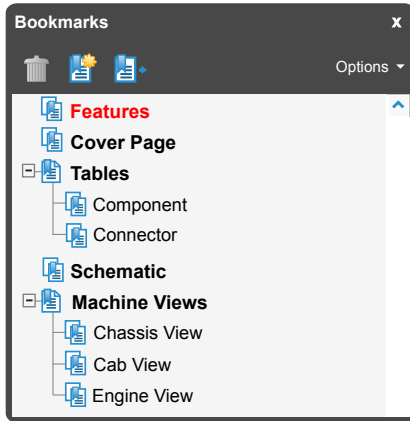


# INTERACTIVE SCHEMATIC



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**.

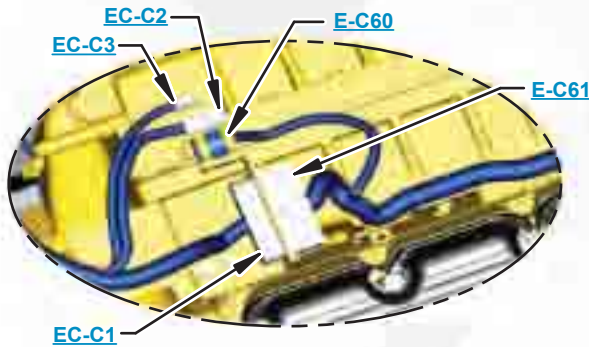
Select **PROPERTIES**.

**CLICK** the **SETTINGS TAB**.

**MOVE THE SLIDER** under **SCREEN RESOLUTION** until it shows **1024 X 768**.

**CLICK OK** to apply the resolution.

*\*Due to different monitor sizes and PDF reader preferences there may be some variance in linked schematic locations*



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



[Click here to save a copy of this interactive schematic to your desktop](#)

**VIEW ALL CALLOUTS**

When only one callout is showing on a machine view, clicking on 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”

ELECTRICAL SYMBOLS				
Pressure Switch	Temperature Switch	Level Switch	Flow Switch	Circuit Breaker

BASIC HYDRAULIC COMPONENT SYMBOLS	
Pump or Motor	Variability
Fluid Conditioner	Spring (Adjustable)

[Click here to view the Schematic Symbols and Definitions page](#)



# SCHEMATIC SYMBOLS AND DEFINITIONS



VALVES			
ENVELOPES			
One Position	Two Position	Three Position	
PORTS			
Two-way	Three-Way	Four-Way	
CONTROL			
Normal Position	Shifted Position	Infinite Position	
CHECK			
Basic Symbol	Spring Loaded	Shuttle	Pilot Controlled

INTERNAL PASSAGEWAYS			
Flow in One Direction	Flow Allowed in Either Direction	Parallel Flow	Cross Flow
Infinite Positioning	Two Position	Three Position	

PUMPS	
FIXED DISPLACEMENT	
Unidirectional	Bidirectional
VARIABLE DISPLACEMENT NON-COMPENSATED	
Unidirectional	Bidirectional

BASIC HYDRAULIC COMPONENT SYMBOLS	
Pump or Motor	Variability
Fluid Conditioner	Spring (Adjustable)
Spring	Pressure Compensation
Control Valves	Line Restriction (Variable)
Restriction	Line Restriction (Fixed)
Line Restriction Variable and Pressure Compensated	2-Section Pump
Attachment	Pump: Variable and Pressure Compensated
Hydraulic Energy Triangles	Pneumatic Energy Triangles

CYLINDERS	
Single Acting	Double Acting

ACCUMULATORS	
Spring Loaded	Gas Charged

MOTORS	
FIXED DISPLACEMENT	
Unidirectional	Bidirectional
VARIABLE DISPLACEMENT NON-COMPENSATED	
Unidirectional	Bidirectional

ROTATING SHAFTS	
Unidirectional	Bidirectional

PILOT CONTROL		
RELEASED PRESSURE		
External Return	Internal Return	
REMOTE SUPPLY PRESSURE		
Simplified	Complete	Internal Supply Pressure

COMBINATION CONTROLS						
Solenoid	Solenoid or Manual	Solenoid and Pilot	Solenoid and Pilot or Manual	Servo	Thermal	Detent

LINES	
Crossing	Joining

MEASUREMENT		
Pressure	Temperature	Flow

MANUAL CONTROL					
Push-pull Lever	Manual Shutoff	General Manual	Push Button	Pedal	Spring

FLUID STORAGE RESERVOIRS			
Vented	Pressurized	Return Above Fluid Level	Return Below Fluid Level

HYDRAULIC SYMBOLS - ELECTRICAL							
Transducer (Fluid)	Transducer (Gas / Air)	Generator	Electric Motor	Pressure Switch	Pressure Switch (Adjustable)	Temperature Switch	Electrical Wire

ELECTRICAL SYMBOLS				
Pressure Switch	Temperature Switch	Level Switch	Flow Switch	Circuit Breaker

BASIC ELECTRICAL COMPONENT SYMBOLS	
	<b>Fuse:</b> A component in an electrical circuit that will open the circuit if too much current flows through it.
	<b>Switch (Normally Open):</b> 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.
	<b>Switch (Normally Closed):</b> A switch that will open at a specified point (temp, press, etc.). No circle indicates that the wire cannot be disconnected from the component.
	<b>Ground (Wired):</b> This indicates that the component is connected to a grounded wire. The grounded wire is fastened to the machine.
	<b>Ground (Case):</b> This indicates that the component does not have a wire connected to ground. It is grounded by being fastened to the machine.
	<b>Reed Switch:</b> 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.
	<b>Sender:</b> 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.
	<b>Relay (Magnetic Switch):</b> 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.
	<b>Solenoid:</b> 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.
	<b>Magnetic Latch Solenoid:</b> 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.

HARNES AND WIRE SYMBOLS	
<b>Wire, Cable, or Harness Assembly Identification:</b> Includes Harness Identification Letters and Harness Connector Serialization Codes (see sample).	
<b>Harness Identification Letter(s):</b> (A, B, C, AA, AB, AC, ...)	
<b>Harness Connector Serialization Code:</b> The "C" stands for "Connector" and the number indicates which connector in the harness (C1, C2, C3, ...)	
<b>Harness identification code:</b> This example indicates wire group 325, wire 135 in harness "AG".	
<b>Deutsch connector:</b> Typical representation of a Deutsch connector. The plug contains all sockets and the receptacle contains all pins.	
<b>Sure-Seal connector:</b> Typical representation of a Sure-Seal connector. The plug and receptacle contain both pins and sockets.	

# Schematic

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## **416F, 422F, and 428F Backhoe Loader Electrical System**

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**416F:**  
LWT1-322

**422F:**  
LRH1-695

**428F:**  
LBH1-1572  
SJW1-436

**Volume 1 of 2: Mechanical Control**

**Volume 2 of 2: Electronic Control**

# COMPONENT LOCATION

## Volume 1 of 2 - MECHANICAL CONTROL



Component Location VOL 1 PM HARNESS					
Component	Schematic Location	Machine Location	Component	Schematic Location	Machine Location
Alarm - Action	<a href="#">D-15</a>	<a href="#">1</a>	Solenoid - Diff Lock As STD	<a href="#">J-3</a>	<a href="#">77</a>
Alarm - Action	<a href="#">A-15</a>	<a href="#">2</a>	Solenoid - Fuel Shutoff Turbo	<a href="#">F-3</a>	<a href="#">78</a>
Alarm - Backup (CP)	<a href="#">H-16</a>	<a href="#">3</a>	Solenoid - FWD Low STD	<a href="#">J-3</a>	<a href="#">79</a>
Alarm - Backup (SS)	<a href="#">J-16</a>	<a href="#">4</a>	Solenoid - HYD Torque Limit STD	<a href="#">J-3</a>	<a href="#">80</a>
Alternator	<a href="#">F-3</a>	<a href="#">5</a>	Solenoid - LH Lock Valve	<a href="#">D-3</a>	<a href="#">81</a>
Battery	<a href="#">F-5</a>	<a href="#">6</a>	Solenoid - Lockout	<a href="#">I-15</a>	<a href="#">82</a>
Block As - Fuse	<a href="#">G-8</a>	<a href="#">7</a>	Solenoid - REV As STD	<a href="#">J-3</a>	<a href="#">83</a>
Blower Gp - Cab heater	<a href="#">H-15</a>	<a href="#">8</a>	Solenoid - RH Lock Valve	<a href="#">D-3</a>	<a href="#">84</a>
Bus Bar 1	<a href="#">J-8</a>	<a href="#">9</a>	Solenoid - Ride Control 1	<a href="#">E-10</a>	<a href="#">85</a>
Bus Bar 2	<a href="#">J-7</a>	<a href="#">10</a>	Solenoid - Ride Control 2	<a href="#">E-10</a>	<a href="#">86</a>
Bus Bar 3	<a href="#">J-7</a>	<a href="#">11</a>	Solenoid - RTD	<a href="#">F-11</a>	<a href="#">87</a>
Compressor Gp - A/C Clutch	<a href="#">H-3</a>	<a href="#">12</a>	Solenoid - Side Shift Left	<a href="#">J-14</a>	<a href="#">88</a>
Control Gp - AWS	<a href="#">A-9</a>	<a href="#">13</a>	Solenoid - Side Shift Lock	<a href="#">J-16</a>	<a href="#">89</a>
Diode - Blocking 1	<a href="#">C-5</a>	<a href="#">14</a>	Solenoid - Side Shift Right	<a href="#">I-14</a>	<a href="#">90</a>
Diode - Blocking 2	<a href="#">C-5</a>	<a href="#">15</a>	Solenoid - STD AWD	<a href="#">J-3</a>	<a href="#">91</a>
Diode - Fuel Lift Pump	<a href="#">E-8</a>	<a href="#">16</a>	Stud - Cab Power	<a href="#">G-4</a>	<a href="#">92</a>
Diode - Lights (FR)	<a href="#">E-12</a>	<a href="#">17</a>	Stud - Jump Start	<a href="#">G-5</a>	<a href="#">93</a>
Diode - Lights (RR)	<a href="#">E-12</a>	<a href="#">18</a>	Stud - Power	<a href="#">F-4</a>	<a href="#">94</a>
Diode - Neut Lock Alarm	<a href="#">E-9</a>	<a href="#">19</a>	Suppressor - Lockout	<a href="#">I-15</a>	<a href="#">95</a>
Diode - REV Solenoid	<a href="#">J-3</a>	<a href="#">20</a>	Suppressor - ARC Ride Control	<a href="#">E-10</a>	<a href="#">96</a>
Diode - Roading	<a href="#">E-12</a>	<a href="#">21</a>	Suppressor - ARC (Side Shift Left)	<a href="#">J-14</a>	<a href="#">97</a>
Diode - Side Shift 1	<a href="#">I-15</a>	<a href="#">22</a>	Suppressor - ARC (Side Shift Right)	<a href="#">I-14</a>	<a href="#">98</a>
Diode - Side Shift 2	<a href="#">I-15</a>	<a href="#">23</a>	Suppressor - ARC (SS Lock)	<a href="#">J-16</a>	<a href="#">99</a>
Flasher	<a href="#">F-8</a>	<a href="#">24</a>	Suppressor - ARC HVAC	<a href="#">H-3</a>	<a href="#">100</a>
Glow Plugs	<a href="#">F-3</a>	<a href="#">25</a>	Suppressor - ARC Load Check Disable 1	<a href="#">D-3</a>	<a href="#">101</a>
Ground - Cab RF	<a href="#">D-10</a>	<a href="#">26</a>	Suppressor - ARC Load Check Disable 2	<a href="#">D-3</a>	<a href="#">102</a>
Ground - Control	<a href="#">F-8</a>	<a href="#">27</a>	Switch - A/C Refrigerant Pressure	<a href="#">H-3</a>	<a href="#">103</a>
Ground - Engine	<a href="#">H-4</a>	<a href="#">28</a>	Switch - Air Filter	<a href="#">G-3</a>	<a href="#">104</a>
Ground - Lower Cab	<a href="#">F-8</a>	<a href="#">29</a>	Switch - Attach Rear Work Lamp	<a href="#">B-14</a>	<a href="#">105</a>
Ground - Upper Cab	<a href="#">C-9</a>	<a href="#">30</a>	Switch - Attch Front Work Lamp	<a href="#">D-14</a>	<a href="#">106</a>
Ground - Upper Cab	<a href="#">G-14</a>	<a href="#">31</a>	Switch - Attch Front Work Lamp	<a href="#">B-14</a>	<a href="#">107</a>
Horn - Forward	<a href="#">G-3</a>	<a href="#">32</a>	Switch - Attch Rear Work Lamp	<a href="#">D-14</a>	<a href="#">108</a>
Horn - RR	<a href="#">J-16</a>	<a href="#">33</a>	Switch - AWD	<a href="#">J-9</a>	<a href="#">109</a>
Motor Gp - Front Washer	<a href="#">G-3</a>	<a href="#">34</a>	Switch - AWS	<a href="#">A-11</a>	<a href="#">110</a>
Motor Gp - Front Wiper	<a href="#">D-7</a>	<a href="#">35</a>	Switch - Battery Disconnect	<a href="#">F-5</a>	<a href="#">111</a>
Motor Gp - Front Wiper	<a href="#">C-9</a>	<a href="#">36</a>	Switch - Beacon	<a href="#">G-10</a>	<a href="#">112</a>
Motor Gp - Fuel Lift Pump	<a href="#">F-3</a>	<a href="#">37</a>	Switch - Beacon	<a href="#">B-14</a>	<a href="#">113</a>
Motor Gp - Rear Washer	<a href="#">G-3</a>	<a href="#">38</a>	Switch - Blower Speed	<a href="#">H-15</a>	<a href="#">114</a>
Motor Gp - Rear Wiper	<a href="#">D-9</a>	<a href="#">39</a>	Switch - Brake (LH)	<a href="#">I-10</a>	<a href="#">115</a>
Motor Gp - Rear Wiper	<a href="#">B-12</a>	<a href="#">40</a>	Switch - Brake (RH)	<a href="#">I-10</a>	<a href="#">116</a>
Motor Gp - Seat	<a href="#">E-5</a>	<a href="#">41</a>	Switch - Bucket POS	<a href="#">F-10</a>	<a href="#">117</a>
Motor Gp - Starter	<a href="#">E-4</a>	<a href="#">42</a>	Switch - Cold Start Adv	<a href="#">F-3</a>	<a href="#">118</a>
Panel Gp - Instrument	<a href="#">E-15</a>	<a href="#">43</a>	Switch - Column Multi Function	<a href="#">H-10</a>	<a href="#">119</a>
Panel Gp - Instrument	<a href="#">B-15</a>	<a href="#">44</a>	Switch - Cont Flow 7-8	<a href="#">C-14</a>	<a href="#">120</a>
Radio - Prod Link	<a href="#">I-4</a>	<a href="#">45</a>	Switch - Crab Circle	<a href="#">A-11</a>	<a href="#">121</a>
Relay - A/C Shutoff	<a href="#">H-13</a>	<a href="#">46</a>	Switch - Differential Lock	<a href="#">I-10</a>	<a href="#">122</a>
Relay - AWD	<a href="#">H-8</a>	<a href="#">47</a>	Switch - Engine Oil Pressure	<a href="#">G-3</a>	<a href="#">123</a>
Relay - Dead Engine Lower Command	<a href="#">C-3</a>	<a href="#">48</a>	Switch - Float Detent Pressure	<a href="#">D-3</a>	<a href="#">124</a>
Relay - Dead Engine Lower Enable	<a href="#">C-3</a>	<a href="#">49</a>	Switch - FNR Control	<a href="#">I-10</a>	<a href="#">125</a>
Relay - Fuel Lift Pump	<a href="#">E-8</a>	<a href="#">50</a>	Switch - Hazard	<a href="#">H-10</a>	<a href="#">126</a>
Relay - FWD Horn	<a href="#">I-8</a>	<a href="#">51</a>	Switch - Heater A/C	<a href="#">H-15</a>	<a href="#">127</a>
Relay - Hi Speed	<a href="#">H-13</a>	<a href="#">52</a>	Switch - Horn	<a href="#">E-14</a>	<a href="#">128</a>
Relay - Low Side Control	<a href="#">F-8</a>	<a href="#">53</a>	Switch - HYD Oil Filter Bypass	<a href="#">H-3</a>	<a href="#">129</a>
Relay - Neut Lock Alarm	<a href="#">D-8</a>	<a href="#">54</a>	Switch - Impl Lockout 1	<a href="#">A-14</a>	<a href="#">130</a>
Relay - Neutral Start	<a href="#">E-8</a>	<a href="#">55</a>	Switch - Key	<a href="#">D-15</a>	<a href="#">131</a>
Relay - Neutralizer	<a href="#">F-8</a>	<a href="#">56</a>	Switch - Key	<a href="#">A-15</a>	<a href="#">132</a>
Relay - Park Brake Alarm	<a href="#">E-8</a>	<a href="#">57</a>	Switch - Neutralizer Loader Handle	<a href="#">E-5</a>	<a href="#">133</a>
Relay - POS Lamp	<a href="#">H-8</a>	<a href="#">58</a>	Switch - Neutralizer XMSN Handle	<a href="#">E-5</a>	<a href="#">134</a>
Relay - Rear Horn	<a href="#">H-8</a>	<a href="#">59</a>	Switch - Park Brake	<a href="#">E-13</a>	<a href="#">135</a>
Relay - Ride Control	<a href="#">H-8</a>	<a href="#">60</a>	Switch - RC Pressure	<a href="#">E-10</a>	<a href="#">136</a>
Relay - Start	<a href="#">B-5</a>	<a href="#">61</a>	Switch - Rear Fog Lamp	<a href="#">I-9</a>	<a href="#">137</a>
Relay As - PRM Module 1	<a href="#">J-8</a>	<a href="#">62</a>	Switch - Rear Wiper	<a href="#">E-14</a>	<a href="#">138</a>
Relay As - PRM Module 2	<a href="#">J-7</a>	<a href="#">63</a>	Switch - Rear Wiper	<a href="#">A-14</a>	<a href="#">139</a>
Relay As - PRM Module ENG	<a href="#">J-7</a>	<a href="#">64</a>	Switch - Return to Dig	<a href="#">F-10</a>	<a href="#">140</a>
Relay As - PRM Module HVAC	<a href="#">J-6</a>	<a href="#">65</a>	Switch - Ride Control	<a href="#">I-9</a>	<a href="#">141</a>
Resistor - Motor Speed	<a href="#">G-15</a>	<a href="#">66</a>	Switch - Roading	<a href="#">H-9</a>	<a href="#">142</a>
Sender - Conv Temp	<a href="#">I-3</a>	<a href="#">67</a>	Switch - Side Shift Lock	<a href="#">D-14</a>	<a href="#">143</a>
Sender - Coolant Temp	<a href="#">G-3</a>	<a href="#">68</a>	Switch - Stability Pressure	<a href="#">B-7</a>	<a href="#">144</a>
Sender - Fuel Level	<a href="#">G-3</a>	<a href="#">69</a>	Switch - Stability Warning	<a href="#">B-10</a>	<a href="#">145</a>
Sensor - FR Axle Posn	<a href="#">A-11</a>	<a href="#">70</a>	Switch - Start Aid	<a href="#">C-14</a>	<a href="#">146</a>
Sensor - Fuel Water Separator	<a href="#">G-3</a>	<a href="#">71</a>	Switch - Start Aid	<a href="#">A-14</a>	<a href="#">147</a>
Sensor - HYD Load STD	<a href="#">J-5</a>	<a href="#">72</a>	Switch - Thermostat	<a href="#">H-15</a>	<a href="#">148</a>
Sensor - Hyd Oil Temp	<a href="#">H-3</a>	<a href="#">73</a>	Switch - XMSN Lock	<a href="#">J-9</a>	<a href="#">149</a>
Sensor - RR Axle Posn	<a href="#">A-8</a>	<a href="#">74</a>	Valve Gp - AWS	<a href="#">A-8</a>	<a href="#">150</a>
Sensor - XMSN Out SPD STD	<a href="#">J-5</a>	<a href="#">75</a>	Valve Gp - Stabilizer	<a href="#">I-14</a>	<a href="#">151</a>
Solenoid - Cold Start Adv	<a href="#">F-3</a>	<a href="#">76</a>			

