



## Product Improvement Campaign

No: C1006210

Issued: 4/16/2013

Re: V68.1 EEC Reprogramming

Group: 13 Models: FE/FG

Expires: 4/16/2014

### SUBJECT:

Product Improvement Campaign C1006210 – V68.1 EEC Reprogramming

### MODELS:

FEC52, FEC72, FEC92, FGB72

### VEHICLES INVOLVED:

Certain 2012, 2013 and 2014 model year FEC52, FEC72, FEC92 and FGB72 trucks produced from April 8, 2011 through March 31, 2013.

### OWNER NOTIFICATION:

Owners of affected vehicles will be notified by mail.

### MODIFICATION:

The engine EEC will be reprogrammed on all affected vehicles. If any EEC-related DTC's are present, the vehicle must be diagnosed prior to EEC reprogramming, and any components found to be defective must be replaced.

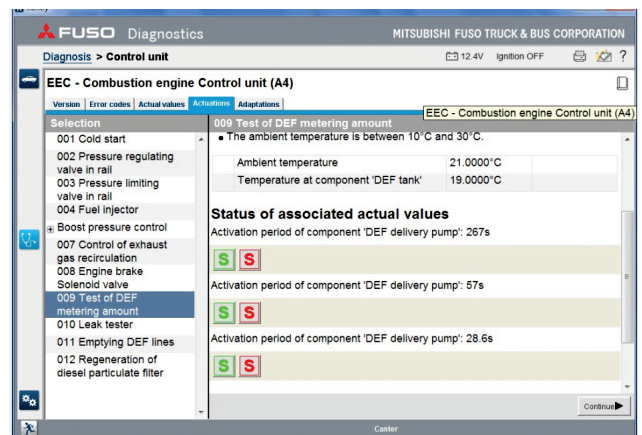
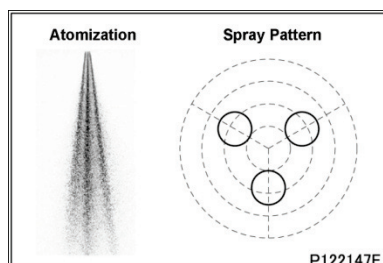
### REPAIR PROCEDURE:

1. Park the vehicle on a flat, level surface, turn off the engine, apply the parking brake and chock the wheels.  
**CAUTION! Do not remove the wheel chocks until all modification work has been completed.**
2. Turn the key to the off position and wait at least one minute. Then, fill the DEF tank.  
**The DEF tank level must be full prior to performing any reprogramming!**
3. Confirm that the vehicle's battery(s) and the Fuso Diagnostics (FD) laptop are properly charged. Connect the laptop's charging cord before reprogramming. Do not rely on internal battery voltage. Insufficient truck or laptop voltage could cause errors during reprogramming. **NOTE: IT IS NOT RECOMMENDED TO HAVE A BATTERY CHARGER ON THE VEHICLE WHILE REPROGRAMMING THE ECU. CHARGE THE BATTERY(S) COMPLETELY, AND THEN DISCONNECT THE CHARGER BEFORE STARTING THE REPROGRAMMING PROCEDURE.**
4. Connect Fuso Diagnostics (Version FDS-R12-2.2) and check for DTC's. If **no** DTC's are present, proceed to step 5. If DTC's **are** present, skip step 5 and proceed to step 6.
5. Perform Modification Procedure 1 – V68.1 EEC Upgrade and reprogram the engine EEC, then submit for reimbursement following **CAMPAIGN CLAIM SUBMITTAL** on page 3. Skip steps 6 and 7.
6. If DTC's are present **DO NOT IMMEDIATELY REPROGRAM THE EEC!** First, examine the condition of the DEF dosing modulator, and then perform Modification Procedure 2 – V68.1 EEC Upgrade.

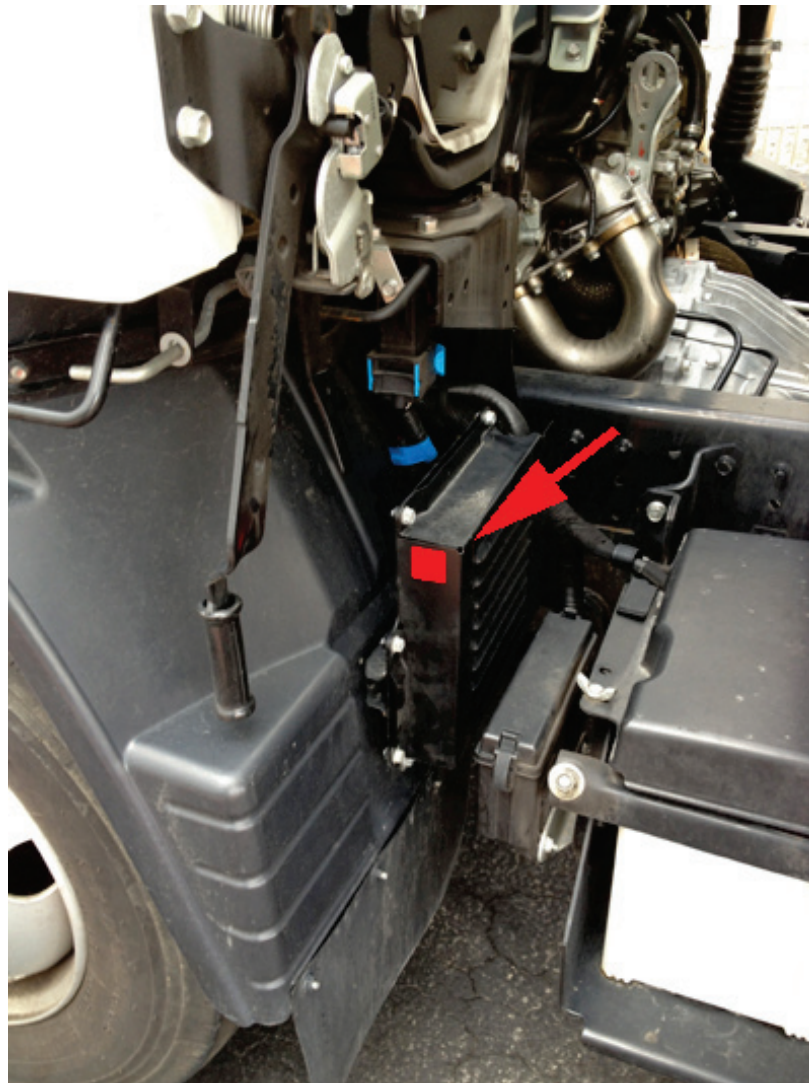
Examine dosing condition as follows:

- Go to the Selection under the "Actuations" tab.

- Perform the 28.6 second test in the "009 Test of DEF metering amount" and examine the dosing condition if needed.



7. Diagnose the DTC's and replace any defective components, then reprogram the engine EEC following Modification Procedure 1. Submit for EEC reprogramming using **CAMPAIGN CLAIM SUBMITTAL** and diagnosis and repair using **WARRANTY CLAIM SUBMITTAL FOR DIAGNOSIS AND DEFECTIVE COMPONENT REPLACEMENT** on page 3.
8. Affix a red sticker to the EEC cover as shown below to indicate completion of reprogramming. Additional red stickers can be procured through MFTA Customer Service at 877-711-0707.



**POTENTIAL REPLACEMENT PARTS:**

<b>Potential Replacement Parts</b>			
<b>Part #</b>	<b>Part Name</b>	<b>Qty.</b>	<b>Remarks</b>
ME556058	Urea Modulator Gasket	1	Replace if urea modulator is removed for diagnosis.
ML239040	Exhaust NOx Sensor	1	Replace only if determined to be defective.
ME422856	Air Flow Sensor	1	Replace only if determined to be defective.
QC000523	Intake Temperature Sensor	1	Replace only if determined to be defective.
ME556056	Urea Modulator	1	Replace only if determined to be defective.
ME557325	Exhaust Temperature Sensor 1	1	Replace only if determined to be defective.
ME557326	Exhaust Temperature Sensor 2	1	Replace only if determined to be defective.
ME422097	Intake Humidity Sensor	1	Replace only if determined to be defective.

**CAMPAIGN CLAIM SUBMITTAL:**

Claim labor for EEC reprogramming via Fusonet using the Recall Claim Entry screen. Enter all requested information, including the Campaign Number. The system will apply the labor allowance shown.

Campaign Reimbursement					
Campaign Number	Models	Allowances		Labor Description	Part Number
C1006210	FEC52	Labor Time	1.6 hours	Fill DEF tank with up to 1 ½ gallons of fluid and reprogram EEC	DEF003
	FEC72 FEC92 FGB72	Parts Pricing	US\$8.34		

**PARTS PRICING ADJUSTMENT TABLE:**

Part #	Part Name	Qty	Dealer Net	33% Mark Up	Recall Reimbursement
DEF003	Diesel Exhaust Fluid	1.5	US\$4.18/gal	US\$5.56/gal	US\$8.34

**WARRANTY CLAIM SUBMITTAL FOR DIAGNOSIS AND DEFECTIVE COMPONENT REPLACEMENT:**

Submit a special **Warranty Service Claim S** (WSC S) via Fusonet for the diagnosis and defective component replacement. Enter all requested header information, including the information listed below. **IMPORTANT! Any labor operation from the table below submitted on the WSC S must be accompanied by its associated replacement part.**

Warranty Service Claim Header Entry	
Claim Type	S
Failed Labor Operation Number	C1006210
A Code	8B
B Code	XC
Failed Part Number	NPN

Warranty Service Claim Labor and Parts Entry and Failure Work Description for FE Models (Labor Operation / Work Code / Quantity / Labor Time)		
Labor	Troubleshooting DTC's	C10062 / 1Y / 1 / 3.9 hours
Part	ME556058	
Labor	R/R NOx Sensor	C10062 / 2Y / 1 / 0.4 hour
Part	ML239040	
Labor	R/R Air Flow & Intake Temp Sensor	C10062 / 3Y / 1 / 0.2 hour
Part	ME422856	
Labor	R/R Boost Pressure & Temp Sensor	C10062 / 4Y / 1 / 0.5 hour
Part	QC000523	
Labor	R/R DEF Dosing Modulator	C10062 / 5Y / 1 / 0.2 hour
Part	ME556056	
Labor	R/R DPF Exh Gas Temp Sensor 1&2	C10062 / 6Y / 1 or 2 / 0.3 or 0.6 hour
Part	ME557325 or ME557326	
Labor	R/R Humidity & Intake Air Temp Sensor	C10062 / 7Y / 1 / 0.2 hour
Part	ME422097	

Warranty Comments
Include all DTC's retrieved from the EEC, and the results of the diagnostic steps taken to repair the vehicle.

## Modification Procedure 1 – Upgrading EEC Software to V68.1

**IMPORTANT:** All technical issues must be remedied before performing the reprogramming procedure below, and the DEF tank level must be full prior to performing any reprogramming.

**1. Check the “FUSO object number for software” using FD, under the “Version” tab of the EEC.**

If the object number is 0154484440001 [Characteristics Map Coordinates (DIESEL FUEL METERING) – 0164480940001 <FE>, 0164481040001 <FG>], the EEC has already been updated to Version V68.1 P17. If the EEC has not been updated to V68.1, continue to Step 2.

**2. Fix all technical issues (DTC’s, component failures, etc.) before upgrading the EEC to software version V68.1.**

There must be NO active or pending DTC’s present in the EEC when starting the upgrade reprogramming procedure. If technical issues exist, perform Modification Procedure 2. Note: DTC 552558-31 indicates a NOx-related failure.

**3. Perform the ECU after-run process.**

Turn the ignition switch from the ON to OFF position, then remove the key for one minute to complete the after-run process.

**4. Check Air Flow Sensor (AFS) calibration value using FD.**

Record the AFS learning values (#152 & #153) for later comparison.

**5. Go to MFTBC’s Field Rewrite Network (FRN) website at <https://eol.mitsubishi-fuso.com/fss/>.**

Download the EEC file to a USB storage device. Record the inquiry number and password for an EEC control module.

**6. Insert the USB mass storage device into the laptop.**

Open the *Adaptations* tab, open the *Data transfer* tab, and click On *Copying from USB storage device*.

**7. Upgrade Engine software to V68.1 using FD.**

FUSO Diagnostics	
Diagnosis > Control unit	
EEC - Combustion engine Control unit (A4)	
Version	
EEC - Combustion engine Control unit (A4)	
MB object number for hardware	K56 446 77 31 001
MB object number for software	0
MB object number for hardware and software	---
Diagnosis identifier	000207
Diagnosis identifier	---
Hardware version	10/22 00
Software version	10/23 00
Software version	11/27 00
Software version	11/49 01
Boot software version	10/23 00
Hardware supplier	Bosch
Supplier	---
Software supplier	Bosch
Software supplier	Bosch
Software supplier	Bosch
Control unit variant	App_0207
FUSO object number for hardware	MK667731
<b>FUSO object number for software</b>	<b>011448740001</b>
Characteristics map coordinates ( DIESEL FUEL METERING )	014448340001
Part number of software 'Boot software version ( MFTBC )'	011448740001
Original vehicle identification number	JL6BNC1A3C...4104
Current VIN	FBA3050002XXXX
SCN (software calibration number) (CAL ID)	F1CE3481V'D
CVN (calibration verification number) (CVN)	FF C2 64 1E

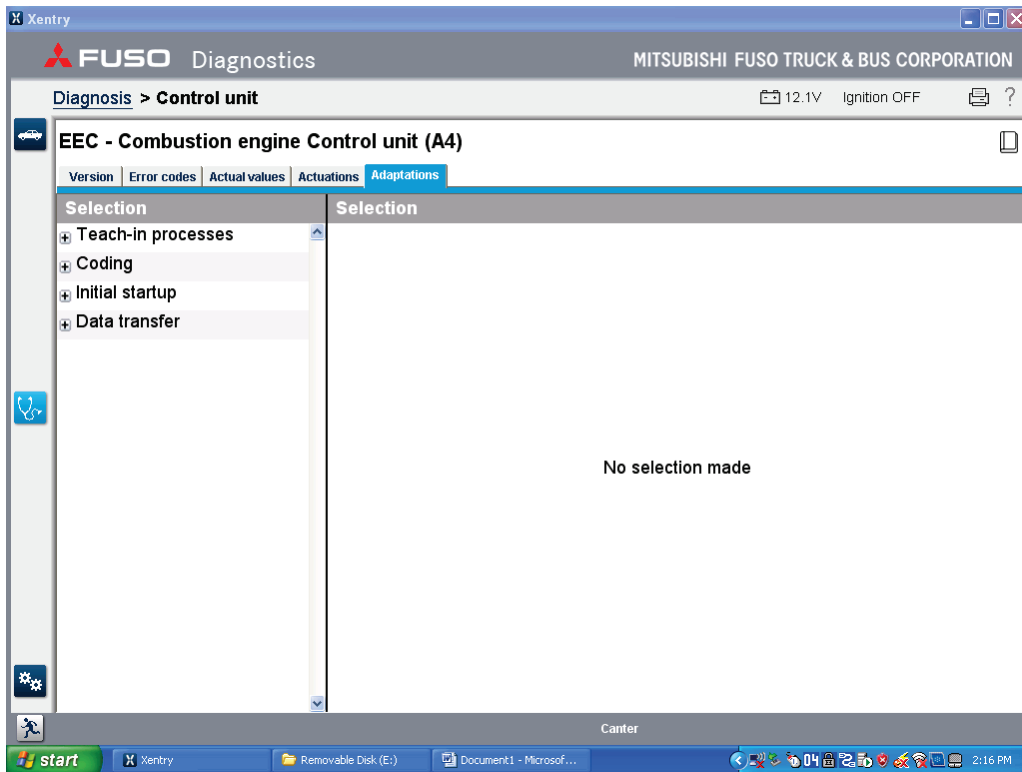
(1). Software object number and version  
The software part number can be checked under the “Version” tab in the EEC on Fuso Diagnostics

(2).Perform EEC Reprogramming to upgrade to V68.1.

