YANMAR

TROUBLESHOOTING MANUAL

INDUSTRIAL ENGINES

ELECTRONIC CONTROL

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3TNV84T
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California
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

California
Proposition 65 Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and reproductive harm.
Wash hands after handling.

Section 1

FAILURE DIAGNOSIS

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DTCS (DIAGNOSTIC TROUBLE CODES) GENERAL DESCRIPTION

DTC Code List

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Classification	DTC	Lamp Flashing Patterns	Error Item		Referenced page number	
			Area	Status	Overview	Failure Diagnosis
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Classification	DTC	Lamp Flashing Patterns	Error Item			Referenced page number	
			Area		Status	Overview	Failure Diagnosis
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Description Items

DTC	Code Number	DTC Name

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Precondition for Error detection 2. Error detecting Condition 3. Indicates the pattern in which the failure lamp flashes when the DTC is output. (For detailed information on various flashing patterns, see Annex).	This column shows what parts or items should be checked to identify the cause of the error. For details, see "<Diagnosis Description>."

Movement at Error occurrence

Error Mode	[Operation Continuation] / [Run Under Restrictions] / [Stop Immediately]: The engine operation after detecting the error is described. * [Operation Continuation]:After detecting the error, the system lets the engine continue to run without any restrictions. [Run Under Restrictions]:The system lets the engine continue to run but restricts the High idle speed, engine power, and/or other performance factors as appropriate. [Stop Immediately]: The system stops the engine immediately after detecting the error.When any error is detected before starting the engine, the starter will not rotate.
Run restricted?	Yes/No.: If Yes, this field details how the engine run is restricted when the error has occurred.
Recovery Conditions	Yes/No.: If Yes, this field describes what conditions must be true for the error mode to be reset.
Remarks	This field describes some notes on safety precautions and so on, as appropriate.

Estimation of Failure cause/Error condition

Provides descriptive information on possible points of failure, possible direct causes (such as a disconnected sensor wire), or possible system abnormalities that has indirectly caused the failure (such as abnormally high cooling water temperature), as can be estimated from the output DTC.

Note: Indicates failures that might be related with the output DTC.

Diagnosis Description

Describes methods or procedures of failure diagnosis.

*** After sucessful recovery by the replacement of ECU, sensor or actuator, make sure that installing the previous parts will reproduce the same error.**

Analog Input Related Failures

Rack position sensor

(1) P1202/4: Failure with Rack Position Sensor (Low Voltage)

DTC	P1202/4	Rack Position Sensor Error (Low Voltage)

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. The sensor voltage lower limit and below [at E-ECU activation, engine running] 3. Seven flashes.	Connector Harness Rack position sensor E-ECU

Movement at Error occurrence

Error Mode	[Run Under Restrictions]: The engine continues to run in on-error engine control mode. If any error is detected at E-ECU activation, it takes 1 - 10 seconds from the starter begins to rotate until the engine starts.
Run restricted?	Yes: • The High idle speed is restricted to one of the following, whichever smaller: - 80% of the pre-error High idle speed - 150% of the Low idle speed • The fuel injection rate is restricted.
Recovery Conditions	No.
Remarks	The High and Low idle speeds must be equal to those specified in the engine specifications.

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - The rack position sensor's signal wires may be disconnected or short-circuited with GND.
  - The SENSOR 12V wire may be disconnected or short-circuited with GND (*NOTE).
  - The SENSOR GND wire may be short-circuited with POWER SUPPLY (*NOTE).

***NOTE) If the SENSOR 12V wire is short-circuited with GND or SENSOR GND wire is short-circuited with POWER SUPPLY, the E-ECU's power supply line fuse 10A might be blown.With this fuse blown, the E-ECU may fail to detect/indicate the error, and to store the error history.**

The rack position sensor may be faulty.

  - Output defect of the rack position signal by a disconnection or a short circuit of the inner wiring
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check the sensor voltage (AD value). *For details of the method and the procedure of diagnosis, see P.1-136

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the rack actuator is correctly inserted. • Check that the wiring of the rack actuator is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the input voltage of the rack position sensor (voltage of the sensor 12V line). • Check the harness for correct continuity. *For details of the method and the procedure of diagnosis, see P.1-136

(2) P1203/3: Failure with Rack Position Sensor (High Voltage)

DTC	P1202/3	Failure with Rack Position Sensor (High Voltage)

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. The sensor voltage upper limit and above [at E-ECU activation, engine running] 3. Seven flashes.	Connector Harness rack position sensor Rack actuator E-ECU

Movement at Error occurrence

	Detection at the engine start	Detection at the engine running
Error Mode	[Run Under Restrictions]: Start the engine in on-error engine control mode. It takes 1 to 10 seconds from the starter's rotation to the engine start.	[Stop Immediately]: The engine stops running.
Run restricted?	Yes: • The High idle is restricted to one of the following, whichever smaller: • 80% of the pre-error High idle speed • 150% of the Low idle speed • The fuel injection rate is restricted.	Yes: The rack actuator relay is turned OFF, and the rack position is forcibly set to the engine stop position.
Recovery Conditions	No.	No.
Remarks	The High and Low idle speeds must be equal to those specified in the engine specifications.	

