

ENGINE CONTROL SYSTEM

EFI SYSTEMEF-2

 SYSTEM DESCRIPTIONEF-2

 DIAGNOSISEF-6

 BASIC CHECKEF-6

 TROUBLE SHOOTING

 ACCORDING TO DTCEF-16

UNIT INSPECTIONEF-20

 BOOST PRESSURE

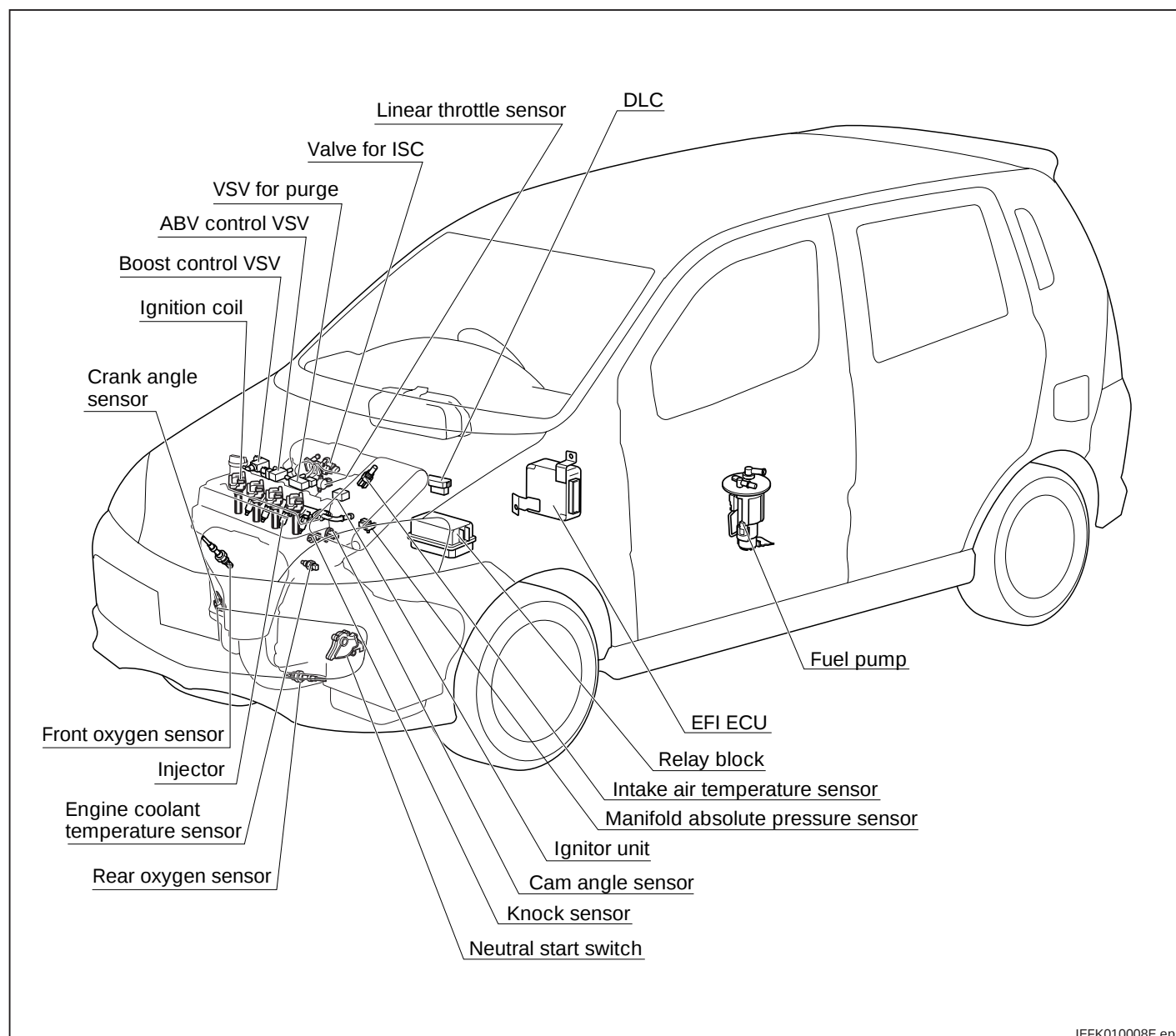
 CONTROL VSVEF-20

 AIR BYPASS CONTROL VSVEF-20

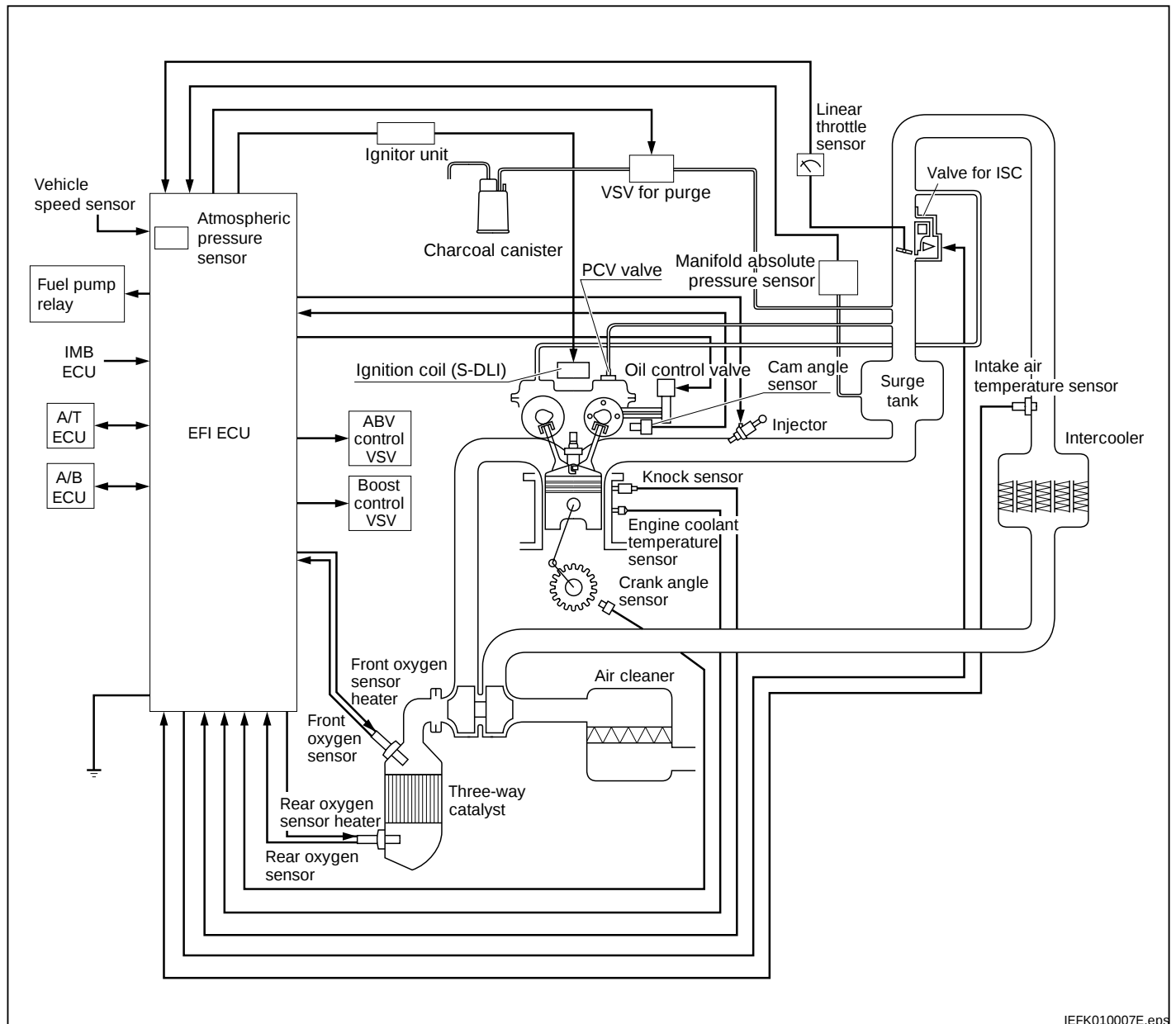
1 EFI SYSTEM

1-1 SYSTEM DESCRIPTION

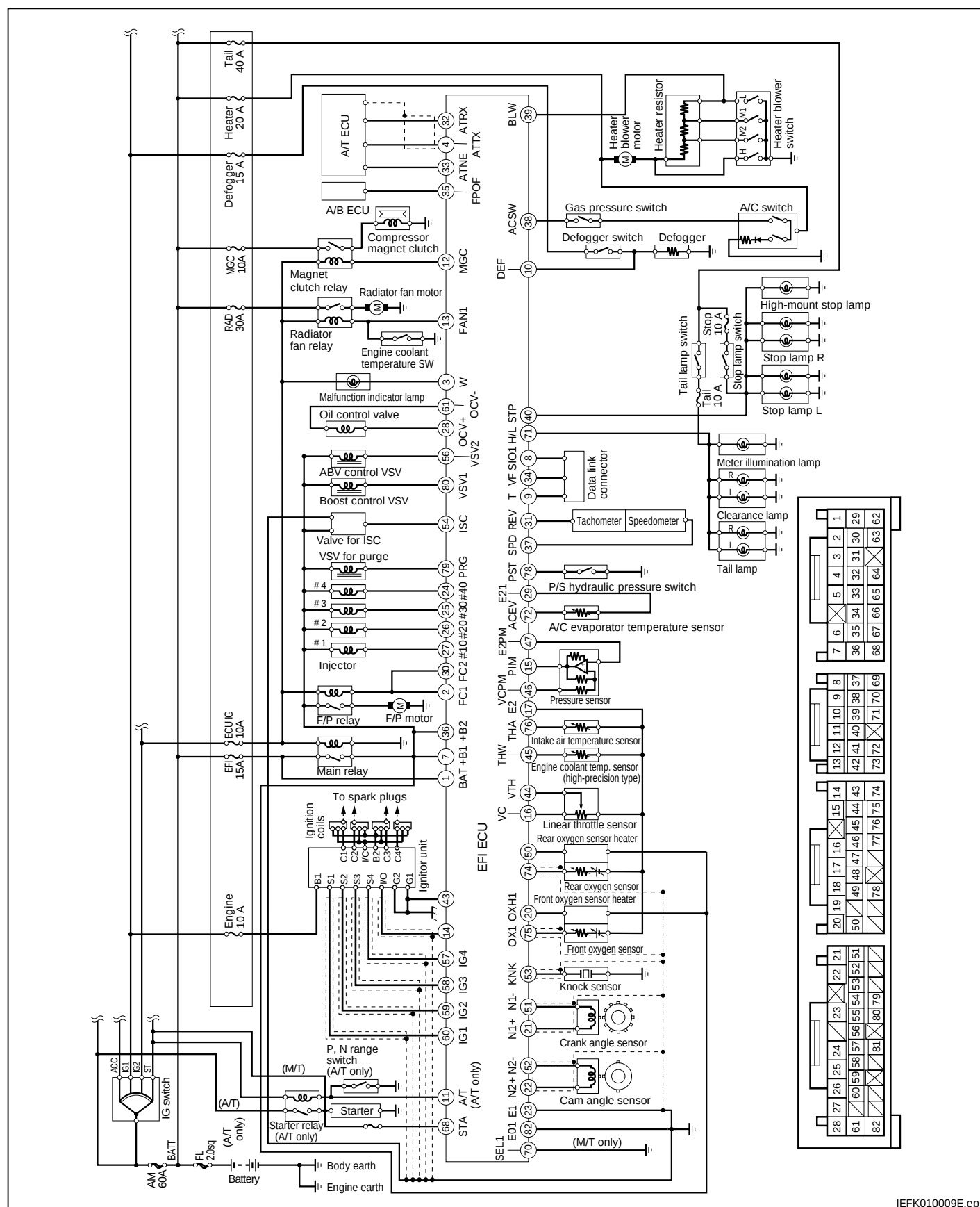
1-1-1 LOCATION OF ELECTRONIC CONTROL PARTS



1-1-2 SYSTEM DIAGRAM

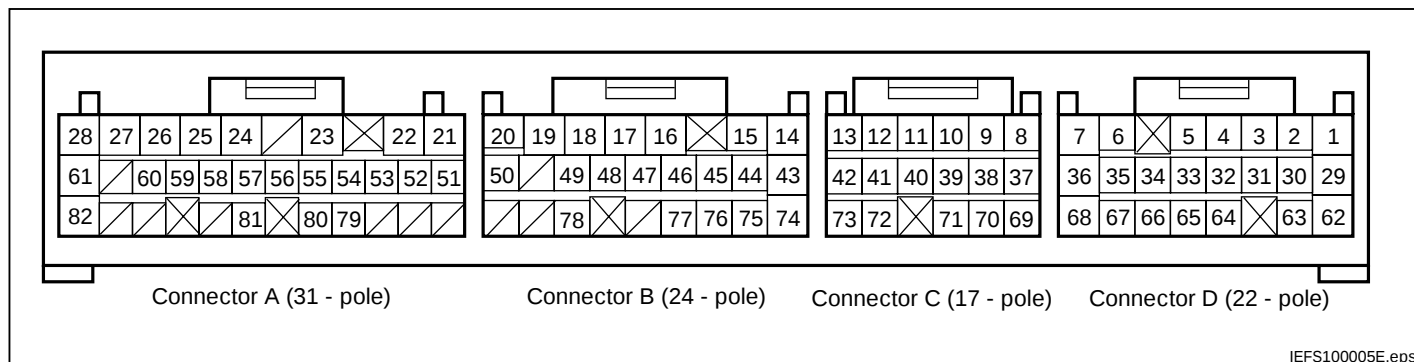


1-1-3 WIRING DIAGRAM



1-1-4 ARRANGEMENT OF EFI ECU TERMINAL

(1) M201 EU SPECIFICATIONS (K3-VET ENGINE)



1. CONNECTOR A

No.		Contents of connection	No.		Contents of connection
21	N1+	Crank angle sensor (+)	55	ALTC	—
22	N2+	Cam angle sensor (+)	56	VSV2	ABV control VSV
23	E1	Sensor system ground	57	IG4	Ignition signal (#4 cylinder)
24	#40	Injector (#4 cylinder)	58	IG3	Ignition signal (#3 cylinder)
25	#30	Injector (#3 cylinder)	59	IG2	Ignition signal (#2 cylinder)
26	#20	Injector (#2 cylinder)	60	IG1	Ignition signal (#1 cylinder)
27	#10	Injector (#1 cylinder)	61	OCV-	Oil control valve (-)
28	OCV+	Oil control valve (+)	79	PRG	Purge control VSV
51	N1-	Crank angle sensor (-)	80	VSV1	Boost pressure control VSV
52	N2-	Cam angle sensor (-)	81	ALT	—
53	KNK	Knock sensor	82	E01	Power supply system ground
54	ISC	Rotary ISC			

