon Brake Press. (sit)	944	OR	Cat Data Link +
439	YL	Lamp Indicator	945	BR	Cat Data Link -
442	GY	Hyd System Temp Gage	976	OR	Ride Cont Solenoid 1
443	YL	Power Train Temp Gage	987	WH	Third Function Diverter Sol
447	PK	Fuel Level Gage	994	GY	Oil Pressure Sensor (Signal)
450	YL	Tach Sender (+)	995	BU	Coolant Temperature Sensor (Signal)
453	PK	Supplemental Steering Fault Lamp	A958	WH	Park Brake Sol
484	YL	Primary Steering Lamp	A982	BR	Engine Throttle Cont
E455	BR	Hydraulic Oil Filter	C967	BU	Intake Manifold Air Temperature Sensor (Signal)
F421	YL	Fuel Temperature Sensor (Signal)	C991	PK	Fuel Pressure Sensor (Signal)
G479	WH	Prelube Indicator	E900	WH	Trans Output Spd +
G485	BU	Opr Mon Front Brake Temperature	E901	GN	Trans Output Spd -
G486	GN	Opr Mon Rear Brake Temperature	E906	OR	Trans Output Spd Qv
		Accessory Circuits	E907	GY	Trans Output Spd Q-
506	PU	Washer - Front	E908	BR	Trans Input Spd +
507	WH	Washer - Rear	E909	WH	Trans Input Spd -
513	OR	A/C Pressure Sw. to A/C Clutch Solenoid	E919	YL	Aux Lower Proportional Sol
521	YL	A/C Sw To Refrigerant Sw	E920	BR	Aux Lift Proportional Sol
522	WH	A/C Clutch To Thermostat Sw	E921	PK	Rackback Proportional Sol
C529	GY	Lift Press. Sensor	E922	GN	Dump Proportional Solenoid
C530	BU	Lift Position Sensor	E963	BK	Crank Speed/Timing (-)
		Lighting Circuits	E964	WH	Crank Speed/Timing (+)
604	OR	Stop Lamp	E965	BU	Cam Speed/Timing (-)
605	YL	Turn Lamp - Left	E966	YL	Cam Speed/Timing (+)
606	GY	Turn Lamp - Right	K927	BU	On/Off Pilot Solenoid (Return)
611	PU	Head Lamp Hi	K977	PK	Trans Oil Temp Sensor
614	PU	Park/Tail/Dash/Lamp	N939	GN	Ride Control Solenoid 2
617	BR	Tailposition Lamp - Left (Road Pkg/Width	P945	OR	Anti Drift Sol- Stick
619	GN	Head Lamp Low	P946	BR	Anti Drift Sol- Boom
		Control Circuits	P976	BR	Quick Coupler Sw To Low Pressure Sol
727	GN	Supplemental Steering Motor Relay	P990	BR	Start Relay Ctrl (Return)
728	BU	Supplemental Steering Cont Sw	T957	PU	Fuel Injector Solenoid #1
751	GN	Xmsn Shift Sol No. 1 Ctr 3	T958	YL	Fuel Injector Solenoid #2
752	YL	Xmsn Shift Sol No. 2	T959	BR	Fuel Injector Solenoid #3
754	BU	Xmsn Shift Sol No. 3 Ctr 1	T960	BU	Fuel Injector Solenoid #4
755	OR	Xmsn Shift Sol No. 4 Ctr 5	T961	GN	Fuel Injector Solenoid #5
E748	BK	Auto Reverse Fan/Start Aid Solenoid Return	T962	WH	Fuel Injector Solenoid #6
F713	OR	Turbo Inlet Pressure Sensor (Signal)	X918	PU	Ground Level Shut Down (N.O.)
F762	GY	Start Aid Solenoid	X919	WH	Ground Level Shut Down (N.C.)
G764	PK	Xmsn Cont Park Brake Lever Sw To Gnd			

Component Location					
Component	**Schematic Location**	**Machine Location**	**Component**	**Schematic Location**	**Machine Location**
Alarm - Backup	D-17	E-4 , F-4	Sensor - Intake Manifold Air Temp	E-15	F-19 , W-19
Alternator	A-14	W-6 , U-6	Sensor - Lift Cylinder Head End Pressure	K-3	N-19 , T-18
Arc Suppressor - A/C	B-13	G-6 , U-6	Sensor - Lift Position	H-3	F-7 , U-7
Arc Suppressor - Quick Coupler	L-2	D-17 , V-17	Sensor - Oil Pressure	C-15	C-10 , W-10
Arc Suppressor - Secondary Steering	J-9	D-11, X-11	Sensor - Rear Axle Oil Temp.	A-9	G-7 , U-7
Arc Suppressor - Start Relay	I-14	F-15 , Z-15	Sensor - Tilt Position	H-2	E-24 , U-24
Batteries	L-13	F-13 , Z-13	Sensor - Transmission Oil Temperature	I-9	D-11 , U-11
Block Asm.	L-13	F-13 , Z-13	Sensor - Transmission Input Speed	I-9	E-10 , U-10
Breaker - Alternator	I-14	F-15 , Z-15	Sensor - Trans. Output Speed (Loading)	H-9	E-12 , U-12
Breaker - Belly Guard Actuator	K-14	F-15 , Z-15	Sensor - Trans. Output Speed (Trailing)	H-9	E-12 , U-12
Breaker - Hood Actuator	J-14	F-15 , Z-15	Sensor - Turbo Inlet Pressure	G-12	G-9 , X-9
Breaker - Main	J-14	F-15 , Z-15	Solenoid - A/C Clutch	A-13	G-6 , U-6
Breaker - Running Lamp	K-14	F-15 , Z-15	Solenoid - Aux Lift Prop	H-3	F-19 , W-19
Breaker - Start	I-14	F-15 , Z-15	Solenoid - Aux Lower Prop	I-3	F-19 , W-19
Breaker - Unswitched Bus (Cab)	J-14	F-15 , Z-15	Solenoid - Dump Prop	I-3	F-19 , W-19
Control - Engine	G-14	F-7 , U-7	Solenoid - Lift Anti-Drift	I-3	F-19 , W-19
Control - Hood Raise/Lower	J-13	F-15 , Z-15	Solenoid - Lift Prop	I-3	F-19 , W-19
Motor - Autolube Pump	B-6	I-10 , T-10	Solenoid - Lower Prop	I-3	F-19 , W-19
Motor - Belly Guard	L-14	D-14 , X-14	Solenoid - On / Off Pilot	H-3	F-19 , W-19
Motor - Front Washer	C-5	F-12 , S-12	Solenoid - Quick Coupler	L-2	D-17 , V-17
Motor - Fuel Priming Pump	A-13	H-7 , U-7	Solenoid - Rack Back Prop	I-3	F-19 , W-19
Motor - Hood Actuator	G-15	E-3 , Y-3	Solenoid - Reversing Fan	B-13	E-7 , U-7
Motor - Rear Washer	C-5	F-12 , S-12	Solenoid - Start Aid	K-7	I-9 , Y-9
Motor - Secondary Steering	J-9	D-11, X-11	Solenoid - Tilt Anti-Drift	I-3	F-19 , W-19
Motor - Starter	K-11	E-9 , X-9	Solenoid - Variable Speed Fan	B-13	E-7 , U-7
Relay - Main	J-14	F-15 , Z-15	Solenoids - Cylinder Head (1 - 6)	F-17	G-7 , U-7
Relay - Secondary Steering	J-9	D-11, X-11	Solenoids - Ride Control (1-3)	G-3	F-19 , W-19
Relay - Secondary Steering Intermediate	K-10	E-10 , X-10	Solenoids - Trans. Clutch	I-9	E-11 , U-11
Relay - Start	I-14	F-15 , Z-15	Switch - A/C Refrigerant	B-13	G-6 , U-6
Resistor - CAN	E-9	F-7 , U-7	Switch - Belly Guard Actuator 1,2	L-13	G-15 , Z-15
Sender - Fuel Level	I-16	F-7 , U-7	Switch - Brake Oil Pressure	B-13	E-7 , U-7
Sender - T/C Temperature	E-9	G-6 , U-6	Switch - Differential Pressure	B-16	H-7 , U-7
Sensor - Atmospheric Pressure	E-15	G-6 , W-6	Switch - Disconnect	L-12	G-15 , Z-15
Sensor - Boost Pressure	D-15	F-6 , V-6	Switch - Fuel Priming Pump	A-13	H-7 , U-7
Sensor - Cam Shaft Speed Timing	D-15	C-19 , W-19	Switch - Ground Level Shutdown	H-13	F-15 , Z-15
Sensor - Coolant Temperature	B-15	H-7 , U-7	Switch - Hood Actuator	H-13	F-15 , Z-15
Sensor - Crank Shaft Speed Timing	C-15	H-7 , U-7	Switch - Hydraulic Filter Bypass Pressure	C-5	E-13 , S-13
Sensor - Front Axle Oil Temperature	L-3	D-4 , U-4	Switch - Park Brake Pressure	D-5	E-13 , T-13
Sensor - Fuel Pressure	B-16	G-11 , W-11	Switch - Primary Steering Pressure	K-7	F-14 , X-14
Sensor - Fuel Temperature	B-16	G-7 , U-7	Switch - Secondary Steering Pressure	K-7	F-14 , X-14
Sensor - Hydraulic Oil Temperature	I-5	G-6 , U-6	Switch - Trans Filter Bypass	C-5	D-13 , S-13

