1

SERVICE DATA

POWER PRUNER

with new gear case

PPF-2100 PPT-2100 PPT-2400 PPFD-2400

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.

For further information to service these models, please refer to ECHO SERVICE MANUAL Ord.No. 402-18.

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Reference No. **17-21C-00**
ISSUED: 200007

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KIORITZ CORPORATION

1 SERVICE INFORMATION

1-1 Specifications

Models			**PPF-2100**
Dimensions	Length(collapsed)	mm(in)	2365 (93.1)
	Length(fully extended)	mm(in)	N/A
	Length(with extension)*	mm(in)	3288 (129.5)
	Width	mm(in)	230 (9.06)
	Height	mm(in)	221 (8.70)
	Dry weight**	kg(lb)	5.82 (12.8)
Engine	Type		KIORITZ, air-cooled, two-stroke, single cylinder
	Rotation		Counterclockwise as viewed from the output end
	Displacement	$cm^3(in^3)$	21.2 (1.294)
	Bore	mm(in)	32.2 (1.268)
	Stroke	mm(in)	26.0 (1.024)
	Compression ratio		6.5
Carburetor	Type		Diaphragm, horizontal-draught, with primer (purge pump)
	Model		ZAMA C1U-K52
Ignition	Type		CDI (Capacitor discharge ignition) system in a single integrated piece w/ESG
	Spark plug		BPMR7A, RCJ-7Y, BPM7A, CJ-7Y
Starter	Type		Automatic rewind
	Rope diameter x length	mm(in)	3.0 x 1000 (0.12 x 39.4)
Fuel	Type		Premixed two-stroke fuel (Refer to Operator's manual.)
	Tank capacity	cm^3(U.S.fl.oz.)	420 (14.2)
Clutch	Type		Centrifugal, 2-shoe slide
Drive shaft	Type		Flexible
	Diameter - Length	mm(in)	6.1 - 1854 (0.24 - 73.0)
Housing(Operation Rod)		OD - ID mm(in)	25.4 - 23.6 (1.00 - 0.93)
		Length mm(in)	1829 (72.0)
Gear case	Reduction ratio		1.5
	Gear tooth		Spiral bevel, Spur
	Lubrication		Lithium based grease
Guide bar / Saw chain lubrication type			Automatic
	Tank capacity, oil	cm^3(U.S.fl.oz.)	225 (7.6)
Sprocket	Type		Spur
	Number of teeth		6
	Pitch	in	3/8
Guide bar	Type		Sprocket nose
	Called length	cm(in)	25.4 (10)
	Gauge	in	0.043 (0.050 for Type 1E and Canada)
Saw chain	Number of drive links		39
	pitch	in	3/8
	Gauge	in	0.043 (0.050 for Type 1E and Canada)

* Extension is an option.

OD: Outer Dia., ID: Inner Dia.

Models			PPT-2100	PPT-2400	PPFD-2400
Dimensions	Length(collapsed)	mm(in)	2260 (89.0)	2734 (107.6)	2320 (91.3)
	Length(fully extended)	mm(in)	3410 (134.3)	3884 (152.9)	N/A
	Length(with extension)*	mm(in)	5000 (196.9)	5468 (215.3)	3910 (153.9)
	Width	mm(in)	230 (9.06)	230 (9.06)	220 (8.66)
	Height	mm(in)	221 (8.70)	221 (8.70)	230 (9.06)
	Dry weight	kg(lb)	7.27 (16.0)	7.85 (17.3)	6.95 (15.3)
Engine	Type		KIORITZ, air-cooled, two-stroke, single cylinder		
	Rotation		Counterclockwise as viewed from the output end		
	Displacement	$cm^3(in^3)$	21.2 (1.294)	23.6 (1.440)	
	Bore	mm(in)	32.2 (1.268)	34.0 (1.339)	
	Stroke	mm(in)	26.0 (1.024)	26.0 (1.024)	
	Compression ratio		6.5	6.3	
Carburetor	Type		Diaphragm, horizontal-draught, with primer (purge pump)		
	Model		ZAMA C1U-K52	WALBRO WT424B	
Ignition	Type		CDI (Capacitor discharge ignition) system in a single integrated piece w/ESG		
	Spark plug		BPMR7A, RCJ-7Y, BPM7A, CJ-7Y		
Starter	Type		Automatic rewind		
	Rope diameter x length	mm(in)	3.0 x 1000 (0.12 x 39.4)		
Fuel	Type		Premixed two-stroke fuel (Refer to Operator's manual.)		
	Tank capacity	cm^3(U.S.fl.oz.)	420 (14.2)		
Clutch	Type		Centrifugal, 2-shoe slide		
Drive shaft	Type		Aluminum extrusion		Fiberglass
	Upper OD	mm(in)	15.1 (0.59)		15.8 (0.62)
	Upper Length	mm(in)	1588 (62.5)	2026 (79.8)	1760 (69.3)
	Lower Length	mm(in)	1543 (60.75)		N/A
Housing	Type Upper / Lower		Aluminum / Fiberglass		
	Upper OD - ID	mm(in)	34.6 - 32.1 (1.36 - 1.26)		
	Upper Length	mm(in)	1594 (62.8)	2032 (80.0)	356 (14.0)
	Lower OD - ID	mm(in)	46.5 - 38.9 (1.83 - 1.53)		
	Lower Length	mm(in)	1524 (60.0)		1491 (58.7)
Gear case	Reduction ratio		1.5		
	Gear tooth		Spiral bevel, Spur		
	Lubrication		Lithium based grease		
Guide bar / Saw chain lubrication type			Automatic		
	Tank capacity, oil	cm^3(U.S.fl.oz.)	225 (7.6)		
Sprocket	Type		Spur		
	Number of teeth		6		
	Pitch	in	3/8		
Guide bar	Type		Sprocket nose		
	Called length	in	10	12	
	Gauge	in	0.043 (0.050 for Type 1E and Canada)		
Saw chain	Number of drive links		39	44	
	pitch	in	3/8		
	Gauge	in	0.043 (0.050 for Type 1E and Canada)		

