

FOREWORD

This workshop manual has been prepared to provide information regarding repair procedures on Hino Trucks.

Applicable for HINO 238, 258LP, 268, 338 series, equipped with J08E-VB and J08E-VC engine

When making any repairs on your vehicle, be careful not to be injured through improper procedures.

As for maintenance items, refer to the Driver's / Owner's Manual.

All information and specifications in this manual are based upon the latest product information available at the time of printing.

Hino Motors Sales U.S.A., Inc. reserves the right to make changes at any time without prior notice.

Please note that the publications below have also been prepared as relevant service manuals for the components and systems in these vehicles.

Manual Name	Pub. No.
Chassis Workshop Manual	S1-UNAE09A 1/2 S1-UNAE09A 2/2
J08E-VB, VC Engine Workshop Manual	S5-UJ08E09A
Trouble Shooting Workshop Manual	S7-UNAE09A 1/3 S7-UNAE09A 3/3

Hino Motors Sales U.S.A. , Inc.

CHAPTER REFERENCES REGARDING THIS WORKSHOP MANUAL

Use this chart to the appropriate chapter numbers for servicing your particular vehicle.

CHAPTER	MANUAL NO.	S7-UNAE09A 2/3 (U.S.A.), S7-CNAE09A 2/3 (CANADA)					
	MODELS	HINO 238, 258LP, 268, 338, 358					
	Production Model Code	NE8J, NF8J, NJ8J, NV8J					
GENERAL INTRODUCTION		GN01-001					
TROUBLE SHOOTING		TS01-001					
VEHICLE CONTROL		DN01-001					
FUEL CONTROL (J08E)		DN02-001					
FUEL CONTROL (DEF SCR)		DN02-002					
FUEL CONTROL (BURNER)		DN02-003					
OTHERS (CAN COMMUNICATION)		DN06-001					
DX MANUAL		DX01-001	DX02-001	DX03-001	DX04-001	DX06-001	DX07-001

This manual does not contain items on half-tone dot meshing.



WORKSHOP MANUAL

INDEX: TROUBLE SHOOTING GROUP 2/3

GENERAL INTRODUCTION	

TROUBLE SHOOTING	

VEHICLE CONTROL	

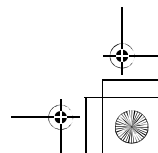
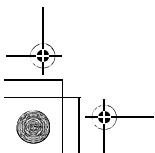
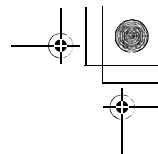
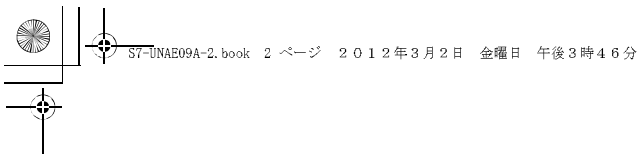
FUEL CONTROL (J08E)	

FUEL CONTROL (DEF SCR)	

FUEL CONTROL (BURNER)	

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DX MANUAL	



FUEL CONTROL (DEF SCR)

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FUEL CONTROL (DEF SCR)

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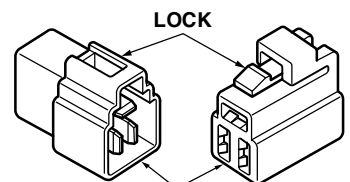
DEF SCR SYSTEM

PRECAUTIONS FOR DIAGNOSIS

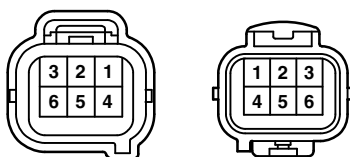
EN1612602F200001

- Ensure that individual connectors are certainly connected before start of checking works.
- Make sure to set the starter key to the "LOCK" position before disconnecting a connector.
- Replace the part or the component that have a failure or trouble. Do not fix and reuse it.
- Delete the past malfunction code after recording. Then conduct a diagnosis again to check for present failures.
- Delete the past failure memory after completion of a diagnostic analysis.

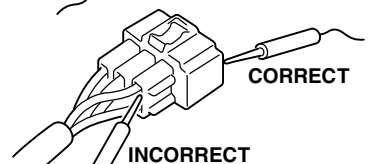
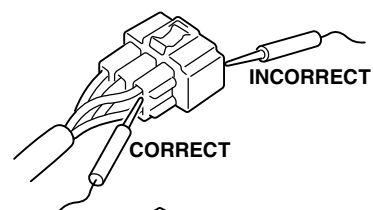
1. ILLUSTRATION OF CONNECTOR AND MEASUREMENT ON TERMINAL



TO BE CONNECTED
MALE CONNECTOR FEMALE CONNECTOR



MALE CONNECTOR FEMALE CONNECTOR



WATERPROOF CONNECTOR

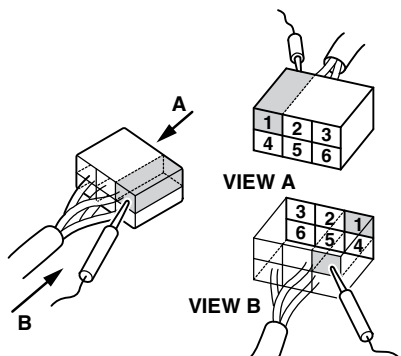


ILLUSTRATION OF CONNECTOR

The illustration of a connector contained in this document represents an image of a connector with its lock positioned on top as viewed from the connecting face.

NUMBERING OF CONNECTOR TERMINALS

The terminals are symmetrically numbered (symmetrically reversed numbering) as viewed on the connecting faces of a pair of connectors.

The terminal #1 is located at the top right corner of a male connector and at the top left corner of a female connector respectively in this document.

PRECAUTIONS FOR TERMINAL MEASUREMENT

Unless otherwise specified in this document, the illustration of a connector represents an image of a connector as viewed from the connecting face. A test probe must access the back face of a connector.

However, some types of connector do not allow a test probe to contact with the back face such as a waterproof connector. In such case, a test probe may be allowed to access the front face of a connector but a special care must be used to avoid a risk of damage in terminals.

As to a connector that is designed to use the signal check harness for terminal measurement, do not place a test probe directly onto the front or back face. Use a contact box of the connected signal check harness to take measurement on terminals.

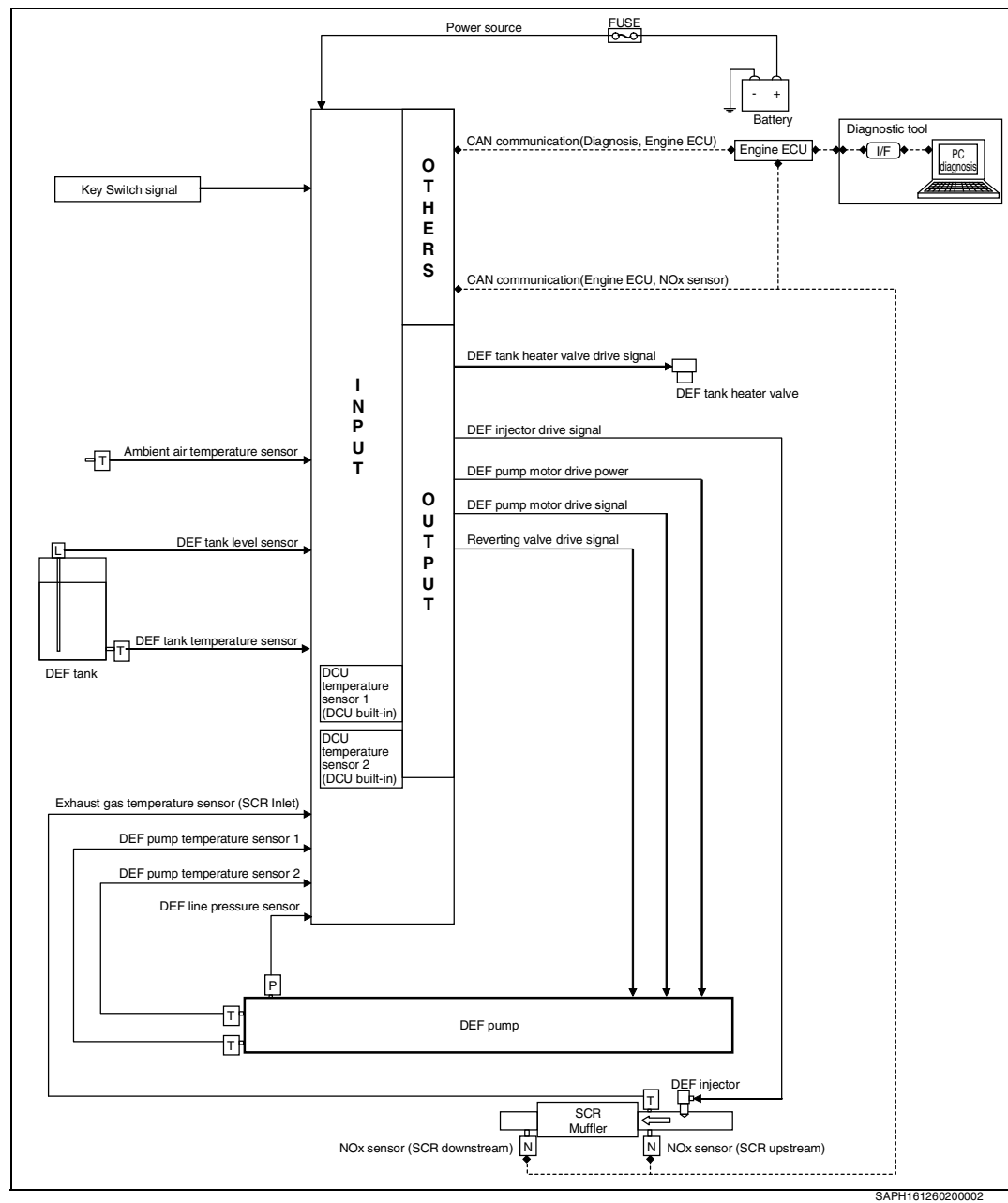
ILLUSTRATION OF CONNECTOR AND MEASUREMENT SURFACE

The illustration of a connector contained in this document represents an image of a connector as viewed from the connecting face. For example, the terminal #1 of a female connector is located at the top left corner of a connector as viewed from the connecting face.

In actual measurement on the terminal #1 of a female connector, a test probe must be placed onto the top right corner on the back face of a connector.

DIAGRAM

EN1612602F200002



SAPH161260200002

SIGNAL CHECK HARNESS

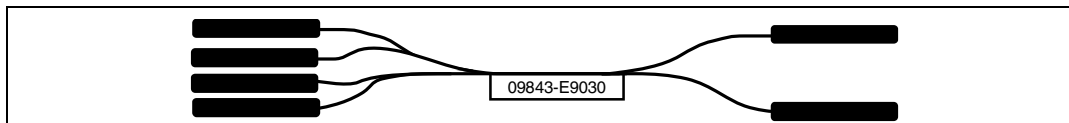
EN1612602F200003

1. MENTION OF THE SIGNAL CHECK HARNESS

- (1) HINO provides a signal check harness to check the DCU.

⚠ CAUTION

To prevent damage of the DCU connector, connect the signal check harness and perform measuring by bringing the test probe into contact with the signal check harness side.

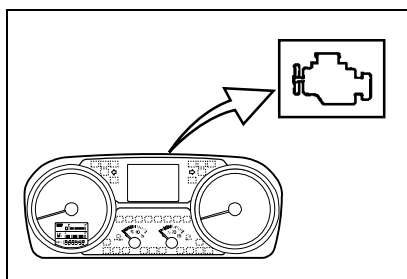


SAPH161260200003

INSPECTION

EN1612602F200004

MALFUNCTION INDICATOR LIGHT STATUS



SAPH161260200004

1. INSPECTION PROCEDURE

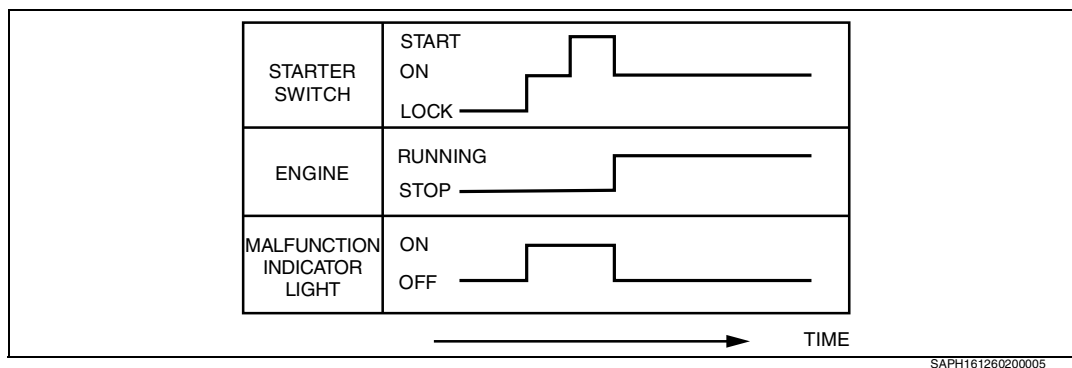
- (1) Set the starter switch to the "ON" position (Do not start the engine) and confirm that the MIL (malfunction indicator light) in the indicator area lights up.
- (2) If the DTC of P204F appears during meter multi-display, have the DCU communicate with the Hino-DX and check the detailed DTC.

HINT

- If the MIL is lit, perform a system check to see if the malfunction is of the past or present.
- In the case of the past malfunction, this light will turn off if a status is judged to be normal in 3 times of driving.
- DTC must be cleared on the Hino-DX, after MIL comes off.

(Definition of 1 time of driving)

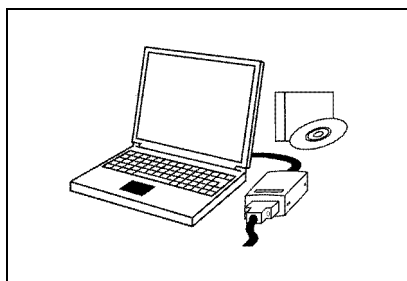
- a. Begins with engine start and ends with engine shut off.
- b. Begins with engine start and ends after four hours of continuous engine-on operation.
- c. Begins at end of the previous four hours of continuous engine-on operation and ends after four hours of continuous engine-on operation.
- d. Begins at the end of the previous four hours of continuous engine-on operation and ends with engine shut off.
 - Since the normal judgment method and time differ according to the malfunction code, a proper definition will be selected from the above 4 definitions.
- If the MIL does not go out, the system is abnormal. Check the system according to diagnosis on the following page.

MALFUNCTION INDICATOR LIGHT ILLUMINATION PATTERN

SAPH161260200005

DIAGNOSIS USING THE PC DIAGNOSIS TOOL

EN1612602F200005



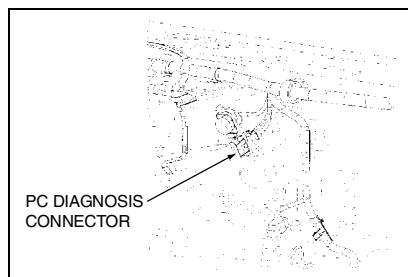
SAPH161260200006

1. DIAGNOSIS TOOL

- Trouble diagnosis can be performed using the PC diagnosis tool. By connection to the diagnosis connector, the trouble location is indicated.

SST:**Computer interface****(Hino-Bowie)****The main body and cables for RS232C and USB (09993-E9070)****Cable between vehicle and Hino-Bowie (S0904-21220)****(DENSO DST-i set without LCD)****Without Bluetooth® (95171-01020)****With Bluetooth® (95171-01040)****(DENSO DST-i set with LCD)****Without Bluetooth® (95171-01030)****With Bluetooth® (95171-01050)****Diagnosis software: HINO Diagnostic explorer (DX)****Reprogramming software: HINO Reprog Manager****NOTICE**

Only ECU reprogramming can be performed by authorized HINO dealer.



SAPH161260200007

2. CONNECT THE PC DIAGNOSIS TOOL

- Turn the starter switch on the "LOCK" position.
- Connect the PC DIAGNOSIS TOOL.

DN02-8

FUEL CONTROL (DEF SCR)

DIAGNOSTIC TROUBLE CODE (DTC) TABLE					
MALFUNCTION INDICATOR LIGHT	DTC NO.		DIAGNOSIS ITEM	INSPECTION ITEM	REFER PAGE
	ECU	DCU			
Light	P204F	P0071	Ambient air temperature sensor - rationality	- Ambient air temperature sensor - Wire harness - DCU connector	DN02-14
Light	P204F	P0072	Ambient air temperature sensor - out of range (Out of range low)	- Ambient air temperature sensor - Wire harness - DCU connector	DN02-20
Light	P204F	P0073	Ambient air temperature sensor - out of range (Out of range high)	- Ambient air temperature sensor - Wire harness - DCU connector	DN02-20
Light	P204F	P0562	Sensor supply voltage - out of range (Out of range low)	- Battery - DCU connector - Wire harness	DN02-24
Light	P204F	P0563	Sensor supply voltage - out of range (Out of range high)	- Battery - DCU connector - Wire harness	DN02-24
Light	P204F	P060C	DCU abnormality	DCU	DN02-28
Light	P204F	P062F	Internal Control Module EEPROM Error	DCU	DN02-30
Light	P204F	P0667	DeNOx ECU temperature sensor 1, 2 - rationality	DCU	DN02-32
Light	P204F	P0668	DeNOx ECU temperature sensor (Out of range low)	DCU	DN02-34
Light	P204F	P0669	DeNOx ECU temperature sensor (Out of range high)	DCU	DN02-34
Light	P204F	P068A	Malfunction of main relay	DCU	DN02-36
Light	P204F	P142A	DEF pump temperature sensor (Out of range)	- DEF pump - DCU - Wire harness	DN02-42
Light	P204F	P142B	DEF pump temperature sensor - rationality	DEF pump	DN02-44
Light	P204F	P202E	Reductant Delivery Performance	- DEF injector - DEF piping	DN02-50
Light	P204F	P203B	DEF tank level sensor - rationality	- DEF tank level sensor - DCU connector - Wire harness	DN02-52

FUEL CONTROL (DEF SCR)

DN02-9

DIAGNOSTIC TROUBLE CODE (DTC) TABLE					
MALFUNCTION INDICATOR LIGHT	DTC NO.		DIAGNOSIS ITEM	INSPECTION ITEM	REFER PAGE
	ECU	DCU			
Light	P204F	P203C	DEF tank level sensor - out of range (Out of range low)	- DEF tank level sensor - DCU connector - Wire harness	DN02-54
Light	P204F	P203D	DEF tank level sensor - out of range (Out of range high)	- DEF tank level sensor - DCU connector - Wire harness	DN02-54
Light	P204F	P2047	DEF injector - functional	DEF injector	DN02-58
Light	P204F	P2048	DEF injector - disconnection (Disconnection (low side))	- DEF injector - DCU connector - Wire harness	DN02-60
Light	P204F	P2049	DEF injector - disconnection (Disconnection (high side))	- DEF injector - DCU connector - Wire harness	DN02-60
Light	P204F	P204B	DEF pressure sensor - rationality	DEF pump	DN02-64
Light	P204F	P204C	DEF pressure sensor - out of range (Out of range low)	- DEF pump - DCU - Wire harness	DN02-66
Light	P204F	P204D	DEF pressure sensor - out of range (Out of range high)	- DEF pump - DCU - Wire harness	DN02-66
Light	P204F	P205B	DEF tank temperature sensor - rationality	- DEF tank temperature sensor - DCU connector - Wire harness	DN02-70
Light	P204F	P205C	DEF tank temperature sensor - out of range (Out of range low)	- DEF tank temperature sensor - DCU connector - Wire harness	DN02-76
Light	P204F	P205D	DEF tank temperature sensor - out of range (Out of range high)	- DEF tank temperature sensor - DCU connector - Wire harness	DN02-76
Light	P204F	P208A	DEF pump motor - circuit (Open load)	- DEF pump - DCU - Wire harness	DN02-80
Light	P204F	P208B	DEF pump motor - functional	DEF pump	DN02-86
Light	P204F	P208C	DEF pump motor - circuit (Circuit low)	- DEF pump - DCU - Wire harness	DN02-82

DN02-10

FUEL CONTROL (DEF SCR)

DIAGNOSTIC TROUBLE CODE (DTC) TABLE					
MALFUNCTION INDICATOR LIGHT	DTC NO.		DIAGNOSIS ITEM	INSPECTION ITEM	REFER PAGE
	ECU	DCU			
Light	P204F	P208D	DEF pump motor - circuit (Circuit high)	- DEF pump - DCU - Wire harness	DN02-82
Light	P204F	P20A0	Reverting valve for DEF pump - circuit (Open load)	- DEF pump - DCU connector - Wire harness	DN02-88
Light	P204F	P20A1	Reverting valve for DEF pump stuck close	DEF pump	DN02-94
Light	P204F	P20A2	Reverting valve for DEF pump - circuit (Circuit low)	- DEF pump - DCU connector - Wire harness	DN02-90
Light	P204F	P20A3	Reverting valve for DEF pump - circuit (Circuit high)	- DEF pump - DCU connector - Wire harness	DN02-90
Light	P204F	P20B1	DEF tank heater valve - circuit (Open load)	- Coolant shutoff valve - Wire harness - DCU connector	DN02-98
Light	P204F	P20B2	DEF tank heater valve stuck	- Coolant shutoff valve - DEF piping	DN02-104
Light	P204F	P20B3	DEF tank heater valve - circuit (Circuit low)	- Coolant shutoff valve - Wire harness - DCU connector	DN02-100
Light	P204F	P20B4	DEF tank heater valve - circuit (Circuit high)	- Coolant shutoff valve - Wire harness - DCU connector	DN02-100
Light	P204F	P20E8	Suction line pressure build up check	- DEF piping (pressure back-flow) - DEF pump - Suction line	DN02-108
Light	P204F	P20E9	Back flow line and pressure line Pressure check	- DEF piping (pressure back-flow) - DEF pump	DN02-118
Light	P204F	P2200	NOx sensor (SCR upstream) circuit	- NOx sensor 1 - DCU - Wire harness	DN02-126
Light	P204F	P2201	NOx sensor (SCR upstream) - Performance	NOx sensor 1	DN02-128
Light	P204F	P2202	NOx sensor (SCR upstream) and Heater - Circuit	- NOx sensor 1 - DCU - Wire harness	DN02-124

FUEL CONTROL (DEF SCR)

DN02-11

DIAGNOSTIC TROUBLE CODE (DTC) TABLE					
MALFUNCTION INDICATOR LIGHT	DTC NO.		DIAGNOSIS ITEM	INSPECTION ITEM	REFER PAGE
	ECU	DCU			
Light	P204F	P2209	NOx sensor (SCR upstream) Heater Sense Circuit Range/Performance	• NOx sensor 1	DN02-134
Light	P204F	P2213	NOx sensor (SCR downstream) Circuit	• NOx sensor 2 • DCU • Wire harness	DN02-142
Light	P204F	P2214	NOx sensor (SCR downstream) - Performance	• NOx sensor 2	DN02-144
Light	P204F	P2215	NOx sensor (SCR downstream) and Heater - Circuit	• NOx sensor 2 • DCU • Wire harness	DN02-140
Light	P204F	P2222	NOx sensor (SCR downstream) Heater Sense Circuit Range/Performance	• NOx sensor 2	DN02-152
Light	P204F	P2481	Exhaust gas temperature sensor (SCR inlet) - out of range (Out of range low)	• Exhaust gas temperature sensor • Wire harness • DCU connector	DN02-158
Light	P204F	P2482	Exhaust gas temperature sensor (SCR inlet) - out of range (Out of range high)	• Exhaust gas temperature sensor • Wire harness • DCU connector	DN02-158
Light	P204F	P2483	Exhaust gas temperature sensor (SCR inlet) - rationality	• Exhaust gas temperature sensor • Wire harness • DCU connector	DN02-162
Light	P204F	P2510	DeNOx Power Relay Sense Circuit Range/Performance	• DCU	DN02-168
Light	P204F	P2BA8	NOx Exceedence - Interruption of Reagent Dosing Activity	• DCU	DN02-170
Light	P204F	P2BAE	Feedback control	• DEF • NOx sensor	DN02-172
No light	P204F	U0029	Vehicle Communication Bus A Performance	• DCU connector • Wire harness	DN02-176
No light	P204F	U0038	Vehicle Communication Bus B Performance	• DCU connector • Wire harness	DN02-177
No light	P204F	U0100	DeNOx ECU CAN communication (ECM)	• DCU connector • Wire harness	DN02-178
Light	P204F	U029D	DeNOx ECU CAN communication (NOx sensor (SCR upstream))	• NOx sensor • Wire harness	DN02-182
Light	P204F	U029E	DeNOx ECU CAN communication (NOx sensor (SCR downstream))	• NOx sensor • Wire harness	DN02-182

DN02-12

FUEL CONTROL (DEF SCR)

DIAGNOSTIC TROUBLE CODE (DTC) TABLE					
MALFUNCTION INDICATOR LIGHT	DTC NO.		DIAGNOSIS ITEM	INSPECTION ITEM	REFER PAGE
	ECU	DCU			
No light	P204F	U0400	Invalid Data Received	• DCU connector • Wire harness	DN02-180
Light	P204F	U0597	Invalid Data Received From AC to DC Converter (DeNOx ECU)	• DCU	DN02-190

HINT

After deleting the DTC of the DCU, also delete P204 of the ECU.



FUEL CONTROL (DEF SCR)

DN02-13



DN02-14

FUEL CONTROL (DEF SCR)

DTC:P0071 (Check sheet)

EN1612602F200006

DTC:P0071

Ambient air temperature sensor - rationality

1. Technical description

- Ambient air temperature sensor rationality is checked by comparison with Engine coolant temperature

2. DTC set condition

(1) Check conditions

- Key switch ON
Difference between DEF pump temperature and Exhaust gas temperature (SCR inlet) : <8°C {46.4°F} and difference of DEF pump temperature between Engine coolant temperature (from Engine ECU) : <8°C {46.4°F} and difference between Exhaust gas temperature (SCR inlet) and Engine coolant temperature (from Engine ECU) : <8°C {46.4°F}

(2) Judgment criteria

- Difference between Ambient air temperature and Engine coolant temperature (from Engine ECU) : >25°C {77°F} for 10sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Ambient air temperature sensor:
Engine coolant temperature sensor:
Exhaust gas temperature sensor (SCR inlet):
DEF pump temperature sensor:

- Bad contact of harness connector
- Malfunction of sensor

FUEL CONTROL (DEF SCR)

DN02-15

DTC:P0071	Ambient air temperature sensor - rationality	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Ambient air temperature (AAT) sensor	Resistance, Coupler check	Within criteria Contiguous		Replace
2	Harnesses (AAT↔DCU)	Sensor resistance check from DCU connector through harness Coupler of DCU connector check	Within criteria Contiguous		Fix
3	External resistor	Resistance, Coupler check	Within criteria Contiguous		Replace
4	Engine coolant temperature sensor	Resistance, Coupler check	Within criteria Contiguous		Replace
5	Exhaust gas temperature sensor (SCR inlet)	Resistance, Coupler check	Within criteria Contiguous		Replace
6	DEF pump temperature sensor	Coupler check	Contiguous		Pump Replace

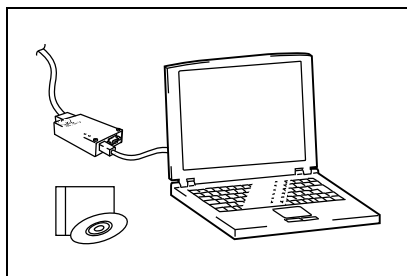
DN02-16

FUEL CONTROL (DEF SCR)

DTC:P0071

EN1612602F200007

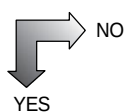
DTC	P0071	Ambient air temperature sensor - rationality



SAPH161260200008

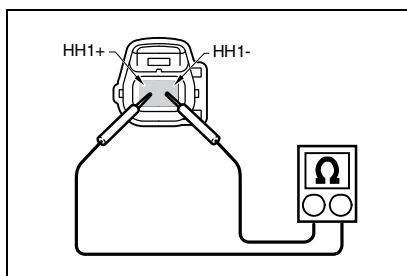
1. CHECK THE AMBIENT AIR TEMPERATURE SENSOR USING THE PC DIAGNOSIS TOOL (Hino-DX)

- (1) Connect the PC DIAGNOSIS TOOL (Hino-DX)
- (2) Set the starter switch to "ON" position.
- (3) Monitor the ambient temperature sensor and check that it is equivalent to the outside temperature.



Proceed to 2.

Proceed to 5.



SAPH161260200009

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

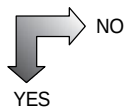
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the ambient air temperature sensor connector.
- (3) Measure resistance between the terminals HH1+ and HH1- of the ambient air temperature sensor connector.

Standard value:

21.8 kΩ (-25°C {-13°F})

1.7 kΩ (25°C {77°F})

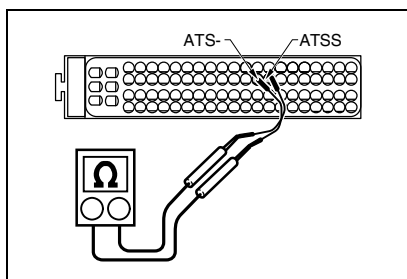
0.2 kΩ (80°C {176°F})



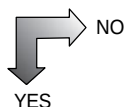
Faulty ambient air temperature sensor

FUEL CONTROL (DEF SCR)

DN02-17


3. CHECK THE RESISTANCE BETWEEN TERMINALS.

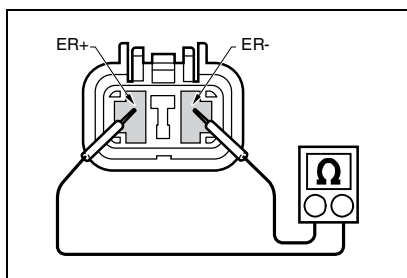
- (1) Connect the ambient air temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals ATSS and ATS- of the DCU 86P connector on the harness side.

Standard value:
23.8 kΩ (-25°C {-13°F})
3.7 kΩ (25°C {77°F})
2.2 kΩ (80°C {176°F})


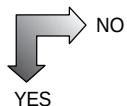
NO

Faulty harness

YES


4. CHECK THE RESISTANCE BETWEEN TERMINALS

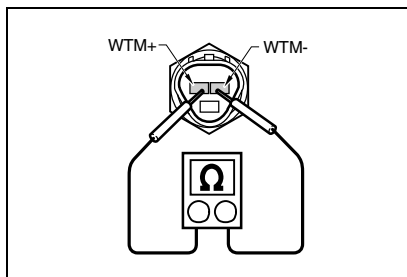
- (1) Measure resistance between the terminals ER+ and ER- of the external connector.

Standard value: 2 kΩ


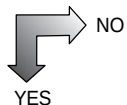
NO

Faulty external connector

YES


5. MEASURING RESISTANCE BETWEEN SENSOR TERMINALS

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the coolant temperature sensor connector.
- (3) Measure resistance between the terminals WTM+ and WTM- of the engine coolant temperature sensor.

HINT
If it is difficult to check only the sensor, proceed to Step 3.
Standard value:
2.45 kΩ (-20 °C {-4°F})
1.15 kΩ (20 °C {68°F})
584 Ω (60 °C {140°F})
318 Ω (80 °C {176°F})


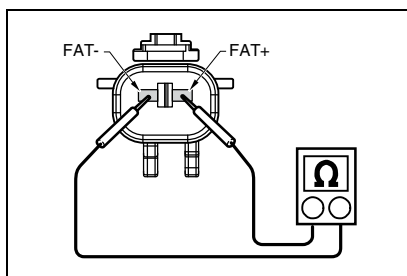
NO

Fault in engine coolant temperature sensor

YES

DN02-18

FUEL CONTROL (DEF SCR)



SAPH161260200013

6. CHECK THE RESISTANCE BETWEEN TERMINALS.

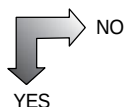
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor connector.
- (3) Measure resistance between the terminals FAT+ and FAT- of the exhaust gas temperature sensor connector.

Standard value:

186 Ω (-20°C {-4°F}): Outside air temperature

220 Ω (20°C {68°F}): Outside air temperature

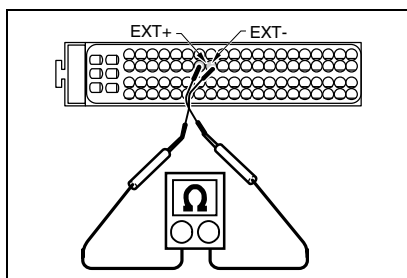
277 Ω (100°C {212°F}): Outside air temperature



NO

Faulty exhaust gas temperature sensor

YES



SAPH161260200014

7. CHECK THE RESISTANCE BETWEEN TERMINALS.

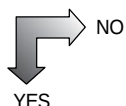
- (1) Connect the exhaust gas temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals EXT+ and EXT- of the DCU 86P connector on the harness side.

Standard value:

186 Ω (-20°C {-4°F}): Outside air temperature

220 Ω (20°C {68°F}): Outside air temperature

277 Ω (100°C {212°F}): Outside air temperature



NO

Faulty harness

YES

Faulty DEF pump connector



FUEL CONTROL (DEF SCR)

DN02-19



DN02-20

FUEL CONTROL (DEF SCR)

DTC:P0072/P0073 (Check sheet)

EN1612602F200008

DTC:P0072	Ambient air temperature sensor - out of range (Out of range low)
DTC:P0073	Ambient air temperature sensor - out of range (Out of range high)

1. Technical description

- Ambient air temperature sensor is connected to DCU through harness
- External resistor is connected in harness between Ambient air temperature sensor and DCU

2. DTC set condition

(1) Check conditions

- Starter switch ON

(2) Judgment criteria

DTC :P0072

- Ambient air temperature sensor voltage : Less than 3.4V

DTC :P0073

- Ambient air temperature sensor voltage : More than 4.783V

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Ambient air temperature sensor:

- Bad contact of harness connector.
- Malfunction of sensor

Harnesses: Miss connection

External resistor:

- Bad contact of harness connector.
- Malfunction of resistance

FUEL CONTROL (DEF SCR)

DN02-21

DTC:P0072 DTC:P0073	Ambient air temperature sensor - out of range (Out of range low) Ambient air temperature sensor - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Ambient air temperature sensor	Resistance, Coupler check	Within criteria Contiguous		Replace
2	Harnesses	Sensor resistance check from DCU connector through harness Coupler of DCU connector check	Within criteria Contiguous		Replace
3	External resistor	Resistance, Coupler check	Within criteria Contiguous		Replace
4	DCU	DCU replace	No malfunction		Check again

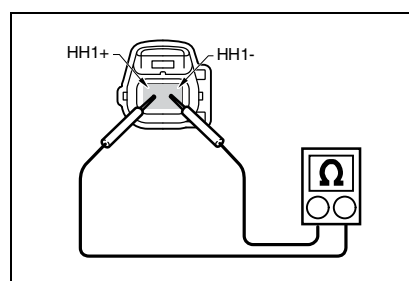
DN02-22

FUEL CONTROL (DEF SCR)

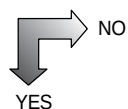
DTC:P0072/P0073

EN1612602F200009

DTC	P0072	Ambient air temperature sensor - out of range (Out of range low)
DTC	P0073	Ambient air temperature sensor - out of range (Out of range high)

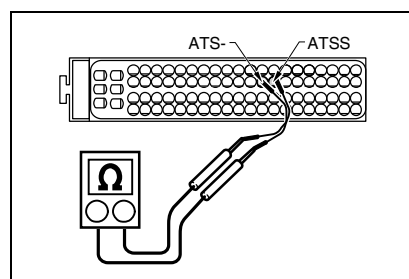
**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the ambient air temperature sensor connector.
- (3) Measure resistance between the terminals HH1+ and HH1- of the ambient air temperature sensor connector.

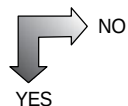
Standard value:**21.8 kΩ (-25°C {-13°F})****1.7 kΩ (25°C {77°F})****0.2 kΩ (80°C {176°F})**

NO

Faulty ambient air temperature sensor

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Connect the ambient air temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals ATSS and ATS- of the DCU 86P connector on the harness side.

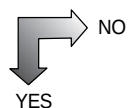
Standard value:**23.8 kΩ (-25°C {-13°F})****3.7 kΩ (25°C {77°F})****2.2 kΩ (80°C {176°F})**

NO

Faulty harness

3. CHECK A MALFUNCTION CODE.

- (1) After turning the starter switch "ON" position, check that no DTC.



NO

Improper connection of connector

Clear and recheck the DTC



FUEL CONTROL (DEF SCR)

DN02-23



DN02-24

FUEL CONTROL (DEF SCR)

DTC:P0562 (Check sheet)/P0563 (Check sheet 1)

EN1612602F200010

DTC:P0562 DTC:P0563	Sensor supply voltage - out of range (Out of range low) Sensor supply voltage - out of range (Out of range high)

1. Technical description

- An abnormality in the sensor supply voltage is sensed by the DCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P0562**

- Voltage of the battery is less than 9V.

DTC :P0563

- Voltage of the battery is less than 16V.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Battery:

- The harness is disconnected.
- The battery has run out.

Harness: Miss connection

FUEL CONTROL (DEF SCR)

DN02-25

DTC:P0562 DTC:P0563	Sensor supply voltage - out of range (Out of range low) Sensor supply voltage - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Battery	Visually check, Voltage check	Within criteria Contiguous		Battery charge or Replace
2	Harness	Detach the DCU53P side connector and check the voltage values of Pin No. 1 through No. 8 on the harness side.	Within criteria Contiguous		Harness Repair
3	DCU	Appearance check and replacement of DCU (forced regeneration after replacement)			Replace

DN02-26

FUEL CONTROL (DEF SCR)

DTC:P0563 (Check sheet 2)

EN1612602F200011

DTC:P0563

Sensor supply voltage - out of range (Out of range high)

1. Technical description

- Excessively high voltage has been detected in the ECU power supply.

2. DTC set condition**(1) Check conditions**

- No malfunction

(2) Judgment criteria

- Sensor supply voltage > 5.3V
- Failure timer >= 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

FL, FUSE: Fusing, irregular contact, partial engagement**Connectors, harnesses and terminals:** Disconnection, irregular contact, looseness**Alternator:** Unadjusted**ECU:** Malfunction

FUEL CONTROL (DEF SCR)

DN02-27

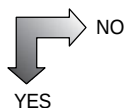
DTC:P0563	Sensor supply voltage - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	FL, FUSE	Check whether fusing has occurred. Check engagement.	No fusing No play		Replace
2	Connectors, harnesses and terminals	Check continuity between the battery and the alternator.	Must be conducting. No partial engagement No looseness		Repair or Replace
3	Alternator	Check power generation voltage. (at no electrical load of vehicle)	14.6 V or higher		Replace
4	ECU				Replace

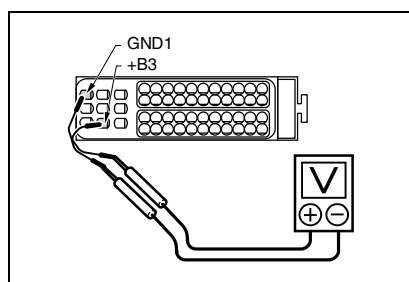
DTC:P0562/P0563

EN1612602F200012

DTC	P0562	Sensor supply voltage - out of range (Out of range low)
DTC	P0563	Sensor supply voltage - out of range (Out of range high)

1. MEASURE BATTERY VOLTAGE.**Standard value: 9-16 V**

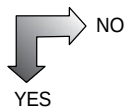
Faulty battery



SAPH161260200017

2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Disconnect the DCU 53P connector.
- (2) Connect the signal check harness.
- (3) Measure voltage between the terminals GND1 and +B3 of the DCU 53P connector on the harness side.

Standard value: 9-16 V

Faulty harness

Improper connection of connector

DN02-28

FUEL CONTROL (DEF SCR)

DTC:P060C (Check sheet)

EN1612602F200013

DTC:P060C

DCU abnormality

1. Technical description

- DCU internal chip errors are judged by DCU itself.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P060C**

- DCU: This Error is judged by DCU itself.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DCU: Malfunction of DCU

FUEL CONTROL (DEF SCR)

DN02-29

DTC:P060C		DCU abnormality		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DCU	- Turn the key OFF from ON and wait until the DCU main relay turns off (after-run operation of the pump completes). - Turn the key ON again. If the relay does not turn on, replace DCU. (Perform a forced regeneration after replacement).			DCU Replace

DN02-30

FUEL CONTROL (DEF SCR)

DTC:P062F (Check sheet)

EN1612602F200014

DTC:P062F

Internal Control Module EEPROM Error

1. Technical description

- The DCU ROM is checked within DCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria

- A ROM malfunction is detected within DCU.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DCU: Malfunction of DCU**Note:**

If power supply for DCU is shut off forcibly, such as by disconnecting the battery before the pump operation ends and the DCU main relay turns off after key OFF, P062F may be detected.

FUEL CONTROL (DEF SCR)

DN02-31

DTC:P062F	Internal Control Module EEPROM Error	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DCU	Clear the DTCs and turn the key OFF. The main relay will turn off 1 minute after the exhaust temperature (SCR inlet) drops below 200°C {392°F} . Then, turn the key ON.	No DTCs recur.		Replace

DTC:P060C/P062F

EN1612602F200015

DTC	P060C	DCU abnormality
DTC	P062F	Internal Control Module EEPROM Error

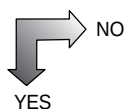
1. **SHIFT THE STARTER SWITCH FROM THE ON TO OFF POSITION AND WAIT UNTIL THE DCU MAIN RELAY IS DISENGAGED.**

HINT

If communication with the DCU through DX fails, the main relay of the DCU will turn off.

2. **CHECK A MALFUNCTION CODE.**

- (1) After turning the starter switch "ON" position, check that no DTC.



Fault in DCU

Clear and recheck the DTC

HINT

This code may be detected when the DCU power is forcibly turned off such as by removing the battery before the main relay of the DCU turns off after the starter switch is turned off and the pump driving ends.

DN02-32

FUEL CONTROL (DEF SCR)

DTC:P0667 (Check sheet)

EN1612602F200016

DTC:P0667

DeNOx ECU temperature sensor 1, 2 - rationality

1. Technical description

- There are 2 internal temperature sensors in DCU.
- DCU internal temperature sensors are checked with each other.

2. DTC set condition**(1) Check conditions**

- The key is ON.
- Battery voltage: Higher than 9 V and lower than 16 V

(2) Judgment criteria

- Absolute value of (sensor 1 - sensor 2): Higher than 15°C {59°F} for 10 seconds

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

**DCU: Malfunction of sensor
(DCU internal temperature sensors)**

FUEL CONTROL (DEF SCR)

DN02-33

DTC:P0667	DeNOx ECU temperature sensor 1, 2 - rationality	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DCU	Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

DN02-34

FUEL CONTROL (DEF SCR)

DTC:P0668/P0669 (Check sheet)

EN1612602F200017

DTC:P0668

DeNOx ECU temperature sensor (Out of range low)

DTC:P0669

DeNOx ECU temperature sensors - out of range (Out of range high)

1. Technical description

- DeNOx ECU temperature sensors are checked by DCU in itself.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P0668**

- ECU internal temperature sensors voltage :
Sensor 1 voltage: Below 0.85 V for 0.4 seconds or longer
Sensor 2 voltage: Below 0.85 V for 0.4 seconds or longer

DTC :P0669

- ECU internal temperature sensors voltage :
Sensor 1 voltage: Over 2.0 V for 0.4 seconds or longer
Sensor 2 voltage: Over 2.0 V for 0.4 seconds or longer

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DCU: Malfunction of sensor**(DCU internal temperature sensors)**

FUEL CONTROL (DEF SCR)

DN02-35

DTC:P0668 DTC:P0669	DeNOx ECU temperature sensor (Out of range low) DeNOx ECU temperature sensors - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DCU	Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

DTC:P0667/P0668/P0669

EN1612602F200018

DTC	P0667	DeNOx ECU temperature sensor 1, 2 - rationality
DTC	P0668	DeNOx ECU temperature sensor (Out of range low)
DTC	P0669	DeNOx ECU temperature sensor (Out of range high)

1. REPLACE THE DCU

DTC:P068A (Check sheet)

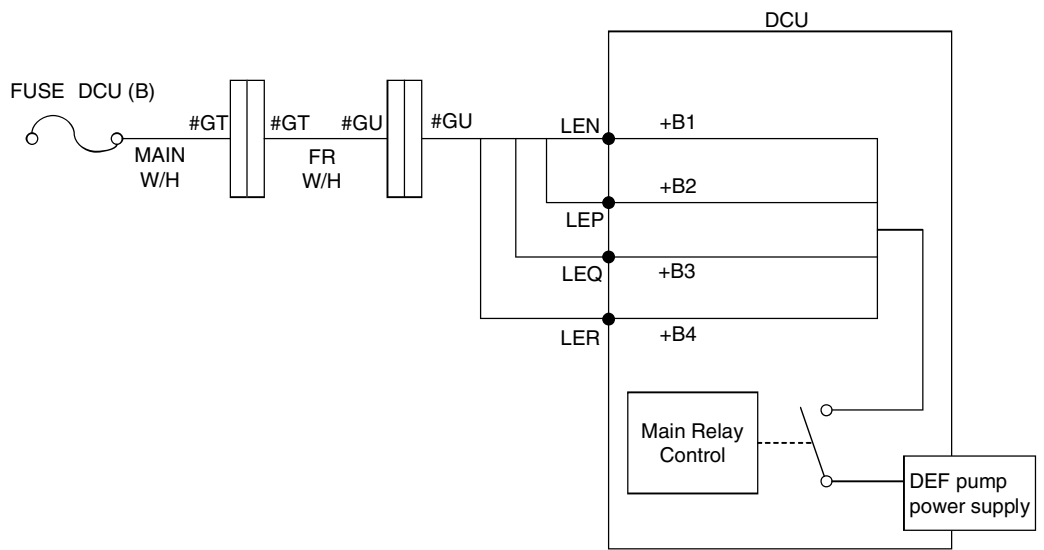
EN1612602F200059

DTC:P068A

Malfunction of main relay

1. Technical description

- After turning off key switch, DCU stays active for few minutes to purge DEF from lines to tank, then writes the data to the DCU ROM before shut-down.
- After completion of data writing to the ROM, the DCU switches the main relay (built-in in the DCU) off.
- The DCU confirms the ROM and checks that the preceding ROM data writing as being completed correctly.

**2. DTC set condition**

(1) Check conditions

- Engine is running

(2) Judgment criteria

- When the ROM data writing status was incomplete before the preceding DCU shut-down

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Battery:

- Too high or low voltage
- Battery replaced before the complete shut-down of the DCU was performed
- When the battery voltage was cut before the complete DCU shut-down

DCU:

- Malfunction of DCU

FUEL CONTROL (DEF SCR)

DN02-37

DTC:P068A	Malfunction of main relay	Inspection Procedure

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
1	DTC confirmation (DCU)	Check DCU if P0562 is stored	P0562 is stored → YES P0562 is not stored → NO		Go to diagnostic procedure of P0562	Go to Step 2
2	Power supply	DCU power supply check	Voltage is within standard range [9-16 V] → YES Voltage is NOT within standard range [9-16 V] → NO		Go to Step 3	Repair or replace the power supply circuit (harness, fuse, etc.).
3	Harness between DCU and battery	Harness check between DCU and battery	The harness resistance value is within the standard value [below 1 Ω] → YES The harness resistance value is NOT within the standard value [1 to ∞ Ω] → NO		Go to Step 4	Repair or replace the harness between DCU and battery
4	DCU	DCU shut-down and check the DTC after engine start	P068A is detected → YES P068A is not detected → NO		Replace the DCU	Completed

DN02-38

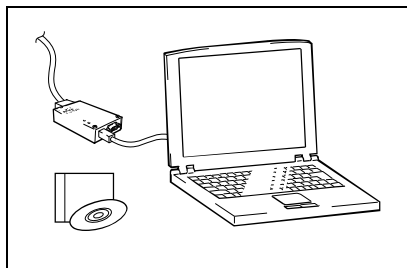
FUEL CONTROL (DEF SCR)

DTC:P068A

EN1612602F200060

DTC	P068A	Malfunction of main relay

1	Check for simultaneous detection of DTC P0562



saph161060200038

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select the DCU and confirm the DTC output.

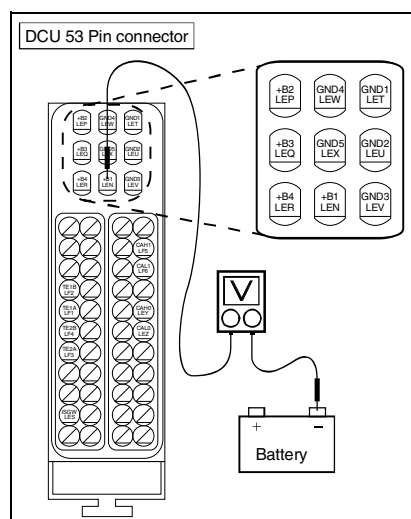
Judgment	Simultaneous detection of P0562 → YES
	No simultaneous detection of P0562 → NO

YES

Go to diagnostic procedure of P0562

NO

2	Check DCU power supply



P068A-02

- 1 Set the starter switch to the "LOCK" position.
- 2 Disconnect the DCU connector.
- 3 Set the starter switch to the "ON" position.
- 4 Measure the voltage between the following pins of the DCU connector and the minus terminal of the battery with a circuit tester
 - Measurement 1: +B1 and minus terminal of the battery
 - Measurement 2: +B2 and minus terminal of the battery
 - Measurement 3: +B3 and minus terminal of the battery
 - Measurement 4: +B4 and minus terminal of the battery

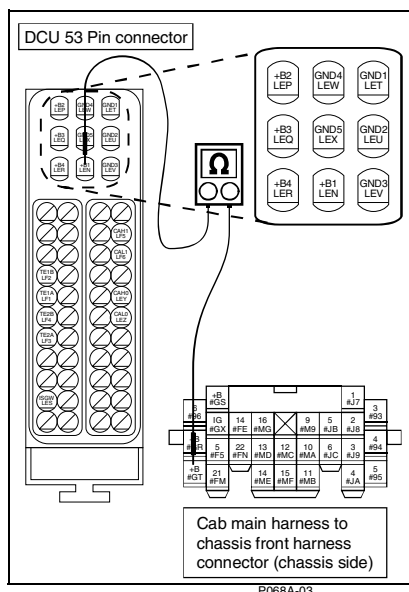
Judgment	Measurements 1 to 4 all are 9 V to 16 V → YES
	Any of the measurements 1 to 4 is not 9 V to 16 V → NO

NO

Repair or replace of the power supply circuit (harness, fuse, etc.).

YES

3 Check the harness between DCU and battery



- 1 Set the starter switch to the "LOCK" position.
- 2 Disconnect the DCU connector.
- 3 Disconnect the connector between cab main harness and chassis front harness.
- 4 Measure the resistance between the following pins of the DCU connector and the #GT pin (chassis-side connector between cab main harness and chassis front harness) with a circuit tester.
 - Measurement 1: +B1 to #GT
 - Measurement 2: +B2 to #GT
 - Measurement 3: +B3 to #GT
 - Measurement 4: +B4 to #GT

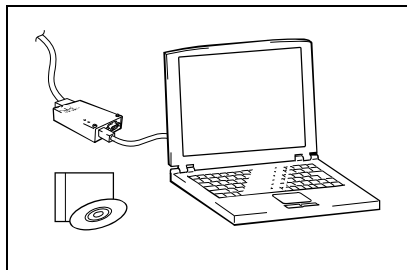
Judgment	Measurements 1 to 4 all are below $1\ \Omega \rightarrow$ YES
	Any of the measurements 1 to 4 is between 1 and $\infty\ \Omega \rightarrow$ NO

NO

Repair or replace the power supply circuit (harness).

YES

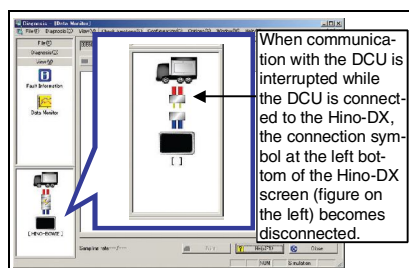
4 DCU shut-down → Check DTC after engine start



- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select the DCU and clear the DTC.
- 5 Start the engine.
- 6 Select the DCU and confirm no DTC is stored.
- 7 Turn the starter switch to the OFF position with the Hino-DX connected.
- 8 After confirmation with Hino-DX that the connection with the DCU has been cut, set the starter switch again to the "ON" position.
- 9 Select the DCU and confirm the DTC output.

DN02-40

FUEL CONTROL (DEF SCR)



Judgment

P068A is stored → YES

P068A is not stored → NO

HINT

If during DCU shut-down the battery switch is set to OFF or the battery terminals are disconnected, this failure code (P068A) may be detected.

NO

Completed

YES

Replace the DCU.



FUEL CONTROL (DEF SCR)

DN02-41



DN02-42

FUEL CONTROL (DEF SCR)

DTC:P142A (Check sheet)

EN1612602F200021

DTC:P142A

DEF pump temperature sensor (Out of range)

1. Technical description

- DEF pump Temperature Sensor is judged with DEF pump Temperature Sensor voltage via Harness by DCU.
- * There are 2 temperature sensors in the DEF pump.

2. DTC set condition**(1) Check conditions**

- Engine ON

(2) Judgment criteria**DTC :P142A**

- DEF Supply module Temperature Sensor duty :
 - Temperature sensor 1 duty: Below 15% for 5 seconds or longer
 - Temperature sensor 1 duty: Over 85% for 5 seconds or longer
 - Temperature sensor 2 duty: Below 15% for 5 seconds or longer
 - Temperature sensor 2 duty: Over 85% for 5 seconds or longer

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF pump:

- Bad contact of harness connector.
- Malfunction of module

Harnesses:

- Miss connection
- Disconnection or short-circuit

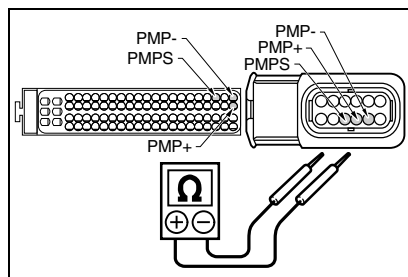
DTC:P142A	DEF pump temperature sensor (Out of range)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Check for continuity at both ends.	With continuity		Repair
2	DCU	Connect a new DCU and turn the key ON.	P142A does not recur after key ON.		OK: Install a new DCU. NG: Proceed to No.3.
3	DEF pump	Reinstall the original DCU and replace the DEF pump.	P142A does not recur after key ON.		Install a new DCU.

DTC:P142A

EN1612602F200022

DTC	P142A	DEF pump temperature sensor (Out of range)



SAPH161260200018

1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DEF pump connector and the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure voltage between terminals of the DEF pump connector and the DCU 86P connector on the harness side.

HINT

At this time, an error will occur because communication between the pump and DCU fails.
Finally, turn the key from "LOCK" to "ON" and check that the malfunction code will not recur.

Terminals to measure the voltage	
DEF pump side	DCU side
PMP+	PMP+
PMP-	PMP-
PMPS	PMPS

Standard value: Continuity

- 2. IF THE MALFUNCTION CODE RECURS AFTER REPAIR, THE DCU IS DEFECTIVE.**

DN02-44

FUEL CONTROL (DEF SCR)

DTC:P142B (Check sheet)

EN1612602F200023

DTC:P142B

DEF pump temperature sensor - rationality

1. Technical description

- DEF pump temperature sensor checks for validity by comparing with the outside temperature.
 - DEF pump temperature sensor checks for validity by monitoring whether the temperature rises when the coolant shut-off valve is released (when DEF defrosts).
- * While the engine is cold, engine coolant will be sent to the pump to defrost the DEF.

2. DTC set condition

(1) Check conditions

1. When the key is ON, difference among the outside temperature, exhaust temperature (SCR upstream) and coolant temperature is within 8°C {46.4°F}.
2. The coolant shutoff valve is released (DEF defrosts). Coolant temperature is over 40°C {104°F}. The above condition continues for 10 minutes or longer.

(2) Judgment criteria

1. Difference between the DEF pump temperature and the outside temperature: Over 22°C {71.6°F}
2. Rise in the DEF pump temperature: less than 1.5°C {34.7°F}

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF pump temperature sensor: Malfunction of sensor
Outside temperature sensor: Malfunction of sensor
Exhaust temperature (SCR upstream) sensor: Malfunction of sensor
Coolant temperature sensor: Malfunction of sensor
Coolant shutoff valve: Stuck closed*
Coolant piping: Clogging or leaks*
 *Also see the malfunction codes of the shutoff valve.

FUEL CONTROL (DEF SCR)

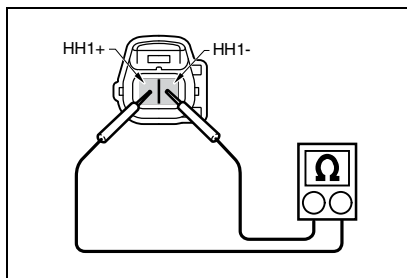
DN02-45

DTC:P142B		DEF pump temperature sensor - rationality		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Ambient air temperature (AAT) sensor	Resistance, Coupler check	Within criteria Contiguous		Replace
2	Harnesses (AAT↔DCU)	Sensor resistance check from DCU connector through harness Coupler of DCU connector check	Within criteria Contiguous		Fix
3	External resistor	Resistance, Coupler check	Within criteria Contiguous		Replace
4	Exhaust gas temperature sensor (SCR inlet)	Immerse the sensor in hot water and check resistance. Coupler check	Within criteria Contiguous		Replace
5	Engine coolant temperature sensor	Immerse the sensor in hot water and check resistance. Coupler check	Within criteria Contiguous		Replace
6	DEF tank heater valve	Using Hino-DX, forcibly activate the shutoff valve. - With the shutoff valve open, check for pressure rise in the downstream coolant piping by touching. - With the shutoff valve closed, check for pressure release by touching. * Take care not to be burned by hot coolant.	Pressure rises. Pressure releases.		OK: Check No.10 NG: Check No.7,8,9
7	Engine coolant line	Visually check	No bending No restriction No leak		Replace
8	Engine coolant line	Disconnect both ends of the piping and blow air from one side to see if the air flows through to the other side.	Air flows through to the other side.		Replace
9	DEF tank heater valve	Replace the valve.			
10	DEF pump temperature sensor	DEF pump Replace			

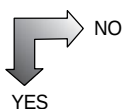
DTC:P142B

EN1612602F200024

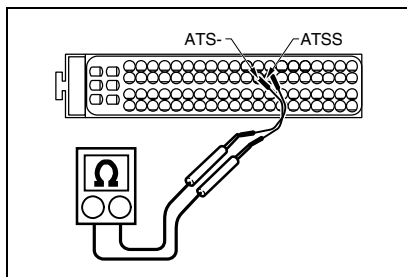
DTC	P142B	DEF pump temperature sensor - rationality

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

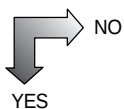
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the ambient air temperature sensor connector.
- (3) Measure resistance between the terminals HH1+ and HH1- of the ambient air temperature sensor connector.

Standard value:**21.8 k Ω (-25°C {-13°F})****1.7 k Ω (25°C {77°F})****0.2 k Ω (80°C {176°F})**

Faulty ambient air temperature sensor

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

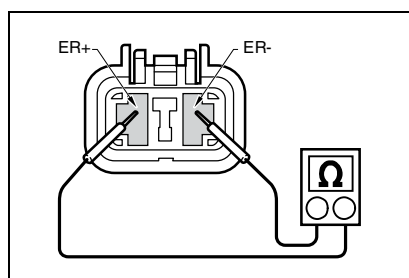
- (1) Connect the ambient air temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals ATSS and ATS- of the DCU 86P connector on the harness side.

Standard value:**23.8 k Ω (-25°C {-13°F})****3.7 k Ω (25°C {77°F})****2.2 k Ω (80°C {176°F})**

Faulty harness

FUEL CONTROL (DEF SCR)

DN02-47

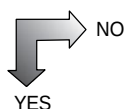


SAPH161260200021

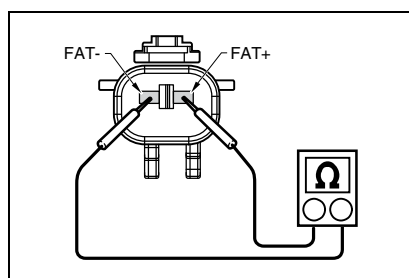
3. CHECK THE RESISTANCE BETWEEN TERMINALS

- (1) Measure resistance between the terminals ER+ and ER- of the external connector.

Standard value: 2k Ω



Faulty external connector



SAPH161260200022

4. CHECK THE RESISTANCE BETWEEN TERMINALS.

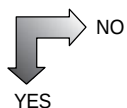
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor connector.
- (3) Measure resistance between the terminals FAT+ and FAT- of the exhaust gas temperature sensor connector.

Standard value:

186 Ω (-20°C {-4°F}): Outside air temperature

220 Ω (20°C {68°F}): Outside air temperature

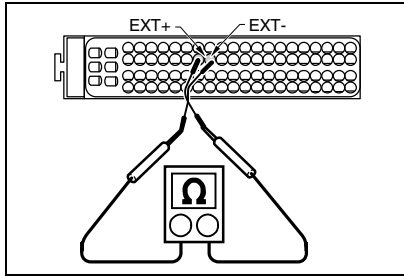
277 Ω (100°C {212°F}): Outside air temperature



Faulty exhaust gas temperature sensor

DN02-48

FUEL CONTROL (DEF SCR)



SAPH161260200023

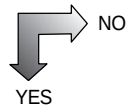
5. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Connect the exhaust gas temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals EXT+ and EXT- of the DCU 86P connector on the harness side.

Standard value:

186 Ω (-20°C {-4°F}): Outside air temperature

220 Ω (20°C {68°F}): Outside air temperature

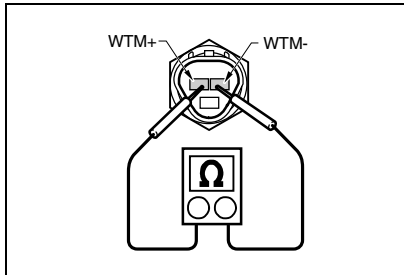
277 Ω (100°C {212°F}): Outside air temperature


NO

Faulty harness

YES

Faulty DEF pump connector



SAPH161260200024

6. MEASURING RESISTANCE BETWEEN SENSOR TERMINALS

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the coolant temperature sensor connector.
- (3) Measure resistance between the terminals WTM+ and WTM- of the engine coolant temperature sensor.

HINT

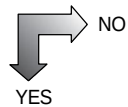
If it is difficult to check only the sensor, proceed to Step 3.

Standard value:

2.45 k Ω (-20°C {-4°F})

1.15 k Ω (20°C {68°F})

584 Ω (60°C {140°F})

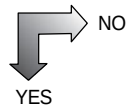
318 Ω (80°C {176°F})


NO

Fault in engine coolant temperature sensor

YES

7. WHILE MONITORING THE DEF TANK TEMPERATURE AND ENGINE COOLANT TEMPERATURE, PERFORM A FORCED RELEASE FROM THE SHUTOFF VALVE, RAISE THE COOLANT TEMPERATURE ABOVE 40°C, AND CHECK THE DEF TANK TEMPERATURE RISES.



NO

Proceed to 8.

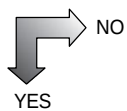
YES

Replace the DEF pump

8. PERFORM A FORCED RELEASE FROM THE SHUTOFF VALVE AND CHECK THE OPERATING SOUND.

FUEL CONTROL (DEF SCR)

DN02-49



Replace the shutoff valve

Faulty piping

DN02-50

FUEL CONTROL (DEF SCR)

DTC:P202E (Check sheet)

EN1612602F200025

DTC:P202E	Reductant Delivery Performance

1. Technical description

- Abnormal DEF dose is diagnosed.
- DEF dose is controlled by DEF pressure and DEF injector opening.

2. DTC set condition**(1) Check conditions****At system start up**

- The engine is ON.
- Exhaust temperature (SCR upstream): > 150°C {302°F}
- While DEF pressure falls within a range from 850 kPa to 950 kPa, an 8s stable state remains.

At system running

- The engine is ON.
- The difference of DEF injector duty is > 20 %
- and difference of DEF pump duty is < 2.7 %

(2) Judgment criteria**At system start up**

- Pressure line check start :
DEF pump speed : keep and DEF injector : full open
- If DEF pressure is >750kPa after 4 seconds from DEF injector open, failure counter is count up .
- When Failure counts >= 50, DTC is detected .

At system running

- Pressure line check start :
DEF pump speed : keep and DEF injector : full open
- If DEF pressure is >750kPa after 4 seconds from DEF injector open,
- DTC is detected .

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Clogging in the DEF injector and/or aqueous DEF solution piping

FUEL CONTROL (DEF SCR)

DN02-51

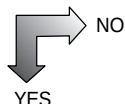
DTC:P202E	Reductant Delivery Performance	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF pipe (pump <=> injector)	Aqueous DEF solution piping (pressure line) Appearance check	No crush, breakage or bend		Replace
2	DEF injector	Remove the DEF injector from the muffler and perform a DEF solution addition test (added quantity pattern x 3).	The metered quantity of additive shall be within each standard.		NG: Replace DEF injector and go to step 7. * OK results prove that clogging caused by crystallized DEF is no longer present.
3	DEF injector	After replacement of the DEF injector, again perform a DEF solution addition test (added quantity pattern x 3).	The metered quantity of additive shall be within each standard.		OK: Leave the new DEF injector installed. NG: Replace the DEF piping (pump <-> injector). * Re-install the previous DEF injector.
Keep the engine at idle (about 10 minutes) and check that DEF pressure is stabilized at around 900 kPa (800 kPa to 1,050 kPa) on Hino-DX.					

DTC:P202E

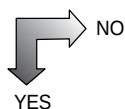
EN1612602F200026

DTC	P202E	Reductant Delivery Performance

1. VISUALLY CHECK THE DEF PIPING BETWEEN DEF PUMP AND DEF INJECTOR.

Repair the trouble, proceed to 2.

Replace the DEF injector

2. CHECK A DEF INJECTION RATE

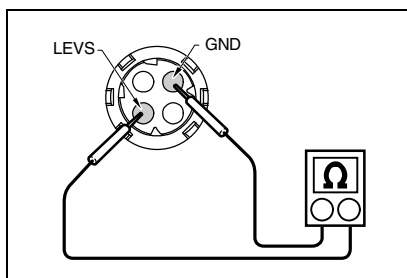
Replace the DEF pump

Clear and recheck the DTC

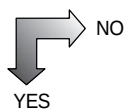
DTC:P203B

EN1612602F200027

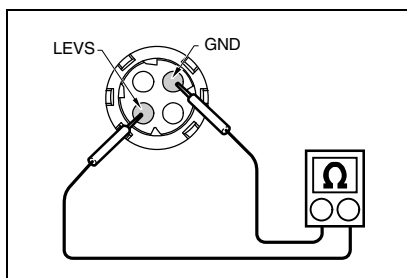
DTC	P203B	DEF tank level sensor - rationality

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

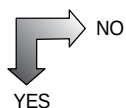
- (1) Set the starter switch to "LOCK" position.
- (2) Drain all DEF through the drain.
- (3) Disconnect the DEF sensor connector.
- (4) Measure resistance between the terminals LEVS and GND of the DEF sensor connector.

Standard value: 14.8-15.3 k Ω : When filled to the empty line

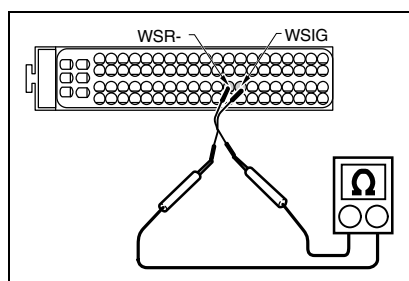
- Faulty DEF sensor
- Sticking of float

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Supply DEF to the full level.
- (2) Measure resistance between the terminals LEVS and GND of the DEF sensor connector.

Standard value: 132-140 Ω : When filled to the full line

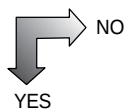
- Faulty DEF sensor
- Sticking of float



SAPH161260200027

3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Install the DEF sensor.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals WSR- and WSIG of the DCU 86P connector on the harness side.

Standard value: 132-140 Ω: When filled to the empty line

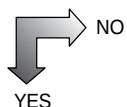
NO

Faulty harness

YES

4. CHECK A MALFUNCTION CODE.

- (1) After turning the starter switch "ON" position, check that no DTC.



NO

Improper connection of connector

YES

Clear and recheck the DTC

HINT

If the float of the DEF tank level sensor is stuck, the DEF tank level sensor value will remain unchanged even if the DEF amount changes. Consequently, P203B may be detected in this case.

DN02-54

FUEL CONTROL (DEF SCR)

DTC:P203C/P203D (Check sheet)

EN1612602F200028

DTC:P203C
DTC:P203DDEF tank level sensor - out of range (Out of range low)
DEF tank level sensor - out of range (Out of range high)**1. Technical description**

- DEF tank level sensor Out of range is checked with DEF tank level sensor voltage via Harness by ECU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P203C**

- DEF tank level sensor voltage : <0.1V for 0.4sec

DTC :P203D

- DEF tank level sensor voltage : >4.7V for 0.4sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF tank level sensor:

- Bad contact of harness connector.
- Malfunction of sensor

Harnesses:

- Miss connection
- Disconnection or short-circuit

FUEL CONTROL (DEF SCR)

DN02-55

DTC:P203C DTC:P203D	DEF tank level sensor - out of range (Out of range low) DEF tank level sensor - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF tank level sensor	Disconnect the connector on the aqueous DEF solution sensor side and measure voltage at pin No.1 and 2.	Within criteria Contiguous		Sensor Replace
2	Harnesses	With the aqueous DEF solution sensor installed, disconnect the connector on the DCU86P side and measure voltage at pin No.58 and 59 on the harness side.	Within criteria Contiguous		Harness Repair
3	DCU	Check that no malfunctions occur after the key is turned ON. NG: Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

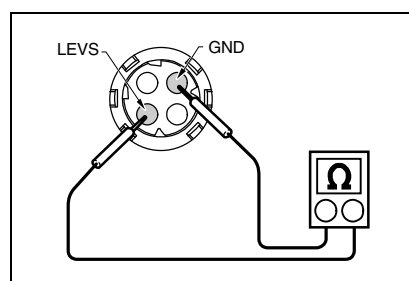
DN02-56

FUEL CONTROL (DEF SCR)

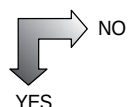
DTC:P203C/P203D

EN1612602F200029

DTC	P203C	DEF tank level sensor - out of range (Out of range low)
DTC	P203D	DEF tank level sensor - out of range (Out of range high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

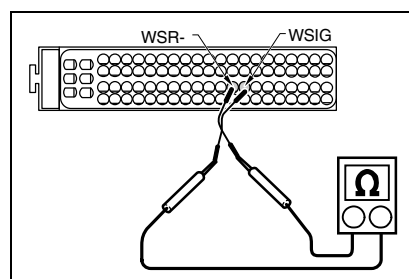
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DEF sensor connector.
- (3) Measure resistance between the terminals LEVS and GND of the DEF sensor connector.

Standard value: 14.8-15.3 kΩ: When filled to the empty line

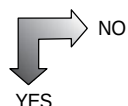
NO

Faulty DEF sensor

YES

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Connect the DEF sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals WSR- and WSIG of the DCU 86P connector on the harness side.

Standard value: 132-140 Ω: When filled to the full line

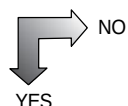
NO

Faulty harness

YES

3. CHECK A MALFUNCTION CODE.

- (1) After turning the starter switch "ON" position, check that no DTC.



NO

Improper connection of connector

YES

Clear and recheck the DTC



FUEL CONTROL (DEF SCR)

DN02-57



DN02-58

FUEL CONTROL (DEF SCR)

DTC:P2047 (Check sheet)

EN1612602F200030

DTC:P2047

DEF injector - functional

1. Technical description

- DEF dosing valve is controlled by DCU.
- Operation of the DEF dosing valve is checked by DCU based on the circuit current waveform.

2. DTC set condition**(1) Check conditions**

- The engine is ON.
- DEF injector duty cycle: > 0%, and DEF Pressure > 350kPa, and 9V < Battery < 16V, and Time elapsed since DEF injector opening <= 0.0025sec

(2) Judgment criteria

- Second order differential in the DEF injector circuit current waveform:
Below 80 A/sec² detected 50 times consecutively

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF injector: Malfunction of injector
*Clogging of crystallized DEF is suspected.

FUEL CONTROL (DEF SCR)

DN02-59

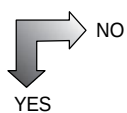
DTC:P2047	DEF injector - functional	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF injector	Check a DEF injection rate. (* Crystallized DEF may be removed by repeating this check and the injector may return to normal.)	within criteria		OK: check ends NG: DEF injector replace

DTC:P2047

EN1612602F200031

DTC	P2047	DEF injector - functional

1. CHECK A DEF INJECTION RATE.

Faulty DEF injector

Clear and recheck the DTC

DN02-60

FUEL CONTROL (DEF SCR)

DTC:P2048/P2049 (Check sheet)

EN1612602F200032

DTC:P2048
DTC:P2049DEF injector - disconnection (Disconnection (low side))
DEF injector - disconnection (Disconnection (high side))**1. Technical description**

- DEF dosing valve is controlled by DCU.
- DEF dosing valve detects disconnection and short-circuit based on the circuit voltage and signals in DCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON , and DEF injector duty cycle >0%

(2) Judgment criteria**DTC :P2048**

- DEF dosing valve circuit voltage (Low side): Below 0.2 V for more than 0.05 seconds
Original: DEF dosing valve circuit voltage (Low side): Below

DTC :P2049

- DEF dosing valve circuit voltage (Hi side): Below 2 V for more than 0.05 seconds
Original: DEF dosing valve circuit voltage (Hi side): Over 2

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF injector:

- Abnormal resistance of DEF injector
- Malfunction in DEF injector

Harness: Disconnection or short-circuit in harness between the sensor and DCU

FUEL CONTROL (DEF SCR)

DN02-61

DTC:P2048 DTC:P2049	DEF injector - disconnection (Disconnection (low side)) DEF injector - disconnection (Disconnection (high side))	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF injector	Disconnect the connector of the DEF dosing valve and measure resistance.	11.4 - 12.6Ω (@20degC)		DEF injector Replace
2	Harness	With the DEF dosing valve installed, disconnect the connector on the DCU86P side and measure resistance at pin No.12 and 32 on the harness side.	11.4 - 12.6Ω (@20degC)		Harness Repair
3	DCU	Replace DCU. (Perform a forced regeneration after replacement.)			

