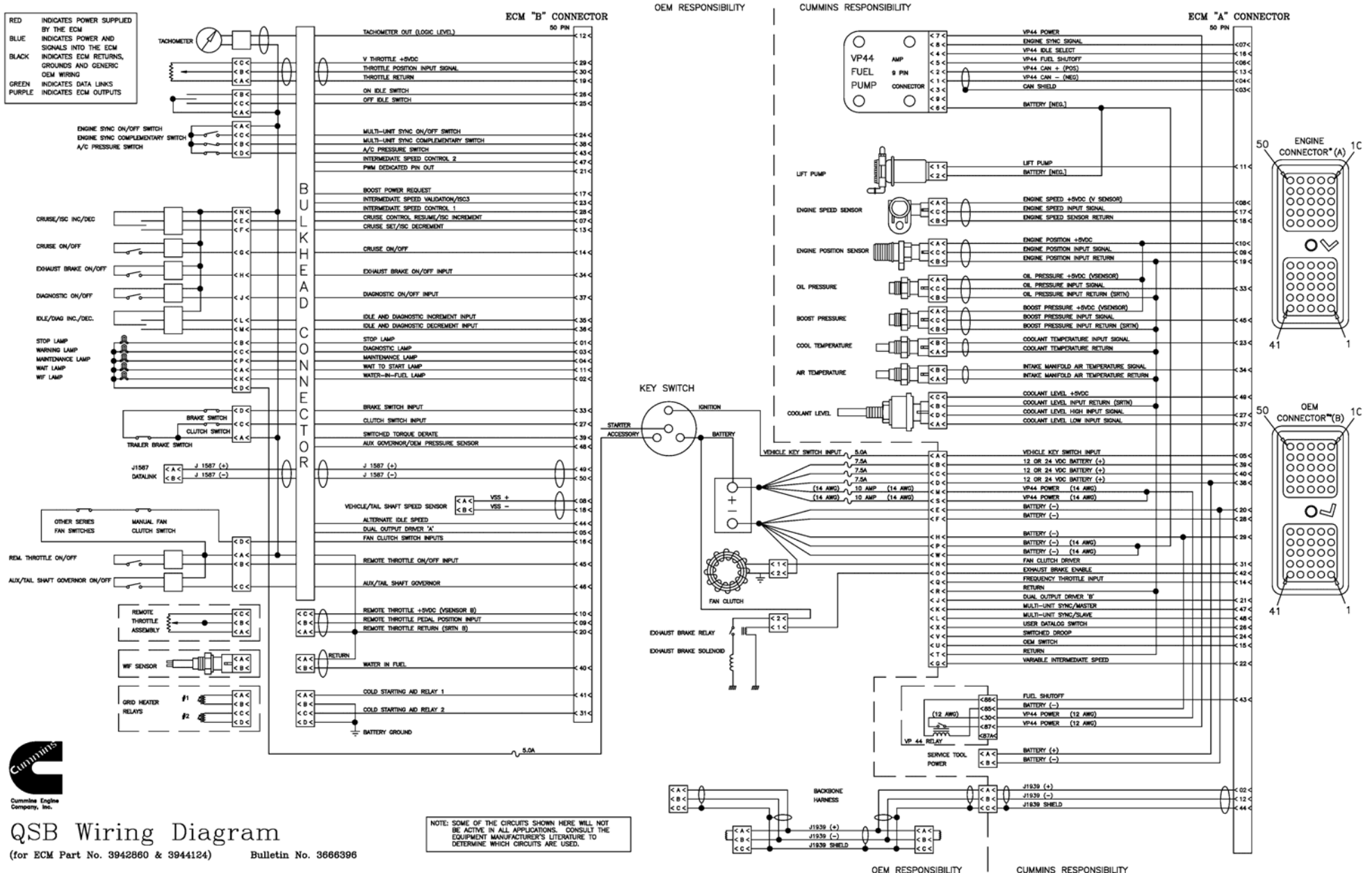


Section VII – Wiring Diagrams

QSB WIRING DIAGRAM

RED INDICATES POWER SUPPLIED BY THE ECM
 BLUE INDICATES POWER AND SIGNALS INTO THE ECM
 BLACK INDICATES ECM RETURNS, GROUNDS AND GENERIC OEM WIRING
 GREEN INDICATES DATA LINKS
 PURPLE INDICATES ECM OUTPUTS