*Extension is an option. OD: Outer Dia., ID: Inner Dia.

1-2 Technical data

Models		PPF-2100 PPT-2100	PPT-2400 PPFD-2400
Engine			
Idling speed	rpm	2500 - 3000	2500 - 3000
Engine speed at maximum power	rpm	7500	7500
Clutch-in speed	rpm	3700 - 4100	3700 - 4100
Compression pressure	MPa(kgf/cm$^{2)}$(psi)	0.85 (8.5) (121)	0.75 (7.5) (107)
Ignition system			
Spark plug gap	mm(in)	0.6 - 0.7 (0.024 - 0.028)	
Minimum secondary voltage at 1000 rpm	kV	15	
Secondary coil resistance	kΩ	1.3 - 1.8	
Pole shoe air gaps	mm(in)	0.3 - 0.4 (0.012 - 0.016)	
Ignition timing	°BTDC	(33) 28	28
Carburetor Model		C1U-K52	WT424B
Type		Diaphragm horizontal-draught	
Supplier		ZAMA	Walbro
Venturi Size	mm(in)	8.5 (0.335)	7.94 (0.313)
Throttle Bore	mm(in)	12.7 (1/2)	12.7 (1/2)
Idle speed screw initial setting	turn in	3 - 4	3 - 4
H needle initial setting	turn back	1 3/4	3 1/4
L needle initial setting	turn back	1 3/4	2 1/4
Test Pressure, minimum	MPa(kgf/cm^2)(psi)	0.05 (0.5) (7.0)	0.05 (0.5) (7.0)
Metering lever height	mm(in)	0.1 - 0.25	1.65

BTDC: Before top dead center.

H needle: High speed needle.

L needle: Idle needle.

1-3 Torque limits

Descriptions		Size	kgf•cm	N•m	in•lbf
Starter system	Pawl carrier	M 8	80 - 100	8 - 10	70 - 90
	Starter case	M 4*	22 - 28	2.2 - 2.8	19 - 24
Ignition system	Ignition coil	M 4*	38 - 55	3.8 - 5.5	33 - 48
	Fan cover	M 4*	38 - 55	3.8 - 5.5	33 - 48
	Spark plug	M14	150 - 170	15 - 17	130 - 150
Fuel system	Carburetor insulator	M 5*	30 - 40	3 - 4	25 - 35
	Carburetor	M 5	35 - 45	3.5 - 4.5	30 - 40
	Throttle wire housing nut	M 6	6 - 10	0.6 - 1.0	5-9
	Fuel tank	M 5*	27 - 32	2.7 - 3.2	23 - 28
Clutch	Clutch hub	M 8	180 - 200	18 - 20	160 - 175
Engine	Crankcase	M 5	75 - 85	7.5 - 8.5	65 - 75
	Cylinder	M 5	75 - 85	7.5 - 8.5	65 - 75
	Cylinder cover	M 4*	35 - 45	3.5 - 4.5	30 - 40
	Muffler	M 5	55 - 65	5.5 - 6.5	50 - 55
	Top guard	M 5*	25 - 35	2.5 - 3.5	22 - 30
Gear case	Housing	M 4*	25 - 40	2.5 - 4.0	29 - 46
	Oil tank	M 4*	25 - 40	2.5 - 4.0	29 - 46
	Auto-oiler	M 4*	25 - 40	2.5 - 4.0	29 - 46
Regular bolt, nut, and screw		M 3	6 - 10	0.6 - 1.0	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

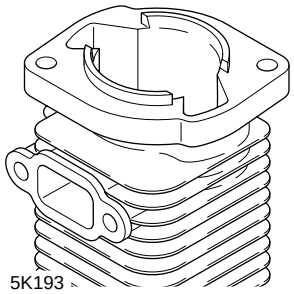
* Apply thread locking sealant. (See below.)

