



ELECTRÓNICA DEL AUTOMÓVIL

OBD II

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Profesor: Juan Manuel Moreno Equilaz
Alumno: Pedro González Melis

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A. Introducción

Durante los años 70 y principios de los 80 algunos fabricantes empezaron a usar componentes electrónicos de control y diagnóstico de errores en sus automóviles. Al principio fue solo para conocer y controlar las emisiones del vehículo y adaptarlas a los estándares exigidos, pero con el paso del tiempo estos sistemas fueron volviéndose cada vez mas sofisticados, hasta los años 90, donde surgió el estándar OBD II.

El OBD II, como su nombre indica “On Board Diagnostic Second Generation”, es un sistema que permite diagnosticar los errores que se producen en el vehículo sin necesidad de desmontar partes para descubrir la procedencia de dicho error.

Este sistema de codificación única se encuentra actualmente implantado en todos los turismos y vehículos industriales ligeros que se producen y a diferencia de otros sistemas desarrollados antes de 1996, este se caracteriza por ser un sistema estandarizado, que permite, de manera fácil, ver que errores se han producido en un vehículo cualquiera utilizando una única codificación y claro esta, un conector estandarizado.

B. Funciones del OBD II

Como ya sabemos, todos los vehículos actuales, disponen de una o varias ECU “Electronic Control Unit”, en general son muchas, que se encargan de gestionar ciertos parámetros de nuestro vehículo para asegurar su correcto funcionamiento. Las relaciones entre estos parámetros deben mantenerse acotadas, dependiendo de las condiciones externas varían ciertos rangos, o sino, es que se está produciendo algún mal funcionamiento en nuestro vehículo.

Los parámetros principales que dictan como debe estar funcionando nuestro motor, y si verifican si todo funcionando correctamente son:

- Velocidad
- Carga
- Temperatura del motor
- Consumo de combustible
- Temperatura ambiente
- Caudal de aire
- Emisiones

Para conocerlos, los automóviles actuales, incorporan una gran cantidad de sensores, que permiten conocer a las ECU, cuales son las condiciones externas, y decidir como actuar sobre el motor. En caso de que alguno de los parámetros se salga de los rangos marcados, el sistema OBD II, es el encargado de almacenar esta información, y avisar al conductor de que algo sufre un mal funcionamiento, señalizando con un indicador luminoso que es recomendable ir al taller a revisar que error se a producido.

Una vez el vehículo llega al taller, el equipo de mecánicos, puede acceder a la información almacenada por el OBD II, ver que error era el que se había producido, y arreglarlo en caso de necesidad sin tener que hacer múltiples pruebas para descubrir la procedencia del error.

Por supuesto, el sistema no es perfecto, y habitualmente, cuando se produce un error en nuestro vehículo, se desencadena una serie de errores inducidos, que también son almacenados. Aquí es donde entra la experiencia y el saber del mecánico para descubrir donde esta la raíz del problema.

C. Detección de errores con OBDII

Como ya hemos comentado el sistema OBDII, es el encargado de almacenar los códigos de los errores que se generan en nuestro vehículo, pero no solo almacena el error, sino que lo almacena de tal manera, que su lectura, nos indique donde se ha producido el error y nos facilite el trabajo de reparación.

Las decenas de unidades de control que hay repartidas en nuestro vehículo, son las encargadas de interpretar todas las informaciones que generan los sensores, velocidades, caudales, presiones, etc. y gracias a estas informaciones, actúan sobre los componentes del vehículo, que regularan el funcionamiento de este.

La cantidad de información con la que se trabaja, y la situación de dichas ECU's en el vehículo, hace imposible, escanear 1 por 1 las diferentes ECU's para buscar un mal funcionamiento. Para ello se usa el OBDII, cuando alguna unidad de control, recibe una señal anómala, informa al resto del sistema, y el OBDII es el encargado de avisar al conductor de que se ha producido un error y almacenarlo.

Por tanto, se ha de dejar claro que no es el sistema OBDII el encargado de detectar los errores, sino, simplemente es el encargado de informar y almacenar los errores detectados por el resto de unidades de control y facilitarnos el acceso a estos.

D. Acceso a la información del sistema OBDII

Cuando el sistema almacena alguna información de error, nos indica, generalmente con una señal luminosa, que algo esta funcionando incorrectamente y por tanto es aconsejable que acudamos a un taller para que revisen el automóvil.

Una vez en el taller, el equipo de mecánicos, conectará nuestro automóvil un escáner o lector del sistema OBDII que le facilitara la información almacenada. A principios de los 80, cuando se extendió, el uso de este sistema de diagnosis, cada fabricante era libre de incorporar su propio conector y utilizar los códigos de error que quisiera. Esto dificultaba mucho la utilización de este sistema para la reparaciones, ya que la inversión que requería en los talleres mecánicos era altísima y poco practica (debían disponer de muchos lectores y de muchas tablas de códigos). Para que el uso de este sistema fuera practico y viable, en 1996, se llego a un consenso entre los fabricantes y se estandarizaron los códigos y el conector. Así con un único lector de códigos y una tabla de errores, se puede diagnosticar un error en cualquier coche, independientemente del fabricante.

1) El conector

El conector del sistema OBDII tiene que cumplir las siguientes especificaciones según la normativa, ISO 15031-3:2004

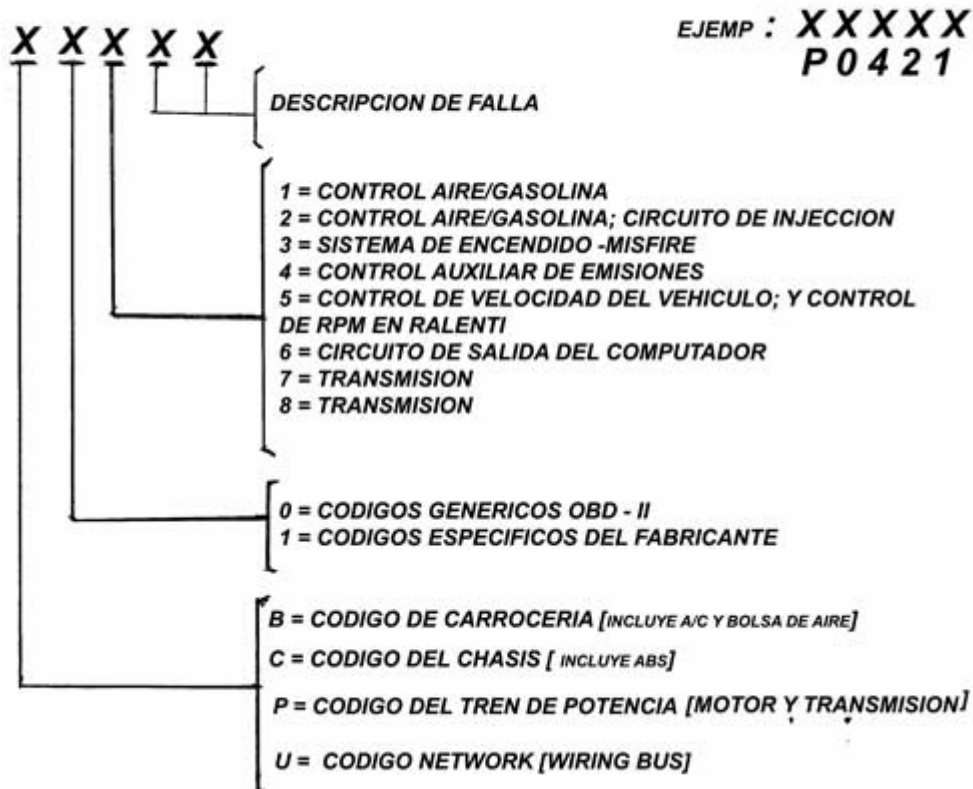




2) Códigos de error

Los códigos también están estandarizados y deben seguir el esquema siguiente.

DESCRIPCION DE CODIGOS DIAGNOSTICO OBD II



Por supuesto, existe una tabla con todos los códigos estandarizados que puede verse en el anexo 1, pero eso no impide que cada fabricante, añada sus propios códigos para el control de parámetros o errores que no están tabulados en los códigos estándares.

3) Protocolos de comunicación

Básicamente existen 3 protocolos de comunicación del sistema OBDII con los lectores. Los fabricantes han escogido que protocolo utilizar y todos los vehículos que salen de su fábrica salen con el mismo protocolo, por tanto es fácil saber que tipo de protocolo funcionan las comunicaciones de nuestro coche.

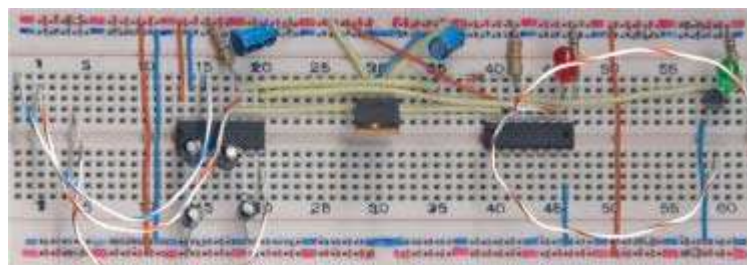
- **ISO 9141-2** en vehículos **Europeos, Asiáticos** y **Chrysler** con variantes (Key Word Protocol=Palabra Clave)
- **SAE J1850 VPW** que significa **Ancho de Pulso Variable** (Variable Pulse Width) y lo utiliza **GM USA**
- **SAE J1850 PWM** que indica **Modulación Ancho de Pulso** (Pulse Width Modulation) utilizado por **Ford USA**.
- **KWP 1281 y KWP 2000** utilizado por el grupo **VAG**.
- **ISO 14230** que lo utiliza **Renault**, etc.

Como es fácil deducir, cada uno de estos protocolos, requiere de un tratamiento de la información, antes de conectar el OBDII con el PC, diferente. Y por tanto, se requieren interfaces de conexión diferentes. Esto no es del todo exacto, ya que existe la posibilidad de fabricar un interfaz de conexión del OBDII con el PC, capaz de utilizar todos los protocolos e incluso seleccionar automáticamente cual es el protocolo utilizado por el vehículo a conectar.

4) Lectores de códigos

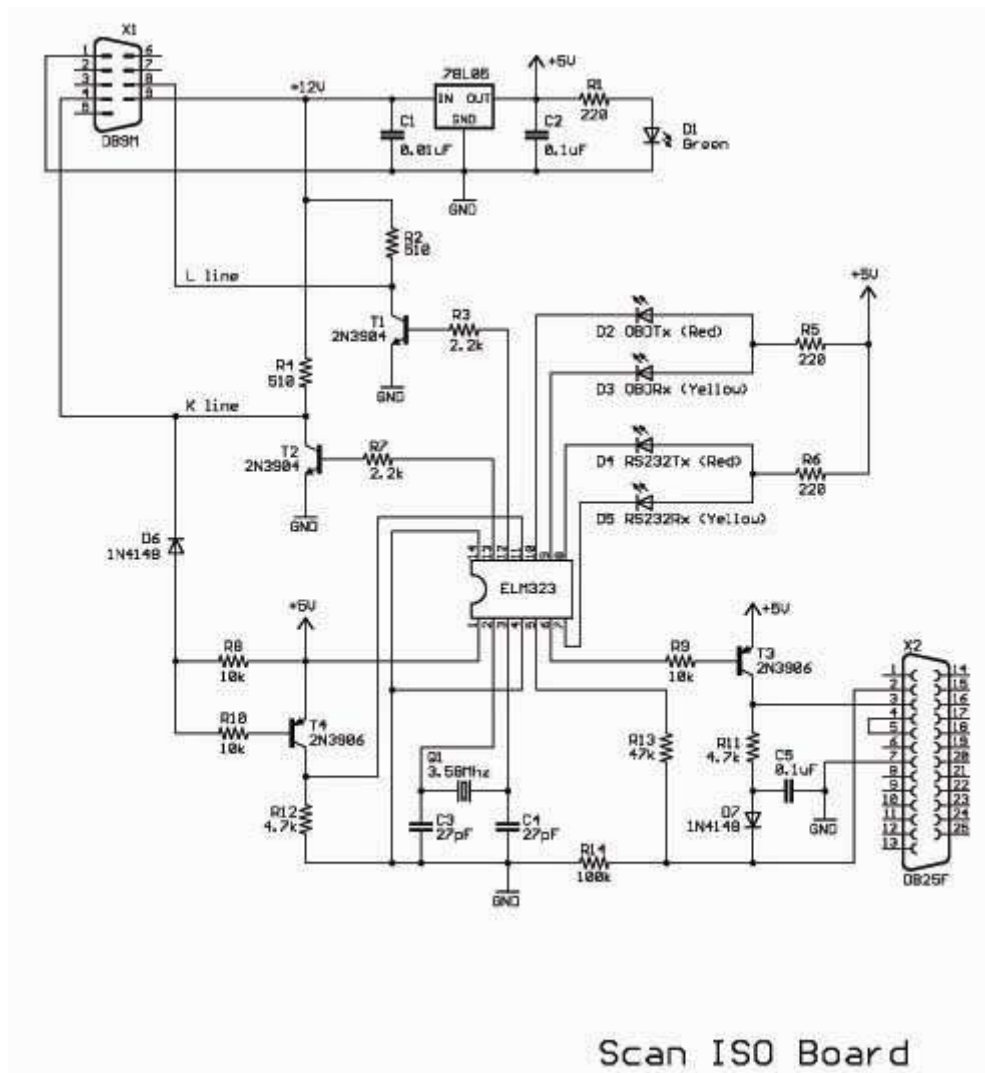
Para poder extraer los datos del OBDII de un vehículo, se necesita un interfaz de conexiones, que recodifique la información que obtiene del vehículo, para que esta pueda ser entendida por el software del pc.

