



# SERVICE DATA

## CHAIN SAW CS-350T CS-350TES CS-350WES

(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 products information available at the time of publication.

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Reference No. **00-36A-04**

**REVISED : 200507**

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**KIORITZ CORPORATION**

## 1 SERVICE INFORMATION

## 1-1 Specifications

Model		CS-350T	CS-350TES	CS-350WES	
Dimensions	Length*	mm(in)	275 (10.8)	277 (10.9)	392 (15.4)
	Width	mm(in)	230 (9.1)	233 (9.1)	241 (9.5)
	Height	mm(in)	211 (8.3)	214 (8.4)	236 (9.3)
Dry weight*		kg(lb)	3.3 (7.3)	3.3 (7.3)	3.6 (7.9)
Engine	Type	KIORITZ, air-cooled, two-stroke, single cylinder			
	Rotation	Clockwise as viewed from the output end			
	Displacement	cm <sup>3</sup> (in <sup>3</sup> )	35.8 (2.185)		
	Bore	mm(in)	39 (1.535)		
	Stroke	mm(in)	30 (1.181)		
	Compression ratio	7.0			
Carburettor	Type	Diaphragm horizontal-draught with auto-return choke			
	Model (Walbro)	WT-699, WT-699A, WT-698A**		WT-722, WT-722A WT-721**	
	Venturi size-Throttle bore	mm(in)	13.5 - 15.85 (0.532 - 0.624)		
Ignition	Type	CDI (Capacitor discharge ignition) system in a single integrated piece, with electronic timing advancer			
	Spark plug	BPMR7A			
Starter	Type	Automatic rewind	ES (Effortless-start)		
	Rope diameter x length	mm(in)	3.0 x 900 (0.12 x 35.4)	3.5 x 950 (0.14 x 37.4)	
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)	0.37 (12.5)		
Clutch	Type	Centrifugal, 3-shoe slide with 3-tension spring			
Guide bar / Saw chain lubrication type		Automatic with volume adjuster			
Oil	Tank capaciz)	L (U.S.fl.oz.)	0.23 (7.8)		
Sprocket	Type	Spur			
	Number of teeth	6			
	Pitch	in	3/8		

\* Without guide bar and saw chain.

\*\* CS-350TES with WT-698A : Serial Number 36010654 and after  
CS-350WES with WT-721 : Serial Number 36007691 and after

Cutting devices					
Guide bar	Type		30RC50-3/8	35RC50-3/8	40RC50-3/8
	Called length	cm	30	35	40
	Gauge	in	0.050		
Saw chain	Number of drive links		47	53	58
	Pitch	in	3/8		
	Gauge	in	0.050		

**1-2 Technical data**

Model		CS-350T	CS-350TES	CS-350WES
<b>Engine</b>				
Idling speed	r/min	2900 - 3500		
Operating speed*	r/min	9300 - 10200		
High speed (No load full throttle)*	r/min	12500 - 13500		
Clutch engagement speed*	r/min	4000 - 4450		
Compression pressure	MPa (kgf/cm <sup>2</sup> ) (psi)	0.97 (9.8) (140)		
<b>Ignition system</b>				
Spark plug gap	mm(in)	0.6 - 0.7 (0.024 - 0.028)		
Minimum secondary voltage at 1500 r/min	kV	17.0		
Secondary coil resistance	kΩ	1.2 - 1.8		
Pole shoe air gaps	mm(in)	0.30 - 0.40 (0.012 - 0.016)		
Ignition timing	at 1500 r/min	°BTDC	15 <sup>†</sup>	20 <sup>††</sup>
	at 3000 r/min	°BTDC	16.5 <sup>†</sup>	21.5 <sup>††</sup>
	at 7000 r/min	°BTDC	30 <sup>†</sup>	35 <sup>††</sup>
<b>Carburettor</b>				
Idle adjust screw initial setting	turns in**	4 7/8		2 1/8
L mixture needle initial setting	turns back	2 1/8 (WT-699, WT-699A) 2 3/4 (WT-698A)***		1 7/8 (WT-722, WT-722A) 2 1/8 (WT-721)***
H mixture needle initial setting	turns back	2 5/8 (WT-699) 2 7/8 (WT-699A) 2 7/8 (WT-698A)***		2 7/8 (WT-722) 2 3/8 (WT-722A) 3 1/8 (WT-721)***
Test Pressure, minimum	MPa (kgf/cm <sup>2</sup> ) (psi)	0.05 (0.5) (7.0)		
Metering lever height	mm(in)	1.65 (0.06) lower than diaphragm seat		
Chain oil discharge volume at 7000 r/ min	mL/min(U.S.fl.oz./min)	Adjustable : 1.5 - 13 (0.05 - 0.44) (Factory set 7 mL/min)		

BTDC: Before top dead centre.

