



SERVICE DATA

CHAIN SAW

ECHO: CS-501SX CS-501SXH

shindaiwa: 501sx

(Serial number : 37000001 and after)
(Serial number : 38000001 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.

SERVICE MANUAL Ref. No. 401-42 (Models: CS-501SX, CS-501SXH and 501sx) contains lots of information for servicing these models.

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Reference No. **01-50E-02**

REVISED : 201903

ISSUED: 201509



1 SERVICE INFORMATION

1-1 Specifications

Models			CS-501SX, 501sx	CS-501SXH
Dimensions	Length*	mm(in)	395 (15.6)	
	Width	mm(in)	235 (9.3)	
	Height	mm(in)	290 (11.4)	
Dry weight*		kg(lb)	4.7 (0.2)	4.9 (10.8)
Engine	Type		YAMABIKO, air-cooled, two-stroke, single cylinder	
	Rotation		Clockwise as viewed from the output end	
	Displacement	cm ³ (in ³)	50.2 (3.063)	
	Bore	mm(in)	44.0 (1.732)	
	Stroke	mm(in)	33.0 (1.299)	
	Compression ratio		7.2	
Carburetor	Type		Diaphragm horizontal-draft	
	Model		Walbro WT-1139	
	Venturi size-Throttle bore	mm(in)	13.5 - 15.85 (0.531 - 0.624)	
Ignition	Type		CDI (Capacitor discharge ignition) system	
	Spark plug		NGK BPMR8Y	
Exhaust	Muffler type		Spark arrester muffler	
Starter	Type		Automatic Rewind	
	Rope diameter x length	mm(in)	3.8 x 910 (0.15 x 35.8)	
Fuel	Type**		Mixed two-stroke fuel	
	Mixture ratio		50 : 1 (2 %)	
	Gasoline		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.)	0.5 (16.9)	
Clutch	Type		Centrifugal type	
Guide bar / Saw chain lubrication type			Automatic with volume adjuster	
Oil	Tank capacity	L (U.S.fl.oz.)	0.28 (9.5)	
Auto oiler	Type		Clutch driven type	
Sprocket	Type		Floating rim	
	Number of teeth		7	
	Pitch	in	0.325	
Heated handle			---	Equipped

* Without guide bar and saw chain.

** Premixed alkylate fuel for 2-stroke can be used.

Cutting devices					
Guide bar	Type		V40R21-68AA	V45R21-72AA	V50R21-80AA
	Called length	cm	40	45	50
	Gauge	in	0.058		
Saw chain	Type		Oregon 21BPX, Carlton K2L		
	Number of drive links		68	72	80
	Pitch	in	0.325		
	Gauge	in	0.058		

1-2 Technical data

Models	CS-501SX, 501sx	CS-501SXH
Engine		
Compression pressure	MPa (kgf/cm ²) (psi) 0.95 (9.7) (138)	
Clutch engagement speed	r/min 3,900	
Ignition system		
Spark plug gap	mm(in) 0.6 - 0.7 (0.024 - 0.028)	
Spark test	Tester gap w/ spark plug	mm(in) 4.0 (0.16)
	Tester gap w/o spark plug	mm(in) 6.0 (0.24)
Secondary coil resistance	kΩ 2.5 - 2.9	
Pole shoe air gaps	mm(in) 0.3 - 0.4 (0.012 - 0.016)	
Ignition timing	at 3,000 r/min	°BTDC 20
	at 8,000 r/min	°BTDC 32
	at 10,000 r/min	°BTDC 34
Carburetor		
Test Pressure, minimum	MPa (kgf/cm ²) (psi) 0.05 (0.5) (7.0)	
Metering lever height	mm(in) 1.65 (0.06) lower than diaphragm seat	
Tool to adjust mixture needles	D-shaped tool (L) P/N X645-000031 (Carb. adjustment tool P/N Y089-000094)	
Carburetor adjustment		
Before carburetor adjustment :		

Turn off heater switch.		
1) Initial setting	H mixture needle	turn out 3 5/8
	L mixture needle	turn out 1 3/4
	Throttle adjust screw	turn in*1 2 1/8
Engine warm-up	Idle - WOT : Total	sec. 5 - 5 : 100
2) Find idle maximum speed	Adjust L mixture needle to maximum idle speed*2	
3) Set idle maximum speed w/ TAS	r/min	3,500
4) Set idle speed by turning L mixture needle CCW	r/min	2,700
5) Confirm H mixture needle position before WOT setting	Turn H mixture needle CCW to confirm engine speed decreases less than or equal to 12,500 r/min.	
6) WOT setting	r/min	Turn H mixture needle CW in 1/8 turn increments with the engine at idle, then accelerate to WOT and check engine speed. The final engine speed should fall within: 13,000 - 13,800
7) Verify final engine speed with standard equipment	r/min	Idle: 2,300 - 3,100 WOT: 13,000 - 13,800
8) Verify clutch engagement speed	Confirm clutch engagement speed. If it is less than 1.25 times the idle speed, adjust the idle speed by turning TAS CCW.	
Chain oil discharge volume at 7,000 r/min	mL/min (US.fl.oz./min) Ajustable: 3.0 - 16.5 (0.12 - 0.65) (Factory set: 7 mL/min)	

BTDC: Before top dead center **WOT:** Wide open throttle **CCW:** Counterclockwise **TAS:** Throttle adjust screw

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

*2 If chain starts to rotate during adjustment process step 2), decrease engine speed by turning TAS CCW until chain stops and then redo step 2). Repeat this until chain no longer rotates after the adjustment step 2).