Dichos interfaces son bastante sencillos, y como podemos ver en la siguiente imagen, no se necesitan grandes conocimientos de electrónica, ni materiales difíciles de conseguir para fabricar uno.

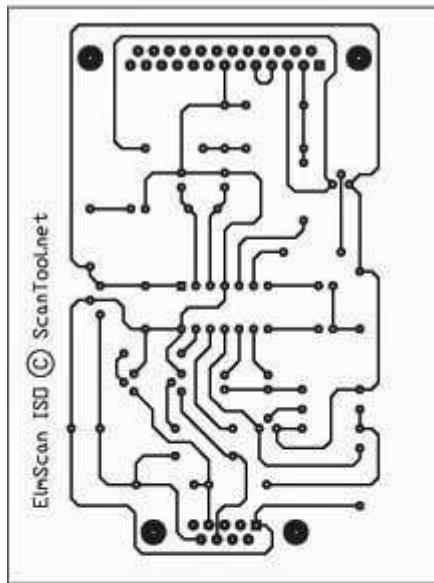


Como se ha comentado en el apartado anterior, para cada protocolo, es necesario utilizar un interfaz diferente, o bien crear un interfaz capaz de trabajar con todos los protocolos. A continuación se enseñan los esquemas internos de los interfaces, para protocolo simple, más comunes.

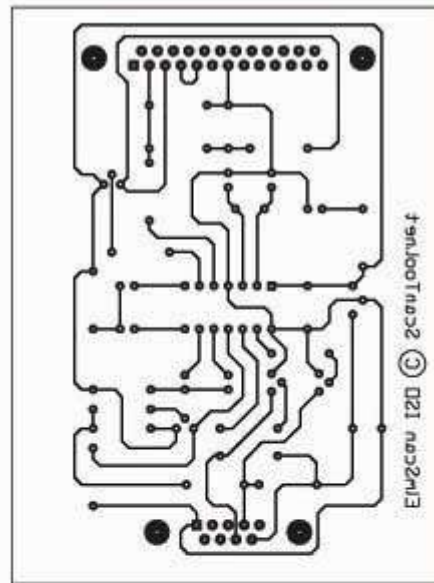
Interfaz de conexión para protocolo ISO 9141-2



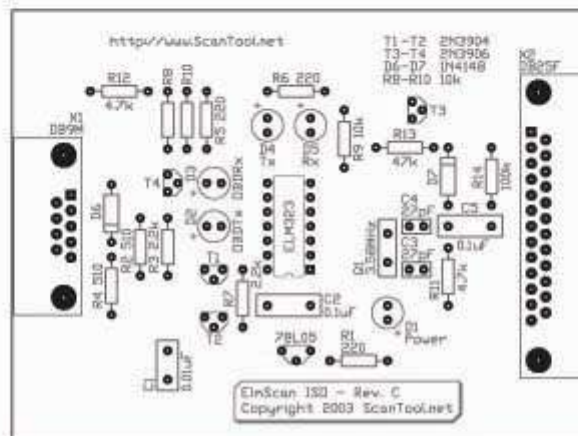
OBD-II ISO 9141-2 to RS-232 interface, PCB layout



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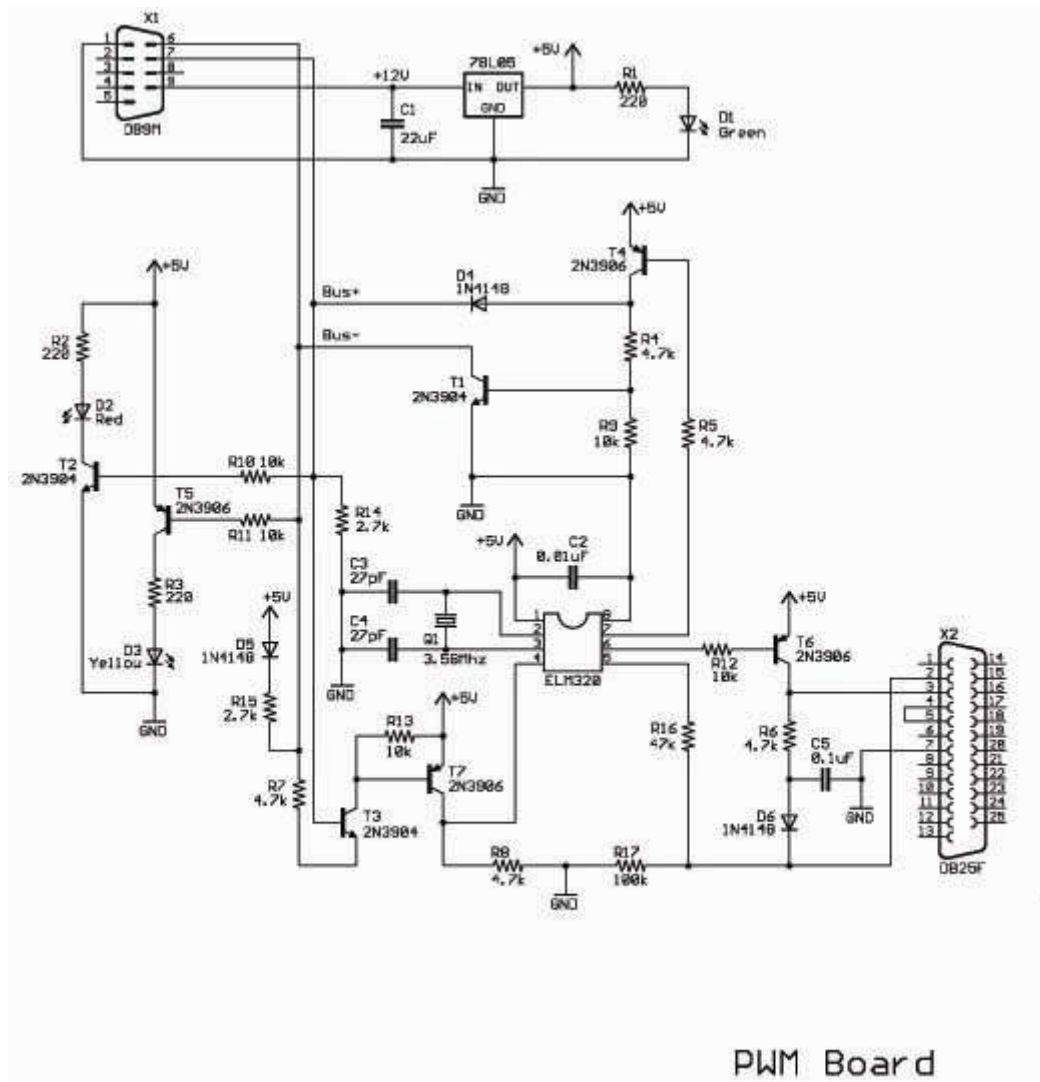


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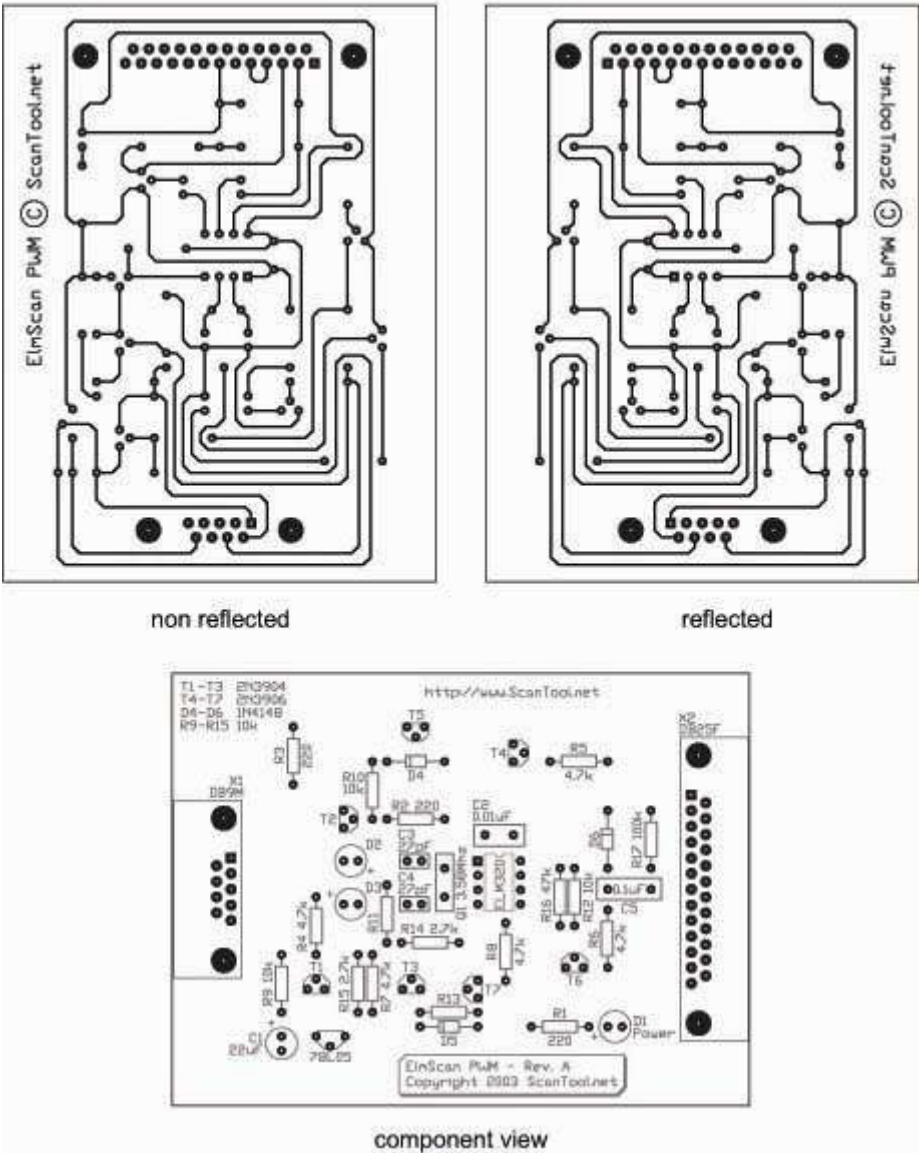


