



# SERVICE DATA

## CHAIN SAW

### CS-8001

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

ECHO SERVICE MANUAL Ord. 401-17 (Model : CS-4000, CS-4100, CS-4500, CS-4600, CS-5500, CS-6700, CS-8000) and Ord. 401-23 (Model : CS-6702) contains lots of information for servicing this model.

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Reference No. **01-81B-00**  
**ISSUED: 200411**



**KIORITZ CORPORATION**

## 1 SERVICE INFORMATION

## 1-1 Specifications

Dimensions	Length*	mm(in)	421 (16.58)			
	Width	mm(in)	244 (9.61)			
	Height	mm(in)	311 (12.24)			
Dry weight*		kg(lb)	7.5 (16.5)			
Engine	Type	KIORITZ, air-cooled, two-stroke, single cylinder Ventilated piston				
	Rotation	Clockwise as viewed from the output end				
	Displacement	cm <sup>3</sup> (in <sup>3</sup> )	80.7 (4.924)			
	Bore	mm(in)	52.0 (2.047)			
	Stroke	mm(in)	38.0 (1.496)			
	Compression ratio	7.3				
Carburettor	Type	Diaphragm horizontal-draught				
	Model	Walbro HDA-153B				
	Venturi size-Throttle bore	mm(in)	15.88 - 19 (0.625 - 0.748)			
Ignition	Type	CDI (Capacitor discharge ignition) system with electronic timing advancer				
	Spark plug	RCJ-6Y				
Starter	Type	Automatic rewind				
	Rope diameter x length	mm(in)	4.0 x 900 (0.16 x 35.4)			
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				
	Tank capacity	L (U.S.fl.oz.)	0.82 (27.7)			
Clutch	Type	Centrifugal, 3-shoe slide				
Guide bar / Saw chain lubrication type			Automatic with volume adjuster and manual			
	Tank capacity, oil	L (U.S.fl.oz.)	0.40 (13.5)			
Sprocket	Type	Floating rim				
	Number of teeth	7				
	Pitch	in	3/8			
Guide bar	Type	for gauge 0.050 in	40RS50-3/8E1	50RS50-3/8E1	60RS50-3/8E1	---
			40S50	50S50	60S50	---
		for gauge 0.058 in	40RS58-3/8E	50RS58-3/8E	60RS58-3/8E	70RS58-3/8E
			40S58	50S58	60S58	70S58
	Called length	cm	40	50	60	70
	Gauge	in	0.050/0.058			
Saw chain	Number of drive links		60	72	84	96
	Pitch	in	3/8			
	Gauge	in	0.050/0.058			

\* Without guide bar and saw chain.

## 1-2 Technical data

Engine			
Idling speed	r/min	2300 - 3300	
Operating speed	r/min	9000 - 9500	
Wide open throttle speed*	r/min	11500 - 12500	
Clutch engagement speed	r/min	3500 - 4000	
Compression pressure	MPa (kgf/cm <sup>2</sup> ) (psi)	0.98 (10.0) (142)	
Ignition system			
Spark plug gap	mm(in)	0.6 - 0.7 (0.024 - 0.028)	
Minimum secondary voltage at 800 r/min	kV	15	
Secondary coil resistance	kΩ	1.8 - 2.2	
Pole shoe air gaps	mm (in)	0.3 - 0.4 (0.012 - 0.016)	
Ignition timing	at 1200 r/min	°BTDC	10
	at 3000 r/min	°BTDC	14.5
	at 10000 r/min	°BTDC	25
Carburettor			
Idle adjust screw initial setting	turn in**	2	
L mixture needle initial setting	turns back	2 3/8	
H mixture needle initial setting	turns back	3 3/8	
Test Pressure, minimum	MPa (kgf/cm <sup>2</sup> ) (psi)	0.05 (0.5) (7.0)	
Metering lever height	mm(in)	Flush with diaphragm seat	
Chain oil discharge volume at 7000 r/ min	mL/min(U.S.fl.oz./min)	Adjustable: 3 - 13 (0.09 - 0.39) (Factory set 8mL/min)	

BTDC: Before top dead centre.