1-3 Torque limits

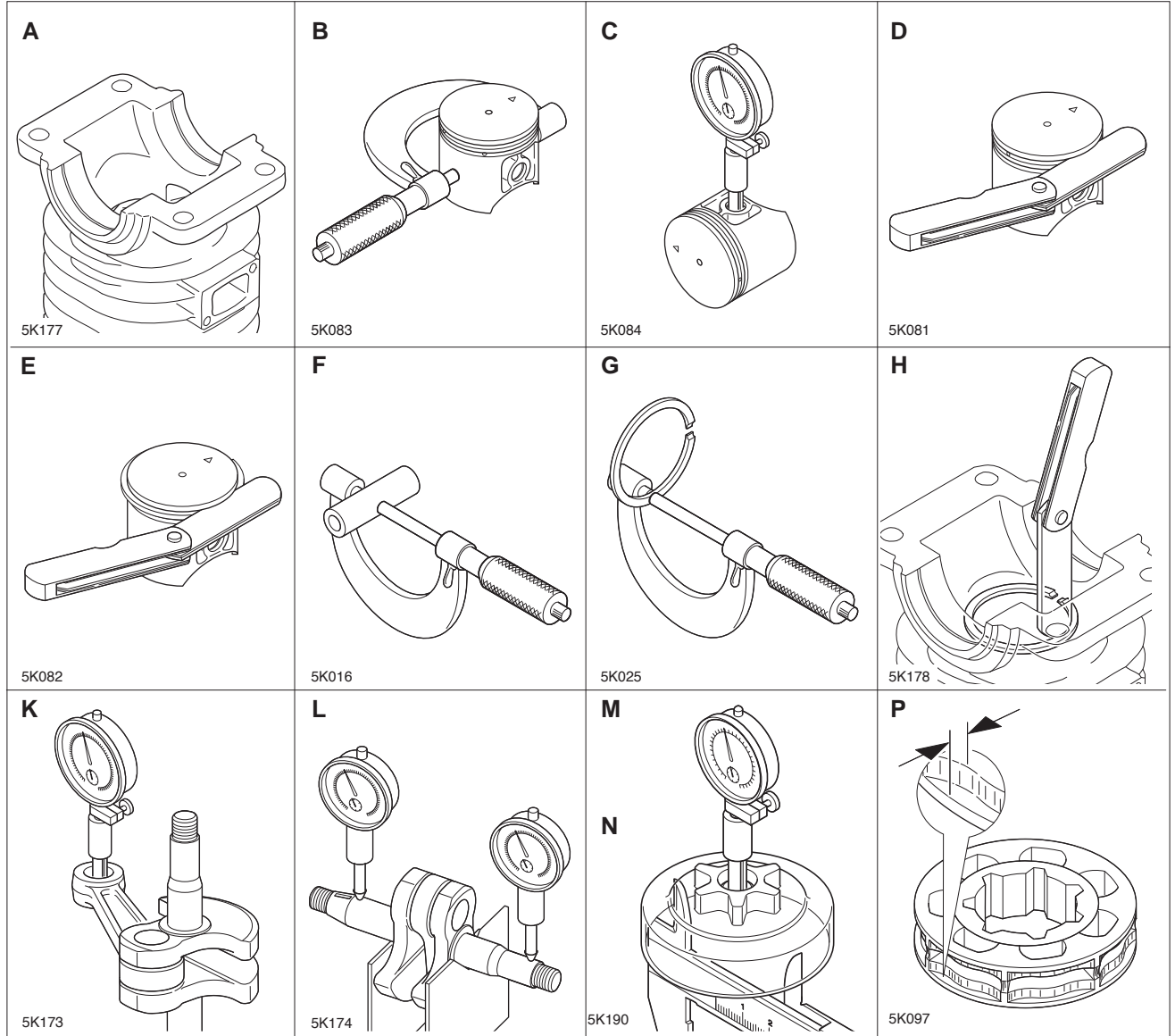
Descriptions		Size	kgf•cm	N•m	in•lbf	
Starter system	Starter pawl	M5	90 - 120	9 - 12	80 - 105	
	Starter case	M4	20 - 30	2 - 3	18 - 25	
Ignition system	Magneto rotor (Flywheel)	M8	150 - 170	15 - 17	130 - 150	
	Ignition coil	M4	30 45	3 4.5	25 40	
	Igniton switch	M10	20 - 30	2 - 3	18 - 25	
	Spark plug	M14	130 - 170	13 - 17	113 - 150	
Fuel system	Carburetor	M5	20 - 30	2 - 3	18 - 25	
	Carburetor elbow	M4	20 - 30	2 - 3	18 - 25	
Clutch	Clutch shoe	LM10	280 - 300	28 - 30	245 - 265	
	Clutch drum	M8	150 - 170	15 - 17	130 - 150	
Engine	Crankcase	M5	70 - 90	7 - 9	60 - 80	
	Muffler	M5	70 - 90	7 - 9	60 - 80	
	Cylinder	M5	70 - 90	7 - 9	60 - 80	
	Cylinder cover	M4	25 - 35	2.5 - 3.5	22 - 30	
Others	Auto-oiler	M4	20 - 35	2 - 3.5	18 - 30	
	Oiler cover	M4	30 - 45	3 - 4.5	25 - 40	
	Crankcase (at oil tank)	M5	50 - 70	5 - 7	45 - 60	
	Cushion (on Front handle)	M5	20 - 30	2 - 3	18 - 25	
	Front handle	M5	40 - 55	4 - 5.5	35 - 48	
		M4	30 - 45	3 - 4.5	25 - 40	
	Rear handle assembly	(M side)	M5	40 - 55	4 - 5.5	35 - 48
		(D side)	M5	40 - 55	4 - 5.5	35 - 48
	Handle grip	M4	20 - 30	2 - 3	18 - 25	
	Brake lever	(D side)	M5	40 - 60	4 - 6	35 - 40
		(M side)	M5	50 - 70	5 - 7	45 - 60
	Brake cover	M4	10 - 20	1 - 2	9 - 18	
	Washer (at brake band)	M4	15 - 25	1.5 - 2.5	13 - 22	
	Sprocket guard plate	M4	10 - 15	1 - 1.5	9 - 13	
	Guide bar nut	M8	200 - 230	20 - 23	175 - 200	
	Chain catcher	M5	50 - 70	5 - 7	45 - 60	
Spike	M5	50 - 70	5 - 7	45 - 60		
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		