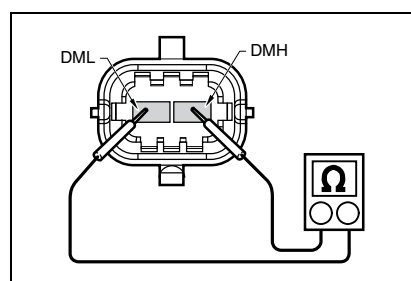
DN02-62

FUEL CONTROL (DEF SCR)

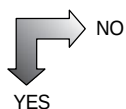
DTC:P2048/P2049

EN1612602F200033

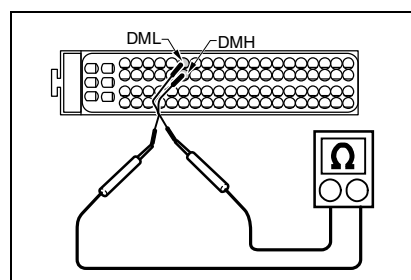
DTC	P2048	DEF injector - disconnection (Disconnection (low side))
DTC	P2049	DEF injector - disconnection (Disconnection (high side))

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

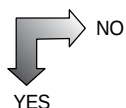
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DEF dosing valve connector.
- (3) Measure resistance between the terminals DMH and DML of the DEF dosing valve connector.

Standard value: 11.4-12.6 Ω (20°C {68°F}): Outside air temperature

Faulty DEF dosing valve

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Connect the DEF dosing valve connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals DML and DMH of the DCU 86P connector on the harness side.

Standard value: 11.4-12.6 Ω (20°C {68°F}): Outside air temperature

Faulty harness

Improper connection of connector



FUEL CONTROL (DEF SCR)

DN02-63



DN02-64

FUEL CONTROL (DEF SCR)

DTC:P204B (Check sheet)

EN1612602F200034

DTC:P204B

DEF pressure sensor - rationality

1. Technical description

- The DEF pressure sensor is used to check pressure of the DEF piping.

2. DTC set condition**(1) Check conditions**

- The key is ON.
- Minimum DEF pressure during previous afterrun > -50 kPa
- DEF defrosting is completed , and
Exhaust Gas Temperature (SCR inlet) : < 150°C , and
DEF Pressure line : No DEF , and
No malfunction

(2) Judgment criteria

- DEF pressure is > 50kPa or <-50kPa for 10 sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF Pump: Malfunction of aqueous DEF solution pressure sensor
(DEF Pressure Sensor)

FUEL CONTROL (DEF SCR)

DN02-65

DTC:P204B	DEF pressure sensor - rationality	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF pump (DEF pressure sensor)	Leave the engine for a while (approximately 3 minutes) after stopping the engine. Set the key to ON position again to check whether P204B is deemed as a past malfunction.	P204B must be deemed as a past malfunction.		Replace the DEF pump.

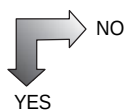
DTC:P204B

EN1612602F200035

DTC	P204B	DEF pressure sensor - rationality

1. CHECK THE DEF PRESSURE SENSOR USING THE PC DIAGNOSIS TOOL (Hino-DX)

- (1) Stop the engine and wait for five minute.
- (2) Connect Hino-DX to the vehicle.
- (3) Set the starter switch to "ON" position.
- (4) Measure the value of the pressure sensor.

Standard value: 50 kPa or more

Replace the DEF pump

Clear and recheck the DTC

DN02-66

FUEL CONTROL (DEF SCR)

DTC:P204C/P204D (Check sheet)

EN1612602F200036

DTC:P204C	DEF pressure sensor - out of range (Out of range low)
DTC:P204D	DEF pressure sensor - out of range (out of range high)

1. Technical description

- DEF pressure sensor is used to check the pressure of the DEF pump.
- Disconnection and short-circuit of the pump is detected by DCU.

2. DTC set condition

(1) Check conditions

- Starter switch ON

(2) Judgment criteria

DTC :P204C

- Sensor circuit voltage: Below 0.25 V for more than 0.4 seconds

DTC :P204D

- Sensor circuit voltage: Over 4.75 V for more than 0.4 seconds

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Aqueous DEF solution pump:

- Malfunction in aqueous DEF solution pump
- Disconnection or short-circuit in aqueous DEF solution pressure sensor
- Abnormal voltage of aqueous DEF solution pressure sensor

Harness: Disconnection or short-circuit in harness between aqueous DEF solution pressure sensor and DCU

FUEL CONTROL (DEF SCR)

DN02-67

DTC:P204C DTC:P204D	DEF pressure sensor - out of range (Out of range low) DEF pressure sensor - out of range (out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	System	Use the Hino-DX, set the key to ON, and check the DEF pressure sensor voltage.	250 mV to 4750 mV		OK: Perform steps 2 and 3 and go to Confirmation after Completion of the Procedure. NG: Go to step 2 and subsequent steps
2	Harnesses	Disconnect the connector on the DEF pump side and the connector on the DCU86P and 1. Check for continuity between the harness terminals No. 2, 3, and 4 on the pump side and the harness terminals No. 19, 17, and 18 on the DCU86P side. 2. Check the insulation between the lines. 3. Make sure that there is no short-circuit to B+ or GND for each line.	1. There must be continuity. 2. There must be insulation. 3. There must be no short-circuits.		Repair
3	DEF pump	With the connector on the DEF pump side connected, disconnect the connector on the DCU86P side and 1. Confirm that the harness terminals No. 19, 17, and 18 have no continuity to each other (isolated or a resistance value). 2. Confirm that each terminal has no short-circuit to B+ or GND.	1. There must be no continuity (isolation or a resistance value). 2. There must be no short-circuits.		DEF pump Replace
4	DCU	Connect a new DCU and set the key to ON.	After key-on, P204C and P204D must not occur again.		OK: Leave the new DCU installed. NG: To step 5
5	DEF pump	Return the DCU to the original one and replace the DEF pump.	After key-on, P204C and P204D must not occur again.		Leave the new DCU installed.

Confirmation after Completion of the Procedure

Bring the exhaust temperature before the SCR to 150°C or higher, raise the DEF solution pressure, monitor the data with the Hino-DX, and confirm that the DEF pressure stabilizes for 60 seconds between 8500 hPa and 9500 hPa.

* Connect the Hino-DX to the DCU and monitor the exhaust temperature before the SCR, the DEF pressure, and the DEF pressure sensor voltage.

* Use the exhaust brake function if the exhaust temperature does not rise after engine start.

* When OK with step 1 and NG with this confirmation, replace the DCU and the DEF pump and perform this confirmation again.

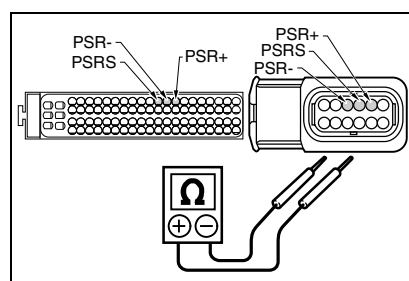
DN02-68

FUEL CONTROL (DEF SCR)

DTC:P204C/P204D

EN1612602F200037

DTC	P204C	DEF pressure sensor - out of range (Out of range low)
DTC	P204D	DEF pressure sensor - out of range (Out of range high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

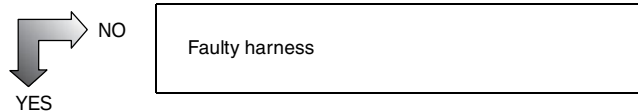
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DEF pump connector and DCU 86P connector.
- (3) Measure resistance between terminals of the DEF pump connector and DCU 86P connector on the harness side.

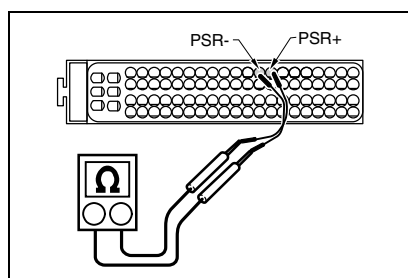
HINT

At this time, an error will occur because communication between the pump and DCU fails.

Finally, turn the key from "LOCK" to "ON" and check that the malfunction code will not recur.

Terminals to measure the voltage	
DEF pump side	DCU side
PSR+	PSR+
PSR-	PSR-
PSRS	PSRS

Standard value: Continuity

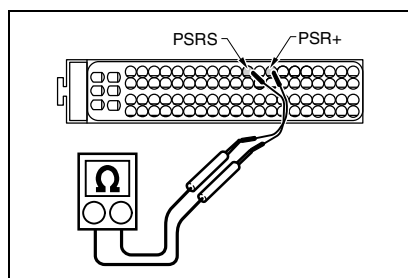


SAPH161260200033

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Measure resistance between terminals PSR+ and PSR- of the DCU 86P connector on the harness side.

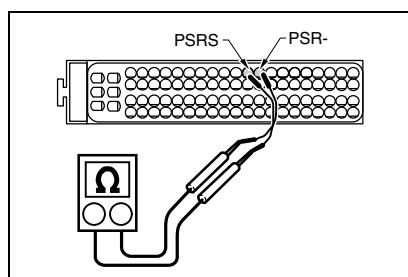
Standard value: 185-215 k Ω



SAPH161260200034

- (2) Measure resistance between terminals PSR+ and PSRS of the DCU 86P connector on the harness side.

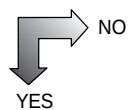
Standard value: 148-172 k Ω



SAPH161260200035

- (3) Measure resistance between terminals PSR- and PSRS of the DCU 86P connector on the harness side.

Standard value: 333-387 k Ω



NO

Replace the DEF pump

YES

Improper connection of connector

3. IF THE MALFUNCTION CODE RECURS AFTER REPAIR, THE DCU IS DEFECTIVE.

DN02-70

FUEL CONTROL (DEF SCR)

DTC:P205B (Check sheet)

EN1612602F200038

DTC:P205B	DEF tank temperature sensor - rationality

1. Technical description

- DEF tank temperature sensor rationality is checked by comparison with Ambient air temperature

2. DTC set condition

(1) Check conditions

- The key is ON.
- Difference between Ambient air temperature and Exhaust gas temperature (SCR inlet) :<10°C {50°F} and difference of Ambient air temperature between Engine coolant temperature (from Engine ECU) :<10°C {50°F} and difference between Exhaust gas temperature (SCR inlet) and Engine coolant temperature (from Engine ECU) :<10°C {50°F}

(2) Judgment criteria

- Difference between DEF tank temperature and Ambient air temperature : >35°C {95°F} for 2sec*
* Original: 50°C {122°F}

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

- DEF tank temperature sensor:**
Ambient air temperature sensor:
Exhaust gas temperature sensor (SCR inlet):
Engine coolant temperature sensor:
- Bad contact of harness connector
 - Malfunction of sensor

FUEL CONTROL (DEF SCR)

DN02-71

DTC:P205B	DEF tank temperature sensor - rationality	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF tank temperature sensor	Data-monitor the temperature using Hino-DX. (Compare the temperature shown on a thermometer placed in the tank.) Coupler check	Within criteria Contiguous		Replace
2	Ambient air temperature (AAT) sensor	Check resistance. Coupler check	Within criteria Contiguous		Replace
3	Harnesses (AAT↔DCU)	Sensor resistance check from DCU connector through harness Coupler of DCU connector check	Within criteria Contiguous		Replace
4	External resistor	Resistance, Coupler check	Within criteria Contiguous		Replace
5	Exhaust gas temperature sensor (SCR inlet)	Immerse the sensor in hot water and check resistance. Coupler check	Within criteria Contiguous		Replace
6	Engine coolant temperature sensor	Immerse the sensor in hot water and check resistance. Coupler check	Within criteria Contiguous		Replace

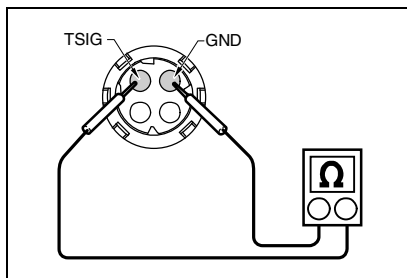
DN02-72

FUEL CONTROL (DEF SCR)

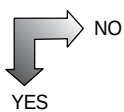
DTC:P205B

EN1612602F200039

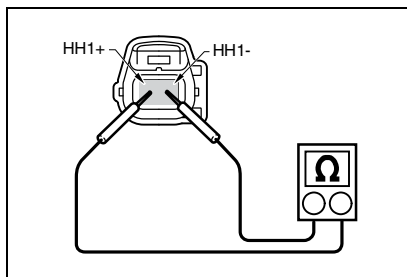
DTC	P205B	DEF tank temperature sensor - rationality

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

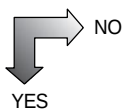
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DEF sensor connector.
- (3) Measure resistance between the TSIG and GND terminals of the DEF sensor connector.

Standard value:**16.4 k Ω (-20°C {-4°F}): DEF temperature****2.4 k Ω (20°C {68°F}): DEF temperature****0.6 k Ω (60°C {140°F}): DEF temperature**

Faulty DEF sensor

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

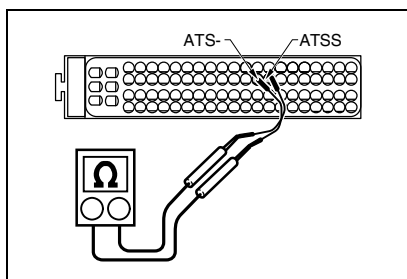
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the ambient air temperature sensor connector.
- (3) Measure resistance between the terminals HH1+ and HH1- of the ambient air temperature sensor connector.

Standard value:**21.8 k Ω (-25°C {-13°F})****1.7 k Ω (25°C {77°F})****0.2 k Ω (80°C {176°F})**

Faulty ambient air temperature sensor

FUEL CONTROL (DEF SCR)

DN02-73



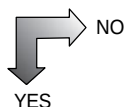
3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Connect the ambient air temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals ATSS and ATS- of the DCU 86P connector on the harness side.

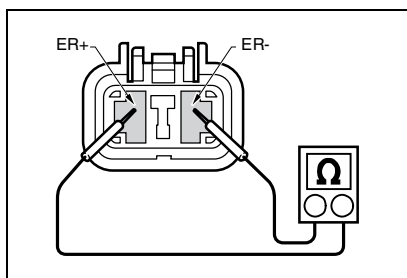
Standard value:

23.8 k Ω (-25°C {-13°F})

3.7 k Ω (25°C {77°F})

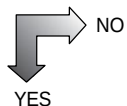
2.2 k Ω (80°C {176°F})


Faulty harness

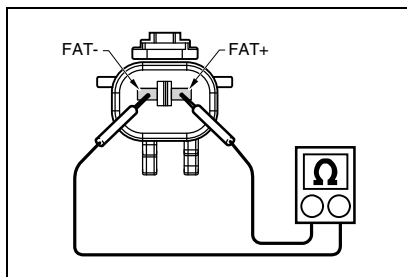


4. CHEK THE RESISTANCE BETWEEN TERMINALS

- (1) Measure resistance between the terminals ER+ and ER- of the external connector.

Standard value: 2 k Ω


Faulty external connector



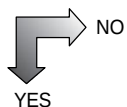
5. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor connector.
- (3) Measure resistance between the terminals FAT+ and FAT- of the exhaust gas temperature sensor connector.

Standard value:

186 Ω (-20°C {-4°F}): Outside air temperature

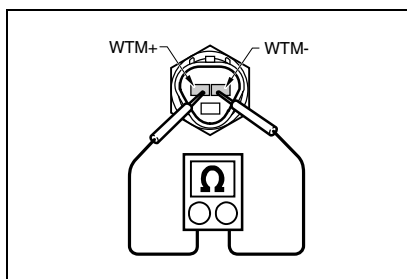
220 Ω (20°C {68°F}): Outside air temperature

277 Ω (100°C {212°F}): Outside air temperature


Faulty exhaust gas temperature sensor

DN02-74

FUEL CONTROL (DEF SCR)



SAPH161260200041

6. MEASURING RESISTANCE BETWEEN SENSOR TERMINALS

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the coolant temperature sensor connector.
- (3) Measure resistance between the terminals WTM+ and WTM- of the engine coolant temperature sensor.

HINT

If it is difficult to check only the sensor, proceed to Step 3.

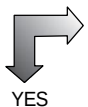
Standard value:

2.45 k Ω (-20°C {-4°F})

1.15 k Ω (20°C {68°F})

584 Ω (60°C {140°F})

318 Ω (80°C {176°F})



NO

Fault in engine coolant temperature sensor

Clear and recheck the DTC



FUEL CONTROL (DEF SCR)

DN02-75



DN02-76

FUEL CONTROL (DEF SCR)

DTC:P205C/P205D (Check sheet)

EN1612602F200040

DTC:P205C
DTC:P205DDEF Temperature Sensor - out of range (Out of range low)
DEF Temperature Sensor - out of range (Out of range high)**1. Technical description**

- DEF Temperature Sensor is judged with DEF Temperature Sensor voltage via Harness by DCU .

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P205C**

- DEF Temperature Sensor voltage : Less than 0.7V for more than 0.4sec

DTC :P205D

- DEF Temperature Sensor voltage : More than 4.7V for more than 0.4sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF Temperature Sensor:

- Bad contact of harness connector.
- Malfunction of sensor

Harnesses:

- Miss connection
- Disconnection or short-circuit

FUEL CONTROL (DEF SCR)

DN02-77

DTC:P205C DTC:P205D	DEF Temperature Sensor - out of range (Out of range low) DEF Temperature Sensor - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF Temperature Sensor	Disconnect the connector on the aqueous DEF solution sensor side and measure resistance at pin No.2 and 3.	Within criteria Contiguous		Sensor Replace
2	Harnesses	With the aqueous DEF solution sensor installed, disconnect the connector on the DCU86P side and measure resistance at pin No.58 and 79 on the harness side.	Within criteria Contiguous		Harness Repair
3	DCU	Check that no malfunctions occur after the key is turned ON. NG: Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

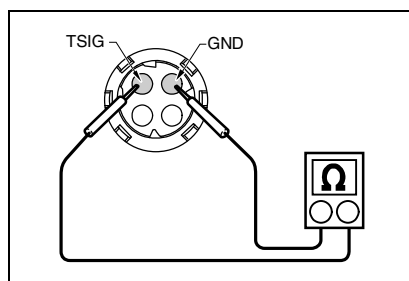
DN02-78

FUEL CONTROL (DEF SCR)

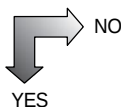
DTC:P205C/P205D

EN1612602F200041

DTC	P205C	DEF tank temperature sensor - out of range (Out of range low)
DTC	P205D	DEF tank temperature sensor - out of range (Out of range high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

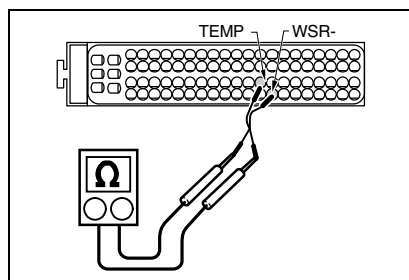
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DEF sensor connector.
- (3) Measure resistance between the TSIG and GND terminals of the DEF sensor connector.

Standard value:**16.4 k Ω (-20°C {-4°F}): DEF temperature****2.4 k Ω (20°C {68°F}): DEF temperature****0.6 k Ω (60°C {140°F}): DEF temperature**

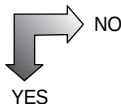
NO

Faulty DEF sensor

YES

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Connect the DEF sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals WSR- and TEMP of the DCU 86P connector on the harness side.

Standard value:**16.4 k Ω (-20°C {-4°F}): DEF temperature****2.4 k Ω (20°C {68°F}): DEF temperature****0.6 k Ω (60°C {140°F}): DEF temperature**

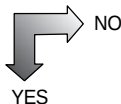
NO

Faulty harness

YES

3. CHECK A MALFUNCTION CODE.

- (1) After turning the starter switch "ON" position, check that no DTC.



NO

Improper connection of connector

YES

Clear and recheck the DTC



FUEL CONTROL (DEF SCR)

DN02-79



DN02-80

FUEL CONTROL (DEF SCR)

DTC:P208A (Check sheet)

EN1612602F200042

DTC:P208A

DEF pump motor - circuit (Open load)

1. Technical description

- DEF Pump Module Motor Actuator is judged with DEF Pump Module Motor Actuator Circuit Voltage via Harness by DCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON
- DEF Pump Module Motor Actuator Duty cycle > 0%

(2) Judgment criteria

- DEF Pump Module Motor Actuator voltage : >2.7V, and <5V for 2sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF Pump Module Motor Actuator:

- Bad contact of harness connector.
- Malfunction of Actuator

Harnesses:

- Miss connection
- Disconnection/short-circuiting

FUEL CONTROL (DEF SCR)

DN02-81

DTC:P208A		DEF pump motor - circuit (Open load)	Inspection Procedure		
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harnesses	Detach the DEF pump side connector and measure voltage at Pin No. 8 and 9, No. 8 and 10 and No. 9 and 10 on the harness side.	Within criteria Contiguous		OK: Pump Replace NG: Check No.2
2	DEF pump	With the DEF pump installed, disconnect the connector on the DCU86P side and measure resistance at Pin No. 17 and 18, No. 17 and 19, and No. 18 and 19 on the harness side.	Within criteria Contiguous		OK: Check No.3 NG: Har- ness Repair
3	DCU	After Key-ON, check that no error will occur. NG: Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

DN02-82

FUEL CONTROL (DEF SCR)

DTC:P208C/P208D (Check sheet)

EN1612602F200043

DTC:P208C DTC:P208D	DEF pump motor - circuit (Circuit low) DEF pump motor - circuit (Circuit high)

1. Technical description

- DEF Pump Module Motor Actuator is judged by DCU via Harness

2. DTC set condition**(1) Check conditions**

- The engine is ON.
- The pump is operating.

(2) Judgment criteria**DTC :P208C**

- DEF Pump Module Motor Actuator voltage : Less than 0.66V for more than 2sec
- The pump is operating.

DTC :P208D

- DEF Pump Module Motor Actuator voltage : Equal to 2.7V for more than 2sec
- The pump is operating.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF Pump (DEF Pump Module Motor Actuator):

- Bad contact of harness connector.
- Malfunction of Actuator

Harnesses: Miss connection

FUEL CONTROL (DEF SCR)

DN02-83

DTC:P208C DTC:P208D	DEF pump motor - circuit (Circuit low) DEF pump motor - circuit (Circuit high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harnesses	Check the appearance. Disconnect the connector on the DEF pump side, pin No.8, 9 and 10 on the harness side, and the connector on the DCU86P side. Then, check for continuity at pin No.24, 26 and 46 on the harness side.	Within criteria Contiguous		Repair
2	DCU	Disconnect the harness on the DEF pump side. Check that voltage is applied from the harness side connector while the key is ON.	Within criteria		Replace
3	DEF pump	Pump Replace	No Malfunction		Pump Replace

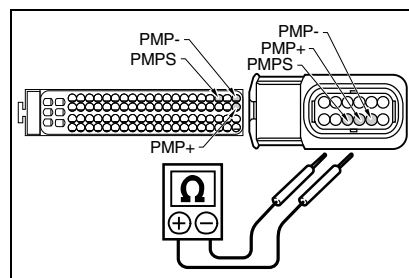
DN02-84

FUEL CONTROL (DEF SCR)

DTC:P208A/P208C/P208D

EN1612602F200044

DTC	P208A	DEF pump motor - circuit (Open load)
DTC	P208C	DEF pump motor - circuit (Circuit low)
DTC	P208D	DEF pump motor - circuit (Circuit high)



SAPH161260200043

1. CHECK THE RESISTANCE BETWEEN TERMINALS.

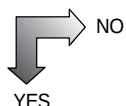
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DEF pump connector and the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between terminals of the DEF pump connector and DCU 86P connector on the harness side.

HINT

At this time, an error will occur because communication between the pump and DCU fails.

Finally, turn the key from "LOCK" to "ON" and check that the malfunction code will not recur.

Terminals to measure the resistance	
DEF pump side	DCU side
PMP+	PMP+
PMP-	PMP-
PMPS	PMPS

Standard value: Continuity

Faulty wire harness

Faulty DEF pump

2. AFTER REPAIR, CHECK THAT NO ERROR WILL RECUR IN DRIVING TEST. IF THE MALFUNCTION CODE RECURS AFTER REPAIR, THE DCU IS DEFECTIVE.



FUEL CONTROL (DEF SCR)

DN02-85



DN02-86

FUEL CONTROL (DEF SCR)

DTC:P208B (Check sheet)

EN1612602F200045

DTC:P208B	DEF pump motor - functional

1. Technical description

- DEF pump motor is used to send DEF to the DEF injector.
- DEF pump motor operates according to the command values from DCU.

2. DTC set condition**(1) Check conditions**

- The engine is ON.
- Temperature before SCR when defrosting of aqueous DEF solution is completed:
Over 150°C {302°F}

(2) Judgment criteria

- "Target pump speed - Actual speed": 300 r/min for 5 seconds

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF pump: Malfunction in aqueous DEF solution pump motor

FUEL CONTROL (DEF SCR)

DN02-87

DTC:P208B	DEF pump motor - functional	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF pump	Replace the DEF pump. Keep the engine at idle (about 10 minutes) and check that the DEF pressure is stabilized at around 900 kPa (800 kPa to 1,050 kPa) on Hino-DX.	No malfunction		DCU Replace

DTC:P208B

EN1612602F200046

DTC	P208B	DEF pump motor - functional

1. REPLACE THE DEF PUMP
2. AFTER REPAIR, CHECK THAT NO ERROR WILL RECUR IN DRIVING TEST.

DN02-88

FUEL CONTROL (DEF SCR)

DTC:P20A0 (Check sheet)

EN1612602F200047

DTC:P20A0

Reverting valve for DEF pump - circuit (Open load)

1. Technical description

- DEF reverting valve out of range is checked with DEF reverting valve Voltage via Harness by ECU.

2. DTC set condition

(1) Check conditions

- Starter switch ON
- DEF reverting valve is activated.

(2) Judgment criteria

- DEF reverting valve voltage : > 2.7V, and <5v for 2.0sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF reverting valve:

- Bad contact of harness connector.
- Malfunction of valve

Harnesses:

- Miss connection
- Disconnection/short-circuiting

FUEL CONTROL (DEF SCR)

DN02-89

DTC:P20A0		Reverting valve for DEF pump - circuit (Open load)	Inspection Procedure		
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF Pump (reverting valve)	With the DEF pump installed, disconnect the connector on the DCU86P side and measure resistance at pin No.65 and 86 on the harness side.	Within criteria Contiguous		OK: Check No.3 NG: Check No.2
2	DEF Pump (reverting valve)	Disassemble the aftertreatment module. Disconnect the connector on the DEF pump side and measure resistance at pin No.11 and 12.	Within criteria Contiguous		OK: Harness Repair NG: Pump Replace
3	DCU	After Key-ON, check that no error will occur. NG: Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

DN02-90

FUEL CONTROL (DEF SCR)

DTC:P20A2/P20A3 (Check sheet)

EN1612602F200048

DTC:P20A2	Reverting valve for DEF pump - circuit (Circuit low)
DTC:P20A3	Reverting valve for DEF pump - circuit (Circuit high)

1. Technical description

- DEF reverting valve out of range is checked with DEF reverting valve Voltage via Harness by ECU.

2. DTC set condition

(1) Check conditions

- Starter switch ON
- DEF reverting valve is activated.

(2) Judgment criteria

DTC :P20A2

- DEF reverting valve voltage : < 0.66V for 2sec

DTC :P20A3

- DEF reverting valve voltage : = 2.7V for 2sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DEF reverting valve:

- Bad contact of harness connector.
- Malfunction of valve

Harness:

- Miss connection
- Disconnection or short-circuit

FUEL CONTROL (DEF SCR)

DN02-91

DTC:P20A2 DTC:P20A3	Reverting valve for DEF pump - circuit (Circuit low) Reverting valve for DEF pump - circuit (Circuit high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DEF Pump (reverting valve)	With the DEF pump installed, disconnect the connector on the DCU86P side and measure resistance at pin No.65 and 86 on the harness side.	Within criteria Contiguous		OK: Check No.3 NG: Check No.2
2	DEF Pump (reverting valve)	Disassemble the aftertreatment module. Disconnect the connector on the DEF pump side and measure resistance at pin No.11 and 12.	Within criteria Contiguous		OK: Harness Repair NG: Pump Replace
3	DCU	Check that no malfunctions occur after the key is turned ON. NG: Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

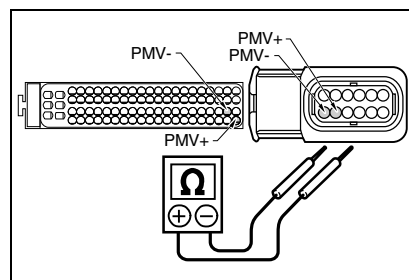
DN02-92

FUEL CONTROL (DEF SCR)

DTC:P20A0/P20A2/P20A3

EN1612602F200049

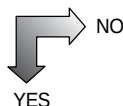
DTC	P20A0	Reverting valve for DEF pump - circuit (Open load)
DTC	P20A2	Reverting valve for DEF pump - circuit (Circuit low)
DTC	P20A3	Reverting valve for DEF pump - circuit (Circuit high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

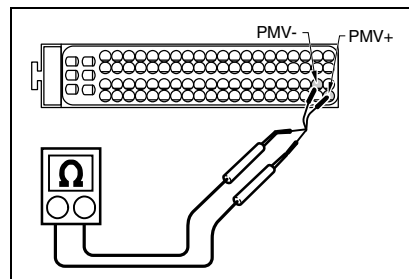
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DCU 86P connector and DEF pump connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between terminals of the DEF pump connector and DCU 86P connector on the harness side.

Terminals to measure the resistance

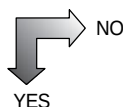
DEF pump side	DCU side
PMV-	PMV-
PMV+	PMV+

Standard value: Continuity

Faulty harness

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals PMV+ and PMV- of the DCU 86P connector on the harness side.

Standard value: 2.05-12.05 Ω (23°C {73.4°F}): Outside air temperature

Faulty DEF pump

Improper connection of connector

3. CHECK THAT NO MALFUNCTION CODES ARE ISSUED.

- (1) After repair, turn the starter switch from "ON" to "OFF" and check for after-run driving sound (pump driving sound).
- (2) When after-run driving sound stops, turn the starter switch "ON" and check that no malfunction codes are issued.



FUEL CONTROL (DEF SCR)

DN02-93



DN02-94

FUEL CONTROL (DEF SCR)

DTC:P20A1 (Check sheet)

EN1612602F200050

DTC:P20A1

Reverting valve for DEF pump stuck close

1. Technical description

- Reverting valve for DEF pump stuck close is checked by DEF pressure

2. DTC set condition**(1) Check conditions**

- 800kPa < DEF pressure < 1,050kPa, and 9V < Battery voltage < 16V

(2) Judgment criteria

- The pressure sensor indicates 50 kPa or higher 25 seconds after the key is turned OFF.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Reverting valve for DEF pump: Malfunction

FUEL CONTROL (DEF SCR)

DN02-95

DTC:P20A1	Reverting valve for DEF pump stuck close	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Reverting valve for DEF pump	Perform a forced activation using Hino-DX to check operating sounds.	Operating sounds heard		Pump Replace
2	Reverting valve for DEF pump	Perform DEF emptying and check the DEF pressure on Hino-DX.	<50kPa		Pump Replace
3	DEF tank	Check for clogging in the breather hose.	No clogging		DEF tank sensor Replace
To confirm that the valve has returned to normal, keep the engine at idle for about 10 minutes and check that the DEF pressure remains at around 900 kPa (800 kPa to 1,050 kPa) on Hino-DX. Then, turn the key OFF. → Check that the DCU main relay turns off on Hino-DX (communication between DX and DCU stops). → Turn the key ON again and check that no P codes recur.					

DN02-96

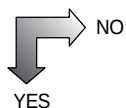
FUEL CONTROL (DEF SCR)

DTC:P20A1

EN1612602F200051

DTC	P20A1	Reverting valve for DEF pump stuck close

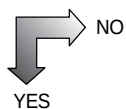
- CHECK THAT THE MALFUNCTION CODES P204B, P204C, P204D, P208A, P208B, P208C, AND P208D DO NOT EXIST SIMULTANEOUSLY.**



Proceed to individual malfunction codes.

- CHECK THAT NO MALFUNCTION CODES ARE ISSUED.**

- After repair, turn the starter switch from "ON" to "OFF" and check for after-run driving sound (pump driving sound).
- When after-run driving sound stops, turn the starter switch "ON" and check that no malfunction codes are issued.



Faulty DEF pump

Clear and recheck the DTC

HINT

If DEF is excessively provided in the DEF tank or the breather-pipe is clogged, DEF may not be successfully returned to the tank. Check if DEF is excessively supplied in the DEF tank and if ventilation is properly performed.



FUEL CONTROL (DEF SCR)

DN02-97



DN02-98

FUEL CONTROL (DEF SCR)

DTC:P20B1 (Check sheet)

EN1612602F200052

DTC:P20B1

DEF tank heater valve - circuit (Open load)

1. Technical description

- Tank heating valve out of range is checked with Tank heating valve voltage via Harness by ECU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON
- Tank heating valve duty : >0%

(2) Judgment criteria**DTC :P20B1**

- Tank heating valve voltage : > 2.7V , and < 5V for 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Tank heating valve:

- Bad contact of harness connector.
- Malfunction of valve

Harnesses:

- Miss connection
- Disconnection/short-circuiting

FUEL CONTROL (DEF SCR)

DN02-99

DTC:P20B1		DEF tank heater valve - circuit (Open load)	Inspection Procedure		
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Tank heating valve	Disconnect the connector on the DEF coolant shutoff valve side and measure resistance.	Within criteria Contiguous		Valve Replace
2	Harnesses	With the DEF coolant shutoff valve installed, disconnect the connector on the DCU86P side and measure resistance at Pin No. 8 and 85 on the harness side.	Within criteria Contiguous		Harness Repair
3	DCU	After Key-ON, check that no error will occur. NG: Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

DN02-100

FUEL CONTROL (DEF SCR)

DTC:P20B3/P20B4 (Check sheet)

EN1612602F200053

DTC:P20B3

DEF tank heater valve - circuit (Circuit low)

DTC:P20B4

DEF tank heater valve - circuit (Circuit high)

1. Technical description

- Tank heating valve out of range is checked with Tank heating valve voltage via Harness by ECU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON
- Tank heating valve duty : >0%

(2) Judgment criteria**DTC :P20B3**

- Tank heating valve voltage : < 0.66V for 0.05sec

DTC :P20B4

- Tank heating valve voltage : = 2.7V for 0.1sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Tank heating valve:

- Bad contact of harness connector.
- Malfunction of valve

Harnesses:

- Miss connection
- Disconnection or short-circuit

FUEL CONTROL (DEF SCR)

DN02-101

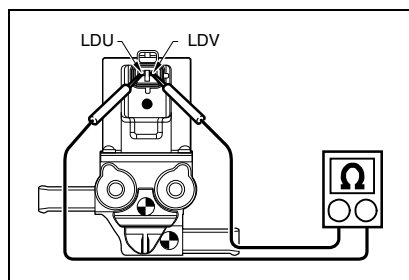
DTC:P20B3 DTC:P20B4	DEF tank heater valve - circuit (Circuit low) DEF tank heater valve - circuit (Circuit high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Tank heating valve	Disconnect the connector on the DEF coolant shutoff valve side and measure resistance.	Within criteria Contiguous		Valve Replace
2	Harnesses	With the DEF coolant shutoff valve installed, disconnect the connector on the DCU86P side and measure resistance at pin No.8 and 85 on the harness side.	Within criteria Contiguous		Harness Repair
3	DCU	Check that no malfunctions occur after the key is turned ON. NG: Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

DTC:P20B1/P20B3/P20B4

EN1612602F200054

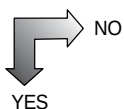
DTC	P20B1	DEF tank heater valve - circuit (Open load)
DTC	P20B3	DEF tank heater valve - circuit (Circuit low)
DTC	P20B4	DEF tank heater valve - circuit (Circuit high)



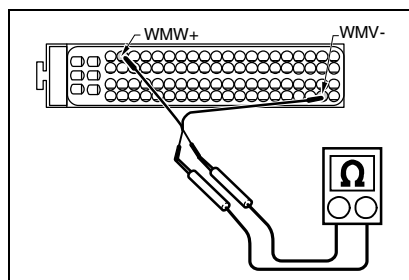
1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the coolant shutoff valve connector.
- (3) Set the starter switch to "ON" position.
- (4) Measure resistance between the terminals LDU and LDV of the coolant shutoff valve connector.

Standard value: 9.04-9.52 Ω (20°C {68°F}): Outside air temperature



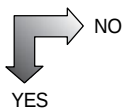
Faulty coolant shutoff valve



2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Connect the coolant shutoff valve connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals WMW+ and WMV- of the DCU 86P connector on the harness side.

Standard value: 9.04-9.52 Ω (20°C {68°F}): Outside air temperature



Faulty harness

Improper connection of connector



FUEL CONTROL (DEF SCR)

DN02-103



DN02-104

FUEL CONTROL (DEF SCR)

DTC:P20B2 (Check sheet)

EN1612602F200055

DTC:P20B2

DEF tank heater valve stuck

1. Technical description

- Malfunction in the coolant shutoff valve is checked based on the values of the DEF tank temperature sensor.
- There are 2 types of malfunctions for the coolant shutoff valve:
"stuck open" and "stuck closed".

2. DTC set condition

(1) Check conditions

When stuck in open position
(1)-Key switch ON
When stuck in closed position
(2)-The coolant shutoff valve is released (aqueous DEF solution defrosts).
Coolant temperature is over 40°C {104°F}

(2) Judgment criteria

(1)-DEF tank temperature: Over 75°C {167°F} for 10 seconds
(Judged by whether the DEF tank is abnormally heated.)
(2)-Rise in the DEF tank temperature after 1,000 to 1,200 seconds in condition 2. above: Within 1°C {33.8°F}
(Judged by the fact that the temperature does not rise even when the DEF tank is heated.)

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Coolant shutoff valve: Stuck closed or open
Coolant piping: Clogging or leaks
DEF tank temperature sensor:
Coolant temperature sensor:

- Bad contact of harness connector(Also refer to P205B.)
- Malfunction(Also refer to P0117.)

Note:

- (1) If the heat source is brought close to the DEF tank or the heated DEF is supplied, P20B2 may be detected.
- (2) "Stuck closed" will be detected only at low temperatures where defrosting of aqueous DEF solution is necessary.

FUEL CONTROL (DEF SCR)

DN02-105

DTC:P20B2	DEF tank heater valve stuck	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
	If P20B1 exists simultaneously, malfunction is likely to have occurred there. First solve the malfunction with P20B1.				
1	DEF tank temperature sensor	Resistance, (The resistance should be appropriate to the measured temperature of the aqueous DEF solution tank.) Coupler check * Also refer to P205B.	Within criteria Contiguous		Replace
2	Engine coolant temperature sensor	Resistance, (Immerse the sensor in hot water and measure resistance.) Coupler check * Also refer to P0117.	Within criteria Contiguous		Replace
3	Engine coolant line	Check for leaks.	Must be free from leakage.		Replace
4	DEF tank heater valve	Forced driving	Operating sounds heard		Replace
5	DEF tank heater valve	While monitoring the DEF tank temperature and coolant temperature, raise the coolant temperature above 40 °C {104°F} and check the DEF tank temperature.	There must be a rise in temperature.		OK: Valve Replace NG: Check No.6 -
6	DEF tank heater valve	Resistance, Coupler check Hold the downstream piping by hand 20 seconds after engine start and check that the pressure releases.	Within criteria Contiguous Pressure releases.		Replace
7	DEF tank sensor	Disconnect the IN and OUT coolant piping and blow air from one side.	Air must be released from the other side.		Replace
8	DEF pump	Disconnect the IN and OUT coolant piping and blow air from one side.	Air must be released from the other side.		Replace
9	Engine coolant line	Visually check	No bending No restriction No leak		Replace

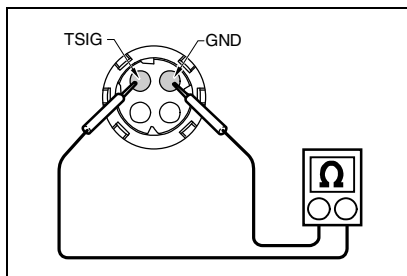
DN02-106

FUEL CONTROL (DEF SCR)

DTC:P20B2

EN1612602F200056

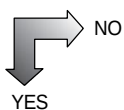
DTC	P20B2	DEF tank heater valve stuck



SAPH161260200036

1. CHECK THE RESISTANCE BETWEEN TERMINALS.

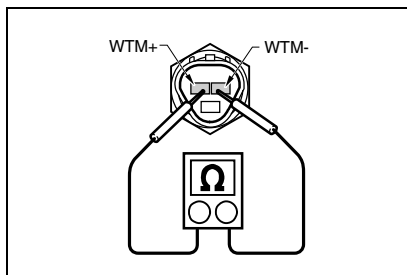
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the DEF sensor connector.
- (3) Measure resistance between the TSIG and GND terminals of the DEF sensor connector.

Standard value:
16.4 kΩ (-20°C {-4°F}): DEF temperature
2.4 kΩ (20°C {68°F}): DEF temperature
0.6 kΩ (60°C {140°F}): DEF temperature


NO

Faulty DEF sensor

YES



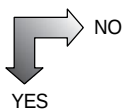
SAPH161260200048

2. MEASURING RESISTANCE BETWEEN SENSOR TERMINALS

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the coolant temperature sensor connector.
- (3) Measure resistance between the terminals WTM+ and WTM- of the engine coolant temperature sensor.

HINT

If it is difficult to check only the sensor, proceed to Step 3.

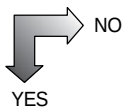
Standard value:
2.45 kΩ (-20°C {-4°F})
1.15 kΩ (20°C {68°F})
584 Ω (60°C {140°F})
318 Ω (80°C {176°F})


NO

Fault in engine coolant temperature sensor

YES

3. WHILE MONITORING THE DEF TANK TEMPERATURE AND ENGINE COOLANT TEMPERATURE, PERFORM A FORCED RELEASE FROM THE SHUTOFF VALVE, RAISE THE COOLANT TEMPERATURE ABOVE 40°C {104°F}, AND CHECK THE DEF TANK TEMPERATURE RISES.



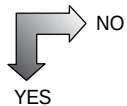
NO

Proceed to 4.

YES

Replace the shutoff valve

**4. PERFORM A FORCED RELEASE FROM THE SHUTOFF VALVE
AND CHECK THE OPERATING SOUND.**



Replace the shutoff valve

Faulty piping

DTC:P20E8 (Check sheet)

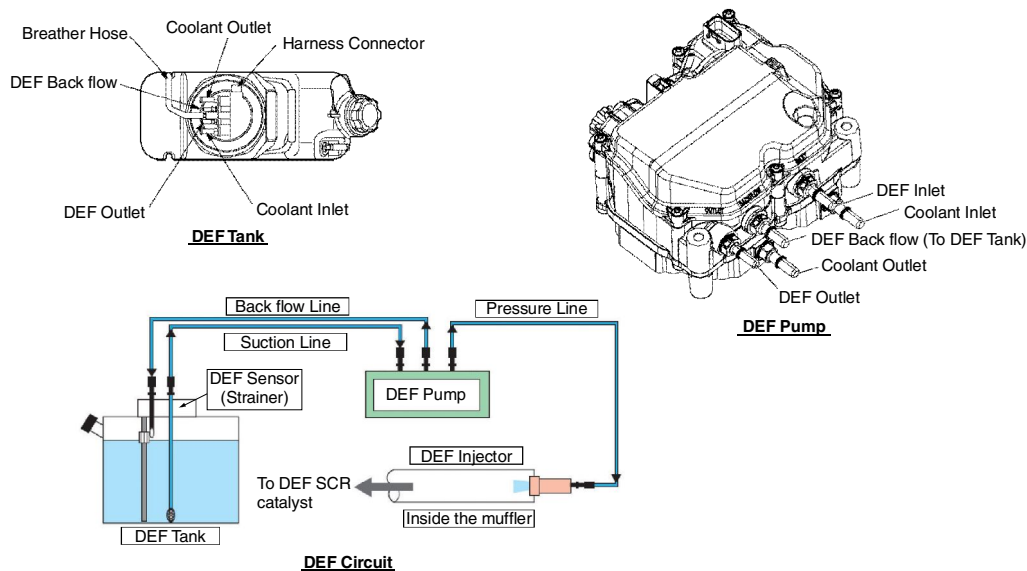
EN1612602F200057

DTC:P20E8

Suction line pressure build up check

1. Technical description

- DEF line pressure depends on ejection of the DEF pump.
- DEF pump ejection is determined by value of DEF pressure sensor which is built in DEF pump.



2. DTC set condition

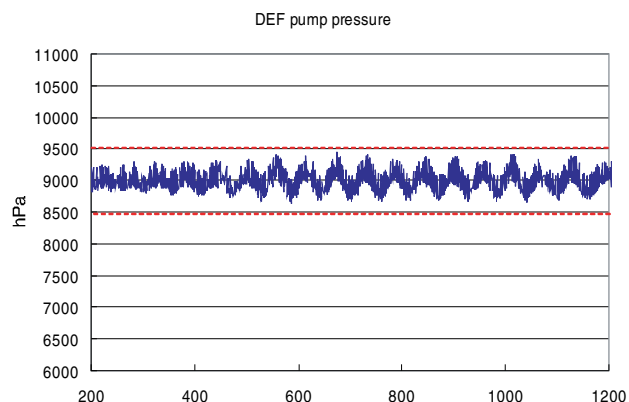
(1) Check conditions

- Exhaust gas temperature (SCR inlet) : >150°C (302°F)
- DEF defrosting is done.

(2) Judgment criteria

- After the DEF pump starts to build up pressure, DEF line pressure does not increase more than 8000 hPa (116 psi) for 50 seconds, three times in a row.

Normal pressure
behavior



3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

- DEF in the DEF tank is empty.
- Strainer in the DEF sensor is clogged.
- Air is entering into DEF suction line.
- DEF suction line is clogged, and DEF is leaking from DEF suction line.
- DEF pump filter is clogged.
- Leak from DEF pump.
- DEF pump malfunction

DN02-110

FUEL CONTROL (DEF SCR)

DTC:P20E8	Suction line pressure build up check	Inspection Procedure

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
1	DEF	Check the amount of DEF	DEF is in the DEF tank → YES DEF is empty → NO		Go to Step 2	Fill up DEF
2	DEF Pump	Check tightening torque of the filter cap below the DEF pump.	The cap is tightened with the correct torque → YES The cap is NOT tightened with the correct torque → NO		Go to Step 3	Clean the filter cap and reinstall it
3	DEF Pump	Check the scheduled replacement period for the filter below the DEF pump.	It is within the scheduled filter replacement period → YES The scheduled filter replacement period already passed → NO		Go to Step 4	Replace the filter
4	DEF Hose between DEF Tank and DEF Pump	Check DEF pump suction line for any leak.	Leak and crystal are found → YES No leak and no crystal are found → NO		Replace the DEF hose between the DEF tank and DEF pump	Go to Step 5
5	DEF Hose connector between DEF Tank and DEF Pump	Check condition of the O-ring inside the DEF connector.	Crack and foreign substance are found on the O-ring → YES No crack and no foreign substance are found on the O-ring → NO		Replace the DEF hose between the DEF tank and DEF pump	Go to Step 6
6	DEF SCR System	Conduct the DEF pump leak test with Hino-DX.	DEF pressure is stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → YES DEF pressure is NOT stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → NO		Completed	Go to Step 7
7	DEF Hose between DEF Tank and DEF Pump	Check DEF pressure after installing SST1 between DEF tank and DEF pump (suction line).	DEF pressure is stabilized between 8500 - 9500 hPa (123.3 -137.8psi) for 60 seconds → YES DEF pressure is NOT stabilized between 8500 - 9500hPa (123.3 -137.8psi) for 60 seconds → NO		Replace the DEF hose between the DEF tank and DEF pump	Go to Step 8
8	DEF Tank Sensor	Check DEF pressure after the connector installed at the top of the DEF tank for SST1 is kept in a different tank.	DEF pressure is stabilized between 8500 - 9500 hPa (123.3 -137.8psi) for 60 seconds → YES DEF pressure is NOT stabilized between 8500 - 9500hPa (123.3 -137.8psi) for 60 seconds → NO		Replace the DEF tank sensor	Go to Step 9

FUEL CONTROL (DEF SCR)

DN02-111

Step	Parts	Description	Judgment	Action		
				Check (YES/ NO)	YES	NO
9	DEF Pump	Check DEF pressure on the DEF pump after replacing the inlet valve of the DEF pump with the new one.	DEF pressure is stabilized between 8500 - 9500 hPa (123.3 -137.8psi) for 60 seconds → YES DEF pressure is NOT stabilized between 8500 - 9500hPa (123.3 -137.8psi) for 60 seconds → NO		Completed	Replace the DEF pump

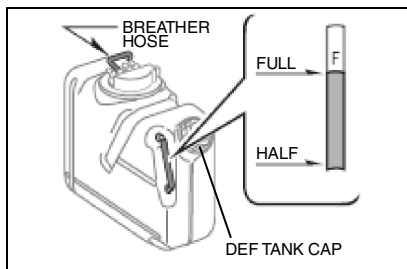
DN02-112

FUEL CONTROL (DEF SCR)

DTC:P20E8

EN1612602F200058

DTC	P20E8	Suction line pressure build up check

1 Check the DEF amount

P20E8-5

1 Remove the DEF tank cap.

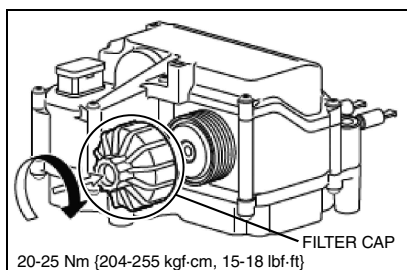
2 Visually check the DEF amount if DEF is in the DEF tank.

Judgment	DEF is in the DEF tank → YES
	DEF is empty → NO

NO

Fill up DEF.

YES

2 Check tightening torque of the filter cap below the DEF pump

P20E8-6

1 Check the tightness of the DEF filter cap.

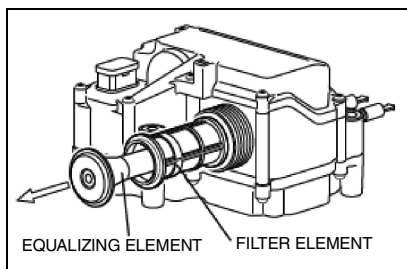
2 Check if there is any leak, crystal, or other things from the DEF filter cap.

Judgment	The cap is tightened to the correct torque → YES
	The cap is NOT tightened to the correct torque → NO

NO

Clean the filter cap and reinstall it (Refer to Workshop Manual EN-10-20(7), S5-UJ08E09*).

YES

3 Check the scheduled replacement period of the filter below the DEF pump

P20E8-7

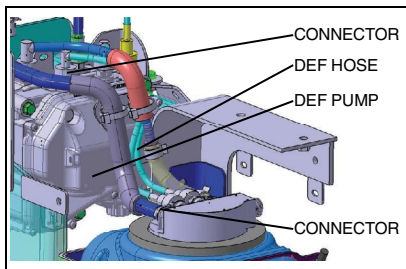
1 Check the filter below the DEF pump if the scheduled replacement period is passed or not.

Judgment	It is within the scheduled filter replacement period → YES
	The scheduled filter replacement period already passed → NO

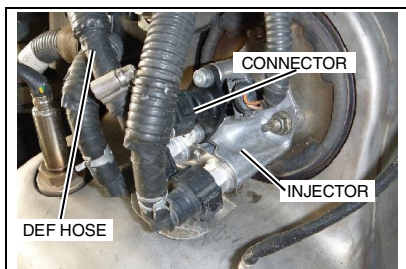
NO

Replace the filter (Refer to Workshop Manual EN10-20 (7) for the procedure for replacement).

YES

4 Check DEF pump suction line for any leak**1 Check all connectors and DEF hoses for any leak or crystal.**

If there is any DEF leak, DEF crystal appears around the muffler.



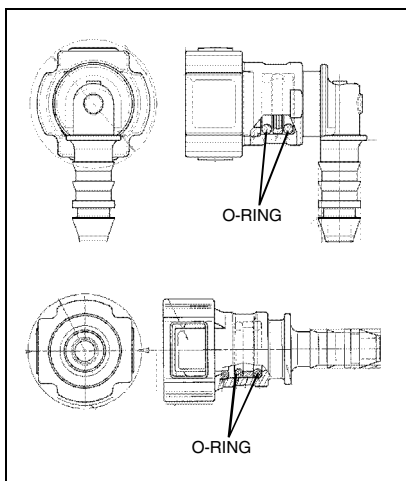
- DEF Hose Connector (on the injector side)
- DEF Hose Connector (on the DEF pump side)
- DEF Hose (suction side)

Judgment	Leak and crystal are found → YES
	No leak and no crystal are found → NO

YES

Replace the DEF hose between the DEF tank and DEF pump.

NO

5 Check condition of O-ring inside the DEF connector**1 Remove the DEF connector.****2 Visually check the O-ring for any crack, damage, or foreign substance stuck to the O-ring.**

Judgment	Crack and foreign substance are found on the O-ring → YES
	No crack and foreign substance on the O-ring → NO

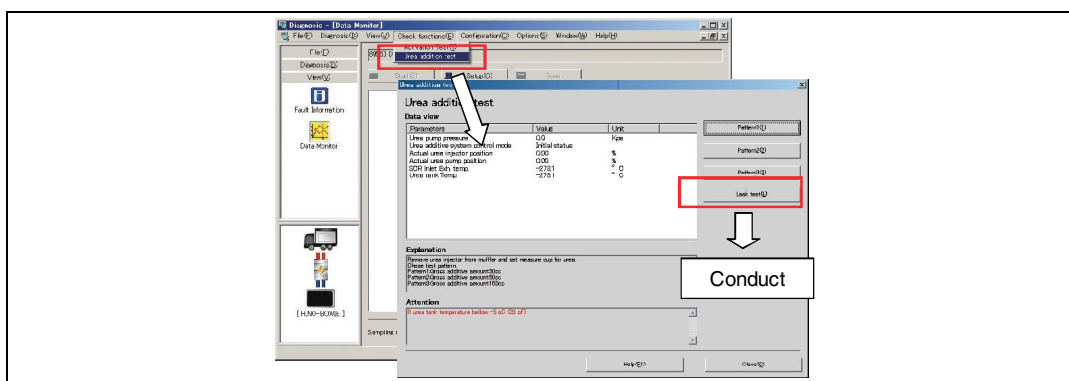
YES

Exchange the DEF hose between the DEF tank and DEF pump.

NO

6 Conduct DEF pump leak test with Hino-DX

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select "DCU".
- 5 Select "Urea Addition Test" in the "Check functions" then conduct "Leak Test".



P20E8-12

Judgment

DEF pressure is stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → YES

DEF pressure is NOT stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → NO

YES

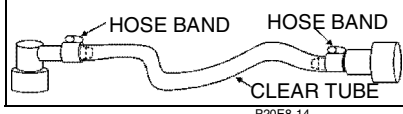
Completed.

NO

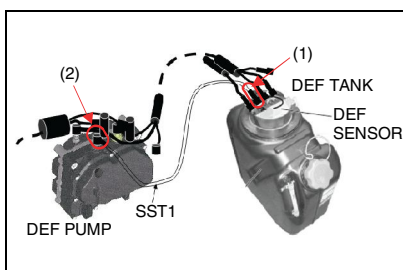
7 Check DEF pressure after installing SST1 between DEF tank and DEF pump (Suction line)

Preparation for making SST1

- Straight Connector :
SAE J2044 8x6- $\text{SAE}3/8$
- Elbow Connector :
SAE J2044 8x6- $\text{SAE}3/8$
- Clear Tube (1m):
8x6 (Outer Dia.: 8mm, Inner Dia.: 6mm)
- Hose Band (2 pcs.)
(After overhauling 87209-E006*, it can be used for Straight Connector and Elbow Connector.)



- 1 Set the starter switch to the "LOCK" position.
- 2 Remove the DEF hose connectors attached to the both ends of the suction line (1) and (2).
- 3 Install the connectors of SST1 to the positions (1) and (2).
- 4 Connect Hino-DX to the vehicle.
- 5 Set the starter switch to the "ON" position.
- 6 Select "DCU".
- 7 Select "Urea Addition Test" in the "Check functions" then conduct "Leak Test".



Judgment

DEF pressure is stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → YES

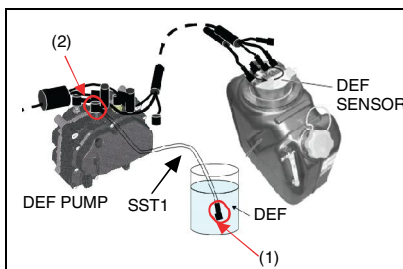
DEF pressure is NOT stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → NO

YES

Replace the DEF hose between DEF tank and DEF pump.

NO

8 Check DEF pressure after the connector installed at the top of the DEF tank for SST1 is kept in a different tank



- 1 Set the starter switch to the "LOCK" position.
- 2 Install the connectors of SST1 to the position (1) and (2)
- 3 Connect Hino-DX to the vehicle.
- 4 Set the starter switch to the "ON" position.
- 5 Select "DCU".
- 6 Select "Urea Addition Test" in the "Check functions" then conduct "Leak Test".

Judgment

DEF pressure is stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → YES

DEF pressure is NOT stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → NO

DN02-116

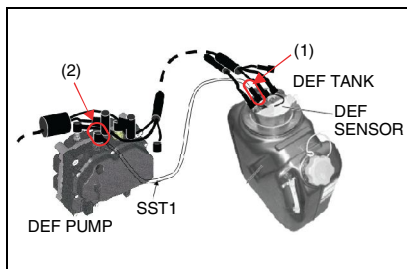
FUEL CONTROL (DEF SCR)

YES

Replace the DEF tank sensor.

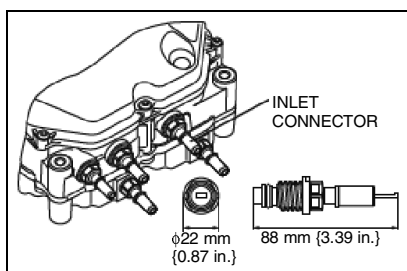
NO

- 9** Check DEF pressure on the DEF pump after replacing the inlet valve (inlet connector) of the DEF pump with the new one



P20E8-15

- 1 Set the starter switch to the "LOCK" position.
- 2 Replace the inlet valve (inlet connector) attached to DEF pump with new one.
- 3 Re-install the connectors of SST1 to the positions (1) and (2).
- 4 Connect Hino-DX to the vehicle.
- 5 Set the starter switch to the "ON" position.
- 6 Select "DCU".
- 7 Select "Urea Addition Test" in the "Check functions" then conduct "Leak Test".



P20E8-17

Judgment

DEF pressure is stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → YES

DEF pressure is NOT stabilized between 8500 - 9500hPa (123.3 - 137.8psi) for 60 seconds → NO

YES

Completed.

NO

Replace the DEF pump.



FUEL CONTROL (DEF SCR)

DN02-117



DTC:P20E9 (Check sheet)

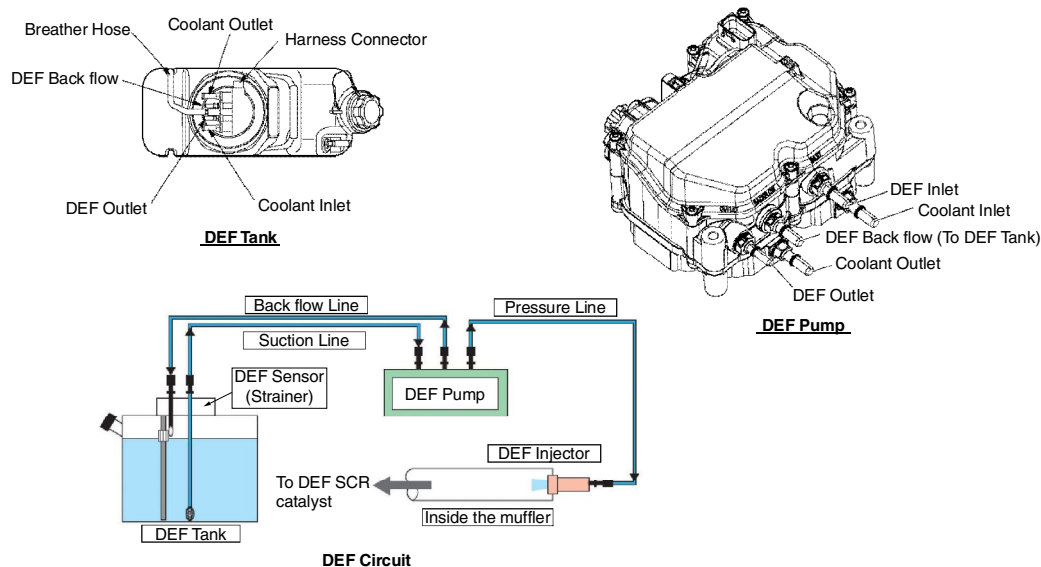
EN1612602F200001

DTC:P20E9

Back flow line and pressure line pressure check

1. Technical description

- DEF line pressure depends on flow rate of DEF pump.
- DEF pump flow rate is determined by the value supplied from the DEF pressure sensor which is integrated with the DEF pump.



2. DTC set condition

(1) Check conditions

- Exhaust gas temperature (SCR inlet) : >150°C (302°F)
- Defrosting DEF is done.

(2) Judgment criteria

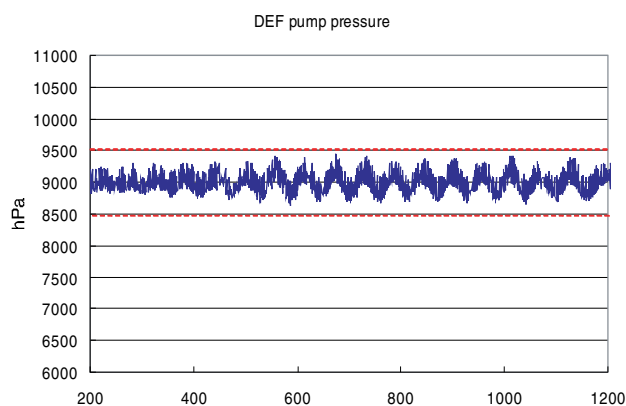
**Immediately after
DEF pressure rise**

- DEF line pressure does not decrease or is stable at more than 10000 hPa for 2 seconds at DEF pump duty cycle 7%
- When the DEF pressure was not stable for 8 seconds from 8500 hPa to 9500 hPa (123.3 psi to 137.8 psi) during a period of 300 seconds.

**While Normal moni-
toring**

- DEF line pressure is more than 12500 hPa (181.3 psi) for 5 seconds.

Normal pressure characteristics

**3. Troubleshooting hints**

(The most likely causes for this code to be set are ;)

- The back flow line of the DEF is clogged.
- The back flow side of the DEF sensor (strainer) is clogged.
- The back flow connector of the DEF pump is clogged.
- DEF pump malfunction

DN02-120

FUEL CONTROL (DEF SCR)

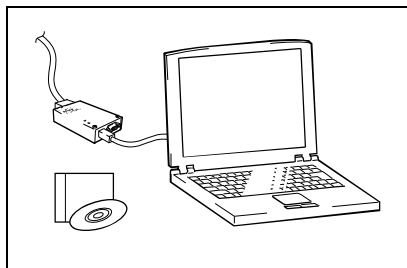
DTC:P20E9	Back flow line and pressure line pressure check	Inspection Procedure

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
1	DTC confirmation	Check for simultaneous detection of the DTC P20E8.	P20E8 is stored → YES P20E8 is not stored → NO		Go to diagnostic procedure of P20E8	Go to Step 2
2	DEF-SCR System	DEF pump leak test execution with Hino-DX.	The DEF pressure is stable for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → YES The DEF pressure is NOT stable for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → NO		Completed	Go to Step 3
3	DEF hose between DEF Tank and DEF Pump	DEF pressure check after installing SST2 between DEF tank and DEF pump (back flow line).	The DEF pressure is stable for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → YES The DEF pressure is not stable for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → NO		Replace the DEF hose between DEF tank and DEF pump	Go to Step 4
4	DEF Sensor	DEF Pressure check when the connector at the DEF tank side of the SST2 is switched to a different container.	The DEF pressure is stable for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → YES The DEF pressure is not stable for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → NO		Replace the DEF sensor	Go to Step 5
5	DEF Pump	DEF pressure check when the back flow valve of the DEF pump has been replaced by a new one.	The DEF pressure is stable for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → YES The DEF pressure is not stable for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → NO		Completed	Replace the DEF pump

DTC:P20E9

EN1612602F200002

DTC	P20E9	Back flow line and pressure line pressure check

1 Check for simultaneous detection of the DTC P20E8

saph161060200038

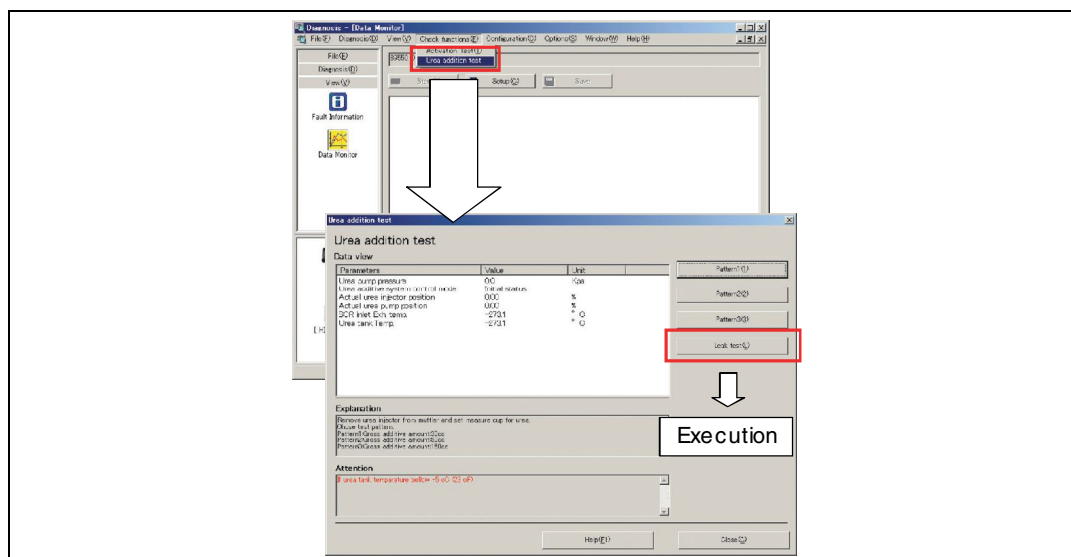
- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select the DCU and confirm the DTC output.

Judgment	Simultaneous detection of P20E8 → YES
	No simultaneous detection of P20E8 → NO

YES

Go to diagnostic procedure of P20E8.

NO

2 DEF pump leak test execution with DX

P20E9-2

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.

DN02-122

FUEL CONTROL (DEF SCR)

4 Select the "DCU".

5 Use the "Urea addition test" of the "Check functions" to execute a leak test.

Judgment	The DEF pressure stabilizes for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → YES
	The DEF pressure does not stabilize for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → NO

YES

Completed

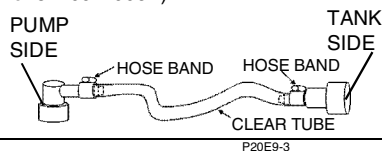
NO

3 Check DEF pressure after installing SST2 between DEF tank and DEF pump (back flow line)

Items to be prepared for SST2 creation

- Straight Connector* : SAE J2044 8x6-5/16"
- Elbow Connector* : SAE J2044 8x6-3/8"
- Clear Tube (1m): 8x6 (Outer Dia.: 8mm, Inner Dia.: 6mm)
- Hose band (2 pcs.)

(*Straight Connector and Elbow Connector are reused from disassembly of 87209-E006*.)



P20E9-3

1 Set the starter switch to the "LOCK" position.

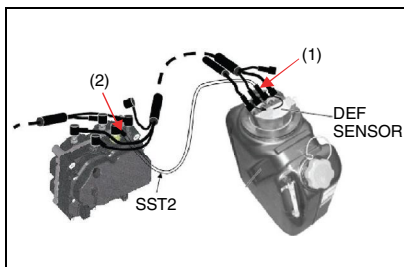
2 Disconnect the DEF hose connectors at the positions (1) and (2) of the DEF tank ↔ DEF pump back flow line.

3 Set the SST2 connectors to the positions (1) and (2).

4 Connect Hino-DX to the vehicle and select the "DCU".

5 Set the starter switch to the "ON" position.

6 Execute the leak test of the "Urea addition test".



P20E8-15

Judgment

The DEF pressure stabilizes for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → YES

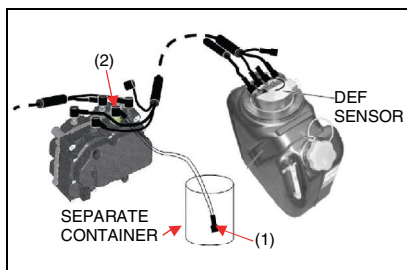
The DEF pressure does not stabilize for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → NO

YES

Replace the DEF hose between DEF tank and DEF pump.

NO

4 DEF Pressure check when the connector at the DEF tank side of the SST2 is switched to a different container



- 1 Set the starter switch to the "LOCK" position.
- 2 Prepare a different container.
- 3 Set the SST2 connectors to the positions (1) and (2).
- 4 Set the starter switch to the "ON" position.
- 5 Connect Hino-DX to the vehicle and select the "DCU".
- 6 Execute the leak test of the "Urea addition test".

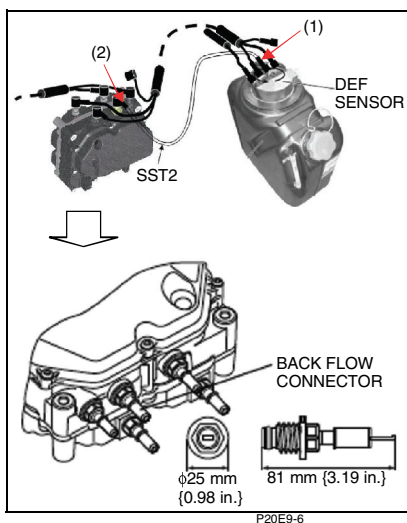
Judgment	The DEF pressure stabilizes for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → YES
	The DEF pressure does not stabilize for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → NO

YES

Replace the DEF sensor.

NO

5 DEF pressure check when the back flow valve (back flow connector) of the DEF pump has been replaced by a new one



- 1 Set the starter switch to the "LOCK" position.
- 2 Replace the back flow valve (back flow connector) of the DEF pump by a new one.
- 3 Set the SST2 connectors to the positions (1) and (2).
- 4 Set the starter switch to the "ON" position.
- 5 Connect Hino-DX to the vehicle and select the "DCU".
- 6 Execute the leak test of the "Urea addition test".

Judgment	The DEF pressure stabilizes for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → YES
	The DEF pressure does not stabilize for 60 seconds within 8500 hPa - 9500 hPa (123.3 psi - 137.8 psi) → NO

YES

Completed.

NO

Replace the DEF pump.

DN02-124

FUEL CONTROL (DEF SCR)

DTC:P2202 (Check sheet)

EN1612602F200061

DTC:P2202

NOx sensor (SCR upstream) and Heater - Circuit

1. Technical description

- The NOx sensors are controlled by the NOx sensor controller.
- The NOx sensor controller is connected to the DCU via the harness for reception and transmission of information.

2. DTC set condition**(1) Check conditions**

- The key is ON.

(2) Judgment criteria

- Open wire between the NOx sensor controller and the sensor is detected or Short circuit between the wires of the sensor is detected in NOx sensor (SCR upstream) for more than 10sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

NOx sensor (SCR upstream):

- Disconnection or short-circuit in sensor harness
- Malfunction of circuit in the sensor
- Abnormal NOx sensor controller

FUEL CONTROL (DEF SCR)

DN02-125

DTC:P2202		NOx sensor (SCR upstream) and Heater - Circuit		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Check signal and voltage of the harness to the NOx sensor (SCR upstream). Coupler check	Within criteria Contiguous		Repair
2	NOx sensor (SCR upstream)	NOx sensor (SCR upstream) replace	No malfunction		

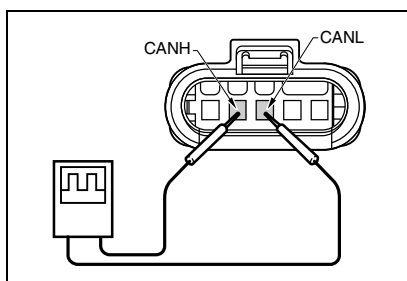
DN02-126

FUEL CONTROL (DEF SCR)

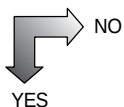
DTC:P2200/P2202

EN1612602F200062

DTC	P2200	NOx sensor (SCR upstream) Circuit
DTC	P2202	NOx sensor (SCR upstream) and Heater - Circuit

**1. CHECK THE VOLTAGE BETWEEN TERMINALS.**

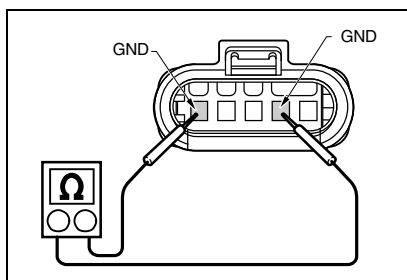
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the NOx sensor 1 connector.
- (3) Set the starter switch to "ON" position.
- (4) Measure voltage between the terminals CANH and CANL of the NOx sensor 1 connector on the harness side.

