

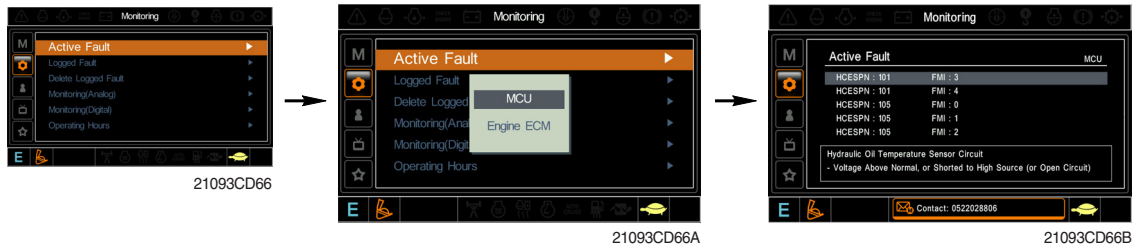
GROUP 11 SELF-DIAGNOSTIC SYSTEM

1. OUTLINE

When any abnormality occurs in the ADVANCED CAPO system caused by electric parts malfunction and by open or short circuit, the MCU diagnoses the problem and sends the error codes to the cluster and also stores them in the memory.

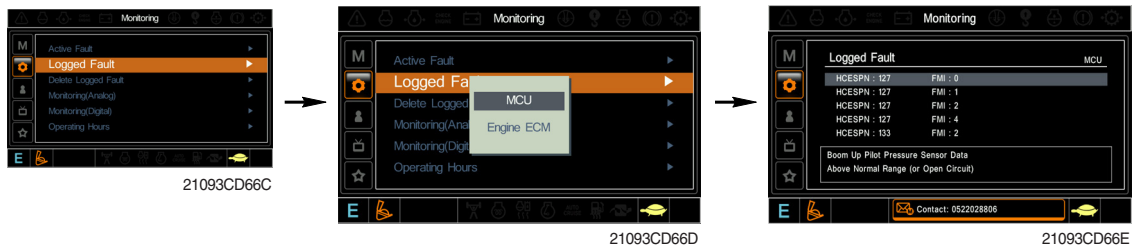
2. MONITORING

1) Active fault



- The active faults of the MCU or engine ECM can be checked by this menu.

2) Logged fault



- The logged faults of the MCU or engine ECM can be checked by this menu.

3) Delete fault



- The logged faults of the MCU or engine ECM can be deleted by this menu.

3. MACHINE ERROR CODES TABLE

Error code		Description
HCESPN	FMI	
101	3	Hydraulic oil temperature sensor circuit - Voltage above normal, or shorted to high source.
	4	Hydraulic oil temperature circuit - Voltage below normal, or shorted to low source.
105	0	Working pressure sensor data above normal range.
	1	Working pressure sensor data below normal range.
	2	Working pressure sensor data error.
	4	Working pressure sensor circuit - Voltage below normal, or shorted to Low source.
108	0	Travel oil pressure sensor data above normal range.
	1	Travel oil pressure sensor data below normal range.
	2	Travel oil pressure sensor data error.
	4	Travel oil pressure sensor circuit - Voltage below normal, or shorted to low source.
120	0	Main pump 1 (P1) pressure sensor data above normal range.
	1	Main pump 1 (P1) pressure sensor data below normal range.
	2	Main pump 1 (P1) pressure sensor data error.
	4	Main pump 1 (P1) pressure sensor circuit - Voltage below normal, or shorted to low source.
121	0	Main pump 2 (P2) pressure sensor data above normal range.
	1	Main pump 2 (P2) pressure sensor data below normal range.
	2	Main pump 2 (P2) pressure sensor data error.
	4	Main pump 2 (P2) pressure sensor circuit - Voltage below normal, or shorted to low source.
122	0	Overhead pressure sensor data above normal range.
	1	Overhead pressure sensor data below normal range.
	2	Overhead pressure sensor data error.
	4	Overhead pressure sensor circuit - Voltage below normal, or shorted to low source.
123	0	Negative 1 pressure sensor data above normal range.
	1	Negative 1 pressure sensor data below normal range.
	2	Negative 1 pressure sensor data error.
	4	Negative 1 pressure sensor circuit - Voltage below normal, or shorted to low source.
124	0	Negative 2 Pressure sensor data above normal range.
	1	Negative 2 Pressure sensor data below normal range.
	2	Negative 2 Pressure sensor data error.
	4	Negative 2 Pressure sensor circuit - Voltage below normal, or shorted to low source.
125	0	Pilot pump (P3) pressure sensor data above normal range.
	1	Pilot pump (P3) pressure sensor data below normal range.
	2	Pilot pump (P3) pressure sensor data error.
	4	Pilot pump (P3) pressure sensor circuit - Voltage below normal, or shorted to low source.
127	0	Boom up pilot pressure sensor data above normal range.
	1	Boom up pilot pressure sensor data below normal range.
	2	Boom up pilot pressure sensor data error.
	4	Boom up pilot pressure sensor circuit - Voltage below normal, or shorted to low source.
133	0	Arm in/out & bucket in pilot pressure sensor data above normal range.
	1	Arm in/out & bucket in pilot pressure sensor data below normal range.
	2	Arm in/out & bucket in pilot pressure sensor data error.
	4	Arm in/out & bucket in pilot pressure sensor circuit - Voltage below normal, or shorted to low source.

