



# SERVICE DATA

## CHAIN SAW

### ECHO: CS-2511TES

### shindaiwa: 251Ts, 251TCs

(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.

SERVICE MANUAL Ref. No. 401-40 (Model : CS-2511TES, 251Ts and 251TCs) contains lots of information for servicing these models.

Caburetor Adjustment video

**CLICK HERE**



#### CONTENTS

<b>1 SERVICE INFORMATION.....</b>	<b>2</b>
1-1 Specifications.....	2
1-2 Technical data.....	3
1-3 Torque limits.....	5
1-4 Special maintenance materials.....	5
1-5 Service limits.....	6
1-6 Special tools .....	7

Reference No. **00-25B-05**

**REVISED : 202104**

ISSUED: 201609



## 1 SERVICE INFORMATION

## 1-1 Specifications

Dimensions	Length*	mm(in)	243 (9.57)
	Width	mm(in)	205 (8.07)
	Height	mm(in)	196 (7.72)
Dry weight*		kg(lb)	2.3 (5.1)
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> )	25.0 (1.525)
	Bore	mm(in)	35.0 (1.378)
	Stroke	mm(in)	26.0 (1.024)
	Compression ratio		7.9
Carburetor	Type		Diaphragm horizontal-draft
	Model		Walbro WT-1153· or WT-1153B (CS-2511TES) WT-1155· or WT-1155B (251Ts, 251TCs)
	Venturi size-Throttle bore	mm(in)	11.11 - 14.3 (0.437 - 0.563)
Ignition	Type		CDI system, Digital magneto or CDI system, Digital magneto with PI (Proportional integral) Controller
	Spark plug		NGK CMR7H
Exhaust	Muffler type		Spark arrester muffler with catalyst
Starter	Type		ES (Effortless-Start) / S (Soft-start)
	Rope diameter x length	mm(in)	3.0 x 720 (0.12 x 28.3)
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 (UK.fl.oz.)	0.19 (6.7)
Clutch	Type		Centrifugal type, 3-shoe slide with 3-tension spring
Guide bar / Saw chain lubrication type			Adjustable automatic oil pump
Oil	Tank capacity	L (UK.fl.oz.)	0.14 (4.9)
Auto oiler	Type		Clutch driven type
Sprocket	Type		Spur
Spike			Option (Parts number: C304-000000)

**CDI:** Capacitor discharge ignition

\* Without guide bar and saw chain.

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

1-1 Specifications (continued)

<b>Cutting devices</b>			<b>Sprocket nose bar</b>		
Guide bar	Type		C20S91-35SA	C25S91-40SL	C30S91-47ML
	Called length	cm	20	25	30
	Gauge	in	0.050		
Saw chain	Type		Carlton N1C-BL, OREGON 91PX		
	Number of drive links		35	40	47
	Pitch	in	3/8		
	Gauge	in	0.050		
Sprocket	Number of teeth		6		
	Pitch	in	3/8		

<b>Cutting devices</b>			<b>Carving bar</b>				
Guide bar	Type		C20H25-52CL	C25H25-60C (CS-2511TES only)	C25H25-60CLD	C25HA4-60CL	C20HA4-52CL
	Called length	cm	20	25	25	25	20
	Gauge	in	0.050			0.043	
Saw chain	Type		OREGON 25AP			SUGIHARA A4S	
	Number of drive links		52	60	60	60	52
	Pitch	in	1/4				
	Gauge	in	0.050			0.043	
Sprocket	Number of teeth		8				
	Pitch	in	1/4				

1-2 Technical data

<b>Serial number label type*</b>			<b>Sticker label</b>	<b>Laser etched label (PI)</b>
<b>Engine</b>				
Compression pressure	MPa (kgf/cm <sup>2</sup> ) (psi)		1.03 (10.5) (150)	
Clutch engagement speed	r/min		4,400	
<b>Ignition system</b>				
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	Ω		980 - 1,020	960 - 1,000
Pole shoe air gaps	mm(in)		0.3 - 0.4 (0.012 - 0.016)	
Ignition timing	at 1,000 r/min	°BTDC	9	
	at 3,000 r/min	°BTDC	12	9
	at 10,000 r/min	°BTDC	29	30
<b>Carburetor</b>				
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	
Chain oil discharge volume	mL/min (UK.fl.oz./min)		Adjustable: 1.5 - 13 (0.05 - 0.46) (Factory set: 6 mL/min)	

**BTDC:** Before top dead center

\* There are 2 serial number label types on these models. The model which has the laser etched label is installed with PI controller.

