SERVICE DATA

TRIMMER/BRUSHCUTTER
ECHO: GT-222ES/SRM-222ES
shindaiwa: F226S/T226S/C226S

STAGE Ⅱ MODEL

(Serial number : 37000001 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. **10-21U-00**
ISSUED: 201206

1 SERVICE INFORMATION

1-1 Specifications

Model			GT-222ES F226S	SRM-222ES (L) T226S	SRM-222ES (U) C226S
Dimentions*	Length	mm (in)	1460 (57.5)	1760 (69.3)	
	Width	mm (in)	320 (12.6)	345 (13.6)	655 (25.8)
	Heigh	mm (in)	575 (22.6)	320 (12.6)	420 (16.5)
Dry weight*		kg (lb)	4.5 (9.9)	5.1 (11.2)	5.2 (11.4)
Engine	Type		YAMABIKO, air-cooled, two-stroke, single cylinder		
	Rotation		Anticlockwise as viewed from the output end		
	Displacement	cm^3 (in^3)	21.2 (1.29)		
	Bore	mm (in)	32.2 (1.27)		
	Stroke	mm (in)	26.0 (1.02)		
	Compression ratio		6.9		
Carburettor	Type		Rotary type : Diaphragm, horizontal-draught, with primer		
	Model		ZAMA RB-K113		
Ignition	Type		CDI (Capacitor discharge ignition) system with electronic timing advancer and speed governor : VST		
	Spark plug		BPMR8Y		
Exhaust	Muffler type		Spark arrester muffler with catalyst		
Starter	Type		ES (effortless-start)		
	Rope diameter x length	mm (in)	3.0 x 820 (0.12 x 32.2)		
Fuel**	Type		Premixed two-stroke fuel		
	Mixture ratio		50 : 1 (2%)		
	Petrol		Minimum 89 octane		
	Two-stroke engine oil		ISO-L-EGD (ISO/CD13738), JASO FC/FD		
	Tank capacity	L (U.S.fl.oz.)	0.38 (12.8)		
Clutch	Type		Centrifugal, 2-shoe pivot		
Handle	Type		Front : Crescent loop with cushion grip Rear : Integrated control grip with cushion		U-handle with integrated control grip
Drive shaft	Type		Flexible		
	Diameter - Length	mm (in)	6.1 - 1330 (0.24 - 52.36)	6.15 - 1522 (0.24 - 59.92)	
	Housing OD - ID	mm (in)	25.0 - 22.0 (0.98 - 0.87)	25.0 - 22.0 (0.98 - 0.87)	
	Main pipe Length	mm (in)	1330 (52.4)	1500 (59.1)	
Gear case	Reduction ratio		---	1.36	
	Gear tooth		---	Spiral bevel gear	
	Lubrication		Lithium based grease or ECHO XTended Protection ™ Lubricant		
Cutter	Type		Nylon line cutter		3-tooth blade (230 mm)
	Arbor diameter for blade	mm (in)	---	25.4 (1.0)	
	Fastener type, size	mm	Standard thread 3/8 inch - 24UNF	Left-hand thread nut, M10 x 1.25 pitch	
	Cutting rotation		Clockwise as viewed from top	Anticlockwise as viewed from top	

OD: Outer diameter. ID: Inner diameter. * Without shoulder harness and standard cutter.