LM: Left-hand thread

1-4 Special repairing materials

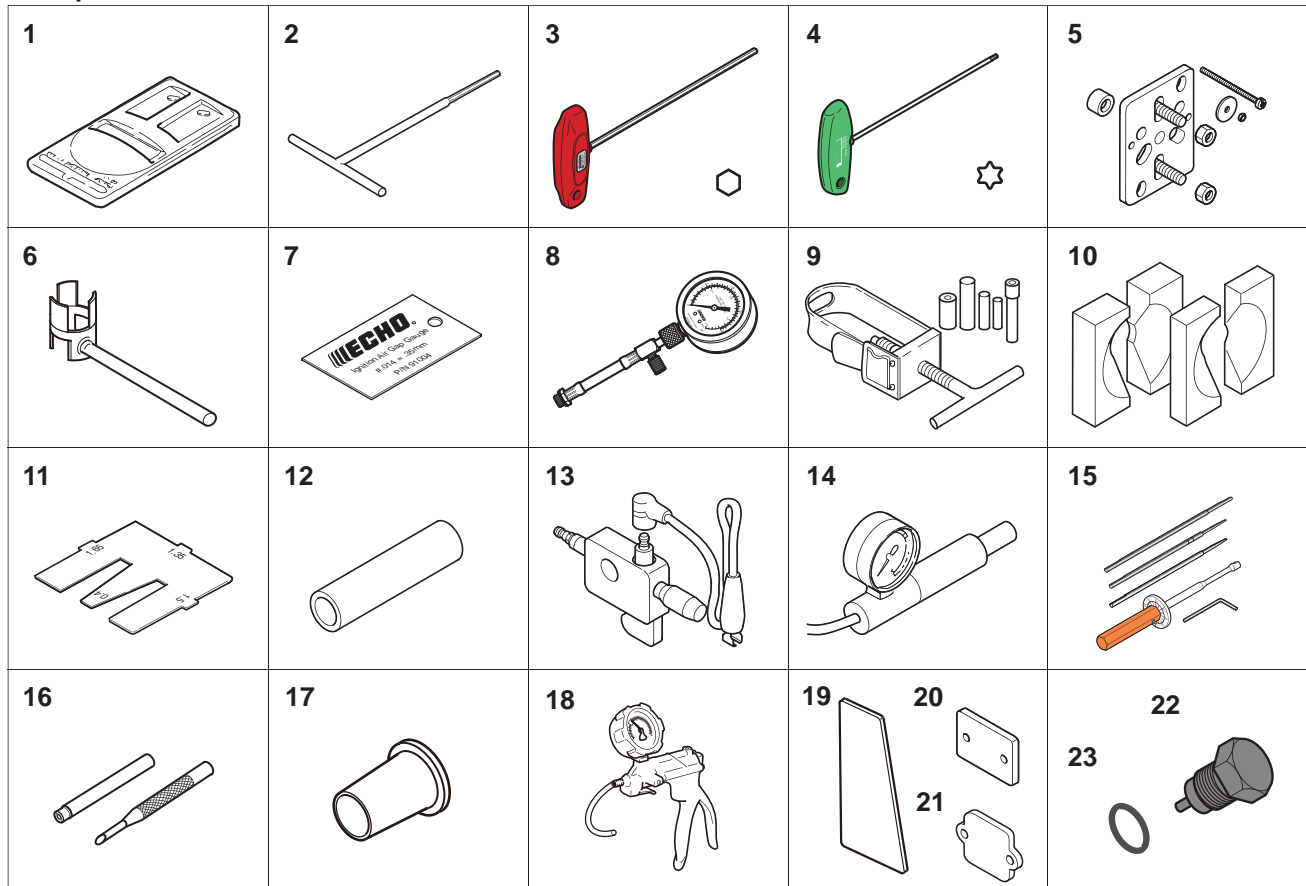
Material	Location	Remarks
Adhesive	Cushion	Loctite #406 (424) or equivalent
Grease	Auto-oiler worm	EPNOC AP2 (Lithium based grease) P/N X695-000060
	Clutch needle bearing	
	Choke knob	
	Oil seal inner lips	
	Chain brake (metal contact part)	
	Throttle rod	
	Bevel gear, Screw, Chain tensioner	

