TROUBLESHOOTING MANUAL

INDUSTRIAL ENGINE

TNV

3TNV88C

3TNV86CT

4TNV88C

4TNV86CT

4TNV98C

4TNV98CT

YANMAR

TROUBLESHOOTING

DTC (Diagnostic Trouble Codes) General Description

DTC code list

DTC code				Lamp that comes on	Error		Reference page	
	SPN		FMI					
P code	Decimal number	Hexa-decimal number	Decimal number		Part	State	Description	Diagnosis
P0336	522400	7F8A0	2	FAIL + AWL	Crankshaft speed sensor	Crankshaft signal error	*P9*	*P319*
P0337			5	FAIL + AWL		No signal from crankshaft	*P11*	*P319*
P0341	522401	7F8A1	2	FAIL + AWL	Camshaft speed sensor	Camshaft signal error	*P13*	*P322*
P0342			5	FAIL + AWL		No signal from camshaft	*P15*	*P322*
P1341			7	FAIL + AWL		Angle offset error	*P17*	–
P0008	**523249**	**7FBF1**	**5**	FAIL + RSL	Crankshaft speed sensor, Camshaft speed sensor	Crankshaft/camshaft speed sensor non-input (simultaneous)	*P19*	*P319, P322*
P0123	91	5B	3	FAIL + AWL	Accelerator sensor 1	Accelerator sensor 1 error (voltage high)	*P20*	*P325*
P0122			4	FAIL + AWL		Accelerator sensor 1 error (voltage low)	*P22*	*P325*
P0223	**28**	**1C**	**3**	FAIL + AWL	Accelerator sensor 2	Accelerator sensor 2 error (voltage high)	*P24*	*P325*
P0222			**4**	FAIL + AWL		Accelerator sensor 2 error (voltage low)	*P26*	*P325*
P1646	**522624**	**7F980**	**7**	FAIL + AWL	Accelerator sensor 1 + 2	Dual accelerator sensor error (closed position)	*P28*	–
P1647	**522623**	**7F97F**	**7**	FAIL + AWL		Dual accelerator sensor error (open position)	*P30*	–
P0228	**29**	**1D**	**3**	FAIL + AWL	Accelerator sensor 3	Accelerator sensor 3 error (voltage high)	*P32*	*P325*
P0227			**4**	FAIL + AWL		Accelerator sensor 3 error (voltage low)	*P34*	*P325*
P1227			**8**	FAIL + AWL	Pulse sensor	**Pulse accelerator sensor error (pulse communication)**	*P36*	–
P1126	**28**	**1C**	**0**	FAIL + AWL	Accelerator sensor 3	Accelerator sensor 3 error (foot pedal in open position)	*P37*	–
P1125			**1**	FAIL + AWL		Accelerator sensor 3 error (foot pedal in closed position)	*P39*	–
P02E9	51	33	3	FAIL + RSL	Intake throttle position sensor	Intake throttle position sensor error (voltage high)	*P40*	*P328*
P02E8			4	FAIL + RSL		Intake throttle position sensor error (voltage low)	*P42*	*P328*
P0238	102	66	3	FAIL + RSL	EGR low pressure side pressure sensor	EGR low pressure side pressure sensor error (excessive sensor output)	*P44*	*P331*
P0237			4	FAIL + RSL		EGR low pressure side pressure sensor error (insufficient sensor output)	*P46*	*P331*
P0236			**13**	FAIL + RSL		EGR low pressure side pressure sensor error (abnormal learning value)	*P48*	*P331*
P1673			**10**	FAIL + RSL		EGR low pressure side pressure sensor error (detected value error)	*P50*	*P334*
P0473	1209	4B9	3	FAIL + RSL	EGR high pressure side pressure sensor	EGR high pressure side pressure sensor error (excessive sensor output)	*P52*	*P339*
P0472			4	FAIL + RSL		EGR high pressure side pressure sensor error (insufficient sensor output)	*P54*	*P339*
P0471			**13**	FAIL + RSL		EGR high pressure side pressure sensor error (abnormal learning value)	*P56*	*P339*
P1679			**10**	FAIL + RSL		EGR high pressure side pressure sensor error (detected value error)	*P58*	*P339*
P0118	110	6E	3	FAIL + AWL	Engine coolant temperature sensor	Engine coolant temperature sensor error (excessive sensor output)	*P60*	*P342*
P0117			4	FAIL + AWL		Engine coolant temperature sensor error (insufficient sensor output)	*P62*	*P342*
P1674			**10**	FAIL + RSL		Engine coolant temperature sensor error (detected value error)	*P64*	*P346*
P0217			0	Application specific		Engine coolant temperature high (overheat)	*P66*	*P342*
P0113	172	AC	3	FAIL + AWL	Ambient air temperature sensor	Ambient air temperature sensor error (voltage high)	*P68*	*P351*
P0112			4	FAIL + AWL		Ambient air temperature sensor error (voltage low)	*P70*	*P351*
P0183	174	AE	3	FAIL + AWL	Fuel temperature sensor	Fuel temperature sensor error (voltage high)	*P72*	*P355*
P0182			4	FAIL + AWL		Fuel temperature sensor error (voltage low)	*P74*	*P355*
P0168			0	Application specific		Fuel temperature high	*P76*	*P355*

P0337: No signal from crankshaft

P code	P0337	Name	No signal from crankshaft
SPN/FMI	522400/5		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. No prerequisite. 2. No pulse input of crankshaft speed sensor while the cam is rotating for a certain number of rotations (2 rotations).	Connector Wire-harness Crankshaft speed sensor ECU Pulser

● Actions when an error occurs

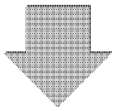
Fault mode	[Limited operation]: The engine operation is limited. (The operation continues with only the camshaft speed sensor.)
Limited operation	• When sensor error occurs, rated output of the engine is reduced immediately. • The maximum engine torque is limited to 85 %. • Rated output of the engine is reduced further after 120 min. • The maximum engine torque is limited to 50 %.
Reset criteria	When the ECU power is turned off, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

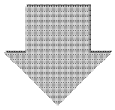
1. Poor connection of connector
2. Wiring failure of the wire-harness
3. Crankshaft speed sensor failure
4. ECU internal circuit failure
5. Pulser error and sensor installation condition error

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Check the sensor voltage. * See Chapter 2 *P325* for details on the diagnosis method and procedure.



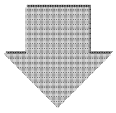
2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the connector pin of the accelerator sensor 2 for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the accelerator sensor wiring is not cut or the wiring coating is not peeled.



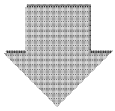
3. Failure diagnosis	• Check the accelerator sensor resistance value. • Check the conduction of the wire-harness. • Check the accelerator sensor output voltage. * See Chapter 2 *P325* for details on the diagnosis method and procedure.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Check the sensor voltage.



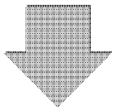
2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the connector pin of the accelerator sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the accelerator sensor wiring is not cut or the wiring coating is not peeled.



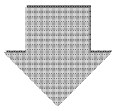
3. Failure diagnosis	• Check the accelerator sensor resistance value. • Check the conduction of the wire-harness. • Check the accelerator sensor output voltage.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Check the sensor voltage. * See Chapter 2 *P328* for details on the diagnosis method and procedure.



2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the connector pin of the intake throttle position sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the intake throttle position sensor wiring is not cut or the wiring coating is not peeled.



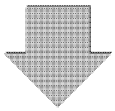
3. Failure diagnosis	• Check the intake throttle position sensor resistance value. • Check the conduction of the wire-harness. • Check the intake throttle position sensor output voltage. * See Chapter 2 *P328* for details on the diagnosis method and procedure.

● Presumed cause of the failure or the error condition

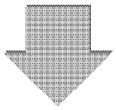
1. Installation failure of EGR pressure sensor
2. Poor connection of connector
3. Wiring failure of the wire-harness
4. EGR pressure sensor failure
5. ECU internal circuit failure

● Diagnosis

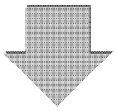
1. Initial diagnosis using SA-D	• Check the fault indication. * See Chapter 2 *P334* for details on the diagnosis method and procedure.