Connector Location		
Connector Number	**Schematic Location**	**Machine Location**
CONN 1		F-2 , U-2
CONN 2		C-17 , U-2
CONN 3		J-16 , F-2 , Y-2
CONN 4		J-16 , F-2 , Y-2
CONN 5		B-15 , F-7 , U-7
CONN 6 Timing/Cal Probe		D-15 , F-7 , U-7
CONN 7		E-15 , G-7 , U-7
CONN 8 Jump Start Receptacle		L-12 , G-13 , Z-13
CONN 9		A-10 , F-11 , U-11
CONN 10		G-9 , E-9 , X-9
CONN 11		K-8 , E-10 , X-10
CONN 12		C-7 , E-13 , S-13
CONN 13		C-7 , E-13 , S-13
CONN 14		I-5 , D-10 , U-10
CONN 15		H-6 , I-12 , V-12
CONN 16		H-6 , I-12 , V-12
CONN 17		F-6 , I-12 , V-12
CONN 18		I-4 , G-15 , X-15
CONN 19		L-3 , G-18 , V-18
CONN 20		L-3 , F-18 , X-18
CONN 21		K-3 , G-18 , Z-18
CONN 22		J-3 , G-18 , T-18
CONN 23		H-3 , F-17 , V-17
CONN 44		B-6 , C-16 , X-16
CONN 45		B-6 , I-10 , T-10



CATERPILLAR®

RENR6332-01
November 2006

Schematic

966H and 972H Wheel Loader Electrical System

966H:	**972H:**
A6D1-UP	**A7D1-UP**
A6G1-UP	**A7G1-UP**
A6J1-UP	**A7J1-UP**

Volume 1: Chassis

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Off Machine Switch Specification				
Part No.	**Function**	**Actuate**	**Deactuate**	**Contact Position**
114-5333	A/C (High / Low) Pressure	270 to 1750 kPa[1] (39.9 to 253.8 psi)		Normally Open[2]
117-7773	Hydraulic Filter Bypass Pressure	138 ± 28 kPa (20 ± 4 psi)	89 ± 20 kPa (12.9 ± 2.9 psi)	Normally Closed
174-4312	Park Brake Pressure	8270 kPa MAX (1200 psi MAX)	6890 ± 345 kPa (1000 ± 50 psi)	A-B, Normally Open A-C, Normally Closed
175-3244	Brake Oil Pressure	10700 kPa MAX (1550 psi MAX)	8960 ± 527 kPa (1300 ± 79 psi)	A-B, Normally Open A-C, Normally Closed
230-5771	Secondary Steering Pressure	1200 kPa MAX (174.0 psi MAX)	700 ± 100 kPa (102 ± 14.5 psi)	A-B Normally Open A-C Normally Closed
258-0883	Fuel Differential Pressure	110.3 ± 13.8 kPa (16 ± 2 psi)	69 kPa MIN (10 psi MIN)	Normally Closed
3E-6450	Primary Steering Pressure	1750 kPa MAX (174.0 psi MAX)	700 ± 100 kPa (102 ± 14.5 psi)	A-B Normally Open A-C Normally Closed

[1] With increasing pressure the closed condition can be maintained up to 2800 kpa (405 psi), with decreasing pressure the closed condition can be maintained down to 170 kpa (25psi).

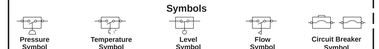
[2] Contact position at the contacts of the harness connector.

Resistor, Sender and Solenoid Specifications			
Part No.	**Component Description**		**Resistance (Ohms)[1]**
128-7991	Solenoids:	Fuel Injection	1.06 ± 0.05
134-2540	Resistor:	CAN Data Link	108 - 132
138-2924	Solenoids:	Aux Lift Raise Prop Aux Lower Prop Dump Prop Lift Prop Lower Prop Rackback Prop	7.75 ± 1.0
145-7028	Sender:	T/C Temperature	1000
148-2390	Solenoid:	Variable Speed Fan	3.0 ± 0.3
152-6761	Solenoid:	On/Off Pilot	32.6 ± 1.6
152-8340	Solenoid:	Auto Reversing Fan	32.6 ± 1.6
163-0972	Solenoid:	A/C Compressor Clutch	17.6±0.6
168-6452	Solenoid:	Axle Oil Cooler Clutch	9.4 ± 5.0
216-5338	Solenoids:	Transmission Clutch	8.7 ± 0.4
220-8214	Sender:	Fuel Level	Empty: 240 - 250 Full: 28 - 33
237-2234	Solenoid	Left Anti-Drift Ride Control (3) Tilt Anti-Drift	33.8
239-1134	Solenoid:	Start Aid	20.0

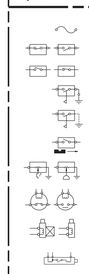
[1] At room temperature unless otherwise noted.

