CATERPILLAR®

UENR2444
July 2012

UENR2444 VOL 1 of 5
42 Page, (Dimensions: 56 inches x 35 inches)

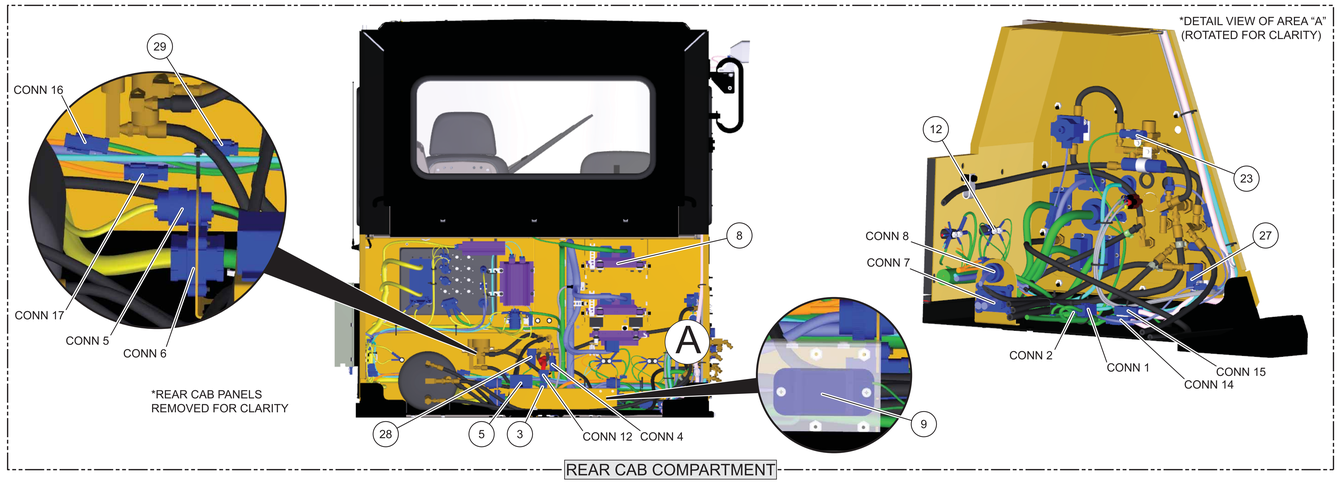
Schematic

785C Off-Highway Truck Electrical System

APX1832-2033

Volume 1 of 5: Cab (Interior and Brake Control)

Printed in U.S.A.



REAR CAB COMPARTMENT

Off-Machine Switch Specification

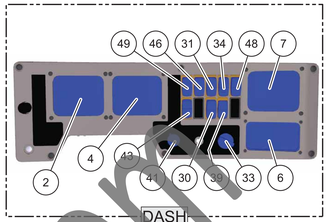
Part No.	Function	Actuate	Deactuate	Contact Position
103-4977	Retarder Pressure	60 kPa MAX (8.70 psi)	28 kPa ± 15 kPa (4.06 psi ± 2.18 psi)	Normally Open Below Deactuation Pressure

Resistor, and Solenoid Specifications

Part No.	Component Description		Resistance (Ohms)*
125-9740	Resistor Blower		A-C 2 (Ohms) ± 5% B-C 1 (Ohms) ± 5% C-D 0.36 (Ohms) ± 5%
185-0008	Solenoid	Horn	71.5 (Ohms) ± 2 (Ohms)
189-2461	Solenoid	Front Brake Cooling Diverter	42.4 (Ohms) ± 2.1 (Ohms)

Related Electrical Service Manuals

Title	Form Number
Cross Reference for Electrical Connectors:	REHS0070
Brake Control:	SENR1503



DASH

**Component Identifiers (CID*)
Module Identifier (MID*)
Brake ECM
(MID 116*)**

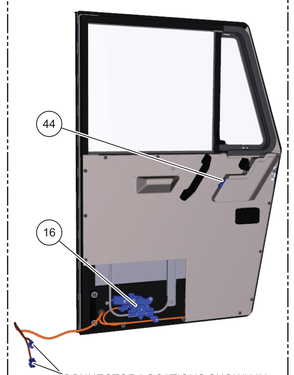
CID	Component
0066	Speed Sensor (Machine Ground Speed)
0091	Position Sensor (Throttle)
0168	Electrical System Voltage
0190	Speed Sensor (Engine)
0248	CAT Data Link
0269	Sensor Power Supply
0297	Solenoid Valve (Engine Cooling Fan)
0298	Electronic Control Module (Transmission/Chassis ECM)
0541	Pressure Sensor (Differential Oil)
0543	Speed Sensor (Engine Cooling Fan)
0599	Electronic Control Module (Engine)
0607	Speed Sensor (Left Wheel)
0608	Speed Sensor (Right Wheel)
0689	Solenoid Valve (Left Rear Traction Control)
0690	Solenoid Valve (Right Rear Traction Control)
0700	Position Sensor (Transmission Gear)
0701	Speed Sensor (Transmission Output)
0702	Position Sensor (Transmission Shift Lever)
0704	Pressure Switch (Service Brake)
0710	Solenoid Valve (Auto Retarder Supply)
0711	Solenoid Valve (Auto Retarder Control)
0712	Indicator Lamp (Retarder)
0713	Rocker Switch (Auto Retarder)
0714	Pressure Switch (Auto Retarder)
0715	Pressure Switch (Retarder)
0719	Proportional Solenoid Valve (Traction Control)
0742	Relay (Brake Lamp)
0796	Solenoid (Differential Fan)
0800	VIMS Information Monitoring System (VIMS)
0835	Temperature Sensor (Differential Oil)
0849	Pressure Sensor (Air System)
0966	Indicator Lamp (Traction Control)
0967	Machine Application
1235	Pressure Sensor (Left Parking Brake Oil)
1236	Pressure Sensor (Right Parking Brake Oil)
1239	Speed Sensor (Brake Cooling Pump)
1240	Solenoid (Brake Cooling Pump)
1231	Solenoid (Front Brake Cooling Diverter)
1232	Solenoid (Rear Axle Diverter)
1326	Incorrect Location Code
1417	Solenoid (Rear Axle Supply)

*The CID is a diagnostic code that indicates which circuit is faulty.
The FMI is a diagnostic code that indicates which electronic control module diagnosed the fault.
*For the Brake ECM, the MID is 116. This chart pertains only to diagnostic codes with a MID of 116.

Failure Mode Identifiers (FMI)*

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.

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



DRIVERS DOOR

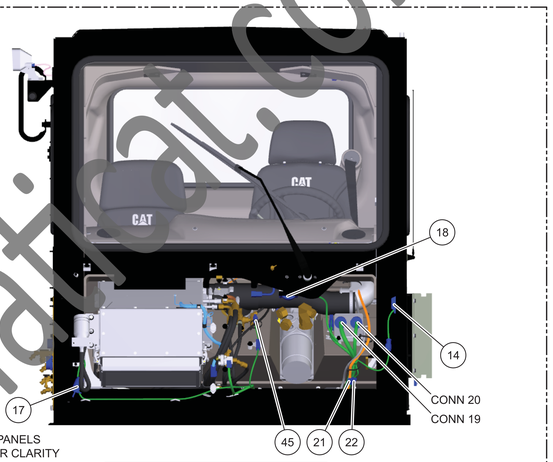
Connector Location

Connector Number	Schematic Location
CONN 1	I-16
CONN 2	H-16
CONN 3	A-15
CONN 4	D-15
CONN 5	J-14
CONN 6	J-14
CONN 7	F-14
CONN 8	E-14
CONN 9	A-14
CONN 10	A-13
CONN 11	A-12
CONN 12	B-3
CONN 13 - **12V POWER PORT**	B-7
CONN 14	C-7
CONN 15	C-7
CONN 16	J-5
CONN 17	I-6
CONN 18	A-5
Motor - Washer	H-4
CONN 20	G-4
CONN 21 - **COMM RADIO**	F-4
CONN 22	B-4
CONN 23	A-4
CONN 24 - **TO PAS HARNESS**	A-4
CONN 25 - **12V POWER PORT**	B-3

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.

Component Location

Component	Schematic Location	Machine Location
Alarm - VIMS Action	D-5	1
Control - Gauge Cluster	D-1	2
Control - Rear Axle Pump	H-16	3
Control - Speedometer / Tachometer	D-1	4
Control - Steering Bleed	H-16	5
Control - VIMS Keypad	C-1	6
Control - VIMS Message Center	C-1	7
ECM - Brake	G-12	8
Flasher AS	G-16	9
Ground - Cab	A-16	10
Ground - Chassis	A-16	11
Ground Brea - Rear Cab	H-10	12
Ground Strap AS	A-16	13
Module - Wiper Delay	I-1	14
Motor - Blower	B-3	15
Motor - Power Window	I-3	16
Motor - Washer	H-1	17
Motor - Wiper	I-1	18
Outlet - 24V Power	A-11	19
Resistor - Blower	B-3	20
Resistor - LH Turn	J-1	21
Resistor - RH Turn	J-1	22
Sensor - Brake Air Pressure	E-16	23
Sensor - Hoist Lever Position	B-7	24
Sensor - Throttle Position	B-2	25
Sensor - Transmission Lever Position	A-7	26
Solenoid - Front Brake Cooling Diverter	E-16	27
Solenoid - Horn	F-11	28
Suppressor - Horn Solenoid Arc	F-11	29
Switch - A/C Enable	F-1	30
Switch - ARC	E-1	31
Switch - Backup Lamp	D-5	32
Switch - Blower	F-1	33
Switch - Brake Retract	E-1	34
Switch - Dome Lamp	D-7	35
Switch - Fog Lamp	C-5	36
Switch - Hazard Lamp	C-5	37
Switch - Headlamp	C-5	38
Switch - Heated Mirror	E-1	39
Switch - Horn	I-1	40
Switch - Key	G-1	41
Switch - Ladder Lamp	D-5	42
Switch - Panel Dimmer	F-1	43
Switch - Power Window	J-3	44
Switch - Retarder Pressure	J-1	45
Switch - Starting Aid	F-1	46
Switch - Steering Column	H-1	47
Switch - TCS Test	E-1	48
Switch - Throttle Backup / Lock	F-1	49
Thermistat - HVAC	B-3	50



FRONT CAB COMPARTMENT

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.

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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).

Harness Identification Letter(s) (A, B, C, ... AA, AB, AC, ...)

Harness Connector Serialization Code: The "-" is the "Harness Connector" and the number indicates which connector in the harness (C1, C2, C3, ...).

AG-G4 11I-7898 — L-C12 3E-5179 — L-C13 3E-5179

Part Number: for Connector Plug — **Part Number:** for Connector Receptacle

Plug — Receptacle — Pin or Socket Number

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

Fuse (5 Amps)—3A—SX-1123—Component Part Number

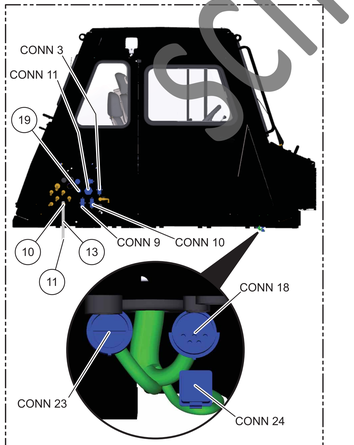
Sure-Seal connector: Typical representation of a Sure-Seal connector. The plug and receptacle contain both pins and sockets.