1-4 Special repairing materials

Material	Location	Remarks
Grease	Drive shaft	Lithium based grease or ECHO LUBE™
	Gear case	
	Rewind spring	
	Starter center post	
Thread locking sealant	Starter case	Loctite #222, ThreeBond #1342, or equivalent
	Ignition coil	
	Fan cover	
	Carburetor insulators	
	Fuel tank	
	Cylinder cover	
	Top guard	
	Gear case housing	Loctite #242 or equivalent
	Oil tank	
	Auto-oiler	
Adhesive	Oil pipe grommet	Loctite #424 or equivalent
	Bar stud	Loctite #609 or equivalent
	Bearing (PPFD-2400 shaft)	
Liquid seal	Gear case	Loctite #593, DOW #732 or equivalent

1-5 Service limits

A



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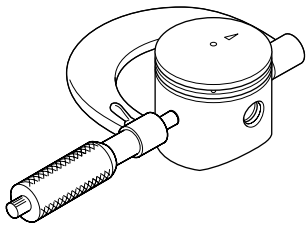

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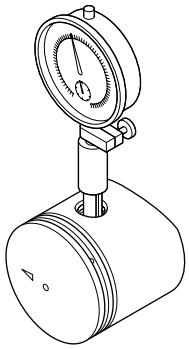

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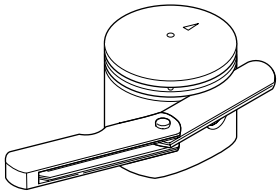

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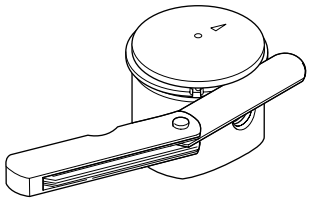

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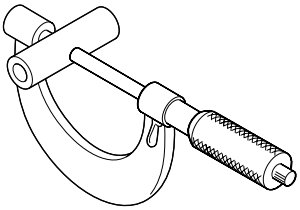

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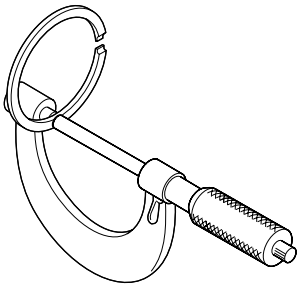

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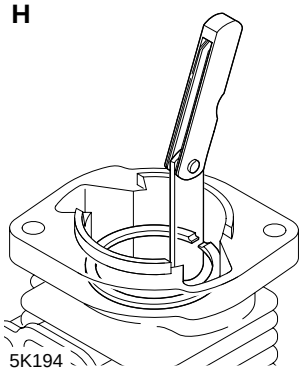

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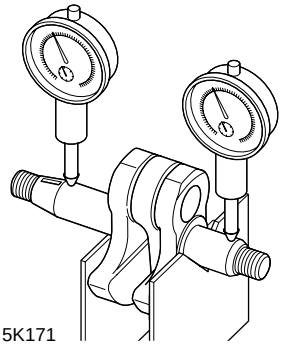

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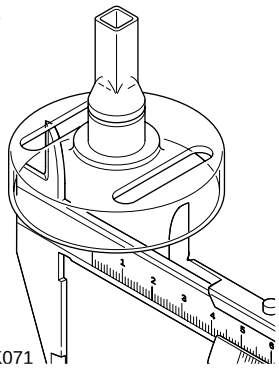

