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SERVICE DATA

CHAIN SAW

CS-680

(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 product information available at the time of publication.
ECHO SERVICE MANUAL Ord. 401-23 (Model : CS-6702) contains lots of information for servicing this model.

CONTENTS

Reference No. **01-67G-00**
ISSUED: 200901

KIORITZ CORPORATION

1 SERVICE INFORMATION

1-1 Specifications

Dimensions	Length mm(in)	435 (17.13)		
	Width mm(in)	236 (9.29)		
	Height mm(in)	302 (11.89)		
Dry weight*	kg(lb)	6.6 (14.5)		
Engine	Type	KIORITZ, air-cooled, two-stroke, single cylinder Ventilated piston, Semi-automatic decompression		
	Rotation	Clockwise as viewed from the output end		
	Displacement $cm^3(in^3)$	66.8 (4.076)		
	Bore mm(in)	50.0 (1.969)		
	Stroke mm(in)	34.0 (1.339)		
	Compression ratio	7.6		
Carburettor	Type	Diaphragm horizontal-draught		
	Model	Walbro HDA-272		
	Venturi size-Throttle bore mm(in)	15.08 - 19.03 (0.594 - 0.749)		
Ignition	Type	CDI (Capacitor discharge ignition) system with electronic timing advancer		
	Spark plug	BPMR7A		
Starter	Type	Automatic rewind		
	Rope diameter x length mm(in)	4.5 x 950 (0.18 x 37.4)		
Fuel	Type	Premixed two-stroke fuel		
	Mixture ratio	50 : 1 (2 %)		
	Petrol	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.)	0.64 (21.6)		
Clutch	Type	Centrifugal, 3-shoe slide with 3-tension spring		
Guide bar / Saw chain lubrication type		Automatic with volume adjuster and manual override		
	Tank capacity, oil L (U.S.fl.oz.)	0.37 (12.5)		
Sprocket	Type	Floating rim		
	Number of teeth	7		
	Pitch in	3/8		
Guide bar	Type	45S58	50S58	60S58
		45RS58-3/8E	50RS58-3/8E	60RS58-3/8E
	Called length cm	45	50	60
	Gauge in	0.058		
Saw chain	Type	CARLTON A2LM		OREGON 73LGX
	Number of drive links	64	72	84
	Pitch in	3/8		
	Gauge in	0.058		

* Without guide bar and saw chain.

1-2 Technical data

Engine			
Idling speed		r/min	2,600 +/- 300
Operating speed		r/min	9,500 - 10,000
Wide open throttle speed*		r/min	12,900 - 13,900
Clutch engagement speed		r/min	3,600 - 4,300
Compression pressure		MPa (kgf/cm^2) (psi)	0.87 (8.9) (126)
Ignition system			
Spark plug gap		mm(in)	0.6 - 0.7 (0.024 - 0.028)
Minimum secondary voltage at 1,200 r/min		kV	21
Secondary coil resistance		kΩ	1.7 - 2.2
Pole shoe air gaps		mm(in)	0.30 - 0.40 (0.012 - 0.016)
Ignition timing	at 1,500 r/min	°BTDC	8
	at 3,000 r/min	°BTDC	15
	at 8,000 r/min	°BTDC	24
	at 10,000 r/min	°BTDC	25
Carburettor			
Idle adjust screw initial setting		turn in**	1/2
L mixture needle initial setting		turns back***	2 1/4
H mixture needle initial setting		turns back***	1 1/8
Test Pressure, minimum		MPa (kgf/cm^2) (psi)	0.05 (0.5) (7.0)
Metering lever height		mm(in)	Flush with diaphragm seat
Chain oil discharge volume at 7,000 r/min		mL/min(U.S.fl.oz./min)	Adjustable 3 - 13 (0.09 - 0.39) (Factory set 7.5 mL/min)

BTDC: Before top dead centre.

*With 50 cm guide bar and properly adjusted saw chain.