** Refer to Operator's manual.

1-2 Technical data

Model			GT-222ES F226S	SRM-222ES (L) T226S	SRM-222ES (U) C226S
Engine					
Idling speed		r/min	3,000 +/- 400		
Wide open throttle speed		r/min	6,700 - 7,700*	9,000 - 10,000*	10,500 - 11,500**
Clutch engagement speed		r/min	3,750		
Engagement Minimum†		r/min	3,500		
Compression pressure		MPa (kgf/cm^2) (psi)	0.9 (9.1) (130)		
Ignition system with stop holding function					
Spark plug gap		mm(in)	0.6 - 0.7 (0.024 - 0.028)		
Minimum secondary voltage at 1500 r/min		kV	18		
Primary coil resistance		Ω	320 - 420		
Secondary coil resistance		kΩ	2.7 - 3.3		
Pole shoe air gaps		mm(in)	0.3 - 0.4 (0.012 - 0.016)		
Ignition timing	at 3,000 r/min	°BTDC	18		
	at 8,000 r/min	°BTDC	34		
	at 11,000 r/min	°BTDC	14		
Carburettor					
Venturi Size			9.0 (0.354)		
Throttle Bore			10.5 (0.413)		
Idle adjust screw initial setting		turns out	8 7/8		
L mixture needle initial setting		turns out	3 7/8		
H mixture needle initial setting		turns out	1 1/8		
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		

BTDC: Before top dead centre.
*With Nylon line cutter and shield.
**With 3-tooth blade (230 mm).
† 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 pawl assembly		M 8	80 - 100	8 - 10	70 - 90
	Starter case		M 4*	30 - 45	3 - 4.5	25 - 40
Ignition system	Flywheel		M 8	160 - 200	16 - 20	140 - 175
	Ignition coil		M 4	35 - 50	3.5 - 5	30 - 44
	Fan cover		M 5	30 - 45	3 - 4.5	25 - 40
	Spark plug		M 14	130 - 170	13 - 17	112 - 150
Fuel system	Carburettor		M 5	30 - 45	3 - 4.5	25 - 40
	Intake insulator		M 5*	35 - 45	3.5 - 4.5	30 - 40
	Fuel tank with stand		M 5*	40 - 60	4 - 6	35 - 55
Cylinder cover		Fan cover side	M 5	25 - 45	2.5 - 4.5	22 - 40
		Recoil side†	M 5	30 - 40	3 - 4	25 - 32
Engine	Crankcase		M 5	70 - 110	7 - 11	60 - 95
	Cylinder		M 5	70 - 110	7 - 11	60 - 95
	Muffler		M 5*	90 - 110	9 - 11	80 - 95
	Exhaust guide		M 4	15 - 30	1.5 - 3	13 - 25
	Muffler cover	Fan cover side	M 5*	30 - 40	3 - 4	25 - 32
		Recoil side†	M 5*	25 - 45	2.5 - 4.5	22 - 40
Other	Cutter fastener		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

