# Bavarian Autosport
# Fault Code Reader/Reset Tool
## Instruction Manual & Code Charts

BAVARIAN® autosport

**IMPORTANT DISCLAIMER:**
This product was designed to provide a long service life and ease of use. As with any software-based device, there is a risk that a small number of unique ECU (Engine Control Unit) variants may not be compatible with this device. Bavarian Autosport may not be held liable for any problems resulting from incompatibilities. Additionally, the code definitions contained in this manual should be regarded as a starting point for diagnosing a problem. Before spending money on a repair, make sure you have a clear understanding of the problem. We recommend using additional sources of information, including a good repair manual (e.g. Bentley service manuals), expert advice, etc. Bavarian Autosport may not be held liable for any expenses you incur in response to the codes or instructions contained in this manual.

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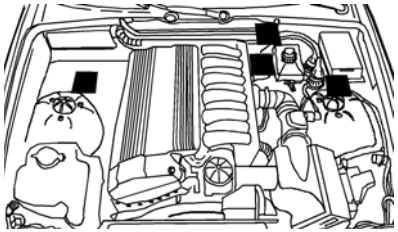
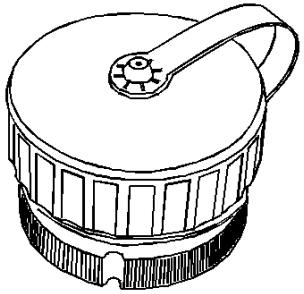
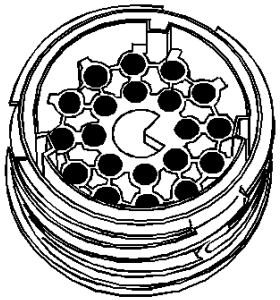
## 1987–2000 (located under the hood)

*Note: for 2001 and later BMWs see below*



BMWs 1987 thru 2000 have a 20-pin diagnostic connector located in the engine compartment. The image at right gives a general idea of where the connector can be found. The images below show what the connector looks like, covered and uncovered.



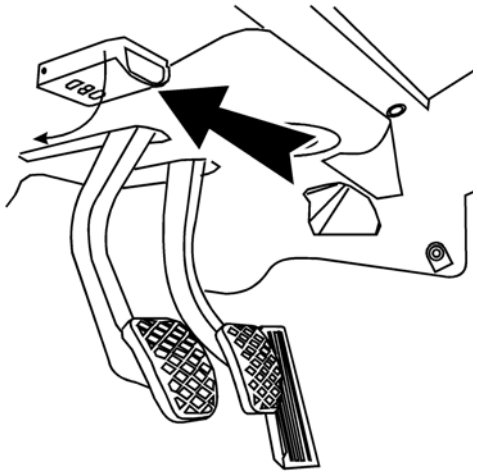


**Orientation:**
Depending on the year and model, BMW located the 20-pin diagnostic connector in different places in varying orientations. You may find that when the tool is plugged in properly, the face panel is actually upside-down relative to your position. This is normal and should take very little time to get used to.

**Plugging tool in properly:**
When inserting the code reader/reset tool, plug it straight in as you would plug a lamp into a wall socket. Even though the BMW connector appears to be a twist-on type, the code reader/reset tool DOES NOT twist in. In fact, it is possible to damage the tool by trying to twist it into the diagnostic connector.

## 2001 on (located inside the BMW)

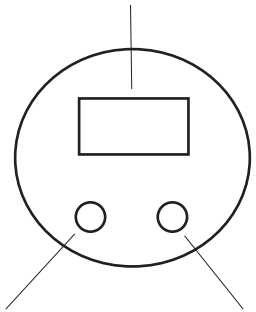
To locate the diagnostic connector in BMWs built 2001 and later, open the driver's door, kneel down and look up at the underside of the dashboard. You will see the diagnostic connector near the pedals, above the driver's left leg (see illustration). You will see a rectangular access panel (often embossed with the letters "OBD") with a rounded thumb grip you will use to open it. The cover will swing downward revealing the 16-pin diagnostic connector inside.




The illustration shows the typical location of the diagnostic connector in 2001 and later BMWs. If it's not there, look on the passenger's side of the center console, about the passenger's left knee. Also small number of 2001 models use a 20-pin connector located under the hood (see previous page).

## Code Reader/Reset Tool Face

**Display:** Shows menu selections, activity and fault codes.



**Function button:** Used to review and select the available functions. (See page 6)

**Start button:** After selecting a function press the Start button to execute the function.



## Directions

1.) Turn your BMW's key to On. (*DO NOT START ENGINE!*)
2.) Plug the code reader into diagnostic connector (see warning below). The code reader is ready to use when it displays "Fc".
3.) Use the "Function" button to select one of the functions shown below.
4.) Press "Start" to execute the function.

## Function Reference


**Read Fault Codes**. The tool automatically starts in this mode, (though it won't read the fault codes until you press the Start button). When Start is pressed, the unit will attempt to read the fault codes. If there are no faults it will display "–". If it finds faults, it will automatically display the number of the chart to use (see pages 7 through 30). To then view the faults press Start again. Repeat until the end of the fault list (tool will show "–"). Press Start to return to "Fc" (starting point.)


**MIL (Malfunction Indicator Lamp) Reset**. (Resets "Check Engine" or "Service Engine Soon") When you have selected cE in the display, you are now ready to reset the MIL. Pressing Start will execute the reset. When finished it will return to "Fc". This clears all faults and extinguishes the MIL. To verify the reset, UNPLUG the tool and start the engine: MIL should be off. (Note: After an MIL reset on some models with automatic transmission, the Automatic Transmission light will be on. To clear it, simply start the engine twice.)


**Oil Service Reset**. When you have selected oL in the display, you are now ready to reset the "Oil Service" light. Pressing Start will execute the reset. During the reset procedure, the display will count from 0 to 2. When finished the display will return to "Fc". The Service Interval (SI) light cluster will display five green lights when finished. (See page 31 for troubleshooting.)


**Inspection reset**. When you have selected "in" in the display, you are now ready to reset the "Inspection" light. Pressing Start will execute the reset. During the reset procedure, the display will count from 0 to 9. When finished the display will return to "Fc". SI cluster will display five green lights when finished. (See page 31 for troubleshooting)


Fii and Cii apply only to 12-cylinder BMWs, all of which have two ECU's. It is the exact same procedure as Fc and cE (see above), except you are reading the 2nd ECU.

**Warning about insertion of tool (applies to 20 pin tool only):**
Tool must be fully inserted in order to work properly. To check for full insertion, first observe the faint line on the side of the connector on the code reader/reset tool. The line should be even with the top of the BMW diagnostic connector. If the line is more than 1/16th of an inch above the top of the diagnostic connector, the tool is not fully inserted.

## Using The Code Charts

**IMPORTANT:** Skip to page 14 if the tool did not display "FF" for the code chart.

1. If the tool displays "FF" for the chart designator, find the car in Table 1 (below) by looking up the year, model and, if necessary, the VDS (Vehicle Description System) number found in the VIN (Vehicle Identification Number).

   Example VIN number: WBAAA13LAE57862
   ^^^^

   The four digit VDS number consists of the 4th through 7th digits. For this VIN, the VDS is AA13. This number is not always necessary.

2. Look up the code on the correct chart: The right hand column in Table 1 shows which fault code chart to use. (K1 through K16, next section.)

### TABLE 1: CHART LOCATOR

**1987**

| Year | Model | VDS | Chart |
|---|---|---|---|
| 1987 | 325is | AA13 | K1 |
| 1987 | 325is A | AA23 | K1 |
| 1987 | 325i/4 | AD13 | K1 |
| 1987 | 325iA/4 | AD23 | K1 |
| 1987 | 325iC | BB13 | K1 |
| 1987 | 325iCA | BB23 | K1 |

**1988**

| Year | Model | VDS | Chart |
|---|---|---|---|
| 1988 | 325is | AA13 | K1 |
| 1988 | 325is A | AA23 | K1 |
| 1988 | 325iX A/2 | AB03 | K1 |
| 1988 | 325/2 | AB54 | K1 |
| 1988 | 325 A/2 | AB64 | K1 |
| 1988 | 325iX/2 | AB93 | K1 |
| 1988 | 325i/4 | AD13 | K1 |
| 1988 | 325iA/4 | AD23 | K1 |
| 1988 | 325/4 | AE54 | K1 |
| 1988 | 325 A/4 | AE64 | K1 |
| 1988 | 325iC | BB13 | K1 |
| 1988 | 325iCA | BB23 | K1 |
| 1988 | 528e | DK73 | K1 |
| 1988 | 528e A | DK83 | K1 |
| 1988 | 635CSi | EC74 | K1 |
| 1988 | 635CSi A | EC84 | K1 |
| 1988 | 735i | GB33 | K1 |
| 1988 | 735i A | GB43 | K1 |
| 1988 | 735iL A | GC43 | K1 |
| 1988 | 750iL A | GC83 | K15 |
| 1988 | M3 | | K1 |

**1989**

| Year | Model | VDS | Chart |
|---|---|---|---|
| 1989 | 325i/is | AA13 | K1 |
| 1989 | 325iA/2 | AA23 | K1 |
| 1989 | 325iX A/2 | AB03 | K1 |
| 1989 | 325iX/2 | AB93 | K1 |
| 1989 | 325i/4 | AD13 | K1 |
| 1989 | 325iA/4 | AD23 | K1 |
| 1989 | 325iX A/4 | AE03 | K1 |
| 1989 | 325iX/4 | AE93 | K1 |
| 1989 | 325iC | BB13 | K1 |
| 1989 | 325iCA | BB23 | K1 |
| 1989 | M3 | | K1 |
| 1989 | 635CSi | EC74 | K1 |
| 1989 | 635CSi A | EC84 | K1 |
| 1989 | 735i | GB33 | K1 |
| 1989 | 735i A | GB43 | K1 |
| 1989 | 735iL A | GC43 | K1 |
| 1989 | 750iL A | GC83 | K15 |
| 1989 | 525i | HC13 | K1 |
| 1989 | 525i A | HC23 | K1 |
| 1989 | 535i | HD13 | K1 |
| 1989 | 535i A | HD23 | K1 |
| 1989 | M5 | | K1 |



**1990**

| Year | Model | VDS | Chart |
|---|---|---|---|
| 1990 | 325i/is/2 | AA13 | K1 |
| 1990 | 325iA/2 | AA23 | K1 |
| 1990 | 325iX A/2 | AB03 | K1 |
| 1990 | 325iX/2 | AB93 | K1 |
| 1990 | 325i/4 | AD13 | K1 |
| 1990 | 325iA/4 | AD23 | K1 |
| 1990 | 325iX A/4 | AE03 | K1 |
| 1990 | 325iX/4 | AE93 | K1 |
| 1990 | 325iC | BB13 | K1 |
| 1990 | 325iCA | BB23 | K1 |
| 1990 | M3 | | K1 |
| 1990 | 735i | GB33 | K1 |
| 1990 | 735i A | GB43 | K1 |
| 1990 | 735iL A | GC43 | K1 |
| 1990 | 750iL A | GC83 | K15 |
| 1990 | 525i | HC13 | K1 |
| 1990 | 525i A | HC23 | K1 |
| 1990 | 535i | HD13 | K1 |
| 1990 | 535i A | HD23 | K1 |
| 1990 | M5 | | K1 |

**1991**

| Year | Model | VDS | Chart |
|---|---|---|---|
| 1991 | 325i/is/2 | AA13 | K1 |
| 1991 | 325iA/2 | AA23 | K1 |
| 1991 | 325iX A/2 | AB03 | K1 |
| 1991 | 325iX/2 | AB93 | K1 |
| 1991 | 325i/4 | AD13 | K1 |
| 1991 | 325iA/4 | AD23 | K1 |
| 1991 | 325iX A/4 | AE03 | K1 |
| 1991 | 325iX/4 | AE93 | K1 |
| 1991 | 318is/2 | AF93 | K13 |
| 1991 | 318i/4 | AJ93 | K13 |
| 1991 | 318iC/2 | BA73 | K13 |
| 1991 | 325iC | BB13 | K1 |
| 1991 | 325iCA | BB23 | K1 |
| 1991 | M3 | | K1 |
| 1991 | 850i | EG13 | K7 |
| 1991 | 850i A | EG23 | K7 |
| 1991 | 735i A | GB43 | K1 |
| 1991 | 735iL A | GC43 | K1 |
| 1991 | 750iL A | GC83 | K7 |
| 1991 | 535i | HD13 | K1 |
| 1991 | 535i A | HD23 | K1 |
| 1991 | 525i | HD53 | K10 |
| 1991 | 525i A | HD63 | K10 |
| 1991 | M5 | HD93 | K1 |