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2. CONNECTOR B

No.		Contents of connection	No.		Contents of connection
14	ICMB	—	46	VCPM	
15	PIM	Pressure sensor signal	47	E2PM	
16	VC	Linear throttle sensor power supply	48	ACLK	
17	E2	Sensor ground	49	ACEN	
18	FCCP	—	50	OXH2	
19	VFP	—	74	OX2	
20	OXH1	—	75	OX1	
43	IE	—	76	THA	
44	VTH	Linear throttle sensor	77	ACVR	
45	THW	Engine coolant temperature sensor	78	PST	

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3. CONNECTOR C

No.		Contents of connection	No.		Contents of connection
8	SIO1	Diagnosis tester	40	STP	Stop lamp switch
9	T	Test terminal	41	AUX	—
10	DEF	Defogger switch	42	FAN2	—
11	A/T	Neutral start switch (Only for A/T)	69	SEL2	—
12	MGC	A/C Magnet clutch relay	70	SEL1	Map constant switch signal (Only for M/T)
13	FAN1	Radiator fan relay (Without 2-step control)	71	H/L	Tail lamp switch
37	SPD	Vehicle speed sensor	72	ACEV	A/C Evaporator temp. sensor
38	ACSW	A/C Switch	73	OX3	—
39	BLW	Heater blower switch			

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4. CONNECTOR D

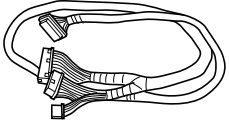
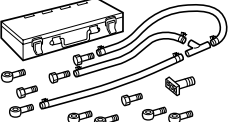
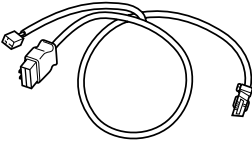
No.		Contents of connection	No.		Contents of connection
1	BAT	Memory back-up supply	33	ATNE	Engine speed signal to A/T ECU
2	FC1	Fuel pump relay (With IMB)	34	VF	VF monitor terminal
3	W	Malfunction indicator lamp	35	FPOF	Fuel pump relay OFF
4	ATTX	Serial data transmission to A/T ECU	36	+B2	Power supply
5	SIO2	Serial port for IMB	62	VCO	—
6	TRRQ	—	63	VTHO	—
7	+B1	Power supply	64	IDLO	—
29	E21	A/C Evaporator temp. sensor ground	65	FCO	—
30	FC2	Fuel pump relay (Without IMB)	66	TRPR	—
31	REV	Engine speed signal	67	ACT	—
32	ATRX	Serial data reception from A/T ECU	68	STA	Starter signal

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1-2 DIAGNOSIS

1-2-1 ARTICLES TO BE PREPARED

	Shape	Parts number, parts name	Use
SST		09842-97203-000 Sub-harness, EFI computer check	For inspection of computer input/output voltage
		09268-87702-000 Tool set, injection measuring	For inspection of fuel pressure
		09842-30070-000 Wire, EFI inspection	For inspection of injector
		09991-87404-000 Wire, engine control system inspection	For measurement of engine revolution speed and VF terminal out-put voltage For shorting terminal T
		09991-87403-000 Wire, diagnosis check	For shorting terminal T
		09268-87701-000 Gauge, EFI fuel pressure	For inspection of fuel pressure
Instrument	Sound scope, Compression pressure gauge, Tester		

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EF-EFI-G-P-00001

1-3 FUNCTION CHECK

1-3-1 VOLTAGE CHECK

1. Install the SST between the engine ECU and the vehicle harness and measure the voltages between the respective terminals of the SST connectors. Check to see if the measured values conform to the specification in accordance with the following table.

(1) STANDARD VOLTAGES

System to be checked		Terminals	Measurement conditions	Reference values
Power supply system		+B1 - E1	When IG is "ON"	Battery voltage
		+B2 - E1	When IG is "ON"	
		BAT - E1	At all times	
Pressure sensor system		VCPM - E2PM	When IG is "ON"	4.5 - 5.5 V
		PIM - E2PM	Sensor released to atmosphere	2.2 - 3.1 V
			After engine starting	Value changes, according to accelerator opening angle
Throttle sensor system		VC - E2	When IG is "ON"	4.5 - 5.5 V
		VTH - E2	Throttle valve fully closed	0.4 - 0.8 V
			Throttle valve fully opened	3.2 - 5.0 V
Engine coolant temperature sensor system		THW - E2	When warming up engine (Water temperature: 60 - 120°C)	0.2 - 1.0 V
Intake air temperature sensor system		THA - E2	When warming up engine	0.1 - 4.8 V
Vehicle speed sensor system		SPD - E1	Driving wheels are turned slowly	0 $\Rightarrow$ 5 V
Knock sensor system		KNK - E1	When idling, racing	Generation of wave form
Cam angle sensor system		N2+ - N2 -	When idling	Generation of wave form
Crank angle sensor system		N1+ - N1 -	When idling	Generation of wave form
O ₂ sensor system	Front	OX1 - E2	After engine speed is held at 3000 rpm for four minutes	0.05 - 0.95 V
	Rear	OX2 - E2	After engine speed is held at 3000 rpm for four minutes	0.05 - 0.95 V
Ignitor unit system (Ion current sensor)		ICMB - IE	When idling	Generation of wave form
Injector system		#10 - E1	When IG is "ON"	Battery voltage
		#20 - E1		
		#30 - E1	When cranking	Generation of pulse
		#40 - E1		
Ignition system		IG1 - E1	When IG is "ON"	Battery voltage
		IG2 - E1		
		IG3 - E1	When cranking	Generation of pulse
		IG4 - E1		
ISC driving signal system		ISC - E1	During idling	Generation of pulse
Oil pressure switch for power steering system		PST - E1	Oil pressure switch "ON"	0 - 0.5 V
			Oil pressure switch "OFF"	Battery voltage
Fuel pump system Equipped with immobilizer/ Not equipped with immobilizer		FC1 - E1	With fuel pump in a stopped state	Battery voltage
		FC2 - E1	During idling (or when cranking)	2 V or less
VF monitor system		VF - E1	After engine speed is held at 3000 rpm for four minutes (Terminal T shorted)	0 $\Rightarrow$ 5 V (Pulse)
P, N range signal detecting system		A/T - E1	P, N range	0 - 0.5 V
			Other than P, N range	Approx. 10 V
Evaporator temperature sensor system		ACEV - E21	When air conditioner is "ON"	0.15 - 4.8 V
Air conditioner input signal system		ACSW - E1	When air conditioner is operating	Battery voltage
			When air conditioner is not operating	0 - 0.5 V
Headlamp system		H/L - E1	Tail lamp illuminated	Battery voltage
			Tail lamp extinguished	0 - 0.5 V
Defogger system		DEF - E1	When defogger switch is "ON"	Battery voltage
			When defogger switch is "OFF"	0 - 0.5 V
Blower system		BLW - E1	When heater blower switch is "ON"	0 - 0.5 V
			When heater blower switch is "OFF"	Battery voltage

