



ZZR1400 ABS

Ninja ZX-14R

Ninja ZX-14R ABS



Motorcycle Service Manual

Quick Reference Guide

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LIST OF ABBREVIATIONS

A	ampere(s)	KDS	Kawasaki Diagnostic System
ABDC	after bottom dead center	km/h	kilometers per hour
AC	alternating current	L	liter(s)
Ah	ampere hour	lb	pound(s)
ATDC	after top dead center	LCD	Liquid Crystal Display
BBDC	before bottom dead center	LED	Light Emitting Diode
BDC	bottom dead center	m	meter(s)
BTDC	before top dead center	min	minute(s)
°C	degree(s) Celsius	mph	miles per hour
cmHg	centimeters of mercury	N	newton(s)
cu in	Cubic inch(s)	oz	ounce(s)
DC	direct current	Pa	pascal(s)
DFI	Digital Fuel Injection	PS	horsepower
ECU	Electronic Control Unit	psi	pound(s) per square inch
F	farad(s)	qt	quart(s)
°F	degree(s) Fahrenheit	r	revolution
ft	foot, feet	rpm	revolution(s) per minute
g	gram(s)	TDC	top dead center
gal	gallon(s)	TIR	total indicator reading
h	hour(s)	V	volt(s)
HP	horsepower(s)	W	watt(s)
in.	inch(s)	Ω	ohm(s)
ISC	Idle Speed Control		

COUNTRY AND AREA CODES

AT	Austria	GB	United Kingdom
AU	Australia	PH	Philippine
BR	Brazil	SEA-B1	Southeast Asia B1 (with Evaporative Emission Control System)
CA	Canada	SEA-B2	Southeast Asia B2
CAL	California	US	United States
CH	Switzerland	WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Full Power)
DE	Germany	GB WVTA (FULL H)	WVTA Model with Honeycomb Catalytic Converter (Left Side Traffic Full Power)
EUR	Europe	WVTA (78.2 H)	WVTA Model with Honeycomb Catalytic Converter (Restricted Power)

Foreword

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

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

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

To get the longest life out of your vehicle.

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

How to Use This Manual

In this manual, the product is divided into its major systems and these systems make up the manual's chapters. The Quick Reference

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

For example, if you want ignition coil information, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Ignition Coil section.

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

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

NOTICE is used to address practices not related to personal injury.

This manual contains four more symbols which will help you distinguish different types of information.

NOTE

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

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

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

General Information

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1-2 GENERAL INFORMATION

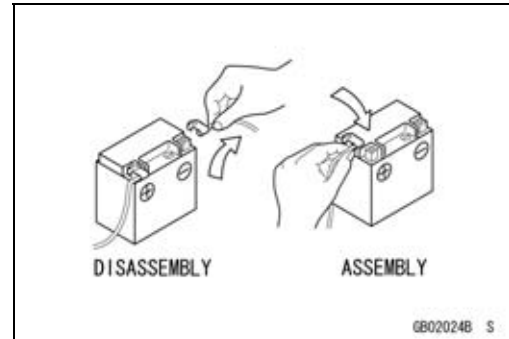
Before Servicing

Before starting to perform an inspection service or carry out a disassembly and reassembly operation on a motorcycle, read the precautions given below. To facilitate actual operations, notes, illustrations, photographs, cautions, and detailed descriptions have been included in each chapter wherever necessary. This section explains the items that require particular attention during the removal and reinstallation or disassembly and reassembly of general parts.

Especially note the following.

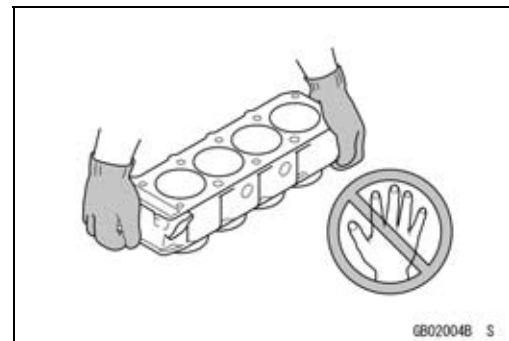
Battery Ground

Before completing any service on the motorcycle, disconnect the battery cables from the battery to prevent the engine from accidentally turning over. Disconnect the ground cable (–) first and then the positive (+). When completed with the service, first connect the positive (+) cable to the positive (+) terminal of the battery then the negative (–) cable to the negative terminal.



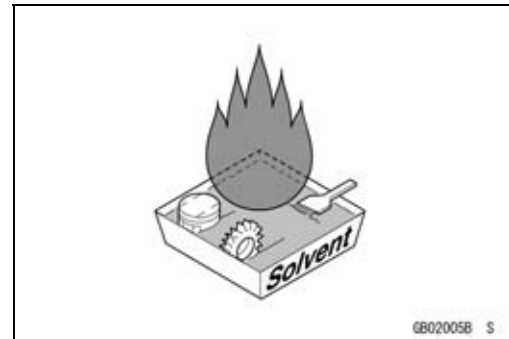
Edges of Parts

Lift large or heavy parts wearing gloves to prevent injury from possible sharp edges on the parts.



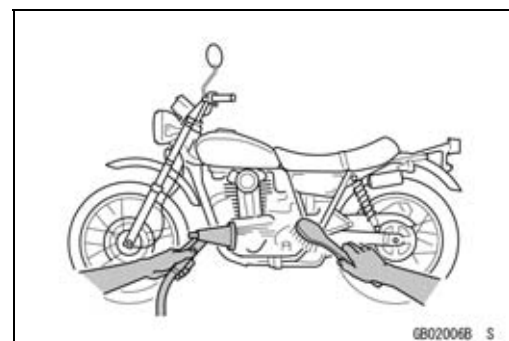
Solvent

Use a high flash-point solvent when cleaning parts. High flash-point solvent should be used according to directions of the solvent manufacturer.



Cleaning Vehicle before Disassembly

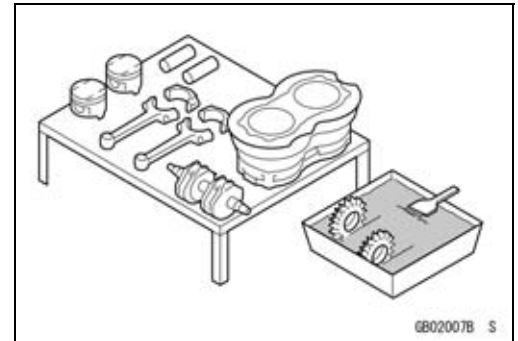
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



Before Servicing

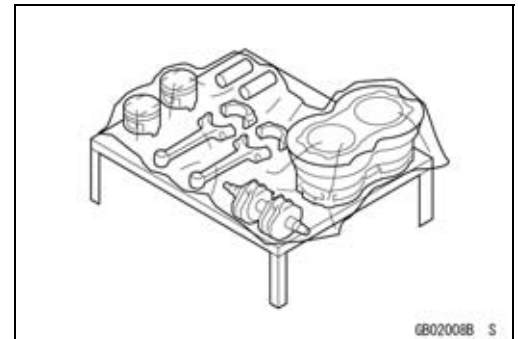
Arrangement and Cleaning of Removed Parts

Disassembled parts are easy to confuse. Arrange the parts according to the order the parts were disassembled and clean the parts in order prior to assembly.



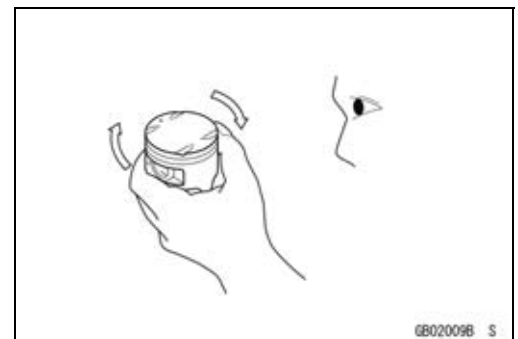
Storage of Removed Parts

After all the parts including subassembly parts have been cleaned, store the parts in a clean area. Put a clean cloth or plastic sheet over the parts to protect from any foreign materials that may collect before re-assembly.



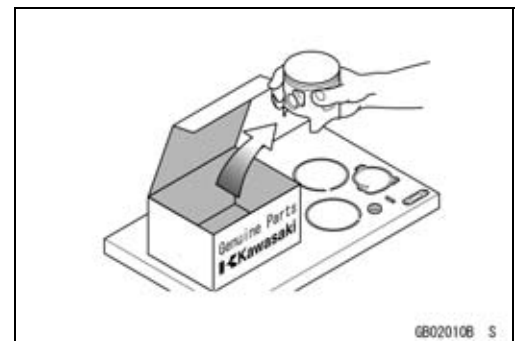
Inspection

Reuse of worn or damaged parts may lead to serious accident. Visually inspect removed parts for corrosion, discoloration, or other damage. Refer to the appropriate sections of this manual for service limits on individual parts. Replace the parts if any damage has been found or if the part is beyond its service limit.