Harness identification code — This example indicates that pin 325 in harness "AG" — 325-AG135 PK-14 — Wire Gauge, Wire Color

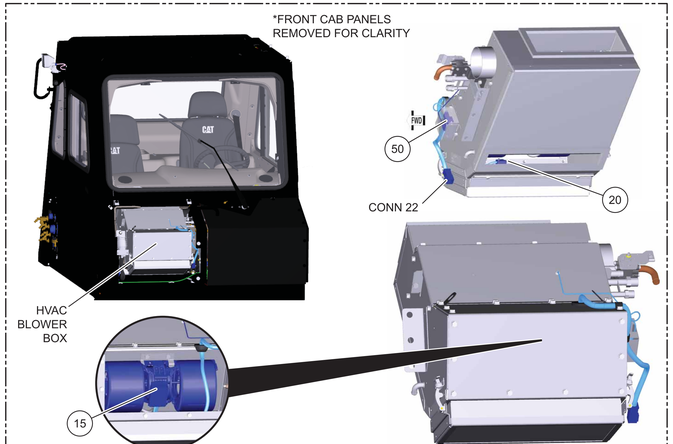
CENTER CONSOLE AND SEATS

STEERING WHEEL

COMM RADIO CONNECTION

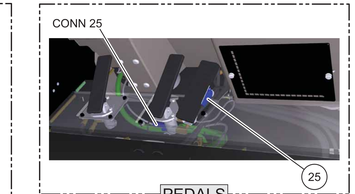


CAB TO CHASSIS CONNECTIONS

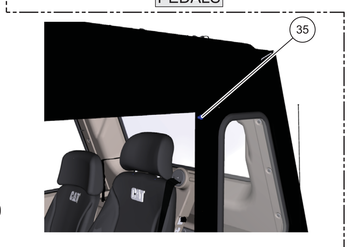


HVAC BLOWER BOX

HEADLINER



PEDALS



NOTE A: NORMALLY OPEN WHEN DOOR IS CLOSED

NOTE B: DO NOT ADD ADDITIONAL CURRENT LOAD TO THIS SWITCH.

IDENT	PART NUMBER	CHG	LOC	DESCRIPTION	NOTE
HARNESS AS					
A	351-6553	00	B-4	A/C	
AG	362-2157	00	D-13	MAIN CAB	
AM	160-5073	01	B-9	CENTER CONSOLE	
AN	351-4427	03	H-3	DASH	
UU	346-4855	01	C-7	HEADLINER	
YY	346-4853	01	J-6	POWER WINDOW	
WIRE AS					
CA	164-5393	01	D-15	RAC JUMPER	

SYMBOL	DESCRIPTION
┼●	CIRCUIT CONNECTED
┼	CIRCUIT NOT CONNECTED
⏚	ELECTRICAL CONNECTION TO MACHINE STRUCTURE
⏚	INTERNAL ELECTRICAL CONNECTION TO SURFACE OF COMPONENT
→)—	CONNECTOR
H#	CIRCUIT GROUPING DESIGNATION
- - -	ATCH WIRE, CABLE, COMPONENT
○–○	SPLICE
○	BLADE, SPADE, RING OR SCREW TERMINAL

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

The following wire pairs must be twisted at least 1 turn per 25mm:

- 892 & 893
- C413 & C414
- E793 & E794
- F418 & F419
- C413 & C414 & E708
- C413 & E708 & E972

CALLOUTS

Callout Number (Machine Location from Component Locations Table) → (52) VALVE GP - CONTROL ← Component Name
138-1234 ← Part Number

WIRE GROUP COLOR DESCRIPTIONS
GROUND CIRCUIT
WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS OFF
WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS ON
VOLTAGE CONVERTER OUTPUT CIRCUIT
STARTING CIRCUIT
STARTING AID CIRCUIT
TRANSMISSION / CHASSIS CONTROL CIRCUIT
MONITOR CIRCUIT
BRAKE CONTROL CIRCUIT
ENGINE CONTROL CIRCUIT
HEATER AND AIR CONDITIONER CIRCUIT
TURN SIGNAL / WIPER WASHER CIRCUIT
CAT DATA LINK
RS-232 DATA LINK
OTHER COLOR DESCRIPTIONS
HIGHWAYS

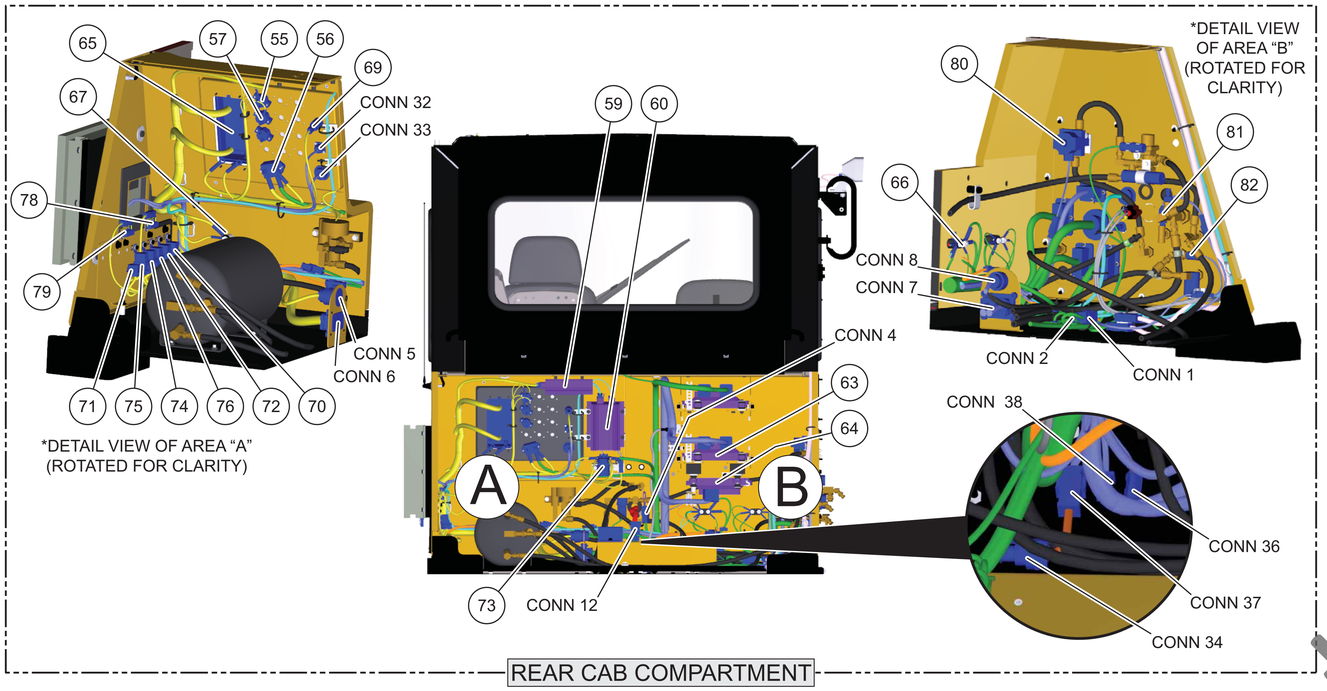
THIS SCHEMATIC IS FOR THE 785C OFF-HIGHWAY TRUCK ELECTRICAL SYSTEM
VOLUME 1 of 5: CAB (INTERIOR AND BRAKE CONTROL)

MEDIA NUMBER: UENR2444

SCHEMATIC PART NUMBER: 321-6340, CHANGE: 01, VERSION: -

Components are shown installed on a fully operable machine with the key and engine off, transmission shifter in neutral and with parking brake set.

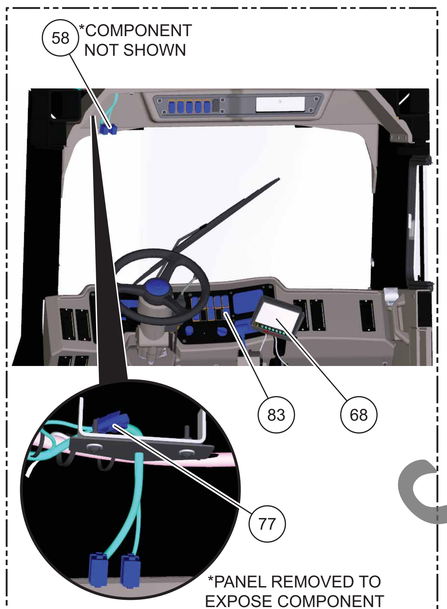
Refer to the appropriate Service Manual for Troubleshooting, Specifications and Systems Operations.



Component Identifiers (CID[1]) Module Identifier (MID[2]) VIMS ECM (MID No. 049)	
0041	Sensor Power Supply (+8 Volt)
0075	Steering Oil Temperature Sensor
0096	Fuel Level Sensor
0171	Ambient Air Temperature Sensor
0248	Cat Data Link
0267	Remote Shutdown Input
0271	Action Alarm
0279	Front Aftercooler Coolant Temperature Sensor
0296	Transmission Electronic Control Module
0324	Lamp (Action)
0379	Auto Lube Pressure Sensor
0431	Steering Oil Level Sensor
0533	Auto Retarder Electronic Control Module
0590	Engine Electronic Control Module
0654	Trailer Right Brake Oil Temperature Sensor
0655	Trailer Left Brake Oil Temperature Sensor
0656	Trailer Brake Cooler Inlet Temperature Sensor
0657	Trailer Brake Cooler Outlet Temperature Sensor
0658	Trailer Right Strut Pressure Sensor
0659	Trailer Left Strut Pressure Sensor
0703	Trailer Door Position Sensor
0809	Speedometer/Tachometer Module (No. 1)
0810	Speedometer/Tachometer Module (No. 2)
0811	Gauge Cluster (No. 1)
0812	Gauge Cluster (No. 2)
0813	Gauge Cluster (No. 3)
0814	Gauge Cluster (No. 4)
0815	Message Center (No. 1)
0816	Message Center (No. 2)
0817	ECM Backup Battery
0819	Display Data Link
0820	Keypad Data Link
0821	Display Power Supply (12 Volts)
0823	Lamp (Service Indicator)
0824	Lamp (Truck Payload) (Green)
0825	Lamp (Truck Payload) (Red)
0833	Rear Brake Oil Temperature Sensor
0838	Left Front Suspension Cylinder Pressure Sensor
0839	Right Front Suspension Cylinder Pressure Sensor
0840	Left Rear Suspension Cylinder Pressure Sensor
0841	Right Rear Suspension Cylinder Pressure Sensor
0852	Right Front Brake Oil Temperature Sensor
0853	Left Front Brake Oil Temperature Sensor
0854	Right Rear Brake Oil Temperature Sensor
0855	Left Rear Brake Oil Temperature Sensor
0890	Telemetry Data Link
1421	Rear Engine Electronic Control Module
1422	Front Engine Electronic Control Module

Transmission / Chassis ECM (MID No. 030)	
CID	Component
0168	Electrical System
0177	Temperature Sensor (Transmission Oil)
0190	Speed Sensor (Engine)
0248	CAT Data Link
0269	Sensor Power Supply
0378	Solenoid Valve (Automatic lubrication)
0444	Start Relay
0585	Speed Sensor (Transmission Output 1)
0590	Electronic Control Module (Engine)
0627	Brake Switch (Parking)
0672	Speed Sensor (Torque Converter Output)
0673	Speed Sensor (Transmission Output 2)
0681	Solenoid Valve (Parking Brake)
0700	Sensor (Transmission Gear)
0701	Speed Sensor (Transmission Output)
0702	Position Sensor (Shift Lever)
0704	Pressure Switch (Service Brake)
0707	Solenoid Valve (Upshift)
0708	Solenoid Valve (Downshift)
0709	Solenoid Valve (Lockup Clutch)
0718	Transmission System
0724	Solenoid Valve (Body Raise)
0725	Solenoid Valve (Body Lower)
0773	Rotary Position Sensor (Hoist Lever)
0800	Vital Information Management System (VIMS)
0826	Temperature Sensor (Torque Converter Oil)
0967	Machine Application
1175	Body Position Sensor
1236	Lamp (Body Up Indicator)
1326	Location Code
1427	Lamp (Machine Lockout)

[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.



