

TECHNICAL DATA

SI* METRIC INFORMATION GUIDE

BASE UNITS			
DESCRIPTION	UNIT	SYMBOL	
length	meter	m	
mass	kilogram	kg	
force	newton	N	
liquid	liter	L	
temperature	Celsius	°C	
pressure	kilopascal	kPa	
torque	newton•meter	N•m	
speed	kilometer per hour	km/h	
PREFIXES			
PREFIX	SYMBOL	MEANING	VALUE
kilo	k	one thousand	1 000
centi	c	one hundredth	0.01
milli	m	one thousandth	0.001
micro	μ	one millionth	0.000001
CONVERSION FACTORS			
TO CONVERT	TO †	MULTIPLY BY	
in	mm	25.4	
in	cm	2.54	
in ²	cm ²	6.45	
in ³	cm ³	16.39	
ft	m	0.3	
oz	g	28.35	
lb	kg	0.45	
lbf	N	4.4	
lbf•in	N•m	0.11	
lbf•ft	N•m	1.36	
lbf•ft	lbf•in	12	
PSI	kPa	6.89	
imp. oz	U.S. oz	0.96	
imp. oz	mL	28.41	
imp. gal	U.S. gal	1.2	
imp. gal	L	4.55	
U.S. oz	mL	29.57	
U.S. gal	L	3.79	
MPH	km/h	1.61	
Fahrenheit	Celsius	(°F - 32) ÷ 1.8	
Celsius	Fahrenheit	(°C × 1.8) + 32	

* The international system of units abbreviates SI in all languages.

† To obtain the inverse sequence, divide by the given factor. To convert "mm" to "in", divide by 25.4.

NOTE: Conversion factors are rounded off to 2 decimals for easier use.

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Subsection 02 (ENGINE AND VEHICLE)

ENGINE AND VEHICLE

VEHICLE MODEL		DS 650	DS 650 BAJA	DS 650 BAJA X	
ENGINE	Engine Type	4 Stroke, Double Overhead Camshaft, Bush Chain Drive, Liquid Cooled			
	Starting System	Electric (start in any gear with clutch applied or on neutral)			
	Number of Cylinder(s)	1			
	Number of Valves	4 Bucket Tappet-Operated Valves			
	Decompressor Type	Automatic			
	Bore	mm (in)	100 (3.94)		
	Stroke	mm (in)	83 (3.27)		
	Displacement	cm ³ (in ³)	652 (39.7)		
	Compression Ratio	9.7: 1			
	Intake Valve Opening	17° BTDC			
	Intake Valve Closing	45° ABDC			
	Exhaust Valve Opening	47° BBDC			
	Exhaust Valve Closing	15° ATDC			
	Valve Clearance When Engine Cold (maximum 35°C/95°F)	Exhaust/Intake	mm (in)	0.1 to 0.15 (.004 to .006)	
	Valve Length	Intake	mm (in)	90.91 and 90.76 (3.579 and 3.573)	
		Exhaust	mm (in)	90.65 and 90.05 (3.568 and 3.545)	
	Plate Diameter	Intake	mm (in)	36 (1.42)	
		Exhaust	mm (in)	31 (1.22)	
	Shaft Diameter	Intake	mm (in)	5.95 (.24)	
		Exhaust	mm (in)	5.935 (.23)	
	Valve Seat Angle	Intake	mm (in)	45°	
		Exhaust	mm (in)	30°	
	Piston Ring End Gap	New Minimum	mm (in)	0.2 (.008)	
		New Maximum	mm (in)	0.4 (.016)	
		Wear Limit	mm (in)	1 (.04)	
	Ring/Piston Groove Clearance	New Minimum	mm (in)	0.03 (.0012)	
		New Maximum	mm (in)	0.065 (.0026)	
		Wear Limit	mm (in)	0.15 (.006)	
	Piston/Cylinder Clearance	Wear Limit	mm (in)	0.09 (.004)	
	Cylinder	New Minimum	mm (in)	100 (3.9371)	
		New Maximum	mm (in)	100.012 (3.9376)	
		Wear Limit	mm (in)	100.03 (3.9382)	
	Crankshaft Balance Factor	%		47 ± 3	
	Crankshaft Deflection	mm (in)		0.1 (.004)	
	Connecting Rod Big End Axial Play	Wear Limit	mm (in)	0.8 (.794)	
	Connecting Rod Small End I.D.	Wear Limit	mm (in)	22.04 (.868)	
	Connecting Rod/Piston Pin Clearance	Wear Limit	mm (in)	0.06 (.002)	
	Camshaft (intake and exhaust)	Bearing Point Ø	mm (in)	21.95 (.864)	
		Cam Height	mm (in)	39.7 (1.56)	
	Timing Chain (gap from sealing face to piston of chain tensioner)	mm (in)		9.5 (.374)	
Lubrication	Dry Sump Lubrication by Oil Pump Replaceable Oil Filter				
Oil Filter	Main-Flow Type				
Air Filter Type	Cleanable Synthetic Panelette/Foam				
Exhaust System	Type	Bombardier, Stainless Header Pipe Painted Steel Muffler			
	Spark Arrester	USFS Approved			