# COMPONENT LOCATION

## Volume 2 of 2 - ELECTRONIC CONTROL



Component Location Vol 2 (PL Harness)					
Component	Schematic Location	Machine Location	Component	Schematic Location	Machine Location
Alarm - Action	<a href="#">D-16</a>	<a href="#">152</a>	Solenoid - FWD Low STD	<a href="#">H-15</a>	<a href="#">232</a>
Alarm - Action	<a href="#">A-16</a>	<a href="#">153</a>	Solenoid - Hyd Torque Limit	<a href="#">J-1</a>	<a href="#">233</a>
Alarm - Backup (CP)	<a href="#">H-16</a>	<a href="#">154</a>	Solenoid - HYD Torque Limit STD	<a href="#">I-1</a>	<a href="#">234</a>
Alarm - Backup (SS)	<a href="#">J-16</a>	<a href="#">155</a>	Solenoid - LH Lock Valve	<a href="#">D-5</a>	<a href="#">235</a>
Alternator	<a href="#">E-1</a>	<a href="#">156</a>	Solenoid - Lockout	<a href="#">I-15</a>	<a href="#">236</a>
Battery	<a href="#">E-3</a>	<a href="#">157</a>	Solenoid - Lockup Clutch	<a href="#">J-1</a>	<a href="#">237</a>
Block As - Fuse	<a href="#">H-6</a>	<a href="#">158</a>	Solenoid - Rev As	<a href="#">I-1</a>	<a href="#">238</a>
Blower Gp - Cab heater	<a href="#">H-15</a>	<a href="#">159</a>	Solenoid - REV As STD	<a href="#">I-1</a>	<a href="#">239</a>
Bus Bar 1	<a href="#">J-6</a>	<a href="#">160</a>	Solenoid - RH Lock Valve	<a href="#">D-5</a>	<a href="#">240</a>
Bus Bar 2	<a href="#">J-5</a>	<a href="#">161</a>	Solenoid - Ride Control 1	<a href="#">E-9</a>	<a href="#">241</a>
Bus Bar 3	<a href="#">J-5</a>	<a href="#">162</a>	Solenoid - Ride Control 2	<a href="#">E-9</a>	<a href="#">242</a>
Compressor Gp - A/C Clutch	<a href="#">G-1</a>	<a href="#">163</a>	Solenoid - RTD	<a href="#">E-11</a>	<a href="#">243</a>
Control Gp - AWS	<a href="#">A-9</a>	<a href="#">164</a>	Solenoid - Side Shift Left	<a href="#">J-15</a>	<a href="#">244</a>
Control Gp - Machine ECM	<a href="#">I-11</a>	<a href="#">165</a>	Solenoid - Side Shift Lock	<a href="#">J-16</a>	<a href="#">245</a>
Diode - Blocking 1	<a href="#">C-6</a>	<a href="#">166</a>	Solenoid - Side Shift Right	<a href="#">I-15</a>	<a href="#">246</a>
Diode - Blocking 2	<a href="#">C-6</a>	<a href="#">167</a>	Solenoid - Speed Clutch 1	<a href="#">J-1</a>	<a href="#">247</a>
Diode - Fuel Lift Pump	<a href="#">F-6</a>	<a href="#">168</a>	Solenoid - Speed Clutch 2	<a href="#">J-1</a>	<a href="#">248</a>
Diode - REV Solenoid	<a href="#">H-1</a>	<a href="#">169</a>	Solenoid - Speed Clutch 3	<a href="#">J-1</a>	<a href="#">249</a>
Diode - Side Shift 1	<a href="#">I-15</a>	<a href="#">170</a>	Solenoid - STD AWD	<a href="#">I-1</a>	<a href="#">250</a>
Diode - Side Shift 2	<a href="#">I-15</a>	<a href="#">171</a>	Stud - Cab Power	<a href="#">F-3</a>	<a href="#">251</a>
Flasher	<a href="#">F-6</a>	<a href="#">172</a>	Stud - Jump Start	<a href="#">F-3</a>	<a href="#">252</a>
Glow Plugs	<a href="#">D-1</a>	<a href="#">173</a>	Stud - Power	<a href="#">E-2</a>	<a href="#">253</a>
Ground - Cab RF	<a href="#">D-10</a>	<a href="#">174</a>	Suppressor - Lockout Solenoid	<a href="#">I-15</a>	<a href="#">254</a>
Ground - Control	<a href="#">G-6</a>	<a href="#">175</a>	Suppressor - ARC Ride Control	<a href="#">E-9</a>	<a href="#">255</a>
Ground - Engine	<a href="#">G-2</a>	<a href="#">176</a>	Suppressor - ARC (Side Shift Left)	<a href="#">J-15</a>	<a href="#">256</a>
Ground - Lower Cab	<a href="#">G-6</a>	<a href="#">177</a>	Suppressor - ARC (Side Shift Right)	<a href="#">I-15</a>	<a href="#">257</a>
Ground - Upper Cab	<a href="#">C-9</a>	<a href="#">178</a>	Suppressor - ARC (SS Lock)	<a href="#">J-16</a>	<a href="#">258</a>
Ground - Upper Cab	<a href="#">G-15</a>	<a href="#">179</a>	Suppressor - ARC HVAC	<a href="#">G-1</a>	<a href="#">259</a>
Horn - Forward	<a href="#">E-2</a>	<a href="#">180</a>	Suppressor - ARC Load Check Disable 1	<a href="#">D-5</a>	<a href="#">260</a>
Horn - RR	<a href="#">J-16</a>	<a href="#">181</a>	Suppressor - ARC Load Check Disable 2	<a href="#">C-5</a>	<a href="#">261</a>
Motor Gp - Front Washer	<a href="#">F-1</a>	<a href="#">182</a>	Switch - A/C Refrigerant Pressure	<a href="#">G-1</a>	<a href="#">262</a>
Motor Gp - Front Wiper	<a href="#">C-9</a>	<a href="#">183</a>	Switch - Air Filter	<a href="#">F-2</a>	<a href="#">263</a>
Motor Gp - Front Wiper	<a href="#">D-7</a>	<a href="#">184</a>	Switch - Attach Rear Work Lamp	<a href="#">B-15</a>	<a href="#">264</a>
Motor Gp - Fuel Lift Pump	<a href="#">E-2</a>	<a href="#">185</a>	Switch - Attch Front Work Lamp	<a href="#">D-15</a>	<a href="#">265</a>
Motor Gp - Rear Washer	<a href="#">F-1</a>	<a href="#">186</a>	Switch - Attch Front Work Lamp	<a href="#">B-15</a>	<a href="#">266</a>
Motor Gp - Rear Wiper	<a href="#">D-9</a>	<a href="#">187</a>	Switch - Attch Rear Work Lamp	<a href="#">D-15</a>	<a href="#">267</a>
Motor Gp - Rear Wiper	<a href="#">B-12</a>	<a href="#">188</a>	Switch - Auto Man	<a href="#">H-7</a>	<a href="#">268</a>
Motor Gp - Seat	<a href="#">D-4</a>	<a href="#">189</a>	Switch - AWD	<a href="#">J-7</a>	<a href="#">269</a>
Motor Gp - Starter	<a href="#">D-2</a>	<a href="#">190</a>	Switch - AWS	<a href="#">A-11</a>	<a href="#">270</a>
Panel Gp - Instrument	<a href="#">E-16</a>	<a href="#">191</a>	Switch - Battery Disconnect	<a href="#">E-3</a>	<a href="#">271</a>
Panel Gp - Instrument	<a href="#">B-16</a>	<a href="#">192</a>	Switch - Beacon	<a href="#">G-8</a>	<a href="#">272</a>
Radio - Prod Link	<a href="#">H-2</a>	<a href="#">193</a>	Switch - Beacon	<a href="#">B-15</a>	<a href="#">273</a>
Relay - A/C Shutoff	<a href="#">H-13</a>	<a href="#">194</a>	Switch - Blower Speed	<a href="#">H-15</a>	<a href="#">274</a>
Relay - AWD	<a href="#">H-6</a>	<a href="#">195</a>	Switch - Brake (LH)	<a href="#">I-8</a>	<a href="#">275</a>
Relay - Dead Engine Lower Command	<a href="#">C-5</a>	<a href="#">196</a>	Switch - Brake (RH)	<a href="#">I-8</a>	<a href="#">276</a>
Relay - Dead Engine Lower Enable	<a href="#">C-5</a>	<a href="#">197</a>	Switch - Bucket POS	<a href="#">E-10</a>	<a href="#">277</a>
Relay - Fuel Lift Pump	<a href="#">F-6</a>	<a href="#">198</a>	Switch - Cold Start Adv	<a href="#">F-1</a>	<a href="#">278</a>
Relay - FWD Horn	<a href="#">I-6</a>	<a href="#">199</a>	Switch - Column Multi Function	<a href="#">H-8</a>	<a href="#">279</a>
Relay - Hi Speed	<a href="#">H-13</a>	<a href="#">200</a>	Switch - Cont Flow 7-8	<a href="#">C-15</a>	<a href="#">280</a>
Relay - Neutral Start	<a href="#">F-6</a>	<a href="#">201</a>	Switch - Crab Circle	<a href="#">A-11</a>	<a href="#">281</a>
Relay - Park Brake Alarm	<a href="#">E-6</a>	<a href="#">202</a>	Switch - Differential Lock	<a href="#">I-8</a>	<a href="#">282</a>
Relay - Rear Horn	<a href="#">I-6</a>	<a href="#">203</a>	Switch - Engine Oil Pressure	<a href="#">F-2</a>	<a href="#">283</a>
Relay - Ride Control	<a href="#">H-6</a>	<a href="#">204</a>	Switch - Float Detent Pressure	<a href="#">D-5</a>	<a href="#">284</a>
Relay - Start	<a href="#">C-4</a>	<a href="#">205</a>	Switch - FNR Control	<a href="#">I-8</a>	<a href="#">285</a>
Relay As - PRM Module 1	<a href="#">J-6</a>	<a href="#">206</a>	Switch - Hazard	<a href="#">H-9</a>	<a href="#">286</a>
Relay As - PRM Module 2	<a href="#">J-5</a>	<a href="#">207</a>	Switch - Heater A/C	<a href="#">H-15</a>	<a href="#">287</a>
Relay As - PRM Module ENG	<a href="#">J-5</a>	<a href="#">208</a>	Switch - Horn	<a href="#">E-15</a>	<a href="#">288</a>
Relay As - PRM Module HVAC	<a href="#">J-5</a>	<a href="#">209</a>	Switch - HYD Oil Filter Bypass	<a href="#">G-1</a>	<a href="#">289</a>
Resistor - Can Terminating 1	<a href="#">F-10</a>	<a href="#">210</a>	Switch - Impl Lockout 1	<a href="#">A-15</a>	<a href="#">290</a>
Resistor - Can Terminating 2	<a href="#">I-14</a>	<a href="#">211</a>	Switch - Key	<a href="#">D-16</a>	<a href="#">291</a>
Resistor - Motor Speed	<a href="#">G-15</a>	<a href="#">212</a>	Switch - Key	<a href="#">A-16</a>	<a href="#">292</a>
Sender - Conv Temp	<a href="#">H-1</a>	<a href="#">213</a>	Switch - Neutralizer Loader Handle	<a href="#">D-4</a>	<a href="#">293</a>
Sender - Conv Temp	<a href="#">I-1</a>	<a href="#">214</a>	Switch - Neutralizer XMSN Handle	<a href="#">D-4</a>	<a href="#">294</a>
Sender - Coolant Temp	<a href="#">F-2</a>	<a href="#">215</a>	Switch - Park Brake	<a href="#">E-14</a>	<a href="#">295</a>
Sender - Fuel Level	<a href="#">F-2</a>	<a href="#">216</a>	Switch - RC Pressure	<a href="#">E-9</a>	<a href="#">296</a>
Sensor - FR Axle Posn	<a href="#">A-11</a>	<a href="#">217</a>	Switch - Rear Fog Lamp	<a href="#">H-7</a>	<a href="#">297</a>
Sensor - Fuel Water Separator	<a href="#">F-1</a>	<a href="#">218</a>	Switch - Rear Wiper	<a href="#">E-15</a>	<a href="#">298</a>
Sensor - Hyd Load Auto	<a href="#">J-3</a>	<a href="#">219</a>	Switch - Rear Wiper	<a href="#">B-15</a>	<a href="#">299</a>
Sensor - HYD Load STD	<a href="#">H-3</a>	<a href="#">220</a>	Switch - Return to Dig	<a href="#">E-10</a>	<a href="#">300</a>
Sensor - Hyd Oil Temp	<a href="#">G-1</a>	<a href="#">221</a>	Switch - Ride Control	<a href="#">I-7</a>	<a href="#">301</a>
Sensor - RR Axle Posn	<a href="#">A-8</a>	<a href="#">222</a>	Switch - Roading	<a href="#">I-7</a>	<a href="#">302</a>
Sensor - XMSN out SPD	<a href="#">J-3</a>	<a href="#">223</a>	Switch - Side Shift Lock	<a href="#">D-15</a>	<a href="#">303</a>
Sensor - XMSN Out SPD STD	<a href="#">H-3</a>	<a href="#">224</a>	Switch - Stability Pressure	<a href="#">B-7</a>	<a href="#">304</a>
Solenoid - AWD As	<a href="#">J-1</a>	<a href="#">225</a>	Switch - Stability Warning	<a href="#">B-10</a>	<a href="#">305</a>
Solenoid - Cold Start Adv	<a href="#">E-1</a>	<a href="#">226</a>	Switch - Start Aid	<a href="#">C-15</a>	<a href="#">306</a>
Solenoid - Diff Lock As	<a href="#">J-1</a>	<a href="#">227</a>	Switch - Start Aid	<a href="#">A-15</a>	<a href="#">307</a>
Solenoid - Diff Lock As STD	<a href="#">I-1</a>	<a href="#">228</a>	Switch - Thermostat	<a href="#">G-15</a>	<a href="#">308</a>
Solenoid - Fuel Shutoff Turbo	<a href="#">E-1</a>	<a href="#">229</a>	Switch - XMSN Lock	<a href="#">J-7</a>	<a href="#">309</a>
Solenoid - FWD High	<a href="#">J-1</a>	<a href="#">230</a>	Valve Gp - AWS	<a href="#">A-8</a>	<a href="#">310</a>
Solenoid - FWD Low	<a href="#">I-1</a>	<a href="#">231</a>	Valve Gp - Stabilizer	<a href="#">I-14</a>	<a href="#">311</a>