1-5 Service Limits



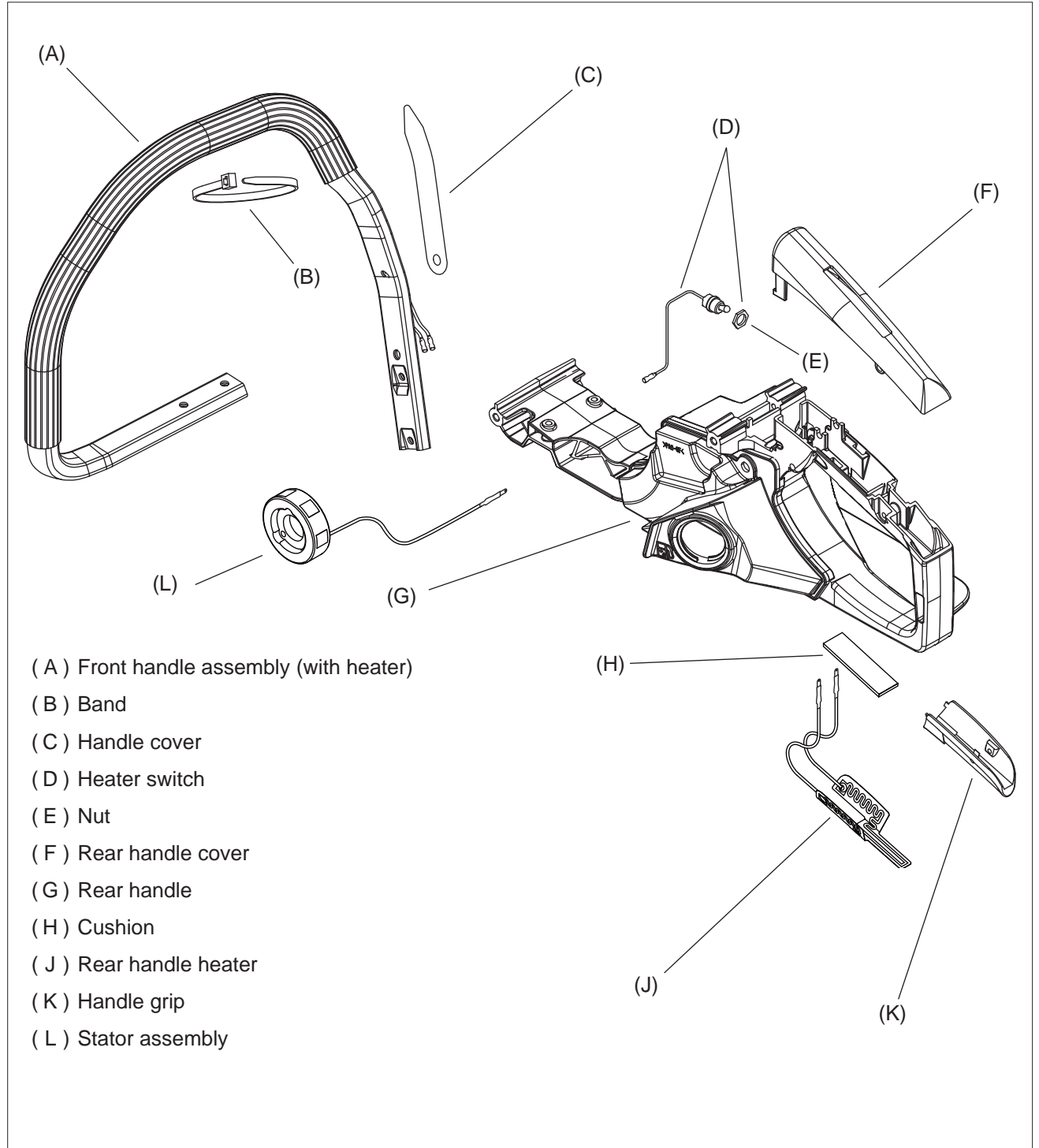
Description		mm (in)	
A	Cylinder bore	When plating is worn and aluminium can be seen	
B	Piston outer diameter	Min.	43.87 (1.727)
C	Piston pin bore	Max.	11.025 (0.4341)
D	Piston ring groove	Max.	1.6 (0.063)
E	Piston ring side clearance	Max.	0.1 (0.004)
F	Piston pin outer diameter	Min.	10.98 (0.4323)
G	Piston ring width	Min.	1.45 (0.057)
H	Piston ring end gap	Max.	0.8 (0.03)
K	Con-rod small end bore	Max.	15.025 (0.5915)
L	Crankshaft runout	Max.	0.02 (0.001)
M	Sprocket bore	Max.	12.75 (0.5020)
N	Clutch drum bore	Max.	73.5 (2.89)
P	Sprocket wear limit	Max.	0.5 (0.02)

1-6 Special tools

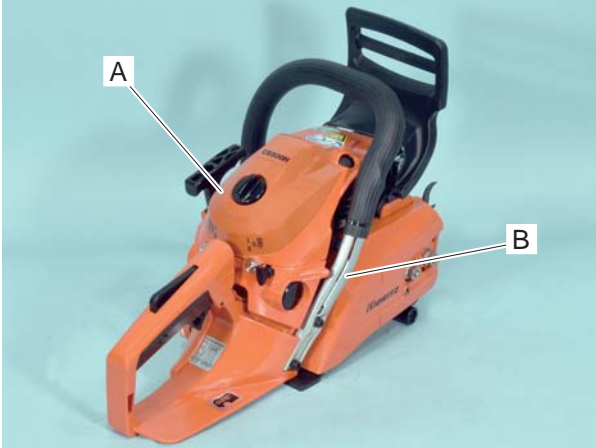


Key	Part Number	Description	Reference
1	897802-33330	Tachometer PET-1000R	Measuring engine speed to adjust Carburetor
2	897559-02831	T-hex. wrench (4 mm)	Removing and installing hex. socket bolt (M5)
3	X602-000230	T-hex. wrench (5 mm)	Removing and installing hex. socket bolt (M6)
4	X602-000340	Torx wrench (T27)	Removing and installing torx bolt
5	Y089-000111	Puller	Removing magneto rotor (flywheel) and crankcase
6	X640-000370	Clutch spanner	Removing and installing clutch assembly
7	91004	Module air gap gauge	Adjusting pole shoe air gaps
8	91037	Compression gauge	Measuring cylinder compression
9	897702-30131	Piston pin tool	Removing and installing piston pin
10	897701-02830	Bearing wedge	Removing ball bearings on crankshaft
11	897563-19830	Metering lever gauge	Measuring metering lever height on Carburetor
12	X646-000360	Oil seal tool	Installing oil seals and clutch plate
13	897800-79931	Spark tester	Checking ignition system
14	897803-30133	Pressure tester	Testing Carburetor and crankcase leakage
15	Y089-000094	Carburetor adjustment tool	Adjusting carburetor
16	500-500	Welch plug tool (Walbro)	Removing and installing welch plug
17	X646-000150	Collar oil seal tool	Set oil seal collect position
18	91149	Pressure / vacuum tester	Testing crankcase / cylinder leakages
19	91041	Pressure rubber plug	Plugging exhaust port to test crankcase/cylinder leakages
20	897826-16131	Pressure rubber plug	Plugging intake port to test crankcase/cylinder leakages
21	897827-16131	Pressure plate	Plugging intake port to test crankcase/cylinder leakages
22	101115-37531	Plug	Testing crankcase / cylinder leakages
23	900720-00009	O-ring	Testing crankcase / cylinder leakages

