



# SERVICE MANUAL SUPPLEMENT

## CHAIN SAW

### ECHO: CS-400

(Serial number : 11000001-11999999)  
(Serial number : 12000001-12999999)  
(Serial number : 13000001-13999999)

#### INTRODUCTION

We are constantly working on technical improvement of our products. For this reason, technical data, equipment and design are subject to change without notice. All specifications and directions in this SERVICE DATA are based on the latest products information available at the time of publication.

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Reference No. 01-40D-00  
ISSUED : 201002



## 1 SERVICE INFORMATION

## 1-1 Specifications

Model		CS-400	
Dimensions	Length*	mm(in)	393 (15.47)
	Width	mm(in)	245 (9.65)
	Height	mm(in)	277 (10.91)
Dry weight*		kg(lb)	4.6 (10.1)
Engine	Type	YAMABIKO, air-cooled, two-stroke, single cylinder	
	Rotation	Clockwise as viewed from the output end	
	Displacement	cm <sup>3</sup> (in <sup>3</sup> )	40.2 (2.453)
	Bore	mm(in)	40.0 (1.575)
	Stroke	mm(in)	32.0 (1.260)
	Compression ratio	6.5	
Carburetor	Type	Diaphragm, horizontal-draught, with purge bulb**	
	Model	Walbro WT-985	
	Venturi size-Throttle bore	mm(in)	13.50 - 15.85 (0.532 - 0.624)
Ignition	Type	CDI (Capacitor discharge ignition) system with electronic timing advancer and speed governor	
	Spark plug	BPM8Y (CANADA : BPMR8Y)	
Exhaust	Muffler type	Spark arrester muffler with catalyst	
Starter	Type	Automatic rewind	
	Rope diameter x length	mm(in)	3.0 x 900 (0.14 x 35.4)
Fuel	Type	Premixed two-stroke fuel	
	Mixture ratio	50 : 1 (2 %)	
	Gasoline	Minimum 89 octane gasoline	
	Two-stroke air cooled engine oil	ISO-L-EGD (ISO/CD13738), JASO M345-FC/FD	
	Tank capacity	L (U.S.fl.oz.)	0.41 (13.9)
Clutch	Type	Centrifugal, 3-shoe slide with 3-tension spring	
Guide bar / Saw chain lubrication type		Automatic with volume adjuster	
Oil	Tank capacity	L (U.S.fl.oz.)	0.28 (9.5)
Sprocket	Type	Spur	
	Number of teeth	6	
	Pitch	in	3/8
Chain tensioner type		Side Access	

\* Without guide bar and saw chain. \*\* Purge bulb on engine body

Cutting devices			
Guide bar	Part No.	16A0ED3757	18A0ED3762
	Called length	in	16
	Gauge	in	0.050
Saw chain	Type	OREGON 91VG	
	Number of drive links	57	62
	Pitch	in	3/8
	Gauge	in	0.050

## 1-2 Technical data

Engine			
Idling speed	RPM	2,650 +/- 250	
Wide open throttle speed*	RPM	12,000 - 12,600	
Clutch engagement speed	RPM	4,100	
Service limit speed <sup>†</sup>	RPM	3,200	
Compression pressure	MPa (kgf/cm <sup>2</sup> ) (psi)	0.88 (8.9) (127)	
Ignition system			
Spark plug gap	mm(in)	0.6 - 0.7 (0.024 - 0.028)	
Minimum secondary voltage at 1,000 RPM	kV	15	
Primary coil resistance	Ω	200 - 400	
Secondary coil resistance	kΩ	1.5 - 2.2	
Pole shoe air gaps	mm(in)	0.3 - 0.4 (0.012 - 0.016)	
Ignition timing	at 3,000 RPM	°BTDC	10
	at 8,000 RPM	°BTDC	32
	at 10,000 RPM	°BTDC	34
PET-9000 Parameter	#1		317
	#2		04
Carburetor			
Idle adjust screw initial setting	turns in**		1 3/8
Test Pressure, minimum	MPa (kgf/cm <sup>2</sup> ) (psi)		0.05 (0.5) (7.0)
Metering lever height	mm(in)		1.65 (0.06) lower than diaphragm seat
Chain oil discharge volume at 7,000 RPM			Adjustable : 1.5 - 13 (0.05 - 0.40)
	mL/min(U.S.fl.oz./min)		(Factory set 7 mL/min)
BTDC: Before top dead center.			