# CONNECTOR LOCATION

## Volume 1 of 2 - MECHANICAL CONTROL



Connector Location			
Connector Number	Schematic Location	Connector Number	Schematic Location
CONN 1	J-14	CONN 17	B-11
CONN 2	H-16, J-14	CONN 18	A-11
CONN 3	I-16	CONN 19	C-10
CONN 4	A-14, D-15, G-14	CONN 20	B-10
CONN 5	D-12, E-13, G-14	CONN 21	B-9
CONN 6	F-13, F-14	CONN 22	B-8
CONN 7	I-13	CONN 23	A-9
CONN 8	E-13, H-13	CONN 24	J-4, J-5
CONN 9	C-7, C-12, E-13	CONN 25	I-5
CONN 10	B-12, D-12	CONN 26	I-3, I-5
CONN 11	A-12, D-12	CONN 27	I-5
CONN 12	A-12, C-12	CONN 28	H-5
CONN 13	B-12, C-13	CONN 29	D-5
CONN 14	A-11, G-10	CONN 30	D-5
CONN 15	F-10, F-11	CONN 31	H-3
CONN 16	E-11	CONN 32	F-4

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 - ELECTRONIC CONTROL



Connector Location Vol 2 (PL Harness)			
Connector Number	Schematic Location	Connector Number	Schematic Location
<a href="#">CONN 33</a>	<a href="#">J-14</a>	<a href="#">CONN 50</a>	<a href="#">A-11</a>
<a href="#">CONN 34</a>	<a href="#">H-16, J-14</a>	<a href="#">CONN 51</a>	<a href="#">C-7, C-10</a>
<a href="#">CONN 35</a>	<a href="#">I-16</a>	<a href="#">CONN 52</a>	<a href="#">B-10</a>
<a href="#">CONN 36</a>	<a href="#">B-16, D-16, G-14</a>	<a href="#">CONN 53</a>	<a href="#">B-9</a>
<a href="#">CONN 37</a>	<a href="#">D-12, F-16</a>	<a href="#">CONN 54</a>	<a href="#">B-8</a>
<a href="#">CONN 38</a>	<a href="#">F-16</a>	<a href="#">CONN 55</a>	<a href="#">A-9</a>
<a href="#">CONN 39</a>	<a href="#">J-14</a>	<a href="#">CONN 56</a>	<a href="#">I-2, J-3, J-4</a>
<a href="#">CONN 40</a>	<a href="#">E-14, H-13</a>	<a href="#">CONN 57</a>	<a href="#">I-2, J-3, J-4</a>
<a href="#">CONN 41</a>	<a href="#">C-7, C-12, E-14</a>	<a href="#">CONN 58</a>	<a href="#">H-3</a>
<a href="#">CONN 42</a>	<a href="#">B-14, D-14</a>	<a href="#">CONN 59</a>	<a href="#">H-1, H-3</a>
<a href="#">CONN 43</a>	<a href="#">A-14, D-14</a>	<a href="#">CONN 60</a>	<a href="#">H-3</a>
<a href="#">CONN 44</a>	<a href="#">A-14, C-14</a>	<a href="#">CONN 61</a>	<a href="#">G-3</a>
<a href="#">CONN 45</a>	<a href="#">B-12, C-14</a>	<a href="#">CONN 62</a>	<a href="#">C-4</a>
<a href="#">CONN 46</a>	<a href="#">A-11, F-9</a>	<a href="#">CONN 63</a>	<a href="#">C-4, D-6</a>
<a href="#">CONN 47</a>	<a href="#">E-11</a>	<a href="#">CONN 64</a>	<a href="#">F-1</a>
<a href="#">CONN 48</a>	<a href="#">E-11</a>	<a href="#">CONN 65</a>	<a href="#">E-2</a>
<a href="#">CONN 49</a>	<a href="#">B-11</a>	<a href="#">CONN 66</a>	<a href="#">F-10</a>

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.



# SPECIFICATIONS AND RELATED MANUALS

## Volume 1 of 2 - MECHANICAL CONTROL



Resistor, Sender and Solenoid Specifications		
Part No.	Component Description	Resistance (Ohms) <sup>1</sup>
244-3106	Sender: Coolant Temp	54°C (130°F) - 560 to 716 110°C (230°F) - 72 to 82
321-1327	Sender: Fuel Level (EST)	Empty: 246-252 Full: 27-33
303-2933	Sender: Fuel Level (NON-EST)	Empty: 246-252 Full: 27-33
299-2212	Solenoid: A/C Clutch	3.50 ± 0.15
248-3290	Solenoid: Diff Lock, STD AWD, Speed Clutch 1	8.8
238-4626	Solenoid: Side Shift Left / Right	8.8
238-4628	Solenoid: Ride Control	7.3

<sup>1</sup> At room temperature unless otherwise noted.

Related Electrical Service Manuals	
Title	Form Number
Starting Motor: 149-0539	SENR3828



# SPECIFICATIONS AND RELATED MANUALS

## Volume 2 of 2 - ELECTRONIC CONTROL

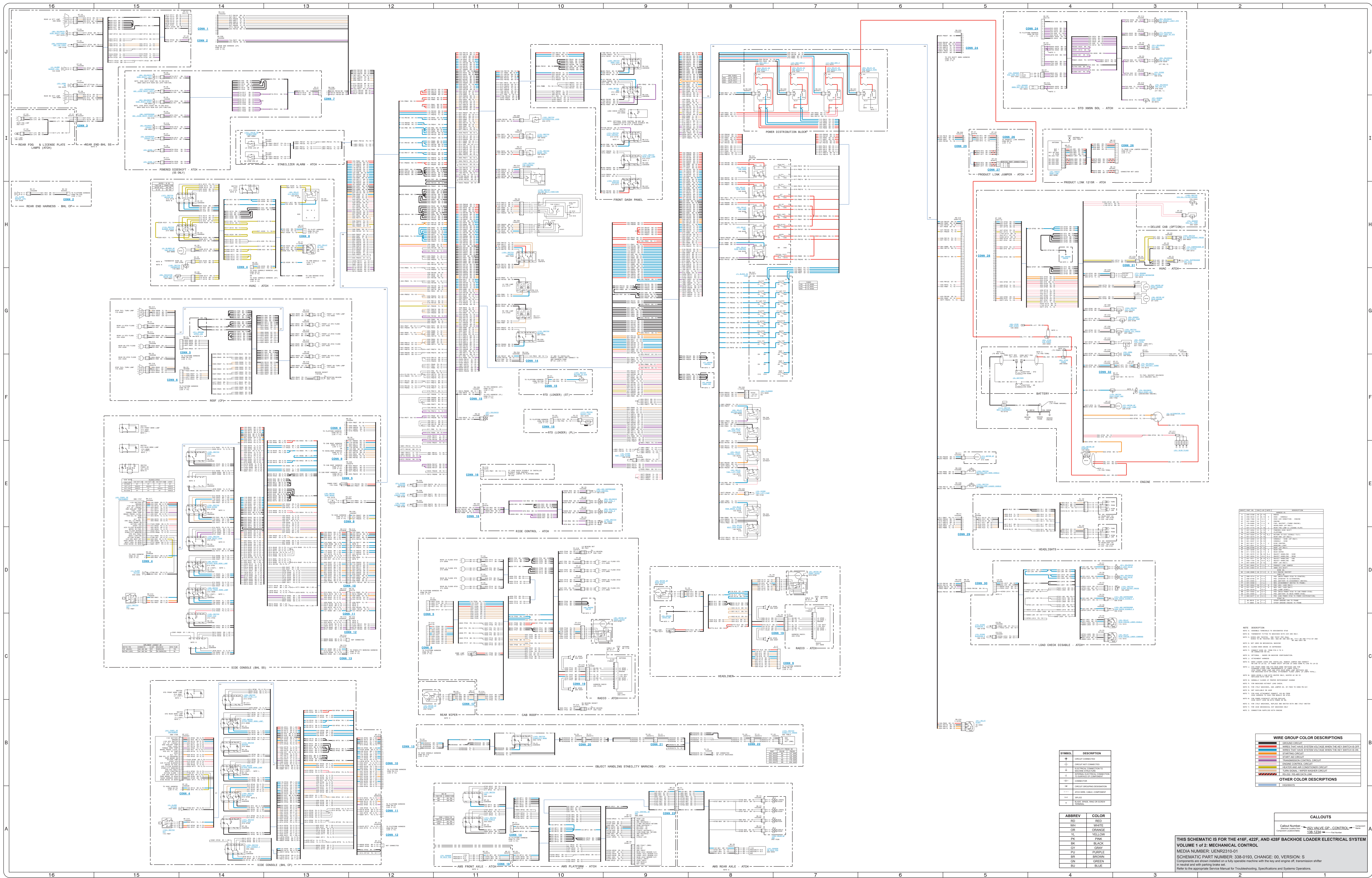


Resistor, Sender and Solenoid Specifications		
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<sup>1</sup> At room temperature unless otherwise noted.