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

***Turn L/H 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 pawl		M5	70 - 110	7 - 11	60 - 95
	Starter centre shaft screw		M5*	70 - 110	7 - 11	60 - 95
	Starter case		M5	20 - 35	2 - 3.5	17 - 30
Ignition system	Magneto rotor (Flywheel)		M8	230 - 270	23 - 27	200 - 235
	Ignition coil		M4	35 - 50	3.5 - 5	30 - 45
	Spark plug		M14	130 - 170	13 - 17	113 - 150
Fuel system	Carburettor		M5	20 - 40	2 - 4	17 - 35
	Carburettor case		M5	50 - 70	5 - 7	45 - 60
	Intake bellows		M5	70 - 110	7 - 11	60 - 95
Clutch	Clutch hub		LM10	450 - 550	45 - 55	390 - 480
Engine	Crankcase		M5†	70 - 110	7 - 11	60 - 95
	Cylinder		M5†	70 - 110	7 - 11	60 - 95
	Cylinder cover		M5	30 - 50	3 - 5	25 - 35
	Muffler		M5*	70 - 110	7 - 11	60 - 95
	Muffler bracket		M5	35 - 50	3.5 - 5	30 - 45
	Muffler lid		M4	35 - 50	3.5 - 5	30 - 45
Others	Auto-oiler		M4	35 - 50	3.5 - 5	30 - 45
	Cushion	Front handle	M5	70 - 110	7 - 11	60 - 95
		Crankcase	M5	35 - 50	3.5 - 5	30 - 45
	Cushion bracket		M5	70 - 110	7 - 11	60 - 95
	Compression spring	Cushion bracket	M5	50 - 70	5 - 7	45 - 60
		Crankcase	M5*	35 - 50	3.5 - 5	30 - 45
	Eye plate	Compression spring	M4*	35 - 50	3.5 - 5	30 - 45
			M5*	35 - 50	3.5 - 5	30 - 45
	Front handle		M5*	70 - 110	7 - 11	60 - 95
	Brake lever (Hand guard)		M5	25 - 45	2.5 - 4.5	22 - 40
	Brake cover nut		M3*	6 - 10	0.6 - 1	5 - 9
	Ignition switch		M10	10 - 30	1 - 3	9 - 25
	Guide bar		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
			M8	110 - 150	11 - 15	95 - 130

LM: Left-hand thread

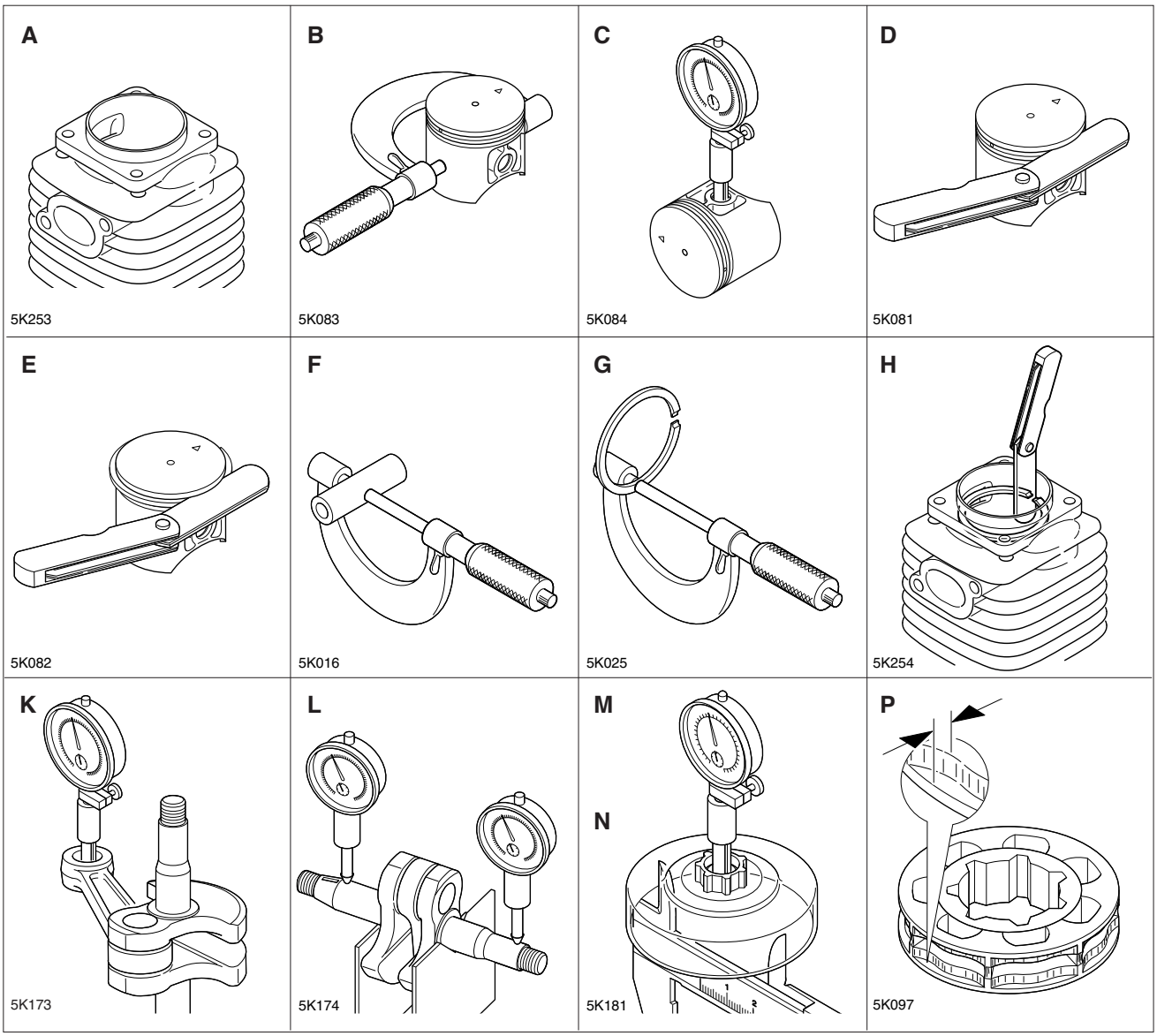
*Thread locking sealant (See next page)