**1992**

| Year | Model | VDS | Chart |
|---|---|---|---|
| 1992 | 318iC/2 | BA73 | K13 |
| 1992 | 325iC | BB13 | K1 |
| 1992 | 325iCA | BB23 | K1 |
| 1992 | 318is | BE53 | K6 |
| 1992 | 325is | BF33 | K10 |
| 1992 | 325is A | BF43 | K10 |
| 1992 | 318i | CA53 | K6 |
| 1992 | 325i | CB33 | K10 |
| 1992 | 325i A | CB43 | K10 |
| 1992 | M3 | | K1 |
| 1992 | 850i | EG13 | K7 |
| 1992 | 850i A | EG23 | K7 |
| 1992 | 735i A | GB43 | K1 |
| 1992 | 735iL A | GC43 | K1 |
| 1992 | 750iL A | GC83 | K7 |
| 1992 | 535i | HD13 | K1 |
| 1992 | 535i A | HD23 | K1 |
| 1992 | 525i | HD53 | K10 |
| 1992 | 525i A | HD63 | K10 |
| 1992 | M5 | HD93 | K1 |
| 1992 | 525iT | HJ63 | K10 |

**1993**

| Year | Model | VDS | Chart |
|---|---|---|---|
| 1993 | 325iC | BB13 | K1 |
| 1993 | 325iCA | BB23 | K1 |
| 1993 | 318is | BE53 | K6 |
| 1993 | 318is A | BE63 | K6 |
| 1993 | 325is | BF33 | K5 |
| 1993 | 325is A | BF43 | K5 |
| 1993 | 318i | CA53 | K6 |
| 1993 | 318i A | CA63 | K6 |
| 1993 | 325i | CB33 | K5 |
| 1993 | 325i A | CB43 | K5 |
| 1993 | M3 | | K5 |
| 1993 | 850i | EG13 | K7 |
| 1993 | 850i A | EG23 | K7 |
| 1993 | 750iL A | GC83 | K7 |

| | | | |
|---|---|---|---|
| 1993 | 740i A | GD43 | K11 |
| 1993 | 740iL A | GD83 | K11 |
| 1993 | 535i | HD13 | K1 |
| 1993 | 535i A | HD23 | K1 |
| 1993 | 525i | HD53 | K5 |
| 1993 | 525i A | HD63 | K5 |
| 1993 | M5 | HD93 | K1 |
| 1993 | 525iT | HJ63 | K5 |

**1994**

| Year | Model | VDS | Chart |
|---|---|---|---|
| 1994 | 318is | BE53 | K6 |
| 1994 | 318is A | BE63 | K6 |
| 1994 | 325is | BF33 | K5 |
| 1994 | 325is A | BF43 | K5 |
| 1994 | 325iC | BJ53 | K5 |
| 1994 | 325iCA | BJ63 | K5 |
| 1994 | 318iC | BK53 | K6 |
| 1994 | 318iC A | BK63 | K6 |
| 1994 | 318i | CA53 | K6 |
| 1994 | 318i A | CA63 | K6 |
| 1994 | 325i | CB33 | K5 |
| 1994 | 325i A | CB43 | K5 |
| 1994 | 840Ci A | EF63 | K11 |
| 1994 | 850i A | EG23 | K7 |
| 1994 | 850CSi | EG93 | K7 |
| 1994 | 750iL A | GC83 | K7 |
| 1994 | 740i A | GD43 | K11 |
| 1994 | 740iL A | GD83 | K11 |
| 1994 | 525i | HD53 | K5 |
| 1994 | 525i A | HD63 | K5 |
| 1994 | 530i | HE13 | K11 |
| 1994 | 530i A | HE23 | K11 |
| 1994 | 540i A | HE63 | K11 |
| 1994 | 525iT | HJ63 | K5 |
| 1994 | 530iT A | HK23 | K11 |

**1995**

| Year | Model | VDS | Chart |
|---|---|---|---|
| 1995 | 318is | BE53 | K6 |
| 1995 | 318is A | BE63 | K6 |
| 1995 | M3 A | BF03 | K5 |
| 1995 | 325is | BF33 | K5 |
| 1995 | 325is A | BF43 | K5 |
| 1995 | M3 | BF93 | K5 |
| 1995 | 325iC | BJ53 | K5 |
| 1995 | 325iCA | BJ63 | K5 |
| 1995 | 318iC | BK53 | K6 |
| 1995 | 318iC A | BK63 | K6 |
| 1995 | 318i | CA53 | K6 |
| 1995 | 318i A | CA63 | K6 |
| 1995 | 325i | CB33 | K5 |
| 1995 | 325i A | CB43 | K5 |
| 1995 | 318i | CC73 | K6 |
| 1995 | 318i A | CC83 | K6 |
| 1995 | 318ti | CG53 | K6 |
| 1995 | 318ti A | CG63 | K6 |
| 1995 | 840Ci A | EF63 | K11 |
| 1995 | 850Ci A | EG43 | K12 |
| 1995 | 850CSi | EG93 | K7 |
| 1995 | 740i A | GF63 | K11 |
| 1995 | 740iL A | GJ63 | K11 |
| 1995 | 750iL A | GK23 | K12 |
| 1995 | 525i | HD53 | K5 |
| 1995 | 525i A | HD63 | K5 |
| 1995 | 530i | HE13 | K11 |
| 1995 | 530i A | HE23 | K11 |
| 1995 | 540i | HE53 | K11 |
| 1995 | 540i A | HE63 | K11 |
| 1995 | 525iT | HJ63 | K5 |
| 1995 | 530iT A | HK23 | K11 |

## A NOTE ABOUT NON-U.S. BMWS:

The preceding table refers to US specification BMWs only, and does not include any non-US BMW variants. To best use the code reader/reset tool on your non-US BMW, you will need to determine which of the above models most closely matches your BMW. For instance a 1991 320i is a 3 series, 4-cylinder, made for non-US markets: In this case, the best chart for you to use would be chart K13, as the closest US spec car would be a 1991 318i (which is also a 4-cylinder 3 series). This method doesn't always work; you may need to experiment to find the correct chart.



## "FF" CODE CHARTS (FOR 1987–95):

### Chart K1.

| | |
|---|---|
| 1 | ECU control unit selftest |
| 3 | Electrical fuel pump relay |
| 4 | Idle speed actuator (open) |
| 5 | Evaporative purge control valve |
| 7 | Air flow meter |
| 0A | Emission (lambda) control |
| 0F | Check engine lamp |
| 10 | Fuel Injectors (Cyl. 1,3,5) |
| 11 | Fuel Injectors (Cyl. 2,4,6) |
| 16 | Idle speed actuator (close) |
| 17 | Oxygen sensor heating relay |
| 1C | Oxygen sensor |
| 1d | Vehicle speed signal not present |
| 21 | AT kick-down prevent solenoid valve |
| 25 | Control unit supply |
| 26 | Automatic Stability Control / DWA |
| 28 | A/C Compressor |
| 2b | Idle CO Potentiometer |
| 2C | Intake air temperature sensor |
| 2d | Coolant temperature sensor |
| 32 | Engine drag torque control (MSR) |
| 33 | Ignition timing intervention |
| 34 | Idle switch |
| 35 | Full load switch |
| 36 | Torque Convertor Clutch |
| 64 | Unspecified ECU Output Stage |

### Chart K5.

| | |
|---|---|
| 1 | Electrical fuel pump relay |
| 2 | Idle speed actuator (close) |
| 3 | Fuel Injector, Cyl #5 |
| 4 | Fuel Injector, Cyl #6 |
| 5 | Fuel Injector, Cyl #4 |
| 6 | Fuel Injector, Unknown |
| 7 | VANOS (Solenoid) |
| 8 | Check engine lamp |
| 0d | Oxygen sensor |
| 0F | Ignition secondary monitor |
| 10 | Crankshaft sensor |
| 11 | Camshaft sensor |
| 17 | Ignition Coil, Cyl #4 |
| 18 | Ignition Coil, Cyl #6 |
| 19 | Ignition Coil, Cyl #5 |
| 1A | Control unit supply |
| 1d | Idle speed actuator (open) |
| 1F | Fuel Injector, Cyl #3 |
| 20 | Fuel Injector, Cyl #2 |
| 21 | Fuel Injector, Cyl #1 |
| 24 | Evaporative purge control valve |
| 26 | Oxygen sensor heating relay |
| 29 | Air mass sensor |
| 2A | Vehicle speed signal not present |
| 30 | A/C Compressor control |
| 32 | Ignition Coil, Cyl #1 |
| 33 | Ignition Coil, Cyl #2 |
| 34 | Ignition Coil, Cyl #3 |
| 36 | Battery voltage / ECU main relay |
| 37 | Misfire detected, Cyl #6 |
| 39 | Ignition timing intervention |
| 41 | A/C Compressor |
| 42 | DWA/EWS Input |
| 45 | Knock Sensor, Cyl 4-6 |
| 46 | Knock Sensor, Cyl 1-3 |
| 49 | Throttle position sensor |
| 4C | Idle CO Potentiometer |
| 4d | Intake air temperature sensor |
| 4E | Coolant temperature sensor |
| 52 | Intervention, MSR |
| 53 | Intervention, ASC |
| 64 | Output Stage, Group #1 |
| C8 | ECU Control Unit |
| C9 | Lambda Control #1 |
| CA | Fault code memory error |
| CC | Idle speed increase during MSR |
| CE | Knock control test pulse |
| dC | EWS message |

### Chart K6.

| | |
|---|---|
| 1 | Electrical fuel pump relay |
| 3 | Fuel Injectors (Cyl 2,4) |
| 8 | Check engine lamp |
| 0C | Throttle position sensor |
| 0F | Knock sensor, Cyl 1-2 |
| 10 | Camshaft/Cylinder ID sensor |
| 12 | Intake air resonance (DISA) valve |
| 1d | Idle Control Valve |
| 20 | Fuel Injectors (Cyl 1,3) |
| 24 | Evaporative purge control valve |
| 25 | Oxygen sensor heating relay |
| 29 | Air flow sensor |
| 2A | Knock sensor, Cyl 3-4 |
| 30 | A/C Compressor control |
| 36 | Control unit supply |
| 37 | Ignition coils |
| 40 | Ignition timing intervention |
| 46 | Oxygen sensor |
| 49 | Vehicle speed signal not present |

4C Idle CO Potentiometer
4d Intake air temperature sensor
4E Coolant temperature sensor
51 DWA/EWS input
55 A/C Compressor
64 Unspecified ECU Output Stage
C8 ECU control unit selftest
C9 Emission (lambda) control
CE Knock control test pulse
CF Knock control regulation
dC EWS message

## Chart K7.

1 Electrical fuel pump relay
3 Fuel Injectors (Cyl 2,4,6 or 8,10,12)
8 Check engine lamp
10 Camshaft/Cylinder ID sensor
20 Fuel Injectors (Cyl 1,3,5 or 7,9,11)
24 Evaporative purge control valve
25 Oxygen sensor heating relay
29 Air flow sensor
30 A/C Compressor control
36 Control unit supply
3F Torque convertor clutch
40 Ignition timing intervention
46 Oxygen sensor
49 Vehicle speed signal not present
4C Idle CO Potentiometer
4d Intake air temperature sensor
4E Coolant temperature sensor
52 Engine drag torque control (MSR)
53 ASC / ZAB
64 Unspecified ECU Output Stage
C8 ECU control unit selftest
C9 Emission (lambda) control

## Chart K10.

1 Electrical fuel pump relay
2 Idle speed actuator (close)
3 Fuel Injector, Cyl #1
4 Fuel Injector, Cyl #3
5 Fuel Injector, Cyl #2
6 Fuel Injector, Unknown
8 Check engine lamp
0C Throttle position sensor
10 Camshaft sensor
12 Output Stage, Group #1
13 Output Stage, Group #2
17 Ignition Coil, Cyl #2
18 Ignition Coil, Cyl #3
19 Ignition Coil, Cyl #1
1A Control unit supply
1d Idle speed actuator (open)
1F Fuel Injector, Cyl #5
20 Fuel Injector, Cyl #6
21 Fuel Injector, Cyl #4
24 Evaporative purge control valve
25 Oxygen sensor heating relay
29 Air mass sensor
2E Output Stage
30 A/C Compressor control
32 Ignition Coil, Cyl #4
33 Ignition Coil, Cyl #6
34 Ignition Coil, Cyl #5
36 Battery voltage / ECU main relay
37 Ignition output stage
3E EML Signal
3F Torque convertor clutch lockup
40 Ignition timing intervention
43 Crankshaft sensor
46 Oxygen sensor
49 Vehicle speed signal not present
4C Idle CO Potentiometer
4d Intake air temperature sensor
4E Coolant temperature sensor
51 DWA Input
52 Engine drag torque control (MSR)
53 Intervention, ASC
55 A/C Compressor
64 Output Stage
C8 ECU Control Unit
C9 Lambda Control
CA Fault code memory error
Cb Ignition circuit primary monitor
CC Stall protection

## Chart K11.

1 Electrical fuel pump relay
2 Idle speed actuator (close)
3 Fuel Injector, Cyl #1
4 Fuel Injector, Cyl #4
5 Fuel Injector, Cyl #6
6 Fuel Injector, Unknown
7 Fuel Injector, Cyl #7
8 Check engine lamp
0C Oxygen sensor, #2
0d Oxygen sensor, #1
0F Ignition secondary monitor
10 Crankshaft sensor
11 Camshaft sensor
13 Secondary air pump relay



