



KEL26A

Handheld Edger Service Manual

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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	pounds(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.

EMISSION CONTROL INFORMATION

To protect the environment in which we all live, Kawasaki has incorporated exhaust emission control systems (EM) in compliance with applicable regulations of the United States Environmental Protection Agency and the California Air Resources Board.

1. Exhaust Emission Control System

The exhaust emission control system applied to this engine consists of a carburetor and an ignition system having optimum ignition timing characteristics.

The carburetor has been calibrated to provide lean air/fuel mixture characteristics and optimum fuel economy with a suitable air cleaner and exhaust system.

TAMPERING WITH EMISSION CONTROL SYSTEM PROHIBITED

Federal law and California State law prohibits the following acts or the causing thereof: (1) the removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new engine for the purpose of emission control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the engine after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:

Do not tamper with the original emission related part:

- Carburetor and internal parts
- Spark plugs
- Magneto or electronic ignition system
- Fuel filter
- Air cleaner elements

Foreword

This manual is designed primarily for use by trained mechanics in a properly equipped shop. However, it contains enough detail and 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 has doubts as to his ability to do the work, all adjustments, maintenance, and repair should be carried out only by qualified mechanics.

This manual cover model: KEL26A (HE026A-AS00). As for safety information, specifications, exploded view, assembly and preparation, operating instructions, and periodic maintenance; this manual does not mention them as you can depend upon their respective owner's manuals and parts catalogues to tell you the details.

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.

To get the longest life out of your equipment.

- Follow the Periodic Maintenance Chart in their respective owner's manual.
- Be alert for problems and non-scheduled maintenance.
- Use proper tools and genuine Kawasaki engine parts. 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

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 WARNING, CAUTION, or 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.

General Information

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1-2 GENERAL INFORMATION

Before Servicing

Before starting to service the engine, carefully read the applicable section 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 required for successful work.

Especially note the following:

- (1) **Dirt**

Before removal and disassembly, clean the engine. Any dirt entering the engine, carburetor, or other parts, will work as an abrasive and shorten the life of engine. For the same reason, before installing a new part, clean off any dust or metal filings.
- (2) **Tightening Sequence**

Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them evenly, in a staggered sequence. 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 a 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.
- (3) **Torque**

When torque values are given in this Service Manual, use them. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.
- (4) **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 heads.
- (5) **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.
- (6) **High-Flash Point Solvent**

A high-flash point solvent is recommended to reduce fire danger. A commercial solvent commonly available in North America is Standard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.
- (7) **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.
- (8) **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 oil passages and cause serious damage. An example of a nonpermanent locking agent commonly available in North America is Loctite Lock'n Seal (Blue).
- (9) **Press**

A part installed using a press or driver, such as a journal, should first be coated with oil on its outer or inner circumference so that it will go into place smoothly.
- (10) **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.
- (11) **Oil Seal, Grease Seal**

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals.
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.
- (12) **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 oil, preferably high temperature grease on the lips to reduce rubber to metal friction.
- (13) **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.
- (14) **Cotter Pin**

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

GENERAL INFORMATION 1-3

Before Servicing

(15) 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. This manual makes reference to molybdenum disulfide grease (MoS₂) in the assembly of certain engine parts. Always check manufacturer recommendations before using such special lubricants.

(16) Replacement Parts

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

(17) 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	

(18) Specifications

Specification terms are defined as follows:

"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.

1-4 GENERAL INFORMATION

Model Identification

KEL26A



GENERAL INFORMATION 1-5

General Specifications

Item	KEL26A
Product code	HE026A-AS00
Engine code	TH026D-AN32
Dimension:	
Overall length	1749 mm (68.8 in)
Overall width	387 mm (15.2 in)
Overall height	303 mm (11.9 in)
Overall weight	5.5 kg (12.1 lb) without cutter, empty fuel tank
Engine:	TH26D
Type	Forced air cooled 2-stroke, single cylinder gasoline engine
Displacement	25.4 mL (1.55 cu in)
Bore × stroke	34 × 28 mm (1.34 × 1.10 in)
Carburetor	Diaphragm type
Ignition	Solid state ignition
Spark Plug	NGK BPMR6A
Starter	Recoil starter
Clutch	Automatic centrifugal type ϕ 54 mm (2.1 in)
Air cleaner	Felt element
Fuel:	
Mixing ratio	50 parts of regular unleaded gasoline to 1 part of 2-stroke engine oil by volume JASO Service Classification: FC class
Tank capacity	0.6 L
Frame:	
Cutter length	203 mm (8.0 in)
Cutter width	50.8 mm (2.0 in)
Cutter thickness	2.3 mm (0.09 in)
Main pipe	ϕ 24 mm (0.94 in)
Main cable	ϕ 6 mm (0.24 in)
Gear ratio	13 : 20
Rotation of the cutting blade	Clockwise (shown the guard)
Lubrication	High quality lithium grease

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

1-6 GENERAL INFORMATION

Setting Table

	KEL26A Setting
The engine speed at which the clutch engages	about 4000 rpm at 0.04 N·m (0.4 kg·cm, 0.35 in·lb), of drag torque
Max. engine speed (rpm)	Different depending on matching machine
Low idling speed	3000 ± 200 rpm
Ignition coil air-gap	0.3 to 0.5 mm (0.012 ~ 0.020 in)
Ignition timing	25° B.T.D.C. @7000 rpm
Spark plug gap	0.6 to 0.7 mm (0.024 ~ 0.028 in)
Carburetor: Main jet	# 37.5
Gear case grease capacity	about 9 ± 1 g (When Gear case is completely dry)

GENERAL INFORMATION 1-7

Periodic Maintenance Chart

▲WARNING

Accidental engine starting can cause injury. Always remove the spark plug cap before servicing the engine to prevent accidental starting.

Maintenance	Daily	First 20 h	Every 20 h	Every 50 h	Every 100 h
Check and replenish fuel	●				
Check for fuel leakage	●				
Check bolts, nuts and screws for looseness and loss	●				
Check throttle lever operation	●				
Check engine switch operation	●				
Check guard, flap and wheel condition	●				
Check cutting blade condition	●				
Clean fuel filter			●		
* Clean air filter element			●		
Tighten bolts, nuts, and screws		●		●	
Clean spark plug and adjust electrode gap				●	
* Remove dust and dirt from cylinder fins				●	
Check gear case assembly lubrication				●	
K Check drive cable lubrication				●	
Clean net of spark arrester				●	
Remove carbon deposits in the exhaust pipe of muffler				●	
K Remove carbon deposits on piston head and inside cylinder				●	
K Check the sliding portion of crankshaft, connecting rod etc.					●
Fuel tube	It is recommended to replace every 3 years.				

NOTE

○ The service intervals indicated are to be used as a guide. “**” Service to be performed more frequently as necessary by operating condition.

K: These items must be performed with proper tools.

See your authorized Kawasaki dealer for service.

1-8 GENERAL INFORMATION

Tightening Torque

The following tables list the tightening torque for the major fasteners and the parts requiring use of a non-permanent locking agent or reiquid gasket.

Letters used in the following "Tightening Torque" table mean:

MTGS: Mounting screw(s)

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

LG: Apply a liquid gasket to the sealing surfaces.

Tightening Torque — KEL26A

Fastener	Size	Torque			Remarks
		N·m	kg·m	ft·lb	
Engine					
Air Cleaner Cap MTGS	M5	2.0 ~ 2.5	0.20 ~ 0.25	17.4 ~ 21.7 in·lb	
Ignition Coil MTGS	M4	2.0 ~ 2.5	0.20 ~ 0.25	17.4 ~ 21.7 in·lb	LA
Recoil Starter MTGS	M4	1.7 ~ 2.0	0.17 ~ 0.20	14.8 ~ 17.4 in·lb	LA
Crankcase Connecting MTGS	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	LA/LG
Engine Shroud MTGS	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	LA
Carburetor/Air Cleaner Case MTGS	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	
Insulator MTGS	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	LA
Fuel Tank MTGS (Crankcase side)	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	
Fuel Tank MTGS (Recoil Starter side)	M5	2.0 ~ 2.5	0.20 ~ 0.25	17.4 ~ 21.7 in·lb	
Muffler MTGS	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	LA
Muffler Cover MTGS	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	LA
Cylinder MTGS	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	LA
Clutch Shoe MTGS	M6	7.8 ~ 9.8	0.80 ~ 1.00	69.4 ~ 86.8 in·lb	LA
Flywheel Nut	M6	7.8 ~ 9.8	0.80 ~ 1.00	69.4 ~ 86.8 in·lb	
Starter Pulley Nut	M8	13.7 ~ 15.7	1.40 ~ 1.60	10.1 ~ 11.6	
Starter Pulley	M8	9.8 ~ 11.8	1.00 ~ 1.20	7.2 ~ 8.7	
Spark Plug	M14	11.8 ~ 16.7	1.20 ~ 1.70	8.7 ~ 12.3 in·lb	
General Bolts and Nuts	M4	2.5 ~ 2.9	0.25 ~ 0.30	21.7 ~ 26.0 in·lb	
General Bolts and Nuts	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	
General Bolts and Nuts	M6	5.9 ~ 7.8	0.60 ~ 0.80	52.1 ~ 69.4 in·lb	
FRAME					
Grease Hole Bolt	M6	3.9 ~ 4.9	0.40 ~ 0.50	34.7 ~ 43.4 in·lb	
Gear Case Clamp Bolt	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	
Gear Case Alignment Bolt	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	
Cutter Blade Mounting Nut	M10	14.7 ~ 18.6	1.50 ~ 1.90	10.8 ~ 13.7	
Guard Clamp Bolt	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	
Guard Clamp Nut	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	
Loop Handle Socket Bolt	M5	1.5 ~ 2.0	0.15 ~ 0.20	13.0 ~ 17.4 in·lb	
Clutch Housing MTGS	M5	3.4 ~ 3.9	0.35 ~ 0.40	30.4 ~ 34.7 in·lb	
Grip Clamp Bolt	M5	1.5 ~ 2.0	0.15 ~ 0.20	13.0 ~ 17.4 in·lb	
Wheel Plate Clamp Bolt	M6	5.9 ~ 7.8	0.60 ~ 0.80	52.1 ~ 69.4 in·lb	
Wheel Nut	M8	2.5 ~ 2.9	0.25 ~ 0.30	21.7 ~ 26.0 in·lb	

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Clearance Table

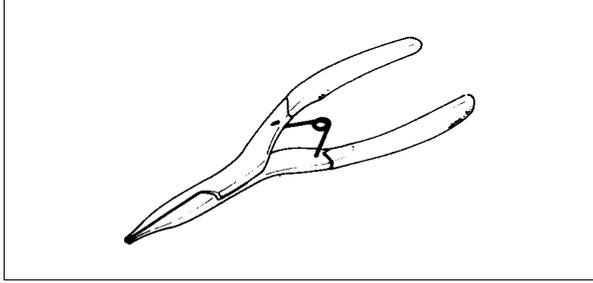
Item	Service Limit (mm)	Remarks
Cylinder bore	34.1 (1.343 in)	Replace if over
Piston-to-cylinder clearance	0.15 (0.0059 in)	Replace if over
Piston ring-to-groove clearance	0.17 (0.0067 in)	Replace if over
Piston ring end-gap	0.7 (0.0276 in)	Replace if over
Piston-to-piston pin clearance	0.1 (0.0039 in)	Replace if over
Connecting rod big-end axial play	0.5 (0.0200 in)	Replace if over
Connecting rod big-end radial play	0.15 (0.0059 in)	Replace if over
Piston pin-to-needle bearing radial play	0.15 (0.0059 in)	Replace if over
Ball bearing axial play	0.5 (0.0200 in)	Replace if over
Crankshaft axial play *	0.05 ~ 0.295 (0.0020 ~ 0.0116 in)	Adjust if over

