

Diagnostic Assistance: Version 6.3

291

Totals: 33 14 821 617

Chapter	Page Title	New	Updated	Illustrations	A4 pages
	Chapter page: Electrics				
1.1	Basic Electrics		6.3	17	7
1.2	Electrical Circuit Testing	6.3		8	4
1.3	Batteries	6.1	6.3	6	5
1.4	Keyless Go System	6.1		2	3
1.5	Power management	6.3		5	5
1.6	Wiring Diagrams	6.3		4	4
	Chapter page: Basic Engine Technology				
2.1	The Otto Cycle	6.3		5	3
2.2	Oil Pumps and Lubrication	6.3		1	2
2.3	Water Pumps and Cooling	6.3		7	6
	Chapter page: Starting and Charging Circuits				
3.1	Starting Circuits		6.3	4	2
3.2	Stop Start Systems	6.3		1	3
3.3	Charging		6.3	9	3
	Chapter page: Electronic Ignition				
4.1	Ignition Primary Circuits		6.2	7	6
4.2	Ignition Secondary Circuits			10	4
4.3	Testing Ignition Secondary Circuits	6.1		7	3
	Chapter page: Petrol Electronic Fuel Injection				
5.1	Indirect Petrol Electronic Fuel Injection			20	16
5.2	Direct Petrol Electronic Fuel Injection		6.2	3	3
5.3	Fuel Pressure Testing (indirect injection)	6.2		1	2
	Chapter page: Diesel Fuel Injection				
6.1	Diesel Mechanical Fuel Injection			6	4
6.2	Diesel Mechanical Fuel Injection Trouble Shooting		6.1	1	1
6.3	Types of Electronic Diesel Fuel Injection		6.3	14	12
6.4	Bosch Diesel Common Rail (part1)			1	2
6.4 ref	HDI - Engine			1	1
6.5	Bosch Diesel Common Rail (part2)			5	7
6.6	Bosch Diesel Common Rail (part3)			4	5
6.7	Bosch Diesel Unit Injection (Pumpe-Duse)	6.1		8	4
6.8	Diesel Leak-off Testing	6.2		2	2
6.9	Vacuum Supply	6.2		2	2
6.10	Fuel Delivery to High Pressure Pump	6.3		2	2
	Chapter page: Control Modules				
7.1	Engine Electronic Control Modules			3	2
7.2	Locations of Engine Electronic Control Modules			0	3
7.3	Body Control Modules	6.3		2	3
	Chapter page: Sensors and Actuators				
8.1	Sensors (Petrol EFI)			1	1
8.2	Actuators (Petrol EFI)			1	1
8.3	Sensors (Common Rail Diesel)			1	1
8.4	Actuators (Common Rail Diesel)			1	1
8.1.1	Coolant Temperature Sensors		6.3	4	2
8.1.2	Air Temperature Sensors			1	1
8.1.3	Fuel Temperature Sensors			1	1
8.1.4	Crankshaft Position Sensors			1	1
8.1.5	Camshaft Position Sensors		6.2	1	1
8.1.6	Engine Speed Sensors			1	1
8.1.7	Throttle Position Sensors			3	2
8.1.8	Airflow Sensors			3	2
8.1.9	Atmospheric Pressure Sensors	6.1		0	1
8.1.10	Manifold Absolute Pressure Sensors			1	1
8.1.11	TMAP Sensors	6.1		1	1
8.1.12	Lambda Sensors		6.2	7	5
8.1.13	Knock Sensors			1	1
8.1.14	Road Speed Sensors			1	1
8.1.15	Miscellaneous Sensors			1	1

Chapter	Page Title	New	Updated	Illustrations	A4 pages
8.1.16	Symptoms of Failed Sensors			0	2
8.2.1	Ignition Coils		6.1	3	2
8.2.2	Injectors			6	2
8.2.3	Fuel Pumps		6.2	7	3
8.2.4	Idle Speed Control			4	2
8.2.5	Electronic Throttle Control		6.3	4	2
8.2.6	Exhaust Gas Recirculation Valve		6.2	6	2
8.2.7	Electronic Engine Cooling Fans	6.1		2	2
8.2.8	Diagnostic Plug and Warning Light			1	1
8.2.9	Symptoms of Failed Actuators	6.1		0	4
8.3.1	Fuel Temperature Sensors	6.1		1	1
8.3.2	Turbocharger Boost Air Temperature	6.1		1	1
8.3.3	Diesel Airflow Meters	6.2		1	1
8.3.4	Turbocharger Boost Pressure Sensors	6.1		1	1
8.3.5	Fuel Rail Pressure Sensors	6.1		2	1
8.3.6	Miscellaneous Sensors		6.2	1	1
