

Connector Location		
Connector Number	Schematic Location	Machine Location
CONN 1	A-15	4
CONN 2 Diagnostic Conn	B-15	8
CONN 3	D-15	52
CONN 4	D-15	50
CONN 4A	E-15	50
CONN 5	D-15	49
CONN 5A	H-13	49
CONN 6	E-15	51
CONN 6A	F-15	51
CONN 7	A-13	52
CONN 8	E-15	23
CONN 9	A-12	21
CONN 9A	B-13	21
CONN 10	A-11	53
CONN 11	A-11	53
CONN 12	B-11	54
CONN 13	B-11	54
CONN 14	B-10	54
CONN 15 Options Code Plug	F-12	52
CONN 16 Std Harness Code Plug	G-11	53
CONN 16A Service Code Plug For Bleeding Brake Oil	G-11	53
CONN 17 Diagnostic Conn	H-11	53
CONN 18	H-12	56
CONN 19	H-12	56
CONN 20	C-10	C
CONN 21	D-10	C
CONN 22	D-10	C
CONN 23	F-10	C
CONN 23A	F-11	C
CONN 24	F-11	C
CONN 25	B-8	C
CONN 26	B-7	54
CONN 27	D-8	C
CONN 28	B-7	33
CONN 29	B-7	48
CONN 30	D-7	C
CONN 31	D-7	C
CONN 32	D-7	C
CONN 33	D-7	C
CONN 34	D-6	56
CONN 35	D-6	A
CONN 36 Harness Code Plug	F-6	A
CONN 37 Service Mode Plug	F-6	A
CONN 38	B-5	54
CONN 39	A-2	55
CONN 39A	A-2	55
CONN 39B	I-3	55
CONN 40	A-3	57
CONN 40A	H-6	57
CONN 40B	H-3	57
CONN 41	A-3	57
CONN 41A	D-6	57
CONN 41B	D-3	57
CONN 42	H-15	63
CONN 42A	H-6	57
CONN 42B	H-3	57
CONN 43	C-3	15
CONN 44 Customer Data Conn	D-3	52
CONN 45 ECAP Service Conn	D-3	52
CONN 46	E-3	A
CONN 47	A	A
CONN 48	B-2	55
CONN 49	C-2	59
CONN 49A	H-5	59
CONN 49B	H-2	59
CONN 49C	E-2	59
CONN 50	C-2	58
CONN 50A	I-5	58
CONN 50B	I-2	58
CONN 50C	E-2	58
CONN 51	C-2	45
CONN 52	D-2	C
CONN 52A	D-2	C
CONN 53	F-1	A
CONN 54	F-1	A
CONN 55	G-1	60
CONN 56	H-14	61
CONN 57	H-14	61
CONN 58	H-14	63
CONN 58A	H-14	63
CONN 59	H-14	62
CONN 60	H-14	62
CONN 61	I-4	58
CONN 62	H-2	31
CONN 63	C-4	C

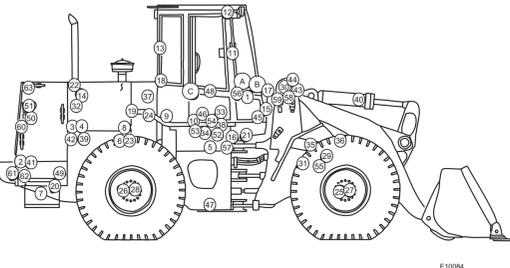
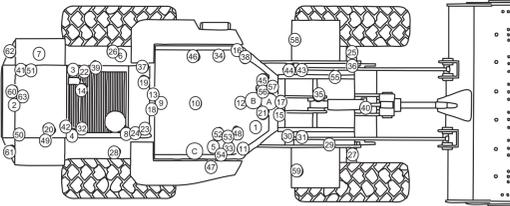
The connectors shown in this chart are for harness to harness connectors. Connectors that join a harness to a component are generally located at or near the component. See the Component Location Chart.

Related Electrical Service Manuals		
Title	Form Number	
Alternator 9W-3043	SEN93685	
Caterpillar Monitoring System	SEN6717	
Payload Monitor	SEN4733	
Starting and Charging Systems	SEN92947	
Starting Motor:	9X-9995	
Consist:	3E-2298	SEN93581
	8C-4773	SEN93589
	106-8558	SEN93559
Traction Control System	SEN95956	
Transmission Control	SEN9589	

Monitoring System Modes		
Mode Of Operation	Mode Number	
Normal	0	
Harness Code	1	
Numeric Readout	2	
Service	3	
Tattletale (Log)	4	
Units	5	
Setup	6	
Calibration	7	

