



SERVICE DATA

TRIMMER/BRUSHCUTTER

SRM-510ES

(Serial number : 36000001 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, illustrations and directions in this SERVICE DATA are based on the latest product information available at the time of publication.

ECHO SERVICE MANUAL Ord. 402-25 (Model : SRM-4000, RM-4000) contains lots of information for servicing this model.

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Reference No. **10-52F-01**

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KIORITZ CORPORATION

1 SERVICE INFORMATION

1-1 Specifications

| Model | | SRM-510ES (L) | SRM-510ES (U) |
|-------------|----------------------------------|--|--|
| Dimensions* | Length | mm(in) | 1860 (73.2) |
| | Width | mm(in) | 355 (14.0) |
| | Height | mm(in) | 324 (12.8) |
| Dry weight* | kg(lb) | 8.5 (18.7) | 8.8 (19.3) |
| Engine | Type | KIORITZ, air-cooled, two-stroke, single cylinder | |
| | Rotation | Anticlockwise as viewed from the output end | |
| | Displacement | cm ³ (in ³) | 51.7 (3.155) |
| | Bore | mm(in) | 44.0 (1.732) |
| | Stroke | mm(in) | 34.0 (1.339) |
| | Compression ratio | 5.8 | |
| Carburettor | Type | Rotary type : Diaphragm, horizontal-draught, with primer [†] | |
| | Model | Walbro WYK-341 | |
| | Venturi size -Throttle bore | mm(in) | 13.5 - 15.0 (0.531 - 0.591) |
| | Metering diaphragm pressure | Lead pressure from inside of cleaner case | |
| Ignition | Type | CDI (Capacitor discharge ignition) system Digital magneto | |
| | Spark plug | RCJ-6Y, BPRM7A | |
| Starter | Type | ES (effortless-start) | |
| | Rope diameter x length | mm(in) | 3.8 x 1150 (0.15 x 45.3) |
| Fuel | Type | Premixed two-stroke fuel | |
| | Mixture ratio | 50 : 1 (2 %) | |
| | Petrol | Minimum 89 octane petrol (RON) | |
| | Two-stroke air cooled engine oil | ISO-L-EGD (ISO/CD13738), JASO FC/FD | |
| | Tank capacity | L (U.S.fl.oz.) | 1.0 (33.8) |
| Clutch | Type | Centrifugal, 2 - shoe pivot | |
| Handle | Type | Front : Crescent loop with cushion grip | U-handle with integrated control grip |
| | | Rear : Integrated control grip with cushion | |
| Drive shaft | Type | Solid, hollow type with serration (10-tooth) | |
| | Inner shaft: Diameter - Length | mm(in) | 8 - 1588 (0.31 - 62.5) |
| | Housing | OD -ID mm(in) | 28 - 24 (1.10 -0.94) |
| | (Main pipe) | Length mm(in) | 1530 (60.2) |
| Gear case | Reduction ratio | 1.33 | |
| | Gear tooth | Spiral bevel gear | |
| | Lubrication | Lithium based grease or ECHO XTended Protection [™] Lubricant | |
| Cutter | Type | Nylon line cutter | 3-tooth blade (255mm) |
| | Pilot diameter | mm(in) | 25.4 (1.0) |
| | Fastener type, size | mm | Left-hand thread nut, M10 x 1.25 pitch |
| | Cutting rotation | Anticlockwise as viewed from top | |

OD: Outer diameter.

ID: Inner diameter.

* Without shoulder harness and standard cutter.

[†]Primer is on cleaner case.