2 SERVICE HINT FOR HEATED HANDLE (CS-501SXH only)



2-1 Inspecting heated handle

**Inspecting stator assembly**

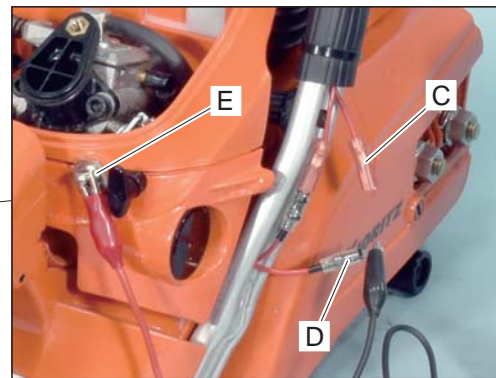
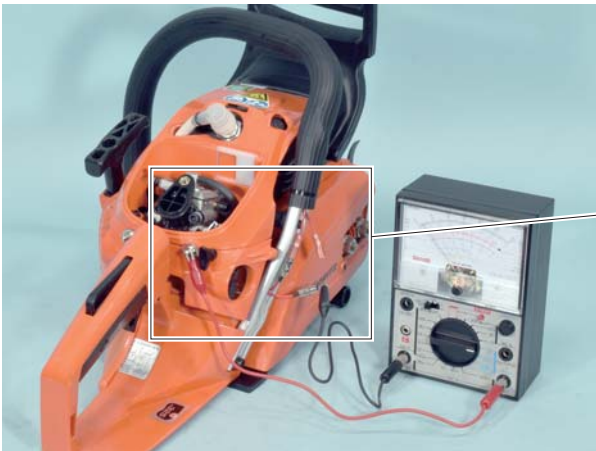
1. Remove air cleaner cover (A), air filter and handle cover (B).

2. Disconnect stator lead coupler (C).

NOTE: If it is not clear which is stator lead coupler (C), remove carburetor and carburetor elbow, and check where the lead is connected to.

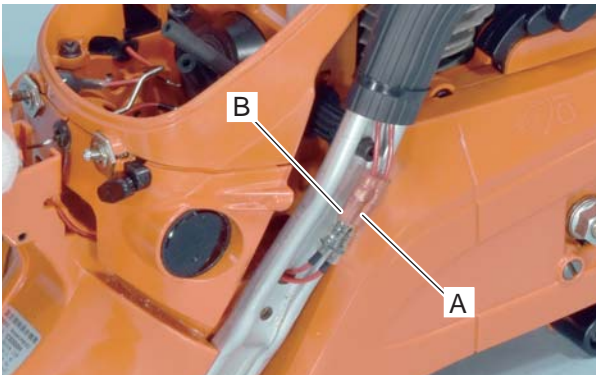
3. Connect one probe of ohm-meter or multi-meter to stator lead (D) as shown.

4. Connect the other probe to heater switch lever (E) or a clean ground as shown.



5. Tester should show that the circuit is in conducting state.

6. If stator assembly is defective, replace with a new one (Refer to 3-2 "Replacing stator assembly").

**Inspecting front handle heater**

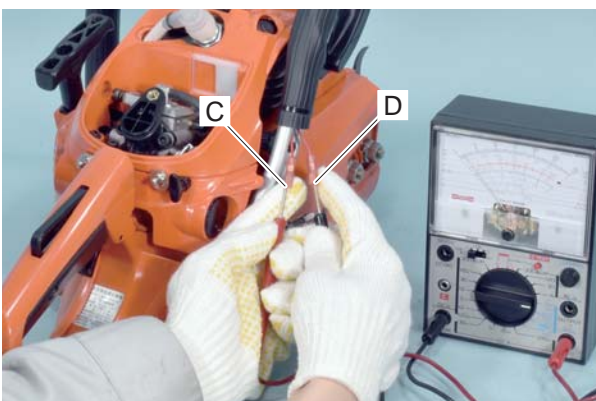
1. Disconnect stator lead coupler (A) and rear handle heater coupler (B).

2. Connect one probe of ohm-meter or multi-meter to one lead of front handle heater (C) as shown.

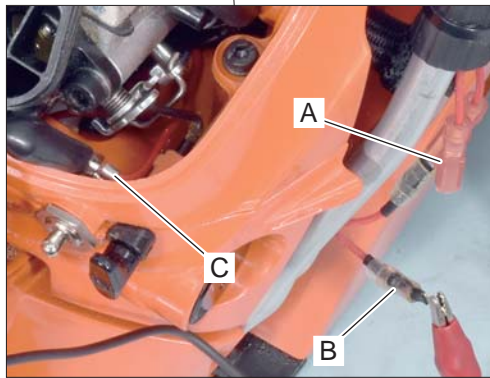
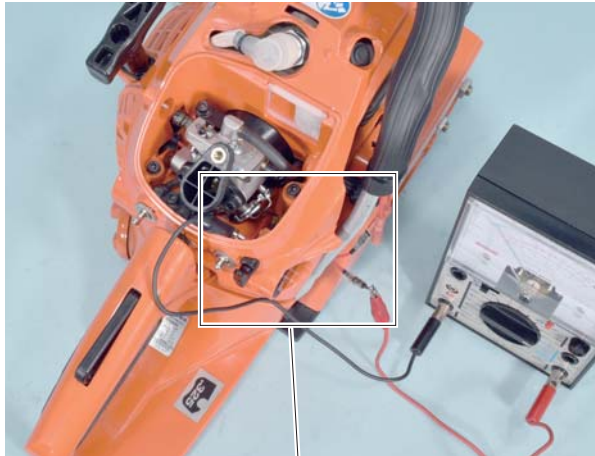
3. Connect the other probe to other lead of front handle heater (D) as shown.