#### 1-2 Technical data (continued)

Carburetor adjustment				WT-1153 / WT-1155	WT-1153B / WT-1155B
Carburetor type					
1) Initial setting	H mixture needle	turn out		2 5/8	2
	L mixture needle	turn out		1 7/8	2 1/2
	Throttle adjust screw	turn in*1		1 5/8	1 1/2

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

**IMPORTANT: Use Tachometer PET-1000R to measure engine speed (Refer to 1-6 Special tools).**

**IMPORTANT:** The PI controller installed model has 2 mode; Carburetor adjustment mode and Operation mode. When adjusting carburetor, must be changed from Operation mode to Carburetor adjustment mode. The mode will return to the Operation mode when the engine is stopped.

#### --- The PI controller installed model ONLY ---

##### To change the mode,

- 1. Start engine without brake activated.** (Do not touch throttle lever.)
- 2. Engine warm-up with fast idle for 120 seconds.** (The speed should be within 6,000 - 10,000 r/min. If it is not, adjust the speed by turning H mixture needle.)

**CAUTION:** Chain will start to rotate during engine warm-up with fast idle.

**NOTE:** Do not stop engine during carburetor adjustment. If the engine is stopped, restart this procedure from the beginning.

#### The carburetor adjustment continues.

Serial number label type	Sticker label	Laser etched label (PI)
Carburetor adjustment		
Engine warm-up Idle - WOT : Total sec.	5 - 5 : 100	5 - 5 : 30
2) Confirm that the mode has changed	-	Confirm to vary idle engine speed by turning L mixture needle 1/4 turn CW. If it is not, change the mode again.*2
3) Find idle maximum speed	Adjust L mixture needle to maximum idle speed*3	
4) Set idle maximum speed w/ TAS r/min	4,200	4,200
5) Set idle speed by turning L mixture needle CCW r/min	3,200	3,400
6) 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.	
7) WOT setting r/min	Turn H mixture needle CW and set engine speed within 12,500 - 12,700	
8) Final WOT setting	Turn H mixture needle CW 1/2 turn	
9) Verify final engine speed with standard equipment r/min	Idle: 2,800 - 3,600 WOT: 12,700 - 13,400	Idle: 3,100 - 3,300
10) 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.	

**WOT:** Wide open throttle **CCW:** Counterclockwise **TAS:** Throttle adjust screw

\*2 The idle engine speed returns to 3,200 r/min for a few seconds in Operation mode, when the engine speed is deviated.

\*3 If clutch engages during adjustment process 2), decrease engine speed by turning TAS CCW until clutch disengages and then redo 2).

