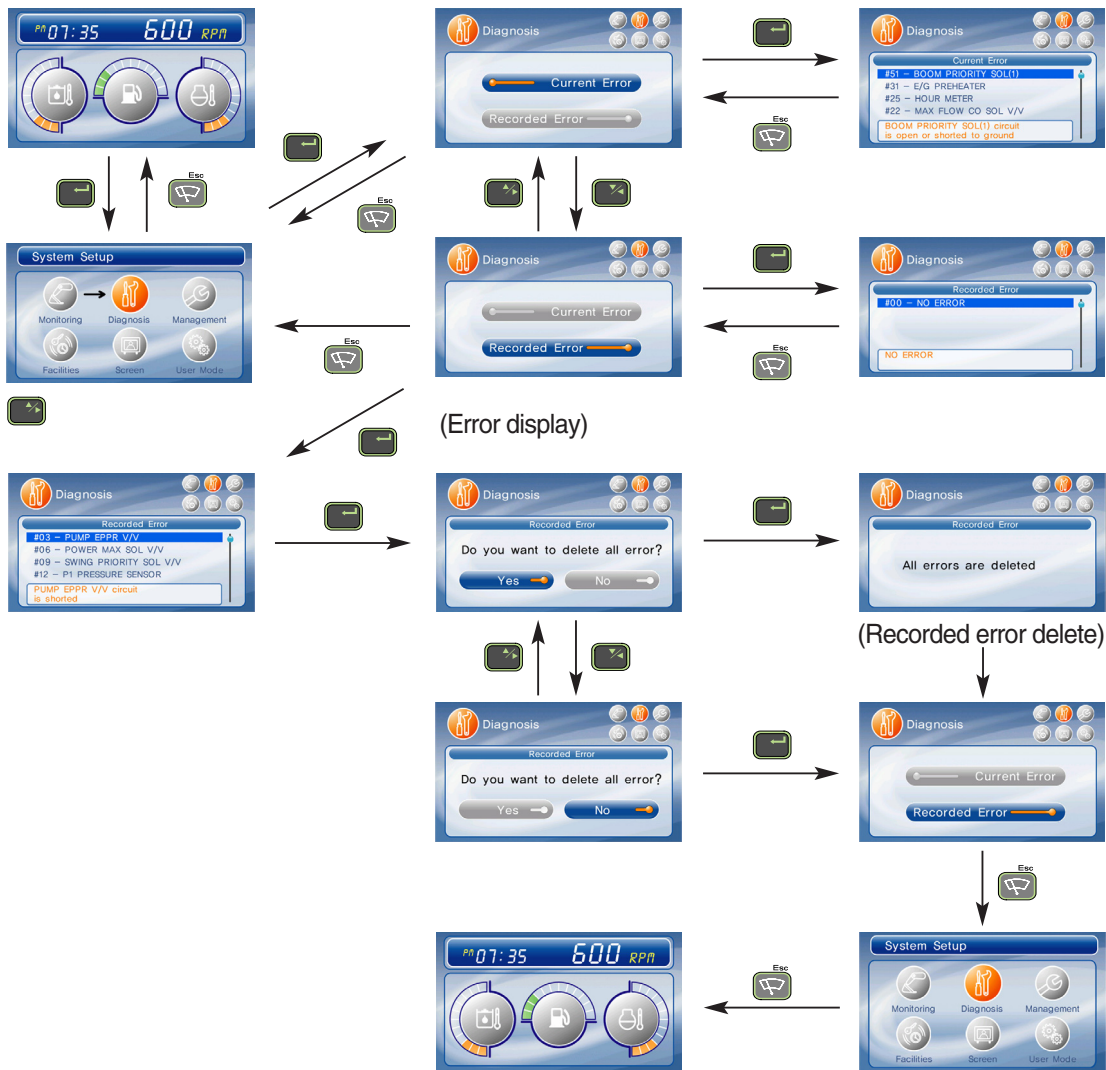


GROUP 8 SELF-DIAGNOSTIC SYSTEM

1. OUTLINE

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

2. CURRENT ERROR DISPLAY



3. ERROR CODES TABLE

Error code No.	Description
1	Short circuit in accel actuator system
2	Potentiometer circuit is shorted to Vcc(5V) or battery +
3	Short circuit in pump EPPR valve system
4	Short circuit in boom down EPPR valve system
5	Short circuit in travel speed solenoid system
6	Short circuit in power boost solenoid system
7	Short circuit in max flow solenoid system
10	Short circuit in hour-meter system
11	Accel dial circuit is shorted to Vcc(5V) or battery +
12	P1 pressure sensor circuit is shorted to power supply(24V) line
13	P2 pressure sensor circuit is shorted to power supply(24V) line
14	P3 pressure sensor circuit is shorted to power supply(24V) line
15	Boom down pressure circuit is shorted to power supply(24V) line
16	Accel actuator circuit is open or shorted to ground
17	Potentiometer circuit is open or shorted to ground
18	Pump EPPR valve circuit is open or shorted to ground
19	Boom down EPPR valve circuit is open or shorted to ground
20	Travel speed solenoid circuit is open or shorted to ground
21	Power boost solenoid circuit is open or shorted to ground
22	Max flow solenoid circuit is open or shorted to ground
25	Hour-meter circuit is open or shorted to ground
26	Accel dial circuit is open or shorted to ground
27	P1 pressure sensor circuit is open or shorted to ground