System to be checked	Terminals	Measurement conditions	Reference values
Radiator fan control system	RFAN - E1	When water temperature switch is "ON"	1 V or less
		When water temperature switch is "OFF"	Battery voltage
Stop lamp system	STP - E1	When stop lamp switch is "ON"	Battery voltage
		When stop lamp switch is "OFF"	0 - 0.5 V
Variable valve timing	OCV+ - OCV-	When idling	4 V or less
Evaporator purge control system	PRG - E1	When idling	Battery voltage
		When racing (3000 rpm)	Generation of pulse
Magnet clutch control system	MGC - E1	When air conditioner is operating (Air conditioner switch and heater blower switch are ON.)	1 V or less
		When air conditioner is not operating	Battery voltage
Engine revolution output system	REV - E1	When idling	Generation of pulse
Communication signal control system	SIO1 - E1	When idling	Generation of pulse
Fuel pump OFF system	FPOF - E1	When ignition switch is "ON" during normal operation	5 V
		Stopping of driving of fuel pump, when encountered with emergency	Generation of pulse
Boost pressure control	VSV1 - E1	When idling, water temperature below 60 °C	Battery voltage
		When idling, water temperature above 60 °C	0 - 1 V
		When the vehicle is running with applying the boost pressure	Generation of pulse
ABV control	VSV2 - E1	When idling	Battery voltage
		When racing (3000 rpm)	0 - 1 V

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1-3-2 RESISTANCE CHECK

1. Install the SST between the engine ECU and the vehicle harness and measure the resistance between the respective terminals of the SST connectors. Check to see if the measured values conform to the specification in accordance with the following table.

NOTE

- When conducting the continuity test or measuring the resistance, turn OFF the ignition switch once. Then, disconnect the connector at the ECU.

(1) STANDARD RESISTANCES

System	Terminals	Circuit	Standard resistance
Front O ₂ sensor system	②⑩ (OXH1) - ⑦ (+B1)	Front O ₂ sensor heater and main relay	11.7 - 14.5 Ω
Rear O ₂ sensor system	⑤⑩ (OXH2) - ⑦ (+B1)	Rear O ₂ sensor heater and main relay	11.7 - 14.5 Ω
Cam angle sensor system	②② (N2+) - ⑤② (N2-)	Camshaft angle sensor	1850 - 2450 Ω
Crank angle sensor system	②② (N1+) - ⑤① (N1-)	Crankshaft angle sensor	1850 - 2450 Ω
Injector system	②⑦ (#10) - ⑦ (+B1)	No. 1 - 4 Fuel injector	13.4 - 14.2 Ω
	②⑥ (#20) - ⑦ (+B1)		
	②⑤ (#30) - ⑦ (+B1)		
	②④ (#40) - ⑦ (+B1)		
Variable valve timing system	②③ (OCV+) - ⑥① (OCV-)	Oil control valve	6.9 - 7.9 Ω
Purge VSV system	⑦⑨ (PRG) - ⑦ (+B1)	Purge control VSV	30 - 34 Ω
A/F adjuster	⑥② (VCO) - ②⑨ (E21)	A/F adjuster	3500 - 6500 Ω
Ground system	②③ (E1) - Body ground	Ground	10 Ω or less
	①⑦ (E2) - Body ground		
	④⑦ (E2PM) - Body ground		
	②⑨ (E21) - Body ground		

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1-3-3 CHECK OF DTC

1. By checking the DTC/freeze-frame data after confirming the reproduction of the malfunctioning phenomenon, it is possible to judge whether the system related to the DTC that was indicated before confirmation of the reproduction is now functioning properly or not. Then, you are to proceed to one of the following three steps.
 - (1) When a DTC was indicated at the time of checking the DTC and the same DTC is indicated after the confirmation of reproduction of the malfunction, it indicates that the malfunction is still persisting in the diagnosis circuit. Proceed to the trouble-shooting according codes.
 - (2) When no abnormal code is indicated, although the occurrence of malfunction was observed during the confirmation of reproduction of malfunction, a malfunction other than those related to the diagnosis system is likely taking place. Proceed to the trouble-shooting according to malfunctioning phenomena.
 - (3) When no malfunction is observed during the confirmation of reproduction of malfunction, and the normal code is indicated at the check of the DTC, it is presumed that an abnormality, such as poor contacts at the harnesses and connectors, occurred in the past, but now they are functioning properly. Check the harnesses and connectors of those systems related to the DTC that was indicated before the confirmation of reproduction of the malfunctioning phenomenon.

(1) DTC SPECIFIED BY ISO/SAE

DTC No.	Detection item	Trouble area	MIL
P0105/31	Manifold absolute pressure/ barometric pressure circuit malfunction	• Open wire or short in manifold absolute pressure sensor circuit • Manifold absolute pressure sensor • Engine ECU	○
P0110/43	Intake air temp. circuit malfunction	• Open wire or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU	○
P0115/42	Engine coolant temp. circuit malfunction	• Open wire or short in water temp. sensor circuit • Engine coolant temperature sensor • Engine ECU	○
P0116/42	Engine coolant temp. circuit range/performance problem	• Engine coolant temp. sensor • Cooling system	○
P0120/41	Throttle/pedal position sensor/switch "A" circuit malfunction	• Open wire or short in throttle position sensor circuit • Throttle position sensor • Engine ECU	○
P0130/21	Oxygen sensor circuit malfunction (Bank 1 sensor 1)	• Air induction system • Fuel pressure • Injector injection • Open wire or short in heated oxygen sensor circuit • Heated oxygen sensor • Engine ECU	○
P0133/21*1	Oxygen sensor circuit slow response (Bank 1 sensor 1)	• Air induction system • Fuel pressure • Injector injection • Open wire or short in heated oxygen sensor circuit • Heated oxygen sensor • Engine ECU	○
P0135/23*1	Oxygen sensor heater circuit malfunction (Bank 1 sensor 1)	• Open wire or short in heater circuit of oxygen sensor • Oxygen sensor heater • Engine ECU	○
P0136/22*1	Oxygen sensor circuit malfunction (Bank 1 sensor 2)	• Open wire or short in heater circuit of oxygen sensor • Oxygen sensor • Engine ECU	○
P0141/24*1	Oxygen sensor heater circuit malfunction (Bank 1 sensor 2)	• Same as DTC No. P0135/23	○
P0171/25	Fuel trim system too lean (Air-fuel ratio lean malfunction, bank 1)	• Air intake (hose loose) • Fuel line pressure • Injector blockage • Open wire or short in oxygen sensor circuit • Oxygen sensor or leakage • Manifold absolute pressure sensor • Engine coolant temperature sensor • Gas leakage or exhaust system • Purge VSV for EVAP • Engine ECU	○
P0172/26	Fuel trim system too rich (Air-fuel ratio rich malfunction, bank 1)		○
P0300/17*1	Random/multiple cylinder misfire detected	• Ignition system • Injector • Fuel pressure • Compression pressure • Valve clearance • Valve timing • Ion current sensor • Engine coolant temperature sensor • Open wire or short in engine wire • Connector connection • Manifold absolute pressure sensor • Engine ECU	MIL flash- ing dur- ing misfire detection
P0301/17*1 P0302/17*1 P0303/17*1 P0304/17*1	Misfire detected -Cylinder 1 -Cylinder 2 -Cylinder 3 -Cylinder 4		
P0314/—*1	Single cylinder misfire (Cylinder not specified) (EU regulation)		
P0325/18	Knock sensor 1 circuit malfunction		

