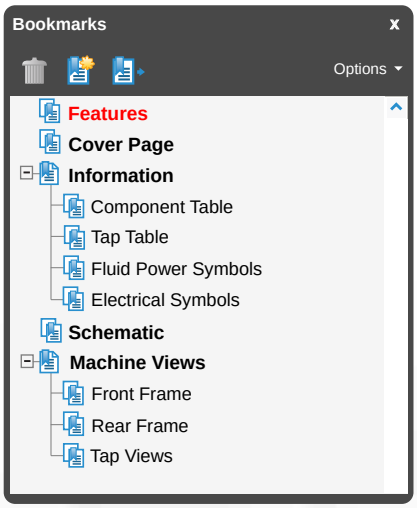
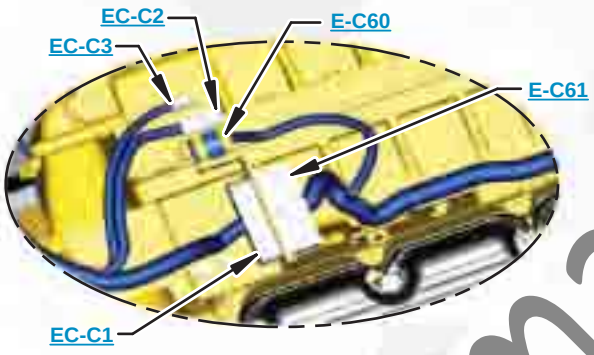
INTERACTIVE SCHEMATIC



The Bookmarks panel will allow you to quickly navigate to points of interest.

This document is best viewed at a screen resolution of 1024 X 768.

To set your screen resolution do the following:
RIGHT CLICK on the **DESKTOP**.
Select **PROPERTIES**.
CLICK the **SETTINGS TAB**.
MOVE THE SLIDER under **SCREEN RESOLUTION** until it shows **1024 X 768**.
CLICK OK to apply the resolution.



Click on any text that is BLUE and underlined. These are hyperlinks that can be used to navigate the schematic and machine views.

VIEW ALL CALLOUTS

When only one callout is showing on a machine view this button will make all of the callouts visible. This button is located in the top right corner of every machine view page.

HOTKEYS (Keyboard Shortcuts)		
	FUNCTION	**KEYS**
	Zoom In	**“CTRL” / “+”**
	Zoom Out	**“CTRL” / “-”**
	Fit to Page	**“CTRL” / “0” (zero)**
	Hand Tool	**“SPACEBAR” (hold down)**
	Find	**“CTRL” / “F”**

CATERPILLAR®

RENR7857-02
September 2012

Schematic

D7R Series II Track-Type Tractor Electrical System

D7R D/S:	D7R FTC:
AEC833-1499	AFG530-UP
ABJ602-1499	ACS633-UP
BRM539-800	ADW533-UP
AGN781-1499	BRP739-UP
BPT515-700	BPK513-UP
BNX714-900	BNM517-UP

Volume 1 of 2: Tractor and Implement Control
Volume 2 of 2: AccuGrade

Printed in U.S.A.

COMPONENT LOCATION
Volume 1 of 2 - TRACTOR AND IMPLEMENT CONTROL
Page 1 of 2

Component	Schematic Location	Machine Location
Alarm - Action	B-13	A
Alarm - Backup	C-17	15
Alternator	K-5	11
Antenna	B-15	43
Antenna - Product Link	K18	24
Battery - 12V (1)	I-13	22
Battery - 12V (2)	I-13	22
Block - Fuse	H-11	38
Block - Junction	I-12	22
Breaker - Alternator	H-12	38
Breaker - Drivetrain	I-11	38
Breaker - Eng ECM Switched	I-11	38
Breaker - Eng ECM Unswitched	I-11	38
Buss Bar - C	H-12	22
Buss Bar - D	H-12	38
Buss Bar - E	G-12	38
Buss Bar A	H-12	38
Buss Bar B	H-12	38
Control - ADEM - III Engine	F-3	1
Control - ECB (DS)	G-16	49
Control - ECB (FTC)	J-16	49
Control - EMS III	D-12	A
Control - Shift (DS)	G-18	C
Control - Shift (FTC)	I-18	C
Diode	H-7	3
Diode - Flyback	H-12	38
Heater - Jacket Water	D-4	50
Horn - Fwd Hi	L-3	7
Horn - Fwd Lo	L-3	7
Injector - 1 through 6	H-2	52
Lamp - Action	D-12	A
Lamp - Beacon	J-12	12
Lamp - Cyl Flood Std 1	D-3	6
Lamp - Cyl Flood Std 2	K-3	5
Lamp - Cylinder Flood 1	K-3	5
Lamp - Cylinder Flood 1	C-3	6
Lamp - Dome	B-16	D
Lamp - Fuel Tank Flood 1	A-18	27
Lamp - Fuel Tank Flood 2	A-18	28
Lamp - Fuel Tank Flood Light 1	E-18	27
Lamp - Fuel Tank Flood Light 1 (SL)	C-18	27
Lamp - Fuel Tank Flood Light 2	E-18	28
Lamp - Fuel Tank Flood Light 2 (SL)	B-18	28
Lamp - Gage	C-12	A

Component	Schematic Location	Machine Location
Relay - Prelube	J-7	8
Relay - ROPS Condensor	F-18	41
Relay - Start	H-12	38
Resistor	D-12	A
Resistor - Blower	E-13	A
Resistor - CAN Term	E-16	23
Sender - D7 Fuel Lvl	D-17	26
Sender - Hyd Oil Temp	A-16	50
Sender - TC Out Temp Sw	F-7	1
Sensor - ATM Pressure	H-2	37
Sensor - Brake Position	B-11	35
Sensor - Cam Speed Timing	G-2	3
Sensor - Coolant Temp	H-2	13
Sensor - Crank Speed Timing	G-2	2
Sensor - Decel Pedal Position	A-11	35
Sensor - Direction Sender	G-18	C
Sensor - Direction Sender (FTC)	J-18	C
Sensor - ECPC Xmsn Inpt Spd	G-7	4
Sensor - Engine Oil Press	G-2	37
Sensor - Engine Spd	F-7	3
Sensor - Fuel Press	I-2	37
Sensor - Fuel Temp	H-1	37
Sensor - Inching Pedal Position	B-11	35
Sensor - Inlet Manifold Press	H-2	52
Sensor - Inlet Manifold Temp	H-2	37
Sensor - Left Steering Lever Pos. (FTC)	J-18	C
Sensor - Right Steering Lever Pos. (FTC)	J-18	C
Sensor - Turbo Inlet Press	E-7	47
Sensor - Xmsn Out SP 1 (FTC)	K-17	17
Sensor - Xmsn Out SP 2 (FTC)	K-17	17
Sensor - Xmsn Sump Temp	G-7	48
Solenoid - A/C Clutch	H-7	3
Solenoid - Blade Float Control	A-11	B
Solenoid - D7 Priority Valve	G-7	48
Solenoid - Ether Start Valve	K-4	8
Solenoid - First Gear Clutch	L-17	17
Solenoid - Flexaire Fan	F-7	3
Solenoid - Forward Clutch	L-17	17
Solenoid - Left Brake	H-13	49
Solenoid - Left Steer Clutch	H-13	49
Solenoid - Park Brake Dump	I-13	49
Solenoid - Reverse Clutch	L-17	17
Solenoid - Right Brake	H-13	49
Solenoid - Right Steer Clutch	I-13	49

Machine locations are repeated for components located close together.

