



# SERVICE DATA

## CHAIN SAW

### ECHO: CS-352ES

(Serial number : 37000001 and after)  
(Serial number : 38000001 and after)

#### 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 product information available at the time of publication.

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Reference No. **01-34D-02**  
**REVISED: 201903**  
ISSUED: 201102



## 1 SERVICE INFORMATION

## 1-1 Specifications

Model			CS-352ES
Dimensions	Length*	mm(in)	396 (15.59)
	Width	mm(in)	232 (9.13)
	Height	mm(in)	268 (10.55)
Dry weight*		kg(lb)	4.0 (8.8)
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> )	34.0 (2.075)
	Bore	mm(in)	38.0 (1.496)
	Stroke	mm(in)	30.0 (1.181)
	Compression ratio	6.8	
Carburetor	Type	Diaphragm horizontal-draft with auto-return choke	
	Model	Walbro WT-991	
	Venturi size-Throttle bore	mm(in)	11.11 - 14.3 (0.437 - 0.562)
Ignition	Type	CDI (Capacitor discharge ignition) system Digital magneto	
	Spark plug	NGK BPMR8Y	
Exhaust	Muffler type	Spark arrester muffler with catalyst	
Starter	Type	ES (Effortless-Start)	
	Rope diameter x length	mm(in)	3.0 x 920 (0.12 x 36.2)
Fuel	Type**	Mixed two-stroke fuel	
	Mixture ratio	50 : 1 (2 %)	
	Gasoline	Minimum 89 octane petrol	
	Two-stroke air cooled engine oil	ISO-L-EGD (ISO/CD13738), JASO FC/FD	
	Tank capacity	L (U.S.fl.oz.)	0.25 (8.5)
Clutch	Type	Centrifugal, 3-shoe slide with 3-tension spring	
Guide bar / Saw chain lubrication type			Pencil type Automatic oil pump
Oil	Tank capacity	L (U.S.fl.oz.)	0.26 (8.8)
Auto oiler	Type	Pencil shape, Clutch driven type	
Sprocket	Type	Spur	
	Number of teeth	6	
	Pitch	in	3/8

\* Without guide bar and saw chain.

\*\* Premixed alkylate fuel for 2-stroke can be used.

Cutting devices						
Guide bar	Type		C30S90-45SA	C30S91-47ML	C35S91-53ML	C35S90-52SA
	Called length	cm	30		35	
	Gauge	in	0.043	0.050		0.043
Saw chain	Type		OREGON 90PX	Carlton N1C-BL OREGON 91PX / 91VXL		OREGON 90PX
	Number of drive links		45	47	53	52
	Pitch	in	3/8			
	Gauge	in	0.043	0.050		0.043

## 1-2 Technical data

Engine			
Compression pressure	MPa (kgf/cm <sup>2</sup> ) (psi)		0.94 (9.6) (136)
Clutch engagement speed	r/min		4,200
Ignition system			
Spark plug gap	mm(in)		0.6 - 0.7 (0.024 - 0.028)
Spark test	Tester gap w/ spark plug	mm(in)	4.0 (0.16)
	Tester gap w/o spark plug	mm(in)	6.0 (0.24)
Secondary coil resistance	kΩ		1.3 - 1.9
Pole shoe air gaps	mm(in)		0.3 - 0.4 (0.012 - 0.016)
Ignition timing	at 3,000 r/min	°BTDC	8
	at 8,000 r/min	°BTDC	34
	at 10,000 r/min	°BTDC	38
PET-9000 Parameter	Parameter 1		322
	Parameter 2		04
Carburetor			
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
Tool to adjust mixture needles			D-shaped tool (L) P/N X645-000031 (Carb. adjustment tool P/N Y089-000094)
Carburetor adjustment			
1) Initial setting	H mixture needle	turn out	3 1/4
	L mixture needle	turn out	2 3/4
	Throttle adjust screw	turn in* <sup>1</sup>	1 1/2
Engine warm-up	Idle - WOT : Total	sec.	5 - 5 : 120
2) Find idle maximum speed			Adjust L mixture needle to maximum idle speed* <sup>2</sup>
3) Set idle maximum speed w/ TAS		r/min	3,800
4) Set idle speed by turning L mixture needle CCW		r/min	2,800
5) Confirm H mixture needle position before WOT setting			Turn H mixture needle CCW to confirm engine speed decreases less than or equal to 12,000 r/min.
6) WOT setting		r/min	Turn H mixture needle CW in 1/8 turn increments with the engine at idle, then accelerate to WOT and check engine speed. The final engine speed should fall within: 12,200 - 12,400
7) Verify final engine speed with standard equipment		r/min	Idle: 2,700 - 3,300 WOT: 11,700 - 12,700
8) Verify clutch engagement speed			Confirm clutch engagement speed. If it is less than 1.25 times the idle speed, adjust the idle speed by turning TAS CCW.
Chain oil discharge volume at 7,000 r/min	mL/min (US.fl.oz./min)		Fixed: 6 (0.20)