Related Electrical Service Manuals		
Title		Form Number
Starting Motor:	149-0539	SENR3828
Control:	Machine	UENR2484





WIRE GROUP	DESCRIPTION
W1	WIRE GROUP 1
W2	WIRE GROUP 2
W3	WIRE GROUP 3
W4	WIRE GROUP 4
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W97	WIRE GROUP 97
W98	WIRE GROUP 98
W99	WIRE GROUP 99
W100	WIRE GROUP 100

SYMBOL	DESCRIPTION
+	CIRCUIT CONNECTED
-	CIRCUIT NOT CONNECTED
+	WIRE GROUP 1
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ABBREV	COLOR
RD	RED
WH	WHITE
OR	ORANGE
YL	YELLOW
PK	PINK
BLK	BLACK
GR	GRAY
PNL	PURPLE
BRN	BROWN
GN	GREEN
BLU	BLUE

WIRE GROUP COLOR DESCRIPTIONS	
W1	WIRE GROUP 1
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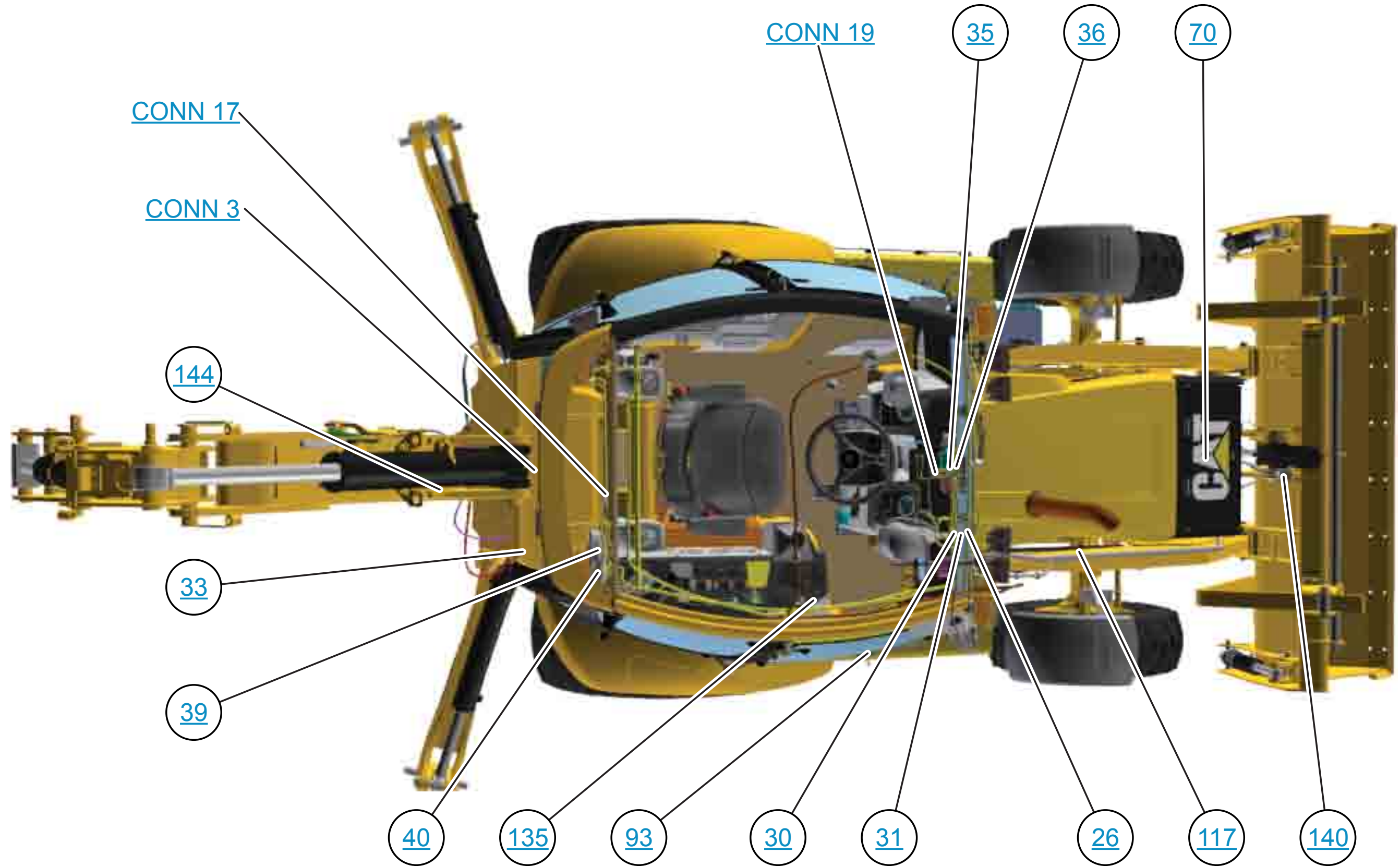
CALLOUTS	
Callout Number	100 VALVE GP. CONTROL
Component Number	138-3224

THIS SCHEMATIC IS FOR THE 416F, 422F, AND 428F BACKHOE LOADER ELECTRICAL SYSTEM  
 VOLUME 1 of 2: MECHANICAL CONTROL  
 MEDIA NUMBER: UENR210-01  
 SCHEMATIC PART NUMBER: 338-0193 CHANGE: 00 VERSION: S  
 Components are shown installed on a fully operate 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.