A = Located on Dash.

B = Located inside of right console.

C = Located inside of left console.

D = Located around Headliner

COMPONENT LOCATION
Volume 1 of 2 - TRACTOR AND IMPLEMENT CONTROL
Page 2 of 2

Component	Schematic Location	Machine Location
Lamp - LH Fender Flood	J-13	10
Lamp - Light Pipe	D-12	A
Lamp - Light Pipe 2	D-12	A
Lamp - Rear Action	A-14	A
Lamp - RH Fender Flood	A-13	20
Lamp - Ripper Flood	C-17	16
Lamp - ROPS Flood 1	B-18	24
Lamp - ROPS Flood 2	A-17	25
Lamp - ROPS Flood 3	A-18	25
Lamp - ROPS Flood 4	A-17	25
Lamp - ROPS Flood Lamp Std No. 1	E-17	24
Lamp - ROPS Flood Lamp Std No. 2	D-17	25
Lamp - Sweep Flood Side 1 (SL)	B-18	10
Lamp - Sweep Flood Side 2 (SL)	B-18	20
Lamp - WDA Flood 2	J-3	5
Lamp - WDA Flood 2	C-3	6
Lamp - Winch Light	B-15	B
Module - Gage Cluster	C-12	A
Module - Lamp Gear	C-12	A
Motor - Blower 1	E-12	A
Motor - Blower 2	E-12	A
Motor - Console (FTC)	K-18	C
Motor - Front Washer	D-15	34
Motor - Front Wiper	C-15	43
Motor - Left Washer	E-15	34
Motor - Precleaner	J-11	12
Motor - Rear Washer	D-15	34
Motor - Rear Wiper	D-15	46
Motor - Right Washer	D-15	34
Motor - Right Wiper	C-15	45
Motor - ROPS Cond	F-18	42
Motor - ROPS Cond 2	E-18	42
Motor - Seat Suspension	E-15	9
Motor - Starter	J-6	1
Outlet - 12V (1)	F-16	23
Outlet - 12V (2)	F-16	23
Product Link	L-18	23
Radio - 12V	B-15	D
Receptacle - Aux. Start	I-12	22
Relay - Ether Start Aid	K-4	8
Relay - Main	H-12	38
Relay - Precleaner	J-10	12

Component	Schematic Location	Machine Location
Solenoid - Second Gear Clutch	L-17	17
Solenoid - Service Brake Dump	I-13	49
Solenoid - Third Gear Clutch	L-17	17
Solenoid - Winch	C-18	16
Speaker - Left	D-16	D
Speaker - Right	B-16	D
Switch - Reverse (DS)	G-18	C
Switch - 4 Speed Blower	E-14	A
Switch - A/C	D-14	A
Switch - Auto Downshift	C-13	A
Switch - Bi Directional Mode	C-13	A
Switch - Console (FTC)	K-18	C
Switch - Disconnect	I-13	22
Switch - Downshift (DS)	G-18	C
Switch - Downshift (FTC)	I-18	C
Switch - Ether Start Aid	D-13	A
Switch - Flexaire Fan	F-7	3
Switch - Forward Horn	B-14	B
Switch - Front Wiper	C-16	30
Switch - Implememnt Lockout	A-11	B
Switch - Implement Lockout 2	A-11	B
Switch - Key Start	D-13	A
Switch - Lamp	C-14	A
Switch - Left Wiper	C-16	30
Switch - Operator Monitor	C-13	A
Switch - Parking Brake (DS)	F-18	C
Switch - Parking Brake (FTC)	I-18	C
Switch - Prelube Oil Press D7	K-7	51
Switch - PT filter Press. 2	A-16	50
Switch - Rear Flood	C-14	A
Switch - Rear Flood/ Ripper	C-14	A
Switch - Rear Wiper	D-16	30
Switch - Refrigerant	H-7	3
Switch - Reverse (FTC)	J-18	C
Switch - Right Wiper	C-16	30
Switch - Service Brake Pedal	B-12	35
Switch - Throttle	B-13	B
Switch - Upshift (DS)	G-18	C
Switch - Upshift (FTC)	J-18	C
Switch - Winch	A-15	B
Thermostat	E-13	A

Machine locations are repeated for components located close together.

A = Located on Dash.

B = Located inside of right console.

C = Located inside of left console.

D = Located around Headliner

COMPONENT LOCATION
Volume 2 of 2 - ACCUGRADE

Component	Schematic Location	Machine Location
Display - CB420	K-6	B
Joystick	I-13	B
Mast - LH Electric	E-5	Note 1
Mast - RH Electric	E-5	Note 1
Module - A4 M1 Valve	J-10	23
PM400	K-10	23
Radio - GPS	H-16	24
Receiver - LH Laser	E-5	Note 1
Receiver - RH Laser	C-5	Note 1
Resistor - CAN A 1	B-8	40
Resistor - CAN B 1	B-8	40
Resistor - Term Resistor CAN B	J-16	20
Sensor - Hyd Press	D-10	20
Sensor - Inclination	D-5	Note 1
Solenoid - Blade Lower	D-10	20
Solenoid - Blade Raise	D-10	20
Solenoid - Blade Tilt Left	D-10	20
Solenoid - Blade Tilt Right	D-10	20
Solenoid - Boost	C-10	20
Solenoid - Counter Bal Sol1	C-8	44
Solenoid - Counter Bal Sol2	C-8	44

Machine locations are repeated for components located close together.

A = Located on Dash.

B = Located inside of right console.

C = Located inside of left console.

D = Located around Headliner

Note 1: Information of locations not available at publishing

CONNECTOR LOCATION
Volume 1 of 2 - TRACTOR AND IMPLEMENT CONTROL

Connector Number	Schematic Location	Machine Location
CONN 1	G-18	C
CONN 2	C-17	16
CONN 3	C-17	16
CONN 4	D-17	16
CONN 5	E-17	27
CONN 6	E-17	26
CONN 7	F-17	25
CONN 8	F-17	24
CONN 9	A-16	29
CONN 10	C-16	A
CONN 11	C-16	30
CONN 12	D-16	16
CONN 13	E-16	16
CONN 14 - DATALINK SERVICE	E-16	23
CONN 15 - MONITOR SERVICE	E-16	23
CONN 16	K-16	31
CONN 17	K-16	31
CONN 18	L-15	31
CONN 19	A-15	29
CONN 20	A-15	B
CONN 21	B-15	A
CONN 22	D-15	34
CONN 23	G-15	32
CONN 24	H-15	20
CONN 25	L-15	31
CONN 26	A-14	B

Connector Number	Schematic Location	Machine Location
CONN 27	D-13	A
CONN 28	J-13	22
CONN 29	A-12	B
CONN 30	B-12	B
CONN 31	E-11	A
CONN 32	B-11	35
CONN 33	A-10	B
CONN 34	D-10	A
CONN 35	F-10	32
CONN 37	G-10	38
CONN 38	H-10	38
CONN 40	E-9	14
CONN 41	C-7	47
CONN 42	C-7	32
CONN 43	D-7	32
CONN 44	E-7	47
CONN 45	F-7	18
CONN 46	H-6	17
CONN 47	J-7	51
CONN 48	J-7	51
CONN 49	J-7	37
CONN 50	D-4	5
CONN 52	H-3	36
CONN 54	L-4	8
CONN 55	K-3	52
CONN 56	H-2	13

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.

