This manual should be considered a permanent part of the motorcycle and should remain with the motorcycle when resold or otherwise transferred to a new owner or operator.

The manual contains important safety information and instructions which should be read carefully before operating the motorcycle.

### AWARNING/ACAUTION/NOTICE/NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the symbol **A** and the words **WARNING**, **CAUTION**, **NOTICE** and **NOTE** have special meanings. Pay particular attention to messages highlighted by these signal words:

### **WARNING**

Indicates a potential hazard that could result in death or serious injury.

### **A** CAUTION

Indicates a potential hazard that could result in minor or moderate injury.

#### **NOTICE**

Indicates a potential hazard that could result in motorcycle or equipment damage.

#### NOTE:

Indicates special information to make maintenance easier or instructions clearer.

# **FOREWORD**

This manual is presented as a means whereby you can maintain your RM-Z450 in top working condition at all times. Your riding skill and the maintenance steps outlined in this manual will assure you of top performance from your machine under any type of competition.

We sincerely wish you and your Suzuki motorcycle a successful partnership for many years of happy riding.

All information, illustrations, photographs and specifications contained in the manual are based on the latest product information available at the time of publication. Due to improvements or other changes, there may be some discrepancies in this manual. Suzuki reserves the right to make production changes at any time, without notice and without incurring any obligation to make the same or similar changes to motorcycle previous built or sold.

Suzuki Motor Corporation believes in conservation and protection of Earth's natural resources. To that end, we encourage every motorcycle owner to recycle, trade in, or properly dispose of, as appropriate, used motor oil, engine coolant, and other fluid, and tires.

### **SUZUKI MOTOR CORPORATION**

# **GENERAL CONSIDERATIONS**

### · Wear a helmet and goggles

A helmet is the most important piece of gear to wear. Helmets do not reduce essential vision or hearing. Generally, helmets do not cause or intensify injury if you crash. Helmets simply help your skull protect your intelligence, your memory, your personality, and your life.

Your eyesight is equally valuable. Wearing suitable eye protection can help keep your vision unblurred by the wind and help shield your eyes from branches and airborne matter like bugs, dirt, or pebbles kicked up by tires. Wear a helmet and eye protection every time you ride.

### • Wear protective gear

Wear proper clothing when you ride. Avoid loose clothes or scarves, which could get caught in moving parts. Abrasion injuries can be minimized by wearing protective clothing including gloves, strong boots that fit over the ankle, long pants, and a long sleeve shirt or jackets. Experienced riders often wear a kidney belt and chest or back protector for additional comfort and protection.

# Inspect your machine before riding Before each use, perform an inspection per "Periodic Inspection" section starting on page 2-3.

## No Passengers

Suzuki RM-Zs are designed for the rider only.

### Practice before competing

Before you begin competing, you should practice the skills you need to ride safely.

Review the controls on your motorcycle before riding.

### Know your limits

Always ride within the boundaries of your own skills. Knowing these limits and staying within them will help you avoid accidents. Ride only in events appropriate for your experience.

Safely competing on a motorcycle requires that your mental and physical skills are fully part of the experience. You should not attempt to operate a motorcycle, especially one with two wheels, if you are tired or under the influence of alcohol or other drugs. Alcohol, illegal drugs, and even some prescription and over-the-counter drugs and cause drowsiness, loss of coordination, loss of balance, and loss of good judgement. If you are tired or under the influence of alcohol or other drugs, PLEASE DO NOT RIDE your motorcycle.

### Conclusion

The actions of other riders are unpredictable. Your motorcycle's condition can change. These factors can best be dealt with by giving every ride your full attention.

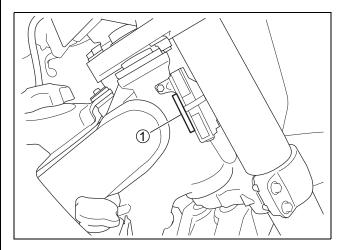
Circumstances beyond your control could lead to an accident. You need to prepare for the unexpected by wearing a helmet and other protective gear, and practicing safe riding techniques to minimize the damage to you and your machine.

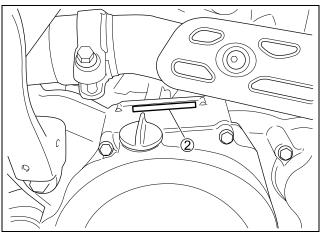
May all of your rides on your new Suzuki be winning rides!

# SERIAL NUMBER LOCATION

The frame number ① is stamped on the steering head as shown in the illustration. The engine serial number ② is stamped on the right side of the crankcase assembly.

Write down the serial numbers here for your future reference.





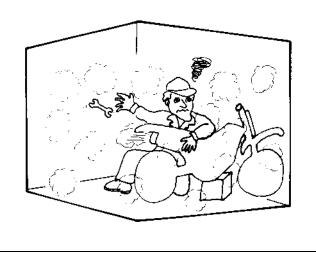
Frame No.	
Engine No.	

# WARNINGS FOR SERVICING

### **WARNING**

Never run the engine indoors or in a garage. Exhaust gas contains carbon monoxide, a gas that is colorless and odorless and can cause death or severe injury.

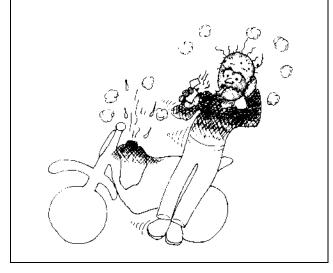
Only run the engine outdoors where there is fresh air.



### **WARNING**

Fuel can catch on fire if you do not handle it properly. Gasoline vapors can catch fire easily.

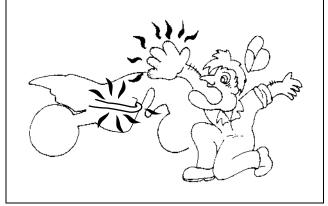
Do not smoke when servicing the machine. Do not service the machine in an area where there are open flames or sparks.



### **WARNING**

Hot engine and muffler can burn you.

Wait until the engine and muffler cools before servicing.



### **WARNING**

Brake fluids and engine coolant can be hazardous to humans and pets. Brake fluid and engine coolant are harmful or fatal if swallowed, and harmful if it comes in contact with your skin or eyes.

Keep brake fluid and engine coolant away from children. Call your doctor immediately if swallowed, and induce vomiting. Flush eyes or skin with water if either brake fluid or engine coolant gets in eyes or comes in contact with skin.



### **WARNING**

Servicing the machine with engine running can be hazardous. You can be caught in the moving parts such as the drive chain, sprockets etc.

Be sure to stop the engine when servicing the machine.



### **▲** WARNING

The strainer has a strong magnet. Magnetic force may affect pacemaker operation.

Do not perform the maintenance if you wear a pacemaker because this magnet has strong magnetic force.

# PRECAUTIONS FOR SERVICING

### **WARNING**

Servicing the machine without proper clothes and protective gear can be hazardous. You can be injured if you do not wear proper clothes and protective gear.

Be sure to wear proper clothes and shoes for servicing and wear protective glasses, mask or gloves as necessary.



#### **NOTICE**

Performing the maintenance improperly can cause damage to the parts or the motorcycle.

To prevent the parts or the motorcycle from damage, be sure to take the following precautions:

Replace gaskets, snap rings, circlips, Orings and cotter pins with new ones.

- \* Take care not to expand the end gap larger than required to slip the circlip over the shaft when installing a circlip.
- \* Use special tools where specified.
- \* Use genuine SUZUKI parts and recommended oil.
- \* When two or more persons work together, pay attention to the safety of each other.
- \* After reassembly, inspect parts for tightness and operation.

#### **NOTICE**

High pressure washers such as those found at coin-operated car washes have enough pressure to damage the parts of your motorcycle. It may cause rust, corrosion and increase wear. Parts cleaner can also damage motorcycle parts.

Do not use high pressure washers to clean your motorcycle. Do not use parts cleaner on throttle body and fuel injection sensors.

#### NOTE:

- \* Clean a motorcycle from dirt and/or dust before servicing.
- \* Avoid spraying or allowing water to flow over the following places:
  - Spark plug
  - Fuel tank cap
  - Throttle body
  - Fuel injection system
  - Brake master cylinders
  - Air cleaner inlet
- \* Be sure to dry the motorcycle after washing the motorcycle. Blow off water from parts by applying air blow if it is necessary to remove parts just after washing the motorcycle.

# **REPLACEMENT PARTS**

### NOTE:

Use of replacement parts which are not equivalent in quality to genuine SUZUKI parts can lead to performance problems and damage.

Use only genuine SUZUKI replacement parts or their equivalent. Genuine SUZUKI parts are high quality parts which are designed and built specially for SUZUKI motorcycle.

# **SYMBOL MARKS AND MATERIALS**

Listed in the table below are the symbols indicating instructions and other information. The meaning of each symbol is also included in the table.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Torque control required.  Data beside it indicates specified torque.	1360	Apply THREAD LOCK CEMENT "1360" or equivalent. 99000-32130
일	Apply oil. Use engine oil or transmission oil unless otherwise specified.	FORK	Use SHOWA SUSPENSION FLUID SS-19 or equivalent.
M/O	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1:1)	RS	Use SHOWA SUSPENSION FLUID SS-25 or equivalent.
FAH	Apply SUZUKI SUPER GREASE "A" or equivalent. 99000-25011	LLC	Use SUZUKI SUPER LONG LIFE COOLANT (BLUE). 99000-99032-20X Use SUZUKI LONG LIFE COOLANT (GREEN) or equivalent. 99000-99032-12X
FSH	Apply SUZUKI SILICONE GREASE or equivalent. 99000-25100	BF	Apply or use brake fluid. (DOT 4)
FMH	Apply SUZUKI MOLY PASTE or equivalent. 99000-25140	ŲV j	Measure in voltage range.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
<b>≠</b> WH	Apply SUZUKI WATER RESISTANT GREASE EP2 or equivalent. 99000-25350		Measure in resistance range.
1215	Apply SUZUKI BOND "1215" or equivalent. 99000-31110		Measure in diode test range.
1207B	Apply SUZUKI BOND "1207B" or equivalent. 99000-31140	TOOL	Use special tool.
1303В	Apply THREAD LOCK CEMENT "1303B" or equivalent. 99000-32030	DATA	Indication of service data.
1322D	Apply THREAD LOCK CEMENT "1322D" or equivalent. 99000-32150	×	Replace a part with a new one when reassembling.
1342H	Apply THREAD LOCK CEMENT "1342H" or equivalent. 99000-32160		

# ABBREVIATIONS USED IN THIS MANUAL

: Alternating Current

API

AC

: American Petroleum Institute

В

**BTDC** B+

: Before Top Dead Center : Battery Positive Voltage

C

CKP Sensor : Crankshaft Position Sensor

(CKPS)

D

DC : Direct Current

DTC : Diagnostic Trouble Code

Ε

**ECM** : Engine Control Module

Engine Control Unit (ECU)

(FI Control Unit)

: Engine Coolant Temperature ECT Sensor

Sensor (ECTS), Water Temp.

Sensor (WTS)

F

FΙ : Fuel Injection, Fuel Injector

FΡ : Fuel Pump

: Fuel Pump Relay FP Relay

G

**GND** : Ground

**GP Switch** : Gear Position Switch

IAP Sensor : Intake Air Pressure Sensor

(IAPS)

(MAP Sensor)

: Intake Air Temperature Sensor IAT Sensor

(IATS)

J

**JASO** : Japanese Automobile Standards

Organization

: Left Hand LH

M

Max : Maximum Min : Minimum

R

RH : Right Hand

S

SAE : Society of Automotive Engineers S-HAC : Suzuki Holeshot Assist Control

Т

Gr

TO Sensor : Tip-Over Sensor (TOS)

TP Sensor : Throttle Position Sensor (TPS)

WIRE COLOR

: Grav

: Light green В : Black Lg ВΙ : Blue : Orange 0

Υ

: Yellow

Br : Brown Р : Pink : Dark green R : Red Dg : Green W : White G

B/BI : Black with Blue tracer

B/Br : Black with Brown tracer

B/W : Black with White tracer B/Y : Black with Yellow tracer

BI/B : Blue with Black tracer

BI/G : Blue with Green tracer

BI/R : Blue with Red tracer

BI/W : Blue with White tracer

BI/Y : Blue with Yellow tracer

Br/W : Brown with White tracer

G/B : Green with Black tracer G/W

: Green with White tracer

Gr/W : Grav with White tracer

R/B : Red with Black tracer

R/BI : Red with Blue tracer

W/BI : White with Blue tracer W/R : White with Red tracer

Y/R : Yellow with Red tracer

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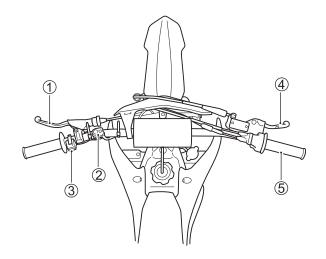
# **COUNTRY AND AREA CODES**

The following codes stand for the applicable country(-ies) and area(-s). NOTE:

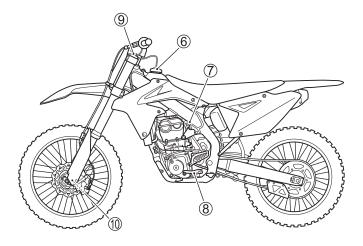
"#" indicates any check digit from 0 to 9 and X.

CODE	COUNTRY or AREA	EFFECTIVE FRAME NO.
000	Japan	JS1RL42A0H0500001 -
E-03	U.S.A.	JS1RL42C#H2100001 -
E-19	E.U.	JS1RL42A0H0500001 -
E-28	Canada	JS1RL42C#H2100001 -

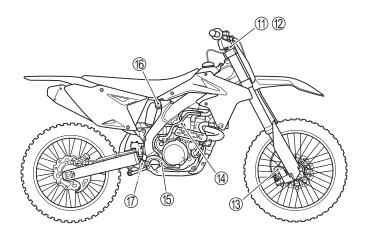
# **LOCATION OF PARTS**



- 1 Clutch lever
- ② S-HAC switch
- 3 Engine stop switch
- 4 Front brake lever
- ⑤ Throttle grip



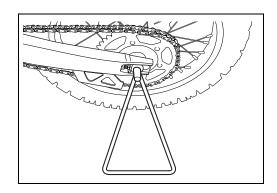
- 6 Fuel tank cap
- Starter knob/Idle screw
- 8 Gearshift lever
- 9 Front fork compression damping force adjuster
- 10 Front fork rebound damping force adjuster



- 1 Front fork inner chamber air valve
- (2) Front fork outer chamber air valve
- (3) Front fork balance chamber air valve
- (14) Kick starter lever
- (5) Rear brake pedal
- 16 Rear suspension compression damping force adjuster
- The Rear suspension rebound damping force adjuster

# **ACCESSORY** SIDE STAND

This motorcycle is not equipped with a side stand. To support the motorcycle for a short period of time, use the accessory side stand that comes supplied with the motorcycle. When servicing the motorcycle, use a service stand and support the underneath of the engine securely. When operating the motorcycle, make sure to remove the accessory side stand.



## FUEL AND OIL RECOMMENDATION

Gasoline: Use only unleaded gasoline of at least 90 pump

octane. (R/2 + M/2 method) ..... For USA and Canada Use only unleaded gasoline of at least 95 octane. (Research method)...... For other countries

# OXYGENATED FUEL RECOMMENDATION (USA, CANADA AND EU)

Oxygenated fuels which meet the minimum octane requirement and the requirements described below may be used in your motorcycle without jeopardizing the New Vehicle Limited Warranty or the Emission Control System Warranty.

### NOTE:

Oxygenated fuels are fuels which contain oxygen-carrying additives such as MTBE or alcohol.

### Gasoline containing MTBE

Unleaded gasoline containing MTBE (Methyl Tertiary Butyl Ether) may be used in your motorcycle if the MTBE content is not greater than 15%. This oxygenated fuel does not contain alcohol.

### Gasoline/Ethanol Blends

Blends of unleaded gasoline and ethanol (grain alcohol), also known as GASOHOL, are commercially available in some areas. Blends of this type may be used in your motorcycle if they are no more than 10% ethanol (@). Make sure this gasoline-ethanol blend has octane ratings no lower than those recommended for gasoline.

## Gasoline/Methanol Blends

Fuels containing 5% or less methanol (wood alcohol) may be suitable for use in your motorcycle if they contain co-solvents and corrosion inhibitors.

DO NOT USE fuels containing more than 5% methanol under any circumstances. Fuel system damage or motorcycle performance problems resulting from the use of such fuels are not the responsibility of Suzuki and may not be covered under the New Vehicle Limited Warranty or the Emission Control System Warranty. NOTE:

- \* To help minimize air pollution, Suzuki recommends that you use oxygenated fuels.
- \* Be sure that any oxygenated fuel you use has recommended octane ratings.
- \* If you are not satisfied with the drivability of your motorcycle when you are using an oxygenated fuel, or if engine pinging is experienced, substitute another brand as there are differences between brands.

#### **NOTICE**

Spilled gasoline containing alcohol can damage the painted surfaces of your motorcycle.

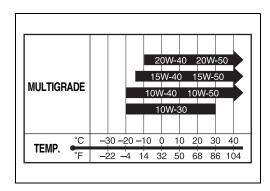
Be careful not to spill any fuel when filling the fuel tank. Wipe spilled gasoline up immediately.

Engine oil: SUZUKI recommends the use of SUZUKI PERFOR-MANCE 4 MOTOR OIL or equivalent. Use of SG/SH/SJ/SL in API with JASO MA/MA1/MA2. The recommended viscosity is SAE 10W-40. If an SAE 10W-40 oil is not available, select an alternative according to the right chart.

For USA

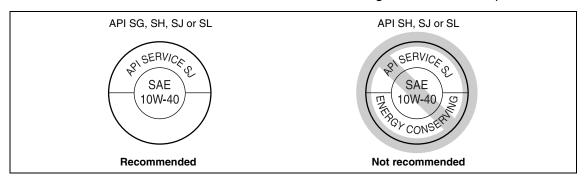
MOTUL 300V 10W-40 (recommendation) or use a premium quality 4-stroke motor oil to ensure longer service life of your motorcycle. Use of SG/SH/SJ/SL in API with JASO MA/MA1/MA2. The recommended viscosity is SAE 10W-40. If an SAE 10W-40 motor oil is not available, select an alternative according to the right chart.





### **Energy Conserving**

Suzuki does not recommend the use of "ENERGY CONSERVING" or "RESOURCE CONSERVING" oils. Some engine oils which have an API classification of SH, SJ or SL have an "ENERGY CONSERVING" indication in the API classification donut mark. These oils can affect engine life and clutch performance.



Fuel tank capacity: 6.2 L (1.6/1.4 US/Imp gal)

### **WARNING**

Gasoline is a flammable material that can cause fire hazard or burns.

When handling gasoline, make sure to stop the engine and keep away from fire or spark.

# OPERATING INSTRUCTIONS

#### **NOTICE**

Leaving the engine at idling speed after riding will cause engine overheat as this competition motorcycle does not have the radiator cooling fan and coolant reservoir. Riding the motorcycle under severe conditions such as muddy or sandy terrain with high ambient temperature can shorten time to be overheated.

Do not leave the engine at idling after riding the motorcycle. Inspect the radiator for proper coolant level before riding for practice and race.

### STARTING THE ENGINE

- Inspect the engine oil level, coolant level and air cleaner condition before starting the engine.
- Check that the fuel tank has enough fuel for practice or race before starting the engine.
- · Shift the transmission into neutral.

#### NOTE:

When the clutch lever is pulled, the motorcycle can be started with the transmission in any gear.

#### NOTE:

Racing the engine in neutral will exceed the engine speed limit. Exceeding the engine speed limit can shorten engine life. Do not race the engine at high speed.

### When the engine is cold:

1) Pull out the starter knob/idle screw ①.

### NOTE:

When pulling the starter knob/idle screw ①, do not turn it.

2) Kick down the kick starter lever slowly from the top position until engine compression resistance is felt, release the kick starter lever from this position and allow it to return to the top. While keeping the throttle closed, depress the kick starter lever strongly through the full stroke. Never open the throttle during the kick start operation.

### NOTE:

When kick-starting the engine, make sure to remove the side stand.

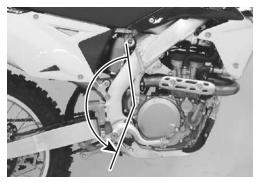
3) Return the starter knob/idle screw 1 when the engine revs at steady speed.

### NOTE:

Turning the starter knob/idle screw 1 clockwise can decrease engine idle speed.

Turning the screw counterclockwise can increase engine idle speed. Standard knob position is 5 to 6 turns out from fully turned in position.





### When the engine is already warm or restarts:

While keeping the throttle closed, start the engine by depressing the kick starter lever strongly through the full stroke.

#### NOTE:

If the engine fails starting, open the throttle fully and depress the kick starter lever slowly about 4-5 times to clear too rich fuel mixtures in the engine. Then, kick the engine over, leaving the throttle closed.

Conditions when the starter knob/idle screw is used			
Engine Condition	Starter Knob/Idle Screw		
Warm engine	Push back (OFF)		
Cold engine	Pull out (ON)		

### When the motorcycle is not used long time:

Due to deterioration of fuel remaining in the fuel line for long period, engine will be difficult to start until the deteriorated (stale) fuel is discharged from the fuel line. Repeated kick operation is required for flushing the fuel line with fresh fuel.

- 1) Fill the fuel tank more than half full.
- 2) Shift the transmission into neutral.
- 3) While keeping the throttle approximately 1/4 open, repeat kick start operation 30 to 40 times.

#### NOTE:

Fuel injection volume is controlled to increase in throttle open condition. However, do not open throttle more than 1/2 as fuel injection is shut off in wide open throttle in engine start mode.

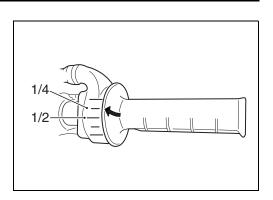
4) Start the engine by following cold engine start procedure.

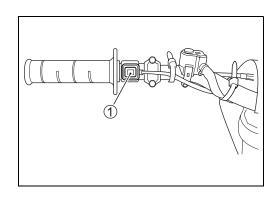
#### NOTE:

If the engine fails to start after several attempts, it could mean that the air-fuel mixture inside the combustion chamber is less than optimal. In this case, repeat kick start operation 4 to 5 times with throttle fully opened to clear too rich fuel mixtures in the engine. No fuel is injected with full throttle opening in engine start mode.

# STOPPING THE ENGINE

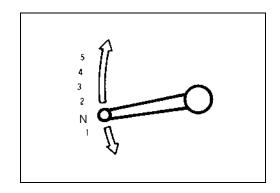
- 1) Shift the transmission into neutral.
- 2) Push the engine stop switch ① to stop the engine.





### TRANSMISSION

This motorcycle has a 5-speed transmission. Neutral is located between low and 2nd. Engage first gear by pressing the lever down from the neutral position. You can shift into higher gears by lifting the shift lever once for each gear. When neutral is desired, press or lift the lever to a position halfway between low and 2nd gear.



### SELECTION OF ECM TUNING MAP

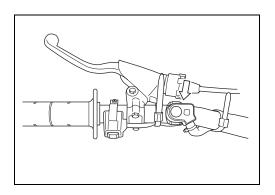
This motorcycle lets you select one of three ECM maps to suit weather and running conditions.

Refer to SELECTION OF ECM TUNING MAP for details. ( 34-2)

# **SELECTION OF S-HAC (SUZUKI HOLESHOT** ASSIST CONTROL) MAP

This is a system that assists operation during the start of races that use a starting gate.

Refer to SELECTION OF S-HAC (SUZUKI HOLESHOT ASSIST CONTROL) MAP for details. ( 4-4)

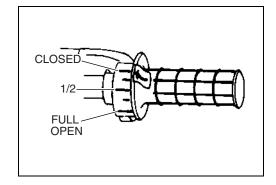


# **BREAK-IN (RUNNING-IN)** WHEN THE MOTORCYCLE IS NEW

- 1) Warm up the engine before starting off.
- 2) Ride for 60 minutes using less than 1/2 throttle opening.
- 3) Ride for 60 minutes using less than 3/4 throttle opening.

### NOTE:

- \* The break-in (running-in) period is the period of greatest wear.
- \* The bolts and nuts of the new machine can loosen quickly. Be sure to retighten the bolts and nuts during the break-in (running-in) period.



### WHEN ENGINE PARTS ARE REPLACED

Follow the same procedure when any of the following parts are replaced:

Piston

Piston ring

Cylinder

Crankshaft

Crankshaft bearing

# PERIODIC MAINTENANCE

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# PERIODIC MAINTENANCE

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FRONT BRAKE CALIPER AXLE BOLT	<i>2-35</i>	
BRAKE PAD		
FRONT BRAKE LEVER ADJUSTMENT	<i>2-36</i>	
BRAKE PEDAL HEIGHT ADJUSTMENT		
FRONT FORK	<i>2-37</i>	
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REAR SUSPENSION		
WHEELS AND TIRES		
WHEEL RIM AND TIRES INSPECTION		
SPOKE NIPPLE AND RIM LOCK INSPECTION		
TIRE PRESSURE		
STEERING		
FRAME		
FRAME INSPECTION		
SWINGARM		
SWINGARM INSPECTION	_	
FUEL TANK		
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LUBRICATION		
COMPRESSION PRESSURE CHECK		
COMPRESSION TEST PROCEDURE		
OIL PRESSURE CHECK		
OIL PRESSURE TEST PROCEDURE	<i>2-43</i>	

# PERIODIC MAINTENANCE **INSPECTION BEFORE PRACTICE**

WHAT TO CHECK	CHECK FOR
Spark plug	Heat range, fouled electrode, tightness
	Loose spark plug cap
Air cleaner element	• Dust
	Lubrication
Engine oil	Oil level
Coolant	Coolant level
Cooling system	Radiator hose damage
	Engine coolant leak
Clutch	Play
	Smooth operation
Throttle	Play
	Smooth operation
Crankcase breather hose	Breather hose clogging and bend
Engine idle speed	Revolution speed
Brake fluid	Fluid level
Brakes	Brake lever position
	Brake pedal height
	Operation
Drive chain and engine sprocket	Slack, lubrication, wear
	Loose sprocket bolt
Drive chain guide, buffer and rollers	Wear, damage
Suspension	Smooth operation
	Front fork air pressure
Wheels	Spoke tension
	Rim lock tightness or damage
Tires	Tire pressure
Steering	Smoothness, play
Exhaust pipe and muffler	Exhaust gas leakage
	Tightening torque
Bolts and nuts	Tightening torque

# **INSPECTION BEFORE RACE**

# (All items of inspection before practice on previous page plus)

WHAT TO CHECK	CHECK FOR
Clutch	Clutch disc plates wear and distortion
Brake pads	Wear
Sprockets	Wear Cleanliness
Fuel tank	Leakage
Fuel hose	Damage
	Hose connection
Exhaust pipe and muffler	Damage
Cylinder head	Combustion chamber carbon deposit
Piston and Cylinder	Piston head carbon deposit
	Piston and cylinder wear
Air cleaner	Damage
	Loose outlet tube
	Sheets peel off (E-19 only)

# PERIODIC MAINTENANCE CHART

It is very important to inspect and maintain the machine regularly. Follow the guideline in the chart. The life of parts varies depending on the riding conditions. Perform more often than shown in the chart if you use the motorcycle under severe conditions.

Interval			- Fyon	- Fuer	T
Interval	races	Every	Every 3 races	Every 6 races	
Service		race Every	Every	Every	Remarks
Item	hours	2 hours	6 hours	12 hours	
Spark plug		I	- 0 110u13	12 110u13	
Air cleaner		C			Replace air cleaner element as necessary.
Engine oil			R		Change after 1st initial break-in.
Engine oil filter			Π	R	Change after 1st initial break-in.
Oil strainers				П	Inspect after 1st initial break-in.
Oli stialileis				_	Replace radiator hose and engine coolant
Cooling-system		1			every year.
Cooling-system		I	_	_	Flushing for overhaul or storage.
Clutch		ı			Replace clutch plates as necessary.
Throttle cable and	Lelutch	<u> </u>			riepiace ciutori piates as riecessary.
cable	Clutch	I&L	_	_	
Throttle body		I	_	_	
Throttle position s	ensor	I		_	
Crankcase breathe	er hose	1		_	
Fuel hose		1		_	Replace every 4 years.
Valve clearance		_			
Piston		_		R	
Piston ring		_		R	
Cylinder head, cy	linder	_	_	ı	
Muffler		I	_	_	
Silencer		I	_	R	Replace after race in sand.
Kick starter lever		I&L	_	_	
Drive chain		I&L	R	_	Adjust slack every 30 minutes.
Crankcase drives	hoft oil				Inspect the oil seal frequently for abnormal-
seal	Hall OII	I	_	_	ity (dust, stone or foreign materials).
Seai					If necessary, replace it with a new one.
Engine sprocket		1	_	_	Check sprocket bolt for looseness at each
Lingine sprocket					race thereafter.
					Check and retighten sprocket bolts at initial
Rear sprocket		I	_	_	and subsequent 10 minutes of riding and
					each race thereafter.
Drive chain buffer	and	_	R	_	
guide					
Brake		İ	_		Replace brake hose and fluid every year.
Front brake calipe	er axle	_	Т	_	
bolt			•		

Interval	roooo	Every	Every	Every	
	races	race	3 races	6 races	Remarks
Service	houre	Every	Every	Every	nemarks
Item	hours	2 hours	6 hours	12 hours	
Front fork oil			R	_	Change after 1st initial break-in.
Front fork		ı		_	Check front fork inner tube frequently for
		ı			abnormality. Check the air pressure.
		1		_	Check rear suspension system frequently
Rear suspension					and apply the grease to the pivoting portion
					as necessary.
Tire					
Spoke nipple		I	1		Inspect every 20 min. up to initial 2 hours
					then check before each ride.
Steering		1	_	_	
Frame		1	_	_	
Swingarm		I	_	_	
Fuel tank		I	_	_	
Bolts and nuts		Т	_	_	Retighten every 1 hour.

NOTE: R = Replace, C = Clean, T = Tighten, I = Inspect and clean, adjust lubricate or replace if necessary, L = Lubricate

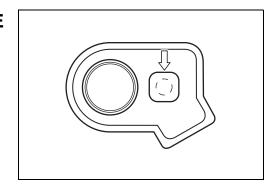
# **ENGINE RUN TIME INDICATION PROCEDURE**

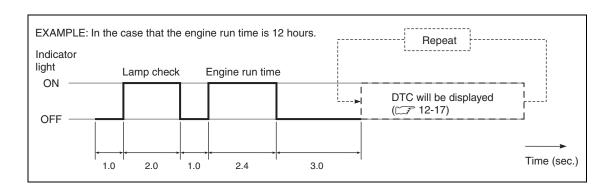
- 1. Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)
- 2. After indicator light will be lit for 2 seconds (lamp check), engine run time will be displayed by indicator light lighting time.

### 36890-28H00: Battery lead wire (option)

### NOTE:

- \* Lighting of lamp check and engine run time is made only at the first time, and when there is DTC available, this DTC will be displayed repeatedly.
- \* Indicator light will be lit for 0.2 sec. per 1 hour of engine run time.
  - However, the display of engine run time is limited to 100 hours (lit for 20 sec.)
- \* Perform the same operation when starting the engine.





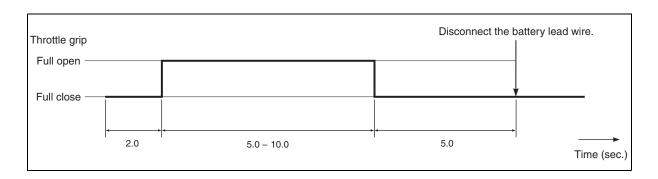
# **ENGINE RUN TIME RESET PROCEDURE**

- 1. Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)
- 2. After connecting the battery lead wire, turn the throttle grip to full open within 2 seconds, then maintain this state for 5 to 10 seconds.
- 3. Fully close the throttle grip for more than 5 seconds.
- 4. Disconnect the battery lead wire.

### 36890-28H00: Battery lead wire (option)

### NOTE:

In case of TP sensor failure, no engine run time reset operation is possible.



# **SPARK PLUG**

- Remove the seat. ( 5-2)
- Remove the radiator covers and fuel tank. (5-2)
- Disconnect the spark plug cap.
- Remove the spark plug.

09930-10121: Spark plug wrench set

### NOTE:

Remove the dirt around the spark plug before removing the spark plug to prevent dirt from entering the combustion chamber.

- Inspect the spark plug condition, electrode color, carbon deposits, spark plug gap and insulator damage.
- If it is extremely worn or burnt, replace the spark plug.
   Also, replace the spark plug if it has a broken insulator, damaged thread, etc.
- Inspect the porcelain tip color.

Porcelain tip color	Cause	
White (overheated)	<ul><li>Hot type spark plug</li><li>Advanced ignition timing</li><li>Lean air/fuel mixture</li><li>Deteriorated fuel</li></ul>	
Black (fouled)	<ul><li>Cold type spark plug</li><li>Retarded ignition timing</li><li>Rich air/fuel mixture</li></ul>	

- If it is not within the specification, replace the spark plug.

#### NOTE:

To prevent the damage of iridium center electrode, use a wire gauge to check the gap. Never adjust the spark plug gap.

09900-20803: Thickness gauge

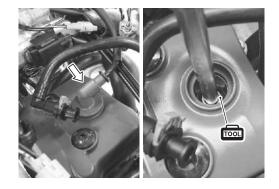
**PATA** Spark plug gap  $\triangle$ : 0.9 – 1.0 mm (0.035 – 0.039 in)

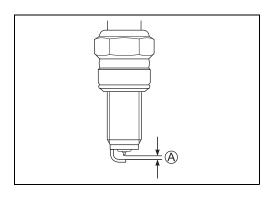
DAVA Standard Spark plug

 Tighten the spark plug with specified tightening torque after tightening the spark plug temporarily with fingers.

Spark plug: 11 N⋅m (1.1 kgf-m, 8.0 lbf-ft)

09930-10121: Spark plug wrench set

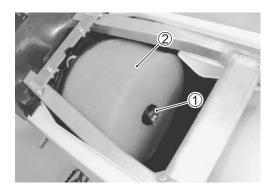




# **AIR CLEANER**

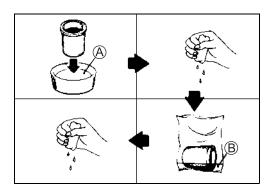
### AIR CLEANER ELEMENT REMOVAL

- Remove the seat. ( 5-2)
- Remove the wing nut 1.
- Remove the element ② from the element holder.



### AIR CLEANER ELEMENT WASHING

- Fill a washing pan large enough to hold the element with a non-flammable cleaning solvent A. Immerse the element in the solvent and wash it.
- A: MOTUL AIR FILTER CLEAN or equivalent
- · Squeeze the element by grasping it to remove excess solvent. Do not twist or wring the element or it will develop cracks.
- Dry the element in a plastic bag, pour in some foam filter oil ® and work the oil into the element.
- **B**: MOTUL AIR FILTER OIL or equivalent
- · Squeeze the element to remove excess oil.

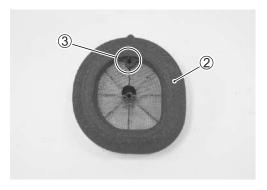


### AIR CLEANER ELEMENT INSTALLATION

• Inspect the air cleaner sheets for peeling off. (E-19 only)



- · Apply grease to the element base where it contacts the air cleaner box.
- Fit the projection of the element holder 3 to the hole of the element base 2.



• Install them in the air cleaner box by engaging the projection  $\mathbb{C}$  of the element holder with the hole  $\mathbb{D}$  of the cleaner body.

### **NOTICE**

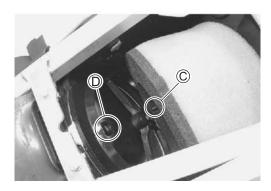
Improper element installation allows dust and dirt to enter the combustion chamber. It can result in piston and cylinder wears.

Be sure to check the element seals properly after installing the element.

### NOTE:

Follow the instructions below to prevent water from entering the engine through the air cleaner element when cleaning the motorcycle.

- Cover the element with a plastic bag.
- Install the seat.
- Cover the inlet holes on the frame covers in order to prevent water from entering the air cleaner box.
- Do not spray high pressure water to the air cleaner box.







## **ENGINE OIL AND OIL FILTER**

### **WARNING**

Improper engine oil treatment is hazardous.

Read engine oil container instruction before replacing the engine oil.

### NOTE:

Improper engine oil selection can cause clutch slip. Do not use engine oil which has friction decrease additives.

### **NOTICE**

Engine oil quality will deteriorate in a short time due to severe competition riding. Riding RM-Z450 with deteriorated engine oil can shorten engine life or can cause engine damage.

Be sure to replace the engine oil as scheduled.

### NOTE:

- \* Do not mix engine oil. Use only good quality engine oil.
- \* Be careful that dirt does not enter into crankcase through engine oil filler.
- \* Wipe off spilled engine oil.
- \* Improper engine oil level can affect engine performance.

### **A** CAUTION

Engine oil and exhaust pipe can be hot enough to burn you.

Wait until the oil drain plug and exhaust pipe are cool enough to touch with bare hands before draining oil.

### **WARNING**

New and used oil can be hazardous. Children and pets may be harmed by swallowing new or used oil. Repeated, prolonged contact with used engine oil may cause skin cancer. Brief contact with used oil may irritate skin.

- \* Keep new and used oil away from children and pets.
- \* Wear a long-sleeve shirt and waterproof gloves.
- \* Wash with soap if oil contacts your skin.

### NOTE:

Recycle or properly dispose of used oil.

# INSPECTION BEFORE ENGINE OIL LEVEL CHECK

· Before starting the engine, check that there is sufficient oil for operating the engine.

### **NOTICE**

If the engine is started with insufficient or no oil, the engine components will possibly be damaged.

Always keep the engine oil at the specified level.

### NOTE:

The oil level measurement may become inaccurate unless the motorcycle is held upright as the motorcycle inclination affects the oil level.

- During inspection, hold the motorcycle in an upright position on a level surface.
- Remove the oil check bolt ①. If, at this time, oil comes out from this bolt hole, proceed to "ENGINE OIL LEVEL INSPEC-TION" below.

Oil check bolt: 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)



### ENGINE OIL LEVEL INSPECTION

• During inspection, hold the motorcycle in an upright position on a level surface.

### NOTE:

The oil level measurement may become inaccurate unless the motorcycle is held upright as the motorcycle inclination affects the oil level.

Start and run the engine at idle for three minutes.

#### NOTE:

Do not run the engine at a speed higher than idling, otherwise the oil level to be inspected may be affected.

- · Stop and leave the engine standstill for two minutes. Thereafter if oil flows out when the oil check bolt (1) is removed, the oil level is appropriate.
- If oil is excessive, let oil flows out of the oil level hole.
- If oil still does not come out, tighten the oil check bolt, remove the filler cap 2 and pour an adequate amount of recommended oil.

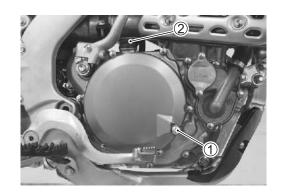
### **A** CAUTION

Exhaust system can be hot enough to burn you.

Do not touch the exhaust system when removing the oil filler cap.

- Repeat the above-mentioned procedure.
- · Tighten the oil check bolt.

Oil check bolt: 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)



### **ENGINE OIL CHANGE**

- During inspection, hold the motorcycle in an upright position on a level surface.
- Warm up the engine.
- Remove filler cap, left front protector 1, drain plug 2 and magneto cover bolt 3.
  - Drain engine oil from the drain plug hole and magneto cover bolt hole.
- Tighten the drain plug ② and magneto cover bolt ③.
- Depress the kick starter lever 10 times or more.

### NOTE:

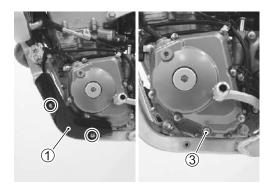
To avoid turn on the engine, push along the engine stop switch while depressing the kick starter lever.

- Swing the motorcycle to the right and left two times or more. Drain engine oil thoroughly.
- · Replace the gasket washers with new ones and tighten the magneto cover bolt 3 and drain plug 2.

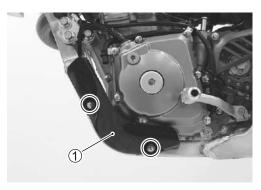
### NOTE:

Replace the gasket washers with new ones.

- **(■)** Oil drain plug: 12 N·m (1.2 kgf-m, 8.5 lbf-ft) Magneto cover bolt: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
- · Pour specified amount of motor oil.
- P MOTUL 300V 10W-40 (Recommended) ..... Except for E-03 SAE 10W-40, API SG/SH/SJ/SL with JASO MA/MA1/MA2 .....Others
- Oil change......... 1 050 ml (1.1/0.9 US/Imp qt) Filter change...... 1 100 ml (1.2/1.0 US/Imp qt) Overhaul............ 1 200 ml (1.3/1.1 US/lmp qt)
- Tighten the filler cap.
- Run the engine for a few minutes and stop it. Wait a few minutes.
- Inspect the oil level. ( 2-13)
- Install the left front protector ①.
- Front protector bolt: 12 N·m (1.2 kgf-m, 8.5 lbf-ft)

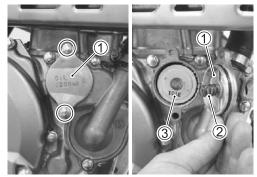






### ENGINE OIL FILTER REPLACEMENT

- · Drain engine oil as described in the engine oil replacement procedure.
- Remove the oil filter cap ①, spring ② and oil filter ③.



- · Apply engine oil lightly to the gasket of new oil filter before installation.
- Install the new oil filter.

### **NOTICE**

If the filter is installed improperly, serious engine damage may result.

Make sure that the oil filter installed properly.



### NOTE:

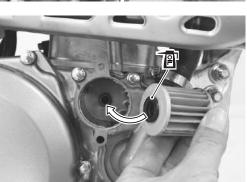
Use the new O-ring to prevent oil leakage.

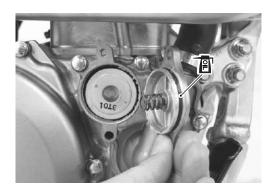
• Install the oil filter cap and tighten the bolts.

# Oil filter cap bolt: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

• Add new engine oil and check the oil level as described in the engine oil level inspection procedure.

Oil change ........... 1 050 ml (1.1/0.9 US/Imp qt) Filter change .....1 100 ml (1.2/1.0 US/Imp qt) Overhaul ......1 200 ml (1.3/1.1 US/Imp qt)





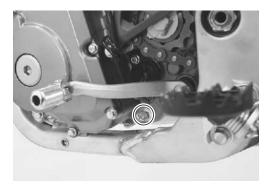
# **OIL STRAINERS OIL STRAINER (No.1) REMOVAL**

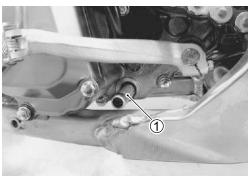
- Hold the motorcycle upright.
- Clean the engine to avoid engine trouble.
- Drain engine oil. ( 2-14)
- Remove the oil strainer cap.

