TOYOTA SERVICE BULLETIN
Group: 04 No.: 04 Date: Mar, 14

Land Cruiser 200

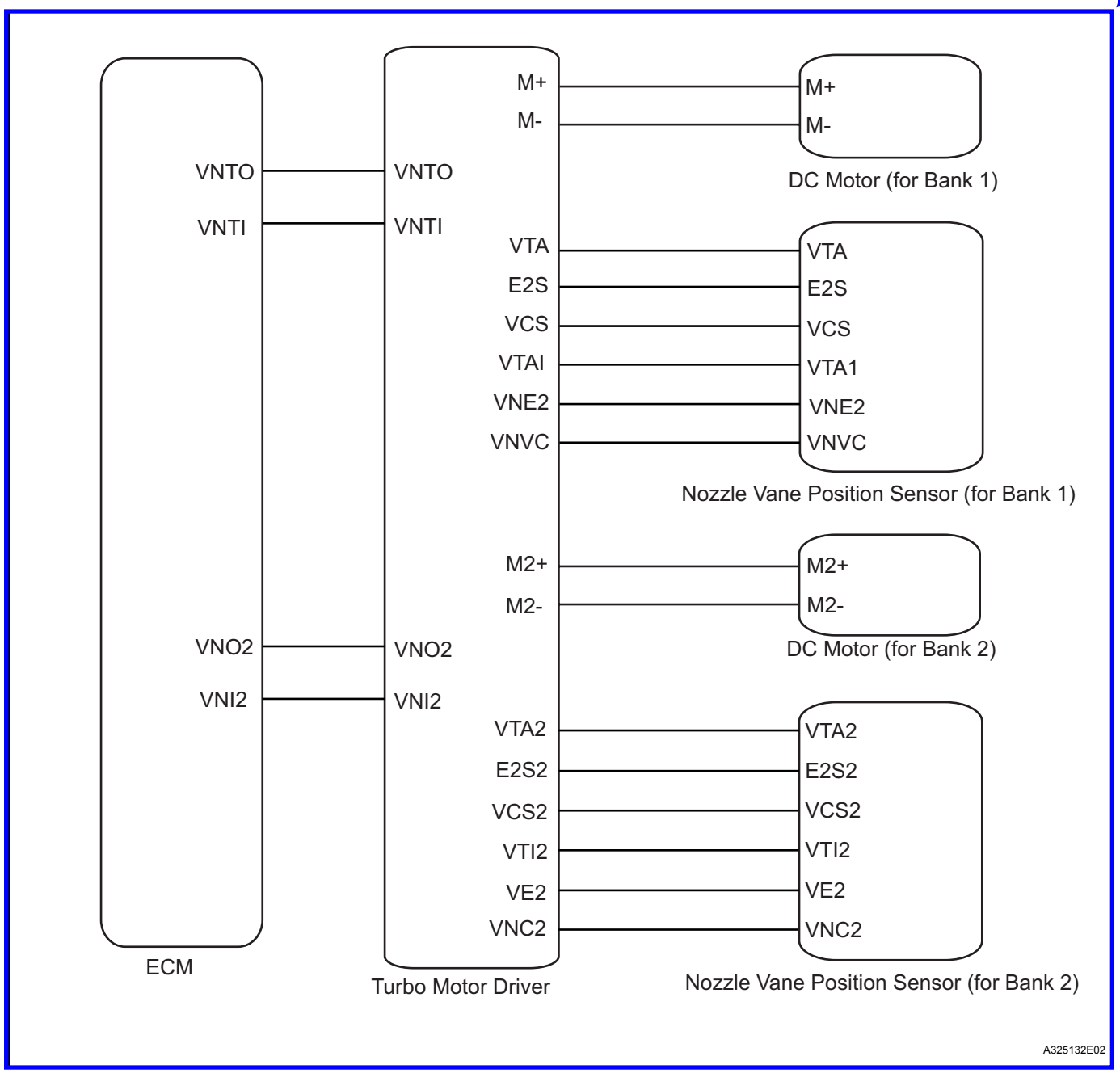
Corrections to Repair Manual RM22W1E

Please ensure these pages are distributed to all relevant staff for their information; and a copy made available for future reference, with the above repair manual.

Section	Title	Paragraph
1VD-FTV ENGINE CONTROL	ECD SYSTEM (w/o DPF)	P0046 (2013/01 - 2013/08)
		P0046 (2013/08 -)
		P00AF (2013/01 - 2013/08)
		P00AF (2013/08 -)
		P1258 (2013/01 - 2013/08)
		P1258 (2013/08 -)

The revised pages listed above are attached.
(The corrected parts are indicated by arrows.)

This Bulletin does not cause the Flat Rate Manual to be changed.



ES

P0046, P004B

DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
Ignition switch ON for 5 seconds	Either of the following conditions are met when the motor is driving (1 trip detection logic): • DC motor duty ratio is +/-100% for 1.3 seconds or more. • DC motor current is 2.2 A or more for 5 seconds or more.	• Open or short in DC motor (turbocharger sub-assembly) circuit • Turbo motor driver • DC motor (turbocharger sub-assembly) • Turbocharger nozzle vane is stuck or movement is irregular

P0047, P004C

DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
Ignition switch ON for 1 second	Both of following conditions are met for 1 second or more when the motor is driving (1 trip detection logic): • DC motor duty ratio is 100%. • DC motor current is 0.5 A or less.	• Open in DC motor (turbocharger sub-assembly) circuit • Turbo motor driver • DC Motor (turbocharger sub-assembly) • Turbocharger nozzle vane is stuck or movement is irregular

P0048, P004D

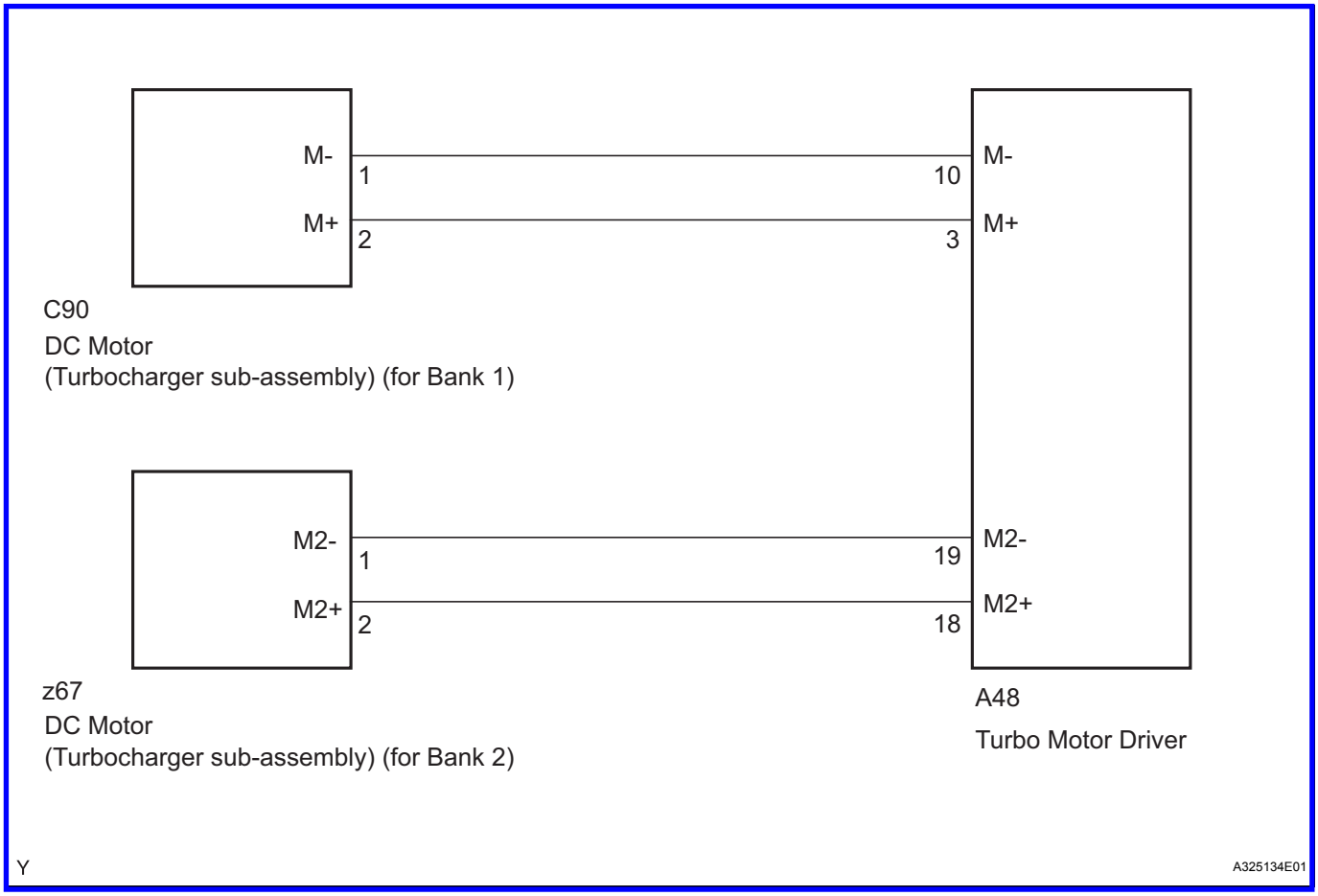
DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
Ignition switch ON for 1 second	DC motor current is 6.5 A or more for 0.5 seconds or more when the motor is operating (1 trip detection logic).	• Short in DC motor (turbocharger sub-assembly) circuit • Turbo motor driver • DC Motor (turbocharger sub-assembly) • Turbocharger nozzle vane is stuck or movement is irregular

HINT:
If DTC P0046, P0047, P0048, P004B, P004C and/or P004D is stored, the following symptoms may appear.
Stuck closed malfunction:
– Vehicle surge when driving with full load
Stuck open malfunction:
– Lack of power
– Vehicle surge or hesitation under light or medium load
– White smoke

ES

[Corrected]

WIRING DIAGRAM

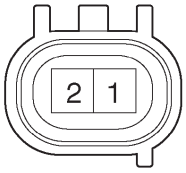


INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1 INSPECT TURBOCHARGER SUB-ASSEMBLY (DC MOTOR) (for Bank 1 or Bank 2)

Component without harness connected:
(DC Motor)



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(a) Disconnect the DC motor connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance for Bank 1

Tester Connection	Condition	Specified Condition
1 (M-) - 2 (M+)	Always	1 to 100 Ω

Standard Resistance for Bank 2

Tester Connection	Condition	Specified Condition
1 (M2-) - 2 (M2+)	Always	1 to 100 Ω

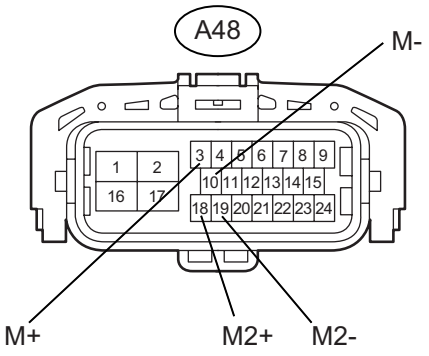
NG → Go to step 6

OK

2 CHECK HARNESS AND CONNECTOR (DC MOTOR - TURBO MOTOR DRIVER)

(a) Disconnect the DC motor (for Bank 1) connector.
(b) Disconnect the DC motor (for Bank 2) connector.
(c) Disconnect the turbo motor driver connector.