CONNECTOR LOCATION
Volume 2 of 2 - ACCUGRADE

Connector Number	Schematic Location	Machine Location
CONN 57	K-16	20
CONN 58	I-16	54
CONN 59	K-13	B
CONN 60	I-13	B
CONN 61	G-13	23
CONN 62	E-13	20
CONN 63	D-13	20
CONN 64	K-10	23
CONN 65	C-10	55
CONN 66	E-8	56
CONN 67	E-8	56
CONN 68	E-8	57
CONN 69	D-8	57

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.

CID / MID / FMI
Volume 1 of 2 - TRACTOR AND IMPLEMENT CONTROL
Page 1 of 2

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
0280	Transmission Oil Temperature Sender
0324	Action Lamp
0600	Hydraulic Oil Temperature Sensor
0819	Display Data Link
0821	Display Power Supply
0826	Power Train Oil Temperature Sender
1045	Power Train Oil Temperature Sensor
1425	Implement Tank Oil Temperature Sensor

Power Train ECM (MID No. 113)	
CID	**Component**
0070	Parking Brake Switch
0075	Steering System Oil Temperature Sensor
0168	Electrical System
0177	Transmission Oil Temperature Sensor (Sump)
0190	Engine Output Speed Sensor
0254	ECM Fault
0269	5 Volt Sensor Power Supply
0298	Service Brake Petal Switch
0299	Transmission Direction Lever Position Switch
0368	Autoshift Switch
0444	Starter Motor Relay
0468	Service Brake Petal Position Sensor
0490	Hydraulic Lockout Switch
0497	Tilt Right Solenoid
0498	Tilt left Solenoid
0573	Inching Pedal Position Sensor
0618	Parking Brake Switch
0621	Downshift Switch
0622	Upshift Switch
0623	Limit Switch (Direction)
0650	Harness Code
0668	Shift Lever
0671	Transmission Output Speed 1 Sensor
0672	Torque Converter Output Speed Sensor
0673	Transmission Output Speed 2 Sensor
0674	Transmission Intermediate Speed 1 Sensor
0675	Transmission Intermediate Speed 2 Sensor
0676	Left Steer Lever Position Sensor
0677	Right Steer Lever Position Sensor
0681	Parking Brake Solenoid
0689	Left Brake Solenoid
0690	Right Steering Brake Solenoid
0691	Reverse Clutch 1 Solenoid
0692	Forward Clutch 2 Solenoid
0693	Third Gear Clutch 3 Solenoid
0694	Second Gear Clutch Solenoid
0695	First Gear Clutch 5 Solenoid
0697	Priority Valve Solenoid
0698	Left Steering Clutch Solenoid
0699	Right Steering Clutch Solenoid
0718	Transmission Clutch Slippage
0722	Secondary Brake Solenoid Valve
1488	Implement Detent Coil
1870	Thumb Lever Position Sensor
1933	Left Angle Blade Clutch Solenoid
1934	Right Angle Blade Clutch 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.

Tractor Engine Control System (MID No. 036)	
0001	Injector Cylinder 1 short/ open
0002	Injector Cylinder 2 short/ open
0003	Injector Cylinder 3 short/ open
0004	Injector Cylinder 4 short/ open
0005	Injector Cylinder 5 short/ open
0006	Injector Cylinder 6 short/ open
0041	Sensor Power Supply (8DCV) open/ short to + battery/ ground
0091	Throttle Position Signal Abnormal
0100	Engine Oil Pressure open/ short to + battery/ ground
0110	Engine Coolant Temperature open/ short to + battery/ ground
0168	System Voltage high/ low/ erratic
0172	Intake Manifold Air Temp open/short to + battery/ground
0190	Engine Speed Abnormal
0253	Personality Module Mismatch
0261	Engine Timing Offset Fault/ Calibration Rerquired
0262	5 Volt DC Power supply open/short to + battery/ground
0264	Decel Throttle Position Signal Abnormal
0268	Check Programmable Parameters
0273	Turbo Outlet Pressure Abnormal
0274	Atmospheric Pressure open/short to + battery/ground
0275	Right Turbo Inlet Pressure Abnormal
0296	Unable To Communicate With Transmission ECM
0342	Secondary Engine Speed Signal Abnormal
0545	Ether Start Relay open/short to + battery/ground
0799	Need Service Tool Update
1599	Engine Fan Pull Solenoid open/short to + battery/ground
1600	Engine Fan Push Solenoid open/short to + battery/ground

CID / MID / FMI
Volume 1 of 2 - TRACTOR AND IMPLEMENT CONTROL
Page 2 of 2

Monitoring System Operator Modes [1]	
Operator Mode	**D7R D/S [1]**
Service Meter	0
Odometer (total distance)	1
3rd Gear Odometer (forward and reverse distance in 3rd gear)	2
Scrolling	3

Note [1] : The Operator Modes for D7R D/S are applicable to D7R D/S machines with serial numbers of 1500 and higher.

Monitoring System Operator Modes	
Operator Mode	**D7R D/S**
Gear Display	1
Service Meter	2
Tachometer	3

Power Train Event Identifier (EID) Codes

EID	Level	Description	Operator Response
0030	2	Trans Oil Temp High	Check Oil. Modify machine operation in order to reduce system load.
0116	2	PTO Fltr Bypassed	PTO filter Bypass Switch is connected to the EMS III module. Activated when hydraulic oil temperature is greater than 52 °C (125.6 °F) and the switch is open. Change filter.
0155	2	High Torque Converter Oil Temp	Check Oil. Modify machine operation in order to reduce system load.
0467	2	Blade Lift Not In Center	Active when the blade control handle is not in the center position when ANY of these conditions are true: Key switch is turned ON. Engine is cranking. Hydraulic lockout switch is moved from LOCKED to UNLOCKED position. During calibrations. If moving the handle back to center position does not correct the problem, perform the troubleshooting procedure for the lift solenoids. (1)
0468	2	Blade Tilt Not In Center	Active when the blade control handle is not in the center position when ANY of these conditions are true: Key switch is turned ON. Engine is cranking. Hydraulic lockout switch is moved from LOCKED to UNLOCKED position. During calibrations. If moving the handle back to center position does not correct the problem, perform the troubleshooting procedure for the tilt solenoids. (1)
0861	1	Clock Manual Alignment Required	Warning - The ECM internal clock is too far out of alignment with the other control module clocks on the machine. Use the ET service tool in order to manually align the clock with the other control modules.
0878	2	Hyd Oil Temp	Activates at 108 °C (226.4 °F) - Resets at 104 °C (219.2 °F.) Modify machine operation to reduce system load. Check oil level.
0878	3	Hyd Oil Temp	Activates at 114 °C (237.2 °F) - Resets at 112 °C (233.6 °F.) Immediate safe shutdown - Modify machine operation to reduce system load - Check oil level.
1969	3	Trans Lube Temp High	Immediate safe shutdown - Modify machine operation to reduce system load - Check oil level.
2115	2	Implements Locked Diagnostic	Activated when a diagnostic code is active for an implement system component for ANY of the following conditions: Short to battery (solenoids). Low voltage or open (solenoids). Hydraulic lockout switch is faulted. Check active diagnostic codes and correct the problem.