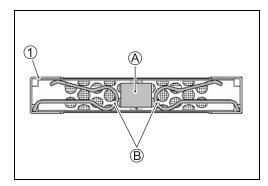


### NOTE:

Inspect the feed pump side oil strainer (No.1) when the engine oil is replaced.







A Magnet B Clip

# **OIL STRAINER (No.2) REMOVAL** ( 711-6)

### INSPECTION AND CLEANING

### **OIL STRAINER (No.1)**

- Check the oil strainer for any damage or clogging.
- If the oil strainer is damaged, replace the oil strainer.
- If the oil strainer is clogging, clean the oil strainer in the following procedures.

### NOTE:

Clean the oil strainer thoroughly up to first 2 to 3 times because steel particles will be caught when the engine is new.

• Remove the clip 1.

### **A** CAUTION

Sharp edge steel particles around the oil strainer magnet can harm your fingers.

Wear protective gloves when removing steel particles from the oil strainer.



### **WARNING**

Magnet is harmful if swallowed.

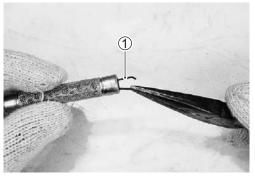
If removed magnet is swallowed, immediately contact a physician.

### NOTE:

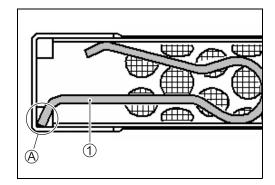
Do not bring the magnet close to a magnetic card, a cellular phone, a watch and so on because this magnet has strong magnetic force.

- Clean the magnet and oil strainer.
- Insert the magnet and clip into the oil strainer. Hook the clip 1 to the groove A.



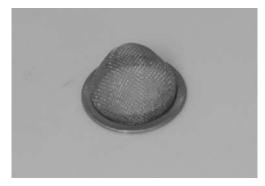






### **OIL STRAINER (No.2)**

- Check the oil strainers for any damage or clogging.
- If the oil strainer is damaged, replace the oil strainer.
- If the oil strainer is clogging, clean the oil strainer with a compressed air.



# **OIL STRAINER (No.2) INSTALLATION**

(2711-8)

# **OIL STRAINER (No.1) INSTALLATION**

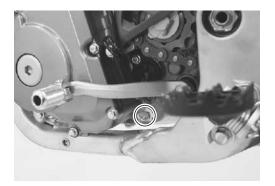
• Install the oil strainer and then tighten the oil strainer cap to the specified torque.

### NOTE:

Replace the gasket washer with a new one.

Engine oil strainer cap: 21 N·m (2.1 kgf-m, 15.0 lbf-ft)

• Add new engine oil and check the oil level. ( 2-13)



# **ENGINE COOLANT** ENGINE COOLANT LEVEL CHECK

### **WARNING**

You can be injured by scalding fluid or steam if you open the radiator cap when the engine is hot.

Do not open the radiator cap when the engine is hot. Wait until engine cools.



- Check that the engine coolant level is at the bottom of the inlet hole. If not, replenish the radiator with specified engine coolant.
- Tighten the air bleeder bolt 2 to the specified torque.

# Radiator air bleeder bolt: 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

• Tighten the radiator cap ① securely.

## **A** CAUTION

Improperly tightening the radiator cap ① will prevent the cooling system from reaching the specified operating pressure and will cause coolant overflow.

Tighten the radiator cap ① until it locks firmly.

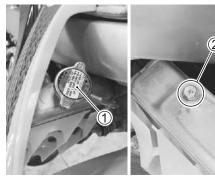
### NOTE:

- \* This motorcycle does not have an overflow tank at the end of breather hose. Therefore, engine coolant level may decrease while riding. Check the engine coolant level every time before riding.
- \* When replenishing engine coolant with SUZUKI LONG LIFE COOLANT, be sure to use engine coolant mixed with distilled water at the ratio of 50:50. Adding only water will dilute engine coolant and it may decrease cooling performance.
- \* If the motorcycle is to be exposed to temperatures below -31 °C (-24 °F), the percentage of antifreeze should be increased to 55% or 60%, according to figure 1.

Antifreeze density	Freezing point
50%	−31 °C (−24 °F)
55%	-40 °C (-40 °F)
60%	−55 °C (−67 °F)

\* "SUZUKI SUPER LONG LIFE COOLANT" is pre-mixed to the proper ratio. Add only "SUZUKI SUPER LONG LIFE COOL-ANT" if coolant level drops. It is not necessary to dilute "SUZUKI SUPER LONG LIFE COOLANT" when replacing coolant.







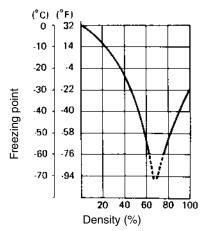


Fig. 1 Engine coolant density-freezing point

### ENGINE COOLANT REPLENISHMENT

• Use "SUZUKI SUPER LONG LIFE COOLANT" or "SUZUKI LONG LIFE COOLANT".

### NOTE:

The radiator, cylinder and cylinder head are made of aluminum alloy. Using non-recommended engine coolant may corrode aluminum alloy and may clog the coolant passageways.

### **WARNING**

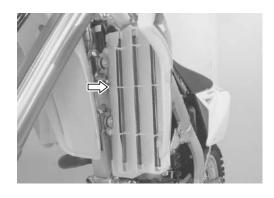
Engine coolant is harmful if swallowed or if it comes in contact with your skin or eyes.

Keep engine coolant away from children and pets. Call your doctor immediately if engine coolant is swallowed and induce vomiting. Flush eyes or skin with water if engine coolant gets in eyes or comes in contact with skin.

### COOLING SYSTEM INSPECTION

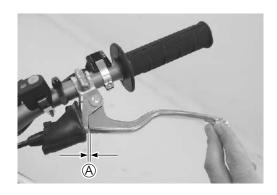
Inspect the following items before practice and races.

- Engine coolant leakage
- Radiator hose cracks and deterioration
- Radiator mounting condition
- Radiator overflow hose condition
- Radiator fin condition



### **CLUTCH CABLE**

Adjust the clutch cable play as follows:

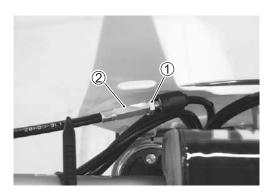


### MAJOR ADJUSTMENT

- Loosen the lock-nut (1).
- Turn adjuster ② so the clutch lever clearance A measured at the lever holder obtains 2 - 3 mm (0.08 - 0.12 in) when squeezing the lever until pressure is felt.
- Tighten the lock-nut 1 to the specified torque.

Clutch lever clearance  $\triangle$ : 2 – 3 mm (0.08 – 0.12 in)

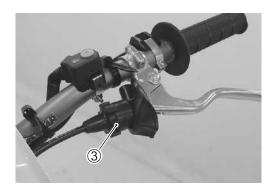
Cable adjuster lock-nut: 2.2 N·m (0.22 kgf-m, 1.60 lbf-ft)



### MINOR ADJUSTMENT

• Turn adjuster ③ so the clutch lever clearance ④ measured at the lever holder obtains 2 - 3 mm (0.08 - 0.12 in) when squeezing the lever until pressure is felt.

Clutch lever clearance  $\triangle$ : 2 – 3 mm (0.08 – 0.12 in)



### THROTTLE CABLE

### **WARNING**

Inadequate throttle cable play can cause engine speed to rise suddenly when you turn the handlebars. This can lead to loss of rider control.

Adjust the throttle cable play so that engine speed does not rise due to handlebars movement.

Adjust the throttle cable play (A) as follows:



### THROTTLE CABLE ADJUSTMENT

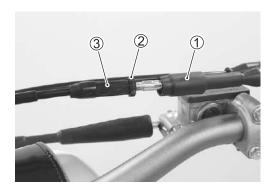
- Move the rubber boot 1.
- Loosen the lock-nut 2.
- Turn adjuster ③ so the throttle grip has 2 4 mm (0.08 0.16 in) play in circumference.
- Tighten the lock-nut ② while holding the adjuster ③.

Throttle cable play  $\triangle$ : 2 – 4 mm (0.08 – 0.16 in)



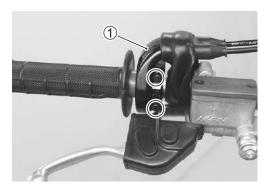
Improper throttle cable adjustment can lead to loss of rider control.

After the adjustment is completed, check that handlebars movement does not raise the engine idle speed and that the throttle grip returns smoothly and automatically.



### THROTTLE CABLE OIL SUPPLY

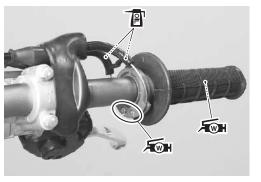
- · Mark the paint mark to the matching surface of throttle case and handlebars before removing. ( 18-34)
- Remove the throttle case 1.



- Apply oil to the throttle cables.
- · Apply grease to the sliding surface of the handlebars and throttle grip.
- Apply grease to the throttle cable spool.

FWH 99000-25350: SUZUKI WATER RESISTANT **GREASE EP2 or equivalent** 

• Install the throttle case. ( 18-41)



### THROTTLE BODY

Inspect the throttle body for dirt or mud. If any dirt or mud is found, clean the throttle body.



### THROTTLE POSITION SENSOR (TP SENSOR)

- Remove the fuel tank. ( 13-3)
- · Connect a 12 volt battery using the battery lead wire to service coupler. ( 12-16)

36890-28H00: Battery lead wire (option)

- Insert the needle-point probes to the TP sensor lead wire cou-
- Measure the TP sensor output voltage at the coupler (between ⊕ Yellow and ⊝ B/Br) by turning the throttle grip. If necessary, adjust the TP sensor. (2712-42)

DATA TP sensor output voltage

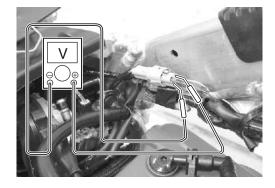
Throttle valve is closed: 0.60 - 0.64 V Throttle valve is opened: 3.60 - 4.00 V

TP sensor output voltage: 0.60 – 0.64 V

(+ Y − ⊝ B/Br)

09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set

• Check the engine starting operation and engine idle speed. ( 2-24)



### **ENGINE IDLE SPEED**

- Adjust the throttle cable play. ( 2-22)
- Warm up the engine.

### NOTE:

Make this adjustment when the engine is hot.

Connect the special tool to the high-tension cord.

09900-26006: Engine tachometer

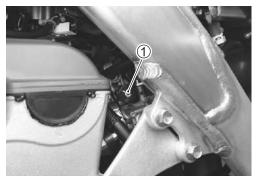
• Start the engine, turn the starter knob/idle screw 1 and set the engine idle speed as follows.

### Engine idle speed: 2 100 ± 50 r/min

### Starter knob/idle screw

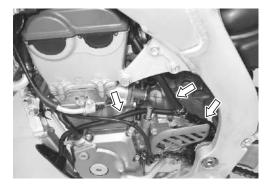
Turn	Engine idle speed
Clockwise	Decrease
Counterclockwise	Increase





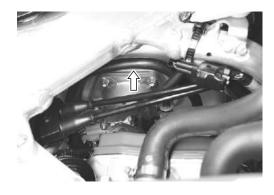
### CRANKCASE BREATHER HOSE

• Inspect the crankcase breather hoses for damage, clogging and bend. If any defects are found, the breather hoses must be replaced.



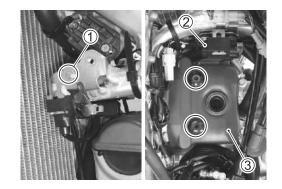
### **FUEL HOSE**

- · Inspect the fuel hose for damage and fuel leakage. If any defects are found, the fuel hose must be replaced. ( 13-2, -3)
- · Replace the fuel hose every four years.



### **VALVE CLEARANCE**

- Remove the seat. ( 5-2)
- Remove the radiator covers and fuel tank. (5-2)
- Remove the spark plug. ( 2-9)
- Remove the coupler bracket bolt 1.
- Remove the TO sensor ② from the bracket.
- Remove the cylinder head cover ③ and its gasket.

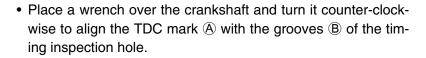


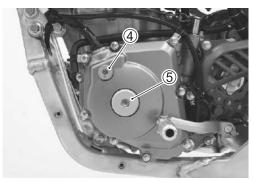
The valve clearance specification is different for both intake and exhaust valves.

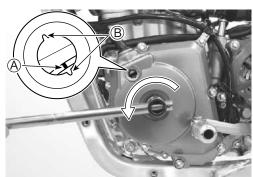
Valve clearance adjustment must be checked and adjusted: 1) at the time of periodic maintenance, 2) when the valve mechanism is serviced, and 3) when the camshafts are removed for servicing.

### NOTE:

- \* The piston must be at top dead center (TDC) on the compression stroke in order to check or adjust the valve clearance.
- \* The valve clearance should only be checked when the engine is cold.
- Drain engine oil. ( 2-14)
- Remove the TDC plug 4 and crankshaft hole plug 5.







 Insert the thickness gauge between the tappet and cam. If the clearance is out of specification, adjust it to specification as follows.

09900-20803: Thickness gauge

DATA Valve clearance (when cold):

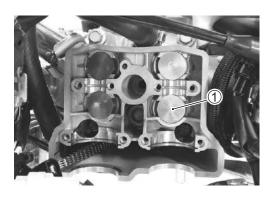
Standard: IN. : 0.09 - 0.16 mm (0.004 - 0.006 in)EX.: 0.17 - 0.24 mm (0.007 - 0.009 in)

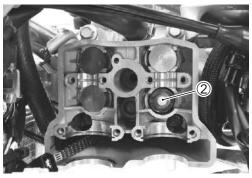


### VALVE CLEARANCE ADJUSTMENT

The clearance is adjusted by replacing the existing tappet shim with a thicker or thinner one.

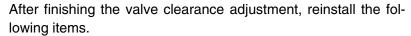
- Remove the intake or exhaust camshaft. ( 6-3)
- Remove the tappet ① and shim ② by fingers or magnetic hand.
- Check the figures printed on the shim. These figures indicate the thickness of the shim, as illustrated.
- Select a replacement shim that will provide a clearance within the specified range. For the purpose of this adjustment, tappet shim are available ranging from 1.500 to 3.000 mm in steps of 0.025 mm. Fit the selected shim to the valve stem end, with numbers toward tappet. Be sure to check shim size with micrometer to ensure its size. Refer to the tappet shim selection table (2.72-27, -28) for details.



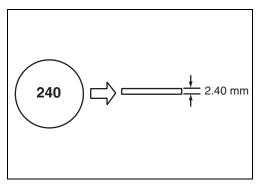


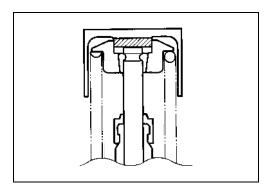
### NOTE:

- \* Be sure to apply engine oil to tappet shim top and bottom faces.
- \* When seating the tappet shim, be sure the figure printed surface faces the tappet.
- Reinstall the intake or exhaust camshaft in the specified manner. ( 6-27)
- After replacing the tappet shim, rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement. Then check the clearance again to confirm that it is within the specified range.



- Cylinder head cover ( 6-31)
- TO sensor and coupler bracket ( 6-31, 12-45)
- Spark plug and spark plug cap (2-9)
- Radiator covers and fuel tank ( 13-5)
- TDC plug and crankshaft hole plug ( 6-30)
- Pour engine oil ( 2-14)
- Seat





# TAPPET SHIM SELECTION TABLE [INTAKE]

(INTAKE SIDE)

			TAPPET SHIM SET (12800-35820)		
	TAI	TAPPET SHIM NO. (12892-35G00-XXX)	TAPPET SHIM NO. (12892-41C00-XXX)	32-41C00-XXX)	
RESENT HIM SIZE (mm)	1.500 1.525 1.550	2.0502.0752.1002.1252.1502.1752.2002.2252.2502.2752.30	2.050 2.075 2.100 2.125 2.150 2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.675 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.675 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.675 2.700 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.675 2.700 2.675 2.750 2.775 2.800 2.825 2.800 2.800 2.825 2.800	$\geq \geq$	2.950 2.975 3.000
MEASURED SUFFIX VALVE (Mm) NO.	150 152 155	205 208 210 212 215 218 220 222 225 228 230	232 235 238 240 242 245 248 250 252 255 258 260 262	265 268 270 272 275 278 280 282 285	295 298 300
0.000 – 0.014		( 1.950 1.975 2.000 2.025 2.050 2.075 2.100 2.125 2.150 2.175 2.20	00 2.125 2.150 2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750		2.850 2.875 2.900
0.015 - 0.039		1.975 2.000 2.025 2.050 2.075 2.100 2.125 2.150 2.175 2.200 2.2;	.975 2.000 2.025 2.050 2.075 2.100 2.125 2.150 2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.300 2.525 2.550 2.575 2.600 2.575 2.650 2.675 2.700 2.725 2.750 2.775	$\geq$	2.875 2.900 2.925
0.040 - 0.064	1.500	2.000 2.025 2.050 2.075 2.100 2.125 2.150 2.175 2.2002 .225 2.23	2.000   2.025   2.050   2.075   2.100   2.175   2.200   2.275   2.250   2.275   2.300   2.375   2.350   2.375   2.400   2.450   2.450   2.450   2.455   2.550   2.555   2.550   2.575   2.650   2.625   2.650   2.675   2.700   2.725   2.750   2.775   2.800		2.900 2.925 2.950
0.065 – 0.089	1.500 1.525	2.025 2.050 2.075 2.100 2.125 2.150 2.175 2.200 2.225 2.250 2.2:	2.025 2.050 2.075 2.100 2.125 2.150 2.175 2.200 2.225 2.350 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825	7(	2.925 2.950 2.975
0.090 – 0.160	7	// SPECIFIE	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED		
0.161 - 0.185	1.550 1.575 1.600	2.100 2.125 2.150 2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.3	2.100 2.125 2.150 2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900		3.000 3.000
0.186 – 0.210	1.575 1.600 1.625	7 2.125 2.150 2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.3:	2.135 2.150 2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.555 2.550 2.575 2.650 2.675 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925		3.000
0.211 - 0.235	1.600 1.625 1.650	2.150 2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.4	2.150/2.175/2.200/2.225/2.250/2.275/2.350/2.350/2.350/2.350/2.355/2.450/2.475/2.500/2.525/2.550/2.555/2.650/2.625/2.650/2.625/2.650/2.675/2.750/2.775/2.800/2.825/2.850/2.875/2.900/2.925/2.950	750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950	Ī
0.236 – 0.260	1.625 1.650 1.675	2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.4;	2.175 2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.555 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.971	775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975	
0.261 – 0.285	1.650 1.675 1.700	2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.4	2.200 2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.900 2	800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000	
0.286 – 0.310	1.675 1.700 1.725	2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.4:	2.225 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.705 2.750 2.775 2.800 2.825 2.850 2.875 2.800 2.925 2.850 2.875 2.800 2.925 2.850 2.875 2.800 2.925 2.850 2.875 2.800 2.925 2.850 2.875 2.800 2.925 2.850 2.875 2.800 2.925 2.850 2.875 2.800 2.925 2.850 2.875 2.800 2.925 2.850 2.875 2.800 2.925 2.850 2.875 2.800 2.925 2.800 2.900 2	825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000	
0.311 - 0.335	1.700 1.725 1.750	7 2.250 2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.51	2.250/2.275/2.300/2.325/2.350/2.375/2.400/2.425/2.450/2.475/2.500/2.525/2.550/2.575/2.600/2.625/2.650/2.675/2.700/2.725/2.750/2.775/2.800/2.825/2.850/2.875/2.900/2.925/2.950/2.925/2.950/2.975/3.000/3.000	850 2.875 2.900 2.925 2.950 2.975 3.000 3.000	
0.336 - 0.360	1.725 1.750 1.775	2.275 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.5;	2275 2300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.800 2.855 2.850 2.875 2.900 2.925 2.950 2.955 2.955 2.950 2.955 2.950 2.955 2.950 2.955 2.950 2.955 2.950 2.955 2.955 2.950 2.955 2.9	875 2.900 2.925 2.950 2.975 3.000 3.000	
0.361 - 0.385	1.750 1.775 1.800	// 2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.50	2.300 2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.500 2.675 2.650 2.675 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.850 2.875 2.850 2.875 2.850 2.875 2.850 2.875 3.000 3.000	900 2.925 2.950 2.975 3.000 3.000	
0.386 – 0.410	1.775 1.800 1.825	2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.5	2.325 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000	925 2.950 2.975 3.000 3.000	
0.411 - 0.435	1.800 1.825 1.850	)) 2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.6	2.350 2.375 2.400 2.425 2.450 2.475 2.500 2.325 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.800 2.925 2.950 2.975 3.000 3.000	950 2.975 3.000 3.000	
0.436 – 0.460	1.825 1.850 1.875	2.375 2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.6:	2375 2400 2425 2450 2475 2500 2525 2550 2575 2600 2625 2650 2675 2700 2.725 2.750 2.775 2800 2.825 2850 2875 2900 2.925 2.950 2.975 3.000 3.000	975 3.000 3.000	
0.461 - 0.485	1.850 1.8751.900	2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.6:	2.400 2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000	000 3.000	
0.486 – 0.510	1.875 1.900 1.925	2.425 2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.6	2.425 2.450 2.475 2.500 2.525 2.550 2.575 12.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000	000	
0.511 - 0.535	1.900 1.925 1.950	2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.71	2.450 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.800 2.875 2.900 2.875 3.000 3.000		
0.536 - 0.560	1.925 1.950 1.975	// 2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.7:	2.475 2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000		
0.561 - 0.585	1.950 1.9752.000	2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.7	2.500 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000	HOW TO USE THIS CHART:	
0.586 – 0.610	1.975 2.000 2.025	7) 2.525 2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000	75 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000	Measure valve clearance. "ENGINE IS COLD"	INE IS COLD"
0.611 – 0.635	2.000 2.025 2.050	2.550 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000		II. Measure present shim size.	diwith drawith
0.636 – 0.660	2.025 2.050 2.075	) 2.575 2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000			olumn.
0.661 – 0.685	2.050 2.0752.100	2.600 2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.300 2.925 2.350 2.975 3.000 3.000	50 2.875 2.900 2.925 2.950 2.975 3.000 3.000	EXAMPLE	
0.686 – 0.710	2.075 2.1002.125	2.625 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.950 2.975 3.000 3.000	75 2.900 2.925 2.956 2.975 3.000 3.000		0.220 mm
0.711 – 0.735	2.100 2.125 2.150	7 2.650 2.675 2.700 2.725 2.750 2.775 2.800 2.825 2.850 2.875 2.900 2.925 2.850 2.975 3.000 3.000	00 2.925 2.950 2.975 3.000 3.000	Shim size to be used	2.400 mm

(EXHAUST SIDE)

# TAPPET SHIM SELECTION TABLE [EXHAUST]

2.025 2.035 2.035 ( 2.575/2.600/2.625 2.650/2.675/2.700 2.735 2.750/2.775/2.800/2.825 2.850/2.875 2.900/2.925 2.950/2.975 3.000/3.000 2.000/2.625 2.950/2.975 2.000/2.725 2.750/2.775 2.800/2.825 2.850/2.875 2.900/2.925 2.950/2.935 3.000/3.000 2.000/2.925 2.90	1.550 1.575 1.600 1.575 1.600 1.625 1.600 1.625 1.650 1.600 1.625 1.650 1.600 1.625 1.650 1.700 1.725 1.750 1.700 1.725 1.750 1.775 1.800 1.825 1.750 1.725 1.750 1.775 1.800 1.825 1.800 1.825 1.850 1.875 1.800 1.825 1.850 1.875 1.800 1.825 1.850 1.925 1.800 1.825 1.850 1.925 1.800 1.825 1.950 1.925 1.900 1.925 1.950 1.975 1.900 1.925 1.950 1.975 1.975 2.000 2.025	2.556 2.556 2.575 2.600 2.625 2.650 2.675 2.700 2.775 2.500 2.755 2.500 2.525 2.55 2.55 2.55 2.55 2.55
Present Shift of the control of the	025 2.050 2.075	Valve clearance is
20/512 1002 125 7002 2552 65012 6752 7002 7552 7502 80012 8252 85012 87512 80012 82512 85012 82512 85012 82512 85012 82512 85012 82512 85012 82512 85012 82512 85012 82512 85012 825	2.050 2.075 2.100	Present shim size Shim size to be used

### **CYLINDER HEAD, CYLINDER AND PISTON**

### **CYLINDER HEAD INSPECTION**

- Remove the cylinder head. ( 6-4)
- Decarbonize the combustion chamber.
- Inspect for pinholes, cracks and other damage.
- If any defects are found, replace the cylinder head with a new one.



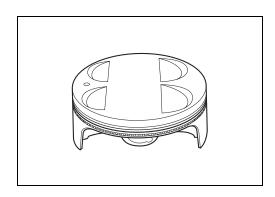
### CYLINDER INSPECTION

- Remove the cylinder. ( 6-6)
- Inspect the cylinder wall for any scratches, nicks or other damage.
- If any defects are found, replace the cylinder with a new one.



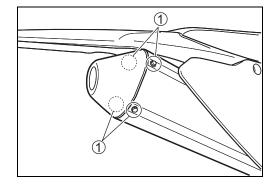
### PISTON AND PISTON RING REPLACEMENT

• Replace the piston and piston rings. ( 6-6)



# MUFFLER SILENCER SILENCER INSPECTION AND REPLACEMENT

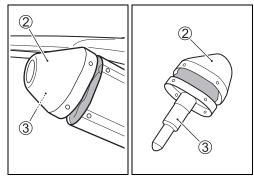
• Remove the rear muffler body mounting bolts ①.



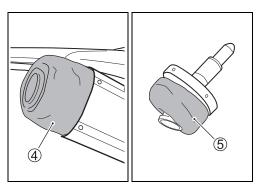
• Remove the rear muffler body ② and muffler tail pipe ③.

### NOTE:

Be careful not to damage the rear muffler body 2 and muffler tail pipe 3.



- Remove the muffler silencer 4 and muffler tail glass wool 5.
- Inspect the muffler silencer ④ and muffler tail glass wool ⑤ for clogging with carbon deposit or tar.
- If necessary, replace the muffler silencer or muffler tail glass wool with a new one.



- Install the muffler tail glass wool ⑤ and muffler silencer ④.
- Apply bond to the circumference of the rear muffler body ②.

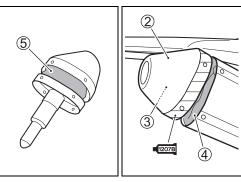
### ■1207B 99000-31140: SUZUKI BOND "1207B" or equivalent

- Insert the rear muffler body ② and muffler tail pipe ③ into the muffler body with aligning each hole.
- Tighten the rear muffler body mounting bolts to the specified torque.





After assembling the muffler, inspect the exhaust gas leakage.



### **DRIVE CHAIN AND SPROCKETS**

### **DRIVE CHAIN SLACK**

- Place the motorcycle on the side stand.
- Inspect the drive chain slack at the middle point between the drive chain buffer and rear sprocket.

**PAYA** Drive chain slack: 35 – 45 mm (1.4 – 1.8 in)

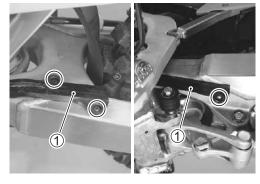
# 35 – 45 mm (1.4 - 1.8 in)

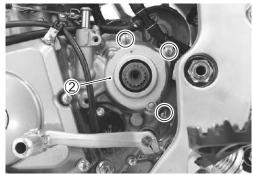
### CRANKCASE DRIVESHAFT OIL SEAL

- Remove the engine sprocket. ( 5-5)
- Remove the chain buffer 1.

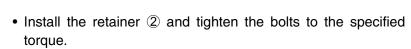


- Inspect the oil seal for abnormality (dust, stone or foreign materials).
- If necessary, replace it with a new one.





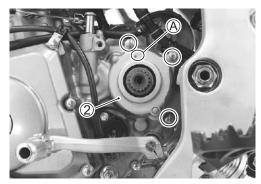




NOTE:

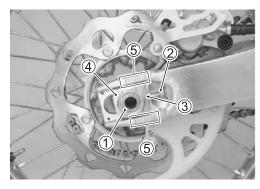
Make sure that the "UP" mark (A) faces up.

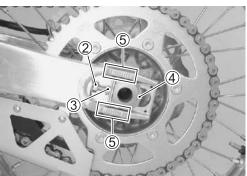
Crankcase bolt: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)



### DRIVE CHAIN ADJUSTMENT

- Loosen the axle nut 1.
- Loosen the lock-nuts 2 and adjust the drive chain slack to the specification by turning the adjusters 3. Make sure that the right and left adjuster washers 4 are at the same position on scales (5).
- With the adjusters ③ held in position, tighten the lock-nuts ②.
- Push the adjuster washers 4 to the adjusters 3 and tighten the axle nut 1.
- Rear axle nut: 100 N·m (10.0 kgf-m, 72.5 lbf-ft)





### DRIVE CHAIN PLATE WEAR

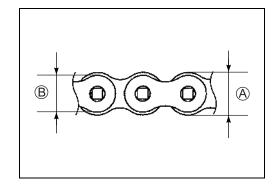
- Measure the heights of the inner (A) and outer (B) plates using the vernier calipers.
- If any of the measurements exceeds the service limit, replace the drive chain with a new one.

### Chain plate height:

**Service Limit:** (Inner A): 12.75 mm (0.502 in)

(Outer ®): 11.20 mm (0.441 in)

09900-20101: Vernier calipers (150 mm)



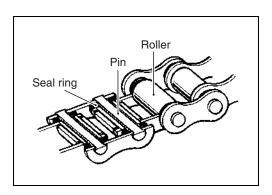
- Visually check the drive chain for the possible defects listed below.
- \* Loose pins \* Excessive wear
- \* Missing seal rings \* Dry or rusted links \* Kinked or binding links

If any defect is found, the drive chain must be replaced.

### NOTE:

\* Damaged rollers

When replacing the drive chain, replace the drive chain and sprockets as a set.



### DRIVE CHAIN CLEANING AND LUBRICA-TION

- Remove dirt and dust from the drive chain. Be careful not to damage the seal ring.
- Clean the drive chain with a sealed drive chain cleaner, or water and neutral detergent.

### **NOTICE**

Cleaning the drive chain improperly can damage seal rings and ruin the drive chain.

- Do not use a volatile solvent such as paint thinner, kerosene and gasoline.
- Do not use high pressure cleaner to clean the drive chain.
- Do not use wire brush to clean the drive chain.
- Use a soft brush to clean the drive chain. Be careful not to damage the seal ring even though using a soft brush.
- Wipe off water and neutral detergent.
- Lubricate with a motorcycle sealed drive chain lubricant or high viscosity oil.

### **NOTICE**

Some drive chain lubricant contains solvents and additives which could damage the seal rings in the drive chain.

Use sealed drive chain lubricant which is specifically intended for use with sealed drive chains.

- Lubricate both front and back plates of the drive chain.
- Wipe off excess lubricant after lubricating all around of the drive chain.

### NOTE:

The standard drive chain is DID520MXV4. Suzuki recommends to use this standard drive chain as a replacement.

### SPROCKET INSPECTION

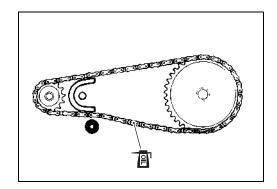
 Inspect the engine sprocket and rear sprocket for wear and cracks. If any defects are found, replace the sprockets with new ones.

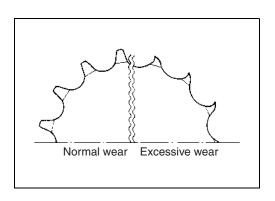
### NOTE:

When replacing a worn sprocket, it is likely that the drive chain will need to be replaced as well.

• Check the engine sprocket bolt for looseness.

If necessary, tighten the engine sprocket bolt. ( 5-9)





### DRIVE CHAIN GUIDE, BUFFER AND **TENSIONER ROLLER**

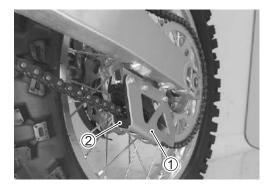
### DRIVE CHAIN GUIDE INSPECTION

• Inspect the drive chain guide ① for bends and damage.

### NOTE:

The drive chain can hit a bent guide causing noise and drive chain wear.

- Inspect the chain guide defense ② for wear.
- If necessary, replace the defective part with a new one.



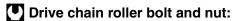
### DRIVE CHAIN BUFFER AND ROLLER INSPECTION

- Inspect the drive chain buffer ① for wear and cracks.
- Inspect the drive chain rollers 2 for wear.
- If necessary, replace the defective part with a new one.

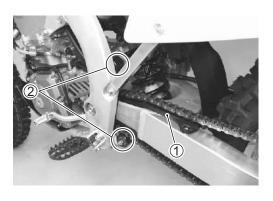
### NOTE:

The drive chain can touch the swingarm directly if the chain guide, buffer and rollers are worn out. This will cause drive chain and swingarm damage.





23 N·m (2.3 kgf-m, 16.5 lbf-ft)



### **BRAKES**

### **BRAKE FLUID LEVEL**

• Inspect the brake fluid level in both front and rear reservoirs. If the brake fluid level is lower than LOWER mark (A), replenish the reservoir with the specified brake fluid to the UPPER line. ( 717-3)

Inspect brake pad wear and brake fluid leakage if the brake fluid level decreases.



Brake fluid: DOT 4

### **WARNING**

Brake fluid can be hazardous to humans and pets. Brake fluid is harmful or fatal if swallowed, and harmful if it comes in contact with your skin or eyes.

Keep brake fluid away from children. Call your doctor immediately if brake fluid is swallowed, and induce vomiting. Flush eyes or skin with water if brake fluid gets in eyes or comes in contact with skin.

### **WARNING**

The use of any fluid except DOT 4 brake fluid from a sealed container can damage the brake system and lead to an accident.

Use only DOT 4 brake fluid from a sealed container. Never use or mix different types of brake fluid.

### **A** CAUTION

Spilled brake fluid can damage painted surfaces and plastic parts.

Be careful not to spill any fluid when filling the brake fluid reservoir. Wipe spilled fluid up immediately.

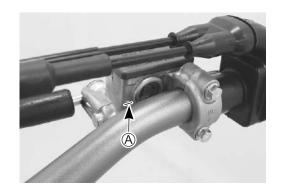
### FRONT BRAKE CALIPER AXLE BOLT

- Remove the brake caliper. ( 17-7)
- · Check that the brake caliper axle bolts are tightened their specified torque. If they are loose, tighten to the specified torque.

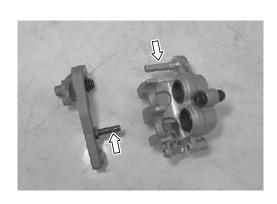
### Front brake caliper axle bolt

(Caliper): 25 N·m (2.5 kgf-m, 18.0 lbf-ft) (Bracket): 28 N·m (2.8 kgf-m, 20.0 lbf-ft)

- Install the brake caliper. ( 17-9)
- Refill brake fluid and bleed air from the brake system. ( 717-3)

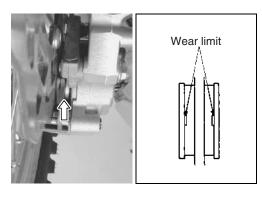






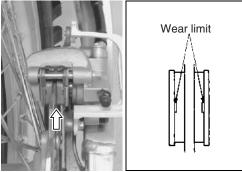
### **BRAKE PAD**

• Inspect the brake pads for wear. If the brake pads are worn, replace them with new ones. (17-5)



### NOTE:

- \* Pump the brake lever and pedal several times to restore the brake pads after replacing the brake pads.
- \* Replace both right and left pads together when replacing the brake pads.

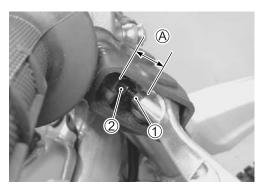


### FRONT BRAKE LEVER ADJUSTMENT

Adjust the brake lever position as follows:

- Loosen the lock-nut 1.
- Turn in or out adjuster 2 to obtain the proper brake lever
- The standard adjuster length  $\triangle$  is from 11 15 mm (0.4 0.6 in).
- Tighten the lock-nut 1.

Adjuster length  $\triangle$ : 11 – 15 mm (0.4 – 0.6 in)



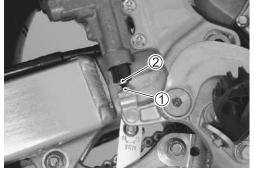
### BRAKE PEDAL HEIGHT ADJUSTMENT

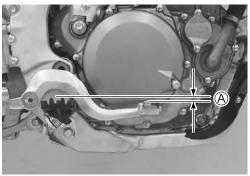
Adjust the rear brake pedal height as follows:

- Loosen the lock-nut 1.
- Adjust the brake pedal height A by turning the adjuster 2 to locate the pedal 0 - 10 mm (0 - 0.4 in) below the top face of the footrest.
- Tighten the lock-nut ①.



Rear brake master cylinder rod lock-nut: 6 N·m (0.6 kgf-m, 4.5 lbf-ft)





### FRONT FORK

- · Inspect the inner tube for dirt or dust. If any dirt or dust is found, clean the inner tube.
- Remove the front fork protectors. ( 18-4)
- Remove the dust seals 1.

### **NOTICE**

Scratches on the inner tube could cause oil leaks.

Avoid scratching when removing.

- Clean the dirt between dust seals ① and oil seals ②.
- Apply fork oil to the inner tubes.
- Reinstall the dust seals ① and front fork protectors.
- · Move the front fork up and down several times and inspect for smooth movement.
- · Inspect for damage and oil or air leaks.
- If any defects are found, replace the defective part with a new one. ( 18-6, -20)
- · Inspect the bolts and nuts for tightness.
- Place a stand under the chassis tube to lift the front wheel off the ground.
- Remove the air bleeder valve and equalize the air pressure in the front fork to atmospheric pressure. (For left front fork)
- Remove the air valve caps. (For right front fork)
- Check and adjust each air pressure. (For right front fork) ( 34-12)
- Install the air bleeder valve and air valve caps.

Front fork air bleeder valve: 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)

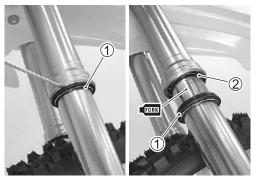
### FRONT FORK OIL REPLACEMENT

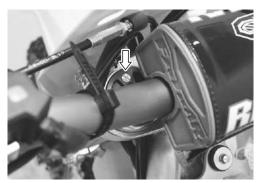
- · Replace the front fork oil.
  - For left front fork (☐₹4-10)
  - For right front fork (☐ 18-20)

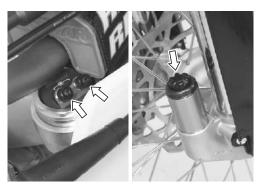
### NOTE:

Right front fork, air spring side, has three air chambers. These three air chambers require specified amount of front fork oil. Neglecting scheduled periodic front fork oil replacement will change oil level in the air chambers. Replace the front fork oil periodically as scheduled.









### **REAR SUSPENSION**

- Move the rear suspension up and down several times and inspect for smooth movement.
- Inspect for damage and oil leaks.
- Inspect the bolts and nuts for tightness.
- Inspect that the rear suspension has play or binds by moving the swingarm up and down, and right and left.
- If necessary, replace the defective part with a new one.



### WHEELS AND TIRES WHEEL RIM AND TIRES INSPECTION

- Inspect the wheel and tires for damage.
- Inspect the wheel bearing for rattles.
- Inspect the wheel rim runout. (136-4)
- If necessary, replace the defective part with a new one.



# SPOKE NIPPLE AND RIM LOCK INSPECTION

- Inspect the spokes for tension by squeezing the spoke nipples.
- Retighten the spoke nipples with a spoke nipple wrench so as all spokes have same tension.
- Spoke nipple: 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

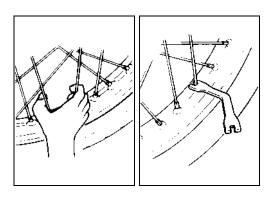
### **NOTICE**

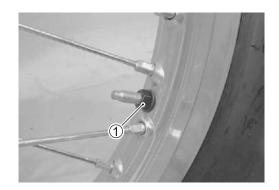
Improperly tightening the spoke nipples can damage the wheel.

Tighten the spoke nipples less than 1/2 turn at a time. Inspect the spoke tension and then retighten the spoke nipple.

Inspect the rim lock ① for tightness.

Front wheel rim lock: 14 N·m (1.4 kgf-m, 10.0 lbf-ft)
Rear wheel rim lock: 17 N·m (1.7 kgf-m, 12.5 lbf-ft)





### TIRE PRESSURE

• Inspect front and rear tire pressures.

Tire pressure (cold): 70 – 110 kPa

 $(0.7 - 1.1 \text{ kgf/cm}^2, 10 - 16 \text{ psi})$ 



### **STEERING**

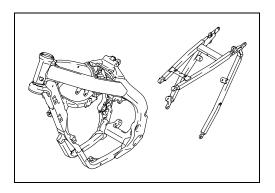
• Inspect the steering by moving the front forks up and down, and back and forward. If the steering has play or binds, inspect steering stem head nut tightness and steering bearings. ( 18-37, -39)



### **FRAME**

### FRAME INSPECTION

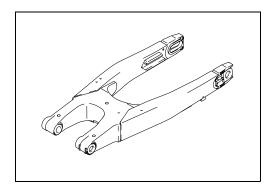
• Inspect the frame periodically.



### **SWINGARM**

### **SWINGARM INSPECTION**

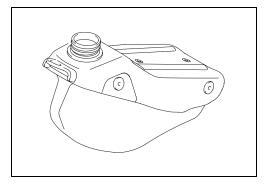
• Inspect the swingarm periodically.



### **FUEL TANK**

### **FUEL TANK INSPECTION**

• Inspect the fuel tank for fuel ooze and leak from welded portions.



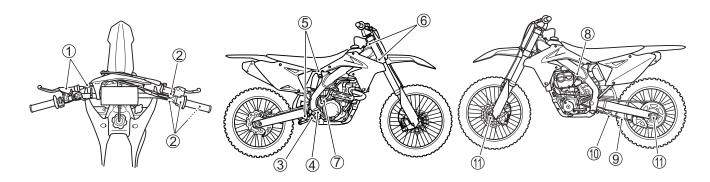
### **LUBRICATION**

Apply grease or oil to the moving parts to increase durability and prevent wear.