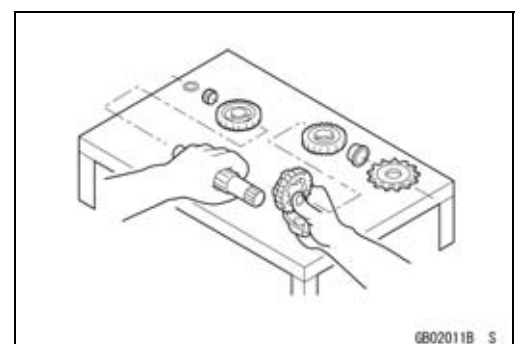
Replacement Parts

Replacement parts must be KAWASAKI genuine or recommended by KAWASAKI. Gaskets, O-rings, oil seals, grease seals, circlips, cotter pins or self-locking nuts must be replaced with new ones whenever disassembled.



Assembly Order

In most cases assembly order is the reverse of disassembly, however, if assembly order is provided in this Service Manual, follow the procedures given.

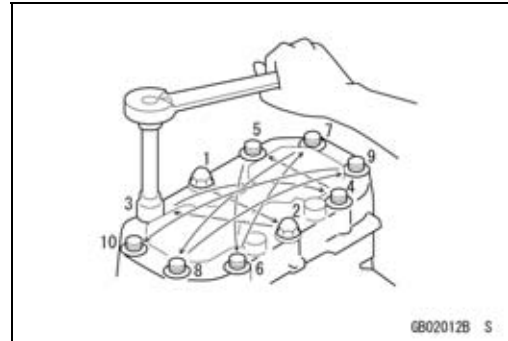


1-4 GENERAL INFORMATION

Before Servicing

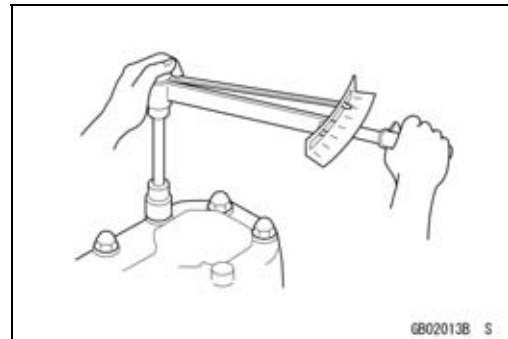
Tightening Sequence

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 according to the specified sequence to prevent case warpage or deformation which can lead to malfunction. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter turn and then remove them. If the specified tightening sequence is not indicated, tighten the fasteners alternating diagonally.



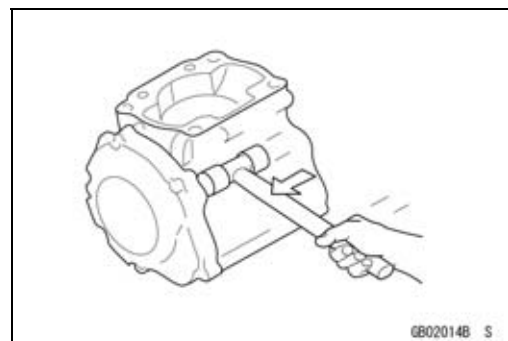
Tightening Torque

Incorrect torque applied to a bolt, nut, or screw may lead to serious damage. Tighten fasteners to the specified torque using a good quality torque wrench.



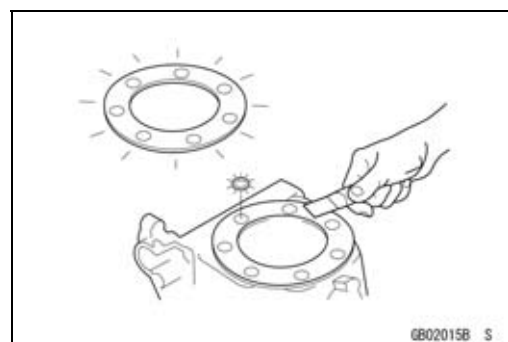
Force

Use common sense during disassembly and assembly, excessive force can cause expensive or hard to repair damage. When necessary, remove screws that have a non-permanent locking agent applied using an impact driver. Use a plastic-faced mallet whenever tapping is necessary.



Gasket, O-ring

Hardening, shrinkage, or damage of both gaskets and O-rings after disassembly can reduce sealing performance. Remove old gaskets and clean the sealing surfaces thoroughly so that no gasket material or other material remains. Install the new gaskets and replace the used O-rings when re-assembling.



Liquid Gasket, Non-permanent Locking Agent

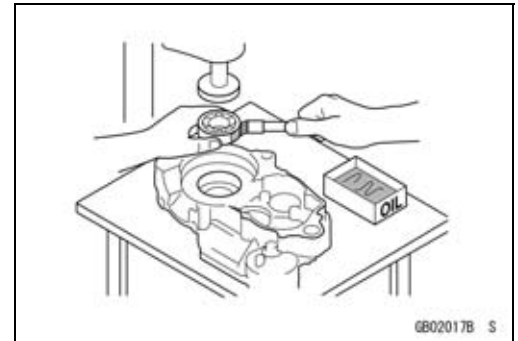
For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



Before Servicing

Press

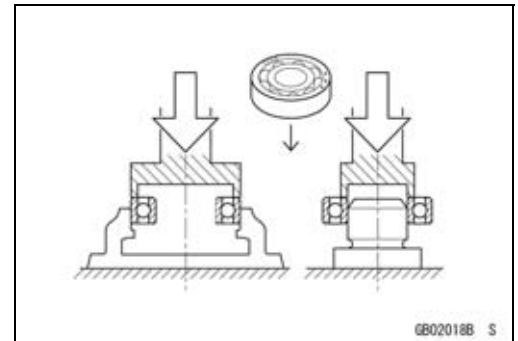
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



Ball Bearing and Needle Bearing

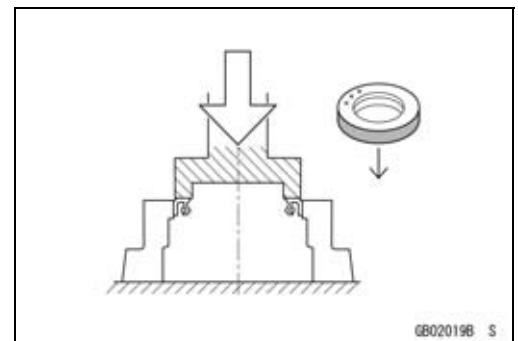
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

Pressing the incorrect race can cause pressure between the inner and outer race and result in bearing damage.

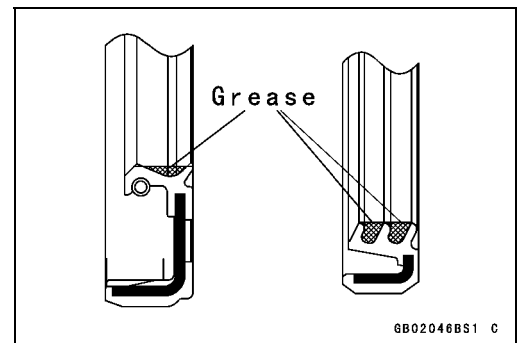


Oil Seal, Grease Seal

Do not remove pressed oil or grease seals unless removal is necessary. Replace with new ones whenever removed. Press new oil seals with manufacture and size marks facing out. Make sure the seal is aligned properly when installing.

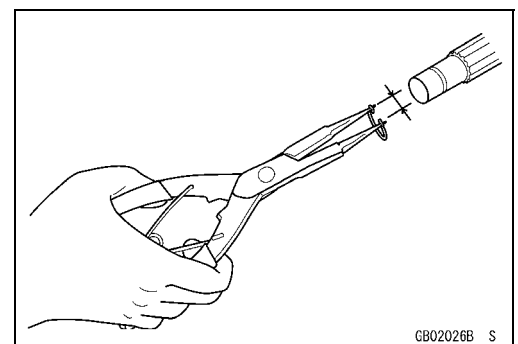


Apply specified grease to the lip of seal before installing the seal.



Circlips, Cotter Pins

Replace the circlips or cotter pins that were removed with new ones. Take care not to open the clip excessively when installing to prevent deformation.

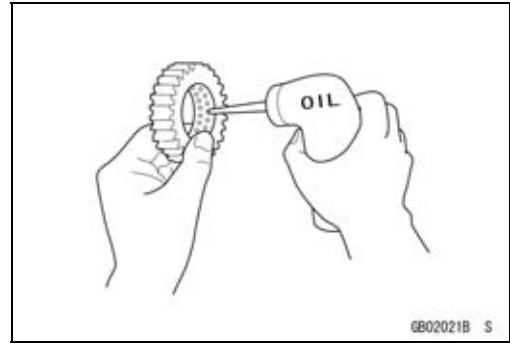


1-6 GENERAL INFORMATION

Before Servicing

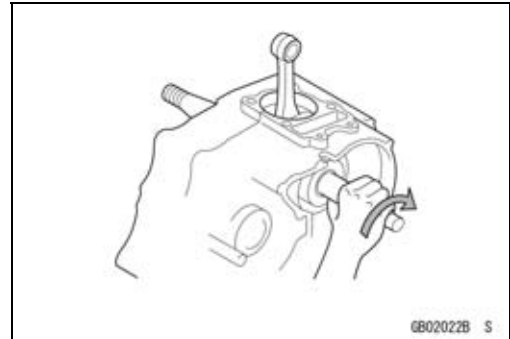
Lubrication

It is important to lubricate rotating or sliding parts during assembly to minimize wear during initial operation. Lubrication points are called out throughout this manual, apply the specific oil or grease as specified.



