

# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

**Subject: CORRECTION OF WORKSHOP MANUAL FOR 2011~2014 MY**  
Troubleshooting information and inspection procedure of the DTC/P2030 were revised

**RELEVANT MODEL:** 11MY-14MY Conventional Trucks (238, 258, 268, or 338)

The following is to inform you of the above caption. This service data should be attached to the relevant pages of the workshop manuals for maintenance and to use for servicing.

**OVERVIEW:**

Troubleshooting information and Inspection procedure of the DTC/P2030 were revised.

**RELEVANT MANUALS:**

Model	Manual No.	Chapter
2011 MY	S1-UNAE07C DIA	BURNER CONTROL SYSTEM (BCU)
2012 MY	S7-UNAE08A	BURNER CONTROL SYSTEM (BCU)
2013 MY	S7-UNAE09B	BURNER CONTROL SYSTEM (BCU)
2014 MY	S7-UNAE10D	BURNER CONTROL SYSTEM (BCU)



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# SERVICE MANUAL INFORMATION

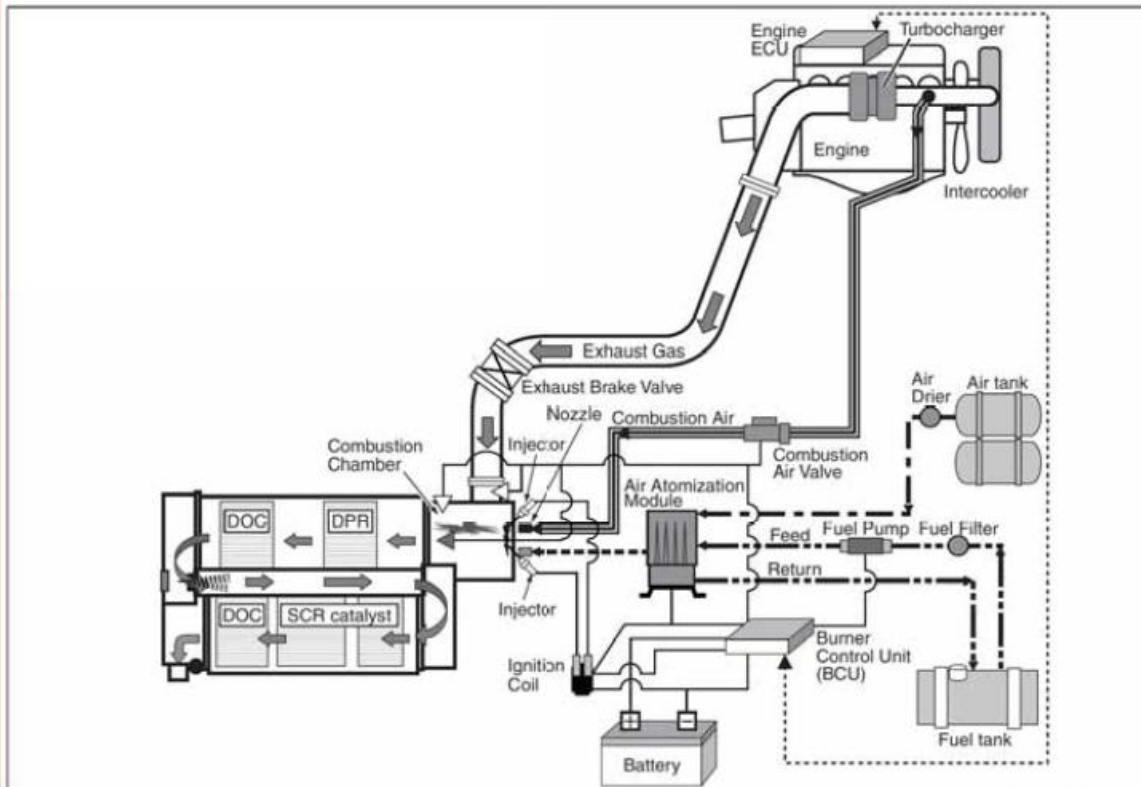
Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### DTC: P2030

EN01H16F03050F03001029

**DTC: P2030 Burner abnormal combustion (Burner misfire, Lost flame, Burner outlet temperature too high, Unable to achieve target temperature)**  
INFORMATION



SAPH16F030500099

#### 1. Technical description

- When an operation request is received from the engine ECU, the burner system raises the exhaust gas temperature up to the required temperature and then maintains the target temperature.

#### <Description of malfunction>

- When exhaust temperature rises, "Misfire", "Lost flame", "Unable to achieve target temperature", or "Burner outlet temperature too high" is detected 3 times in a row.

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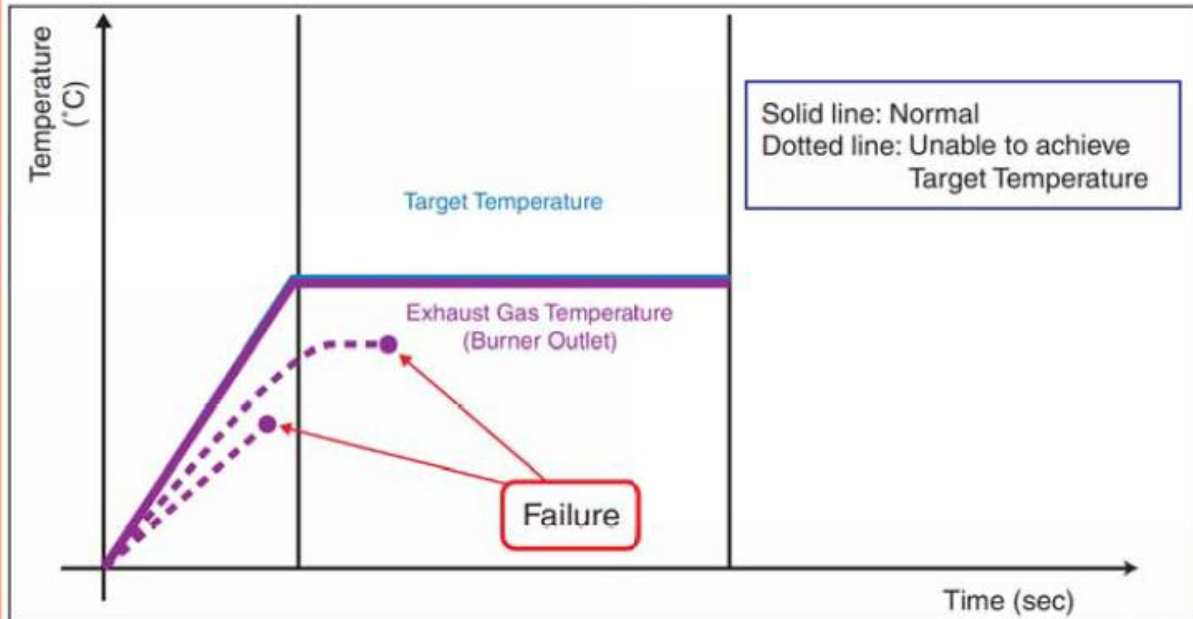
# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

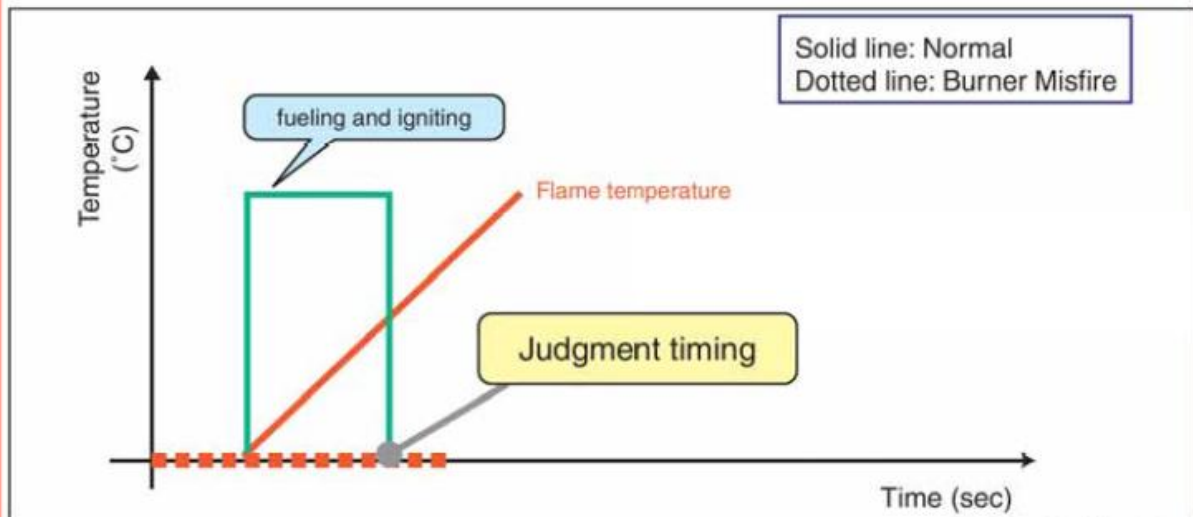
### 2. DTC set condition

- (1) Check condition  
During raising/maintaining the exhaust gas temperature. (See [Reference 2])
- (2) <Judgment criteria>
  - Unable to achieve target temperature  
The exhaust gas temperature sensor (Burner outlet) value is lower than a target temperature value.



SAPH16F030500106

- Misfire  
After fuel injection, the flame temperature sensor value does not rise within 10 seconds.



