



Media Information
16th May 2012

Technical Data BMW Motorsport.

The following datasheets have been taken without modification from the original press documents published at the time.

BMW M1 Group 4/5 (1979): Press kit, 12/1978.

BMW 635CSi Group A (1983): Press kit BMW Motorsport 1983, 03/1983.

BMW Formula-1-Engine (1983): Press kit BMW Motorsport 1983, 03/1983.

BMW Formula-2-Engine (1983): Press kit BMW Motorsport 1983, 03/1983.

BMW M3 Group A (1987): Press kit BMW Motorsport 1987, 04/1987.

SPECIFICATIONS: BMW M1 - GROUP 4

Group 4: Grand Touring cars according to FIA regulations

These vehicles are assembled in small quantities and must have at least two seats. They can be modified for racing purposes; the modifications allowed are set by the FIA (Federation Internationale de l'Automobile)

Their external appearance remains close to that of their production counterparts.

Engine

6-cylinder inline, water-cooled, 4 valves per cylinder, mechanical fuel injection, dry-sump lubrication, front-mounted oil cooler; bore 94 mm, stroke 84 mm, displacement 3500 cc, 470 hp (345 kW) at 9000 rpm, torque 282 lb-ft (390 Nm) at 7000 rpm

Transmission

hydraulically actuated 2-disc dry clutch, ZF 5-speed gearbox; differential and gearbox cooling

Chassis

unequal-length A-arms front and rear, magnesium wheel carriers, aluminum hubs with central locking, Bilstein shock absorbers with screw-on spring plates, anti-roll bars front and rear (exchangeable and adjustable); ATE brakes with internally ventilated discs front and rear, twin master cylinder, driver-adjustable front-rear balance; front wheels 11.0 x 16, rear wheels 12.5 x 16, front tires 10.0/23.5 x 16, rear tires 12.5/25.0 x 16; rack & pinion steering with fast ratio

Dimensions & Weights

length 4360 mm/171.7 in., width 1924 mm/75.7 in.,
Height 1110 mm/43.7 in., wheelbase 2560 mm/100.8 in.,
front track 1594 mm/62.8 in., rear track 1560 mm/61.4 in.;
weight 1020 kg/2249 lb

Performance

0 - 100 km/h 4.5 sec
maximum speed 310 km/h / 189 mph

SPECIFICATIONS: BMW M1 - GROUP 5

Group 5: Special Production Cars according to FIA regulations

Special Production Cars are vehicles for which no minimum production quantity is set, but they must be based on homologated models of Groups 1, 2, 3 and 4. All modifications allowed for those Groups are allowed, as well as further modifications for Group 5 alone. All of them are set by the FIA.

Greater freedom in body widening and aerodynamic aids front and rear give the body considerably different appearance from its production and Group 4 counterparts.

Under the skin, arrangement of the mechanical components (engine, transmission, suspension, brakes) is generally free.

The Group 5 version of the BMW M1 has a 3.2-liter 6-cylinder engine with four valves per cylinder and turbo-charger, capable of developing up to 850 horsepower at 9000 rpm.

At this time the Group 5 version is still undergoing intensive development; final technical specifications are therefore not available. They will be released later.

SPECIFICATIONS

BMW 635 CSi Group A Version

Engine

based on	635 CSi series with racing piston and racing camshaft
Displacement	3468 cm ³
Bore/stroke	92.5/86
Fuel mixture	digital engine electronics
Output	210 kW/285 HP oil cooler at the front of the vehicle

Power Transmission

Clutch	sintered metal clutch with light-alloy pressure plate
Transmission	5-gear racing transmission
Rear axle drive	Locking differential with 75% locking effect and rear axle drive cooling

Chassis

Front axle	double-jointed spring strut axle with reinforced springs and adjustable spring plates
Rear axle	reinforced semi-trailing arms, spring struts with adjustable spring plates
Stabilizers	exchangeable rear and front and adjustable
Rims	9.5"x 16" (tyres 245/575-16, 275/600-16)
Brake system	four-piston fixed-caliper brakes, inside-ventilated brake discs
Passenger Cell	body bolted with aluminium roll cage
Weight	1185 kg
Max. speed	approx. 260 km/h