No.	ITEM	LUBRICANT	FREQUENCY	COMMENTS
	Clutch inner		Pre-race and between	Run oil through cables until it exits the
1	cable, lever	Α	every race	lower end. Lube the cable ends where
				they pivot.
	Throttle grip,	С	Pre-race	Lightly grease the inside of throttle
2	throttle case	C		spool. Keep free from dirt.
	Throttle cable	Α		
3	Rear brake	С	Every 1 race/More often	Grease the brake pedal pivot.
3	pedal	O	according to conditions	
	Swingarm		Every 3 races/More often	Clean and pack the bearings.
4		С	according to conditions	Keep seals fresh.
				Grease the seals.
	Rearsuspension		Every 1 race/More often	Clean and pack the bearings.
<b>⑤</b>	linkage pivot	С	according to conditions	Keep seals fresh.
	points			Grease the seals.
<b>6</b>	Steering stem	С	Every 5 races/More often	Clean and pack the bearings.
0	bearings	Ò	according to conditions	Keep seals fresh.
7	Kick starter lever	С	Pre-race	Grease the kick starter lever pivot.
8	Starter/idle	А	Pre-race	Lightly oil the plunger shaft.
0	adjuster shaft	4		
9	Drive chain	В	Pre-race and between	Keep chain thoroughly lobed at all times.
9		Ь	every race	Always check wear and alignment.
(10)	Cushion lever	А	Every 1 race/More often	Grease the seals.
	dust seals	A	according to conditions	
(11)	Front and rear	А	Every 1 race/More often	Grease the bearing and seals.
U)	wheels		according to conditions	

The following materials are necessary:

- A. Lightweight oil such as WD-40 or penetrating oil
- B. Aerosol type Chain Lube
- C. SUZUKI SUPER GREASE "A" or equivalent, or SUZUKI WATER RESISTANT GREASE EP2 or equivalent



Follow the schedule closely. The disassembly necessary to lubricate many components is in itself valuable preventative maintenance. It allows you to inspect for wear, fatigue, adjustment and fastener tightness and it allows you to clean out the grit which otherwise cannot be gotten out.

### COMPRESSION PRESSURE CHECK

The compression pressure reading of a cylinder is a good indicator of its internal condition. The decision to replace the cylinder is often based on the results of a compression test.

### COMPRESSION PRESSURE SPECIFICATION (Automatic decomp. actuated)

Standard	
300 kPa (3.0 kgf/cm², 43 psi) or more	

### Low compression pressure can indicate any of the following conditions:

- \* Excessively worn cylinder wall
- \* Worn piston or piston rings
- \* Piston rings stuck in grooves
- \* Poor valve seating
- \* Ruptured or otherwise defective cylinder head gasket
- \* Decomp. trouble
- \* Valve clearance out of adjustment.

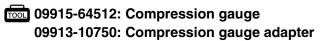
### COMPRESSION TEST PROCEDURE

NOTE:

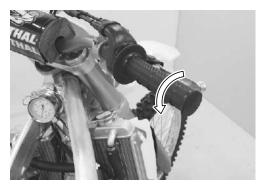
Before testing the engine for compression pressure, make sure that the cylinder head bolts are tightened to the specified torque values and the valves are properly adjusted.

Remove the related parts and test the compression pressure in the following manner:

- Warm up the engine.
- Remove the seat. ( 5-2)
- Remove the fuel tank. ( 13-3)
- Remove the spark plug. ( 2-9)
- Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.
- Keep the throttle grip in the fully opened position.
- Kick energetically the kick starter lever about 5 times to turn the engine.
- · Record the maximum gauge reading as the cylinder compression.



Reinstall the removed parts.





### OIL PRESSURE CHECK

Check the oil pressure periodically. This will give a good indication of the condition of the moving parts.

### DATA Oil pressure:

50 kPa (0.5 kgf/cm<sup>2</sup>, 7.1 psi) at 4 000 r/min, oil temp. at 50 °C (122 °F)

Low or high oil pressure can indicate any of the following conditions:

### **LOW OIL PRESSURE**

- \* Clogged oil filter
- \* Oil leakage from the oil passage
- \* Damaged oil seal
- \* Defective oil pump
- \* Combination of the above items

### **HIGH OIL PRESSURE**

- \* Engine oil viscosity is too high
- \* Clogged oil passage
- \* Combination of the above items

### OIL PRESSURE TEST PROCEDURE

• Connect the special tool to the high-tension cord.



- Remove the oil gallery plug 1.
- Install the oil pressure gauge and adaptor into the oil gallery.
- Warm up the engine.
- After warming up the engine, increase the engine speed to 4 000 r/min (observe the tachometer), and read the oil pressure gauge.

### **A** CAUTION

Engine oil can be hot enough to burn you.

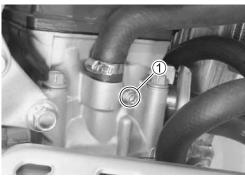
Do not remove the oil pressure gauge adapter when the engine is hot. Wait until engine cools.

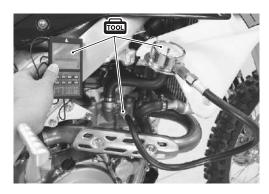
• Install the oil gallery plug 1.

Oil gallery plug: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

09915-74511: Oil pressure gauge (600 kPa) 09940-40211: Fuel pressure gauge adapter







## **TROUBLESHOOTING**

ELECTRICAL ...... 3-10

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### **ENGINE**

Complaint	Symptom and possible causes	Remedy
Engine will not start	Compression too low	
or is hard to start.	Valve clearance out of adjustment	Adjust
	Worn valve guides or poor seating of valves	Repair or replace
	Mistiming valves	Adjust
	Excessively worn piston ring	Replace
	Worn-down cylinder bore	Replace
	Poor seating of spark plug	Retighten
	Broken, cracked, or damaged piston	Replace
	Defective automatic decomp.	Clean or replace
	Plug not sparking	
	Fouled spark plug	Clean or replace
	Wet spark plug	Clean and dry
	Incorrect spark plug gap	Replace
	Defective spark plug cap	Replace
	Defective ignition coil	Replace
	Defective ECM	Replace
	Defective CKP sensor	Replace
	Open-circuited wiring connections	Repair or replace
	Defective magneto	Replace
	Defective engine stop switch	Replace
	Defective regulator/rectifier	Replace
	Defective condenser	Replace
	No fuel reaching the intake manifold	
	Clogged fuel filter or fuel hose	Clean or replace
	Defective fuel pump	Replace
	Defective fuel pressure regulator	Replace
	Defective fuel injector	Replace
	Defective ECM	Replace
	Defective TO sensor	Replace
	Open-circuited wiring connections	Repair or replace
	Defective engine stop switch	Replace
	Defective regulator/rectifier	Replace
	Defective condenser	Replace
	Incorrect fuel/air mixture	
	Defective fuel pump	Replace
	Defective fuel pressure regulator	Replace
	Defective TP sensor	Replace
	Defective CKP sensor	Replace
	Defective IAP sensor	Replace
	Defective IAT sensor	Replace
	Defective ECM	Replace
	Defective ECT sensor	Replace
	Incorrect gasoline	Change
	TP sensor out of adjustment	Adjust
	Engine idling speed out of adjustment	Adjust

Complaint	Symptom and possible causes	Remedy
Engine idles poorly.	Valve clearance out of adjustment	Adjust
	Valve timing out of adjustment	Adjust
	Poor seating of valves	Repair
	Worn valve guide	Replace
	Worn down camshafts	Replace
	Incorrect spark plug gap	Replace
	Defective ignition coil	Replace
	Defective CKP sensor	Replace
	Defective ECM	Replace
	Defective TP sensor	Replace
	Defective fuel pump	Replace
	Insufficient throttle cable play	Adjust
	Incorrect gasoline	Change
	TP sensor out of adjustment	Adjust
	Engine idling speed out of adjustment	Adjust
Engine stalls often.	Incorrect fuel/air mixture	
	Defective IAP sensor or circuit	Repair or replace
	Clogged fuel filter	Replace
	Defective fuel pump	Replace
	Defective fuel pressure regulator	Replace
	Defective ECT sensor	Replace
	Defective IAT sensor	Replace
	Incorrect gasoline	Change
	TP sensor out of adjustment	Adjust
	Engine idling speed out of adjustment	Adjust
	Fuel injector improperly operating	
	Defective fuel injector	Replace
	No injection signal from ECM	Repair or replace
	Open or short circuited wiring connections	Repair or replace
	Defective magneto	Replace
	Control circuit or sensor improperly operating	
	Defective ECM	Replace
	Defective fuel pressure regulator	Replace
	Defective TP sensor	Replace
	Defective This sensor     Defective CKP sensor	Replace
	Defective ECT sensor	Replace
	Defective IAT sensor	Replace
	Defective TO sensor	Replace
		opiaoo
	Engine internal parts improperly operating	Cloop or replace
	Fouled spark plug     Defective CKB concer or ECM	Clean or replace
	Defective CKP sensor or ECM     Clagged fuel base	Replace
	Clogged fuel hose     Value eleganese out of adjustment	Clean
	Valve clearance out of adjustment	Adjust

Complaint	Symptom and possible causes	Remedy
Noisy engine	Excessive valve chatter	
	Too large valve clearance	Adjust
	<ul> <li>Weakened or broken valve springs</li> </ul>	Replace
	Worn tappet or cam surface	Replace
	Worn and burnt camshaft journal	Replace
	Noise seems to come from piston	
	Worn down piston or cylinder	Replace
	Combustion chamber fouled with carbon	Clean
	Worn piston pin or piston pin bore	Replace
	Worn piston ring or ring groove	Replace
	Noise seems to come from cam chain	
	Stretched cam chain	Replace
	Worn sprockets	Replace
	Tension adjuster not working	Repair or replace
	Noise seems to come from clutch	
	Worn splines of countershaft or clutch sleeve hub	Replace
	Worn teeth of clutch plates	Replace
	Distorted clutch plates, driven and drive	Replace
	Worn clutch release bearing	Replace
	Noise seems to come from crankshaft	
	Rattling bearings due to wear	Replace
	Worn and burnt big-end bearing	Replace
	Noise seems to come from transmission	
	Worn or rubbing gears	Replace
	Worn splines	Replace
	Worn bearings	Replace
	Noise seems to come from water pump	
	Worn or damaged impeller shaft	Replace
	Worn or damaged oil seal	Replace
	Contact between pump case and impeller	Replace

Complaint	Symptom and possible causes	Remedy
Engine runs poorly	Defective engine internal/electrical parts	
in high speed range.	Weakened valve springs	Replace
	<ul> <li>Worn down camshafts</li> </ul>	Replace
	<ul> <li>Valve timing out of adjustment</li> </ul>	Adjust
	<ul> <li>Incorrect spark plug gap</li> </ul>	Replace
	Defective ignition coil	Replace
	Defective CKP sensor	Replace
	Defective ECM	Replace
	<ul> <li>Clogged fuel hose, resulting in inadequate fuel supply to injector</li> </ul>	Clean and replace
	Defective fuel pump	Replace
	Defective TP sensor	Replace
	Defective air flow system	
	Clogged air cleaner element	Clean or replace
	Defective throttle valve	Adjust or replace
	Sucking air from throttle body joint or intake pipe	Retighten or replace
	Defective ECM	Replace
	Defective control circuit or sensor	
	Low fuel pressure	Repair or replace
	Defective TP sensor	Replace
	Defective CKP sensor	Replace
	Defective IAP sensor	Replace
	Defective IAT sensor	Replace
	Defective ECM	Replace

Complaint	Symptom and possible causes	Remedy
Engine lacks power.	Defective engine internal/electrical parts	
	<ul> <li>Loss of valve clearance</li> </ul>	Adjust
	Weakened valve springs	Replace
	<ul> <li>Valve timing out of adjustment</li> </ul>	Adjust
	Worn piston ring or cylinder	Replace
	<ul> <li>Poor seating of valves</li> </ul>	Repair
	Fouled spark plug	Clean or replace
	Incorrect spark plug	Replace
	Clogged fuel injector	Replace
	Clogged air cleaner element	Clean or replace
	Sucking air from throttle body joint or intake pipe	Retighten or replace
	Too much engine oil	Drain out excess oil
	Defective fuel pump or ECM	Replace
	<ul> <li>Defective CKP sensor or ignition coil</li> </ul>	Replace
	Defective control circuit or sensor	
	Low fuel pressure	Replace
	Defective TP sensor	Replace
	Defective CKP sensor	Replace
	Defective IAP sensor	Replace
	Defective IAT sensor	Replace
	Defective ECM	Replace
	Defective GP switch	Replace
Engine overheats	Defective engine internal parts	
	<ul> <li>Heavy carbon deposit on piston crown</li> </ul>	Clean
	<ul> <li>Not enough oil in the engine</li> </ul>	Add oil
	Defective oil pump or clogged oil circuit	Replace or clean
	<ul> <li>Sucking air from throttle body joint or intake pipe</li> </ul>	Retighten or replace
	Use incorrect engine oil	Change
	Defective cooling system	See cooling section
	Lean fuel/air mixture	
	Short-circuited IAP sensor/lead wire	Repair or replace
	Short-circuited IAT sensor/lead wire	Repair or replace
	Sucking air from throttle body joint or intake pipe	Retighten or replace
	Defective fuel injector	Replace
	Defective ECT sensor	Replace
	Other factors	-
	<ul> <li>Ignition timing is too advanced due to defective tim-</li> </ul>	Replace
	ing advance system (ECT sensor, GP switch, CKP	Τισριασσ
	sensor and ECM)	
	Drive chain is too tight	Adjust
	טוועם טומווו וא נטט נוטוונ	Aujusi

Complaint	Symptom and possible causes	Remedy
Dirty or heavy	Too much engine oil in the engine	Drain out excess oil
exhaust smoke	Worn piston ring or cylinder	Replace
	Worn valve guides	Replace
	Scored or scuffed cylinder wall	Replace
	Worn valve stems	Replace
	Defective stem seal	Replace
	Worn oil ring side rails	Replace
Slipping clutch	Weakened clutch springs	Replace
	Worn or distorted pressure plate	Replace
	Worn or distorted clutch plates	Replace
	Insufficient clutch cable play	Adjust
Dragging clutch	Some clutch spring weakened while others are not	Replace
	Distorted pressure plate or clutch plates	Replace
Transmission will	Broken gearshift cam	Replace
not shift.	Distorted gearshift forks	Replace
	Worn gearshift pawl	Replace
Transmission will	Broken return spring on gearshift shaft	Replace
not shift back.	Rubbing or stickily gearshift shaft	Repair or replace
	Distorted or worn gearshift forks	Replace
Transmission jumps	Worn shifting gears on driveshaft or countershaft	Replace
out of gear.	Distorted or worn gearshift forks	Replace
	Weakened stopper spring on gearshift cam stopper	Replace
	Worn gearshift cam stopper plate	Replace

## RADIATOR (COOLING SYSTEM)

Complaint	Symptom and possible causes	Remedy
Engine overheats	Not enough engine coolant	Add coolant
	Radiator core clogged with dirt or scale	Clean
	Clogged water passage	Clean
	Air trapped in the cooling circuit	Bleed air
	Defective water pump	Replace
	Use incorrect coolant	Replace
	Defective ECM	Replace
	Defective ECT sensor	Replace
Engine over cools	Extremely cold weather	Put on the radiator cover

### **CHASSIS**

Complaint	Symptom and possible causes	Remedy
Heavy steering	Overtightened steering stem nut	Adjust
	Broken bearing in steering stem	Replace
	Distorted steering stem	Replace
	Not enough pressure in tires	Adjust
Wobbly handlebars	Improperly set right front fork air pressure	Adjust
	Improperly set left front fork damping force adjuster	Adjust
	Distorted front fork	Repair or replace
	Distorted front axle or crooked tire	Replace
	Loose steering stem nut	Adjust
	Worn tire or wrong tire pressure	Adjust or replace
Wobbly front wheel	Distorted wheel rim	Replace
	Worn front wheel bearings	Replace
	Defective or incorrect tire	Replace
	Loose axle or axle pinch bolt	Retighten
	Loose spoke nipple	Retighten
Front suspension	Incorrect front fork oil capacity	Adjust
too soft	• Wrong weight fork oil	
	Improperly set right front fork air pressure	Adjust
	Improperly set left front fork damping force adjuster	Adjust
Front suspension	Too viscous fork oil	Replace
too stiff	Incorrect front fork oil capacity	Adjust
	Bent front fork	Replace
	Improperly set right front fork air pressure	Adjust
	Improperly set left front fork damping force adjuster	Adjust
	Faulty operation due to dirty fork oil seal	Clean or replace
Noisy front	Not enough fork oil     Replenish	
suspension	Loose bolts on suspension     Retighten	
Wobbly rear wheel	Vobbly rear wheel • Distorted wheel rim	
<ul> <li>Worn rear wheel bearing or swingarm bearings</li> </ul>		Replace
	Defective or incorrect tire	Replace
	Worn swingarm and rear suspension bearings	Replace
	Loose nuts or bolts on rear suspension	Retighten
	Loose spoke nipple	Retighten

Complaint	int Symptom and possible causes Remedy		
Rear suspension	Weakened spring of shock absorber     Replace		
too soft	<ul> <li>Improperly set shock absorber spring adjuster</li> </ul>	Adjust	
	<ul> <li>Leakage of oil or gas shock absorber</li> </ul>	Repair or replace	
	Improperly set shock absorber damping force adjuster		
Rear suspension	Bent shock absorber shaft	Replace	
too stiff	• Improperly set shock absorber spring adjuster Adjuster		
	Bent swingarm pivot shaft	Replace	
	<ul> <li>Worn swingarm and rear suspension bearings</li> </ul>	Replace	
	Improperly set shock absorber damping force adjuster		
Noisy rear	Loose nuts or bolts on rear suspension     Retighten		
suspension	pension • Worn swingarm and suspension bearings Replace		

### **BRAKES**

Complaint	Symptom and possible causes	Remedy
Insufficient brake	Leakage of brake fluid from hydraulic system	Repair or replace
power	Worn pads	Replace
	Oil adhesion of engaging surface of pads	Clean disc and pads
	Worn disc	Replace
	Air in hydraulic system	Bleed air
	Not enough brake fluid in the reservoir	Replenish
Brake squeaking	Carbon adhesion on pad surface	Repair surface with
		sandpaper
	Tilted pads	Correct pad fitting or
		replace
	Worn pads	Replace
	Damaged wheel bearing	Replace
	Loosen front wheel axle or rear wheel axle	Tighten to specified torque
	Foreign material in brake fluid	Replace brake fluid
	Clogged return port of master cylinder	Disassemble and clean
		master cylinder
Excessive brake	Air in hydraulic system	Bleed air
lever stroke	Insufficient brake fluid	Replenish fluid to specified
		level; bleed air
	Improper quality of brake fluid	Replace with correct fluid
Leakage of brake	Insufficient tightening of connection joints	Tighten to specified torque
fluid	Cracked hose	Replace
	Worn piston or seal	Replace piston or seal
	Worn cylinder or cup	Replace cylinder or cup
Brake drags	Rusty part	Clean and lubricate
	Insufficient brake lever or brake pedal pivot lubrica-	Lubricate
	tion	

### **ELECTRICAL**

Complaint	Symptom and possible causes	Remedy
No sparking or poor	Defective ignition coil	Replace
sparking	Defective spark plug	Replace
	Defective CKP sensor	
	Defective ECM	Replace
	Defective TO sensor	Replace
	Open-circuited wiring connections	
Spark plug soon	Spark plug soon • Mixture too rich	
• • •		Adjust idle screw
carbon.	Incorrect gasoline	Change
	Dirty air cleaner element	Clean or replace
	Too cold spark plug	Replace with hot type plug
Spark plug become	Worn piston ring	Replace
fouled too soon.	Worn piston or cylinder	Replace
	Excessive clearance of valve stem in valve guide	Replace
	Worn valve stem seal	Replace
Spark plug	Too hot spark plug	Replace with cold type plug Tune up
electrodes overheat	electrodes overheat • Overheated the engine	
• Loose spark plug		Retighten
	Too lean mixture	Inspect FI system
Magneto does not	Open- or short-circuited lead wires, or loose lead	Repair or replace or
charge.	connections	retighten
	Short-circuited, grounded or open charge coil	Replace
	Short-circuited or punctured regulator/rectifier	Replace
Magneto does	Lead wires tend to get shorted or open-circuited or	Repair or retighten
charge, but	loosely connected at terminals	
charging rate is	Grounded or open-circuited charge coil	Replace
below the	Defective regulator/rectifier	Replace
specification.		
Magneto	Damaged or defective regulator/rectifier	Replace
overcharges	Poorly grounded regulator/rectifier	Clean and tighten ground connection
Unstable charging	Lead wire insulation frayed due to vibration, result-	Repair or replace
	ing in intermittent short-circuiting	
	Internally shorted magneto	Replace
	Defective regulator/rectifier	Replace

# **MACHINE TUNING**

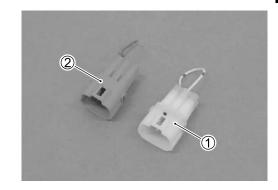
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### **SELECTION OF ECM TUNING MAP**

In the ECM of this model, there are three different maps provided, a standard map and two modified maps (injection map for slightly leaner mixture and that for slightly richer mixture).

Select the appropriate short wire among those that come supplied in the motorcycle shipping crate and connect it to the mode select coupler. This can change the ECM setting to the modified map (either injection map for slightly leaner mixture or that for slightly richer mixture depending on the selected shunt wire).

	Coupler color	Injection map
1	White	Lean
2	Gray	Rich
		STD



### NOTE:

The changeover is executed immediately after the engine has been started.

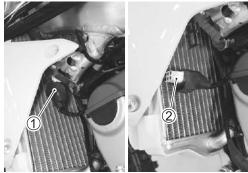
- Select White short wire (map for slightly leaner mixture) when:
  - 1) Raining
  - 2) In highly humidity
- Select Gray short wire (map for slightly richer mixture) when:
  - 1) In low humidity
  - 2) At continuous high speed

### NOTE:

The above information is provided only as a guide. To determine the setting, make sure to check also for driveability and spark plug firing end condition.

#### SHORT WIRE CONNECTING PROCEDURE

- Remove the mode select coupler ① from the bracket.
- Disconnect the mode select coupler cap ②.

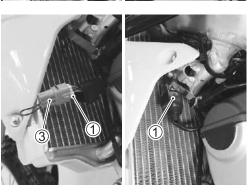


• Connect the short wire ③ to the mode select coupler ①.

#### **NOTICE**

Improper mode select coupler can damage system. Keep dry when connecting the coupler.

- Install the mode select coupler ① to the bracket.
- Start the engine.



# SELECTION OF S-HAC (SUZUKI HOLESHOT ASSIST CONTROL) MAP

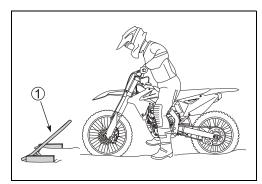
S-HAC is a function that controls engine characteristics when starting a race using a starting gate ①.

One of three different modes (maps) can be selected for engine control.

#### NOTE:

S-HAC performs control intended specifically for starts that use a starting gate.

Do not use S-HAC for a start that does not use a starting gate.



#### S-HAC MAP

Map (Indicator light)	Use for
Standard map (Unlit)	_
A-map (slow flashing)	Hard & dry dirt, or concrete base
B-map (fast flashing)	Normal dirt

#### **Engine control release conditions**

Selected map	Engine control release conditions	
	Control released 6 seconds after starting begins.	
	Control released when throttle is closed after starting begins.	
	Control released upon shift to 4th gear.	
A-map or B-map	Control released if starting off is not performed within 180 seconds after A-map or	
	B-map is selected.	
	Released when the S-HAC switch is pressed again and held down until indicator light	
l	turn off.	

When any of the above conditions are met, the active map is released and the standard map is selected. NOTE:

- \* The "start off" state of the motorcycle is defined as being from the point that the clutch is engaged.
- \* Starting off without opening the throttle (throttle opening of 1/8 or less) or after lowering the engine speed by frequent half-clutching may make determination of start off impossible. Do not use S-HAC when running under such conditions.

#### SELECTING A MODE

• Start the engine and shift the gear to neutral, 1st, or 2nd. Next, adjust the engine speed so it is no greater than 3 500 rpm.

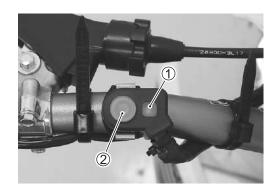
#### NOTE:

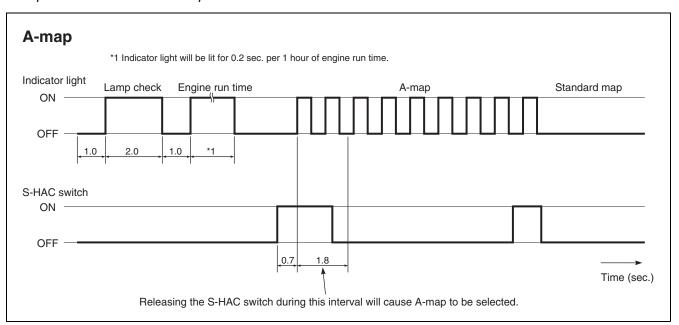
The S-HAC map setting cannot be change (to A-map or B-map) while a DTC (Diagnostic Trouble Code) is displayed.

#### A-MAP

- The indicator light 1 will light for a lamp check (2 seconds) and then become an engine run time indicator light. Note, however, that even while the indicator light is lit to indicate the engine run time, holding down the S-HAC switch 2 for more than 0.7 seconds will cause the indicator light ① to switch to slow flashing (A-map).
- To select A-map, release the S-HAC switch ② while the indicator light ① is flashing slowly (for about 1.8 seconds).
- Selecting A-map will cause the slow flash pattern to continue.

- \* To switch to the standard map from A-map, hold down the S-HAC switch until the indicator light 1 goes out.
- \* To switch from A-map to B-map, first switch to the standard map and then switch to B-map.



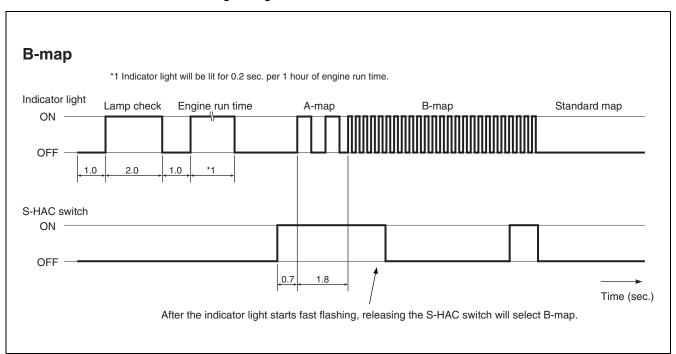


#### **B-MAP**

- The indicator light ① will light for a lamp check (2 seconds) and then become an engine run time indicator light. Note, however, that even while the indicator light is lit to indicate the engine run time, holding down the S-HAC switch ② for more than 0.7 seconds will cause the indicator light ① to switch to slow flashing (A-map). Holding down the S-HAC switch ② for more than 1.8 seconds will cause the indicator light ① to switch to fast flashing.
- Releasing the S-HAC switch ② to select B-map will cause the fast flash pattern to continue.

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- \* After holding down the S-HAC switch to switch from A-map (slow flashing) to B-map (fast flashing), holding down the S-HAC switch again will only select standard map.
- \* To switch from B-map to A-map, first switch to the standard map and then switch to A-map.
- \* To switch to the standard map from B-map, hold down the S-HAC switch until the indicator light ① goes out.



#### FRONT FORK TUNING

#### RIGHT FRONT FORK LABEL

#### **A WARNING**







This unit contains high-pressure air. Mishandling can cause explosion.

- \* Keep away from fire and heat.
- \* Read owner's manual for more information.

#### NOTE:

Ask your Suzuki dealer to dispose of the right front fork.

#### **RECOMMENDED AIR PUMP**

#### **NOTICE**

Applying compressed air with a compressor etc. can damage the fork parts.

Be sure to use a hand-operated air pump.

#### For inner chamber and balance chamber

Measuring range	1 000 – 1 400 kPa	
	(10 – 14 kgf/cm², 142 – 199 psi)	
Gauge scale	auge scale 50 kPa (0.5 kgf/cm², 7.1 psi)	
Hand-operated air pump		
The air pump is equipped with air adjustment valve.		

#### For outer chamber

Measuring range	0 – 130 kPa	
	(0 - 1.3 kgf/cm², 0 - 18 psi)	
Gauge scale	10 kPa (0.1 kgf/cm², 1.4 psi)	
Hand-operated air pump		
The air pump is equipped with air adjustment valve.		

With the front forks of the RM-Z450, air spring reaction force, and compression and rebound damping force can be adjusted in accordance with course conditions and rider preferences.

In order to ensure efficient setting work, first check the items below to determine whether there are any suspension abnormalities.

- Front fork air pressure adjustment. (\$\sumsymbol{2}\$-37)
- Front fork damage and oil leakage. ( 2-37)
- Tire pressure. ( 2-39)
- Tire and wheel damages. (2-38)
- Spoke nipple tension and rim lock tightness. ( 2-39)
- Steering movement. ( 2-39)

- \* Perform settings based on the feeling of running under standard setting.
- \* If you lose a sense of the setting orientation for some reason, return to standard setting and re-start adjustment.

## RIGHT FRONT FORK AIR PRESSURE ADJUSTMENT

NOTE:

Check the air pressure before riding.

- Remove the air valve caps 1.



A rise in inner chamber air pressure increases reaction force, while a drop in inner chamber air pressure decreases reaction force.

DATA Inner chamber air pressure

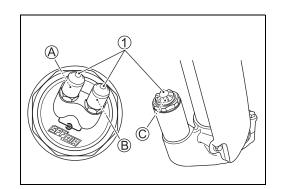
Standard setting: 1 200 kPa (12 kgf/cm<sup>2</sup>, 171 psi)

Balance chamber air pressure

Standard setting: 1 200 kPa (12 kgf/cm², 171 psi)

Outer chamber air pressure

Standard setting: 0 kPa (0 kgf/cm², 0 psi)



## LEFT FRONT FORK COMPRESSION DAMPING FORCE ADJUSTMENT

• Turn the adjust screw clockwise ① until it stops (full hard position).

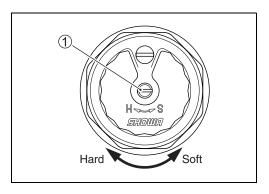
#### NOTE:

To set the adjuster, you must gently turn the adjust screw ① clockwise until it stops, then back it out the recommended number of turns. Do not force the adjust screw past the stopped position or you may damage the adjuster.

• Turn the adjust screw ① counterclockwise and the 8th click is the standard position.

Compression damping force adjuster

Standard setting: 8 clicks turn counterclockwise



• Turn the adjust screw clockwise ① until it stops (full hard position).

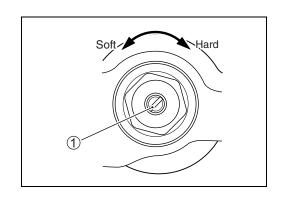
#### NOTE:

To set the adjuster, you must gently turn the adjust screw ① clockwise until it stops, then back it out the recommended number of turns. Do not force the adjust screw past the stopped position or you may damage the adjuster.

• Turn the adjust screw ① counterclockwise and the 13th click is the standard position.

Rebound damping force adjuster

Standard setting: 13 clicks turn counterclockwise



## LEFT FRONT FORK OIL QUANTITY MINOR ADJUSTMENT

#### NOTE:

The oil quantity is normal upon shipment from the factory, and the procedures below can be used to adjust the oil quantity. Adjust the oil quantity when disassembling the forks and/or when you do not know the oil quantity. ( 4-11)

#### ADDING THE FORK OIL

- Remove the air bleeder valve 1.
- Add the fork oil with a injector from the air bleed hole.

#### **NOTICE**

Different oils may cause chemical reaction and deteriorate.

Never mix different types of fork oil.

#### REDUCING THE FORK OIL

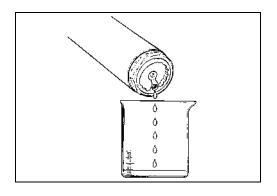
- Remove the left front fork. (\$\sumsymbol{1}\$18-4)
- · Remove the air bleeder valve.
- Leaning the front fork, reduce the fork oil from the air bleed hole.

#### FORK SHOWA SUSPENSION FLUID SS-19 or equivalent

Front fork air bleeder valve:

1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)





# LEFT FRONT FORK OIL CHANGE (Only for outer tube oil chamber)

- Remove the left front fork. ( 18-4)
- Thoroughly clean the fork before disassembly.

#### **NOTICE**

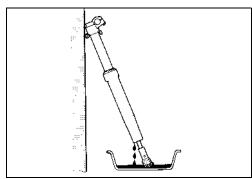
Scratches or other damage on the inner tube or on the oil seal lip will cause oil leakage.

Avoid scratching or damaging the inner tube or the oil seal. Use a mild detergent or car wash soap and sponge out dirt with plenty of water.

- Clamp the outer tube with a vise. Protect the outer tube with a rag when using a vise. ( 18-6)
- Loosen and remove the fork cylinder unit from the outer tube and slowly slide down the outer tube. ( 18-6)

09941-53630: Front fork cap socket wrench (50 mm)

 Hold the front fork (inner and outer tubes) inverted position for more than 20 minutes to allow the fork oil to fully drain.



- Remove the air bleeder valve 1).
- Force out the remaining oil (discharged oil) using compressed air completely.

#### **A** CAUTION

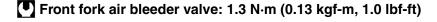
Oil may jet out from fork cylinder unit oil hole and air bleeder. Jet-out oil may stick to your eyes and mouth.

Protect your eyes and mouth with a proper eye protection gear and musk.

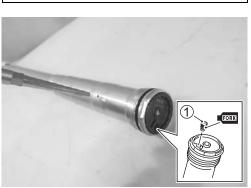
 Apply fork oil to the new O-ring and tighten the air bleeder valve ①.

#### NOTE:

Replace the O-ring with a new one.



· Wipe off the fork oil from the removed parts.



- Slide down the outer tube.
- Pour the specified amount of fork oil into the outer tube.

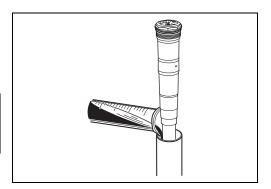
#### FORK SHOWA SUSPENSION FLUID SS-19 or equivalent

	STD oil quantity	Oil quantity adjustable range
STD	320 ml	300 – 390 ml
310	(10.8/11.3 US/Imp oz)	(10.1/10.6 – 13.2/13.7 US/lmp oz)

• Raise the outer tube and temporarily tighten the fork cylinder unit. ( 18-19)



• Install the left front fork. ( 18-31)



## RIGHT FRONT FORK AIR PRESSURE ADJUSTMENT PROCEDURE

#### NOTE:

Check the air pressure before riding.

• Thoroughly clean the fork before adjustment.

#### **NOTICE**

Scratches or other damage on the inner tube or on the oil seal lip will cause oil and air leakages.

Avoid scratching or damaging the inner tube or the oil seal. Use a mild detergent or car wash soap and sponge out dirt with plenty of water.

- Place the motorcycle on a block to lift front wheel off the ground.
- · Adjust the air pressure in the following order.

#### NOTE:

- \* Be sure to use a hand-operated air pump. ( 4-7)
- \* The specified air pressure is the value when the right front fork is fully extended.
- 1) Remove the air valve caps (1,2,3).

#### NOTE:

Prevent the foreign matter from getting into the air valves.

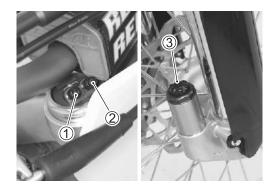
- 2) Decrease the balance chamber air pressure (A) to 1 000 kPa (10 kgf/cm², 142 psi) or less.
- 3) Adjust the inner chamber air pressure (a) within the specified range. (3)
- 4) Adjust the outer chamber air pressure © within the specified range. ( 4-13)

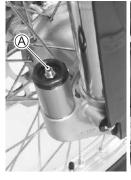
#### **WARNING**

Air pressure that is outside the adjustable range specified in the data of recommended air pressure can adversely affect running.

#### NOTE:

Air pressure change in accordance with atmospheric pressure and/or air temperature.

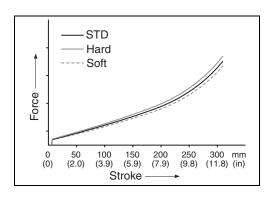






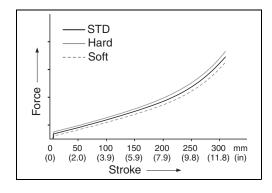
#### **PATA** Recommended air pressure

	Inner	Inner Outer	
	chamber	chamber	chamber
Soft	1 100 kPa	0 kPa	1 100 kPa
	(11 kgf/cm²,	(0 kgf/cm²,	(11 kgf/cm <sup>2</sup> ,
	156 psi)	0 psi)	156 psi)
STD	1 200 kPa	0 kPa	1 200 kPa
	(12 kgf/cm <sup>2</sup> ,	(0 kgf/cm²,	(12 kgf/cm <sup>2</sup> ,
	171 psi)	0 psi)	171 psi)
Hard	1 300 kPa	0 kPa	1 300 kPa
	(13 kgf/cm <sup>2</sup> ,	(0 kgf/cm <sup>2</sup> ,	(13 kgf/cm <sup>2</sup> ,
	185 psi)	0 psi)	185 psi)
Adjust	1 000 - 1 300 kPa	0 – 130 kPa	1 000 – 1 400 kPa
able	(10 – 13 kgf/cm²,	(0 – 1.3 kgf/cm <sup>2</sup> ,	(10 – 14 kgf/cm²,
range	142 – 185 psi)	0 – 18 psi)	142 – 199 psi)



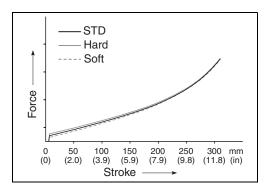
#### Example: To vary the overall stroke from standard setting

	Inner	Outer	Balance
	chamber	chamber	chamber
Soft	1 100 kPa	0 kPa	1 200 kPa
	(11 kgf/cm <sup>2</sup> ,	(0 kgf/cm <sup>2</sup> ,	(12 kgf/cm²,
	156 psi)	0 psi)	171 psi)
STD	1 200 kPa	0 kPa	1 200 kPa
	(12 kgf/cm <sup>2</sup> ,	(0 kgf/cm²,	(12 kgf/cm²,
	171 psi)	0 psi)	171 psi)
Hard	1 300 kPa	0 kPa	1 200 kPa
	(13 kgf/cm <sup>2</sup> ,	(0 kgf/cm <sup>2</sup> ,	(12 kgf/cm²,
	185 psi)	0 psi)	171 psi)



Example: To vary the vicinity of the initial stroke from standard setting

	Inner chamber	Outer chamber	Balance chamber
Soft	1 200 kPa	0 kPa	1 300 kPa
	(12 kgf/cm <sup>2</sup> ,	(0 kgf/cm²,	(13 kgf/cm <sup>2</sup> ,
	171 psi)	0 psi)	185 psi)
STD	1 200 kPa	0 kPa	1 200 kPa
	(12 kgf/cm <sup>2</sup> ,	(0 kgf/cm²,	(12 kgf/cm <sup>2</sup> ,
	171 psi)	0 psi)	171 psi)
Hard	1 200 kPa	0 kPa	1 100 kPa
	(12 kgf/cm <sup>2</sup> ,	(0 kgf/cm <sup>2</sup> ,	(11 kgf/cm <sup>2</sup> ,
	171 psi)	0 psi)	156 psi)

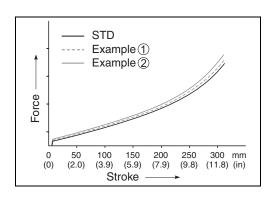


If, after trying the above hard setting, you still feel it is too soft, you can adjust it by increasing outer chamber pressure.

#### NOTE:

Adjust the outer chamber setting with a low-pressure gauge. (3 4-7)

	Inner	Outer	Balance
	chamber	chamber	chamber
STD	1 200 kPa	0 kPa	1 200 kPa
	(12 kgf/cm <sup>2</sup> ,	(0 kgf/cm²,	(12 kgf/cm²,
	171 psi)	0 psi)	171 psi)
Example 1	1 200 kPa	20 kPa	1 200 kPa
	(12 kgf/cm²,	(0.2 kgf/cm <sup>2</sup> ,	(12 kgf/cm²,
	171 psi)	2.8 psi)	171 psi)
Example 2	1 200 kPa	50 kPa	1 200 kPa
	(12 kgf/cm <sup>2</sup> ,	(0.5 kgf/cm <sup>2</sup> ,	(12 kgf/cm²,
	171 psi)	7.1 psi)	171 psi)



6) Install the air valve caps securely after adjustment.

#### REAR SUSPENSION TUNING

#### **REAR SUSPENSION LABEL**

#### **WARNING**







This unit contains high-pressure nitrogen gas. Mishandling can cause explosion.

- \* Keep away from fire and heat.
- \* Read owner's manual for more information.

#### NOTE:

Ask your Suzuki dealer to dispose of the rear suspension unit.

With the rear suspension of the RM-Z450, compression and rebound damping force can be adjusted in accordance with course conditions and rider preferences. In order to ensure efficient setting work, first check the items below to determine whether there are any suspension abnormalities.

- Rear shock absorber damage and oil leakage. (2-38)
- Swingarm and links tightness. ( 2-38)
- Tire pressure. ( 2-39)
- Tire and wheel damages. ( 2-38)
- Spoke nipple tension and rim lock tightness. (2-39)

- \* Perform settings based on the feeling of running under standard setting.
- \* If you lose a sense of the setting orientation for some reason, return to standard setting and re-start adjustment.

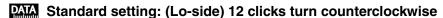
## COMPRESSION DAMPING FORCE ADJUSTMENT

#### NOTE:

To set the adjuster, you must gently turn the adjust screw or bolt clockwise until it stops, then back it out the recommended number of turns. Do not force the adjust screw or bolt past the stopped position, or you may damage the adjuster.

#### Low-side

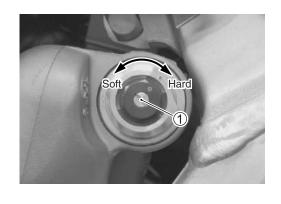
- Turn the adjust screw ① clockwise until it stops (full hard position).
- Turn the adjust screw ① counterclockwise about 12 clicks.

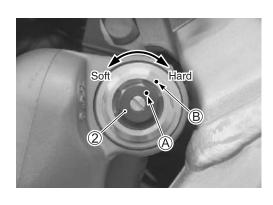


#### High-side

- Turn the adjust bolt ② clockwise until it stops (full hard position).
- Turn the adjust bolt ② counterclockwise about 2 turns until the two punch marks (A, B) align.