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - The SENSOR GND wire may be disconnected.
  - The rack position sensor signal wire may be short-circuited with POWER SUPPLY.
  - The rack actuator wiring may be short-circuited with GND (with engine running).
- The rack position sensor may be faulty.
  - Output defect of the rack position signal by a disconnection or a short circuit of the inner wiring
- The rack actuator may be faulty.
  - The rack actuator inner wiring may be short-circuited with GND (with engine running).
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check the sensor voltage (AD value). *For details of the method and the procedure of diagnosis, see P.1-136

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the rack actuator is correctly inserted. • Check that the wiring of the rack actuator is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the input voltage of the rack position sensor (voltage of the sensor 12V line). • Check the harness for correct continuity. *For details of the method and the procedure of diagnosis, see P.1-136

Accelerator sensor

(1) P0122/4: Accelerator Sensor Error (Low Voltage)

DTC	P0122/4	Accelerator Sensor Error (Low Voltage)

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. Sensor voltage 0.2 [V] or lower. 3. Five flashes.	Harness Accelerator sensor

Movement at Error occurrence

	Spare Accelerator Sensor Function	
	Unavailable	Available
Error Mode	[Run Under Restrictions]: The engine runs at a constant rotational speed.	[Stop Immediately]: The engine continues to run using the spare accelerator sensor instead.
Run restricted?	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or “pre-error target speed”.	No.
Recovery Conditions	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.
Remarks		

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - The accelerator sensor's signal wires may be disconnected or short-circuited with GND.
  - The SENSOR 5V wire may be disconnected or short-circuited with GND.
  - The SENSOR GND wire may be short-circuited with POWER SUPPLY (*NOTE).

  ***NOTE) If the SENSOR GND wire is short-circuited with POWER SUPPLY, the E-ECU's power supply line fuse 10A might be blown.With this fuse blown, the E-ECU may fail to detect/indicate the error, and to store the error history.**
- The accelerator sensor may be faulty.
  - Sensor output defect by a disconnection of the accelerator sensor inner wiring or a sliding resistance increase
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check the sensor voltage. *For details of the method and the procedure of diagnosis, see P.1-140

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the accelerator sensor is correctly inserted. • Check that the wiring of the accelerator sensor is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the resistance value of the accelerator sensor. • Check the harness for correct continuity. • Check the output voltage of the accelerator sensor. *For details of the method and the procedure of diagnosis, see P.1-140

(2) P0123/3: Accelerator Sensor Error (High Voltage)

DTC	P0123/3	Accelerator Sensor Error (High Voltage)

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. Sensor voltage 4.6 [V] or higher. 3. Five flashes.	Harness Accelerator sensor

Movement at Error occurrence

	Spare Accelerator Sensor Function	
	Unavailable	Available
Error Mode	[Run Under Restrictions]: The engine runs at a constant rotational speed.	[Stop Immediately]: The engine continues to run using the spare accelerator sensor instead.
Run restricted?	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or “pre-error target speed”.	No.
Recovery Conditions	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.
Remarks		

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - The SENSOR GND wire may be disconnected.
  - The sensor signal wire may be short-circuited with POWER SUPPLY.
- The accelerator sensor may be faulty.
  - Sensor output defect by a short circuit with power supply of the accelerator sensor inner wiring
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check the sensor voltage. *For details of the method and the procedure of diagnosis, see P.1-140

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the accelerator sensor is correctly inserted. • Check that the wiring of the accelerator sensor is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the resistance value of the accelerator sensor. • Check the harness for correct continuity. • Check the output voltage of the accelerator sensor. *For details of the method and the procedure of diagnosis, see P.1-140

(3) P0124/2: Intermittent Failure with Accelerator Sensor

DTC	P0124/2	Intermittent Failure with Accelerator Sensor

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Engine running. 2. Unconfirmed error detected 10 times. 3: Does not flash.	Connector Harness Accelerator sensor

