



SERVICE DATA

CHAIN SAW

ECHO: CS-280T CS-280TES

shindaiwa: 280Ts 280TCs

(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. 401-22 (Model : CS-2600) contains lots of information for servicing this model.

NOTE: The engine on ECHO CS-280T and CS-280TES is completely different from the engine on ECHO CS-280WES (refer to SERVICE DATA No. 00-27B-00).

CONTENTS

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

Reference No. **00-27D-01**
REVISED : 201903
ISSUED: 201401



1 SERVICE INFORMATION

1-1 Specifications

| | | | |
|--|------------------------------------|--|--------------------------|
| Dimensions | Length* | mm(in) | 257 (10.12) |
| | Width | mm(in) | 233 (9.17) |
| | Height | mm(in) | 210 (8.27) |
| Dry weight* | | kg(lb) | 3.0 (6.6) |
| Engine | Type | YAMABIKO, air-cooled, two-stroke, single cylinder | |
| | Rotation | Clockwise as viewed from the output end | |
| | Displacement | cm ³ (in ³) | 26.9 (1.641) |
| | Bore | mm(in) | 35.0 (1.378) |
| | Stroke | mm(in) | 28.0 (1.102) |
| | Compression ratio | 7.1 | |
| Carburetor | Type | Diaphragm horizontal-draft | |
| | Model | Walbro WT-1085 / WT-1085· (CS-280T, CS-280TES) WT-1091 / WT-1091· (280Ts, 280TCs) | |
| | Venturi size-Throttle bore | mm(in) | 11.11-14.3 (0.437-0.563) |
| Ignition | Type | CDI (Capacitor discharge ignition) system, Digital magneto | |
| | Spark plug | BPMR8Y | |
| Exhaust | Muffler type | Spark arrester muffler with catalyst | |
| Starter | Type | ES (Effortless-Start) / S (Soft-start) CS-280T: Automatic rewind starter | |
| | Rope diameter x length | mm(in) | 3.5 x 700 (0.14 x 27.6) |
| Fuel | Type** | Mixed two-stroke fuel | |
| | Mixture ratio | 50 : 1 (2 %) | |
| | Gasoline | 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.) | 0.24 (8.1) |
| Clutch | Type | Centrifugal type, 3-shoe slide with 3-tension spring | |
| Guide bar / Saw chain lubrication type | | Adjustable automatic oil pump | |
| Oil | Tank capacity | L (U.S.fl.oz.) | 0.16 (5.4) |
| Auto oiler | Type | Clutch driven type | |
| Sprocket | Type | Spur | |
| Spike | Option (Parts number: C304-000070) | | |

* Without guide bar and saw chain.

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

| Cutting devices | | Sprocket nose bar | | | Carving | |
|-----------------|-----------------------|--|-------------|-------------|-------------|-------------|
| Guide bar | Type | C20S91-35SA (CS-280T, CS-280TES only) | C25S91-40SL | C30S91-47ML | C25H25-60CL | C25L25-60CA |
| | Called length | cm | 20 | 25 | 30 | 25 |
| | Gauge | in | 0.050 | | | |
| Saw chain | Type | Carlton N1C-BL, OREGON 91PX | | | OREGON 25AP | |
| | Number of drive links | 35 | 40 | 47 | 60 | |
| | Pitch | in | 3/8 | | | 1/4 |
| | Gauge | in | 0.050 | | | |
| Sprocket | Number of teeth | 6 | | | 8 | |
| | Pitch | in | 3/8 | | | 1/4 |

1-2 Technical data

| | | | |
|--|----------------------------------|------------------------|---|
| Engine | | | |
| Compression pressure | MPa (kgf/cm ²) (psi) | | 1.00 (10.2) (145) |
| Clutch engagement speed | r/min | | 4,400 |
| 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 | | 930 - 970 |
| Pole shoe air gaps | mm(in) | | 0.3 - 0.4 (0.012 - 0.016) |
| Ignition timing | at 3,000 r/min | °BTDC | 16 |
| | at 8,000 r/min | °BTDC | 31 |
| | at 10,000 r/min | °BTDC | 32 |
| Carburetor | | | |
| 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 |
| Tool to adjust mixture needles | | | D-shaped tool (L) P/N X645-000031 (Carb. adjustment tool P/N Y089-000094) |
| Carburetor adjustment | | | |
| 1) Initial setting | H mixture needle | turn out | 3 3/8 |
| | L mixture needle | turn out | 2 |
| | Throttle adjust screw | turn in* ¹ | 1 1/4 |
| Engine warm-up | Idle - WOT : Total | sec. | 5 - 10 : 150 |
| 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 | 2,900 |
| 5) Set idle speed w/ TAS | | r/min | 3,200 |
| 6) Confirm H mixture needle position before WOT setting | | | Turn H mixture needle CCW to confirm engine speed decreases less than or equal to 12,000 r/min. |
| 7) 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: 12,700 - 12,900 |
| 8) Verify final engine speed with standard equipment | | r/min | Idle: 2,900 - 3,500 WOT: 12,400 - 13,300 |
| 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 CCW until chain stops and then redo step 2). Repeat this until chain no longer rotates after the adjustment step 2).

