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SERVICE DATA

CHAIN SAW

ECHO: CS-550

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.

ECHO SERVICE MANUAL Ord. 401-31 (Model : CS-600) contains additional information for servicing this model.

CONTENTS

Reference No. **01-54B-00**
ISSUED: 201102

1 SERVICE INFORMATION

1-1 Specifications

Dimensions	Length	mm(in)	448 (17.64)
	Width	mm(in)	253 (9.96)
	Height	mm(in)	284 (11.18)
Dry weight*		kg(lb)	6.0 (13.2)
Engine	Type		YAMABIKO, stratified scavenging, air-cooled, two-stroke, single cylinder Ventilated piston, Semi-automatic decompression
	Rotation		Clockwise as viewed from the output end
	Displacement	$cm^3(in^3)$	54.1 (3.301)
	Bore	mm(in)	45.0 (1.772)
	Stroke	mm(in)	34.0 (1.339)
	Compression ratio		7.2
Carburettor	Type		Diaphragm horizontal-draught
	Model		Walbro WLA-4 with Large D-shaped mixture needles
	Venturi size-Throttle bore	mm(in)	13.49 - 15.85 (0.531 - 0.624)
Ignition	Type		CDI (Capacitor discharge ignition) system Digital magneto
	Spark plug		BPMR8Y
Exhaust	Muffler type		Spark arrester muffler
Starter	Type		Automatic rewind
	Rope diameter x length	mm(in)	4.0 x 950 (0.15 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.)	0.53 (17.9)
Clutch	Type		Inboard clutch : Centrifugal, 3-shoe slide with 3-tension spring
Guide bar / Saw chain lubrication type			Automatic with volume adjuster
	Tank capacity, oil	L (U.S.fl.oz.)	0.3 (10.1)
Sprocket	Type		Floating rim
	Number of teeth		7
	Pitch	in	0.325, 3/8

* Without guide bar and saw chain.

Oregon Saw chain 21BPX

Cutting devices					
Guide bar	Part No.		38RV58-325E	45RV58-325E	50RV58-325E
	Called length	cm	38	45	50
	Gauge	in	0.058		
Saw chain	Number of drive links		64	72	80
	Pitch	in	0.325		
	Gauge	in	0.058		

Oregon Saw chain 73LGX

Cutting devices					
Guide bar	Part No.		40RV58-3/8E	45RV58-3/8E	50RV58-3/8E
	Called length	cm	40	45	50
	Gauge	in	0.058		
Saw chain	Number of drive links		60	64	72
	Pitch	in	3/8		
	Gauge	in	0.058		

1-2 Technical data

Engine			
Idling speed		r/min	2,800 +/- 200
Wide open throttle speed*		r/min	12,500 - 13,500
Clutch engagement speed		r/min	4,000
	Minimum†	r/min	3,300
Compression pressure		MPa (kgf/cm^2) (psi)	1.04 (10.6) (151)
Ignition system			
Spark plug gap		mm (in)	0.6 - 0.7 (0.024 - 0.028)
Minimum secondary voltage at 1,500 r/min		kV	17
Primary coil resistance		Ω	300 - 340
Secondary coil resistance		kΩ	2.5 - 2.9
Pole shoe air gaps		mm (in)	0.30 - 0.40 (0.012 - 0.016)
Ignition timing	at 3,000 r/min	°BTDC	5
	at 8,000 r/min	°BTDC	24
	at 12,000 r/min	°BTDC	28
PET-9000	Parameter 1		325
	Parameter 2		03
Carburettor			
Idle adjust screw initial setting		turns in**	1 3/8
L mixture needle initial setting		turns out***	1 3/8
H mixture needle initial setting		turns out***	3 3/8
Test Pressure, minimum		MPa (kgf/cm^2) (psi)	0.05 (0.5) (7.0)
Metering lever height		mm (in)	1.50 (0.06) lower than diaphragm seat
Chain oil discharge volume at 7,000 r/min		mL/min (U.S.fl.oz./min)	Adjustable 1.5 - 13 (0.05 - 0.39) (Factory set 7.0 mL/min)

BTDC: Before top dead center.

