SERVICE DATA

TRIMMER/BRUSHCUTTER

GT-220ES
SRM-220ES

(Serial nember : 36000001 and after)

STAGE Ⅱ MODEL

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

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KIORITZ CORPORATION

1 SERVICE INFORMATION

1-1 Specifications

Model			GT-220ES	SRM-220ES (L)	SRM-220ES (U)
Dimensions	Length*	mm(in)	1460 (57.4)	1760 (69.3)	
	Width	mm(in)	320 (12.6)	345 (13.5)	655 (25.7)
	Height	mm(in)	575 (22.6)	320 (12.6)	420 (16.5)
Dry weight*		kg(lb)	4.4 (9.7)	5.0 (11.1)	5.1 (11.2)
Engine	Type		KIORITZ, air-cooled, two-stroke, single cylinder		
	Rotation		Anticlockwise 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		
Carburettor	Type		Rotary valve type: Diaphragm, horizontal-draught, with primer		
	Model		ZAMA RB-K93		
	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		BPMR8Y		
Exhaust	Muffler type		36 series : Spark arrestor muffler 37 series : Spark arrestor 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 petrol (RON)		
	Two-stroke air cooled engine oil		ISO-L-EGD (ISO/CD13738), JASO FC/FD		
	Tank capacity	L (U.S.fl.oz.)	0.4 (13.5)		
Clutch	Type		Centrifugal, 2 - shoe slide		
Handle	Type	Front	D-loop		U-handle with integrated control grip
		Rear	Integrated control grip with cushion		
Drive shaft	Type		Flexible		
	Diameter - Length	mm(in)	6.0 - 1330 (0.24 - 52.4)	6.0 - 1520 (0.24 - 59.8)	
	Housing OD -ID	mm(in)	25 - 22 (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		
Cutter	Type		Nylon line head		Metal blade
	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 cutter head.

1-2 Technical data

Model			GT-220ES	SRM-220ES (L)	SRM-220ES (U)
Engine					
Idling speed		r/min	2600 - 3400		
Wide open throttle speed		r/min	7000 - 8000*	8000 - 9700*	9500 - 11500**
Clutch engagement speed		r/min	3500 - 4100		
Compression pressure		MPa (kgf/cm^2) (psi)	0.74 (7.6) (108)		
Ignition system					
Spark plug gap		mm (in)	0.6 - 0.7 (0.024 - 0.028)		
Minimum secondary voltage at 1500 r/min		kV	15		
Primary coil resistance		Ω	130 - 200		
Secondary coil resistance		kΩ	1.0 - 2.0		
Pole shoe air gaps		mm(in)	0.3 - 0.4 (0.012 - 0.016)		
Ignition timing	at 3000 r/min	°BTDC	27		
	at 8000 r/min	°BTDC	42		
Carburettor					
Venturi Size		mm(in)	9.0 (0.354)		
Throttle Bore		mm(in)	10.5 (0.413)		
Idle adjust screw initial setting		turn in***	1 1/2	2 1/2	
Idle mixture needle initial setting		turn back†	2 3/4		
Hi speed mixture needle initial setting		turns back†	1 3/8		
Test pressure, minimum		MPa (kgf/cm^2) (psi)	0.05 (0.5) (7.0)		
Metering lever height		mm (in)	0.1-0.25 (0.004-0.010) lower than diaphragm seat		

BTDC: Before top dead centre.
* With two line nylon line head.
** With metal blade.
*** Set idle speed screw to the point that its tip just contacts throttle plate before initial setting.
† Turn Idle/Hi speed mixture needles anticlockwise from point that needle is lightly seated.