(1) Refer to the Troubleshooting, "Diagnostic Code List" section of the manual and find the diagnostic code that is assigned to the involved solenoid(s).

Event Codes Engine Control	
Event Code	**Condition**
E017	High Engine Coolant Temperature Warning
E025	High Inlet Air Temperature Derate
E027	High Inlet Air Temperature Warning
E035	Loss Of Coolant Flow Warning
E039	Low Engine Oil Pressure Derate
E100	Low Engine Oil Pressure Warning
E190	Engine Overspeed Warning
E265	User Defined Shutdown
E272	Inlet Air Restriction Warning

Monitoring System Service Modes		
Service Mode	**D7R D/S**	**D7R D/S [2]**
Operator Mode Sequence	0	0
Harness Code	1	1
Numeric Readout	2	2
Service	3	3
Digital Tattletale	4	4
Odometer Units (Km to Miles)		5
Calibration 1 (XMSN Control)	6	6
Calibration 2 (XMSN Control)	7	7
Calibration 3 (XMSN Control)	8	8
Charging System Display	9	9

(2) For Serial Numbers 1500 and higher

Related Electrical Service Manuals		
Title		**Form Number**
Alternator:	70A 185-5294 (STD) 75A 189--0768 (ATCH) 100A 176-4257 (ATCH) 100A 194-0849 (ATCH)	RENR1252 SENR7508
Electric Starting Motor:	207-1557 (STD) 6V-5582 6V-0890 (ATCH)	SENR3581 SENR4975 SENR3860
EMS III Caterpillar Monitoring System:	154-7443 (US) 184-7766 (G)	RENR2014
ADEM III Engine Control:	209-9587	RENR1222
Power train Control:	172-9389	SENR8367
AccuGrade Laser System:		RENR8128
AccuGrade GPS System:		RENR8083

CID / MID / FMI
Volume 2 of 2 - ACCUGRADE

Diagnostic Code
AccuGrade Laser System
Display (CB), Electric Mast (EM), Laser Receiver (LR)

Diagnostic Code	Description
Display Fault Messages	
CB 1	Set Limits Fault
CB 2	No Data
CB 3	Calibration Failure
CB 4	Data Error
CB 5	Calibration Failure
CB 6	Wrong Blade Motion
CB 7	Calibration Failure
CB 8	Timeout
CB 9	Calibration Failure
CB 10	Set Limits Fault
CB 11	Low Voltage
CB 12	Hours Lost
CB 13	Calibration Lost. Recalibrate
CB 14	Memory Error. Retune
CB 15	Memory Error. Factory Default
CB 16	Linked Mode Sensor Missing
CB 17	Internal Failure. Cycle Power
CB 18	Network Warning. Check
CB 19	Network Error. Check
CB 23	Uknown Device. Cycle Power
CB 24	Duplicate Left/Right Device
CB 25	Elevation Limit Left
CB 26	Elevation Limit Right
CB 27	Internal Failure. Cycle Power
CB 28	Invalid Serial Number
CB 29	Disconnect Suspected
CB 30	Duplicate Sensor Serial Number
CB 31	Recalibrate Linked Mode Elevation
CB 32	Stop! ECM Disconnected
CB 33	Restore Failed
CB 34	Update Failed
CB 36	Left Laser Receiver Missing
Electric Mast Fault Messages	
EM 1	PCB Fault
EM 2	Limit Switch Fail
EM 15	Motor/Encoder Bad
EM 21	Verify Bench
EM 23	EM 23 EEPROM Fault #23
EM 24	EM 24 EEPROM Fault #24
EM 25	EM 25 EEPROM Fault #25
EM 26	EM 26 EEPROM Fault #26
EM 29	Zero Adjust
EM 30	Motor/Encoder Fault
EM 31	Non Default Configuration
EM 32	Check Connection
Laser Receiver Fault Messages	
LR 20	End Of Travel
LR 21	Check Connection

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.

Component Identifiers (CID[1])
Module Identifier (MID[2])
Diagnostic Codes For The AccuGrade Laser
Implement ECM (MID 114)

CID	Description
0041	8 Volt Sensor Power Supply Voltage
0168	Electrical System Voltage
0248	Cat Data Link Data
0262	5 Volt Sensor Power Supply Voltage
0358	Implement Pilot Supply
0497	Tilt Right Solenoid
0498	Tilt Left Solenoid
0874	Mode Select Switch
0875	Manual Select Switch
1197	Blade Lower Solenoid
1198	Blade Raise Solenoid
2114	Blade Control Handle Trigger Switch
2233	Blade Lower Pilot Pressure
2234	Hydraulic Pump Boost Pressure Solenoid
2235	Counterbalance Valve Bypass Solenoid
2324	Counterbalance Valve #2 Bypass Solenoid

NOTE: For troubleshooting the AccuGrade Laser System, refer to the procedure with the same diagnostic code title.

[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.

SPECIFICATIONS AND RELATED MANUALS
Volume 1 of 2 - TRACTOR AND IMPLEMENT CONTROL

Resistor, Sender and Solenoid Specifications - V1			
Part No.	**Component Description**		**Resistance (Ohms)[1]**
3E-6332	Solenoid :	Ether Start Valve	6
3E-9205	Solenoid :	Flexaire Fan	24.9 ± 0.4
4W-9972	Sender :	Hyd Oil Temp TC Out Temp Sw	54°C (130°F) 638 ±78 110°C (230°F) 77 ± 5
116-6203	Resistor :	Gage Lights	20 ± 1.0
125-9740	Resistor :	Blower	A-C: 2.00 ± .10 B-C: 1.00 ± 0.05 C-D: 0.36 ± 0.02
134-2540	Resistor :	CAN Term	120 ± 12
136-1679	Solenoid :	D7 Priority Valve	31 ± 3.0
157-8851	Sender :	D7 Fuel Lvl	Full Stop: 92 - 98 Empty Stop: 0 - 3.5
172-2392	Solenoid :	Park Brake Dump Service Brake Dump	41.9 ± 2.1
174-4909	Solenoid :	Left Brake Left Steer Clutch Right Brake Right Steer Clutch	8.7 ± 0.4
200-0189	Solenoid :	Blade Float Control	76.3 ± 3.8

[1] At room temperature unless otherwise noted.