Standard value: Pulse waveform of 0↔5 V

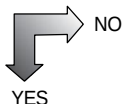
NO

Faulty harness

YES

**2. CHECK THE CONTINUITY BETWEEN TERMINALS.**

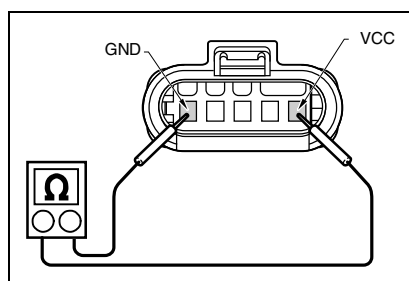
- (1) Measure resistance between the terminals GND and GND of the NOx sensor 1 connector on the harness side.

Standard value: Continuity

NO

Faulty harness

YES



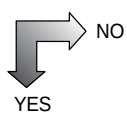
3. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Set the starter switch to "ON" position.
- (2) Measure voltage between the terminals VCC and GND of the NOx sensor 1 connector on the harness side.

Standard value: 9-16 V

HINT

Finally, delete the DTC and check that the malfunction code will not recur.



Faulty harness

Faulty NOx sensor 1

DTC:P2201 (Check sheet)

EN1612602F200063

DTC:P2201**NOx sensor (SCR upstream) - Performance****1. Technical description**

- SCR upstream NOx sensor checks for validity by comparing the sensor values with the model values calculated by ECU.
- The NOx model values are calculated based on engine operation conditions.

2. DTC set condition**(1) Check conditions**

NOx sensor is activated
The engine is ON.
DPR Mode=0
ECT (from ECM) > 60degC
Barometric pressure >= 81kPa
 $\Delta | \text{Calculated NOX (SCR upstr., from ECM)} / \text{Calculated NOX (SCR upstr., from ECM)} | \leq 0.5$

(2) Judgment criteria

Compare actual NOx (from NOx sensor (SCR upstr.))
with calculated NOx (SCR upstr., from ECM)
Difference ratio

$$= \frac{\text{Actual NOX (from NOx sensor (SCR upstr.))} - \text{Calculated NOX (SCR upstr., from ECM)}}{\text{Calculated NOX (SCR upstr., from ECM)}}$$

Average difference ratio: < -0.6 or > 3

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

NOx sensor (SCR upstream):

- Disconnection or short-circuit in sensor harness
- Sensor malfunction

Malfunction in sensor used for model value calculation:

- A/F, boost pressure,
intake manifold temperature,
coolant temperature

DTC:P2201	NOx sensor (SCR upstream) - Performance	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	-	Perform initial inspection.	-		-
2	Mass air flow sensor	Using Hino-DX, compare the NMR with a new sensor. * Refer to P0101.	Difference between old and new sensor less than 10%		MAF Replace
3	Boost pressure sensor	Connector check Resistance check * Refer to P0106.	Fully seated Correct resistance		Replace sensor
4	Intake manifold temperature sensor	Connector check Resistance check * Refer to P0096.	Fully seated Correct resistance		Replace sensor
5	Coolant temperature sensor	Connector check Resistance check * Refer to P0116.	Fully seated Correct resistance		Replace sensor
6	NOx sensor (upstream)	Replace the upstream NOx sensor.			

To confirm that the sensor has returned to normal, it is necessary to drive for a while and so return the vehicle to the owner.

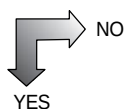
DN02-130

FUEL CONTROL (DEF SCR)

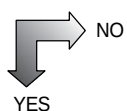
DTC:P2201

EN1612602F200064

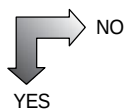
DTC	P2201	NOx sensor (SCR upstream) - Performance

1. CHECK VALIDITY OF THE NOx SENSOR 1.

Replace the NOx sensor

2. CHECK THE AIR FILTER FOR DIRT AND CLOGGING.

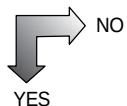
Replace the air filter

3. CHECK THE AIR HOSE FOR BENDING AND LEAKAGE.

Repair or replacement

4. CHECK THE AIR FLOW SENSOR.

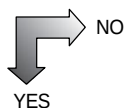
- (1) Check that the air flow sensor is normally installed.
- (2) Check the air flow sensor for dirt and foreign matters.
- (3) Check the air intake systems such as the air cleaner for clogging and leakage.



Improper installation of the sensor.

5. CHECK INSTALLATION OF THE CONNECTOR.

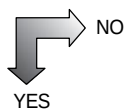
- (1) Check that the air flow sensor connector is properly installed.



Improper connection of connector

6. CHECK WHETHER THE SENSOR IS IN NORMAL CONDITION.

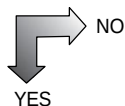
- (1) Troubleshoot the P06D3 and P06D4 and check whether the air flow sensor is in normal condition.



Fault in air flow sensor

7. CHECK WHETHER OTHER ARE IN NORMAL CONDITION.

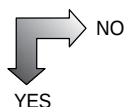
- (1) If the GND terminal is shared in use, disconnect all sensor connectors that use the GND terminal and check whether condition is normal.



Fault in engine ECU

8. CHECK THE BOOST PRESSURE SENSOR.

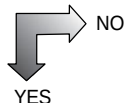
- (1) Check that the boost pressure sensor is normally installed.
(2) Check the hose between the boost pressure sensor and intake manifold for detachment and clogging.
(3) Check the air intake systems such as the intake manifold for clogging and leakage.



Improper installation of the sensor.

9. CHECK INSTALLATION OF THE CONNECTOR.

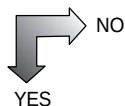
- (1) Check that the boost pressure sensor connector is properly installed.



Improper connection of connector

10. CHECK WHETHER THE SENSOR IS IN NORMAL CONDITION.

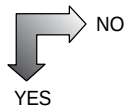
- (1) Troubleshoot the P0108 and P0237 and check whether the boost pressure sensor is in normal condition.



Fault in boost pressure sensor

11. CHECK WHETHER OTHER ARE IN NORMAL CONDITION.

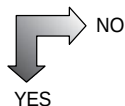
- (1) If the GND terminal is shared in use, disconnect all sensor connectors that use the GND terminal and check whether condition is normal.



Fault in engine ECU

12. CHECK THE INTAKE MANIFOLD TEMPERATURE SENSOR.

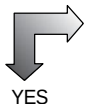
- (1) Check that the intake manifold temperature sensor is normally installed.
(2) Check the intake manifold temperature sensor measurement portion for dirt and foreign matters.
(3) Check the air intake systems such as the intake manifold for clogging and leakage.



Improper installation of the sensor.

13. CHECK INSTALLATION OF THE CONNECTOR.

- (1) Check that the intake air temperature sensor (intake manifold) connector is properly installed.



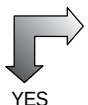
NO

YES

Improper connection of connector

14. CHECK WHETHER THE SENSOR IS IN NORMAL CONDITION.

- (1) Troubleshoot the P0097 and P0098 and check whether the intake air temperature sensor (intake manifold) is in normal condition.



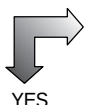
NO

YES

Fault in intake air temperature sensor (intake manifold)

15. CHECK WHETHER OTHER ARE IN NORMAL CONDITION.

- (1) If the GND terminal is shared in use, disconnect all sensor connectors that use the GND terminal and check whether condition is normal.



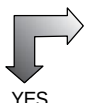
NO

YES

Fault in engine ECU

16. CHECK THE ENGINE COOLANT TEMPERATURE SENSOR.

- (1) Check that the engine coolant temperature sensor is normally installed.
(2) Check the engine coolant temperature sensor measurement portion for dirt and foreign matters.



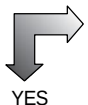
NO

YES

Improper installation of the sensor.

17. CHECK INSTALLATION OF THE CONNECTOR.

- (1) Check that the engine coolant temperature sensor connector is properly installed.



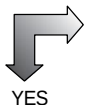
NO

YES

Improper connection of connector

18. CHECK WHETHER THE SENSOR IS IN NORMAL CONDITION.

- (1) Troubleshoot the P0117 and P0118 and check whether the engine coolant temperature sensor is in normal condition.



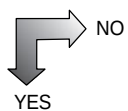
NO

YES

Fault in engine coolant temperature sensor

19. CHECK WHETHER OTHER ARE IN NORMAL CONDITION.

- (1) If the GND terminal is shared in use, disconnect all sensor connectors (intake air temperature sensor (air flow sensor built-in)) that use the GND terminal and check whether condition is normal.



Fault in engine ECU

- Fault in other sensors
- Wrong wiring

DN02-134

FUEL CONTROL (DEF SCR)

DTCP:2209 (Check sheet)

EN1612602F200065

DTC:P2209

NOx sensor (SCR upstream) Heater Sense Circuit Range/Performance

1. Technical description

- The NOx sensors are controlled by the NOx sensor controller.
- The NOx sensor controller is connected to the DCU via the harness for reception and transmission of information.

2. DTC set condition**(1) Check conditions**

- The key is ON.
- SCR catalyst downstream temperature (from EGT (SCR inlet)) $\geq 100^{\circ}\text{C}$ {212°F}
Engine coolant temperature $\geq 65^{\circ}\text{C}$ {149°F}

(2) Judgment criteria

- A valid NOx reading cannot be taken by the NOx sensor when 180 seconds elapses after start of NOx sensor heater activation.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

NOx sensor:

- Malfunction of NOx sensor
- Disconnection or short-circuit in sensor harness
- Abnormal NOx controller

FUEL CONTROL (DEF SCR)

DN02-135

DTC:P2209	NOx sensor (SCR upstream) Heater Sense Circuit Range/Performance	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Check signal and voltage of the harness to the NOx sensor (SCR upstream). Coupler check * Refer to P2202	Within criteria Contiguous		Repair
2	NOx sensor (SCR upstream)	NOx sensor (SCR upstream) replace *Also check the following two temperature sensors. (There may be secondary damage due to abnormality in temperature sensor.)	No malfunction		
3	Exhaust gas temperature sensor (SCR inlet)	Immerse the sensor in hot water and check resistance. Check the value during the forced regeneration on Hino-DX. Coupler check * Refer to P2483	Within criteria Contiguous		Replace
4	Engine coolant temperature sensor	Immerse the sensor in hot water and check resistance. Coupler check * Refer to P0116	Within criteria Contiguous		Replace

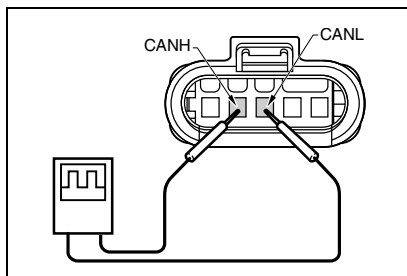
DN02-136

FUEL CONTROL (DEF SCR)

DTCP:2209

EN1612602F200066

DTC	P2209	NOx sensor (SCR upstream) Heater Sense Circuit Range/Performance

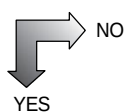


SAPH161260200063

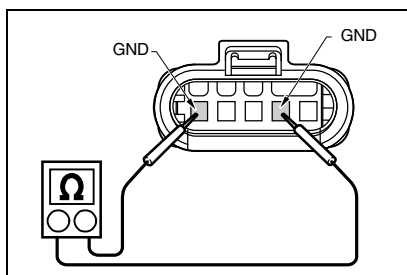
1. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the NOx sensor 1 connector.
- (3) Set the starter switch to "ON" position.
- (4) Measure voltage between the terminals CANH and CANL of the NOx sensor 1 connector on the harness side.

Standard value: Pulse waveform of 0↔5 V



Faulty harness

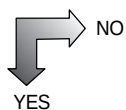


SAPH161260200064

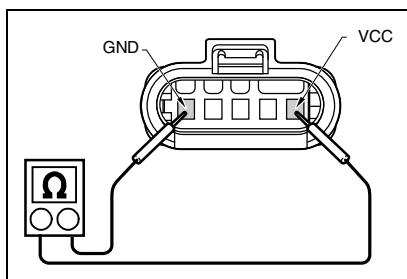
2. CHECK THE CONTINUITY BETWEEN TERMINALS.

- (1) Measure resistance between the terminals GND and GND of the NOx sensor 1 connector on the harness side.

Standard value: Continuity



Faulty harness



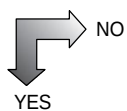
3. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Set the starter switch to "ON" position.
- (2) Measure voltage between the terminals VCC and GND of the NOx sensor 1 connector on the harness side.

Standard value: 9-16 V

HINT

Finally, delete the DTC and check that the malfunction code will not recur.

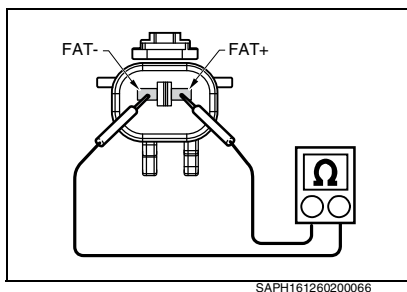


NO

Faulty harness

YES

Faulty NOx sensor 1



4. CHECK THE RESISTANCE BETWEEN TERMINALS.

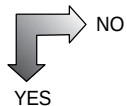
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor connector.
- (3) Measure resistance between the terminals FAT+ and FAT- of the exhaust gas temperature sensor connector.

Standard value:

186 Ω (-20°C {-4°F}): Outside air temperature

220 Ω (20°C {68°F}): Outside air temperature

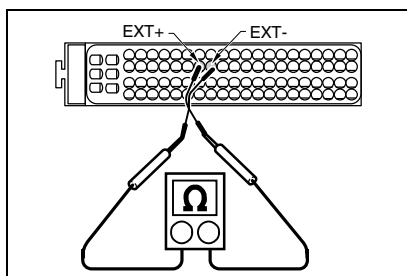
277 Ω (100°C {212°F}): Outside air temperature



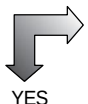
NO

Faulty exhaust gas temperature sensor

YES

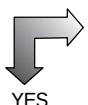
**5. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Connect the exhaust gas temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals EXT+ and EXT- of the DCU 86P connector on the harness side.

Standard value:**186 Ω (-20°C {-4°F}): Outside air temperature****220 Ω (20°C {68°F}): Outside air temperature****277 Ω (100°C {212°F}): Outside air temperature**

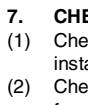
NO

Faulty harness



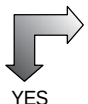
NO

Improper connection of connector



NO

Improper installation of the sensor.



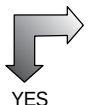
NO

Improper installation of the sensor.



NO

Improper connection of connector



NO

Fault in engine coolant temperature sensor

Clear and recheck the DTC.



FUEL CONTROL (DEF SCR)

DN02-139



DN02-140

FUEL CONTROL (DEF SCR)

DTC:P2215 (Check sheet)

EN1612602F200067

DTC:P2215

NOx sensor (SCR downstream) and Heater - Circuit

1. Technical description

- The NOx sensors are controlled by the NOx sensor controller.
- The NOx sensor controller is connected to the DCU via the harness for reception and transmission of information.

2. DTC set condition**(1) Check conditions**

- The key is ON.

(2) Judgment criteria

- Open wire between the NOx sensor controller and the sensor is detected or Short circuit between the wires of the sensor is detected in NOx sensor (SCR downstream) for more than 10sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

NOx sensor (SCR downstream):

- Disconnection or short-circuit in sensor harness
- Malfunction of circuit in the sensor
- Abnormal NOx sensor controller

FUEL CONTROL (DEF SCR)

DN02-141

DTC:P2215	NOx sensor (SCR downstream) and Heater - Circuit	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Check signal and voltage of the harness to the NOx sensor (SCR downstream). Coupler check	Within criteria Contiguous		Repair
2	NOx sensor (SCR downstream)	NOx sensor (SCR downstream) replace	No malfunction		

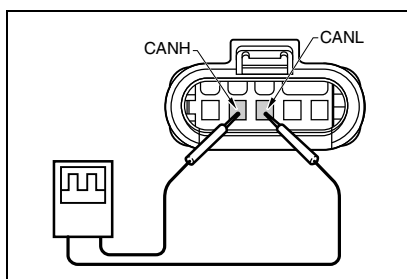
DN02-142

FUEL CONTROL (DEF SCR)

DTC:P2213/P2215

EN1612602F200068

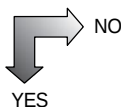
DTC	P2213	NOx sensor (SCR downstream) Circuit
DTC	P2215	NOx sensor (SCR downstream) and Heater - Circuit



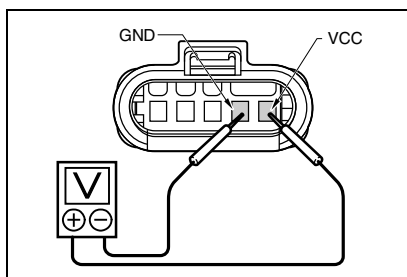
SAPH161260200068

1. CHECK THE VOLTAGE TANCE BETWEEN TERMINALS.

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the NOx sensor 2 connector.
- (3) Set the starter switch to "ON" position.
- (4) Measure voltage between the terminals CANH and CANL of the NOx sensor 2 connector on the harness side.

Standard value: Pulse waveform of 0↔5 V

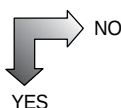
Faulty harness



SAPH161260200069

2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals VCC and GND of the NOx sensor 2 connector on the harness side.

Standard value: 9-16 V**HINT****Finally, delete the DTC and check that the malfunction code will not recur.**

Faulty harness

Faulty NOx sensor 2



FUEL CONTROL (DEF SCR)

DN02-143



DN02-144

FUEL CONTROL (DEF SCR)

DTC:P2214 (Check sheet)

EN1612602F200069

DTC:P2214

Nox sensor (SCR downstream) - Performance

1. Technical description

- With DEF dosing stopped and without NOx purification through the SCR catalyst, compare a reading taken by the downstream NOx sensor with a reading taken by the upstream NOx sensor to check likelihood of the sensors.

2. DTC set condition**(1) Check conditions**

- After DPR regeneration or at SCR catalyst temperature of 450°C (842°F) or higher
- Total 2,200 mg or higher NOx emission from the engine after stop of DEF injection
- Sum of upstream and downstream NOx sensor readings (100seconds)

(2) Judgment criteria

- $0.5 < \text{sum of downstream NOx sensor readings} / \text{sum of upstream NOx sensor readings} < 1.5$

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

- Downstream NOx sensor: Abnormal NOx measurement characteristics
- Upstream NOx sensor: Abnormal NOx measurement characteristics

DEF dose: Excessively high dose of aqueous DEF solution

FUEL CONTROL (DEF SCR)

DN02-145

DTC:P2214		Nox sensor (SCR downstream) - Performance		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	-	Perform initial inspection.	-		-
2	Aqueous DEF solution	Measure an aqueous DEF solution concentration.	32.5±2.5%		Replace
3	Exhaust system	Check for gas leakage.	No leakage is allowed.		Reassemble
4	Mass air flow sensor	Using Hino-DX, compare the NMR with a new sensor. * Refer to P0101.	Difference between old and new sensor less than 10%		MAF Replace
5	SCR inlet temperature sensor	Immerse the sensor in hot water and check resistance. Check the value during the DPR forced regeneration on Hino-DX. Coupler check * Refer to P2483.	Within criteria Contiguous		Replace
6	DOC aft temperature sensor	Immerse the sensor in hot water and check resistance. Check the value during the DPR forced regeneration on Hino-DX. Coupler check * Refer to P246F.	Within criteria Contiguous		Replace
7	Outside temperature sensor	Check resistance. Coupler check * Refer to P0071.	Within criteria Contiguous		Replace
8	DEF injector	Remove the aqueous DEF solution injector from the muffler and perform a DPR forced regeneration. Check whether aqueous DEF solution jets out from the injector. * After this process, delete the malfunction from Hino-DX and connect the injector to the muffler to perform a DPR forced regeneration again.	Aqueous DEF solution jets out.		NG: DEF injector Replace * OK results prove that clogging caused by crystallized DEF is no longer present.
9	NOx sensor (upstream and downstream)	Replace the upstream and downstream NOx sensors.			
Driving is required to some extent to check that the normal state is restored. Once return it to the driver and see how it works.					

DN02-146

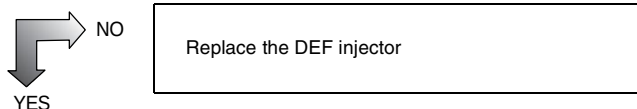
FUEL CONTROL (DEF SCR)

DTC:P2214

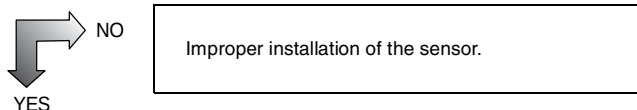
EN1612602F200070

DTC	P2214	NOx sensor (SCR downstream) - Performance

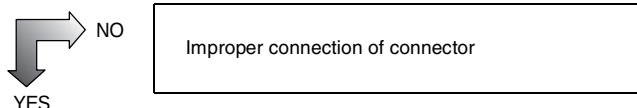
1. **CHECK VALIDITY OF THE NOx SENSOR.**
2. **CHECK THE DEF SOLUTION FOR ABNORMAL CONCENTRATION.**
3. **CHECK THE EXHAUST SYSTEM FOR GAS LEAKAGE.**
4. **CHECK A DEF INJECTION RATE.**



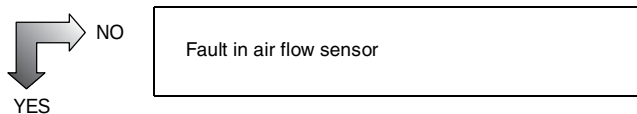
5. **CHECK THE AIR FLOW SENSOR.**
 - (1) Check that the air flow sensor is normally installed.
 - (2) Check the air flow sensor for dirt and foreign matters.
 - (3) Check the air intake systems such as the air cleaner for clogging and leakage.



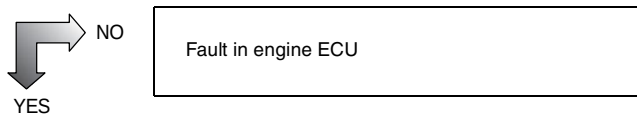
6. **CHECK INSTALLATION OF THE CONNECTOR.**
 - (1) Check that the air flow sensor connector is properly installed.



7. **CHECK WHETHER THE SENSOR IS IN NORMAL CONDITION.**
 - (1) Troubleshoot the P06D3 and P06D4 and check whether the air flow sensor is in normal condition.

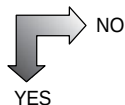


8. **CHECK WHETHER OTHER ARE IN NORMAL CONDITION.**
 - (1) If the GND terminal is shared in use, disconnect all sensor connectors that use the GND terminal and check whether condition is normal.



9. CHECK THE EXHAUST GAS TEMPERATURE SENSOR.

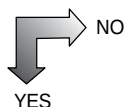
- (1) Check that the exhaust gas temperature sensor is normally installed.
- (2) Check the exhaust gas temperature sensor measurement portion for dirt and foreign matters.
- (3) Check the DPR and muffler for clogging and leakage.



Improper installation of the sensor.

10. CHECK INSTALLATION OF THE CONNECTOR.

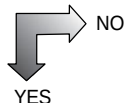
- (1) Check that the exhaust gas temperature sensor (DOC outlet) connector is properly installed.



Improper connection of connector

11. CHECK WHETHER THE SENSOR IS IN NORMAL CONDITION.

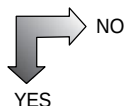
- (1) Troubleshoot the P2470 and P2471 and check whether the exhaust gas temperature sensor (DOC outlet) is in normal condition.



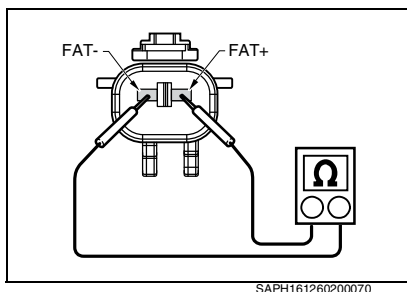
Fault in exhaust gas temperature sensor (DOC outlet)

12. CHECK WHETHER OTHER ARE IN NORMAL CONDITION.

- (1) If the GND terminal is shared in use, disconnect all sensor connectors that use the GND terminal and check whether condition is normal.



Fault in engine ECU

**13. CHECK THE RESISTANCE BETWEEN TERMINALS.**

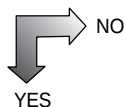
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor connector.
- (3) Measure resistance between the terminals FAT+ and FAT- of the exhaust gas temperature sensor connector.

Standard value:

186 Ω (-20°C {-4°F}): Outside air temperature

220 Ω (20°C {68°F}): Outside air temperature

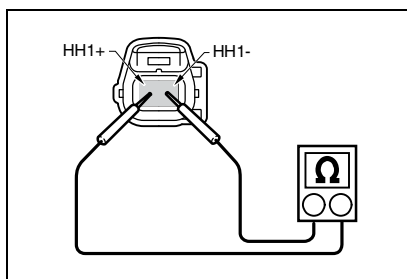
277 Ω (100°C {212°F}): Outside air temperature



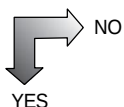
Faulty exhaust gas temperature sensor

DN02-148

FUEL CONTROL (DEF SCR)

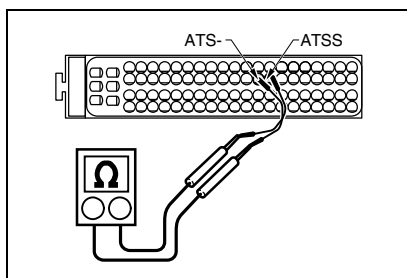
**14. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the ambient air temperature sensor connector.
- (3) Measure resistance between the terminals HH1+ and HH1- of the ambient air temperature sensor connector.

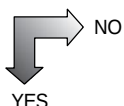
Standard value:**21.8 k Ω (-25°C {-13°F})****1.7 k Ω (25°C {77°F})****0.2 k Ω (80°C {176°F})**

NO

Faulty ambient air temperature sensor

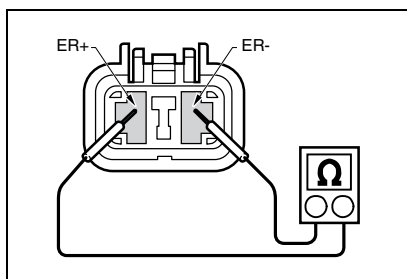
**15. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Connect the ambient air temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals ATSS and ATS- of the DCU 86P connector on the harness side.

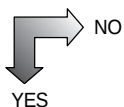
Standard value:**23.8 k Ω (-25°C {-13°F})****3.7 k Ω (25°C {77°F})****2.2 k Ω (80°C {176°F})**

NO

Faulty harness

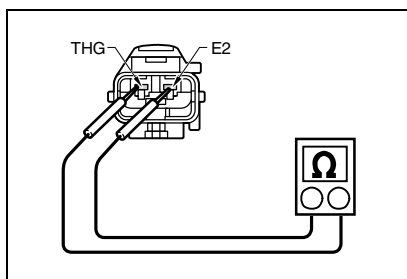
**16. CHECK THE RESISTANCE BETWEEN TERMINALS**

- (1) Measure resistance between the terminals ER+ and ER- of the external connector.

Standard value: 2 k Ω 

NO

Faulty external connector



17. MEASURING RESISTANCE BETWEEN SENSOR TERMINALS

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the EGR gas temperature sensor connector.
- (3) Measure resistance between the terminals THG and E2 of the EGR gas temperature sensor connector.

HINT

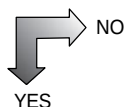
If it is difficult to check only the sensor, proceed to Step 15.

Standard value:

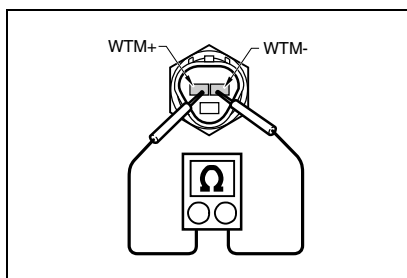
2.02 k Ω (50°C {122°F})

508.1 Ω (100°C {212°F})

160.4 Ω (150°C {302°F})



Faulty EGR gas temperature sensor



18. MEASURING RESISTANCE BETWEEN SENSOR TERMINALS

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the coolant temperature sensor connector.
- (3) Measure resistance between the terminals WTM+ and WTM- of the engine coolant temperature sensor.

HINT

If it is difficult to check only the sensor, proceed to Step 15.

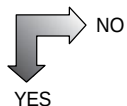
Standard value:

2.45 k Ω (-20°C {-4°F})

1.15 k Ω (20°C {68°F})

584 Ω (60°C {140°F})

318 Ω (80°C {176°F})

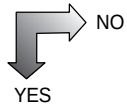


Fault in engine coolant temperature sensor

Check the air flow sensor

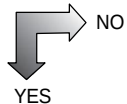
19. CHECK THE DPF.

- (1) Remove the DPF.
- (2) Check for soot leakage.

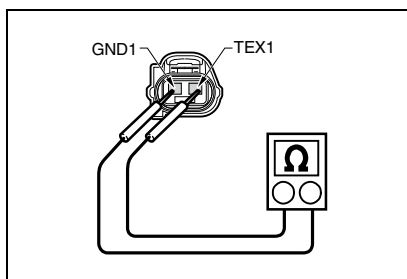


Replace the DPF.

- (3) Blow air against the DPF.
- (4) Perform a forced regeneration and check that regeneration is completed.



Inspect the burner system.



SAPH161260200076

20. MEASURE RESISTANCE BETWEEN SENSOR TERMINALS.

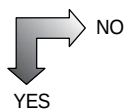
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor (DOC outlet) connector.
- (3) Measure resistance between the terminals TEX1 and GND1 of the exhaust gas temperature sensor (DOC outlet).

Standard:

9.75 kΩ (50° {122°F})

3.77 kΩ (100° {212°F})

1.80 kΩ (150° {302°F})

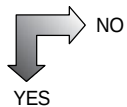


NO

Faulty exhaust gas temperature sensor (DOC outlet)

21. INSPECT THE ENGINE.

- (1) Check the engine body for oil leakage or black smoke.

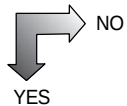


NO

Inspect the engine body.

22. INSPECT THE FUEL.

- (1) Check that the fuel is not abnormally black.



NO

Replace fuel.

Clean or replace the DOC.

23. SCR CATALIST PERFORMANCE CERTIFICATION TEST.



FUEL CONTROL (DEF SCR)

DN02-151



DN02-152

FUEL CONTROL (DEF SCR)

DTC:P2222 (Check sheet)

EN1612602F200071

DTC:P2222

NOx sensor (SCR downstream) Heater Sense Circuit Range/Performance

1. Technical description

- The NOx sensors are controlled by the NOx sensor controller.
- The NOx sensor controller is connected to the DCU via the harness for reception and transmission of information.

2. DTC set condition**(1) Check conditions**

- The key is ON.
- SCR catalyst downstream temperature (from EGT (SCR inlet)) $\geq 100^{\circ}\text{C}$ {212°F}
Engine coolant temperature $\geq 65^{\circ}\text{C}$ {149°F}

(2) Judgment criteria

- A valid NOx reading cannot be taken by the NOx sensor when 180 seconds elapses after start of NOx sensor heater activation.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

NOx sensor:

- Malfunction of NOx sensor
- Disconnection or short-circuit in sensor harness
- Abnormal NOx controller

FUEL CONTROL (DEF SCR)

DN02-153

DTC:P2222	NOx sensor (SCR downstream) Heater Sense Circuit Range/Performance	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Check signal and voltage of the harness to the NOx sensor (SCR downstream). Coupler check * Refer to P2215.	Within criteria Contiguous		Repair
2	NOx sensor (SCR downstream)	NOx sensor (SCR downstream) replace *Also check the following two temperature sensors. (There may be secondary damage due to abnormality in temperature sensor.)	No malfunction		
3	Exhaust gas temperature sensor (SCR inlet)	Immerse the sensor in hot water and check resistance. Check the value during the forced regeneration on Hino-DX. Coupler check * Refer to P2483.	Within criteria Contiguous		Replace
4	Engine coolant temperature sensor	Immerse the sensor in hot water and check resistance. Coupler check. * Refer to P0116.	Within criteria Contiguous		Replace

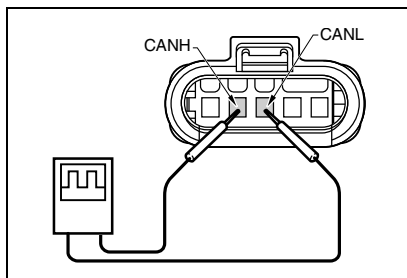
DN02-154

FUEL CONTROL (DEF SCR)

DTC:P2222

EN1612602F200072

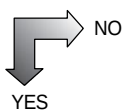
DTC	P2222	NOx sensor (SCR downstream) Heater Sense Circuit Range/Performance



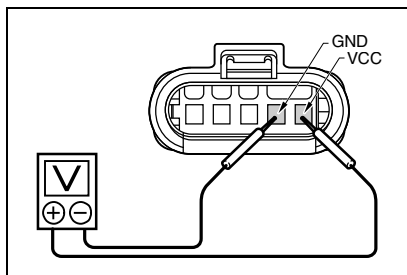
SAPH161260200077

1. CHECK THE VOLTAGE TANCE BETWEEN TERMINALS.

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the NOx sensor 2 connector.
- (3) Set the starter switch to "ON" position.
- (4) Measure voltage between the terminals CANH and CANL of the NOx sensor 2 connector on the harness side.

Standard value: Pulse waveform of 0↔5 V


Faulty harness



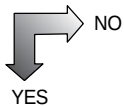
SAPH161260200078

2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals VCC and GND of the NOx sensor 2 connector on the harness side.

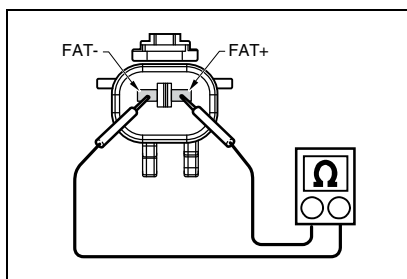
Standard value: 9-16 V

HINT

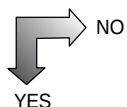
Finally, delete the DTC and check that the malfunction code will not recur.


Faulty harness

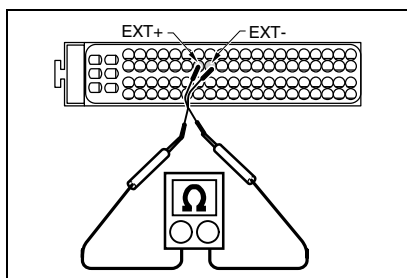
Faulty NOx sensor 2

**3. CHECK THE RESISTANCE BETWEEN TERMINALS.**

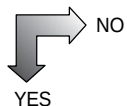
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor connector.
- (3) Measure resistance between the terminals FAT+ and FAT- of the exhaust gas temperature sensor connector.

Standard value:**186 Ω (-20°C {-4°F}): Outside air temperature****220 Ω (20°C {68°F}): Outside air temperature****277 Ω (100°C {212°F}): Outside air temperature**

Faulty exhaust gas temperature sensor

**4. CHECK THE RESISTANCE BETWEEN TERMINALS.**

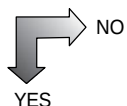
- (1) Connect the exhaust gas temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals EXT+ and EXT- of the DCU 86P connector on the harness side.

Standard value:**186 Ω (-20°C {-4°F}): Outside air temperature****220 Ω (20°C {68°F}): Outside air temperature****277 Ω (100°C {212°F}): Outside air temperature**

Faulty harness

5. CHECK A MALFUNCTION CODE.

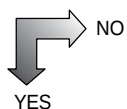
- (1) After turning the starter switch "ON" position, check that no DTC.



Improper connection of connector

6. CHECK THE ENGINE COOLANT TEMPERATURE SENSOR.

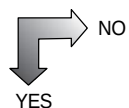
- (1) Check that the engine coolant temperature sensor is normally installed.
- (2) Check the engine coolant temperature sensor measurement portion for dirt and foreign matters.



Improper installation of the sensor.

7. CHECK INSTALLATION OF THE CONNECTOR.

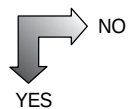
- (1) Check that the engine coolant temperature sensor connector is properly installed.



Improper connection of connector

8. CHECK WHETHER THE SENSOR IS IN NORMAL CONDITION.

- (1) Troubleshoot the P0117 and P0118 and check whether the engine coolant temperature sensor is in normal condition.



Fault in engine coolant temperature sensor

Clear and recheck the DTC



FUEL CONTROL (DEF SCR)

DN02-157



DN02-158

FUEL CONTROL (DEF SCR)

DTC:P2481/P2482 (Check sheet)

EN1612602F200073

DTC:P2481	Exhaust gas temperature sensor (SCR inlet) - out of range (Out of range low)
DTC:P2482	Exhaust gas temperature sensor (SCR inlet) - out of range (Out of range high)

1. Technical description

- SCR temperature sensor monitors the temperature at the SCR upstream.
- SCR temperature sensor detects disconnection and short-circuit based on the circuit voltage and signals in DCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P2481**

- Exhaust gas temperature sensor voltage : Less than 0.7V

DTC :P2482

- Exhaust gas temperature sensor voltage : More than 2.2V

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Exhaust gas temperature sensor:

- Sensor disconnection
- Abnormal resistance of sensor
- Disconnection or short-circuit in sensor harness

Harness: Disconnection or short-circuit in harness between the sensor and DCU

FUEL CONTROL (DEF SCR)

DN02-159

DTC:P2481 DTC:P2482	Exhaust gas temperature sensor (SCR inlet) - out of range (Out of range low) Exhaust gas temperature sensor (SCR inlet) - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Exhaust gas temperature sensor	Disconnect the connector on the exhaust temperature sensor side and measure resistance at ambient temperature.			Sensor Replace
2	Harness	With the exhaust temperature sensor installed, disconnect the connector on the DCU86P side and measure resistance at pin No.33 and 34 on the harness side at ambient temperature.			Harness Repair
3	DCU	Check that no malfunctions occur after the key is turned ON. NG: Replace DCU. (Perform a forced regeneration after replacement.)			DCU Replace

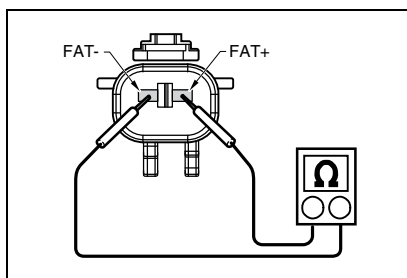
DN02-160

FUEL CONTROL (DEF SCR)

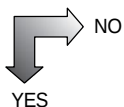
DTC:P2481/P2482

EN1612602F200074

DTC	P2481	Exhaust gas temperature sensor (SCR inlet) - out of range (Out of range low)
DTC	P2482	Exhaust gas temperature sensor (SCR inlet) - out of range (Out of range high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

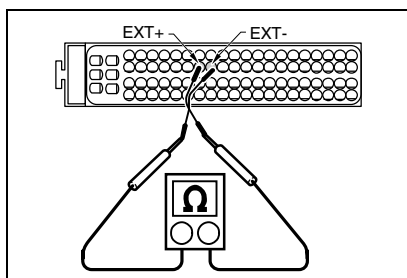
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor connector.
- (3) Measure resistance between the terminals FAT+ and FAT- of the exhaust gas temperature sensor connector.

Standard value:**186 Ω (-20°C {-4°F}): Outside air temperature****220 Ω (20°C {68°F}): Outside air temperature****277 Ω (100°C {212°F}): Outside air temperature**

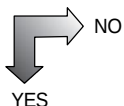
NO

Faulty exhaust gas temperature sensor

YES

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Connect the exhaust gas temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals EXT+ and EXT- of the DCU 86P connector on the harness side.

Standard value:**186 Ω (-20°C {-4°F}): Outside air temperature****220 Ω (20°C {68°F}): Outside air temperature****277 Ω (100°C {212°F}): Outside air temperature**

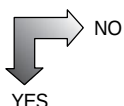
NO

Faulty harness

YES

3. CHECK A MALFUNCTION CODE.

- (1) After turning the starter switch "ON" position, check that no DTC.



NO

Improper connection of connector

YES

Clear and recheck the DTC



FUEL CONTROL (DEF SCR)

DN02-161



DN02-162

FUEL CONTROL (DEF SCR)

DTC:P2483 (Check sheet)

EN1612602F200075

DTC:P2483

Exhaust gas temperature sensor (SCR inlet) - rationality

1. Technical description

- Exhaust gas temperature (EGT) sensor (SCR inlet) rationality is checked by comparison with Ambient air temperature
- EGT sensor (SCR inlet) rationality is checked by temperature model calculated from EGT (DOC outlet)

2. DTC set condition**(1) Check conditions**

- Starter switch ON
- 1. Difference of Ambient air temperature between Engine coolant temperature (from Engine ECU) : $<8^{\circ}\text{C}$ $\{46.4^{\circ}\text{F}\}$
- 2. Calculated EGT (SCR inlet) (from EGT (DOC outlet, from Engine ECU) and Mass air flow (from Engine ECU) and Vehicle speed (from Engine ECU) and Ambient air temperature) is more than 210°C $\{410^{\circ}\text{F}\}$ for more than 10sec

(2) Judgment criteria

1. Difference between EGT (SCR inlet) and Ambient air temperature: $>25^{\circ}\text{C}$ $\{77^{\circ}\text{F}\}$ for 1sec
2. Actual EGT (SCR inlet) is less than 160°C $\{320^{\circ}\text{F}\}$ for 7sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

EGT sensor (SCR inlet):**Ambient air temperature sensor:****EGT sensor (DOC outlet):****Engine coolant temperature sensor:**

- Bad contact of harness connector
- Malfunction of sensor

FUEL CONTROL (DEF SCR)

DN02-163

DTC:P2483	Exhaust gas temperature sensor (SCR inlet) - ratio-nality	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Exhaust gas temperature sensor (SCR inlet)	Immerse the sensor in hot water and check resistance. Check the value during the forced regeneration on Hino-DX. Coupler check	Within criteria Contiguous		Replace
2	Ambient air temperature (AAT) sensor	Check resistance. Coupler check	Within criteria Contiguous		Replace
3	Harnesses (AAT↔DCU)	Sensor resistance check from DCU connector through harness Coupler of DCU connector check	Within criteria Contiguous		Repair
4	External resistor	Resistance, Coupler check	Within criteria Contiguous		Replace
5	Exhaust gas temperature sensor (DOC outlet)	Immerse the sensor in hot water and check resistance. Check the value during the forced regeneration on Hino-DX. Coupler check	Within criteria Contiguous		Replace
6	Engine coolant temperature sensor	Immerse the sensor in hot water and check resistance. Coupler check	Within criteria Contiguous		Replace
7	Air flow sensor	Compare the NMR with a new sensor. Check (refer to P0101)	Difference within 10%		Replace

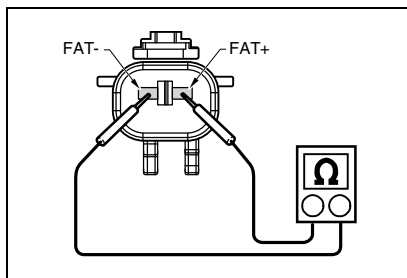
DN02-164

FUEL CONTROL (DEF SCR)

DTC:P2483

EN1612602F200076

DTC	P2483	Exhaust gas temperature sensor (SCR inlet) - rationality



1. CHECK THE RESISTANCE BETWEEN TERMINALS.

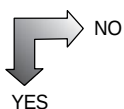
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor connector.
- (3) Measure resistance between the terminals FAT+ and FAT- of the exhaust gas temperature sensor connector.

Standard value:

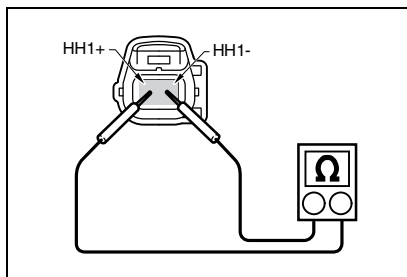
186 Ω (-20°C {-4°F}): Outside air temperature

220 Ω (20°C {68°F}): Outside air temperature

277 Ω (100°C {212°F}): Outside air temperature



Faulty exhaust gas temperature sensor



2. CHECK THE RESISTANCE BETWEEN TERMINALS.

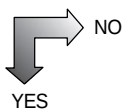
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the ambient air temperature sensor connector.
- (3) Measure resistance between the terminals HH1+ and HH1- of the ambient air temperature sensor connector.

Standard value:

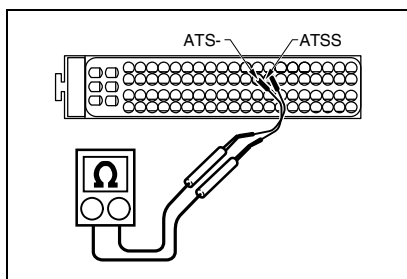
21.8 k Ω (-25°C {-13°F})

1.7 k Ω (25°C {77°F})

0.2 k Ω (80°C {176°F})



Faulty ambient air temperature sensor



SAPH161260200085

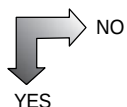
3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Connect the ambient air temperature sensor connector.
- (2) Disconnect the DCU 86P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals ATSS and ATS- of the DCU 86P connector on the harness side.

Standard value:

23.8 k Ω (-25°C {-13°F})

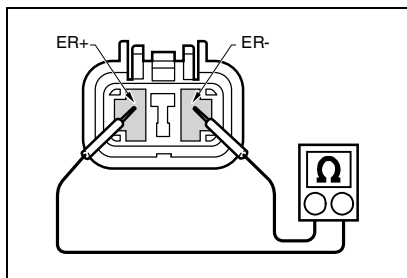
3.7 k Ω (25°C {77°F})

2.2 k Ω (80°C {176°F})


NO

Faulty harness

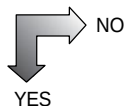
YES



SAPH161260200086

4. CHECK THE RESISTANCE BETWEEN TERMINALS

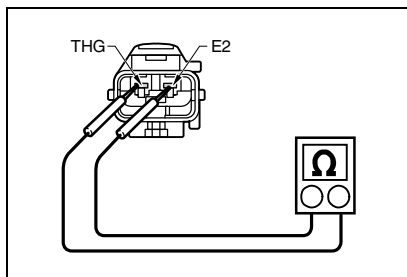
- (1) Measure resistance between the terminals ER+ and ER- of the external connector.

Standard value: 2 k Ω


NO

Faulty external connector

YES



SAPH161260200087

5. MEASURING RESISTANCE BETWEEN SENSOR TERMINALS

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the EGR gas temperature sensor connector.
- (3) Measure resistance between the terminals THG and E2 of the EGR gas temperature sensor connector.

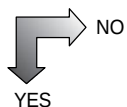
HINT

If it is difficult to check only the sensor, proceed to Step 3.

Standard value:

2.02 k Ω (50°C {122°F})

508.1 Ω (100°C {212°F})

160.4 Ω (150°C {302°F})


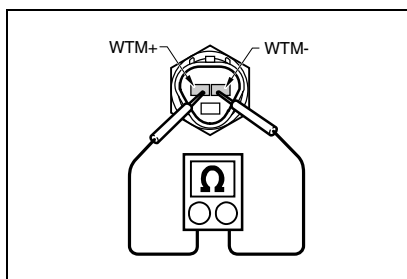
NO

Faulty EGR gas temperature sensor

YES

DN02-166

FUEL CONTROL (DEF SCR)



6. MEASURING RESISTANCE BETWEEN SENSOR TERMINALS

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the coolant temperature sensor connector.
- (3) Measure resistance between the terminals WTM+ and WTM- of the engine coolant temperature sensor.

HINT

If it is difficult to check only the sensor, proceed to Step 3.

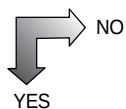
Standard value:

2.45 k Ω (-20°C {-4°F})

1.15 k Ω (20°C {68°F})

584 Ω (60°C {140°F})

318 Ω (80°C {176°F})



Fault in engine coolant temperature sensor

Check the air flow sensor



FUEL CONTROL (DEF SCR)

DN02-167



DN02-168

FUEL CONTROL (DEF SCR)

DTC:P2510

DTC	P2510	DeNOx Power Relay Sense Circuit Range/Performance

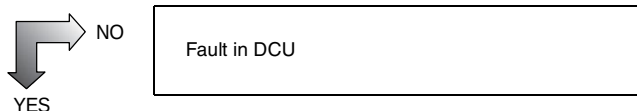
1. **SHIFT THE STARTER SWITCH FROM THE ON TO OFF POSITION AND WAIT UNTIL THE DCU MAIN RELAY IS DISENGAGED.**

HINT

If communication with the DCU through DX fails, the main relay of the DCU will turn off.

2. **CHECK A MALFUNCTION CODE.**

(1) After turning the starter switch "ON" position, check that no DTC.



Clear and recheck the DTC

HINT

This code may be detected when the DCU power is forcibly turned off such as by removing the battery before the main relay of the DCU turns off after the starter switch is turned off and the pump driving ends.



FUEL CONTROL (DEF SCR)

DN02-169



DN02-170

FUEL CONTROL (DEF SCR)

DTC:P2BA8 (Check sheet)

EN1612602F200077

DTC:P2BA8	NOx Exceedence - Interruption of Reagent Dosing Activity

1. Technical description

- A failure has been detected in the aqueous DEF solution injection control.
- Aqueous DEF solution injection control is judged within the DCU based on the vehicle status such as temperature.

2. DTC set condition**(1) Check conditions**

- The engine is ON.

(2) Judgment criteria

- Although the temperature of the upper stream of the SCR is kept at above 230°C for 60 s after the temperature (calculated value) of the SCR reaches 180°C {356°F}, the DCU does not give an instruction to dose DEF.

* SCR temperature (calculation) = gas flow rate (air flow sensor), SCR upstream temperature sensor, vehicle speed and outside air temperature

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Exhaust gas temperature sensor (SCR inlet): Abnormal sensor value

FUEL CONTROL (DEF SCR)

DN02-171

DTC:P2BA8	NOx Exceedence - Interruption of Reagent Dosing Activity	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Exhaust gas temperature sensor (SCR inlet)	Immerse the sensor in hot water and check resistance. Check the value during the forced regeneration on Hino-DX. Coupler check	Within criteria Contiguous		Replace
2	Ambient air temperature (AAT) sensor	Immerse the sensor in hot water and check resistance. Coupler check	Within criteria Contiguous		Replace
3	Air flow sensor	Try replacing with a correct sensor.			Next
4	Vehicle speed sensor	Check the meter by driving.	The correct vehicle speed must be indicated.		Replace the valve.
5	DCU	Replace DCU.			

To confirm that the sensor has returned to normal, it is necessary to return a vehicle to its owner and see until the vehicle is driven for a while.

DTC:P2BA8

EN1612602F200078

DTC	P2BA8	NOx Exceedence - Interruption of Reagent Dosing Activity

1. REPLACE THE DCU

DTC:P2BAE (Check sheet)

EN1612602F200079

DTC:P2BAE**Feedback control****1. Technical description**

- A failure has occurred in the injection control.
 - The DEF injection control feeds back DEF dose if a measured NOx purification rate deviates from an estimated NOx purification rate.
 - Feedback will be reset when a target purification rate reaches the upper limit for feedback.
This diagnosis will be active when repeated resets are detected.
- * The NOx sensor measures NOx level and also counts NH3 as NOx.

2. DTC set condition**(1) Check conditions**

- The engine is ON.

(2) Judgment criteria

- Dosing feedback is reset 3 times at an interval of 180 seconds or shorter.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

* It is likely that a NOx purification rate has dropped or NH3 slip has occurred.

Upstream NOx sensor: If the upstream sensor reads low or high NOx due to malfunction, the downstream NOx sensor reading may be high due to NH3 slip.

Downstream NOx sensor: It is likely that the downstream sensor reads high NOx.

DEF: Low concentration

DEF dose: Excessively low level of aqueous DEF solution dose

SCR catalyst: When purification performance is degraded by deterioration of the catalyst, feedback control will be activated.

FUEL CONTROL (DEF SCR)

DN02-173

DTC:P2BAE		Feedback control		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	-	Perform initial inspection.	-		-
2	DEF	Measure DEF concentration.	32.5±2.5%		Replace
3	SCR inlet temperature sensor	Immerse the sensor in hot water and check resistance. Check the value during the DPR forced regeneration on Hino-DX. Coupler check * Refer to P2483.	Within criteria Contiguous		Replace
4	Mass air flow sensor	Using Hino-DX, compare the NMR with a new sensor. * Refer to P0101.	Difference between old and new sensor less than 10%		MAF Replace
5	DEF pipe (pump ↔ injector)	DEF piping (pressure line) Appearance check	No crush, breakage or bend		Replace
6	DEF injector	Remove the DEF injector from the muffler and perform a DEF solution addition test (added quantity pattern x 3).	The metered quantity of additive shall be within each standard.		NG: Replace DEF injector and go to step 10. * OK results prove that clogging caused by crystallized DEF is no longer present.
7	DEF injector	After replacement of the DEF injector, again perform a DEF solution addition test (added quantity pattern x 3).	The metered quantity of additive shall be within each standard.		OK: Leave the new DEF injector installed. NG: Replace the DEF piping (pump ↔ injector). * Re-install the previous DEF injector.
8	NOx sensor (upstream and downstream)	Replace the upstream and downstream NOx sensors.			
Driving is required to some extent to check that the normal state is restored. Once return it to the driver and see how it works.					

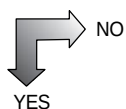
DN02-174

FUEL CONTROL (DEF SCR)

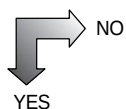
DTC:P2BAE

EN1612602F200080

DTC	P2BAE	Feedback control

1. CHECK DEF QUALITY.

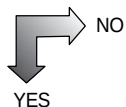
DEF quality defect

2. DEF DOSING TEST.

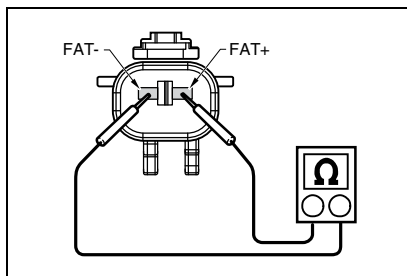
Replace the DEF injector

3. CHECK VALIDITY OF THE NOx SENSOR.

(1) Forced regeneration



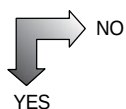
Faulty NOx sensor



SAPH161260200089

4. CHECK THE RESISTANCE BETWEEN TERMINALS.

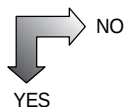
- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor connector.
- (3) Measure resistance between the terminals FAT+ and FAT- of the exhaust gas temperature sensor connector.

Standard value:**186 Ω (-20°C {-4°F}): Outside air temperature****220 Ω (20°C {68°F}): Outside air temperature****277 Ω (100°C {212°F}): Outside air temperature**

Faulty exhaust gas temperature sensor

5. CHECK THE AIR FLOW SENSOR.

(Refer to the chapter "FUEL CONTROL (J08E)" DN02-001)



Replace the air flow sensor

After repair, check that no error will recur in driving test.



FUEL CONTROL (DEF SCR)

DN02-175



DN02-176

FUEL CONTROL (DEF SCR)

DTC:U0029 (Check sheet)

EN1612602F200081

DTC:U0029	Vehicle Communication Bus A Performance

1. Technical description

- Vehicle communication bus (CAN) A is connected to CAN terminator, Engine ECU, EGR, VNT, NOx sensor (SCR upstream), NOx sensor (SCR downstream), BCU and DCU

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria

- DCU cannot receive all message from CAN A

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DCU:

- Bad contact of harness connector
- Malfunction of DCU

Harnesses: Miss connection

FUEL CONTROL (DEF SCR)

DN02-177

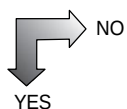
DTC:U0029	Vehicle Communication Bus A Performance	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DCU	Coupler check	Contiguous		Replace
2	Harnesses	Signal from harness check	Within criteria		Replace
3	DCU	DCU replace	No malfunction		Check again

DTC:U0029/U0038

EN1612602F200082

DTC	U0029	Vehicle Communication Bus A Performance
DTC	U0038	Vehicle Communication Bus B Performance

1. CHECK OTHER ECU ERRORS.

NO

Improper connection of connector

YES

Faulty CAN line

DN02-178

FUEL CONTROL (DEF SCR)

DTC:U0100 (Check sheet)

EN1612602F200083

DTC:U0100	DeNOx ECU CAN communication (ECM)

1. Technical description

- DeNOx ECU (DCU) is connected to ECM (Engine ECU) through both CAN A harness and CAN B harness

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria

- DCU cannot receive CAN message from Engine ECU

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Engine ECU:

- Bad contact of harness connector
- Malfunction of ECU

Harnesses: Miss connection**DCU:**

- Bad contact of harness connector
- Malfunction of ECU

FUEL CONTROL (DEF SCR)

DN02-179

DTC:U0100	DeNOx ECU CAN communication (ECM)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Engine ECU	Coupler check	Contiguous		Replace
2	CAN A harness	Signal from harness at Engine ECU connector check	Within criteria		Replace
3	CAN B harness	Signal from harness at Engine ECU connector check	Within criteria		Replace
4	DCU	Coupler check	Contiguous		Replace
5	CAN A harness	Signal from harness at DCU connector check	Within criteria		Replace
6	CAN B harness	Signal from harness at DCU connector check	Within criteria		Replace
7	DCU	DCU replace	No malfunction		Check again

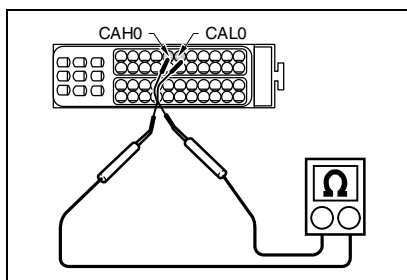
DN02-180

FUEL CONTROL (DEF SCR)

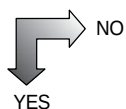
DTC:U0100/U0400

EN1612602F200084

DTC	U0100	DeNOx ECU CAN communication (ECM)
DTC	U0400	Invalid Data Received

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Disconnect the DCU 53P connector.
- (2) Connect the signal check harness.
- (3) Measure resistance between the terminals CAH0 and CAL0 of the DCU 53P connector on the harness side.

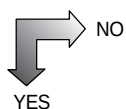
Standard value: 120 Ω 

Faulty CAN line

Improper connection of connector

2. CHECK THAT NO MALFUNCTION CODES ARE ISSUED.

- (1) Check that no malfunction codes of the engine ECU are issued.



Fault in engine ECU

Improper connection of connector



FUEL CONTROL (DEF SCR)

DN02-181



DTC:U029D/U029E (Check sheet)

EN1612602F200085

DTC:U029D
DTC:U029EDeNOx ECU CAN communication (NOx sensor (SCR upstream))
DeNOx ECU CAN communication (NOx sensor (SCR downstream))**1. Technical description****DTC :U029D**

- CAN signals cannot be received from the NOx sensor (upstream).

DTC :U029E

- CAN signals cannot be received from the NOx sensor (downstream).

2. DTC set condition**(1) Check conditions**

Starter switch ON

DTC :U029D

- Continuously checked in the configured raster: [0]- 10
- Continuously checked in the configured raster: [0]- 11
- Continuously checked in configured raster: [4]- 9
- [25]- 8
- [25]- 9

DTC :U029E

- Continuously checked in the configured raster: [1]- 0
- Continuously checked in the configured raster: [1]- 1

(2) Judgment criteria**DTC :U029D**

- CAN signals from the NOx sensor (upstream) remains interrupted for 0.25 seconds.

DTC :U029E

- CAN signals from the NOx sensor (downstream) remains interrupted for 0.25 seconds.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

NOX Sensor:

- Disconnection of CAN communication line
- Crossed line
- External abnormal noise
- Malfunction of sensor

Harnesses: Miss connection

FUEL CONTROL (DEF SCR)

DN02-183

DTC:U029D DTC:U029E	DeNOx ECU CAN communication (NOxsensor (SCR upstream)) DeNOx ECU CAN communication (NOxsensor (SCR downstream))	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Disconnect the connector on the NOx sensor side and check resistance at pin No.2 and 3 on the harness side.	Within criteria Contiguous		OK: Proceed to No.2. NG: Inspect the CAN communication line.
2	NOX Sensor	Replace the NOx sensor.			Sensor Replace

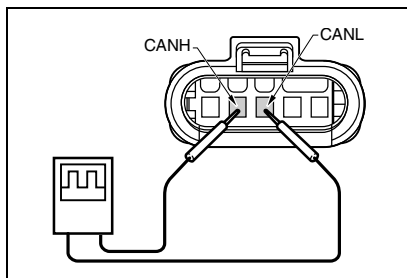
DN02-184

FUEL CONTROL (DEF SCR)

DTC:U029D

EN1612602F200086

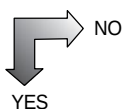
DTC	U029D	DeNOx ECU CAN communication (NOx sensor (SCR upstream))



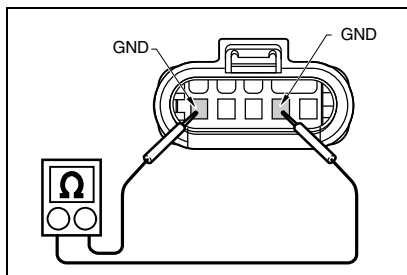
SAPH161260200091

1. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the NOx sensor 1 connector.
- (3) Set the starter switch to "ON" position.
- (4) Measure voltage between the terminals CANH and CANL of the NOx sensor 1 connector on the harness side.

Standard value: Pulse waveform of 0↔5 V


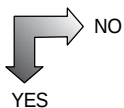
Faulty harness



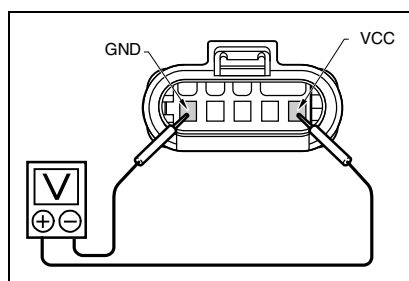
SAPH161260200092

2. CHECK THE CONTINUITY BETWEEN TERMINALS.

- (1) Measure resistance between the terminals GND and GND of the NOx sensor 1 connector on the harness side.

Standard value: Continuity


Faulty harness



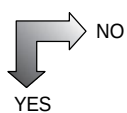
3. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Set the starter switch to "ON" position.
- (2) Measure voltage between the terminals VCC and GND of the NOx sensor 1 connector on the harness side.

Standard value: 9-16 V

HINT

Finally, delete the DTC and check that the malfunction code will not recur.



Faulty harness

Faulty NOx sensor 1

DTC:U029D/U029E (Check sheet)

EN1612602F200087

DTC:U029D
DTC:U029EDeNOx ECU CAN communication (NOx sensor (SCR upstream))
DeNOx ECU CAN communication (NOx sensor (SCR downstream))**1. Technical description****DTC :U029D**

- CAN signals cannot be received from the NOx sensor (upstream).

DTC :U029E

- CAN signals cannot be received from the NOx sensor (downstream).

2. DTC set condition**(1) Check conditions**

Starter switch ON

DTC :U029D

- Continuously checked in the configured raster: [0]- 10
Continuously checked in the configured raster: [0]- 11
Continuously checked in configured raster: [4]- 9
[25]- 8
[25]- 9

DTC :U029E

- Continuously checked in the configured raster: [1]- 0
Continuously checked in the configured raster: [1]- 1

(2) Judgment criteria**DTC :U029D**

- CAN signals from the NOx sensor (upstream) remains interrupted for 0.25 seconds.

DTC :U029E

- CAN signals from the NOx sensor (downstream) remains interrupted for 0.25 seconds.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

NOX Sensor:

- Disconnection of CAN communication line
Crossed line
External abnormal noise
Malfunction of sensor

Harnesses: Miss connection

FUEL CONTROL (DEF SCR)

DN02-187

DTC:U029D DTC:U029E	DeNOx ECU CAN communication (NOxsensor (SCR upstream)) DeNOx ECU CAN communication (NOxsensor (SCR downstream))	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Disconnect the connector on the NOx sensor side and check resistance at pin No.2 and 3 on the harness side.	Within criteria Contiguous		OK: Proceed to No.2. NG: Inspect the CAN communication line.
2	NOX Sensor	Replace the NOx sensor.			Sensor Replace

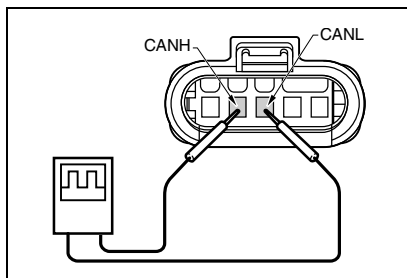
DN02-188

FUEL CONTROL (DEF SCR)

DTC:U029E

EN1612602F200088

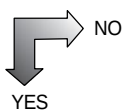
DTC	U029E	DeNOx ECU CAN communication (NOx sensor (SCR downstream))



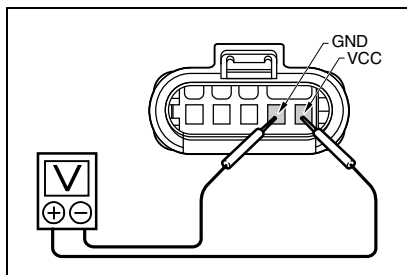
SAPH161260200094

1. CHECK THE VOLTAGE TANCE BETWEEN TERMINALS.

- (1) Set the starter switch to "LOCK" position.
- (2) Disconnect the NOx sensor 2 connector.
- (3) Set the starter switch to "ON" position.
- (4) Measure voltage between the terminals CANH and CANL of the NOx sensor 2 connector on the harness side.

Standard value: Pulse waveform of 0↔5 V


Faulty harness



SAPH161260200095

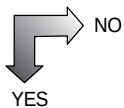
2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure volutes between the terminals VCC and GND of the NOx sensor 2 connector on the harness side.

Standard value: 9-16 V

HINT

Finally, delete the DTC and check that the malfunction code will not recur.



Faulty harness

Faulty NOx sensor 2



FUEL CONTROL (DEF SCR)

DN02-189



DN02-190

FUEL CONTROL (DEF SCR)

DTC:U0597 (Check sheet)

EN1612602F200089

DTC:U0597	Invalid Data Received From AC to DC Converter (DeNOx ECU)

1. Technical description

– AC to DC converter is loaded in DeNOx ECU (DCU)

2. DTC set condition**(1) Check conditions**

– Starter switch ON

(2) Judgment criteria

– AC to DC converter abnormality is judged by DCU itself

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DCU: Malfunction of DCU

FUEL CONTROL (DEF SCR)

DN02-191

DTC:U0597	Invalid Data Received From AC to DC Converter (DeNOx ECU)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DCU	DCU replace	No malfunction		Replace

DTC:U0597

EN1612602F200090

DTC	U0597	Invalid Data Received From AC to DC Converter (DeNOx ECU)

1. **REPLACE THE DCU**
2. **FINALLY, TURN THE KEY FROM "LOCK" TO "ON" AND CHECK THAT THE MALFUNCTION CODE WILL NOT RECUR.**



DN02-192

FUEL CONTROL (DEF SCR)



FUEL CONTROL (BURNER)

DN02-003

BURNER SYSTEM.....DN02-3

PRECAUTIONS FOR DIAGNOSIS.....	DN02-3
DIAGRAM	DN02-5
SIGNAL CHECK HARNESS.....	DN02-6
INSPECTION.....	DN02-6
DIAGNOSIS USING THE PC	
DIAGNOSIS TOOL	DN02-7
DTC:P0148 (Check sheet).....	DN02-12
DTC:P018C (Check sheet).....	DN02-14
DTC:P018C	DN02-16
DTC:P018D (Check sheet).....	DN02-18
DTC:P018D	DN02-20
DTC:P0351 (Check sheet).....	DN02-22
DTC:P0351	DN02-28
DTC:P0410 (Check sheet).....	DN02-30
DTC:P0413 (Check sheet).....	DN02-32
DTC:P0413	DN02-34
DTC:P0414 (Check sheet).....	DN02-36
DTC:P0414	DN02-38
DTC:P0416 (Check sheet).....	DN02-40
DTC:P0416	DN02-42
DTC:P0417 (Check sheet).....	DN02-44
DTC:P0417	DN02-46
DTC:P0545 (Check sheet).....	DN02-48
DTC:P0545	DN02-50
DTC:P0546 (Check sheet).....	DN02-52
DTC:P0546	DN02-54
DTC:P0562 (Check sheet)/	
DTC:P0563 (Check sheet 1).....	DN02-56
DTC:P0563 (Check sheet 2).....	DN02-58
DTC:P0562/P0563.....	DN02-59
DTC:P060C (Check sheet).....	DN02-60
DTC:P062F (Check sheet).....	DN02-62
DTC:P060C/P062F.....	DN02-63
DTC:P0642 (Check sheet).....	DN02-64
DTC:P0642	DN02-66
DTC:P0643 (Check sheet).....	DN02-68
DTC:P0643	DN02-70
DTC:P141B (Check sheet).....	DN02-74
DTC:P141B.....	DN02-76
DTC:P141C (Check sheet).....	DN02-78
DTC:P141C	DN02-80
DTC:P141D (Check sheet).....	DN02-82
DTC:P141D	DN02-86
DTC:P2029 (Check sheet).....	DN02-88

DTC:P2029.....	DN02-91
DTC:P2030 (Check sheet).....	DN02-100
DTC:P2030	DN02-113
DTC:P2032 (Check sheet).....	DN02-138
DTC:P2032	DN02-140
DTC:P2033 (Check sheet).....	DN02-142
DTC:P2033	DN02-144
DTC:P2080 (Check sheet).....	DN02-146
DTC:P2080	DN02-149
DTC:P2084 (Check sheet).....	DN02-150
DTC:P2084	DN02-154
DTC:P20D3 (Check sheet).....	DN02-156
DTC:P20D3	DN02-158
DTC:P20D4 (Check sheet).....	DN02-160
DTC:P20D4	DN02-162
DTC:P2300 (Check sheet).....	DN02-164
DTC:P2300	DN02-166
DTC:P2301 (Check sheet).....	DN02-172
DTC:P2301	DN02-174
DTC:P2302 (Check sheet).....	DN02-178
DTC:P2302	DN02-179
DTC:P2431 (Check sheet).....	DN02-180
DTC:P2431	DN02-182
DTC:P2432 (Check sheet).....	DN02-184
DTC:P2432	DN02-186
DTC:P2433 (Check sheet).....	DN02-188
DTC:P2433	DN02-190
DTC:P2436 (Check sheet).....	DN02-192
DTC:P2436	DN02-197
DTC:P2437 (Check sheet).....	DN02-210
DTC:P2437	DN02-212
DTC:P2438 (Check sheet).....	DN02-214
DTC:P2438	DN02-216
DTC:P2441 (Check sheet).....	DN02-218
DTC:P2441	DN02-221
DTC:P2506/P2507 (Check sheet).....	DN02-226
DTC:P2506/P2507	DN02-228
DTC:P2532 (Check sheet).....	DN02-230
DTC:P2539 (Check sheet).....	DN02-232
DTC:P2633 (Check sheet).....	DN02-234
DTC:P2633	DN02-236
DTC:P2634 (Check sheet).....	DN02-238
DTC:P2634	DN02-240
DTC:P2636 (Check sheet).....	DN02-242
DTC:P2636	DN02-245
DTC:P3040 (Check sheet).....	DN02-252



DN02-2

FUEL CONTROL (BURNER)



DTC:P3040.....	DN02-254
DTC:P3041 (Check sheet)	DN02-256
DTC:P3041.....	DN02-258
DTC:U0100 (Check sheet)	DN02-260
DTC:U0100	DN02-262



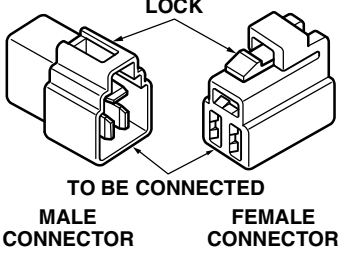
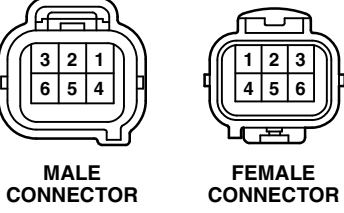
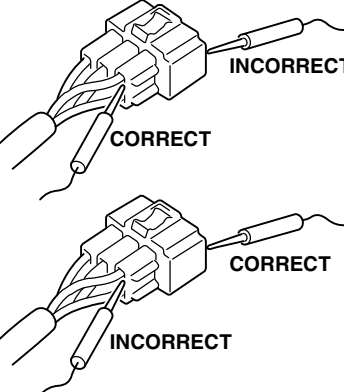
BURNER SYSTEM

PRECAUTIONS FOR DIAGNOSIS

EN1613602F200001

- Ensure that individual connectors are certainly connected before start of checking works.
- Make sure to set the starter key to the "LOCK" position before disconnecting a connector.
- Replace the part or the component that have a failure or trouble. Do not fix and reuse it.
- Delete the past malfunction code after recording. Then conduct a diagnosis again to check for present failures.
- Delete the past failure memory after completion of a diagnostic analysis.

1. ILLUSTRATION OF CONNECTOR AND MEASUREMENT ON TERMINAL

WATERPROOF CONNECTOR

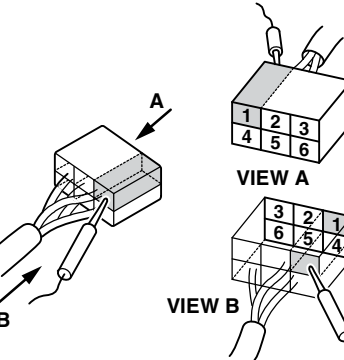


ILLUSTRATION OF CONNECTOR

The illustration of a connector contained in this document represents an image of a connector with its lock positioned on top as viewed from the connecting face.