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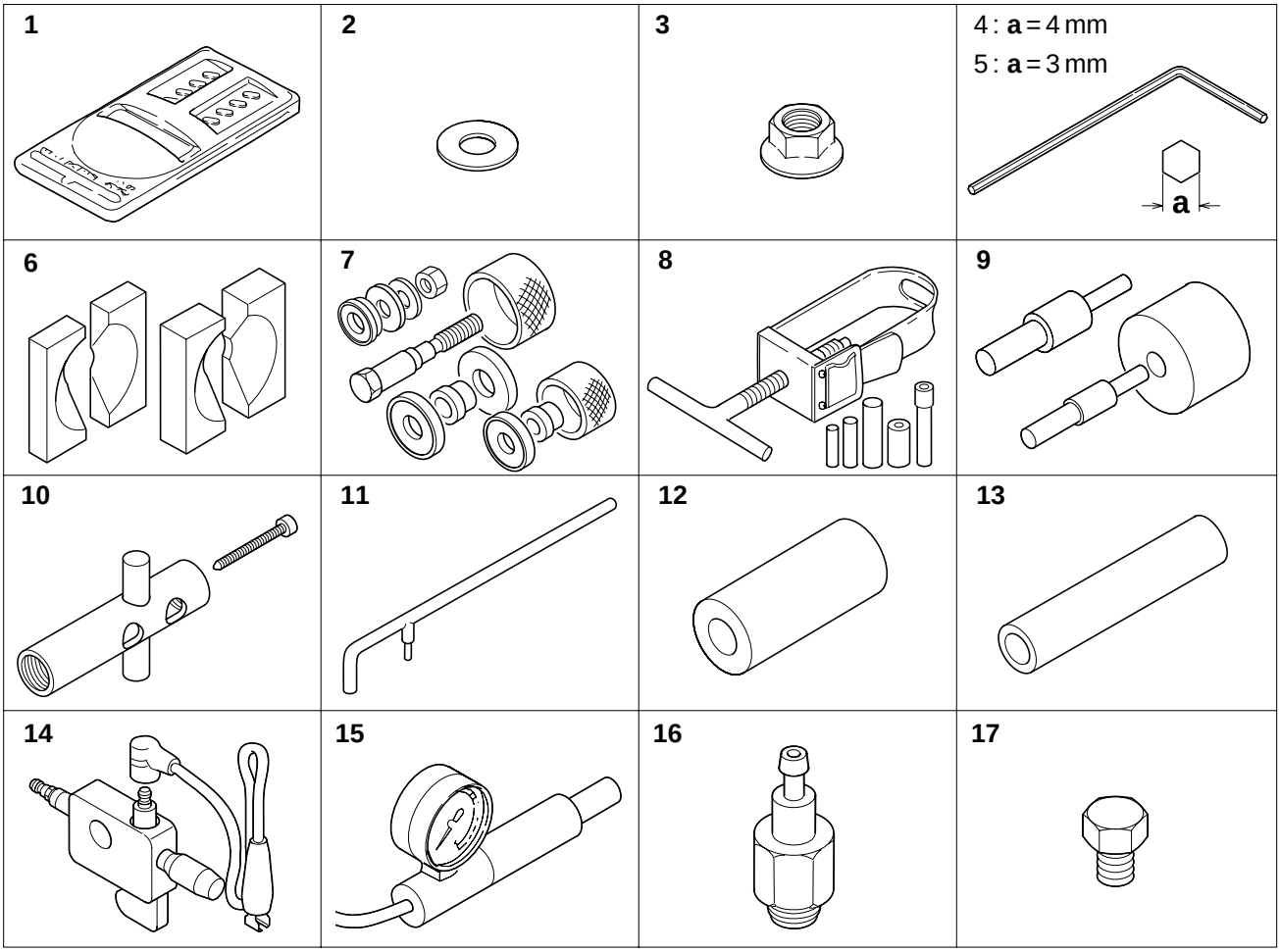
mm (in)

Description			PPF-2100 PPT-2100	PPT-2400 PPFD-2400
A	Cylinder bore		When plating is worn and aluminum can be seen	
B	Piston outer diameter	Min.	32.10 (1.264)	33.90 (1.335)
C	Piston pin bore	Max.	8.030 (0.3161)	
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 (0.3142)	
G	Piston ring width	Min.	1.45 (0.057)	
H	Piston ring end gap	Max.	0.5 (0.02)	
K	Crankshaft runout	Max.	0.05 (0.002)	
L	Clutch drum bore	Max.	51.5 (2.03)	