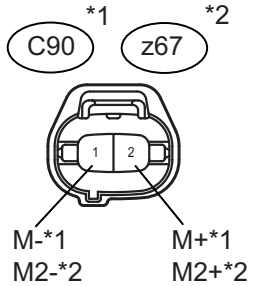
Front view of wire harness connector:
(to Turbo Motor Driver)



*1: Bank 1

*2: Bank 2

Front view of wire harness connector:
(to DC Motor (for Bank 1))



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(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open) for Bank 1

Tester Connection	Condition	Specified Condition
C90-1 (M-) - A48-10 (M-)	Always	Below 1 Ω
C90-2 (M+) - A48-3 (M+)	Always	Below 1 Ω

for Bank 2

Tester Connection	Condition	Specified Condition
z67-1 (M2-) - A48-19 (M2-)	Always	Below 1 Ω
z67-2 (M2+) - A48-18 (M2+)	Always	Below 1 Ω

Standard Resistance (Check for Short)

for Bank 1

Tester Connection	Condition	Specified Condition
C90-1 (M-) or A48-10 (M-) - Body ground	Always	10 kΩ or higher
C90-2 (M+) or A48-3 (M+) - Body ground	Always	10 kΩ or higher

for Bank 2

Tester Connection	Condition	Specified Condition
z67-1 (M2-) or A48-19 (M2-) - Body ground	Always	10 kΩ or higher
z67-2 (M2+) or A48-18 (M2+) - Body ground	Always	10 kΩ or higher

ES

NG → **Go to step 7**

OK

3	INSPECT TURBOCHARGER SUB-ASSEMBLY

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to ON and turn the tester on.
(c) Start the engine and warm up.
(d) Move the shift lever to 3rd and accelerate the vehicle with the accelerator fully open.
(e) Stop the vehicle.
(f) Enter the following menus: Powertrain / Engine / DTC.
(g) Read the DTCs.

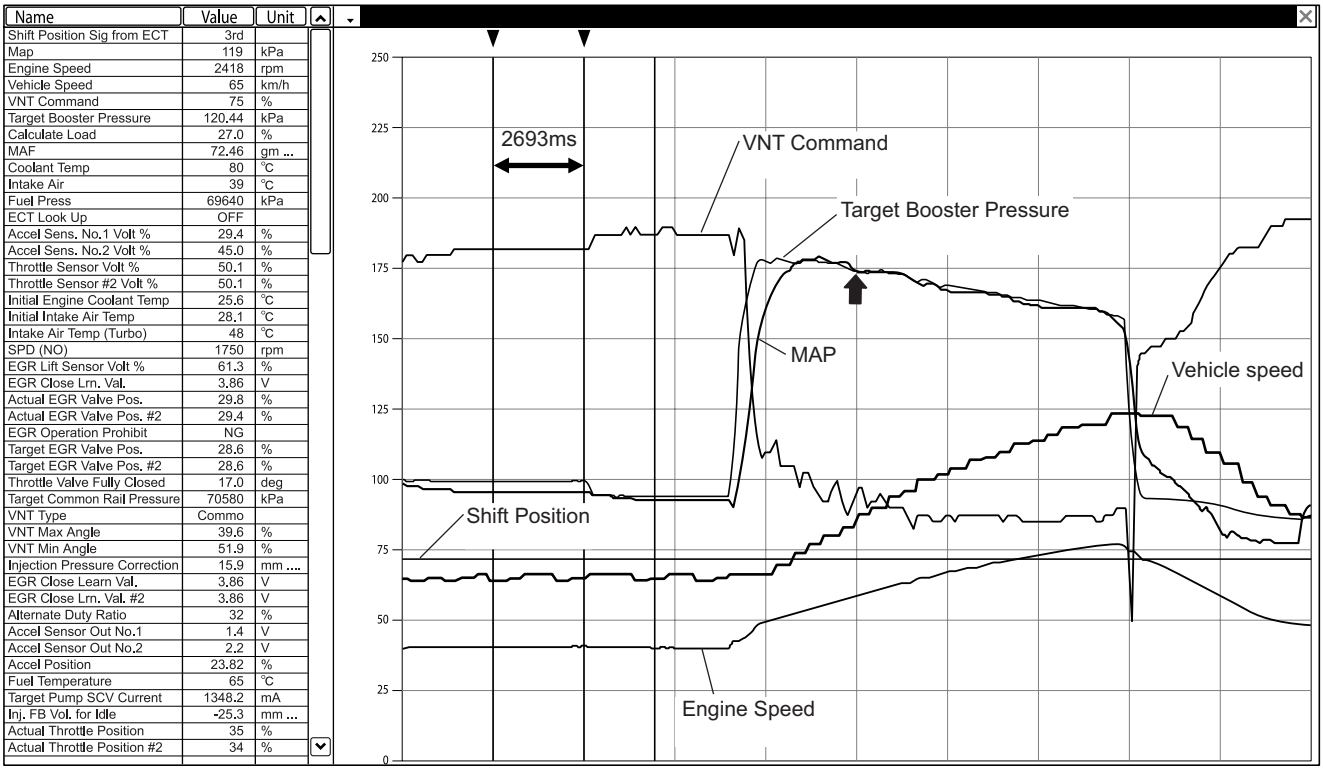
Result

Display (DTC Output)	Proceed to
DTC P0046, P0047, P0048, P004B, P004C and/or P004D are output	A
No DTC output	B

HINT:

- A snapshot can be used to compare vehicle data from the time of the malfunction to normal data and is very useful for troubleshooting.
- "Target Booster Pressure" and "MAP" in the snapshot can be used to check the operation of the turbocharger. If "MAP" does not follow "Target Booster Pressure", the turbocharger nozzle vane may be stuck or the movement may be irregular.
- When the engine speed is 2500 to 3000 rpm with the accelerator pedal fully depressed, "MAP" is within +/- 10 kPa* of "Target Booster Pressure" (not immediately after beginning of acceleration).
- * If the turbocharger pressure does not reach a specified value, it cannot be determined whether the system is normal by checking whether "MAP" is within +/-10 kPa of "Target Booster Pressure".

Normal Condition



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HINT:
Compare "MAP" with "Target Booster Pressure" at the point indicated by the arrow (↑) in the illustration.

A	**Go to step 6**

B

4 INSPECT TURBO MOTOR DRIVER

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*).
(c) Turn the engine switch off.
(d) Remove the rear fender splash shield sub-assembly RH.
(e) Remove the front fender liner LH.
(f) Disconnect the turbo motor driver connector.
(g) Reconnect the turbo motor driver connector.
(h) Turn the engine switch on (IG) and turn the tester on.
(i) After starting the engine, idle it for 5 seconds.
(j) Enter the following menus: Powertrain / Engine / DTC.
(k) Read the DTCs.

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

See*: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/01-2013/08)

B	END

A

5	REPLACE TURBO MOTOR DRIVER

(a) Replace the turbo motor driver (See page See*1).
NOTICE:
Make sure that foreign matter does not enter the connector(s) when replacing parts.

NEXT	Go to step 8

6	REPLACE TURBOCHARGER SUB-ASSEMBLY (for Bank 1 or Bank 2)

ES

(a) Replace the turbocharger sub-assembly (for Bank 1 or Bank 2) (See page See*2).

NEXT	Go to step 8

7	REPAIR OR REPLACE HARNESS OR CONNECTOR

NEXT

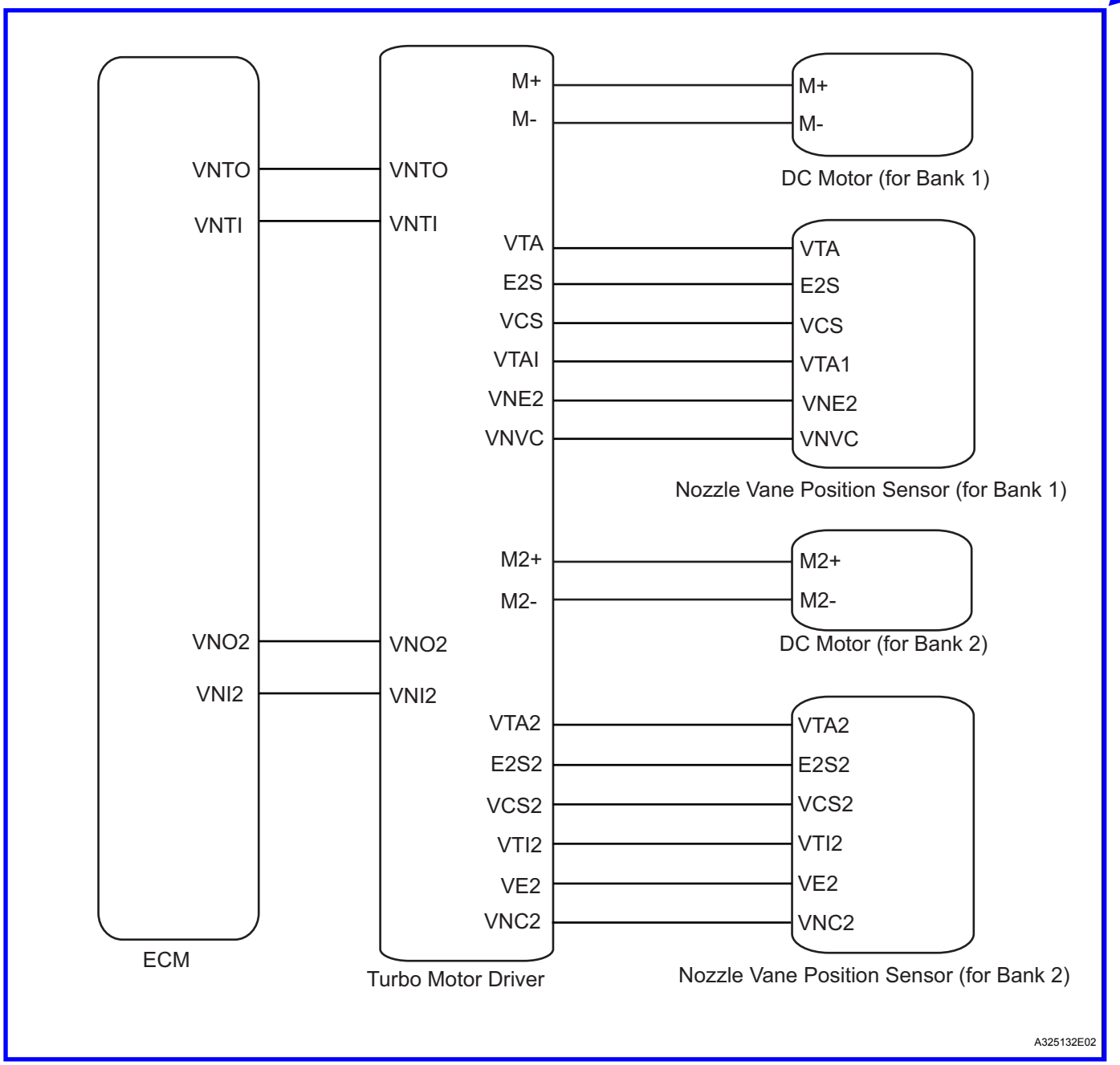
8	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*3).
(c) Turn the ignition switch off.
(d) Turn the ignition switch to ON for 5 seconds or more.
(e) Enter the following menus: Powertrain / Engine / DTC.
(f) Confirm that the DTC is not output again.