NUMBERING OF CONNECTOR TERMINALS

The terminals are symmetrically numbered (symmetrically reversed numbering) as viewed on the connecting faces of a pair of connectors. The terminal #1 is located at the top right corner of a male connector and at the top left corner of a female connector respectively in this document.

PRECAUTIONS FOR TERMINAL MEASUREMENT

Unless otherwise specified in this document, the illustration of a connector represents an image of a connector as viewed from the connecting face. A test probe must access the back face of a connector.

However, some types of connector do not allow a test probe to contact with the back face such as a waterproof connector. In such case, a test probe may be allowed to access the front face of a connector but a special care must be used to avoid a risk of damage in terminals.

As to a connector that is designed to use the signal check harness for terminal measurement, do not place a test probe directly onto the front or back face. Use a contact box of the connected signal check harness to take measurement on terminals.

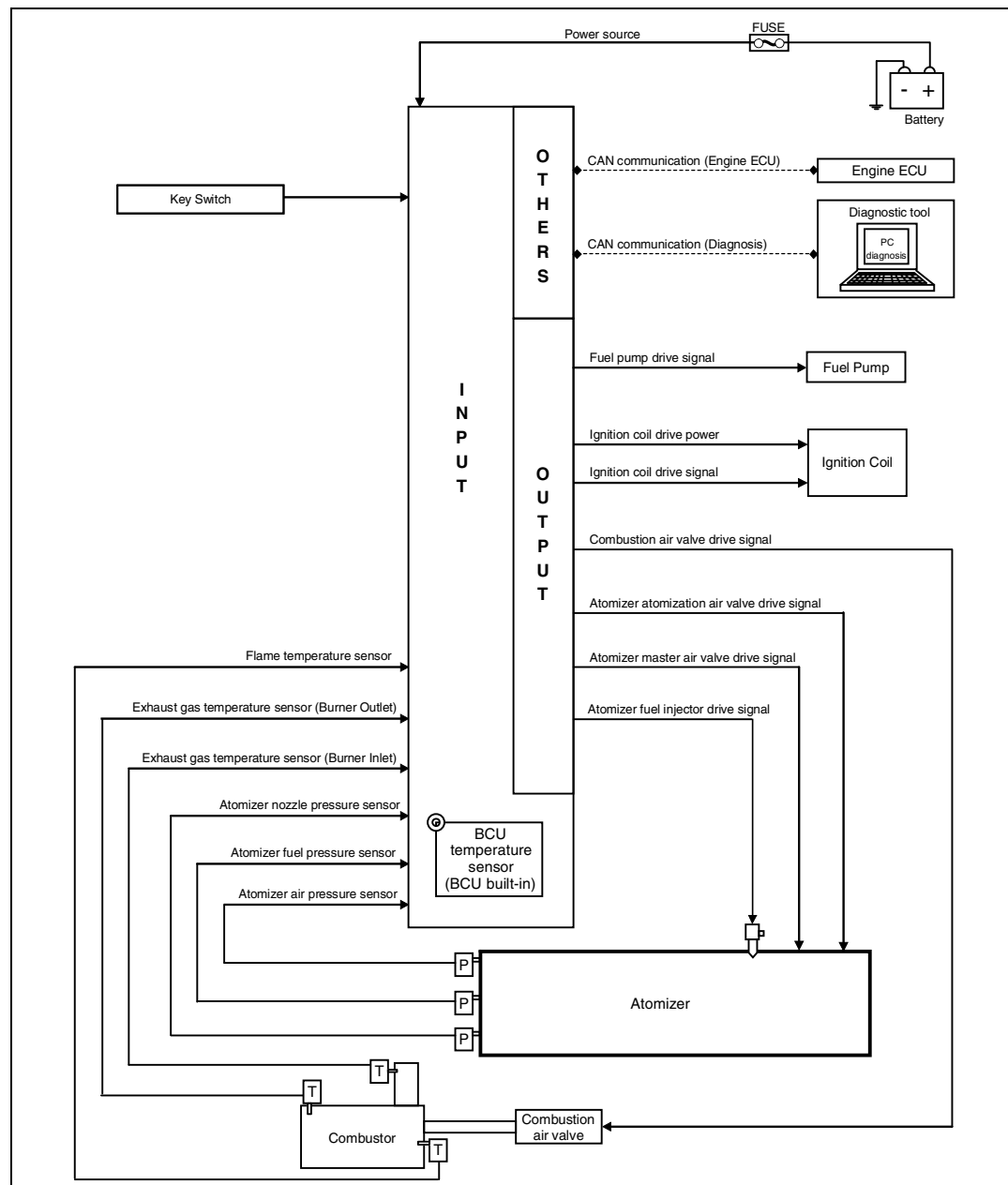
ILLUSTRATION OF CONNECTOR AND MEASUREMENT SURFACE

The illustration of a connector contained in this document represents an image of a connector as viewed from the connecting face. For example, the terminal #1 of a female connector is located at the top left corner of a connector as viewed from the connecting face.

In actual measurement on the terminal #1 of a female connector, a test probe must be placed onto the top right corner on the back face of a connector.

DIAGRAM

EN1613602F200002



SAPH161360200002

SIGNAL CHECK HARNESS

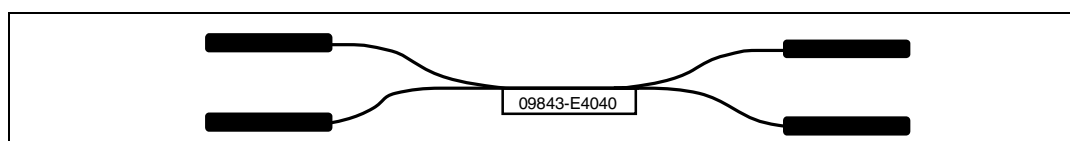
EN1613602F200003

1. MENTION OF THE SIGNAL CHECK HARNESS

- (1) HINO provides a signal check harness to check the BCU.

⚠ CAUTION

To prevent damage of the BCU connector, connect the signal check harness and perform measuring by bringing the test probe into contact with the signal check harness side.



SAPH161360200004

INSPECTION

EN1613602F200004

1. PRIOR CHECK

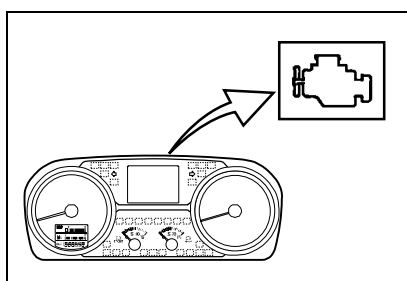
- (1) Set the starter switch to the "ON" position (Do not start the engine) and confirm that the malfunction indicator light in the indicator area light up.
- (2) If the DTC of P141F appears during meter multi-display, have the BCU communicate with the Hino-DX and check the detailed DTC.

HINT

- If the MIL (Malfunction Indicator Light) is lit, perform a system check to see if the malfunction is of the past or present.
- In the case of the past malfunction, this light will turn off if a status is judged to be normal in 3 times of driving.
- DTC must be cleared on the Hino-DX, after MIL comes off.

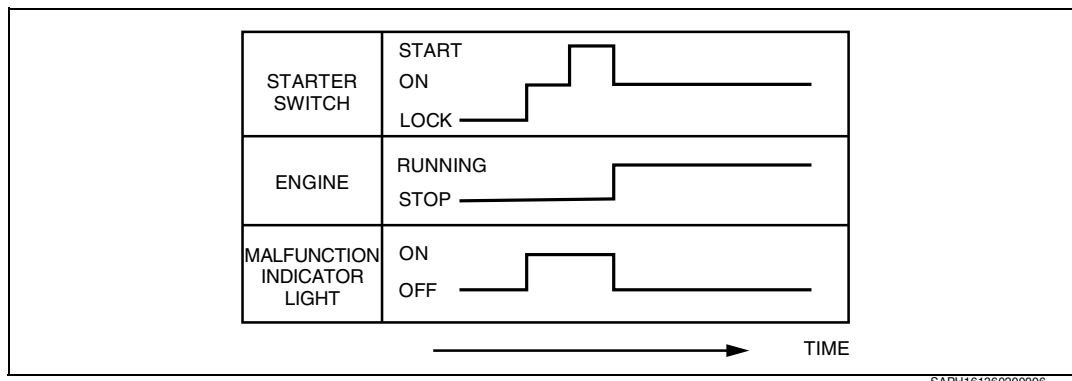
(Definition of 1 time of driving)

- a. Begins with engine start and ends with engine shut off.
- b. Begins with engine start and ends after four hours of continuous engine-on operation.
- c. Begins at end of the previous four hours of continuous engine-on operation and ends after four hours of continuous engine-on operation.
- d. Begins at the end of the previous four hours of continuous engine-on operation and ends with engine shut off.
 - Since the normal judgment method and time differ according to the malfunction code, a proper definition will be selected from the above 4 definitions.
- If the malfunction indicator light does not go out, the system is abnormal. Check the system according to diagnosis on the following page.



SAPH161360200005

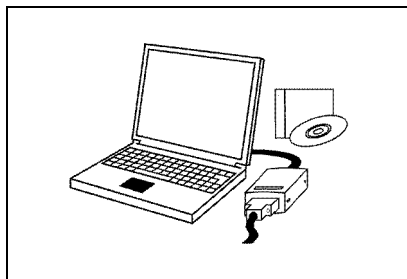
MALFUNCTION INDICATOR LIGHT ILLUMINATION PATTERN



SAPH161360200006

DIAGNOSIS USING THE PC DIAGNOSIS TOOL

EN1613602F200005



SAPH161360200007

1. DIAGNOSIS TOOL

- Trouble diagnosis can be performed using the PC diagnosis tool. By connection to the diagnosis connector, the trouble location is indicated.

SST:

Computer interface
(Hino-Bowie)

The main body and cables for RS232C and USB (09993-E9070)

Cable between vehicle and Hino-Bowie (S0904-21220)

(DENSO DST-i set without LCD)

Without Bluetooth® (95171-01020)

With Bluetooth® (95171-01040)

(DENSO DST-i set with LCD)

Without Bluetooth® (95171-01030)

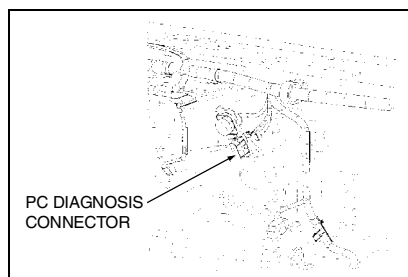
With Bluetooth® (95171-01050)

Diagnosis software: HINO Diagnostic explorer (DX)

Reprogramming software: HINO Reprog Manager

NOTICE

Only ECU reprogramming can be performed by authorized HINO dealer.



SAPH161360200008

2. CONNECT THE PC DIAGNOSIS TOOL

- Turn the starter switch on the "LOCK" position.
- Connect the PC DIAGNOSIS TOOL.

DN02-8

FUEL CONTROL (BURNER)

DIAGNOSTIC TROUBLE CODE (DTC) TABLE					
MALFUNCTION INDICATOR LIGHT	DTC NO.		DIAGNOSIS ITEM	INSPECTION ITEM	REFER PAGE
	ECU	BCU			
Light	P141F	P0148	Fuel pressure zero (Pending fault code, No MIL)	- Atomizer - DTC P2636 or P2436	DN02-12
Light	P141F	P018C	Atomizer fuel pressure sensor - out of range (Out of range low)	- Atomizer - Connector - Wire harness	DN02-14
Light	P141F	P018D	Atomizer fuel pressure sensor - out of range (Out of range high)	- Atomizer - Connector - Wire harness	DN02-18
Light	P141F	P0351	Ignition module malfunction	- Ignition Coil - Ignition plug - Ignition cable	DN02-22
Light	P141F	P0410	Atomizer air pressure too low (Pending fault code, No MIL)	- Atomizer - DTC P2431 or P2436	DN02-30
Light	P141F	P0413	Atomizer master air valve - circuit failure (Circuit high)	- Atomizer - Connector - Wire harness	DN02-32
Light	P141F	P0414	Atomizer master air valve - circuit failure (Circuit low)	- Atomizer - Connector - Wire harness	DN02-36
Light	P141F	P0416	Atomizer atomization air valve - circuit failure (Circuit high)	- Atomizer - Connector - Wire harness	DN02-40
Light	P141F	P0417	Atomizer atomization air valve - circuit failure (Circuit low)	- Atomizer - Connector - Wire harness	DN02-44
Light	P141F	P0545	Exhaust gas temperature sensor (Burner inlet) - out of range (Out of range low)	- Exhaust Gas Temperature Sensor (Burner Inlet) - Connector - Wire harness	DN02-48
Light	P141F	P0546	Exhaust gas temperature sensor (Burner inlet) - out of range (Out of range high)	- Exhaust Gas Temperature Sensor (Burner Inlet) - Connector - Wire harness	DN02-52
Light	P141F	P0562	Sensor supply voltage - out of range (Out of range low)	BCU	DN02-56
Light	P141F	P0563	Sensor supply voltage - out of range (Out of range high)	BCU	DN02-56
Light	P141F	P060C	BCU temperature sensor - rationality	BCU	DN02-60
Light	P141F	P062F	BCU controller store data error	BCU	DN02-62

FUEL CONTROL (BURNER)

DN02-9

DIAGNOSTIC TROUBLE CODE (DTC) TABLE					
MALFUNCTION INDICATOR LIGHT	DTC NO.		DIAGNOSIS ITEM	INSPECTION ITEM	REFER PAGE
	ECU	BCU			
Light	P141F	P0642	A/D converter input sensor supply voltage - out of range (Out of range low)	- Atomizer - Connector - Wire harness	DN02-64
Light	P141F	P0643	A/D converter input sensor supply voltage - out of range (Out of range high)	- Atomizer - Connector - Wire harness	DN02-68
Light	P141F	P141B	Flame temperature sensor - out of range (Out of range low)	- Flame Temperature Sensor - Connector - Wire harness	DN02-74
Light	P141F	P141C	Flame temperature sensor - out of range (Out of range high)	- Flame Temperature Sensor - Connector - Wire harness	DN02-78
Light	P141F	P141D	Flame temperature sensor - rationality	Flame Temperature Sensor	DN02-82
Light	P141F	P2029	Exhaust gas temperature (Burner inlet) too high	- Exhaust pipe - Connector	DN02-88
Light	P141F	P2030	Burner abnormal combustion (Burner misfire, lost flame, burner outlet temperature too high, unable to achieve target temperature)	Other DTC	DN02-100
Light	P141F	P2032	Exhaust gas temperature sensor (Burner outlet) - out of range (Out of range low)	- Exhaust Gas Temperature Sensor (Burner Outlet) - Connector - Wire harness	DN02-138
Light	P141F	P2033	Exhaust gas temperature sensor (Burner outlet) - out of range (Out of range high)	- Exhaust Gas Temperature Sensor (Burner Outlet) - Connector - Wire harness	DN02-142
Light	P141F	P2080	Exhaust gas temperature sensor (Burner inlet) - rationality	Exhaust Gas Temperature Sensor (Burner Inlet)	DN02-146
Light	P141F	P2084	Exhaust gas temperature sensor (Burner outlet) - rationality	Exhaust Gas Temperature Sensor (Burner Outlet)	DN02-150
Light	P141F	P20D3	Atomizer fuel injector - circuit failure (Circuit low)	- Atomizer - Connector - Wire harness	DN02-156
Light	P141F	P20D4	Atomizer fuel injector - circuit failure (Circuit high)	- Atomizer - Connector - Wire harness	DN02-160
Light	P141F	P2300	Ignition coil - circuit failure out of range (too low)	- Ignition Coil - Connector - Wire harness	DN02-164

DN02-10

FUEL CONTROL (BURNER)

DIAGNOSTIC TROUBLE CODE (DTC) TABLE					
MALFUNCTION INDICATOR LIGHT	DTC NO.		DIAGNOSIS ITEM	INSPECTION ITEM	REFER PAGE
	ECU	BCU			
Light	P141F	P2301	Ignition coil - circuit failure (Circuit high)	- Ignition Coil - Connector - Wire harness	DN02-172
Light	P141F	P2302	Ignition coil supply voltage - open circuit	- Ignition Coil - Connector - Wire harness	DN02-178
Light	P141F	P2431	Air supply (from air tank) failure	- Air compressor - Air dryer - Safety valve - Air piping	DN02-180
Light	P141F	P2432	Atomizer air pressure sensor - out of range (Out of range low)	- Atomizer - Connector - Wire harness	DN02-184
Light	P141F	P2433	Atomizer air pressure sensor - out of range (Out of range high)	- Atomizer - Connector - Wire harness	DN02-188
Light	P141F	P2436	Atomizer failure	Atomizer	DN02-192
Light	P141F	P2437	Atomizer nozzle pressure sensor - out of range (Out of range low)	- Atomizer - Connector - Wire harness	DN02-210
Light	P141F	P2438	Atomizer nozzle pressure sensor - out of range (Out of range high)	- Atomizer - Connector - Wire harness	DN02-214
Light	P141F	P2441	Combustion air valve stuck	- Combustion air valve - Combustion air line	DN02-218
Light	P141F	P2506	Battery voltage - out of range	- Battery - Connector - Wire harness	DN02-226
Light	P141F	P2507	A/D converter input battery voltage - out of range (Out of range low)	- Battery - Connector - Wire harness	DN02-226
Light	P141F	P2532	BCU internal supply key switch voltage high	- Wire harness - CAN	DN02-230
Light	P141F	P2539	Fuel pressure zero too low (Pending fault code, No MIL)	- Atomizer - DTC P2636 or P2436	DN02-232
Light	P141F	P2633	Fuel pump - circuit failure (Circuit low)	- Fuel pump - Connector - Wire harness	DN02-234

FUEL CONTROL (BURNER)

DN02-11

DIAGNOSTIC TROUBLE CODE (DTC) TABLE					
MALFUNCTION INDICATOR LIGHT	DTC NO.		DIAGNOSIS ITEM	INSPECTION ITEM	REFER PAGE
	ECU	BCU			
Light	P141F	P2634	Fuel pump - circuit failure (Circuit high)	- Fuel pump - Connector - Wire harness	DN02-238
Light	P141F	P2636	Fuel pump failure	Fuel pump	DN02-242
Light	P141F	P3040	Combustion air valve - circuit failure (Circuit low)	- Combustion air valve - Connector - Wire harness	DN02-252
Light	P141F	P3041	Combustion air valve - circuit failure (Circuit high)	- Combustion air valve - Connector - Wire harness	DN02-256
Light	P141F	U0100	Burner ECU CAN communication (ECM)	- Wire harness - Engine ECU	DN02-260

DN02-12

FUEL CONTROL (BURNER)

DTC:P0148 (Check sheet)**DTC:P0148**

Fuel pressure zero (Pending Fault Code, NO MIL)

1. Technical description

- This code is the PENDING FAULT CODE (NO MIL).
- This code is set when BCU detects low fuel pressure.
- BCU presume failure when 3 times low pressure events detected in a row.
(P2636(Fuel Pump Malfunction), P2436(Atomizer Failure set))
- If no P2436/P2636, this DTC can be ignored.

2. DTC set condition**(1) Check conditions**

- Fuel Pump Activated

(2) Judgment criteria**DTC :P018C**

1. Atomizer fuel pressure < 68.9kPa

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

FUEL CONTROL (BURNER)

DN02-13

DTC:P0148		Fuel pressure zero (Pending Fault Code, NO MIL)		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Burner System	Check DTC on Burner No P2636 (Fuel Pump Malfunction) or P2436 (Atomizer Failure set)	No P2436 or P2636		No P2436/ P2636: Clear DTC and can be released. P2436/ P2636 exists: Proceed to analysis of the relevant DTC.

DN02-14

FUEL CONTROL (BURNER)

DTC:P018C (Check sheet)

EN1613602F200006

DTC:P018C	Atomizer fuel pressure sensor - out of range (Out of range low)

1. Technical description

- Atomizer nozzle pressure sensor detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P018C**

- Atomizer fuel pressure sensor voltage < 0.1V (-70.40kPa) for more than 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer:

- Malfunction in atomizer nozzle pressure sensor
- Disconnection or short-circuit in atomizer nozzle pressure sensor
- Abnormal voltage of atomizer nozzle pressure sensor

Harness: Disconnection or short-circuit in harness between atomizer and BCU

FUEL CONTROL (BURNER)

DN02-15

DTC:P018C	Atomizer fuel pressure sensor - out of range (Out of range low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the connector on the atomizer side and measure resistance.	40 k Ω or higher		Atomizer Replace
2	Harness	Disconnect the BCU connector and measure resistance between the terminals of the BCU connector on the wire harness side.	40 k Ω or higher		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

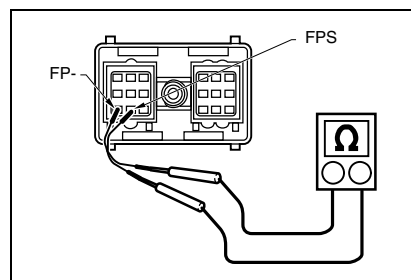
DN02-16

FUEL CONTROL (BURNER)

DTC:P018C

EN1613602F200007

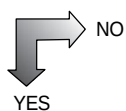
DTC	P018C	Atomizer fuel pressure sensor - out of range (Out of range low)



1. CHECK THE RESISTANCE BETWEEN TERMINALS.

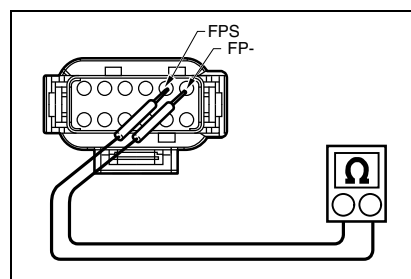
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 18P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals FPS and FP- of the BCU 18P connector on the harness side.

Standard value: 40 kΩ or more



Proceed to 2.

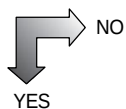
Irregular contact of connectors



2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 12P connector.
- (2) Measure resistance between the terminals FPS and FP- of the atomizer 12P connector.

Standard value: 40 kΩ or more



Faulty atomizer

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-17



DN02-18

FUEL CONTROL (BURNER)

DTC:P018D (Check sheet)

EN1613602F200008

DTC:P018D

Atomizer fuel pressure sensor - out of range (Out of range high)

1. Technical description

- Atomizer nozzle pressure sensor detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P018D**

- Atomizer fuel pressure sensor voltage > 4.89V (766.77kPa) for more than 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer:

- Malfunction in atomizer nozzle pressure sensor
- Disconnection or short-circuit in atomizer nozzle pressure sensor
- Abnormal voltage of atomizer nozzle pressure sensor

Harness: Disconnection or short-circuit in harness between atomizer and BCU

FUEL CONTROL (BURNER)

DN02-19

DTC:P018D	Atomizer fuel pressure sensor - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the Atomizer connectors and measure resistance and voltage between the terminals of the mating connectors.	40 k Ω or higher, 240 Ω or lower 0.1 V or lower		Atomizer Replace
2	Harness	Disconnect the BCU connectors and measure resistance and voltage between the terminals of the mating BCU connector on the wire harness.	40 k Ω or higher, 240 Ω or lower 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

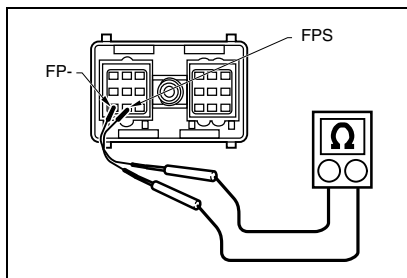
DN02-20

FUEL CONTROL (BURNER)

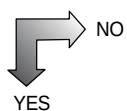
DTC:P018D

EN1613602F200009

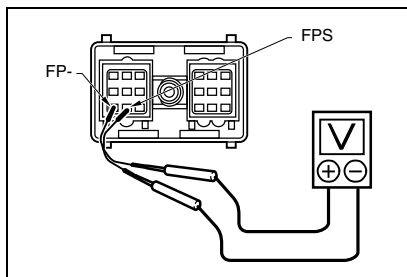
DTC	P018D	Atomizer fuel pressure sensor - out of range (Out of range high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

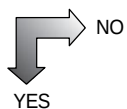
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 18P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals FPS and FP- of the BCU 18P connector on the harness side.

Standard value: 40 kΩ or more

Proceed to 3.

**2. CHECK THE VOLTAGE BETWEEN TERMINALS.**

- (1) Measure voltage between the terminals FPS and FP- of the BCU 18P connector on the harness side.

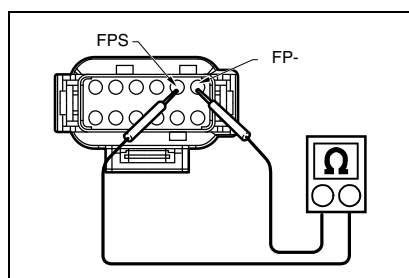
Standard value: 0.1 V or less

Proceed to 3.

Irregular contact of connectors

FUEL CONTROL (BURNER)

DN02-21

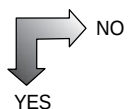


SAPH161360200013

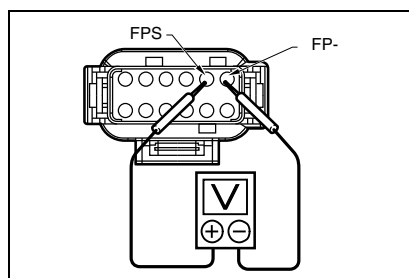
3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 12P connector.
- (2) Measure resistance between the terminals FPS and FP- of the atomizer 12P connector.

Standard value: 40 kΩ or more



Faulty atomizer

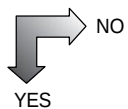


SAPH161360200014

4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals FPS and FP- of the atomizer 12P connector.

Standard value: 0.1 V or less



Faulty atomizer

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DN02-22

FUEL CONTROL (BURNER)

DTC:P0351 (Check sheet)

EN1613602F200010

DTC:P0351

Ignition module malfunction

1. Technical description

- Abnormal igniter spark of the burner system is detected.

2. DTC set condition**(1) Check conditions**

- Initial check (before burner operation or 5 minutes elapsed after Engine ON)
- The burner is operating

(2) Judgment criteria

- Primary-side coil current > 0.89A

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Igniter Cable: Improper connection including disconnection or damage**Ignition Coil:** Internal disconnection**Ignitor:** Soot deposit or improper end gap**Battery:** Drop in supply voltage**Harness:** Disconnection or short-circuit between BCU and ignition coil**BCU:** Internal disconnection

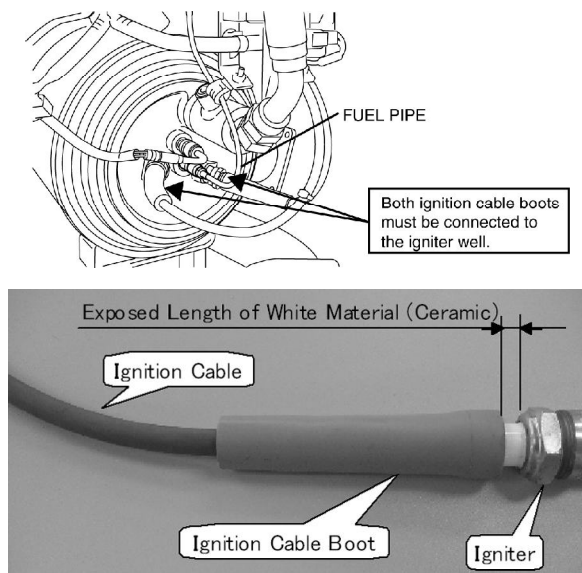
FUEL CONTROL (BURNER)

DN02-23

DTC:P0351		Ignition module malfunction		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Check for harness malfunction codes on Hino-DX (Burner).	P2300 or P2301 does not exist.		See the workshop manual.
2	Battery	Check for battery malfunction codes on Hino-DX (Burner).	P2506 or P2507 does not exist.		See the workshop manual.
3	BCU	Check for BCU malfunction codes on Hino-DX (Burner).	P060C or P062F does not exist.		See the workshop manual.
4	Ignition Cable	Ignition Cable Installation Check (Detail on next page A)	Exposed Length must be less than 7mm. No loosen of ignition cable boots.		Install correctly
5	Ignition Cable	Ignition Cable Check (Detail on next page B)	No damage (exposed wire/cutted insulator) on cable		Replace Ignition Cable
6	Igniters	Resistance Check (Detail on next page C)	Resistance > 1MΩ (=OPEN CIRCUIT)		If resistance is less than 1MΩ, excessive soot loading on the igniters. Cleaning up igniters by the wire brush and the brake cleaner
7	Igniters	Igniters Visual Check (Detail on next page D)	No plugged tip by fuel		Cleaning up igniters by the wire brush and the brake cleaner
8	GND Connection	GND Fastener Check (Detail on next page E)	No Loosen of GND Fastener		Tighten correctly
9	Igniters/IGN Coil	1. Turn off the engine, and starter key position must be "OFF". 2. To remove the right side front splash board. 3. To remove the fuel nozzle on the combustor. 4. Connect Hino-DX to the vehicle, then turn starter key position to "ON". 5. Select "Burner". 6. Activate "Ignition Coil". (Detail on next page F) 7. To confirm spark (Detail on next page G)	Spark exists between igniters		Replace Ignition Coil
10	BCU	Replacement (If still P141F is active)	-	-	-
After repairing, should be make sure not existing this DTC 5 minutes elapsed after Engine ON.					

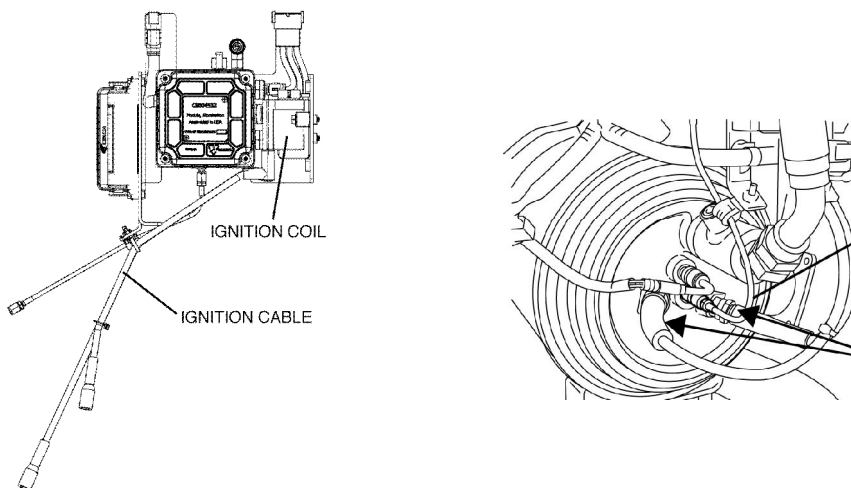
Ignition Cable Installation Check

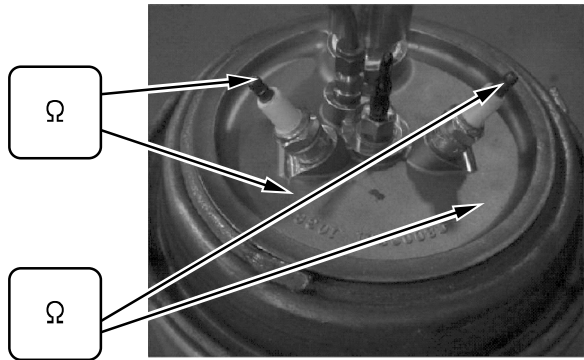
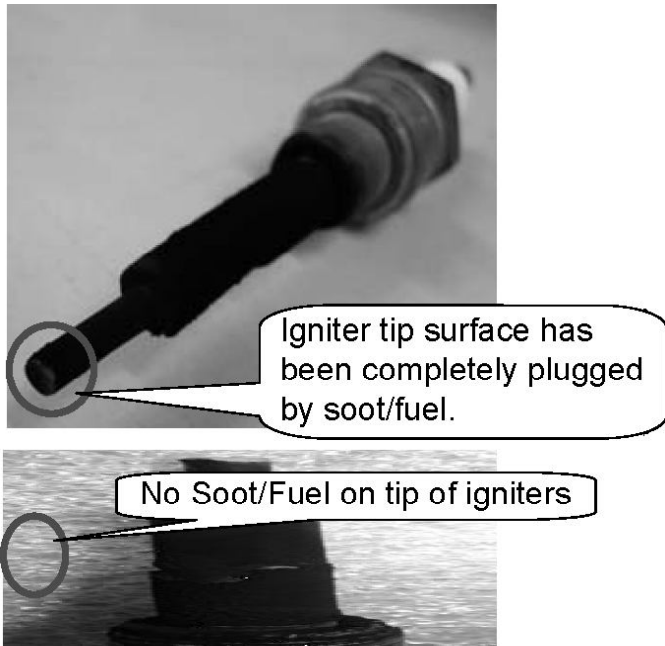
A



Ignition Cable Check

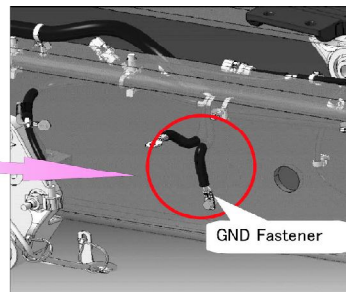
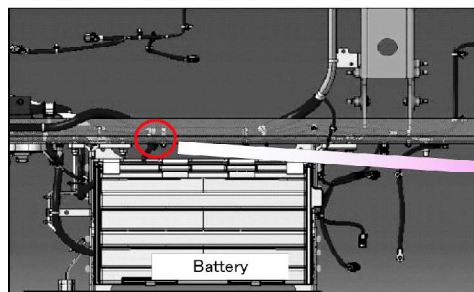
B



C	Igniters Resistance Check 
D	Igniters Visual Check 

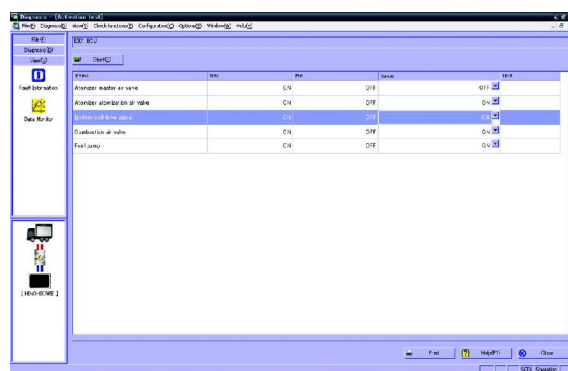
GND Fastener Check

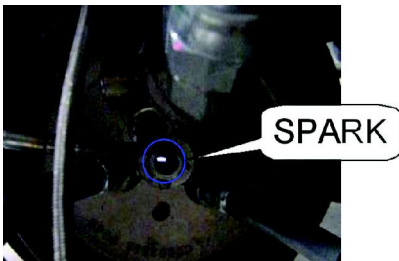
E



Igniters/IGN Coil Check (Using Hino-DX)

F



Igniters/IGN Coil Check (Confirm spark)**⚠ DANGER**

G Just after engine "ON", the burner system makes a high voltage arc (40,000-50,000 V) for few seconds. Do not touch the ignition coil, ignition cables, ignition plugs and arc during this checking. Death or serious personal injury, and damage to components can result. Depending on the amount of soot, exhaust outlet temperatures during regeneration can exceed 1,290°F (700°C). Do not touch the exhaust outlet. Death or serious personal injury, and damage to components can result.

⚠ WARNING

The burner system operates at an extremely high temperature of about 1,832°F (1,000°C) inside the combustion chamber. The skin temperature of a unit can reach 572°F (300°C) during operation. Even higher temperatures can occur at the flange; the exhaust outlet; and the filter, which remains hot for a longer period of time than other system components. Before you service the burner unit, all system components must be at ambient temperature to prevent serious personal injury. An original equipment-mounted exhaust outlet is not insulated. The skin temperature of a non-insulated exhaust outlet can exceed 1,292°F (700°C) during operation. Before you service the thermal regenerator unit, all system components must be at ambient temperature to prevent serious personal injury. When you work on an electrical system, the possibility of electrical shock exists, and sparks can ignite flammable substances. You must always disconnect the battery ground cable before you work on an electrical system to prevent serious personal injury and damage to components.

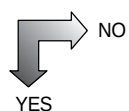
DN02-28

FUEL CONTROL (BURNER)

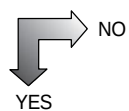
DTC:P0351

EN1613602F200011

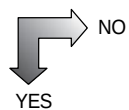
DTC	P0351	Ignition module failure

1. CHECK THAT NO OTHER MALFUNCTION CODES EXIST SIMULTANEOUSLY.

Proceed to other malfunction codes.

2. CHECK THE IGNITION CABLE.

Repair the trouble

3. CLEAN THE IGNITION PLUG. AFTER CLEARING THE DTC, PERFORM A DPR FORCED REGENERATION AND CHECK THAT P0351 IS NOT ISSUED.

Faulty ignition coil

Clear and recheck the DTC.

⚠ WARNING

- When working, turn off the starter switch because of the high-voltage area.
- After replacing the ignition plug, reset the travel distance counter with Hino-DX.

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-29



DN02-30

FUEL CONTROL (BURNER)

DTC:P0410 (Check sheet)

DTC:P0410	Atomizer air pressure too low (Pending Fault Code, NO MIL)

1. Technical description

- This code is the **PENDING FAULT CODE (NO MIL)**.
- This code is set when BCU detects low air pressure from the air tank.
- BCU presume failure when 3 times low pressure events detected in a row.
(P2431 Air Supply (from air tank) failure) or P2436(Atomizer Failure set)
- If no P2431/P2636, **this DTC can be ignored.**

2. DTC set condition**(1) Check conditions**

- Engine speed (from ECM) > 450 r/min.

(2) Judgment criteria

- (1) Atomizer air pressure < 350kPa for 120sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

FUEL CONTROL (BURNER)

DN02-31

DTC:P0410	Atomizer air pressure too low (Pending Fault Code, NO MIL)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Burner System	Check DTC on Burner No P2431 (Air Supply (from air tank) failure) or P2436 (Atomizer Failure set)	No P2431 or P2436		No P2431/ P2436 : Clear DTC and can be released. P2431/P2436 exists : Proceed to analysis of the relevant DTC.

DN02-32

FUEL CONTROL (BURNER)

DTC:P0413 (Check sheet)

EN1613602F200012

DTC:P0413

Atomizer master air valve - circuit failure (Circuit high)

1. Technical description

- Atomizer detects errors based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Atomizer Master Air Valve : Deactivation)

(2) Judgment criteria**DTC :P0413**

- Atomizer master air valve circuit resistance < 0.6Ω for more than 0.8sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer master air valve:

- Malfunction of atomizer master air valve
- Abnormal voltage of atomizer master air valve
- Disconnection in harness of atomizer master air valve

Harness: Disconnection or short-circuit in harness between atomizer master air valve and BCU

FUEL CONTROL (BURNER)

DN02-33

DTC:P0413	Atomizer master air valve - circuit failure (Circuit high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the Atomizer connectors and measure resistance and voltage between the terminals of the mating connectors.	4 Ω or higher, 24 Ω or lower 0.1 V or lower		Atomizer Replace
2	Harness	Reconnect the Atomizer connectors and disconnect the BCU connectors. Measure resistance and the voltage between the terminals of the mating BCU connector on the wire harness.	4 Ω or higher, 24 Ω or lower 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON.	No malfunction		BCU Replace
4	Nozzle	Release the vehicle after the nozzle cleaning.			

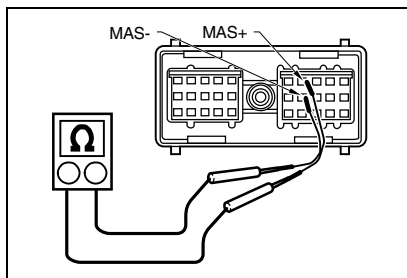
DN02-34

FUEL CONTROL (BURNER)

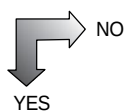
DTC:P0413

EN1613602F200013

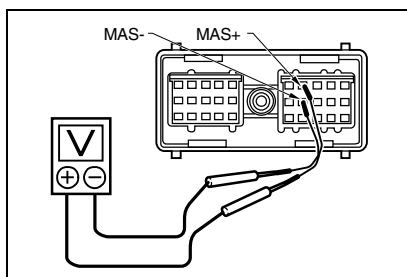
DTC	P0413	Atomizer master air valve - circuit failure (Circuit high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

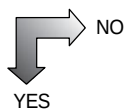
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals MAS+ and MAS- of the BCU 30P connector on the harness side.

Standard value: 4 Ω or more

Proceed to 3.

**2. CHECK THE VOLTAGE BETWEEN TERMINALS.**

- (1) Measure voltage between the terminals MAS+ and MAS- of the BCU 30P connector on the harness side.

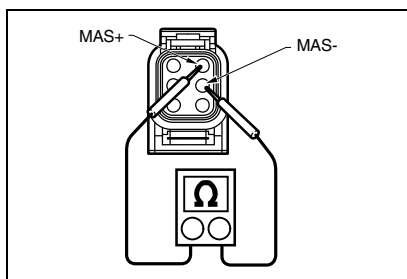
Standard value: 0.1 V or less

Proceed to 3.

Irregular contact of connectors

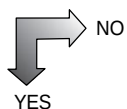
FUEL CONTROL (BURNER)

DN02-35

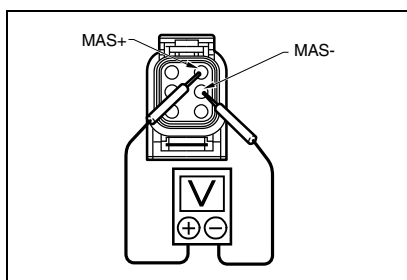


3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 6P connector.
- (2) Measure resistance between the terminals MAS+ and MAS- of the atomizer master air valve connector.
Standard value: 4 Ω or more

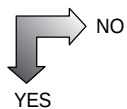


Faulty atomizer master air valve



4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals MAS+ and MAS- of the atomizer master air valve connector.
Standard value: 0.1 V or less



Faulty atomizer master air valve

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.

DN02-36

FUEL CONTROL (BURNER)

DTC:P0414 (Check sheet)

EN1613602F200014

DTC:P0414

Atomizer master air valve - circuit failure (Circuit low)

1. Technical description

- The atomizer detects errors based on the circuit voltage and signals in the BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Atomizer Master Air Valve : Activation)

(2) Judgment criteria**DTC :P0414**

- Atomizer master air valve circuit resistance < 0.6Ω for more than 1sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer master air valve:

- Malfunction of atomizer master air valve
- Abnormal voltage of atomizer master air valve
- Disconnection in harness of atomizer master air valve

Harness: Disconnection or short-circuit in harness between atomizer master air valve and BCU

FUEL CONTROL (BURNER)

DN02-37

DTC:P0414	Atomizer master air valve - circuit failure (Circuit low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the Atomizer connector and measure the resistance between the mating connectors.	4Ω or higher, 24Ω or lower		Atomizer Replace
2	Harness	Reconnect the Atomizer connectors and disconnect the BCU connectors. Measure resistance between the terminals of the mating BCU connector on the wire harness.	4Ω or higher, 24Ω or lower		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON.	No malfunction		BCU Replace
4	Nozzle	Release the vehicle after the nozzle cleaning.			

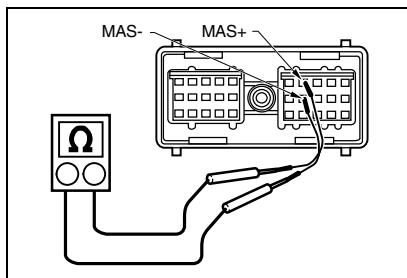
DN02-38

FUEL CONTROL (BURNER)

DTC:P0414

EN1613602F200015

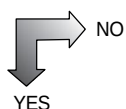
DTC	P0414	Atomizer master air valve - circuit failure (Circuit low)



SAPH161360200028

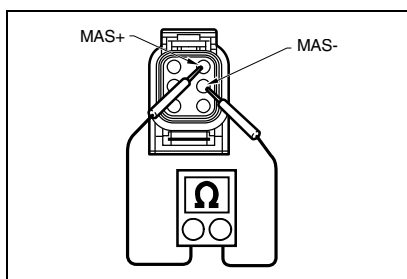
1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals MAS+ and MAS- of the BCU 30P connector on the harness side.

Standard value: 4 Ω or more

Proceed to 2.

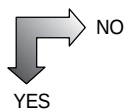
Irregular contact of connectors



SAPH161360200029

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 6P connector.
- (2) Measure resistance between the terminals MAS+ and MAS- of the atomizer master air valve connector.

Standard value: 4 Ω or more

Faulty atomizer master air valve

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-39



DN02-40

FUEL CONTROL (BURNER)

DTC:P0416 (Check sheet)

EN1613602F200016

DTC:P0416

Atomizer atomization air valve - circuit failure (Circuit high)

1. Technical description

- Atomizer detects errors based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Atomizer Atomization Air Valve: Deactivation)

(2) Judgment criteria**DTC :P0416**

- Atomizer atomization air valve circuit resistance < 0.6Ω for more than 0.8sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer atomization air valve:

- Malfunction of atomizer atomization air valve
- Abnormal voltage of atomizer atomization air valve
- Disconnection in harness of atomizer atomization air valve

Harness: Disconnection or short-circuit in harness between atomizer atomization air valve and BCU

FUEL CONTROL (BURNER)

DN02-41

DTC:P0416	Atomizer atomization air valve - circuit failure (Circuit high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the Atomizer connector and measure the resistance and voltage between the mating connectors.	4 Ω or higher, 24 Ω or lower 0.1 V or lower		Atomizer Replace
2	Harness	Reconnect the Atomizer connectors and disconnect the BCU connectors. Measure resistance and voltage between the terminals of the mating BCU connector on the wire harness.	4 Ω or higher, 24 Ω or lower 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON. NG: Replace BCU.	No malfunction		Check again

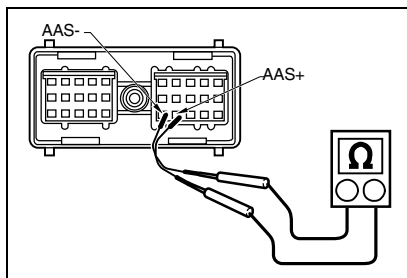
DN02-42

FUEL CONTROL (BURNER)

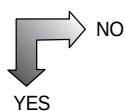
DTC:P0416

EN1613602F200017

DTC	P0416	Atomizer atomization air valve - circuit failure (Circuit high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

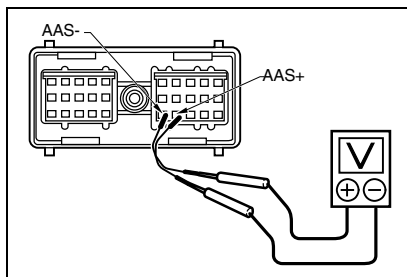
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals AAS+ and AAS- of the BCU 30P connector on the harness side.

Standard value: 4 Ω or more

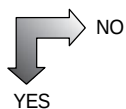
NO

Proceed to 3.

YES

**2. CHECK THE VOLTAGE BETWEEN TERMINALS.**

- (1) Measure voltage between the terminals AAS+ and AAS- of the BCU 30P connector on the harness side.

Standard value: 0.1 V or less

NO

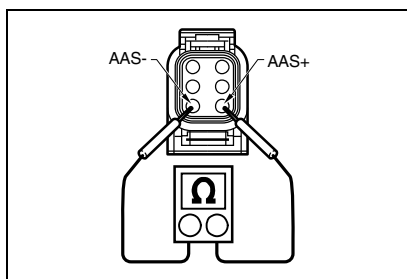
Proceed to 3.

YES

Irregular contact of connectors

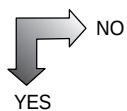
FUEL CONTROL (BURNER)

DN02-43

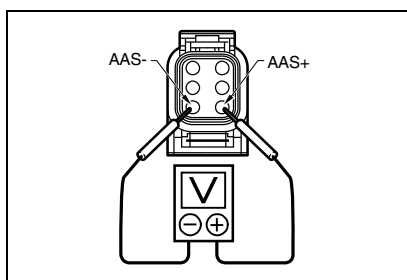


3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 6P connector.
 - (2) Measure resistance between the terminals AAS+ and AAS- of the atomizer atomization air valve connector.
- Standard value: 4 Ω or more**

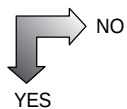


Faulty atomizer atomization air valve



4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals AAS+ and AAS- of the atomizer atomization air valve connector.
- Standard value: 0.1 V or less**



Faulty atomizer atomization air valve

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.

DN02-44

FUEL CONTROL (BURNER)

DTC:P0417 (Check sheet)

EN1613602F200018

DTC:P0417

Atomizer atomization air valve - circuit failure (Circuit low)

1. Technical description

- Atomizer detects errors based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Atomizer Atomization Air Valve: Activation)

(2) Judgment criteria**DTC :P0417**

- Atomizer atomization air valve circuit resistance < 0.6Ω for more than 1sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer:

- Malfunction of atomizer atomization air valve
- Abnormal voltage of atomizer atomization air valve
- Disconnection in harness of atomizer atomization air valve

Harness: Disconnection or short-circuit in harness between atomizer and BCU

FUEL CONTROL (BURNER)

DN02-45

DTC:P0417	Atomizer atomization air valve - circuit failure (Circuit low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the Atomizer connectors and measure the resistance between the mating connectors.	4 Ω or higher, 24 Ω or lower		Atomizer Replace
2	Harness	Reconnect the Atomizer connectors and disconnect the BCU connectors. Measure resistance between the terminals of the mating BCU connector on the wire harness.	4 Ω or higher, 24 Ω or lower		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON. NG: Replace BCU.	No malfunction		Check again

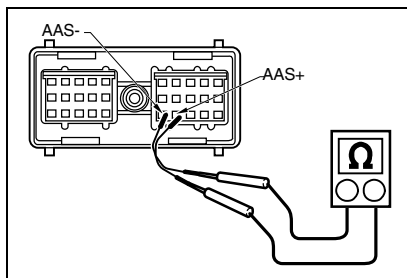
DN02-46

FUEL CONTROL (BURNER)

DTC:P0417

EN1613602F200019

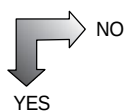
DTC	P0417	Atomizer atomization air valve - circuit failure (Circuit low)



1. CHECK THE RESISTANCE BETWEEN TERMINALS.

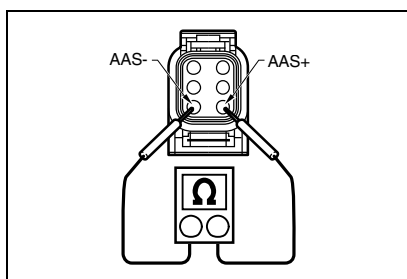
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals AAS+ and AAS- of the BCU 30P connector on the harness side.

Standard value: 4 Ω or more



Proceed to 2.

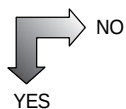
Irregular contact of connectors



2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 6P connector.
- (2) Measure resistance between the terminals AAS+ and AAS- of the atomizer atomization air valve connector.

Standard value: 4 Ω or more



Faulty atomizer atomization air valve

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-47



DN02-48

FUEL CONTROL (BURNER)

DTC:P0545 (Check sheet)

EN1613602F200020

DTC:P0545	Exhaust gas temperature sensor (Burner inlet) - out of range (Out of range low)

1. Technical description

- Exhaust gas temperature sensor detects the temperature, disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P0545**

- Exhaust gas temperature sensor voltage < 0.1V for more than 1sec
(-50°C at BCU temp 25°C)

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Exhaust gas temperature sensor:

- Sensor disconnection
- Abnormal resistance of sensor
- Disconnection or short-circuit in sensor harness

Harness: Disconnection or short-circuit in harness between the sensor and DCU

FUEL CONTROL (BURNER)

DN02-49

DTC:P0545	Exhaust gas temperature sensor (Burner inlet) - out of range (Out of range low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Exhaust gas temperature sensor	Disconnect the sensor connectors and measure resistance and voltage between the terminals of mating connectors.	0.3 Ω or higher, 1.8 Ω or lower 0.1 V or lower		Sensor Replace
2	Harness	Reconnect the sensor connectors and disconnect the BCU connectors. Measure resistance between the terminals of mating BCU connector on the wire harness.	0.3 Ω or higher, 1.8 Ω or lower 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

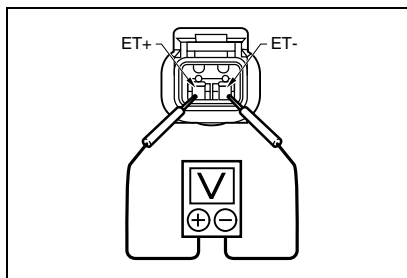
DN02-50

FUEL CONTROL (BURNER)

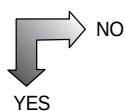
DTC:P0545

EN1613602F200021

DTC	P0545	Exhaust gas temperature sensor (Burner inlet) - out of range (Out of range low)

**1. CHECK THE VOLTAGE BETWEEN TERMINALS.**

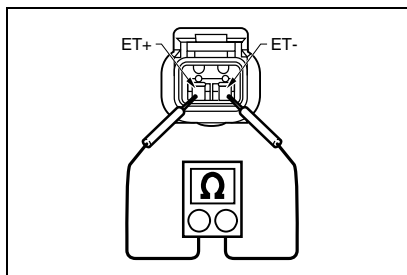
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor (burner inlet) connector.
- (3) Measure voltage between the terminals ET+ and ET- of the exhaust gas temperature sensor (burner inlet) connector on the harness side.

Standard value: 0.1 V or less

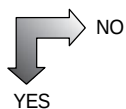
NO

Faulty harness

YES

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Measure resistance between the terminals ET+ and ET- of the exhaust gas temperature sensor (burner inlet) connector.

Standard value: 0.3 Ω or more

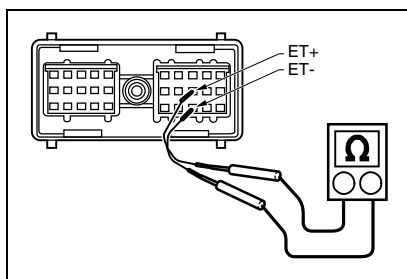
NO

Faulty exhaust gas temperature sensor (burner inlet)

YES

FUEL CONTROL (BURNER)

DN02-51

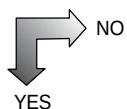


SAPH161360200038

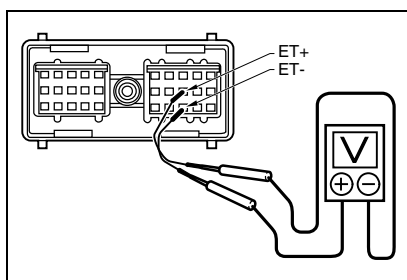
3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Connect the exhaust gas temperature sensor (burner inlet) connector.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals ET+ and ET- of the BCU 30P connector on the harness side.

Standard value: 0.3 Ω or more



Faulty harness

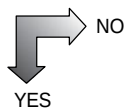


SAPH161360200039

4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals ET+ and ET- of the BCU 30P connector on the harness side.

Standard value: 0.1 V or less



Faulty harness

Irregular contact of connectors

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DN02-52

FUEL CONTROL (BURNER)

DTC:P0546 (Check sheet)

EN1613602F200022

DTC:P0546	Exhaust gas temperature sensor (Burner inlet) - out of range (Out of range high)

1. Technical description

- Exhaust gas temperature sensor detects the temperature, disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P0546**

- Exhaust gas temperature sensor voltage > 4.3V for more than 0.5sec
(1,300°C at BCU temp 25°C)

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Exhaust gas temperature sensor:

- Sensor disconnection
- Abnormal resistance of sensor
- Disconnection or short-circuit in sensor harness

Harness: Disconnection or short-circuit in harness between the sensor and DCU

FUEL CONTROL (BURNER)

DN02-53

DTC:P0546	Exhaust gas temperature sensor (Burner inlet) - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Exhaust gas temperature sensor	Disconnect the sensor connectors and measure resistance between the terminals of mating connectors.	0.3 Ω or higher, 1.8 Ω or lower		Sensor Replace
2	Harness	Reconnect the sensor connectors and disconnect the BCU connectors. Measure resistance between the terminals of the mating BCU connector on the wire harness.	0.3 Ω or higher, 1.8 Ω or lower		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

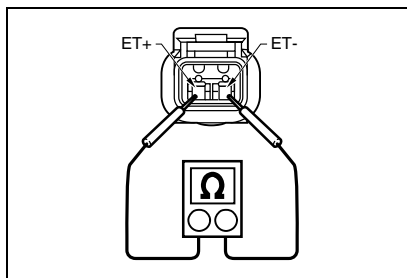
DN02-54

FUEL CONTROL (BURNER)

DTC:P0546

EN1613602F200023

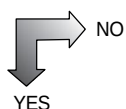
DTC	P0546	Exhaust gas temperature sensor (Burner inlet) - out of range (Out of range high)



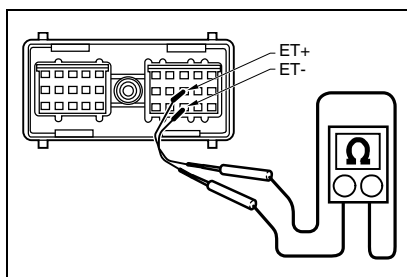
SAPH161360200040

1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor (burner inlet) connector.
- (3) Measure resistance between the terminals ET+ and ET- of the exhaust gas temperature sensor (burner inlet) connector.

Standard value: 0.3 Ω or more


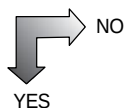
Faulty exhaust gas temperature sensor (burner inlet)



SAPH161360200041

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Connect the exhaust gas temperature sensor (burner inlet) connector.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals ET+ and ET- of the BCU 30P connector on the harness side.

Standard value: 0.3 Ω or more


Faulty harness

Irregular contact of connectors

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-55



DN02-56

FUEL CONTROL (BURNER)

DTC:P0562 (Check sheet)/DTC:P0563 (Check sheet 1)

EN1613602F200024

DTC:P0562
DTC:P0563Sensor supply voltage - out of range (Out of range low)
Sensor supply voltage - out of range (Out of range high)**1. Technical description**

- Abnormal sensor supply voltage is detected by BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC :P0562**

- Sensor_Supply_Voltage < 4.5 V for 0.5sec

DTC :P0563

- Sensor_Supply_Voltage > 5.3 V for 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Battery: Failure
Harness: Irregular contact
BCU: Malfunction

FUEL CONTROL (BURNER)

DN02-57

DTC:P0562 DTC:P0563	Sensor supply voltage - out of range (Out of range low) Sensor supply voltage - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Battery	Visually check, Voltage check	Within criteria Contiguous		Battery charge or Replace
2	BCU	BCU Replace	-		-
3	Harness	Harness Replace	-		-

DN02-58

FUEL CONTROL (BURNER)

DTC:P0563 (Check sheet 2)

EN1613602F200025

DTC:P0563

Sensor supply voltage - out of range (Out of range high)

1. Technical description

- Excessively high voltage has been detected in the ECU power supply.

2. DTC set condition**(1) Check conditions**

- No malfunction

(2) Judgment criteria

- Sensor supply voltage > 5.3V
- Failure timer >= 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

FL, FUSE: Fusing, irregular contact, partial engagement**Connectors, harnesses and terminals:** Disconnection, irregular contact, looseness**Alternator:** Unadjusted**ECU:** Malfunction

FUEL CONTROL (BURNER)

DN02-59

DTC:P0563	Sensor supply voltage - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	FL, FUSE	Check whether fusing has occurred. Check engagement.	No fusing No play		Replace
2	Connectors, harnesses and terminals	Check continuity between the battery and the alternator.	Must be conducting. No partial engagement No looseness		Repair or Replace
3	Alternator	Check power generation voltage. (at no electrical load of vehicle)	14.6 V or higher		Replace
4	ECU				Replace

DTC:P0562/P0563

EN1613602F200026

DTC	P0562	Sensor supply voltage - out of range (Out of range low)
DTC	P0563	Sensor supply voltage - out of range (Out of range high)

1. CHECK THAT NO OTHER MALFUNCTION CODES EXIST SIMULTANEOUSLY.



 NO
 YES

Proceed to other malfunction codes.

Faulty BCU

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DN02-60

FUEL CONTROL (BURNER)

DTC:P060C (Check sheet)

EN1613602F200027

DTC:P060C

BCU temperature sensor - rationality

1. Technical description

- The BCU is the Burner Control Unit.
- (1) The BCU compares the internal temperature sensor with the intake air temperature (air flow sensor) to judge characteristic abnormality.
- (2) The BCU judges malfunctioning of the internal circuit.

2. DTC set condition**(1) Check conditions**

- The above (1) is judged 5 minutes after starting the engine.
- The above (2) is judged with the starter key ON.

(2) Judgment criteria

- (1): Both below conditions continue for 300sec.
| BCU temp - Intake air temp (AFS built-in, from ECM) | > 30°C(86°F) for 30sec
 Δ | BCU temp. | (°C(°F) / 150sec) < 0.005
This monitoring becomes disabled during PTO activated.
- (2) A judgment is made by the microprocessor in the BCU.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Intake air temp (AFS built-in): Abnormal air flow sensor (built-in temperature sensor)
BCU: Abnormal

FUEL CONTROL (BURNER)

DN02-61

DTC:P060C	BCU temperature sensor - rationality	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Air flow sensor	Check Engine ECU for stored code P011C.	No P011C detected		Refer to P011C.
2	Abnormal air flow sensor (built-in tem- perature sensor)	(1) Open Hood. (2) Start engine and idle for 5 minutes. (3) With engine running monitor "Ambient Temp in ECU" with DX (BCU) and com- pare to sample of air temperature just outside of air filter box. (use thermome- ter or electronic temperature probe)	Must not differ by more than 10°C {50°F} .		Replace the air flow sen- sor.
3	BCU	Replace			

DN02-62

FUEL CONTROL (BURNER)

DTC:P062F (Check sheet)

EN1613602F200028

DTC:P062F

BCU controller store data error

1. Technical description

- The DCU ROM is checked within DCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria

- A ROM malfunction is detected within DCU.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

DCU:Malfunction of DCU**Note:**

If power supply for DCU is shut off forcibly, such as by disconnecting the battery before the pump operation ends and the DCU main relay turns off after starter key OFF, P062F may be detected.

FUEL CONTROL (BURNER)

DN02-63

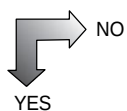
DTC:P062F	BCU controller store data error	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	DCU	Clear the DTCs and turn the starter key OFF. The main relay will turn off 1 minute after the exhaust temperature (SCR inlet) drops below 200 °C {392°F}. Then, turn the starter key ON.	No DTCs recur.		Replace

DTC:P060C/P062F

EN1613602F200029

DTC	P060C	BCU temperature sensor - rationality
DTC	P062F	BCU controller store data error

1. CHECK THAT NO OTHER MALFUNCTION CODES EXIST SIMULTANEOUSLY.

NO

Proceed to other malfunction codes.

YES

Faulty BCU

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DN02-64

FUEL CONTROL (BURNER)

DTC:P0642 (Check sheet)

EN1613602F200030

DTC:P0642	ECU sensor supply 1 failure (Low)

1. Technical description

- | |
|--|
| <ul style="list-style-type: none">- Power is supplied to the sensor supply 1 circuit.
(boost pressure sensor, D throttle opening sensor 1, D throttle opening sensor 2, common rail pressure sensor (main),
accelerator sensor 2, cam position sensor) <p><Description of malfunction></p> <ul style="list-style-type: none">- Excessively low voltage has been detected in the sensor power supply. |
|--|

2. DTC set condition**(1) Check conditions**

- | |
|--|
| <ul style="list-style-type: none">- The key is ON.- The monitor disable DTC table can be referred to. |
|--|

(2) Judgment criteria

- | |
|--|
| <ul style="list-style-type: none">- A/D converter input sensor supply voltage < 0.5V- Failure timer >= 0.5sec |
|--|

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Individual sensors and harnesses: Engine ECU:

FUEL CONTROL (BURNER)

DN02-65

DTC:P0642	ECU sensor supply 1 failure (Low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Disconnect the BCU connectors and measure the resistance between the terminals of the connectors.	40 k Ω or higher, 240 k Ω or lower		Harness Repair
2	Atomizer	Disconnect the connectors of the Atomizer master air valve and measure resistance between the terminals of the mating connectors.	40 k Ω or higher, 240 k Ω or lower		Atomizer Replace
3	BCU	Turn the Key ON and ensure that no error occurs. NG: Replace the BCU	No malfunction		Check again

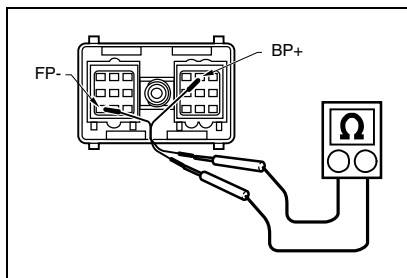
DN02-66

FUEL CONTROL (BURNER)

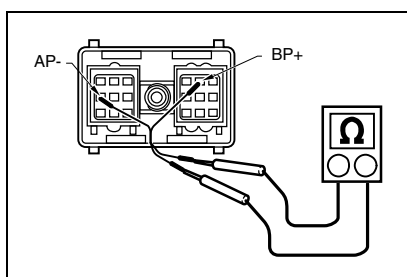
DTC:P0642

EN1613602F200031

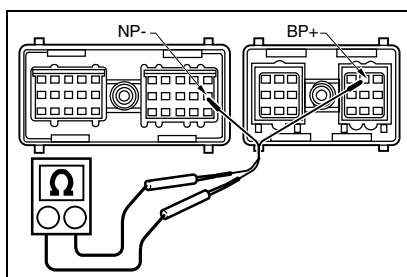
DTC	P0642	A/D converter input sensor supply voltage - out of range (Out of range low)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

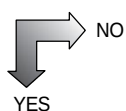
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 18P and BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals BP+ and FP- of the BCU 18P connector on the harness side.

Standard value: 40 kΩ or more

- (5) Measure resistance between the terminals BP+ and AP- of the BCU 18P connector on the harness side.

Standard value: 40 kΩ or more

- (6) Measure resistance between the terminals BP+ of the BCU 18P connector and NP- of the BCU 30P connector on the harness side.

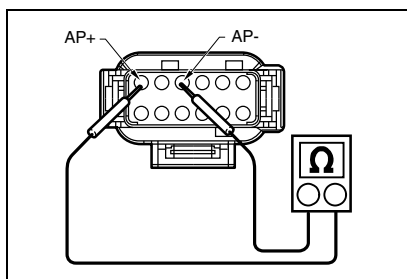
Standard value: 40 kΩ or more

Proceed to 2.

Irregular contact of connectors

FUEL CONTROL (BURNER)

DN02-67

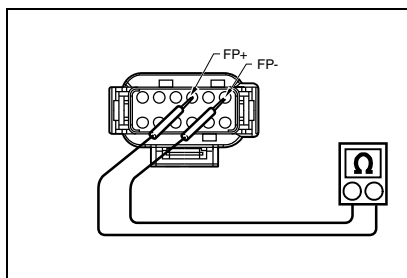


SAPH161360200045

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 12P connector.
- (2) Measure resistance between the terminals AP+ and AP- of the atomizer connector.

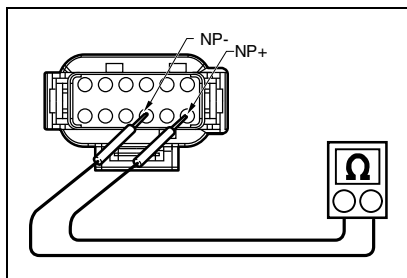
Standard value: 40 kΩ or more



SAPH161360200046

- (3) Measure resistance between the terminals FP+ and FP- of the atomizer 12P connector.

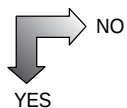
Standard value: 40 kΩ or more



SAPH161360200047

- (4) Measure resistance between the terminals NP+ and NP- of the atomizer 12P connector.

Standard value: 40 kΩ or more



NO

Faulty atomizer

YES

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DN02-68

FUEL CONTROL (BURNER)

DTC:P0643 (Check sheet)

EN1613602F200032

DTC:P0643

ECU sensor supply 1 failure (High)

1. Technical description

- Sensor voltage supply system detects errors based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC : P0643**

- A/D converter input sensor supply voltage > 1.9V for more than 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer:

- Malfunction in atomizer
- Abnormal voltage of atomizer

Harness: Disconnection or short-circuit in harness between atomizer and BCU

FUEL CONTROL (BURNER)

DN02-69

DTC:P0643	ECU sensor supply 1 failure (High)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Disconnect the BCU connectors and measure the resistance and voltage between the terminals of the connectors.	40 k Ω or higher, 240 k Ω or lower 4 V or lower		Harness Repair
2	Atomizer	Disconnect the connectors of the Atomizer master air valve and measure resistance and voltage between the terminals of the mating connectors.	40 k Ω or higher, 240 k Ω or lower 4 V or lower		Atomizer Replace
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

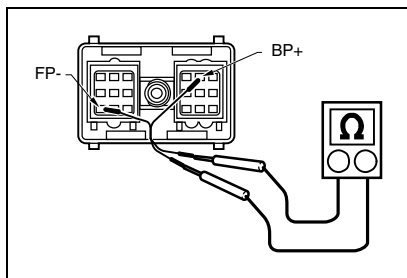
DN02-70

FUEL CONTROL (BURNER)

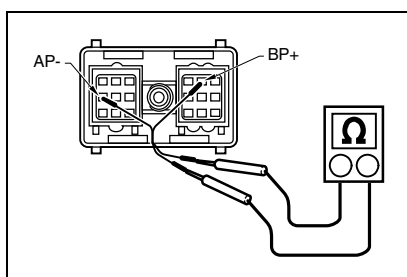
DTC:P0643

EN1613602F200033

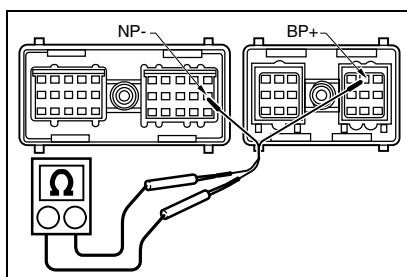
DTC	P0643	A/D converter input sensor supply voltage - out of range (Out of range high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

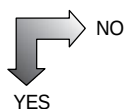
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 18P and BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals BP+ and FP- of the BCU 18P connector on the harness side.

Standard value: 40 kΩ or more

- (5) Measure resistance between the terminals BP+ and AP- of the BCU 18P connector on the harness side.

Standard value: 40 kΩ or more

- (6) Measure resistance between the terminals BP+ of the BCU 18P connector and NP- of the BCU 30P connector on the harness side.

Standard value: 40 kΩ or more

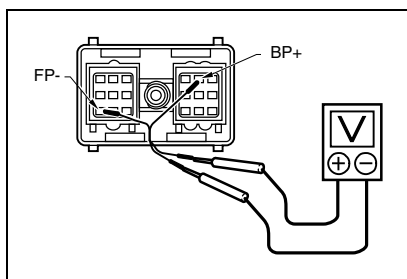
NO

Proceed to 3.

YES

FUEL CONTROL (BURNER)

DN02-71

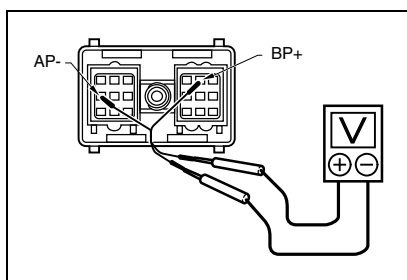


SAPH161360200051

2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals BP+ and FP- of the BCU 18P connector on the harness side.

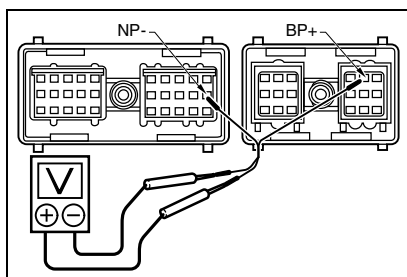
Standard value: 4 V or less



SAPH161360200052

- (2) Measure resistance between the terminals BP+ and AP- of the BCU 18P connector on the harness side.

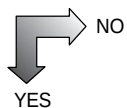
Standard value: 4 V or less



SAPH161360200053

- (3) Measure resistance between the terminals BP+ of the BCU 18P connector and NP- of the BCU 30P connector on the harness side.

Standard value: 4 V or less

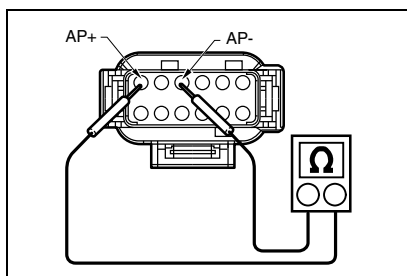


Proceed to 3.

Irregular contact of connectors

DN02-72

FUEL CONTROL (BURNER)

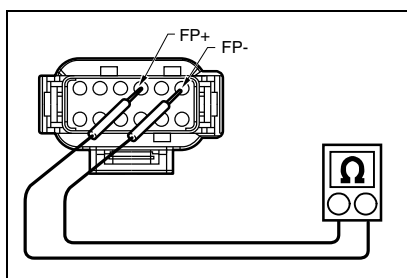


SAPH161360200054

3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 12P connector.
- (2) Measure resistance between the terminals AP+ and AP- of the atomizer 12P connector.

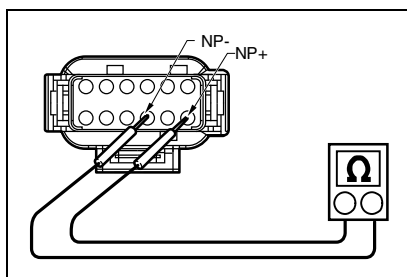
Standard value: 40 kΩ or more



SAPH161360200055

- (3) Measure resistance between the terminals FP+ and FP- of the atomizer 12P connector.

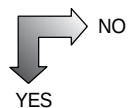
Standard value: 40 kΩ or more



SAPH161360200056

- (4) Measure resistance between the terminals NP+ and NP- of the atomizer 12P connector.