1-2 Technical data

| Model | | SRM-510ES (L) | SRM-510ES (U) |
|---|----------------------------------|--------------------------------------|-------------------------------|
| Engine | | | |
| Idling speed | r/min | 2,750 +/- 250 | |
| Operating speed | r/min | 8,000 | |
| Wide open throttle speed | r/min | 9,500 - 11,000* ¹ | 11,000 - 11,700* ² |
| Clutch engagement speed | r/min | 3,500 | |
| Service limit speed [†] | r/min | 3,300 | |
| Compression pressure | MPa (kgf/cm ²) (psi) | 0.83 (8.5) (121) | |
| Ignition system | | | |
| Spark plug gap | mm (in) | 0.6 - 0.7 (0.024 - 0.028) | |
| Minimum secondary voltage at 1000 r/min | kV | 14.0 | |
| Secondary coil resistance | kΩ | 2.0 - 2.8 | |
| Pole shoe air gaps | mm (in) | 0.30 - 0.40 (0.012 - 0.016) | |
| Ignition timing | at 1,000 r/min | °BTDC | 22 |
| | at 3,000 r/min | °BTDC | 15 |
| | at 8,000 r/min | °BTDC | 25 |
| | at 10,000 r/min | °BTDC | 25 |
| PET-9000 Parameter | #1 | | 328 |
| | #2 | | 05 |
| Carburettor | | | |
| Idle adjust screw initial setting | turns in** | 1 1/2 | |
| Idle mixture needle initial setting | turns in*** | 13 | |
| Hi speed mixture needle initial setting | turns out | 3 3/4 | |
| Test Pressure, minimum | MPa (kgf/cm ²) (psi) | 0.05 (0.5) (7.0) | |
| Metering lever height | mm (in) | 1.5 (0.06) lower than diaphragm seat | |
| Air cleaner system | | | |
| type | | Inner vent | |
| Air filter | | Pleats | |

BTDC: Before top dead centre.

*¹ With Nylon line cutter and shield.*² With 3-tooth blade (255 mm).

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

*** Screw in idle mixture needle from initial thread engagement (at the point that the clicking sound is heard).

† If clutch engagement speed is lower than service limit speed, replace clutch assembly with new one.

1-3 Torque limits

| Descriptions | | Size | kgf·cm | N·m | in·lbf |
|-----------------------------|--------------------------|-----------|-----------|-----------|-----------|
| Starter system | Starter pulley | M 8 | 180 - 220 | 18 - 22 | 160 - 190 |
| | Starter case | M 5* | 35 - 50 | 3.5 - 5 | 30 - 45 |
| Ignition system | Magneto rotor (Flywheel) | M 10 | 200 - 240 | 20 - 24 | 175 - 210 |
| | Ignition coil | M 5 | 60 - 100 | 6 - 10 | 50 - 90 |
| | Spark plug | M 14 | 130 - 170 | 13 - 17 | 115 - 150 |
| | Fan cover | M 5 | 50 - 90 | 5 - 9 | 45 - 80 |
| Fuel system | Carburettor insulator | M 5 | 40 - 55 | 4 - 5.5 | 35 - 50 |
| | Carburettor | M 5 | 30 - 45 | 3 - 4.5 | 26 - 40 |
| | Fuel tank bracket | M 5 | 70 - 110 | 7 - 11 | 60 - 95 |
| | Fuel tank | M 5* | 50 - 90 | 5 - 9 | 45 - 80 |
| 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 |
| | Top guard | M 5* | 30 - 45 | 3 - 4.5 | 26 - 40 |
| | Muffler | M 6 | 110 - 150 | 11 - 15 | 95 - 130 |
| | Muffler cover | M 5* | 30 - 45 | 3 - 4.5 | 26 - 40 |
| | Muffler stay | M 5 | 70 - 110 | 7 - 11 | 60 - 95 |
| Others | Blade fastening nut | LM 10 | 280 - 320 | 28 - 32 | 245 - 280 |
| 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 | |
| | M 10 | 210 - 300 | 21 - 30 | 180 - 260 | |

LM: Left hand thread.