\*With 50cm guide bar and saw chain.

\*\*Set idle adjust screw to contact throttle plate before initial setting.

## 1-3 Torque limits

Descriptions		Size	kgf•cm	N•m	in•lbf	
Starter system	Starter center post screw	M5*	70 - 110	7 - 11	60 - 95	
	Starter pawl	M5*	70 - 110	7 - 11	60 - 95	
	Starter case	M5	50 - 60	5 - 6	45 - 50	
Ignition system	Magneto rotor (Flywheel)	M8	230 - 270	23 - 27	200 - 240	
	Ignition coil	M4	35 - 50	3.5 - 5.0	30 - 45	
	Spark plug	M14	150 - 170	15 - 17	130 - 150	
Fuel system	Carburettor	M5	50 - 60	5 - 6	45 - 50	
	Carburettor case	M5	30 - 45	3.0 - 4.5	26 - 40	
Clutch	Clutch hub	LM10	450 - 550	45 - 55	390 - 480	
Engine	Crankcase	M5*†	70 - 110	7 - 11	60 - 95	
	Cylinder	M6†	130 - 190	13 - 19	110 - 170	
	Cylinder cover	M5	50 - 60	5 - 6	45 - 50	
	Muffler	M5	100 - 130	10 - 13	90 - 110	
Others	Cushion	Crankcase	M4	35 - 50	3.5 - 5.0	35 - 45
		Carburettor case	M5	25 - 50	2.5 - 5.0	22 - 45
		Rear handle	M5	30 - 45	3.0 - 4.5	26 - 40
	Auto-oiler	M4	35 - 50	3.5 - 5.0	30 - 45	
	Manual oiler	M5	35 - 60	3.5 - 6.0	30 - 50	
	Throttle latch	M4	6 - 10	0.6 - 1.0	5 - 9	
	Handle assembly	M5	70 - 110	7 - 11	60 - 95	
	Brake lever (Hand guard)	M5	25 - 45	2.5 - 4.5	22 - 40	
	Chain catcher	M5	30 - 45	3.0 - 4.5	26 - 40	
	Chain brake adjuster	M5	30 - 45	3.0 - 4.5	26 - 40	
	Guide bar	M8	200 - 230	20 - 23	175 - 200	
	Sprocket guard plate	M3	6 - 10	0.6 - 1.0	5 - 9	
	Regular bolt, nut, and screw	M3	6 - 10	0.6 - 1.0	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		

