Kawasaki

TH23/TH26/TH34

2–Stroke Air-Cooled Gasoline Engine

Service Manual

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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 California Air Resources Board.

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 covers models: TH23D/TH26D/TH34D. As for safety information, specifications, exproded 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 maker 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.

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(MoS_2)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

General Specifications

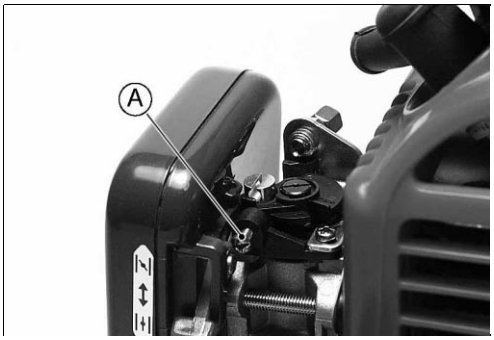
Model			TH23D	TH26D	TH34D
Dimension	Overall (Length × Width × Height)	mm (in)	160.2×202.5×223 (6.3 × 8.0 × 8.8)	160.2 × 205 × 223 (6.3 × 8.0 × 8.8)	173 × 224 × 249 (6.8 × 8.8 × 9.8)
Weight*		kg (lbs)	2.1 (4.6)	2.2 (4.8)	2.7 (6.0)
Engine	Type		Forced air cooled 2-stroke single cylinder gasoline engine		
	Diplacement	ml(cu in)	22.5 (1.37)	25.4 (1.55)	33.3 (2.03)
	Bore × stroke	mm (in)	32 × 28 (1.26 × 1.10)	34 × 28 (1.34 × 1.10)	37 × 31 (1.46 × 1.22)
	Direction of rotation		Counterclockwise, viewed from PTO side		
	Carburetor		Diaphragm type		
	Ignition type		Solid state ignition		
	Spark plug		NGK BPMR6A		
	Starting		Recoil starter		
	Cluch type mm		Automatic centrifugal type		
	Clutch drum bore	mm	ϕ54 or ϕ56		ϕ78
	Air cleaner		Dry type (Polyurethane form element)		
Fuel	Mixing ratio		Regular unleaded gasoline 50:1 2-stroke engine oil (JASO-FC class)		
	Tank capacity	L	0.5	0.6	0.8

* : The unit without the throttle cable and lever.
Specifications are subject to change without notice.

Idling Speed

Idling Speed Adjustment

- A case that the cutting head or the cutting blade is installed with a drive shaft in the engine, the idling speed adjustment should proceed as follows:
- Start the engine and leave it running at idling speed to warm it up thoroughly.
- If the engine stops while idling, turn the throttle stop screw[A] clockwise until the cutting head or the cutting blade begins to rotate. Then back off one half turn. The cutting head or the cutting blade must not rotate.
- If the cutting head or the cutting blade rotates when the engine Is idling, turn the throttle stop screw counterclockwise until the cutting head or the cutting blade stops rotating and then turn the throttle stop screw another one half turn.



Idling speed-TH23D/TH26D/TH34D
3000±200 rpm

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	Interval				
	Daily	First 20 hours	Every 20 hours	Every 50 hours	Every 100 hours
Check and replenish fuel	●				
Check for fuel leakage	●				
Check bolts, nuts and screws for looseness and loss	●				
Check engine switch operation	●				
Clean fuel filter			●		
* Clean air filter element			●		
Tighten bolts, nuts and screws		●		●	
Clean spark plug and adjust electorode gap				●	
* Remove dust and dirt from cylinder fins				●	
K Remove carbon deposits on piston head and inside cylinder				●	
K Remove carbon deposits in the muffler				●	
K Clean net of spark arrester				●	
K Check the sliding portion of crankshaft, connectiong rod etc.					●
Fuel tube	It is recommecded 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.

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 requid gasket.

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

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

LG: Apply a liquid gasket to the sealing surfaces.

MTGS:Mounting screw(s)

Tightening Torque - TH23D/TH26D/TH34D

Fasteners		Size	Torque			Remarks
			N·m	kg·m	ft·lb	
Air Cleaner Cap MTGS		M5	2.0 – 2.5	0.20 – 0.25	1.4 – 1.8	
Ignition Coil MTGS		M4	2.0 – 2.5	0.20 – 0.25	1.4 – 1.8	LA
Recoil Starter MTGS		M4	1.7 – 2.0	0.17 – 0.20	1.2 – 1.4	LA
Crankcase Connecting Screw		M5	3.5 – 4.0	0.35 – 0.40	2.5 – 3	LG, LA
Engine Shroud MTGS		M5	3.5 – 4.0	0.35 – 0.40	2.5 – 3	LA
Carburetor/Air Cleaner Case MTG		M5	3.5 – 4.0	0.35 – 0.40	2.5 – 3	
Insulator MTGS		M5	3.5 – 4.0	0.35 – 0.40	2.5 – 3	LA
Fuel Tank MTGS (Crankcase side)		M5	3.5 – 4.0	0.35 – 0.40	2.5 – 3	LA
Fuel Tank MTGS (Recoil Starter side)		M5	2.0 - 2.5	0.20 - 0.25	1.4 - 1.8	LA
Muffler MTGS		M5	3.5 – 4.0	0.35 – 0.40	2.5 – 3	LA
Muffler Cover MTGS		M5	3.5 – 4.0	0.35 – 0.40	2.5 – 3	LA
Cylinder MTGS		M5	3.5 – 4.0	0.35 – 0.40	2.5 – 3	LA
Clutch Pin	TH23D, TH26D	M6	8 - 10	0.8 - 1.0	5.8 - 7.2	LA
	TH34D	M8	14 - 16	1.4 - 1.6	10 - 12	LA
Flywheel Nut	TH23D, TH26D	M6	8 – 10	0.8 – 1.0	5.8 – 7.2	
	TH34D	M8	14– 16	1.4 – 1.6	10 – 12	
Starter Pulley Nut		M8	14 – 16	1.4 – 1.6	10 – 12	
Starter Pulley		M8	10 – 12	1.0 – 1.2	7.2 – 8.7	
Spark plug		M14	12 – 17	1.2 – 1.7	8.7 – 12.3	

1-8 GENERAL INFORMATION

Clearance Table

Clearance Table

Unit : mm(in)

	Service Limit			Remarks
	TH23D	TH26D	TH34D	
Cylinder bore	32.1 (1.263)	34.1 (1.342)	37.1 (1.461)	Replace if over
Piston-to-cylinder clearance	0.15	←	←	Replace if over
Piston ring-to-groove clearance	0.17	←	←	Replace if over
Piston ring end-gap	0.7	←	←	Replace if over
Piston-to-piston pin clearance	0.1	←	←	Replace if over
Connecting rod big-end axial play	0.5	←	←	Replace if over
Connecting rod big-end radial play	0.15	←	←	Replace if over
Piston pin-to-needle bearing radial play	0.15	←	←	Replace if over
Ball bearing axial play	0.5	←	←	Replace if over
Crankshaft axial play	0.05 ~ 0.295	←	←	Adjust if over

*does not include that of ball bearings.