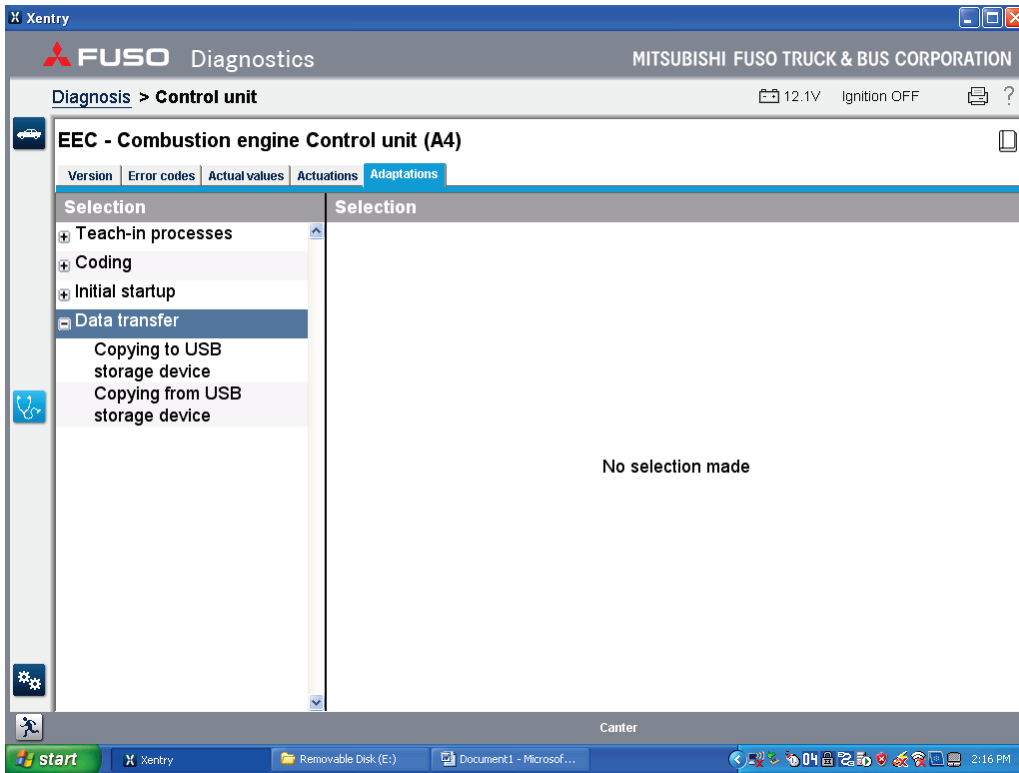
Go to MFTBC's Field Rewrite Network website at <https://eol.mitsubishi-fuso.com/fss/> and obtain an inquiry number and password for an EEC control module.

a) "Transfer data from USB storage device"

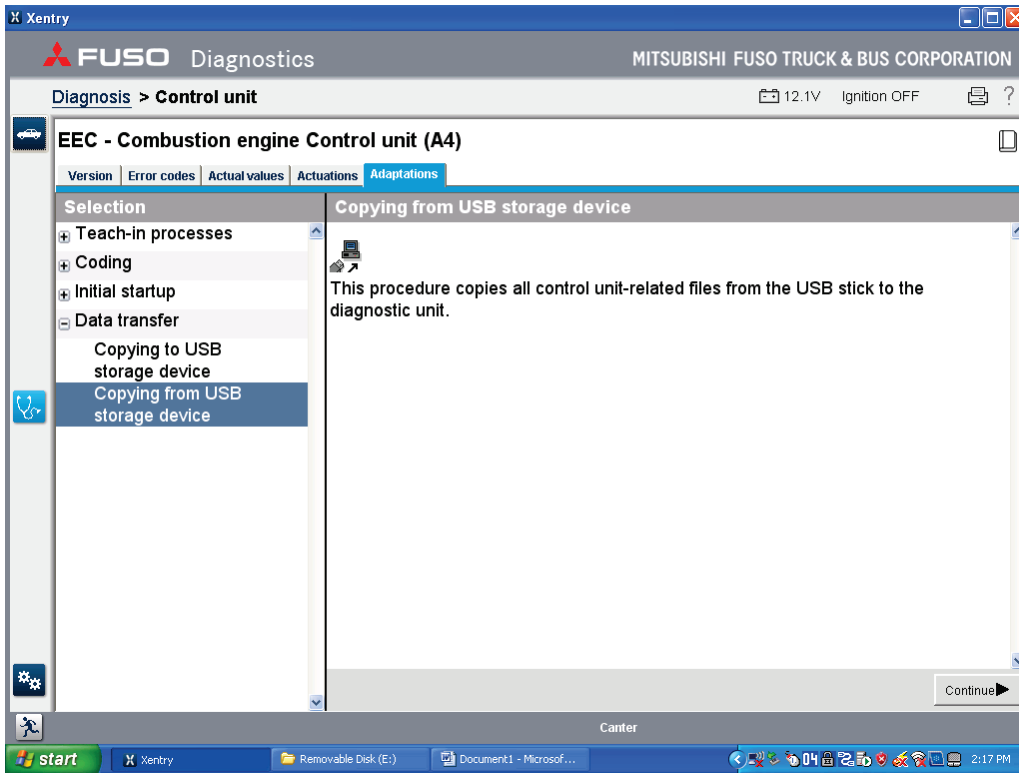
Open "Adaptations" tab – insert the USB flash drive containing the EEC control module data into a USB port on the FUSO Diagnostics laptop.



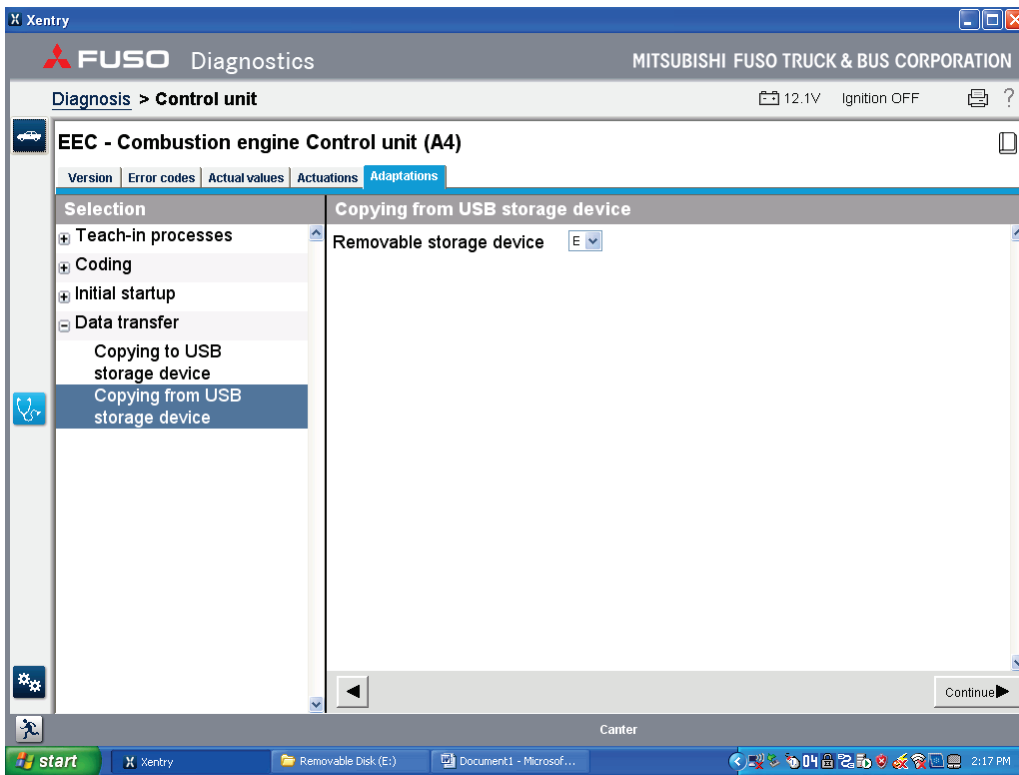
b) Open the “Data Transfer” Selection.



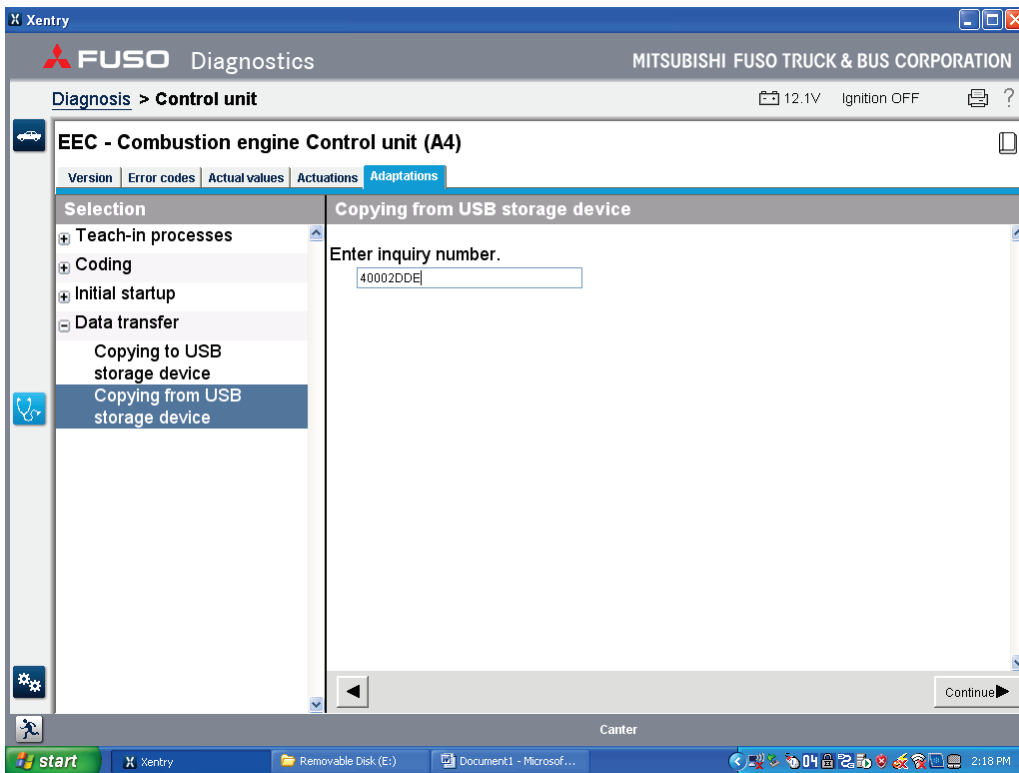
c) Click “Copying files from USB storage device” – Click “Continue”.



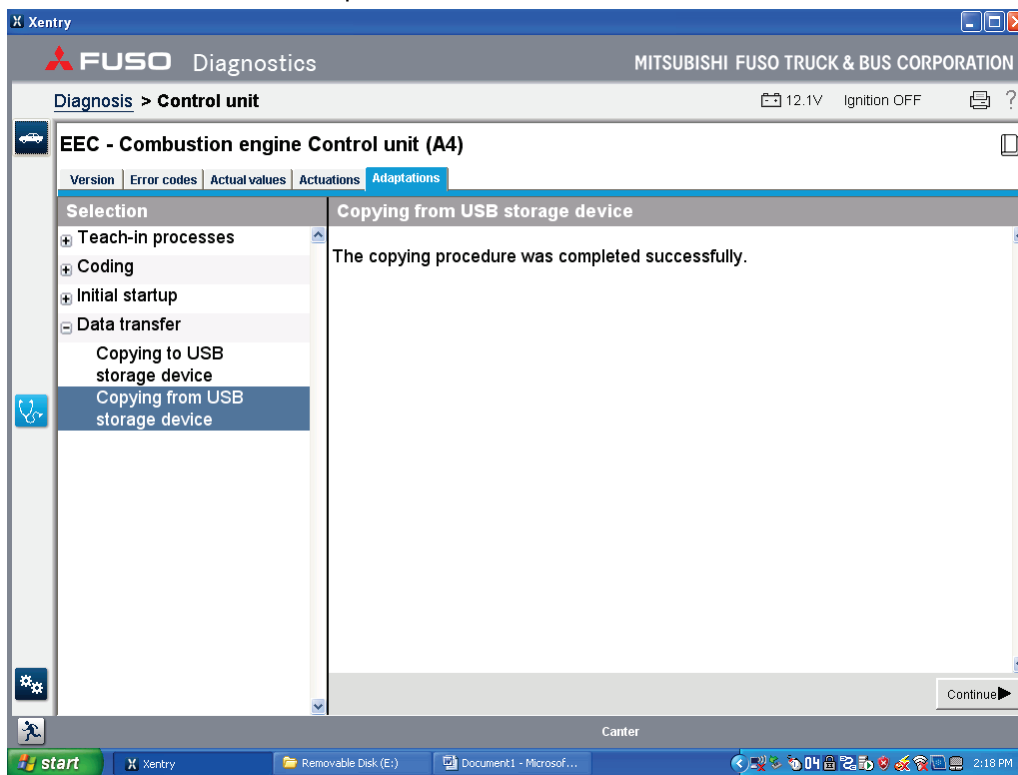
d) Verify the USB drive location, and then click “Continue”.



e) Enter the Inquiry #, and then click “Continue”.