NEXT

END

See*1: 1VD-FTV INTAKE / EXHAUST - TURBO MOTOR DRIVER - REMOVAL (2013/01-2013/08)
See*2: 1VD-FTV INTAKE / EXHAUST - EXHAUST MANIFOLD W/ TURBOCHARGER - REMOVAL (2013/01-2013/08)
See*3: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/01-2013/08)



ES

P0046, P004B

DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
Ignition switch ON for 5 seconds	Either of the following conditions are met when the motor is driving (1 trip detection logic): • DC motor duty ratio is +/-100% for 1.3 seconds or more. • DC motor current is 2.2 A or more for 5 seconds or more.	• Open or short in DC motor (turbocharger sub-assembly) circuit • Turbo motor driver • DC motor (turbocharger sub-assembly) • Turbocharger nozzle vane is stuck or movement is irregular

P0047, P004C

DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
Ignition switch ON for 1 second	Both of following conditions are met for 1 second or more when the motor is driving (1 trip detection logic): • DC motor duty ratio is 100%. • DC motor current is 0.5 A or less.	• Open in DC motor (turbocharger sub-assembly) circuit • Turbo motor driver • DC Motor (turbocharger sub-assembly) • Turbocharger nozzle vane is stuck or movement is irregular

P0048, P004D

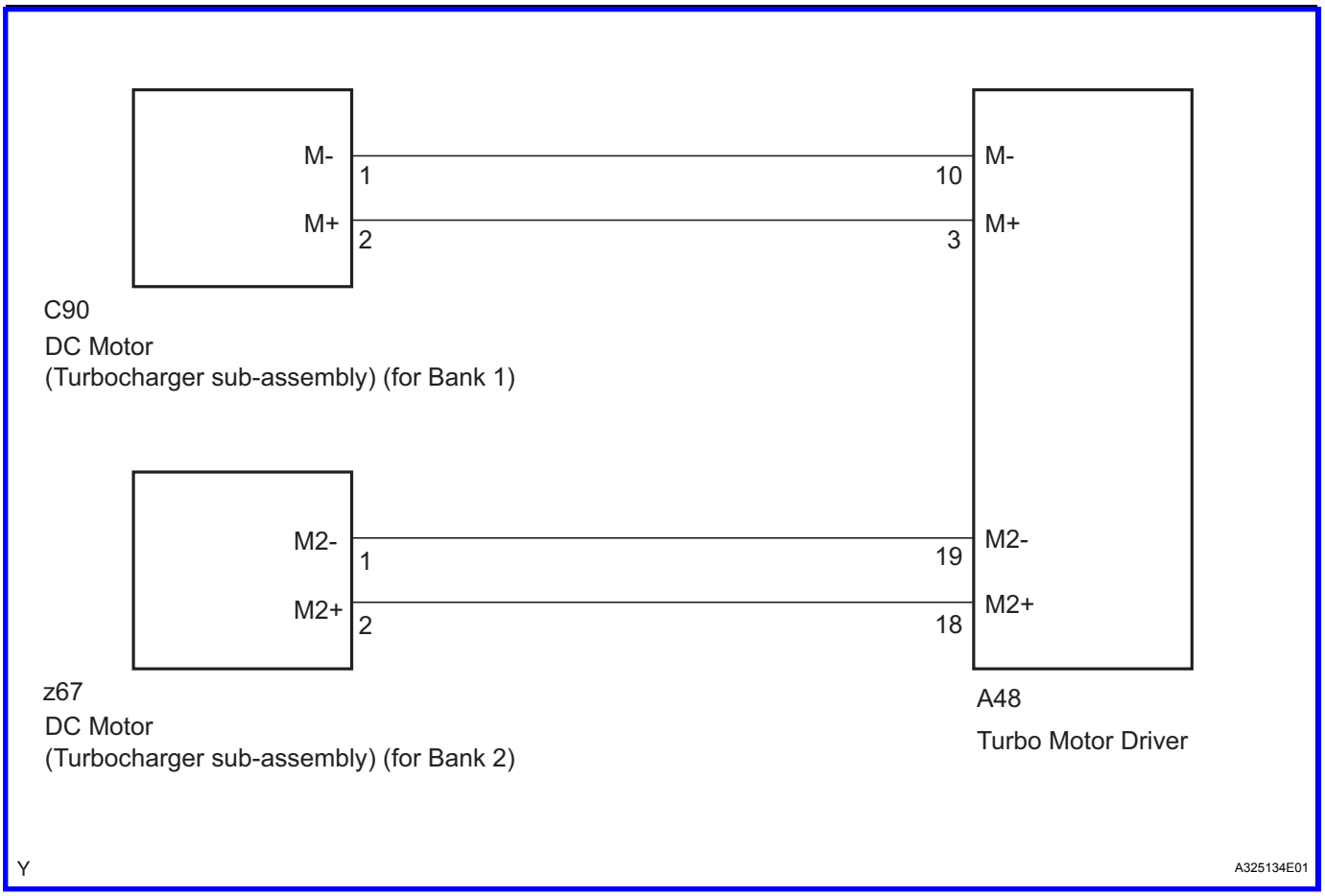
DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
Ignition switch ON for 1 second	DC motor current is 6.5 A or more for 0.5 seconds or more when the motor is operating (1 trip detection logic).	• Short in DC motor (turbocharger sub-assembly) circuit • Turbo motor driver • DC Motor (turbocharger sub-assembly) • Turbocharger nozzle vane is stuck or movement is irregular

HINT:
If DTC P0046, P0047, P0048, P004B, P004C and/or P004D is stored, the following symptoms may appear.
Stuck closed malfunction:
– Vehicle surge when driving with full load
Stuck open malfunction:
– Lack of power
– Vehicle surge or hesitation under light or medium load
– White smoke

[Corrected]

ES

WIRING DIAGRAM

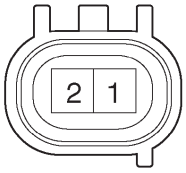


INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	INSPECT TURBOCHARGER SUB-ASSEMBLY (DC MOTOR) (for Bank 1 or Bank 2)

Component without harness connected:
(DC Motor)



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(a) Disconnect the DC motor connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance for Bank 1

Tester Connection	Condition	Specified Condition
1 (M-) - 2 (M+)	Always	1 to 100 Ω

Standard Resistance for Bank 2

Tester Connection	Condition	Specified Condition
1 (M2-) - 2 (M2+)	Always	1 to 100 Ω

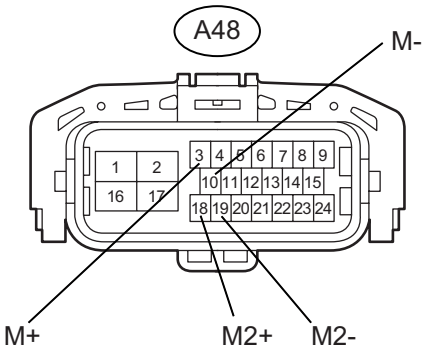
NG → **Go to step 6**

OK

2	CHECK HARNESS AND CONNECTOR (DC MOTOR - TURBO MOTOR DRIVER)

(a) Disconnect the DC motor (for Bank 1) connector.
(b) Disconnect the DC motor (for Bank 2) connector.
(c) Disconnect the turbo motor driver connector.

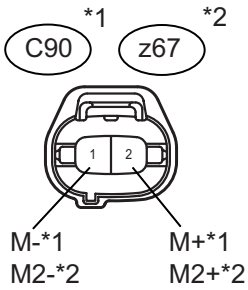
Front view of wire harness connector:
(to Turbo Motor Driver)



*1: Bank 1

*2: Bank 2

Front view of wire harness connector:
(to DC Motor (for Bank 1))



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(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open) for Bank 1

Tester Connection	Condition	Specified Condition
C90-1 (M-) - A48-10 (M-)	Always	Below 1 Ω
C90-2 (M+) - A48-3 (M+)	Always	Below 1 Ω

for Bank 2

Tester Connection	Condition	Specified Condition
z67-1 (M2-) - A48-19 (M2-)	Always	Below 1 Ω
z67-2 (M2+) - A48-18 (M2+)	Always	Below 1 Ω

Standard Resistance (Check for Short)

for Bank 1

Tester Connection	Condition	Specified Condition
C90-1 (M-) or A48-10 (M-) - Body ground	Always	10 kΩ or higher
C90-2 (M+) or A48-3 (M+) - Body ground	Always	10 kΩ or higher

for Bank 2

Tester Connection	Condition	Specified Condition
z67-1 (M2-) or A48-19 (M2-) - Body ground	Always	10 kΩ or higher
z67-2 (M2+) or A48-18 (M2+) - Body ground	Always	10 kΩ or higher

NG → Go to step 7

OK

3	INSPECT TURBOCHARGER SUB - ASSEMBLY

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to ON and turn the tester on.
(c) Start the engine and warm up.
(d) Move the shift lever to 3rd and accelerate the vehicle with the accelerator fully open.
(e) Stop the vehicle.
(f) Enter the following menus: Powertrain / Engine / DTC.
(g) Read the DTCs.

Result

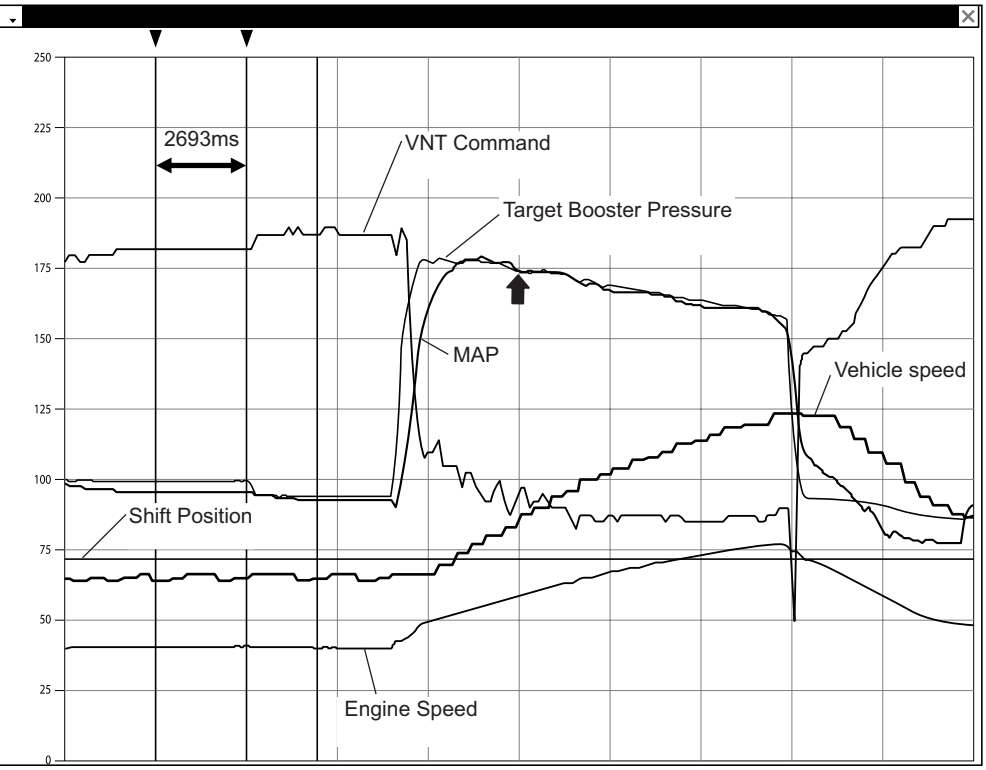
Display (DTC Output)	Proceed to
DTC P0046, P0047, P0048, P004B, P004C and/or P004D are output	A
No DTC output	B

HINT:

- A snapshot can be used to compare vehicle data from the time of the malfunction to normal data and is very useful for troubleshooting.
- "Target Booster Pressure" and "MAP" in the snapshot can be used to check the operation of the turbocharger. If "MAP" does not follow "Target Booster Pressure", the turbocharger nozzle vane may be stuck or the movement may be irregular.
- When the engine speed is 2500 to 3000 rpm with the accelerator pedal fully depressed, "MAP" is within +/- 10 kPa* of "Target Booster Pressure" (not immediately after beginning of acceleration).
- * If the turbocharger pressure does not reach a specified value, it cannot be determined whether the system is normal by checking whether "MAP" is within +/-10 kPa of "Target Booster Pressure".