2. Engine check	• Before beginning your work, be sure to turn off the key switch, and turn off the ECU power. • Check the installation condition of EGR pressure sensor. • Make sure that there is nothing wrong (disconnections and damages) with the exhaust piping, pressure hose, or pressure pipe.



3. Connector/wiring check	• Check the pin of the EGR pressure sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the EGR pressure sensor wiring is not cut or the wiring coating is not peeled.



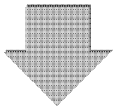
4. Failure diagnosis	• Check the ECU output voltage. • Check the EGR low pressure side pressure sensor output voltage. • Check the conduction of the wire-harness. * See Chapter 2 *P334* for details on the diagnosis method and procedure.

● Presumed cause of the failure or the error condition

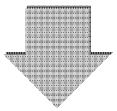
1. Poor connection of connector
2. Wiring failure of the wire-harness
   - Disconnection or power short circuit of the sensor GND wire
   - Disconnection or power short circuit of the sensor signal wire
3. Engine coolant temperature sensor failure
   - Sensor output failure caused by an disconnection of the engine coolant temperature sensor internal wiring
4. ECU internal circuit failure

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Check the sensor voltage. * See Chapter 2 *P342* for details on the diagnosis method and procedure.



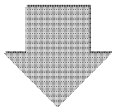
2. Connector/wiring check	• Before beginning your work, turn off the ECU power. • Check the pin of the engine coolant temperature sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the engine coolant temperature sensor wiring is not cut or the wiring coating is not peeled.



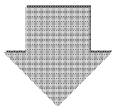
3. Failure diagnosis	• Check the engine coolant temperature sensor resistance value. • Check the conduction of the wire-harness. • Check the engine coolant temperature sensor output voltage. * See Chapter 2 *P342* for details on the diagnosis method and procedure.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Check the sensor voltage. * See Chapter 2 *P351* for details on the diagnosis method and procedure.



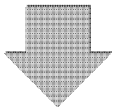
2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the pin of the ambient air temperature sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the ambient air temperature sensor wiring is not cut or the wiring coating is not peeled.



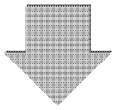
3. Failure diagnosis	• Check the resistance value of the ambient air temperature sensor. • Check the conduction of the wire-harness. • Check the output voltage of the ambient air temperature sensor. * See Chapter 2 *P351* for details on the diagnosis method and procedure.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Check the sensor voltage. * See Chapter 2 *P359* for details on the diagnosis method and procedure.



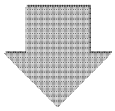
2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the pin of the rail pressure sensor for deformation and cracks, the condition of the connection, and whether the retainer is removed. • Make sure that the rail pressure sensor wiring is not cut or the wiring coating is not peeled.



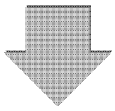
3. Failure diagnosis	• Check the conduction of the wire-harness. • Check the ECU output voltage. • Check the rail pressure sensor output voltage. * See Chapter 2 *P359* for details on the diagnosis method and procedure.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Check the sensor voltage. * See Chapter 2 *P362* for details on the diagnosis method and procedure.



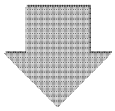
2. Connector/wiring check	• Before beginning your work, be sure to turn off the key switch. • Check the pin of the DPF substrate/DPF differential pressure sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the DPF substrate/DPF differential pressure sensor wiring is not cut or the wiring coating is not peeled.



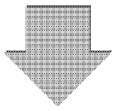
3. Failure diagnosis	• Check the DPF substrate/DPF differential pressure sensor resistance value. • Check the conduction of the wire-harness. • Check the DPF substrate/DPF differential pressure sensor output voltage. * See Chapter 2 *P362* for details on the diagnosis method and procedure.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Check the sensor voltage. * See Chapter 2 *P365* for details on the diagnosis method and procedure.



2. Connector/wiring check	• Before beginning your work, turn off the ECU power. • Check the pin of the DPF inlet temperature sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the DPF inlet temperature sensor wiring is not cut or the wiring coating is not peeled.



3. Failure diagnosis	• Check the resistance value of the DPF inlet temperature sensor. • Check the conduction of the wire-harness. • Check the output voltage of the DPF inlet temperature sensor. * See Chapter 2 *P365* for details on the diagnosis method and procedure.

P0420: DPF intermediate temperature sensor abnormal temperature (abnormally low)

P code	P0420	Name	DPF intermediate temperature sensor abnormal temperature (abnormally low)
SPN/FMI	3250/1		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. No prerequisite. 2. Any of the following conditions is kept for a given length of time (1200 seconds). • DPF intermediate temperature becomes 300 °C or lower during the stationary regeneration. • DPF intermediate temperature becomes 250 °C or lower during the recovery regeneration.	Connector Wire-harness DPF intermediate temperature sensor system ECU Injector DOC Piping

● Actions when an error occurs

Fault mode	[Limited operation]: The engine operation is limited.
Limited operation	• When sensor error occurs, rated output of the engine is reduced immediately. • The maximum engine torque is limited to 85 %. • EGR fully closes. • DPF regeneration stops. • Rated output of the engine is reduced further after 120 min. • The maximum engine torque is limited to 50 %.
Reset criteria	When the ECU power is turned off, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

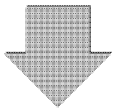
1. Poor connection of connector
2. Wiring failure of the wire-harness
3. DPF intermediate temperature sensor system failure
4. ECU internal circuit failure
5. DOC deterioration due to the external factor such as sulfur poisoning
   • Increase in activated temperature
6. Blow-by of combustion gas
   • Catalytic damage
   • Piping damage in the passage to DOC
7. Injector failure
   • Decrease in injection quantity
   • Injection timing error

● Presumed cause of the failure or the error condition

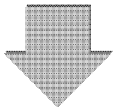
1. Installation failure of EGR gas temperature sensor
2. Poor connection of connector
3. Wiring failure of the wire-harness
4. EGR gas temperature sensor failure
5. ECU internal circuit failure

● Diagnosis

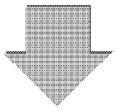
1. Initial diagnosis using SA-D	• Check the fault indication. * See Chapter 2 *P377* for details on the diagnosis method and procedure.



2. Engine check	• Before beginning your work, be sure to turn off the key switch, and turn off the ECU power. • Check the installation condition of EGR gas temperature sensor. • Check the EGR pipe and EGR cooler for damage or failure.



3. Connector/wiring check	• Check the pin of the EGR gas temperature sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the EGR gas temperature sensor wiring is not disconnected or the wiring coating is not peeled.



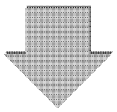
4. Failure diagnosis	• Check the resistance value of the EGR gas temperature sensor. • Check the conduction of the wire-harness. • Check the output voltage of the EGR gas temperature sensor. * See Chapter 2 *P377* for details on the diagnosis method and procedure.

● Presumed cause of the failure or the error condition

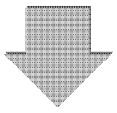
1. Poor connection of connector
2. Wiring failure of the wire-harness
3. Exhaust manifold temperature sensor failure
4. ECU internal circuit failure

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Check the sensor voltage. * See Chapter 2 *P391* for details on the diagnosis method and procedure.



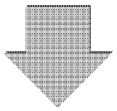
2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the pin of the exhaust manifold temperature sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the exhaust manifold temperature sensor wiring is not cut or the wiring coating is not peeled.



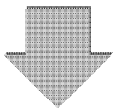
3. Failure diagnosis	• Check the resistance value of the exhaust manifold temperature sensor. • Check the conduction of the wire-harness. • Check the output voltage of the exhaust manifold temperature sensor. * See Chapter 2 *P391* for details on the diagnosis method and procedure.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. * See Chapter 2 *P404* for details on the diagnosis method and procedure.



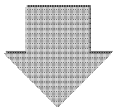
2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the pin of the starting aid relay for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the starting aid relay wiring is not cut or the wiring coating is not peeled.



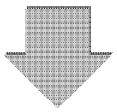
3. Failure diagnosis	• Check the starting aid relay resistance value. • Check the conduction of the wire-harness. * See Chapter 2 *P404* for details on the diagnosis method and procedure.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. * See Chapter 2 *P431* for details on the diagnosis method and procedure.



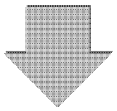
2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the pin of the injector for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the injector wiring is not cut or the wiring coating is not peeled.