Setting Table

Setting Table

		Standard Setting		
		TH23D	TH26D	TH34D
The engine speed at which the clutch engages		about 4000 rpm at 0.4 kg·cm of drag torque	←	←
Ignition coil air-gap		0.3 to 0.5 mm (0.011 to 0.019 in.)	←	←
Ignition timing		25° B.T.D.C.@ 7000 rpm	←	←
Carburetor	Main jet	# 34	#37.5	#37.5
	Idle Needle Pin*	1.0 ± 1/4 turn open (other than US and CN)	← ←	← ←

* : The adjustment of idle needle pins of the TH23D/TH26D/TH34D models destined for US and Canada are impossible for tampering prevention.

Removal/Installation

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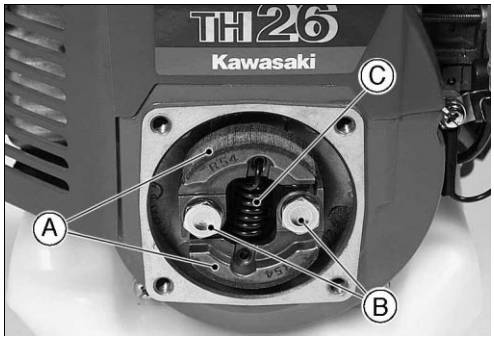
2-2 REMOVAL/INSTALLATION

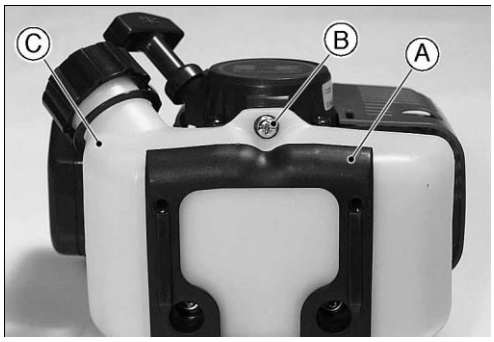
Clutch and Fuel Tank

Removal

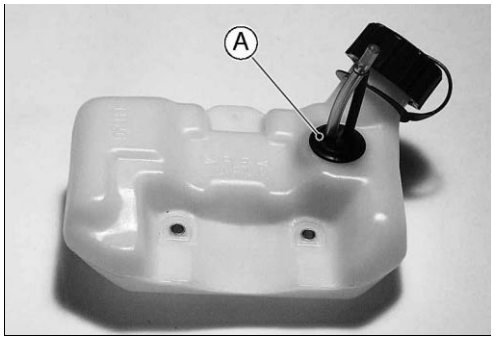
- Keeping the clutch shoes [A] from turning by using a pair of pliers, release the clutch pins [B] by turning counterclockwise to remove the clutch assembly.
  - Take care not to scratch the clutch shoes [A].
  - Do not remove the clutch spring [C] if not needed.



- 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.



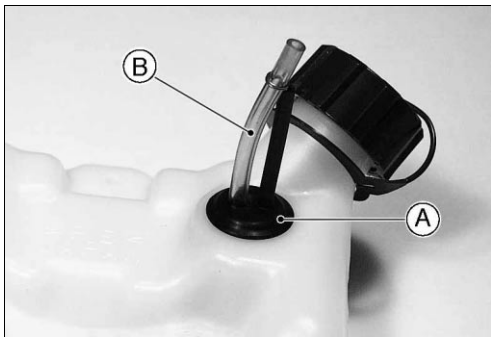
Installation

- 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

- 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 to install them by tightening the clutch pins to the specified torque.

Specified Clutch Pin Tightening Torque

TH23D/TH26D:	**8~10 N·m (0.8~1.0 kg·m, 5.8~7.2 ft·lb)**
TH34D:	**14~16 N·m (1.4~1.6 kg·m, 10~12 ft·lb)**

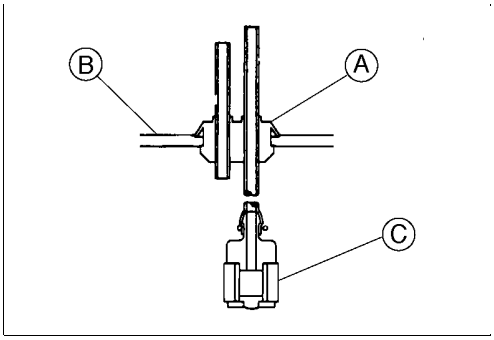
- Install the clutch spring to the clutch shoes before installing the clutch shoes on the flywheel if the clutch spring is removed.

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 new one.*

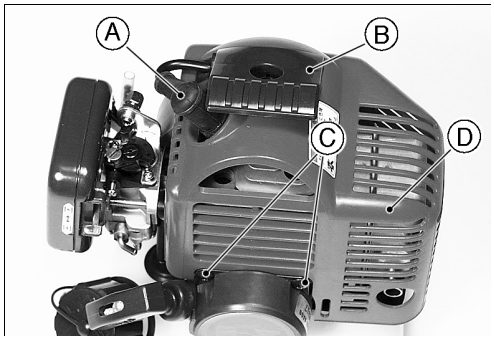


2-4 REMOVAL/INSTALLATION

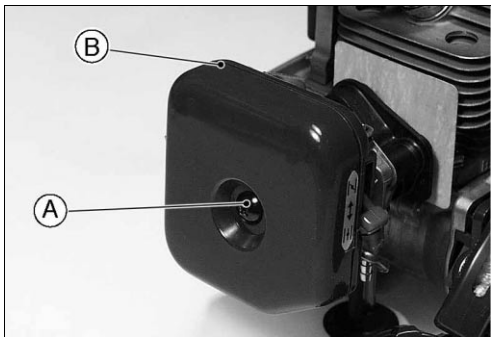
Air Cleaner, Carburetor, and Muffler

Removal

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



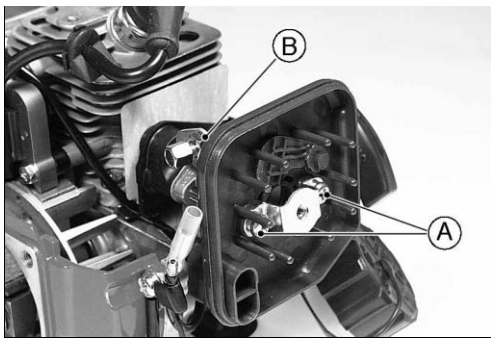
- Unscrew the air cleaner mounting screws [A] to remove the air cleaner cap [B].



