Subsection 01 (SPYDER RT (SM5/SE5))

# **SPYDER RT (SM5/SE5)**

MODEL			SPYL	DER RT
			SM5	SE5
ENGINE				•
Engine type			ROTAX® 991, 4-stroke, 60° V-twin, Dual Over Head Camshaft (DOHC), liquid cooled	
Number of cylinders				2
Number of valves			8	
Bore			97 mm (3.82 in)	
Stroke			68 mm (2.68 in)	
Displacement			998 cm <sup>3</sup> (60.9 in <sup>3</sup> )	
Compression ratio			12.2:1	
	Туре		Dry sump with separate	oil reservoir and oil cooler
	Oil filter (eng transmission)	ine and	BRP Rotax paper	r type, replaceable
	Engine oil pressure	Minimum	350 kPa (51 PSI) @ 5000 RPM	1 / 80°C (176°F) oil temperature
Lubrication		Capacity (oil change with engine filter)	3.9 L (4.1 qt (U.S. liq.))	4.2 L (4.4 qt (U.S. liq.))
	Engine oil	Capacity (oil change with engine and HCM filters)	N.A.	4.3 L (4.5 qt (U.S. liq.))
		Recommended	40 semi-synthetic (minimum) or s	grade) (P/N 293 600 121) or a 5W ynthetic motorcycle oil meeting the SL, SJ, SH or SG classification.
Exhaust system			2 into 1 with c	catalytic converter
Air filter			Paper	element
Intake valve opening			20° BTDC @ 1 mm (.04 in)	
Intake valve closing			40° ABDC @ 1 mm (.04 in)	
Exhaust valve opening			45° BBDC @ 1 mm (.04 in)	
Exhaust valve closing			5° ATDC @ 1 mm (.04 in)	
Valve clearance	Intake		0.11 mm to 0.18 mm (.0043 in to .0071 in)	
	Exhaust		0.22 mm to 0.29 mm (.0087 in to .0114 in)	
Valve stem diameter	Intake	New	5.961 mm to 5.975 mm (.2347 in to .2352 in)	
	IIItake	Service limit	5.950 mm (.2343 in)	
	Exhaust	New	5.946 mm to 5.960 mm (.2341 in to .2346 in)	
Exhaust		Service limit	5.935 mm (.2337 in)	
Valve out of round	Intake and	New	0.005 mm (.0002 in)	
	exhaust	Service limit	0.06 mm (.0024 in)	
Valve guide diameter		New	6.006 mm to 6.018 mm (.2365 in to .2369 in)	
vaive guide didifiele		Service limit	6.050 mm (.2382 in)	

			SPYDER RT		
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NGINE (cont'd)					
la ta la		New	1.00 mm to 1.40 mm (.0394 in to .0551 in)		
Value east contact width	Intake	Service limit	1.60 mm (.063 in)		
Valve seat contact width	Fybouot	New	1.25 mm to 1.55 mm (.0492 in to .061 in)		
	Exhaust	Service limit	1.80 mm (.0709 in)		
Valve lifter bucket diameter		New	33.459 mm to 33.475 mm (1.3173 in to 1.3179 in)		
		Service limit	33.440 mm (1.3165 in)		
Valve lifter bucket radial cleara	ance	Service limit	0.08 mm (.0031 in)		
	Inner spring	New	39.24 m	m (1.5449 in)	
Valve springs free length	inner spring	Service limit	38.00 m	m (1.4961 in)	
valve springs nee length	Outer spring	New	41.97 m	m (1.6524 in)	
	Outer spring	Service limit	40.50 m	m (1.5945 in)	
		New	96.940 mm to 96.950	mm (3.8165 in to 3.8169 in)	
	Size "1" / "A"	Service limit	96.920 m	nm (3.8157 in)	
Piston measurement		New	96.950 mm to 96.960 mm (3.8169 in to 3.8173 in)		
	Size "2" / "B"	Service limit	96.930 m	nm (3.8161 in)	
Diaton (aulindar algorange		New	0.050 mm to 0.075 mm (.002 in to .003 in)		
Piston/cylinder clearance		Service limit	0.090 mm (.0035 in)		
		1st	Upper compression ring, L-section		
Piston ring type		2 <sup>nd</sup>	Lower compression ring, taper-face		
		3 <sup>rd</sup>	Oil scraper ring		
Dian and say	All	New	0.15 mm to 0.35 mm (.0059 in to .0138 in)		
Ring end gap	All	Service limit	0.100 m	nm (.0039 in)	
	Upper compression ring	Service limit	0.120 mm (.0047 in)		
Ring/piston groove clearance	Lower compression ring	Service limit	0.120 mm (.0047 in)		
	Oil scraper ring	Service limit	0.100 m	nm (.0039 in)	
Cylinder bore	Size "1" / "A"	New	97.000 mm to 97.012	mm (3.8189 in to 3.8194 in)	
	Size "2" / "B"	New	97.012 mm to 97.025	mm (3.8194 in to 3.8199 in)	
Camshaft bearing journal		New	23.967 mm to 23.980	) mm (.9436 in to .9441 in)	
Canishart Scaring Journal		Service limit	23.950 mm (.9429 in)		
Camshaft bearing journal bore		New	24.007 mm to 24.020	) mm (.9452 in to .9457 in)	
canishalt bearing journal bore		Service limit	24.040 mm (.9465 in)		
Camshaft radial clearance		Service limit	0.060 mm (.0024 in)		
Cronkaboft deflection	MAG side	Service limit	0.070 mm (.0028 in)		
Crankshaft deflection	Clutch side	Service limit	0.040 mm (.0016 in)		
Crankshaft pin diameter		New	41.979 mm to 42.010 mm (1.6527 in to 1.6539 in)		
oranksnart hin nigilierei		Service limit	41.960 mm (1.652 in)		