16 Ignition Coil, Cyl #7
17 Ignition Coil, Cyl #6
18 Ignition Coil, Cyl #4
19 Ignition Coil, Cyl #1
1A Control unit supply
1d Idle speed actuator (open)
1F Fuel Injector, Cyl #5
20 Fuel Injector, Cyl #8
21 Fuel Injector, Cyl #3
23 Fuel Injector, Cyl #2
24 Evaporative purge control valve
25 Oxygen sensor heating relay
29 Air mass sensor
2A Vehicle speed signal not present
30 A/C Compressor control
31 Ignition Coil, Cyl #2
32 Ignition Coil, Cyl #3
33 Ignition Coil, Cyl #8
34 Ignition Coil, Cyl #5
36 Battery voltage / ECU main relay
3E EML Signal
41 A/C Compressor
42 DWA/EWS Input
43 Knock Sensor, Cyl 7-8
44 Knock Sensor, Cyl 5-6
45 Knock Sensor, Cyl 3-4
46 Knock Sensor, Cyl 1-2
49 Throttle position sensor
4C Idle CO Potentiometer
4d Intake air temperature sensor
4E Coolant temperature sensor
52 Intervention, MSR
53 Intervention, ASC
64 Output Stage, Group #1
65 Output Stage, Group #2
C8 ECU Control Unit
C9 Lambda Control #1
CA Fault code memory error
Cb Lambda Control #2
CC Idle speed increase - CAN Bus
Cd Ignition timing intervention
CE Knock control test pulse
d2 CAN message
dC EWS message

## Chart K12.

4 PreCat oxy sensor heater, Bank 2
5 AfterCat oxy sensor heater, Bank 2
8 Misfire w/ low fuel
0A PreCat oxy sensor, Bank 1
0C AfterCat oxy sensor, Bank 1
0d PreCat oxy sensor heater, Bank 1
0E AfterCat oxy sensor heater, Bank 1
0F PreCat oxy sensor response time, Bank 1
10 PreCat oxy sensor aging, Bank 1
11 AfterCat oxy sensor response time, Bank 1
12 PreCat oxy sensor, Bank 2
14 Aftercat oxy sensor, Bank 2
PreCat oxy sensor response time, Bank 2
16 PreCat oxy sensor aging, Bank 2
17 AfterCat oxy sensor response time, Bank 2
18 A/C Compressor
1A Fuel trim, multiplicative, Bank 1
1b Fuel trim, QL additive, Bank 1
1C Fuel trim, Ti additive, Bank 1
20 Idle control valve stuck mechanically
22 Fuel trim, multiplicative, Bank 2
23 Fuel trim, QL additive, Bank 2
24 Fuel trim, Ti additive, Bank 2
27 EWS message
28 Catalyst efficiency, Bank 1
2d Catalyst efficiency, Bank 2
32 Misfire detected, Cyl#1
33 Misfire detected, Cyl#2
34 Misfire detected, Cyl#3
35 Misfire detected, Cyl#4
36 Misfire detected, Cyl#5
37 Misfire detected, Cyl#6
38 Misfire detected, Cyl#7
39 Misfire detected, Cyl#8
3A Misfire detected, Cyl#9
3b Misfire detected, Cyl#10
3C Misfire detected, Cyl#11
3d Misfire detected, Cyl#12
3E Misfire detected, random or unknown cyl.
3F Misfire detected, catalyst damaging, Cyl#1
40 Misfire detected, catalyst damaging, Cyl#2
41 Misfire detected, catalyst damaging, Cyl#3
42 Misfire detected, catalyst damaging, Cyl#4
43 Misfire detected, catalyst damaging, Cyl#5
44 Misfire detected, catalyst damaging, Cyl#6
45 Misfire detected, catalyst damaging, Cyl#7
46 Misfire detected, catalyst damaging, Cyl#8
47 Misfire detected, catalyst damaging, Cyl#9
48 Misfire detected, catalyst damaging, Cyl#10
49 Misfire detected, catalyst damaging, Cyl#11
4A Misfire detected, catalyst damaging, Cyl#12
4b Misfire det. cat damaging, random / unknown Cyl.
4E Crankshaft position sensor (too many teeth)
50 Secondary air control, Bank 1

54 Secondary air pump final stage
55 Secondary air valve final stage
5d EVAP emission control system
5E EVAP large leak
61 EVAP small leak
62 EVAP purge control valve circuit
65 DME, internal RAM failure
66 DME, external RAM failure
67 DME, ROM failure
68 Fault code memory error
6b Control unit supply voltage
6C Battery disconnected
6F Crankshaft position sensor
70 Camshaft position sensor
73 Air mass sensor
75 Throttle position sensor
78 Vehicle speed signal not present
79 Load calculation crosscheck (HFM vs TPS)
7b Coolant temperature sensor
7C Intake air temperature sensor
87 Torque reduction: Transmission
8A A/C Compressor torque reduction
8b Electric thermostat control final stage
8d ASC signal plausibility
8F Intervention, MSR
90 Intervention, ASC
93 Electric thermostat control performance
94 EWS Input
96 Fuel Injector, Cyl#1
97 Fuel Injector, Cyl#2
98 Fuel Injector, Cyl#3
99 Fuel Injector, Cyl#4
9A Fuel Injector, Cyl#5
9b Fuel Injector, Cyl#6
9C Fuel Injector, Cyl#7
9d Fuel Injector, Cyl#8
9E Fuel Injector, Cyl#9
9F Fuel Injector, Cyl#10
A0 Fuel Injector, Cyl#11
A1 Fuel Injector, Cyl#12
A5 Check engine lamp
A7 Electrical fuel pump relay
A8 Idle speed actuator (open)
A9 Idle speed actuator (close)
AA A/C Compressor control
d0 Secondary air control, Bank 2
d2 Knock Sensor #1
d3 Knock Sensor #2
d4 Knock Sensor #3
d5 Knock Sensor #4
d8 CAN timeout, ASC
dC Knock control test pulse
dE Knock control test pulse
EA Automatic start input
EC CAN timeout, EGS
Ed Automatic start output
Fd Coolant fan final stage

## Chart K13.

1 Electrical fuel pump relay
3 Fuel Injectors (Cyl 1,3)
8 Check engine lamp
0C Throttle position sensor
10 Camshaft/Cylinder ID sensor
1d Idle Control Valve
20 Fuel Injectors (Cyl 2,4)
24 Evaporative purge control valve
25 Oxygen sensor heating relay
29 Air flow sensor
30 A/C Compressor control
36 Control unit supply
40 Ignition timing intervention
46 Oxygen sensor
49 Vehicle speed signal not present
4C Idle CO Potentiometer
4d Intake air temperature sensor
4E Coolant temperature sensor
55 A/C Compressor request
64 Unspecified ECU Output Stage
C8 ECU control unit selftest
C9 Emission (lambda) control

## Chart K15

1 ECU control unit selftest
3 Electric fuel pump relay / TR Signal
5 Evaporative purge control valve
7 Air flow meter
0A Emission (lambda) control
0F Check engine lamp
10 Fuel Injectors (Cyl. 1,3,5 or 7,9,11)
11 Fuel Injectors (Cyl. 2,4,6 or 8,10,12)
17 Oxygen sensor heating relay
1C Oxygen sensor
25 Control unit supply
2b Idle CO Potentiometer
2C Intake air temperature sensor
2d Coolant temperature sensor
33 Ignition angle
36 Torque Convertor Clutch
64 Unspecified ECU Output Stage



# CODE CHARTS FOR 1996 ON

**Important:** Use the following code charts only if the tool did NOT display "FF" for the chart designator.

## Chart 00

01 Electrical fuel pump relay
02 Idle speed actuator (close)
03 "Fuel Injector, Cyl #1"
04 "Fuel Injector, Cyl #4"
05 "Fuel Injector, Cyl #6"
06 "Fuel Injector, Unknown"
07 "Fuel Injector, Cyl #7"
08 Check engine lamp
0C "Oxygen sensor, #2"
0D "Oxygen sensor, #1"
0F Ignition secondary monitor
10 Crankshaft sensor
11 Camshaft sensor
13 Secondary air pump relay
16 "Ignition Coil, Cyl #7"
17 "Ignition Coil, Cyl #6"
18 "Ignition Coil, Cyl #4"
19 "Ignition Coil, Cyl #1"
1A Control unit supply
1D Idle speed actuator (open)
1F "Fuel Injector, Cyl #5"
20 "Fuel Injector, Cyl #8"
21 "Fuel Injector, Cyl #3"
23 "Fuel Injector, Cyl #2"
24 Evaporative purge control valve
25 Oxygen sensor heating relay
29 Air mass sensor
2A Vehicle speed signal not present
30 A/C Compressor control
31 "Ignition Coil, Cyl #2"
32 "Ignition Coil, Cyl #3"
33 "Ignition Coil, Cyl #8"
34 "Ignition Coil, Cyl #5"
36 Battery voltage / ECU main relay
3E EML Signal
41 A/C Compressor
42 DWA/EWS Input
43 "Knock Sensor, Cyl 7-8"
44 "Knock Sensor, Cyl 5-6"
45 "Knock Sensor, Cyl 3-4"
46 "Knock Sensor, Cyl 1-2"
49 Throttle position sensor
4C Idle CO Potentiometer
4D Intake air temperature sensor
4E Coolant temperature sensor
52 "Intervention, MSR"
53 "Intervention, ASC"
64 "Output Stage, Group #1"
65 "Output Stage, Group #2"
C8 ECU Control Unit
C9 Lambda Control #1
CA Fault code memory error
CB Lambda Control #2
CC Idle speed increase - CAN Bus
CD Ignition timing intervention
CE Knock control test pulse
D2 CAN message
DC EWS message

## Chart 0b

01 EVAP LDP Valve final stage
02 EVAP Running losses valve final stage
03 "EVAP Reed switch not closed, doesn't open/close"
04 "PreCat oxygen sensor heater, Cyl 5-8"
05 "AfterCat oxygen sensor heater, Cyl 5-8"
06 "CAN timeout, instrument cluster"
07 "Engine coolant temperature, radiator outlet"
08 Misfire w/ low fuel
0A "PreCat oxygen sensor, Cyl 1-4"
0C "AfterCat oxygen sensor, Cyl 1-4"
0D "PreCat oxygen sensor heater, Cyl 1-4"
0E "AfterCat oxygen sensor heater, Cyl 1-4"
0F "PreCat oxygen sensor response time, Cyl 1-4"
10 "PreCat oxygen sensor aging, Cyl 1-4"
11 "AfterCat oxygen sensor response time, Cyl 1-4"
12 "PreCat oxygen sensor, Cyl 5-8"
14 "AfterCat oxygen sensor, Cyl 5-8"
15 "PreCat oxygen sensor response time, Cyl 5-8"
16 "PreCat oxygen sensor aging, Cyl 5-8"
17 "AfterCat oxygen sensor response time, Cyl 5-8"
18 A/C Compressor
1A "Fuel trim, multiplicative, Cyl 1-4"
1B "Fuel trim, QL additive, Cyl 1-4"
1C "Fuel trim, Ti additive, Cyl 1-4"
1D "Air containment valve, shrouded injectors, Cyl 1-4"
20 Idle control valve stuck mechanically
22 "Fuel trim, multiplicative, Cyl 5-8"
23 "Fuel trim, QL additive, Cyl 5-8"

24 "Fuel trim, Ti additive, Cyl 5-8"
27 EWS message
28 "Catalyst efficiency, Cyl 1-4"
2D "Catalyst efficiency, Cyl 5-8"
32 "Misfire detected, Cyl #1"
33 "Misfire detected, Cyl #2"
34 "Misfire detected, Cyl #3"
35 "Misfire detected, Cyl #4"
36 "Misfire detected, Cyl #5"
37 "Misfire detected, Cyl #6"
38 "Misfire detected, Cyl #7"
39 "Misfire detected, Cyl #8"
3E "Misfire detected, random or unknown cylinder"
3F "Misfire detected, catalyst damaging, Cyl #1"
40 "Misfire detected, catalyst damaging, Cyl #2"
41 "Misfire detected, catalyst damaging, Cyl #3"
42 "Misfire detected, catalyst damaging, Cyl #4"
43 "Misfire detected, catalyst damaging, Cyl #5"
44 "Misfire detected, catalyst damaging, Cyl #6"
45 "Misfire detected, catalyst damaging, Cyl #7"
46 "Misfire detected, catalyst damaging, Cyl #8"
4B "Misfire detected, catalyst damaging, random or unknown cylinder"
4D "Air containment valve, shrouded injectors, Cyl 5-8"
4E Crankshaft position sensor (too many teeth)
50 "Secondary air control, Cyl 1-4"
54 Secondary air pump final stage
55 Secondary air valve final stage
5B "EVAP purge control valve, Cyl 5-8"
5D EVAP emission control system
5E EVAP large leak
61 EVAP small leak
62 EVAP purge control valve circuit
65 "ECU, internal RAM failure"
66 "ECU, external RAM failure"
67 "ECU, ROM failure"
68 Fault code memory error
69 "ECU, EEPROM failure"
6B Control unit supply voltage
6C Battery disconnected
6F Crankshaft position sensor
70 Camshaft position sensor
73 Air mass sensor
75 Throttle position sensor
78 Vehicle speed signal not present
79 Load calculation crosscheck (HFM vs TPS)
7B Coolant temperature sensor
7C Intake air temperature sensor
87 Torque reduction: Transmission
8A A/C Compressor torque reduction
8B Electric thermostat control final stage
8D ASC signal plausibility
8F "Intervention, MSR"
90 "Intervention, ASC"
93 Electric thermostat control performance
94 EWS Input
96 "Fuel Injector, Cyl #1"
97 "Fuel Injector, Cyl #2"
98 "Fuel Injector, Cyl #3"
99 "Fuel Injector, Cyl #4"
9A "Fuel Injector, Cyl #5"
9B "Fuel Injector, Cyl #6"
9C "Fuel Injector, Cyl #7"
9D "Fuel Injector, Cyl #8"
A4 EVAP Barometric tank pressure sensor
A5 Check engine lamp
A7 Electrical fuel pump relay
A8 Idle speed actuator (open)
A9 Idle speed actuator (close)
AA A/C Compressor control
B7 EVAP large leak
B8 EVAP pinched hose check
CB Ignition feedback failed
CC EWS rolling code storage
D0 "Secondary air control, Cyl 5-8"
D2 "Knock Sensor, Cyl 1-2"
D3 "Knock Sensor, Cyl 3-4"
D4 "Knock Sensor, Cyl 5-6"
D5 "Knock Sensor, Cyl 7-8"
D6 CAN index verification
D7 "CAN timeout, left/right ECU"
D8 "CAN timeout, ASC"
D9 "CAN signal, EML"
DC Knock control test pulse
DE Knock control test pulse
E4 Automatic start output
E9 Automatic start output
EA Automatic start input
EC "CAN timeout, EGS"
ED Automatic start output
FD Coolant fan final stage