1-6 Special tools



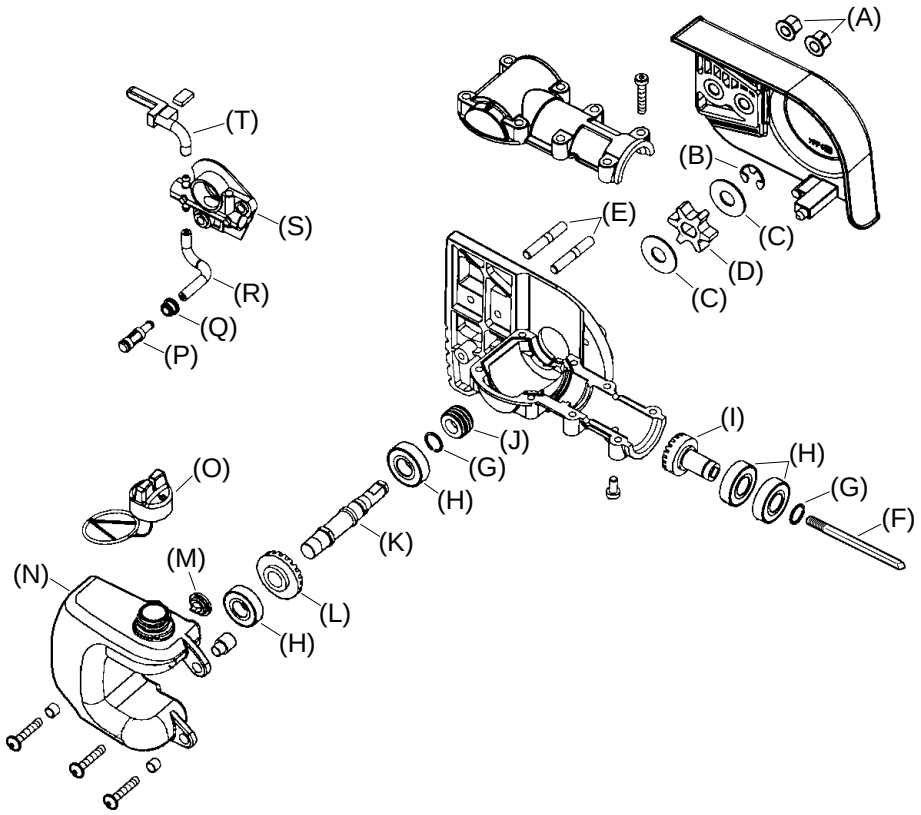
Key	Part Number	Description	Used for:
1		Tachometer	Measuring engine speed
2	363018-00310	Washer	Installing crankcase oil seal of starter side
3	433019-12330	Flange nut	Removing magneto rotor (flywheel) Use key No.18 together
4	895610-79920	L-hex wrench (4 mm)	Removing and installing hex. socket bolts (M5)
5	895612-79920	L-hex wrench (3 mm)	Removing and installing hex. socket bolts (M4)
6	897701-06030	Bearing wedge	Removing ball bearings on crankshaft
7	897701-14732	Bearing tool	Removing and installing crankcase ball bearings
8	897702-30131	Piston pin tool	Removing and installing piston pin (Use 8 mm dia. adapter.)
9	897705-11520	Bearing tool	Removing and installing con-rod small end needle bearing
10	897708-19835	Worm remover	Removing and installing worm for auto-oiler
11	897712-04630	2-pin wrench	Removing and installing pawl carrier
12	897714-24330	Oil seal tool	Installing crankcase oil seals
13	897726-09130	Oil seal tool	Removing clutch drum and installing drive gear ball bearing
14	897800-79931	Spark tester	Checking ignition system
15	897803-30130	Pressure tester	Checking carburetor and crankcase leakages
16	897835-16131	Pressure connector	Checking crankcase and cylinder leakages
17	900100-08008	Bolt	Removing magneto rotor (flywheel) Use key No.3 together

2. SERVICE PROCEDURE

Refer to SERVICE DATA of PPF-2100/2110, PPT-2100/2400 and PPFD-2400 (Ref. No. 17-21B-00) for servicing drive shaft.

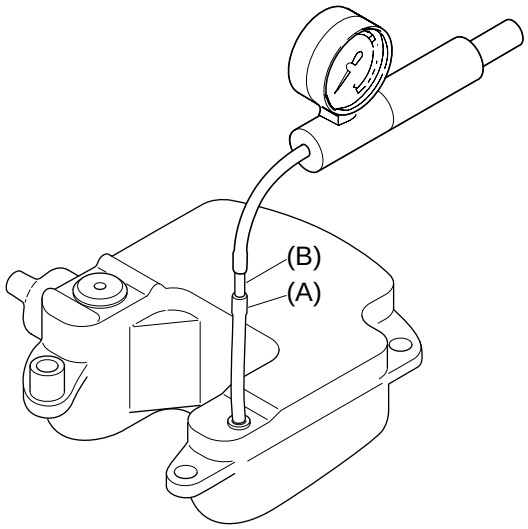
Refer to SERVICE MANUAL of CS-3000/3050/3400/3450 or CS-4200/4400 for servicing auto-oiler assembly.