8.3.7	Symptoms of Failed Sensors	6.1		0	1
8.4.1	Glow Plugs		6.2	2	2
8.4.2	Fuel Pressure Control Solenoid	6.1		1	1
8.4.3	Fuel Quantity Control Solenoid	6.1		1	1
8.4.4	Injectors		6.2	6	3
8.4.5	Diesel Throttle Valve	6.2		1	1
8.4.6	Turbocharger Wastegate Valve	6.1		4	2
8.4.7	Symptoms of Failed Actuators	6.1	6.3	2	3
Chapter page: Emissions					
9.1	Petrol Emissions		6.1	3	3
9.2	Diesel Emissions		6.3	4	4
9.3	Emission Control Devices		6.2	2	3
9.4	Diesel Particulate Filters		6.3	7	6
Chapter page: Braking, Steering and Suspension					
10.1	ABS		6.3	9	6
10.2	ESP	6.3		10	6
10.3	Electronic Handbrakes	6.3		4	2
10.4	Electronic Steering		6.3	4	3
10.5	SRS	6.3		4	4
Chapter page: Vehicle Servicing					
11.1	Engine oil	6.3		3	2
11.2	Power Steering Fluids	6.3		2	2
11.3	Brake Fluids	6.3		2	1
11.4	Anti-freeze	6.3		4	3
11.5	Filters	6.3		6	4
11.6	Spark Plugs	6.3		3	3
11.7	Cambelts and Timing Chains	6.3		3	2
11.8	Serpentine Belts	6.3		5	2
Chapter page: EOBD and Vehicle Networking					
12.1	EOBD		6.1	2	4
12.2	EOBD Generic Codes		6.2	0	1
12.3	Diagnostic Socket Locations	6.1		1	1
12.4	Communication and Binary Code			6	1
12.5	Multiplexing			2	2
12.6	CAN-Bus		6.1	5	3
12.7	Scan tools: Fuel Trims	6.2		1	2
12.8	Scan tools: Live Data Examples	6.2		0	2
12.8 ref1	Scan tools: Live Data Examples	6.2		2	1
12.8 ref2	Scan tools: Live Data Examples	6.2		2	1
12.8 ref3	Scan tools: Live Data Examples	6.2		2	1
12.8 ref4	Scan tools: Live Data Examples	6.2		2	1
Chapter page: Diagnostic Procedures and Flowcharts					
13.1	Six Step Approach	6.1		0	2
13.2	Guided Diagnostics	6.2		0	1
13.3	Diagnostic Procedures - Checking Batteries			0	2
13.3 ref	Checking Battery Static Current Draw	6.1		0	2

Chapter	Page Title	New	Updated	Illustrations	A4 pages
13.4	Diagnostic Procedures - Engine Fails to Crank or Cranks Slowly			0	2
13.5	Diagnostic Procedures - Engine Cranks but fails to start - Checking HT circuits			0	2
13.6	Diagnostic Procedures - Engine Cranks but fails to start - Checking LT circuits (Inductive pick-ups)			0	2
13.7	Diagnostic Procedures - Engine Cranks but fails to start - Checking LT circuits (Hall effect pick-ups)			0	2
13.8	Diagnostic Procedures - Engine Cranks but fails to start - Electronic Fuel Injection			0	2
13.9	Miscellaneous Diagnostic Procedures	6.2		11	6
	Chapter page: Waveform Library				
14.1	Waveform Library - Sensors			n/a	n/a
14.2	Waveform Library - Actuators			n/a	n/a
14.3	Waveform Library Ignition			n/a	n/a
14.4	Waveform Library Miscellaneous			n/a	n/a
14.5	Waveform Library Electronic Diesel Injection			n/a	n/a
14.6	Waveform Library Motorcycle Engine Management			n/a	n/a
14.1.1	Waveform - Air Flow Meter - Air Vain		6.1	2	2
14.1.2	Waveform - Air Flow Meter - Hot Wire		6.1	2	2
14.1.3	Waveform - Faulty - Air Flow Meter		6.1	1	1
14.1.4	Waveform - Frequency - Hot Film	6.3		4	3
14.1.5	Waveform - Frequency - Hot Wire	6.3		4	3
14.1.6	Waveform - Camshaft Sensor - AC Excited		6.1	2	1
14.1.7	Waveform - Camshaft Sensor - Inductive		6.1	2	1
14.1.8	Waveform - Camshaft Sensor - Hall Effect (example 1)		6.1	3	2
14.1.9	Waveform - Camshaft Sensor - Hall Effect (example 2)		6.1	1	1
