



SERVICE DATA

CHAIN SAW

ECHO: CS-501SX

shindaiwa: 501sx

(Serial number : 37000001 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. **01-50E-00**

ISSUED : 201509



1 SERVICE INFORMATION

1-1 Specifications

Model		CS-501SX, 501sx	
Dimensions	Length*	mm(in)	395 (15.55)
	Width	mm(in)	235 (9.25)
	Height	mm(in)	290 (11.42)
Dry weight*		kg(lb)	4.7 (0.19)
Engine	Type	YAMABIKO, air-cooled, two-stroke, single cylinder	
	Rotation	Clockwise as viewed from the output end	
	Displacement	cm ³ (in ³)	50.2 (3.063)
	Bore	mm(in)	44.0 (1.732)
	Stroke	mm(in)	33.0 (1.299)
	Compression ratio		7.2
Carburettor	Type	Diaphragm horizontal-draught	
	Model	Walbro WT-1139 w/ D-shaped(L) mixture needles	
	Venturi size-Throttle bore	mm(in)	13.5-15.85 (0.531-0.624)
Ignition	Type	CDI (Capacitor discharge ignition) system Digital magneto	
	Spark plug	BPMR8Y	
Starter	Type	Recoil starter	
	Rope diameter x length	mm(in)	3.8 x 750 (0.150 x 29.5)
Fuel	Type	Premixed two-stroke fuel	
	Mixture ratio	50 : 1 (2 %)	
	Petrol	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.)	0.5 (16.9)
Exhaust	Muffler type	Spark arrester muffler	
Clutch	Type	Centrifugal type	
Guide bar / Saw chain lubrication type		Automatic with volume adjuster	
Oil	Tank capacity	L (U.S.fl.oz.)	0.28 (9.5)
Auto oiler	Type	Clutch driven type	
Sprocket	Type	Floating rim	
	Number of teeth	7	
	Pitch	in	0.325

* Without guide bar and saw chain.

Cutting devices					
Guide bar	Part No.	V40R21-68AA	V45R21-72AA	V50R21-80AA	
	Called length	cm	40	45	50
	Gauge	in	0.058		
Saw chain	Type	Oregon 21BPX, Carlton K2L			
	Number of drive links	68	72	80	
	Pitch	in	0.325		
	Gauge	in	0.058		

1-2 Technical data

Engine		
Idling speed	r/min	2,300 - 3,100
Wide open throttle speed*	r/min	13,000 - 14,000
Clutch engagement speed	r/min	3,900
		3,600 - 4,200
Engagement Minimum [†]	r/min	3,400
Compression pressure	MPa (kgf/cm ²) (psi)	0.95 (9.7) (138)
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)
Primary coil resistance (Red Probe on stop terminal of module)	Ω	310 - 350
Secondary coil resistance	kΩ	2.5 - 2.9
Pole shoe air gaps	mm (in)	0.3 - 0.4 (0.012 - 0.016)
Ignition timing	at 3,000 r/min	°BTDC
	at 8,000 r/min	°BTDC
	at 10,000 r/min	°BTDC
Carburettor		
Throttle adjust screw initial setting	turn in**	2 1/8
L mixture needle initial setting	turn out	1 3/4
H mixture needle initial setting	turn out	3 5/8
Test Pressure, minimum	MPa (kgf/cm ²) (psi)	0.05 (0.5) (7.0)
Metering lever height	mm(in)	1.65 (0.06) lower than diaphragm seat
Chain oil discharge volume	mL/min(U.S.fl.oz./min)	Ajustable: 3.0 - 16.5 (0.12 - 0.65) (Factory set: 7 mL/min)

BTDC: Before top dead centre.

* With 45 cm guide bar and properly adjusted saw chain.

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

† If clutch engagement speed is lower than minimum r/min, replace clutch assembly with new one.