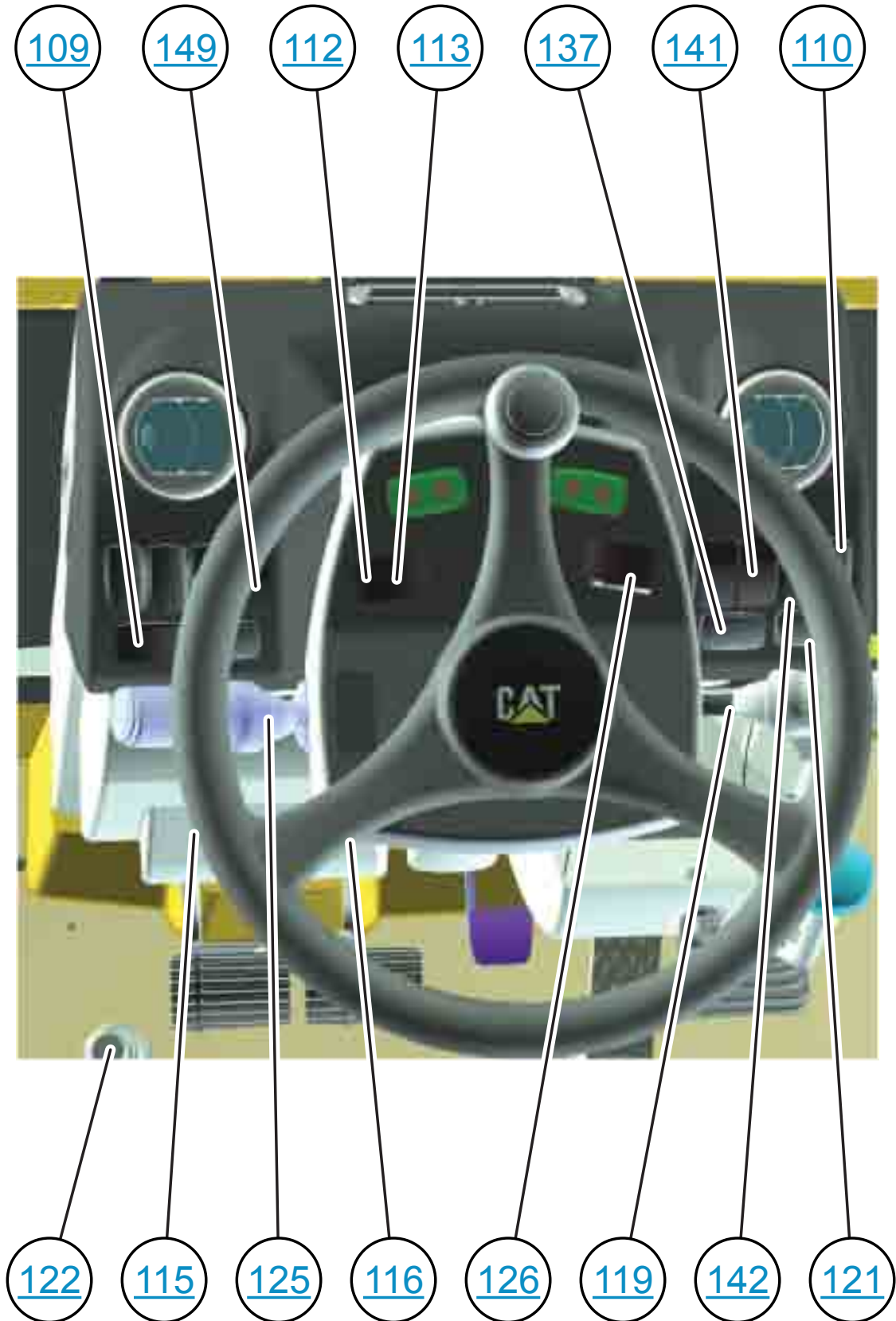




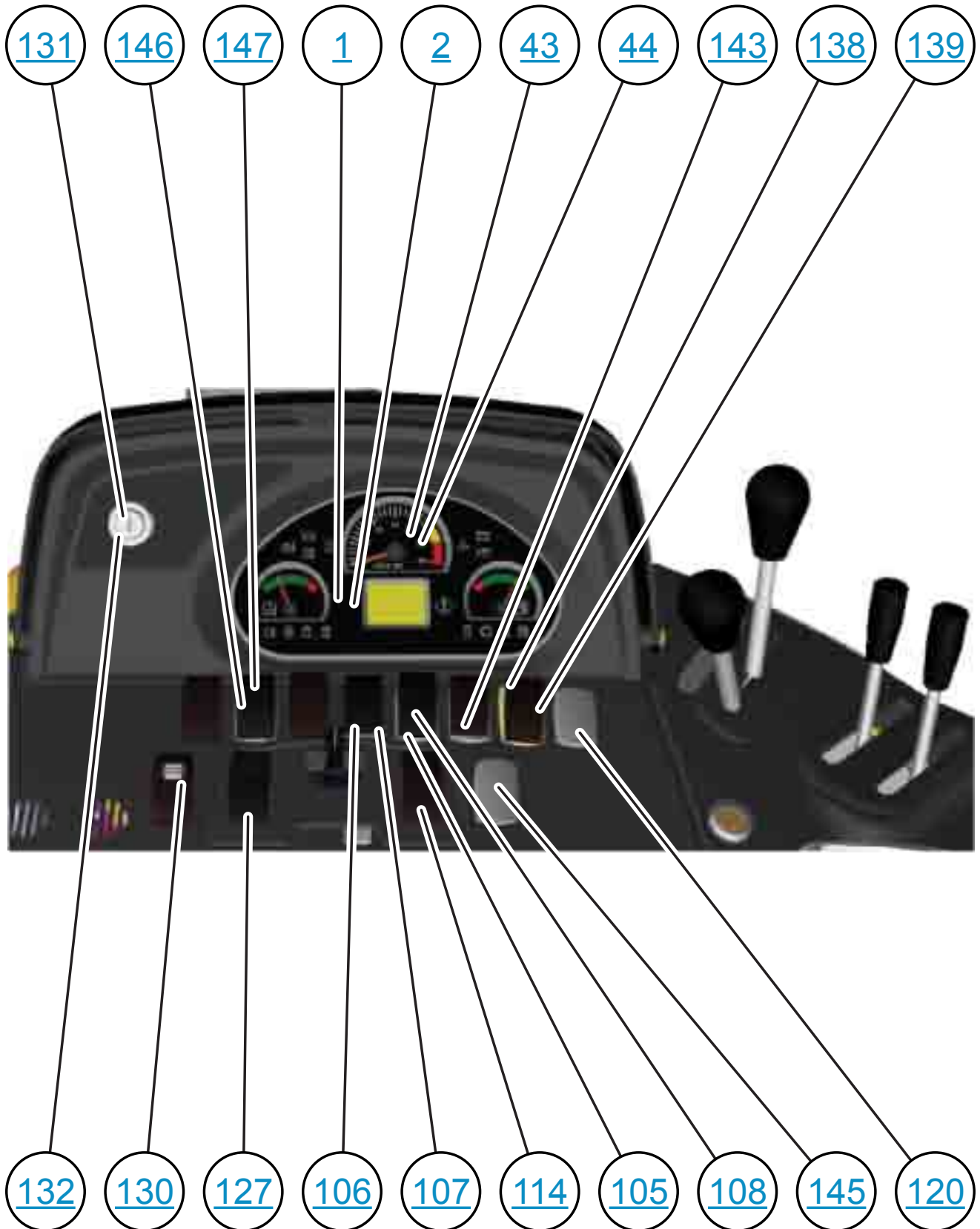




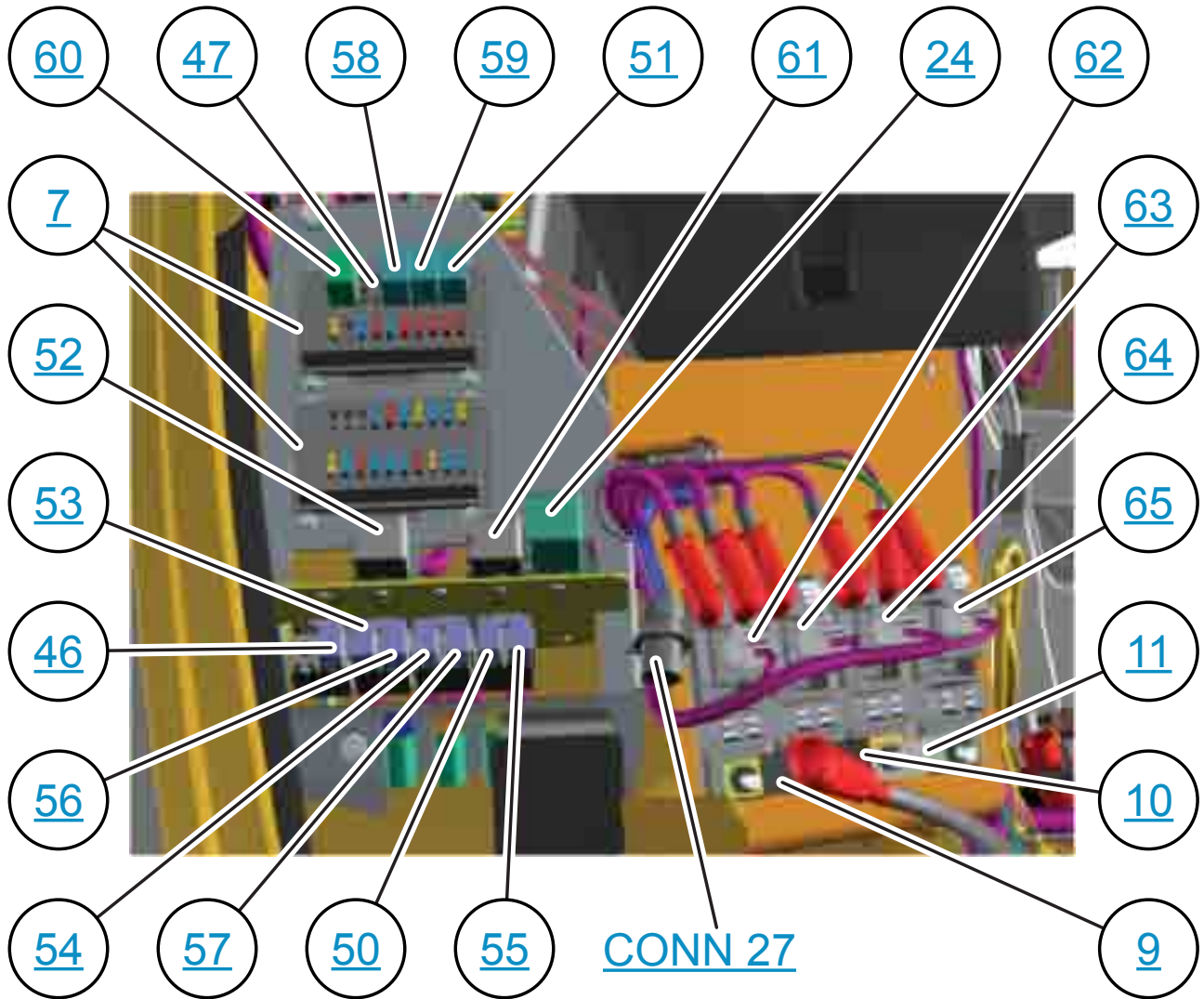
# STEERING CONSOLE VIEW



# RIGHT CONSOLE VIEW

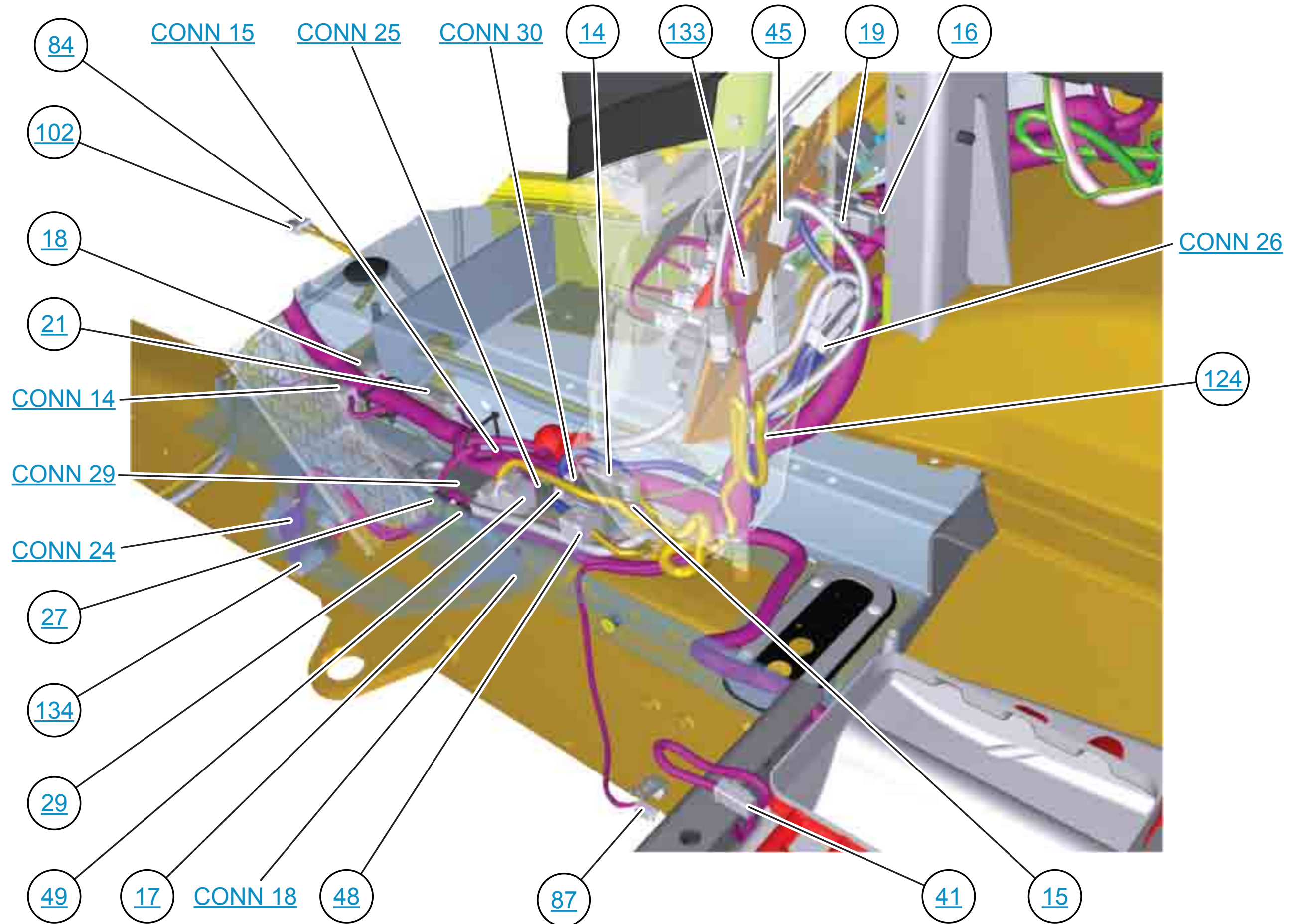


# FUSE / RELAY BLOCK VIEW

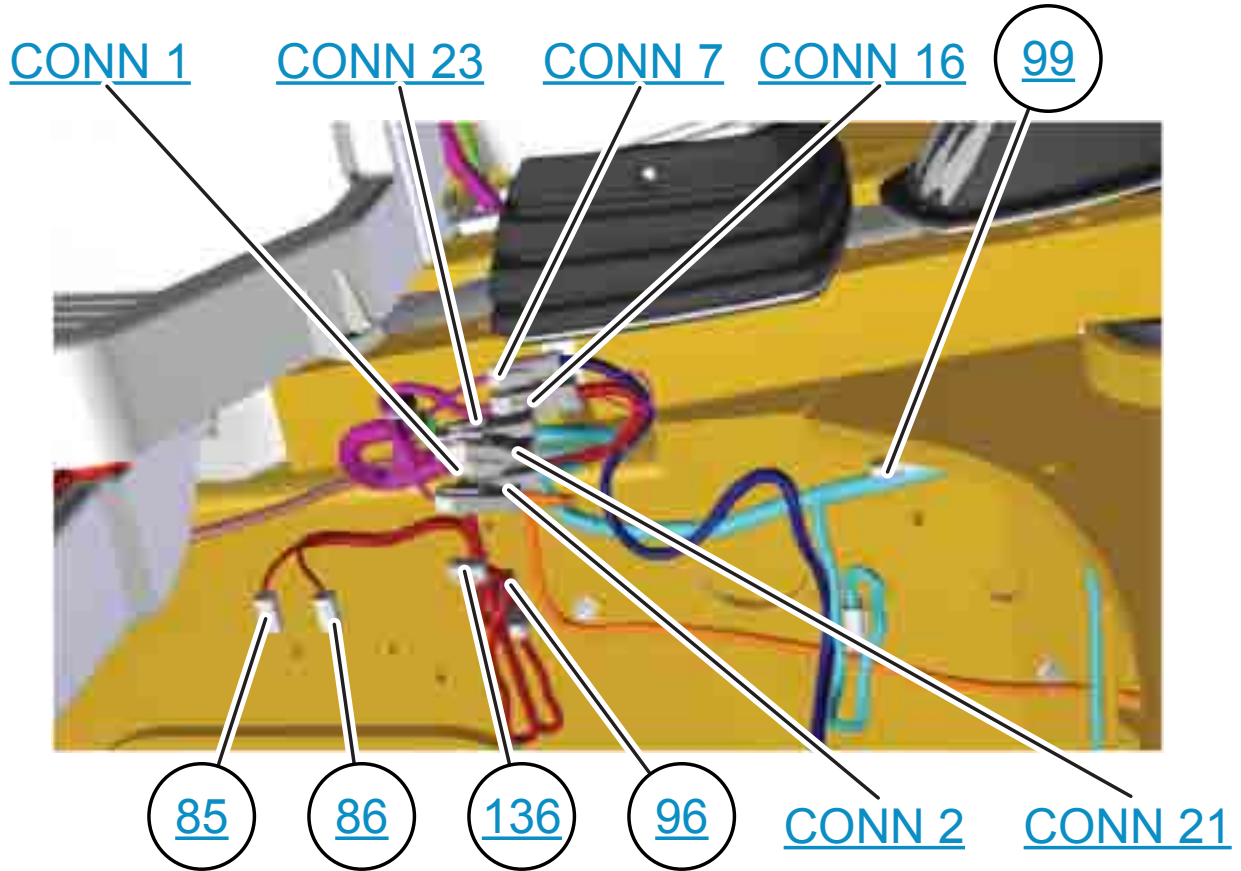