SAPH16F030500107



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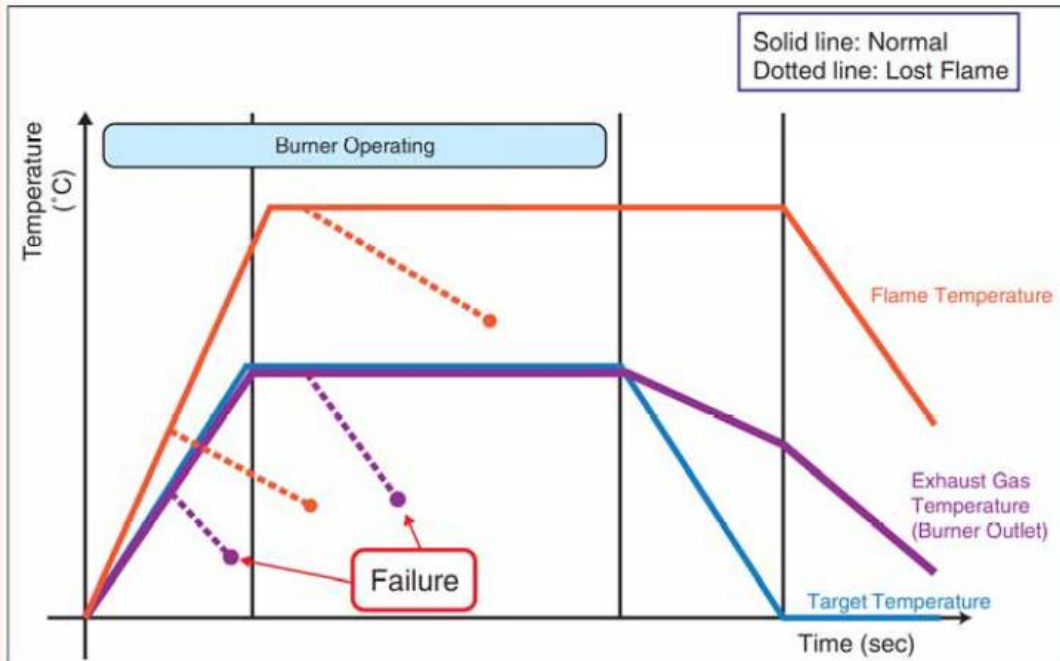


# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

- 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. The exhaust gas temperature sensor (Burner outlet) value reduces.



SAPH116F030500108

- The exhaust gas temperature sensor (Burner outlet) > 700 °C {1,292 °F} for 1 seconds.  
 The exhaust gas temperature sensor (Burner outlet) exceeds the threshold.

### 3. Reset condition

- Cleared with the diagnostic device (HINO DX II).

### 4. Indication, warning or system control regulation when the DTC is set.

(1) MIL: ON

### 5. Symptoms on the vehicle when the DTC is set

#### <Symptoms on the vehicle due to backup control (fail safe function)>

- DPR auto regeneration function is stopped.

#### <Symptoms on the vehicle due to malfunction>

- DPF melted down.

### 6. Pre-inspection work

- Check that the battery voltage is in the normal range.

### 7. After-inspection work

- Clear all past DTC.
- Perform DPR manual regeneration and check that no DTC is detected. (See [Reference 1])

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 8. Estimated failure factors

ROOT CAUSES	PRESUMED CAUSE	SUGGESTION
No spark on the tip of igniters	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 igniter tips	Clean up the igniters
	Excessive fuel on the igniter tips. It means excessive soot from the engine has emitted.	Check the turbocharger
		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		
Damaged igniter ceramics	Check the igniters	
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	
Lack of combustion air from the turbocharger	CAV (Combustion Air Valve) stuck closed	Check the CAV
	Air leakage from the combustion air piping	Check the combustion air hoses/connectors
	Kinked combustion air hose/piping	Check the combustion air hoses
	Turbo failure	Check the turbocharger
	EGR valve failure	Check EGR valve
	Stuck exhaust brake failure	Check the exhaust brake failure
	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
	Differential pressure rise by DPR filter melting	Check the DPR filter
Lack of injected fuel quantity from the atomizer	Plugged fuel line between the atomizer and the nozzle	Check the fuel line
	Atomizer injector issue	In this case P2436 (Atomizer Failure) appears
Uncontrolled airflow internal of the combustor	Combustor internal shape issue (e.g. loose internal component)	Check no rattling from the combustor
Control failure	Flame temperature sensor failure	Check insulation resistance/junction resistance
	Outlet temperature sensor failure	Check insulation resistance/junction resistance
	BCU failure	In this case, other DTC appears

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### [Diagnosis Procedure Overview]

Step	Description	Judgment Criteria	YES	NO
1	DTC for SPARK FAIL	Have DTC P2300, P2301 or P2302 been recorded?	Correct the problem according to diagnosis procedure for the subject DTC, and then go to step 2	Go to step 2
2	ATOMIZER NOZZLE PRESSURE	Is the value 55.16 kPa (8 psi) or less?	Go to step 3	Go to step 12
3	IGNITER SPARK	Is there spark between igniters?	Go to step 4	Go to step 14
4	IGNITER GAP	Is the igniter gap within the spec: 2.5 - 3.5 mm (0.10 - 0.14 in.) ?	Go to step 5	Correct the gap, and then go to step 5
5	COMBUSTION AIR HOSES	No kink/plugging?	Go to step 6	Repair, and then go to step 6
6	COMBUSTOR ORIFICE	Is the combustor orifice diameter within the spec: 11.25 - 11.75 mm (0.44 - 0.46 in.) ?	Go to step 7	Clean the orifice, and then go to step 7
7	COMBUSTOR MANTLE	Is the combustor mantle depth within the spec: 20 mm (0.78 in.) or less?	Go to step 8	Replace the combustor, and then go to step 8
8	Combustion Air Valve (CAV)	Air comes from CAV within 7 seconds after CAV is opened at 2,000 - 2,500 r/min?	Go to step 9	Wait 1 hour and re-test if ambient temp is low. Replace CAV, and then go to step 9
9	FLAME TEMP SENSOR	Does the insulation resistance at room temperature is greater than 1 MΩ at 500 VDC?	Go to step 10	Replace the flame temperature sensor, and then go to step 10
10	DPR MANUAL REGEN	Does the DPR manual regeneration is completed w/o any issues?	Go to step 11	Go to step 19
11	DPR AUTO REGEN	Does the DPR automatic regeneration is completed w/o any issues?	Diagnosis is completed	Go to step 21

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### Extra Diagnosis Procedures when problem was found thru 1-11

Step	Description	Judgment Criteria	YES	NO
12	ATOMIZER NOZZLE PRESSURE <If no at step 2>	Is the value 55.16 kPa (8 psi) or less after disconnecting the fuel tube from nozzle?	Clean the nozzle and then go to step 2	Go to step 13
13	ATOMIZER NOZZLE PRESSURE <If no at step 12>	Is the value 55.16 kPa (8 psi) or less after disconnecting the fuel tube from atomizer?	Clean the fuel tube and then go to step 2	Clean the atomizer outlet fitting, and then go to step 2
14	IGNITION CABLE <If no at step 3>	Is the exposed length 7 mm (0.28 in.) or less? Is there no loose?	Go to step 15	Repair and then go to step 3
15	IGNITER INSULATION RESISTANCE <If yes at step 14>	Is the insulation resistance 1 MΩ or more?	Perform step 3 again. If no spark, replace the ignition coil, and then go to step 3	Go to step 16
16	IGNITER GAP <If no at step 15>	Is the igniter gap within the spec: 2.5 - 3.5 mm (0.10 - 0.14 in.) ?	Go to step 17	Correct the gap, and then go to step 3
17	DPR FILTER <If yes at step 16>	Is the DPR filter melted/pushed out?	Replace the DPR filter, clean the igniters, and then go to step 3	Go to step 18
18	SCR CATALYST <If no at step 17>	Is the SCR catalyst slipped down?	Replace the SCR catalyst, clean the igniters, and then go to step 3	Clean the igniters, and then go to step 3
19	ATOMIZER FUEL INJECTION <If no at step 10>	Is the fuel injection quantity within spec?	Go to step 20	Replace the atomizer, and then go to step 10
20	MANUAL REGEN DATA <If yes at step 19>	Flame temperature sensor value was increasing?	Replace the flame temperature sensor	Go to step 1
21	SCR CATALYST <If no at step 11>	Is the SCR catalyst slipped down?	Replace the SCR catalyst, clean the igniters, and then go to step 11	Go to step 22
22	DPR FILTER <If no at step 21>	Is the DPR filter melted/pushed out?	Replace the DPR filter, clean the igniters, and then go to step 11	Go to step 23
23	ATOMIZER FUEL INJECTION <If no at step 22>	Is the fuel injection quantity within spec?	Go to step 24	Replace the atomizer, and then go to step 11
24	TURBO <If yes at step 23>	Is the turbo response speed is within spec?	Go to step 25	Replace the turbo, and then go to step 11
25	EGR VALVE <If yes at step 24>	Is the EGR valve response speed is within spec?	Go to step 26	Replace the EGR valve, and then go to step 11
26	EGR VALVE <If yes at step 25>	No issue found?	Go to step 1	Replace the EGR valve, and then go to step 11

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### INSPECTION PROCEDURE: P2030

#### ⚠ 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.

#### NOTICE

BCU software version must be 25F7 or later before starting procedure.

1	DTC for spark fail [HINO DX II ]
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1. Set the starter switch to the "LOCK" position.
2. Connect the vehicle to HINO DX II .
3. Set the starter switch to the "ON" position.
4. Confirm the DTC code in the BCU.

Have DTC P2300, P2301 or P2302 been recorded?

