



# SERVICE DATA

## CHAIN SAW

# ECHO: CS-4510

(Serial number : C7131500001 - C71315999999)

### 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. **01-45D-01**  
**Revised: 20201019**  
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## 1 SERVICE INFORMATION

## 1-1 Specifications

Dimensions	Length*	mm(in)	437 (17.2)
	Width	mm(in)	237 (9.3)
	Height	mm(in)	298 (11.7)
Dry weight*		kg(lb)	5.0 (11.0)
Engine	Type	YAMABIKO, stratified scavenging, air-cooled, two-stroke, single cylinder	
	Rotation	Clockwise as viewed from the output end	
	Displacement	cm <sup>3</sup> (in <sup>3</sup> )	45.0 (2.746)
	Bore	mm(in)	43.0 (1.693)
	Stroke	mm(in)	31.0 (1.220)
	Compression ratio	7.3	
Carburetor	Type	Diaphragm, horizontal-draft	
	Model	ZAMA C1Q-110129C / C1Q-Z011/72	
	Venturi size-Throttle bore	mm(in)	16.0 - 17.5 (0.630 - 0.689)
Ignition	Type	CDI (Capacitor discharge ignition) system, Digital Magneto	
	Spark plug	NGK BPMR8Y	
Exhaust	Muffler type	Spark arrester muffler	
Starter	Type	i-30	
	Rope diameter x length	mm(in)	3.5 x 900 (0.13 x 35.4)
Fuel	Type	Premixed two-stroke fuel	
	Mixture ratio	50 : 1 (2 %)	
	Gasoline	Minimum 89 octane	
	Two-stroke air cooled engine oil	ISO-L-EGD (ISO/CD13738), JASO M345-FC/FD	
	Tank capacity	L (UK.fl.oz.)	0.48 (16.2)
Clutch	Type	Centrifugal, 3-shoe slide with 3-tension spring	
Guide bar / Saw chain lubrication type		Adjustable automatic oiler	
Oil	Tank capacity	L (UK.fl.oz.)	0.33 (11.2)
Auto oiler	Type	Clutch driven type	
Sprocket	Type	Spur	
	Number of teeth	7	
	Pitch	in	0.325

\* Without guide bar and saw chain.

Cutting devices					
Guide bar	<b>Type</b>	<b>16B0AD3366C</b>	<b>18B0AD3372C</b>	<b>20B0AD3378C</b>	
	Called length	in	16	18	20
	Gauge	in	0.050		
Saw chain	<b>Type</b>	<b>OREGON 20BPX</b>			
	Number of drive links		66	77	78
	<b>Pitch</b>	<b>in</b>	<b>.325</b>		
	Gauge	in	0.050		

## 1-2 Technical data

Engine			
Compression pressure	MPa (kgf/cm <sup>2</sup> ) (psi)		1.06 (10.8) (154)
Clutch engagement speed	RPM		4,150
Engagement Minimum <sup>†</sup>	RPM		3,800
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	Ω		785 - 1,005
Pole shoe air gaps	mm(in)		0.3 - 0.4 (0.012 - 0.016)
Ignition timing	at 3,000 RPM	°BTDC	13
	at 10,000 RPM	°BTDC	31
Carburetor			
Test Pressure, minimum	MPa (kgf/cm <sup>2</sup> ) (psi)		0.05 (0.5) (7.0)
Metering lever height	mm(in)		0.1 - 0.25 (0.004 - 0.010) lower than diaphragm seat
Limiting plug / cap			Limiting cap P/N P005004220
Tool to adjust mixture needles			Special tool P/N 91085
Carburetor adjustment			
1) Initial setting			
H mixture needle	turn out		2 7/8
L mixture needle	turn out		1 7/8
Throttle adjust screw	turn out* <sup>1</sup>		8 1/8
Engine warm-up	Idle - WOT : Total	sec.	5 - 10 : 150
2) Find idle maximum speed			Adjust L mixture needle to maximum idle speed* <sup>2</sup>
3) Set idle maximum speed w/ TAS		RPM	4,100
4) Set idle speed			
by turning L mixture needle CCW		RPM	3,100
5) Confirm H mixture needle position before WOT setting			Turn H mixture needle CCW to confirm engine speed decreases less than lower value of the range below
6) WOT setting		RPM	Turn H mixture needle CW in 1/8 turn increment with the engine at idle, then accelerate to WOT and check engine speed. The final engine speed should fall within : 12,350 - 12,550
7) Verify final engine speed with standard equipment		RPM	Idle: 2,700 - 3,500 WOT: 12,250 - 12,650
Chain oil discharge volume			Adjustable: 1.5 - 13 (0.05 - 0.46) (Factory set: 7 mL/min)
	mL/min(UK.fl.oz./min)		

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

<sup>†</sup> If clutch engagement speed is lower than minimum clutch engagement speed, replace clutch assembly with new one.

