

Kawasaki

JETSKI watercraft **750SX**



JET SKI® Watercraft Service Manual

MODEL APPLICATION

Year	Model	Beginning Hull No.
1992	JS750-A1	KAW80001 □192, or JS750A-600001
1993	JS750-A2	KAW60001 □293, or JS750A-602300
1994	JS750-A3	KAW70001 □394, or Js750A-605701
1995	JS750-A4	KAW10001 □495, or JS750A-608801

□ :This digit in the hull number changes from one machine to another.

Quick Reference Guide

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This quick reference guide will assist you in locating a desired topic or procedure.

- Bend the pages back to match the black tab of the desired chapter number with the black tab on the edge at each table of contents page.
- Refer to the sectional table of contents for the exact pages to locate the specific topic required.



JETSKI watercraft **750SX**

JET SKI® Watercraft

Service Manual

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The right is reserved to make changes at any time without prior notice and without incurring an obligation to make such changes to products manufactured previously. See your "JET SKI" watercraft dealer for the latest information on product improvements incorporated after this publication.

All information contained in this publication is based on the latest product information available at the time of publication. Illustrations and photographs in this publication are intended for reference use only and may not depict actual model component parts.

LIST OF ABBREVIATIONS

A	ampere(s)	lb	pound(s)
ABDC	after bottom dead center	m	meter(s)
AC	alternating current	min	minute(s)
ATDC	after top dead center	N	newton(s)
BBDC	before bottom dead center	Pa	pascal(s)
BDC	bottom dead center	PS	horsepower
BTDC	before top dead center	psi	pound(s) per square inch
°C	degree(s) Celsius	r	revolution
DC	direct current	rpm	revolution(s) per minute
F	farad(s)	TDC	top dead center
°F	degree(s) Fahrenheit	TIR	total indicator reading
ft	foot,feet	V	volt(s)
g	gram(s)	W	watt(s)
h	hour(s)	Ω	ohm(s)
L	liter(s)		

Read OWNER'S MANUAL before operating

Foreword

This manual is designed primarily for use by trained mechanics in a properly equipped shop. However, it contains enough detail and basic information to make it useful to the owner who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily. Whenever the owner has insufficient experience or doubts his ability to do the work, all adjustments, maintenance, and repair should be carried out only by qualified mechanics.

In order to perform the work efficiently and to avoid costly mistakes, read the text, thoroughly familiarize yourself with the procedures before starting work, and then do the work carefully in a clean area. Whenever special tools or equipment are specified, do not use makeshift tools or equipment. Precision measurements can only be made if the proper instruments are used, and the use of substitute tools may adversely affect safe operation.

For the duration of the warranty period, we recommend that all repairs and scheduled maintenance be performed in accordance with this service manual. Any owner maintenance or repair procedure not performed in accordance with this manual may void the warranty.

To get the longest life out of your "JET SKI" watercraft:

- Follow the Periodic Maintenance Chart in the Service Manual.
- Be alert for problems and non-scheduled maintenance.
- Use proper tools and genuine Kawasaki "JET SKI" watercraft parts. Special tools, gauges, and testers that are necessary when servicing Kawasaki "JET SKI" watercraft are introduced by the Special Tool Manual. Genuine parts provided as spare parts are listed in the Parts Catalog.
- Follow the procedures in this manual carefully. Don't take shortcuts.
- Remember to keep complete records of maintenance and repair with dates and any new parts installed.

How to Use This Manual

In preparing this manual, we divided the product into its major systems. These systems became the manual's chapters. All information for a particular system from adjustment through disassembly and inspection is located in a single chapter.

The Quick Reference Guide shows you all of the product's system and assists in locating their chapters. Each chapter in turn has its own comprehensive Table of Contents.

The Periodic Maintenance Chart is located in the General Information chapter. The chart gives a time schedule for required maintenance operations.

If you want spark plug information, for example, go to the Periodic Maintenance Chart first. The chart tells you how frequently to clean and gap the plug. Next, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Spark Plug section.

Whenever you see these WARNING and CAUTION symbols, heed their instructions! Always follow safe operating and maintenance practices.

WARNING

This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

This manual contains four more symbols (in addition to WARNING and CAUTION) which will help you distinguish different types of information.

NOTE

- **This note symbol indicates points of particular interest for more efficient and convenient operation.**

- **Indicates a procedural step or work to be done.**

- Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a NOTE.
- ★ Indicates a conditional step or what action to take based on the results of the test or inspection in the procedural step or sub-step it follows.

In most chapters an exploded view illustration of the system components follows the Table of Contents. In these illustrations you will find the instructions indicating which parts require specified tightening torque, oil, grease or a locking agent during assembly.

General Information

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1-2 GENERAL INFORMATION

Before Servicing

Before starting to service a watercraft, careful reading of the applicable section is recommended to eliminate unnecessary work. Photographs, diagrams, notes, cautions, warnings, and detailed descriptions have been included wherever necessary. Nevertheless, even a detailed account has limitations, a certain amount of basic knowledge is also required for successful work.

Especially note the following:

(1) Adjustments

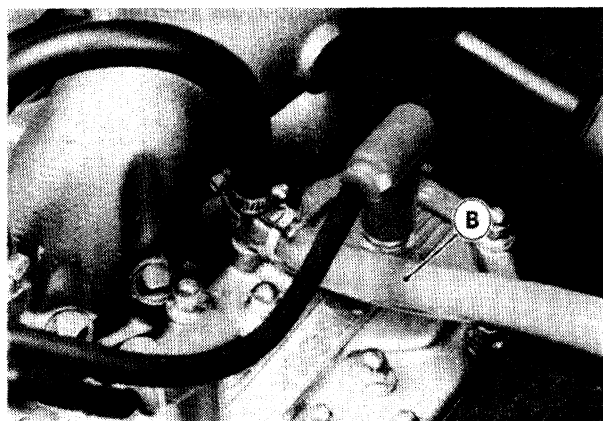
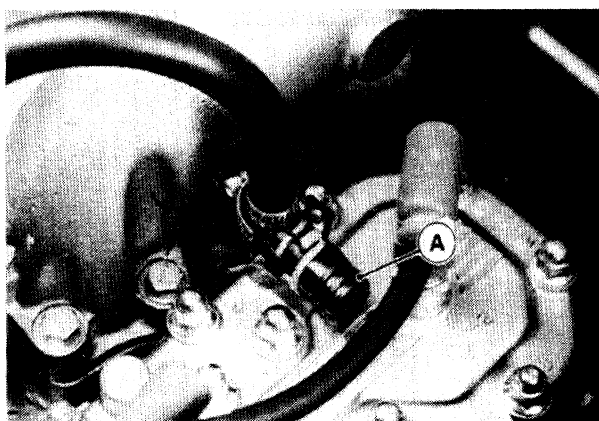
Adjustments shall be made in accordance with the Periodic Maintenance Chart or whenever trouble-shooting or presence of symptoms indicate that adjustments may be required. Whenever running of the engine is required during maintenance it is best to have the watercraft in water.

CAUTION

Do not run the engine without cooling water supply for more than 15 seconds or severe engine and exhaust system damage will occur.

(2) Auxiliary Cooling

An auxiliary cooling supply may be used if the watercraft cannot be operated in water during adjustments. If possible, always operate the watercraft in water rather than use an auxiliary cooling supply.



- Loosen the clamp and remove the cap [A].
- Connect the garden hose [B] to the hose fitting (see above).
- Attach the garden hose to a faucet. Do not turn on the water until the engine is running and turn it off immediately when the engine stops. The engine requires 2.4 L/min (2.5 qts/min) at 1800 rpm and 7.0 L/min (7.4 qts/min) at 6000 rpm.

CAUTION

Insufficient cooling supply will cause the engine and/or exhaust system to overheat and severe damage will occur. Excessive cooling supply may kill the engine and flood the cylinder, causing hydraulic lock. Hydraulic lock will cause severe damage to the engine. If the engine dies while using an auxiliary cooling supply, the water must be shut off immediately.

Always turn the boat on its left side. Rolling to the right side can cause water in the exhaust system to run into the engine, with possible engine damage.

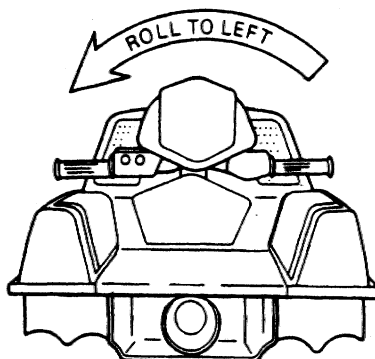
(3) Dirt

Before removal and disassembly, clean the "Jet Ski" watercraft. Any sand entering the engine, carburetor, or other parts will work as an abrasive and shorten the life of the watercraft. For the same reason, before installing a new part, clean off any dust or metal filings.

(4) Battery Ground

Remove the ground (-) lead from the battery before performing any disassembly operations on the watercraft. This prevents:

- (a) the possibility of accidentally turning the engine over while partially disassembled.
- (b) sparks at electrical connections which will occur when they are disconnected.
- (c) damage to electrical parts.



(5) Tightening Sequence

Generally, when installing a part with several bolts, nuts, or screws, they should all be started in their holes and tightened to snug fit. Then tighten them evenly in a cross pattern. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter of turn and then remove them.

Where there is a tightening sequence indication in this Service Manual, the bolts, nuts, or screws must be tightened in the order and method indicated.

(6) Torque

The torque values given in this Service Manual should always be adhered to. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.

(7) Force

Common sense should dictate how much force is necessary in assembly and disassembly. If a part seems especially difficult to remove or install, stop and examine what may be causing the problem. Whenever tapping is necessary, tap lightly using a wooden or plastic faced mallet. Use an impact driver for screws (particularly for the removal of screws held by a locking agent) in order to avoid damaging the screw heads.

(8) Edges

Watch for sharp edges, especially during major engine disassembly and assembly. Protect your hands with gloves or a piece of thick cloth when lifting the engine or turning it over.

(9) High Flash-Point Solvent

A high flash-point solvent is recommended to reduce fire danger. A commercial solvent commonly available in North America is Stoddard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.

(10) Gasket, O-Ring

Do not reuse a gasket or O-ring once it has been in service. The mating surfaces around the gasket should be free of foreign matter and perfectly smooth to avoid oil or compression leaks.

(11) Liquid Gasket, Non-Permanent Locking Agent

Follow manufacturer's directions for cleaning and preparing surfaces where these compounds will be used. Apply sparingly. Excessive amounts may block engine cooling passages and cause serious damage. An example of a non-permanent locking agent commonly available in North America is Loctite Lock N' Seal (Blue).

(12) Press

A part installed using a press or driver, such as a seal, should first be coated with oil on its outer or inner circumference so that it will go into place smoothly.

(13) Ball Bearing

When installing a ball bearing, the bearing race which is affected by friction should be pushed by a suitable driver. This prevents severe stress on the balls and races, and prevents races and balls from being dented. Press a ball bearing until it stops at the stop in the hole or on the shaft.

(14) Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals.

1-4 GENERAL INFORMATION

When pressing in a seal which has manufacturer's marks, press it in with the marks facing out. Seals should be pressed into place using a suitable driver, which contacts evenly with the side of seal, until the face of the seal is even with the end of the hole.

(15) Seal Guide

A seal guide is required for certain oil or grease seals during installation to avoid damage to the seal lips. Before a shaft passes through a seal, apply a little lubricant, preferably high temperature grease on the lips to reduce rubber to metal friction.

(16) Circlip, Retaining Ring

Replace any circlips and retaining rings that were removed with new ones, as removal weakens and deforms them. When installing circlips and retaining rings, take care to compress or expand them only enough to install them and no more.

(17) Cotter Pin

Replace any cotter pins that were removed with new ones, as removal deforms and breaks them.

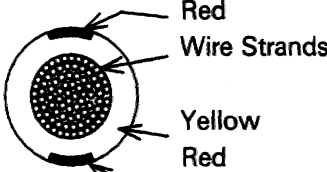
(18) Lubrication

Engine wear is generally at its maximum while the engine is warming up and before all the rubbing surfaces have an adequate lubricative film. During assembly, oil or grease (whichever is more suitable) should be applied to any rubbing surface which has lost its lubricative film. Old grease and dirty oil should be cleaned off. Deteriorated grease has lost its lubricative quality and may contain abrasive foreign particles.

Don't use just any oil or grease. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended.

(19) Electrical Wires

All the electrical wires are either single-color or two-color and, with only a few exceptions, must be connected to wires of the same color. On any of the two-color wires there is a greater amount of one color and a lesser amount of a second color, so a two-color wire is identified by first the primary color and then the secondary color. For example, a yellow wire with thin red stripes is referred to as a "yellow/red" wire; it would be a "red/yellow" wire if the colors were reversed to make red the main color.

Wire (cross-section)	Name of Wire Color
	Yellow/Red

(20) Replacement Parts

When there is a replacement instruction, replace these parts with new ones every time they are removed. These replacement parts will be damaged or lose their original function once removed.

(21) Inspection

When parts have been disassembled, visually inspect these parts for the following conditions or other damage. If there is any doubt as to the condition of them, replace them with new ones.

Abrasion	Crack	Hardening	Warp
Bent	Dent	Scratch	Wear
Color change	Deterioration	Seizure	

(22) Service Data

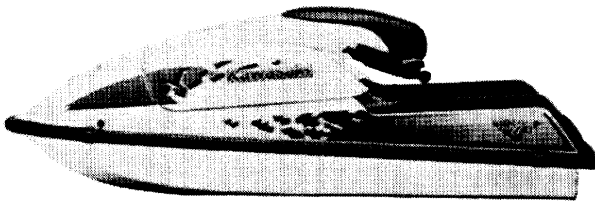
Numbers of service data in this text have following meanings:

"Standards": Show dimensions or performances which brand-new parts or systems have.

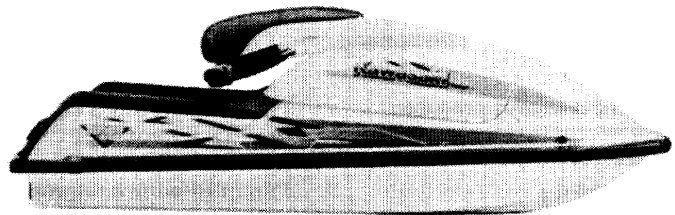
"Service Limits": Indicate the usable limits. If the measurement shows excessive wear or deteriorated performance, replace the damaged parts.

Model Identification

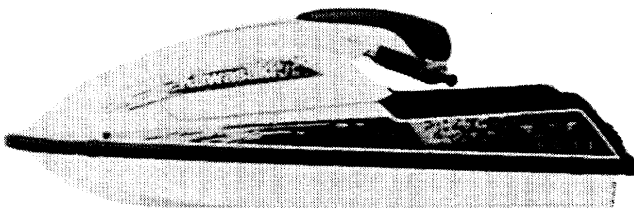
JS750-A1



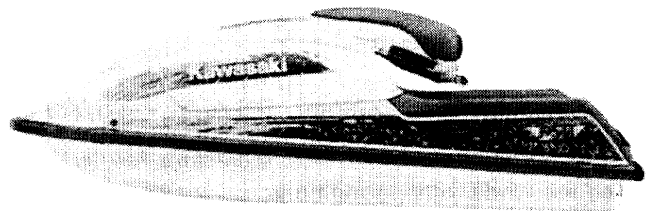
JS750-A2



JS750-A3



JS750-A4



1-6 GENERAL INFORMATION

General Specifications

Items	JS750-A1, A2, A3, A4
Engine:	
Type	2-stroke, vertical twin, crankcase reed valve, water cooled
Displacement	743 mL
Bore and stroke	80.0 x 74.0 mm
Compression ratio	7.0 : 1
Maximum horsepower	46.3 kW (63 PS) @6 000 r/min (rpm) (E) 44.1 kW @6 250 r/min (rpm)
Maximum torque	76.5 N-m (7.8 kg-m, 56.4 ft-lb) @5 500 r/min (rpm) (E) 73.5 N-m @5 500 r/min (rpm)
Ignition system	Magneto CDI (Digital)
Lubrication system	Oil injection (break-in period: Oil injection and fuel mixture 50 : 1)
Carburetion system	Keihin CDK40-34 diaphragm type (38 mm venturi)
Starting system	Electric starter
Tuning Specifications:	
Spark plug: Type	NGK BR8ES
Gap	0.7 ~ 0.8 mm
Ignition timing	13° BTDC @1 250 r/min (rpm) ~ 16° BTDC @2 500 r/min (rpm)
Carburetor : Idle speed	1 250 ±100 r/min (rpm) – in water 1 700 ±100 r/min (rpm) – out of water
Compression pressure	835 ~ 1 294 kPa (8.5 ~ 13.2 kg/cm ² , 121 ~ 187 psi)
Drive System:	
Coupling	Direct drive from engine
Jet pump: Type	Axial flow, single stage
Thrust	2 451 N (250 kg, 551 lb)
Steering	Steerable nozzle
Braking	Water drag
Performance:	
†Minimum Turning Radius	2.9 m
†Draft (Stationary)	200 mm
†Fuel consumption	23 L/h @full throttle
†Cruising range	49 km @ full throttle 42 minutes, JS750-A2 : 58 km @50 minutes
Dimensions:	
Length	2 210 mm
Width	700 mm
Height	680 mm
Dry weight	144 kg
Fuel tank capacity	16 L including 2.3 L reserve, JS750-A2 : 19 L
Engine Oil:	
Type	2-stroke, NMMA Certified for Service TC-WII
Oil tank capacity	2.6 L
Electrical Equipment:	
Battery	12 V 19 Ah
Maximum generator out put	6.6 A/14 V @6 000 r/min (rpm)

† : This information shown here represents results under controlled conditions, and the information may not be correct under other conditions.

Specifications are subject to change without notice, and may not apply to every country.

Periodic Maintenance Chart

NOTE

○ Complete the Pre-Ride Checklist before each outing.

Description	Frequency	Initial 10 Hours	Every 25 Hours	Every 100 Hours
Check all hose clamps, nuts, bolts, and fasteners		●	●	
Torque cylinder head nuts		●	●	
Lubricate throttle cable fitting and choke cable fitting at carburetor			●	
Lubricate choke cable and throttle case and cable			●	
Clean and gap spark plugs (replace if necessary)			●	
Check battery level and terminals			●	
Lubricate steering nozzle pivots			●	
Lubricate steering cable ball joints			●	
Clean fuel filter screens			●	
Adjust carburetor			●	
Flush bilge line and filter			●	
Flush cooling system (after each use in salt water)			●	
Inspect/clean flame arrester			●	
Inspect impeller blade for damage (remove)				●
Inspect/replace coupling damper				●
Inspect carburetor throttle shaft spring (replace carburetor if necessary)				●
Inspect steering cable				●

1-8 GENERAL INFORMATION

Torque and Locking Agent

The following tables list the tightening torque for the major fasteners requiring use of a non-permanent locking agent or silicone sealant.

Letters used in the "Remarks" column mean:

L : Apply a non-permanent locking agent to the threads.

SS : Apply silicone sealant to the threads.

S : Tighten the fasteners following the specified sequence.

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Fuel System:				
Carburetor Mounting Bolts	7.8	0.8	69 in-lb	L
Intake Manifold Mounting Nuts	7.8	0.8	69 in-lb	
Air Intake Cover Bolts	7.8	0.8	69 in-lb	L
Fuel Tap Mounting Screws	-	-	-	L
Choke Assembly Mounting Screws	-	-	-	L
Intake Silencer Stand Mounting Bolts	-	-	-	L
Exhaust System:				
Exhaust Pipe Mounting Bolts	20	2.0	14.5	L
Front Muffler Mounting Bolts	20	2.0	14.5	L
Water Pipe Joints	9.8	1.0	87 in-lb	SS
Exhaust Manifold Mounting Nuts	20	2.0	14.5	S
Expansion Chamber Mounting Bolts	20	2.0	14.5	L
Muffler Bracket Mounting Bolts	20	2.0	14.5	L
Water Box Muffler Bracket Mounting Bolts	-	-	-	L
Engine Top End:				
Cylinder Head Nuts	29	3.0	22	S
Water Pipe Joint	9.8	1.0	87 in-lb	SS
Cylinder Base Nuts	34	3.5	25	
Engine Removal/Installation:				
Engine Mounting Bolts	36	3.7	27	
Engine Bed Mounting Bolts	36	3.7	27	L
Engine Mount Bolts	16	1.6	11.6	
Engine Bottom End:				
Flywheel Bolt	125	13.0	94	L
Stator Mounting Bolts	12	1.2	8.5	
Coupling	98	10.0	72	SS
Magneto Cover Mounting Bolts	7.8	0.8	69 in-lb	L
Crankcase Bolts (6 mm Dia.)	7.8	0.8	69 in-lb	L, S
Crankcase Bolts (8 mm Dia.)	29	3.0	22	L, S
Water Drain Valve Mounting Bolts	7.8	0.8	69 in-lb	L
Water Drain Valve Cover Bolts	7.8	0.8	69 in-lb	L
Magneto Cover Stud	-	-	-	L
Cooling and Bilge Systems:				
Water Pipe Joint	9.8	1.0	87 in-lb	SS
Drive System:				
Coupling Cover Nuts	-	-	-	L
Coupling	39	4.0	29	SS
Drive Shaft Holder Mounting Bolts	22	2.2	16.0	L

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Pump and Impeller:				
Water Pipe Joint	9.8	1.0	87 in-lb	SS
Steering Nozzle Pivot Bolts	9.8	1.0	87 in-lb	L
Pump Outlet Mounting Bolts	—	—	—	L
Pump Cap Bolts	—	—	—	L
Impeller	98	10.0	72	
Pump Mounting Bolts	22	2.2	16.0	L
Pump Cover Mounting Bolts	6.9	0.7	61 in-lb	L
Grate Mounting Bolts	9.8	1.0	87 in-lb	L
Handle Pole and Handlebar:				
Steering Support Bracket Mounting Bolts	—	—	—	L
Steering Pivot Stud	38	3.9	28	
Handle Pole Pivot Shaft	13	1.3	9.5	L
Handle Pole Pivot Shaft Nut	33	3.4	25	L
Handlebar Clamp Bolts	18	1.8	13.0	
Handle Pole Bracket Bolts	19	1.9	13.5	
Hull/Engine Hood:				
Bumper Bushings	—	—	—	L
Bumpers Mounting Nuts	—	—	—	L
Mat Guard Mounting Nuts	—	—	—	L
Electrical System:				
Electric Case Bolts	7.8	0.8	69 in-lb	L
Electric Case Mounting Bolts	7.8	0.8	69 in-lb	L
Regulator/Rectifier Mounting Bolts	7.8	0.8	69 in-lb	L
CDI Igniter Mounting Bolts	7.8	0.8	69 in-lb	L
Spark Plugs	27	2.8	20	
Starter Motor Mounting Bolts	7.8	0.8	69 in-lb	L
Ignition Coil Mounting Bolts	7.8	0.8	69 in-lb	L
Temperature Sensor Mounting Bolts	7.8	0.8	69 in-lb	L
Starter Relay Mounting Nuts	7.8	0.8	69 in-lb	
Starter Lead Mounting Nut	7.8	0.8	69 in-lb	
Battery Ground Lead Mounting Bolt	7.8	0.8	69 in-lb	L
Flywheel Bolt	125	13.0	94	
Stator Mounting Bolts	7.8	0.8	69 in-lb	

This table relating tightening torque of the stainless bolt and the nut to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value.

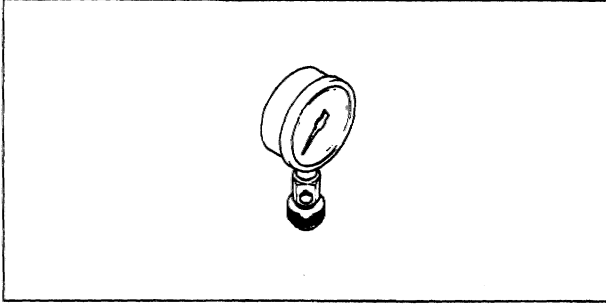
General Fasteners (stainless bolt and nut)

Threads dia. (mm)	Torque		
	N-m	kg-m	ft-lb
6	5.9~8.8	0.60~0.90	52~78 in-lb
8	16~22	1.6~2.2	11.6~15.9
10	30~41	3.1~4.2	22~30

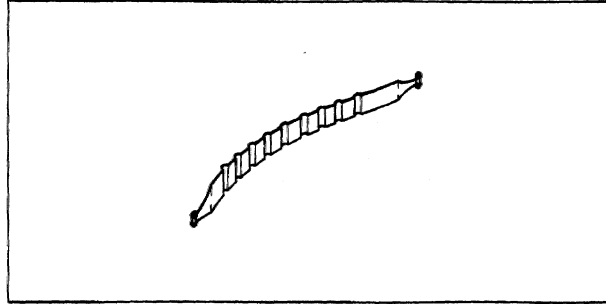
1-10 GENERAL INFORMATION

Special Tools, Sealant

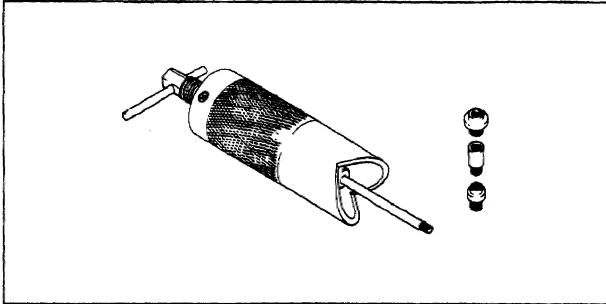
Compression Gauge: 57001-221



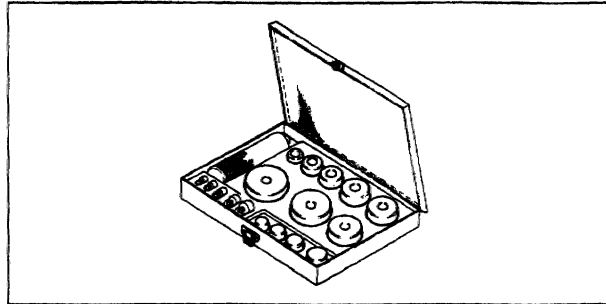
Piston Ring Compressor Belt, $\phi 67 \sim \phi 79$: 57001-1097



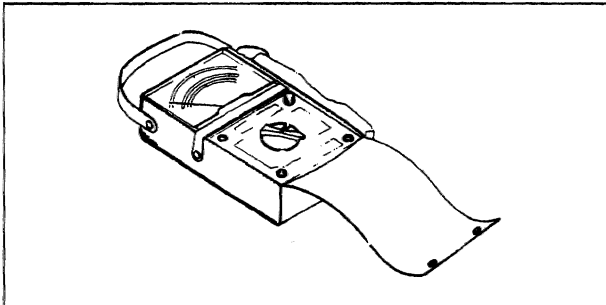
Piston Pin Puller Assembly: 57001-910



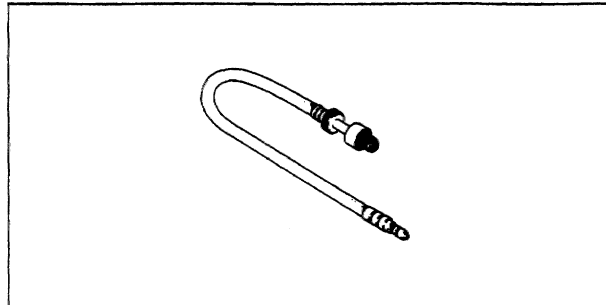
Bearing Driver Set: 57001-1129



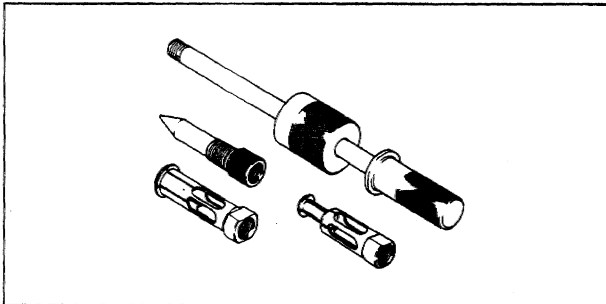
Hand Tester (V. O. M) : 57001-983



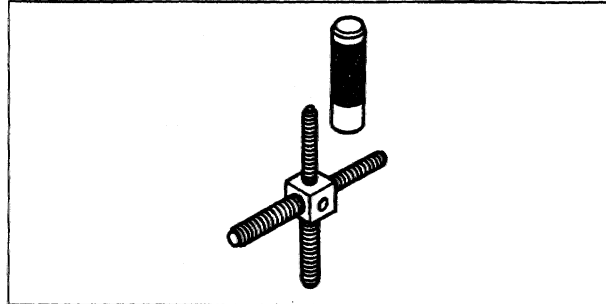
Compression Gauge Adapter: 57001-1159



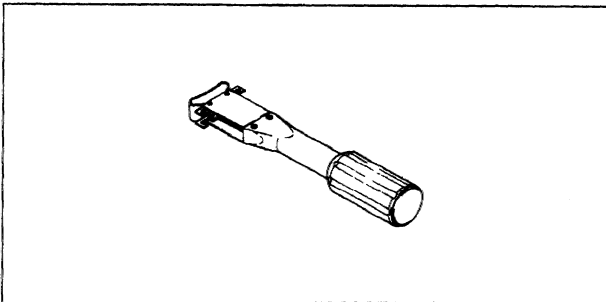
Oil Seal & Bearing Remover: 57001-1058



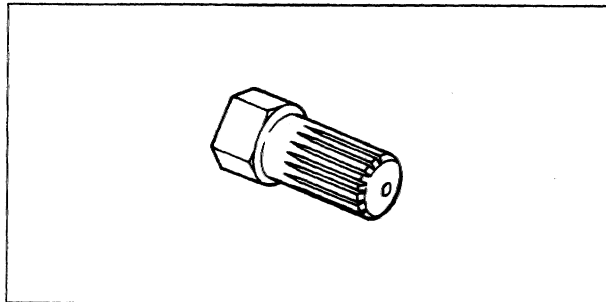
Rotor Puller, M16/M18/M20/M22 x 1.5: 57001-1216



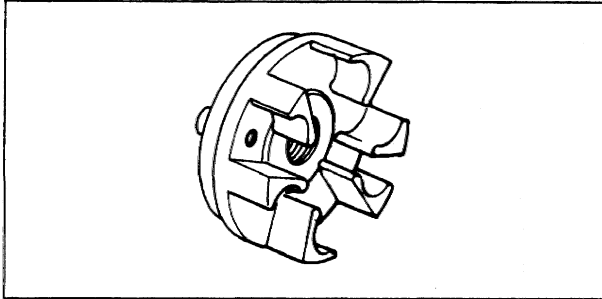
Piston Ring Compressor Grip: 57001-1095



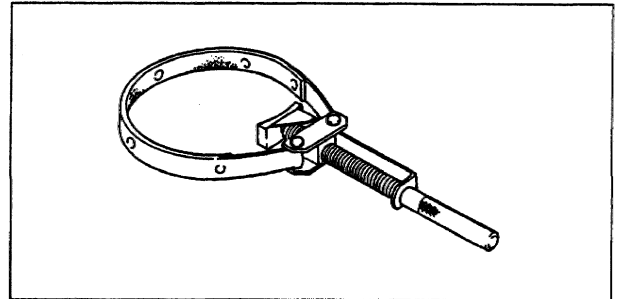
Impeller Wrench: 57001-1228



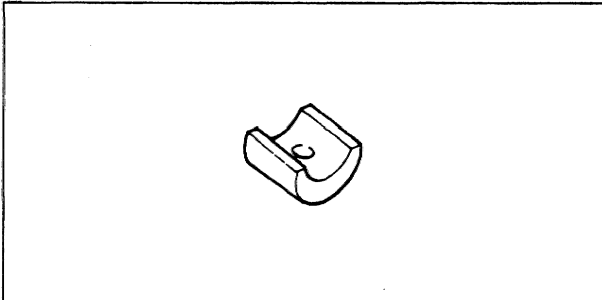
Coupling Holder: 57001-1230



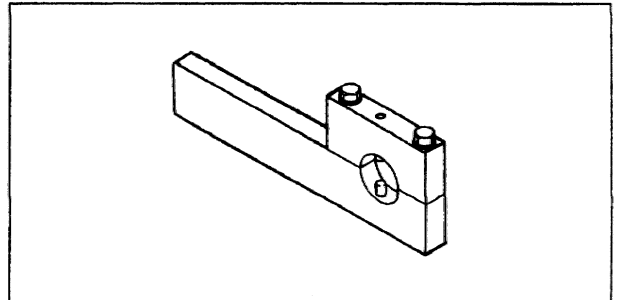
Flywheel Holder: 57001-1313



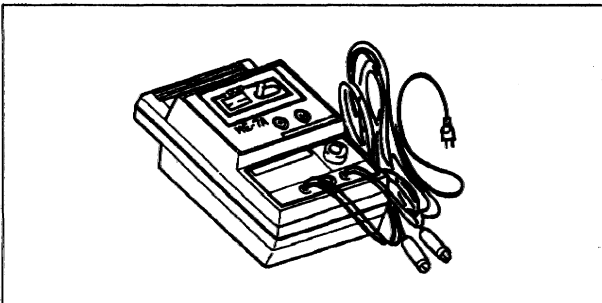
Drive Shaft Holder Adapter: 57001-1231



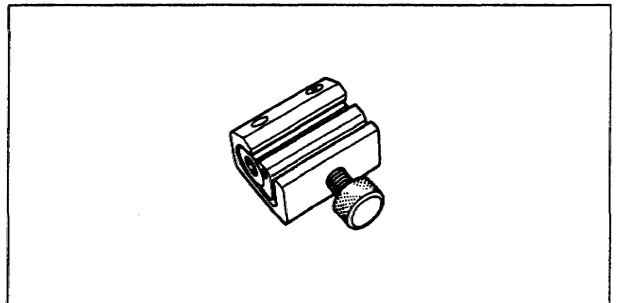
Drive Shaft Holder: 57001-1327



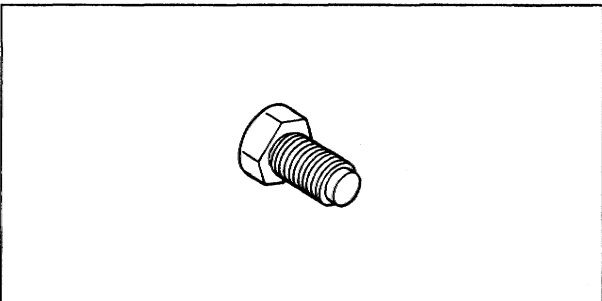
Coil Tester: 57001-1242



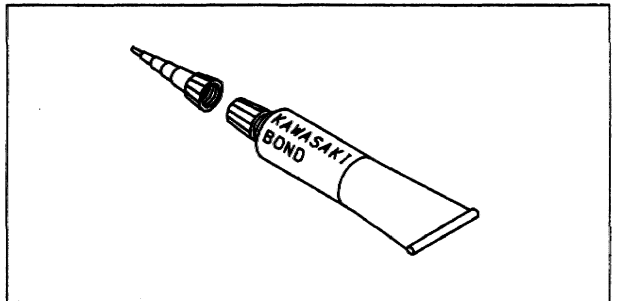
Pressure Cable Luber: K56019-021



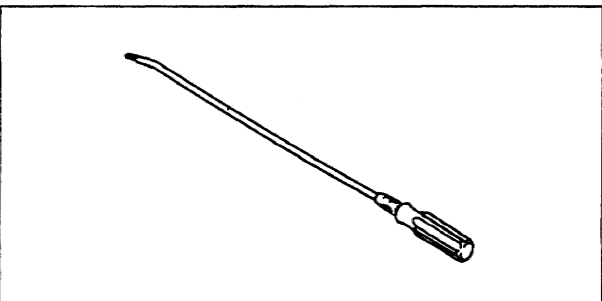
Rotor Puller, M18 x 1.5: 57001-1258



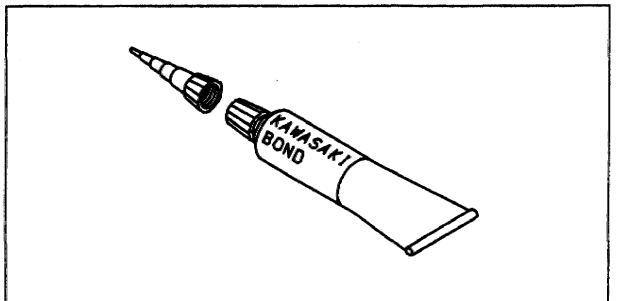
Kawasaki Bond (Silicone Sealant): 56019-120



Watercraft Strap Tool: 57001-1294



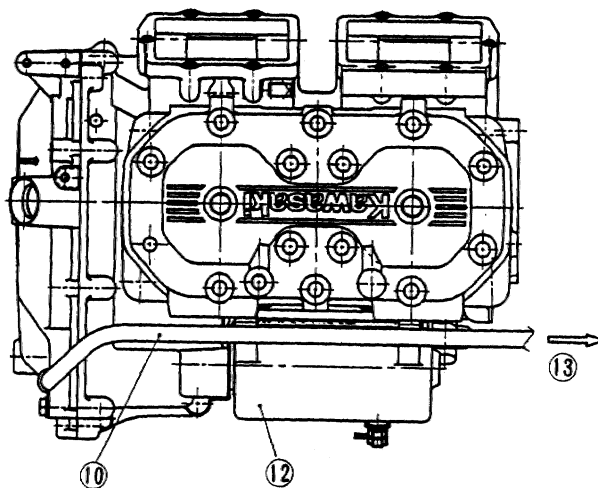
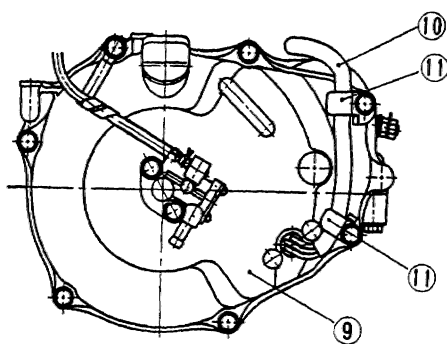
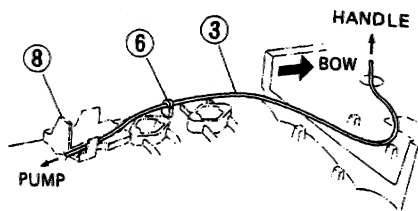
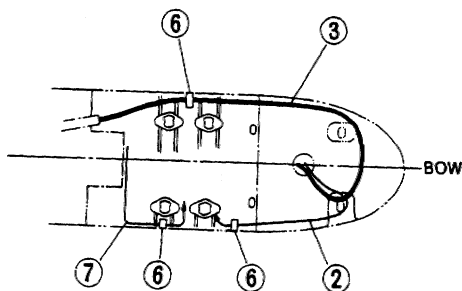
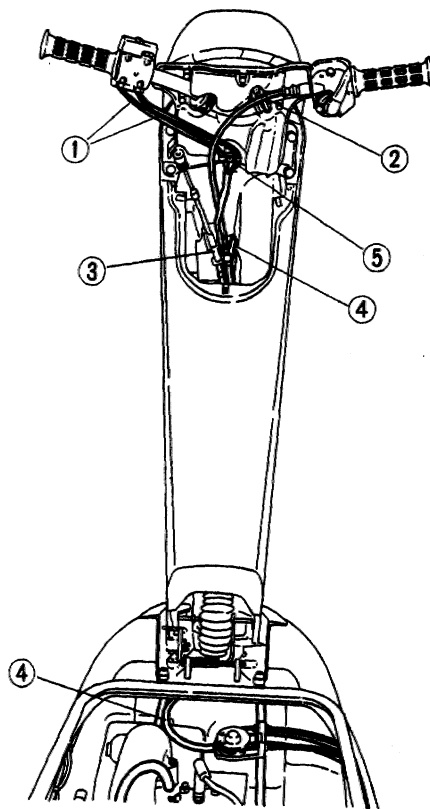
Kawasaki Bond (Liquid Gasket - Black): 92104-1003

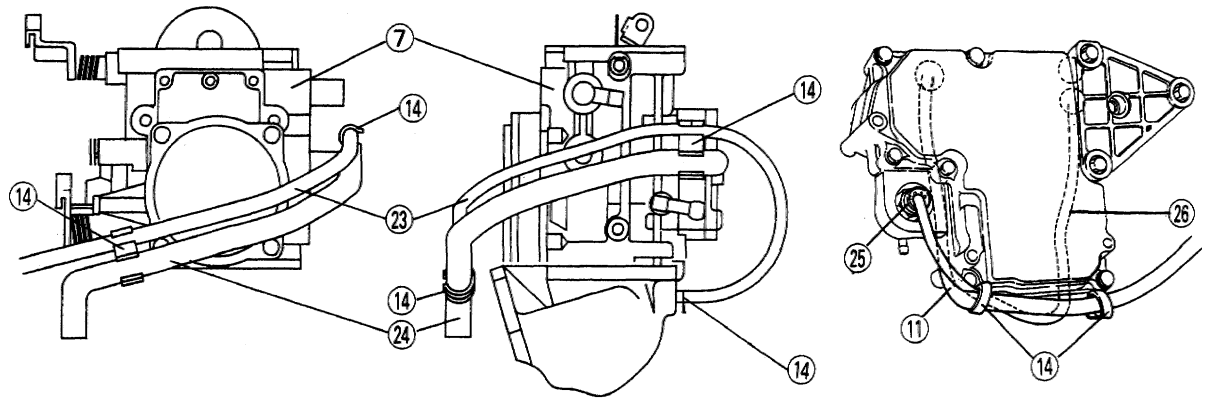


1-12 GENERAL INFORMATION

Cable, Wire and Hose Routing

1. Start/Stop Switch Leads
2. Throttle Cable
3. Steering Cable
4. Fuel Vent Hose
5. Wiring Clamps
6. Detent
7. Choke Cable
8. Water Box Muffler Damper
9. Magneto Case
10. Magneto Lead
11. Clamps
12. Starter Motor
13. To Electric Case

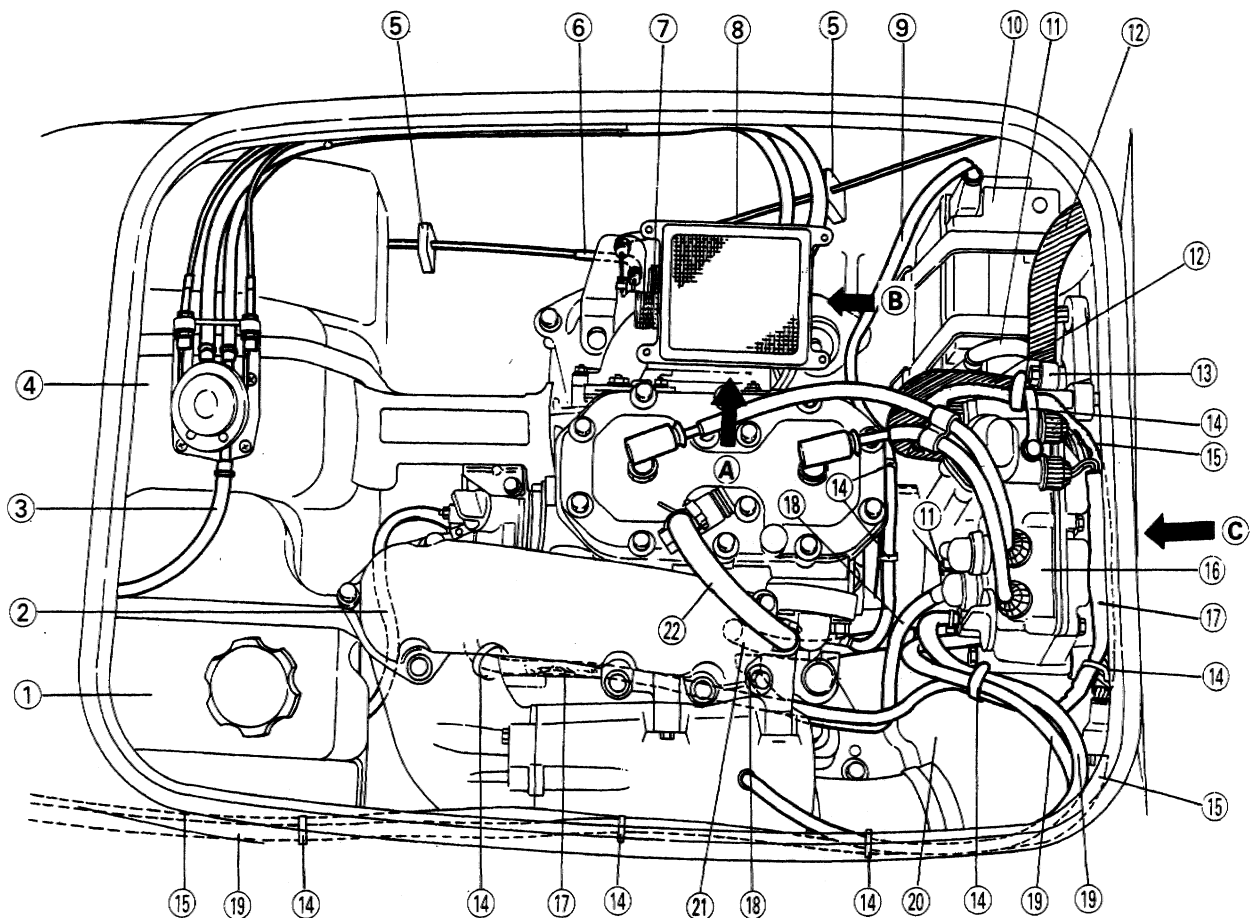




Viewed from A

Viewed from B

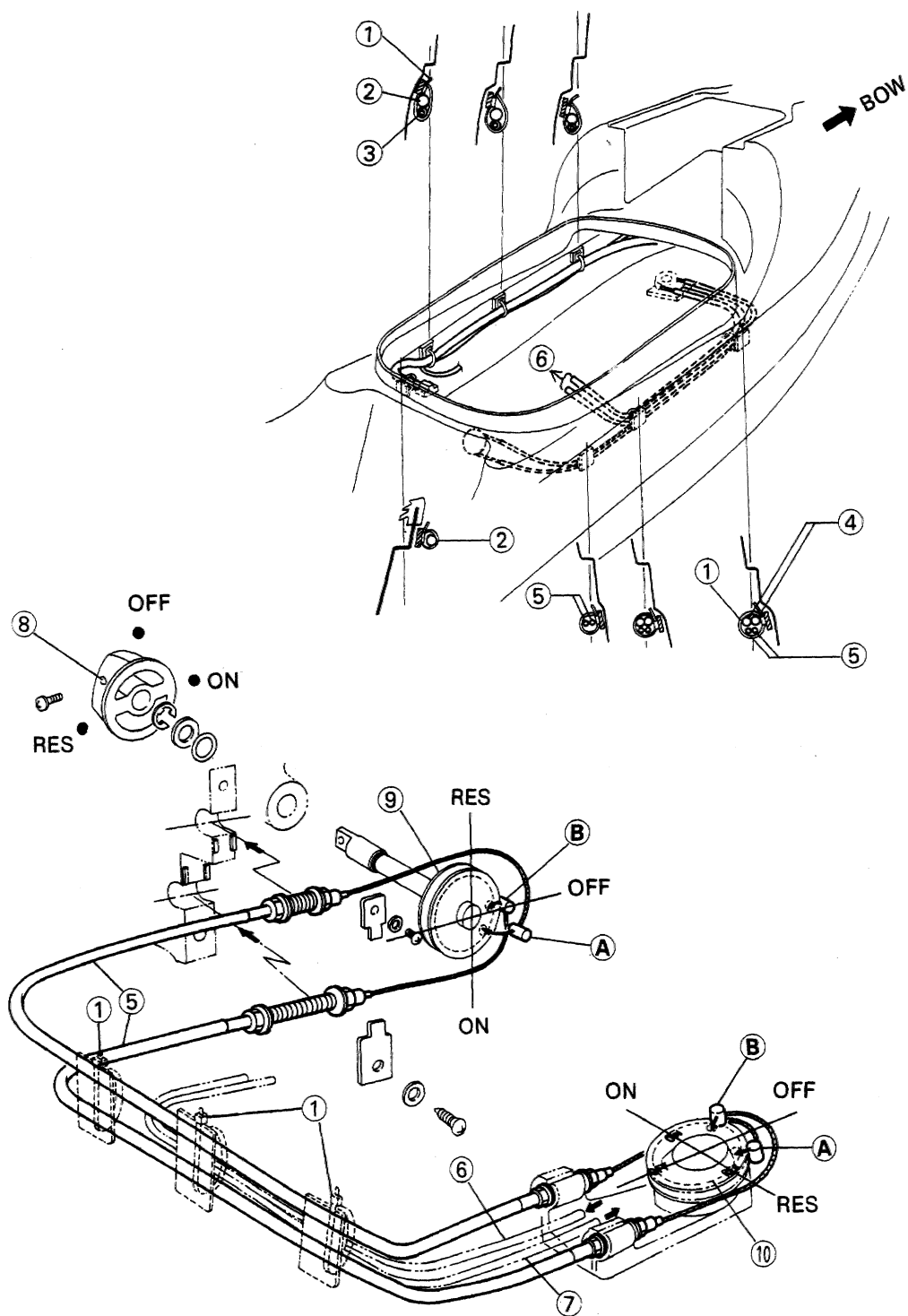
Viewed from C



1. Oil Tank
2. Oil Inlet Hose
3. Vent Hose
4. Fuel Tank
5. Detent
6. Throttle Cable
7. Carburetor
8. Choke Cable
9. Battery Cable (-)
10. Battery

11. Battery Cable (+)
12. Bilge Hose
13. Bilge Breather
14. Clamp
15. Start/Stop Switch Leads
16. Electric Case
17. Magneto Leads
18. Starter Motor Cable
19. Bypass Cooling Hose
20. Water Box Muffler

21. Inlet Cooling Hose
22. Cooling Hose
23. Oil Outlet Hose
24. Pulse Hose
25. Temperature Sensor
26. Temperature Sensor Leads



- 1. Clamp
- 2. Start/Stop Switch Leads
- 3. Bypass Cooling Hose
- 4. Fuel Hoses
- 5. Remote Control Cables

- 6. Supply Fuel Hose
- 7. Return Fuel Hose
- 8. Fuel Knob
- 9. Reel
- 10. Fuel Tap

Fuel System

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2-2 FUEL SYSTEM

Exploded View

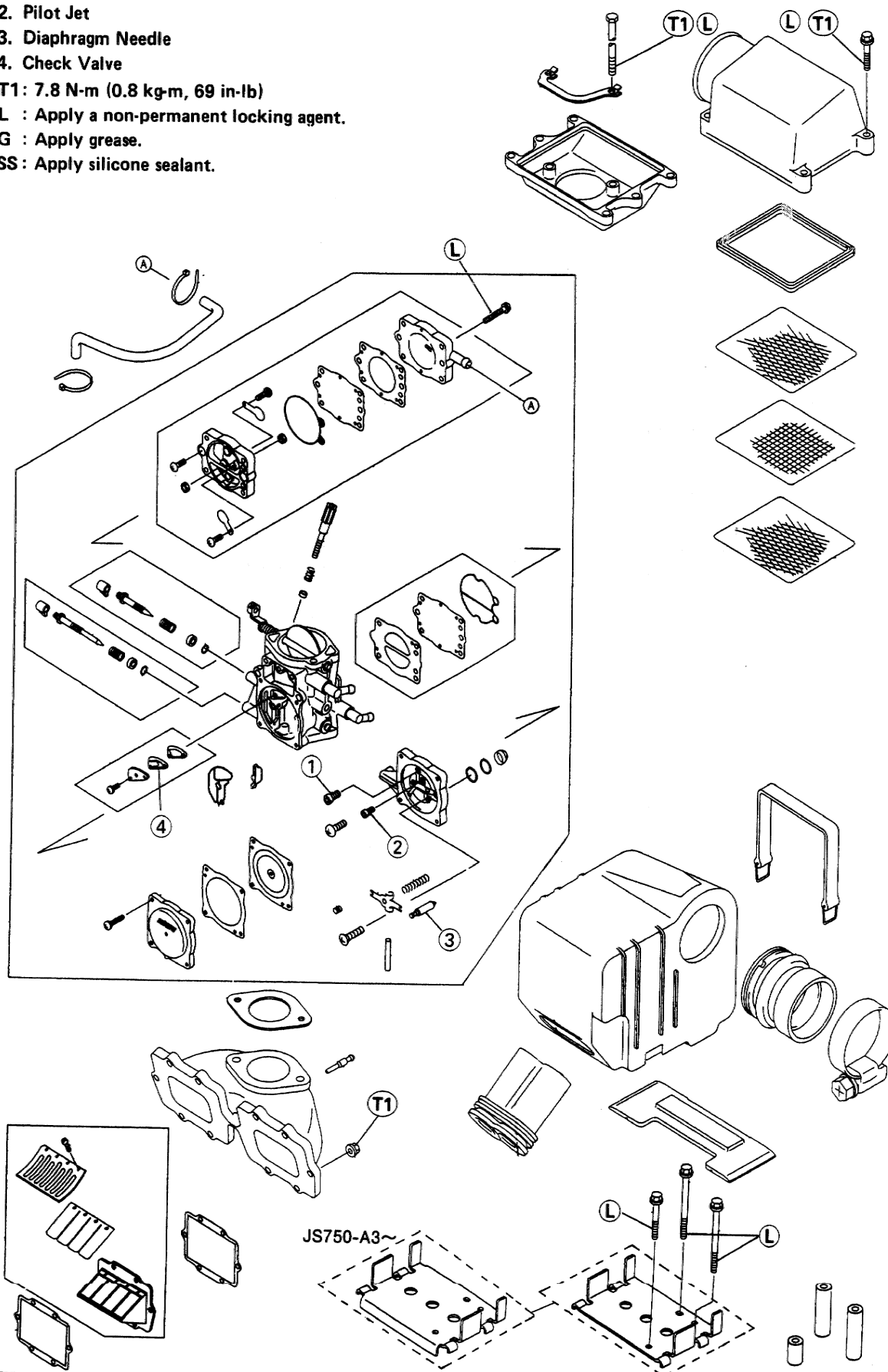
1. Main Jet
2. Pilot Jet
3. Diaphragm Needle
4. Check Valve

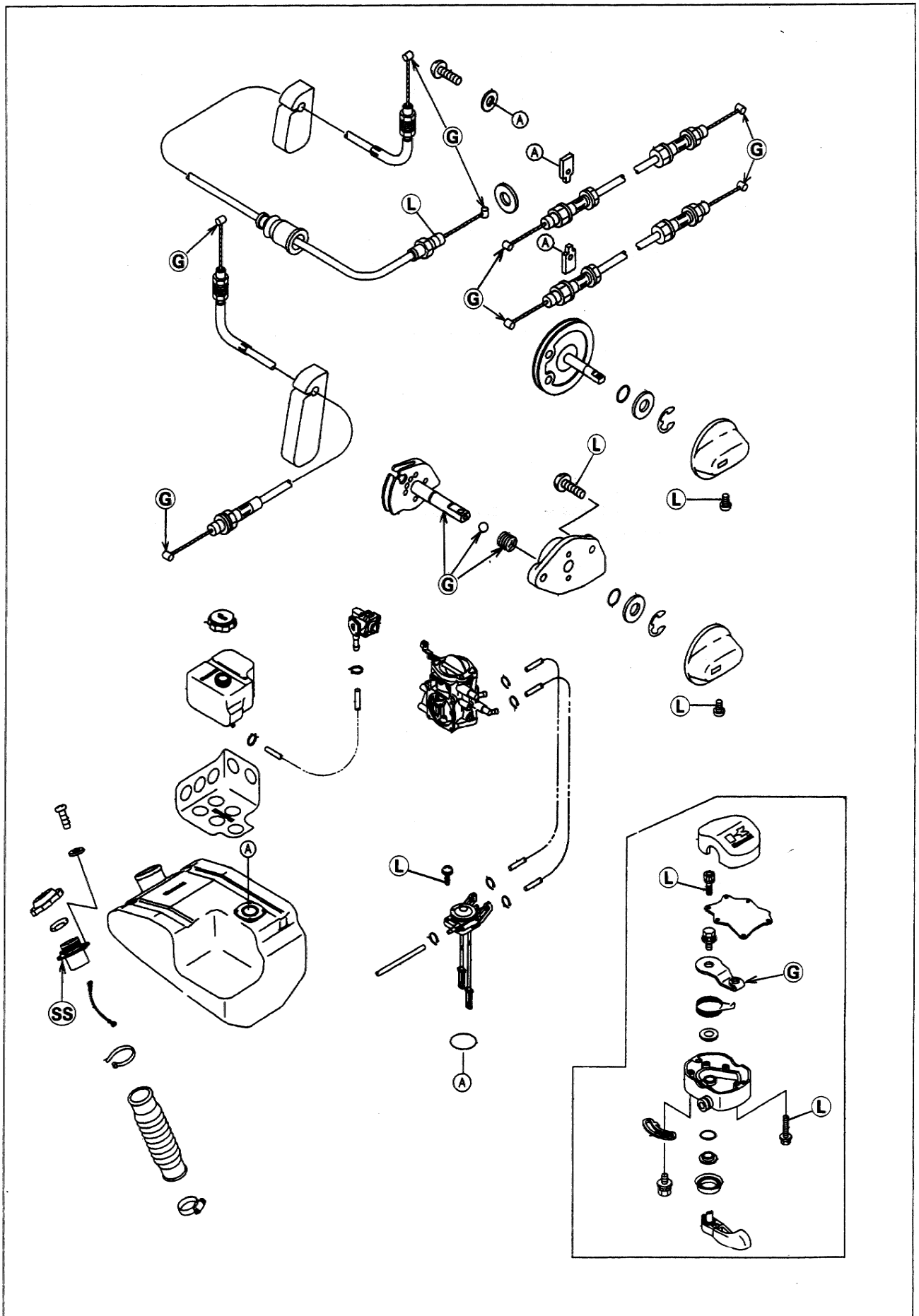
T1: 7.8 N-m (0.8 kg-m, 69 in-lb)

L : Apply a non-permanent locking agent.