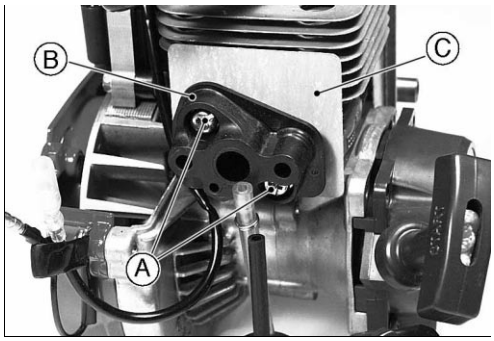
- Unscrew the two carburetor mounting screws [A] to remove the carburetor [B] together with the gasket.

NOTE

○ *Do not remove the carburetor if not needed.*



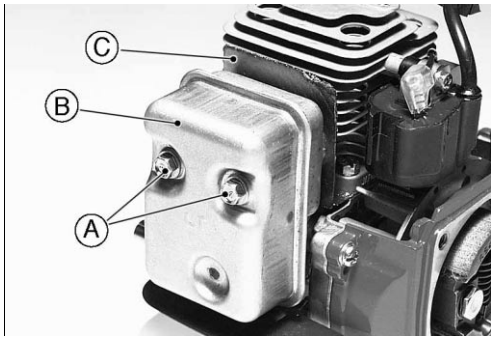
- Unscrew the two insulator mounting screws [A] to remove the insulator [B] together with the gasket [C].



- 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.*

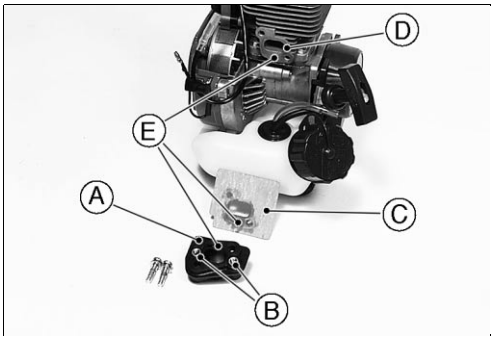


Air Cleaner, Carburetor, and Muffler

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

- Clean the air cleaner element in a bath of high flash-point solvent. Dry the element before installing.

CAUTION
More frequent maintenance is necessary when the engine is operated in dusty condition.

Spark Arrester Cleaning

⚠WARNING
Hot engine parts can cause severe burns. Allow engine to stop and cool before servicing spark arrester.

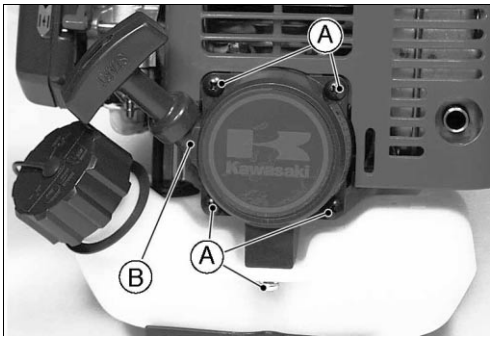
- Remove the shroud.
- Remove the spark arrester by unscrewing the screw at the exhaust pipe in the muffler.
- Clean deposits from the spark arrester screen by brushing it.
- Install the spark arrester and the shroud.

2-6 REMOVAL/INSTALLATION

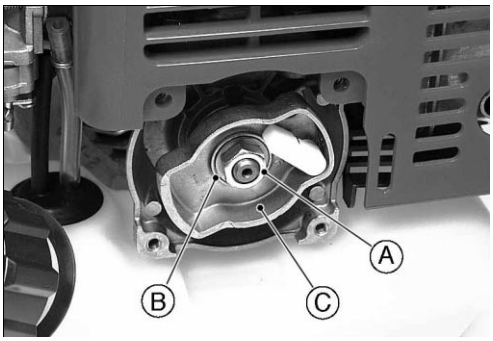
Recoil Starter, Shroud, Fan Housing, and Ignition Coil

Removal

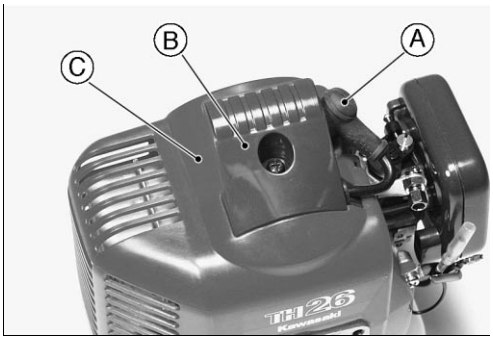
- Remove the mounting screws [A] to remove the recoil starter [B].



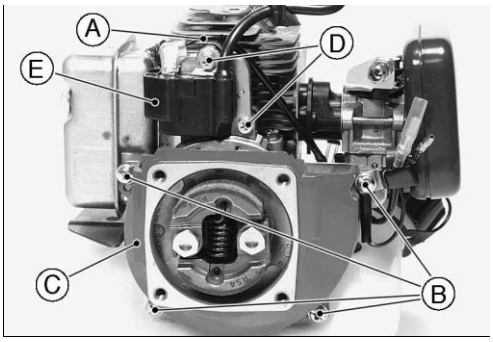
- Release the starting pulley lock nut [A] counterclockwise to remove it together with the washer [B].
- Remove the starting pulley [C] by turning itself counterclockwise.



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



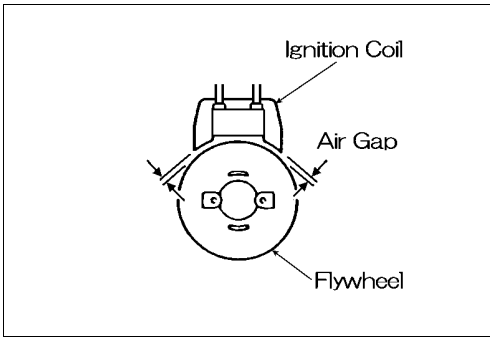
- Disconnect the ignition lead wire [A].
- Unscrew the fan housing mounting screws [B] to remove the fan housing [C].
- Unscrew the ignition coil mounting bolts [D] to remove the ignition coil [E] together with the insulators.



Installation

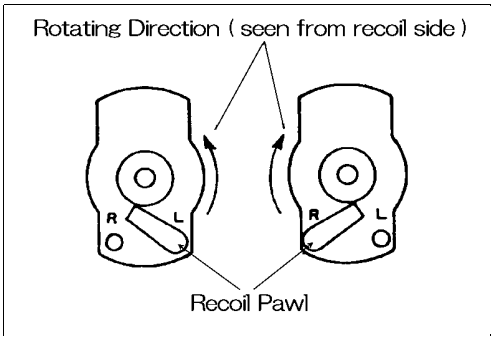
- Installation is the reverse of removal.
- Adjust the ignition coil air gap to the specified value.

