



SERVICE DATA

CHAIN SAW

ECHO: CS-590

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

ECHO: CS-610 shindaiwa: 600

(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.

ECHO SERVICE MANUAL Ord. 401-31 (Model : CS-600) contains lots of information for servicing this model.

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Reference No. **01-59D-02**

REVISED: 201903

ISSUED: 201201



1 SERVICE INFORMATION

1-1 Specifications

Model		CS-610, 600	CS-590
Dimensions	Length	mm(in)	448 (17.64)
	Width	mm(in)	246 (9.69)
	Height	mm(in)	296 (11.65)
Dry weight*		kg(lb)	6.0 (13.2)
Engine	Type	YAMABIKO, air-cooled, two-stroke, single cylinder Ventilated piston, Semi-automatic decompression	
	Rotation	Clockwise as viewed from the output end	
	Displacement	cm ³ (in ³)	59.8 (3.649)
	Bore	mm(in)	45.0 (1.772)
	Stroke	mm(in)	37.6 (1.480)
	Compression ratio	7.2	
Carburetor	Type	Diaphragm, horizontal-draft	
	Model	Walbro HAD-268A or HAD-268A	
	Venturi size-Throttle bore	mm(in)	15.08 - 19.03 (0.594 - 0.749)
Ignition	Type	CDI (Capacitor discharge ignition) system Digital magneto	
	Spark plug	NGK BPMR8Y	
Exhaust	Muffler type	Spark arrester muffler	
Starter	Type	Automatic rewind starter	
	Rope diameter x length	mm(in)	4.0 x 950 (0.15 x 37.4) : Kevlar
Fuel	Type	Mixed two-stroke fuel	
	Mixture ratio	50 : 1 (2 %)	
	Petrol	Minimum 89 octane gasoline	
	Two-stroke air cooled engine oil	ISO-L-EGD (ISO/CD13738), JASO FC/FD	
	Tank capacity	L (U.S.fl.oz.)	0.6 (20.3)
Clutch	Type	Inboard clutch: 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.)	0.3 (10.1)
Auto oiler	Type	Clutch driven type	
Sprocket	Type	Floating rim	spur
	Number of teeth	7	
	Pitch	in	3/8

* Without guide bar and saw chain.

Cutting devices					
Guide bar	Type	S40S73-60AA	S45S73-64AA	S50S73-72AA	S60S73-84AL
		----	S45R73-64AA	S50R73-72AA	S60R73-84AA
	Called length	cm	40	45	50
	Gauge	in	0.058		
Saw chain	Type	Oregon 73LGX			
	Number of drive links	60	64	72	84
	Pitch	in	3/8		
	Gauge	in	0.058		

1-2 Technical data

Engine			
Compression pressure	MPa (kgf/cm ²) (psi)		1.01 (10.3) (146)
Clutch engagement speed	r/min		4,000
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		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	6
	at 8,000 r/min	°BTDC	24
	at 10,000 r/min	°BTDC	30
	at 12,500 r/min	°BTDC	27
Carburetor			
Test Pressure, minimum	MPa (kgf/cm ²) (psi)		0.05 (0.5) (7.0)
Metering lever height	mm(in)		Flush with diaphragm seat
Limiters cap / plug			Limiters cap P/N P003-000010
Tool to adjust mixture needles			Screwdriver 2.0 mm
Carburetor adjustment			
1) Initial setting	H mixture needle	turn out	7/8
	L mixture needle	turn out	1 7/8
	Throttle adjust screw	turn in* ¹	1
Engine warm-up	Idle - WOT : Total	sec.	5 - 5 : 120
2) Find idle maximum speed			Adjust L mixture needle to maximum idle speed* ²
3) Set idle maximum speed w/ TAS		r/min	3,600
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 11,500 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: 12,100 - 12,300
7) Verify final engine speed with standard equipment		r/min	Idle: 2,600 - 3,200 WOT: 11,800 - 12,800
8) Verify idle rich down by pinching fuel line (Refer to 2. SERVICE HINT on page 8 for details)			Idle rich down: 250 r/min over If it is not, readjust from the "Step1 Initial setting".
9) 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)		Adjustable: 1.5 - 13 (0.05 - 0.43) (Factory set: 7 mL/min)