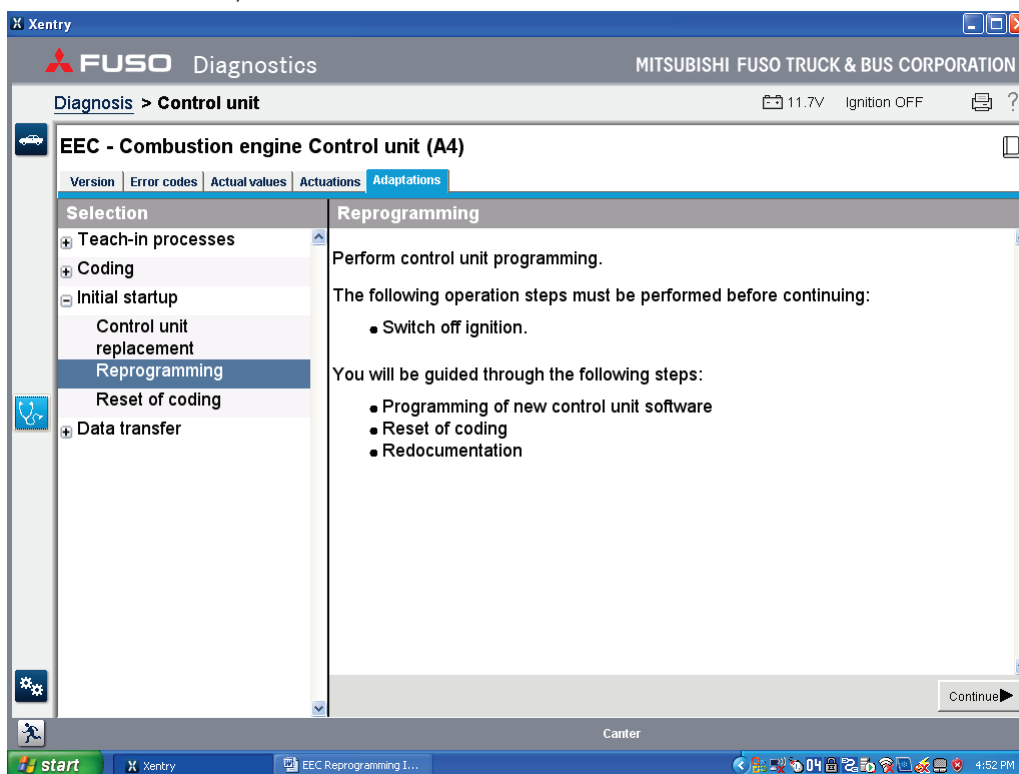


f) The transfer of files has completed.



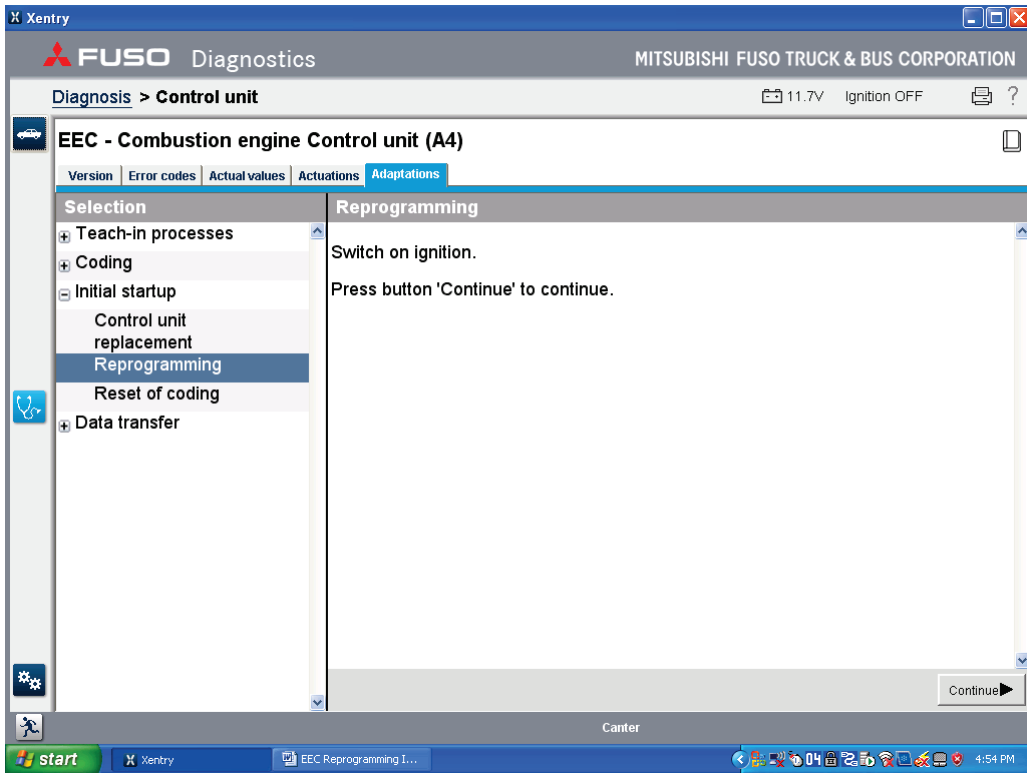
g) Start the Reprogramming Sequence

- Click the “Adaptations” Tab.
- Open the “Initial Startup” drop down list.
- Click the “Reprogramming” icon – Follow the instructions on the screen – Turn the Ignition Switch off for a least 1 minute, then click “Continue”.

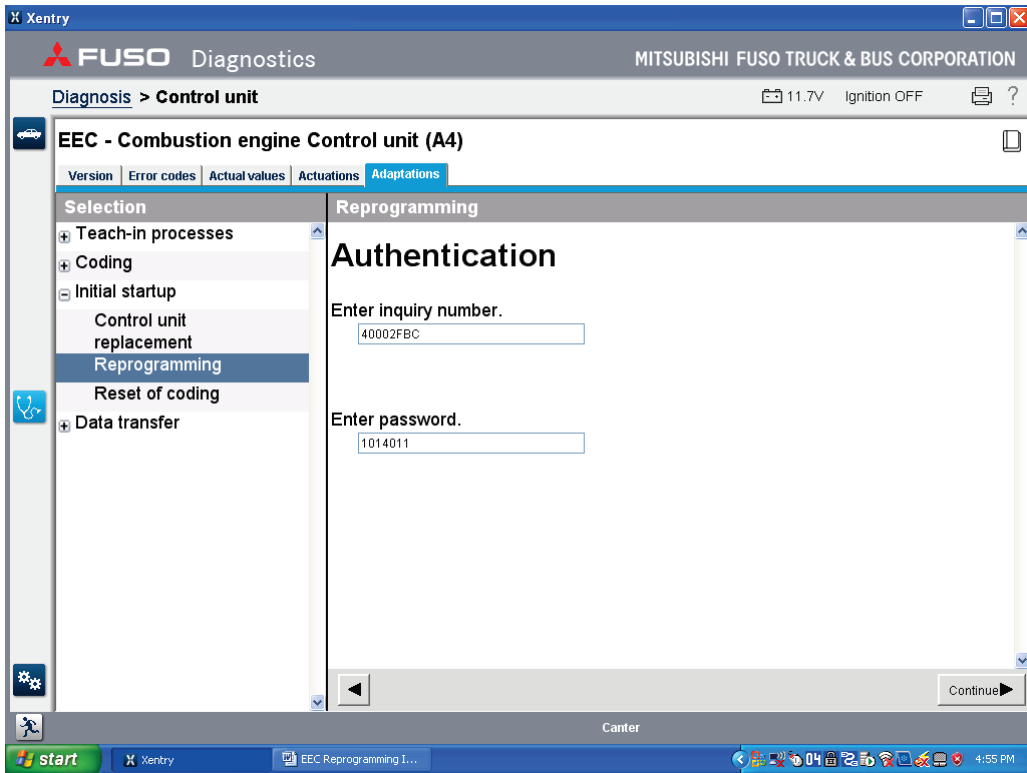




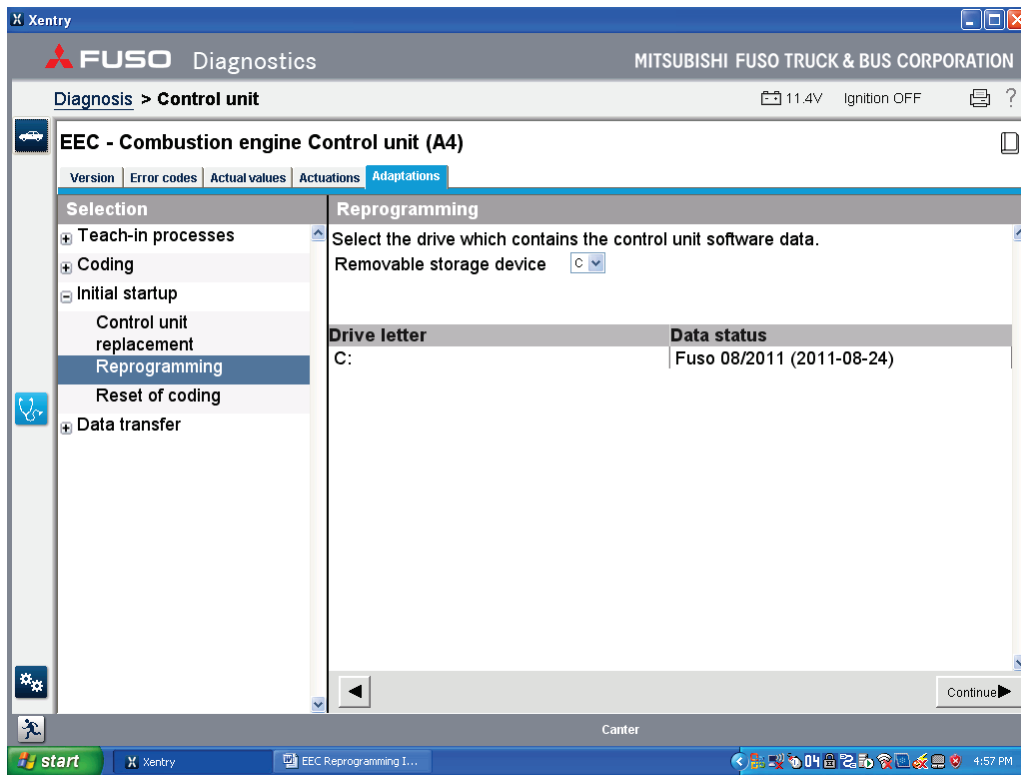
h) Turn the ignition switch to the "ON" position, then click "Continue".



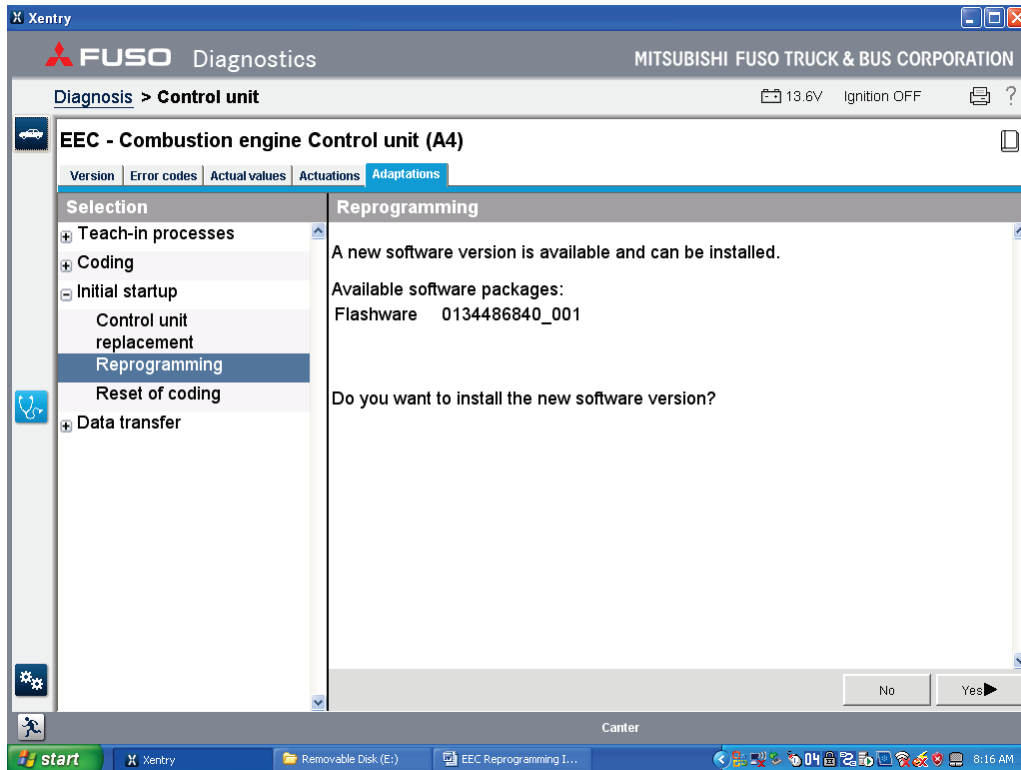
i) Enter the Inquiry # and Password, then click "Continue".



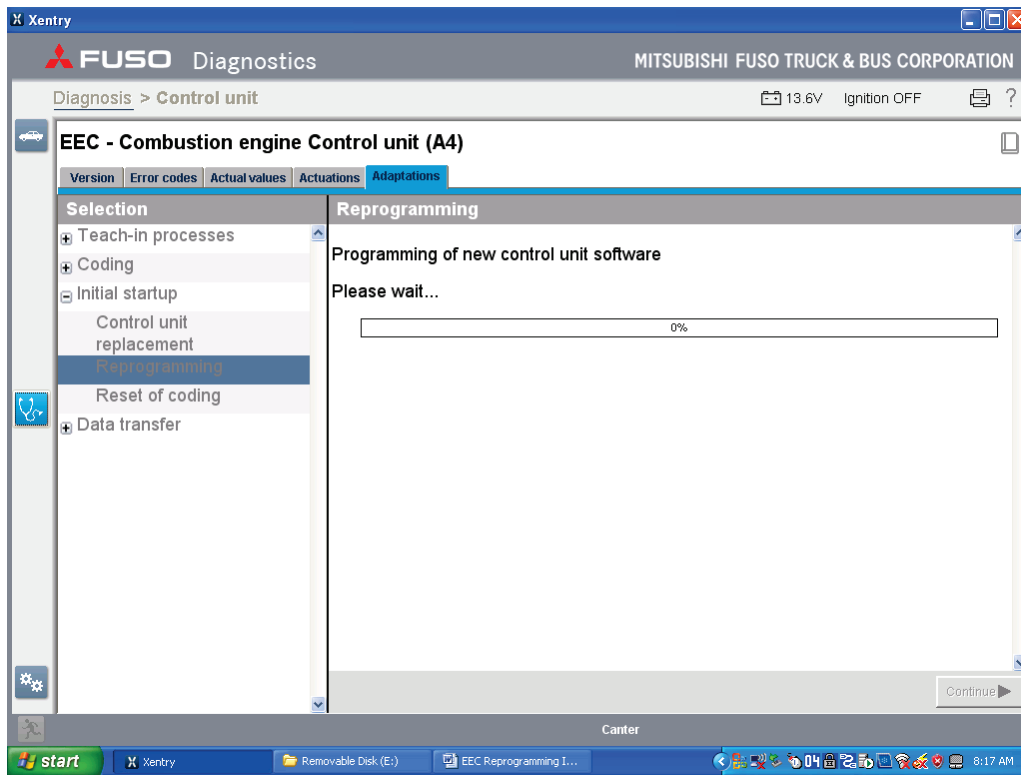
j) Verify the drive location, then click "Continue".