Component Location					
Component	Schematic Location	Machine Location	Component	Schematic Location	Machine Location
Alarm - Action	E-5	1	Sensor - Wheel Speed (Right Front)	A-2	27
Alarm - Backup	D-15	2	Sensor - Wheel Speed (Right Rear)	F-11	28
Alternator	E-13	3	Sensor - W/LPS Lift Cylinder Pressure	A-2	29
Arc Suppressor (A/C)	A-15	4	Sensor - W/LPMS Lift Position	A-2	30
Arc Suppressor (Secondary Steering)	A-14	5	Solenoid - 4th Function Downer Valves (IT38F Only)	H-1	31
Aux Start Receptacle	F-14	6	Solenoid - Pilot Valve Up (Busset/Overhaul)	B-1	32
Battery	F-15	7	Solenoid - Pilot Valve Up Float Detent	B-5	C
Breaker - Alternator (80A)	C-15	8	Solenoid - Pilot Valve Up 11ft Detent	B-6	C
Breaker - Blower Motors (15A)	C-11	C	Solenoid - A/C Clutch	A-15	4
Breaker - Main (80A)	C-15	8	Solenoid - Engine Shutdown	B-15	32
Breaker - Running Lamp (15A)	C-15	8	Solenoid - ON/OFF Pilot	F-11	33
Breaker - Seat (Air Compressor/Heater) (15A)	C-11	C	Solenoid - Proportional (Left Front)	F-11	38
Caterpillar Monitoring System	E-5	A	Solenoid - Proportional (Left Rear)	H-11	38
Control - CSY AutoShift	E-12	9	Solenoid - Proportional (Right Front)	F-11	38
Control - Secondary Steering	A-14	5	Solenoid - Proportional (Right Rear)	H-11	38
Control - Traction Control System	H-12	10	Solenoid - Ride Control (z)	B-1	35,36
Control - WLPCSI	E-3	11	Solenoid - Start Aid	E-14	37
Converter	F-7	12	Solenoid - Transmission (6)	C-12	34
Defroster - Rear (COSA Only)	F-11	13	Starter	F-14	38
Dimmer	F-4	8	Switch - 4th Function Overster (IT38F Only)	F-10	C
Flasher	E-6	A	Switch - A/C Hi/Low Pressure	A-15	4
Fuses	C-15	C	Switch - Auto Ride Control	E-7	C
Fuses	C-15	C	Switch - Beacon	D-10	C
Gauge (Quad)	F-4	A	Switch - Blower	D-5	A
Horn - Forward	B-11	43	Switch - Brake Oil Pressure	C-13	38
Intake Air Heater	F-13	14	Switch - Bucket Positioner	B-1	40
Keypad - (WLPCS)	C-3	11	Switch - Bucket/Fork Positioner (IT38F Only)	F-10	C
Lamp - Action	D-4	B	Switch - Defroster (Rear Window/COSA Only)	E-11	C
Lamp - Auto Ride Control	F-4	B	Switch - Detent Lockout	B-7	C
Lamp - Automatic Transmission Mode	D-4	B	Switch - Dimmer (COSA Only)	D-2	C
Lamp - Defroster (Rear Window/COSA Only)	E-11	B	Switch - Disconnect	F-14	41
Lamp - Flood Indicator	D-4	B	Switch - Engine Oil	A-15	42
Lamp-Hazard Flasher	F-4	B	Switch - Flood Lamp	E-11	C
Lamp-Hi/Low/Position/Turn (Left Hand) (COSA Only)	E-1	B	Switch - Forward Horn	C-6	B
Lamp - Hi/Low/Position/Turn (Right Hand) (COSA Only)	E-1	B	Switch - Intake Air Heater	E-8	C
Lamp - Neutralizer Override	D-4	B	Switch - Key Start	E-9	C
Lamp - Ride Control	F-4	B	Switch - Kickout Neutralizer (IT38F Only)	F-10	C
Lamp - Turn Indicator (Left)	F-4	B	Switch - Lift Positioner	A-1	44
Lamp - Turn Indicator (Right)	F-4	B	Switch - Neutralizer	C-1	45
Lamp - Turn Indicator (Left)	F-4	B	Switch - Parking Brake	E-12	46
Lamp - Turn Indicator (Right)	F-4	B	Switch - Primary Steer Pressure	A-14	47
Motor - (Secondary Steering)	A-14	5	Switch - Primary Steering (Alt)	B-13	47
Motor - Blower (z)	C-3	15	Switch - Running Lamp	E-10	C
Motor - Washer (Front)	B-13	16	Switch - Secondary Steer Manual	D-8	C
Motor - Washer (Rear)	B-13	16	Switch - Secondary Steer Pressure	A-14	5
Motor - Wiper (Front)	B-3	17	Switch - Secondary Steering (AU)	B-13	5
Motor - Wiper (Rear)	F-10	18	Switch - Start Aid	D-8	C
Relay - Bosch Motor (Secondary Steering)	C-15	8	Switch - Start Aid Coolant	E-14	22
Relay - Start	C-15	8	Switch - Stop Lamp	C-1	45
Resistor - (Blower Motor)	F-13	14	Switch - Tach/Speed/Serv Meter Select	F-8	C
Resistor - (Intake Air Heater)	C-14	6	Switch - Tach/Speed/Serv Meter Select	F-8	C
Resistor - (Main Relay)	F-14	19	Switch - Tach/Speed/Serv Meter Select	F-8	C
Resistor - (Starter)	F-14	19	Switch - ThermoStat (Blower Motor)	C-3	15
Sender - Fuel Level	D-14	20	Switch - Transmission Auto/Manual	D-11	C
Sensor - Articulation Mfg Position	I-10	21	Switch - Transmission Downshift	B-6	48
Sensor - Coolant Temp	E-14	22	Switch - Transmission Neutralizer Override	E-7	C
Sensor - Engine Speed	C-13	23	Switch - Turn Signal	D-8	B
Sensor - Hydraulic Temp	B-14	24	Switch - Wiper (Front Intermittent)	E-8	C
Sensor - Torque Converter Oil Temp	C-13	34	Switch - Wiper (Rear)	E-8	C
Sensor - Transmission Speed	C-13	34	Tachometer/Speedometer	E-4	A
Sensor - Wheel Speed (Left Front)	A-2	27	TCS Display Module	B-3	C
Sensor - Wheel Speed (Left Rear)	H-1	29	Transmission Shift	F-3	B