1-3 Torque limits

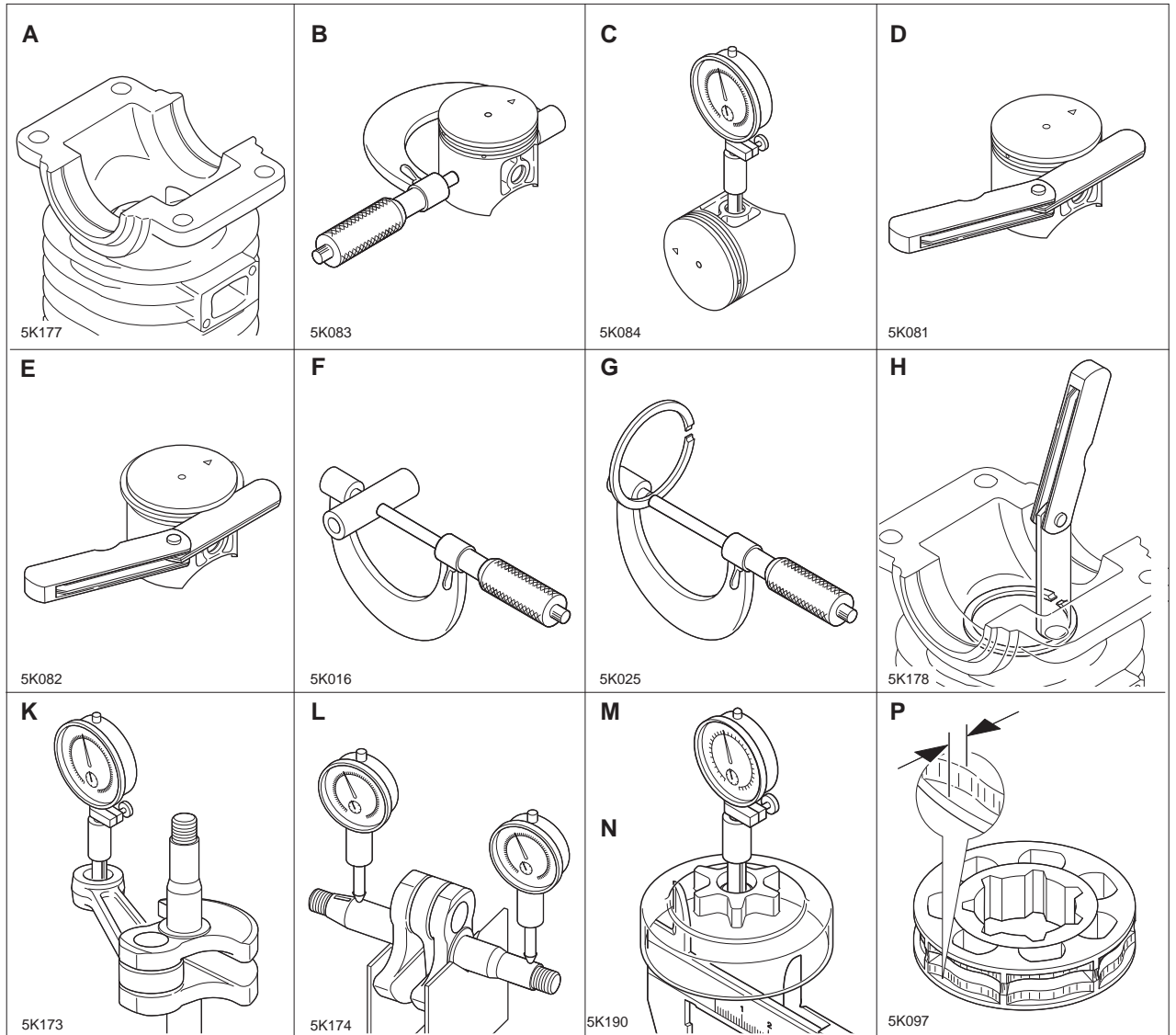
Descriptions		Size	kgf•cm	N•m	in•lbf	
Starter system	Starter pawl assembly	M5	90 - 120	9 - 12	80 - 105	
	Starter case	M5	20 - 30	2 - 3	18 - 25	
Ignition system	Magneto rotor (Flywheel)	M8	150 - 170	15 - 17	130 - 150	
	Ignition coil	M4	30 45	3 4.5	25 40	
	Igniton switch	M10	20 - 30	2 - 3	18 - 25	
	Spark plug	M14	130 - 170	13 - 17	113 - 150	
Fuel system	Carburettor	M5	20 - 30	2 - 3	18 - 25	
	Elbow	M4	20 - 30	2 - 3	18 - 25	
	Intake insulator	M4	20 - 30	2 - 3	18 - 20	
Clutch	Clutch shoe	LM10	280 - 300	28 - 30	245 - 265	
	Clutch drum	M8	150 - 170	15 - 17	130 - 150	
Engine	Crankcase	M5	70 - 90	7 - 9	60 - 80	
	Muffler	M5	70 - 90	7 - 9	60 - 80	
	Cylinder	M5	70 - 90	7 - 9	60 - 80	
	Cylinder cover	M5	25 - 35	2.5 - 3.5	22 - 30	
Others	Auto-oiler	M4	30 - 45	3 - 4.5	25 - 40	
	Oiler cover	M4	30 - 45	3 - 4.5	25 - 40	
	Crankcase (at oil bypass)	M5	55 - 70	5.5 - 7	48 - 60	
	Cushion	M5	20 - 30	2 - 3	18 - 25	
	Front handle	M5	40 - 55	4 - 5.5	35 - 48	
		M4	30 - 45	3 - 4.5	25 - 40	
	Rear handle assembly	(M side)	M5	40 - 55	4 - 5.5	35 - 48
		(D side)	M5	40 - 55	4 - 5.5	35 - 48
		Handle lid	M4	20 - 30	2 - 3	18 - 25
	Brake lever	(D side)	M5	40 - 60	4 - 6	35 - 40
		(M side)	M5	50 - 70	5 - 7	45 - 60
	Brake cover	M4	10 - 20	1 - 2	9 - 18	
	Washer (at brake band)	M4	15 - 25	1.5 - 2.5	13 - 22	
	Sprocket guard plate	M4	15 - 25	1.5 - 2.5	13 - 22	
	Chain catcher	M5	50 - 70	5 - 7	45 - 60	
	Spike	M5	50 - 70	5 - 7	45 - 60	
	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