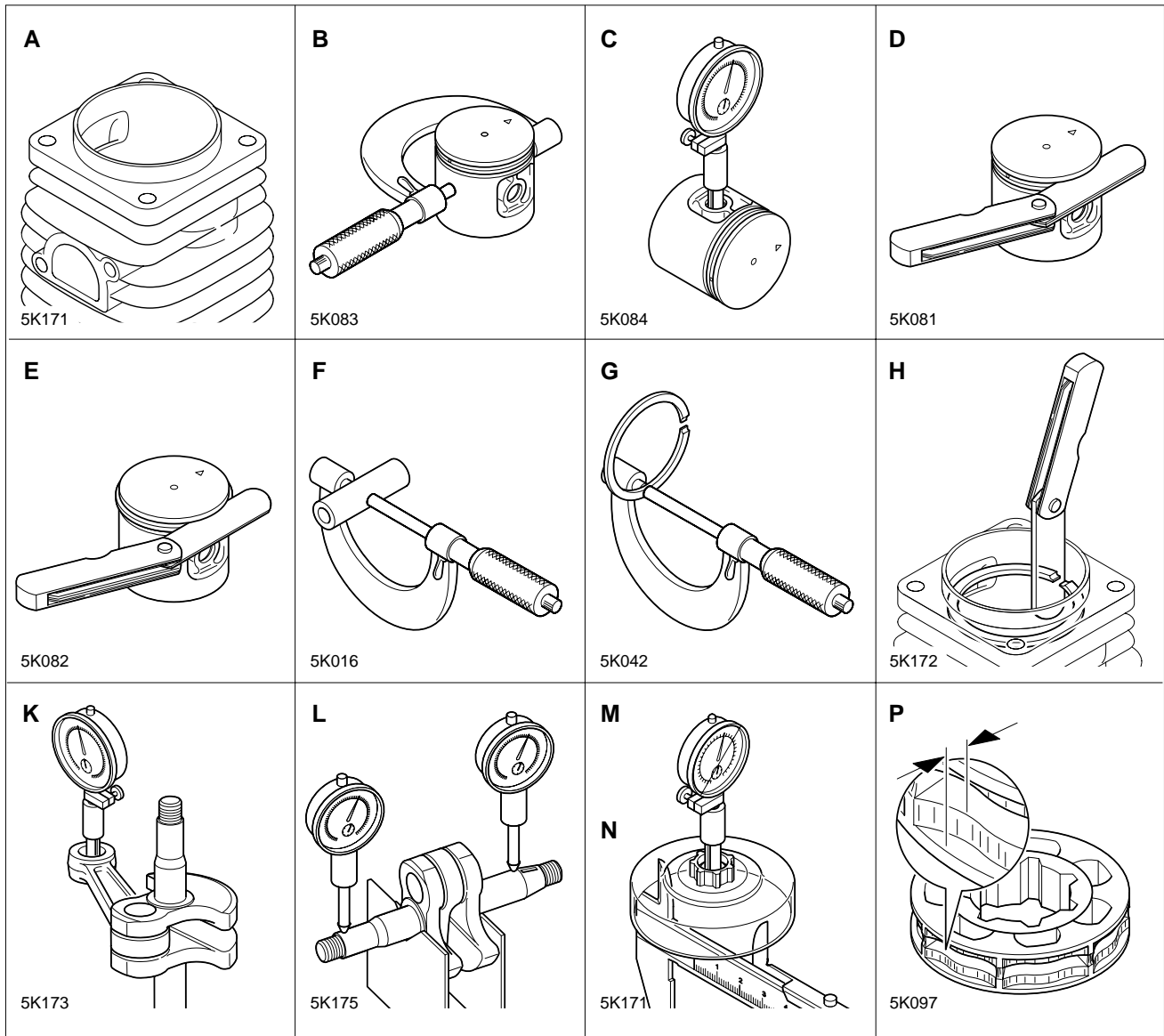
LM: Left-hand thread \*Apply thread locking sealant (See next page)