**BTDC:** Before top dead center **WOT:** Wide open throttle **CCW:** Counterclockwise **TAS:** Throttle adjust screw

\*<sup>1</sup> Set Throttle adjust screw to the point that its tip just contacts throttle plate before initial setting.

\*<sup>2</sup> If chain starts to rotate during adjustment process step 2), decrease engine speed by turning TAS CCW until chain stops and then redo step 2). Repeat this until chain no longer rotates after the adjustment step 2).

## 1-3 Torque limits

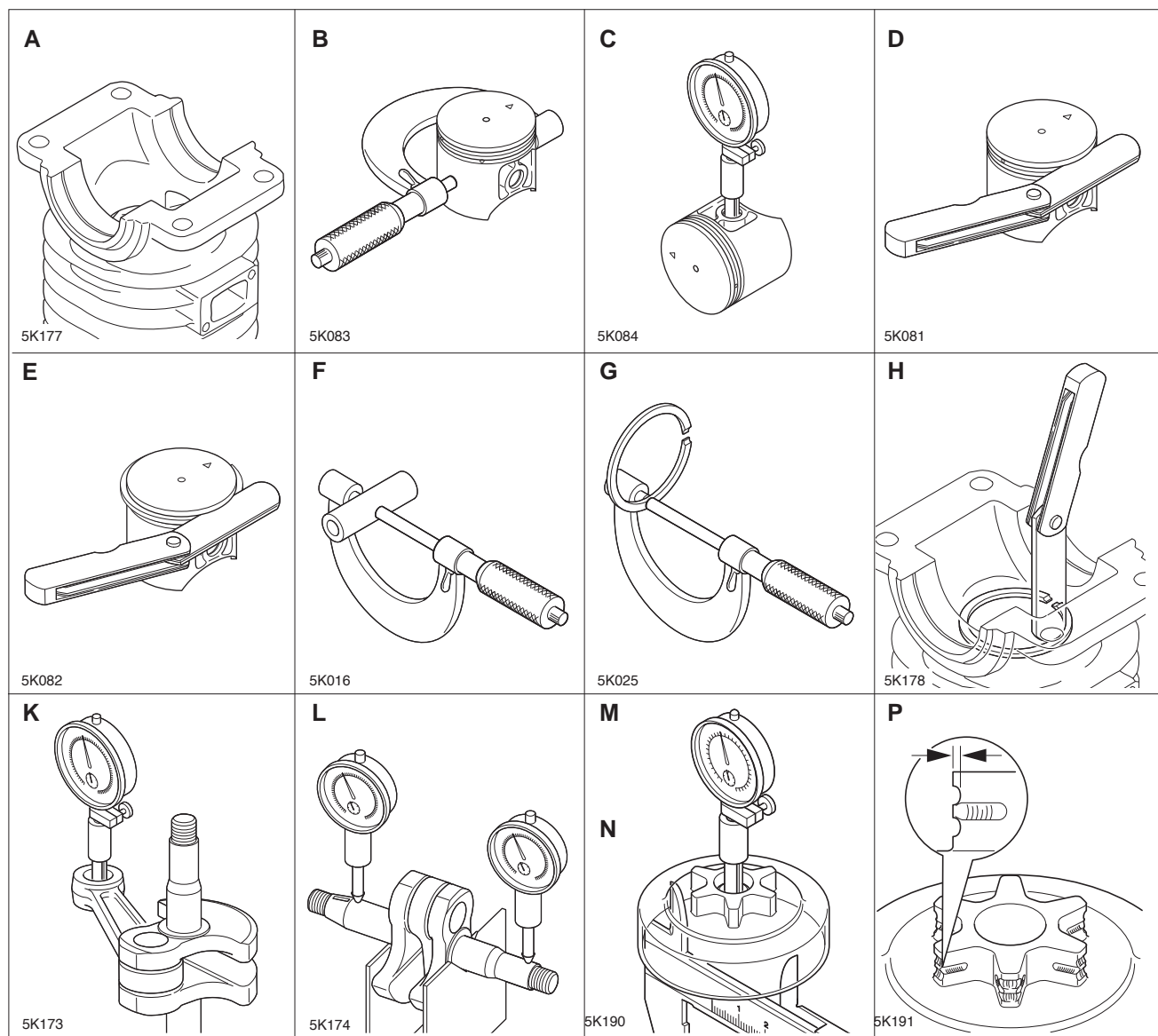
Descriptions		Size	kgf•cm	N•m	in•lbf
Starter system	Starter pawl	M5	30 - 50	3 - 5	26 - 45
	Starter case	M5	35 - 50	3.5 - 5	30 - 45
Ignition system	Magneto rotor (Flywheel)	M8	250 - 290	25 - 29	220 - 255
	Ignition coil	M5*	30 - 45	3 - 4.5	26 - 40
	Ignition switch	M10	20 - 30	2 - 3	18 - 26
	Spark plug	M14	130 - 170	13 - 17	110 - 150
Fuel system	Carburetor	M5	35 - 50	3.5 - 5	30 - 45
	Carburetor elbow	M5	30 - 45	3 - 4.5	26 - 40
Clutch	Clutch hub	LM10	230 - 260	23 - 26	200 - 230
Engine	Crankcase	M5*	60 - 100	6 - 10	60 - 90
	Engine mount	M5	70 - 110	7 - 11	60 - 95
	Muffler	M5	70 - 90	7 - 9	60 - 80
	Intake insulator	M5	50 - 70	5 - 7	45 - 60
Others	Front handle	M5	30 - 50	3 - 5	26 - 45
	Rear handle assembly	M5	30 - 50	3 - 5	26 - 45
	Brake lever	M4	25 - 35	2.5 - 3.5	22 - 30
	Compression spring	M5	30 - 50	3 - 5	26 - 45
	Sprocket guard	M4	10 - 20	1 - 2	9 - 17
	Guide bar nut	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 special repairing materials