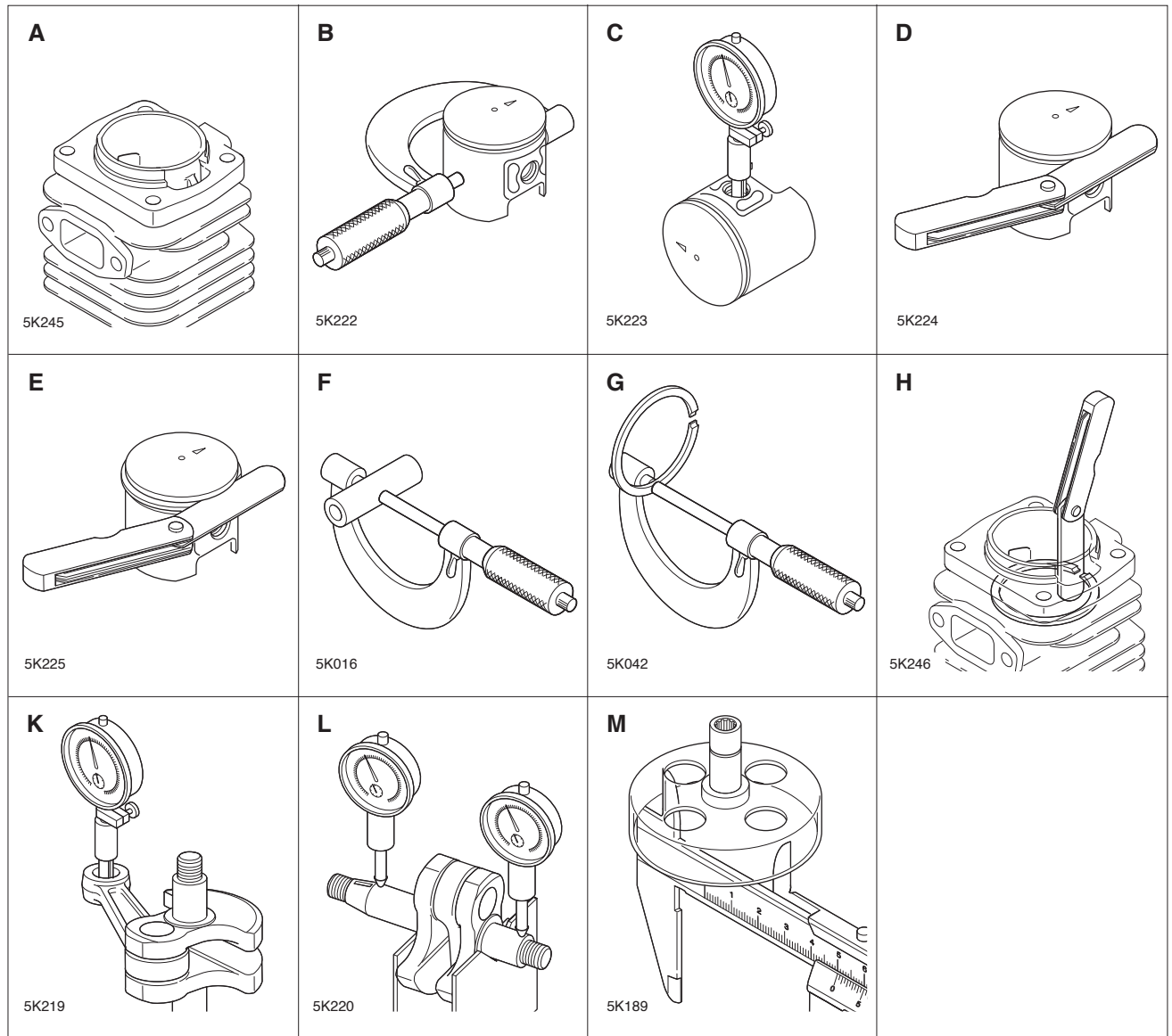
* Apply thread locking sealant. (See below)