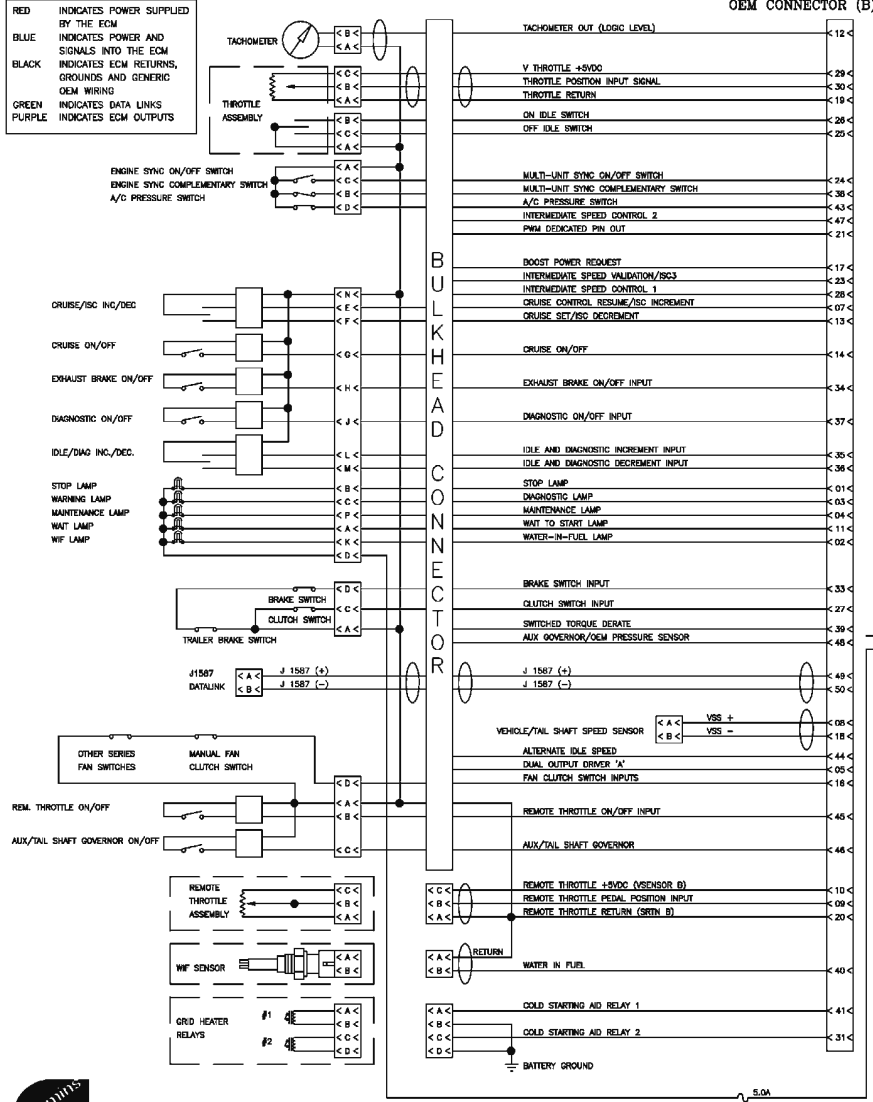


Cummins
 Cummins Engine Company, Inc.

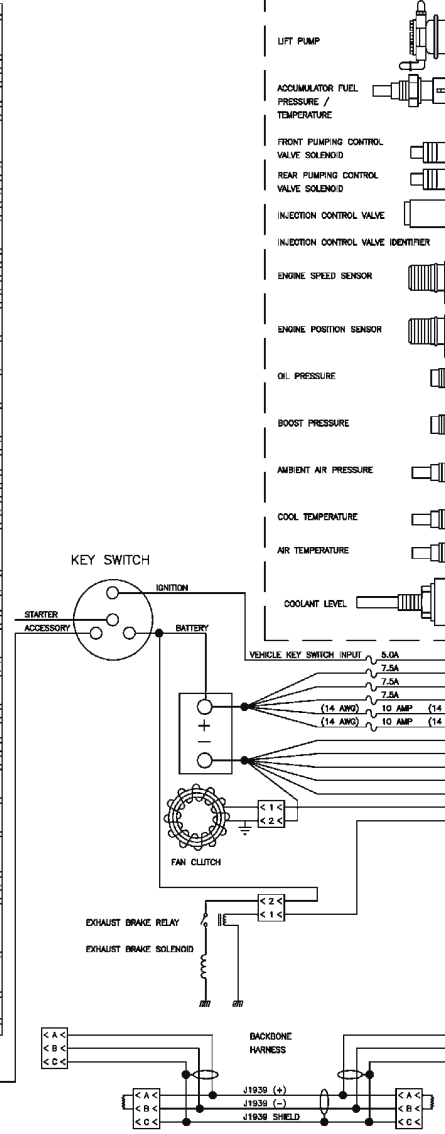
QSB Wiring Diagram
 (for ECM Part No. 3942860 & 3944124) Bulletin No. 3666396