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VEHICLE MODEL		DS 650	DS 650 BAJA	DS 650 BAJA X	
ELECTRICAL	Magneto/Generator	290 W @ 6000 RPM			
	Ignition System Type	CDI (Capacitor Discharge Ignition)			
	Spark Plug	Make and Type	NGK DR8EA		
		Gap mm (in)	0.65 (.026)		
	Trigger Coil	Ω	190 - 300		
	Battery Charging Coil	Ω	0.3 @ 0.5		
	Ignition Coil	Primary	Ω	0.4 to 0.9 @ 20°C (68°F)	
		Secondary	kΩ	6 @ 13	
	Engine RPM Limiter		7700 (any gear in forward)	7900 (any gear in forward)	
	Battery	Type	Dry Battery Type		
		Voltage	12 Volts		
		Nominal Rating	13 A•h		
		Power Starter Output	0.9 KW		
	Head Lamp		30/30		
Auxiliary Head Light		N.A.	2 x 35 W, H3	2 x 35 W, H3	
Taillight and Brake Light		8/27 W, 1157			
Fuse	Fan	15 A			
	Auxiliary Headlights	N.A.	15 A		
	Main	25 A			
CARBURATION	Carburetor	Type	Mikuni Constant Depression Type with Manual Choke		
		Model	BSR42-4		
	Idle Engine Speed	RPM	1300 ± 100		
	Main Jet		165		
	Needle Jet		00		
	Jet Needle		6BCY22-60-4		
	Needle Valve and Seat		3.0 Hi Flow		
	Pilot Jet		40		
	Starter Jet No. 1 and No. 2	mm (in)	45 - Ø 2 (1.77 - Ø .079)		
	Main Air Jet		120		
	Pilot Air Jet No. 1		110		
	Pilot Air Jet No. 2	mm (in)	1.3 (.05)		
	Clip Position Number		4		
	Choke Plunger Position		2		
Adjustment	Preliminary Pilot Screw Turn	Position for Maximum Speed at Idle			
	Idle Speed Preliminary Adjustment	At Least 1 Turn			
	Float Level mm (in)	10 ± .5 (.394 ± .020)			
Fuel	Type	Super Unleaded Gasoline			
	Octane No.	91 (Ron + Mon)/2			
COOLING	Cooling Type	Liquid Cooled with Integrated Water Pump			
	Radiator	Front Mounted			
	Fan	Thermostatic			
	Fan Thermostat	Opening Temperature	90°C (205°F)		
		Closing Temperature	95°C (221°F)		
	Engine Thermostat	Opening Temperature	85°C (185°F)		
		Closing Temperature	75°C (167°F)		
Radiator Cap Opening Pressure		110 kPa (16 PSI)			

