



SERVICE DATA

HEDGE TRIMMER

ECHO :
HC-156, HC-1501, HCR-1501

shindaiwa :
DH221

(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. **12-21T-C1**
REVISED: 201906
ISSUED: 201606



1 SERVICE INFORMATION

1-1 Specifications

Models			HC-1501 DH221	HCR-1501	HC-156
Dimensions	Length	mm (in)	1017 (40.0)	1008 (39.7)	1157 (45.6)
	Width	mm (in)	270 (10.6)		
	Height	mm (in)	192 (7.5)		
Dry weight		kg (lb)	4.9 (10.7)	5.1 (11.2)	
Engine	Type		YAMABIKO, air-cooled, two-stroke, single cylinder		
	Rotation		Counterclockwise as viewed from the output end		
	Displacement	cm ³ (in ³)	21.2 (1.294)		
	Bore	mm (in)	32.2 (1.268)		
	Stroke	mm (in)	26.0 (1.024)		
	Compression ratio		5.9		
Carburetor	Type		Diaphragm, horizontal-draft, with purge bulb		
	Model		ZAMA RB-K92A		
	Venturi size - Throttle bore	mm (in)	9.0 - 10.5 (0.35 - 0.41)		
Ignition	Type		CDI (Capacitor discharge ignition) system Variable Slope Timing (VST) : Slope advance ignition system combined with electronic speed governor		
	Spark plug		NGK BPMR8Y		
Exhaust	Muffler type		Spark arrester muffler with catalyst		
Starter	Type		Automatic rewind starter		
	Rope diameter x length	mm (in)	3.0 x 830 (0.12 x 32.7)		
Fuel*	Type**		Mixed two-stroke fuel		
	Mixture ratio		50 : 1 (2%)		
	Gasoline		Minimum 89 octane		
	Two-stroke engine oil		ISO-L-EGD (ISO/CD13738), JASO FC/FD		
	Tank capacity	L (U.S.fl.oz.)	0.44 (14.9)		
Clutch	Type		Centrifugal, 2-shoe pivot		
Handle	Type	Front	Loop type with hand guard		
		Rear	Rubber grip with throttle trigger		
Gear case	Reduction ratio		5.88		
	Gear tooth		Spur		
	Lubrication		Lithium based grease		
Cutter	Type		Double reciprocating, Double edge blade		
	Effective length	mm (in)	499 (19.6)	639 (25.2)	
	Pitch	mm (in)	35 (1.4)		
	Height	mm (in)	21 (0.8)		
	Thickness	mm (in)	2.5 (0.1)		
	Lubrication		Apply oil every 4 hours of use		

* Refer to Operator's manual.

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

1-2 Technical data

Engine			
Compression pressure	MPa (kgf/cm ²) (psi)		0.62 (6.3) (90)
Clutch engagement speed	r/min		4,900
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	22
	at 8,000 r/min	°BTDC	38
	at 11,000 r/min	°BTDC	20
Carburetor			
Test Pressure, minimum	MPa (kgf/cm ²) (psi)		0.05 (0.5) (7.0)
Metering lever height	mm(in)		0.1 - 0.25 (0.004 - 0.01) lower than diaphragm seat
Limiter cap / plug			Limiter plug P/N P005-001270
Tool to adjust mixture needles			Screwdriver 2.5 mm P/N X603-000050 (Carb. adjustment tool P/N Y089-000094)
Carburetor adjustment			
1) Initial setting			
H mixture needle	turn out		1 1/8
L mixture needle	turn out		2
Throttle adjust screw	turn out* ¹		8 1/4
Engine warm-up	Idle - WOT : Total	sec.	10 - 10 : 180
2) Find idle maximum speed			Adjust L mixture needle to maximum idle speed* ²
3) Set idle maximum speed w/ TAS			r/min 4,600
4) Set idle speed by turning L mixture needle CCW			r/min 3,300
5) Find WOT maximum speed			Adjust H mixture needle to maximum WOT speed
6) WOT setting			turn Turn H mixture needle CCW by: 1/4
7) Verify final engine speed with standard equipment			Idle: 2,900 - 3,700 WOT: 10,500 - 11,800
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.