\* With 16 in. guide bar and saw chain.

\*\*Set idle adjust screw to contact throttle plate before initial setting.

† If clutch engagement speed is lower than service limit speed, replace clutch assembly with new one.

## 1-3 Torque limits

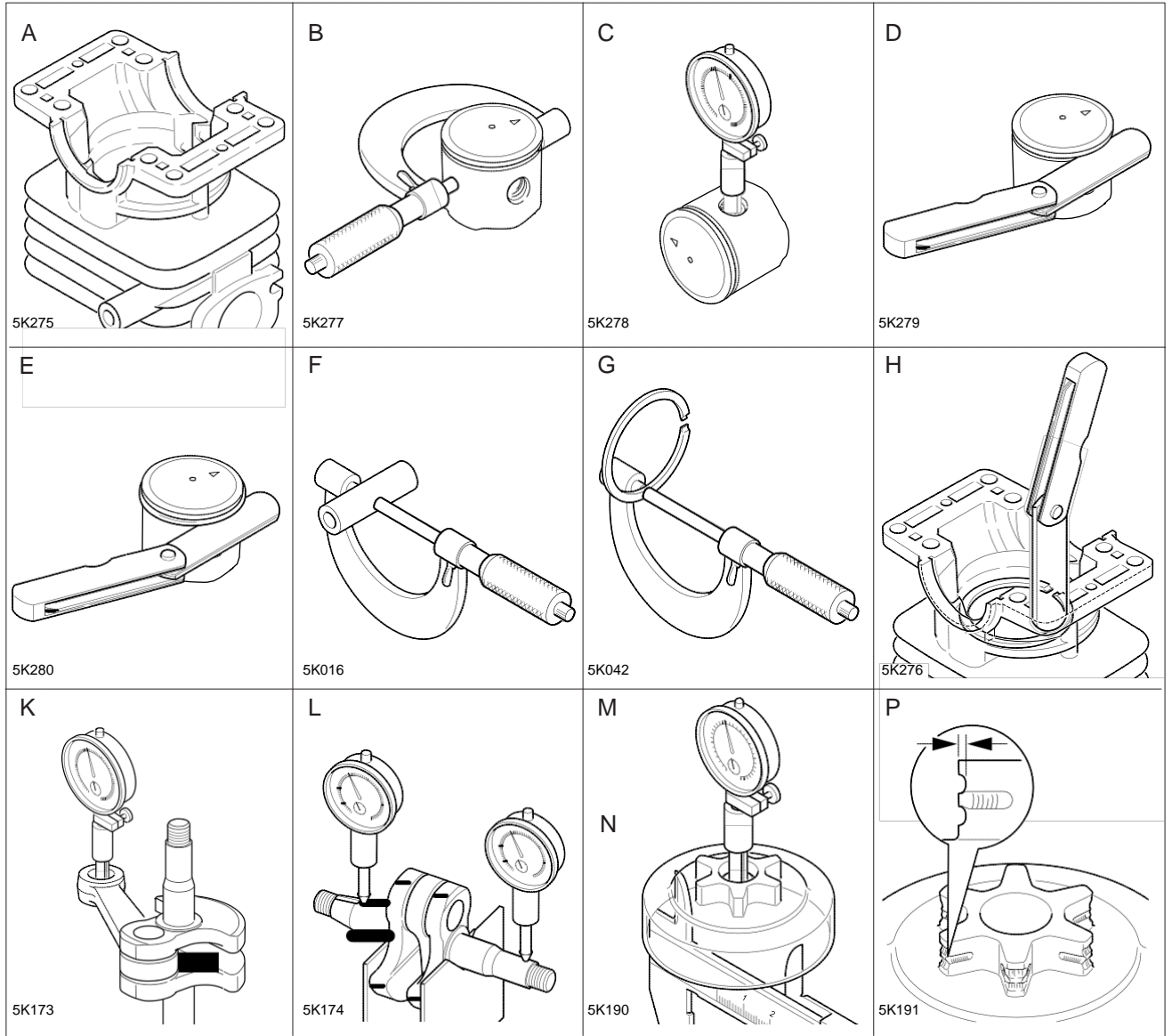
Descriptions		Size	kgf•cm	N•m	in•lbf
Starter system	Starter pawl	M5	40 - 60	4 - 6	35 - 50
	Starter case	M5**	25 - 35	2.5 - 3.5	22 - 30
Ignition system	Magneto rotor (Flywheel)	M8	250 - 290	25 - 29	220 - 250
	Ignition coil	M5	40 - 60	4 - 6	35 - 50
	Ignition switch	M14	15 - 30	1.5 - 3	13 - 26
	Spark plug	M14	150 - 170	15 - 17	130 - 150
Fuel system	Carburetor	M5	30 - 45	3 - 4.5	26 - 40
	Carburetor elbow	M5**	20 - 30	2 - 3	17 - 26
	Intake bellows	M5	30 - 45	3.0 - 4.5	26 - 40
Clutch	Clutch hub	LM10	300 - 400	30 - 40	260 - 350
Engine	Crankcase	M5*	70 - 110	7 - 11	60 - 95
	Engine mount	M5	70 - 110	7 - 11	60 - 95
	uffler	M5	80 - 110	8 - 11	70 - 95
	Cylinder cover	M5	25 - 45	2.5 - 4.5	22 - 40
Others	Auto-oiler	M4	20 - 35	2.5 - 3.5	17 - 30
	Front handle	M5**	45 - 65	4.5 - 6.5	40 - 55
	Rear handle assembly	M5	30 - 50	3 - 5	26 - 45
		M4	35 - 50	3.5 - 5	30 - 45
	Handle lid	M4	10 - 20	1 - 2	9 - 17
	Brake lever (Hand guard)	M5**	10 - 20	1 - 2	9 - 17
		M4**	45 - 65	4.5 - 6.5	40 - 55
	Sprocket guard plate	M4**	10 - 20	1 - 2	9 - 17
	Chain catcher	M5	45 - 60	4.5 - 6	40 - 52
	Guide bar	M8	200 - 230	20 - 23	175 - 200
Regular bolt, nut and screw	M3	6 - 10	0.6 - 1	5 - 9	
	M4	15 - 25	1.5 - 2.5	13 - 22	
	M5	25 - 45	2.5 - 4.5	22 - 40	
	M6	45 - 75	4.5 - 7.5	40 - 65	

