



# **SERVICE DATA**

## **POWER PRUNER**

**ECHO: PPF-300ES**

**ECHO: PPT-300ES**

### **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.

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Reference No. **17-28A-00**

**ISSUED : 201209**



## 1 SERVICE INFORMATION

## 1-1 Specifications

Model			PPF-300ES	PPT-300ES
Dimentions	Length	mm (in)	2768 (109.0)	4035 (158.9)
	Width	mm (in)	246 (9.7)	
	Heigh	mm (in)	259 (10.2)	
Dry weight*		kg (lb)	6.3 (13.8)	8.1 (17.9)
Engine	Type		YAMABIKO, air-cooled, two-stroke, single cylinder	
	Rotation		Anticlockwise as viewed from the output end	
	Displacement	cm <sup>3</sup> (in <sup>3</sup> )	28.1 (1.71)	
	Bore	mm (in)	34.0 (1.34)	
	Stroke	mm (in)	31.0 (1.22)	
	Compression ratio		5.8	
Carburettor	Type		Rotary type : Diaphragm, horizontal-draught, with primer	
	Model		WALBRO WYK-233A	
Ignition	Type		CDI (Capacitor discharge ignition) system Digital magneto	
	Spark plug		BPMR8Y	
Exhaust	Muffler type		Spark arrester muffler with catalyst	
Starter	Type		ES (effortless-start)	
	Rope diameter x length	mm (in)	2.8 x 850 (0.11 x 33.5)	
Fuel**	Type		Premixed two-stroke fuel	
	Mixture ratio		50 : 1 (2%)	
	Petrol		Minimum 89 octane	
	Two-stroke engine oil		ISO-L-EGD (ISO/CD13738), JASO FC/FD	
	Tank capacity	L (U.S.fl.oz.)	0.62 (21.0)	
Clutch	Type		Centrifugal, 2-shoe pivot	

OD: Outer diameter. ID: Inner diameter. \* Without cutting attachment \*\* Refer to Operator's manual.

Drive shaft and Housing			PPF-300ES
Drive shaft	Type		Flexible
	Inner shaft: Diameter - Length	mm(in)	6.35 - 2161 (0.25 - 85.1)
Housing (Operation Rod)	OD -ID	mm(in)	25.4 - 23.6 (1.00 - 0.93)
	Length	mm(in)	2138 (84.2)
Drive shaft and Housing			PPT-300ES
Drive shaft	Type		Aluminum extrusion
	Upper	OD -ID mm(in)	9.9 - 15.0 (0.39 - 0.59)
		Length mm(in)	1521 (59.9)
	Lower	Length mm(in)	1702 (67.0)
Housing	Type	Upper / Lower	Aluminum / Fiberglass
	Upper	OD -ID mm(in)	34.7 - 32.3 (1.37 - 1.27)
		Length mm(in)	1676 (66.0)
	Lower	OD -ID mm(in)	44.5 - 39.0 (1.75 - 1.54)
		Length mm(in)	1416 (55.7)
Front handle fixed pipe	Type		Aluminum
	Upper	OD -ID mm(in)	24.9 - 22.0 (0.98 - 0.87)
		Length mm(in)	454 (17.9)
	Drive shaft		Flexible
	Inner shaft: Diameter - Length	mm(in)	8.2 - 503 (0.32 - 19.8)

**1-1 Specifications (continued)**

Gear case	Reduction ratio	1.53
	Gear tooth	Bevel gear
	Lubrication	Lithium based grease or ECHO XTended Protection™ Lubricant
Guide bar /	Saw chain lubrication type	Automatic
	Tank capacity, oil L (U.S.fl.oz.)	0.22 (7.4)
Sprocket	Type	Spur
	Number of teeth	6
	Pitch in	3/8
Guide bar	Type	Sprocket nose
	Called length cm(in)	30.5 (12)
	Gauge in	0.050
Saw chain	Number of drive links	44
	Pitch in	3/8
	Gauge in	0.050