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

*¹ Turn Throttle adjust screw (TAS) clockwise until its head touches boss. Then turn TAS counterclockwise.

*² 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 assembly	M 8	160 - 200	16 - 20	140 - 175
	Starter case	M 4*	20 - 30	2 - 3	18 - 26
Ignition system	Ignition coil	M 4	45 - 55	4.5 - 5.5	40 - 48
	Spark plug	M 14	130 - 170	13 - 17	115 - 150
Fuel system	Carburetor	M 5	30 - 45	3 - 4.5	26 - 40
	Intake insulator	M 5*	50 - 70	5 - 7	45 - 60
	Fuel tank	M 5	50 - 70	5 - 7	45 - 60
Clutch	Clutch shoe	M 8	160 - 200	16 - 20	140 - 175
Engine	Crankcase	M 5**	70 - 110	7 - 11	60 - 95
	Cylinder	M 5**	70 - 110	7 - 11	60 - 95
	Muffler	M 5*	55 - 65	5.5 - 6.5	48 - 57
	Engine mount on gear case	M 6	80 - 120	8 - 12	70 - 105
Gear case	Gear case cover	M 4	35 - 50	3.5 - 5	30 - 45
Cutter	Cutter nuts	M 6	See NOTE below		
	Cutter bolts	M 6	See NOTE below		
Handle	Rear handle set	M 5	50 - 70	5 - 7	45 - 60
Regular bolt, nut and screw		M 3	6 - 10	0.6 - 1	5 - 9
		M 4	15 - 25	1.5 - 2.5	13 - 22
		M 5	25 - 45	2.5 - 4.5	22 - 40
		M 6	45 - 75	4.5 - 7.5	40 - 65
		M 8	110 - 150	11 - 15	95 - 130
Torx bolt		M 4	35 - 45	3.5 - 4.5	30 - 40
		M 5	50 - 70	5 - 7	45 - 60

* Apply thread locking sealant (See below).

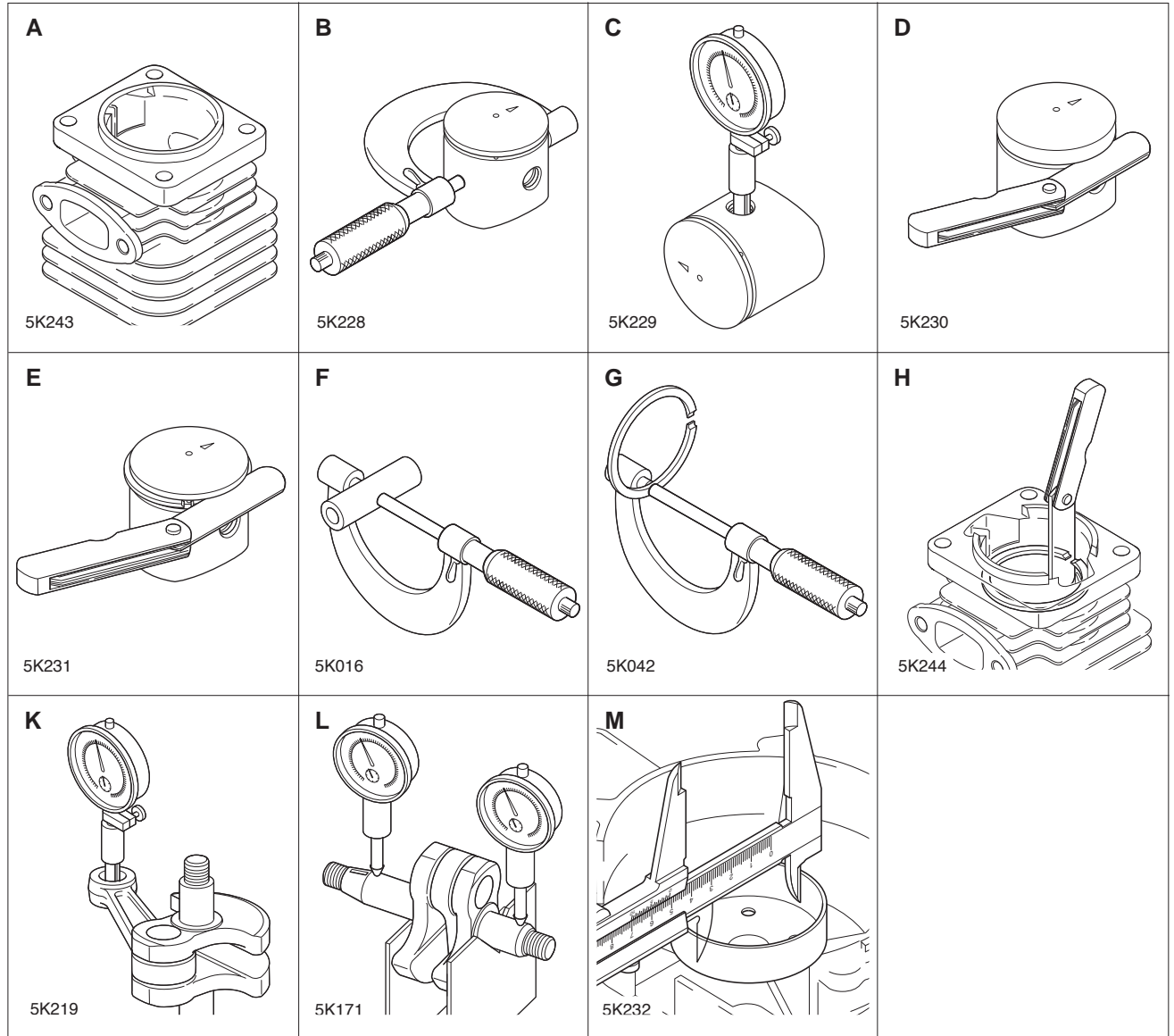
** The torque differences among bolts should not exceed 20 kgf•cm (2N•m, 17in•lbf) on one cylinder or crankcase.