† The torque difference between four bolts should not exceed 20 kgf• cm (2N• m, 17in•lbf) per bolt.

1-4 Special repairing materials

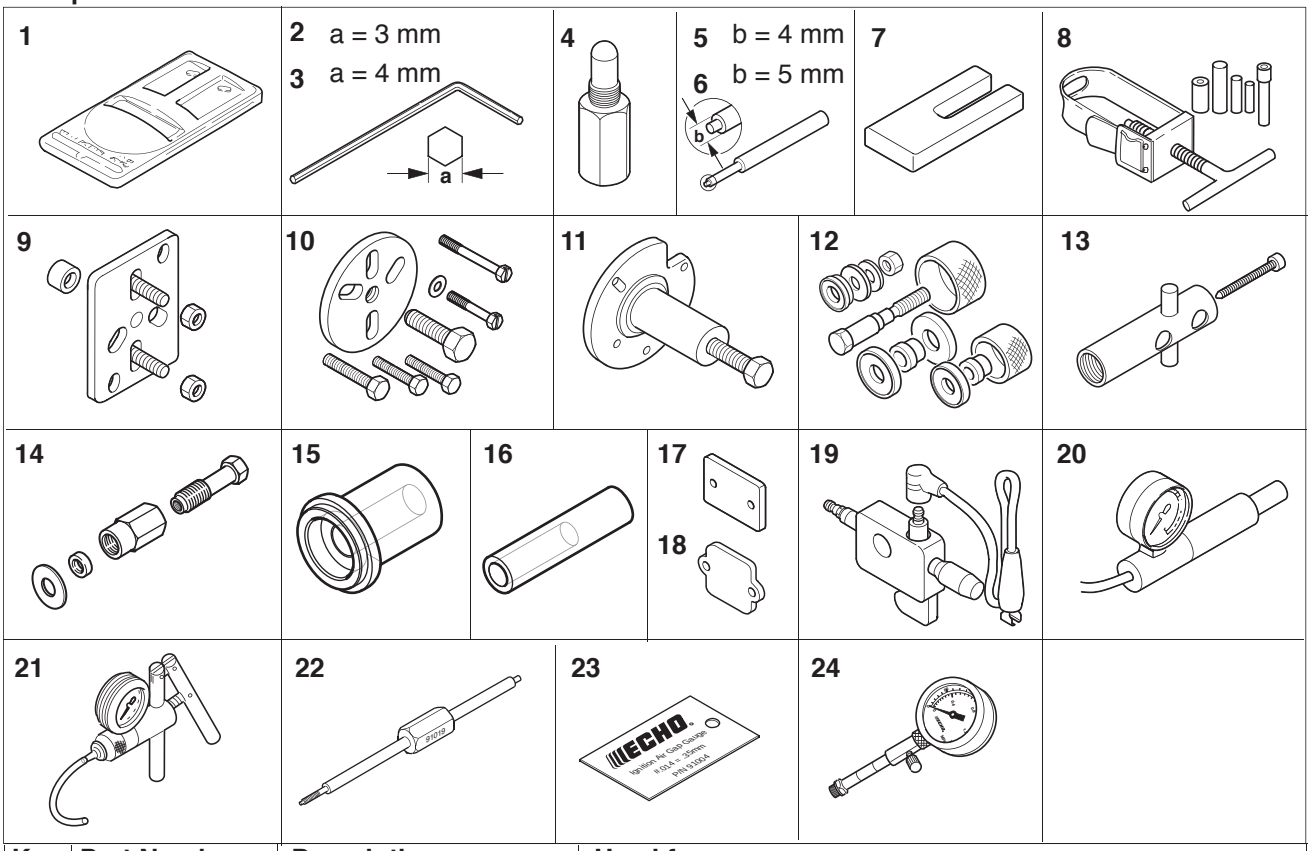
Material	Location	Remarks
Adhesive	Guide bar stud	Loctite #609, ThreeBond 1373 or equivalent
	Starter centre shaft screw	Loctite #222, ThreeBond1342 or equivalent
	Brake cover nut	
Grease	Auto-oiler worm	Lithium based grease or ECHO XTended Protection ™ Lubricant
	Clutch needle bearing	
	Rubber cushion, inside	
	Choke knob	
	Rewind spring	
	Oil seal inner lips	
	Starter centre shaft	
	Chain brake (metal contact part)	Molybdenum grease (approx. 1 gram)
Thread locking sealant	Front handle	Loctite #242, ThreeBond #1324 or equivalent
	Compression spring Crankcase	
	Eye plate	
	Muffler	

1-5 Service Limits



Description			mm (in)
A	Cylinder bore		When plating is worn and aluminium can be seen
B	Piston outer diameter	Min.	49. 83 (1.962)
C	Piston pin bore	Max.	12. 035 (0.4738)
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.	11. 98 (0.4717)
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.	16. 025 (0.6309)
L	Crankshaft runout	Max.	0. 01 (0.001)
M	Sprocket bore	Max.	14. 07 (0.5539)
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	895612-79920	L-hex wrench (3 mm)	Removing and installing hex. socket bolt (M4)
3	895610-79920	L-hex wrench (4 mm)	Removing and installing hex. socket bolt (M5)