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

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

*² If chain starts to rotate during adjustment process step 2), decrease engine speed by turning TAS ACW 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* [†]	60 - 90	6 - 9	50 - 80	
	Starter center shaft screw	M5*	30 - 45	3 - 4.5	25 - 40	
	Starter case	M5	50 - 70	5 - 7	45 - 60	
Ignition system	Magneto rotor (Flywheel)	M8	230 - 270	23 - 27	200 - 235	
	Ignition coil	M4	60 - 90	6 - 9	50 - 80	
	Ignition switch	M10	15 - 30	1.5 - 3	13 - 25	
	Spark plug	M14	130 - 170	13 - 17	113 - 150	
Fuel system	Carburetor	M5	30 - 45	3 - 4.5	25 - 40	
	Intake bellows	M5	60 - 90	6 - 9	50 - 80	
Clutch	Clutch hub	LM10	300 - 400	30 - 40	250 - 350	
Engine	Crankcase	M5 [†]	60 - 90	6 - 9	50 - 80	
	Cylinder	M5 [†]	70 - 110	7 - 11	60 - 95	
	Cylinder cover	M5	60 - 90	6 - 9	50 - 80	
	Muffler	M5*	70 - 110	7 - 11	60 - 95	
	Muffler lid	M4	15 - 25	1.5 - 2.5	13 - 22	
Others	Auto-oiler	M4	35 - 50	3 - 5	25 - 45	
	Compression spring	Cushion bracket	M5	30 - 40	3 - 4	25 - 35
		Crank case	M5	60 - 80	6 - 8	50 - 70
		Front handle	M5	40 - 60	4 - 6	35 - 50
	M6		40 - 50	4 - 5	35 - 45	
	Rear handle	M5	40 - 60	4 - 6	35 - 50	
	Brake lever (Hand guard)	Starter side	M5	30 - 50	3 - 5	25 - 40
		Sprocket side	M5	60 - 90	6 - 9	50 - 80
	Brake cover	M5*	40 - 60	4 - 6	35 - 50	
	Sprocket guard plate	M4*	15 - 25	1.5 - 2.5	13 - 22	
	Spike	M4	60 - 90	6 - 9	50 - 80	
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	
		M8	110 - 150	11 - 15	95 - 130	

LM: Left-hand thread

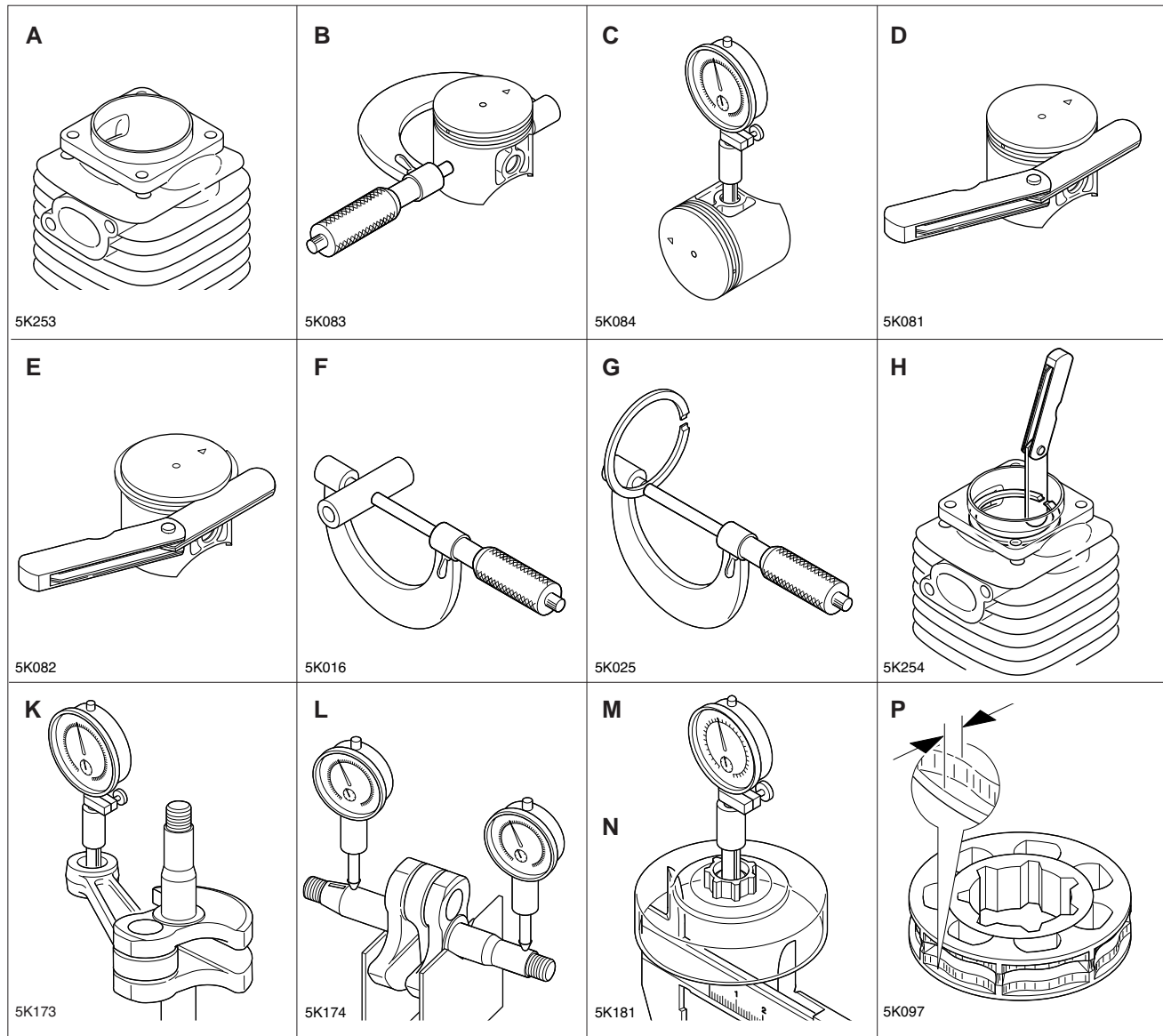
*Thread locking sealant (See next page)

