



SERVICE DATA

HEDGE TRIMMER

ECHO :
HCR-165ES HCR-185ES

shindaiwa :
DH165ST DH185ST

(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.

ECHO SERVICE MANUAL Ord. 402-32 (Model : HCR-161ES, HCR-171ES) contains lots of information for servicing this model.

CONTENTS

	page
1 SERVICE INFORMATION	2
1-1 Specifications	2
1-2 Technical data	3
1-3 Torque limits.....	4
1-4 Special repairing materials	5
1-5 Service limits.....	6
1-6 Special tools	7

Reference No. **12-21R-02**

REVISED : 201906

ISSUED: 201405



1 SERVICE INFORMATION

1-1 Specifications

Model		HCR-165ES DH165ST	HCR-185ES DH185ST
Dimensions	Length	mm (in)	1172 (46.1)
	Width	mm (in)	272 (10.7)
	Height	mm (in)	207 (8.2)
Dry weight		kg (lb)	5.1 (11.2) 5.3 (11.7)
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		5.6
Carburetor	Type	Diaphragm, horizontal-draft, with purge bulb	
	Model	ZAMA RB-Z011/67A	
	Venturi size - Throttle bore	mm (in)	9.0 - 10.5 (0.35 - 0.41)
Ignition	Type	CDI (Capacitor discharge ignition) system, Digital magneto	
	Spark plug	NGK BPMR8Y	
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 850 (0.12 x 33.5)
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.)	Full tank capacity: 0.39 (13.2), Usable capacity: 0.38 (12.8)
Clutch	Type	Centrifugal, 2-shoe slide	
Handle	Type	Front	Loop with hand guard
		Rear	Grip with throttle trigger
Gear case	Reduction ratio	5.75	
	Gear tooth	Spur	
	Lubrication	Lithium based grease	
Cutter	Type	Double reciprocating, Double edge blade	
	Effective length	mm (in)	639 (25.2) 744 (29.3)
	Pitch	mm (in)	35 (1.38)
	Height	mm (in)	21 (0.83)
	Thickness	mm (in)	2.5 (0.098)
	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)		0.71 (7.2) (103)
Clutch engagement speed	r/min		5,100
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	20
	at 8,000 r/min	°BTDC	33
	at 10,000 r/min	°BTDC	25
PET-9000	Parameter 1		332
	Parameter 2		07
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
Limiting cap / plug			Limiting 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		1/2
L mixture needle	turn out		2 1/2
Throttle adjust screw	turn out* ¹		7 1/2
Engine warm-up	Idle - WOT : Total	sec.	0 - 300 : 300
2) Find idle maximum speed			Adjust L mixture needle to maximum idle speed* ²
3) Set idle maximum speed w/ TAS		r/min	4,100
4) Set idle speed by turning L mixture needle CCW		r/min	3,300
5) Find WOT maximum speed			Pull throttle trigger to WOT, and after stabilizing engine WOT speed, adjust H mixture needle to maximum WOT speed
6) WOT setting		turn	Turn H mixture needle CCW by: 150
7) Verify final engine speed with standard equipment			Idle: 2,900 - 3,600 WOT: 10,000 - 11,000
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).