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

1-4 Special repairing materials

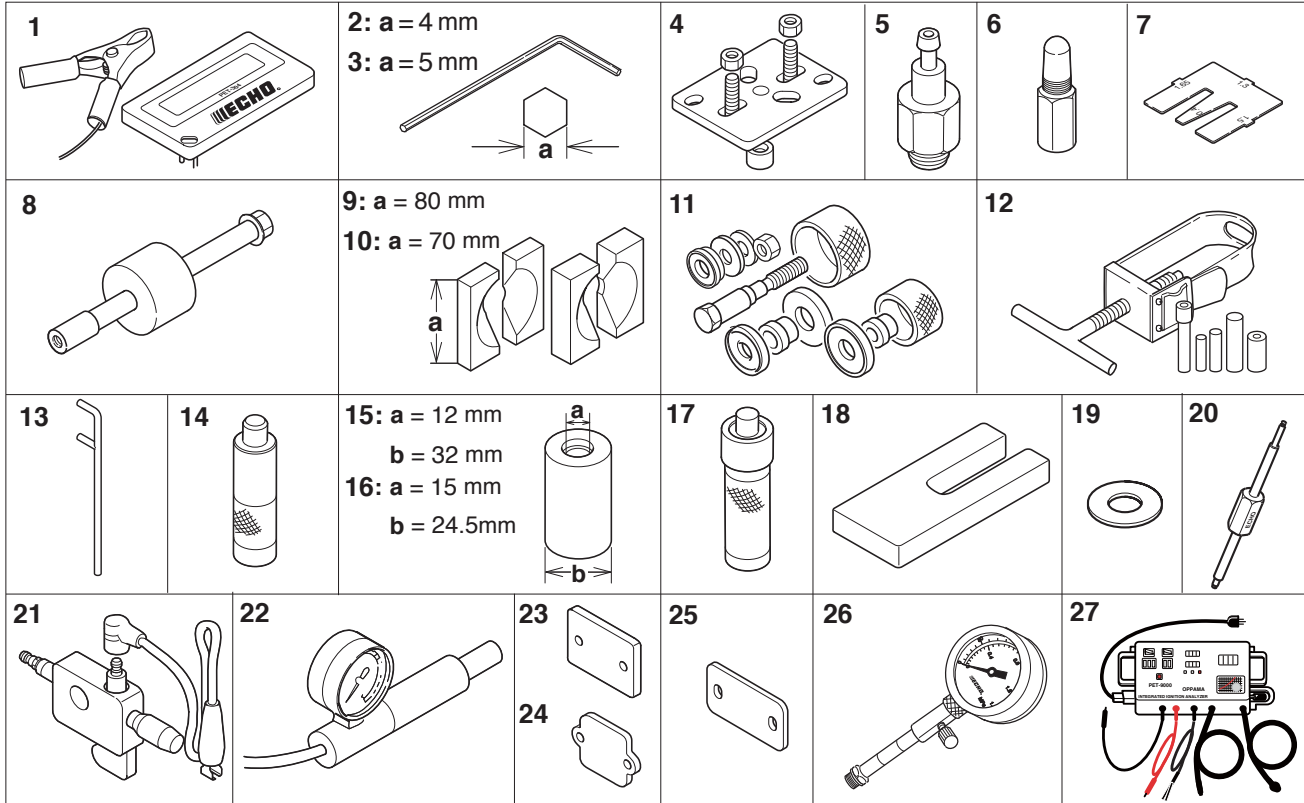
| Material | Location | Remarks |
|------------------------|---------------------|--|
| Grease | Gear case | Lithium based grease or ECHO XTended Protection™ Lubricant |
| | Rewind spring | |
| | Starter center post | |
| Oil | Oil seal inner lips | Two-stroke engine oil or engine oil (SAE#30) |
| | Drive shaft | |
| Thread locking sealant | Starter case | Loctite #242, ThreeBond #1324 or equivalent |
| | Muffler cover | |
| | Fuel tank | |
| | Top guard | |

1-5 Service limits



| Description | | mm (in) | |
|-------------|----------------------------|---|-----------------|
| A | Cylinder bore | When plating is worn and aluminum can be seen | |
| B | Piston outer diameter | Min. | 43.95 (1.730) |
| C | Piston pin bore | Max. | 10.035 (0.3951) |
| D | Piston ring groove | Max. | 1.65 (0.065) |
| E | Piston ring side clearance | Max. | 0.1 (0.004) |
| F | Piston pin outer diameter | Min. | 13.97 (0.5500) |
| 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. | 0.02 (0.001) |
| M | Clutch drum bore | Max. | 79.5 (3.13) |