DTC No.	Detection item	Trouble area	MIL
P0335/13	Crankshaft position sensor "A" circuit malfunction	• Open wire or short in crank angle sensor circuit • crank angle sensor • Signal rotor • Engine ECU	○
P0340/14	Camshaft position sensor circuit malfunction	• Open wire or short in crank angle sensor circuit • crank angle sensor • Engine ECU	○
P0420/27*1	Catalyst system efficiency below threshold	• Three-way catalytic converter • Open wire or short in (heated) oxygen sensor circuit • (Heated) oxygen sensor	○
P0443/76	Evaporative emission control system purge control valve circuit malfunction	• Open wire or short in VSV circuit for EVAP • VSV for EVAP • Engine ECU	○
P0500/52	Vehicle speed sensor malfunction	• Open wire or short in signal line from A/T ECU or ABS ECU or vehicle speed sensor • Combination meter • Vehicle speed sensor • Engine ECU or A/T ECU or ABS ECU	○
P0505	ISC valve malfunction	• Open wire or short in ISC circuit • ISC valve • Engine ECU	○
P0710/38*3	Transmission fluid temperature sensor circuit malfunction	Refer to the AT section	○
P0711/38*3	Transmission fluid temperature sensor circuit range/performance		○
P0715/38*3	Turbine speed sensor circuit malfunction		○
P0720/42*3	Output speed sensor circuit malfunction		○
P0725/86*3	Engine speed input circuit malfunction		○
P0753/61*3	Solenoid No. 1		○
P0758/62*3	Solenoid No. 2		○
P0763/63*3	Solenoid No. 3		○
P0768/64*3	Duty solenoid		○
P0773/65*3	Lock up solenoid circuit malfunction		○

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NOTE

- MIL Malfunction indicator lamp.; However, in the case of A/T vehicles, the 2-digit codes of DTC No. can be read out through the flashing pattern of the D range lamp.
- When the "○" mark is shown in the MIL column, the lamp will go on for that DTC No., but when the "-" mark is shown the lamp will not go on for that DTC No. However, the data other than the switch signal system (P1520/51) are memorized in the backup memory. Therefore, it is possible to read out the DTC No. by using the diagnosis tester DS-21.
- DTC No. with *1 mark Only for European specifications; But, only in the case of DTC No. P0314, it is possible to read out this DTC No. by means of the "continuous monitoring results" function of the CARB mode.
- DTC No. with *2 mark Only for vehicles with immobilizer
- DTC No. with *3 mark Only for vehicles with electronically-controlled A/T

(2) DTC SPECIFIED BY DMC

DTC No.	Detection item	Trouble area	MIL
P1105/32* ¹	Barometric pressure sensor circuit malfunction	• Engine ECU	○
P1300/36* ¹	Ion system malfunction	• Open wire or short in Ion system circuit • Ignitor unit • Ignition coil (All cylinders) • Spark plug (All cylinders) • Engine ECU	○
P1346/75	VVT sensor circuit range/performance problem	• Mechanical system (Skipping teeth of timing chain, wrong installation of timing chain and chain tensioner) • Engine ECU	○
P1349/73	VVT system malfunction	• Valve timing • OCV • DVVT controller assembly • Engine ECU	○
P1510/54	Starter signal circuit malfunction	• Open wire in starter signal circuit • Engine ECU	○
P1520/51	Switch signal circuit malfunction	• Open wire or short in A/C switch circuit • A/C switch • Open wire or short in linear throttle sensor circuit • Linear throttle sensor • Open wire or short in neutral start switch circuit • Neutral start switch • Engine ECU	—
P1530/44	A/C evaporator temp. sensor circuit malfunction	• Open wire or short in A/C evaporator temp. sensor circuit • A/C evaporator temp. sensor • Engine ECU	—
P1560/61	ECU back up power source circuit malfunction	• Open wire in back up power source circuit • Engine ECU	○
P1600/83* ²	Immobilizer signal malfunction	• Engine ECU	—
P1601/81* ²	Immobilizer signal circuit malfunction	• Open wire or short in immobilizer signal circuit • Immobilizer ECU • Engine ECU	—
P1602/82* ³	Serial communication problem between EFI ECU and A/T ECU	• Open wire or short in serial communication circuit • A/T ECU • Engine ECU	○
P1656/74	OCV circuit malfunction	• Open wire or short in OCV circuit • OCV • Engine ECU	○
P1703/72* ³	Lock-up clutch status malfunction	Refer to AT section.	○
P1780/66* ³	Switch solenoid		○

NOTE

- MIL Malfunction indicator lamp.; However, in the case of A/T vehicles, the 2-digit codes of DTC No. can be read out through the flashing pattern of the D range lamp.
- When the “○” mark is shown in the MIL column, the lamp will go on for that DTC No., but when the “-” mark is shown the lamp will not go on for that DTC No. However, the data other than the switch signal system (P1520/51) are memorized in the backup memory. Therefore, it is possible to read out the DTC No. by using the diagnosis tester DS-21.
- DTC No. with *1 mark Only for European specifications; But, only in the case of DTC No. P0314, it is possible to read out this DTC No. by means of the “continuous monitoring results” function of the CARB mode.
- DTC No. with *2 mark Only for vehicles with immobilizer
- DTC No. with *3 mark Only for vehicles with electronically-controlled A/T

1-3-4 CHECK OF FREEZE FRAME DATA

- When the DTC of the diagnosis is indicated, it is necessary to confirm whether that a system malfunction took place in the past or is still taking place, and confirm how the malfunction is related with the reproduced malfunction. To confirm this, you have to indicate the DTC/freeze-frame data twice. That is to say, you indicate the DTC/freeze-frame data, erase the data, and confirm the malfunctioning phenomenon. Then, you indicate the DTC/freeze-frame data again. Please check the DTC (including unidentified DTC) by referring to the "DTC checking procedure" section. When any DTC are indicated, print or write down the DTC and freeze-frame data. Then, erase them by referring to the "DTC erasing procedure." If you fail to erase the DTC at this time, you may make a wrong diagnosis, conclude that the normal circuit is malfunctioning, or face difficulty in trouble-shooting.

	DS-21 diagnosis tester display	Signal name	Vehicle condition		Reference values under normal condition
*	FUEL SYSTEM (Fuel system status)	FSYS	At idle speed after warming up		O2 (Closed loop)
*	CALC LOAD (Calculated load value)	LOAD	At idle speed with no load after warming up		1.7 - 2.2 %
			At 2500 r/min. with no load after warming up		5.9 - 7.3 %
*	COOLANT TEMP (Engine coolant temperature)	ECT	Cold start ~ Warming-up running		Value should be rising gradually.
			When engine has warmed up completely		80 - 100 °C
			During fail-safe function (At time of starting)		20 °C
			During fail-safe function (After starting)		80 °C
*	SHORT FT (Short term fuel trim)	SHRT	At idle speed after warming up		-20 - +20 %
*	LONG FT (Long term fuel trim)	LONG	At idle speed after warming up		-16 - +16 %
*	ENGINE SPEED	RPM	When engine is running at a constant speed		There should be no remarkable variation, rpm
			At idle speed with no load after warming-up	M/T	600 - 700 rpm
				A/T	650 - 750 rpm
*	VEHICLE SPEED	VS	During running (Compared with speedometer)		There should be no remarkable difference, Km/h
*	IGN ADVANCE (Ignition timing advance for No. 1 cylinder)	ITA	At idle speed with no load after warming up		-2 - 8°
			When idle switch is OFF		Changes should be made according to running conditions, °
*	INTAKE AIR TEMP	IAT	When engine is running		Changes should be made according to running conditions. °C
*	MANI ABS PRESS (Intake manifold absolute pressure)	MAP	When ignition switch is ON (Vacuum hose is released to atmosphere)		Around 100 kPa
			When idling (After warming-up, with no load)		65 - 73 kPa