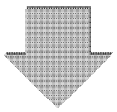
3. Failure diagnosis	• Check the conduction of the wire-harness. • Check the injector resistance value. * See Chapter 2 *P431* for details on the diagnosis method and procedure.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. * See Chapter 2 *P431* for details on the diagnosis method and procedure.



2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the pin of the injector for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the injector wiring is not cut or the wiring coating is not peeled.



3. Failure diagnosis	• Check the conduction of the wire-harness. • Check the injector resistance value. * See Chapter 2 *P431* for details on the diagnosis method and procedure.

P1648: Injector (No. 1 cylinder) correction value error

P code	P1648	Name	Injector (No. 1 cylinder) correction value error
SPN/FMI	523462/13		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. During EEPROM initialization or value input. 2. The injector corrected value is not or mistakenly entered, and the EEPROM cannot be read.	ECU

● Actions when an error occurs

Fault mode	[Engine stop]: The engine operation stops.
Limited operation	Fuel injection stops.
Reset criteria	When the ECU power is turned off, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

1. Input failure of the injector correction value
2. ECU internal circuit failure

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. Input the injector correction value again. • Switch the ECU power from ON to OFF to check the fault indication again. • If this DTC is detected again, exchange the ECU.

P0627: SCV (MPROP) disconnection

P code	P0627	Name	SCV (MPROP) disconnection
SPN/FMI	633/5		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. No prerequisite. 2. The high pressure pump drive circuit detects the open circuit.	Connector Wire-harness SCV (MPROP) ECU

● Actions when an error occurs

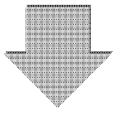
Fault mode	[Limited operation]: The engine operation is limited.
Limited operation	• When sensor error occurs, rated output of the engine is reduced immediately. • The maximum engine torque is limited to 85 %. • The engine speed is limited to the [maximum torque speed +200 min^{-1}]. • EGR fully closes. • DPF regeneration stops. • Rated output of the engine is reduced further after 15 min. • The maximum engine torque is limited to 50 %. • The engine speed is limited to the [maximum torque speed +200 min^{-1}].
Reset criteria	When the ECU power off is detected, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

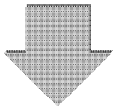
1. Poor connection of connector
2. Wiring failure of the wire-harness
   - SCV (MPROP) open circuit
3. SCV (MPROP) failure by the open circuit
4. ECU internal circuit failure

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication.



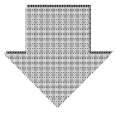
2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the pin of the SCV (MPROP) and the rail pressure sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the SCV (MPROP) and the rail pressure sensor wiring is not cut or shorted to the power/ground line, or the wiring coating is not peeled.



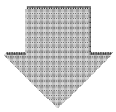
3. Failure diagnosis	• Check the fuel system, common rail system, and supply pump. • If needed, exchange the parts of the fuel system or common rail system, supply pump. * For details on the check method and procedure, refer to TNV Tier4 CR engine service manual.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication.



2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the pin of the SCV (MPROP) and the rail pressure sensor for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the SCV (MPROP) and the rail pressure sensor wiring is not cut or shorted to the power/ground line, or the wiring coating is not peeled.



3. Failure diagnosis	• Check the fuel system, common rail system, and supply pump. • If needed, exchange the parts of the fuel system or common rail system, supply pump. * For details on the check method and procedure, refer to TNV Tier4 CR engine service manual.

P02E4: Throttle valve sticking (sticking open)

P code	P02E4	Name	Throttle valve sticking (sticking open)
SPN/FMI	2950/7		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. No prerequisite. 2. When the actual degree of opening of the throttle valve is 50 % or less, if the difference between the target opening and the actual opening is ±10 % or more for 1 second or more, this difference cannot be eliminated even if operation to release valve sticking is continued for the prescribed number of times. • 12 V: 10 times × 8 • 24 V: 7 times × 6	Connector Wire-harness Intake throttle ECU

● Actions when an error occurs

Fault mode	[Limited operation]: The engine operation is limited.
Limited operation	• When sensor error occurs, rated output of the engine is reduced immediately. • The maximum engine torque is limited to 85 %. • The engine speed is limited to the [maximum torque speed +200 min^{-1}]. • EGR fully closes. • Intake throttle fully opens. • DPF regeneration stops. • Rated output of the engine is reduced further after 15 min. • The maximum engine torque is limited to 50 %. • The engine speed is limited to the [maximum torque speed +200 min^{-1}].
Reset criteria	When the ECU power is turned off, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

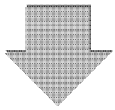
1. Intake throttle sticking
2. Poor connection of connector
3. Wiring failure of the wire-harness
4. Internal circuit of intake throttle failure

● Presumed cause of the failure or the error condition

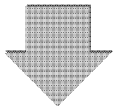
1. Poor connection of connector
2. Wiring failure of the wire-harness
3. Failure of EGR valve internal circuit

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication.



2. Connector/wiring check	• Before beginning your work, be sure to turn off the ECU power. • Check the pin of the EGR valve for deformation and cracks, the condition of the connection, and whether the retainer is loose or removed. • Make sure that the EGR valve or EGR valve relay wiring is not cut or the wiring coating is not peeled.



3. Failure diagnosis	• Check the fault indication again. • If this DTC is detected again, exchange the wire-harness or EGR valve.

P1439: Exhaust throttle (motor fault)

P code	P1439	Name	Exhaust throttle (motor fault)
SPN/FMI	522747/12		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. No prerequisite. 2. When any of the following is true inside the exhaust throttle: • Motor drive duty at the excessive condition is continued for a period of time. • Learning value exceeds normal range. • Overcurrent, overload, open circuit, or short circuit of the motor coil is detected.	Exhaust throttle

● Actions when an error occurs

Fault mode	[Engine stop]: The engine operation stops.
Limited operation	Fuel injection stops.
Reset criteria	When the ECU power is turned off, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

1. DC motor failure of exhaust throttle
2. Failure of exhaust throttle internal circuit
3. Sticking of exhaust throttle valve

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Switch the ECU power from ON to OFF to check the fault indication again. • If this DTC is detected again, inspect and replace the exhaust throttle. * For details on inspection and replacement, refer to TNV Tier4 CR engine service manual.

U1301: TSC1 (SA2) reception timeout

P code	U1301	Name	TSC1 (SA2) reception timeout
SPN/FMI	522597/9		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. The following conditions are all true: • Key switch is ON. • Not in cranking status. • Battery voltage is 10 V or higher. 2. A reception time out is detected at a fixed time.	Connector Wire-harness Controller of machine side ECU

● Actions when an error occurs

Fault mode	[Continuous operation]: Engine control is not obstructed.
Limited operation	No
Reset criteria	When the ECU power off is detected, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

1. CAN communication error from the controller on the driven machine
2. Poor connection of connector
3. Wire-harness disconnection/short circuit
4. ECU internal circuit failure

U1300: Y_ETCP1 reception time out

P code	U1300	Name	Y_ETCP1 reception time out
SPN/FMI	522609/9		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. The following conditions are all true: • Key switch is ON. • Not in cranking status. • Battery voltage is 10 V or higher. 2. A reception time out is detected at a fixed time.	Connector Wire-harness Controller of machine side ECU

● Actions when an error occurs

Fault mode	[Continuous operation]: Engine control is not obstructed.
Limited operation	No
Reset criteria	The following operation can be selected by setting application. • When the ECU power is turned off, the fault mode is released. • The fault mode is automatically reset when Y_ETCP1 message is received.
Remarks	

● Presumed cause of the failure or the error condition

1. CAN communication error from the controller on the driven machine
2. Poor connection of connector
3. Wire-harness disconnection/short circuit
4. ECU internal circuit failure

P160F: EEPROM memory writing error

P code	P160F	Name	EEPROM memory writing error
SPN/FMI	522578/12		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. When write-accessing. 2. EEPROM writing malfunctions. This error occurs when there are 3 failed attempts to write one data.	ECU

● Actions when an error occurs

Fault mode	[Limited operation]: The engine operation is limited.
Limited operation	• When sensor error occurs, rated output of the engine is reduced immediately. • The maximum engine torque is limited to 85 %. • EGR fully closes. • Rated output of the engine is reduced further after 120 min. • The maximum engine torque is limited to 50 %.
Reset criteria	When the ECU power is turned off, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

1. ECU internal circuit failure

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Switch the ECU power from ON to OFF to check the fault indication again. * See Chapter 2 *P461* for details on the diagnosis method and procedure.