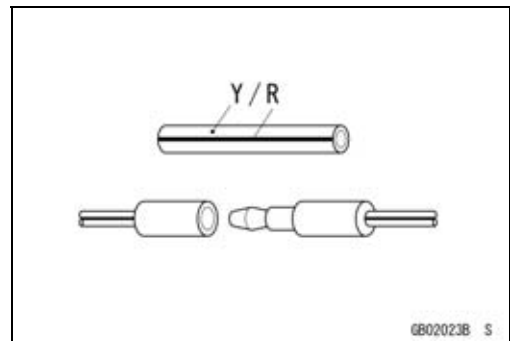
Direction of Engine Rotation

When rotating the crankshaft by hand, the free play amount of rotating direction will affect the adjustment. Rotate the crankshaft to positive direction (clockwise viewed from output side).



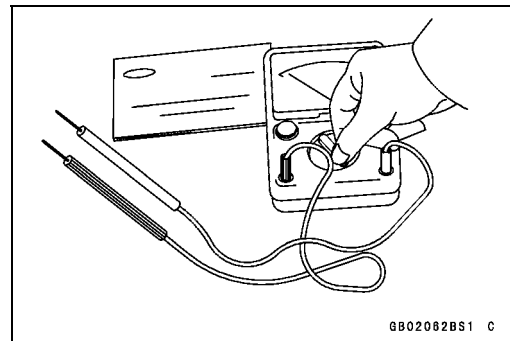
Electrical Leads

A two-color lead is identified first by the primary color and then the stripe color. Unless instructed otherwise, electrical leads must be connected to those of the same color.



Instrument

Use a meter that has enough accuracy for an accurate measurement. Read the manufacture's instructions thoroughly before using the meter. Incorrect values may lead to improper adjustments.



Model Identification

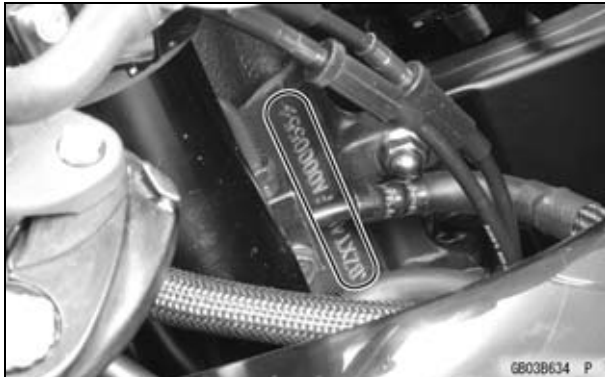
ZX1400EC Left Side View



ZX1400EC Right Side View



Frame Number



Engine Number



1-8 GENERAL INFORMATION

Model Identification

ZX1400FC Left Side View



ZX1400FC Right Side View



General Specifications

Items	ZX1400EC, ZX1400FC
Dimensions	
Overall Length	2 170 mm (85.43 in.)
Overall Width	770 mm (30.31 in.)
Overall Height	1 170 mm (46.06 in.)
Wheelbase	1 480 mm (58.27 in.)
Road Clearance	125 mm (4.92 in.)
Seat Height	800 mm (31.50 in.)
Curb Mass:	
ZX1400EC	265 kg (584.3 lb)
ZX1400FC	268 kg (591.0 lb)
Front	134 kg (295.5 lb)
Rear	
ZX1400EC	131 kg (288.9 lb)
ZX1400FC	134 kg (295.5 lb)
Fuel Tank Capacity	22 L (5.8 US gal.)
Performance	
Minimum Turning Radius	3.1 m (10.2 ft)
Engine	
Type	4-stroke, DOHC, 4-cylinder
Cooling System	Liquid-cooled
Bore and Stroke	84.0 × 65.0 mm (3.31 × 2.56 in.)
Displacement	1 441 cm ³ (87.9 cu in.)
Compression Ratio	12.3 : 1
Maximum Horsepower	147.2 kW (200 PS) @10 000 r/min (rpm) WVTA (78.2 H) 78.2 kW (106 PS) @8 500 r/min (rpm) (CA), (CAL), (US) – – –
Maximum Torque	162.5 N·m (16.6 kgf·m, 120 ft·lb) @7 500 r/min (rpm) WVTA (78.2 H) 120.1 N·m (12.2 kgf·m, 89 ft·lb) @4 500 r/min (rpm) (CA), (CAL), (US) – – –
Carburetion System	FI (Fuel Injection) MIKUNI 44EIDW × 4
Starting System	Electric starter
Ignition System	Battery and coil (transistorized)
Timing Advance	Electronically advanced (digital igniter in ECU)
Ignition Timing	From 10° BTDC @1 100 r/min (rpm)
Spark Plug	NGK CR9EIA-9
Cylinder Numbering Method	Left to right, 1-2-3-4
Firing Order	1-2-4-3
Valve Timing:	
Intake:	
Open	34° (BTDC)
Close	72° (ABDC)
Duration	286°

1-10 GENERAL INFORMATION

General Specifications

Items	ZX1400EC, ZX1400FC
Exhaust: Open Close Duration Lubrication System Engine Oil: Type Viscosity Capacity	66° (BBDC) 36° (ATDC) 282° Forced lubrication (wet sump with cooler) API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2 SAE 10W-40 4.6 L (4.9 US qt)
Drive Train Primary Reduction System: Type Reduction Ratio Clutch Type Transmission: Type Gear Ratios: 1st 2nd 3rd 4th 5th 6th Final Drive System: Type Reduction Ratio Overall Drive Ratio	Gear 1.556 (84/54) Wet multi disc 6-speed, constant mesh, return shift 2.611 (47/18) 1.947 (37/19) 1.545 (34/22) 1.333 (32/24) 1.154 (30/26) 1.036 (29/28) Chain drive 2.471 (42/17) 3.980 @Top gear
Frame Type Caster (Rake Angle) Trail Front Tire: Type Size Rim Size Rear Tire: Type Size Rim Size Front Suspension: Type Wheel Travel	Press, backbone 23° 93 mm (3.66 in.) Tubeless 120/70 ZR17 M/C (58W) J17M/C x MT3.50 Tubeless 190/50 ZR17 M/C (73W) J17M/C x MT6.00 Telescopic fork (upside-down) 117 mm (4.61 in.)

General Specifications

Items	ZX1400EC, ZX1400FC
Rear Suspension: Type Wheel Travel Brake Type: Front Rear	Swingarm (uni-trak) 124 mm (4.88 in.) Dual discs Single disc
Electrical Equipment Battery Headlight: Type Bulb: High Low Tail/Brake Light Alternator: Type Rated Output	12 V 12 Ah Semi-sealed beam 12 V 55 W + 65 W (quartz-halogen) x 2 12 V 55 W (quartz-halogen) x 2 LED Three-phase AC 35 A/14 V @5 000 r/min (rpm)

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

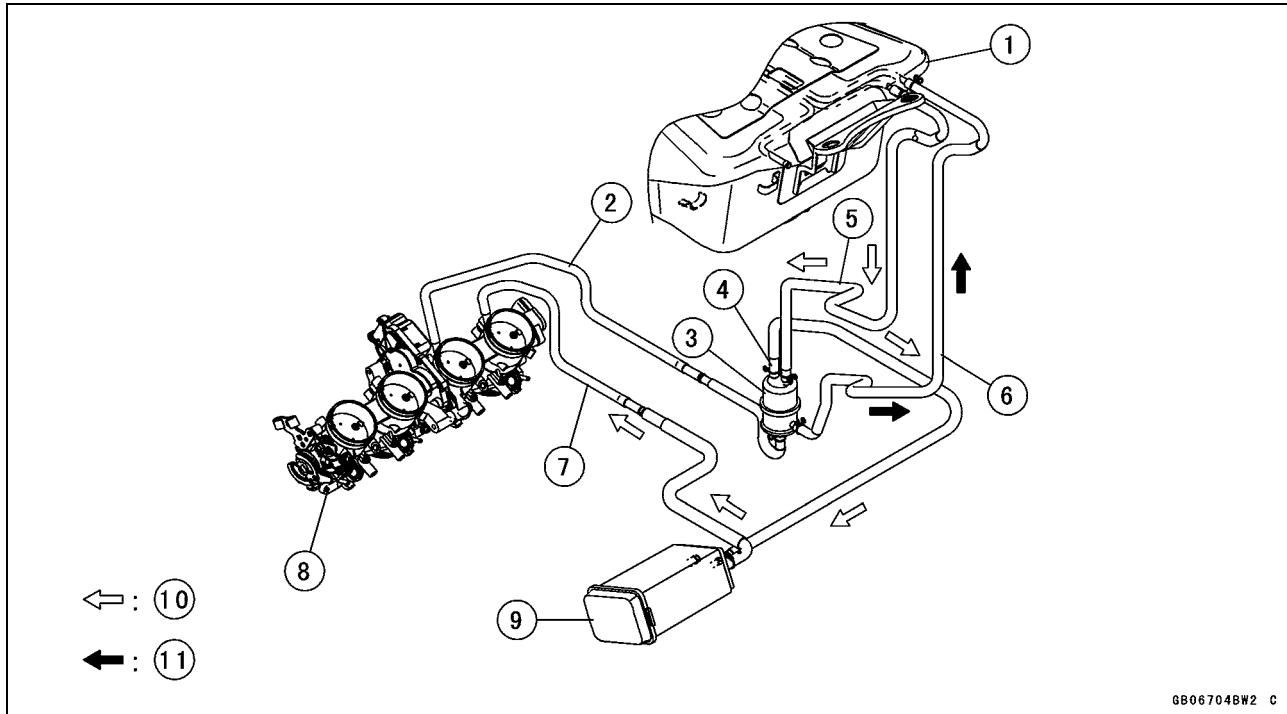
1-12 GENERAL INFORMATION

Technical Information-Evaporative Emission Control System (CAL and SEA B1 Models)

Overview

The fuel vapors from the fuel tank contain toxic HC (Hydrocarbons). In the evaporative emission control system, these vapors are kept in the canister temporarily without being released directly into the atmosphere. After that, the vapors are routed to the throttle body or carburetor by the engine vacuum pressure and is then burned by the engine.