G : Apply grease.

SS : Apply silicone sealant.





2-4 FUEL SYSTEM

Specifications

Item	Standard	Service Limit
Carburetor:		
Make, type	Keihin, CDK 40 - 34 Diaphragm	---
Size	38 mm Venturi	---
Mixture screws: Low speed	7/8 turn open, JS750-A3~ : 1 1/8 turn open	---
High speed	7/8 turn open, JS750-A3~ : 3/4 turn open	---
Main jet	#140, JS750-A3~ : #145	---
Pilot jet	# 75	---
Idle speed: in water	1 250 ±100 rpm	---
out of water	1 700 ±100 rpm	---
Reed Valve:		
Reed warp	---	0.2 mm
Fuel Tank:		
Capacity	16 L (including 2.3 L reserve)	---

Special Tool - Pressure Cable Luber: K56019-021

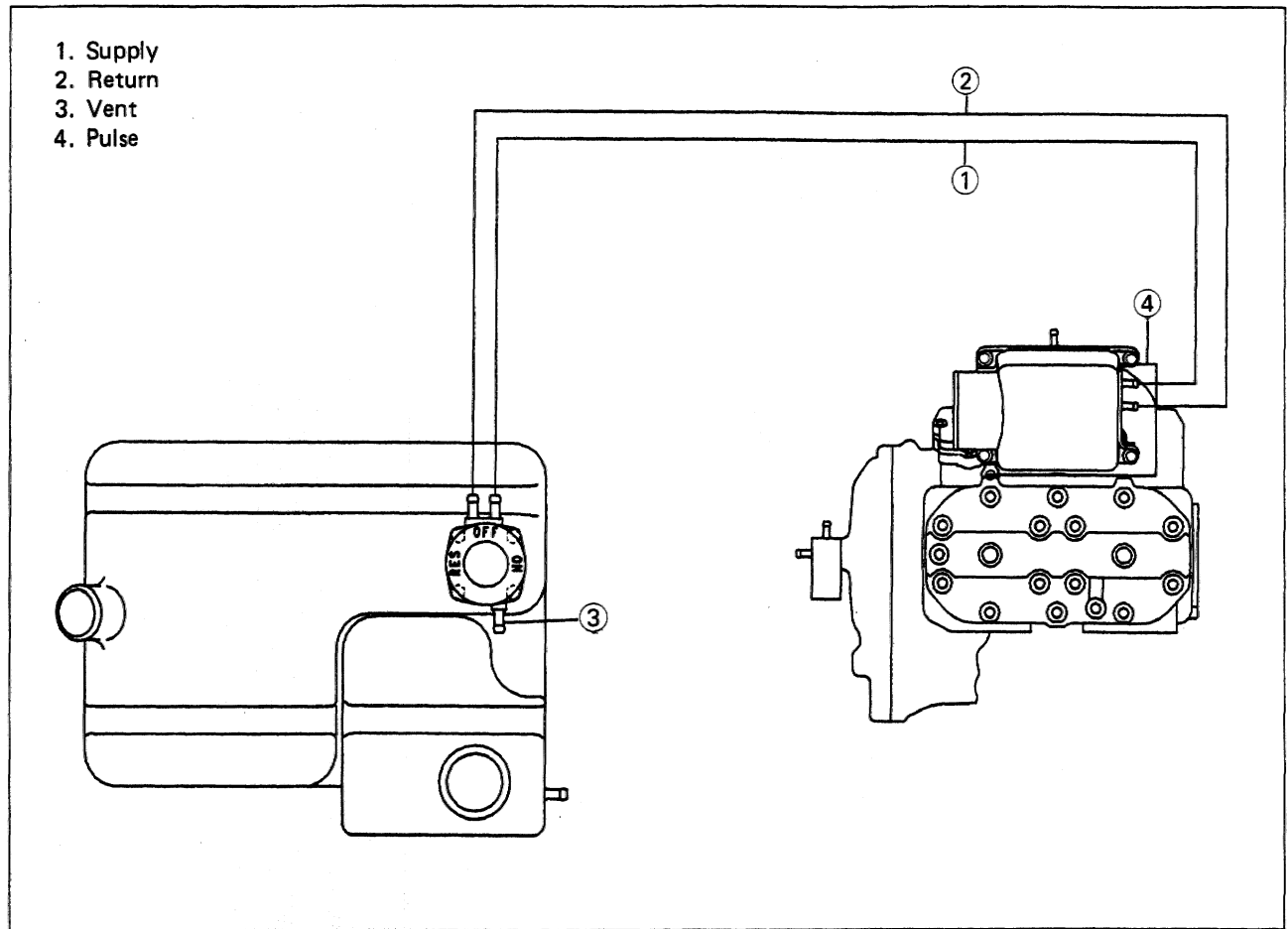
Watercraft Strap Tool: 57001-1294

(This Special Tool is available for the rubber strap removal and installation.)

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

Fuel System Diagram

1. Supply
2. Return
3. Vent
4. Pulse

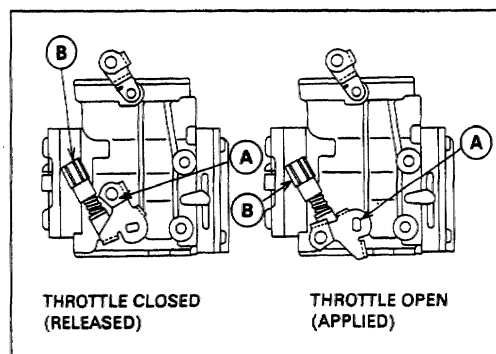


2-6 FUEL SYSTEM

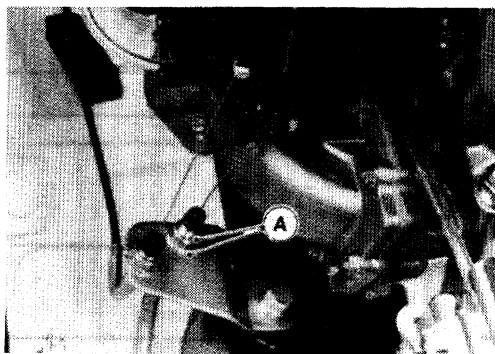
Throttle Case and Cable

Throttle Cable Adjustment

- Check throttle cable adjustment.
- With the throttle lever released, the stop on the shaft lever [A] should rest against the idle adjust screw [B], and there should be slight slack in the throttle cable.
- When the throttle lever is fully applied (pushed), the stop on the shaft lever should be all the way up against the stop on the carburetor.

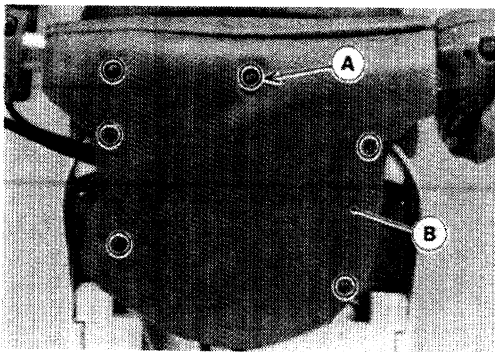


- If necessary, adjust the throttle cable.
- Loosen and turn the locknuts [A] at the bracket until the stop on the shaft lever hits against the idle adjust screw with slight cable slack.
- Tighten the locknuts securely.

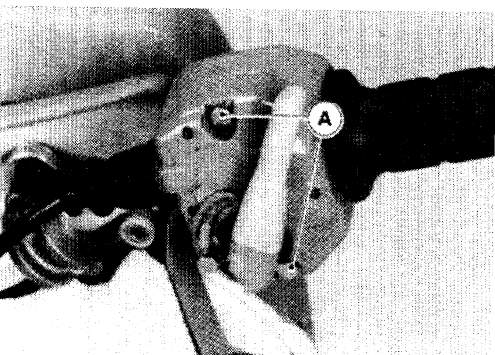


Throttle Case Removal/Disassembly

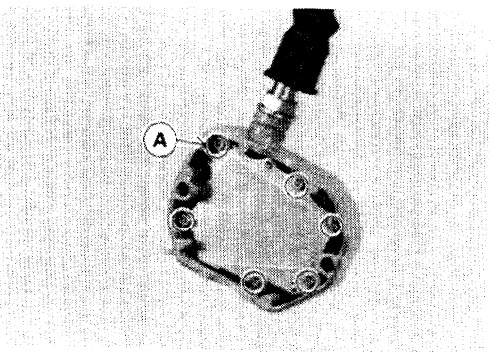
- Unscrew the mounting screws [A], remove the handlebar pad [B].



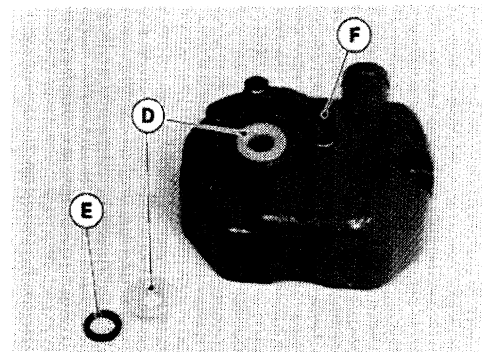
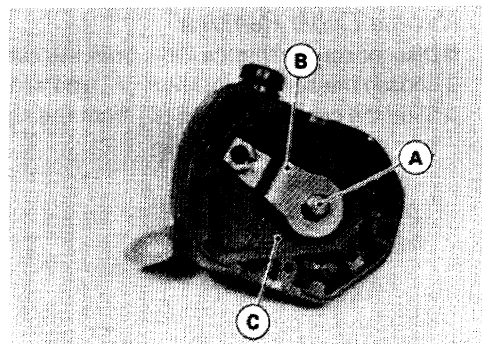
- Disconnect the throttle cable from the carburetor (see Throttle Cable Removal).
- Remove the throttle case.
- Remove the throttle case bolts [A] and separate the case halves.



- Unscrew the socket bolts [A] and remove the steel plate.

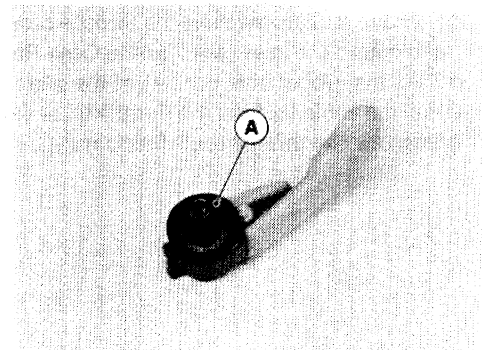


- Remove the throttle cable (see Throttle Cable Removal).
- Disassemble the throttle case.
- Remove the throttle bolt [A], lockwasher, and flat washer, and lift the throttle case lever [B] and return spring [C] from the case.
- Pull the throttle control lever out of the case.
- Pull the control lever pivot bushings [D] out of the case. One is toward the outside and the other is to the inside. There is an O-ring [E] between them.
- Remove the lockbolt and take out the throttle limiter [F].

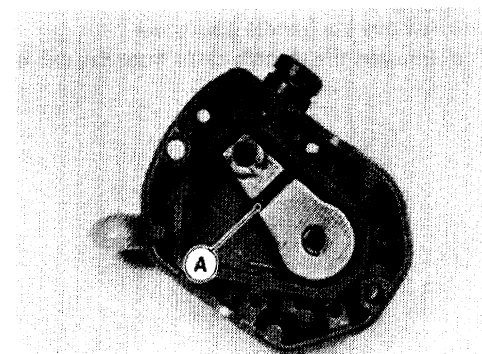


Throttle Case Assembly/Installation Notes

- Be sure the rubber seal [A] is in place on the throttle lever pivot.
- ★ If there is any doubt as to the condition of the rubber coating on the steel plate or the rubber seal on the throttle lever pivot, replace it with a new one.
- Lubricate the throttle case and cable before assembly/installation (see Throttle Case and Cable Lubrication).



- Be certain that the return spring [A] is correctly installed on the throttle lever.
- Apply a non-permanent locking agent to the throttle lever bolt and tighten it to the specified torque (see Exploded View).
- Apply a non-permanent locking agent to the throttle cable threads at the throttle case.
- Swing the throttle control lever so that the carburetor throttle valve is fully open.
- Locate the throttle limiter at the throttle lever fully open.



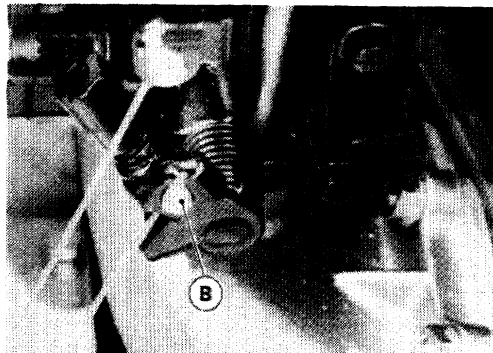
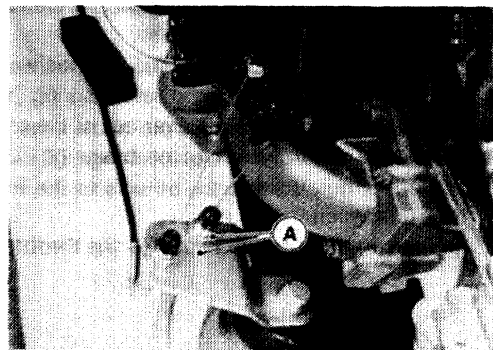
⚠ WARNING

Operation with an improperly assembled throttle case could result in an unsafe riding condition.

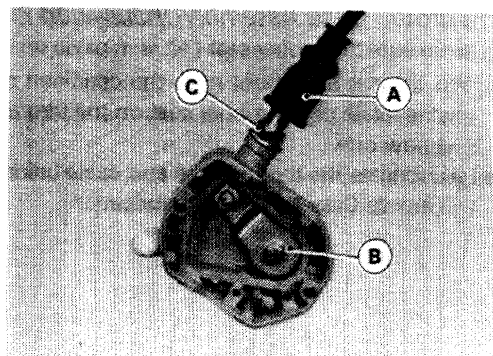
- Adjust the throttle cable (see Throttle Cable Adjustment).

Throttle Cable Removal

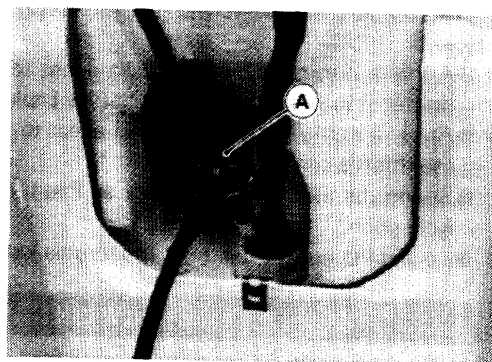
- Disconnect the throttle cable from the carburetor.
- Loosen the adjuster locknuts [A] and slide the cable from the bracket.
- Slide the cable lower end [B] from the shaft lever.



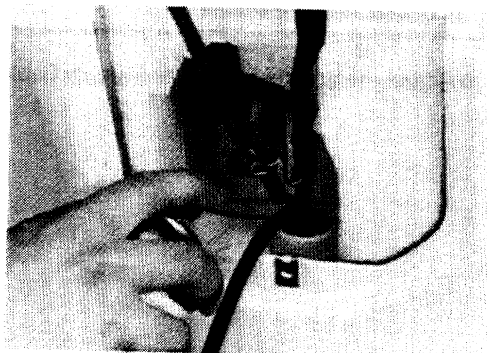
- Remove and disassemble the throttle case to free the upper end of the cable from the case (see Throttle Case Removal/Disassembly).
- Slide the rubber boot out [A] of the place.
- Pull the cable tip from the throttle lever catch [B].
- Unscrew the throttle cable fitting nut [C].



- Remove the handle pole cover.
- Unfasten the throttle cable from the cable holder [A].

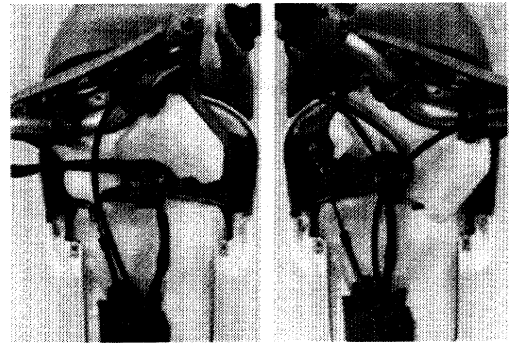


- Pull the throttle cable from the handle pole.
- Lubricate the cable passage in the handle pole with a penetrating rust inhibitor.
- Reach under the front deck and pull the throttle cable from the handle pole.



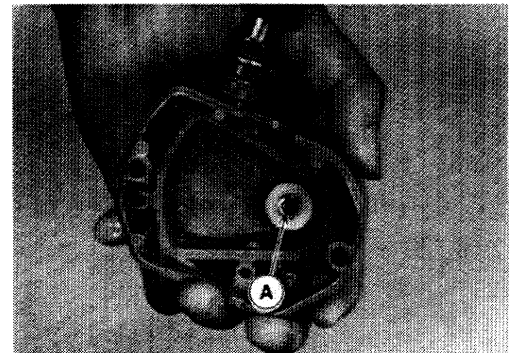
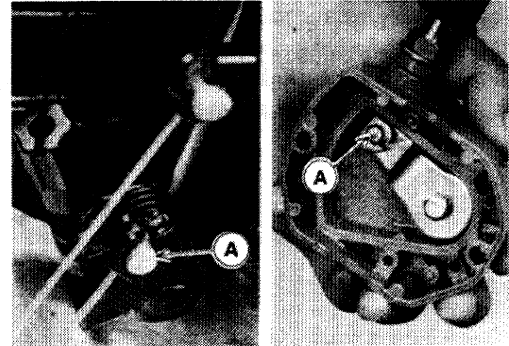
Throttle Cable Installation Notes

- Lubricate the outside of the new cable with a penetrating rust inhibitor to ease cable installation.
- Check throttle cable routing to be sure the cable does not bend sharply at the steering pivot nut. Check the cable at both extremes of handlebar movement.
- Apply a non-permanent locking agent to the throttle cable threads at the throttle case.
- Adjust the throttle cable (see Throttle Cable Adjustment).

**Throttle Case and Cable Lubrication**

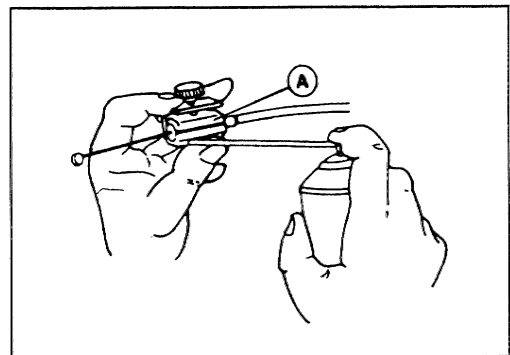
Whenever the throttle case is disassembled, and in accordance with the Periodic Maintenance Chart, perform the following.

- Apply water resistant grease [A] to the tips of the throttle cable ends.

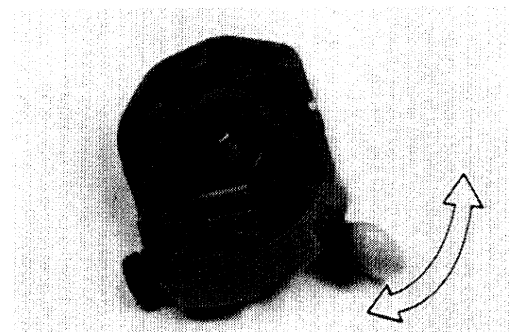


- Lubricate the cable by seeping oil between the cable and cable housing.

Special Tool – Pressure Cable Luber: K56019-021 [A]

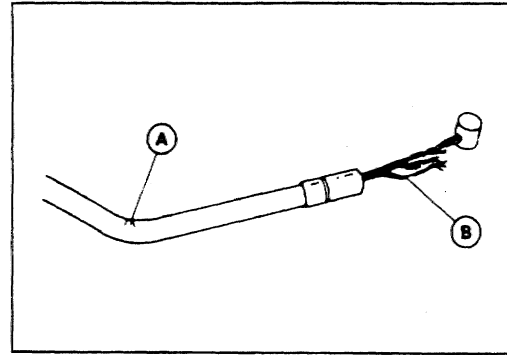
**Throttle Case Inspection**

- With the throttle cable disconnected from the throttle lever, the lever should move freely and return smoothly by spring tension.
- ★ If the lever binds, disassemble the throttle case, and clean and lubricate the throttle case (see Throttle Case and Cable Lubrication).
- Examine the lever and case for cracks. Replace the case assembly if it is cracked.



Throttle Cable Inspection

- Examine the cable.
- ★ If the cable or cable housing is kinked [A] or frayed [B], replace the cable.

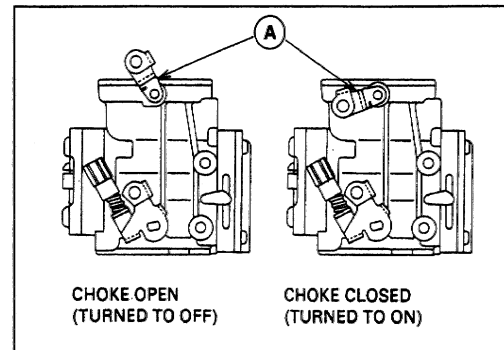


- Be certain that the throttle cable moves freely in both directions.
- Loosen the adjuster locknuts, and slide the cable from the pulley.
- Slide the inner cable back and forth in the cable housing.
- ★ If the cable does not move freely, replace it.

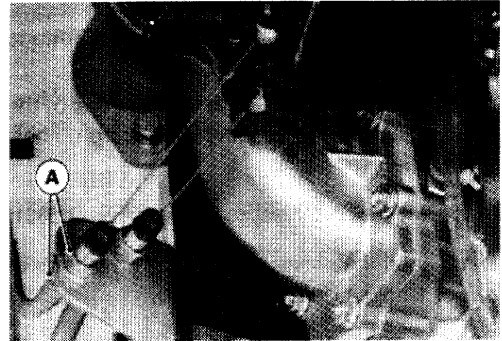
Choke Cable

Adjustment

- When the choke knob is turned counterclockwise, the choke butterfly valve in the carburetor should be completely open. Check that the choke pivot arm [A] is up all the way with minimal cable slack. This will fully open the choke butterfly valve in the carburetor.

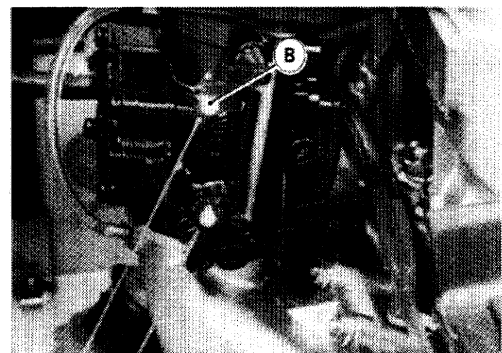
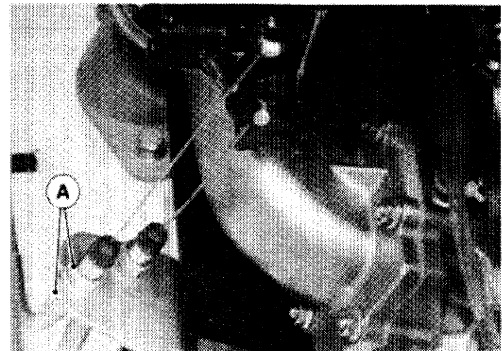


- If necessary, adjust the choke cable.
 - Turn the choke knob counterclockwise completely.
 - Loosen the locknuts [A] and turn the nuts to allow a little cable slack.
 - Tighten the locknuts.

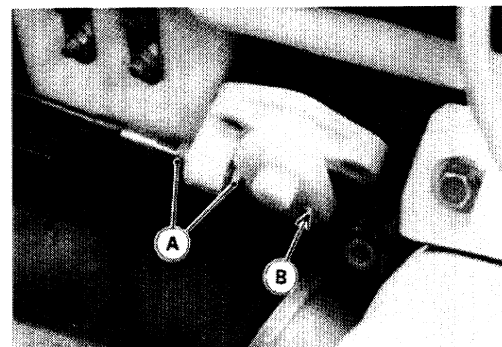


Removal

- Disconnect the choke cable from the carburetor.
 - Loosen the adjuster locknuts [A] and slide the cable from the bracket.
 - Slide the cable lower end [B] from the pivot arm.



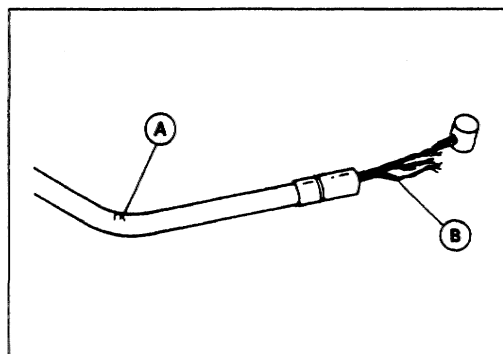
- Remove the electric case (see Electric Case Removal in the Electrical System chapter).
- Loosen the locknuts [A] and disconnect the cable tip [B].



2-12 FUEL SYSTEM

Inspection

- Examine the cable.
- ★ If the cable or cable housing is kinked [A] or frayed [B], replace the cable.
- With the choke cable disconnected at the both ends, the cable should move freely within the cable housing.
- ★ If the cable does not move freely, replace it.



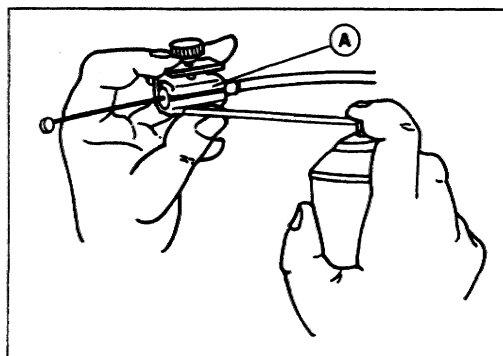
Lubrication

Whenever the choke cable removed, lubricate the choke cable as follows.

- Apply water resistant grease to the tips of the choke cable ends.
- Lubricate the choke cable by seeping oil between the cable and cable housing.

Special Tool – Pressure Cable Luber: K56019-021 [A]

- Attached the choke cable to the carburetor and adjust the choke cable (see Choke Cable Adjustment).



Carburetor/Fuel Pump

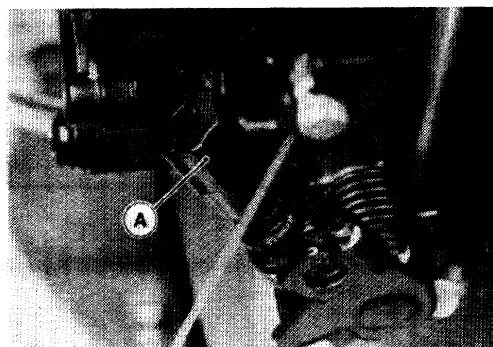
Idle Speed Adjustment

The normal idle speed setting is the lowest at which the watercraft will run reliable while still producing enough thrust to circle back to the rider after spill.

- Turn the idle adjusting screw [A] as required to reach this setting.

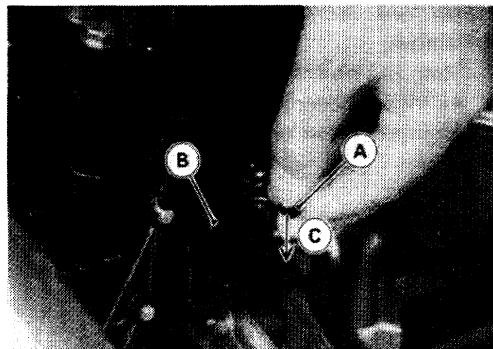
Idle Speed

- 1,250 \pm 100 rpm (in water)
- 1,700 \pm 100 rpm (out of water)



Mixture Screw Adjustment

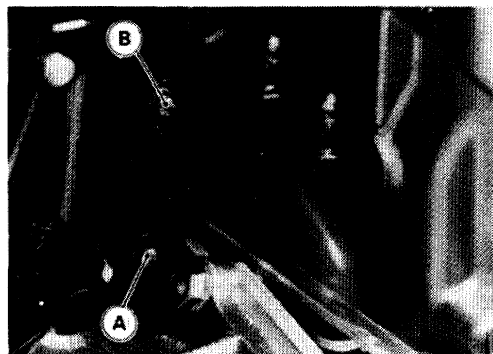
Since every carburetor is adjusted individually at the factory using a flow meter, specific mixture screw settings cannot be given. After adjustment, a cap [A] is installed over each mixture screw head [B] with the point straight down [C] to identify proper mixture screw settings for each until. **DO NOT CHANGE THESE SETTINGS.** If the carburetor is tampered with and these settings cannot be relocated, set the mixture screws to the following guide line.



- Pull out the mixture screw caps.
- To set each screw, turn it in until seats lightly, and then back it out the specified number of turns.

Mixture Screw	Turns out
Low Speed (lower) [A]	7/8, JS750-A3~ : 1 1/8
High Speed (upper) [B]	7/8, JS750-A3~ : 3/4

These guideline represent a "starting point" from which additional fine tuning of the carburetor may be necessary.



CAUTION

Do not force the mixture screws into their seats. You could damage the screws or the carburetor.

Operating the watercraft with the high speed screw at too lean a setting (screwed in clockwise too far) could cause serious engine damage.

High Altitude Performance Adjustment

The normal carburetor settings are best for sea level. If the watercraft is used at the higher elevations, the lower atmospheric pressure makes the carburetion richer. To obtain the proper carburetor setting at higher elevations, turn in the high speed screw according to the following table.

Altitude m (ft)	Turn the high speed screw in the normal position
1000 (3300)	1/8 turn
2000 (6600)	1/4 turn
3000 (10000)	3/8 turn

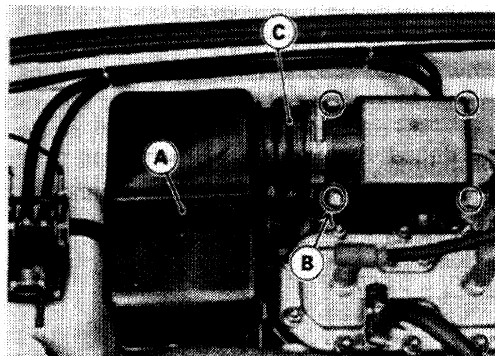
NOTE

○ The adjustment of the low speed screw is not required on the actual usage.

Carburetor Removal

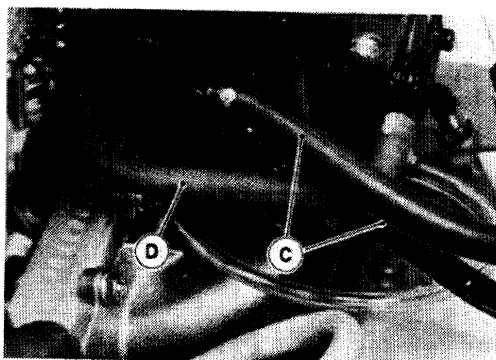
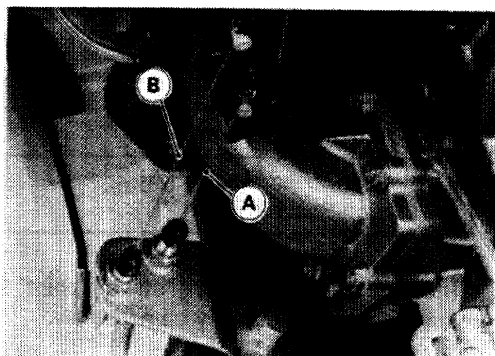
● Remove:

- Strap [A] on Intake Silencer
- Air Intake Cover Mounting Bolts [B]
- Air Intake Cover with Intake Silencer [C]

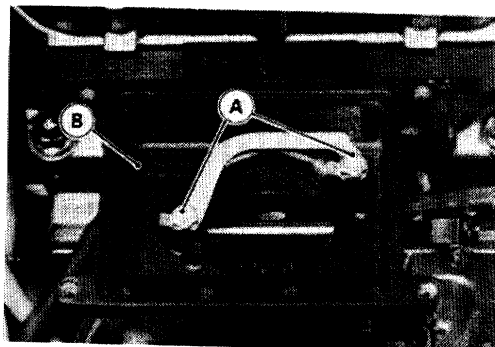


● Disconnect:

- Throttle Cable [A]
- Choke Cable [B]
- Fuel Hoses [C]
- Pulse Hose [D]



- Remove the carburetor mounting bolts [A], and remove the arrester case [B].
- Lift the carburetor off the intake manifold.



Carburetor Installation Notes

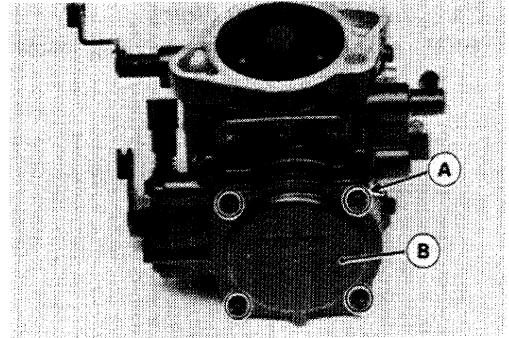
- Connect the fuel hoses and pulse hose correctly (see Fuel System Diagram).
- Install a new gasket under the carburetor.
- Apply a non-permanent locking agent to the carburetor mounting bolts.

Torque – Carburetor Mounting Bolts : 7.8 N-m (0.8 kg-m, 69 in-lb)

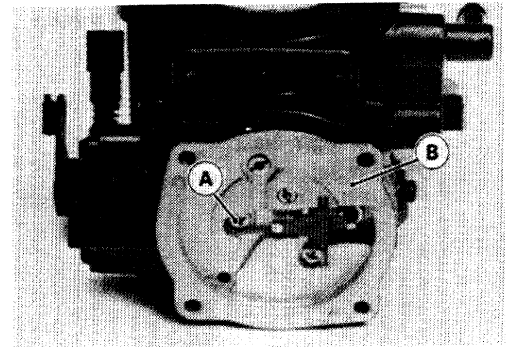
- Bend the tab portions of the double washer over the bolts.
- Adjust the throttle and choke cables (see Throttle Cable Adjustment, Choke Cable Adjustment).

Carburetor Disassembly

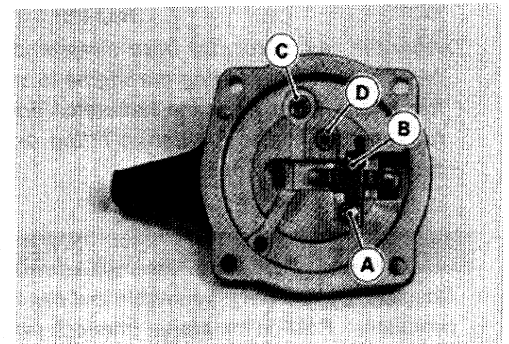
- Remove the carburetor (see Carburetor Removal).
- Unscrew the carburetor cover screws [A] and take off the carburetor cover [B].



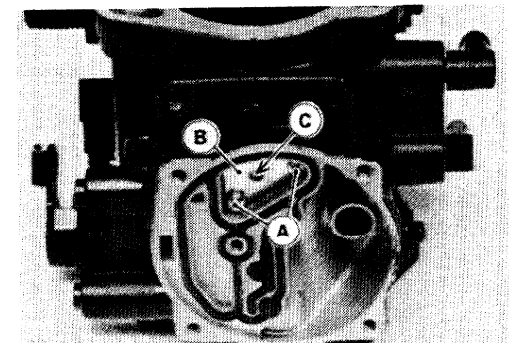
- Unscrew the carburetor case screw [A] and separate the carburetor case [B] from the carburetor body.



- Unscrew the float arm set screw [A].
- Remove:
 - Float Arm [B]
 - Spring
 - Float Valve
 - Main Jet [C]
 - Pilot Jet [D]



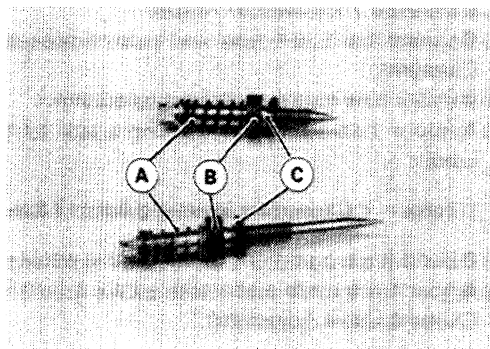
- Remove the mounting screws [A] and drop out the plate [B] and check valve [C].



NOTE

○ If the mixture screws need to be removed, check number of return rotations of mixture screws beforehand.

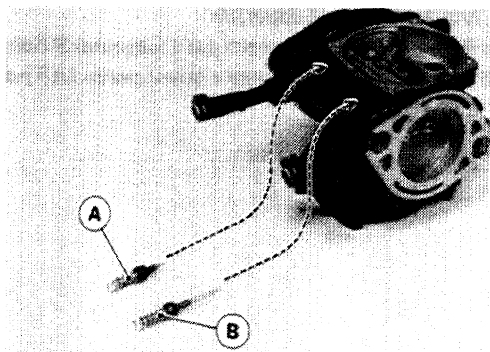
- To remove the mixture screws, turn them counterclockwise until they come out. Do not lose the spring [A], washer [B], and O-ring [C] on each screw.



Carburetor Assembly Notes

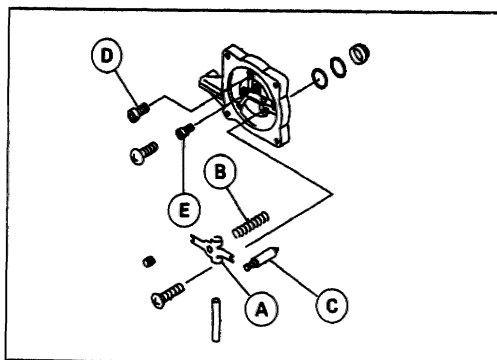
- If the mixture screws were removed, install them, as shown.

- A. High Speed Screw
- B. Low Speed Screw



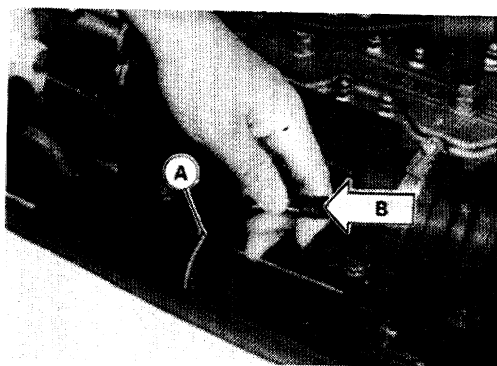
- Assemble the carburetor cover, as shown.

- A. Float Arm
- B. Spring
- C. Diaphragm Needle
- D. Main Jet
- E. Pilot Jet



NOTE

○ After the carburetor has been disassembled and cleaned, it should be primed before starting the engine to save the battery. Pull off the fuel return hose [A] at the carburetor, and blow [B] through it until fuel appears at the fuel return fitting on the carburetor. The fuel system is now full of fuel.



⚠ WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Position the starter interlock switch to the locked position. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

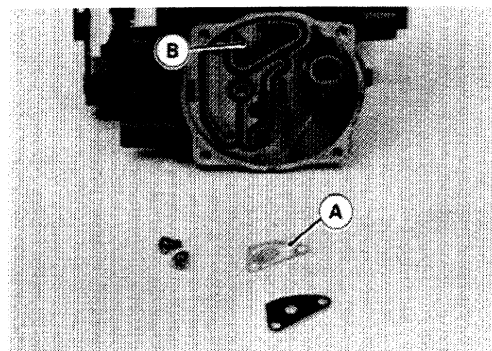
Carburetor Cleaning and Inspection

- Disassemble the carburetor (see Carburetor Disassembly).

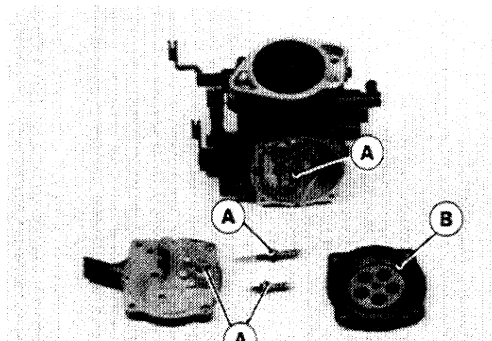
⚠ WARNING

Solvent is toxic and flammable. Avoid prolonged contact with skin and keep away from open flame. Use only in a well ventilated area. Eye protection should be worn when compressed air is used to dry parts. Do not direct air towards anyone. Use 172 kPa (1.75 kg/cm², 25 psi) maximum nozzle pressure.

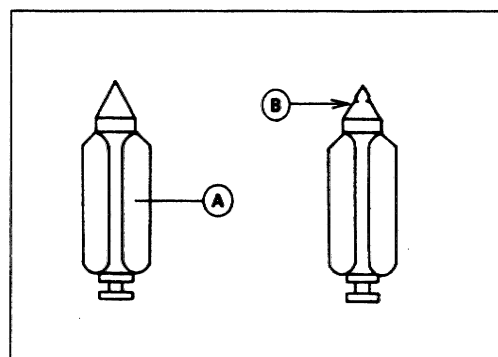
- Immerse all the metal parts in a carburetor cleaning solution.
- Rinse the parts in water.
- When the parts are clean, dry them with compressed air.
- Blow out the air and fuel passages with compressed air.
- Inspect the check valve [A] for damage or deterioration, and replace it if necessary.
- ★ If the gasket [B] under the check valve appears damaged, it may leak and must be replaced.



- Check these rubber parts for damage.
 - O-ring [A]
 - Diaphragm [B]
- ★ If any of these parts are not in good condition, replace them.



- Check the plastic tip on the diaphragm valve needle. It should be smooth, without any grooves, scratches, or tears.
 - Diaphragm Needle [A]
 - Diaphragm Needle Wear [B]
- ★ If the plastic tip is damaged, replace the needle.

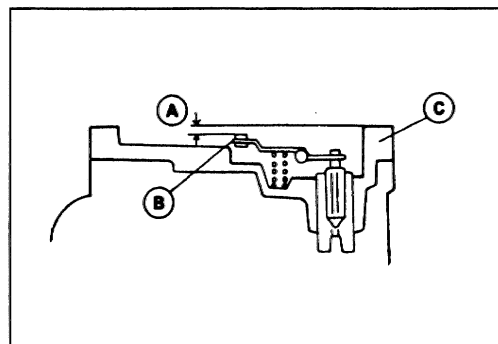


Float Arm Level Inspection and Adjustment

- Check the float arm level [A].
- Measure from the plastic tip [B] on the float arm to the carburetor case [C].

Float Arm Level
1.0 ~ 2.0 mm

- ★ If the float arm level is incorrect, bend the float arm very slightly to change the float arm level.



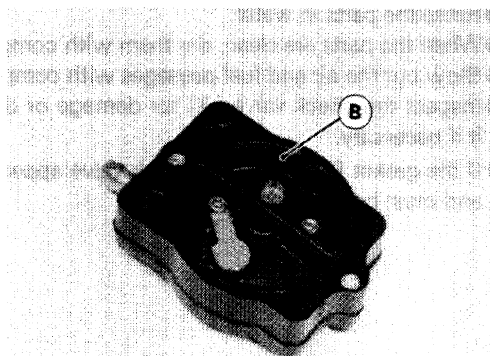
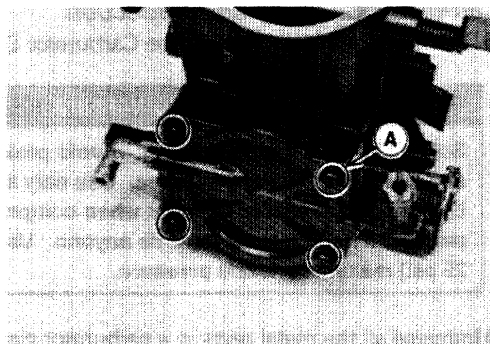
Fuel Pump Removal/Installation Note

- Remove the carburetor.
- Remove the fuel pump body screws [A], and take the fuel pump unit [B] off the carburetor.

CAUTION

The fuel pump should not be disassembled.

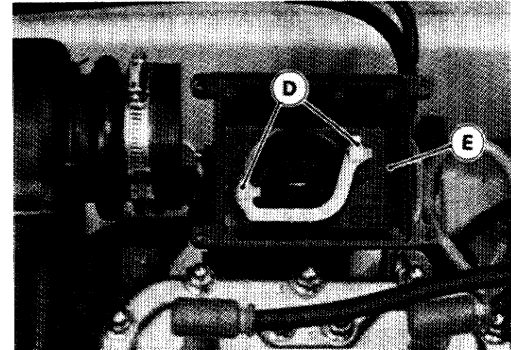
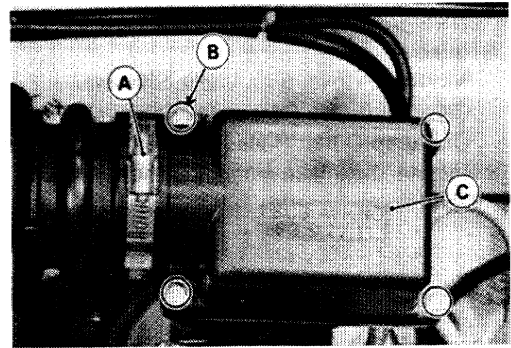
If leakage is evident or internal damage is suspected, replace the fuel pump unit [B].



Flame Arrester

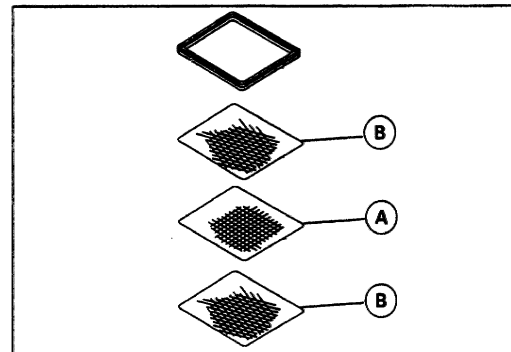
Removal

- Remove:
 - Clamp [A] on Duct (Loosen)
 - Air Intake Cover Mounting Bolts [B]
 - Air Intake Cover [C]
 - Carburetor Mounting Bolts [D]
 - Arrester Case [E].