\*With 35cm guide bar and saw chain.

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

†Serial number CS-350T 36000001 to 36002100, CS-350TES 36000001 to 36007533, CS-350WES 36000001 to 36004400

††Serial number CS-350TES 36007534 and after, CS-350WES 36004401 and after

\*\*\* CS-350TES with WT-698A : Serial Number 36010654 and after  
CS-350WES with WT-721 : Serial Number 36007691 and after

## 1-3 Torque limits

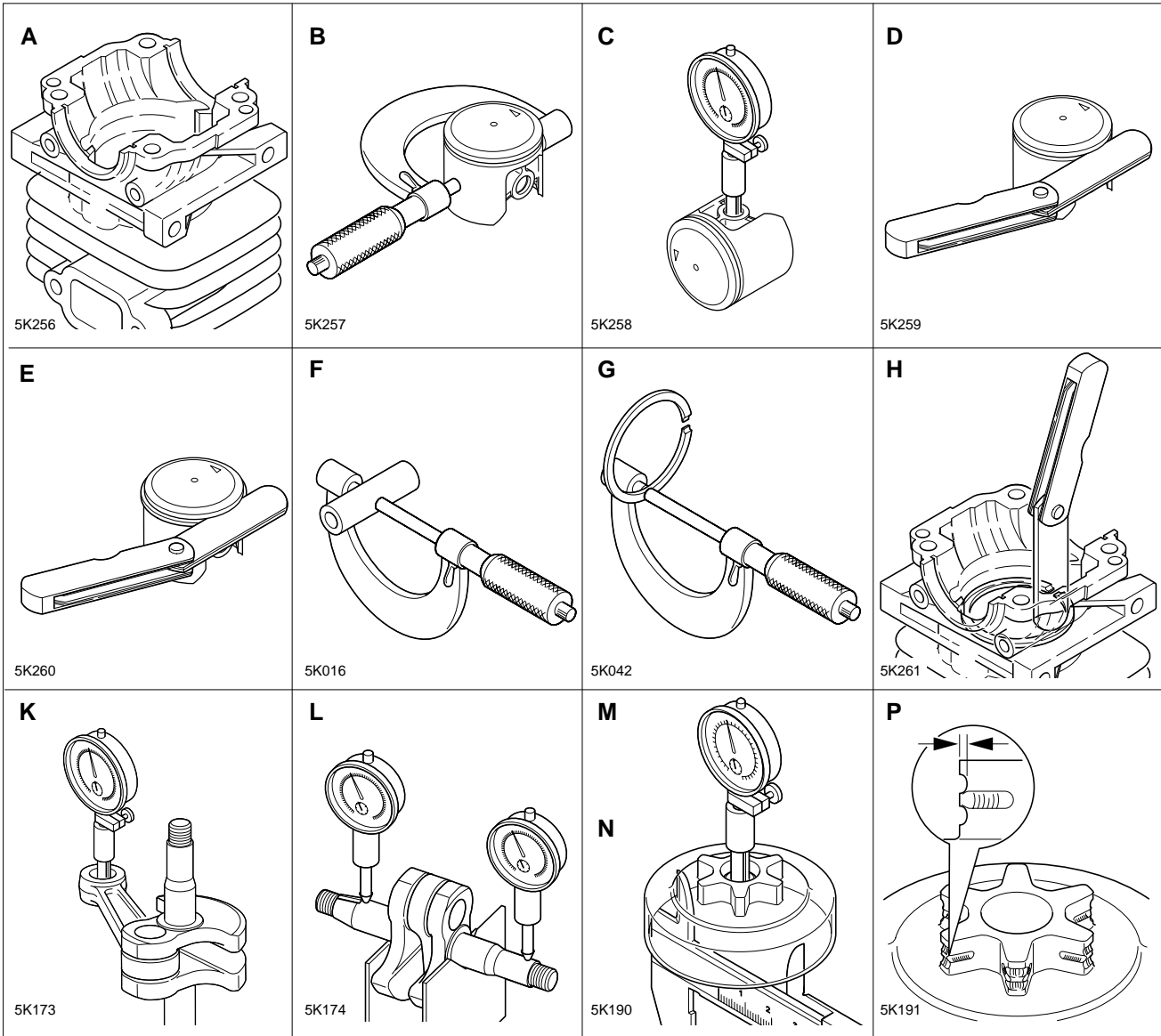
Descriptions		Size	kgf•cm	N•m	in•lbf	
Starter system	Starter pawl	M5*	40 - 60	4 - 6	35 - 50	
	Starter case	M4**	10 - 20	1 - 2	9 - 18	
Ignition system	Magneto rotor (Flywheel)	M8	200 - 240	20 - 24	175 - 210	
	Ignition coil	M5*	30 - 45	3.0 - 4.5	26 - 40	
	Spark plug	M14	150 - 170	15 - 17	130 - 150	
Fuel system	Carburettor	M5	30 - 45	3.5 - 4.5	26 - 40	
	Intake bellows	M5	30 - 50	3.5 - 4.5	30 - 40	
Clutch	Clutch hub	LM10	230 - 260	23 - 26	200 - 230	
Engine	Crankcase	M5	60 - 80	6 - 8	50 - 70	