Related Electrical Service Manuals		
Title		**Form Number**
Alternator:	70A 185-5294 (STD) 75A 189--0768 (ATCH) 100A 176-4257 (ATCH) 100A 194-0849 (ATCH)	RENR1252 SENR7508
Electric Starting Motor:	207-1557 (STD) 6V-5582 6V-0890 (ATCH)	SENR3581 SENR4975 SENR3860
EMS III Caterpillar Monitoring System:	154-7443 (US) 184-7766 (G)	RENR2014
ADEM III Engine Control:	209-9587	RENR1222
Power train Control:	172-9389	SENR8367
AccuGrade Laser System:		RENR8128
AccuGrade GPS System:		RENR8083

Off Machine Switch Specification - V1				
Part No.	**Function**	**Actuate**	**Deactuate**	**Contact Position**
3E-5464	Thermostat	-1.1 ± 0.8°C (36 ± 1.4°F)	2.2 ± 0.8°C (36 ± 1.4°F)	Normally Closed
105-9152	Switch - Prelube Oil Press D7	30 ± 7kPa (39.9 to 253.8 psi)	30 ± 7kPa (39.9 to 253.8 psi)	Normally Closed
114-5333	Switch - Refrigerant	275 to 1750 kPa[1] (39 to 253.8 psi)	- -	Normally Open[2]

[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.

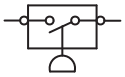
SPECIFICATIONS AND RELATED MANUALS
Volume 2 of 2 - ACCUGRADE

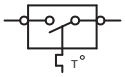
Related Electrical Service Manuals		
Title		**Form Number**
Alternator:	70A 185-5294 (STD) 75A 189--0768 (ATCH) 100A 176-4257 (ATCH) 100A 194-0849 (ATCH)	RENR1252 SENR7508
Electric Starting Motor:	207-1557 (STD) 6V-5582 6V-0890 (ATCH)	SENR3581 SENR4975 SENR3860
EMS III Caterpillar Monitoring System:	154-7443 (US) 184-7766 (G)	RENR2014
ADEM III Engine Control:	209-9587	RENR1222
Power train Control:	172-9389	SENR8367
AccuGrade Laser System:		RENR8128
AccuGrade GPS System:		RENR8083

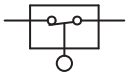
Resistor, Sender and Solenoid Specifications V2		
Part No.	**Component Description**	**Resistance (Ohms)[1]**
134-2540	Resistor : CAN A 1 CAN B 1 Term Resistor CAN B	120 ± 12.0
235-4605	Solenoid : Blade Lower Blade Raise Blade Tilt Left Blade Tilt Right Boost	5 ± 0.3

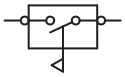
HARNESS and WIRE
Electrical Schematic Symbols

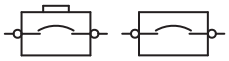
Symbols


Pressure Symbol


Temperature Symbol

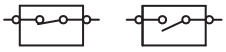

Level Symbol

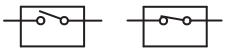

Flow Symbol

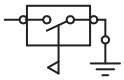

Circuit Breaker Symbol

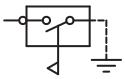
Symbols and Definitions

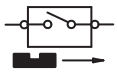

Fuse: A component in an electrical circuit that will open the circuit if too much current flows through it.

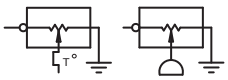

Switch (Normally Open): A switch that will close at a specified point (temp, press, etc.). The circle indicates that the component has screw terminals and a wire can be disconnected from it.

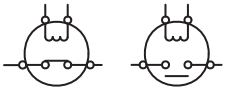

Switch (Normally Closed): A switch that will open at a specified point (temp, press, etc.). No circle indicates that the wire cannot be disconnected from the component.

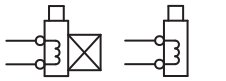

Ground (Wired): This indicates that the component is connected to a grounded wire. The grounded wire is fastened to the machine.

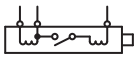

Ground (Case): This indicates that the component does not have a wire connected to ground. It is grounded by being fastened to the machine.


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.

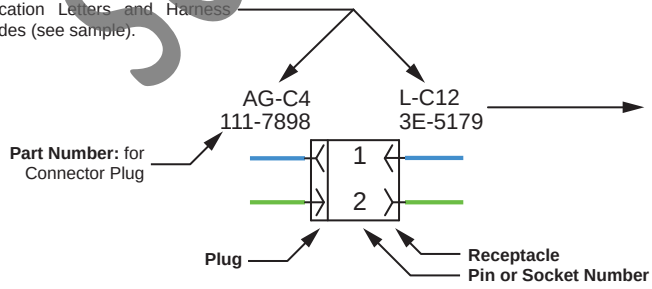

Relay (Magnetic Switch): A relay is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close the switch part of the relay.

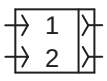

Solenoid: A solenoid is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close a valve or move a piece of metal that can do work.


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.

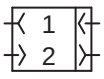
Harness and Wire Symbols

Wire, Cable, or Harness Assembly Identification: Includes Harness Identification Letters and Harness Connector Serialization Codes (see sample).