4. Tester should show that the circuit is in conducting state.

5. If front handle heater is defective, replace with a new one.

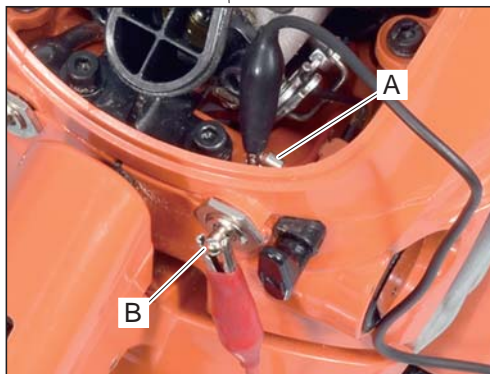
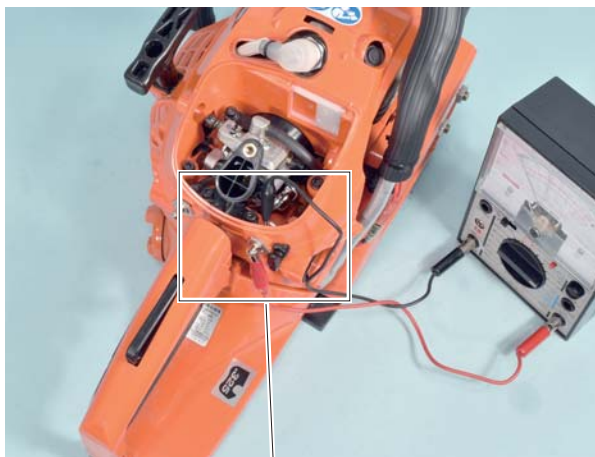


2-1 Inspecting heated handle (continued)



Inspecting rear handle heater

1. Disconnect rear handle heater lead coupler (A).
- NOTE:** If it is not clear which is rear handle heater lead coupler (A), remove carburetor and carburetor elbow, and check where the lead is connected to.
2. Connect one probe of ohm-meter or multi-meter to rear handle heater lead (B) as shown.
 3. Connect the other probe to heater switch terminal (C) as shown.
 4. Tester should show that the circuit is in conducting state.
 5. If rear handle heater is defective, replace with a new one (Refer to 3-3 "Replacing rear handle heater").



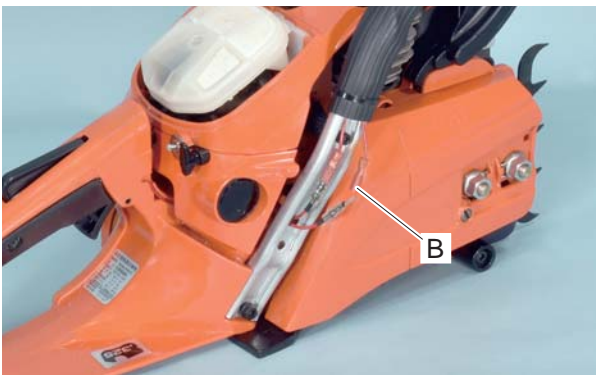
Inspecting heater switch

1. Connect one probe of ohm-meter or multi-meter to heater switch terminal (A) as shown.
2. Connect the other probe to heater switch lever (B) as shown.
3. When heater switch is in "RUN" position, tester should show that the circuit is in conducting state.
4. When heater switch is in "STOP" position, tester should indicate infinite resistance.
5. If heater switch is defective, replace with a new one (Refer to 3-4 "Replacing heater switch").

2-2 Replacing stator assembly

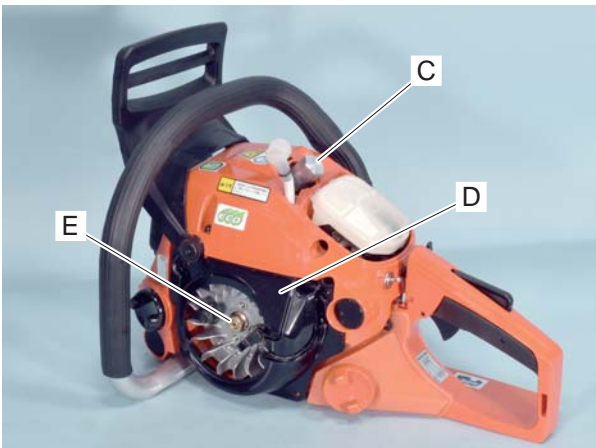


1. Remove air cleaner cover and handle cover.
2. Remove four bolts and remove starter assembly (A) from unit.



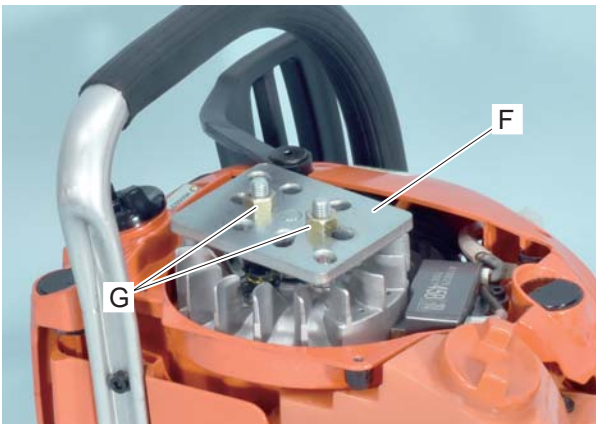
3. Disconnect stator lead coupler (B).

NOTE: If it is not clear which is stator lead coupler (B), remove carburetor and carburetor elbow, and check where the lead is connected to.