FRONT INSIDE CAB

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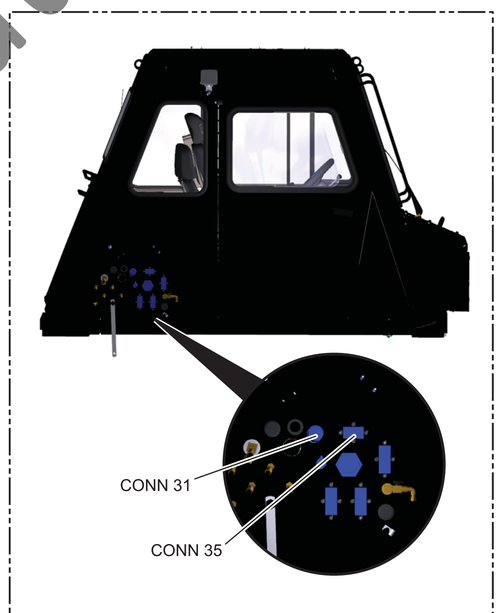
LH DIGITAL PAYLOAD DISPLAY

Related Electrical Service Manuals	
Title	Form Number
Cross Reference for Electrical Connectors:	REHS0970
VIMS Control:	RENR2631
Transmission/ Chassis Control:	SENR1502



CAB TO CHASSIS CONNECTIONS

Off-Machine Switch Specification				
Part No.	Function	Actuate	Deactuate	Contact Position
111-9563	Service Brake Pressure	80 kPa MAX (11.60 psi)	55 kPa ± 20 kPa (7.98 psi ± 2.90 psi)	Normally Closed Below Deactuation Pressure
242-8903	Parking Brake Pressure	517 kPa ± 35 kPa (74.98 psi)	448 kPa ± 35 kPa (64.98 psi ± 5.08 psi)	Normally Open

CATERPILLAR®

UENR2444
July 2012

Schematic

785C Off-Highway Truck Electrical System

APX1832-2033

Volume 2 of 5: Cab / Transmission/Chassis Control and Relay/Breaker Panel)

Printed in U.S.A.

Harness And Wire Electrical Schematic Symbols

Symbols

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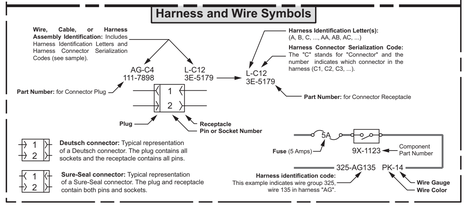
Harness and Wire Symbols



Component Location					
Component	Schematic Location	Machine Location	Component	Schematic Location	Machine Location
Breaker - A/C	B-8	55	Relay - Brake Retract	E-8	70
Breaker - Alternator	C-8	56	Relay - Heated Mirror Timer	F-8	71
Breaker - Brake Retract	B-8	57	Relay - High Beam	E-8	72
Control - CIODS	F-4	58	Relay - Main Power	B-8	73
Converter - 20A 1	F-8	59	Relay - Window 1	F-8	74
Converter - 20A 2	F-6	60	Relay - Window 2	F-8	75
Display - LH Digital Payload (ATCH)	F-3	61	Relay - Wiper	E-8	76
ECM - RAC (ATCH) ***NOT SHOWN**	A-7	62	Resistor - CIODS CAN 1	F-4	77
ECM - Transmission / Chassis	C-2	63	Resistor - Starting Aid 1	D-8	78
ECM - VIMS	F-3	64	Resistor - Starting Aid 2	D-8	79
Fuse and Relay Block AS	D-8	65	Solenoid - Auto Lube	A-4	80
Ground - Cab	E-6	66	Switch - Parking Brake Pressure	C-3	81
Ground Boss - Fuse Block	D-6	67	Switch - Service Brake Pressure	C-3	82
Monitor - Rear Vision	C-4	68	Switch - WAVS	D-4	83
Outlet - 12V Power	B-8	69			

Connector Location	
Connector Number	Schematic Location
CONN 1	F-6
CONN 2	D-6
CONN 4	B-7
CONN 5	E-6
CONN 6	E-6
CONN 7	D-4
CONN 8	D-2
CONN 12	A-2
CONN 31	F-4
CONN 32 - **CAB SERIAL DNLOAD PORT**	E-4
CONN 33 - **ET SERVICE CONN**	E-4
CONN 34 - **TELEMETRY DNLOAD PORT**	E-4
CONN 35	A-4
CONN 36 - **MINESTAR, XIM, TC900**	E-2
CONN 37	E-2
CONN 38 - **CUSTOM 3RD PARTY ATCH**	D-2

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.

Resistor Specifications		
Part No.	Component Description	Resistance (Ohms)[1]
174-3016	Resistor CIODS CAN 2	120 (Ohms) ± 10 %

[1] At room temperature unless otherwise noted.

UENR2444 VOL 2 of 5
30 Page, (Dimensions: 39 inches x 28 inches)

UENR2444 VOL 2 of 5
30 Page, (Dimensions: 39 inches x 28 inches)

CAT INTEGRATED OBJECT DETECTION SYSTEM (CIODS)

VIMS

REAR VISION

TRANSMISSION/CHASSIS CONTROL

RELAY AND CIRCUIT BREAKER PANEL

RAC (ATCH)

UNDERSTUDY POWER FUSE	FUNCTION	SWITCHED POWER FUSE	FUNCTION
SLOT F40	VIMS CONTROL	SLOT F20	TRANSMISSION CONTROL
SLOT F39	AUDIO CONTROL	SLOT F19	WIPER
SLOT F38	LOW BEAM	SLOT F18	VIMS MESSAGE
SLOT F37	DOG LAMP		
SLOT F36	LADDER LAMP	SLOT F16	ACR DRIVER
SLOT F35	HEADLAMP CONTROL	SLOT F15	HORN
SLOT F34	KEY SWITCH	SLOT F14	PRELUBE
SLOT F33	STOP LAMP/DIME LAMP	SLOT F13	POWER WINDOWS
SLOT F32	HIGH BEAM	SLOT F12	BRAKE CONTROL
SLOT F31	START ACR	SLOT F11	
SLOT F30	24V POWER PORT	SLOT F10	SPARE
SLOT F29	CONVERTER		
SLOT F28	POWERED ACCESS STACOMA7	SLOT F8	CCPT FAN
		SLOT F6	HEATED MIRROR

IDENT	PART NUMBER	CHG	LOC	DESCRIPTION	NOTE
				HARNESS AS	
T	362-2150	00	F-6	FUSEBLOCK	
W	346-4857	00	D-6	WAVS	ATCH
AF	230-9202	00	E-6	VIMS TELEMETRY	
CE	351-4429	01	E-4	ECM	
CH	192-7413	01	B-7	ROAD ANALYSIS CONT	ATCH
CM	349-1159	01	F-6	C10DS	ATCH

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

SYMBOL	DESCRIPTION
	CIRCUIT-CONNECTED
	CIRCUIT-NOT CONNECTED
	ELECTRICAL CONNECTION TO MACHINE STRUCTURE
	INTERNAL ELECTRICAL CONNECTION TO SURFACE OF COMPONENT
	CONNECTOR
H#	CIRCUIT GROUPING DESIGNATION
	ATCH WIRE, CABLE, COMPONENT
	SPLICE
	BLADE, SPADE, RING OR SCREW TERMINAL

The following wire pairs must be twisted at least 1 turn per 25mm:

892 & 893	
C415 & E972	
E793 & E794	
F418 & F419	
C413 & C414 & E708	

CALLOUTS

Callout Number — (Machine Location from Component Locations Table) — (52) VALVE GP - CONTROL — Component Name

138-1234 — Part Number

WIRE GROUP COLOR DESCRIPTIONS

- GROUND CIRCUIT
- WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS OFF
- WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS ON
- VOLTAGE CONVERTER OUTPUT CIRCUIT
- STARTING CIRCUIT
- STARTING AID CIRCUIT
- TRANSMISSION / CHASSIS CONTROL CIRCUIT
- MONITOR CIRCUIT
- BRAKE CONTROL CIRCUIT
- ENGINE CONTROL CIRCUIT
- TURN SIGNAL / WIPER WASHER CIRCUIT
- CAN A DATA LINK
- CAT DATA LINK
- RS-232 DATA LINK
- CIODS CAN DATA LINK 1
- CIODS CAN DATA LINK 2

OTHER COLOR DESCRIPTIONS

- HIGHWAYS

THIS SCHEMATIC IS FOR THE 785C OFF-HIGHWAY TRUCK ELECTRICAL SYSTEM

VOLUME 2 of 5: CAB (TRANSMISSION/CHASSIS CONTROL AND RELAY/BREAKER PANEL)

MEDIA NUMBER: UENR2444

SCHEMATIC PART NUMBER: 321-6340, CHANGE: 01, VERSION: -

Components are shown installed on a fully operable machine with the key and engine off, transmission shifter in neutral and with parking brake set.

Refer to the appropriate Service Manual for Troublehooting, Specifications and Systems Operations.

UENR2444
July 2012

CATERPILLAR®

Schematic

785C Off-Highway Truck Electrical System

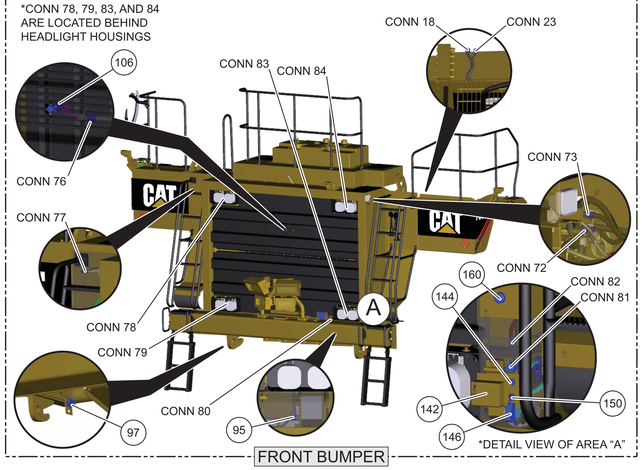
APX1832-2033

Volume 3 of 5: Chassis (Main)

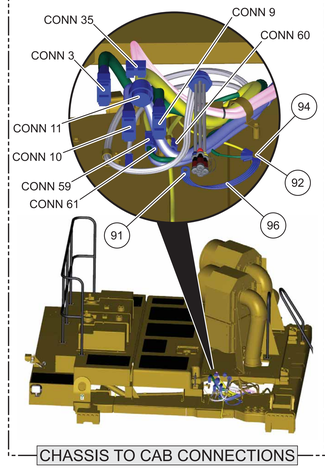
Printed in U.S.A.

