

**IMPORTANT DISCLAIMER:  
READ NOW**

Thank you for purchasing the R5/fcx scanner/resetter for BMWs. This product was designed to provide a long service life and ease of use at a low cost. In designing this product we went to great lengths to assure compatibility and safe operation with BMWs built from 1987 to 2000. As with any software-based device, there is a risk that a small number of unique DME variants may not be compatible with this device. Peake Research Corporation (also referred to as Peake Research) 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 - the codes your BMW generates can often be misleading, and there may be errors in our code definitions. Before spending your money on a repair, make sure you have a clear understanding of the problem by using additional sources of information, such as a good quality repair manual, expert advice, the Internet, etc... Peake Research Corporation may not be held liable for any expenses you incur in response to the codes or instructions contained in this manual.

## PEAKE RESEARCH CORP.

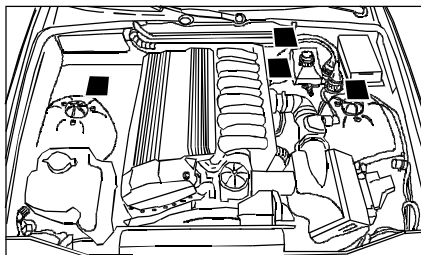
### Instruction Manual & Code Charts for the R5/fcx Code/reset tool for BMWs

#### Table of Contents:

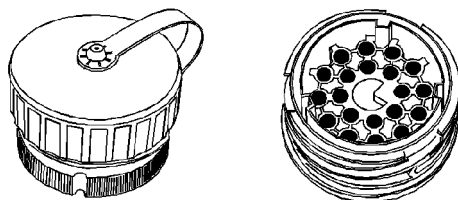
General Information		Pg
	Disclaimer	2
	Locating Diagnostic Connector	3
	Tool face panel description	3
	Directions - Using the R5-fcx	4
	Function Reference	4
Guide to using Code Charts		
	Determining the correct Fault Code Chart	5-7
	Fault Code Charts	8-17
Appendix:		
	Oilservice/Insp troubleshooting	18
	Insertion Warning	18
	Glossary: Words and abbreviations	19
Technical Support		20
Warranty		20

## LOCATING THE DIAGNOSTIC CONNECTOR

The R5/FCX plugs into the 20 pin diagnostic connector shown below. The car image at right shows approximately where the diagnostic connector can be found. The images below show what it looks like, covered and uncovered.



Black squares show possible locations



**BMW Diagnostic Connector:**

Left- dust cap on.

Right- dust cap removed.

## R5/FCX FACE PANEL



1. **Display:** Shows menu selections, activity and fault codes.
2. **Select button:** Used to review and select the available functions. (See page 4)
3. **GO button:** After using "Select" to choose a function (see page 4). The GO button causes the function to execute.

## DIRECTIONS

- 1.) Turn on key (DO NOT START ENGINE)
- 2.) Plug tool into diagnostic connector - Tool is ready to use when it displays "Fc".
- 3.) Use the "Select" button to select one of the following functions:

### Function Reference:



**Fault Code Read.** The tool automatically starts in this mode, (though it won't read the fault codes until you press the "GO" button). When GO 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 first one. To view the next fault press GO again, and so on. At the end of the fault list display will show "--". Press GO to return to "Fc" (starting point.)



**Check Engine Reset:** When you have selected cE in the display, you are now ready to reset the "Check Engine" light. Pressing GO will execute the reset. When finished it will return to "Fc". This clears all faults and extinguishes the Check Engine light. To verify reset, UNPLUG the tool and start the engine- "Check Engine" light should be off. (Note: After a cE reset on some models with Automatic Transmission, the Automatic Transmission Light will be on. To clear it, simply start the engine twice.)



**Oilservice Reset.** When you have selected oL in the display, you are now ready to reset the "oilservice" light. Pressing GO will execute the reset. During the reset procedure the display will count from 0 to 2. When finished the display will return to "Fc". Si light cluster will display five green lights when finished. (See page 18 for trouble shooting)



**Inspection reset.** When you have selected "in" in the display, you are now ready to reset the "inspection" light. Pressing GO will execute 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 18 for troubleshooting)



**Fii** only applies to 12 cylinder BMWs, all of which have two DME's. It is the exact same procedure as Fc (see above), except you are reading the 2<sup>nd</sup> DME.



**Cii** only applies to 12 cylinder BMWs, all of which have two DME's. It is the exact same procedure as cE(see above), except you are resetting the "Check Engine" light trigger on the 2<sup>nd</sup> DME.

## Making sense of the codes

1.) Find the car in table 1 (below) by looking up the year, model, and (if necessary) the VDS number (Vehicle Description System) in the VIN#.