Conventional Evaporative Emission Control System



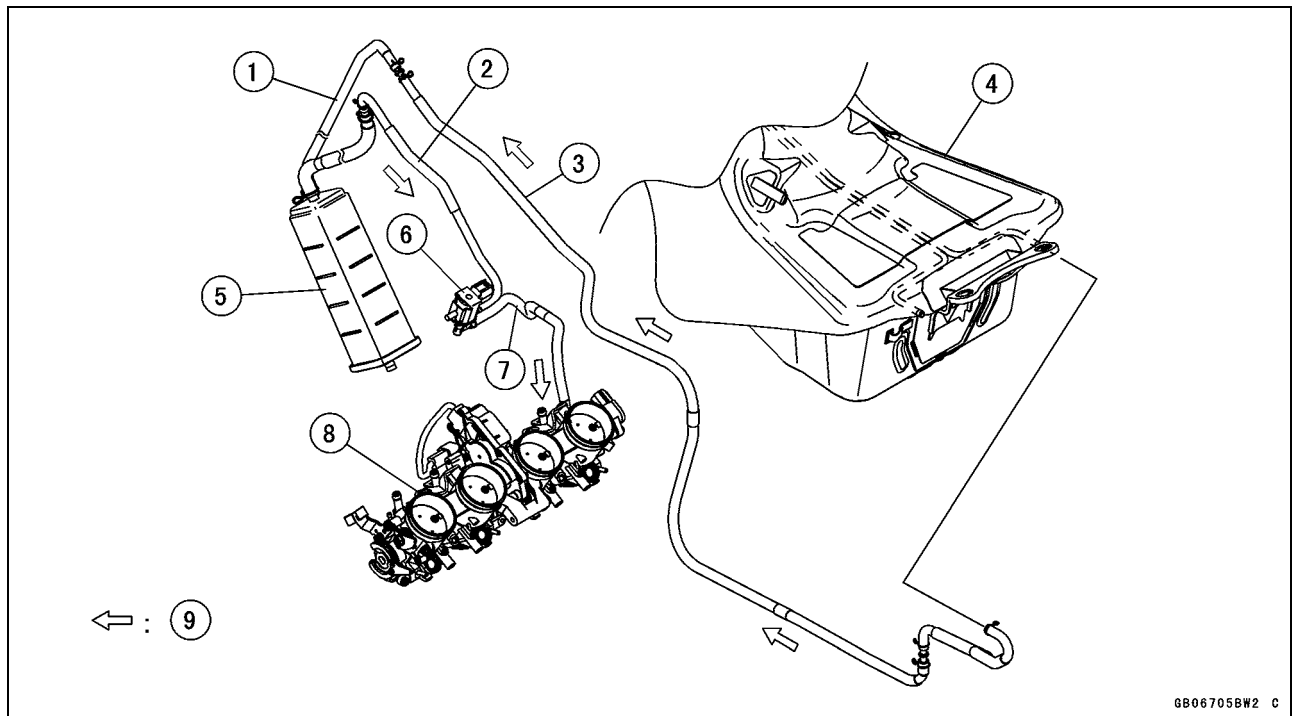
- | | |
|--------------------------|----------------------------------|
| 1. Fuel Tank | 7. Purge Hose (Green) |
| 2. Vacuum Hose (White) | 8. Throttle Body (or Carburetor) |
| 3. Separator/Return Pump | 9. Canister |
| 4. Breather Hose (Blue) | 10. Flow of Vapor Gas |
| 5. Breather Hose (Blue) | 11. Flow of Liquid Gasoline |
| 6. Return Hose (Red) | |

Function of Conventional Evaporative Emission Control System

The fuel vapors generated in the fuel tank flow to the separator (Return Pump) and is separated into liquid and gas. The liquid gasoline is returned to the fuel tank by the return pump driven by the engine vacuum pressure. On the other side, the vapor sent to the canister is kept temporarily in the canister by the activated carbon before it is routed to the throttle body or carburetor by the engine vacuum pressure and is burned by the engine.

Technical Information-Evaporative Emission Control System (CAL and SEA B1 Models)

New Evaporative Emission Control System



GB06705BW2 C

- | | |
|-------------------------|-----------------------|
| 1. Breather Hose (Blue) | 6. Purge Valve |
| 2. Purge Hose (Green) | 7. Purge Hose (Green) |
| 3. Breather Hose (Blue) | 8. Throttle Body |
| 4. Fuel Tank | 9. Flow of Vapor Gas |
| 5. Canister | |

Function of New Evaporative Emission Control System

This model is equipped with New Evaporative Emission Control System in which the separator and return hose connected to the fuel tank are eliminated.

The vapors generated in the fuel tank flow to the canister and is absorbed into the activated carbon. The fuel cap has a valve that prevents a large amount of liquid gasoline from spilling in case the motorcycle turns over. Even if a small amount of gasoline flows into the canister, the canister will maintain its normal function.

The purge valve is controlled by the ECU which opens and closes the valve to control the purge timing of the vapors.

Purge Valve Control:

The purge valve does not work when the engine is not running.

Even with the engine running, the valve might not always work such as when the vacuum pressure is high (idle). This can have a large effect on the air-fuel ratio and can result in the engine malfunctioning or exhaust deterioration.

Canister:

The canister has a pressure control mechanism which prevents an excessive pressure increase.

1-14 GENERAL INFORMATION

Unit Conversion Table

Prefixes for Units:

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

Units of Mass:

kg	×	2.205	=	lb
g	×	0.03527	=	oz

Units of Volume:

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

Units of Force:

N	×	0.1020	=	kg
N	×	0.2248	=	lb
kg	×	9.807	=	N
kg	×	2.205	=	lb

Units of Length:

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

Units of Torque:

N·m	×	0.1020	=	kgf·m
N·m	×	0.7376	=	ft·lb
N·m	×	8.851	=	in·lb
kgf·m	×	9.807	=	N·m
kgf·m	×	7.233	=	ft·lb
kgf·m	×	86.80	=	in·lb

Units of Pressure:

kPa	×	0.01020	=	kgf/cm ²
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cmHg
kgf/cm ²	×	98.07	=	kPa
kgf/cm ²	×	14.22	=	psi
cmHg	×	1.333	=	kPa

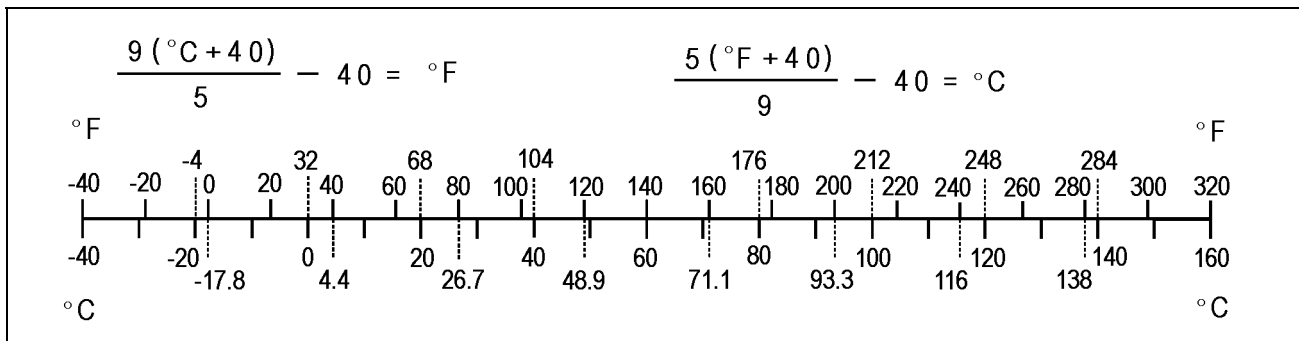
Units of Speed:

km/h	×	0.6214	=	mph
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Units of Power:

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

Units of Temperature:



Periodic Maintenance

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2-2 PERIODIC MAINTENANCE

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2-4 PERIODIC MAINTENANCE

Periodic Maintenance Chart

ITEM	FREQUENCY	* ODOMETER READING × 1 000 km (× 1 000 mile)							See Page
		Whichever comes first ↓	1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)	
Clutch hose installation condition - inspect	year	●	●	●	●	●	●	●	2-27
Wheels and Tires									
Tire air pressure - inspect	year			●		●		●	2-28
Wheel/tire damage - inspect				●		●		●	2-28
Tire tread wear, abnormal wear - inspect				●		●		●	2-28
Wheel bearing damage - inspect	year			●		●		●	2-29
Final Drive									
Drive chain lubrication condition - inspect #		Every 600 km (400 mile)							2-30
Drive chain slack - inspect #		Every 1 000 km (600 mile)							2-30
Drive chain wear - inspect #				●		●		●	2-32
Drive chain guide wear - inspect				●		●		●	2-33
Brakes									
Brake fluid leak (brake hose and pipe) - inspect	year	●	●	●	●	●	●	●	2-33
Brake hose and pipe damage - inspect	year	●	●	●	●	●	●	●	2-34
Brake hose installation condition - inspect	year	●	●	●	●	●	●	●	2-34
Brake operation (effectiveness, play, no drag) - inspect	year	●	●	●	●	●	●	●	2-35
Brake fluid level - inspect	6 months	●	●	●	●	●	●	●	2-35
Brake pad wear - inspect #			●	●	●	●	●	●	2-36
Brake light switch operation - inspect		●	●	●	●	●	●	●	2-36
Suspension									
Front forks/rear shock absorber operation (damping and smooth stroke) - inspect				●		●		●	2-37
Front forks/rear shock absorber oil leak - inspect	year			●		●		●	2-38
Rocker arm operation - inspect				●		●		●	2-38
Tie-rods operation - inspect				●		●		●	2-38
Steering									
Steering play - inspect	year	●		●		●		●	2-39
Steering stem bearings - lubricate	2 years					●			2-40
Electrical System									
Lights and switches operation - inspect	year			●		●		●	2-41

Periodic Maintenance Chart

ITEM	FREQUENCY	* ODOMETER READING							See Page
		Whichever comes first ↓	1 (0.6)	6 (3.75)	12 (7.5)	18 (11.25)	24 (15)	30 (18.75)	
Headlight aiming - inspect	year			●		●		●	2-44
Sidestand switch operation - inspect	year			●		●		●	2-45
Engine stop switch operation - inspect	year			●		●		●	2-46
Others									
Chassis parts - lubricate	year			●		●		●	2-46
Bolts and nuts tightness - inspect		●		●		●		●	2-47

#: Service more frequently when operating in severe conditions; dusty, wet, muddy, high speed or frequent starting/stopping.

*: For higher odometer readings, repeat at the frequency interval established here.

2-6 PERIODIC MAINTENANCE

Periodic Maintenance Chart

Periodic Replacement Parts

ITEM	FREQUENCY	* ODOMETER READING × 1 000 km (× 1 000 mile)					See Page
	Whichever comes first ↓ Every	1 (0.6)	12 (7.5)	24 (15)	36 (22.5)	48 (30)	
Air cleaner element - replace #	Every 18 000 km (11 250 mile)					2-48	
Fuel hose - replace	5 years						2-49
Coolant - change	3 years				●		2-51
Radiator hose and O-ring - replace	3 years				●		2-53
Clutch hose - replace	4 years					●	2-54
Clutch fluid - change	2 years			●		●	2-55
Rubber parts of clutch master cylinder/slave cylinder - replace	4 years					●	2-56
Engine oil - change #	year	●	●	●	●	●	2-57
Oil filter - replace	year	●	●	●	●	●	2-58
Brake hose - replace	4 years					●	2-59
Brake fluid - change	2 years			●		●	2-62
Rubber parts of brake master cylinder/caliper - replace	4 years					●	2-63, 2-65
Spark plug - replace			●	●	●	●	2-68

#: Service more frequently when operating in severe conditions; dusty, wet, muddy, high speed or frequent starting/stopping.

*: For higher odometer readings, repeat at the frequency interval established here.

Torque and Locking Agent

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

Letters used in the “Remarks” column mean:

AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.

G: Apply grease.

L: Apply a non-permanent locking agent.

M: Apply molybdenum disulfide grease.

MO: Apply molybdenum disulfide oil solution.

(mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10 : 1)

R: Replacement Parts

S: Follow the specified tightening sequence.

Si: Apply silicone grease.

SS: Apply silicone sealant.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System (DFI)				
Idle Speed Control Valve Actuator Mounting Bolts	8.3	0.85	73 in·lb	
Delivery Pipe Mounting Screws	5.0	0.51	44 in·lb	
Crankshaft Sensor Bolts	5.9	0.60	52 in·lb	L
Gear Position Switch Screws	2.9	0.30	26 in·lb	L
Water Temperature Sensor	12	1.2	106 in·lb	
Throttle Body Assy Holder Bolts	9.8	1.0	87 in·lb	S
Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in·lb	
Vehicle-down Sensor Mounting Nuts	5.9	0.60	52 in·lb	
Throttle Case Screws	3.5	0.36	31 in·lb	
Oxygen Sensor (Equipped Models)	25	2.5	18	
Fuel Level Sensor Bolts	6.9	0.70	61 in·lb	L
Fuel Pump Bolts	9.8	1.0	87 in·lb	L, S
Cooling System				
Water Hose Clamp Screws	3.0	0.31	27 in·lb	
Coolant Fitting Bolts	8.8	0.90	78 in·lb	L
Thermostat Housing Mounting Bolts	9.8	1.0	87 in·lb	
Thermostat Housing Cover Bolts	5.9	0.60	52 in·lb	
Oil Cooler Mounting Bolts	12	1.2	106 in·lb	S
Cylinder Fitting Mounting Bolts	9.8	1.0	87 in·lb	
Water Pump Cover Bolts	9.8	1.0	87 in·lb	
Coolant Drain Bolt	10	1.0	89 in·lb	
Water Temperature Sensor	12	1.2	106 in·lb	
Engine Top End				
Air Suction Valve Cover Bolts	9.8	1.0	87 in·lb	L
Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	S
Camshaft Sprocket Mounting Bolts	15	1.5	11	L
Front Camshaft Chain Guide Bolt (Upper)	25	2.5	18	
Front Camshaft Chain Guide Bolt (Lower)	12	1.2	106 in·lb	
Engine Bracket Bolts (M8)	25	2.5	18	R, S

2-8 PERIODIC MAINTENANCE

Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Front Engine Mounting Bolts (M10)	59	6.0	44	R, S
Camshaft Chain Tensioner Mounting Bolts	9.8	1.0	87 in-lb	
Cylinder Head Bolts (M11)	see the text	←	←	MO, S
Cylinder Head Bolts (M6)	12	1.2	106 in-lb	S
Water Passage Plugs	19.6	2.00	14.5	L
Camshaft Cap Bolts	12	1.2	106 in-lb	S
Upper Camshaft Chain Guide Bolts	12	1.2	106 in-lb	S
Throttle Body Assy Holder Bolts	9.8	1.0	87 in-lb	S
Throttle Body Assy Holder Clamp Bolts	2.0	0.20	18 in-lb	
Spark Plugs	13	1.3	115 in-lb	
Muffler Body Mounting Bolts	34	3.5	25	
Clutch				
Clutch Cover Bolts	9.8	1.0	87 in-lb	L (1)
Oil Filler Plug	–	–	–	Hand-tighten
Clutch Lever Pivot Bolt	1.0	0.10	8.9 in-lb	Si
Clutch Hose Banjo Bolts	25	2.5	18	
Clutch Lever Pivot Bolt Locknut	5.9	0.60	52 in-lb	
Clutch Master Cylinder Bleed Valve	5.4	0.55	48 in-lb	
Clutch Master Cylinder Clamp Bolts	10.3	1.05	91 in-lb	S
Starter Lockout Switch Screw	0.70	0.071	6.2 in-lb	L
Sub Clutch Hub Bolts	25	2.5	18	L
Clutch Spring Bolts	8.8	0.90	78 in-lb	
Clutch Hub Nut	135	13.8	100	R
Clutch Slave Cylinder Bleed Valve	7.8	0.80	69 in-lb	
Engine Lubrication System				
Oil Pipe Mounting Bolts	9.8	1.0	87 in-lb	L
Oil Pipe Bolts	9.8	1.0	87 in-lb	L
Oil Passage Plug (R1/4)	15	1.5	11	L
Oil Cooler Mounting Bolts	12	1.2	106 in-lb	S
Oil Pump Cover Bolts	9.8	1.0	87 in-lb	
Oil Filter	17	1.7	13	G, R
Oil Pan Plate Bolts	9.8	1.0	87 in-lb	L
Oil Filter Holder Mounting Bolt	35	3.6	26	L
Oil Pan Bolts	9.8	1.0	87 in-lb	
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in-lb	G
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Relief Valve	15	1.5	11	L
Oil Passage Plug (R3/8)	20	2.0	15	L
Engine Oil Drain Bolt	30	3.1	22	
Engine Removal/Installation				
Engine Bracket Bolts (M8)	25	2.5	18	R, S
Subframe Bolts	23	2.3	17	R
Front Engine Mounting Bolts (M10)	59	6.0	44	R, S

Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Engine Mounting Nuts (M12)	59	6.0	44	R, S
Adjusting Collars	15	1.5	11	M
Crankshaft/Transmission				
Breather Cover Bolts (L = 25 mm)	9.8	1.0	87 in-lb	
Breather Cover Bolt (L = 35 mm)	9.8	1.0	87 in-lb	
Breather Cover Plate Screws	9.8	1.0	87 in-lb	L
Oil Nozzle Pipe Mounting Bolts	25	2.5	18	
Oil Passage Plugs (R3/8)	20	2.0	15	L
Bearing Position Plate Screws	4.9	0.50	43 in-lb	L
Shift Drum Bearing Holder Screws	4.9	0.50	43 in-lb	L
Clamp Bolts	9.8	1.0	87 in-lb	
Drive Shaft Cover Bolts	25	2.5	18	L
Timing Rotor Bolt	39	4.0	29	
Connecting Rod Big End Nuts	see the text	←	←	MO, R
Crankcase Bolts (M7, L = 60 mm)	20	2.0	15	S
Crankcase Bolt (M7, L = 110 mm)	20	2.0	15	S
Crankcase Bolts (M7, L = 45 mm)	20	2.0	15	S
Crankcase Bolts (M10, L = 90 mm)	49	5.0	36	MO, S
Crankcase Bolt (M7, L = 85 mm)	20	2.0	15	S
Crankcase Bolt (M7, L = 50 mm)	20	2.0	15	S
Crankcase Bolts (M10, L = 120 mm)	49	5.0	36	MO, S
Crankcase Bolt (M6, L = 65 mm)	12	1.2	106 in-lb	S
Crankcase Bolts (M8, L = 80 mm)	27	2.8	20	S
Crankcase Bolts (M6, L = 25 mm)	12	1.2	106 in-lb	S
Crankcase Bolts (M6, L = 40 mm)	12	1.2	106 in-lb	S
Crankcase Bolt (M6, L = 50 mm)	12	1.2	106 in-lb	S
Crankcase Bolts (M8, L = 70 mm)	27	2.8	20	S
Crankcase Bolts (M7, L = 65 mm)	20	2.0	15	S
Balancer Shaft Clamp Bolts	9.8	1.0	87 in-lb	
Balancer Shaft Clamp Lever Bolts	25	2.5	18	
Shift Drum Cam Holder Bolt	12	1.2	106 in-lb	L
Shift Shaft Return Spring Pin	29	3.0	21	L
Gear Position Switch Screws	2.9	0.30	26 in-lb	L
Gear Positioning Lever Bolt	12	1.2	106 in-lb	
Torque Limiter Bolt	25	2.5	18	L
Starter Clutch Shaft Plate Bolt	9.8	1.0	87 in-lb	L
Starter Clutch Shaft Bolt	9.8	1.0	87 in-lb	L
Wheels/Tires				
Front Axle Clamp Bolts	20	2.0	15	AL
Front Axle Nut	127	13.0	93.7	
Rear Axle Nut	127	13.0	93.7	
Final Drive				
Chain Guide Bolt	12	1.2	106 in-lb	L

2-10 PERIODIC MAINTENANCE

Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Chain Guide Bolts	9.8	1.0	87 in-lb	L
Engine Sprocket Nut	127	13.0	93.7	MO
Rear Axle Nut	127	13.0	93.7	
Rear Sprocket Nuts	69	7.0	51	R
Stud Bolts	14.7	1.5	10.8	L
Brakes				
Front Brake Pad Pins	17.2	1.75	12.7	
Bleed Valves	7.8	0.80	69 in-lb	
Front Caliper Mounting Bolts	34	3.5	25	
Front Brake Reservoir Cap Stopper Screw	1.2	0.12	11 in-lb	
Front Caliper Assembly Bolts	27	2.8	20	L
Brake Lever Pivot Bolt	1.0	0.10	8.9 in-lb	Si
Front Brake Master Cylinder Bleed Valve	7.8	0.80	69 in-lb	
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in-lb	
Front Brake Light Switch Screw	1.2	0.12	11 in-lb	
Front Master Cylinder Clamp Bolts	11	1.1	97 in-lb	S
Brake Hose Banjo Bolts	25	2.5	18	
Front Brake Disc Mounting Bolts	27	2.8	20	L
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Rear Master Cylinder Push Rod Locknut	17.2	1.75	12.7	
Brake Pedal Bolt	8.8	0.90	78 in-lb	
Rear Brake Disc Mounting Bolts	27	2.8	20	L
Rear Caliper Assembly Bolts	36.8	3.75	27.1	L
Rear Caliper Mounting Bolts	25	2.5	18	
Rear Brake Pad Pin	17.2	1.75	12.7	
Brake Pipe Joint Nuts (ABS Equipped Models)	18	1.8	13	
Suspension				
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Front Fork Clamp Bolts (Lower)	30	3.1	22	AL
Front Fork Top Plugs	22	2.2	16	
Piston Rod Nuts	28	2.9	21	
Front Axle Clamp Bolts	20	2.0	15	AL
Front Fork Bottom Allen Bolts	23	2.3	17	L
Rear Shock Absorber Nuts	34	3.5	25	R
Swingarm Pivot Shaft	20	2.0	15	
Swingarm Pivot Shaft Locknut	98	10.0	72	
Swingarm Pivot Shaft Nut	108	11.0	79.7	
Rocker Arm Nut	34	3.5	25	R
Tie-Rod Nuts	59	6.0	44	R
Steering				
Handlebar Bolts	34	3.5	25	L
Handlebar Holder Bolts	25	2.5	18	AL

Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Right Switch Housing Screws	3.5	0.36	31 in-lb	
Throttle Case Screws	3.5	0.36	31 in-lb	
Steering Stem Head Nut	78	8.0	58	
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Steering Stem Nut	25	2.5	18	
Left Switch Housing Screws	3.5	0.36	31 in-lb	
Front Fork Clamp Bolts (Lower)	30	3.1	22	AL
Frame				
Front Footpeg Bracket Bolts	25	2.5	18	
Sidestand Nut	44	4.5	32	R, S
Sidestand Bolt	44	4.5	32	S
Sidestand Bracket Bolts	49	5.0	36	L
Sidestand Switch Bolt	8.8	0.90	78 in-lb	L
Center Stand Bolts (Equipped Models)	44	4.5	32	
Rear Footpeg Bracket Bolts	25	2.5	18	
Rear Frame Bolts	44	4.5	32	L
Rear Frame Pipe Bolts	44	4.5	32	
Rear Frame Pipe Nuts	44	4.5	32	R
Front Fender Cover Screws	1.2	0.12	11 in-lb	
Rear Fender Mounting Screws	1.2	0.12	11 in-lb	
Seat Lock Bracket Screws	1.2	0.12	11 in-lb	
Grab Rail Mounting Bolts (Equipped Models)	25	2.5	18	
Electrical System				
Headlight Mounting Screws	1.2	0.12	11 in-lb	
Front Turn Signal Light Mounting Screws	1.2	0.12	11 in-lb	
Tail/Brake Light Mounting Screws	1.2	0.12	11 in-lb	
License Plate Light Mounting Plate Screws	1.2	0.12	11 in-lb	
License Plate Light Cover Mounting Screws	1.8	0.18	16 in-lb	
Starter Motor Through Bolts	3.4	0.35	30 in-lb	
Starter Motor Cable Terminal Nut	5.9	0.60	52 in-lb	
Starter Motor Terminal Locknut	6.9	0.70	61 in-lb	
Starter Motor Mounting Bolts	9.8	1.0	87 in-lb	
Spark Plugs	13	1.3	115 in-lb	
Water Temperature Sensor	12	1.2	106 in-lb	
Engine Ground Terminal Bolt	9.8	1.0	87 in-lb	
Alternator Rotor Bolt	155	15.8	114	S
Alternator Cover Bolts	9.8	1.0	87 in-lb	
Alternator Lead Holding Plate Bolts	7.8	0.80	69 in-lb	L
Stator Coil Bolts	12	1.2	106 in-lb	
Gear Position Switch Screws	2.9	0.30	26 in-lb	L
Crankshaft Sensor Bolts	5.9	0.60	52 in-lb	L
Crankshaft Sensor Cover Bolts	9.8	1.0	87 in-lb	L (1)
Timing Rotor Bolt	39	4.0	29	

2-12 PERIODIC MAINTENANCE

Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in-lb	G
Oil Pressure Switch	15	1.5	11	SS
Switch Housing Screws	3.5	0.36	31 in-lb	
Starter Lockout Switch Screw	0.70	0.071	6.2 in-lb	L
Front Brake Light Switch Screw	1.2	0.12	11 in-lb	
Fuel Level Sensor Bolts	6.9	0.70	61 in-lb	L
Sidestand Switch Bolt	8.8	0.90	78 in-lb	L
Oxygen Sensor (Equipped Models)	25	2.5	18	

The table below, relating tightening torque to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. All of the values are for use with dry solvent-cleaned threads.