component view

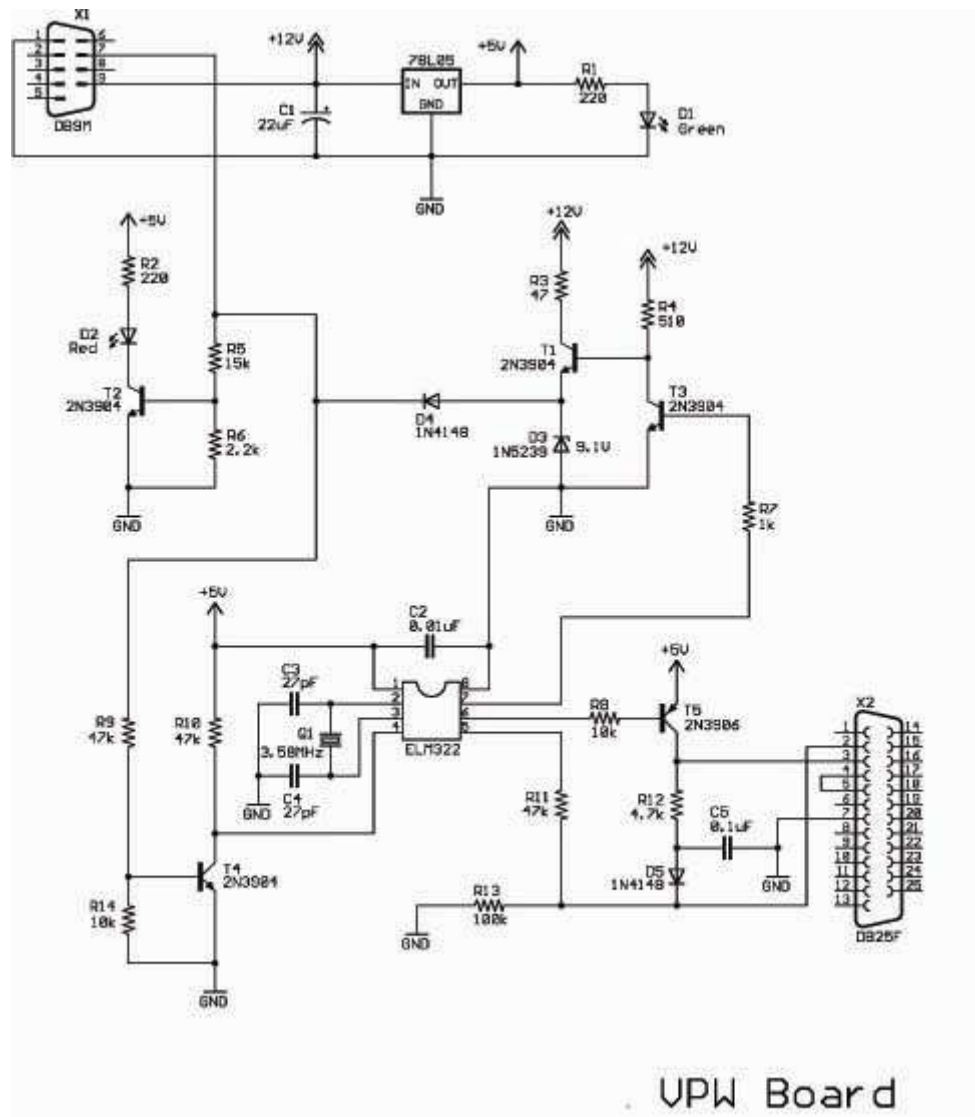
Interfaz de conexión para protocolo SAE J1850 PWM



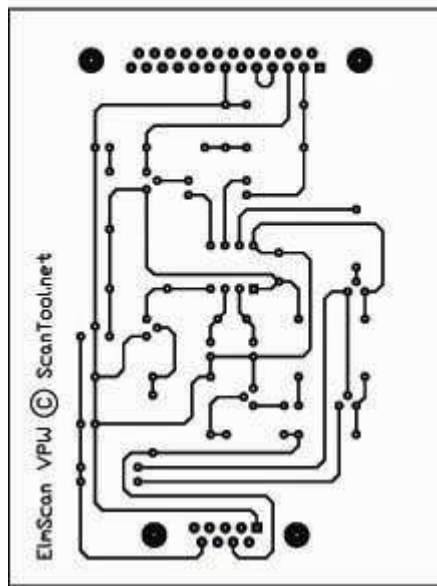
OBD-II J1850 PWM to RS-232 interface, PCB layout



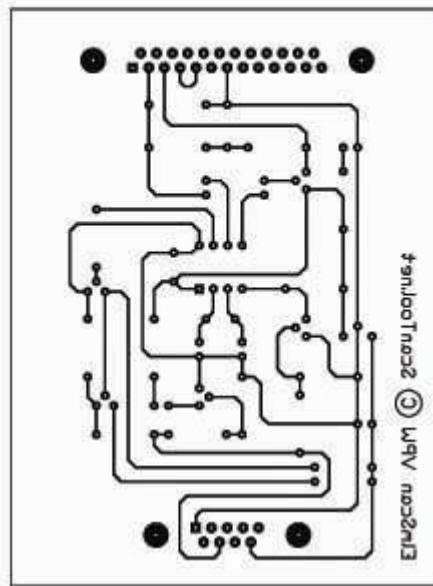
Interfaz de conexión para protocolo SAE J1850 VPW



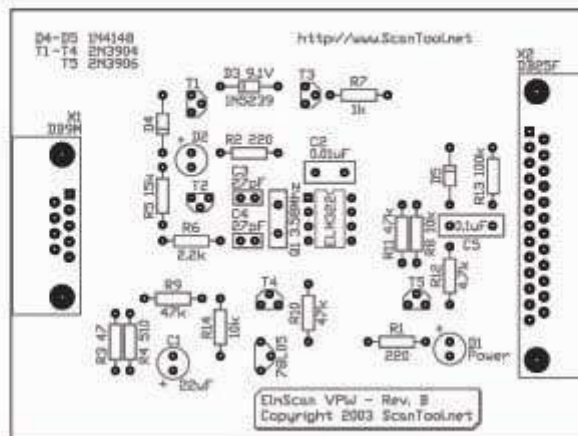
OBD-II J1850 VPW to RS-232 interface, PCB layout



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5) Software necesario

Una vez tenemos conectado el OBDII del vehículo con el PC, es necesario disponer del software capaz de leer la información, una vez recodificada, que viene del vehículo. Por supuesto que existen muchas opciones y a continuación se detallan algunos de los softwares disponibles actualmente para la lectura de dicha información.

- Scantool.net 1.13
- EasyOBD II 2.1.1
- OBD 2007
- VitalScan 1.3

6) Otros sistemas de lectura

Todos los sistemas que se han visto hasta el momento, estaban formados por:

- Cable de conexión de del conector OBDII al Interfaz
- Interfaz de conexiones
- Cable del interfaz al puerto COM del PC.
- Software para lectura de los códigos

Aunque existen otras posibilidades, algo más simplificadas, y que pueden ser adquiridas fácilmente. Se trata de instrumentos de lectura de códigos, que disponen de capacidad de lectura del OBDII sin necesidad de ningún PC. Estos sistemas realizan el tratamiento de la información del OBDII del vehículo y muestran en su pantalla los códigos de error.



E. OTRAS FUNCIONES DEL OBDII

Como hemos visto hasta ahora, el conector OBDII nos permite acceder a las informaciones almacenadas en las ECU's de nuestro sistema, aunque hasta ahora solo se ha comentado el acceso a los errores del vehículo, pero esta no es la única opción del sistema OBDII, ya que también nos permite conectarnos al BUS CAN del vehículo, y así acceder no solo a los errores, sino que podemos acceder al software de control de nuestro vehículo e incluso modificarlo.

Así que a través del conector del OBDII también podemos acceder a partes del vehículo que nos permitirán hacer modificaciones, reparaciones y comprobaciones del funcionamiento en las ECU's de nuestro vehículo.

Para realizar estas operaciones no necesitamos ningún elemento que no conozcamos a estas alturas del estudio. Se necesita:

- El interfaz de conexión o adaptación de las señales
- Los cableados de conexión del puerto OBDII hasta el PC
- Un PC
- Software capaz de realizar las nuevas operaciones

Simplemente, para realizar estas nuevas funciones, se requieren mayores conocimientos de los sistemas que integra nuestro vehículo para ser capaces de entender las nuevas informaciones que recibiremos en nuestro PC y así poder trabajar con ellas.

Es herramienta, es extremadamente potente, y en muchísimos casos permite modificar prácticamente toda la información necesaria para el funcionamiento de nuestro vehículo, desde gráficos de inyección y encendido, hasta modificar el funcionamiento de control de tracción, estabilidad,...

Por supuesto, todas estas funciones y opciones que nos facilita el OBDII, deben manipularse con cuidado, ya que algunos cambios pueden producir errores muy graves en el funcionamiento del vehículo y provocar graves roturas.

F. CONCLUSIÓN

Gracias al sistema de auto diagnosis que se integró en los vehículos, se consiguió realizar un diagnostico constante del vehículo y almacenar información que después será necesaria para poder encontrar posibles averías en el vehículo con mayor facilidad y precisión.

El consenso al que llegaron los fabricantes, para estandarizar sus códigos y equipos, llamado OBDII, permite a los mecánicos de talleres no oficiales y aficionados al mundo de la mecánica, realizar un análisis del funcionamiento del vehículo más exhaustivo y conseguir reparar el vehículo con mayor facilidad al poder tratar la información almacenada.

Del mismo modo, la facilidad de crear tu propio interfaz y la gran cantidad de software libre que se puede encontrar, permite reducir muchísimo los costes (si se es un poco hábil con el soldador y el pc), y así conseguir una mayor utilización de este sistema para las pequeñas reparaciones.

Así mismo, creo que en el momento de la adquisición de un vehículo, debería incorporarse el cable, el interfaz y el software necesario para poder leer los códigos personalmente y sin necesidad de recurrir a un taller para reparar pequeños desperfectos que puedan producirse en el automóvil. Aunque esta claro que los intereses económicos de los fabricantes son totalmente contrarios a esto.

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ANEXO 1 – CODIGOS OBD II

1) POWER TRAIN ERROR CODES

P0010...."A" Camshaft Position Actuator circuit (Bank 1)
P0011...."A" Camshaft Position - Timing over-advanced (Bank 1)
P0012...."A" Camshaft Position - Timing over-retarded (Bank 1)
P0013...."B" Camshaft Position Actuator circuit (Bank 2)
P0014...."B" Camshaft Position - Timing over-advanced (Bank 1)
P0015...."B" Camshaft Position - Timing over-retarded (Bank 1)
P0020...."A" Camshaft Position Actuator circuit (Bank 2)
P0021...."A" Camshaft Position - Timing over-advanced (Bank 2)
P0022...."A" Camshaft Position - Timing over-retarded (Bank 2)
P0023...."B" Camshaft Position Actuator circuit (Bank 2)
P0024...."B" Camshaft Position - Timing over-advanced (Bank 2)
P0025...."B" Camshaft Position - Timing over-retarded (Bank 2)
P0030....O2 Sensor heater control circuit (Bank 1 Sensor 1)
P0031....O2 Sensor heater control circuit low (Bank 1 Sensor 1)
P0032....O2 Sensor heater control circuit high (Bank 1 Sensor 1)
P0033....Turbocharger bypass valve control circuit
P0034....Turbocharger bypass valve control circuit low
P0035....Turbocharger bypass valve control circuit high
P0036....O2 Sensor heater control circuit (Bank 1 Sensor 2)
P0037....O2 Sensor heater control circuit low (Bank 1 Sensor 2)
P0038....O2 Sensor heater control circuit high (Bank 1 Sensor 2)
P0042....O2 Sensor heater control circuit (Bank 1 Sensor 3)
P0043....O2 Sensor heater control circuit low (Bank 1 Sensor 3)
P0044....O2 Sensor heater control circuit high (Bank 1 Sensor 3)
P0050....O2 Sensor heater control circuit (Bank 2 Sensor 1)
P0051....O2 Sensor heater control circuit low (Bank 2 Sensor 1)
P0052....O2 Sensor heater control circuit high (Bank 2 Sensor 1)
P0056....O2 Sensor heater control circuit (Bank 2 Sensor 2)
P0057....O2 Sensor heater control circuit low (Bank 2 Sensor 2)
P0058....O2 Sensor heater control circuit high (Bank 2 Sensor 2)
P0062....O2 Sensor heater control circuit (Bank 2 Sensor 3)
P0063....O2 Sensor heater control circuit low (Bank 2 Sensor 3)
P0064....O2 Sensor heater control circuit high (Bank 2 Sensor 3)
P0065....Air Assisted Injector control range/performance problem
P0066....Air Assisted Injector control circuit low
P0067....Air Assisted Injector control circuit high
P0070....Ambient Air Temperature Sensor circuit
P0071....Ambient Air Temperature Sensor range/performance problem
P0072....Ambient Air Temperature Sensor circuit low input
P0073....Ambient Air Temperature Sensor circuit high input
P0074....Ambient Air Temperature Sensor circuit intermittent
P0075....Intake Valve control Solenoid circuit (Bank 1)
P0076....Intake Valve control Solenoid circuit low (Bank 1)
P0077....Intake Valve control Solenoid circuit high (Bank 1)
P0078....Exhaust Valve control Solenoid circuit (Bank 1)
P0079....Exhaust Valve control Solenoid circuit low (Bank 1)
P0080....Exhaust Valve control Solenoid circuit high (Bank 1)
P0081....Intake Valve control Solenoid circuit (Bank 2)
P0082....Intake Valve control Solenoid circuit low (Bank 2)
P0083....Intake Valve control Solenoid circuit high (Bank 2)
P0084....Exhaust Valve control Solenoid circuit (Bank 2)
P0085....Exhaust Valve control Solenoid circuit low (Bank 2)
P0086....Exhaust Valve control Solenoid circuit high (Bank 2)