※ Some error codes are not applied to this machine.

Error code		Description
HCESPN	FMI	
135	0	Swing pilot pressure sensor data above normal range.
	1	Swing pilot pressure sensor data below normal range.
	2	Swing pilot pressure sensor data error.
	4	Swing pilot pressure sensor circuit - Voltage below normal, or shorted to low source.
138	0	Attachment pilot pressure sensor data above normal range.
	1	Attachment pilot pressure sensor data below normal range.
	2	Attachment pilot pressure sensor data error.
	4	Attachment pilot pressure sensor circuit - Voltage below normal, or shorted to low source.
140	5	Pump EPPR valve circuit - Current below normal, or open circuit.
	6	Pump EPPR valve circuit - Current above normal.
141	5	Boom priority EPPR valve circuit - Current below normal, or open circuit.
	6	Boom priority EPPR valve circuit - Current above normal.
143	5	Travel EPPR valve circuit - Current below normal, or open circuit.
	6	Travel EPPR valve circuit - Current above normal.
144	5	Attachment flow EPPR valve circuit - Current below normal, or open circuit.
	6	Attachment flow EPPR valve circuit - Current above normal.
145	5	Remote cooling fan EPPR valve circuit - Current below normal, or open circuit.
	6	Remote cooling fan EPPR valve circuit - Current above normal.
150	5	Left rotate EPPR valve circuit - Current below normal, or open circuit.
	6	Left rotate EPPR valve circuit - Current above normal.
151	5	Right rotate EPPR valve circuit - Current below normal, or open circuit.
	6	Right rotate EPPR valve circuit - Current above normal.
152	5	Left tilt EPPR valve circuit - Current below normal, or open circuit.
	6	Left tilt EPPR valve circuit - Current above normal.
153	5	Right tilt EPPR valve circuit - Current below normal, or open circuit.
	6	Right tilt EPPR valve circuit - Current above normal.
166	5	Power max solenoid circuit - Current below normal, or open circuit.
	6	Power max solenoid circuit - Current above normal.
167	5	Travel speed solenoid circuit - Current below normal, or open circuit.
	6	Travel speed solenoid circuit - Current above normal.
168	5	Attachment pressure solenoid circuit - Current below normal, or open circuit.
	6	Attachment pressure solenoid circuit - Current above normal.
169	5	Attachment conflux solenoid circuit - Current below normal, or open circuit.
	6	Attachment conflux solenoid circuit - Current above normal.
170	5	Arm regeneration solenoid circuit - Current below normal, or open circuit.
	6	Arm regeneration solenoid circuit - Current above normal.
171	5	Attachment safety solenoid circuit - Current below normal, or open circuit.
	6	Attachment safety solenoid circuit - Current above normal.
181	5	Remote cooling fan reverse solenoid circuit - Current below normal, or open circuit.
	6	Remote cooling fan reverse solenoid circuit - Current above normal.
301	5	Fuel level sensor circuit - Voltage above normal, or shorted to high source.
	6	Fuel level sensor circuit - Voltage below normal, or shorted to low source.
304	3	Engine coolant temperature sensor circuit - Voltage above normal, or shorted to high source.
	4	Engine coolant temperature sensor circuit - Voltage below normal, or shorted to low source.
310	8	Engine speed signal error - Abnormal frequency or pulse width.
322	3	Engine preheat relay circuit - Voltage above normal, or shorted to high source.
	4	Engine preheat relay circuit - Voltage below normal, or shorted to low source.
325	3	Fuel warmer relay circuit - Voltage above normal, or shorted to high source.
	4	Fuel warmer relay circuit - Voltage below normal, or shorted to low source.