*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.

† If clutch engagement speed is lower than minimum r/min, replace clutch assembly with new one.

1-3 Torque limits

Descriptions		Size	kgf•cm	N•m	in•lbf
Starter system	Starter pawl	M5*	60 - 100	6 - 10	50 - 90
	Starter case	M5	30 - 50	3 - 5	25 - 45
	Brake lever side	M5*	70 - 90	7 - 9	60 - 80
Ignition system	Magneto rotor (Flywheel)	M8	160 - 200	16 - 20	140 - 175
	Ignition coil	M5	35 - 50	3.5 - 5	30 - 45
	Spark plug	M14	130 - 170	13 - 17	113 - 150
Fuel system	Carburettor	M5	30 - 40	3 - 4	25 - 35
	Intake bellows	M5	75 - 95	7.5 - 9.5	65 - 85
Clutch	Clutch hub	LM10	300 - 400	30 - 40	265 - 350
Cylinder cover	Fan cover side	M6	15 - 25	1.5 - 2.5	13 - 22
	Recoil side	M5	15 - 30	1.5 - 3	13 - 25
Engine	Crankcase	M5†	60 - 90	6 - 9	50 - 80
	Cylinder	M5†	60 - 100	6 - 10	50 - 90
	Cylinder cover	M5	60 - 90	6 - 9	50 - 80
	Muffler	M5*	70 - 110	7 - 11	60 - 95
	Muffler plate	M4	15 - 25	1.5 - 2.5	13 - 22
	Exhaust gasket	M5	70 - 110	7 - 11	60 - 95
Other	Auto-oiler	M4	30 - 50	3 - 5	25 - 45
	Compression spring				
	Engine	M5	30 - 45	3 - 4.5	25 - 40
	Crankcase	M5	60 - 80	6 - 8	50 - 70
	Front handle	M5	60 - 90	6 - 9	50 - 80
	Front handle	M6	40 - 55	4 - 5.5	35 - 48
		M5	40 - 60	4 - 6	35 - 50
	Rear handle	M5	40 - 60	4 - 6	35 - 50
	Brake lever	M5	60 - 90	6 - 9	50 - 80
	Brake cover	M5*	40 - 60	4 - 6	35 - 50
	Sprocket guard plate	M4*	15 - 25	1.5 - 2.5	13 - 22
	Spring holder	M5	30 - 45	3 - 4.5	25 - 40
	Spike	M5	60 - 90	6 - 9	50 - 80
	Ignition switch	M10	15 - 30	1.5 - 3	13 - 25
	Guide bar	M5	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)

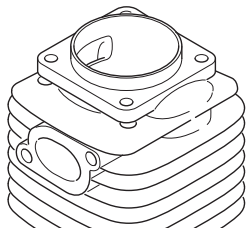
† The torque difference between four bolts should not exceed 20 kgf• cm (2N• m, 17in•lbf) per bolt.

1-4 Special repairing materials

Material	Location	Remarks
Adhesive	Guide bar stud	Loctite #609, ThreeBond #1373 or equivalent
	Starter case Brake lever side	
	Starter center shaft screw	Loctite #222, ThreeBond #1342 or equivalent
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 center shaft	
	Brake cover	
	Chain brake (metal contact part)	Molybdenum grease (approx. 1 gram)
Thread locking sealant	Muffler	Loctite #242, ThreeBond #1324 or equivalent
	Sprocket guard plate	
	Starter pawl	

1-5 Service Limits

A



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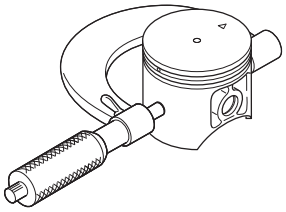