*: Thrust runout of ball bearing not included

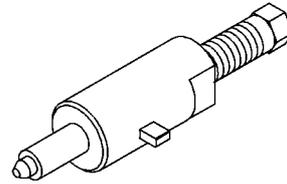
1-10 GENERAL INFORMATION

Special Tools

Outside Circlip Pliers: 57001-144

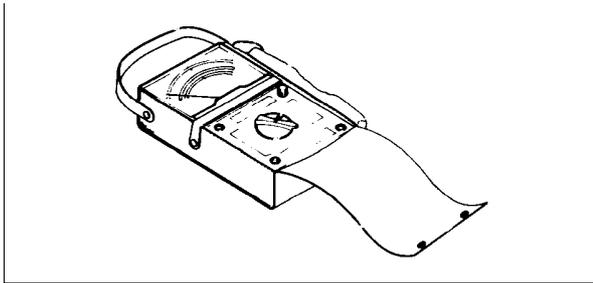


Drum Pusher, 24 mm: 57001-1440

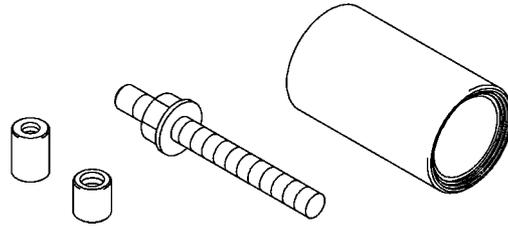


ST571440ST C

Hand Tester: 57001-1394

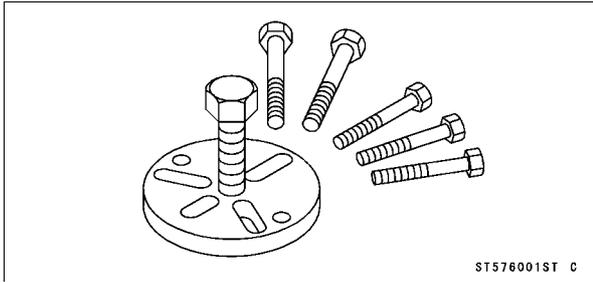


Bearing Puller: 57001-1467



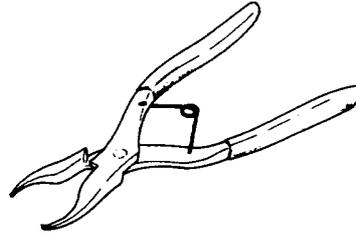
ST571467ST C

Flywheel Puller: 57001-6001

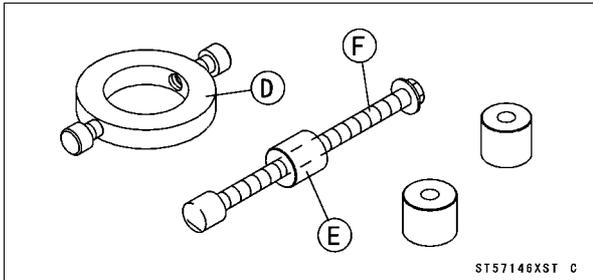


ST576001ST C

Inside Circlip Pliers : 57001-143



Damper Puller: 57001-1466



ST57146XST C

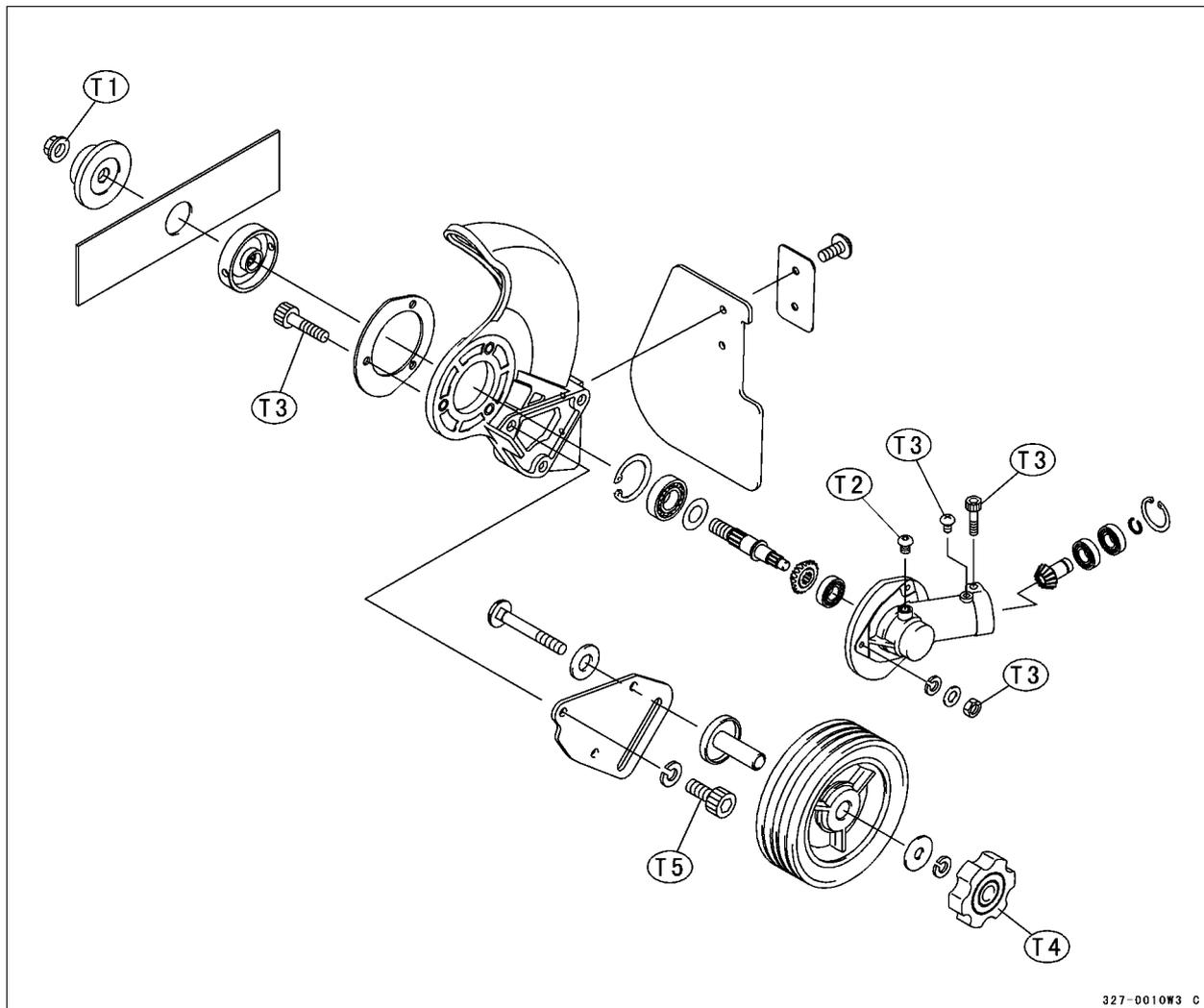
Frame

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2-2 FRAME

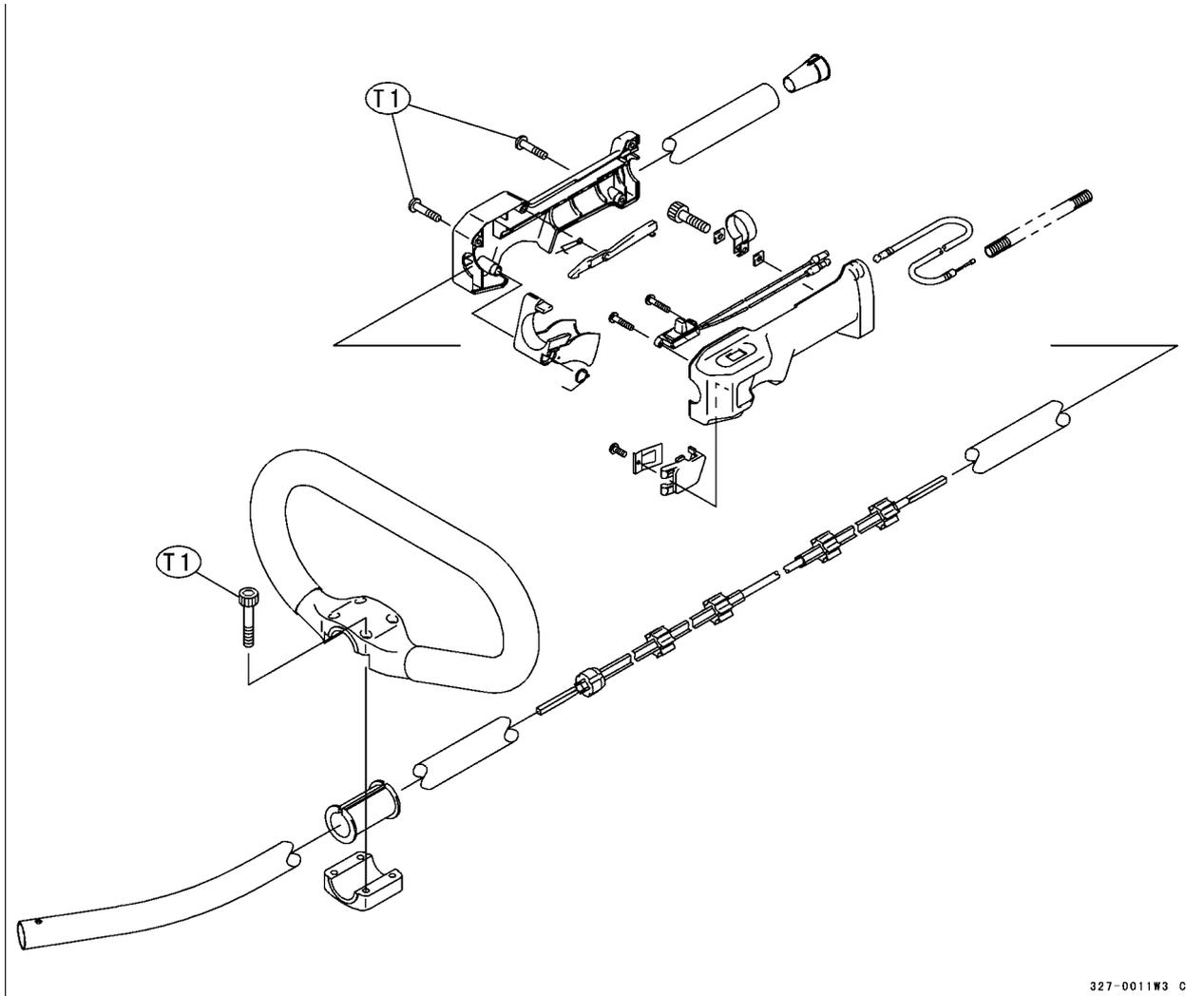
Exploded View



327-0010W3 C

- T1: M10, 14.7 ~ 18.6 N·m (1.50 ~ 1.90 kg·m, 10.8 ~ 13.7 ft·lb)
- T2: M6, 3.9 ~ 4.9 N·m (0.40 ~ 0.50 kg·m, 34.7 ~ 43.4 in·lb)
- T3: M5, 3.4 ~ 3.9 N·m (0.35 ~ 0.40 kg·m, 30.4 ~ 34.7 in·lb)
- T4: M8, 2.5 ~ 2.9 N·m (0.25 ~ 0.30 kg·m, 21.7 ~ 26.0 in·lb)
- T5: M6, 5.9 ~ 7.8 N·m (0.60 ~ 0.80 kg·m, 52.1 ~ 69.4 in·lb)

Exploded View



327-0011W3 C

T1: M5, 1.5 ~ 2.0 N·m (0.15 ~ 0.20 kg·m, 13.0 ~ 17.4 in·lb)

2-4 FRAME

Cutter

⚠ WARNING

Stop the engine and completely drain the fuel tank before disassembling the unit. Pay close attention to prevent burns or fire.

Cutter Removal

- Align the lock tool hole [F] of the holder with the tool retaining cutout [G] in the gear case. Then, insert the Allen wrench that is supplied with the unit to prevent the cutter from turning.
- To loosen the nut [A], use a 17mm socket wrench to turn it clockwise. Then, remove the nut [A], holder [B], cutter blade [C] in that order.

Nut [A]

Holder-1 [B]

Cutter Blade [C]

Holder-2 [D]

Holder Flange [E]

Lock Tool Hole [F]

Tool Retaining Cutout [G]

NOTE

- Before replacing the old cutting blade with the new one, check for, and remove any debris built up in the guard. Then after cleaning the inside of guard, install new cutting blade. Debris build up may cause the guard to crack or break with new cutting blade.

NOTE

- To protect the gear case shaft, insert the top and bottom holders and temporarily tighten them with nuts.

Cutter Installation

- Installation is the reverse of removal.

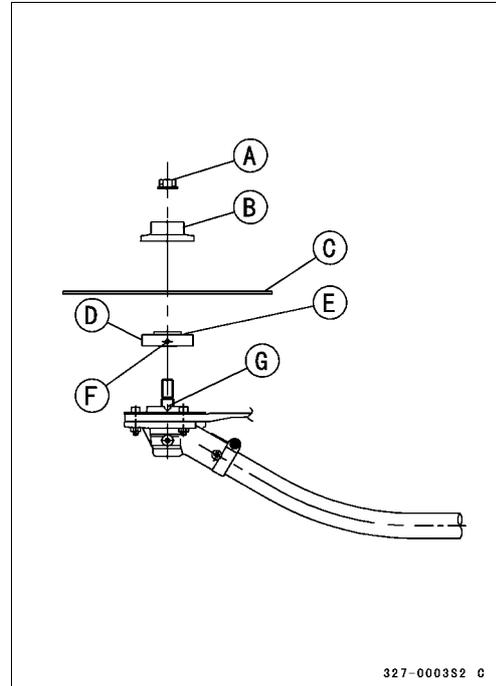
Torque - Nut 10 mm: 14.7 ~ 18.6 N·m (1.5 ~ 1.9 kg·m, 10.8 ~ 13.7 ft·lb)

⚠ WARNING

Securely install the cutter blade on the holder flange and tighten the nut to the specified torque. Failure to properly tighten it could cause abnormal vibration or the loosening of the nut, which could lead to the cutter blade flying away.

NOTE

- Apply a thin coat of grease to the splines of the shaft.



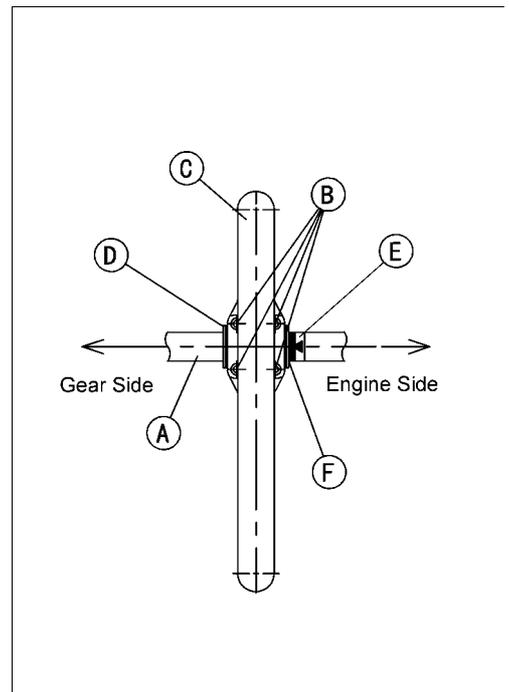
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Handle

Handle Removal

- Remove the handle [C] from the main pipe [A].
- Remove:
 - Allen bolts [B], 4 bolts
 - Handle [C]
 - Collar [D]



Handle Installation

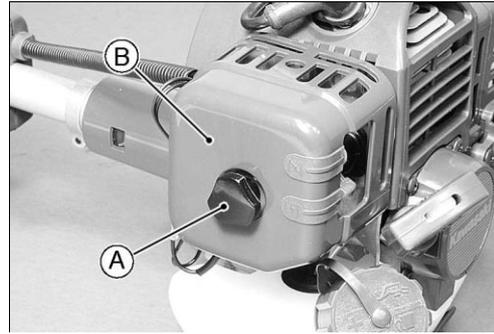
- Installation is the reverse of removal.
 - Torque - Allen Bolts 5 mm: 1.5 ~ 2.0 N·m (0.15 ~ 0.20 kg·m, 13.0 ~ 17.4 in·lb)**
- Install the handle so that the end with the larger oval shape is to the left of the cutter blade.
- Align the handle end face with the label end face [F].
- Install the collar [D] on the handle position indication label [E].
- Ensure the proper installation angle of the collar by directing its cutout in the horizontal direction, and assemble it without infringing on the handle or the bracket.

2-6 FRAME

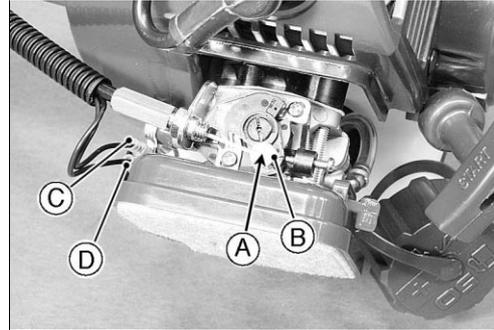
Complete Engine

Complete Engine Removal

- Unscrew the mounting screw [A] to remove the air filter cap [B].



- Remove the cable-end nipple [A] out of the throttle valve terminal [B].
- Remove the lead wire connectors [C], [D].



- Release the clamp Bolt [A].