1-4 Special repairing materials

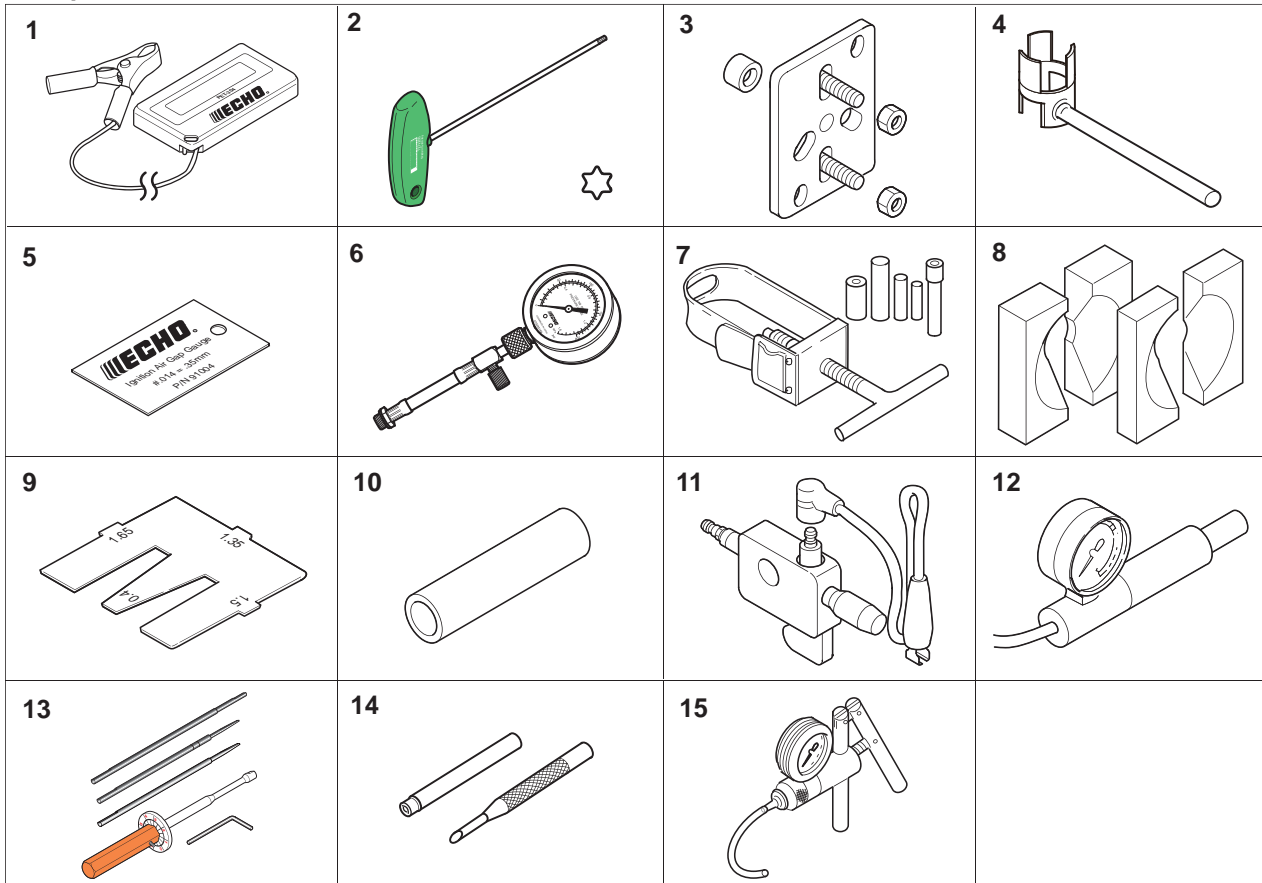
Material	Location	Remarks
Adhesive	Cushion	Loctite #406 (424) or equivalent
Grease	Auto-oiler worm	Lithium based grease or ECHO XTended Protection™ Lubricant
	Clutch needle bearing	
	Choke knob	
	Oil seal inner lips	
	Chain brake (metal contact part)	
	Throttle rod	
	Bevel gear, Screw, Chain tensioner	