	Engine mount	M5	100	10	85	
	Engine mount with lead terminal	M5	80	8	70	
	Dust cover	M4**	10 - 20	1 - 2	9 - 18	
	Muffler	M5	70 - 100	7 - 10	60 - 90	
	Muffler cover	M4**	10 - 20	1 - 2	9 - 18	
Others	Auto-oiler	M4	15 - 25	1.5 - 2.5	13 - 22	
	CS-350T and CS-350TES	Front handle	M5**	20 - 40	2 - 4	18 - 35
			M4**	10 - 20	1 - 2	9 - 18
		Top handle	M4**	10 - 20	1 - 2	9 - 18
		Top handle assembly	M4**	20 - 30	2 - 3	18 - 26
	CS-350WES	Front handle	M4**	20 - 30	2 - 3	17 - 26
			M4**	20 - 30	2 - 3	17 - 26
		Rear handle	M4**	20 - 30	2 - 3	17 - 26
	Brake lever (Hand guard)	M5	25 - 45	2.5 - 4.5	22 - 40	
	Chain catcher	M5**	20 - 40	2 - 4	18 - 35	
	Guide bar stud (one stud type)	M8*	180 - 250	18 - 25	130 - 220	
	Guide bar stud (two studs type)	M6*	90 - 110	9 - 11	80 - 95	
	Guide bar nuts	M8	200 - 230	20 - 23	175 - 200	
		M6	90 - 110	9 - 11	80 - 95	
	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)    \*\* Tapping screw