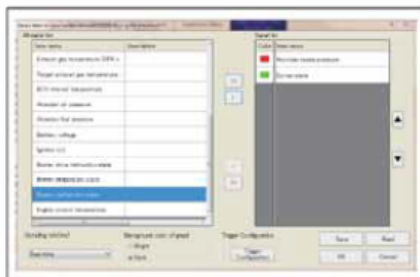
YES

Go to diagnosis procedure of a related DTC, and then go to step 2.

NO

Go to step 2.

2	Check the "Atomizer nozzle pressure" [HINO DX II ]
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P2030-02-10

1. Connect HINO DX II to the vehicle, then turn starter switch position to "ON". (Do not start the engine)
2. Select [BCU].
3. Set up data monitor [atomizer nozzle pressure] and [Burner State].
4. Start the engine.
5. Check the value of [atomizer nozzle pressure] when [Burner State] is [Accum Soot].

Standard value

55.16 kPa (8 psi) or less.

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

Is the value 55.16 kPa (8 psi) or less?

YES

NO

Go to step 3.

Go to step 12.

### 3 Inspect the ignition coil condition [HINO DX II ]



SAPH16F030500115

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 from the combustor.
4. Connect HINO DX II to the vehicle, then turn starter switch position to "ON".
5. Select [BCU].
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.

#### **NOTICE**

Discard the copper washer when the fuel nozzle is re-assembled.

Measurement condition	Measurement site
Starter switch: ON	Igniters (Burner combustor)

Is there spark between igniters?

YES

NO

Go to step 4.

Go to step 14.

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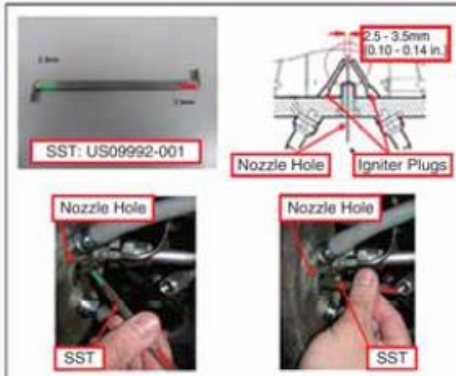
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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 4 Checking the igniter gap



P2030-01-05

1. Check igniter plug gap.  
The SST is a "Go - No-Go" gauge to check the igniter gap at the tips. The tool has a 2.5 mm (0.10 in.) gauge on one end and a 3.5 mm (0.14 in.) gauge on the other end. The 2.5 mm (0.10 in.) end should be able to pass between the igniter tips while the 3.5 mm (0.14 in.) end should not.

#### NOTICE

- Care must be taken when checking the igniter gap to make certain no damage occurs to either igniter tip or to the porcelain.
- Care must be taken to prevent any foreign debris from entering the combustor through the nozzle hole opening. If foreign debris does enter the combustor, the debris must be removed from the combustor.
- Nozzle should not be reassembled after completion of this step for 'step 8'.

Measurement condition	Measurement site
Starter switch: LOCK	Igniters (Burner combustor)

Standard value
Igniter gap specification: 2.5 - 3.5 mm {0.10 - 0.14 in.}

Do the measurements meet the standard value?

YES

Go to step 5.

NO

Remove both blue ceramic igniter plugs from the combustor. And carefully cleaned up by break cleaner and wire brush.  
Switch igniter positions side to side. Reinstall both igniter plugs and torque to the specified torque.  
Specified Torque: 22.0 lb-ft (29.8 N-m). Check the gap again. If the gap is still out of spec, remove one (1) igniter from the combustor and exchange it with another new one. Due to manufacturing variability of igniters it may be necessary to replace one of the two igniters to bring the gap within specification and then go to step 5.

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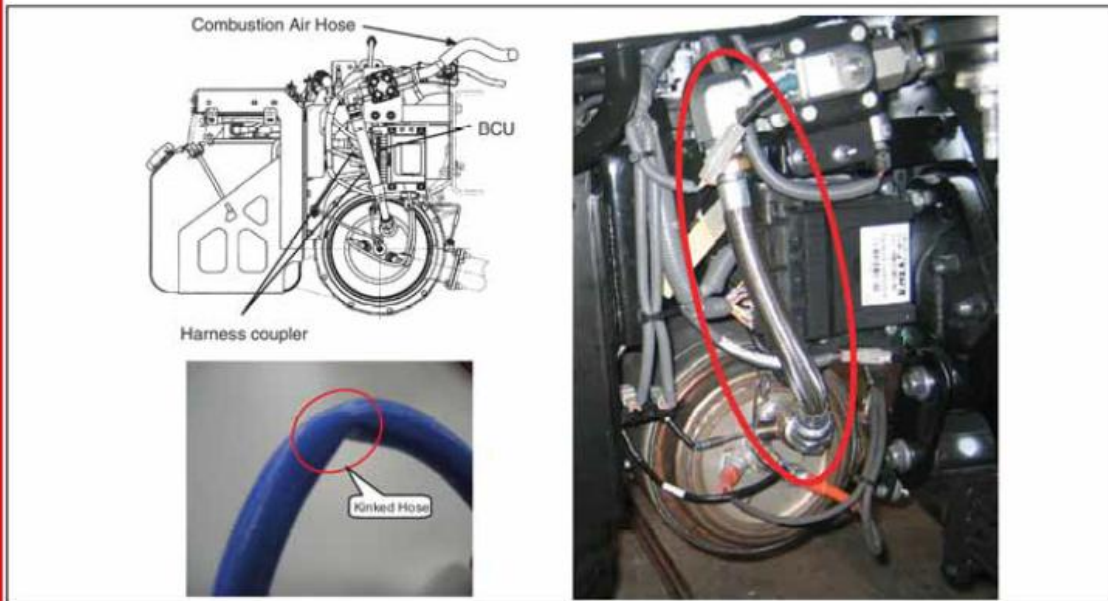
# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 5 Visual inspection of combustion air piping and hoses

1. Check combustion air hoses.



P2030-n22

Measurement condition	Measurement site
Starter switch: LOCK	Combustion air hoses

Standard value
Not kink, not loose, not leaks, not restriction

No issue found?

YES

NO

Go to step 6.

Repair/Replace.  
And then go to step 6.

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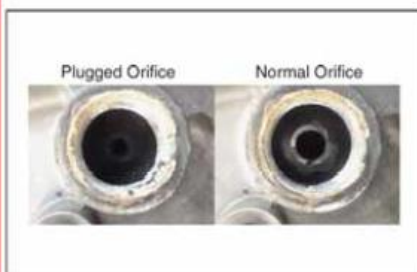
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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 6 Visual inspection of the combustor orifice



step2-15

1. Disconnect the combustion air hose from the combustor.
2. Check the orifice.

#### NOTICE

After removal, be careful to avoid entry of foreign matter into the hose / combustor.

#### HINT

Combustor orifice must be periodically replaced every 150,000 miles.

Measurement condition	Measurement site
Starter switch: LOCK	Combustor
Standard value	
11.25 - 11.75 mm (0.44 - 0.46 in.)	

Do the measurements meet the standard value?

YES

NO

Go to step 7.

Clean the hole by brake cleaner / wire brush and then go to step 7.

### 7 Confirmation of the combustor deflecting plate



Step2-16

1. Take measurement of distance from bottom of combustion air valve fitting opening to mantle deflector plate.

#### NOTICE

- After removal, be careful to avoid entry of foreign matter into the hose / combustor.
- Combustion air hose should not be reassembled to the combustor after this step for "step 8".

Measurement condition	Measurement site
Starter switch: LOCK	Combustor
Standard value	
Depth is 20 mm (0.78 in.) or less	

Do the measurements meet the standard value?

YES

NO

Go to step 8.

Replace the combustor and then go to step 8.

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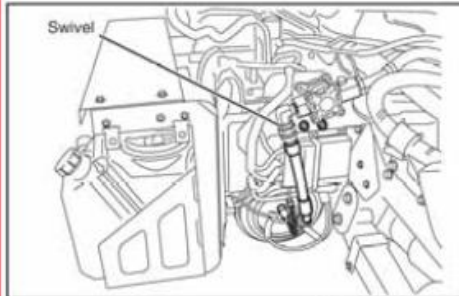


# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 8 Checking the combustion air valve for correct operation [HINO DX II]



p2030-r26

1. Remove the fuel nozzle from the combustor.

#### **⚠ DANGER**

Burner system may be operated after engine ON in order to elevate the exhaust gas temperature for early NOx reduction. If the fuel is not supplied, flame cannot be created.

Therefore, to make sure to remove the fuel nozzle prior this procedure.

Otherwise, flame may be spilling from the combustor.

2. Start the engine. (Idling)
3. Select [BCU] on the diagnosis screen.
4. Use the accelerator pedal to raise the engine speed to 2,000 - 2,500 r/min.
5. Select [Combustion air valve] in [Active test Setting], keep it [ON] for 30 seconds, and then turn it on [OFF].
6. Repeat the operation of the above step 5 ten times and confirm the flow of air (air bubbles) from the tip of the hose.

- At the time of [ON] operation: Air flows from the tip of the hose.
- At the time of [OFF] operation: No air flows from the tip of the hose.

#### **NOTICE**

- 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}

Air comes from CAV within 7 seconds after CAV is turned ON?

YES

Go to step 9.

NO

Test again.

After the vehicle is left for 1 hour in room temperature, if air is still not coming, replace combustion air valve. And then go to step 9.