Example VIN number:

WBAAA13LAE57862

▲ ▲ ▲ ▲

*The four digit VDS number is contained in the VIN#. It is the 4<sup>th</sup> through 7<sup>th</sup> digits. 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. (1 through 16 next section.)

TABLE 1: CHART LOCATOR

<b>1987</b>				1988 750iL A	GC83	15	1990 325iA/2	AA23	1		
<b>Year</b>	<b>Model</b>	<b>VDS</b>	<b>Chart</b>	1988 M3		1	1990 325iX A/2	AB03	1		
1987 325is	AA13	1		<b>1989</b>							
1987 325is A	AA23	1		<b>Year</b>	<b>Model</b>	<b>VDS</b>	<b>Chart</b>	1990 325iX/2	AB93	1	
1987 325i/4	AD13	1		1989 325i/is	AA13	1		1990 325i/4	AD13	1	
1987 325iA/4	AD23	1		1989 325iA/2	AA23	1		1990 325iA/4	AD23	1	
1987 325iC	BB13	1		1989 325iX A/2	AB03	1		1990 325iX A/4	AE03	1	
1987 325iCA	BB23	1		1989 325iX/2	AB93	1		1990 325iX/4	AE93	1	
				1989 325i/4	AD13	1		1990 325iC	BB13	1	
				1989 325iA/4	AD23	1		1990 325iCA	BB23	1	
<b>1988</b>				1989 325iX A/4	AE03	1		1990 M3		1	
<b>Year</b>	<b>Model</b>	<b>VDS</b>	<b>Chart</b>	1989 325iX/4	AE93	1		1990 735i	GB33	1	
1988 325is	AA13	1		1989 325iC	BB13	1		1990 735i A	GB43	1	
1988 325is A	AA23	1		1989 325iCA	BB23	1		1990 735iL A	GC43	1	
1988 325iX A/2	AB03	1		1989 M3		1		1990 750iL A	GC83	15	
1988 325/2	AB54	1		1989 635CSi	EC74	1		1990 525i	HC13	1	
1988 325 A/2	AB64	1		1989 635CSi A	EC84	1		1990 525i A	HC23	1	
1988 325iX/2	AB93	1		1989 735i	GB33	1		1990 535i	HD13	1	
1988 325i/4	AD13	1		1989 735i A	GB43	1		1990 535i A	HD23	1	
1988 325iA/4	AD23	1		1989 735iL A	GC43	1		1990 M5		1	
1988 325/4	AE54	1		1989 750iL A	GC83	15		<b>1991</b>			
1988 325 A/4	AE64	1		1989 525i	HC13	1		<b>Year</b>	<b>Model</b>	<b>VDS</b>	<b>Chart</b>
1988 325iC	BB13	1		1989 525i A	HC23	1		1991 325i/is/2	AA13	1	
1988 325iCA	BB23	1		1989 535i	HD13	1		1991 325iA/2	AA23	1	
1988 528e	DK73	1		1989 535i A	HD23	1		1991 325iX A/2	AB03	1	
1988 528e A	DK83	1		1989 M5		1		1991 325iX/2	AB93	1	
1988 635CSi	EC74	1						1991 325i/4	AD13	1	
1988 635CSi A	EC84	1		<b>1990</b>							
1988 735i	GB33	1		<b>Year</b>	<b>Model</b>	<b>VDS</b>	<b>Chart</b>	1991 325iA/4	AD23	1	
1988 735i A	GB43	1		1990 325i/is/2	AA13	1		1991 325iX A/4	AE03	1	
1988 735iL A	GC43	1						1991 325iX/4	AE93	1	
								1991 318is/2	AF93	13	
								1991 318i/4	AJ93	13	