UENR2444 VOL 3 of 5
42 Page, (Dimensions: 56 inches x 35 inches)

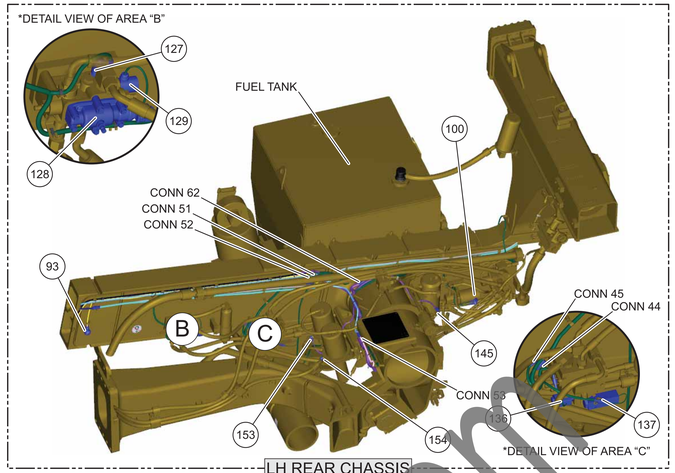
*CONN 78, 79, 83, AND 84 ARE LOCATED BEHIND HEADLIGHT HOUSINGS



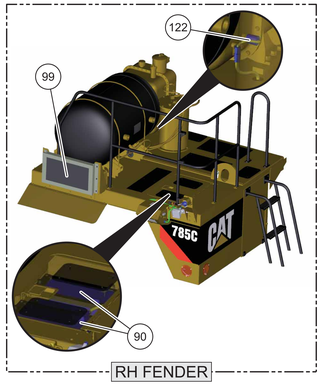
FRONT BUMPER



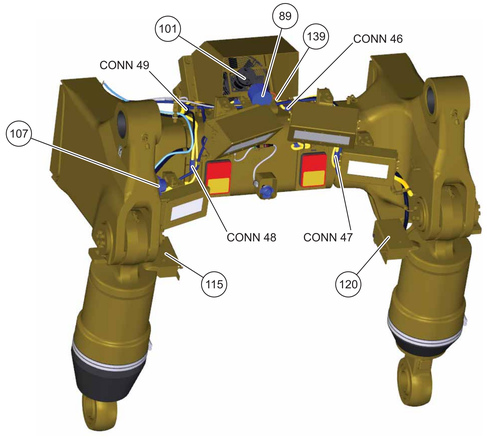
CHASSIS TO CAB CONNECTIONS



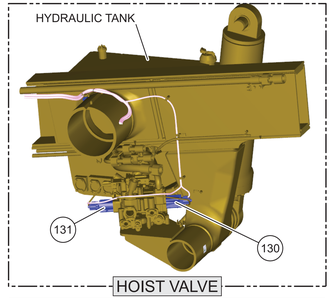
LH REAR CHASSIS



RH FENDER



REAR CHASSIS

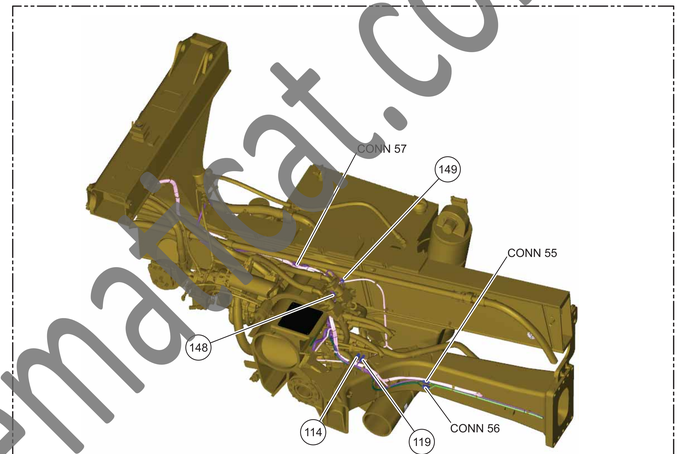


HOIST VALVE

Component Location

Component	Schematic Location	Machine Location
Air Dryer A/S	A-6	89
Alarm - Backup	E-16	89
Batteries - LH / RH	A-4	90
Ground - Cab	J-6	91
Ground - Chassis	J-6	92
Ground Boss - Chassis 1	E-14	93
Ground Boss - Chassis 2	I-11	94
Ground Boss - Chassis 3	F-1	95
Ground Strap A/S	J-6	96
Junction Block A/S	D-4	97
Module - A/C Protection	F-6	98
Monitor - RH Digital Payload (ATCH)	B-2	99
Motor - Brake Retract	F-10	100
Motor - Differential Cooling Fan (ATCH)	E-16	101
Motor - Prelube (ATCH)	E-3	102
Relay - Prelube (ATCH)	E-3	103
Sensor - Actual Gear	G-13	104
Sensor - Aftercooler Coolant Level	F-3	105
Sensor - Ambient Air Temperature	H-1	106
Sensor - Body Position	G-16	107
Sensor - Differential Oil Temperature	E-14	108
Sensor - Differential Pump Outlet Pressure	E-14	109
Sensor - Fuel Level	G-13	110
Sensor - Jacket Water Coolant Level	F-3	111
Sensor - LH Front Brake Oil Temperature	A-9	112
Sensor - LH Front Strut Pressure	J-8	113
Sensor - LH Rear Brake Oil Temperature	B-12	114
Sensor - LH Rear Strut Pressure	F-16	115
Sensor - LH Wheel Speed	E-14	116
Sensor - RH Front Brake Oil Temperature	A-9	117
Sensor - RH Front Strut Pressure	C-3	118
Sensor - RH Rear Brake Oil Temperature	B-12	119
Sensor - RH Rear Strut Pressure	C-16	120
Sensor - RH Wheel Speed	C-14	121
Sensor - Steering Oil Temperature	H-8	122
Sensor - Torque Converter Output Speed	E-12	123
Sensor - Transmission Oil Temperature	A-9	124
Solenoid - A/C Comp Clutch *NOT SHOWN	F-5	125
Solenoid - Air Start	G-7	126
Solenoid - ARC Bleed	G-15	127
Solenoid - ARC Control	G-15	128
Solenoid - ARC Supply	G-15	129
Solenoid - Body Lower	C-11	130
Solenoid - Body Raise	C-11	131
Solenoid - Downshift	E-12	132
Solenoid - Lockup Clutch	E-13	133
Solenoid - Starting Aid	G-5	134
Solenoid - Steering Bleed	G-7	135
Solenoid - TCS 4-Way	B-15	136
Solenoid - TCS Proportional	B-15	137
Solenoid - Upshift	E-12	138
Suppressor - Differential Cooling Fan Arc	E-16	139
Switch - A/C High Pressure	E-6	140
Switch - A/C Low Pressure	E-6	141
Switch - Battery Disconnect	F-1	142
Switch - Differential Oil Level Plugged	E-14	143
Switch - Engine Oil Pressure		144
Switch - Front Brake Wear		145
Switch - Ground Level Control	F-16	146
Switch - High Steering Pressure	G-6	147
Switch - Hoist Inside Screen	B-11	148
Switch - Hoist Outside Screen	B-11	149
Switch - Ladder Lamp	G-1	150
Switch - LH Differential Oil Level	D-14	151
Switch - Parking Brake		152
Switch - Rear Brake Wear Overstroke		153
Switch - Rear Brake Wear Overstroke	F-16	154
Switch - RH Differential Oil Level	D-14	155
Switch - Torque Converter Inlet Filter Press.	A-12	156
Switch - Torque Converter Outlet Screen	H-10	157
Switch - Transmission Oil Filter	B-9	158
Switch - Transmission Oil Level	F-1	159
Switch - VIMS Service Key		160

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



RH REAR CHASSIS

Solenoid Specifications

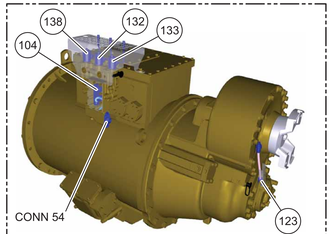
Part No.	Component Description		Resistance (Ohms)*
37-0262	Solenoid	TCS Proportional	16
57-4434	Solenoid	Air Start	1.7
90-3566	Solenoid	TCS 4-Way	(Coil 5) 12.8 ± 0.4 (Coil 5) 24.9 ± 0.4
123-8773	Solenoid	Starting Aid	3
149-2458	Solenoid	Steering Bleed	32.6 ± 1.6
184-0967	Solenoid	ARC Supply	32.6 ± 1.6
198-4564	Solenoid	A/C Compressor Clutch	
302-3909	Solenoid	Upshift Downshift Lockup Clutch	32.6 ± 1.6 12.5

* At room temperature unless otherwise noted.

Off Machine Switch Specification

Part No.	Function	Actuate	Deactivate	Contact Position
114-8333	A/C HIGH Pressure	2175 to 1750 kPa* (29.9 to 253.8 psi)	?	Normally Open*
149-8371	A/C LOW Pressure	193 to 138 kPa (10.45 ± 2.05 psi)	34.5 ± 7.0 kPa (5.0 ± 1.0 psi)	Normally Open

* With increasing pressure the closed condition can be maintained up to 2900 kpa (400 psi), with decreasing pressure the closed condition can be maintained down to 170 kpa (25psi).
* Contact position at the contacts of the harness connector.



TRANSMISSION

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 Letter(s), Harness Connector Serialization Codes (see sample):

AG-C4 111-7998 | LC12 3E-5179 | LC12 3E-5179

Harness Identification Letter(s): (A, B, C, ... AA, AB, AC, ...)

Serialization Color Code: The "C" stands for "Connector" and the number indicates which connector in the harness (C1, C2, C3, ...).

Part Number: for Connector Plug

Part Number: for Connector Receptacle

Plug | Receptacle | Pin or Socket Number

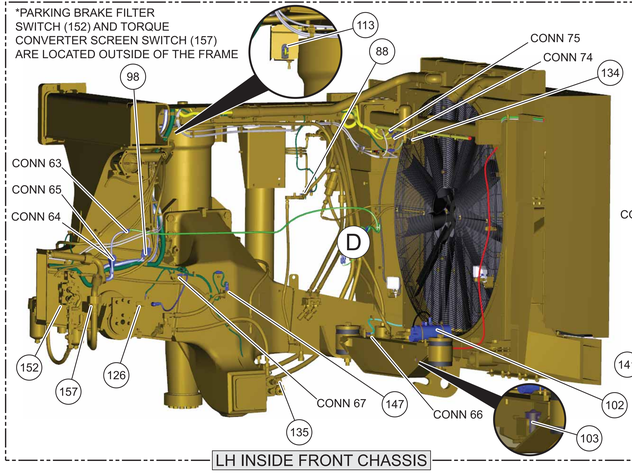
Deutsch connector: Typical representation of a Deutsch connector. The plug contains all sockets and the receptacle contains all pins.

Fuse (5 Amps) | Component | **Part Number**

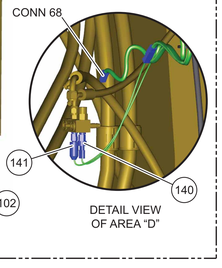
Sure-Seal connector: Typical representation of a Sure-Seal connector. The plug and receptacle contain both pins and sockets.

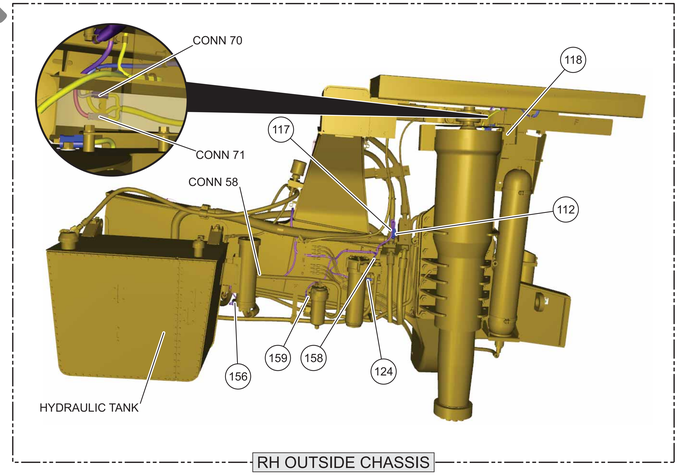
Harness Identification code. This example indicates wire gage 325, wire 135 in harness "PK".