Basic Torque for General Fasteners

Threads Diameter (mm)	Torque		
	N-m	kgf-m	ft-lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in-lb
6	5.9 ~ 7.8	0.60 ~ 0.80	52 ~ 69 in-lb
8	14 ~ 19	1.4 ~ 1.9	10.0 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19.0 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17.0 ~ 23.0	125 ~ 165
20	225 ~ 325	23.0 ~ 33.0	165 ~ 240

Specifications

Item	Standard	Service Limit
Fuel System (DFI)		
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	— — —
Idle Speed	1 100 ±50 r/min (rpm)	— — —
Throttle Body Vacuum	36.66 ±1.3 kPa (275.0 ±10 mmHg) at idle speed	— — —
Air Cleaner Element	Viscous paper element	— — —
Cooling System		
Coolant:		
Type (Recommended)	Permanent type of antifreeze	— — —
Color	Green	— — —
Mixed Ratio	Soft water 50%, Coolant 50%	— — —
Freezing Point	−35°C (−31°F)	— — —
Total Amount	3.2 L (3.4 US qt)	— — —
Engine Top End		
Valve Clearance:		
Exhaust	0.22 ~ 0.27 mm (0.0087 ~ 0.0106 in.)	— — —
Inlet	0.15 ~ 0.20 mm (0.0059 ~ 0.0079 in.)	— — —
Clutch		
Clutch Fluid:		
Grade	DOT4	— — —
Clutch Lever Free Play	Non-adjustable	— — —
Engine Lubrication System		
Engine Oil:		
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2	— — —
Viscosity	SAE 10W-40	— — —
Capacity	3.8 L (4.0 US qt) (when filter is not removed)	— — —
	4.2 L (4.4 US qt) (when filter is removed)	— — —
	4.6 L (4.9 US qt) (when engine is completely dry)	— — —
Level	Between upper and lower level lines (Wait 2 ~ 3 minutes after idling or running)	— — —
Wheels/Tires		
Tread Depth:		
Front	4.2 mm (0.17 in.)	1 mm (0.04 in.), (AT, CH, DE) 1.6 mm (0.06 in.)
Rear	5.3 mm (0.21 in.)	Up to 130 km/h (80 mph): 2 mm (0.08 in.), Over 130 km/h (80 mph): 3 mm (0.12 in.)

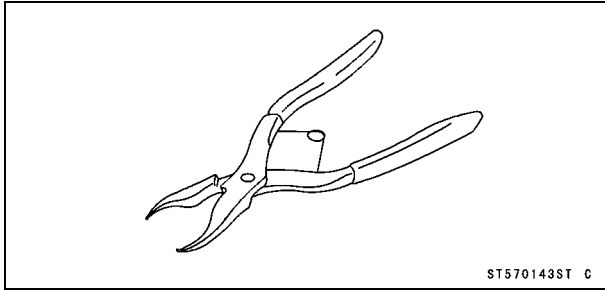
2-14 PERIODIC MAINTENANCE

Specifications

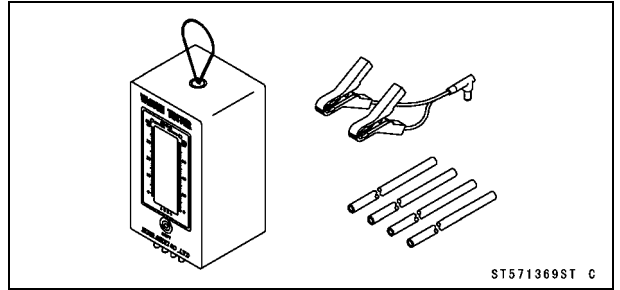
Item	Standard	Service Limit
Air Pressure (when Cold):		
Front	Up to 175 kg (385 lb) load: 290 kPa (2.9 kgf/cm ² , 42 psi)	— — —
Rear	Up to 175 kg (385 lb) load: 290 kPa (2.9 kgf/cm ² , 42 psi)	— — —
Final Drive		
Drive Chain Slack	25 ~ 30 mm (1.0 ~ 1.2 in.)	— — —
Drive Chain Wear (20-link Length)	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	319 mm (12.6 in.)
Standard Chain:		
Make	ENUMA	— — —
Type	EK530RMX/3D	— — —
Link	118 links	— — —
Brakes		
Brake Fluid:		
Grade	DOT4	— — —
Brake Pad Lining Thickness:		
Front	4.0 mm (0.16 in.)	1 mm (0.04 in.)
Rear	5.0 mm (0.20 in.)	1 mm (0.04 in.)
Brake Light Timing:		
Front	Pulled ON	— — —
Rear	ON after about 10 mm (0.39 in.) of pedal travel	— — —
Electrical System		
Spark Plug:		
Type	NGK CR9EIA-9	— — —
Gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in.)	— — —

Special Tools and Sealant

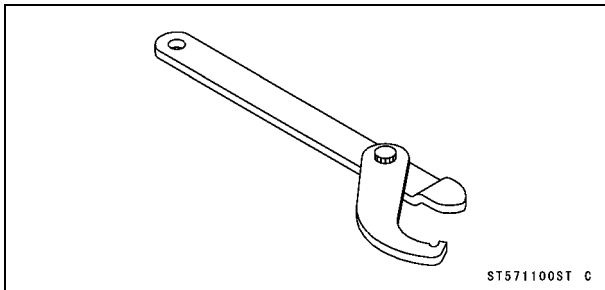
Inside Circlip Pliers:
57001-143



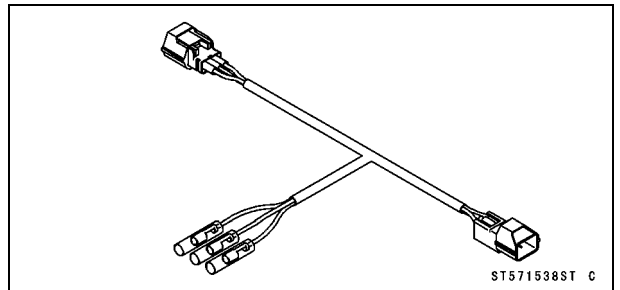
Vacuum Gauge:
57001-1369



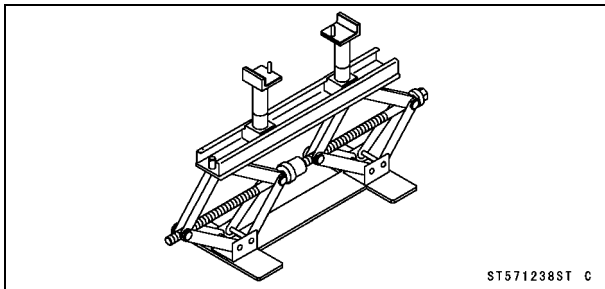
Steering Stem Nut Wrench:
57001-1100



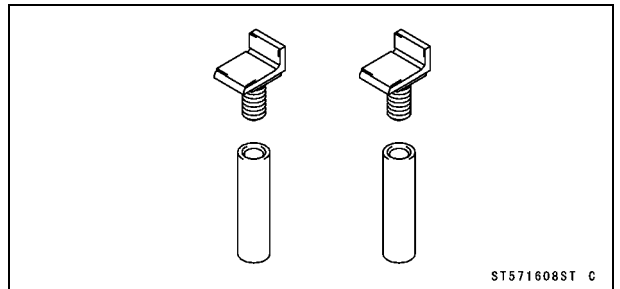
Throttle Sensor Setting Adapter:
57001-1538



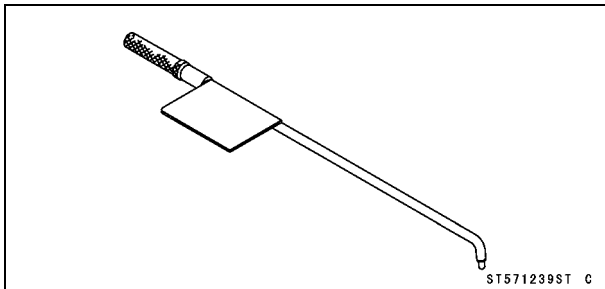
Jack:
57001-1238



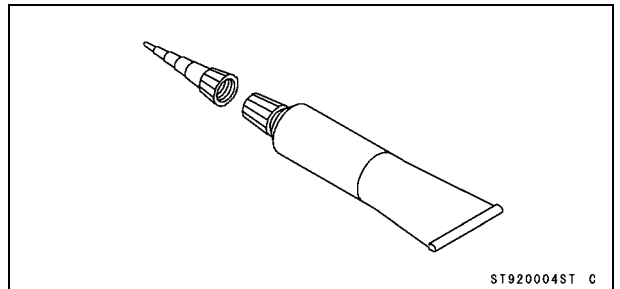
Jack Attachment:
57001-1608



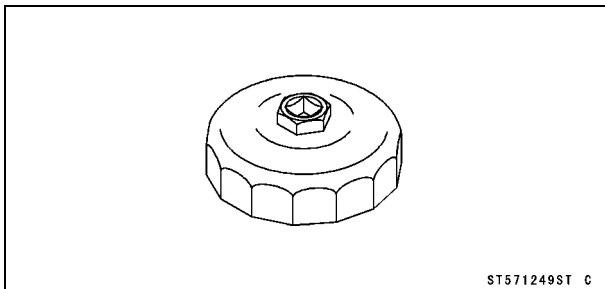
Pilot Screw Adjuster, A:
57001-1239



Liquid Gasket, TB1211F:
92104-0004



Oil Filter Wrench:
57001-1249



2-16 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Fuel System (DFI)

Throttle Control System Inspection

- Check the throttle grip free play [A].
- ★ If the free play is incorrect, adjust the throttle cables.

Throttle Grip Free Play

Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)

- Check that the throttle grip [B] moves smoothly from full open to close, and the throttle closes quickly and completely by the return spring in all steering positions.
- ★ If the throttle grip does not return properly, check the throttle cables routing, grip free play, and cable damage. Then lubricate the throttle cable.
- Run the engine at the idle speed, and turn the handlebar all the way to the right and left to ensure that the idle speed does not change.
- ★ If the idle speed increases, check the throttle cable free play and the cable routing.