P1469: AD converter fault 1

P code	P1469	Name	AD converter fault 1
SPN/FMI	523473/12		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. No prerequisite. 2. A pulse error is detected through diagnosis of the AD converter.	ECU

● Actions when an error occurs

Fault mode	[Engine stop]: The engine operation stops.
Limited operation	Fuel injection stops.
Reset criteria	When the ECU power is turned off, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

1. ECU internal circuit failure

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Switch the ECU power from ON to OFF to check the fault indication again. • If this DTC is detected again, exchange the ECU.

P1479: Shutoff path fault 6

P code	P1479	Name	Shutoff path fault 6
SPN/FMI	523483/12		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. During shutoff path test (operation diagnosis of the isolation function of injector current) by the external monitoring IC, which is implemented after turning on the ECU power. 2. An error of the external monitoring IC in shutoff path test is detected by the external monitoring IC.	ECU

● Actions when an error occurs

Fault mode	[Engine stop]: The engine operation stops.
Limited operation	Fuel injection stops.
Reset criteria	When the ECU power is turned off, the fault mode is released.
Remarks	

● Presumed cause of the failure or the error condition

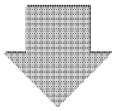
1. ECU internal circuit failure

● Diagnosis

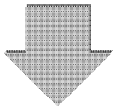
1. Initial diagnosis using SA-D	• Check the fault indication. • Switch the ECU power from ON to OFF to check the fault indication again. • If this DTC is detected again, exchange the ECU.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Make sure that the input signal of the air cleaner switch is correctly recognized. * See Chapter 2 *P415* for details on the diagnosis method and procedure.



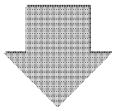
2. Engine check	• Turn off the ECU power and stop the engine. • Check the air cleaner. • After a few moments, turn on the key switch and make sure that DTC is detected.



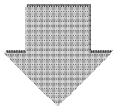
3. Failure diagnosis	• Check the air cleaner switch system. * See Chapter 2 *P415* for details on the diagnosis method and procedure.

● Diagnosis

1. Initial diagnosis using SA-D	• Check the fault indication. • Make sure that the input signal of the oil pressure switch is correctly recognized. * See Chapter 2 *P412* for details on the diagnosis method and procedure.



2. Engine check	• Turn off the ECU power and stop the engine. • Check the lubrication system. • After checking, turn on the power switch and check for the DTC detection.



3. Failure diagnosis	• Check the oil pressure switch system. * See Chapter 2 *P412* for details on the diagnosis method and procedure.

P1425: Reset regeneration is inhibited

P code	P1425	Name	Reset regeneration is inhibited
SPN/FMI	3695/14		

● DTC detection criteria

1. Prerequisite, 2. Judgment criteria	Check points
1. No prerequisite. 2. The post injection is inhibited by prohibition SW of DPF regeneration when the operation transmitted to the reset regeneration mode.	Regeneration inhibit switch (including CAN control)

● Actions when an error occurs

Fault mode	[Continuous operation]: Engine control is not obstructed.
Limited operation	No
Reset criteria	Error determination conditions are not met.
Remarks	This function only applies to special models.

● Presumed cause of the failure or the error condition

The mode is reset regeneration, but the regeneration is prohibited by the regeneration Inhibit switch (including CAN control) and the regeneration cannot be performed.

● Work description

1. Checking the resistance values of the crankshaft speed sensor
   1- Remove the crankshaft speed sensor from the wire-harness.
   2- Using a circuit tester, measure the resistance value between crankshaft speed sensors A and B.

Reference: Resistance value between crankshaft speed sensor terminals

Terminal	Specifications
Sensor A - B	1050 Ω (Error 10 %)

NG	Replace the crankshaft speed sensor.
OK	Go to “Checking the resistance values of the crankshaft speed sensor (sensor and wire-harness)”.

2. Checking the resistance values of the crankshaft speed sensor (sensor and wire-harness)
   1- Remove the ECU from the wire-harness while the crankshaft speed sensor and the wire-harness are connected.
   2- Using a circuit tester, measure the resistance value between ECU connector terminals A39 - A54 on the wire-harness side.
   Note: See the above “Reference: Resistance value between crankshaft speed sensor terminals“.

NG	• The coupler between the sensor and the wire-harness may be defective. Replace the sensor. • Replace the wire-harness.
OK	Go to “Pulser inspection”.

3. Pulser inspection
   1- Check the pulser for cracks, pieces of metal, distortion, etc.

NG	Repair the failure part.
OK	• The coupler between the ECU and the wire-harness may be defective. Replace the wire-harness. • Replace the ECU.

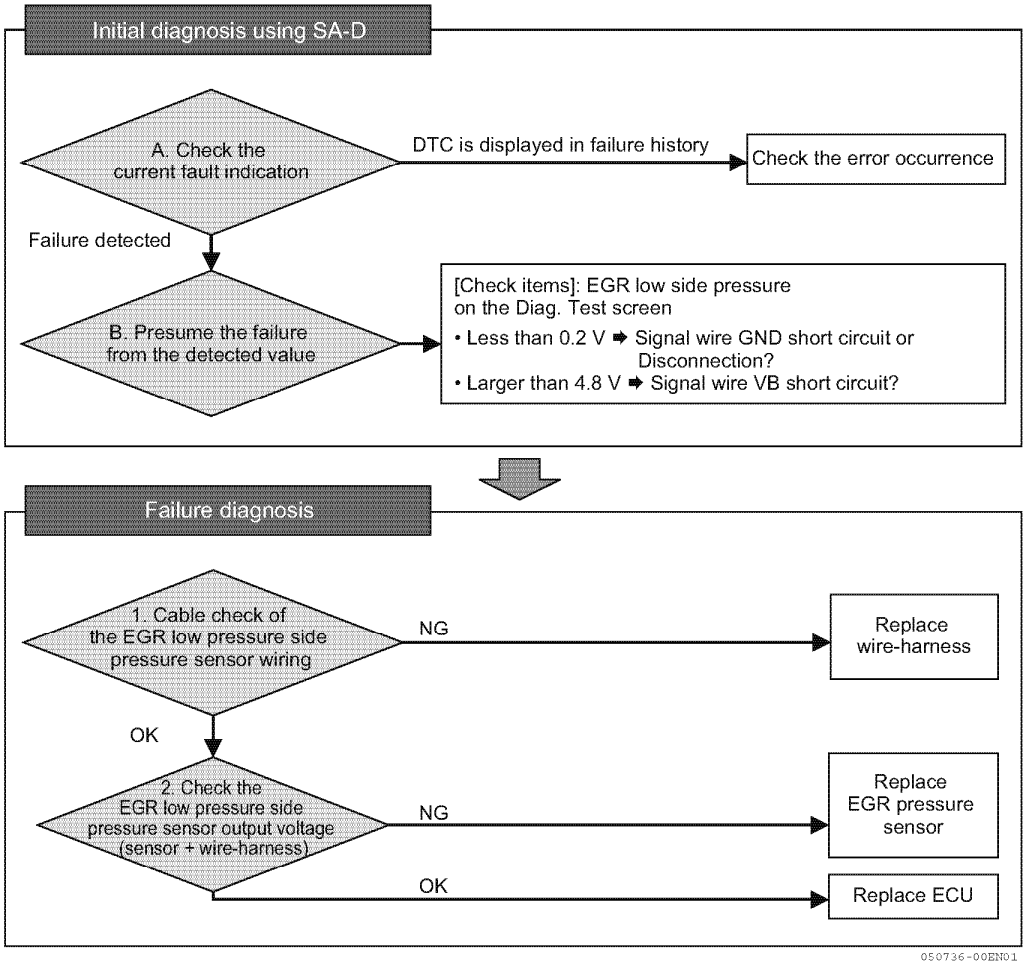
■ EGR low pressure side pressure sensor

● Related DTC

P code	SPN/FMI	Name
P0238	102/3	EGR low pressure side pressure sensor error (excessive sensor output)
P0237	102/4	EGR low pressure side pressure sensor error (insufficient sensor output)
P0236	102/13	EGR low pressure side pressure sensor error (abnormal learning value)

● Workflow

Note: See "Work description" for work details. Go to "SA-D Operation Manual" for the SA-D operation.