LM: Left-hand thread. † Tapping screw

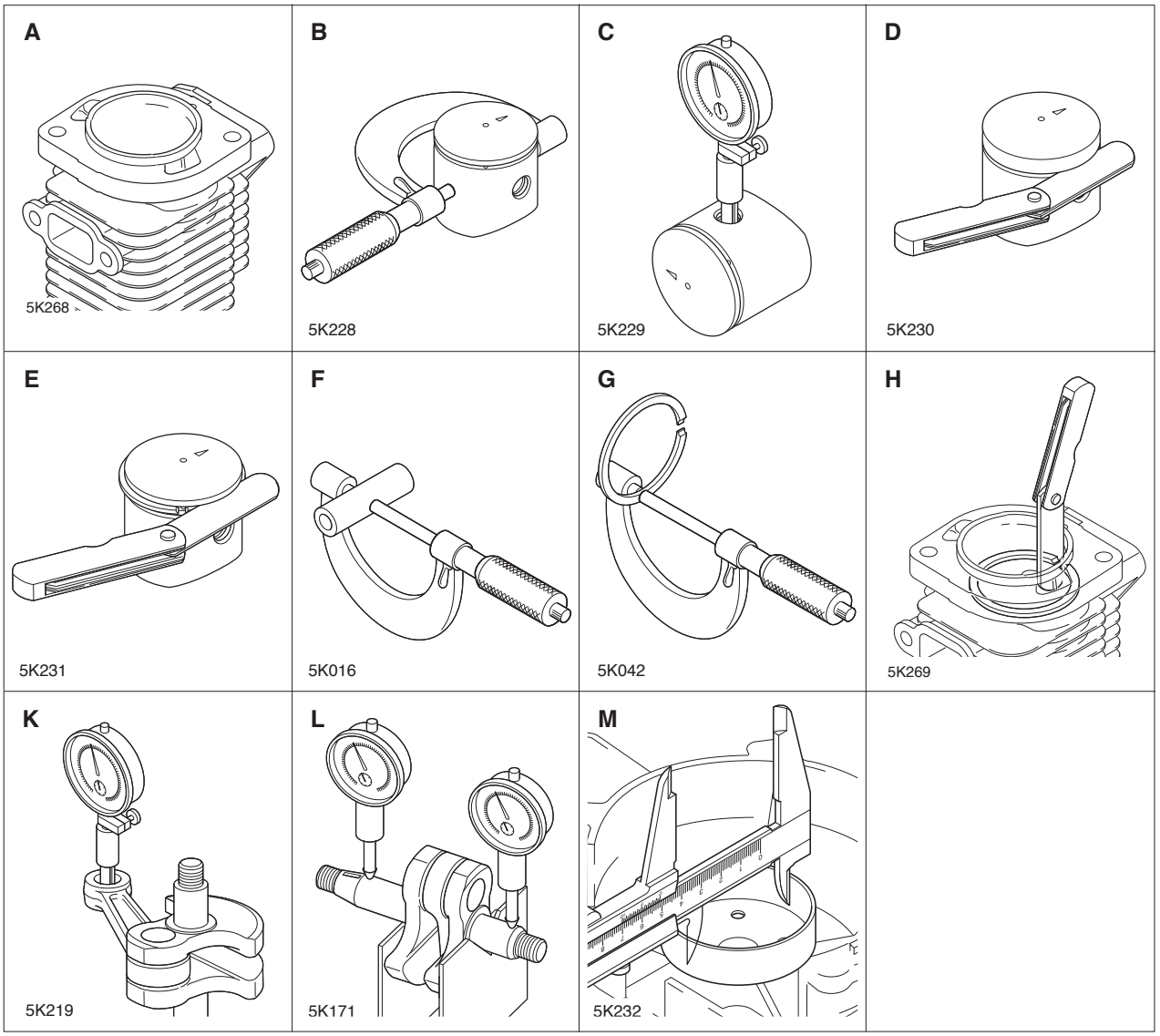
* Apply thread locking sealant. (See below)

