

**DTC Reading Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
  - (1) Select "Self Test".
  - (2) Select "Modules".
  - (3) Select "PCM".
3. Then, select the "Retrieve CMDTCs" and perform procedures according to the directions on the M-MDS screen.
4. Verify the DTC according to the directions on the M-MDS screen.
  - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
5. After completion of repairs, clear all DTCs stored in the PCM, while referring to "AFTER REPAIR PROCEDURE".

**Pending Trouble Code Access Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
  - (1) Select "Self Test".
  - (2) Select "Modules".
  - (3) Select "PCM".
3. Then, select the "Retrieve CMDTCs" and perform procedures according to the directions on the M-MDS screen.
4. Retrieve the pending trouble codes according to the directions on the M-MDS screen.

**Freeze Frame PID Data Access Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
  - (1) Select "Self Test".
  - (2) Select "Modules".
  - (3) Select "PCM".
3. Then, select the "Retrieve CMDTCs" and perform procedures according to the directions on the M-MDS screen.
4. Retrieve the freeze frame PID data according to the directions on the M-MDS screen.

**Note**

- Freeze frame data/snapshot data appears at the top of the help screen when the displayed DTC is selected.

**Freeze frame data**

- The freeze frame data consists of data for vehicle and engine control system operation conditions when malfunctions in the engine control system are detected and stored in the PCM.
- Freeze frame data is stored at the instant the check engine light illuminates, and only a part of the DTC data is stored.
- For the freeze frame data, if there are several malfunctions in the engine control system, the data for the malfunction which occurred initially is stored. Thereafter, if a misfire or fuel injection control malfunction occurs, data from the misfire or fuel injection control malfunction is written over the initially stored data. However, if the initially stored freeze frame data is a misfire or fuel injection control malfunction, it is not overwritten.

**Snapshot data**

- The snapshot data stores the currently detected DTC data.
- The recording timing for the freeze frame data/snapshot data differs depending on the number of DTC drive cycles.
  - For a DTC with a drive cycle number 1, only the malfunction determination data is recorded.
  - For a DTC with a drive cycle number 2, both the malfunction determination and undetermined data is recorded.

**Freeze frame data table****Note**

- Refer to the PID monitor table to confirm the engine control system operation status when the PCM does not store a DTC. (See PCM INSPECTION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
- Freeze frame data items are not displayed according to detected DTC.

—: Not applicable

Freeze frame data item	Unit	Description	Corresponding PID data monitor item
FUELSYS1	OL/CL/OL-Drive/OL-Fault/ CL-Fault	Fuel system status	FUELSYS
LOAD	%	Calculated engine load	—

Freeze frame data item	Unit	Description	Corresponding PID data monitor item
ECT	°C, °F	Engine coolant temperature	ECT
SFT1	%	Short term fuel trim	SHRTFT1
LFT1	%	Long term fuel trim	LONGFT1
MAP	KPa {MPa}, mBar {Bar}, psi, in H2O	Manifold absolute pressure	MAP
RPM	RPM	Engine speed	RPM
VS	KPH, MPH	Vehicle speed	VSS
SPARKADV	°	Ignition timing	SPARKADV
IAT	°C, °F	Intake air temperature	IAT
MAF	g/sec	Mass airflow	MAF
TP	%	Throttle valve position No.1	TP1
RUNTM	hh:mm:ss	Time from engine start	—
EVAPPCT	%	Purge solenoid valve controlled value	EVAPCP
FLI	%	Fuel level in fuel tank	FLI
WARMUPS	—	Number of warm-up cycle after DTC cleared	—
CLRDIST	km, ft {mi}	Mileage after DTC cleared	—
BARO	KPa {MPa}, mBar {Bar}, psi, in H2O	Barometric pressure	BARO
CATTEMP11	°C, °F	Estimated catalytic converter temperature	CATT11_DSD
VPWR	V	Module supply voltage	VPWR
ALV	%	Engine load	LOAD
EQ_RAT	—	Target equivalence ratio (lambda)	EQ_RAT11_DSD
TP_REL	%	Relative throttle position	TP_REL
TP_B	%	Throttle valve position No.2	TP2
APP_D	%	Accelerator pedal position No.1	APP1
APP_E	%	Accelerator pedal position No.2	APP2
TAC_PCT	%	Target throttle valve position	ETC_DSD
FUEL_TYP	—	Type of fuel currently being utilized by the vehicle	—
STSO2FT1	%	Short term fuel trim (HO2S)	—
LGSO2FT1	%	Long term fuel trim (HO2S)	—
FRP	KPa {MPa}, mBar {Bar}, psi, in H2O	Fuel pressure	FUEL_PRES
		Fuel pressure (absolute)	
IAT11_SUP	—	Intake air temperature No.1 support	—
IAT12_SUP	—	Intake air temperature No.2 support	—
IAT11	°C, °F	Intake air temperature No.1	IAT
IAT12	°C, °F	Intake air temperature No.2	IAT2

## Snapshot data table

### Note

- Refer to the PID monitor table to confirm the engine control system operation status when the PCM does not store a DTC. (See PCM INSPECTION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
- Snapshot data items are not displayed, according to detected DTC.