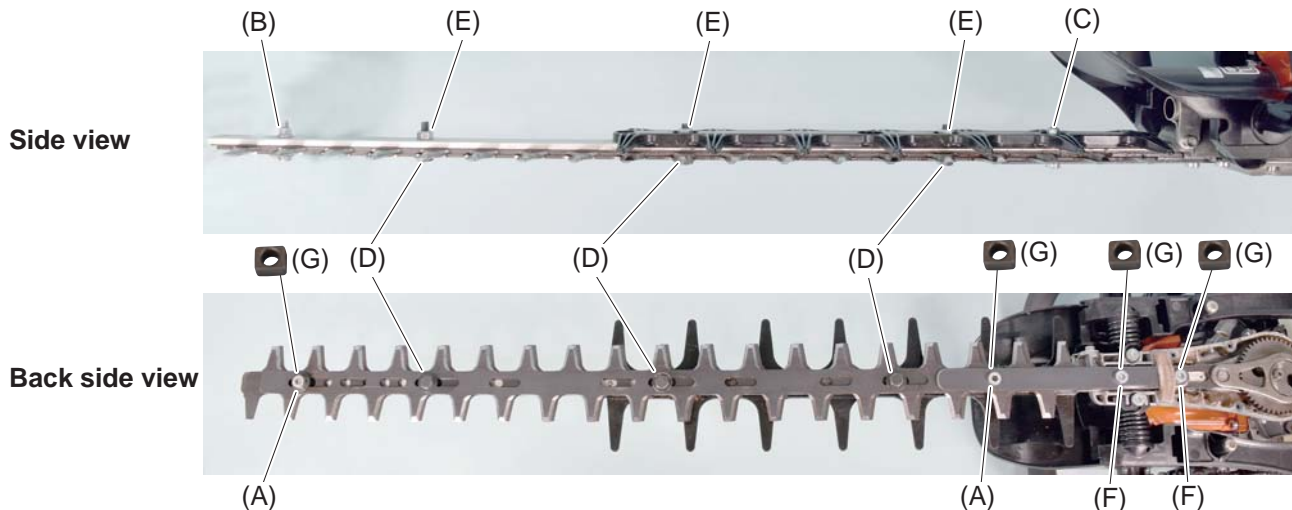
1-3 Torque limits

Descriptions		Size	kgf•cm	N•m	in•lbf
Starter system	Starter case	M4*	20 - 30	2 - 3	17 - 26
	Crankcase side				
	Cylinder cover side	M4	15 - 20	1.5 - 2	13 - 17
Ignition system	Magneto rotor (Flywheel)	M8*	80 - 100	8 - 10	70 - 88
	Ignition coil	M4	35 - 45	3.5 - 4.5	30 - 39
	Spark plug	M14	130 - 170	13 - 17	115 - 150
Fuel system	Carburetor	M5	30 - 45	3 - 4.5	26 - 39
	Intake insulator	M5*	50 - 70	5 - 7	44 - 61
Clutch	Clutch shoe	M8	160 - 200	16 - 20	140 - 175
Cylinder cover		M5*	25 - 45	2.5 - 4.5	22 - 39
Engine	Crankcase/Cylinder	M5*	70 - 110	7 - 11	61 - 95
	Muffler	M5*	70 - 90	7 - 9	61 - 79
	Muffler cover	M5*	20 - 30	2 - 3	17 - 26
	Engine mount on gear case	M6	80 - 12	8 - 12	70 - 105
Cutter	Cutter bolts	M5 / M6	See NOTE below.		
	Cutter nuts	M5 / M6	See NOTE below.		
	Cutter support**	M5	See NOTE below.		
	Gear case cover	M4	30 - 45	3 - 4.5	26 - 39
	Rear handle	M4	15 - 30	1.5 - 3	13 - 26
	Front handle assembly	M5	25 - 35	2.5 - 3.5	22 - 30
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 - 39
		M6	45 - 75	4.5 - 7.5	39 - 65
		M8	110 - 150	11 - 15	95 - 130

* Apply thread locking sealant. (See next page.)