4	897537-30130	Piston stopper	Locking crankshaft rotation
5	897724-01361	Spring pin tool (4 mm)	Removing and installing spring pin (4 mm dia)
6	897724-02831	Spring pin tool (5 mm)	Removing and installing spring pin (5 mm dia)
7	897719-02830	Piston holder	Making piston steady to remove and install piston / rings
8	897702-30131	Piston pin tool	Removing and installing piston pin
9	897501-03938	Puller	Removing magneto rotor
10	897500-00335	Puller	Removing auto oiler oil cover
11	897502-19830	Crankcase tool	Separating crankcase
12	897701-14732	Bearing tool	Removing and installing ball bearings on crankcase
13	897708-19835	Worm puller	Removing auto-oiler worm
14	Y089-000040	Worm inserter	Installing auto-oiler worm
15	897727-19830	Oil seal tool	Installing clutch side oil seal
16	897726-21430	Oil seal tool	Installing starter side oil seal
17	897826-16131	Pressure rubber plug	Plugging intake port to test crankcase / cylinder leakages
18	897827-16131	Pressure plate	Plugging intake port to test crankcase / cylinder leakages
19	897800-79931	Spark tester	Checking ignition system
20	897803-30133	Pressure tester	Testing carburettor leakages
21	91024	Pressure tester	Testing crankcase leakages
22	91019	Limiter cap tool	Removing and installing limiter cap
23	91004	Module air gap gauge	Adjusting pole shoe air gaps
24	91037	Compression gauge	Measuring cylinder compression

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.