1-5 Service Limits



Description		mm (in)	
A	Cylinder bore	When plating is worn and aluminium can be seen	
B	Piston outer diameter	Min.	43.87 (1.727)
C	Piston pin bore	Max.	11.025 (0.4341)
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.	10.98 (0.4323)
G	Piston ring width	Min.	1.45 (0.057)
H	Piston ring end gap	Max.	0.8 (0.03)
K	Con-rod small end bore	Max.	15.025 (0.5915)
L	Crankshaft runout	Max.	0.02 (0.001)
M	Sprocket bore	Max.	12.75 (0.5020)
N	Clutch drum bore	Max.	73.5 (2.89)
P	Sprocket wear limit	Max.	0.5 (0.02)

1-6 Special tools



Key	Part Number	Description	Reference
1	G310-000050	Tachometer PET-304	Measuring engine speed
2	X602-000340	Torx wrench (T27)	Removing and installing bolt
3	897501-03938	Puller	Removing magneto rotor
4	X640-000370	Clutch spanner	Removing and assembling clutch assembly
5	91004	Module air gap gauge	Adjusting pole shoe air gaps
6	91037	Compression gauge	Measuring cylinder compression
7	897702-30131	Piston pin tool	Removing and installing piston pin
8	897701-02830	Bearing wedge	Removing ball bearings on crankshaft
9	897563-19830	Metering lever gauge	Measuring metering lever height on carburettor
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 carburettor and crankcase leakage
13	Y089-000094	Carburettor adjustment tool	Adjusting caburettor
14	500-500	Welch plug tool	Removing and installing welch plug
15	91139	Pressure tester	Testing crankcase leakages

2 CARBURETTOR ADJUSTMENT PROCEDURE

2-1 General adjusting rules

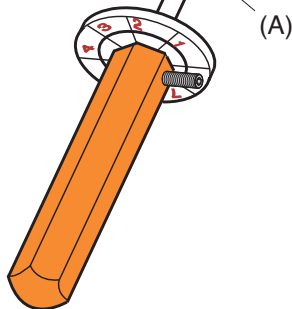
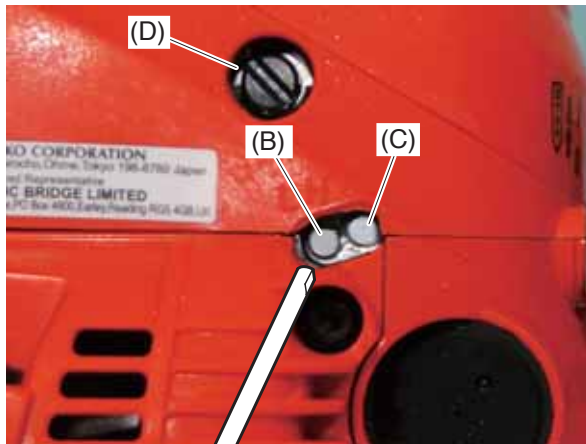
A. Before adjustment, check the following items.

1. The correct spark plug must be clean and properly gapped.
2. The air filter element must be clean and properly installed.
3. The muffler exhaust port must be clear of carbon.
4. The fuel lines, tank vent and fuel filter are in good condition and clear of debris.
5. The fuel is fresh (> 89 octane : RON) and properly mixed at 50 : 1 with "ISO L-EGD" or "JASO FC/FD" 2-stroke oil.
6. 40, 45 or 50 cm bar and chain must be installed, and properly tensioned.