—: Not applicable

Snapshot data item	Unit	Definition	Data read/use method	Corresponding PID data monitor item
ALTT_V	V	Generator output voltage	—	ALTT V
APP1	V	Accelerator pedal position No.1	—	APP1
	%			
APP2	V	Accelerator pedal position No.2	—	APP2
	%			
TP1	V	Throttle valve position No.1	—	TP1
	%			
TP2	V	Throttle valve position No.2	—	TP2
	%			
ALT_CUR_DS D	A	Generator current desired	—	—

Snapshot data item	Unit	Definition	Data read/use method	Corresponding PID data monitor item
BATT_RES	ohm	Battery inferred internal resistance	—	—
TOTAL_TIME	hh:mm:ss	Total time	The elapsed time when the PCM detected a DTC can be calculated by performing the following procedure. 1. Verify the instrument cluster PID item TOTAL_TIME. 2. Verify the snapshot data item TOTAL_TIME. 3. Subtract 2 from 1.	—
TOTAL_DIST	km, ft {mi}	Total distance	The distance traveled when the PCM detected a DTC can be calculated by performing the following procedure. 1. Verify the odometer value in the instrument cluster. 2. Verify the snapshot data item TOTAL_DIST. 3. Subtract 2 from 1.	—
FUELSYS	OL/CL/OL-Drive/OL-Fault/CL-Fault	Fuel system status	—	FUELSYS
LOAD_C	%	Calculated engine load	—	—
ECT	°C, °F	Engine coolant temperature	—	ECT
SHRTFT1	%	Short term fuel trim	—	SHRTFT1
LONGFT1	%	Long term fuel trim	—	LONGFT1
MAP	KPa {MPa}, mBar {Bar}, psi, in H2O	Manifold absolute pressure	—	MAP
RPM	RPM	Engine speed	—	RPM
VSS	KPH, MPH	Vehicle speed	—	VSS
SPARKADV	°	Ignition timing	—	SPARKADV
IAT	°C, °F	Intake air temperature No.1	—	IAT
MAF	g/sec	Mass airflow	—	MAF
O2S12	V	HO2S	—	O2S12
EG_RUN_TIME	—	Time from engine start	—	—
FUEL_PRES	KPa {MPa}, mBar {Bar}, psi, in H2O	Fuel pressure	—	FUEL_PRES
SEGRP_DSD	%	Target EGR valve position	—	—
EVAPCP	%	Purge solenoid valve controlled value	—	EVAPCP
FLI	%	Fuel level in fuel tank	—	FLI
CLR_CNT	—	Number of warm-up cycle after DTC cleared	—	—
CLR_DIST	km, ft {mi}	Mileage after DTC cleared	—	—
FTP	KPa {MPa}, mBar {Bar}, psi, in H2O	Fuel tank pressure	—	FTP
BARO	KPa {MPa}, mBar {Bar}, psi, in H2O	Barometric pressure	—	BARO
CATT11_DSD	°C, °F	Estimated catalytic converter temperature	—	CATT11_DSD
VPWR	V	Module supply voltage	—	VPWR
LOAD	%	Engine load	—	LOAD
EQ_RAT11_DS D	—	Target equivalence ratio (lambda)	—	EQ_RAT11_DS D
TP_REL	%	Relative throttle position	—	TP_REL
AAT	°C, °F	Ambient air temperature	—	AAT
ETC_DSD	%	Target throttle valve position	—	ETC_DSD
SHRTFT12	%	Short term fuel trim (HO2S)	—	—
LONGFT12	%	Long term fuel trim (HO2S)	—	—

Snapshot data item	Unit	Definition	Data read/use method	Corresponding PID data monitor item
FRP	KPa {MPa}, mBar {Bar}, psi, in H2O	Fuel pressure (absolute)	—	FUEL_PRES
ECT2_SUP	—	Engine coolant temperature No.2 support	—	—
ECT2	°C, °F	Engine coolant temperature No.2	—	ECT2_V
IAT12	°C, °F	Intake air temperature No.2	—	IAT2

### On-Board System Readiness Tests Access Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
  - (1) Select "Powertrain".
  - (2) Select "OBD Test Modes".
  - (3) Select "Mode 1 Powertrain Data".
  - (4) Select "PCM".
3. Then, select the "\*\*\*\*SUP" and "\*\*\*EVAL" PIDs in the PID selection screen.
4. Monitor those PIDs and verify that the system monitor is completed.

#### Note

- If the on-board system readiness tests are not completed the PCM stores DTC P1000.

### PID/DATA Monitor and Record Procedure

#### Note

- The PID data screen function is used for monitoring the calculated value of input/output signals in the module. Therefore, if the monitored value of the output parts is not within specification, it is necessary to inspect the monitored value of input parts corresponding to the applicable output part control. In addition, because the system does not display an output part malfunction as an abnormality in the monitored value, it is necessary to inspect the output parts individually.
- When detecting DTCs, PIDs related to a malfunctioning system may not display even if the module is normal. Therefore, if a PID is not displayed, it is necessary to verify the DTC, perform malfunction diagnosis of the DTC that was detected, and do repairs.

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
  - (1) Select "DataLogger".
  - (2) Select "Modules".
  - (3) Select "PCM".
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the detections on the screen.

### Diagnostic Monitoring Test Results Access Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
  - (1) Select "Powertrain".
  - (2) Select "OBD Test Modes".
  - (3) Select "Mode 6 On-Board Test Results".
3. Verify the diagnostic monitoring test result according to the directions on the M-MDS screen.

### Active Command Modes Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
  - (1) Select "DataLogger".
  - (2) Select "Modules".
  - (3) Select "PCM".
3. Select the simulation items from the PID table.
4. Using the active command modes function, inspect the operation of each part.
  - If the operation of output parts cannot be verified after the active command mode inspection is performed, this could indicate the possibility of an open or short circuit, sticking, or operation malfunction in the output parts.