1991	318iC/2	BA73	13	1993	850i	EG13	7	1995	318i	CA53	6
1991	325iC	BB13	1	1993	850i A	EG23	7	1995	318i A	CA63	6
1991	325iCA	BB23	1	1993	750iL A	GC83	7	1995	325i	CB33	5
1991	M3		1	1993	740i A	GD43	11	1995	325i A	CB43	5
1991	850i	EG13	7	1993	740iL A	GD83	11	1995	318i	CC73	6
1991	850i A	EG23	7	1993	535i	HD13	1	1995	318i A	CC83	6
1991	735i A	GB43	1	1993	535i A	HD23	1	1995	318ti	CG53	6
1991	735iL A	GC43	1	1993	525i	HD53	5	1995	318ti A	CG63	6
1991	750iL A	GC83	7	1993	525i A	HD63	5	1995	840Ci A	EF63	11
1991	535i	HD13	1	1993	M5	HD93	1	1995	850Ci A	EG43	12
1991	535i A	HD23	1	1993	525iT	HJ63	5	1995	850CSi	EG93	7
1991	525i	HD53	10					1995	740i A	GF63	11
1991	525i A	HD63	10					1995	740iL A	GJ63	11
1991	M5	HD93	1					1995	750iL A	GK23	12
1992				1994				1996			
Year	Model	VDS	Chart	Year	Model	VDS	Chart	Year	Model	VDS	Chart
1992	318iC/2	BA73	13	1994	318is	BE53	6	1996	318is	BE73	4
1992	325iC	BB13	1	1994	318is A	BE63	6	1996	318is A	BE83	4
1992	325iCA	BB23	1	1994	325is	BF33	5	1996	328is	BG13	2
1992	318is	BE53	6	1994	325is A	BF43	5	1996	328is A	BG23	2
1992	325is	BF33	10	1994	325iC	BJ53	5	1996	M3	BG93	2
1992	325is A	BF43	10	1994	325iCA	BJ63	5	1996	318iC	BH73	4
1992	318i	CA53	6	1994	318iC	BK53	6	1996	318iC A	BH83	4
1992	325i	CB33	10	1994	318iC A	BK63	6	1996	328iC	BK73	2
1992	325i A	CB43	10	1994	318i	CA53	6	1996	328iC A	BK83	2
1992	M3		1	1994	318i A	CA63	6	1996	328i	CD13	2
1992	850i	EG13	7	1994	325i	CB33	5	1996	328i A	CD23	2
1992	850i A	EG23	7	1994	325i A	CB43	5	1996	328i	CD33	2
1992	735i A	GB43	1	1994	840Ci A	EF63	11	1996	328i A	CD43	2
1992	735iL A	GC43	1	1994	850i A	EG23	7	1996	318i	CD73	4
1992	750iL A	GC83	7	1994	850CSi	EG93	7	1996	318i	CD73	4
1992	535i	HD13	1	1994	750iL A	GC83	7	1996	318i A	CD83	4
1992	535i A	HD23	1	1994	740i A	GD43	11	1996	318i A	CD83	4
1992	525i	HD53	10	1994	740iL A	GD83	11	1996	318ti	CG73	4
1992	525i A	HD63	10	1994	740iL A	GD83	11	1996	318ti A	CG83	4
1992	M5	HD93	1	1994	525i	HD53	5	1996	Z3 1.9	CH73	4
1992	525iT	HJ63	10	1994	525i A	HD63	5	1996	Z3 1.9 A	CH83	4
				1994	530i	HE13	11	1996	540i	DE53	9
				1994	530i A	HE23	11	1996	540i A	DE63	9
				1994	540i A	HE63	11	1996	840Ci A	EF83	9
				1994	525iT	HJ63	5	1996	850Ci A	EG43	12
				1994	530iT A	HK23	11	1996	740iL A	GJ83	9
								1996	750iL A	GK23	12
1993				1995							
Year	Model	VDS	Chart	Year	Model	VDS	Chart				
1993	325iC	BB13	1	1995	318is	BE53	6				
1993	325iCA	BB23	1	1995	318is A	BE63	6				
1993	318is	BE53	6	1995	M3 A	BF03	5				
1993	318is A	BE63	6	1995	325is	BF33	5				
1993	325is	BF33	5	1995	325is A	BF43	5				
1993	325is A	BF43	5	1995	M3	BF93	5				
1993	318i	CA53	6	1995	325iC	BJ53	5				
1993	318i A	CA63	6	1995	325iCA	BJ63	5				
1993	325i	CB33	5	1995	318iC	BK53	6				
1993	325i A	CB43	5	1995	318iC A	BK63	6				
1993	M3		5								

## 1997

Year	Model	VDS	Chart
1997	318is	BE73	4
1997	318is A	BE83	4
1997	328is	BG13	2
1997	328is A	BG23	2
1997	M3	BG93	2
1997	318iC	BH73	4