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ENGINE (cont'd)				•	
Connecting rod big end diamet (with plain bearings)	er	Service limit	42.080 mm (1.6567 in)		
Connecting rod big end radial pl	214	New	0.020 mm to 0.045 mm (.0008 in to .0018 in)		
connecting fou big enu faular pi	dy	Service limit	0.070 mm (.0028 in)		
Connecting rod small end diame	tor	New	22.010 mm to 22.020 mm (.8665 in to .8669 in)		
	lei	Service limit	22.030 mm (.8673 in)		
Piston pin diameter		New	21.997 mm to 22.000 mm (.866 in to .8661 in)		
		Service limit	21.990 mm (.8657 in)		
CLUTCH					
Туре			Wet clutch, multi-plate, hydraulic operation (pneumatic assist)	Centrifugal clutch + wet multi-plate clutch, automatically controlled by the TCM	
Clutch fluid	Recommended		Brake fluid DOT 4	Use engine oil for lubrication	
	Capacity		60 ml (2 U.S. oz)		
Clutch spring free length		Service limit	58.00 mm (2.283 in)		
Clutch plate assembly (friction and steel driven plates) thickness		Service limit	44.90 mm (1.768 in)		
Friction and steel driven plate w	rarpage	Service limit	0.15 mm (.0059 in)		
Centrifugal clutch speed		Engagement	N.A.	2000 ± 200 RPM	
Gentinugai Glutteri Speed		Stall	N.A.	3200 ± 200 RPM	
GEARBOX					
Туре			Sequential manual 5-speed (SM5) with reverse	Sequential electronic 5-speed (SE5) with reverse	
Primary reduction gear ratio			60	/31	
		1 st	32/14		
		2 <sup>nd</sup>	29/17		
Gear ratio		3rd	26/19		
		4 <sup>th</sup>	26/23		
		5 <sup>th</sup>	24/25		
		Reverse	36/14		
Shift fork claw thickness		Service limit	3.90 mm (.1535 in)		
Width of shift fork engagement	-	Service limit	4.50 mm (.1772 in)		
	1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>rd</sup>	Service limit	29.035 mm (1.143 in)		
Free pinion bore diameter	4 <sup>th</sup>	Service limit	29.125 mm (1.1467 in)		
	5 <sup>th</sup>	Service limit	26.025 mm (1.0246 in)		
	Reverse	Service limit	40.040 mm (1.5764 in)		
	MAG side	4	34.975 mm (1.377 in)		
Main shaft journal diameter	Free pinion bearing	Service limit	24.970 mm (.9831 in)		
	Clutch side		19.970 mm (.7862 in)		