Complete Engine Installation

- Installation is the reverse of removal.
- Apply a thin coat of molybdenum disulfide grease to the outer periphery [A] of the cable opening at the engine.
- Make sure that the cable opening is securely inserted into the holes of the outer periphery engine drum housing and the pipe ends touched the bottom of holder as well. Both are confirmed by the "CLICK" sound.
- Install the gear case shaft so that it forms a right angle with the direction of the engine cylinder.



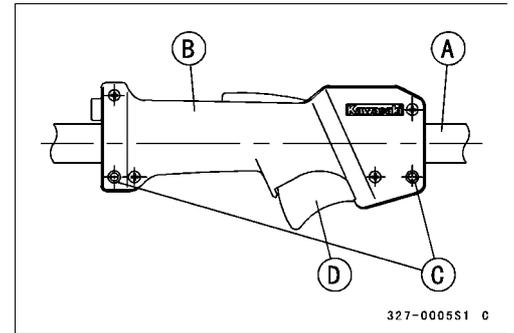
FRAME 2-7

Grip

Complete Grip Removal

- Loosen the two grip retaining bolts [C], and pull out the grip [B] from the main pipe [A].

- Main Pipe [A]
- Grip [B]
- Clamp Bolt [C]
- Throttle Lever [D]

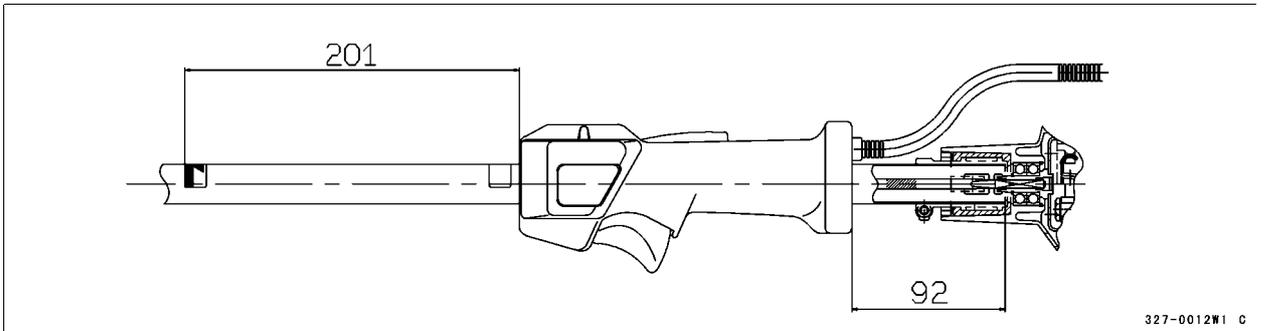
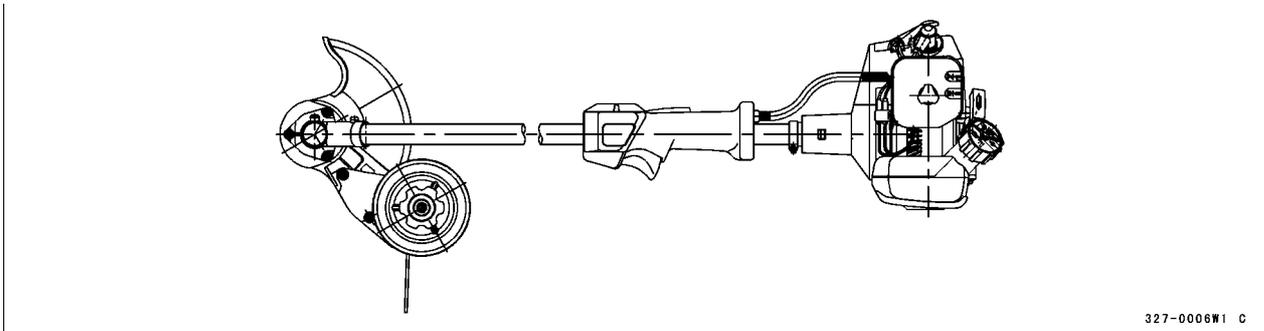


Complete Grip Installation

- Installation is the reverse of removal.

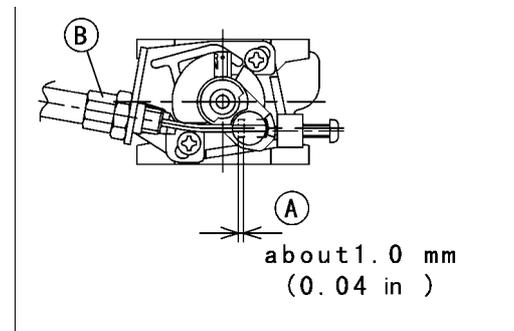
Torque - Allen Bolt 5 mm: 1.5 ~ 2.0 N·m (0.15 ~ 0.20 kg·m, 13.0 ~ 17.4 in·lb)

- To ensure the proper circumferential direction of the grip, install the grip so that the direction of the throttle lever forms a right angle with the direction of the gear case shaft.



Throttle Cable Installation

- Installation is the reverse of removal.
- Adjust the carburetor adjustment screw [B] so that the play [A] of the throttle cable is approximately 1mm (0.04 in.) maximum when the throttle lever on the grip is in its idle position.

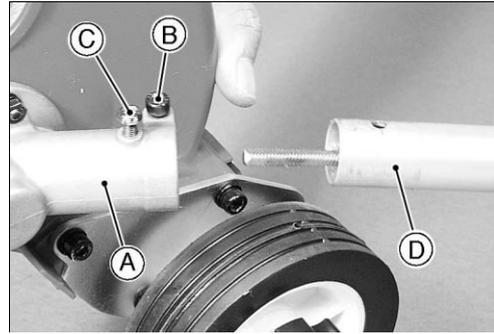


2-8 FRAME

Complete Gear Case, Guard and Wheel

Complete Gear Case, Guard and Wheel Removal

- Remove the clamp bolt [B] and alignment bolt [C] from the gear case [A], and pull out the complete gear case from the main pipe [D].



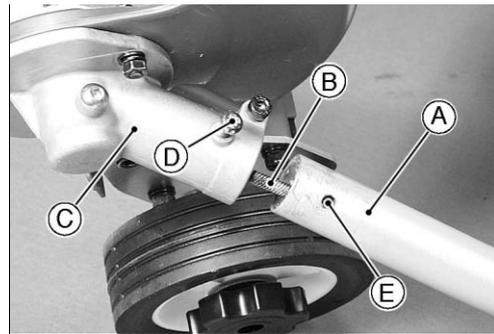
Complete Gear Case, Guard and Wheel Installation

- Installation is the reverse of removal.

Torque - Clamp Bolt 5 mm: 3.4 ~ 3.9 N·m (0.35 ~ 0.40 kg·m, 30.4 ~ 34.7 in·lb)

Alignment Bolt 5 mm: 3.4 ~ 3.9 N·m (0.35 ~ 0.40 kg·m, 30.4 ~ 34.7 in·lb)

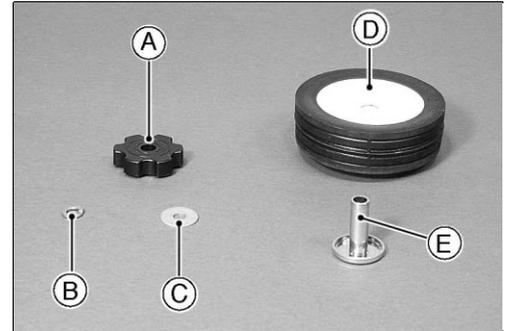
- Pull out the cable [B] from the main pipe [A] and insert the cable opening into the pinion hole in the gear case.
- Insert the gear case [C] so that it comes in contact with the end face of the main pipe; then, align the alignment bolt [D] with the locating hole [E] of the main pipe and tighten it.



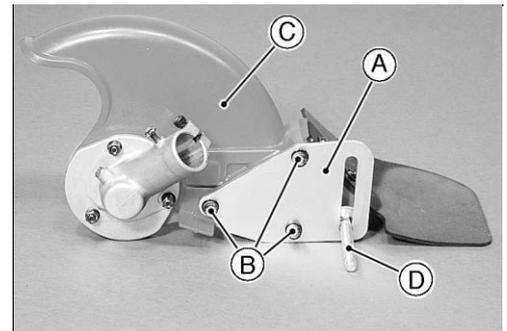
Wheel and attached Parts

Wheel and Attached Parts Removal

- Remove the wheel nut [A], spring washer [B], and washer [C]; then, remove the wheel [D] and collar [E].



- Remove the three bolts [B] that retain the plate [A] from the guard [C]; then, remove the plate [A] together with the long bolt [D].



Wheel and Attached Parts Installation

- Installation is the reverse of removal.

Torque - Wheel Nut 8 mm: 2.5 ~ 2.9 N·m (0.25 ~ 0.30 kg·m, 21.7 ~ 26.0 in·lb)

Plate Bolts 6 mm: 5.9 ~ 7.8 N·m (0.60 ~ 0.80 kg·m, 52.1 ~ 69.4 in·lb)

- After installing the wheel, make sure that the wheel moves smoothly up and down, and secure it in place.
- Secure the wheel at its topmost position.

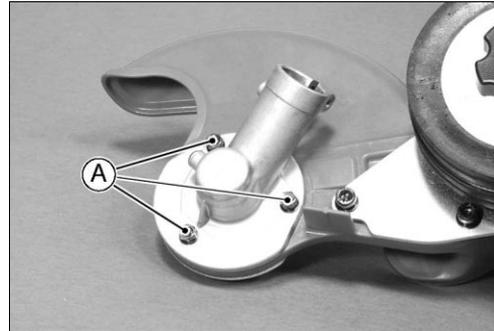


2-10 FRAME

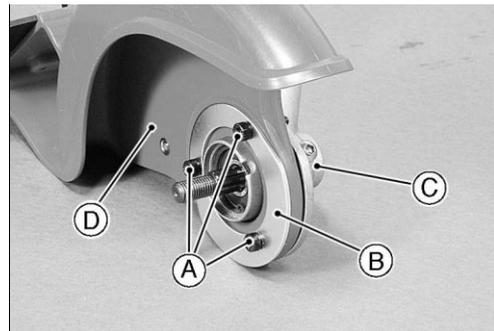
Guard

Guard Removal

- Remove the three guard clamp nuts [A] together with the spring washers and flat washers.



- Remove the three guard clamp bolts [A] together with the plate [B] and gear case [C] from the guard [D].



Gear Case and Attached Parts Installation

- Installation is the reverse of removal.

Torque - Guard Clamp Nuts 5 mm: 3.4 ~ 3.9 N·m (0.35 ~ 0.40 kg·m, 30.4 ~ 34.7 in·lb)

Guard Clamp Bolts 5 mm: 3.4 ~ 3.9 N·m (0.35 ~ 0.40 kg·m, 30.4 ~ 34.7 in·lb)

- When attaching the gear case to the guard, make sure that the protrusion on the guard comes in contact with the cylindrical portion of the gear case.

NOTE

- Be sure that the guard bolts are not turned together with the nuts when installing.

Gear Case

Gear Case Disassembly

- Remove the circlips [A], [B] out of their respective grooves.
- Using the special tool, remove the shaft [I], the plate [L] and the ball bearing [G] as a unit.

Special Tool - Bearing Puller: 57001-1467

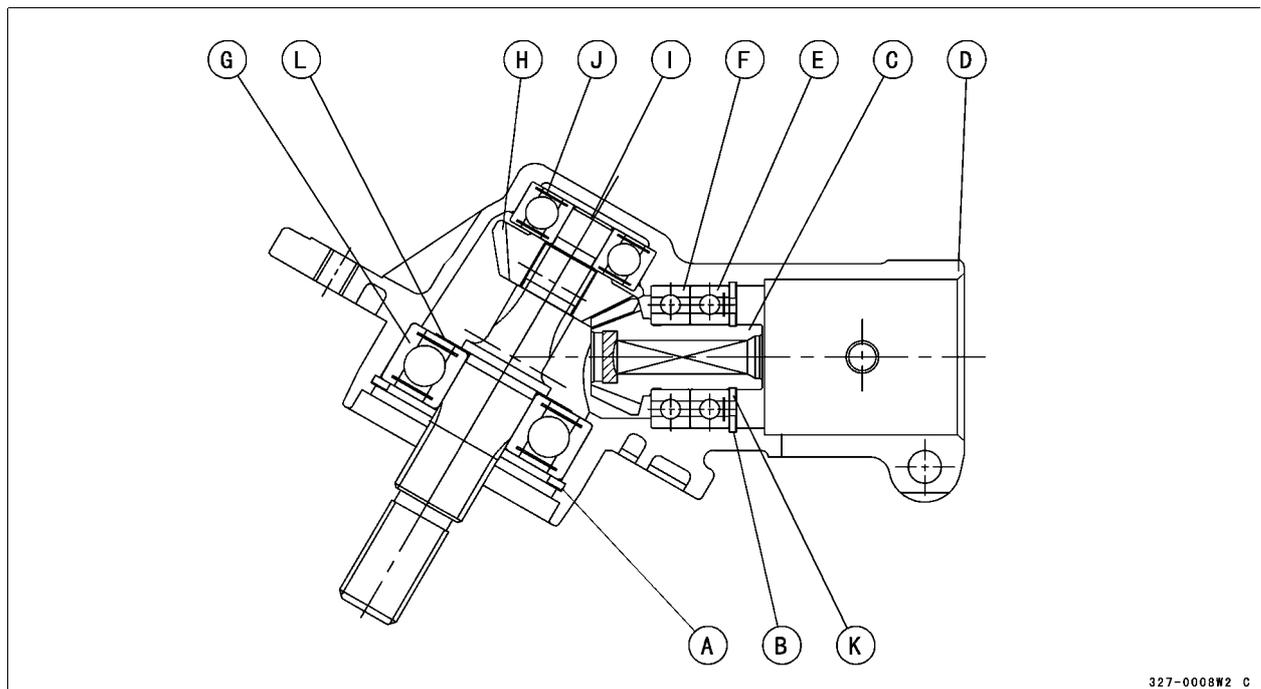


- Heat the complete gear case to about 110°C to 140°C (230°F to 280°F) on a heating plate to facilitate bearing removal.

⚠ WARNING

Be careful when handling the gear case and related parts, as they could be extremely hot and cause serious burns.

- Pull the bevel gear [C] off the gear case [D] together with the bearing [E], [F] and the bevel gear [H].
- Strike the gear case against a wooden block to allow the ball bearing [J] to fall out of the gear case [D].
- Remove the snap ring [K] out of the bevel gear [C] to separate the ball bearing [E], [F] from the bevel gear [C].