**1-2 Technical data**

Model			PPF-300ES	PPT-300ES
Engine				
Idling speed	r/min		2,700 - 200 + 300	
Wide open throttle speed	r/min		10,400 - 11,400	
Clutch engagement speed	r/min		3,800	
Engagement Minimum†	r/min		3,300	
Compression pressure	MPa (kgf/cm²) (psi)		0.79 (8.1) (115)	
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		320 - 420	
Secondary coil resistance	kΩ		2.7 - 3.3	
Pole shoe air gaps	mm(in)		0.30 - 0.40 (0.012 - 0.016)	
Ignition timing	at 3,000 r/min	°BTDC	11	
	at 8,000 r/min	°BTDC	34	
	at 10,000 r/min	°BTDC	22	
	at 12,000 r/min	°BTDC	Revolution limiter	
PET-9000 Parameter	Parameter 1		64	
	Parameter 2		02	
Carburettor				
Venturi Size			12.2 (0.48)	
Throttle Bore			12.2 (0.48)	
Idle adjust screw initial setting	turns out		9 5/8	
Idle mixture needle initial setting	turns in*		13 1/4	
Hi speed mixture needle initial setting	turns out		3 1/8	
Test Pressure, minimum	MPa (kgf/cm²) (psi)		0.05 (0.5) (7.0)	
Metering lever height	mm(in)		1.5 (0.06) lower than diaphragm seat	

BTDC: Before top dead centre.

\* Screw in idle mixture needle from initial thread engagement (at the point that the clicking sound is heard).

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

## 1-3 Torque limits

Descriptions		Size	kgf·cm	N·m	in·lbf
Starter system	Starter pawl assembly	M 8	160 - 200	16 - 20	140 - 175
	Starter case	M 4*	40 - 60	4 - 6	35 - 53
Ignition system	Flywheel	M 8	160 - 200	16 - 20	140 - 175
	Ignition coil	M 4*	40 - 60	4 - 6	35 - 53
	Fan cover	M 5*	50 - 70	5 - 7	44 - 61
	Spark plug	M 14	130 - 170	13 - 17	112 - 150
Fuel system	Carburettor	M 5	30 - 45	3 - 4.5	26 - 39
	Intake insulator	M 5	50 - 70	5 - 7	44 - 61
	Fuel tank with stand	M 5*	40 - 60	4 - 6	32 - 53
Clutch	Clutch shoe	M 6	70 - 110	7 - 11	61 - 95
Cylinder cover	Flanged bolt	M 5	30 - 45	3 - 4.5	26 - 39
	Button bolt	M 5	30 - 45	3 - 4.5	26 - 39
Engine	Crankcase	M 5	70 - 110	7 - 11	60 - 95
	Cylinder	M 5	70 - 110	7 - 11	60 - 95
	Muffler	M 5*	60 - 80	6 - 8	53 - 70
	Exhaust guide	M 4	14 - 28	1.4 - 2.8	12 - 24
	Muffler cover	M 5*	30 - 45	3 - 4.5	26 - 39
	Top guard	M 5*	30 - 45	3 - 4.5	26 - 39
Other	Cutter fastener	LM 10	280 - 320	28 - 32	245 - 280
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

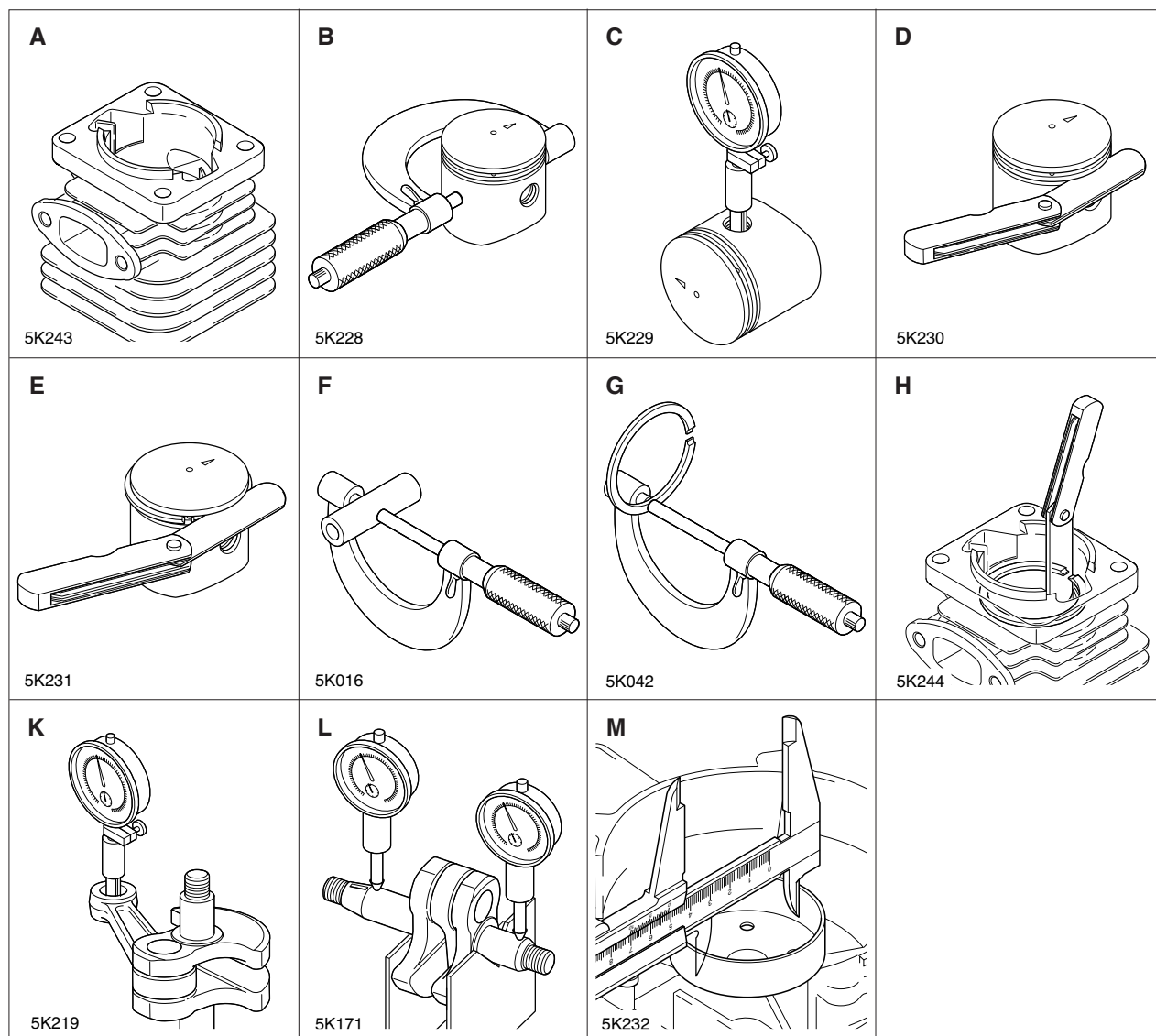
LM: Left-hand thread. \* Apply thread locking sealant. (See below)