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ENGINE (cont'd)				
	MAG side Service limit		19.970 mm (.7862 in)	
Clutch shaft journal diameter	Free pinion bearing 4 <sup>th</sup> Service limit		29.030 mm (1.1429 in)	
	Free pinion bearing 5 <sup>th</sup> Service limit		21.970 mm (.865 in)	
	Clutch side	Service limit	29.965 n	nm (1.1797 in)
COOLING SYSTEM				
Туре			Liquid cooled, single	e radiator with cooling fan
Coolant			Ethyl glycol/water mix (50% coolant, 50% water). Use premixed coolant sold by BRP (P/N 219 700 362) or coolant specifically designed for aluminum engines	
	Capacity		3.2 L (3.4 qt (U.S. liq.))	
Thermostat	Opening temperature		75°C (167°F)	
Radiator fan	•		102°	°C (216°F)
Radiator cap opening pressure			90 kPa (13 PSI)	
ELECTRICAL SYSTEM				
Magneto generator output			650 W @ 6000 RPM	
Ignition system type			Electronic ignition	n with dual output coil
Ignition timing			Electronically cor	ntrolled, not adjustable
	Quantity			2
Spark plug	Make and type		NGK DCPR9E (apply heat-sink paste P12 (P/N 420 897 186) on spark plug thread)	
	Gap		0.7 mm to 0.8 mm (.028 in to .031 in)	
Engine RPM limiter setting	Forward		9500 RPM	
	Туре		Maintenance free	
Patton	Model		Yuasa YTX24HL-BS	
Battery	Voltage		12 V	
	Nominal rating		21A∙h	
Headlight			Halogen, 2 x 55 W CE Models: Halogen, 4 x 60 W	
Fog light (Spyder RTS)			Halogen, 2 x 35 W	
Taillight/brake light		2 x 2.25 W		
Turn signal lights	Front		2 x 4.5 W	
Turn signal lights	Rear		2 x 20 W	
Position lights		2 x 5 W		
License plate light			5 W	
Backup light			2 x 20 W	
Day light (Spyder RTS)		0.5 W		
Front storage compartment light (Spyder RTS)		0.2 W		

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ELECTRICAL SYSTEM (cont'd)				
	Accessories	40	А	
	TCM valves	N.A.	20 A	
	Rectifier	60	А	
Fuses	Main fuse	40	А	
(under seat)	Dynamic Power Steering (DPS) motor	40	А	
	VSS pump	40	А	
	Headlights	30	А	
	VSS valves	25	А	
	Lights: tail, position, plate & day Vbat: Cluster, VIM & DLC	15	A	
	Vbat Control: main relays Vkey: SAS, YRS, VCM, ECM, D.E.S.S., PRS & MSR	10	А	
	Vbat: Main relay Vrelayed: WPM, CL, FG, CTG, PBS pilot light, TCM, DPS	20	A	
	Vbat: Cooling fan relay	15	А	
	Vbat: Hazard, brake light switch	10	А	
Fuses (under the service center behind	Vbat: radio (XM, CB, GPS, iPOD)	15	А	
the front storage compartment)	Vbat: Backup actuator & trailer module	10	А	
	Vbat: Horn, shedding relay Vrelayed: suspension relay, heated grips, HA, LED Pilot lights: CSS, FHS, FGS	20	A	
	Vbat: Accessory plugs	10	A	
	Vrelayed: ECM	5	A	
	Vrelayed: Injectors & ignition coils	15	А	
	Vrelayed: HO2S1 & 2, EVAP, CAPS, fuel pump motor, CSV, pre-starting relay	15	A	
FUEL SYSTEM				
Fuel delivery	Туре	Multi-point Electronic with ETC (Electroni Dual throttle body (51	ic Throttle Control)	
Fuel pump	Туре	Electrical modu	le in fuel tank	
	Operating pressure	350 kPa		
Idle speed		1400 RPM ± 100	(not adjustable)	

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FUEL SYSTEM (cont'd)			<u>.</u>	
			MINIMUM OCTANE RATING	
	Туре		Regular unleaded gasoline	
		Inside North America	87 (R+M)/2	
Fuel	Octane rating	Outside North America	92 RON	
luei		00-	TANE RATING (OPTIMUM PERFORMANCE)	
	Туре	_	Premium unleaded gasoline	
		Inside North America	91 (R+M)/2	
	Octane rating	Outside North America	95 RON	
Fuel tank capacity		•	25 L (6.6 U.S. gal	.)
DRIVE SYSTEM				
Fired alaba	Туре		Drive belt	
Final drive	Ratio		28/79	
Duine helt	Material		Carbon reinforced	
Drive belt	Tension (with rear wheel lifted)		750 N ± 250 N (169 lbf ± 56 lbf)	
Final drive ratio		2.8:1		
STEERING				
Turning radius			4.84 m (15.9 ft)	
Total toe-in (vehicle on ground)		-10 mm ± 0.5 mm (394 ir	ו ± .02 in)	
Camber angle		$0^\circ \pm 0.5^\circ$		
Tie-rod maximum length unengaged threads		12 mm (.4724 in) max	imum	
Tie-rod maximum length		595 mm (23.43 in		
SUSPENSION				
FRONT				
Suspension type			Double suspension arm with anti-roll bar	
Suspension travel			151 mm (5.9 in)	
Shock absorber	Qty		2	
SHOCK ADSOLDEL	Туре		Oil damper	
Spring free length		250.5 mm ± 3 mm (9.9 in ± .1 in)		
Spring preload adjustment		5 position cam adjustment		
REAR				
Suspension type		Air pressure Swing arm with single shock		
	Spyder RT/Audio and Convenience Package		Adjustable air pressure: 69 kPa to 689 kPa (10 PSI to 100 PSI)	
Preload adjustment	Spyder RTS		Air Controlled Suspension (ACS) Compressor-controlled air suspension with 5 customized positions	