Ignition Coil Air Gap Specified — TH23D/TH26D/TH34D
0.3 to 0.5 mm (0.011 to 0.019 in.)



Recoil Starter, Shroud, Fan Housing, and Ignition Coil

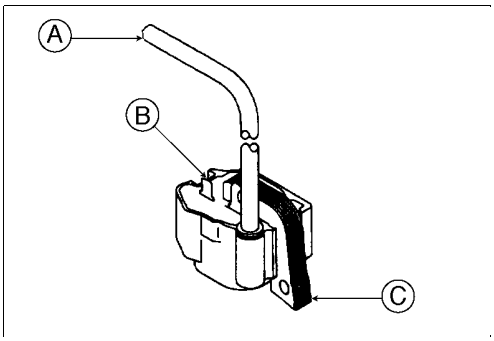
● Install the starting pulley to the crankshaft by turning clockwise.
○ The recoil pawl must be fitted on the pulley as shown.



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.



Ignition Coil Specified Resistance

	Resistance Between	
	[B] and [C] Primary Winding	[A] and [C] Secondary Winding
TH23D/TH26D	0.8Ω to 1.2Ω (Rx1 Ω)	9kΩ to15kΩ (Rx1kΩ)
TH34D	0.4Ω to 0.6Ω (Rx1 Ω)	8kΩ to13kΩ (Rx1kΩ)

NOTE

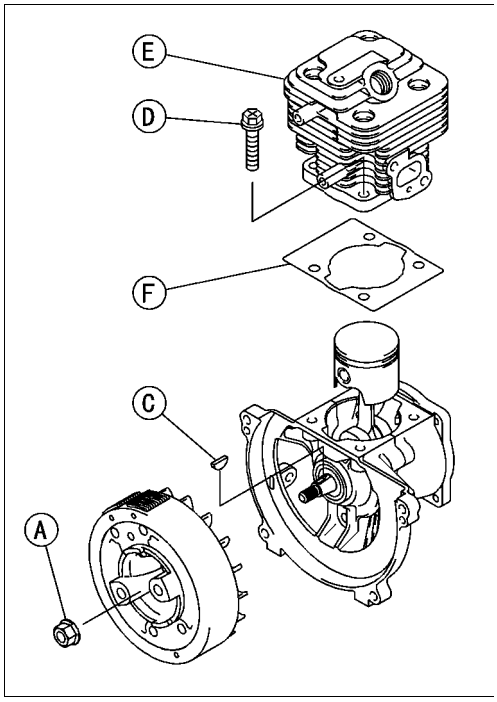
○ *It is unable to inspect the igniter whether it is good or bad with the Kawasaki hand tester since it was integrated with the ignition coil.*
○ *Whenever you have doubt as to function of the igniter to operate, try replacing the ignition coil with one known to be good.*

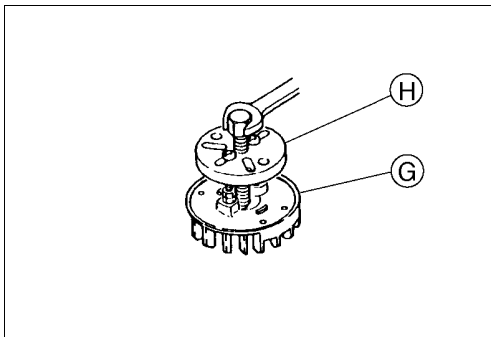
2-8 REMOVAL/INSTALLATION

Flywheel and Cylinder

Removal

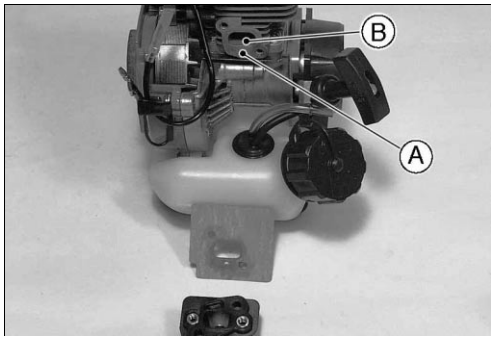
- Release the flywheel nut [A] counterclockwise to remove it.
- Remove the flywheel [G] out of the crankshaft by using a puller [H] as shown.
- Remove the key [C] from the crankshaft.
- Unscrew the flange bolts [D] to remove the cylinder [E] and the cylinder gasket [F] from the crankcase.





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

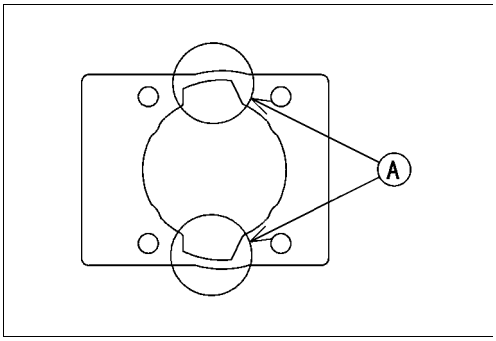
★If clogged, clean.



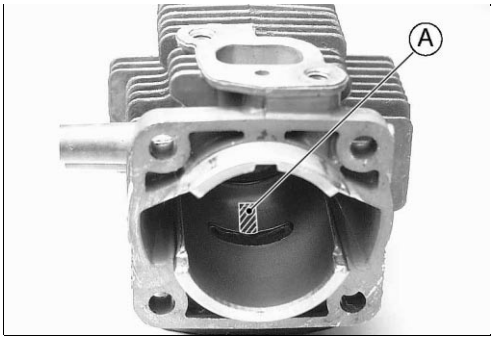
Flywheel and Cylinder

Installation

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



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



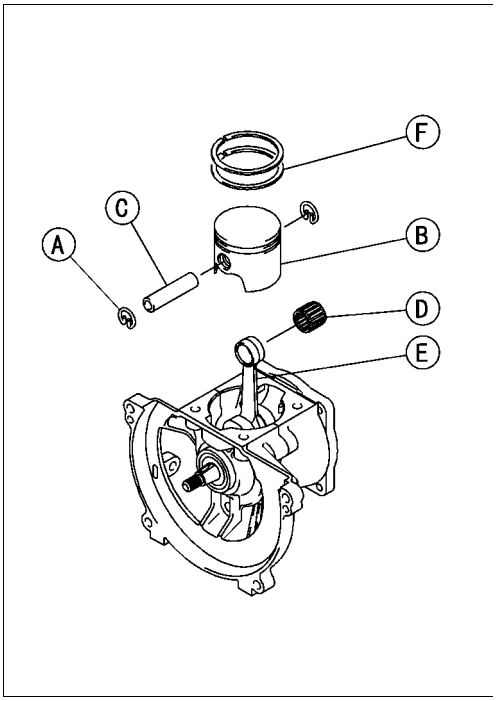
2-10 REMOVAL/INSTALLATION

Piston and Piston Ring

Removal

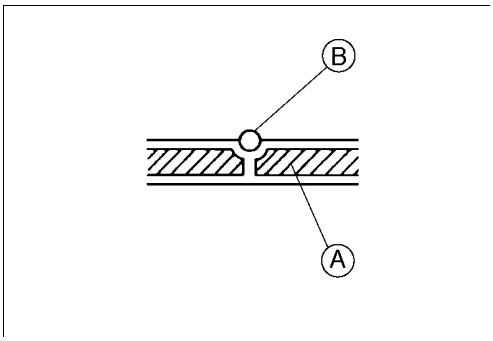
CAUTION
Do not reuse snap rings as removal weakens and deforms them. They could fall out and score the cylinder wall.

