

TECHNICAL DATA - ENGINE 450/525 SMR, 540 SXS, 610 CRATE RACING 2005

TYPE	450 SMR	525 SMR	450 SXS	540 SXS	610 CRATE
Design	Liquid-cooled single cylinder 4-stroke engine with balancer shaft				
Displacement	449,4 cm ³	449,4 cm ³	449,4 cm ³	533,8 cm ³	612,3 cm ³
Bore/Stroke	95/63,4 mm	95/72 mm	95/63,4 mm	100/68 mm	100/78 mm
Ratio	12 : 1	11:1	12 : 1	11,5:1	11,85:1
Fuel	unleaded fuel with at least RON 95 (USA = Premium RON 91)		unleaded fuel with at least RON 98		
Valve timing	4 valves over rocker arm and 1 overhead camshaft, camshaft drive through single chain				
Camshaft	590/5521		55/21	8/06	8/07
Valve diameter Intake	35 mm (Titan)				
Valve diameter Exhaust	30 mm (Titan)				
Valve clearance cold Intake	0,12 mm				
Valve clearance cold Exhaust	0,12 mm				
Crank shaft bearing	2 cylinder roller bearing				cylinder roller-/ball bearing
Connecting rod bearing	needle bearing				
Top end bearing	bronze bushing				
Piston alluminium alloy -	forged				
Piston rings	1 compression ring, 1 oil scraper ring				
Engine lubrication	pressure circulation lubrication with two rotor pumps				
Engine oil	full synthetic oil (Motorex Power Synt 4T 10W/50)				
Quantity of engine oil	1,25 liters				
Primary ratio	straight geared spur wheels 33:76				
Clutch	multi disc clutch in oil bath				
Transmission claw shifted	6-speed		6-speed	4-speed	6-speed
Gear ratio					
1st Gear	16:32		16:32	16:32	16:32
2nd Gear	18:30		16:28	18:30	18:30
3rd Gear	20:28		21:32	20:28	20:28
4th Gear	22:26		22:29	22:26	22:26
5th Gear	24:24		23:26	--	24:24
6th Gear	21:18		21:18	--	21:18
Ignition system	contactless DC-CDI ignition with digital advanced system by KOKUSAN				
Generator	12 V 40 W				
Spark plug	NGK DCPR 8 E				
Spark plug gap	0,6 mm				
Cooling system	liquid cooled, permanent rotation of cooling liquid through mechanically driven water pump				
Cooling liquid	1 liter, 50% antifreeze, 50% water, at least -25°				
Starting equipment	kickstarter				

BASIC CARBURATOR SETTING				
	450 SMR	525 SMR	540 SXS	610 CRATE
Type	Keihin FCR-MX 4122A	Keihin FCR-MX 4125A	Keihin FCR-MX 4122A	Keihin FCR-MX 4122A
Main jet	185	185	185	190
Jet needle	OBDTP	OBDTP	OBDTP	OBDTP
Idling jet	40	42	42	45
Main air jet	200	200	200	200
Idling air jet	100	100	100	100
Needle position	4 th from top	4 th from top	4 th from top	4 th from top
Starting jet	85	85	85	85
Mixture control screw open	1,0	1,5	1,0	1,5
Slide	15	15	15	15
Performance restrictor	–	–	–	–
Stop pump membrane	858 / 2,15 mm	858 / 2,15 mm	858 / 2,15 mm	858 / 2,15 mm
Hot start device	2,2 mm	2,5 mm	2,2 mm	2,2 mm

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ASSEMBLY CLEARANCE, WEAR LIMIT		
Crankshaft	axial clearance	0.25 - 0.35 mm
	run out of crank stud	max 0.12 mm
	crankshaft webs - measure outer dimension	65 mm ± 0.05 mm
Conrod bearing	radial clearance	max. 0.05 mm
	axial clearance	max. 1.10 mm
Cylinder 250 EXC	bore diameter size I	75.000 - 75.012 mm
	bore diameter size II	75.013 - 75.025 mm
Cylinder 400 SX/MXC/EXC, 450 EXC/MXC	bore diameter size I	89.000 - 89.012 mm
	bore diameter size II	89.013 - 89.025 mm
Cylinder 450 SX/SMR/SXS, 520, 525	bore diameter size I	95.000 - 95.012 mm
	bore diameter size II	95.013 - 95.025 mm
Cylinder 540 SXS, 610 CRATE	bore diameter	100.000 - 100.012 mm
Piston 250 EXC	diameter size I	74.950 - 74.980 mm
	diameter size II	74.960 - 74.990 mm
	assembly clearance size I	0.020 - 0.062 mm
	assembly clearance size II	0.022 - 0.065 mm
	wear limit	0.12 mm
Piston 400 MXC/EXC	diameter size I	88.920 - 88.950 mm
	diameter size II	88.930 - 88.960 mm
	assembly clearance size I	0.050 - 0.092 mm
	assembly clearance size II	0.052 - 0.095 mm
	wear limit	0.12 mm
Piston 450 EXC/MXC	diameter size I	88.916 - 88.946 mm
	diameter size II	88.926 - 88.958 mm
	assembly clearance size I	0.054 - 0.096 mm
	assembly clearance size II	0.056 - 0.099 mm
	wear limit	0.12 mm
Piston 520 MXC/EXC	diameter size I	94.942 - 94.950 mm
	diameter size II	94.951 - 94.956 mm
	assembly clearance size I	0.060 - 0.070 mm
	assembly clearance size II	0.064 - 0.075 mm
	wear limit	0.12 mm
Piston 450 SX/SMR/SXS	diameter size I	94.932 - 94.960 mm
	diameter size II	94.940 - 94.968 mm
	assembly clearance size I	0.040 - 0.080 mm
	assembly clearance size II	0.044 - 0.085 mm
	wear limit	0.12 mm
Piston 525	diameter size I	94.922 - 94.950 mm
	diameter size II	94.951 - 94.978 mm
	assembly clearance size I	0.050 - 0.090 mm
	assembly clearance size II	0.034 - 0.075 mm
	wear limit	0.12 mm
Piston 540 SXS, 610 CRATE	diameter size I	99.940 - 99.948 mm
	diameter size II	99.950 - 99.958 mm
	assembly clearance	0.060 - 0.090 mm
	wear limit	0.10 mm
	Piston ring end gap	compression ring
oil scraper ring		max. 1.00 mm