● Work description

1. Cable check of the EGR high pressure side pressure sensor wiring
   1- Remove the wire-harness from the EGR pressure sensor and the ECU.
   2- Using a circuit tester, check the cable of the wire-harness.

Terminal	Cable check	State
Between A and K85	OK	Normal
	NG	Wire-harness failure
Between C and K45	OK	Normal
	NG	Wire-harness failure
Between D and K74	OK	Normal
	NG	Wire-harness failure

NG	• Check if the wire-harness is damaged or there is mis-wiring. • Replace the wire-harness.
OK	Go to “Check the EGR high pressure side pressure sensor output voltage (sensor + wire-harness)”.

2. Checking the EGR high pressure side pressure sensor output voltage (sensor + wire-harness)
   1- Connect the checker harness between the ECU and engine wire-harness. Also, connect all connectors (sensor, ECU).
   2- Using a circuit tester, measure the voltage value between the EGR high pressure side pressure sensor signals K85 and K74.

Voltage	State	Corrective action
K85 < 0.2 V	NG	• Replace the wire-harness. • Replace the ECU.
0.2 V ≤ K85 ≤ 4.8 V	OK (normal range)	Replace the ECU.
4.8 V < K85	NG	• Replace the wire-harness. • Replace the ECU.

NG	Replace the EGR pressure sensor. Then, check the output voltage again.
OK	Replace the ECU.

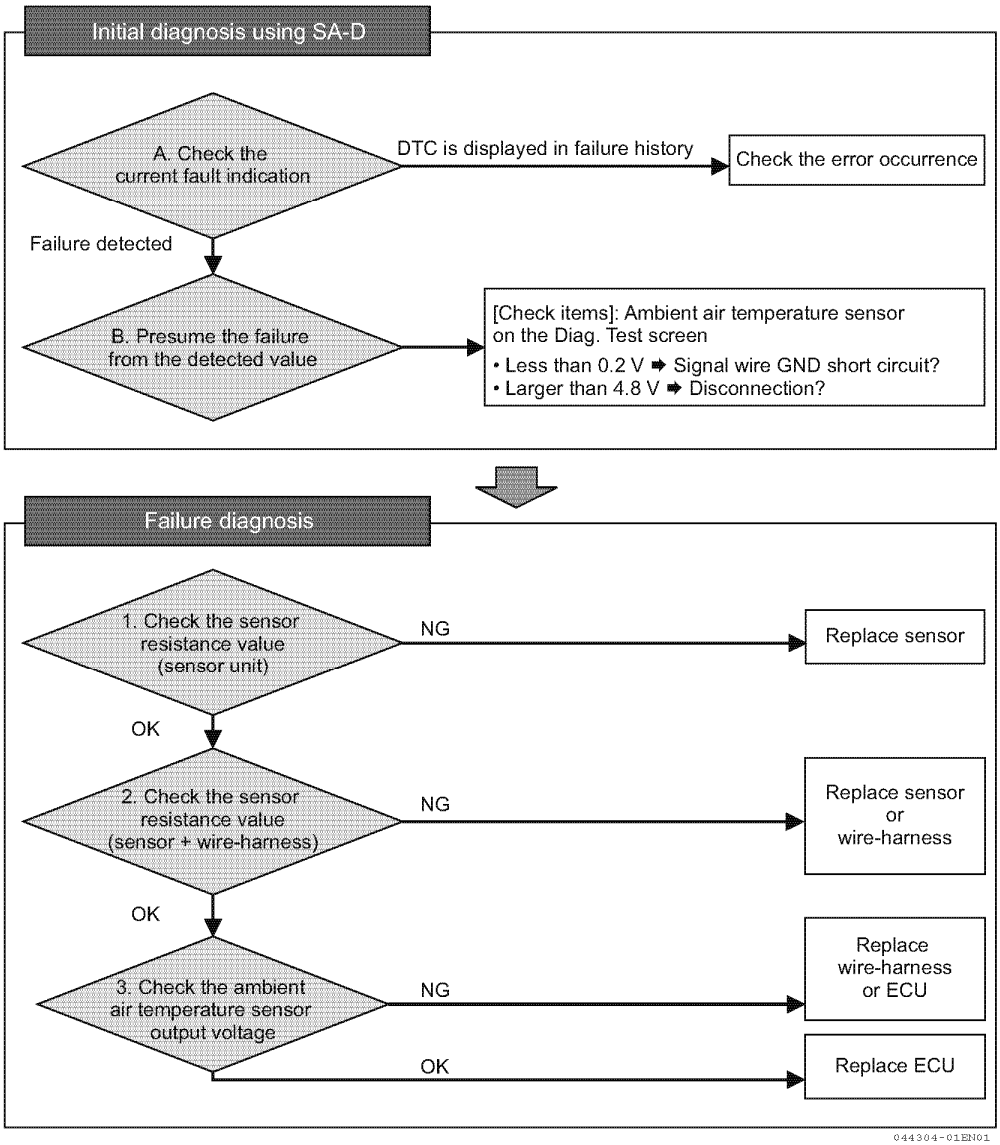
■ Ambient air temperature sensor

● Related DTC

P code	SPN/FMI	Name
P0113	172/3	Ambient air temperature sensor error (voltage high)
P0112	172/4	Ambient air temperature sensor error (voltage low)

● Workflow

Note: See "Work description" for work details. Go to "SA-D Operation Manual" for the SA-D operation.



● Work description

1. Cable check of the rail pressure sensor wiring
   1- Remove the wire-harness from the rail pressure sensor and the ECU.
   2- Using a circuit tester, check the cable of the wire-harness.

Terminal	Cable check	State
Between A and A25	OK	Normal
	NG	Wire-harness failure
Between B and A26	OK	Normal
	NG	Wire-harness failure
Between C and A07	OK	Normal
	NG	Wire-harness failure

NG	• Check if the wire-harness is damaged or there is mis-wiring. • Replace the wire-harness.
OK	Go to “Check the rail pressure sensor output voltage (sensor + wire-harness)”.

2. Checking the rail pressure sensor output voltage (sensor + wire-harness)
   1- Connect the checker harness between the ECU and engine wire-harness. Also, connect all connectors (sensor, ECU).
   2- Using a circuit tester, measure the voltage value between the rail pressure sensor signals K26 and K25.

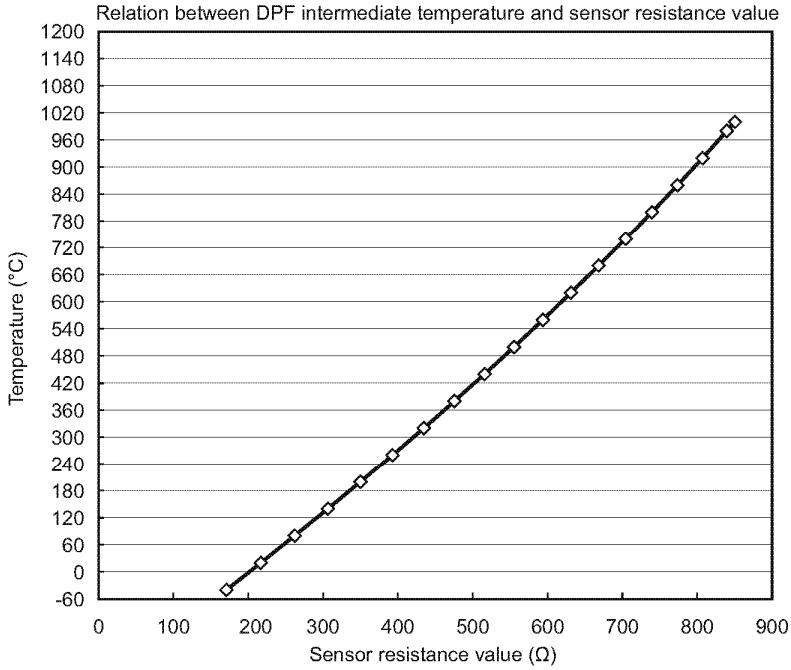
Voltage	State	Corrective action
A26 < 0.24 V	NG	• Replace the wire-harness. • Replace the ECU.
0.24 V ≤ A26 ≤ 4.75 V	OK (normal range)	Replace the ECU.
4.75 V < A26	NG	• Replace the wire-harness. • Replace the ECU.