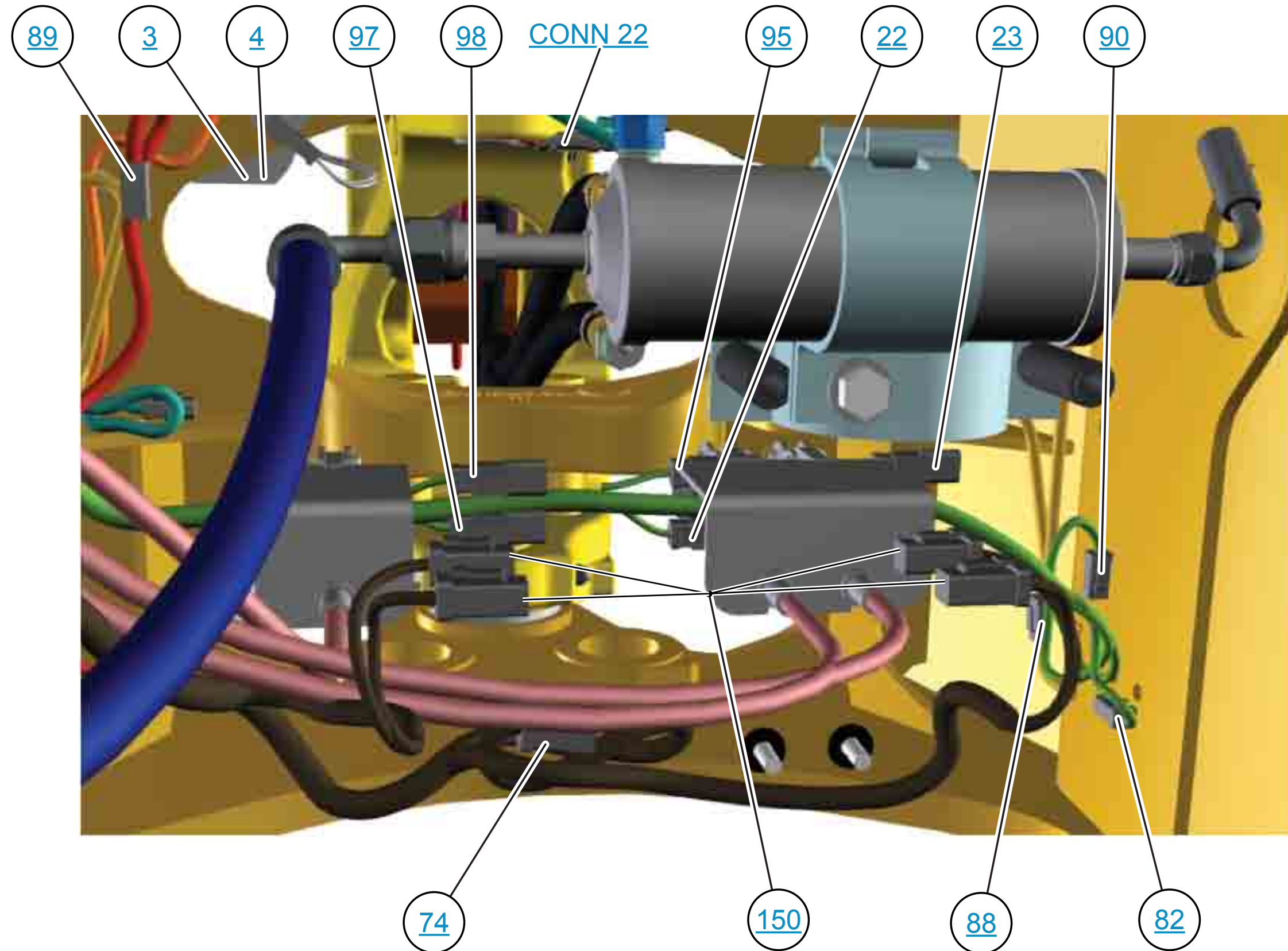
# FRONT UNDER PLATFORM VIEW



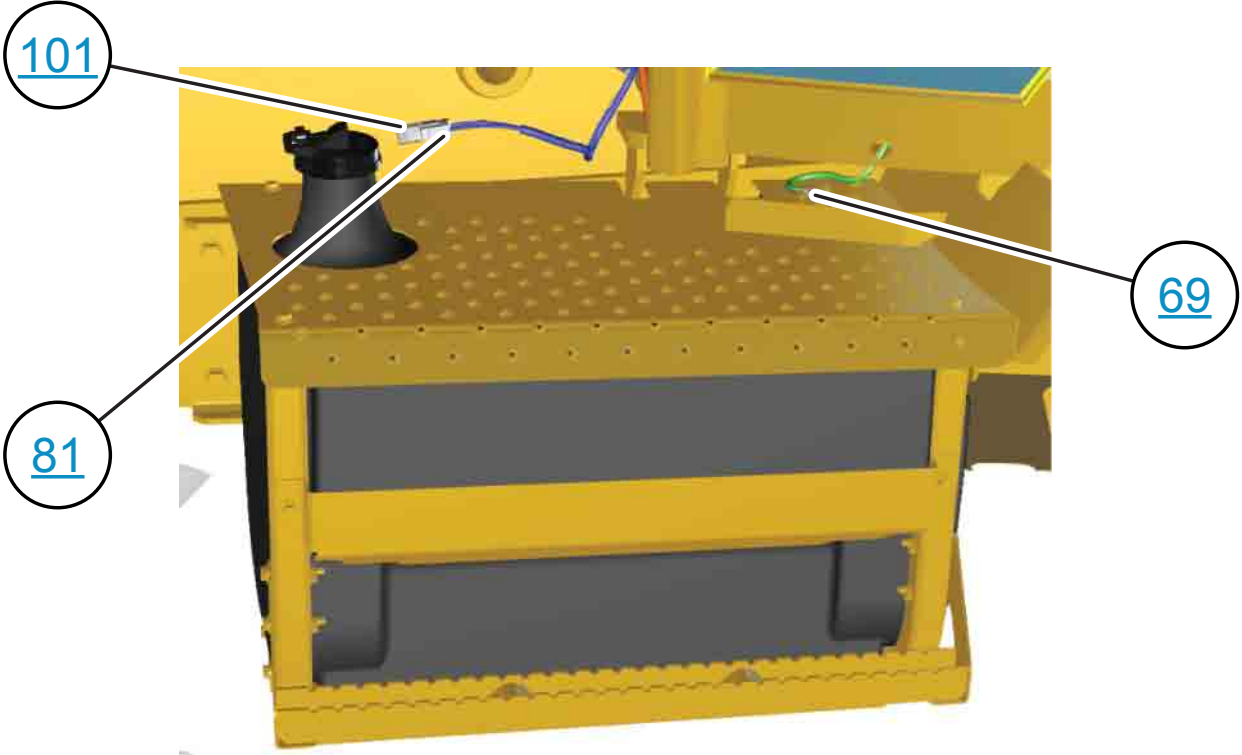
# UNDER PLATFORM VIEW - Right Side

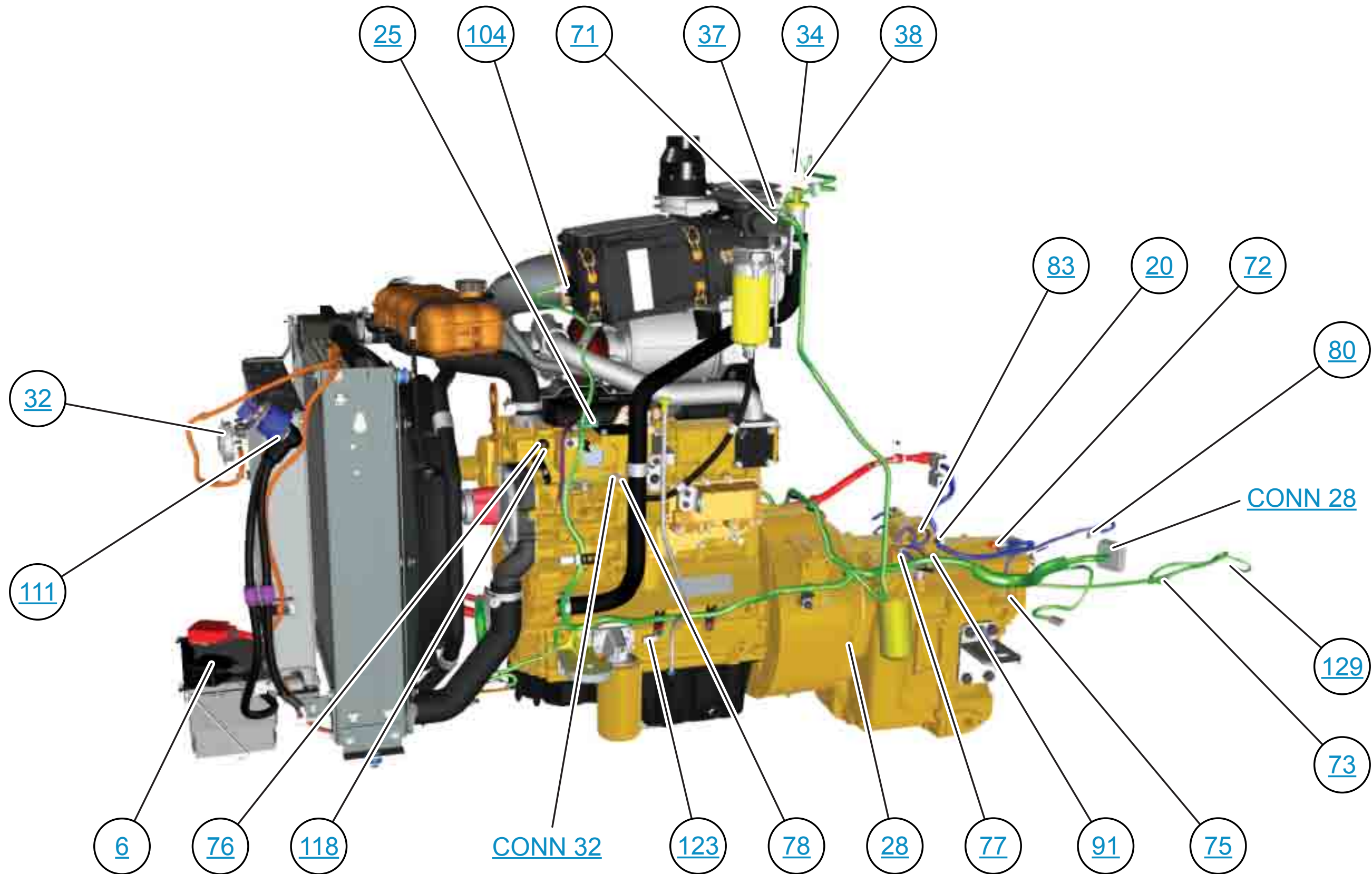




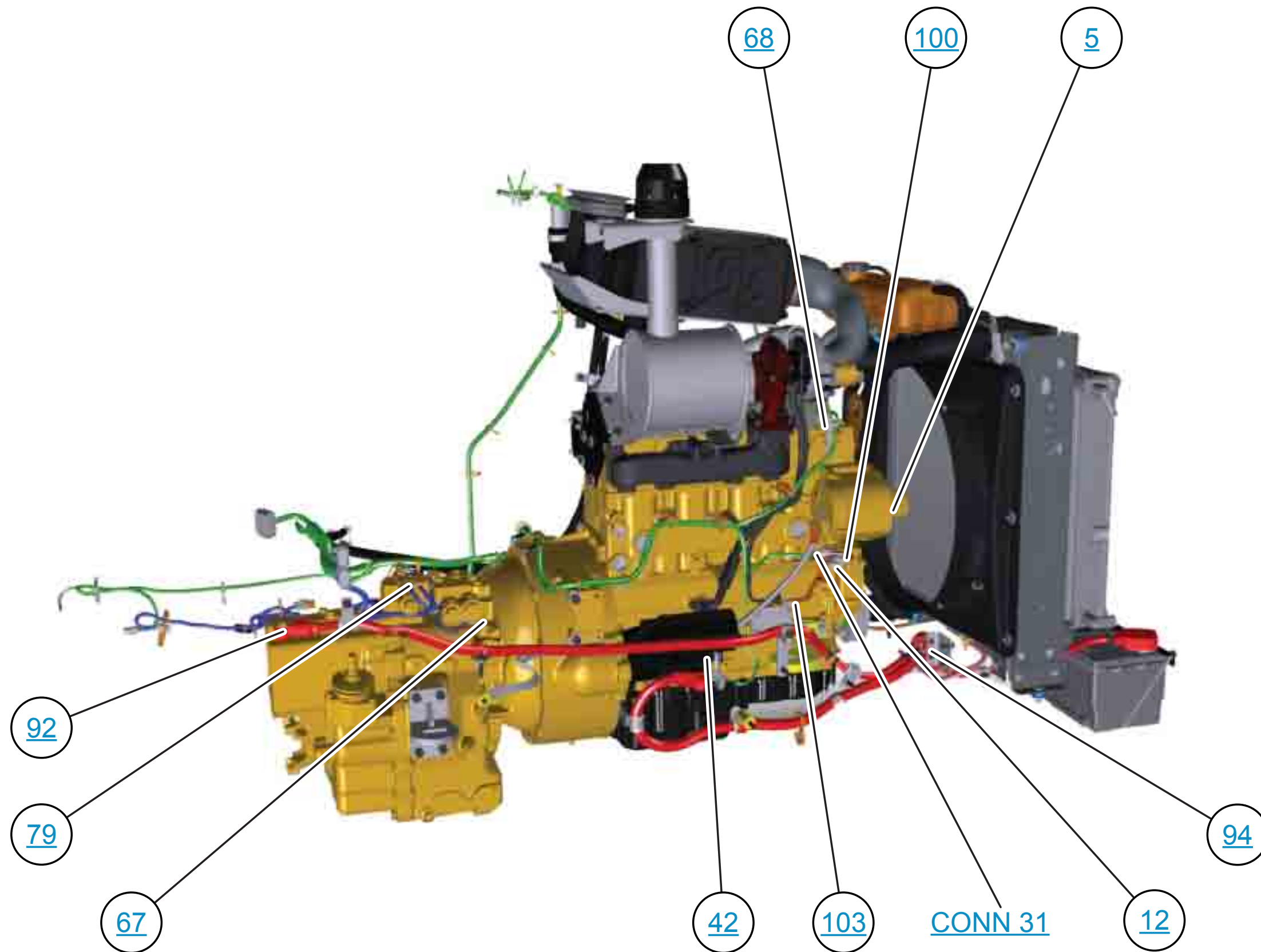


