TECHNICAL SPECIFICATIONS – ENGINE 400/620 SC '99

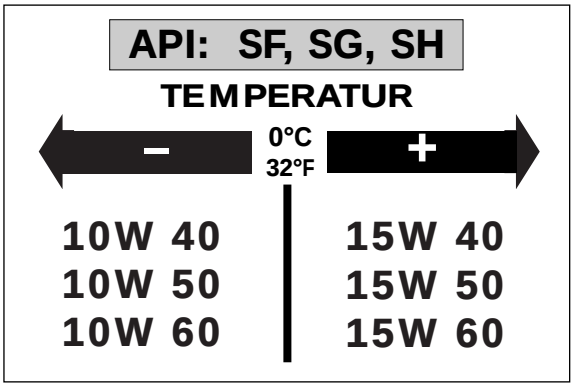
Engine	**400**	**620**
Design	Liquid-cooled single cylinder 4-stroke engine with balancer shaft	
Displacement	398 ccm	609 ccm
Bore / Stroke	89 / 64 mm	101 / 76 mm
Ratio	10,8 : 1	10,4 : 1
Fuel	unleaded premium gasoline with a least RON 95	
Valve timing	4 valves over rocker arm and 1 overhead camshaft, camshaft drive through single chain	
Camshaft	249/1	
Valve timing by 1 mm valve clearence	IO 22° BTDC EO 60° BBDC IC 42° ABDC EC 4° ATDC	IO 15° BTDC EO 52° BBDC IC 54° ABDC EC 17° ATDC
Valve diameter	Intake: 36 mm Exhaust: 30 mm	
Valve clearence cold	Intake: 0,20 mm Exhaust: 0,20 mm	Intake: 0,15 mm Exhaust: 0,15 mm
Crank shaft bearing	2 cylinder roller bearing	
Connecting rod bearing	needle bearing	
Top end bearing	bronze bushing	
Piston	cast aluminium alloy	
Piston rings	1 compression ring, 1 taper face ring, 1 oil scraper ring	
Engine lubrication	forced-feed lubrication through Eaton-Oilpump with oil sump	
Engine oil	see bellow #	
Engine oil quantity	1,6 liters (0,42 US gallons)	
Primary ratio	straight geared spur wheels 30 : 81 teeth	
Clutch	multi disc clutch in oil bath	
Transmission	5-speed claw shifted	
Gear ratio	1st 14:35 2nd 15:24 3rd 18:21 4th 20:19 5th 22:18	
Ignition system	contactless thyristor ignition with electronic advanced system type KOKUSAN 4K3	
Ignition timing	400: adjustment to max. 40 ° BTDC at 5000 rpm 620: adjustment to max. 36 ° BTDC at 5000 rpm	
Generator	12V 110W	
Spark plug	NGK DPR8 EA-9	
Spark plug gap	0,6 mm	
Cooling system	liquid cooled, permanent rotation of cooling liquid through mechanic driven water pump	
Cooling liquid	1 liter, 40% antifreeze, 60% water, at least –25°C (–13°F)	
Starting equipment	decompressor automatic and hand actuated, cold and hot start knob on carburetor	

BASIC CARBURETOR SETTING

	400 SC (20 kW)	**400 SC**	**620 SC (20 kW)**	**620 SC**
Carburetor	PHM 38 SD	PHM 38 SD	PHM 40 SD	PHM 40 SD
Carburetor setting number	300896	4894/6	110996	4922
Main jet	150	190	155	195
Needle jet	DR 266	DR 270 (DR 272)	DR 268	DR 272
Idling jet	45	45	45	45
Jet needle	K 51	K 51	K 51	K 51
Needle position from top	3 rd	2 nd	3 rd	2 nd
Mixture.adju. screw open	1,5 turn	1,5 turn	1,5 turn	1,5 turn
Throttle valve	40	40	40	40
Starting jet	45	45	45	45
Performance restrictor	slide stop 22 mm	–	slide stop 26 mm	–