Normal Condition

Name	Value	Unit
Shift Position Sig from ECT	3rd	
Map	119	kPa
Engine Speed	2418	rpm
Vehicle Speed	65	km/h
VNT Command	75	%
Target Booster Pressure	120.44	kPa
Calculate Load	27.0	%
MAF	72.46	gm ...
Coolant Temp	80	°C
Intake Air	39	°C
Fuel Press	69640	kPa
ECT Look Up	OFF	
Accel Sens. No.1 Volt %	29.4	%
Accel Sens. No.2 Volt %	45.0	%
Throttle Sensor Volt %	50.1	%
Throttle Sensor #2 Volt %	50.1	%
Initial Engine Coolant Temp	25.6	°C
Initial Intake Air Temp	28.1	°C
Intake Air Temp (Turbo)	48	°C
SPD (NO)	1750	rpm
EGR Lift Sensor Volt %	61.3	%
EGR Close Lrn. Val.	3.86	V
Actual EGR Valve Pos.	29.8	%
Actual EGR Valve Pos. #2	29.4	%
EGR Operation Prohibit	NG	
Target EGR Valve Pos.	28.6	%
Target EGR Valve Pos. #2	28.6	%
Throttle Valve Fully Closed	17.0	deg
Target Common Rail Pressure	70580	kPa
VNT Type	Commo	
VNT Max Angle	39.6	%
VNT Min Angle	51.9	%
Injection Pressure Correction	15.9	mm ....
EGR Close Learn Val.	3.86	V
EGR Close Lrn. Val. #2	3.86	V
Alternate Duty Ratio	32	%
Accel Sensor Out No.1	1.4	V
Accel Sensor Out No.2	2.2	V
Accel Position	23.82	%
Fuel Temperature	65	°C
Target Pump SCV Current	1348.2	mA
Inj. FB Vol. for Idle	-25.3	mm ...
Actual Throttle Position	35	%
Actual Throttle Position #2	34	%



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HINT:
Compare "MAP" with "Target Booster Pressure" at the point indicated by the arrow (↑) in the illustration.

A	**Go to step 6**

B

4 INSPECT TURBO MOTOR DRIVER

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*).
(c) Turn the engine switch off.
(d) Remove the rear fender splash shield sub-assembly RH.
(e) Remove the front fender liner LH.
(f) Disconnect the turbo motor driver connector.
(g) Reconnect the turbo motor driver connector.
(h) Turn the engine switch on (IG) and turn the tester on.
(i) After starting the engine, idle it for 5 seconds.
(j) Enter the following menus: Powertrain / Engine / DTC.
(k) Read the DTCs.

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

See*: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/08-)

B → END

A

5	REPLACE TURBO MOTOR DRIVER

(a) Replace the turbo motor driver (See page See*1).
NOTICE:
Make sure that foreign matter does not enter the connector(s) when replacing parts.

NEXT → Go to step 8

6	REPLACE TURBOCHARGER SUB-ASSEMBLY (for Bank 1 or Bank 2)

(a) Replace the turbocharger sub-assembly (for Bank 1 or Bank 2) (See page See*2).

NEXT → Go to step 8

7	REPAIR OR REPLACE HARNESS OR CONNECTOR

NEXT

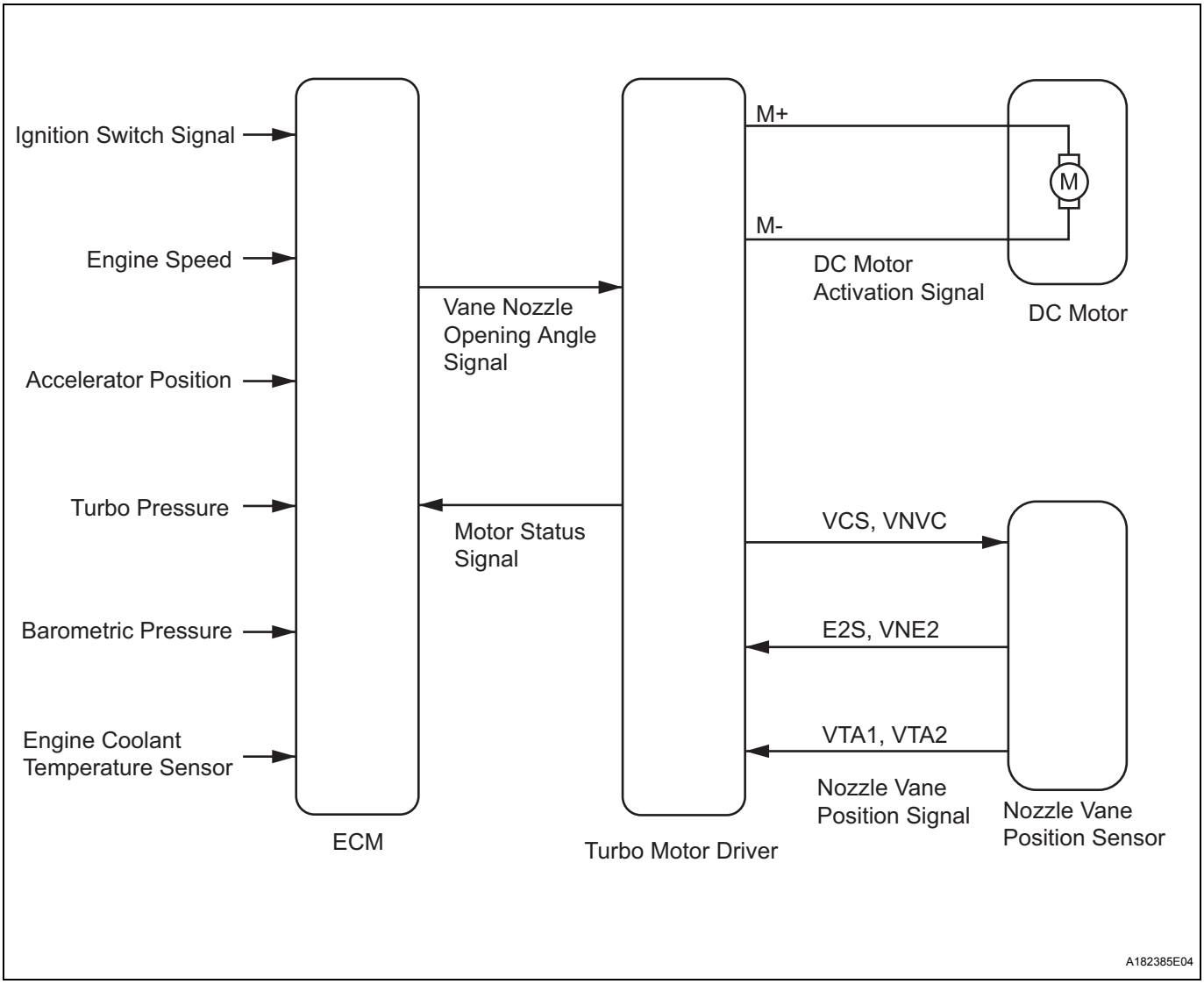
8	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*3).
(c) Turn the ignition switch off.
(d) Turn the ignition switch to ON for 5 seconds or more.
(e) Enter the following menus: Powertrain / Engine / DTC.
(f) Confirm that the DTC is not output again.

NEXT

END

See*1: 1VD-FTV INTAKE / EXHAUST - TURBO MOTOR DRIVER - REMOVAL (2013/08-)
See*2: 1VD-FTV INTAKE / EXHAUST - EXHAUST MANIFOLD W/ TURBOCHARGER - REMOVAL (2013/08-)
See*3: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/08-)



ES

P00AF

DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
After idling for 5 seconds	When a communication error occurs between the turbo motor driver and ECM (1 trip detection logic).	• Turbo motor driver • Open or short in turbo motor driver circuit • Turbo motor driver ground problem • ECM

[Corrected]

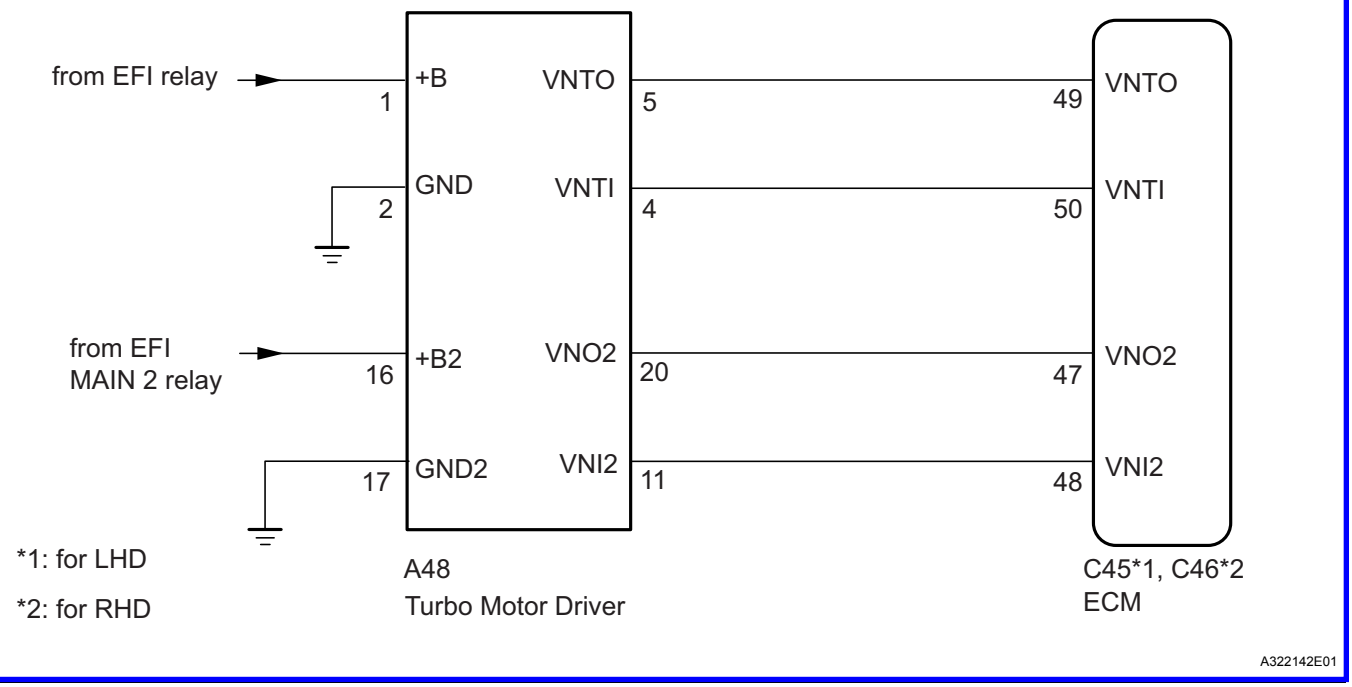
P00B0

DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
After idling for 5 seconds	When a communication error occurs between the turbo motor driver and ECM (1 trip detection logic).	• Turbo motor driver • Open or short in turbo motor driver circuit • Turbo motor driver ground problem • ECM

[Corrected]

[Corrected]

WIRING DIAGRAM



ES

INSPECTION PROCEDURE

HINT:

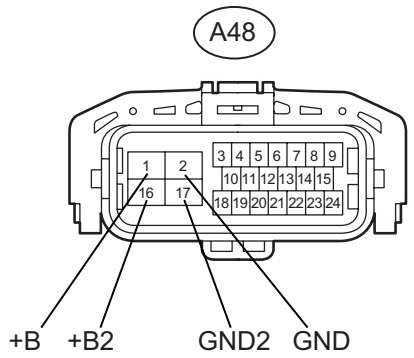
- Read freeze frame data using the intelligent tester. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Excessive electrical noise, such as from wireless radios or electrical modifications, may cause a DTC to be stored.