1-6 Special tools



| Key | Part Number | Description | Used for: |
|-----|--------------|------------------------------|---|
| 1 | G310-000050 | Tachometer PET-304 | Measuring engine speed to adjust carburettor |
| 2 | 895610-79920 | L-hex wrench (4 mm) | Removing and installing hex. socket bolt (M5) |
| 3 | 895611-79920 | L-hex wrench (5 mm) | Removing and installing hex. socket bolt (M6) |
| 4 | 897501-03938 | Puller | Removing flywheel |
| 5 | 897835-16131 | Pressure connector | Testing crankcase and cylinder leakages |
| 6 | 897537-30130 | Piston stopper | Locking crankshaft rotation |
| 7 | 897563-19830 | Metering lever gauge | Measuring metering lever height on carburettor |
| 8 | 897603-23030 | PTO shaft puller | Removing PTO shaft |
| 9 | 897701-02830 | Bearing wedge | Removing ball bearing remaining on crankshaft |
| 10 | 897701-06030 | Bearing wedge | Removing ball bearing on PTO shaft / drive gear |
| 11 | 897701-14732 | Bearing tool | Removing and installing ball bearings on crankcase / clutch drum |
| 12 | 897702-30131 | Piston pin tool | Removing and installing piston pin (Use 10mm dia. adapter) |
| 13 | 897712-04630 | 2-pin wrench | Removing and installing pawl carrier |
| 14 | 897714-12330 | Oil seal tool | Installing crankcase oil seal (clutch side) |
| 15 | 897714-24330 | Oil seal tool | Installing crankcase oil seal (starter side) / PTO shaft bearings |
| 16 | 897726-21430 | Oil seal tool | Installing crankcase oil seal (clutch side) |
| 17 | 897718-03930 | Bearing tool | Installing crankcase oil seal (starter side) |
| 18 | 897719-02830 | Piston holder | Making piston steady to remove and install piston / ring |
| 19 | 363018-00310 | Washer | Installing crankcase oil seal (starter side) |
| 20 | 91020 | Limiter plug tool | Removing and installing limiter plug |
| 21 | 897800-79931 | Spark tester | Checking ignition system |
| 22 | 897803-30132 | Pressure tester | Testing fuel pipes/tank and crankcase leakages |
| 23 | 897826-16131 | Pressure plug | Plugging intake port to test crankcase / cylinder sealing |
| 24 | 897827-16131 | Pressure plate | Plugging intake port to test crankcase / cylinder sealing |
| 25 | 897831-16131 | Pressure plug | Plugging exhaust port to test crankcase / cylinder sealing |
| 26 | 91037 | Compression gauge | Measuring cylinder compression |
| 27 | 900300 | Ignition Analyzer : PET-9000 | Measuring Ignition timing, Primary/Secondary voltage engine speed |

2 CARBURETTOR ADJUSTMENT PROCEDURE

2-1 General adjusting rules

A. Before adjustment, check the following items.

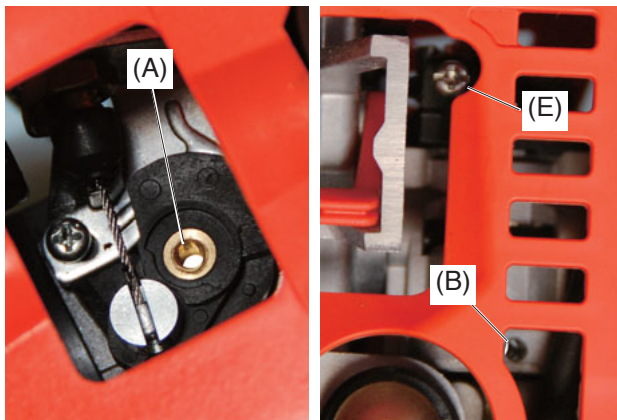
1. The correct spark plug must be clean and properly gapped.
2. The air filter element must be clean and properly installed.
3. The muffler exhaust port must be clear of carbon.
4. The fuel lines, tank vent and fuel filter are in good condition and clear of debris.
5. The fuel is fresh (> 89 octane : RON) and properly mixed at 50 : 1 with "ISO L-EGD" or "JASO FC/FD" 2-stroke oil.
6. Install nylon line cutter with 2 nylon lines (225 mm) properly cut without shield, even if 3-tooth blade is installed, for proper engine loading to adjust carburettor on both SRM-510ES(L) and SRM-510ES(U).

B. Adjustment with limiter plugs on carburettor.

Start and run engine for 10 seconds at idle, and for 2 minutes alternating engine speed between WOT for 20 seconds and Idle for 10 seconds. Adjust idle engine speed to 2,800 \pm 200 r/min by turning Idle adjust screw. Adjust nylon line length to be WOT engine speed within 8,000 \pm 500 r/min (10,000 \pm 500 r/min with shield). If engine does not run correctly after this adjustment, proceed to the next step 2-2.

IMPORTANT : After adjusting carburettor according to the steps 2-2 and 2-3, the limiter plug(s) must be installed in Idle and Hi speed mixture needle(s) hole(s) to comply with Emission Directive.