\*\* The torque differences among four bolts should not exceed 20 kgf·cm (2N·m, 17in·lbf) on one cylinder or crankcase

## 1-4 Special repairing materials

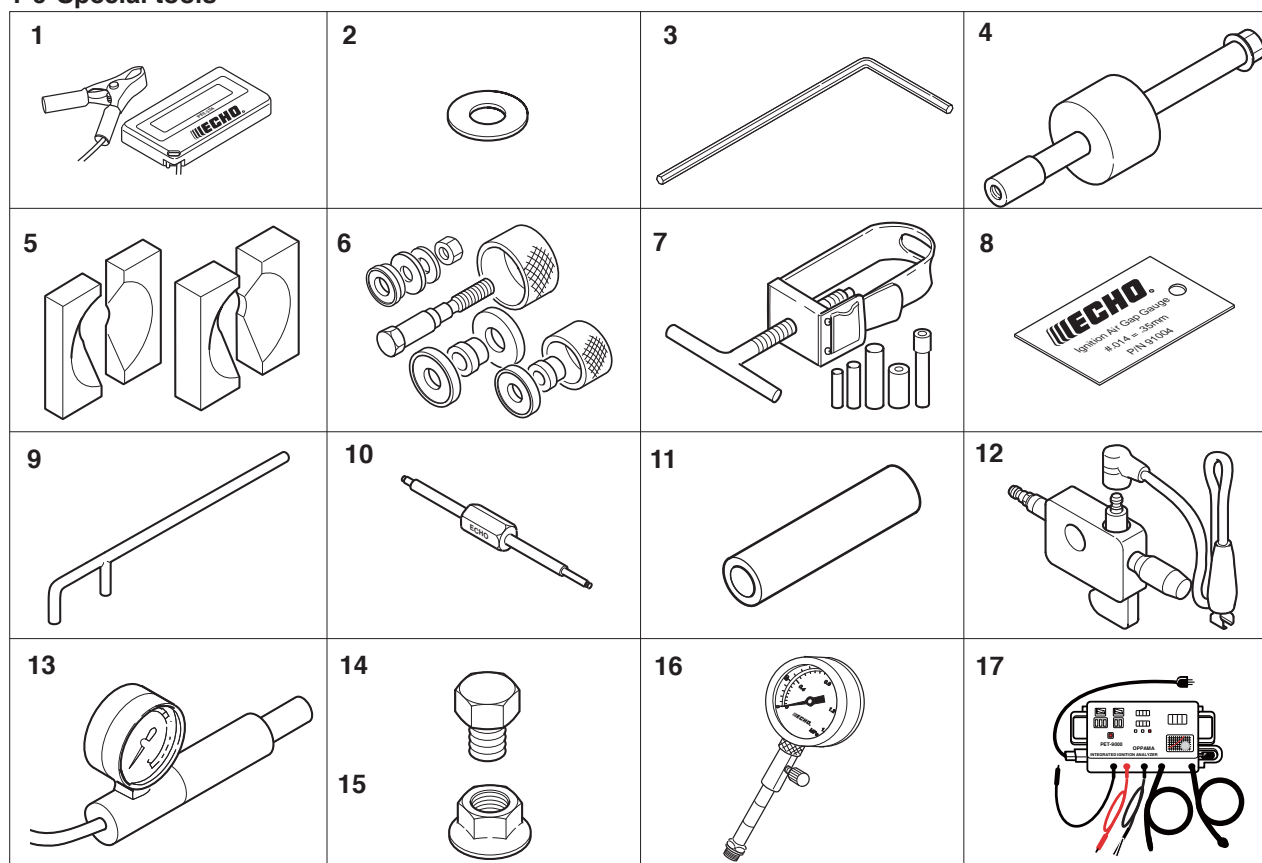
Material	Location	Remarks
Grease	Drive shaft	Lithium based grease or ECHO XTended Protection™ Lubricant
	Gear case	
	Rewind spring	
	Starter center post	
	Oil seal inner lips	
Thread locking sealant	Starter case	Loctite #675 or equivalent
	Fuel tank	
	Ignition coil	Loctite #222, Three Bond #1342 or equivalent
	Fan cover	
	Top guard	
	Stand	
	Muffler cover	Loctite #242, ThreeBond #1324 or equivalent
	Muffler	