\*<sup>1</sup> Turn TAS clockwise until lightly seated. Then turn TAS counterclockwise.

\*<sup>2</sup> 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	in·lbf	
Starter system	Starter pawl	M5	40 - 60	4 - 6	35 - 52	
	Starter case	M5 <sup>†</sup>	25 - 40	2.5 - 4	18 - 35	
Ignition system	Flywheel (Magneto rotor)	M8	250 - 290	25 - 29	220 - 255	
	Ignition coil	M5	40 - 60	4 - 6	35 - 52	
	Spark plug	M14	130 - 170	13 - 17	110 - 150	
Fuel system	Carburetor	M5 <sup>†</sup>	30 - 40	3 - 4	26 - 35	
	Intake bellows	M4*	30 - 45	3 - 4.5	26 - 40	
Clutch	Clutch shoe	LM10	300 - 400	30 - 40	262 - 350	
Engine	Crankcase	M5*	50 - 70	5 - 7	45 - 60	
	Engine mount	M5	70 - 110	7 - 11	60 - 95	
	Cylinder cover	M5 <sup>†</sup>	25 - 40	2.5 - 4	18 - 35	
	Cylinder plug	M4	30 - 45	3 - 4.5	26 - 40	
	Muffler	M5	90 - 110	9 - 11	80 - 95	
Others	Auto-oiler	M5	30 - 45	3 - 4.5	26 - 40	
	Front handle		M5 <sup>†</sup>	25 - 40	2.5 - 4	18 - 35
		Cylinder side	M5	50 - 70	5 - 7	45 - 60
	Rear handle assembly	M5 <sup>†</sup>	25 - 40	2.5 - 4	18 - 35	
	Spike	M5 <sup>†</sup>	50 - 70	5 - 7	45 - 60	
	Brake lever (Hand guard)		M4 <sup>†</sup>	25 - 35	2.5 - 3.5	18 - 30
			M5 <sup>†</sup>	25 - 40	2.5 - 4	18 - 35
	Stud bolt	M8 <sup>†</sup>	160 - 220	16 - 22	140 - 190	
	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	