Installation Notes

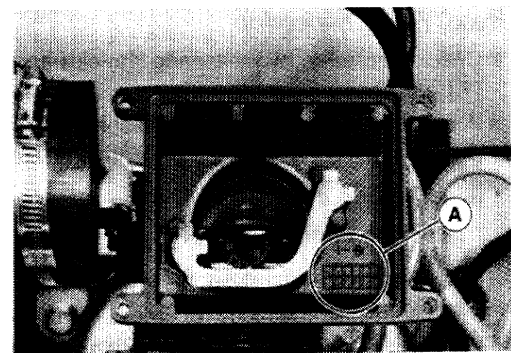
- When assembling the flame arrester, put the screen [A] between two expanders [B].



- Install the arrester case so that the mark [A] points to the engine side.
- Apply a non-permanent locking agent to the thread of the carburetor mounting bolts and the air intake cover bolts.

Torque – Carburetor Mounting Bolts : 7.8 N-m (0.8 kg-m, 69 in-lb)

- Bend the tap portions of double washer over the carburetor mounting bolts.



Cleaning

- Remove the flame arrester (see Flame Arrester Removal).
- Blow the flame arrester clean with compressed air.

⚠ WARNING

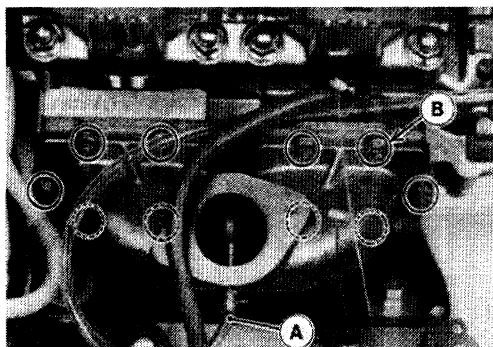
Eye protection should be worn when compressed air is used to dry ports. Do not direct air toward anyone. Use 172 kPa (1.75 kg/cm², 25 psi) maximum nozzle pressure.

- Install the flame arrester (see Flame Arrester Installation Notes).

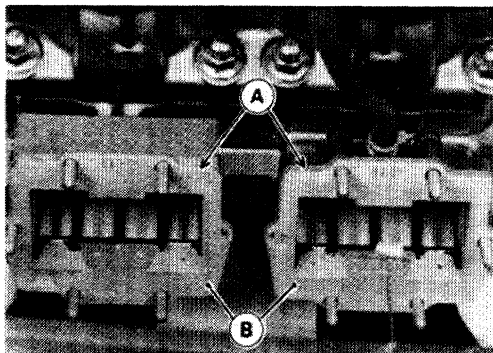
Intake Manifold, Reed Valves

Removal

- Remove:
 - Air Intake Cover with Intake Silencer
 - Carburetor (see Carburetor Removal)
 - Oil Pump Outlet Hose [A] at Oil Injection Nozzle.
- Remove the intake manifold mounting nuts [B] and remove the intake manifold.



- Pull out the gaskets [A] and the reed valves [B].

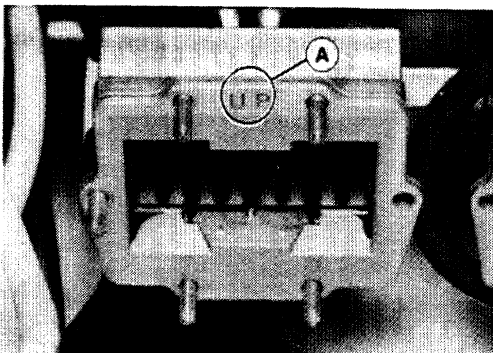


Installation Notes

- Replace the gaskets with new ones.
- Install the reed valves so that the "up" mark [A] is up.
- Install the intake manifold.

Torque – Intake Manifold Mounting Nuts : 7.8 N-m (0.8 kg-m, 69 in-lb)

- After installing the parts removed, bleed the oil pump if there are air bubbles in the outlet hose (see Engine Lubrication System chapter).



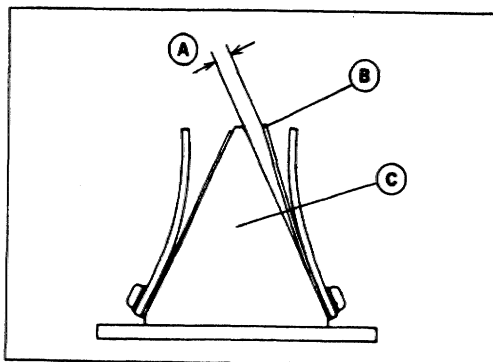
Reed Valve Inspection

- Check reed warp by measuring the clearance [A] between each reed [B] and the valve holder [C].
- ★ If any one of the clearance measurements exceeds the service limit, replace the reed valve assembly with a new one.

Reed Warp

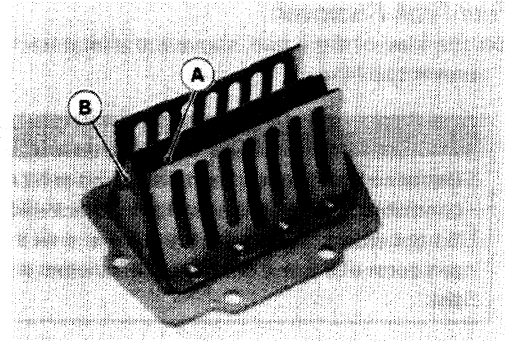
Service Limit: 0.2 mm

- Check the mounting screw tightness.
- Visually inspect the reeds for cracks, folds, or other damage.
- ★ If there is any doubt as to the condition of a reed, replace the reed valve assembly.
- ★ If a reed becomes wavy, replace the reed valve assembly with a new one even if reed warp is less than there service limit.

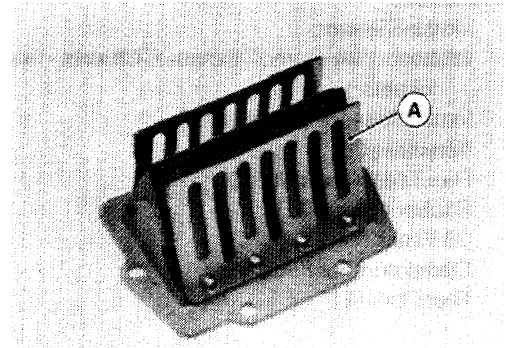


Valve Holder Inspection

- Check the reed [A] contact areas of the valve holder for grooves, scratches, or other damage.
 - Check that the rubber coating [B] on the valve holder does not show any signs of separation from the holder.
- ★ If there is any doubt as to the condition of the rubber coating, replace the reed valve assembly with a new one.

***Valve Stop Inspection***

- Check the valve stops [A] for deformation, cracks, or other damage.
- ★ If there is any doubt as to the condition of a stop, replace the reed valve assembly with a new one.



2-22 FUEL SYSTEM

Fuel Tank

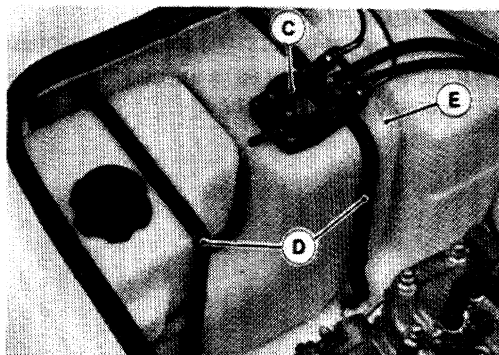
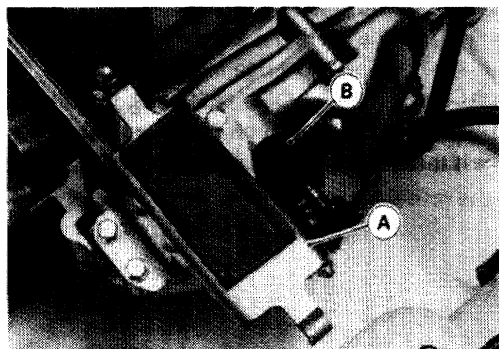
Fuel Tank Removal

- If the level of the fuel is above the inlet neck, siphon some fuel out to prevent spilling it.

⚠ WARNING

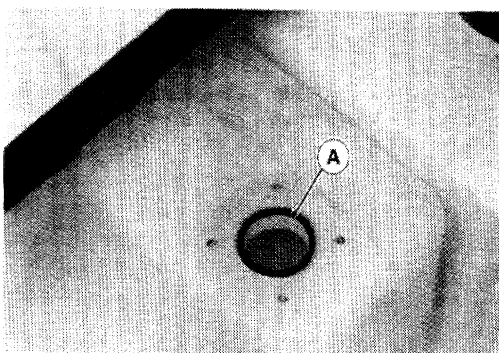
Gasoline is extremely flammable and can be explosive under certain conditions. Position the starter interlock switch to the locked position. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Remove:
 - Intake Silencer
 - Exhaust Pipe and Exhaust Chamber (see the Exhaust System chapter)
 - Intake Silencer Bracket [A]
 - Breather [B]
 - Fuel Tap Assembly [C]
 - Rubber Strap [D]
 - Oil Tank
 - Clamp on Fuel Inlet Hose
 - Fuel Tank [E]



Fuel Tank Installation Notes

- Be sure the O-ring [A] is on the fuel tank.
- Apply a non-permanent locking agent to the intake silencer bracket mounting bolts and tighten them securely.



Fuel Tank Cleaning

- Remove the fuel tank (see Fuel Tank Removal).
- Drain the tank into a suitable container.

⚠ WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Position the starter interlock switch to the locked position. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

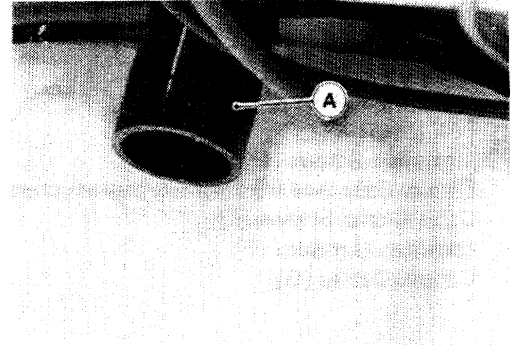
- Flush the tank repeatedly with high flash-point solvent until it is clean. It may be necessary to put a few marbles or pieces of clean gravel into the tank and shake it, to knock loose any foreign matter in the bottom.

⚠ WARNING

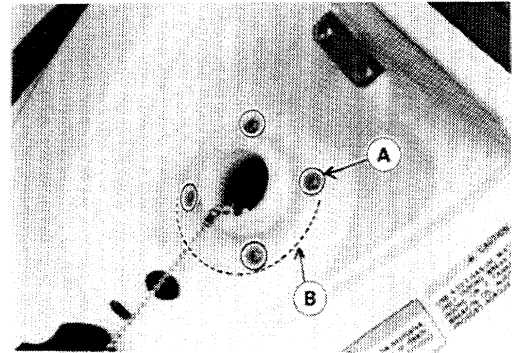
Clean the tank in a well-ventilated area, and take ample care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Do not use gasoline or a low flash-point solvent to clean the tank. A fire or explosion could result.

Fuel Filler and Tube Removal

- Remove the fuel tank (see Fuel Tank Removal).
- Loosen the clamp and twist the filler tube [A] off the bottom of the filler.



- Take out the screws [A] in the filler flange, cut the sealant [B], and pull the filler away from the hull.

***Fuel Filler and Tube Installation Notes***

- Clean the hull and the filler on their mating surfaces with a graceless, high flash-point solvent.

⚠ WARNING

Clean the parts in a well ventilated area, and take ample care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Do not use gasoline or a low flash-point solvent. A fire or explosion could result.

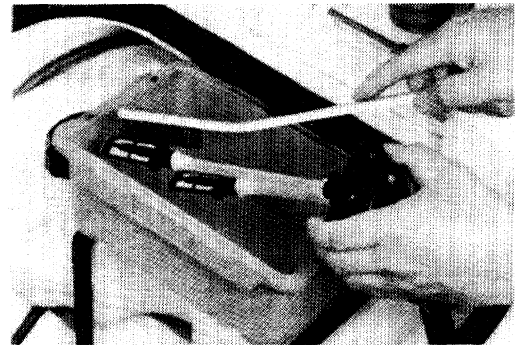
- Apply an even layer of silicone sealant to the mating surfaces of the filler and hull.

Fuel Filter Screen Cleaning

- Clean the fuel filter screens in accordance with the Periodic Maintenance Chart (see General Information chapter).
- Wash the fuel filter screens in non-flammable or high flash-point solvent. Use a brush to remove any contaminants trapped in the screens.

⚠ WARNING

Clean the fuel filter screens in a well ventilated area, and take care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Do not use gasoline or a low flash-point solvent. A fire or explosion could result.



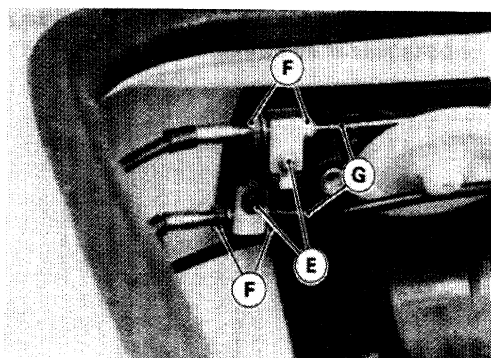
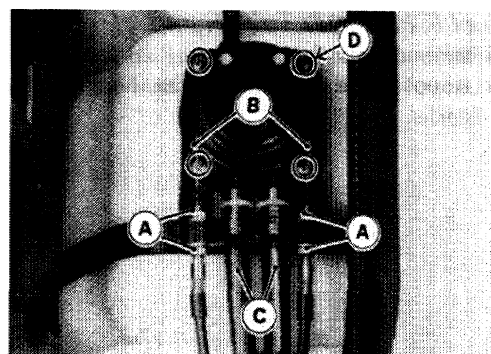
2-24 FUEL SYSTEM

Fuel Tap and Cables

Removal

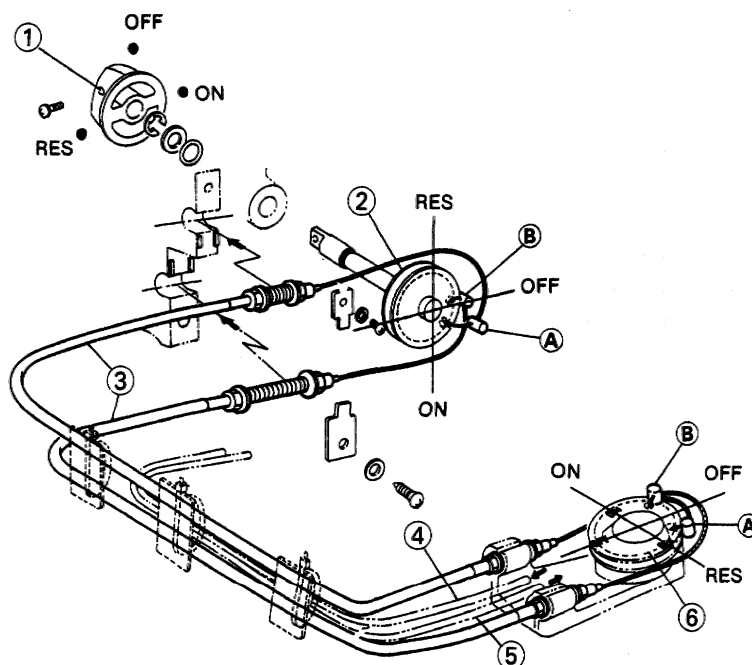
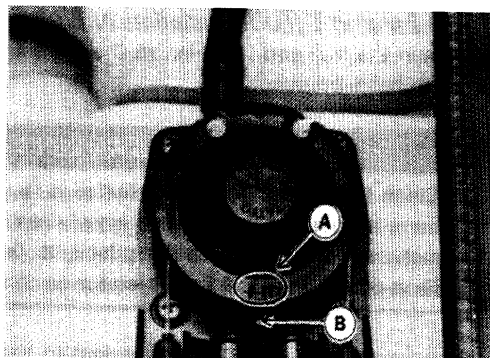
● Remove:

- Locknuts (Loosen) [A]
- Control Cables [B]
- Fuel Hoses [C]
- Mounting Screws [D]
- Electric Case (see the Electrical System chapter)
- Cable Clamp Screws [E]
- Locknuts (Loosen) [F]
- Control Cables [G]



Installation Notes

- Set the fuel knob and fuel tap in the "OFF" position, and install the cables.
- Align the "OFF" mark [A] on the fuel tap with the projection [B] on the bracket.
- Connect the fuel hoses and cables, as shown.



1. Fuel Knob
2. Reel
3. Control Cables
4. Supply Fuel Hose
5. Return Fuel Hose
6. Fuel Tap

Cleaning

If the fuel tap becomes clogged with foreign matter, it must be cleaned.

- Pull the fuel lines off the carburetor.
- Remove the fuel tap assembly.
- Use compressed air to blow through supply hose, while switching the fuel knob right and left between the "ON" and "RES" positions.
- And use compressed air to blow through the return hose.

NOTE

- *Do not use too high air pressure (25 psi max.).*

Engine Lubrication System

3

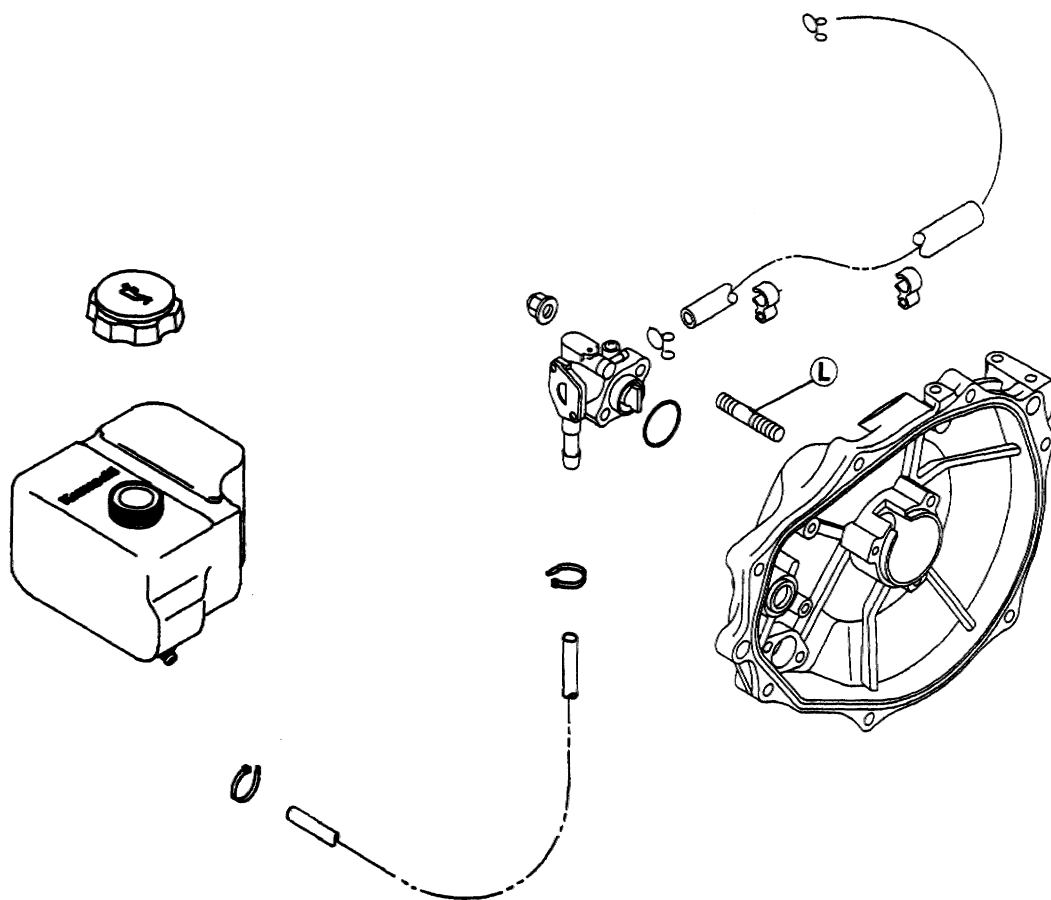
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Oil Pump Bleeding	3-4
Oil Pump Performance Test	3-4
Oil Pump Removal.....	3-5
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3-2 ENGINE LUBRICATION SYSTEM

Exploded View

L : Apply a non-permanent locking agent.



Specifications

Item	Standard
Engine Oil: Type Capacity	2-stroke, NMMA Certified for Service TC-WII 2.6 L
Engine Oil Pump: Oil pump output @3000 r/min (rpm), 2min.	5.9 – 7.2 mL

3-4 ENGINE LUBRICATION SYSTEM

Oil Pump

Oil Pump Bleeding

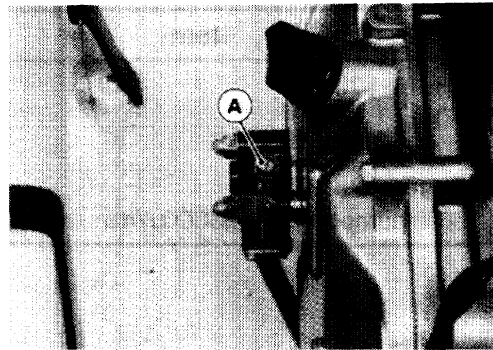
- Make sure that there is plenty of engine oil in the oil tank and that oil flow is not restricted.
- Loosen the air bleeder screw [A] on the oil pump a couple of turns, wait until oil flows out, and then tighten the bleeder screw securely.

CAUTION

Use a 50 : 1 mixture of gasoline to oil in the fuel tank in place of the gasoline normally used.

Do not turn on the water until the engine is running and turn it off immediately when the engine stops.

- Supply the cooling system with water (see Auxiliary Cooling in the General Information chapter).
- Start the engine, keep it at idling speed and check the oil flow through the transparent outlet hose.
- Keep the engine running until the air bubble in the outlet hose disappears.



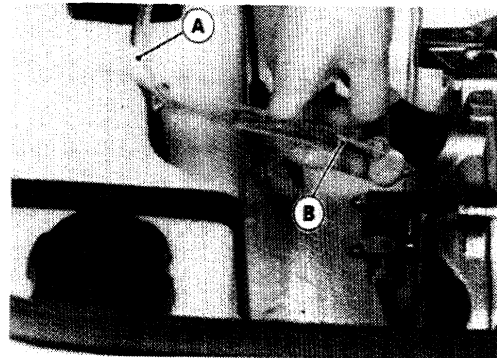
Oil Pump Performance Test

If a drop in oil pump performance is suspected, check the rate at which the oil is being pumped.

- Disconnect the oil pump outlet hose at the oil injection nozzle and run the hose [A] into a measuring glass [B].

CAUTION

For this test use a 50 : 1 mixture of gasoline to oil instead of the gasoline normally used.



- Supply the cooling system with water (see Auxiliary Cooling in the General Information chapter).
- Start the engine, and run it at a steady 3,000 rpm (use a tachometer).
- Collect the oil that is being pumped for 2 minutes. If the quantity of oil collected is within the specification, the oil pump is operating properly.

Oil Pump Output (3,000 rpm for 2 minutes)

Standard: 5.9 – 7.2 mL

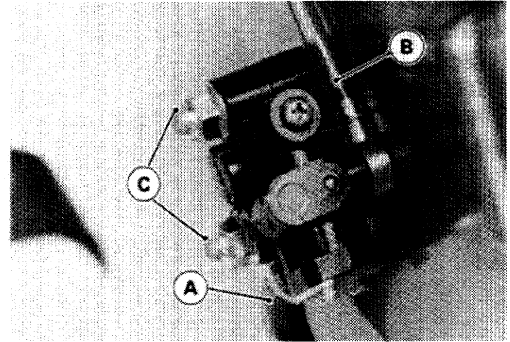
- ★ If the oil pump output is subnormal, inspect the oil pump, and the inlet and outlet hoses for oil leaks.
- ★ If oil leaks are not found, replace the oil pump.

NOTE

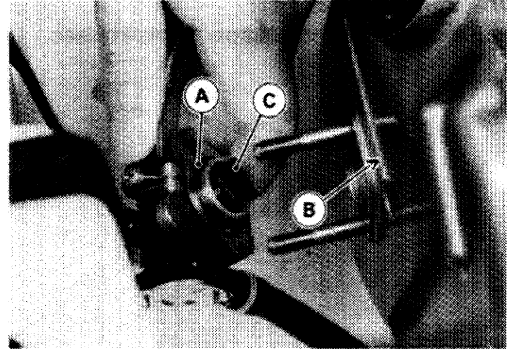
○ A check valve is built into the oil pump and can not be removed.

Oil Pump Removal

- Squeeze the inlet hose [A] to restrict oil flow and disconnect it from the oil pump.
- Pull off the outlet hose [B], remove both mounting nuts [C] and take off the oil pump and the O-ring.

***Oil Pump Installation***

- Be sure the O-ring [A] is in place and install the oil pump on the magneto cover.
- When mounting the oil pump, note the position of the slot [B] in the flywheel bolt, and then turn the oil pump shaft [C] so that it will fit into the slot.
- Connect both oil hose and bleed the air from the system (see Oil Pump Bleeding).

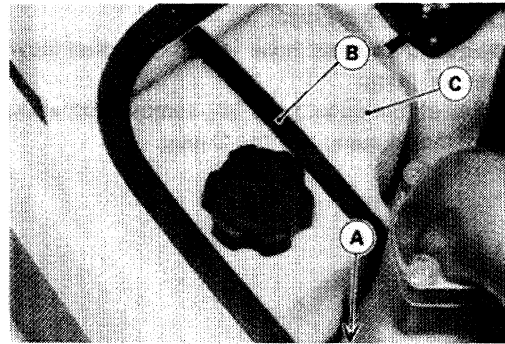


3-6 ENGINE LUBRICATION SYSTEM

Oil Tank

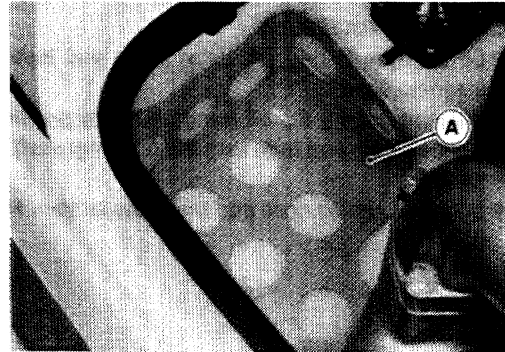
Removal

- Remove:
 - Engine Oil (Drain)
 - Oil Inlet Hose [A]
 - Rubber Strap [B]
- Take out the oil tank [C]



Installation Note

- Be sure the rubber damper [A] is in place.



Cleaning

- Flush the tank repeatedly with high flash-point solvent until it is clean.

⚠ WARNING

Clean the tank in a well-ventilated area, and take ample care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Do not use gasoline or a low flash-point solvent to clean the tank. A fire or explosion could result.

Exhaust System

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4-2 EXHAUST SYSTEM

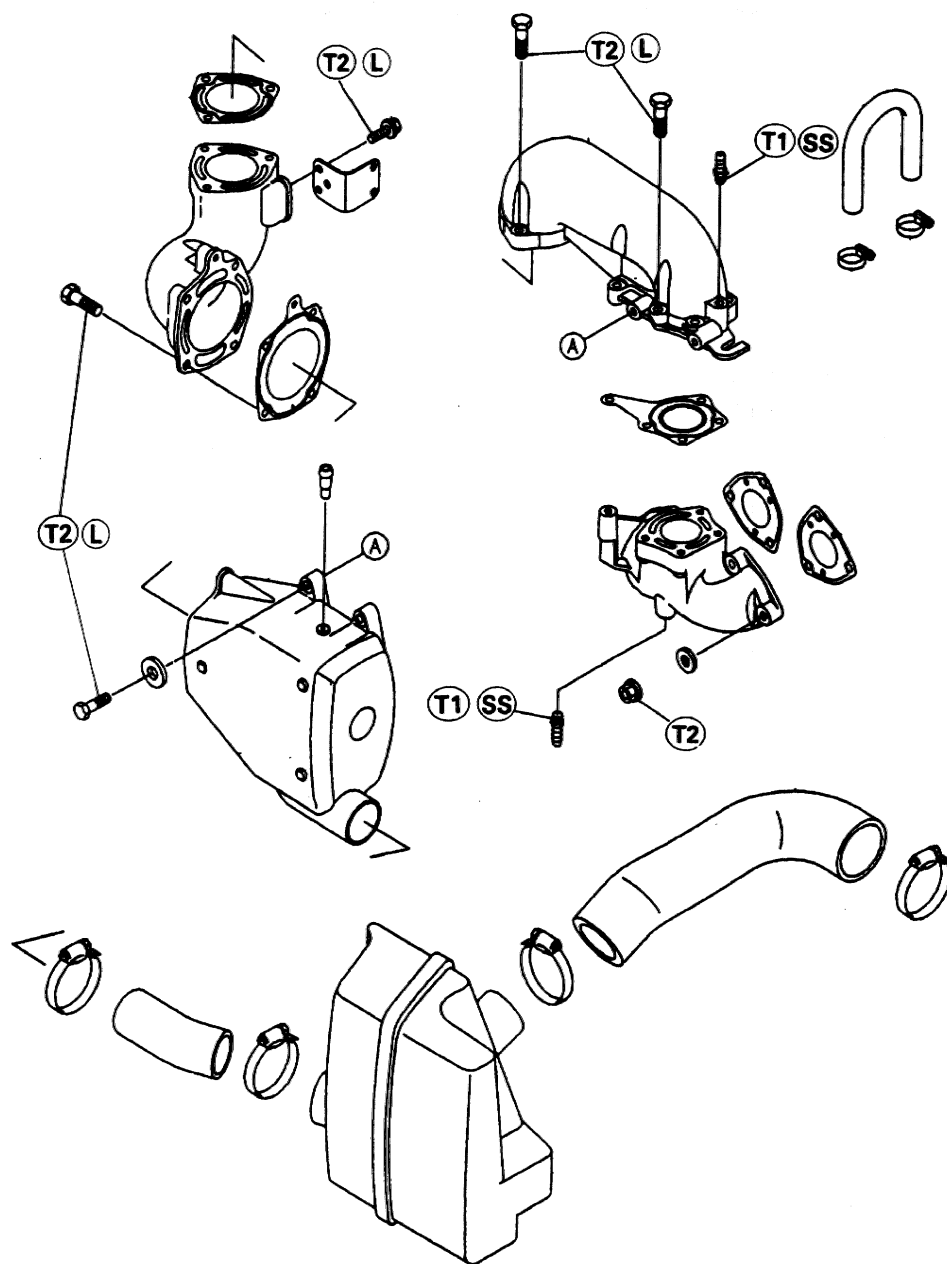
Exploded View

T1: 9.8 N-m (1.0 kg-m, 87 in-lb)

T2: 20 N-m (2.0 kg-m, 14.5 ft-lb)

L : Apply a non-permanent locking agent.

SS: Apply silicone sealant.

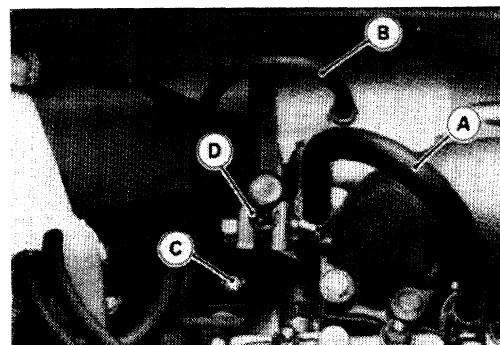


Expansion Chamber

Removal

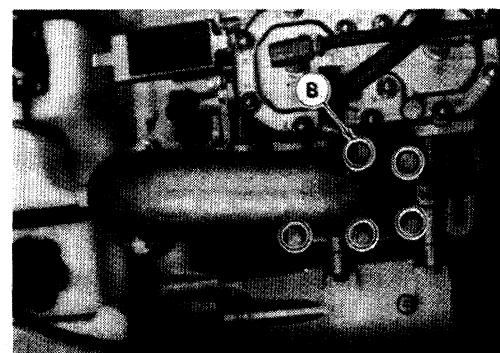
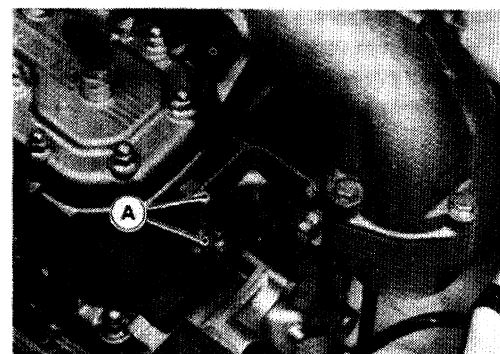
● Remove or disconnect:

- Cooling Hose [A]
- Bypass Hose [B]
- Clamp [C] (Loosen)
- Water Drain Knob [D]
- Intake Silencer

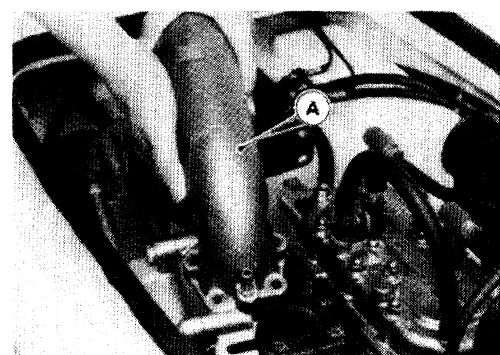


● Remove:

- Muffler Bracket Mounting Bolts [A]
- Exhaust Pipe Mounting Bolts [B]

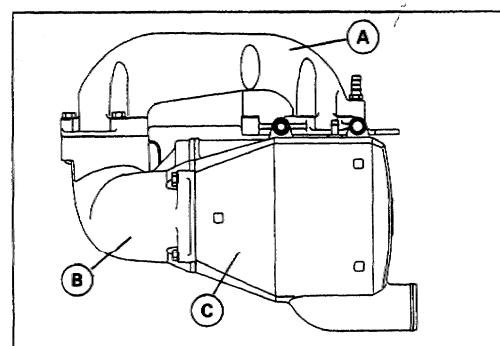


- Remove the exhaust pipe, the front muffler and the expansion chamber as a set [A].



● Disassemble:

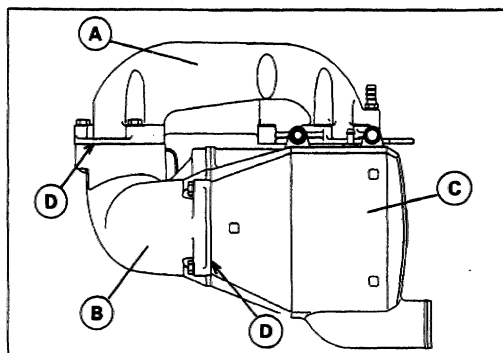
- Exhaust Pipe [A]
- Front Muffler [B]
- Expansion Chamber [C]



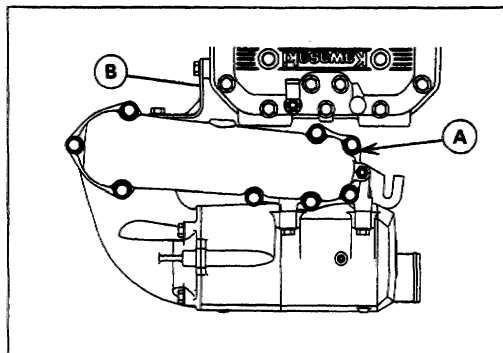
4-4 EXHAUST SYSTEM

Installation Notes

- Assemble provisionally the exhaust pipe [A], the front muffler [B] and the expansion chamber [C] with the gaskets [D].



- Install the above assembly provisionally on the exhaust manifold that is set on the engine with the gasket [A].
- Install provisionally the muffler bracket [B] between the cylinder and the front muffler.



- Apply a non-permanent locking agent to all the bolts and torque all the bolts in the following order.

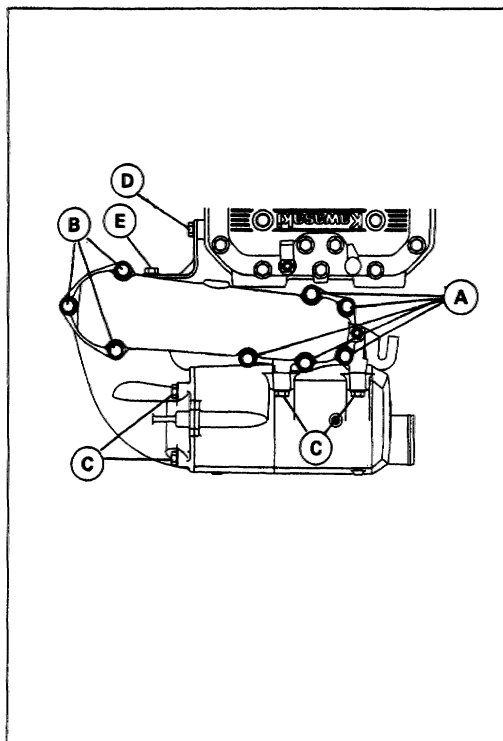
Torque – Exhaust Pipe Mounting Bolts: 20 N-m (2.0 kg-m, 14.5 ft-lb) [A]

Front Muffler Mounting Bolts: 20 N-m (2.0 kg-m, 14.5 ft-lb) [B]

Expansion Chamber Mounting Bolts: 20 N-m (2.0 kg-m, 14.5 ft-lb) [C]

Muffler Bracket Mounting Bolts (cylinder side): 20 N-m (2.0 kg-m, 14.5 ft-lb) [D]

Muffler Bracket Mounting Bolts (front muffler side): 20 N-m (2.0 kg-m, 14.5 ft-lb) [E]



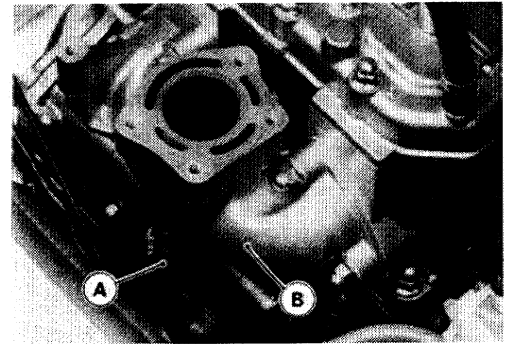
Expansion Chamber Cleaning and Inspection

- Remove the expansion chamber (see Expansion Chamber Removal).
- Scrape any carbon deposits out of the expansion chamber with a blunt, rounded tool. Excessive deposits will cause the engine to run poorly.
- Check the expansion chamber carefully for cracks. Also look for corrosion both inside and out.

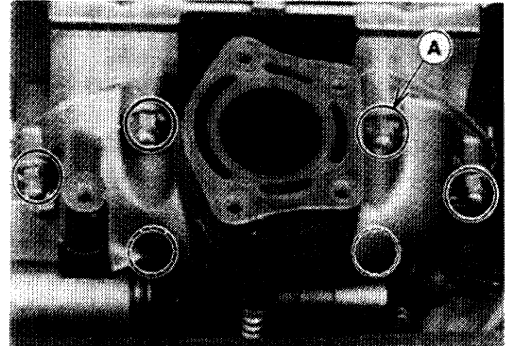
Exhaust Manifold

Removal

- Remove the exhaust pipe, the front muffler and the expansion chamber as a set.
- Disconnect the inlet cooling hose [A] from the lower part of the exhaust manifold [B].

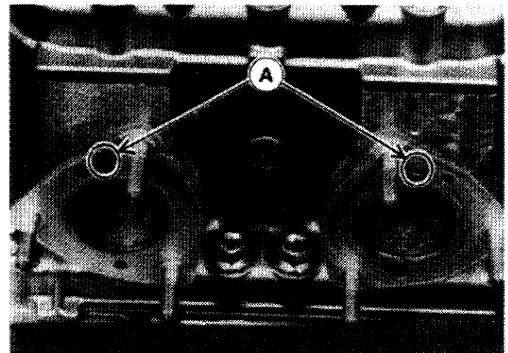


- Remove the exhaust manifold mounting nuts [A].
- Take off the exhaust manifold off the cylinder.

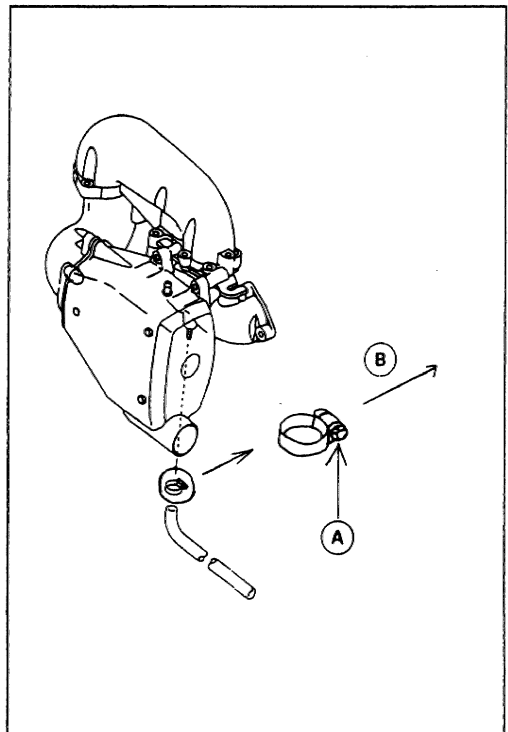


Installation Notes

- Install the exhaust manifold gaskets so that the arrows [A] point the up.



- The cooling hose clamp bolt [A] should face toward cylinder [B].

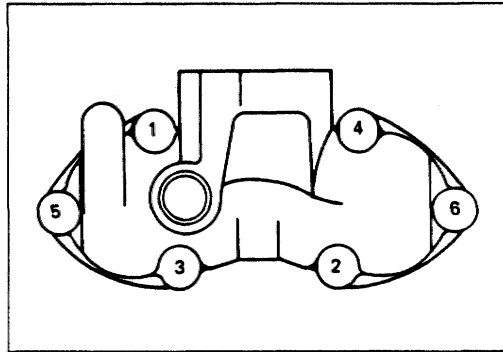


4-6 EXHAUST SYSTEM

Water Box Muffler

- Torque the exhaust manifold mounting nuts, following the specified tightening sequence.

Torque – Exhaust Manifold Mounting Nuts: 20 N-m (2.0 kg-m, 14.5 ft-lb)



Exhaust Manifold Cleaning and Inspection

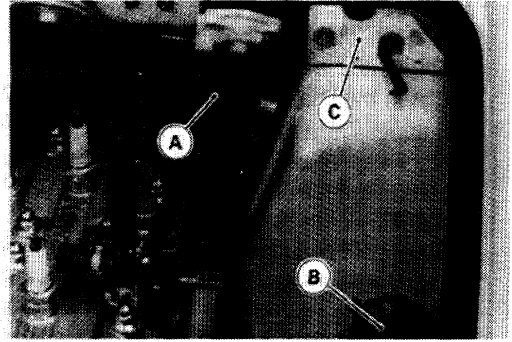
- Remove the exhaust manifold parts.
 - Clean the carbon deposits out of the exhaust passages with a blunt, rounded tool.
 - Flush foreign matter out of the water passages with fresh water.
 - Check the insides of the water passages for corrosion. Check the gasket surfaces for nicks or other damage.
- ★ If there is excessive corrosion or if the gasket surfaces are so badly damaged that they will not seal properly, replace the part.

Water Box Muffler

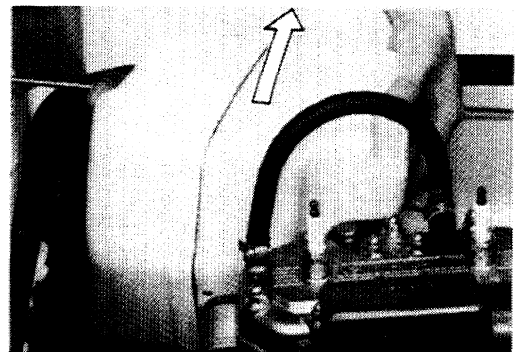
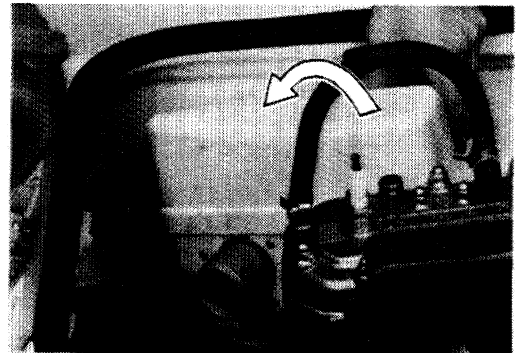
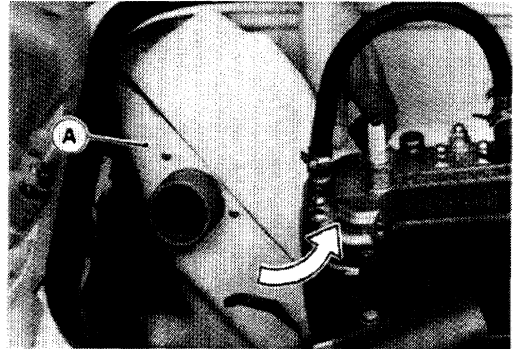
Removal/Installation

● Remove or disconnect:

- Electric Case
- Exhaust Pipe, Front Muffler and Expansion Chamber as a set
- Outlet Tube [A]
- Inlet Tube [B]
- Muffler Bracket [C]



- Rotating the water box muffler [A] as shown, remove the muffler out of the hull.



Inspection

- Remove the water box muffler.
- Empty any water out of the water box.
- Check the inlet spigot for damage caused by excessive heat.
- ★ If there is heat damage to the inlet spigot, check the cooling system for blockage (see Cooling System Cleaning and Inspection) and the carburetor for proper mixture needle adjustment (see Mixture Screw Adjustment in the Fuel System chapter).
- Check the seam around the center of the water box for leaks.
- ★ If there are leaks in the water box seam, they may be repaired with an epoxy putty, or the water box may be replaced. Exhaust leaks will fill the engine compartment with exhaust gasses which will cause the engine to run poorly.

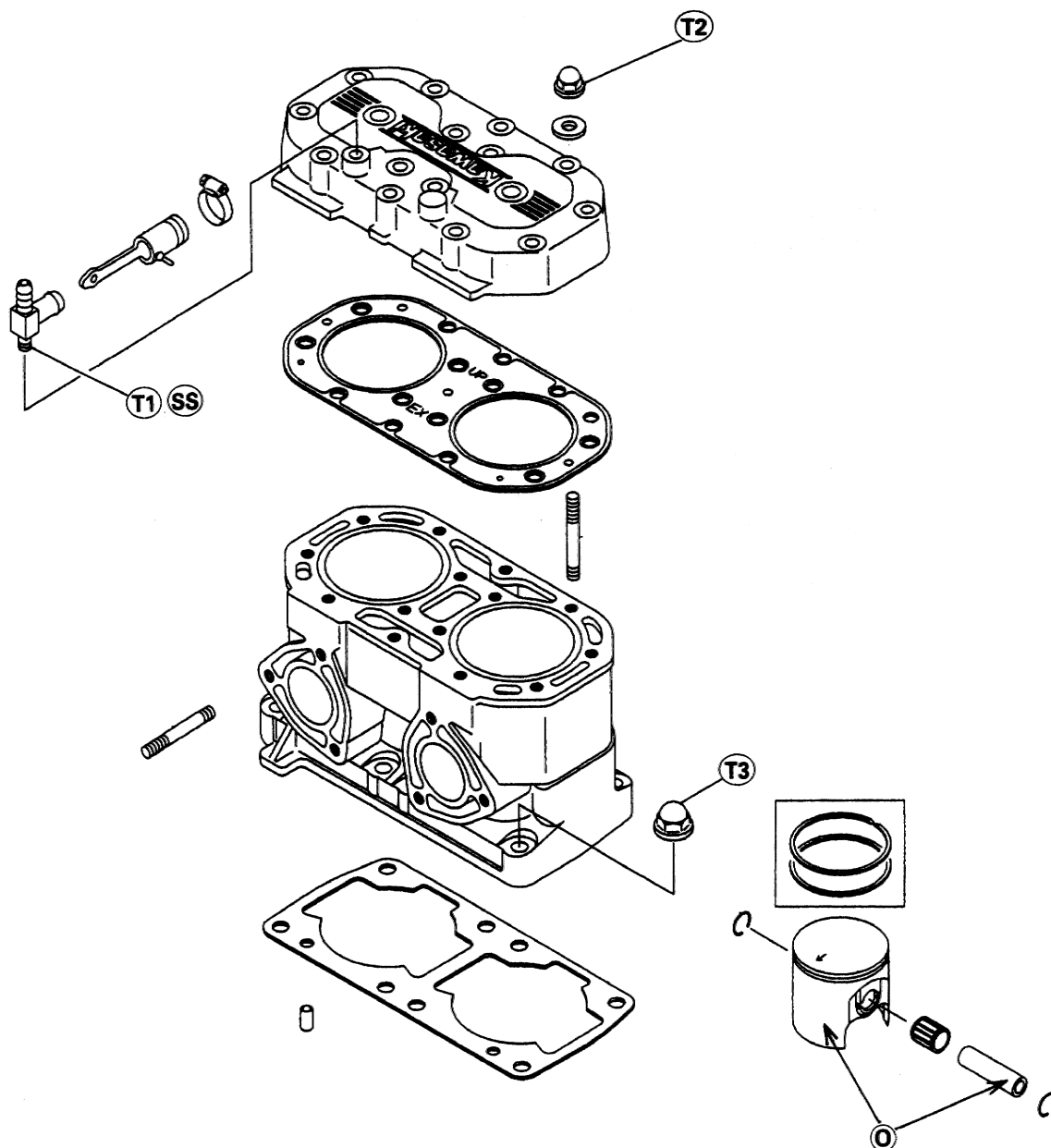
Engine Top End

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Exploded View

O : Apply engine oil.



Specifications

Item	Standard	Service Limit
Cylinder Head:		
Cylinder compression	(Usable range) 835 ~ 1294 kPa (8.5 ~ 13.2 kg/cm ² , 121 ~ 187 psi) (Open throttle)	---
Cylinder head warp	---	0.05 mm
Cylinder, Piston:		
Cylinder inside diameter	80.000 ~ 80.015 mm	80.10 mm
Piston diameter (18 mm up from bottom of skirt)	79.900 ~ 79.915 mm	79.75 mm
Piston/cylinder clearance	0.095 ~ 0.115 mm	---
Oversize piston and rings	+0.5 mm and +1.0 mm	---
Piston ring/groove clearance: Top (keystone)	---	---
Second	0.03 ~ 0.07 mm	0.17 mm
Piston ring groove width: Top (keystone)	---	---
Second	1.22 ~ 1.24 mm	1.32 mm
Piston ring thickness: Top (keystone)	---	---
Second	1.17 ~ 1.19 mm	1.1 mm
Piston ring end gap: Top	0.25 ~ 0.40 mm	0.7 mm
Second	0.25 ~ 0.40 mm	0.7 mm

Special Tools – Piston Pin Puller Assembly: 57001-910
Piston Ring Compressor Grip: 57001-1095
Piston Ring Compressor Belt, $\phi 67 \sim \phi 79$: 57001-1097
Compression Gauge: 57001-221
Compression Gauge Adapter: 57001-1159

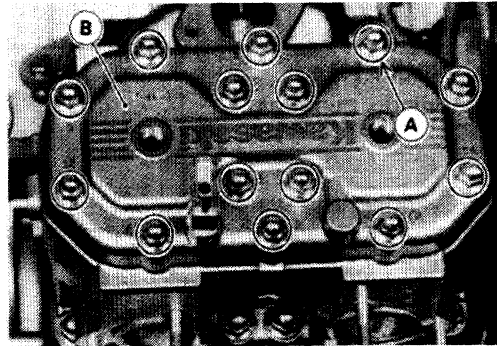
5-4 ENGINE TOP END

Engine Top End

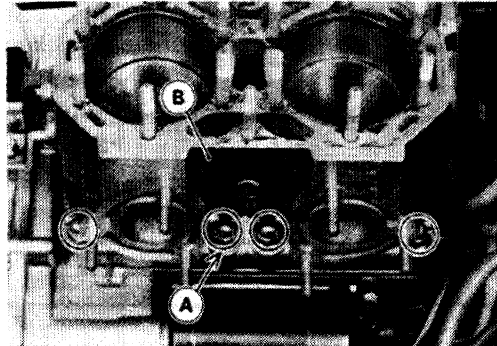
Disassembly and Assembly:

Disassembly

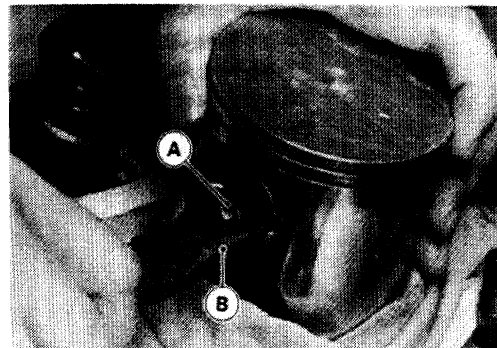
- Remove:
 - Spark Plugs
 - Intake Silencer
 - Carburetor (see Carburetor Removal in the Fuel System chapter)
 - Exhaust Pipe, Front Muffler and Expansion Chamber as a set (see Exhaust System chapter)
- Remove the cylinder head nut [A], and take off the cylinder head [B].