NG	Replace the rail pressure sensor. Then, check the output voltage again.
OK	Replace the ECU.

● Work description

1. Checking the sensor resistance value (sensor unit)
   1- Remove the wire-harness from the DPF intermediate temperature sensor.
   2- Using a circuit tester, measure the resistance value between DPF intermediate temperature sensor terminals A and B.
   3- Using “DPF intermediate temperature sensor characteristics”, make sure that the measured resistance value is within the normal range.

DPF intermediate temperature sensor characteristics



Temp. (°C)	Resistance[Ω]
-40	170.68
20	216.77
80	262.01
140	306.40
200	349.96
260	392.67
320	434.54
380	475.57
440	515.76
500	555.10
560	593.60
620	631.26
680	668.08
740	704.05
800	739.18
860	773.47
920	806.92
980	839.52
1000	850.20

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NG	Replace the DPF intermediate temperature sensor.
OK	Go to “Checking the sensor resistance value (sensor and wire-harness)”.

2. Checking the sensor resistance value (sensor and wire-harness)
   1- Connect the DPF intermediate temperature sensor and wire-harness, then remove the ECU from the wire-harness.
   2- Using a circuit tester, measure the resistance value between ECU connector terminals K80 and K77C on the wire-harness side.
   3- Using “DPF intermediate temperature sensor characteristics”, make sure that the measured resistance value is within the normal range.

NG	• The coupler between the sensor and the wire-harness may be defective. Replace the sensor. • Replace the wire-harness.
OK	Go to “Checking the DPF intermediate temperature sensor output voltage”.

4. Checking the sensor resistance value (sensor and wire-harness)
   1- Connect the EGR gas temperature sensor and the wire-harness, and then remove the ECU from the wire-harness.
   2- Using a circuit tester, measure the resistance value between ECU connector terminals K33 and K52A on the wire-harness side.
   3- Using “EGR gas temperature sensor characteristics”, make sure that the measured resistance value is within the normal range.

NG	• The coupler between the sensor and the wire-harness may be defective. Replace the sensor. • Replace the wire-harness. Switch the ECU power from OFF to ON for failure diagnosis using SA-D after replacement.
OK	Go to “Checking the output voltage of the EGR gas temperature sensor”.

5. Checking the output voltage of the EGR gas temperature sensor
   1- Connect the checker harness between the ECU and engine wire-harness. Also connect all connectors (sensor, ECU).
   2- Using a circuit tester, measure the voltage between EGR gas temperature sensor signals K33 and K52A.

Voltage	State	Corrective action
K33 < 0.15 V	NG	• Replace the wire-harness. • Replace the ECU.
0.15 V ≤ K33 ≤ 4.8 V	OK (normal range)	Perform failure diagnosis using SA-D.
4.8 V < K33	NG	• Replace the wire-harness. • Replace the ECU.

NG	• The coupler between the wire-harness and the ECU may be defective. Replace the wire-harness. • Replace the ECU. Switch the ECU power from OFF to ON for failure diagnosis using SA-D after replacement.
OK	Switch the ECU power from OFF to ON for failure diagnosis using SA-D.

6. Operation using SA-D
   1- Turn off the key switch and turn on the key switch again to start the engine. Operate the engine that satisfies the reset criteria for P1675: EGR gas temperature sensor error (detected value error) (*P120*).
   2- Connect the SA-D and check the current fault indication to see whether an error is detected.

No	Normal
Yes	Replace the EGR gas temperature sensor or ECU.

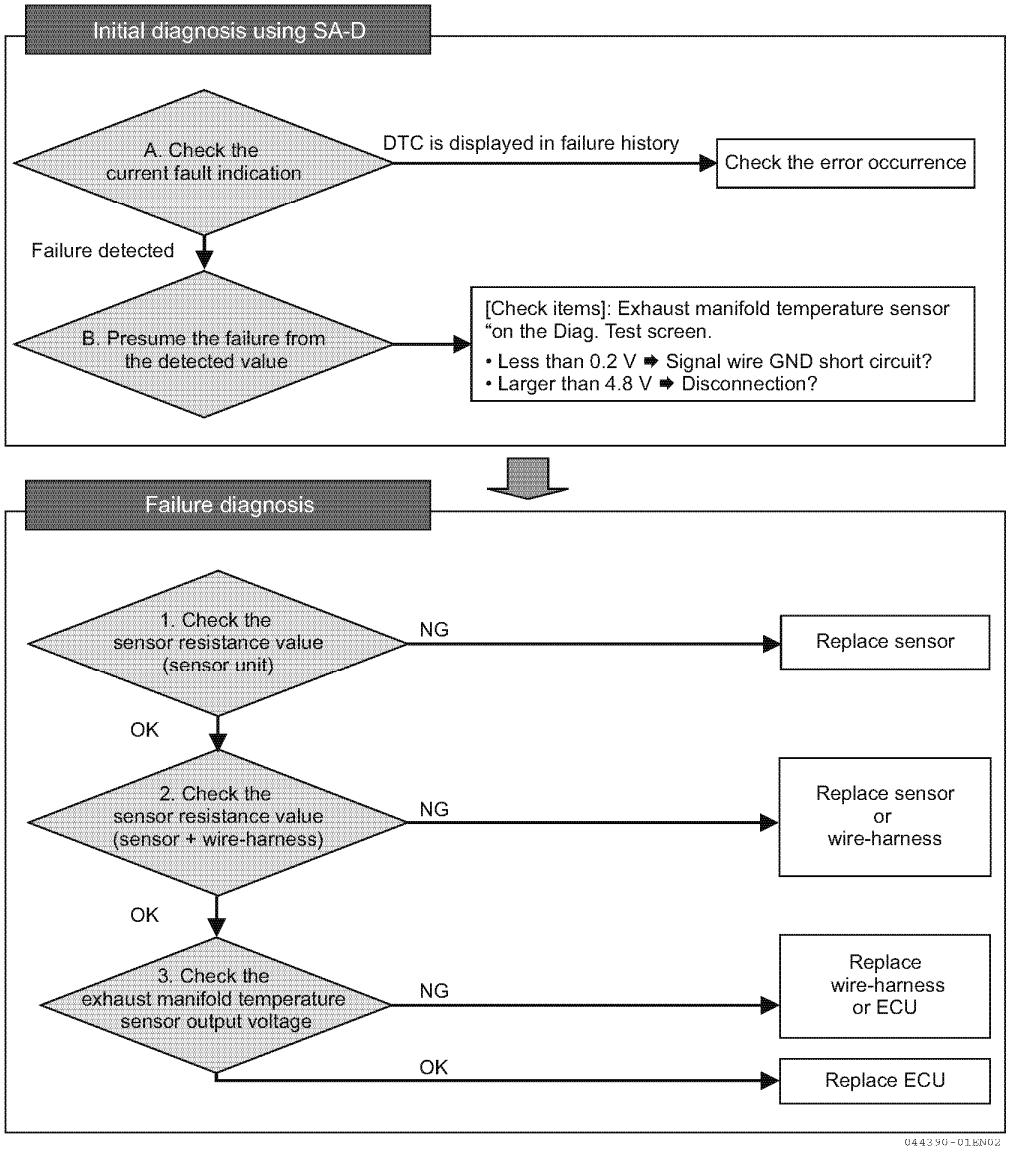
■ Exhaust manifold temperature sensor

● Related DTC

P code	SPN/FMI	Name
P0546	173/3	Exhaust manifold temperature sensor error (excessive sensor output)
P0545	173/4	Exhaust manifold temperature sensor error (insufficient sensor output)