QSC WIRING DIAGRAM

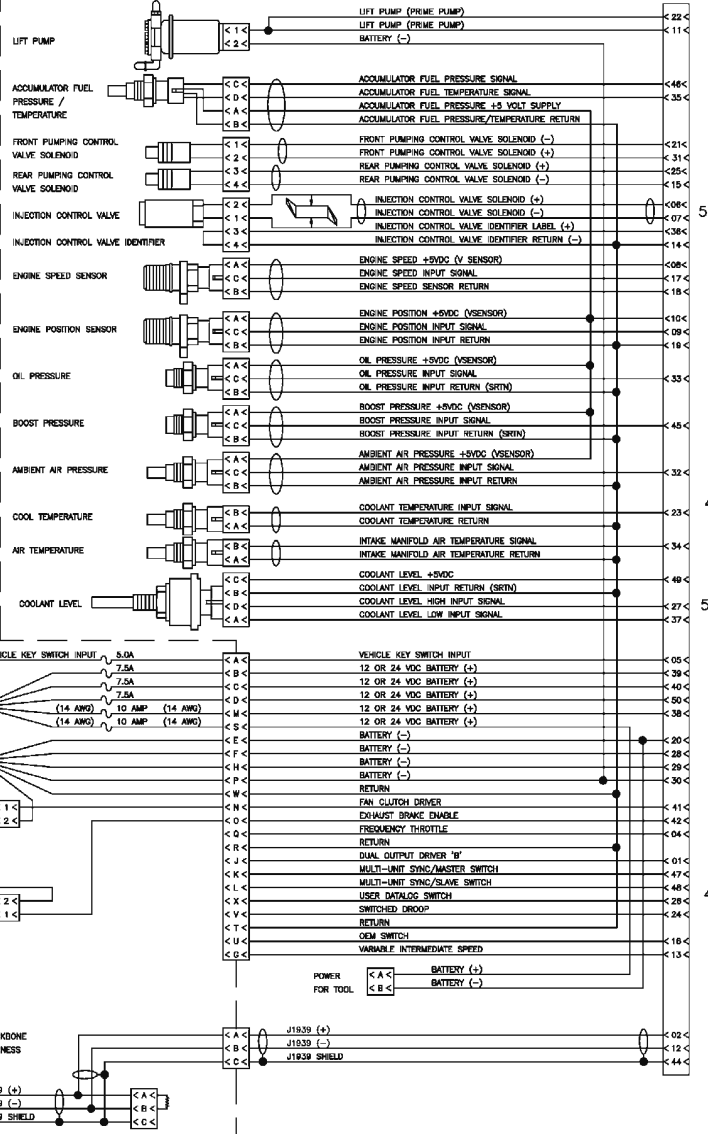
RED INDICATES POWER SUPPLIED BY THE ECM
 BLUE INDICATES POWER AND SIGNALS INTO THE ECM
 BLACK INDICATES ECM RETURNS, GROUNDS AND GENERIC OEM WIRING
 GREEN INDICATES DATA LINKS
 PURPLE INDICATES ECM OUTPUTS



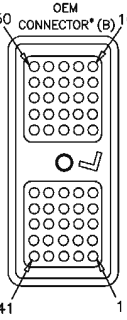
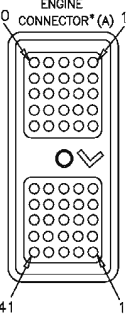
OEM RESPONSIBILITY



CUMMINS RESPONSIBILITY



ENGINE CONNECTOR (A)