- Remove the cylinder base nuts [A], and lift off the cylinder [B].

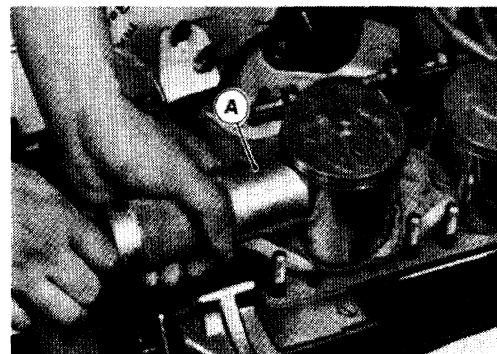


- Stuff clean rags into the crankcase opening to prevent dirt or foreign objects from falling into the crankcase.
- Remove the piston pin snap ring [A] with a pliers [B].



- Remove the piston by pushing its pin out the side that the circlip was removed. Use a piston pin puller assembly [A], if the pin is tight.

Special Tool – Piston Pin Puller Assembly: 57001-910

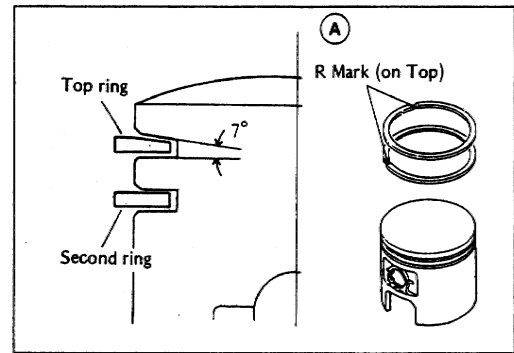


- Carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring [A] to remove it.

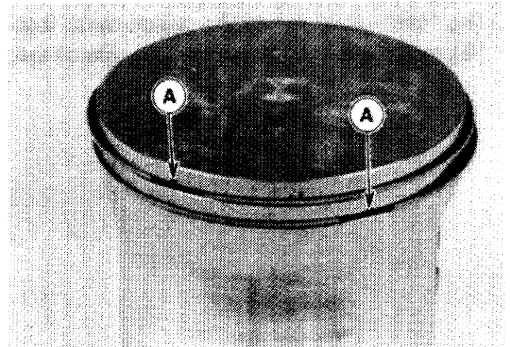


Assembly Notes

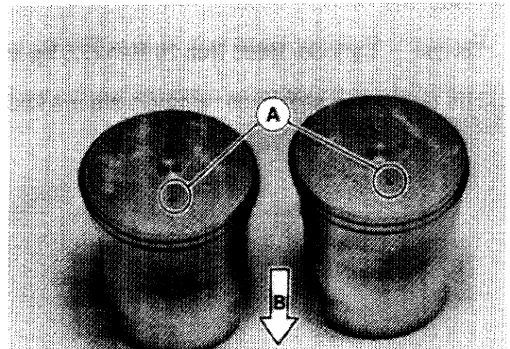
- If any parts in the piston assemblies require replacement, or if the cylinder is honed or replaced, be sure to check the critical clearances of the new parts against the values given in Specifications.
- Install the piston rings so that the "R" mark [A] faces upwards as shown.



- When installing the piston rings by hand, first fit one end of the piston ring against the pin in the ring groove, spread the ring opening with the other hand and then slip the ring into the groove.
- Check to see that the pin [A] in each piston ring groove is between the ends of the piston ring.



- Apply engine oil to the surface of each piston pin.
- Mount the piston on the connecting rod with the arrow [A] on its crown pointing to the left (exhaust) side [B] of the engine.

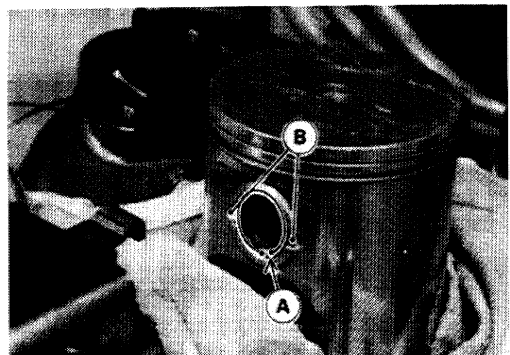


- When installing a piston pin snap ring, compress it only enough to install it and no more.

CAUTION

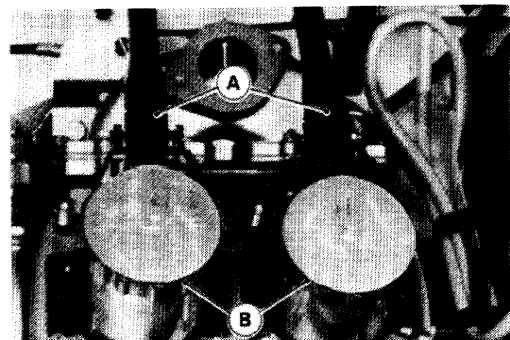
Do not reuse rings, as removal weakens and deforms them. They could fall out and score the cylinder wall.

- Fit a new piston pin snap ring into the side of each piston so that the snap ring opening [A] does not coincide with the slits [B] of the piston pin hole.



- Set the new cylinder base gasket in place on the crankcase.
- Apply engine oil to the surface of the pistons.
- Compress the piston rings.

**Special Tool – Piston Ring Compressor Grip: 57001-1095 [A]
Piston Ring Compressor Belt, $\phi 67 \sim \phi 79$: 57001-1097 [B]**



5-6 ENGINE TOP END

- Thoroughly oil the cylinder bores.
- Slide the cylinder block down over the crankcase studs onto the crankcase.

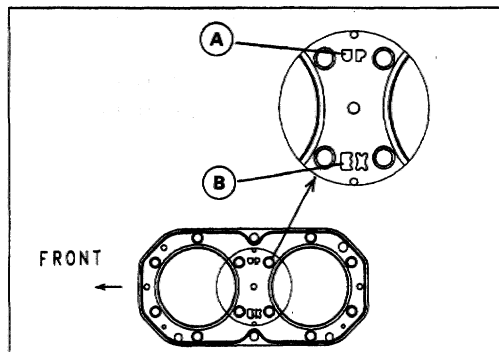
CAUTION

Do not force the cylinder block. Make sure the rings are in position.

- Install the cylinder base nuts, and cross-tighten them.

Torque – Cylinder Base Nuts: 34 N-m (3.5 kg-m, 25 ft-lb)

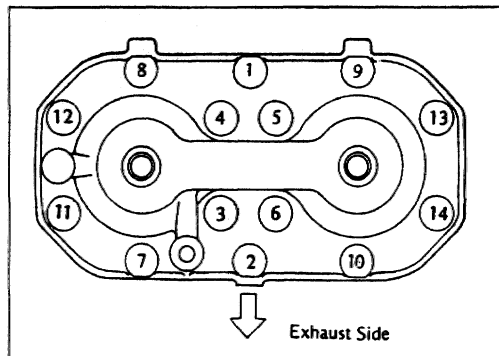
- Place a new cylinder head gasket on the cylinder head.
- The "UP" mark [A] of the gasket must face upward and "EX" mark [B] must face toward the exhaust side of the engine.



- Install the cylinder head.

Torque – Cylinder Head Nut: 29 N-m (3.0 kg-m, 22 ft-lb)

- The tightening sequence numbers are marked on the cylinder head.



- Start the engine to check for fuel and oil leaks, exhaust leaks, and excessive vibration.

⚠ WARNING

Do not run the engine in a closed area. Exhaust gases contain carbon monoxide, a colorless, odorless, poisonous gas which can be lethal.

CAUTION

Do not run the engine for more than 15 seconds without cooling water.

Maintenance and Inspection:***Compression Measurement***

- Thoroughly warm up the engine, while checking that there is no compression leakage from around the spark plugs or the cylinder head gasket.

CAUTION

Do not run the engine for more than 15 seconds without cooling water.

- Stop the engine.
- Remove the spark plugs and screw a compression gauge firmly into the spark plug hole.

Special Tools – Compression Gauge: 57001-221 [A]

Compression Gauge Adapter: 57001-1159 [B]

- Using the starter motor, turn the engine over with the throttle fully open until the compression gauge stops rising; the compression is the highest reading obtainable.
- Repeat the measurement for the other cylinder.

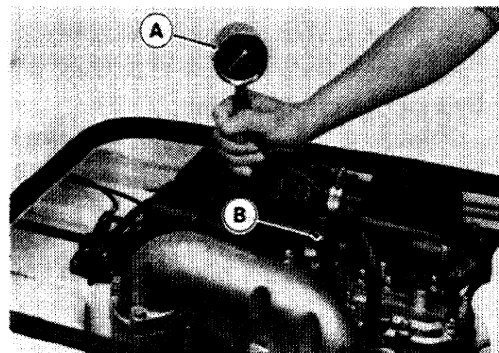
Cylinder Compression (Usable Range)

835 – 1,294 kPa

(8.5 – 13.2 kg/cm², 121 – 187 psi)

(open throttle)

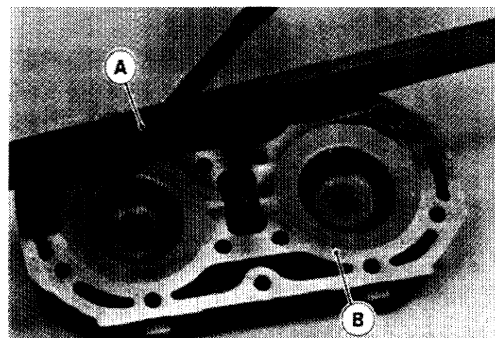
- ★ If the cylinder compression is higher than the usable range, check the following.
 - Carbon buildup on the piston head and cylinder head – clean off any carbon on the piston head and cylinder head.
 - Cylinder head gasket, cylinder base gaskets – use only the proper gaskets. The use of a gasket of incorrect thickness will change the compression.
- ★ If cylinder compression is lower than the usable range, check the following:
 - Gas leakage around the cylinder head – replace the damaged gasket and check the cylinder head for warp.
 - Piston/cylinder clearance, piston seizure.
 - Piston rings, piston ring grooves wear.

***Cylinder Head Warp Inspection***

- Lay a straightedge [A] across the lower surface of the head [B] at several different points, and measure warp by inserting a thickness gauge between the straightedge and the head.
- ★ If warp exceeds the service limit, repair the mating surface. Replace the cylinder head if the mating surface is badly damaged.

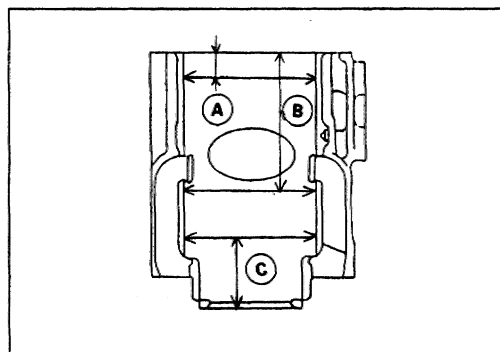
Cylinder Head Warp

Service Limit: 0.05 mm



Cylinder Wear Inspection

- Inspect the inside of the cylinder for scratches and abnormal wear.
- ★ If the cylinder is damaged or badly worn, replace it with a new one.
- Since there is a difference in cylinder wear in different directions, take a side-to-side and a front-to-back measurement at each of the 3 locations (total of 6 measurements) shown in the figure.
 - A. 10 mm
 - B. 80 mm
 - C. 35 mm



- ★ If any of the cylinder inside diameter measurements exceeds the service limit, the cylinder will have to be bored oversize and then honed.

Cylinder Inside Diameter

Standard: 80.000 – 80.015 mm and less than 0.01 mm difference between any two measurements

Service Limit: 80.10 mm, or more than 0.05 mm difference between any two measurements

Piston Diameter Measurement

- Measure the outside diameter [A] of the piston 18 mm up [B] from the bottom of the piston at a ring angle to the direction of the piston pin.

Piston Diameter

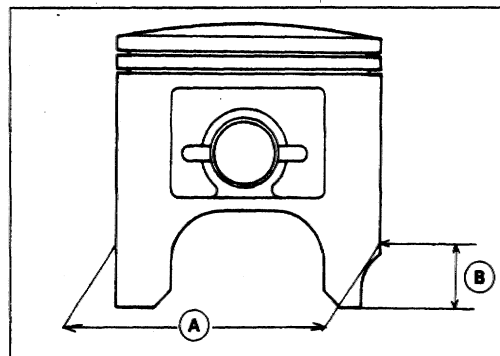
Standard: 79.900 – 79.915 mm

Service Limit: 79.75 mm

- If the measurement is less than the service limit, replace the piston.

NOTE

- Abnormal wear such as a marked diagonal pattern across the piston skirt may mean a bent connecting rod or a misaligned crankshaft.



Piston/Cylinder Clearance

The piston-to-cylinder clearance must be checked, and the standard value maintained anytime a piston or the cylinder block are replaced with new parts, or whenever the cylinder is rebored and oversize pistons installed.

- The most accurate way to find the piston clearance is by making separate piston and cylinder diameter measurements and then computing the difference between the two values.
- Measure the piston diameter as just described, and subtract this value from the measurement. The difference is the piston clearance.

Piston/Cylinder Clearance

0.095 – 0.115 mm

Boring and Honing

When boring and honing a cylinder, note the following:

- There are two sizes of oversize pistons available.
 - Oversize Piston and Rings
 - Oversize Pistons and Rings
 - 0.5 mm Oversize
 - 1.0 mm Oversize
- Before boring a cylinder, first measure the exact diameter of the oversize piston, and then, according to the standard clearance in the Service Data Section, determine the rebore diameter. However, if the amount of boring necessary would make the inside diameter greater than 1.0 mm oversize, the cylinder block must be replaced.
- Cylinder inside diameter must not vary more than 0.01 mm at any point.
- Be wary of measurements taken immediately after boring since the heat affects cylinder diameter.
- In the case of a rebored cylinder and oversize piston, the service limit for the cylinder is the diameter that the cylinder was bored to plus 0.1 mm and the service limit for the piston is the oversize piston original diameter minus 0.15 mm. If the exact figure for the rebored diameter is unknown, it can be roughly determined by measuring the diameter at the base of the cylinder.

Piston Ring, Piston Ring Groove Inspection

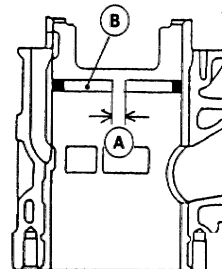
- Visually inspect the piston rings and the piston ring grooves.
- ★ If the rings are worn unevenly or damaged, they must be replaced.
- ★ If the piston ring groove are worn unevenly or damaged, the piston must be replaced and fitted with new rings.

Piston Ring End Gap

- Place the piston ring inside the cylinder, using the piston to locate the ring squarely in place. Set it close to the bottom of the cylinder, where cylinder wear is low.
- Measure the gap [A] between the ends of the ring [B] with a thickness gauge.
- ★ If the gap is wider than the service limit, the ring is worn excessively and must be replaced.

Piston Ring End Gap

	Standard	Service Limit
Top	0.25 – 0.40 mm	0.70 mm
Second	0.25 – 0.40 mm	0.70 mm



Engine Removal / Installation

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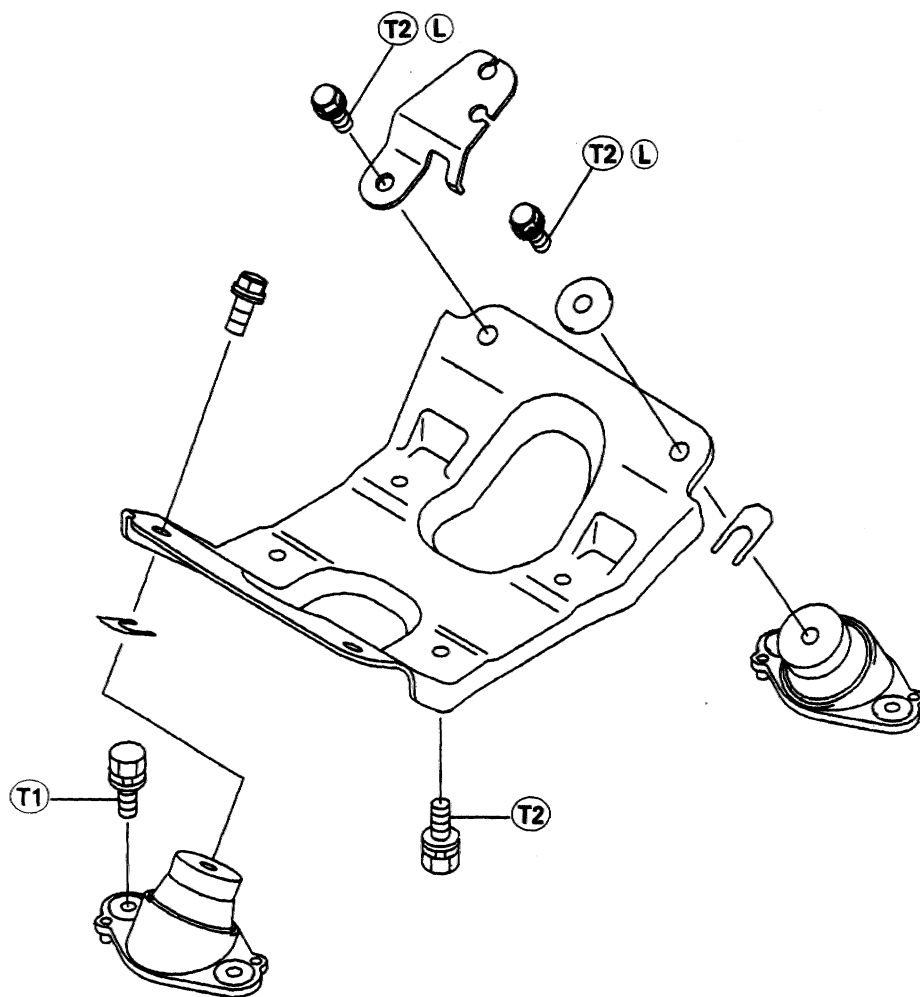
6-2 ENGINE REMOVAL / INSTALLATION

Exploded View

T1: 16 N·m (1.6 kg·m, 11.6 ft·lb)

T2: 36 N·m (3.7 kg·m, 27 ft·lb)

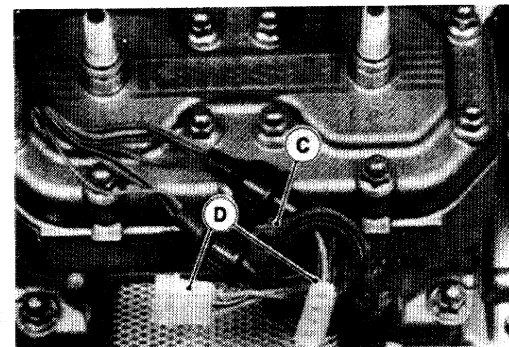
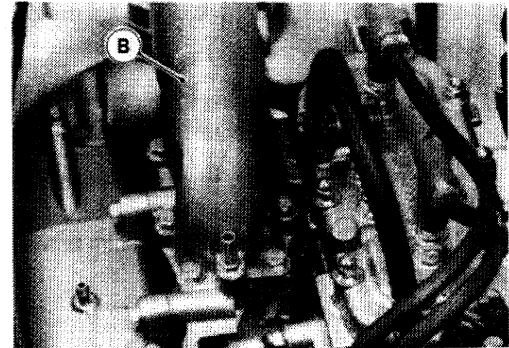
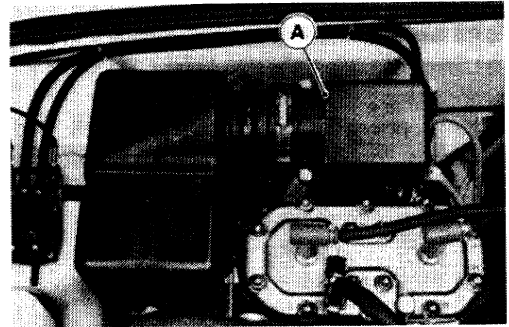
L : Apply a non-permanent locking agent.



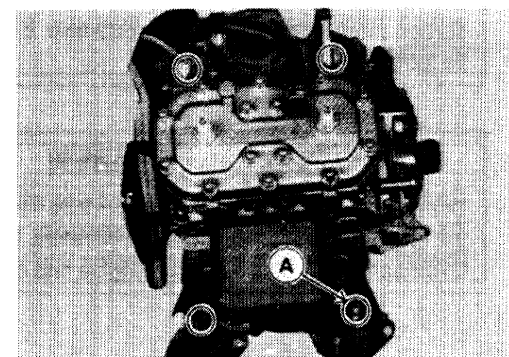
Engine Removal/Installation

Removal

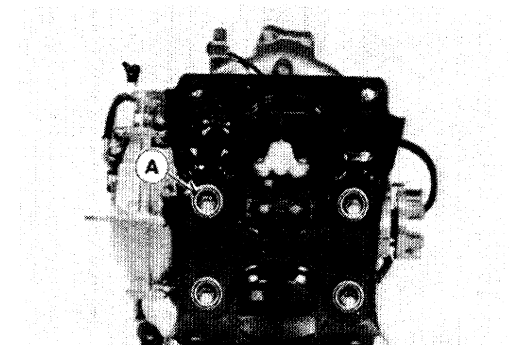
- Remove or disconnect (see the appropriate chapters):
 - Air Intake Cover with Intake Silencer [A]
 - Intake Silencer Stand
 - Throttle Cable
 - Choke Cable
 - Fuel Hoses (Return and Supply)
 - Exhaust Pipe, Front Muffler and Expansion Chamber as a set [B]
 - Inlet Cooling Hose
 - Spark Plug Caps
 - Battery Ground Cable
 - Electric Case Cap [C]
 - Magneto Lead [D]



- Remove the engine bed mounting bolts [A].



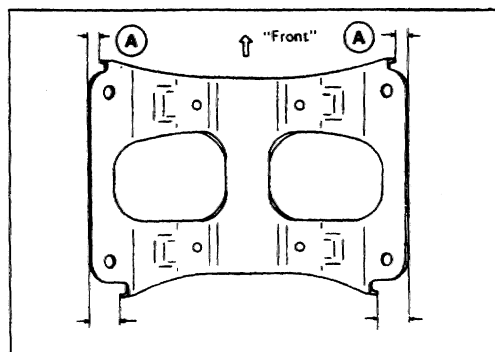
- Slide the engine toward the front to disengage the couplings, and then lift the engine out of the hull.
- Remove the engine mounting bolts [A], and separate the engine bed and the engine.



6-4 ENGINE REMOVAL / INSTALLATION

Installation Notes

- Be sure there are no foreign objects and parts inside of the hull.
- Clean the bilge filter (see Filter Cleaning and Inspection in the Cooling and Bilge Systems chapter).
- Check the coupling damper for wear and damage (see Coupling Damper Inspection in the Engine Bottom End chapter).
- Install the engine bed so that the small notches [A] are on the magneto end of the engine as shown.



- Apply a non-permanent locking agent to the following mounting bolts, and torque them.

Torque – Engine Mounting Bolts: 36 N-m (3.7 kg-m, 27 ft-lb)

Engine Bed Mounting Bolts: 36 N-m (3.7 kg-m, 27 ft-lb)

- Check the gap between the engine bed and the dampers by rocking the engine.
- If there is a gap, insert a suitable shim between the engine bed and the damper to achieve a good fit.

Shim Selection

Shim No.	Thickness
92025-3705	t0.3 mm
92025-3706	t0.5 mm
92025-3707	t1.0 mm
92025-3708	t1.5 mm

- After installing the engine in the hull, check the following.

Throttle Cable
Choke Cable
Oil Pump Bleeding
Fuel and Exhaust Leaks

⚠ WARNING

Do not run the engine in a closed area. Exhaust gases contain carbon monoxide, a colorless, odorless, poisonous gas which can be lethal.

CAUTION

Operate the engine only for short periods without cooling water. Stop the engine immediately if the temperature warning buzzer goes on. Overheating will cause severe engine and exhaust system damage.

Engine Bottom End

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7-2 ENGINE BOTTOM END

Exploded View

T1: 7.8 N-m (0.8 kg-m, 69 in-lb)

T2: 12 N-m (1.2 kg-m, 8.5 ft-lb)

T3: 29 N-m (3.0 kg-m, 22 ft-lb)

T4: 125 N-m (13.0 kg-m, 94 ft-lb)

L : Apply a non-permanent locking agent.

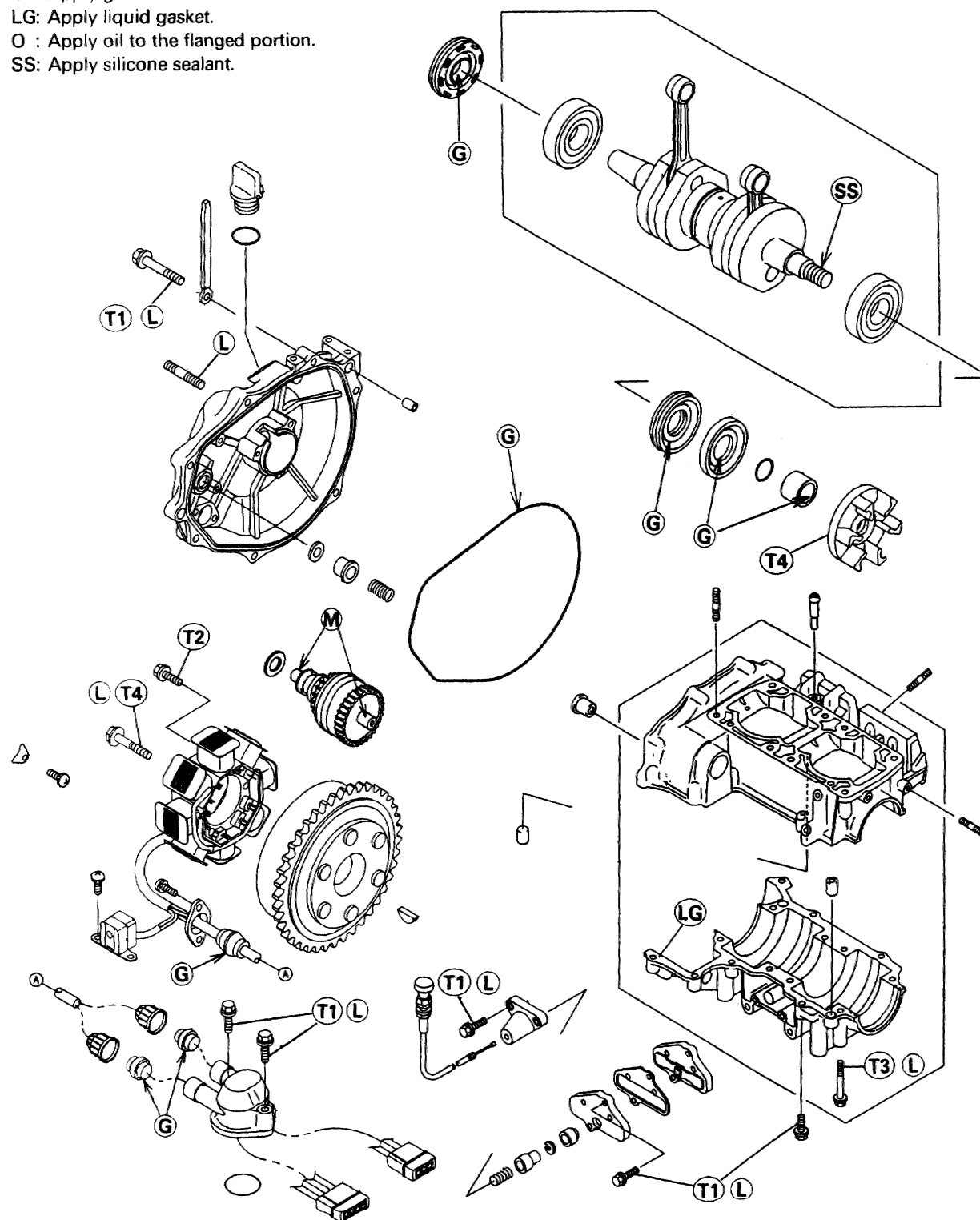
M : Apply molybdenum disulfide grease.

G : Apply grease.

LG: Apply liquid gasket.

O : Apply oil to the flanged portion.

SS: Apply silicone sealant.



Specifications

Item	Standard	Service Limit
Crankshaft, Connecting Rods:		
Crankshaft runout	0.04 mm	0.10 mm TIR
Connecting rod side clearance	0.45 ~ 0.55 mm	0.8 mm
Connecting rod radial clearance	0.038 ~ 0.049 mm	0.10 mm
Connecting rod bend	0.05 mm/100 mm	0.2mm/100mm
Connecting rod twist	0.15 mm/100 mm	0.2mm/100mm

Special Tools – Flywheel Holder: 57001-1313

Coupling Holder: 57001-1230

Rotor Puller, M16/M18/M20/M22 x 1.5: 57001-1216

Rotor Puller, M18 x 1.5: 57001-1258

Sealant – Kawasaki Bond (Liquid Gasket – Black): 92104-1003

Kawasaki Bond (Silicone Sealant): 56019-120

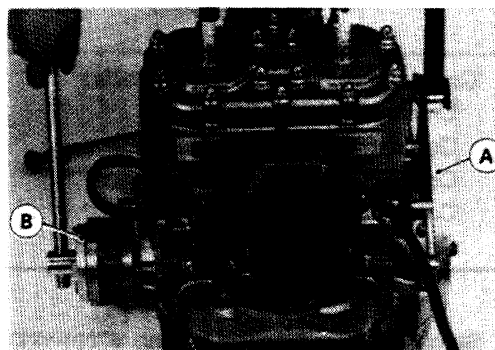
7-4 ENGINE BOTTOM END

Coupling

Removal

- Remove:
 - Engine (see Engine Removal/Installation chapter)
 - Coupling Damper
 - Magneto Cover
- Holding the flywheel, unscrew the coupling.

Special Tool – Flywheel Holder: 57001-1313 [A]
Coupling Holder: 57001-1230 [B]

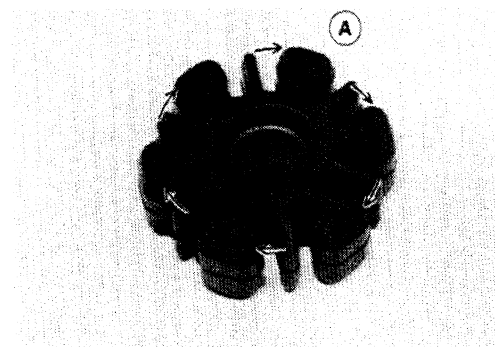


Installation Notes

- Apply a thin coat of silicone sealant to the coupling threads.
 - Sealant – Kawasaki Bond (Silicone Sealant): 56019-120**
- Screw the coupling onto the crankshaft and tighten it
 - Torque – Coupling: 98 N-m (10.0 kg-m, 72 ft-lb)**

Coupling Damper Inspection

- With the engine removed, remove the coupling damper and inspect it for wear [A] and deterioration.
- ★ If it is grooved or misshapen, replaced it with a new damper.
- ★ If there is any doubt as to coupler condition, replace it.



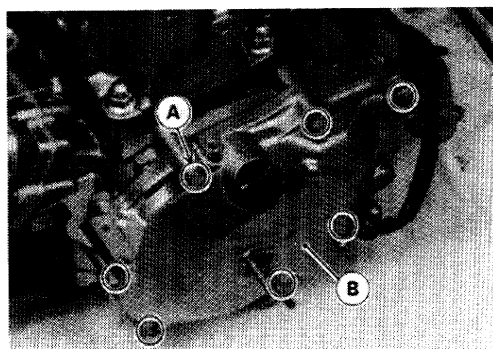
Magneto Flywheel

Removal

- Remove the fuel tank (see Fuel System chapter).
- Remove the oil pump.
- Remove the mounting bolts [A], and take off the magneto cover [B].

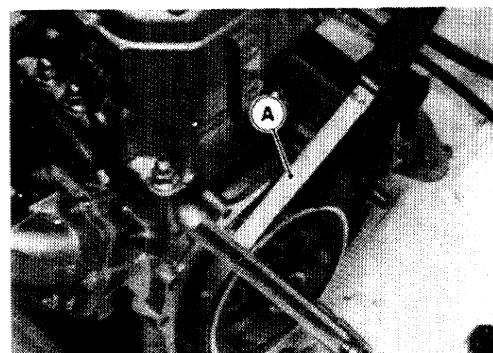
NOTE

○ The flywheel can be removed without removing the fuel tank if the rotor puller (57001-1258) is used.



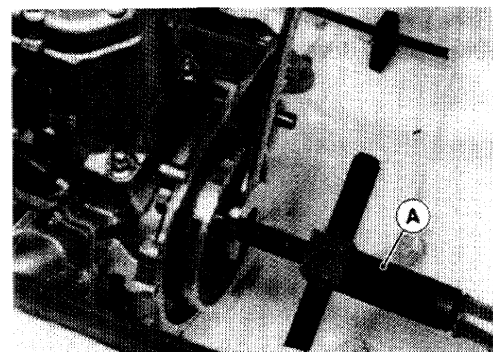
- Holding the flywheel, remove the flywheel bolt.

Special Tool – Flywheel Holder: 57001-1313 [A]



- Pull the flywheel off the crankshaft.

**Special Tool – Rotor Puller, M16/M18/M20/M22 x 1.5: 57001-1216 [A]
or Rotor Puller, M18 x 1.5: 57001-1258**

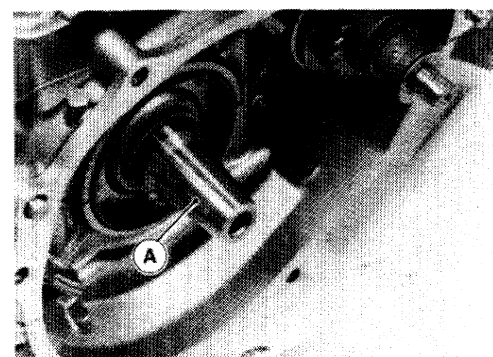


CAUTION

Do not strike the flywheel with a hammer as the magnets may be damaged.

Installation Notes

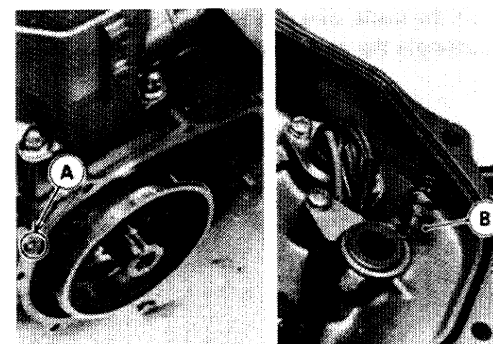
- Using a high flash-points solvents, clean off any oil or dirt that may be on the flywheel bolt, the crankshaft taper, or in the tapered hole in the flywheel.
- Fit the woodruff key [A] securely in the crankshaft, before installing the magneto flywheel.



- Apply a thin coat of engine oil to the flanged portion of flywheel bolt.
- Install the flywheel.

Torque – Flywheel Bolt: 125 N-m (13.0 kg-m, 94 ft-lb)

- Check that the knock pins [A] and the spring [B] are in place and replace the O-ring if it is damaged.
- Apply a non-permanent locking agent to the threads of the magneto cover mounting bolts, and tighten them securely.

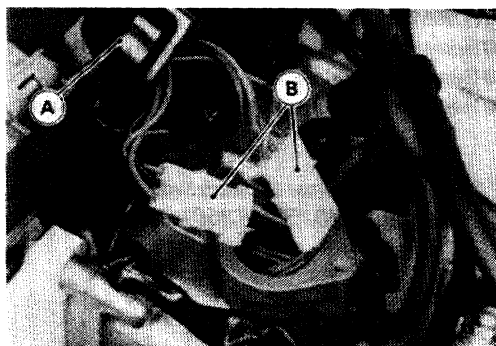


7-6 ENGINE BOTTOM END

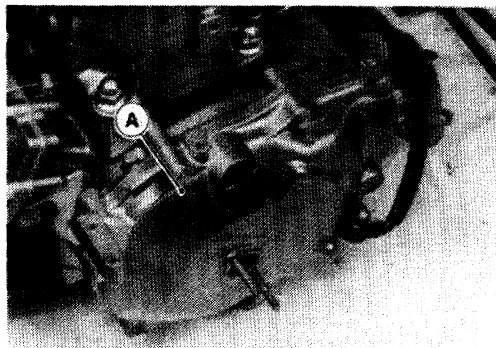
Stator

Removal

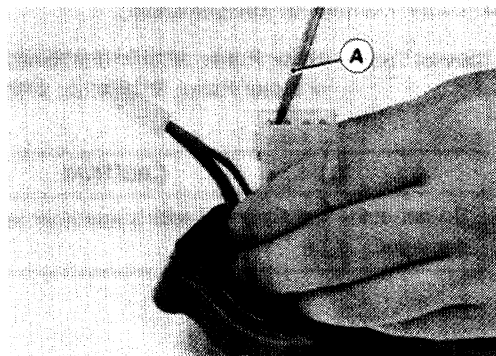
- Remove the electric case cap [A], and disconnect the connectors [B].



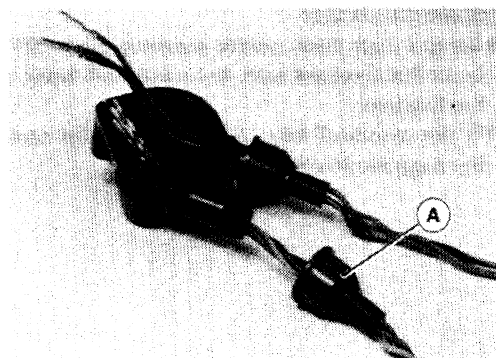
- Remove:
 - Intake Silencer
 - Magneto Cover [A]



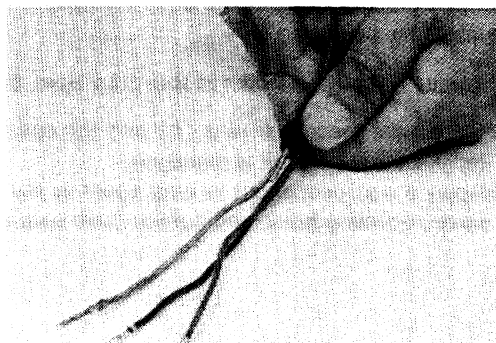
- Slide the pins out of the connectors.
 - Use a screw driver [A] to depress the pin latches.



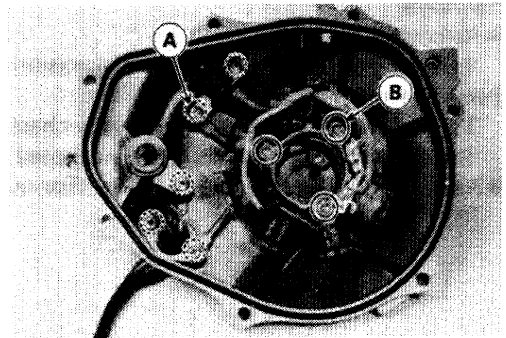
- Unscrew the grommet cap [A] from the electric case cap.



- Pull the leads, one at a time, through the grommet and cap.
 - Lubricate the grommet with a penetrating rust inhibitor.

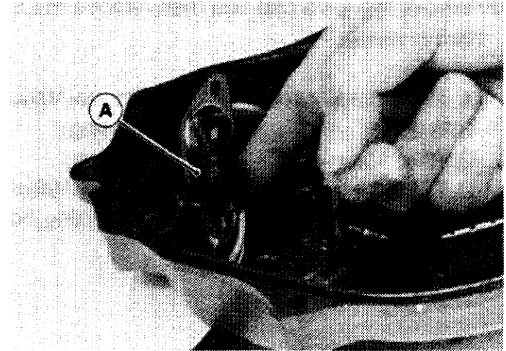


- Unscrew the set screws [A] and bolts [B], and remove the stator assembly.

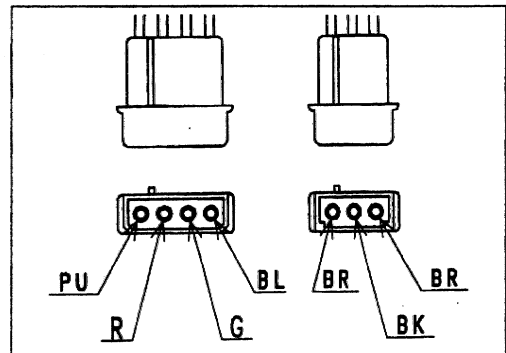


Installation Notes

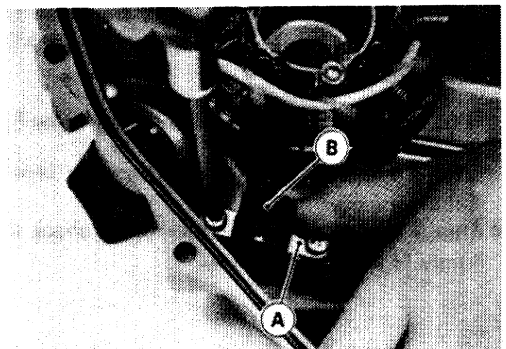
- Coat the grommets [A] with water resistant grease.



- Insert the connector pins onto the connector, as shown.



- While pushing the pickup coil bracket [A] as shown, install the pickup coil [B].

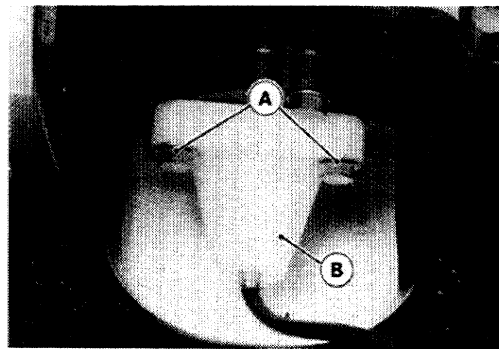


7-8 ENGINE BOTTOM END

Water Drain Valve

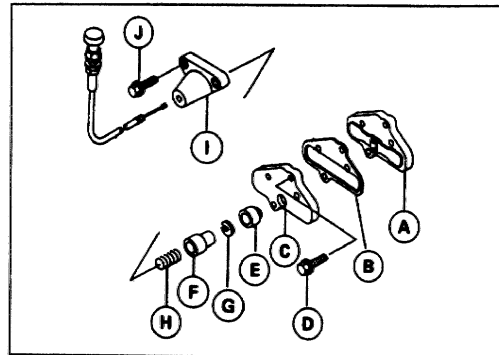
Removal

- Remove:
 - Exhaust Pipe, Front Muffler and Expansion Chamber (see Exhaust System chapter)
 - Exhaust Manifold (see Exhaust System chapter)
 - Starter Motor (see Electrical System chapter)
- Remove the mounting bolt [A], and take out the water drain valve [B].



- Remove the valve cap and then remove the E-ring to disassemble the control valve.

- | | |
|------------------------|--------------------------|
| A. Reed Valve Assembly | F. Control Valve |
| B. Gasket | G. E-Ring |
| C. Reed Valve Cover | H. Spring |
| D. Cover bolt | I. Control Valve Housing |
| E. Valve Cap | J. Mounting bolt |

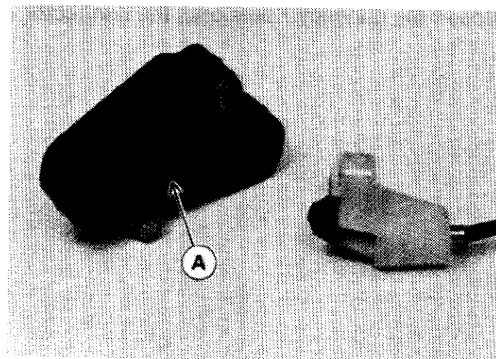


Water Drain Valve Installation

- Visually inspect the reed valves for cracks, folds, or other damage.
- ★ If there is any doubt as to the condition of a reed, replace the reed valve assembly.
- Apply a non-permanent locking agent to the cover bolt threads.

Torque – Water Drain Valve Cover Bolts: 7.8 N-m (0.8 kg-m, 69 in-lb)

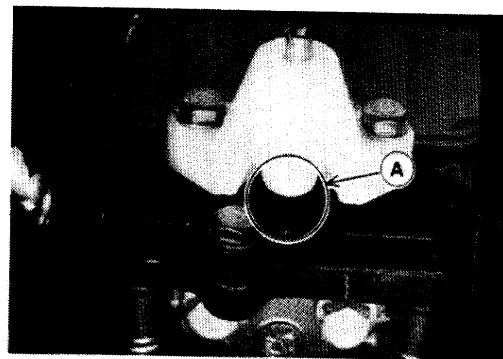
- Clean the drain hole [A] and the valve cap.
- Visually inspect the valve cap, replace it if necessary.



- Install the assembly on the lower crankcase half.
- Apply a non-permanent locking agent to the threads of the water drain valve mounting bolts.

Torque – Water Drain Valve Mounting Bolts: 7.8 N-m (0.8 kg-m, 69 in-lb)

- Loosen the locknut just until the water drain valve knob returns by spring tension.
- After installing the water drain valve, check that the control valve fits tightly [A] in the drain hole.



Crankcase

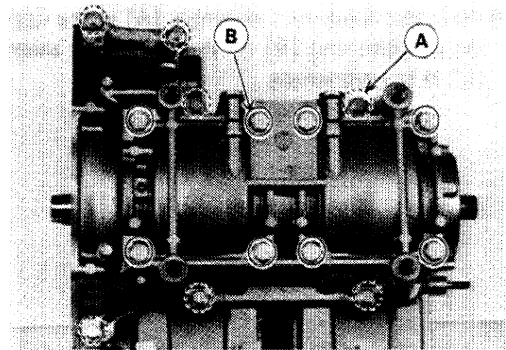
Splitting

- Remove the engine (see Engine Removal/Installation chapter).
- Remove the following from the engine.
 - Exhaust Manifold
 - Starter Motor
 - Carburetor
 - Intake Manifold
 - Cylinder Head
 - Cylinder Block
 - Pistons
 - Water Drain Valve
 - Oil Pump
 - Coupling
 - Magneto Flywheel
 - Reduction Gear

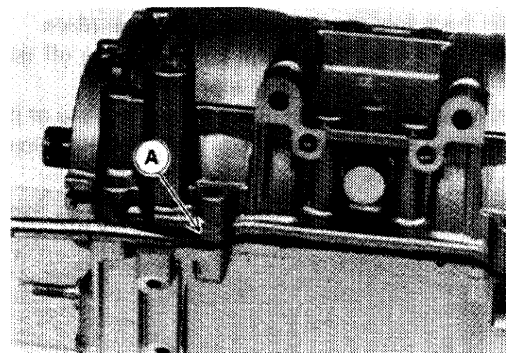
NOTE

- *Always remove the coupling before removing the magneto flywheel, or there won't be any way to hold the crankshaft while unscrewing the coupling.*

- Remove the 6 mm crankcase bolts [A] first and the 8 mm bolts [B].

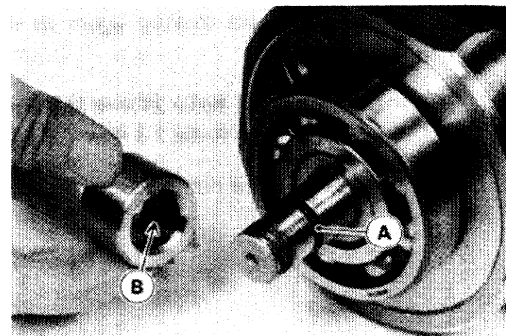


- Pry the point [A] indicated in the figure to split the crankcase halves apart, and then remove the lower crankcase half.
- Lift the crankshaft assembly out of the upper crankcase half.



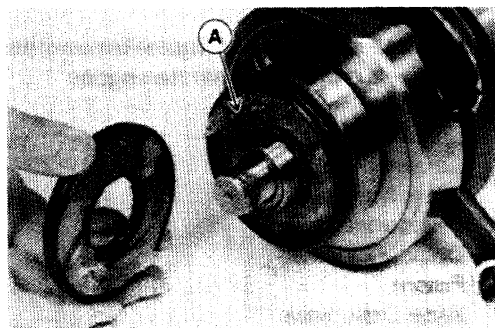
Assembly Notes

- Visually inspect the crankshaft O-ring [A], and replace it if necessary.
- Grease the inner surface of the collar [B].



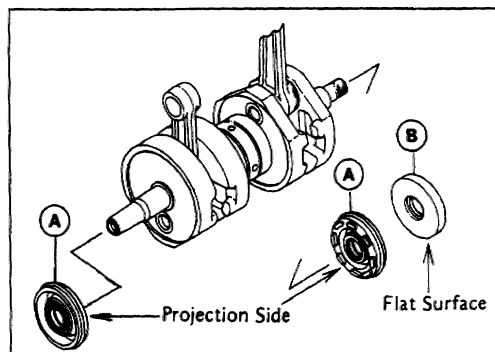
7-10 ENGINE BOTTOM END

- Grease the lips of the oil seals.
- Pack grease [A] between the rear oil seals (coupling side).

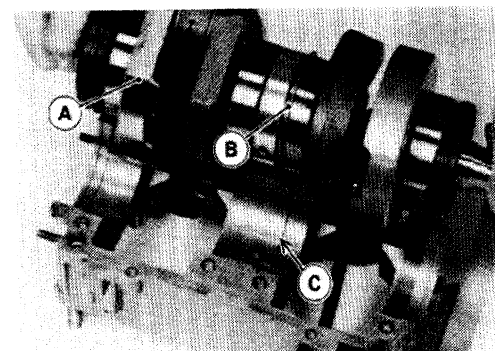


- Install the oil seals as shown.

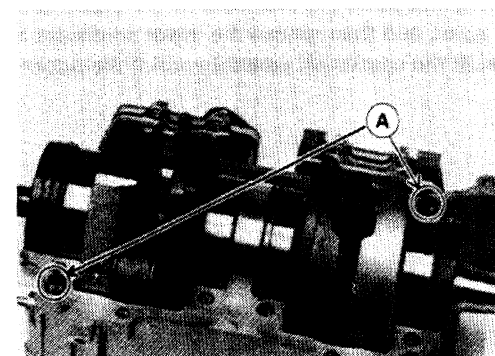
- A. Double Lips Seals
- B. Single Lip Seals



- Place the crankshaft assembly [A] in the upper crankcase half so that the position ring [B] on the crankshaft assembly fits into the groove [C] in the crankcase.



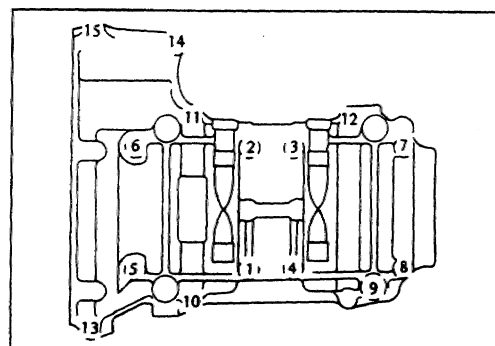
- Check that the knock pins [A] are in place.
- With a high flash-point solvent, clean off the mating surfaces of the crankcases halves and wipe dry.
- Apply liquid gasket to the mating surface of the lower crankcase half.
- Install the lower crankcase half onto the upper half.



- Apply a non-permanent locking agent to the crankcase bolts, and tighten them.