	DS-21 diagnosis tester display	Signal name	Vehicle condition		Reference values under normal condition
*	MANI ABS PRESS (Intake manifold absolute pressure)	MAP	During fail-safe function	M/T	35 - 73 %
				A/T	33 - 71 %
*	THROTTLE POS (Absolute throttle position)	TP	When accelerator pedal is operated		Changes should be made according to pedal operation. %
*	OXYGEN SENSOR S1 (Heated oxygen sensor 1)	O ₂ FP	At idle speed after warming up		-5 - 5 %
		O ₂ FV			0.05 - 0.95 V
*	OXYGEN SENSOR S2* (Heated oxygen sensor 2)	O ₂ RP	When engine is running at 2000 r/min., for 3 min. or longer after warming up.		20 - 77 %
		O ₂ RV			0.05 - 0.95 V
*	MIL ON RUN DIST (Distance since actviation of MIL)	DWM	When there is no DTC		0 Km

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	DS-21 diagnosis tester display	Signal name	Vehicle condition	Reference values under normal condition
	BATTERY VOLTAGE	BAT	When engine is running at 5000 rpm (25 °C)	Approx. 14 V
	ELECTRIC LOAD	DSW	When light, heater blower, defogger or radiator fan switch is ON	"OFF" → "ON"
	AIR CONDITIONING (If equipped)	AC	When air conditioner switch is set to ON or "A/C"	"OFF" → "ON"
	CTP SWITCH (Closed throttle position switch)	IDL	When throttle valve is switched from fully closed state to opened stale	"ON" → "OFF"
	INJ PULSE WIDTH (Fuel injection pulse width)	TAU	Cold start ~ Warming-up running	Value should be decreasing gradually.
			When idling (After warming-up, with no load)	1 - 3 ms
	ISC DUTY RATIO	ISC	When ignition switch is ON	0 %
			Cold start ~ Warming-up running	Value should be decreasing gradually
			When idling (After warming-up, with no load)	5 - 15 %
			When air conditioner switch is set to "ON"	18 - 45 %
			When automatic transmission is shifted from N range to D range	9 - 22 %
			When light, heater or defogger switch is ON	7 - 19 %
	ACTUAL DISP ANGLE OF IN CAM (Actual displacement angle of intake cam)	VT	When idling (After warming-up, with no load)	0 - 2 °CA
			During vehicle running	The value changes, depending on the driving conditions. °CA
	TARGET DISP ANGLE OF IN CAM (Target displacement angle of intake cam)	VTT	When idling (After warming-up, with no load)	0 °CA
			During vehicle running	The value changes, depending on the driving conditions. °CA

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NOTE

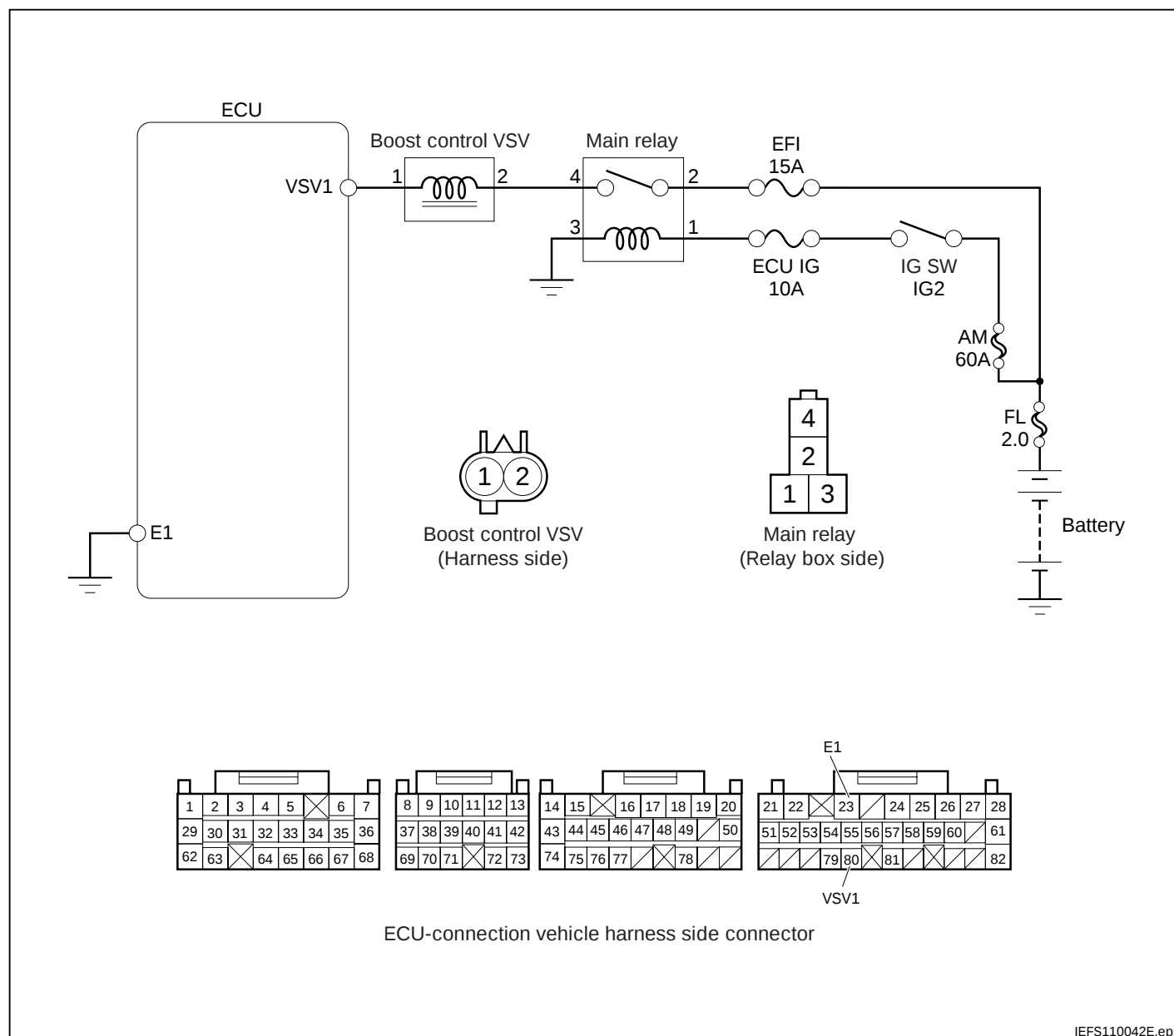
- In the case of the OBD II generic scan tool, it is possible to take a reading of the values specified by ISO/SAE.
- The items with an asterisk(*) mark is provided only for EU specifications. Therefore, in the case of the non-EU specification vehicles, no indication will be made.