P0100....Mass or Volume Air Flow circuit malfunction
P0101....Mass or Volume Air Flow circuit range/performance problem
P0102....Mass or Volume Air Flow circuit low input
P0103....Mass or Volume Air Flow circuit high input
P0104....Mass or Volume Air Flow circuit intermittent
P0105....Manifold Absolute Pressure/Barometric Pressure circuit malfunction
P0106....Manifold Absolute Pressure/Barometric Pressure circuit range/performance problem
P0107....Manifold Absolute Pressure/Barometric Pressure circuit low input
P0108....Manifold Absolute Pressure/Barometric Pressure circuit high input
P0109....Manifold Absolute Pressure/Barometric Pressure circuit intermittent
P0110....Intake Air Temperature circuit malfunction
P0111....Intake Air Temperature circuit range/performance problem
P0112....Intake Air Temperature circuit low input
P0113....Intake Air Temperature circuit high input
P0114....Intake Air Temperature circuit intermittent
P0115....Engine Coolant Temperature circuit malfunction
P0116....Engine Coolant Temperature circuit range/performance problem
P0117....Engine Coolant Temperature circuit low input
P0118....Engine Coolant Temperature circuit high input
P0119....Engine Coolant Temperature circuit intermittent
P0120....Throttle/Petal Position Sensor/Switch A circuit malfunction
P0121....Throttle/Petal Position Sensor/Switch A circuit range/performance problem
P0122....Throttle/Petal Position Sensor/Switch A circuit low input
P0123....Throttle/Petal Position Sensor/Switch A circuit high input
P0124....Throttle/Petal Position Sensor/Switch A circuit intermittent
P0125....Insufficient Coolant Temperature for Closed Loop Fuel control
P0126....Insufficient Coolant Temperature for stable operation
P0127....Intake Air Temperature too high
P0128....Coolant Thermostat (coolant below normal temp range)
P0130....O2 Sensor circuit malfunction (Bank 1 Sensor 1)
P0131....O2 Sensor circuit low Voltage (Bank 1 Sensor 1)
P0132....O2 Sensor circuit high Voltage (Bank 1 Sensor 1)
P0133....O2 Sensor circuit Slow Response (Bank 1 Sensor 1)
P0134....O2 Sensor circuit No Activity detected (Bank 1 Sensor 1)
P0135....O2 Sensor Heater circuit malfunction (Bank 1 Sensor 1)
P0136....O2 Sensor circuit malfunction (Bank 1 Sensor 2)
P0137....O2 Sensor circuit low Voltage (Bank 1 Sensor 2)
P0138....O2 Sensor circuit high Voltage (Bank 1 Sensor 2)
P0139....O2 Sensor circuit Slow Response (Bank 1 Sensor 2)
P0140....O2 Sensor circuit No Activity detected (Bank 1 Sensor 2)
P0141....O2 Sensor Heater circuit malfunction (Bank 1 Sensor 2)
P0142....O2 Sensor circuit malfunction (Bank 1 Sensor 3)
P0143....O2 Sensor circuit low Voltage (Bank 1 Sensor 3)
P0144....O2 Sensor circuit high Voltage (Bank 1 Sensor 3)
P0145....O2 Sensor circuit Slow Response (Bank 1 Sensor 3)
P0146....O2 Sensor circuit No Activity detected (Bank 1 Sensor 3)
P0147....O2 Sensor Heater circuit malfunction (Bank 1 Sensor 3)
P0148....Fuel delivery error P0149....Fuel timing error
P0150....O2 Sensor circuit malfunction (Bank 2 Sensor 1)
P0151....O2 Sensor circuit low Voltage (Bank 2 Sensor 1)
P0152....O2 Sensor circuit high Voltage (Bank 2 Sensor 1)
P0153....O2 Sensor circuit Slow Response (Bank 2 Sensor 1)
P0154....O2 Sensor circuit No Activity detected (Bank 2 Sensor 1)
P0155....O2 Sensor Heater circuit malfunction (Bank 2 Sensor 1)
P0156....O2 Sensor circuit malfunction (Bank 2 Sensor 2)
P0157....O2 Sensor circuit low Voltage (Bank 2 Sensor 2)
P0158....O2 Sensor circuit high Voltage (Bank 2 Sensor 2)
P0159....O2 Sensor circuit Slow Response (Bank 2 Sensor 2)
P0160....O2 Sensor circuit No Activity detected (Bank 2 Sensor 2)
P0161....O2 Sensor Heater circuit malfunction (Bank 2 Sensor 2)

P0162....O2 Sensor circuit malfunction (Bank 2 Sensor 3)
P0163....O2 Sensor circuit low Voltage (Bank 2 Sensor 3)
P0164....O2 Sensor circuit high Voltage (Bank 2 Sensor 3)
P0165....O2 Sensor circuit Slow Response (Bank 2 Sensor 3)
P0166....O2 Sensor circuit No Activity detected (Bank 2 Sensor 3)
P0167....O2 Sensor Heater circuit malfunction (Bank 2 Sensor 3)
P0168....Fuel temperature too high
P0169....Incorrect fuel composition (flex fuel vehicles)
P0170....Fuel Trim malfunction (Bank 1)
P0171....System too Lean (Bank 1)
P0172....System too Rich (Bank 1)
P0173....Fuel Trim malfunction (Bank 2)
P0174....System too Lean (Bank 2)
P0175....System too Rich (Bank 2)
P0176....Fuel Composition Sensor circuit malfunction
P0177....Fuel Composition Sensor circuit range/performance
P0178....Fuel Composition Sensor circuit low input
P0179....Fuel Composition Sensor circuit high input
P0180....Fuel Temperature Sensor A circuit malfunction
P0181....Fuel Temperature Sensor A circuit range/performance
P0182....Fuel Temperature Sensor A circuit low input
P0183....Fuel Temperature Sensor A circuit high input
P0184....Fuel Temperature Sensor A circuit intermittent
P0185....Fuel Temperature Sensor B circuit malfunction
P0186....Fuel Temperature Sensor B circuit range/performance
P0187....Fuel Temperature Sensor B circuit low input
P0188....Fuel Temperature Sensor B circuit high input
P0189....Fuel Temperature Sensor B circuit intermittent
P0190....Fuel Rail Pressure Sensor circuit malfunction
P0191....Fuel Rail Pressure Sensor circuit range/performance
P0192....Fuel Rail Pressure Sensor circuit low input
P0193....Fuel Rail Pressure Sensor circuit high input
P0194....Fuel Rail Pressure Sensor circuit intermittent
P0195....Engine Oil Temperature Sensor malfunction
P0196....Engine Oil Temperature Sensor range/performance
P0197....Engine Oil Temperature Sensor low
P0198....Engine Oil Temperature Sensor high
P0199....Engine Oil Temperature Sensor intermittent
P0200....Injector circuit malfunction
P0201....Injector circuit malfunction - Cylinder 1
P0202....Injector circuit malfunction - Cylinder 2
P0203....Injector circuit malfunction - Cylinder 3
P0204....Injector circuit malfunction - Cylinder 4
P0205....Injector circuit malfunction - Cylinder 5
P0206....Injector circuit malfunction - Cylinder 6
P0207....Injector circuit malfunction - Cylinder 7
P0208....Injector circuit malfunction - Cylinder 8
P0209....Injector circuit malfunction - Cylinder 9
P0210....Injector circuit malfunction - Cylinder 10
P0211....Injector circuit malfunction - Cylinder 11
P0212....Injector circuit malfunction - Cylinder 12
P0213....Cold Start Injector 1 malfunction
P0214....Cold Start Injector 2 malfunction
P0215....Engine Shutoff Solenoid malfunction
P0216....Injection Timing control circuit malfunction
P0217....Engine Overtemp Condition
P0218....Transmission Over Temperature Condition
P0219....Engine Overspeed Condition
P0220....Throttle/Pedal Position Sensor/Switch B circuit malfunction
P0221....Throttle/Pedal Position Sensor/Switch B circuit range/performance problem

P0222....Throttle/Pedal Position Sensor/Switch B circuit low input
P0223....Throttle/Pedal Position Sensor/Switch B circuit high input
P0224....Throttle/Pedal Position Sensor/Switch B circuit intermittent
P0225....Throttle/Pedal Position Sensor/Switch C circuit malfunction
P0226....Throttle/Pedal Position Sensor/Switch C circuit range/performance problem
P0227....Throttle/Pedal Position Sensor/Switch C circuit low input
P0228....Throttle/Pedal Position Sensor/Switch C circuit high input
P0229....Throttle/Pedal Position Sensor/Switch C circuit intermittent
P0230....Fuel Pump Primary circuit malfunction
P0231....Fuel Pump Secondary circuit low
P0232....Fuel Pump Secondary circuit high
P0233....Fuel Pump Secondary circuit intermittent
P0234....Engine Overboost Condition
P0235....Turbocharger Boost Sensor A circuit malfunction
P0236....Turbocharger Boost Sensor A circuit range/performance
P0237....Turbocharger Boost Sensor A circuit low
P0238....Turbocharger Boost Sensor A circuit high
P0239....Turbocharger Boost Sensor B malfunction
P0240....Turbocharger Boost Sensor B circuit range/performance
P0241....Turbocharger Boost Sensor B circuit low
P0242....Turbocharger Boost Sensor B circuit high
P0243....Turbocharger Wastegate Solenoid A malfunction
P0244....Turbocharger Wastegate Solenoid A range/performance
P0245....Turbocharger Wastegate Solenoid A low
P0246....Turbocharger Wastegate Solenoid A high
P0247....Turbocharger Wastegate Solenoid B malfunction
P0248....Turbocharger Wastegate Solenoid B range/performance
P0249....Turbocharger Wastegate Solenoid B low
P0250....Turbocharger Wastegate Solenoid B high
P0251....Injection Pump Fuel Metering control "A" malfunction (Cam/Rotor/Injector)
P0252....Injection Pump Fuel Metering control "A" range/performance (Cam/Rotor/Injector)
P0253....Injection Pump Fuel Metering control "A" low (Cam/Rotor/Injector)
P0254....Injection Pump Fuel Metering control "A" high (Cam/Rotor/Injector)
P0255....Injection Pump Fuel Metering control "A" intermittent (Cam/Rotor/Injector)
P0256....Injection Pump Fuel Metering control "B" malfunction (Cam/Rotor/Injector)
P0257....Injection Pump Fuel Metering control "B" range/performance (Cam/Rotor/Injector)
P0258....Injection Pump Fuel Metering control "B" low (Cam/Rotor/Injector)
P0259....Injection Pump Fuel Metering control "B" high (Cam/Rotor/Injector)
P0260....Injection Pump Fuel Metering control "B" intermittent (Cam/Rotor/Injector)
P0261....Cylinder 1 Injector circuit low
P0262....Cylinder 1 Injector circuit high
P0263....Cylinder 1 Contribution/Balance Fault
P0264....Cylinder 2 Injector circuit low
P0265....Cylinder 2 Injector circuit high
P0266....Cylinder 2 Contribution/Balance Fault
P0267....Cylinder 3 Injector circuit low
P0268....Cylinder 3 Injector circuit high
P0269....Cylinder 3 Contribution/Balance Fault
P0270....Cylinder 4 Injector circuit low
P0271....Cylinder 4 Injector circuit high
P0272....Cylinder 4 Contribution/Balance Fault
P0273....Cylinder 5 Injector circuit low
P0274....Cylinder 5 Injector circuit high
P0275....Cylinder 5 Contribution/Balance Fault
P0276....Cylinder 6 Injector circuit low
P0277....Cylinder 6 Injector circuit high
P0278....Cylinder 6 Contribution/Balance Fault
P0279....Cylinder 7 Injector circuit low
P0280....Cylinder 7 Injector circuit high
P0281....Cylinder 7 Contribution/Balance Fault