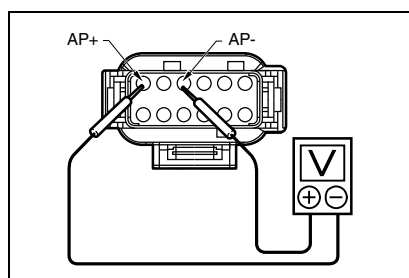
Standard value: 40 kΩ or more



Faulty atomizer

FUEL CONTROL (BURNER)

DN02-73

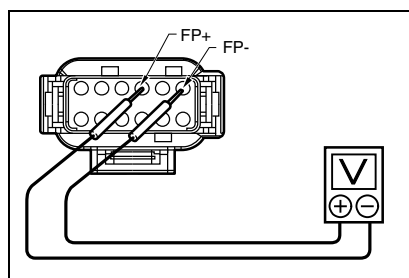


SAPH161360200057

4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals AP+ and AP- of the atomizer 12P connector.

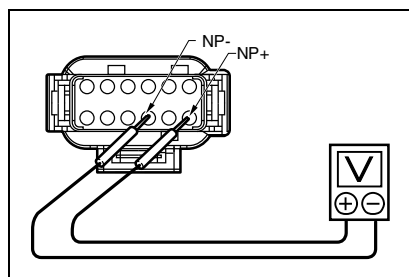
Standard value: 4 V or less



SAPH161360200058

- (2) Measure resistance between the terminals FP+ and FP- of the atomizer 12P connector.

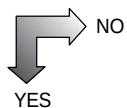
Standard value: 4 V or less



SAPH161360200059

- (3) Measure resistance between the terminals NP+ and NP- of the atomizer 12P connector.

Standard value: 4 V or less



NO

Faulty atomizer

YES

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DN02-74

FUEL CONTROL (BURNER)

DTC:P141B (Check sheet)

EN1613602F200034

DTC:P141B

Flame temperature sensor - out of range (Out of range low)

1. Technical description

- Flame temperature sensor detects the temperature, disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON (except burner activation)

(2) Judgment criteria**DTC : P141B**

- Flame temp sensor voltage < 0.1V for more than 1sec
(-50°C at BCU temp 25°C)

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Flame temp sensor:

- Sensor disconnection
- Abnormal resistance of sensor
- Disconnection or short-circuit in sensor harness

Harness: Disconnection or short-circuit in harness between the sensor and BCU

FUEL CONTROL (BURNER)

DN02-75

DTC:P141B	Flame temperature sensor - out of range (Out of range low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Flame temperature sensor	Disconnect the sensor connectors and measure resistance and voltage between the terminals of the mating connectors.	0.3 Ω or higher, 1.2 Ω or lower 0.1 V or lower		Sensor Replace
2	Harness	Reconnect the sensor connectors and disconnect the BCU connectors. Measure resistance and voltage between the terminals of the mating BCU connector on the wire harness.	0.3 Ω or higher, 1.2 Ω or lower 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

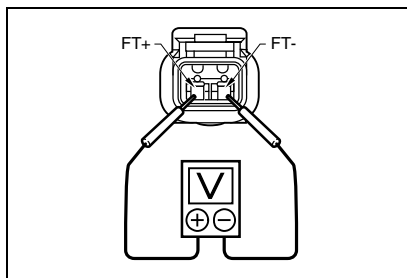
DN02-76

FUEL CONTROL (BURNER)

DTC:P141B

EN1613602F200035

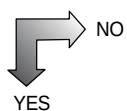
DTC	P141B	Flame temperature sensor - out of range (Out of range low)



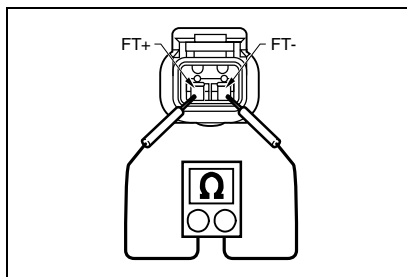
1. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the flame temperature sensor connector.
- (3) Measure voltage between the terminals FT+ and FT- of the flame temperature sensor connector.

Standard value: 0.1 V or less



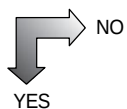
Faulty harness



2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Measure resistance between the terminals FT+ and FT- of the flame temperature sensor connector.

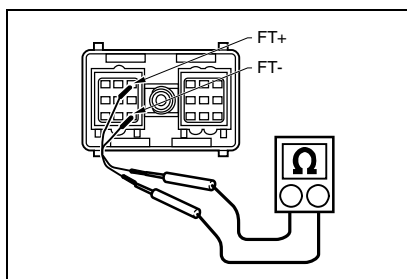
Standard value: 0.3 Ω or more



Faulty flame temperature sensor

FUEL CONTROL (BURNER)

DN02-77

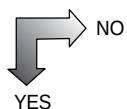


SAPH161360200062

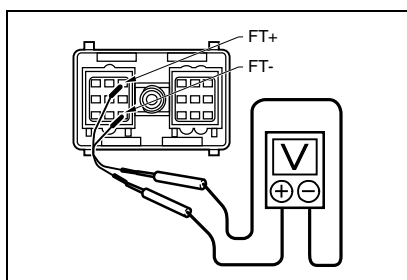
3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Connect the flame temperature sensor connector.
- (2) Disconnect the BCU 18P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals FT+ and FT- of the BCU 18P connector on the harness side.

Standard value: 0.3 Ω or more



Faulty harness

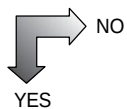


SAPH161360200063

4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals FT+ and FT- of the BCU 18P connector on the harness side.

Standard value: 0.1 V or less



Faulty harness

Irregular contact of connectors

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DN02-78

FUEL CONTROL (BURNER)

DTC:P141C (Check sheet)

EN1613602F200036

DTC:P141C

Flame temperature sensor - out of range (Out of range high)

1. Technical description

- Flame temperature sensor detects the temperature, disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC : P141C**

- Flame temp sensor voltage > 4.2V for more than 0.5sec
(1,200°C at BCU temp 25°C)

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Flame temp sensor:

- Sensor disconnection
- Abnormal resistance of sensor
- Disconnection or short-circuit in sensor harness

Harness: Disconnection or short-circuit in harness between the sensor and BCU

FUEL CONTROL (BURNER)

DN02-79

DTC:P141C	Flame temperature sensor - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Flame temperature sensor	Disconnect the sensor connectors and measure resistance between the terminals of the mating connectors.	0.3 Ω or higher, 1.8 Ω or lower		Sensor Replace
2	Harness	Reconnect the sensor connectors and disconnect the BCU connectors. Measure resistance between the terminals of the mating BCU connector on the wire harness.	0.3 Ω or higher, 1.8 Ω or lower		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

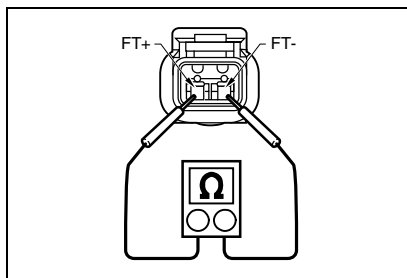
DN02-80

FUEL CONTROL (BURNER)

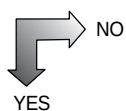
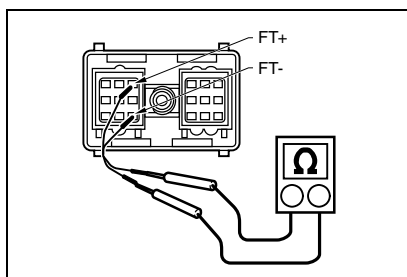
DTC:P141C

EN1613602F200037

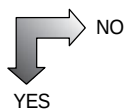
DTC	P141C	Flame temperature sensor - out of range (Out of range high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the flame temperature sensor connector.
- (3) Measure resistance between the terminals FT+ and FT- of the flame temperature sensor connector.

Standard value: 0.3 Ω or moreNO
Faulty flame temperature sensor**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Connect the flame temperature sensor connector.
- (2) Disconnect the BCU 18P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals FT+ and FT- of the BCU 18P connector on the harness side.

Standard value: 0.3 Ω or moreNO
Faulty harness

Irregular contact of connectors

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-81



DN02-82

FUEL CONTROL (BURNER)

DTC:P141D (Check sheet)

EN1613602F200038

DTC:P141D

Flame temperature sensor - rationality

1. Technical description

- Characteristic abnormality of the flame temperature sensor is sensed by judging the difference between the actual temperature and model temperature.
- The model temperature is predicted from the engine speed/load and exhaust gas flow based on the other two temperature sensor values (exhaust temperature (burner inlet) and exhaust temperature (burner outlet)).
- A judgment is made when the burner is not operating (when not lit) and the exhaust brake is inactive.

2. DTC set condition

(1) Check conditions

When the following three conditions are met:

- After continuing to operate the engine for 10 minutes
- and
- After continuing to make the burner non-operating for 10 minutes
- and
- After continuing to make the exhaust brake inactive for 10 minutes

(2) Judgment criteria

The following conditions are met for 30 seconds.

- | Actual temp - Predicted temp from (EGT*(Burner Inlet)) | > 50°C(122°F)
 - and
 - | Actual temp - Predicted temp from (EGT*(Burner Outlet)) | > 50°C(122°F)
- * EGT : Exhaust Gas Temperature

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

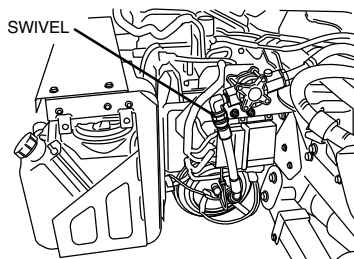
Flame tem. sensor: Sensor characteristic abnormality, disconnection/short-circuiting
Combustion air valve: Stuck in open position (P2441)
Air flow meter: Malfunction
Wire harness: Disconnection/short-circuiting
Intake and exhaust: Leakage

FUEL CONTROL (BURNER)

DN02-83

DTC:P141D		Flame temperature sensor - rationality		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	System	Check DTC on Burner	No P2080 and P2084		If both P2080 and P2084 exists, proceed to No. 4.
2	Wire harness	Check that no malfunction code of disconnection/short-circuiting is issued (Burner).	No P141B and P141C to be detected.		Proceed to analysis of the relevant DTC.
3	Air flow meter	Check that no malfunction code of the air flow meter is issued (Engine).	No P0101, P0102 and P0103 to be detected.		Proceed to analysis of the relevant DTC.
4	Combustion air valve (CAV)	- Turn off the engine, and starter switch position must be "OFF". - Remove the combustion air hose from CAV. - Disconnect the wiring harness coupler for flame temperature sensor. - Connect Hino-DX to the vehicle, then set the starter switch to the "ON" position. - Select "Burner". - Start the engine. - Activate "Combustion Air Valve" for 10 seconds, then deactivate for 10 seconds by "Activation test" in Hino-DX. - Repeat step7. thirty times. (Detail on next page A) ⚠ DANGER Burner System may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If electric circuit for flame temperature sensor has a open circuit, burner operation becomes aborted. Therefore, to make sure to disconnect the wiring harness coupler for flame temperature sensor prior this procedure. Otherwise, flame may be spilling from the combustor. This condition makes DTC: P141C (Flame Temp Sensor Circuit High) and MIL comes ON.	(1) Air coming from CAV when CAV is activated (2) No Air coming from CAV when CAV is deactivated		Replace the CAV
5	Exhaust Brake	Check the exhaust brake whether butterfly does contact with the exhaust pipe or not.	No contact with exhaust pipe No stuck		Replace exhaust brake
6	System	To perform manual regen and log the burner data during forced regen. (Detail on next page B)	No abnormal wave form appears in all three sensor value		BCU replacing
If parts has been replaced by this DTC, the event log should be collected. And collected event log should be provided to Hino TSM(Technical Service Manager).					

(1) Remove The Combustion Air Hose From CAV



- Mount it without bending the hose with the combustion air valve free.
- When tightening, fold the hexagonal part under the swivel with the wrench.

Mount the combustion air valve.

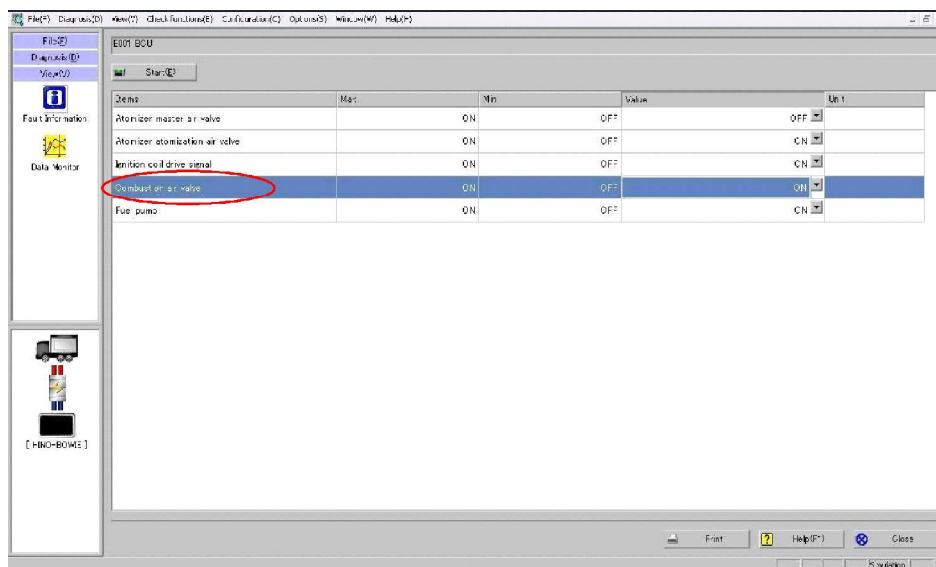
Tightening Torque:

41-61 N·m {418-622 kgf·cm, 31-45 lbf·ft}

NOTICE

- When removing, be sure to remove the swivel on the vehicle upper side.
- After removal, be careful to avoid entry of foreign matter into the pipe.

(2) Check Using Hino-DX



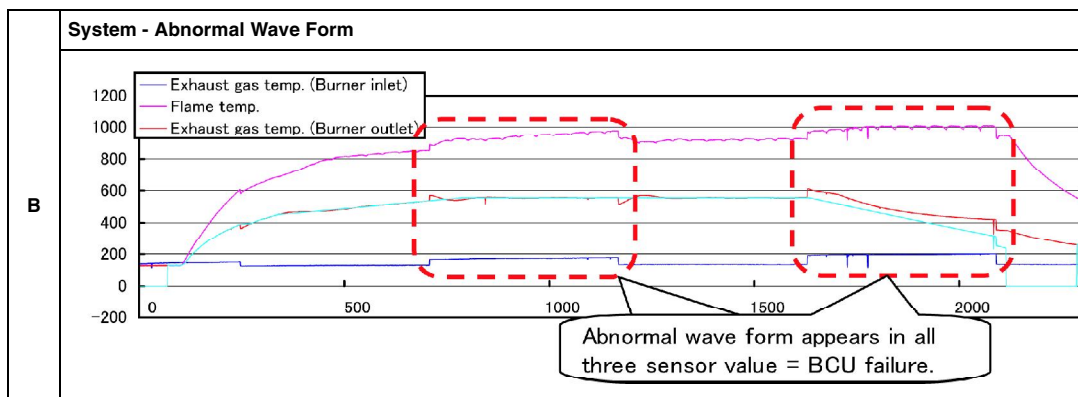
⚠ DANGER

Burner System may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If exhaust brake is turned on, Burner System never been turned on. Therefore, drain cock of air tank must be opened continuously during this checking. Otherwise, flame may be spilling from the combustor.

This condition may make DTC: P0410 (Air pressure too low, Pending, No MIL) and P2431 (Air supply failure, Confirmed, MIL ON).

FUEL CONTROL (BURNER)

DN02-85



DN02-86

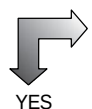
FUEL CONTROL (BURNER)

DTC:P141D

EN1613602F200039

DTC	P141D	Flame temperature sensor - rationality

1. CHECK THAT NO OTHER MALFUNCTION CODES EXIST SIMULTANEOUSLY.



NO

Proceed to other malfunction codes.

YES

Faulty flame temperature sensor

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, start the engine. After the non-operating state of the burner continues for 12 minutes, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-87



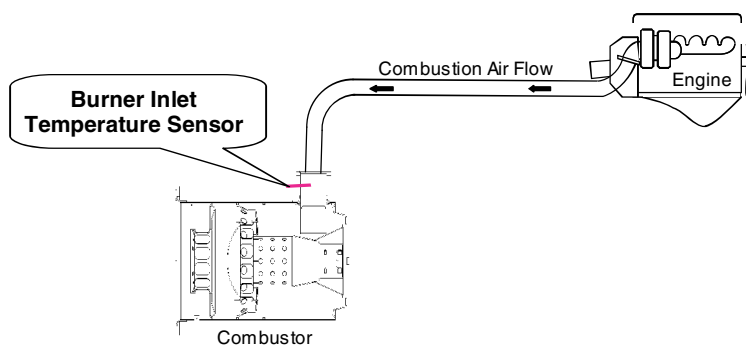
DTC:P2029 (Check sheet)

EN1610602F200093

DTC:P2029	Exhaust gas temperature (Burner inlet) too high

1. Technical description

- BCU monitor the burner inlet temperature sensor value.
- BCU detects excessive high temperature in burner inlet when this DTC set.

**2. DTC set condition****(1) Check conditions**

- 5 seconds elapsed after the engine starting up

(2) Judgment criteria

- Exhaust Gas Temp (Burner inlet) >550°C {1,022°F} for 1sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Possible Root Causes

Cracked or loose fastener on the exhaust pipe/flange

Misreading of the burner inlet temperature sensor

Excessive filled engine oil volume

Lack of intake airflow for the engine: Clogged air cleaner element,

Air leakage from air intake pipe(s),

Clogged air intake pipe(s)

Combustion Air Valve (CAV) stuck open

Clogged exhaust pipe: exhaust brake valve sticking to the exhaust pipe

Turbo malfunction

Incorrect valve clearance

FUEL CONTROL (BURNER)

DN02-89

DTC:P2029	Exhaust gas temperature (Burner inlet) too high	Inspection Procedure

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
1	DTC confirmation (BCU)	Check if any of following DTCs are stored (P0545, P0546, P2080)	DTCs are stored → YES No DTCs stored → NO		Go to diagnostic procedure of a relevant DTC	Go to Step 2
2	DTC confirmation (Engine ECU)	Check if any of DTC is stored other than P141F	Other DTC(s) exist(s) → YES P141F only → NO		Go to diagnostic procedure of a relevant DTC	Go to Step 3
3	Exhaust pipe	Checking for pipe cracks, connection status confirmation	Leakage, cracks exist → YES No leakage, cracks → NO		Repair or replace the exhaust pipe	Go to Step 4
4	Air intake hose	Check for air leakage from the hose	Existence of air leakage or bad connections → YES No air leakage or bad connection → NO		Repair or replace the hoses	Go to Step 5
5	Air cleaner element	Checking for non-original parts, clogging, or dirt	Existence of clogging, dirt Existence of non-original parts → YES No problem (original parts, normal condition) → NO		Replace the air cleaner element	Go to Step 6
6	Turbocharger	Confirmation of actual turbo opening taking place	The actual opening corresponds to the commanded opening on the inspection screen → YES The actual opening does not correspond to the commanded opening → NO		Go to Step 7	Replace the turbocharger
7	Exhaust brake	Exhaust brake inspection Injection quantity difference at the time of exhaust brake ON/OFF 10 - 18 mm ³ /st	Injection quantity difference within 10 - 18 mm ³ /st Injection quantity difference outside the above range → NO		Go to Step 8	Adjust the exhaust brake opening angle
8	Engine oil	Oil level confirmation	No problem (Gauge level within the specified value) → YES Gauge level outside the specified value → NO		Go to Step 9	Adjust the oil level
9	CAV	CAV operation confirmation	No problem (Normal operation) → YES Abnormal operation → NO		Go to Step 10	Replace the CAV

DN02-90

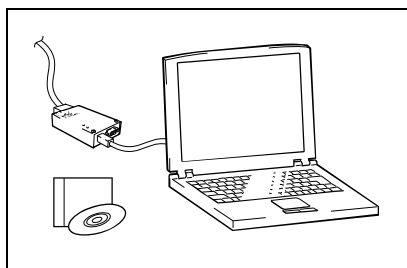
FUEL CONTROL (BURNER)

Step	Parts	Description	Judgment	Action		
				Check (YES/ NO)	YES	NO
10	Air piping	Checking for air leakage of the combustion air hose (piping)	Air leakage → YES No air leakage → NO		Repair or replace the air piping	Go to Step 11
11	Engine	Valve clearance confir- mation Intake: 0.30 mm (0.0118 in) Exhaust: 0.45 mm (0.0177 in.)	Outside the specified value → YES No problem (within the speci- fied value) → NO		Replace the BCU	Adjust the valve clear- ance

DTC:P2029

EN1613602F200041

DTC	P2029	Exhaust gas temperature (Burner inlet) too high

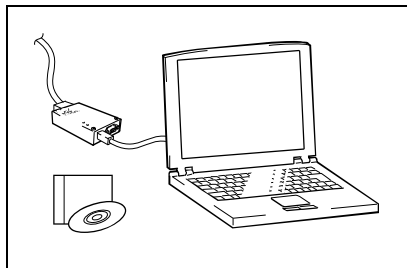
1 Other system DTC confirmation

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position
- 4 Select the BCU and confirm the DTC output.
Check for a fault code other than (P2029)

Judgment	P0545, P0546, P2080, etc. → YES
	No DTC → NO

YES → Go to diagnostic procedure of a relevant DTC.

NO

2 Other system DTC confirmation

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position
- 4 Select "Engine ECU" and check if any of DTC is stored other than P141F.

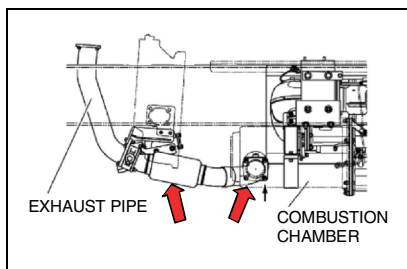
Judgment	Other DTC is stored → YES
	Only P141F → NO

YES → Go to diagnostic procedure of a relevant DTC.

NO

DN02-92

FUEL CONTROL (BURNER)

3 Exhaust pipe inspection**1 Inspect the exhaust pipe visually for cracks and leakage.**

Judgment	Cracks or leakage → YES
	No cracks or leakage → NO

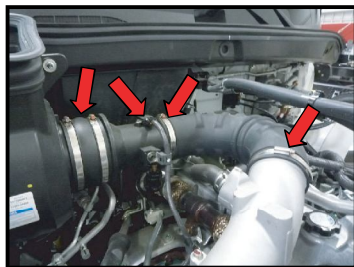
YES	Repair or replace the exhaust pipe.

NO

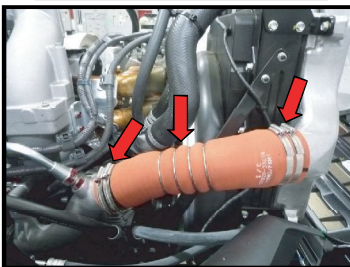
4 Check the air intake hoses**1 Check the air intake hoses condition.**

<Proper condition>
NO bending
NO leakage

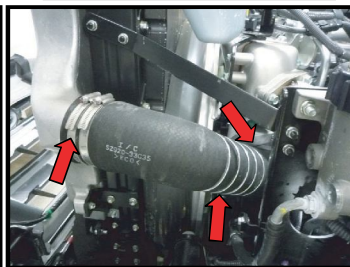
Check tightness and no bending



Check tightness, no bending and no leak



Check tightness, no bending and no leak



P2029-3

Judgment	Proper condition → YES
	Improper condition → NO

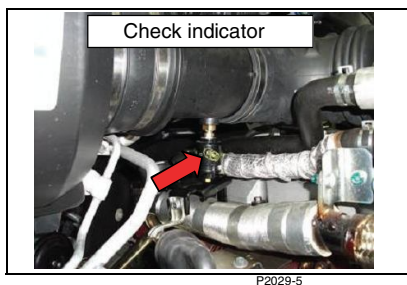
NO	Repair or replace the hoses.

YES

5 Check the air cleaner condition**1 Check the air cleaner element condition.**

<Proper condition>
NO restriction
Genuine parts

Judgment	Proper condition → YES
	Improper condition → NO



NO

Replace the air cleaner element.

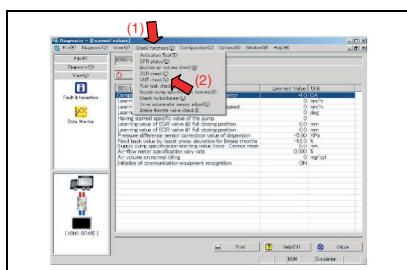
YES

6 Check the Turbocharger**Check the followability of VNT controller.**

- 1 Set the starter switch to the "LOCK" position.
- 2 Warm-up the engine (Coolant temperature: 60°C {140°F} or more).
- 3 Stop the engine.
- 4 Connect Hino-DX to the vehicle.
- 5 Set the starter switch to the "ON" position.
- 6 Select "Engine ECU".
- 7 Check the followability of VNT controller by "check functions" of Hino-DX.
- 8 Check time lag between directed VNT position value and VNT actual position value.

DN02-94

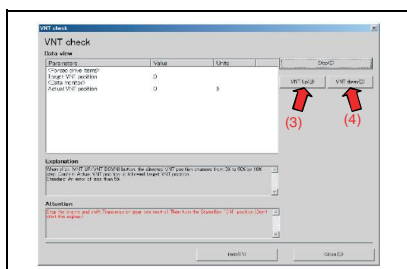
FUEL CONTROL (BURNER)



P2029-15

<Inspection procedure>

- (1) Select "Check functions".
- (2) Select "VNT check".



P2029-16

- (3) Select "VNT UP" and click "Check start".
Check time lag (followability) between target VNT position value and actual VNT position value.
- (4) Select "VNT Down" and click "Check start".
Check time lag (followability) between target VNT position value and actual VNT position value.

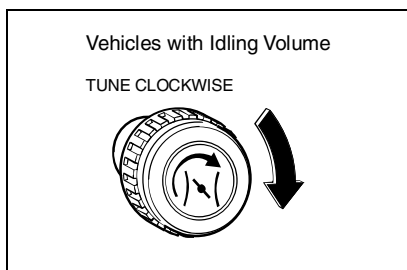
Judgment	Response delay: less than 3 seconds.
	less than 3 seconds → YES
	3 seconds or more → NO

NO

Replace the turbocharger.

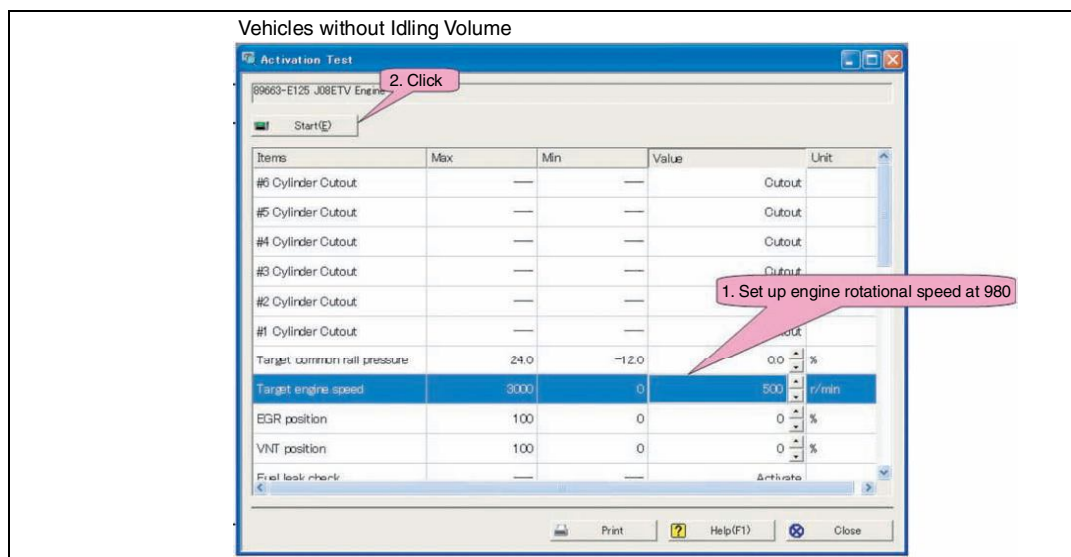
YES

7 Check the Exhaust Brake



P2029-17

- 1 Warm up the engine until engine coolant temperature reaches over 80°C {176°F}.
- 2 Turn off air conditioning and PTO.
- 3 Adjust engine speed to 980 r/min by idle volume.
- 4 Measure injection quantity on Hino-DX when exhaust brake is ON and OFF.



P2029-18

Judgment

Injection quantity "exhaust brake ON" -
Injection quantity "exhaust brake OFF"

10 to 18 mm³/st → YES

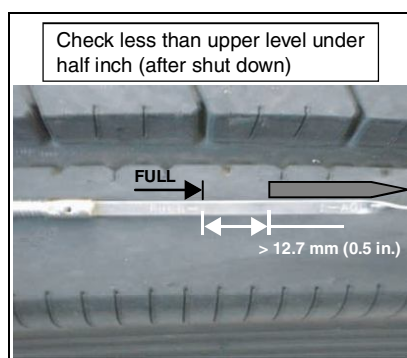
NOT within criteria → NO

NO

Adjust exhaust brake opening angle.

YES

8 Check engine oil level



P2029-9

YES

1 Check engine oil level

<Proper condition>

Engine oil level is in the preferred area.

Judgment

Proper condition → YES

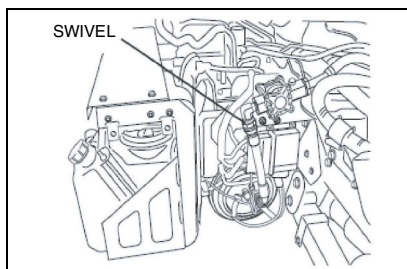
Improper condition → NO

NO

Adjust oil level to the preferred area.

DN02-96

FUEL CONTROL (BURNER)

9 Check the CAV operation

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Remove the combustion air hose from CAV.
- 3 Disconnect the wiring harness coupler for flame temperature sensor.
- 4 Connect Hino-DX to the vehicle, then set the starter switch to the "ON" position.
- 5 Select "Burner".
- 6 Start the engine.
- 7 Activate "Combustion Air Valve" for 10 sec, then deactivate for 10 sec.
- 8 Duplicate (7) 30 times.

- Mount it without bending the hose with the combustion air valve free.
- When tightening, fold the hexagonal part under the swivel with the wrench.
- a. Mount the combustion air valve.

Tightening Torque:

41 - 61 N·m {418 - 622 kgf·cm, 31 - 45 lbf·ft}

NOTICE

- When removing, be sure to remove the swivel on the vehicle upper side.
- After removal, be careful to avoid entry of foreign matter into the pipe.

⚠ DANGER

Burner System may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If electric circuit for flame temperature sensor has a open circuit, burner operation becomes aborted. Therefore, to make sure to disconnect the wiring harness coupler for flame temperature sensor prior this procedure. Otherwise, flame may be spilling from the combustor.

This condition makes DTC: P141C (Flame Temp Sensor Circuit High) and MIL comes ON.

Judgment	Air is coming from CAV when CAV is ON. and NO air is coming from CAV when CAV is OFF. → YES
	Air is NOT coming from CAV when CAV is ON. or Air is coming from CAV when CAV is OFF. → NO

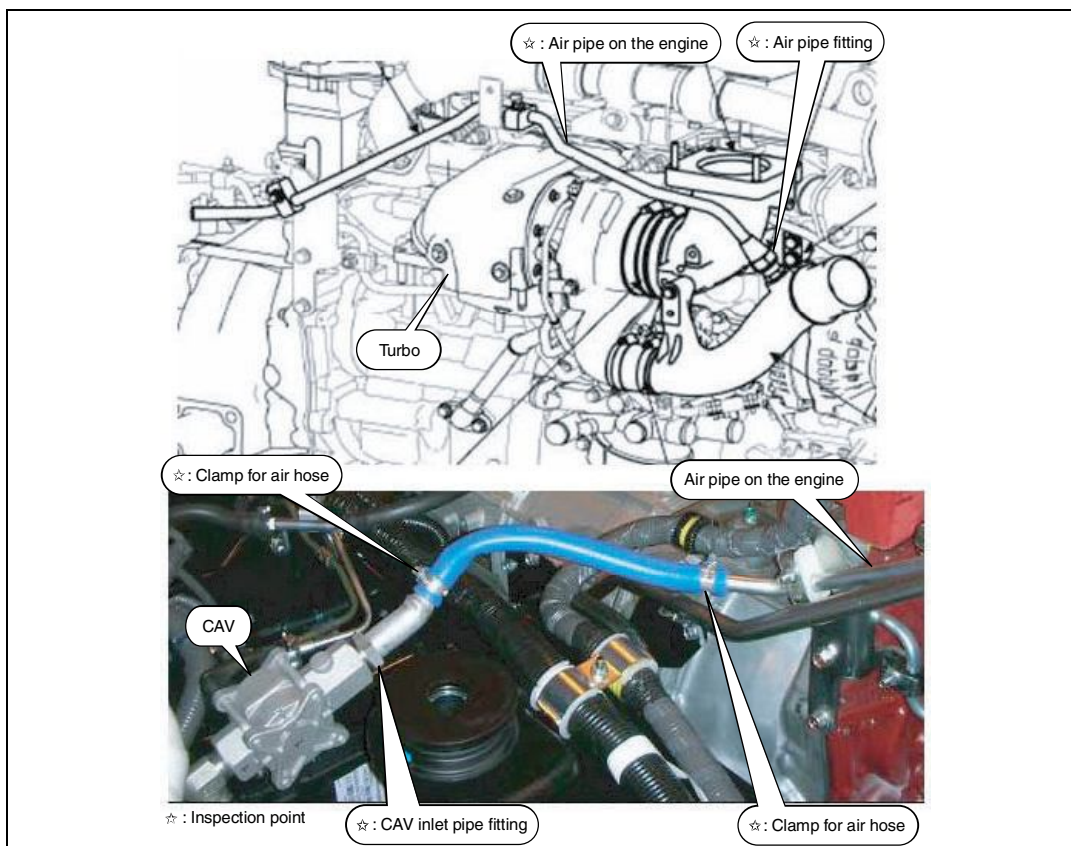
YES

Replace the CAV.

NO

10 Check air leakage from the air plumbing visually**1 Check the air plumbing visually.****<Proper condition>**

NO damage, or LOOSEN of fitting.



P2029-13

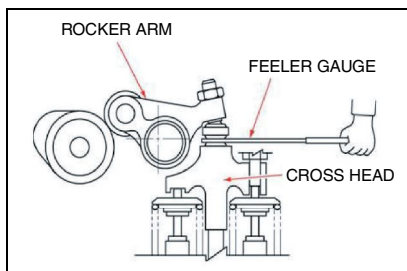
Judgment	There is damage, or loosen of fitting → YES
	NO damage or loosen of fitting → NO

YES	Inspect and repair the air plumbing.

NO

DN02-98

FUEL CONTROL (BURNER)

11 Check the valve clearance**1 VALVE CLEARANCE CHECKING (when cold).**

Judgment	Intake valve: 0.30 mm (0.0118 in.) Exhaust valve : 0.45 mm (0.0177 in.)
	Specified value → YES
	NOT specified value → NO

NO

Adjust the valve clearance.

YES

Replace the BCU.



FUEL CONTROL (BURNER)

DN02-99



DN02-100

FUEL CONTROL (BURNER)

DTC:P2030 (Check sheet)

EN1610602F200093

DTC:P2030	Burner abnormal combustion (Burner misfire, Lost flame, Burner outlet temperature too high, Unable to achieve target temperature)

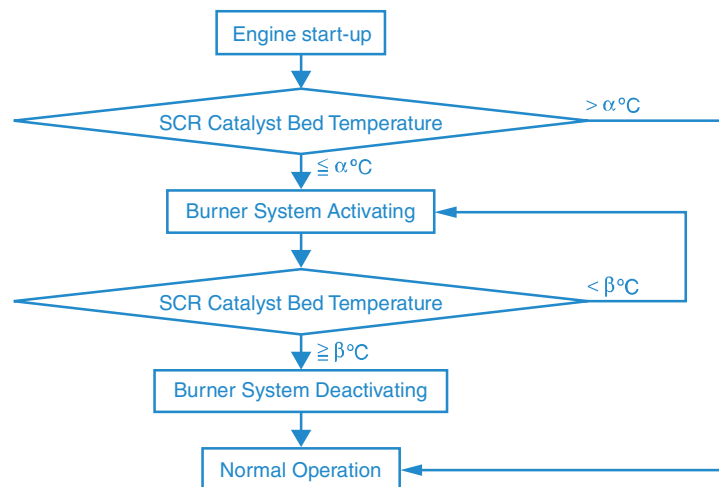
1. Technical description

- Abnormal combustion in the burner system is detected.
Since the error details are described for the simultaneously-set malfunction code, proceed to the malfunction analysis of the relevant DTC.
- When BCU judge MISFIRE, LOST FLAME, UNABLE TO ACHIEVE TARGET TEMP, BCU goes to the extra diagnosis mode in order to seek the root cause.
BCU judges P2441 or P2436 according to the result of this diagnosis mode.

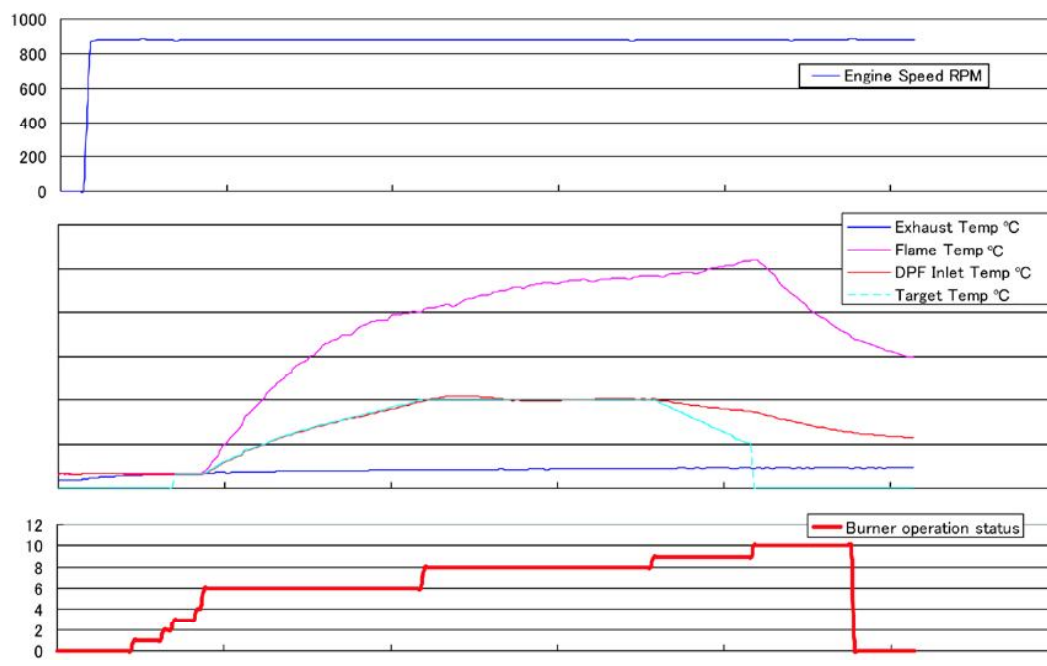
2. DTC set condition**(1) Check conditions**

Burner System Operation Status				
Status #	Description	Purpose	Duration	
			SCR Warm Up Mode	DPR Regen Mode
0	Accumulating Soot	Waiting ECU Command	-	-
		To dry ignitor tips after misfire, lost flame event	<u>10min</u>	<u>10min</u>
1	Checking Outputs	Electrical Parts Function Check	8sec (ON : 4sec, OFF : 4sec)	
2	Cleaning ignitors	Burnt up soot on ignitors by spark	NORMAL: <u>3sec</u> After after misfire, lost flame event in previous fueling cycle: <u>5 min</u>	NORMAL: <u>5sec</u> After after misfire, lost flame event in previous fueling cycle: <u>5 min</u>
3	Preparing Regeneration	Build up fuel pressure (by fuel pump)	<u>7sec</u>	
4	Detecting Flame	Ignition	<u>Maximum 10sec</u> (If no flame detected within this 10sec, MISFIRE)	
6	Ramping Up	Ramping up exh gas temp	Depend on initial DPR inlet temp (Ramping Up Speed: 3.75 °C {38.75 °F}/sec)	Depend on initial DPR inlet temp (Ramping Up Speed: 3.75 °C {38.75°F}/sec (< 450 °C {842°F}), 1 °C {33.8 °F}/sec (> 450 °C {842°F}))
8	Regenerating	Holding hot exh gas temp	Depend on condition	
9	Cooling Down	Burnt up soot on ignitors and on combustor internal surface by small flame	<u>30sec</u>	<u>180sec</u>
10	Shutting Down	Fuel purge and cool down	<u>30sec</u>	
11	Extended Shut Down	Extended ignitor cleaning after exhaust brake event	<u>5min</u> when exhaust brake was turned on in fueling cycle	
12	Active diagnostic	Diagnose failure component (e.g. will be switched this mode after detected P2030)		

- Purpose of the burner system are,
(1) SCR WARM UP MODE
 - To elevate exhaust gas temp just after engine start up for improving NOx reduction efficiency by DEF-SCR system.
 - During this activation, engine speed becomes **880 r/min**.
- <Operation Flow>

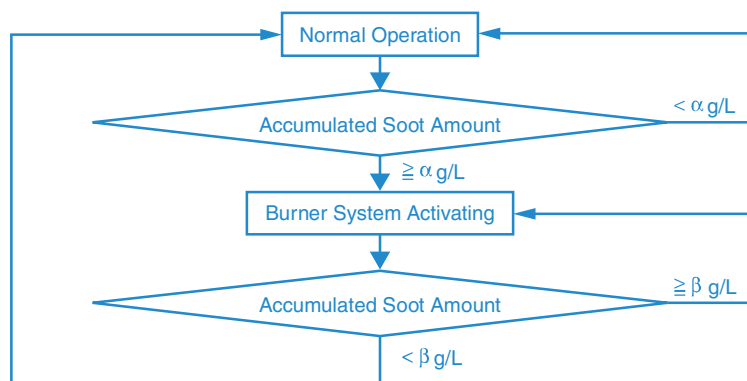


<SAMPLE : Operation Sequence and Normal Behavior>

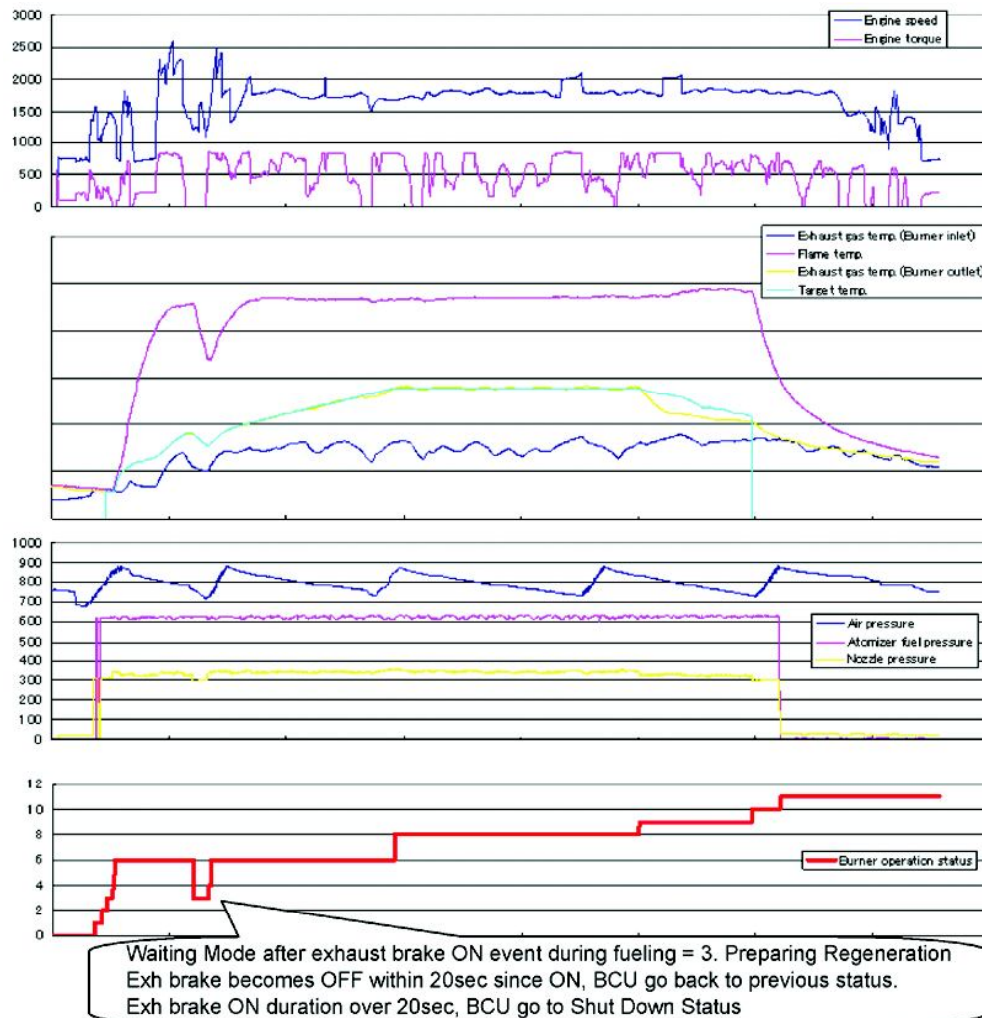


(2) Elevate exhaust gas temp for DPR active regeneration

<Operation Flow>

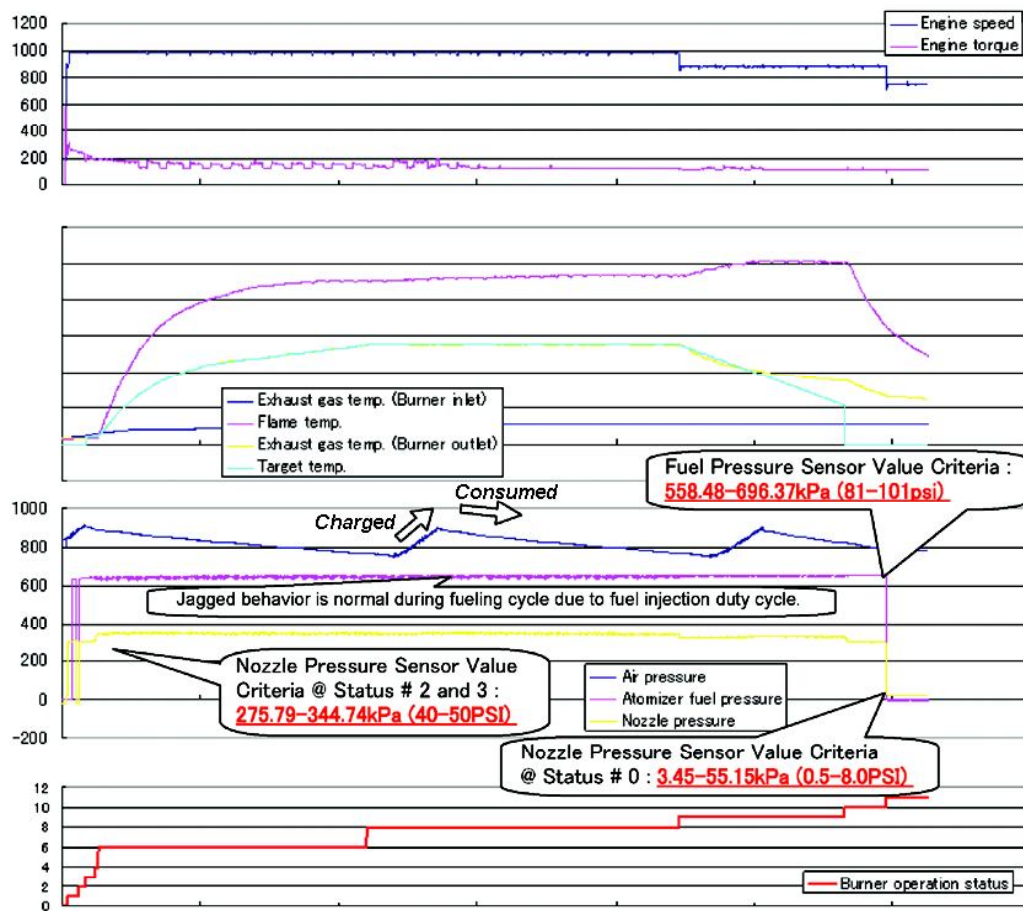


<SAMPLE : Auto Regen Operation Sequence and Normal Behavior>

**Automatic regen stop conditions**

- (1) DPR regeneration done
- (2) Exhaust brake turned on
- (3) Vehicle speed is "0" for more than 2 minutes
- (4) Geared in to "R" range
- (5) Relative failure detected
(e.g. Over temp of DPR inlet/outlet
Excessive soot - DTC P244B detected)
- (6) Key off / Engine stall

<SAMPLE : Manual Regen Operation Sequence and Normal Behavior>
During MANUAL REGENERATION, engine speed becomes 980 r/min.

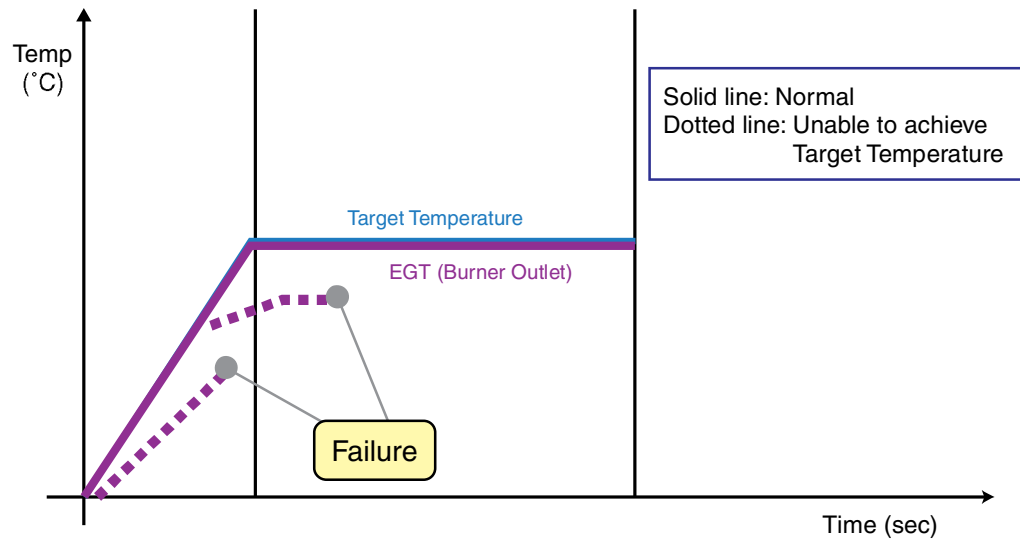


Manual regen cancellation conditions

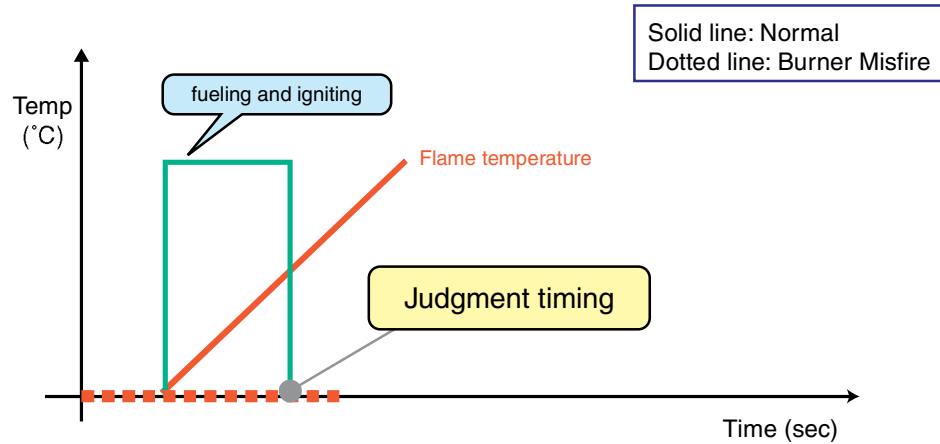
- (1) DPR regeneration done
- (2) Accelerated
- (3) PTO enabled
- (4) Geared in except "P" or "N" range
- (5) DPR regen button pushed twice
- (6) Relative failure detected
(e.g. Over temp of DPR inlet/outlet
Excessive soot - DTC P244B detected)
- (7) Vehicle speed detected
- (8) Key off / Engine stall

(2) Judgment criteria

- Unable to achieve target temperature
The purpose of the burner system is to raise the exhaust gas temperature at burner outlet.
The exhaust gas temperature sensor (Burner outlet) value lower than a target temperature value during operating state of the burner system.

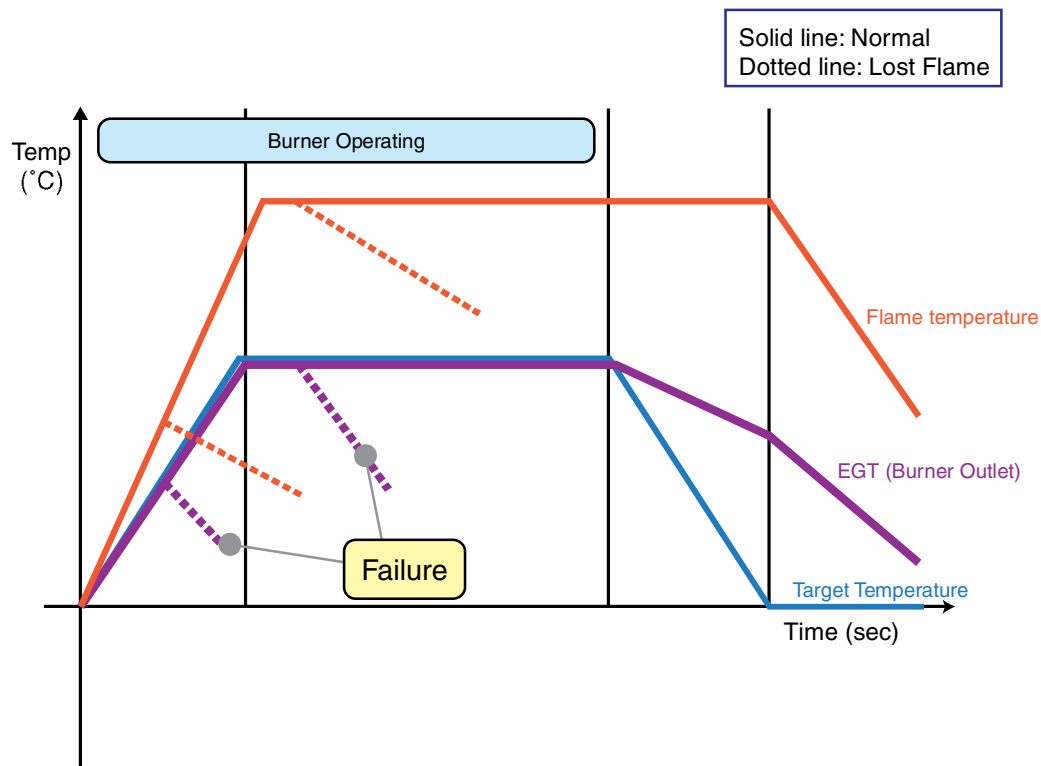


- Multiple Burner misfire
Flame temperature does not increase for 10 sec after fueling and igniting.



- Multiple Lost flame
The purpose of the burner system is to raise exhaust gas temperature at burner outlet. It means the exhaust gas temperature sensor (Burner outlet) value reduces immediately when lost flame occur.

Decreasing of Exhaust gas temperature (Burner Outlet)



- Exhaust gas temperature (Burner outlet) too high $> 700^{\circ}\text{C}$ $\{1,292^{\circ}\text{F}\}$ for 1 sec
Burner outlet temp sensor value exceeds the threshold.

FUEL CONTROL (BURNER)

DN02-107

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

ROOT CAUSES	PRESSUMED CAUSE	SUGGESTION
NO SPARK on the tip of ignitors	Damaged ignition coil internal electrical components	Check the spark present or not
	Ignition Coil SHORT Circuit caused by water intrusion to the ignition coil internal	Check the ignition coil isolation resistance
	Excessive soot build up on the ignitor tips	Clean up the ignitors
	Excessive fuel on the ignitor tips. It means excessive soot from the engine has emitted.	Check the turbo
		Check EGR Valve
		Check the exhaust brake failure
		Check the air cleaner element
		Check air intake hoses on the engine
		Check the injectors on the engine
LACK of COMBUSTION AIR from the turbo	Damaged ignitor ceramics	Check the ignitors
	Loose of the ignition cable	Check the ignition cables
	Loose of the Battery Ground for the burner system	Check the battery ground on the left side frame rail
	CAV (Combustion Air Valve) stuck closed	Check the CAV
	Air leakage from the combustion air plumbing	Check the combustion air hoses/connectors
	Kinked combustion air hose/plumbing	Check the combustion air hoses
	Turbo failure	Check the turbo
	EGR Valve failure	Check EGR Valve
	Stuck exhaust brake failure	Check the exhaust brake failure
LACK of INJECTED FUEL Q'ty from the atomizer	High restriction on the air cleaner element	Check the air cleaner element
	Plugged/kinked air intake hose in the engine	Check air intake hoses on the engine
	EXCESSIVE HIGH BACK PRESSURE in a downstream of the combustor. Excessive high accumulated soot on DPR	Check the injectors on the engine
Uncontrolled airflow internal of the combustor	Plugged fuel line between the atomizer and the nozzle	Check the fuel line
	Atomizer injector issue	In this case P2436 (Atomizer Failure) appears
CONTROL FAILURE	Combustor internal shape issue (i.g. loose internal component)	Check no rattling from the combustor
	Flame temp sensor failure	Check insulation resistance/junction resistance
	Outlet temp sensor failure	Check insulation resistance/junction resistance
	BCU failure	In this case, other DTC appears

DN02-108

FUEL CONTROL (BURNER)

DTC:P2030	Burner abnormal combustion (Burner misfire, Lost flame, Burner outlet temperature too high, Unable to achieve target temperature)	Inspection Procedure

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
0	Burner system	BCU software version is 25B3 or later?	25B3 or later → YES 2541 or 25A1 → NO		Go to Step 1	Update software
1	DTC confirmation (BCU)	Check whether the DTC except P2441 and pending fault code are stored. *Pending Fault Code : P0410, P0148, P2539	DTC(s) are stored on BCU except P2441 and Pending Fault Code → YES Only P2441 or Pending Fault Code are stored → NO		Go to diagnosis procedure of a relevant DTC	Go to Step 2
2	Air Cleaner	Check the air cleaner element condition. <Proper condition> NO restriction Genuine parts.	Proper condition → YES Improper condition → NO		Go to Step 3	Replace the air cleaner element
3	Air Intake Hoses	Check the air intake hoses condition. <Proper condition> NO bending NO leakage	Proper condition → YES Improper condition → NO		Go to Step 4	Fix / Replace the hose
4	Engine Oil Level	Check engine oil level	Proper condition → YES Improper condition → NO		Go to Step 5	Adjust oil level to the preferred area
5	Atomizer Nozzle	To confirm the nozzle clogging, check the nozzle pressure with idling condition.	The value is 55.15 kPa (8 psi) or less → YES The value is more than 55.15 kPa (8 psi) → NO		Go to Step 8	Go to Step 6
6	Atomizer Nozzle	To verify the clogging point, check the nozzle pressure with idling condition after removing the fuel tube from nozzle on combustor.	The value is 55.15 kPa (8 psi) or less → YES The value is more than 55.15 kPa (8 psi) → NO		Replace the nozzle, then confirm Step 5 again	Go to Step 7
7	Atomizer Nozzle	To verify the clogging point, check the nozzle pressure with idling condition after removing the fuel tube from atomizer.	The value is 55.15 kPa (8 psi) or less → YES The value is more than 55.15 kPa (8 psi) → NO		Replace the fuel tube, then confirm Step 5 again	Replace the atomizer, then confirm Step 5 again

FUEL CONTROL (BURNER)

DN02-109

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
8	Ignitors/ Ignition Coil	Check spark condition between ignitors.	There is SPARK between ignitors → YES There is NO SPARK between ignitors → NO		Go to Step 15	Go to Step 9
9	Ignition Cable	Check the ignition cable installation condition.	The exposed length is 7 mm (0.28 in.) or less and There is NO loose → YES The exposed length is more than 7 mm (0.28 in.) or There is loose → NO		Go to Step 10	Install the cable correctly, then verify the spark exist for 2min. If still NO spark, go to Step 10.
10	Ignition Cable	Check the ignition cable visually.	Proper condition → YES Improper condition → NO		Go to Step 11	Replace the ignition cable, then verify the spark exist for 2min. If still NO spark, go to Step 11.
11	Ignitors	Check the ignitor resistance.	It is 1 MΩ or more (Open circuit) → YES It is less than 1 MΩ → NO		Go to Step 12	Excessive soot may accumulate on the ignitors. Cleaning up ignitors by the wire brush and the BRAKE CLEANER, then verify the spark exist for 2min. If still NO spark, go to Step 12.
12	Ignitors	Check the ignitors visually.	There is soot/fuel on the ignitor → YES There is NO soot/fuel on the ignitor → NO		Cleaning up ignitors by the wire brush and the BRAKE CLEANER, then verify the spark exist for 2min. If still NO spark, go to Step 13.	Go to Step 13
13	GND Connection	Check the ground condition on the frame.	Proper condition → YES Improper condition → NO		Tighten correctly, then verify the spark exist for 2 min. If still NO spark, go to Step 14.	Go to Step 14
14	Ignition Coil	Ignition coil replacement, then check spark condition again	There is SPARK between ignitors for 2 min → YES There is NO SPARK between ignitors → NO	-	Completed	Replace the BCU

DN02-110

FUEL CONTROL (BURNER)

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
15	Ignition Cable	Check the ignition cable installation condition.	The exposed length is 7 mm (0.28 in.) or less and there is NO loose → YES The exposed length is more than 7 mm (0.28 in.) or there is loose → NO		Go to Step 16	Install the cable correctly
16	Ignition Cable	Check the ignition cable visually.	Proper condition → YES Improper condition → NO		Go to Step 17	Replace the Ignition cable
17	Ignitors	Check the ignitor resistance.	It is 1 MΩ or more (Open circuit) → YES It is less than 1 MΩ → NO		Go to Step 18	Excessive soot may accumulate on the ignitors. Cleaning up ignitors by the wire brush and the BRAKE CLEANER.
18	Ignitors	Check the ignitors visually.	There is soot/fuel on the ignitor → YES There is NO soot/fuel on the ignitor → NO		Cleaning up ignitors by the wire brush and the BRAKE CLEANER.	Go to Step 19
19	Fuel Plumbing	Check fuel plumbing from the fuel tank and the combustor visually.	There is fuel leakage or kinked fuel tube → YES There is NO fuel leakage and NO kinked fuel tube → NO		Repair correctly	Go to Step 20
20	Fuel	Check fuel filter.	Fuel filter has been replaced every two years → YES Fuel filter has not been replaced for two years or more → NO		Go to Step 21	Replace the fuel filter. And then priming by Hino-DX (to activate the fuel pump for 30 seconds).
21	Fuel	Check fuel condition in fuel filter.	Fuel is filled in fuel filter cup → YES Fuel is NOT filled in fuel filter cup → NO		Go to Step 22	Tighten the drain plug on the fuel filter. And then priming by Hino-DX (to activate the fuel pump for 30 seconds).
22	Fuel filter	Check fuel condition in fuel filter.	The condition is OK. (Fuel Color is YELLOW/GREEN, and No water in fuel) → YES Improper condition → NO		Go to Step 23	Replace the fuel or drain the water from the cup

FUEL CONTROL (BURNER)

DN02-111

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
23	Fuel Pump	Check the fuel pump.	The pressure range between 558.48 and 696.37kPa (81 and 101psi) → YES The pressure range is NOT stable between 558.48 and 696.37kPa (81 and 101psi) → NO		Go to Step 24	Replace the fuel pump
24	CAV	Check the CAV operation.	Air is coming from CAV when CAV is ON, and No air is coming from CAV when CAV is OFF → YES Air is NOT coming from CAV when CAV is ON, or Air is coming from CAV when CAV is OFF → NO		Go to Step 28	Go to step 25
25	Combustion Air Hose	Check the combustion air hose.	Proper condition → YES Improper condition → NO		Go to Step 26	Install the hose correctly
26	Air plumbing	Check the air plumbing visually.	There is damage or loose of fitting → YES NO damage or loose of fitting → NO		Inspect and repair the air plumbing	Go to Step 27
27	CAV Wiring Connection	Check the CAV wiring connection. Measure resistance between pins.	Resistance is within standard (Between 6 Ω and 10 Ω) → YES Resistance is NOT within standard → NO		Replace the CAV. (Mechanical stuck closed)	Replace the CAV. (Electrical issue)
28	Ignition Coil	Check the ignition coil connector visually.	Salt/Water on wire harness connector → YES NO salt/water on wire harness connector → NO		Replace ignition coil	Go to Step 29
29	Flame temp sensor	Check the flame temp sensor insulation resistance, between sheath and a terminal. Measured insulation resistance at room temperature is more than 1 M Ω at 500 VDC?	1 M Ω or more → YES Less than 1 M Ω → NO		Go to Step 30	Replace the flame temp sensor

After repairing, must to perform automatical and manual DPR regeneration and check that there are no abnormalities.

DTC:P2030

EN1620702F200001

DTC	P2030	Burner abnormal combustion (Burner misfire, lost flame, burner outlet temperature too high, unable to achieve target temperature)

NOTICE**BCU software version must be 25B3 or later before starting procedure.****Even if the root cause could be found out prior Step 24, Step 24 should be performed.****1 Check the DTC on Burner (BCU)**

DTC(s) are stored on Burner (BCU)
except P2441 and Pending Fault Code*?

*Pending Fault Code : P0410, P0148, P2539

P2030-09

1 Check whether the DTC except P2441 and pending fault code are stored.

Judgment	Is the DTC detected?
	DTC(s) are stored on BCU except P2441 and Pending Fault Code → YES
	Only P2441 or Pending Fault Code are stored → NO

YES

Proceed to troubleshooting for the DTC(s).
If multiple DTC's are stored,
priority to investigate is,
1. relative DTC w/Atomizer,
2. relative DTC w/BCU,
3. relative DTC w/Temp sensor,
4. relative DTC w/Voltage,
5. relative DTC w/Ignition

NO

DN02-114

FUEL CONTROL (BURNER)

2 Check the air cleaner condition



P2030-10

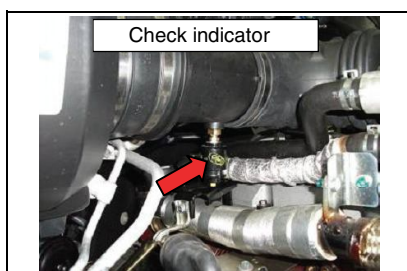
1 Check the air cleaner element condition.

<Proper condition>

NO restriction

Genuine parts

Judgment	Proper condition → YES
	Improper condition → NO



P2030-11

NO

Replace the air cleaner element.

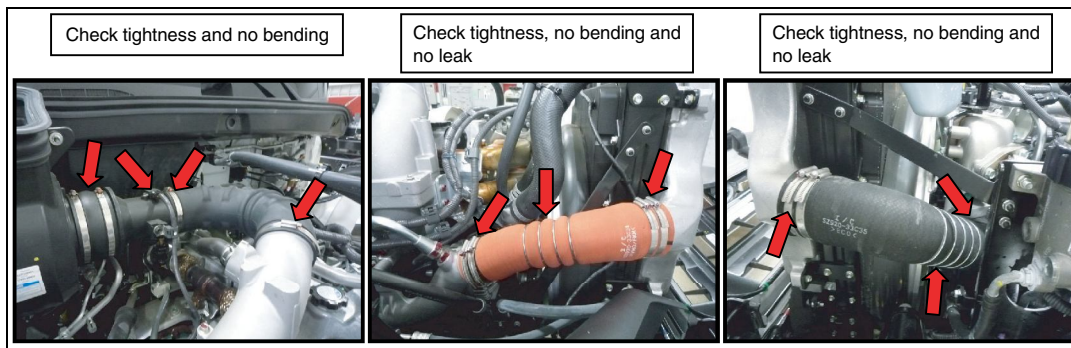
YES

3 Check the air intake hoses

- 1 Check the air intake hoses condition.

<Proper condition>

NO bending
NO leakage



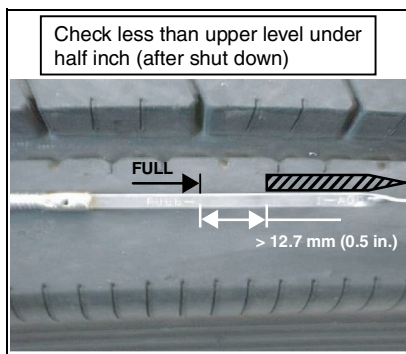
P2030-12

Judgment**Proper condition → YES****Improper condition → NO****NO****Fix / Replace the hoses.****YES****4 Check engine oil level**

- 1 Check engine oil level

<Proper condition>

Engine oil level is in the preferred area.



P2030-13

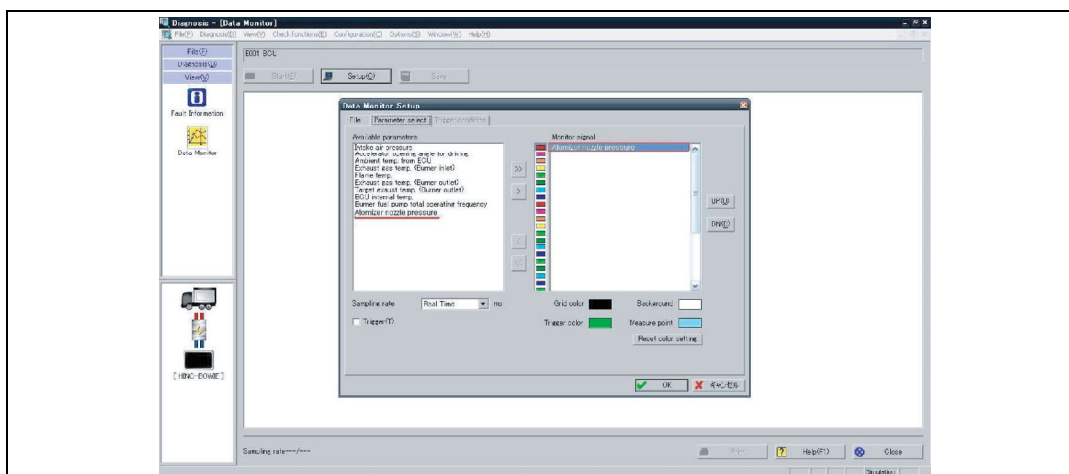
Judgment**Proper condition → YES****Improper condition → NO****NO****Adjust oil level to the preferred area.****YES**

5 Check atomizer nozzle (air) pressure with Hino-DX

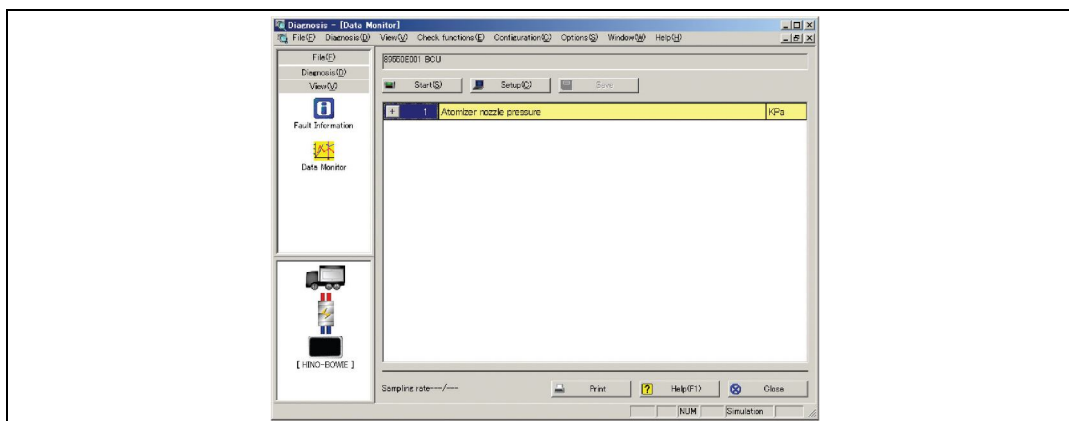
- 1 Connect Hino-DX to the vehicle, then turn starter switch position to "ON". (Do not start the engine)
- 2 Select "Burner".
- 3 Set up data monitor "atomizer nozzle pressure".
- 4 Start the engine (Idling condition).
- 5 Turn ON the exhaust brake switch.

CAUTION
If exhaust brake is not turned on, ignition may start.
This checking must be executed on un-ignition condition.

- 6 Check the value of "atomizer nozzle pressure" in data monitor for 5 seconds.



P2030-14



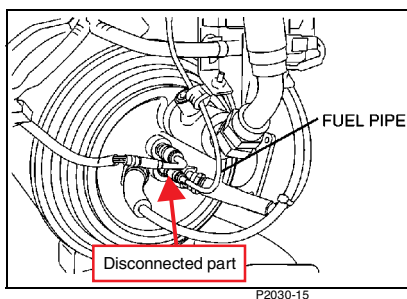
P2030-14-2

Judgment	Is the value 55.15kPa (8psi) or less?
	55.15kPa (8psi) or less → YES
	More than 55.15kPa (8psi) → NO

YES

Go to Step 8.

NO

6 Confirm clogging in the nozzle

- 1 Disconnect the fuel tube from nozzle on combustor.
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 3 Select "Burner".
- 4 Set up data monitor "atomizer nozzle pressure".
- 5 Start the engine (Idling condition).
- 6 Turn ON the exhaust brake switch.