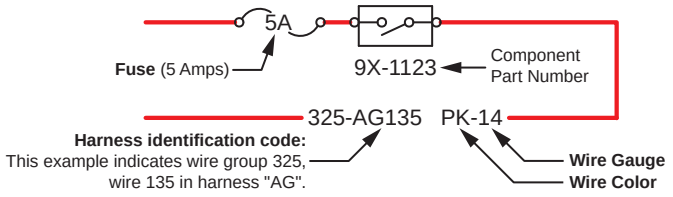


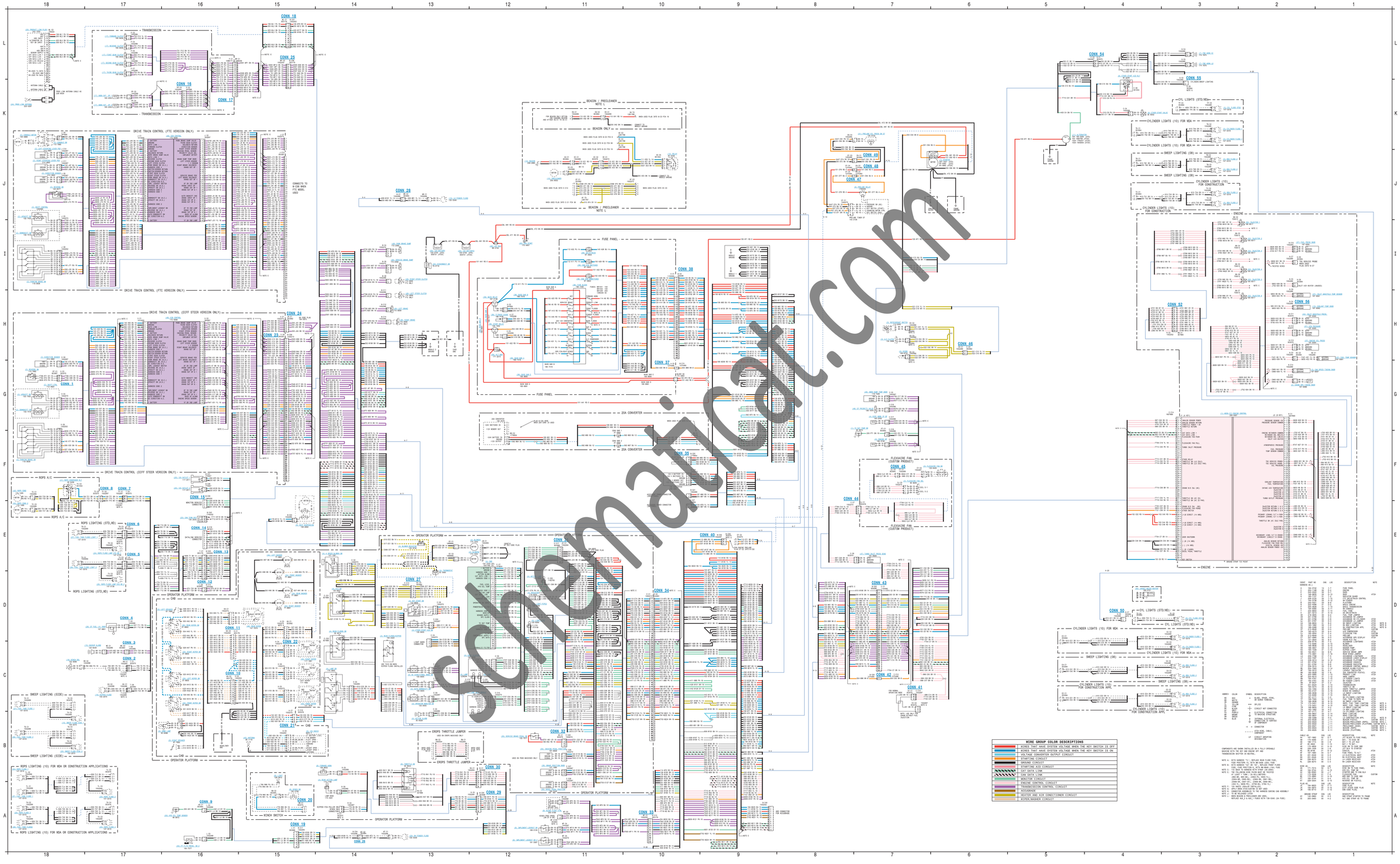


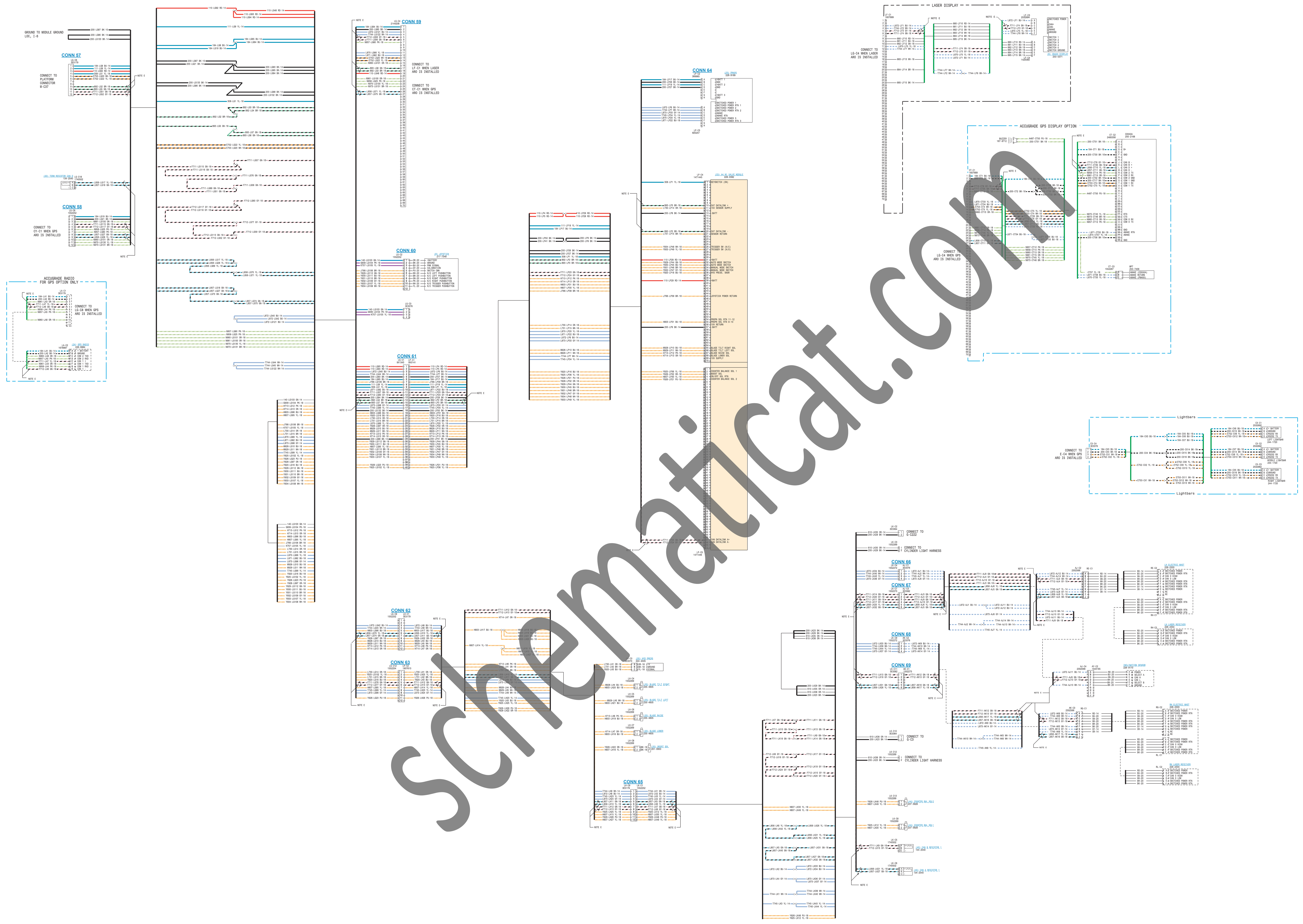
Deutsch connector: Typical representation of a Deutsch connector. The plug contains all sockets and the receptacle contains all pins.



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







WIRE GROUP COLOR DESCRIPTIONS	
(red)	WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS OFF.
(blue)	WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS ON.
(black)	GROUND CIRCUIT.
(green/black stripe)	CAT DATA LINK.
(pink/black stripe)	CAN DATA LINK (ACCUGRADE).
(orange stripe)	VALVE CONTROL CIRCUIT.
(light green stripe)	ACCUGRADE (RADIO).
(purple)	DRIVE TRAIN CONTROL CIRCUIT.
(light blue/black stripe)	CAN DATA LINK D (GPS).
(orange/black stripe)	ACCUGRADE (GPS LIGHT BARS).
(light blue)	ACCUGRADE CONTROL CIRCUIT.

