CATERPILLAR®

Service Manual

Models
TH336, TH337, TH406, TH407, TH414, TH514, TH417

S/N TDE00100 & After
S/N TDF00100 & After
S/N TBX00100 & After
S/N TBY00100 & After
S/N TBZ00100 & After
S/N TBW00100 & After
S/N TBT00100 & After

31200370

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2.3.4 Electrical System

Battery:	
Type, Rating	12 V, Negative (-) Ground, Tapered Top Post, Maintenance Free
Quantity	1 - (2 - If Equipped)
Cranking Performance	1 - 900 Cold Cranking Amps @ -18° C (0° F) (2 - If Equipped), 750 Cold Cranking Amps @ -18° C (0° F) each
Group/Series	BCI Group 31
Alternator	12V, 100 Amps (74 kW) 12V, 120A (93kW)
Starter	12V, R2,7 KW

2.3.5 Engine Performance Specifications

Description	74 kW	93kW
Engine Make/Model	CAT C4.4	CAT C4.4
Displacement	4,5 liters (276 in³)	4,5 liters (276 in³)
Low Idle	950 ±50 rpm	950 ±5 rpm
High Idle	2350 ±50 rpm	2350 ±5 rpm
Horsepower	74,5 kW (99.9 HP) @ 2400 rpm	93,1 kW (124.8 HP) @ 2400 rpm
Peak Torque	410 Nm (302 lb-ft) @ 1400 rpm	496 Nm (365 lb-ft) @ 1400 rpm
Fuel Delivery	Fuel Injection	Common Rail
Air Cleaner	Dry Type, Replaceable Primary and Safety Elements	Dry Type, Replaceable Primary and Safety Elements

2.3.6 Transmission Performance Specifications

Description	74 kW	93kW
Low Stall Speed	1945 rpm	2070 rpm
High Stall Speed	2125 rpm	2220 rpm

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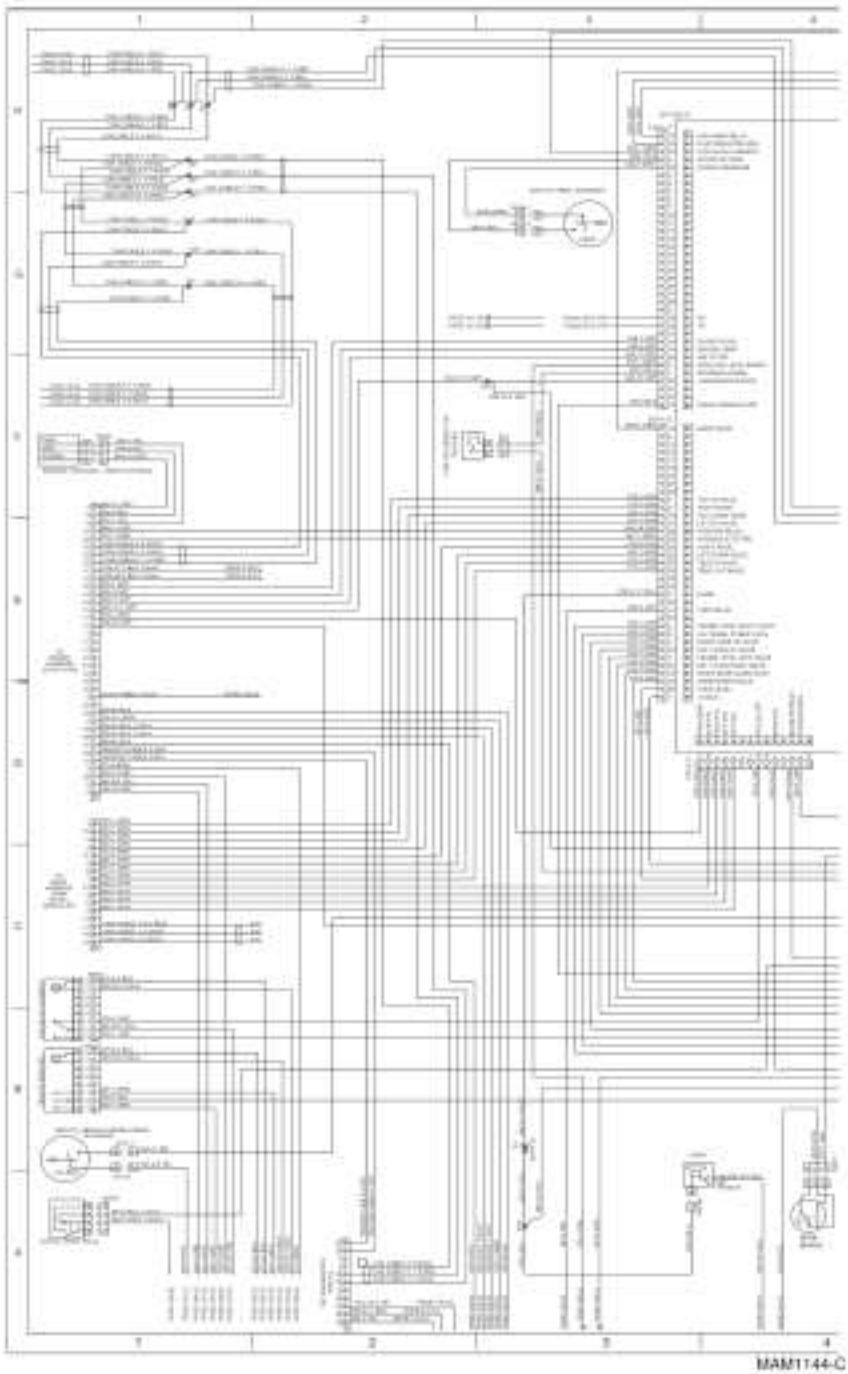
9.8 ELECTRICAL SYSTEM SCHEMATICS