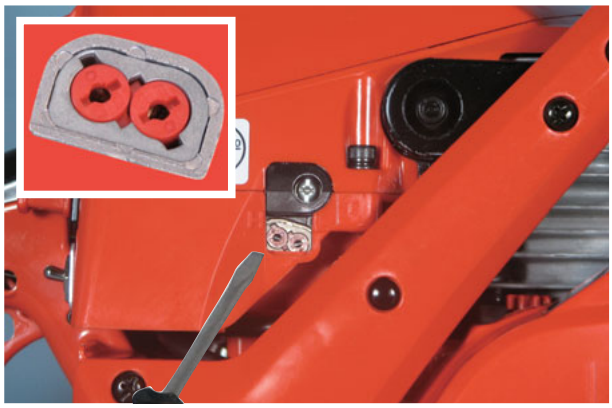
6. The recommended bar and chain must be installed, and properly tensioned.

NOTE : In order to achieve proper carburettor adjustment, a 50 cm bar and chain should be installed on the unit. Otherwise serious engine damage will occur due to overspeeding.

B. Adjustment with limiter caps on carburettor.
Set L and H mixture needles fully anticlockwise. Start and run engine for two minutes alternating engine speed between WOT for 5 seconds and idle for 5 seconds. Adjust idle speed screw to 2,600 +/- 150 r/min. Adjust H mixture needle with limiter cap to 13,400 +/- 300 r/min. If engine does not run correctly after this adjustment, proceed to the next step 2-2.

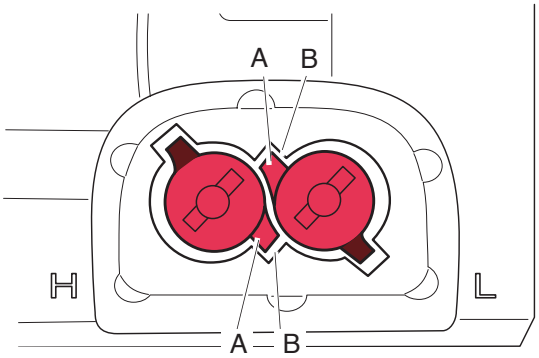
IMPORTANT : After adjusting carburettor according to the steps 2-2 and 2-3, the limiter cap(s) must be installed on L and H mixture needle(s) to comply with Emission Directive.

2-2 Presetting Idle adjust screw, L mixture needle and H mixture needle



Tools Required : Small screwdriver with 2.5 mm blade, electronic tachometer P/N 897801-33330, limiter cap removal tool with 2.5 mm left-hand thread P/N 91019. Parts Required : (2) limiter caps P/N P003-000010.

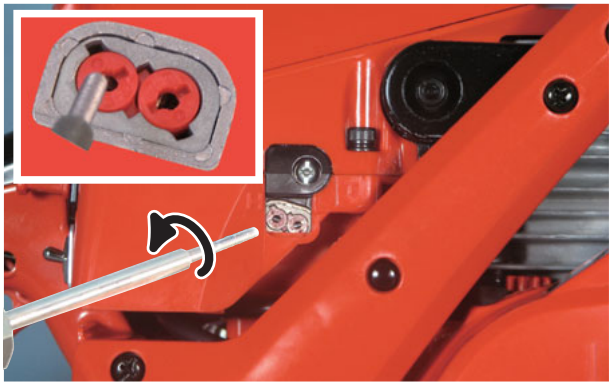
1. Turn the L and H mixture needles anticlockwise to rich side stop to align limiter cap tab (A) with locating slot (B), using 2.5 mm blade screwdriver.



NOTE : If cap tabs (A) misalign with locating slots (B), the cap cannot be removed and the centre hole threads will strip. If centre hole threads strip, use 3 mm diameter thread wood screw to remove the limiter cap.