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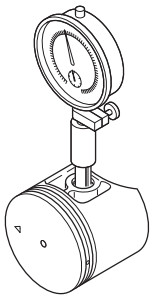

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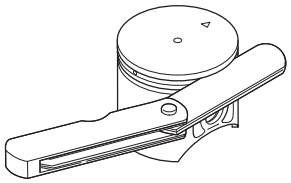

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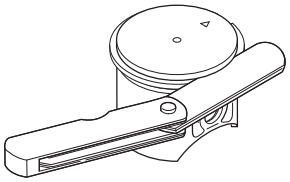

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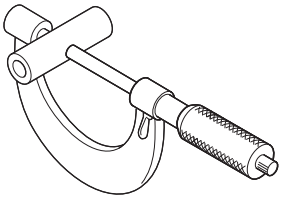

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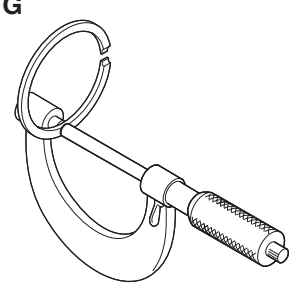

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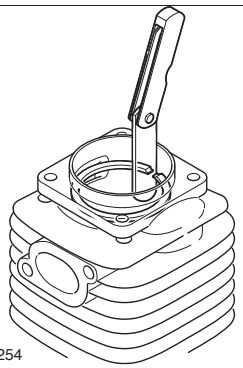

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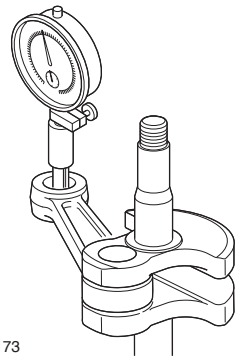

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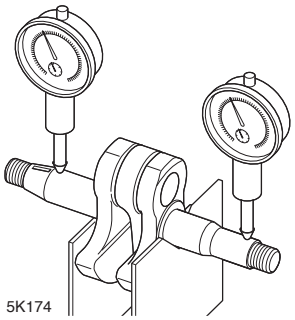

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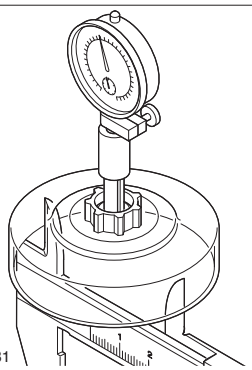

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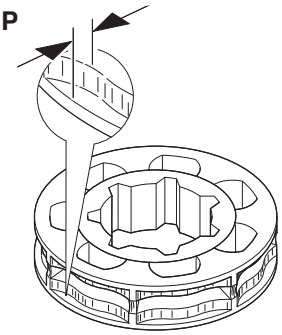