1-3 Torque limits

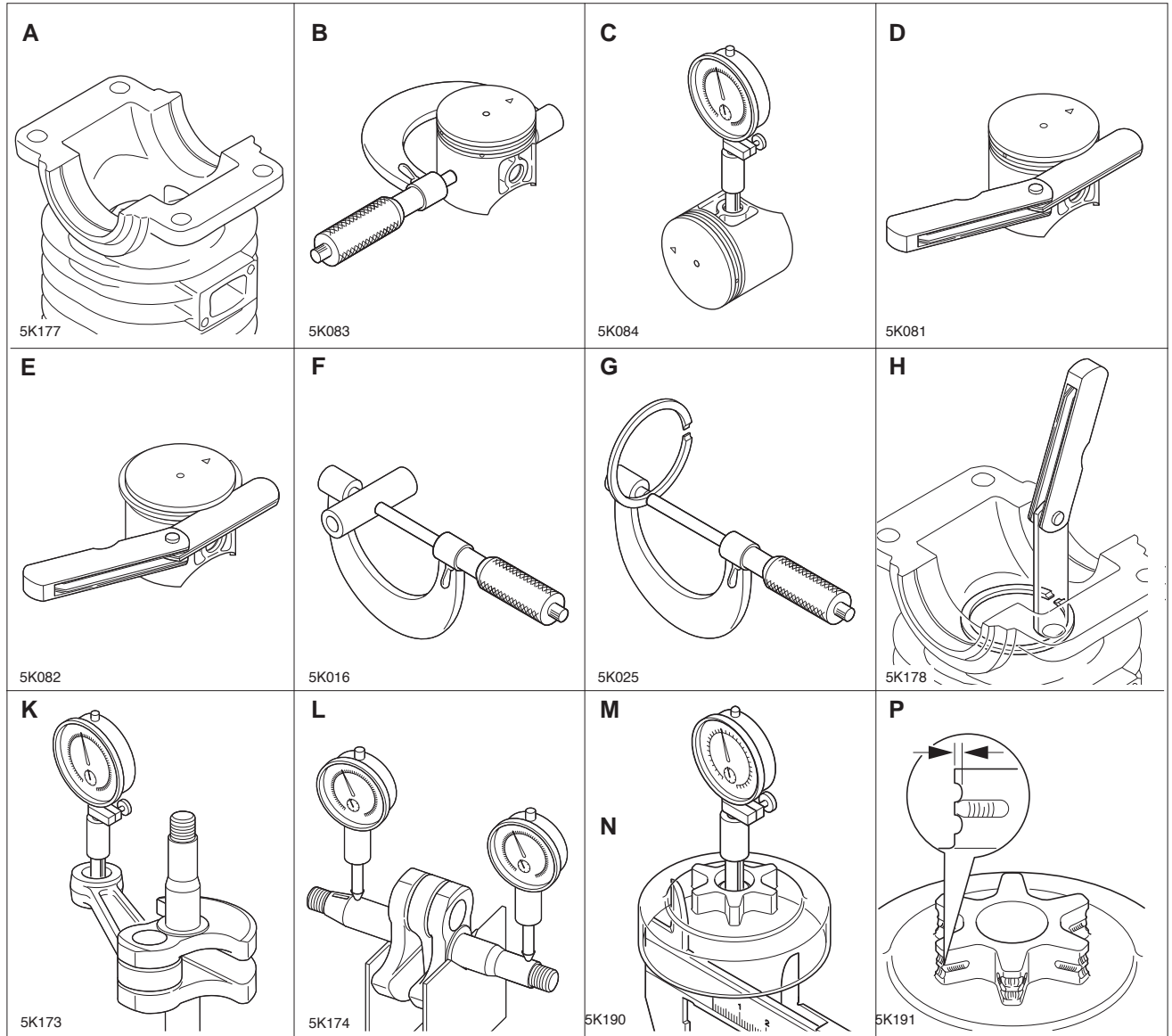
| Descriptions | Size | kgf•cm | N•m | in•lbf | |
|-----------------|-----------------------------|---------|-----------|-----------|-----------|
| Starter system | Starter pawl | M5* | 30 - 45 | 3 - 4.5 | 25 - 40 |
| | Starter case | M4 | 10 - 20 | 1 - 2 | 9 - 18 |
| Ignition system | Magneto rotor (Flywheel) | M8 | 250 - 290 | 25 - 29 | 220 - 255 |
| | Ignition coil | M5* | 30 - 45 | 3 - 4.5 | 25 - 40 |
| | Ignition switch | M3* | 3 - 5 | 0.3 - 0.5 | 3 - 4 |
| | Spark plug | M14 | 130 - 170 | 13 - 17 | 113 - 150 |
| Fuel system | Carburetor | M5 | 30 - 45 | 3 - 4.5 | 25 - 40 |
| | Intake bellows | M4 | 35 - 50 | 3.5 - 5 | 30 - 45 |
| Clutch | Clutch hub | LM10 | 230 - 260 | 23 - 26 | 200 - 230 |
| Engine | Crankcase | M5* | 55 - 95 | 5.5 - 9.5 | 48 - 85 |
| | Engine mount | M5 | 70 - 110 | 7 - 11 | 60 - 95 |
| | Dust cover | M4 | 10 - 20 | 1 - 2 | 9 - 18 |
| | Eye plate | M4 | 10 - 20 | 1 - 2 | 9 - 18 |
| | Muffler | M5 | 70 - 100 | 7 - 10 | 60 - 90 |
| | Muffler cover | M4 | 10 - 20 | 1 - 2 | 9 - 18 |
| Others | Exhaust guide | M4 | 15 - 25 | 1.5 - 2.5 | 13 - 22 |
| | Auto-oiler | M4 | 20 - 30 | 2 - 3 | 18 - 25 |
| | Rear handle | M4 | 20 - 30 | 2 - 3 | 18 - 25 |
| | Front handle | M5 | 20 - 40 | 2 - 4 | 18 - 35 |
| | Top handle | M4 | 10 - 20 | 1 - 2 | 9 - 18 |
| | Top handle assembly | M4 | 20 - 30 | 2 - 3 | 18 - 25 |
| | Cushion | M4 | 10 - 20 | 1 - 2 | 9 - 18 |
| | Brake cover | M4 | 10 - 20 | 1 - 2 | 9 - 18 |
| | Sprocket guard plate | M4 | 20 - 40 | 2 - 4 | 18 - 35 |
| | Brake lever (Hand guard) | M5 | 25 - 45 | 2.5 - 4.5 | 22 - 40 |
| | Chain catcher | M5 | 20 - 40 | 2 - 4 | 18 - 35 |
| | 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 | |