## 1-5 Service limits



Description			mm (in)
A	Cylinder bore		When plating is worn and aluminum can be seen
B	Piston outer diameter	Min.	33.90 (1.335)
C	Piston pin bore	Max.	9.035 (0.3557)
D	Piston ring groove	Max.	1.65 (0.065)
E	Piston ring side clearance	Max.	0.1 (0.004)
F	Piston pin outer diameter	Min.	9.98 (0.3929)
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.	12.025 (0.4734)
L	Crankshaft runout	Max.	0.02 (0.001)
M	Clutch drum bore	Max.	65.5 (2.58)

## 1-6 Special tools



Key	Part Number	Description	Used for:
1	G310-000050	Tachometer PET-304	Measuring engine speed
2	363018-00310	Washer	Installing crankcase oil seal
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	91004	Module air gap gauge	Adjusting pole shoe air gaps
9	897712-04630	2-pin wrench	Removing and installing pawl carrier
10	91020	Limiter plug tool	Removing and installing plug
11	897726-09130	Oil seal tool	Installing crankcase oil seals
12	990511-30023	Spark tester	Checking ignition system
13	897803-30133	Pressure tester	Checking carburettor and crankcase leakages
14	900100-08008	Bolt	Removing magneto rotor (flywheel), crankshaft from crankcase
15	433019-12330	Flange nut	Removing magneto rotor (flywheel)
16	91037	Compression gauge	Measuring cylinder compression
17	900300	Ignition Analyzer : PET-9000	Measuring Ignition timing, Primary/Secondary voltage, engine speed

## 2 CARBURETTOR ADJUSTMENT PROCEDURE

### 2-1 General adjusting rules

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

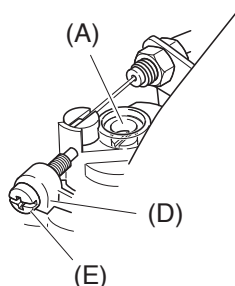
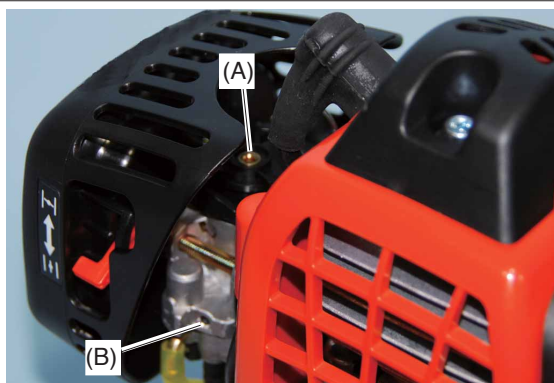
1. The correct spark plug must be clean and properly gapped.
2. The air filter element must be clean and properly installed.
3. The muffler exhaust port must be clear of carbon.
4. The fuel lines, tank vent and fuel filter are in good condition and clear of debris.
5. The fuel is fresh ( > 89 octane : RON ) and properly mixed at 50 : 1 with "ISO L-EGD" or "JASO FC/FD" 2-stroke oil.
6. The gear case assembly with 12" guide bar and saw chain must be installed for proper engine loading.