14.1.10	Waveform - Camshaft vs. Crankshaft Sensors (dual trace)		6.1	1	1
14.1.11	Waveform - Coolant Temperature Sensor		6.1	2	1
14.1.12	Waveform - Coolant Temperature Sensor (Vauxhall)		6.1	2	1
14.1.13	Waveform - Crankshaft Sensor - Hall Effect		6.1	2	1
14.1.14	Waveform - Crankshaft Sensor - Inductive (engine cranking)		6.1	2	1
14.1.15	Waveform - Crankshaft Sensor - Inductive (engine running)		6.1	2	1
14.1.16	Waveform - Distributor (Hall Effect) Pick-up		6.1	2	1
14.1.17	Waveform - Distributor (Inductive) Pick-up (Engine Cranking)		6.1	2	2
14.1.18	Waveform - Distributor (Inductive) Pick-up (Engine Running)		6.1	2	2
14.1.19	Waveform - Knock Sensor		6.1	2	2
14.1.20	Waveform - MAP Sensor (Analogue)		6.1	2	2
14.1.21	Waveform - MAP Sensor (Digital)		6.1	2	2
14.1.22	Waveform - Manifold Vacuum - Idle, Cruise, WOT	6.3		4	3
14.1.23	Waveform - Oxygen Sensor Heater	6.3		3	2
14.1.24	Waveform - Oxygen Sensor (Titania)		6.1	2	1
14.1.25	Waveform - Oxygen Sensor (Zirconia)		6.1	2	2
14.1.26	Waveform - EOBd Oxygen Sensors		6.1	3	2
14.1.27	Waveform - Power Steering Pressure Sensor	6.1		2	1
14.1.28	Waveform - Road Speed Sensor (Hall Effect)		6.1	2	1
14.1.29	Waveform - Throttle Pedal Sensor (ETC)		6.1	2	1
14.1.30	Waveform - Throttle Position Sensor (ETC)		6.1	1	1
14.1.31	Waveform - Throttle Potentiometer		6.1	2	1
14.1.32	Waveform - Fault Throttle Potentiometer		6.1	1	1
14.1.33	Waveform - Throttle Potentiometer and Switch		6.1	1	1
14.1.34	Waveform - Throttle Switch		6.1	2	2
14.1.35	Waveform - TMAP		6.1	2	1
14.1.36	Waveform - Twin Camshaft Sensors	6.2		1	1
14.2.1	Waveform - Carbon Canister Solenoid Valve		6.1	2	1
14.2.2	Waveform - Variable Speed Cooling Fan	6.1		4	2
14.2.3	Waveform - EGR Solenoid Valve		6.1	2	1
14.2.4	Waveform - Fuel Pump Current		6.1	2	1
14.2.5	Waveform - Fuel Pump - High Pressure Regulator	6.3		4	3
14.2.6	Waveform - Fuel Pump - Returnless Regulator	6.3		3	2
14.2.7	Waveform - Fuel Supply Pressure	6.3		3	2
14.2.8	Waveform - Idle Speed Control Valve (Electromagnetic)		6.1	2	1
14.2.9	Waveform - Idle Speed Control Valve (Rotary)		6.1	2	1
14.2.10	Waveform - Injector - Direct Injection	6.3		4	3
14.2.11	Waveform - Injector - Multi-point injection (voltage)		6.1	2	2
14.2.12	Waveform - Injector - Multi-point injection (current)		6.1	2	1
14.2.13	Waveform - Injector - Multi-point injection (multi-pulsing)		6.1	2	1

Chapter	Page Title	New	Updated	Illustrations	A4 pages
14.2.14	Waveform - LPG Injector Simulator		6.1	1	1
14.2.15	Waveform - Single Point Injection (current)		6.1	2	1
14.2.16	Waveform - Single Point Injection (example 1)		6.1	2	1
14.2.17	Waveform - Single Point Injection (example 2)		6.1	2	1
14.2.18	Waveform - Stepper Motor (4 wire)		6.1	2	1
14.2.19	Waveform - Stepper Motor (5 wire)		6.1	2	1
14.2.20	Waveform - Throttle Body Servomotor		6.1	3	2
14.2.21	Waveform - Variable Camshaft Timing Solenoid		6.1	2	1
14.3.1	Waveform - Amplifier Earth		6.1	2	1
14.3.2	Waveform - EDIS Unit (PIP & SAW)		6.1	2	1
14.3.3	Waveform - Ignition Amplifier ECM Signals		6.1	2	1
14.3.4	Waveform - Primary vs. Secondary (dual trace)		6.1	3	2
14.3.5	Waveform - Faulty Ignition Coil		6.1	4	2