LM: Left-hand thread *Apply special repairing materials

1-4 Special repairing materials

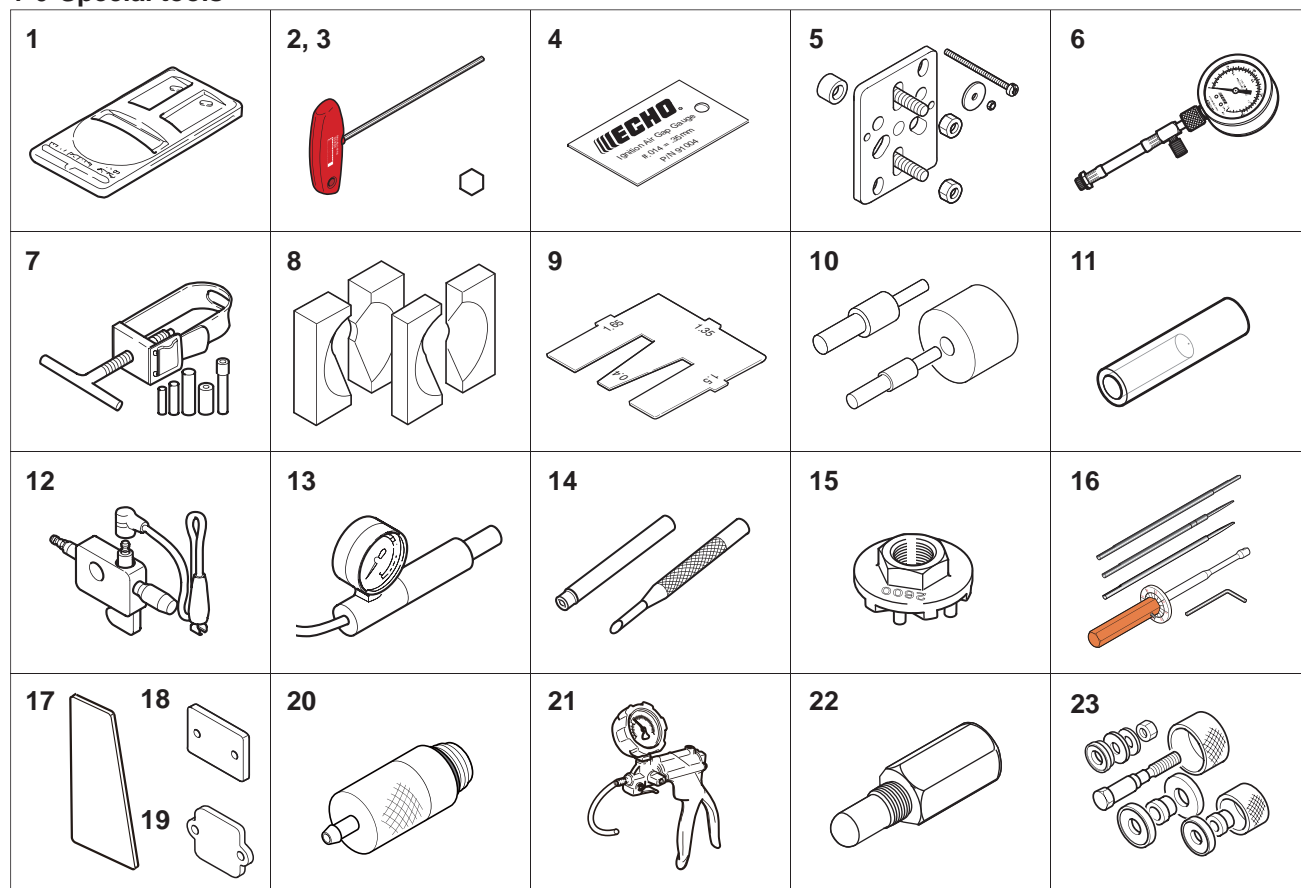
| Material | Location | Remarks |
|---------------|--------------------------------|-----------------------------------|
| Adhesive | Main bearing outer / crankcase | Loctite #675 or equivalent |
| Liquid gasket | Crankcase seams | ThreeBond 1207D (P/N X686-000000) |