NOTICE:

After replacing the ECM, the new ECM needs registration (See page ES-34) and initialization (See page ES-60).

1 INSPECT TURBO MOTOR DRIVER (POWER SOURCE CIRCUIT)

Front view of wire harness connector:
(to Turbo Motor Driver)



(a) Disconnect the turbo motor driver connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
A48-1 (+B) - A48-2 (GND)	Engine switch on (IG)	11 to 14 V
A48-16 (+B2) - A48-17 (GND2)	Engine switch on (IG)	11 to 14 V

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A48-2 (GND) - Body ground	Always	Below 1 Ω
A48-17 (GND2) - Body ground	Always	Below 1 Ω

ES

NG → **Go to step 7**

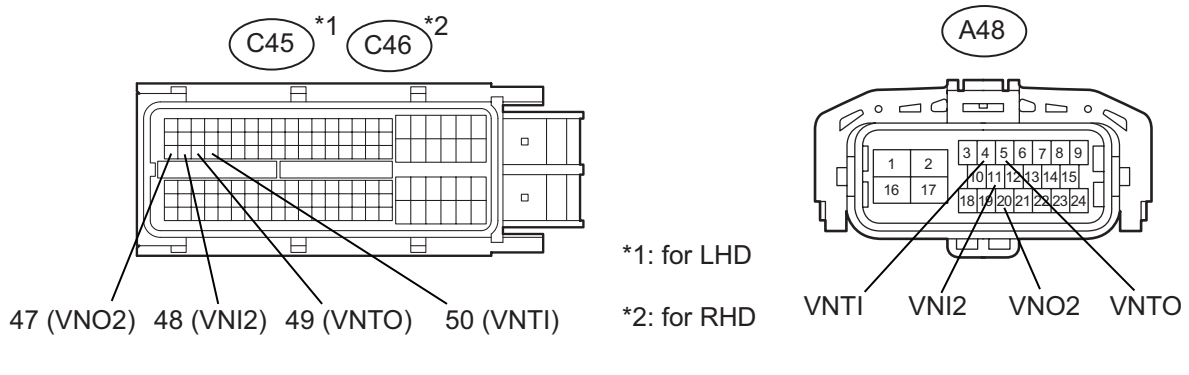
OK

2 CHECK HARNESS AND CONNECTOR (TURBO MOTOR DRIVER - ECM)

(a) Disconnect the turbo motor driver connector.
(b) Disconnect the ECM connector.

Front view of wire harness connector:
(to ECM)

Front view of wire harness connector:
(to Turbo Motor Driver)



(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open)
for LHD

Tester Connection	Condition	Specified Condition
C45-49 (VNTO) - A48-5 (VNTO)	Always	Below 1 Ω
C45-50 (VNTI) - A48-4 (VNTI)	Always	Below 1 Ω

Tester Connection	Condition	Specified Condition
C45-47 (VNO2) - A48-20 (VNO2)	Always	Below 1 Ω
C45-48 (VNI2) - A48-11 (VNI2)	Always	Below 1 Ω

for RHD

Tester Connection	Condition	Specified Condition
C46-49 (VNTO) - A48-5 (VNTO)	Always	Below 1 Ω
C46-50 (VNTI) - A48-4 (VNTI)	Always	Below 1 Ω
C46-47 (VNO2) - A48-20 (VNO2)	Always	Below 1 Ω
C46-48 (VNI2) - A48-11 (VNI2)	Always	Below 1 Ω

Standard Resistance (Check for Short)

for LHD

Tester Connection	Condition	Specified Condition
C45-49 (VNTO) or A48-5 (VNTO) - Body ground	Always	10 kΩ or higher
C45-50 (VNTI) or A48-4 (VNTI) - Body ground	Always	10 kΩ or higher
C45-47 (VNO2) or A48-20 (VNO2) - Body ground	Always	10 kΩ or higher
C45-48 (VNI2) or A48-11 (VNI2) - Body ground	Always	10 kΩ or higher

ES

for RHD

Tester Connection	Condition	Specified Condition
C46-49 (VNTO) or A48-5 (VNTO) - Body ground	Always	10 kΩ or higher
C46-50 (VNTI) or A48-4 (VNTI) - Body ground	Always	10 kΩ or higher
C46-47 (VNO2) or A48-20 (VNO2) - Body ground	Always	10 kΩ or higher
C46-48 (VNI2) or A48-11 (VNI2) - Body ground	Always	10 kΩ or higher

NG → **Go to step 8**

OK

3	INSPECT TURBO MOTOR DRIVER (for Bank 1 and Bank 2)

See*: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/01-2013/08)

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*).
(c) Turn the engine switch off.
(d) Remove the rear fender splash shield sub-assembly RH.
(e) Remove the front fender liner LH.
(f) Disconnect the turbo motor driver connector.
(g) Reconnect the turbo motor driver connector.
(h) Turn the engine switch on (IG) and turn the tester on.
(i) After starting the engine, idle it for 5 seconds.
(j) Enter the following menus: Powertrain / Engine / DTC.
(k) Read the DTCs.

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

B → END

A

4	REPLACE TURBO MOTOR DRIVER

(a) Replace the turbo motor driver (See page See*1).
NOTICE:
Make sure that foreign matter does not enter the connector(s) when replacing parts.

NEXT

5	CHECK WHETHER DTC OUTPUT RECURS

See*1: 1VD-FTV INTAKE / EXHAUST - TURBO MOTOR DRIVER - REMOVAL (2013/01-2013/08)
See*2: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/01-2013/08)
See*3: 1VD-FTV ENGINE CONTROL - ECM - REMOVAL (2013/01-2013/08)

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*2).
(c) Turn the engine switch off.
(d) Turn the engine switch on (IG) and turn the tester on.
(e) After starting the engine, idle it for 5 seconds.
(f) Enter the following menus: Powertrain / Engine / DTC.
(g) Read the DTCs.

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

B → END

A

6	REPLACE ECM

(a) Replace the ECM (See page See*3).

NEXT → Go to step 9

7	REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

NEXT → Go to step 9

8	REPAIR OR REPLACE HARNESS OR CONNECTOR (TURBO MOTOR DRIVER - ECM)

NEXT

9	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the intelligent tester to the DLC3.

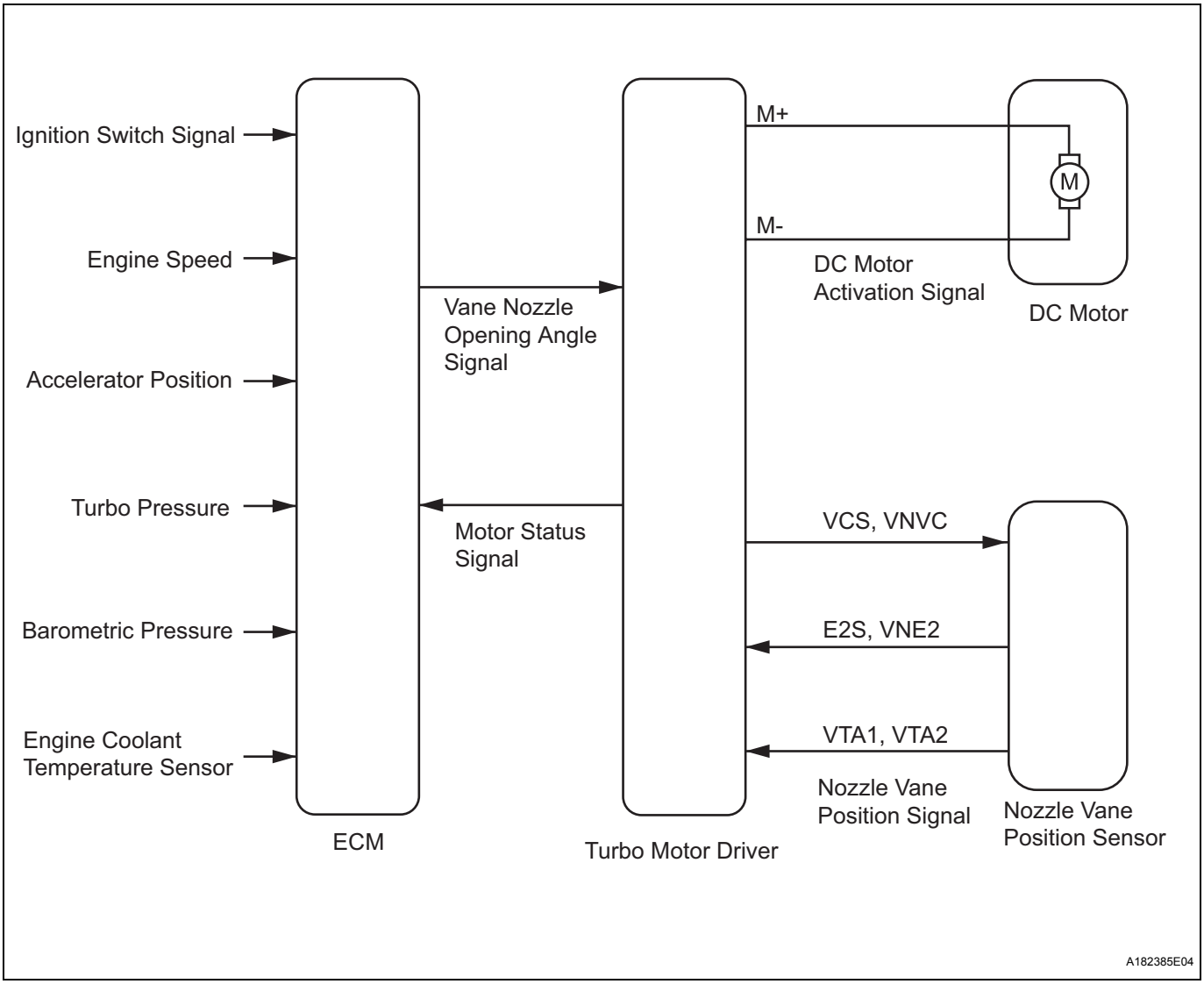
(b) Clear the DTCs (See page See*).
(c) Turn the ignition switch off.
(d) After starting the engine, idle it for 5 seconds.
(e) Enter the following menus: Powertrain / Engine / DTC.
(f) Confirm that the DTC is not output again.