14.3.6	Waveform - Coil-per-cylinder with Integral Amplifier	6.1		2	2
14.3.7	Waveform - Ignition Primary		6.1	6	2
14.3.8	Waveform - Ignition Primary (Burn Time)		6.1	1	1
14.3.9	Waveform - Ignition Primary (Sparkline)		6.1	1	1
14.3.10	Waveform - Ignition Primary (Induced Voltage)		6.1	1	1
14.3.11	Waveform - Ignition Primary (Dwell Period)		6.1	1	1
14.3.12	Waveform - Ignition Primary (Current 1)		6.1	3	2
14.3.13	Waveform - Ignition Primary (Current 2)		6.1	1	1
14.3.14	Waveform - BMW Ignition Primary		6.1	2	2
14.3.15	Waveform - Ignition Secondary		6.1	6	2
14.3.16	Waveform - Ignition Secondary (Burn Time)		6.1	1	1
14.3.17	Waveform - Ignition Secondary (Sparkline)		6.1	1	1
14.3.18	Waveform - Ignition Secondary (Plug Kv)		6.1	1	1
14.4.1	Waveform - ABS Speed Sensor (Inductive)		6.1	4	2
14.4.2	Waveform - ABS Speed Sensor (Inductive) Dual Trace		6.1	1	1
14.4.3	Waveform - ABS Speed Sensor (Inductive) Cornering		6.1	1	1
14.4.4	Waveform - ABS Speed Sensor (Digital)		6.1	5	2
14.4.5	Waveform - ABS Speed Sensor (Digital) Dual Trace		6.1	1	1
14.4.6	Waveform - ABS Speed Sensor (Digital) Cornering		6.1	1	1
14.4.7	Waveform - Alternator Volts and Amps		6.1	3	2
14.4.8	Waveform - Alternator		6.1	2	1
14.4.9	Waveform - CAN-Bus Signal Integrity		6.1	1	1
14.4.10	Waveform - CAN-Bus Data Integrity		6.1	1	1
14.4.11	Waveform - CAN-Bus Long Capture		6.1	1	1
14.4.12	Waveform - LIN-Bus Engine off		6.1	1	1
14.4.13	Waveform - Cranking Amps (Petrol)		6.1	2	1
14.4.14	Waveform - Cranking Amps (Diesel)		6.1	2	1
14.4.15	Waveform - Electric Handbrake Operation	6.2		2	1
14.4.16	Waveform - Glow plug Timer Relay		6.1	2	1
14.4.17	Waveform - Pulse width modulation example 1	6.2		2	2
14.4.18	Added - pulse width modulation example 2	6.2		1	1
14.4.19	Waveform - Smart Charging (Ford)	6.1		4	2
14.4.20	Waveform - Steering Angle Sensor	6.3		3	2
14.4.21	Waveform - Volt Drop Test	6.1		10	4
14.5.1	Waveform - CDI Accelerator Pedal Sensor		6.1	2	1
14.5.2	Waveform - CDI Airflow Sensor		6.1	2	1
14.5.3	Waveform - CDI Camshaft (Hall Effect) Sensor		6.1	2	1
14.5.4	Waveform - CDI EGR Solenoid Valve		6.1	1	1
14.5.5	Waveform - CDI Engine Speed Sensor		6.1	1	1
14.5.6	Waveform - CDI High Fuel Pressure Sensor		6.1	1	1
14.5.7	Waveform - CDI Injector (Current) Idle		6.1	2	1
14.5.8	Waveform - CDI Injector (Current) Under Acceleration		6.1	1	1
14.5.9	Waveform - CDI Injector (Current) Overrun		6.1	1	1
14.5.10	Waveform - CDI Inlet Air Pressure Sensor		6.1	2	1
14.5.11	Waveform - CDI Turbo Pressure Sensor Solenoid Valve (At idle)		6.1	1	1
14.5.12	Waveform - CDI Turbo Pressure Sensor Solenoid Valve (Under Acceleration)		6.1	1	1
14.5.13	Waveform - CDI 3 Injector		6.1	2	1
14.5.14	Waveform - CDI 3 Pressure Regulator		6.1	2	1
14.5.15	Waveform - CDI 3 Quantity Control Valve		6.1	2	1

Chapter	Page Title	New	Updated	Illustrations	A4 pages
14.5.16	Waveform - Common rail injector	6.1		3	2
14.5.17	Waveform - MPROP valve	6.1		3	2
14.5.18	Waveform - Rail pressure sensor	6.1		1	1
14.5.19	Waveform - PD injector	6.1		3	2
14.5.20	Waveform - PD Piezo injector	6.3		3	2
14.5.21	Waveform - Delphi Injector	6.1		4	2