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VEHICLE MODEL			DS 650	DS 650 BAJA	DS 650 BAJA X
TRANSMISSION	Transmission	Type	Integrated 5-Speed Constant Mesh Transmission		
	Clutch		1 Multi-Disc		
	Clutch Drum I.D.	mm (in)	145 (5.71)		
	Friction Plate Warpage (fall through a slot)	mm (in)	3.75 (.1476)		
	Friction Plate Wear Limit of the Whole Package	mm (in)	27.5 (1.0827)		
	Steel Driven Plate Warpage (fall through a slot)	mm (in)	1.63 (.0642)		
	Steel Driven Plate Wear Limit of the Whole Package	mm (in)	11.5 (.4528)		
	Clutch Spring Minimum Rate		27.4 mm @ 210 N (1.0787 in @ 47 lbf)		
	Clutch Spring Minimum Length	mm (in)	43 (1.69)		
DRIVE TRAIN	Drive Chain		Regina 530 ORT4		
	Engine Pinion	Teeth	16		
	Axle Sprocket	Teeth	40		
	Rear Axle		Shaft Driven/Solid Axle		
	Rear Axle Ratio		3.6: 1		
STEERING/ CONTROL	Turning Radius	mm (in)	3159 (124)		
	Total Toe-Out (vehicle on ground)	mm (in)	0.5 ± 0.5 (.0197 ± .0197)		
	Camber Angle/Caster Angle		0°/5.7°		
	Tie-Rod Maximum Length Unengaged	mm (in)	20 ± 5 (.787 ± .197)		
	Tie-Rod Maximum Length	mm (in)	452 (17.78)		
SUSPENSION	FRONT				
	Suspension Type		Independent Suspension — Double A-Arm		
	Suspension Travel	mm (in)	305 (12)		
	Shock Absorber	Qty		2	
		Type		Oil	Oil/Gas
	Spring Free Length	mm (in)	368 (14.5)		
	Spring Color Code		Gold/Blue/Black	Gold/Green/Black	Green/Blue/Blue
	Front Preload Adjustment		Seat of Spring Threaded		
	REAR				
	Suspension Type		Rigid Swing Arm		
	Suspension Travel	mm (in)	279.4 (11)		
	Shock Absorber	Qty		1	
		Type		Oil/Gas	
	Spring Free Length	Short	mm (in)	52.7 (2.07)	
		Long	mm (in)	251.5 (9.90)	
Spring Color Code	Short		White/Yellow/Black	Silver/Yellow/Black	
	Long		Blue/Red/Red		
Rear Preload Adjustment		Seat of Spring Threaded			
BRAKES	Front Brake	Qty	2 discs		
		Type	Hydraulic		
	Rear Brake	Qty	1 disc		
		Type	Hydraulic		
	Parking Device		RH Brake Lever Includes a Lock on Front Wheels		
	Lining Material		Metallic		
	Minimum Pad Thickness		1 mm (0.04 in) or Refer to the Mark on the Pad		
	Minimum Brake Disk Thickness	mm (in)	3.5 (.138)		
Maximum Brake Disk Warpage	mm (in)	0.25 (.01)			
Caliper		Floating			

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VEHICLE MODEL				DS 650	DS 650 BAJA	DS 650 BAJA X
TIRES AND WHEELS	TIRE					
	Pressure	Front	Recommended	34 kPa (5 PSI)		
			Minimum	21 kPa (3 PSI)		
		Rear	Recommended	34 kPa (5 PSI)		
			Minimum	21 kPa (3 PSI)		
	Minimum Tire Thread Depth			mm (in)	4 (0.16)	
	Size	Front	22 x 7 x 10			
		Rear	20 x 10 x 9			
	WHEELS					
	Size	Front	10 x 5.5			
Rear		9 x 8.5				
DIMENSION	Overall Length			mm (in)	1956 (77)	1968 (77.5)
	Overall Width	Front	mm (in)	1232 (48.5)		
		Rear	mm (in)	1232 (48.5)		
	Overall Height			mm (in)	1206 (47.5)	
	Dry Weight			kg (lb)	225 (495)	
	Total Vehicle Load Allowed			kg (lb)	125 (275.5)	
	Wheel Base			mm (in)	1244 (49)	
	Wheel Track	Front	mm (in)	1048 (41)		
		Rear	mm (in)	978 (38.5)		
	Front and Under Engine Ground Clearance			mm (in)	297 (11.7)	
Rear Rigid Axle Ground Clearance			mm (in)	120 (4.75)		
CAPACITIES	LIQUID					
	Fuel Tank			12 L (3.5 U.S. gal)		
	Fuel Tank Reserve			2.4 L (0.6 U.S. gal)		
	Engine/Transmission Oil	Capacity		3 L (0.8 U.S. gal)		
		Recommended		SAE 10W40, 4 Stroke Mineral Based Oil SG, SH or SJ or Bombardier synthetic oil 5W40 (P/N 293 600 039). Do Not Use Synthetic Oil, other than Bombardier brand name or any Synthetic Blend Oil. Refer to OIL VISCOSITY CHART for proper grade.		
	Hydraulics Brakes	Capacity		250 mL (8.5 U.S. oz)		
		Recommended		Brake Fluid DOT 4, ONLY		
	Cooling System	Capacity		1.75 L (0.58 U.S. gal)		
		Recommended		Use Coolant Specially Designed for Aluminum Engine		
	Ethylene-Glycol Concentration			50%		