Torque – Crankcase M8 Bolts: 29 N-m (3.0 kg-m, 22 ft-lb)
Crankcase M6 Bolts: 7.8 N-m (0.8 kg-m, 69 in-lb)

- The tightening sequence numbers are marked on the lower crankcase half.



Crankshaft Maintenance

The crankshaft changes the reciprocating motion of the piston into rotating motion to drive the jet pump. Crankshaft trouble, such as excessive play or runout, will multiply the stress caused by the intermittent force on the piston and will result in not only rapid crankshaft bearing wear, but also noise, power loss, vibration, and shortened engine life. A defective crankshaft should always be detected at an early stage and repaired immediately.

The following explanation concerns the most common crankshaft problems and the method for measuring play, runout, and con-rod alignment, it does not cover crankshaft disassembly because of the highly specialized equipment that is required. If crankshaft components become damaged or worn, the entire shaft should be replaced as an assembly, or rebuilt by a properly equipped shop.

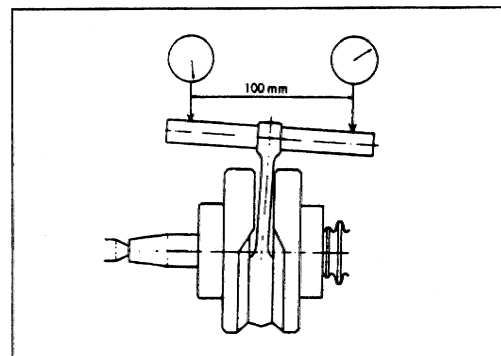
Connecting Rod Bend/Twist

- Set the crankshaft in an alignment jig or in V blocks on a surface plate.
- Select an arbor of the same diameter as the connecting rod small end and at least 100 mm long, and insert the arbor through the connecting rod small end.
- With the connecting rod held vertically, use a height gauge to measure the difference in the height of the arbor above the surface plate over a 100 mm length to determine the amount of connect rod bend.
- ★ If connecting rod bend exceeds the service limit, the connecting rod or crankshaft must be replaced.

Connecting Rod Bend

Standard: Under 0.05/100 mm

Service Limit: 0.2/100 mm



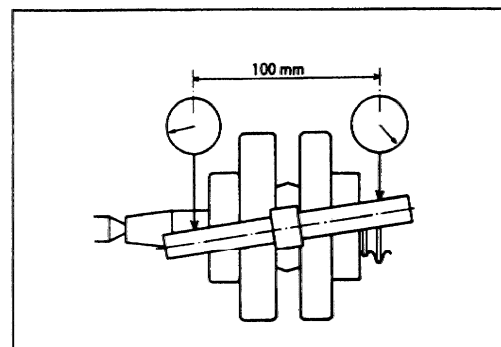
● Measure connecting rod twist.

- With the crankshaft still in the alignment jig, hold the connecting rod horizontally and measure the amount that the arbor varies from being parallel with the crankshaft over a 100 mm length of the arbor to determine the amount of connecting rod twist.
- ★ If connecting rod twist exceeds the service limit, the connecting rod or crankshaft must be replaced.

Connecting Rod Twist

Standard: Under 0.15/100 mm

Service Limit: 0.2/100 mm

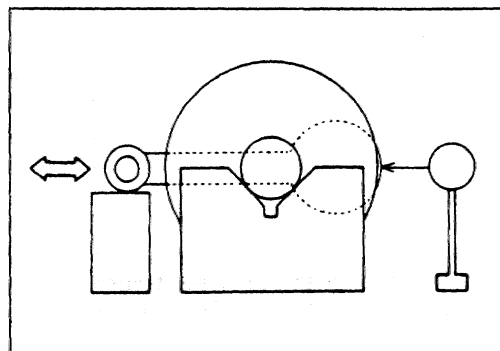


Connecting Rod Big End Radial Clearance

- Check big end radial clearance.
- Set the crankshaft in an alignment jig or on V blocks, and place a dial gauge against the connecting rod big end.
- Push the connecting rod first towards the gauge and then in the opposite direction. The difference between the two gauge readings in the radial clearance.
- ★ If the radial clearance exceeds the service limit, the crankshaft assembly must be replaced or disassembled and the crankpin, needle bearing, and connecting rod big end examined for wear.

Connecting Rod Big End Radial Clearance

Standard: 0.038 – 0.049 mm
Service Limit: 0.10 mm

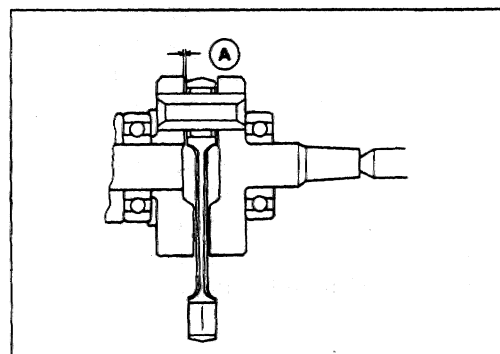


Connecting Rod Big End Side Clearance

- Measure big end side clearance [A].
- Insert feeler gauges between the big end and either crank half to determine clearance.
- ★ If the measured value exceeds the service limit, the crankshaft should be either replaced or rebuilt.

Connecting Rod Big End Side Clearance

Standard: 0.45 – 0.55 mm
Service Limit: 0.8 mm



Crankshaft Main Bearing Wear

- Wash the bearings in high flash-point solvent, blow them dry (DO NOT SPIN THEM), and lubricate them with engine oil.

⚠ WARNING

Solvent is toxic and flammable. Avoid prolonged contact with skin and keep away from open flame. Use only in a well-ventilated area. Eye protection should be worn when compressed air is used to dry parts. Do not direct air towards anyone. Use 172 kPa (1.75 kg/cm², 25 psi) maximum nozzle pressure.

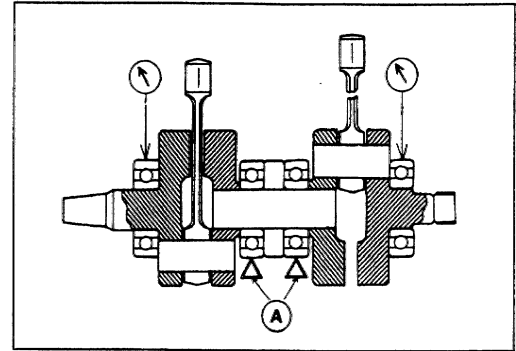
- Turn each bearing over by hand and see that it makes no noise, turns smoothly, and has no rough spots.
- ★ If any of the bearings are defective, replace them.

Crankshaft Runout

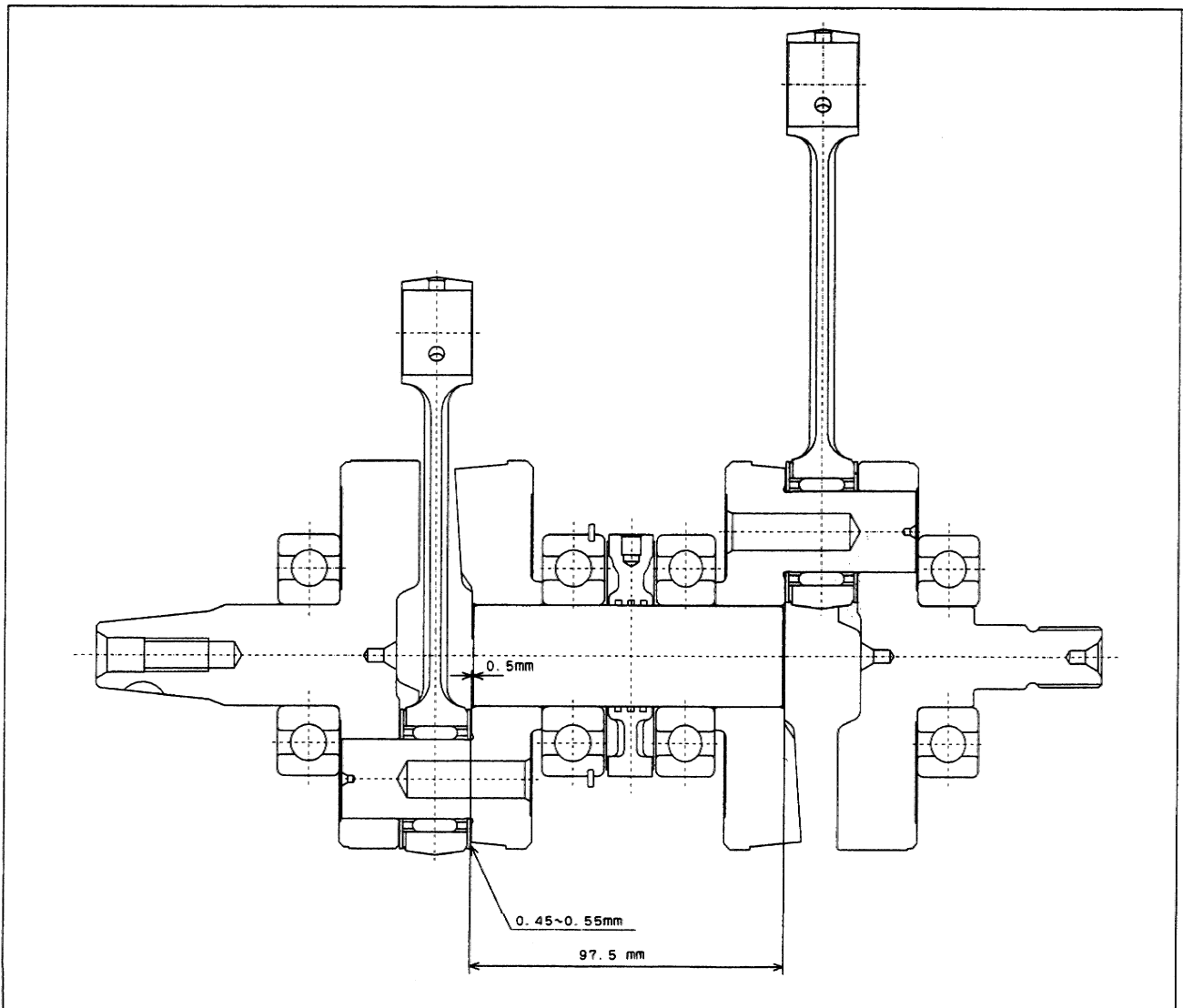
- Check crankshaft alignment by measuring runout.
- With the crankshaft on V blocks [A], rotate the crankshaft slowly and measure runout at each of the locations shown.
- ★ If the runout at any point exceeds the service limit, the crankshaft must be either replaced or rebuilt.

Crankshaft Runout (Either Location)

Standard: Under 0.04 mm TIR
Service Limit: 0.10 mm TIR

**Crankshaft Assembly Specifications**

If the crankshaft is disassembled, use these specifications during rebuilding.



Cooling and Bilge Systems

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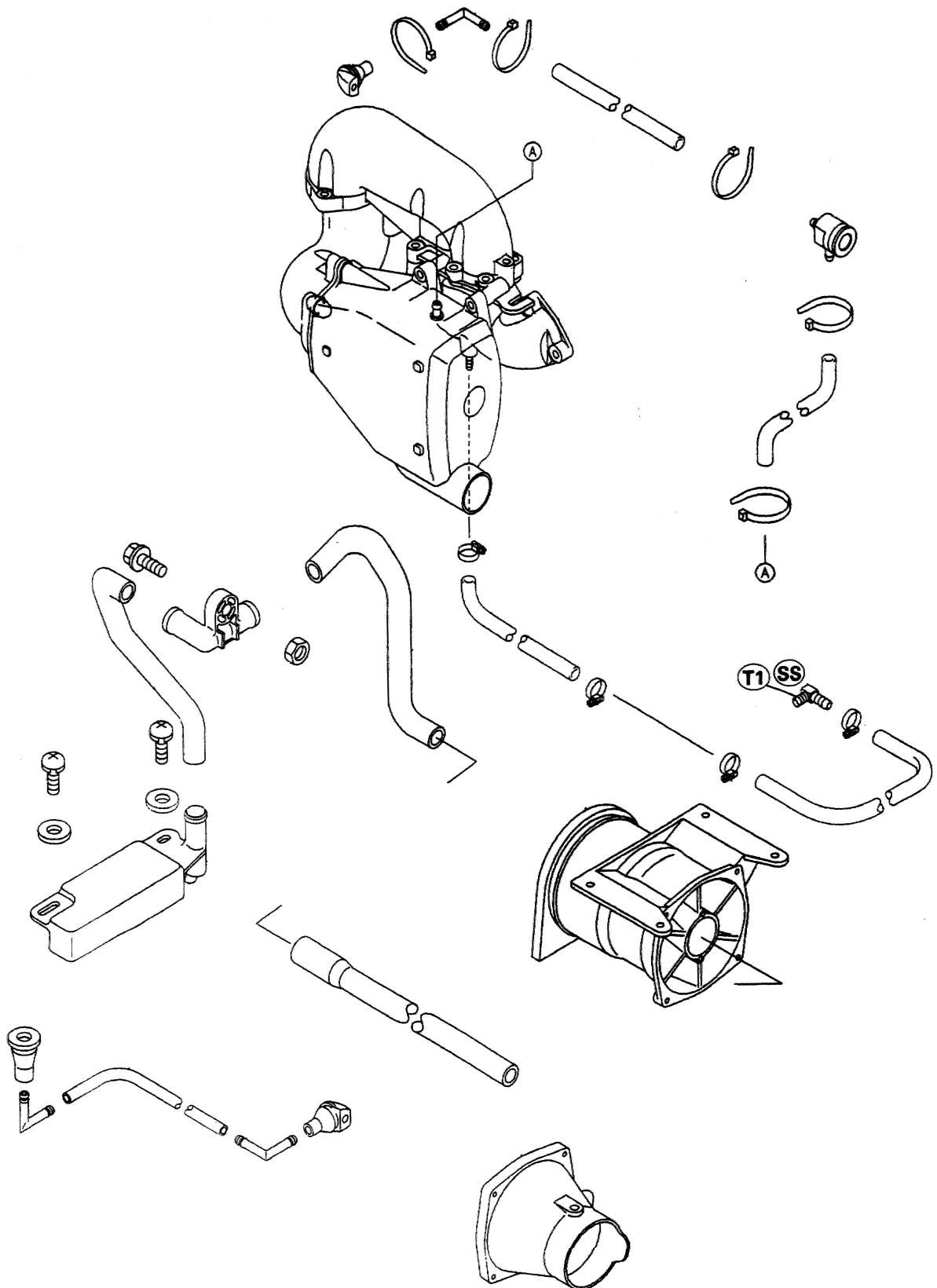
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Bilge System Flushing.....	8-5

8-2 COOLING AND BILGE SYSTEMS

Exploded View

T1 : 9.8 N-m (1.0 kg-m, 87 in-lb)

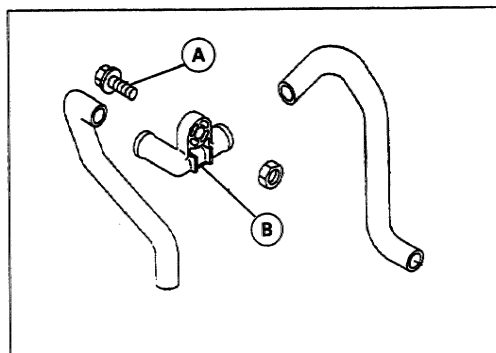
SS : Apply silicone sealant.



Bilge System

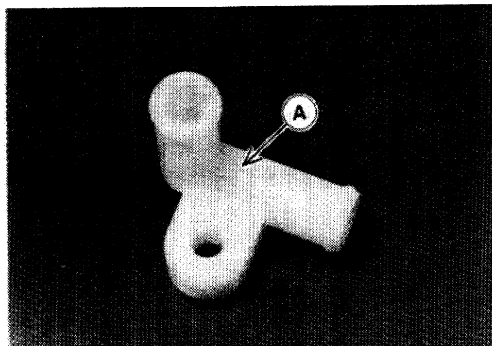
Breather Removal

- Pull the hoses off the breather.
- Remove the electric case (see the Electrical System chapter).
- Unscrew the mounting bolt [A], and remove the breather [B] from the bracket.



Breather Installation

- Be sure the small hole [A] in the breather is open before installing it.

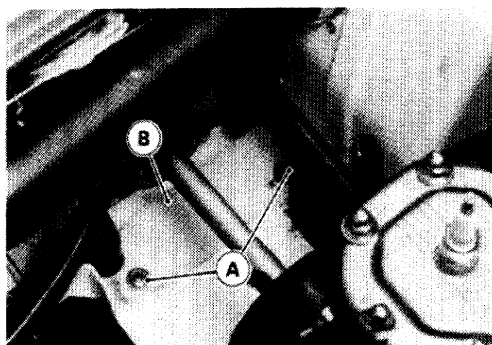


Breather Cleaning and Inspection

- Check that the small hole in the top of the breather is open by blowing in one end of the breather and plugging the other.
- ★ If the hole is plugged, clean it with compressed air. Do not open it with a pointed object (like a needle or a piece of wire), because the hole may be enlarged. If the hole is too large, the bilge system may not suck water out of the hull as well as it should.

Filter Removal

- Remove the electric case (see the Electrical System).
- Remove the mounting screws [A] and take out the filter [B].



Filter Cleaning and Inspection

- Flush the filter thorough with fresh water and shake it dry.
- Water must flow freely through the filter, but large debris must not.
- ★ If the filter cannot be cleaned, or if it is broken and allows debris to pass through, replace it.

8-4 COOLING AND BILGE SYSTEMS

Cooling and Bilge System Hoses

Hose Removal

- None of the bilge system hoses has a clamp. To remove this hose, remove the filter (see Filter Removal). The bilge system hoses without clamps may be simply pulled off their fittings.
- All the cooling system hoses are clamped at both ends. Loosen the clamps and pull the hoses off.

Hose Installation

- To install the bilge filter hose, push the hose over the end of the filter.
- When installing the cooling system hoses, be sure to use the same kind of clamp as the original. Some of the clamps are metal for tighter clamping ability (required when smooth fitting are used). Plastic clamps are used where tight clamping is not required.

Hose Inspection

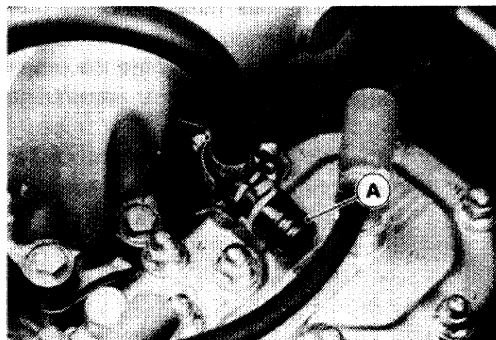
- Check the hoses for hardening, cracking, checking, cuts, abrasions, and breaks.
- ★ If a hose is damaged in any way, replace it immediately and check all the other for damage.

Cooling and Bilge System Flushing

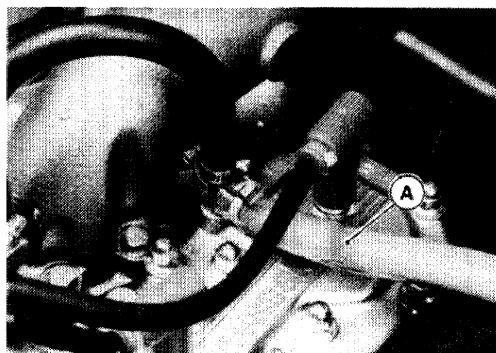
Cooling System Flushing

To prevent sand or salt deposits from accumulating in the cooling system, it must be flushed occasionally. Flush the system according to the Periodic Maintenance Chart, after each use in salt water, or whenever there is reduced water flow from the bypass outlet on the left side of the hull.

- Remove the fitting cap [A] on the cylinder head.



- Connect a garden hose [A] to the fitting.

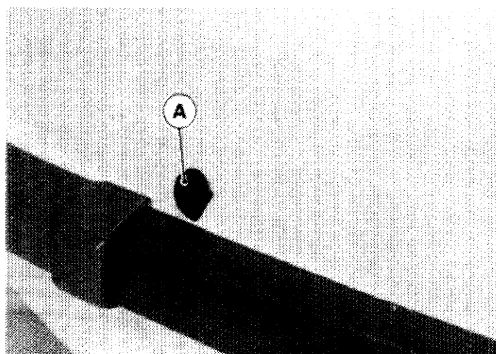


- Start the engine and allow it to idle before turning on the water.

CAUTION

The engine must be running before the water is turned on or water may flow back through the exhaust pipe into the engine, resulting in the possibility of severe internal damage.

- Immediately turn on the water and adjust the flow so that little trickle of water comes out of the bypass outlet [A] on the left side of the hull.



- Left the engine idle for several minutes with the water running.
- Turn off the water. Leave the engine idling.
- Rev the engine a few times to clear the water out of the exhaust system.

CAUTION

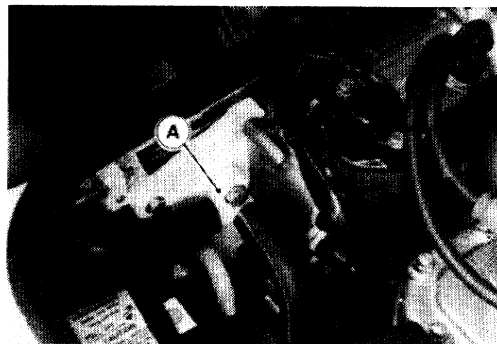
Do not run the engine without cooling water flowing for more than 15 seconds. Overheating will cause severe engine and exhaust system damage.

- Switch off the engine, remove the garden hose, install the fitting cap.

Bilge System Flushing

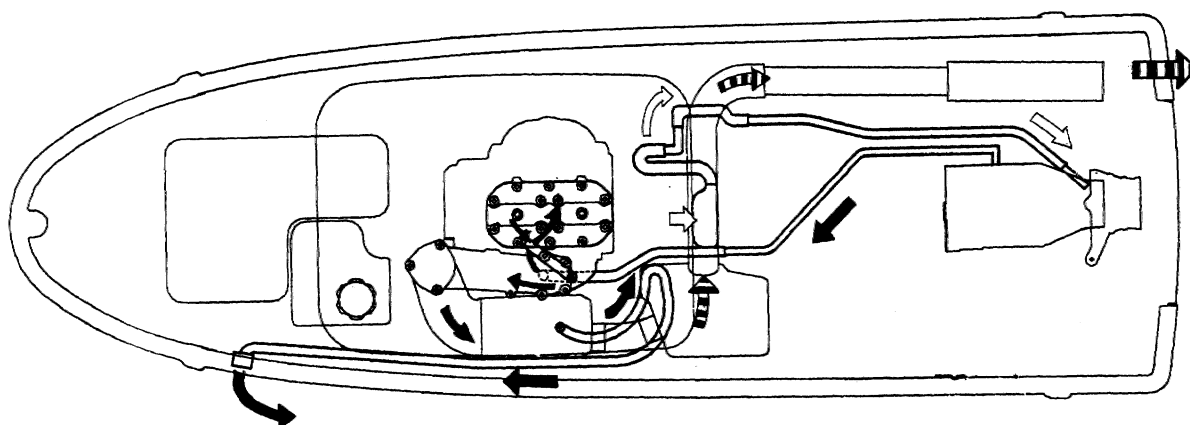
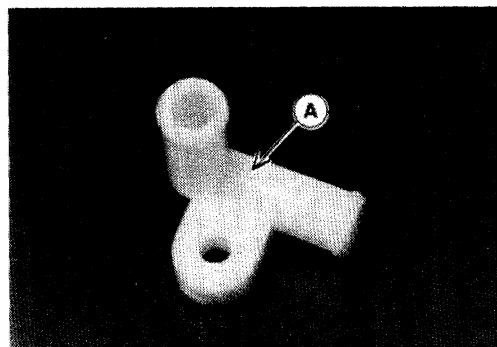
To prevent clogging, the bilge system should be flushed out according to the Periodic Maintenance Chart, or whenever you suspect it is blocked.

- Disconnect both bilge hoses at the plastic breather fitting [A].



8-6 COOLING AND BILGE SYSTEMS

- Connect the bilge filter hose (from the hull bottom) to the garden hoses, turn the water on, and flush it out for about a minute. During this procedure, water will flow into the engine compartment. Do not allow a large amount of water to accumulate in the engine compartment.
- Connect the other hoses (from the hull bulkhead) to the garden hose, turn the water on, and flush it out for several minutes.
- Before reconnecting the hoses to the plastic breather fitting make sure the small hole [A], on top of the breather fitting is clear.
- Reconnect the bilge hoses.



DIRECTION OF COOLING SYSTEM FLOW



DIRECTION OF BILGE SYSTEM FLOW



DIRECTION OF COMBINED EXHAUST AND COOLING WATER FLOW

Drive System

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Exploded View

Specifications

Item	Standard	Service Limit
Drive Shaft: Runout (Refer to Page5)	[A] less than 0.1 mm [B] less than 0.2 mm	0.2 mm 0.6 mm

Special Tools – Coupling Holder: 57001-1230
Drive Shaft Holder: 57001-1327
Drive Shaft Holder Adapter: 57001-1231
Bearing Driver Set: 57001-1129

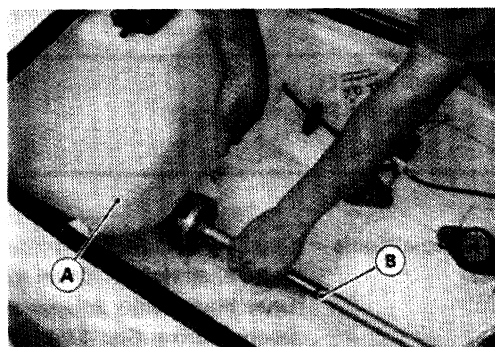
Sealant – Kawasaki Bond (Silicone Sealant): 56019-120

9-4 DRIVE SYSTEM

Drive Shaft/Drive Shaft Holder

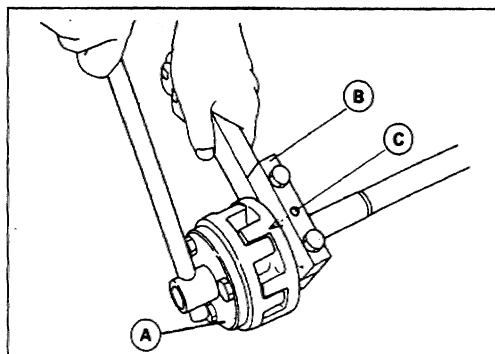
Drive Shaft Removal/Installation

- Remove the engine (see Engine Removal/Installation chapter).
- Lifting the fuel tank [A], pull the drive shaft [B] out of the hull.



- Clamp the drive shaft, and unscrew the coupling.

Special Tools – **Coupling Holder:** 57001-1230 [A]
Drive Shaft Holder: 57001-1327 [B]
Drive Shaft Holder Adapter: 57001-1231 [C]



- When installing the drive shaft, be careful of the following items.
- Apply a thin coat to the coupling threads and tighten it.

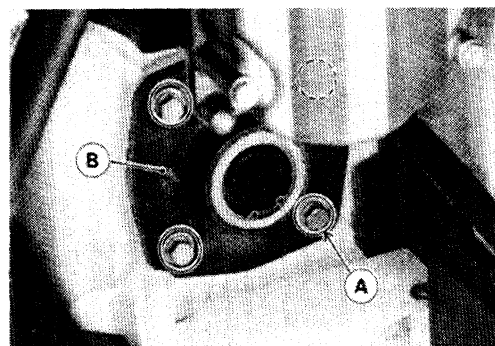
Sealant – **Kawasaki Bond (Silicone Sealant):** 56019-120

Torque – **Coupling:** 39 N-m (4.0 kg-m, 29 ft-lb)

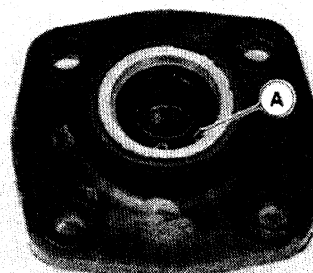
- Apply grease to the grease seal lips and the drive shaft spline.

Drive Shaft Holder Removal/Disassembly

- Remove the drive shaft.
- Unscrew the mounting bolts [A] and remove the drive shaft holder [B] from the bulkhead.

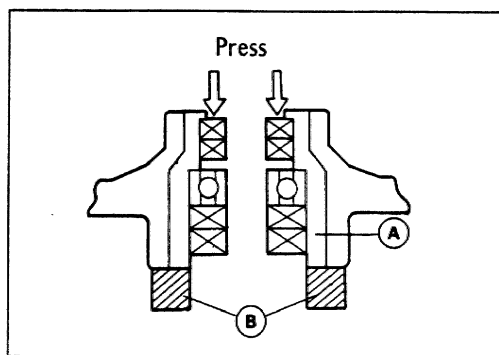


- Disassemble the drive shaft holder.
- Remove the circlip [A].



- Press the small grease seal, and the large grease seals, bearing, and small grease seals come out of the holder.

- A. Sleeve
- B. Blocks

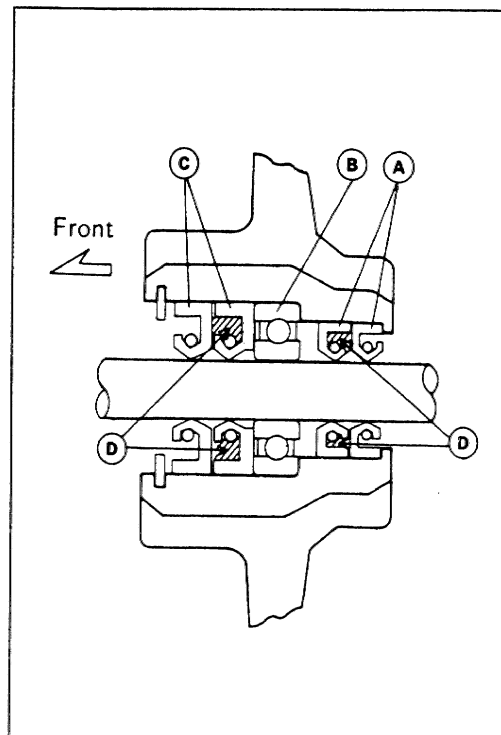


Drive Shaft Holder Assembly/Installation

- Replace the grease seals with new ones.
- Press the bearing and grease seals into the drive shaft holder, noting the following.
- Install the parts in this order:
 - Two Small Grease Seals [A]
 - One Bearing [B]
 - Two Large Grease Seals [C]

Special Tool – Bearing Driver Set: 57001-1129

- Install the seals so that the sides with the spring face outward.
- Fill the gaps between the seals with grease [D].
- Install the circlip.
- Grease to the bearing inner surface and grease seal lips.



- Install the drive shaft holder on the bulkhead so that the circlip side face toward the front.
- Apply a non-permanent locking agent to the drive shaft holder mounting bolts, **tighten them loosely**.
- Install the drive shaft.
- After installing the engine, tighten the drive shaft holder mounting bolts to the specified torque to give proper coupling alignment.

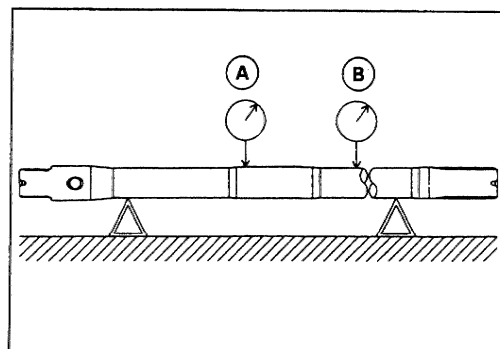
Torque – Drive Shaft Holder Mounting Bolts: 22 N-m (2.2 kg-m, 16.0 ft-lb)

Drive Shaft Runout

- Measure drive shaft runout by supporting the shaft on V blocks and setting a dial gauge against the shaft at each point shown.
- Turn the drive shaft slowly. The difference between the highest and lowest dial gauge reading is the runout.
- ★ If any measurement exceeds the service limit, replace the shaft.

Drive Shaft Runout

Standard:	Less than 0.1 mm [A] Less than 0.2 mm [B]
Service Limit:	0.2 mm [A] 0.6 mm [B]



Pump and Impeller

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10-2 PUMP AND IMPELLER

Exploded View

T1: 6.9 N-m (0.7 kg-m, 61 in-lb)

T2: 9.8 N-m (1.0 kg-m, 87 in-lb)

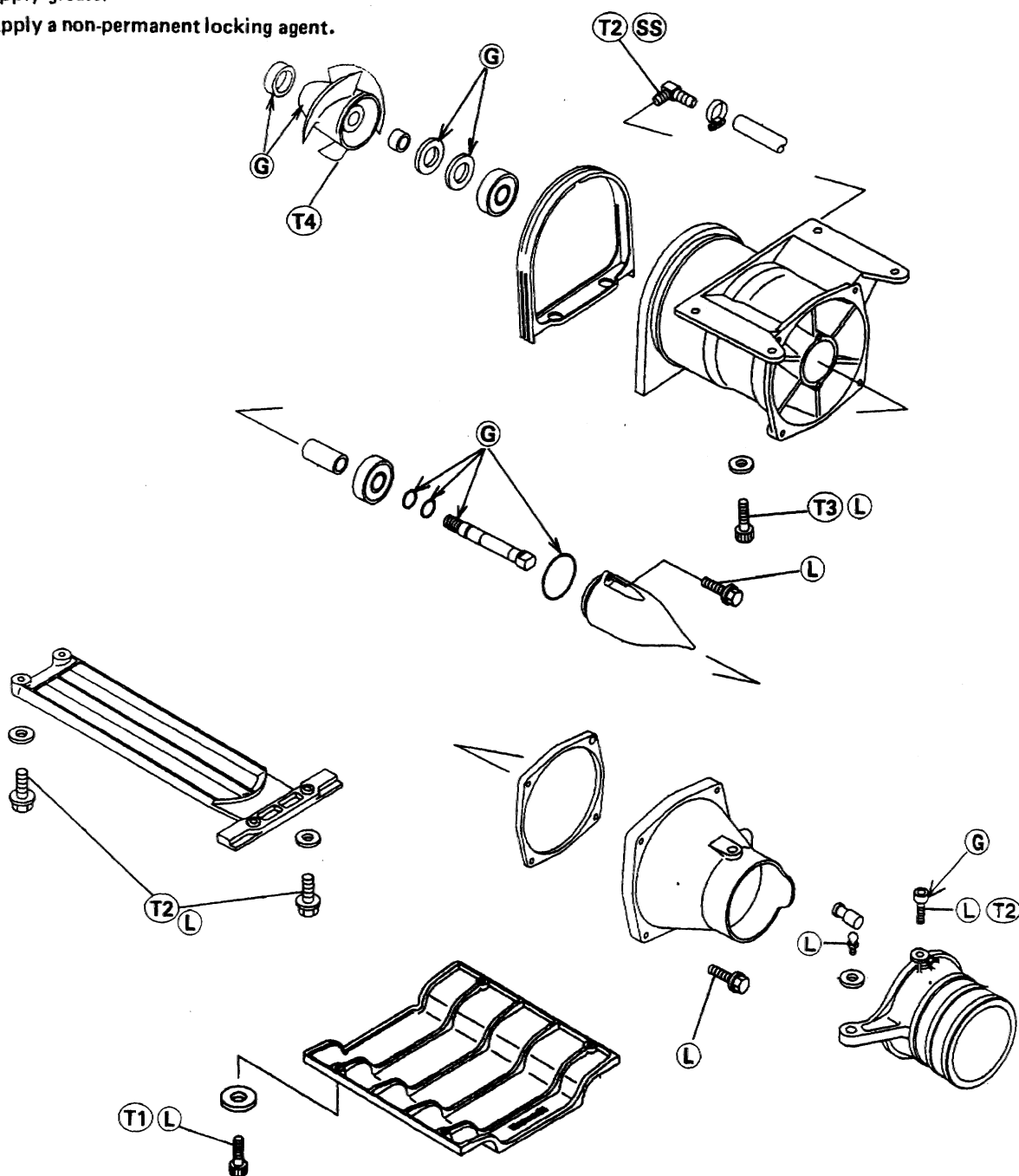
T3: 22 N-m (2.2 kg-m, 16.0 ft-lb)

T4: 98 N-m (10.0 kg-m, 72 ft-lb)

SS: Apply silicone sealant.

G : Apply grease.

L : Apply a non-permanent locking agent.



Specifications

Item	Standard	Service Limit
Jet Pump:		
Impeller Outside Diameter	139.5 ~ 139.6 mm	138.5 mm
Pump Case Inside Diameter	140.0 ~ 140.1 mm	141.1 mm
Impeller Clearance	0.2 ~ 0.3 mm	0.6 mm

Special Tools – Impeller Wrench: 57001-1228
Oil Seal & Bearing Remover: 57001-1058
Bearing Driver Set: 57001-1129

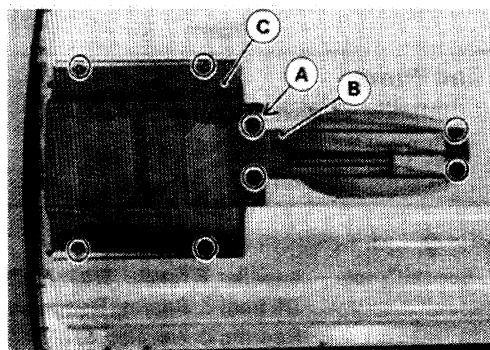
Sealant – Kawasaki Bond (Silicone Sealant): 56019-120

10-4 PUMP AND IMPELLER

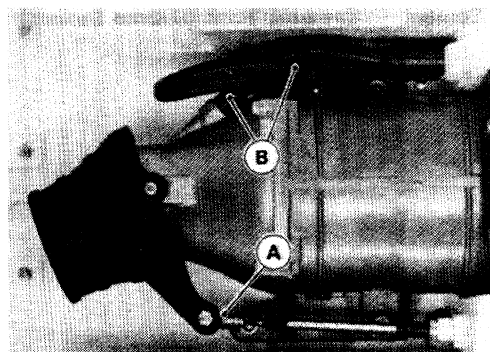
Pump and Impeller

Pump Removal

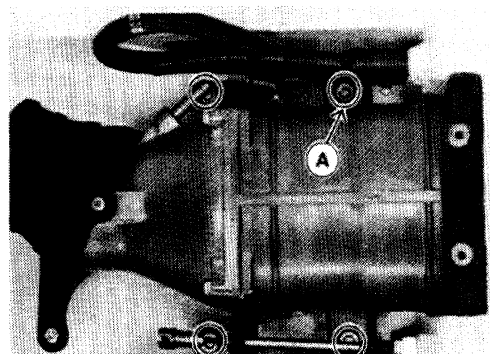
- Turn the craft on its left side.
- Unscrew the mounting bolts [A], and remove the grate [B] and the pump cover [C].



- Slip the steering cable connector [A] off the ball.
- Loosen the clamp, and pull off the hoses [B].



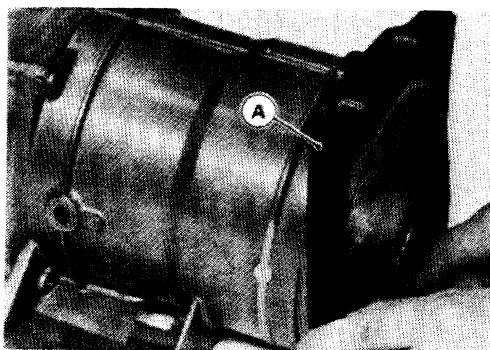
- Unscrew the pump mounting bolts [A].



- Slide the pump to the rear to disengage the drive shaft, and remove it from the hull.

Pump Installation

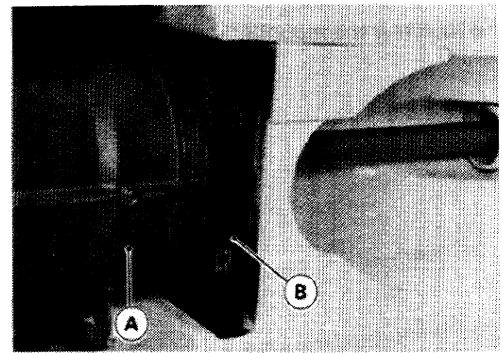
- Grease the splines on the drive shaft with water resistant grease, and be sure the O-ring is in place inside the pump shaft.
- Be sure the trim seal [A] is in place.



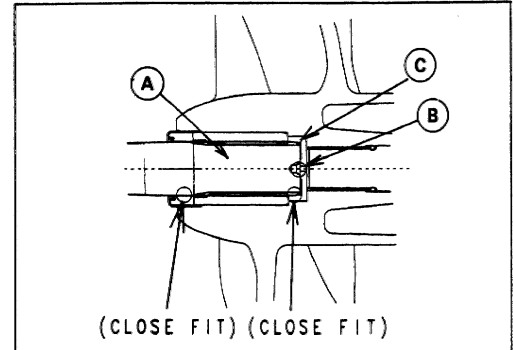
- When installing the pump case [A], be careful that the trim seal [B] is stayed in place.
- If necessary, apply water or oil to the surface of the trim seal.

NOTE

- No need to apply silicone sealant between the pump (trim seal) and the hull.



- When installing the drive shaft [A], fit the drive shaft into the spline of the impeller such that no clearance [B] exist between the shaft end and the spacer [C] (material : rubber).



- Apply a non-permanent locking agent to the pump mounting bolts and torque them.

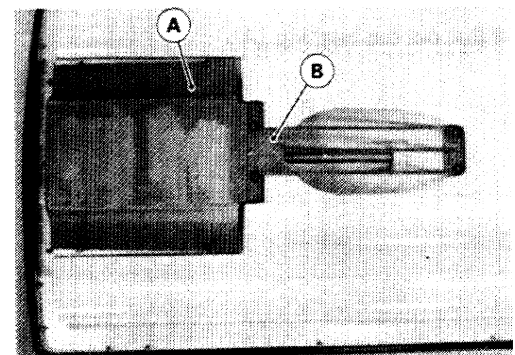
Torque – Pump Mounting Bolts: 22 N-m (2.2 kg-m, 16.0 ft-lb)

- Connect the hose and steering cable.

- Install the pump cover [A] and the pump grate [B].
- Apply a non-permanent locking agent to the following bolts and torque them.

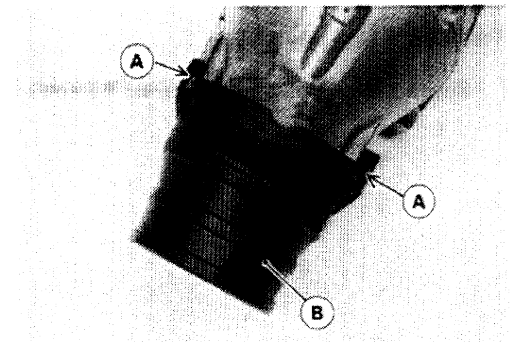
Torque – Pump Cover Mounting Bolts: 6.9 N-m (0.7 kg-m, 61 in-lb)

Grate Mounting Bolts: 9.8 N-m (1.0 kg-m, 87 in-lb)



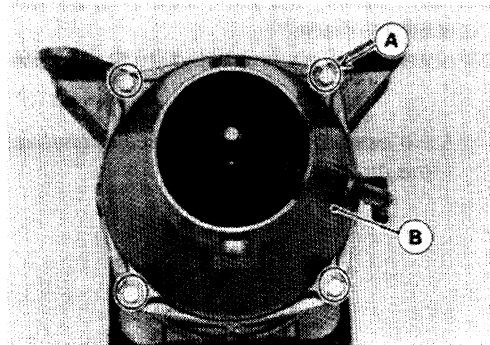
Pump Disassembly

- Unscrew the mounting bolts [A], and remove the steering nozzle [B].

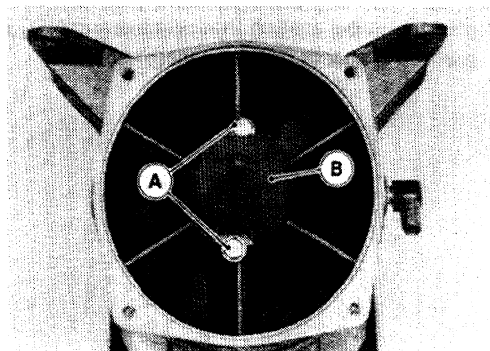


10-6 PUMP AND IMPELLER

- Unscrew the mounting bolts [A], and remove the pump outlet [B].

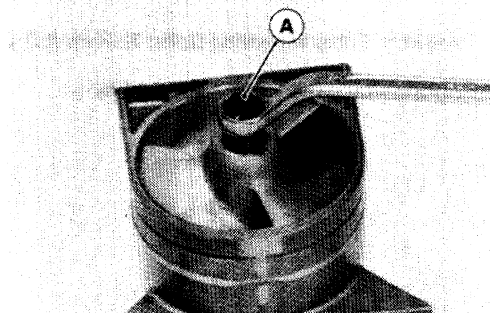


- Unscrew the cap bolts [A], and remove the pump cap [B].

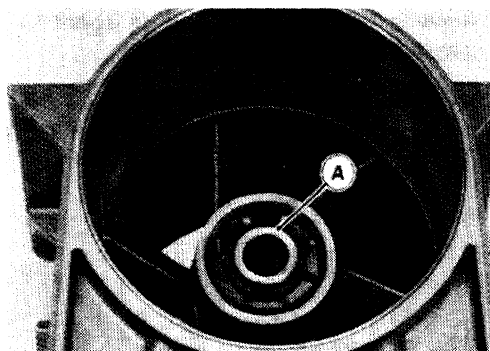


- Hold the shaft in a vise, taking care not to damage it. Remove the impeller from the pump shaft and then pull out the pump shaft.

Special Tool – Impeller Wrench: 57001-1228 [A]

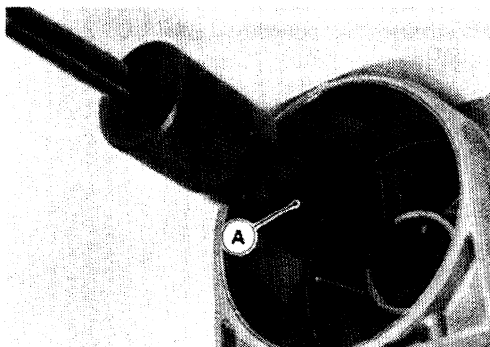


- Pull out the bushing [A].



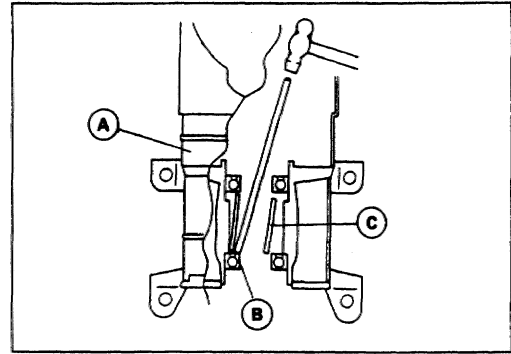
- Remove the grease seals.

Special Tool – Oil Seal & Bearing Remover: 57001-1058 [A]



● Remove the pump bearings.

- A. Pump Case
- B. Bearing
- C. Collar

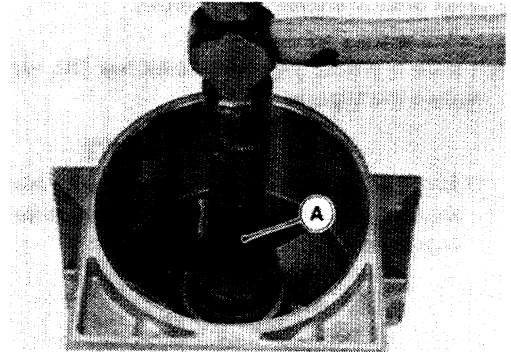


Pump Assembly

- Before installing the pump bearings, blow any dirt or foreign particles out of the pump case with compressed air.
- Install new bearings.

Special Tool – Bearing Driver Set: 57001-1129 [A]

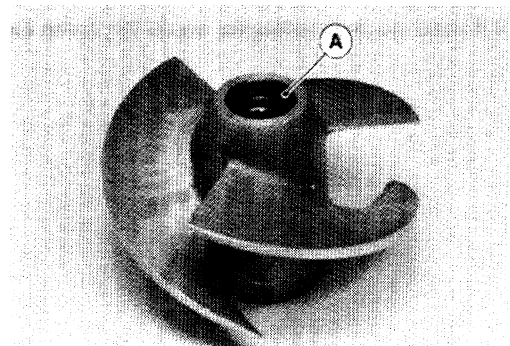
- Press the rear pump bearing into the pump case as far as it will go.
- Insert the collar and install the front pump bearing.



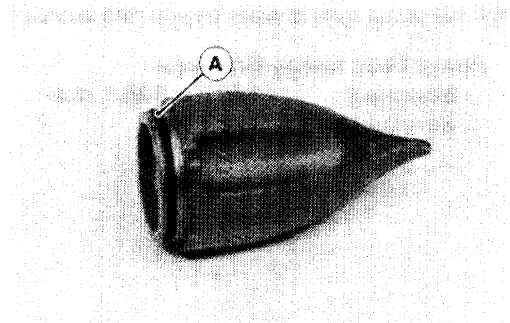
- Replace the grease seals with new ones, if necessary, and install them using the same special tool used for bearing installation.
- Press each seal into the pump case so that the side with the spring faces outward. Fill the gap between the seal with grease.
- Push the bushing into the pump case.
- Visually inspect the pump shaft O-rings, and replace them if necessary.
- Grease the pump shaft and insert it from rear of the pump case.
- Screw on the impeller.

Torque – Impeller: 98 N-m (10.0 kg-m, 72 ft-lb)

- Visually inspect impeller grease seal [A], and replace if necessary.
- When installing the grease seal, pack grease inside it.



- Be sure the O-ring [A] is in place on the pump cap.



10-8 PUMP AND IMPELLER

- Install:
 - Pump Cap
 - Pump Outlet
 - Steering Nozzle
- Apply a non-permanent locking agent to the thread of the following.
 - Pump Cap Bolts
 - Pump Outlet Mounting Bolts
 - Steering Nozzle Pivot Bolts

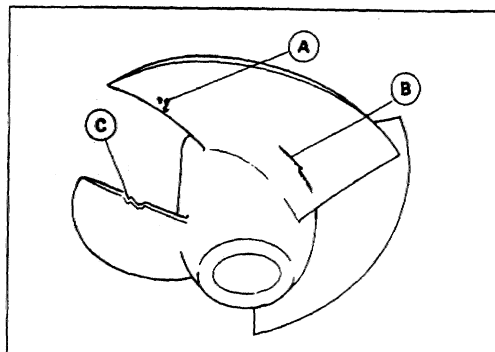
Torque – Steering Nozzle Pivot Bolts: 9.8 N-m (1.0kg-m, 87 in-lb)

Pump and Impeller Inspection

- Examine the impeller.
- ★ If there is pitting [A], deep scratches [B], nicks [C] or other damage, replace the impeller.

NOTE

- *Minor nicks and gouges in the impeller blades can be removed with abrasive paper or careful filing. Smooth leading edges are especially important to avoid cavitation.*

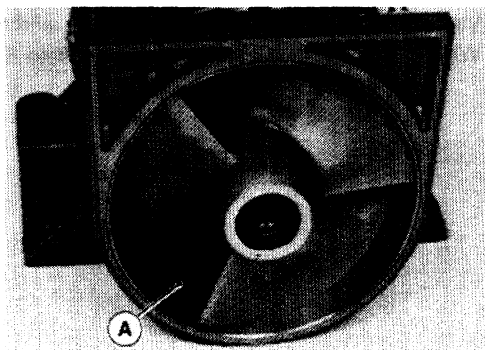


- Measure the impeller outside diameter.
- ★ If the impeller is worn smaller than the service limit, replace it.

Impeller Outside Diameter

Standard: 139.5 – 139.6 mm
Service Limit: 138.5 mm

- Examine the pump case [A].
- ★ If there are deep scratches inside the pump case, replace it.



- Measure the inside diameter of the pump case.
- ★ If the pump case is worn beyond the service limit, replace it.