MODEL		SPYDER RT		
		SM5 SE5		
SUSPENSION (cont'd)				
Suspension travel		14	5 mm (5.7 in)	
Shock absorber	Qty	1		
SHOCK ADSOLDEL	Туре	(	Oil damper	
Spring free length		10	10 mm (3.9 in)	
Spring color code		Gold/Black/Gold		
BRAKES				
Туре		Foot-actuated. Fully integrated hydraulic 3-wheel braking system with ABS and EBD		
Front brake		Dual discs of 250 mm	n (9.8 in) with 4 piston calipers	
Rear brake		Single disc of 250 m	m (9.8 in) with 1 piston caliper	
Brake fluid	Capacity	530 r	nl (17.9 U.S. oz)	
	Туре		DOT 4	
Parking brake		Mechanical, electrica	ally actuated to the rear caliper	
Caliper	Front	4 p	vistons caliper	
Caliper	Rear	Single piston. Sliding pins caliper		
Brake pad material	Front	Organic		
Diake pau material	Rear	Organic		
Minimum brake pad thickness		1 mm (.04 in)		
Minimum brake disc thickness	Front/rear	5.3	33 mm (.21 in)	
Maximum brake disc warpage		0.1	2 mm (.005 in)	
TIRES AND WHEELS				
TIRES				
Type (use BRP recommended	Front	MC 165/65R14 47	7H (special motorcycle type)	
tires)	Rear	MC 225/50R15 76	6H (special motorcycle type)	
	Furnet	Minimum: 89 kPa (13 PSI) (0.89 bar)		
D	Front	Maximum: 117 kPa (17 PSI) (1.17 bar)		
Pressure	D	Minimum: 179 kPa (26 PSI) (1.79 bar)		
	Rear	Maximum: 207 kPa (30 PSI) (2.07 bar)		
Minimum ting the solution th	Front	2.5 mm (3/32 in)		
Minimum tire thread depth	Rear	4.0	4.0 mm (5/32 in)	
WHEELS				
0.	Front	14 in x 5 in		
Size	Rear	15 in x 7 in		
Front wheel nuts torque		105 N • m (77 lbf • ft)		
Rear drive axle nut torque		130 N • m (96 lbf • ft)		
DIMENSION				
Overall length		2 667 mm (105 in)		
Overall width		1 572 mm (62 in)		
	Windshield in upper position	1 600 mm (63 in)		
Overall height	Windshield in lower position	1 510 mm (59.5 in)		
Seat height		780 mm ± 10 mm (30.7 in ± .4 in)		

		SPYDER RT		
N	ODEL –	SM5	SE5	
DIMENSION (cont'd)				
Wheel base		1 708 mm (67 in)		
Front wheel track		1 384 mm (54.5 in)		
Ground clearance (front and u	nder engine)	115 mm (4	.5 in)	
WEIGHT AND LOADING CA	PACITY			
	Spyder RT	400 kg (882 lb)		
Dry weight	Spyder RT Audio & Convenience Package	413 kg (911 lb)		
	Spyder RTS	422 kg (930 lb)		
Front storage comportment	Capacity	55 L (14.5 U.S. gal.)		
Front storage compartment	Maximum load	16 kg (35 lb)		
	Capacity	1.8 L (.5 U.S. gal.)		
Glove box	Maximum load	2 kg (4 lb)		
Sida ataraga appartment	Capacity	23.5 L (6.2 U.S. gal.)		
Side storage compartment	Maximum load	7 kg (15 lb)		
Door storage comportment	Capacity	40.5 L (10.7 U.S. gal.)		
Rear storage compartment	Maximum load	9 kg (20 lb)		
Total vehicle load allowed (including operator, passenger, cargo and added accessories)		240 kg (525 lb)		
Gross vehicle weight rating (GVWR)		663 kg (1,462 lb)		
Maximum weight on trailer tongue		18 kg (40 lb)		
Maximum towed weight (trailer and cargo)		180 kg (400 lb)		