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VEHICLE MODEL		DS 650	DS 650 BAJA	DS 650 BAJA X	
MATERIAL	Frame	Material	Steel		
		Color	Grey		
	Front/Rear Bumper	Material	Steel	Aluminum	
		Color	Grey	Aluminum	
	Front/Rear Fender	Material	High Density Polyethylene		
		Color	Yellow or Black	Orange	
	Fuel Tank Cover	Material	High Density Polyethylene		
		Color	Black		
	Steering Cover	Material	Foam and Vinyl		
		Color	Yellow or Black	Orange	
	Front Facia	Material	High Density Polyethylene		
		Color	Red	Black	
	Air Box and Cover	Material	Low Density Polyethylene		
		Color	Black		
	Mudguard	Material	Synprene		
		Color	Black		
	Seat Cover	Material	Vinyl		
		Color	Black/Orange		

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VEHICLE MODEL		DS 650	DS 650 BAJA	DS 650 BAJA X	
TORQUE	ENGINE				
	Engine Support	M8	26 N•m (19 lbf•ft)		
		M10	64 N•m (47 lbf•ft)		
		M14	135 N•m (100 lbf•ft)		
	Spark Plug		20 N•m (15 lbf•ft)		
	Magneto Nut		180 N•m (133 lbf•ft)		
	Starter		10 N•m (89 lbf•in)		
	Starter Red (+) Cable		6 N•m (53 lbf•in)		
	Oil Pressure Switch		12 N•m (106 lbf•in)		
	COOLING				
	Radiator Mount Screw/Nut		10 N•m (89 lbf•in)		
	Radiator Protector		1.5 N•m (13 lbf•in)		
	Temperature Sensor		22 N•m (16 lbf•ft)		
	Water Pump Cover		10 N•m (89 lbf•in)		
	Fan Mount Screw/Nut		11 N•m (97 lbf•in)		
	Temperature Sender		35 N•m (26 lbf•ft)		
	EXHAUST				
	Exhaust Pipe Nut		11 N•m (97 lbf•in)		
	Heat Shield Screws		10 N•m (89 lbf•in)		
	Exhaust Pipe Collar		15 N•m (133 lbf•in)		
	Muffler Support		26 N•m (19 lbf•ft)		
	Pipe Support		10 N•m (89 lbf•in)		
	FUEL				
	Carburetor Mounting Clamp	Engine Side	2.5 N•m (22 lbf•in)		
		Air Box Side			
	DRIVE TRAIN				
	Front Wheel Hub Nut		135 N•m (100 lbf•ft) (MINIMUM)		
	Rear Wheel Hub Nut		235 N•m (173 lbf•ft) (MINIMUM)		
	Rear Axle Adjusting Nut		Refer to REAR AXLE section for the proper torquing sequence.		
	Sprocket Protector		4 N•m (35 lbf•in)		
	Eccentric Axle Housing Bolts		44 N•m (32 lbf•ft)		
	Sprocket Nuts		80 N•m (59 lbf•ft)		
	Chain Roller		23 N•m (17 lbf•ft)		
	WHEEL				
	Wheel Nuts		53 N•m (39 lbf•ft)		
	STEERING/CONTROL				
Tie Rod Ends		75 N•m (55 lbf•ft)			
Steering Arm (castellated nut)		58 N•m (43 lbf•ft)			
Steering Column Support Screws		23 N•m (17 lbf•ft)			
Handlebar Screws		23 N•m (17 lbf•ft)			
Flanged Bearing Bolts		10 N•m (89 lbf•in)			

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VEHICLE MODEL		DS 650	DS 650 BAJA	DS 650 BAJA X
TORQUE	SUSPENSION			
	Shock Absorber Bolt	Front	48 N•m (35 lbf•ft)	
		Rear	85 N•m (63 lbf•ft)	
	Rear Swing Arm LH First Nut		100 N•m (74 lbf•ft), Unscrew Nut a Quarter Turn	
	Rear Swing Arm LH Nut		100 N•m (74 lbf•ft)	
	Upper/Lower A-Arm Lock Nut		60 N•m (48 lbf•ft)	
	Ball Joint Nuts		50 N•m (37 lbf•ft) MINIMUM	
	BRAKE			
	Caliper Brake Screws		24 N•m (17 lbf•ft)	
	Brake Disk Screws		34 N•m (25 lbf•ft)	
	BODY/FRAME			
	Front Bumper		24 N•m (17 lbf•ft)	
	Rear Extension Frame		48 N•m (35 lbf•ft)	
	Footrest		10 N•m (89 lbf•in)	
	Skid Plate		4 N•m (35 lbf•in)	