※ Some error codes are not applied to this machine.

Error code		Description
HCESPN	FMI	
340	3	Potentiometer (G/A) circuit - Voltage above normal, or shorted to high source.
	4	Potentiometer (G/A) circuit - Voltage below normal, or shorted to low source.
341	5	Governor actuator circuit - Current below normal, or open circuit.
	6	Governor actuator circuit - Current above normal.
501	0	Transmission oil pressure sensor data above normal range.
	1	Transmission oil pressure sensor data below normal range.
	2	Transmission oil pressure sensor data error.
	4	Transmission oil pressure sensor circuit - Voltage below normal, or shorted to low source.
503	0	Brake pressure sensor data above normal range.
	1	Brake pressure sensor data below normal range.
	2	Brake pressure sensor data error.
	4	Brake pressure sensor circuit - Voltage below normal, or shorted to low source.
505	0	Working brake pressure sensor data above normal range.
	1	Working brake pressure sensor data below normal range.
	2	Working brake pressure sensor data error.
	4	Working brake pressure sensor circuit - Voltage below normal, or shorted to low source.
506	3	Working brake lamp circuit - Voltage above normal, or shorted to high source.
	4	Working brake lamp circuit - Voltage below normal, or shorted to low source.
520	3	Ram lock lamp circuit - Voltage above normal, or shorted to high source.
	4	Ram lock lamp circuit - Voltage below normal, or shorted to low source.
525	5	Ram lock solenoid circuit - Current below normal, or open circuit.
	6	Ram lock solenoid circuit - Current above normal.
530	0	Travel F pilot pressure sensor data above normal range.
	1	Travel F pilot pressure sensor data below normal range.
	2	Travel F pilot pressure sensor data error.
	4	Travel F pilot pressure sensor circuit - Voltage below normal, or shorted to low source.
531	0	Travel R pilot pressure sensor data above normal range.
	1	Travel R pilot pressure sensor data below normal range.
	2	Travel R pilot pressure sensor data error.
	4	Travel R pilot pressure sensor circuit - Voltage below normal, or shorted to low source.
701	3	Hourmeter circuit - Voltage above normal, or shorted to high source.
	4	Hourmeter circuit - Voltage below normal, or shorted to low source.
705	0	MCU input voltage high.
	1	MCU input voltage low.
707	1	Alternator node I voltage low.
714	3	Acc. dial circuit - Voltage above normal, or shorted to high source.
	4	Acc. dial circuit - Voltage below normal, or shorted to low source.
715	3	Rotate signal input circuit - Voltage above normal, or shorted to high source.
	4	Rotate signal input circuit - Voltage below normal, or shorted to low source.
716	3	Tilt signal input circuit - Voltage above normal, or shorted to high source.
	4	Tilt signal input circuit - Voltage below normal, or shorted to low source.
722	3	Travel alarm (buzzer) circuit - Voltage above normal, or shorted to high source.
	4	Travel alarm (buzzer) circuit - Voltage below normal, or shorted to low source.
830	12	MCU internal memory error.
840	2	Cluster communication data error.
841	2	ECM communication data error.
843	2	Option #1 (CAN 2) communication data error.
850	2	RCM communication data error.

※ Some error codes are not applied to this machine.

