

ENGINE	690 SUPERMOTO / 690 SUPERMOTO PRESTIGE 2007
Design	Single-cylinder, 4-stroke Otto engine with balancer shaft
Displacement	654 cc
Bore / Stroke	102 / 80 mm (4.02 / 3.15 in)
Compression ratio	11.8 : 1
Fuel	unleaded fuel with at least RON 95 (USA: Premium PON 91)
Valve timing	4 valves OHC, roller rocker arms
Valve diameter	Intake: 40 mm (1.57 in) Exhaust: 34 mm (1.34 in)
Valve clearance, cold	0.07 - 0.13 mm (0.00276 - 0.00512 in)
Crankcase bearing	Two-cylinder roller bearing
Conrod bearing	Needle bearing
Piston pin bearing	Bronze bushing
Piston	Light alloy – forged
Piston rings	1 L-ring, 1 tapered compression piston ring, 1 oil scraper ring
Engine lubrication	Semi-dry sump with 2 Eaton pumps
Engine oil	Fully-synthetic 10W/60 engine oil according to the JASO T903 MA specification (Motorex Cross Power 4T 10W/60)
Quantity of engine oil	approx. 2 liters (0.53 USgal)
Primary drive	Straight-toothed spur wheels 36 : 79
Clutch	APTC multi-disc wet clutch, hydraulically operated
Transmission	6-speed claw shifted
Gear ratio	1 st gear 14 : 35 2 nd gear 16 : 28 3 rd gear 21 : 28 4 th gear 21 : 23 5 th gear 23 : 22 6 th gear 23 : 20

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Mixture preparation	electronically controlled gasoline injection
Ignition system	breakerless transistorized electronic ignition system with digital ignition advance
Alternator	12V 224W at 5000 rpm
Spark plug	NGK LKAR8AI-9
Electrode distance	0.9 mm (0.035 in)
Cooling system	liquid cooled
Cooling liquid	1.2 liter (0.317 USgal), 50% antifreeze, 50% distilled water, at least -25°C (-13°F)
Starting aid	electric starter

TIGHTENING TORQUES – ENGINE		
HH screws for ignition cover	M6	Loctite 243 + 10 Nm
Plastic screw in ignition cover	M24x1.5	8 Nm
AH plug for oil bore	M14x1.5	Loctite 243 + 15 Nm
AH plug for oil bore	M10x1	Loctite 243 + 15 Nm
Torx plug for oil bore	self-tapping	Loctite 243 + 9 Nm
Plugs for oil bore in oil cooler	M10x1	15 Nm
Plug for drain bore in water pump	M10x1	15 Nm
Oil jet (piston cooling)	M6x0.75	Loctite 648 + 6 Nm
Oil jet (conrod lubrication)	M4	Loctite 648 + 2 Nm
Threaded sleeve (engine vent)	M16x1.5	Loctite 243 + 25 Nm
AH plug for crankshaft fixation	M8	20 Nm
AH screw to fasten diaphragm plate/diaphragm	M3	Loctite 243
AH screws for oil pump cover	M5	Loctite 243 + 6 Nm
Screws for bearing retainers	M5	Loctite 648 + 5 Nm
HH nut for clutch drive	M20x1.5	Loctite 243 + 100 Nm
HH screws for slave cylinder	M6	Loctite 243 + 10 Nm
HH screw for locking lever	M6	Loctite 243 + 10 Nm
AH screw for shift lock	M6	Loctite 243 + 10 Nm
HH screw for gear sensor	M5	Loctite 243 + 5 Nm
HH nut for primary gear	M20x1.5 LH thread	Loctite 243 + 100 Nm
HH nut for ignition rotor	M18x1.5	100 Nm
AH screws to fasten stator in ignition cover	M6	Loctite 243 + 10 Nm
HH screws for starter	M6	Loctite 243 + 10 Nm
HH screws for cylinder head	M10	oiled, 4 stages: 15/30/45/60 Nm
HH screws for cylinder head / cylinder (timing chain chamber)	M6	Loctite 243 + 10 Nm
AH screws for cylinder head / housing (timing chain chamber)	M6	Loctite 243 + 10 Nm
AH screws for front/rear rocker arm shafts	M6	12 Nm
HH screw for camshaft retaining bracket	M6	Loctite 243 + 10 Nm
Spark plug	M12x1.25	17 Nm
AH screw to fasten vent cover	M5	Loctite 243 + 3 Nm
Stud for exhaust flange	M8	Loctite 243 + 10 Nm
CU nut to fasten exhaust flange	M8	20 Nm
AH screw for decompression bearing bolt	M6	Loctite 243 + 3-4 Nm
HH screw for water pump wheel	M6	Loctite 243 + 10 Nm
HH screw for thermostat case	M6	Loctite 243 + 10 Nm
Temperature sensor on cylinder head	M12x1.5	12 Nm
HH screw for timing chain tensioner (plug)	M20x1.5	25 Nm
HH screw for timing chain tensioner (release screw)	M10x1	10 Nm
HH screw for guide rail	M6	Loctite 243 + 10 Nm
HH screw for tensioning rail	M6	Loctite 243 + 10 Nm
AH plug for oil thermostat	M24x1.5	15 Nm
Oil plug at oil screen	M20x1.5	15 Nm
Oil plug with magnet	M12x1.5	20 Nm
Plug for pressure relief valve	M12x1.5	20 Nm
HH screw for pulse generator	M6	Loctite 243 + 10 Nm
HH rear sprocket nut (A/F 27)	M20x1.5	Loctite 243 + 60 Nm
HH screw for shift lever	M6	Loctite 222 + 10 Nm
Gemi hose clamp (intake)	M4	1.5 Nm
Other engine screws	M5	6 Nm
	M6	10 Nm