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

**1-4 Special repairing materials**

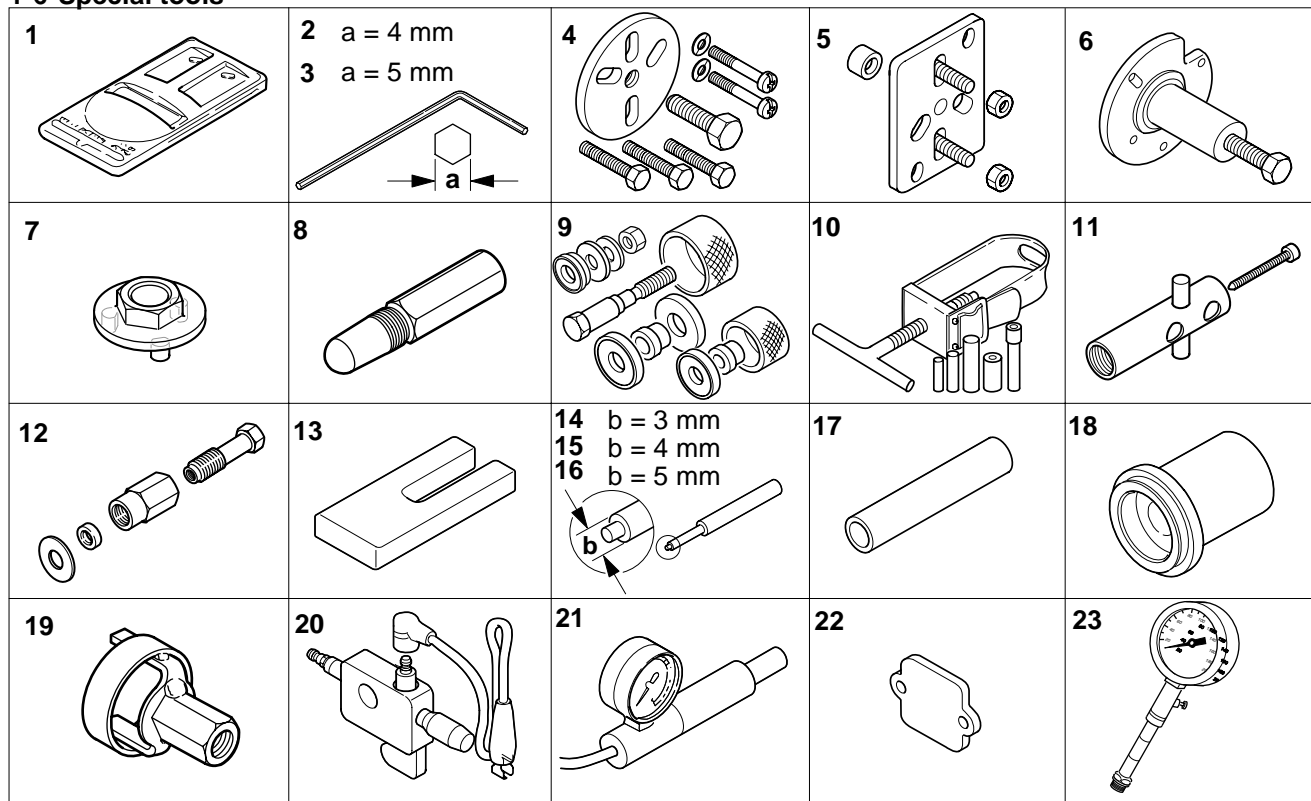
Material	Location	Remarks
Adhesive	Stud bolt	Loctite #609, ThreeBond 1373 or equivalent
	Bellows holder	
	Intake insulator	Loctite #406 (424), ThreeBond 1741 or equivalent
	Cushion (Rear handle)	
	Check valve assembly	
Thread locking sealant	Starter pawl screws	Loctite #242, ThreeBond 1324 or equivalent
	Stator center post screws	Loctite #222, ThreeBond 1342 or equivalent
	Brake adjuster screws	
	Throttle bearing screws	
Grease	Auto-oiler worm	Lithium based grease
	Clutch needle bearing	
	Cushion inside	
	Rewind spring	
	Oil seal lip	
	Choke knob	
	Brake seal	
	Chain brake (metal contact part)	Molybdenum grease (approx. 1 gram)

### 1-5 Service Limits



Description		mm (in)	
A	Cylinder bore	When plating is worn and aluminium can be seen	
B	Piston outer diameter	Min.	51.82 (2.040)
C	Piston pin bore	Max.	13.020 (0.5126)
D	Piston ring groove	Max.	1.3 (0.051)
E	Piston ring side clearance	Max.	0.1 (0.004)
F	Piston pin outer diameter	Min.	12.980 (0.5110)
G	Piston ring width	Min.	1.15 (0.045)
H	Piston ring end gap	Max.	0.5 (0.02)
K	Con-rod small end bore	Max.	17.025 (0.6703)
L	Crankshaft runout	Max.	0.05 (0.002)
M	Sprocket bore	Max.	18.02 (0.712)
N	Clutch drum bore	Max.	79.0 (3.11)
P	Sprocket wear limit	Max.	0.5 (0.02)