Refer to Electrical Schematic Package (P/N 31200483)

9.8.1 Cab Harness Electrical Schematic 1 of 3

TH336 Before S/N TDE00337 excluding TDE00297-313, 328 & 332, TH337 Before S/N TDF00329 excluding TDF00297, 299-302, 317, 320, 321, 323, 324 & 327, TH406 Before S/N TBX00454, TH407 Before S/N TBY01110 including TBY01121, 1122 & 1128, TH414 Before S/N TBZ00561, TH514 Before S/N TBW00201, TH417 Before S/N TBT00216 (Sheet 2 of 12)

Note: *Sheet 1 of 12 not included in electrical schematic intentionally.*



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9.19.3 Transmission Fault Codes

SPN	SPN Description	FMI	FMI Description	Warning Level
678	ECU 8 Volts DC Supply	3	Voltage Above Normal	2
678	ECU 8 Volts DC Supply	4	Voltage Below Normal	2
168	Electrical Potential (voltage)	3	Valid & Above Normal Range	2
168	Electrical Potential (voltage)	4	Valid & Below Normal Range	2
639	J1939 Network #1	9	Abnormal Update	2
525	Transmission Requested Gear	19	Received Network Data in Error	2
683	Disengage Driveline Request	19	Received Network Data in Error	2
177	Transmission Oil Temperature	3	Voltage Above Normal	2
177	Transmission Oil Temperature	4	Voltage Below Normal	2
190	Engine Speed	19	Received Network Data in Error	2
191	Transmission Output Shaft Speed	2	Data Erratic, Intermittent or Incorrect	1
161	Transmission Input Shaft Speed	2	Data Erratic, Intermittent or Incorrect	1
4216	Transmission Reverse Solenoid Valve	3	Voltage Above Normal	3
4216	Transmission Reverse Solenoid Valve	5	Current Below Normal	2
4216	Transmission Reverse Solenoid Valve	6	Current Above Normal	2
741	Transmission Forward Solenoid Valve	3	Voltage Above Normal	3
741	Transmission Forward Solenoid Valve	5	Current Below Normal	2
741	Transmission Forward Solenoid Valve	6	Current Above Normal	2
734	Transmission Range Clutch Solenoid #1	3	Voltage Above Normal	3
734	Transmission Range Clutch Solenoid #1	5	Current Below Normal	2
734	Transmission Range Clutch Solenoid #1	6	Current Above Normal	2
735	Transmission Range Clutch Solenoid #2	3	Voltage Above Normal	3
735	Transmission Range Clutch Solenoid #2	5	Current Below Normal	2
735	Transmission Range Clutch Solenoid #2	6	Current Above Normal	2
736	Transmission Range Clutch Solenoid #3	3	Voltage Above Normal	3
736	Transmission Range Clutch Solenoid #3	5	Current Below Normal	2
736	Transmission Range Clutch Solenoid #3	6	Current Above Normal	2
737	Transmission Range Clutch Solenoid #4	3	Voltage Above Normal	3
737	Transmission Range Clutch Solenoid #4	5	Current Below Normal	2
737	Transmission Range Clutch Solenoid #4	6	Current Above Normal	2
738	Transmission Range Clutch Solenoid #5	3	Voltage Above Normal	3