## Chart 0F

01 LDP control circuit
02 DM-TL solenoid control circuit
03 PreCat oxygen sensors swapped
04 "AfterCat oxygen sensor heater, Cyl#5-8"
05 "PreCat oxygen sensor heater, Cyl#5-8"
0A "PreCat oxygen sensor, Cyl#1-4"
0C "AfterCat oxygen sensor, Cyl#1-4"
0D "PreCat oxygen sensor heater, Cyl#1-4"
0E "AfterCat oxygen sensor heater, Cyl#1-4"
0F "PreCat oxygen sensor slow response, Cyl#1-4"
10 "PreCat oxygen sensor aging, Cyl#1-4"
11 "AfterCat oxygen sensor aging, Cyl#1-4"
12 "PreCat oxygen sensor, Cyl#5-8"
14 "AfterCat oxygen sensor, Cyl#5-8"
15 "PreCat oxygen sensor slow response, Cyl#5-8"
16 "PreCat oxygen sensor aging, Cyl#5-8"
17 "AfterCat oxygen sensor aging, Cyl#5-8"
18 "Mixture Control, higher load, Cyl #1-4"
19 "Mixture Control, higher load, Cyl #5-8"
1A "Mixture Control, off idle, Cyl #1-4"
1B "Mixture Control, off idle, Cyl #5-8"
1C "Mixture Control, idle, Cyl #1-4"
1D "Mixture Control, idle, Cyl #5-8"
1E "Mixture Control, idle, Cyl #1-4"
1F "Mixture Control, idle, Cyl #5-8"
20 Idle speed control
21 "Camshaft VANOS control, Cyl#1-4"
22 "Camshaft VANOS control, Cyl#5-8"
27 "EWS, manipulation detected"
28 "Catalyst efficiency, Cyl#1-4"
2D "Catalyst efficiency, Cyl#5-8"
32 "Misfire, Cyl #1"
33 "Misfire, Cyl #5"
34 "Misfire, Cyl #4"
35 "Misfire, Cyl #8"
36 "Misfire, Cyl #6"
37 "Misfire, Cyl #3"
38 "Misfire, Cyl #7"
39 "Misfire, Cyl #2"
3E "Misfire, random/multiple cylinders"
50 "Secondary air system, Cyl #1-4"
51 "Secondary air system, Cyl #5-8"
52 Secondary air valve
54 Secondary air control circuit
55 Secondary air valve
5D Evaporative emission system
62 Evaporative emission system purge valve
65 Torque monitoring
66 MFL interface
67 Safety concept monitoring
68 Clutch switch
69 "Control unit self-test, RAM faulty"
6A Brake switch
6B "Control unit self-test, ROM faulty"
6C "Control unit self-test, reset"
6D Battery voltage
6E Torque control
6F Crankshaft sensor
70 Timing reference high resolution signal
71 "Camshaft position sensor, Cyl#1-4"
72 "Camshaft position sensor, Cyl#5-8"
73 Air mass sensor
75 Throttle position sensors
76 Throttle position sensor 1
77 Throttle position sensor 2
78 Vehicle speed
79 Wheel sensor failure
7A Ambient temperature sensor
7B Engine coolant temperature sensor
7C Intake air temperature sensor
7D Radiator outlet temperature sensor
7F Coolant temperature plausibility
82 Drive-by-wire throttle position monitoring
83 Drive-by-wire throttle control
84 Drive-by-wire throttle control output stage
85 "Drive-by-wire throttle controller, spring check"
86 "Drive-by-wire throttle controller, lower adaptation"
87 "Drive-by-wire throttle controller, amplifier check"
88 "Drive-by-wire throttle, emergency air position test"
8B Map controlled thermostat jammed
8C Map controlled thermostat circuit/control
8D Engine cooling fan control
8E Exhaust flap control
94 EWS signal/interface
96 "Fuel Injector, Cyl #1"
97 "Fuel Injector, Cyl #5"

98 "Fuel Injector, Cyl #4"
99 "Fuel Injector, Cyl #8"
9A "Fuel Injector, Cyl #6"
9B "Fuel Injector, Cyl #3"
9C "Fuel Injector, Cyl #7"
9D "Fuel Injector, Cyl #2"
A3 Throttle position / air mass plausibility
A4 Ambient pressure sensor
A5 "VANOS output stage, Cyl #1-4"
A6 "VANOS output stage, Cyl #5-8"
A7 Fuel pump relay control
A8 Check engine lamp/MIL
AA A/C compressor control
B7 LDP diagnosis
B8 LDP system
B9 LDP pressure sensor
BA DM-TL pump control circuit
BB DM-TL small leak
BC DM-TL large leak
BD DM-TL pump current
C9 DM-TL heater
CC EWS exchange code stored
D2 "Knock sensor, Cyl #1-2"
D3 "Knock sensor, Cyl #3-4"
D4 "Knock sensor, Cyl #5-6"
D5 "Knock sensor, Cyl #7-8"
D6 Knock control zero test
D7 Knock control offset
D8 Knock control test pulse
DB CAN timeout
DC "CAN timeout, EGS"
DD "CAN timeout, ASC/DSC"
DE "CAN timeout, instrument cluster"
DF "CAN timeout, ACC"
E0 MSR intervention plausibility
E1 ACC intervention plausibility
E2 Fuel level plausibility
E5 Pedal position sensor supply voltage
E6 Pedal position sensors
E7 Pedal position sensor 1
E8 Pedal position sensor 2
E9 Automatic starter control output
EA Automatic starter input signal
EC Intake air flap control
ED Automatic starter

## Chart 1b

01 Fuel pump relay
02 Idle speed actuator (close)
03 "Fuel Injector, Cyl #1"
04 "Fuel Injector, Cyl #3"
05 "Fuel Injector, Cyl #2"
06 Timeout SMG-CAN
07 Intake camshaft position sensor
09 "Knock sensor, Cyl #1-2"
0A Exhaust camshaft position sensor
0C "PreCat oxygen sensor, Cyl #4-6"
0D "PreCat oxygen sensor, Cyl #1-3"
0E Tank small leak
10 Crankshaft sensor
12 Map controlled thermostat actuator
13 Secondary air pump relay
14 Starter relay
15 "Exhaust camshaft VANOS retard valve, Cyl #1-4"
16 "Exhaust camshaft VANOS advance valve, Cyl #1-4"
17 "Ignition Coil, Cyl #2"
18 "Ignition Coil, Cyl #3"
19 "Ignition Coil, Cyl #1"
1B DM-TL switching valve
1C Map controlled thermostat control
1D Idle speed actuator (open)
1E "Control unit self-test, A/D converter monitoring"
1F "Fuel Injector, Cyl #5"
20 "Fuel Injector, Cyl #6"
21 "Fuel Injector, Cyl #4"
24 Evaporative emission purge control valve
25 "PreCat oxygen sensor heater control, Cyl #1-3"
26 "PreCat oxygen sensor heater control, Cyl #4-6"
27 "AfterCat oxygen sensor heater control, Cyl #1-3"
28 "AfterCat oxygen sensor heater control, Cyl #4-6"
29 Air mass sensor
2A Vehicle speed signal
2B Radiator outlet temperature sensor
2C Thermal oil level sensor
2D Drive-by-wire throttle actuator driver
2E Fuel consumption (KVA) signal output
2F Engine RPM (TD) signal output
30 A/C Compressor relay



32 "Ignition Coil, Cyl #4"
33 "Ignition Coil, Cyl #6"
34 "Ignition Coil, Cyl #5"
35 Electronic fan (relay)
36 Battery voltage behind main relay
3A Sensor voltage supply 1
3B Sensor voltage supply 2
3C "Pedal position sensor 1, master measurement"
3D "Pedal position sensor 2, master measurement"
3F Secondary air switching valve
41 "Throttle position sensor 2, slave measurement"
42 EWS interface
43 Intake camshaft VANOS advance valve
45 "Knock sensor, Cyl #5-6"
46 "Knock sensor, Cyl #3-4"
48 Intake camshaft VANOS retard valve
49 "Air mass sensor, plausibility "
4C Ambient pressure sensor
4D Intake air temperature sensor
4E Coolant temperature sensor
4F Exhaust gas temperature sensor
50 Switch-chain grip
51 MFL interface signal
52 Muffler flap
55 "Throttle position sensor, master measurement"
56 CAN bus offline
57 "AfterCat oxygen sensor voltage, Cyl #1-3"
58 "AfterCat oxygen sensor voltage, Cyl #4-6"
59 "Control unit self-test, Safety Concept slave check"
5A "PreCat oxygen sensor aging, Cyl #1-3"
5B "PreCat oxygen sensor aging, Cyl #4-6"
5C "AfterCat oxygen sensor aging, Cyl #1-3"
5D "AfterCat oxygen sensor aging, Cyl #4-6"
63 "Control unit self-test, Safety Concept master check"
69 "Engine coolant temperature, Plausibility"
6A Brake light switch
6B "Control unit self-test, pre-drive check of drive-by-wire system"
6C Switching valve oil circuit left
6D Switching valve oil circuit right
6E Sport switch LED indicator
6F "Pedal position sensor 1, cross check"
70 "Pedal position sensor 2, cross check"
73 "Control unit self-test, internal ECU temperature"
76 Throttle position sensor 1
77 Throttle position sensor 2
78 "Throttle position sensors, cross check"
79 "Throttle position sensors, both bad"
7A "Control unit self-test, master processor"
7B "Bus offline, SMG-CAN"
7E Fuel pump crash shut-off
7F DM-TL module
80 Idle speed deviation
82 "EWS signal, manipulation detected"
83 "DSC intervention, plausibility"
84 DSC message timeout
86 Instrument Cluster message timeout
87 Vehicle speed signal
88 Idle speed controller
8B Cruise control system
8C Engine noise too high
8D "Fuel level, plausibility"
8F E-box-fan
90 "Fuel control, Cyl #1-3"
91 "Fuel control, Cyl #4-6"
95 Misfire w/ empty fuel tank
96 "Control unit self-test, memory test master"
97 "Control unit self-test, driver diagnostics chain"
98 "Control unit self-test, communication master"
9B "Control unit self-test, adaption EEPROM master"
9C "Control unit self-test, adaption EEPROM slave"
9D "Control unit self-test, memory test slave"
9E "Control unit self-test, communication slave"
9F "Control unit self-test, knock detection IC 1"
A0 "Control unit self-test, knock detection IC 2"
A1 Knock control
A3 "Control unit self-test, master resets"
AA "Secondary air system, flow too low"
AB "Secondary air system, valve sticking"
AC VANOS pressure storage valve
AD Starter switch input
AE "Mixture adaptation, Cyl #1-3"
AF "Mixture adaptation, Cyl #4-6"
B0 DM-TL error
B2 "Catalyst system efficiency, Cyl #1-3"
B3 "Catalyst system efficiency, Cyl #4-6"
B4 Tank leak detected
B5 Filler cap open
B6 "Injection driver 1, over temp."
B7 "Injection driver 2, over temp."