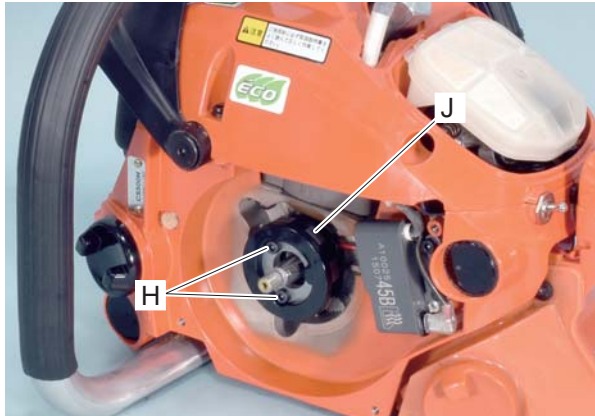
4. Install piston stopper X644-000020 (C) into spark plug hole by hand to stop crankshaft rotation.
5. Remove fan cover (D).
6. Remove nut (E) by rotating counterclockwise.

NOTE: Do not use power tool to remove nut (E). Otherwise, piston damage may occur.



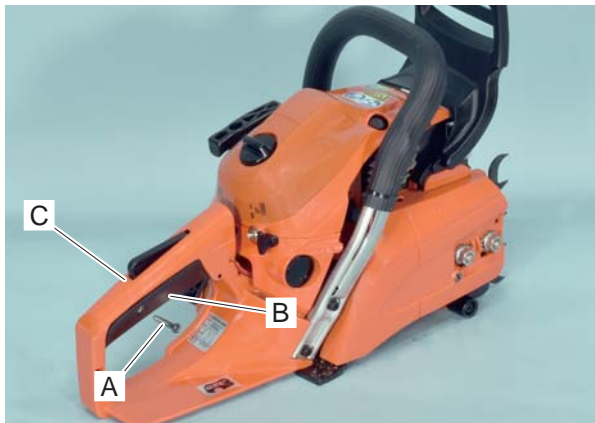
7. Set puller Y089-000110 or Y089-000111 (F) on flywheel as shown.
8. Tighten two nuts (G) on the puller alternately to remove flywheel.

2-2 Replacing stator assembly (continued)

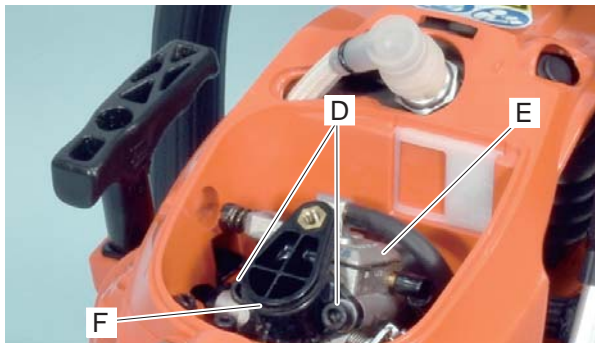


9. Remove two bolts (H) and remove stator assembly (J).
10. Install new stator assembly, and connect stator lead coupler (B).
11. Reinstall disassembled parts.

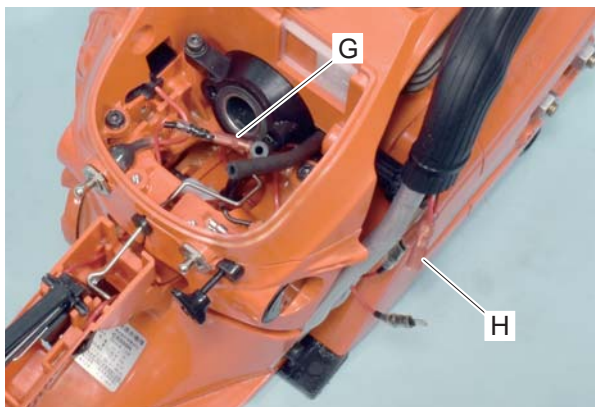
2-3 Replacing rear handle heater



1. Remove air cleaner cover, air filter and handle cover.
2. Remove screw (A). Remove handle grip (B) and rear handle cover (C).



3. Remove two bolts (D) and remove carburetor (E) and carburetor elbow (F).

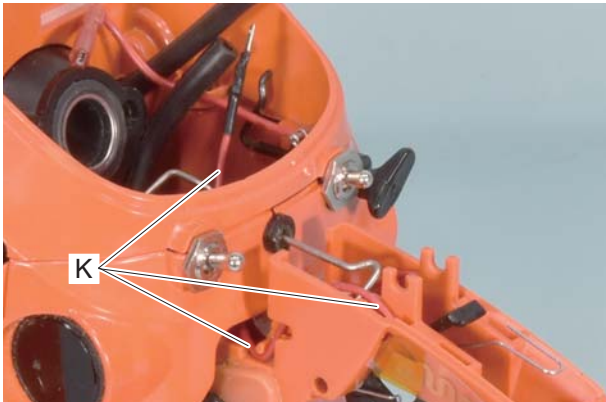


4. Disconnect heater switch coupler (G) and rear handle heater coupler (H).

2-3 Replacing rear handle heater (continued)

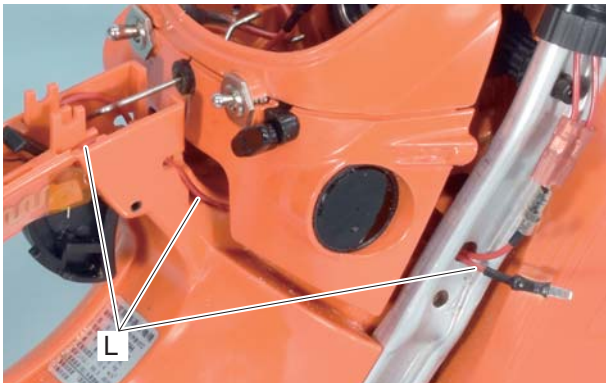


5. Remove boots (J) and + rear handle heater.



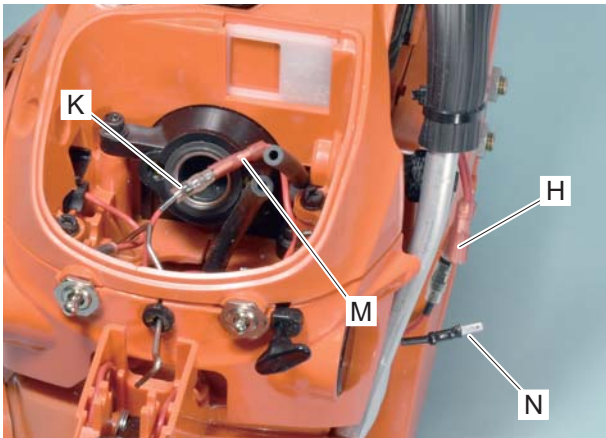
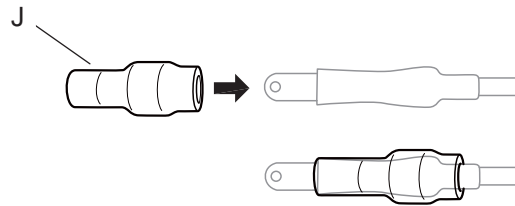
6. Install new rear handle heater.