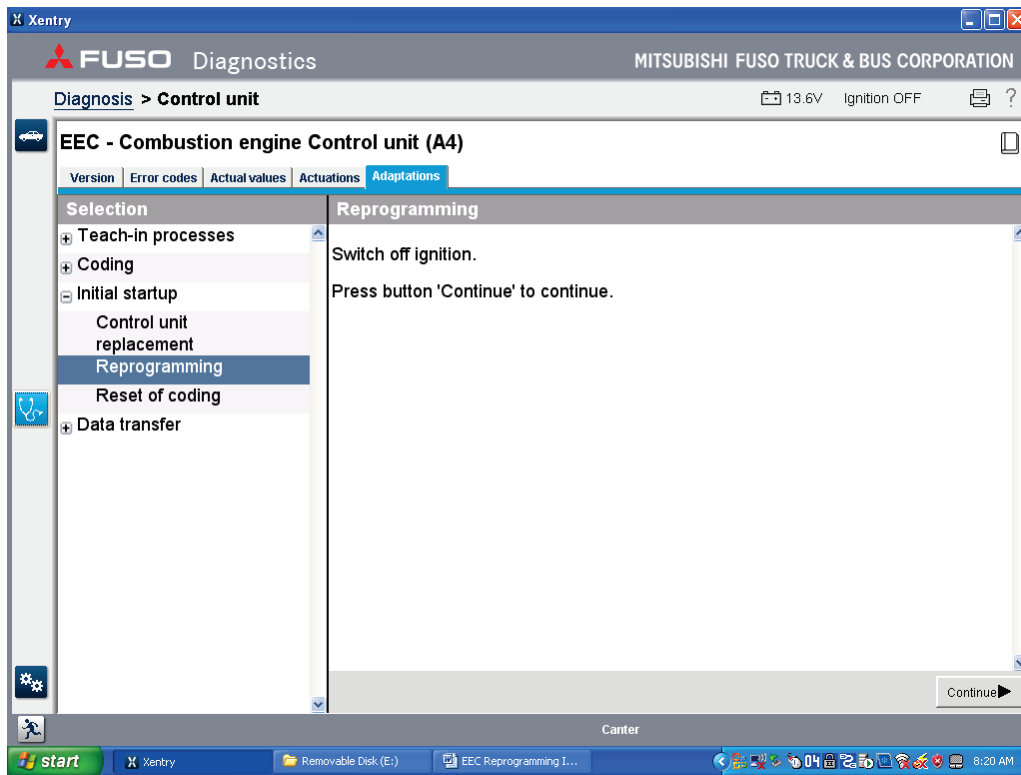
k) Click "Yes".



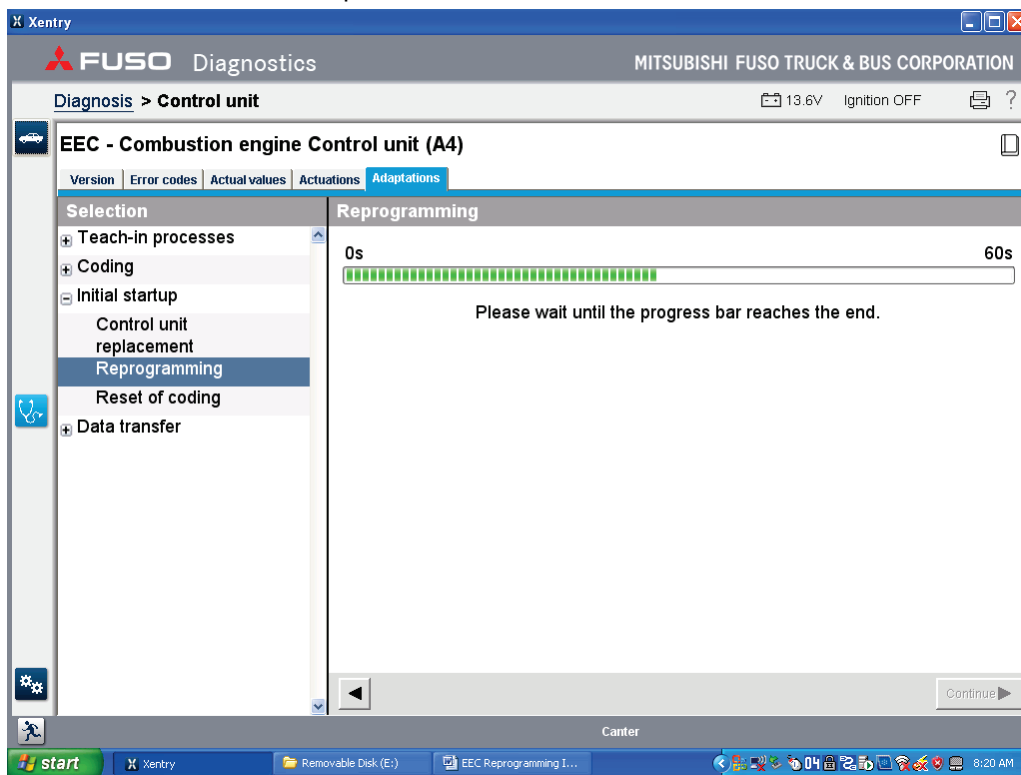
l) After programming begins, wait for the status bar to reach 100%.



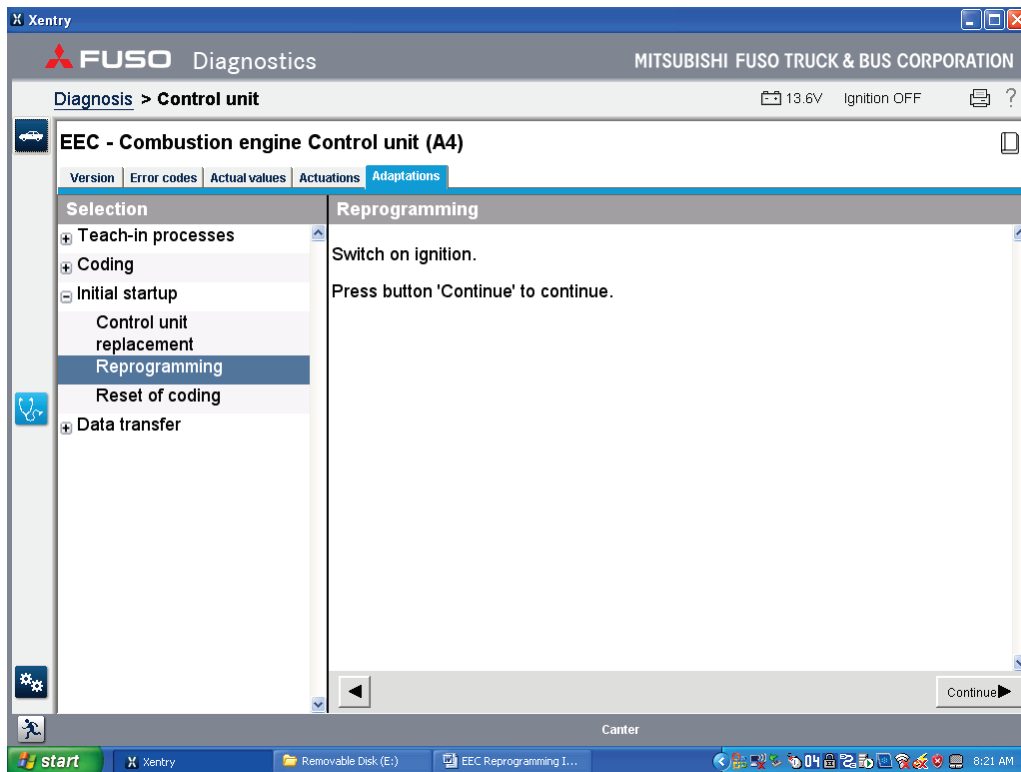
m) Turn ignition key to the "OFF" position, then click "Continue".



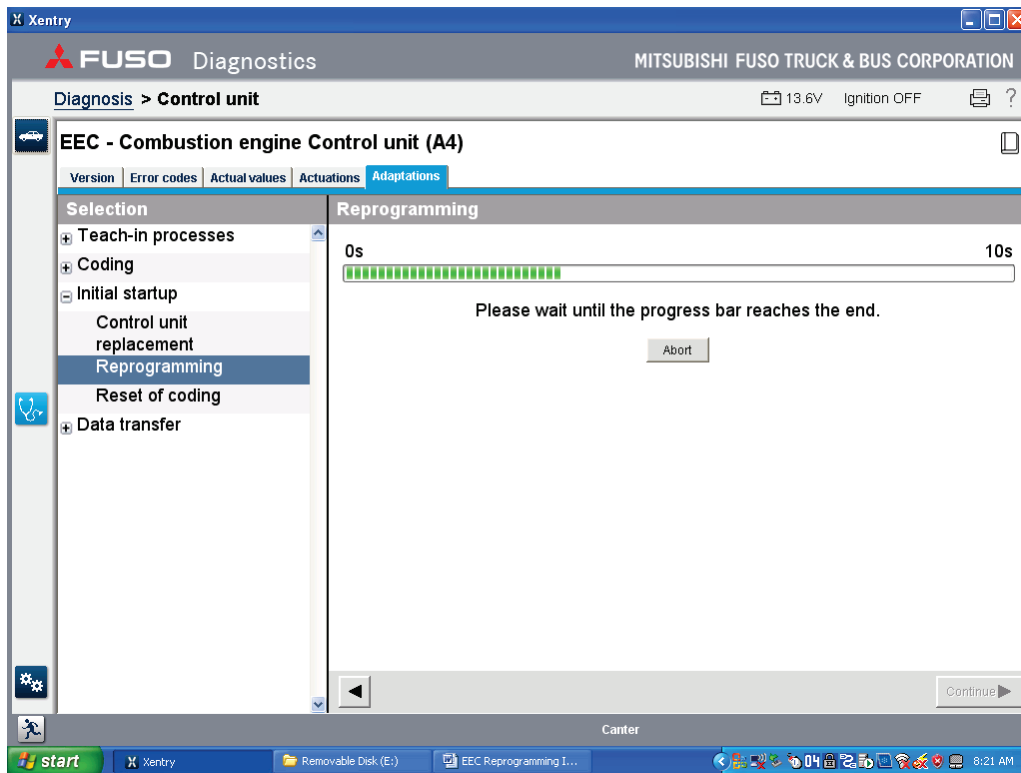
n) Wait for the status bar to complete the 60 second count.



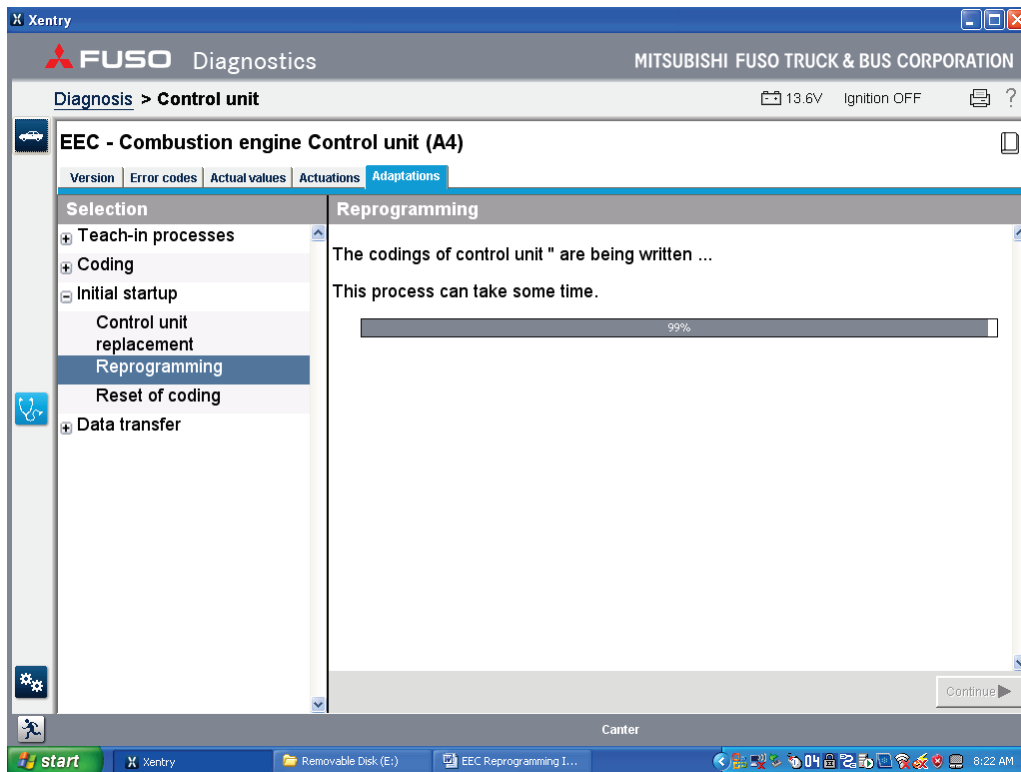
o) Turn the ignition key "ON", then click "Continue".



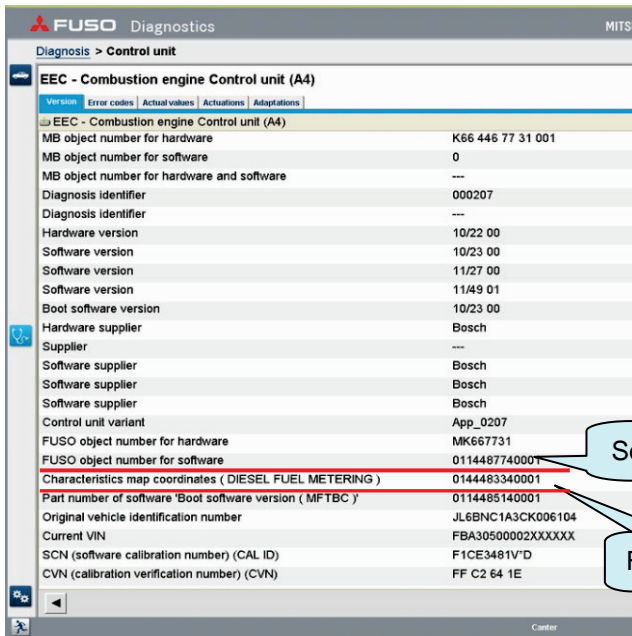
p) Wait for the status bar to complete the 10 second count.



q) Then, wait for system to finish the data download.

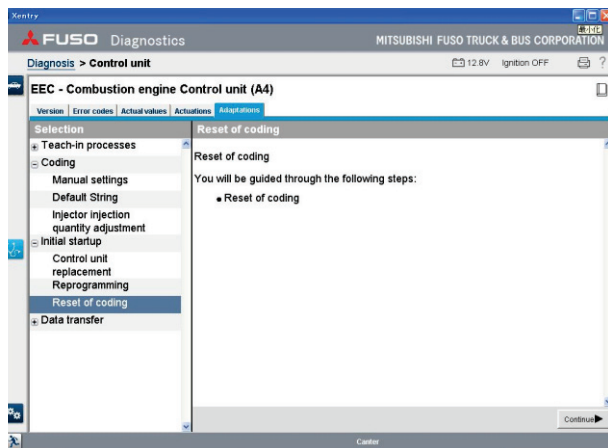


- r) Wait for the program to finish the sequence and display the “Order log”. The programming has completed. Note: Click “Continue” before proceeding to the next operation.