B8 Intake camshaft VANOS position control
B9 Exhaust camshaft VANOS position control
BA "Ignition output stage, Cyl #1"
BB "Ignition output stage, Cyl #2"
BC "Ignition output stage, Cyl #3"
BD "Ignition output stage, Cyl #4"
BE "Ignition output stage, Cyl #5"
BF "Ignition output stage, Cyl #6"
C2 "Control unit self-test, cruise control shut-off"
C3 "Control unit self-test, torque manager monitoring"
C4 "Misfire w/ fuel cutoff, Cyl #1"
C5 "Misfire w/ fuel cutoff, Cyl #2"
C6 "Misfire w/ fuel cutoff, Cyl #3"
C7 "Misfire w/ fuel cutoff, Cyl #4"
C8 "Misfire w/ fuel cutoff, Cyl #5"
C9 "Misfire w/ fuel cutoff, Cyl #6"
CC "Misfire, multiple cylinders w/ fuel cutoff"
CD "Misfire during warm-up, Cyl #1"
CE "Misfire during warm-up, Cyl #2"
CF "Misfire during warm-up, Cyl #3"
D0 "Misfire during warm-up, Cyl #4"
D1 "Misfire during warm-up, Cyl #5"
D2 "Misfire during warm-up, Cyl #6"
D5 "Misfire during warm-up, multiple cylinders"
D6 "PreCat oxygen sensor slow response, Cyl #1-3"
D7 "PreCat oxygen sensor slow response, Cyl #4-6"
D8 "PreCat oxygen sensor slow switching (rich to lean), Cyl #1-3"
D9 "PreCat oxygen sensor slow switching (rich to lean), Cyl #4-6"
DA "PreCat oxygen sensor signal size/amplitude, Cyl #1-3"
DB "PreCat oxygen sensor signal size/amplitude, Cyl #4-6"
E4 "Drive-by-wire, throttle control failure"
E5 "Drive-by-wire, throttle control failure"
E6 "Drive-by-wire, throttle position failure"
E7 "Control unit self-test, slave processor check"
E8 Evaporative emissions purge valve functional check
F7 VANOS pressure accumulator valve
F8 Intake camshaft VANOS moving time
F9 Exhaust camshaft VANOS moving time
FA Intake camshaft VANOS sealing
FB Exhaust camshaft VANOS sealing

## Chart 06

04 "PreCat oxygen sensor heater, Cyl 5-8"
05 "AfterCat oxygen sensor heater, Cyl 5-8"
08 Misfire w/ low fuel
0A "PreCat oxygen sensor, Cyl 1-4"
0C "AfterCat oxygen sensor, Cyl 1-4"
0D "PreCat oxygen sensor heater, Cyl 1-4"
0E "AfterCat oxygen sensor heater, Cyl 1-4"
0F "PreCat oxygen sensor response time, Cyl 1-4"
10 "PreCat oxygen sensor aging, Cyl 1-4"
11 "AfterCat oxygen sensor response time, Cyl 1-4"
12 "PreCat oxygen sensor, Cyl 5-8"
14 "AfterCat oxygen sensor, Cyl 5-8"
15 "PreCat oxygen sensor response time, Cyl 5-8"
16 "PreCat oxygen sensor aging, Cyl 5-8"
17 "AfterCat oxygen sensor response time, Cyl 5-8"
18 A/C Compressor
1A "Fuel trim, multiplicative, Cyl 1-4"
1B "Fuel trim, QL additive, Cyl 1-4"
1C "Fuel trim, Ti additive, Cyl 1-4"
20 Idle control valve stuck mechanically
22 "Fuel trim, multiplicative, Cyl 5-8"
23 "Fuel trim, QL additive, Cyl 5-8"
24 "Fuel trim, Ti additive, Cyl 5-8"
27 EWS message
28 "Catalyst efficiency, Cyl 1-4"
2D "Catalyst efficiency, Cyl 5-8"
32 "Misfire detected, Cyl #1"
33 "Misfire detected, Cyl #2"
34 "Misfire detected, Cyl #3"
35 "Misfire detected, Cyl #4"
36 "Misfire detected, Cyl #5"
37 "Misfire detected, Cyl #6"
38 "Misfire detected, Cyl #7"
39 "Misfire detected, Cyl #8"
3E "Misfire detected, random or unknown cylinder"
3F "Misfire detected, catalyst damaging, Cyl #1"
40 "Misfire detected, catalyst damaging, Cyl #2"
41 "Misfire detected, catalyst damaging, Cyl #3"
42 "Misfire detected, catalyst damaging, Cyl #4"



43 "Misfire detected, catalyst damaging, Cyl #5"
44 "Misfire detected, catalyst damaging, Cyl #6"
45 "Misfire detected, catalyst damaging, Cyl #7"
46 "Misfire detected, catalyst damaging, Cyl #8"
4B "Misfire detected, catalyst damaging, random or unknown cylinder"
4E Crankshaft position sensor (too many teeth)
50 "Secondary air control, Cyl 1-4"
54 Secondary air pump final stage
55 Secondary air valve final stage
5D EVAP emission control system
5E EVAP large leak
61 EVAP small leak
62 EVAP purge control valve circuit
65 "ECU, internal RAM failure"
66 "ECU, external RAM failure"
67 "ECU, ROM failure"
68 Fault code memory error
6B Control unit supply voltage
6C Battery disconnected
6F Crankshaft position sensor
70 Camshaft position sensor
73 Air mass sensor
75 Throttle position sensor
78 Vehicle speed signal not present
79 Load calculation crosscheck (HFM vs TPS)
7B Coolant temperature sensor
7C Intake air temperature sensor
87 Torque reduction: Transmission
8A A/C Compressor torque reduction
8B Electric thermostat control final stage
8D ASC signal plausibility
8F "Intervention, MSR"
90 "Intervention, ASC"
93 Electric thermostat control performance
94 EWS Input
96 "Fuel Injector, Cyl #1"
97 "Fuel Injector, Cyl #2"
98 "Fuel Injector, Cyl #3"
99 "Fuel Injector, Cyl #4"
9A "Fuel Injector, Cyl #5"
9B "Fuel Injector, Cyl #6"
9C "Fuel Injector, Cyl #7"
9D "Fuel Injector, Cyl #8"
A5 Check engine lamp
A7 Electrical fuel pump relay
A8 Idle speed actuator (open)
A9 Idle speed actuator (close)
AA A/C Compressor control
D0 "Secondary air control, Cyl 5-8"
D2 "Knock Sensor, Cyl 1-2"
D3 "Knock Sensor, Cyl 3-4"
D4 "Knock Sensor, Cyl 5-6"
D5 "Knock Sensor, Cyl 7-8"
D8 "CAN timeout, ASC"
DC Knock control test pulse
DE Knock control test pulse
EA Automatic start input
EC "CAN timeout, EGS"
ED Automatic start output
FD Coolant fan final stage

## Chart 07

08 Misfire w/ low fuel
0A PreCat oxygen sensor
0C AfterCat oxygen sensor
0D PreCat oxygen sensor heater
0E AfterCat oxygen sensor heater
0F PreCat oxygen sensor response time
10 PreCat oxygen sensor aging
11 AfterCat oxygen sensor response time
18 A/C Compressor
1A "Fuel trim, multiplicative"
1B "Fuel trim, QL additive"
1C "Fuel trim, Ti additive"
20 Idle control valve stuck mechanically
27 EWS message
28 Catalyst efficiency
32 "Misfire detected, Cyl #1"
33 "Misfire detected, Cyl #2"
34 "Misfire detected, Cyl #3"
35 "Misfire detected, Cyl #4"
3E "Misfire detected, random or unknown cylinder"
3F "Misfire detected, catalyst damaging, Cyl #1"
40 "Misfire detected, catalyst damaging, Cyl #2"
41 "Misfire detected, catalyst damaging, Cyl #3"
42 "Misfire detected, catalyst damaging, Cyl #4"
4B "Misfire detected, catalyst damaging, random or unknown cylinder"

4E Crankshaft position sensor (too many teeth)
50 Secondary air control
5D EVAP emission control system
5E EVAP large leak
61 EVAP small leak
62 EVAP purge control valve circuit
65 "ECU, internal RAM failure"
66 "ECU, external RAM failure"
67 "ECU, ROM failure"
68 Fault code memory error
6B Control unit supply voltage
6C Battery disconnected
6F Crankshaft position sensor
70 Camshaft position sensor
73 Air mass sensor
75 Throttle position sensor
78 Vehicle speed signal not present
79 Load calculation crosscheck (HFM vs TPS)
7B Coolant temperature sensor
7C Intake air temperature sensor
87 Torque reduction: Transmission
8F "Intervention, MSR"
90 "Intervention, ASC"
94 EWS Input
96 "Fuel Injector, Cyl #1"
97 "Fuel Injector, Cyl #2"
98 "Fuel Injector, Cyl #3"
99 "Fuel Injector, Cyl #4"
A5 Check engine lamp
A7 Electrical fuel pump relay
A8 Idle speed actuator (open)
A9 Idle speed actuator (close)
AA A/C Compressor control
AF DISA (intake resonance) flap
D2 "Knock Sensor, Cyl 1-2"
D3 "Knock Sensor, Cyl 3-4"
DC Knock control zero test
DE Knock control test pulse
EC "CAN timeout, EGS"

## Chart 09

04 "PreCat oxygen sensor heater, Bank 2"
05 "AfterCat oxygen sensor heater, Bank 2"
08 Misfire w/ low fuel
0A "PreCat oxygen sensor, Bank 1"
0C "AfterCat oxygen sensor, Bank 1"
0D "PreCat oxygen sensor heater, Bank 1"
0E "AfterCat oxygen sensor heater, Bank 1"
0F "PreCat oxygen sensor response time, Bank 1"
10 "PreCat oxygen sensor aging, Bank 1"
11 "AfterCat oxygen sensor response time, Bank 1"
12 "PreCat oxygen sensor, Bank 2"
14 "AfterCat oxygen sensor, Bank 2"
15 "PreCat oxygen sensor response time, Bank 2"
16 "PreCat oxygen sensor aging, Bank 2"
17 "AfterCat oxygen sensor response time, Bank 2"
18 A/C Compressor
1A "Fuel trim, multiplicative, Bank 1"
1B "Fuel trim, QL additive, Bank 1"
1C "Fuel trim, Ti additive, Bank 1"
20 Idle control valve stuck mechanically
22 "Fuel trim, multiplicative, Bank 2"
23 "Fuel trim, QL additive, Bank 2"
24 "Fuel trim, Ti additive, Bank 2"
27 EWS message
28 "Catalyst efficiency, Bank 1"
2D "Catalyst efficiency, Bank 2"
32 "Misfire detected, Cyl #1"
33 "Misfire detected, Cyl #2"
34 "Misfire detected, Cyl #3"
35 "Misfire detected, Cyl #4"
36 "Misfire detected, Cyl #5"
37 "Misfire detected, Cyl #6"
38 "Misfire detected, Cyl #7"
39 "Misfire detected, Cyl #8"
3A "Misfire detected, Cyl #9"
3B "Misfire detected, Cyl #10"
3C "Misfire detected, Cyl #11"
3D "Misfire detected, Cyl #12"
3E "Misfire detected, random or unknown cylinder"
3F "Misfire detected, catalyst damaging, Cyl #1"
40 "Misfire detected, catalyst damaging, Cyl #2"
41 "Misfire detected, catalyst damaging, Cyl #3"
42 "Misfire detected, catalyst damaging, Cyl #4"
43 "Misfire detected, catalyst damaging, Cyl #5"
44 "Misfire detected, catalyst damaging, Cyl #6"
45 "Misfire detected, catalyst damaging, Cyl #7"



46 "Misfire detected, catalyst damaging, Cyl #8"
47 "Misfire detected, catalyst damaging, Cyl #9"
48 "Misfire detected, catalyst damaging, Cyl #10"
49 "Misfire detected, catalyst damaging, Cyl #11"
4A "Misfire detected, catalyst damaging, Cyl #12"
4B "Misfire detected, catalyst damaging, random or unknown cylinder"
4E Crankshaft position sensor (too many teeth)
50 "Secondary air control, Bank 1"
54 Secondary air pump final stage
55 Secondary air valve final stage
5D EVAP emission control system
5E EVAP large leak
61 EVAP small leak
62 EVAP purge control valve circuit
65 "ECU, internal RAM failure"
66 "ECU, external RAM failure"
67 "ECU, ROM failure"
68 Fault code memory error
6B Control unit supply voltage
6C Battery disconnected
6F Crankshaft position sensor
70 Camshaft position sensor
73 Air mass sensor
75 Throttle position sensor
78 Vehicle speed signal not present
79 Load calculation crosscheck (HFM vs TPS)
7B Coolant temperature sensor
7C Intake air temperature sensor
87 Torque reduction: Transmission
8A A/C Compressor torque reduction
8B Electric thermostat control final stage
8D ASC signal plausibility
8F "Intervention, MSR"
90 "Intervention, ASC"
93 Electric thermostat control performance
94 EWS Input
96 "Fuel Injector, Cyl #1"
97 "Fuel Injector, Cyl #2"
98 "Fuel Injector, Cyl #3"
99 "Fuel Injector, Cyl #4"
9A "Fuel Injector, Cyl #5"
9B "Fuel Injector, Cyl #6"
9C "Fuel Injector, Cyl #7"
9D "Fuel Injector, Cyl #8"
9E "Fuel Injector, Cyl #9"
9F "Fuel Injector, Cyl #10"
A0 "Fuel Injector, Cyl #11"
A1 "Fuel Injector, Cyl #12"
A5 Check engine lamp
A7 Electrical fuel pump relay
A8 Idle speed actuator (open)
A9 Idle speed actuator (close)
AA A/C Compressor control
D0 "Secondary air control, Bank 2"
D2 Knock Sensor #1
D3 Knock Sensor #2
D4 Knock Sensor #3
D5 Knock Sensor #4
D8 "CAN timeout, ASC"
DC Knock control test pulse
DE Knock control test pulse
EA Automatic start input
EC "CAN timeout, EGS"
ED Automatic start output
FD Coolant fan final stage