** The bolts were changed. Refer to TECHNICAL INFORMATION Y2016-598 for details.

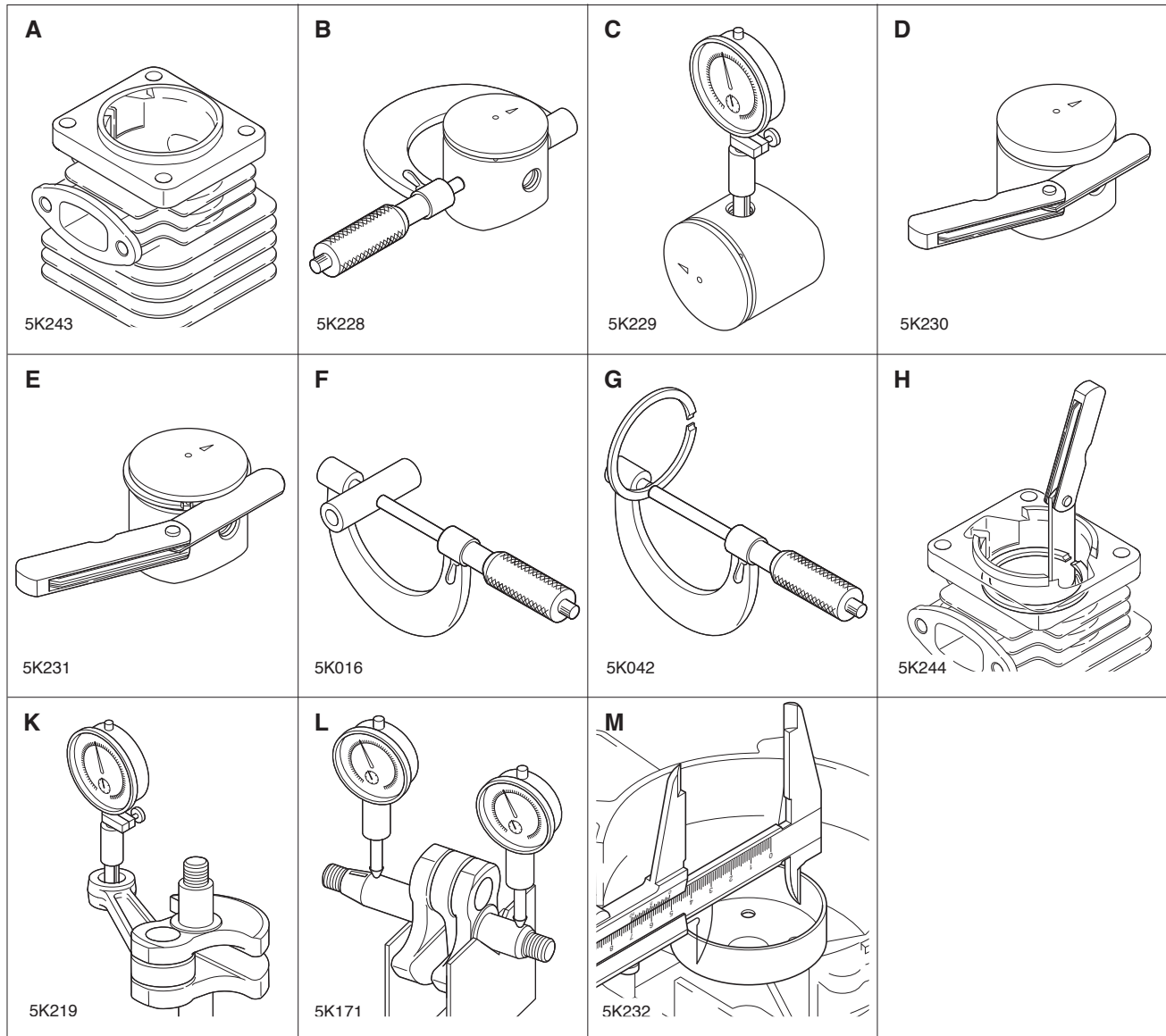
NOTE: To assemble the cutter, fasten cutter bolts (A) with 5 - 7 N•m. Then tighten nut (B) with 7 - 9 N•m and nut (C) with 5 - 7 N•m, holding cutter bolts (A) with spanner. Fasten cutter bolts (D) (HCR-165ES, DH165ST: 3 pcs, HCR-185ES, DH185ST: 4 pcs) with 0.5 - 1.5 N•m, and back 1/2 turns (180°) counterclockwise. Then tighten nuts (E) with 5 - 7 N•m, holding cutter bolts (D) with spanner. Fasten cutter support bolts (F) with 9 - 11 N•m on gear case. Spacers (G) are installed on the bolts (A) and (F) between cutter support.



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	Flywheel	Loctite #222, ThreeBond #1342 or equivalent
	Starter case	Loctite #242, ThreeBond #1324 or equivalent
	Cylinder cover	
	Intake insulator	
	Muffler	
	Muffler cover	

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.	7.98 (0.3142)
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.	0.02 (0.001)
M	Clutch drum bore	Max.	51.5 (2.03)

1-6 Special tools

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

Key	Part Number	Description	Reference
1	897802-33330	Tachometer PET-1000R	Measuring engine speed to adjust carburetor
2	X602-000340	Torx wrench (T27)	Removing and installing bolt
3	Y089-000094	Carburetor adjustment tool	Adjusting carburetor
4	363018-00310	Washer	Installing crankcase oil seal (starter side)
5	897701-02830	Bearing wedge	Removing ball bearings on crankshaft
6	897701-14732	Bearing tool	Removing and installing ball bearings on crankcase
7	897702-30131	Piston pin tool	Removing and installing piston pin
8	91004	Module air gap gauge	Adjusting pole shoe air gaps
9	897712-04630	2-pin wrench	Removing and installing pawl carrier
10	91020	Limiter plug tool	Removing and installing plug
11	897726-21430	Oil seal tool	Installing oil seals
12	900100-08008	Bolt	Removing magneto rotor (flywheel), crankshaft from crankcase
13	V265-000200	Flange nut	Removing magneto rotor (flywheel)
14	91041	Pressure rubber plug	Plugging exhaust port to test crankcase / cylinder leakages
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	91149	Pressure / vacuum tester	Testing crankcase / cylinder leakages
18	897800-79931	Spark tester	Checking ignition system
19	897803-30133	Pressure tester	Testing carburetor and crankcase leakages
20	91037	Compression gauge	Measuring cylinder compression
21	A131-000150	Pressure connector	Testing crankcase and cylinder leakage