[†] The torque difference between four bolts should not exceed 20 kgf•cm (2N•m, 17in•lbf) per bolt.

1-4 Special repairing materials

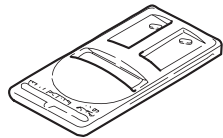
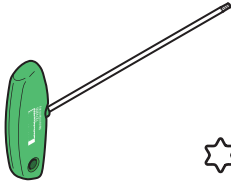

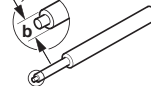
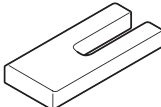
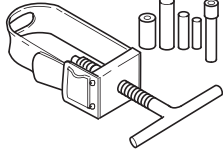
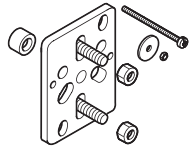

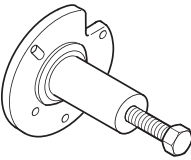
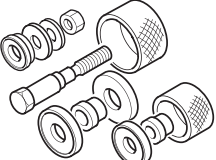
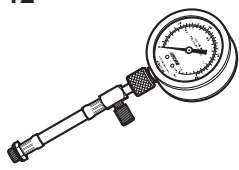
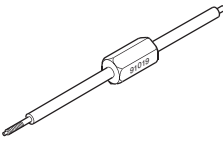
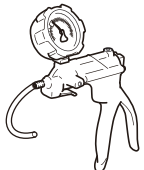
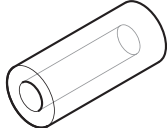


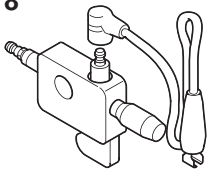
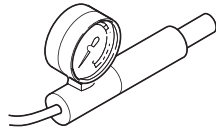
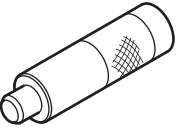
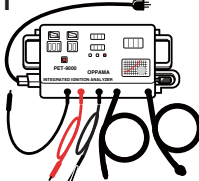
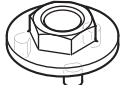
Material	Location	Remarks
Adhesive	Guide bar stud	Loctite #609, ThreeBond 1373 or equivalent
	Starter centre shaft screw	Loctite #222, ThreeBond 1342 or equivalent
Grease	Auto-oiler worm	EPNOC AP2 (Lithium based grease) P/N X695-000060
	Clutch needle bearing	
	Rubber cushion, inside	
	Choke knob	
	Rewind spring	
	Oil seal inner lips	
	Starter centre shaft	
	Brake cover	
	Chain brake (metal contact part)	Molybdenum grease (approx. 1 gram)
Thread locking sealant	Muffler	Loctite #242, ThreeBond #1324 or equivalent
	Sprocket guard plate	
	Starter pawl	