1997	318iC A	BH83	4	1998	318i	CC93	4	1999	318ti A	CG83	4
1997	328iC	BK73	2	1998	M3 A/4	CD03	2	1999	Z3 rdstr	CH03	3
1997	328iC A	BK83	2	1998	328i	CD33	2	1999	Z3 rdstr	CH33	3
1997	318i A	CC03	4	1998	328i A	CD43	2	1999	Z3 rdstr	CH43	3
1997	318i	CC93	4	1998	M3/4	CD93	2	1999	Z3 rdstr	CH93	3
1997	M3 A/4	CD03	2	1998	318ti	CG73	4	1999	Z3 cpe 2	CK53	3
1997	328i	CD33	2	1998	318ti A	CG83	4	1999	Z3 cpe 2	CK63	3
1997	328i A	CD43	2	1998	Z3 1.9	CH73	4	1999	M rdstr	CK93	2
1997	M3/4	CD93	2	1998	Z3 1.9 A	CH83	4	1999	M coupe	CM93	2
1997	318ti	CG73	4	1998	Z3 rdstr	CJ33	2	1999	528i	DM53	3
1997	318ti A	CG83	4	1998	Z3 rdstr	CJ43	2	1999	528i A	DM63	3
1997	Z3 1.9	CH73	4	1998	M rdstr	CK93	2	1999	528iT	DP53	3
1997	Z3 1.9 A	CH83	4	1998	528i	DD53	2	1999	528iT A	DP63	3
1997	Z3 rdstr	CJ33	2	1998	528i A	DD63	2	1999	750iL A	GJ03	16
1997	Z3 rdstr	CJ43	2	1998	540i	DE53	14				
1997	528i	DD53	2	1998	540i A	DE63	14				
1997	528i A	DD63	2	1998	740i A	GF83	14				
1997	540i	DE53	9	1998	740iL A	GJ83	14				
1997	540i A	DE63	9	1998	750iL A	GK23	16				
1997	840Ci A	EF83	9								
1997	850Ci A	EG43	12								
1997	740i A	GF83	9								
1997	740iL A	GJ83	9								
1997	750iL A	GK23	12								

## 1998

Year	Model	VDS	Chart
1998	323is	BF73	2
1998	323is A	BF83	2
1998	328is	BG13	2
1998	328is A	BG23	2
1998	M3	BG93	2
1998	323iC	BJ73	2
1998	323iC A	BJ83	2
1998	M3C A	BK03	2
1998	328iC	BK73	2
1998	328iC A	BK83	2
1998	M3C	BK93	2
1998	318i A	CC03	4

## 1999

Year	Model	VDS	Chart
1999	323i	AM33	3
1999	323i A	AM43	3
1999	328i	AM53	3
1999	328i A	AM63	3
1999	323is	BF73	2
1999	323is A	BF83	2
1999	328is	BG13	2
1999	328is A	BG23	2
1999	M3	BG93	2
1999	323iC	BJ73	2
1999	323iC A	BJ83	2
1999	M3C A	BK03	2
1999	328iC	BK73	2
1999	328iC A	BK83	2
1999	M3C	BK93	2
1999	318ti	CG73	4

## 2000

Year	Model	VDS	Chart
2000	323i	AM33	3
2000	323i A	AM43	3
2000	328i	AM53	3
2000	328i A	AM63	3
2000	323Ci	BM33	3
2000	323Ci A	BM43	3
2000	328Ci	BM53	3
2000	328Ci A	BM63	3
2000	Z3 rdstr	CH03	3
2000	Z3 rdstr	CH33	3
2000	Z3 rdstr	CH43	3
2000	Z3 rdstr	CH93	3
2000	Z3 cpe 2	CK53	3
2000	Z3 cpe 2	CK63	3
2000	M rdstr	CK93	2
2000	M cpe	CM93	2
2000	528i	DM53	3
2000	528i A	DM63	3
2000	528iT	DP53	3
2000	528iT A	DP63	3

the closest US spec car would be a 1991 318i (which is also a 4cyl, 3 series) This method doesn't always work, you may need to experiment to find the correct chart.

## USE THESE CODE DEFINITIONS WISELY:

The code definitions contained in this manual should be regarded as a starting point for diagnosing a problem. The codes that your BMW generates can be misleading. There may also be errors in this manual. Before spending your money on a repair or replacement parts, make sure you have a clear understanding of the problem by using additional sources of information, such as a good quality repair manual, expert advice, the Internet, etc... Note: Unfortunately, we are not staffed to answer your questions about codes, diagnostics, or BMW problems or offer repair advice. We apologize for any inconvenience this may cause.

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

The above vehicle reference refers to US specification BMWs only, and does not include any non-US BMW variants. To best use the R5/FCX on your non-US BMW, you will need to determine which of the above most closely matches your BMW. For instance a 1991 320i, is a 3 series, four cylinder, made for non-US markets: In this case, the best chart for you to use would be chart 13, as

# FAULT CODE CHARTS: 1 THROUGH 16

## Chart 1.

1 DME 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 Oxy sensor heating relay  
1C Oxy 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 Converter Clutch  
64 Unspecified DME Output Stage

## Chart 2.

1 Ignition Coil, Cyl #2  
2 Ignition Coil, Cyl #4  
3 Ignition Coil, Cyl #6  
5 Fuel Injector, Cyl #2  
6 Fuel Injector, Cyl #1  
8 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 oxy 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 oxy sensor heater, Cyl #4-6  
38 Ignition feedback - shunt resistor  
39 Knock Sensor, Cyl #1-3  
3b Knock Sensor, Cyl #4-6  
3d AfterCat oxy 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 oxy sensor voltage, Cyl #1-3  
4C PreCat oxy sensor voltage, Cyl #4-6  
4d AfterCat oxy sensor voltage, Cyl #1-3  
4E AfterCat oxy sensor voltage, Cyl #4-6  
4F AfterCat oxy 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 DME 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 oxy sensor no activity, Cyl #1-3  
C9 PreCat oxy sensor no activity, Cyl #4-6  
CA Oxy sensor control limit, Cyl #1-3  
Cb Oxy 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 Oxy sensor adaption limit, Cyl #1-3  
E4 Oxy sensor adaption limit, Cyl #4-6