4. ENGINE FAULT CODE

Fault code J1939 SPN J1939 FMI	Reason	Effect (only when fault code is active)
111 629 12	Error internal to the ECM related to memory hardware failures or internal processor communication failures.	Mission-disabling failure. Engine not allowed to start.
112 635 7	The error between estimated timing fueling and desired timing fueling is outside acceptable limits.	Depending on the calibration, the engine will shut down or speed-derate or no action by the ECM is taken.
113 635 3	Timing actuator circuit is open, or supply pin 1 is shorted to ground, or return pin 20 is shorted to battery voltage.	No action by the ECM is taken. Actuator is closed or partially closed. Engine exhausts white smoke and loses power. Fault code 112 can possibly be logged.
115 190 2	No engine speed signal detected at pins 27, 28, 37 and 38 of the engine harness.	Engine is shut down and can not be run.
116 156 3	More than 4.78 VDC detected at timing pressure sensor signal pin 33 of the engine harness.	Depending on the calibration, the engine will shut down or speed-derate, or no action by the ECM is taken.
117 156 4	Less than 0.15 VDC detected at timing pressure sensor signal pin 33 of the engine harness.	Depending on the calibration, the engine will shut down or speed-derate, or no action by the ECM is taken.
118 135 3	More than 4.78 VDC detected at fuel pump pressure sensor signal pin 32 of the engine harness.	No action by the ECM is taken.
119 135 4	Less than 0.30 VDC detected at fuel pump pressure sensor signal pin 32 of the engine harness.	No action by the ECM is taken.
121 190 10	No engine speed signal detected at one pair of pins, either pin 27, 28, 37 or 38 of the engine harness.	No action by the ECM is taken.
122 102 3	More than 4.72 VDC detected at the intake manifold air pressure sensor signal pin 35 of the engine harness.	Engine power derate to no-air setting.
123 102 4	Less than 0.33 VDC detected at the intake manifold air pressure sensor signal pin 35 of the engine harness.	Engine power derate to no-air setting.
131 091 3	More than 4.20 VDC detected at the accelerator pedal or lever position signal pin 29 of the OEM interface harness.	Calibration dependent power and speed derate.
132 091 4	Less than 0.13 VDC detected at the accelerator pedal or lever position signal pin 29 of the OEM interface harness ECM connector.	Calibration dependent power and speed derate.
133 029 3	More than 4.82 VDC detected at the remote throttle position signal pin 30 of the OEM interface harness.	Calibration dependent power and speed derate.
134 029 4	Less than 0.12 VDC detected at the remote accelerator pedal or lever position signal pin 30 of the OEM interface harness.	Calibration dependent power and speed derate.
135 100 3	More than 4.88 VDC detected at the engine oil pressure sensor signal pin 24 of the engine harness.	No engine protection for oil pressure. Centinel system is disabled.

※ Some fault codes are not applied to this machine.

Fault code J1939 SPN J1939 FMI	Reason	Effect (only when fault code is active)
141 100 4	Less than 0.31 VDC detected at the engine oil pressure sensor signal pin 24 of the engine harness.	No engine protection for oil pressure. Centinel™ system is disabled.
143 100 1	Low oil pressure has been detected. Voltage signal at oil pressure signal pin 24 of the engine harness indicates oil pressure lower than 103 kPa (15 psi) at 600 rpm, 131 kPa (19 psi) at 800 rpm, 165 kPa (24 psi) at 1500 rpm, and 207 kPa (30 psi) above 2100 rpm.	Calibration dependent progressive power derate and engine shutdown with increasing time after alert. Centinel™ system is disabled.
144 110 3	More than 4.95 VDC detected at the coolant temperature signal pin 22 of the engine harness.	Possible white smoke. No engine protection for coolant temperature. Centinel™ system is disabled.
145 110 4	Less than 0.21 VDC detected at the coolant temperature signal pin 22 of the engine harness.	Possible white smoke. No engine protection for coolant temperature. Centinel™ system is disabled.
147 091 8	A frequency of less than 100Hz has been detected at the frequency accelerator signal pin 17 of the OEM interface harness.	Calibration dependent power and speed derate.
148 091 8	A frequency of more than 1500Hz has been detected at the frequency accelerator signal pin 17 of the OEM interface harness.	Calibration dependent power and speed derate.
151 110 0	High coolant temperature has been detected. Voltage signal at coolant temperature signal pin 22 indicates the coolant temperature is above 100°C (212°F).	Calibration dependent progressive power and speed derate and engine shutdown as temperature increases over thresholds. Centinel™ system is disabled.
153 105 3	More than 4.88 VDC detected at the intake manifold temperature sensor signal pin 23 of the engine harness ECM connector.	No engine protection for the intake manifold air temperature.
154 105 4	Less than 0.08 VDC detected at the intake manifold air temperature signal pin 23 of the engine harness.	No engine protection for the intake manifold air temperature.
155 105 0	High intake air manifold temperature has been detected. Voltage signal at intake manifold air temperature signal pin 23 indicates intake manifold air temperature above 104°C (219°F).	Calibration dependent progressive power and speed derate and engine shutdown as the temperature increases over thresholds.
219 1380 1	Low oil level detected in the remote oil reservoir used in the Centinel™ system.	Centinel™ system is disabled.
221 108 3	More than 4.78 VDC detected at the ambient air pressure sensor signal pin 34 of the engine harness.	Derate in power output of the engine.
222 108 4	Less than 0.20 VDC detected at the ambient air pressure sensor signal pin 34 of the engine harness.	Derate in power output of the engine.
223 1265 4	The Centinel™ burn valve solenoid circuit is open or shorted. Less than 18.0 VDC detected at the Centinel™ burn valve solenoid supply pin 8 of the OEM interface harness or resistance of the solenoid has dropped below 80 ohms.	ECM turns off the burn valve supply voltage and the Centinel™ system is disabled.
225 1266 4	The centinel™ make-up valve solenoid circuit is open or shorted. Less than 18.0 VDC detected at Centinel™ make-up valve solenoid supply pin 2 of the engine harness or resistance of the solenoid has dropped below 80 ohms.	ECM turns off the Centinel™ make-up valve supply voltage and the Centinel™ system is disabled.