SPECIFICATIONS**BMW formula 1-engine**

Model	4-cylinder in-line engine, water-cooled, crankshaft with 5 bearings
Crank case	grey cast (from our regular 4-cylinder series production)
Crankshaft	alloyed steel, drop forged and nitrified, diameter of main bearing neck and connecting rod neck as in the 4-cylinder series production Diameter of main bearing neck 55 mm Diameter of connecting rod bearing neck 48 mm
Valve drive	2 overhead camshafts driven by spur gears 4 suspended valves per cylinder actuated by cup tappets
Connecting rod	titanium alloy, forged, length 153.6 mm, gear ratio $r/l = 30/153.6 = 0.195$
Connecting rod screws	titanium screws with steel nuts
Displacement (cm ³)	1 499
Bore (mm)	89,2
Stroke (mm)	60
Output at 1/min (kW) (HP)	441/9 500 600/9 500
Torque at 1/min (Nm)	450/8 500
Max. speed	11 000/min
Highest useful compression ratio	6.7 : 1
Mean piston speed at max. speed	22 m/s
Fuel supply and ignition	Digital engine electronics with mechanical Bosch fuel injection system, Kugelfischer system, breakerless ignition system Bosch HKZ

Supercharging	exhaust gas turbocharger by KKK with double-entry turbine, charge-air cooling
Boost pressure	2.9 bar = 1.9 bar overpressure
Charge-air cooling	with Beer radiators
Oil supply	dry sump lubrication, approx 10 liters with triple scavenge pump
Weight	170 kg (including turbo system and charge-air cooling system)

Brabham BT52

Designer: Gordon Murray, David North

Wheelbase:	112 1/2 " - 2860 mm
Front track:	70" - 1778 mm
Rear track:	65" - 1657 mm
Overall height:	39" - 990 mm
Overall width:	83" - 2108 mm
Overall length:	170" - 4323 mm
Weight:	1188 pounds - 540 kg

Chassis: The chassis is of monocoque construction using courtaulds carbon fibre panels (as pioneered in Formula One by Brabham in 1978) and high strength aluminium alloy. The chassis has been designed around valuable information gained from the BT49 which was crashed under controlled conditions at the BMW test centre in munich last year. In the interest of driver safety the section of the beams alongside the cockpit far exceed the size required by the new regulations - as does the foot box section ahead of the drivers feet. The driver has been moved rearward in the chassis by a considerable amount and has ahead of his feet an immensely strong cast frame.

Layout and aerodynamics: The BT52 is the first of the new generation ground effect cars designed to the 1983 regulations and is unique in chassis layout, driver position and aerodynamics. The layout of the car required a completely new engine and turbocharger installations.

Suspension:	<p>The front and the rear suspension is another version of the Brabham rod operated linkage (introduced in 1973) and has been developed from the pullrod suspension on the BT50 and the pushrod rear suspension on the BT50 b as tested last year. The wheel geometry is controlled by double wishbones and the inboards spring and damper unit is operated by pushrods and rockers.</p>
Transmission:	<p>The transaxle unit is a completely new design for the BT52.</p> <p>Based on the Hewland FG the unit has been developed (and extensively tested on the BT50 b) with the help from Weissmann, Alfa Romeo and Getrag.</p>
Clutch:	Borg and Beck
Drive shafts:	Brabham solid alloy steel with C. V. joints.
Steering:	<p>Brabham rack and pinion.</p> <p>Momo steering wheel</p>
Dampers:	Koni light alloy.
Springs:	Schmitthelm
Fuel tank:	ATL 215 litres capacity.
Wheels:	Momo
Tyres:	Michelin

Brakes:

Calipers - Girling

Discs - AP ventilated

or Hitco / Brabham solid carbon discs.

Brake pads:

Ferodo or Hitco

Engine:

BMW

SPECIFICATIONS
BMW formula 2-engine

Model	4-cylinder in-line engine, water-cooled, crankshaft with 5 bearings
Crank case	grey cast (from our regular 4-cylinder series production)
Crankshaft	alloyed steel, drop forged and nitrified diameter of main bearing neck and connecting rod neck as in the 4-cylinder series production Diameter of main bearing neck 55 mm Diameter of connecting rod bearing neck 48 mm
Valve drive	2 overhead camshafts driven by spur gears 4 suspended valves per cylinder actuated by cup tappets
Connecting rod	titanium alloy, forged, length 153,6 mm gear ratio $r/l = 40/153.6 = 0.260$
Connecting rod screws	titanium screws with steel nuts
Displacement (cm ³)	1 999
Bore (mm)	89.2
Stroke (mm)	80
Output at 1/min (kW) (HP)	235/9 500 320/9 500
Torque at 1/min (Nm)	251/7 500
Max. Speed	10 000/min
Highest useful compression ratio	11.2 : 1
Mean piston speed at max. speed	26 m/s
Fuel supply	Bosch mechanical fuel injection system Kugelfischer system
Ignition	breakerless ignition system, Bosch HKZ
Oil supply	dry sump lubrication approx. 10 liters with dual scavenge pump