E5 PreCat oxy sensor response time, Cyl #1-3  
E6 PreCat oxy sensor response time, Cyl #4-6  
E7 PreCat oxy sensor switching Time, Cyl #1-3  
E8 PreCat oxy sensor switching Time, Cyl #4-6  
E9 Catalyst efficiency below threshold, Cyl #1-3  
EA Catalyst efficiency below threshold, Cyl #4-6  
Eb AfterCat oxy sensor heater power, Cyl #1-3  
EC AfterCat oxy 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 3.

1 Ignition Coil, Cyl #2  
2 Ignition Coil, Cyl #4  
3 Ignition Coil, Cyl #6  
5 Fuel Injector, Cyl #2  
6 Fuel Injector, Cyl #1  
8 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 oxy 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 Brakelight 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  
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 oxy sensor heater, Cyl #4-6  
38 Ignition feedback - shunt resistor  
39 Knock Sensor, Cyl #1-3  
3b Knock Sensor, Cyl #4-6  
3d AfterCat oxy 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 oxy sensor heater, Cyl #1-3  
53 Crankshaft Sensor  
64 DME 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 oxy sensor short to B+, Cyl #1-3  
97 PreCat oxy sensor short to ground, Cyl #1-3  
98 PreCat oxy sensor disconnection, Cyl #1-3  
99 PreCat oxy sensor short to B+, Cyl #4-6  
9A PreCat oxy sensor short to ground, Cyl #4-6

9b PreCat oxy sensor disconnection, Cyl #4-6  
 9C AfterCat oxy sensor short to B+, Cyl #1-3  
 9d AfterCat oxy sensor short to ground, Cyl #1-3  
 9F AfterCat oxy sensor short to B+, Cyl #4-6  
 A0 AfterCat oxy 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 potentiometers  
 Ad Motorized Throttle (MDK) short between pot's  
 AE Motorized Throttle (MDK) idle position not plausible  
 AF Pedal sensr (PWG) pot. #1 idle position implausible  
 b0 Pedal sensr (PWG) pot. #2 idle position implausible  
 bC PreCat oxy sensor heater insufficient, Cyl #1-3  
 bd PreCat oxy sensor heater insufficient, Cyl #4-6  
 bE AfterCat oxy sensor heater insufficient, Cyl #1-3  
 bF AfterCat oxy sensor heater insufficient, Cyl #4-6  
 CA Oxy sensor control limit, Cyl #1-3  
 Cb Oxy 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 oxy sensor disconnection, Cyl #1-3  
 d8 AfterCat oxy sensor disconnection, Cyl #4-6  
 d9 CAN timeout (EGS1)  
 db CAN bus offline  
 dC AfterCat oxy sensor slow resp. time, Cyl #1-3  
 dd AfterCat oxy sensor slow resp. time, Cyl #4-6  
 dE Coolant temp too low for closed loop operation  
 dF AfterCat oxy sensor slow switch time, Cyl #1-3  
 E0 AfterCat oxy sensor slow switching time, Cyl #4-6  
 E1 AfterCat oxy sensor trim control, Cyl #1-3  
 E2 AfterCat oxy sensor trim control, Cyl #4-6  
 E3 Oxy sensor adaption limit, Cyl #1-3  
 E4 Oxy sensor adaption limit, Cyl #4-6  
 E5 PreCat oxy sensor slow response time, Cyl #1-3  
 E6 PreCat oxy sensor slow response time, Cyl #4-6  
 E7 PreCat oxy sensor slow switching Time, Cyl #1-3  
 E8 PreCat oxy 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 oxy sensor trim control, Cyl #1-3  
 EC PreCat oxy 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 oxy sensor, sig. after decel not plausible, Cyl #1-3  
 F9 AfterCat oxy sensor, signal after decel not plausible, Cyl #4-6  
 FA Functional check purge valve

#### Chart 4.

8 Misfire w/ low fuel  
 0A PreCat oxy sensor  
 0C AfterCat oxy sensor  
 0d PreCat oxy sensor heater  
 0E AfterCat oxy sensor heater  
 0F PreCat oxy sensor response time  
 10 PreCat oxy sensor aging  
 11 AfterCat oxy 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, catalyst dming, random or unknown cyl.  
 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 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  
 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 5.