** 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

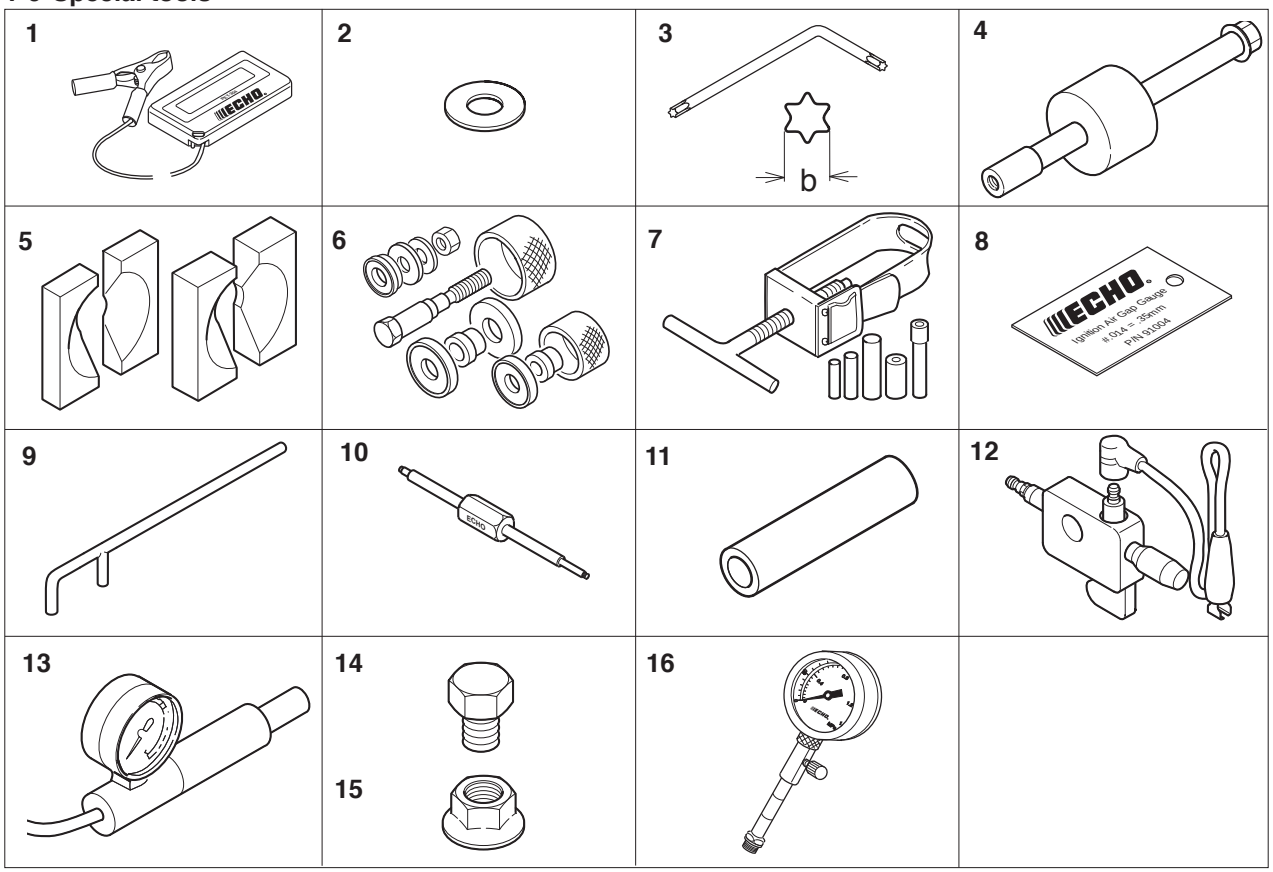
Material	Location	Remarks
Grease	Drive shaft	Lithium based grease or ECHO XTended Protection ™ Lubricant
	Gear case	
	Rewind spring	
	Starter centre post	
	Oil seal inner lips	
Thread locking sealant	Starter case	Loctite #242, ThreeBond #1324 or equivalent
	Muffler	
	Muffler cover	
	Fuel tank	
	Intake insulator	Loctite #675

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. 000 (0.4724)
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	Used for:
1	G310-000050	Tachometer PET-304	Measuring engine speed to adjust carburettor
2	363018-00310	Washer	Installing crankcase oil seal
3	X605-000050	Torx L wrench	Removing and installing bolt
4	897603-23030	PTO shaft puller	Removing driven (PTO) shaft
5	897701-06030	Bearing wedge	Removing ball bearings on crankshaft
6	897701-14732	Bearing tool	Removing and installing crankcase ball bearings
7	897702-30131	Piston pin tool	Removing and installing piston pin (Use 8 mm dia. adapter.)
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	897726-09130	Oil seal tool	Installing crankcase oil seals
12	990511-30023	Spark tester	Checking ignition system
13	897803-30133	Pressure tester	Checking carburettor and crankcase leakages
14	900100-08008	Bolt	Removing magneto rotor (flywheel)
15	433019-12330	Flange nut	Removing magneto rotor (flywheel)
16	91037	Compression gauge	Measuring cylinder compression