1-3 Torque limits

Descriptions		Size	kgf•cm	N•m	in•lbf
Starter system	Starter case	M 4	14 - 28	1.4 - 2.8	12 - 24
Ignition system	Ignition coil	M 4	30 - 50	3 - 5	26 - 45
	Fan cover	M 4**	14 - 28	1.4 - 2.8	12 - 24
	Spark plug	M 14	150 - 170	15 - 17	130 - 150
	Ground lead terminal	M 4**	20 - 40	2 - 4	18 - 35
Fuel system	Intake insulator	M 5**	25 - 40	2.5 - 4	22 - 35
	Carburettor	M 5	30 - 40	3 - 4	26 - 35
	Throttle cable nut	M 6	25 - 35	2.5 - 3.5	22 - 30
	Fuel tank	M 5**	30 - 45	3.0 - 4.5	26 - 40
Clutch	Clutch hub	M 8	120 - 160	12 - 16	100 - 140
Engine	Crankcase	M 5†	70 - 100	7 - 10	60 - 90
	Cylinder	M 5†	70 - 100	7 - 10	60 - 90
	Cylinder cover	M 4	14 - 28	1.4 - 2.8	12 - 24
	Muffler	M 5	60 - 100	6 - 10	52 - 85
	Top guard	M 5*	15 - 25	1.5 - 2.5	13 - 22
Others	Trigger holder assembly	M 5	35 - 55	3.3 - 5.5	30 - 48
	Trigger holder assembly band	M 5	20 - 40	2 - 4	18 - 35
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

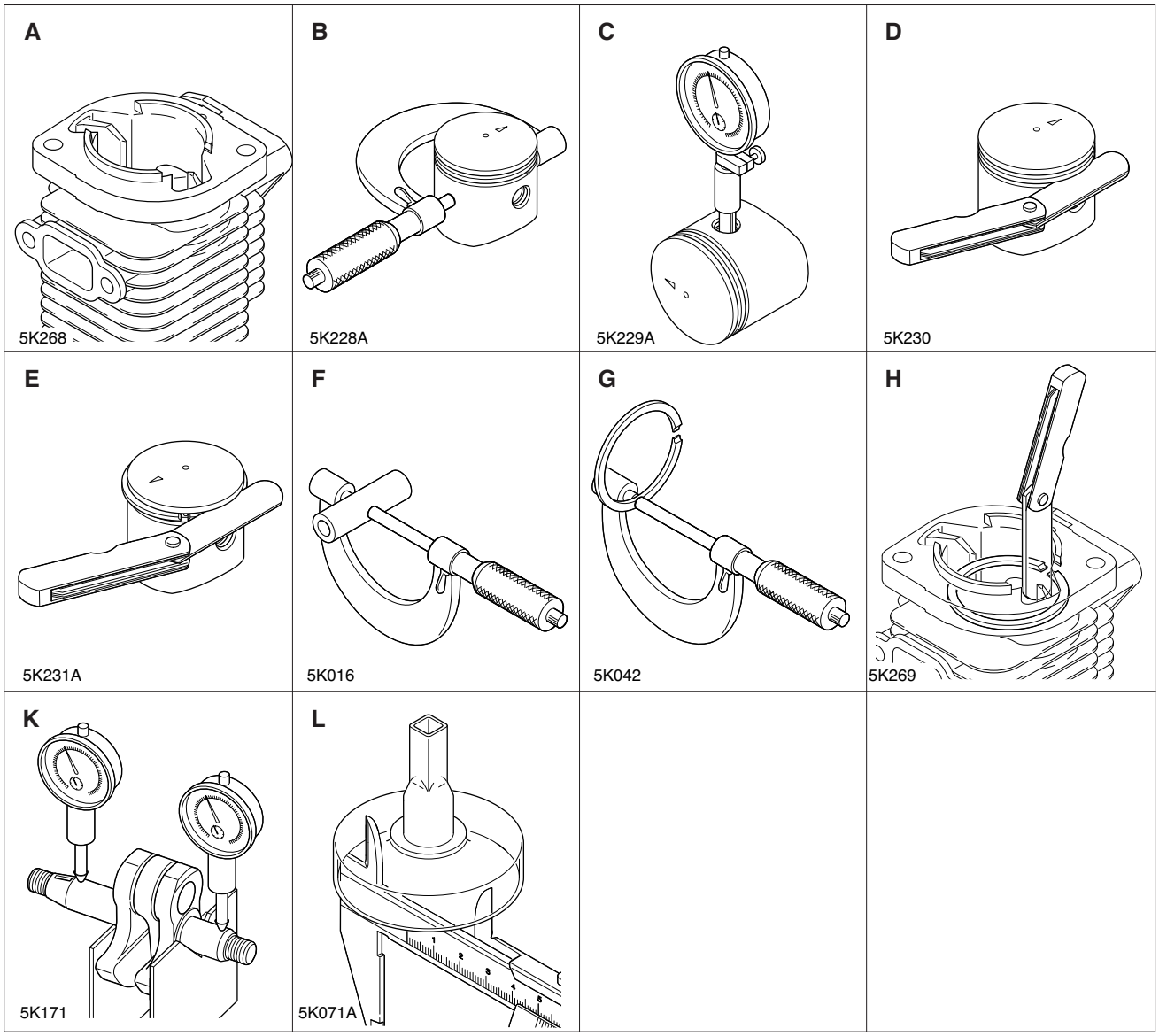
*Tapping screw ** Apply thread locking sealant. (See below)