ABBREV	COLOR
RD	RED
WH	WHITE
OR	ORANGE
YL	YELLOW
PK	PINK
BK	BLACK
GY	GREY
PU	PURPLE
BR	BROWN
GN	GREEN
BU	BLUE

SYMBOL	DESCRIPTION
∘	BLADE, SPADE, RING, OR SCREW TERMINAL
⊸∘	SPLICE
+	CIRCUIT NOT CONNECTED
(ground symbol)	ELECTRICAL CONNECTION TO MACHINE STRUCTURE
(ground symbol)	INTERNAL ELECTRICAL CONNECTION TO SURFACE OF COMPONENT
⤙ ⟵	CONNECTOR
_ _ _ _	ATCH WIRE, CABLE, COMPONENT
L#	CIRCUIT GROUPING DESIGNATION

COMPONENTS ARE SHOWN INSTALLED ON A FULLY OPERABLE MACHINE WITH THE KEY AND ENGINE OFF AND TRANSMISSION SHIFTER IN NEUTRAL.

NOTE A: WITH HARNESS "TL", REPLACE REAR FLOOD FUSE, FUSE POSITOPN 10, WITH 8M-0456 (20A) FUSE
NOTE B: WITH HARNESS "CA" OR "CE", REPLACE FRONT FLOOD FUSE, FUSE POSITION 6, WITH 8M-8948 (15A) FUSE
NOTE C: TIE BACK TO HARNESS WITH STRAP (3S-2093)
NOTE E: THE FOLLOWING WIRE PAIRS MUST BE TWISTED AT LEAST 1 TURN / 25 MILLIMETERS:
(892-BR, 893-GN), (E902-PU, E903-YL),
(E904-BR, E905-BU), (E900-WH, E901-GN),
(E906-OR, E907-GY), (E908-BR, E909-WH),
(450-YL, G939-PK), (E793-BU, E794-YL)
NOTE F: 12V RADIO (DEALER INSTALLED)
NOTE G: APPLY WHEN ATCH/CUSTOM IS NOT USED
NOTE H: CONNECTOR ASSEMBLED TO THE HARNESS DURING CAB ASSEMBLY
NOTE J: TO BE RELEASED LATER
NOTE L: WHEN BEACON & PRECLEANER ARE USED, REPLACE AUX_3 & AUX_1 FUSES WITH 139-5345 (5A FUSE)

IDENT	PART NO	CHG	LOC	DESCRIPTION	NOTE	
HARNESS AS.}						
A	164-3742	14	I-7	FUSE PANEL		
C	250-1168	00	D-4	ENGINE		
E	240-0322	02	D-7	DASH		
H	169-9635	04	D-13	ROOF	ATCH	
G	185-7157	01	I-2	RADIATOR GUARD		
J	206-3720	02	I-15	FTC DRIVETRAIN CONTROL		
L	164-3736	04	A-12	RH FENDER		
M	240-0321	03	B-9	PLATFORM		
N	222-4086	01	D-2	BASIC ENGINE		
P	205-4626	01	I-13	BASIC TRANSMISSION		
R	194-9380	02	A-11	RH CONSOLE		
T	234-6850	00	C-14	FUEL TANK		
X	221-3213	01	H-14	DS DRIVETRAIN		
AE	218-4605	00	G-2	FUEL TEMP JUMPER		
AH	251-5766	00	C-3	ACCUGRADE RH JUMPER		
AK	251-5766	00	D-6	ACCUGRADE RH CYLINDER	ATCH	
AJ	251-5767	00	D-3	ACCUGRADE LH JUMPER	ATCH	
CA	168-8655	01	B-2	RH SWEEP LIGHTING	ATCH	NOTE B
CC	183-1982	02	C-2	RH WDA LIGHTING	ATCH	NOTE B
CE	189-5368	02	C-4	RH CONSTRUCTION APPL	ATCH	NOTE B
CF	213-6948	00	H-5	PRELUBE	CUSTOM	
CH	183-4273	03	G-4	AIR COMPRESSOR	ATCH	
CJ	195-5934	01	E-4	FLEXXAIRE FAN	CUSTOM	
CN	213-6949	01	I-5	PRELUBE	CUSTOM	
CT	257-4980	00	H-3	ACCUGRADE GPS DISPLAY	ATCH	
CV	121-2844	02	B-4	CRANK W/O INJ		
CX	256-8776	00	F-5	ACCUGRADE LIGHTBARS	ATCH	
EE	172-9290	02	E-10	BLOWER	ATCH	
HA	169-9636	02	D-13	HEADLINER	ATCH	
HH	186-4857	03	E-10	WASHER PUMP	ATCH	
KA	190-1028	01	C-14	RIPPER LIGHT	ATCH	
KK	164-9541	04	B-9	SERVICE BRAKE JMPR		
KW	170-4891	02	C-19	REAR WINCH JUMPER		
LA	256-7789	01	F-5	ACCUGRADE LIGHTBARS	ATCH	
LF	242-7097	01	I-4	ACCUGRADE LASER DISPLAY	ATCH	
LG	239-3313	04	H-12	ACCUGRADE PLATFORM	ATCH	
LH	251-5762	01	C-9	ACCUGRADE CHASSIS	ATCH	
LK	251-5764	01	B-6	ACCUGRADE RADIATOR	ATCH	
LP	239-3315	03	E-9	ACCUGRADE CONTROL MODULE	ATCH	
ME	204-7563	01	C-14	BACKUP ALARM PIGTAIL		
MF	195-3312	05	A-7	LOCKOUT INDICATOR		
MG	185-5628	02	F-8	20A CONVERTER PIGTAIL	ATCH	
ML	202-0985	02	I-13	PRODUCT LINK	ATCH	
MP	254-6510	01	I-12	XMSN JUMPER		
MR	184-4761	00	I-10	LH FENDER LIGHTS	ATCH	
MT	184-4761	00	A-11	RH FENDER LIGHTS	ATCH	
NN	4P-9537	07	E-3	INJECTOR		
PP	241-8424	00	I-14	TRANSMISSION		
RA	160-5574	05	B-10	THROTTLE SW		
RN	194-1094	00	B-13	EROPS THROTTLE JUMPER	ATCH	
RW	165-0107	04	A-19	WINCH RH CONSOLE	ATCH	
TA	186-0636	02	C-15	LH SWEEP LIGHTING	ATCH	
TC	124-8490	04	F-15	ROPS AC	ATCH	
TE	167-2171	01	C-2	RH CYLINDER LIGHTING	ATCH	
TF	199-7065	00	F-14	FUEL TANK TO ROPS AC	ATCH	
TG	186-0636	02	B-15	RH SWEEP LIGHTING	ATCH	
TH	175-0451	05	A-15	ROPS, FUEL TANK LIGHTING	ATCH	NOTE A
TL	175-0451	05	A-15	ROPS, FUEL TANK LIGHTING	ATCH	NOTE A
TM	168-8655	01	H-2	LH SWEEP LIGHTING	ATCH	NOTE B
TN	183-1982	02	H-2	LH WDA LIGHTING	ATCH	NOTE B
TP	167-2171	01	H-1	LH CYLINDER LIGHTING	ATCH	
TR	185-9607	03	E-14	ROPS LIGHTING	ATCH	
TV	185-9607	03	E-14	ROPS LIGHTING	ATCH	
TX	189-5368	02	H-3	LH CONSTRUCTION APPL	ATCH	NOTE B
XA	253-8326	00	J-11	BEACON PIGTAIL	CUSTOM	NOTE L
XC	253-8323	00	J-11	BEACON/PRECLEANER (ROPS)	CUSTOM	NOTE L
XE	253-8322	00	J-11	BEACON/PRECLEANER (PLATFORM)	CUSTOM	NOTE L
XF	253-8321	00	J-11	PRECLEANER (DASH)	CUSTOM	NOTE L
XG	253-8324	00	K-11	BEACON (ROPS)	CUSTOM	NOTE L
XH	253-8325	00	K-11	BEACON (PLATFORM)	CUSTOM	NOTE L