★ If necessary, adjust the throttle cable as follows.

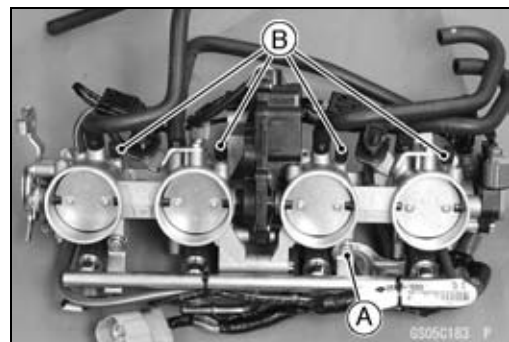
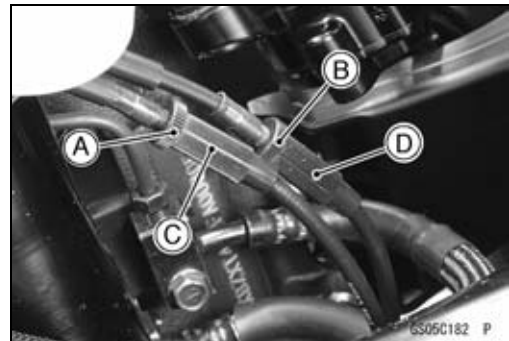
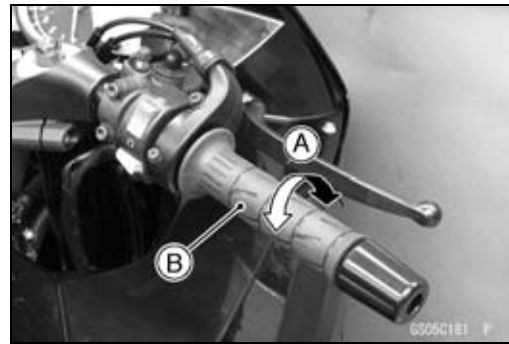
- Loosen the locknuts [A] [B].
- Screw both throttle cable adjusters [C] [D] to give the throttle grip plenty of play.
- Turn the decelerator cable adjuster [C] until 2 ~ 3 mm (0.08 ~ 0.12 in.) of throttle grip play is obtained.
- Tighten the locknut [A].
- Turn the accelerator cable adjuster [D] until 2 ~ 3 mm (0.08 ~ 0.12 in.) of throttle grip play is obtained.
- Tighten the locknut [B].
- ★ If the free play cannot be adjusted with the adjusters, replace the cable.

Engine Vacuum Synchronization Inspection

NOTE

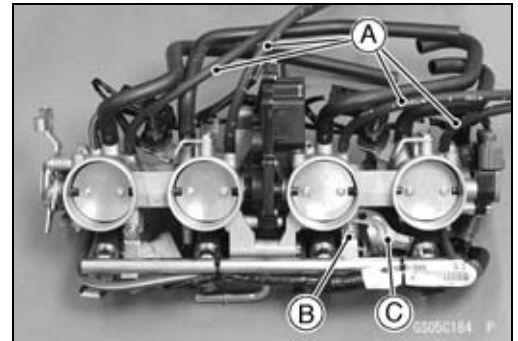
○ These procedures are explained on the assumption that the intake and exhaust systems of the engine are in good condition.

- Situate the motorcycle so that it is vertical.
- Remove:
 - Throttle Body Assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter)
 - Screw [A]
 - Rubber Caps [B] (for CAL and SEA-B1 models, three rubber caps)

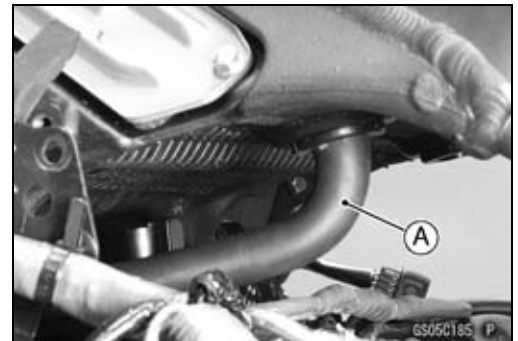


Periodic Maintenance Procedures

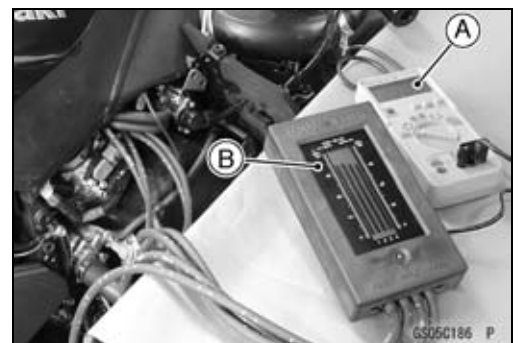
- Connect a vacuum gauge and hoses [A] (Special Tool: 57001-1369) to the fittings on the throttle body.
- **Special Tool - Vacuum Gauge: 57001-1369**
- Tighten the screw [B] without the bracket [C].



- Pull off the air switching valve hose [A] from the frame.
- Plug the air switching valve hose end and frame hole.



- Install the following parts temporarily.
 - Throttle Body Assy (see Throttle Body Assy Installation in the Fuel System (DFI) chapter)
 - Idle Speed Control Valve Actuator (see Idle Speed Control Valve Actuator Installation in the Fuel System (DFI) chapter)
 - Fuel Tank (see Fuel Tank Installation in the Fuel System (DFI) chapter)
- Connect a highly accurate tachometer [A] to one of the stick coil primary leads.
- Start the engine and warm it up thoroughly.
- Check the idle speed, using a highly accurate tachometer.



Idle Speed

Standard: 1 100 ±50 r/min (rpm)

- ★ If the idle speed is out of the specified range, inspect the idle speed control valve actuator (see Idle Control Valve Actuator Inspection in the Fuel System (DFI) chapter).

NOTICE

Do not measure the idle speed by the tachometer of the meter unit.

- While idling the engine, inspect the throttle body vacuum, using the vacuum gauge [B].

Throttle Body Vacuum

Standard: 36.66 ±1.3 kPa (275.0 ±10 mmHg) at idle speed

2-18 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

- ★ If any vacuum is not within specifications, adjust the bypass screws [A].
View from Rear [B]

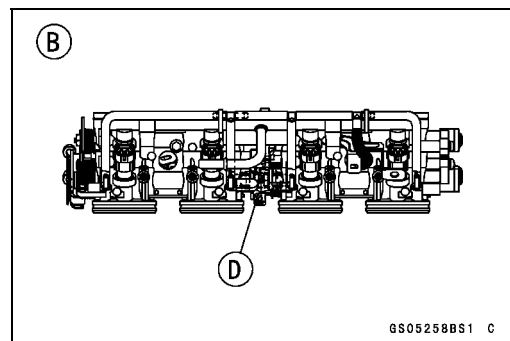
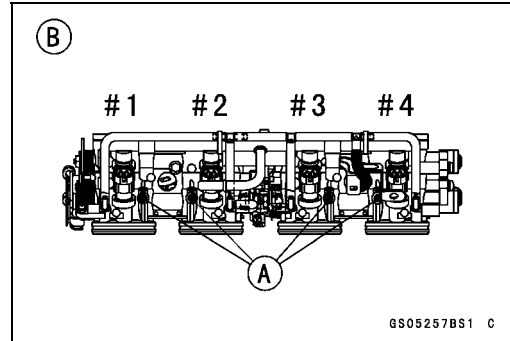
Special Tool - Pilot Screw Adjuster, A [C]: 57001-1239

- Adjust the each vacuum (#1 ~ #4) to the standard value.
- Open and close the throttle valves after each measurement.

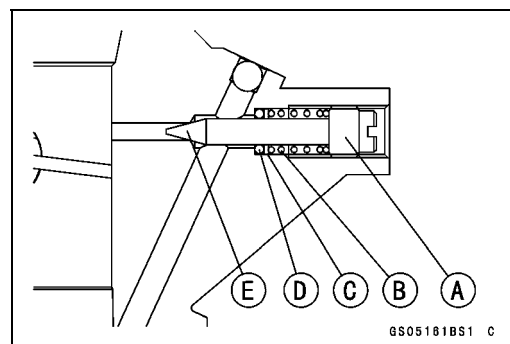
NOTE

○ Do not turn the center adjusting screw [D].

- Check the vacuums as before.
- ★ If all vacuums are within the specification range, finish the engine vacuum synchronization.
- ★ If any vacuum can not be adjusted within the specification, replace the bypass screws #1 ~ #4 with new ones, refer to the following procedure.



- Remove the throttle body assy (see Throttle Body Assy Removal in the Fuel System (DFI) chapter).
- Turn in the bypass screw [A] with counting the number of turns until it seals fully but not tightly. Record the number of turns.
- Remove:
 - Bypass Screw
 - Spring [B]
 - Washer [C]
 - O-ring [D]
- Check the bypass screw hole in the throttle body for carbon deposits.
- ★ If any carbons accumulate, wipe the carbons off from the hole, using a cotton pad penetrated with a high flash-point solvent.
- Replace the bypass screw, spring, washer and O-ring as a set.
- Turn in the bypass screw until it seats fully but not tightly.



NOTICE

Do not over-tighten the bypass screw. The tapered portion [E] of the bypass screw could be damaged.



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