327-0008W2 C

Gear Case Installation

- Installation is the reverse of removal.
- Wash the gear case [D] and make sure that no cutting chips or other debris remain in the case.
- Face the seal of the ball bearing [E] towards the snap ring.
- To press the bevel gear [C] sub-assembly in, turn the shaft to make sure that the gears mesh properly.
- After the installation, make sure that that the gears rotate smoothly and that the parts sound normal.

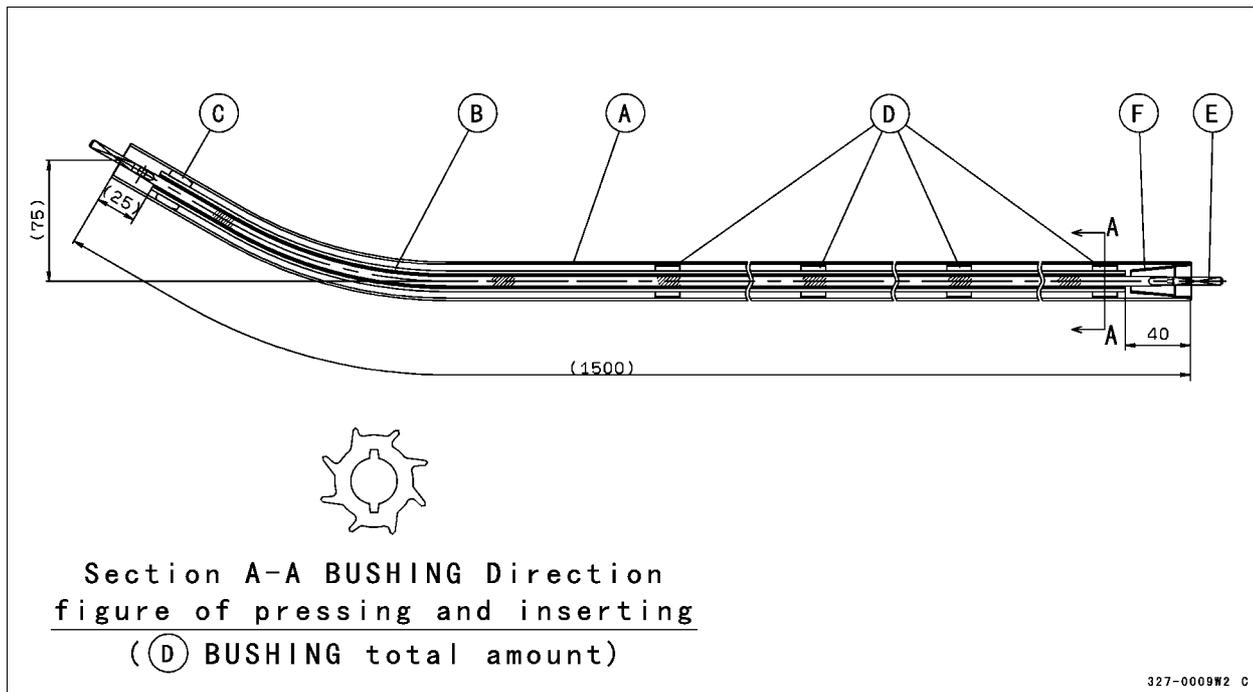
2-12 FRAME

Cable

Cable Removal

- Pull out the cable [E] from the main pipe [A].

Pipe [A]
Liner [B]
Bushing [C]
Bushing [D]
Cable [E]
Spacer [F]



327-0009W2 C

Cable Installation

- Installation is the reverse of removal.
- As a rule of thumb, replace the cable when it no longer transmits its movement to the cutter blade. A type of cable that is saturated with grease is used.

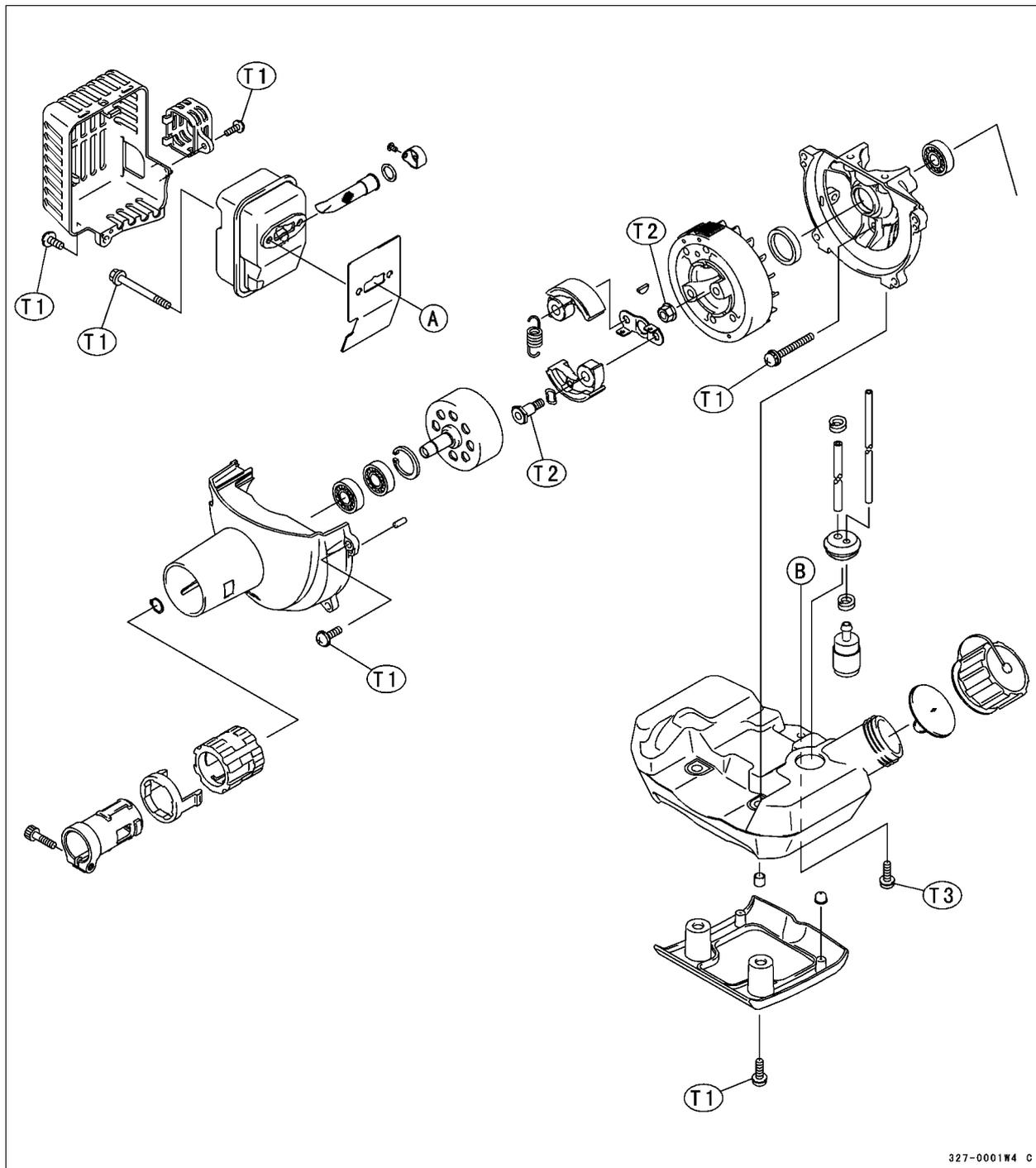
Engine

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3-2 ENGINE

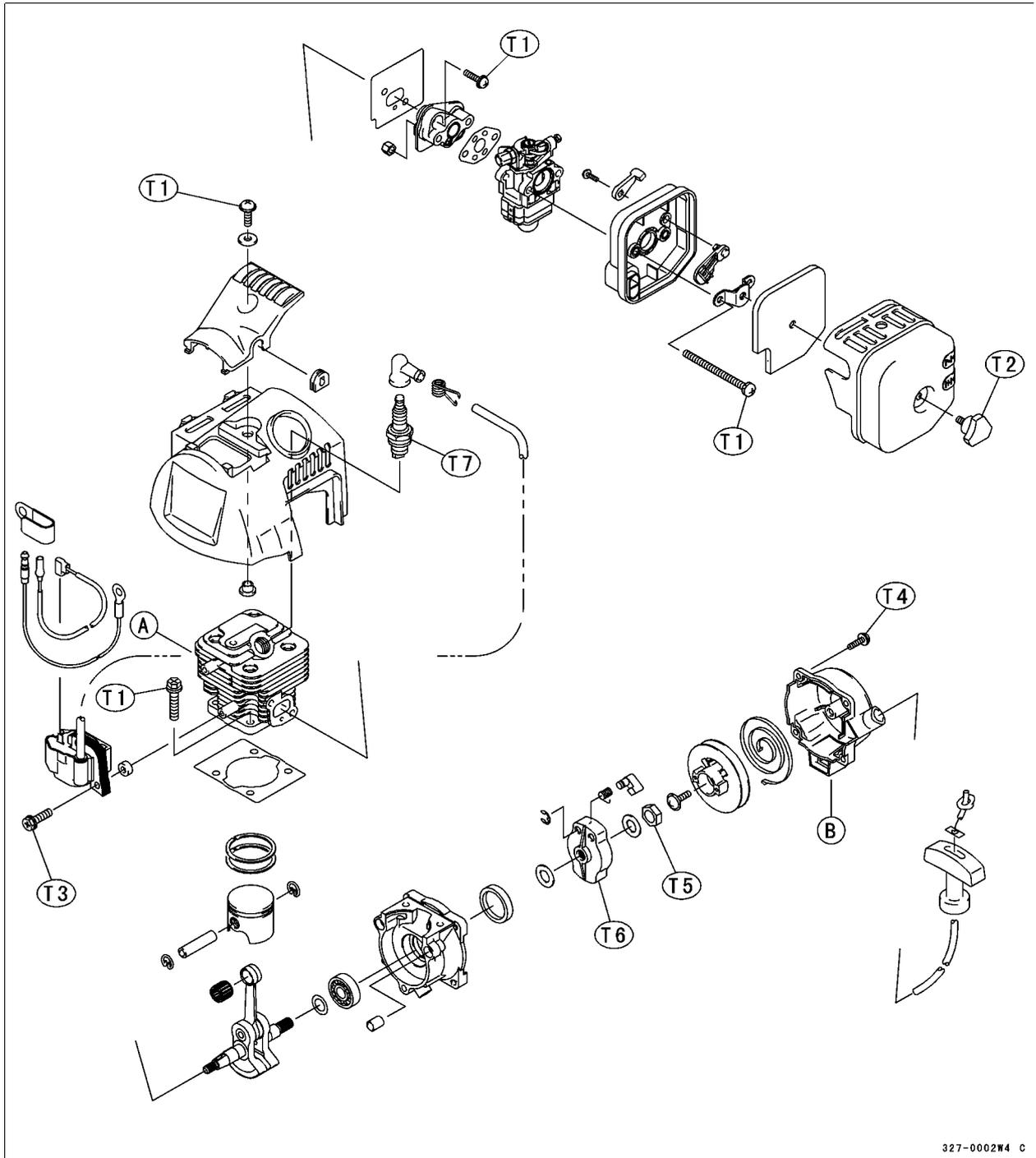
Exploded View



- T1: M5, 3.4 ~ 3.9 N·m (0.35 ~ 0.40 kg·m, 30.4 ~ 34.7 in·lb)
- T2: M6, 7.8 ~ 9.8 N·m (0.80 ~ 1.00 kg·m, 69.4 ~ 86.8 in·lb)
- T3: M5, 2.0 ~ 2.5 N·m (0.20 ~ 0.25 kg·m, 17.4 ~ 21.7 in·lb)

327-0001W4 C

Exploded View



- T1: M5, 3.4 ~ 3.9 N·m (0.35 ~ 0.40 kg·m, 30.4 ~ 34.7 in·lb)
- T2: M5, 2.0 ~ 2.5 N·m (0.20 ~ 0.25 kg·m, 17.4 ~ 21.7 in·lb)
- T3: M4, 2.0 ~ 2.5 N·m (0.20 ~ 0.25 kg·m, 17.4 ~ 21.7 in·lb)
- T4: M4, 1.7 ~ 2.0 N·m (0.17 ~ 0.20 kg·m, 14.8 ~ 17.4 in·lb)
- T5: M8, 13.7 ~ 15.7 N·m (1.40 ~ 1.60 kg·m, 10.1 ~ 11.6 ft·lb)
- T6: M8, 9.8 ~ 11.8 N·m (1.00 ~ 1.20 kg·m, 7.2 ~ 8.7 ft·lb)
- T7: M14, 11.8 ~ 16.7 N·m (1.20 ~ 1.70 kg·m, 8.7 ~ 12.3 in·lb)

327-0002W4 C

3-4 ENGINE

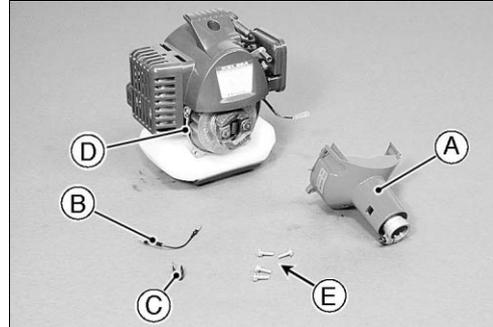
Housing, Clutch Drum and Damper

⚠ WARNING

Stop the engine before disassembling the unit, and drain the fuel tank securely.
Special attention should be paid to prevent burns or fire.

Housing Removal

- Remove the housing [A] and lead wire [B], clamp [C] from crankcases [D].
Screws [E]



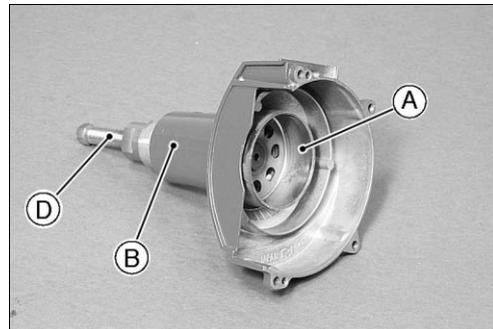
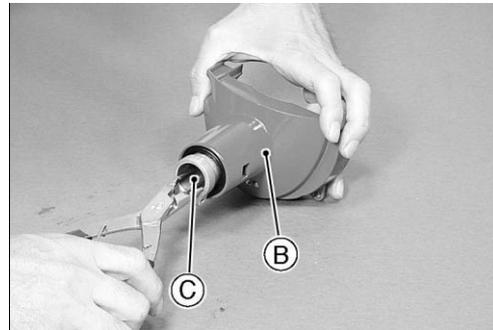
Clutch Drum Removal

- Remove the clutch drum [A] from the housing [B].
Circlip [C]

NOTE

- Use two types of special tools to removable the clutch drum.