- 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].

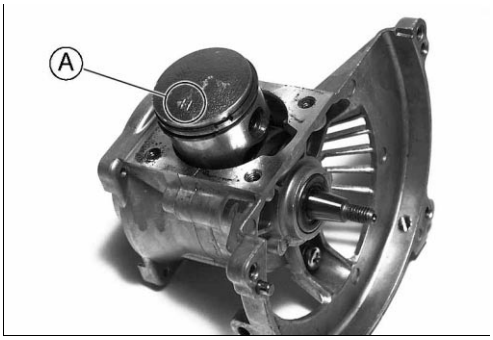


Installation

- 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.



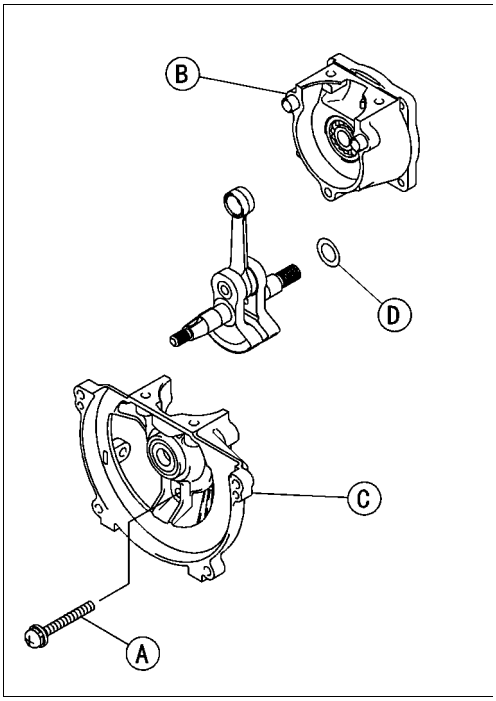
- Fit the needle bearing into small end of the connecting rod to install the piston to small end of the connecting rod, with the mark [A] on piston crown pointing to specified side, with the piston pin.
- "H mark" [A] on piston crown should face muffler side.



Crankcase and Crankshaft

Removal

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



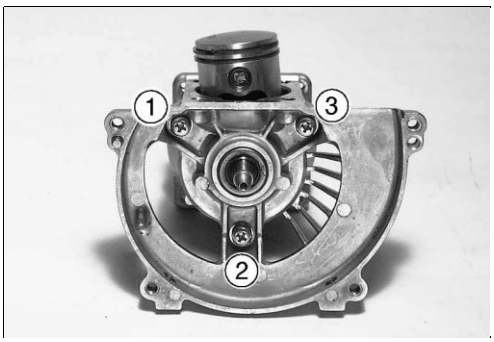
Installation

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.
- 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.

CAUTION
Excessive amounts may block something inside and cause serious damage.

- Put the flywheel half of the crankcase onto the starter half of the crankcase so that the dowel pins can be fit into their holes of the flywheel half of the crankcase and tighten the bolts to the specified torque evenly in the order shown(see Tightening Torque).



2-12 REMOVAL/INSTALLATION

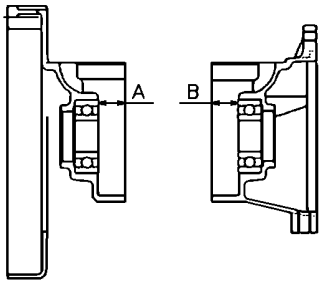
Crankcase and Crankshaft

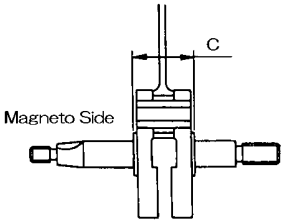
Crankshaft Shim Selection

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.*

TH23D/TH26D/TH34D

Shim thickness mm (in.)	Shim Parts No.	
	TH23D/TH26D	TH34D
0.2 (0.007)	92025-2125	92025 - 2104
0 4 (0.015)	92025-2126	92025 - 2105
0.6 (0.023)	92025-2127	92025 - 2106

TH23D/TH26D/TH34D

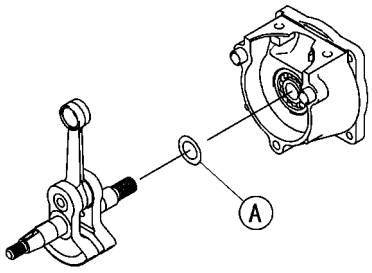
Clearance	Fitting shim	
(dimension D) mm	TH23D, TH26D	TH34D
0.05~0.27	None	
0.28~0.47	92025-2125	92025-2104
0.48~0.67	92025-2126	92025-2105
0.68~0.79	92025-2127	92025-2106

Crankshaft Shim Installation

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

Crankshaft Axial Play — TH23D/TH26D/TH34D
Standard: 0.05~0.295 mm (0.001~0.011 in.)*

*does not include that of ball bearings.



Troubleshooting

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3-2 TROUBLESHOOTING

Engine Troubleshooting

Hard Starting

Symptom	Cause		Remedy
Pulling recoil starter handle would not cause sufficient compression.	Poor compression	•Wear in piston •Wear in piston ring •Stick of piston ring •Wear or deformation of cylider bore. •Poor tightening of cylinder and spark plug	•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	•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	•Replenish •Clean •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	•Faulty choking(In summer, or when engine is warm, full choking gives too rich mixture) •Overflow of fuel from carburetor •Clogged air cleaner	•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	•Mixture of water into fuel •Deterioration in fuel because of poor long-term storage •Use of fuel other than designated	•Change fuel •Change fuel •Change fuel
Make spark check. No spark but spark appears on spark plug replaced.	Faulty spark plug	•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 (Provided that only spare parts)	•Crrect 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	•Faulty contacting at spark plug cap	•Remove plug cap and connect terminal again

Engine Troubleshooting

Symptom		Cause		Remedy
No spark or very week spark at the end of high ten-sion on cord	Spark appears when stop switch wire is disconnected at connector.	Faulty stop switch	•Stop switch lead wire is jammed •Short circuit in stop switch	•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	•Wiring of coil coming short-circuited or disconnect •Stop lead wire is jammed	•Replace •Correct or replace
	Spark appears when flywheel is replaced with new one.	Faulty flywheel	•Flywheel demagnetized	•Replace