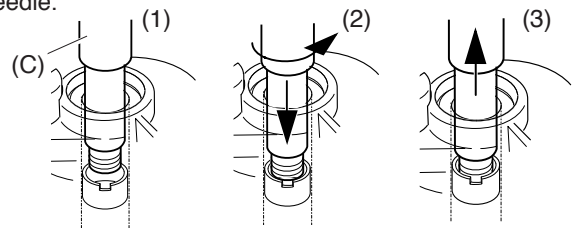
2-2 Presetting Idle adjust screw, Idle mixture needle and Hi speed mixture needle



Tools Required : Small screwdriver with 2.5 mm blade, electronic tachometer P/N G310-000050, limiter cap tool with 2.5 mm left-hand thread P/N 91020.
Parts Required : (2) limiter plug P/N A259-000000

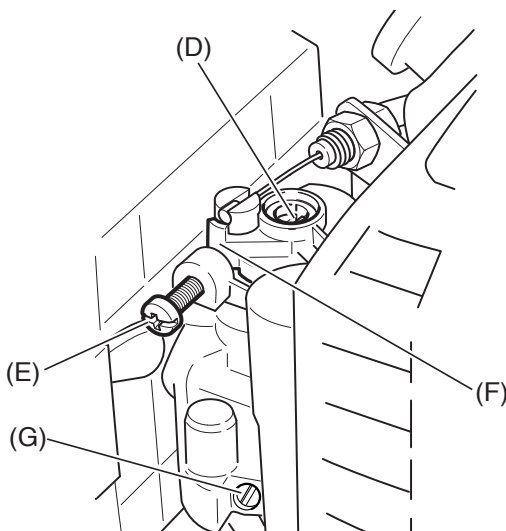
1. Remove plugs from Idle mixture needle hole (A) and H mixture needle hole (B) using limiter plug tool (C) as follows.

- (1) Put limiter plug tool (C) on limiter plug in mixture needle hole.
- (2) Screw limiter plug tool anticlockwise 2 turns into limiter plug pushing the tool against the plug to engage tool threads.
- (3) Pull limiter plug tool, with the limiter plug, from mixture needle hole.
- (4) Repeat plug removal procedure for remaining mixture needle.



NOTE : If the plug is difficult to remove, use a needle or pin to completely remove plug.

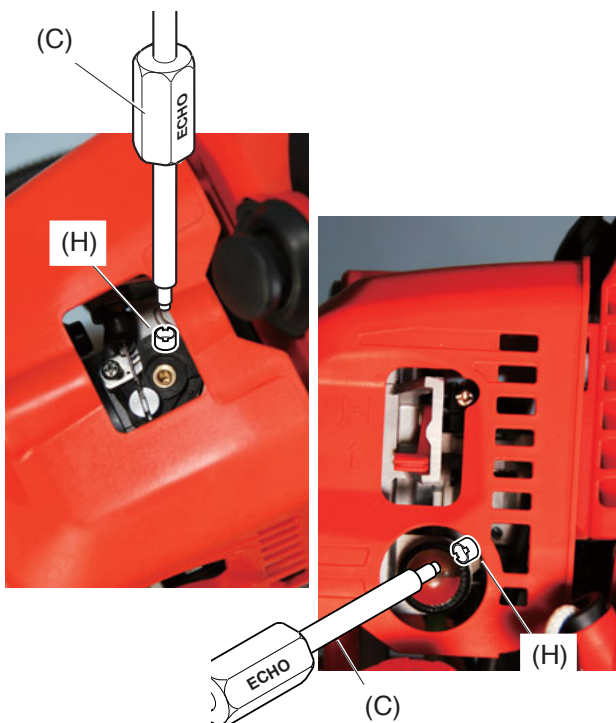
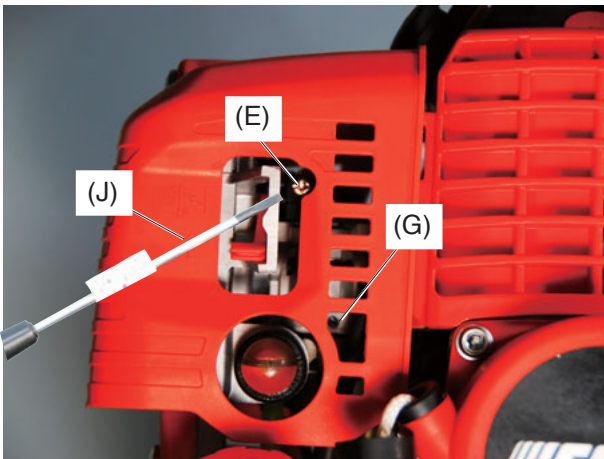
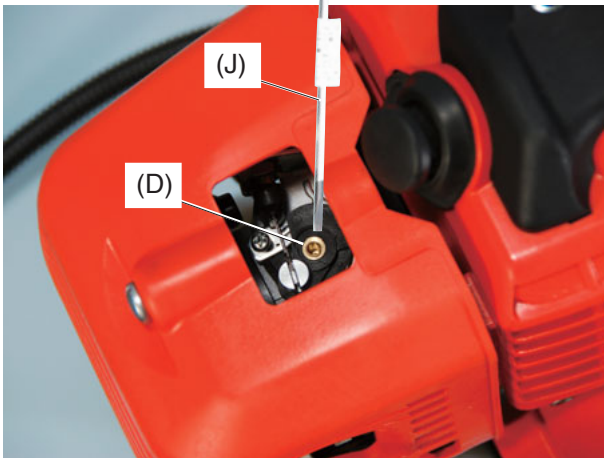
2. Turn Idle mixture needle (D) anticlockwise to fully come out until clicking sound is heard. Then turn it clockwise 13 turns. Turn Hi speed mixture needle (G) clockwise until lightly seated. Then turn it anticlockwise 3 3/4 turns.