## Charts 11 & 16

01 "Ignition Coil, Cyl #2"
02 "Ignition Coil, Cyl #4"
03 "Ignition Coil, Cyl #6"
05 "Fuel Injector, Cyl #2"
06 "Fuel Injector, Cyl #1"
08 Air mass sensor
0A Coolant temperature sensor
0B EVAP system pressure sensor
0C Throttle position sensor
0E Intake air temperature sensor
10 A/C compressor PWM signal
12 EWS Signal
14 Check engine lamp
15 VANOS (Solenoid)
16 "Fuel Injector, Cyl #3"
17 "Fuel Injector, Cyl #6"
18 "Fuel Injector, Cyl #4"
19 "PreCat oxygen sensor heater, Cyl #1-3"
1B Idle speed actuator (close)
1D "Ignition Coil, Cyl #1"
1E "Ignition Coil, Cyl #3"
1F "Ignition Coil, Cyl #5"
21 "Fuel Injector, Cyl #5"
23 Secondary air system relay/pump
2E Fuel level signal (reserve lamp)

2F Catalyst temperature after start-up
32 EVAP system running losses valve
33 EVAP system shutoff valve
34 Rear exhaust valve flap
35 Idle speed actuator (open)
37 "PreCat oxygen sensor heater, Cyl #4-6"
38 Ignition feedback - shunt resistor
39 "Knock Sensor, Cyl #1-3"
3B "Knock Sensor, Cyl #4-6"
3D "AfterCat oxygen sensor heater, Cyl #4-6"
3E "Secondary air system, switching valve"
41 Camshaft sensor
44 "EVAP system, purge control valve ckt."
45 Electrical fuel pump relay
4A A/C compressor relay
4B "PreCat oxygen sensor voltage, Cyl #1-3"
4C "PreCat oxygen sensor voltage, Cyl #4-6"
4D "AfterCat oxygen sensor voltage, Cyl #1-3"
4E "AfterCat oxygen sensor voltage, Cyl #4-6"
4F "AfterCat oxygen sensor heater, Cyl #1-3"
50 "ASC signal, active too long"
51 "MSR signal, active too long"
52 "EML signal, active too long"
53 Crankshaft Sensor
64 ECU Control Unit
BE EVAP reed switch not closed
BF EVAP reed switch doesn't open
C0 EVAP reed switch doesn't close
C1 EVAP clamped tube check
C2 EVAP large leak detected
C3 EVAP small leak detected
C4 EVAP electrical LDP valve
C5 EVAP barometric pressure sensor
C8 "PreCat oxygen sensor no activity, Cyl #1-3"
C9 "PreCat oxygen sensor no activity, Cyl #4-6"
CA "Oxygen sensor control limit, Cyl #1-3"
CB "Oxygen sensor control limit, Cyl #4-6"
CC "Idle control system, idle speed not plausible"
D1 EWS message
D2 Ignition feedback faulty (>2 cylinders)
D3 Idle control valve mechanically stuck
D4 VANOS mechanically stuck
D6 Vehicle speed signal not present
D7 ASC/MSR/EML - interface not plausible
D8 "Gear selector signal, signal undefined"
D9 CAN bus timeout
DA CAN controller - warning level reached
DB CAN bus offline
DE Time to closed loop temperature too long
E3 "Oxygen sensor adaption limit, Cyl #1-3"
E4 "Oxygen sensor adaption limit, Cyl #4-6"
E5 "PreCat oxygen sensor response time, Cyl #1-3"
E6 "PreCat oxygen sensor response time, Cyl #4-6"
E7 "PreCat oxygen sensor switching Time, Cyl #1-3"
E8 "PreCat oxygen sensor switching Time, Cyl #4-6"
E9 "Catalyst efficiency below threshold, Cyl #1-3"
EA "Catalyst efficiency below threshold, Cyl #4-6"
EB "AfterCat oxygen sensor heater power, Cyl #1-3"
EC "AfterCat oxygen sensor heater power, Cyl #4-6"
EE "Misfire detected, Cyl #1"
EF "Misfire detected, Cyl #2"
F0 "Misfire detected, Cyl #3"
F1 "Misfire detected, Cyl #4"
F2 "Misfire detected, Cyl #5"
F3 "Misfire detected, Cyl #6"
F4 "Flywheel adaption, segment timing faulty"
F5 "Secondary air system flow too low, Cyl #1-3"
F6 "Secondary air system flow too low, Cyl #4-6"
F7 Secondary air system injector valve jammed
FA EVAP TEV not operating
FB EVAP small leak detected
FC EVAP incorrect purge flow
FD EVAP shut off valve stuck closed
FE EVAP large leak detected
FF EVAP TEV stuck open

## Chart 15 (not the same as chart K15)

01 Ignition Coil, Cyl #2
02 Ignition Coil, Cyl #4
03 Ignition Coil, Cyl #6
05 Fuel Injector, Cyl #2
06 Fuel Injector, Cyl #1
08 Air mass sensor
0A Coolant temperature sensor
0B Radiator outlet temperature sensor
0E Intake air temperature sensor
12 Camshaft sensor, exhaust cam



13 VANOS solenoid, exhaust
15 VANOS solenoid, intake
16 Fuel Injector, Cyl #3
17 Fuel Injector, Cyl #6
18 Fuel Injector, Cyl #4
19 PreCat oxygen sensor heater, Cyl #1-3
1B Idle speed actuator (close)
1D Ignition Coil, Cyl #1
1E Ignition Coil, Cyl #3
1F Ignition Coil, Cyl #5
21 Fuel Injector, Cyl #5
23 Secondary air system electrical pump
26 Clutch switch
27 Brake light switch (BLS) / brake light test plausibility
28 Brake light switch (BLS) / pedal sensor plausibility
29 Multi-function steering wheel (MFL) signal
2A Multi-function steering wheel (MFL) redundant code transmission
2B Multi-function steering wheel (MFL) control switch
2D Multi-function steering wheel (MFL) toggle bit
32 Running loss (3/2) valve final stage
34 Rear exhaust valve flap
35 Idle speed actuator (open)
37 PreCat oxygen sensor heater, Cyl #4-6
38 Ignition feedback - shunt resistor
39 Knock Sensor, Cyl #1-3
3B Knock Sensor, Cyl #4-6
3D AfterCat oxygen sensor heater, Cyl #4-6
3E Secondary air system, switching valve
41 Camshaft sensor, intake cam
44 EVAP system, purge control valve circuit
45 Electrical fuel pump relay
4A A/C compressor relay
4F AfterCat oxygen sensor heater, Cyl #1-3
53 Crankshaft Sensor
64 ECU Control Unit
67 VANOS, faulty intake reference value
68 VANOS, faulty exhaust reference value
69 VANOS, intake mechanically stuck
6A VANOS, exhaust mechanically stuck
6D Motorized Throttle Valve (MDK), PWM not plausible
6E Pedal sensor (PWG) potentiometer #1
6F Pedal sensor (PWG) potentiometer #2
70 Motorized Throttle Valve (MDK) potentiometer #1
71 Motorized Throttle Valve (MDK) potentiometer #2
72 Motorized Throttle Valve (MDK) final stage
73 Reference voltage (5v) source for #1 potentiometers
74 Reference voltage (5v) source for #2 potentiometers
75 Pedal sensor (PWG) potentiometer plausibility
76 Motorized Throttle Valve (MDK) feedback plausibility
77 Motorized Throttle Valve (MDK) mechanically stuck
78 PWG / MDK potentiometers not plausible
7A Oil temperature sensor
7B Electric thermostat control final stage
7C DISA flap control
7D Coolant fan final stage
7E LDP solenoid valve
7F Electrical fuel pump
80 EWS signal
82 CAN timeout (ASC1)
83 CAN timeout (instr2)
84 CAN timeout (instr3)
85 CAN timeout (ASC3)
8C EVAP LDP reed switch not closed
8D EVAP LDP reed switch doesn't open
8E EVAP LDP reed switch doesn't close
8F EVAP clamped tube check
90 EVAP large leak detected
91 EVAP small leak detected
92 EVAP capillary leak (0.5mm) detected
95 MDK position and airmass signal not plausible
96 PreCat oxygen sensor short to B+, Cyl #1-3
97 PreCat oxygen sensor short to ground, Cyl #1-3
98 PreCat oxygen sensor disconnection, Cyl #1-3
99 PreCat oxygen sensor short to B+, Cyl #4-6
9A PreCat oxygen sensor short to ground, Cyl #4-6
9B PreCat oxygen sensor disconnection, Cyl #4-6
9C AfterCat oxygen sensor short to B+, Cyl #1-3
9D AfterCat oxygen sensor short to ground, Cyl #1-3

9F AfterCat oxygen sensor short to B+, Cyl #4-6
A0 AfterCat oxygen sensor short to ground, Cyl #4-6
A8 Electrical thermostat mechanically jammed open
A9 Motorized Throttle (MDK) final stage failure
AA Communication with safety controller disturbed
AB Safety controller has shut down MDK function
AC Pedal sensor (PWG) short between potientiometers
AD Motorized Throttle (MDK) short between potientiometers
AE Motorized Throttle (MDK) idle position not plausible
AF Pedal sensor (PWG) pot. #1 idle position not plausible
B0 Pedal sensor (PWG) pot. #2 idle position not plausible
BC PreCat oxygen sensor heater insufficient, Cyl #1-3
BD PreCat oxygen sensor heater insufficient, Cyl #4-6
BE AfterCat oxygen sensor heater insufficient, Cyl #1-3
BF AfterCat oxygen sensor heater insufficient, Cyl #4-6
CA Oxygen sensor control limit, Cyl #1-3
CB Oxygen sensor control limit, Cyl #4-6
CC Idle control system, idle speed not plausible
D0 EWS engine speed check not ok
D1 EWS message
D2 Ignition feedback faulty (>2 cylinders)
D3 Idle control valve mechanically stuck
D6 Vehicle speed signal not present
D7 AfterCat oxygen sensor disconnection, Cyl #1-3
D8 AfterCat oxygen sensor disconnection, Cyl #4-6
D9 CAN timeout (EGS1)
DB CAN bus offline
DC AfterCat oxygen sensor slow response time, Cyl #1-3
DD AfterCat oxygen sensor slow response time, Cyl #4-6
DE Coolant temp too low for closed loop operation
DF AfterCat oxygen sensor slow switching time, Cyl #1-3
E0 AfterCat oxygen sensor slow switching time, Cyl #4-6
E1 AfterCat oxygen sensor trim control, Cyl #1-3
E2 AfterCat oxygen sensor trim control, Cyl #4-6
E3 Oxygen sensor adaption limit, Cyl #1-3
E4 Oxygen sensor adaption limit, Cyl #4-6
E5 PreCat oxygen sensor slow response time, Cyl #1-3
E6 PreCat oxygen sensor slow response time, Cyl #4-6
E7 PreCat oxygen sensor slow switching Time, Cyl #1-3
E8 PreCat oxygen sensor slow switching Time, Cyl #4-6
E9 Catalyst efficiency below threshold, Cyl #1-3
EA Catalyst efficiency below threshold, Cyl #4-6
EB PreCat oxygen sensor trim control, Cyl #1-3
EC PreCat oxygen sensor trim control, Cyl #4-6
EE Misfire detected, Cyl #1
EF Misfire detected, Cyl #2
F0 Misfire detected, Cyl #3
F1 Misfire detected, Cyl #4
F2 Misfire detected, Cyl #5
F3 Misfire detected, Cyl #6
F4 Flywheel adaption, segment timing faulty
F5 Secondary air system flow too low, Cyl #1-3
F6 Secondary air system flow too low, Cyl #4-6
F7 Secondary air system valve stuck open
F8 AfterCat oxygen sensor, signal after decel not plausible, Cyl #1-3
F9 AfterCat oxygen sensor, signal after decel not plausible, Cyl #4-6
FA Functional check purge valve

## Chart 16 (see Chart 11) Chart 18

01 Fuel pump relay
02 Idle speed actuator (close)
03 "Fuel Injector, Cyl #1"
04 "Fuel Injector, Cyl #3"
05 "Fuel Injector, Cyl #2"
06 Timeout SMG-CAN
07 "Intake camshaft position sensor, Cyl #1-4"
08 "Intake camshaft position sensor, Cyl #5-8"
09 "Knock sensor, Cyl #1-2"