(continued)

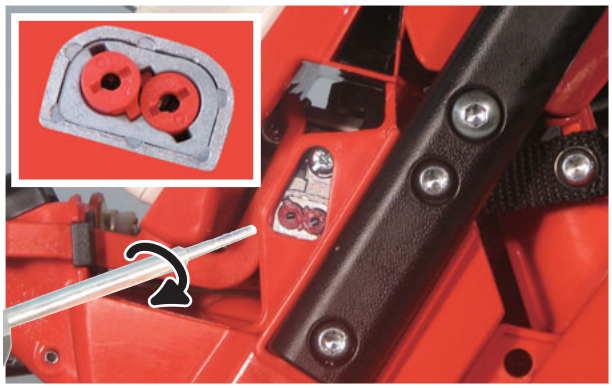
2-2 Presetting Idle adjust screw, L mixture needle and H mixture needle (continued)



2. Screw 2.5 mm limiter cap removal tool P/N 91019 anticlockwise into centre hole of either limiter cap until tab of the limiter cap just comes out of the locating slot.

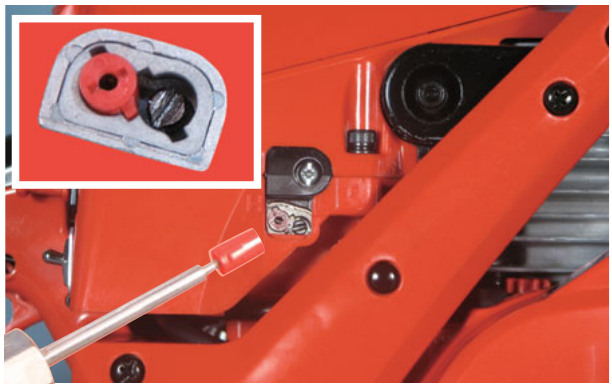
NOTE : DO NOT COMPLETELY REMOVE LIMITER CAP FROM Carburettor!

If the first limiter cap is removed completely, the second limiter cap can be misaligned while inserting the cap removal tool.



3. Remove the limiter cap removal tool from the limiter cap by turning the tool clockwise, leaving the limiter cap in place.

4. Screw 2.5 mm limiter cap removal tool P/N 91019 anticlockwise into centre hole of remaining limiter cap until the limiter cap is removed from the mixture needle completely. Remove the limiter cap from limiter cap removal tool by turning clockwise, then screw limiter cap removal tool into centre hole of previous limiter cap to remove completely.

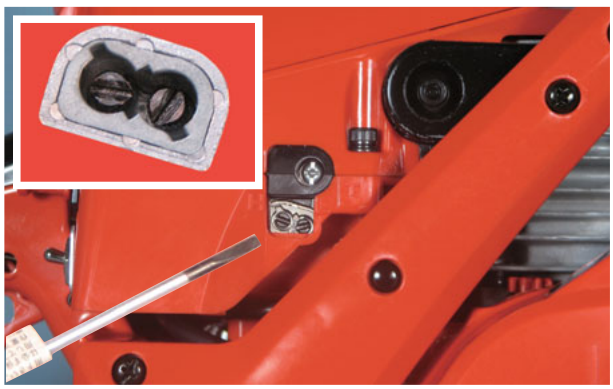


5. Turn L and H mixture needle clockwise until lightly seated, then turn both mixture needles anticlockwise for initial setting as follows :

L mixture needle : 2 1/4, H mixture needle : 1 1/8

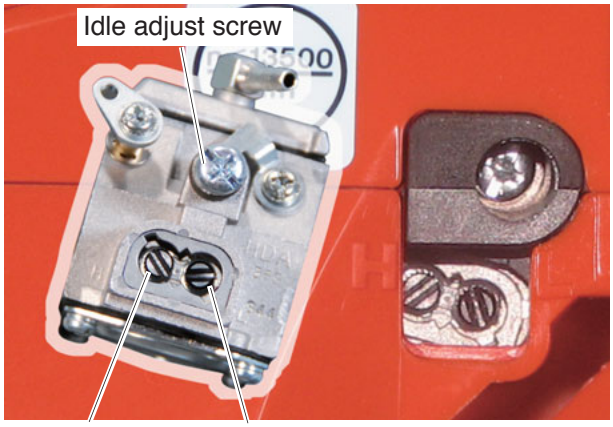
NOTE : If needles are forced during seating, damage to carburettor may occur.