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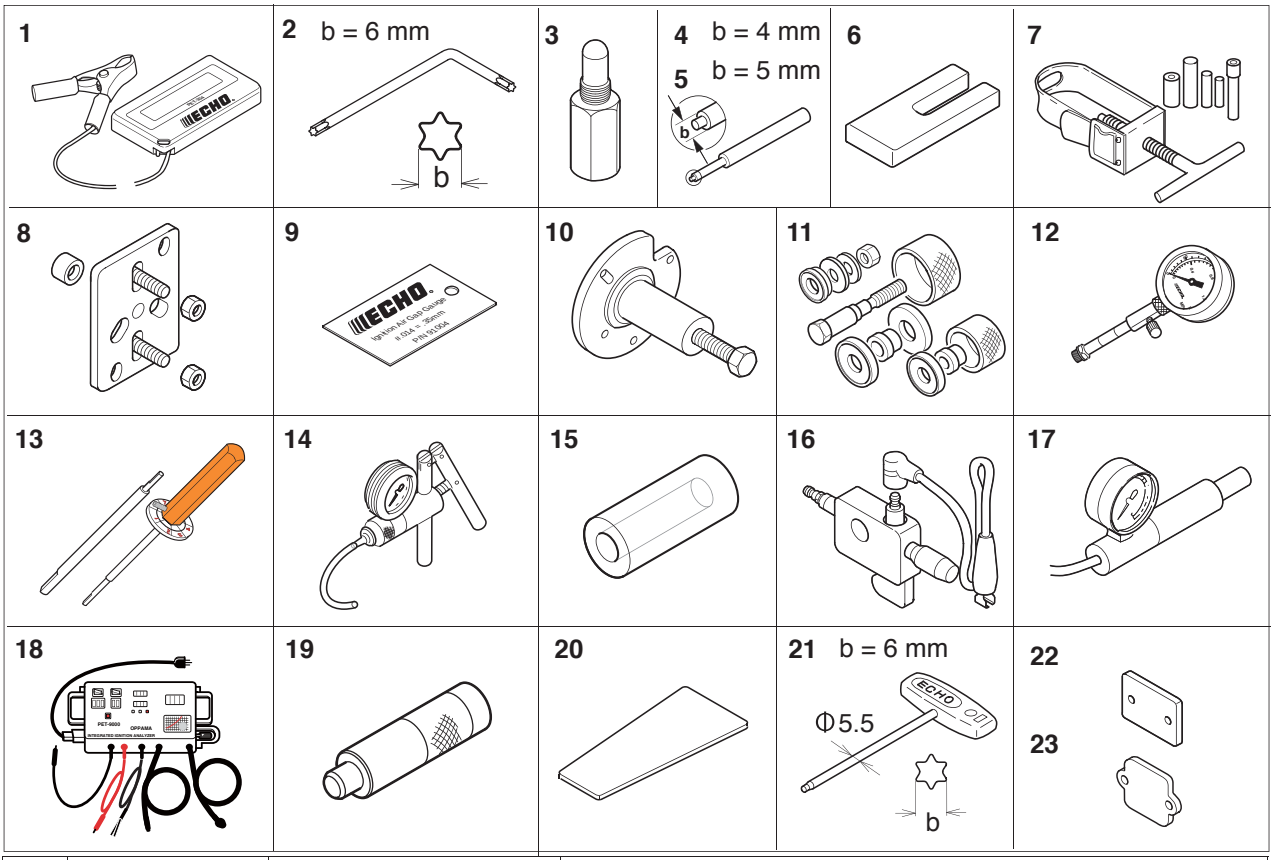
Description			mm (in)
A	Cylinder bore		When plating is worn and aluminum can be seen
B	Piston outer diameter	Min.	44. 89 (1.767)
C	Piston pin bore	Max.	11. 035 (0.4344)
D	Piston ring groove	Max.	1. 35 (0.053)
E	Piston ring side clearance	Max.	0. 1 (0.004)
F	Piston pin outer diameter	Min.	10. 98 (0.4323)
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.	15. 025 (0.5915)
L	Crankshaft runout	Max.	0. 01 (0.001)
M	Sprocket bore	Max.	13. 90 (0.5472)
N	Clutch drum bore	Max.	71. 5 (2.81)
P	Sprocket wear limit	Max.	0. 5 (0.02)