Harness And Wire Electrical Schematic Symbols

Symbols



Symbols And Definitions



Fuse - A component in an electrical circuit that will open the circuit if too much current flows through it.

Switch (Normally Open): A switch that will close at a specified point (temp, press, etc.). The circle indicates that the component has screw terminals and a wire can be disconnected from it.

Switch (Normally Closed): A switch that will open at a specified point (temp, press, etc.). No circle indicates that the wire cannot be disconnected from the component.

Ground (Wired): This indicates that the component is connected to a grounded wire. The grounded wire is fastened to the machine.

Ground (Case): This indicates that the component does not have a wire connected to ground. It is grounded by being fastened to the machine.

Reed Switch: A switch whose contacts are controlled by a magnet. A magnet closes the contacts of a normally open reed switch; it opens the contacts of a normally closed reed switch.

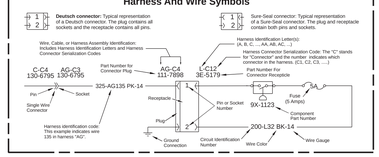
Sender: A component that is used with a temperature or pressure gauge. The sender measures the temperature or pressure. Its resistance changes to give an indication to the gauge of the temperature or pressure.

Relay (Magnetic Switch): A relay is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close a valve or move a piece of metal that can do work.

Solenoid: A solenoid is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close a valve or move a piece of metal that can do work.

MAGNETIC LATCH SOLENOID - A magnetic latch solenoid is an electrical component that is activated by electricity and held latched by a permanent magnet. It has two coils (latch and unlatch) that make electromagnet when current flows through them. It also has an internal switch that places the latch coil circuit open at the time the coil latches.

Harness And Wire Symbols



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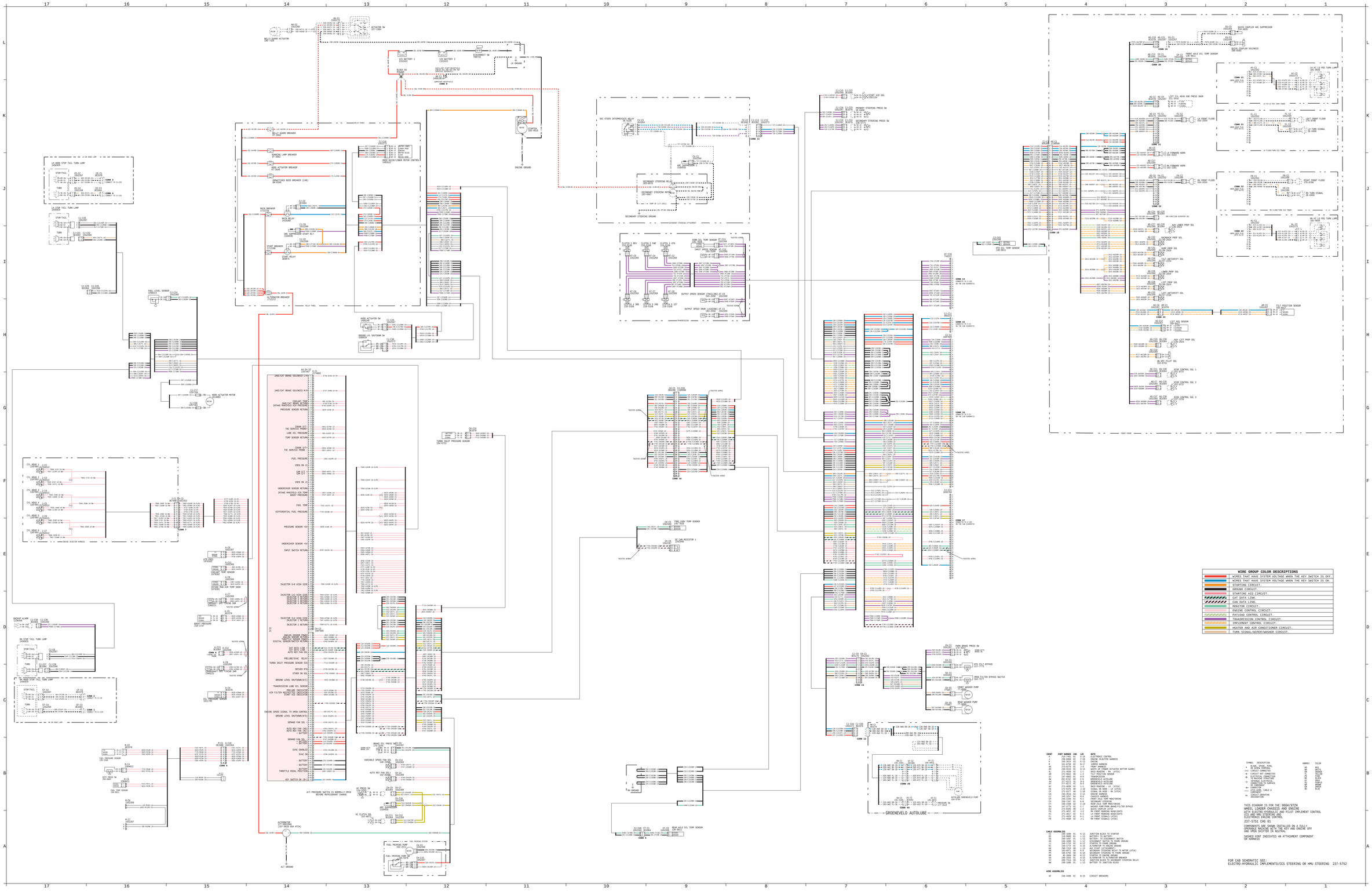