2-1 Gear case construction



(A) Nut for stud bolt
(B) E-ring
(C) Washer
(D) Sprocket
(E) Bar stud bolt
(F) Shaft connector (Except PPF-2100)
(G) Retaining ring
(H) Ball bearing
(I) Drive gear
(J) Worm gear
(K) Sprocket shaft
(L) Bevel gear
(M) Check valve
(N) Oil tank
(O) Oil tank cap
(P) Oil strainer
(Q) Oil pipe grommet
(R) Inlet oil line
(S) Auto-oiler assembly
(T) Outlet oil line

2-2 Checking oil line

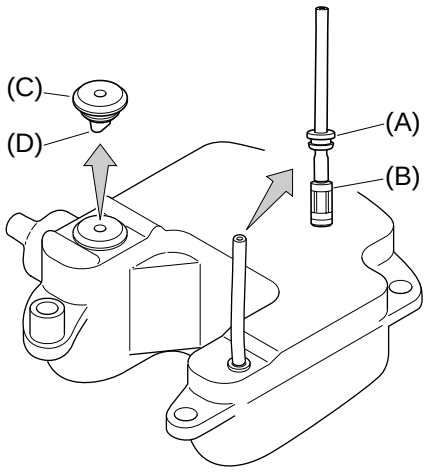


1. Disconnect oil line from the auto-oiler and remove oil tank from the gear case.

2. Connect pressure tester #897803-30130 to the oil line (A) using appropriate connector pipe (B) (recommended outer dia. : 4 - 5 mm).

3. Apply pressure approximately 0.01 MPa (0.1 kgf/cm^2) (1.5 psi). Pressure should not drop. If the pressure drops, leakage may be occurring at oil cap, oil cap O-ring, oil tank, oil line, grommet, or oil tank check valve. Check them and replace defective part(s).

2-3 Checking oil filter and check valve



1. Pry out oil pipe grommet (A), and pull out oil line and oil filter (B).

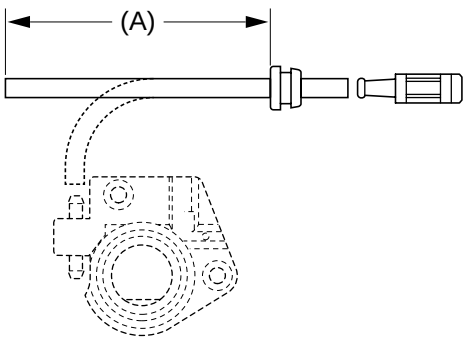
2. Wash oil filter in suitable clean solvent or replace the filter with a new one if damaged.

3. Remove oil tank check valve (C), and clean it.

4. Check if the valve lips (D) are hardened or left opened. Replace as required.

5. Insert oil tank check valve until flush with oil tank.

2-4 Replacing oil line and grommet



1. Remove defective oil line and the grommet.

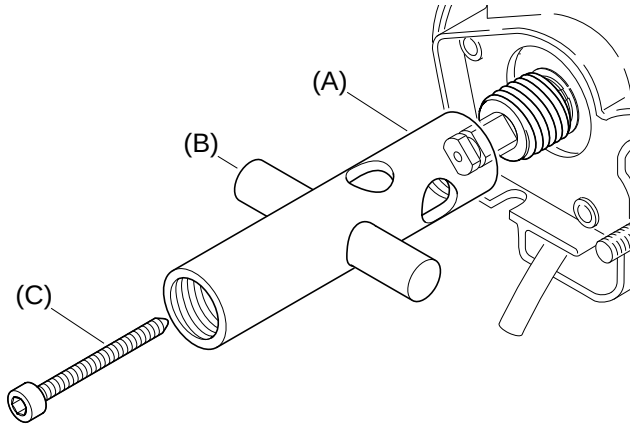
2. Insert new oil line to the grommet as shown.

   (A): 50 mm (2 in)

NOTE: Apply an adhesive (Loctite #424 or equivalent) at the grommet.

3. Connect oil filter to oil line.

2-5 Removing worm gear



1. Remove E-ring, washer, sprocket, another washer, then auto-oiler.

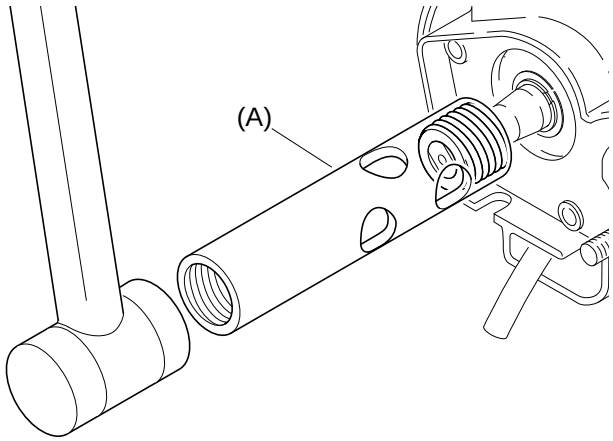
2. Screw worm remover #897708-19835 (A) on to the worm.