CAUTION

If exhaust brake is not turned on, ignition may start.
This checking must be executed on un-ignition condition.

- 7 Check the value of "atomizer nozzle pressure" in data monitor for 5 seconds.

NOTICE

When the tube is re-installed, tighten it with proper tightening torque.

Tightening torque: 10.6 - 12.0 N·m (108 - 122 kgf·cm, 7.82 - 8.85 lbf·ft)
Socket size: 7/16" HEX

Judgment	Is the value 55.16kPa (8.0psi) or less?
	55.15kPa (8psi) or less → YES
	More than 55.15kPa (8psi) → NO

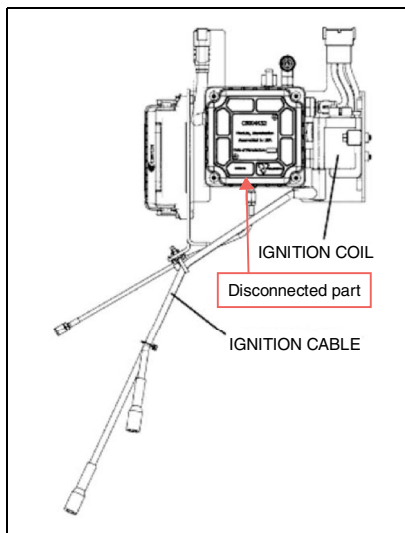
YES

Replace the nozzle and confirm step 5 again.

NO

DN02-118

FUEL CONTROL (BURNER)

7 Confirm clogging in the fuel tube between the nozzle and the atomizer

- 1 Disconnect the fuel tube from atomizer.
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 3 Select "Burner".
- 4 Set up data monitor "atomizer nozzle pressure".
- 5 Start the engine (Idling condition).
- 6 Turn ON the exhaust brake switch.

⚠ CAUTION

If exhaust brake is not turned on, ignition may start.
This checking must be executed on un-ignition condition.

- 7 Check the value of "atomizer nozzle pressure" in data monitor for 5 seconds.

NOTICE

When the tube is re-installed, tighten it with proper tightening torque.

Tightening torque: 10.6 - 12.0 N·m (108 - 122 kgf·cm, 7.82 - 8.85 lbf·ft)
Socket size: 7/16" HEX

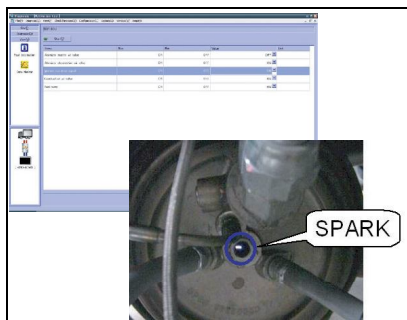
Judgment	Is the value 55.16kPa (8.0psi) or less?
	55.15kPa (8psi) or less → YES
	More than 55.15kPa (8psi) → NO

YES

Replace the tube and confirm step 5 again.

NO

Replace the atomizer and confirm step 5 again.

8 Check the ignition coil condition

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Remove the right side front splash board.
- 3 Remove the fuel nozzle on the combustor.
- 4 Connect Hino-DX to the vehicle, then turn starter switch position to "ON".
- 5 Select "Burner".
- 6 Activate "Ignition Coil" for 2 min.
- 7 Confirm spark visually for 2 min.

⚠ DANGER

Just after engine "ON", the burner system makes a high voltage arc (40,000-50,000 volts) for few seconds. Do not touch the ignition coil, ignition cables, ignition plugs and arc during this checking. Death or serious personal injury, and damage to components can result. Depending on the amount of soot, exhaust outlet temperatures during regeneration can exceed 700°C {1,290°F}. Do not touch the exhaust outlet. Death or serious personal injury, and damage to components can result.

⚠ WARNING

The burner system operates at an extremely high temperature of about 1,000°C {1,832°F} inside the combustion chamber. The surface temperature of a unit can reach 300°C {572°F} during operation. Even higher temperatures can occur at the flange; the exhaust outlet; and the filter, which remains hot for a longer period of time than other system components. Before you service the burner unit, all system components must be at ambient temperature to prevent serious personal injury. An original equipment-mounted exhaust outlet is not insulated. The skin temperature of a non-insulated exhaust outlet can exceed 700°C {1,292°F} during operation. Before you service the thermal regenerator unit, all system components must be at ambient temperature to prevent serious personal injury. When you work on an electrical system, the possibility of electrical shock exists, and sparks can ignite flammable substances. You must always disconnect the battery ground cable before you work on an electrical system to prevent serious personal injury and damage to components.

Judgment	Is there SPARK between ignitors?
	SPARK → YES
	NO SPARK → NO

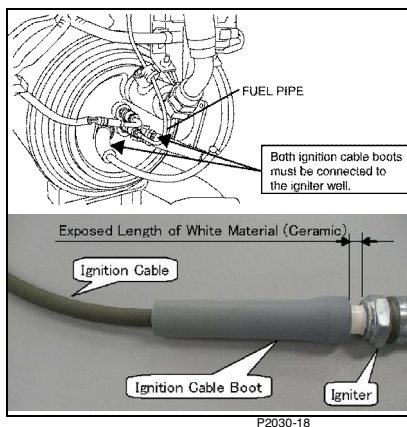
YES

Go to Step 15.

NO

DN02-120

FUEL CONTROL (BURNER)

9 Check the ignition cable

P2030-18

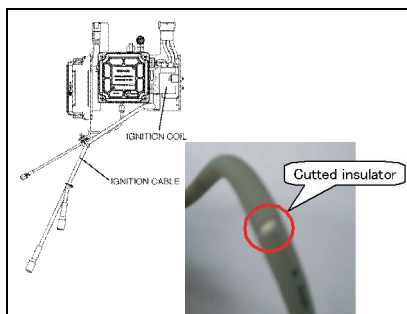
- 1 Check the exposed length at left and no loose of ignition cable boots.

Judgment	Is the exposed length 7mm (0.28 in.) or less? Is there loose?
	The length is 7 mm (0.28 in.) or less. AND There is NO loose. → YES
	The length is more than 7 mm (0.28 in.). OR There is loose. → NO

NO

Install the cable correctly, then verify the spark exist for 2min. If still NO spark, go to Step 10.

YES

10 Check the ignition cable condition

P2030-19

- 1 Check the damage on the cable.

<Proper condition>

No damage

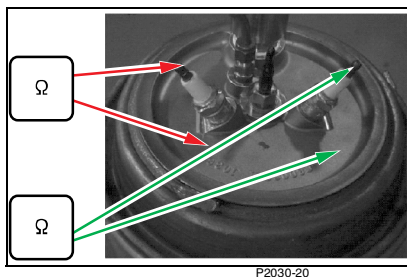
No kink

Judgment	Proper condition → YES
	Improper condition → NO

NO

Replace the ignition cable, then verify the spark exist for 2min. If still NO spark, go to Step 11.

YES

11 Check the ignitor resistance**1 Check the resistance.**

Judgment	Is it 1 M Ω or more (Open circuit)?
	1 M Ω or more (Open circuit) → YES
	Less than 1 M Ω → NO

NO

Excessive soot may accumulate on the ignitors. Cleaning up ignitors by the wire brush and the BRAKE CLEANER, then verify the spark exist for 2min. If still NO spark, go to Step 12.

YES

12 Check the ignitor condition**1 Check the ignitor condition.**

Judgment	Is there soot/fuel on the ignitor?
	Soot/Fuel on the ignitor → YES
	NO soot/fuel on the ignitor → NO

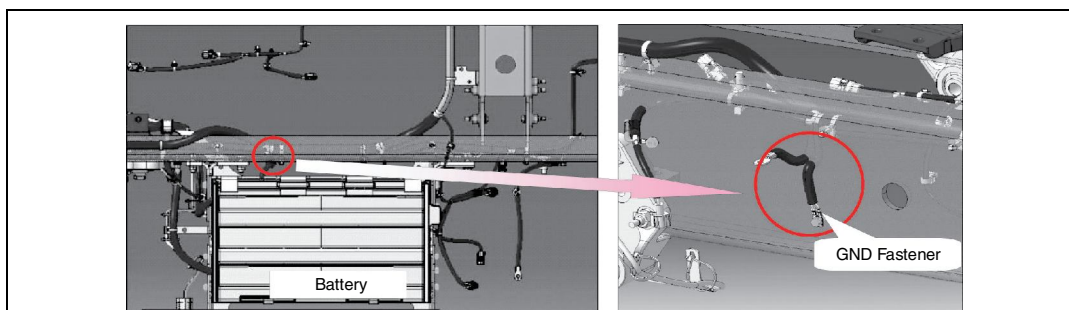
YES

Cleaning up ignitors by the wire brush and the BRAKE CLEANER, then verify the spark exist for 2min. If still NO spark, go to Step 13.

NO

DN02-122

FUEL CONTROL (BURNER)

13 Check the ground condition on the frame**1 Check the ground condition.****<Proper condition>**

No Loose, No paint on the bolt, No contaminants on the bolt

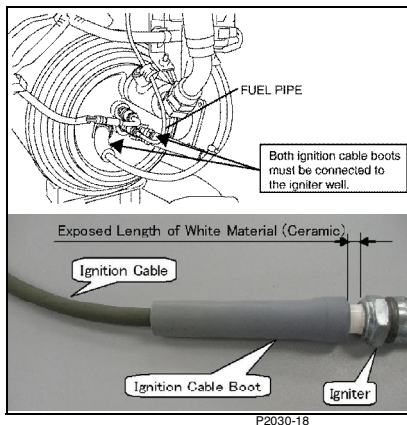
Judgment	Is there loose?
	Proper condition → YES
	Improper condition → NO

NO

Tighten correctly, then verify the spark exist for 2 min. If still NO spark, go to Step 14.

YES

14 Replace the ignitor coil, then verify the spark exist for 2 min. If still NO spark, replace BCU.

15 Check the ignition cable

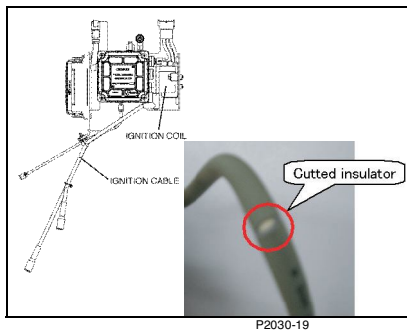
- 1 Check the exposed length at left and no loose of ignition cable boots.

Judgment	Is the exposed length 7 mm (0.28 in.) or less? Is there loose?
	The length is 7 mm (0.28 in.) or less. AND There is NO loose. → YES
	The length is more than 7 mm (0.28 in.). OR There is loose. → NO

NO

Install the cable correctly.

YES

16 Check the ignition cable condition

- 1 Check the damage on the cable.

<Proper condition>

No damage

No kink

Judgment	Proper condition → YES
	Improper condition → NO

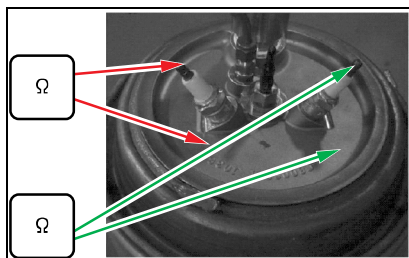
NO

Replace the ignition cable.

YES

DN02-124

FUEL CONTROL (BURNER)

17 Check the ignitor resistance**1 Check the resistance.**

Judgment	Is it 1 MΩ or more (Open circuit)?
	1 MΩ or more (Open circuit) → YES
	Less than 1 MΩ → NO

NO

Excessive soot may accumulate on the ignitors.
Cleaning up ignitors by the wire brush and the
BRAKE CLEANER.

YES

18 Check the ignitor condition**1 Check the ignitor condition.**

Judgment	Is there soot/fuel on the ignitor?
	Soot/Fuel on the ignitor → YES
	NO soot/fuel on the ignitor → NO

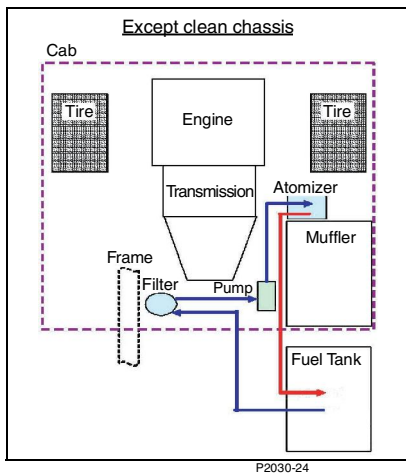
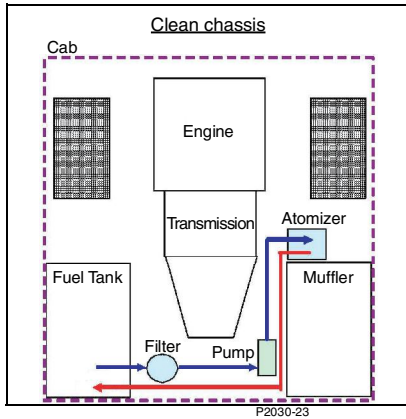
YES

Cleaning up ignitors by the wire brush and the
BRAKE CLEANER.

NO

19 Check the fuel plumbing from the fuel tank and the combustor

1 Check the plumbing visually.



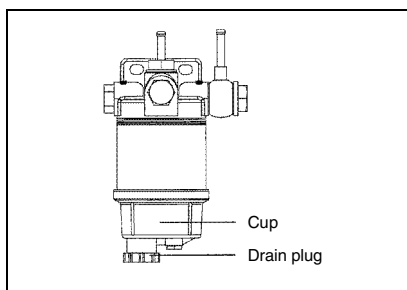
Judgment	Is there fuel leakage or kinked fuel plumbing?
	Fuel leakage or kinked fuel plumbing → YES
	NO fuel leakage and NO kinked fuel plumbing → NO

YES → Repair correctly.

NO

DN02-126

FUEL CONTROL (BURNER)

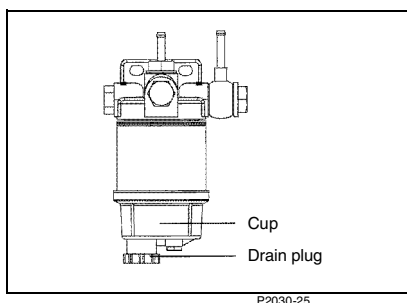
20 Check the fuel filter maintenance interval**1 Check the fuel filter maintenance interval.**

Judgment	Fuel filter has been replaced every two years?
	Fuel filter has been replaced every two years → YES
	Fuel filter has not been replaced for two years or more → NO

NO

Replace the fuel filter. And then priming by Hino-DX (to activate the fuel pump for 30 seconds).

YES

21 Check the fuel filter**1 Check the fuel filter visually.**

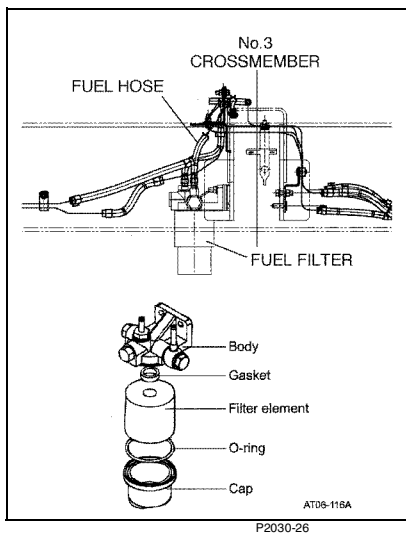
Judgment	Is fuel filled in fuel filter cup?
	Fuel is filled in fuel filter cup → YES
	Fuel is NOT filled in fuel filter cup → NO

NO

Tighten the drain plug on the fuel filter. And then priming by Hino-DX (to activate the fuel pump for 30 seconds).

YES

22 Check fuel condition in the fuel filter



P2030-26

1 Drain fuel in fuel filter cup.

2 Check the fuel condition.

<Proper condition>

Color: Yellow/Green

No water mixing

Judgment

Proper condition → YES

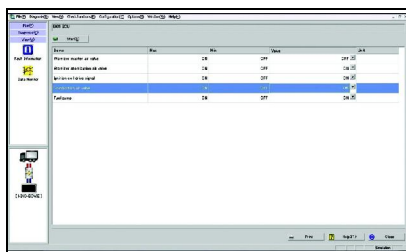
Improper condition → NO

NO

Replace the fuel or drain the water from the cup.

YES

23 Check the fuel pump



P2030-27

1 Turn off the engine, and starter switch position must be "OFF".

2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON".

3 Select "Burner".

4 Set up data monitor. "Atomizer fuel pressure"

5 Activate "Fuel Pump" for 60 seconds.

6 Monitor "Atomizer fuel pressure" in data monitor.

Judgment

Is the pressure range between 558.48 and 696.37kPa (81 and 101psi)?

The pressure range is between 558.48 and 696.37kPa (81 and 101psi) → YES

The pressure range is NOT between 558.48 and 696.37kPa (81 and 101psi) → NO

NO

Replace the fuel pump.

YES

P2030-27-2

24 Check the CAV operation

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Remove the combustion air hose from CAV.

NOTICE**Important Point - Dismounting and mounting the combustion air hose****Dismounting**

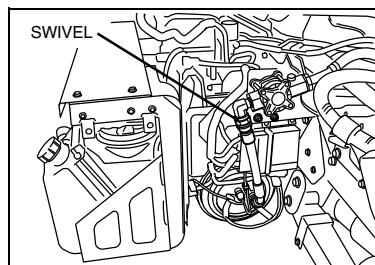
- When removing, be sure to remove the swivel on the vehicle upper side.
- After removal, be careful to avoid entry of foreign matter into the pipe.

Mounting

- Mount it without bending the hose with the combustion air valve free.
- When tightening, fold the hexagonal part under the swivel with the wrench.
 - a. Mount the combustion air valve.

Tightening Torque:

41 - 61 N·m {418 - 622 kgf·cm, 31 - 45 lbf·ft}

**⚠ DANGER**

Burner System may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If electric circuit for flame temperature sensor has a open circuit, burner operation becomes aborted. Therefore, to make sure to disconnect the wiring harness coupler for flame temperature sensor prior this procedure. Otherwise, flame may be spilling from the combustor.

This condition makes DTC: P141C (Flame Temp Sensor Circuit High) and MIL comes ON.

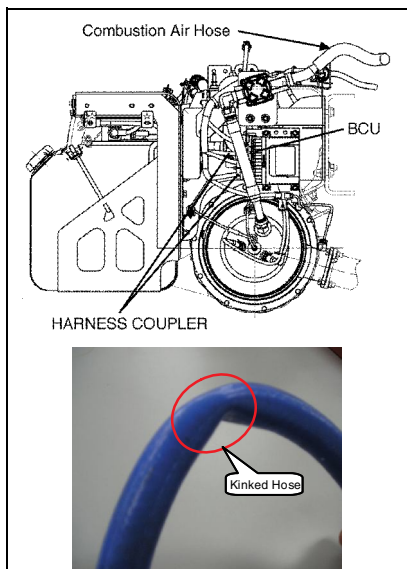
- 3 Disconnect the wiring harness coupler for flame temperature sensor.
- 4 Connect Hino-DX to the vehicle, then set the starter switch to the "ON" position.
- 5 Select "Burner".
- 6 Start the engine.
- 7 Activate "Combustion Air Valve" for 10 sec, then deactivate for 10 sec.
- 8 Duplicate (7) 30 times.

Judgment	Air is coming from CAV when CAV is ON, and NO air is coming from CAV when CAV is OFF. → YES
	Air is NOT coming from CAV when CAV is ON, or Air is coming from CAV when CAV is OFF. → NO

YES

Go to step 28.

NO

25 Check the combustion air hose**1 Check the hose condition.****<Proper condition>**

No damage
No kink

Judgment

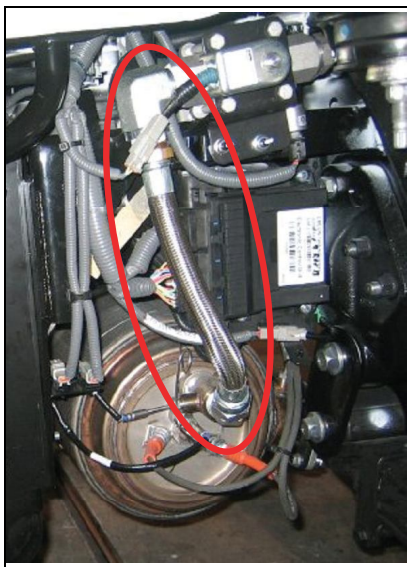
Proper condition → YES

Improper condition → NO

NO

Install the hose correctly.

YES

26 Check air leakage from the air plumbing visually**1 Check the air plumbing visually.****<Proper condition>**

NO damage, or LOOSE of fitting

Judgment

Is there damage on the air hose, or loose of fitting, ?

There is damage or loose of fitting → YES

NO damage or loose of fitting → NO

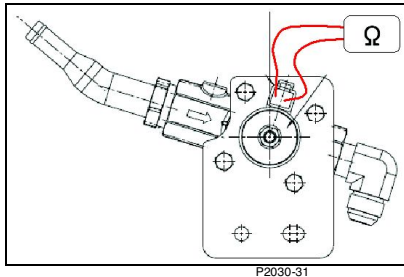
YES

Inspect and repair the air plumbing.

NO

DN02-130

FUEL CONTROL (BURNER)

27 Check the CAV wiring connection**1 Measure resistance between pins.**

Judgment	Is the resistance between 6 Ω and 10 Ω?
	Within standard → YES
	NOT within standard → NO

NO

Replace the CAV. (Electrical issue)

YES

Replace the CAV. (Mechanical stuck closed)

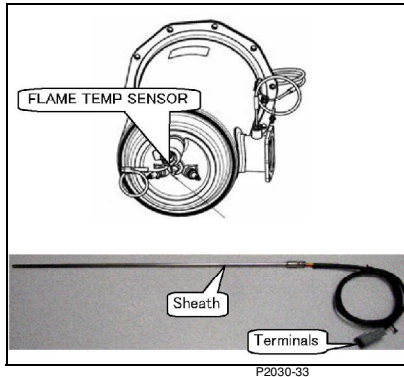
28 Check the ignition coil visually**1 Check the ignition coil connector visually.**

Judgment	Is Salt/Water on wire harness connector confirmed?
	Salt/Water on wire harness connector → YES
	NO salt/water on wire harness connector → NO

YES

Replace the ignition coil.

NO

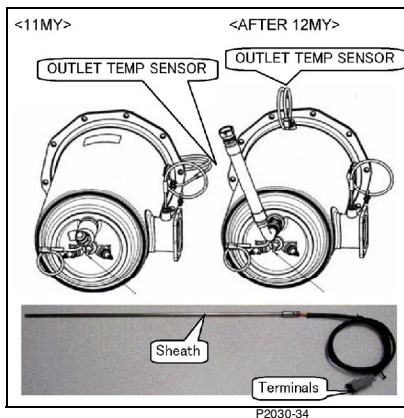
29 Check the flame temp sensor insulation resistance**1 Check insulation resistance, between sheath and a terminal.**

Judgment	Measured insulation resistance at room temperature is greater than 1 MΩ at 500 VDC?
	1 MΩ or more → YES
	Less than 1 MΩ → NO

NO

Replace the flame temp sensor.

YES

30 Check the burner outlet temp sensor insulation resistance**1 Check insulation resistance, between sheath and a terminal.**

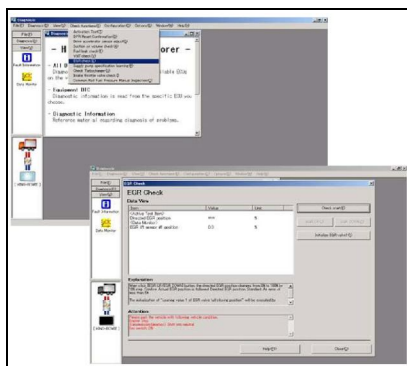
Judgment	Measured insulation resistance at room temperature is greater than 1 MΩ at 500 VDC?
	1 MΩ or more → YES
	Less than 1 MΩ → NO

NO

Replace the burner outlet temp sensor.

YES

31 Check the EGR Valve



P2030-35

1 Conduct active test with Hino-DX and check operation and response of EGR valve.

1. Click on a [EGR check].
2. Conduct the measurement and the evaluation according to the indicate of Hino-DX.

[Explanation]

If EGR is not working properly, abnormal combustion, insufficient air supply quantity into engine and excessive soot occurs.

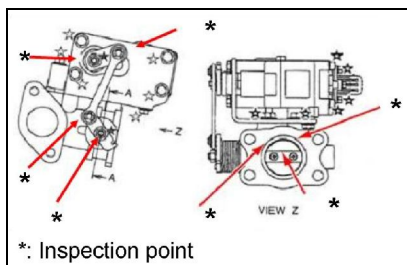
Judgment	Error in response is within 5%?
	Within 5% → YES
	NOT within 5% → NO

NO

Replace the EGR Valve.

YES

32 Check the EGR Valve



P2030-36

1 Check screws attached to EGR valve shaft and butterfly valve.

2 Check rust on the link rod.

[Explanation]

If EGR is not working properly, abnormal combustion, insufficient air supply quantity into engine and excessive black smoke occur.

Judgment	No shaft rattle?, No butterfly valve screw loose?, No link rod rust?
	NO fail → YES
	Shaft rattle, loose screw, rust → NO

NO

Replace the EGR Valve.

YES

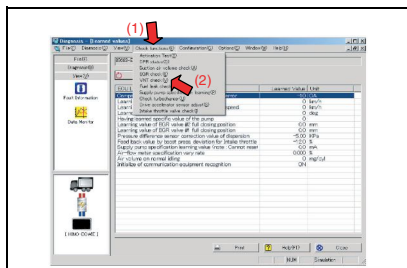
33 Check the Turbocharger

Check the followability of VNT controller.

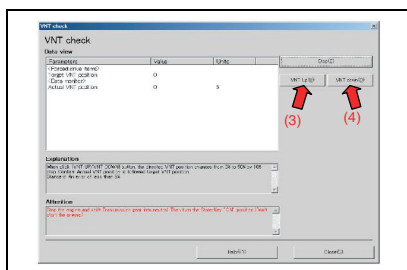
- 1 Set the starter switch to the "LOCK" position.
- 2 Warm-up the engine (Coolant temperature: 60°C {140°F} or more).
- 3 Stop the engine.
- 4 Connect Hino-DX to the vehicle.
- 5 Set the starter switch to the "ON" position.
- 6 Select "Engine ECU".
- 7 Check the followability of VNT controller by "check functions" of Hino-DX.
- 8 Check time lag between directed VNT position value and VNT actual position value.

<Inspection procedure>

- (1) Select "Check functions".
- (2) Select "VNT check".



P2030-38



P2030-39

- (3) Select "VNT UP" and click "Check start".
Check time lag (followability) between target VNT position value and actual VNT position value.
- (4) Select "VNT Down" and click "Check start".
Check time lag (followability) between target VNT position value and actual VNT position value.

Judgment	Response delay: less than 3 seconds.
	Less than 3 seconds → YES
	3 seconds or more → NO

NO

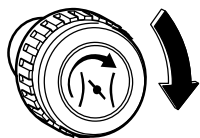
Replace the turbocharger.

YES

34 Check the Exhaust Brake

Vehicles with Idling Volume

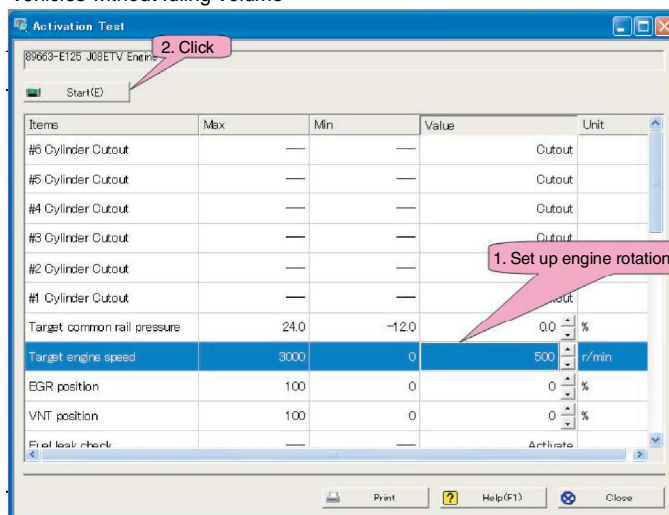
TUNE CLOCKWISE



P2030-40

- 1 Warm up the engine until engine coolant temperature reaches over 80°C {176°F}.
- 2 Turn off air conditioning and PTO.
- 3 Adjust engine speed to 980 r/min by idle volume.
- 4 Measure injection quantity on Hino-DX when exhaust brake is ON and OFF.

Vehicles without Idling Volume



P2030-41

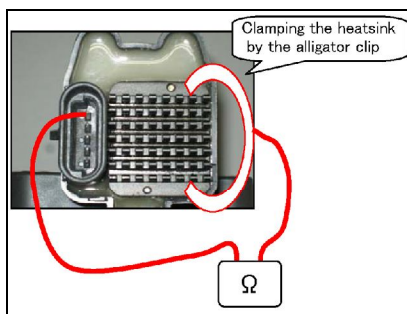
JudgmentInjection quantity "exhaust brake ON" -
Injection quantity "exhaust brake OFF"
= 10 to 18 mm³/st?10 to 18 mm³/st → YES

NOT within criteria → NO

NO

Adjust exhaust brake opening angle.

YES

35 Check the ignition coil isolation resistance

YES

1 Check the ignition coil isolation resistance.

Judgment	Measured isolation resistance is greater than 10 MΩ at 500 VDC?
	Greater than 10 MΩ → YES
	Less than 10 MΩ → NO

NO

Replace the ignition coil and the burner combustion chamber.

DN02-136

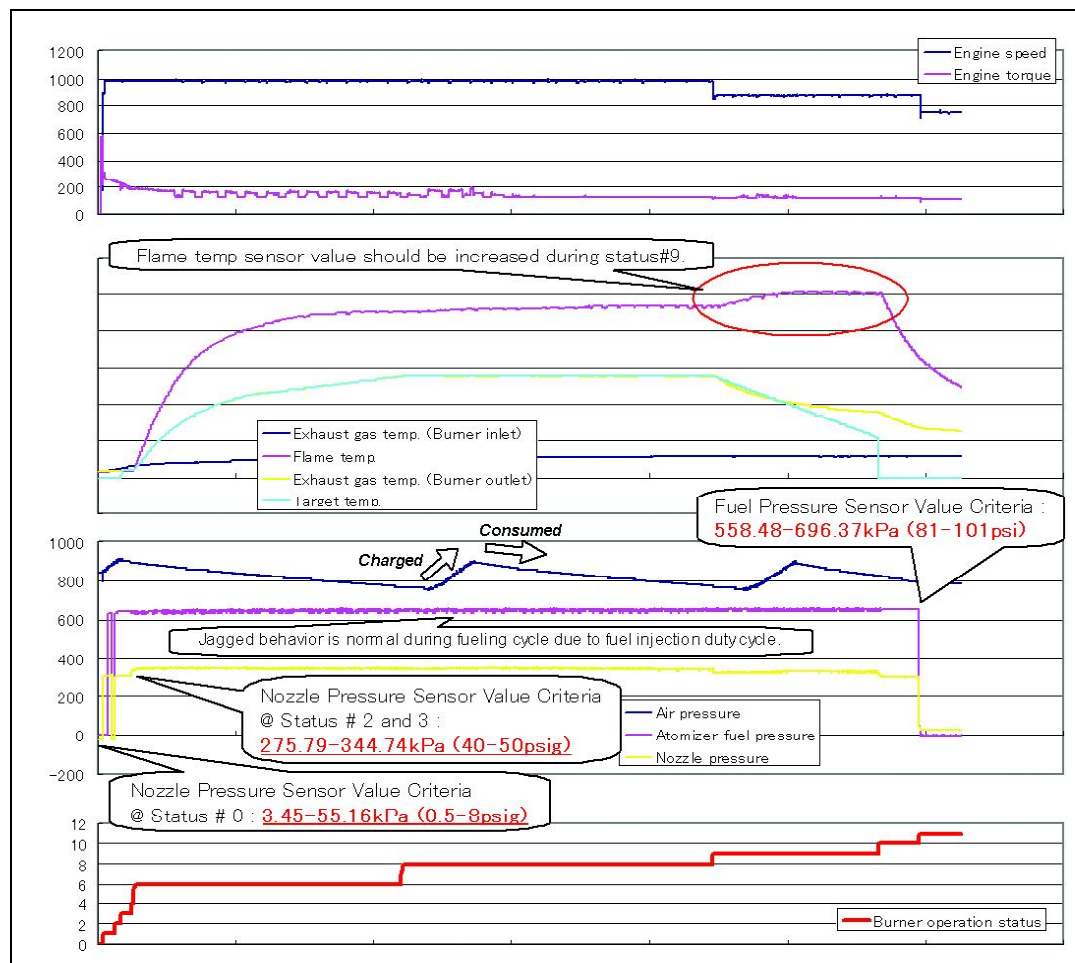
FUEL CONTROL (BURNER)

36	Replace the burner combustor chamber
REF	Manual regen data

[Manual Regen Procedure]

1. Turn off the engine, and starter switch position must be "OFF".
2. Connect Hino-DX to the vehicle, then turn starter switch position to "ON". (Not start the engine)
3. Select "Burner".
4. Start the engine. (Idling condition)
5. Check the value of "Flame temp", "Exhaust Gas temp.(DPR Outlet)" and "Burner operation status" in the data monitor.
6. Perform the manual regen.

<Sample>



P2030-43



FUEL CONTROL (BURNER)

DN02-137



DN02-138

FUEL CONTROL (BURNER)

DTC:P2032 (Check sheet)

EN1613602F200044

DTC:P2032	Exhaust gas temperature sensor (Burner outlet) - out of range (Out of range low)

1. Technical description

- Exhaust gas temperature sensor detects the temperature, disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC : P2032**

- Flame temp sensor voltage < 0.1V for more than 1sec
(-50°C at BCU temp 25°C)

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Exhaust gas temperature sensor:

- Sensor disconnection
- Abnormal resistance of sensor
- Disconnection or short-circuit in sensor harness

Harness: Disconnection or short-circuit in harness between the sensor and BCU

FUEL CONTROL (BURNER)

DN02-139

DTC:P2032	Exhaust gas temperature sensor (Burner outlet) - out of range (Out of range low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Exhaust gas temperature sensor	Disconnect the connector on the sensor side and measure resistance.	0.3 Ω or higher 0.1 V or lower		Sensor Replace
2	Harness	Reconnect the sensor connector and disconnect the BCU connector. Measure resistance between the terminals of the BCU connector on the wire harness side.	0.3 Ω or higher 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

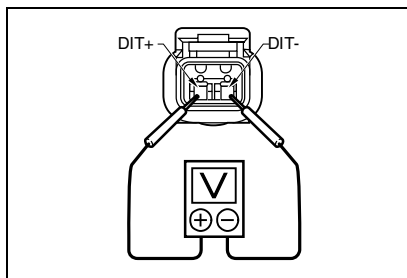
DN02-140

FUEL CONTROL (BURNER)

DTC:P2032

EN1613602F200045

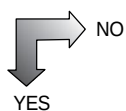
DTC	P2032	Exhaust gas temperature sensor (Burner outlet) - out of range (Out of range low)



SAPH161360200099

1. CHECK THE VOLTAGE BETWEEN TERMINALS.

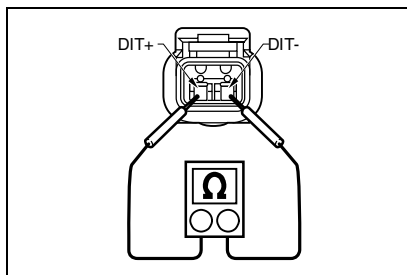
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor (burner outlet) connector.
- (3) Measure voltage between the terminals DIT+ and DIT- of the exhaust gas temperature sensor (burner outlet) connector on the harness side.

Standard value: 0.1 V or less


NO

Faulty harness

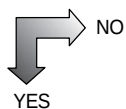
YES



SAPH161360200100

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Measure resistance between the terminals DIT+ and DIT- of the exhaust gas temperature sensor (burner outlet) connector.

Standard value: 0.3 Ω or more


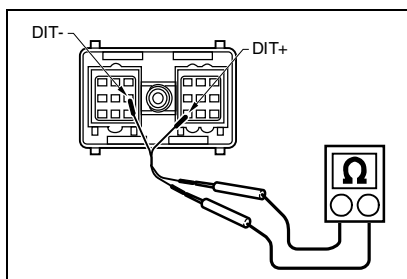
NO

Faulty exhaust gas temperature sensor (burner outlet)

YES

FUEL CONTROL (BURNER)

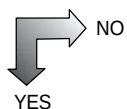
DN02-141



3. CHECK THE RESISTANCE BETWEEN TERMINALS.

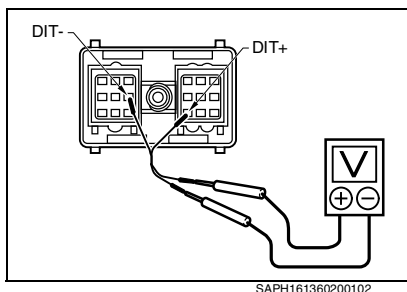
- (1) Connect the burner outlet temperature sensor connector.
- (2) Disconnect the BCU 18P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals DIT+ and DIT- of the BCU 18P connector on the harness side.

Standard value: 0.3 Ω or more



Faulty harness

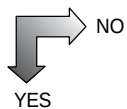
Irregular contact of connectors



4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals DIT+ and DIT- of the BCU 18P connector on the harness side.

Standard value: 0.1 V or less



Faulty harness

Irregular contact of connectors

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DN02-142

FUEL CONTROL (BURNER)

DTC:P2033 (Check sheet)

EN1613602F200046

DTC:P2033	Exhaust gas temperature sensor (Burner outlet) - out of range (Out of range high)

1. Technical description

- Exhaust gas temperature sensor detects the temperature, disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC : P2033**

- Flame temp sensor voltage > 4.3V for more than 0.5sec
(1,300°C at BCU temp 25°C)

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Exhaust gas temperature sensor:

- Sensor disconnection
- Abnormal resistance of sensor
- Disconnection or short-circuit in sensor harness

Harness: Disconnection or short-circuit in harness between the sensor and BCU

FUEL CONTROL (BURNER)

DN02-143

DTC:P2033	Exhaust gas temperature sensor (Burner outlet) - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Exhaust gas temperature sensor	Disconnect the connector on the sensor side and measure resistance.	0.3 Ω or higher		Sensor Replace
2	Harness	Reconnect the sensor connector and disconnect the BCU connector. Measure resistance between the terminals of the BCU connector on the wire harness side.	0.3 Ω or higher		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

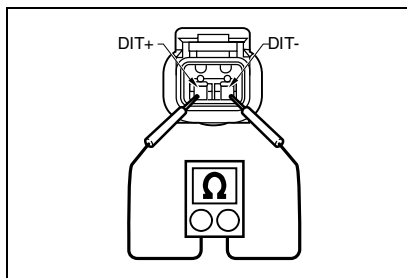
DN02-144

FUEL CONTROL (BURNER)

DTC:P2033

EN1613602F200047

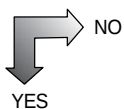
DTC	P2033	Exhaust gas temperature sensor (Burner outlet) - out of range (Out of range high)



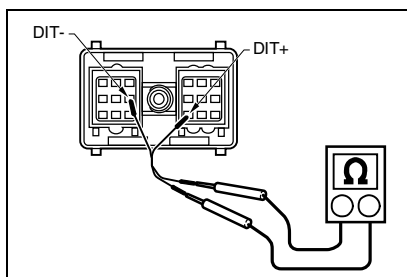
SAPH161360200103

1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the exhaust gas temperature sensor (burner outlet) connector.
- (3) Measure resistance between the terminals DIT+ and DIT- of the exhaust gas temperature sensor (burner outlet) connector.

Standard value: 0.3 Ω or more


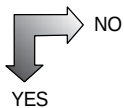
Faulty exhaust gas temperature sensor (burner outlet)



SAPH161360200104

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Connect the exhaust gas temperature sensor (burner outlet) connector.
- (2) Disconnect the BCU 18P connector.
- (3) Connect the signal check harness
- (4) Measure resistance between the terminals DIT+ and DIT- of the BCU 18P connector on the harness side.

Standard value: 0.3 Ω or more


Faulty harness

Irregular contact of connectors

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-145



DN02-146

FUEL CONTROL (BURNER)

DTC:P2080 (Check sheet)

EN1613602F200048

DTC:P2080

Exhaust gas temperature (Burner inlet) - rationality

1. Technical description

- Characteristic abnormality of the burner inlet temperature sensor is sensed by judging the difference between the actual temperatures of the other two temperature sensors and respective model temperatures.
- The model temperatures of the flame temperature and exhaust temperature (burner outlet) are predicted from the engine speed/load and exhaust gas flow based on the burner inlet temperature sensor value.
- A judgment is made when the burner is not operating (when not lit) and the exhaust brake is inactive.

2. DTC set condition**(1) Check conditions**

When the following three conditions are met:

- After continuing to operate the engine for 10 minutes
- and
- After continuing to make the burner non-operating for 10 minutes
- and
- After continuing to make the exhaust brake inactive for 10 minutes

(2) Judgment criteria

The following conditions are met for 30 seconds.

Flame temp. | Actual – Predicted from (EGT*(Burner Inlet)) | > 30°C(86°F)

and

Exhaust temp. (burner outlet) | Actual – Predicted from (EGT*(Burner Inlet)) | > 30°C(86°F)

* EGT : Exhaust Gas Temperature

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

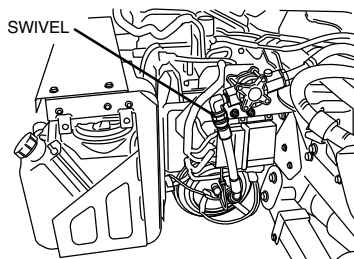
Burner inlet temperature sensor: Sensor characteristic abnormality, disconnection/short-circuiting**Air flow meter:** Malfunction**Wire harness:** Disconnection/short-circuiting**Intake and exhaust:** Leakage

FUEL CONTROL (BURNER)

DN02-147

DTC:P2080		Exhaust gas temperature (Burner inlet) - rationality		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	System	Check DTC on Burner	No P141D and P2084		If both P141D and P2084 exists, proceed to No. 4.
2	Wire harness	Check that no malfunction code of disconnection/short-circuiting is issued (Burner).	No P0545 and P0546 to be detected.		Proceed to analysis of the relevant DTC.
3	Air flow meter	Check that no malfunction code of the air flow meter is issued (Engine).	No P0101, P0102 and P0103 to be detected.		Proceed to analysis of the relevant DTC.
4	Combustion air valve (CAV)	1. Turn off the engine, and starter switch position must be "OFF". 2. Remove the combustion air hose from CAV. 3. Disconnect the wiring harness coupler for flame temperature sensor. 4. Connect Hino-DX to the vehicle, then set the starter switch to the "ON" position. 5. Select "Burner". 6. Start the engine. 7. Activate "Combustion Air Valve" for 10 seconds, then deactivate for 10 seconds by "Activation test" in Hino-DX. 8. Repeat step 7. thirty times. (Detail on next page A) ⚠ DANGER Burner System may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If electric circuit for flame temperature sensor has a open circuit, burner operation becomes aborted. Therefore, to make sure to disconnect the wiring harness coupler for flame temperature sensor prior this procedure. Otherwise, flame may be spilling from the combustor. This condition makes DTC: P141C (Flame Temp Sensor Circuit High) and MIL comes ON.	(1) Air coming from CAV when CAV is activated (2) No Air coming from CAV when CAV is deactivated		Replace the CAV
5	Exhaust Brake	Check the exhaust brake whether butterfly does contact with the exhaust pipe or not.	No contact with exhaust pipe No stuck		Replace exhaust brake
6	System	To perform manual regen and log the burner data during forced regen. (Detail on next page B)	No abnormal wave form appears in all three sensor value		BCU replacing

(1) Remove The Combustion Air Hose From CAV



- Mount it without bending the hose with the combustion air valve free.
- When tightening, fold the hexagonal part under the swivel with the wrench.

Mount the combustion air valve.

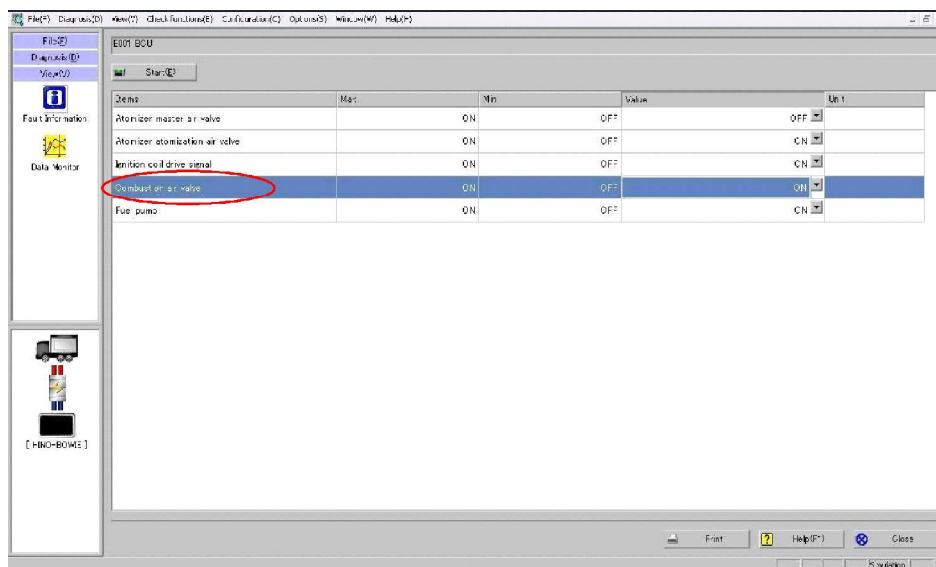
Tightening Torque:

41-61 N·m {418-622 kgf·cm, 31-45 lbf·ft}

NOTICE

- When removing, be sure to remove the swivel on the vehicle upper side.
- After removal, be careful to avoid entry of foreign matter into the pipe.

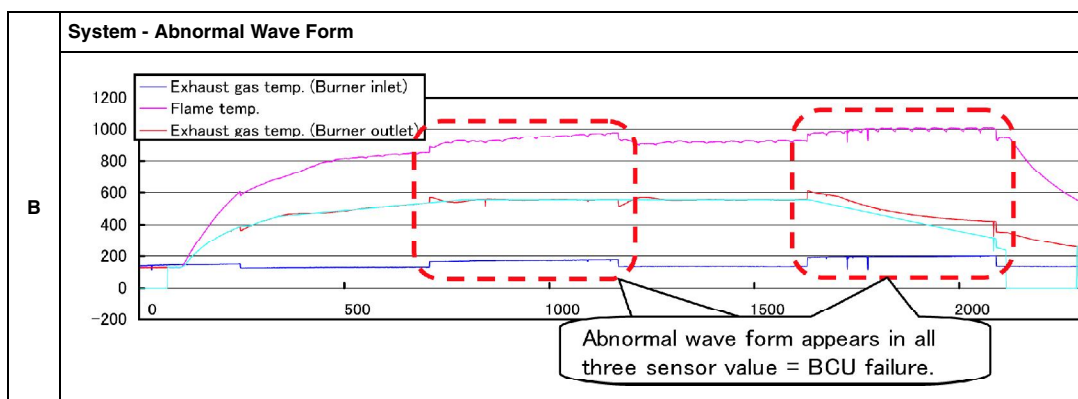
(2) Check Using Hino-DX



⚠ DANGER

Burner System may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If exhaust brake is turned on, Burner System never been turned on. Therefore, drain cock of air tank must be opened continuously during this checking. Otherwise, flame may be spilling from the combustor.

This condition may make DTC: P0410 (Air pressure too low, Pending, No MIL) and P2431 (Air supply failure, Confirmed, MIL ON).

**DTC:P2080**

EN1613602F200049

DTC	P2080	Exhaust gas temperature (Burner inlet) - rationality

1. CHECK THAT NO OTHER MALFUNCTION CODES EXIST SIMULTANEOUSLY.

NO
YES

Proceed to other malfunction codes.

Faulty exhaust gas temperature sensor (burner outlet)

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, start the engine. After the non-operating state of the burner continues for 12 minutes, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.

DN02-150

FUEL CONTROL (BURNER)

DTC:P2084 (Check sheet)

EN1613602F200050

DTC:P2084

Exhaust gas temperature (Burner outlet) - rationality

1. Technical description

- Characteristic abnormality of the burner outlet temperature sensor is judged by comparing the following two measured values with the model values.
 - (1) Model value from burner outlet temperature sensor measured value vs. burner inlet temperature sensor value
 - (2) Model value from flame temperature sensor measured value vs. burner outlet temperature sensor value (Each model value is predicated from the sensor value, engine speed/load and exhaust gas flow.)
- A judgment is made when the burner is not operating (when not lit) and the exhaust brake is inactive.

2. DTC set condition**(1) Check conditions**

When the following three conditions are met:

- After continuing to operate the engine for 10 minutes
- and
- After continuing to make the burner non-operating for 10 minutes
- and
- After continuing to make the exhaust brake inactive for 10 minutes

(2) Judgment criteria

The following conditions are met for 30 seconds.

Flame temp. | Actual – Predicted from (EGT*(Burner Outlet)) | > 30°C(86°F)

and

Exhaust temp. (burner outlet) | Actual – Predicted from (EGT*(Burner Inlet)) | > 30°C(86°F)

* EGT : Exhaust Gas Temperature

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

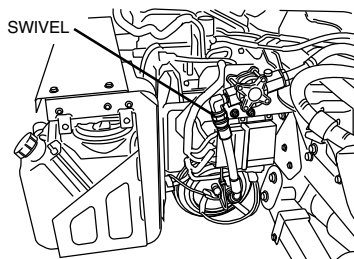
Burner inlet temperature sensor: Sensor characteristic abnormality, disconnection/short-circuiting**Air flow meter:** Malfunction**Wire harness:** Disconnection/short-circuiting**Intake and exhaust:** Leakage

FUEL CONTROL (BURNER)

DN02-151

DTC:P2084		Exhaust gas temperature (Burner outlet) - rationality		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	System	Check DTC on Burner	No P2080 and P141D		If both P2080 and P141D exists, proceed to No. 4.
2	Wire harness	Check that no malfunction code of disconnection/short-circuiting is issued (Burner).	No P2032 and P2033 to be detected.		Proceed to analysis of the relevant DTC.
3	Air flow meter	Check that no malfunction code of the air flow meter is issued (Engine).	No P0101, P0102 and P0103 to be detected.		Proceed to analysis of the relevant DTC.
4	Combustion air valve (CAV)	- Turn off the engine, and starter switch position must be "OFF". - Remove the combustion air hose from CAV. - Disconnect the wiring harness coupler for flame temperature sensor. - Connect Hino-DX to the vehicle, then set the starter switch to the "ON" position. - Select "Burner". - Start the engine. - Activate "Combustion Air Valve" for 10 seconds, then deactivate for 10 seconds by "Activation test" in Hino-DX. - Repeat step 7. thirty times. (Detail on next page A) ⚠ DANGER Burner System may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If electric circuit for flame temperature sensor has a open circuit, burner operation becomes aborted. Therefore, to make sure to disconnect the wiring harness coupler for flame temperature sensor prior this procedure. Otherwise, flame may be spilling from the combustor. This condition makes DTC: P141C (Flame Temp Sensor Circuit High) and MIL comes ON.	(1) Air coming from CAV when CAV is activated (2) No Air coming from CAV when CAV is deactivated		Replace the CAV
5	Exhaust Brake	Check the exhaust brake whether butterfly does contact with the exhaust pipe or not.	No contact with exhaust pipe No stuck		Replace exhaust brake
6	System	To perform manual regen and log the burner data during forced regen. (Detail on next page B)	No abnormal wave form appears in all three sensor value		BCU replacing

(1) Remove The Combustion Air Hose From CAV



- Mount it without bending the hose with the combustion air valve free.
- When tightening, fold the hexagonal part under the swivel with the wrench.

Mount the combustion air valve.

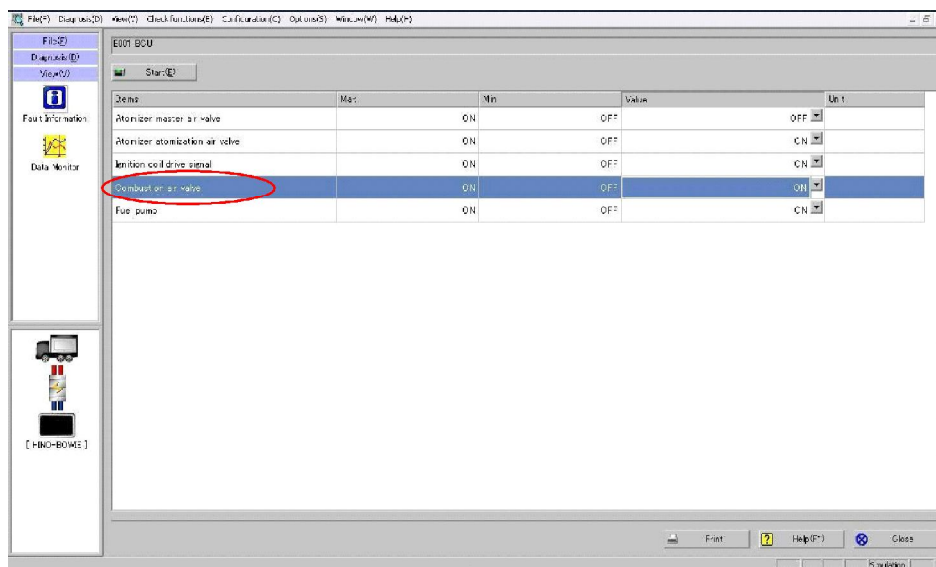
Tightening Torque:

41-61 N·m {418-622 kgf·cm, 31-45 lbf·ft}

NOTICE

- When removing, be sure to remove the swivel on the vehicle upper side.
- After removal, be careful to avoid entry of foreign matter into the pipe.

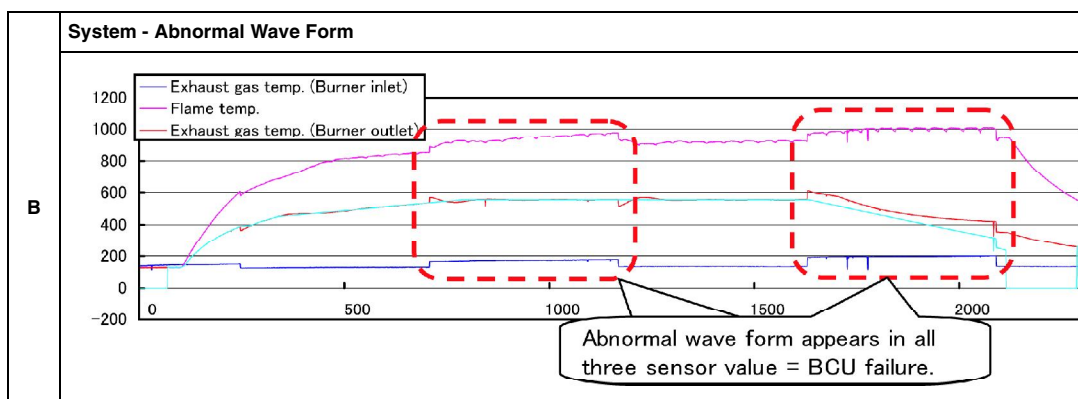
(2) Check Using Hino-DX



⚠ DANGER

Burner System may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If exhaust brake is turned on, Burner System never been turned on. Therefore, drain cock of air tank must be opened continuously during this checking. Otherwise, flame may be spilling from the combustor.

This condition may make DTC: P0410 (Air pressure too low, Pending, No MIL) and P2431 (Air supply failure, Confirmed, MIL ON).



DN02-154

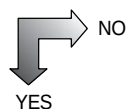
FUEL CONTROL (BURNER)

DTC:P2084

EN1613602F200051

DTC	P2084	Exhaust gas temperature (Burner outlet) - rationality

1. CHECK THAT NO OTHER MALFUNCTION CODES EXIST SIMULTANEOUSLY.



Proceed to other malfunction codes.

Faulty exhaust gas temperature sensor (burner outlet)

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, start the engine. After the non-operating state of the burner continues for 12 minutes, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-155



DN02-156

FUEL CONTROL (BURNER)

DTC:P20D3 (Check sheet)

EN1613602F200052

DTC:P20D3

Atomizer fuel injector - circuit failure (Circuit low)

1. Technical description

- Atomizer fuel injector detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Atomizer Fuel Injector: Activation)

(2) Judgment criteria**DTC : P20D3**

- Atomizer fuel injector circuit resistance < 0.6Ω for more than 1sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer fuel injector:

- Malfunction of atomizer fuel injector
- Abnormal voltage of atomizer fuel injector
- Disconnection in harness of atomizer fuel injector

Harness: Disconnection or short-circuit in harness between atomizer fuel injector and BCU

FUEL CONTROL (BURNER)

DN02-157

DTC:P20D3		Atomizer fuel injector - circuit failure (Circuit low)	Inspection Procedure		
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the Atomizer connectors and measure resistance between the terminals of the mating connectors.	4 Ω or higher, 12 Ω or lower		Atomizer Replace
2	Harness	Reconnect the Atomizer connectors and disconnect the BCU connectors. Measure resistance between the terminals of the mating BCU connector on the wire harness.	4 Ω or higher, 12 Ω or lower		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON. NG: Replace BCU.	No malfunction		Check again

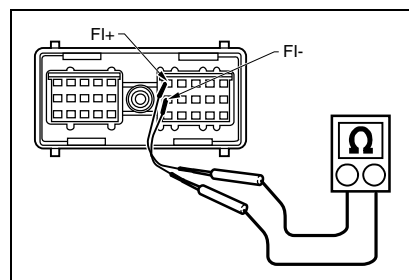
DN02-158

FUEL CONTROL (BURNER)

DTC:P20D3

EN1613602F200053

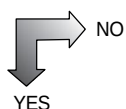
DTC	P20D3	Atomizer fuel injector - circuit failure (Circuit low)



SAPH161360200107

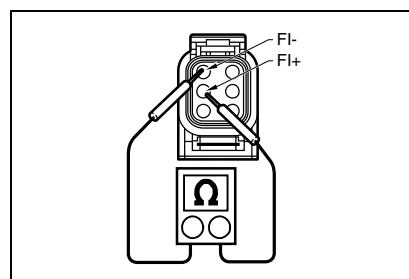
1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals FI+ and FI- of the BCU 30P connector on the harness side.

Standard value: 4 Ω or more


Proceed to 2.

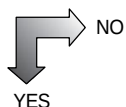
Faulty BCU



SAPH161360200108

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 6P connector.
- (2) Measure resistance between the terminals FI+ and FI- of the atomizer fuel injector connector.

Standard value: 4 Ω or more


Faulty atomizer fuel injector

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-159



DN02-160

FUEL CONTROL (BURNER)

DTC:P20D4 (Check sheet)

EN1613602F200054

DTC:P20D4

Atomizer fuel injector - circuit failure (Circuit high)

1. Technical description

- Atomizer fuel injector detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Atomizer Fuel Injector: Deactivation)

(2) Judgment criteria**DTC : P20D4**

- Atomizer fuel injector circuit resistance < 0.6Ω for more than 0.8sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer fuel injector:

- Malfunction of atomizer fuel injector
- Abnormal voltage of atomizer fuel injector
- Disconnection in harness of atomizer fuel injector

Harness: Disconnection or short-circuit in harness between atomizer fuel injector and BCU

FUEL CONTROL (BURNER)

DN02-161

DTC:P20D4		Atomizer fuel injector - circuit failure (Circuit high)		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the Atomizer connectors and measure resistance and voltage between the terminals of the mating connectors.	4 Ω or higher, 12 Ω or lower 0.1 V or lower		Atomizer Replace
2	Harness	Reconnect the Atomizer connectors and disconnect the BCU connectors. Measure resistance and voltage between the terminals of the mating BCU connector on the wire harness.	4 Ω or higher, 12 Ω or lower 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

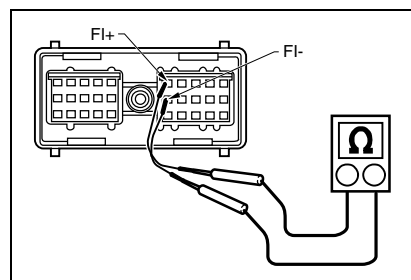
DN02-162

FUEL CONTROL (BURNER)

DTC:P20D4

EN1613602F200055

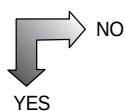
DTC	P20D4	Atomizer fuel injector - circuit failure (Circuit high)



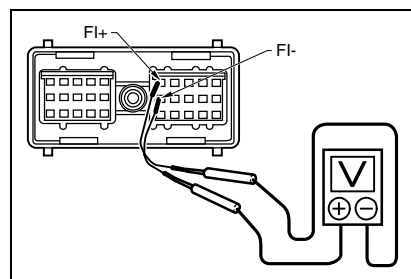
1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals FI+ and FI- of the BCU 30P connector on the harness side.

Standard value: 4 Ω or more



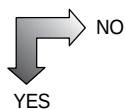
Proceed to 3.



2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals FI+ and FI- of the BCU 30P connector on the harness side.

Standard value: 0.1 V or less

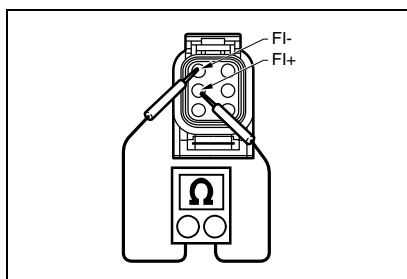


Proceed to 3.

Irregular contact of connectors

FUEL CONTROL (BURNER)

DN02-163

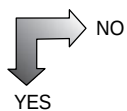


SAPH161360200111

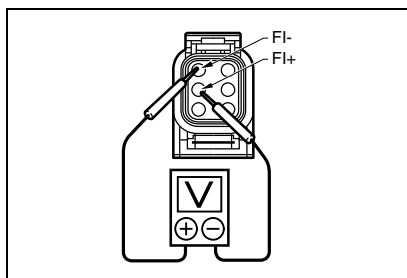
3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 6P connector.
- (2) Measure resistance between the terminals FI+ and FI- of the atomizer fuel injector connector.

Standard value: 4 Ω or more



Faulty atomizer fuel injector

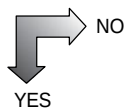


SAPH161360200112

4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals FI+ and FI- of the atomizer fuel injector connector.

Standard value: 0.1 V or less



Faulty atomizer fuel injector

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.

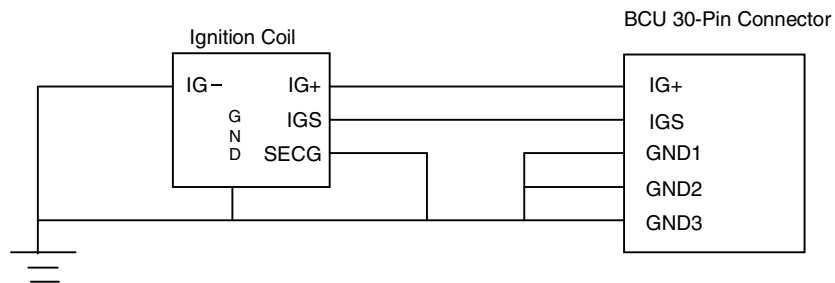
DTC:P2300 (Check sheet)

EN1610602F200093

DTC:P2300	Ignition coil-circuit failure out of range (too low)

1. Technical description

BCU detects disconnection and short-circuit based on the circuit voltage or signals.

**2. DTC set condition****(1) Check conditions**

- Five minutes after starting the Engine.

(2) Judgment criteria

- Ignition coil circuit switch feedback voltage < 1V for 4 seconds or more.
- Ignition coil circuit switch current > 8A for 15 seconds or more.

3. Troubleshooting hints**Ignition Coil**

- Ignition coil malfunction
- Abnormal voltage of ignition coil

Harness

- Disconnection or short-circuit in harness between the ignition coil and BCU

FUEL CONTROL (BURNER)

DN02-165

DTC: P2300	Ignition coil-circuit failure out of range (too low)	Inspection Procedure

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
1	DTC confir- mation	Check the Engine ECU if any DTC is stored.	DTC is stored → YES No DTC is stored → NO		Go to step 2	Go to step 3
2	Fuse for BCU system	Check two fuses installed in the BCU sys- tem for any melting fuse.	There is Melting fuse → YES There is No melting fuse → NO		Replace the BCU	Go to step 3
3	Wire Har- ness between BCU and ignition coil	Measure resistance between the BCU 30-pin connector H3 and igni- tion coil E terminal.	Within the standard value (less than 1 Ω) → YES NOT within the standard value (1 Ω or more) → NO		Go to step 4	Repair the harness
4	Wire Har- ness between BCU and ignition coil	Measure resistance between the BCU 30-pin connector G1 terminal and ignition coil A termi- nal.	Within the standard value (less than 1 Ω) → YES NOT within the standard value (1 Ω or more) → NO		Go to step 5	Repair the harness
5	GND	Check the GND fasten- ers for any loose fas- tener.	GND fastener is loose → YES GND fastener is NOT loose → NO		Repair GND fastener	Go to step 6
6	Ignition Coil	Check the ignition coil connector for any corro- sion or other damages.	Corrosion or other damages are found → YES No corrosion and no other dam- ages → NO		Clean or replace the ignition coil	Go to step 7
7	Ignition Coil	Check ignition coil oper- ation with Hino-DX	DTC is stored → YES No DTC is stored → NO		Replace the ignition coil	Return the vehicle to the cus- tomer

DN02-166

FUEL CONTROL (BURNER)

DTC:P2300

EN1613602F200041

DTC	P2300	Ignition coil-circuit failure out of range (too low)

1	Check DTC for engine system.

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select "Engine", and check if any DTC is stored.

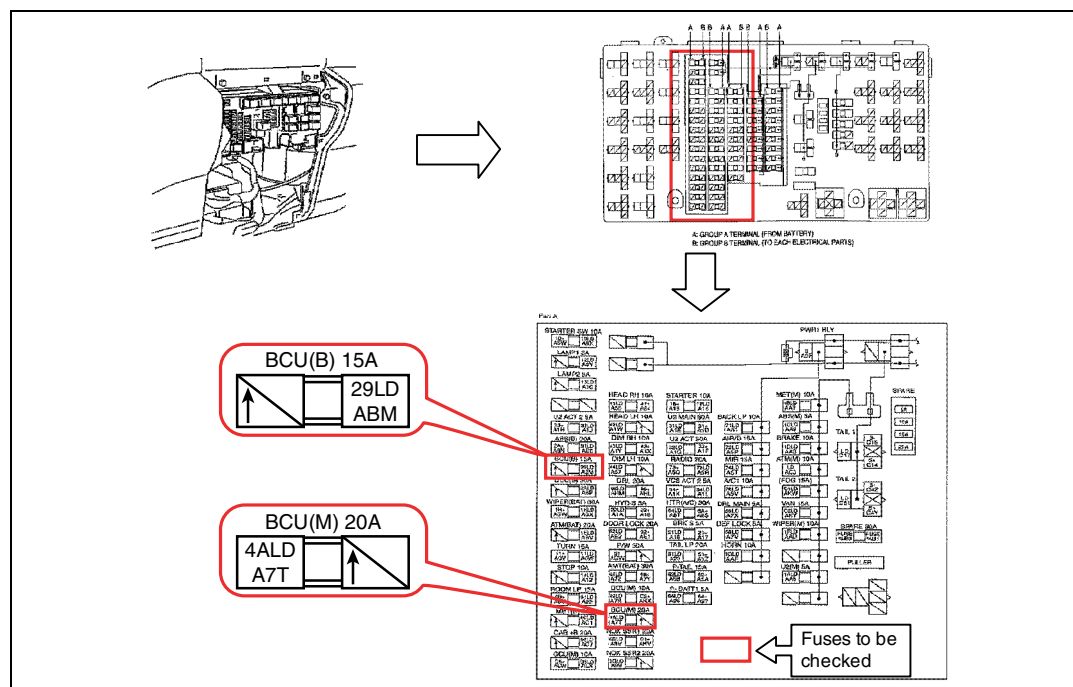
Judgment	DTC is stored → YES
	DTC is NOT stored → NO

NO → Go to step 3.

YES

2	Check fuses installed in the BCU system.

- 1 Check two BCU fuses for being melted.



P2300-2

Judgment

Melting fuse → YES

No melting fuse → NO

YES

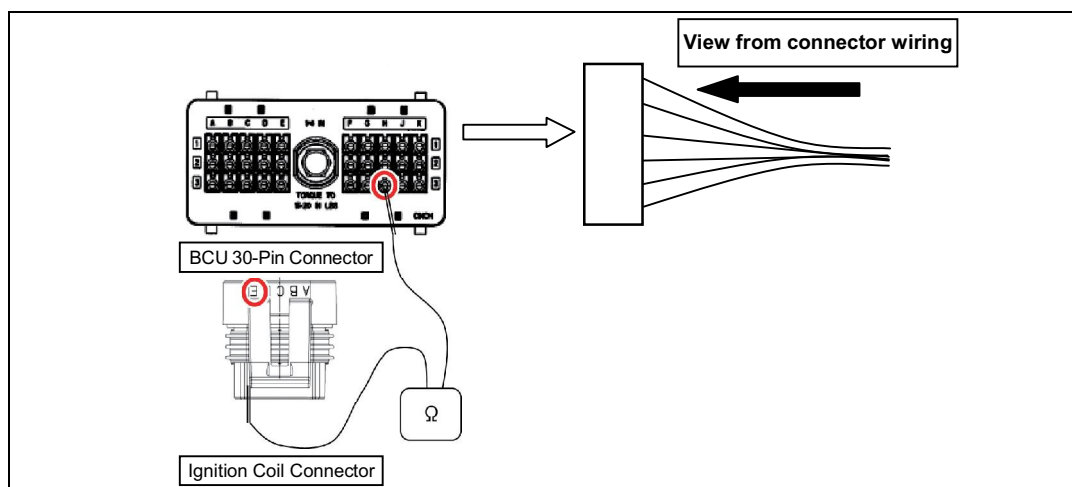
Replace the BCU.

NO

3 Inspect the wire harness.

- 1 With the tester, measure the resistance between the BCU 30-pin connector H3 (IGS) terminal and the ignition coil connector E (IGS).

Because the space between the terminals is narrow, insert the test stick from the wiring side.



P2300-3

Judgment

The resistance is within the standard value (less than 1 Ω) → YES

The resistance is NOT within the standard value (1 Ω or more) → NO

NO

Repair a relevant harness.

YES

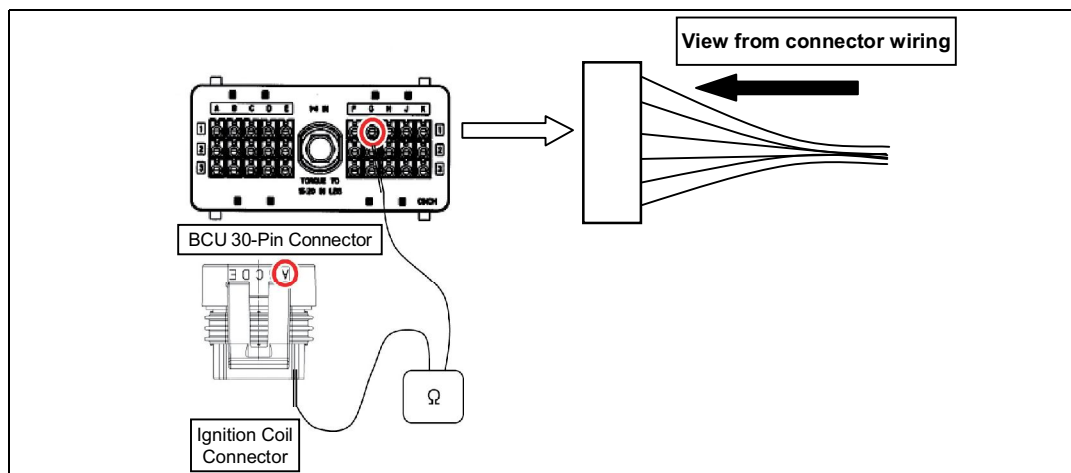
DN02-168

FUEL CONTROL (BURNER)

4 Inspect the wire harness.

- 1 With the tester, measure the resistance between the BCU 30-pin connector G1 (IG+) terminal and the ignition coil connector A (IG+).

Because the space between the terminals is narrow, insert the test stick from the wiring side.

**Judgment**

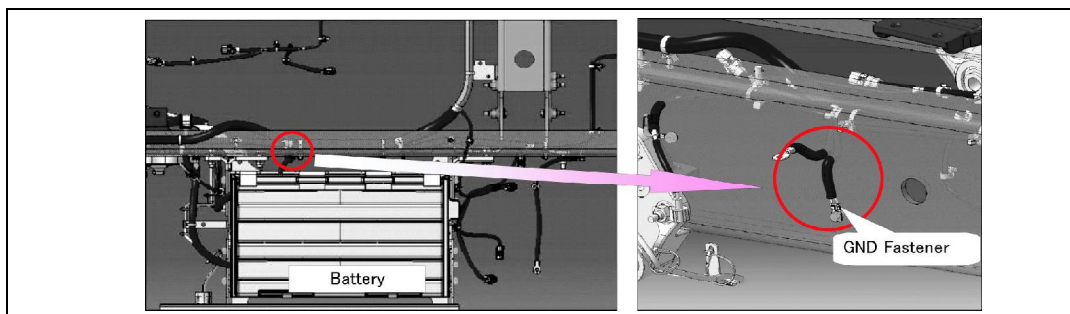
The resistance is within the standard value (1 Ω) → YES

The resistance is NOT within the standard value (1 Ω or more) → NO

NO

Repair a relevant harness.