Component Identifiers (CID[1]) Module Identifier (MID[2])	
Caterpillar Monitoring System (MID No. 030)	
CID	**Component**
0096	Fuel Level Sender
0100	Engine Oil Pressure Sensor
0110	Engine Coolant Temperature Sensor
0177	Torque Converter Oil Temperature Sensor
0248	Data Link
0263	Sensor Power Supply
0271	Action Alarm
0324	Action Lamp
0600	Hydraulic Oil Temperature Sensor
0819	Display Data Link
0821	Display Power Supply
0826	T/C Oil Temperature Sensor
0830	Brake Oil Temperature Sensor
Payload Control System (MID No. 074)	
CID	**Component**
0248	CAT Data Link
0364	Head End Lift Cylinder Pressure Sensor
0591	PCS EEPROM
0769	Rod End Lift Cylinder Pressure Sensor
1964	Lift Position Sensor
Electronic Transmission Control System (MID No. 081)	
CID	**Component**
0041	8 Volt DC Supply
0168	Electrical System Voltage
0177	Transmission Oil Temperature Sensor
0190	Engine Speed Sensor
0262	5 Volt DC Supply
0268	Programmed Parameter Fault
0367	Ride Control Switch
0368	Transmission Auto/Manual Switch
0444	Start Relay
0562	Electronic Monitoring System
0585	Transmission Output Speed Sensor 1
0590	Engine Control Module
0596	Implement Control
0623	Directional Switch
0627	Parking Brake Pressure Sw.
0672	Transmission Input Speed Sensor
0673	Transmission Output Speed Sensor 2
0702	Lever Switch (Transmission Shifting/Direction)
0737	Left Brake Pedal Position Sensor
0793	Primary Steering Pressure Switch
0794	Secondary Steering Pressure Switch
0795	Secondary Steering Relay
0967	Machine Application
1326	ECM Location Code
1400	Rear Axle Oil Cooler Solenoid
1401	Reverse Solenoid
1402	Forward Solenoid
1403	Fourth Speed Clutch
1404	Third Speed Clutch
1405	Second Speed Clutch
1406	First Speed Clutch
1521	Part-Throttle Autoshift Selector Switch
1960	Ignition Key Reader
2129	Ride Control Solenoid (1)
2274	Transmission Direction Switch #2
2347	Ride Control Solenoid (2)
2684	Ride Control Solenoid (3)
Electronic Implement Control (MID No. 082)	
CID	**Component**
0041	8 Volt DC Supply
0168	Electrical System Voltage
0268	Programmed Parameter Fault
0296	Transmission Control
0350	Lift Linkage Position Sensor
0351	Tilt Linkage Position Sensor
0352	Lift Lever Position Sensor
0353	Tilt Lever Position Sensor
0354	Raise Solenoid
0355	Lower Solenoid
0356	Dump Solenoid
0357	Rackback Solenoid
0358	Pilot Pressure Solenoid
0364	Lify Cylinder Head End Oil Pressure Sensor
0365	Kickout Set Switch
0487	3rd Lever Position Sensor
0490	Implement Lockout Switch
0491	3rd Function Forward Solenoid
0492	3rd Function Rearward Solenoid
0562	Caterpillar Monitoring System
0590	Engine Electronic Control Module
0965	Autodig Dig Mode Switch
0967	Machine Application
1187	Continuous Flow Rocker Switch
1324	Autodig Operation Mode Select Switch
1325	Autodig Trigger Switch
1326	ECM Location Code
1592	Autodig Kickout Set Switch
1639	Machine Security System ECM
1718	Fine Modulation Switch
2326	Lower Anti-Drift Solenoid Valve
2328	Dump Anti-Drift Solenoid Valve
Product Link Radio (MID No. 122)	
CID	**Component**
0168	Electrical System Voltage
0254	Electronic Control Module
0269	Sensor Power Supply
1250	Remote Communication Module
1251	Alternator "R" Terminal
Machine Security System (MID No. 124)	
CID	**Component**
0168	Electrical System Voltage
0248	Data Link
0817	ECM Internal Backup Battery
1391	Theft Deterent Output Driver #1
1392	Theft Deterent Output Driver #2

[1] The CID is a diagnostic code that indicates which circuit is faulty.
[2] The MID is a diagnostic code that indicates which electronic control module diagnosed the fault.

Failure Mode Identifiers (FMI)[1]	
FMI No.	**Failure Description**
0	Data valid but above normal operational range.
1	Data valid but below normal operational range.
2	Data erratic, intermittent, or incorrect.
3	Voltage above normal or shorted high.
4	Voltage below normal or shorted low.
5	Current below normal or open circuit.
6	Current above normal or grounded circuit.
7	Mechanical system not responding properly.
8	Abnormal frequency, pulse width, or period.
9	Abnormal update.
10	Abnormal rate of change.
11	Failure mode not identifiable.
12	Bad device or component.
13	Out of calibration.
14	Parameter failures.
15	Parameter failures.
16	Parameter not available.
17	Module not responding.
18	Sensor supply fault.
19	Condition not met.
20	Parameter failures.

[1]The FMI is a diagnostic code that indicates what type of failure has occurred.