Pump Case Inside Diameter

Standard: 140.0 – 140.1 mm
Service Limit: 141.1 mm

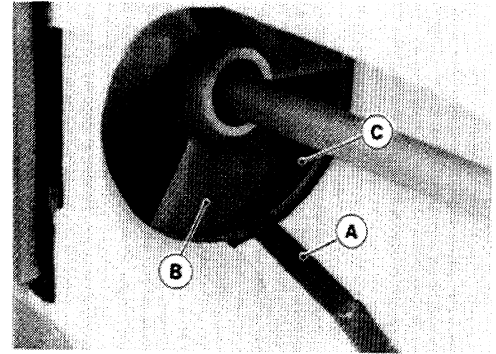
Impeller Clearance

- Impeller clearance is critical to proper performance. If the pump case and impeller are not visibly damaged, poor performance may be caused by too much impeller clearance.
- To check impeller clearance, remove the grate and insert a feeler gauge [A] between the tip of the impeller blade [B] and the pump case [C].

Impeller Clearance

Standard: 0.2 – 0.3 mm

Service Limit: 0.6 mm



- ★ If impeller clearance is incorrect, determine if it is due to wear or damage (see Pump and Impeller Inspection).

Handle Pole and Handlebar

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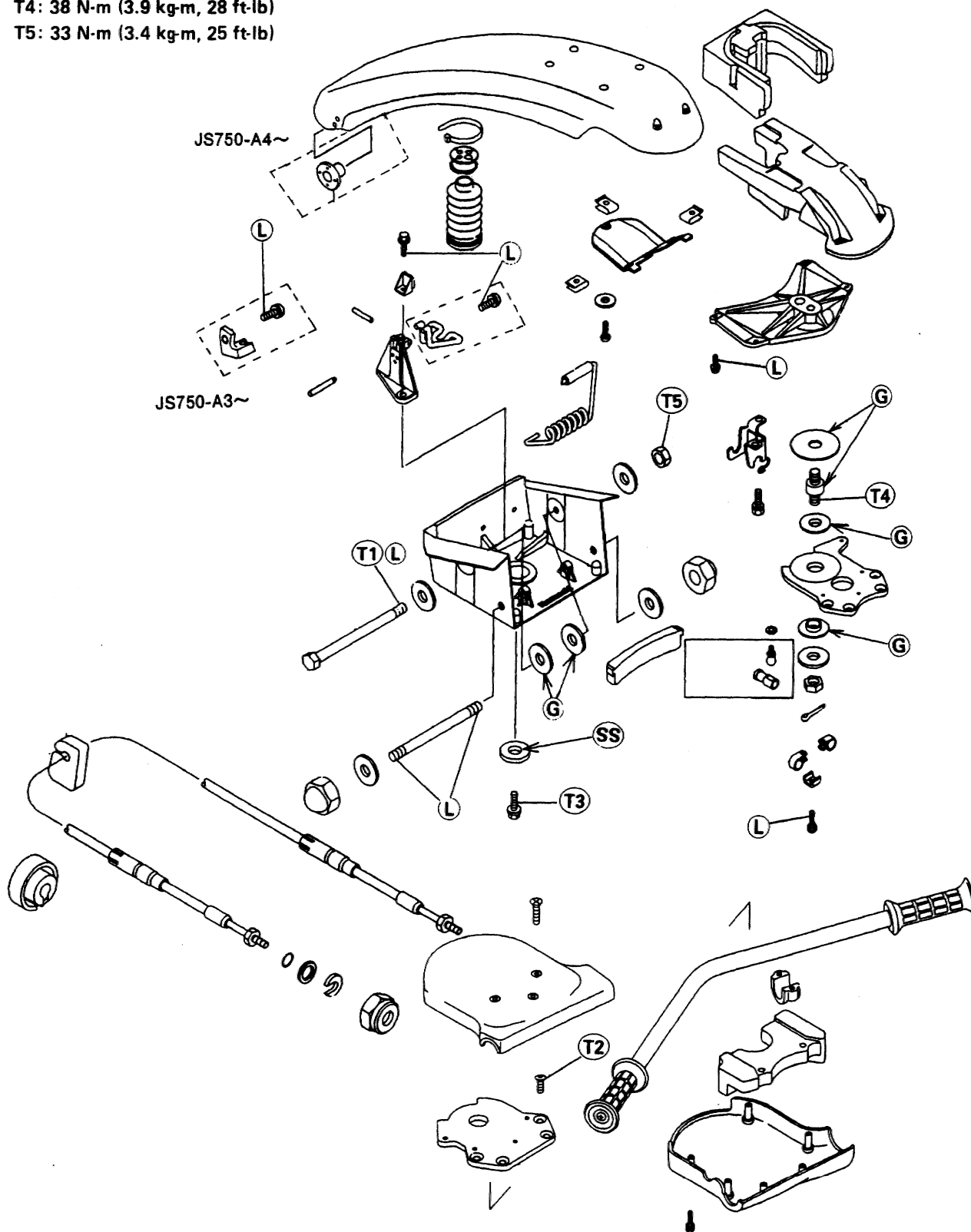
Exploded View

SS : Apply silicone sealant.

T2: 18 N-m (1.8 kg-m, 13.0 ft-lb)

T4: 38 N-m (3.9 kg-m, 28 ft-lb)

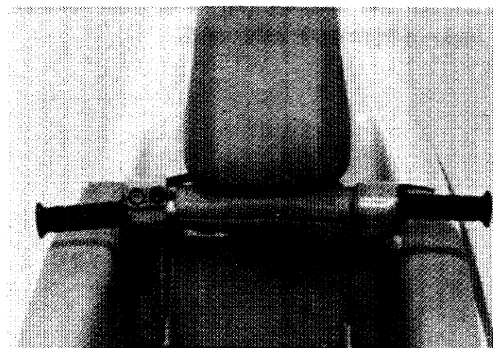
T5: 33 N-m (3.4 kg-m, 25 ft-lb)



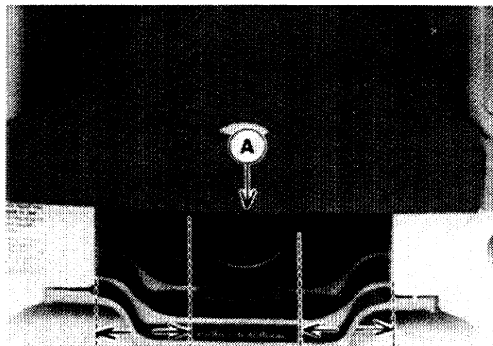
Steering Cable

Adjustment

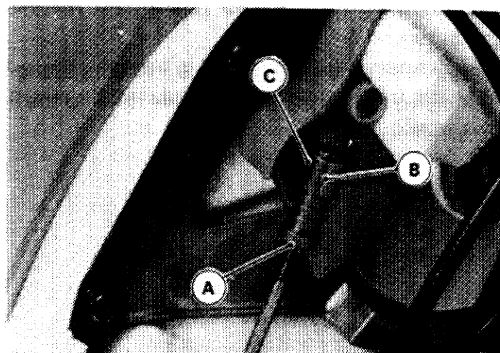
- Check steering cable adjustment.
- Lower the handle pole and center the handlebar in the straight-ahead position.



- Check that the steering nozzle is centered [A] in the pump cavity.

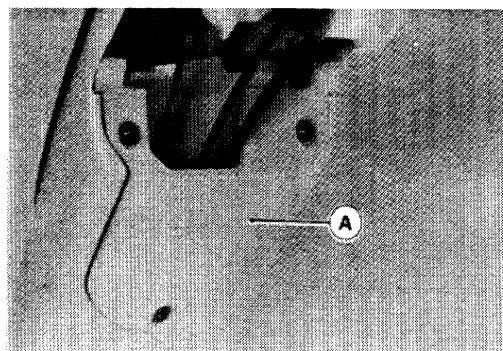


- If necessary adjust the steering cable.
- Raise the handle pole and loosen the locknut [A] on the steering cable.
- Disconnect the ball joint by sliding the outer sleeve [B] away from the ball [C] slightly, and lifting the cable from the ball.
- Turn the ball joint on the cable to adjust the steering.
- Connect the ball joint and check cable adjustment again.
- When adjustment is correct, tighten the steering cable locknut.



Removal

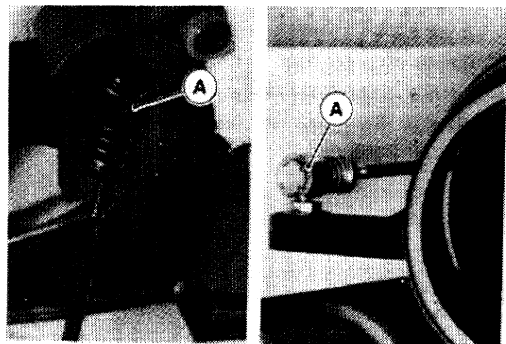
- Remove:
 - Handlebar Pad
 - Handlebar Pole Cover [A]



- Disconnect the ball joint at each end of the steering cable.
- Slide the outer sleeve [A] away from the ball slightly, and lift the cable from the ball.

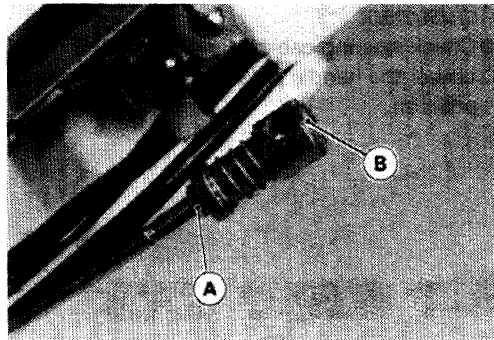
CAUTION

Never lay the watercraft on the right side. Water in the exhaust system may drain back into the engine, causing serious damage.

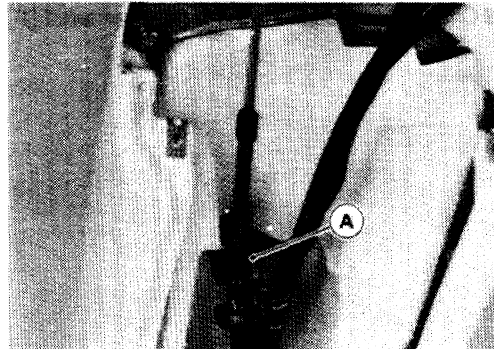


11-4 HANDLE POLE AND HANDLEBAR

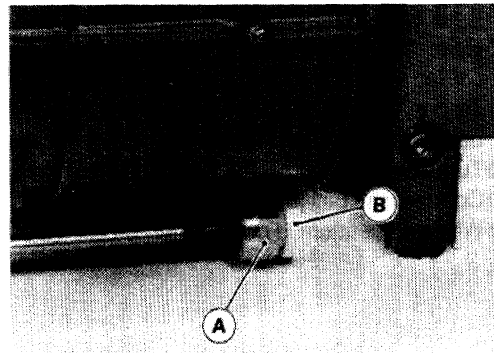
- Loosen the locknut [A], and then remove the ball joint [B] and locknut from each cable end.



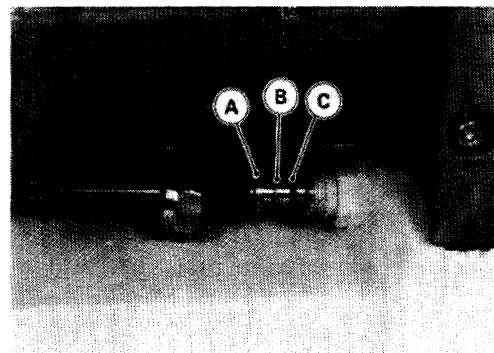
- Disconnect the steering cable from the cable holder on the handle pole.
- Unbolt the cable holder [A].



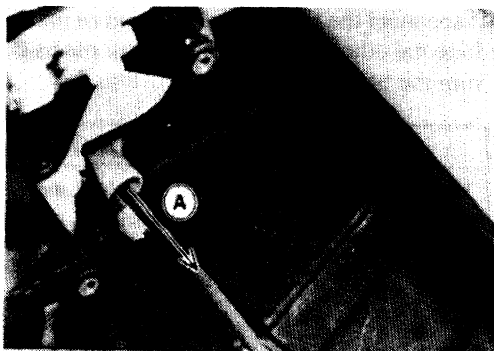
- Remove the pump cover (see Pump Removal in the Pump/Impeller chapter).
- Disconnect the steering cable from the fitting at the rear of the hull.
- Unscrew the large nut [A] while holding the fitting [B] in the hull with a wrench.



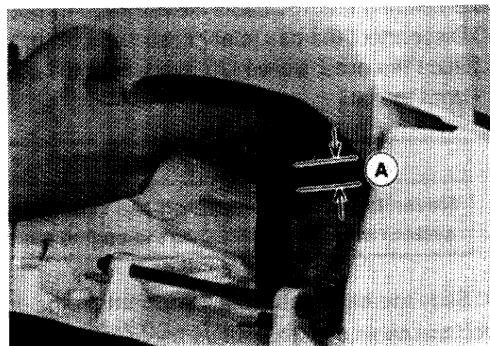
- Slide off the snap ring [A], washer [B], and O-ring [C].



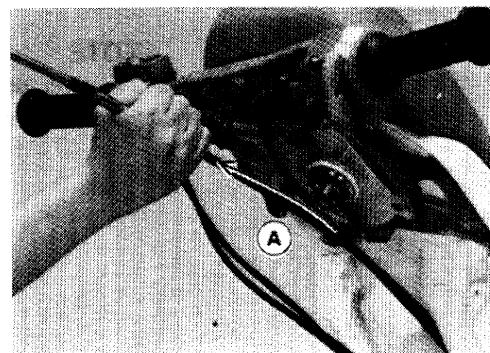
- Remove:
 - Fuel Tank
 - Water Box Muffler
- Pull the cable from cable detents in the engine compartment.
- Remove the cable by carefully pulling rear section [A] of the cable through the hull.



- Push the rear end of the inner cable [A].

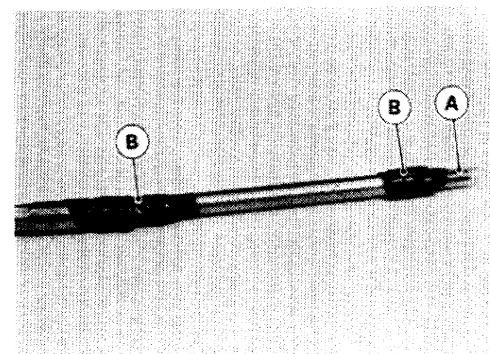


- Lay the handle pole a little rearwards, and remove the cable by carefully pulling the front section of the cable [A] through the handle pole.



Installation Notes

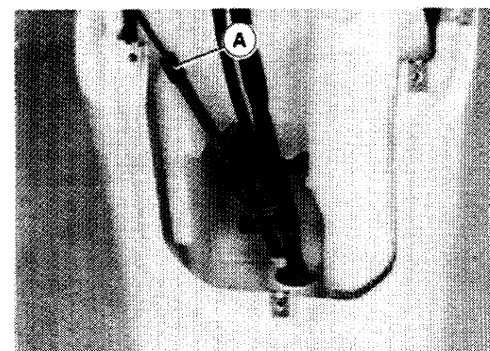
- The protective sheath [A] and tape [B] around the steering cable goes toward the front of the watercraft, to protect the cable where it enters the handle pole.
- Lubricate the outside of the new cable to ease cable installation.



Inspection

- Examine the steering cable.
- ★ If the cable or cable housing is kinked [A] or frayed [B], replace the cable.

- ★ If the seal [A] at either end of the cable is damaged in any way, replace the cable.



11-6 HANDLE POLE AND HANDLEBAR

- Be certain that the cable moves freely in both directions.
- Disconnect the ball joint at each end of the steering cable.
- Slide the outer sleeve [A] away from the ball slightly, and lift the cable from the ball.

CAUTION

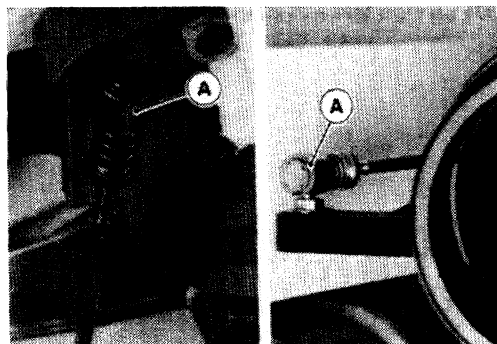
Never lay the watercraft on the right side. Water in the exhaust system may drain back into the engine causing serious damage.

- Slide the inner cable back and forth in the cable housing.
- ★ If the cable does not move freely, replace it.

Lubrication

NOTE

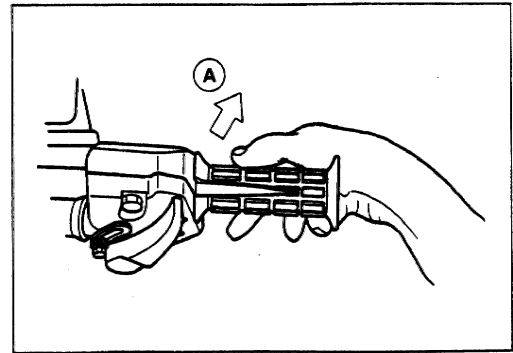
- The steering cable is sealed at each end and does not require lubrication. If the seals are damaged, the cable must be replaced.



Handlebar

Hand Grip Removal/Installation

- The hand grips are bonded to the handlebar. To remove them, cut the grips lengthwise with a sharp knife and peel [A] them off the bar.



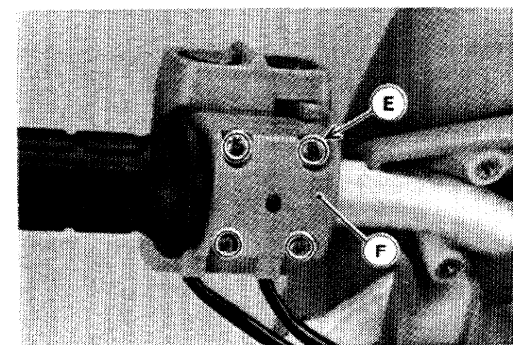
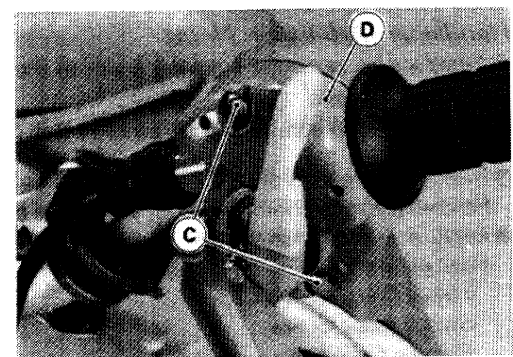
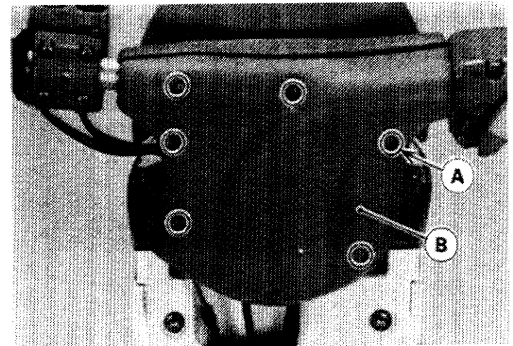
⚠ WARNING

Read all warnings and cautions on any solvents and adhesives used. Many of these products are flammable, may be harmful to the skin and eyes, and may give off harmful vapors. Use these solvents and adhesives only in a well-ventilated area and never near an open flame.

- Apply an adhesive to the inside of grip.
- Slide the grip into position on the handlebar.

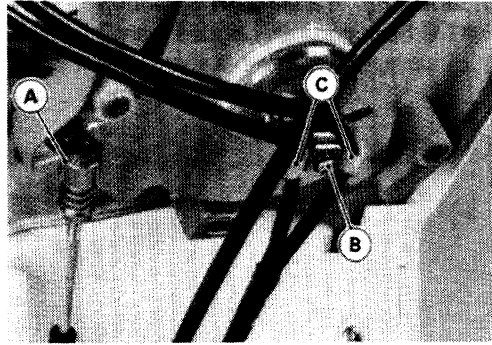
Handlebar Removal

- Remove:
 - Handlebar Pad Mounting Screws [A]
 - Handlebar Pad [B]
 - Throttle Case Bolts [C]
 - Throttle Cases [D]
 - Switch Case Screws [E]
 - Switch Cases [F]

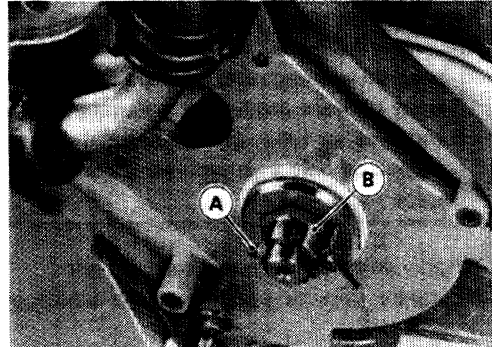


11-8 HANDLE POLE AND HANDLEBAR

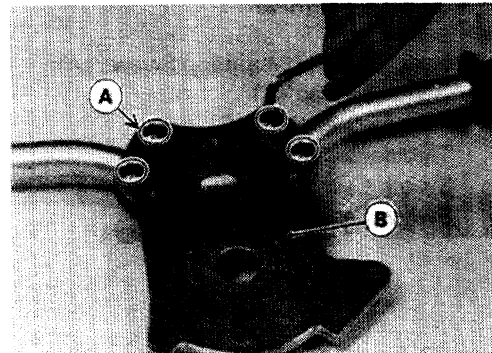
- Remove or disconnect:
 - Steering Cable Ball Joint [A]
 - Wiring Clamps Screw [B]
 - Wiring Clamps [C]



- Remove the cotter pin [A] and take the nut [B] off the steering pivot stud.
- Remove the handlebar with the handlebar plate from the handle pole.



- Remove the pad, and take out the screws [A] and separate the handlebar from the handlebar plate [B].

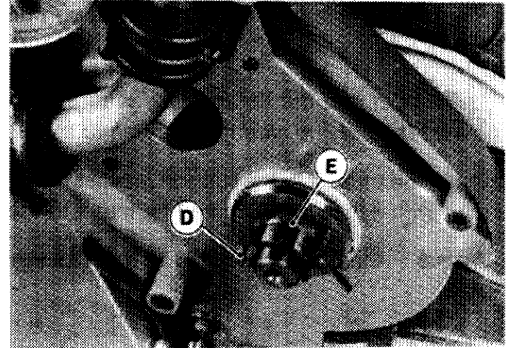
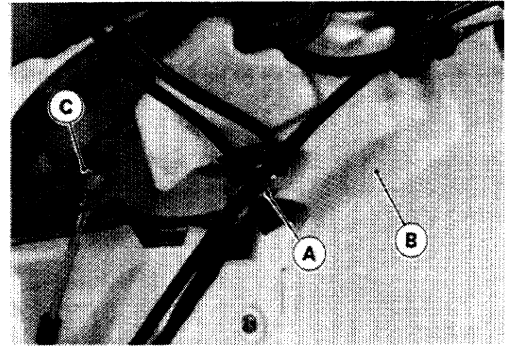


Handlebar Installation Notes

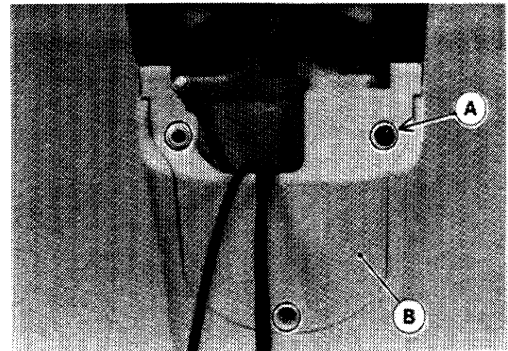
- Apply a non-permanent locking agent to the handlebar clamp screws and torque them.
Torque – Handlebar Clamp Screws : 18 N-m (1.8 kg-m, 13 ft-lb)
- Grease the steering pivot thoroughly, and tighten the nut to allow the handlebar turn smoothly without play. Use a new cotter pin.
- Apply a non-permanent locking agent to the following and tighten them securely.
 - Wiring Clamp Screw
 - Switch Case Screws
 - Throttle Case Bolts

Handlebar Steering Pivot Maintenance

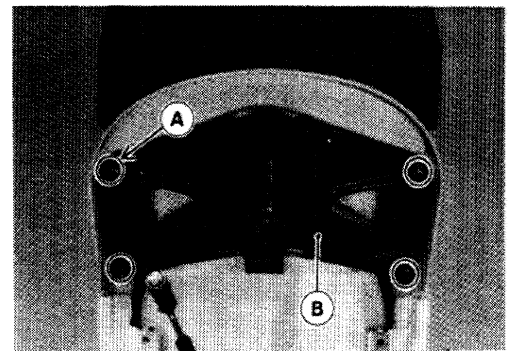
- If the steering pivot feels loose or overtight, the pivot may need lubrication or the bushings may need to be replaced.
- Remove or disconnect:
 - Handlebar Pad
 - Wiring Clamps Screw [A]
 - Handle Pole Float [B]
 - Steering Cable Ball Joint [C]
 - Cotter Pin [D]
 - Steering Pivot Nut [E]
- Remove the handlebar with the handlebar plate from the handle pole.



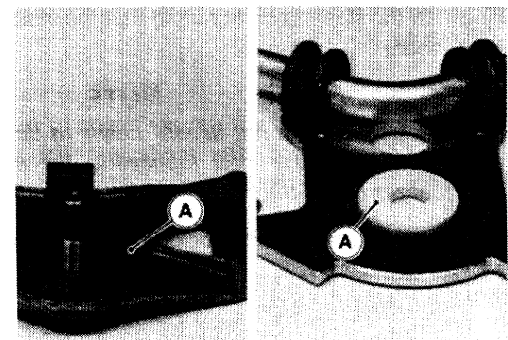
- Take out the screws [A], and remove the handle pole cover [B].



- Take out the mounting bolts [A], and remove the steering support bracket [B].

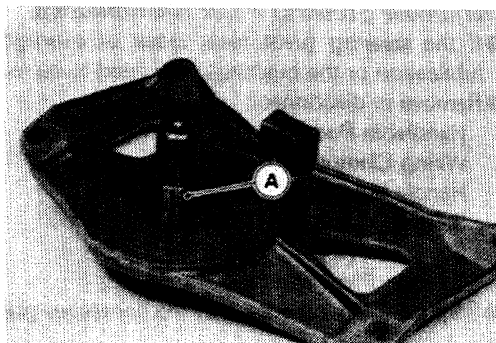


- Separate the nylon bushings [A] from the support bracket and the handlebar plate.



11-10 HANDLE POLE AND HANDLEBAR

- Clean the steering pivot stud [A] and check the surface for corrosion and wear.
- ★ If the stud is corroded or noticeably worn, replace it.



- Remove the stud from the steering support bracket

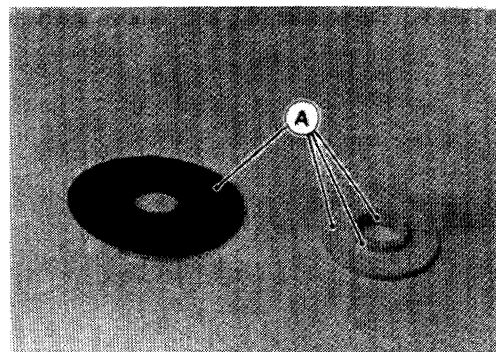
NOTE

○ The stud and nut are installed with a locking agent. If necessary, heat the nut and stud with a torch to make removal easier.

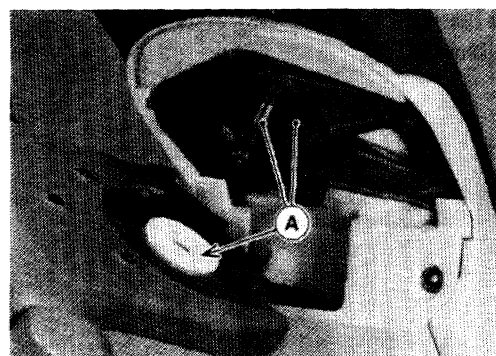
- Clean the threads in the support bracket thoroughly and install the new stud with a locking agent and tighten it to the specified torque.

Torque – Steering Pivot Stud : 38 N-m (3.9 kg-m, 28 ft-lb)

- Check the bushings [A] for damage and wear.
- ★ If the bushings are damaged or worn, replace them.



- When reassembling the steering pivot, be sure to grease [A] the new bushings well.



- Tighten the steering pivot nut so that the steering action is smooth but nut loose.

NOTE

○ The steering pivot nut usually needs to be readjusted after the first few hours of use after lubricating the steering bushings. The squeezing out of the bushings a little, and the steering feels loose.

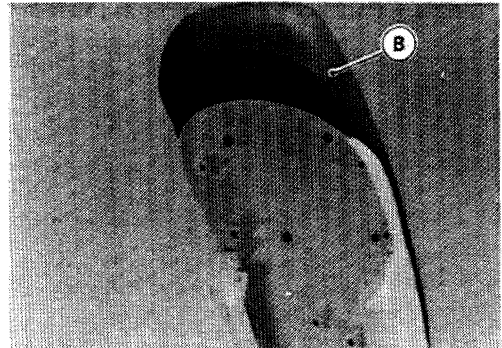
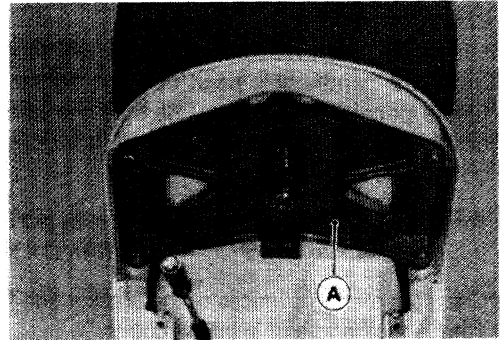
- Apply a non-permanent locking agent to wiring clamp screw and tighten it securely.

Handle Pole and Bracket

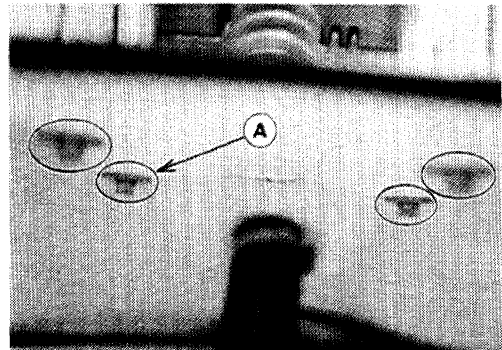
Removal

● Remove:

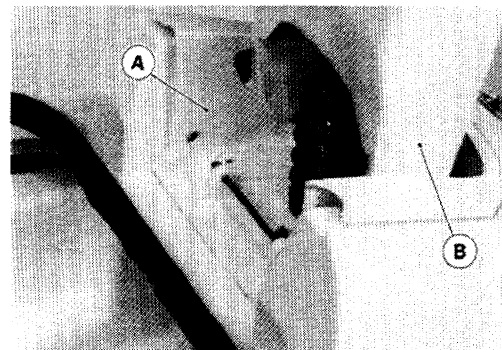
- Fuel Tank
- Throttle Cable
- Handlebar Switch Case and Wiring
- Steering Cable
- Steering Support Bracket [A]
- Pad [B]



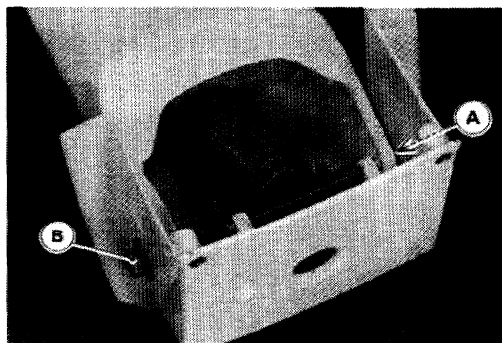
- Take out the bolts [A] holding the bracket to the hull.



- Remove the bracket [A] with the handle pole [B].



- Take off the handle pole pivot nut [A].
- Unscrew the pivot bolt [B], and lift the handle pole out of the bracket.
Two nylon washers will fall out.
- Remove the handle pole spring.



11-12 HANDLE POLE AND HANDLEBAR

Installation Notes

- Grease the nylon washers with water resistant grease.
- Install the handle pole pivot bolt and tighten to the specified torque before putting on the nut. Be sure the handle pole moves up and down smoothly before continuing. If it does not, decrease the pivot bolt torque slightly.

Torque – Handle Pole Pivot Bolt : 13 N-m (1.3 kg-m, 9.5 ft-lb)

Handle Pole Pivot Nut : 33 N-m (3.4 kg-m, 25 ft-lb)

- Clean the mating surfaces of the bracket and hull.
- Torque the handle pole bracket bolts.

Torque – Handle Pole Bracket Bolts : 19 N-m (1.9 kg-m, 13.5 ft-lb)

Hull/Engine Hood

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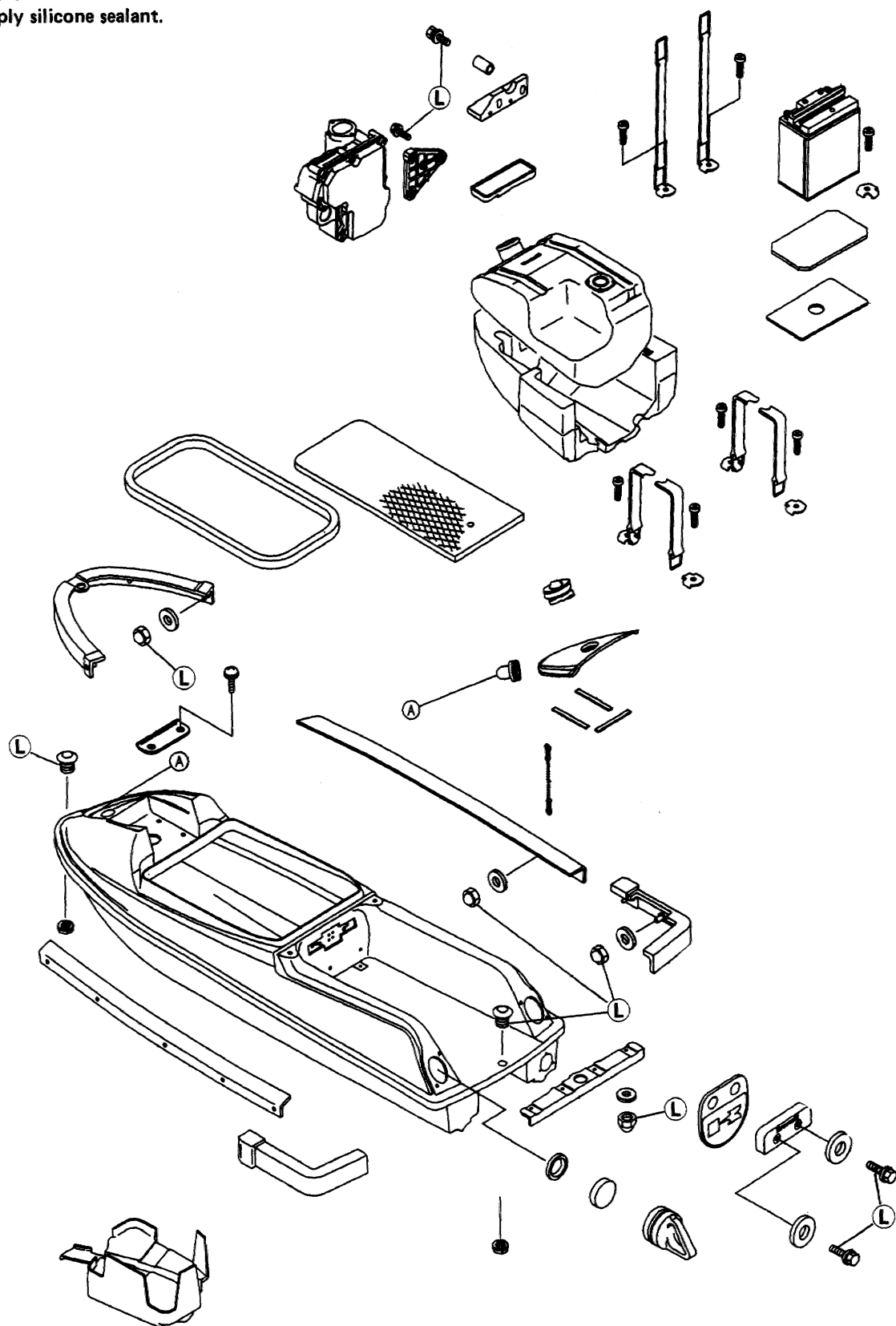
 Bumper Installation Note12-8

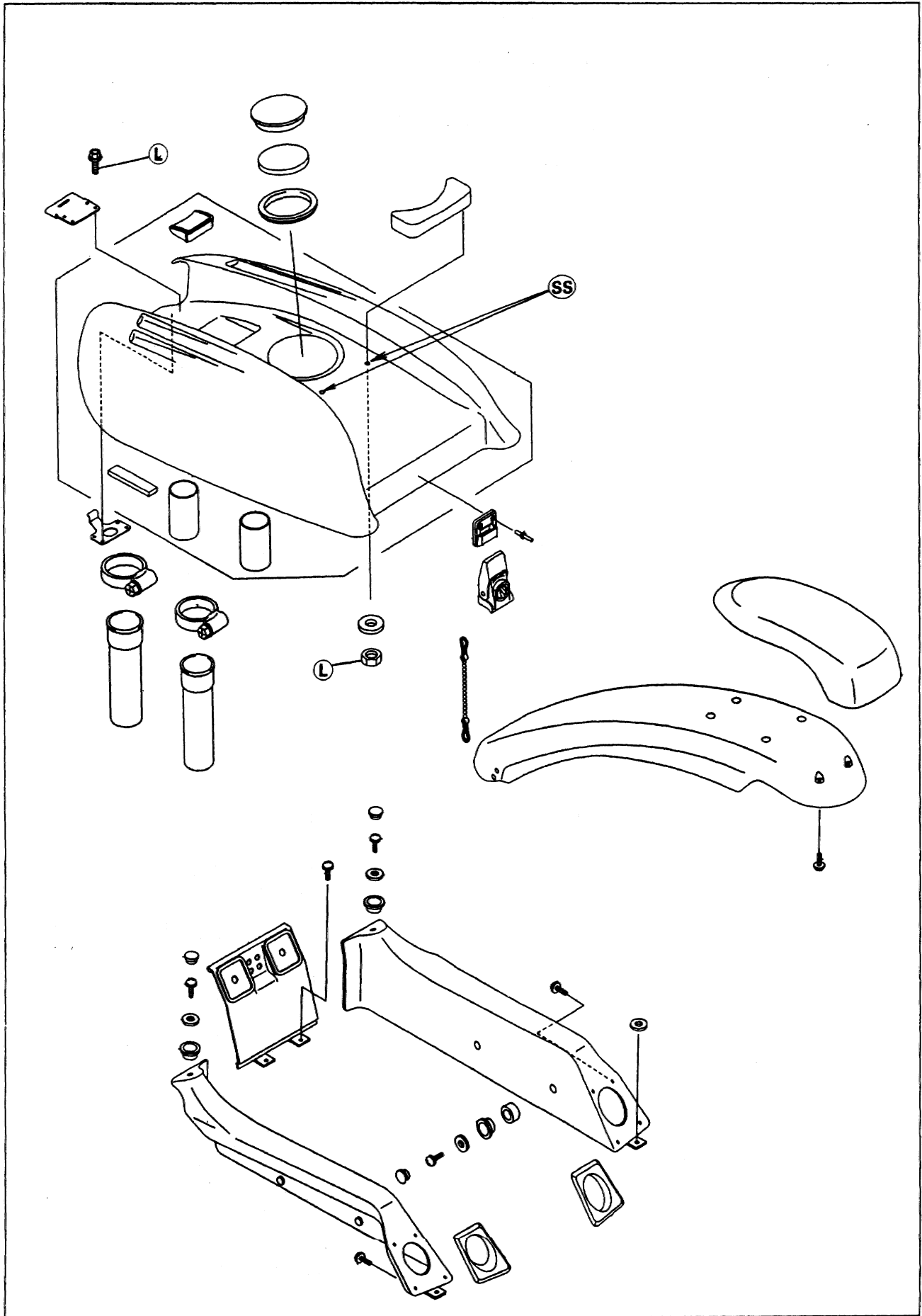
12-2 HULL/ENGINE HOOD

Exploded View

L : Apply a non-permanent locking agent.

SS : Apply silicone sealant.





12-4 HULL/ENGINE HOOD

Pads

CAUTION

Do not remove the pads unless it is absolutely necessary, because the screw holes in the hull or pad frame may be damaged by removal.

When installing the pads, be careful not to overtighten the self-tapping screws.

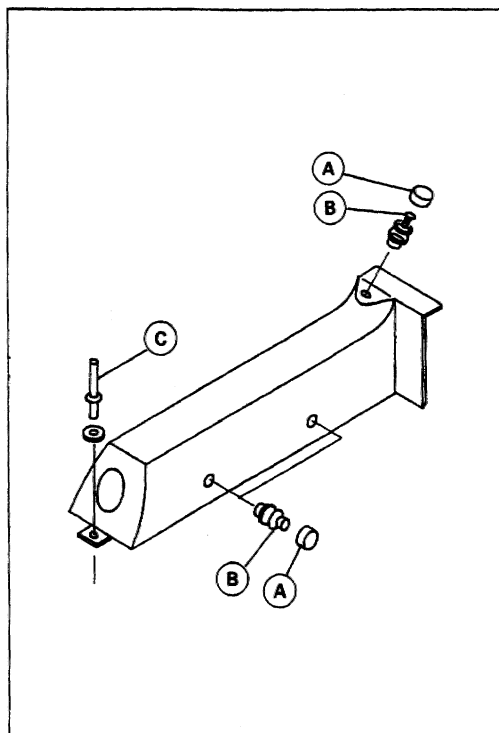
● Remove:

Rear Bumpers

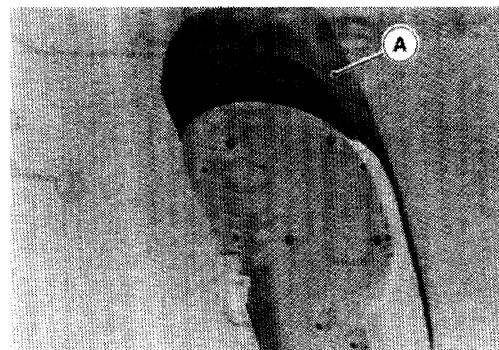
Plugs [A]

Mounting Screws [B]

Rivets [C]



- If the handle pole pad [A] is to be removed, remove the steering support bracket.



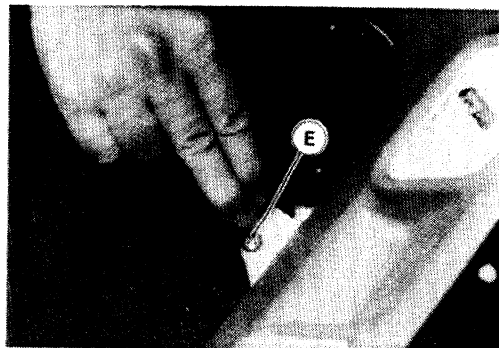
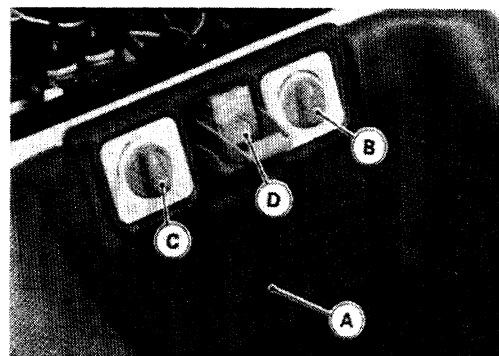
- If the control panel [A] is to be removed, remove the following parts.

Fuel Tap Knob [B]

Choke Knob [C]

Engine Hood Latch [D]

Mounting Screws [E]



Hull Replacement

- To replace the hull, remove the following.

- Battery and Pad
- Pump and Hoses
- Handle Pole with Bracket
- Intake Silencer
- Carburetor
- Exhaust Pipe, Front Muffler, and Expansion Chamber
- Electric Case
- Water Box Muffler
- Engine and Mounts
- Oil Tank
- Fuel Tank
- Drive Shaft and Shaft Holder
- Control Cables
- Engine Hood Latch
- Bilge Breather
- Bilge and Cooling Hose
- Fuel Filler
- Bypass Hose and Outlet
- Cable Detents
- Fuel Hose Holder
- Bumpers

The following parts cannot be removed from the hull and must be replaced.

- Decals
- Labels
- Registration Number (if any)

If the new hull is to be painted, do that first. Then install the parts removed in the reverse order of their removal. Finally, install the labels, decals, mats and the registration numbers.

12-6 HULL/ENGINE HOOD

Rubber Parts

NOTE

- The rubber parts on the watercraft are fastened in place with various adhesives. To replace a rubber parts, use a cement in the following table, or an equivalent.

⚠ WARNING

Read all warnings and cautions on any solvents and adhesives used. Many of these products are flammable, may be harmful to the skin and eyes, and may give off harmful vapors. Use these solvents and adhesives only in a well-ventilated area and never near an open flame.

For this Application:	Type
Mat Engine Hood Gasket Water Box Muffler Damper	Synthetic Rubber Adhesive P/N: 92104-3701
Detents Handlebar Grips Handle Pole Bracket Damper	Cyanoacrylate cement

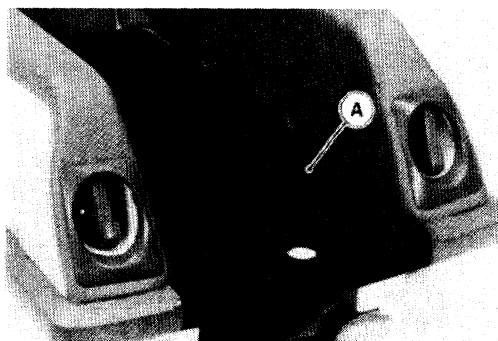
CAUTION

Be very careful that the part is positioned correctly when you apply the cement. It may be impossible to reposition the part.

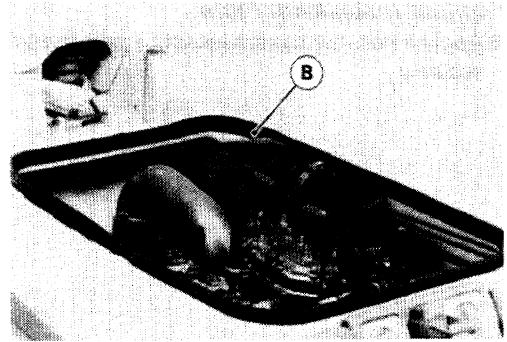
⚠ WARNING

Do not get any cyanoacrylate cement in your eyes or on your skin. If you do get some in your eyes, do not try to wash it out. Contact a physician immediately! If you do get some on your fingers, do not touch any other part of your body; your fingers will stick to anything they touch. Allow the cement to cure and it will eventually wear off.

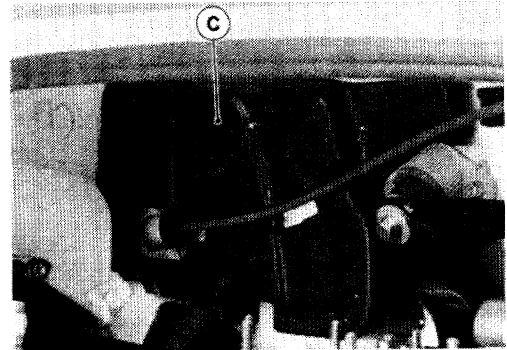
Rubber Parts Location Mat [A]



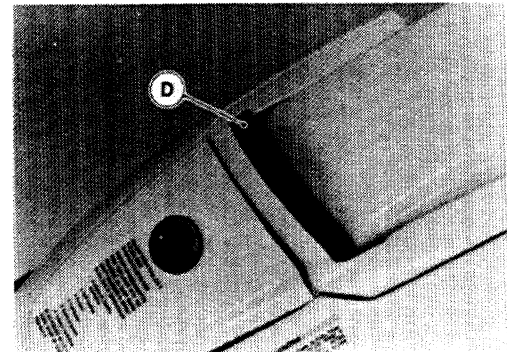
Engine Hood Gasket [B]



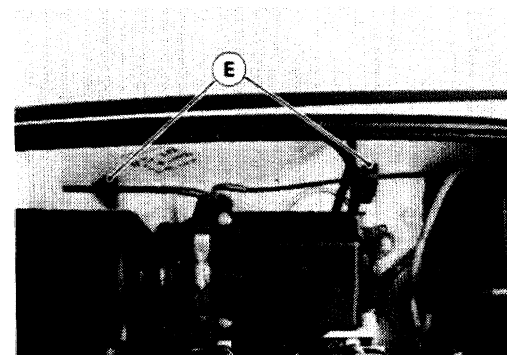
Water Box Muffler Damper [C]



Handle Pole Bracket Damper [D]



Detent [E]



Bumper Removal

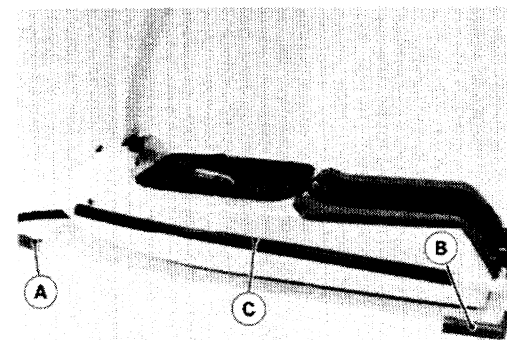
The bumper consists of five-piece, they are attached firmly to the hull with nuts.

- Unscrew the mounting nuts, and remove the following.

Front Bumper [A]

Rear Bumpers [B]

Side Bumpers [C].



12-8 HULL/ENGINE HOOD

Bumper Installation Note

- Apply a non-permanent locking agent to all the nuts and tighten them securely.