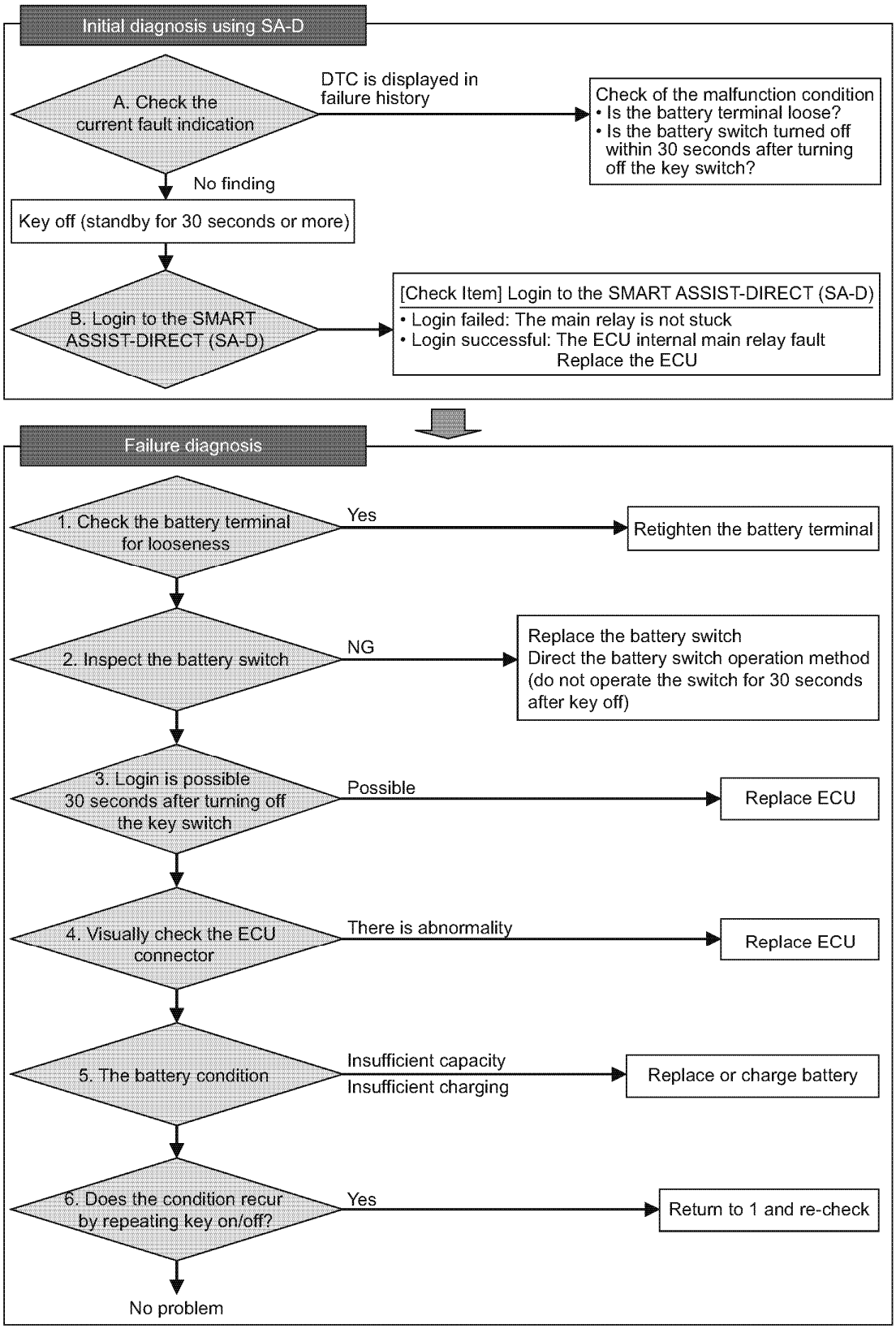
● Workflow

Note: See "Work description" for work details. Go to "SA-D Operation Manual" for the SA-D operation.



● Workflow

Note: See "Work description" for work details. Go to "SA-D Operation Manual" for the SA-D operation.

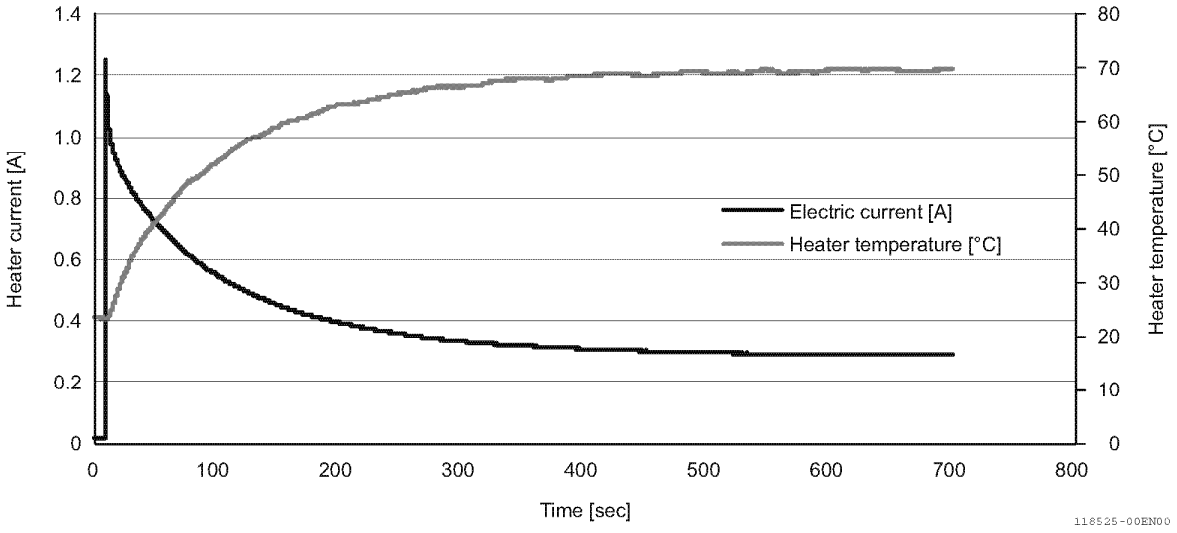


3. Checking energization of heater

1- Apply 12 V between the breather heater A and B, then measure the current.

Note: See "Reference: Relation between the heater current and temperature".

Reference: Relation between the heater current and temperature



NG	Replace the heater.
OK	• The coupler connecting the ECU and wire-harness might have failed. Replace the wire-harness. • Replace the ECU.

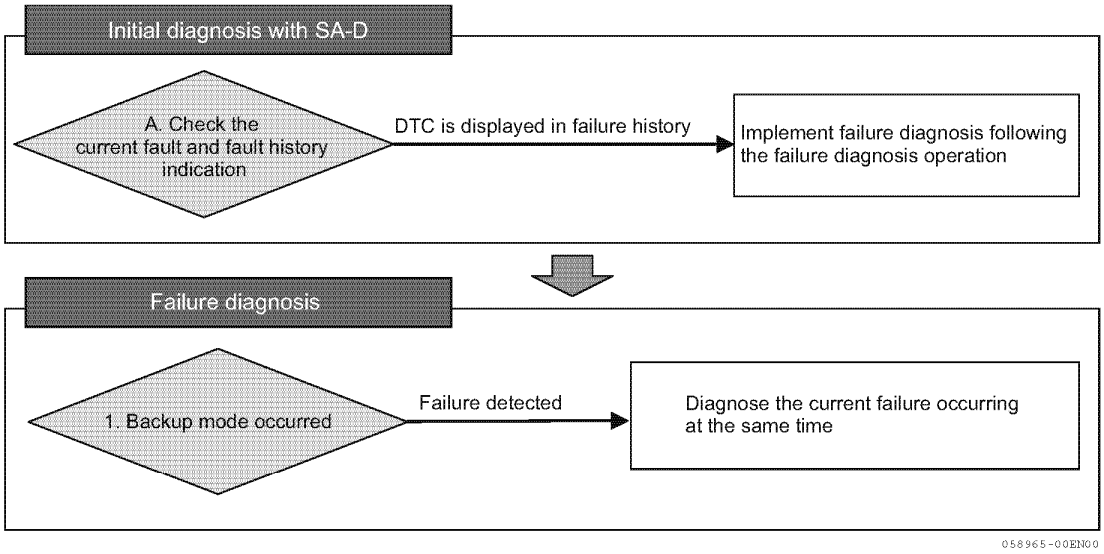
Backup mode

● Related DTC

P code	SPN/FMI	Name
P1424	3719/0	Backup mode

● Workflow

Note: See "Work description" for work details. Go to "SA-D Operation Manual" for the SA-D operation.