325-AG135 | PK-14 | **Wire Gauge** | **Wire Color**



LH INSIDE FRONT CHASSIS

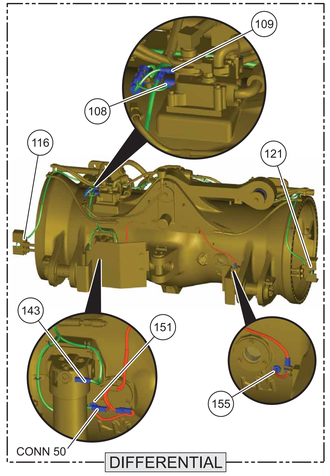




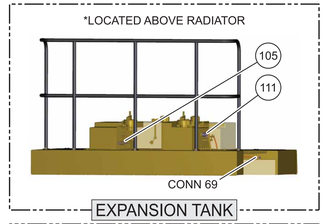
RH OUTSIDE CHASSIS

Connector Location

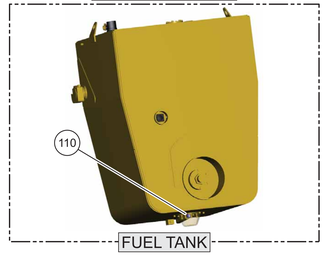
Connector Number	Schematic Location
CONN 3	J-13
CONN 9	J-11
CONN 10	J-10
CONN 11	J-9
CONN 20	J-2
CONN 23	J-2
CONN 35	J-7
CONN 44	B-15
CONN 45	B-15
CONN 46	D-15
CONN 47	E-15
CONN 48	E-15
CONN 49	F-15
CONN 50	D-14
CONN 51	F-13
CONN 52	F-13
CONN 53	G-13
CONN 54	D-12
CONN 55	C-12
CONN 56	C-12
CONN 57	B-12
CONN 58	A-11
CONN 59	I-11
CONN 60	I-11
CONN 61	I-11
CONN 62	E-15
CONN 63	F-9
CONN 64	F-6
CONN 65	F-7
CONN 66	F-7
CONN 67	H-7
CONN 68	E-5
CONN 69	F-4
CONN 70	B-3
CONN 71	B-3
CONN 72	G-3
CONN 73	G-3
CONN 74	H-3
CONN 75	H-3
CONN 76	H-2
CONN 77	D-2
CONN 78	E-1
CONN 79	F-1
CONN 80	G-1
CONN 81 - VIMS GND LVL SERIAL PORT	G-1
CONN 82	G-1
CONN 83	H-1
CONN 84	H-1



DIFFERENTIAL



EXPANSION TANK



FUEL TANK

UENR2444 VOL 3 of 5
42 Page, (Dimensions: 56 inches x 35 inches)

IDENT	PART NUMBER	CHG	LOC	DESCRIPTION	NOTE
HARNESS AS.					
F	348-5404	00	F-9	CAB TO ENGINE	
J	324-0843	01	D-12	ACTUAL GEAR SWITCH	
K	154-8313	05	J-7	TRANSMISSION	
M	185-2340	01	F-10	VIMS REAR	
N	185-2343	01	F-13	REAR LIGHTING	
P	185-2342	03	C-12	TCS/DIFF OIL FILTER	
V	164-3172	02	G-13	BODY POSITION SENSOR	
W	227-5906	01	H-2	VIMS AIR TEMPERATURE	
AE	185-2336	01	F-7	GROUND LEVEL SHUTDOWN	
AH	154-9520	03	D-14	REAR DIFF OIL LEVEL	
AJ	154-8772	03	D-2	RH TURN LAMP	
AP	185-2338	01	H-3	LH LADDER	
AR	227-5907	02	J-9	MAIN POWER	
CC	185-2341	02	G-3	HEADLAMP	
CK	201-1120	01	F-9	A/C PROTECTION MODULE	
CR	230-1481	00	B-3	RH DIGITAL PAYLOAD DISPLAY	ATCH
CT	228-0935	01	B-3	RH PAYLOAD LAMPS	ATCH
CU	133-5942	01	E-5	A/C COMPRESSOR	
CV	185-2339	01	G-13	REAR PAYLOAD	
EE	185-2337	02	F-4	VIMS COOLANT LEVEL	
HH	308-3111	00	J-13	VIMS FRONT CHASSIS	
JJ	110-6150	02	G-1	VIMS SERV KEY SWITCH	
MM	216-0101	01	G-1	SERVICE LAMP JUMPER	ATCH
NN	363-5994	00	F-15	REAR LAMP JUMPER	
CABLE AS.					
X	315-1535	00	A-4	BATTERY TO JUNCTION BLOCK AS	
Y	116-7156	02	F-1	DISCONNECT SW TO GND	
Z	315-1533	00	D-4	JUNCTION BLOCK AS TO DISC SW	
AC	116-7161	02	E-3	PRE-LUBE POWER	ATCH
AU	117-5883	02	A-4	BATTERY NEG TO BATTERY POS	
AV	315-1534	00	E-3	PRE-LUBE GROUND	ATCH
AY	116-7159	05	E-3	PRE-LUBE RELAY TO MOTOR	ATCH

NOTE A: NORMALLY OPEN BEFORE REFRIGERANT CHARGE.
NOTE B: NOT USED ON MACHINES WITH AIR START.
NOTE C: USED ON MACHINES WITH AIR START ONLY.

CALLOUTS

Callout Number (Machine Location from Component Locations Table) → (52) VALVE GP - CONTROL ← Component Name
138-1234 ← Part Number

SYMBOL	DESCRIPTION
┼ (dot)	CIRCUIT CONNECTED
┼	CIRCUIT NOT CONNECTED
⏚	ELECTRICAL CONNECTION TO MACHINE STRUCTURE
⏚ (dashed)	INTERNAL ELECTRICAL CONNECTION TO SURFACE OF COMPONENT
→)—	CONNECTOR
H#	CIRCUIT GROUPING DESIGNATION
- - -	ATCH WIRE, CABLE, COMPONENT
o–o	SPLICE
o	BLADE, SPADE, RING OR SCREW TERMINAL

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

The following wire pairs must be twisted at least 1 turn per 25mm:
892 & 893
E793 & E794
F418 & F419

WIRE GROUP COLOR DESCRIPTIONS

- GROUND CIRCUIT
- WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS OFF
- WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS ON
- STARTING CIRCUIT
- STARTING AID CIRCUIT
- TRANSMISSION / CHASSIS CONTROL CIRCUIT
- MONITOR CIRCUIT
- BRAKE CONTROL CIRCUIT
- ENGINE CONTROL CIRCUIT
- HEATER AND AIR CONDITIONER CIRCUIT
- TURN SIGNAL / WIPER WASHER CIRCUIT
- CAT DATA LINK
- RS-232 DATA LINK

OTHER COLOR DESCRIPTIONS

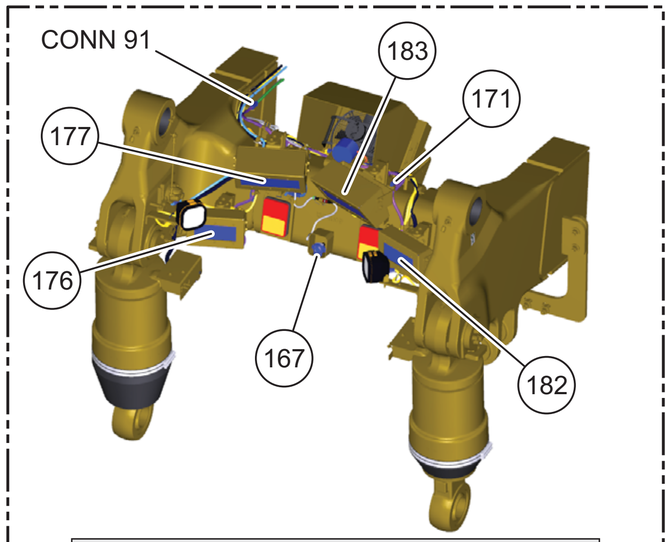
- HIGHWAYS

THIS SCHEMATIC IS FOR THE 785C OFF-HIGHWAY TRUCK ELECTRICAL SYSTEM
VOLUME 3 of 5: CHASSIS (MAIN)
MEDIA NUMBER: UENR2444
SCHEMATIC PART NUMBER: 235-3402, CHANGE: 01, VERSION: -
Components are shown installed on a fully operable machine with the key and engine off, transmission shifter in neutral and with parking brake set.
Refer to the appropriate Service Manual for Troubleshooting, Specifications and Systems Operations.

Component Location					
Component	Schematic Location	Machine Location	Component	Schematic Location	Machine Location
Camera - Front	D-3	165	Sensor - LH Front Short Range Radar	E-2	175
Camera - LH	F-4	166	Sensor - LH Rear Mid Range Radar	B-7	176
Camera - Rear	A-7	167	Sensor - LH Rear Short Range Radar	B-7	177
Camera - RH	B-4	168	Sensor - LH Top Mid Range Radar	F-1	178
Ground Boss - Chassis	F-6	169	Sensor - RH Bottom Mid Range Radar	C-1	179
Resistor - CIODS CAN 1	D-2	170	Sensor - RH Front Mid Range Radar	D-2	180
Resistor - CIODS CAN 2 "A"	A-7	171	Sensor - RH Front Short Range Radar	D-2	181
Resistor - CIODS CAN 2 "B"	C-3	172	Sensor - RH Rear Mid Range Radar	A-7	182
Sensor - LH Bottom Mid Range Radar	F-1	173	Sensor - RH Rear Short Range Radar	B-7	183
Sensor - LH Front Mid Range Radar	E-2	174	Sensor - RH Top Mid Range Radar Sensor	C-1	184

Connector Location	
Connector Number	Schematic Location
CONN 31	F-5
CONN 90	E-6
CONN 91	A-5
CONN 92	A-4
CONN 93	C-4
CONN 94	D-4
CONN 95	D-4
CONN 96	F-3
CONN 97	C-3

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.