Special Tools - Outside Circlip Pliers : 57001-144
Drum Pusher [D] 24 mm : 57001-1440

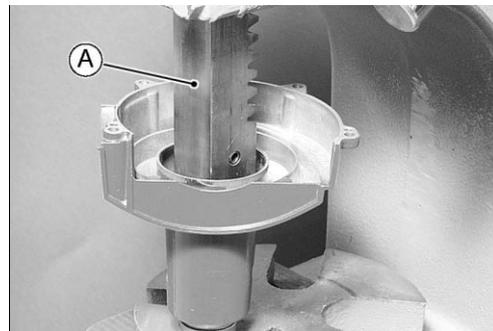


Clutch Drum Installation

- Installation is the reverse of removal.
- Push with the hand press [A].

NOTE

- Apply a bit of grease to the clutch drum shaft.
- Confirm that the clutch drum rotates smoothly after assembles.



Housing, Clutch Drum and Damper

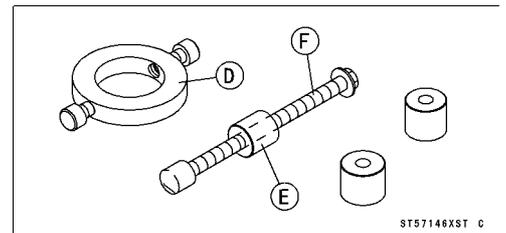
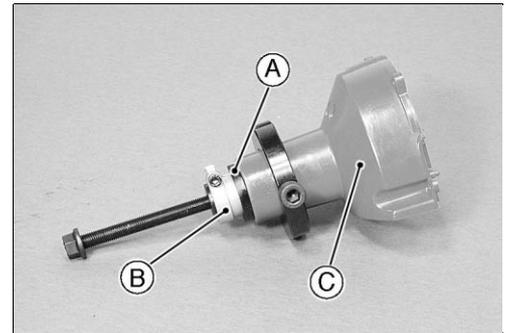
Damper Removal

- Remove the damper [A] and holder [B] from the housing [C].
- Use of special tools to removable the damper and holder.

Special Tool - Damper Puller: 57001-1466

Noticing Points When Using Special Tools:

- Install the ring remover [D] to the square holes (2) so that the allen bolts (2) are turned to the bottoms securely.
- Install the long bolt [F] to the puller nut [E] so that it is flush with the holder [B].
- Turn the clamp bolt of the holder [B] clockwise securely so that the long bolt [F] is turned to the same direction.

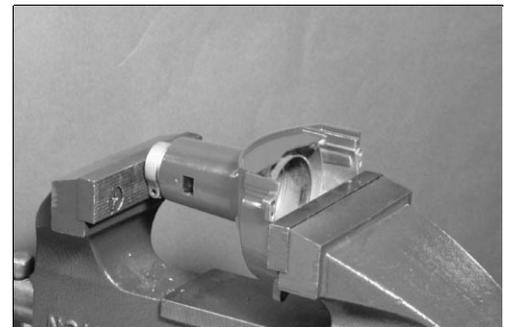


Installation

- Installation is the reverse of removal.
- Damper and holder installation. Push with the vise.
- Apply soap and water to the damper.

NOTE

- Do not apply oils to the damper.

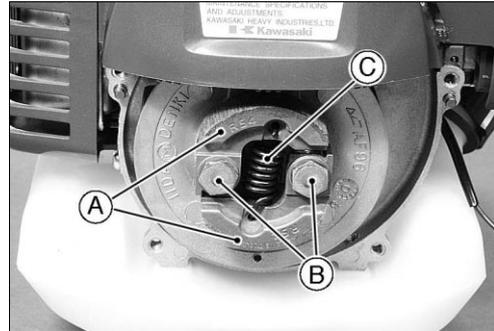


3-6 ENGINE

Clutch and Fuel Tank

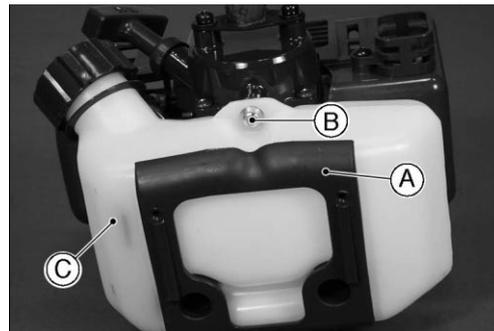
Clutch Removal

- Keeping the clutch shoes [A] from turning by using a pair of pliers, release the clutch pins [B] by turning counterclockwise to remove the clutch assembly.
- Take care not to scratch the clutch shoes [A].
- Do not remove the clutch spring [C] if not needed.

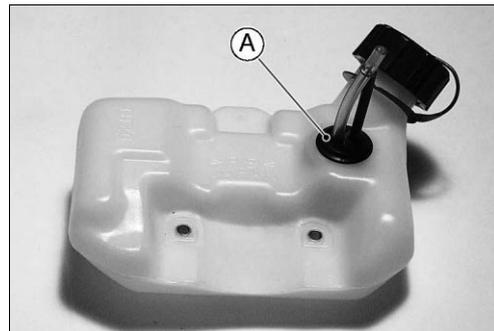


Fuel Tank Removal

- Remove the stand [A] and unscrew the remaining mounting screw [B] of the fuel tank.
- Loosen the fuel tube clamps to remove the fuel tank [C] together.



- Remove the tank grommet [A] out of the fuel tank.

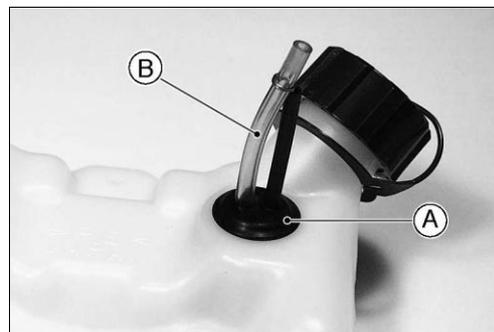


Fuel Tank Installation

- Installation is the reverse of removal.
- Fix the fuel filter to the delivery side opaque tube and clamp it.
- Put the opaque tube into the fuel tank together with the fuel filter and fit the tank grommet into its hole in order that the raised letters on the tank grommet can look toward outside.

NOTE

- Apply a bit of 2-stroke engine oil to the grommet in order to make the insertion easy.
- Install the tank grommet [A] to the fuel tank so that the transparent tube [B] comes toward the fuel tank center.



Clutch and Fuel Tank

Clutch Installation

- Apply locking agent to screw threads of the clutch pins.
- Apply a bit of heat resisting grease to the clutch-pin holes.
- Put the clutch shoes and the plate on the flywheel with raised letter such as R54 toward you. Install them by tightening the clutch pins to the specified torque.

Specified Clutch Pin Tightening Torque

8 ~ 10 N·m (0.8 ~ 1.0 kg·m, 71 ~ 89 in·lb)

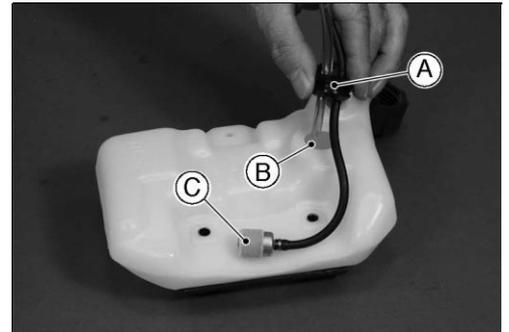
- Install the clutch spring to the clutch shoes before installing the clutch shoes on the flywheel if the clutch spring is removed.

Fuel Filter Cleaning

- Remove the fuel filter assembly together with the grommet [A] from the fuel tank [B] to keep dust from entering the fuel filter [C].
- Clean the fuel filter in a bath of high flash-point solvent.
- Dry the fuel filter before installing.

NOTE

- If fuel does not flow better with the fuel filter cleaned, replace the fuel filter with a new one.

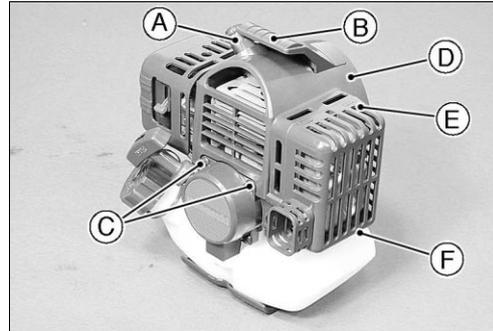


3-8 ENGINE

Air Cleaner, Carburetor, and Muffler

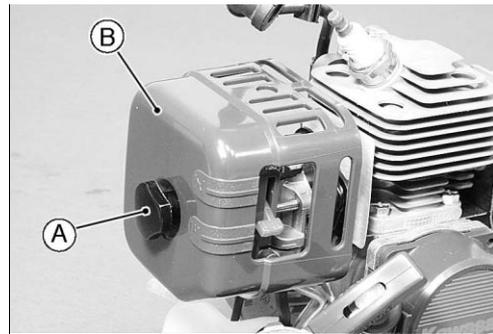
Shroud and Muffler Cover Removal

- Pull out the plug cap [A].
- Remove the guard [B].
- Unscrew the muffler cover screw [F] to remove the muffler cover [E].
- Unscrew the shroud mounting screws [C] to remove the shroud [D].



Air Cleaner Removal

- Unscrew the air cleaner mounting screws [A] to remove the air filter cap [B].

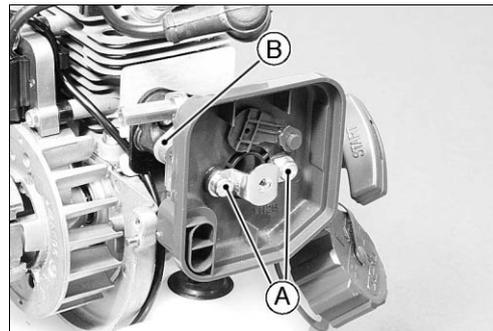


Carburetor Removal

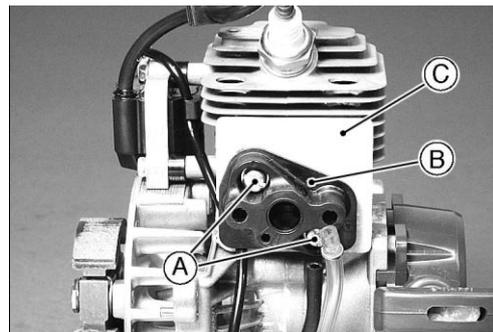
- Unscrew the two carburetor mounting screws [A] to remove the carburetor [B] together with the gasket.

NOTE

- Do not remove the carburetor if not needed.



- Unscrew the two insulator mounting screws [A] to remove the insulator [B] together with the gasket [C].

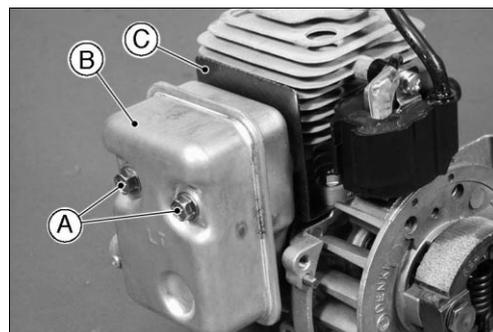


Muffler Removal

- Unscrew the two flange bolts [A] to remove the muffler body complete [B] together with the gasket [C].

NOTE

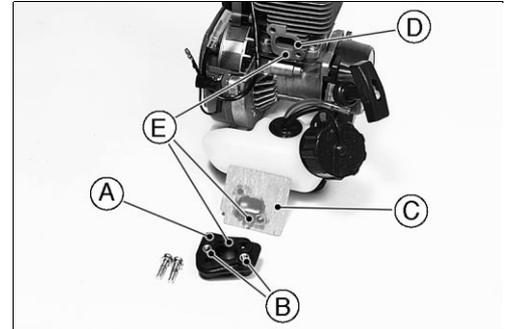
- In ordinary circumstances, there is no need to remove the muffler body complete out of the cylinder.



Air Cleaner, Carburetor, and Muffler

Air Cleaner, Carburetor, and Muffler Installation

- Installation is the reverse of removal.
- Use new gaskets.
- ★ If the insulator [A] is removed, fit the screw to round seat and nuts [B] to the hexagonal seats in the insulator, and put the insulator gasket [C] onto screw ends, then install the insulator on the cylinder [D] with the screws.
- Each pulse hole [E] must align.



Air Cleaner Element Cleaning

- Gently tap the element to remove dust or loosen accumulated dirt.
- Apply low-pressure compressed air as appropriate or replace the element with a new one as required.
- Do not wash the element.

CAUTION

<p>More frequent maintenance is necessary when the engine is operated in dusty condition.</p>
--

Spark Arrester Cleaning

⚠ WARNING

<p>Hot engine parts can cause severe burns. Allow engine to stop and cool before servicing spark arrester.</p>

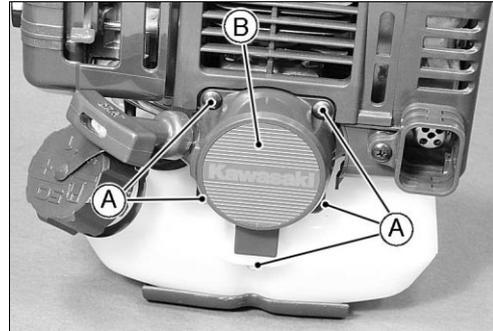
- Remove the muffler cover.
- Remove the spark arrester by unscrewing the screw at the exhaust pipe in the muffler.
- Clean deposits from the spark arrester screen by brushing it.
- Install the spark arrester and the muffler cover.

3-10 ENGINE

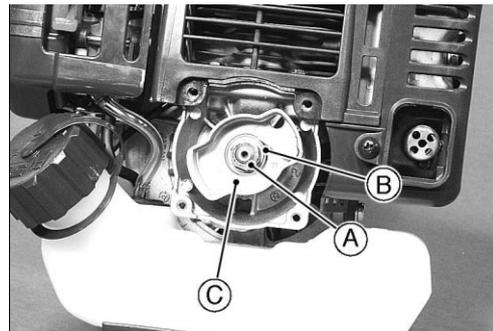
Recoil Starter, Shroud, Fan Housing, and Ignition Coil

Recoil Starter Removal

- Remove the mounting screws [A] to remove the recoil starter [B].

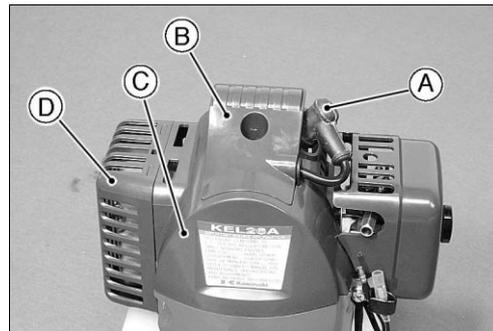


- Release the starting pulley lock nut [A] counterclockwise to remove it together with the washer [B].
- Remove the starting pulley [C] by turning itself counterclockwise.