P0282....Cylinder 8 Injector circuit low
P0283....Cylinder 8 Injector circuit high
P0284....Cylinder 8 Contribution/Balance Fault
P0285....Cylinder 9 Injector circuit low
P0286....Cylinder 9 Injector circuit high
P0287....Cylinder 9 Contribution/Balance Fault
P0288....Cylinder 10 Injector circuit low
P0289....Cylinder 10 Injector circuit high
P0290....Cylinder 10 Contribution/Balance Fault
P0291....Cylinder 11 Injector circuit low
P0292....Cylinder 11 Injector circuit high
P0293....Cylinder 11 Contribution/Balance Fault
P0294....Cylinder 12 Injector circuit low
P0295....Cylinder 12 Injector circuit high
P0296....Cylinder 12 Contribution/range Fault
P0300....Random/Multiple Cylinder misfire detected
P0301....Cylinder 1 misfire detected
P0302....Cylinder 2 misfire detected
P0303....Cylinder 3 misfire detected
P0304....Cylinder 4 misfire detected
P0305....Cylinder 5 misfire detected
P0306....Cylinder 6 misfire detected
P0307....Cylinder 7 misfire detected
P0308....Cylinder 8 misfire detected
P0309....Cylinder 9 misfire detected
P0311....Cylinder 11 misfire detected
P0312....Cylinder 12 misfire detected
P0313....misfire detected with low fuel
P0314....Single cylinder misfire (cylinder not specified)
P0320....Ignition/Distributor Engine Speed input circuit malfunction
P0321....Ignition/Distributor Engine Speed input circuit range/performance
P0322....Ignition/Distributor Engine Speed input circuit No Signal
P0323....Ignition/Distributor Engine Speed input circuit intermittent
P0325....Knock Sensor 1 circuit malfunction (Bank 1 or Single Sensor)
P0326....Knock Sensor 1 circuit range/performance (Bank 1 or Single Sensor)
P0327....Knock Sensor 1 circuit low input (Bank 1 or Single Sensor)
P0328....Knock Sensor 1 circuit high input (Bank 1 or Single Sensor)
P0329....Knock Sensor 1 circuit intermittent (Bank 1 or Single Sensor)
P0330....Knock Sensor 2 circuit malfunction (Bank 2)
P0331....Knock Sensor 2 circuit range/performance (Bank 2)
P0332....Knock Sensor 2 circuit low input (Bank 2)
P0333....Knock Sensor 2 circuit high input (Bank 2)
P0334....Knock Sensor 2 circuit intermittent (Bank 2)
P0335....Crankshaft Position Sensor A circuit malfunction
P0336....Crankshaft Position Sensor A circuit range/performance
P0337....Crankshaft Position Sensor A circuit low input
P0338....Crankshaft Position Sensor A circuit high input
P0339....Crankshaft Position Sensor A circuit intermittent
P0340....Camshaft Position Sensor circuit malfunction
P0341....Camshaft Position Sensor circuit range/performance
P0342....Camshaft Position Sensor circuit low input
P0343....Camshaft Position Sensor circuit high input
P0344....Camshaft Position Sensor circuit intermittent
P0345....Camshaft Position Sensor "A" circuit (Bank 2)
P0346....Camshaft Position Sensor "A" circuit out of range (Bank 2)
P0347....Camshaft Position Sensor "A" circuit low input (Bank 2)
P0348....Camshaft Position Sensor "A" circuit high input (Bank 2)
P0349....Camshaft Position Sensor "A" circuit intermittent (Bank 2)
P0350....Ignition Coil Primary/Secondary circuit malfunction
P0351....Ignition Coil A Primary/Secondary circuit malfunction

P0352....Ignition Coil B Primary/Secondary circuit malfunction
P0353....Ignition Coil C Primary/Secondary circuit malfunction
P0354....Ignition Coil D Primary/Secondary circuit malfunction
P0355....Ignition Coil E Primary/Secondary circuit malfunction
P0356....Ignition Coil F Primary/Secondary circuit malfunction
P0357....Ignition Coil G Primary/Secondary circuit malfunction
P0358....Ignition Coil H Primary/Secondary circuit malfunction
P0359....Ignition Coil I Primary/Secondary circuit malfunction
P0360....Ignition Coil J Primary/Secondary circuit malfunction
P0361....Ignition Coil K Primary/Secondary circuit malfunction
P0362....Ignition Coil L Primary/Secondary circuit malfunction
P0365....Camshaft Position Sensor "B" circuit (Bank 1)
P0366....Camshaft Position Sensor "B" circuit out of range (Bank 1)
P0367....Camshaft Position Sensor "B" circuit low input (Bank 1)
P0368....Camshaft Position Sensor "B" circuit high input (Bank 1)
P0369....Camshaft Position Sensor "B" circuit intermittent (Bank 1)
P0370....Timing Reference high Resolution Signal A malfunction
P0371....Timing Reference high Resolution Signal A Too Many Pulses
P0372....Timing Reference high Resolution Signal A Too Few Pulses
P0373....Timing Reference high Resolution Signal A intermittent/Erratic Pulses
P0374....Timing Reference high Resolution Signal A No Pulses
P0375....Timing Reference high Resolution Signal B malfunction
P0376....Timing Reference high Resolution Signal B Too Many Pulses
P0377....Timing Reference high Resolution Signal B Too Few Pulses
P0378....Timing Reference high Resolution Signal B intermittent/Erratic Pulses
P0379....Timing Reference high Resolution Signal B No Pulses
P0380....Glow Plug/Heater circuit "A" malfunction
P0381....Glow Plug/Heater Indicator circuit malfunction
P0382....Exhaust Gas Recirculation Flow malfunction
P0385....Crankshaft Position Sensor B circuit malfunction
P0386....Crankshaft Position Sensor B circuit range/performance
P0387....Crankshaft Position Sensor B circuit low input
P0388....Crankshaft Position Sensor B circuit high input
P0389....Crankshaft Position Sensor B circuit intermittent
P0390....Camshaft Position Sensor "B" circuit intermittent
P0391....Camshaft Position Sensor "B" circuit out of range (Bank 2)
P0392....Camshaft Position Sensor "B" circuit low input (Bank 2)
P0393....Camshaft Position Sensor "B" circuit high input (Bank 2)
P0394....Camshaft Position Sensor "B" circuit intermittent (Bank 2)
P0400....Exhaust Gas Recirculation Flow malfunction
P0401....Exhaust Gas Recirculation Flow Insufficient detected
P0402....Exhaust Gas Recirculation Flow Excessive detected
P0403....Exhaust Gas Recirculation circuit malfunction
P0404....Exhaust Gas Recirculation circuit range/performance
P0405....Exhaust Gas Recirculation Sensor A circuit low
P0406....Exhaust Gas Recirculation Sensor A circuit high
P0407....Exhaust Gas Recirculation Sensor B circuit low
P0408....Exhaust Gas Recirculation Sensor B circuit high
P0410....Secondary Air Injection System malfunction
P0411....Secondary Air Injection System Incorrect Flow detected
P0412....Secondary Air Injection System Switching Valve A circuit malfunction
P0413....Secondary Air Injection System Switching Valve A circuit open
P0414....Secondary Air Injection System Switching Valve A circuit shorted
P0415....Secondary Air Injection System Switching Valve B circuit malfunction
P0416....Secondary Air Injection System Switching Valve B circuit open
P0417....Secondary Air Injection System Switching Valve B circuit shorted
P0418....Secondary Air Injection System Relay "A" circuit malfunction
P0419....Secondary Air Injection System Relay "B" circuit malfunction
P0420....Catalyst System Efficiency Below Threshold (Bank 1)
P0421....Warm Up Catalyst Efficiency Below Threshold (Bank 1)

P0422....Main Catalyst Efficiency Below Threshold (Bank 1)
P0423....Heated Catalyst Efficiency Below Threshold (Bank 1)
P0424....Heated Catalyst Temperature Below Threshold (Bank 1)
P0425....Catalyst Temperature Sensor (Bank 1)
P0426....Catalyst Temperature Sensor out of range (Bank 1)
P0427....Catalyst Temperature Sensor low input (Bank 1)
P0428....Catalyst Temperature Sensor high input (Bank 1)
P0429....Catalyst Heater control circuit (Bank 1)
P0430....Catalyst System Efficiency Below Threshold (Bank 2)
P0431....Warm Up Catalyst Efficiency Below Threshold (Bank 2)
P0432....Main Catalyst Efficiency Below Threshold (Bank 2)
P0433....Heated Catalyst Efficiency Below Threshold (Bank 2)
P0434....Heated Catalyst Temperature Below Threshold (Bank 2)
P0435....Catalyst Temperature Sensor (Bank 2)
P0436....Catalyst Temperature Sensor out of range (Bank 2)
P0437....Catalyst Temperature Sensor low input (Bank 2)
P0438....Catalyst Temperature Sensor high input (Bank 2)
P0439....Catalyst Heater control circuit (Bank 2)
P0440....Evaporative Emission control System malfunction
P0441....Evaporative Emission control System Incorrect Purge Flow
P0442....Evaporative Emission control System Leak detected (small leak)
P0443....Evaporative Emission control System Purge control Valve circuit malfunction
P0444....Evaporative Emission control System Purge control Valve circuit open
P0445....Evaporative Emission control System Purge control Valve circuit shorted
P0446....Evaporative Emission control System Vent control circuit malfunction
P0447....Evaporative Emission control System Vent control circuit open
P0448....Evaporative Emission control System Vent control circuit shorted
P0449....Evaporative Emission control System Vent Valve/Solenoid circuit malfunction
P0450....Evaporative Emission control System Pressure Sensor malfunction
P0451....Evaporative Emission control System Pressure Sensor range/performance
P0452....Evaporative Emission control System Pressure Sensor low input
P0453....Evaporative Emission control System Pressure Sensor high input
P0454....Evaporative Emission control System Pressure Sensor intermittent
P0455....Evaporative Emission control System Leak detected (gross leak)
P0456....Evaporative Emission control System leak detected (small leak)
P0457....Evaporative Emission control System leak detected (loose filler cap)
P0460....Fuel Level Sensor circuit malfunction
P0461....Fuel Level Sensor circuit range/performance
P0462....Fuel Level Sensor circuit low input
P0463....Fuel Level Sensor circuit high input
P0464....Fuel Level Sensor circuit intermittent
P0465....Purge Flow Sensor circuit malfunction
P0466....Purge Flow Sensor circuit range/performance
P0467....Purge Flow Sensor circuit low input
P0468....Purge Flow Sensor circuit high input
P0469....Purge Flow Sensor circuit intermittent
P0470....Exhaust Pressure Sensor malfunction
P0471....Exhaust Pressure Sensor range/performance
P0472....Exhaust Pressure Sensor low
P0473....Exhaust Pressure Sensor high
P0474....Exhaust Pressure Sensor intermittent
P0475....Exhaust Pressure control Valve malfunction
P0476....Exhaust Pressure control Valve range/performance
P0477....Exhaust Pressure control Valve low
P0478....Exhaust Pressure control Valve high
P0479....Exhaust Pressure control Valve intermittent
P0480....Cooling Fan 1 control circuit malfunction
P0481....Cooling Fan 2 control circuit malfunction
P0482....Cooling Fan 3 control circuit malfunction
P0483....Cooling Fan Rationality Check malfunction