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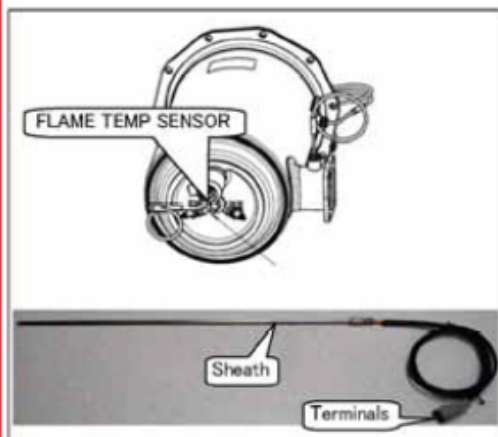
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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 9 Inspect the flame temperature sensor insulation resistance



1. Check insulation resistance, between sheath and a terminal.

#### HINT

Flame temperature sensor must be periodically replaced every 150,000 miles.

Measured insulation resistance at room temperature is greater than 1 M $\Omega$  at 500 VDC?

YES

NO

Go to step 10.

Replace the flame temperature sensor.  
And then go to step 10.

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 10 Performing of DPR manual regeneration [HINO DX II ]

items	Initial value	Set value	Unit	Write to ECU
<input type="checkbox"/> E-COAST release on Acc/Dec setting	Invalid	Invalid		
<input type="checkbox"/> E-COAST cruise co-operation setting	Invalid	Invalid		
<input type="checkbox"/> Vehicle speed control/cruise/speed limit/co-operation sub-brak..	Invalid	Invalid		
<input type="checkbox"/> Brake override control flag for MT	No priority	No priority		
<input type="checkbox"/> Electric control FAN flag	Without the electri.	Without the electri.		
<input type="checkbox"/> Setting time of idle shutdown	0	0	Minutes	
<input type="checkbox"/> Idle shutdown setting coolant temperature	-40	-40	° C	
<input type="checkbox"/> Idle shutdown setting intake air temperature	-40	-40	° C	
<input type="checkbox"/> Setting of economy running intensity	Low	Low		
<input type="checkbox"/> Setting start idle up mode changeover	Always	Always		
<input checked="" type="checkbox"/> DPR deposit volume	0.000	0.000	g/L	
<input type="checkbox"/> PM deposit volume 1 (A09C)	0.000	0.000	g/L	
<input type="checkbox"/> PM deposit volume 2 (A09C)	0.000	0.000	g/L	
<input type="checkbox"/> Total idle fuel injection quantity	0.0	0.0	gal	
<input type="checkbox"/> Trip idle injection quantity	0.0	0.0	gal	
<input type="checkbox"/> Total fuel injection quantity	0.0	0.0	gal	
<input type="checkbox"/> Trip total fuel injection quantity	0.0	0.0	gal	

CQE1-5

1. Set the starter switch to the "ON" position.
2. Use the HINO DX II to rewrite the DPR soot accumulation quantity to a value permitting DPR manual regeneration.
3. Set the starter switch to the "LOCK" position.
4. Set the starter switch to the "ON" position.
5. Select [BCU].
6. Set up data monitor [Engine speed], [Engine torque], [Exhaust gas temp (Burner inlet)], [Flame temp], [Exhaust gas temp (Burner outlet)], [Exhaust gas temp (DPR outlet)], [Target exhaust temp (Burner outlet)], [Atomizer air pressure], [Atomizer fuel pressure], [Atomizer nozzle pressure], [Battery voltage], [Burner operation status].
7. Perform DPR manual regeneration (data acquisition by HINO DX II BCU).
8. Once regeneration is completed, select stop then save the BCU record data.

Do the DPR gauge change to "0" after completion of the DPR manual regeneration?

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A Toyota Group Company

# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

YES

Go to step 11.

NO

Go to step 19.

### 11 Performing of DPR automatic regeneration [HINO DX II]

1. Set the starter switch to the "ON" position.
2. Use the HINO DX II to rewrite the DPR soot accumulation quantity to a value permitting DPR manual regeneration.
3. Set the starter switch to the "LOCK" position.
4. Set the starter switch to the "ON" position.
5. Select [BCU].
6. Set up data monitor [Engine speed], [Engine torque], [Exhaust gas temp (Burner inlet)], [Flame temp], [Exhaust gas temp (Burner outlet)], [Exhaust gas temp (DPR outlet)], [Target exhaust temp (Burner outlet)], [Atomizer air pressure], [Atomizer fuel pressure], [Atomizer nozzle pressure], [Battery voltage], [Burner operation status].
7. Perform DPR manual regeneration (data acquisition by HINO DX II BCU).
8. Once regeneration is completed, select stop the save the BCU record data.

#### HINT

The test drive must be implemented with the engine speed simulation of P141F at a freeze frame in the DX report during DPR automatic regeneration.

#### Sample

##### Freeze frame information

Freeze frame item	At work start	At the end of work	Unit
<P141F: Burner system malfunction>			
Year	2014		Year
Month	7		Month
Day	1		Day
Hours	6		Hours
Minutes	57		Minutes
Engine coolant temperature	90		°C
Engine revolution	2407		r/min
Injection quantity	70.88		mm <sup>3</sup> /st
Final accelerator opening	0		%
Speed	112		km/h
Intake air pressure	180		kPa
2 digit diagnosis code	98		
Actual common rail pressure	193.49		MPa

Do the DPR gauge change to "0" after completion of the DPR automatic regeneration?

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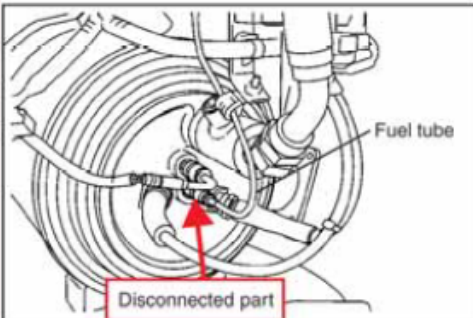
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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

<p style="text-align: center;">YES</p> <p style="text-align: center;">Diagnosis is completed.</p>	<p style="text-align: center;">NO</p> <p style="text-align: center;">Go to step 21.</p>		
<b>12</b> Check the "Atomizer nozzle pressure" [HINO DX II]			
 <p style="text-align: center; font-size: small;">P2030-01-11</p>	<ol style="list-style-type: none"> <li>1. Disconnect the fuel tube from nozzle on combustor.</li> <li>2. Connect HINO DX II to the vehicle, then turn starter switch position to "ON" (Do not start the engine).</li> <li>3. Select [BCU].</li> <li>4. Set up data monitor [atomizer nozzle pressure] and [Burner State].</li> <li>5. Start the engine.</li> <li>6. Check the value of [atomizer nozzle pressure] when [Burner State] is [Accum Soot].</li> </ol> <p><b>NOTICE</b> 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</p> <p><b>HINT</b> Nozzle must be periodically replaced every 150,000 miles.</p> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <th style="text-align: center;">Standard value</th> </tr> <tr> <td style="text-align: center;">55.16kPa (8psi) or less</td> </tr> </table>	Standard value	55.16kPa (8psi) or less
Standard value			
55.16kPa (8psi) or less			
<p>Is the value 55.16kPa (8psi) or less?</p>			
<p style="text-align: center;">YES</p> <p style="text-align: center;">Cleaning the nozzle by correct procedure. See [Reference 4]. And then go to 2.</p>	<p style="text-align: center;">NO</p> <p style="text-align: center;">Go to step 13.</p>		

CHANGE



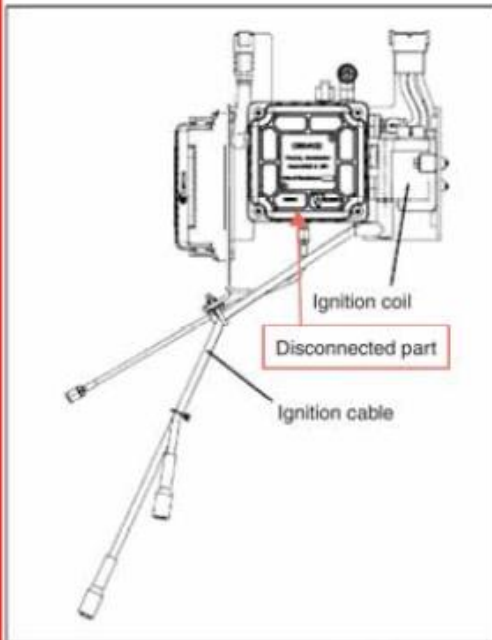
A Toyota Group Company

# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 13 Check the "Atomizer nozzle pressure" [HINO DX II ]



1. Disconnect the fuel tube from atomizer (Do not disconnect the fitting in atomizer).
2. Connect HINO DX II to the vehicle, then turn starter switch position to "ON" (Do not start the engine).
3. Select [BCU].
4. Set up data monitor [atomizer nozzle pressure] and [Burner State].
5. Start the engine.
6. Check the value of [atomizer nozzle pressure] when [Burner State] is [Accum Soot].

#### 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

#### Standard value

55.16 kPa (8psi) or less

Is the value 55.16kPa (8psi) or less?

YES

Cleaning the fuel tube and then go to step 2.

NO

Cleaning the atomizer outlet fitting. If pressure is still high after cleaning the fitting, replace the atomizer and then go to step 2.

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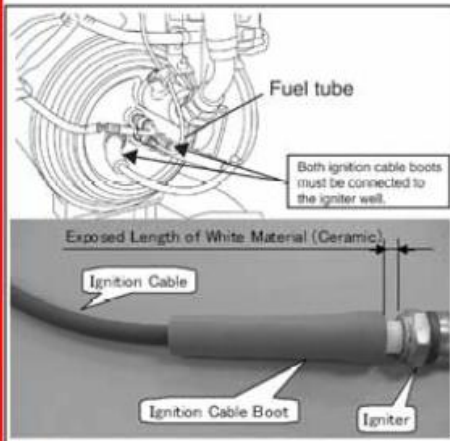


# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 14 Visual inspection of the ignition cable



p2000-18

1. Check the exposed length at left and no loose of ignition cable boots.

#### HINT

Check whether the contact between the terminal in the ignition cable boot and the igniter is okay or not.