Standard setting: (Hi-side) 2 turns counterclockwise





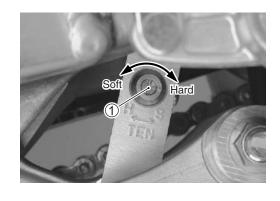
#### REBOUND DAMPING FORCE ADJUSTMENT

NOTE:

To set the adjuster, you must gently turn the adjust screw clockwise until it stops, then back it out the recommended number of turns. Do not force the adjust screw past the stopped position, or you may damage the adjuster.

- Turn the adjust screw 1 clockwise until it stops (full hard position).
- Turn the adjust screw ① counterclockwise about 12 clicks until the two punch marks align.

Standard setting: 12 clicks turn counterclockwise



#### SPRING PRE-LOAD ADJUSTMENT

- Place a block under the chassis tube.
- Remove the muffler and seat rail assembly. (19-3)
- Loosen the lock-nut 1 with the special tool.

#### 09910-60611: Universal clamp wrench

- Turn the adjuster 2 clockwise or counterclockwise to change the spring pre-load.
- Tighten the lock-nut 1.

Standard spring set length: 5 mm (0.2 in) compressed from spring free length

Spring set length adjustable range:

248 - 262 mm (9.8 - 10.3 in)

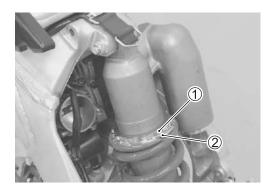
[at spring free length 265 mm (10.4 in)]

Spring adjuster lock-nut: 70 N⋅m (7.0 kgf-m, 50.5 lbf-ft)

#### **NOTICE**

Turning the adjuster ② without loosening the lock-nut 1 can damage the rear cushion unit.

Turn the adjuster after loosening the lock-nut.



#### SELECTION OF REAR SHOCK ABSORBER SPRING

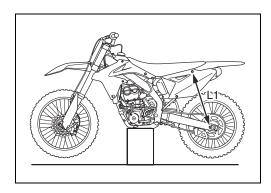
- Remove the rear shock absorber. ( 19-3)
- Change the spring. ( 19-4)

Spring	Part No.	Spring rate	Marking paint	Set-length adjustable range
Standard	62211-28H90	55.9 N/mm	Purple x 2	248 – 262 mm (9.8 – 10.3 in)
Otandard	— *1	(5.70 kgf/mm)	Gray x 1	[at spring free length 265 mm (10.4 in)]
Soft	62211-49H60	53.9 N/mm (5.50 kgf/mm)	Light blue x 2	247 – 262 mm (9.7 – 10.3 in)
Hard	62211-35G40	57.9 N/mm (5.90 kgf/mm)	Blue x 1	[at spring free length 265 mm (10.4 in)]

<sup>\*1</sup> The marking paint of the rear suspension is gray when the motorcycle is shipped by the factory.

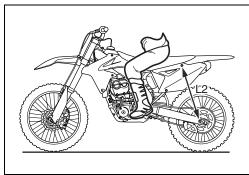
#### **REAR SUSPENSION SAG ADJUSTMENT**

 Measure the distance L1 from the seat bolt to the chain adjuster lock-nut with the motorcycle on the stand and the rear wheel lifted off the ground.



- Measure the distance L2 from the seat bolt to the chain adjuster lock-nut with the motorcycle off the stand and riding the motorcycle normally in full riding gear.
- Find the sag by subtracting L2 from L1. Standard sag range is 105 mm (4.1 in).

When the sag measured is:	Adjustment procedure
Less than 105 mm	Reduce spring pre-set length by turning
(4.1 in)	the spring adjuster.
More than 105 mm	Increase spring pre-set length by turning
(4.1 in)	the spring adjuster.



#### **SUSPENSION TUNING**

• The ability to set suspension in accordance with course conditions and/or a rider's running style is essential for motocross racing. The table below provides explanations of general suspension setting trends. Perform setting with the content of the table in mind.

#### NOTE:

The contents and trends in the table below may not be exactly applicable when performing actual setting work for multiple conflicting factors. If you lose a sense of the setting orientation for some reason, return to standard setting, and re-start setting work based on running time and running feeling.

#### COURSE ROAD SURFACE CONDITIONS AND SUSPENSION SETTING

Road Surface Conditions	Setting Trend		
Hard course	<ul> <li>Use the standard position as reference. If some problem is discovered, adjust the setting to resolve it.</li> </ul>		
Sand course	<ul> <li>Front setting is slightly harder to reduce automatic turning of the front handle to the inside.</li> <li>Front forks: Setting to hard.         <ul> <li>Example - Compression adjuster adjusted to hard.</li> <li>Balance chamber air pressure decreased, initial stroke adjusted to hard.</li> <li>Inner chamber air pressure and balance chamber air pressure both adjusted to hard.</li> </ul> </li> <li>Rear suspension: Standard setting.</li> </ul>		
Mud course	<ul> <li>Since both wheels are made heavy by adhering mud, set to hard.</li> <li>Front forks:         <ul> <li>Example – Compression adjuster adjusted to hard.</li> <li>Inner chamber air pressure and balance chamber air pressure both adjusted to hard.</li> <li>Inner chamber air pressure increased, overall stroke adjusted to hard.</li> </ul> </li> <li>Rear suspension:         <ul> <li>Example – Compression and rebound adjusters both adjusted to hard.</li> <li>Change with optional hard spring.</li> <li>5 – 10 mm (0.2 – 0.4 in) shorter than the standard sag range. (</li></ul></li></ul>		

#### SYMPTOMS WHILE RUNNING AND FRONT FORK SETTING

#### **SOFT**

SYMPTOM	SECTION		ADJUSTMENT PROCEDURE	
Soft initial stroke	<ul><li>Small bump</li><li>When braking</li></ul>	RH	Increase the inner chamber air pressure.	
			2. Decrease the balance chamber air pressure.	
			1. Adjust the compression damping force to a harder se	et-
		LH	ting. (See note below.)	
			2. Adjust the rebound damping force to a harder setting	າg.
			(See note below.)	
Soft middle stroke	<ul><li>Jump</li><li>Large bump</li><li>Medium bump</li><li>Small bump</li><li>When braking</li></ul>	RH	1. If the initial stroke is not hard, increase the inner char	m-
			ber air pressure.	
			2. If the initial stroke becomes hard following adjustment	nt,
			increase the balance chamber air pressure.	
			1. Adjust the compression damping force to a harder se	et-
		LH	ting. (See note below.)	
			2. Adjust the rebound damping force to a harder setting	ıg.
Soft bottom stroke	a lumn		(See note below.)	
Soit bottom stroke	<ul><li>Jump</li><li>Large bump</li></ul>		<ol> <li>If the initial stroke is not hard, increase the inner char ber air pressure.</li> </ol>	111-
	Large bump		<ol> <li>If the initial stroke becomes hard following the above</li> </ol>	NΑ
		RH	adjustment, increase the balance chamber air pre	
			sure.	,
			<ol> <li>If the bottom stroke is still soft following adjustment</li> </ol>	nt.
			repeat steps 1 and 2 until the softness is eliminated.	,
			1. Increase fork oil quantity in 2 - 5 ml (0.068/0.0	70
		LH	US/Imp oz) increments.	
Soft overall stroke	• Jump		1. Adjust the air pressure to hard setting of recommende	ed
	<ul> <li>Large bump</li> </ul>	RH	air pressure. ( 4-13)	
	Medium bump		2. Increase the inner chamber air pressure.	
			1. Adjust the compression damping force to a harder se	et-
			ting. (See note below.)	
		LH	2. If there is still softness following adjustment, adjust the	
			rebound damping force to a harder setting. (See no	ote
			below.)	
Still soft after above	• Jump		Return to standard setting.	
setting	Large bump		2. Increase the outer chamber air pressure to 10 kPa (0	).1
		RH	kgf/cm <sup>2</sup> , 1.4 psi).	
			3. Try the above setting in accordance with symptoms.	
			4. If there is still softness, repeat steps 1 and 2.	

#### NOTE:

When adjusting the damping force setting, attempt turning the adjuster 1 to 2 click stops at a time for each adjustment.

#### **HARD**

SYMPTOM	SECTION		ADJUSTMENT PROCEDURE
Hard initial stroke	<ul><li>Initial stroke</li><li>Small bump</li><li>When braking</li></ul>	RH	Decrease the inner chamber air pressure.
			2. Increase the balance chamber air pressure.
		LH	1. Adjust the compression damping force to a softer set
			ting. (See note below.)
			2. Adjust the rebound damping force to a softer setting
			(See note below.)
Hard middle stroke	<ul><li>Jump</li><li>Large bump</li><li>Medium bump</li></ul>	RH	1. If the initial stroke is not hard, decrease the balance
			chamber air pressure.
			2. If the initial stroke and middle stroke are hard, decrease
	Small bump		the inner chamber air pressure.
	When braking	LH	1. Adjust the compression damping force to a softer set
			ting. (See note below.)
			2. Adjust the rebound damping force to a softer setting
			(See note below.)
			3. If the bottom stroke becomes soft following the above
			adjustment, increase fork oil quantity in 2 – 5 m
	_		(0.068/0.070 US/Imp oz) increments.
Hard bottom stroke	Jump     Large bump	RH	Decrease the inner chamber air pressure.
			2. If the initial stroke and middle stroke become soft fol
			lowing adjustment, decrease the balance chamber ai
			pressure.
		LH	1. Adjust the compression damping force to a softer set
			ting. (See note below.)
Hard overall stroke	• Jump	RH	1. Adjust the air pressure to soft setting of recommended
	Large bump     Medium bump		air pressure. ( 74-13)
			2. Decrease the inner chamber air pressure.
			1. Adjust the compression damping force to a softer set
		10	ting. (See note below.)
		LH	2. If there is still hardness following adjustment, adjust the
			rebound damping force to a softer setting. (See note
			below.)

#### NOTE:

When adjusting the damping force setting, attempt turning the adjuster 1 to 2 click stops at a time for each adjustment.

#### SYMPTOMS WHILE RUNNING AND REAR SUSPENSION SETTING

SYMPTOM	SECTION	ADJUSTMENT PROCEDURE
Feels too hard overall	• Jump	1. Adjust the low-speed compression damping
	<ul> <li>Series of bumps</li> </ul>	force to a softer setting. (See note below.)
		2. Adjust the rebound damping force to a softer
		setting. (See note below.)
		3. Change the spring with an optional softer one.
		( 🚅 4-18)
		4. Adjust the high-speed compression damping
		force to a softer setting. (See note below.)
Kicks up	Medium to large bumps	1. Adjust the low-speed compression damping
		force and rebound damping force to harder set-
		tings. (See note below.)
		2. Adjust the high-speed compression damping
		force to a harder setting. (See note below.)
Bottom feeling or feels too	• Jump	1. Adjust the low-speed compression damping
soft and unstable	Large bump	force to a harder setting. (See note below.)
	Series of bumps	2. Adjust the rebound damping force to a harder
		setting. (See note below.)
		3. Change the spring with an optional harder one.
		( ( ₹4-18)
Feels harsh and hits	Jump	1. Adjust the low-speed compression damping
bumps too harshly	Large bump	force to a harder setting. (See note below.)
	Series of bumps	2. Adjust the rebound damping force to a harder
		setting. (See note below.)
		3. If the suspension feels bottom even with the
		above adjustment, adjust the high-speed com-
		pression damping to a harder setting. (See note
		below.)
Provides poor traction	Accelerating	1. Adjust the rebound damping force to a harder
	Series of small bumps	setting. (See note below.)
		2. If traction feeling does not improve after adjust-
		ing above mention, adjust the low-speed com-
		pression damping force to a softer setting.
		(See note below.)
		3. If the suspension feels bottom even with the
		above adjustment, adjust the high-speed com-
		pression damping to a harder setting. (See note
Tando to ainly freeze the air	- Deceleration or broking	below.)
Tends to sink front than	Decelerating or braking	1. Adjust the high-speed compression damping
rear		force to a softer setting. (See note below.)
		2. Adjust the rebound damping force to a harder
		setting. (See note below.)

#### NOTE:

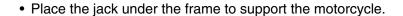
When adjusting the damping force setting, attempt turning the adjuster 1 to 2 click stops at a time for each adjustment.

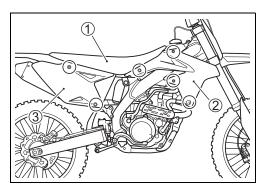
## ENGINE REMOVAL AND INSTALLATION

——————————————————————————————————————	
ENGINE REMOVAL AND INSTALLATION	5- 2
REMOVAL	<i>5- 2</i>
INSTALLATION	<i>5- 7</i>

## **ENGINE REMOVAL AND INSTALLATION REMOVAL**

- Drain engine oil. ( 2-14)
- Drain engine coolant. ( 14-3)
- Remove the seat ①.
- Remove the radiator covers 2, left and right.
- Remove the right frame cover 3.







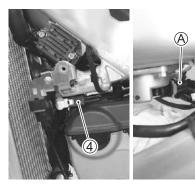
• Remove the fuel tank bolt and rubber band.



- Disconnect the fuel pump coupler 4.
- Lift and hold the fuel tank.
- Place a rag under the fuel hose ⑤.
- Clean the fuel hose connector (A) and disconnect it. ( 3-2)

#### NOTE:

When removing the fuel tank, do not leave the fuel hose ⑤ on the fuel tank side.



• Put the cleaned plug 6 and cap 7 to the fuel hose and fuel pump.

#### **NOTICE**

Dirt and dust in the fuel supply line can damage the motorcycle.

- \* Put the plug 6 and cap 7 to the fuel hose and fuel pump when the fuel hose connector is disconnected.
- \* Be sure to keep the parts clean when disconnecting and connecting the fuel hose connector.
- Remove the fuel tank assembly.
- Remove the muffler ®.



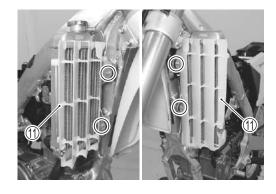
• Remove the exhaust pipe 9 and exhaust pipe gasket 10.



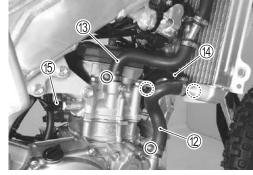
• Remove the right front protector.



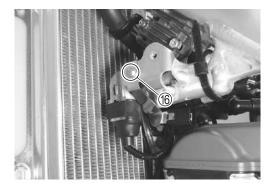
- Remove the radiator louvers (1), left and right.
- Remove the radiator mounting bolts, left and right.



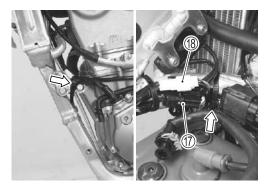
- Disconnect the radiator hoses 12 and 13.
- Remove the radiator hose (4).
- Disconnect the ECT sensor coupler ⑤.



• Remove the coupler bracket bolt 6.

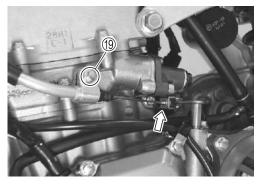


- Remove the clamps.
- Disconnect the magneto lead wire coupler ① and GP switch lead wire coupler 18.

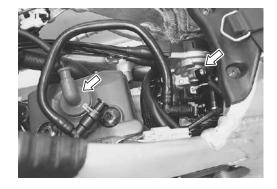


• Remove the clutch cable bracket bolt (9) and disconnect the clutch cable.

- \* Mark the clutch cable at which the bracket slit set for correct reinstallation.
- \* Loosen the clutch cable adjuster when disconnecting.



- Remove the throttle body. ( 13-10)
- Disconnect the spark plug cap.



• Remove the gearshift lever 20.

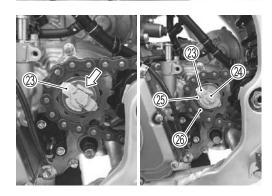
#### NOTE:

Mark the gearshift shaft head at which the gearshift lever slit set for correct reinstallation.

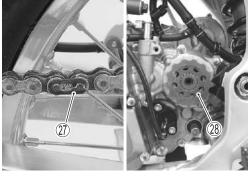
- Remove the engine sprocket cover ②.
- Remove the front chain guide plate 22.



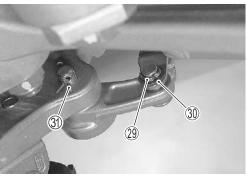
• Remove the engine sprocket bolt 4, lock washer 3, washer ② and wave washer ② while depressing the rear brake.



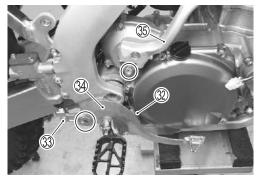
- Remove the drive chain clip ② and release the drive chain.
- Remove the engine sprocket 28.



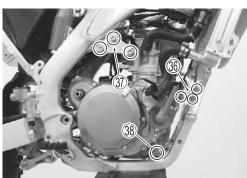
• Remove the cotter pin ②, washer ③ and clip ③.



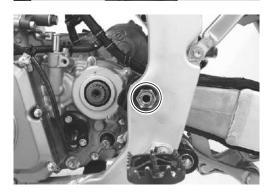
- Remove the brake pedal spring ②, master cylinder rod pin ③ and brake pedal 34.
- Remove the kick starter lever 35.



- Remove the engine mounting front brackets 36, left and right.
- Remove the right engine mounting upper bracket ③.
- Remove the engine mounting bolt and nut 38.



• Remove the swingarm pivot nut and washer.

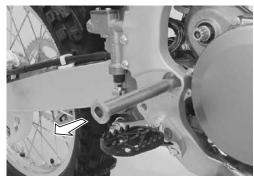


• Extract three quarters of the swingarm pivot shaft so as to keep the swingarm in position.

#### NOTE:

The swingarm will come off when the swingarm pivot shaft is completely removed.

• Remove the engine from the frame.

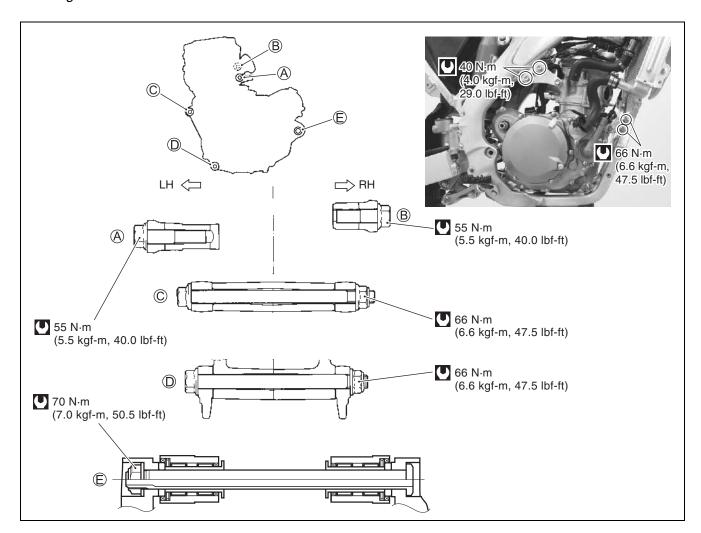


#### INSTALLATION

Install the engine in the reverse order of removal. Pay attention to the following points:

- Mount the engine on the frame.
- Fit the swingarm in its position and hold it with the swingarm pivot shaft.
- Tighten the engine mounting bolts, nuts and swingarm pivot nut to the specified torque.

- \* Install the left engine mounting upper bracket after installing the throttle body.
- \* The engine mounting nut is the self-lock type and cannot be used repeatedly. If the self-lock effect is lose, replace it with a new one.
- \* The engine mounting bolts and nuts can loosen quickly when the engine is removed and installed. Be sure to retighten the bolts and nuts.



- Install the kick starter lever in the correct position. (\$\subseteq 8-7)
- Apply thread lock to the kick starter lever bolt.
- Tighten the kick starter lever bolt to the specified torque.

99000-32030: THREAD LOCK CEMENT "1303B" or equivalent

Kick starter lever bolt: 29 N·m (2.9 kgf-m, 21.0 lbf-ft)

• Apply grease to the brake pedal pivot bolt.

**→** 99000-25011: SUZUKI SUPER GREASE "A" or equivalent

• Install the brake pedal and brake pedal spring. (220-25)

Brake pedal pivot bolt: 29 N⋅m (2.9 kgf-m, 21.0 lbf-ft)

• Install the clip ①, washer ② and new cotter pin ③.

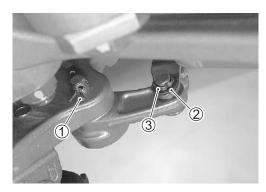
NOTE:

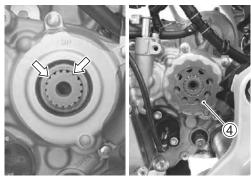
Replace the cotter pin 3 with a new one.

- Clean the engine sprocket spacer and driveshaft if any dust, stone or foreign materials stuck on them.
- Install the engine sprocket 4 properly.





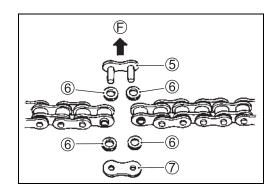


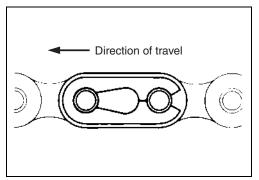


- Connect both ends of the drive chain with the new joint pin 5 inserted from the wheel side (F) as installed on the motorcycle.
  - 6 New seal ring ... 4 pcs.
  - 7 New joint plate

#### NOTE:

- \* Replace the joint pin 5, seal rings 6, joint plate 7 and drive chain clip with new ones.
- \* When installing the joint plate 7, its stamp mark must face the outside.
- Reassemble the drive chain clip so the slit end faces opposite the direction of rotation.





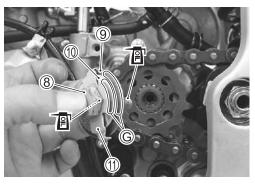
- Clean the engine sprocket bolt 8.
- · Apply engine oil to the bearing surface and the threaded portion of the engine sprocket bolt 8.
- Install the wave washer (9), washer (10), new lock washer (11) and engine sprocket bolt 8.

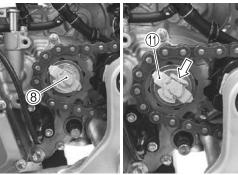
#### NOTE:

- \* Replace the lock washer 11 with a new one.
- \* Face each stamped mark @ outside.
- Tighten the engine sprocket bolt ® to the specified torque while depressing the rear brake.

#### Engine sprocket bolt: 32 N·m (3.2 kgf-m, 23.0 lbf-ft)

• Bend the lock washer (1) to secure the bolt.





• Install the front chain guide plate 1 and engine sprocket cover 13.

#### NOTE:

When installing the front chain guide plate 12, pay attention to its direction.

Apply thread lock to the engine sprocket cover bolts.

## 99000-32030: THREAD LOCK CEMENT "1303B"

or equivalent

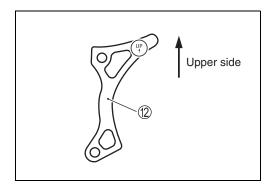
• Tighten the engine sprocket cover bolts to the specified torque.

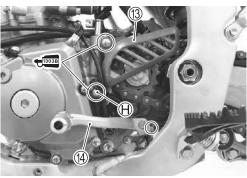
#### NOTE:

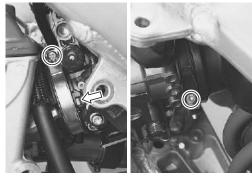
Fit the clamp to the sprocket cover bolt  $\oplus$ .

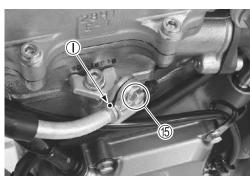
- Engine sprocket cover bolt: 11 N⋅m (1.1 kgf-m, 8.0 lbf-ft)
- Install the gearshift lever (4) in the correct position.
- Fit the projection of the throttle body to the depression of intake pipe.
- Position the clamps correctly. ( 20-23)

- Align the matching mark ① on the clutch cable with slit of the bracket.
- Tighten the clutch cable bracket bolt (5) to the specified
- Clutch cable bracket bolt: 7 N⋅m (0.7 kgf-m, 5.0 lbf-ft)
- Install the right front protector.
- Front protector bolt: 12 N·m (1.2 kgf-m, 8.5 lbf-ft)











• Install the new muffler joint connector (6) and new exhaust pipe gasket (7).

#### NOTE:

- \* Replace the connector ® and gasket ® with new ones to prevent exhaust gas leakage.
- \* When installing a new connector, clean the exhaust pipe and joint of the muffler.
- Temporarily tighten the exhaust pipe nuts ®.
- Insert the muffler to the exhaust pipe.
- Apply engine oil to the bearing surface and the threaded portion of the muffler mounting front bolt (9).
- Temporarily tighten the muffler mounting front bolt <sup>(1)</sup> and rear bolt <sup>(2)</sup>.
- Temporarily tighten the muffler connector clamp bolt 2).

#### NOTE:

Fit the convex part of connector clamp to the concave part of muffler.

- Check the clearance between exhausted pipe and radiator hose.
- Be sure to tighten the bolts and nuts in the following order.
- 1) Muffler mounting front bolt (19) and rear bolt (20)
- 2) Exhaust pipe nuts ®
- 3) Connector clamp bolt 21
- Exhaust pipe nut: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

  Muffler mounting front bolt:

21 N·m (2.1 kgf-m, 15.0 lbf-ft)

Muffler mounting rear bolt:

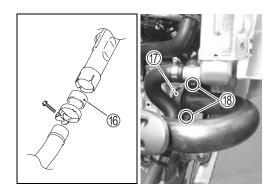
23 N·m (2.3 kgf-m, 16.5 lbf-ft)

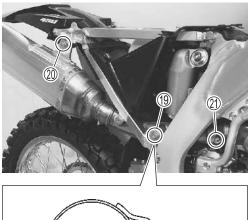
Muffler connector clamp bolt:

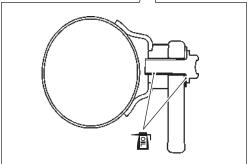
17 N·m (1.7 kgf-m, 12.5 lbf-ft)

#### **INSPECTION AFTER INSTALLATION**

- Engine oil level ( 2-13)
- Engine coolant level and coolant leakage (2-19, -20)
- Fuel leakage
- Exhaust gas leakage
- Throttle cable play (\$\sum\_2\$-22)
- Clutch cable play ( 2-21)
- Drive chain slack ( 2-31)
- Brake pedal height (2-36)
- Wiring harness, cable and hose routing (220-20 to -24)



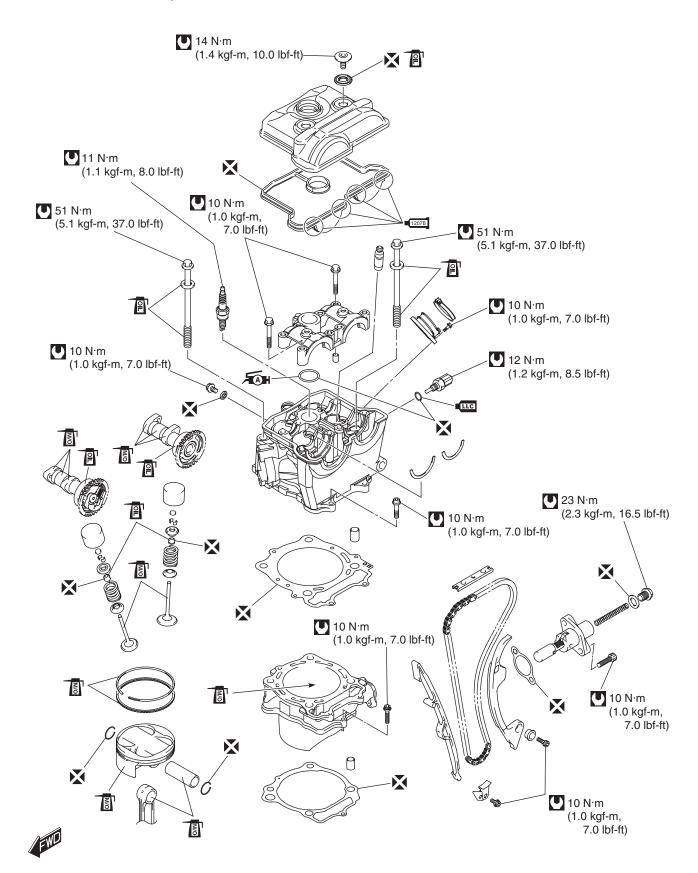




## CYLINDER HEAD, CYLINDER AND PISTON

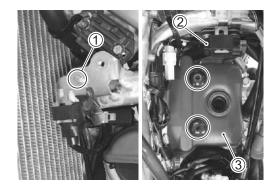
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## **CONSTRUCTION CYLINDER HEAD, CYLINDER AND PISTON**



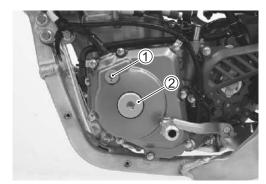
## **ENGINE TOP SIDE DISASSEMBLY** CYLINDER HEAD COVER REMOVAL

- Remove the seat. ( 5-2)
- Remove the radiator covers and fuel tank. ( 5-2)
- Disconnect the spark plug cap and remove the spark plug. ( 2-9)
- Remove the coupler bracket bolt 1.
- Remove the TO sensor ② from the bracket.
- Remove the cylinder head cover ③ and its gasket.



#### **CAMSHAFTS (AUTOMATIC DECOMP.) AND CAM CHAIN TENSION ADJUSTER REMOVAL**

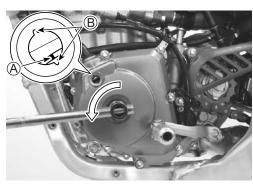
- Remove the cylinder head cover. ( above)
- Drain engine oil. ( 2-14)
- Remove the TDC plug ① and crankshaft hole plug ②.

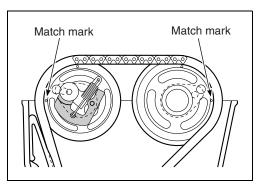


· Place a wrench over the crankshaft and turn it counter clockwise to align the TDC mark (A) with the grooves (B) of the timing inspection hole.

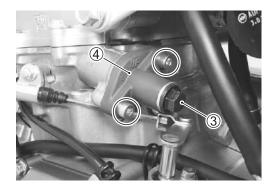
#### NOTE:

The piston must be at TDC on the compression stroke.





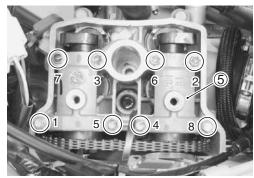
- Remove the cam chain tension adjuster cap bolt 3, washer and spring.
- Remove the cam chain tension adjuster 4 and its gasket.



Remove the camshaft journal holder ⑤.

#### NOTE:

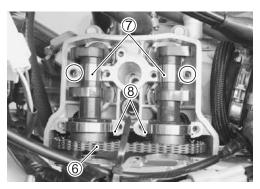
- \* Be sure to loosen the camshaft journal holder bolts evenly by shifting the wrench in the descending order of numbers.
- \* The descending order of numbers are indicated on the camshaft journal holder.



- Disengage the camshafts 7 from cam chain 6.
- Remove the dowel pins and C-rings 8.

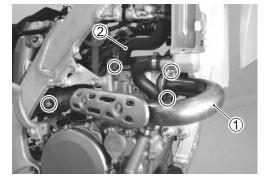
#### NOTE:

Do not drop the cam chain 6, dowel pins and C-rings 8 into the crankcase.

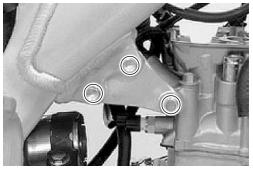


#### CYLINDER HEAD REMOVAL

- Remove the camshafts. ( 6-3)
- Remove the throttle body. ( 13-10)
- Drain engine coolant. ( 14-3)
- Remove the exhaust pipe ① and gaskets.
- Loosen the clamp and disconnect the radiator hose 2.



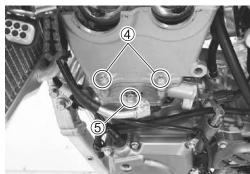
• Remove the engine mounting upper bracket (RH).



• Disconnect the ECT sensor coupler ③.



- Remove the cylinder head base bolts 4.
- Loosen the cylinder base bolt ⑤.



• Remove the cylinder head bolts.

#### NOTE:

When loosening the cylinder head bolts, loosen each bolt little by little diagonally.

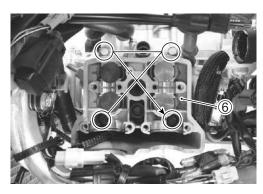
• Remove the cylinder head 6.

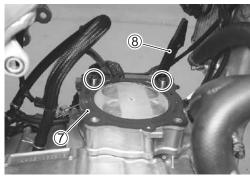
If the cylinder head does not come off easily, lightly tap it using a plastic hammer.

• Remove the cylinder head gasket ⑦, dowel pins and cam chain No.1 guide 8.

#### NOTE:

Do not drop the cam chain and dowel pins into the crankcase.



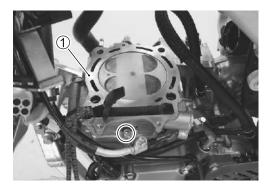


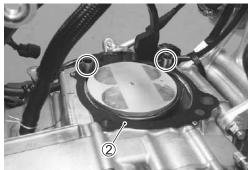
## **CYLINDER REMOVAL**

- Remove the cylinder head. (\$\sum\_6\$-4)
- Remove the cylinder ① by removing the cylinder base bolt.

#### NOTE:

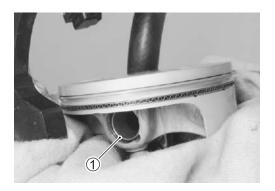
- \* Do not drop the cam chain into the crankcase.
- \* If the cylinder does not come off easily, lightly tap it using a plastic hammer.
- Remove the cylinder gasket ② and dowel pins.

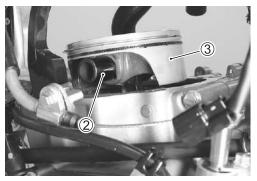




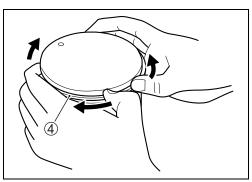
## PISTON AND PISTON RING REMOVAL

- Remove the cylinder. ( above)
- Place a clean rag over the cylinder base to prevent the piston pin circlip ① from dropping into the crankcase.
- Remove the piston pin circlip 1.
- Remove the piston pin ② and piston ③.





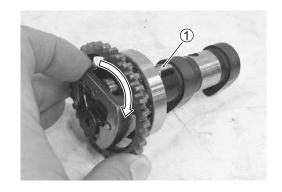
- Carefully spread the ring opening with your thumbs and then push up the opposite side of the ring 4 to remove it.
- · Remove the oil ring in the same procedure.



## **ENGINE TOP COMPONENTS INSPECTION AND SERVICE**

## **AUTOMATIC DECOMP. INSPECTION**

- Check the decomp. arm moves smoothly and decomp.cam ① rotates together.
- If any abnormal condition are found, replace the camshaft assembly.



#### **CAMSHAFT INSPECTION**

NOTE:

The camshaft assembly can not be disassembled.



#### **CAM SPROCKET**

- Inspect the sprocket teeth for wear.
- If they are worn, replace the camshafts, crankshaft and cam chain as a set.



#### **CAMSHAFT BEARING**

- Inspect the bearings for play, discoloration, wear and seizure.
- · Move the outer race by finger and inspect for smooth move-
- If there is anything unusual, replace the camshaft assembly.



#### **CAM WEAR**

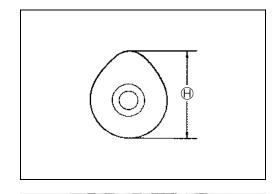
- Measure the cam height  $\oplus$  using the micrometer.
- Replace a camshaft if the cams are worn to the service limit.

**DATA** Cam height  $\oplus$ 

Service Limit IN.: 35.28 mm (1.389 in)

EX.: 34.23 mm (1.348 in)

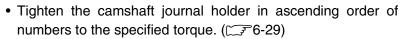
09900-20202: Micrometer (25 – 50 mm)



#### **CAMSHAFT JOURNAL WEAR**

- Determine whether or not each journal is worn down to the limit by measuring the oil clearance with the camshaft installed in place.
- Use the plastigage to read the clearance at the widest portion, which is specified as follows:

09900-22301: Plastigage (0.025 - 0.076 mm) 09900-22302: Plastigage (0.051 - 0.152 mm)



Camshaft journal holder bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft) NOTE:

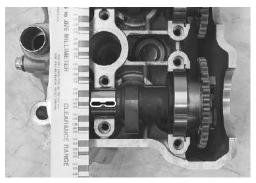
Do not rotate the camshaft with the plastigage in place.



· Remove the camshaft journal holder, and read the width of the compressed plastigage with envelope scale. This measurement should be taken at the widest part.

## **DATA** Camshaft journal oil clearance:

Service Limit (IN. & EX.): 0.150 mm (0.0059 in)



- If the camshaft journal oil clearance measured exceeds the limit, measure the inside diameter of the camshaft journal holder and outside diameter of the camshaft journal.
- Replace the camshaft or the cylinder head depending upon which one exceeds the specification.

DATA Camshaft journal holder I.D.:

Standard (IN. & EX.): 22.012 - 22.025 mm (0.8667 - 0.8671 in)

100 09900-20602: Dial gauge

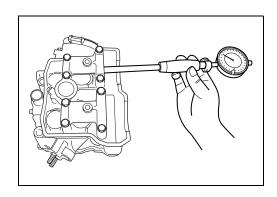
09900-22403: Small bore gauge (18 - 35 mm)

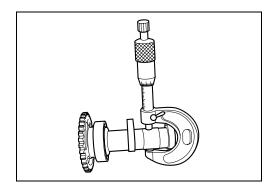
DATA Camshaft journal O.D.:

Standard (IN. & EX.): 21.959 - 21.980 mm

(0.8645 - 0.8654 in)

09912-66310: Micrometer (0 – 25 mm)





## **CAM CHAIN TENSION ADJUSTER** INSPECTION

- Remove the cam chain tension adjuster cap bolt and spring.
- Check that the push rod slides smoothly when releasing stopper 1.
- If it does not slide smoothly, replace the cam chain tension adjuster with a new one.



## **CAM CHAIN No.2 GUIDE INSPECTION**

- Inspect the contacting surface of the cam chain No.2 guide.
- Check the cam chain No.2 guide for proper installation.
- If any defects are found, replace the cam chain No.2 guide with a new one.

Cam chain No.1 guide and cam chain tensioner inspection ( 6-32)



## CYLINDER HEAD AND VALVE INSPECTION **VALVE REMOVAL**

• Remove the tappet 1 and shim 2 by fingers or magnetic hand.

#### NOTE:

Identify the position of each removed part. Organize the parts in their respective groups (i.e., intake or exhaust) so that they can be installed in their original locations.

- Install the sleeve protector @ between the valve spring and cylinder head.
- Using the special tools, compress the valve spring and remove the two cotter halves 3 from the valve stem.



When removing the cotter halves 3, not using the sleeve protector @ can cause damage to tappet sliding surface.

Use the sleeve protector @.

100L 09916-14510: Valve lifter

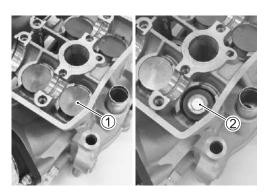
09916-14522: Valve lifter attachment

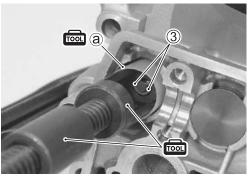
09916-84511: Tweezer

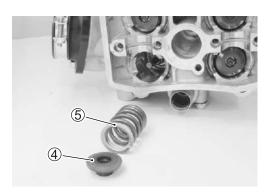
09919-28620: Sleeve protector

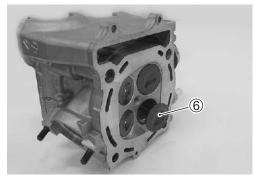
• Remove the valve spring retainer 4 and valve spring 5.

• Remove the valve 6 from the combustion chamber side.







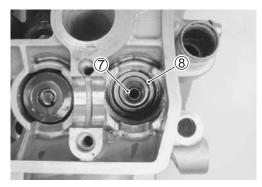


• Remove the valve stem seal 7 and spring seat 8.

#### NOTE:

Do not reuse the removed valve stem seal.

 Remove the other valves in the same manner as described previously.



#### **CYLINDER HEAD DISTORTION**

- Decarbonize the combustion chamber.
- Check the gasket surface of the cylinder head for distortion with a straightedge and thickness gauge, taking a clearance reading at several places indicated.
- If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder head.

#### **DATA** Cylinder head distortion:

Service Limit: 0.05 mm (0.002 in)

09900-20803: Thickness gauge

#### **VALVE STEM RUNOUT**

- Support the valve using V blocks and check its runout using the dial gauge as shown.
- If the runout exceeds the service limit, replace the valve.

#### NOTE:

Valve stem runout is half amount of dial gauge reading.

Valve stem runout (IN. & EX.):

Service Limit: 0.05 mm (0.002 in)

09900-20607: Dial gauge

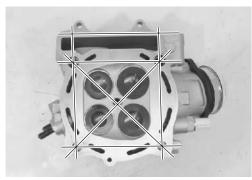
09900-20701: Dial gauge chuck

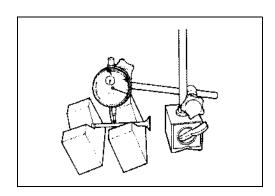
09900-21304: V blocks

#### NOTICE

Scratching or otherwise damaging the valve surface can possibly lose the engine output power.

Be careful not to damage the valve head and valve stem when handling it.





#### **VALVE HEAD RADIAL RUNOUT**

- Place the dial gauge at a right angle to the valve head face and measure the valve head radial runout.
- If it measures more than the service limit, replace the valve.

#### NOTE:

Valve head radial runout is half amount of dial gauge reading.

Valve head radial runout (IN. & EX.): Service Limit: 0.03 mm (0.001 in)

**5** 09900-20607: Dial gauge

09900-20701: Dial gauge chuck

09900-21304: V blocks

#### **NOTICE**

Scratching or otherwise damaging the valve surface can possibly lose the engine output power.

Be careful not to damage the valve head and valve stem when handling it.

#### **VALVE STEM AND VALVE FACE WEAR CONDITION**

- Visually inspect each valve stem and valve face for wear and pitting.
- If it is worn or damaged, replace the valve with a new one.



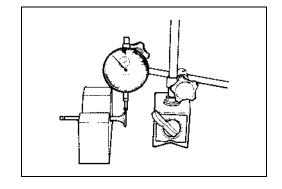
#### **VALVE STEM DEFLECTION**

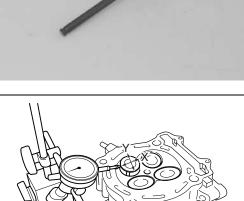
- Lift the valve about 10 mm (0.4 in) from the valve seat.
- Measure the valve stem deflection in two directions, perpendicular to each other, by positioning the dial gauge as shown.
- If the deflection measured exceeds the limit, then determine whether the valve or the guide should be replaced with a new one.