111 Fault code J1939 SPN J1939 FMI	Reason	Effect (only when fault code is active)
231 109 3	More than 4.72 VDC detected at the coolant pressure sensor signal pin 16 of the engine harness.	No engine protection for coolant pressure.
232 109 4	Less than 0.33 VDC detected at the coolant pressure sensor signal pin 16 of the engine harness.	No engine protection for coolant pressure.
233 109 1	Low coolant pressure has been detected. Voltage signal at coolant pressure signal pin 16 of the engine harness indicates coolant pressure lower than 28 kPa (4 psi) at 800 rpm, 41 kPa (6 psi) at 1300 rpm, 76 kPa (11 psi) at 1800 rpm, 96 kPa (14 psi) at 2000 rpm and 103 kPa (15 psi) above 2100 rpm.	Calibration dependent progressive power and speed derate and engine shutdown with increasing time after alert.
234 190 0	Engine speed signal on pin 27 and pin 28 and/or pin 37 and pin 38 of the engine harness indicates an engine speed greater than the safe operation rpm limit. The limit is 2450 rpm for the QSK19 and 2190 rpm for the QSK60.	Fuel shutoff valve deenergizes (valve closes). The valve reenergizes (fuel shut off valve opens) when engine speed falls below its upper rpm threshold.
235 111 1	Low coolant level has been detected. Voltage signal on the coolant level signal pin 23 of the OEM harness indicates low radiator coolant level on the vehicle	Calibration dependent progressive power and speed derate and engine shutdown with increasing time after alert.
237 644 2	Duty cycle of input throttle signal pin 17 of the OEM interface harness is less than 3 percent or more than 97 percent.	The primary engine and secondary engines are shut down with increasing time after alert if hard coupled. Only the secondary engines are shut down with increasing time after alert if soft coupled.
252 098 2	Oil level sensor error.	No engine protection for low oil level. Centinel™ system is disabled.
253 098 1	Low coolant level has been detected. Voltage signal on the oil level signal pin 12 of the engine harness indicates low oil level in the engine.	Calibration dependent progressive power derate and engine shutdown with increasing time after alert.
254 632 4	The fuel shutoff valve solenoid circuit is open or shorted. Less than 6.0 VDC detected at fuel shutoff valve solenoid supply pin 30 of the engine harness or resistance of the solenoid has dropped below 20 ohms.	ECM turns off fuel shutoff valve supply voltage. The engine dies.
259 632 7	Fuel shutoff valve is open and will not close.	No action by the ECM is taken.
261 174 0	High fuel temperature has been detected. Voltage signal at fuel temperature signal pin 26 of engine harness indicates fuel temperature above 71°C (160°F).	Calibration dependent progressive power and speed derate and engine shutdown with increasing time after alert.
263 174 3	More than 4.95 VDC detected at the fuel temperature signal pin 26 of the engine harness.	No engine protection for fuel temperature.
265 174 4	Less than 0.21 VDC detected at the fuel temperature signal pin 26 of the engine harness.	No engine protection for fuel temperature.
292 1083 14	OEM temperature out-of-range has been detected. Voltage signal at OEM temperature signal pin 27 indicates OEM temperature beyond the OEM specified threshold.	Calibration dependent progressive power and speed derate and engine shutdown with increasing time after alert.