Measurement condition	Measurement site
Starter switch: LOCK	Ignition cables

Is the exposed length 7mm (0.28 in.) or less?  
Is there no loose?

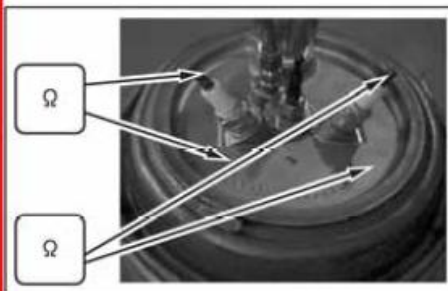
YES

NO

Go to step 15.

Repair and then go to step 3.

### 15 Inspect the igniter resistance



P2000-20

1. Check the resistance.

#### HINT

The insulation resistance of the igniter decreases with excessive deposit of soot and/or fuel on the igniter surface. In this case, the spark is not generated at the tip of the igniter, and there is leakage at the combustor.

Measurement condition	Measurement site
Starter switch: LOCK	Igniters (Burner combustor)

Is it 1 MΩ or more (Open circuit)?

YES

NO

Perform step 3 again. If no spark, replace the ignition coil and then go to step 3.

Go to step 16.

CHANGE



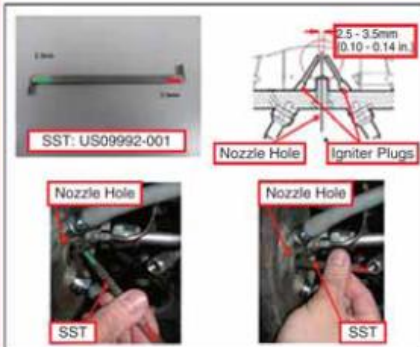
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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 16 Checking the igniter gap



P2030-01-05

#### 1. Check igniter plug gap.

The SST is a "Go - No-Go" gauge to check the igniter gap at the tips. The tool has a 2.5 mm (0.10 in.) gauge on one end and a 3.5 mm (0.14 in.) gauge on the other end. The 2.5 mm (0.10 in.) end should be able to pass between the igniter tips while the 3.5 mm (0.14 in.) end should not.

#### NOTICE

- Care must be taken when checking the igniter gap to make certain no damage occurs to either igniter tip or to the porcelain.
- Care must be taken to prevent any foreign debris from entering the combustor through the nozzle hole opening. If foreign debris does enter the combustor, the debris must be removed from the combustor.

Measurement condition	Measurement site
Starter switch: LOCK	Igniters (Burner combustor)

Standard value
Igniter gap specification: 2.5 – 3.5 mm (0.10 - 0.14 in.)

Do the measurements meet the standard value?

YES

Go to step 17.

NO

Remove both blue ceramic igniter plugs from the combustor. And carefully cleaned up by break cleaner and wire brush. Switch igniter positions side to side. Reinstall both igniter plugs and torque to the specified torque. Specified Torque: 22.0 lb-ft (29.8 N·m). Check the gap again. If the gap is still out of spec, remove one (1) igniter from the combustor and exchange it with another new one. Due to manufacturing variability of igniters it may be necessary to replace one of the two igniters to bring the gap within specification and then go to step 3.

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 17 Inspect the DPR filter



step17-01

1. Remove the DPR filter and check the DPR filter outlet surface.

#### HINT

When DPR filter is melted, the combustion air cannot be supplied correctly.



step17-02

Damage / soot leakage found on DPR filter outlet surface?

YES

NO

DPR replacement.  
Clean the igniters, and then go to step 3.

Go to step 18.

### 18 SCR catalyst unit check

1. Remove the tail pipe and check the condition of the SCR catalyst unit.

#### HINT

When the SCR catalyst has shifted towards the rear, the SCR catalyst differential the pressure increases and the combustion air no longer is supplied correctly.

Measurement condition	Measurement site
Starter switch: LOCK	SCR catalyst

#### Standard value

The SCR catalyst does not come in direct contact with the tail-pipe.

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

Does the SCR catalyst come in direct contact with tailpipe?

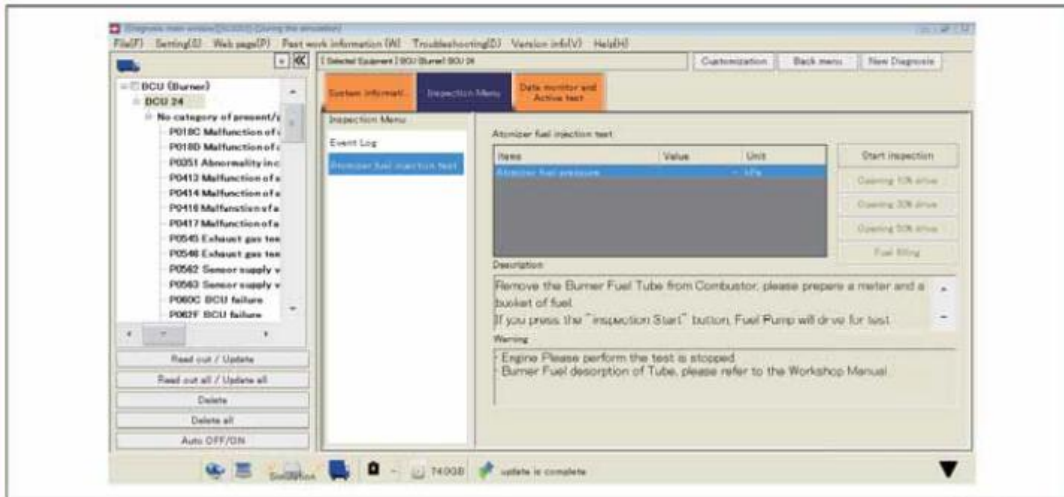
YES

SCR catalyst unit replacement.  
Clean the igniters, and then go to step 3.

NO

Clean the igniters, and then go to step 3.

### 19 Inspect the atomizer fuel injection quantity [HINO DX II ]



P2030-02-26

1. Select [BCU] on the HINO DX II .  
DX II version should be 1.1.15.11 or later. BCU software version should be 25FA/2606 or later.
2. In [Active test setting], measure the fuel injection quantity on "PWM 10 %", "PWM 30 %" and "PWM 50 %".  
Fuel will be injected for 30 seconds once each buttons is turned on.

Measurement condition	Measurement site
Starter switch: ON	Atomizer

Standard value
Injection quantity in 30 seconds PWM 10 %: 22.92 - 38.22 cc (18 - 30 grams) PWM 30 %: 61.14 - 84.09 cc (48 - 66 grams) PWM 50 %: 99.36 - 124.83 cc (78 - 97.8 grams)

Do the fuel injection quantity meet the standard value?

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">YES</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">NO</div>
Go to step 20.	Replace the atomizer and then go to step 10.
<b>20</b> Inspect the manual regeneration data	
1. Check the recored data at step 10.	
Flame temperature sensor value was increased during "flame detection" status?	
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">YES</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">NO</div>
Replace the flame temperature sensor. Diagnosis completion after igniter cleaning.	Go to step 1.
<b>21</b> SCR catalyst unit check	
1. Remove the tail pipe and check the condition of the SCR catalyst unit.	
<b>HINT</b> When the SCR catalyst has shifted towards the rear, the SCR catalyst differential the pressure increases and the combustion air no longer is supplied correctly.	
Measurement condition	Measurement site
Starter switch: LOCK	SCR catalyst
Standard value	
The SCR catalyst does not come in direct contact with the tailpipe.	
Does the SCR catalyst come in direct contact with tailpipe?	
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">YES</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">NO</div>
SCR catalyst unit replacement. Diagnosis completion after igniter cleaning. Go to step 11.	Go to step 22.

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

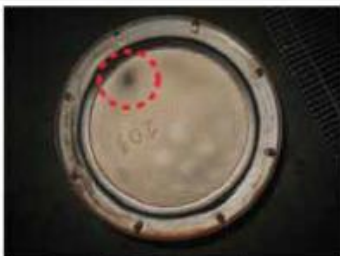
## BURNER CONTROL SYSTEM (BCU)

### 22 Inspect the DPR filter



Damage

SAPH16F010301007



Soot leakage

SAPH16F010301008

1. Remove the DPR filter and check the DPR filter outlet surface.

#### HINT

When DPR filter is melted, the combustion air cannot be supplied correctly.

Damage / soot leakage found on DPR filter outlet surface?

YES

DPR filter replacement.  
Clean the igniters, and then go to step 11.

NO

Go to step 23.