Valve stem deflection (IN. & EX.):

**Service Limit: 0.25 mm (0.010 in)** 

09900-20607: Dial gauge 09900-20701: Dial gauge chuck





#### **VALVE STEM WEAR**

- If the valve stem is worn down to the limit, as measured with a micrometer, replace the valve.
- If the stem is within the limit, then replace the guide.
- After replacing valve or guide, be sure to recheck the deflection.

#### DATA Valve stem O.D.:

Standard (IN.): 5.475 – 5.490 mm (0.2156 – 0.2161 in) (EX.): 5.455 – 5.470 mm (0.2148 – 0.2154 in)

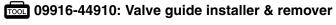
09912-66310: Micrometer (0 – 25 mm)

#### NOTE:

If valve guides have to be removed for replacement after inspecting related parts, carry out the steps shown in valve guide servicing.

#### **VALVE GUIDE SERVICING**

• Using the valve guide remover, drive the valve guide out toward the intake or exhaust camshaft side.



#### NOTE:

- \* Discard the removed valve guide subassemblies.
- \* Only oversized valve guides are available as replacement parts. (Part No. 11115-45G70)
- Re-finish the valve guide holes in cylinder head with the reamer and handle.

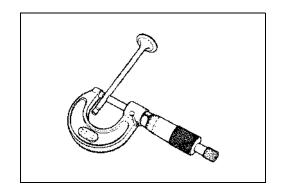
#### **NOTICE**

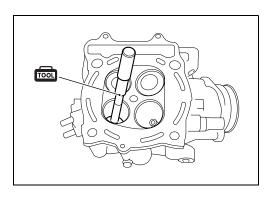
Improper handling of the reamer will cause damage to the valve guide hole.

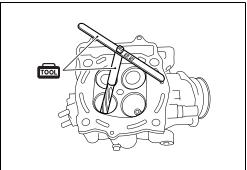
When refinishing or removing the reamer from the valve guide hole, always turn it clockwise.

09916-34580: Valve guide reamer (10.8 mm)

09916-34542: Reamer handle







 Cool down the new valve guides in a freezer for about one hour and heat the cylinder head to 100 - 150 °C (212 - 302°F) with a hot plate.

#### **NOTICE**

Improper heating can damage to the cylinder head.

Do not use a burner to heat the valve guide hole to prevent cylinder head distortion.

- Apply engine oil to the valve guide hole.
- Drive the valve guide into the hole using the valve guide installer 1) and attachment 2).

#### **NOTICE**

Press-fitting the valve guide improperly can cause damage to the cylinder head.

Always coat engine oil on the valve guide hole.

#### NOTE:

Install the valve guide until the attachment contacts with the cylinder head 3.

09916-44310: Valve guide installer & remover 1 09916-53360: Valve guide installer attachment 2

- · After installing the valve guides, re-finish their guiding bores using the reamer.
- Clean and oil the guides after reaming.

09916-34550: Valve guide reamer (5.5 mm) 09916-34542: Reamer handle

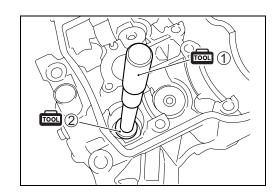
#### NOTE:

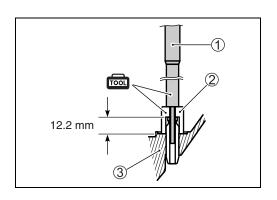
- \* Be sure to cool down the cylinder head to ambient air temperature.
- \* Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.

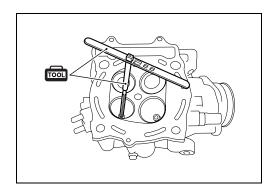
#### **VALVE SEAT WIDTH INSPECTION**

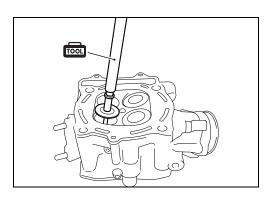
- · Visually check for valve seat width on each valve face.
- If the valve face has worn abnormally, replace the valve.
- Coat the valve seat with Prussian Blue and set the valve in place. Rotate the valve with light pressure.
- Check that the transferred blue on the valve face is uniform all around and in center of the valve face.

09916-10911: Valve lapper set





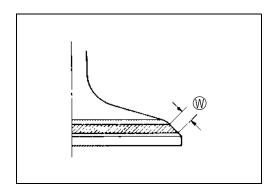




• If the seat width W measured exceeds the standard value or seat width is not uniform, refuse the seat using the seat cutter.

#### **DATA** Valve seat width **(W)**:

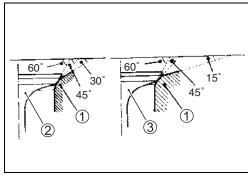
Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)



#### **VALVE SEAT SERVICING**

The valve seats 1 for both the intake valve 2 and exhaust valve 3 are machined to three different angles. The seat contact surface is cut at  $45^{\circ}$ .

	INTAKE	EXHAUST
Seat angle	30°, 45°, 60°	15°, 45°, 60°
Seat width	0.9 – 1.1 mm	,
	(0.035 – 0.043 in)	<b>←</b>
Valve diameter	36 mm (1.4 in)	31 mm (1.2 in)
Valve guide I.D.	5.500 – 5.512 mm	,
	(0.2165 – 0.2170 in)	<b>←</b>



#### NOTE:

The valve seat contact area must be inspected after each cut.

#### **NOTICE**

Lapping the titanium valve can cause the coating to peel off.

Do not perform valve lapping.

#### NOTE:

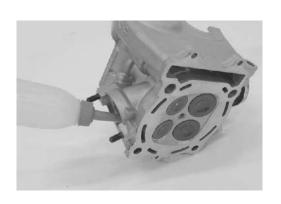
After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. ( 2-26)

- Clean and assemble the head and valve components. Fill the intake and exhaust ports with gasoline to check for leaks.
- If any leaks occur, inspect the valve seat and face for burrs or other things that could prevent the valve from sealing.

### **WARNING**

Gasoline is a flammable material that can cause fire hazard or burns.

When handling gasoline, make sure to stop the engine and keep away from fire or spark.

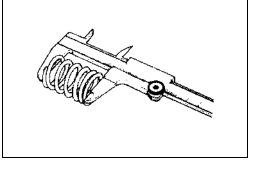


#### **VALVE SPRING**

- · Check the valve spring for proper strength by measuring its free length and also by the force required to compress it.
- If the spring length is less than the service limit, or if the force required to compress the spring does not fall within the range specified, replace the spring.

**DATA** Valve spring free length:

Service limit (IN. & EX.): 35.8 mm (1.41 in)



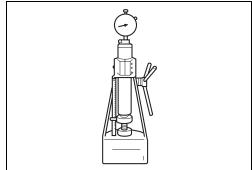
09900-20101: Vernier calipers (150 mm)

**DATA** Valve spring tension:

Standard (IN. & EX.): 146 - 168 N

(14.9 – 17.1 kgf/32.8 – 37.7 lbs)

/30.9 mm (1.22 in)

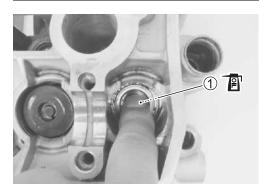


#### **VALVE INSTALLATION**

- Install the spring seat.
- Apply engine oil to the new stem seal ①, and press-fit it into position.

#### NOTE:

Do not reuse the removed stem seal 1).

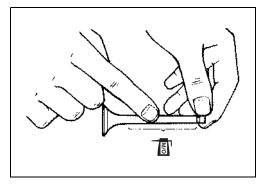


• Insert the valve, with its stem coated with molybdenum oil solution all around and along the full stem length without any break.

#### **NOTICE**

Installing the valve improperly can cause damage to the lip of stem hole.

When inserting the valve, take care not to damage the lip of the stem seal.





MOLYBDENUM OIL SOLUTION

• Install the valve spring with the small-pitch portion (A) facing cylinder head.

- A Small-pitch portion
- B Large-pitch portion
- © UPWARD
- © Paint
- Put on the valve spring retainer ②, and using the valve lifter and sleeve protector ③, press down the spring, fit the valve cotter halves to the stem end, and release the lifter to allow the valve cotter ③ to wedge in between retainer and stem.



09916-14522: Valve lifter attachment

09916-84511: Tweezer

09919-28620: Sleeve protector

- Be sure that the rounded lip © of the cotter fits snugly into the groove © in the stem end.
- Install the other valves and springs in the same manner as described previously.

#### **NOTICE**

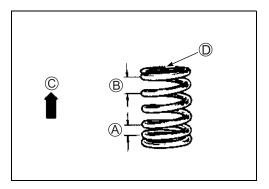
Improper assembling can cause the setting to be varied.

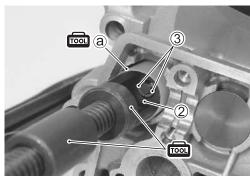
Be sure to restore each spring and valve to their original positions.

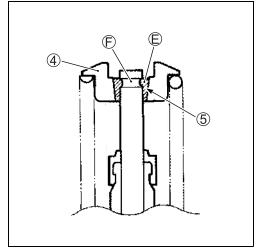
- 4 Valve spring retainer
- ⑤ Valve cotter
- Install the tappet shims and the tappets to their original positions.

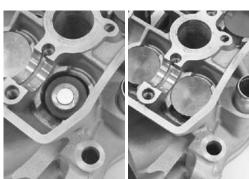
#### NOTE:

- \* Apply engine oil to the stem end, shim and tappet before fitting them.
- \* When seating the tappet shim, be sure the figure printed surface faces the tappet.









## **INTAKE PIPE REMOVAL**

- Remove the intake pipe clamp ①.
- Remove intake pipe 2.



## INTAKE PIPE INSTALLATION

• Apply grease to O-ring of the intake pipe 1.

**→ 1** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent



- Fit the clamp to the bolt (A).
- Install the intake pipe ① and tighten its bolts to the specified torque.

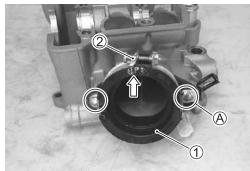
## NOTE:

Make sure that the "UP" mark faces up.

Intake pipe bolt: Initial: 1 N·m (0.1 kgf-m, 0.7 lbf-ft)

Final: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

• Install the intake pipe clamp 2.



## **ECT SENSOR REMOVAL**

(2-44)

## **ECT SENSOR INSPECTION**

( 12-43)

#### **ECT SENSOR INSTALLATION**

(2-44)



## CYLINDER INSPECTION

#### **CYLINDER DISTORTION**

- Check the gasketed surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places indicated.
- If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.

#### **DATA** Cylinder distortion:

**Service Limit: 0.05 mm (0.002 in)** 

09900-20803: Thickness gauge

#### **CYLINDER BORE**

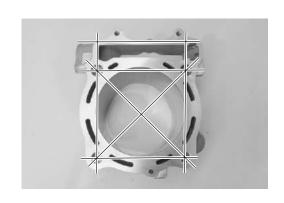
- Inspect the cylinder wall for any scratches, nicks or other damage.
- Measure the cylinder bore diameter at six places.

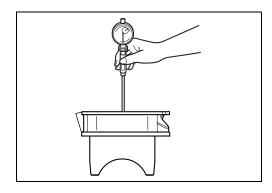
#### Cylinder bore

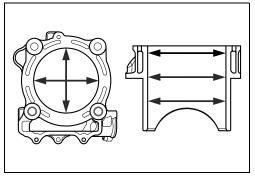
Standard: 96.000 - 96.015 mm (3.7795 - 3.7801 in)

09900-20530: Cylinder gauge set

09900-20513: Cylinder gauge rod (94 mm)







## PISTON AND PISTON RING INSPECTION

#### **PISTON DIAMETER**

- Using a micrometer, measure the piston outside diameter at 16 mm (0.6 in) A from the piston skirt end.
- If the measurement is less than the limit, replace the piston.

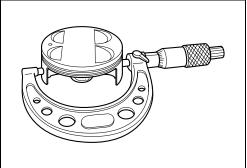
#### **PATA** Piston diameter:

Service Limit: 95.880 mm (3.7748 in)

at 16 mm (0.6 in) from the skirt end

09900-20204: Micrometer (75 – 100 mm)





#### PISTON-TO-CYLINDER CLEARANCE

- Subtract the piston diameter from the cylinder bore diameter. (Zabove)
- If the piston-to-cylinder clearance exceeds the service limit, replace the cylinder or the piston, or both.

#### PAYA Piston-to-cylinder clearance:

Service Limit: 0.120 mm (0.0047 in)

#### **PISTON PIN AND PIN BORE**

- Measure the piston pin bore inside diameter using the small
- If the measurement is out of specifications replace the piston.

## Piston pin bore:

Service Limit: 19.030 mm (0.7492 in)

100L 09900-20602: Dial gauge

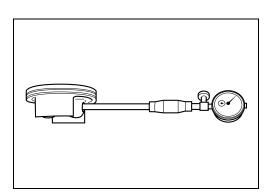
09900-22403: Small bore gauge (18 - 35 mm)

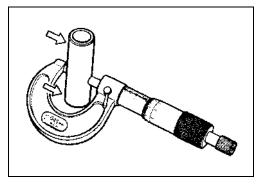
- Inspect the surface of the piston pin.
- If it is worn damaged, replace it with a new one.
- · Measure the piston pin outside diameter at three positions using the micrometer.
- If any of the measurements are out of specification, replace the piston pin.

#### DATA Piston pin O.D.:

Service Limit: 18.980 mm (0.7472 in)







#### PISTON RING-TO-GROOVE CLEARANCE

- Decarbonize the piston ring and piston ring groove.
- Measure the side clearances of the 1st piston ring using the thickness gauge.
- If any of the clearances exceed the limit, replace both the piston and piston ring.

09900-20803: Thickness gauge

09912-66310: Micrometer (0 – 25 mm)

Piston ring-to-groove clearance:

Service Limit (1st): 0.180 mm (0.007 in)

Piston ring groove width:

Standard (1st): 0.78 - 0.80 mm (0.0307 - 0.0315 in)

: 1.30 – 1.32 mm (0.0512 – 0.0520 in)

(Oil) : 2.01 – 2.03 mm (0.0791 – 0.0799 in)

PATA Piston ring thickness:

Standard (1st): 0.71 - 0.76 mm (0.0279 - 0.0299 in)

: 1.08 – 1.10 mm (0.0425 – 0.0433 in)

#### PISTON RING FREE END GAP AND PISTON RING END GAP

- Measure the piston ring free end gap using the vernier calipers.
- Next, fit the piston ring squarely into the cylinder and measure the piston ring end gap using the thickness gauge.
- If any of the measurements exceed the service limit, replace the piston ring with a new one.

PAYA Piston ring free end gap:

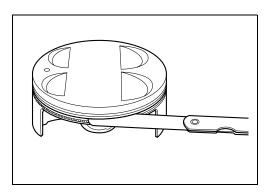
Service Limit (1st): 7.0 mm (0.28 in)

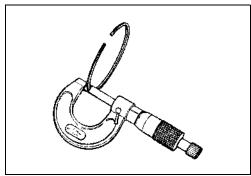
09900-20101: Vernier calipers (150 mm)

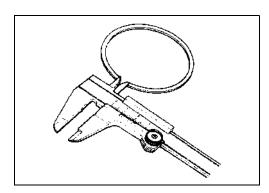
PAYA Piston ring end gap:

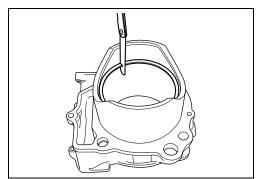
Service Limit (1st): 0.50 mm (0.020 in)

09900-20803: Thickness gauge









#### **CONROD INSPECTION**

For inspection other than the following, refer to page 10-7.

#### **CONROD SMALL END I.D.**

- Using a small bore gauge, measure the inside diameter of the conrod small end.
- If the inside diameter of the conrod small end exceeds the limit, replace the conrod.

DATA Conrod small end I.D.:

Service Limit: 19.050 mm (0.7500 in)

09900-20602: Dial gauge

09900-22403: Small bore gauge (18 – 35 mm)

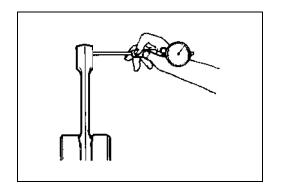
#### **CONROD BIG END SIDE CLEARANCE**

- Inspect the conrod side clearance by using a thickness gauge.
- If the clearance exceeds the service limit, replace crankshaft assembly or bring the deflection and side clearance into specification by replacing the worn parts. (e.g., conrod, big end bearing and crank pin)

Conrod big end side clearance:

Service Limit: 1.0 mm (0.04 in)

09900-20803: Thickness gauge





# ENGINE TOP SIDE ASSEMBLY PISTON AND PISTON RING INSTALLATION

Install the piston and piston ring in the reverse order of removal. Pay attention to the following points:

#### **PISTON RING**

- Install the piston rings in the order of oil ring and 1st ring.
- The first member to go into the oil ring groove is a spacer ①. After placing the spacer, fit the two side rails ②.

#### NOTE:

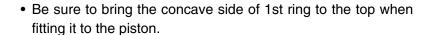
Side designations, top and bottom, are not applied to the spacer and side rails: you can position each either way.

#### NOTE:

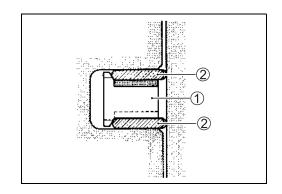
When installing the spacer ①, be careful not to allow its two ends to overlap in the groove.

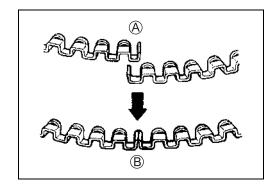


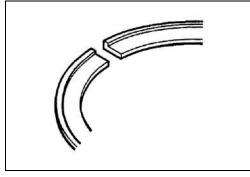
**®** CORRECT

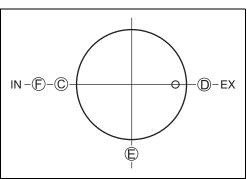


- Position the gaps of the two ring as shown. Before inserting a piston into the cylinder, check that the gaps are so located.
  - © 1st ring
  - D Upper side rail
  - © Spacer
  - © Lower side rail



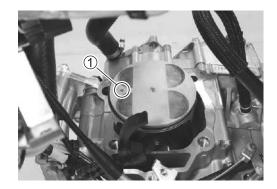






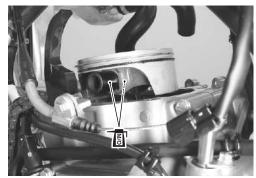
#### **PISTON**

• Install the piston with the punch mark ① facing towards the exhaust side.



• Before installing the piston pin, apply molybdenum oil solution onto its surface.

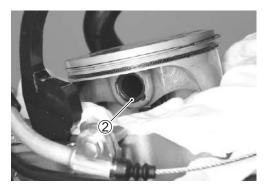
## MOLYBDENUM OIL SOLUTION



 Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into crankcase. Install the new piston pin circlip ②.

#### NOTE:

- \* Replace the piston pin circlip ② with a new one.
- \* End gap of the circlip should not be aligned with the cutaway in the piston pin bore.



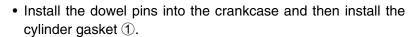
## CYLINDER AND CYLINDER HEAD INSTALLATION

Install the cylinder and cylinder head in the reverse order of removal. Pay attention to the following points:

#### **CYLINDER**

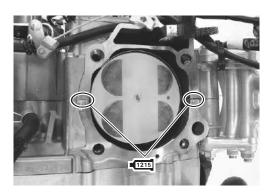
- Thoroughly wipe off oil from the fitting surface of the crankcase.
- · Apply bond to the crankcases as shown.

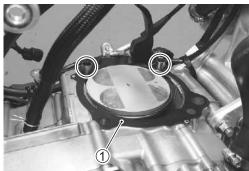
## ■1215 99000-31110: SUZUKI BOND "1215" or equivalent



#### NOTE:

Replace the cylinder gasket ① with a new one.





 Apply molybdenum oil solution to the sliding surface of the piston and cylinder bore.

## MOLYBDENUM OIL SOLUTION

- Hold each piston ring with the piston ring sections positioned correctly and put it into the cylinder.
- Make sure that the piston rings are caught by the cylinder skirt.
- Place the cylinder on the crankcase.

#### NOTE:

Do not drop the cam chain into the crankcase.

• Temporarily tighten the cylinder base bolt 2.

#### NOTE:

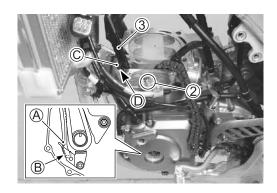
Fit the bracket to the cylinder base bolt 2.

- Insert the cam chain No.1 guide end (A) into the recess (B) of the crankcase securely.
- Fit the projection © of the cam chain No.1 guide ③ in the groove ① of the cylinder.

#### NOTE:

Make sure that cam chain engages properly to the cam chain drive sprocket.





• Install the dowel pins into the cylinder and then install the new cylinder head gasket ① onto the cylinder.

#### NOTE:

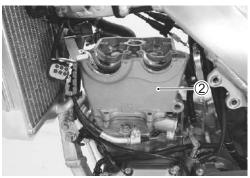
Replace the gasket 1 with a new one.



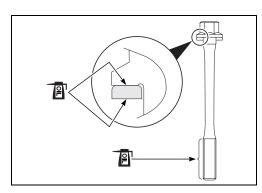
• Place the cylinder head ② on the cylinder.

#### NOTE:

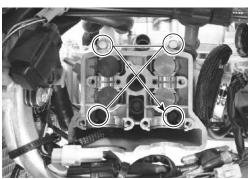
Do not drop the cam chain into the crankcase.

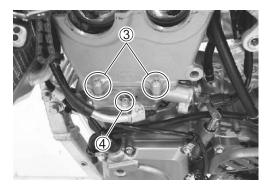


 Apply engine oil to the washers and thread portion of the bolts before installing the cylinder head bolts.



- With the head snugly seated on the cylinder, secure it by tightening the bolts in diagonal stages.
- Tighten the cylinder head bolts to the specified torque.
- Cylinder head bolt: Initial 25 N·m (2.5 kgf-m, 18.0 lbf-ft) Final 51 N·m (5.1 kgf-m, 37.0 lbf-ft)
- After tightening the cylinder head bolts to specification, tighten
  the cylinder head base bolts ③ and cylinder base bolt ④ to
  the specified torque.
- Cylinder head base bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
  Cylinder base bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
- Connect the ECT sensor coupler.
- Install the engine mounting upper brackets. ( 5-7)
- Install the exhaust pipe. ( 5-11)
- Connect the radiator hose. ( 20-24)
- Install the throttle body. ( 13-17)





## CAMSHAFT (AUTOMATIC DECOMP.) AND CAM CHAIN TENSION ADJUSTER INSTALLATION

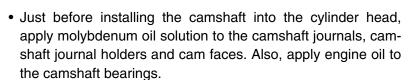
Install the camshaft and cam chain tension in the reverse order of removal. Pay attention to the following points:

#### **CAMSHAFT (AUTOMATIC DECOMP.)**

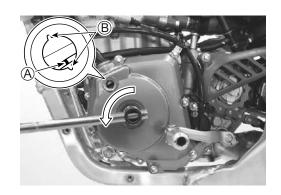
• Place a wrench over the crankshaft and turn it counterclockwise to align the TDC mark (A) with the grooves (B) of the timing inspection hole. Also, hold this position.

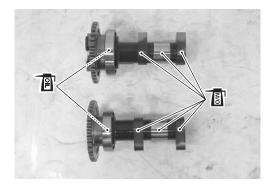
#### NOTE:

Pull the cam chain upward, or the chain will be caught between crankcase and cam chain drive sprocket.





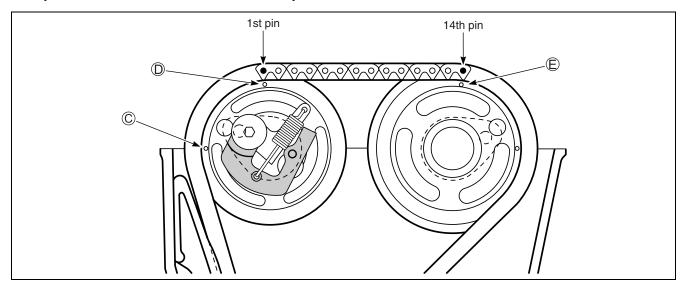




- Pull the exhaust side of the cam chain taut to install the camshaft sprocket (exhaust side).
- Turn the exhaust camshaft so that the timing mark © is aligned with the gasket surface of the cylinder head. Engage the cam chain with the exhaust camshaft sprocket.
- The other timing marked ① should now be pointing straight up. Starting from the roller pin that is directly above the timing marked ①, count out 14 roller pins (from the exhaust camshaft side going towards the intake camshaft side).
- Engage the 14th roller pin on the cam chain with the timing marked © on the camshaft sprocket (intake side). Refer to the following illustrations.

#### NOTE:

The cam chain should now be on all three sprockets. Be careful not to move the crankshaft until the camshaft journal holder and cam chain tension adjuster are secured.



- Install the dowel pins and C-ring ①.
- Install the camshafts, intake and exhaust.



 Apply grease to the new O-ring and install it to the camshaft journal holder.

#### NOTE:

Use the new O-ring to prevent oil leakage.

Æ 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent



- Install the camshaft journal holder.
- Have the camshaft journal holder evenly by tightening the camshaft journal holder bolts lightly, in the ascending order of numbers.

#### NOTE:

When tightening the camshaft journal holder bolts, the piston position must be at TDC on the compression stroke.

• Tighten the camshaft journal holder bolts in ascending order of numbers to the specified torque.



#### **CAM CHAIN TENSION ADJUSTER**

• Retract the push rod by pushing the stopper ①.



• Install a new gasket 2.

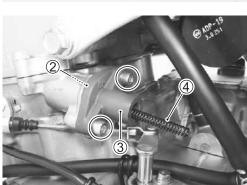
#### NOTE:

Replace the gasket 2 with a new one.

- Install the cam chain tension adjuster ③ with "UP" mark faced upward.
- Tighten the cam chain tension adjuster mounting bolts to the specified torque.
- Cam chain tension adjuster mounting bolt:

10 N·m (1.0 kgf-m, 7.0 lbf-ft)

• Install the spring 4.



• Install the new gasket ⑤ and cam chain tension adjuster cap bolt ⑥.

#### NOTE:

- \* Replace the gasket 5 with a new one.
- \* Click sound is heard when the cam chain tension adjuster cap bolt 6 is installed.
- Tighten the cam chain tension adjuster cap bolt 6 to the specified torque.

## Cam chain tension adjuster cap bolt:

23 N·m (2.3 kgf-m, 16.5 lbf-ft)

#### NOTE:

After installing the cam chain tension adjuster, check to be sure that the adjuster works properly by checking the slack of cam chain.

 After installing the cam chain tension adjuster, rotate the crankshaft (two turns), and recheck the positions of the camshafts. ( 6-28)

#### NOTE:

After this procedure, if any resistance is felt while turning over the crankshaft, stop immediately, and check the camshaft chain timing.

- Inspect the valve clearance. (2-2-26)
- Apply grease to the new O-rings.

#### NOTE:

Replace the O-rings with new ones.

#### **√A** 99000-25011: SUZUKI SUPER GREASE "A"

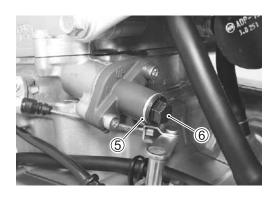
or equivalent

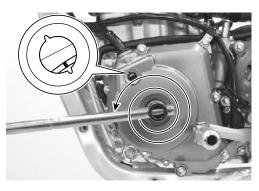
• Tighten each plug to the specified torque.

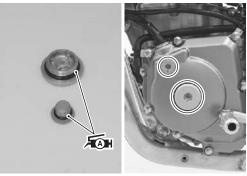
TDC plug: 14 N⋅m (1.4 kgf-m, 10.0 lbf-ft)

Crankshaft hole plug: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

• Pour engine oil. ( 2-14)







### CYLINDER HEAD COVER INSTALLATION

Install the cylinder head cover in the reverse order of removal. Pay attention to the following points:

Install the new gasket to the cylinder head cover.

#### NOTE:

Replace the gasket with a new one.

 Apply bond to the end caps of the cylinder head cover gasket as shown.

## ■1207B 99000-31140: SUZUKI BOND "1207B" or equivalent

 Install the cam chain No.2 guide to the cylinder head cover tightly.

#### NOTE:

If there is looseness in the joints between the cylinder head cover and the cam chain No.2 guide, replace the cam chain No.2 guide with a new one.

- Place the cylinder head cover on the cylinder head.
- Apply engine oil to both sides of new gaskets.

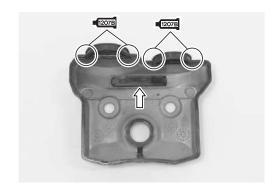
#### NOTE:

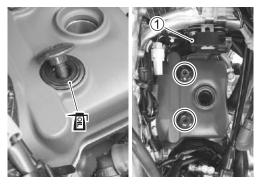
Replace the gaskets with new ones.

• Tighten the cylinder head cover bolts to the specified torque.

## Cylinder head cover bolt: 14 N·m (1.4 kgf-m, 10.0 lbf-ft)

- Install the TO sensor ① to the bracket. ( 12-45)
- Tighten the coupler bracket bolt 2.
- Install the spark plug and spark plug cap.
- Install the fuel tank and radiator covers.
- Install the seat.







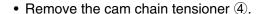
#### **INSPECTION AFTER INSTALLATION**

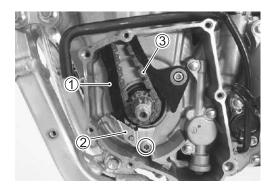
- Engine oil level and oil leakage ( 2-13)
- Engine coolant level and coolant leakage (\$\sumsymbol{2}\$-19, -20)
- · Fuel leakage
- Exhaust gas leakage
- Throttle cable play ( 2-22)
- Clutch cable play (\$\sums\_2\$-21)
- Wiring harness, cable and hose routing ( 20-20 to -24)

## **CAM CHAIN, CAM CHAIN TENSIONER AND CAM CHAIN No.1 GUIDE**

## **REMOVAL**

- Remove the cylinder head. ( 6-4)
- Remove the magneto cover and magnet rotor. ( 15-17)
- Remove the cam chain No.1 guide ① and cam chain guide retainer 2.
- Remove the cam chain 3.



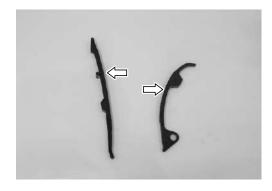




## **INSPECTION**

- Inspect the contacting surface of the cam chain No.1 guide and cam chain tensioner.
- If it is worn or damaged, replace it with a new one.

Cam chain No.2 guide inspection ( 6-9)



## **INSTALLATION**

Install the cam chain, cam chain tensioner and cam chain No.1 guide in the reverse order of removal. Pay attention to the following points:

• Install the cam chain tensioner ①.

Cam chain tensioner bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

Install the cam chain ② to the cam chain drive sprocket.

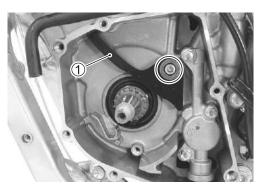
#### NOTE:

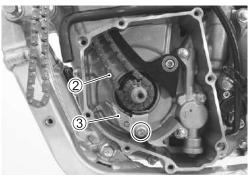
Make sure that cam chain ② engages properly to the cam chain drive sprocket.

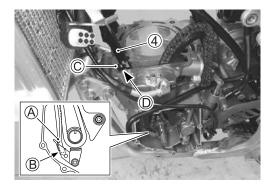
• Install the cam chain guide retainer 3.

Cam chain guide retainer bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

- Insert the cam chain No.1 guide end (A) into the recess (B) of the crankcase securely.
- Fit the projection © of the cam chain No.1 guide ④ in the groove D of the cylinder.
- Install the magneto rotor and magneto cover. ( 15-18)
- Install the cylinder head and cylinder head cover.
   6-26 to -31)





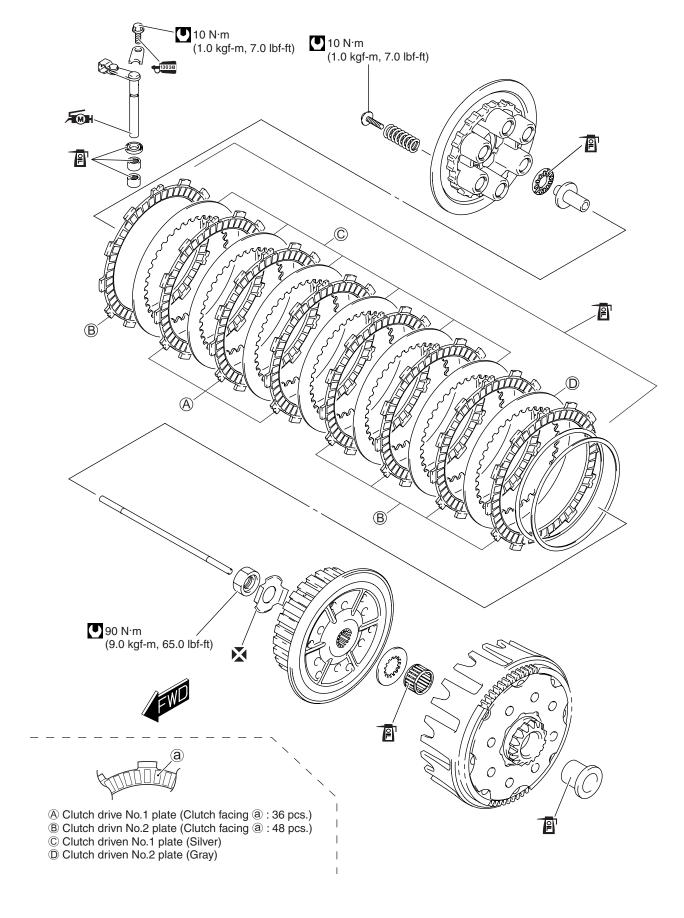


## CLUTCH

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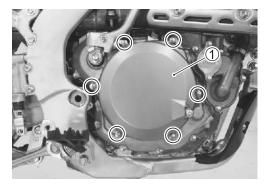
## CONSTRUCTION CLUTCH



## **CLUTCH PLATE**

## **REMOVAL**

- Drain engine oil. ( 2-14)
- Remove the brake pedal. ( 717-18)
- Remove the clutch cover ① and its gasket.



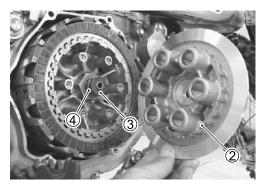
• Remove the clutch spring set bolts and clutch springs.

#### NOTE:

Loosen the clutch spring set bolts little by little and diagonally.



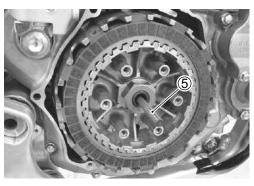
• Remove the clutch pressure plate ②, bearing ③ and push piece ④.



• Remove the push rod ⑤.

#### NOTE:

If it is difficult to pull out the push rod ⑤, use a magnetic hand or a wire.



 $\bullet$  Remove the clutch drive plates  $\ensuremath{\mathfrak{G}}$  and driven plates  $\ensuremath{\mathfrak{T}}.$ 

## NOTE:

Mark the paint mark to the clutch driven No. 2 plate.



- Mark the paint mark.

  A

  B

  C
- A Clutch driven No. 2 plate
- ® Clutch driven No. 1 plate
- © Direction of outside
- Remove the spring washer ® and spring washer seat 9.

## **INSPECTION**

#### **DRIVE PLATE**

• Measure the drive plate thickness.

#### DATA Drive plate thickness

Service Limit: 2.77 mm (0.109 in)

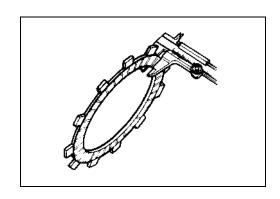
09900-20101: Vernier calipers (150 mm)

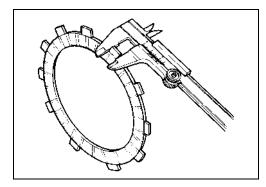
- Inspect the drive plates for wear, distortion and discoloration.
- If the drive plate thickness is found to have reached the limit, replace it with a new one.
- Measure the drive plate claw width.
- Replace the drive plates found to have worn down to the limit.

#### DATA Drive plate claw width

Service Limit: 13.05 mm (0.514 in)

09900-20101: Vernier calipers (150 mm)





#### **DRIVEN PLATE**

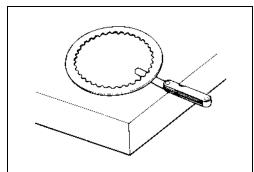
• Measure the driven plate distortion.

#### David Driven plate distortion

**Service Limit: 0.10 mm (0.004 in)** 

09900-20803: Thickness gauge

- Inspect the driven plates for wear and discoloration.
- Replace driven plates which exceed the limit.



#### **CLUTCH SPRING**

- · Measure the clutch spring free length.
- Replace all the springs if any spring is not within the limit.

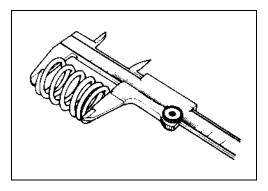
#### DATA Clutch spring free length

Service Limit: 49.4 mm (1.94 in)

09900-20101: Vernier calipers (150 mm)

NOTE:

Replace six clutch springs together even if only one spring is beyond the service limit.



## **PUSH ROD**

- Inspect the push rod for wear and damage.
- If any defects are found, replace the push rod with a new one.



#### **RELEASE BEARING**

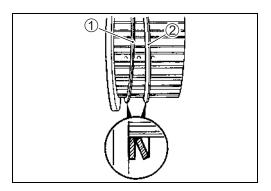
- Inspect the clutch release bearing for any abnormality, particularly cracks, to decide whether it can be reused or should be replaced.
- Smooth engagement and disengagement of the clutch depends on the condition of this bearing.



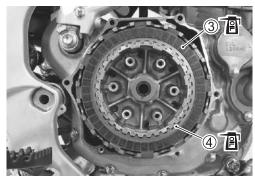
## **INSTALLATION**

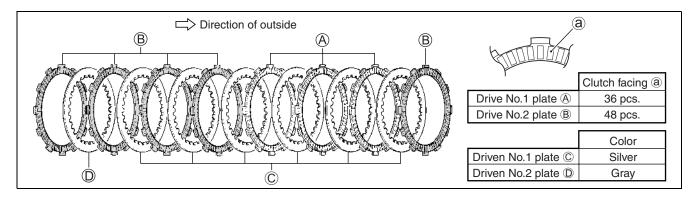
Install the clutch plates in the reverse order of removal. Pay attention to the following points:

• Install the spring washer seat ① and spring washer ② onto the clutch sleeve hub correctly.



- Apply engine oil to the drive plates ③ and driven plates ④.
- Install the clutch drive plates and driven plates one by one into the clutch sleeve hub in the prescribed order as show in illustration.



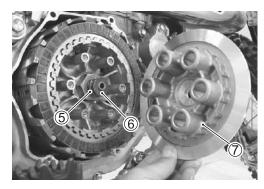


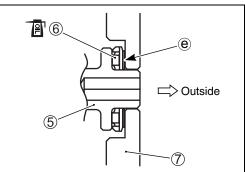
- Install the push rod and push piece ⑤.
- Apply engine oil to the release bearing 6.

#### NOTE:

The covered side (e) of the bearing (6) should face outside.

• Fit the clutch pressure plate 7.



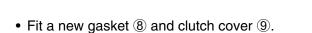


- Install the clutch springs and clutch spring set bolts.
- Tighten the clutch spring set bolts to the specified torque.

#### NOTE:

Tighten the clutch spring set bolts diagonally.

Clutch spring set bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



#### NOTE:

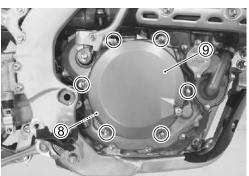
Replace the gasket ® with a new one.

- Tighten the clutch cover bolts diagonally.
- Clutch cover bolt: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
- Install the brake pedal. ( 17-18)

#### **INSPECTION AFTER INSTALLATION**

- Engine oil level and oil leakage (2-13)
- Clutch cable play ( 2-21)
- Smooth operation of clutch system

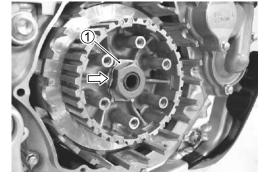




## PRIMARY DRIVEN GEAR AND CLUTCH SLEEVE HUB

## **REMOVAL**

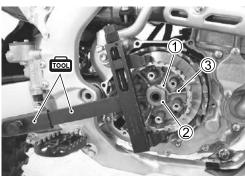
- Remove the clutch cover. ( 7-3)
- Remove the pressure plate and clutch plates. ( 7-3, -4)
- Flatten the lock washer 1.



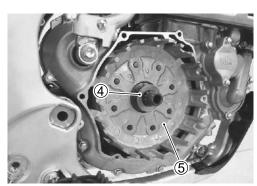
 Hold the clutch sleeve hub with the special tools and loosen the nut ②.

09920-53740: Clutch sleeve hub holder 09920-31020: Extension handle

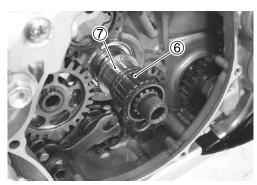
• Remove the nut 2, lock washer 1 and clutch sleeve hub 3.



• Remove the washer ④ and primary driven gear ⑤.



• Remove the needle bearing 6 and spacer 7.



#### INSPECTION

- Inspect the clutch sleeve hub and primary driven gear for wear and cracks.
- If necessary, replace the sleeve hub or driven gear.



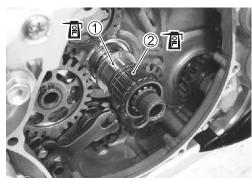
- Inspect the needle bearing and spacer for damage and wear.
- If any defects are found, replace the bearing or spacer.



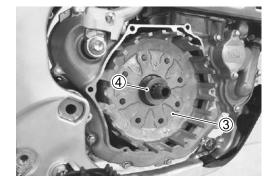
#### **INSTALLATION**

Install the primary driven gear and clutch sleeve hub in the reverse order of removal. Pay attention to the following points:

- Apply engine oil to the spacer ① and needle bearing ②.
- Install the spacer ① and needle bearing ②.



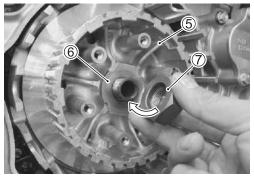
- Install the primary driven gear 3.
- Install the washer 4.



• Fit the clutch sleeve hub ⑤, new lock washer ⑥ and clutch sleeve hub nut ⑦.

#### NOTE:

- \* Replace the lock washer 6 with a new one.
- \* The thread part side of clutch sleeve hub nut ? faces outside.