- (3). Check software object number and version  
Software part number can be checked under the “Version” tab in the EEC

Software version	V68.1
Software(FE/FG)	0154484440001
Diesel Fuel Metering – FE	0164480940001
Diesel Fuel Metering – FG	0164481040001

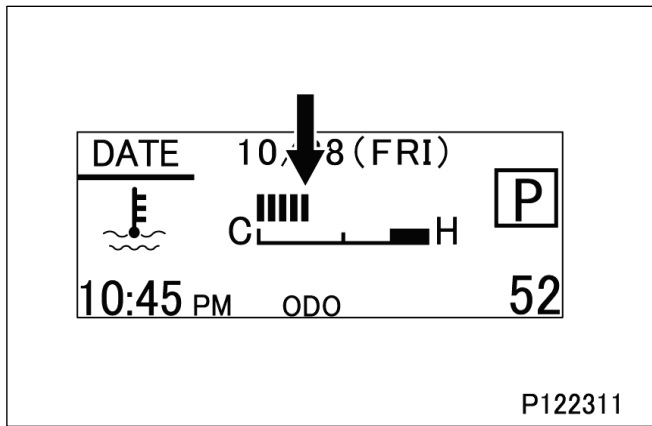
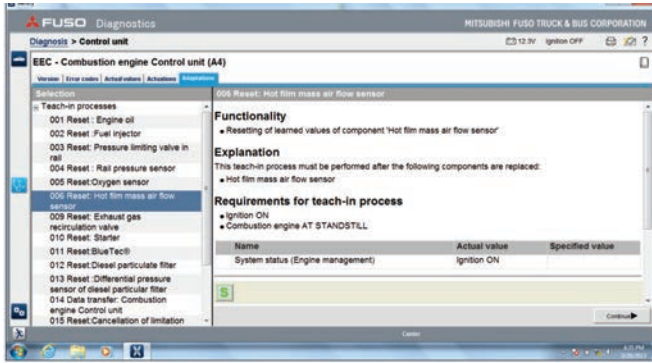


- (4). Perform Reset of coding  
Choose “Reset of coding”.

- (5). Perform the ECU after-run process.  
Turn the ignition switch from the ON to OFF position, then remove the key for one minute to complete the after-run process.

Reprogramming functions complete –  
Continue with “Reset and learning” functions below.





(8) Conduct air flow sensor learning using fast learning function

- Perform “006 Reset Hot film mass air flow sensor”.
- On vehicles that will allow fast learning, perform the fast learning procedure as follows.

- Turn off the air conditioning switch.
- Run the engine until the engine cooling water temperature rises above 60C {140F}. (more than 5 bars on the meter cluster)
- Intake temperature must be between -20C to 40C {-4F to 104F}. If the temperature is below -20C {-4F}, move the vehicle to a location that will allow a warmer intake temperature.
- Wait for approximately 2 minutes with the engine idling.
- For best auditory results, perform the test while sitting in the cab with the doors and windows closed.
- Hold the engine speed at wide open throttle (WOT) for about 15 seconds until the buzzer sounds (If the buzzer does not sound – hold the accelerator pedal down again at WOT for 15 seconds).
- Turn off the engine and wait at least for 60 seconds to allow the after-run to finish completely and turn the ignition on again.

**Note:** Refer to the MF00002 Addendum for a detailed procedure.

• After fast learning has finished, compare the air flow sensor learning values (#152, #153) recorded in step 5 on page 1 to the default values.

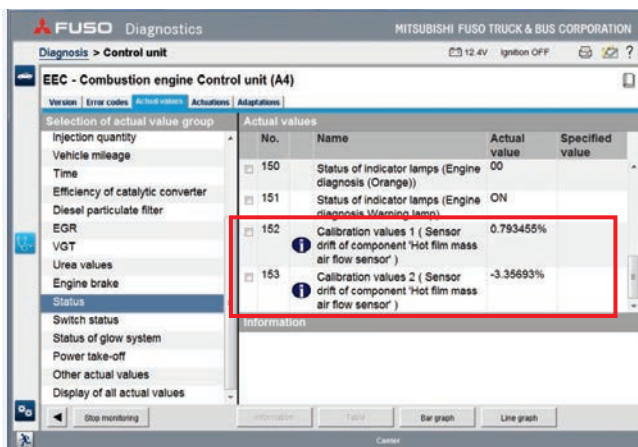
Note 1: The value should not exceed the previously recorded value by +/- 5.0000%

Example:	
Original Value:	+ 1.0000%
New Value Range:	-4.0000% to +6.0000%

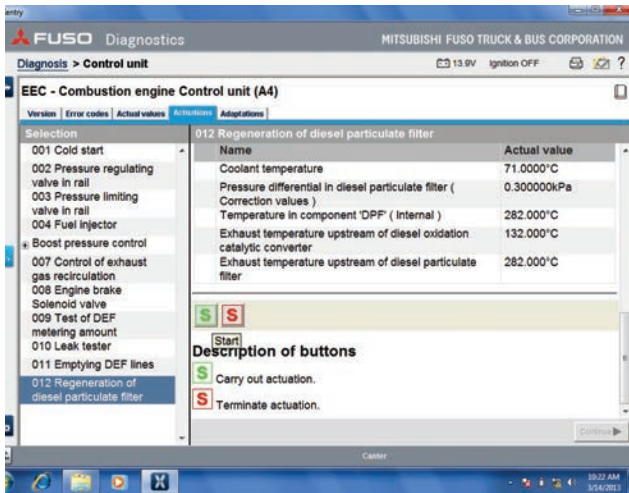
Note 2: The AFS values should be not greater than 6.0000% (it should no longer be 0.0000%).

If the values are higher than this, perform fast learning again.

If the values remain outside of the acceptable range, perform Modification Procedure 2.



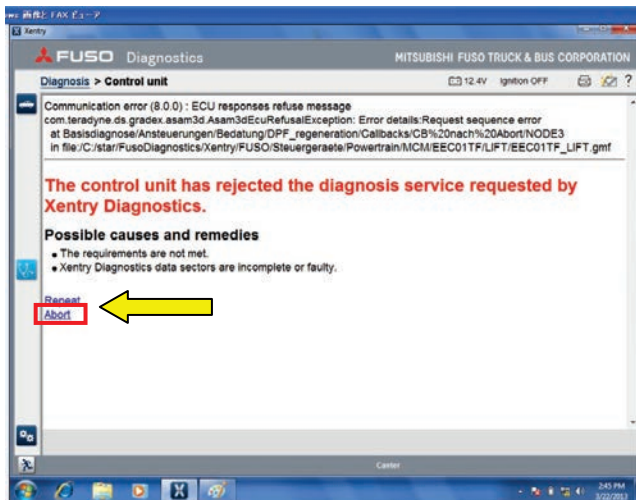




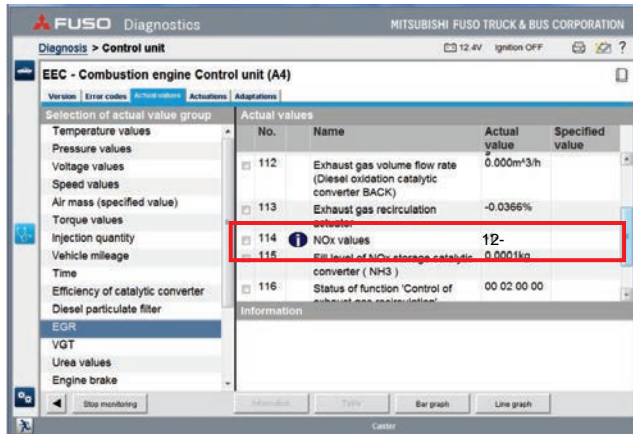
- (9) Perform manual DPF regeneration using FD.  
 • Perform “012 Regeneration of diesel particulate filter”

**NOTE 1:** Coolant temperature must rise to at least 60C {140F} before performing the manual DPF regeneration.

**NOTE 2:** If DTC 520570-31 appears in the EEC and the SCR lamp is illuminating, perform the “Procedure to clear DTC 520570-31” on page 19 after completing all Engine EEC software reprogramming procedures.



**NOTE :**  
 If this error screen appears, select “Abort”.



(10) Check NOx value

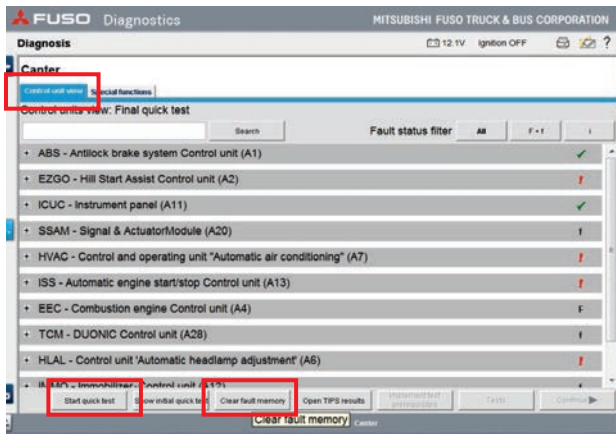
- Check NOx value (#114) within 2 min.

Nox value	Less than 200- (And other than “-0-“ or “-1-“)
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- If this value is not within the acceptable range, proceed to Modification Procedure 2.

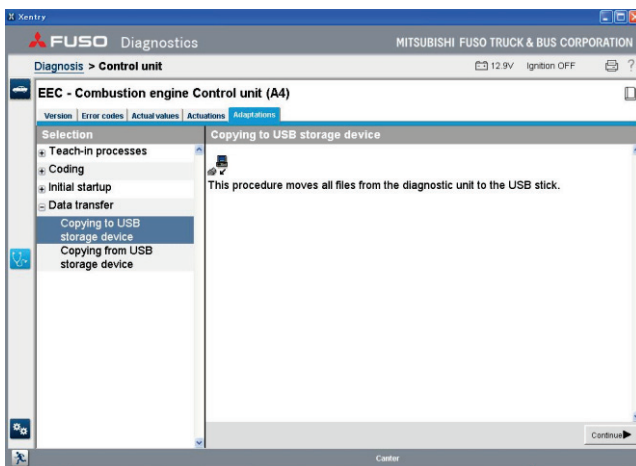
(11) Turn the ignition off and wait 60 seconds. Turn ignition on again and check for DTC's in the EEC using FD. Ignore the following codes:

520240-0 / 520584-31 / 520586-31



(12) Erase failure memory in all ECUs in the vehicle.

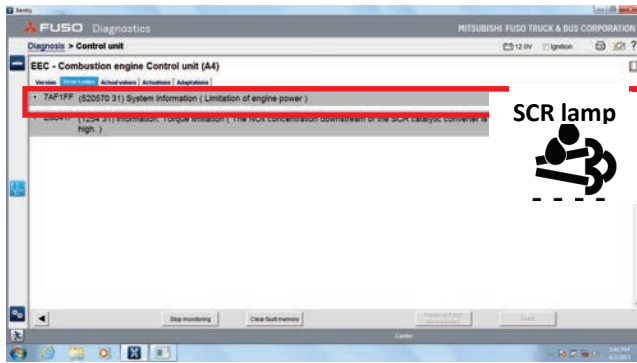
- Navigate to the “Diagnosis” screen.
  - In the “Control unit view”, choose “Start quick test”
  - After the quick tests finishes, choose “Clear fault memory”
  - Choose “Start quick test” again to ensure all codes have cleared.



(13). Collect EEC data to be uploaded to the FRN website. Perform “Copying to USB storage device”.

(14). Upload EEC data to the FRN website.

## Procedure to clear DTC 520570-31



If after finishing all software update procedures, DTC 520570-31 appears in the EEC and the SCR lamp is illuminating, Please perform the procedure below.

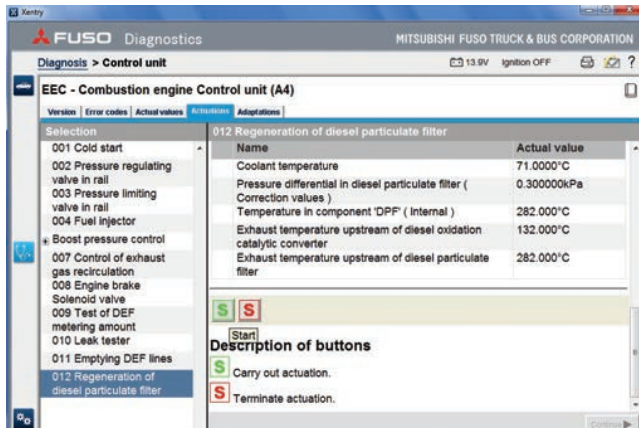
- (1) Erase failure memory in all ECUs in the vehicle.
  - Navigate to the “Diagnosis” screen.
  - In the “Control unit view”, choose “Start quick test”
  - After the quick tests finishes, choose “Clear fault memory”
  - Choose “Start quick test” again to ensure all codes have cleared.

- (2) Confirm DTC 520570-31 still appears.  
NOTE : the codes below also may appear with 520570-31: 1254-31 / 6DF1FF

- (3) Perform a manual DPF regeneration using FD.
  - Perform “012 Regeneration of diesel particulate filter”.

NOTE : Coolant temperature must rise to at least 60C {140F}

- After, approximately 15 minutes, the error will resolve (Allow DPF regeneration to finish automatically.)

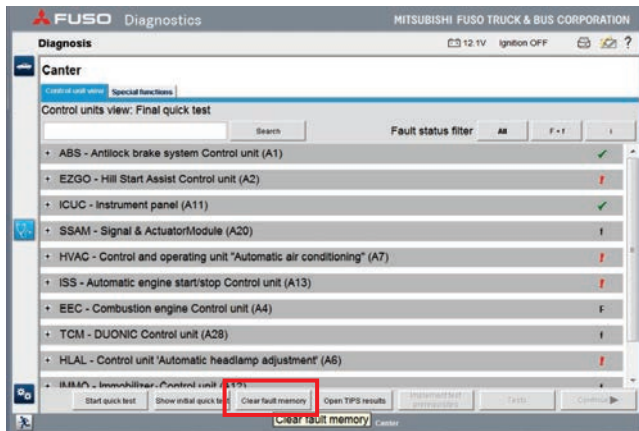


- (4) After DPF regeneration, turn off the ignition and wait 60 seconds

- Turn the ignition on again and confirm that there are no DTC's present in then EEC using FD.

**Note: Ignore the following codes:**  
**520240-0 / 520584-31 / 520586-31**

- (5) Press “Start quick test, then erase the failure memory in all ECU's.




1. Checks to be made at NOx Level1 error occurrence

- When the following diagnostic code occurs, carry out troubleshooting based on the questionnaire without deleting any diagnostic code.
- Diagnostic code 3361-18 (Indication in FUSO Diagnostics: Too high exhaust emission level output from NOx sensor (non-processed data)) or 520558-31(Indication in FUSO Diagnostics: System information (System information trouble group: SCR 6)) occurs, carry out troubleshooting with the following procedure.

Record the diagnostic code based on the questionnaire.

Diagnostic code occurs like below.

SCR lamp status	3361-18	520558-31	NOx level1 error judgment
EPA			
			
Illuminated or Blinking	Current or stored	Current	The NOx error has occurred currently.
Not Illuminated	stored	stored	The NOx error occurred in the past and the NOx error has solved currently.

Is the SCR lamp on or not?

Not illuminated

Illuminated or Blinking

IF the state is "Vehicles restrictions", do DPF manual regenerating in creep mode. (See "1.1 DPF manual regeneration methods in creep mode")

Check density of DEF.  
(See "1.2 Check density of DEF.")

Any other diagnostic code occurred at the same time?

No

Yes

There occurred any diagnostic codes which were included in "1.4 Probable cause of diagnostic code occurrence"?

No

Yes

Determine the probable cause based on the diagnostic codes having occurred simultaneously and make checks on the relevant system sections. (See "1.4 Probable cause of diagnostic code occurrence")

Make checks on major probable causes of NOx sensor error (See "1.3 Checks at relevant system sections".)