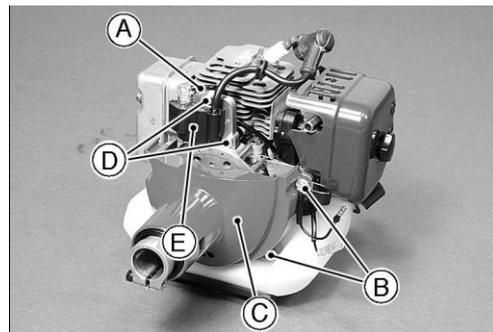


Ignition Coil Removal

- Remove the spark plug cap [A] out of the spark plug.
- Remove the guard [B].
- Remove the shroud [C] and muffler cover [D].



- Disconnect the ignition lead wire [A].
- Unscrew the fan housing mounting screws [B] to remove the fan housing [C].
- Unscrew the ignition coil mounting bolts [D] to remove the ignition coil [E] together with the insulators.

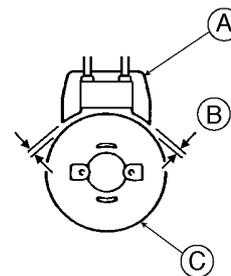


Installation

- Installation is the reverse of removal.
- Adjust the air gap [B] between the ignition coil [A] and flywheel [C] to the specified value.

Ignition Coil Air Gap Specified

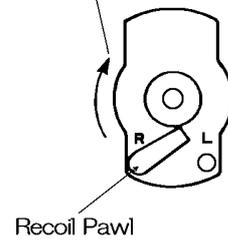
0.3 to 0.5 mm (0.012 to 0.020 in)



Recoil Starter, Shroud, Fan Housing, and Ignition Coil

- Install the starting pulley to the crankshaft by turning clockwise.
- The recoil pawl must be fitted on the pulley as shown.

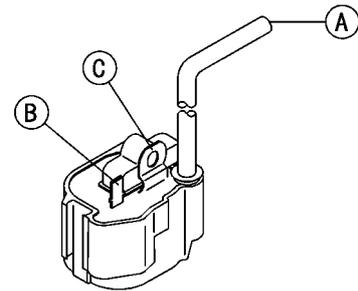
Rotating Direction (seen from recoil side)



Ignition Coil Inspection

The ignition coil has been integrated with an igniter being solid-state.

- Use the Kawasaki hand tester (P/N 57001-1394); resistance value may vary with individual meters.
- Set the Kawasaki hand tester to the specified range.
- Connect the test leads to the points shown and read the resistance.
- ★ If the resistance is not as specified, replace the ignition coil.
- ★ If the meter reads as specified, the ignition coil windings probably good. However if the ignition system still does not perform as it should after all other components have been checked, replace the ignition coil with one known to be good.



KCC12AC051 0

Ignition Coil Specified Resistance

Resistance Between

- [B] and [C] Primary Winding: 0.8 Ω to 1.2 Ω (R × 1 Ω)
- [A] and [C] Secondary Winding: 9 kΩ to 15 kΩ (R × 1 kΩ)

NOTE

- *It is unable to inspect the igniter whether it is good or bad with the Kawasaki hand tester since it was integrated with the ignition coil.*
- *Whenever you have doubt as to function of the igniter to operate, try replacing the ignition coil with one known to be good.*

3-12 ENGINE

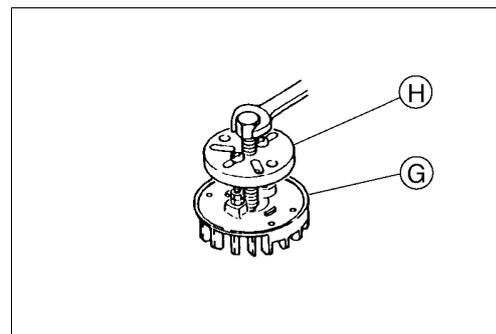
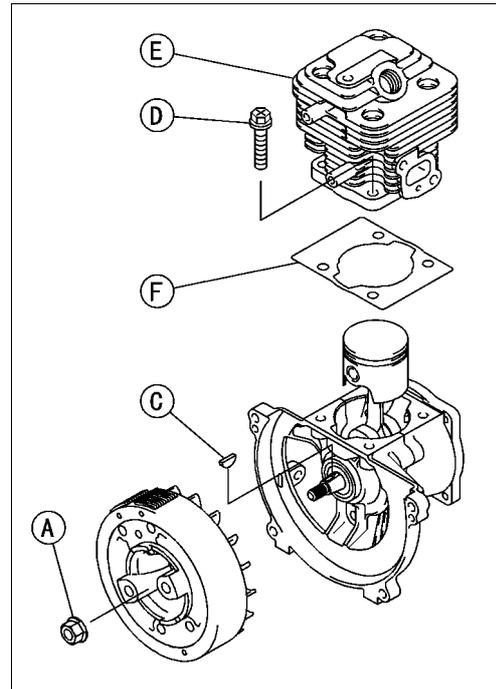
Flywheel and Cylinder

Flywheel and Cylinder Removal

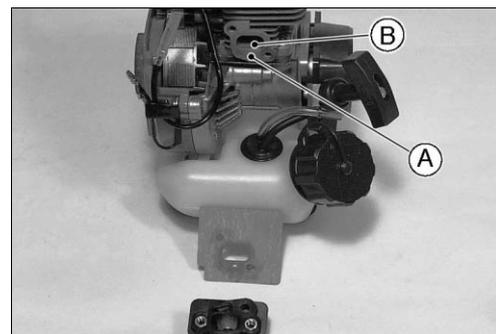
- Release the flywheel nut [A] counterclockwise to remove it.
- Remove the flywheel [G] out of the crankshaft by using a puller [H] as shown.

Special Tool - Flywheel Puller: 57001-6001

- Remove the key [C] from the crankshaft.
- Unscrew the flange bolts [D] to remove the cylinder [E] and the cylinder gasket [F] from the crankcase.

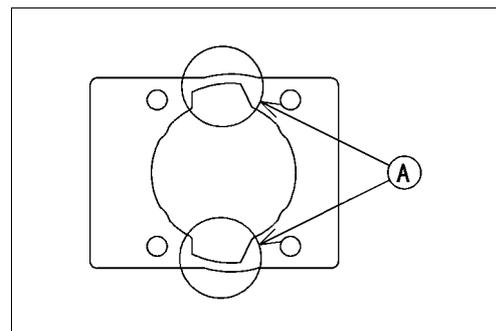


- Check to see if the pulse hole [A] under the inlet port [B] is clogged.
- ★ If clogged, clean.



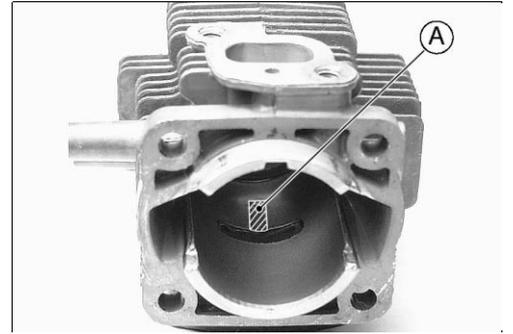
Flywheel and Cylinder Installation

- Installation is the reverse of removal.
- Use a new gasket.
- Set the cylinder gasket noting its profile [A] for scavenging ports.



Flywheel and Cylinder

- Scrape the carbon deposits inside the cylinder, especially slit [A] for decompression, with a suitable tool.



3-14 ENGINE

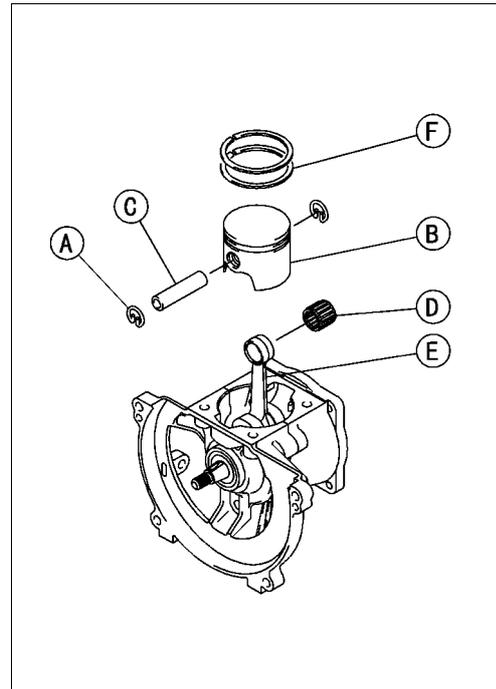
Piston and Piston Ring

Piston and Piston Ring Removal

CAUTION

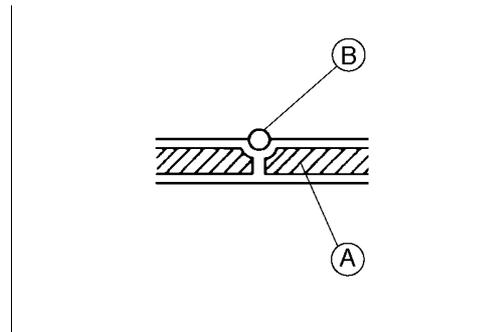
Do not reuse snap rings as removal weakens and deforms them. They could fall out and score the cylinder wall.

- Remove snap rings [A] out of the piston [B].
- Pull the piston pin [C] off the piston [B] to remove the piston [B] and the needle bearing [D] out of small-end of the connecting rod [E].
- Remove piston rings [F] out of the piston [B].

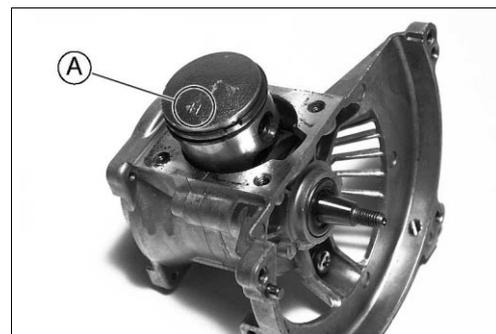


Piston and Piston Ring Installation

- Installation is the reverse of removal.
- Position the piston rings [A] in order that the radii at the ring gap can meet at the piston ring stopper pin [B] in the piston groove when the rings are compressed.



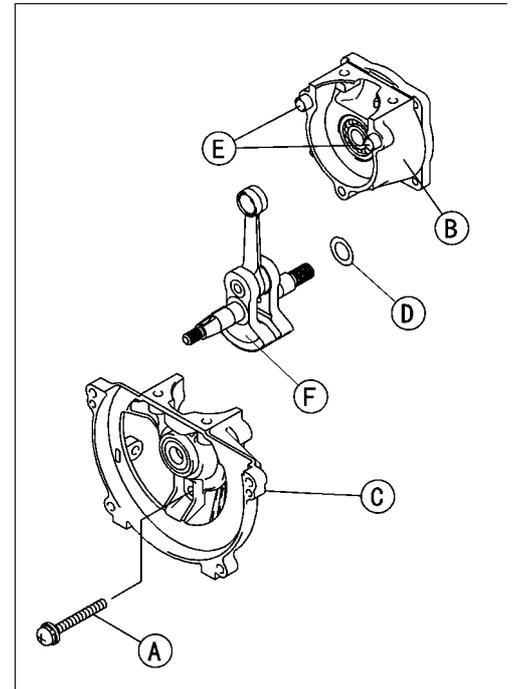
- Fit the needle bearing into small end of the connecting rod to install the piston to small end of the connecting rod, with the mark [A] on piston crown pointing to specified side, with the piston pin.
- "H mark" [A] on piston crown should face muffler side.



Crankcase and Crankshaft

Crankcase and Crankshaft Removal

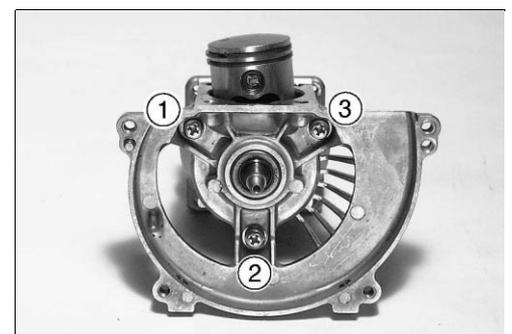
- Unscrew the tightening screws [A] to split the crankcase [B] from the crankcase [C].
- Lightly tap the crankcase with a plastic hammer to split apart both crankcases from the crankshaft [F].
- Take care not to damage the oil seals.
- Take care not to lose the adjusting shims [D]. (0 to 1 piece).



Crankcase and Crankshaft Installation

The crankshaft, the connecting rod, and the needle bearing are inseparable. This means that the crankshaft must always be replaced as a complete unit in the event of damage to any one of these parts when fitting a replacement always install new ball bearings. The complete crankcase must be replaced if either half is damaged.

- Installation is the reverse of removal.
- Apply fine oil to both ball bearings.
- Apply heat resisting grease between oil seal lips.
- Make sure that the dowel pins [E] are correctly placed onto crankcase [B] before assembly.
- ★ If the original crankcase is reused, remove liquid must be cleaned thoroughly to ensure a perfect seal.
- Sparingly apply liquid gasket on the sealing surface of the starter half of the crankcase.
- Put the crankcase [B] and the crankcase [C] in-between both sides of the crankshaft [F] so that the dowel pins [E] can be fitted into their holes on the crankcase [C], and tighten the bolts (1, 2, 3) to the specified torque evenly in the order shown (see Tightening Torque).



3-16 ENGINE

Crankcase and Crankshaft

Crankshaft Shim Selection

Whenever any one of the crankshaft, the crankcase, and the ball bearing is replaced; select the crankshaft shim(s) to adjust crankshaft axial play according to crankshaft shim selection.

- Measure dimension of A, B, and C shown in the figure and calculate crankshaft clearance(dimension D) by the following equation.

$$D = A + B - C$$

NOTE

- Measure dimension of A and B at the outer race not to allow ball bearing axial play to affect the shim selection.