Movement at Error occurrence

Error Mode	[Run Under Restrictions]: After detecting the error, the system lets the engine continue to run without any restrictions.
Run restricted?	No.
Recovery Conditions	No.
Remarks	

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - Accelerator sensor signal wire may be disconnected, or short-circuited with GND or power supply.
  - Sensor 5V wire may be disconnected, or short-circuited with GND or power supply.
  - Sensor GND wire may be disconnected.
- The accelerator sensor may be faulty.
  - Inner wiring may be disconnected or short-circuited

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check the sensor voltage. *For details of the method and the procedure of diagnosis, see P.1-140

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the accelerator sensor is correctly inserted. • Check that the wiring of the accelerator sensor is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the resistance value of the accelerator sensor. • Check the harness for correct continuity. • Check the output voltage of the accelerator sensor. *For details of the method and the procedure of diagnosis, see P.1-140

(4) P0123/1: Accelerator Sensor Error (foot pedal-close position)

DTC	P1125/1	Accelerator Sensor Error (foot pedal-close position)

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. With sensor voltage at or below 0.65[V], foot pedal Normally Open switch detected being ON or foot pedal Normally Closed Switch detected being OFF. 3. Five flashes.	Harness Foot pedal

Movement at Error occurrence

Error Mode	[Run Under Restrictions]: The engine runs at a constant rotational speed.
Run restricted?	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or “pre-error target speed”.
Recovery Conditions	No.
Remarks	

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - The wiring for the foot pedal Normally Closed switch may be disconnected.
  - The wiring for the foot pedal Normally Open switch may be short-circuited with GND.
- The foot pedal may be faulty.
  - The foot pedal inner wiring may be disconnected or short-circuited with GND.
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check that the foot pedal movement is correctly recognized. *For details of the method and the procedure of diagnosis, see P.1-144

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the foot pedal is correctly inserted. • Check that the wiring of the foot pedal is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the foot pedal for correct continuity. • Check the harness for correct continuity. *For details of the method and the procedure of diagnosis, see P.1-144

(5) P1126/0: Accelerator Sensor Error (foot pedal-open position)

DTC	P1126/0	Accelerator Sensor Error (foot pedal-open position)

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. With sensor voltage 1.1[V] and above, foot pedal Normally Open switch detected being OFF or foot pedal Normally Closed Switch detected being ON. 3. Five flashes.	Harness Foot pedal

Movement at Error occurrence

Error Mode	[Run Under Restrictions]: The engine runs at a constant rotational speed.
Run restricted?	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or “pre-error target speed”.
Recovery Conditions	No.
Remarks	

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - The wiring for the foot pedal Normally Open switch may be disconnected.
  - The wiring for the foot pedal Normally Closed switch may be short-circuited with GND.
- The foot pedal may be faulty.
  - The inner wiring may be disconnected or short-circuited with GND.
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check that the foot pedal movement is correctly recognized. *For details of the method and the procedure of diagnosis, see P.1-144

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the foot pedal is correctly inserted. • Check that the wiring of the foot pedal is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the foot pedal for correct continuity. • Check the harness for correct continuity. *For details of the method and the procedure of diagnosis, see P.1-144

Spare accelerator sensor (option)

(1) P0222/4: Failure with Spare Accelerator Sensor (Low Voltage)

DTC	P0222/4	Failure with Spare Accelerator Sensor (Low Voltage)

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. Sensor voltage 0.2 [V] or lower. 3. One flash followed by eight flashes	Harness Spare accelerator sensor

Movement at Error occurrence

	Error detection of main accelerator sensor	
	Unavailable	Available
Error Mode	[Run As Is]: The engine continues to run using the main accelerator sensor.	[Run Under Restrictions]: The engine runs at a constant rotational speed.
Run restricted?	No.	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or “pre-error target speed”.
Recovery Conditions	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.
Remarks		

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - The spare accelerator sensor's signal wires may be disconnected or short-circuited with GND.
  - The SENSOR 5V wire may be disconnected or short-circuited with GND.
  - The SENSOR GND wire may be short-circuited with POWER SUPPLY (*NOTE).