1-4 Special repairing materials

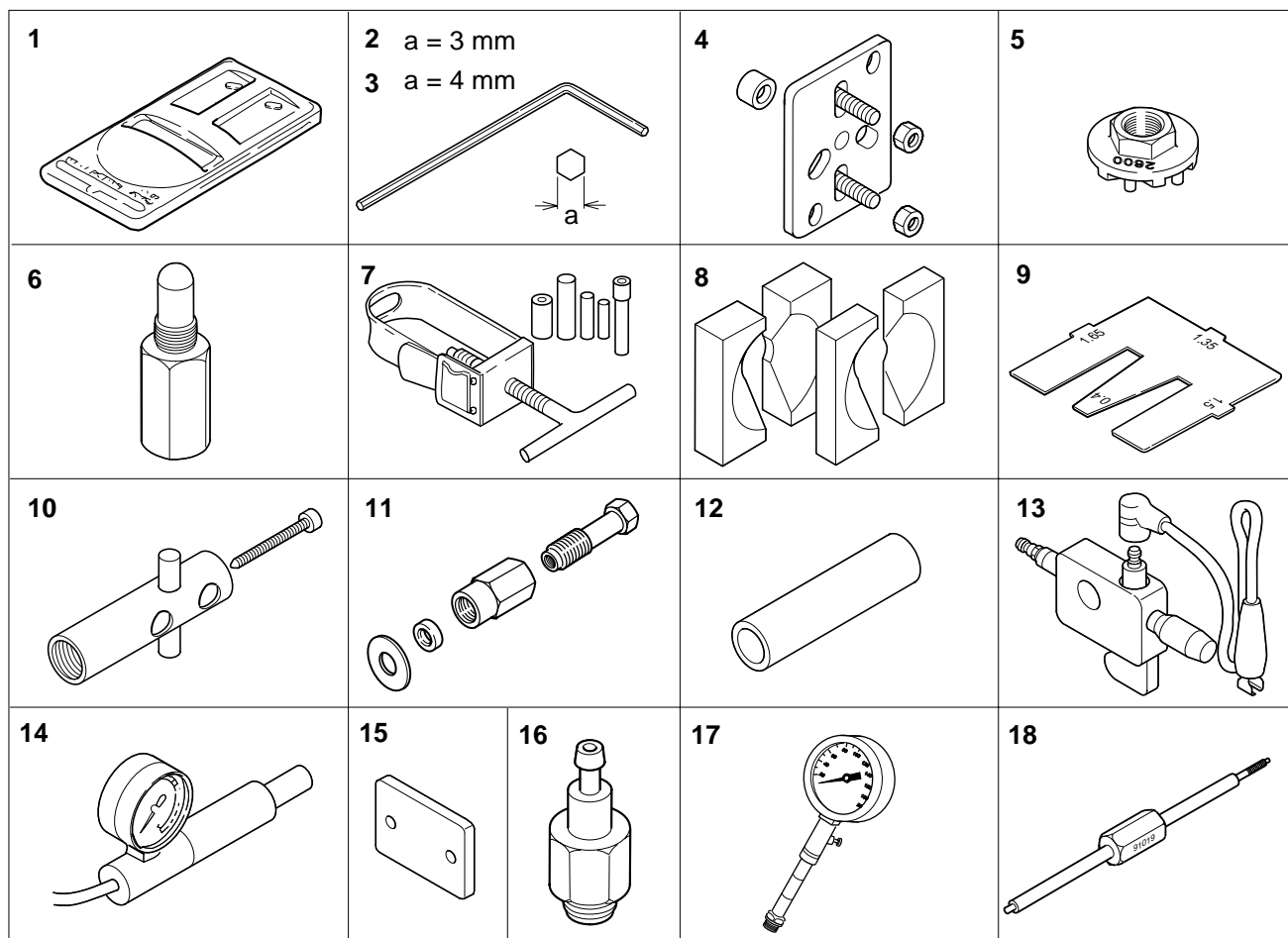
Material	Location	Remarks
Adhesive	Ball bearing outer / crankcase	Loctite #675 or equivalent
	Guide bar stud	
Liquid gasket	Crankcase seams	Loctite #515 or equivalent
Thread locking sealant	Starter pawl screws	Loctite #242, ThreeBond 1324 or equivalent
	Ignition coil	Loctite #222, ThreeBond 1342 or equivalent
Grease	Auto-oiler worm	Lithium based grease
	Clutch needle bearing	
	Rear handle cushion	
	Rewind spring	
	Starter center shaft	
	Chain brake (metal contact part)	Molybdenum grease (approx. 1 gram)