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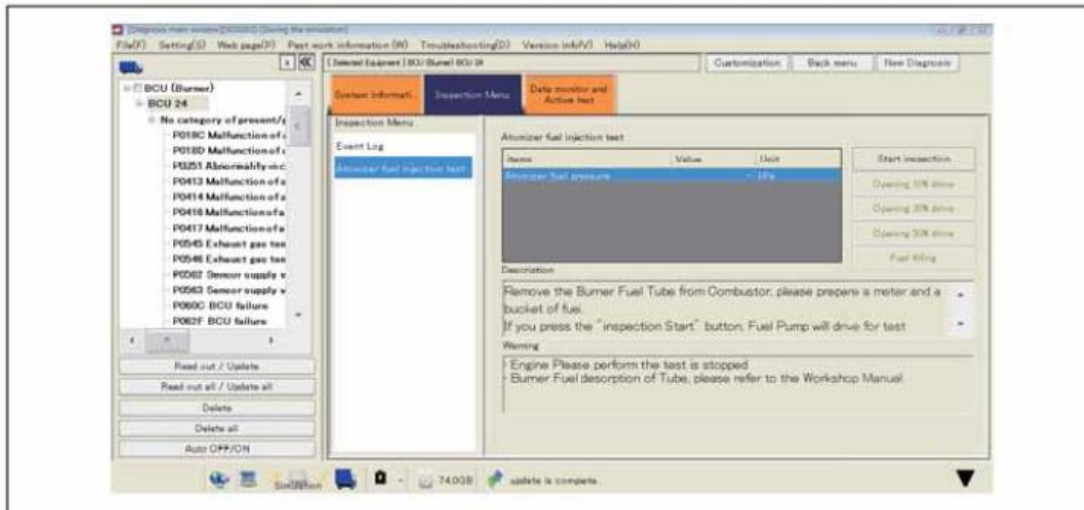


# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 23 Inspect the atomizer fuel injection quantity [HINO DX II]



P2030-n4802

1. Select [BCU] on the HINO DX II .  
DX II version should be 1.1.15.11 or later. BCU software version should be 25FA/2606 or later.
2. In [Active test setting], measure the fuel injection quantity on "PWM 10 %", "PWM 30 %" and "PWM 50 %".  
Fuel will be injected for 30 seconds once each buttons is turned on.

Measurement condition	Measurement site
Starter switch: ON	Atomizer

Standard value
Injection quantity in 30 seconds PWM 10 %: 22.92 - 38.22 cc (18 - 30 grams) PWM 30 %: 61.14 - 84.09 cc (48 - 66 grams) PWM 50 %: 99.36 - 124.83 cc (78 - 97.8 grams)

Do the fuel injection quantity meet the standard value?

YES

Go to step 24.

NO

Replace the atomizer and then go to step 11.

CHANGE



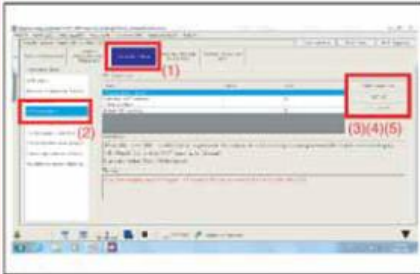
A Toyota Group Company

# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### 24 Inspect the turbocharger [HINO DX II ]



P2030-r25

1. Use the HINO DX II and inspect the time lag (following ability) of the indicated VNT opening and the actual VNT opening.

#### ⚠ CAUTION

Perform this inspection with stopped engine to avoid damage to the engine.

#### <Inspection procedure>

- (1) Select [Inspection Menu].
- (2) Select [VNT inspection].
- (3) Click [Start inspection].
- (4) Click [VNT UP].
  - inspect the response delay at each step of the Target VNT position and Actual VNT position from 0 to 90 %.
- (5) Click [VNT DOWN].
  - inspect the response delay at each step of the Target VNT position and Actual VNT position from 90 to 0 %.

#### <Reference>

With the VNT opening in the range from 0 to 90 %, the change per step is 10 %.

#### Standard value

A time lag (follow-up delay) within 3 seconds in regard to the indicated VNT opening.

Do the measurements meet the standard value?

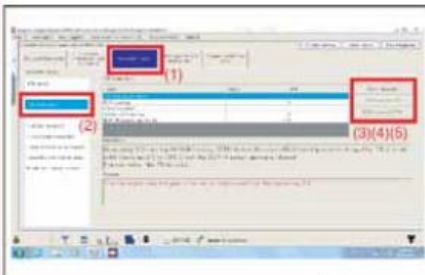
YES

NO

Go to step 25.

Replace the turbocharger.  
And then go to step 11.

### 25 Inspect the EGR valve [HINO DX II ]



P2030-r27

1. Inspect the time lag (following ability) of indicated EGR valve opening and actual EGR valve opening.

#### ⚠ CAUTION

Perform the inspection with stopped engine to avoid damage to the engine.

#### <Inspection procedure>

- (1) Select [Inspection Menu].
- (2) Select [EGR inspection].
- (3) Click [Start inspection].
- (4) Click [EGR opening UP]:
  - Check each step from 0 % – 90 % of the time lag (following characteristics) of the target EGR valve opening and actual EGR valve opening.
- (5) Click [EGR opening DOWN]:
  - Check each step from 90 % – 0 % of the time lag (following characteristics) of the target EGR valve opening and actual EGR valve opening.

#### <Reference>

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

With the EGR opening in the range from 0 to 90 %, the change per step is 10 %.

### Standard value

A time lag (follow-up delay) within 5 seconds in regard to the indicated EGR opening.

Do the measurements meet the standard value?

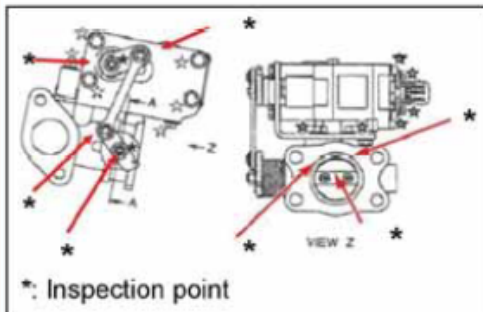
YES

Go to step 26.

NO

Replace the EGR valve.  
And then go to step 11.

### 26 Inspect 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.

No shaft rattle?, No butterfly valve screw loose?, No link rod rust?

YES

Go to step 1.

NO

Replace the EGR valve.  
And then go to step 11.

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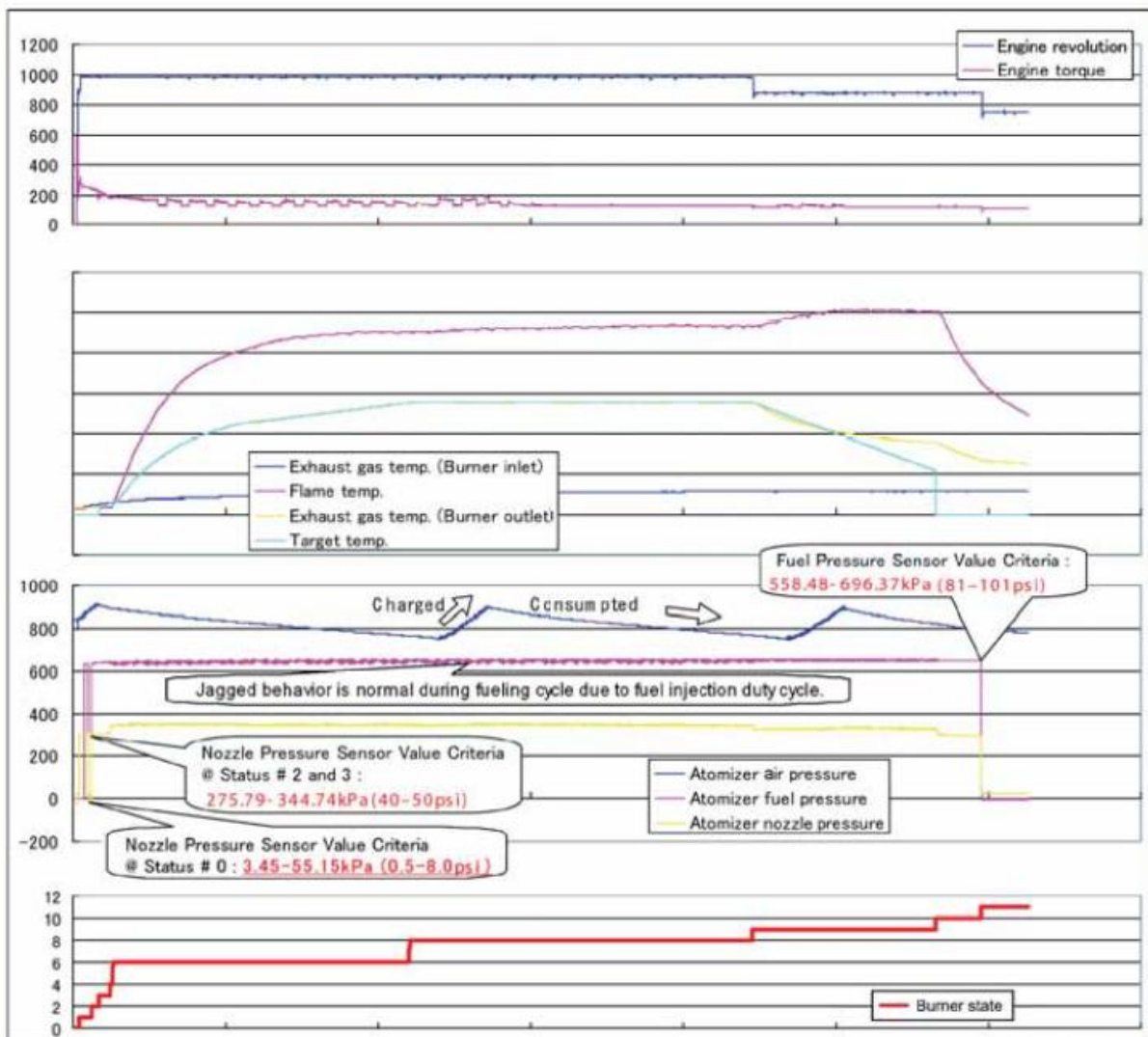
# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### [Reference 1: Manual Regeneration Data Correction Procedure]

1. Turn off the engine, and starter switch position must be "LOCK".
2. Connect HINO DX II to the vehicle, then set the starter switch to the "ON" position (Do not start the engine).
3. Select [BCU].
4. Start the engine (Idling condition).
5. Check the value of [Flame temperature], [Exhaust gas temperature (DPR Outlet)] and [Burner state] in [Data monitor Setting].
6. Perform the manual regeneration.