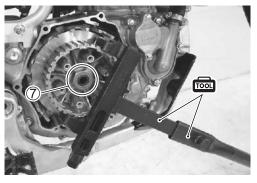
• Tighten the clutch sleeve hub nut ⑦ with the special tool to the specified torque.

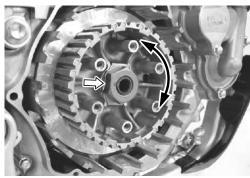
Clutch sleeve hub nut: 90 N·m (9.0 kgf-m, 65.0 lbf-ft)

09920-53740: Clutch sleeve hub holder 09920-31020: Extension handle

Make sure the clutch sleeve hub for smooth movement.

• Bend the lock washer to secure the nut.





- Reassemble the clutch plates and pressure plate. ( 7-6, -7)
- Fit a new gasket and clutch cover.

#### NOTE:

Replace the gasket with a new one.

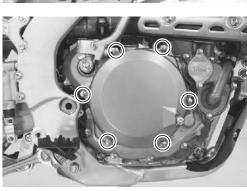
• Tighten the clutch cover bolts diagonally.

Clutch cover bolt: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

• Install the brake pedal. ( 17-18)

#### **INSPECTION AFTER INSTALLATION**

- Engine oil level and oil leakage (2-13)
- Clutch cable play (\$\sumset 2-21)
- Smooth operation of clutch system



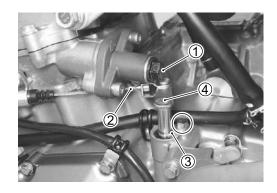
# CLUTCH RELEASE CAMSHAFT REMOVAL

- Remove the clutch cover and its gasket. ( 7-3)
- Remove the pressure plate and push rod. (\$\tilde{\tiide{\tilde{\tilde{\tilde{\tilde{\tilde{\tilde{\tilde{\tilde{
- Remove the cam chain tension adjuster cap bolt ① and spring.

#### NOTE:

Do not turn the crankshaft after removing the cam chain tension adjuster cap bolt.

- Disconnect the clutch cable ② and remove the retainer ③.
- Pull the clutch release camshaft 4 out of crankcase.



#### **INSPECTION**

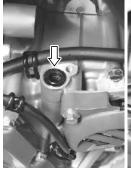
#### **CLUTCH RELEASE CAMSHAFT**

- Inspect the clutch release camshaft for abnormal deflection and damage.
- If any defects are found, replace the release camshaft with a new one.



#### **OIL SEAL AND BEARING**

- Inspect the oil seal for oil leakage and oil seal lip damage.
- Inspect the bearing for play and smooth movement.
- If necessary, replace the defective part with a new one. (10-8 to -11)





#### **INSTALLATION**

Install the clutch release camshaft in the reverse order of removal. Pay attention to the following points:

• Apply moly paste to the clutch release camshaft.

#### FMH 99000-25140: SUZUKI MOLY PASTE or equivalent

· Apply grease to the oil seal lip.

#### **√A** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent

- Install the clutch release camshaft ① and connect the clutch cable ②.
- Install the push rod and pressure plate. (\$\sumsymbol{17}7-6, -7)
- Install the gasket and clutch cover. ( 7-7)
- Install the retainer 3.
- Apply thread lock to the clutch release camshaft retainer bolt and tighten it to the specified torque.



or equivalent

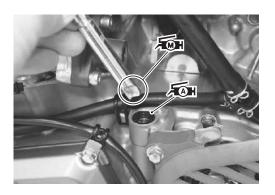
#### Clutch release camshaft retainer bolt:

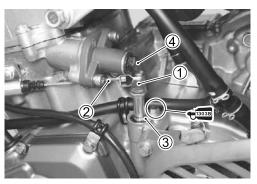
10 N·m (1.0 kgf-m, 7.0 lbf-ft)

Install the spring and cam chain tension adjuster cap bolt 4.
 (236-29, -30)

#### INSPECTION AFTER INSTALLATION

- Engine oil level and oil leakage (2-13)
- Clutch cable play ( 2-21)
- Smooth operation of clutch system



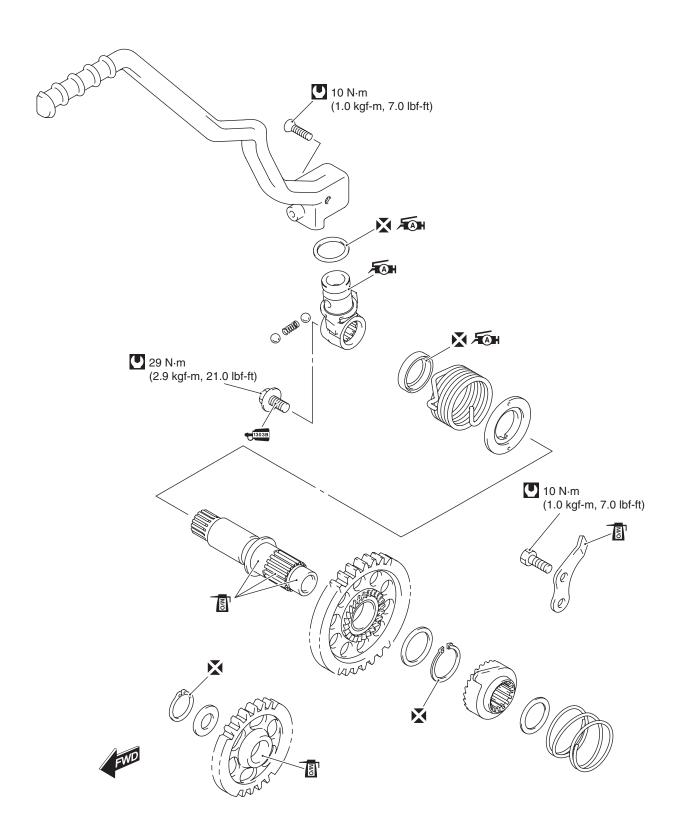


## KICK STARTER

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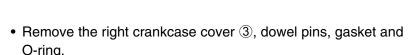
## CONSTRUCTION KICK STARTER



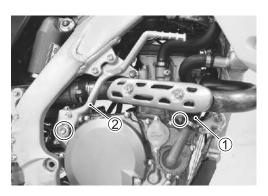
#### **KICK STARTER**

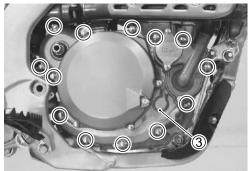
#### **REMOVAL**

- Drain engine oil. ( 2-14)
- Drain engine coolant. ( 14-3)
- Remove the brake pedal. ( 77-18)
- Disconnect the radiator hose ①.
- Remove the kick starter lever 2.

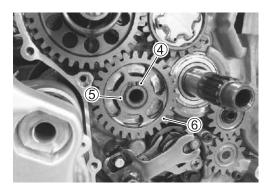


• Remove the clutch component parts. ( 7-8)





• Remove the snap ring 4, thrust washer 5 and kick starter idle gear 6.



- Unhook the end of return spring 7.
- Remove the kick starter shaft assembly 8.



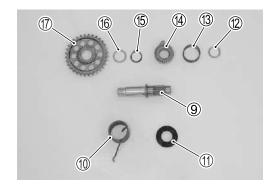
• Remove the following parts from the kick starter shaft 9.

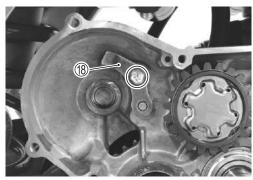
Return spring ® Kick starter ® Spring guide ® Snap ring \$ Washer ® Washer ®

Spring ③ Kick starter drive gear ⑦

09900-06107: Snap ring pliers (Open type)

• Remove the kick starter guide ®.





#### **INSPECTION**

- Inspect the oil seal lip for wear and damage.
- If any defects are found, replace the oil seal with a new one.



- Inspect the kick starter drive gear teeth for damage.
- Inspect the kick starter drive gear ratchet part for wear and damage.
- Inspect the kick starter shaft and drive gear for contact surface wear.
- Inspect the return spring for damage.
- If necessary, replace the defective part with a new one.
- Inspect the kick starter idle gear teeth for wear and damage.
- Inspect the kick starter idle gear and its shaft contact surface for wear and damage.
- If any defects are found, replace the gear with a new one.





Install the kick starter in the reverse order of removal. Pay attention to the following points:

• Apply molybdenum oil solution to the kick starter guide 1 and install it.

#### Wick starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft) I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft). I will be the starter guide bolt: 10 N⋅m

• Apply molybdenum oil solution to the kick starter shaft.

#### MOLYBDENUM OIL SOLUTION

• Install the kick starter drive gear 2, washer 3 and new snap ring 4 onto the kick starter shaft.

#### NOTE:

Replace the snap ring 4 with a new one.

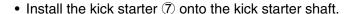
09900-06107: Snap ring pliers (Open type)



#### NOTE:

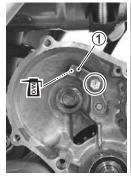
Align the concave A of spring guide with kick starter shaft hole B.

• Install the return spring 6 into the kick starter shaft hole.

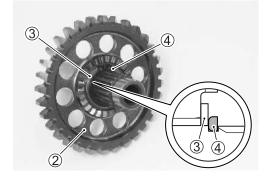


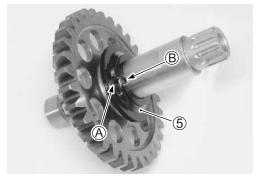
#### NOTE:

When installing the kick starter 7, align the wide spline teeth © and  $\mathbb{D}$ .

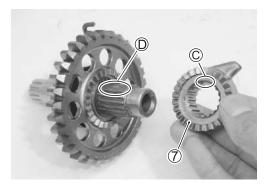












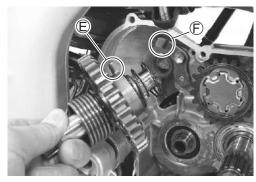
• Install the washer ® and spring 9 onto the kick starter shaft.



• Install the kick starter shaft assembly onto the crankcase.

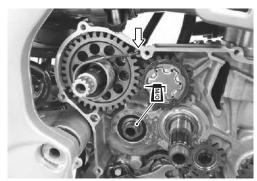
#### NOTE:

Securely engage the stopper portion © of the kick starter with the stopper guide 🖹.



- Hook the end of return spring to the crankcase.
- · Apply molybdenum oil solution to the kick starter idle gear shaft.





• Install the kick starter idle gear ①, thrust washer ① and new snap ring 12.

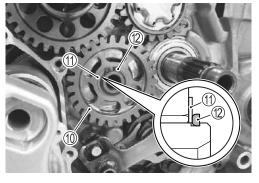
#### NOTE:

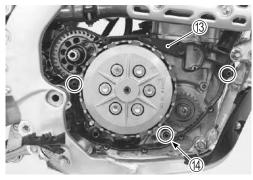
Replace the snap ring 12 with a new one.

- Install the clutch component parts. (\$\tilde{\ti}
- Install the dowel pins, new gasket (3) and O-ring (4).

#### NOTE:

Replace the gasket (3) and O-ring (4) with new ones.





- Install the right crankcase cover (5).
- Fit the new gasket washer to the right crankcase cover bolt G.

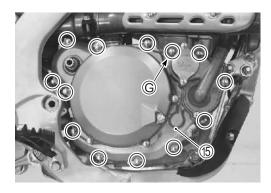
#### NOTE:

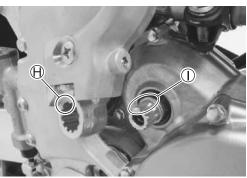
Replace the gasket washer with new one.

• Tighten the right crankcase cover bolts to the specified torque.

#### Right crankcase cover bolt: 11 N·m (1.1kgf-m, 8.0 lbf-ft)

ullet Install the kick starter lever so that its wide spline ullet aligns with the wide spline teeth ①.





- Apply thread lock to the kick starter lever bolt.
- Tighten the kick starter lever bolt to the specified torque.

99000-32030: THREAD LOCK CEMENT "1303B"

or equivalent

- Kick starter lever bolt: 29 N⋅m (2.9 kgf-m, 21.0 lbf-ft)
- Install the brake pedal. ( 17-18)
- Connect the radiator hose. ( 20-24)

#### **INSPECTION AFTER INSTALLATION**

- Engine oil level and oil leakage (2-13)
- Engine coolant level and coolant leakage (2-19, -20)
- Smooth movement of kick starter system

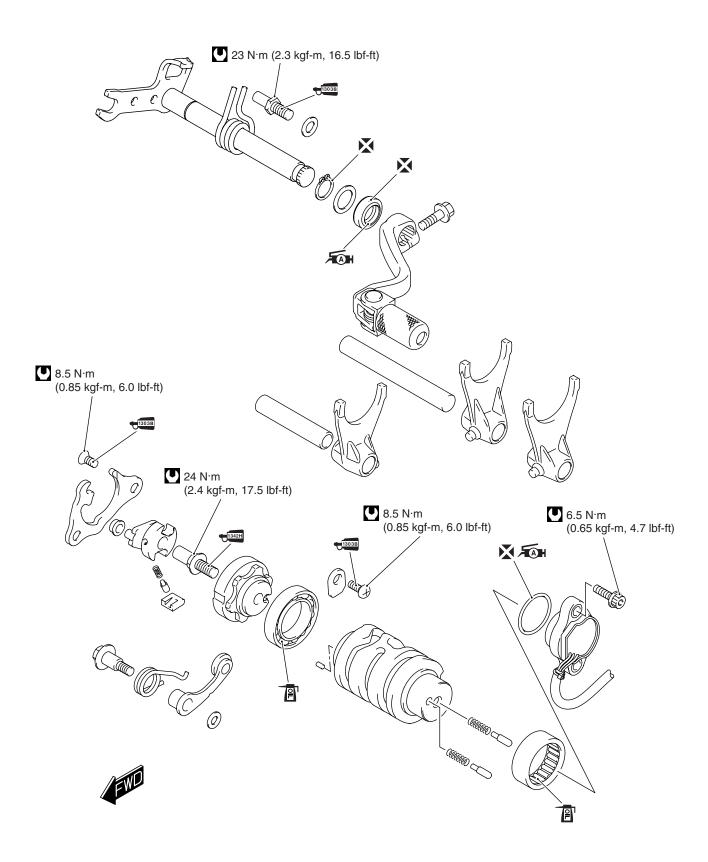


## **GEARSHIFTING**

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## CONSTRUCTION GEARSHIFT LINKAGE



### **GEARSHIFT LINKAGE**

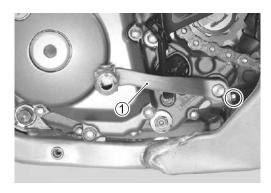
#### **REMOVAL**

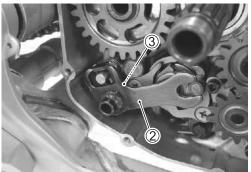
- Drain engine oil. ( 2-14)
- Drain engine coolant. ( 14-3)
- Remove the gearshift lever 1.

#### NOTE:

Mark the gearshift shaft head at which the gearshift lever slit set for correct reinstallation.

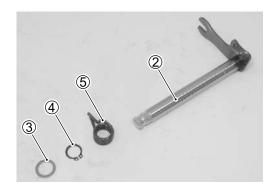
- · Remove the right crankcase cover and clutch component parts. ( 7-8, 8-3)
- Remove the gearshift shaft assembly ② and washer ③.





• Remove the washer ③, snap ring ④ and return spring ⑤ from the gearshift shaft 2.

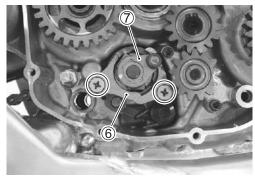
09900-06107: Snap ring pliers (Open type)



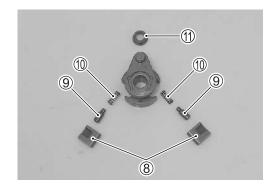
- Remove the gearshift pawl lifter 6.
- Remove the gearshift cam driven gear ⑦.

#### NOTE:

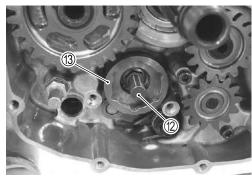
Be careful not to drop the pins and springs when removing the gearshift cam driven gear.



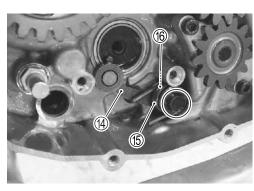
• Remove the gearshift pawls (3), pins (9), springs (0) and gearshift roller (1).



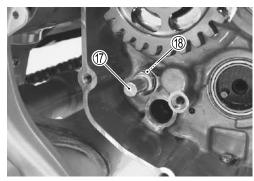
• Remove the gearshift cam driven gear pin ② and gearshift cam stopper plate ③.



• Remove the gearshift cam stopper (4), spring (5) and washer (6).

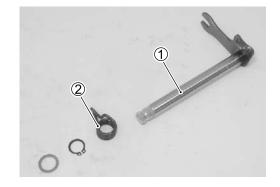


• Remove the gearshift arm stopper ① and washer ®.

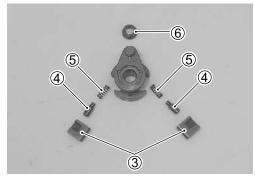


#### INSPECTION

- Inspect the gearshift shaft 1 for bends and damage.
- Inspect the return spring ② for damage.
- If necessary, replace the defective part with a new one.



- Inspect the pawls ③, pins ④, springs ⑤ and gearshift roller
   ⑥ for damage.
- If necessary, replace the defective part with a new one.



#### **INSTALLATION**

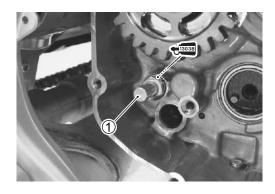
Install the gearshift linkage in the reverse order of removal. Pay attention to the following points:

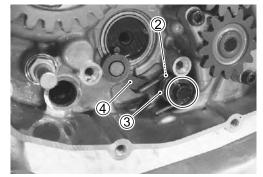
• Apply a small quantity of thread lock to the gearshift arm stopper ① and tighten it to the specified torque.



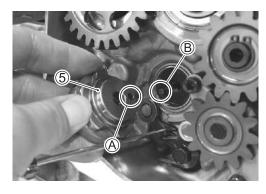
Gearshift arm stopper: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

• Install the washer ②, spring ③ and gearshift cam stopper ④.





• Align the pin hole (A) with the pin (B) when installing the stopper plate (5).

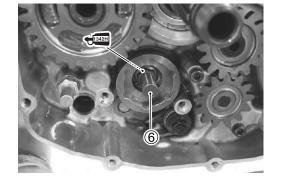


· Apply a small quantity of thread lock to the gearshift cam driven pin 6 and tighten it to the specified torque.

**←** 342H 99000-32160: THREAD LOCK CEMENT "1342H"

or equivalent

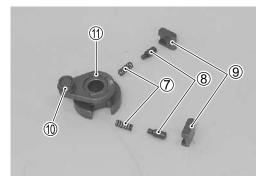
Gearshift cam driven pin: 24 N⋅m (2.4 kgf-m, 17.5 lbf-ft)

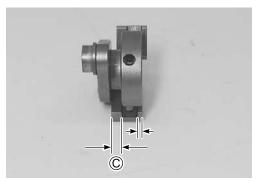


• Fit the springs ⑦, pins ⑧, pawls ⑨ and gearshift roller ⑩ to the gearshift cam driven gear 11.

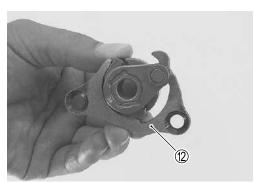
#### NOTE:

Wider side © of pawl should be positioned outside.





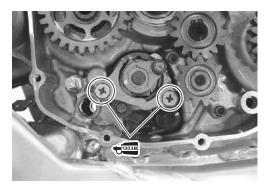
· With the pawls held in pushed position, install the pawl lifter 12.



- Install the gearshift cam driven gear and pawl lifter.
- · Apply thread lock to the screws and tighten them to the specified torque.

**←**1303B 99000-32030: THREAD LOCK CEMENT "1303B" or equivalent

Pawl lifter screw: 8.5 N·m (0.85 kgf-m, 6.0 lbf-ft)



• Install the gearshift return spring (4), new snap ring (5) and washer 6 onto the gearshift shaft 3 properly.

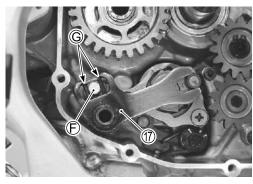
#### NOTE:

- \* Replace the snap ring ® with a new one.
- \* When installing the return spring, position the stopper 

  of gearshift arm between the return spring ends ©.

#### **100** 09900-06107: Snap ring pliers (Open type)

- Install the gearshift shaft assembly ①.
- Pinch the gearshift arm stopper © with return spring ends ©.
- Install the clutch components parts and right crankcase cover. ( 7-9, 8-6)



- · Align the matching mark on the gearshift shaft head with slit of the gearshift lever.
- Tighten the gearshift lever bolt.



#### **INSPECTION AFTER INSTALLATION**

- Engine oil level and oil leakage (2-13)
- Engine coolant level and coolant leakage (2-19, -20)
- Smooth operation of gearshift system

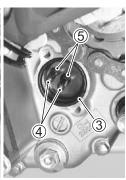
## **GEAR POSITION (GP) SWITCH REMOVAL**

- Drain engine oil. ( 2-14)
- Remove the seat, radiator covers and fuel tank. ( 5-2)
- Remove the gearshift lever. ( 9-3)
- Disconnect the GP switch lead wire coupler ① and clamps.









- Remove the GP switch 2.
- Remove the O-ring ③, switch contacts ④ and springs ⑤.

#### INSPECTION

Refer to page 12-34 for details.

#### **INSTALLATION**

Install the gear position switch in the reverse order of removal. Pay attention to the following points:

- Install the switch contacts and springs.
- Fit the new O-ring to GP switch and apply grease to it.

#### NOTE:

Replace the O-ring with a new one.

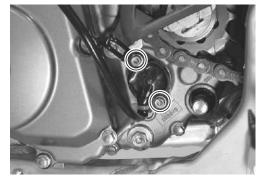


• Install the GP switch and tighten the bolts to the specified torque.

GP switch mounting bolt: 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)

• Route the GP switch lead wire properly. ( 20-21)

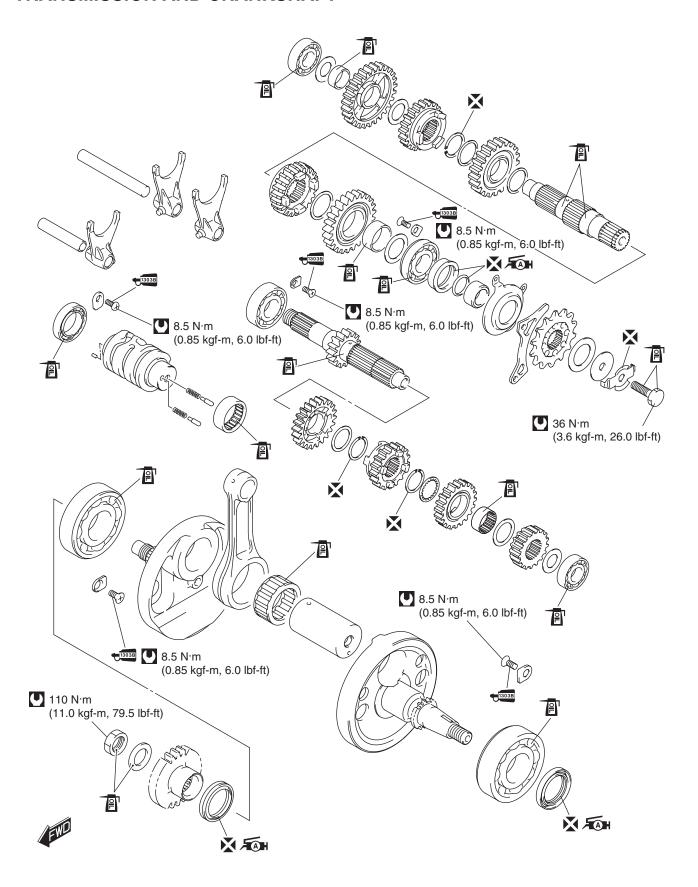




## TRANSMISSION AND CRANKSHAFT

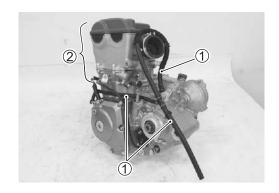
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# CONSTRUCTION TRANSMISSION AND CRANKSHAFT



#### **ENGINE BOTTOM SIDE**

- Remove the engine assembly. ( 5-2)
- Remove the crankcase breather hoses ①.
- Remove the engine top side ② (cylinder head, cylinder and piston). ( 6-3)
- Remove the magneto rotor and key. (\$\sumsymbol{15}-17, -18)
- Remove the cam chain No.1 guide, cam chain guide retainer, cam chain and cam chain tensioner. ( 6-32)
- Remove the right crankcase cover. ( 8-3)



#### PRIMARY DRIVE GEAR REMOVAL

• Hold the crankshaft immovable with the special tool.

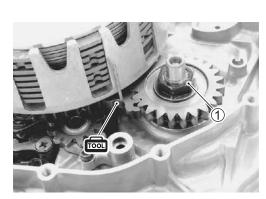
#### 09914-61010: Gear holder

• Remove the primary drive gear nut ① and washer.

#### NOTE:

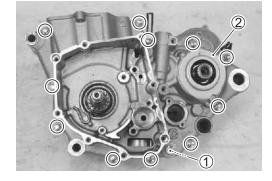
The primary drive gear nut 1 has left-hand threads.

- Remove the clutch component parts. (\$\sumsymbol{17}7-8, -11)
- Remove the primary drive gear.
- Remove the breather gear. ( 11-9)
- Remove the kick starter idle gear and kick starter shaft assembly. ( 8-3)
- Remove the gearshift linkage and GP switch. ( 9-3, -8)
- Remove the oil pump No.1, No.2 and oil pump idle gear. ( 11-5, -6)

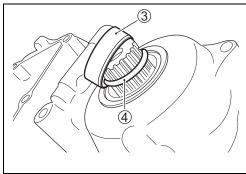


#### **CRANKCASE SEPARATION**

- Remove the oil strainer (No.1) ①. ( 2-16)
- Remove the crankcase bolts and oil seal retainer 2.



• Remove the engine sprocket spacer ③ and D-ring ④.



• Separate the crankcase with the special tool.

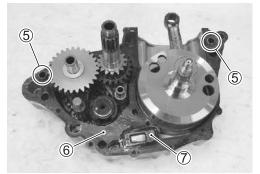
#### NOTE:

- \* Set the special tool to the clutch side of the crankcase.
- \* Separate the crankcase gradually while hitting the crankcase boss and countershaft softly with a plastic hammer.

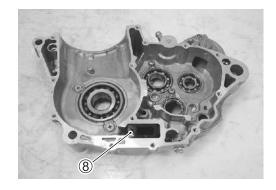


- Remove the dowel pins ⑤ and gasket ⑥.
- Remove the oil reed valve 7.



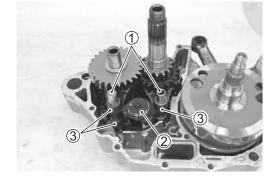


• Remove the oil reed valve guide 8.

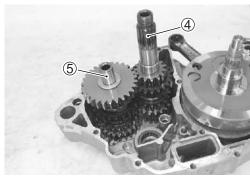


#### TRANSMISSION REMOVAL

- Remove the gearshift fork shafts ①.
- Remove the gearshift cam 2.
- Remove the gearshift forks ③.



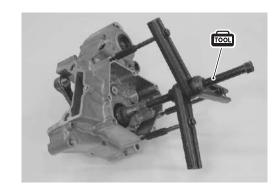
• Remove the countershaft assembly ④ and driveshaft assembly ⑤.



#### **CRANKSHAFT REMOVAL**

• Remove the crankshaft with the special tool.





#### TRANSMISSION INSPECTION

- · Inspect the gear teeth, dogs, and gearshift grooves for abnormal wear and damage.
- · Inspect the bushings and splines for abnormal wear and discoloration.
- If necessary, replace defective part with a new one.



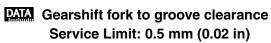
- Inspect the gearshift cam groove for abnormal wear and dam-
- If any defects are found, replace the gearshift cam with a new one.



- Inspect the gearshift forks and shafts for wear and damage.
- · If any defects are found, replace the gearshift fork or shaft.



- · Measure the gearshift fork to groove clearance with a thickness gauge.
- If the clearance checked is noted to exceed the limit, replace the fork or dog.



09900-20803: Thickness gauge

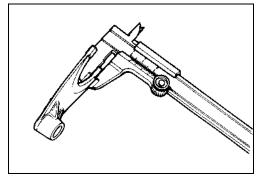


• Measure the gearshift fork thickness with a vernier calipers.

DATA Gearshift fork thickness

Standard: 4.8 - 4.9 mm (0.189 - 0.193 in)

09900-20101: Vernier calipers (150 mm)

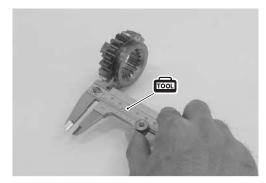


· Measure the gearshift fork groove width with a vernier calipers.

DATA Gearshift fork groove width

Standard: 5.0 - 5.1 mm (0.197 - 0.201 in)

09900-20101: Vernier calipers (150 mm)



#### CONROD INSPECTION

- For conrod inspection other than the following, refer to page
- Measure the conrod deflection with the special tools.

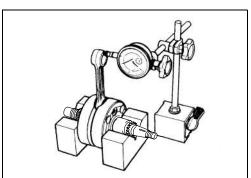
DATA Conrod deflection

Service Limit: 3.0 mm (0.12 in)

09900-20607: Dial gauge

09900-20701: Dial gauge chuck

09900-21304: V blocks



#### CRANKSHAFT INSPCECTION

• Measure the crankshaft runout with V blocks and dial gauge.

#### NOTE:

- \* Place the crankshaft onto the V blocks so that it becomes horizontally.
- \* Shaft runout is half amount of dial gauge reading.

#### Crankshaft runout

**Service Limit: 0.08 mm (0.0031 in)** 

09900-20607: Dial gauge

09900-20701: Dial gauge chuck

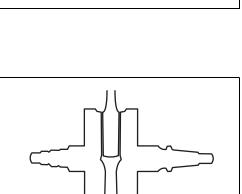
09900-21304: V blocks

· Measure the crankshaft web to web width with a vernier calipers.

DATA Crank web to web width

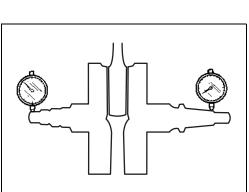
Standard: 61.9 - 62.1 mm (2.437 - 2.445 in)

09900-20101: Vernier calipers (150 mm)



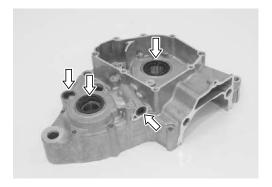


( 711-3)



#### **OIL SEAL INSPECTION**

- · Inspect each oil seal lip for wear and damage.
- If any defects are found, replace the oil seal with a new one.



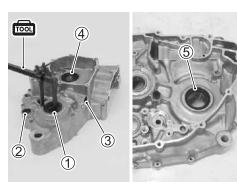


#### **OIL SEAL REMOVAL AND INSTALLATION**

• Remove the oil seals (1), 2, 3, 5) with the special tool.

09913-50121: Oil seal remover

• Remove the oil seal 4 with the suitable tool.



· Apply grease to each oil seal lip.

#### **√A** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent

• Install each new oil seal (1), 2, 3, 5) with the special tool.

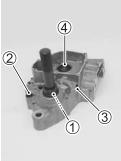
#### NOTE:

After installing the crankshaft, install the oil seal 4 with special tool. (10-12)



**100** 09913-70210: Bearing installing set (10 – 75  $\phi$ )

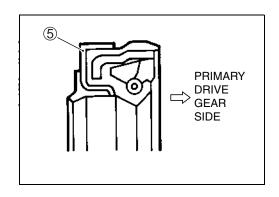
Oil seal ①:  $\phi$  47 Attachment Oil seal ②:  $\phi$  22 Attachment Oil seal ③:  $\phi$  17 Attachment Oil seal ⑤:  $\phi$  40 Attachment





#### NOTE:

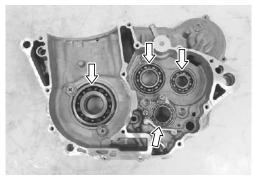
Be sure to check the direction of the crankshaft bearing oil seal 5 before installing it.



#### **BEARING INSPECTION**

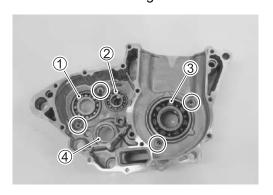
- Inspect the bearings for play, discoloration, wear and seizure.
- Move the inner race by finger and inspect for smooth move-
- If it does not move smoothly, replace the bearing with a new one.

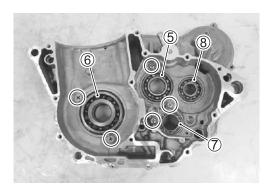


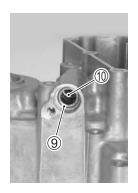


#### **BEARING REMOVAL AND INSTALLATION**

- Remove the oil seals. ( 10-8)
- Remove the bearing retainers.







#### **REMOVAL**

• Remove the bearings with the special tool. Bearing ①, ③, ⑤, ⑥:  $\phi$  40 Attachment Bearing ⑦, ⑧:  $\phi$  32 Attachment

**1** 09913-70210: Bearing installing set (10 – 75  $\phi$ )

Remove the bearing ② with the special tool.
 Bearing ②: Remover 17 mm

09921-20240: Bearing remover set

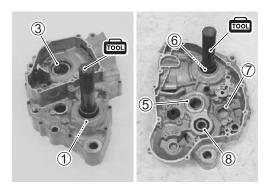
• Remove the bearing 4 with the special tools.

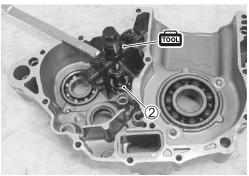
09923-74511: Bearing remover

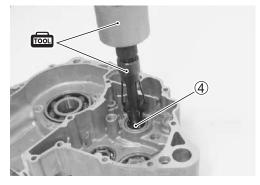
09930-30104: Rotor remover sliding shaft

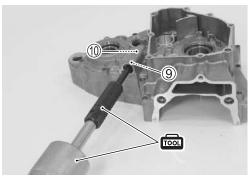
• Remove the bearings (9, 10) with the special tools.

09921-20200: Bearing remover (10 mm) 09930-30104: Rotor remover sliding shaft









#### **INSTALLATION**

• Press the new bearings with the special tool.

Bearing ①:  $\phi$  55 Attachment

Bearing ②, 8:  $\phi$  40 Attachment

Bearing  $3: \phi$  75 Attachment

Bearing 4:  $\phi$  32 Attachment

Bearing 5:  $\phi$  52 Attachment

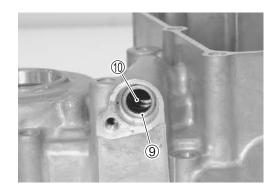
Bearing 6:  $\phi$  72 Attachment

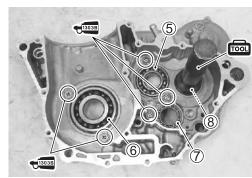
Bearing  $? : \phi$  37 Attachment

Bearing  $9: \phi$  15 Attachment

#### **10** 09913-70210: Bearing installing set (10 – 75 $\phi$ )

Press the new bearing ① with the appropriate steel rod.

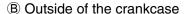




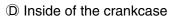
#### NOTE:

NOTE:

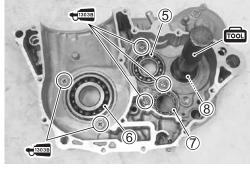
- \* Press the bearings (9, 10) into the crankcase, so that the stamped side faces upside of the crankcase.
- \* Press the bearings (2, 5, 7, 8) into the crankcase, so that the sealed side (A) faces outside of the crankcase.

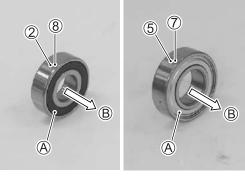


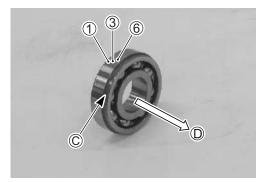
Press the bearings (1, 3, 6) into the crankcase, so that the stepped side © faces inside of the crankcase.



- Apply thread lock to the bearing retainer screws.
- 99000-32030: THREAD LOCK CEMENT "1303B" or equivalent
- Tighten the bearing retainer screws to the specified torque.
- Bearing retainer screw: 8.5 N·m (0.85 kgf-m, 6.0 lbf-ft)







#### CRANKSHAFT INSTALLATION

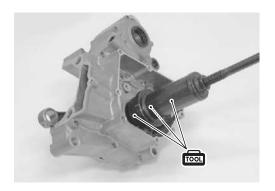
• Fit the crankshaft into the left crankcase with the special tools.

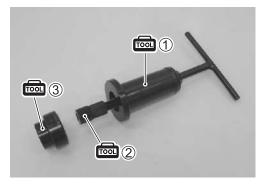
#### NOTE:

Use the attachment (inner driver attachment ③) for crankshaft bearing inside diameter.

09910-32812: Crankshaft installer 1

09911-11310: Crankshaft installer attachment C (2) 09913-70210: Bearing installing set  $(10 - 75 \phi)$  (Inner driver attachment 35 mm (3))





· Apply grease to the oil seal lip.

#### NOTE:

Replace the oil seal 4 with a new one.

**√A** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent

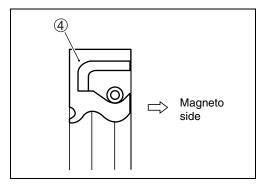
• Install a new oil seal 4 with the special tool.

09930-35010: Rotor remover

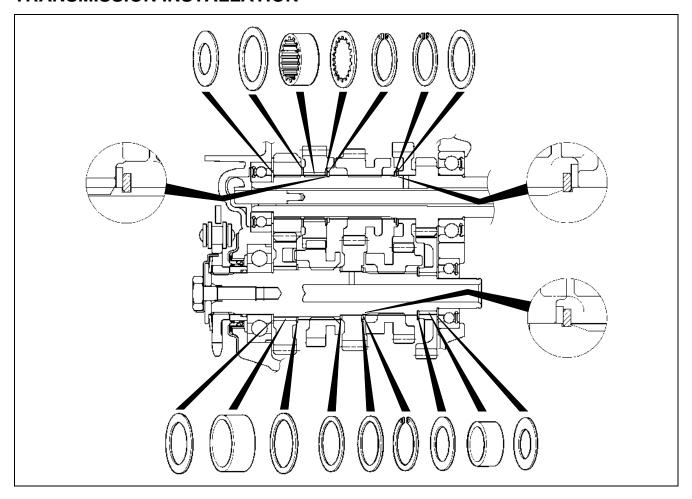
# FOH 4

#### NOTE:

Be sure to check the direction of the crankshaft bearing oil seal 4 before installing it.



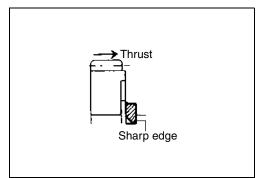
#### TRANSMISSION INSTALLATION



• Install the new snap rings.

#### NOTE:

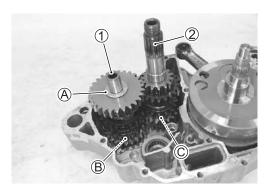
Install the snap ring in the groove and locate its end as shown in the illustration.



- · Apply engine oil to the following parts: driveshaft, countershaft, transmission gears, bearings.
- Install the driveshaft 1 and countershaft 2 with gears installed.

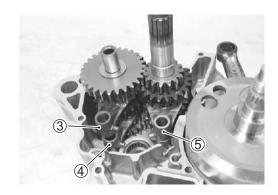
#### NOTE:

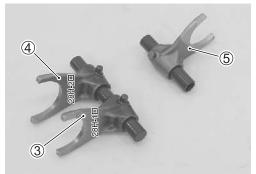
- \* Install the washers (A), (B) located in both ends of the driveshaft 1 positively.
- \* Install the washer © located in end of the countershaft ② positively



• Install the gearshift forks (3, 4, 5) as shown.

- ③ For 5th driven gear (28H-1□)
- ④ For 4th driven gear (28H-2□)
- ⑤ For 3rd drive gear

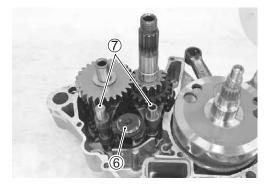




 $\bullet$  Install the gearshift cam  $\ensuremath{\textcircled{6}}$  and gearshift fork shafts  $\ensuremath{\textcircled{7}}.$ 

#### NOTE:

Turn the gearshift cam to the neutral position and confirm that the driveshaft and countershaft turn without resistance.

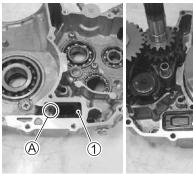


#### **CRANKCASE ASSEMBLY**

• Install the oil reed valve guide ①. *NOTE:* 

Face the hole A forward.

• Install the oil reed valve 2.



• Fit the dowel pins and new gasket ③.

#### NOTE:

Replace the gasket ③ with a new one.

- Fit the right crankcase on the left crankcase.
- Install the oil seal retainer 4.

#### NOTE:

Make sure that the "UP" mark B faces up.

- Fit the clamps © to the bolts.
- Tighten the crankcase bolts to the specified torque.

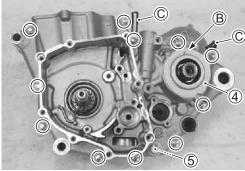
#### NOTE:

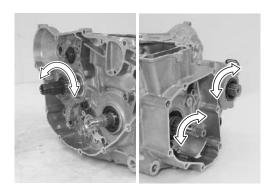
- \* Tighten the crankcase bolts diagonally.
- \* If it is hard to tighten the bolts, separate the crankcase and confirm that the transmission parts are assembled correctly.

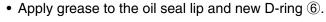
#### Crankcase bolt: 11 N⋅m (1.1 kgf-m, 8.0 lbf-ft)

- Install the oil strainer (No.1) ⑤. ( 2-18)
- Inspect the crankshaft, countershaft and driveshaft for smooth movement.







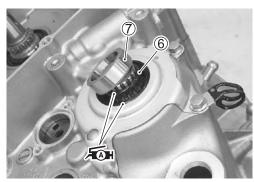


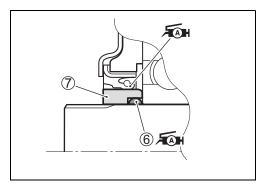
#### NOTE:

Replace the D-ring 6 with a new one.

#### **√A** 99000-25011: SUZUKI SUPER GREASE "A" or equivalent

• Fit the D-ring 6 and spacer 7 to the driveshaft.