Wire Description

Wire Number	Wire Color	Description
		Power Circuits
102	RD	Hd Lmp
104	YL	MSS / Product Link
105	RD	Key Sw
106	WH	Tilt/Lift Position Sensors
108	BU	Air Seat
110	RD	Engine ECM
112	PU	Main Power Rly Output
113	OR	Opr Mon Panel Vmis B+ Switched
114	RD	Warning Horn (forward)
115	PK	Voltage Converters / Radio
118	GY	Front/Rear Wiper/Washer
120	RD	Voltage Converter Memory
121	RD	Back Alarm To Lamp
122	RD	Dome Lamps
124	GN	AC
125	RD	Product Link ECM/Radio
126	PK	Xmsn Ctrl
127	OR	Front Cab Flood Lamps
130	RD	Stop Lamps
131	BR	Flasher / Front/Rear Flood Relays
133	RD	LH/RH Dash Indicator Panels
134	YL	Rear Cab Flood Lamps
135	BU	Converter 12 Volt Switched Out
136	GN	Supplemental Steering
138	GN	Auto Lube Pump To PCS
139	RD	LH Tail / Clearance Lamps
141	PK	Beacon / Heated Mirrors
142	BU	Converter 12 Volt Switched Out
147	RD	ECAP / Center Dash Indicator Panel
148	RD	Voltage Converter Memory
150	OR	Bat (+)
151	GN	Axle Oil Cooler Clutch
164	WH	Hydro Ctrl Wtl Powertrain Ctrl
168	GN	Quick Coupler
170	RD	Transmission ECM
174	RD	Unswitched Bus Power
199	RD	Hood Actuator
A105	OR	8 Volt Sensor Supply+
		Ground Circuits
200	BK	Main Chassis
201	BK	Operator Monitor Return
202	BK	Xmsn Ctrl
210	BK	Converter Output (24/12 Volt)
250	BK	Payload Mon - Customer Gnd
251	BK	Payload Mon - System Gnd
290	BK	CMS Service
291	BK	CMS Clear
A272	BK	Implement Ctrl B-
A273	BK	Transmission Ctrl B-
C216	BK	Implement Return
		Basic Machine Circuits
306	GN	Starter Relay Coil to Transmission Control
307	OR	Key Sw to Transmission Control
308	YL	Main Power Relay Coil
320	OR	Horn Relay Coil To Sw
321	BR	Backup Alarm Lamp Travel Alarm
322	GY	Warning Horn (forward)
326	PU	Key Sw 'C' Term.
A307	GY	Throttle Position
		Monitoring Circuits
403	GN	Alternator (R) Term.
410	WH	Opr Mon Action Alarm
411	PK	Opr Mon Master
413	BR	Opr Mon Fuel Press.
416	OR	Supplemental Steering Sw
417	GY	Primary Steering Sw
419	YL	Opr Mon Parking Brake
426	BR	Opr Mon Power Train Oil Filter
430	BU	Opr Mon Air Filter
432	PK	Opr Mon Brake Press. (oil)
436	OR	Opr Mon Power Train Oil Filter Jumper
439	YL	Lamp Indicator
442	GY	Hyd System Temp Gage
443	YL	Power Train Temp Gage
447	PK	Fuel Level Gage
450	YL	Tach Sender (+)
453	PK	Supplemental Steering Fault Lamp
484	YL	Primary Steering Lamp
C413	YL	CMS Display Data
C414	BU	CMS Display Load
E416	PU	Lift Cyl Press Sensor
E455	BR	Hydraulic Oil Filter
G479	WH	Prelube Indicator
G480	GN	Fuel Level Low Indicator
G485	BU	Opr Mon Front Brake Temperature
G486	GN	Opr Mon Rear Brake Temperature
		Accessory Circuits
500	BR	Wiper - Front (Park)
501	GN	Wiper - Front (Low)
502	OR	Wiper - Front (Hi)
503	BR	Wiper - Rear (Park)
504	YL	Wiper - Rear (Low)
505	BU	Wiper - Rear (Hi)
506	PU	Washer - Front
507	WH	Washer - Rear
508	PU	Radio Speaker - Left
509	WH	Radio Speaker - Left (Commom)
511	BR	Radio Speaker - Right
512	GN	Radio Speaker - Right (Common)
515	GY	Blower Motor (Hi)
516	GN	Blower Motor (Medium)
517	BU	Blower Motor (Low)
518	OR	Hazard Flasher To Sw
521	YL	A/C Sw To Refrigerant Sw
522	WH	A/C Clutch To Thermostat Sw
537	GN	Turn Signal Sw To Flasher
538	BR	Hazard Indicator
539	BU	Turn Signal Indicator Basic/Right
540	WH	Turn Signal Indicator Left
550	GY	Aux Hyd Left- Disconnect To Sw
567	WH	A/C Sw Jumper
592	BU	DC/DC Converter Power Output
A513	RD	DC/DC Converter Memory Output
A523	PU	Temp Potentiometer Pos 1
A524	BR	Temp Potentiometer Pos 2
A525	GN	Temp Potentiometer Pos 3
A541	PU	Flasher To Indicator Lights
C529	GY	Lift Press Sensor
C530	BU	Lift Position Sensor
C542	GN	Heated Mirror Power
C543	GY	Aux Heater Blower
C583	GN	+24v Relay To A/C Control Module
F523	PU	Temp Potentiometer Pos 1
F524	BR	Temp Potentiometer Pos 2
F525	GN	Temp Potentiometer Pos 3
		Lighting Circuits
603	PK	Rotary Beacon
604	OR	Stop Lamp
605	YL	Turn Lamp - Left
606	GY	Turn Lamp - Right
608	GN	Flood Lamp - Rear
610	OR	Head Lamp Basic
611	PU	Head Lamp Hi
614	PU	Park/Tail/Dash/Lamp
615	YL	Cab Flood Lamp/Rops
617	BR	Tail/position Lamp - Left (Road Pkg)/Width