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

1-4 Special repairing materials

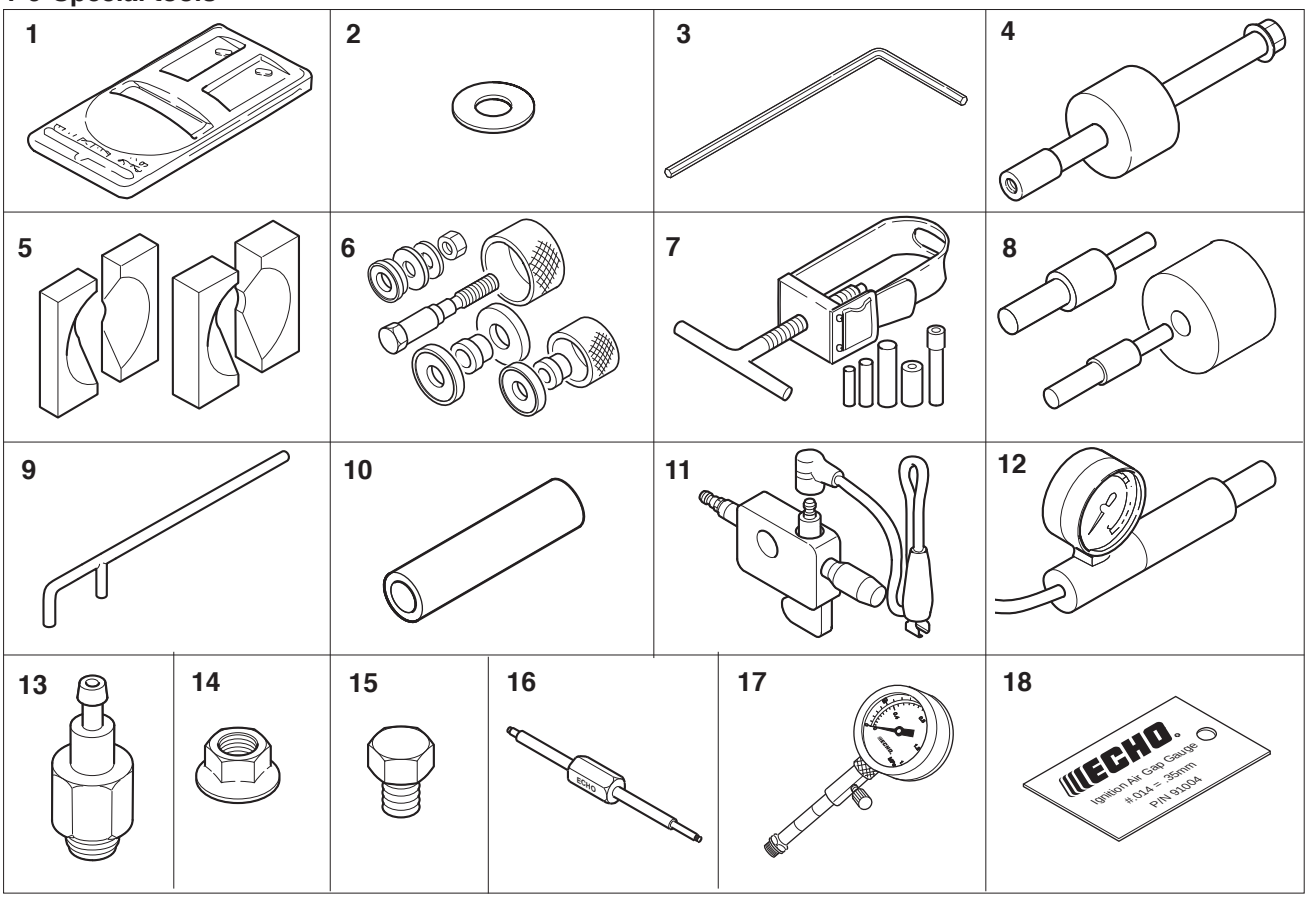
Material	Location	Remarks
Thread locking sealant	Fan cover	ThreeBond 1342 or equivalent
	Intake insulator	
	Ground lead terminal	
	Fuel tank	
Grease	Gear case	Lithium based grease
	Rewind spring	
	Starter center post	