## 1-6 Special tools



Key	Part Number	Description	Used for:
1	897801-33330	Tachometer PET-1000	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	897500-00335	Puller	Removing auto oiler oil cover
5	897501-03938	Puller	Removing magneto rotor
6	897502-19830	Crankcase tool	Separating crankcase
7	897505-16133	Clutch tool	Removing and installing clutch assembly
8	897537-30130	Piston stopper	Locking crankshaft rotation
9	897701-14732	Bearing tool	Removing and installing ball bearings on crankcase
10	897702-30131	Piston pin tool	Removing and installing piston pin
11	897708-19835	Worm puller	Removing auto-oiler worm
12	Y089-000010	Worm inserter	Installing auto-oiler worm
13	897719-02830	Piston holder	Making piston steady remove and install piston / rings
14	897724-01261	Spring pin tool (3 mm)	Removing and installing spring pin (3 mm dia)
15	897724-01361	Spring pin tool (4 mm)	Removing and installing spring pin (4 mm dia)
16	897724-02831	Spring pin tool (5 mm)	Removing and installing spring pin (5 mm dia)
17	897726-21430	Oil seal tool	Installing starter side oil seal
18	897727-19830	Oil seal tool	Installing clutch side oil seal
19	897740-19830	Cushion tool	Removing and installing cushion (Right - Rear - Upper)
20	897800-79931	Spark tester	Checking ignition system
21	897803-30130	Pressure tester	Testing carburettor and crankcase leakage
22	897827-16131	Pressure plate	Plugging intake port to test crankcase / cylinder leakages
23	91007	Compression gauge	Measuring cylinder compression

## 2 EMISSION ADJUSTMENT GUIDE

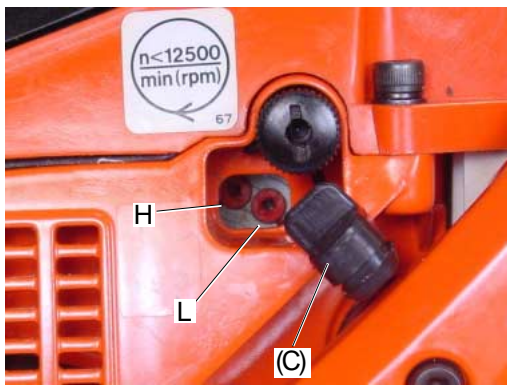
### 2-1 General adjusting rules

Before starting the unit for adjustment, check the following items.

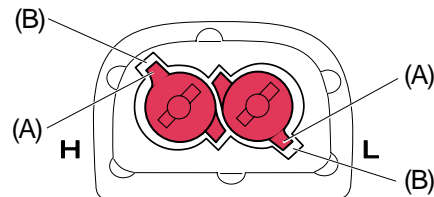
1. The correct spark plug must be clean and properly gapped.
2. The air filter element must be clean and properly installed.
3. The muffler exhaust port must be clear of carbon.
4. The fuel lines, tank vent and fuel filter are in good condition and clear of debris.
5. The fuel is fresh ( > 89 octane : RON) and properly mixed at 50 : 1 with "ISO L-EGD" 2-stroke oil.
6. The recommended bar and chain must be installed to the power head, and properly tensioned.

**NOTE :** Make sure of proper installation of 50cm guide bar and saw chain when adjusting carburettor, or serious engine damage will occur due to overspeeding.

### 2-2 Presetting idle adjust screw, L mixture needle and H mixture needle



1. Take off plug (C) for adjusting L and H mixture needle. Turn the L and H mixture needles out anticlockwise to rich stop, and meet limiter caps tabs (A) with locating slots (B).



2. Screw 2.5 mm wood screw in the center of the L limiter cap.

**NOTE :** Screw the wood screw in until it lightly contacts L mixture needle in the cap.

3. Pull the wood screw with limiter cap using pliers.
4. Repeat Step 2 and Step 3 for H limiter cap removal.

5. Turn L and H mixture needle clockwise lightly seated. and then turn out both needles following turns.

L mixture needle : 2 3/8, H mixture needles : 3 3/8

**NOTE :** If needles are forced during seating, damage to carburettor may occur.

6. Turn idle adjust screw anticlockwise and set the screw until the tip to just contact throttle plate. Then turn idle adjust screw 2 turns clockwise.