1-6 Special tools



Key	Part Number	Description	Used for:
1	G310-000050	Tachometer PET-304	Measuring engine speed to adjust carburettor
2	X605-000050	Torx L wrench (T27)	Removing and installing bolt
3	897537-30130	Piston stopper	Locking crankshaft rotation
4	897724-01361	Spring pin tool (4 mm)	Removing and installing spring pin (4 mm dia)
5	897724-02831	Spring pin tool (5 mm)	Removing and installing spring pin (5 mm dia)
6	897719-02830	Piston holder	Making piston steady to remove and install piston / rings
7	897702-30131	Piston pin tool	Removing and installing piston pin
8	897501-03938	Puller	Removing magneto rotor
9	91004	Module air gap gauge	Adjusting pole shoe air gaps
10	897502-19830	Crankcase tool	Separating crankcase
11	897701-14732	Bearing tool	Removing and installing ball bearings on crankcase
12	91037	Compression gauge	Measuring cylinder compression
13	Y089-000090	D-shaped tool	Adjusting mixture needle
14	91024	Pressure tester	Testing crankcase leakages
15	897726-16431	Oil seal tool	Installing starter side oil seal
16	897800-79931	Spark tester PET-4000	Checking ignition system
17	897803-30133	Pressure tester	Testing carburettor leakages
18	900300	Ignition Analyzer : PET-9000	Measuring Ignition timing, Primary/Secondary voltage engine speed
19	897714-12330	Oil seal tool	Installing crankcase side oil seal
20	91041	Pressure rubber plug	Plugging exhaust port to test crankcase / cylinder leakages
21	895624-32731	Torx T wrench (T27)	Removing and installing bolt
22	897826-16131	Pressure rubber plug	Plugging intake port to test crankcase / cylinder leakages
23	897827-16131	Pressure plate	Plugging intake port to test crankcase / cylinder leakages

2 CARBURETTOR ADJUSTMENT PROCEDURE

2-1 General adjusting rules

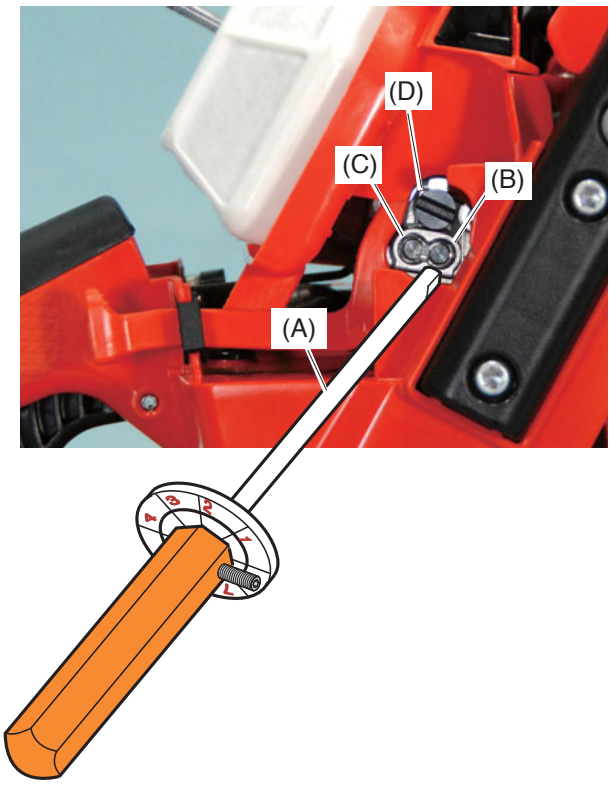
A. Before adjustment, check the following items.

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 38, 40, 45 or 50 cm bar and chain should be installed on the unit. Otherwise serious engine damage will occur due to overspeeding.

B. Preliminary adjustment. Adjustment by Idle adjust screw of carburettor.
Start and run engine for two minutes alternating engine speed between WOT for 10 seconds and idle for 10 seconds. Adjust idle speed screw to 2,800 +/- 150 r/min. Make sure WOT engine speed in range 12,500 - 13,500 r/min. If engine does not run correctly after this adjustment, proceed to the next step 2-2.

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



Tools Required : Small screwdriver with 2.5 mm blade, P/N G310-000050 electronic tachometer, P/N Y089-000090 D-shaped tool (A).