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 Oxy 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 Oxy 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 / DME 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 DME 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 6.

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 Oxy 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 Oxy 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 DME Output Stage  
 C8 DME control unit selftest  
 C9 Emission (lambda) control  
 CE Knock control test pulse  
 CF Knock control regulation  
 dC EWS message

#### Chart 7.

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 Oxy 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 Oxy 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 DME Output Stage  
 C8 DME control unit selftest  
 C9 Emission (lambda) control

### Chart 8.

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 Oxy sensor, #2  
 0d Oxy sensor, #1  
 0F Ignition secondary monitor  
 10 Crankshaft sensor  
 11 Camshaft sensor  
 13 Secondary air pump relay  
 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 Oxy sensor heating relay  
 29 Air mass sensor  
 2A Vehicle speed signal not present  
 30 A/C Compressor control  
 32 Ignition Coil, Cyl #4  
 33 Ignition Coil, Cyl #6  
 34 Ignition Coil, Cyl #5  
 36 Battery voltage / DME main relay  
 41 A/C Compressor  
 42 DWA/EWS Input  
 44 Knock Sensor, Cyl 5-6  
 45 Knock Sensor, Cyl 3-4  
 46 Knock Sensor, Cyl 1-2  
 49 Throttle position sensor  
 4d Intake air temperature sensor  
 4E Coolant temperature sensor

64 Output Stage, Group #1  
 65 Output Stage, Group #2  
 C8 DME Control Unit  
 C9 Lambda Control #1  
 CA Fault code memory error  
 Cb Lambda Control #2  
 CE Knock control test pulse

### Chart 9.

4 PreCat oxy sensor heater, Cyl 5-8  
 5 AfterCat oxy sensor heater, Cyl 5-8  
 8 Misfire w/ low fuel  
 0A PreCat oxy sensor, Cyl 1-4  
 0C AfterCat oxy sensor, Cyl 1-4  
 0d PreCat oxy sensor heater, Cyl 1-4  
 0E AfterCat oxy sensor heater, Cyl 1-4  
 0F PreCat oxy sensor response time, Cyl 1-4  
 10 PreCat oxy sensor aging, Cyl 1-4  
 11 AfterCat oxy sensor response time, Cyl 1-4  
 12 PreCat oxy sensor, Cyl 5-8  
 14 AfterCat oxy sensor, Cyl 5-8  
 15 PreCat oxy sensor response time, Cyl 5-8  
 16 PreCat oxy sensor aging, Cyl 5-8  
 17 AfterCat oxy 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 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  
 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 10.

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 Oxy 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 / DME main relay  
 37 Ignition output stage  
 3E EML Signal  
 3F Torque convertor clutch lockup  
 40 Ignition timing intervention  
 43 Crankshaft sensor  
 46 Oxy 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 DME Control Unit  
 C9 Lambda Control  
 CA Fault code memory error  
 Cb Ignition circuit primary monitor  
 CC Stall protection

### Chart 11.

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 Oxy sensor, #2  
 0d Oxy 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 Oxy 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 / DME 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 DME 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 12.

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  
 15 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 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 det, ctlyst 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 13.

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 Oxy sensor heating relay  
 29 Air flow sensor  
 30 A/C Compressor control  
 36 Control unit supply  
 40 Ignition timing intervention  
 46 Oxy 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 DME Output Stage  
 C8 DME control unit selftest  
 C9 Emission (lambda) control

## Chart 14.

1 EVAP LDP Valve final stage  
 2 EVAP Running losses valve final stage  
 3 EVAP Reed switch not closed, doesn't open/close  
 4 PreCat oxy sensor heater, Cyl 5-8  
 5 AfterCat oxy sensor heater, Cyl 5-8  
 6 CAN timeout, instrument cluster  
 7 Engine coolant temperature, radiator outlet  
 8 Misfire w/ low fuel  
 0A PreCat oxy sensor, Cyl 1-4  
 0C AfterCat oxy sensor, Cyl 1-4  
 0d PreCat oxy sensor heater, Cyl 1-4  
 0E AfterCat oxy sensor heater, Cyl 1-4  
 0F PreCat oxy sensor response time, Cyl 1-4  
 10 PreCat oxy sensor aging, Cyl 1-4  
 11 AfterCat oxy sensor response time, Cyl 1-4  
 12 PreCat oxy sensor, Cyl 5-8  
 14 AfterCat oxy sensor, Cyl 5-8  
 15 PreCat oxy sensor response time, Cyl 5-8  
 16 PreCat oxy sensor aging, Cyl 5-8  
 17 AfterCat oxy 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 dmg, random/unknown cyl.  
 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 DME, internal RAM failure  
 66 DME, external RAM failure  
 67 DME, ROM failure  
 68 Fault code memory error  
 69 DME, 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 DME  
 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 15.