3-4 TROUBLESHOOTING

Engine Troubleshooting

Engine Malfunction at Low Speed

Symptom	Cause		Remedy
When throttle value is opened gradually, revolution speed drops at some position or engine stops.	•Faulty carburetor •Faulty fuel filter •Air enters at carburetor flange	•Clogging in carburetor inside •Foul fuel filter •Faulty carburetor gasket •Incomplete fitting of carburetor	•Disassemble and clean •Clean or replace •Replace •Tighten
When spark test of spark plug is made with recoil starter rope pulled, spark appears very week.	•Faulty ignition system	•Faulty insulation of spark plug •Foul electrodes •Faulty magneto •Faulty ignition coil	•Replace •Clean •Replace

Engine Malfunction at High Speed

Symptom	Cause		Remedy
Same as "Engine Malfunction at Low Speed" mentioned above.	•Faulty carburetor •Faulty fuel filter •Faulty ignition system	•Same as "Engine Malfunction at Low Speed"	•Same as "Engine Malfunction at Low Speed"
Loaded operation causes revolution fluctuation with big frequency.	•Clogged fuel tank cap air vent and breather •Dust clogging in or entry of air into fuel pipe or carburetor		•Clean •Clean

Insufficient Power

Symptom	Cause		Remedy
Same as "Hard Starting"	•Poor compression •Insufficient fuel •Excess fuel •Faulty fuel •Faulty magneto •Faulty igniter	Same as "Hard Starting"	Same as "Hard Starting"
Engine overheated	•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		•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	•Carbon deposit narrows exhaust passage and muffler •Excessive oil mixed	•Clean •Change fuel
Engine knocking	•Inferior fuel		•Change fuel

Engine Troubleshooting

Abnormal Engine Noises

Symptom	Cause	Remedy
Piston Slapping	•Cylinder and piston ring wear	•Replace
	•Wear and/or deformation in piston	•Replace
	•Carbon deposit inside combustion chamber	•Clean
	•Wear in piston pin and connecting rod small end bearing	•Replace
	•Wear in piston and piston pin	•Replace
Connecting rod noise	•Wear in large and small end bearings	•Replace (Crankshaft Assy)

Hunting

Symptom	Cause	Remedy
Hunting	•Foul air cleaner	•Clean
	•Dust clogging in or air entry into fuel pipe	•Clean
	•Clogged fuel tank cap air vent and breather	•Clean
	•Clogged carburetor	•Clean

Fuel Leakage from Carburetor

Symptom	Cause	Remedy
Fuel leak from carburetor	•Foreign matter attached to needle valve and/or valve seat	•Clean
	•Correction or wear in needle valve and/or valve seat	•Replace needle valve assembly
	•Poor tightening of diaphragm gasket	•Tighten or replace

Excessive Fuel Consumption

Symptom	Cause		Remedy
Same as "Hard Starting"	•Poor compression	•Same as "Hard Starting"	•Same as "Hard Starting"
Sufficient compression but excessive fuel consumption.	•Too rich fuel mixture		•Adjust
	•Inferior fuel		•Replace
	•Foul air cleaner		•Clean
	•Too high idling speed		•Adjust
	•Choke valve not fully open		•Adjust
Same as "Fuel Leakage from Carburetor"	•Same as "Fuel Leakage from Carburetor"		•Same as "Fuel Leakage from Carburetor"

3-6 TROUBLESHOOTING

Engine Troubleshooting

Engine Stops during Operation

Symptom	Cause		Remedy
Difficulty in cranking, or seizure	Overheat	•Excessively lean fuel mixture(too little fuel)	•Adjust carburetor
		•Inferior lubricating oil mixed	•Change fuel
		•Excessive carbon deposit in conbusion chamber	•Clean
		•Dust accumulation on cooling fins of cylinder	•Clean
Cranking is easy	Faulty electrical system	•Faulty spark plug	•Clean or replace
		•Faulty magneto	•Replace
		•Looseness in connections	•Check and repair
		•Faulty ignition coil	•Replace
	Faulty fuel system	•Clogged fuel line	•Clean
		•Foul air cleaner	•Clean or replace
		•Fuel in tank used up	•Replenish
	Faulty carburetor	•Dust clogging in fuel passage	•Clean

Supplement

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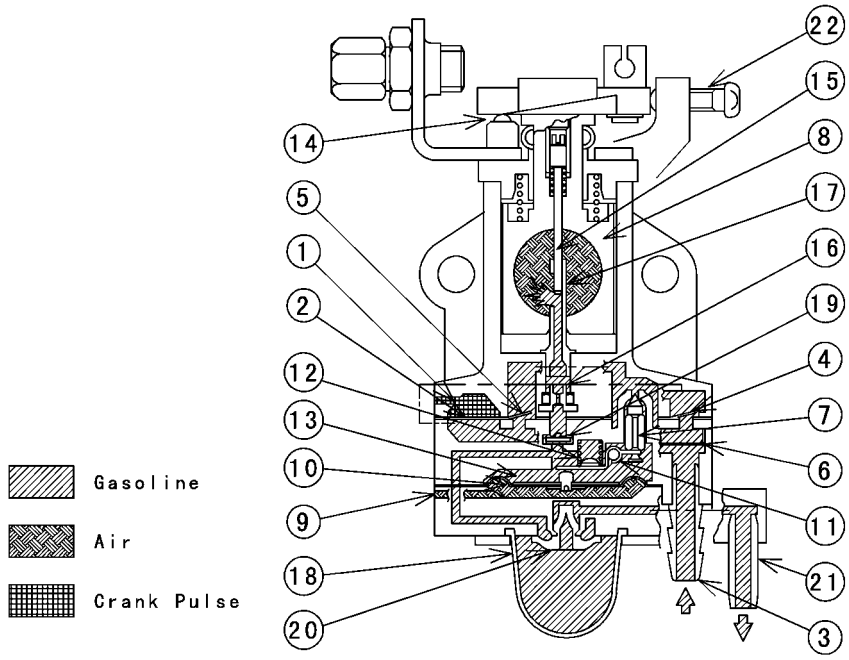
4-2 SUPPLEMENT

Rotary Valve, Diaphragm Type Carburetor



1. Engine Pulse Passage
2. Fuel Pump Diaphragm
3. Fuel Inlet
4. Inlet Check Valve
5. Outlet Check Valve
6. Inlet Screen
7. Needle Valve
8. Throttle Valve
9. Air Vent
10. Main Diaphragm
11. Control Level
12. Valve Spring
13. Metering Chamber
14. Lead Cam
15. Idle Needle Pin
16. Main Jet
17. Main Nozzle
18. Priming Pump
19. Main Check Valve
20. Priming Pump Check Valve
21. Overflow Pipe
22. Idle Adjust Screw

Priming Pump System

When starting the engine, by pushing the priming pump, air is pushed out toward the overflow pipe from the priming pump check valve, which causes negative pressure inside the metering chamber and the needle valve opens.