※ Some fault codes are not applied to this machine.

Fault code J1939 SPN J1939 FMI	Reason	Effect (only when fault code is active)
293 1083 3	VDC detected at the OEM temperature sensor signal pin 27 of the OEM interface harness indicates the sensor has failed high.	No engine protection for OEM temperature.
294 1083 4	VDC detected at the OEM temperature sensor signal pin 27 of the OEM interface harness indicates the sensor has failed low.	No engine protection for OEM temperature.
296 1084 14	OEM pressure out-of-range has been detected. Voltage signal at OEM pressure signal pin 27 indicates OEM pressure beyond OEM specified threshold.	OEM and calibration dependent progressive power and speed derate and engine shutdown with increasing time after alert.
297 1084 3	VDC detected at the OEM pressure sensor signal pin 15 of the OEM interface harness indicates the sensor has failed high.	No engine protection for OEM pressure.
298 1084 4	VDC detected at the OEM pressure sensor signal pin 15 of the OEM interface harness indicates the sensor has failed low.	No engine protection for OEM pressure.
299 - -	The engine was shutdown by device other than the key switch before proper engine cooldown, resulting in a load factor above the maximum shutdown threshold. Fault Code 299 will be logged if the engine is shut down while hot by the engine protection feature or other OEM devices.	No action taken by the ECM.
316 931 3	Fuel pump actuator circuit is open, or supply pin 11 is shorted to battery voltage or ground, or return pin 40 is shorted to battery voltage or ground in the engine harness.	No action by the ECM is taken. Actuator is open or close, or or partially closed.
318 931 7	The error between estimated fuel pump pressure and desired fuel pump pressure is outside acceptable limits.	No action by the ECM is taken.
343 629 12	Microprocessor communication error internal to the ECM.	Variable; performance will or will not be affected.
346 630 12	ECM powerdown internal data store error.	Powerdown data are lost. Powerdown data include maintenance monitoring, present ECM and engine delta times, and past fault dat.
349 191 0	A frequency of greater than a calibrated threshold has been detected at frequency accelerator signal pin 17 of the OEM interface harness.	Calibration dependent power and speed derate.
384 626 11	The ether injection solenoid circuit is open or shorted at pin 2 of the engine harness.	Ether injection feature is disabled.
415 100 1	Very low oil pressure has been detected. Voltage signal at oil pressure signal pin 24 of the engine harness indicates oil pressure lower than 83 kPa (12 psi) at 600 rpm, 110 kPa (16 psi) at 800 rpm, and 138 kPa (20 psi) at 1500 rpm and 172 kPa (25 psi) above 2100 rpm.	Calibration dependent progressive power and speed derate and engine shutdown with increasing time after alert.
422 111 2	Voltage detected simultaneously on both the coolant level high and low signal pins 14 and 23 of the OEM interface harness, or no voltage detected on either pin.	No engine protection for coolant level

※ Some fault codes are not applied to this machine.