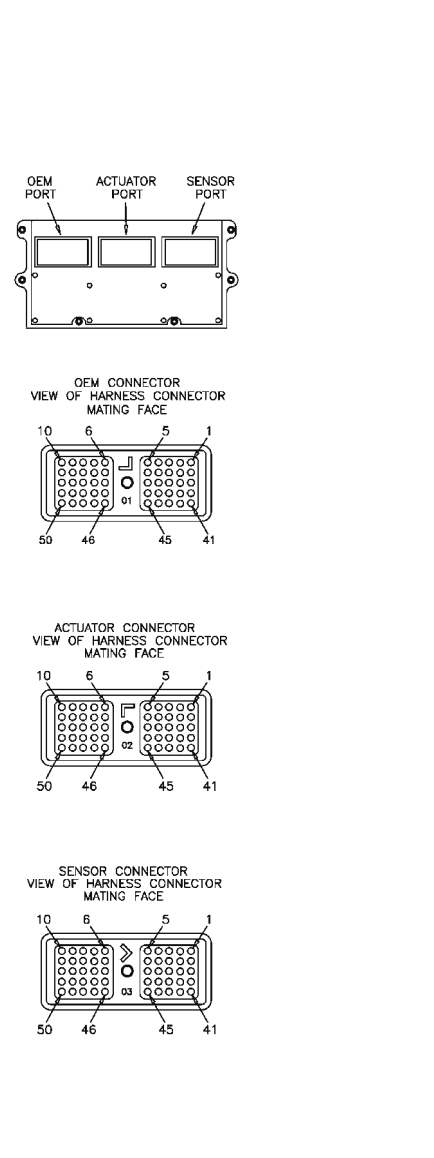
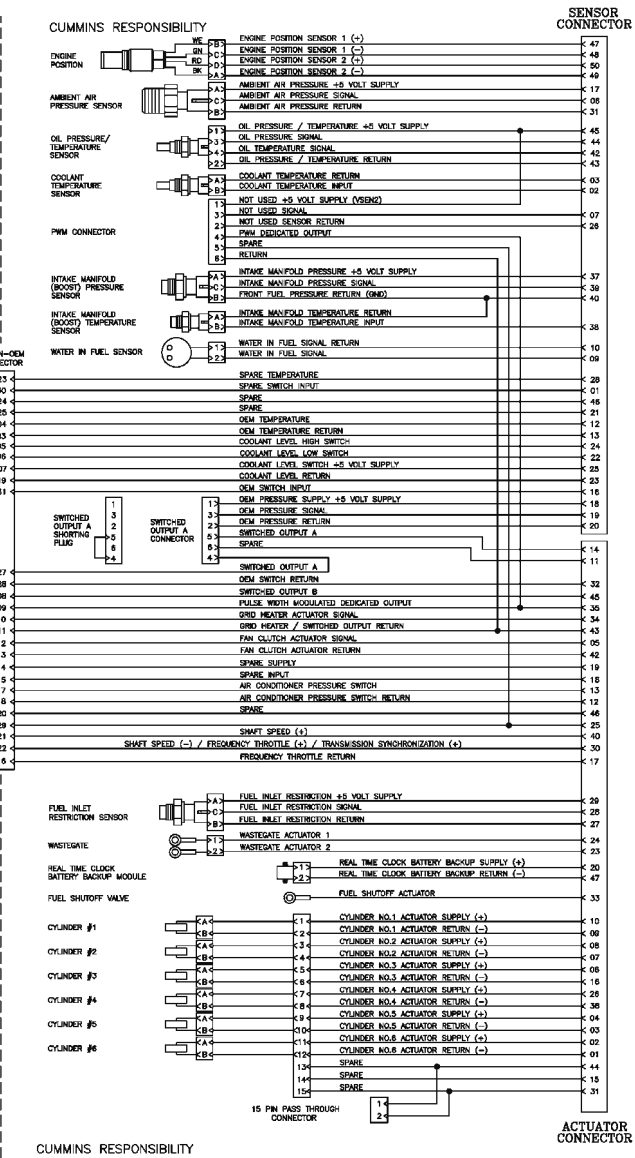
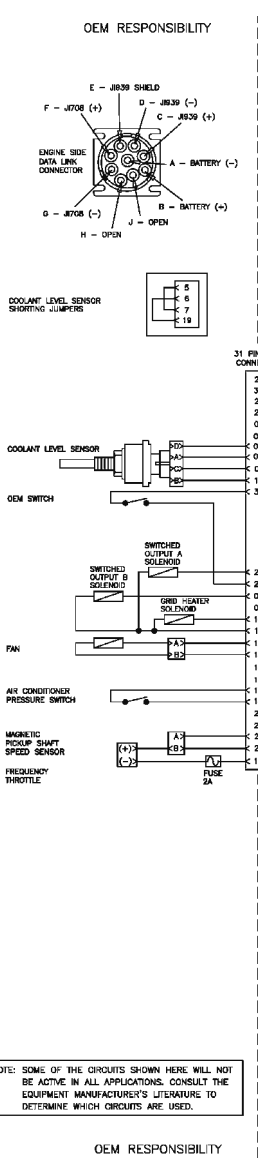
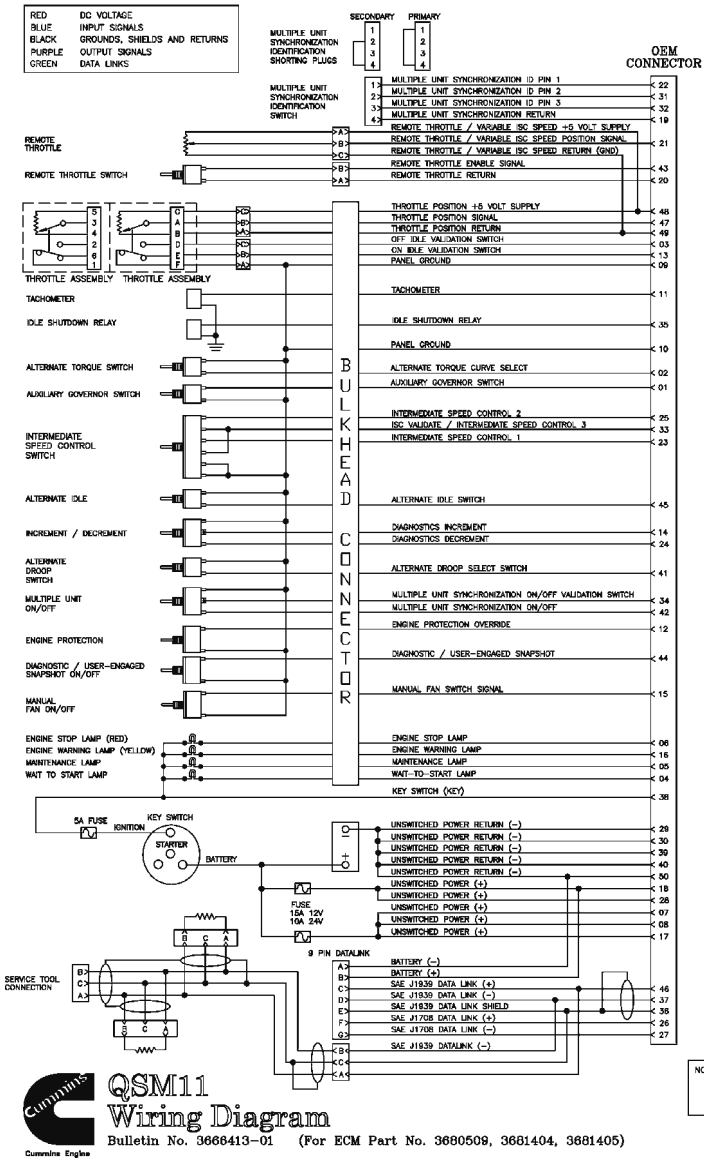