#### PRIMARY DRIVE GEAR INSTALLATION

- Install the oil pump No.1, No.2 and oil pump idle gear. ( 11-7, -8)
- Install the gearshift linkage and GP switch. ( 3-5, -8)
- Install the kick starter idle gear and kick starter shaft assembly. ( 8-5)
- Install the breather gear. ( 11-10)
- · Apply grease to the oil seal lip.

## Æ 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent

- Apply engine oil to the washer ① and primary drive gear nut
   ②
- Install the primary drive gear 3 and washer 1.

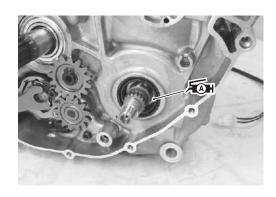
#### NOTE:

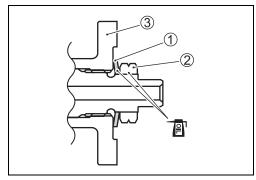
- \* Pay attention to the direction of the washer ① as shown in the illustration.
- \* The primary drive gear nut 2 has left-hand threads.
- Install the clutch component parts. (\$\install 7-9, -12)
- Hold the crankshaft immovable with the special tool and tighten the primary drive gear nut ② to the specified torque.

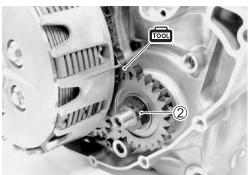
Primary drive gear nut: 110 N·m (11.0 kgf-m, 79.5 lbf-ft)

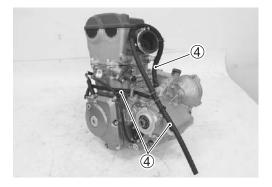
09914-61010: Gear holder

- Install the cam chain tensioner, cam chain, cam chain guide retainer and cam chain No.1 guide. ( 36-33)
- Install the key and magneto rotor. (\$\sumsymbol{15}\$-18)
- Install the magneto cover. ( 15-19)
- Install the engine top side (piston, cylinder and cylinder head).
   (23)
- Install the crankcase breather hoses ④. ( 20-23)
- Mount the engine assembly. ( 5-7)





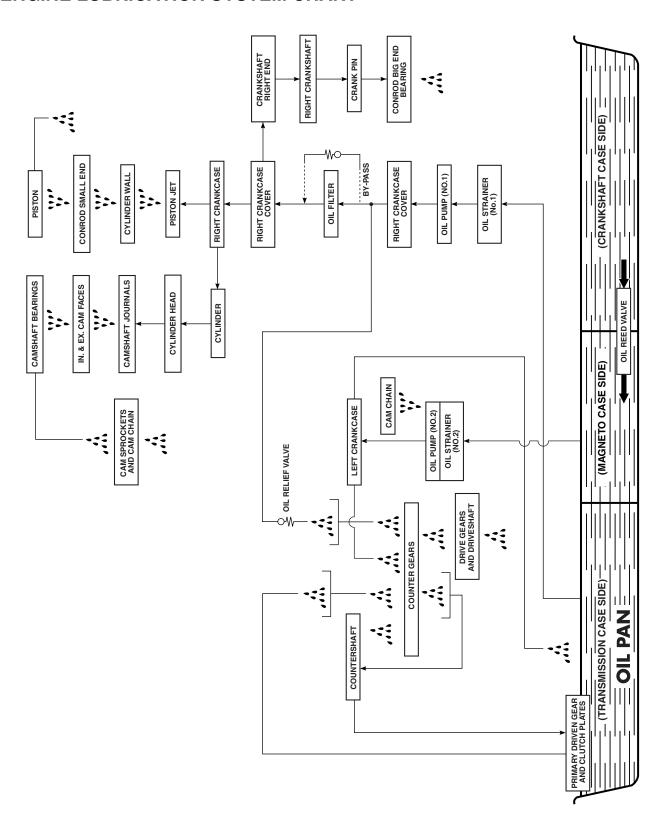




## **LUBRICATION SYSTEM**

——————————————————————————————————————	
ENGINE LUBRICATION SYSTEM	11- 2
ENGINE LUBRICATION SYSTEM CHART	11- 2
ENGINE OIL LEVEL INSPECTION	11- 3
ENGINE OIL CHANGE	11- 3
ENGINE OIL FILTER REPLACEMENT	11- 3
OIL PRESSURE CHECK	11- 3
OIL STRAINER REMOVAL	11- 3
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OIL REED VALVE REMOVAL	11- 3
OIL REED VALVE INSPECTION	11- 3
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OIL RELIEF VALVE REMOVAL	11- 3
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OIL RELIEF VALVE INSTALLATION	
OIL SEAL REMOVAL	
OIL SEAL INSPECTION	
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OIL PUMP No.1 AND No.2 INSPECTION	_
OIL PUMP No.1 AND No.2 INSTALLATION	
BREATHER GEAR REMOVAL	_
BREATHER GEAR INSPECTION	
BREATHER GEAR INSTALLATION	11-10

# **ENGINE LUBRICATION SYSTEM ENGINE LUBRICATION SYSTEM CHART**



#### **ENGINE OIL LEVEL INSPECTION**

( 2-13)

### **ENGINE OIL CHANGE**

( 2-14)

#### **ENGINE OIL FILTER REPLACEMENT**

( 2-15)

#### **OIL PRESSURE CHECK**

( 2-43)

#### **OIL STRAINER REMOVAL**

OIL STRAINER No.1 ( 2-16) OIL STRAINER No.2 (11-6)

#### **OIL STRAINERS INSPECTION**

( 2-17)

#### **OIL STRAINER INSTALLATION**

OIL STRAINER No.1 ( 2-18) OIL STRAINER No.2 (11-8)

#### OIL REED VALVE REMOVAL

( 310-4)

#### OIL REED VALVE INSPECTION

- Inspect the oil reed valve for wear and damage.
- If any defects are found, replace the oil reed valve with a new one.

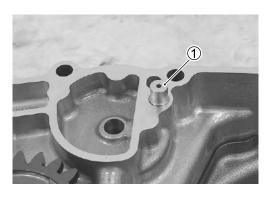
### **OIL REED VALVE INSTALLATION**

( 310-14)

#### **OIL RELIEF VALVE REMOVAL**

- Remove the right crankcase cover. ( 8-3)
- Remove the oil relief valve 1.





#### **OIL RELIEF VALVE INSPECTION**

- Inspect the operation of the oil relief valve by pushing on the piston with a proper bar.
- If the piston does not operate, replace the oil relief valve with a new one.



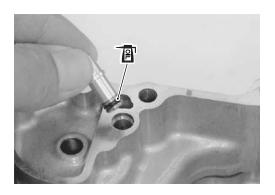
#### OIL RELIEF VALVE INSTALLATION

• Apply engine oil to the O-ring and press in the oil relief valve to the right crankcase cover.

#### NOTE:

Replace the O-ring with a new one.

• Install the right crankcase cover. ( 8-6)

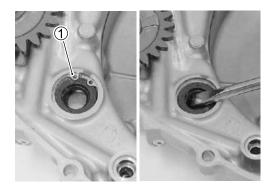


# **OIL SEAL REMOVAL**

- Remove the right crankcase cover. ( 8-3)
- Remove the snap ring ①.

**100** 09900-06108: Snap ring pliers (Close type)

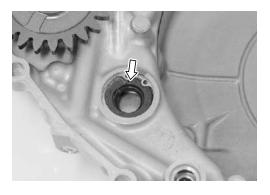
· Remove the oil seal.



#### **OIL SEAL INSPECTION**

For oil seal inspection other than the following, refer to page 10-8.

- Inspect the oil seal lip for wear and damage.
- If any defects are found, replace the oil seal with a new one.



#### OIL SEAL INSTALLATION

 Install the new oil seal and new snap ring ① with the special tool.

#### NOTE:

- \* Replace the oil seal and snap ring 1 with new ones.
- \* Face the sharp edge side of the snap ring to the crankshaft side.
- \* Take care not to scratch the oil seal by the snap ring pliers when installing the snap ring.



 $\bigcirc$  09913-70210: Bearing installing set (10 – 75  $\phi$ )

Oil seal:  $\phi$  22 Attachment

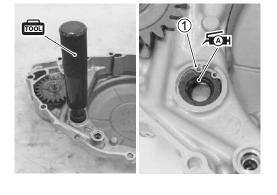
09900-06108: Snap ring pliers (Close type)

Apply grease to the oil seal lip.



**√A** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent



# **OIL PUMP No.1 AND No.2 REMOVAL OIL PUMP No.1**

- Drain engine oil. ( 2-14)
- Drain engine coolant. ( 14-3)
- Remove the brake pedal. ( 17-18)
- · Remove the kick starter lever and right crankcase cover.
- Remove the clutch component parts. (\$\sum\_7-8\$)
- Remove the snap ring ①, washer ② and oil pump idle gear 3.

# **100** 09900-06107: Snap ring pliers (Open type)

- Remove the dowel pin 4 and O-ring 5.
- Remove the oil pump No.1 6.
- · Remove the following parts from the oil pump driven gear shaft (7).

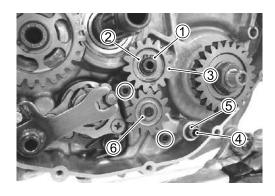
Outer rotor ®

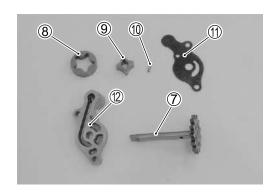
Inner rotor (9)

Pin (10)

Oil pump No.1 plate 11

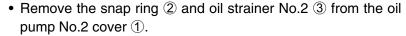
Oil pump No.1 cover 12





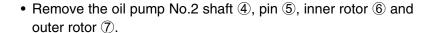
#### **OIL PUMP No.2**

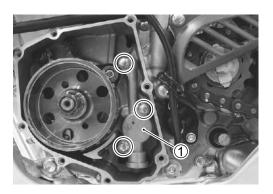
- Drain engine oil. ( 2-14)
- Remove the gearshift lever. ( 9-3)
- Remove the magneto cover. ( 15-17)
- Remove the oil pump No.2 cover ①.

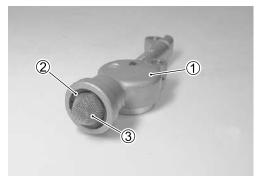


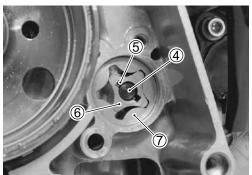
09900-06108: Snap ring pliers (Close type)

Oil strainer inspection (2-17)









#### **OIL PUMP No.1 AND No.2 INSPECTION**

- Check the oil pump with each part for any defects or wear.
- If necessary, replace the defective part with a new one.

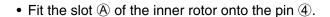


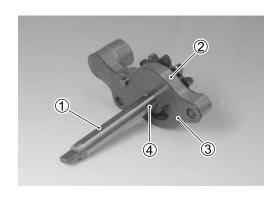


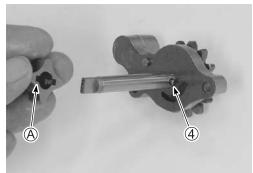
### **OIL PUMP No.1 AND No.2 INSTALLATION OIL PUMP No.1**

Install the oil pump No.1 in the reverse order of removal. Pay attention to the following points:

• Install the oil pump No.1 cover 2, oil pump No.1 plate 3 and pin 4 onto the oil pump driven gear shaft 1.







• Install the outer rotor (5).

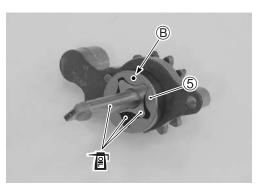
#### NOTE:

Face the punch mark 

B on outer rotor 

5 to the crankcase.

 Apply engine oil to the oil pump driven gear shaft, outer rotor and inner rotor.



• Install the oil pump No.1 and tighten the oil pump No.1 bolts to the specified torque.

# Oil pump No.1 bolt: 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)

· Apply molybdenum oil solution to the oil pump idle gear shaft.

# MOLYBDENUM OIL SOLUTION

• Install the oil pump idle gear 6, washer and new snap ring 7.

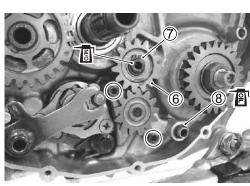
# 09900-06107: Snap ring pliers (Open type)

- Apply engine oil to the new O-ring 8.
- Install the dowel pin and new O-ring 8.

#### NOTE:

Replace the snap ring 7 and O-ring 8 with new ones.

- Install the clutch component parts. (\$\sum\_7-9\$)
- Install the right crankcase cover and kick starter lever. ( 58-6, -7)
- Install the brake pedal. ( 17-18)



#### **OIL PUMP No.2**

Install the oil pump No.2 in the reverse order of removal. Pay attention to the following points:

- Install the pin ② into the oil pump No.2 shaft ①.
- Install the inner rotor ③ onto the oil pump No.2 shaft ①.

#### NOTE:

Fit the slot (A) of the inner rotor onto the pin (2).

- Apply engine oil to the oil pump shaft, outer rotor and inner rotor.
- Install the oil pump No.2 shaft and inner rotor onto the crankcase.
- Install the outer rotor 4 onto the crankcase.

#### NOTE:

Face the punch mark 

B on outer rotor 4 to the crankcase.

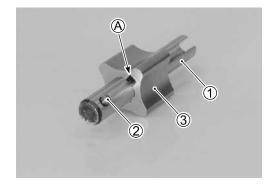
• Install the oil strainer No.2 ⑤ and new snap ring ⑥.

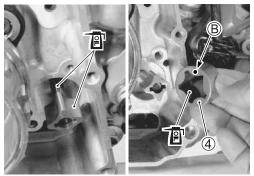
#### NOTE:

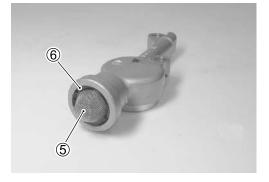
Replace the snap ring 6 with a new one.

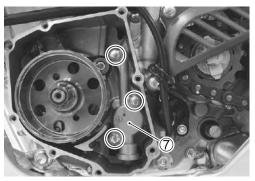
09900-06108: Snap ring pliers (Close type)

- Install the oil pump No.2 cover ⑦ and tighten the oil pump No.2 bolts to the specified torque.
- Oil pump No.2 bolt: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
- Install the magneto cover. ( 15-19)
- Install the gearshift lever. ( 9-7)







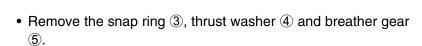


#### **INSPECTION AFTER INSTALLATION**

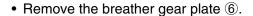
- Engine oil level and oil leakage ( 2-13)
- Engine coolant level and coolant leakage ( 2-19, -20)
- Oil pressure ( 2-43)

# **BREATHER GEAR REMOVAL**

- Drain engine oil. ( 2-14)
- Drain engine coolant. ( 14-3)
- Remove the right crankcase cover and clutch component parts. ( 7-8, 8-3)
- Remove the circlip 1 and breather gear cap 2.

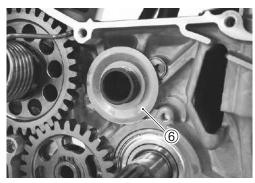


09900-06107: Snap ring pliers (Open type)









#### **BREATHER GEAR INSPECTION**

- Inspect the breather gear teeth for damage.
- Inspect the breather gear and breather gear shaft contact surface for wear and damage.
- If any defects are found, replace the gear with a new one.



### **BREATHER GEAR INSTALLATION**

Install the breather gear in the reverse order of removal. Pay attention to the following points:

• Apply molybdenum oil solution to the breather gear shaft ①.

# MOLYBDENUM OIL SOLUTION

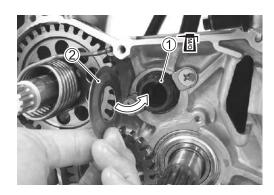
- Install the breather gear plate ② with its convex side facing inside.
- Install the breather gear ③, thrust washer ④ and new snap ring ⑤.

#### NOTE:

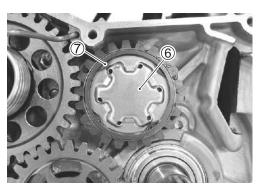
Replace the snap ring 5 with a new one.

**100** 09900-06107: Snap ring pliers (Open type)

- Install the breather gear cap (6) and circlip (7).
- Install the clutch components parts and right crankcase cover. ( 37-9, 8-6)







#### **INSPECTION AFTER INSTALLATION**

- Engine oil level and oil leakage (2-13)
- Engine coolant level and coolant leakage (2-19, -20)

# FI SYSTEM DIAGNOSIS

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# FI SYSTEM DIAGNOSIS

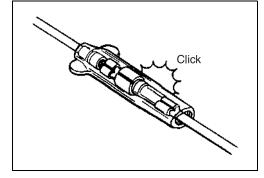
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# PRECAUTIONS IN SERVICING

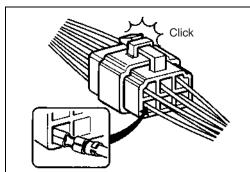
When handling the component parts or servicing the FI system, observe the following points for the safety of the system.

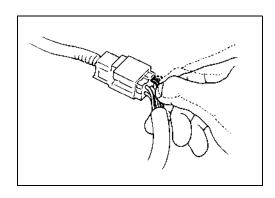
#### CONNECTOR/COUPLER

- Faulty FI system is often related to poor electrical contact of connector/coupler. Before servicing individual electronic part, check electrical contact of connector/coupler.
- When connecting a connector, be sure to push it in until a click is felt.

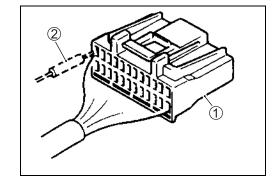


- With a lock type coupler, be sure to release the lock when disconnecting, and push in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- Push in the coupler straightly. An angled or skewed insertion may cause the terminal to be deformed, possibly resulting in poor electrical contact.
- Inspect each terminal for corrosion and contamination.
   The terminals must be clean and free of any foreign material which could impede proper terminal contact.
- Before refitting the sealed coupler, make sure its seal rubber is positioned properly. The seal rubber may possibly come off the position during disconnecting work and if the coupler is refitted with the seal rubber improperly positioned, it may result in poor water sealing.
- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.





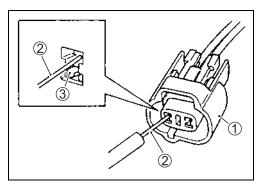
 When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (backside) of the connector/coupler.



- ① Coupler
- 2 Probe
- When connecting meter probe from the terminal side of the coupler (where connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open.
  - Connect the probe as shown to avoid opening of female terminal.

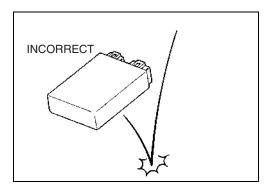
Never push in the probe where male terminal is supposed to fit.

- Check the male connector for bend and female connector for excessive opening. Also check the coupler for locking (looseness), corrosion, dust, etc.
  - 1 Coupler
  - 2 Probe
  - (3) Where male terminal fits

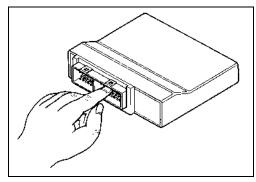


#### **ECM/VARIOUS SENSORS**

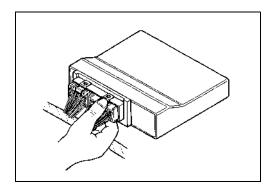
• Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.



• Be careful not to touch the electrical terminals of the electronic parts. The static electricity from your body may damage this part.

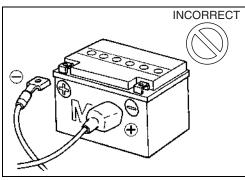


• When disconnecting and connecting the coupler, make sure to stop the engine, or electronic parts may get damaged.



#### WHEN USING THE BATTERY LEAD WIRE (Optional part: 36890-28H00)

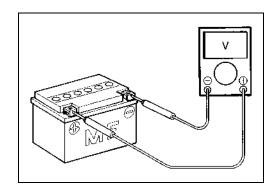
• Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system instantly when reverse power is applied.



• Removing the condenser coupler of a running engine is strictly prohibited.

The moment such removal is made, damaging counter electromotive force will be applied to the ECM which may result in serious damage.

 Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher. Terminal voltage check with a low voltage battery will lead to erroneous diagnosis.



- Never connect any tester (voltmeter, ohmmeter, or whatever) to the ECM when its coupler is disconnected.
   Otherwise, damage to ECM may result.
- Never connect an ohmmeter to the ECM with its coupler connected. If attempted, damage to ECM or sensors may result.
- Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be obtained and personal injury may result.

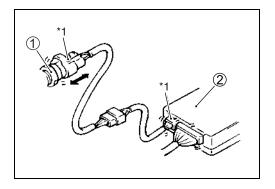
# ELECTRICAL CIRCUIT INSPECTION PROCEDURE

While there are various methods for electrical circuit inspection, described here is a general method to check for open and short circuit using an ohmmeter and a voltmeter.

#### **OPEN CIRCUIT CHECK**

Possible causes for the open circuits are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

- Loose connection of connector/coupler.
- Poor contact of terminal (due to dirt, corrosion or rust, poor contact tension, entry of foreign object etc.).
- · Wire harness being open.
- Poor terminal-to-wire connection.
- Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check for condition of the coupler lock if equipped.
  - 1 Sensor
  - ② ECM
  - \*1 Check for loose connection.



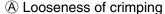
 Using a test male terminal, check the female terminals of the circuit being checked for contact tension.

Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust, entry of foreign object, etc.). At the same time, check to make sure that each terminal is fully inserted in the coupler and locked.

If contact tension is not enough, rectify the contact to increase tension or replace.

The terminals must be clean and free of any foreign material which could impede proper terminal contact.

- \*1 Check contact tension by inserting and removing.
- \*2 Check each terminal for bend and proper alignment.
- Using continuity inspect or voltage check procedure as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.



- B Open
- © Thin wire (a few strands left)

#### **Continuity check**

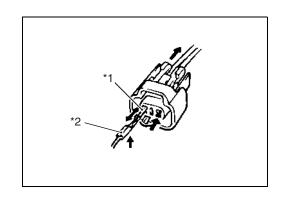
If no continuity is indicated (infinity or over limit), the circuit is open between terminals a and c.

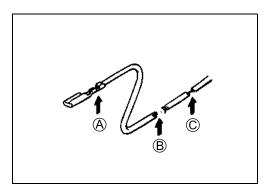
① ECM

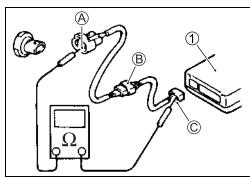
• Disconnect the coupler ® and measure resistance between couplers A and B.

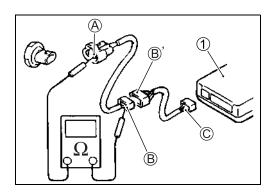
If no continuity is indicated, the circuit is open between couplers A and B. If continuity is indicated, there is an open circuit between couplers B' and C or an abnormality in coupler B' or coupler C.











#### **VOLTAGE CHECK**

If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

 With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.

If measurements were taken as shown in the figure at the right and results are as listed below, it means that the circuit is open between terminals A and B.

#### Voltage Between:

© and body ground: Approx. 5 V

B and body ground: Approx. 5 V

A and body ground: 0 V

Also, if measured values are as listed below, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals A and B.

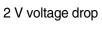
#### Voltage Between:

© and body ground: Approx. 5 V

B and body ground: Approx. 5 V — 2 V voltage drop

(A) and body ground:

3 V



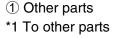
#### SHORT CIRCUIT CHECK (WIRE HARNESS TO GROUND)

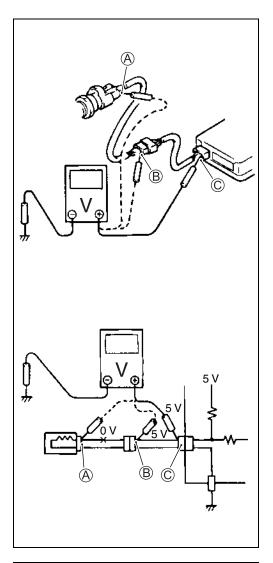
• Disconnect the connectors/couplers at both ends of the circuit to be checked.

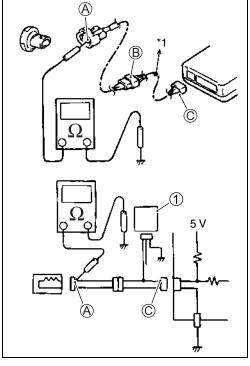
#### NOTE:

If the circuit to be checked branches to other parts as shown, disconnect all connectors/couplers of those parts. Otherwise, diagnosis will be misled.

Measure resistance between terminal at one end of circuit (A terminal in figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals A and C.



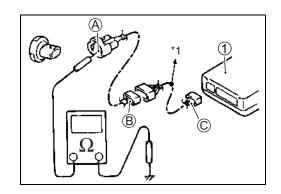




· Disconnect the connector/coupler included in circuit (coupler (B) and measure resistance between terminal (A) and body ground.

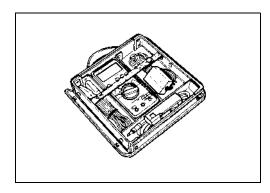
If continuity is indicated, the circuit is shorted to the ground between terminals (A) and (B).

> 1 ECM \*1 To other parts



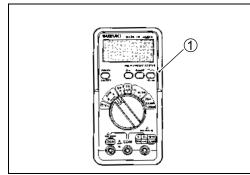
#### **USING THE MULTI CIRCUIT TESTER**

- Use the Suzuki multi circuit tester set (09900-25008).
- · Use well-charged batteries in the tester.
- Be sure to set the tester to the correct testing range.



#### **USING THE TESTER**

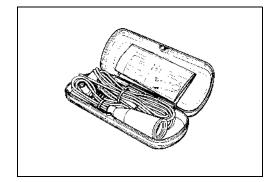
- Incorrectly connecting the  $\oplus$  and  $\ominus$  probes may cause the inside of the tester to burnout.
- If the voltage and current are not known, make measurements using the highest range.
- When measuring the resistance with the multi circuit tester ①,  $\infty$  will be shown as 10.00 M $\Omega$  and "1" flashes in the display.
- · Check that no voltage is applied before making the measurement. If voltage is applied the tester may be damaged.
- After using the tester, turn the power off.



#### 09900-25008: Multi circuit tester set

#### NOTE:

- \* When connecting the multi circuit tester, use the needle-point probe to the back side of the lead wire coupler and connect the probes of tester to them.
- \* Use the needle-point probe to prevent the rubber of the water proof coupler from damage.
- \* When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

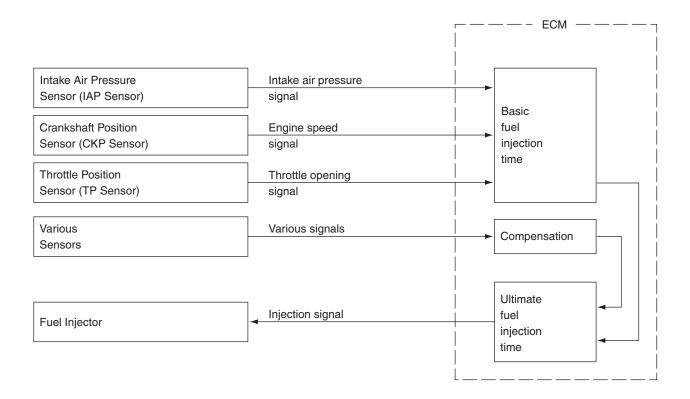


09900-25009: Needle-point probe set

# FI SYSTEM TECHNICAL FEATURES INJECTION TIME (INJECTION VOLUME)

The factors to determine the injection time include the basic fuel injection time, which is calculated on the basis of intake air pressure, engine speed and throttle opening angle, and various compensations.

These compensations are determined according to the signals from various sensors that detect the engine and driving conditions.



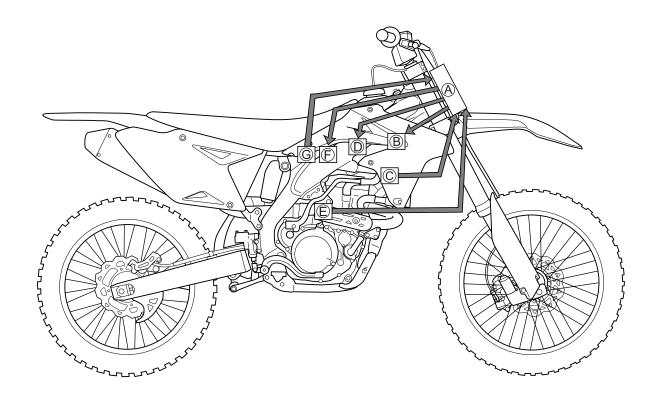
**COMPENSATION OF INJECTION TIME (VOLUME)**The following different signals are output from the respective sensors for compensation of the fuel injection time (volume).

SIGNAL	DESCRIPTION
ENGINE COOLANT TEMPERATURE SEN-	When engine coolant temperature is low, injection time (vol-
SOR SIGNAL	ume) is increased.
INTAKE AIR TEMPERATURE SENSOR	When intake air temperature is low, injection time (volume)
SIGNAL	is increased.
ACCELERATION SIGNAL/	During acceleration, the fuel injection time (volume) is
DECELERATION SIGNAL	increased in accordance with the throttle opening speed and
	engine rpm. During deceleration, the fuel injection time (vol-
	ume) is decreased.

# **INJECTION STOP CONTROL**

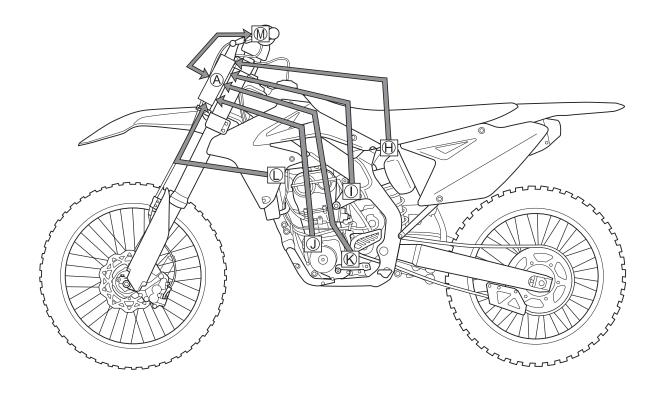
SIGNAL	DESCRIPTION
TIP-OVER SENSOR SIGNAL	When the motorcycle tips over, the tip-over sensor sends a
(FUEL SHUT-OFF)	signal to the ECM. Then, this signal cuts OFF current sup-
	plied to the fuel pump, fuel injector and ignition coil.
OVER-REV. LIMITER SIGNAL	The ignition signal stop operation when engine rpm reaches
	rev. limit rpm.

# **FI SYSTEM PARTS LOCATION**



- ${\rm \textcircled{A}}~{\rm ECM}$
- **B** Ignition coil
- © TO sensor
- D Fuel pump

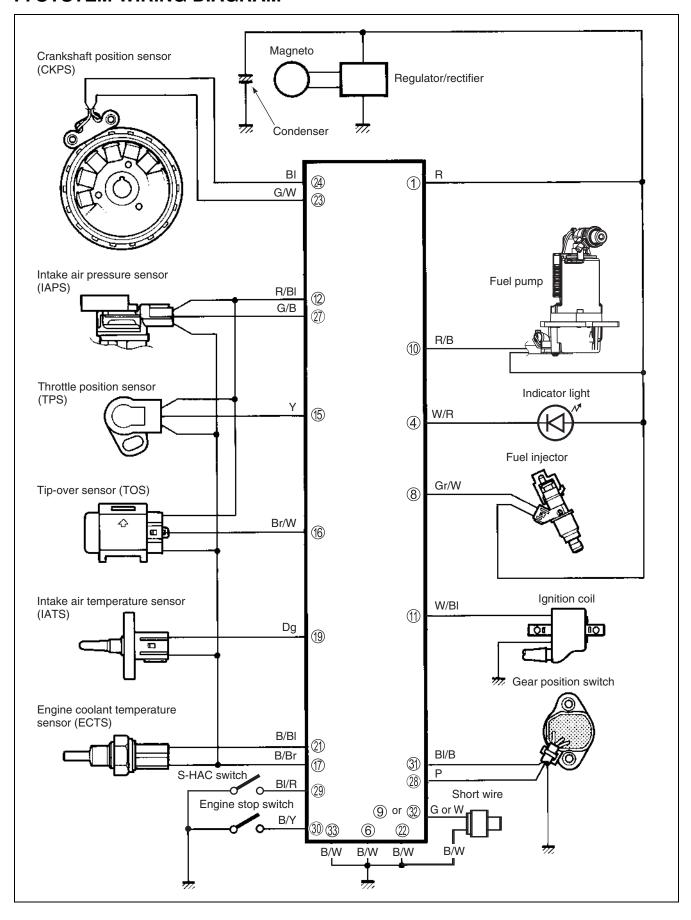
- © ECT sensor
- Fuel injector
- G IAP sensor



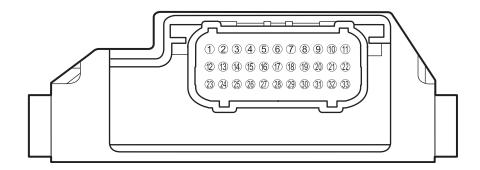
- (A) ECM
- ① IAT sensor
- ① TP sensor
- ① CKP sensor

- **⊗** GP switch
- © Short wire

### FI SYSTEM WIRING DIAGRAM



# **ECM TERMINAL**



TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
1	Power source (+B)	18)	_
2	_	19	IAT sensor signal (IATS)
3	_	20	_
4	Indicator output	21)	ECT sensor signal (ECTS)
(5)	_	22)	Ground (E02)
6	Ground (E01)	23)	CKP sensor signal (CKP-)
7	_	24)	CKP sensor signal (CKP+)
8	Fuel injector (#11)	25)	_
9	Map select input 2 (MAP2)	26	_
10	Fuel pump (FP)	27)	IAP sensor signal (IAPS)
11)	Ignition coil	28	GP switch signal (GP)
12	Power source for sensors (VCC)	29	S-HAC switch
13	_	30	Engine stop switch
(14)	_	31)	Neutral switch (NT)
(15)	TP sensor signal (TPS)	32)	Map select input 1 (MAP1)
16	TO sensor signal (TOS)	33	Ground (E1)
17	Sensor ground (E2)		

#### **SELF-DIAGNOSIS FUNCTION**

The self-diagnosis function is incorporated in the ECM. It can be notified by blinking the indicator light.

#### VISUAL INSPECTION

Prior to diagnosis, perform the following visual inspections. The reason for visual inspection is that mechanical failures (such as oil leakage) cannot be displayed on the indicator light.

- \* Engine oil level and leakage (2-13)
- \* Engine coolant level and leakage (2-19, -20)
- \* Fuel level and leakage
- \* Clogged air cleaner element
- \* Throttle cable play (\$\sumsymbol{2}\$-2-22)
- \* Exhaust gas leakage and noise
- \* Each coupler disconnection
- \* Clogged radiator fins (14-5)

#### SELF-DIAGNOSTIC PROCEDURE

#### NOTE:

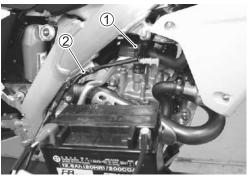
- \* Do not disconnect the ECM coupler or battery lead wire before checking the DTC (Diagnostic Trouble Code). Such disconnection may erase the DTC.
- \* Be sure to read "PRECAUTIONS IN SERVICING" (12-3) before inspection and observe what is written there.
- Disconnect the service coupler ① from the cap.
- Connect a 12 volt battery to the service coupler ① using the battery lead wire ②.
- Depress the kick starter lever at least ten times or run the engine for more than 30 seconds.
- Check the DTC by indicator light ③ to determine the malfunction part.

#### 36890-28H00: Battery lead wire (option)

#### NOTE:

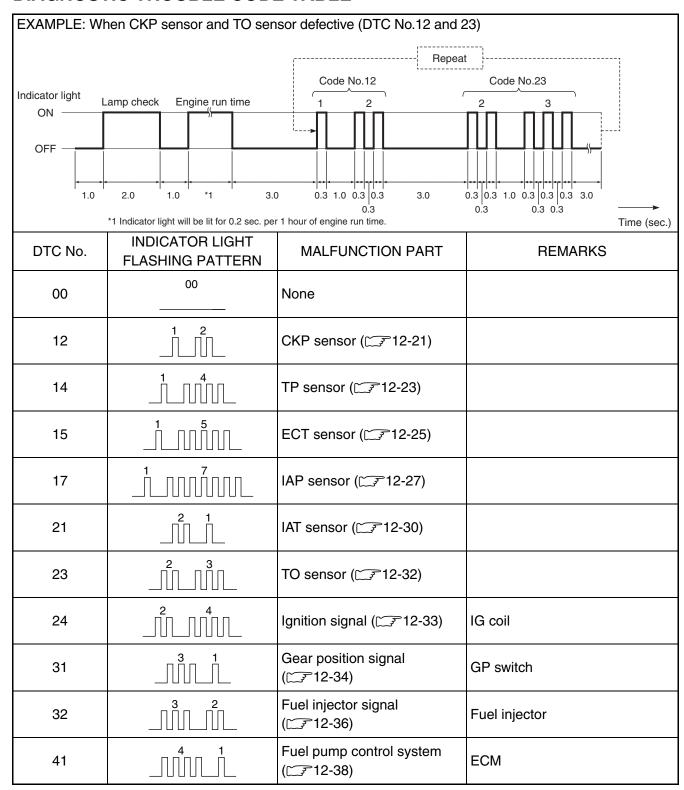
- \* ECM detects the malfunction part by the cranking or the engine start.
- \* There are some trouble codes that can be checked without cranking by kick starter for ten times or more or starting for more than 30 seconds.







#### DIAGNOSTIC TROUBLE CODE TABLE



In the indicator light, the DTC is indicated from small code to large code.

# **DTC AND DEFECTIVE CONDITION**

DTC No.	DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
12	CKP sensor	The signal does not reach ECM for 1 second or more, after receiving the IAP sensor input signal.	CKP sensor wiring and mechanical parts CKP sensor, lead wire/coupler connection
14	TP sensor	The sensor should produce following voltage. $0.35~V \leq sensor~voltage < 4.60~V$ In other than the above range, 14 is indicated.	TP sensor, lead wire/coupler connection
15	ECT sensor	The sensor voltage should be the following.  0.11 V ≤ sensor voltage < 4.83 V In other than the above range, 15 is indicated.	ECT sensor, lead wire/coupler connection
17	IAP sensor	The sensor should produce following voltage.  0.29 V ≤ sensor voltage < 4.05 V In other than the above range, 17 is indicated.	IAP sensor, lead wire/coupler connection
21	IAT sensor	The sensor voltage should be the following. $0.19~V \leq sensor~voltage < 4.93~V$ In other than the above range, 21 is indicated.	IAT sensor, lead wire/coupler connection
23	TO sensor	The sensor voltage should be the following. $0.29~V \leq sensor~voltage < 4.61~V$ In other than the above value, 23 is indicated.	TO sensor, lead wire/coupler connection
24	Ignition signal	CKP sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted 5 times or more continuously. In this case, 24 is indicated.	Ignition coil, wiring/coupler con- nection

DTC No.	DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
31	Gear position signal	Gear position signal voltage should be higher than the following. GP switch voltage $\geq$ 0.88 V If lower than the above value, 31 is indicated.	GP switch, wiring/coupler connection, gearshift cam, etc.
32	Fuel injector	CKP sensor (pickup coil) signal is produced, but fuel injector signal is interrupted 8 times or more continuously. In this case, 32 is indicated.	Fuel injector, wiring/coupler con- nection, power supply to the injector
41	FP relay	The fuel pump continues working although the operation of fuel pump is made to stop.	FP relay (ECM), lead wire/coupler connection

#### NOTE:

The FP relay is incorporated in the ECM.

- If the DTC does not indicate, the malfunction is cleared.
- Disconnect the battery lead wire.

36890-28H00: Battery lead wire (option)





#### **FAIL-SAFE FUNCTION**

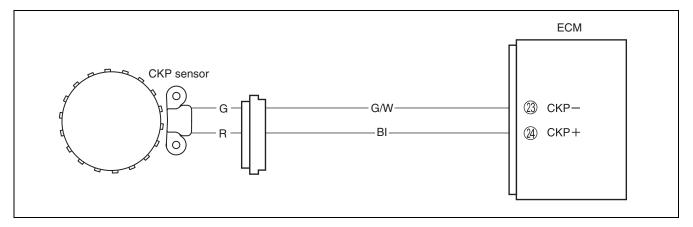
FI system is provided with fail-safe function to allow the engine to start and the motorcycle to run in a minimum performance necessary even under malfunction condition.

ITEM	FAIL-SAFE MODE	STARTING ABILITY	RUNNING ABILITY
IAP sensor	Intake air pressure is fixed to 106 kPa (795 mmHg).	"YES"	"YES"
TP sensor	The throttle opening is fixed to close position. Ignition timing is also fixed.	"YES"	"YES"
ECT sensor	Engine coolant temperature value is fixed to 80 °C (176 °F).	"YES"	"YES"
IAT sensor	Intake air temperature value is fixed to 15 °C (59 °F).	"YES"	"YES"
Gear position signal	Gear position signal is fixed to 1st gear.	"YES"	"YES"

The engine can start and can run even if the above signal is not received from each sensor. But, the engine running condition is not complete, providing only emergency help (by fail-safe circuit). In this case, it is necessary to bring the motorcycle to the workshop for complete repair.

# "12" CKP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
The signal does not reach ECM for 1 second or	Metal particles or foreign material being stuck on
more, after receiving the IAP sensor input signal.	the CKP sensor and rotor tip.
	CKP sensor circuit open or short.
	CKP sensor malfunction.
	ECM malfunction.



#### NOTICE

When inspecting the ECM coupler, pressing the probe excessively can cause damage to the terminal.

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

#### **INSPECTION**

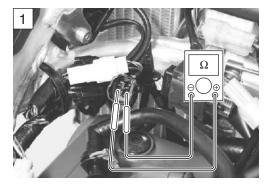
#### Step 1

- 1) Stop the engine.
- 2) Remove the fuel tank. ( 13-3)
- 3) Check the CKP sensor coupler for loose or poor contacts. If OK, then measure the CKP sensor resistance.



4) Disconnect the CKP sensor coupler and measure the resistance.

DATA CKP sensor resistance: 80 – 120  $\Omega$ (Green - Red)



5) If OK, then check the continuity between each terminal and ground.

**DATA** CKP sensor resistance:  $\infty \Omega$  (Infinity)

(Red - Ground)

(Green - Ground)

09900-25008: Multi circuit tester set

 $\square$  Tester knob indication: Resistance ( $\Omega$ )

Are the resistance and continuity OK?

YES	Go to step 2.
NO	Replace the CKP sensor with a new one.



#### Step 2

- 1) Measure the CKP sensor peak voltage by depressing the kick starter lever several times forcefully.
- 2) Repeat the above test procedure a few times and measure the highest peak voltage.