CABLE AS.		CHG	LOC	DESCRIPTION	NOTE
AA	167-1882	02	G-7	JCT BLOCK TO FUSE PANEL	
AM	170-4068	01	I-10	BAT.- TO DISC SW	
AN	189-1715	00	I-9	BAT.+ TO JCT BLK	
AP	8V-0622	00	I-10	BAT.+ TO BAT.-	
AR	170-4859	01	H-10	DISC SW TO CASE GND	
AW	229-1509	00	I-9	JCT BLK TO STARTER	
HC	9U-8746	01	B-12	COAXIAL	ATCH
HF	167-1880	04	G-7	FUSE PANEL TO ALT	
RE	231-0049	00	D-3	LH ELECTRICAL MAST	ATCH
RG	231-0049	00	C-3	RH ELECTRICAL MAST	ATCH
RH	226-9270	00	D-3	LH LASER RECEIVER	ATCH
RL	226-9270	00	C-3	RH LASER RECEIVER	ATCH

WIRE AS.		CHG	LOC	DESCRIPTION	NOTE
AG	171-7215	02	G-7	DISC SW TO FUSE PANEL	
AH	164-3744	01	A-13	HYD OIL TEMP SW	
AV	185-6393	00	J-7	STARTER GND TO ENG BLK	
CY	173-3208	01	F-4	FLEXXAIRE FAN	CUSTOM
MC	172-4860	01	H-10	MOD GND TO CASE GND	
PT	164-3744	01	G-4	HYD OIL TEMP SW	
RT	229-5354	00	G-15	REVERSE SW PIGTAIL	

PLUG AS.		CHG	LOC	DESCRIPTION	NOTE
JE	184-6633	02	E-11	CODE PLUG	
JK	184-0870	00	H-15	DIFF STEER CODE PLUG	
JM	195-8710	01	E-12	EMS CODE PLUG}	

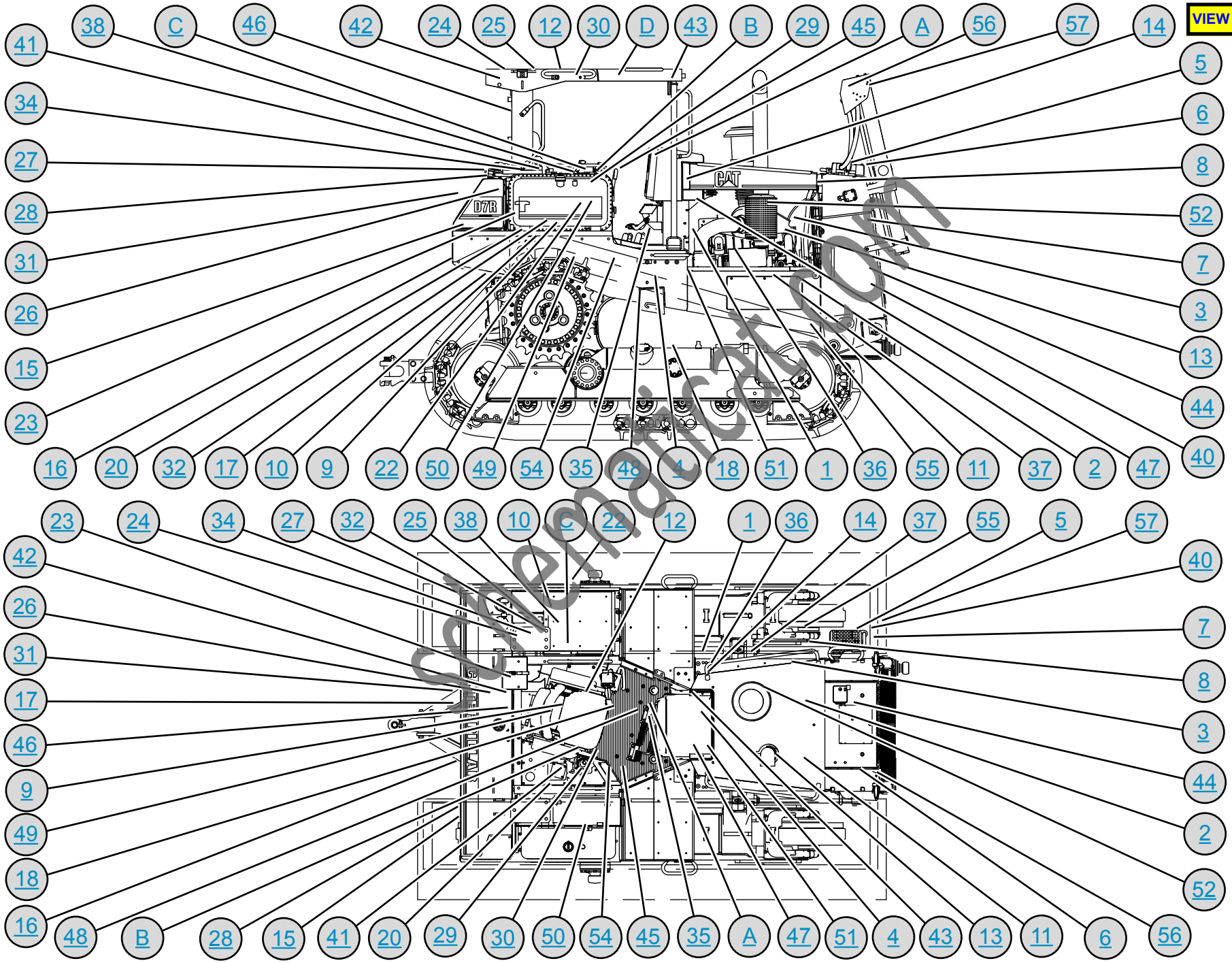
	GROUND STRAP	CHG	LOC	DESCRIPTION
AY	140-0860	00	H-3	GND STRAP STARTER TO FRAME
CE	203-0463	00	H-2	ALT GND STRAP AS TO FRAME

THIS DIAGRAM IS FOR THE D7R SERIES II
FTC TRACTOR MODELS T881, T882, & T883 AND
DIFFERENTIAL STEER TRACTOR MODELS T884, T885,
& T886
PART NUMBER 291-3971
(PRODUCTION: OCT 2004)

VOLUME 2 of 2

MACHINE HARNESS CONNECTOR AND COMPONENT LOCATIONS

VIEW ALL CALLOUTS



ACCUGRADE

VIEW ALL CALLOUTS