NOTE: SOME OF THE CIRCUITS SHOWN HERE WILL NOT BE ACTIVE IN ALL APPLICATIONS. CONSULT THE EQUIPMENT MANUFACTURER'S LITERATURE TO DETERMINE WHICH CIRCUITS ARE USED.



QSC Wiring Diagram
(for ECM Part No. 3944105) Bulletin No. 3668395

QSM11 WIRING DIAGRAM



* Engine Brake Select 1 shares pin 22 w/ Multi-Unit Sync
 * Engine Brake Select 2 shares pin 31 w/ Multi-Unit Sync

* Pin 30 on the 31-pin OEM connector is Alternate Torque Select Switch 2
 * Pin 44 on the Actuator Conn. is Engine Brake Driver 1 and pin18 is Engine Brake Driver

Pin Mapping

QSB - OEM 50 Pin connector

Pin	Pinout Type	Signal Name	Feature
1	600 mA current sink to ground	Stop Lamp	Engine Protection/Diagnostics
2	600 mA current sink to ground	Water In Fuel Lamp	Water-In-Fuel
3	600 mA current sink to ground	Diagnostic Lamp	Diagnostics
4	600 mA current sink to ground	Maintenance Lamp	Diagnostics
5	600 mA current sink to ground	Dual Output Driver A	Dual Outputs
7	<50 ohm Closed, 50Kohm Open	Cruise Control/ISC Increment/ ISC Resume	Cruise Control/ISC Increment
8	Vehicle/Tail Shaft Speed Sensor	Vehicle Speed Sensor Positive Input	Vehicle Speed
9	Remote Throttle Sensor	Remote Throttle Analog Input	Remote Throttle
10	Remote throttle (VsensorB)	Remote Throttle +5Vdc	Remote Throttle
11	600 mA current sink to ground	Wait to Start Lamp	Intake Air Heater/Grid Heater
12	Frequency Output	Tachometer Out (Logic Level)	Tachometer
13	<50 ohm Closed, 50Kohm Open	Cruise Set/ISC Decrement	Cruise Control/ISC Decrement
14	<50 ohm Closed, 50Kohm Open	Cruise On/Off	Cruise Control
15		Reserved	
16	<50 ohm Closed, 50Kohm Open	Fan Clutch Switch Inputs	Fan Clutch
17	<50 ohm Closed, 50Kohm Open	Boost Power Request Switch	Boost Power
18	Vehicle Speed Sensor	Vehicle Speed Sensor Negative Input	Vehicle Speed
19	Ground	Throttle Return	Throttle
20	Ground	Remote Throttle Return	Remote Throttle
21	3 amps	Dedicated PWM Output	Dedicated PWM
22		Reserved	
23	<50 ohm Closed, 50Kohm Open	ISC 3 / ISC Validation Switch	Intermediate Speed Control
24	50 ohm Closed, 50Kohm Open	Multi-Unit Sync On/Off Switch Input	Multi-Unit Sync
25	125 ohm Closed, 50 Mohm Open	Off Idle Switch	Idle Validation
26	<125 ohm Closed, 50 Mohm Open	On Idle Switch	Idle Validation
27	<50 ohm Closed, 50Kohm Open	Clutch Switch Input	Exhaust Brakes
28	<50 ohm Closed, 50Kohm Open	ISC 1 Switch	Intermediate Speed Control
29	+5 Vdc supply	Throttle\Potentiometer +5 Vdc	Throttle
30	Throttle Position Sensor	Throttle Position Input Signal	Throttle
31	1 amp, Hi side Drive	Cold Starting Aid Relay 2	Intake Air Heater/Grid Heater
32		Reserved	
33	<50 ohm Closed, 50Kohm Open	Brake Switch	Exhaust Brakes
34	<50 ohm Closed, 50Kohm Open	Exhaust Brake On/Off Switch	Exhaust Brakes
35	<50 ohm Closed, 50Kohm Open	Idle and Diagnostic Increment Switch	Diagnostics, Low Idle Gov.
36	<50 ohm Closed, 50Kohm Open	Idle and Diagnostic Decrement Switch	Diagnostics, Low Idle Gov., ISC
37	<50 ohm Closed, 50Kohm Open	Test (Diagnostic) On/Off Switch	Diagnostics