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1-4 TROUBLE SHOOTING ACCORDING TO DTC

1-4-1 BOOST PRESSURE CONTROL SYSTEM CIRCUIT

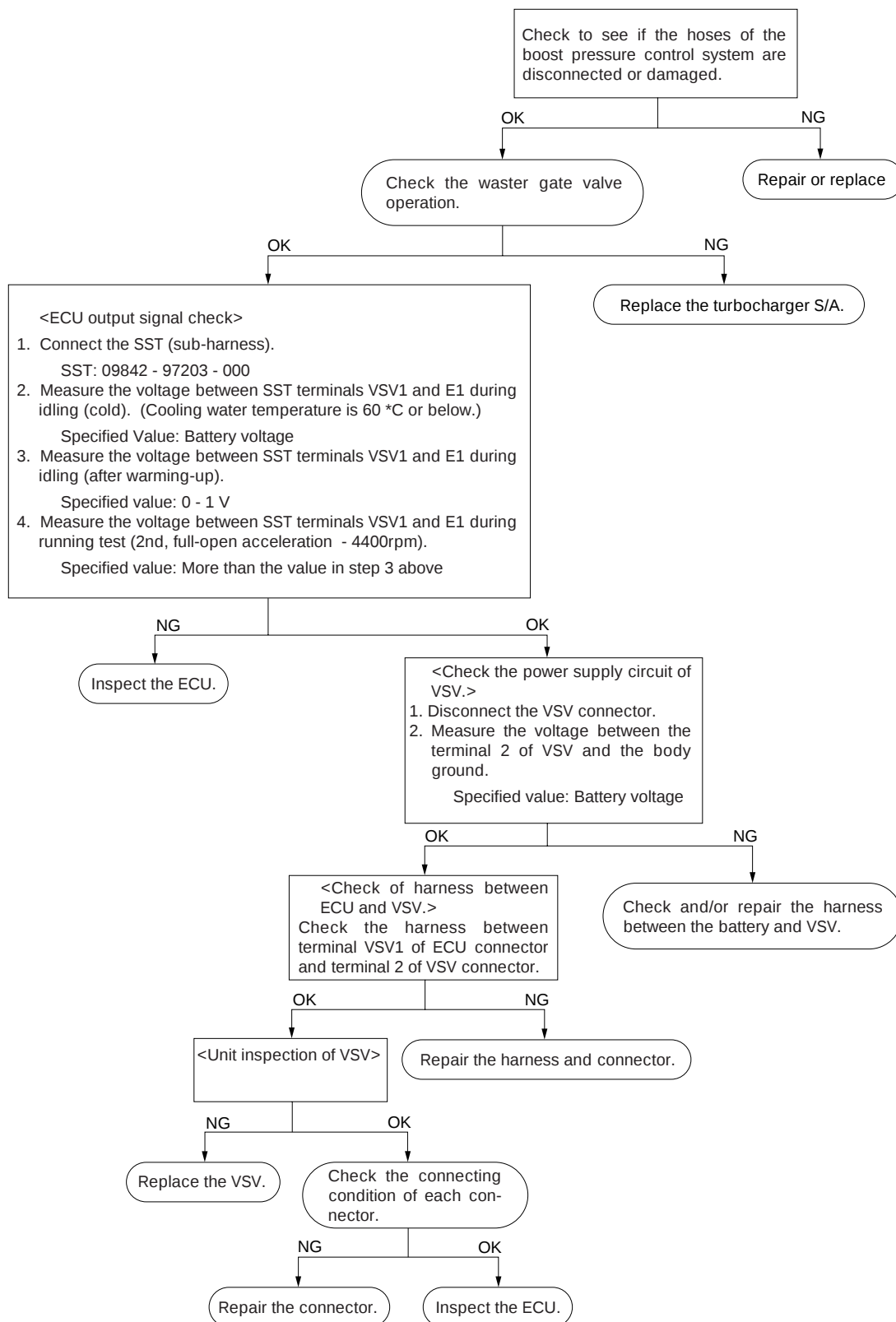
(1) WIRING DIAGRAM



(2) CIRCUIT DESCRIPTION

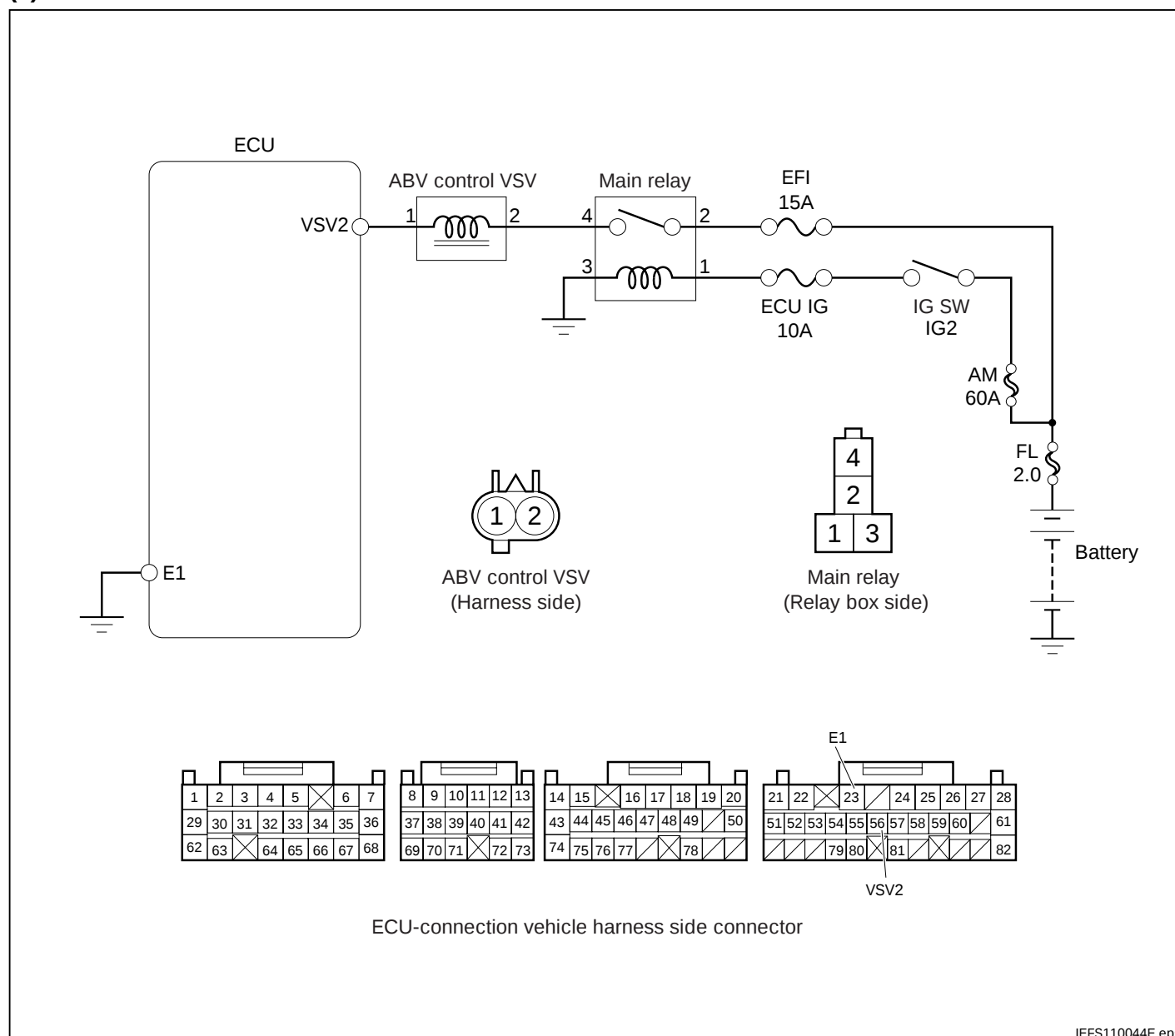
- (1) Check the hoses of the boost pressure control system for disconnection, breakage, etc.
- (2) Check that the waste gate valve operates normally.
- (3) Check that the power supply voltage is applied properly to the boost control VSV.
- (4) Check that the harness between the boost control VSV and the ECU exhibits no open wire and short circuit.
- (5) Check that the boost control VSV operates normally.