ASSEMBLY CLEARANCE, WEAR LIMIT		
Valves	seat sealing intake	max. 1.50 mm
	seat sealing exhaust	max. 2.00 mm
	spring washer	min. 0.4 mm (new 0.5 mm)
Valve springs 400/520,450/525 EXC/MXC	minimum length of the outer spring	39.20 mm
	minimum length of the inner spring	36.45 mm
Valve springs conical 250 EXC	minimum length	37.70 mm
Valve springs conical 450/525 SX/SMR	minimum length	38.30 mm
Valve springs 450/525 SX/SXS/SMR	minimum length of the outer spring	32.40 mm
	minimum length of the inner spring	30.20 mm
Valve springs 540 SXS, 610 CRATE	minimum length of the outer spring	32.90 mm
	minimum length of the inner spring	30.70 mm
Oil pumps	clearance outer rotor - housing	max. 0.20 mm
	clearance outer rotor - inner rotor	max. 0.20 mm
	axial clearance	0.15 mm
Bypass valve	minimum spring length	23.5 mm
Clutch	length of springs	min. 41.5 mm (new 43 mm)
	wear limit organic up to model 2003	min. 1.70 mm
	wear limit organic from model 2004	min. 1.90 mm
Transmission shafts	axial clearance	0.1 - 0.4 mm
	eccentricity	0.06 mm
Rocker arms	axial clearance	0.02 - 0.10 mm
Balancer shaft	journal eccentricity	0.06 mm

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TIGHTENING TORQUES - ENGINE		
Hexagon collar screw, engine case, clutch cover, ignition cover	M6	10 Nm
Oil drain plug	M12x1,5	20 Nm
Allan head plug oil, screen short	M16x1,5	10 Nm
Hexagon plug, oil screen longg	M20x1,5	15 Nm
Collar screw for oil filter cover	M5	6 Nm
Plug pressure valve	M12x1,5	20 Nm
Jet screw and hollow screw, oil line	M8	10 Nm
Oil spraying nozzle	M6x0,75	Loctite 243
Screws, oil pump cover	M5	Loctite 222 + 6 Nm
Hexagon collar screw, cylinder head top section	M6	10 Nm
Hex.collar screw, cylinder head top section, water pump cover	M6	10 Nm
Hexagon collar screw, exhaust flange	M6	Loctite 243 + 10 Nm
Cylinder head screw	M10	40/50 Nm
Hexagon collar screws for cylinder/cylinder head	M6	10 Nm
Allan head screw, camshaft gear	M8	Loctite 243 + 28 Nm
Stop screw, autodecompression (up to model 2003)	M5	Loctite 222 + 8 Nm
Allan head screw, cap rocker arm	M5	6 Nm
Counter nuts, valve adjustment screw	M6x0,75	11 Nm
Allan head screw, primary gear, free wheel	M6	Loctite 648 + 16 Nm
Hexagon nut, primary gear	M20x1,5	Loctite 243 + 150 Nm
Allan head screw, balancer shaft gear	M6	Loctite 243 + 10 Nm
Nut for inner clutch hub	M18x1,5	Loctite 243 + 120 Nm
Hexagon collar screw, clutch spring	M6	Loctite 243 + 8 Nm
Allan head screw, shift roller locking piece	M6	Loctite 243 + 10 Nm
Hexagon collar screw, locking lever	M5	Loctite 243 + 6 Nm
Hexagon collar screw, shift roller	M5	Loctite 243 + 6 Nm
Hexagon collar screw securing guide, chain guide, chain tensioner	M6	Loctite 243 + 6 Nm
Hexagon collar screw, clip	M5	Loctite 243 + 6 Nm
Hexagon collar screw, chain adjuster	M6	10 Nm
Hexagon collar screw, stator MXC/EXC	M6	Loctite 243 + 10 Nm
Hexagon collar screw, stator SX	M5	Loctite 243 + 6 Nm
Hexagon collar screw, pulser coil	M5	Loctite 243 + 6 Nm
Hexagon collar nut, flywheel	M12x1	60 Nm
Hexagon collar screw, bump part kickstarter	M6	Loctite 243 + 10 Nm
Hexagon collar screw, spring hanger kickstarter	M6	Loctite 243 + 10 Nm
Hexagon collar screw, cover E-starter, only SX	M6	Loctite 243 + 10 Nm
Hexagon collar screw, hanger vent hose	M6	Loctite 243 + 10 Nm
Allan head screw, kickstarter	M8	Loctite 243 + 25 Nm
Hexagon collar screw, shift lever	M6	Loctite 243 + 10 Nm
Hexagon screw, engine sprocket	M10	Loctite 243 + 60 Nm
Spark plug	M10	10-12 Nm
Spark plug	M12x1,25	20 Nm
AH bearing bolt for electric starter, kickstarter	M6	Loctite 243 + 10 Nm
Threaded sleeve for cylinder head top section	M20x1,5	Loctite 577
Bleeder flange for housing	M12x1,5	Loctite 243