3. Turn Idle adjust screw (E) anticlockwise until screw tip just touches throttle plate (F). Then turn it in clockwise 1 1/2 turns.

NOTE : The initial carburettor settings for Idle adjust screw, Idle and Hi speed mixture needles are intended to start and run the engine before final carburettor adjustments are made to conform the unit to meet Emission Directive are made. The actual number of turns needed for engine operation may vary.

2-3 Adjusting carburettor



1. Start and warm engine for 1 minute engine speed at WOT.

NOTE : If the engine doesn't start, turn Idle mixture needle anticlockwise in 1/2 turn increments.

2. Adjust Idle mixture needle (D) to reach maximum idle speed with 2.5 mm blade screwdriver (J).

3. Set idle speed to 3,500 r/min by turning Idle adjust screw (E). Engine speed should be stable at 3,500 +/- 50 r/min.

4. Turn Idle mixture needle (D) anticlockwise to reduce engine idle speed 750 r/min to set idle speed at 2,750 r/min. The idle speed range is 2,700 - 2,800 r/min.

NOTE : Engine speed must be allowed to stabilize a minimum of 20 seconds after each adjustment of idle mixture needle to assure accurate tachometer readings.

5. Adjust Hi speed mixture needle (G) to reach maximum WOT engine speed after 20 seconds at WOT. Then turn Hi speed mixture needle (G) anticlockwise to reduce WOT engine speed 120 r/min (RANG : 100-140 r/min).

Max. approx. 8,000 r/min

NOTE : Nylon line length should be 225 mm without shield.

6. SRM-510ES(L) : Stop engine, reinstall shield and restart engine again and verify engine idle speed ranges from 2,500 to 3,000 r/min, and WOT engine speed ranges from 9,500 to 11,000 r/min after 60 seconds at WOT.

NOTE : Nylon line length should be 160 mm with shield.

SRM-510ES(U) : Stop engine, Reinstall shield for blade and 3-tooth blade (255 mm). Start engine again and verify engine idle speed ranges from 2,500 to 3,000 r/min, and WOT engine speed ranges from 11,000 to 11,700 r/min after 20 seconds at WOT.

Make sure the nylon line cutter/3-tooth blade(255 mm) does not rotate when engine is idle, and engine should accelerate smoothly.

7. After adjusting carburettor, insert and secure new plug(s) (H) A259-000000 deep in the needle holes per the Emission Directive using limiter plug tool (C).

NOTE : Engine WOT, and idle speed in field operation may vary from final adjustment specifications due to changing ambient conditions, fuel, and engine loads. Safe engine r/min variances should be within the safe ranges for WOT and Idling speed as listed in Section 1-2, otherwise the carburettor should be readjusted.