2 CARBURETTOR ADJUSTMENT PROCEDURE

2-1 General adjusting rules

A. Before starting the unit for 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.

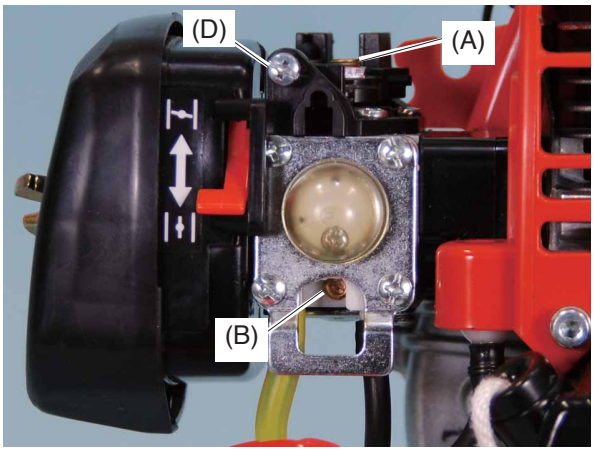
6. Install nylon line cutter with 2 nylon lines with 145 mm cut by shield knife, even if 3-tooth blade is installed, for proper engine loading to make sure engine speed on GT-222ES, SRM-222ES, F226S, T226S and C226S.

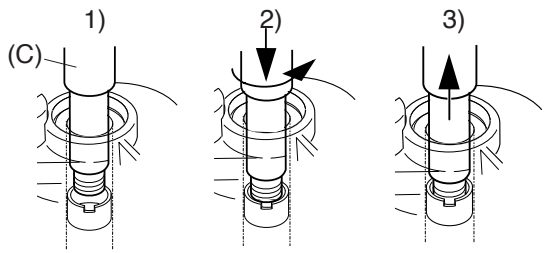
B. Adjustment with limiter plugs on carburettor.

Start and run engine for 3 minute alternating engine speed between WOT for 50 seconds and idle for 10 seconds. Adjust idle engine speed to 3,000 +/- 100 r/min by turning Idle adjust screw. Confirm WOT engine speed approx. 9,500 r/min on SRM-222ES, T226S and C226S, and approx. 7,200 r/min on GT-222ES and F226S. 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, P/N G310-000050 electronic tachometer, P/N 91020 limiter cap tool with 2.5 mm left-hand thread. Parts Required : (2) limiter plug P/N P005-001270

1. Remove plugs from Idle mixture needle hole (A) and Hi speed 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 out limiter plug tool, with the limiter plug, from mixture needle hole.

4) Repeat plug removal procedure for the other mixture needle.

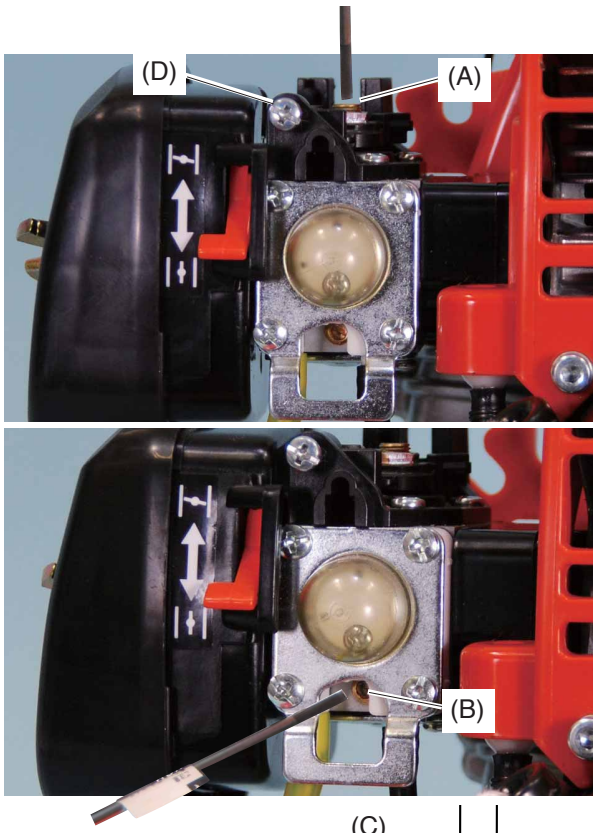
NOTE : If the plug is damaged and left in the hole, use a needle or pin-shaped tool to remove deformed plug pieces.