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.	7.970 (0.3138)
G	Piston ring width	Min.	1.45 (0.057)
H	Piston ring end gap	Max.	0.5 (0.02)
K	Crankshaft runout	Max.	0.03 (0.001)
L	Clutch drum bore	Max.	51.5 (2.03)

1-6 Special tools



Key	Part Number	Description	Used for:
1	897801-33330	Tachometer PET-1000	Measuring engine speed
2	363018-00310	Washer	Installing crankcase oil seal of starter side
3	895610-79920	L-hex wrench (4 mm)	Removing and installing hex. socket bolts (M5)
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	897705-11520	Bearing tool	Removing and installing con-rod small end needle bearing
9	897712-04630	2-pin wrench	Removing and installing pawl carrier
10	897726-09130	Oil seal tool	Installing crankcase oil seals
11	897800-79931	Spark tester	Checking ignition system
12	897803-30131	Pressure tester	Checking carburettor and crankcase leakages
13	897835-16131	Pressure connector	Checking crankcase and cylinder leakages
14	433019-12330	Flange nut	Removing magneto rotor (flywheel)
15	900100-08008	Bolt	Removing magneto rotor (flywheel)
16	91020	Limiter plug tool	Removing and installing plug
17	91037	Compression gauge	Measuring cylinder compression
18	91004	Module air gap gauge	Adjusting pole shoe air gaps

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.

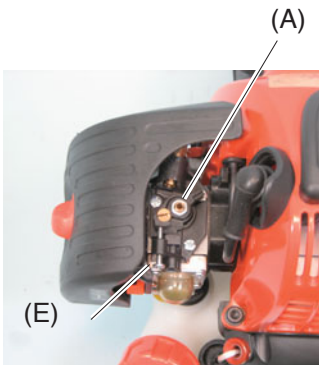
5. The fuel is fresh (> 89 octane : RON) and properly mixed at 50 : 1 with “ISO L-EGD” or “JASO FC/FD” 2-stroke oil.

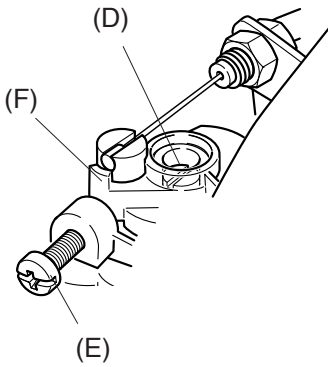
6. Two nylon line head with properly cut lines is recommended to be installed for proper engine loading.

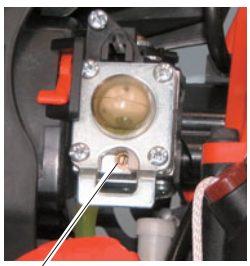
B. Start and run engine for 3 minutes alternating engine speed between WOT for 10 seconds and idle for 5 seconds. Adjust idle speed screw to 3,000 +/- 100 r/min. If engine does not run correctly after this adjustment, proceed to the next step 2-2.

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 Initial Idle adjust screw, Idle mixture needle and Hi speed mixture needle settings







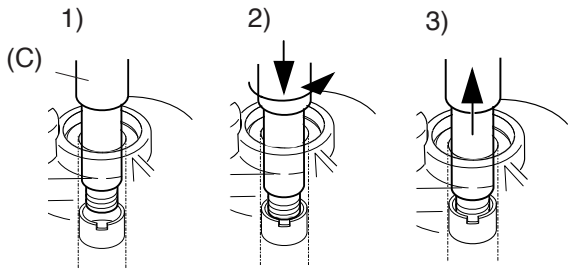
Parts Required : (2) limiter plug P/N P005-001270

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) Turn limiter plug tool anticlockwise 2 turns slowly into limiter plug while pushing the tool.