1-5 Service Limits



| Description | | mm (in) | |
|-------------|----------------------------|--|----------------|
| A | Cylinder bore | When plating is worn and aluminium can be seen | |
| B | Piston outer diameter | Min. | 34.91 (1.374) |
| C | Piston pin bore | Max. | 8.075 (0.3179) |
| 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. | 12.00 (0.4724) |
| L | Crankshaft runout | Max. | 0.02 (0.001) |
| M | Sprocket bore | Max. | 12.80 (0.5039) |
| N | Clutch drum bore | Max. | 55.5 (2.19) |
| P | Sprocket wear limit | Max. | 0.5 (0.02) |

1-6 Special tools



| Key | Part Number | Description | Reference |
|-----|--------------|----------------------------|--|
| 1 | 897802-33330 | Tachometer PET-1000R | Measuring engine speed |
| 2 | X602-000350 | T-hex. wrench (3 mm) | Removing and installing hex. head bolt (M4) |
| 3 | X602-000360 | T-hex. wrench (4 mm) | Removing and installing hex. head bolt (M5) |
| 4 | 91004 | Module air gap gauge | Adjusting pole shoe air gaps |
| 5 | Y089-000111 | Puller | Removing magneto rotor |
| 6 | 91037 | Compression gauge | Measuring cylinder compression |
| 7 | 897702-30131 | Piston pin tool | Removing and installing piston pin |
| 8 | 897701-02830 | Bearing wedge | Removing and crankshaft ball bearings |
| 9 | 897563-19830 | Metering lever gauge | Measuring metering lever height on Carburetor |
| 10 | 897705-11520 | Bearing tool | Replacing needle bearing on con-rod small end |
| 11 | 897726-09130 | Oil seal tool | Installing oil seals |
| 12 | 897800-79931 | Spark tester | Checking ignition system |
| 13 | 897803-30133 | Pressure tester | Testing Carburetor and crankcase leakage |
| 14 | 500-500 | Welch plug tool | Removing and installing welch plug tool |
| 15 | X640-000011 | Clutch tool | Removing and assembling clutch assembly |
| 16 | Y089-000094 | Carburetor adjustment tool | Adjusting carburetor |
| 17 | 91041 | Pressure rubber plug | Plugging exhaust port to test crankcase/cylinder leakages |
| 18 | 897826-16131 | Pressure rubber plug | Plugging intake port to test crankcase / cylinder leakages |
| 19 | 897827-16131 | Pressure plate | Plugging intake port to test crankcase / cylinder leakages |
| 20 | A131-000150 | Pressure connector | Checking crankcase and cylinder leakages |
| 21 | 91149 | Pressure / vacuum tester | Testing crankcase / cylinder leakages |
| 22 | X644-000020 | Piston stopper | Locking crankshaft rotation |
| 23 | 897701-14732 | Bearing tool | Removing and installing ball bearings on crankcase |