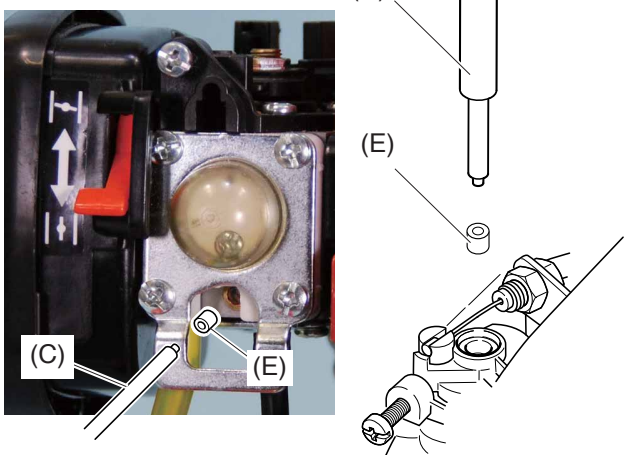
2. Turn Idle mixture needle (A) clockwise completely until lightly seated. Then turn it anticlockwise 3 7/8 turns. Turn Hi speed mixture needle (B) clockwise until lightly seated. Then turn it anticlockwise 1 1/8 turns.

3. Turn Idle adjust screw (D) clockwise until its head touches boss. Then turn Idle adjust screw (D) anticlockwise 8 7/8 turns.

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

2-3 Adjusting carburettor





Nylon line lengths

Model name	SRM-222ES(L) T226S	SRM-222ES(U) C226S	GT-222ES F226S
Carburettor setting	180 mm	180 mm	130 mm
Confirming	145 mm	-	145 mm

SRM-222ES, T226S, C226S: Remove shield and cut trimmer head line lengths to 180 mm.

GT-222ES, F226S: Cut trimmer head line lengths to 130 mm with shield. (normal lengths : 145 mm cut by shield knife.)

1. Start and warm engine for 3 minute alternating engine speed between WOT for 50 seconds and idle for 10 seconds.

2. Adjust Idle mixture needle (A) to reach maximum idle speed using 2.5 mm blade screwdriver.

3. Set Idle speed to 3,700 r/min by turning Idle adjust screw (D). Engine speed should be stable at 3,700 +/- 50 r/min.

4. Turn Idle mixture needle anticlockwise to reduce engine idle speed 1,400 r/min to set idle speed at 2,300 r/min. The idle speed range is 2,200 - 2,400 r/min.

5. Turn Idle adjust screw (D) clockwise to increase idle engine speed to set idle at 3,000 r/min. The idle speed range is 2,900 to 3,100 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.

6. Adjust Hi speed mixture needle (B) to reach maximum WOT engine speed.(max. approx. 8,000 r/min) Then turn Hi speed mixture needle (B) anticlockwise to reduce WOT engine speed 20 r/min (RANG : 10-30 r/min).

NOTE : Nylon line length should be 180 mm without shield on SRM-222ES, T226S and C226S.

Nylon line length should be 130 mm with shield on GT-222ES and F226S.

7. SRM-222ES(L), T226S : Stop engine and reinstall shield with knife, and restart engine and verify engine idle speed ranges from 2,600 to 3,400 r/min, and expand and cut nylon line by shield knife and WOT engine speed ranges from 9,000 to 10,000 r/min on SRM-222ES(L) and T226S, from 6,700 to 7,700 r/min on GT-222ES and F226S.

NOTE: Nylon line length should be 145 mm with shield.

SRM-222ES(U), C226S : Stop engine and reinstall shield for 3-tooth blade (230 mm) and the blade. Restart engine and verify engine idle speed ranges from 2,600 to 3,400 r/min, and WOT engine speed ranges from 10,500 to 11,500 r/min.

Make sure the nylon line cutter does not rotate when engine is at idle. Engine should start and accelerate smoothly.

8. After adjusting carburettor, insert and secure new plug(s) (E) P005-001270 deep in the needle holes per the Emission Directive using limiter plug tool 91020 (C).

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