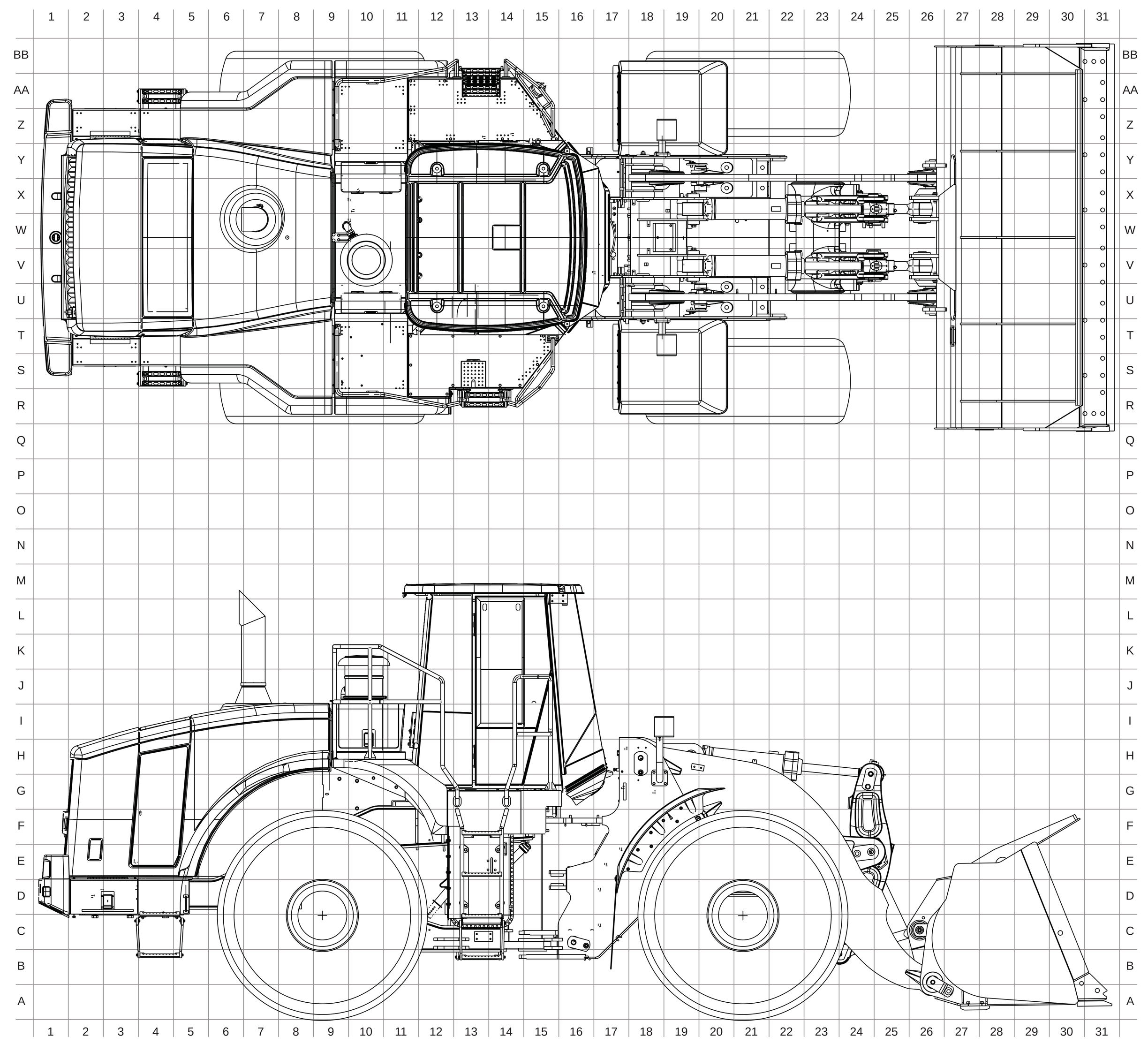
Wire Number	Wire Color	Description
		Lighting Circuits Continued
619	GN	Head Lamp Low
633	BU	Attach Lighting Ckt
646	OR	Light Sw To Front Flood Relay
647	GN	Light Sw To Rear Flood Relay
651	PK	Flood Lamp Rear
661	GN	Tachometer Lamp
662	YL	Speedometer Lamp
663	GY	Gage Lamps
691	GY	Warning Lights To Breaker
A629	BU	Front Rops Hid Flood Attachment
		Control Circuits
720	PU	Xmsn Brake Sw
727	GN	Supplemental Steering Motor Relay
728	BU	Supplemental Steering Cont Sw
751	GN	Xmsn Shift Sol No. 1 Or 3
752	YL	Xmsn Shift Sol No. 2
754	BU	Xmsn Shift Sol No. 3 Or 1
755	OR	Xmsn Shift Sol No. 4 Or 5
762	YL	Bucket Positioner Sol Sw
E701	PK	Auto Ride Control Sw
E707	GN	CMS Display +v
E708	PK	CMS Display Clock
E735	PU	CMS Tack/Serv Mtr/Odometer Select
E746	GN	Downshift Sw (N.O.)
G746	WH	Xmsn Cont Torque Limit
G750	BU	Xmsn Cont Fwd Sw To Gnd
G755	GY	Xmsn Cont Rev Sw To Gnd
G760	WH	Xmsn Cont Speed 2 Sw To Gnd
G761	YL	Xmsn Cont Speed 3 Sw To Gnd
G762	BR	Xmsn Cont Speed 4 Sw To Gnd
G763	PU	Xmsn Cont Neut Sw To Gnd
G764	PK	Xmsn Cont Park Brake Lever Sw To Gnd
G766	GN	Impl Cont Sw To Gnd N.O.
G767	WH	Impl Cont Sw To Gnd N.C.
G768	GN	Xmsn Cont Speed 1 Sw To Gnd
G787	GN	Xmsn Cont Remote Fwd Sw To Gnd
G788	YL	Xmsn Cont Remote Rev Sw To Gnd
H702	PU	Impl Cont Reversing Fan Sw (N.O.)
H703	YL	Impl Cont Reversing Fan Sw (N.C.)
H708	OR	Impl Cont Kickout Sw 1
H709	BU	Impl Cont Kickout Sw 2
H710	PK	Impl Cont Lift Lever Position
H711	GN	Impl Cont Tilt Lever Position
H713	PK	Impl Cont Lift Proportional Sol
H714	OR	Impl Cont Lower Proportional Sol
H717	BR	Impl Cont Pilot Press Sol
H718	GY	Impl Cont Tilt Cyl Position
H722	GN	Xmsn Cont L. Brake Pedal Position Sens
H728	GN	CCS Auto 3
H729	WH	CCS Auto 2
H730	BR	CCS Auto 1-4
H795	PK	Throttle Sensor Common
J764	BR	Transmission Switch/Sensor Return #1
P739	BU	Axle Cooler Clutch
Y794	OR	Expanded Can Data Link +
Y795	GN	Expanded Can Data Link -
818	BR	Serial Data (transmit)
819	GY	Serial Data (receive)
G848	GN	Led Driver 2
G850	BU	Inlet Air Heater
J807	BK	Proportional Return (1-3)
J808	BK	Proportional Return (4/Rev)
J809	BK	Proportional Return (Forward)
J813	BK	Implement Proportional Return
J814	BK	Implement Proportional Return
J815	BK	Ride Control Solenoids Proportional Return
J887	PU	Axle Cooler Relay
T852	GY	Auto Dig Mode Sw. Pos #1
T853	OR	Auto Dig Mode Sw. Pos #2
T854	YL	Auto Dig Mode Sw. Pos #3
T855	BU	Auto Dig Mode Sw. Pos #4
T856	WH	Auto Dig Mode Select Sw. Pos #1
T857	GN	Auto Dig Mode Select Sw. Pos #2
T858	GY	Auto Dig Kickout Set Sw. (N.O.)
T859	WH	Auto Dig Kickout Set Sw. (N.C.)
T860	OR	Auto Dig Trigger Sw. (N.O.)
T861	YL	Auto Dig Trigger Sw. (N.C.)
T862	BU	Auto Dig Auto Trigger Indicator
T863	PU	Auto Dig Record Mode Indicator
T864	BR	Auto Dig Operator Trigger Indicator
T866	YL	Dump Detent
T869	WH	Fine Modulation Sw 1
T870	BR	Fine Modulation Sw 2
900	PU	Xmsn Shift Sol No. 5 Or 4
901	WH	Xmsn Shift Sol No. 6
910	YL	Xmsn Neutizer Override Indicator
944	OR	Cat Data Link +
945	BR	Cat Data Link -
961	BR	Selector Sw
964	BU	Fork Position Select
973	BR	Autoshift- Auto/Manual Sw 2
976	OR	Ride Cont Solenoid 1
977	YL	Autoshift- Auto/Manual Sw 1
987	WH	Third Function Diverter Sol
A958	WH	Park Brake Sol
A982	BR	Engine Thrttle Cont
E900	WH	Trans Output Spd +
E901	GN	Trans Output Spd -
E906	OR	Trans Output Spd Q+
E907	GY	Trans Output Spd Q-
E908	BR	Trans Input Spd +
E909	WH	Trans Input Spd -
E917	WH	Implement Lockout Sw To Gnd (N.O.)
E918	GN	Implement Lockout Sw To Gnd (N.C.)
E919	YL	Aux Lower Proportional Sol
E920	BR	Aux Lift Proportional Sol
E921	PK	Rackback Proportional Sol
E922	GN	Dump Proportional Solenoid
E955	OR	PCS Keypad Data
K927	BU	On/Off Pilot Solenoid Return
K977	PK	Trans Oil Temp Sensor
N939	GN	Ride Control Solenoid 2
N957	PK	Rxd - Comm #1
N959	PK	Rxd - Comm #3
N960	OR	Txd - Comm #1
N963	OR	Txd - Comm #3
N970	YL	Dtr - Comm #1
N973	BR	Dcd - Comm #1
N979	GN	Signal Gnd - Comm #1
N981	GN	Signal Gnd - Comm #3
P910	BR	Secondary Steering Test Sw Input
P915	PK	Xmsn Neutral Indicator
P916	OR	Xmsn Neutral Switch
P945	OR	Anti Drift Sol- Stick
P946	BR	Anti Drift Sol- Boom
P976	BR	Quick Coupler Sw To Low Pressure Sol
P990	BR	Start Relay Ctrl Return
T901	YL	MSS Exciter Coil In
T902	PK	MSS Exciter Coil Out
T969	YL	Third Function Control Flow Switch
T970	GY	Third Function Control Flow Switch
X972	GN	Part Throttle Auto Shift Position 1
X973	BU	Part Throttle Auto Shift Position 2
X974	BR	Part Throttle Auto Shift Position 3
X998	BR	Digital Sensor Return