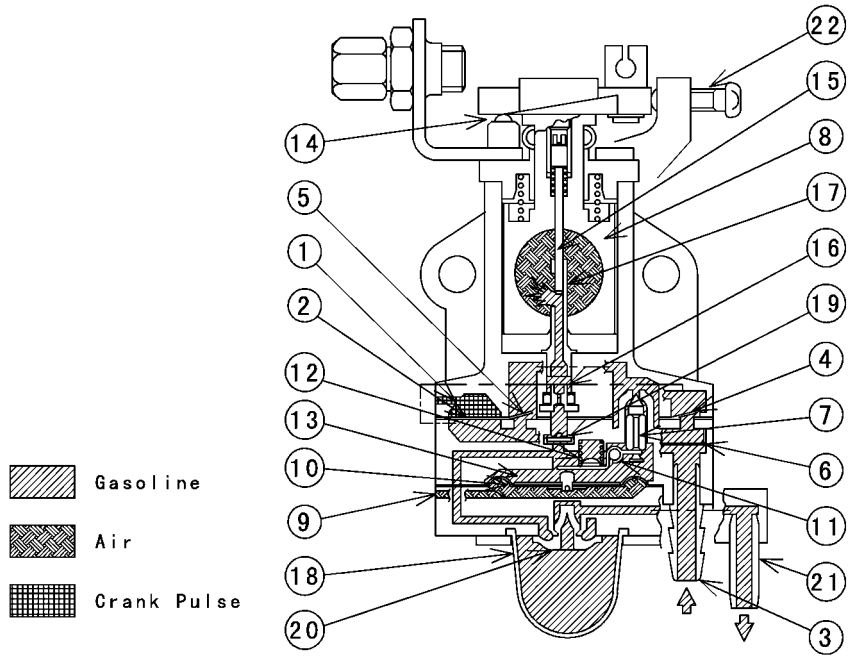
Then fuel from the fuel tanks is sucked into the metering chamber through the inlet check valve and then into the priming pump.

And excessive fuel is discharged from the overflow pipe. This operation is called “Priming operation at starting.”

Fuel Pump System

After starting the engine, part of pressure change inside the crankcase caused by engine revolution is transmitted to the pump diaphragm through the engine pulse passage, which deforms the pump diaphragm and it starts reciprocationg motion. Namely, fuel is sucked from the tank into the carburetor under pressure by volume change due to the pump diaphragm’s reciprocating motion and the inlet and the outlet check valves function.

Rotary Valve, Diaphragm Type Carburetor



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16. Main Jet
17. Main Nozzle
18. Priming Pump
19. Main Check Valve
20. Priming Pump Check Valve
21. Overflow Pipe
22. Idle Adjust Screw

Metering Chamber System

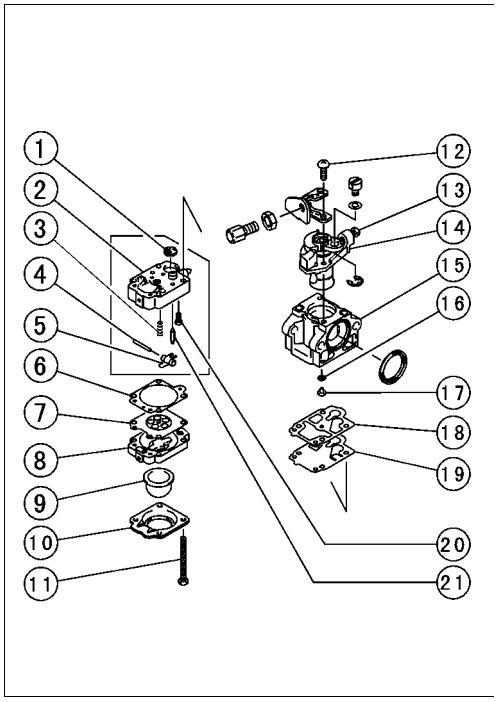
The main diaphragm forming the metering chamber senses inside fuel pressure change of the metering chamber, which occurs in accordance with the engine revolution change, as vertical motion. And it works to keep a uniform pressure (equivalent to the fuel surface of a float type carburetor) inside the metering chamber by opening and closing the needle valve.

Fuel in the metering chamber is drawn by negative pressure in the venturi, blown out from the main nozzle, mixed with air passed through the venturi and sucked into the engine. When the engine stops, negative pressure in the venturi becomes zero; the control lever is pushed up with the valve spring; and the needle valve closes. Then fuel flow stops and overflow is prevented.

4-4 SUPPLEMENT

Rotary Valve, Diaphragm Type Carburetor

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



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.

- Reasembly 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 diaphram 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.

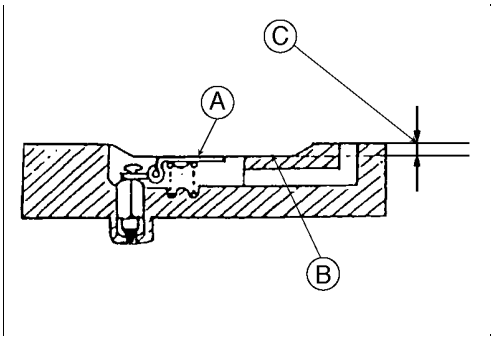
- Push the tip end of the control lever lightly and make sure that the lever moves smoothly.

★If the needle valve which opens and closes with movement of the control lever, has got some damage on its tip end or wear due to its long use, applying air to the tip end of the needle valve will not be solution for overflow.

★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.

4-6 SUPPLEMENT

Rotary Valve, Diaphragm Type Carburetor

Idle Needle Pin Adjustment

- Start the engine and move the throttle lever to its fully-closed position. Raise the engine speed just before the cutting tool begins turning by turning the idle adjust screw clockwise.
- Adjust the idle needle pin where the engine speed rises highest by turning it clockwise or counterclockwise. When the engine speed rises and the cutting tool begins turning, lower the engine speed by turning the idle adjust screw counterclockwise and readjust the idle needle pin where the engine speed rises highest right before the cutting tool begins turning by turning the pin clockwise or counterclockwise.
- When the idle needle pin position is fixed, turn the idle needle pin counterclockwise1/4 to 1/2 turn more and stop turning.
- And then adjust the idle adjust screw to the specified speed. See “Setting Table.”