SAPH16F030500145

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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

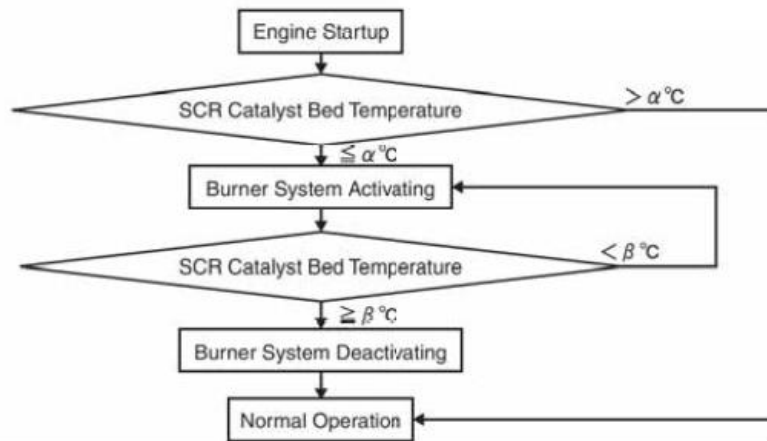
## BURNER CONTROL SYSTEM (BCU)

### [Reference 2: Purpose of the burner system]

#### 1. SCR WARM UP MODE

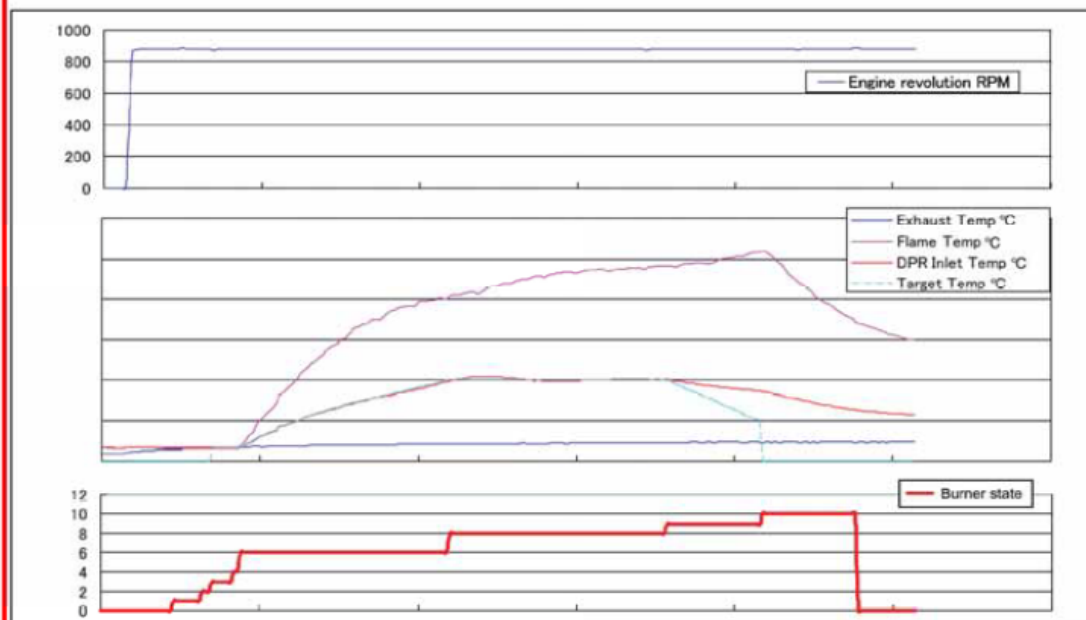
- To elevate exhaust gas temperature just after engine start up for improving NOx reduction efficiency by DEF-SCR system.
- During this activation, engine speed becomes 880 r/min.

<Operation Flow>



SAPH16F030500100

<SAMPLE: Operation Sequence and Normal Behavior>



SAPH16F030500101

CHANGE



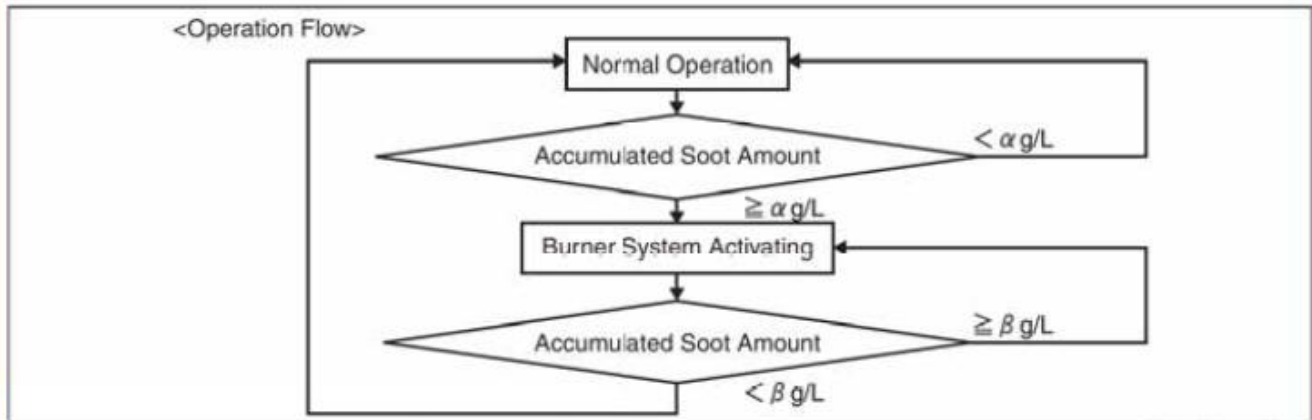
A Toyota Group Company

# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

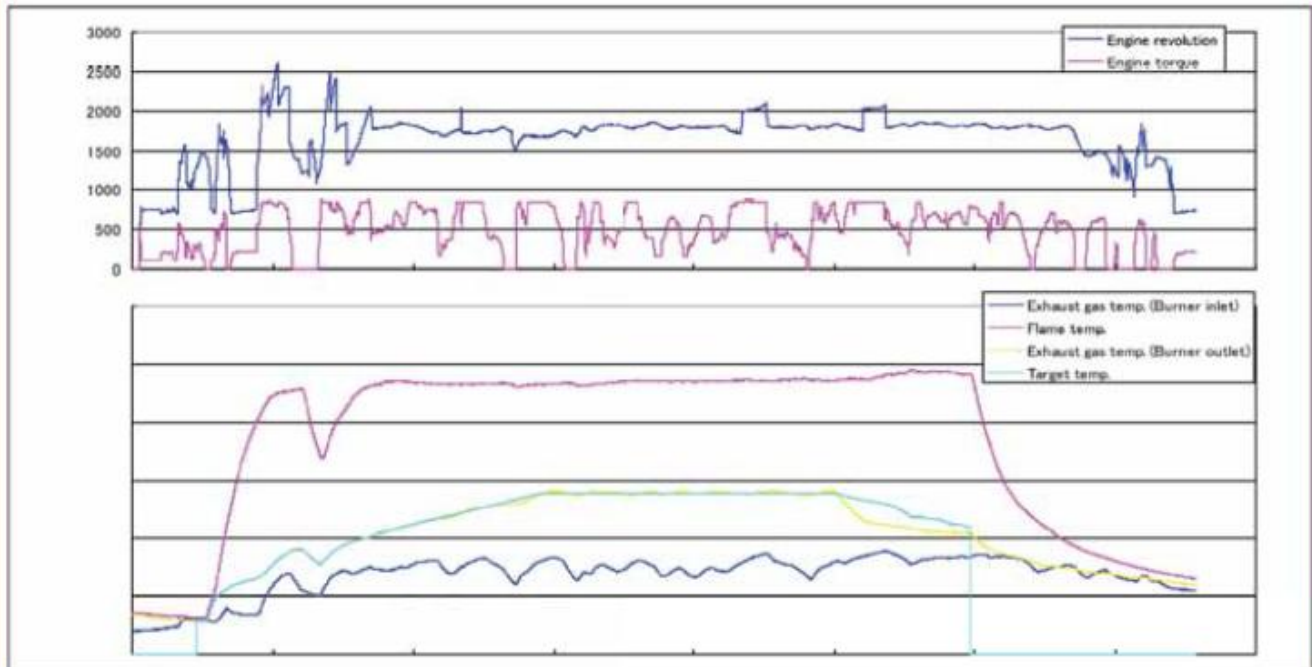
## BURNER CONTROL SYSTEM (BCU)

