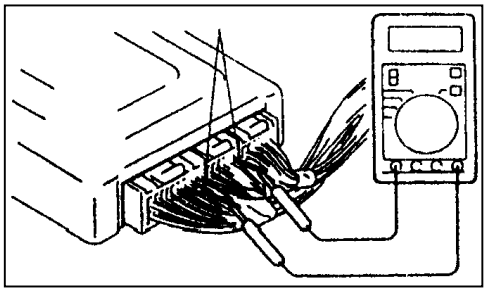
Chapter 6 ECU Control Unit

M Engine ECU Terminal Check Configuration



Terminal configuration is as below:

Terminal voltage check

1.Connect mandrin(test cable:MB991223 or return pin) to the detect pin on voltmeter.

2.Plus mandrin into the terminal of every ECU joint from harness side, and then measure the voltage of every terminal according to check table.

Note：

（1）Measure the voltage when ECU terminal and harness joint are connected.

（2）Pull harness joint a little out from ECU terminal and let detect pin easily touch joint terminal, which is convenient to check.

（3）You needn't check it according to the sequence of check table.

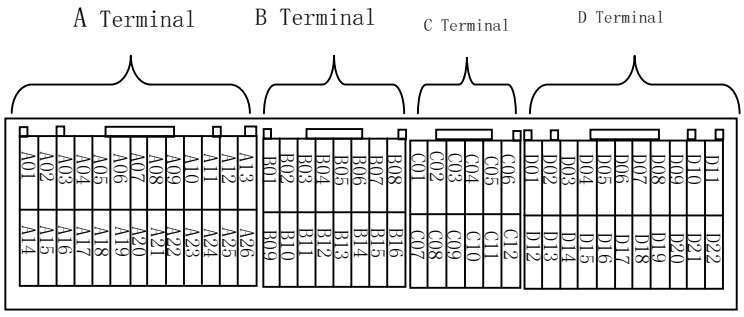
Caution:

If plus terminal by mistake during check, which causes short, harness, sensor, ECU or other components may be destroyed. Please be very careful during check.

3.If the voltage check result is different from standard value, please check related sensor, actuator and harness. If necessary, it should be repaired or replaced.

4.After repair or replace, check again with voltmeter to confirm if the failure is eliminated.

2.Engine ECU Terminal



3.Terminal Voltage Check

Terminal No.	Check Item	Check Condition (Engine Status)	Normal Status
A01	1st Cylinder Injector	Step on accelerator pedal suddenly when idle running after engine preheat.	Suddenly the voltage decreases partially from 11-14V
A14	2nd Cylinder Injector		
A02	3rd Cylinder Injector		
A15	4th Cylinder Injector		
A04	Stepper Motor Coil A	Engine: Start engine immediately after preheat	System Voltage-0V (Change frequently)
A17	Stepper Motor Coil B		
A05	Stepper Motor Coil C		
A18	Stepper Motor Coil D		
A06	EGR Solenoid Valve	Ignition Switch ： ON	System Voltage
		Step on accelerator pedal suddenly when idle running.	System voltage decrease suddenly
A08	Fuel Pump Relay （ ECU without Anti-Theft）	Ignition Switch ： ON	System Voltage
		Engine at idle speed	0-3V
A09	Purge Solenoid	Ignition Switch ： ON	System Voltage
		Running at 3000rpm after engine warming up	0-3V
A10	Ignition coil-No.1, No.4(Power Transistor)	Engine 3000 rpm	0.3-3.0V
A23	Ignition coil-No.2,No.3(Power Transistor)		0.3-3.0V
A12	Power Supply	Ignition Switch ： ON	System Voltage
A25			
A19	Signal Re-setup of Mass Airflow Sensor	Engine：Idle Speed	0-1V
		Engine：3000rpm	6-9V
A21	Fan Controller	Radiator fan and condenser off	0-0.3V。
		Radiator fan and condenser on	Above 0.7V
A22	A/C Relay	Engine：Idle Speed	

		Air Conditioner Switch：OFF →ON(when air conditioner compressor is running)	System voltage or instantaneous voltage 6V above→0-3V。
A24	A/C switch 2	Refer to diagnostic troubleshooting (A/C ECU terminal check, Engine ECU output terminal check)	

Terminal No.	Check Item	Check Condition (Engine Status)		Normal Status
B03	Alternator G Terminal	1、Engine:Preheted，Idle Speed（Radiator fan：OFF）		The voltage increases 0.2-3.5V
		2、Frontal Light：OFF→ON		
		3、Rear defroster light switch :OFF →ON		
		4、Stop Light：ON		
B06	Engine warning light	Ignition Switch ： OFF→ON		0-3V → 9-13V after some seconds
B07	Power Steering Switch	Engine:Idle running after preheated	Steering standing	System Voltage
			Steering rotating	0-3V。
B08	Control Relay(Power Supply)	Ignition Switch ： OFF		System Voltage
		Ignition Switch ： ON		0-3V
B11	Alternator FR Terminal	1、Engine:Preheater，Idle Speed（Radiator fan：OFF）		The voltage increases 0.2-3.5V
		2、Front Light：OFF→ON		
		3、Rear Defroster Light Switch：0FF→ON		
		4、Stop Light：ON		
B15	A/C Switch	Engine Idle Speed	A/C Switch：OFF	0-3V
			A/C Switch：ON（Compressor On）	System Voltage
C10	Oxygen Sensor（Front）Heater Control Signal	Engine: Idle running after preheat		0-3V
		Engine:5000rpm		System Voltage
C08	Tachometer Signal	Engine Speed：3000rpm		0.3-3.0V
D01	Ignition Switch —ST	Engine:Start on		Above 8V
D13	Coolant Temperature Sensor	Ignition Switch ： ON	Coolant Temperature 0 ℃	3.2-3.8V