38	<50 ohm Closed, 50Kohm Open	Multi-Unit Sync Complementary Switch	Multi-Unit Sync
39	A/D Input	Alternate Torque Derate Switch Input	Alternate Torque
40	Water In Fuel Sensor	Water In Fuel Sensor	Water-In-Fuel
41	1 amp, Hi side drive	Cold Starting Aid Relay1	Intake Air Heater/Grid Heater
42		Reserved	
43	<125 ohm Closed, 50 Mohm Open	A/C Pressure Switch	Fan Clutch
44	<50 ohm Closed, 50Kohm Open	Alternate Idle Speed Switch Input	Alternate Idle
45	<50 ohm Closed, 50Kohm Open	Remote Throttle On/Off Switch	Remote Throttle
46	Switch (Pulled up)	Aux. Governor On/Off Switch	Auxiliary Speed Governor
47	<50 ohm Closed, 50Kohm Open	ISC 2 Switch	Intermediate Speed Control
48	A/D Input	OEM Pressure Sensor	OEM Pressure
49	Datalink	J1708/J1587 Datalink +	J1587 Datalink
50	Datalink	J1708/J1587 Datalink -	J1587 Datalink

QSC/QSL9 - OEM 50 Pin connector

Pin	Pinout Type	Signal Name	Feature
1	600 mA current sink to ground	Stop Lamp	Engine Protection/Diagnostics
2	600 mA current sink to ground	Water in Fuel Lamp	Water-In-Fuel
3	600 mA current sink to ground	Diagnostic Lamp	Diagnostics
4	600 mA current sink to ground	Maintenance Lamp	Diagnostics
5	600 mA current sink to ground	Dual Output Driver A	Dual Outputs
7	<50 ohm Closed, 50Kohm Open	CC/ISC Resume Switch Input	Cruise Control/ISC Increment
8	Vehicle/Tail Shaft Speed Sensor	Vehicle Speed Sensor + Input	Vehicle Speed
9	Remote Throttle Sensor	Remote Throttle Pedal Position Input	Remote Throttle
10	Remote throttle (VsensorB)	Remote Throttle +5VDC	Remote Throttle
11	600 mA current sink to ground	Wait to Start Lamp	Intake Air Heater/Grid Heater
12	Frequency Output	Tachometer Output (Logic Level)	Tachometer
13	Switch (Pulled up)	CC/ISC Set /Coast Switch Input	Cruise Control/ISC Decrement
14	<50 ohm Closed, 50Kohm Open	CC/On-OFF Switch Input	Cruise Control
15		Reserved	
16	<50 ohm Closed, 50Kohm Open	Fan Clutch Switch Input	Fan Clutch
17	<50 ohm Closed, 50Kohm Open	Boost Power Request Switch	Boost Power
18	Vehicle Speed Sensor	Vehicle Speed Sensor - Input	Vehicle Speed
19	Ground	Throttle Return	Throttle
20	Ground	Remote Throttle Return	Remote Throttle
21	3 amps	Dedicated PWM Output	Dedicated PWM
22		Reserved	
23	<50 ohm Closed, 50Kohm Open	ISC 3 / ISC Validation	Intermediate Speed Control
24	50 ohm Closed, 50Kohm Open	Multi-Unit Sync On/Off Switch	Multi-Unit Sync
25	125 ohm Closed, 50 Mohm Open	Off Idle Sw	Idle Validation

26	<125 ohm Closed, 50 Mohm Open	On Idle Sw	Idle Validation
27	<50 ohm Closed, 50Kohm Open	Clutch Switch Input	Exhaust Brakes
28	<50 ohm Closed, 50Kohm Open	ISC 1 Switch Input	Intermediate Speed Control
29	+5 Vdc supply	V Throttle +5VDC	Throttle
30	Throttle Position Sensor	Throttle Pos Input Signal	Throttle
31	1 amp, Hi side Drive	Cold Start Aid Relay 2	Intake Air Heater/Grid Heater
32		Reserved	
33	<50 ohm Closed, 50Kohm Open	Brake Switch Input	Exhaust Brakes
34	<50 ohm Closed, 50Kohm Open	Exhaust Brake On/Off Switch Input	Exhaust Brakes
35	<50 ohm Closed, 50Kohm Open	Idle/Diag Increment Switch Input	Diagnostics, Low Idle Gov.
36	<50 ohm Closed, 50Kohm Open	Idle/Diag Decrement Switch Input	Diagnostics, Low Idle Gov.
37	<50 ohm Closed, 50Kohm Open	Diagnostic On/Off Switch Input	Diagnostics
38	<50 ohm Closed, 50Kohm Open	Multi-Unit Sync Complementary Switch	Multi-Unit Sync
39	A/D Input	Alternate Torque Derate Switch Input	Alternate Torque
40	Water In Fuel Sensor	Water In Fuel	Water-In-Fuel
41	1 amp, Hi side drive	Cold Start Aid Relay 1	Intake Air Heater/Grid Heater
42		Reserved	
43	<125 ohm Closed, 50 Mohm Open	AC Pressure Switch	Fan Clutch
44	<50 ohm Closed, 50Kohm Open	Alternate Idle Switch	Alternate Idle
45	<50 ohm Closed, 50Kohm Open	Remote Throttle On/Off Input	Remote Throttle
46	Switch (Pulled up)	Aux. Governor On/Off Input	Auxiliary Speed Governor
47	<50 ohm Closed, 50Kohm Open	ISC 2 Switch Input	Intermediate Speed Control
48	A/D Input	OEM Pressure Sensor Input	OEM Pressure
49	Datalink	J1708/J1587 Datalink +	J1587 Datalink
50	Datalink	J1708/J1587 Datalink -	J1587 Datalink