## 1-4 Special repairing materials

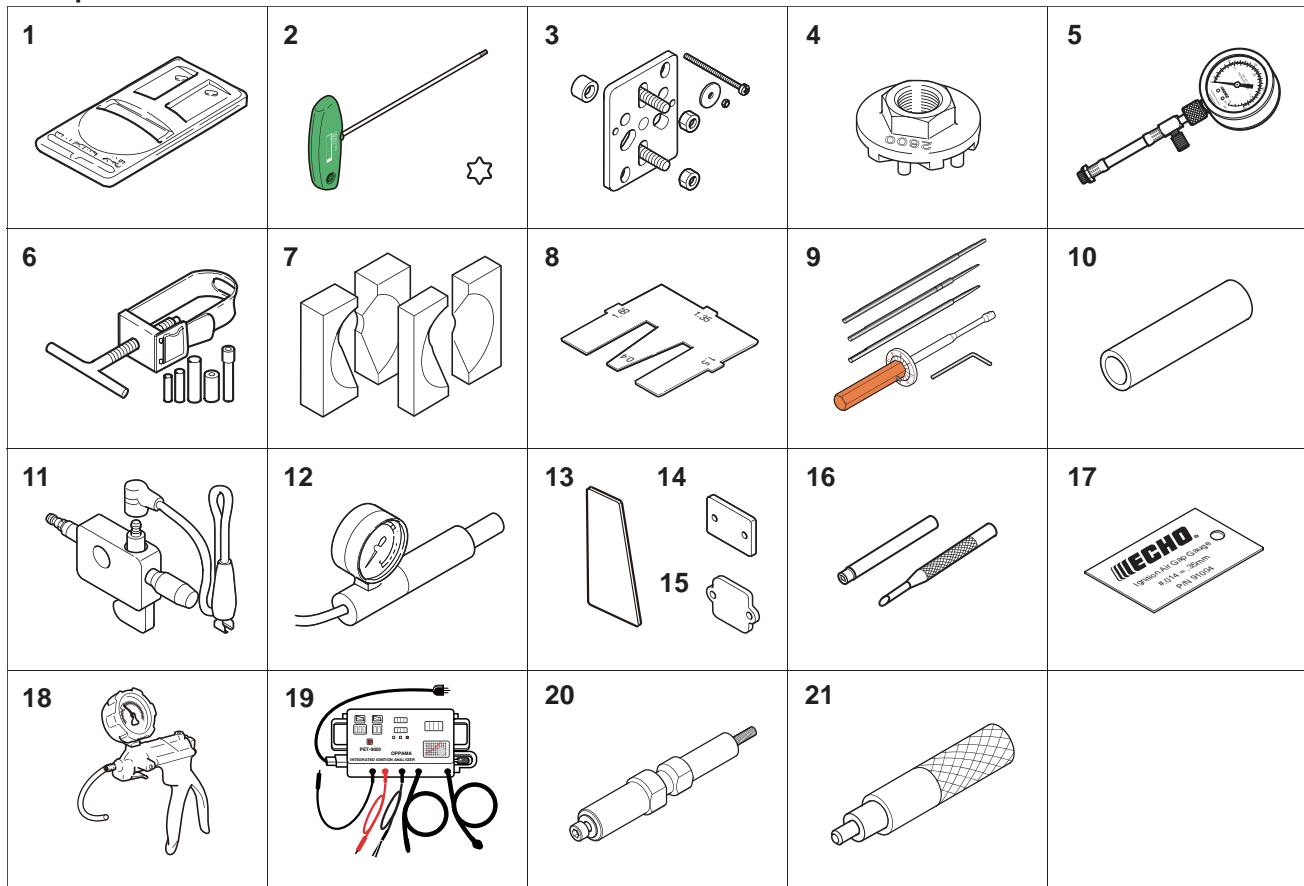
Material	Location	Remarks
Adhesive	Ball bearing outer / crankcase	Loctite #675 or equivalent
	Stud bolt	
Liquid gasket	Crankcase seams	ThreeBond 1207D
Thread locking sealant	Starter pawl	Loctite #242, ThreeBond #1324 or equivalent
	Ignition coil	Loctite #222, ThreeBond #1342 or equivalent
Grease	Clutch needle bearing	EPNOC AP2 (Lithium based grease)
	Starter center shaft	P/N X695-000060
	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 aluminium can be seen	
B	Piston outer diameter	Min.	37.91 (1.493)
C	Piston pin bore	Max.	8.035 (0.3163)
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.	7.98 (0.3142)
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.	12.000 (0.4724)
L	Crankshaft runout	Max.	0.02 (0.001)
M	Sprocket bore	Max.	10.80 (0.4252)
N	Clutch drum bore	Max.	61.5 (2.42)
P	Sprocket wear limit	Max.	0.5 (0.02)

## 1-6 Special tools



Key	Part Number	Description	Reference
1	897802-33330	Tachometer PET-1000R	Measuring engine speed to adjust Carburetor
2	X602-000340	Torx wrench (T27)	Removing and installing bolt
3	Y089-000111	Puller	Removing magneto rotor
4	X640-000011	Clutch tool	Removing and assembling clutch assembly