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

L mixture needle (B) : 1 3/8

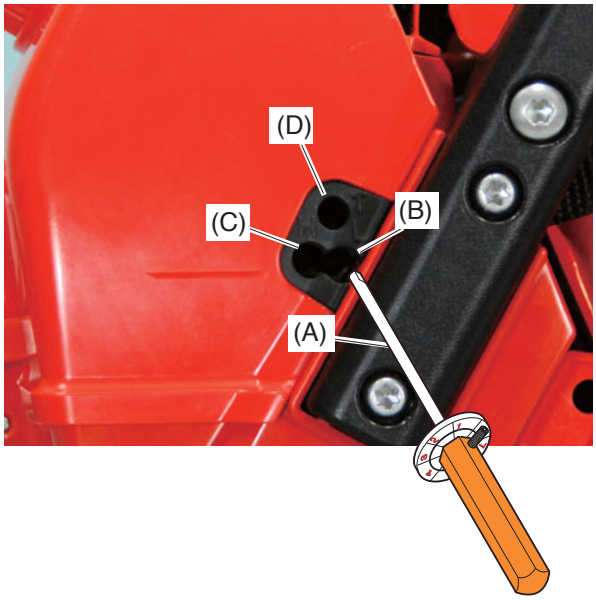
H mixture needle (C) : 3 3/8

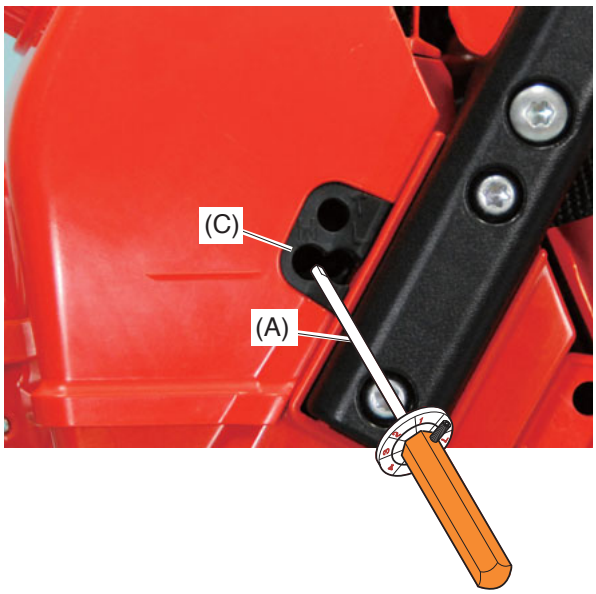
NOTE : If needles are overtighted during seating, damage to carburettor may occur.

2. Turn Idle adjust screw (D) anticlockwise until idle adjust screw tip just touches throttle plate. Then turn it clockwise 1 3/8 turns.

NOTE : The initial carburettor settings for idle adjust screw, L and H mixture needles are intended to start and run the engine before making final carburettor adjustments to meet Emission Directive. Actual turns required 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 (C) anticlockwise until engine speed drops to approx. 12,000 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 (B) using D-shaped tool (A) to reach maximum engine speed just before lean r/min drop off.

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

4. Turn L mixture needle (B) anticlockwise reducing engine idle speed 800 r/min to set idle speed at 2,800 r/min. The idle speed range is 2,700 - 2,900 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. After adjustment L mixture needle, WOT engine speed should be 12,000 r/min or less before adjustment H mixture needle. If engine speed is higher, turn H mixture needle (C) anticlockwise until 12,000 r/min is achieved. **Stabilize engine for 45 seconds alternating engine speed between WOT for 10 seconds and idle for 5 seconds.** To make the final WOT engine speed adjustment, turn the H mixture needle (C) clockwise in 1/8 turn increments with the engine at idle. After each adjustment, accelerate to WOT, and check engine speed. The final engine speed should fall within 12,800 - 13,000 r/min at WOT.

6. Start engine, and verify engine idle speed ranges from 2,600 to 3,000 r/min, and WOT engine speed ranges from 12,500 to 13,500 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.

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, Idle engine speed ranges listed in Section 1-2, otherwise the carburettor should be readjusted.