NEXT

See*: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/01-2013/08)

END

ES



ES

P00AF

DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
After idling for 5 seconds	When a communication error occurs between the turbo motor driver and ECM (1 trip detection logic).	• Turbo motor driver • Open or short in turbo motor driver circuit • Turbo motor driver ground problem • ECM

[Corrected]

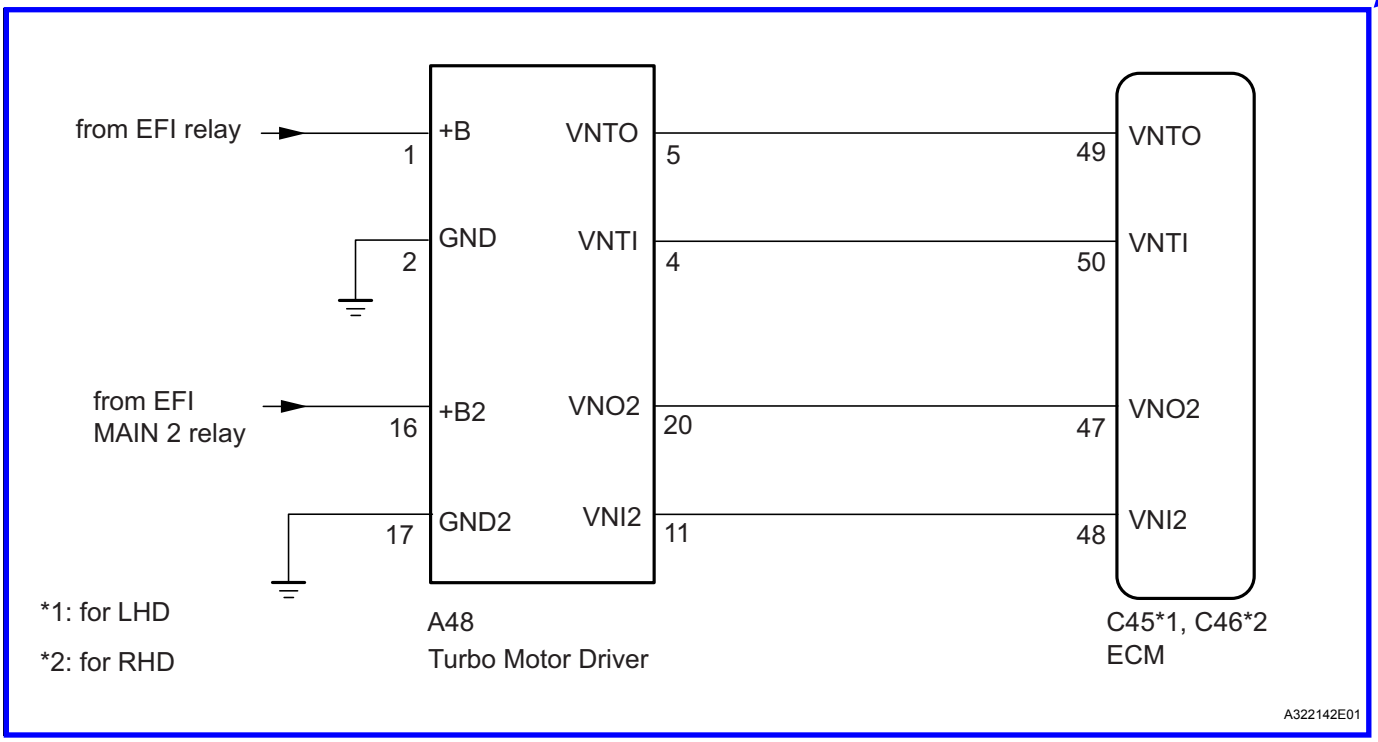
P00B0

DTC Detection Drive Pattern	DTC Detection Condition	Trouble Area
After idling for 5 seconds	When a communication error occurs between the turbo motor driver and ECM (1 trip detection logic).	• Turbo motor driver • Open or short in turbo motor driver circuit • Turbo motor driver ground problem • ECM

[Corrected]

[Corrected]

WIRING DIAGRAM



ES

INSPECTION PROCEDURE

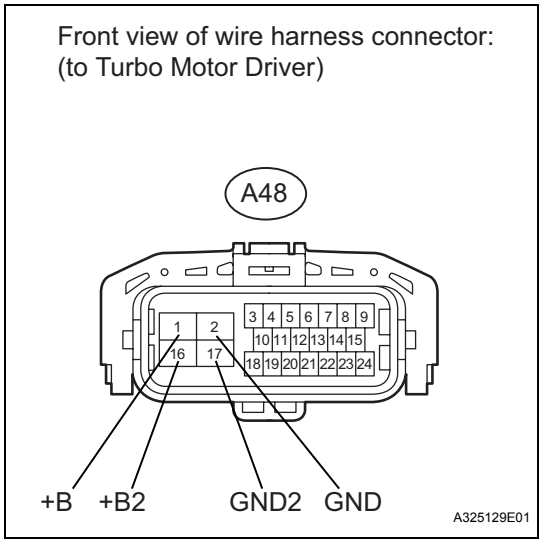
HINT:

- Read freeze frame data using the intelligent tester. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Excessive electrical noise, such as from wireless radios or electrical modifications, may cause a DTC to be stored.

NOTICE:

After replacing the ECM, the new ECM needs registration (See page ES-47) and initialization (See page ES-60).

1 INSPECT TURBO MOTOR DRIVER (POWER SOURCE CIRCUIT)



(a) Disconnect the turbo motor driver connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
A48-1 (+B) - A48-2 (GND)	Engine switch on (IG)	11 to 14 V
A48-16 (+B2) - A48-17 (GND2)	Engine switch on (IG)	11 to 14 V

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance

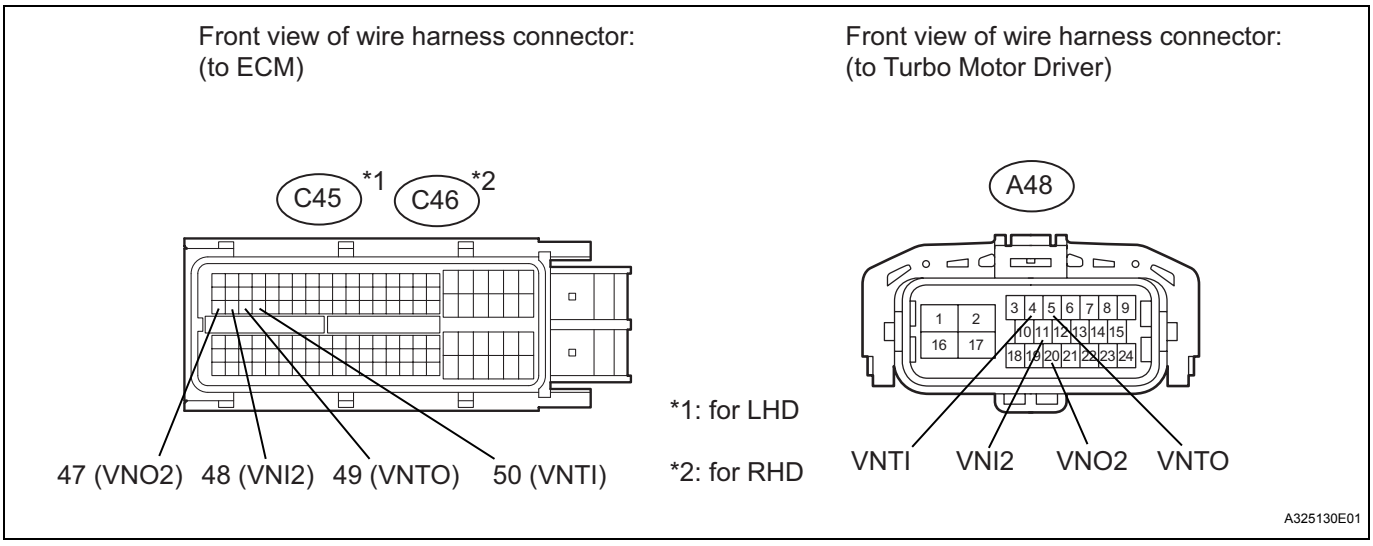
Tester Connection	Condition	Specified Condition
A48-2 (GND) - Body ground	Always	Below 1 Ω
A48-17 (GND2) - Body ground	Always	Below 1 Ω

NG → **Go to step 7**

OK

2 CHECK HARNESS AND CONNECTOR (TURBO MOTOR DRIVER - ECM)

(a) Disconnect the turbo motor driver connector.
(b) Disconnect the ECM connector.



(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open) for LHD

Tester Connection	Condition	Specified Condition
C45-49 (VNTO) - A48-5 (VNTO)	Always	Below 1 Ω
C45-50 (VNTI) - A48-4 (VNTI)	Always	Below 1 Ω

Tester Connection	Condition	Specified Condition
C45-47 (VNO2) - A48-20 (VNO2)	Always	Below 1 Ω
C45-48 (VNI2) - A48-11 (VNI2)	Always	Below 1 Ω

for RHD

Tester Connection	Condition	Specified Condition
C46-49 (VNTO) - A48-5 (VNTO)	Always	Below 1 Ω
C46-50 (VNTI) - A48-4 (VNTI)	Always	Below 1 Ω
C46-47 (VNO2) - A48-20 (VNO2)	Always	Below 1 Ω
C46-48 (VNI2) - A48-11 (VNI2)	Always	Below 1 Ω

Standard Resistance (Check for Short)

for LHD

Tester Connection	Condition	Specified Condition
C45-49 (VNTO) or A48-5 (VNTO) - Body ground	Always	10 kΩ or higher
C45-50 (VNTI) or A48-4 (VNTI) - Body ground	Always	10 kΩ or higher
C45-47 (VNO2) or A48-20 (VNO2) - Body ground	Always	10 kΩ or higher
C45-48 (VNI2) or A48-11 (VNI2) - Body ground	Always	10 kΩ or higher

for RHD

Tester Connection	Condition	Specified Condition
C46-49 (VNTO) or A48-5 (VNTO) - Body ground	Always	10 kΩ or higher
C46-50 (VNTI) or A48-4 (VNTI) - Body ground	Always	10 kΩ or higher
C46-47 (VNO2) or A48-20 (VNO2) - Body ground	Always	10 kΩ or higher
C46-48 (VNI2) or A48-11 (VNI2) - Body ground	Always	10 kΩ or higher

ES

NG → **Go to step 8**

OK

3 INSPECT TURBO MOTOR DRIVER (for Bank 1 and Bank 2)

See*: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/08-)

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*).
(c) Turn the engine switch off.
(d) Remove the rear fender splash shield sub-assembly RH.
(e) Remove the front fender liner LH.
(f) Disconnect the turbo motor driver connector.
(g) Reconnect the turbo motor driver connector.
(h) Turn the engine switch on (IG) and turn the tester on.
(i) After starting the engine, idle it for 5 seconds.
(j) Enter the following menus: Powertrain / Engine / DTC.
(k) Read the DTCs.

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

B → END

A

4	REPLACE TURBO MOTOR DRIVER

(a) Replace the turbo motor driver (See page See*1).

NOTICE:
Make sure that foreign matter does not enter the connector(s) when replacing parts.

NEXT

5	CHECK WHETHER DTC OUTPUT RECURS

ES

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*2).
(c) Turn the engine switch off.
(d) Turn the engine switch on (IG) and turn the tester on.
(e) After starting the engine, idle it for 5 seconds.
(f) Enter the following menus: Powertrain / Engine / DTC.
(g) Read the DTCs.

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

See*1: 1VD-FTV INTAKE / EXHAUST - TURBO MOTOR DRIVER - REMOVAL (2013/08-)
See*2: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/08-)
See*3: 1VD-FTV ENGINE CONTROL - ECM - REMOVAL (2013/08-)

B → END

A

6	REPLACE ECM

(a) Replace the ECM (See page See*3).

NEXT → Go to step 9

7	REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

NEXT → Go to step 9

8	REPAIR OR REPLACE HARNESS OR CONNECTOR (TURBO MOTOR DRIVER - ECM)

NEXT

9	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the intelligent tester to the DLC3.

(b) Clear the DTCs (See page See*).
(c) Turn the ignition switch off.
(d) After starting the engine, idle it for 5 seconds.
(e) Enter the following menus: Powertrain / Engine / DTC.
(f) Confirm that the DTC is not output again.