0A "Exhaust camshaft position sensor, Cyl #1-4"
0B "Exhaust camshaft position sensor, Cyl #5-8"
0C "PreCat oxygen sensor, Cyl #5-8"
0D "PreCat oxygen sensor, Cyl #1-4"
0E Tank small leak
0F "Crankshaft/Camshaft position correlation, Cyl #1-4"
10 Crankshaft sensor
12 Map controlled thermostat actuator
13 Secondary air pump relay
14 Starter relay
15 "Exhaust camshaft VANOS retard valve, Cyl #1-4"
16 "Exhaust camshaft VANOS advance valve, Cyl #1-4"
17 "Ignition Coil, Cyl #2"
18 "Ignition Coil, Cyl #3"
19 "Ignition Coil, Cyl #1"
1A "Ignition Coil, Cyl #8"
1B DM-TL switching valve
1C Map controlled thermostat control
1D Idle speed actuator (open)
1E "Control unit self-test, A/D converter monitoring"
1F "Fuel Injector, Cyl #5"
20 "Fuel Injector, Cyl #6"
21 "Fuel Injector, Cyl #4"
22 "Fuel Injector, Cyl #7"
23 "Fuel Injector, Cyl #8"
24 Evaporative emission purge control valve
25 "PreCat oxygen sensor heater control, Cyl #1-4"
26 "PreCat oxygen sensor heater control, Cyl #5-8"
27 "AfterCat oxygen sensor heater control, Cyl #1-4"
28 "AfterCat oxygen sensor heater control, Cyl #5-8"
29 "Air mass sensor, Cyl #1-4"
2A "Vehicle speed input signal, hardwired ""A"" signal"
2B Radiator outlet temperature sensor
2C Thermal oil level sensor
2D Drive-by-wire throttle actuator driver
2E Fuel consumption (KVA) signal output
2F Engine RPM (TD) signal output
30 A/C Compressor relay
32 "Ignition Coil, Cyl #4"
33 "Ignition Coil, Cyl #6"
34 "Ignition Coil, Cyl #5"
35 Electronic fan (relay)
36 Battery voltage behind main relay
37 "Ignition Coil, Cyl #7"
39 "Air mass sensor, Cyl #5-8"
3A Sensor voltage supply 1
3B Sensor voltage supply 2
3C "Pedal position sensor 1, master measurement"
3D "Pedal position sensor 2, master measurement"
3F Secondary air switching valve
41 "Throttle position sensor 2, slave measurement"
42 EWS interface
43 "Intake camshaft VANOS advance valve, Cyl #1-4"
45 "Knock sensor, Cyl #5-6"
46 "Knock sensor, Cyl #3-4"
47 "Knock sensor, Cyl #7-8"
48 "Intake camshaft VANOS retard valve, Cyl #1-4"
49 "Air mass sensor, plausibility "
4A "Intake camshaft VANOS advance valve, Cyl #5-8"
4B "Intake camshaft VANOS retard valve, Cyl #5-8"
4C Ambient pressure sensor
4D Intake air temperature sensor
4E Coolant temperature sensor
4F Exhaust gas temperature sensor
50 Switch-chain grip
51 MFL interface signal
52 Muffler flap
53 "Exhaust camshaft VANOS advance valve, Cyl #5-8"
54 "Exhaust camshaft VANOS retard valve, Cyl #5-8"
55 "Throttle position sensor, master measurement"
56 CAN bus offline
57 "AfterCat oxygen sensor voltage, Cyl #1-4"
58 "AfterCat oxygen sensor voltage, Cyl #5-8"
59 "Control unit self-test, Safety Concept slave check"
5A "PreCat oxygen sensor aging, Cyl #1-4"
5B "PreCat oxygen sensor aging, Cyl #5-8"

5C "AfterCat oxygen sensor aging, Cyl #1-4"
5D "AfterCat oxygen sensor aging, Cyl #5-8"
63 "Control unit self-test, Safety Concept master check"
64 Tire pressure left front
65 Tire pressure right front
66 Tire pressure right back
67 Tire pressure left back
69 "Engine coolant temperature, Plausibility"
6A Brake light switch
6B "Control unit self-test, pre-drive check of drive-by-wire system"
6C Switching valve oil circuit left
6D Switching valve oil circuit right
6E Sport switch LED indicator
6F "Pedal position sensor 1, cross check"
70 "Pedal position sensor 2, cross check"
71 "Intake camshaft VANOS position control, Cyl #5-8"
72 "Exhaust camshaft VANOS position control, Cyl #5-8"
73 "Control unit self-test, internal ECU temperature"
74 Servotronic valve current
75 Servotronic speed signal
76 Throttle position sensor 1
77 Throttle position sensor 2
78 "Throttle position sensors, cross check"
79 "Throttle position sensors, both bad"
7A "Control unit self-test, master processor"
7B "Bus offline, SMG-CAN"
7C Active engine bearing
7D Spoiler adjustment
7E Fuel pump crash shut-off
7F DM-TL module
80 Idle speed deviation
82 "EWS signal, manipulation detected"
83 "DSC intervention, plausibility"
84 DSC message timeout
85 Steering angle sensor message timeout
86 Instrument Cluster message timeout
87 Vehicle speed signals (both Discrete & CAN)
88 Idle speed controller
89 Jet stream pump
8A Differential lock
8B Cruise control system
8C Engine noise too high
8D "Fuel level, plausibility"
8F E-box-fan
90 "Fuel control, Cyl #1-4"
91 "Fuel control, Cyl #5-8"
95 Misfire w/ empty fuel tank
96 "Control unit self-test, memory test master"
97 "Control unit self-test, driver diagnostics chain"
98 "Control unit self-test, communication master"
9B "Control unit self-test, adaption EEPROM master"
9C "Control unit self-test, adaption EEPROM slave"
9D "Control unit self-test, memory test slave"
9E "Control unit self-test, communication slave"
9F "Control unit self-test, knock detection IC 1"
A0 "Control unit self-test, knock detection IC 2"
A1 Knock control
A2 "Crankshaft/Camshaft position correlation, Cyl #5-8"
A3 "Control unit self-test, master resets"
AA "Secondary air system, flow too low"
AB "Secondary air system, valve sticking"
AC VANOS pressure storage valve
AD Starter switch input
AE "Air-fuel adaptation, Cyl #1-4"
AF "Air-fuel adaptation, Cyl #5-8"
B0 "Air-fuel adaptation at idle, Cyl #1-4"
B1 "Air-fuel adaptation at idle, Cyl #5-8"
B2 "Catalyst system efficiency, Cyl #1-4"
B3 "Catalyst system efficiency, Cyl #5-8"
B4 Tank leak detected
B5 Filler cap open
B6 "Injection driver 1, over temp."
B7 "Injection driver 2, over temp."
B8 "Intake camshaft VANOS position control, Cyl #1-4"
B9 "Exhaust camshaft VANOS position control, Cyl #1-4"
BA "Ignition output stage, Cyl #1"
BB "Ignition output stage, Cyl #2"
BC "Ignition output stage, Cyl #3"



BD "Ignition output stage, Cyl #4"
BE "Ignition output stage, Cyl #5"
BF "Ignition output stage, Cyl #6"
C0 "Ignition output stage, Cyl #7"
C1 "Ignition output stage, Cyl #8"
C2 "Control unit self-test, cruise control shut-off"
C3 "Control unit self-test, torque manager monitoring"
C4 "Misfire, Cyl #1"
C5 "Misfire, Cyl #2"
C6 "Misfire, Cyl #3"
C7 "Misfire, Cyl #4"
C8 "Misfire, Cyl #5"
C9 "Misfire, Cyl #6"
CA "Misfire, Cyl #7"
CB "Misfire, Cyl #8"
CC "Misfire, multiple cylinders"
CD "Misfire during warm-up, Cyl #1"
CE "Misfire during warm-up, Cyl #2"
CF "Misfire during warm-up, Cyl #3"
D0 "Misfire during warm-up, Cyl #4"
D1 "Misfire during warm-up, Cyl #5"
D2 "Misfire during warm-up, Cyl #6"
D3 "Misfire during warm-up, Cyl #7"
D4 "Misfire during warm-up, Cyl #8"
D5 "Misfire during warm-up, multiple cylinders"
D6 "PreCat oxygen sensor slow response, Cyl #1-4"
D7 "PreCat oxygen sensor slow response, Cyl #5-8"
D8 "PreCat oxygen sensor slow switching (rich to lean), Cyl #1-4"
D9 "PreCat oxygen sensor slow switching (rich to lean), Cyl #5-8"
DA "PreCat oxygen sensor signal size/amplitude, Cyl #1-4"
DB "PreCat oxygen sensor signal size/amplitude, Cyl #5-8"
E4 "Drive-by-wire, throttle control failure"
E5 "Drive-by-wire, throttle control failure"
E6 "Drive-by-wire, throttle position failure"
E7 "Control unit self-test, slave processor check"
E8 Evaporative emissions purge valve functional check
F7 VANOS pressure accumulator valve
F8 "Intake camshaft VANOS moving time, Cyl #1-4"
F9 "Exhaust camshaft VANOS moving time, Cyl #1-4"
FA "Intake camshaft VANOS sealing, Cyl #1-4"
FB "Exhaust camshaft VANOS sealing, Cyl #1-4"
FC "Intake camshaft VANOS moving time, Cyl #5-8"
FD "Exhaust camshaft VANOS moving time, Cyl #5-8"
FE "Intake camshaft VANOS sealing, Cyl #5-8"
FF "Exhaust camshaft VANOS sealing, Cyl #5-8"

## Chart 19

01 "Ignition Coil, Cyl #2"
02 "Ignition Coil, Cyl #4"
03 "Ignition Coil, Cyl #6"
05 "Fuel Injector, Cyl #2"
06 "Fuel Injector, Cyl #1"
08 Air mass sensor
0A Engine coolant temperature
0B "Engine coolant temperature, radiator outlet"
0C "Engine coolant temperature, Plausibility"
0E Intake air temperature
12 Exhaust camshaft position sensor
13 Exhaust camshaft solenoid valve
15 Intake camshaft solenoid valve
16 "Fuel Injector, Cyl #3"
17 "Fuel Injector, Cyl #6"
18 "Fuel Injector, Cyl #4"
19 "PreCat oxygen sensor heater insufficient, Cyl #1-3"
1B Idle speed actuator (close)
1D "Ignition Coil, Cyl #1"
1E "Ignition Coil, Cyl #3"
1F "Ignition Coil, Cyl #5"
21 "Fuel Injector, Cyl #5"
23 Secondary air pump relay
24 Main relay
25 Main relay switching delay
26 Clutch switch
27 BLS/BTS plausibility
2A MFL signal redundancy
2B MFL seesaw key
2D MFL bit toggle
2F "Torque limitation, safety level 1"

30 "Control module self-test, control module defective"
31 "Control module self-test, torque monitoring"
32 "Control module self-test, speed monitoring"
33 "Control module self-test, speed monitoring"
34 Exhaust flap
35 Idle speed actuator (open)
37 "PreCat oxygen sensor heater insufficient, Cyl #4-6"
38 Ignition feedback - shunt resistor
39 "Knock Sensor, Cyl #1-3"
3A "Control module self-test, control module defective"
3B "Knock Sensor, Cyl #4-6"
3D "AfterCat oxygen sensor heater insufficient, Cyl #4-6"
3E "Secondary air system, switching valve circuit"
3F "Control module self-test, control module defective"
41 Intake camshaft position sensor
42 "Control module self-test, control module defective"
43 "Control module self-test, control module defective"
44 "Evaporative emission system, purge control valve"
45 Fuel pump relay
46 "Control module self-test, control module defective"
47 "Control module self-test, control module defective"
48 "Control module self-test, control module defective"
4A A/C compressor relay
4F "AfterCat oxygen sensor heater insufficient, Cyl #1-3"
53 Crankshaft Sensor
5E "Secondary air system, air mass"
5F "Secondary air system, tube blocked"
60 "Secondary air system, pump not active"
61 "Secondary air system, flow too low"
62 "Secondary air system, flow too high"
63 "Secondary air system, valve jammed open"
64 "Memory self-test, control module defective"
67 "Intake camshaft VANOS, over-advanced or system perf."
68 "Exhaust camshaft VANOS, over-advanced or system perf."
69 "Intake camshaft VANOS, over-retarded"
6A "Exhaust camshaft VANOS, over-retarded"
6D Throttle valve control circuit
6E Pedal position sensor 1
6F Pedal position sensor 2
70 Throttle position sensor 1
71 Throttle position sensor 2
72 "Pedal position sensor, plausibility"
73 "Throttle position sensor, adaptation"
75 "Pedal position sensor, range/performance"
76 "Throttle position sensor 1, plausibility, range, or performance"
77 "Throttle position sensor 2, plausibility, range, or performance"
78 Brake and Pedal positions not plausible
7A Oil temperature sensor
7B Map controlled thermostat
7C DISA control
7D E-fan
7E DM-TL Switching solenoid
80 EWS signal
81 "Timeout, SSG"
82 "Timeout, CAN - ASC1"
83 "Timeout, CAN - INSTR2"
84 "Timeout, CAN - INSTR3"
85 "Timeout, CAN - ASC3"
86 "SSG intervention, plausibility"
87 "Throttle position sensor, adaptation selftest"
88 "Throttle position sensor, adaptation selftest"
8C DM-TL pump control circuit
8E DM-TL pump current
8F DM-TL leak detected
92 "Pedal position sensor 1, supply voltage"
93 "Pedal position sensor 2, supply voltage"
95 "Air mass sensor, range/performance"
96 "PreCat oxygen sensor voltage, Cyl #1-3"
97 "PreCat oxygen sensor voltage, Cyl #4-6"
98 "AfterCat oxygen sensor voltage, Cyl #1-3"
99 "AfterCat oxygen sensor voltage, Cyl #4-6"