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Neutral Into First Gear (End of Shift) (FORWARD)

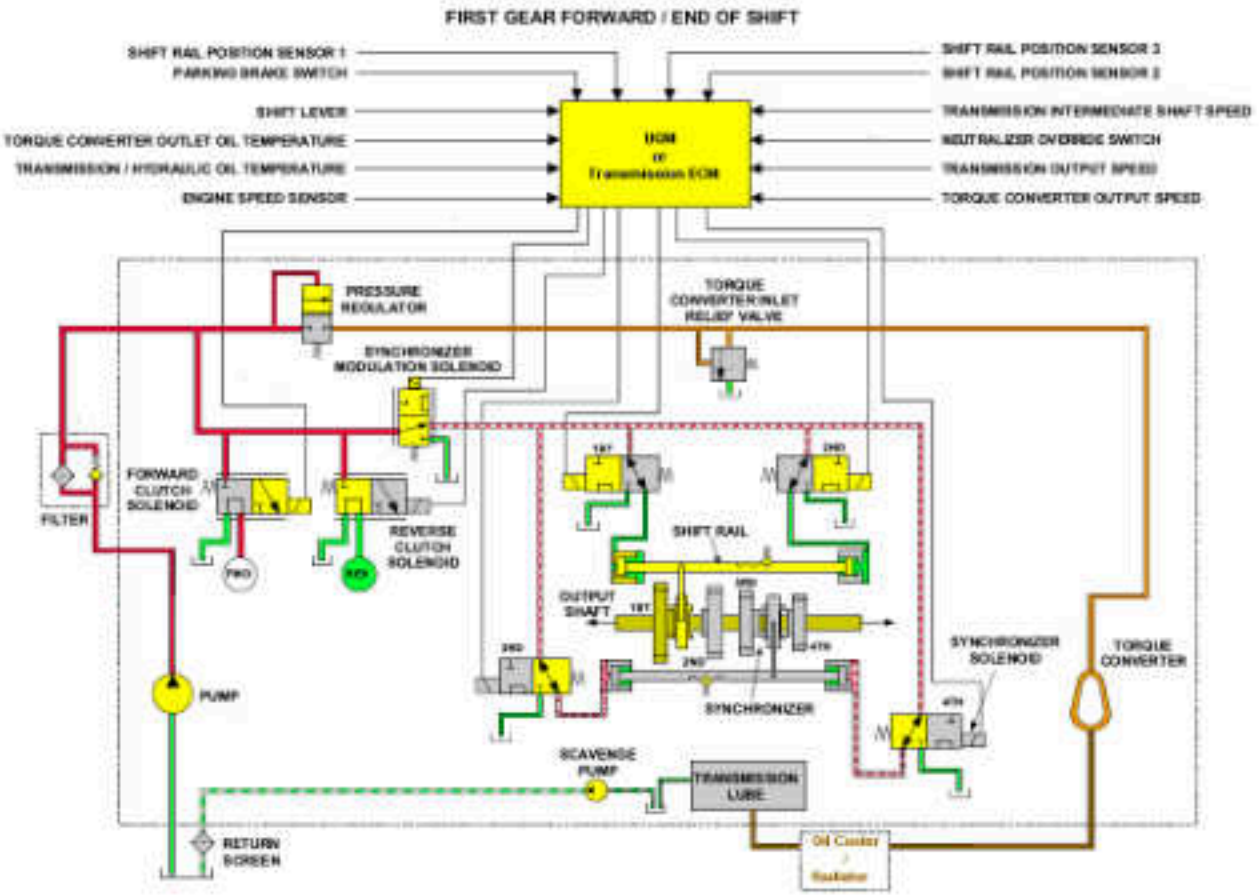


Illustration 51

The position sensor detects the position of the shift rail. When the shift rail is in the ENGAGED Position, the solenoid for the synchronizer that is on the opposite end of the same shift rail is energized. The oil that is on that end of the shaft is sent to the tank. The gear is kept in the engaged position by the spring and ball detents that are in the synchronizers.

When a gear change is made, all energized solenoids for the synchronizer are de-energized. Oil is then sent to both ends of the shift rail and the shift rail is moved to the NEUTRAL Position. There is a double piston arrangement on each end of each shift rail. The smaller piston is used to push the shift rail into gear and the larger piston is used to shift that particular shift rail into neutral.

For example, the port for the small piston is blocked on the "in gear end" of the shift rail and the oil acts on the large piston. The oil on the other end of the shift rail is acting on the small piston. This imbalance pushes the shift rail to the Neutral Position. As the shift rail gets closer