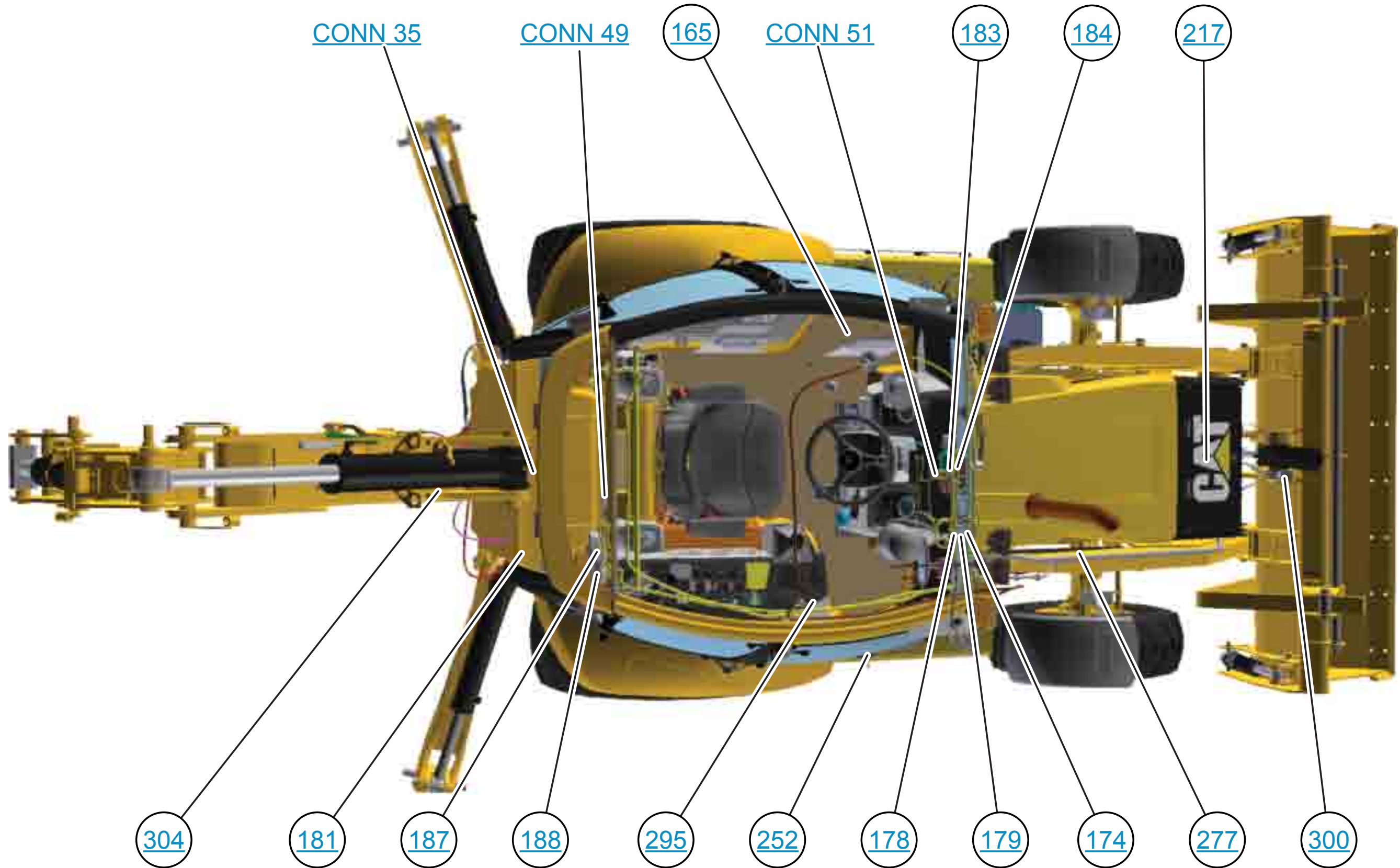
# FUEL TANK VIEW





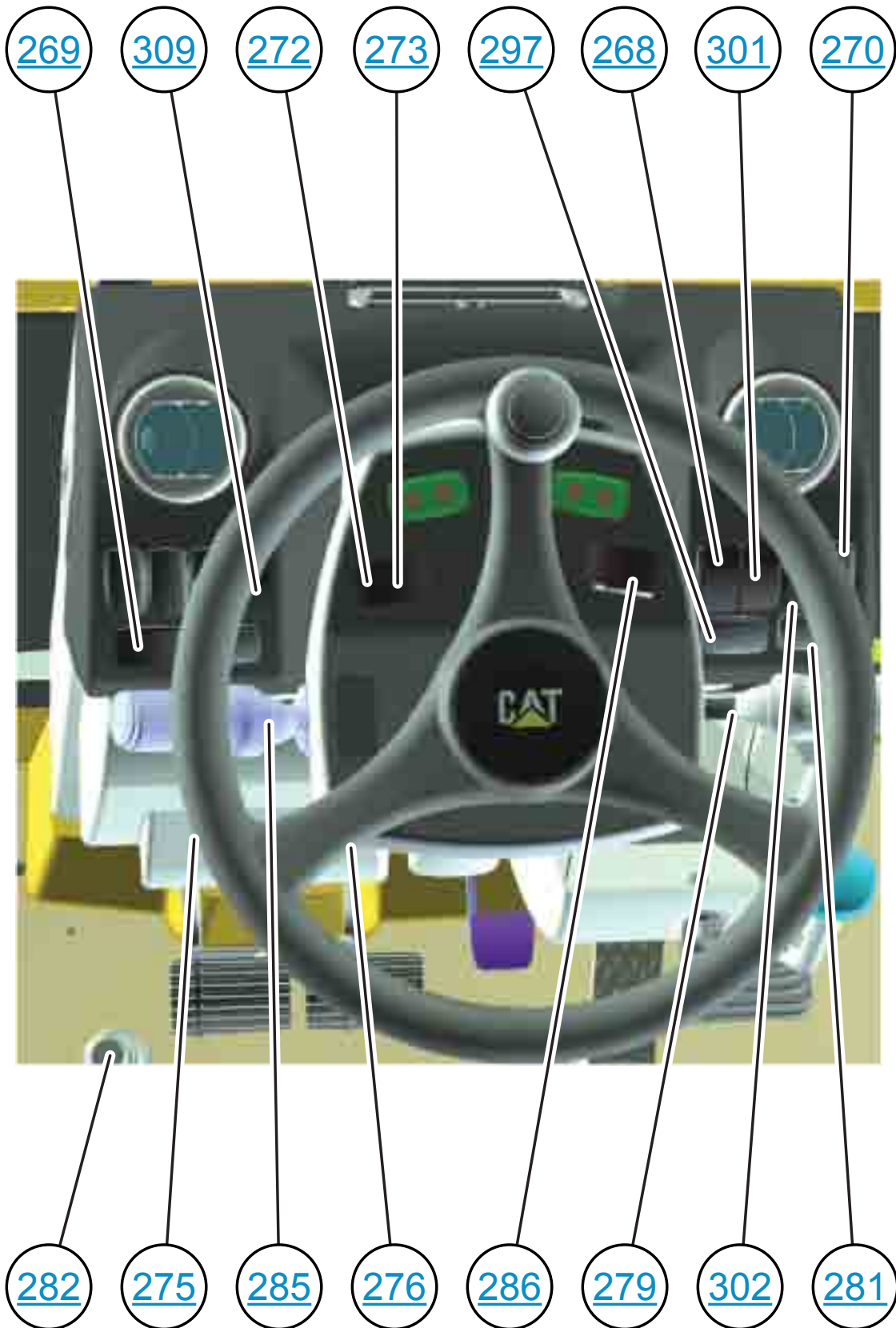




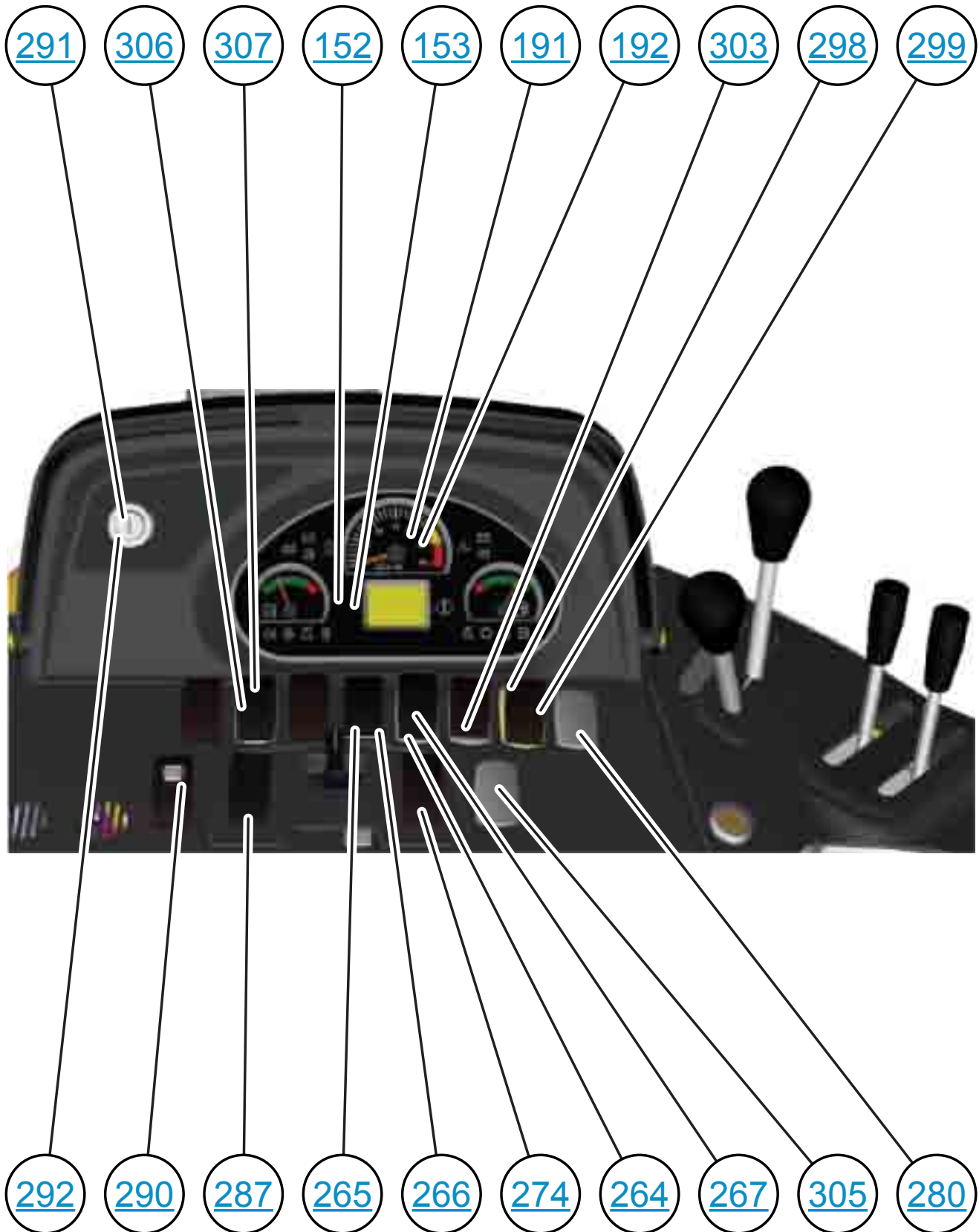




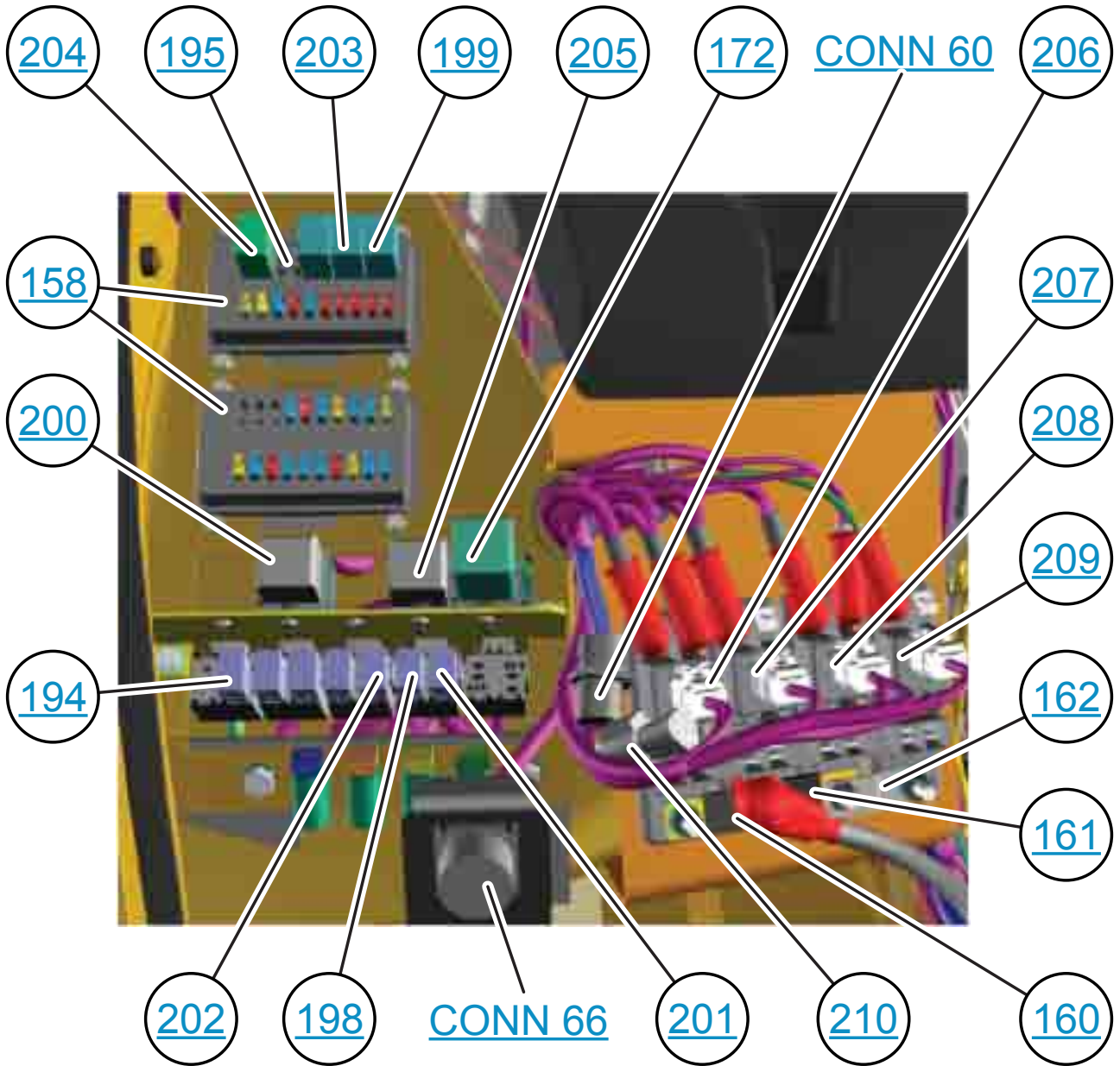
# STEERING CONSOLE VIEW



# RIGHT CONSOLE VIEW

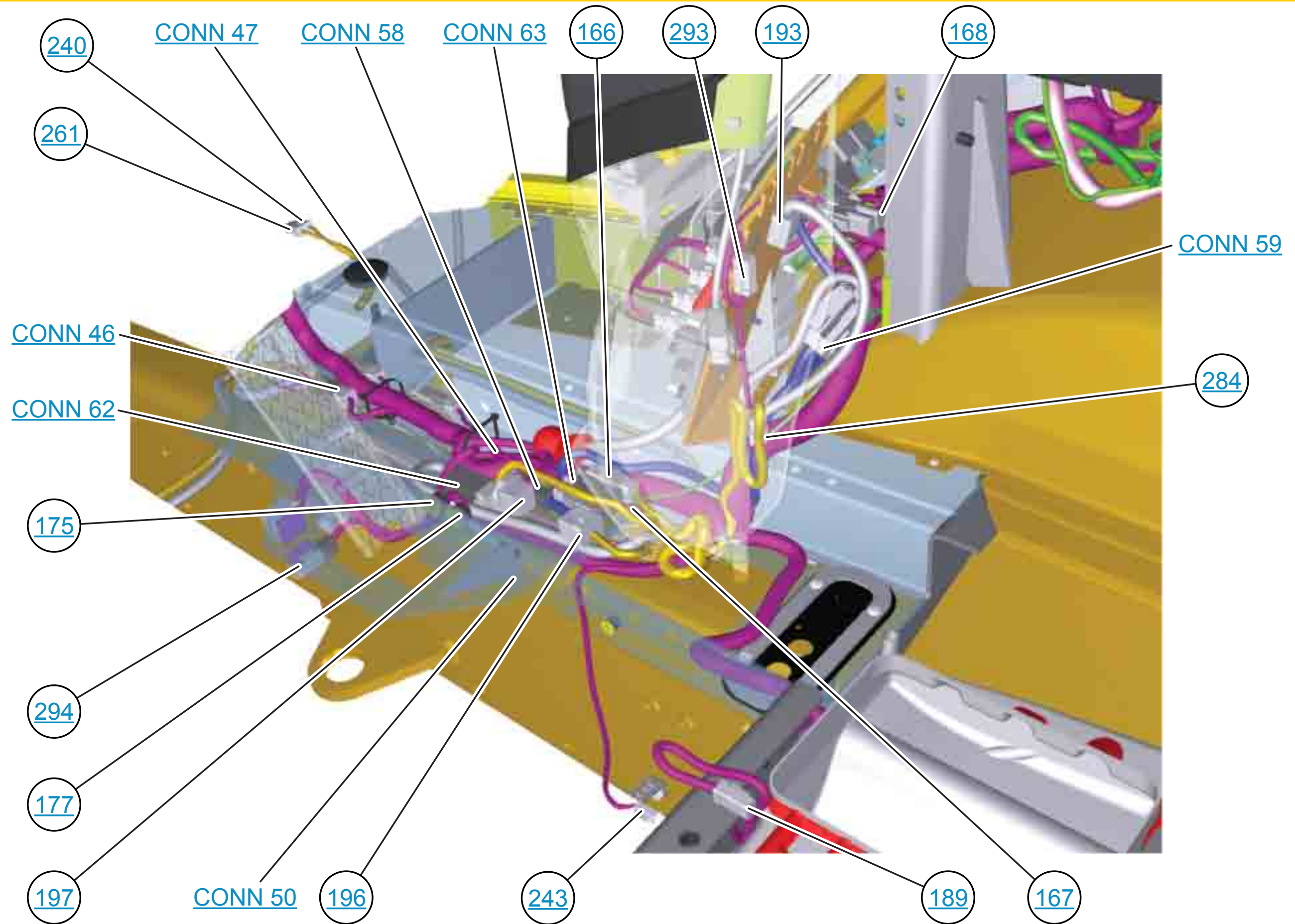