TOLERANCES AND FITTING CLEARANCE

COMPONENT	MEASUREMENT/TEST	SETPOINT VALUE	TOLERANCE LIMIT
Valves	Valve clearance (at 20°C) intake	0.07 mm - 0.13 mm	
	Valve clearance (at 20°C) exhaust	0.07 mm - 0.13 mm	
	Valve shaft runout		.max. 0.05 mm
	Sealing seat width, intake		.max. 1.60 mm
	Sealing seat width, exhaust		.max. 2.00 mm
	Valve disk runout		.max. 0.05 mm
	Valve guide, inner diameter		.max. 6.05 mm
	Valve shaft, outer diameter, intake	.5.961 mm - 5.975 mm	.min. 5.93 mm
	Valve shaft, outer diameter, exhaust	.5.946 mm - 5.960 mm	.min. 5.93 mm
Valve springs	length, unloaded	new 42.85 mm	.min. 42.3 mm
	spring washer	new 2.5 mm	.min. 2.4 mm
Camshafts/cylinder head	Camshaft bearing journal (front)		.min. 39.95 mm
	Camshaft bearing journal (rear)		.min. 17.96 mm
	Cylinder head distortion		.max. 0.15 mm
Cylinder	Size 1	102.000 mm - 102.012 mm	
	Size 2	102.013 mm - 102.025 mm	.max. 102.04 mm
	Cylinder distortion		.max. 0.10 mm
Piston	Size 1	101.955 mm - 101.965 mm	
	Size 2	101.966 mm - 101.975 mm	
	Mounting clearance		.min. 0.03 mm - max. 0.10 mm
Piston ring	Compression ring gap		.max. 0.8 mm
	Oil scraper ring gap		.max. 1.0 mm
	Width of piston ring groove - 1st ring (L-ring)	.0.91 mm - 0.93 mm	.max. 1.0 mm
	Width of piston ring groove - 2nd ring (L-ring)	.1.26 mm - 1.28 mm	.max. 1.35 mm
	Width of piston ring groove - oil scraper ring	.3.01 mm - 3.03 mm	.max. 3.1 mm
Crankshaft/conrod	Lateral runout		.max. 0.08 mm
	Outer crankshaft web dimensions	.71.95 mm - 72.05 mm	
	Axial clearance for crankshaft	.0.15 mm - 0.25 mm	
	Bearing clearance for conrod bearing		.0.05 mm
Balancer shaft	Axial clearance	.0.10 mm - 0.20 mm	
Oil pressure	measured at the right oil filter cover with the engine at service temperature		.min. 0.5 bar at 1600 rpm
Oil consumption			.max. 0.8 lt /1000 km
Oil pumps	Clearance between inner and outer rotor		.max. 0.2 mm
	Clearance between outer rotor and case		.max. 0.2 mm
	Axial clearance	.0.04 mm - 0.08 mm	
Bypass valve	Length of spring, unloaded		.min. 25 mm
Clutch	Thickness of lining disks		.min. 2.5 mm
	Thickness of steel disks	.1.45 mm - 1.55 mm	.min. 1.35 mm
	Length of clutch springs, unloaded	neu 33.5 mm	.min. 31.5 mm
Thermostat/radiator	Opening temperature of thermostat	.68 °C - 72 °C	
	Opening stroke of thermostat		.min. 6 mm
	Discharge pressure of radiator cap		.max. 1.4 bar
	Switch-on temperature of radiator fan switch	.102 °C	
Transmission	Axial clearance of the mainshaft	.0.1 mm - 0.4 mm	
	Run out of the mainshaft		.max. 0.025 mm
	Clearance between shift fork and groove	.0.49 mm - 0.75 mm	
	Width of shift fork groove	.5.55 mm - 5.6 mm	
	Thickness of shift fork	.4.85 mm - 4.95 mm	