1-5 Service Limits

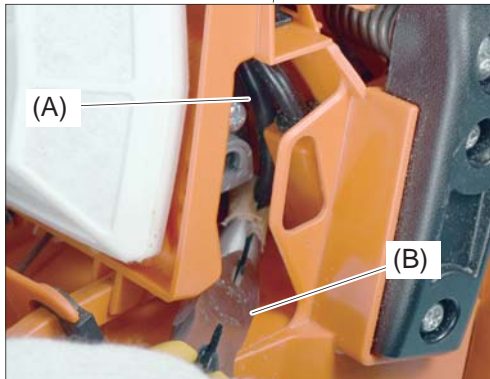
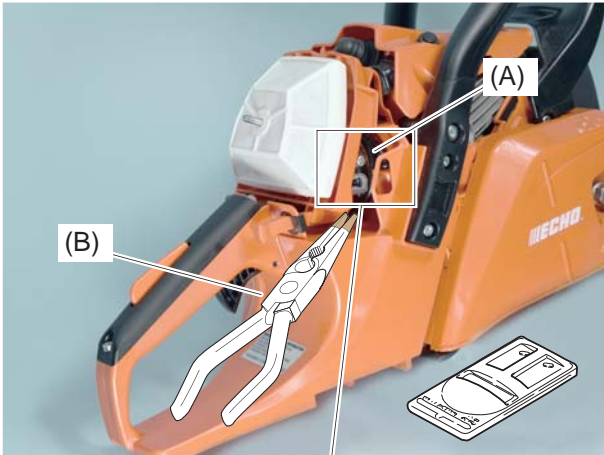


Description		mm (in)	
A	Cylinder bore	When plating is worn and aluminium can be seen	
B	Piston outer diameter	Min.	44.90 (1.768)
C	Piston pin bore	Max.	11.030 (0.4343)
D	Piston ring groove	Max.	1.6 (0.063)
E	Piston ring side clearance	Max.	0.1 (0.004)
F	Piston pin outer diameter	Min.	10.98 (0.4323)
G	Piston ring width	Min.	1.45 (0.057)
H	Piston ring end gap	Max.	0.5 (0.02)
K	Con-rod small end bore	Max.	15.025 (0.5915)
L	Crankshaft runout	Max.	0.01 (0.001)
M	Sprocket bore	Max.	13.90 (0.5472)
N	Clutch drum bore	Max.	71.5 (2.81)
P	Sprocket wear limit	Max.	0.5 (0.02)

1-6 Special tools

1 	2 	3 	4 b = 4 mm 5 b = 5 mm 	6 
7 	8 	9 	10 	11 
12 	13 	14 	15 	16 
17 	18 	19 	20 	21 
22 				

Key	Part Number	Description	Reference
1	897802-33330	Tachometer PET-1000R	Measuring engine speed
2	X602-000340	Torx wrench (T27)	Removing and installing bolt
3	897537-30130	Piston stopper	Locking crankshaft rotation
4	897724-01361	Spring pin tool (4 mm)	Removing and installing spring pin (4 mm dia)
5	897724-02831	Spring pin tool (5 mm)	Removing and installing spring pin (5 mm dia)
6	897719-02830	Piston holder	Making piston steady to remove and install piston / rings
7	897702-30131	Piston pin tool	Removing and installing piston pin
8	Y089-000111	Puller	Removing magneto rotor
9	91004	Module air gap gauge	Adjusting pole shoe air gaps
10	897502-19830	Crankcase tool	Separating crankcase
11	897701-14732	Bearing tool	Removing and installing ball bearings on crankcase
12	91037	Compression gauge	Measuring cylinder compression
13	91019	Limiter cap tool	Removing and installing limiter cap
14	91149	Pressure tester	Testing crankcase leakages
15	897726-16431	Oil seal tool	Installing starter side oil seal
16	897826-16131	Pressure rubber plug	Plugging intake port to test crankcase / cylinder leakages
17	897827-16131	Pressure plate	Plugging intake port to test crankcase / cylinder leakages
18	897800-79931	Spark tester	Checking ignition system
19	897803-30133	Pressure tester	Testing Carburetor leakages
20	897714-12330	Oil seal tool	Installing crankcase side oil seal
21	900300	Ignition Analyzer: PET-9000	Measuring Ignition timing, Primary/Secondary voltage engine speed
22	897505-16133	Clutch tool	Removing and installing clutch assembly

2 SERVICE HINT**2-1 Verifying idle rich down**

1. Remove air cleaner cover.
2. Pinch fuel line (A) with longnose pliers (B) as shown.

NOTE: Wrap the ends of longnose pliers with tape (or cover with soft pipes) to protect fuel line from damage.

3. Then, make sure that how much idle engine speed increases by pinching fuel line.
4. If it is less than 250 r/min, readjust carburetor from the beginning.