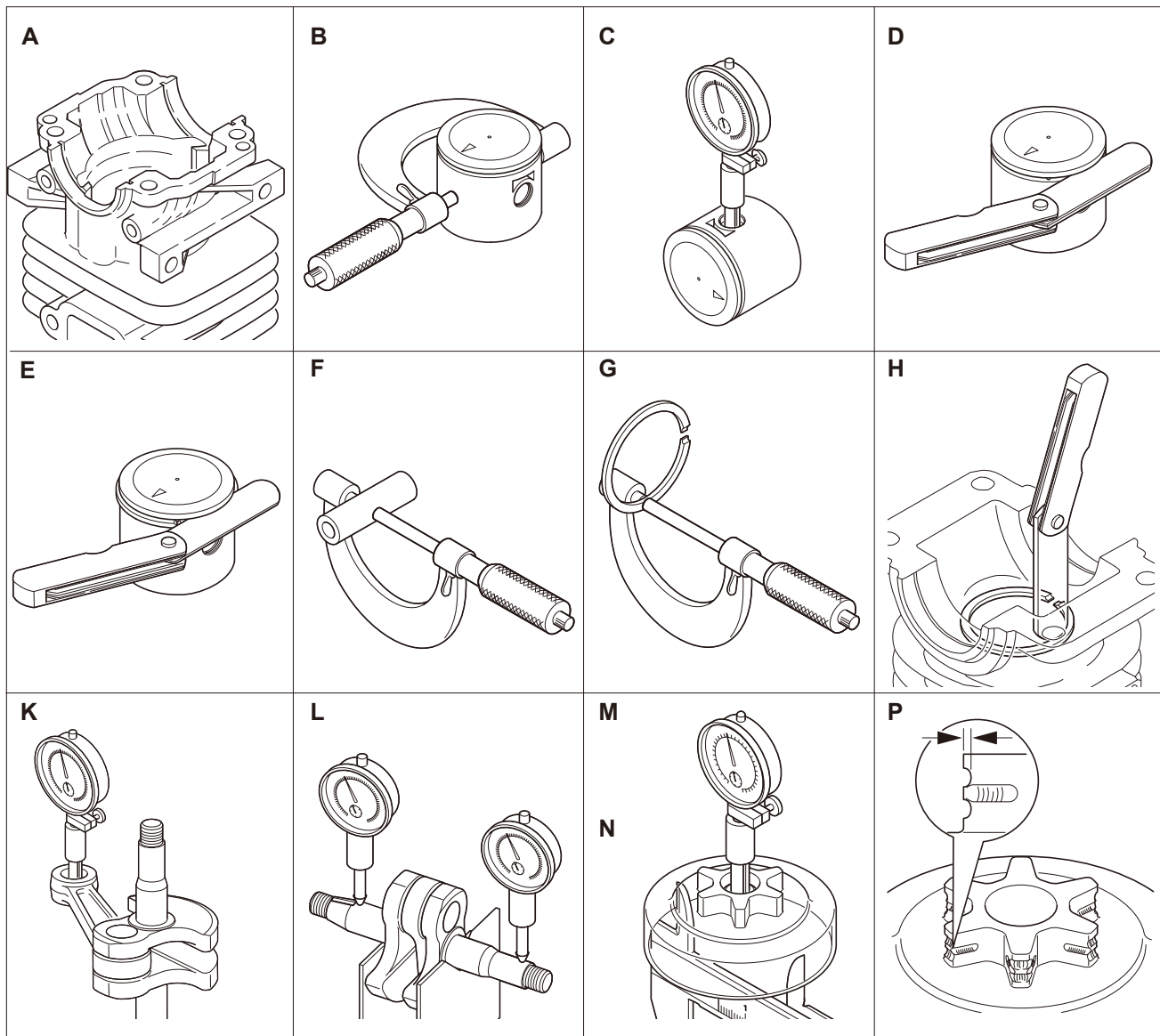
LM: Left-hand thread \*Apply special repairing materials