COMPARISON OF TECHNICAL DATA BMW M3 ROAD-GOING AND GROUP A VERSION		M3	M3 Group A
Body Dimensions and weights	No of doors	2	2
	No of seats	4	1
	Length/Width/Height (empty)	mm 4345/1680/1370	4355/1880/1330
	Wheelbase	mm 2565*	2565.5
	Track, front	mm 1412*	1412
	rear	mm 1424	1424
	Turning circle	m 11.1	–
	Fuel tank capacity/range	l/km 70/840	110
	Unladen weight	kg 1200	960 min.
	Max. load	kg 400	–
Engine	Max. permissible weight	kg 1600	–
	Max. trailer load	kg –	–
	braked max. gradient 12%	kg –	–
	unbraked	kg –	–
	Max. roof load	kg 75	–
	Max. trailer nose weight	kg –	–
	Luggage capacity/VDA test	l 480/420 ¹⁾	–
	Layout	Inline	Inline
	No. of cylinders	4	4
	Mixture preparation	ML Motronic	Motronic
Chassis/power transmission		4 valves	4 valves
	Displacement, effective	cm ³ 2302	2332
	Bore/stroke	mm 93.4/84	94/84
	Compression/fuel grade	10.5/S	12.0/S
	Max. output	kW/PS 147/200	approx. 220/300
	– at engine speed	min ⁻¹ 6750	8000
	Max. torque	Nm 240	8000
	– at engine speed	min ⁻¹ 4750	270
	Battery	Ah 66 ¹⁾	26
	Alternator	A/W 90/1260	65/910
Performance characteristics	Front suspension	Single-joint spring strut axle with displaced camber; compensation of transverse forces; anti-squat reduction; small, positive steering roll radius	Single-joint spring strut axle; spring struts made of aluminium with adjustable spring plates for vehicle height adjustment; wheel mounting with central lock nut; adjustable anti-roll bar
	Rear suspension	Independent suspension at semi-trailing arms (sweep angle degrees); separate springs and dampers; anti-dive; sporty chassis	Independent suspension at reinforced semi-trailing arms with joint bearings and camber and toe-in adjustment; adjustable spring struts for vehicle height adjustment; wheel mounting with central lock nut
	Brakes front	Single-piston swing-calliper disc brakes, vented, ABS	4-piston alloy swing calliper, inner-vented brake disc, 32 mm thick, 332 mm diameter
	rear	Single-piston swing-calliper disc brakes with integrated drum hand brake, ABS	4-piston alloy swing calliper, inner-vented brake disc, 20.7 mm thick, 280 mm diameter
			2 main brake cylinders with balance bars, brake force distribution adjustable during motion, adjustable hand brake
	Steering	Rack-and-pinion/Servo 19.6:1	Rack-and-pinion 17:1
	Final drive ratio	3.25:1	from 3.25:1 to
	Gear ratios	I 3.72:1	5.28:1
		II 2.40:1	2.337:1
		III 1.77:1	1.681:1
		IV 1.26:1	1.358:1
		V 1.00:1	1.150:1
		R 4.23:1	1.000:1
	Tyres	205/55 VR	235/590-16 or 245/610-17
	Wheel	15 7 J x	9x16 or 9x17/LM three-part
	Power-weight ratio	kg/kW 8.2	4.4
	Torque-weight ratio	kg/Nm 5.0	3.5
	Output per litre	kW/l 63.9	94.2
	Torque per litre	Nm/l 104.3	117.8
	Acceleration 0-100 km/h	s 6.7	4.6 with rear axle ratio 4.44:1
	0-1000 m	s 27.	–
	in 4th gear 80-120 km/h	s 2	–
	Top speed	km/h 7.1	281 with rear axle ratio 3.25:1
		235	
1) Battery in the boot from 1.4.1987			