Component Location

Component	Schematic Location	Machine Location	Component	Schematic Location	Machine Location
Alarm - Action	E-15	H-12 , V-12	Switch - Auto/Manual Gear Select	D-4	L-14 , Y-14
Alarm - Implement Audible Alert	E-15	H-12 , V-12	Switch - Autodig Kickout Set	C-1	L-14 , Y-14
Alarm - Quick Coupler	D-1	L-14 , Y-14	Switch - Autodig Mode	D-3	L-14 , Y-14
Arc Suppressor - Forward Horn	I-7	H-13 , X-13	Switch - Autodig Mode Select	C-1	L-14 , Y-14
Control - Caterpillar Monitoring System	E-7	L-15 , Y-15	Switch - Autodig Trigger	G-7	H-13 , X-13
Control - Dimmer	D-15	H-12 , V-12	Switch - Beacon	G-3	I-16 , W-16
Control - Implement Control System	F-14	H-12 , U-12	Switch - Blower Fan Speed	D-6	L-15 , Y-15
Control - Payload Control System	D-7	K-15 , Y-15	Switch - Bucket/Fork Select	E-2	L-14 , Y-14
Control - Product Link (Gateway)	J-11	G-12 , W-12	Switch - Cat Mon Sys Mode Select	C-6	L-15 , Y-15
Control - Transmission Control System	L-18	H-12 , W-12	Switch - Dimmer	H-1	G-16 , X-16
Converter - Voltage (10A)	F-15, G-16	H-12 , W-12	Switch - Downshift	F-7	H-13 , X-13
Diode - Blower Motor	K-15	H-12 , W-12	Switch - Fine Modulation	F-8	H-13 , X-13
Display - Groeneveld Autolube	F-6	L-15 , Y-15	Switch - Forward Horn	I-3	I-15 , W-15
Flasher - 24V	E-15	H-12 , V-12	Switch - Forward Horn 2	G-7	H-13 , X-13
Fuse - Block	B-15	H-12 , V-12	Switch - Front Intermittent Wiper/Washer	D-5	L-15 , Y-15
Fuse - Thermal Cut Out	K-15	H-12 , W-12	Switch - Hazard Lamp	H-3	I-16 , W-16
Guage - Quad	J-1	I-16 , W-16	Switch - Heated Mirror	E-2	L-14 , Y-14
Indicator - Center Dash	K-1	I-16 , W-16	Switch - HID Lamp	J-3	I-16 , W-16
Indicator - Left Hand Panel	K-1	I-16 , W-16	Switch - HVAC Select	D-6	L-15 , Y-15
Indicator - Right Hand Panel	K-1	I-16 , W-16	Switch - HVAC Temperature Select	D-5	L-15 , Y-15
Joystick - Implement Control	I-7	H-13 , X-13	Switch - Implement Lockout	G-8	H-13 , X-13
Keypad - WLPCS	C-7	K-15 , Y-15	Switch - Key Start	G-3	I-16 , W-16
Motor - Blend Door Actuator	L-15	H-12 , W-12	Switch - Lift Tilt Kickout Set	E-1	L-14 , Y-14
Motor - Blower	L-16	H-12 , W-12	Switch - Neutral Override	C-2	L-14 , Y-14
Motor - Front Wiper	I-1	H-17 , W-17	Switch - Quick Coupler	D-1	L-14 , Y-14
Motor - Rear Wiper	K-14	I-12 , V-12	Switch - Rear Wiper/Washer	E-4	L-14 , Y-14
Radio - Product Link	K-11	G-12 , W-12	Switch - Remote FNR	H-7	H-13 , X-13
Relay - Axle Cooler	C-15	H-12 , V-12	Switch - Reversing Fan	D-1	L-14 , Y-14
Relay - Forward Cab Floodlamp	C-15	H-12 , V-12	Switch - Ride Control	C-2	L-14 , Y-14
Relay - Forward Horn	C-15	H-12 , V-12	Switch - Running Lamp	K-3	I-16 , W-16
Relay - Heated Mirrors Timer	D-15	H-12 , V-12	Switch - Secondary Steering Test	D-2	L-14 , Y-14
Relay - Rear Floodlamp	C-15	H-12 , V-12	Switch - Stop Lamp	H-1	G-15 , W-15
Resistor A/C (1)	L-14	H-12 , W-12	Switch - Third Function Control Flow	K-3	I-16 , W-16
Resistor A/C (2)	L-14	H-12 , W-12	Switch - Third Function Diverter	G-8	H-13 , X-13
Resistor - Blower Motor	K-16	H-12 , W-12	Switch - Transmission Gear Selector	I-3	I-15 , W-15
Resistor - CAN A	K-6	I-16 , W-16	Switch - Transmission Shifter Assembly	H-2	I-15 , W-15
Sensor - 3rd Lever Position	F-7	H-13 , X-13	Switch - Turn Signal	I-2	I-15 , W-15
Sensor - Left Hand Brake Pedal	H-1	G-15 , W-15	Switch - Variable Shift Control	D-3	L-14 , Y-14
Sensor - Lift Lever Position	G-7	H-13 , X-13	Tach/Speedometer	J-1	I-16 , W-16
Sensor - Throttle Position	G-1	G-15 , V-15	Thermostat	K-15	H-12 , W-12
Sensor - Tilt Lever Position	G-7	H-13 , X-13			

Connector Location

Connector Number	Schematic Location	Machine Location
CONN 14	E-18	D-10 , U-10
CONN 15	D-18	I-12 , V-12
CONN 16	C-18	I-12 , V-12
CONN 17	B-18	I-12 , V-12
CONN 24	F-15	H-12 , V-12
CONN 25 Service Mode Plug	E-15	H-12 , V-12
CONN 26	L-13	H-12 , W-12
CONN 27	H-12	H-12 , V-12
CONN 28	H-9	H-13 , X-13
CONN 29	G-9	H-13 , X-13
CONN 30	F-9	H-12 , V-12
CONN 31	D-8	L-15 , Y-15
CONN 32	L-7	L-11 , Y-11
CONN 33	L-7	L-16 , Y-16
CONN 34	K-7	L-11 , U-11
CONN 35	K-7	L-16 , U-16
CONN 36 PCS Customer Data Conn	D-7	K-15 , Y-15
CONN 37	I-3	I-16 , W-16
CONN 38	I-3	I-16 , W-16
CONN 39	H-3	I-15 , W-15
CONN 40	F-3	I-16 , W-16
CONN 41 Service Tool Conn	F-2	I-16 , W-16
CONN 42	H-1	G-16 , X-16
CONN 43	G-1	G-15 , W-15



CATERPILLAR®

RENR6332-01
November 2006

Schematic

966H and 972H Wheel Loader Electrical System

966H:	972H:
A6D1-UP	A7D1-UP
A6G1-UP	A7G1-UP
A6J1-UP	A7J1-UP

Volume 2: Cab

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Off Machine Switch Specification				
Part No.	**Function**	**Actuate**	**Deactuate**	**Contact Position**
3E-5464	A/C Thermostat	-1.1 ± 0.8°C (30 ± 1.4°F)	2.2 ± 0.8°C (36 ± 1.4°F)	Normally Closed

Resistor, Sender and Solenoid Specifications		
Part No.	**Component Description**	**Resistance (Ohms)[1]**
9G-1950	Resistor: Blower Motor Speed	Overall: 2.0 ± 0.1 Tap 1.0 ± .05
134-2540	Resistor: CAN	120

[1] At room temperature unless otherwise noted.