QSB/QSC/QL9 - OEM 23 Pin Connector

Pin	Pinout Type	Signal Name	Feature
A	Switched Pulldown Input	Vehicle Key Switch Input	All
B	ECM Supply (+)	Unswitched Battery Supply	All
C	ECM Supply (+)	Unswitched Battery Supply	All
D	ECM Supply (+)	Unswitched Battery Supply	All
E	ECM Supply (-)	Battery Ground	All
F	ECM Supply (-)	Battery Ground	All
G	Variable Intermediate Speed Sensor	Variable Intermediate Speed Signal	
H	ECM Supply (-)	Battery Ground	All
J	Source Driver Output	Dual Output 'B' Signal	Dual Outputs
L	10V Switched Pullup Input	Multi Unit Synch On/Off Slave Signal	Multiple Unit Synchronization
M	ECM Supply (+)	Unswitched Battery Supply	All
N	PWM Source Driver	Fan Control Signal	Electronic Fan Clutch
O	10V Switched Pullup Input	Exhaust Brake Signal	Exhaust Brake

P	ECM Supply (-)	Battery Ground	All
Q		Frequency Throttle Input	Frequency Throttle
R	ECM Switch Return	Return	
S	ECM Supply (+)	Unswitched Battery Supply	All
T	ECM Switch Return	Return	
U	5V Switched Pullup input	OEM Switch Signal	Switched Outputs
V	10V Switched Pullup Input	Droop Adjust Signal	Alternate Droop
W	ECM Supply (-)	Battery Ground	All
X		User Datalog Signal	

QSM11/QSX15 - OEM 50 Pin connector

Pin	Pinout Type	Signal Name	Feature
1	10V Switched Pullup Input	AXG On/Off Switch	Auxiliary Speed Governor
2	10V Switched Pullup Input	Alternate Torque Switch	Switchable Torque
3	IVS 10V Switched Pullup Input	Off Idle Switch	Base Throttle
			Frequency Throttle
4	Switched Sink Driver Output	Wait-To-Start Lamp	Intake Air Heater
5	Switched Sink Driver Output	Maintenance Lamp	Real-Time Clock
			Water-In-Fuel
			Maintenance Monitor
6	Switched Sink Driver Output	Stop Lamp	Diagnostics
			Engine Protection
7	ECM Supply (+)	ECM Supply (+)	All
8	ECM Supply (+)	ECM Supply (+)	All
9	ECM Switch Return	Panel Return 1	All
10	ECM Switch Return	Panel Return 2	All
11	Tachometer Source Driver Output	Tachometer	All Tachometer
12	10V Switched Pullup Input	EP Shutdown Override Switch	Engine Protection
13	IVS 10V Switched Pullup Input	On Idle Switch	Base Throttle
			Frequency Throttle
14	10V Switched Pullup Input	Diagnostics Increment	Diagnostics
	F MULTIFUNCTION pinout	ISC Increment	Intermediate Speed Control
		Idle Increment	Low Idle Governor
15	10V Switched Pullup Input	Fan Accessory Switch	Electronic Fan Clutch
16	Switched Sink Driver Output	Warning Lamp	Diagnostics
			Low Idle Shutdown
17	ECM Supply (+)	ECM Supply (+)	All
18	ECM Supply (+)	ECM Supply (+)	All
19	ECM Switch Return	MUS ID Return	Multiple Unit Synchronization
20	ECM Switch Return	Remote Return	Remote Throttle
21	APS Ratiometric Analog Input	Remote Throttle Position	Remote Throttle
	F RECONFIGURABLE pinout	Variable ISC	Intermediate Speed Control
22	10V Switched Pullup Input	MUS ID1 Engine Brake Select 1	Multiple Unit Synchronization Engine Brakes
23	10V Switched Pullup Input	ISC Switched Speed 1	Intermediate Speed Control
24	10V Switched Pullup Input	Diagnostics Decrement	Diagnostics
	F MULTIFUNCTION pinout	ISC Decrement	Intermediate Speed Control