Any abnormalities discovered and remedied?

Nothing abnormal

Completed

Check procedure completed  
According to the vehicle restriction state after diagnostic code generating, you check that a warning lamp eliminate in each procedure. (See "1.5 Procedure of eliminate the warning lamp")

Contact nearest Mitsubishi-Fuso dealer.

## 1.1 DPF manual regeneration methods in creep mode

- If the vehicle is the state of torque and power limitation, run the engine at idle a few hours until creep mode is reached. In creep mode a manual regeneration can be started.
- Turn the starter switch to the OFF position, wait at least 60 seconds and complete the after-run.
- Turn the starter switch to the ON position and after a lapse of 10 seconds or longer, start the engine.
- Warm up the engine until the engine coolant temperature exceeds 60 °C {140 °F}.
- Press the Diesel Particulate Filter cleaning switch to perform the manual regeneration of Diesel Particulate Filter. In the manual regeneration, the engine speed increases to 1500 – 2500 rpm and it takes approximately 20 minutes to complete the manual regeneration.
- After that, engine revolution goes to idling and DPF manual regenerating is end.

## 1.2 Check density of DEF.

- Check the DEF density in the DEF tank.

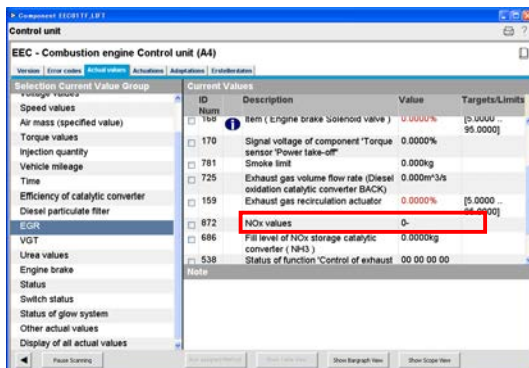
Standard value	32.5±0.8%
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- If the measured value exceeds a standard value, exchange the DEF to new one.

## 1.3 Check relevant systems.

- Perform the following checks in this order.

## (1) NOx sensor



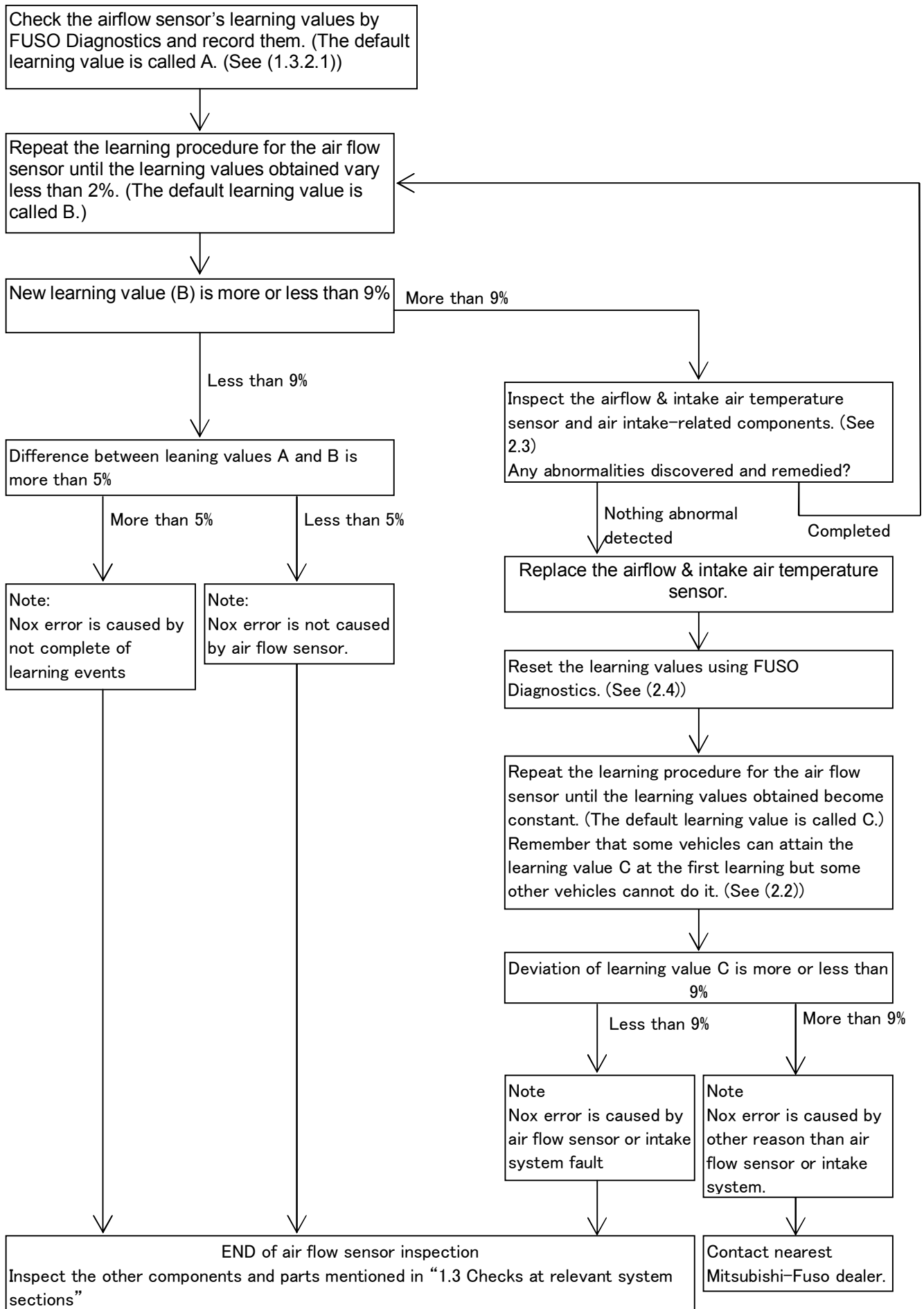
- Drive the vehicle at 80 km/h [49.7mph] about for 30 minutes to collect the service data (actual measurements) using FUSO Diagnostics. Then check to confirm that the NOx sensor is active (NOx value of FUSO Diagnostics other than “-1-” is indicated).

OR

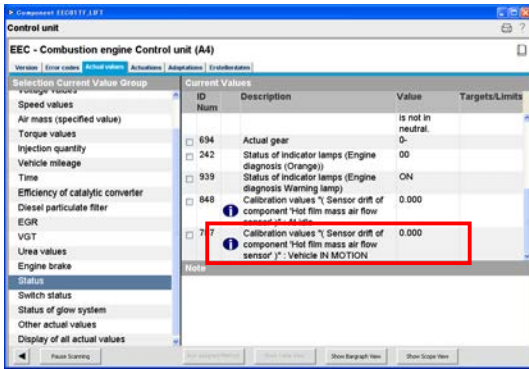
- Turn on DPF manual regeneration and then right after finished DPF manual regeneration check the service data (actual measurements) using FUSO Diagnostics. Then check to confirm that the NOx sensor is active (NOx value of FUSO Diagnostics other than “-1-” is indicated)
- Within 10 minutes, Run the engine at idle to determine the NOx value of FUSO diagnostics. If a value more than 200ppm (200 in reading of FUSO Diagnostics) is indicated continuously, faulty NOx sensor is suspected. Replace the NOx sensor.

(2) Air flow & intake air temperature sensor.

- Inspect the air flow & intake air temperature sensor according to the following flowchart:



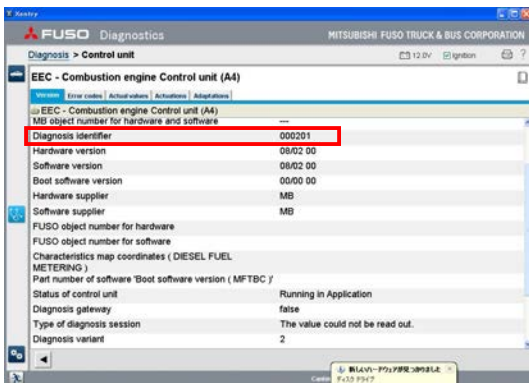




(1.3.2.1) Verification of learning value of airflow sensor

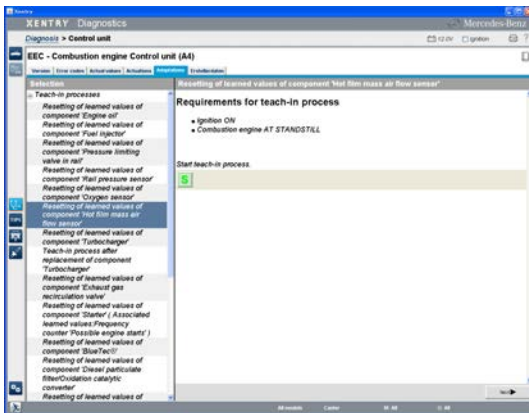
- Check the learning values of the airflow by FUSO Diagnostics tool and record them.

NB. In case of FUSO Diagnostics display “0.021”, the value means “2.1%”.

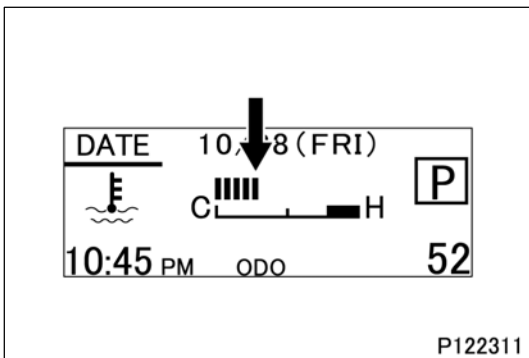


(1.3.2.2) Perform the learning procedure for the airflow sensor.

- There are two learning methods available for airflow sensor; one performed with the vehicle stationary (first learning), and one performed with the vehicle running.
- However note that not all vehicles can perform first learning. The vehicle that initial study is possible is as follows.
  - ECU software version : from 67.1 (variant 020A\*) <EPA13MY>
  - ECU software version : from 68.1



- On vehicles where it is possible to do first learning, perform the first learning procedure as follows after resetting the learning value using FUSO Diagnostics:
- Please note that before perform the AFS learning, be sure to take AFS reset and turn off the engine once and wait at least for 60 seconds to have the after-run finished completely before proceeding to the verification check.



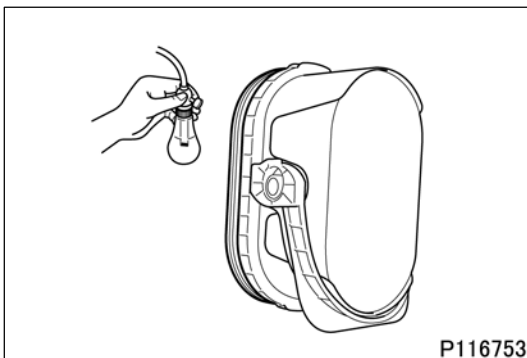
- Turn off the air conditioning switch.
- Using FUSO Diagnostics, check to ensure that the learning value of the airflow sensor is “0”.
- Run the engine until the engine cooling water temperature rises above 60 °C {140 °F}. (on meter cluster: Over 5 points)
- Wait for about 2 minutes with the engine idling.
- Keep the engine revolution to high-idling for about 15 seconds until the buzzer beeped.
- Verify If the learning value is to be verified using FUSO Diagnostics, turn off the engine once and wait at least for 60 seconds to have the after-run finished completely before proceeding to the verification check.

- Let the air flow sensor re-learning by following procedure. And let it do repeatedly until the difference of the value be less than 2% (from the constant value).

Ex) In case of last learning value is "2.1%" (FUSO Diagnostics display "0.021")

Less than 2% : 0.1 to 4.1% ( FUSO Diagnostics display "0.001 to 0.041").

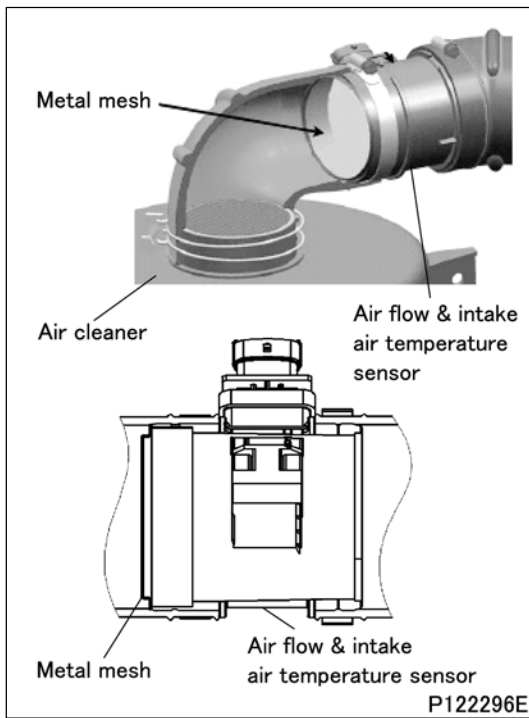
- Turn off the air conditioning switch.
- Run the engine until the engine cooling water temperature within 70 to 111°C {158 to 232 ° F}.
- Using FUSO Diagnostics, check to ensure that the intake air temperature is 0 to 50°C{32 to 122 ° F}.
- Using FUSO Diagnostics, check to ensure that the Atmospheric pressure is more than 81kPa {12psi, 0.8kgf/cm<sup>2</sup>} (810hPa).
- Check that DPF manual regeneration is not active.
- Operate the engine idling in 20 minutes and do study by running. Do not stop the engine in the mean time.
- In normal driving conditions, drive the vehicle with the transmission in 5th gear for more than 7 seconds in full load condition. Either fully loaded, steep hill or fast highway. This gives the ECU a chance to learn. (For DUONIC-equipped vehicle, use manual mode.)
- The upper limit of correction of values obtained from one time learning is 3%.
- If the learning value is to be verified using FUSO Diagnostics, turn off the engine once and wait at least for 60 seconds to have the after run finished completely before proceeding to the verification check.



(2.3) Inspection of airflow sensor & intake air temperature sensor and intake air-related components

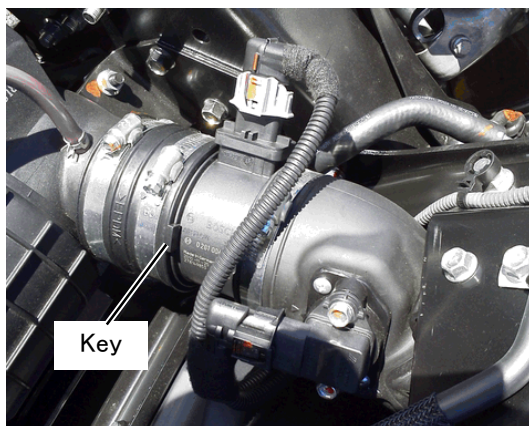
- Check that there is no dust on the "clean side" of the air filter system. If dust is present check that the rubber seal on the filter is fitted correctly.
  - Check that there is no clogging or dirt in the air cleaner element by following procedure.
  - Shine light inside the element.
  - Replace the element if thin spots or broken parts are evident in the filter paper, or if the packing at the top of the element is damaged. Also replace the element if the dust on the element is damp with oily soot.
  - Blow a jet of compressed air at a pressure not higher than 685kPa {100psi, 7kgf/cm<sup>2</sup>} against the inside surfaces of the element.
  - Move the compressed air jet up and down along all pleats of the filter paper element.
- Oily air flow & intake air temperature sensor can be evidence that there is another faulty part in the system. In such a case, check other air intake-related parts for contamination and clean them if contaminated.