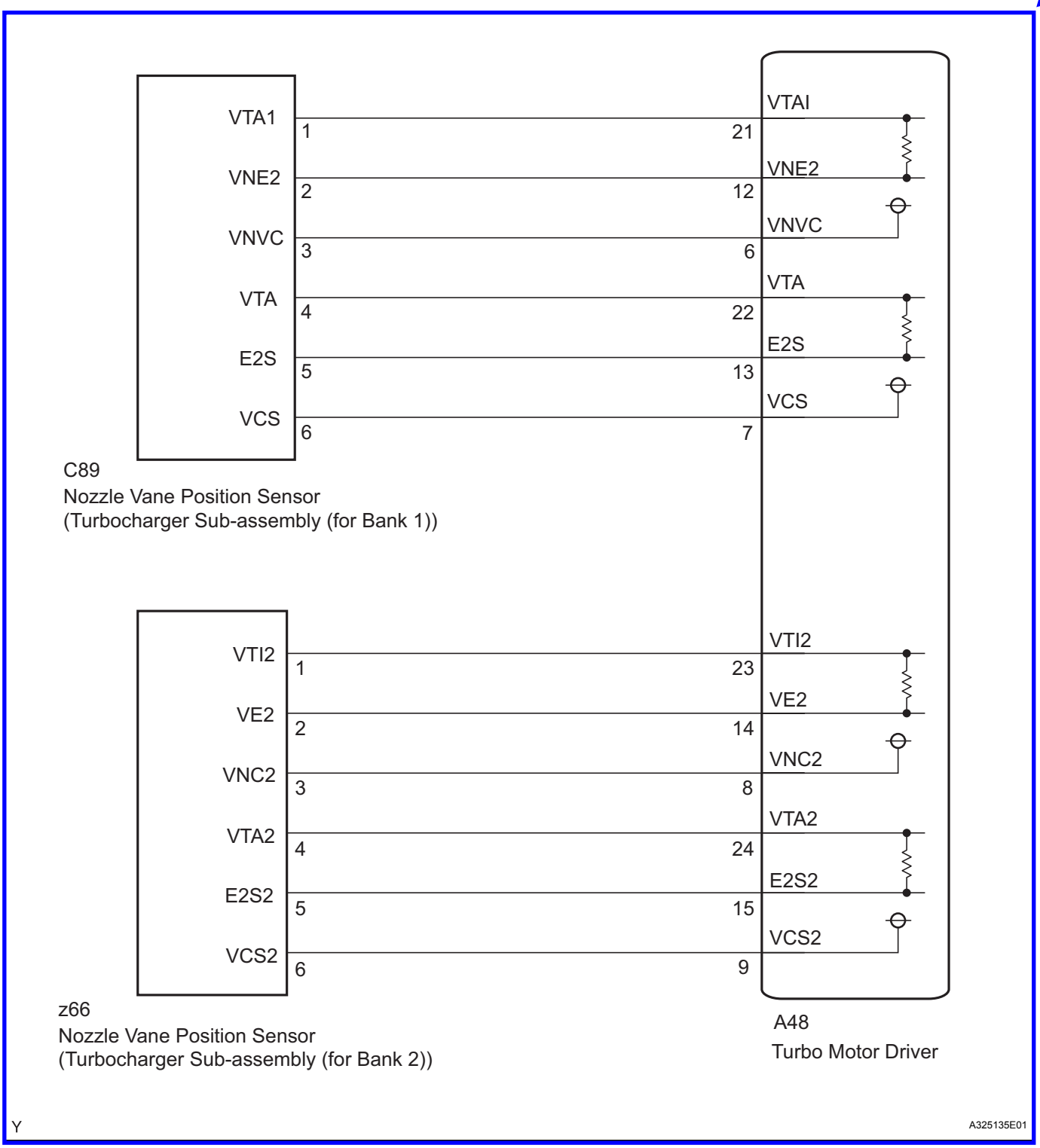
NEXT

See*: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/08-)

END

ES

WIRING DIAGRAM



ES

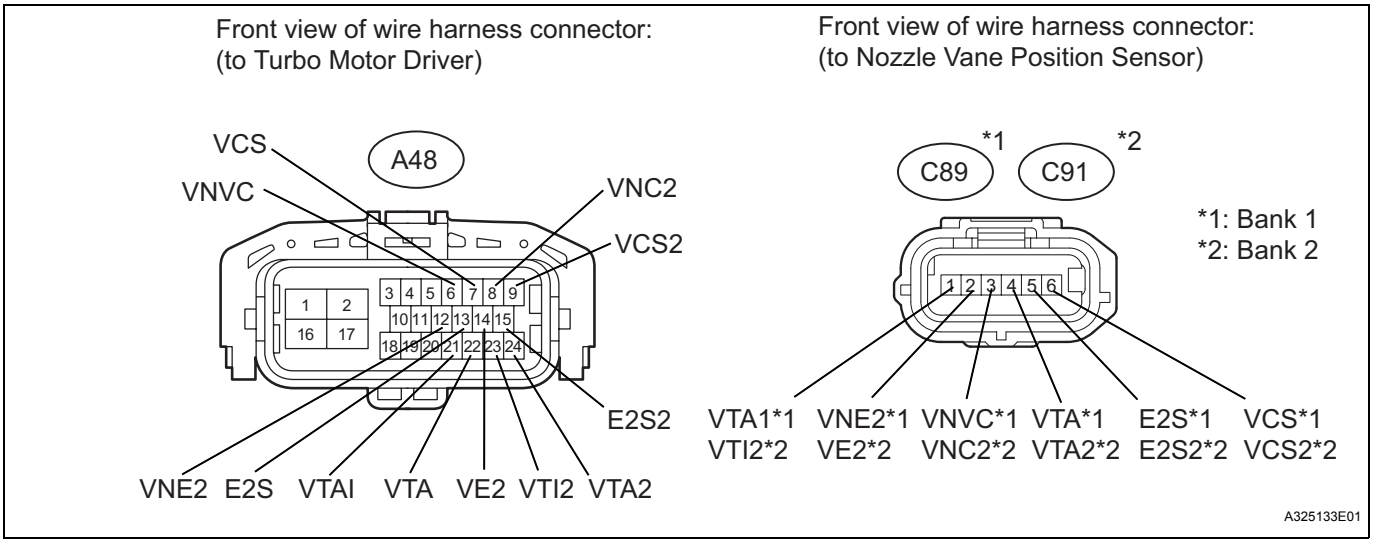
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK HARNESS AND CONNECTOR (TURBO MOTOR DRIVER - NOZZLE VANE POSITION SENSOR)

(a) Disconnect the nozzle vane position sensor (for Bank 1) connector.
(b) Disconnect the nozzle vane position sensor (for Bank 2) connector.
(c) Disconnect the turbo motor driver connector.



(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open)
for Bank 1

Tester Connection	Condition	Specified Condition
A48-21 (VTAI) - C89-1 (VTA1)	Always	Below 1 Ω
A48-12 (VNE2) - C89-2 (VNE2)	Always	Below 1 Ω
A48-6 (VNVC) - C89-3 (VNVC)	Always	Below 1 Ω
A48-22 (VTA) - C89-4 (VTA)	Always	Below 1 Ω
A48-13 (E2S) - C89-5 (E2S)	Always	Below 1 Ω
A48-7 (VCS) - C89-6 (VCS)	Always	Below 1 Ω

for Bank 2

Tester Connection	Condition	Specified Condition
A48-23 (VTI2) - z66-1 (VTI2)	Always	Below 1 Ω
A48-14 (VE2) - z66-2 (VE2)	Always	Below 1 Ω
A48-8 (VNC2) - z66-3 (VNC2)	Always	Below 1 Ω
A48-24 (VTA2) - z66-4 (VTA2)	Always	Below 1 Ω
A48-15 (E2S2) - z66-5 (E2S2)	Always	Below 1 Ω
A48-9 (VCS2) - z66-6 (VCS2)	Always	Below 1 Ω

Standard Resistance (Check for Short)
for Bank 1

Tester Connection	Condition	Specified Condition
A48-21 (VTAI) or C89-1 (VTA1) - Body ground	Always	10 kΩ or higher
A48-12 (VNE2) or C89-2 (VNE2) - Body ground	Always	10 kΩ or higher

Tester Connection	Condition	Specified Condition
A48-6 (VNVC) or C89-3 (VNVC) - Body ground	Always	10 kΩ or higher
A48-22 (VTA) or C89-4 (VTA) - Body ground	Always	10 kΩ or higher
A48-13 (E2S) or C89-5 (E2S) - Body ground	Always	10 kΩ or higher
A48-7 (VCS) or C89-6 (VCS) - Body ground	Always	10 kΩ or higher

for Bank 2

Tester Connection	Condition	Specified Condition
A48-23 (VTI2) or z66-1 (VTI2) - Body ground	Always	10 kΩ or higher
A48-14 (VE2) or z66-2 (VE2) - Body ground	Always	10 kΩ or higher
A48-8 (VNC2) or z66-3 (VNC2) - Body ground	Always	10 kΩ or higher
A48-24 (VTA2) or z66-4 (VTA2) - Body ground	Always	10 kΩ or higher
A48-15 (E2S2) or z66-5 (E2S2) - Body ground	Always	10 kΩ or higher
A48-9 (VCS2) or z66-6 (VCS2) - Body ground	Always	10 kΩ or higher

ES

NG → **Go to step 6**

OK

2 INSPECT TURBO MOTOR DRIVER

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*1).
(c) Turn the engine switch off.
(d) Remove the rear fender splash shield sub-assembly RH.
(e) Remove the front fender liner LH.
(f) Disconnect the turbo motor driver connector.
(g) Reconnect the turbo motor driver connector.
(h) Turn the engine switch on (IG) and turn the tester on.
(i) After starting the engine, idle it for 5 seconds.
(j) Enter the following menus: Powertrain / Engine / DTC.
(k) Read the DTCs.

See*1: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/01-2013/08)
See*2: 1VD-FTV INTAKE / EXHAUST - TURBO MOTOR DRIVER - REMOVAL (2013/01-2013/08)

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

B → **END**

A

3 REPLACE TURBO MOTOR DRIVER

(a) Replace the turbo motor driver (See page See*2).

NOTICE:
Make sure that foreign matter does not enter the connector(s) when replacing parts.

NEXT

4	CHECK WHETHER DTC OUTPUT RECURS

(a) Connect the intelligent tester to the DLC3.
(b) Turn the engine switch on (IG) and turn the tester on.
(c) Clear the DTCs (See page See*1).
(d) Turn the engine switch off.
(e) Turn the engine switch on (IG) and turn the tester on.
(f) After starting the engine, idle it for 5 seconds.
(g) Enter the following menus: Powertrain / Engine / DTC.
(h) Read the DTCs.

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

B → END

A

5	REPLACE TURBOCHARGER SUB-ASSEMBLY (for Bank 1 or Bank 2) (NOZZLE VANE POSITION SENSOR)

(a) Replace the turbocharger sub-assembly (for Bank 1 or Bank 2) (See page See*2).

NEXT → Go to step 7

6	REPAIR OR REPLACE HARNESS OR CONNECTOR

NEXT

7	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*1).
(c) Turn the ignition switch off.
(d) Turn the ignition switch off and leave the vehicle for 15 seconds.
(e) Turn the ignition switch to ON for 1 second.
(f) Confirm that the DTC is not output again.

HINT:

Perform the following procedure using the tester to determine whether or not the DTC judgment has been carried out

(1) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
(2) Input DTC P1258, P1259, P1260, P1262, P1263, P2563, P2564, P2565, P2588 and/or P2589.