CIODS TAIL CASTING OPTION

CATERPILLAR®

UENR2444
July 2012

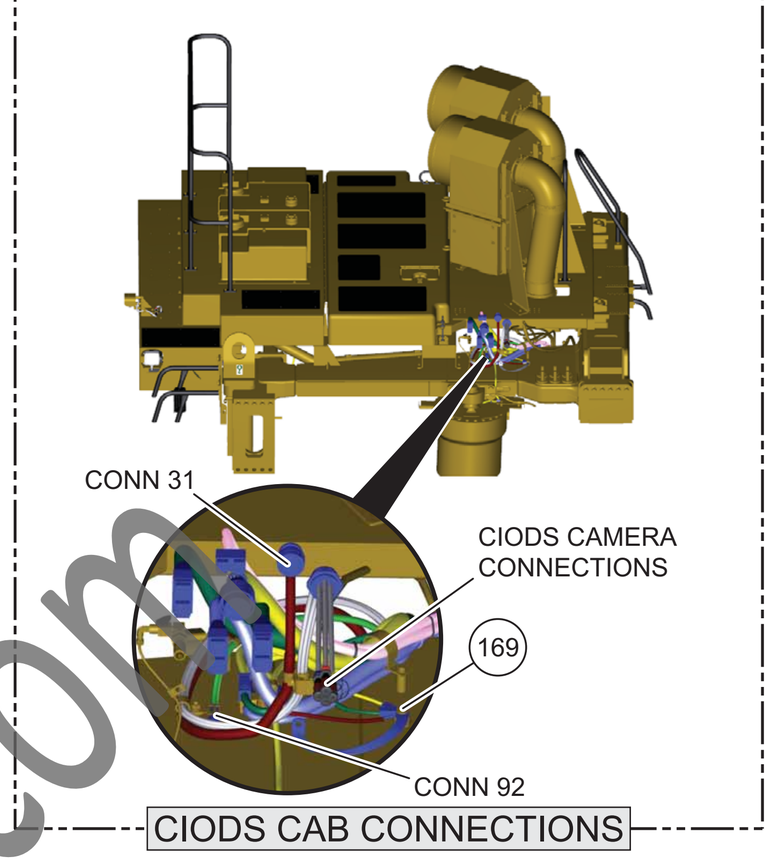
Schematic

785C Off-Highway Truck Electrical System

APX1832-2033

Volume 4 of 5: Chassis (CAT Integrated Object Detection System - CIODS)

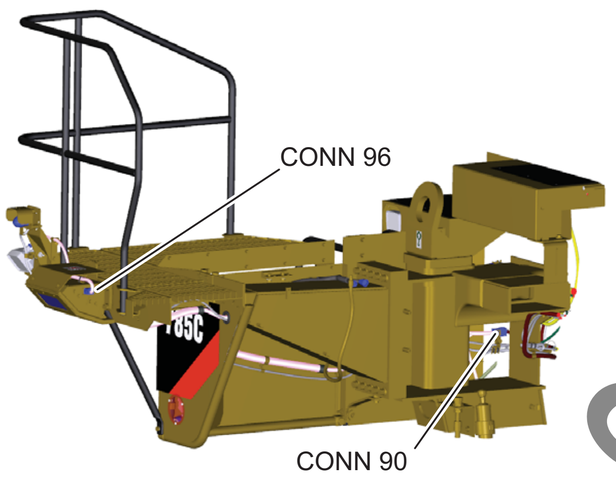
Printed in U.S.A.

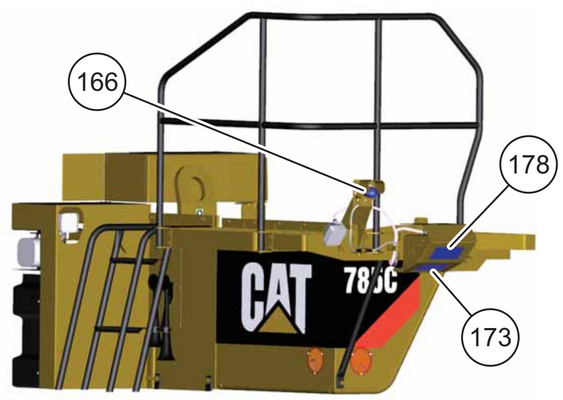


CIODS CAB CONNECTIONS

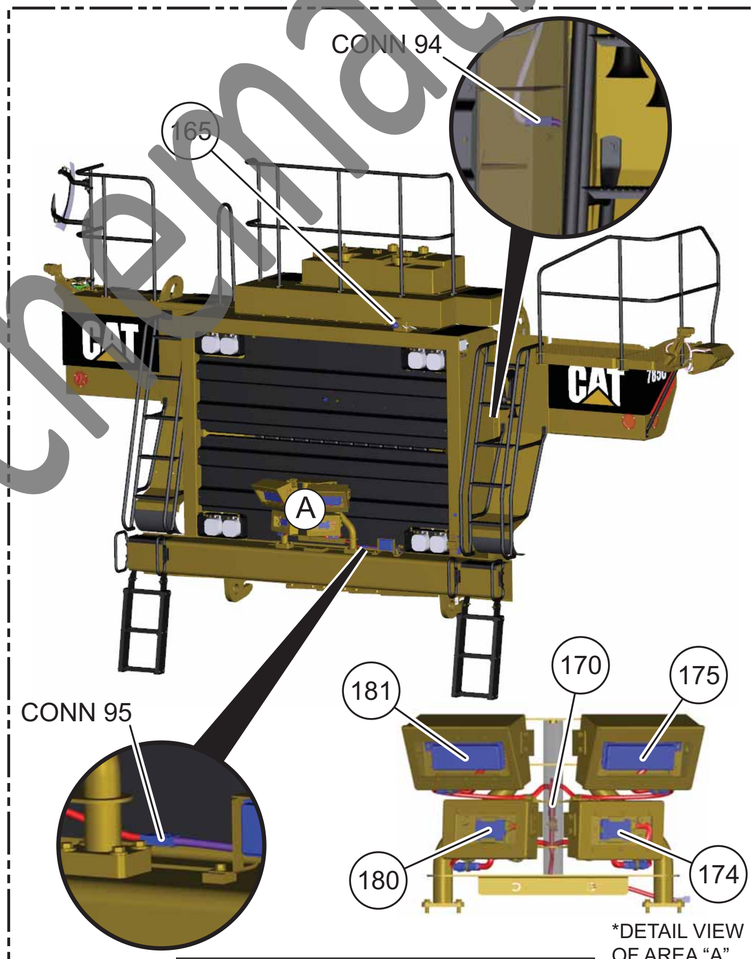
Resistor Specifications		
Part No.	Component Description	Resistance (Ohms)[1]
352-2018	Resistor CIODS CAN 1 CIODS CAN 2 "A" CIODS CAN 2 "B"	360 (Ohms)

[1] At room temperature unless otherwise noted.



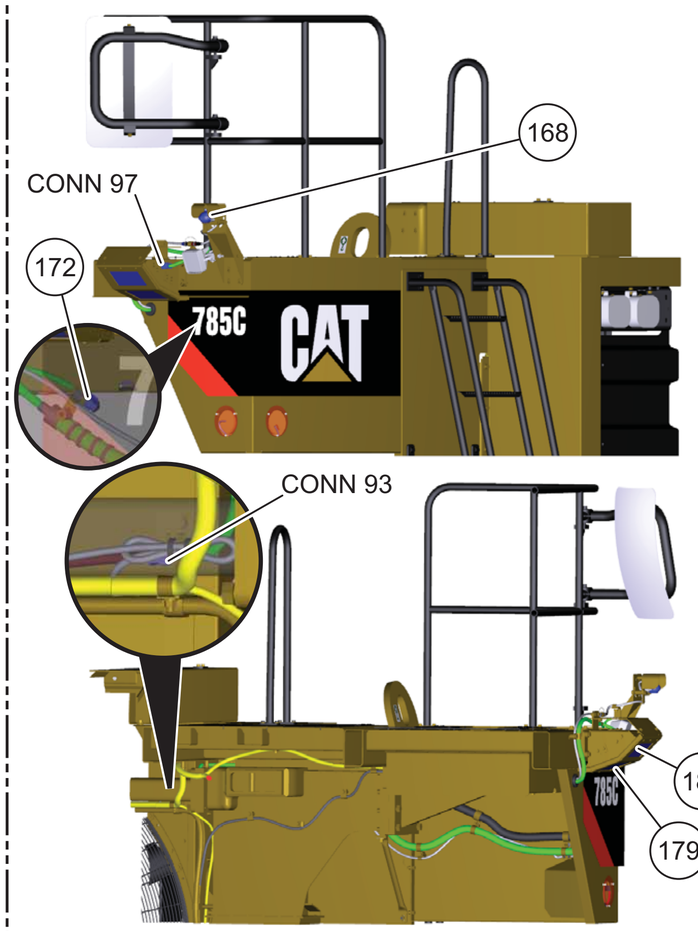


CIODS LH FENDER



*DETAIL VIEW OF AREA "A"

CIODS FRONT BUMPER

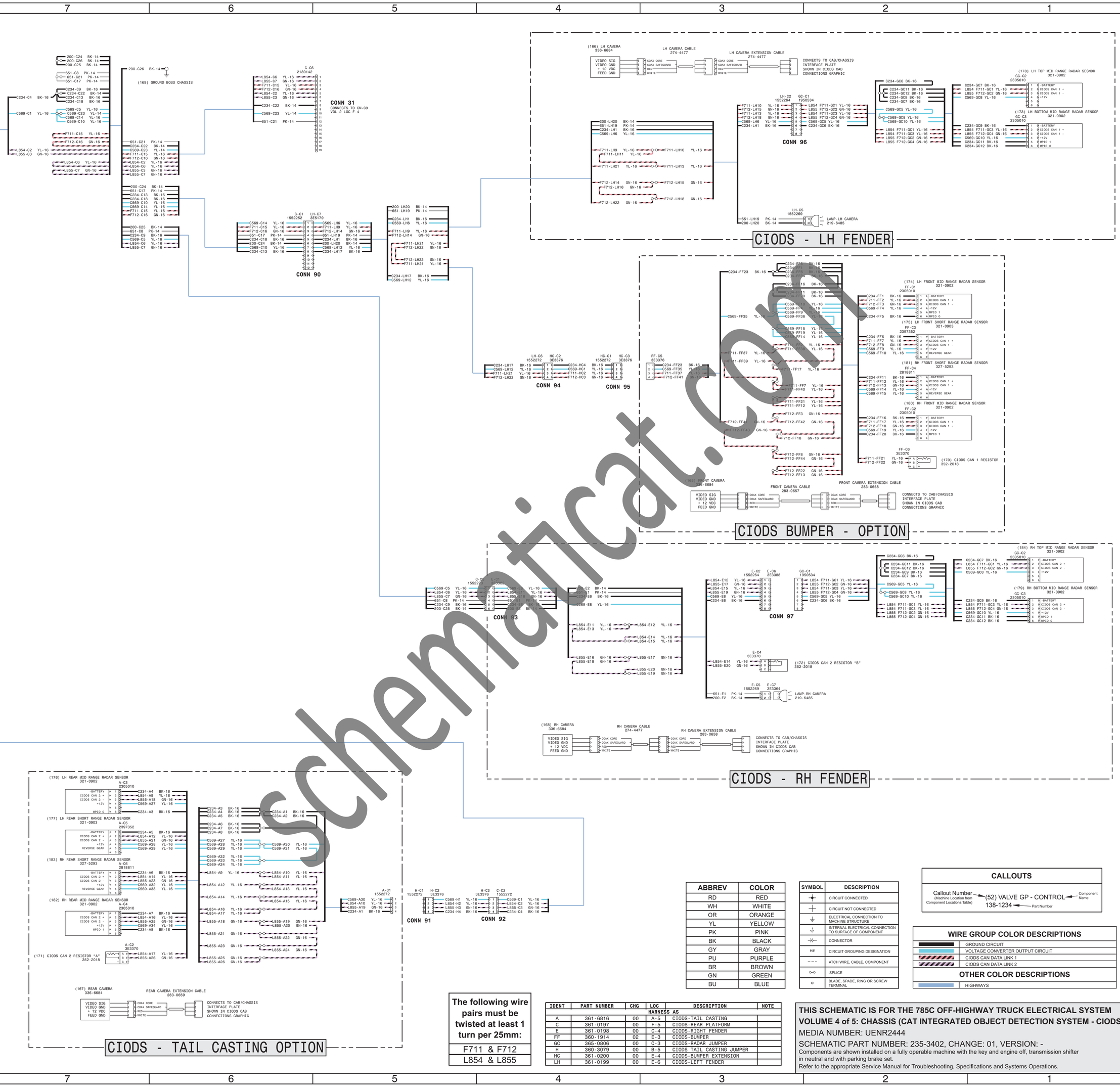


CIODS RH FENDER

UENR2444 VOL 4 of 5
12 Page, (Dimensions: 25 inches x 24 inches)