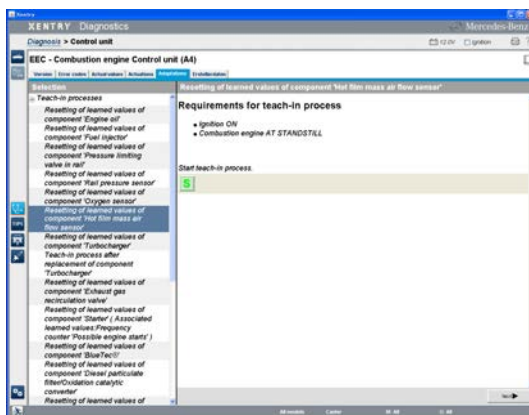


Check that there is no dirt or deformation in the metal mesh.

- Attach the metal mesh to the air hose by direction of illustration.



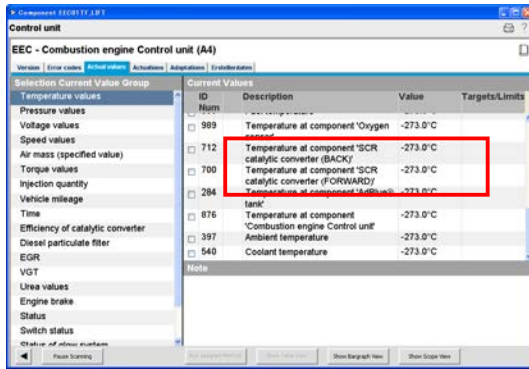
- Check the engagement and attachment state of Airflow & intake air temperature sensor's align slit and air hose's key.
- Inspect the lines connecting the airflow & intake air temperature sensor with the air cleaner and the turbocharger for installed conditions of clamps and air leakage through the sealing sections.
- Check that the clips are correctly closed and the sealing is correct without gaps.
- Inspect the gap between airflow & intake air temperature sensor and turbocharger.



#### (2.4) Resetting method of learning values using FUSO Diagnostics

- Use FUSO Diagnostics to reset the learning value of the airflow sensor.

## (3) SCR temperature sensor 1 and 2



## HOT range

- Run the engine at idle for 1 hour and then, using FUSO Diagnostics, check that both SCR temperature sensors 1 and 2 give the same measurements (tolerance within 15°C {27° F} at a temperature between 50 and 150°C {122 and 302° F}).
- After DPF manual regeneration is completed, using FUSO Diagnostics, check that both SCR temperature sensors 1 and 2 give the same measurements (tolerance within 40°C {72° F} at a temperature between 480 and 600°C {896 and 1112° F}).

## COLD range

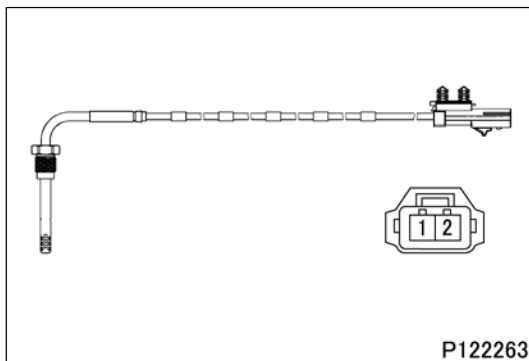
- Inspect the sensor by whichever procedure for engine cold temperature range condition.

## (3.1) On-vehicle inspection

- After engine has cooled down. Check using FUSO Diagnostics that both SCR temperature sensors give the same measurements as other temperature sensors (tolerance within 15° C {27° F}).

## (3.2) Inspection by removal

- Remove the SCR temperature sensor 1 and 2 and do visual check and if it is dirty then you should clean it.
- Using a known temperature reference source, measure the resistance between terminals 1 and 2.

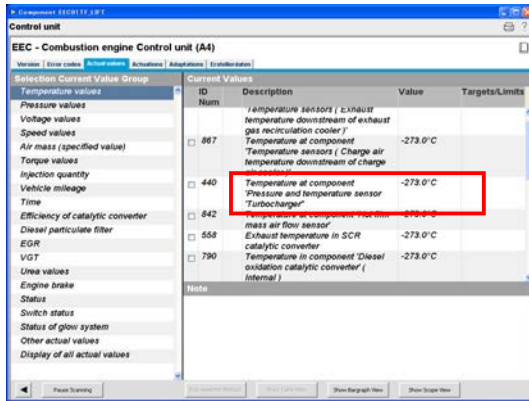


Standard value	-18°C [-0.4° F]	187 Ω
	-12°C [10° F]	191 Ω
	-7°C [19° F]	195 Ω
	-1°C [30° F]	200 Ω
	0°C [32° F]	201 Ω
	4°C [39° F]	204 Ω
	10°C [50° F]	208 Ω
	16°C [61° F]	212 Ω
	21°C [70° F]	217 Ω
	27°C [81° F]	221 Ω
	32°C [90° F]	225 Ω
	38°C [100° F]	229 Ω
	50°C [122° F]	239 Ω
	100°C [212° F]	276 Ω
150°C [302° F]	313 Ω	

- If the measurement is out of reference value, replace the sensor.
- Measure resistance between each pin to sensor body. Resistance should be greater than 1 MΩ (open circuit).

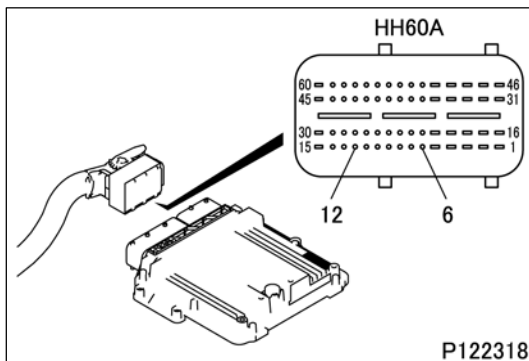
## (4) Boost pressure &amp; boost temperature sensor (temperature sensing section)

- Check the boost pressure & temperature sensor by whichever procedure.



## (4.1) On-vehicle inspection

- When the engine is cold, check using FUSO Diagnostics that this sensor gives the same measurement as other temperature sensors (tolerance within 15°C {27 ° F}).
- Visually check the sensor and clean it if contaminated.



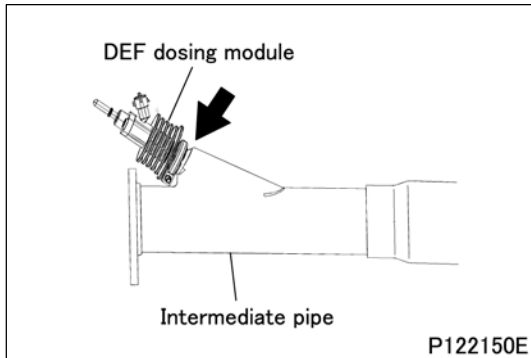
## (4.2) Inspection by removal

- Remove boost pressure & temperature sensor with wiring.
- Do visual check and if it is clogged with soot you should clean it. Use distilled water.
- Remove engine ECU connector.
- Using a known temperature reference source, measure the resistance between terminals 6 and 12 at the ECU connector side.

Standard value	-40°C [-40 ° F]	48153 Ω
	-30°C [-22 ° F]	26855 Ω
	-20°C [-4 ° F]	15614 Ω
	-10°C [14 ° F]	9426 Ω
	0°C [32 ° F]	5886.7 Ω
	10°C [50 ° F]	3791.1 Ω
	20°C [68 ° F]	2510.6 Ω
	30°C [86 ° F]	1715.4 Ω
	40°C [104 ° F]	1199.6 Ω
	50°C [122 ° F]	851.1 Ω
	60°C [140 ° F]	612.27 Ω
	70°C [158 ° F]	446.33 Ω
	80°C [176 ° F]	329.48 Ω
	90°C [194 ° F]	246.15 Ω
	100°C [212 ° F]	186 Ω
110°C [230 ° F]	142.08 Ω	
120°C [248 ° F]	109.65 Ω	
130°C [266 ° F]	85.45 Ω	

- If the measurement is out of standard value, replace the sensor.

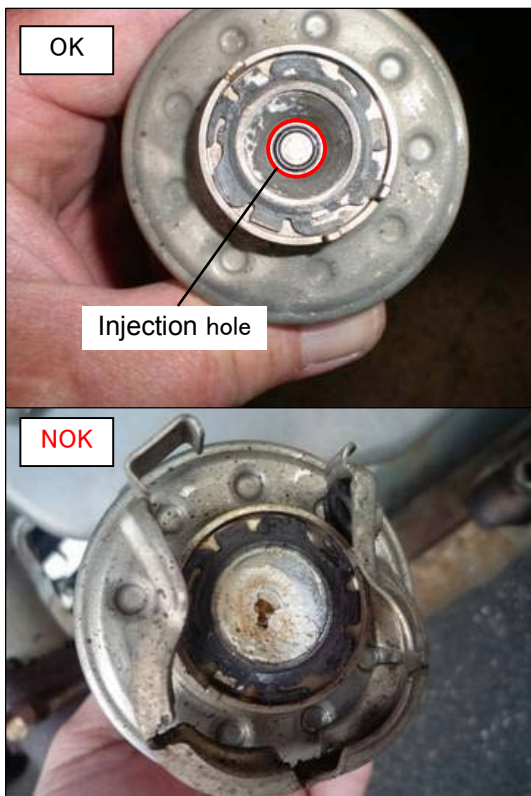
(5) DEF dosing module, DEF supply module (motor and heater)



- Check that there are no gas leaks and adhesion of deposits on the attachment part of the DEF dosing module. If there is some abnormality, then it is possibility that the attachment failure of the DEF dosing module is the cause of NOx errors.
- Remove the DEF dosing module. Check the DEF dosing module and its mount are in a proper condition.
- Replace gasket (ME556058), if dosing module is removed.



Gasket between dosing module and intermediate pipe (ME556058)

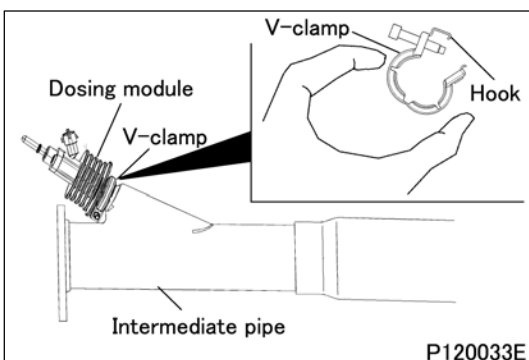
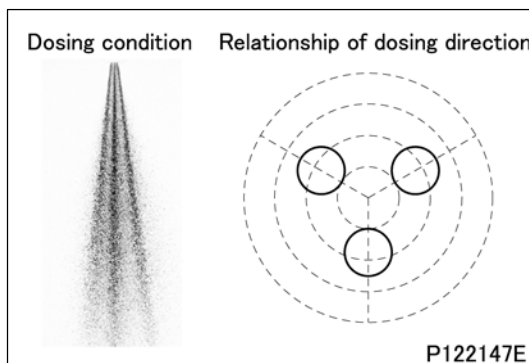
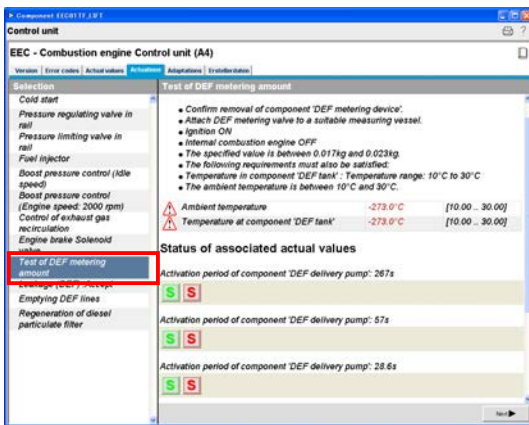
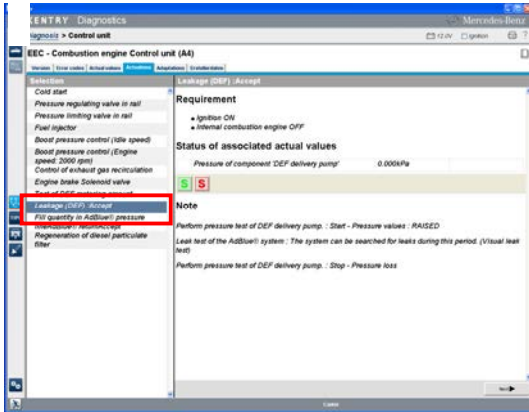


- Verify that the injection hole in the DEF dosing module is free from any deposits. Replace the DEF dosing module if the injection hole is blocked.
- Clean the DEF dosing module if other places than the injection hole are deposited, please use distilled water.
- When at the actuator test (Actuation) function of FUSO Diagnostics there is no abnormality, there is no problem even with when there is a deposit.



- If any deposits are found on the mounting section of the DEF dosing module, remove them completely before the module is re-installed. After the module is installed, be sure to perform forced DPF regeneration using FUSO Diagnostics.





- Rewrite software to the latest version of the engine electronic control unit.
- CAUTION** ⚠
- When the software of engine electronic control unit is not the latest version, the actuator test (Actuations) function of FUSO Diagnostics may not operate normally.

- Test the leakage(DEF): Accept by making use of the actuator test (control) function of FUSO Diagnostics.
- Perform the test with a DEF dosing module removed from intermediate pipe.
- Recommended FUSO Diagnostics version: FDS-R12-2.2. or newer
- Verify that there is no leakage of DEF at the time of test execution.
- Replace the DEF dosing module if leakage is found at dosing module tip.
- Replace the DEF tube if leakage is found on DEF tube itself.
- Re-check the DEF tube install condition if the leakage is found from DEF tube junction part.
- After the additional test is finished, make the starter switch OFF and wait 60 minutes and finish the after run.
- Test the dosing rate of DEF by making use of the actuator test (control) function of FUSO Diagnostics.
- Verify that the specified amount of solution is dosed. Replace the DEF dosing module if the amount is abnormal, and then perform the actuator test (control) again. If the amount is still abnormal, replace the DEF supply module (motor and heater).
- After addition test is finished, switch OFF and wait 60 seconds to finish the after run.

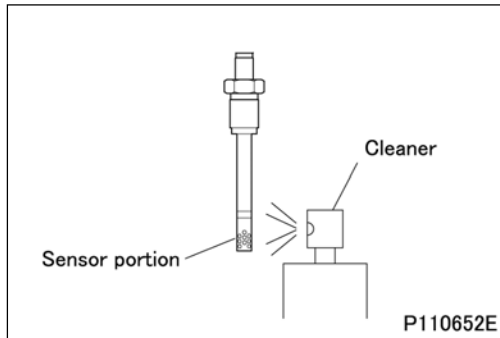
- Retest the dosing rate of DEF by making use of the actuator test (control) function of FUSO Diagnostics to check for dosing condition.
- Verify that DEF is sprayed evenly in three directions as shown in the illustration.
- Replace the DEF dosing module if the spray pattern is abnormal.
- After addition test is finished, switch OFF and wait 60 seconds to finish the after run.