# FUSE / RELAY BLOCK VIEW

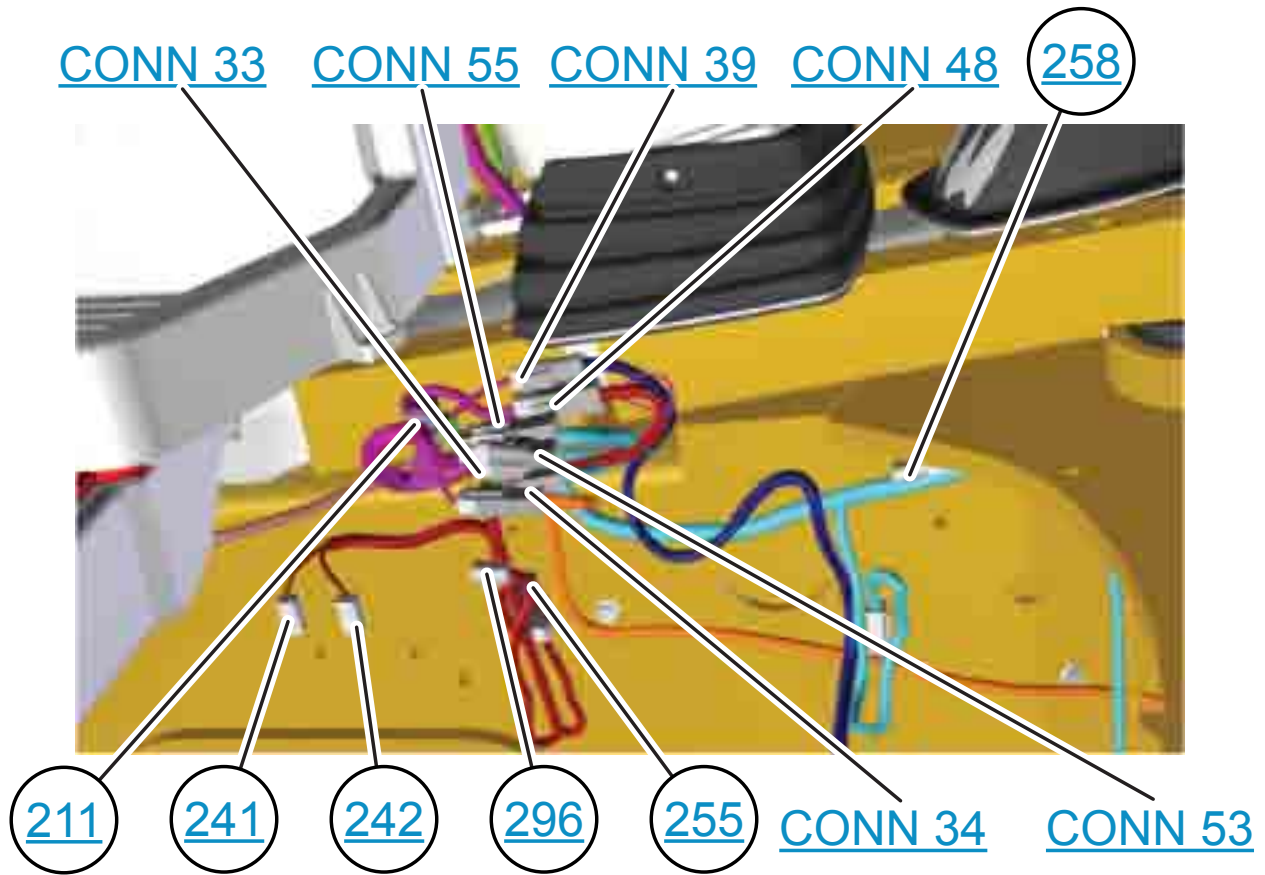




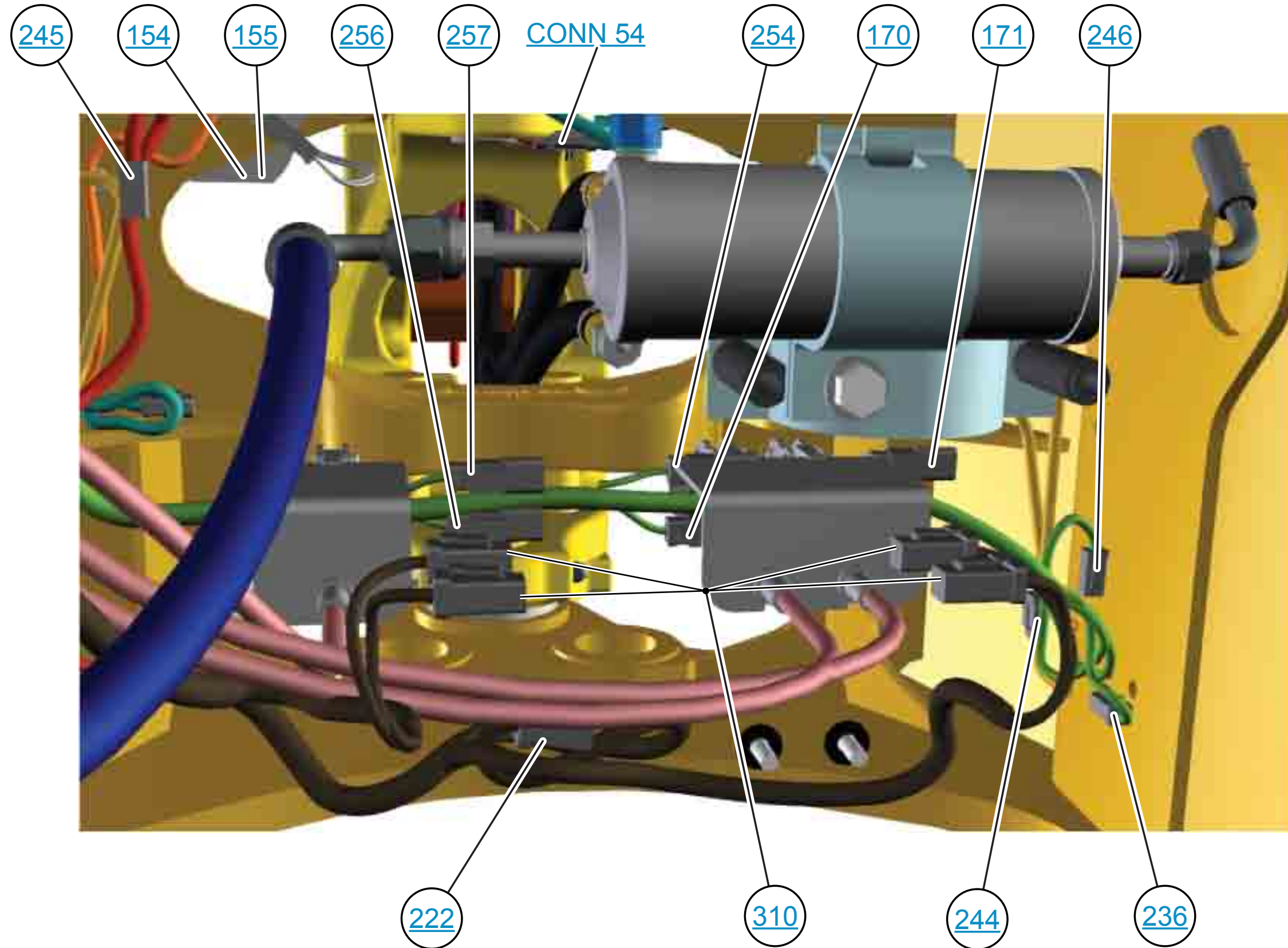
# FRONT UNDER PLATFORM VIEW



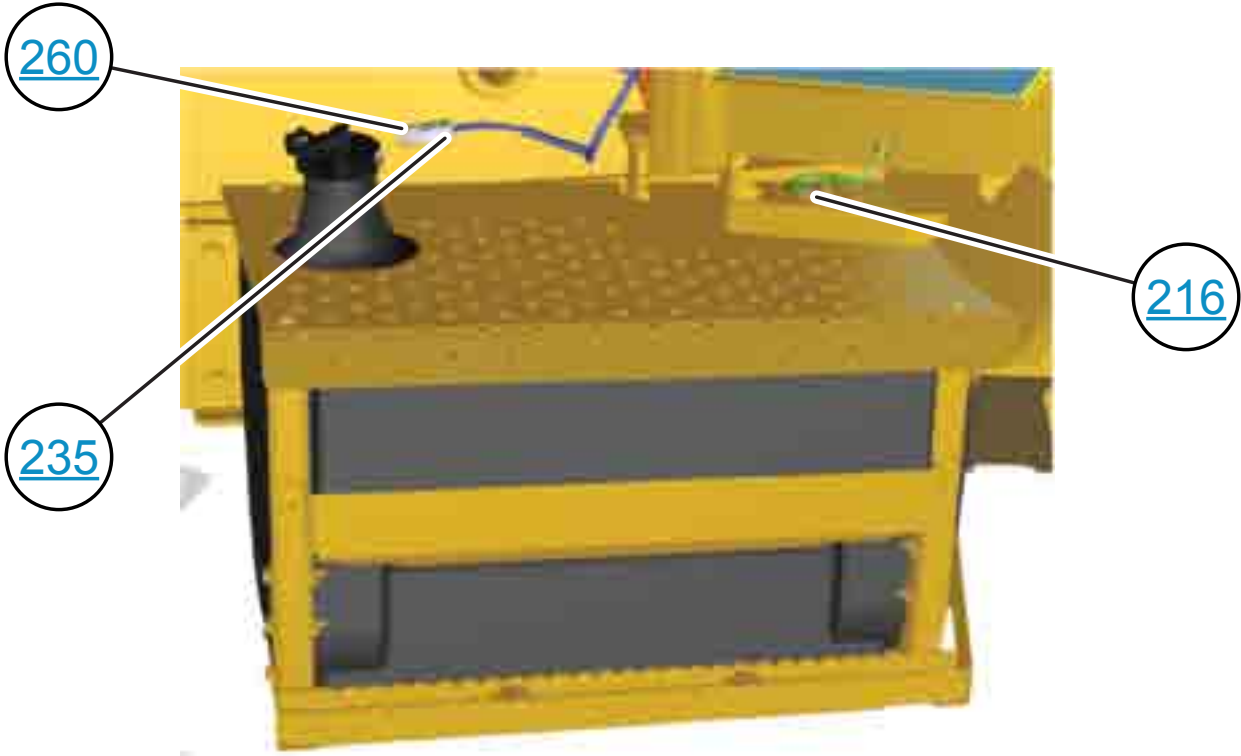
# RIGHT SIDE UNDER PLATFORM VIEW







# FUEL TANK VIEW





# AUTOSHIFT TRANSMISSION VIEW