P0484....Cooling Fan circuit Over Current
P0485....Cooling Fan Power/Ground circuit malfunction
P0486....Exhaust Gas Recirculation Sensor "B" circuit
P0487....Exhaust Gas Recirculation Throttle Position control circuit
P0488....Exhaust Gas Recirculation Throttle Position control out of range
P0491....Secondary Air Injection System (Bank 1)
P0492....Secondary Air Injection System (Bank 2)
P0500....Vehicle Speed Sensor malfunction
P0501....Vehicle Speed Sensor range/performance
P0502....Vehicle Speed Sensor low input
P0503....Vehicle Speed Sensor intermittent/Erratic/high
P0505....Idle control System malfunction
P0506....Idle control System RPM lower Than Expected
P0507....Idle control System RPM higher Than Expected
P0508....Idle control System circuit low
P0509....Idle control System circuit high
P0510....Closed Throttle Position Switch malfunction
P0512....Starter request circuit
P0513....Incorrect Immobilizer key
P0515....Battery Temperature Sensor circuit
P0516....Battery Temperature Sensor circuit low
P0517....Battery Temperature Sensor circuit high
P0520....Engine Oil Pressure Sensor/Switch circuit malfunction
P0521....Engine Oil Pressure Sensor/Switch circuit range/performance
P0522....Engine Oil Pressure Sensor/Switch circuit low Voltage
P0523....Engine Oil Pressure Sensor/Switch circuit high Voltage
P0524....Engine oil pressure too low
P0530....A/C Refrigerant Pressure Sensor circuit malfunction
P0531....A/C Refrigerant Pressure Sensor circuit out of range
P0532....A/C Refrigerant Pressure Sensor circuit low input
P0533....A/C Refrigerant Pressure Sensor circuit high input
P0534....Air Conditioner Refrigerant Charge Loss
P0540....Intake Air Heater circuit
P0541....Intake Air Heater circuit low
P0542....Intake Air Heater circuit high
P0544....Exhaust Gas Temperature Sensor circuit (Bank 1)
P0545....Exhaust Gas Temperature Sensor circuit low (Bank 1)
P0546....Exhaust Gas Temperature Sensor circuit high (Bank 1)
P0547....Exhaust Gas Temperature Sensor circuit (Bank 2)
P0548....Exhaust Gas Temperature Sensor circuit low (Bank 2)
P0549....Exhaust Gas Temperature Sensor circuit high (Bank 2)
P0550....Power Steering Pressure Sensor circuit malfunction
P0551....Power Steering Pressure Sensor circuit range/performance
P0552....Power Steering Pressure Sensor circuit low input
P0553....Power Steering Pressure Sensor circuit high input
P0554....Power Steering Pressure Sensor circuit intermittent
P0560....System Voltage malfunction
P0561....System Voltage Unstable
P0562....System Voltage low
P0563....System Voltage high
P0564....Cruise control multi-function input signal
P0565....Cruise control On Signal malfunction
P0566....Cruise control Off Signal malfunction
P0567....Cruise control Resume Signal malfunction
P0568....Cruise control Set Signal malfunction
P0569....Cruise control Coast Signal malfunction
P0570....Cruise control Accel Signal malfunction
P0571....Cruise control/Brake Switch A circuit malfunction
P0572....Cruise control/Brake Switch A circuit low
P0573....Cruise control/Brake Switch A circuit high

P0574....Cruise control system - vehicle speed too high
P0575....Cruise control Input circuit
P0576....Cruise control Input circuit low
P0577....Cruise control Input circuit high
P0578....Cruise control Related malfunction
P0579....Cruise control Related malfunction
P0580....Cruise control Related malfunction
P0600....Serial Communication Link malfunction
P0601....Internal control Module Memory Check Sum Error
P0602....control Module Programming Error
P0603....Internal control Module Keep Alive Memory (KAM) Error
P0604....Internal control Module Random Access Memory (RAM) Error
P0605....Internal control Module Read Only Memory (ROM) Error
P0606....PCM Processor Fault
P0607....control Module performance
P0608....control Module VSS Output "A" malfunction
P0609....control Module VSS Output "B" malfunction
P0610....control Module vehicle options error
P0615....Starter Relay circuit
P0616....Starter Relay circuit low
P0617....Starter Relay circuit high
P0618....Alternative Fuel control Module KAM error
P0619....Alternative Fuel control Module RAM/ROM error
P0620....Generator control circuit malfunction
P0621....Generator Lamp "L" control circuit malfunction
P0622....Generator Field "F" control circuit malfunction
P0623....Generator Lamp control circuit
P0624....Fuel Cap Lamp control circuit
P0630....VIN not programmed or mismatch - ECM/PCM
P0631....VIN not programmed or mismatch - TCM
P0635....Power Steering control circuit
P0636....Power Steering control circuit low
P0637....Power Steering control circuit high
P0638....Throttle Actuator control out of range (Bank 1)
P0639....Throttle Actuator control out of range (Bank 2)
P0640....Intake Air Heater control circuit
P0645....A/C Clutch Relay control circuit
P0646....A/C Clutch Relay control circuit high
P0647....A/C Clutch Relay control circuit high
P0648....Immobilizer Lamp control circuit
P0649....Speed control Lamp control circuit
P0650....Malfunction Indicator Lamp (MIL) control circuit malfunction
P0654....Engine RPM Output circuit malfunction
P0655....Engine Hot Lamp Output control circuit malfunction
P0656....Fuel Level Output circuit malfunction
P0660....Intake Manifold Tuning Valve control circuit (Bank 1)
P0661....Intake Manifold Tuning Valve control circuit low (Bank 1)
P0662....Intake Manifold Tuning Valve control circuit high (Bank 1)
P0663....Intake Manifold Tuning Valve control circuit (Bank 2)
P0664....Intake Manifold Tuning Valve control circuit low (Bank 2)
P0665....Intake Manifold Tuning Valve control circuit high (Bank 2)
P0700....Transmission control System malfunction
P0701....Transmission control System out of range
P0702....Transmission control System Electrical
P0703....Torque Converter/Brake Switch B circuit malfunction
P0704....Clutch Switch input circuit malfunction
P0705....Transmission range Sensor circuit malfunction (PRNDL input)
P0706....Transmission range Sensor circuit range/performance
P0707....Transmission range Sensor circuit low input
P0708 Transmission range Sensor circuit high input

P0709 Transmission range Sensor circuit intermittent
P0710....Transmission Fluid Temperature Sensor circuit malfunction
P0711....Transmission Fluid Temperature Sensor circuit range/performance
P0712....Transmission Fluid Temperature Sensor circuit low input
P0713....Transmission Fluid Temperature Sensor circuit high input
P0714....Transmission Fluid Temperature Sensor circuit intermittent
P0715....input/Turbine Speed Sensor circuit malfunction
P0716....input/Turbine Speed Sensor circuit range/performance
P0717....input/Turbine Speed Sensor circuit No Signal
P0718....input/Turbine Speed Sensor circuit intermittent
P0719....Torque Converter/Brake Switch B circuit low
P0720....Output Speed Sensor circuit malfunction
P0721....Output Speed Sensor range/performance
P0722....Output Speed Sensor No Signal
P0723....Output Speed Sensor intermittent
P0724....Torque Converter/Brake Switch B circuit high
P0725....Engine Speed input circuit malfunction
P0726....Engine Speed input circuit range/performance
P0727....Engine Speed input circuit No Signal
P0728....Engine Speed input circuit intermittent
P0730....Incorrect Gear Ratio
P0731....Gear 1 Incorrect ratio
P0732....Gear 2 Incorrect ratio
P0733....Gear 3 Incorrect ratio
P0734....Gear 4 Incorrect ratio
P0735....Gear 5 Incorrect ratio
P0736....Reverse incorrect gear ratio
P0737....TCM engine speed output circuit
P0738....TCM engine speed output circuit low
P0739....TCM engine speed output circuit high
P0740....Torque Converter Clutch circuit malfunction
P0741....Torque Converter Clutch circuit performance or stuck off
P0742....Torque Converter Clutch circuit stuck on
P0743....Torque Converter Clutch circuit electrical
P0744....Torque Converter Clutch circuit intermittent
P0745....Pressure control Solenoid malfunction
P0746....Pressure control Solenoid performance or Stuck Off
P0747....Pressure control Solenoid Stuck On
P0748....Pressure control Solenoid Electrical
P0749....Pressure control Solenoid intermittent
P0750....Shift Solenoid A malfunction
P0751....Shift Solenoid A performance or Stuck Off
P0752....Shift Solenoid A Stuck On
P0753....Shift Solenoid A Electrical
P0754....Shift Solenoid A intermittent
P0755....Shift Solenoid B malfunction
P0756....Shift Solenoid B performance or Stuck Off
P0757....Shift Solenoid B Stuck On
P0758....Shift Solenoid B Electrical
P0759....Shift Solenoid B intermittent
P0760....Shift Solenoid C malfunction
P0761....Shift Solenoid C performance or Stuck Off
P0762....Shift Solenoid C Stuck On
P0763....Shift Solenoid C Electrical
P0764....Shift Solenoid C intermittent
P0765....Shift Solenoid D malfunction
P0766....Shift Solenoid D performance or Stuck Off
P0767....Shift Solenoid D Stuck On
P0768....Shift Solenoid D Electrical
P0769....Shift Solenoid D intermittent

P0770....Shift Solenoid E malfunction
P0771....Shift Solenoid E performance or Stuck Off
P0772....Shift Solenoid E Stuck On
P0773....Shift Solenoid E Electrical
P0774....Shift Solenoid E intermittent
P0775....Pressure Control Solenoid "B"
P0776....Pressure Control Solenoid "B" performance or stuck off
P0777....Pressure Control Solenoid "B" stuck on
P0778....Pressure Control Solenoid "B" electrical
P0779....Pressure Control Solenoid "B" intermittent
P0780....Shift malfunction
P0781....1-2 Shift malfunction
P0782....2-3 Shift malfunction
P0783....3-4 Shift malfunction
P0784....4-5 Shift malfunction
P0785....Shift/Timing Solenoid malfunction
P0786....Shift/Timing Solenoid range/performance
P0787....Shift/Timing Solenoid low
P0788....Shift/Timing Solenoid high
P0789....Shift/Timing Solenoid intermittent
P0790....Normal/performance Switch circuit malfunction
P0791....Intermediate Shaft Speed Sensor circuit
P0792....Intermediate Shaft Speed Sensor circuit out of range
P0793....Intermediate Shaft Speed Sensor circuit no signal
P0794....Intermediate Shaft Speed Sensor circuit intermittent
P0795....Pressure Control Solenoid "C"
P0796....Pressure Control Solenoid "C" out of range
P0797....Pressure Control Solenoid "C" stuck on
P0798....Pressure Control Solenoid "C" electrical
P0799....Pressure Control Solenoid "C" intermittent
P0801....Reverse Inhibit control circuit malfunction
P0803....1-4 Upshift (Skip Shift) Solenoid control circuit malfunction
P0804....1-4 Upshift (Skip Shift) Lamp control circuit malfunction
P0805....Clutch Position Sensor circuit
P0806....Clutch Position Sensor circuit out of range
P0807....Clutch Position Sensor circuit low
P0808....Clutch Position Sensor circuit high
P0809....Clutch Position Sensor circuit intermittent
P0810....Clutch Position control error
P0811....Excessive Clutch Slippage
P0812....Reverse Input circuit
P0813....Reverse Output circuit
P0815....Upshift Switch circuit
P0816....Downshift Switch circuit
P0817....Starter Disable circuit
P0818....Driveline Disconnect Switch input circuit
P0820....Gear Lever X-Y Position Sensor circuit
P0821....Gear Lever X Position circuit
P0822....Gear Lever Y Position circuit
P0823....Gear Lever X Position circuit intermittent
P0824....Gear Lever Y Position circuit intermittent
P0830....Clutch Pedal Switch "A" circuit
P0831....Clutch Pedal Switch "A" circuit low
P0832....Clutch Pedal Switch "A" circuit high
P0833....Clutch Pedal Switch "B" circuit
P0834....Clutch Pedal Switch "B" circuit low
P0835....Clutch Pedal Switch "B" circuit high
P0837....Four Wheel Drive Switch circuit
P0838....Four Wheel Drive Switch circuit low
P0839....four Wheel Drive Switch circuit high

P0840....Transmission Fluid Pressure Sensor/Switch "A" circuit
P0841....Transmission Fluid Pressure Sensor/Switch "A" circuit out of range
P0842....Transmission Fluid Pressure Sensor/Switch "A" circuit low
P0843....Transmission Fluid Pressure Sensor/Switch "A" circuit high
P0844....Transmission Fluid Pressure Sensor/Switch "A" circuit intermittent
P0845....Transmission Fluid Pressure Sensor/Switch "B" circuit
P0846....Transmission Fluid Pressure Sensor/Switch "B" circuit out of range
P0847....Transmission Fluid Pressure Sensor/Switch "B" circuit low
P0848....Transmission Fluid Pressure Sensor/Switch "B" circuit high
P0849....Transmission Fluid Pressure Sensor/Switch "B" circuit intermittent C0000 - Vehicle Speed Information Circuit Malfunction

2) BODY ERROR CODES

Los códigos de error en la carrocería del vehículo no se encuentran estandarizados por normativa, aunque existen unos códigos de GM, que generalmente se usan como estandarizados.