Machine locations are repeated for components located close together.
 A = Operator Compartment - Dash Console
 B = Operator Compartment - Steering Column
 C = Operator Compartment - Right Console



Machine Harness Connector and Component Locations

Off Machine Switch Specification				
Part No.	Function	Activate	Deactivate	Contact Position
3E-6429	Supplemental Steering Oil Flow	4 grams (14 oz)	1.5 grams (05 oz)	Normally Open
3E-6449	Start Aid Coolant	38 ± 3°C (100 ± 5°F)	27°C MIN (80.6°F)	Normally Closed
3E-6450	Primary Steering Pressure	1200 kPa MAX (172 psi MAX)	700 ± 100 kPa (102 ± 15 psi)	A-CI Normally Closed
3E-6455	Engine Oil Pressure (EMS)	90 ± 21 kPa (13 ± 3.0 psi)	70 ± 21 kPa (10 ± 3.0 psi)	A-B, Normally Open
3E-7993	Brake Oil Pressure (EMS)	10700 kPa MAX (1550 psi MAX)	8860 ± 345 kPa (1300 ± 50 psi)	A-B, Normally Open
114-5323	Refrigerant Pressure (A/C)	275 to 1750 kPa* (40 to 255 psi)	-	Normally Open*

* A hydraulic hand system, 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).
 * Contact position at the contacts of the harness connector.

Resistor, Sender and Solenoid Specifications		
Part No.	Component Description	Resistance (Ohms)*
9D-1950	Resistor - Blower Motor Speed	Overall 2.0 ± .1, Tap 1.0 ± 0.05
6T-7864	Resistor - Main Relay	39 ± 1.95
3E-7842	Resistor - Starter/Diagnostic Conn	150 ± 7.5
134-7262	Sender - Fuel Level	240 - 260 Empty 27.5 - 38.5 Full
3E-8848	Sensor - Engine Speed	1000-1200
4W-9972	Sender - Hydraulic Oil Temp, Torque	54°C (130°F)-560 to 716 110°C (230°F) - 72 to 82
6V-9455	Sensor - Transmission Speed	110 - 200
8T-8806	Solenoid - Fourth Function Overster	34.3 ± 1.7
134-3999	Solenoid - A/C Clutch	17.6 ± 0.8
8C-3653	Solenoid - Engine Shutdown	1.55 ± 0.15 10.3 ± 1.03
116-4152	Solenoid - Pilot ON/OFF	34.3 ± 1.7
6T-8046	Solenoid - Aids Control	20.1 ± 1.0
3E-6332	Solenoid - Start Aid	6.00
3E-8591	Solenoids - Transmission	29.8 ± 1.5

* At room temperature unless otherwise noted.