NOTE: To adjust cutter clearance, faster 5 pcs of cutter bolts 1-2 N•m, and back 1/2 turn counterclockwise. Then tighten the nuts 5-7 N•m holding cutter bolts with spanner.

1-4 Special repairing materials

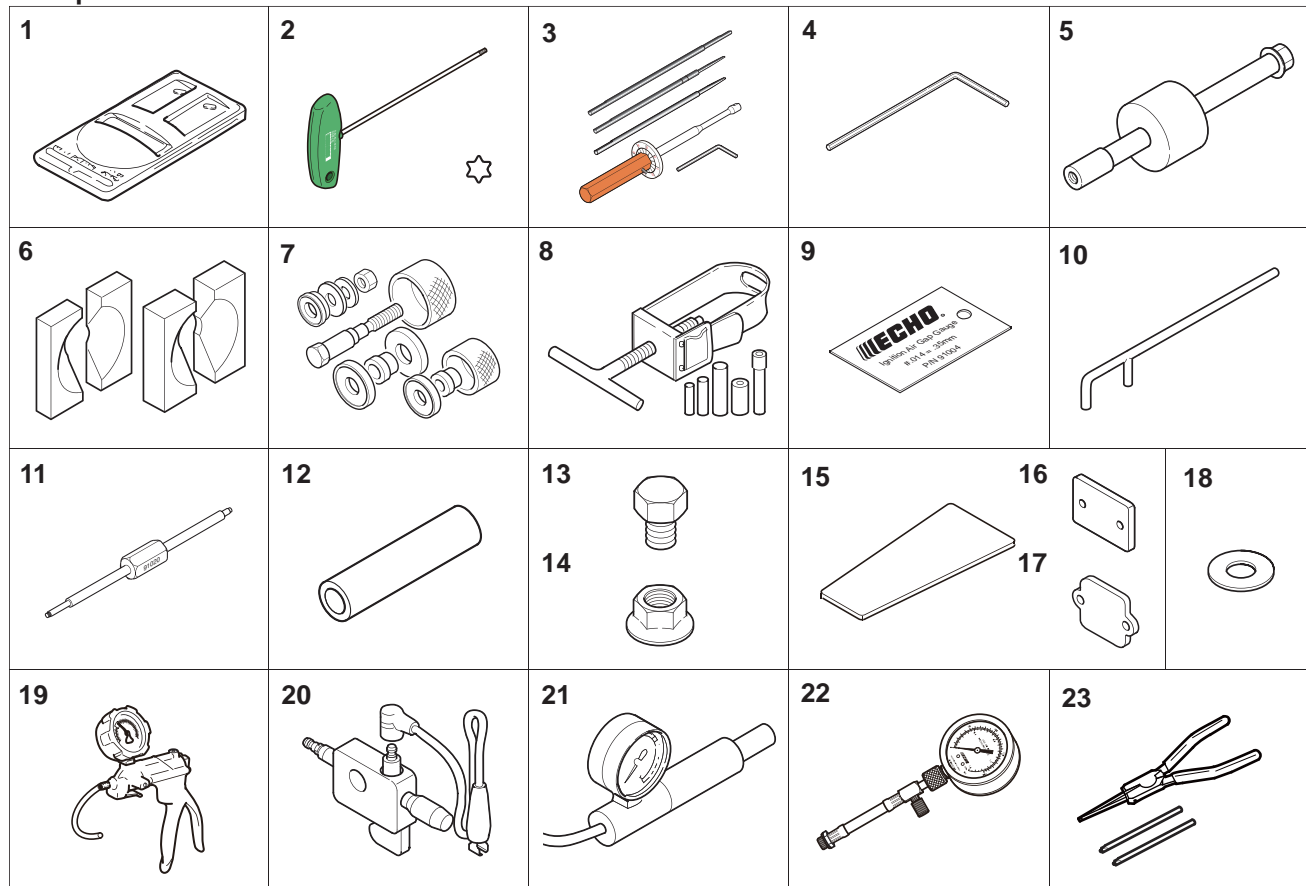
Material	Location	Remarks
Grease	Gear case	EPNOC AP2 (Lithium based grease) P/N X695-000060
	Rewind spring	
	Starter center post	
	Oil seal inner lips	
Thread locking sealant	Intake insulator	Loctite #222, ThreeBond 1342 or equivalent
	Starter case	
	Cylinder cover	
	Muffler	Loctite #242, ThreeBond 1324 or equivalent