1 DME 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 Oxy sensor heating relay  
 1C Oxy sensor  
 25 Control unit supply  
 2b Idle CO Potentiometer  
 2C Intake air temperature sensor  
 2d Coolant temperature sensor  
 33 Ignition angle  
 36 Torque Converter Clutch  
 64 Unspecified DME Output Stage

### Chart 16

1 EVAP LDP Valve final stage  
 2 EVAP Running losses valve final stage  
 3 EVAP Reed switch not closed, doesn't open/close  
 4 PreCat oxy sensor heater, Bank 2  
 5 AfterCat oxy sensor heater, Bank 2  
 6 CAN timeout, instrument cluster  
 7 Engine coolant temperature, radiator outlet  
 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  
 13 CAN timeout, EKAT  
 14 AfterCat oxy sensor, Bank 2  
 15 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  
 1d Air containment valve, shrouded injectors, Bank 1

1E EKAT - Status 7 - power switch control  
 20 Idle control valve stuck mechanically  
 21 EKAT - Status 8 - EKAT ECU  
 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  
 2A EKAT - Status 1 - heater disconnection, Catalyst #1  
 2b EKAT - Status 2 - Switch on operation condition for Catalyst #1  
 2C EKAT - Status 3 - Power switch for Catalyst #1  
 2d Catalyst efficiency, Bank 2  
 2E EKAT - Status 4 - Heater disconnection, Catalyst #2  
 2F EKAT - Status 5 - Switch on operation condition for Catalyst #2  
 30 EKAT - Status 6 - Power switch for Catalyst #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, Cyl #13  
 4d Air containment valve, shrouded injectors, Bank 2  
 4E Crankshaft position sensor (too many teeth)  
 50 Secondary air control, Bank 1  
 51 EKAT - Status 9 - Sensor check temperature sensor 1 in batt.  
 52 EKAT - Status 10 - Sensor check temperature sensor 2 in batt.  
 53 EKAT - Status 11 - plausibility check of sensor temp. in batt.  
 54 Secondary air pump final stage  
 55 Secondary air valve final stage  
 5b EVAP purge control valve, Bank 2  
 5d EVAP emission control system  
 5E EVAP large leak

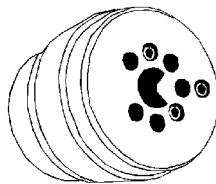
61 EVAP small leak  
 62 EVAP purge control valve circuit  
 64 Transmission/coolant heat exchanger  
 65 DME, internal RAM failure  
 66 DME, external RAM failure  
 67 DME, ROM failure  
 68 Fault code memory error  
 69 DME, EEPROM failure  
 6b Control unit supply voltage  
 6C Battery disconnected  
 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  
 82 Swapped oxy sensors, PreCat  
 85 DME bank identification input  
 87 Torque reduction: Transmission  
 8A A/C Compressor torque reduction  
 8b Electric thermostat control final stage  
 8C Torque imbalance  
 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  
 A3 Electrical fuel pump relay, Bank 2  
 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  
 b3 A/C Compressor control, Bank 2  
 b7 EVAP large leak  
 b8 EVAP pinched hose  
 Cb Ignition feedback failed  
 CC EWS rolling code storage  
 d0 Secondary air control, Bank 2  
 d2 Knock Sensor #1  
 d3 Knock Sensor #2  
 d4 Knock Sensor #3  
 d5 Knock Sensor #4  
 d6 CAN index verification

- d7 CAN timeout, left/right DME
- d8 CAN timeout, ASC
- d9 CAN timeout, EML
- dC Knock control test pulse
- dE Knock control test pulse
- E1 EKAT - Status 12 - temperature sensor - plausibility power switch
- E2 EKAT - Status 13 - temperature sensor - plausibility power switch
- E3 EKAT - Status 14 - plausibility check of battery disconnect switch
- 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

## Common problems / troubleshooting:

**Service Light battery problems:** (note: only applies to BMWs older than 1989) The lights on the R5 are working as they are supposed to but one of the following conditions 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. **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 indicates a dying or dead backup battery on your S.I. (Service Interval) computer circuit board. When this "backup" battery dies, the S.I. 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 S.I. battery failure. These specialized batteries have a life expectancy of approximately 4 to 7 years. Replacing the S.I. batteries takes about 90 minutes from start to finish and requires that you know how to operate a soldering iron. A battery replacement kit for most pre 1992 models is available from Peake Research for \$24.95 + \$3.99 S&H (California residents add sales tax).

**Wrong Plug Style:** The tool doesn't fit the car. **a.)** You may not have found the correct diagnostic plug (please closely review the illustrations on page 3) , or **b.)** the BMW is 1988 or older and equipped with the 15 pin plug. Note an adaptor is available to adapt the R5/FCX back to the older BMW for service light reset only, or **c.)** The car is 2001 or newer which is outside the compatibility range of the R5/FCX.