to the NEUTRAL Position, less oil acts on the large piston and more oil acts on the small piston. When neutral for that particular shift rail is attained, oil on both ends of the shaft acts on the small piston and the shaft stops moving. The spring and ball detents hold the shift rail in the NEUTRAL Position.

When the transmission control lever is placed into the NEUTRAL Position, only the direction clutch is disengaged and the synchronizers stay in gear.

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Systems Operation Section

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Graphic Color Codes

SMCS Code: 4000

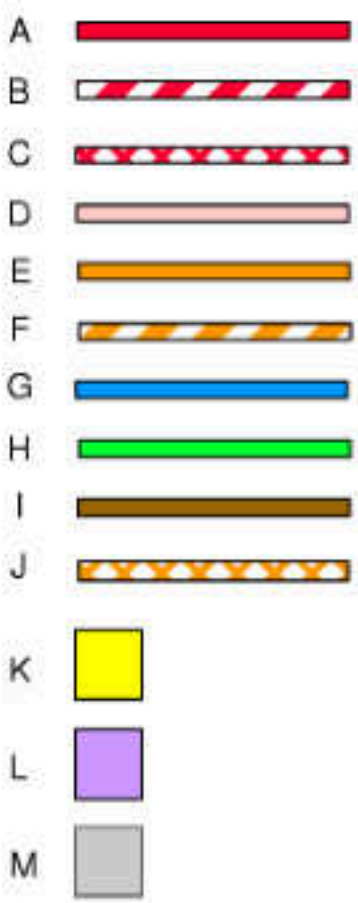


Illustration 1 g01023555

(A) Red ..... High pressure oil

(B) Red Stripes and White Stripes ..... First pressure reduction

(C) Red Crosshatch ..... Second pressure reduction

(D) Pink ..... Third pressure reduction

(E) Orange ..... Pilot, signal or torque converter oil

(F) Orange Stripes and White Stripes ..... Reduced pilot, signal or torque converter oil

(G) Blue ..... Trapped oil

(H) Green ..... Tank, sump or return oil

(I) Brown ..... Lubricating oil

(J) Orange Crosshatch ..... Second reduction in pilot, signal or torque converter oil