● Work description

When this error occurs, either of the following that shows the cause of backup mode is detected at the same time: "Excessive PM accumulation (method C)", "Excessive PM accumulation (method P)", "Regeneration failure (stationary regeneration failure", and "Regeneration failure (stationary regeneration not performed)".
What to check is different depending on the details of the failures detected at the same time. Perform failure diagnosis for them first.

CRS (common rail system) related

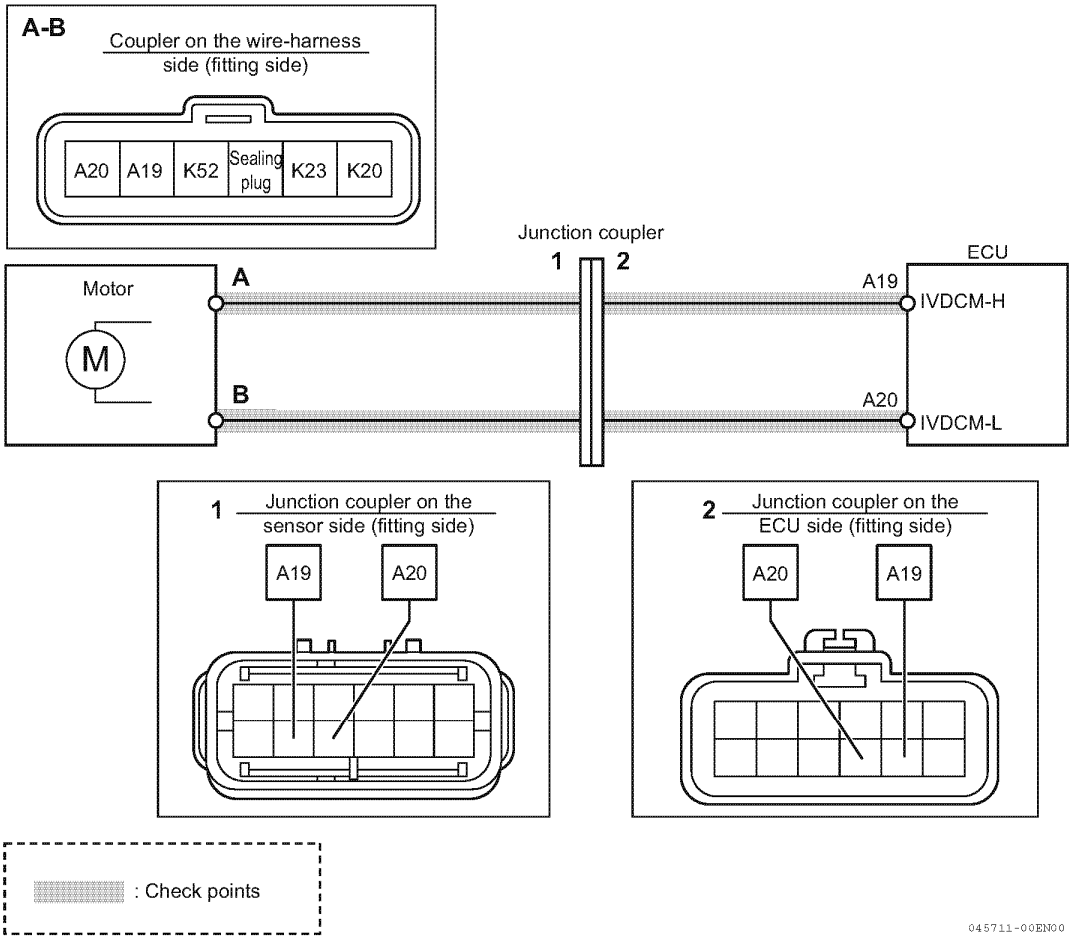
■ Injector

Disconnection of the injector and coil short circuit

● Related DTC

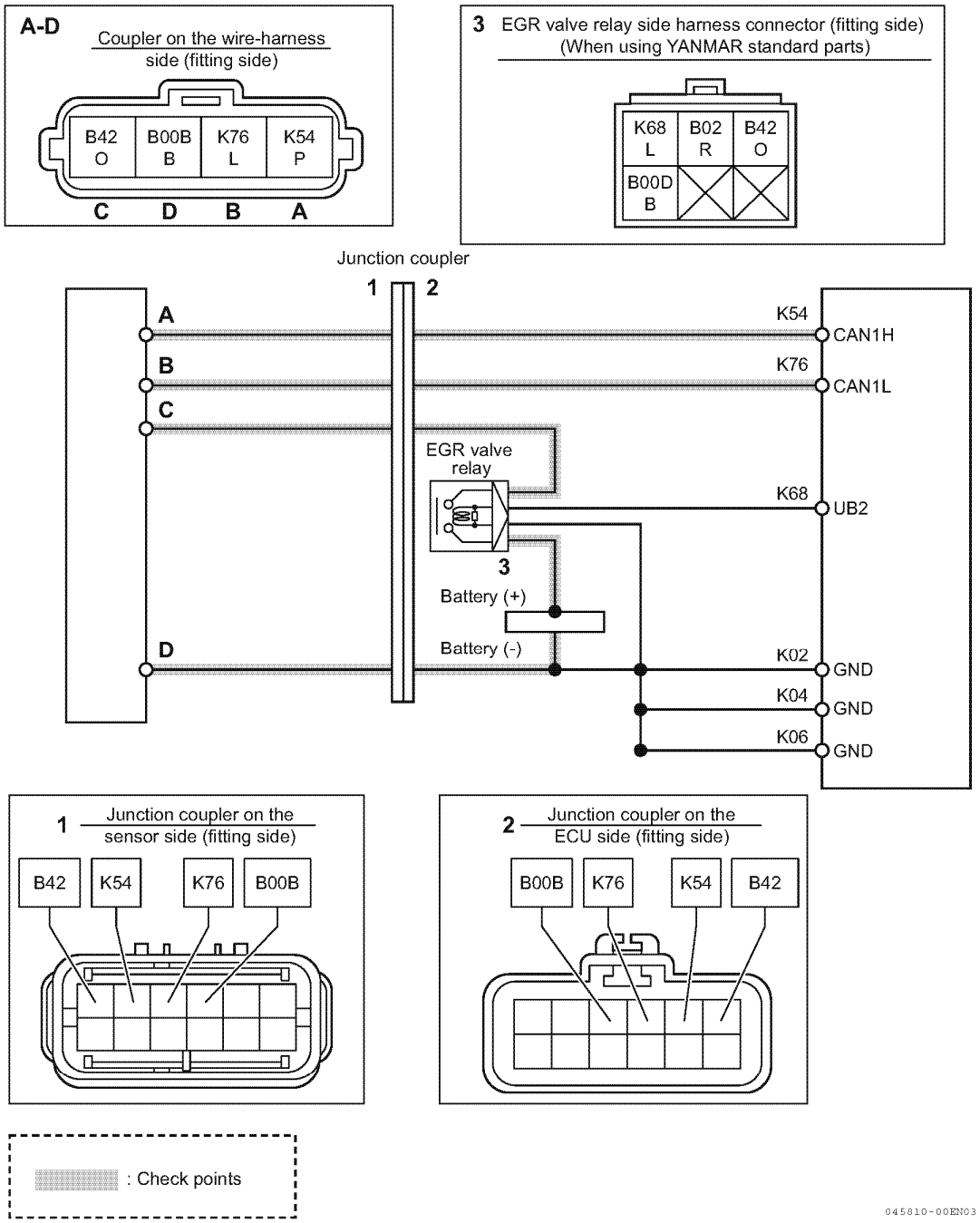
P code	SPN/FMI	Name
P0201	654/5	Injector (No. 1 cylinder) disconnection (injector-specific)
P0202	653/5	Injector (No. 2 cylinder) disconnection (injector-specific)
P0203	652/5	Injector (No. 3 cylinder) disconnection (injector-specific)
P0204	651/5	Injector (No. 4 cylinder) disconnection (injector-specific)
P0262	654/6	Injector (No. 1 cylinder) coil short circuit
P0265	653/6	Injector (No. 2 cylinder) coil short circuit
P0268	652/6	Injector (No. 3 cylinder) coil short circuit
P0271	651/6	Injector (No. 4 cylinder) coil short circuit

● Wiring diagram



Note: See P316 for the ECU pin layout.

● Wiring diagram



Note: See P316 for the ECU pin layout.