### 1-5 Service Limits



			mm (in)
A	Cylinder bore		When plating is worn and aluminium can be seen
B	Piston outer diameter	Min.	38.91 (1.532)
C	Piston pin bore	Max.	8.03 (0.316)
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.	7.98 (0.314)
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.	11.03 (0.434)
L	Crankshaft runout	Max.	0.05 (0.002)
M	Sprocket bore	Max.	13.07 (0.515)
N	Clutch drum bore	Max.	61.5 (2.42)
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	897501-03938	Puller	Removing magneto rotor
5	X640-000011	Clutch tool	Removing and assembling clutch assembly
6	897537-30130	Piston stopper	Locking crankshaft rotation
7	897702-30131	Piston pin tool	Removing and installing piston pin
8	897701-06030	Bearing wedge	Removing and crankshaft ball bearings
9	897563-19830	Metering lever gauge	Measuring metering lever hight on carburettor
10	897708-19835	Worm puller	Removing auto-oiler worm
11	Y089-000040	Worm inserter	Installing auto-oiler worm
12	897726-09130	Oil seal tool	Installing oil seals
13	897800-79931	Spark tester	Checking ignition system
14	897803-30132	Pressure tester	Testing carburettor and crankcase leakage
15	897826-16131	Pressure rubber plug	Plugging intake port to test crankcase / cylinder leakages
16	897835-16131	Pressure connector	Checking crankcase and cylinder leakages
17	91007	Compression gauge	Measuring cylinder compression
18	91019	Limiter cap tool	Removing and installing limiter cap

## 2 EMISSION ADJUSTMENT GUIDE

### 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" 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 guide bar and saw chain when adjusting carburettor, or serious engine damage will occur due to overspeeding.

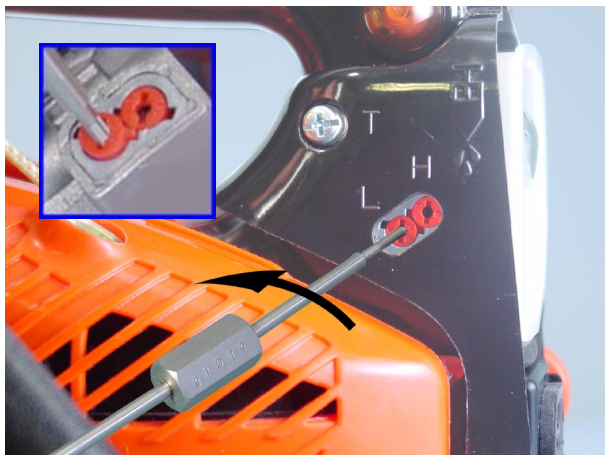
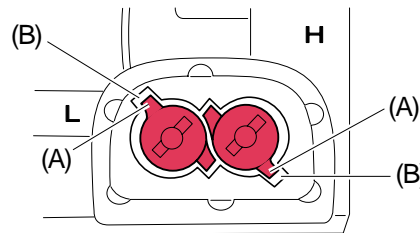
B. Adjust carburettor turning L and H mixture needles with limiter caps within the moving range (approx. 90°) and idle adjust screw. When engine does not run correctly after this adjustment, proceed to the next step (2-2).

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

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



1. Turn the L and H mixture needles out anticlockwise until side of rich stop to meet limiter cap tab (A) with locating slot (B), using 2.5 mm blade screw driver.



2. Screw thread of limiter cap tool 91019 into centre hole of limiter cap anticlockwise until tab of the limiter cap just come out from locating slot.

**NOTE :** If cap tabs (A) misalign with locating slots (B), there is a chance to strip thread. When the thread is stripped by limiter cap tool, screw 3 mm wood screw in the stripped centre hole of the limiter cap, and pull off the cap.

(continued)

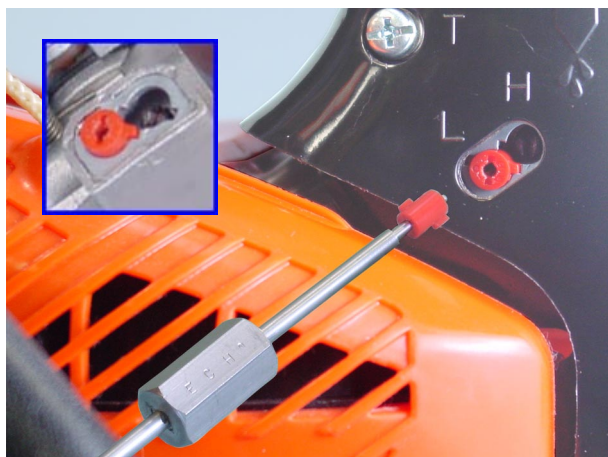


2-2 Presetting idle adjust screw, L mixture needle and H mixture needle (continued)



3. Remove the limiter cap tool from the limiter cap turning the tool clockwise as the limiter cap is remained there.

**NOTE :** If the limiter cap was pulled out completely, there is a chance that the other mixture needle would turn and limiter cap tab would misalign with locating slot when screwing the limiter cap tool into centre hole of the other limiter cap.