		Idle Decrement	Low Idle Governor
25	10V Switched Pullup Input	ISC Switched Speed 2	Intermediate Speed Control
26	J1587 Datalink (+)	J1587 Datalink (+)	J1708/J1587 Datalink
27	J1587 Datalink (-)	J1587 Datalink (-)	J1708/J1587 Datalink
28	ECM Supply (+)	ECM Supply (+)	All
29	ECM Supply Return	ECM Supply Return	All
30	ECM Supply Return	ECM Supply Return	All
31	10V Switched Pullup Input	MUS ID2 Engine Brake Select 2	Multiple Unit Synchronization Engine Brakes
32	10V Switched Pullup Input	MUS ID3 Engine Brake Select 3 (QSX15)	Multiple Unit Synchronization Engine Brakes (QSX15)
33	10V Switched Pullup Input	ISC Switched Speed 3	Intermediate Speed Control
	F RECONFIGURABLE pinout	ISC Validation	Intermediate Speed Control
34	10V Switched Pullup Input	MUS On/Off Validation	Multiple Unit Synchronization
35	Switched Source Driver Output	Idle Shutdown Relay	Low Idle Shutdown
36	J1939 Datalink Shield	J1939 Datalink Shield	J1939 Datalink
37	J1939 Datalink (-)	J1939 Datalink (-)	J1939 Datalink
38	Switched Pulldown Input	Keyswitch	All
39	ECM Supply Return	ECM Supply Return	All
40	ECM Supply Return	ECM Supply Return	All
41	10V Switched Pullup Input	Alternate Droop Switch	Alternate Droop
42	10V Switched Pullup Input	MUS On/Off Switch	Multiple Unit Synchronization
43	10V Switched Pullup Input	Remote Throttle Switch	Remote Throttle
44	10V Switched Pullup Input	Diagnostics Enable	Diagnostics
	F MULTIFUNCTION pinout	Manual Snapshot	User-Activated Datalogger
45	10V Switched Pullup Input	Alternate Low Idle Switch	Switchable Low Idle
46	J1939 Datalink (+)	J1939 Datalink (+)	All
47	APS Ratiometric Analog Input	Base Throttle Position	Base Throttle
48	APS 5V Sensor Voltage Source	Throttle Supply (+)	Base Throttle
			Remote Throttle
			Intermediate Speed Control
49	ECM Switch Return	Throttle Supply Return	Base Throttle
			Remote Throttle
			Intermediate Speed Control
50	ECM Supply Return	ECM Supply Return	All

QSM11/QSX15 - OEM 31 Pin connector

Pin	Pinout Type	Signal Name	Feature
1	5V Sensor Voltage Source	not used	none
2	Ratiometric Analog Input	not used	none
3	ECM Switch Return	OEM Temperature Return	Switched Outputs
			Electronic Fan Clutch
4	Resistive Analog Input	OEM Temperature	Switched Outputs
			Electronic Fan Clutch
5	5V Switched Pullup Input	Coolant Detected	Engine Protection
6	5V Switched Pullup Input	Coolant Not Detected	Engine Protection
7	5V Sensor Voltage Source	Coolant Level Supply (+)	Engine Protection
8	Switched Source Driver Output	Switched Output B	Switched Outputs
9	Switched Source Driver Output	Engine Speed	PWM Dedicated Output

	F RECONFIGURABLE pinout	Engine Torque	PWM Dedicated Output
		Commanded Throttle	PWM Dedicated Output
10	Switched Source Driver Output	Intake Air Heater	Intake Air Heater
11	ECM Solenoid Return	Solenoid Return	Switched Outputs
12	Switched Source Driver Output	Fan Clutch	Electronic Fan Clutch
13	ECM Solenoid Return	Fan Clutch Return	Electronic Fan Clutch
14	5V Sensor Voltage Source	not used	none
15	Hall Effect Input	not used	none
16	ECM Switch Return	SE Return	various features
17	10V Switched Pullup Input	AC Pressure Switch	PWM Dedicated Output
18	ECM Switch Return	AC Pressure Return	Electronic Fan Clutch
19	ECM Switch Return	Coolant Level Return	Electronic Fan Clutch
20	Switched Sink Driver Output	not used	none
21	Variable Reluctance Input (+)	Shaft Speed (+)	Auxiliary Governor
	F RECONFIGURABLE pinout		Switched Outputs
22	Variable Reluctance Input (-)	Shaft Speed (-)	Auxiliary Governor
	F RECONFIGURABLE pinout		Switched Outputs
		Frequency Throttle (+)	Frequency Throttle
		Transmission Synch (+)	Transmission Synchronization
23	Resistive Analog Input	not used	none
24	ECM Switch Return	spare	as required
25	10V Switched Pullup Input	not used	none
26	not connected	not used	none
27	Switched Source Driver Output	Switched Output A	Switched Outputs
28	ECM Switch Return	OEM Switch Return	Switched Outputs
29	Switched Source Driver Output	not used	none
30	5V Switched Pullup Input	Alternate Torque Select	Alternate Torque
31	5V Switched Pullup Input	OEM Switch	Switched Outputs