## 2-3 Adjusting carburettor



1. Start engine and warm it up well for 2 -3 minutes with cycle of 5 seconds at WOT (Wide Open Throttle) and 10 seconds at idling.

2. Using 2.5 mm wide blade screw driver, adjust L mixture needle to obtain maximum idle speed.

3. Set idle speed to 3,000 r/min by turning idle adjust screw (in the range of 2,700 to 3,300 r/min allowable).

4. Turn L mixture needle anticlockwise to reduce engine idle speed 500 r/min to set idle speed in the range of 2,200 to 2,800 r/min.

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

5. Turn H mixture needle anticlockwise at WOT until engine speed drops less than 11,000 r/min.

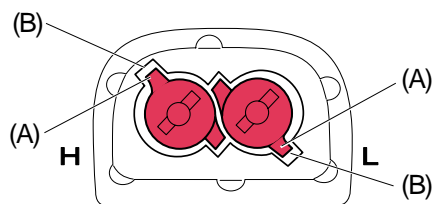
6. Adjust WOT engine speed in the range of 11,500 to 12,500 r/min by turning H mixture needle clockwise.

**NOTE :** During H mixture needle adjustment, do not run engine at high speed without load longer than 5 seconds.

7. If the engine speed at WOT is above 12,500 r/min, adjust H mixture needle anticlockwise and set maximum engine speed at less than 12,500 r/min.

8. After adjusting carburettor, put the limiter cap on the tip of 2.5 mm wood screw and install the caps on L and H mixture needles.

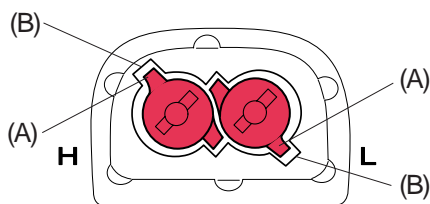
**NOTE :** Align the limiter caps tabs (A) with locating slots (B) in extended housing of carburettor.



9. Tap the respective limiter caps in as shown.

10. Start engine again and make it sure engine runs at idle speed in the range of 2,300 to 3,300 r/min and at WOT engine speed in the range of 11,500 to 12,500 r/min. Also make it sure chain would not turn at engine idle speed and suitable acceleration.

## 2-3 Adjusting carburettor



1. Start engine and warm it up well for 2 -3 minutes with cycle of 5 seconds at WOT (Wide Open Throttle) and 10 seconds at idling.

2. Using 2.5 mm wide blade screw driver, adjust L mixture needle to obtain maximum idle speed.

3. Set idle speed to 3,000 r/min by turning idle adjust screw (in the range of 2,700 to 3,300 r/min allowable).

4. Turn L mixture needle anticlockwise to reduce engine idle speed 500 r/min to set idle speed in the range of 2,200 to 2,800 r/min.

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

5. Turn H mixture needle anticlockwise at WOT until engine speed drops less than 11,000 r/min.

6. Adjust WOT engine speed in the range of 11,500 to 12,500 r/min by turning H mixture needle clockwise.

**NOTE :** During H mixture needle adjustment, do not run engine at high speed without load longer than 5 seconds.

7. If the engine speed at WOT is above 12,500 r/min, adjust H mixture needle anticlockwise and set maximum engine speed at less than 12,500 r/min.

8. After adjusting carburettor, put the limiter cap on the tip of 2.5 mm wood screw and install the caps on L and H mixture needles.

**NOTE :** Align the limiter caps tabs (A) with locating slots (B) in extended housing of carburettor.

9. Tap the respective limiter caps in as shown.

10. Start engine again and make it sure engine runs at idle speed in the range of 2,300 to 3,300 r/min and at WOT engine speed in the range of 11,500 to 12,500 r/min. Also make it sure chain would not turn at engine idle speed and suitable acceleration.

**NOTE :** Initial carburettor setting (Idle adjust screw, L and H mixture needles) shown here is to start the engine after restoration or carburettor change. Idle adjust screw, L and H 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, variance would be ignorable.