Related Electrical Service Manuals	
Title	**Form Number**
Machine Security System:	RENR2462
Product Link Radio:	RENR7911
Power Train Control:	RENR8846
Implement Control:	RENR8858
Caterpillar Monitoring System:	SENR1394
Payload Control System:	RENR6293

Harness And Wire Electrical Schematic Symbols

Symbols

Pressure Symbol | Temperature Symbol | Level Symbol | Flow Symbol | Circuit Breaker Symbol

Symbols And Definitions

Fuse - A component in an electrical circuit that will open the circuit if too much current flows through it.

Switch (Normally Open): A switch that will close at a specified point (temp, press, etc.). The circle indicates that the component has screw terminals and a wire can be disconnected from it.

Switch (Normally Closed): A switch that will open at a specified point (temp, press, etc.). No circle indicates that the wire cannot be disconnected from the component.

Ground (Wired): This indicates that the component is connected to a grounded wire. The grounded wire is fastened to the machine.

Ground (Case): This indicates that the component does not have a wire connected to ground. It is grounded by being fastened to the machine.

Reed Switch: A switch whose contacts are controlled by a magnet. A magnet closes the contacts of a normally open reed switch; it opens the contacts of a normally closed reed switch.

Sender: A component that is used with a temperature or pressure gauge. The sender measures the temperature or pressure. Its resistance changes to give an indication to the gauge of the temperature or pressure.

Relay (Magnetic Switch): A relay is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close the switch part of the relay.

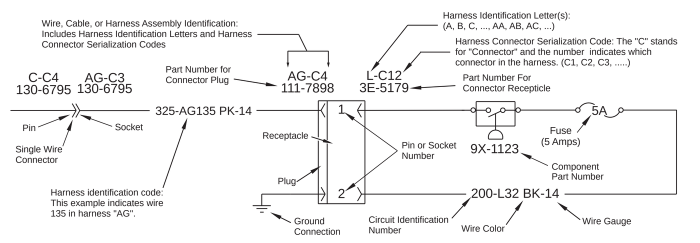
Solenoid: A solenoid is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close a valve or move a piece of metal that can do work.

MAGNETIC LATCH SOLENOID - A magnetic latch solenoid is an electrical component that is activated by electricity and held latched by a permanent magnet. It has two coils (latch and unlatch) that make electromagnet when current flows through them. It also has an internal switch that places the latch coil circuit open at the time the coil latches.

Harness And Wire Symbols

Deutsch connector: Typical representation of a Deutsch connector. The plug contains all sockets and the receptacle contains all pins.

Sure-Seal connector: Typical representation of a Sure-Seal connector. The plug and receptacle contain both pins and sockets.



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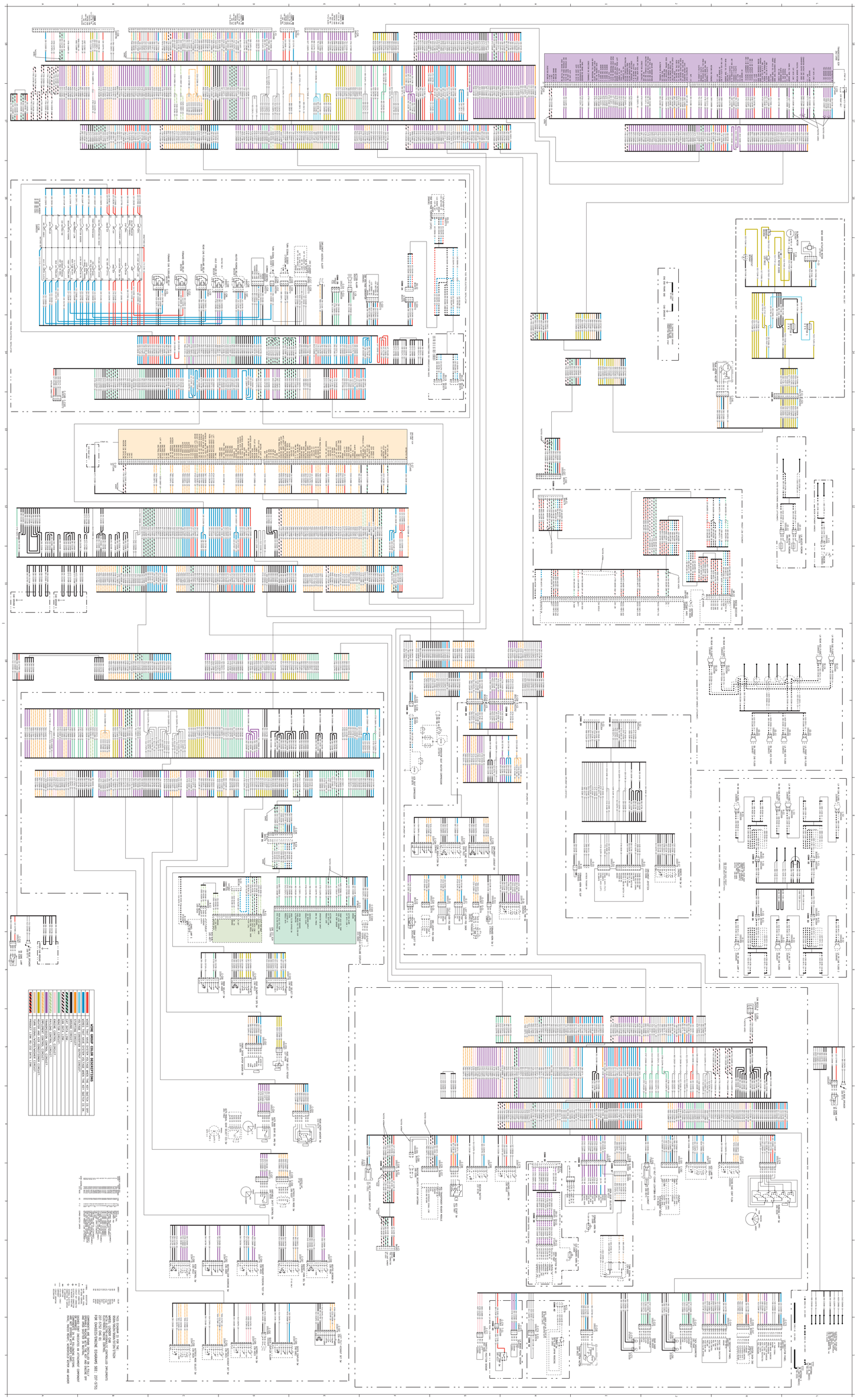
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