Rotary Valve, Diaphragm Type Carburetor Troubleshooting

Symptom	Cause	Remedy
Engine hard to start	•Idle Needle pin maladjustment	•Adjust
	•Idle adjust screw maladjustment	•Adjust
	•Foul fuel filter in fuel tank	•Clean
	•Clogging in fuel passage	•Clean
	•Air leakage in fuel passage	•Repair
	•Improper fuel	•Change
	•Inferior check valve	•Replace
	•Clogged air cleaner element	•Clean or replace
	•Damaged carburetor control (metering) lever	•Repair
	•Malfunction of carburetor control (metering) lever	•Repair
	•Inferior main diaphragm gasket	•Replace
	•Poor tightening of main diaphragm cover screw	•Tighten
	•Damaged main diaphragm	•Replace
	•Adherence of inlet needle valve	•Replace
	•Inlet needle valve wear	•Replace
	•Inlet needle valve sticking	•Repair
Overflow, fuel leakage	•Poor tightening of fuel pump cover screw	•Tighten
	•Damaged carburetor control (metering) lever	•Repair
	•Too high carburetor control (metering) lever	•Adjust
	•Malfunction of carburetor control (metering) lever	•Repair
	•Deformed carburetor control (metering) lever spring	•Replace
	•Inferior main diaphragm gasket	•Replace
	•Poor tightening of main diaphragm cover screw	•Tighten
	•Damaged main diaphragm	•Replace
	•Inlet needle valve wear	•Replace
	•Inlet needle valve sticking	•Repair
Priming is hard to suck fuel	•Clogged fuel tank cap air vent	•Clean
	•Foul fuel filter in fuel tank	•Clean
	•Clogged fuel line	•Clean
	•Air leakage in fuel line	•Repair
	•Damaged priming pump	•Replace
	•Inferior priming pump check valve	•Replace
	•Malfunction of carburetor control (metering) lever	•Repair
	•Inferior main diaphragm gasket	•Replace
	•Poor tightening of main diaphragm cover screw	•Tighten
	•Damaged main diaphragm	•Replace
	•Adherence of inlet needle valve	•Replace
Engine would not idle	•Idle needle pin maladjustment	•Adjust
	•Idle adjust screw maladjustment	•Adjust
	•Foul fuel filter in fuel tank	•Clean
	•Air leakage in fuel line	•Repair
	•Inferior manifold o-ring	•Replace
	•Poor tightening of carburetor	•Tighten
Idling is too slow	•Idle needle pin maladjustment	•Adjust
	•Clogged air cleaner element	•Clean or replace
	•Damaged carburetor control (metering) lever	•Replace
	•Carburetor control (metering) lever is too high	•Adjust

4-8 SUPPLEMENT

Rotary Valve, Diaphragm Type Carburetor Troubleshooting

Symptom	Cause	Remedy
	•Malfunction of carburetor control (metering) lever	•Replace
	•Inlet needle valve wear	•Replace
	•Foreign matter sticking of needle valve	•Clean
Idling is unstable	•Idle needle pin maladjustment	•Adjust
	•Idle adjust screw maladjustment	•Adjust
	•Clogged fuel tank cap air vent	•Clean
	•Foul fuel filter in fuel tank	•Clean
	•Clogged fuel line	•Clean
	•Air leakage in fuel line	•Repair
	•Improper fuel	•Change
	•Inferior check valve (foreign matter)	•Replace
	•Inferior manifold o-ring	•Replace
	•Poor tightening of carburetor	•Tighten
	•Malfunction of carburetor control (metering) lever	•Replace
	•Poor installation of carburetor control lever	•Correct
	•Damaged main diaphragm	•Replace
	•Adherence of inlet needle valve	•Replace
	•Foreign matter sticking of needle valve	•Clean
Idling does not continue	•Idling needle pin maladjustment	•Adjust
	•Idling adjust screw maladjustment	•Adjust
	•Foul fuel tank filter	•Clean
	•Clogged fuel line	•Clean
	•Air leakage in fuel line	•Repair
	•Inferior check valve (foreign matter)	•Replace
	•Too high carburetor control (metering) lever	•Adjust
	•Malfunction of carburetor control (metering) lever	•Replace
	•Deformation of carburetor control (matering) lever spring	•Replace
	•Poor installation of carburetor control lever spring	•Correct
	•Inlet needle valve wear	•Replace
	•Foreign matter sucking of inlet needle	•Clean
Engine does not accelerate	•Idle needle pin maladjustment	•Adjust
	•Clogged fuel tank cap air vent	•Clean
	•Foul fuel tank filter	•Clean
	•Clogged fuel line	•Clean
	•Air leakage in fuel line	•Repair
	•Pulse leakage from fuel pump	•Repair
	•Clogged pulse passage	•Clean
	•Poor tightening of pump cover screw	•Tighten
	•Inferior of pump diaphragm	•Replace
	•Inferior of check valve	•Repair
	•Inferior of manifold o-ring	•Replace
	•Poor tightening of carburetor	•Tighten
	•Damaged carburetor control (metering) lever	•Replace
	•Too low carburetor control (metering) lever	•Adjust
	•Malfunction of carburetor control (metering) lever	•Replace
	•Poor installation of carburetor control (metering) lever	•Correct
	•Damaged carburetor control (metering) lever button	•Replace

Rotary Valve, Diaphragm Type Carburetor Troubleshooting

Symptom	Cause	Remedy
	•Poor tightening of diaphragm cover	•Tighten
	•Damaged diaphragm	•Replace
	•Adherence of inlet needle valve	•Replace
Engine stops when decelrating	•Idle needle pin maladjustment	•Adjust
	•Inferior pump diaphragm	•Replace
	•Too high carburetor control (metering) lever	•Adjust
	•Malfunction of carburetor control (metering) lever	•Replace
	•Inlet needle valve wear	•Replace
	•Foreign matter sticking of inlet needle	•Clean
Engine does not accelrate quick	•Idle needle pin maladjustment	•Adjust
	•Clogged air cleaner element	•Clean
Malfunction at high speed	•Clogged fuel tank cap air vent	•Clean
	•Foul fuel tank filter	•Clean
	•Clogged fuel line	•Clean
	•Air leakage in fuel line	•Repair
	•Improper fuel	•Change
	•Pulse leakage from pulse passage	•Repair
	•Clogged pulse passage	•Clean
	•Poor tightening of pump cover screw	•Tighten
	•Inferior of pump diaphragm	•Replace
	•Inferior of check valve	•Replace
	•Clogged air cleaner element	•Clean
	•Inferior of manifold o-ring	•Replace
	•Poor tightening of carburetor screw	•Tighten
	•Damaged carburetor control (metering) lever	•Replace
	•Malfunction of carburetor control (metering) lever	•Replace
	•Deformation of carburetor control (metering) lever spring	•Replace
	•Poor installation of control lever spring	•Correct
	•Damaged main diaphragm button	•Replace
	•Inferior of main diaphragm gasket	•Replace
	•Poor tightening of main diaphragm cover	•Tighten
	•Damaged main diaphragm	•Replace
	•Inlet needle valve wear	•Replace
	•Foreign matter sticking of inlet needle	•Clean