5	91037	Compression gauge	Measuring cylinder compression
6	897702-30131	Piston pin tool	Removing and installing piston pin
7	897701-02830	Bearing wedge	Removing ball bearings on crankshaft
8	897563-19830	Metering lever gauge	Measuring metering lever height on Carburetor
9	Y089-000094	Carburetor adjustment tool	Adjusting carburetor
10	897726-21430	Oil seal tool	Installing oil seals and clutch plate
11	897800-79931	Spark tester	Checking ignition system
12	897803-30133	Pressure tester	Testing Carburetor and crankcase leakage
13	91041	Pressure rubber plug	Plugging exhaust port to test crankcase/cylinder leakages
14	897826-16131	Pressure rubber plug	Plugging intake port to test crankcase/cylinder leakages
15	897827-16131	Pressure plate	Plugging intake port to test crankcase/cylinder leakages
16	500-500	Welch plug tool	Removing and installing welch plug tool
17	91004	Module air gap gauge	Adjusting pole shoe air gaps
18	91149	Pressure / vacuum tester	Testing crankcase / cylinder leakages
19	900300	Ignition Analyzer : PET-9000	Measuring Ignition timing, Primary/Secondary voltage
20	Y089-000130	Auto-oiler puller	Removing pencil type Auto-oiler
21	91073	Auto-oiler installer	Installing pencil type Auto-oiler