UENR2444 VOL 4 of 5

12 Page, (Dimensions: 25 inches x 24 inches)



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

SYMBOL	DESCRIPTION
	CIRCUIT CONNECTED
	CIRCUIT NOT CONNECTED
	ELECTRICAL CONNECTION TO MACHINE STRUCTURE
	INTERNAL ELECTRICAL CONNECTION TO SURFACE OF COMPONENT
	CONNECTOR
H#	CIRCUIT GROUPING DESIGNATION
	ATCH WIRE, CABLE, COMPONENT
	SPLICE
	BLADE, SPADE, RING OR SCREW TERMINAL

CALLOUTS

Callout Number (Machine Location from Component Locations Table) → (52) VALVE GP - CONTROL ← Component Name
138-1234 ← Part Number

WIRE GROUP COLOR DESCRIPTIONS

	GROUND CIRCUIT
	VOLTAGE CONVERTER OUTPUT CIRCUIT
	CIODS CAN DATA LINK 1
	CIODS CAN DATA LINK 2

OTHER COLOR DESCRIPTIONS

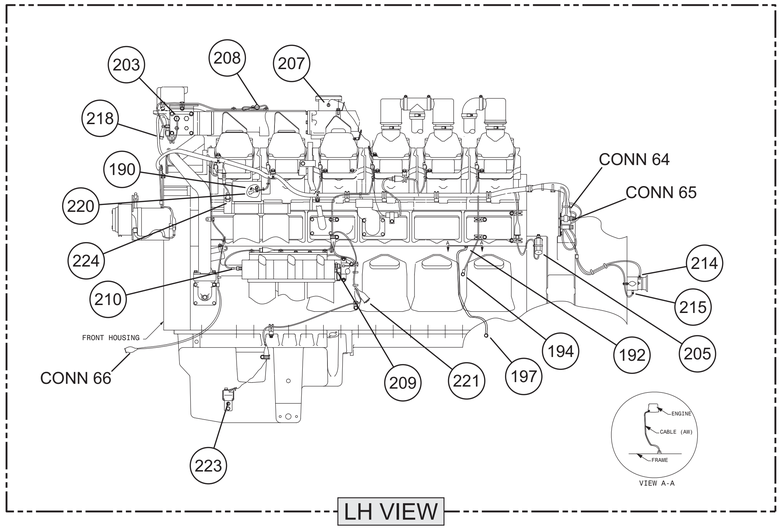
	HIGHWAYS

The following wire pairs must be twisted at least 1 turn per 25mm:

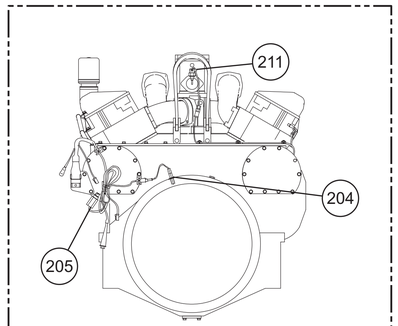
F711 & F712
L854 & L855

IDENT	PART NUMBER	CHG	LOC	DESCRIPTION	NOTE
HARNESS AS					
A	361-6816	00	A-5	CIODS-TAIL CASTING	
C	361-0197	00	F-5	CIODS-REAR PLATFORM	
E	361-0198	00	C-4	CIODS-RIGHT FENDER	
FF	360-1914	02	E-3	CIODS-BUMPER	
GC	365-0806	00	C-3	CIODS-RADAR JUMPER	
H	360-3079	00	B-5	CIODS TAIL CASTING JUMPER	
HC	361-0200	00	E-4	CIODS-BUMPER EXTENSION	
LH	361-0199	00	E-6	CIODS-LEFT FENDER	

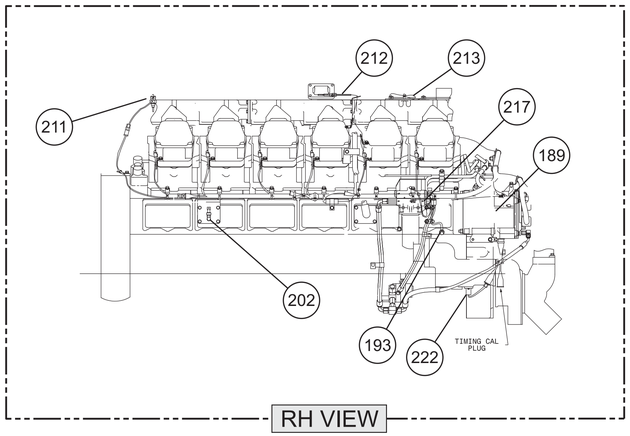
THIS SCHEMATIC IS FOR THE 785C OFF-HIGHWAY TRUCK ELECTRICAL SYSTEM
VOLUME 4 of 5: CHASSIS (CAT INTEGRATED OBJECT DETECTION SYSTEM - CIODS)
MEDIA NUMBER: UENR2444
SCHEMATIC PART NUMBER: 235-3402, CHANGE: 01, VERSION: -
Components are shown installed on a fully operable machine with the key and engine off, transmission shifter in neutral and with parking brake set.
Refer to the appropriate Service Manual for Troubleshooting, Specifications and Systems Operations.



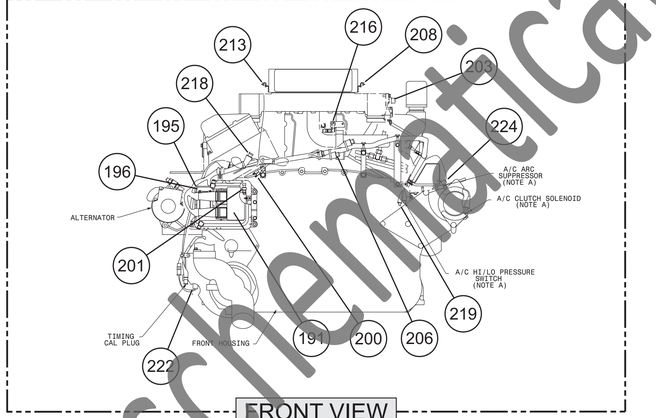
LH VIEW



REAR VIEW



RH VIEW



FRONT VIEW

CATERPILLAR®

UENR2444
July 2012

Schematic

785C Off-Highway Truck Electrical System

APX1832-2033

Volume 5 of 5: Engine

Printed in U.S.A.

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.

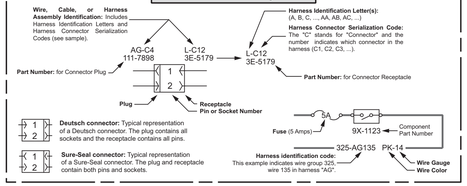
Sender: A component that is used with a temperature or pressure gauge. The sender measures the temperature or pressure. Its resistance changes to give an indication to the gauge of the temperature or pressure.

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



Connector Location

Connector Number	Schematic Location
CONN 64	E-6
CONN 65	E-6
CONN 66	E-5

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.

Component Location

Component	Schematic Location	Machine Location
Alternator	D-4	189
Breaker - Electronic Fuel Priming Pump	C-9	190
ECM - Engine	D-9	191
Ground - Engine	A-4	192
Ground - Engine Block	D-4	193
Ground - Engine Block ECM	D-7	194
Ground - Engine ECM Housing	A-9	195
Ground - Engine ECM Mount	A-9	196
Ground - Frame	A-4	197
Injectors - Even (1-12) *NOT SHOWN	C-5	198
Injectors - Odd (1-12) *NOT SHOWN	A-5	199
Relay - Pre Lube (ATCH)	D-4	200
Sensor - Atmospheric Pressure	D-2	201
Sensor - Crankcase Pressure	D-2	202
Sensor - Engine Coolant Temperature	C-2	203
Sensor - Engine Speed	E-9	204
Sensor - Engine Speed/Timing	D-2	205
Sensor - Fan Speed (ATCH)	E-2	206
Sensor - LH Turbo Exhaust Temperature	C-2	207
Sensor - LH Turbo Inlet Pressure	C-2	208
Sensor - Oil Pressure (Filtered)	D-2	209
Sensor - Oil Pressure (Unfiltered)	D-2	210
Sensor - Rear Aftercooler Temperature	B-2	211
Sensor - RH Turbo Exhaust Temperature	C-2	212
Sensor - RH Turbo Inlet Pressure	B-2	213
Sensor - Torque Converter Out Speed	E-9	214
Sensor - Torque Converter Temperature	D-9	215
Sensor - Turbo Outlet Pressure	C-2	216
Solenoid - Electronic Fuel Priming Pump	C-6	217
Solenoid - Fan Control (ATCH)	C-4	218
Switch - A/C Fan Control Override (ATCH)	D-4	219
Switch - Electronic Fuel Priming Pump	D-6	220
Switch - Engine Add Oil Level (ATCH)	B-2	221
Switch - Engine Coolant Flow	A-2	222
Switch - Engine Oil Level Low	A-2	223
Switch - Fuel Filter Differential Pressure	B-2	224

Event Codes
Engine Control

Event Code	Condition
E017	High Engine Coolant Temperature Warning
E021	High Exhaust Temperature Derate
E035	Loss of Coolant Flow Warning
E038	Low Engine Coolant Temperature Warning
E072	Oil Level Low Mark
E073	Oil Filter Differential Pressure High
E074	Oil Filter Differential Pressure Very High
E092	Boost Pressure Above Normal (793 HA Only)
E093	Boost Pressure Below Normal (793 HA Only)
E095	Fuel Filter Restriction Warning
E098	Engine Prelube Override
E100	Low Engine Oil Pressure Warning
E101	High Crankcase Pressure Warning
E190	Engine Overspeed Warning
E265	User Defined Shutdown
E272	Inlet Air Restriction Warning

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.

Related Electrical Service Manuals

Title	Form Number
Alternator: 9X-7803	SENR7508
Engine Control:	SENR1128

Component Identifiers (CID[1]) Module Identifier (MID[2]) Engine Control (MID No. 036)

CID	Component
0001	Cylinder 1 Injector Solenoid
0002	Cylinder 2 Injector Solenoid
0003	Cylinder 3 Injector Solenoid
0004	Cylinder 4 Injector Solenoid
0005	Cylinder 5 Injector Solenoid
0006	Cylinder 6 Injector Solenoid
0007	Cylinder 7 Injector Solenoid
0008	Cylinder 8 Injector Solenoid
0009	Cylinder 9 Injector Solenoid
0010	Cylinder 10 Injector Solenoid
0011	Cylinder 11 Injector Solenoid
0012	Cylinder 12 Injector Solenoid
0013	Cylinder 13 Injector Solenoid
0014	Cylinder 14 Injector Solenoid
0015	Cylinder 15 Injector Solenoid
0016	Cylinder 16 Injector Solenoid
0091	Throttle Position Signal
0100	Engine Oil Pressure
0101	Crankcase Pressure Signal
0102	Boost Pressure
0110	Coolant Temperature
0168	System Voltage
0190	Engine Speed Signal
0248	CAT Data Link
0253	Personality Module
0254	Engine ECM
0261	Timing Calibration
0262	Analog Sensor Supply
0263	Digital Sensor Supply
0267	Shutdown Inputs
0268	System Parameters
0273	Turbocharger Outlet Pressure
0274	Atmospheric Pressure
0275	Right Turbocharger Inlet Pressure
0276	Left Turbocharger Inlet Pressure
0291	Engine Cooling Fan Solenoid
0296	Unable to Communicate withTransmission ECM
0338	Prelube Pump Relay
0526	Wastegate Solenoid
0542	Unfiltered Oil Pressure Signal
0543	Filtered Oil Pressure
0544	Engine Fan Speed Sensor Signal
0545	Start Aid Relay
0546	Start Aid Hold Relay
0562	Unable to Communicate with Caterpillar Monitoring System
0569	Oil Renewal Solenoid
0771	Shutter Relay
0799	Service Tool
0800	Unable to Communicates with VIMS
0827	Left Exhaust Temp Signal
0828	Right Exhaust Temp Signal
0829	Rear Aftercooler Coolant Temperature Signal
0830	Brake Oil Temperature

[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.