			Coolant Temperature 20℃	2.3-2.9V
			Coolant Temperature 40℃	1.3-1.9V
			Coolant Temperature 80℃	0.3-0.9V
D12	Ignition Switch －IG	Ignition Switch ： ON		System Voltage
D02	Intake Temperature Sensor	Ignition Switch ： ON	Coolant Temperature 0 ℃	3.2－3.8V
			Coolant Temperature 20 ℃	2.3-2.9V
			Coolant Temperature 40 ℃	1.5-2.1V
			Coolant Temperature80 ℃	0.4-1.0V
D14	Throttle Position Sensor	Ignition Switch ： ON	Throttle's idle speed postion	0.3-1.0V
			Throttle wide open	4.5-5.5V
D06	Oxygen Sensor （Front）	Engine: running at 2000rpm after preheat(Check with digital voltmeter)。		0-0.8V (Change frequently)
D05	Oxygen Sensor （Rear）	Engine:running at 2000rpm after preheat(Check with digital voltmeter)。		0-0.8V (Change frequently)
D15	Barometric Pressure Sensor	Ignition Switch ： ON	Altitute height is 0m	3.7-4.3V
			Altitude Height：1200m	3.2-3.8V
Terminal No.	Check Item	Check Condition (Engine Status)		Normal Status
D16	Speed Sensor	Move vehichle forward slowly		0-5V （Change frequently）
		Ignition Switch ： ON		

D17	**Idle Speed Postion Switch**	**Ignition Switch ： ON**	**Throttle is adjusted to idle speed postion**	**0-1V**
			Throttle partial open	**Above 4V**
D18	**Cam Position Sensor**	**Engine:Running**		**0.4-3.0V**
		Engine:Idle Speed		**0.5-2.0V**
D19	**Crank Angle Sensor**	**Engine:Running**		**0.4-4.0V**
		Engine:Idle Speed		**1.5-2.5V**
D20	**Mass Air Flow Sensor**	**Engine:Idle Speed**		**2.2-3.2V**
		Engine:Speed：2500rpm		

4.Check Resistance and Conductivity between terminals

1. Turn ignition switch to OFF.
2. Remove harness joint of engine ECU.
3. Measure and check resistance and conductivity between every terminals of harness side joint of engine ECU according to check table.

Note：

(1) When checking terminal's resistance and conductivity, you must use special check cable in stead of normal check stick to avoid affacting terminal contact pressure.

(2) You needn't check them according to the sequence of check table.

Caution

If plug terminals incorrectly or joint terminals are short ground incorrectly when checking resistance and conductivity between terminals, body cable, sensor, ECU or ohmmeter may be destoryed. So, please be careful.

4. If the result value of ohmmeter is different from standard value, please check related sensor, actuator and cable. If necessary, please repair or replace it.
5. Check and confirm if the malfunction is removed with ohmmeter after repair or replacement.

Resistance check between terminals

Terminal No.	Check Item	Normal Status
A01—A12	1st Cylinder Injector	13－16kΩ(20℃)
A14—A12	2nd Cylinder Injector	
A02—A12	3rd Cylinder Injector	
A15—A12	4th Cylinder Injector	
A04—A12	Stepper Motor Coil A	28－33Ω(20℃)
A17—A12	Stepper Motor Coil B	
A05—A12	Stepper Motor Coil C	
A18—A12	Stepper Motor Coil D	
13－Body Ground	Engine ECU Ground	Conductive (0Ω)
26－Body Ground	Engine ECU Ground	
A06—A12	EGR Solenoid Valve	36－44Ω(20℃)
A09—A12	Purge Solenoid	36－44Ω(20℃)
D13—D22	Coolant Temperature Sensor	5.1－6.5kΩ(Coolant Temperature is 0℃)
		2.1－2.7kΩ(Coolant Temperature is 20℃)
		0.9－1.3kΩ(Coolant Temperature is 40℃)
		0.26－0.36kΩ(Coolant Temperature is 80℃)
D02—D22	Intake Air Temperature Sensor	5.3－6.7kΩ(Coolant Temperature is 0℃)
		2.3－3.0kΩ(Coolant Temperature is 20℃)
		1.0－1.5kΩ(Coolant Temperature is 40℃)
		0.3－0.42kΩ(Coolant Temperature is 80℃)
D05.D06—D22	Oxygen Sensor	About 12Ω
D17—D22	Idle Position Switch	Conductible (Throttle is at ilde speed postion)
		Non-conductible (Throttel is partial open)