Component Identifiers (CID) ¹	
CID	Component
Caterpillar Monitoring System MID 30	
096	Fuel Level Sensor
110	Engine Coolant Temp Sensor
177	Torque Converter Oil Temp Sensor
248	CAT Data Link
265	10 Volt Sensor Power Supply
271	Action Alarm
324	Action Lamp
600	Hydraulic Oil Temp Sensor
819	Display Data Link
82	10 Volt Display Power Supply
AutoShift Transmission Control MID 81	
168	Electrical System Voltage
190	Engine RPM Sensor
191	Transmission Speed Sensor
248	CAT Data Link
265	10 Volt Power Supply
368	Auto/Manual Switch
817	Air Inlet Heater Relay
821	Downshift Switch
641	Solenoid 1 (Forward High)
642	Solenoid 2 (Reverse)
643	Solenoid 3 (Forward Low)
644	Solenoid 4 (Speed 1)
645	Solenoid 4 (Speed 2)
646	Solenoid 6 (Speed 3)
850	Harness Code
860	Shift Handle
680	Ride Control Switch
687	Options Identification Code
Traction Control System MID 28	
168	Electrical System Voltage
248	CAT Data Link
265	10 Volt Power Supply
270	Harness Code
600	Left Front Speed Sensor
608	Right Front Speed Sensor
607	Left Rear Speed Sensor
608	Right Rear Speed Sensor
609	Left Front Brake Solenoid
610	Right Front Brake Solenoid
611	Left Rear Brake Solenoid
612	Right Rear Brake Solenoid
613	ON/OFF Solenoid
615	Articulation Angle Sensor
616	Test/Enable Switch
683	TCS (ECM) Control
687	TCS Options Code Plug

¹The CID is a diagnostic code that indicates which component is faulty.
²The 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.

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



SEN6716-02
August 1997

Schematic

938F Wheel Loader and IT38F Integrated Toolcarrier Electrical System

938F:
1KM1-UP
2RM1-UP
8SM-UP
7SN1-UP

IT38F:
5DR1-UP
6FN1-UP

Wire Description					
Wire Number	Wire Color	Description	Wire Number	Wire Color	Description
Power Circuits					
101	RD	Bat (+)	503	BR	Wiper - Rear (Park)
102	BU	Hi/Low	504	YL	Wiper - Rear (Low)
105	BR	Key/Sw	505	BU	Wiper - Rear (Hi)
108	BU	Aux Ckt	506	PU	Washer - Front
109	OR	Alt Output (+) Term	507	WH	Washer - Rear
112	PU	Main Power Rly Output	508	PU	Radio Speaker - Left
113	OR	Op Man Panel	509	WH	Radio Speaker - Left (Common)
114	GN	Warning Horn (Forward)	511	BR	Radio Speaker - Right
116	BR	Aux Ckt	512	GN	Radio Speaker - Right (Common)
118	OY	Aux Ckt	513	OR	A/C Compressor/Refrigerant Pressure SW
120	YL	Aux Ckt	515	OY	Blower Motor (Hi)
121	YL	Back Alarm To Lamp	516	GN	Blower Motor (Medium)
124	GN	A/C	517	BU	Blower Motor (Low)
126	PK	Xmin Ckt	521	YL	A/C SW To Refrigerant SW
127	OR	Aux Ckt	522	WH	A/C Clutch To ThermoStat SW
128	PK	Aux Ckt	537	GN	Turn Signal SW To Flasher
129	BU	Aux Ckt	538	BR	Hazard Indicator
130	GN	Aux Ckt	AS13	PK	DC/DC Converter Memory Output
133	OR	Aux Ckt	AS38	OR	Rear Window Defroster (Resistive Element In Glass)
Lighting Circuits					
135	BU	Aux Ckt	603	PK	Relay Beacon
136	GN	Strip Steer	604	OR	Stop Lamp
144	GN	Aux Ckt	605	YL	Turn Lamp - Left
150	OR	Bat (+)	606	OY	Turn Lamp - Right
164	WH	Hydra Ckt W/L Powertrain Crt	608	GN	Flood Lamp - Rear
167	OR	Aux Ckt	610	OR	Head Lamp Base
188	WH	Aux Ckt	611	PU	Head Lamp Hi
Ground Circuits					
200	BK	Main Chassis	612	OY	Backup Lamp
201	BK	Operator Monitor Return	614	PU	Park/Tail/Dash/Lamp
202	BK	XMSN Ckt	617	BR	Tail/Position Lamp - Left (Road Pig) Width
203	BK	Chassis Diagnostic	619	GN	Head Lamp Lo
207	BK	Starter Diagnostic	661	GN	Tachometer Lamp
250	BK	Payload Mon - Customer Ord	662	YL	Speedometer Lamp