28	P2 pressure sensor circuit is open or shorted to ground
29	P3 pressure sensor circuit is open or shorted to ground
30	Boom down pressure sensor circuit is open or shorted to ground
31	Engine preheater circuit is open or shorted to ground
32	Travel alarm buzzer circuit is open or shorted to ground
33	Alternator circuit is open or shorted to ground
34	Controller input voltage is below 18V
35	Controller input voltage is over 38V
36	Communication error with cluster
37	Engine speed sensor circuit is open or shorted to ground
38	Anti-restart relay circuit is open or shorted to ground
39	Accel actuator does not stop at a target position
40	There is more than 500rpm difference between target speed and actual speed

Error code No.	Description
41	Hydraulic oil temperature sensor circuit is shorted to ground
42	Fuel level sensor circuit is shorted to ground
43	Coolant temperature sensor circuit is shorted to ground
44	Boom up pressure sensor circuit is shorted to power supply(24V) line
45	Hydraulic oil temperature sensor circuit is open or shorted to battery +
46	Fuel level sensor circuit is open or shorted to battery +
47	Coolant temperature sensor circuit is open or shorted to battery +
48	Boom up pressure sensor circuit is open or shorted to ground
49	Engine preheater circuit is shorted to battery +
51	Heavy duty work solenoid circuit is open or shorted to ground
56	Travel alarm buzzer circuit is shorted to battery +
58	Heavy duty work solenoid circuit is shorted to battery +