- Attach a new gasket to the DEF dosing module.
- Stick and install the DEF dosing module to intermediate pipe.
- Push the clamp central part until it applies the hook of a new clamp and stick and install the clamp to dosing module. In this regard, do not adhere oil or grease to clamp and screw.

Tightening torque	$5^0_{-0.5} \text{ N}\cdot\text{m}$ { $3.7^0_{-0.37} \text{ lbs}\cdot\text{ft}$ , $0.5^0_{-0.05} \text{ kgf}\cdot\text{m}$ }
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- When attaching the DEF tube to the DEF dosing module. If it needs the lubrication, please use distilled water.
- Check the gas leakage after attaching the DEF dosing module.

## (6) DFP exhaust gas temperature sensor 1 and 2

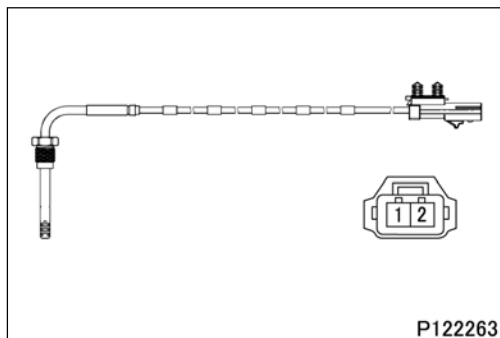


## (6.1) Cleaning

- Check that the sensor portion is free of soot, oily substance, etc.
- If not, clean the sensor portion as follows.
- Spray a cleaner on the sensor portion from 2 or 3 cm {0.79 or 1.18in.} away.
- Recommended cleaners:  
Nonchlorinated solvent
- In 20 to 30 seconds after spraying, wipe the sensor portion clear of the sprayed cleaner using a soft waste cloth the like.

**CAUTION** 

Be sure to wait for 20 to 30 seconds before wiping. It takes the cleaner that long to dissolve foreign matter.



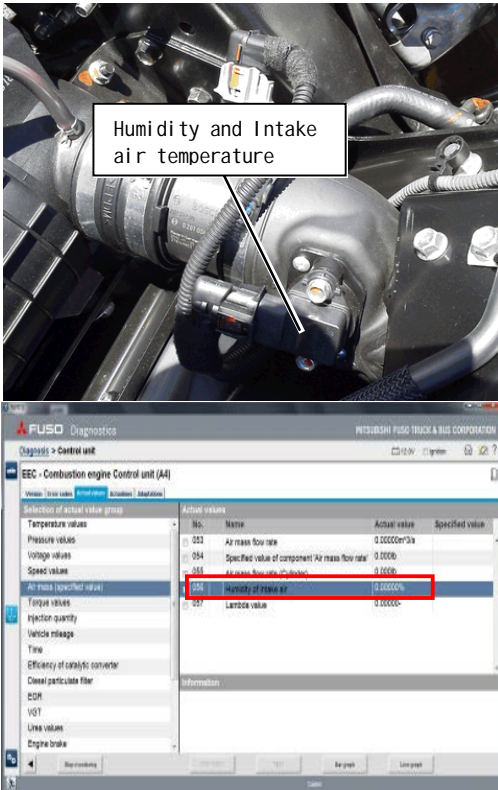
## (6.2) Inspection

- Removal the DFP exhaust gas temperature sensor 1 and 2 and do visual check and if it is dirty then you should clean it.
- Using a known temperature reference source, measure the resistance between terminals 1 and 2.

Standard value	-18°C [-0.4 ° F]	187 Ω
	-12°C [10 ° F]	191 Ω
	-7°C [19 ° F]	195 Ω
	-1°C [30 ° F]	200 Ω
	0°C [32 ° F]	201 Ω
	4°C [39 ° F]	204 Ω
	10°C [50 ° F]	208 Ω
	16°C [61 ° F]	212 Ω
	21°C [70 ° F]	217 Ω
	27°C [81 ° F]	221 Ω
	32°C [90 ° F]	225 Ω
	38°C [100 ° F]	229 Ω
	50°C [122 ° F]	239 Ω
	100°C [212 ° F]	276 Ω
150°C [302 ° F]	313 Ω	

- If the measurement is out of reference value, replace the sensor.
- Measure resistance between each pin to sensor body. Resistance should be greater than 1 MΩ (open circuit).

## (7) Humidity and Intake Air temperature sensor



## (7.1) inspection of sensor output signal

- Write down the humidity value on FD service #056 at key-on and engine off state. (value A)
- Key off at once and wait for around one second to complete engine after run. Write down again the humidity value at key-on and engine off state. (value B : second time)
- Do once again (value C : third time)
- Compare these three values if the values are inside of below.  
+/-10%
- Replace the sensor if the values out of threshold.

## (7.2) Check daiagnosis failure code in the past

- Replace the sensor if the diagnosis code of “354-17” or “354-18” was recorded in the failure memory.

## 1.4 Probable cause of diagnostic code occurrence

- Check the diagnostic code which occurs simultaneously with Diagnostic code 3361-18 & 520558-31. And if there is the code in bellow chart, Check the part which caused the diagnostic code ◎ or ○ for each codes. (See 13E-100)

For inspection procedures for parts marked with ★, refer to “1.3 Checks at relevant system sections” as well.

Diagnostic codes that occurred		27-15	27-17	102-15	102-17	110-12	110-31	132-20	132-21	171-7	172-2	1172-2	1174-2	3050-31	3058-0	3058-1	3058-16	3058-18	3241-31	3242-2	Remarks	
Parts to be inspected																						
Atmospheric sensor (built-in engine ECU.)				◎	◎																	*1
Air cleaner																						See Gr15
Intake manifold															○	○	○	○				See Gr15
★Metal mesh																						See Gr15
★Position of Air flow and intake air temperature sensor																						See Gr15
Air flow and intake air temperature sensor	★Air flow sensor							◎	◎						○	○	○	○				See Gr13E-#306
	Intake air temperature sensor									◎	◎	○	○									See Gr13E-#306
Humidity and intake air temperature sensor	Humidity sensor																					See Gr13E-#347
	Intake air temperature sensor									◎	◎	○	◎									See Gr13E-#347
Turbocharger															○	○	○	○				See Gr15
VGT position sensor<JP>																						
Water temperature sensor						○	◎															See Gr13E-#262
Thermostat						◎	○															See Gr14
Intercooler outlet temperature sensor<EPA>											◎	○	○									*1
EGR cooler outlet temperature sensor<EPA>																						*1
Boost pressure and temperature sensor	★Boost temperature sensor										◎	◎	○									See Gr13E-#346
	Boost pressure sensor			◎	◎																	See Gr13E-#346
EGR actuator	EGR valve														◎	◎	○	○				*2
	position sensor	◎	◎												◎	◎	○	○				*2
EGR cooler															○	○						See Gr17
Injector															○	○	○	○				See Gr13E-#582
Injection timing																						See Gr11
Pressure sensor (Common rail unit)																						*2
EBS (Exhaust Brake system)															○	○	◎	◎				*2
Lambda sensor															◎							*3
Exhaust gas temperature sensor 1																			◎	○		See Gr13E-#336
Diesel Oxidation Catalyst																						*3
Exhaust gas temperature sensor 2																			○	◎		See Gr13E-#336
DPF																						*3
DPF differential pressure sensor																						See Gr13E-#334
★SCR temperature sensor1																			○	○		See Gr13E-#336
★SCR temperature sensor2																			○	○		See Gr13E-#336
★NOx sensor															◎							

◎: Major probable causes for diagnostic code occurrence

○: Possible causes for diagnostic code occurrence

\*1: See Gr13E "FUSO Diagnostics Service Data (Actual values)"

\*2: See Gr13E "FUSO Diagnostics Actuator Test (Actuations)"

\*3 Contact nearest Mitsubishi-Fuso dealer.



Diagnostic codes that occurred	3244-2	3245-31	3246-2	3597-12	3598-12	3599-12	520192-20 *4	520192-21 *4	520193-20	520193-21	520207-2	520210-2	520211-0	520211-1	520212-0	520212-1	520213-0	Remarks
Parts to be inspected																		
Atmospheric sensor (built-in engine ECU.)																		*1
Air cleaner							◎	◎	◎	◎								See Gr15
Intake manifold							◎	◎	◎	◎								See Gr15
★Metal mesh							◎	◎	◎	◎								See Gr15
★Position of Air flow and intake air temperature sensor							◎	◎	◎	◎								See Gr15
Air flow and intake air temperature sensor	★Air flow sensor						◎	◎	◎	◎								See Gr13E-#306
	Intake air temperature sensor																	See Gr13E-#306
Humidity and intake air temperature sensor	Humidity sensor					◎												See Gr13E-#347
	Intake air temperature sensor																	See Gr13E-#347
Turbocharger							○	○	○	○								See Gr15
VGT position sensor<JP>				◎														
Water temperature sensor											◎							See Gr13E-#262
Thermostat																		See Gr14
Intercooler outlet temperature sensor<EPA>																		*1
EGR cooler outlet temperature sensor<EPA>																		*1
Boost pressure and temperature sensor	★Boost temperature sensor						◎	◎	◎	◎	◎							See Gr13E-#346
	Boost pressure sensor					◎	◎	◎	◎	◎								See Gr13E-#346
EGR actuator	EGR valve						○	○	○	○								*2
	★position sensor					◎	○	○	○	○								*2
EGR cooler							○	○	○	○								See Gr17
Injector												◎	◎	◎	◎	◎	◎	See Gr13E-#582
Injection timing												○	○	○	○	○	○	See Gr11
Pressure sensor (Common rail unit)					◎													*2
EBS (Exhaust Brake system)							○	○	○	○								*2
Lambda sensor																		*3
Exhaust gas temperature sensor 1	◎	○	○															See Gr13E-#336
Diesel Oxidation Catalyst																		*3
Exhaust gas temperature sensor 2	◎	○	○															See Gr13E-#336
DPF																		*3
DPF differential pressure sensor						◎	○	○	○	○								See Gr13E-#334
★SCR temperature sensor1		○	◎															See Gr13E-#336
★SCR temperature sensor2		◎	○															See Gr13E-#336
★NOx sensor																		

◎: Major probable causes for diagnostic code occurrence

○: Possible causes for diagnostic code occurrence

\*1:See Gr13E "FUSO Diagnostics Service Data (Actual values)"

\*2:See Gr13E "FUSO Diagnostics Actuator Test (Actuations)"

\*3 Contact nearest Mitsubishi-Fuso dealer.

\*4: For this diagnostic code inspection refer to "1.3 (2) Air flow &amp; intake air temperature sensor (air flow sensing section)"

Diagnostic codes that occurred		520213-1	520214-0	520214-1	520330-2	520340-0	520352-0	520352-1	520353-0	520353-1	520354-0	520354-1	520355-0	520355-1	520364-2	520379-0	520379-1	520491-2	Remarks
Parts to be inspected																			
Atmospheric sensor (built-in engine ECU.)																			*1
Air cleaner																			See Gr15
Intake manifold																			See Gr15
★Metal mesh																			See Gr15
★Position of Air flow and intake air temperature sensor																			See Gr15
Air flow and intake air temperature sensor	★Air flow sensor														○	○			See Gr13E-#306
	Intake air temperature sensor																		See Gr13E-#306
Humidity and intake air temperature sensor	Humidity sensor																		See Gr13E-#347
	Intake air temperature sensor																		See Gr13E-#347
Turbocharger																			See Gr15
VGT position sensor<JP>																			
Water temperature sensor																			See Gr13E-#262
Thermostat																			See Gr14
Intercooler outlet temperature sensor<EPA>																			*1
EGR cooler outlet temperature sensor<EPA>						◎													*1
Boost pressure and temperature sensor	★Boost temperature sensor																		See Gr13E-#346
	Boost pressure sensor																		See Gr13E-#346
EGR actuator	EGR valve					○													*2
	★position sensor					○													*2
EGR cooler						◎													See Gr17
Injector		◎	◎	◎			◎	◎	◎	◎	◎	◎	◎	◎		◎	◎		See Gr13E-#582
Injection timing		○	○	○															See Gr11
Pressure sensor (Common rail unit)							○	○	○	○	○	○	○	○		○	○		*2
EBS (Exhaust Brake system)																			*2
Lambda sensor							○	○	○	○	○	○	○		○	○			*3
Exhaust gas temperature sensor 1															○			◎	See Gr13E-#336
Diesel Oxidation Catalyst																		◎	*3
Exhaust gas temperature sensor 2															○			◎	See Gr13E-#336
DPF																			*3
DPF differential pressure sensor																			See Gr13E-#334
★SCR temperature sensor1						◎									○				See Gr13E-#336
★SCR temperature sensor2						◎									○				See Gr13E-#336
★NOx sensor																			

◎: Major probable causes for diagnostic code occurrence

○: Possible causes for diagnostic code occurrence

\*1:See Gr13E "FUSO Diagnostics Service Data (Actual values)"

\*2:See Gr13E "FUSO Diagnostics Actuator Test (Actuations)"

\*3 Contact nearest Mitsubishi-Fuso dealer.

### 1.5 Procedure of eliminate the warning lamp <EPA>

(1) The case of the mileage or running time of after diagnostic code was occurred are less than 320km {200miles} or 4 hours. (Torque and power is restricted)

ID Num	Description	Value	Targets/Limits
169	Item ( Engine brake Solenoid valve )	0.0000%	{0.0000 ... 96.0000}
170	Signal voltage of component 'Torque sensor 'Power take-off'	0.0000%	
781	Smoke limit	0.000kg	
725	Exhaust gas volume flow rate (Diesel oxidation catalytic converter BACK)	0.000m <sup>3</sup> /s	
159	Exhaust gas recirculation actuator	0.0000%	{0.0000 ... 96.0000}
872	NOx values	0-	
686	Fill level of NOx storage catalytic converter ( NH3 )	0.0000kg	
538	Status of function 'Control of exhaust	00 00 00 00	

- Turn the starter switch to the OFF position, wait at least 60 seconds and complete the after-run.
- Turn the starter switch to the ON position and after a lapse of 10 seconds or longer, start the engine.
- Drive the vehicle at 80 km/h about for 30 minutes to collect the service data (actual measurements) using FUSO Diagnostics. Then check to confirm that the NOx sensor is active (NOx value of FUSO Diagnostics other than “-1-” is indicated).( The value of SCR temperature sensor 1is more than 250°C {482 ° F})
- After running of above procedure, check the warning lamp is eliminated.

(2) The case of the mileage or running time of after diagnostic code was occurred are more than 320km {200miles} or 4 hours. (Creep mode)

- Turn the starter switch to the OFF position, wait at least 60 seconds and complete the after-run.
- Turn the starter switch to the ON position and after a lapse of 10 seconds or longer, start the engine.
- Warm up the engine until the engine coolant temperature exceeds 60°C {140 ° F}.
- Press the Diesel Particulate Filter cleaning switch to perform the manual regeneration of Diesel Particulate Filter. In the manual regeneration, the engine speed increases to 1500 – 2500 rpm and it takes approximately 20 minutes to complete the manual regeneration.
- After that, the engine speed drops to idle and warning goes out. It may not go out immediately and it can take 10 minutes for the lamp to go out.