3. Insert handle (B) in the tool.

4. Screw hex socket bolt (C) in the center of the handle until the bolt touches the center of sprocket shaft end.

5. Tighten the bolt with wrench holding handle (B) until the worm comes off.

2-6 Inserting worm gear



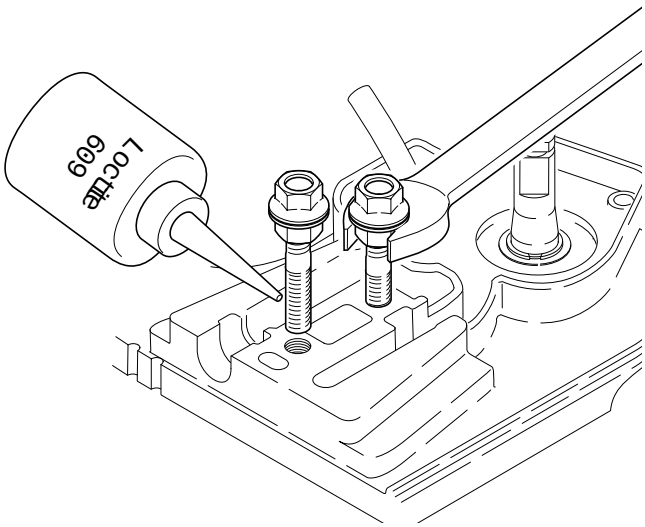
NOTE: Do not reuse removed worm gear. Bore of the used worm gear may be enlarged and the worm gear may slip on sprocket shaft.

1. Screw worm gear into the worm remover (A).

2. Apply oil to the tapered side of worm gear.

3. Tap on to sprocket shaft until the worm gear bottoms.

2-7 Replacing bar stud



1. Install two nuts on defective stud and tighten them against each other.

2. Turn nut counterclockwise to remove stud.

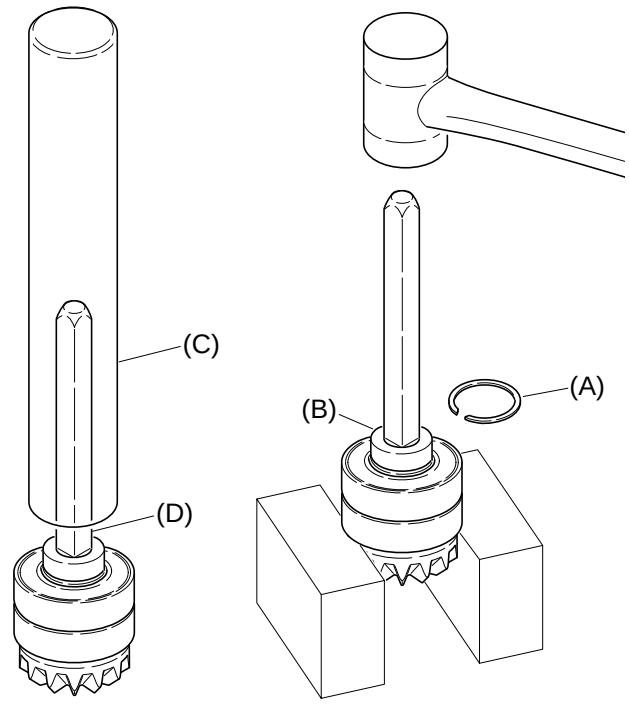
If it is hard to remove stud, hold defective stud in a vise and turn the gear case body counter clockwise, or use a suitable stud remover.

3. Install two nuts to new stud and secure the nuts against each other.

NOTE: Apply small amount of adhesive (Loctite #609 or equivalent) to the stud.

4. Turn nut clockwise to install stud until it bottoms.

2-8 Replacing drive gear and bearing



1. Separate gear case and take out gear sets.
2. Remove retaining ring (A).
3. Set the bearing cage on a vise or equivalent.
4. Push out drive gear (B).

NOTE: Removed bearing may never be reused since the cages are distorted.

5. Push in new bearing(s) using oil seal tool (C) #897726-09130.

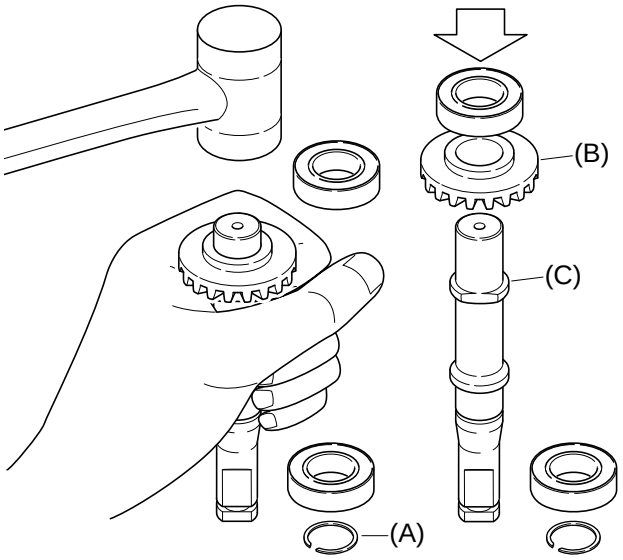
For PPT-2100/2400 and PPFD-2400: If shaft connector (D) hit bottom inside of oil seal tool, remove shaft connector and try again.