1-5 Service limits



Description		mm (in)	
A	Cylinder bore	When plating is worn and aluminium can be seen	
B	Piston outer diameter	Min.	32.10 (1.264)
C	Piston pin bore	Max.	8.030 (0.3161)
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.	7.97 (0.3138)
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.	12.025 (0.4734)
L	Crankshaft runout	Max.	0.03 (0.001)
M	Clutch drum bore	Max.	51.5 (2.03)

1-6 Special tools



Key	Part Number	Description	Reference
1	897802-33330	Tachometer PET-1000R	Measuring engine speed to adjust carburettor
2	X602-000340	Torx wrench (T27)	Removing and installing bolt
3	Y089-000094	Carburetor adjustment tool	Adjusting carburettor
4	895610-79920	L-hex wrench (4 mm)	Removing and installing hex. socket bolts (M5)
5	P021-044870	PTO shaft puller	Removing PTO shaft
6	897701-02830	Bearing wedge	Removing ball bearings on crankshaft
7	897701-14732	Bearing tool	Removing and installing ball bearings on crankcase
8	897702-30131	Piston pin tool	Removing and installing piston pin
9	91004	Module air gap gauge	Adjusting pole shoe air gaps
10	897712-04630	2-pin wrench	Removing and installing pawl carrier
11	91020	Limiter plug tool	Removing and installing plug
12	897726-09130	Oil seal tool	Installing oil seals
13	900100-08008	Bolt	Removing magneto rotor (flywheel), crankshaft from crankcase
14	V265-000200	Flange nut	Removing magneto rotor (flywheel)
15	91041	Pressure rubber plug	Plugging exhaust port to test crankcase / cylinder leakages
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	363018-00310	Washer	Installing crankcase oil seal (starter side)
19	91149	Pressure / vacuum tester	Testing crankcase / cylinder leakages
20	897800-79931	Spark tester	Checking ignition system
21	897803-30133	Pressure tester	Testing carburettor and crankcase leakages
22	91037	Compression gauge	Measuring cylinder compression
23	P021-051610	Snap ring pliers	Removing snap ring from clutch drum