  ***NOTE) If the SENSOR GND wire is short-circuited with POWER SUPPLY, the E-ECU's power supply line fuse 10A might be blown.With this fuse blown, the E-ECU may fail to detect/indicate the error, and to store the error history.**
- The spare accelerator sensor may be faulty.
  - Sensor output defect by a disconnection of the spare accelerator sensor inner wiring or a sliding resistance increase
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check the sensor voltage. *For details of the method and the procedure of diagnosis, see P.1-148

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the spare accelerator sensor is correctly inserted. • Check that the wiring of the spare accelerator sensor is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the resistance value of the spare accelerator sensor. • Check the harness for correct continuity. • Check the output voltage of the spare accelerator sensor. *For details of the method and the procedure of diagnosis, see P.1-148

(2) P0223/3: Spare Accelerator Sensor Error (High Voltage)

DTC	P0223/3	Spare Accelerator Sensor Error (High Voltage)

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. Sensor voltage 4.6 [V] or higher. 3. One flash followed by eight flashes	Harness Spare accelerator sensor

Movement at Error occurrence

	Error detection of main accelerator sensor	
	Unavailable	Available
Error Mode	[Run As Is]: The engine continues to run using the main accelerator sensor.	[Run Under Restrictions]: The engine runs at a constant rotational speed.
Run restricted?	No.	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or “pre-error target speed”.
Recovery Conditions	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.	Yes: This error will be automatically reset when a normal voltage (0.2 to 4.6[V]) is input.
Remarks		

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - The SENSOR GND wire may be disconnected.
  - The sensor signal wire may be short-circuited with POWER SUPPLY.
- The spare accelerator sensor may be faulty.
  - Sensor output defect by a short circuit with power supply of the spare accelerator sensor inner wiring
- The E-ECU internal circuitry may be faulty.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check the sensor voltage. *For details of the method and the procedure of diagnosis, see P.1-148

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the spare accelerator sensor is correctly inserted. • Check that the wiring of the spare accelerator sensor is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the resistance value of the spare accelerator sensor. • Check the harness for correct continuity. • Check the output voltage of the spare accelerator sensor. *For details of the method and the procedure of diagnosis, see P.1-148

(3) P0224/2: Intermittent Failure with Spare Accelerator Sensor

DTC	P0224/2	Intermittent Failure with Spare Accelerator Sensor

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Engine running. 2. Unconfirmed error detected 10 times. 3: Does not flash.	Connector Harness Spare accelerator sensor

Movement at Error occurrence

Error Mode	[Run As Is]: After detecting the error, the system lets the engine continue to run without any restrictions.
Run restricted?	No.
Recovery Conditions	No.
Remarks	

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - Spare accelerator sensor signal wire may be disconnected or short-circuited with GND or power supply.
  - Sensor 5V wire may be disconnected, or short-circuited with GND or power supply.
  - Sensor GND wire may be disconnected.
- The spare accelerator sensor may be faulty.
  - Spare accelerator sensor wiring may be disconnected or short-circuited.

Diagnosis Description

1) Initial diagnosis with the diagnosis tool	• Check the fault indication. • Check the sensor voltage. *For details of the method and the procedure of diagnosis, see P.1-148

2) Check of connectors/wiring	• Before beginning your work, be sure to turn off the key switch. • Check that the connector of the spare accelerator sensor is correctly inserted. • Check that the wiring of the spare accelerator sensor is not disconnected or the insulation of the wiring is not peeled.

3) Failure Diagnostic Work	• Check the resistance value of the spare accelerator sensor. • Check the harness for correct continuity. • Check the output voltage of the spare accelerator sensor. *For details of the method and the procedure of diagnosis, see P.1-148

(4) P1225/1: Spare Accelerator Sensor Error (foot pedal-close position)

DTC	P1225/1	Spare Accelerator Sensor Error (foot pedal-close position)

DTC Detecting Conditions

1 - Precondition; 2 - Detecting condition(s); 3 - Flashing pattern of failure indicator	Check points
1. Key switch ON. 2. With sensor voltage at or below 0.65[V], foot pedal Normally Open switch detected being ON or foot pedal Normally Closed Switch detected being OFF. 3. One flash followed by eight flashes	Harness Foot pedal

Movement at Error occurrence

	Error detection of main accelerator sensor	
	Unavailable	Available
Error Mode	[Run As Is]: The engine continues to run using the main accelerator sensor.	[Run Under Restrictions]: The engine runs at a constant rotational speed.
Run restricted?	No.	Yes: The target speed is set to the "on-error target speed (standard value: 1500[min^{-1}])" or “pre-error target speed”.
Recovery Conditions	No.	No.
Remarks		

Estimation of Failure cause/Error condition

- The connector may not be properly connected.
- Wiring defect of the harness
  - The wiring for the foot pedal Normally Closed switch may be disconnected.
  - The wiring for the foot pedal Normally Open switch may be short-circuited with GND.
- The foot pedal may be faulty.
  - The inner wiring may be disconnected or short-circuited with GND.
- The E-ECU internal circuitry may be faulty.