B. Preliminary adjustment. Adjustment by Throttle adjust screw of carburettor.

Start and run engine for 100 seconds alternating engine speed between WOT and idle every 5 seconds. Adjust throttle adjust screw to 2,700 +/- 200 r/min. Make sure WOT engine speed in range 13,000 - 14,000 r/min. If engine does not run correctly after this adjustment, proceed to the next step 2-2.

2-2 Initial setting Throttle adjust screw, L mixture needle and H mixture needle



Tools Required: Small screwdriver with 2.5 mm blade, P/N G310-000050 tachometer PET-304, P/N Y089-000094 Carburettor adjustment tool (A).

1. Turn L and H mixture needles clockwise until lightly seated, and then turn out both mixture needles following turns:

L mixture needle (B) : 1 3/4

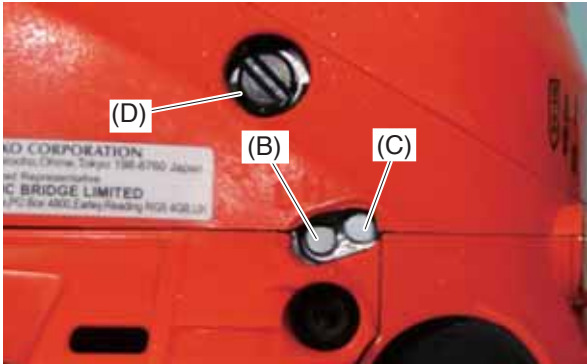
H mixture needle (C) : 3 5/8

NOTE: If needles are overtightened during seating, damage to carburettor may occur.

2. Remove air cleaner lid and air filter to expose the Throttle adjust screw and throttle plate. Turn Throttle adjust screw (D) anticlockwise until Throttle adjust screw tip just touches throttle plate. Then turn Throttle adjust screw (D) 2 1/8 turns clockwise. Reinstall air filter, and cleaner lid.

NOTE : The initial carburettor settings for Throttle adjust screw, L and H mixture needles are intended to start and run the engine before final carburettor adjustments are made through this procedure. The actual number of turns needed for engine operation may vary.

2-3 Adjusting carburettor



1. Start and warm engine for 100 seconds alternating engine speed between WOT and idle every 5 seconds. Turn H mixture needle (C) anticlockwise until engine speed drops to approx. 12,500 r/min at WOT.

NOTE : Do not run engine at high speed without load longer than 10 seconds, or engine damage may occur.

2. Adjust L mixture needle (B) using Carburettor adjustment tool (A) to reach maximum engine speed just before lean drop off.

If chain starts to rotate during adjustment, decrease engine speed by turning throttle adjust screw (D) anticlockwise until chain stops and then readjust L mixture needle (B).

3. Set idle speed to 3,500 r/min by turning Throttle adjust screw (D). Engine speed should be stable at 3,500 +/- 50 r/min after Throttle adjust screw adjustment.

4. Turn L mixture needle (B) anticlockwise reducing engine idle speed 800 r/min to set idle speed at 2,700 r/min. The engine idle speed ranges is 2,600 - 2,800 r/min.

NOTE : Engine speed must be allowed to stabilize a minimum of 20 seconds after each adjustment of L mixture needle to assure accurate tachometer readings.

5. Before adjustment, WOT engine speed should be 12,500 r/min or less. If engine speed is higher, turn H mixture needle (C) anticlockwise until 12,500 r/min is achieved. To make the final WOT engine speed adjustment, turn H mixture needle (C) clockwise in 1/8 turn increments with the engine at idle, then squeeze throttle trigger and check WOT engine speed. The final WOT engine speed should fall within 13,000 - 14,000 r/min.

6. Start engine, and verify engine idle speed ranges from 2,300 to 3,100 r/min, and WOT engine speed ranges from 13,000 to 14,000 r/min. Make sure the chain does not rotate when engine is idling. When final adjustment is completed, the engine should idle, accelerate smoothly, and attain WOT per above specifications.

NOTE : WOT and idle engine speed in field operation may vary from final adjustment specifications due to changing ambient conditions and fuel. Engine speed variances should be within the safe ranges for WOT and idle engine speed as listed in Section 1-2 Technical data, otherwise the carburettor should be readjusted.