### 2. Elevate exhaust gas temperature for DPR active regeneration



SAPH16F030500102

### <SAMPLE: Auto Regeneration Operation Sequence and Normal Behavior>



SAPH16F030500103

CHANGE



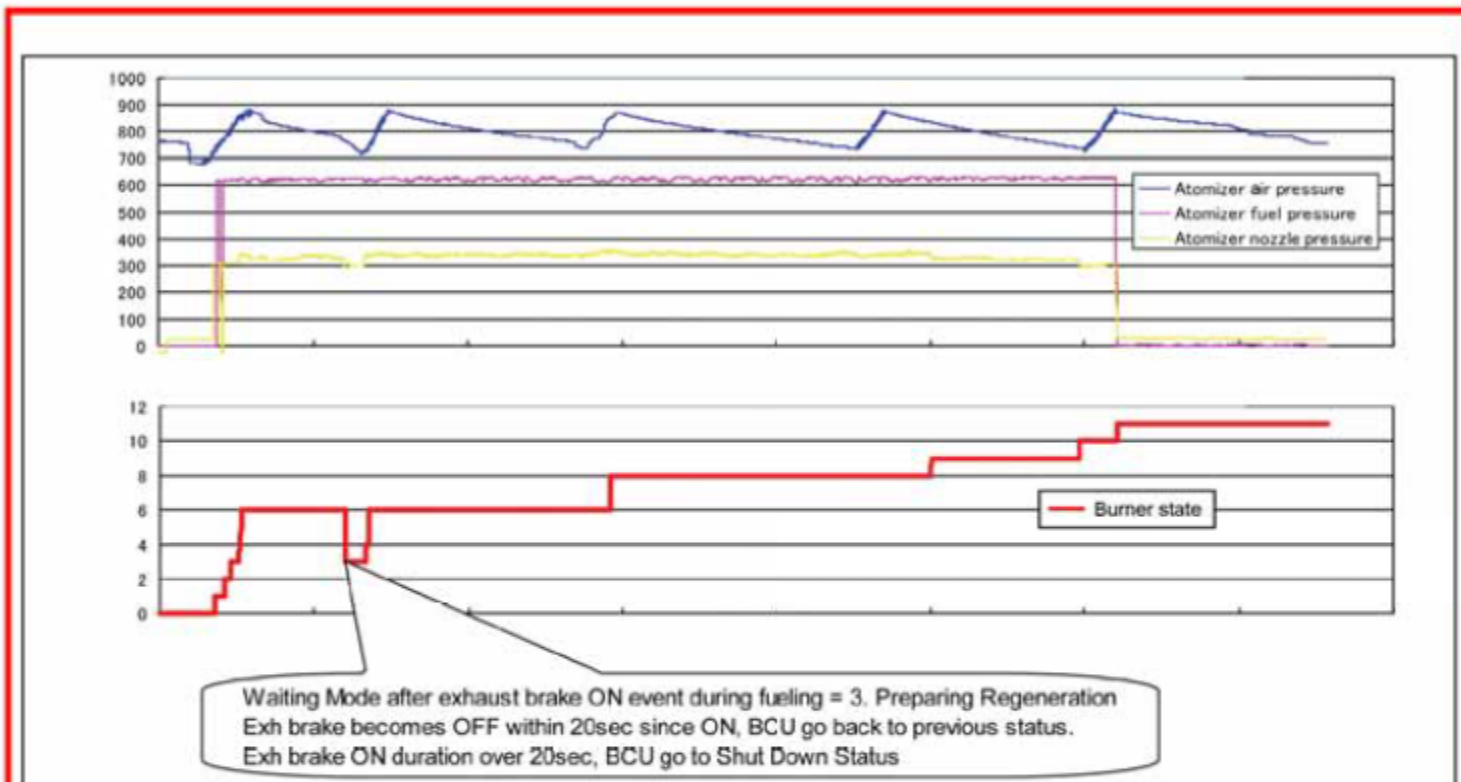
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# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)



SAPH16F030500104

### Automatic regeneration 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 temperature of DPR inlet/outlet, Excessive soot - DTC P244B detected)
- (6) Starter switch LOCK / Engine stall

CHANGE



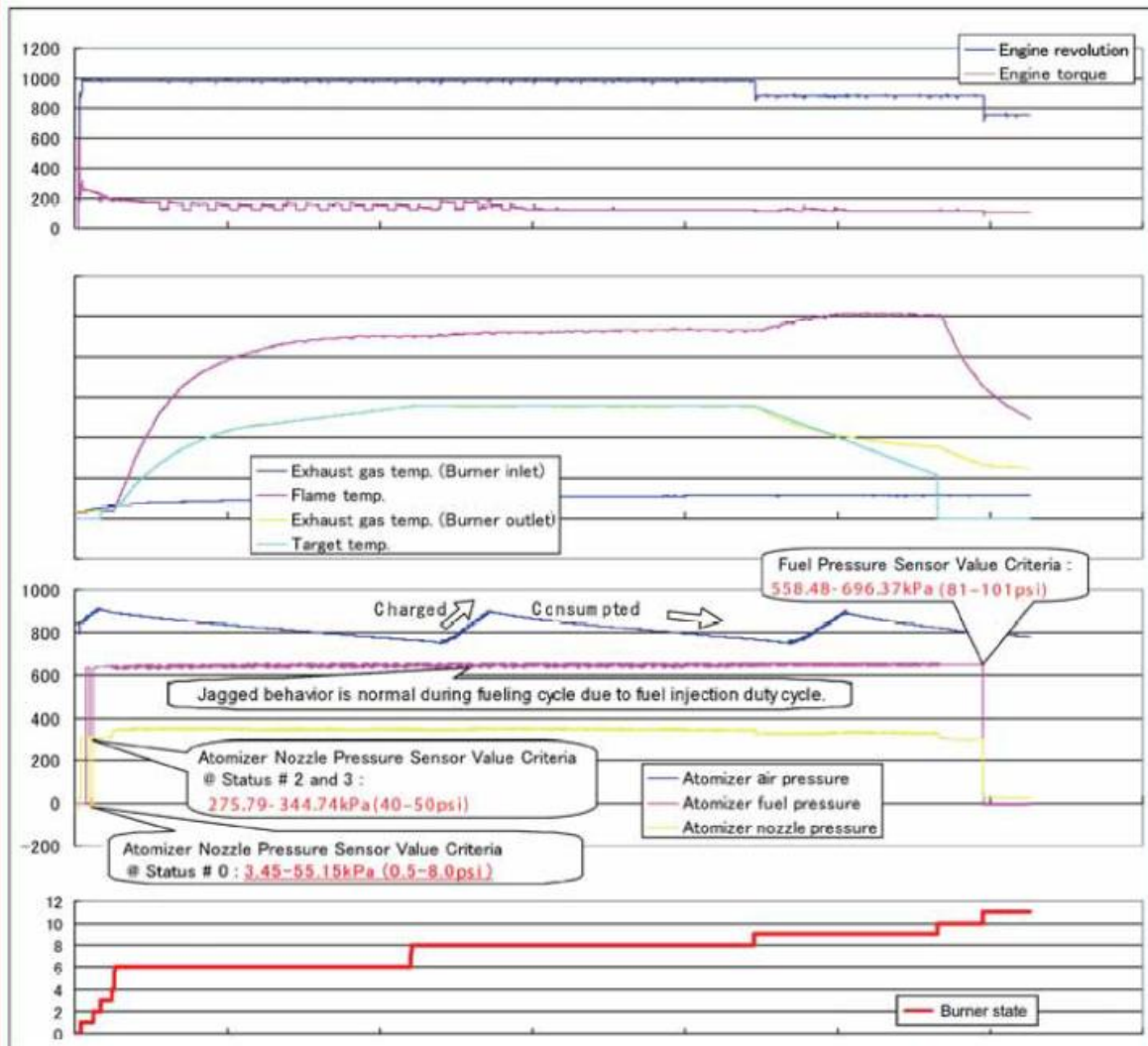
A Toyota Group Company

# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

<SAMPLE: Manual Regeneration Operation Sequence and Normal Behavior>  
During MANUAL REGENERATION, engine speed becomes 980 r/min.



SAPH16F030500105

### Manual regeneration cancellation conditions

- (1) DPR regeneration done
- (2) Accelerated
- (3) PTO enabled
- (4) Geared in except "P" or "N" range
- (5) DPR regeneration button pushed twice
- (6) Relative failure detected(e.g. Over temperature of DPR inlet/outlet, Excessive soot - DTC P244B detected)
- (7) Vehicle speed detected
- (8) Starter switch LOCK / Engine stall

CHANGE



A Toyota Group Company



# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### [Reference 3: Burner System Operation Status]

Status #	Description	Purpose	Duration	
			SCR Warm Up Mode	DPR Regeneration Mode
0	Accumulating Soot	Waiting ECU Command	Periodic igniter cleaning performed for 5 min every 1 hour for burning soot on the igniter surface up.	
		To dry igniter tips after misfire, lost flame event	30 min.	10 min.
1	Checking Outputs	Electrical Parts Function Check	8 sec. (ON: 4 sec, OFF: 4 sec.)	
2	Cleaning Igniters	Burnt up soot on igniters by spark	NORMAL: 3 sec. After misfire, lost flame event in previous fueling cycle: 5 min.	NORMAL: 5 sec. After misfire, lost flame event in previous fueling cycle: 5 min.
4	Detecting Flame	Ignition	Maximum 10 sec. (If no flame detected within this 10 sec, misfire)	
3	Preparing Regeneration	Build up fuel pressure (by fuel pump)	7 sec	
6	Ramping Up	Ramping up exhaust gas temperature	Depend on initial DPR inlet temperature (Ramping Up Speed: 3.75 °C {38.75 °F}/sec.)	Depend on initial DPR inlet temperature (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 exhaust gas temperature	Depend on condition	
9	Cooling Down	Burnt up soot on igniters and on combustor internal surface by small flame	30 sec	180 sec
10	Shutting Down	Fuel purge and cool down	30 sec	
11	Extended Shut Down	Extended igniter cleaning after exhaust brake event	5 min 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)		

CHANGE



A Toyota Group Company

# SERVICE MANUAL INFORMATION

Group:	SERVICE MANUAL UPDATE
Bulletin No:	SB-15-032
Issue Date:	10-21-2015

## BURNER CONTROL SYSTEM (BCU)

### [Reference 4: Nozzle Cleaning Method]

1. Clean the outside of the nozzle with brake cleaner.



P2030-noz001

2. Clean the inside of the nozzle with brake cleaner.



P2030-noz002

### ⚠ CAUTION

Do not wipe the outside of the nozzle; otherwise, the nozzle may become clogged.



P2030-noz003

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