YES

5 Inspect the GND fasteners.**1 Check GND fasteners for any loose fastener.****Judgment**

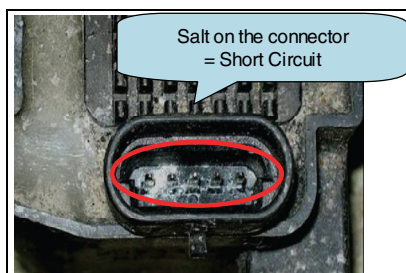
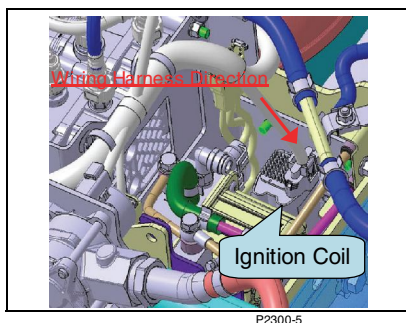
GND fastener is loose → YES

GND fastener is NOT loose → NO

YES

Tighten a relevant fastener.

NO

6 Inspect the ignition coil.**1 Visually inspect the ignition coil connector for any corrosion or other damages.****Judgment**

Corrosion and other damages → YES

No corrosion and no other damages → NO

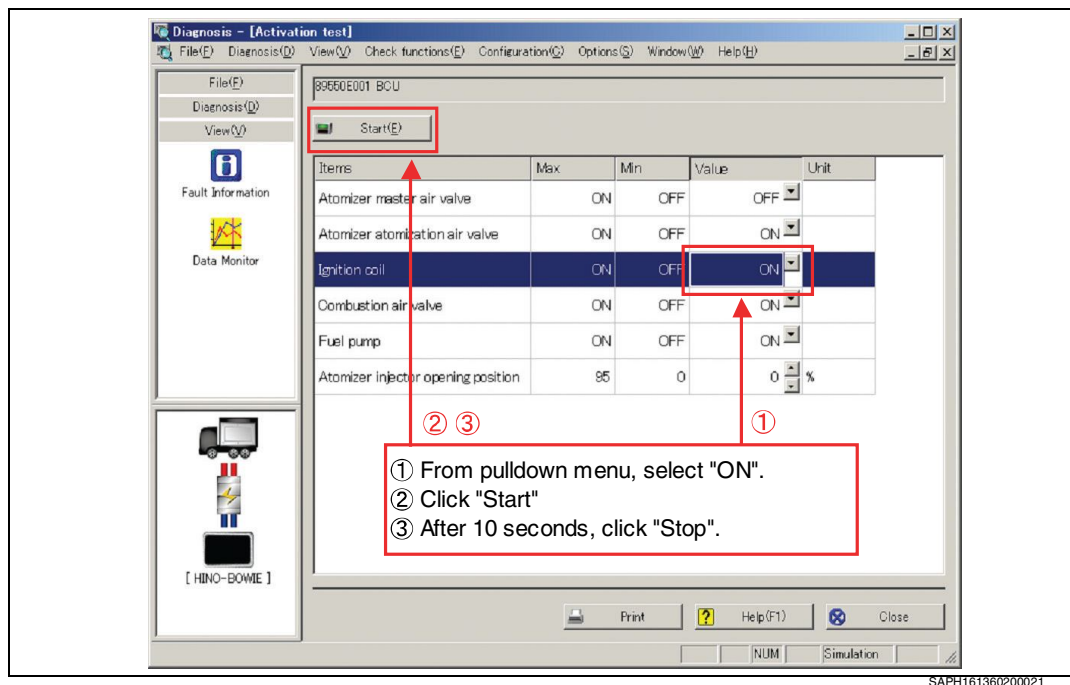
YES

Clean the connector or replace the ignition coil.

NO

7 Inspect the ignition coil.

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select "BCU".
- 5 Conduct "activation test" on Hino-DX to forcefully activate the ignition coil.



Judgment	DTC is stored → YES
	No DTC is stored → NO

YES

Replace the ignition coil.

NO

Completed after implementation below.

1. Clear DTC with Hino-DX.
2. Five minutes after starting the engine, check if any DTC is stored.
3. Clear DTC P141F for engine system.



FUEL CONTROL (BURNER)

DN02-171



DN02-172

FUEL CONTROL (BURNER)

DTC:P2301 (Check sheet)

EN1613602F200058

DTC:P2301	Ignition coil - circuit failure (Circuit high)

1. Technical description

- | |
|--|
| – Ignition coil detects disconnection and short-circuit based on the circuit voltage and signals in BCU. |
|--|

2. DTC set condition**(1) Check conditions**

- | |
|-------------------------------------|
| – 5 minutes elapsed after Engine ON |
|-------------------------------------|

(2) Judgment criteria**DTC : P2301**

- | |
|---|
| – Ignition coil circuit switch feedback voltage > 4V for more than 0.8sec |
|---|

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Ignition coil:

- | |
|-------------------------------------|
| – Malfunction in ignition coil |
| – Abnormal voltage of ignition coil |

Harness: Disconnection or short-circuit in harness between ignition coil and BCU

FUEL CONTROL (BURNER)

DN02-173

DTC:P2301		Ignition coil - circuit failure (Circuit high)		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Ignition coil	Disconnect the ignition coil connector and measure resistance between the terminals.	20 Ω or higher 4 V or lower		Ignition coil Replace
2	Harness	With the ignition coil installed, disconnect the BCU connector and measure resistance between the terminals.	20 Ω or higher 4 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON. NG: Replace BCU.	No malfunction		Check again

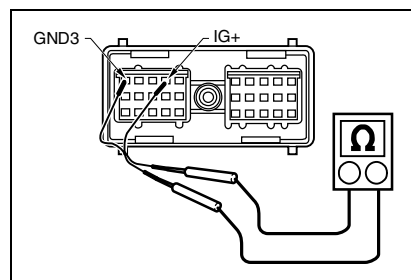
DN02-174

FUEL CONTROL (BURNER)

DTC:P2301

EN1613602F200059

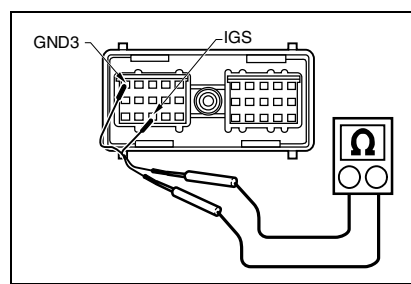
DTC	P2301	Ignition coil - circuit failure (Circuit high)



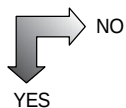
1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals IG+ and GND3 of the BCU 30P connector on the harness side.

Standard value: 20 kΩ or more



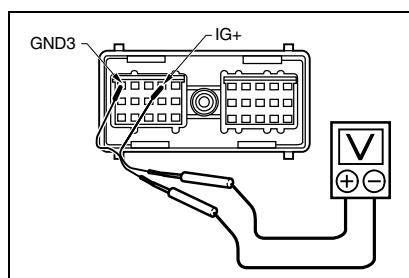
- (5) Measure resistance between the terminals IGS and GND3 of the BCU 30P connector on the harness side.



Proceed to 3.

FUEL CONTROL (BURNER)

DN02-175

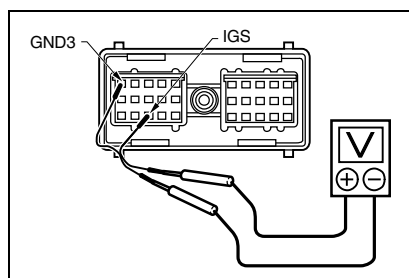


SAPH161360200121

2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals IG+ and GND3 of the BCU 30P connector on the harness side.

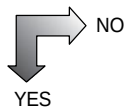
Standard value: 4 V or less



SAPH161360200122

- (2) Measure voltage between the terminals IGS and GND3 of the BCU 30P connector on the harness side.

Standard value: 4 V or less

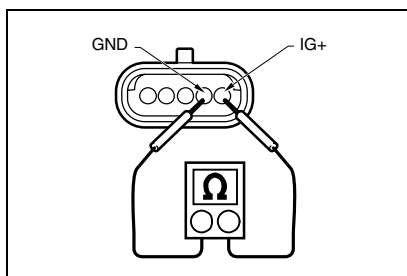


Proceed to 3.

Irregular contact of connectors

DN02-176

FUEL CONTROL (BURNER)

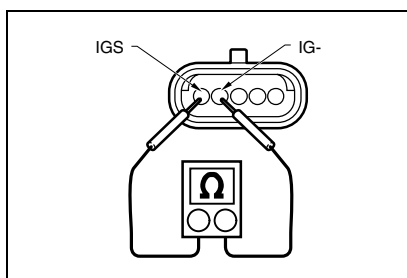


SAPH161360200123

3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the ignition coil connector.
- (2) Measure resistance between the terminals IG+ and GND of the ignition coil connector.

Standard value: 20 k Ω or more



SAPH161360200124

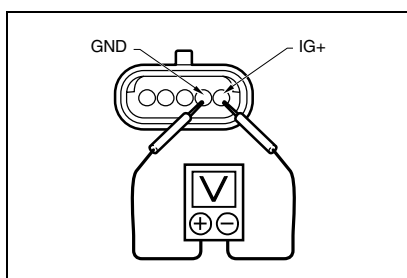
- (3) Measure resistance between the terminals IG- and IGS of the ignition coil connector.

YES
NO

Faulty ignition coil

FUEL CONTROL (BURNER)

DN02-177

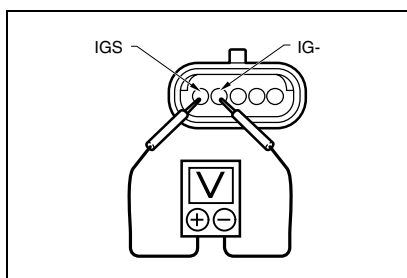


SAPH161360200125

4. CHECK THE VOLTAGE BETWEEN TERMINALS.

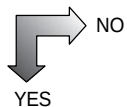
- (1) Measure voltage between the terminals IG+ and GND of the ignition coil connector.

Standard value: 4 V or less



SAPH161360200126

- (2) Measure voltage between the terminals IG- and IGS of the ignition coil connector.



Faulty ignition coil

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.

DN02-178

FUEL CONTROL (BURNER)

DTC:P2302 (Check sheet)

EN1613602F200060

DTC:P2302

Ignition coil supply voltage - open circuit

1. Technical description

- The BCU measures supply voltage to the ignition coil.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON.

(2) Judgment criteria

- Ignition coil power supply voltage < 1V for 3sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

BCU: Abnormal**Harness:** Disconnection

FUEL CONTROL (BURNER)

DN02-179

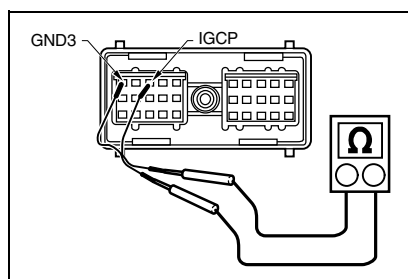
DTC:P2302	Ignition coil supply voltage - open circuit	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Aftertreatment harness	DTC	P2506 must not be present.		Proceed to P2506 troubleshooting.
2	Aftertreatment harness	DTC	P2300 and P2301 must not be present.		Proceed to each troubleshooting.
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON. NG: Replace BCU.	No malfunction		Check again

DTC:P2302

EN1613602F200061

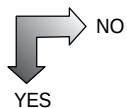
DTC	P2302	Ignition coil supply voltage - circuit failure (open circuit)



SAPH161360200127

1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals IGCP and GND3 of the BCU 30P connector on the harness side.

Standard value: 10 kΩ or more

Faulty harness

Irregular contact of connectors

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.

DN02-180

FUEL CONTROL (BURNER)

DTC:P2431 (Check sheet)

EN1613602F200062

DTC:P2431

Air supply (from air tank) failure

1. Technical description

- Abnormality of the supplied air (from the vehicle air tank) pressure used for atomization of injected fuel is sensed.

2. DTC set condition**(1) Check conditions**

- Engine speed (from ECM) > 450r/min

(2) Judgment criteria

1. Atomizer air pressure < 350kPa for 120sec
2. Activate atomizer master air valve and atomization air valve for 5sec
3. Atomizer nozzle pressure <= 186kPa
4. The error is confirmed when the above have been sensed for the third time in a row.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Air compressor: Malfunction**Air piping:** Leakage/clogging

FUEL CONTROL (BURNER)

DN02-181

DTC:P2431		Air supply (from air tank) failure		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Vehicle (Compressor)	Check the air filling status.	About 3 minutes (reference value) after starting the engine, a purge sound can be confirmed from the air dryer.		Refer to the Workshop Manual.
2	Vehicle (Entire air supply system)	1. Wait for more than 3 minutes after starting the engine to sufficiently fill the tank with air. 2. After once turning the engine OFF, check for air leakage between the air tank and atomizer with the key ON by listening a sound. * Note that starting the engine when inspecting may present danger to the operator.	Must be free from air leakage.		Repair
3	Vehicle (Air supply tube)	Check for clogging between the air tank and atomizer. Remove the tube from the vehicle and check by blowing air.	Must be free from clogging.		Repair
To perform judging malfunction again after clearing the error DTC, perform a DPR forced regeneration and check that there is no abnormality. (For reference: If the air pressure is insufficient, the burner will not operate and the regeneration will not be completed, either.)					

DN02-182

FUEL CONTROL (BURNER)

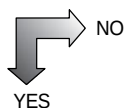
DTC:P2431

EN1613602F200063

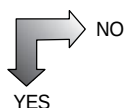
DTC	P2431	Air supply (from air tank) failure

1. CHECK AIR PRESSURE.

- (1) Start the engine and check brake air pressure indicated by the meter.
Standard value: 785 kPa (8 kgf/cm²) or more



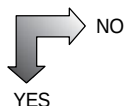
Proceed to inspect the air compressor and service brake

2. AURALLY CHECK LEAK FROM AIR PIPING.

Repair the trouble

3. INSPECT THE AIR DRYER AND SAFETY VALVE.

- (1) Stop the engine and inspect the air dryer and safety valve.



- Faulty air dryer
 - Faulty safety valve
- Refer to the chapter "**SERVICE BRAKE (FULL AIR)**". (BR02-002)

Repair the air piping for clogging.

HINT

After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-183



DN02-184

FUEL CONTROL (BURNER)

DTC:P2432 (Check sheet)

EN1613602F200064

DTC:P2432

Atomizer air pressure sensor - out of range (Out of range low)

1. Technical description

- Atomizer air pressure sensor detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC : P2432**

- Atomizer air pressure sensor voltage < 0.1V (-62.27kPa) for more than 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer:

- Malfunction of atomizer fuel pressure sensor
- Disconnection or short-circuit in atomizer fuel pressure sensor
- Abnormal voltage of atomizer fuel pressure sensor

Harness: Disconnection or short-circuit in harness between atomizer and BCU

FUEL CONTROL (BURNER)

DN02-185

DTC:P2432	Atomizer air pressure sensor - out of range (Out of range low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Harness	Disconnect the BCU connector and measure resistance between the terminals of the BCU connector on the wire harness side.	40 k Ω or higher		Harness Repair
2	Atomizer	Disconnect the connector on the atomizer side and measure resistance.	40 k Ω or higher		Atomizer Replace
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

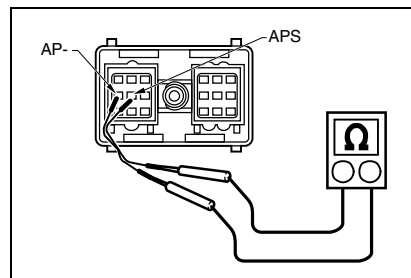
DN02-186

FUEL CONTROL (BURNER)

DTC:P2432

EN1613602F200065

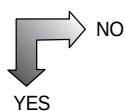
DTC	P2432	Atomizer air pressure sensor - out of range (Out of range low)



1. CHECK THE RESISTANCE BETWEEN TERMINALS.

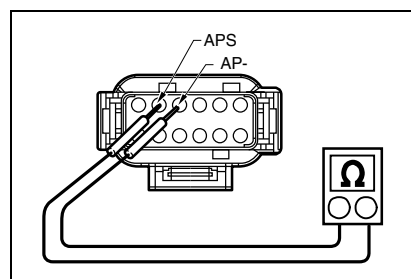
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 18P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals APS and AP- of the BCU 18P connector on the harness side.

Standard value: 40 kΩ or more



Proceed to 2.

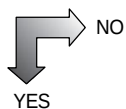
Irregular contact of connectors



2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 12P connector.
- (2) Measure resistance between the terminals APS and AP- of the atomizer 12P connector.

Standard value: 40 kΩ or more



Faulty atomizer

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-187



DN02-188

FUEL CONTROL (BURNER)

DTC:P2433 (Check sheet)

EN1613602F200066

DTC:P2433

Atomizer air pressure sensor - out of range (Out of range high)

1. Technical description

- Atomizer air pressure sensor detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC : P2433**

- Atomizer air pressure sensor voltage > 4.89V (1,174.96kPa) for more than 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer:

- Malfunction in atomizer fuel pressure sensor
- Disconnection or short-circuit in atomizer fuel pressure sensor
- Abnormal voltage of atomizer fuel pressure sensor

Harness: Disconnection or short-circuit in harness between atomizer and BCU

FUEL CONTROL (BURNER)

DN02-189

DTC:P2433	Atomizer air pressure sensor - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the connector on the atomizer side and measure resistance.	40 k Ω or higher 0.1 V or lower		Atomizer Replace
2	Harness	Disconnect the BCU connector and measure resistance between the terminals of the BCU connector on the wire harness side.	40 k Ω or higher 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

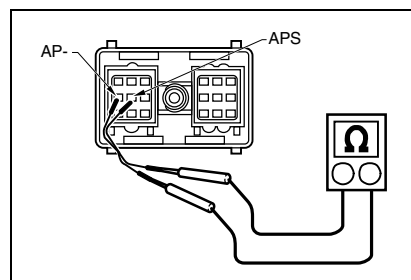
DN02-190

FUEL CONTROL (BURNER)

DTC:P2433

EN1613602F200067

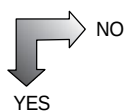
DTC	P2433	Atomizer air pressure sensor - out of range (Out of range high)



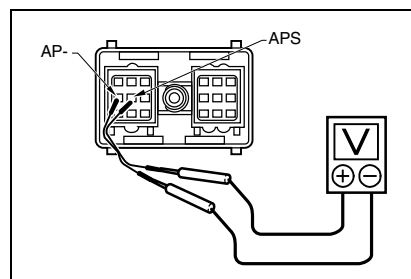
1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 18P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals APS and AP- of the BCU 18P connector on the harness side.

Standard value: 40 kΩ or more



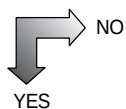
Proceed to 3.



2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Set the starter to the "ON" position.
- (2) Measure voltage between the terminals APS and AP- of the BCU 18P connector on the harness side.

Standard value: 0.1 V or less

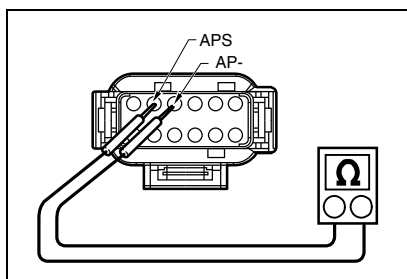


Proceed to 3.

Irregular contact of connectors

FUEL CONTROL (BURNER)

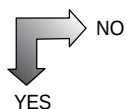
DN02-191



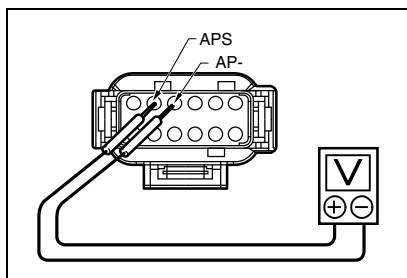
3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the atomizer 12P connector.
- (3) Measure resistance between the terminals APS and AP- of the atomizer connector on the harness side.

Standard value: 40 k Ω or more



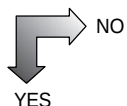
Faulty atomizer



4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals APS and AP- of the atomizer 12P connector on the harness side.

Standard value: 0.1 V or less



Faulty atomizer

Faulty harness

HINT

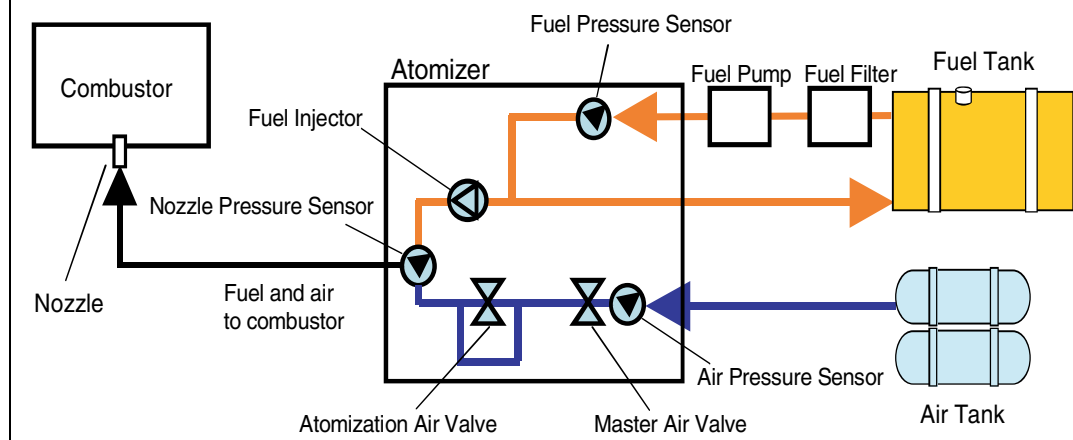
- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DTC:P2436 (Check sheet)

EN1610602F200093

DTC:P2436**Atomizer failure****1. Technical description**

- Atomizer is a device for atomizing and injecting the fuel to be injected to the combustion chamber.
- Abnormality in atomizer characteristics is judged by BCU.

**2. DTC set condition****(1) Check conditions**

- Engine is running (The condition for following A, B, C)
- Before fueling (combustion) (The condition for following A, B, C, D)
- After P2030 detected (The condition for following E, F)

(2) Judgment criteriaNozzle pressure when atomization air valve activated

- A. Too high (>434.4 kPa)
- B. Too low (<199.9 kPa) although air pressure value is normal (>350kPa)

Fuel pressure

- C. Non zero (<-69kPa, >69kPa) while the fuel pump deactivated
- D. Improper pressure (>696.4 kPa, <558.5 kPa) while the fuel pump activated

Fuel injector malfunction (Following two diagnosis appears after P2030 detected)

- E. Fuel pressure value does not change (decrease) after fuel injector activated
- F. Nozzle pressure value does not change (increase) after fuel injector activated

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Symptom	Root causes	Suggestions
Nozzle pressure is too high (>434.4kPa) when atomization air valve activated	Plugged nozzle	Replace the nozzle
	Plugged fuel hose between nozzle and atomizer	Replace the fuel hose
	Plugged atomizer outlet connector	Replace the atomizer
	Plugged atomizer internal plumbing	Replace the atomizer
	Air pressure regulator has stucked	Replace the atomizer
	Nozzle pressure sensor which is built in the atomizer has an inaccuracy failure.	Replace the atomizer
Nozzle pressure is too low (<199.9kPa) when atomization air valve activated although inlet pressure value is normal (>350kPa)	Air leakage from air tube between the air tank and the atomizer	Check the air tube
	Air leakage from the air tank	Check the air tank
	Plugged air tube between the air tank and the atomizer	Check the air tube
	Air pressure regulator has stucked	Replace the atomizer
	Nozzle pressure sensor which is built in the atomizer has an inaccuracy failure	Replace the atomizer
Non zero fuel pressure(<69kPa, >69kPa) while the fuel pump deactivated	Fuel pressure sensor which is built in the atomizer has an inaccuracy failure	Replace the atomizer
	Improper BCU control	Check the sound from the fuel pump when ignition key ON, if sound is heard, replace BCU
Fuel pressure is low (<558.5kPa) while the fuel pump activated	Plugged fuel suction plumbing between the fuel pump and the fuel tank	Check fuel hoses/fuel filter
	Fuel leakage from fuel suction plumbing between the fuel pump and the fuel tank	Check fuel hoses/fuel filter
	Fuel leakage from fuel supply plumbing between the fuel pump and the atomizer	Check fuel leakage
	Lack of fuel in the fuel tank	Refuel
	No fuel in the fuel filter (no priming)	Turn on the fuel pump on Hino DX
	No maintenance of the fuel filter	Replace the fuel filter element
	Fuel pressure sensor which is built in the atomizer has an inaccuracy failure	Replace the atomizer
Fuel pressure is high (>696.4 kPa) while the fuel pump activated	Plugged fuel return hose between the atomizer and the fuel tank	Check fuel hoses
	BCU supply excessive current to the fuel pump	Check the sound from the fuel pump when ignition key ON, if sound is heard, replace BCU
	Fuel pressure sensor which is built in the atomizer has an inaccuracy failure	Replace the atomizer
P2030 is stored and P2441 is not stored	(E) Fuel injector which is built in the atomizer has stucked close	Replace the atomizer
	(F) Fuel injector which is built in the atomizer has stucked open	Replace the atomizer

DN02-194

FUEL CONTROL (BURNER)

DTC:P2436	Atomizer failure	Inspection Procedure

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	Yes	No
1	DTC confirmation	Check that no DTC of the atomizer pressure sensor exist.	P018C, P018D, P2432, P2433, P2437, or P2438 is/are stored in the BCU → YES The DTC's are not stored in the BCU → NO		Go to diagnostic procedure of a relevant DTC	Go to Step 2
2	DTC confirmation	Check that no DTC of the atomizer injector exist.	P20D3 or P20D4 is/are stored in the BCU → YES The DTC's are not stored in the BCU → NO		Go to diagnostic procedure of a relevant DTC	Go to Step 3
3	DTC confirmation	Check that no DTC of the fuel pump exist.	P2633 or P2634 is/are stored in the BCU → YES The DTC's are not stored in the BCU → NO		Go to diagnostic procedure of a relevant DTC	Go to Step 4
4	DTC confirmation	Check that no DTC of the BCU exist.	P060C, P0642, P0643, P2506 or P2507 is/are stored in the BCU → YES The DTC's are not stored in the BCU → NO		Go to diagnostic procedure of a relevant DTC	Go to Step 5
5	DTC confirmation	Check that no DTC of Misfire exist.	P2030 is stored in the BCU → YES The DTC is not stored in the BCU → NO		Go to Step 6	Go to Step 7
6	DTC confirmation	Check that no DTC of Combustion Air Valve (CAV) stuck exist.	P2441 is stored in the BCU → YES The DTC is not stored in the BCU → NO		Go to Step 7	Replace the atomizer
7	Atomizer	Check the atomizer air pressure in data monitor during engine is running (idling condition).	The air pressure is 350kPa (51 psi) or more → YES The air pressure is less than 350 kPa (51 psi) → NO		Go to Step 11	Go to Step 8
8	Atomizer	Check the nozzle pressure in data monitor during starter switch is ON (not engine start) and activation test is performed.	The nozzle pressure is within the standard (Between 200 kPa (29 psi) and 434 kPa (63 psi)) → YES The nozzle pressure is NOT within the standard → NO		Go to Step 10	Go to Step 9

FUEL CONTROL (BURNER)

DN02-195

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	Yes	No
9	Atomizer	Regarding nozzle pressure that took data at Step 8, the value is over / under range of the standard.	The nozzle pressure is less than 200 kPa (29 psi) → YES The nozzle pressure is more than 434 kPa (63 psi) → NO		Check the function of the air compressor and the air dryer	Replace the atomizer.
10	Atomizer	Check the air pressure on Hino DX again (Same test as Step 7).	The air pressure is 350 kPa (51 psi) or more → YES The air pressure is less than 350 kPa (51 psi) → NO		Go to Step 15	Replace the atomizer
11	Atomizer	Check the nozzle pressure in data monitor during starter switch is ON (not engine start) and activation test is performed.	The nozzle pressure is within the standard (Between 200 kPa (29 psi) and 434 kPa (63 psi)) → YES The nozzle pressure is NOT within the standard → NO		Go to Step 15	Go to Step 12
12	Atomizer	Regarding nozzle pressure that take data on Step 11, the value is over / under range of the standard.	The nozzle pressure is less than 200 kPa (29 psi) → YES The nozzle pressure is more than 434 kPa (63 psi) → NO		Replace the atomizer	Go to Step 13
13	Nozzle	Check the nozzle pressure in data monitor after disconnecting the fuel tube from nozzle on the combustor with idling condition.	The nozzle pressure is 55.16 kPa (8.0 psi) or less → YES The nozzle pressure is more than 55.16 kPa (8.0 psi) → NO		Replace the nozzle, then confirm "Nozzle pressure" value again	Go to Step 14
14	Atomizer	Check the nozzle pressure after disconnecting the fuel tube from atomizer in data monitor with idling condition for 5 seconds.	The nozzle pressure is 55.16 kPa (8.0 psi) or less → YES The nozzle pressure is more than 55.16 kPa (8.0 psi) → NO		Replace the fuel tube, then confirm "Nozzle pressure" value again	Replace the atomizer, then confirm "Nozzle pressure" value again
15	Fuel Pump	Check the fuel pressure in data monitor during KEY-ON (Do not start the engine).	The fuel pressure is within standard (Between -69 kPa (-10 psi) and 69 kPa (10 psi)) → YES The fuel pressure is NOT within standard → NO		Go to Step 17	Go to Step 16
16	Fuel Pump	Check the operating noise from the fuel pump during KEY-ON (Do not start the engine).	Noise from the pump → YES No noise from the pump → NO		Replace the BCU	Replace the atomizer
17	Atomizer	Check the fuel pressure in data monitor during engine is ON (Do not start the engine) and activation test is performed.	The fuel pressure is within standard (Between 558 kPa (81 psi) and 696 kPa (101 psi)) → YES The fuel pressure is NOT within standard → NO		Go to Step 22	Go to Step 18

DN02-196

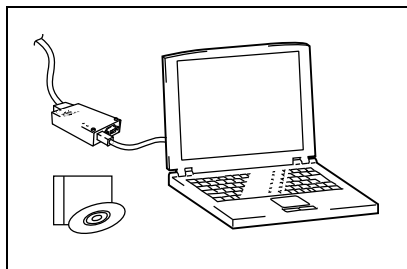
FUEL CONTROL (BURNER)

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	Yes	No
18	Atomizer	Regarding nozzle pressure that took data at Step 17, the value is over / under range of the standard.	The nozzle pressure is less than 558 kPa (81 psi) → YES The nozzle pressure is more than 696 kPa (101 psi) → NO		Go to Step 19	Go to Step 20
19	Atomizer	Confirm the return fuel quantity after removed a fuel tube between atomizer and fuel tank.	The quantity is within standard (1 quart gallon/min or more) → YES The quantity is NOT within standard → NO		Replace the atomizer	Find out clogged on suction fuel plumbing between fuel tank and atomizer
20	Fuel pump	Confirm operation error of fuel pump.	Noise from the pump → YES No noise from the pump → NO		Replace the BCU	Go to Step 21
21	Atomizer	Confirm the return fuel quantity after removed a fuel tube between atomizer and fuel tank.	The quantity is within standard (1 quart gallon/min or more) → YES The quantity is NOT within standard → NO		Replace the atomizer	Find out clogged on return fuel plumbing between fuel tank and atomizer
22	Atomizer	Check the nozzle pressure after disconnecting the fuel tube from nozzle on the combustor in data monitor during starter switch is ON (not engine start) and activation test is performed.	Fuel is spilling from the tube → YES Fuel is NOT spilling from the tube → NO		Replace the atomizer	Go to Step 23
23	Atomizer	Perform the manual regen. At the same time, check the data of "Flame temp", "Exhaust Gas temp (DPR Outlet)" and "Burner operation status" in DX data monitor.	Proper condition → YES Data discrepancy is confirmed → NO		Completed.	Replace the atomizer.

DTC:P2436

EN1620702F200001

DTC	P2436	Atomizer failure

1 Check the DTC about atomizer pressure sensor

saph161060200038

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.

4 Check whether the DTC(s) at left is/are stored in the BCU.

P018C Fuel pressure sensor (Out of range low)
P018D Fuel pressure sensor (Out of range high)
P2432 Air pressure sensor (Out of range low)
P2433 Air pressure sensor (Out of range high)
P2437 Nozzle pressure sensor (Out of range low)
P2438 Nozzle pressure sensor (Out of range high)

P2436-07

Judgment	Is/Are the DTC(s) stored?
	The DTC(s) is/are stored → YES
	The DTC(s) are not stored → NO

YES

Go to diagnostic procedure of a relevant DTC.

NO

2 Check the DTC about atomizer injector

P20D3 Atomizer fuel injector (Circuit low)
P20D4 Atomizer fuel injector (Circuit high)

P2436-08

1 Check whether the DTC(s) at left is/are stored in the BCU.

Judgment	Is/Are the DTC(s) stored?
	The DTC(s) is/are stored → YES
	The DTC(s) are not stored → NO

YES

Go to diagnostic procedure of a relevant DTC.

NO

DN02-198

FUEL CONTROL (BURNER)

3 Check the DTC about fuel pump

P2633 Fuel pump (Circuit low)
P2634 Fuel pump (Circuit high)

P2436-09

1 Check whether the DTC(s) at left is/are stored in the BCU.

Judgment	Is/Are the DTC(s) stored?
	The DTC(s) is/are stored → YES
	The DTC(s) are not stored → NO

YES

Go to diagnostic procedure of a relevant DTC.

NO

4 Check the DTC about BCU

P060C BCU temperature sensor - rationality
P0642 ECU sensor supply 1 failure (Low)
P0643 ECU sensor supply 1 failure (High)
P2506 Battery voltage (out of range low)
Battery voltage (out of range high)
P2507 A/D converter input battery voltage
(Out of range low)

P2436-10

1 Check whether the DTC(s) at left is/are stored in the BCU.

Judgment	Is/Are the DTC(s) stored?
	The DTC(s) is/are stored → YES
	The DTC(s) are not stored → NO

YES

Go to diagnostic procedure of a relevant DTC.

NO

5 Check the DTC about Misfire

P2030 Burner abnormal combustion
(Burner misfire)

P2436-11

1 Check whether the DTC at left is stored in the BCU.

Judgment	Is the DTC stored?
	The DTC is stored → YES
	The DTC is not stored → NO

NO

Go to Step 7.

YES

6 Check the DTC about combustion air valve (CAV) Stuck

P2441 Combustion air valve stuck

P2436-12

1 Check whether the DTC at left is stored in the BCU.

Judgment

Is the DTC stored?

The DTC is stored → YES

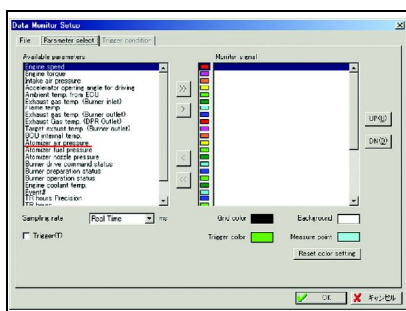
The DTC is not stored → NO

NO

Replace the atomizer.

YES

7 Check "atomizer air pressure" with Hino-DX



P2436-02

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Not start the engine).
- 3 Select "Burner".
- 4 Start the engine (Idling condition).
- 5 Wait for 3 minutes.
- 6 Check "atomizer air pressure" in data monitor.

Judgment

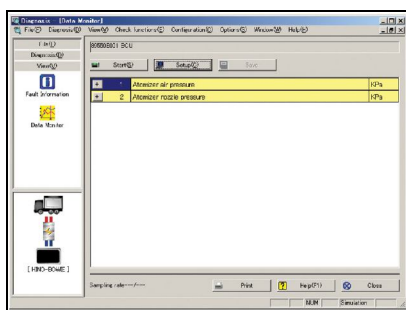
Is the value 350 kPa (51 psi) or more?

350 kPa (51 psi) or more → YES

Less than 350 kPa (51 psi) → NO

YES

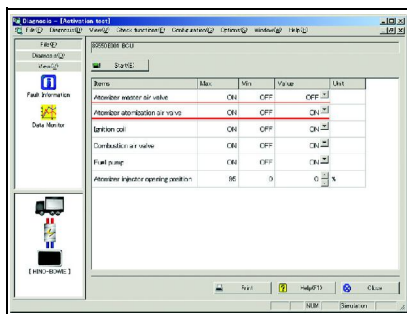
Go to Step 11.



P2436-18

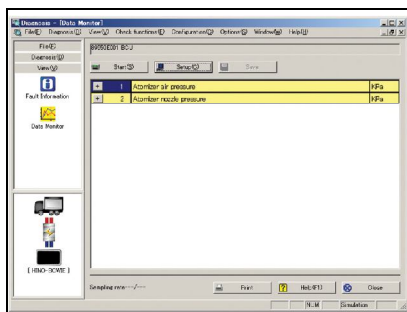
NO

8 Check "atomizer nozzle pressure" with Hino-DX



P2436-03

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Not start the engine).
- 3 Select "Burner".
- 4 Start the engine (Idling condition).
- 5 Turn on the exhaust brake.
- 6 Perform the activation test "Atomizer atomization air valve".
- 7 Wait for 5 seconds.
- 8 Check both "atomizer nozzle pressure" and "atomizer air pressure" in data monitor.



P2436-19

Judgment

Is the value of nozzle pressure standard (Between 200 kPa (29 psi) and 434 kPa (63 psi))?

Within the standard → YES

NOT within the standard → NO

YES

Go to Step 10.

NO

9 The value of "atomizer nozzle pressure" is over / under range of the standard

- 1 Check the result of Step 8.

Judgment

Is the value less than 200 kPa (29 psi)?

Less than 200 kPa (29 psi) → YES

More than 434 kPa (63 psi) → NO

YES

Check the function of air compressor and the air dryer.

NO

Replace the atomizer.

10 Re-confirm "atomizer air pressure"

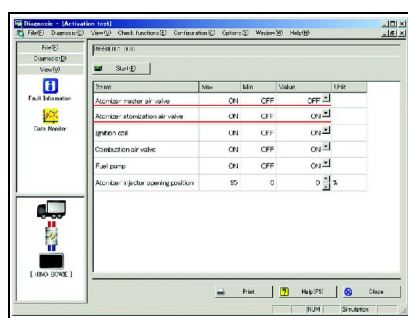
- 1 Check the result of Step 7.

Judgment	Is the value more than 350 kPa (51 psi)?
	350 kPa (51 psi) or more → YES
	Less than 350 kPa (51 psi) → NO

YES → Go to Step 15.

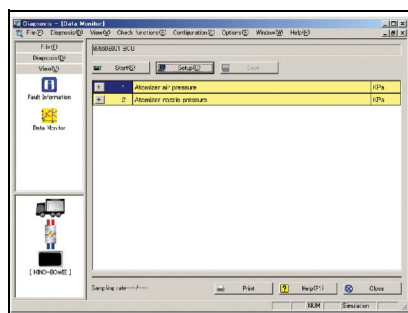
NO

Replace the atomizer.

11 Check "atomizer nozzle pressure" with Hino-DX

P2436-04

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 3 Select "Burner".
- 4 Start the engine (Idling condition).
- 5 Turn on the exhaust brake.
- 6 Perform the activation test "Atomizer atomization air valve".
- 7 Wait for 5 seconds.
- 8 Check both "atomizer nozzle pressure" and "atomizer air pressure" in data monitor.



P2436-19

Judgment	Is the value of nozzle pressure standard (Between 200 kPa (29 psi) and 434 kPa (63 psi))?
	Within the standard → YES
	NOT within the standard → NO

YES → Go to Step 15.

NO

DN02-202

FUEL CONTROL (BURNER)

12 The value of "atomizer nozzle pressure" is over / under range of the standard

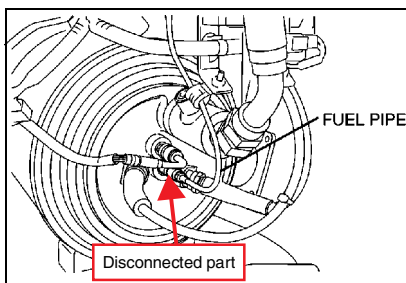
1 Check the result of Step 11.

Judgment	Is the value 200kPa (29psi) or less?
	Less than 200kPa (29psi) → YES
	More than 434kPa (63psi) → NO

YES

Replace the atomizer

NO

13 Confirm clogging in the nozzle

SAPH161360200162

- 1 Disconnect the fuel tube from nozzle on combustor.
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 3 Select "Burner".
- 4 Set up data monitor "atomizer nozzle pressure".
- 5 Start the engine (Idling condition).
- 6 Turn ON the exhaust brake switch.

CAUTION

If exhaust brake is not turned on, ignition may start.
This checking must be executed on un-ignition condition.

- 7 Check the value of "atomizer nozzle pressure" in data monitor for 5 seconds.

NOTICE

When the tube is re-installed, tighten it with proper tightening torque.

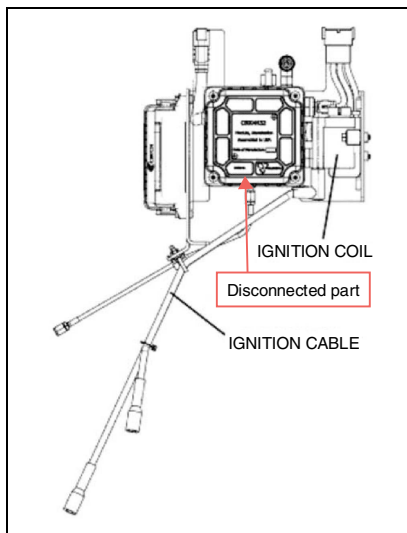
Tightening torque: 10.6 - 12.0 N·m (108 - 122 kgf·cm, 7.82 - 8.85 lbf·ft)
Socket size: 7/16" HEX

Judgment	Is the value 55.16kPa (8.0psi) or less?
	55.15kPa (8psi) or less → YES
	More than 55.15kPa (8psi) → NO

YES

Replace the nozzle and confirm this step again.

NO

14 Confirm clogging in the fuel tube between the nozzle and the atomizer

- 1 Disconnect the fuel tube from atomizer.
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 3 Select "Burner".
- 4 Set up data monitor "atomizer nozzle pressure".
- 5 Start the engine (Idling condition).
- 6 Turn ON the exhaust brake switch.

⚠ CAUTION

If exhaust brake is not turned on, ignition may start.
This checking must be executed on un-ignition condition.

- 7 Check the value of "atomizer nozzle pressure" in data monitor for 5 seconds.

NOTICE

When the tube is re-installed, tighten it with proper tightening torque.

Tightening torque: 10.6 - 12.0 N·m (108 - 122 kgf·cm, 7.82 - 8.85 lbf·ft)
Socket size: 7/16" HEX

Judgment	Is the value 55.16kPa (8.0psi) or less?
	55.15kPa (8psi) or less → YES
	More than 55.15kPa (8psi) → NO

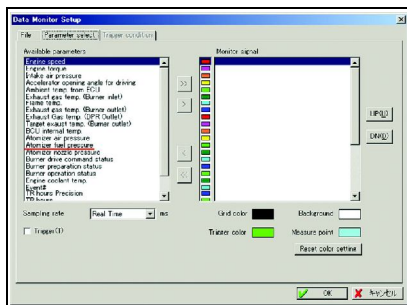
YES

Replace the tube and confirm this step again.

NO

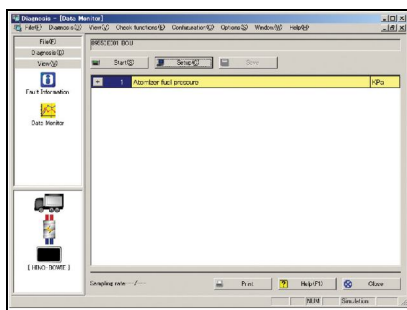
Replace the atomizer and confirm this step again.

15 Check "fuel pressure" in the atomizer



P2436-05

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 3 Select "Burner".
- 4 Check the value of "fuel pressure" in data monitor.



P2436-22

Judgment

Is the value standard (Between -69 kPa (-10 psi) and 69 kPa (10 psi))?

Within standard → YES

NOT within standard → NO

YES

Go to Step 17.

NO

16 Check the operating noise from the fuel pump

- 1 Set the starter switch to the ON position (Do not start the engine).
- 2 Confirm the operating noise from the fuel pump.

Judgment

Is there any noise from the pump?

Noise from the pump → YES

No noise from the pump → NO

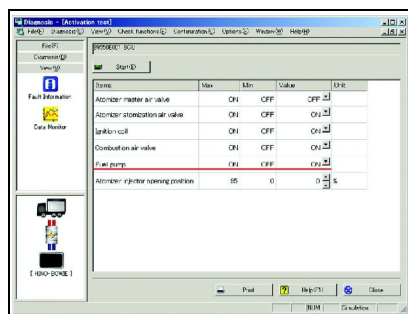
YES

Replace the BCU.

NO

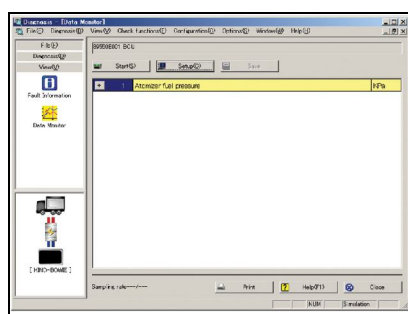
Replace the atomizer.

17 Check "fuel pressure" in the atomizer during fuel pump activated



P2436-06

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 3 Select "Burner".
- 4 Perform the activation test "Fuel pump".
- 5 Wait for 3 seconds.
- 6 Check "fuel pressure" in data monitor.



P2436-22

Judgment

Is the value standard (Between 558 kPa (81 psi) and 696 kPa (101 psi))?

Within standard → YES

NOT within standard → NO

YES

Go to Step 22.

NO

18 The value of "fuel pressure" is over / under range of the standard

- 1 Check the result of Step 17.

Judgment

Is the value less than 558 kPa (81 psi)?

Less than 558 kPa (81 psi) → YES

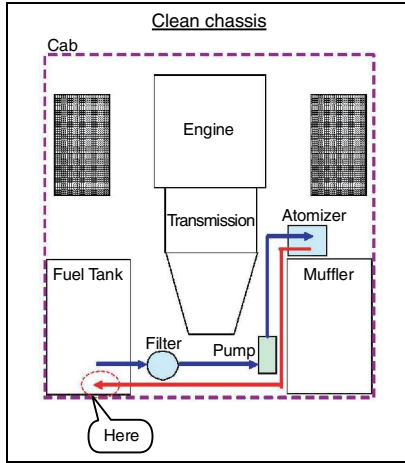
More than 696 kPa (101 psi) → NO

NO

Go to Step 20.

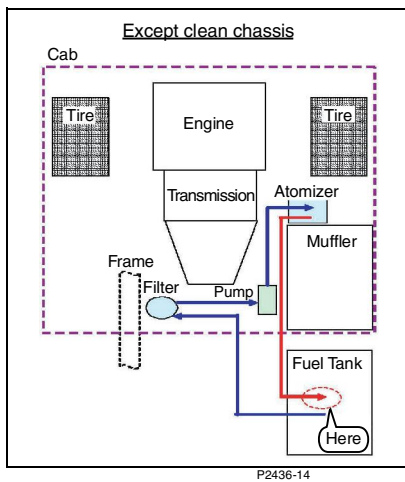
YES

19 Check the return fuel quantity after removed a fuel tube between atomizer and fuel tank



- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Remove the fuel return tube of fuel tank side between atomizer and fuel tank.
- 3 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 4 Select "Burner".
- 5 Perform the activation test "Fuel pump".
- 6 Check the quantity of fuel return.

Judgment	Is the quantity within standard (1 quart/min or more)?
	Within standard → YES
	NOT within standard → NO



NO

Find out clogged on suction fuel plumbing between fuel tank and atomizer.

YES

Replace the atomizer.

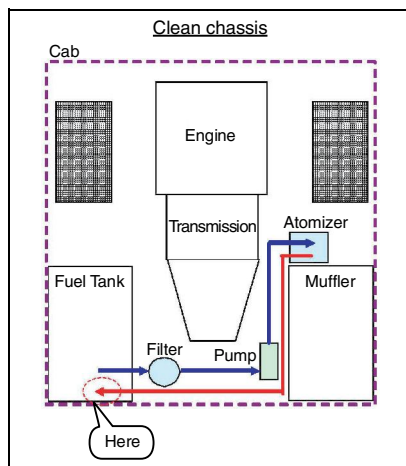
20 Confirm operation noise of fuel pump

- 1 Set starter switch to the ON position (Do not start the engine).
- 2 Confirm the operating noise from the fuel pump.

Judgment	Is there any noise from the pump?
	Noise from the pump → YES
	No noise from the pump → NO

YES → Replace the BCU.

NO

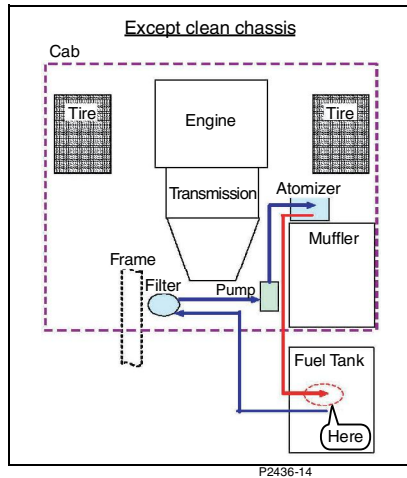
21 Confirm the return fuel quantity after removed a fuel tube between atomizer and fuel tank

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Remove the fuel return tube of fuel tank side between atomizer and fuel tank.
- 3 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 4 Select "Burner".
- 5 Perform the activation test "Fuel pump".
- 6 Check the quantity of fuel return.

Judgment	Is the quantity within standard (1 quart/min or more)?
	Within standard → YES
	NOT within standard → NO

DN02-208

FUEL CONTROL (BURNER)



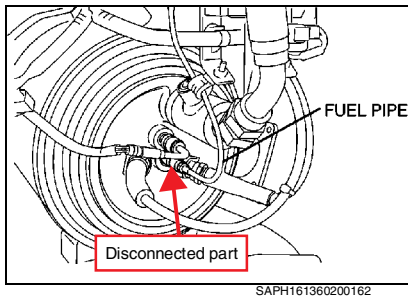
NO

Find out clogged on suction fuel plumbing between fuel tank and atomizer.

YES

Replace the atomizer.

22 Confirm fuel leakage from the atomizer



- 1 Turn off the engine.
- 2 Disconnect the fuel tube from nozzle on the combustor.
- 3 Set the starter switch to the ON position (Do not start the engine).
- 4 Check the fuel spilling from the tube.

NOTICE

When the tube is re-installed, tighten it with proper tightening torque.
Tightening torque: 10.6 - 12.0 N·m (108 - 122 kgf·cm, 7.82 - 8.85 lbf·ft)
Socket size: 7/16" HEX

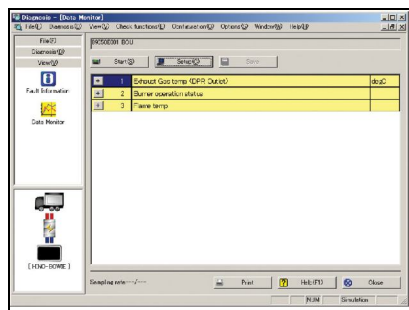
Judgment	Is there any fuel spilling?
	Spilling from the tube → YES
	NOT spilling from the tube → NO

YES

Replace the atomizer.

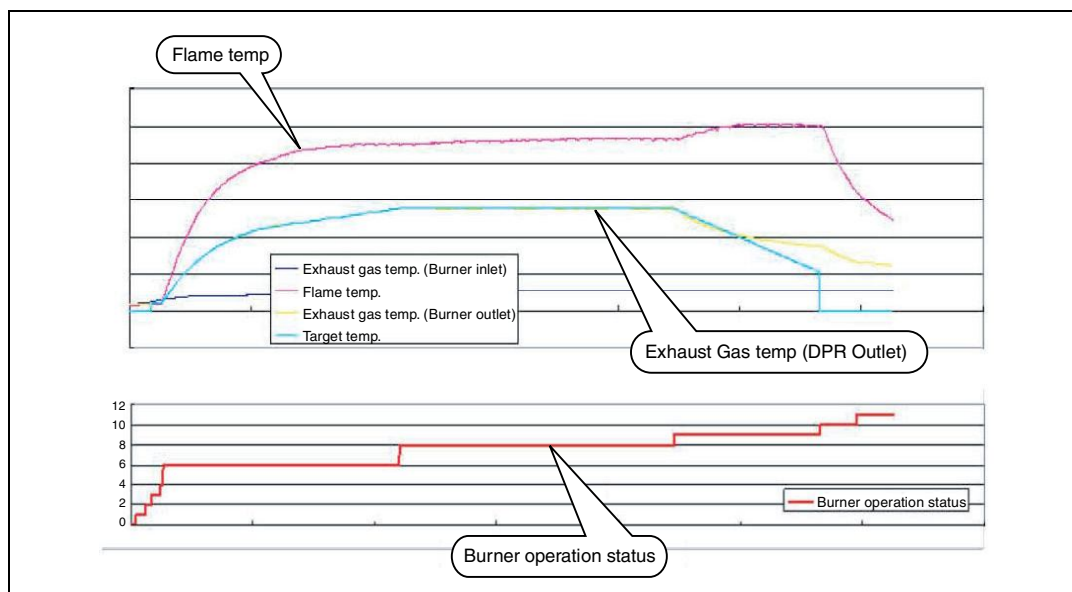
NO

23 Confirm the manual regen data of Flame temp and DPR outlet exhaust temp



P2436-23

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 3 Select "Burner".
- 4 Start the engine (Idling condition).
- 5 Check the value of "Flame temp", "Exhaust Gas temp (DPR Outlet)" and "Burner operation status" in the data monitor.
- 6 Perform the manual regen.



P2436-15

Judgment	Are these values ramping up when "Burner operation status" is 9 (cool-down)?
	Proper condition → YES
	Data discrepancy is confirmed → NO

NO

Replace the atomizer.

YES

Completed.

DN02-210

FUEL CONTROL (BURNER)

DTC:P2437 (Check sheet)

EN1613602F200070

DTC:P2437

Atomizer nozzle pressure sensor - out of range (Out of range low)

1. Technical description

- Atomizer fuel pressure sensor detects the pressure based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC : P2437**

- Atomizer fuel pressure sensor voltage < 0.1V (-70.40kPa) for more than 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer:

- Malfunction in atomizer nozzle pressure sensor
 - Disconnection or short-circuit in atomizer nozzle pressure sensor
 - Abnormal voltage of atomizer nozzle pressure sensor
- Harness:** Disconnection or short-circuit in harness between atomizer and BCU

FUEL CONTROL (BURNER)

DN02-211

DTC:P2437	Atomizer nozzle pressure sensor - out of range (Out of range low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the connector on the atomizer side and measure resistance.	40 k Ω or higher		Atomizer Replace
2	Harness	Disconnect the BCU connector and measure resistance between the terminals of the BCU connector on the wire harness side.	40 k Ω or higher		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

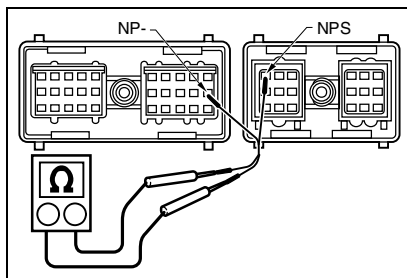
DN02-212

FUEL CONTROL (BURNER)

DTC:P2437

EN1613602F200071

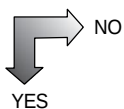
DTC	P2437	Atomizer nozzle pressure sensor - out of range (Out of range low)



SAPH161360200134

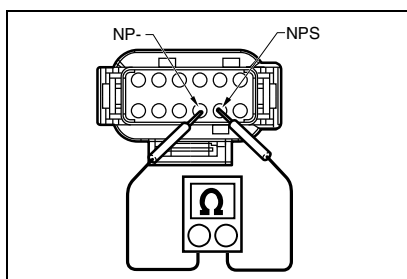
1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 18P and BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals NPS of the BCU 18P and NP- of the BCU 30P connector on the harness side.

Standard value: 40 kΩ or more


Proceed to 2.

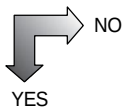
Irregular contact of connectors



SAPH161360200135

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 12P connector.
- (2) Measure resistance between the terminals NPS and NP- of the atomizer 12P connector.

Standard value: 40 kΩ or more


Faulty atomizer

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-213



DN02-214

FUEL CONTROL (BURNER)

DTC:P2438 (Check sheet)

EN1613602F200072

DTC:P2438

Atomizer nozzle pressure sensor - out of range (Out of range high)

1. Technical description

- Atomizer fuel pressure sensor detects the pressure based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

Starter switch ON

(2) Judgment criteria**DTC : P2438**

- Atomizer fuel pressure sensor voltage > 4.89V (766.77kPa) for more than 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Atomizer:

- Malfunction in atomizer nozzle pressure sensor
 - Disconnection or short-circuit in atomizer nozzle pressure sensor
 - Abnormal voltage of atomizer nozzle pressure sensor
- Harness:** Disconnection or short-circuit in harness between atomizer and BCU

FUEL CONTROL (BURNER)

DN02-215

DTC:P2438	Atomizer nozzle pressure sensor - out of range (Out of range high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Atomizer	Disconnect the connector on the atomizer side and measure resistance.	40 k Ω or higher 0.1 V or lower		Atomizer Replace
2	Harness	Disconnect the BCU connector and measure resistance between the terminals of the BCU connector on the wire harness side.	40 k Ω or higher 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after the key is turned ON. NG: Replace BCU.	No malfunction		Check again

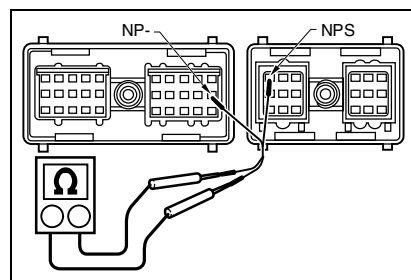
DN02-216

FUEL CONTROL (BURNER)

DTC:P2438

EN1613602F200073

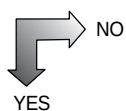
DTC	P2438	Atomizer nozzle pressure sensor - out of range (Out of range high)



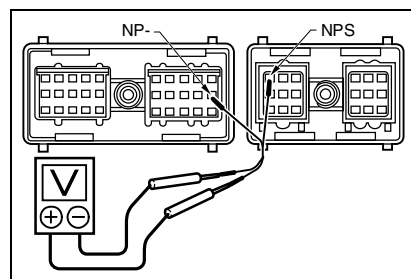
1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 18P and BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals NPS of the BCU 18P and NP- of the BCU 30P connector on the harness side.

Standard value: 40 kΩ or more



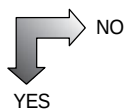
Proceed to 3.



2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals NPS of the BCU 18P and NP- of the BCU 30P connector on the harness side.

Standard value: 0.1 V or less

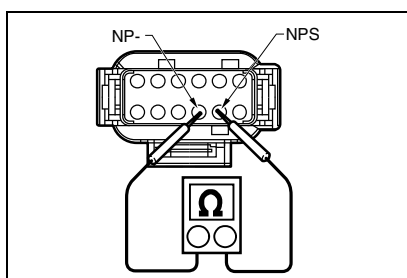


Proceed to 3.

Irregular contact of connectors

FUEL CONTROL (BURNER)

DN02-217

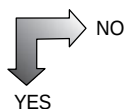


SAPH161360200138

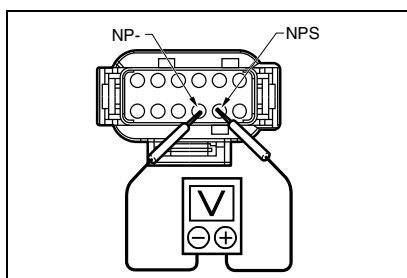
3. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Disconnect the atomizer 12P connector.
- (2) Measure resistance between the terminals NPS and NP- of the atomizer 12P connector.

Standard value: 40 kΩ or more



Faulty atomizer

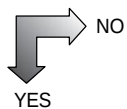


SAPH161360200139

4. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Measure voltage between the terminals NPS and NP- of the atomizer 12P connector.

Standard value: 0.1 V or less



Faulty atomizer

Faulty harness

HINT

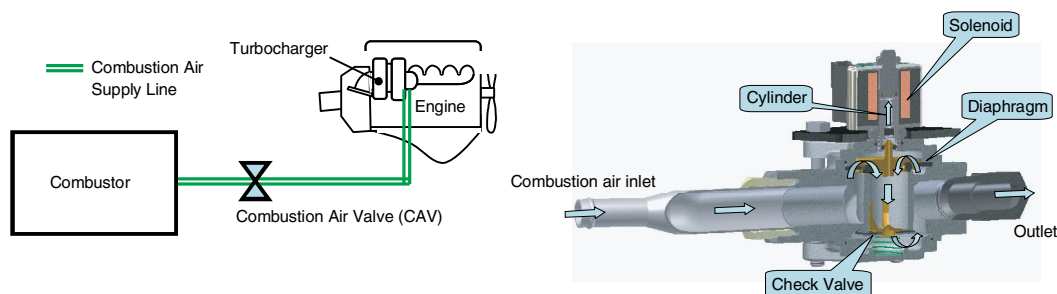
- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DTC:P2441 (Check sheet)

EN1610602F200093

DTC:P2441 Combustion air valve stuck**1. Technical description**

The combustion air valve (CAV) is a solenoid valve which is combined with the check valve. BCU sends signal, and CAV is activated (opened) when combustion air is supplied from the turbocharger to the burner combustor.



There are two scenarios that DTC is detected following A and B to detect this DTC.

A) BCU checks the CAV function based on boost pressure sensor value which is send by Engine ECU.

B) In addition, BCU goes "Active Diagnosis Mode" after detecting P2030 in order to find out root cause of P2030.

Active Diagnosis Mode : BCU monitors the nozzle pressure sensor value before/after fuel injection from the injector which is built in the atomizer.

BCU judges P2441 (CAV stuck) when BCU detects normal nozzle pressure variance after fuel injection (= fuel injection is normal). If P2030 is present, perform troubleshooting for P2030.

2. DTC set condition**(1) Check conditions**

A) BCU monitors the subject pressure value before/after CAV is activated (opened) at stable and required engine conditions.

<Reference>

BCU monitors the boost pressure value when all the following conditions are met.

- Engine is running.
- Burner status: Not fueling cycle.
- Engine percent torque (from Engine ECU) < 90 %.
- Engine torque variance per second < 4 %.
- Engine speed variance per second < 5 %.
- In judgment area (see the right-hand table).
- Boost pressure (gauge: from Engine ECU) > 120kPa.
- Boost pressure variance per second is < 3.5 kPa.

B) After P2030 is detected in order to find out a root cause of P2030.

RPM Torque (Nm)	750	1000	1500	2000	2500
1000	0	0	0	1	1
900	0	0	0	1	1
800	0	0	0	1	1
700	0	0	0	1	1
600	0	0	0	1	1
500	0	0	0	1	1
400	0	0	0	1	1
300	0	0	0	0	0
200	0	0	0	0	0
100	0	0	0	0	0

(2) Judgment criteria

A) BCU judge CAV failure when the subject pressure value does not change (decrease) after CAV opened.

Boost pressure sensor variance after CAV opened < 3.5kPa for 1.5seconds, and

Above condition confirmed 3 times in a row, BCU judge P2441.

B) BCU judge P2441 (CAV stuck) when BCU detects normal nozzle pressure variance after fuel injection (= fuel injection is normal). If P2030 is present, perform troubleshooting for P2030.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Possible Root Causes

- Shorted electrical circuit for CAV
- Shorted electrical circuit inside CAV
- Mechanical stuck open/close
- Air leakage from combustion air supply line between the boost pipe and the combustor
- Plugged combustion air supply line between the boost pipe and the combustor
- Low boost pressure from the turbocharger.

DN02-220

FUEL CONTROL (BURNER)

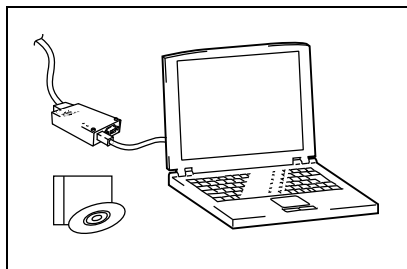
DTC:P2441	Combustion air valve stuck	Inspection Procedure

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
1	DTC confirmation (BCU)	Check BCU if any of the following DTC is stored. (P2030, P3040, P3041, P2436)	DTC is stored ? → YES DTC is stored ? → NO		Go to diagnostic procedure of a relevant DTC	Go to step 2
2	DTC confirmation (Engine ECU)	Check the Engine ECU if any of the following DTC is stored. (P0106, P0108, P0237, P0045, P00AF, P0234, P0299, P1515, P266C)	DTC is stored ? → YES No DTC is stored ? → NO		Go to diagnosis procedure of a relevant DTC	Go to step 3
3	Combustion Air Hose	Check the combustion air hose (piping) for any crack and connection failure.	Crack, connection failure, or clogging are found ? → YES No problem ? → NO		Inspect or repair the air supply line	Go to step 4
4	CAV	Measure resistance between Pins A and B.	Resistance is NOT within the standard range ? → YES Resistance is within the standard range (6 - 10 Ω) ? → NO		Go to step 5	Replace the CAV
5	CAV	Check CAV operation with Hino-DX.	Abnormal operation ? → YES Normal operation ? → NO		Go to step 6	Replace the CAV
6	Combustion Air Hose	Check the combustion air hose for any air leak.	Air leak ? → YES No air leak ? → NO		Repair or replace the combustion air hose	Go to step 7
7	DTC	Check if any DTC is stored after forcing a manual regeneration.	DTC is stored ? → YES No DTC is stored ? → NO		Go to step 1	Completed

DTC:P2441

EN1613602F200041

DTC	P2441	Combustion air valve stuck

1 Check DTC for burner system.

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select "BCU", and check BCU if any of the following DTC is stored in the BCU.

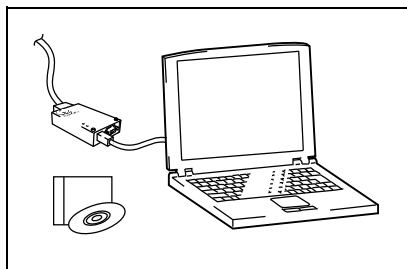
JudgmentAny of P2030, P3040, P3041 or P2436 is stored
→ YES

No DTC is stored → NO

YES

Go to diagnostic procedure of a relevant DTC.

NO

2 Check DTC for engine system.

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select "Engine ECU", and check if any of the following DTC is stored.

JudgmentAny of P0106, P0108, P0237, P0045, P00AF, P0234,
P0299, P1515, P266C is stored → YES

No DTC is stored → NO

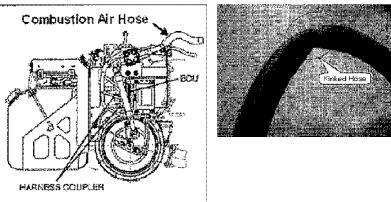
YES

Go to diagnostic procedure of a relevant DTC.

NO

DN02-222

FUEL CONTROL (BURNER)

3 Inspect combustion air hose.**Visual Inspection of Combustion Air Hose**

P2441-2

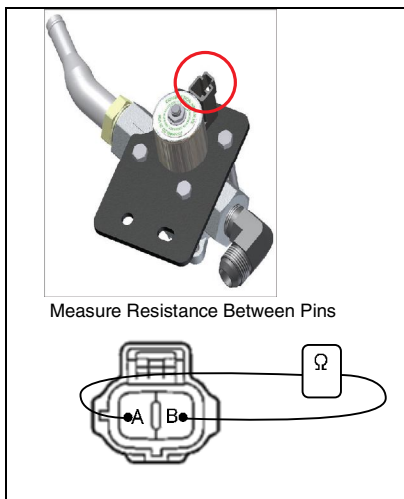
1 Visually inspect the combustion air hose.**Judgment****Crack, connection failure, or clogging are found**
→ YES

No problem → NO

YES

Repair or replace the combustion air hose.

NO

4 Inspect the combustion air valve.

P2441-2

1 Set the starter switch to the "LOCK" position.**2 Remove the CAV connector.****3 Measure resistance between pins A and B attached to the CAV.****Judgment****Resistance is within the standard range (6 - 10 Ω)**
→ YES

Resistance is NOT within the standard range → NO

NO

Replace the CAV.

YES

5 Inspect combustion air valve.

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Remove the combustion air hose from CAV.

NOTICE**Important Point - Dismounting and mounting the combustion air hose****Dismounting**

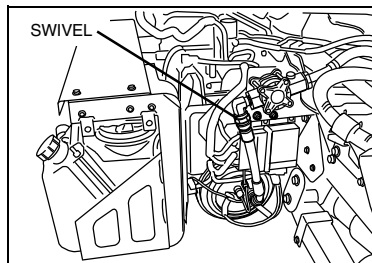
- When removing, be sure to remove the swivel on the vehicle upper side.
- After removal, be careful to avoid entry of foreign matter into the pipe.

Mounting

- Mount it without bending the hose with the combustion air valve free.
- When tightening, fold the hexagonal part under the swivel with the wrench.
- a. Mount the combustion air valve.

Tightening Torque:

41 - 61 N·m {418 - 622 kgf·cm, 31 - 45 lbf·ft}

**⚠ DANGER**

Burner System may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If electric circuit for flame temperature sensor has a open circuit, burner operation becomes aborted. Therefore, to make sure to disconnect the wiring harness coupler for flame temperature sensor prior this procedure. Otherwise, flame may be spilling from the combustor.

This condition makes DTC: P141C (Flame Temp Sensor Circuit High) and MIL comes ON.

- 3 Disconnect the wiring harness coupler for flame temperature sensor.
- 4 Connect Hino-DX to the vehicle, then set the starter switch to the "ON" position.
- 5 Select "Burner".
- 6 Start the engine.
- 7 Activate "Combustion Air Valve" for 10seconds, then deactivate for 10 seconds by "Activation test " in Hino-DX.
- 8 Repeat step 7. thirty times.

Judgment	Air is coming from CAV when CAV is ON. and NO air is coming from CAV when CAV is OFF → YES
	Air is NOT coming from CAV when CAV is ON. or Air is coming from CAV when CAV is OFF → NO

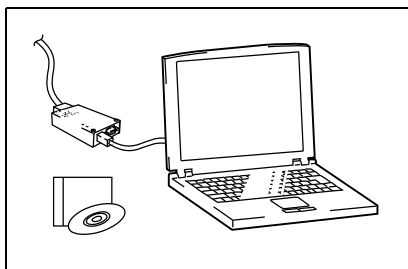
NO

Replace the CAV.

YES

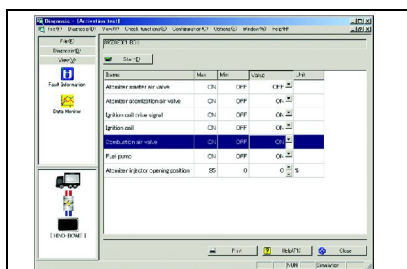
DN02-224

FUEL CONTROL (BURNER)

6 Inspect the combustion air hose.

saph161060200038

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select "BCU".
- 5 Start the engine.
- 6 Activate the CAV by "activation test" in Hino-DX.
- 7 Open and close the CAV repeatedly.



P2441-5

Judgment

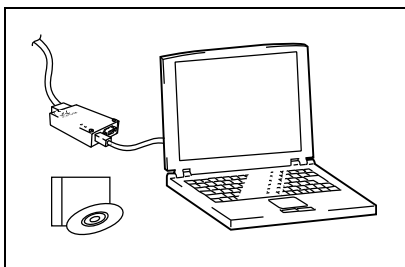
Air leak → YES

No air leak → NO

YES

Replace the combustion air hose.

NO

7 Check DTC.

saph161060200038

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select "Engine ECU".
- 5 Start the engine, and conduct a "manual regeneration" of DPR with Hino-DX.

HINT

DTC may be detected depending on operations during diagnosis.
After diagnosis, make sure to clear DTC then to check if DTC is stored or not.

Judgment	DTC is stored. Manual regeneration is NOT completed → YES
	DTC is NOT stored. Manual regeneration is completed → NO

YES

Go to step 1.

NO

Completed

DN02-226

FUEL CONTROL (BURNER)

DTC:P2506/P2507 (Check sheet)

EN1613602F200076

DTC:P2506	Battery voltage - out of range (out of range low)
DTC:P2507	Battery voltage - out of range (out of range high) A/D converter input battery voltage - out of range (Out of range low)

1. Technical description

- Abnormal battery voltage is detected by BCU.

2. DTC set condition**(1) Check conditions**

- Engine speed ≥ 450 r/min

(2) Judgment criteria**DTC : P2506**

- Battery_Voltage < Minimum_Battery_Voltage = 9.0 V for more than 10 sec
- Battery_Voltage > Maximum_Battery_Voltage = 16.0 V for more than 10 sec

DTC : P2507

- A/D Converter Input Battery_Voltage (internal BCU) = 0V for more than 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Battery:

- Harness disconnection
- Flat battery

Harness: Miss connection

FUEL CONTROL (BURNER)

DN02-227

DTC:P2506 DTC:P2507	Battery voltage - out of range (out of range low) Battery voltage - out of range (out of range high) A/D converter input battery voltage - out of range (Out of range low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	BCU	1. Turn the key OFF. 2. Disconnect the BCU connector. 3. Turn the key ON. 4. Using an electrical tester, measure voltage between the terminals of the BCU connector on the wire harness side.	Within criteria Contiguous Standard value: 9 to 16 V		OK: BCU replace NG: Check No. 2.
2	Battery Harness	Visually check, Voltage check	Within criteria Contiguous		OK: Harness Repair NG: Battery charge or Replace

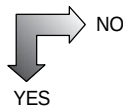
DN02-228

FUEL CONTROL (BURNER)

DTC:P2506/P2507

EN1613602F200077

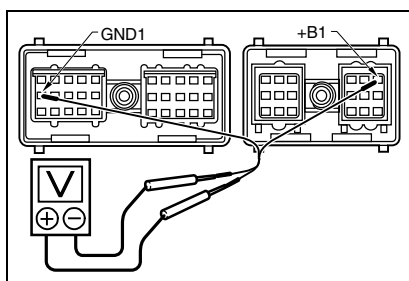
DTC	P2506	Battery voltage - out of range
DTC	P2507	A/D converter input battery voltage - out of range (Out of range low)

1. INSPECT THE BATTERY.

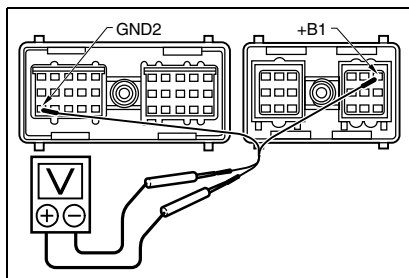
Faulty battery

2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 18P and BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Set the starter to the "ON" position.
- (5) Measure voltage between the terminals +B1 of the BCU 18P and GND1 of the BCU 30P connector on the harness side.