A0 "Throttle valve position controller, stuck temporarily"
A1 "Throttle valve position controller, stuck permanently"
A2 "Throttle valve position controller, control deviation"
A8 Coolant thermostat jammed open
BA "Oxygen sensor heating during regulation, Cyl #1-3"
BB "Oxygen sensor heating during regulation, Cyl #4-6"
BC "PreCat oxygen sensor heater circuit, Cyl #1-3"
BD "PreCat oxygen sensor heater circuit, Cyl #4-6"
BE "AfterCat oxygen sensor heater circuit, Cyl #1-3"
BF "AfterCat oxygen sensor heater circuit, Cyl #4-6"
C4 Pressure sensor circuit
C5 Pressure sensor circuit
C6 "Catalytic convertor efficiency, Cyl #1-3"
C7 "Catalytic convertor efficiency, Cyl #4-6"
CA "Oxygen sensor control limit, Cyl #1-3"
CB "Oxygen sensor control limit, Cyl #4-6"
CC "Idle control system, idle speed not plausible"
D1 EWS message
D2 Ignition feedback faulty (>2 cylinders)
D3 Idle control valve mechanically stuck
D6 Vehicle speed signal not present
D7 "AfterCat oxygen sensor disconnection, Cyl #1-3"
D8 "AfterCat oxygen sensor disconnection, Cyl #4-6"
D9 CAN timeout (EGS1)
DB CAN bus offline
DC "AfterCat oxygen sensor slow response time, Cyl #1-3"
DD "AfterCat oxygen sensor slow response time, Cyl #4-6"
DE Coolant temp too low for closed loop operation
DF "AfterCat oxygen sensor slow switching time, Cyl #1-3"
E0 "AfterCat oxygen sensor slow switching time, Cyl #4-6"
E1 "AfterCat fuel trim system, Cyl #1-3"
E2 "AfterCat fuel trim system, Cyl #4-6"
E3 "Oxygen sensor adaptation limit, Cyl #1-3"
E4 "Oxygen sensor adaptation limit, Cyl #4-6"
E5 "PreCat oxygen sensor slow response time, Cyl #1-3"
E6 "PreCat oxygen sensor slow response time, Cyl #4-6"
E7 "PreCat oxygen sensor slow switching Time, Cyl #1-3"
E8 "PreCat oxygen sensor slow switching Time, Cyl #4-6"
E9 "Catalyst efficiency below threshold, Cyl #1-3"
EA "Catalyst efficiency below threshold, Cyl #4-6"
EB "PreCat fuel trim system, Cyl #1-3"
EC "PreCat fuel trim system, Cyl #4-6"
EE "Misfire detected, Cyl #1"
EF "Misfire detected, Cyl #2"
F0 "Misfire detected, Cyl #3"
F1 "Misfire detected, Cyl #4"
F2 "Misfire detected, Cyl #5"
F3 "Misfire detected, Cyl #6"
F4 "Flywheel adaption, segment timing faulty"
F5 "Secondary air system flow too low, Cyl #1-3"
F6 "Secondary air system flow too low, Cyl #4-6"
F7 Secondary air system valve stuck open
F8 "AfterCat oxygen sensor, signal after decel not plausible, Cyl #1-3"
F9 "AfterCat oxygen sensor, signal after decel not plausible, Cyl #4-6"
FA Functional check purge valve

## Common Problems / Troubleshooting

**"The tool doesn't fit my BMW."**

a) You may not have found the correct diagnostic plug (please closely review the illustrations on page 4 and 5).

b) Your BMW is 1988 or older and equipped with a 15-pin plug. An Adapter is available (part # SR 300A) to adapt the code reader/reset tool to older BMWs for service light reset only; no codes can be read by the tool on BMWs with the 15 pin connector.

c) You do not have the proper version of the tool for your BMW. There are two native connector configurations for the code reader/reset tool:

**OBDI code reader/reset tool** fits BMWs 1987 to year 2000 (20-pin format). A 16-pin format adapter is available for use on 2001 and later BMWs (part number SR 300-16A).

**OBDII code reader/reset tool** fits BMWs 2001 on: (16-pin format) No Adapter is available that will allow use of this tool on BMWs built prior to 2001.

**"Where's the Adapter I ordered?"**

If you ordered the SR 300A Adapter and do not see it in the box, do the following before calling Customer Service:

a) Check to see if the tool fills the entire storage case

b) See if there are three silver pins in the tool connector.

If you answered yes to both, then the Adapter is there, attached to the end of the tool (we ship them plugged together).

**"There's a flashing "E" on tool."**

Occasionally the code reader/reset tool will flash "E" when an attempt is made to read codes or reset the MIL light (Check Engine or Service Engine Soon). "E" means the car is not responding to the tool: This happens when the data line (also called "diagnostic bus") inside the car is "hung" or disabled.

Try the following:

1.) Check the insertion depth of the code reader/reset tool. If it is not fully inserted, the unit will not work. See page X.

2.) Reverse the power-up sequence. Plug in the code reader/reset tool first, THEN turn on the ignition key. This is the opposite of the routine specified by the manual and the tool label. This procedure has proven very effective on some cars.

3.) Check the pins in your BMW's diagnostic connector to see if any pins are bent or recessed. A number of BMW connectors had pin 19 improperly installed. If it appears pin 19 is recessed, call us for a copy of BMW service bulletin 12 09 94 or go to www.bavauto.com/servicebulletins.

4.) Cycle the power. Plug in tool and cycle the ignition key on and off two or three times. (DO NOT START THE ENGINE!)

5.) Observe that no other MIL lights are on. Often a malfunctioning module (e.g. ECU, EGS/transmission, ABS traction control, etc.) can impair or "hang" the diagnostic bus.



6.) Perform a power reset of all modules (entire car)

***NOTE:*** *before doing this procedure, get your radio security code from the dealer.*

a) Disconnect the main car battery.

b) Activate the emergency flasher lights (this will fully drain all power from all ECUs) and wait 5 minutes.

c) Reconnect the main battery and try the tool again.

7.) Module troubleshooting: If you suspect a particular module is malfunctioning or damaged, you may wish to consult repair documentation for the car (see page 30) and attempt to isolate the problem by removing the module from the diagnostic bus. [WARNING: This procedure is for qualified mechanics only.] A malfunction of the ABS unit ground wiring which can cause diagnostic bus problems on a large number of BMWs. This is often the problem on BMWs built prior to 10/94 that are getting the "E" message on the code reader/reset tool. Call us for a copy of BMW service bulletin 34 01 96 or go to www.bavauto.com/servicebulletins.

8.) Visit your local BMW dealership. The code reader/reset tool will not serve it's intended purpose if the diagnostic bus is impaired by a malfunctioning control module. If one of the modules is inhibiting communication, it is necessary to visit a BMW dealer or qualified repair facility to diagnose and fix/replace the bad module.

**"I'm having trouble resetting the lights."**

The lights on the code reader/reset tool are working as they are supposed to but one of the following occurs:

a) The reset seemed successful but the service lights come back on shortly after the reset was done.

b) The service lights stay on while the ignition is off and the key is out of the ignition switch.

c) The service lights flash off and on.

d) The service lights will not reset at all. *(Note: On some BMW models, the service lights will not reset until the green "countdown" lights are all out.*

e) The tachometer, temperature gauge or fuel economy gauge seem erratic (meter needle jumps rapidly) or have quit working completely.

The list of problems above usually indicates a dying or dead backup battery on your SI (Service Interval) computer circuit board. If the backup battery dies, the SI computer has to re-start every time you start your car, at which point an "Inspection" will be indicated. Winter storage without a trickle charger is the most common cause of premature SI battery failure. Replacment SI boards are available from Bavarian Autosport. Call 1.800.535.2002.

**"The tool won't reset the other warning lights."**

The code reader/reset tool will not reset the brake lining light, the SRS/airbag light or the ABS brake light; it resets only the Check Engine, Service Engine Soon, Oil Service and Inspection lights.

**"The fault code I get from the code reader/reset tool is different than the code the dealer gets."**

The code reader/reset tool reports codes in a format called hexadecimal, or "hex"; the dealer's tool reports codes in decimal format. Hex codes can be converted to decimal codes by simply multiplying the left digit times 16 and adding the result to the right digit. (If the code has a letter in it, the letters A through F correspond to the numbers 10 through 15, where A=10 and F=15.)

Examples:

hex code 22 = decimal code 34 [(2 x 16) + 2 = 34]
hex code 1A = decimal code 26 [A = 10, so (1 x 16) + 10 = 26]
hex code A2 = decimal code 162 [A = 10, so (10 x 16) + 2 = 162]



## Glossary:

A/C = Air conditioner
ABS = Anti-lock Brake System
ASC = Skid control (see "Intervention")
ADS = Aux Throttle Position Motor
AHK = Active Rear Axle Kinematics
BLS = Brake Light Switch
Check Engine Light (on the dashboard): indicates the ECU has detected a problem
CC = Check control
CO = Carbon Monoxide
DDE = ECU for Diesel Engine
Diagnostic Connector: where the tool plugs into the car. See pages 3 and 4.
Decimal = Numeric format the dealer diagnostic machines report codes in; see page 30 for explanation
DISA =Intake runner length tuning mechanism
ECU = Engine ECU (Gasoline engine): monitors and controls all engine sensors and functions
DSC = Dynamic Stability Control
DWA = Alarm system
E = Communications error: See "Flashing E" below
EGS = Electronic Automatic Transmission
EKAT = Electrically Heated Catalytic Convertor
EKM = Electronic Body Module
EML = Electronic Throttle Control
EVAP = Relates to fuel vapor recovery; often this code indicates a loose gas cap
EWS = Drive away protection (alarm system)
Fault Code: a code stored in the ECU memory bank that indicates a past or present problem.
Fuel Trim = Adjustments to maintain proper air fuel ratio (see Lambda Control)
Flashing E (in tool display): communication problem in the vehicle; see Troubleshooting on page XX
GM = General Module
Hex = The code reader/reset tool shows codes in a format called hexadecimal; see page 30.
Intervention, MSR, ASC = Intervention is when another control unit (e.g. skid control) requests a power/torque change from the ECU. Code indicates ECU assessed the request as being incorrect or too long.
Lambda Control = ECU is unable to maintain requisite air/fuel ratio due to external factor (air leak, bad injector, sensor, etc.); see also Fuel Trim.
LDP = Loss Diagnosis Pump
Load Calculation Cross Check (HFM vs TPS)= Actual air flow exceeds +/- 25% of calculated air flow.
MDK = Motorized Throttle Valve
MIL = Malfunction Indicator Lamp, also called the "Check Engine" or "Service Engine Soon" lamp

MLF = Multi-function Steering Wheel
MSR = Drag Torque Intervention (torque reduction for anti-skid);
see Intervention above.
NTC = coolant temperature sensor
Oil Service & Inspection: Also called SI (Service Interval) maintenance reminder lights
PWG = Pedal Sensor Potentiometer
QL = Idle air mass adaption; see Fuel Trim
RAM = ECU random access memory
ROM = ECU program memory
Service Engine Soon (on the dashboard): indicates the ECU has detected a problem.
SI = Service Interval
SMG = BMW Motorsport Sequential Gearbox
SRS = Supplemental Restraint System (Airbag)
TD = Tachometer Signal
TEV = Evap, fuel tank vent / purge valve
Ti Additive: idle fuel adaption; see Fuel Trim)
Ti multiplicative: adaption as a percentage +/- of injector time (see Fuel Trim)
TR signal = from ECU, RPM and valve position
VANOS = Adjustable Valve Train
VDS = Vehicle Description System; VIN digits 4–7
VIN = Vehicle identification number.
ZAB = see ASC
ZKE = Central Body Electronics
For further definitions, please consult documentation for the vehicle.



**Warranty:**

Bavarian Autosport warrants, to the original purchaser, that your BMW code reader/reset tool, hereinafter called “unit”, is free from any defects in material and workmanship for a period not exceeding two years from the date of purchase. If any such defect is discovered within the warranty period, Bavarian Autosport will repair or replace the unit free of charge, subject to verification of proof of purchase, and verification of the defect or malfunction upon delivery. This warranty does not apply to defects resulting from abuse, alterations or unreasonable use of the unit resulting in cracked or broken parts or damage caused by excessive heat, cold, or moisture. This warranty does not apply to non-functional and cosmetic attributes of the unit such as color, finish, or labels. In no event does Bavarian Autosport assume liability for any damage beyond the refund of the purchase price of the unit. This warranty is null and void if the unit has been disassembled, modified or if the inner tamper seals are broken.

To process a warranty claim please contact Bavarian Autosport for a Return Authorization. Warranty claims can only be processed by the original purchaser. This warranty is non-transferrable.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