Wire Description

Wire Number	Wire Color	Description
Power Circuits		
109	OR	Alt Output (+) Term.
113	OR	Key SW On
150	OR	Battery + (Engine Control)
Ground Circuits		
200	BK	Main Chassis
229	BK	Bat - (Engine Control)
Basic Machine Circuits		
317	YL	Start Aid Relay To Start Aid Sol
323	WH	EFPP SW to EFPP Breaker
329	WH	EFPP SW to EFPP Solenoid
337	WH	Prelube Pushbutton SW To Prelube Timer
Monitoring Circuits		
403	GN	Alternator (R) Term.
412	BU	Engine Control to Engine Coolant Flow SW
450	YL	Engine Speed Sensor
452	PU	Torque Converter Out Speed Sensor
481	GN	Converter Temp SW To Brake Oil Temp SW
Accessory Circuits		
513	OR	A/C Compressor/Refrigerant Pressure SW
521	YL	A/C SW To Refrigerant SW
522	WH	A/C Clutch To Thermostat SW
Control Circuits		
799	WH	Sensor Power
A700	OR	Digital Sensor Power(+8V)
A701	GY	Injector #1
A702	PU	Injector #2
A703	BR	Injector #3
A704	GN	Injector #4
A705	BU	Injector #5
A706	GY	Injector #6
A707	PU	Injector #7
A708	BR	Injector #8
A709	OR	Injector #9
A710	GY	Injector #10
A711	PU	Injector #11
A712	BR	Injector #12
A746	PK	Turbo Outlet Pressure Sensor
A747	GY	Atmospheric Pressure Sensor
A751	YL	Rear After Cooler Temperature Sensor
E793	BU	ATA Data Link (-)
E794	YL	ATA Data Link (+)
E795	YL	Crankcase Pressure Sensor
E796	GN	Oil Pressure Sensor (Unfiltered)

Wire Description (Continued)

Wire Number	Wire Color	Description
Control Circuits (Continued)		
E799	BR	Fan Control Solenoid Return
F700	BU	Fan Control Solenoid
F701	BR	Oil Renewal Solenoid
F702	GN	Throttle Position Sensor
F703	GY	LH Turbo Exhaust Temperature Sensor
F704	OR	RH Turbo Exhaust Temperature Sensor
F705	PK	Not Used
F707	WH	Start Aid Hold Relay
F708	YL	Shutter Relay
F709	BU	Pre-lube Relay
F710	BR	Start Aid On Relay
F713	OR	Left Turbo Inlet Pressure Sensor
F714	PK	Right Turbo Inlet Pressure Sensor
F715	PU	Shutdown Signal (N/O)
F716	WH	Shutdown Signal (N/C)
F717	YL	Throttle Bypass SW
F718	BU	Engine Add Oil Level SW
F719	BR	Engine Low Oil Level SW
F720	GN	Start Aid SW
F721	GY	User Def Shutdown
F722	OR	A/C Fan Control Override SW
F723	PK	Timing Cal (+)
F724	PU	Timing Cal (-)
F725	WH	Fuel Filter Differential Press SW
F726	YL	Injector Common 1 & 3
F727	BU	Injector Common 2 & 4
F728	BR	Injector Common 5 & 7
F729	GN	Injector Common 6 & 8
F730	GY	Injector Common 9 & 11
F731	OR	Injector Common 10 & 12
F732	PK	Fan Speed Sensor
F780	PK	Parking Brake SW
J765	BU	Engine Speed Sensor
892	BR	CAT Data Link (-)
893	GN	CAT Data Link (+)
993	BR	Analog Sensor Common
994	GY	Oil Pressure Sensor (Filtered)
995	BU	Engine Coolant Temperature Sensor
996	GN	Engine Speed Timing Sensor
997	OR	Analog Sensor Power (+ 5V)
998	BR	Digital Sensor Return
999	WH	Crankcase Pressure Sensor
E976	GN	Air Intake Temperature Sensor

Solenoid Specifications

Part No.	Component Description	Resistance (Ohms)[1]
124-3497	Solenoid: Fan Control	2.8 ± 0.3

[1] At room temperature unless otherwise noted.

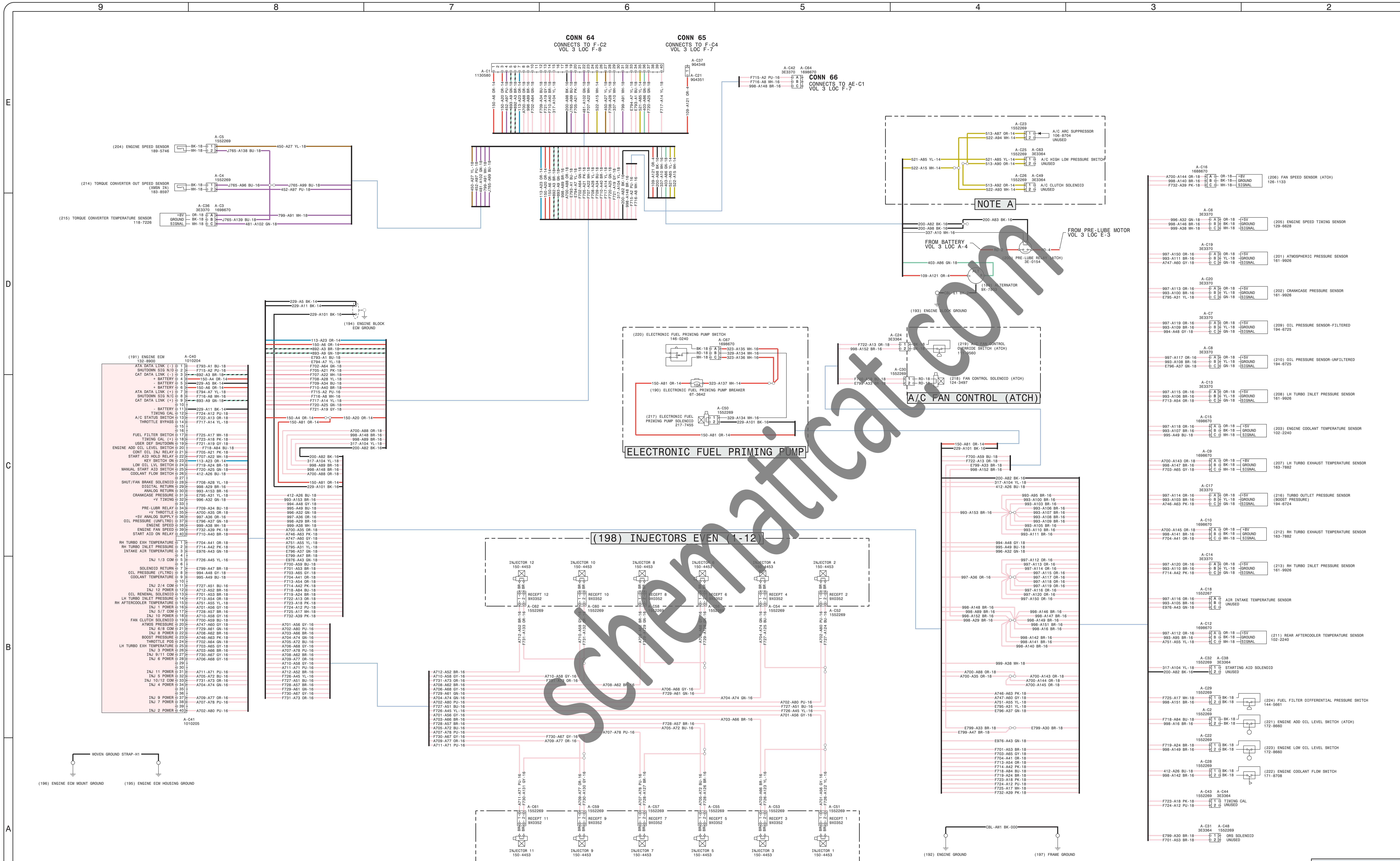
Off Machine Switch Specification

Part No.	Function	Actuate	Deactuate	Contact Position
144-5661	Fuel Filter Differential Pressure	137.9 ± 13.8 kPa (20.00 ± 2.00 psi)	82.7 kPa MIN (12.0 psi MIN)	Normally Closed
171-8708	Engine Coolant Flow	362 ± 29 mN (1.3 ± 0.1 oz) at point X	303 mN MIN (1.1 oz MIN) at point X	Normally Open

UENR2444 VOL 5 of 5
20 Page, (Dimensions: 39 inches x 24 inches)

UENR2444 VOL 5 of 5

20 Page, (Dimensions: 39 inches x 24 inches)



IDENT	PART NUMBER	LOC	DESCRIPTION	NOTE
HARNESS AS				
A	223-9125	D-8	MAIN ENGINE	
CABLE AS				
E	153-7485	D-4	ALTERNATOR GROUND	
AW	116-7156	A-4	ENG TO FRAME GROUND	
STRAP AS				
H	7X-6315	A-9	ADEM II GROUND	

NOTE A: THESE CONNECTORS ARE NOT USED ON THIS MACHINE. SEE VOL 1 (CHASSIS) PROPER A/C HARNESS CONNECTIONS AND COMPONENTS.

NOTE B: THESE WIRES ARE NOT USED ON THIS MACHINE AND ARE TO BE TIED BACK TO HARNESS.

CALLOUTS

Callout Number (Machine Location from Component Locations Table) → (52) VALVE GP - CONTROL ← Component Name
138-1234 ← Part Number

SYMBOL	DESCRIPTION
┼●	CIRCUIT CONNECTED
┼	CIRCUIT NOT CONNECTED
⏚	ELECTRICAL CONNECTION TO MACHINE STRUCTURE
⏚ (dashed)	INTERNAL ELECTRICAL CONNECTION TO SURFACE OF COMPONENT
→)—	CONNECTOR
H#	CIRCUIT GROUPING DESIGNATION
– – –	ATCH WIRE, CABLE, COMPONENT
○–○	SPLICE
○	BLADE, SPADE, RING OR SCREW TERMINAL

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

The following wire pairs must be twisted at least 1 turn per 25mm:
892 & 893
E793 & E794
F723 & F724

WIRE GROUP COLOR DESCRIPTIONS	
(black)	GROUND CIRCUIT
(red)	WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS OFF
(blue)	WIRES THAT HAVE SYSTEM VOLTAGE WHEN THE KEY SWITCH IS ON
(pink)	STARTING AID CIRCUIT
(purple)	TRANSMISSION / CHASSIS CONTROL CIRCUIT
(green)	MONITOR CIRCUIT
(brown)	BRAKE CONTROL CIRCUIT
(light pink)	ENGINE CONTROL CIRCUIT
(yellow)	HEATER AND AIR CONDITIONER CIRCUIT
(striped)	CAT DATA LINK
OTHER COLOR DESCRIPTIONS	
(light blue)	HIGHWAYS

THIS SCHEMATIC IS FOR THE 785C OFF-HIGHWAY TRUCK ELECTRICAL SYSTEM
VOLUME 5 of 5: ENGINE

MEDIA NUMBER: UENR2444

SCHEMATIC PART NUMBER: 235-3404, CHANGE: 01, VERSION: -

Components are shown installed on a fully operable machine with the key and engine off, transmission shifter in neutral and with parking brake set.

Refer to the appropriate Service Manual for Troubleshooting, Specifications and Systems Operations.