3) CHASSIS ERROR CODES

C0035 - Left Front Wheel Speed Circuit Malfunction
C0040 - **Right Front** Wheel Speed Circuit Malfunction
C0041 - Right Front Wheel Speed Sensor Circuit Range/Performance (EBCM)
C0045 - Left Rear Wheel Speed Circuit Malfunction
C0046 - Left Rear Wheel Speed **Sensor Circuit** Range/Performance (EBCM)
C0050 - Right Rear Wheel Speed Circuit Malfunction
C0051 - LF Wheel Speed Sensor Circuit Range/Performance (EBCM)
C0060 - Left Front ABS Solenoid #1 Circuit Malfunction
C0065 - Left Front ABS Solenoid #2 Circuit Malfunction
C0070 - Right Front ABS Solenoid #1 Circuit Malfunction
C0075 - Right Front ABS Solenoid #2 Circuit Malfunction
C0080 - Left Rear ABS Solenoid #1 Circuit Malfunction
C0085 - Left Rear ABS Solenoid #2 Circuit Malfunction
C0090 - Right Rear ABS Solenoid #1 Circuit Malfunction
C0095 - Right Rear ABS Solenoid #2 Circuit Malfunction
C0110 - Pump Motor Circuit Malfunction
C0121 - Valve Relay Circuit Malfunction
C0128 - Low Brake Fluid Circuit Low
C0141 - Left TCS Solenoid #1 Circuit Malfunction
C0146 - Left TCS Solenoid #2 Circuit Malfunction
C0151 - Right TCS Solenoid #1 Circuit Malfunction
C0156 - Right TCS Solenoid #2 Circuit Malfunction
C0161 - ABS/TCS Brake **Switch Circuit** Malfunction
C0221 - Right Front Wheel Speed Sensor Circuit Open
C0222 - Right Front Wheel Speed Signal Missing
C0223 - Right Front Wheel Speed Signal Erratic
C0225 - Left Front Wheel Speed Sensor Circuit Open
C0226 - Left Front Wheel Speed Signal Missing
C0227 - Left Front Wheel Speed Signal Erratic
C0229 - Drop Out of Front Wheel Speed Signals
C0235 - Rear Wheel Speed Signal Circuit Open
C0236 - Rear Wheel Speed Signal Circuit Missing
C0237 - Rear Wheel Speed Signal Erratic
C0238 - Wheel Speed Mismatch
C0241 - EBCM **Control Valve** Circuit

C0245 - Wheel Speed Sensor Frequency Error
C0254 - EBCM Control Valve Circuit
C0265 - EBCM Relay Circuit
C0266 - EBCM Relay Circuit
C0267 - Pump Motor Circuit Open/Shorted
C0268 - Pump Motor Circuit Open/Shorted
C0269 - Excessive Dump/Isolation Time
C0271 - EBCM Malfunction
C0272 - EBCM Malfunction
C0273 - EBCM Malfunction
C0274 - Excessive Dump/Isolation Time
C0279 - Powertrain Configuration Not Valid
C0281 - Brake Switch Circuit
C0283 - Traction Switch Shorted to Ground
C0284 - EBCM Malfunction
C0286 - ABS [Indicator Lamp](#) Circuit Shorted to B+
C0287 - Delivered Torque Circuit
C0288 - Brake Warning Lamp Circuit Shorted to B+
C0290 - Lost Communications With PCM
C0292 - Lost Communications With PCM
C0291 - Lost Communications With BCM
C0297 - Powertrain Configuration Data Not Received
C0298 - Powertrain Indicated Traction Control Malfunction
C0300 - Rear Speed Sensor Malfunction
C0305 - Front Speed Sensor Malfunction
C0306 - Motor A or B Circuit
C0308 - Motor A/B Circuit Low
C0309 - Motor A/B Circuit High
C0310 - Motor A/B Circuit Open
C0315 - Motor Ground Circuit Open
C0321 - Transfer Case Lock Circuit
C0323 - T-Case Lock Circuit Low
C0324 - T-Case Lock Circuit High
C0327 - Encoder Circuit Malfunction
C0357 - Park Switch Circuit High
C0359 - [Four Wheel Drive](#) Low Range (4LO) Discrete Output Circuit
C0362 - 4LO Discrete Output Circuit High
C0367 - Front Axle Control Circuit High
C0374 - General System Malfunction
C0376 - Front/Rear Shaft Speed Mismatch
C0379 - Front Axle System
C0387 - Unable to Perform Shift
C0472 - Steering Handwheel Speed Sensor Signal V Low
C0473 - Steering Handwheel Speed Sensor Signal V High
C0495 - EVO Tracking Error
C0498 - Steering Assist Control Actuator Feed Circuit Low
C0499 - Steering Assist Control Solenoid Feed Circuit High
C0503 - Steering Assist Control Solenoid Return Circuit Low
C0504 - Steering Assist Control Solenoid Return Circuit High
C0550 - ECU Malfunction - internal write / checksum malfunction
C0559 - EEPROM Checksum Error
C0563 - Calibration ROM Checksum Error
C0577 - Left Front Solenoid Circuit Low
C0578 - Left Front Solenoid Circuit High
C0579 - Left Front Solenoid Circuit Open
C0582 - Right Front Solenoid Circuit Low
C0583 - Right Front Solenoid Circuit High
C0584 - Right Front Solenoid Circuit Open
C0587 - Left Rear Solenoid Circuit Low
C0588 - Left Rear Solenoid Circuit High

C0589 - Left Rear Solenoid Circuit Open
C0592 - Right Rear Solenoid Circuit Low
C0593 - Right Rear Solenoid Circuit High
C0594 - Right Rear Solenoid Circuit Open
C0611 - VIN Information Error
C0615 - Left Front [Position Sensor](#) Malfunction
C0620 - Right Front Position Sensor Malfunction
C0625 - Left Rear Position Sensor Malfunction
C0628 - Level Control Position Sensor Circuit High
C0630 - Right Rear Position Sensor Malfunction
C0635 - Left Front Normal Force Circuit Malfunction
C0638 - Left Front Normal Force Circuit High
C0640 - Right Front Normal Force Circuit Malfunction
C0643 - Right Front Normal Force Circuit High
C0655 - Level Control Compressor Relay Malfunction
C0657 - Level Control Compressor Circuit Low
C0658 - Level Control Compressor Circuit High
C0660 - Level Control Exhaust Valve Circuit Malfunction
C0662 - Level Control Exhaust Valve Circuit Low
C0663 - Level Control Exhaust Valve Circuit High
C0665 - Chassis Pitch Signal Circuit
C0690 - Damper Control Relay Circuit Malfunction
C0691 - Damper Control Relay [Circuit Range](#)
C0693 - Damper Control Relay Circuit High
C0695 - Position Sensor Overcurrent (8 volt supply)
C0696 - Position Sensor Overcurrent (5 volt supply)
C0710 - Steering Position Signal Malfunction
C0750 - [Tire Pressure](#) Monitor (TPM) system sensor not transmitting
C0755 - Tire Pressure Monitor (TPM) system sensor not transmitting
C0760 - Tire Pressure Monitor (TPM) system sensor not transmitting
C0765 - Tire Pressure Monitor (TPM) system sensor not transmitting
C0800 - Device Power #1 Circuit Malfunction
C0896 - Electronic Suspension Control (ESC) voltage is outside the normal range of 9 to 15.5 volts

4) NETWORK ERROR CODES

U0001 High Speed CAN Communication Bus
U0002 High Speed CAN Communication Bus Performance
U0003 High Speed CAN Communication Bus (+) Open
U0004 High Speed CAN Communication Bus (+) Low
U0005 High Speed CAN Communication Bus (+) High
U0006 High Speed CAN Communication Bus (-) Open
U0007 High Speed CAN Communication Bus (-) Low
U0008 High Speed CAN Communication Bus (-) High
U0009 High Speed CAN Communication Bus (-) shorted to Bus (+)
U0010 Medium Speed CAN Communication Bus
U0011 Medium Speed CAN Communication Bus Performance
U0012 Medium Speed CAN Communication Bus (+) Open
U0013 Medium Speed CAN Communication Bus (+) Low
U0014 Medium Speed CAN Communication Bus (+) High
U0015 Medium Speed CAN Communication Bus (-) Open
U0016 Medium Speed CAN Communication Bus (-) Low
U0017 Medium Speed CAN Communication Bus (-) High
U0018 Medium Speed CAN Communication Bus (-) shorted to Bus (+)
U0019 Low Speed CAN Communication Bus
U0020 Low Speed CAN Communication Bus Performance
U0021 Low Speed CAN Communication Bus (+) Open
U0022 Low Speed CAN Communication Bus (+) Low
U0023 Low Speed CAN Communication Bus (+) High

U0024	Low Speed CAN Communication Bus (-) Open
U0025	Low Speed CAN Communication Bus (-) Low
U0026	Low Speed CAN Communication Bus (-) High
U0027	Low Speed CAN Communication Bus (-) shorted to Bus (+)
U0028	Vehicle Communication Bus A
U0029	Vehicle Communication Bus A Performance
U0030	Vehicle Communication Bus A (+) Open
U0031	Vehicle Communication Bus A (+) Low
U0032	Vehicle Communication Bus A (+) High
U0033	Vehicle Communication Bus A (-) Open
U0034	Vehicle Communication Bus A (-) Low
U0035	Vehicle Communication Bus A (-) High
U0036	Vehicle Communication Bus A (-) shorted to Bus A (+)
U0037	Vehicle Communication Bus B
U0038	Vehicle Communication Bus B Performance
U0039	Vehicle Communication Bus B (+) Open
U0040	Vehicle Communication Bus B (+) Low
U0041	Vehicle Communication Bus B (+) High
U0042	Vehicle Communication Bus B (-) Open
U0043	Vehicle Communication Bus B (-) Low
U0044	Vehicle Communication Bus B (-) High
U0045	Vehicle Communication Bus B (-) shorted to Bus B (+)
U0046	Vehicle Communication Bus C
U0047	Vehicle Communication Bus C Performance
U0048	Vehicle Communication Bus C (+) Open
U0049	Vehicle Communication Bus C (+) Low
U0050	Vehicle Communication Bus C (+) High
U0051	Vehicle Communication Bus C (-) Open
U0052	Vehicle Communication Bus C (-) Low
U0053	Vehicle Communication Bus C (-) High
U0054	Vehicle Communication Bus C (-) shorted to Bus C (+)
U0055	Vehicle Communication Bus D
U0056	Vehicle Communication Bus D Performance
U0057	Vehicle Communication Bus D (+) Open
U0058	Vehicle Communication Bus D (+) Low
U0059	Vehicle Communication Bus D (+) High
U0060	Vehicle Communication Bus D (-) Open
U0061	Vehicle Communication Bus D (-) Low
U0062	Vehicle Communication Bus D (-) High
U0063	Vehicle Communication Bus D (-) shorted to Bus D (+)
U0064	Vehicle Communication Bus E
U0065	Vehicle Communication Bus E Performance
U0066	Vehicle Communication Bus E (+) Open
U0067	Vehicle Communication Bus E (+) Low
U0068	Vehicle Communication Bus E (+) High
U0069	Vehicle Communication Bus E (-) Open
U0070	Vehicle Communication Bus E (-) Low
U0071	Vehicle Communication Bus E (-) High
U0072	Vehicle Communication Bus E (-) shorted to Bus E (+)
U0073	Control Module Communication Bus Off
U0074	Reserved by Document
U0075	Reserved by Document
U0076	Reserved by Document
U0077	Reserved by Document
U0078	Reserved by Document
U0079	Reserved by Document
U0080	Reserved by Document
U0081	Reserved by Document
U0082	Reserved by Document
U0083	Reserved by Document