**1-3 Torque limits**

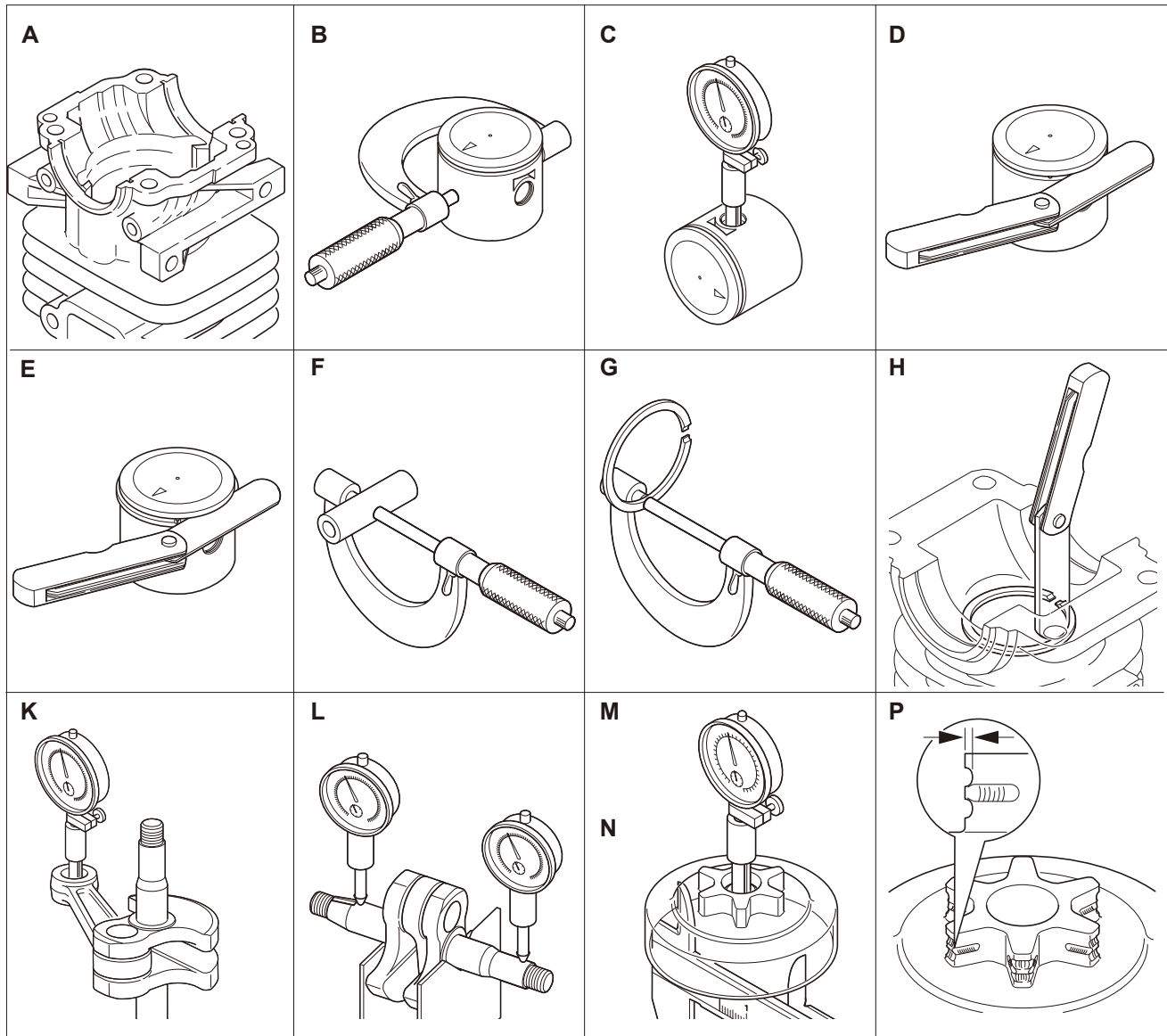
Descriptions		Size	kgf•cm	N•m	lbf•in
Starter system	Starter pawl	M5	30 - 45	3 - 4.5	25 - 40
	Starter case	M4	20 - 30	2 - 3	20 - 25
Ignition system	Flywheel (Magneto rotor)	M8	250 - 290	25 - 29	220 - 255
	Ignition coil	M4*	30 - 45	3 - 4.5	25 - 40
	Ignition switch	M3*	3 - 5	0.3 - 0.5	3 - 4
	Spark plug	M10	100 - 150	10 - 15	90 - 135
Fuel system	Carburetor	M5	30 - 45	3 - 4.5	25 - 40
	Intake bellows	M4	30 - 45	3 - 4.5	25 - 40
Clutch	Clutch hub	LM8	250 - 290	25 - 29	220 - 255
Engine	Crankcase	M4	30 - 45	3 - 4.5	25 - 40
	Cylinder	M4	30 - 45	3 - 4.5	25 - 40
	Engine mount	M4	30 - 45	3 - 4.5	25 - 40
	Muffler	M5	60 - 90	6 - 9	55 - 80
	Muffler cover	M4	20 - 30	2 - 3	20 - 25
Others	Auto-oiler	M4	30 - 45	3 - 4.5	25 - 40
	Rear handle lid	M4	20 - 30	2 - 3	20 - 25
	Front handle (front side)	M5	30 - 40	3 - 4	25 - 35
	Front handle (rear side)	M4	20 - 30	2 - 3	20 - 25
	Spring	M4	20 - 35	2 - 3.5	20 - 30
	Brake cover	M4	20 - 30	2 - 3	20 - 25
	Sprocket guard plate (Sprocket guard side)	M4	20 - 30	2 - 3	20 - 25
	Brake lever (Hand guard)	M5	30 - 45	3 - 4.5	25 - 40
	Chain catcher	M5	30 - 45	3 - 4.5	25 - 40
	Stud bolt	M8*	150 - 200	15 - 20	130 - 220
	Bolt (at guide bar mount)	M5	30 - 45	3 - 4.5	25 - 40
	Guide bar nut	M8	150 - 200	15 - 20	130 - 220
	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	