B. Adjustment with limiter plugs on carburettor.

Start and run engine for 2 minutes alternating engine speed between WOT and idle every 5 seconds. Adjust idle speed screw to 2,700 +/- 200 r/min by tuning Idle adjust screw. 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 Presetting Idle adjust screw, Idle mixture needle and Hi speed mixture needle



Tools Required : Small screwdriver with 2.5 mm blade, P/N G310-000050 electronic tachometer, P/N 91020 limiter cap tool with 2.5 mm left-hand thread.

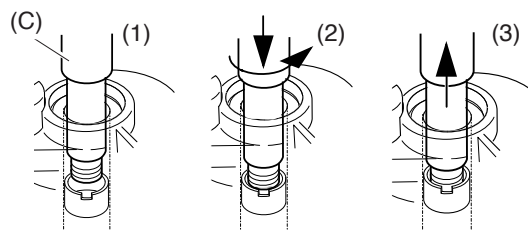
Parts Required: (2) limiter plug P/N A259-000000

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) Push and turn limiter plug tool anticlockwise 2 turns into limiter plug slowly 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 cap pieces out of the hole.

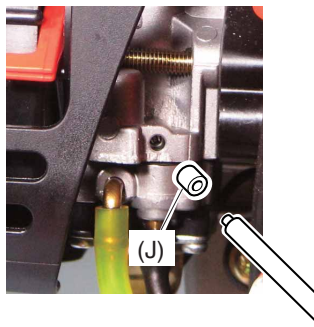
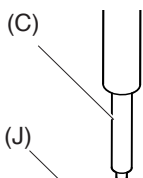
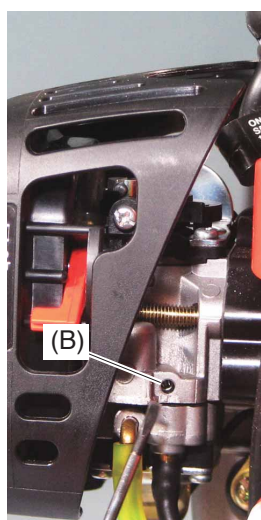
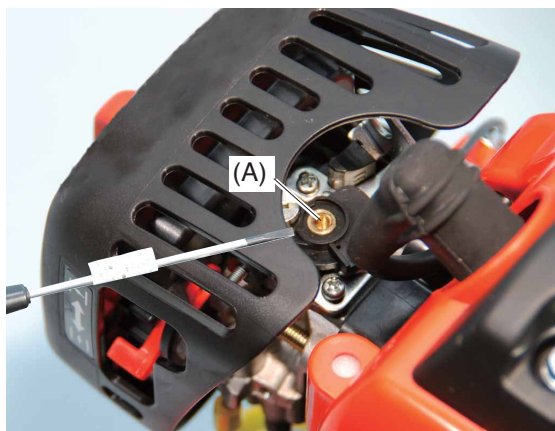
2. Turn Idle mixture needle (A) anticlockwise to fully come out until clicking sound is heard. Then turn it clockwise 13 1/4 turns. Turn Hi speed mixture needle (B) clockwise until lightly seated. Then turn it anticlockwise 3 1/8 turns.

3. Turn Idle adjust screw (E) clockwise until its head touches boss (D). Then turn Idle adjust screw (E) anticlockwise 9 5/8 turns.

**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 to conform the unit 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 between WOT and idle every 5 seconds.

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

3. Set idle speed to 3,500 r/min by turning idle adjust screw. Engine speed should be stable at 3,500 +/- 50 r/min.

4. Turn Idle mixture needle anticlockwise to reduce engine idle speed 800 r/min to set idle speed at 2,700 r/min. The idle speed range is 2,600 - 2,800 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 (B) to reach maximum WOT engine speed. Then turn Hi speed mixture needle anticlockwise to reduce WOT engine speed 20-40 r/min with guide bar (F).

6. Stop engine, restart engine again and verify engine idle speed ranges from 2,500 to 3,000 r/min, and WOT engine speed ranges from 10,400 to 11,400 r/min.

Make sure the blade does not rotate when engine is idle, and engine should accelerate smoothly.

7. After adjusting carburettor, insert and secure new plug(s) (J) A259-000000 deep in the needle holes per the Emission Directive using limiter plug tool (C).

**NOTE :** Engine WOT, and idle speed in field operation may vary from final adjustment specifications due to changing ambient conditions, fuel, and engine loads. Engine speed variances should be within the safe ranges for WOT and Idling speed as listed in Section 1-2 Technical data, otherwise the carburettor should be readjusted.