(3) INSPECTION PROCEDURE



1-4-2 AIR BYPASS VALVE CONTROL SYSTEM CIRCUIT

(1) WIRING DIAGRAM

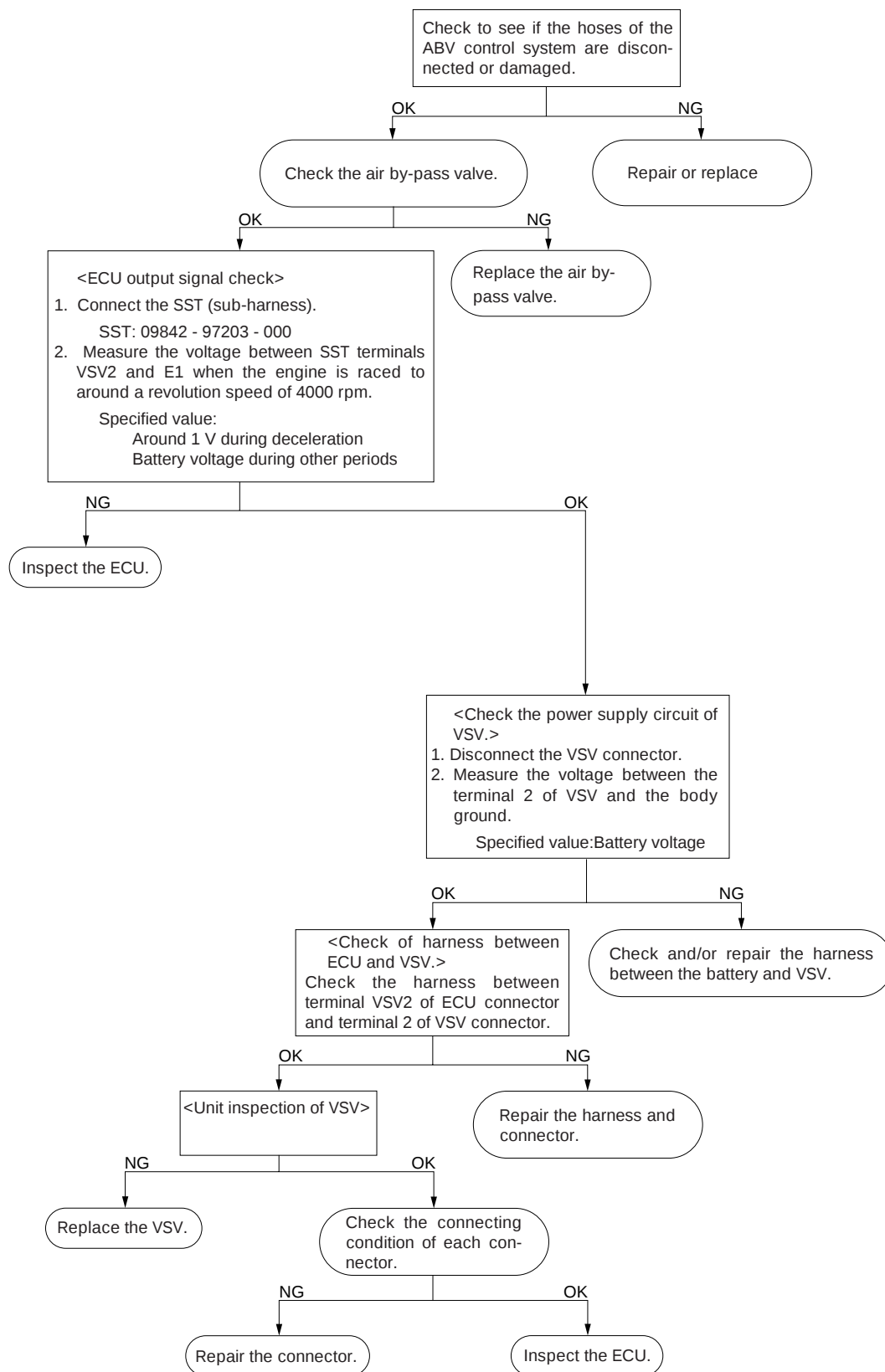


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(2) POINTS OF INSPECTION

- (1) Check the hoses of the ABV control system for disconnection, breakage, etc.
- (2) Check that the ABV operates normally.
- (3) Check that the power supply voltage is applied properly to the VSV for ABV control.
- (4) Check that the harness between the VSV for ABV control and the ECU exhibits no open wire and short circuit.
- (5) Check that the VSV for ABV control operates normally.

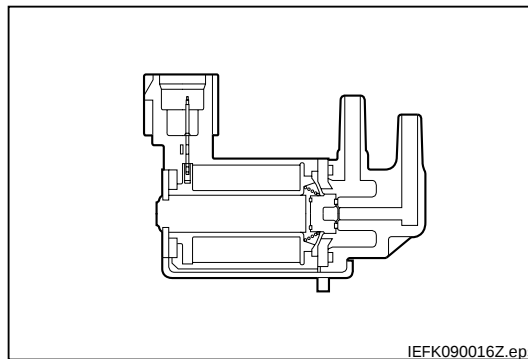
(3) INSPECTION PROCEDURE



2 UNIT INSPECTION

2-1 BOOST PRESSURE CONTROL VSV

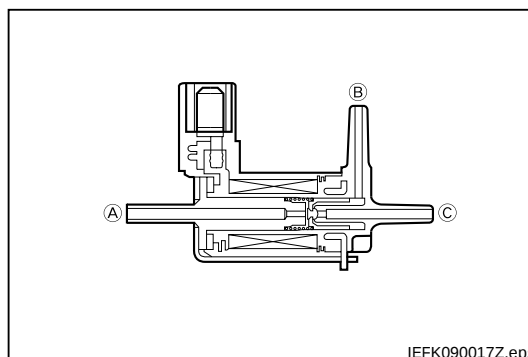
1. Check to see if there is air continuity between the respective ports of the VSV.
SPECIFIED VALUE: No continuity exists.
2. When the power supply voltage is applied across both terminals of the VSV connector, check air continuity between the respective ports.
SPECIFIED VALUE: Continuity exists.
3. Check the resistance between both terminals of the VSV connector.
SPECIFIED VALUE: Approx. 32 Ω (at 20°C)



EF-UIP-D-Z-00001

2-2 AIR BYPASS CONTROL VSV

1. Check air continuity between the respective ports of the VSV.
SPECIFIED VALUE: Air continuity should exist. (Between A and B)
No air continuity should exist. (Between A and C; Between B and C)
2. When the power supply voltage is applied across both terminals of the VSV connector, check air continuity between the respective ports.
SPECIFIED VALUE: Air continuity should exist. (Between B and C)
No air continuity should exist. (Between A and B; Between A and C)
3. Measure the resistance between both terminals of the VSV connector.
SPECIFIED VALUE: Approx. 40 Ω (at 20°C)



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