LM: Left-hand thread      \*Apply thread locking sealant described in "1-4 Special repairing materials"

**1-4 Special maintenance materials**

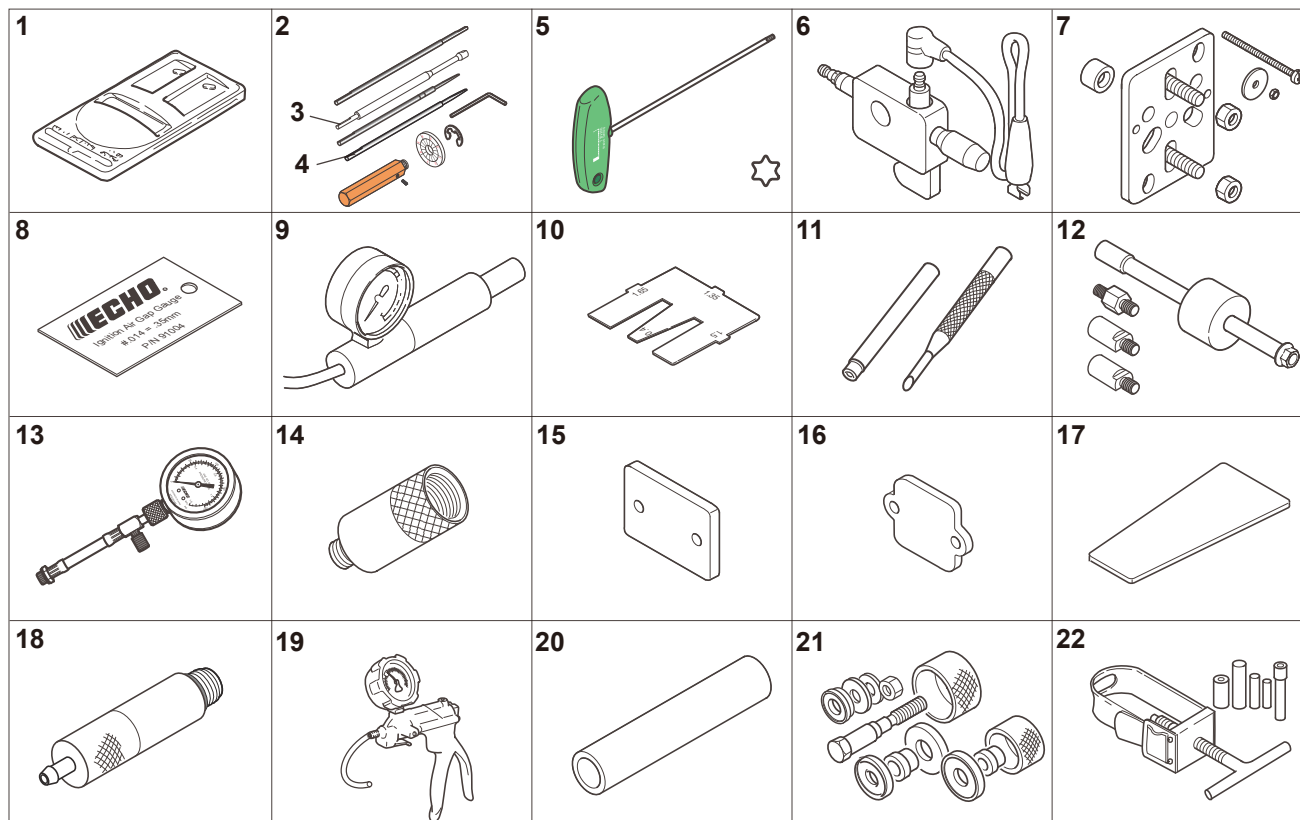
Material	Location	Remarks
Thread locking sealant	Stud bolt	Loctite #272 or equivalent
	Ignition coil	ThreeBond #1344 or equivalent
	Ignition switch	ThreeBond #1324 or equivalent
Grease	Recoil starter	EPNOC AP2 (Lithium based grease) P/N X695-000060
	Needle bearing, clutch	
	Worm gear	
	Auto-oiler	
	Oil seal lip	Molybdenum grease (approx.1 gram)
Chain brake (metal contact part)		

