

## Keyword Protocol 2000

### OBD Service \$01

PID	Description
00	PIDs supported [01 - 20]
01	Monitor status since DTCs cleared. (Includes malfunction indicator lamp (MIL) status and number of DTCs.)
03	Fuel system status
05	Engine coolant temperature
06	Short term fuel trim-Bank 1 and Bank 3
07	Long term fuel trim-Bank 1 and Bank 3
08	Short term fuel trim-Bank 2 and Bank 4
09	Long term fuel trim-Bank 2 and Bank 4
0B	Intake manifold absolute pressure
0C	Engine speed
0D	Vehicle speed
0E	Ignition timing advance
0F	Intake air temperature
10	Air flow rate from mass air flow sensor
11	Absolute throttle position sensor
12	Commanded secondary air status
13	Location of oxygen sensors
14	Bank 1 Sensor 1
18	Bank 2 Sensor 1
1C	OBD requirements to which vehicle or engine is certified
1F	Time Since Engine Start
20	Supported PIDs 21h-40h
21	Distance traveled with MIL is activated
24	Bank 1 Sensor 1 (Wide range O2S)
28	Bank 2 Sensor 1 (Wide range O2S)
2E	Commanded Evaporative Purge air status
33	Barometric pressure
40	Supported PIDs 41h - 60h
44	Fuel/Air commanded equivalence ratio
4D	Engine run time with MIL is activated

## OBD Service \$02

PID	Description
00	PIDs supported [01 - 20]
02	Freeze DTC
03	Fuel system status
05	Engine coolant temperature
06	Short term fuel % trim—Bank 1
0B	Intake manifold absolute pressure
0C	Engine RPM
0D	Vehicle speed
0E	Timing advance
0F	Intake air temperature
11	Throttle position
14	Oxygen sensor voltage,
20	PIDs supported [21 - 40]
33	Barometric pressure
40	PIDs supported [41 - 60]
45	Relative Throttle Position

## OBD Service \$04

### Functional description

The purpose of this service is to provide a means for the external test equipment to command ECUs to clear all emission-related diagnostic information

This includes:

- MIL and number of diagnostic trouble codes (can be read with Service \$01, PID \$01)
- Clear the I/M (Inspection/Maintenance) readiness bits (Service \$01, PID \$01 and \$41)
- Confirmed diagnostic trouble codes (can be read with Service \$03)
- Pending diagnostic trouble codes (can be read with Service \$07)
- Diagnostic trouble code for freeze frame data (can be read with Service \$02, PID \$02)
- Freeze frame data (can be read with Service \$02)
- Oxygen sensor test data (can be read with Service \$05)
- Status of system monitoring tests (can be read with Service \$01, PID \$01)
- On-board monitoring test results (can be read with Service \$06)
- Distance travelled while MIL is activated (can be read with Service \$01, PID \$21)
- Number of warm-ups since DTCs cleared (can be read with Service \$01, PID \$30)
- Distance travelled since DTCs cleared (can be read with Service \$01, PID \$31)
- Time run by the engine while MIL is activated (can be read with Service \$01, PID \$4D)
- Time since diagnostic trouble codes cleared (can be read with Service \$01, PID \$4E)

Other manufacturer-specific “clearing/resetting” actions may also occur in response to this request message.

For safety and/or technical design reasons, some ECUs may not respond to this service under all conditions.

All ECUs shall respond to this service request with the ignition ON and with the engine not running.

ECUs that cannot perform this operation under other conditions, such as with the engine running, will ignore the request with SAE J1850 May2007 and ISO 9141-2 interfaces, or will send a negative response message with ISO 14230-4 or SAE J1979 May 2007 interfaces, as described in ISO 14230-4 or SAE J1979 May 2007.

## **OBD Service \$07**

### **Functional description for ISO 15765-4 or SAE J1979 May 2007**

The purpose of this service is to enable the external test equipment to obtain “pending” diagnostic trouble codes detected during current or last completed driving cycle for emission-related components / systems that are tested or continuously monitored during normal driving conditions.

Service 07h is required for all DTCs and is independent of Service 03h.

The intended use of this data is to assist the service technician after a vehicle repair, and after clearing diagnostic information, by reporting test results after a single driving cycle.

If the test failed during the driving cycle, the DTC associated with that test will be reported. Test results reported by this service do not necessarily indicate a faulty component / system. If test results indicate a failure after additional driving, then the MIL will be illuminated and a DTC will be set and reported with service 03h, indicating a faulty component / system. This service can always be used to request the results of the latest test, independent of the setting of a DTC.

Test results for these components / systems are reported in the same format as the DTCs in Service \$03 - refer to the functional description for service \$03.

If less than three (3) DTC values are reported for failed tests, the response messages used to report the test results shall be filled with \$00 to fill seven (7) data bytes.

This maintains the required fixed message length for all messages.

## **OBD Service \$09**

### **-PIDs supported**

PID	Description
00	PIDs supported [01 - 20]
02	Vehicle Identification Number
04	Calibration Identifications
06	Calibration Verification Numbers
08	In use Performance tracking