Electrical System

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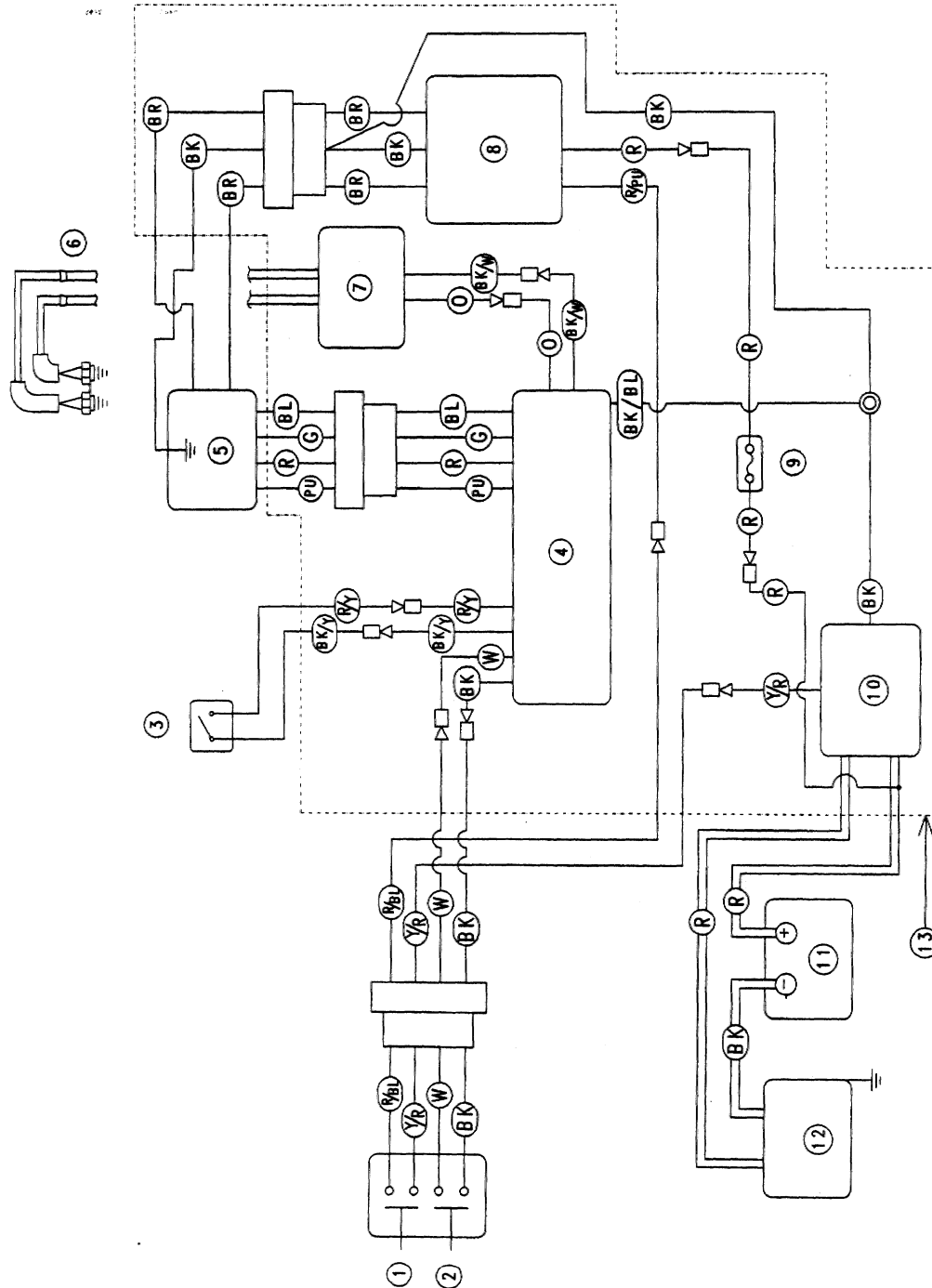
13-2 ELECTRICAL SYSTEM

Wiring Diagram

1. Start Switch
2. Stop Switch
3. Temperature Sensor
4. CDI Igniter
5. Magneto
6. Spark Plug
7. Ignition Coil
8. Regulator/Rectifier
9. Fuse (10A)
10. Starter Relay
11. Battery
12. Starter Motor
13. Electric Case

Wire Color Code	
BK	Black
BR	Brown
G	Green
BL	Blue
O	Orange
PU	Purple
W	White
R	Red

(98051-3709C)



Exploded View

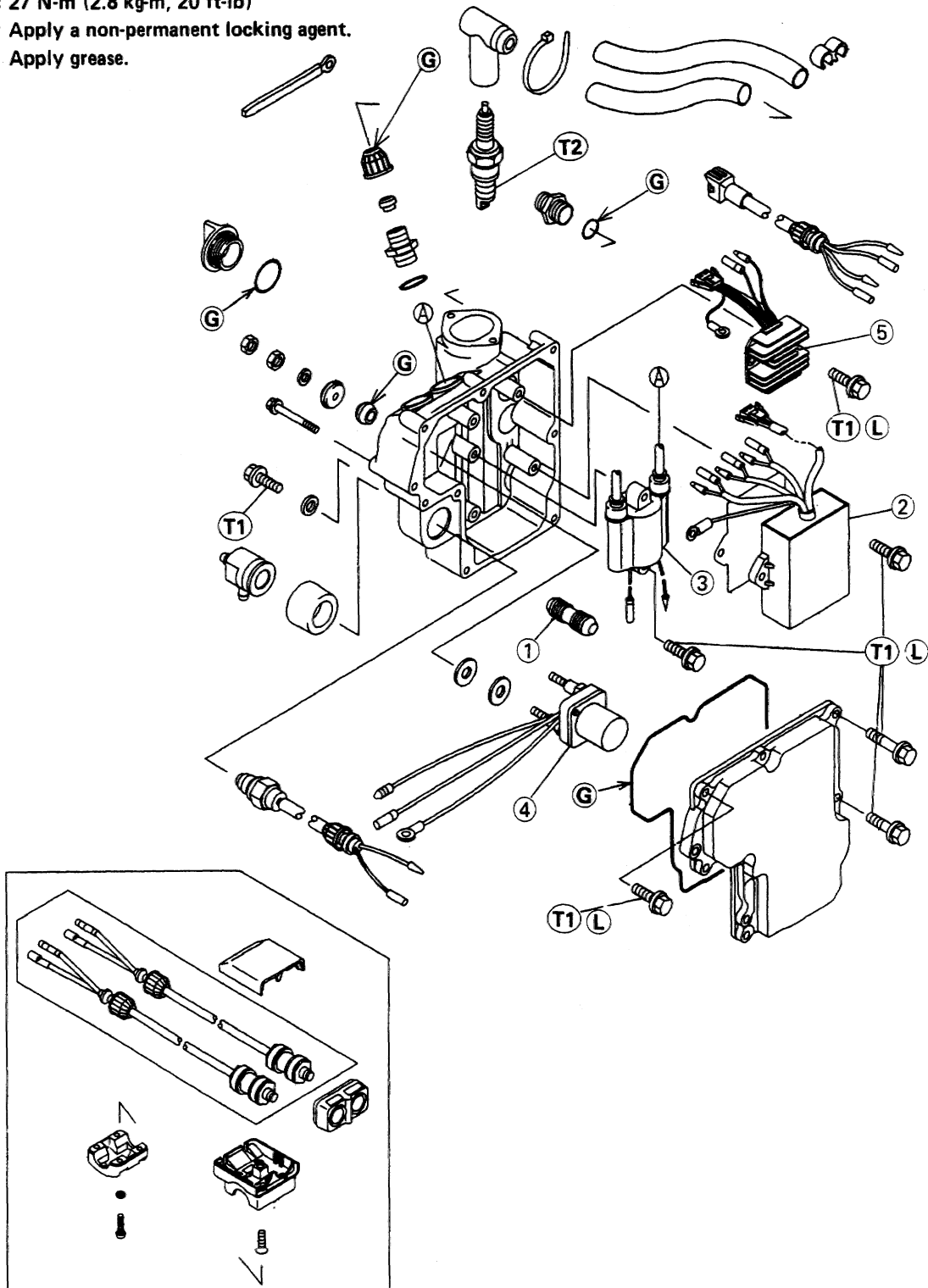
1. 10A Fuse
2. CDI Igniter
3. Ignition Coil
4. Starter Relay
5. Regulator/Rectifier

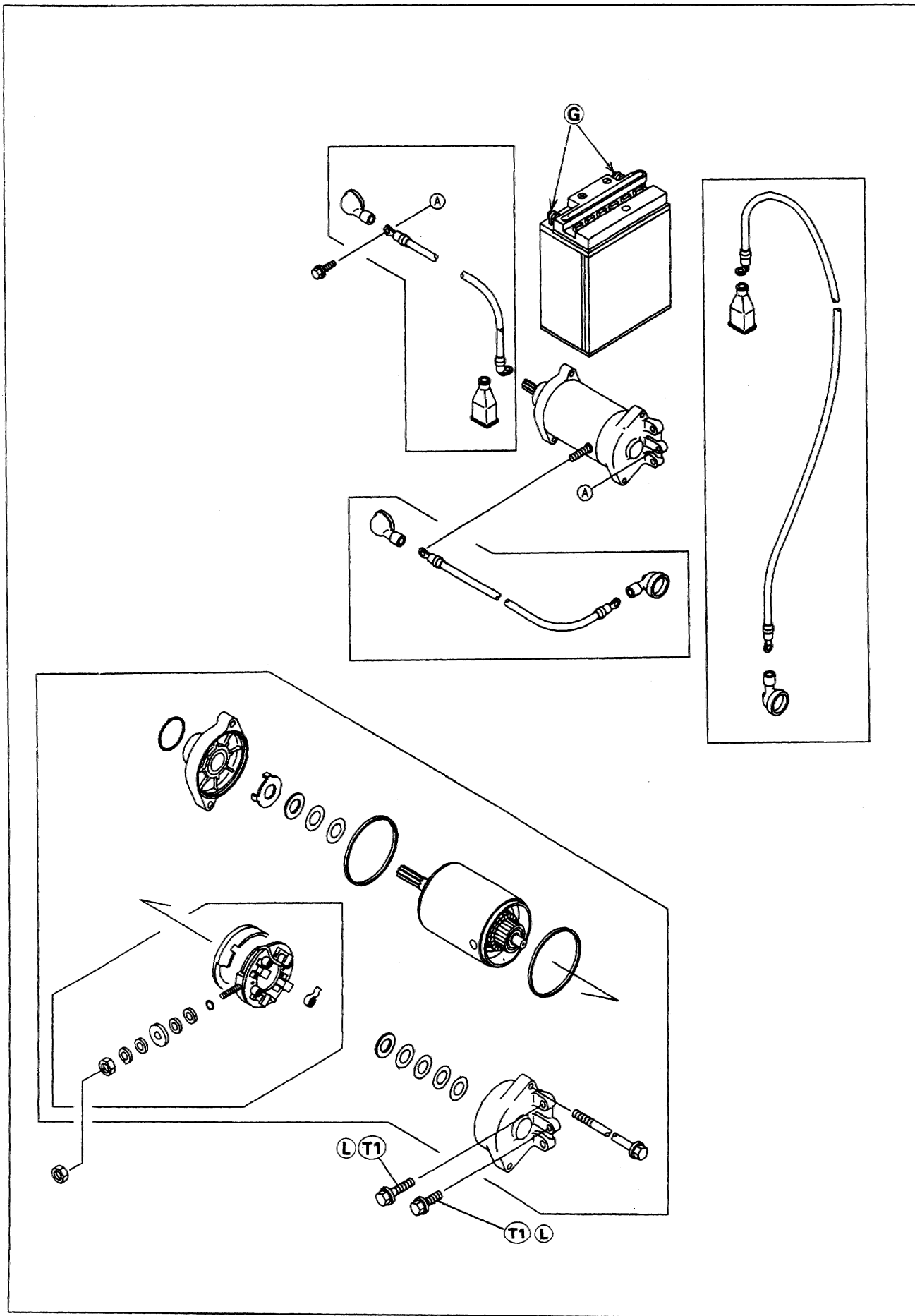
T1: 7.8 N-m (0.8 kg-m, 69 in-lb)

T2: 27 N-m (2.8 kg-m, 20 ft-lb)

L : Apply a non-permanent locking agent.

G : Apply grease.





Specifications

Item	Standard	Service Limit
Battery:		
Type	12 V 19 Ah	---
Specific gravity of electrolyte	1.280 @20°C (68°F)	---
Electric Starter System:		
Starter motor:		
Brush length	12.5 mm	6.5 mm
Commutator diameter	28 mm	27 mm
Charging System:		
Regulator/rectifier output voltage	Battery voltage - 14.5 ±0.5 V	---
Charging coil output voltage	20 V	---
Charging coil resistance:		
Brown ↔ Brown	0.7 ~ 1.1 Ω	---
Ignition System:		
Ignition timing	13° BTDC @1,250 r/min (rpm) ~ 16° @2,500 r/min (rpm)	---
Ignition coil:		
Primary winding resistance	0.08 ~ 0.1 Ω	---
Secondary winding resistance	3.5 ~ 4.7 kΩ	---
Spark plug:		
Type	NGK BR8ES	---
Gap	0.7 ~ 0.8 mm	---
Pickup coil resistance	396 - 594 Ω	---
Start/Stop Switch:		
Start button:		
Released	∞Ω	---
Depressed	Almost 0Ω	---
Stop button:		
Released	∞Ω	---
Depressed	Almost 0Ω	---

Special Tools – Hand Tester (V. O. M) : 57001-983
Coil Tester: 57001-1242

13-6 ELECTRICAL SYSTEM

Battery

Precautions

Following a few simple rules will greatly extend the life of the battery.

- When the level of the electrolyte in the battery is low, add only distilled water to each cell, until the level is at the upper level line marked on the outside of the battery. Ordinary tap water is not a substitute for distilled water and will shorten the life of the battery.
- Never add sulphuric acid solution to the battery. This will make the electrolyte solution too strong and will ruin the battery within a very short time.
- Avoid quick-charging the battery. A quick-charge will damage the battery plates.
- Never let a good battery stand for more than 30 days without giving it a supplemental charge, and never let a discharged battery stand without charging it. If a battery stands for any length of time, it slowly self-discharges. Once it is discharged, the plates sulphate (turn white), and the battery will no longer take a charge.
- Keep the battery well-charged during cold weather so that the electrolyte does not freeze and crack open the battery. The more discharged the battery becomes, the more easily it freezes.
- **DON'T INSTALL THE BATTERY BACKWARDS.** The negative side is grounded.

Removal

⚠ WARNING

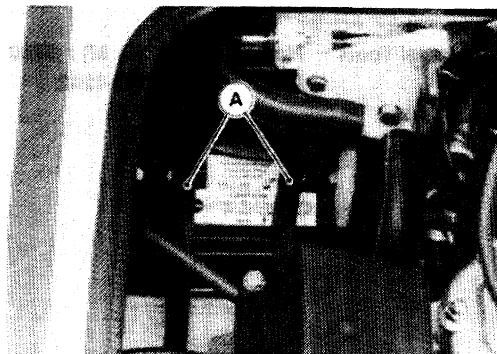
Battery electrolyte contains sulphuric acid which is poisonous and causes severe burns. When installed in the battery, electrolyte generates hydrogen gas which under certain conditions is flammable and explosive. Keep all flames and sparks (cigarettes, etc.) away and always wear eye protection when working on or near the battery.

- Disconnect the battery cables.

⚠ WARNING

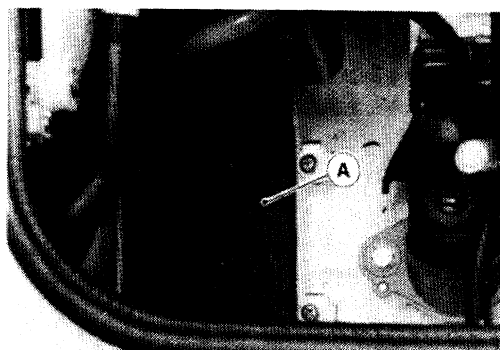
To prevent possible personal injury and damage to electrical components, always disconnect the grounded cable first.

- Unhook the battery straps [A].
- Carefully lift the battery from the engine compartment.



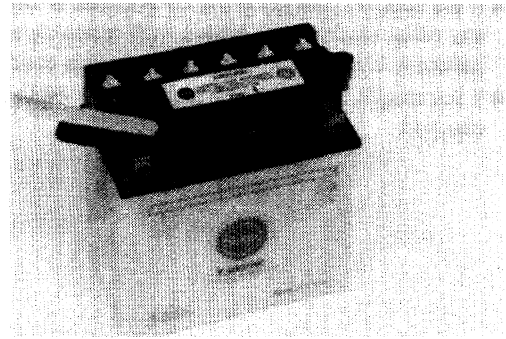
Installation

- Be sure the battery damper [A] is in position in the battery compartment.
- Place the battery in position.
- Install the battery with positive (+) terminal toward the bow (forward).
- Hook the battery straps.
- Connect the battery cables, positive first.
- After attaching both cables, coat the terminals and cable ends with grease to prevent corrosion.
- Slide the protective boot over each terminal.

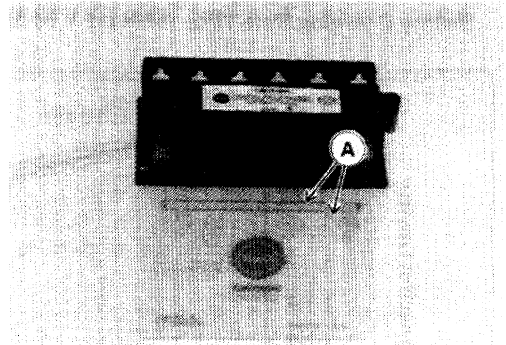


Battery Cleaning

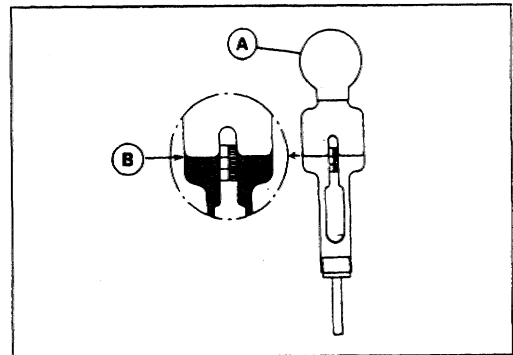
- Remove the battery from the hull (see Battery Removal).
- Clean off the battery using a baking soda-and-water solution.
 - Mix one heaping tablespoon of baking soda in one cup of water.
 - Be careful not to get any of the cleaning solution in the battery.
 - The terminals must be especially clean.
- Rinse the battery with clean water.

**Electrolyte Level Inspection**

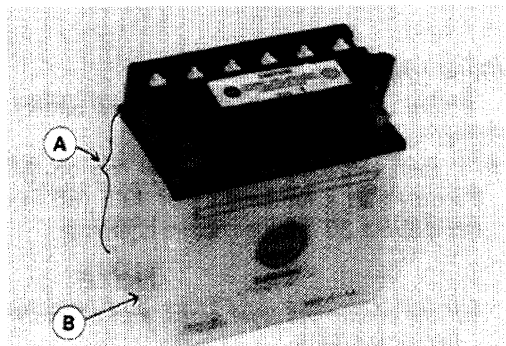
- Remove the battery.
- Visually check the electrolyte level [A] in the battery.
- ★ If the level of electrolyte in any cell is below the lower level line on the battery case, add distilled water only to that cell.
- Install the battery.

**Condition**

- Before charging, check battery condition by testing the specific gravity of the electrolyte in each cell.
- Draw a little fluid from the cell with a hydrometer [A].
- Read the level of the electrolyte [B] on the floating scale. This is the specific gravity of the electrolyte.



- Look for sediment [A] and white sulfation [B] inside the cells.



- See the Battery Troubleshooting Guide in Battery Test Charging.
- ★ If the specific gravity is below 1.280 the battery needs to be charged.

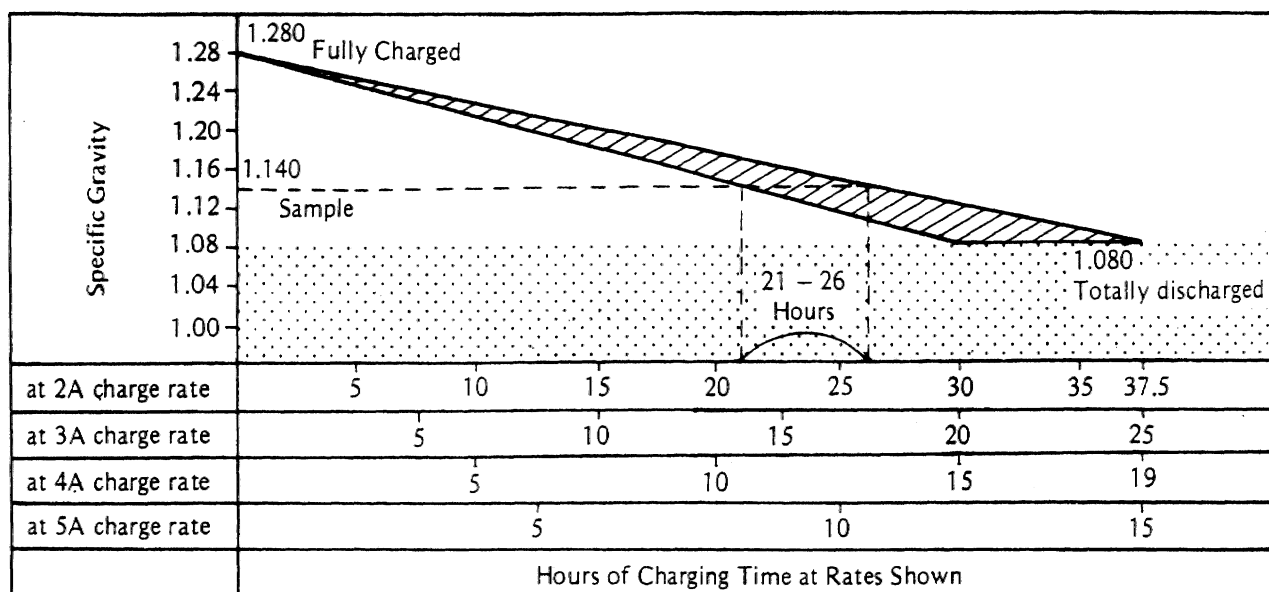
NOTE

- The specific gravity of the electrolyte varies with changes in temperature, so the specific gravity reading must be corrected for the temperature of the electrolyte.
- Celsius: Add 0.007 points to reading for each 10°C above 20°C or subtract 0.007 points for each 10°C below 20°C.
- Fahrenheit: Add 0.004 points to reading for each 10°F above 68°F or subtract 0.004 points for each 10°F below 68°F.

13-8 ELECTRICAL SYSTEM

- ★ If the specific gravity of any of the cells is more than 0.050 away from any other reading, the battery will probably not accept a charge. It is generally best to replace a battery in this condition.
- ★ If the specific gravity of all the cells is 1.280 or more the battery is fully charged.

Battery Charging Rate/Time Table (12 V 50 Ah)



Initial Charging

Before being placed in service, a new battery should be given an initial charging.

- Fill each cell to the upper level line on the battery case with fresh electrolyte at a temperature of 30°F (86°F) or less. Let the battery stand about 30 minutes before charging.

NOTE

○ If the electrolyte level drops, add electrolyte to the upper level line before charging.

- Leaving the caps off the cells, connect the battery to a charger, set the charging rate at 1/10 the battery capacity, and charge it for 10 hours. For example, if the battery is rated at 50 Ah, the charging rate would be 5A.

⚠ WARNING

Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

CAUTION

Do not use a high rate battery charger, as it typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat which can warp the plates and cause internal shorting. Higher-than-normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.

If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

- Turn the charger off, then disconnect it from the battery.
- Check battery voltage. Battery voltage should be 12 – 13 V.
- Check the specific gravity of each cell with a hydrometer (see Battery Condition).
- ★ If the voltmeter or hydrometer readings are below those specified, additional charging is necessary before the battery can be installed.

Ordinary Charging

- Remove the battery from the hull (see Battery Removal).
- Clean off the battery (see Battery Cleaning).
- If any of the cells are low, fill them to the LOWER level line with distilled water only. The electrolyte will expand during charging, and the level will rise.
- Connect a charger to the battery BEFORE plugging it in or turning it on.

⚠ WARNING

Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

- Set the charge rate and time according to the battery condition previously determined (see Battery Condition), using the table.

CAUTION

Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at high rate causes excess heat which can warp the plates and cause internal shorting. High-than-normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting. If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

- Turn the charger off or unplug it, then disconnect it from the battery.
- Check battery condition (see Battery Condition).
- ★ If the battery condition indicates that it is not fully charged, additional charging time is necessary.

Test Charging

- If the battery is suspected of being defective, sulfated, or unable to take a charge, consult the Battery Troubleshooting Guide table.
- To test charge a battery, perform the ordinary charging procedure and monitor the battery voltage and other signs as mentioned below.

Battery Troubleshooting Guide

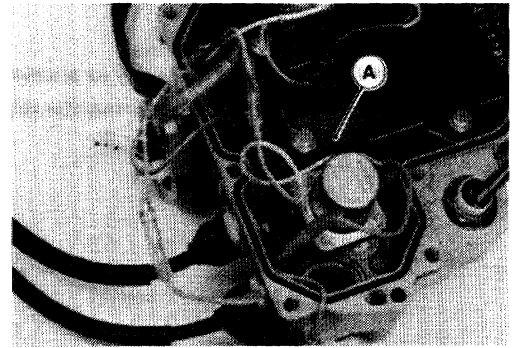
	Good Battery	Suspect Battery	Action
Plates	(+) chocolate color (-) gray	white (sulphated); + plates broken or corroded	Replace
Sediment	none, or small amount	sediment up to plates, causing short	Replace
Voltage	above 12V	below 12V	Test charge
Electrolyte Level	above plates	below top of plates	Fill and test charge
Specific Gravity	above 1.200 in all cells; no two cells more than 0.020 different	below 1.100, or difference of more than 0.020 between two cells	Test charge

Electric Starter System

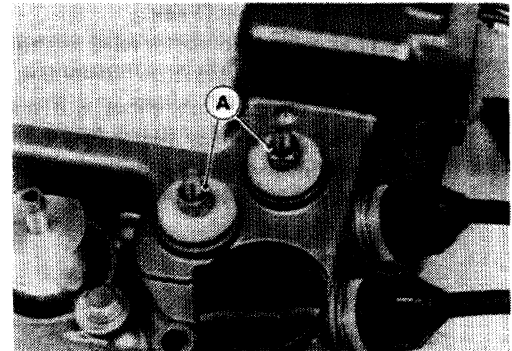
Starter Relay:

Removal

- Open the electric case (see Electric Case Disassembly).
- Disconnect the starter relay switch ground lead [A].



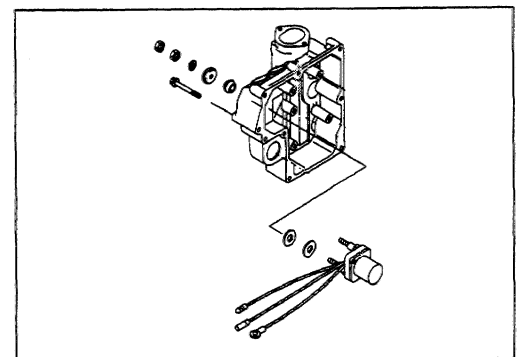
- Remove the nuts [A] from the battery and starter terminals on the starter relay switch.



- Slide the starter relay switch from the electric case, being careful not to lose any of the insulating washers or grommets.
- Disconnect the yellow/red and red wire connectors.

Installation Notes

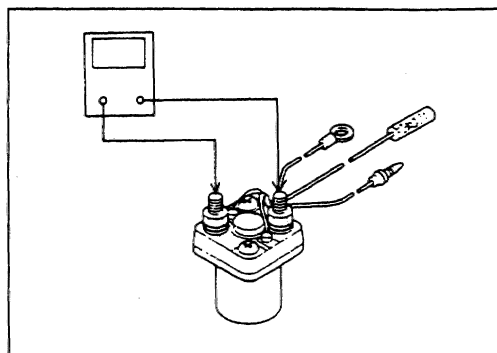
- Coat the insulating washers and grommets with waterproof grease.
- Be certain all insulating washers and grommets are in position.



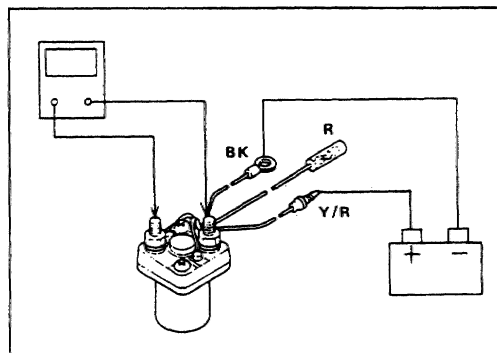
- Connect the ground lead (black) to the regulator/rectifier mounting bolt.
- Connect the battery cable to the relay (+) terminal having red lead.

Inspection

- Set ohmmeter to $R \times 1 \Omega$ scale.
- Connect meter leads to starter relay as shown.
- ★ If resistance is less than infinite, the starter relay switch is not returning and must be replaced.



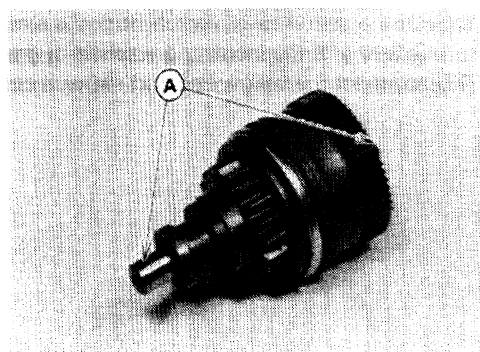
- Set ohmmeter to $R \times 1 \Omega$ scale.
- Connect meter leads to starter relay as shown.
- Activate starter relay switch by connecting a 12 V battery as shown.
- ★ If the starter relay switch clicks and the ohmmeter indicates zero resistance, the starter relay switch is good.
- ★ If the meter indicates high or infinite (∞) resistance, the starter relay switch is defective and must be replaced.



Reduction Gear:

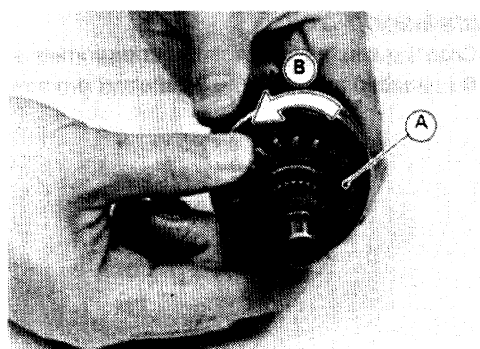
Removal/Installation Notes

- Before removing the reduction gear, remove the magneto flywheel (see Engine Bottom End chapter).
- When installing the reduction gear, apply a molybdenum disulfide grease [A] to both ends of its shaft.

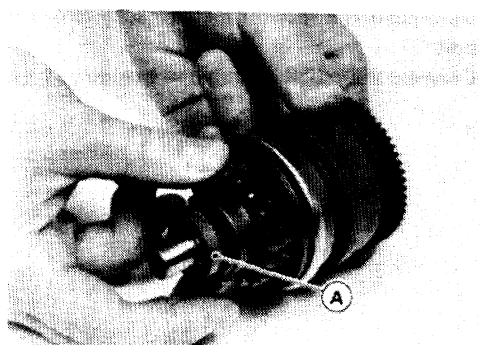


Inspection

- Rotate the pinion gear [A] counterclockwise. The gear must be rotate freely [B].



- Rotate the pinion gear clockwise all the way. The pinion gear will be advanced along the reduction gear shaft, and stopped against the stopper [A].
- Release the pinion gear. The pinion gear must return to the initial position rapidly.
- ★ If the pinion gear does not function properly, replace it.

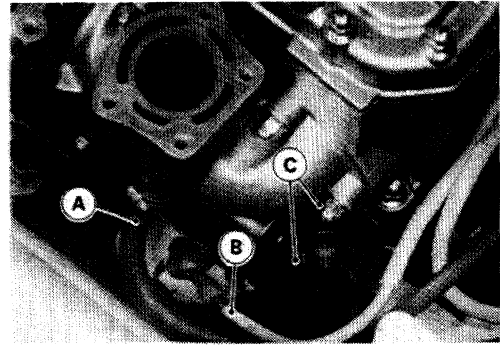


Starter Motor:**Removal**

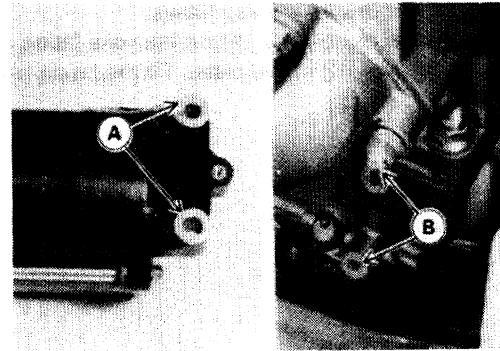
- Disconnect:
 - Battery Ground Cable
 - Exhaust Pipe, Front Muffler and Expansion Chamber as a set
 - Inlet Cooling Hose [A]
 - Starter Motor Cable [B]
- Remove the starter mounting bolts [C] and pull off the starter motor.

CAUTION

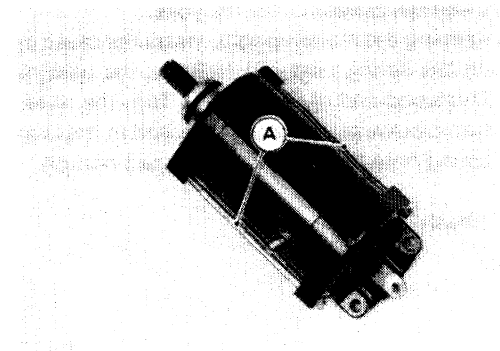
Do not tap the starter motor shaft or body. Tapping on the shaft or body could damage the motor.

**Installation Notes**

- Clean the starter motor lugs [A] and crankcase [B] where the starter motor is grounded.
- Apply a small amount of engine oil to the O-ring
- Apply a non-permanent locking agent to the starter motor mounting bolt threads.
- Connect the battery ground cable.

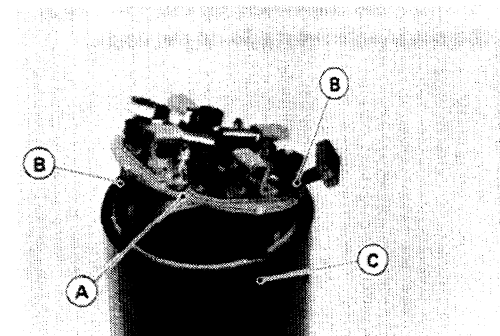
**Disassembly**

- Unscrew the retaining screws [A] and remove the both end covers.



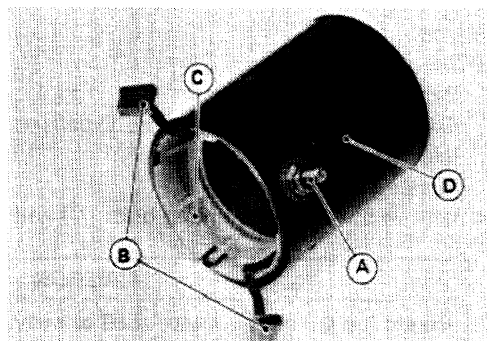
- Pull the armature out the pinion gear end.
- Remove the brush plate [A] from the leads [B].

Yoke [C]



- Remove the nut and terminal bolt [A], and then remove the brush [B] and the plastic holder [C].

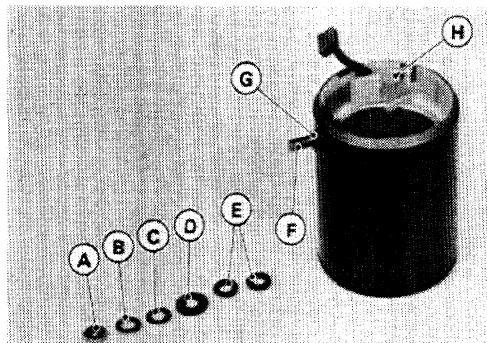
Yoke [D]



Assembly

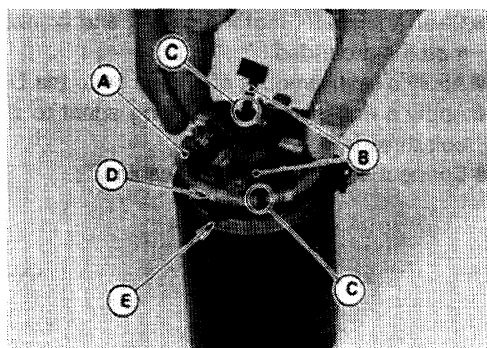
- Install the terminal bolt as shown.

Nut [A]
Spring Washer [B]
Washer [C]
Large Insulator [D]
Small Insulator [E]
Terminal Bolt [F]
O-ring [G]
Plastic Holder [H]



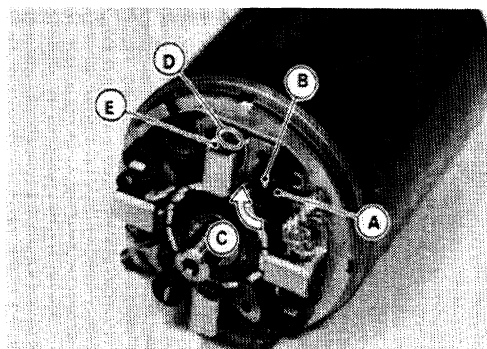
- Install the brush plate as follows.

- Install the brush plate [A] on the yoke fitting the brush leads [B] into the notches [C] in the plate. Fit the brush plate tongue [D] into the yoke notch [E].

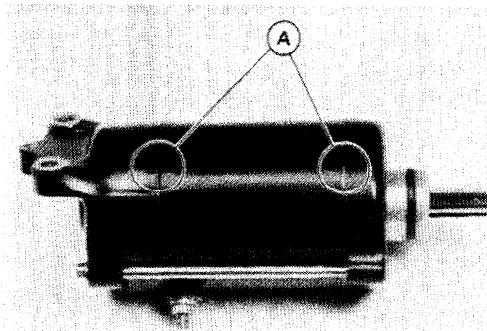


- Insert the armature into the yoke.
- Keeping the motor upright, install the brush springs [A]. Fit the spring on the spring post [B] halfway; the post must be positioned in the D-shaped end of the spring. Turn the other end of the spring a half turn clockwise [C], and fit the end in the brush groove [D]. Push the spring onto the post to the stepped portion.

Brush [E]



- To install the end covers on the yoke, align [A] the mark on the each end cover with the marks on the yoke.

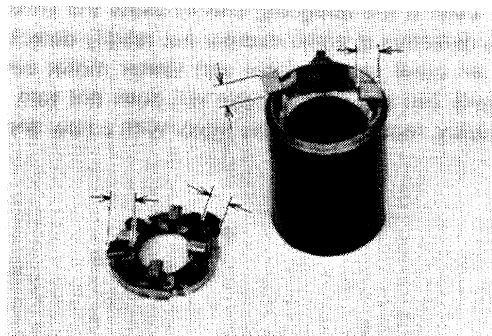


Brush Inspection

- Measure the length of each brush.
- ★ If any is worn down to the service limit, replace all the brushes.

Starter Motor Brush Length

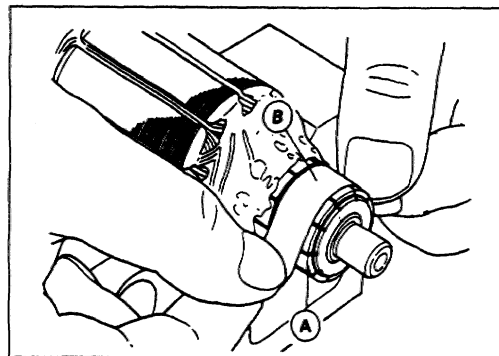
Standard: 12.5 mm
Service Limit: 6.5 mm

**Brush Spring Inspection**

- Check that the brush springs are in place and will snap the brushes firmly into place.
- ★ If not, reinstall or replace the spring.

Commutator Cleaning and Inspection

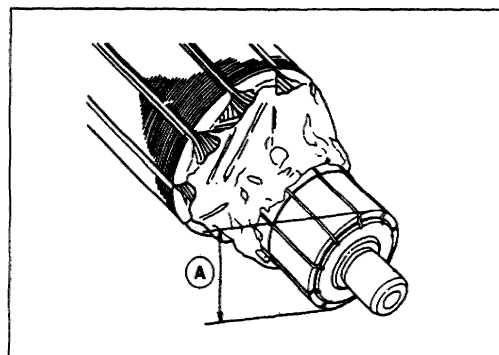
- Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.



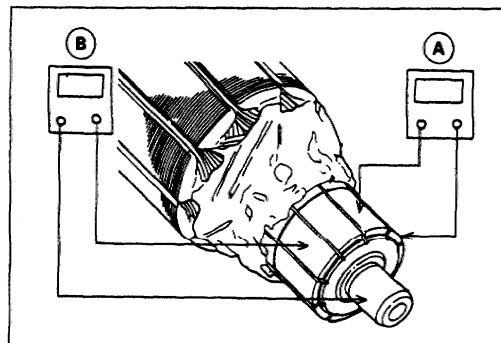
- Measure the diameter of the commutator.
- ★ Replace the starter motor with a new one if the commutator diameter [A] is less than the service limit.

Commutator Diameter

Standard: 28 mm
Service Limit: 27 mm

**Armature Inspection**

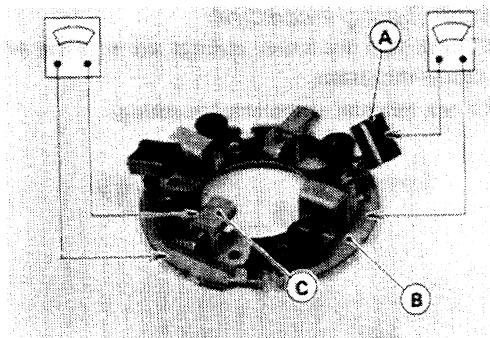
- Using the $\times 1\Omega$ ohmmeter range, measure the resistance between any two commutator segments [A].
- ★ If there is a high resistance or no reading (∞) between any two segments, a winding is open and the starter motor must be replaced.
- Using the highest ohmmeter range, measure the resistance between the commutator and the shaft [B].
- ★ If there is any reading at all, the armature has a short and the starter motor must be replaced.



Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with an ohmmeter. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.

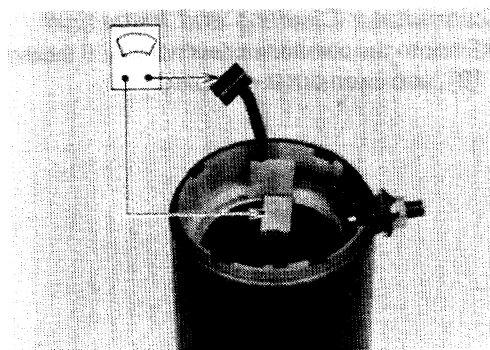
Brush Plate Inspection

- Using the $\times 1\Omega$ ohmmeter range, measure the resistance between the brush [A] and the brush plate [B].
- ★ If there is not close to zero ohms, the brush plate has an open and the brush plate must be replaced.
- Using the highest ohmmeter range, measure the resistance between the brush plate [B] and the brush holders [C].
- ★ If there is any reading at all, the brush holder has a short and the brush plate must be replaced.



Brush and Lead Assembly Inspection

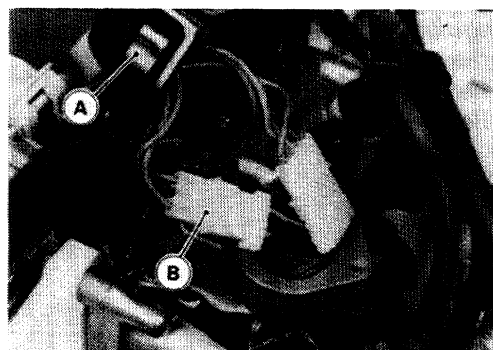
- Using the $\times 1\Omega$ ohmmeter range, measure the resistance between the brushes.
- ★ If there is high resistance or no reading (∞), a lead is open and the brush and lead assembly must be replaced.



Charging System

Charging Coil Testing

- Remove the electric case connector [A].
- Disconnect the 3-pin connector [B].
- Temporarily connect the magneto leads except the charging coil leads (brown).



- With a multimeter, check the charging coil output (in circuit) according to the following table with the engine running at approximately 3,000 rpm.

⚠ WARNING

To avoid electrical shock, do not perform this test with the watercraft in the water.

CAUTION

Do not run the engine over 15 seconds without cooling water. Take care not over-rev the engine while running it with no load.

Charging Coil Output Test

Meter Setting	Connections		Standard Value
	Meter (+) to	Meter (-) to	
250 VAC	Brown lead	Brown lead	20 V

- ★ If the charging coil output voltage is correct, check the regulator according to the regulator test procedure.
- ★ If the charging coil output voltage is low, check the charging coil resistance with a multimeter according to the following table.

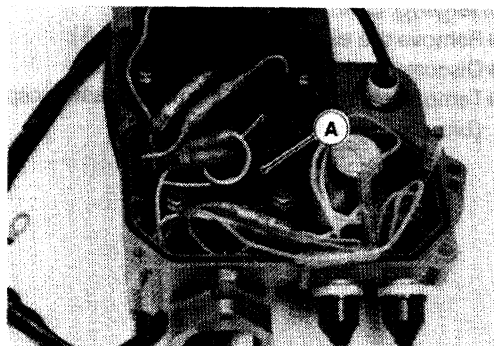
Charging Coil Resistance Test

Meter Setting	Connections		Standard Value
	Meter (+) to	Meter (-) to	
R × 1Ω	Brown lead	Brown lead	0.7 ~ 1.1 Ω

- ★ If the coil has normal resistance, but the voltage check shows the charging system to be defective, then the permanent magnets in the flywheel have probably weakened, necessitating flywheel replacement.

Regulator/Rectifier Removal

- Disconnect the battery ground cable.
- Remove the electric case and open it.
- Remove the regulator/rectifier [A].



Regulator/Rectifier Installation Notes

- Apply a non-permanent locking agent to the following bolts.

Torque – Regulator/Rectifier Mounting Bolts: 7.8 N-m (0.8 kg-m, 69 in-lb)

Electric Case Bolts: 7.8 N-m (0.8 kg-m, 69 in-lb)

Regulator/Rectifier Inspection

- With a multimeter set to the $R \times 1k\Omega$ range, test the regulator/rectifier according the following table.

Regulator/Rectifier Resistance Test

		Tester (+) Lead Connection					
(-)*	Terminal	Red	Red/ Purple	Brown	Brown	Black	Black
	Red	—	0	18 ~ 110	18 ~ 110	15 ~ 80	15 ~ 80
	Red/ Purple	0	—	18 ~ 110	18 ~ 110	15 ~ 80	15 ~ 80
	Brown	1.0 ~ 6.0	1.0 ~ 6.0	—	30 ~ 160	18 ~ 110	18 ~ 110
	Brown	1.0 ~ 6.0	1.0 ~ 6.0	30 ~ 160	—	18 ~ 110	18 ~ 110
	Black	2.0 ~ 12	2.0 ~ 12	1.0 ~ 6.0	1.0 ~ 6.0	—	0
	Black	2.0 ~ 12	2.0 ~ 12	1.0 ~ 6.0	1.0 ~ 6.0	0	—

(-)* : Tester (-) Lead Connection

★ If any of the values obtained do not agree with the above table, the regulator/rectifier must be replaced.

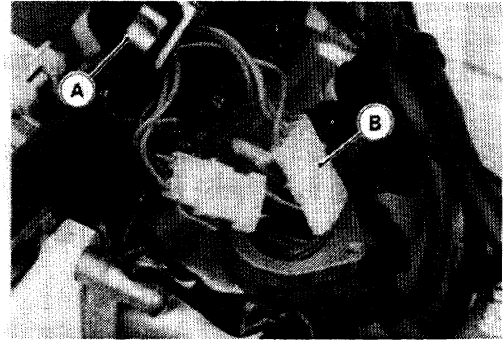
Ignition System

Pickup Coil Inspection

- Remove the electric case connector [A].
- Disconnect the 4-pin connector [B].
- Set the hand tester to the $\times 100 \Omega$ range, zero it, and connect it to the pickup coil lead terminals (G and BL) in the connector.
- ★ If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

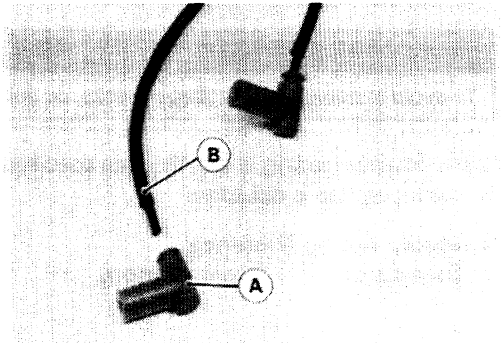
Pickup Coil Resistance

Standard: 396 ~ 594 Ω



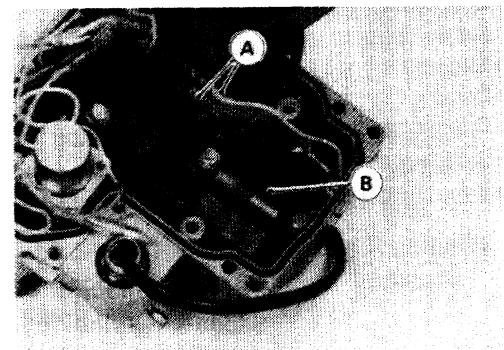
Ignition Coil Removal

- Open the electric case (see Electric Case Removal/Disassembly).
- Pull the spark plug caps [A], and slide off the protector tubes [B].



- Unscrew the grommet caps and slide off the grommets. Lubricate the leads with a penetrating rust inhibitor.

- Disconnect the ignition coil primary lead connectors [A], and unscrew the ignition coil [B].



Ignition Coil Installation Note

- Apply a non-permanent locking agent to the ignition coil mounting bolts and torque them.

Torque – Ignition Coil Mounting Bolts: 7.8 N-m (0.8 kg-m, 69 in-lb)

Ignition Coil Inspection

Measuring arcing distance:

The most accurate test for determining the condition of the ignition coil is made by measuring distance.

- Remove the ignition coil.
- Connect the ignition coil (with the spark plug cap left installed on the spark plug lead) to the tester, and measure the arcing distance.

Special Tool – Coil Tester: 57001-1242 [A]

NOTE

- Since a tester other than the Coil Tester may produce a different arcing distance, the Coil Tester is recommended for reliable results.

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the coil or lead.

- ★ If the distance reading is less than the specified value, the ignition coil or spark plug cap is defective.

3 Needle Arcing Distance

Standard: 7 mm or more

- To determine which part is defective, measure the arcing distance again with the spark plug caps removed from the ignition coil.
- ★ If the arcing distance is subnormal as before, the trouble is with the ignition coil itself. If the arcing distance is now normal, the trouble is with the spark plug caps.

Measuring coil resistance:

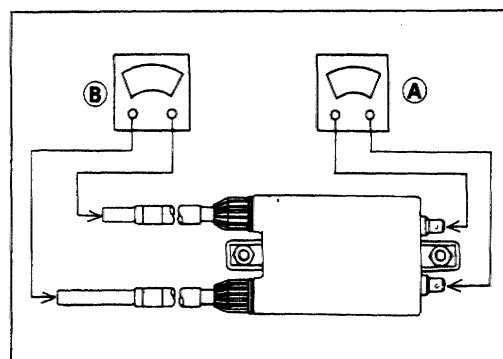
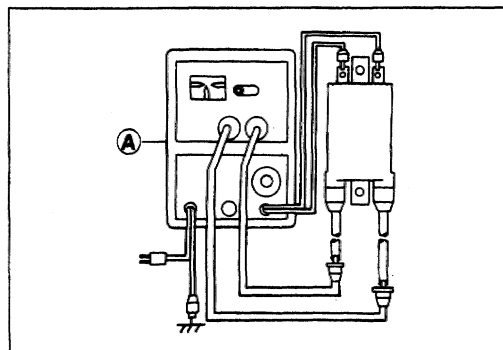
If the Coil Tester is not available, the coil can be checked for a broken or badly shorted winding with a hand tester. However, a hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.

- Disconnect the primary leads from the coil terminals.
- Measure the primary winding resistance as follows [A].
- Connect the tester between the coil terminals.
- Set the tester to the $\times 1 \Omega$ range, and read the tester.
- Measure the secondary winding resistance as follows [B].
- Remove the plug caps by turning them counterclockwise.
- Connect the tester between the spark plug leads.
- Set the tester to the $\times 1 \text{ k}\Omega$, and read the tester.
- ★ If the hand tester does not read as specified, replace the coil.

Winding Resistance

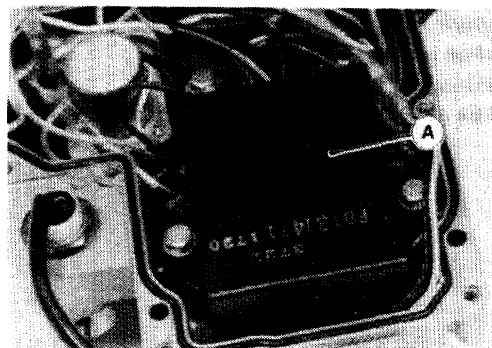
Standard: **Primary windings** $0.08 \sim 0.1 \Omega$
 Secondary windings $3.5 \sim 4.7 \text{ k}\Omega$

- ★ If the tester reads as specified, the ignition coil windings are probably good. However, if the ignition system still does not perform as it should after all other components have been checked, test replace the coil with one known to be good.
- Check the spark plug lead for visible damage.
- ★ If the spark plug lead is damaged, replace the coil.



CDI Igniter Removal

- Remove the electric case and open it.
- Remove the igniter [A] and disconnect the connectors.

**CDI Igniter Installation Note**

- Apply a non-permanent locking agent to the mounting bolts and torque them.

Torque – CDI Igniter Mounting Bolts : 7.8 N-m (0.8 kg-m, 69 in-lb)

CDI Igniter Inspection

- Remove the CDI igniter.
- Set the hand tester to the x 1 k Ω range, zero it, and mark the measurements shown in the table
- ★ If the tester readings are not as specified, replace the CDI igniter.

Special Tool – Hand Tester (V. O. M) : 57001-983

CAUTION

Use only Hand Tester (special tool: 57001-983) for this test. A multi-meter other than the Kawasaki Hand Tester may show different readings.