† Tapping screw

## 1-4 Special repairing materials

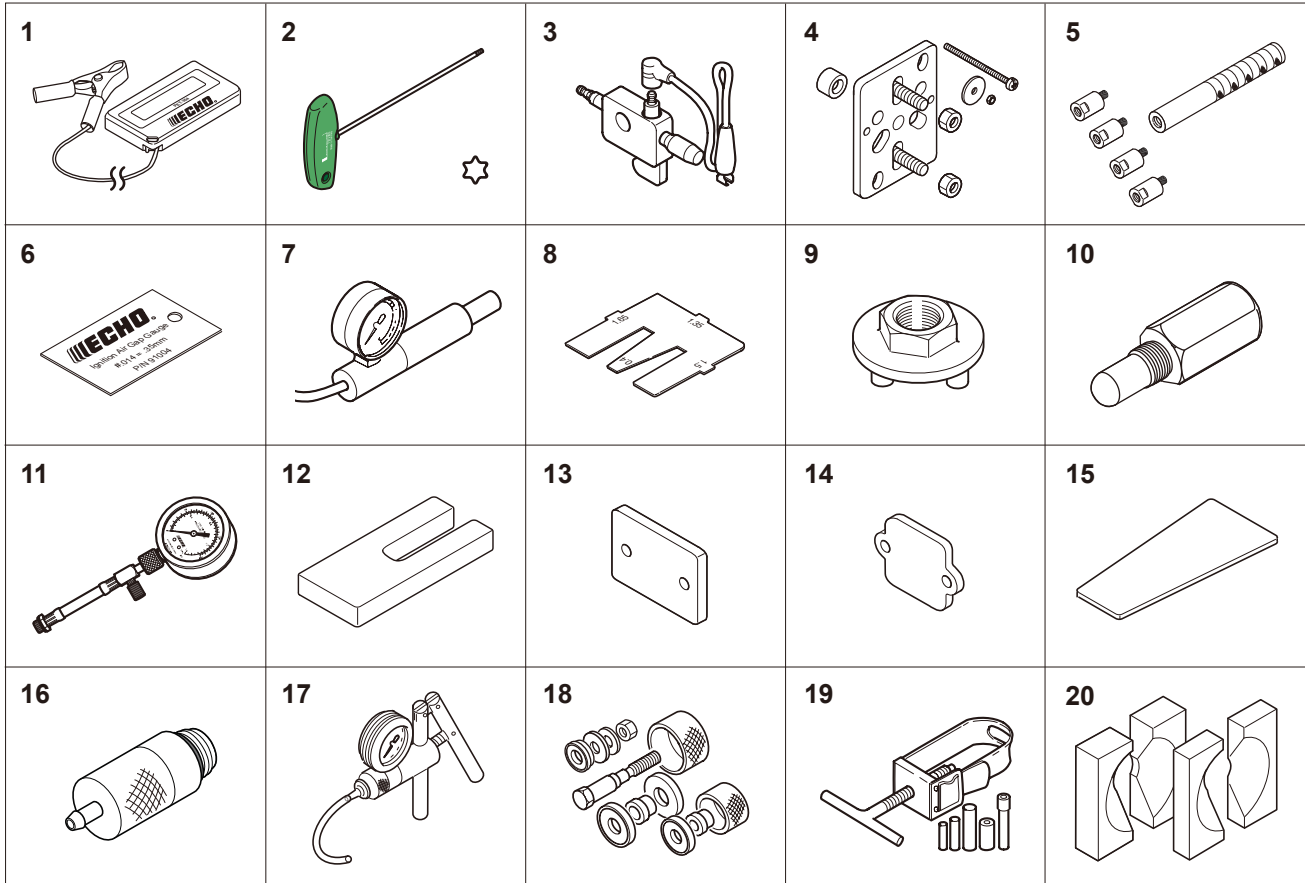
Material	Location	Remarks
Adhesive	Main bearing	Loctite® #675 or equivalent
	Stud bolt	Loctite® #272 or equivalent
Thread locking sealant	Intake bellows	Loctite® #222, ThreeBond #1342 or equivalent
Grease	Clutch needle bearing	Lithium based grease or ECHO XTended Protection™ Lubricant
	Starter center shaft	
	Engine cover	
	Cushion	
	Oil seal inner lips	
	Air cleaner cover	
	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.	42.90 (1.689)
C	Piston pin bore	Max.	10.035 (0.3951)
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.	9.98 (0.3929)
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.	14.025 (0.5522)
L	Crankshaft runout	Max.	0.01 (0.0004)
M	Sprocket bore	Max.	12.80 (0.5039)
N	Clutch drum bore	Max.	71.5 (2.81)
P	Sprocket wear limit	Max.	0.5 (0.02)

## 1-6 Special tools



Key	Part Number	Description	Reference
1	G310000050	Tachometer PET 304	Measuring engine speed to adjust Carburetor
2	91160	Torx wrench (T27)	Removing and installing Torx bolt
3	PET4000EC	Spark tester	Checking ignition system
4	91134	Puller	Removing magneto rotor (flywheel)
5	91122	Flywheel remover kit	Removing magneto rotor (flywheel)
6	91004	Module air gap gauge	Adjusting pole shoe air gaps
7	8978030133	Pressure tester	Testing Carburetor and crankcase leakage
8	91021	Metering lever gauge	Measuring metering lever height on Carburetor
9	89750516133	Clutch tool	Removing and installing clutch assembly
10	X644000020	Piston stopper	Locking crankshaft rotation
11	91147	Compression gauge	Measuring cylinder compression
12	91101	Piston holder	Making piston steady to remove and install piston/ring
13	89782616131	Pressure rubber plug	Plugging intake port to test crankcase / cylinder leakages
14	89782716131	Pressure plate	Plugging intake port to test crankcase / cylinder leakages
15	91041	Pressure rubber plug	Plugging exhaust port to test crankcase / cylinder leakages
16	91018	Pressure connector	Testing crankcase and cylinder leakage
17	91149	Pressure / vacuum tester	Testing tank vent and crankcase leakages
18	89770114732	Bearing tool	Removing and installing ball bearings on crankcase
19	89770230131	Piston pin tool	Removing and installing piston pin
20	89770102830	Bearing wedge	Removing ball bearings on crankshaft