4. ENGINE FAULT CODE INFORMATION

SPN	FMI	Fault code No.	Description
91	2	SPN91-FMI2	Throttle Position Sensor Data Erratic, Intermittent, or Incorrect
	3	SPN91-FMI3	(Secondary) Throttle Position Sensor Voltage Above Normal or Shorted High
	4	SPN91-FMI4	(Secondary) Throttle Position Sensor Voltage Below Normal or Shorted Low
	8	SPN91-FMI8	(Secondary) Throttle Position Sensor Abnormal Frequency or Period
	12	SPN91-FMI12	(Secondary) Throttle Position Sensor Bad Device or Component
100	1	SPN100-FMI1	Engine Oil pressure Low-Warning
	2	SPN100-FMI2	Engine Oil Pressure Low-Derate
	3	SPN100-FMI3	Engine Oil Pressure Sensor Voltage Above Normal or Shorted High(Shutdown)
	4	SPN100-FMI4	Engine Oil Pressure Sensor Voltage Below Normal or Shorted Low
105	10	SPN100-FMI10	Engine Oil Pressure Sensor 5V Supply Connection Open Circuit
	1	SPN105-FMI1	Inlet Manifold Air Temp High-Warning
	2	SPN105-FMI2	Inlet Manifold Air Temp High-Derate
	3	SPN105-FMI3	Inlet Manifold Air Temp Sensor Voltage Above Normal or Shorted High
	4	SPN105-FMI4	Inlet Manifold Air Temp Sensor Voltage Below Normal or Shorted Low
106	3	SPN106-FMI3	Inlet Manifold Pressure Sensor Voltage Above Normal or Shorted High
	4	SPN106-FMI4	Inlet Manifold Pressure Sensor Voltage Below Normal or Shorted Low
	10	SPN106-FMI10	Inlet Manifold Pressure Sensor 5V Supply Connection Open Circuit
110	1	SPN110-FMI1	Engine Coolant Temp High-Warning
	2	SPN110-FMI2	Engine Coolant Temp High-Derate
	3	SPN110-FMI3	Engine Coolant Temp Sensor Voltage Above Normal or Shorted High(Shutdown)
	4	SPN110-FMI4	Engine Coolant Temp Sensor Voltage Below Normal or Shorted Low
157	3	SPN157-FMI3	Fuel Rail Pressure Sensor Voltage Above Normal or Shorted High
	4	SPN157-FMI4	Fuel Rail Pressure Sensor Voltage Below Normal or Shorted Low
158	2	SPN158-FMI2	Keyswitch Data Erratic, Intermittent, or Incorrect
168	0	SPN168-FMI0	ECU Battery Power Excessive
	1	SPN168-FMI1	ECU Battery Power Low
	2	SPN168-FMI2	ECU Battery Power Intermittent
190	1	SPN190-FMI1	Engine Overspeed - Warning
	8	SPN190-FMI8	Speed/Timing Sensor Abnormal Signal Frequency
558	2	SPN558-FMI2	(Secondary) Throttle Position Sensor Idle Validation Switch
630	2	SPN630-FMI2	Customer or System Parameters Data Incorrect
631	2	SPN631-FMI2	Engine Software Data Incorrect
637	11	SPN637-FMI11	Primary to Secondary Engine Speed Signal Calibration Fault
639	9	SPN639-FMI9	SAE J1939 Data Link Abnormal Update
646	5	SPN646-FMI5	Turbo Wastegate Solenoid Current Low
	6	SPN646-FMI6	Turbo Wastegate Solenoid Current High
651	5	SPN651-FMI5	Cylinder #1 Injector Current Low

※ SPN : Suspect Parameter Number

FMI : Failure Mode Identifier

SPN	FMI	Fault code No.	Description
651	6	SPN651-FMI6	Cylinder #1 Injector Current High
	7	SPN651-FMI7	Cylinder #1 Injector Not Responding
652	5	SPN652-FMI5	Cylinder #2 Injector Current Low
	6	SPN652-FMI6	Cylinder #2 Injector Current High
653	7	SPN652-FMI7	Cylinder #2 Injector Not Responding
	5	SPN653-FMI5	Cylinder #3 Injector Current Low
	6	SPN653-FMI6	Cylinder #3 Injector Current High
654	7	SPN653-FMI7	Cylinder #3 Injector Not Responding
	5	SPN654-FMI5	Cylinder #4 Injector Current Low
	6	SPN654-FMI6	Cylinder #4 Injector Current High
655	7	SPN654-FMI7	Cylinder #4 Injector Not Responding
	5	SPN655-FMI5	Cylinder #5 Injector Current Low
	6	SPN655-FMI6	Cylinder #5 Injector Current High
656	7	SPN655-FMI7	Cylinder #5 Injector Not Responding
	5	SPN656-FMI5	Cylinder #6 Injector Current Low
	6	SPN656-FMI6	Cylinder #6 Injector Current High
676	7	SPN656-FMI7	Cylinder #6 Injector Not Responding
	5	SPN676-FMI5	Glow Plug Start Aid Relay Current Low
678	6	SPN676-FMI6	Glow Plug Start Aid Relay Current High
	3	SPN678-FMI3	ECU 8V DC Supply Voltage Above Normal or Shorted High
723	4	SPN678-FMI4	ECU 8V DC Supply Voltage Below Normal or Shorted Low
	8	SPN723-FMI8	Secondary Engine Speed Sensor Abnormal Signal Frequency
1079	3	SPN1079-FMI3	5V Sensor DC Supply Voltage Above Normal or Shorted High
	4	SPN1079-FMI4	5V Sensor DC Supply Voltage Below Normal or Shorted Low
1188	7	SPN1188-FMI7	Turbo Wastegate Not Responding
1347	5	SPN1347-FMI5	Fuel Rail Pump Output Current Low
	6	SPN1347-FMI6	Fuel Rail Pump Output Current High
	7	SPN1347-FMI7	Fuel Rail Pump Output Not Responding

※ SPN : Suspect Parameter Number

FMI : Failure Mode Identifier