If a megger or a meter with a large-capacity battery is used, the CDI igniter will be damaged.

CDI Igniter Internal Resistance

Unit : k Ω

Tester (+) Lead Connection											
Lead Color	O	BK/W	BL	G	R	PU	R/Y	BK/Y	W	BK	BL
O	–	2~4	2~4	12~20	6~13	6~13	10~20	2~4	∞	2~4	2~4
BK/W	∞	–	0	6~13	2~5	2~5	4~10	0	∞	0	0
BL	∞	0	–	6~13	2~5	2~5	4~10	0	0	0	0
G	∞	6~12	6~12	–	11~22	11~22	12~23	6~12	∞	6~12	6~12
R	∞	20~60	20~60	20~60	–	40~110	14~28	20~60	∞	20~60	20~60
PU	∞	100~200	100~200	100~200	130~400	–	130~400	100~200	∞	100~200	100~200
R/Y	∞	20~60	20~60	40~100	60~200	60~200	–	20~60	∞	20~60	20~60
BK/Y	∞	0	0	6~13	2~5	2~5	4~10	–	∞	0	0
W	∞	10~30	10~30	25~60	30~300	30~300	30~300	10~30	–	10~30	10~30
BK	∞	0	0	6~13	2~5	2~5	4~10	0	∞	–	0
BL	∞	0	0	6~13	2~5	2~5	4~10	0	∞	0	–

(–) : Tester (–) Lead Connection

Spark Plug Removal

- Pull off the spark plug caps.
- Unscrew the spark plugs.
- Be careful to avoid breaking the ceramic on the spark plugs.

Spark Plug Installation

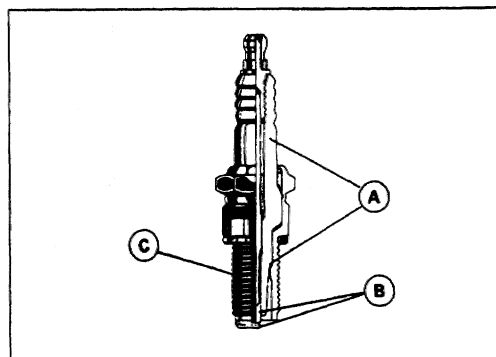
- Be sure the spark plug threads are clean and dry.
- Torque the spark plugs.

Torque – Spark Plugs: 27 N-m (2.8 kg-m, 20 ft-lb)

- Be careful to avoid breaking the ceramic on the spark plugs.
- Connect the spark plug caps.

Spark Plug Inspection

- Remove the spark plugs (see Spark Plug Removal).
- Examine the ceramic insulator [A] and electrodes [B].
- ★ If the insulator appears glazed or very white, or if there are gray metallic deposits on the electrodes, combustion chamber temperatures are too high. Refer to Troubleshooting.
- ★ If the insulator appears dry and sooty the fuel/air mixture is overly rich (see Carburetor Adjustments in the Fuel System chapter).
- If the insulator and electrodes are wet and oily, an improper oil type or an excess oil output may be the cause.
- ★ If the ceramic insulator is cracked, replace the plug.
- ★ If the electrodes are badly worn or burned, replace the plug.
- Examine the spark plug threads [C].
- ★ If the threads are damaged, replace the plug.



Spark Plug Cleaning

- Clean the electrodes and the ceramic insulator around the center electrode with an abrasive blasting device.
- Be certain that all abrasive particles are removed from the plug.
- Clean the entire plug in a high flash point solvent.

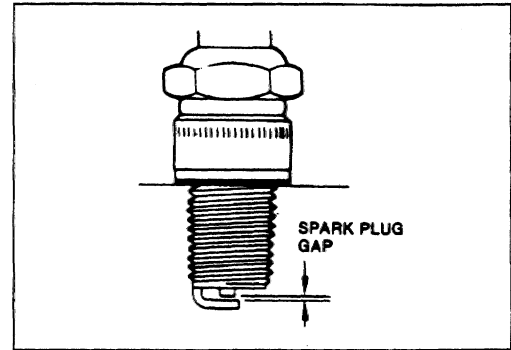
Spark Plug Adjustment

- Measure the spark plug gap.
- Check the distance between the electrodes with a feeler gauge or a wire gauge.

Spark Plug Gap

Standard: 0.7 ~ 0.8 mm

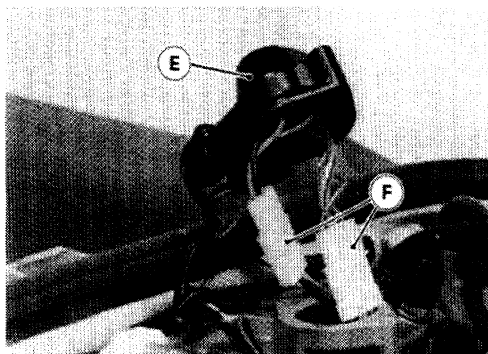
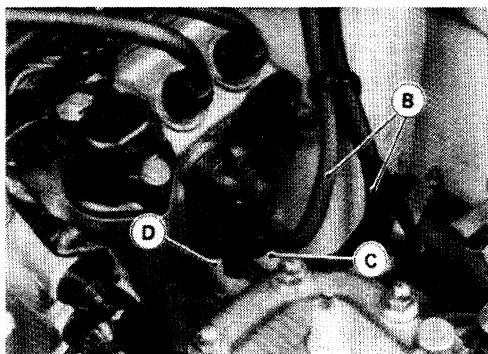
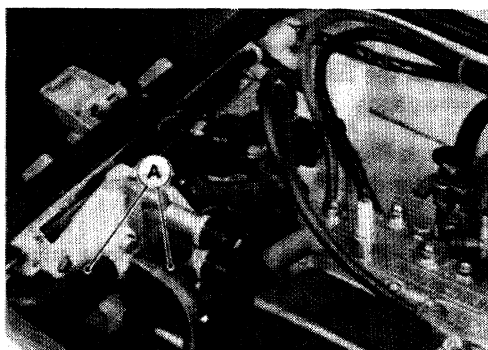
- ★ If the gap is not within specifications, adjust it.
- Adjust the gap by carefully bending the side electrode with a tool designed for this purpose.



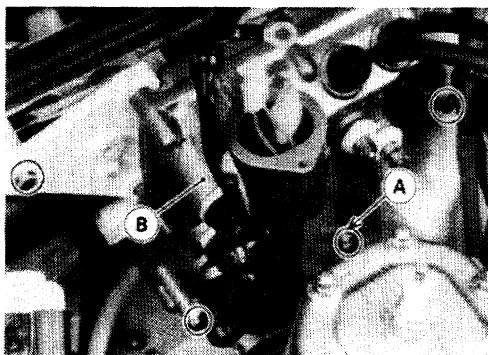
Electric Case

Removal

- Remove or disconnect:
 - Spark Plug Caps
 - Bilge Hoses [A]
 - Bypass Outlet Hoses [B]
 - Starter Motor Cable [C]
 - Battery Cable (+) [D]
 - Electric Case Connector [E]
 - 4-pin and 3-pin Connectors [F]



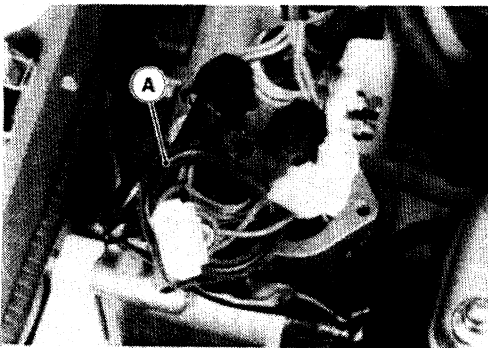
- Remove the electric case mounting bolts [A].
- Lift out the electric case [B].



Installation Notes

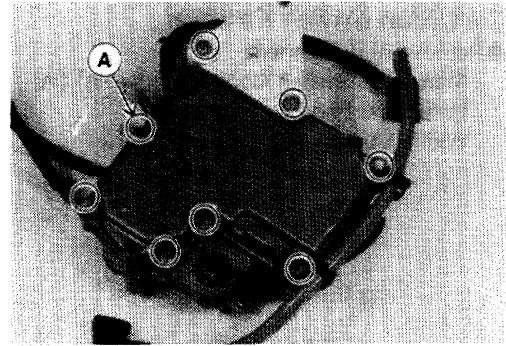
- Apply a light coating of water resistance grease to the electric case connector O-ring [A].
- Apply a non-permanent locking agent to the electric case mounting bolts and torque them.

Torque – Electric Case Mounting Bolts : 7.8 N-m (0.8 kg-m, 69 in-lb)

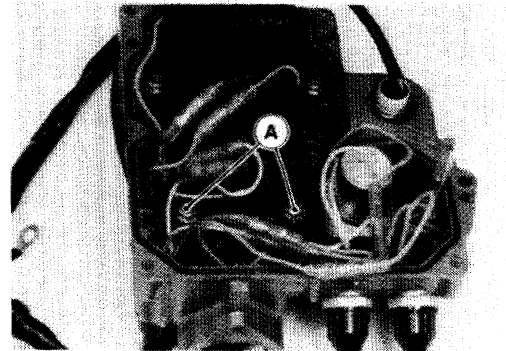


Disassembly

- Remove the electric case (see Electric Case Removal).
- Remove the electric case bolts [A], and open the electric case.



- Remove the electric box components.
- Before removing the igniter, remove the regulator/rectifier mounting bolts [A].

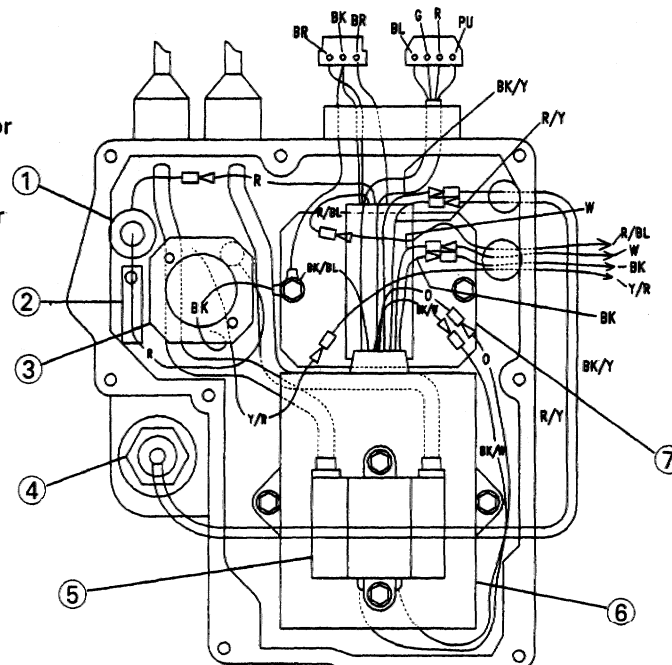
**Assembly Notes**

- Connect the battery cable to the relay (+) terminal having red lead.
- Run the charge wires of igniter and regulator through the electric case hole, before installing regulator.
- Connect the ground leads (black) to the regulator/rectifier mounting bolts.
- Apply a non-permanent locking agent to all the removed bolts, and torque them.

Torque – All Removed Bolts : 7.8 N-m (0.8 kg-m, 69 in-lb)

- Apply water resistance grease to the O-ring of electric case.

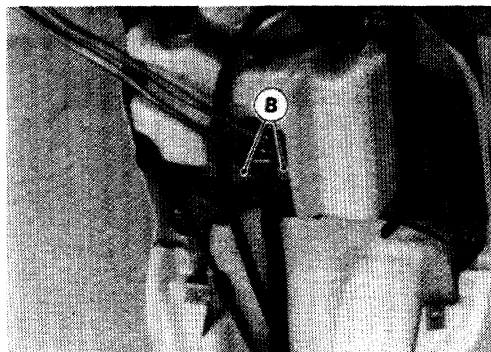
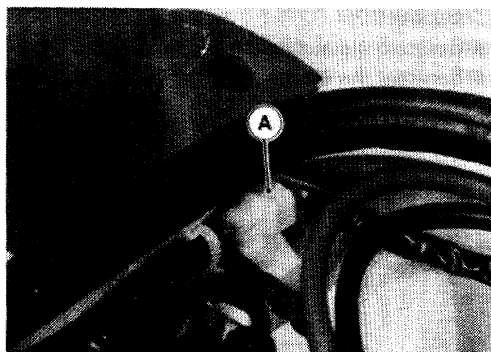
1. Fuse (10A)
2. Spare Fuse
3. Starter Relay
4. Temperature Sensor
5. Ignition Coil
6. CDI Igniter
7. Regulator/Rectifier



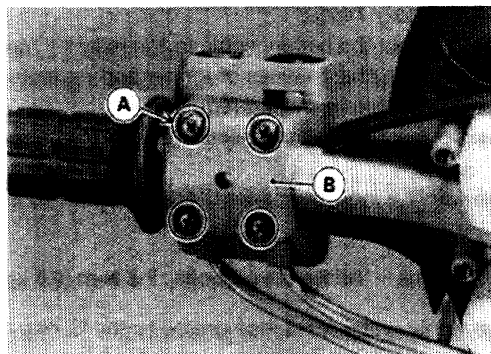
Switches

Start/Stop Switch Removal

- Remove or disconnect:
 - Start/Stop Switch Connector (4-pin) [A]
 - Handlebar Pad
 - Wiring Ciamps [B]

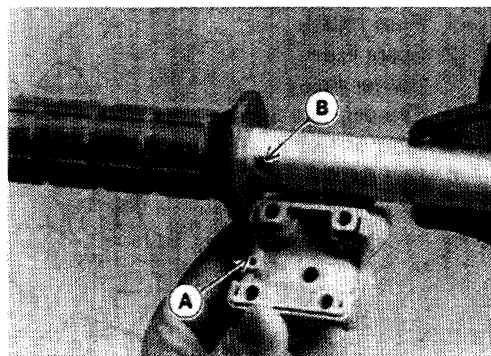


- Carefully pull the start/stop switch wiring up through the handle pole.
- Unscrew the switch case mounting screws [A], and remove the switch case [B].



Start/Stop Switch Installation Notes

- The switch case mounting clamp has an indexing dowel [A]. Position the dowel in the handlebar hole [B].



- Be certain the start/stop switch wiring does not interfere with throttle cable or choke cable movement when the handlebar is moved.

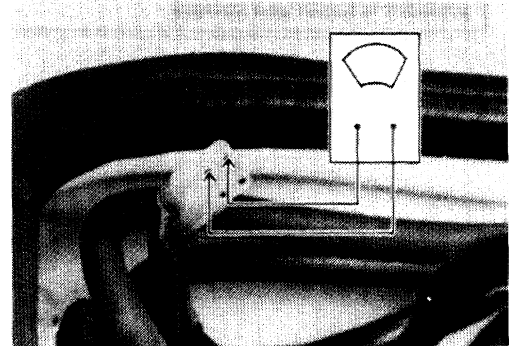
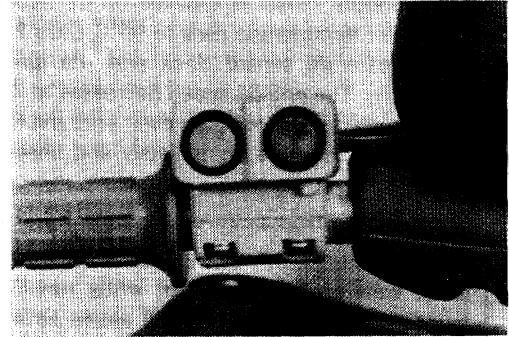
Start/Stop Switch Inspection

- Examine the start/stop switch case and wiring.
- ★ If the switch case is broken or damaged in any way, replace the switch assembly.
- ★ If the wiring is damaged, repair it or replace the switch assembly.
- Test the start switch.
 - Set an ohmmeter to the R x 1 Ω scale.
 - Connect the meter leads to the red/blue and yellow/red start switch leads.
 - Position the starter interlock switch to the right.
 - Check switch resistance with the start button released, and with the start button depressed.

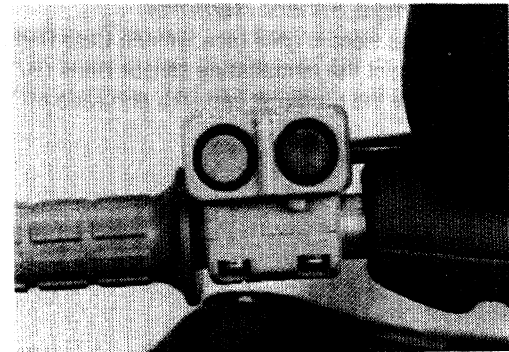
Start Switch Resistance

Start Button	Reading
Released	$\infty \Omega$
Depressed	Almost 0 Ω

- ★ If either meter reading is incorrect, replace the start/stop switch.



- Test the starter interlock switch.
 - Repeat the start switch test with the starter interlock switch to the left.
 - Both meter readings should be $\infty \Omega$.
- ★ If either reading is less than $\infty \Omega$, replace the start/stop switch.

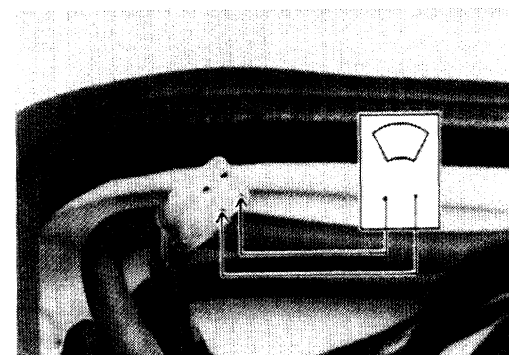


- Test the stop switch.
 - Set an ohmmeter to the R x 1 Ω scale.
 - Connect the meter leads to the blue and white stop switch leads.
 - Check switch resistance with the stop button released, and with the stop button depressed.

Stop Switch Resistance

Stop Button	Reading
Released	$\infty \Omega$
Depressed	Almost 0 Ω

- ★ If either meter reading is incorrect, replace the start/stop switch.



Temperature Sensor

A temperature sensor is installed on the bypass hose. Whenever the cooling water temperature rises to 95°C (203°F) or higher, the contacts in the temperature sensor does and the igniter works to cut spark intermittently. The engine speed decreases to 3,500 rpm.

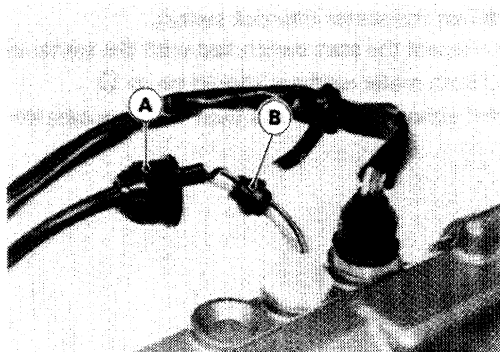
If the watercraft slows down even with the throttle on and the engine running, return to shore immediately and check the cooling system for clogging.

CAUTION

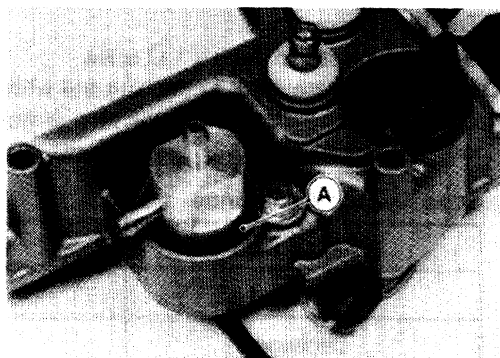
If the watercraft slows down while running, return to the shore immediately. Overheating will cause severe engine and exhaust system damage. Do not operate the craft until the source of the problem is found and correct.

Temperature Sensor Removal

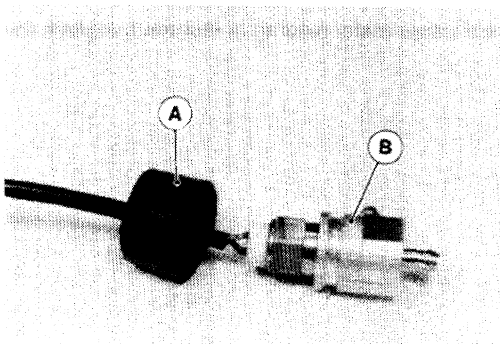
- Open the electric case (see Electric Case Removal/Disassembly).
- Disconnect the temperature sensor leads (B/Y and R/Y).
- Unscrew the grommet cap [A], and slide off the grommet [B].



- Pull off the temperature sensor assembly [A] out of the electric case.

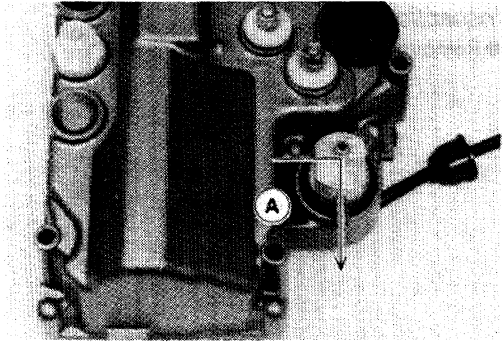


- Slide off the rubber cap [A], and unscrew the temperature sensor [B].



Temperature Sensor Installation Notes

- Be sure holder assembly [A] is in the position, as shown.

**Temperature Sensor Inspection**

- Suspend the sensor [A] in a container of water so that the temperature sensing projection is submerged.
- Suspend a thermometer in the water.

NOTE

- The sensor and thermometer must not touch the container sides or bottom.
- Place the container over a source of heat and gradually rise the temperature of the water while stirring gently.

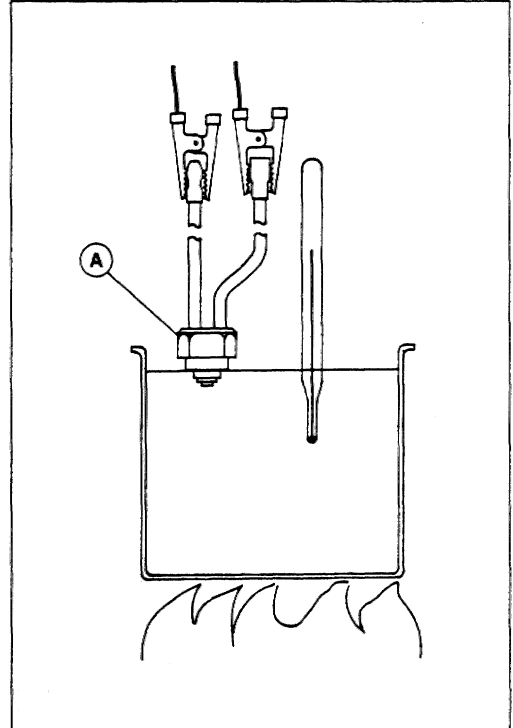
Temperatures Sensor Connections

Rising temperature: From OFF to ON at 95°C (203°F)

Falling temperature: From ON to OFF at 88°C (190°F)

ON : Less than 0.5 Ω

OFF : More than 1 M Ω

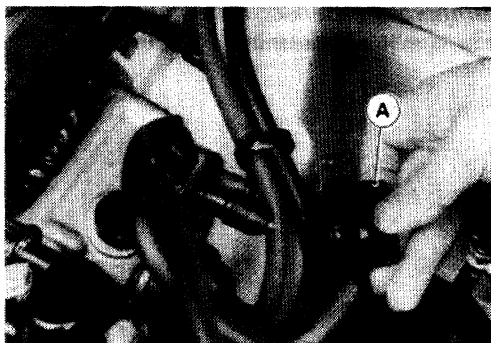


13-30 ELECTRICAL SYSTEM

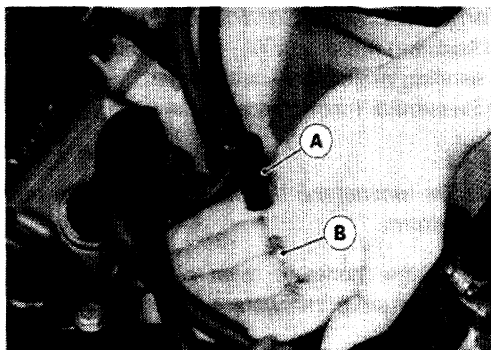
Fuse

Inspection

- Remove the fuse plug [A].



- Pull the cap [A], and take out the fuse (10A) [B].



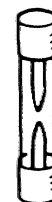
- Inspect the fuse element.
- ★ If it blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

CAUTION

When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.



Normal



Failed

Storage

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Bilge System	14-2
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14-2 STORAGE

Preparation for Storage

During the winter, or whenever the watercraft will not be in use for a long period of time, proper storage is essential. It consists of checking and replacing missing or worn parts; lubricating parts to ensure that they do not become rusted; and, in general, preparing the watercraft so that when the time comes to use it again, it will be in top condition.

Cooling System

- Clean the cooling system (see Cooling System Flushing in the Cooling and Bilge Systems chapter).

Bilge System

- Clean the bilge system (see Bilge System Flushing in the Cooling and Bilge Systems chapter). Before reconnecting the hoses to the plastic breather fitting, blow air through both hoses [A] to force all water out of the bilge system.



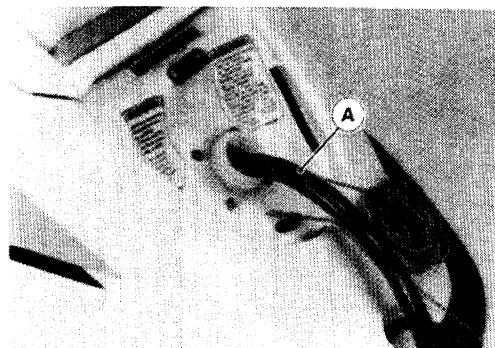
Fuel System

⚠ WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Position the starter interlock switch to the left. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Drain the fuel tank. This should be done with a siphon or pump.

A. Siphon Hose



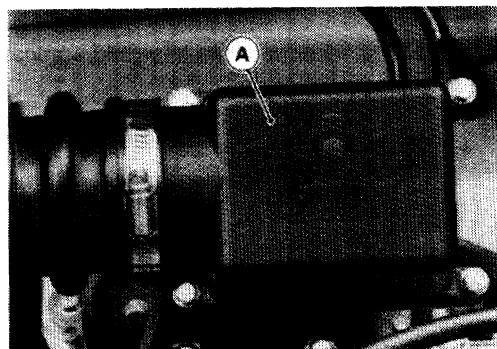
- Clean the filter screens (see Fuel Filter Screen Cleaning in the Fuel System chapter).
- Leave the fuel filler cap loose to prevent condensation in the tank.

- Start the engine and run it in 15 second periods until all fuel in the carburetor is used up. Wait 5 minutes between 15 second running periods.

CAUTION

Do not run the engine with the watercraft out of the water for more than 15 seconds at a time. Overheating can cause severe engine and exhaust system damage.

- Remove the air intake cover [A] from the carburetor.
- Lift out the flame arrester and clean it, if necessary (see Flame Arrester Cleaning in the Fuel System chapter).
- Spray a penetrating rust inhibitor down the carburetor bore.
- Install the flame arrester.
- Reinstall the cover, apply a non-permanent locking agent to the threads of the air intake cover bolts and tighten securely.

**Engine**

- Remove the spark plugs and pour one ounce of motor oil into each cylinder.

CAUTION

Do not use too much oil, or the crank seals may be damaged when the engine is next started.

- While holding the stop button down turn the engine over several times with the start button to coat the cylinder walls with oil, then reinstall the spark plugs.
- Remove the exhaust tube and pour three ounces of automobile antifreeze into the water box muffler. Replace the exhaust tube.

14-4 STORAGE

Battery

- Remove the battery (see Battery Removal in the Electrical System chapter).
- Clean the exterior with a solution of baking soda and water (one heaping tablespoon of baking soda in one cup of water). Rinse thoroughly with water.

CAUTION

Do not allow any soda solution to enter the battery.

- Check the electrolyte and fill to the upper level mark with distilled water, if necessary.
- Check the specific gravity with a hydrometer and recharge if necessary.
- Cover both battery terminals with grease.
- Store the battery in a cool, dry place. Do not expose it to freezing temperatures.

NOTE

- *Check the battery at least every 30 days and recharge if necessary. A neglected battery will gradually lose its charge and begin to sulfate (plates turn white). Once this reaction has begun, the battery usually cannot be salvaged.*

Lubrication

- Carry out all recommended lubrication procedures (see Lubrication in the Appendix chapter).

General

- Wash the watercraft and dry it thoroughly, making sure to drain the engine compartment completely.

CAUTION

Use only a mild detergent in water to wash the hull. Harsh solvents may attack the surface or smear the colors.
--

- Apply a good grade of wax to all exterior hull surfaces.
- Lightly spray all exposed metal parts with a penetrating rust inhibitor.
- Block the seat up with 10 mm spacers to insure adequate ventilation, and prevent corrosion.
- Cover the watercraft and store it in a clean, dry place.

Removal from Storage

Lubrication

- Carry out all recommended lubrication procedures (see Lubrication in the Appendix chapter).

General Inspection

- Check for binding or sticking throttle, choke, or steering mechanism. The throttle lever must return fully when released.
- Clean and gap spark plugs (see Spark Plug Cleaning and Spark Plug Adjustment in the Electrical System chapter).
- Check all rubber hoses for weathering, cracking, or looseness.
- Turn the watercraft on its left side on protective pad, and remove the jet pump cover. Check cooling hose for weathering, cracking or looseness.
- Replace them if necessary. Replace the cover and tighten securely.
- Check the fire extinguisher for a full charge.
- Check the battery, charge if necessary, and clean the terminals. Install the battery (see Battery Installation in the Electrical System chapter).

Fuel System

- Check and clean or replace the fuel filter screens as necessary (see Fuel Filter Screen Cleaning in the Fuel System chapter).

⚠ WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Position the starter interlock switch to the left. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- After refueling and before starting the engine, tilt the seat to the rear for several minutes to ventilate the engine compartment.

⚠ WARNING

A concentration of gasoline fumes in the engine compartment can cause a fire or explosion.

- Check for fuel leaks. Repair if necessary.
- Check the engine oil level. Fill the oil tank with the specified oil.

Test Run

⚠ WARNING

Do not run the engine in a closed area. Exhaust gases contain carbon monoxide, a colorless, odorless, poisonous gas. Breathing exhaust gas leads to carbon monoxide poisoning, asphyxiation, and death.

- Start the engine and run it only for 15 seconds. Check for fuel, oil and exhaust leaks. Any leaks must be repaired.

CAUTION

Never run the engine with the watercraft out of the water for more than 15 seconds. Overheating can cause severe engine and exhaust system damage. Do not run the engine at maximum speed out of the water. Severe engine damage may result.

- Install the engine cover making sure the engine cover latch is secure.

Appendix

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Lubrication	15-2
Troubleshooting	15-3
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15-2 APPENDIX

Lubrication

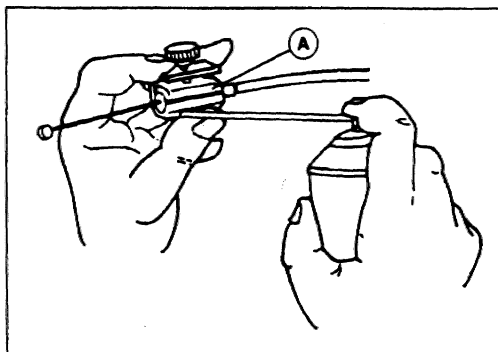
As in all marine craft, adequate lubrication and corrosion protection is an absolute necessity to provide long, reliable service. Refer to the Periodic Maintenance Chart for the frequency of the following items:

- Lubricate the following with a penetrating rust inhibitor.

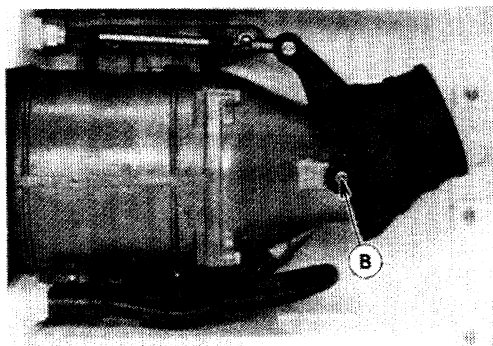
Throttle Cable

Choke Cable

Special Tool – Pressure Cable Luber: K56019-021 [A]

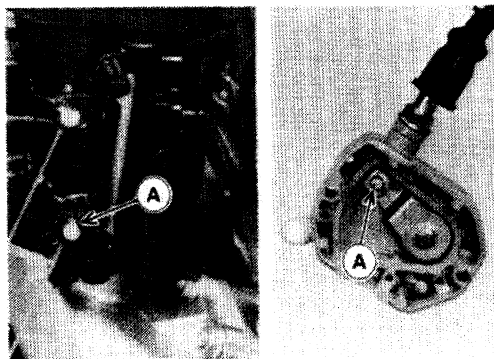


Steering Nozzle Pivots [B]

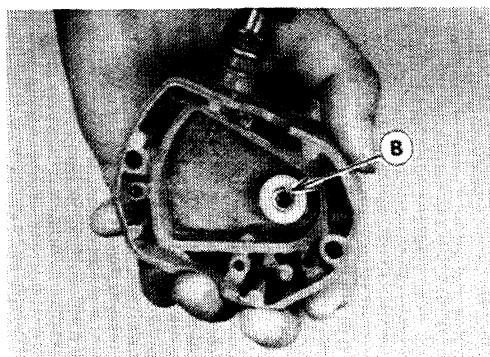


- Lubricate the following with a high quality waterproof grease.

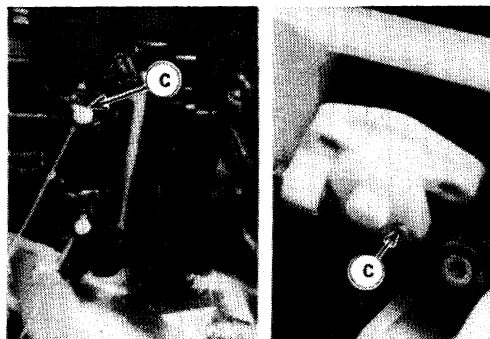
Throttle Cable Ends [A]

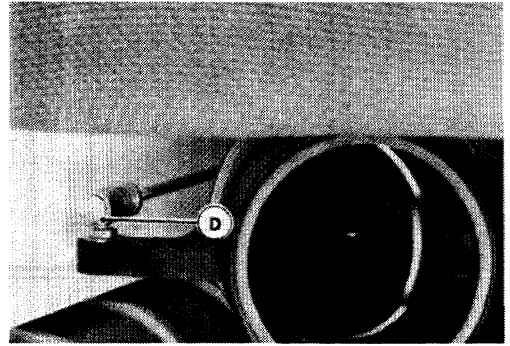


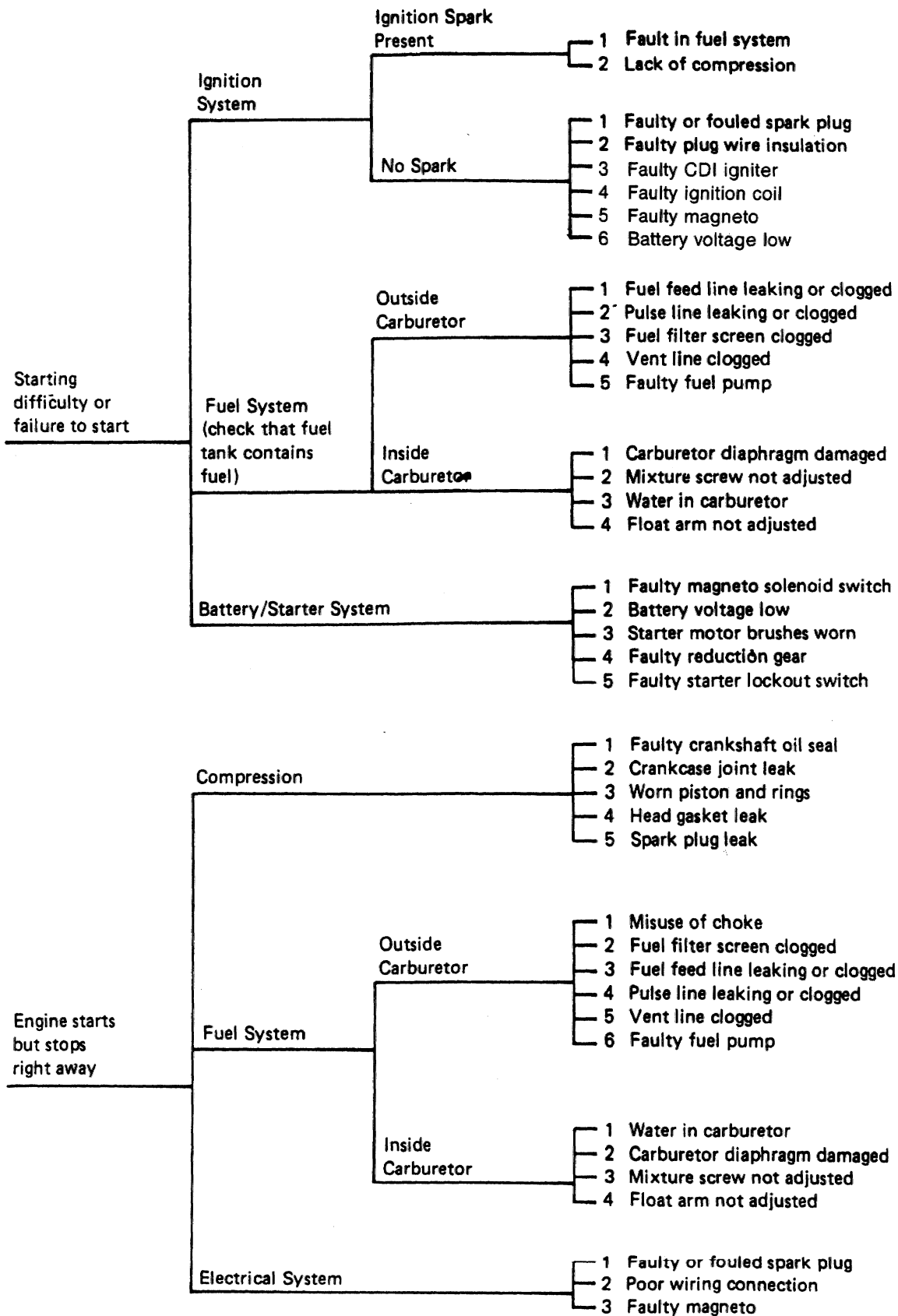
Throttle Case [B]

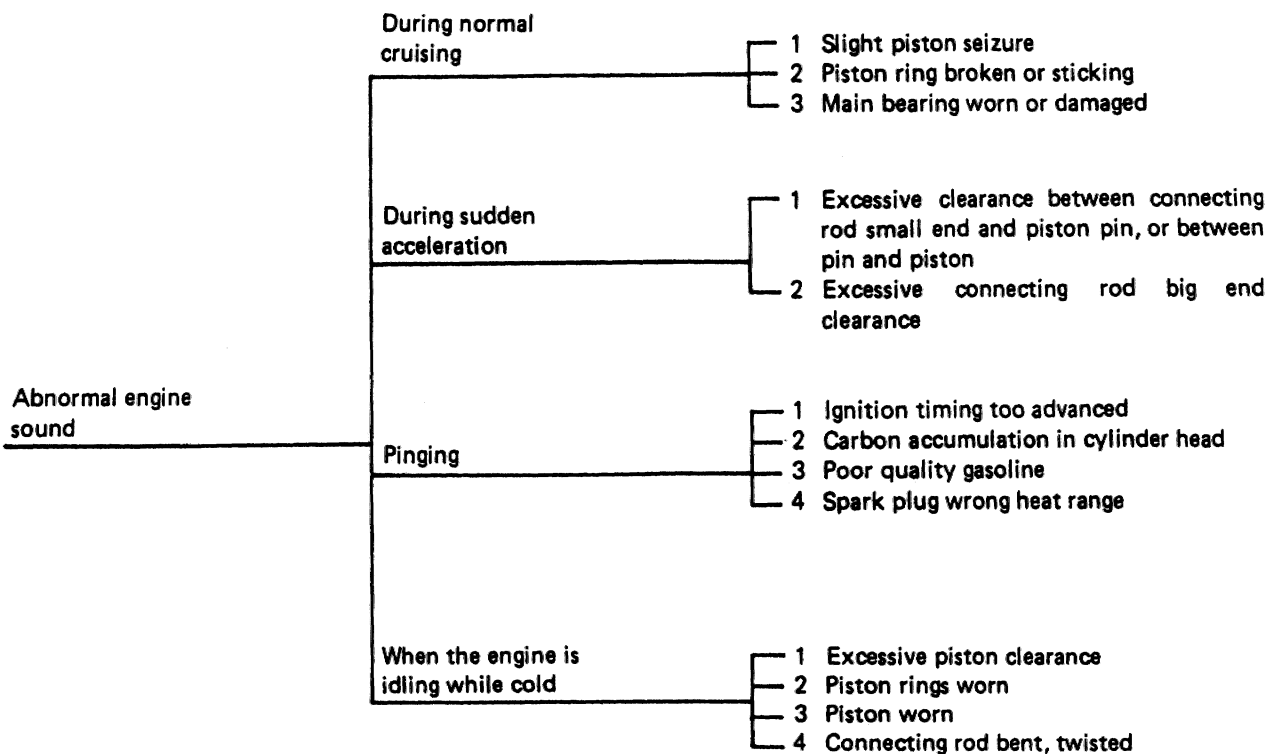
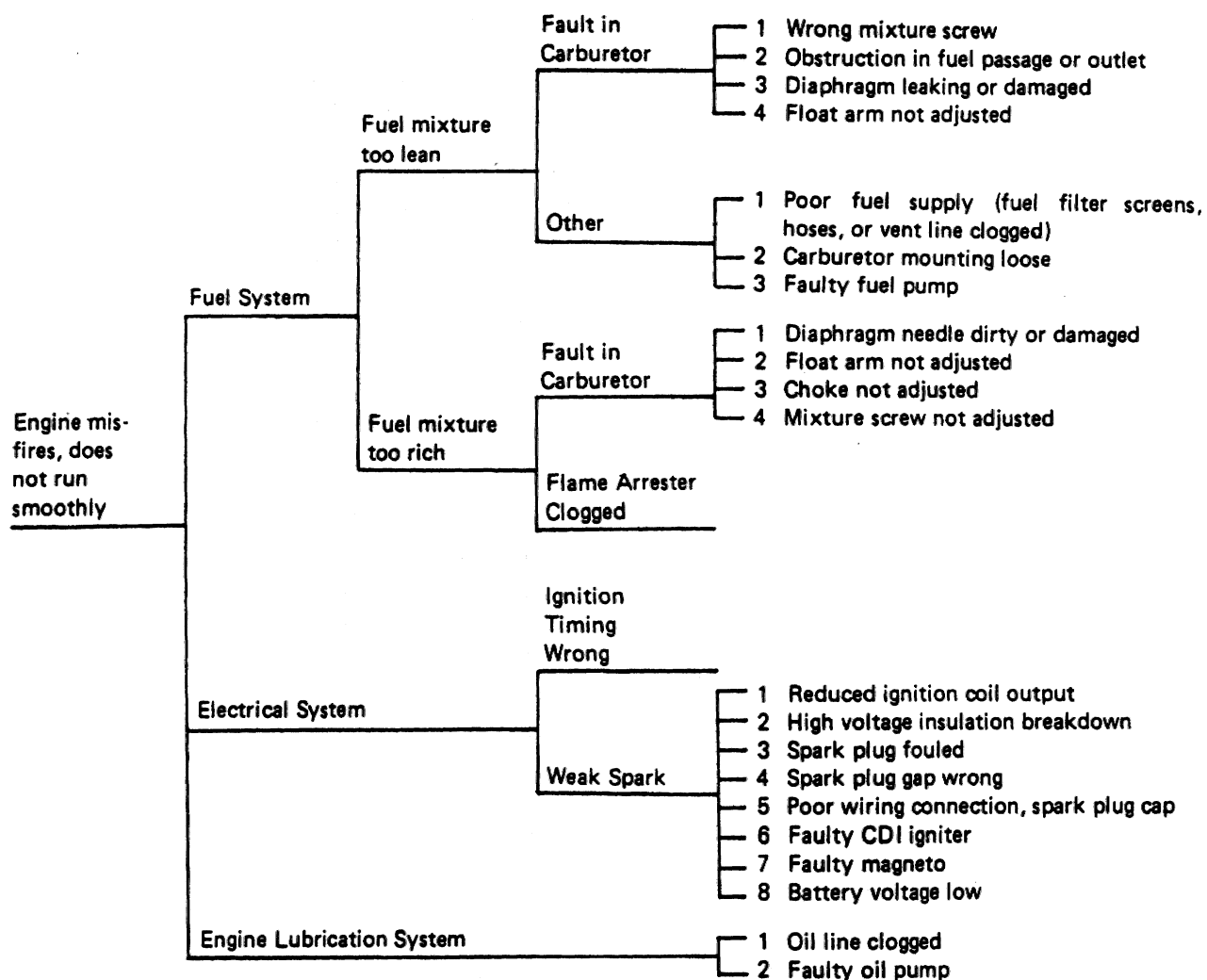


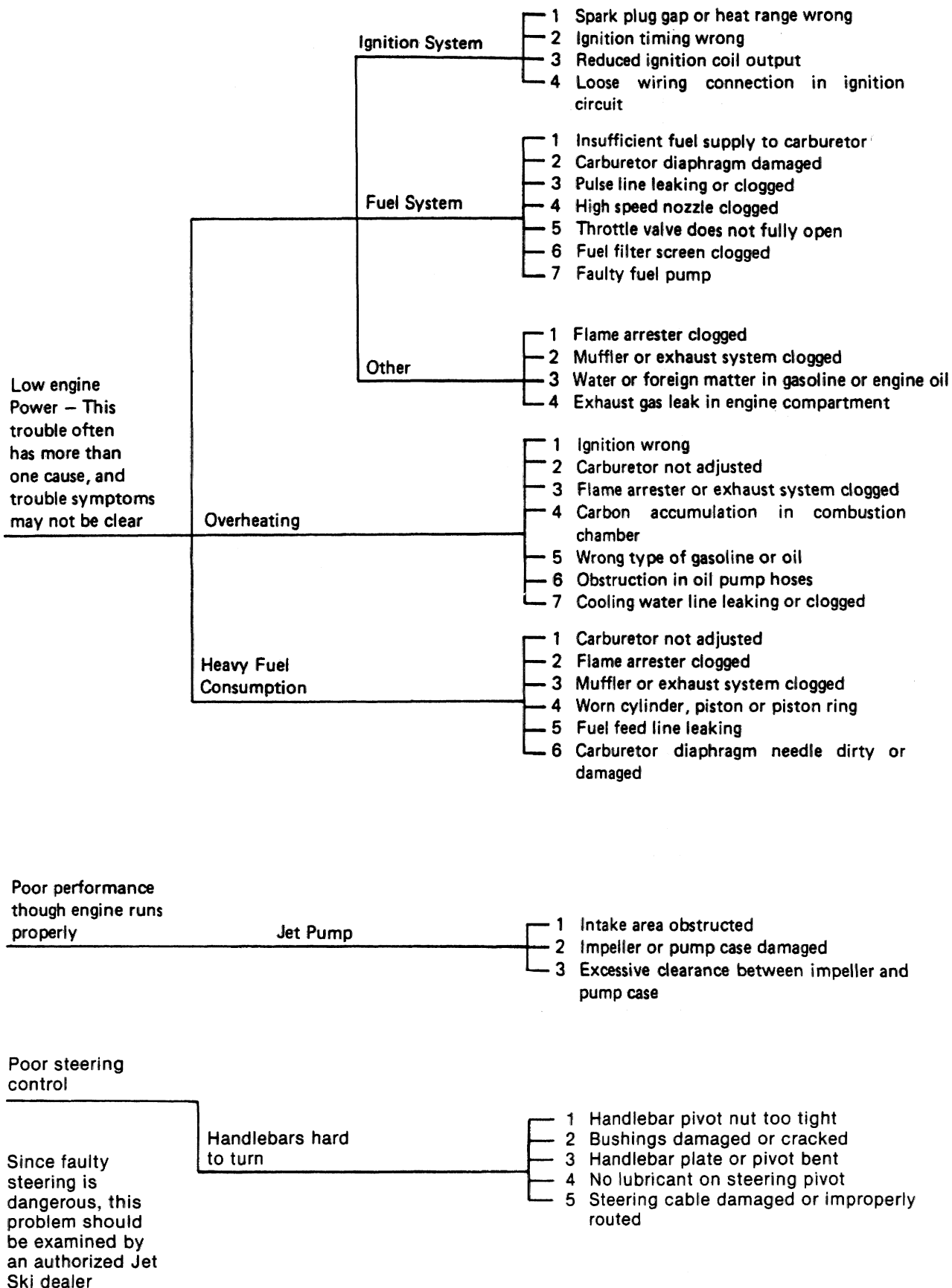
Choke Cable Ends [C]



Steering Cable Ball Joints [D]







Unit Conversion Table**Prefixes for Units:**

Prefix	Symbol	Power
mega	M	x 1 000 000
kilo	k	x 1 000
centi	c	x 0.01
milli	m	x 0.001
micro	μ	x 0.000001

Units of Mass:

kg	x	2.205	=	lb
g	x	0.03527	=	oz

Units of Volume:

L	x	0.2642	=	gal (US)
L	x	0.2200	=	gal (imp)
L	x	1.057	=	qt (US)
L	x	0.8799	=	qt (imp)
L	x	2.113	=	pint (US)
L	x	1.816	=	pint (imp)
mL	x	0.03381	=	oz (US)
mL	x	0.02816	=	oz (imp)
mL	x	0.06102	=	cu in

Units of Force:

N	x	0.1020	=	kg
N	x	0.2248	=	lb

kg	x	9.807	=	N
kg	x	2.205	=	lb

Units of Length:

km	x	0.6214	=	mile
m	x	3.281	=	ft
mm	x	0.03937	=	in

Units of Torque:

N-m	x	0.1020	=	kg-m
N-m	x	0.7376	=	ft-lb
N-m	x	8.851	=	in-lb

kg-m	x	9.807	=	N-m
kg-m	x	7.233	=	ft-lb
kg-m	x	86.80	=	in-lb

Units of Pressure:

kPa	x	0.01020	=	kg/cm ²
kPa	x	0.1450	=	psi
kPa	x	0.7501	=	cm Hg

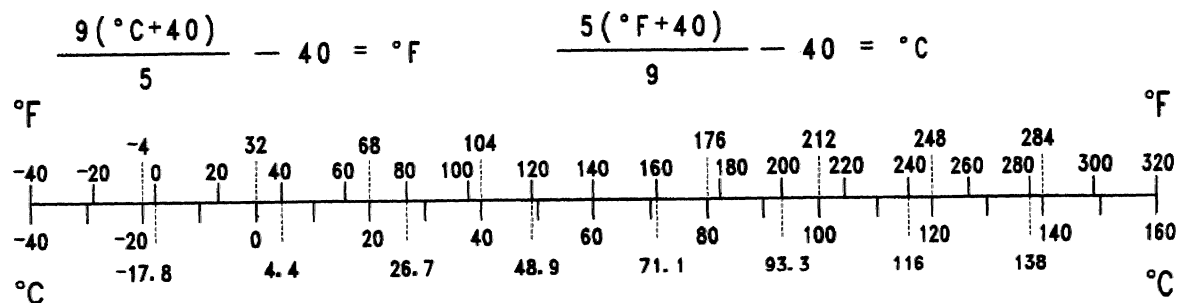
kg/cm ²	x	98.07	=	kPa
kg/cm ²	x	14.22	=	psi
cm Hg	x	1.333	=	kPa

Units of Speed:

km/h	x	0.6214	=	mph
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Units of Power:

kW	x	1.360	=	PS
kW	x	1.341	=	HP
PS	x	0.7355	=	kW
PS	x	0.9863	=	HP

Units of Temperature:

MODEL APPLICATION

Year	Model	Beginning Hull No.
1992	JS750-A1	KAW80001 □192, or JS750A-600001
1993	JS750-A2	KAW60001 □293, or JS750A-602300
1994	JS750-A3	KAW70001 □394, or Js750A-605701
1995	JS750-A4	KAW10001 □495, or JS750A-608801

□ :This digit in the hull number changes from one machine to another.



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