

## TECHNICAL DATA – ENGINE 400/640 LC4 '99

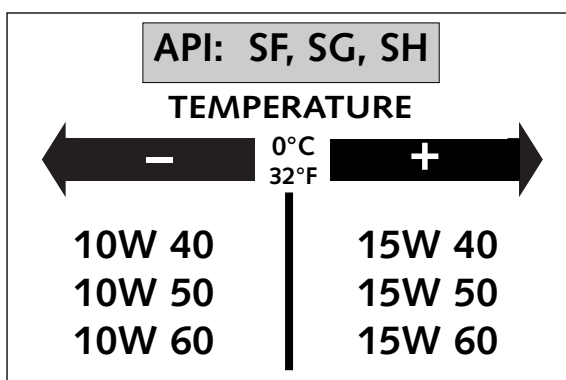
Type	400 LC4	640 LC4
Design	Liquid-cooled single cylinder 4-stroke engine with balancer shaft and electric starter	
Displacement	398 ccm	624,6 ccm
Bore / Stroke	89 / 64 mm	101 / 78 mm
Ratio	10,8 : 1	11,0 : 1
Fuel	unleaded premium gasoline with a least RON 95	
Valve timing	4 valves over rocker arm and 1 overhead camshaft, camshaft drive through single chain	
Camshaft	(249/1)	
Valve timing by 1 mm valve clearance	IO 22° BTDC EO 60° BBDC IC 42° ABDC EC 4° ATDC	IO 13° BTDC EO 53° BBDC IC 51° ABDC EC 11° ATDC
Valve diameter	Intake: 36 mm Exhaust: 30 mm	
Valve clearance 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	forged/cast aluminium alloy	
Piston rings	1 compression ring, 1 taper face ring, 1 oil scraper ring	
Engine lubrication	2 Eaton-Oilpumps	
Quantity of engine oil	see table	
Engine oil	2.1 liters including frame	
Primary ratio	straight geared spur wheels 30 : 81 teeth	
Clutch	multi disc clutch in oil bath	
Transmission	5-speed claw shifted	
Ignition system	contactless DC- CDI ignition with digital advanced system type KOKUSAN	
Ignition timing	adjustment to max. 38° BTDC at 6000 rpm	
Generator	12V 200W	
Spark plug	NGK DR8EA	
Spark plug gap	0.7 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	electric starter, kick starter	

### ASSEMBLY CLEARANCE, WEAR LIMIT

Crank shaft	axial play . . . . .	.003 - 0.12 mm
	run out of crank stud . . . . .	.max. 0.08 mm
Connecting rod bearing	radial play . . . . .	.max. 0.05 mm
	axial play . . . . .	.max. 1.10 mm
Cylinder 400	bore . . . . .	.max. 89.04 mm
Cylinder 640	bore . . . . .	.max. 101.04 mm
Piston forged	assembly clearance . . . . .	.max. 0.12 mm
Piston cast	assembly clearance . . . . .	.max. 0.05 mm
Piston rings end gap	compression rings . . . . .	.max. 0.80 mm
	oil scraper ring . . . . .	.max. 1.00 mm
Valves	seat sealing intake . . . . .	.max. 1.50 mm
	seat sealing exhaust . . . . .	.max. 2.00 mm
	run out of valve heads . . . . .	.max. 0.05 mm
	valve guides diameter . . . . .	.max. 7.05 mm
Oil pumps	clearance outer rotor - housing . . . . .	.max. 0.20 mm
	clearance outer rotor - inner rotor . . . . .	.max. 0.20 mm
Bypaß valve	minimum spring length . . . . .	25.00 mm
Clutch	Length of springs . . . . .	.min. 34.5 mm (new 37.00 mm)
	wear limit organic . . . . .	.min. 2.50 mm
Camshaft	diameter of bearing bolt (needle bearing) . . . . .	.min. 19.97 mm
Transmission shafts	axial play . . . . .	.0.10 - 0.40 mm

<b>TIGHTENING TORQUES - ENGINE</b>			
Hexagon nut at primary gear	M20x1.5	Loctite 242 + 170 Nm	(125 ft.lb)
Collar nut flywheel	M16x1.25 LH thread	80° C + 150 Nm	(132 ft.lb)
Hexagon nut for inner clutch hub	M18x1.5	80 Nm	(60 ft.lb)
Kickstarter stop screw	M12x1.5	50 Nm	(35 ft.lb)
Allan head screws oil pump	M6	Loctite 242 + 8 Nm	(6 ft.lb)
Allan head screws freewheel hub	M6x12/M6x12.5	Loctite 648 + 18 Nm	(13 ft.lb)
Hexagon screw camshaft gear	M10	Loctite 242 + 35 Nm	(26 ft.lb)
Allan head screw cylinder head top sect.	M6x25/M6x65/M6x70 (8.8)	8 Nm	(6 ft.lb)
Allan head screw cylinder head top sect.	M6x50/M6x55 (12.9)	20 Nm	(15 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)
Hollow screws oil lines	M8x1	10 Nm	(7.4 ft.lb)
Hollow screws oil lines	M10x1	15 Nm	(11 ft.lb)
Jet screw clutch cover	M8	10 Nm	(7,4 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)
Crankshaft locking bolt	M8	25 Nm	(19 ft.lb)
Engine mounting bolt	M8	40 Nm	(30 ft.lb)
Engine mounting bolt	M10	70 Nm	(50 ft.lb)

<b>GEAR RATIOS</b>				
Primary ratio	Transmission	Original final drive ratio	Available chain drive sprockets	Available final drive sprockets
30:81	1st gear 14:35	15:45	15 t	38 t
	2nd gear 15:24			40 t for chain
	3rd gear 18:21			42 t <sup>5</sup> / <sub>8</sub> x <sup>1</sup> / <sub>4</sub> "
	4th gear 20:19			45 t
	5th gear 22:18			48 t



### Engine oil

Use only oil brands, 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.

<b>BASIC CARBURETOR SETTING</b>		
	<b>400 LC4</b> 25 kW	<b>400 LC4</b> 31 kW
Type	PHM 38 ND	PHM 38 ND
Carb.-setting number	100197	100197
Main jet	130	130
Needle jet	AR 264	AR 264
Idling jet	50	50
Jet needle	K 23	K 23
Needle clip pos. f. top	2. from top	2. from top
Mixt. adj. screw open	1.5 turns	1,5 turns
Throttle valve	50/1	50/1
Starting jet	45(50,55)	45(50,55)
Performance restrictor	slide stop 51mm	–

<b>BASIC CARBURETOR SETTING</b>		
	<b>640 LC4</b> 25 kW	<b>640 LC4</b> 36 kW
Type	BST40-225	BST40-225
Carb.-setting number	080298	090298
Main jet	142,5	142,5
Needle jet	689 X-6	689 X-6
Idling jet	45	45
Jet needle	6G5	6G5
Needle clip pos. f. top	3. from top	3. from top
Mixt. adj. screw open	2,25	2,25
Throttle valve	–	–
Starting jet	–	–
Performance restrictor	slide stop 17mm	–