6. Remove air cleaner lid and air filter to expose the Idle adjust screw and throttle plate. Turn Idle adjust screw anticlockwise and set the screw until the tip just contacts the throttle plate. Then turn Idle adjust screw 1/2 turns clockwise. Reinstall air filter, and cleaner lid.



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 through this procedure. The actual number of turns needed for engine operation may vary.

2-3 Adjusting carburettor



1. Start and warm engine for 1 minute alternating engine speed between WOT and idle every 5 seconds. Turn H mixture needle anticlockwise until engine speed drops to approx. 11,500 r/min at WOT.

NOTE : Do not run engine at high speed without load longer than 10 seconds, or engine damage may occur.

2. Adjust L mixture needle using 2.5mm blade screwdriver to reach maximum engine r/min just before lean r/min drop off.

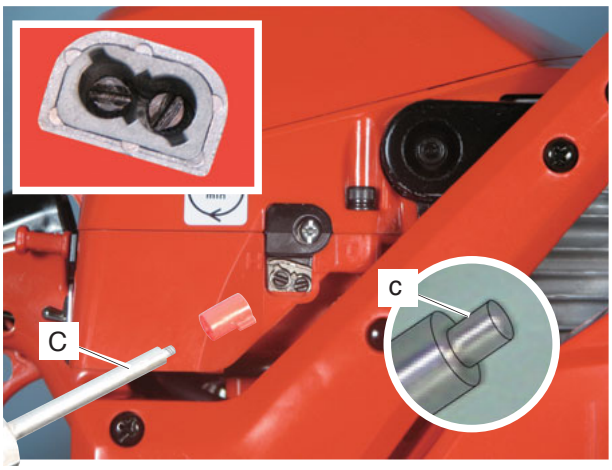
3. Set idle speed to 3,600 r/min by turning Idle adjust screw. Engine speed should be stable at 3,600 +/- 50 r/min after idle adjust screw adjustment.

4. Turn L mixture needle anticlockwise reducing engine idle speed 1,000 r/min to set idle speed at 2,600 r/min. The idle speed range is 2,500 - 2,700 r/min.

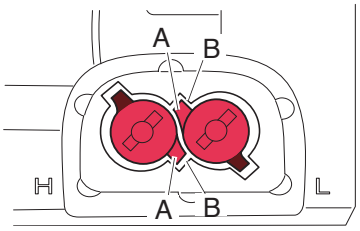
NOTE : Engine speed must be allowed to stabilize a minimum of 20 seconds after each adjustment of L mixture needle to assure accurate tachometer readings.

5. Before adjustment, WOT engine speed should be 11,500 r/min or less. If r/min is higher, turn H mixture needle anticlockwise until 11,500 r/min is achieved. To make the final WOT engine speed adjustment, turn the H mixture needle clockwise in 1/8 turn increments with the engine at idle. After each adjustment, accelerate to WOT, and check r/min. The final r/min should fall within 13,000 - 13,800 r/min.

NOTE : When the H mixture needle is turned completely clockwise, the engine will continue to run. If the engine speed at WOT is above 14,300 r/min, adjust H mixture needle anticlockwise and set maximum engine speed at less than 13,900 r/min.



6. After adjusting carburettor, put new limiter cap on the other side (c) of limiter cap tool (C) as shown. Align the limiter cap's tabs (A) with locating slots (B) in extended housing of carburettor and press the limiter caps to the bottoms on L and H mixture needles respectively.



IMPORTANT : The limiter caps must be properly installed on L and H mixture needles to comply with Emission Directive.

7. Start engine, and verify engine idle speed ranges from 2,300 to 2,900 r/min, and WOT engine speed ranges from 12,900 to 13,900 r/min. Make sure the chain does not rotate when engine is idling. When final adjustment is completed, the engine should idle, accelerate smoothly, and attain WOT per above specifications.