ASSEMBLY CLEARANCE, WEAR LIMIT		
Crank shaft	axial play	0,03 - 0,12 mm (0,001-0,005 in)
	run out of crank stud	max. 0,04 mm (0,002 in)
Connecting rod bearing	radial play	max. 0,05 mm (0,002 in)
	axial play	max. 1,00 mm (0,04 in)
Piston forged	assembly clearance	max. 0,12 mm (0,005 in)
Piston cast	assembly clearance	max. 0,05 mm (0,002 in)
Piston rings end gap	compression rings	max. 0,60 mm (0,023 in)
	oil scraper ring	max. 0,80 mm (0,031 in)
Valves	seat sealing intake	max. 1,50 mm 0,059 in)
	seat sealing exhaust	max. 2,00 mm (0,080 in)
	run out of valve heads	max. 0,03 mm (0,001 in)
	valve guides diameter	max. 7,05 mm (0,277 in)
Oil pump	clearance outer rotor - housing	max. 0,20 mm (0,008 in)
	clearance outer rotor - inner rotor	max. 0,20 mm (0,008 in)
Bypaß valve	minimum spring lenght	25 mm (1 in)
Clutch discs	wear limit organic	2,5 mm (0,1 in)
Clutch springs	minimum lenght	34,5 mm (new 37 mm) (1,36 in - new 1,45 in)
Transmission shafts	axial play	0,1 - 0,4 mm (0,004 - 0,016 in)

TIGHTENING TORQUES - ENGINE			
Hexagon nut at primary gear	M20x1,5	Loctite 242 +170Nm	(125 ft.lb)
Collar nut flywheel	M12x1 LH thread	60 Nm	(44 ft.lb)
Hexagon nut for inner clutch hub	M18x1,5	Loctite 648 + 80 Nm	(59 ft.lb)
Kickstarter stop screw	M12x1,5	50 Nm	(37 ft.lb)
AH screws oil pump	M6	Loctite 242 + 8 Nm	(6 ft.lb)
Hexagon screw camshaft gear	M10	35 Nm	(26 ft.lb)
AH screw cylinder head top sect.	M6x25	8 Nm	(6 ft.lb)
AH screw cylinder head top sect.	M6x50/M6x55 (12.9)	20 Nm	(15 ft.lb)
AH screw cylinder head top sect.	M6x65/M6x70 (8.8)	8 Nm	(6 ft.lb)
Cylinder head screws	M10	50 Nm	(37 ft.lb)
Collar nuts at cylinder base	M10	40 Nm	(30 ft.lb)
Hexagon screw chain sprocket	M10	Loctite 242 + 40 Nm	(30 ft.lb)
Oil drain plug	M22x1,5	30 Nm	(22 ft.lb)
Magnetic plug	M12x1,5	20 Nm	(15 ft.lb)
Plug bypass valve	M12x1,5	20 Nm	(15 ft.lb)
Banjo bolts oil lines	M8x1	10 Nm	(7 ft.lb)
Banjo bolt oil lines	M10x1	15 Nm	(11 ft.lb)
Jet screw clutch cover	M8x1	10 Nm	(7 ft.lb)
Screw plug timing-chain tensioner	M12x1,5	20 Nm	(15 ft.lb)
Counternuts valve adjusting screws	M7x0,75	20 Nm	(15 ft.lb)
Spark plug	M12x1,25	20 Nm	(15 ft.lb)
Crankshaft locking screw	M8	25 Nm	18 ft.lb)
Engine fastening screw	M8	40 Nm	(30 ft.lb)
	M10	70 Nm	(51 ft.lb)



#

Engine oil

Use only oil brands (Shell Advance Ultra 4), which meet quality requirements of API-classes SF, SG or SH (informations on bottles) or higher. Both, mineral and synthetic oils with above specifications can be used.

! CAUTION !

POOR OIL QUALITY OR MINOR QUANTITY EFFECT EARLY ENGINE-WEAR.