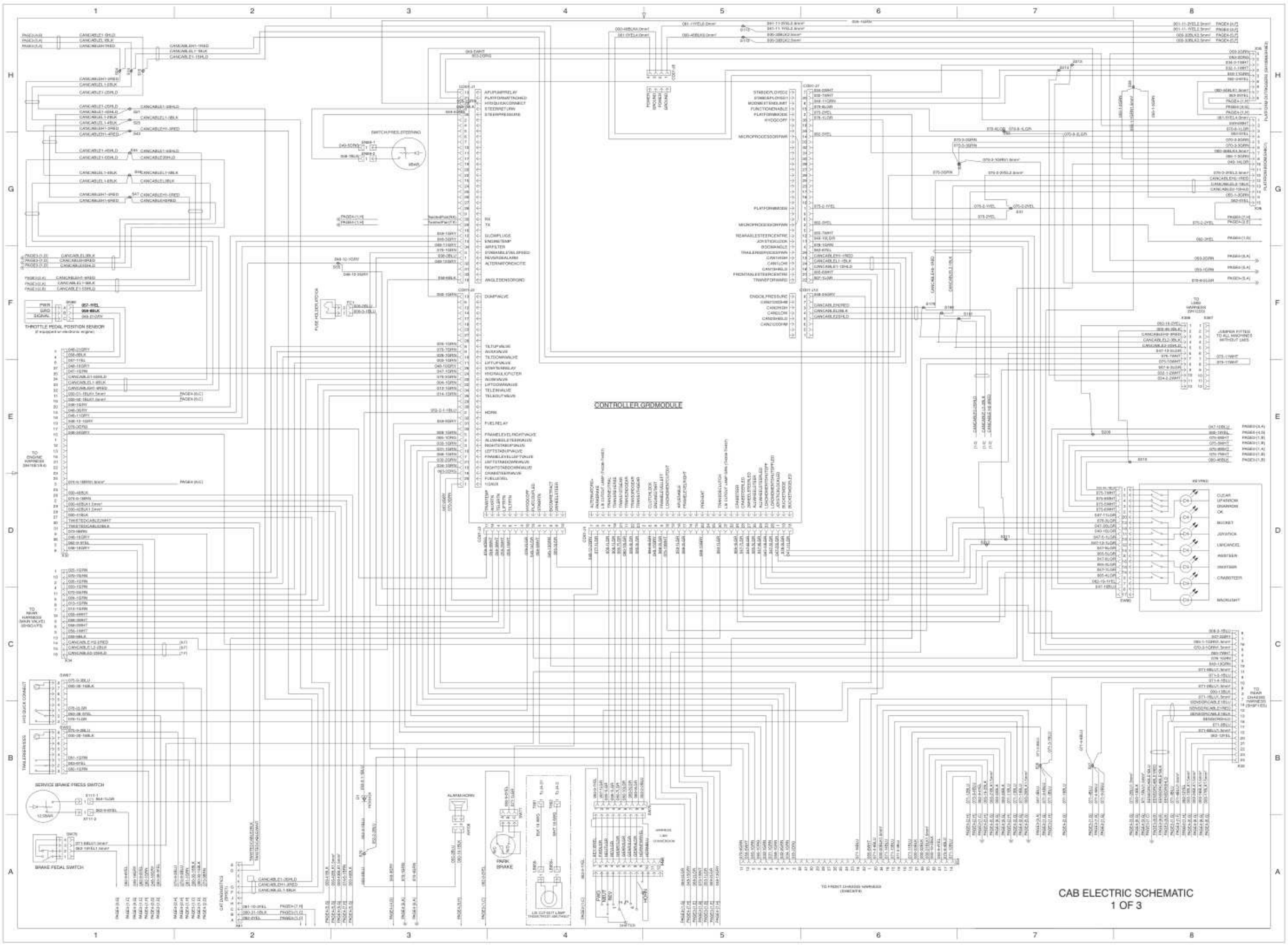
(K) Yellow ..... Moving or activated components

(L) Purple ..... Pneumatic pressure

(M) Light Gray ..... Surface color

Note: The information that is covered in this manual may not require all of the colors in Illustration 1.

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S/N TBZ00561 & After
S/N TBW00201 & After
S/N TBT00216 & After

TH336, TH337, TH406, TH407, TH414, TH514, TH417
Electrical Schematic
31200720

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