#### 1-5 Service limits



Description		mm (in)	
A	Cylinder bore	When plating is worn and aluminium can be seen	
B	Piston outer diameter	Min.	34.92 (1.375)
C	Piston pin bore	Max.	8.035 (0.3163)
D	Piston ring groove	Max.	1.3 (0.051)
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.	1.15 (0.045)
H	Piston ring end gap	Max.	0.5 (0.02)
K	Con-rod small end bore	Max.	11.03 (0.4341)
L	Crankshaft runout	Max.	0.02 (0.001)
M	Sprocket bore	Max.	13.07 (0.5146)
N	Clutch drum bore	Max.	53.5 (2.11)
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	Y089-000094	Carburetor Adjustment tool	Adjusting Carburetor
3	X645-000031	D-shaped tool (L)	Adjusting D-shaped L / H mixture needle
4	X603-000050	Screwdriver (2.5mm)	Adjusting throttle adjust screw
5	X602-000340	Torx wrench (T27)	Removing and installing Torx bolt
6	897800-79931	Spark tester	Checking ignition system
7	Y089-000111	Puller	Removing magneto rotor and crankcase
8	91004	Module air gap gauge	Adjusting pole shoe air gaps
9	897803-30133	Pressure tester	Testing Carburetor and crankcase leakage
10	897563-19830	Metering lever gauge	Measuring metering lever height on Carburetor
11	500-500	Welch plug tool	Removing and installing welch plug
12	P021-044870	PTO shaft puller	Removing plug from auto-oiler assembly
13	91037	Compression gauge	Measuring cylinder compression
14	P021-051690	Adapter (M10)	Measuring cylinder compression(for 10mm dia. spark plug)
15	897826-16131	Pressure rubber plug	Plugging intake port to test crankcase / cylinder leakages
16	897827-16131	Pressure plate	Plugging intake port to test crankcase / cylinder leakages
17	91041	Pressure rubber plug	Plugging exhaust port to test crankcase / cylinder leakages
18	A131-000160	Pressure connector(M10)	Checking crankcase and cylinder leakages
19	91149	Pressure / vacuum tester	Testing tank vent and crankcase leakages
20	897726-09130	Oil seal tool	Installing oil seals
21	897701-14732	Bearing tool	Removing and installing ball bearings on crankcase
22	897702-30131	Piston pin tool	Removing and installing piston pin