See*1: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/01-2013/08)
See*2: 1VD-FTV INTAKE / EXHAUST - EXHAUST MANIFOLD W/ TURBOCHARGER - REMOVAL (2013/01-2013/08)

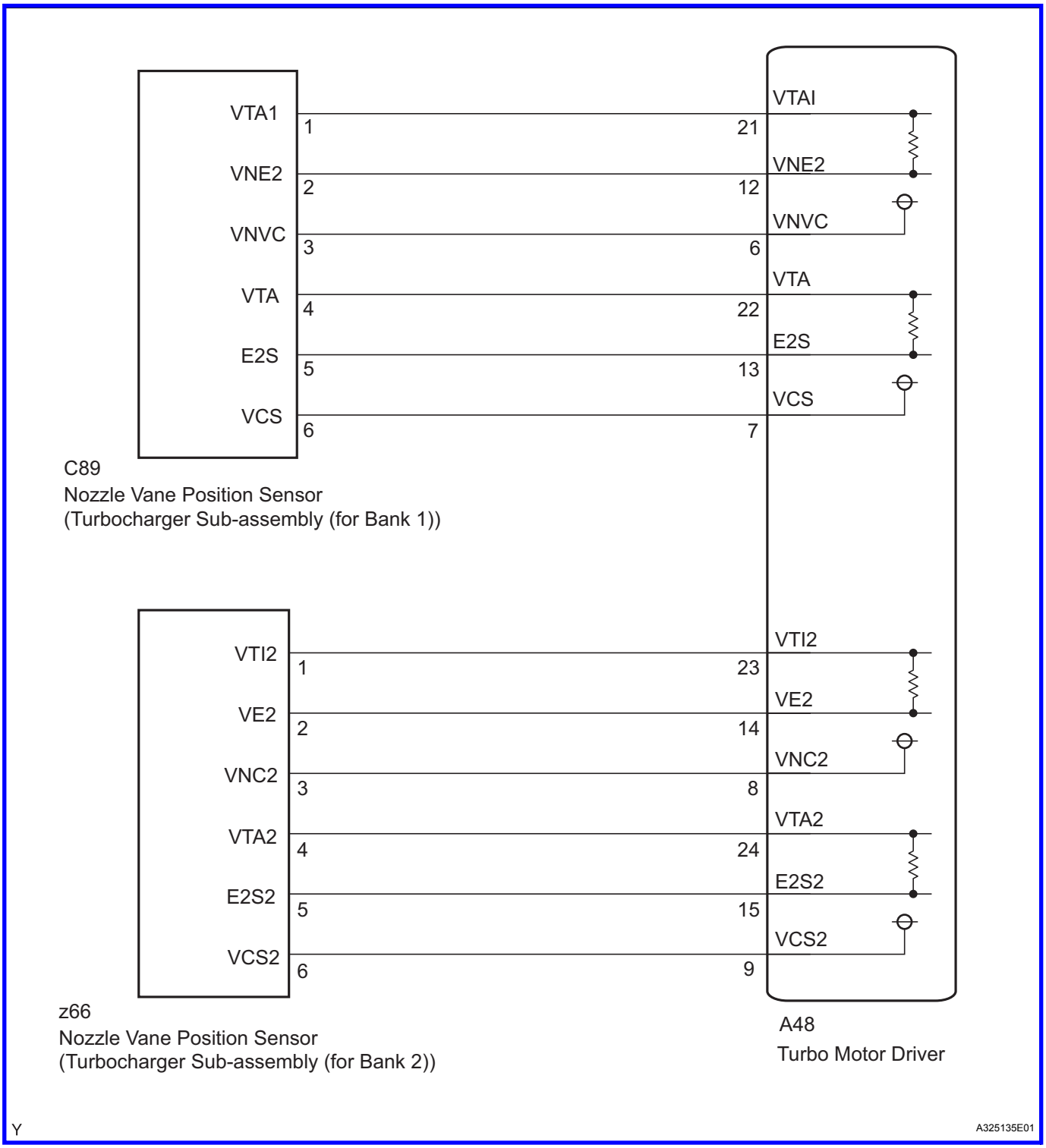
(3) Check that STATUS is NORMAL. If STATUS is INCOMPLETE or UNKNOWN, idle the engine.

NEXT

END

ES

WIRING DIAGRAM



ES

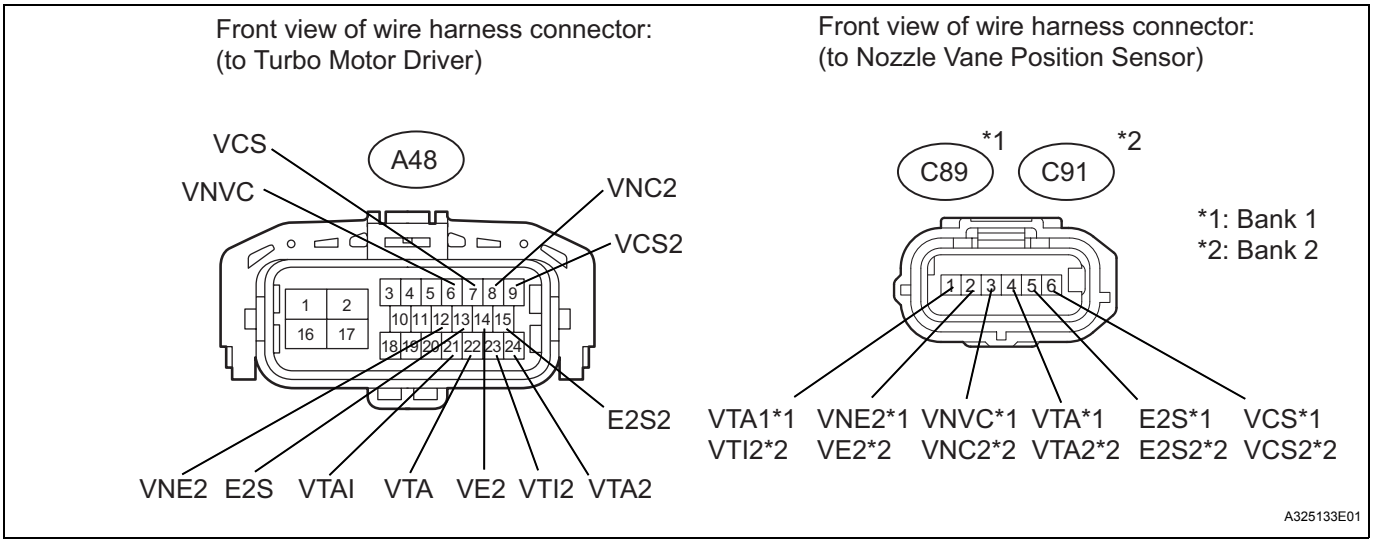
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	**CHECK HARNESS AND CONNECTOR (TURBO MOTOR DRIVER - NOZZLE VANE POSITION SENSOR)**

(a) Disconnect the nozzle vane position sensor (for Bank 1) connector.
(b) Disconnect the nozzle vane position sensor (for Bank 2) connector.
(c) Disconnect the turbo motor driver connector.



(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open)
for Bank 1

Tester Connection	Condition	Specified Condition
A48-21 (VTAI) - C89-1 (VTA1)	Always	Below 1 Ω
A48-12 (VNE2) - C89-2 (VNE2)	Always	Below 1 Ω
A48-6 (VNVC) - C89-3 (VNVC)	Always	Below 1 Ω
A48-22 (VTA) - C89-4 (VTA)	Always	Below 1 Ω
A48-13 (E2S) - C89-5 (E2S)	Always	Below 1 Ω
A48-7 (VCS) - C89-6 (VCS)	Always	Below 1 Ω

for Bank 2

Tester Connection	Condition	Specified Condition
A48-23 (VTI2) - z66-1 (VTI2)	Always	Below 1 Ω
A48-14 (VE2) - z66-2 (VE2)	Always	Below 1 Ω
A48-8 (VNC2) - z66-3 (VNC2)	Always	Below 1 Ω
A48-24 (VTA2) - z66-4 (VTA2)	Always	Below 1 Ω
A48-15 (E2S2) - z66-5 (E2S2)	Always	Below 1 Ω
A48-9 (VCS2) - z66-6 (VCS2)	Always	Below 1 Ω

Standard Resistance (Check for Short)
for Bank 1

Tester Connection	Condition	Specified Condition
A48-21 (VTAI) or C89-1 (VTA1) - Body ground	Always	10 kΩ or higher
A48-12 (VNE2) or C89-2 (VNE2) - Body ground	Always	10 kΩ or higher

Tester Connection	Condition	Specified Condition
A48-6 (VNVC) or C89-3 (VNVC) - Body ground	Always	10 kΩ or higher
A48-22 (VTA) or C89-4 (VTA) - Body ground	Always	10 kΩ or higher
A48-13 (E2S) or C89-5 (E2S) - Body ground	Always	10 kΩ or higher
A48-7 (VCS) or C89-6 (VCS) - Body ground	Always	10 kΩ or higher

for Bank 2

Tester Connection	Condition	Specified Condition
A48-23 (VTI2) or z66-1 (VTI2) - Body ground	Always	10 kΩ or higher
A48-14 (VE2) or z66-2 (VE2) - Body ground	Always	10 kΩ or higher
A48-8 (VNC2) or z66-3 (VNC2) - Body ground	Always	10 kΩ or higher
A48-24 (VTA2) or z66-4 (VTA2) - Body ground	Always	10 kΩ or higher
A48-15 (E2S2) or z66-5 (E2S2) - Body ground	Always	10 kΩ or higher
A48-9 (VCS2) or z66-6 (VCS2) - Body ground	Always	10 kΩ or higher

ES

NG → **Go to step 6**

OK

2 INSPECT TURBO MOTOR DRIVER

See*1: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/08-)
See*2: 1VD-FTV INTAKE / EXHAUST - TURBO MOTOR DRIVER - REMOVAL (2013/08-)

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*1).
(c) Turn the engine switch off.
(d) Remove the rear fender splash shield sub-assembly RH.
(e) Remove the front fender liner LH.
(f) Disconnect the turbo motor driver connector.
(g) Reconnect the turbo motor driver connector.
(h) Turn the engine switch on (IG) and turn the tester on.
(i) After starting the engine, idle it for 5 seconds.
(j) Enter the following menus: Powertrain / Engine / DTC.
(k) Read the DTCs.

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

B → **END**

A

3 REPLACE TURBO MOTOR DRIVER

(a) Replace the turbo motor driver (See page See*2).

NOTICE:
Make sure that foreign matter does not enter the connector(s) when replacing parts.

NEXT

4	CHECK WHETHER DTC OUTPUT RECURS

(a) Connect the intelligent tester to the DLC3.
(b) Turn the engine switch on (IG) and turn the tester on.
(c) Clear the DTCs (See page See*1).
(d) Turn the engine switch off.
(e) Turn the engine switch on (IG) and turn the tester on.
(f) After starting the engine, idle it for 5 seconds.
(g) Enter the following menus: Powertrain / Engine / DTC.
(h) Read the DTCs.

Result

Display (DTC Output)	Proceed to
DTC is output	A
DTC is not output	B

B → END

A

5	REPLACE TURBOCHARGER SUB-ASSEMBLY (for Bank 1 or Bank 2) (NOZZLE VANE POSITION SENSOR)

(a) Replace the turbocharger sub-assembly (for Bank 1 or Bank 2) (See page See*2).

NEXT → Go to step 7

6	REPAIR OR REPLACE HARNESS OR CONNECTOR

NEXT

7	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the intelligent tester to the DLC3.
(b) Clear the DTCs (See page See*1).
(c) Turn the ignition switch off.
(d) Turn the ignition switch off and leave the vehicle for 15 seconds.
(e) Turn the ignition switch to ON for 1 second.
(f) Confirm that the DTC is not output again.

HINT:

Perform the following procedure using the tester to determine whether or not the DTC judgment has been carried out

(1) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
(2) Input DTC P1258, P1259, P1260, P1262, P1263, P2563, P2564, P2565, P2588 and/or P2589.

See*1: 1VD-FTV ENGINE CONTROL - ECD SYSTEM - DTC CHECK / CLEAR (2013/08-)
See*2: 1VD-FTV INTAKE / EXHAUST - EXHAUST MANIFOLD W/ TURBOCHARGER - REMOVAL (2013/08-)

(3) Check that STATUS is NORMAL. If STATUS is INCOMPLETE or UNKNOWN, idle the engine.

NEXT

END

ES