3) Pull out limiter plug tool with the limiter plug from mixture needle hole.



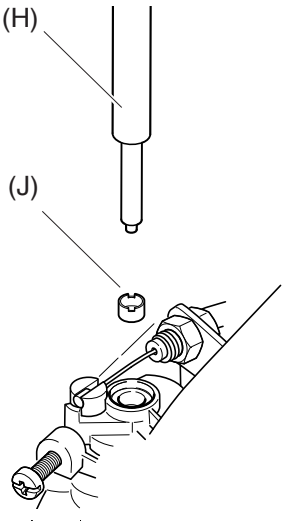
NOTE : If plug is damaged and stays in the hole, use hand auger or pin-shaped tool to scrape and lift the plug pieces out of the hole.

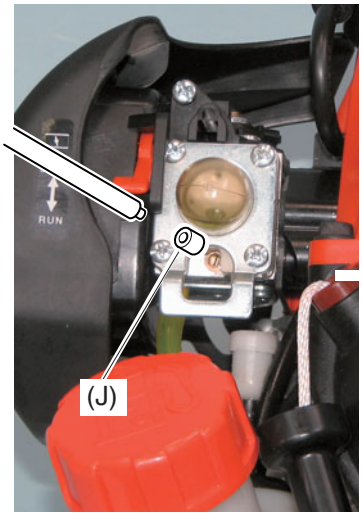
2. Turn Idle mixture needle (D) clockwise completely until lightly seated. Then turn it anticlockwise 2 3/4 turns. Turn Hi speed mixture needle (G) clockwise until lightly seated. Then turn it anticlockwise 1 3/8 turn.

3. Turn Idle adjust screw (E) anticlockwise until screw tip just touches throttle plate (F). Then turn it in clockwise 1 1/2 (GT-220ES), 2 1/2 (SRM-220ES) turns.

NOTE : Initial carburettor setting (Idle adjust screw, Idle and Hi speed mixture needles) shown here is to start the engine after restoration or carburettor change. Idle adjust screw, Idle and Hi speed mixture needles turn for designated engine revolution through procedures indicated here may vary. As long as idle and WOT engine speed is set in given range, the variance would be ignorable.

2-3 Adjusting carburettor





1. Start and warm up engine alternating engine speed between WOT for 10 seconds and idle for 5 seconds for 3 minute.

NOTE : If the engine can't start, turn Idle mixture needle clockwise in 1/4 turn increments until the engine starts.

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

3. Set idle speed to 3,800 r/min by turning Idle adjust screw. Engine speed should be stable at 3,800 +/- 50 r/min.

4. Turn Idle mixture needle anticlockwise to reduce engine idle speed 800 r/min to set idle speed at 3,000 r/min. The idle speed range is 2,900 - 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.

5. Adjust Hi speed mixture needle to reach maximum WOT engine speed.(maximum approximate 7,300 r/min on GT-220ES, 8,800 r/min on SRM-220ES with nylon line head, 10,500 r/min on SRM-220ES with metal blade.) Then turn Hi speed mixture needle anticlockwise to reduce WOT engine speed 20 r/min.

6. Start engine again and verify engine idle speed ranges from 2,600 to 3,400 r/min, and WOT engine speed ranges from 7,000 r/min to 8000 r/min on GT-220ES, 8,000 r/min to 9,700 r/min on SRM-220ES with nylon line head, 9,500 r/min to 11,500 r/min on SRM-220ES with metal blade. Make sure the cutter does not rotate when engine is idling. When final adjustment is completed, the engine should idle, accelerate smoothly, and attain WOT per above specifications.

7. After adjusting carburettor, completely insert and secure new plug (s) (J) P005-001270 deep in the needle holes per the Emission directive using limiter plug tool (H).

NOTE : Engine WOT, and idle engine 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 1-1, otherwise the carburetor should be readjusted.