If not using oil seal tool, set bearing on a vise supporting inner race and push in drive gear.

6. Install retaining ring.

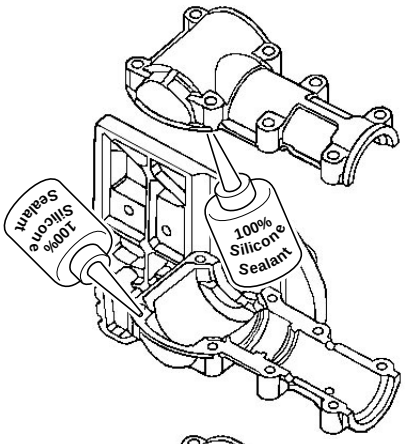
NOTE: When replacing drive gear, always replace bearings as a set.

2-9 Replacing sprocket shaft gear



1. Remove retaining ring (A) using plier.
2. Remove bearings on both sides by hand.
3. Hold bevel gear by hand as shown and tap on the sprocket shaft to separate bevel gear from sprocket shaft.
4. Install bevel gear (B) by hand on to sprocket shaft aligning double D-slot (C) on the shaft and gear.
5. Install bearing on to sprocket shaft and press together with bevel gear.
6. Install sprocket side bearing and secure with retaining ring.

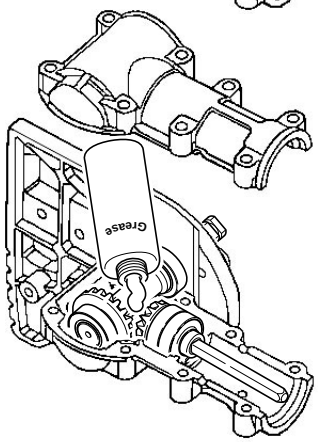
2-10 Assembling gear case



1. Clean sealing channels thoroughly on upper and lower case housings.

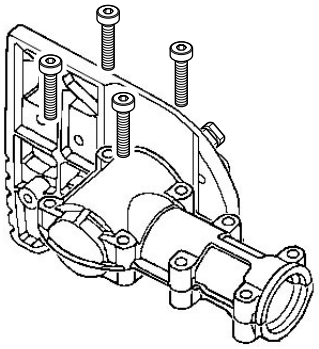
2. Apply thin bead of black 100% silicon rubber sealant (DOW #732, Loctite #593 or equivalent) into channels.

NOTE: Make sure to apply sealant on to channels cut in bearing support area on both halves of gear housings.



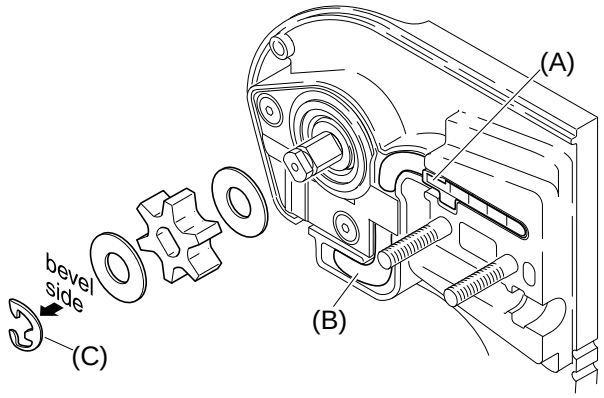
3. Install gear sets.

4. Apply 17 g (6 oz) of lithium based grease to gears and gear housings.



5. Install four 3 mm hex socket bolts, tightening to torque specification of 2.5 - 4.0 N•m (25 - 40 kgf•cm) (29 - 46 in•lbs).

6. Install worm gear onto sprocket shaft. (Refer to 2-6 Inserting worm gear.)



7. Connect outlet oil line (A) to auto-oiler.

8. Apply small amount of lithium based grease to worm gear and install auto-oiler with outlet oil line.

9. Secure auto-oiler with two hex socket bolts applying sealant (Loctite #242 or equivalent).

10. Install oil tank and route inlet oil line (B) through gear case and connect the oil line to auto-oiler.

11. Install washer, sprocket, another washer and E-ring (C).

NOTE: Bevel of E-ring must face washer as shown.