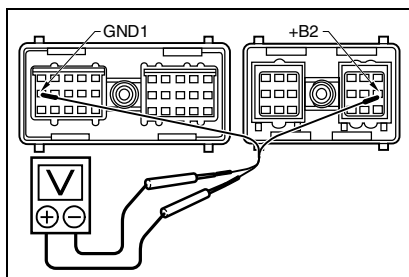
Standard value: 9-16 V

SAPH161360200145



SAPH161360200146

- (6) Measure voltage between the terminals +B1 of the BCU 18P and GND2 of the BCU 30P connector on the harness side.

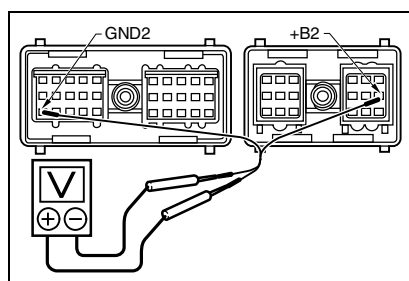


SAPH161360200147

- (7) Measure voltage between the terminals +B2 of the BCU 18P and GND1 of the BCU 30P connector on the harness side.

FUEL CONTROL (BURNER)

DN02-229



SAPH161360200148

- (8) Measure voltage between the terminals +B2 of the BCU 18P and GND2 of the BCU 30P connector on the harness side.

NO
YES

Faulty harness

Irregular contact of connectors

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, start the engine. After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.

DN02-230

FUEL CONTROL (BURNER)

DTC:P2532 (Check sheet)

EN1613602F200078

DTC:P2532	BCU internal supply key switch voltage high

1. Technical description

– Abnormal voltage of the starter key switch is detected by BCU.

2. DTC set condition**(1) Check conditions**

– A judgment is made with the key ON.

(2) Judgment criteria

– A/D Converter Input starter key Switch_Voltage (internal BCU) = 5V for more than 0.5sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

BCU: Abnormal

FUEL CONTROL (BURNER)

DN02-231

DTC:P2532	BCU internal supply key switch voltage high	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Wire-harness	Connect the Hino-DX to BCU during the key is turned OFF.	Hino-DX non-connectable		Inspect +B short-circuit areas of IG harness. (Refer to Workshop Manual EL02-001.)
2	CAN	Check for DTC and U111E of engine ECU (disruption of BCU communication)	There shall be no U111E		Inspect the CAN circuit connecting to the BCU. (Refer to Workshop Manual EL02-001.)
3	BCU	Replace			

DN02-232

FUEL CONTROL (BURNER)

DTC:P2539 (Check sheet)

DTC:P2539	Fuel pressure too low (Pending Fault Code, NO MIL)

1. Technical description

- This code is the PENDING FAULT CODE (NO MIL).
- This code is set when BCU detects low fuel pressure.
- BCU presume failure when 3 times low pressure events detected in a row.
(P2636(Fuel Pump Malfunction), P2436(Atomizer Failure set))

2. DTC set condition**(1) Check conditions**

- Fuel Pump Activated

(2) Judgment criteria

- (1) Atomizer fuel pressure > 68.9 kPa, < 551.6 kPa

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

- If no P2436/P2636, this DTC can be ignored.

FUEL CONTROL (BURNER)

DN02-233

DTC:P2539	Fuel pressure too low (Pending Fault Code, NO MIL)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Burner System	Check DTC on Burner No P2636(Fuel Pump Malfunction) or P2436(Atomizer Failure set)	No P2436 or P2636		No P2436/P2636: Clear DTC and can be released. P2436/P2636 exists: Proceed to analysis of the rel- evant DTC.

DN02-234

FUEL CONTROL (BURNER)

DTC:P2633 (Check sheet)

EN1613602F200079

DTC:P2633

Fuel pump - circuit failure (Circuit low)

1. Technical description

- Fuel pump detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Fuel Pump: Activation)

(2) Judgment criteria**DTC : P2633**

- Fuel pump circuit resistance < 0.6Ω for more than 1sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Fuel pump:

- Malfunction of fuel pump
- Abnormal voltage of fuel pump
- Disconnection in fuel pump harness

Harness: Disconnection or short-circuit in harness between fuel pump and BCU

FUEL CONTROL (BURNER)

DN02-235

DTC:P2633	Fuel pump - circuit failure (Circuit low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Fuel pump	Disconnect the fuel pump connector and measure resistance between the terminals.	0.3 Ω or higher		Fuel pump Replace
2	Harness	With the fuel pump installed, disconnect the BCU connector and measure resistance between the harness terminals from the BCU side.	0.3 Ω or higher		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON. NG: Replace BCU.	No malfunction		Check again

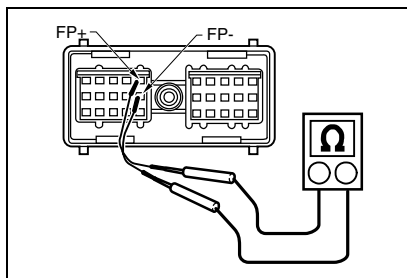
DN02-236

FUEL CONTROL (BURNER)

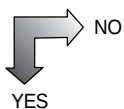
DTC:P2633

EN1613602F200080

DTC	P2633	Fuel pump - circuit failure (Circuit low)

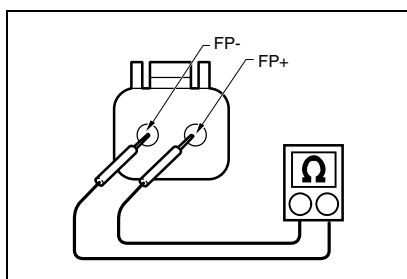
**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals FP+ and FP- of the BCU 30P connector on the harness side.

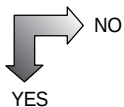
Standard value: 0.3 Ω or more

Proceed to 2.

Irregular contact of connectors

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Disconnect the fuel pump connector.
- (2) Measure resistance between the terminals FP+ and FP- of the fuel pump connector.

Standard value: 0.3 Ω or more

Faulty fuel pump

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-237



DN02-238

FUEL CONTROL (BURNER)

DTC:P2634 (Check sheet)

EN1613602F200081

DTC:P2634

Fuel pump - circuit failure (Circuit high)

1. Technical description

- Fuel pump detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Fuel Pump: Deactivation)

(2) Judgment criteria**DTC : P2634**

- Fuel pump circuit resistance < 0.6Ω for more than 1sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Fuel pump:

- Malfunction of fuel pump
- Abnormal voltage of fuel pump
- Disconnection in fuel pump harness

Harness: Disconnection or short-circuit in harness between fuel pump and BCU

FUEL CONTROL (BURNER)

DN02-239

DTC:P2634	Fuel pump - circuit failure (Circuit high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Fuel pump	Disconnect the fuel pump connector and measure resistance between the terminals.	0.3 Ω or higher 0.1 V or lower		Fuel pump Replace
2	Harness	With the fuel pump installed, disconnect the BCU connector and measure resistance between the harness terminals from the BCU side.	0.3 Ω or higher 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON. NG: Replace BCU.	No malfunction		Check again

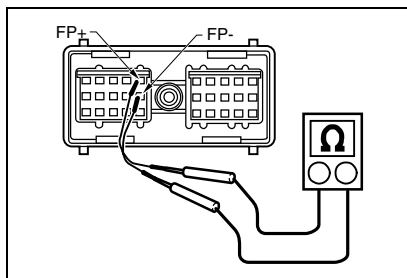
DN02-240

FUEL CONTROL (BURNER)

DTC:P2634

EN1613602F200082

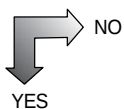
DTC	P2634	Fuel pump - circuit failure (Circuit high)



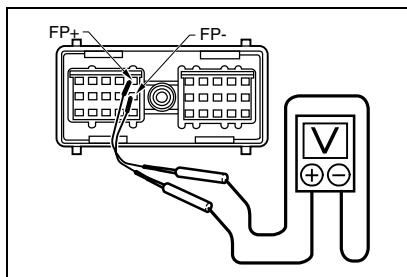
SAPH161360200151

1. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connecting the signal check harness.
- (4) Measure resistance between the terminals FP+ and FP- of the BCU 30P connector on the harness side.

Standard value: 0.3 Ω or more

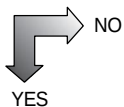
Proceed to 3.



SAPH161360200152

2. CHECK THE VOLTAGE BETWEEN TERMINALS.

- (1) Set the starter to the "ON" position.
- (2) Measure voltage between the terminals FP+ and FP- of the BCU 30P connector on the harness side.

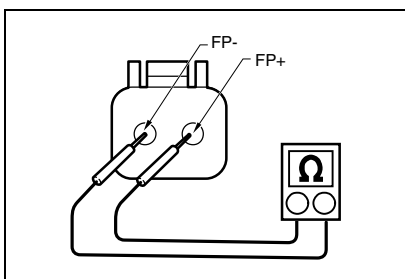
Standard value: 0.1 V or less

Proceed to 3.

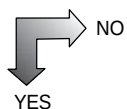
Irregular contact of connectors

FUEL CONTROL (BURNER)

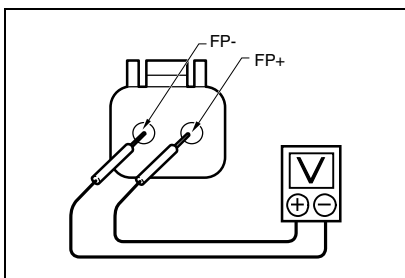
DN02-241

**3. CHECK THE RESISTANCE BETWEEN TERMINALS.**

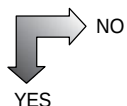
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the fuel pump connector.
- (3) Measure resistance between the terminals FP+ and FP- of the fuel pump connector.

Standard value: 0.3 Ω or more

Faulty fuel pump

**4. CHECK THE VOLTAGE BETWEEN TERMINALS.**

- (1) Measure voltage between the terminals FP+ and FP- of the fuel pump connector.

Standard value: 0.1 V or less

Faulty fuel pump

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, turn on the starter switch "ON". After a lapse of 20 seconds, check that there are no DTC.
- After repair, delete the P141F of the engine ECU side.

DTC:P2636 (Check sheet)

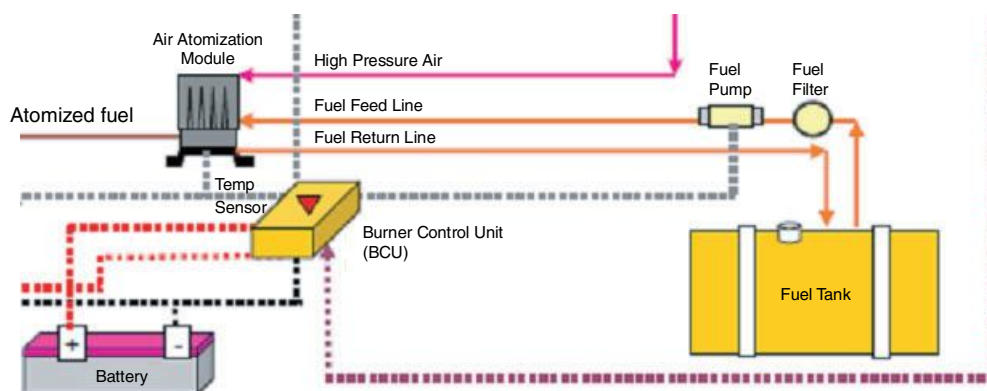
EN1610602F200093

DTC:P2636

Fuel pump failure

1. Technical description

- The fuel pump supplies burner injection fuel
- Characteristic abnormality or fuel leakage of the fuel pump is sensed



2. DTC set condition

(1) Check conditions

- Initial check (Starter switch ON or before operation)
- Initial check (before operation)

(2) Judgment criteria

- Fuel pump resistance < 2Ω
- Pressure at fuel pump operation < 558kPa (81 psi)

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Fuel: Freezing, waxing

Fuel filter: Clogging of element

Atomizer: Open/short-circuit of pressure sensor, clogging of fuel inlet screen

Fuel line (From fuel tank through fuel filter to atomizer): Lack of fuel, air suction, leakage, clogging

Fuel pump: Abnormal

FUEL CONTROL (BURNER)

DN02-243

DTC:P2636		Fuel pump failure		Inspection Procedure		
Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
1	DTC confirmation (BCU)	Check if any of following DTCs are stored in the BCU. (P2432, P2433)	DTC is stored → YES No DTC is stored → NO		Go to diagnostic procedure of a relevant DTC	Go to Step 2
2	Fuel tank	Check the amount of fuel.	There is fuel → YES No fuel → NO		Go to Step 3	Replenish fuel
3	Fuel line	Check the fuel plumbing from the fuel tank and the combustor	Fuel leakage or kinked fuel plumbing → YES NO fuel leakage and NO kinked fuel plumbing → NO		Replace or repair the respective part	Go to Step 4
4	Fuel line	Conduct "activation test" in Hino-DX to confirm the operation of the fuel pump.	There is clogging → YES No clogging → NO		Replace or repair the respective part	Go to Step 5
5	Fuel filter element	Check the fuel filter maintenance interval.	Fuel filter has been replaced every two years → YES Fuel filter has not been replaced for two years or more → NO		Go to Step 6	Replace the fuel filter. And then priming by Hino-DX (to activate the fuel pump for 30 seconds)
6	Fuel inspection	Check fuel condition in the fuel filter element (Fuel gelling in fuel filter element?)	Fuel gelling → YES NO fuel gelling → NO		Use fuel for cold regions	Go to Step 7
7	Fuel pump 1	Check "fuel pressure" in the atomizer Is the value standard (Between -69 kPa (-10 psi) and 69 kPa (10 psi))?	Within standard → YES NOT within standard → NO		Go to Step 9	Go to Step 8
8	Fuel pump 2	Check the operating noise from the fuel pump.	Noise from the pump → YES No noise from the pump → NO		Replace the BCU	Replace the atomizer
9	Fuel pump	Check the operating noise from the fuel pump during fuel pump activated	Noise from the pump → YES No noise from the pump → NO		Go to step 10	Replace the fuel pump, And then priming by Hino-DX (to activate the fuel pump for 30sec)

DN02-244

FUEL CONTROL (BURNER)

Step	Parts	Description	Judgment	Action		
				Check (YES/NO)	YES	NO
10	Fuel pump	Check "fuel pressure" in the atomizer during fuel pump activated Is the value standard (Between 558kPa (81psi) and 696kPa (101psi)) for 5 minutes?	Within standard value for 5 min- utes → YES NOT within standard value for 5 minutes → NO		Completed	Replace the fuel pump, and then redo this step after priming by Hino-DX (to activate the fuel pump for 30sec). Replace the atomizer if the result is "NO"

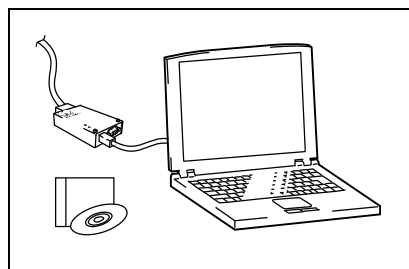
DTC:P2636

EN1613602F200041

DTC	P2636	Fuel pump failure

NOTICE

BCU software version must be 25B3 or later before starting procedure.

1 DTC confirmation

- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select the BCU and confirm the DTC output.

Judgment	P2432, P2433 detection → YES
	No DTC detection → NO

YES

Go to diagnostic procedure of a relevant DTC.

NO

2 Fuel tank inspection

- 1 Check the remaining fuel quantity in the fuel tank.

Judgment	There is fuel → YES
	There is no fuel → NO

NO

Replenish fuel.

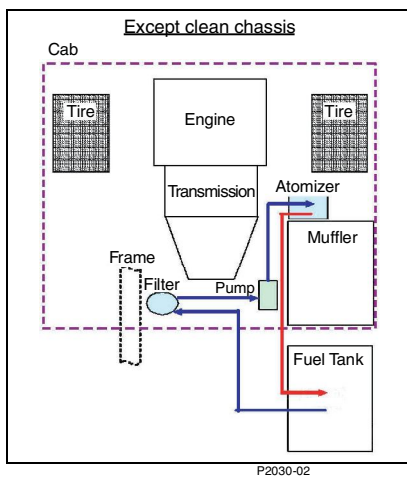
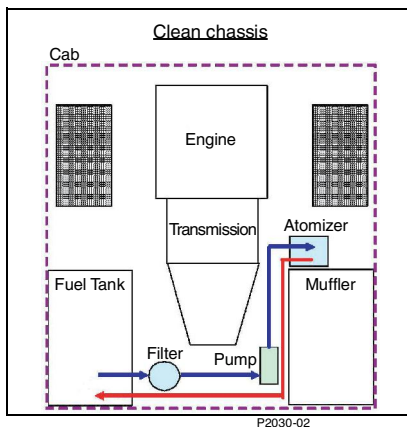
YES

DN02-246

FUEL CONTROL (BURNER)

3 Check the fuel plumbing from the fuel tank and the combustor

1 Check the plumbing visually.



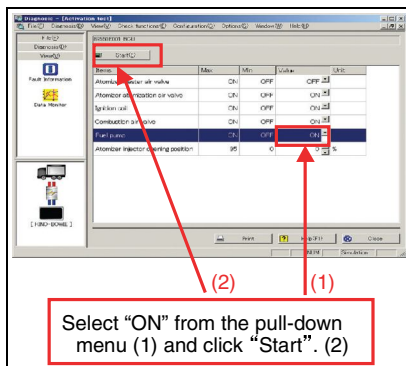
Judgment	Is there fuel leakage or kinked fuel plumbing?
	Fuel leakage or kinked fuel plumbing → YES
	NO fuel leakage and NO kinked fuel plumbing → NO

YES

Repair correctly.

NO

4 Fuel pump inspection



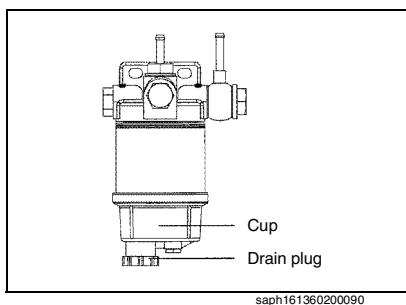
- 1 Set the starter switch to the "LOCK" position.
- 2 Connect Hino-DX to the vehicle.
- 3 Set the starter switch to the "ON" position.
- 4 Select the BCU.
- 5 Conduct "activation test" in Hino-DX to confirm the operation of the fuel pump.

Judgment	There is fuel leakage → YES
	There is operation noise, but no fuel leakage → NO

YES → Repair fuel plumbing and then redo this step.

NO

5 Check the fuel filter maintenance interval



- 1 Check the fuel filter maintenance interval.

Judgment	Fuel filter has been replaced every two years?
	Fuel filter has been replaced every two years → YES
	Fuel filter has not been replaced for two years or more → NO

NO → Replace the fuel filter. And then priming by Hino-DX (to activate the fuel pump for 30 seconds).

YES

6 Fuel condition in fuel filter element

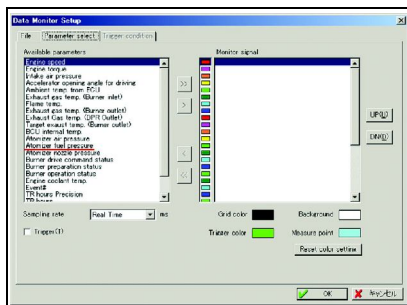
- 1 NO fuel gelling in fuel filter element?

Judgment	Fuel gelling → YES
	NO fuel gelling → NO

YES → Use fuel for cold regions.

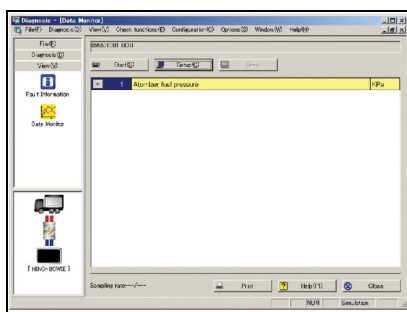
NO

7 Check "fuel pressure" in the atomizer



P2636-05

- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
- 3 Select "Burner".
- 4 Check the value of "fuel pressure" in data monitor.



P2636-12

Judgment

Is the value standard (Between -69 kPa (-10 psi) and 69 kPa (10 psi))?

Within standard → YES

NOT within standard → NO

YES

Go to Step 9.

NO

8 Check the operating noise from the fuel pump

- 1 Set the starter switch to the "ON" position (Do not start the engine).
- 2 Confirm the operating noise from the fuel pump.

Judgment

Is there any noise from the pump?

Noise from the pump → YES

No noise from the pump → NO

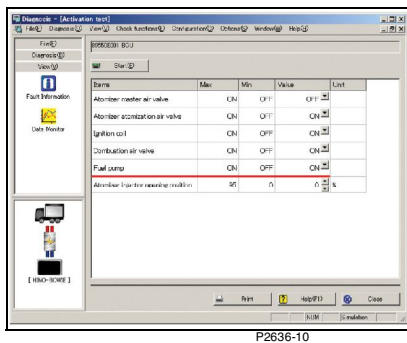
YES

Replace the BCU.

NO

Replace the atomizer.

9 Check the operating noise from the fuel pump during fuel pump activated



- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON". (Do not start the engine)
- 3 Select "Burner".
- 4 Perform the activation test "Fuel pump".
- 5 Confirm the noise from the fuel pump.

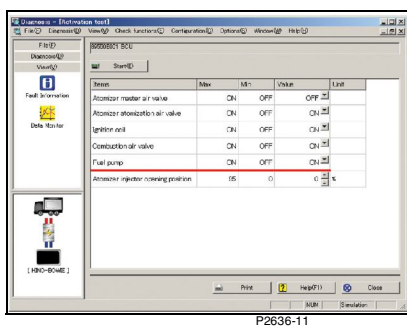
Judgment	Is there any noise from the pump?
	Noise from the pump → YES
	No noise from the pump → NO

NO

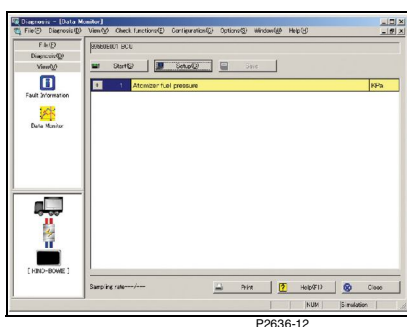
Replace the fuel pump, And then priming by Hino-DX (to activate the fuel pump for 30 seconds).

YES

10 Check "fuel pressure" in the atomizer during fuel pump activated



- 1 Turn off the engine, and starter switch position must be "OFF".
- 2 Connect Hino-DX to the vehicle, then turn starter switch position to "ON". (Do not start the engine)
- 3 Select "Burner".
- 4 Perform the activation test "Fuel pump".
- 5 Wait for 3 seconds.
- 6 Check "fuel pressure" in data monitor (Check for 5 minutes.)



Judgment	Is the value standard (Between 558kPa(81psi) and 696kPa(101psi))?
	Within standard value for 5 minutes → YES
	NOT within standard value for 5 minutes → NO

YES

Completed.



DN02-250

FUEL CONTROL (BURNER)



NO

Replace the fuel pump, and then redo this step after priming by Hino-DX (to activate the fuel pump for 30sec).
Replace the atomizer if the result is "NO".





FUEL CONTROL (BURNER)

DN02-251



DN02-252

FUEL CONTROL (BURNER)

DTC:P3040 (Check sheet)

EN1613602F200085

DTC:P3040

Combustion air valve - circuit failure (Circuit low)

1. Technical description

- Combustion air valve detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Combustion Air Valve: Activation)

(2) Judgment criteria**DTC : P3040**

- Combustion air valve circuit resistance < 0.6Ω for more than 1sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Combustion air valve:

- Malfunction of combustion air valve
- Abnormal voltage of combustion air valve
- Disconnection in harness of combustion air valve

Harness: Disconnection or short-circuit in harness between combustion air valve and BCU

FUEL CONTROL (BURNER)

DN02-253

DTC:P3040	Combustion air valve - circuit failure (Circuit low)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Combustion air valve	Disconnect the combustion air valve connector and measure resistance between the terminals.	2 Ω or higher		Combustion air valve Replace
2	Harness	With the combustion air valve installed, disconnect the BCU connector and measure resistance between the harness terminals from the BCU side.	2 Ω or higher		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON. NG: Replace BCU.	No malfunction		Check again

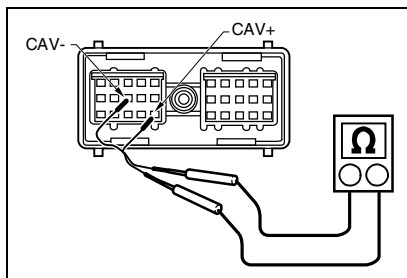
DN02-254

FUEL CONTROL (BURNER)

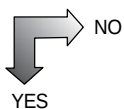
DTC:P3040

EN1613602F200086

DTC	P3040	Combustion air valve - circuit failure (Circuit low)

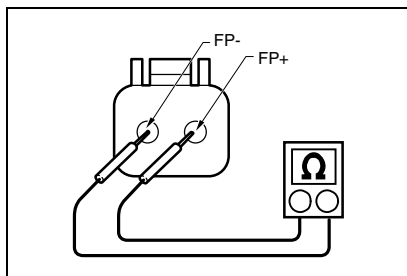
**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals CAV+ and CAV- of the BCU 30P connector on the harness side.

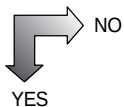
Standard value: 2 Ω or more

Proceed to 2.

Irregular contact of connectors

**2. CHECK THE RESISTANCE BETWEEN TERMINALS.**

- (1) Disconnect the combustion air valve connector.
- (2) Measure resistance between the terminals FP+ and FP- of the combustion air valve connector.

Standard value: 2 Ω or more

Faulty combustion air valve

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.



FUEL CONTROL (BURNER)

DN02-255



DN02-256

FUEL CONTROL (BURNER)

DTC:P3041 (Check sheet)

EN1613602F200087

DTC:P3041

Combustion air valve - circuit failure (Circuit high)

1. Technical description

- Combustion air valve is used to supply air for regeneration.
- Combustion air valve detects disconnection and short-circuit based on the circuit voltage and signals in BCU.

2. DTC set condition**(1) Check conditions**

- 5 minutes elapsed after Engine ON (Combustion Air Valve: Deactivation)

(2) Judgment criteria**DTC : P3041**

- Combustion air valve circuit resistance < 0.6Ω for more than 0.8sec

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Combustion air valve:

- Malfunction of combustion air valve
- Abnormal voltage of combustion air valve
- Disconnection in harness of combustion air valve

Harness: Disconnection or short-circuit in harness between combustion air valve and BCU

FUEL CONTROL (BURNER)

DN02-257

DTC:P3041	Combustion air valve - circuit failure (Circuit high)	Inspection Procedure

No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	Combustion air valve	Disconnect the combustion air valve connector and measure resistance between the terminals.	2 Ω or higher 0.1 V or lower		Combustion air valve Replace
2	Harness	With the combustion air valve installed, disconnect the BCU connector and measure resistance between the harness terminals from the BCU side.	2 Ω or higher 0.1 V or lower		Harness Repair
3	BCU	Check that no malfunctions occur after a lapse of 5 minutes after Engine ON. * System check is practicable after a lapse of 5 minutes after Engine ON. NG: Replace BCU.	No malfunction		Check again

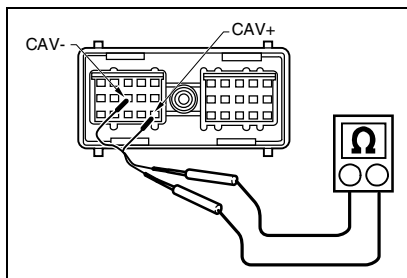
DN02-258

FUEL CONTROL (BURNER)

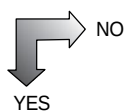
DTC:P3041

EN1613602F200088

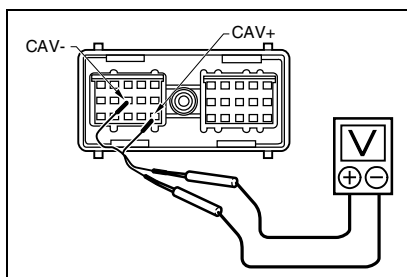
DTC	P3041	Combustion air valve - circuit failure (Circuit high)

**1. CHECK THE RESISTANCE BETWEEN TERMINALS.**

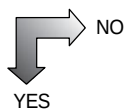
- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Connect the signal check harness.
- (4) Measure resistance between the terminals CAV+ and CAV- of the BCU 30P connector on the harness side.

Standard value: 2 Ω or more

Proceed to 3.

**2. CHECK THE VOLTAGE BETWEEN TERMINALS.**

- (1) Measure voltage between the terminals CAV+ and CAV- of the BCU 30P connector on the harness side.

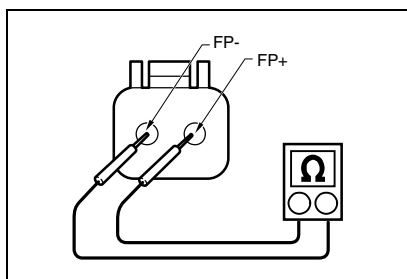
Standard value: 0.1 V or less

Proceed to 3.

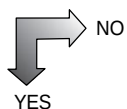
Irregular contact of connectors

FUEL CONTROL (BURNER)

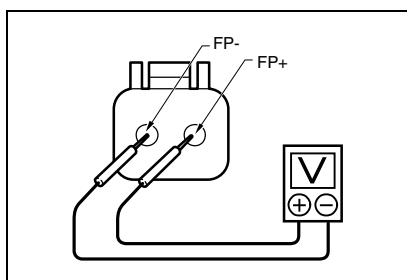
DN02-259

**3. CHECK THE RESISTANCE BETWEEN TERMINALS.**

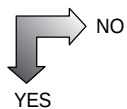
- (1) Disconnect the atomizer connector.
- (2) Measure resistance between the terminals FP+ and FP- of the combustion air valve connector.
Standard value: 2 Ω or more



Faulty combustion air valve

**4. CHECK THE VOLTAGE BETWEEN TERMINALS.**

- (1) Measure voltage between the terminals FP+ and FP- of the combustion air valve connector.
Standard value: 0.1 V or less



Faulty combustion air valve

Faulty harness

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

DN02-260

FUEL CONTROL (BURNER)

DTC:U0100 (Check sheet)

EN1613602F200089

DTC:U0100

Burner ECU CAN communication (ECM)

1. Technical description

- Abnormal combustion of the burner system is detected by BCU based on a difference between output from the burner outlet temperature sensor and model temperature.

2. DTC set condition**(1) Check conditions**

- Starter switch ON

(2) Judgment criteria**DTC : U0100**

- If CAN message from ECM cannot be received, Failure timer counts up and OK timer resets.
- If CAN message from ECM can be received, Failure timer resets and OK timer counts up.
- If Failure timer ≥ 3 sec, DTC is detected.
- If Key off and OK timer ≥ 0.1 sec, No malfunction are detected.

3. Troubleshooting hints

(The most likely causes for this code to be set are ;)

Wire harness: Disconnection or short-circuit, or improper connection

FUEL CONTROL (BURNER)

DN02-261

DTC:U0100		Burner ECU CAN communication (ECM)		Inspection Procedure	
No	Parts	Check contents	Judge	Check (Pass/Fail)	If fail
1	BCU	1. Turn the key OFF. 2. Disconnect the BCU connector. 3. Using an electrical tester, measure resistance between the terminals of the BCU connector on the wire harness side.	Standard value 20 Ω or higher		OK: BCU replace NG: Check No. 2.
2	CAN communication	Inspect the CAN communication. No errors are allowed. Refer to "Control system diagnosis code, CAN communication."	CAN communication		

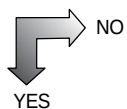
DN02-262

FUEL CONTROL (BURNER)

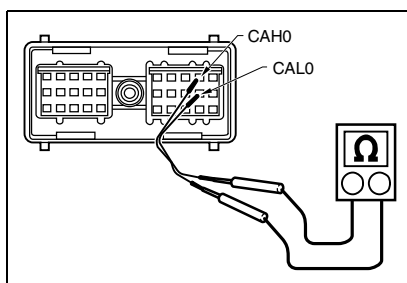
DTC:U0100

EN1613602F200090

DTC	U0100	Burner ECU CAN communication (ECM)

1. CHECK THAT P141F EXIST.

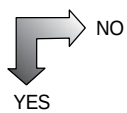
Proceed to malfunction codes of the engine ECU.



SAPH161360200161

2. CHECK THE RESISTANCE BETWEEN TERMINALS.

- (1) Set the starter to the "LOCK" position.
- (2) Disconnect the BCU 30P connector.
- (3) Measure voltage between the terminals CAH0 and CAL0 of the BCU 30P connector on the harness side.

Standard value: 20 Ω or more

Proceed to 3.

- Faulty engine ECU
- Faulty harness

3. INSPECT THE CAN COMMUNICATION.

- (1) Refer to the chapter "CAN COMMUNICATION ERROR (VEHICLE CONTROL ECU)". (DN01-001)

HINT

- After repair, delete the DTC with the tool to turn off the MIL light.
- After repair, delete the P141F of the engine ECU side.

OTHERS (CAN COMMUNICATION)

DN06-001

CAN COMMUNICATION SYSTEM DN06-2

PRECAUTIONS FOR DIAGNOSIS.....DN06-2

CONCEPT AND PROCEDURE FOR CAN

COMMUNICATION TROUBLESHOOTING DN06-4

BASIC PROCEDURES FOR CAN

COMMUNICATION TROUBLESHOOTING DN06-6

INSPECTION WHEN CAN

COMMUNICATION LINE IS ABNORMAL.....DN06-9



CAN COMMUNICATION SYSTEM

PRECAUTIONS FOR DIAGNOSIS

EN16Z1606F200001

- Ensure that individual connectors are certainly connected before start of checking works.
- Make sure to set the starter key to the "LOCK" position before disconnecting a connector.
- Replace the part or the component that have a failure or trouble. Do not fix and reuse it.
- Delete the past malfunction code after recording. Then conduct a diagnosis again to check for present failures.
- Delete the past failure memory after completion of a diagnostic analysis.

1. ILLUSTRATION OF CONNECTOR AND MEASUREMENT ON TERMINAL

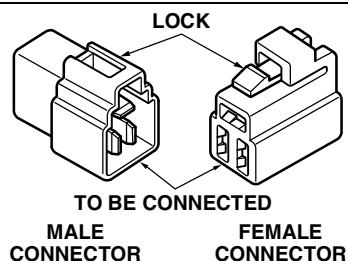
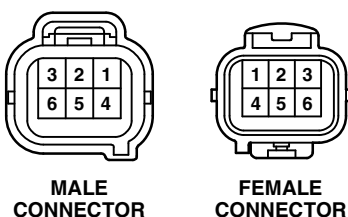


ILLUSTRATION OF CONNECTOR

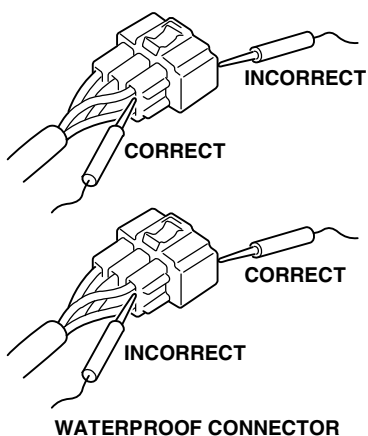
The illustration of a connector contained in this document represents an image of a connector with its lock positioned on top as viewed from the connecting face.



NUMBERING OF CONNECTOR TERMINALS

The terminals are symmetrically numbered (symmetrically reversed numbering) as viewed on the connecting faces of a pair of connectors.

The terminal #1 is located at the top right corner of a male connector and at the top left corner of a female connector respectively in this document.



PRECAUTIONS FOR TERMINAL MEASUREMENT

Unless otherwise specified in this document, the illustration of a connector represents an image of a connector as viewed from the connecting face. A test probe must access the back face of a connector.

However, some types of connector do not allow a test probe to contact with the back face such as a waterproof connector. In such case, a test probe may be allowed to access the front face of a connector but a special care must be used to avoid a risk of damage in terminals.

As to a connector that is designed to use the signal check harness for terminal measurement, do not place a test probe directly onto the front or back face. Use a contact box of the connected signal check harness to take measurement on terminals.

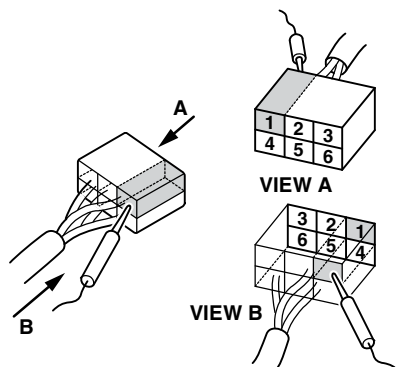


ILLUSTRATION OF CONNECTOR AND MEASUREMENT SURFACE

The illustration of a connector contained in this document represents an image of a connector as viewed from the connecting face. For example, the terminal #1 of a female connector is located at the top left corner of a connector as viewed from the connecting face.

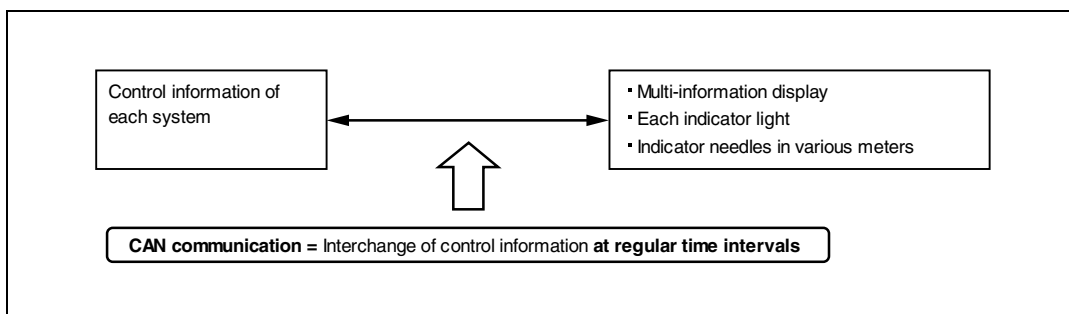
In actual measurement on the terminal #1 of a female connector, a test probe must be placed onto the top right corner on the back face of a connector.

CONCEPT AND PROCEDURE FOR CAN COMMUNICATION TROUBLESHOOTING

EN16Z1606F200002

1. BEHAVIOR DURING NORMAL OPERATION

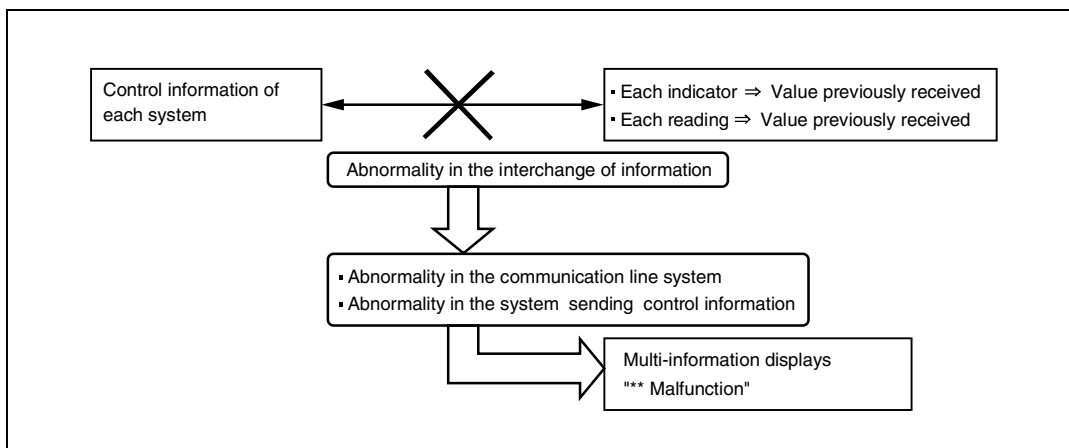
- The meter receives and indicates/displays control information from each system.
- The indicated/displayed information of the meter is transmitted to the meter constantly at regular time intervals.
- The meter concludes that the operation of the sending system is normal by the receipt of the displayed information at regular time intervals.



SHTS16Z160600002

2. BEHAVIOR IN THE EVENT OF ABNORMALITY

- When the meter does not receive the displayed information within the specified time, it concludes that there has been an abnormality in the harness system or an abnormality, etc. occurred in the sending system, and will display "*** Malfunction" on the multi-information display in the meter.



SHTS16Z160600003

HINT

If "*** Malfunction" appears on the multi-information display, malfunction in the harness system or malfunction of ECU is presumed and therefore, a root cause analysis of the malfunction will be performed.

3. ROOT CAUSE ANALYSIS OF MALFUNCTIONS AND IDENTIFICATION OF MALFUNCTION WILL BE PERFORMED.

- (1) The root cause of a malfunction is analyzed by performing the following checks.
 - a. Check the diagnosis code retained in vehicle control ECU
 - b. Check continuity and resistance in the CAN communication line
- (2) The meter and vehicle control ECU are installed on all vehicles, and the physical connecting locations are both ends of each CAN communication line. (Refer to the "**CAN COMMUNICATION LINE MALFUNCTION PART DIAGRAM**")
- (3) Other systems are connected to the CAN communication line between vehicle control ECU and the meter and to the CAN communication line between vehicle control ECU and DCU, and the vehicle information is received/transmitted between respective systems.
- (4) CAN communication lines are connected and branched with junction connectors, providing aggregation points/branch points of vehicle information.
- (5) By checking the diagnosis code of vehicle control ECU, determine vehicle information of which system is not received/transmitted from/to vehicle control ECU and the meter.
- (6) On the basis of the results of these confirmations, check continuity between respective ECUs, between respective ECUs and junction connectors and between junction connectors, and identify the range of malfunction areas.
- (7) Also, if it is determined that no interchange of any vehicle information is performed, disconnect all ECUs from the CAN communication line, and check only the harness system, and if no abnormality is detected, it will be judged to be an abnormality in ECU, and a root cause analysis of the malfunction will be performed.

BASIC PROCEDURES FOR CAN COMMUNICATION TROUBLESHOOTING

EN16Z1606F200003

SYMPTOM OF VEHICLE

- "*** Malfunction" appear on the multi-information display in the meter.
- Control function is deactivated/released = not activated when the driver attempts to operate, or released while it is activated.

TROUBLESHOOTING PROCEDURES

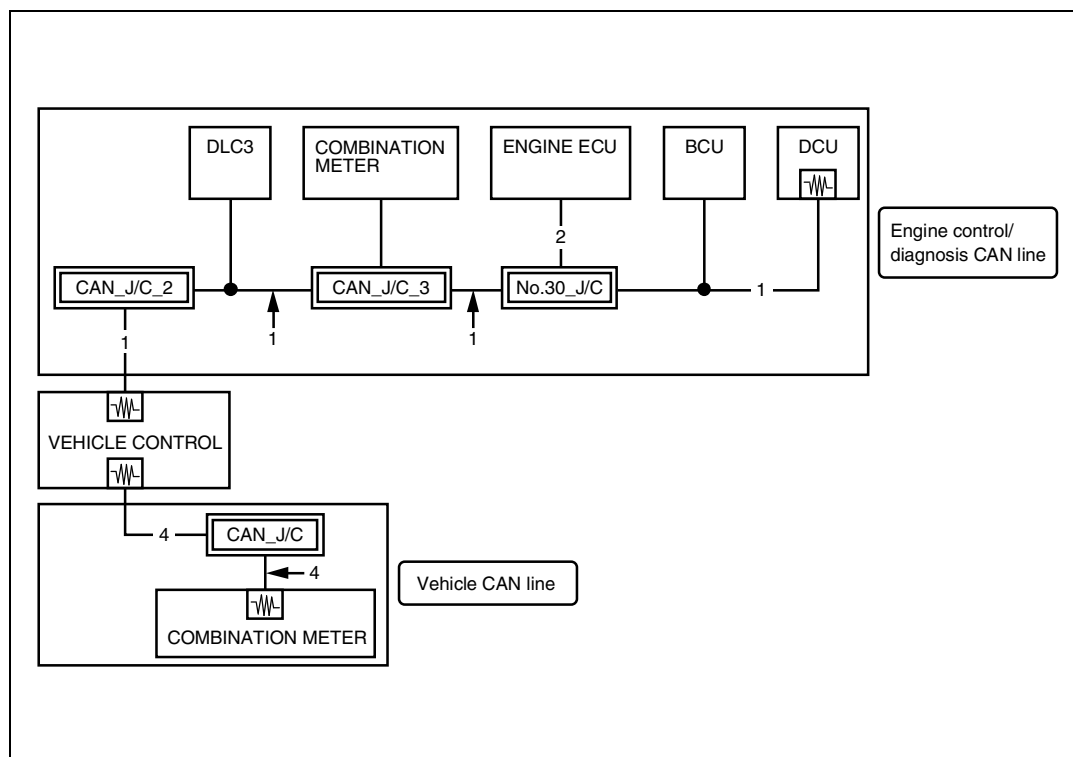
- TROUBLESHOOTING PROCEDURES
 1. Check the diagnosis code of vehicle control ECU.
 2. Inspection of harness: Check the CAN communication line for +B/ GND short circuit.
 3. Inspection of harness: Check the resistance between H line and L line of the CAN communication line.
 4. Check the insertion of connectors.
- TROUBLESHOOTING OF ECU SYSTEM
 1. Check each ECU.

FLOW OF SPECIFIC RESPONSES

1. Check the diagnosis code on the display of vehicle control ECU.
2. Inspect the busline/ECU according to the diagnostic flow and the CAN communication line fault place identification table.
3. Troubleshoot the malfunction, or replace ECU.

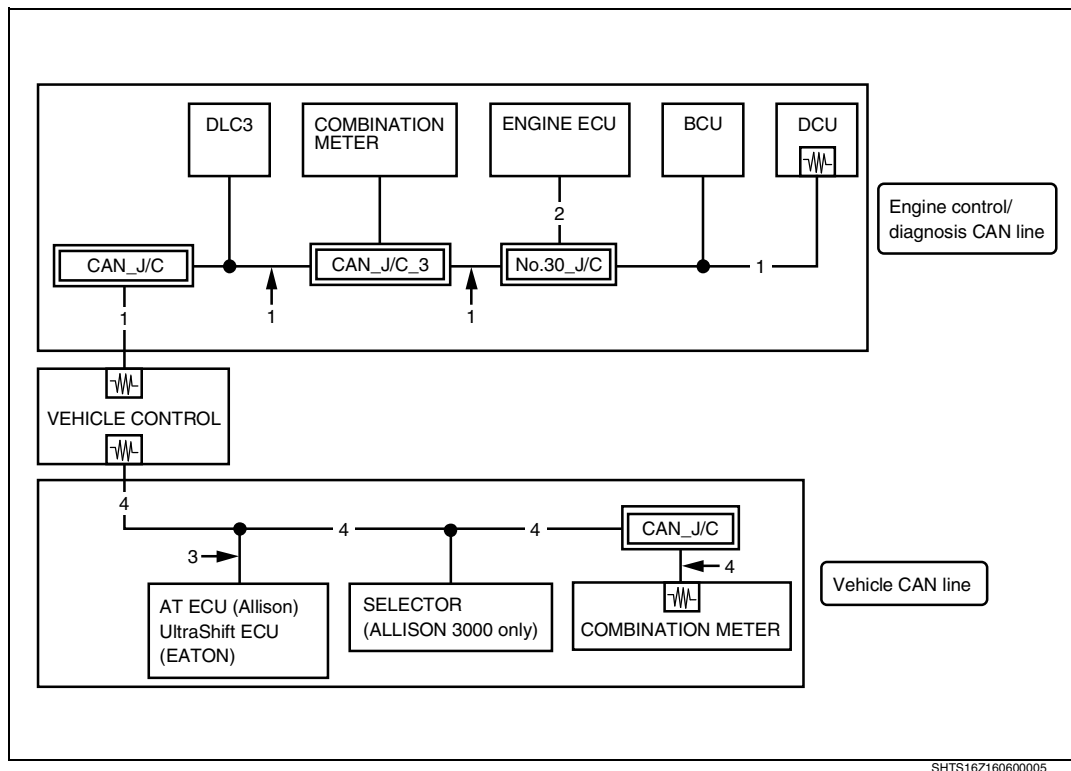
CAN COMMUNICATION LINE MALFUNCTION PART DIAGRAM

1. VEHICLE WITH MANUAL TRANSMISSION



SHTS16Z160600004

2. VEHICLE WITH ALLISON AUTOMATIC TRANSMISSION AND EATON UltraShift TRANSMISSION



CAN COMMUNICATION LINE MALFUNCTION PART DETERMINATION TABLE

DTC cord of Vehicle control ECU			Malfunction part	Inspection No.
U0105	U0101	U0155		
○			1, 2	Inspection 1
	○		3	Inspection 2
		○	4	Inspection 3
For other combinations of DTC code and information display.				Inspection 3

INSPECTION WHEN CAN COMMUNICATION LINE IS ABNORMAL

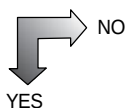
EN16Z1606F200004

INSPECTION 1

Possible cause	[In case of "U0105" only] • Harness disconnection between vehicle control ECU and DCU • Harness disconnection between the engine ECU and joint connectors • Loose fitting of joint connectors • +B/GND short circuit in the H line or L line of the engine control/diagnosis CAN line • Abnormality in terminal resistance (vehicle control ECU or DCU) • Abnormality in the engine ECU
	[In addition to "U0105" "U0101" and/or "U0155" are displayed] • Harness disconnection between vehicle control ECU and the meter • +B/GND short-circuit in the H line or L line of the vehicle CAN line • Loose fitting of joint connectors • Abnormality in terminal resistance (vehicle control ECU or meter) • Communication failure due to other system abnormalities • Abnormality in ECU

1. CHECK THE DIAGNOSIS CODE OF VEHICLE CONTROL ECU

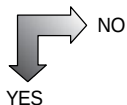
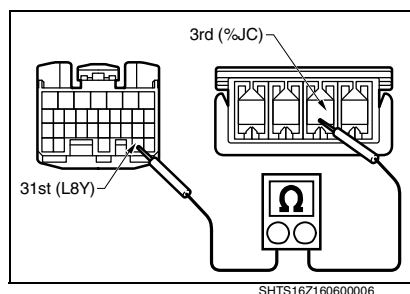
- (1) Diagnosis code is "U0105" only



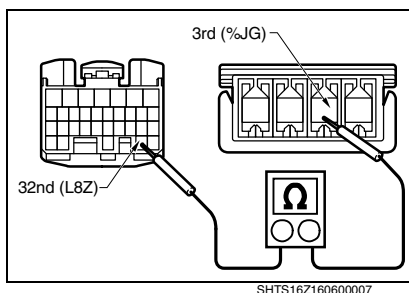
Proceed to INSPECTION 3.

2. INSPECTION OF THE HERNESS BETWEEN VEHICLE CONTROL ECU AND JOINT CONNECTORS (1)

- (1) Check continuity between 31st (L8Y) terminal of the vehicle control ECU connector (32P) and 3rd (%JC) terminal of the CAN_J/C_2_H connector (4P)

Standard value: Less than 1Ω

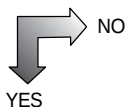
Replace the harness. (Malfunction part 1 in CAN communication line)



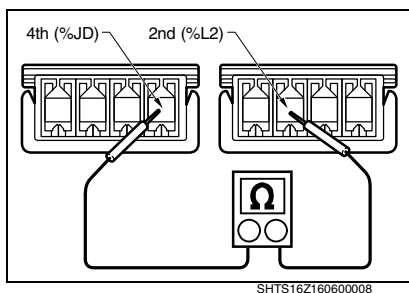
3. INSPECTION OF THE HARNESS BETWEEN VEHICLE CONTROL ECU AND JOINT CONNECTORS (2)

- (1) Check continuity between 32nd (L8Z) terminal of the vehicle control ECU connector (32P) and 3rd (%JG) terminal of the CAN_J/C_2_L connector (4P)

Standard value: Less than 1Ω



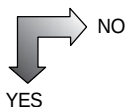
Replace the harness. (Malfunction part 1 in CAN communication line)



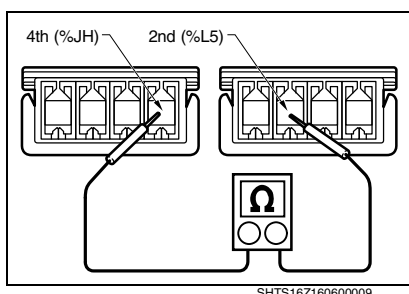
4. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS (1)

- (1) Check continuity between 4th (%JD) terminal of the CAN_J/C_2_H connector (4P) and 2nd (%L2) terminal of the CAN_J/C_3_H connector (4P)

Standard value: Less than 1Ω



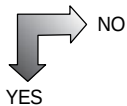
Replace the harness. (Malfunction part 1 in CAN communication line)



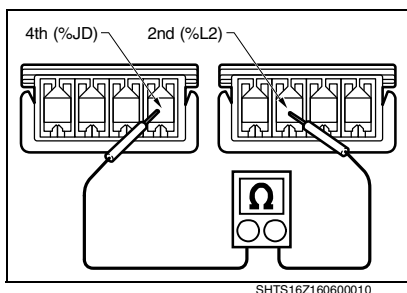
5. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS (2)

- (1) Check continuity between 4th (%JH) terminal of the CAN_J/C_2_L connector (4P) and 2nd (%L5) terminal of the CAN_J/C_3_L connector (4P)

Standard value: Less than 1Ω



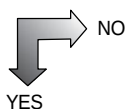
Replace the harness. (Malfunction part 1 in CAN communication line)



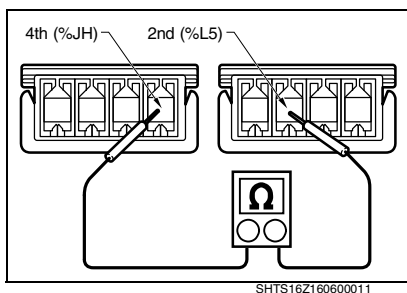
6. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS (3)

- (1) Check continuity between 4th (%JD) terminal of the CAN_J/C_2_H connector (4P) and 2nd (%L2) terminal of the CAN_J/C_3_H connector (4P)

Standard value: Less than 1Ω



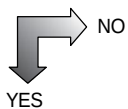
Replace the harness. (Malfunction part 1 in CAN communication line)



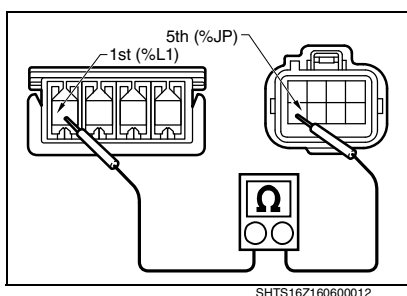
7. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS (4)

- (1) Check continuity between 4th (%JH) terminal of the CAN_J/C_2_L connector (4P) and 2nd (%L5) terminal of the CAN_J/C_3_L connector (4P)

Standard value: Less than 1Ω



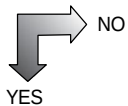
Replace the harness. (Malfunction part 1 in CAN communication line)



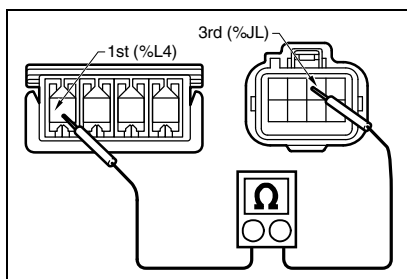
8. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS (5)

- (1) Check continuity between 1st (%L1) terminal of the CAN_J/C_3_H connector (4P) and 5th (%JP) terminal of the No30_J/C connector (8P)

Standard value: Less than 1Ω



Replace the harness. (Malfunction part 1 in CAN communication line)

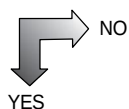


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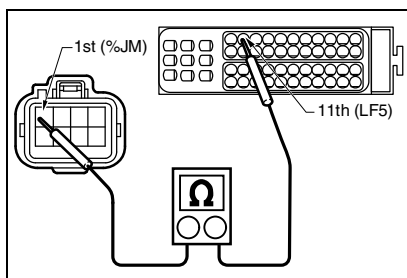
9. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS (6)

- (1) Check continuity between 1st (%L4) terminal of the CAN_J/C_3_L connector (4P) and 3rd (%JL) terminal of the No30_J/C connector (8P)

Standard value: Less than 1Ω



Replace the harness. (Malfunction part 1 in CAN communication line)

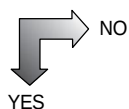


SHTS16Z160600014

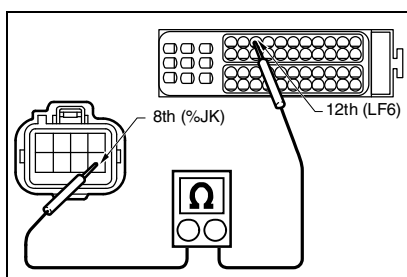
10. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS (7)

- (1) Check continuity between 1st (%JM) terminal of the No30_J/C connector (8P) and 11th (LF5) terminal of the DCU 53P connector

Standard value: Less than 1Ω



Replace the harness. (Malfunction part 1 in CAN communication line)

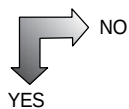


SHTS16Z160600015

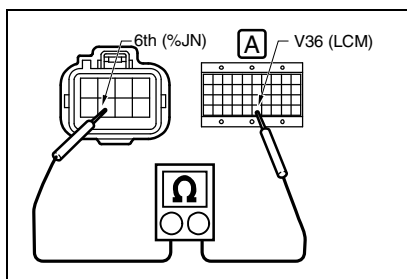
11. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS (8)

- (1) Check continuity between 8th (%JK) terminal of the No30_J/C connector (8P) and 12th (LF6) terminal of the DCU 53P connector

Standard value: Less than 1Ω



Replace the harness. (Malfunction part 1 in CAN communication line)

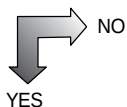


SHTS16Z160600016

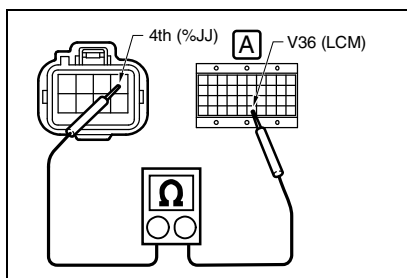
12. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS AND ENGINE ECU (1)

- (1) Disconnect the engine ECU connector.
- (2) Connect the signal check harness on the vehicle side (gray).
- (3) Check continuity between 6th (%JN) terminal of the No30_J/C connector (8P) and V36 (LCM) terminal of the signal check harness.

Standard value: Less than 1Ω



Replace the harness. (Malfunction part 2 in CAN communication line)

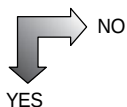


SHTS16Z160600017

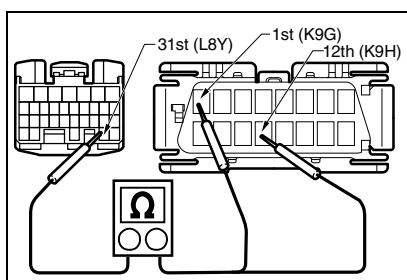
13. INSPECTION OF THE HARNESS BETWEEN ENGINE JOINT CONNECTORS AND ENGINE ECU (2)

- (1) Checking continuity between 4th (%JJ) terminal of the No30_J/C connector (8P) and V36 (LCM) terminal of the signal check harness.

Standard value: Less than 1Ω



Replace the harness. (Malfunction part 2 in CAN communication line)

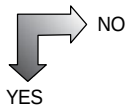


SHTS16Z160600018

14. CHECKING OF THE H LINE FOR +B/GND SHORT CIRCUIT

- (1) Disconnect the signal check harness
- (2) Check continuity between 31st (L8Y) terminal of the vehicle control ECU connector (32P) and 1st (K9G) and 12th (K9H) terminals of the DLC connector (16P).

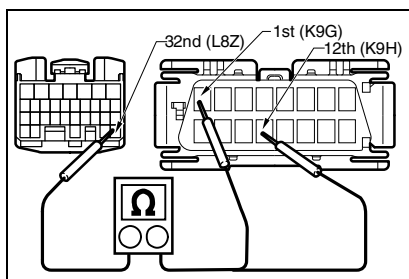
Standard value: More than 5kΩ



Replacement of the cowl and engine sub wire harness

DN06-14

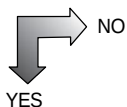
OTHERS (CAN COMMUNICATION)



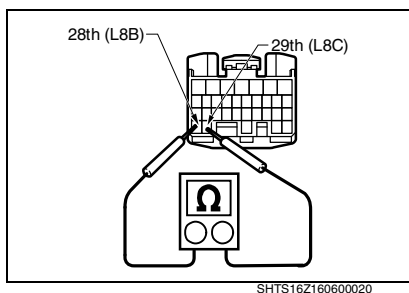
15. CHECKING OF THE L LINE FOR +B/GND SHORT CIRCUIT

- (1) Check continuity between 32nd (L8Z) terminal of the vehicle control ECU connector (32P) and 1st (K9G) and 12th (K9H) terminals of the DLC connector (16P).

Standard value: More than 5k Ω



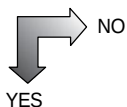
Replacement of the cowl and engine sub wire harness



16. CHECKING OF TERMINAL RESISTANCE

- (1) Reconnect engine ECU, and in that condition, check the resistance between 28th (L8B) terminal and 29th (L8C) terminal of the vehicle control ECU connector (32P).

Standard value: 45-75 Ω



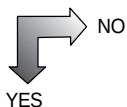
Proceed to 18
If the judgment is "No" again, replace vehicle control ECU or DCU

17. CHECKING OF EACH ECU

- (1) Disconnect engine ECU again, and check for abnormality in the connector terminal
(2) If there is no abnormality in the connector of engine ECU and no change in the diagnosis code abnormality in vehicle control ECU or engine ECU
(3) Replace vehicle control ECU and engine ECU

18. INSPECTION JOINT CONNECTORS (1)

- (1) Check the fit of the joint connector CAN_J/C_2
Standard value: A "click" is heard when the connector is inserted

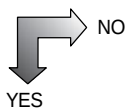


Poor fit of the joint connector

19. INSPECTION JOINT CONNECTORS (2)

- (1) Check the fit of the joint connector CAN_J/C_3

Standard value: A "click" is heard when the connector is inserted

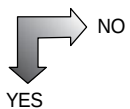


Poor fit of the joint connector

20. INSPECTION JOINT CONNECTORS (3)

- (1) Check the fit of the joint connector No30_J/C

Standard value: A "click" is heard when the connector is inserted



Poor fit of the joint connector

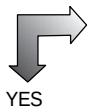
Proceed to 16 (Checking again the terminal resistance)

INSPECTION 2

Possible cause	[In case of "U0101" only]
	• Harness disconnection between vehicle control ECU and DCU • Loose fitting of joint connectors • Abnormality in AT-ECU/AMT-ECU
	[In addition to "U0101" "U0105" and/or "U0155" are displayed]
	• Harness disconnection between vehicle control ECU and the meter • +B/GND short circuit in the H line or L line of the vehicle CAN line • Loose fitting of joint connectors • Communication failure due to other system abnormalities • Abnormality in terminal resistance (vehicle control ECU or meter) • Abnormality in AT-ECU/AMT-ECU

1. CHECKING OF THE DIAGNOSIS CODE

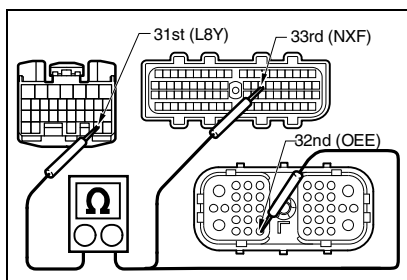
- (1) Shift position is not displayed on the meter
- (2) Diagnosis code is "U0101" only



NO

Checking insertion of CAN_J/C

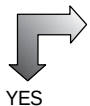
YES



2. INSPECTION OF THE HARNESS BETWEEN AT-ECU/AMT-ECU AND VEHICLE CONTROL ECU (1)

- (1) Check continuity between 33rd (NXF) terminal of the AT-ECU connector (80P) or 32nd (OEE) terminal of AMT-ECU connector (38P) and 31st (L8Y) terminal of the vehicle control ECU connector (32P)

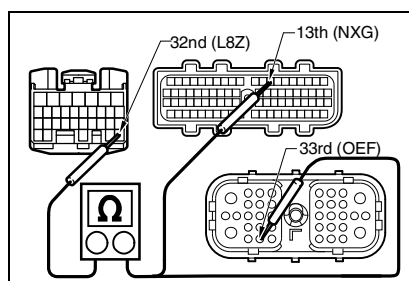
Standard value: Less than 1Ω



NO

Replace the harness. (Malfunction part 4 in CAN communication line)

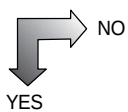
YES



3. INSPECTION OF THE HARNESS BETWEEN AT-ECU/AMT-ECU AND VEHICLE CONTROL ECU (2)

- (1) Check continuity between the 13th (NXG) terminal of the AT-ECU connector (80P) or the 33rd (OEF) terminal of the AMT-ECU connector (38P) and the 32nd (L8Z) terminal of the vehicle control ECU connector (32P)

Standard value: Less than 1 Ω



Replace the harness. (Malfunction part 4 in CAN communication line)

Replace the AT-ECU/AMT-ECU.

INSPECTION 3

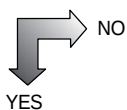
Possible cause	• Harness disconnection between vehicle control ECU and the meter • +B/GND short-circuit in the H line or L line of the vehicle CAN line • Abnormality in terminal resistance (vehicle control ECU or meter) • Loose fitting of joint connectors • Communication failure due to abnormality in ECU

1. CHECKING OF THE DIAGNOSIS CODE

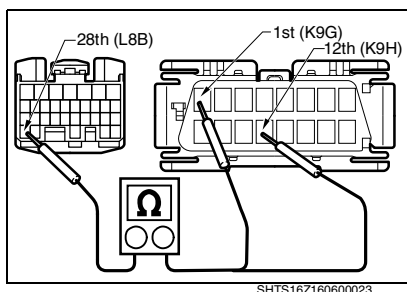
- (1) Diagnosis codes of all communication systems of the systems installed to the vehicle are detected.
- (2) "U0101", "U0105" and "U0155" are all detected.

HINT

Check the vehicle specification in advance. Because diagnosis codes of uninstalled systems are not detected.



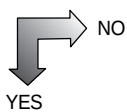
If diagnosis codes do not change after checking insertion of the CAN_J/C, move to Step 2



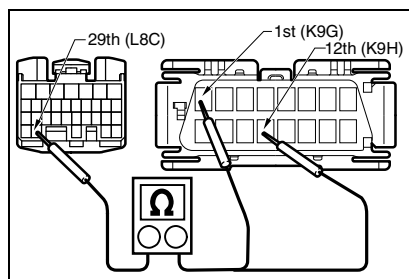
2. CHECK THE H LINE FOR +B/GND SHORT CIRCUIT

- (1) Disconnect connectors of vehicle control ECU and the meter.
- (2) Check continuity between 28th (L8B) terminal of the vehicle control ECU connector (32P) and 1st (K9G) and 12th (K9H) terminals of the DLC connector (16P).

Standard value: More than 5k Ω



Proceed to 6

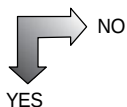


SHTS16Z160600024

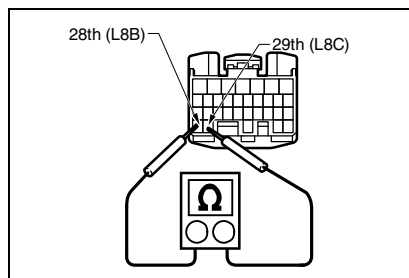
3. CHECK THE L LINE FOR +B/GND SHORT CIRCUIT

- (1) Check the continuity between 29th (L8C) terminal of the vehicle control ECU connector (32P) and 1st (K9G) and 12th (K9H) terminals of the DLC connector (16P).

Standard value: More than 5k Ω



Proceed to 6

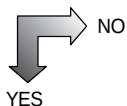


SHTS16Z160600025

4. CHECKING OF TERMINAL RESISTANCE

- (1) With the vehicle control ECU and the meter re-connected, check the resistance between 28th (L8B) terminal and 29th (L8C) terminal of the vehicle control ECU connector (32P).

Standard value: 45-75 Ω



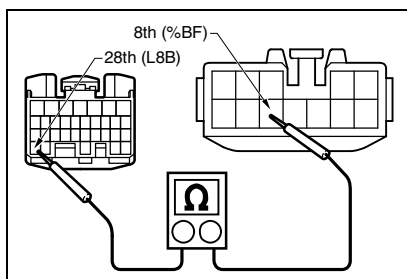
Proceed to 6 (If the judgment is "No" again, replace vehicle control ECU or the meter)

5. CHECKING OF EACH ECU

- (1) Re-connect all ECUs, and disconnect the ECUs one by one
- (2) CAN communication system diagnosis code (U**): The ECU disconnected when "***Malfunction" disappeared is the abnormal one
- (3) Inspect or replace the ECU

DN06-20

OTHERS (CAN COMMUNICATION)

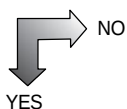


SHTS16Z160600026

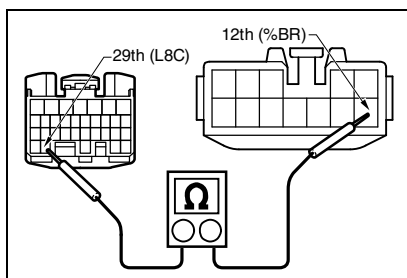
6. CHECKING OF THE VEHICLE CAN LINE (BETWEEN VEHICLE CONTROL ECU AND J/C) (1)

- (1) Check continuity between 28th (L8B) terminal of the vehicle control ECU connector (32P) and 8th (%BF) terminal of CAN_J/C (15P).

Standard value: Less than 1Ω



Replace the harness. (Malfunction part 3 in CAN communication line)

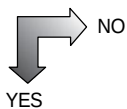


SHTS16Z160600027

7. CHECKING OF THE VEHICLE CAN LINE (BETWEEN VEHICLE CONTROL ECU AND J/C) (1)

- (1) Check continuity between 29th (L8C) terminal of the vehicle control ECU connector (32P) and 12th (%BR) terminal of CAN_J/C (15P).

Standard value: Less than 1Ω

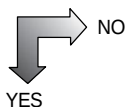


Replace the harness. (Malfunction part 3 in CAN communication line)

8. INSPECTION OF JOINT CONNECTORS

- (1) Check the fit of the joint connector CAN_J/C

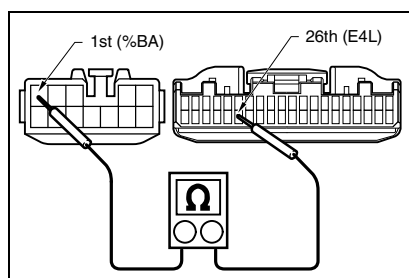
Standard value: A "click" is heard when the connector is inserted



Poor fit of the joint connector

OTHERS (CAN COMMUNICATION)

DN06-21

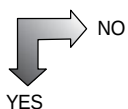


SHTS16Z160600028

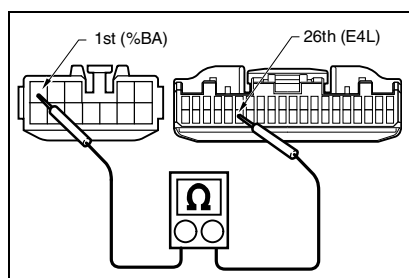
9. CHECKING OF THE VEHICLE CAN LINE (BETWEEN J/C AND THE METER) (1)

- (1) Check continuity between the 1st (%BA) terminal of CAN_J/C2 (12P) and 26th (E4L) terminal of the meter connector (40P)

Standard value: Less than 1Ω



Replace the harness. (Malfunction part 3 in CAN communication line)

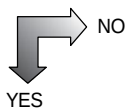


SHTS16Z160600029

10. CHECKING OF THE VEHICLE CAN LINE (BETWEEN J/C AND THE METER) (2)

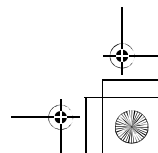
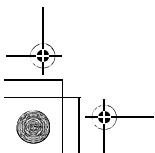
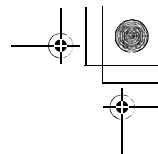
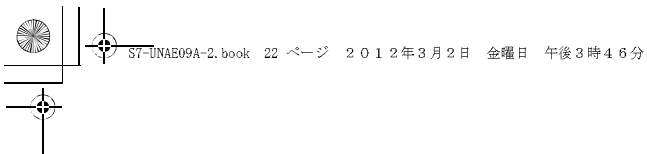
- (1) Check continuity between the 1st (%BA) terminal of CAN_J/C2 (12P) and 26th (E4L) terminal of the meter connector (40P)

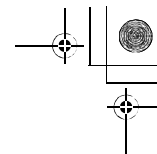
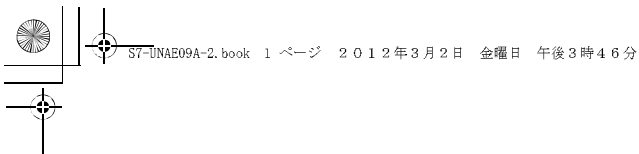
Standard value: Less than 1Ω



Replace the harness. (Malfunction part 3 in CAN communication line)

Proceed to 4





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