7. Pass the rear handle heater lead (K) as shown.



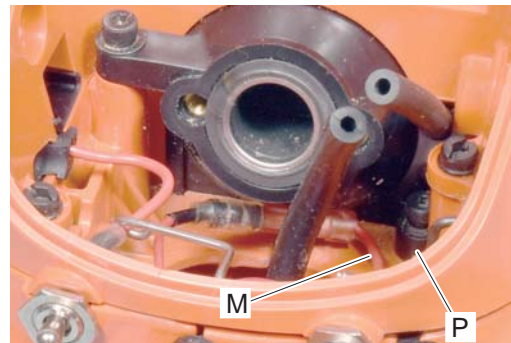
8. Pass the rear handle heater lead (L) as shown.

9. Reinstall boots (J) to each lead terminal as shown.

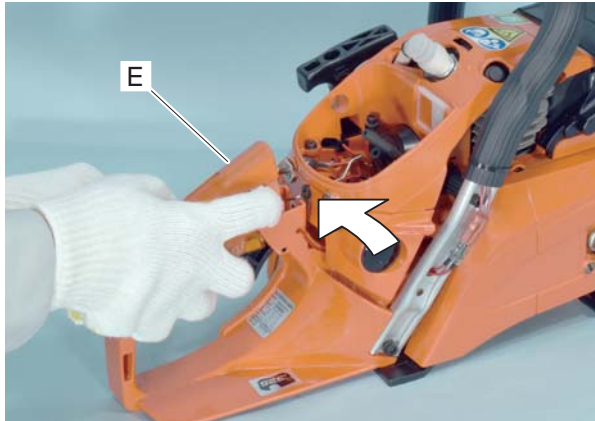


10. Connect rear handle heater lead (K) to heater switch lead (M) and rear handle heater lead (N) to coupler (H).

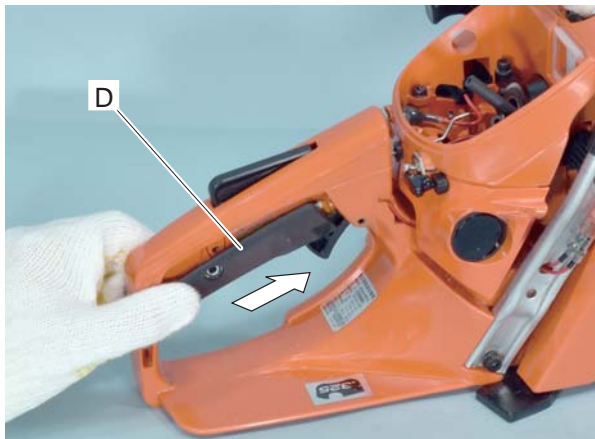
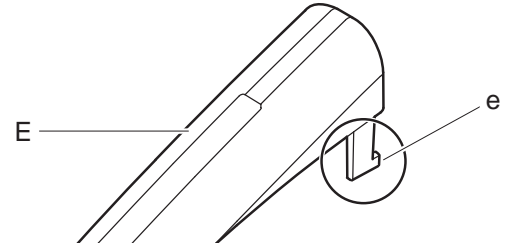
NOTE: Check if heater switch lead (M) is mounted without contacting with the side (P).



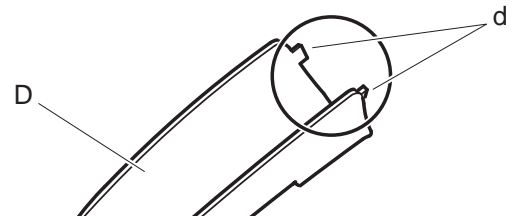
2-3 Replacing rear handle heater (continued)



11. Insert the tab (e) of rear handle cover (E) into rear handle, and install rear handle cover (E) on rear handle, while pushing the rear handle cover (E) as shown.

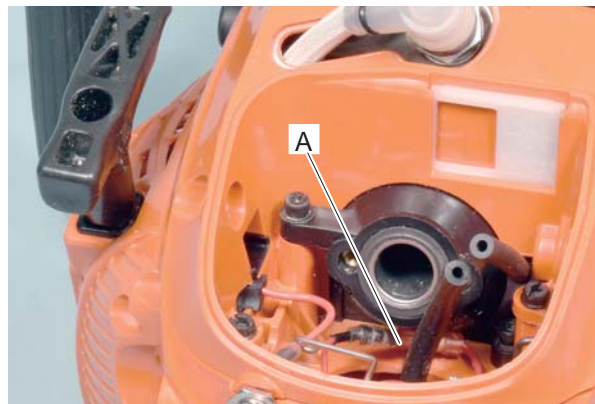


12. Insert the tab (d) of handle grip (D) into rear handle, and install handle grip (D) as shown.



13. Reinstall disassembled parts.

2-4 Replacing heater switch



1. Remove air cleaner cover and air filter.
2. Remove carburetor and carburetor elbow.
3. Disconnect heater switch coupler (A) and remove heater switch.



4. Install new heater switch (B) as shown.
5. Connect heater switch coupler (A).
6. Reinstall disassembled parts.