4. Screw thread of limiter cap tool 91019 into other centre hole of the other limiter cap anticlockwise until the limiter cap is pulled out from the mixture needle completely. Remove the limiter cap from limiter cap tool turning clockwise, and screw thread of limiter cap tool 91019 into centre hole of previous limiter cap to pull out completely.



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

CS-350T, CS-350TES

L mixture needle : 2 1/8 (WT-699, WT-699A)  
2 3/4 (WT-698A)

H mixture needle : 2 5/8 (WT-699)  
2 7/8 (WT-699A, WT-698A)

CS-350WES

L mixture needle : 1 7/8 (WT-722, WT-722A)  
2 1/8 (WT-721)

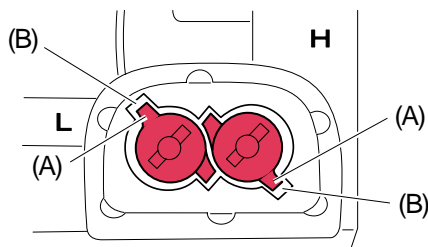
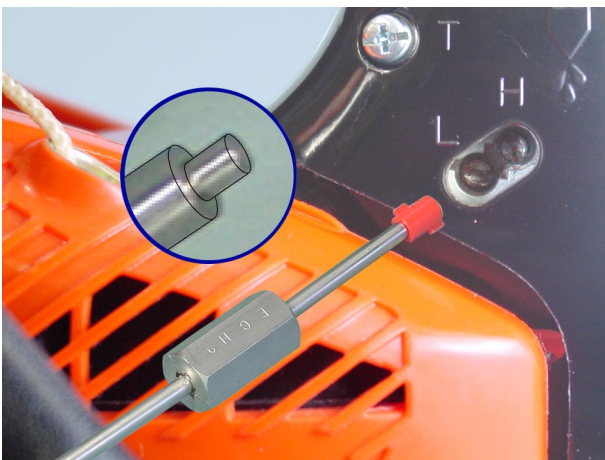
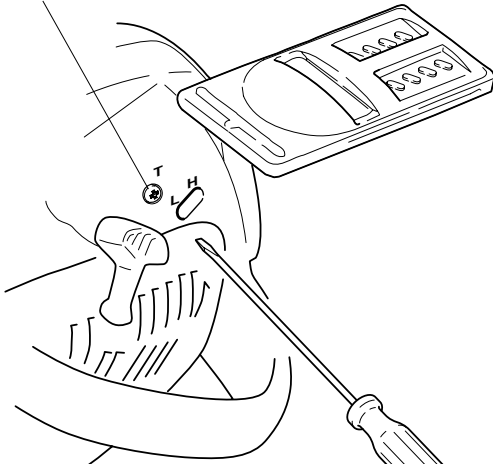
H mixture needle : 2 7/8 (WT-722), 2 3/8 (WT-722A)  
3 1/8 (WT-721)

**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 4 7/8 (CS-350T, CS-350TES), 2 1/8 (CS-350WES) turns clockwise.

## 2-3 Adjusting carburettor

idle adjust screw



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 4,200 r/min (CS-350TES), 4000 r/min (CS-350WES) by turning idle adjust screw.

4. Turn L mixture needle anticlockwise to reduce engine idle speed 1,000 r/min (CS-350TES), 800 r/min (CS-350WES) to set idle speed at 3200 r/min. The idle speed is allowed in the range of 3,000 to 3,400 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 12000 r/min. Then turn H mixture needle clockwise to obtain 12,800 to 13,200 r/min at WOT.

**NOTE :** Do not run engine at high speed without load longer than 5 seconds, or engine damage may occur.

6. If the engine speed at WOT is above 13,500 r/min adjust H mixture needle anticlockwise and set maximum engine speed at less than 13,500 r/min.

7. After adjusting carburettor, put new limiter cap on the other side of limiter cap tool as shown, and install new limiter caps on L and H mixture needles respectively.

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

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

8. Start engine again and make it sure engine runs at idle speed in the range of 2,900 to 3,500 r/min and at WOT speed in the range of 12,500 to 13,500 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.