Late to early adaptor

**Where's the adaptor I ordered!** If you ordered the AB02 adaptor and do not see it in the box, do the following before calling us. (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/yes, then the adaptor is there, just tug it out of the end of the tool- we ship them plugged together - it looks like one unit with no adaptor.

**Service Light Reset fails:** A reset was attempted before one of the Oilservice or Inspection lights came on but the five green lights did not illuminate. • The computer was counting down to a different service interval than the one you tried to reset. There is no way to know if the next light will be Oilservice or Inspection. Some BMWs will not reset prior to the illumination of the

Oilservice or the Inspection lights. In all cases we advise you to wait for the Oilservice or Inspection light to come on before attempting a reset. In other words, if there are any green "countdown" lights remaining, do not attempt a reset because it probably won't work.

**Tool will not reset other lights:** The R5/FCX would not reset the brake lining light, the SRS/airbag light, or the ABS brake light. • The R5/FCX only resets the Check engine, Oilservice and Inspection lights

## WARNING ABOUT INSERTION OF TOOL:

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 R5/FCX. That line Should be just even with the top of the BMW's diagnostic connector. If that line is more than 1/16th of an inch above the top of the diagnostic connector, the tool is not fully inserted. (Note: for your reference, the bold black line above this paragraph is exactly 1/16th of an inch thick).

## 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 DME has detected a problem  
**CC** = Check control  
**CO** = Carbon Monoxide  
**DDE** = ECU for Diesel Engine  
**Diagnostic Connector:** Where the R5-FCX plugs into the car. See page 3  
**DISA** =intake runner length tuning mechanism  
**DME** = 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 DME memory bank that indicates a past or present problem.  
**Fuel Trim** = adjustments to maintain proper air fuel ratio (see Lambda Control)  
**Flashing E:** (in R5-FCX display) communication problem in the vehicle, please visit the following web page: [www.r5tool.com/fcxttech.shtml](http://www.r5tool.com/fcxttech.shtml)  
**GM** = General Module  
**Intervention, MSR, ASC** = intervention is when another

control unit (i.e. skid control) requests a power/torque change from the DME. Code indicates DME assessed the request as being incorrect or too long.  
**Lambda Control** = Code means DME is unable to maintain requisite air/fuel ratio due to external factor (air leak, bad injector, sensor, etc...). (also see fuel trim)  
**LDP** = Loss Diagnosis Pump  
**Load Calculation Cross Check (HFM vs TPS)**= when actual air flow exceeds +/- 25% of calculated air flow.  
**MDK** = Motorized Throttle Valve  
**MLF** = Multi function Steering Wheel  
**MSR** = Drag Torque Intervention (torque reduction for anti skid) see Intervention above  
**NTC** = coolant temperature sensor  
**Oilservice & Inspection:** Also called Si (abbrev. for service interval) maintenance reminder lights  
**PWG** = Pedal Sensor Potentiometer  
**QL** = idle air mass adaption (see Fuel Trim)  
**R5/FCX:** The scan/reset tool. Subject of this manual  
**RAM** = DME random access memory  
**ROM** = DME program memory  
**Scan Tool:** Generic term for the R5/FCX  
**SI** = Service Interval  
**SMG** = BMW Motorsport Sequential Gearbox  
**SRS** = Airbag  
**TD** = Tachometer Signal  
**TEV** = Evap, fuel tank vent / purge valve  
**Ti Additive:** idle fuel adaption (see fuel trim)  
**Ti multiplicative:** adaption a percentage +/- of injector time (see Fuel Trim)  
**TR signal** = from DME, 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.

## Technical Information:

Technical information for the R5/fcx is available online:

**[www.r5tool.com/fcxttech.shtml](http://www.r5tool.com/fcxttech.shtml)**

Note: We have done our best to provide a high quality BMW scan tool at a very low cost. Unfortunately, the level of technical assistance we can provide is minimal. Please note that we are not staffed to answer questions about codes, diagnostics, or BMW problems or offer repair advice. We apologize for any inconvenience this may cause.

## Warranty:

Peake Research Corporation of Campbell, CA., hereinafter called "Peake Research" warrants, to the original purchaser, that your model number R5/fcx, BMW reset/scan tool, hereinafter called "unit", is free from any defects in material and workmanship for a period not exceeding ninety days from the date of purchase. If any such defect is discovered within the warranty period, Peake Research 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 units damaged 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 Peake Research 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 the original seller for information & return authorization. All warranty claims must be accompanied by the original receipt. Warranty claims can only be processed by the original purchaser. This warranty is non-transferrable.

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