Shim Thickness (mm)	Shim Parts No.
0.2 (0.008 in)	92025-2125
0.4 (0.016 in)	92025-2126
0.6 (0.024 in)	92025-2127

Clearance (dimension D) (mm)	Fitting shim
0.05~0.27 (0.002 ~ 0.0106 in)	None
0.28~0.47 (0.0110 ~ 0.0185 in)	92025-2125
0.48~0.67 (0.0188 ~ 0.0264 in)	92025-2126
0.68~0.79 (0.0268 ~ 0.0311 in)	92025-2127

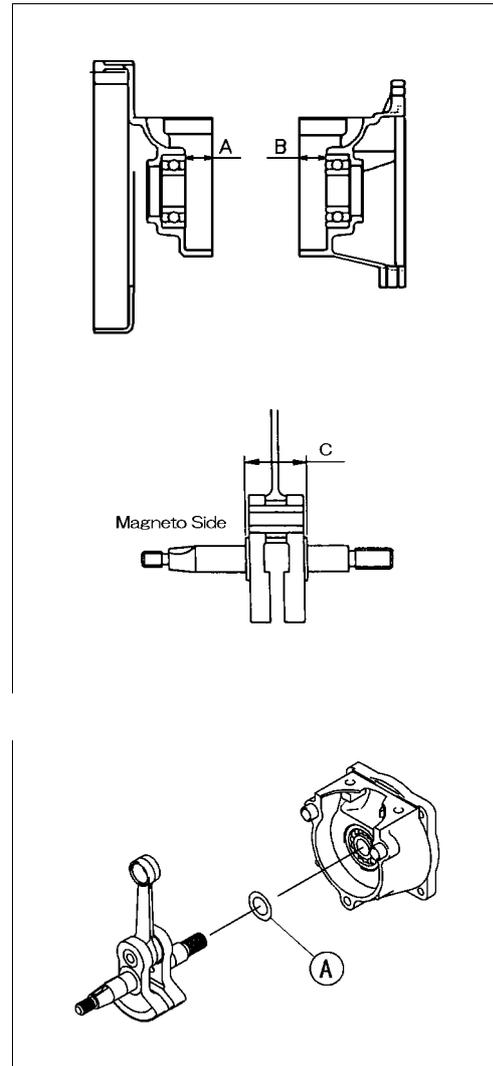
Crankshaft Shim Installation

- Install shim(s) [A] selected onto the crankshaft as shown and assemble the crankcase.

Crankshaft Axial Play

Standard: 0.05~0.295 mm* (0.002 ~ 0.0116 in)

*: thrust runout of ball bearing not included



Troubleshooting

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4-2 TROUBLESHOOTING

Engine Troubleshooting

Hard Starting

Symptom	Cause	Remedy
Pulling recoil starter handle would not cause sufficient compression.	Poor compression <ul style="list-style-type: none"> •Wear in piston •Wear in piston ring •Stick of piston ring •Wear or deformation of cylinder bore. •Poor tightening of cylinder and spark plug 	<ul style="list-style-type: none"> •Replace •Replace •Clean ring groove and replace piston ring •Replace cylinder and piston ring as a set •Tighten
After choking and making several starting attempts, it is found, on removing spark plug, that electrodes are still dry.	Insufficient fuel <ul style="list-style-type: none"> •No fuel in fuel tank •Clogging of dust or entry of air in fuel pipe •Clogged fuel tank cap air vent and breather •Foul fuel filter in fuel tank •Poor opening and closing of choke valve •Air entering at gasket fitted to carburetor flange •Clogged carburetor needle jet or main jet 	<ul style="list-style-type: none"> •Replenish •Clean •Clean •Correct •Tighten or replace gasket •Clean
After choking and making several starting attempts, it is found, on removing spark plug, that electrodes are excessively wet.	Excess fuel <ul style="list-style-type: none"> •Faulty choking(In summer, or when engine is warm, full choking gives too rich mixture) •Overflow of fuel from carburetor •Clogged air cleaner 	<ul style="list-style-type: none"> •Remove spark plug, with engine switch OFF, exhaust excess fuel by pulling starter rope •Check carburetor and exhaust excess fuel from cylinder •Clean air cleaner and exhaust excess fuel from cylinder
On removing spark plug, moisture condensed on spark plug electrodes.	Faulty fuel <ul style="list-style-type: none"> •Mixture of water into fuel •Deterioration in fuel because of poor long-term storage •Use of fuel other than designated 	<ul style="list-style-type: none"> •Change fuel •Change fuel •Change fuel
Make spark check. No spark but spark appears on spark plug replaced.	Faulty spark plug <ul style="list-style-type: none"> •Electrodes are burned and damaged to cause too wide gap •Much carbon bridging electrodes gap •Small foreign matter being caught between electrodes •Faulty insulation of electrodes •Looseness of terminal (Only for spare parts spark plug) 	<ul style="list-style-type: none"> •Correct gap or replace •Clean or replace •Clean •Clean or replace spark plug •Tighten securely
No spark in any spark plug, but spark appears when the end of high tension cord is touched to engine block.	Faulty plug cap <ul style="list-style-type: none"> •Faulty contacting at spark plug cap 	<ul style="list-style-type: none"> •Remove plug cap and connect terminal again

TROUBLESHOOTING 4-3

Engine Troubleshooting

Symptom		Cause		Remedy
No spark or very weak spark at the end of high tension on cord	Spark appears when stop switch wire is disconnected at connector.	Faulty stop switch	<ul style="list-style-type: none"> •Stop switch lead wire is jammed •Short circuit in stop switch 	<ul style="list-style-type: none"> •Correct •Replace
	No spark appears even when stop switch wire is disconnected at connector.	Slow recoil starter revolution	•Recoil starter revolution is lower than that igniter begins to work.	•Pull recoil starter rope more rapidly
	Spark appears when ignition coil is replaced with new one.	Faulty ignition coil	<ul style="list-style-type: none"> •Wiring of coil coming short-circuited or disconnect •Stop lead wire is jammed 	<ul style="list-style-type: none"> •Replace •Correct or replace
	Spark appears when flywheel is replaced with new one.	Faulty flywheel	•Flywheel demagnetized	•Replace

4-4 TROUBLESHOOTING

Engine Troubleshooting

Engine Malfunction at Low Speed

Symptom	Cause		Remedy
When throttle valve is opened gradually, revolution speed drops at some position or engine stops.	<ul style="list-style-type: none"> •Faulty carburetor •Faulty fuel filter •Air enters at carburetor gaskets and/or insulator 	<ul style="list-style-type: none"> •Clogging in carburetor inside •Foul fuel filter •Faulty carburetor gasket •Incomplete fitting of carburetor 	<ul style="list-style-type: none"> •Disassemble and clean •Clean or replace •Replace •Tighten
When spark test of spark plug is made with recoil starter rope pulled, spark appears very weak.	<ul style="list-style-type: none"> •Faulty ignition system 	<ul style="list-style-type: none"> •Faulty insulation of spark plug •Foul electrodes •Faulty magneto •Faulty ignition coil 	<ul style="list-style-type: none"> •Replace •Clean •Replace

Engine Malfunction at High Speed

Symptom	Cause		Remedy
Same as "Engine Malfunction at Low Speed" mentioned above.	<ul style="list-style-type: none"> •Faulty carburetor •Faulty fuel filter •Faulty ignition system 	<ul style="list-style-type: none"> •Same as "Engine Malfunction at Low Speed" 	<ul style="list-style-type: none"> •Same as "Engine Malfunction at Low Speed"
Loaded operation causes revolution fluctuation with big frequency.	<ul style="list-style-type: none"> •Clogged fuel tank cap air vent and breather •Dust clogging in or entry of air into fuel pipe or carburetor 		<ul style="list-style-type: none"> •Clean •Clean

Insufficient Power

Symptom	Cause		Remedy
Same as "Hard Starting"	<ul style="list-style-type: none"> •Poor compression •Insufficient fuel •Excess fuel •Faulty fuel •Faulty magneto •Faulty igniter 	Same as "Hard Starting"	Same as "Hard Starting"
Engine overheated	<ul style="list-style-type: none"> •Clogged air cleaner •Carbon deposit inside combustion chamber •Inappropriate mixing ratio(too little oil) •Broken cooling fan blade •Dirt or dust attached to cooling fins of cylinder •Grass or dirt attached to cooling air passage and flywheel blade 		<ul style="list-style-type: none"> •Clean •Clean •Change fuel •Replace •Clean •Clean
Thick smoke issues from exhaust port.	Excess fuel	•Same as "Hard Starting"	•Same as "Hard Starting"
	Faulty exhaust system	<ul style="list-style-type: none"> •Carbon deposit narrows exhaust passage and muffler •Excessive oil mixed 	<ul style="list-style-type: none"> •Clean •Change fuel
Engine knocking	<ul style="list-style-type: none"> •Inferior fuel 		<ul style="list-style-type: none"> •Change fuel

TROUBLESHOOTING 4-5

Engine Troubleshooting

Abnormal Engine Noises

Symptom	Cause	Remedy
Piston Slapping	<ul style="list-style-type: none"> •Cylinder and piston ring wear •Wear and/or deformation in piston •Carbon deposit inside combustion chamber •Wear in piston pin and connecting rod small end bearing •Wear in piston and piston pin 	<ul style="list-style-type: none"> •Replace •Replace •Clean •Replace •Replace
Connecting rod noise	<ul style="list-style-type: none"> •Wear in large and small end bearings 	<ul style="list-style-type: none"> •Replace (Crankshaft Assy)

Surging

Symptom	Cause	Remedy
Surging	<ul style="list-style-type: none"> •Foul air cleaner •Dust clogging in or air entry into fuel pipe •Clogged fuel tank cap air vent and breather •Clogged carburetor 	<ul style="list-style-type: none"> •Clean •Clean •Clean •Clean

Fuel Leakage from Carburetor

Symptom	Cause	Remedy
Fuel leak from carburetor	<ul style="list-style-type: none"> •Foreign matter attached to needle valve and/or valve seat •Correction or wear in needle valve and/or valve seat •Poor tightening of diaphragm gasket 	<ul style="list-style-type: none"> •Clean •Replace needle valve assembly •Tighten or replace

Excessive Fuel Consumption

Symptom	Cause	Remedy
Same as "Hard Starting"	<ul style="list-style-type: none"> •Poor compression •Same as "Hard Starting" 	<ul style="list-style-type: none"> •Same as "Hard Starting"
Sufficient compression but excessive fuel consumption.	<ul style="list-style-type: none"> •Too rich fuel mixture •Inferior fuel •Foul air cleaner •Too high idling speed •Choke valve not fully open 	<ul style="list-style-type: none"> •Adjust •Replace •Clean •Adjust •Adjust
Same as "Fuel Leakage from Carburetor"	<ul style="list-style-type: none"> •Same as "Fuel Leakage from Carburetor" 	<ul style="list-style-type: none"> •Same as "Fuel Leakage from Carburetor"

4-6 TROUBLESHOOTING

Engine Troubleshooting

Engine Stops during Operation

Symptom	Cause		Remedy
Difficulty in cranking, or seizure	Overheat	<ul style="list-style-type: none"> •Excessively lean fuel mixture(too little fuel) •Inferior lubricating oil mixed •Excessive carbon deposit in combustion chamber •Dust accumulation on cooling fins of cylinder 	<ul style="list-style-type: none"> •Adjust carburetor •Change fuel •Clean •Clean
Cranking is easy	Faulty electrical system	<ul style="list-style-type: none"> •Faulty spark plug •Faulty magneto •Looseness in connections •Faulty ignition coil 	<ul style="list-style-type: none"> •Clean or replace •Replace •Check and repair •Replace
	Faulty fuel system	<ul style="list-style-type: none"> •Clogged fuel line •Foul air cleaner •Fuel in tank used up 	<ul style="list-style-type: none"> •Clean •Clean or replace •Replenish
	Faulty carburetor	<ul style="list-style-type: none"> •Dust clogging in fuel passage 	<ul style="list-style-type: none"> •Clean

Supplement

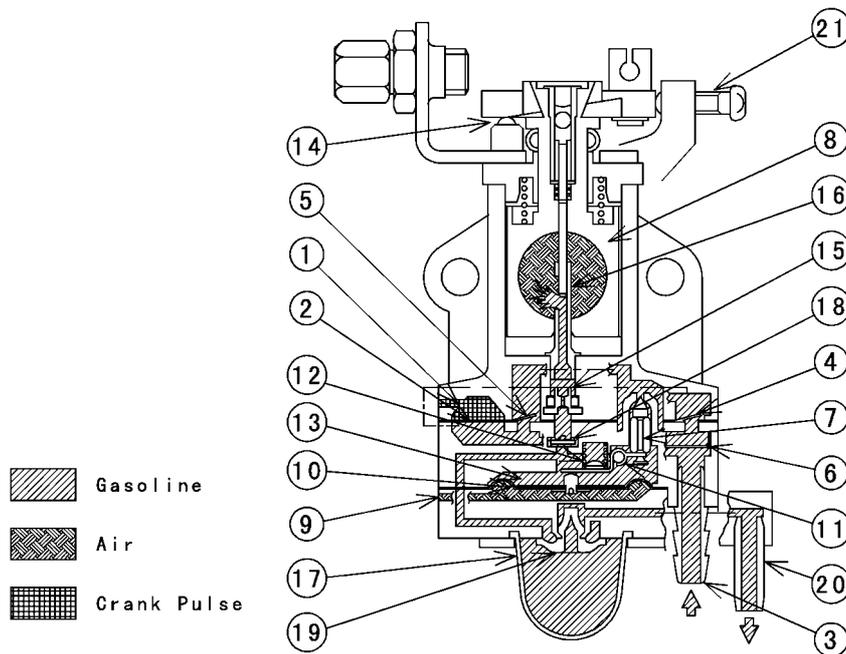
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5-2 SUPPLEMENT

Rotary Valve, Diaphragm Type Carburetor

Internal Construction



327-0013W2 C

- 1) Engine pulse passage
Pressure change Inside the crankcase goes through this passage and the fuel pump diaphragm moves.
- 2) Fuel pump diaphragm
The fuel pump diaphragm waves corresponding to engine pulse, which supplies fuel to the metering chamber.
- 3) Fuel inlet
Fuel inlet from the fuel tank
- 4) Inlet check valve
Corresponding to the movement of the pump diaphragm, the valve opens when negative pressure acts on the diaphragm and closes when positive pressure acts on it.
- 5) Outlet check valve
Being very reverse to the inlet check valve, the valve closes when negative pressure acts on the diaphragm and opens when positive pressure acts on it.
- 6) Inlet screen
Prevention of penetration of dirt in fuel.
- 7) Needle valve
Linked with the main diaphragm, the valve controls fuel flow supplied to the metering chamber.
- 8) Throttle valve
The throttle valve controls the air/fuel mixture supplied to the engine and controls engine output.
- 9) Air vent (air hole)
To make the diaphragm movement smooth, the hole is exposed to the atmosphere.
- 10) Main diaphragm
Moving up and down by the differential pressure between the engine vacuum and the atmospheric pressure, the main diaphragm transmits the movement to the control lever and controls the needle valve operation and fuel flow.
- 11) Control lever
The control lever transmits the movement of the main diaphragm to the needle valve and gets the valve to open and close.
- 12) Valve spring
The valve spring continually functions in the direction which closes the needle valve and controls the movement of the control lever so that a uniform negative pressure is kept inside the metering chamber.
- 13) Metering chamber
Fuel reservoir to supply fuel to the nozzle.
- 14) Lead cam
As the throttle valve opens, inlet air increases. The lead cam moves the idle needle or idle needle pin up and down so as to supply proper fuel flow for the increased air.
- 15) Main Jet
Fuel at high speed is controlled.