LM: Left-hand thread    \*Apply thread locking sealant (See below)    \*\* Tapping screw

## 1-4 Special repairing materials

Material	Location	Remarks
Adhesive	Ball bearing outer / crankcase	Loctite #675 or equivalent
	Pulse pipe joint	
	Cushions	Loctite #424, ThreeBond #1741 or equivalent
Liquid gasket	Crankcase seams	Loctite #515 or equivalent
Grease	Auto-oiler worm	Lithium based grease or ECHO XTended Protection™ Lubricant
	Clutch needle bearing	
	Handle cushions	
	Rewind spring	
	Starter center shaft	
	Chain brake (metal contact part)	Molybdenum grease (approx. 1 gram)

1-5 Service limits



Description		mm (in)	
A	Cylinder bore	When plating is worn and aluminum can be seen	
B	Piston outer diameter	Min.	39.89 (1.570)
C	Piston pin bore	Max.	9.030 (0.3555)
D	Piston ring groove	Max.	1.6 (0.063)
E	Piston ring side clearance	Max.	0.1 (0.004)
F	Piston pin outer diameter	Min.	8.98 (0.3535)
G	Piston ring width	Min.	1.45 (0.057)
H	Piston ring end gap	Max.	0.5 (0.02)
K	Con-rod small end bore	Max.	12.025 (0.4734)
L	Crankshaft runout	Max.	0.05 (0.002)
M	Sprocket bore	Max.	13.07 (0.5146)
N	Clutch drum bore	Max.	71.5 (2.81)
P	Sprocket wear limit	Max.	0.5 (0.02)