14.5.22	Waveform - Common Rail Pressure Sensor (Delphi)	6.1		2	1
14.5.23	Waveform - Denso Common Rail Injector	6.1		4	2
14.5.24	Waveform - Denso FTS	6.1		2	1
14.5.25	Waveform - Denso SCV	6.1		3	2
14.5.26	Waveform - Airflow intake / turbo boost pressure	6.1		3	2
14.5.27	Waveform - Fuel Supply Pressure	6.3		5	3
14.5.28	Waveform - Diesel Injector Lift Valve Sensor	6.1		2	2
14.5.29	Waveform - Piezo Injector	6.1		3	2
14.5.30	Waveform - TMAP on Turbocharged Diesel	6.1		2	2
14.5.31	Waveform - Turbo Boost / Air Intake Temperature	6.1		2	2
14.5.32	Waveform - Turbo Boost Pressure	6.3		4	3
14.5.33	Waveform - Vacuum Supply	6.3		4	2
14.6.1	Waveform - Motorcycle cranking		6.1	3	2
14.6.2	Waveform - Motorcycle Charging Volts & Amps		6.1	2	1
14.6.3	Waveform - Motorcycle Phase Wires		6.1	4	2
14.6.4	Waveform - Motorcycle Engine speed & position		6.1	3	2
14.6.5	Waveform - Motorcycle Coolant & Intake Air Temperature		6.1	3	2
14.6.6	Waveform - Motorcycle Atmospheric Pressure Sensor		6.1	3	2
14.6.7	Waveform - Motorcycle Road speed Sensor		6.1	3	2
14.6.8	Waveform - Motorcycle Throttle Position Sensor		6.1	3	2
14.6.9	Waveform - Motorcycle Manifold Pressure Sensor		6.1	3	2
14.6.10	Waveform - Motorcycle Lambda Sensor		6.1	3	2
14.6.11	Waveform - Motorcycle Fuel Pump Current		6.1	2	1
14.6.12	Waveform - Motorcycle Injector		6.1	3	2
14.6.13	Waveform - Motorcycle Injector Current		6.1	2	1
14.6.14	Waveform - Motorcycle Primary Ignition		6.1	3	2
14.6.15	Waveform - Motorcycle Primary Ignition Current		6.1	2	2
14.6.16	Waveform - Motorcycle Secondary Ignition (Negative Fired)		6.1	2	1
14.6.17	Waveform - Motorcycle Secondary Ignition (Positive Fired)		6.1	2	1
14.6.18	Waveform - Motorcycle Side Stand Switch		6.1	4	2
14.6.19	Waveform - Motorcycle Neutral Switch		6.1	2	2
14.6.20	Waveform - Motorcycle Cooling Fan Current		6.1	2	1
Chapter page: Miscellaneous Topics					
15.1	Mechanical Fuel Injection (K-jetronic)			11	11
15.2	Liquefied Petroleum Gas			5	8
15.3	Hybrid Vehicles		6.2	11	5
15.4	Variable Valve Timing			1	2
15.5	Air Conditioning			12	8
15.6	Turbochargers			3	2
15.7	Variable geometry turbos (previous pages re-numbered)	6.2		3	2
15.8	Saddle fuel tanks / pumps (previous pages re-numbered)	6.2		3	2
15.9	Miscellaneous Older Technology			4	2
Chapter page: Bonus Material					
16.1	Back to basics - Part 1 - Ignition Primary Circuits	6.1		6	6
16.2	Back to basics - Part 2 - Trigger Signals (part 1)	6.1		5	4
16.3	Back to basics - Part 3 - Trigger Signals (part 2)	6.1		7	4
16.4	Back to basics - Part 4 - Trigger Signals (part 3)	6.1		7	5
16.5	Back to basics - Part 5 - Primary vs Secondary	6.1		4	4
16.6	Back to basics - Part 6 - Electronic Fuel Injection (part 1)	6.1		6	5
16.7	Back to basics - Part 7 - Electronic Fuel Injection (part 2)	6.1		7	4
16.8	Back to basics - Part 8 - Electronic Fuel Injection (part 3)	6.1		4	4
16.9	Back to basics - Part 9 - Emission Related Components & Actuators	6.1		4	4
16.10	Back to basics - Part 10 - Miscellaneous Sensor & Actuator Waveforms	6.1		7	5
App A Health & Safety Disclaimer					
App A	Health & Safety Disclaimer		6.3	0	1
App B	Glossary		6.3	0	8
App C	Ebook Navigation			n/a	n/a