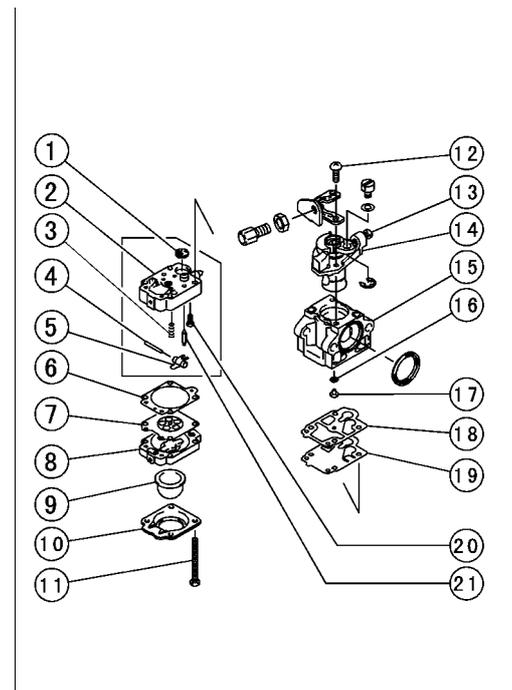
Rotary Valve, Diaphragm Type Carburetor

- 16) Main nozzle
Fuel flow is controlled by a triangle shape outlet area for idle and partial speed.
- 17) Priming pump
Pushed repeatedly by hand, the pump sucks fuel into the metering chamber from the fuel tank.
- 18) Main check valve
During priming pump operation, the valve prevents air from entering the metering chamber through the nozzle.
- 19) Priming pump check valve
During priming pump operation, the valve functions as both inlet and outlet check valves.
- 20) Overflow pipe
Air outlet from carburetor to tank-Air from carburetor is forced out through this passage when primer bulb is compressed.
- 21) Idle adjust screw
Engine idling speed is adjusted.

Function

- 1) Priming pump system
When starting the engine, by pushing or pinching the priming pump (18), air is pushed out toward the overflow pipe (21) from the priming pump check valve (20), which causes negative pressure inside the metering chamber (13) and the needle valve (7) opens. Then fuel from the fuel tank is sucked into the metering chamber through the inlet check valve (4) and then into the priming pump. And excessive fuel is discharged from the overflow pipe. This operation is called 'Priming operation' at starting.
- 2) Fuel pump system
After starting the engine, part of the pressure change inside the crankcase caused by engine revolution is transmitted to the pump diaphragm (2) through the engine pulse passage (1), which deforms the pump diaphragm and it starts reciprocating motion. Namely, fuel is sucked from the tank into the carburetor under pressure by the volume change due to the pump diaphragm's reciprocating motion and the inlet (4) and outlet check valves (5) function.
- 3) Metering chamber system
The main diaphragm (10) forming the metering chamber senses the inside fuel pressure change of the metering chamber (13), which occurs in accordance with the engine revolution change, as vertical motion. And it works to keep a uniform pressure (equivalent to the fuel surface of a float carburetor) inside the metering chamber by opening and closing the needle valve (7).
Fuel in the metering chamber is drawn by the negative pressure in the venturi, blown out from the main nozzle (17), mixed with the air passed through the venturi and sucked into the engine. When the engine stops, negative pressure in the venturi becomes zero; the control lever (11) is pushed up with the valve spring (12); and the needle valve (7) closes. Then fuel flow stops and overflow is prevented.

- 1. Inlet Screen
- 2. Pump Body
- 3. Valve Spring
- 4. Lever Pin
- 5. Control Lever
- 6. Gasket
- 7. Main Diaphragm
- 8. Air Purge Body
- 9. Priming Pump
- 10. Priming Pump Cover
- 11. Pump Cover Screw
- 12. Throttle Collar Screw
- 13. Idle Adjust Screw
- 14. Throttle Valve Assembly
- 15. Carburetor Body
- 16. O-ring
- 17. Main Jet
- 18. Pump Gasket
- 19. Pump Diaphragm
- 20. Lever Pin Screw
- 21. Needle Valve



5-4 SUPPLEMENT

Rotary Valve, Diaphragm Type Carburetor

Disassembly

Before disassembling, clean the carburetor with a high flash-point solvent so that no dirt enters the carburetor.

- Remove 2 throttle-collar screws to remove the throttle valve assembly from the carburetor body.

CAUTION

Do not disassemble the throttle valve assembly.
--

- Remove 4 pump-cover screws with the priming pump side upward.
- Remove the priming pump cover, the priming pump the air purge body, the main diaphragm, the gasket, the pump body, the pump diaphragm, and the pump gasket in that order.
- Remove the main jet and the O-ring from the carburetor body.

CAUTION

Do not remove the main nozzle as it is press fitted. If much dirt is found inside the carburetor, especially on the inlet screen, clean the fuel tank inside and replace the fuel filter.
--

Reassembly

Before reassembly, clean removed parts and the body with suitable detergent and use compressed air to dry.

- Reassembly is the reverse of removal.

Rotary Valve, Diaphragm Type Carburetor

Inspection and Adjustment

- Clean the carburetor with a high flash-point solvent and apply air.
- Check to see that no dirt or corrosion is found in the main jet.
- ★ If dirt is found, clean and apply air.
- ★ If corrosion is found, replace the main jet with new one.

CAUTION

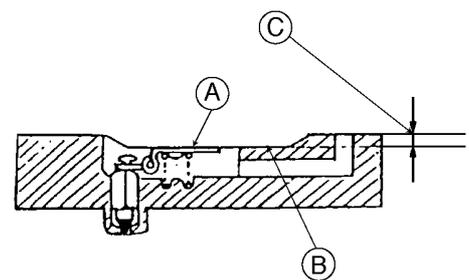
When replacing the main jet, be sure to replace with a jet with the same number.

- As to the gaskets, check to see if no deformation or damage is found.
- ★ If deformation or damage is found, replace them with new ones.
- Check the pump diaphragm to see if no damage or hardening is found. Check the inlet check valve and the outlet check valve in particular and make sure that they are flat and not bent.
- ★ If they are bent, replace them with new ones.
- Check the main diaphragm to see if there is any peeling, damage or the aluminum plate bent.
- ★ If they are bent, replace with new one. After cleaning the pump body, check to see that the control lever functions well and that no dirt is found on the inlet screen.

CAUTION

To prevent deformation or sticking of the main check valve, never apply high pressure air to the valve.

- Check to see that there is no deformation or damage on the check valve.
- ★ If any, replace it with new one.
- Check to see that no hole, damage or abnormal hardening is present on the priming pump.
- ★ If present, replace it with new one.
- Push the tip end of the control lever lightly and make sure that the lever moves smoothly.
- ★ If the needle valve, which opens and closes with the control lever movements, is damaged on its tip or worn out due to long use replace the pump body assembly.
- ★ In this case, replace the pump body assembly with new one.
- Adjust the control lever [A] so as to be at the same level as the bottom [B] of the metering chamber as shown.
- ★ If correction is necessary, bend the lever lightly to be on the same surface of the metering chamber bottom, or adjust the lever to be from 1.4 mm (0.055 in.) to 1.6 mm (0.062 in.) [C] with surface of the pump body as standard.



- To check function of the main check valve, stick vinyl pipe end to the main check valve and breathe in and out from the other end.
- ★ If the valve opens when breathing in and closes when breathing out, the valve functions well.
- If any problems are found, soak the valve in gasoline for about 10 minutes and repeat breathing in and out several times.
- ★ If no improvement shows, replace the pump body with new one.

5-6 SUPPLEMENT

Rotary Valve, Diaphragm Type Carburetor Troubleshooting

Symptom	Cause	Remedy
Engine hard to start	<ul style="list-style-type: none"> •Idle adjust screw maladjustment •Foul fuel filter in fuel tank •Clogging in fuel passage •Air leakage in fuel passage •Improper fuel •Inferior check valve •Clogged air cleaner element •Damaged carburetor control (metering) lever •Malfunction of carburetor control (metering) lever •Inferior main diaphragm gasket •Poor tightening of main diaphragm cover screw •Damaged main diaphragm •Adherence of inlet needle valve •Inlet needle valve wear •Inlet needle valve sticking 	<ul style="list-style-type: none"> •Adjust •Clean •Clean •Repair •Change •Replace •Clean or replace •Repair •Repair •Replace •Tighten •Replace •Replace •Replace •Repair
Overflow, fuel leakage	<ul style="list-style-type: none"> •Poor tightening of fuel pump cover screw •Damaged carburetor control (metering) lever •Too high carburetor control (metering) lever •Malfunction of carburetor control (metering) lever •Deformed carburetor control (metering) lever spring •Inferior main diaphragm gasket •Poor tightening of main diaphragm cover screw •Damaged main diaphragm •Inlet needle valve wear •Inlet needle valve sticking 	<ul style="list-style-type: none"> •Tighten •Repair •Adjust •Repair •Replace •Replace •Tighten •Replace •Replace •Repair
Priming is hard to suck fuel	<ul style="list-style-type: none"> •Clogged fuel tank cap air vent •Foul fuel filter in fuel tank •Clogged fuel line •Air leakage in fuel line •Damaged priming pump •Inferior priming pump check valve •Malfunction of carburetor control (metering) lever •Inferior main diaphragm gasket •Poor tightening of main diaphragm cover screw •Damaged main diaphragm •Adherence of inlet needle valve 	<ul style="list-style-type: none"> •Clean •Clean •Clean •Repair •Replace •Replace •Repair •Replace •Tighten •Replace •Replace
Engine would not idle	<ul style="list-style-type: none"> •Idle adjust screw maladjustment •Foul fuel filter in fuel tank •Air leakage in fuel line •Inferior manifold o-ring •Poor tightening of carburetor 	<ul style="list-style-type: none"> •Adjust •Clean •Repair •Replace •Tighten
Idling is too slow	<ul style="list-style-type: none"> •Clogged air cleaner element •Damaged carburetor control (metering) lever •Carburetor control (metering) lever is too high •Malfunction of carburetor control (metering) lever •Inlet needle valve wear •Foreign matter sticking of needle valve 	<ul style="list-style-type: none"> •Clean or replace •Replace •Adjust •Replace •Replace •Clean

SUPPLEMENT 5-7

Rotary Valve, Diaphragm Type Carburetor Troubleshooting

Symptom	Cause	Remedy
Idling is unstable	<ul style="list-style-type: none"> •Idle adjust screw maladjustment •Clogged fuel tank cap air vent •Foul fuel filter in fuel tank •Clogged fuel line •Air leakage in fuel line •Improper fuel •Inferior check valve (foreign matter) •Inferior manifold o-ring •Poor tightening of carburetor •Malfunction of carburetor control (metering) lever •Poor installation of carburetor control lever •Damaged main diaphragm •Adherence of inlet needle valve •Foreign matter sticking of needle valve 	<ul style="list-style-type: none"> •Adjust •Clean •Clean •Clean •Repair •Change •Replace •Replace •Tighten •Replace •Correct •Replace •Replace •Clean
Idling does not continue	<ul style="list-style-type: none"> •Idling adjust screw maladjustment •Foul fuel tank filter •Clogged fuel line •Air leakage in fuel line •Inferior check valve (foreign matter) •Too high carburetor control (metering) lever •Malfunction of carburetor control (metering) lever •Deformation of carburetor control (metering) lever spring •Poor installation of carburetor control lever spring •Inlet needle valve wear •Foreign matter sucking of inlet needle 	<ul style="list-style-type: none"> •Adjust •Clean •Clean •Repair •Replace •Adjust •Replace •Replace •Correct •Replace •Clean
Engine does not accelerate	<ul style="list-style-type: none"> •Clogged fuel tank cap air vent •Foul fuel tank filter •Clogged fuel line •Air leakage in fuel line •Pulse leakage from fuel pump •Clogged pulse passage •Poor tightening of pump cover screw •Inferior of pump diaphragm •Inferior of check valve •Inferior of manifold o-ring •Poor tightening of carburetor •Damaged carburetor control (metering) lever •Too low carburetor control (metering) lever •Malfunction of carburetor control (metering) lever •Poor installation of carburetor control (metering) lever •Damaged carburetor control (metering) lever button •Poor tightening of diaphragm cover •Damaged diaphragm •Adherence of inlet needle valve 	<ul style="list-style-type: none"> •Clean •Clean •Clean •Repair •Repair •Clean •Tighten •Replace •Repair •Replace •Tighten •Replace •Adjust •Replace •Correct •Replace •Tighten •Replace •Replace
Engine stops when decelerating	<ul style="list-style-type: none"> •Inferior pump diaphragm •Too high carburetor control (metering) lever •Malfunction of carburetor control (metering) lever 	<ul style="list-style-type: none"> •Replace •Adjust •Replace

5-8 SUPPLEMENT

Rotary Valve, Diaphragm Type Carburetor Troubleshooting

Symptom	Cause	Remedy
	<ul style="list-style-type: none"> •Inlet needle valve wear •Foreign matter sticking of inlet needle 	<ul style="list-style-type: none"> •Replace •Clean
Engine does not accelerate quick	<ul style="list-style-type: none"> •Clogged air cleaner element 	<ul style="list-style-type: none"> •Clean
Malfunction at high speed	<ul style="list-style-type: none"> •Clogged fuel tank cap air vent •Foul fuel tank filter •Clogged fuel line •Air leakage in fuel line •Improper fuel •Pulse leakage from pulse passage •Clogged pulse passage •Poor tightening of pump cover screw •Inferior of pump diaphragm •Inferior of check valve •Clogged air cleaner element •Inferior of manifold o-ring •Poor tightening of carburetor screw •Damaged carburetor control (metering) lever •Malfunction of carburetor control (metering) lever •Deformation of carburetor control (metering) lever spring •Poor installation of control lever spring •Damaged main diaphragm button •Inferior of main diaphragm gasket •Poor tightening of main diaphragm cover •Damaged main diaphragm •Inlet needle valve wear •Foreign matter sticking of inlet needle 	<ul style="list-style-type: none"> •Clean •Clean •Clean •Repair •Change •Repair •Clean •Tighten •Replace •Replace •Clean •Replace •Tighten •Replace •Replace •Replace •Replace •Correct •Replace •Replace •Tighten •Replace •Replace •Clean