Fault code J1939 SPN J1939 FMI	Reason	Effect (only when fault code is active)
423 156 2	More than 1.83 VDC detected at the timing temperature signal pin 33 of the engine harness at engine key on.	Calibration dependent power and speed derate.
426 - -	ECM can not transmit on J1939 datalink.	No action is taken by ECM.
427 - -	ECM can not transmit on J1939 datalink at acceptable rate.	No action is taken by ECM.
431 091 2	Voltage detected simultaneously on both the idle validation off idle and idle signal pins 12 and 13 of the OEM harness, or no voltage detected on either pin.	None on performance.
432 091 13	Voltage detected at the idle validation on idle signal pins 13 of the OEM harness when voltage at accelerator position signal pin 29 of the OEM harness indicates pedal is not at idle or voltage detected at idle validation off-idle signal pin 12 of the OEM harness when voltage at accelerator position signal pin 29 of the OEM harness indicates pedal is at rest.	Engine will default to 0 percent accelerator.
441 168 1	Less than 12.0 VDC battery voltage detected at the ECM.	ECM voltage supply approaching a level at which unpredictable operation will occur.
442 168 0	More than 38.0 VDC battery voltage detected at the ECM.	ECM damage will occur.
451 157 3	More than 4.78 VDC detected at the rail pressure sensor signal pin 31 of the engine harness.	Depending on the calibration, the engine will shut down or power derate, or no action is taken by the ECM.
452 157 4	Less than 0.15 VDC detected at the rail pressure sensor signal pin 31 of the engine harness.	Depending on the calibration, the engine will shut down or power derate, or no action is taken by the ECM.
455 633 3	Rail actuator circuit is open, or supply pin 3 is shorted to battery voltage or ground, or return pin 10 is shorted to battery voltage or ground in the engine harness.	No action by the ECM is taken. Actuator is closed, or partially closed. Engine will not run, or runs at one speed. Fault code 514 can be logged.
467 635 2	The timing current offset, used to adjust timing flow, has reached the maximum or minimum threshold.	No action taken by the ECM.
468 633 2	The rail current offset, used to adjust fueling flow, has reached the maximum or minimum threshold.	No action taken by the ECM.
471 098 1	Very low oil level is detected. Voltage signal on the oil level signal pin 12 of the engine harness indicates very low oil level in the engine.	Calibration dependent progressive power derate and engine shutdown with increasing time after alert. Centinel™ feature is disabled.
487 - -	The ether bottle for the ether injection system is empty.	The ether injection system is disabled.
489 191 1	Auxiliary speed frequency on input pin 17 indicates the frequency is below a calibration dependent threshold.	Engine will go to idle.

※ Some fault codes are not applied to this machine.

Fault code J1939 SPN J1939 FMI	Reason	Effect (only when fault code is active)
497 1377 2	Multiunit synchronous on/off switch and multiunit synchronous complimentary on/off switch have different values at the ECM.	Multiunit synchronous feature is disabled.
498 - -	Engine oil level #1 sensor circuit-shortcd high.	No engine protection for low oil level. Centinel system is disabled.
499 - -	Engine oil level #1 sensor signal-shortcd high.	No engine protection for oil level. Centinel system is disabled.
514 633 7	The error between the estimated rail fueling and the desired rail fueling is outside the acceptable limits.	Calibration-dependent engine shutdown or power derate or no action by the ECM is taken. Engine will overspeed, or run at one speed, or not run.
527 702 3	The dual output A signal pin 1 of the OEM interface harness indicates an open or short circuit.	OEM dependent.
529 703 3	The dual output B signal pin 9 of the OEM interface harness indicates an open or short circuit.	OEM dependent.
551 091 4	No voltage detected simultaneously on both the idle validation off-idle and idle signal pins 12 and 13 of the OEM interface harness.	Engine will default to 0-percent accelerator.
553 157 0	Rail pressure exceeds a normal limit.	Fuel shutoff valve de-energized (valve closes). The valve reenergizes (valve opens) when rail pressure falls below acceptable limit for present engine speed.
554 157 2	More than 0.67 VDC detected at the rail pressure signal pin 31 of the engine harness at engine key-on.	Calibration dependent engine derate.
555 1264 0	High blowby pressure has been detected. Voltage signal at blowby pressure signal pin 25 indicates blowby pressure above 368 mm H ₂ O (14.5 in H ₂ O).	Calibration dependent. Progressive power and speed derate and engine shutdown as pressure increases over thresholds.
611 - -	Engine shut down with the keyswitch before proper engine cooldown.	No action is taken by ECM. Load factor above the maximum shutdown threshold. Fault code will be logged.
649 - -	The maintenance interval has been reached.	No action is taken by ECM.
719 1264 3	More than 4.94 VDC detected at the blowby pressure sensor signal pin 25 of the engine harness.	No engine protection for blowby pressure.
729 1264 4	Less than 0.29 VDC detected at the blowby pressure sensor signal pin 25 of the engine harness.	No engine protection for blowby pressure.
753 723 2	The engine speed signals detected on pins 27, 28, 37 and 38 of the ECM do not match.	No action by the ECM is taken.
777 - -	The turbocharger inlet air temperature has exceeded the standard ambient air temperature limit.	The engine will go into a derate mode until the turbocharger inlet air temperature drops to a normal level.

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