U0084	Reserved by Document
U0085	Reserved by Document
U0086	Reserved by Document
U0087	Reserved by Document
U0088	Reserved by Document
U0089	Reserved by Document
U0090	Reserved by Document
U0091	Reserved by Document
U0092	Reserved by Document
U0093	Reserved by Document
U0094	Reserved by Document
U0095	Reserved by Document
U0096	Reserved by Document
U0097	Reserved by Document
U0098	Reserved by Document
U0099	Reserved by Document
U0100	Lost Communication With ECM/PCM "A"
U0101	Lost Communication with TCM
U0102	Lost Communication with Transfer Case Control Module
U0103	Lost Communication With Gear Shift Module
U0104	Lost Communication With Cruise Control Module
U0105	Lost Communication With Fuel Injector Control Module
U0106	Lost Communication With Glow Plug Control Module
U0107	Lost Communication With Throttle Actuator Control Module
U0108	Lost Communication With Alternative Fuel Control Module
U0109	Lost Communication With Fuel Pump Control Module
U0110	Lost Communication With Drive Motor Control Module
U0111	Lost Communication With Battery Energy Control Module "A"
U0112	Lost Communication With Battery Energy Control Module "B"
U0113	Lost Communication With Emissions Critical Control Information
U0114	Lost Communication With Four-Wheel Drive Clutch Control Module
U0115	Lost Communication With ECM/PCM "B"
U0116	Reserved by Document
U0117	Reserved by Document
U0118	Reserved by Document
U0119	Reserved by Document
U0120	Reserved by Document
U0121	Lost Communication With Anti-Lock Brake System (ABS) Control Module
U0122	Lost Communication With Vehicle Dynamics Control Module
U0123	Lost Communication With Yaw Rate Sensor Module
U0124	Lost Communication With Lateral Acceleration Sensor Module
U0125	Lost Communication With Multi-axis Acceleration Sensor Module
U0126	Lost Communication With Steering Angle Sensor Module
U0127	Lost Communication With Tire Pressure Monitor Module
U0128	Lost Communication With Park Brake Control Module
U0129	Lost Communication With Brake System Control Module
U0130	Lost Communication With Steering Effort Control Module
U0131	Lost Communication With Power Steering Control Module
U0132	Lost Communication With Ride Level Control Module
U0133	Reserved by Document
U0134	Reserved by Document
U0135	Reserved by Document
U0136	Reserved by Document
U0137	Reserved by Document
U0138	Reserved by Document
U0139	Reserved by Document
U0140	Lost Communication With Body Control Module
U0141	Lost Communication With Body Control Module "A"
U0142	Lost Communication With Body Control Module "B"
U0143	Lost Communication With Body Control Module "C"

U0144	Lost Communication With Body Control Module "D"
U0145	Lost Communication With Body Control Module "E"
U0146	Lost Communication With Gateway "A"
U0147	Lost Communication With Gateway "B"
U0148	Lost Communication With Gateway "C"
U0149	Lost Communication With Gateway "D"
U0150	Lost Communication With Gateway "E"
U0151	Lost Communication With Restraints Control Module
U0152	Lost Communication With Side Restraints Control Module
U0153	Lost Communication With Side Restraints Control Module
U0154	Lost Communication With Restraints Occupant Sensing Control Module
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module
U0156	Lost Communication With Information Center "A"
U0157	Lost Communication With Information Center "B"
U0158	Lost Communication With Head Up Display
U0159	Lost Communication With Parking Assist Control Module
U0160	Lost Communication With Audible Alert Control Module
U0161	Lost Communication With Compass Module
U0162	Lost Communication With Navigation Display Module
U0163	Lost Communication With Navigation Control Module
U0164	Lost Communication With HVAC Control Module
U0165	Lost Communication With HVAC Control Module
U0166	Lost Communication With Auxiliary Heater Control Module
U0167	Lost Communication With Vehicle Immobilizer Control Module
U0168	Lost Communication With Vehicle Security Control Module
U0169	Lost Communication With Sunroof Control Module
U0170	Lost Communication With "Restraints System Sensor A"
U0171	Lost Communication With "Restraints System Sensor B"
U0172	Lost Communication With "Restraints System Sensor C"
U0173	Lost Communication With "Restraints System Sensor D"
U0174	Lost Communication With "Restraints System Sensor E"
U0175	Lost Communication With "Restraints System Sensor F"
U0176	Lost Communication With "Restraints System Sensor G"
U0177	Lost Communication With "Restraints System Sensor H"
U0178	Lost Communication With "Restraints System Sensor I"
U0179	Lost Communication With "Restraints System Sensor J"
U0180	Lost Communication With Automatic Lighting Control Module
U0181	Lost Communication With Headlamp Leveling Control Module
U0182	Lost Communication With Lighting Control Module
U0183	Lost Communication With Lighting Control Module
U0184	Lost Communication With Radio
U0185	Lost Communication With Antenna Control Module
U0186	Lost Communication With Audio Amplifier
U0187	Lost Communication With Digital Disc Player/Changer Module "A"
U0188	Lost Communication With Digital Disc Player/Changer Module "B"
U0189	Lost Communication With Digital Disc Player/Changer Module "C"
U0190	Lost Communication With Digital Disc Player/Changer Module "D"
U0191	Lost Communication With Television
U0192	Lost Communication With Personal Computer
U0193	Lost Communication With "Digital Audio Control Module A"
U0194	Lost Communication With "Digital Audio Control Module B"
U0195	Lost Communication With Subscription Entertainment Receiver Module
U0196	Lost Communication With Rear Seat Entertainment Control Module
U0197	Lost Communication With Telephone Control Module
U0198	Lost Communication With Telematic Control Module
U0199	Lost Communication With "Door Control Module A"
U0200	Lost Communication With "Door Control Module B"
U0201	Lost Communication With "Door Control Module C"
U0202	Lost Communication With "Door Control Module D"
U0203	Lost Communication With "Door Control Module E"

U0204	Lost Communication With "Door Control Module F"
U0205	Lost Communication With "Door Control Module G"
U0206	Lost Communication With Folding Top Control Module
U0207	Lost Communication With Movable Roof Control Module
U0208	Lost Communication With "Seat Control Module A"
U0209	Lost Communication With "Seat Control Module B"
U0210	Lost Communication With "Seat Control Module C"
U0211	Lost Communication With "Seat Control Module D"
U0212	Lost Communication With Steering Column Control Module
U0213	Lost Communication With Mirror Control Module
U0214	Lost Communication With Remote Function Actuation
U0215	Lost Communication With "Door Switch A"
U0216	Lost Communication With "Door Switch B"
U0217	Lost Communication With "Door Switch C"
U0218	Lost Communication With "Door Switch D"
U0219	Lost Communication With "Door Switch E"
U0220	Lost Communication With "Door Switch F"
U0221	Lost Communication With "Door Switch G"
U0222	Lost Communication With "Door Window Motor A"
U0223	Lost Communication With "Door Window Motor B"
U0224	Lost Communication With "Door Window Motor C"
U0225	Lost Communication With "Door Window Motor D"
U0226	Lost Communication With "Door Window Motor E"
U0227	Lost Communication With "Door Window Motor F"
U0228	Lost Communication With "Door Window Motor G"
U0229	Lost Communication With Heated Steering Wheel Module
U0230	Lost Communication With Rear Gate Module
U0231	Lost Communication With Rain Sensing Module
U0232	Lost Communication With Side Obstacle Detection Control Module
U0233	Lost Communication With Side Obstacle Detection Control Module
U0234	Lost Communication With Convenience Recall Module
U0235	Lost Communication With Cruise Control Front Distance Range Sensor
U0300	Internal Control Module Software Incompatibility
U0301	Software Incompatibility with ECM/PCM
U0302	Software Incompatibility with Transmission Control Module
U0303	Software Incompatibility with Transfer Case Control Module
U0304	Software Incompatibility with Gear Shift Control Module
U0305	Software Incompatibility with Cruise Control Module
U0306	Software Incompatibility with Fuel Injector Control Module
U0307	Software Incompatibility with Glow Plug Control Module
U0308	Software Incompatibility with Throttle Actuator Control Module
U0309	Software Incompatibility with Alternative Fuel Control Module
U0310	Software Incompatibility with Fuel Pump Control Module
U0311	Software Incompatibility with Drive Motor Control Module
U0312	Software Incompatibility with Battery Energy Control Module A
U0313	Software Incompatibility with Battery Energy Control Module B
U0314	Software Incompatibility with Four-Wheel Drive Clutch Control Module
U0315	Software Incompatibility with Anti-Lock Brake System Control Module
U0316	Software Incompatibility with Vehicle Dynamics Control Module
U0317	Software Incompatibility with Park Brake Control Module
U0318	Software Incompatibility with Brake System Control Module
U0319	Software Incompatibility with Steering Effort Control Module
U0320	Software Incompatibility with Power Steering Control Module
U0321	Software Incompatibility with Ride Level Control Module
U0322	Software Incompatibility with Body Control Module
U0323	Software Incompatibility with Instrument Panel Control Module
U0324	Software Incompatibility with HVAC Control Module
U0325	Software Incompatibility with Auxiliary Heater Control Module
U0326	Software Incompatibility with Vehicle Immobilizer Control Module
U0327	Software Incompatibility with Vehicle Security Control Module

U0328 Software Incompatibility with Steering Angle Sensor Module
U0329 Software Incompatibility with Steering Column Control Module
U0330 Software Incompatibility with Tire Pressure Monitor Module
U0331 Software Incompatibility with Body Control Module "A"
U0400 Invalid Data Received
U0401 Invalid Data Received From ECM/PCM
U0402 Invalid Data Received From Transmission Control Module
U0403 Invalid Data Received From Transfer Case Control Module
U0404 Invalid Data Received From Gear Shift Control Module
U0405 Invalid Data Received From Cruise Control Module
U0406 Invalid Data Received From Fuel Injector Control Module
U0407 Invalid Data Received From Glow Plug Control Module
U0408 Invalid Data Received From Throttle Actuator Control Module
U0409 Invalid Data Received From Alternative Fuel Control Module
U0410 Invalid Data Received From Fuel Pump Control Module
U0411 Invalid Data Received From Drive Motor Control Module
U0412 Invalid Data Received From Battery Energy Control Module A
U0413 Invalid Data Received From Battery Energy Control Module B
U0414 Invalid Data Received From Four-Wheel Drive Clutch Control Module
U0415 Invalid Data Received From Anti-Lock Brake System Control Module
U0416 Invalid Data Received From Vehicle Dynamics Control Module
U0417 Invalid Data Received From Park Brake Control Module
U0418 Invalid Data Received From Brake System Control Module
U0419 Invalid Data Received From Steering Effort Control Module
U0420 Invalid Data Received From Power Steering Control Module
U0421 Invalid Data Received From Ride Level Control Module
U0422 Invalid Data Received From Body Control Module
U0423 Invalid Data Received From Instrument Panel Control Module
U0424 Invalid Data Received From HVAC Control Module
U0425 Invalid Data Received From Auxiliary Heater Control Module
U0426 Invalid Data Received From Vehicle Immobilizer Control Module
U0427 Invalid Data Received From Vehicle Security Control Module
U0428 Invalid Data Received From Steering Angle Sensor Module
U0429 Invalid Data Received From Steering Column Control Module
U0430 Invalid Data Received From Tire Pressure Monitor Module
U0431 Invalid Data Received From Body Control Module "A"