CKP sensor peak voltage: 2.8 V or more

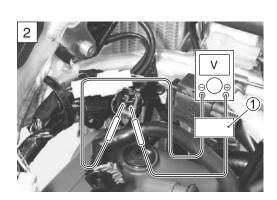
(**⊕** Red – **⊕** Green)

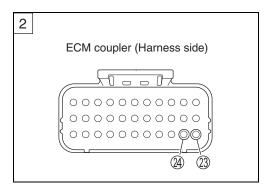
1 Peak volt adaptor

09900-25008: Multi circuit tester set Tester knob indication: Voltage (==)

Is the voltage OK?

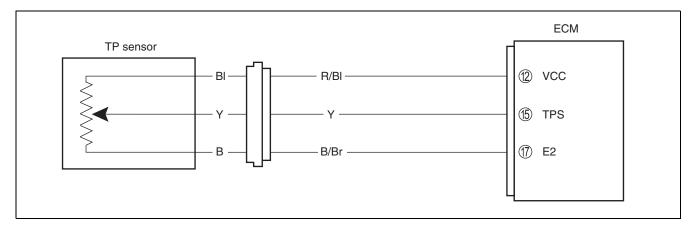
	G/W or Blue wire open or shorted to ground.
	Loose or poor contacts on the CKP sensor cou-
	pler or ECM coupler (terminal ② or ④).
	If wire and connection are OK, intermittent trou-
YES	ble or faulty ECM.
	<ul> <li>Recheck each terminal and wire harness for</li> </ul>
	open circuit and poor connection.
	Replace the ECM with a known good one, and
	inspect it again. ( 12-40)
	Inspect that metal particles or foreign material
	stuck on the CKP sensor and rotor tip.
NO	• If there are no metal particles and foreign mate-
	rial, then replace the CKP sensor with a new
	one.





# "14" TP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Output voltage is not within the following range.	TP sensor maladjusted.
0.35 V ≤ Sensor voltage < 4.60 V	TP sensor circuit open or short.
	TP sensor malfunction.
	ECM malfunction.



#### **NOTICE**

When inspecting the ECM coupler, pressing the probe excessively can cause damage to the terminal.

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

### **INSPECTION**

#### Step 1

- 1) Stop the engine.
- 2) Remove the fuel tank. ( 13-3)
- 3) Check the TP sensor coupler for loose or poor contacts. If OK, then measure the TP sensor input voltage.
- 4) Disconnect the TP sensor coupler.
- 5) Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)



- 6) Measure the voltage at the R/BI wire terminal (A) and ground.
- 7) If OK, then measure the voltage at the R/BI wire terminal (A) and B/Br wire terminal (B).

TP sensor input voltage: 4.5 – 5.5 V

(⊕ R/BI – ⊝ Ground)

(⊕ R/BI – ⊝ B/Br)

09900-25008: Multi circuit tester set 36890-28H00: Battery lead wire (option)

Tester knob indication: Voltage (---)

Is the voltage OK?

YES	Go to Step 2.
NO	<ul> <li>Loose or poor contacts on the ECM coupler (terminal ② or ①).</li> <li>Open or short circuit in the R/BI wire or B/Br wire.</li> </ul>

### Step 2

- 1) Connect the TP sensor coupler.
- 2) Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)
- 3) Insert the needle-point probes to the lead wire coupler.
- 4) Measure the TP sensor output voltage at the coupler (between ⊕ Yellow and ⊝ B/Br) by turning the throttle grip.

#### TP sensor output voltage

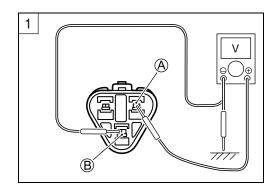
Throttle valve is closed: 0.60 - 0.64 VThrottle valve is opened: 3.60 - 4.00 V

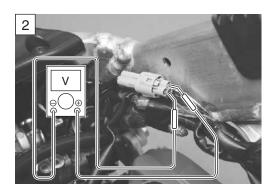
09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set 36890-28H00: Battery lead wire (option)

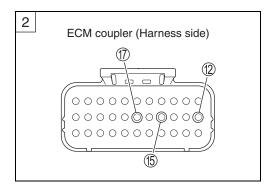
Tester knob indication: Voltage (---)

Is the voltage OK?

YES	R/Bl, Yellow or B/Br wire open or shorted to
	ground, or poor ②, ⑤ or ⑦ connection.
	• If wire and connection are OK, intermittent trou-
	ble or faulty ECM.
	Recheck each terminal and wire harness for
	open circuit and poor connection.
	Replace the ECM with a known good one, and
	inspect it again. ( 12-40)
NO	If check result is not satisfactory, replace TP sen-
	sor with a new one.

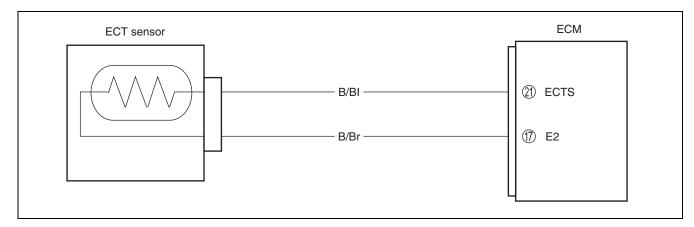






#### "15" ECT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Output voltage is not within the following range.	ECT sensor circuit open or short.
0.11 V ≤ Sensor voltage < 4.83 V	ECT sensor malfunction.
	ECM malfunction.



#### **NOTICE**

When inspecting the ECM coupler, pressing the probe excessively can cause damage to the terminal.

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

#### **INSPECTION**

#### Step 1

- 1) Stop the engine.
- 2) Check the ECT sensor coupler for loose or poor contacts. If OK, then measure the ECT sensor voltage at the wire side coupler.
- 3) Disconnect the ECT sensor coupler.
- 4) Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)



5) Insert the needle-point probes to the lead wire coupler.

6) Measure the voltage between B/BI wire terminal (A) and ground.

7) If OK, then measure the voltage between B/BI wire terminal A and B/Br wire terminal B.

DATA ECT sensor voltage: 4.5 – 5.5 V

( $\oplus$  B/BI –  $\bigcirc$  Ground)

(⊕ B/BI – ⊝ B/Br)

09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set 36890-28H00: Battery lead wire (option)

Tester knob indication: Voltage (---)

Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ① or ②).
	Open or short circuit in the B/Br wire or B/Bl wire.

#### Step 2

- 1) Stop the engine.
- 2) Disconnect the ECT sensor coupler.
- 3) Measure the ECT sensor resistance.

#### **DATA** ECT sensor resistance:

Approx. 2.58 k $\Omega$  at 20 °C (68 °F) (Terminal – Terminal)

09900-25008: Multi circuit tester set

 $\square$  Tester knob indication: Resistance ( $\Omega$ )

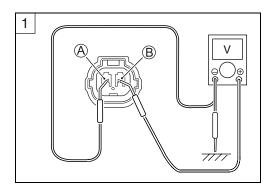
Refer to 12-43 for details.

Is the resistance OK?

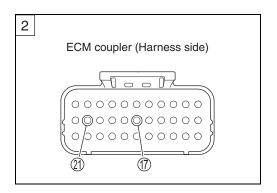
YES	<ul> <li>B/Br or B/Bl wire open or shorted to ground, or poor ⑦ or ② connection.</li> <li>If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>Replace the ECM with a known good one, and inspect it again. ( 12-40)</li> </ul>
NO	Replace the ECT sensor with a new one.

### **PATA** ECT sensor specification

Engine Coolant Temp.	Resistance
20 °C (68 °F)	Approx. 2.58 kΩ
50 °C (122 °F)	Approx. 0.77 kΩ
80 °C (176 °F)	Approx. 0.28 kΩ

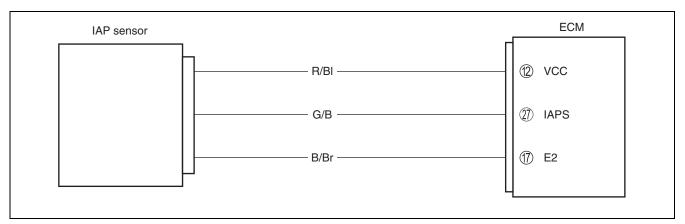






# "17" IAP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
IAP sensor voltage is not within the following range. 0.29 V $\leq$ Sensor voltage < 4.05 V	<ul> <li>Clogged vacuum passage between throttle body and IAP sensor.</li> </ul>
NOTE: Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.	IAP sensor circuit open or shorted to ground.  IAP sensor malfunction.



#### **NOTICE**

When inspecting the ECM coupler, pressing the probe excessively can cause damage to the terminal.

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

#### **INSPECTION**

#### Step 1

- 1) Stop the engine.
- 2) Remove the fuel tank. ( 13-3)
- 3) Check the IAP sensor coupler for loose or poor contacts. If OK, then measure the IAP sensor input voltage.
- 4) Disconnect the IAP sensor coupler.



- 5) Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)
- 6) Insert the needle-point probes to the lead wire coupler.
- 7) Measure the voltage at the R/BI wire terminal and ground.
- 8) If OK, then measure the voltage at the R/BI wire terminal and B/Br wire terminal.

IAP sensor input voltage: 4.5 – 5.5 V

(**⊕** R/BI – **⊝** Ground)

(⊕ R/BI – ⊝ B/Br)

09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set 36890-28H00: Battery lead wire (option)

Tester knob indication: Voltage (---)

Is the voltage OK?

YES	Go to Step 2.	
NO	<ul> <li>Loose or poor contacts on the ECM coupler (terminal ② or ⑦).</li> <li>Open or short circuit in the R/BI wire or B/Br wire.</li> </ul>	

#### Step 2

- 1) Connect the IAP sensor coupler.
- 2) Insert the needle-point probes to the lead wire coupler.
- 3) Temporarily install the fuel tank and connect the fuel pump coupler.
- 4) Kick start the engine at idle speed.
- 5) Measure the IAP sensor output voltage at the wire side coupler (between G/B and B/Br wires).

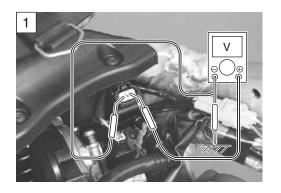
IAP sensor output voltage: 0.98 – 2.86 V at idle speed (⊕ G/B – ⊕ B/Br)

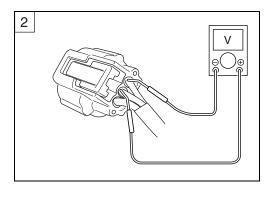
09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set

Tester knob indication: Voltage (---)

Is the voltage OK?

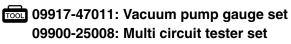
YES	Go to Step 3.
	<ul> <li>Open or short circuit in the G/B wire.</li> <li>If wire is OK, replace the IAP sensor with a new one.</li> </ul>





#### Step 3

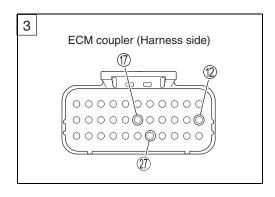
- 1) Remove the throttle body. ( 13-10)
- 2) Remove the IAP sensor. ( 13-12)
- 3) Connect the vacuum pump gauge to the vacuum port of the IAP sensor.
- 4) Arrange 3 new 1.5 V batteries in series ① (check that total voltage is 4.5 - 5.0 V) and connect  $\bigcirc$  terminal to the ground terminal 2 and + terminal to the VCC terminal 3.
- 5) Check the voltage between Vout 4 and ground. Also, check if voltage reduces when vacuum is applied by using vacuum pump gauge.



Tester knob indication: Voltage (---)

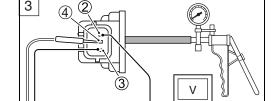


YES	<ul> <li>R/BI, B/Br or G/B wire open or shorted to ground, or poor ②, ⑦ or ② connection.</li> <li>If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>Replace the ECM with a known good one, and inspect it again. ( 12-40)</li> </ul>
NO	If check result is not satisfactory, replace the IAP sensor with a new one.



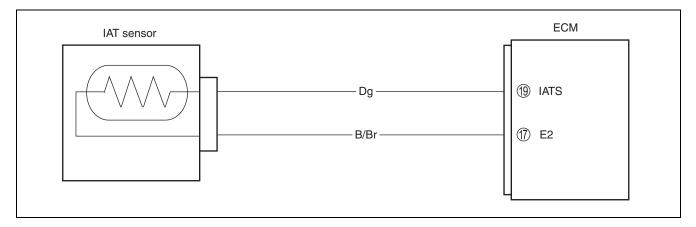
### **Output voltage** (VCC voltage 4.5 – 5.0 V, ambient temp. 25 °C, 77 °F)

ATMOSPHEDI	OUTPUT	
ATMOSPHERIC PRESSURE		VOLTAGE
(mmHg)	kPa	(V)
760	100	Approx. 2.86
707	94	Approx. 2.70
634	85	Approx. 2.45
567	76	Approx. 2.21
526	70	Approx. 2.05



# "21" IAT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Output voltage is not within the following range.	IAT sensor circuit open or short.
0.19 V ≤ Sensor voltage < 4.93 V	IAT sensor malfunction.
	ECM malfunction.



#### **NOTICE**

When inspecting the ECM coupler, pressing the probe excessively can cause damage to the terminal.

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

# INSPECTION Step 1

- 1) Stop the engine.
- 2) Remove the seat and fuel tank rubber band. ( 5-2)
- Check the IAT sensor coupler for loose or poor contacts.If OK, then measure the IAT sensor voltage at the wire side coupler.
- 4) Disconnect the IAT sensor coupler.
- 5) Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)



- 6) Measure the voltage between Dg wire terminal (A) and ground.
- 7) If OK, then measure the voltage between Dg wire terminal (A) and B/Br wire terminal B.

IAT sensor input voltage: 4.5 – 5.5 V

(**⊕** Dg – **⊝** Ground)

(⊕ Dg – ⊝ B/Br)

09900-25008: Multi circuit tester set 36890-28H00: Battery lead wire (option)

Tester knob indication: Voltage (==)

Is the voltage OK?

YES	Go to Step 2.
NO	Loose or poor contacts on the ECM coupler (terminal ⑦ or ⑨).
	Open or short circuit in the B/Br wire or Dg wire.

#### Step 2

- 1) Stop the engine.
- 2) Disconnect the IAT sensor coupler.
- 3) Measure the IAT sensor resistance.

IAT sensor resistance: Approx. 2.58 k $\Omega$  at 20 °C (68 °F) (Terminal - Terminal)

09900-25008: Multi circuit tester set  $\square$  Tester knob indication: Resistance  $(\Omega)$ 

Is the resistance OK?

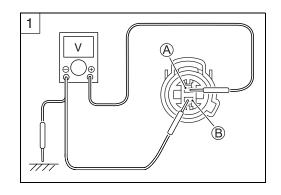
YES	<ul> <li>B/Br or Dg wire open or shorted to ground, or poor ⑦ or ⑨ connection.</li> <li>If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>Replace the ECM with a known good one, and inspect it again. ( 12-40)</li> </ul>
NO	Replace the IAT sensor with a new one.

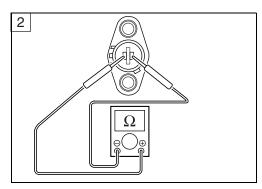
# DATA IAT sensor specification

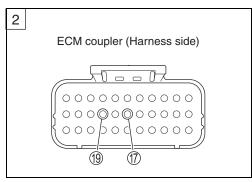
Intake Air Temp.	Resistance
20 °C (68 °F)	Approx. 2.58 kΩ
50 °C (122 °F)	Approx. 0.77 kΩ
80 °C (176 °F)	Approx. 0.28 kΩ

#### NOTE:

IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to 12-43 for details.

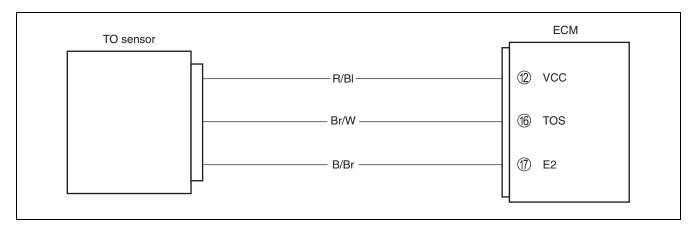






#### "23" TO SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
The sensor voltage should be the following.	TO sensor circuit open or short.
0.29 V ≤ Sensor voltage < 4.61 V	TO sensor malfunction.
	ECM malfunction.



#### **NOTICE**

When inspecting the ECM coupler, pressing the probe excessively can cause damage to the terminal.

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

# INSPECTION

# Step 1

- 1) Stop the engine.
- 2) Remove the fuel tank. ( 13-3)
- 3) Check the TO sensor coupler for loose or poor contacts. If OK, then measure the TO sensor resistance.



- 4) Remove the TO sensor.
- 5) Measure the resistance between terminal (A) and terminal (B).

TO sensor resistance: Approx. 19.4 k $\Omega$  at 20°C (68 °F)

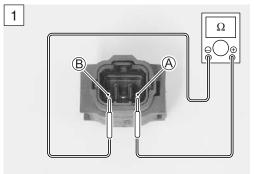
(Terminal (A) – Terminal (B)

09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

Is the resistance OK?

YES	Go to Step 2.
NO	Replace the TO sensor with a new one.



#### Step 2

- 1) Connect the TO sensor coupler.
- 2) Insert the needle-point probes to the lead wire coupler.
- 3) Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)
- 4) Measure the voltage at the wire side coupler between Br/W and B/Br wires.

TO sensor voltage (Normal): 0.4 – 1.4 V

(+ Br/W − ⊝ B/Br)

5) Also, measure the voltage when it is leaned 65° or more, left and right, from the horizontal level.

DATA TO sensor voltage (Leaning): 3.7 – 4.4 V

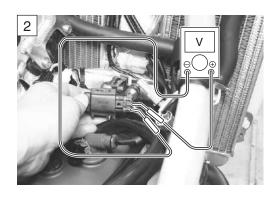
(⊕ Br/W – ⊝ B/Br)

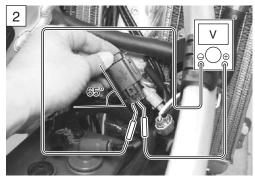
09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set 36890-28H00: Battery lead wire (option)

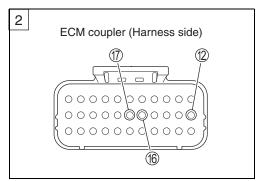
Tester knob indication: Voltage (==)

Is the voltage OK?

	R/Bl, Br/W or B/Br wire open or shorted to
	ground, or poor ②, ⑥ or ⑦ connection.
	If wire and connection are OK, intermittent trou-
YES	ble or faulty ECM.
1 5	Recheck each terminal and wire harness for
	open circuit and poor connection.
	Replace the ECM with a known good one, and
	inspect it again. ( 12-40)
	Loose or poor contacts on the ECM coupler.
NO	Open or short circuit.
	Replace the TO sensor with a new one.





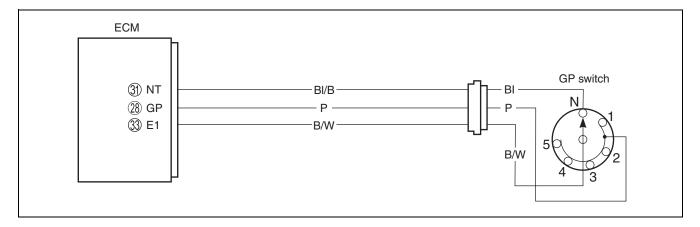


# "24" IGNITION SYSTEM MALFUNCTION

\* Refer to the IGNITION SYSTEM for details. (2715-11)

# "31" GP SWITCH CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Switch voltage is lower than the following value	GP switch circuit open or short.
continuously.	GP switch malfunction.
Switch voltage ≥ 0.88 V	ECM malfunction.



#### **NOTICE**

When inspecting the ECM coupler, pressing the probe excessively can cause damage to the terminal.

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

# INSPECTION

#### Step 1

- 1) Stop the engine.
- 2) Remove the fuel tank. ( 13-3)
- Check the GP switch lead wire coupler for loose or poor contacts
  - If OK, then measure the GP switch voltage.



- 4) Insert the needle-point probes to the lead wire coupler.
- 5) Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)
- 6) Measure the voltage at the wire side coupler between Pink wire and B/W wire, when shifting the gearshift lever from 1st to Top.

**DATA** GP switch voltage: 0.6 V or more

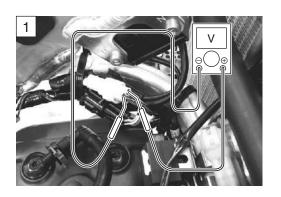
(⊕ Pink – ⊝ B/W)

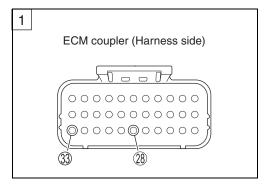
09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set 36890-28H00: Battery lead wire (option)

Tester knob indication: Voltage (---)

Is the voltage OK?

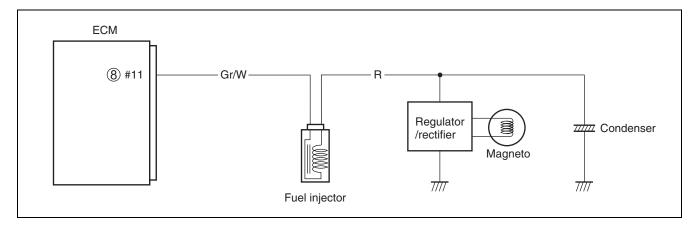
	Pink wire open or shorted to ground.
	• If wire and connection are OK, intermittent trou-
	ble or faulty ECM.
YES	Recheck each terminal and wire harness for
	open circuit and poor connection.
	Replace the ECM with a known good one, and
	inspect it again. ( 12-40)
	Pink or B/W wire open, or Pink wire shorted to
	ground.
NO	Loose or poor contacts on the ECM coupler
INO	(terminal <sup>28</sup> or <sup>33</sup> ).
	If wire and connection are OK, replace the GP
	switch with a new one.





#### "32" FUEL INJECTOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
CKP signal is produced but fuel injector signal is	Injector circuit open or short.
interrupted by 8 times or more continuously.	Injector malfunction.
	ECM malfunction.



# NOTICE

When inspecting the ECM coupler, pressing the probe excessively can cause damage to the terminal.

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

# INSPECTION Ctor 1

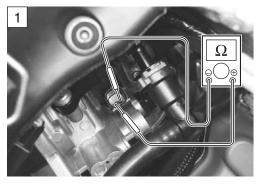
#### Step 1

- 1) Stop the engine.
- 2) Remove the fuel tank. ( 13-3)
- 3) Check the injector coupler for loose or poor contacts. If OK, then measure the injector resistance.



4) Disconnect the injector coupler and measure the resistance between terminals.

Injector resistance: 9.5 – 11.5  $\Omega$  at 20 °C (68 °F) (Terminal – Terminal)



5) If OK, then check the continuity between each terminal and ground.

**DATA** Injector resistance:  $\infty \Omega$  (Infinity)

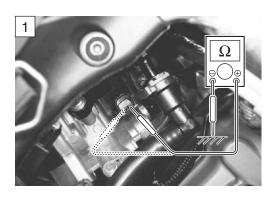
(Terminal – Ground)

09900-25008: Multi circuit tester set

Tester knob indication: Resistance ( $\Omega$ )

Are the resistance and continuity OK?

YES	Go to Step 2.
NO	Replace the injector with a new one. (13-18)



# Step 2

- 1) Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)
- 2) Insert the needle-point probe to the lead wire coupler.
- 3) Measure the injector voltage between Red wire terminal and

DATA Injector voltage: Battery voltage

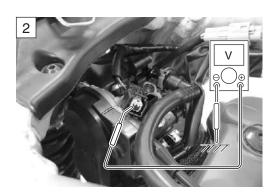
( $\oplus$  Red –  $\bigcirc$  Ground)

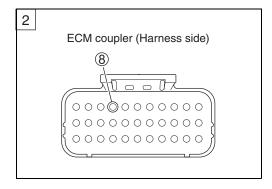
09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set 36890-28H00: Battery lead wire (option)

Tester knob indication: Voltage (==)

Is the voltage OK?

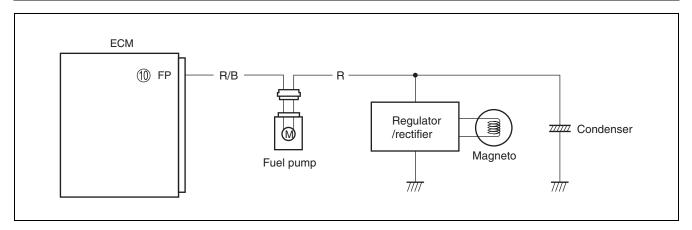
	Gr/W wire open or shorted to ground, or poor ®	
	connection.	
	If wire and connection are OK, intermittent trou-	
YES	ble or faulty ECM.	
163	Recheck each terminal and wire harness for	
	open circuit and poor connection.	
	Replace the ECM with a known good one, and	
	inspect it again. ( 12-40)	
NO	NO Open or short circuit in the Red wire.	





# "41" FP RELAY CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE	
The fuel pump continues working although the oper-	FP relay circuit open or short.	
ation of fuel pump is made to stop.	FP relay (ECM) malfunction.	



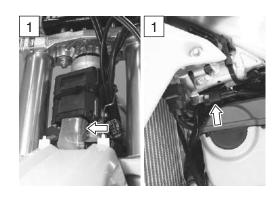
#### **NOTICE**

When inspecting the ECM coupler, pressing the probe excessively can cause damage to the terminal.

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

# INSPECTION Step 1

- 1) Stop the engine.
- 2) Remove the front number plate. ( 18-4)
- 3) Check the ECM coupler and fuel pump coupler for loose or poor contacts.
  - If OK, then measure the FP relay input voltage.
- 4) Disconnect the ECM coupler. ( 12-40)



- 5) Connect a 12 volt battery to the service coupler using the battery lead wire. ( 12-16)
- 6) Insert the needle-point probe to the ECM coupler.
- 7) Measure the voltage between terminal 100 and ground.

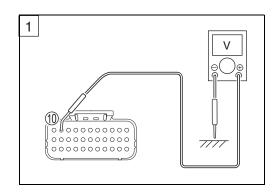
FP relay input voltage: Battery voltage

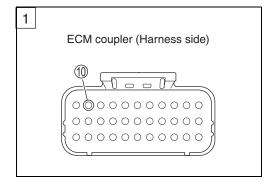
09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set 36890-28H00: Battery lead wire (option)

Tester knob indication: Voltage (==)

Is the voltage OK?

	ECM malfunction.
	Red or R/B wire open or shorted, or poor termi-
	nal (1) connection.
	• If wire and connection are OK, intermittent trou-
YES	ble or faulty ECM.
	Recheck each terminal and wire harness fro
	open circuit and poor connection.
	Replace the ECM with a known good one, and
	inspect it again. ( 12-40)
	Open or short circuit in the Red wire or R/B
NO	wire.
NO	If wire and connection are OK, replace the fuel
	pump with a new one.

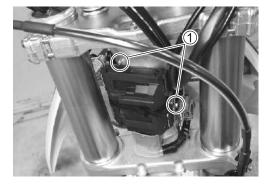




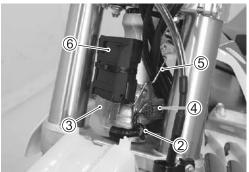
# **ECM AND SENSORS**

#### ECM REMOVAL AND INSTALLATION

- Remove the front number plate. ( 18-4)
- Remove the ECM bracket mounting bolts 1.



- Remove the clamp ②.
- Disconnect the ECM coupler 3.
- Remove the coupler ④ from the ECM bracket ⑤.
- Remove the ECM bracket 5 together with the ECM 6.



#### **NOTICE**

Removing the ECM 6 from the ECM bracket 5 can cause damage to the mounting part of rubber holder 7.

Do not remove the ECM (6) from the ECM bracket (5) unless necessary.

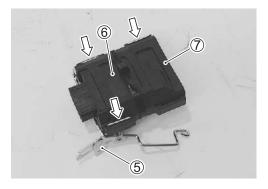


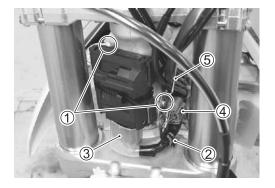
Take care the following items when removing the ECM <sup>©</sup> from the ECM bracket <sup>©</sup>.

- \* Rubber holder 7 damage
- \* ECM bracket 5 bent
- Install the coupler 4 to the ECM bracket 5.
- Connect the ECM coupler ③.
- Bind the ECM bracket and wiring harness with the clamp ②. ( 20-20)
- Pass the cables and lead wires into the cable guide of ECM bracket ⑤. ( 20-22)
- Tighten the ECM mounting bolts ① to the specified torque.



• Install the front number plate.





#### CKP SENSOR INSPECTION

The CKP sensor 1) is installed at the inside of the magneto cover. ( 12-21)

# **CKP SENSOR** REMOVAL AND INSTALLATION

- Remove the magneto cover. ( 15-17)
- Remove the CKP sensor. ( 15-19)
- Install the CKP sensor in the reverse order of removal.



#### IAP SENSOR INSPECTION

The IAP sensor is installed on the throttle body. (12-27)

# IAP SENSOR REMOVAL AND INSTALLATION

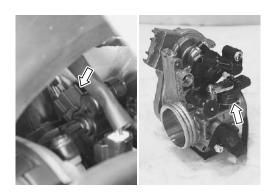
- Remove the fuel tank. ( 13-3)
- Remove the IAP sensor from the throttle body. ( 13-12)
- Install the IAP sensor in the reverse order of removal.



The TP sensor is installed at the left side of the throttle body. (23)

# TP SENSOR REMOVAL AND INSTALLATION

- Remove the engine mounting upper bracket (LH) and fuel tank. (13-3, -11)
- Remove the TP sensor. ( 13-11)
- Install the TP sensor in the reverse order of removal.
- Adjust the TP sensor. ( 12-42)





#### TP SENSOR ADJUSTMENT

- 1. Remove the engine mounting upper bracket (LH). (13-11)
- 2. Remove the fuel tank. ( 13-3)
- 3. Connect a 12 volt battery using the battery lead wire to service coupler. ( 12-16)

#### 36890-28H00: Battery lead wire (option)

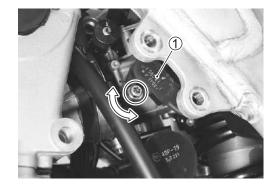
- 4. Loosen the screw and turn the TP sensor ①.
- 5. Insert the needle-point probes to the lead wire coupler.
- 6. Adjust the TP sensor ① until the output voltage comes within the specified value.
- 7. Then, tighten the screw to fix the TP sensor.

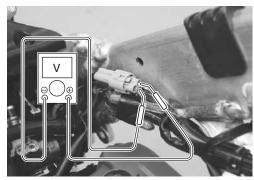
TP sensor output voltage: 0.60 – 0.64 V (+ Y – - B/Br)

09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set

TP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)

8. Check the engine starting operation and engine idle speed. (2-2-24)





#### **ECT SENSOR INSPECTION**

The ECT sensor is installed on the cylinder head.



- Remove the ECT sensor. ( 12-44)
- Check the ECT sensor by testing it at the bench as shown in the figure. Connect the ECT sensor 1 to a circuit tester and place it in the water 2 contained in a pan, which is placed on a heater 3.
- Heat the water to raise its temperature slowly and read the thermometer 4 and the ohmmeter.

#### NOTE:

To measure the temperature accurately, care should be taken not to allow the ECT sensor or the thermometer to contact the pan.

• If the ECT sensor resistance value does not change in the proportion indicated, replace it with a new one.

# **DATA** ECT sensor specification

Engine Coolant Temp.	Resistance
20 °C (68 °F)	Approx. 2.58 kΩ
50 °C (122 °F)	Approx. 0.77 kΩ
80 °C (176 °F)	Approx. 0.28 kΩ

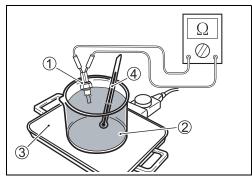
09900-25008: Multi circuit tester set

Tester knob indication: Resistance  $(\Omega)$ 

#### **NOTICE**

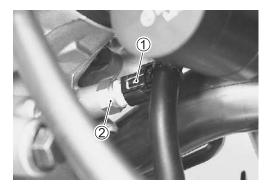
Since the ECT sensor is shock sensitive, improper handling can cause damage to the ECT sensor.

Care must be used in handling the ECT sensor.



# **ECT SENSOR REMOVAL AND INSTALLATION**

- Drain engine coolant. ( 14-3)
- Disconnect the ECT sensor coupler ①.
- Remove the ECT sensor 2.



Apply engine coolant to the O-ring.

#### NOTE:

Replace the O-ring with a new one.

• Tighten the ECT sensor to the specified torque.

# ECT sensor: 12 N⋅m (1.2 kgf-m, 8.5 lbf-ft)

- Connect the ECT sensor coupler.
- Pour engine coolant. ( 14-3)



#### IAT SENSOR INSPECTION

The IAT sensor is installed on the air cleaner outlet tube. (2-30)

# IAT SENSOR REMOVAL AND INSTALLATION

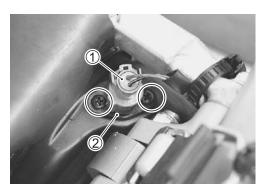
- Remove the seat and fuel tank rubber hand. ( 5-2)
- Disconnect the IAT sensor coupler ①.
- Remove the IAT sensor ② from the air cleaner outlet tube.
- Install the IAT sensor in the reverse order of removal.

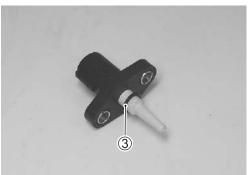
#### NOTE:

Replace the O-ring 3 with a new one.

IAT sensor mounting screw:

1.3 N·m (0.13 kgf-m, 0.95 lbf-ft)





# TO SENSOR INSPECTION

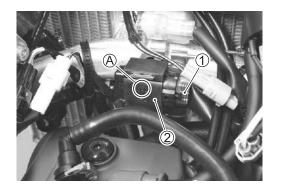
The TO sensor is installed on the frame bridge. (12-32)

# TO SENSOR REMOVAL AND INSTALLATION

- Remove the fuel tank. ( 13-3)
- Disconnect the TO sensor coupler ①.
- Remove the TO sensor 2.
- Install the TO sensor in the reverse order of removal.

#### NOTE:

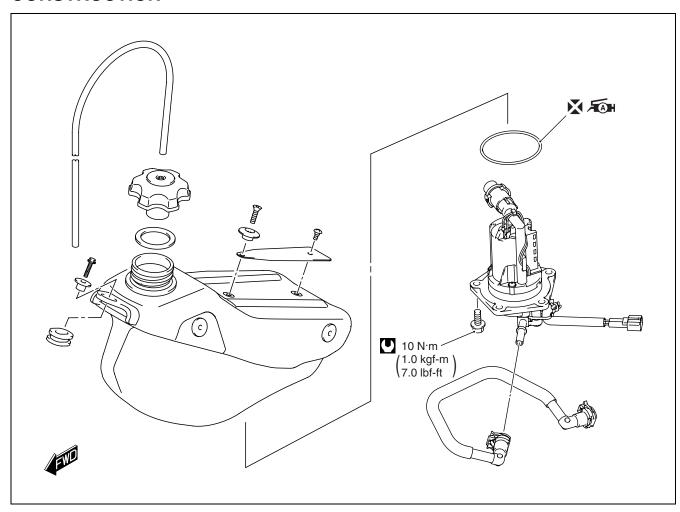
When installing the TO sensor 2, the arrow mark A must be pointed upward.



# FUEL SYSTEM AND THROTTLE BODY

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# **FUEL SYSTEM CONSTRUCTION**



# **FUEL HOSE DISCONNECTING**

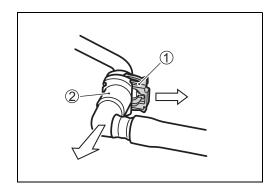
# **WARNING**

Gasoline is a flammable material that can cause fire hazard or burns.

When handling gasoline, make sure to stop the engine and keep away from fire or spark.

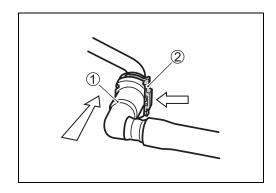
The work should be carried out in a well ventilated area.

- Clean the retainer ① and fuel hose connector ②.
- Unlock the fuel hose connector ② by pulling the retainer ①.
- Disconnect the fuel hose connector ② from fuel pipe.



# **FUEL HOSE CONNECTING**

- Insert the fuel hose connector ① to fuel pipe securely.
- Lock the fuel hose connector ① by pushing the retainer ②.
- Confirm that fuel hose connector is not disconnected by hand.



# FUEL TANK AND FUEL PUMP REMOVAL

# **WARNING**

Gasoline is a flammable material that can cause fire hazard or burns.

When handling gasoline, make sure to stop the engine and keep away from fire or spark.

The work should be carried out in a well ventilated area.

- · Drain out the gasoline.
- Remove the seat. ( 5-2)
- Remove the radiator covers, left and right. ( 5-2)
- Remove the fuel tank bolt and rubber band.
- Disconnect the fuel pump coupler ①.
- Lift and hold the fuel tank.
- Place a rag under the fuel hose 2.
- Clean the fuel hose connector (A) and disconnect it. ( 3-2)

#### NOTE:

When removing the fuel tank, do not leave the fuel hose on the fuel tank side.





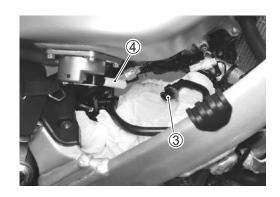


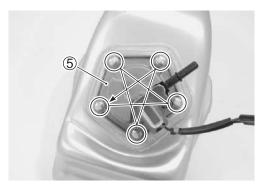
• Put the cleaned plug 3 and cap 4 to the fuel hose and fuel pump.

# NOTICE

Dirt and dust in the fuel supply line can damage the motorcycle.

- \* Put the plug ③ and cap ④ to the fuel hose and fuel pump when the fuel hose connector is disconnected.
- \* Be sure to keep the parts clean when disconnecting and connecting the connector.
- Remove the fuel tank assembly.
- Remove the fuel pump assembly ⑤ by removing its mounting bolts diagonally.

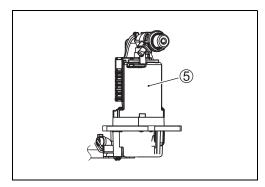




#### **NOTICE**

Disassembling the fuel pump assembly 5 can lead to troubles.

Do not disassemble the fuel pump fuel pump assem-



# **FUEL TANK AND FUEL PUMP INSTALLATION**

Install the fuel pump and fuel tank in the reverse order of removal. Pay attention to the following points:

• Install a new O-ring and apply grease to it.

NOTE:

Replace the O-ring with a new one.

**1** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent



• When installing the fuel pump assembly, first tighten all the fuel pump mounting bolts lightly and then to the specified torque.

Fuel pump mounting bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



• Connect the fuel hose to the fuel pump securely. ( 13-3)



# **FUEL PRESSURE INSPECTION**

#### **WARNING**

Gasoline is a flammable material that can cause fire hazard or burns.

When handling gasoline, make sure to stop the engine and keep away from fire or spark.

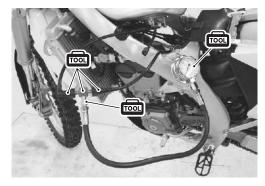
- Remove the seat and radiator covers. ( 5-2)
- Remove the fuel tank bolt and rubber band. ( 5-2)
- Disconnect the fuel pump coupler 1.
- Lift and hold the fuel tank.
- Place a rag under the fuel hose 2.
- Clean the fuel hose connectors and remove the fuel hose ②. ( 3-2)
- Install the special tools between the fuel pump and fuel joint.

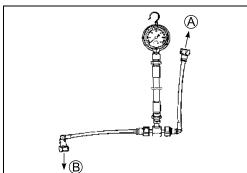
**1001** 09915-74521: Adapter hose

09915-77331: Oil pressure gauge (1000 kPa) 09940-40211: Fuel pressure gauge adapter 09940-40220: Fuel pressure gauge attachment









- A To fuel pump
- B To fuel joint

• Connect the proper lead wires into the fuel pump coupler (fuel pump side) and apply 12 volts to the fuel pump (between terminal (A) and terminal (B) and check the fuel pressure.

Battery + terminal — terminal A (Red wire)

Battery — terminal — terminal B (Black wire)

### Fuel pressure: Approx. 294 kPa (2.94 kgf/cm², 41.81 psi)

If the fuel pressure is lower than the specification, inspect the following items:

- \* Fuel hose leakage
- \* Clogged fuel filter
- \* Pressure regulator
- \* Fuel pump

If the fuel pressure is higher than the specification, inspect the following items:

- \* Fuel pump
- \* Pressure regulator

#### NOTE:

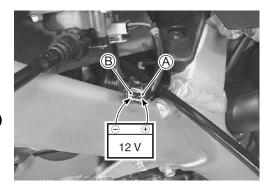
- \* Before removing the special tool, disconnect the battery.
- \* Check that the fuel pressure is relieved before detaching the special tool.

#### **FUEL PUMP INSPECTION**

Connect the proper lead wires into the fuel pump coupler (fuel pump side) and apply 12 volts to the fuel pump (Fabove) and check that the fuel pump operates.

If the fuel pump motor does not make operating sound, replace the fuel pump with a new one.

If the fuel pump is OK, the cause may lie in the TO sensor or TO sensor circuit. ( 12-32)



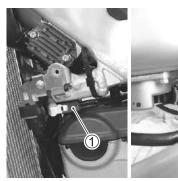
### FUEL DISCHARGE AMOUNT INSPECTION

#### **WARNING**

Gasoline is a flammable material that can cause fire hazard or burns.

When handling gasoline, make sure to stop the engine and keep away from fire or spark.

- Remove the seat and radiator covers. ( 5-2)
- Remove the fuel tank bolt and rubber band. (5-2)
- Disconnect the fuel pump coupler 1.
- · Lift and hold the fuel tank.
- Place a rag under the fuel hose 2.
- Clean the fuel hose connector and disconnect it. ( 13-2)
- Connect a proper fuel hose 3 to the fuel pump.







 Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.



• Connect the proper lead wires into the fuel pump coupler (fuel pump side) and apply 12 volts to the fuel pump (between terminal (A) and terminal (B) for 10 seconds and measure the amount of fuel discharged.

Battery ① terminal — terminal ② (Red wire)
Battery ② terminal — terminal ③ (Black wire)

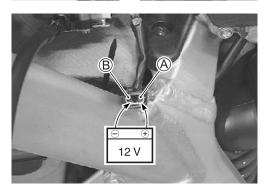
If the pump does not discharge the amount specified, it means that the fuel pump is defective or that the fuel filter is clogged. Replace the fuel pump assembly.

#### **DATA** Fuel discharge amount:

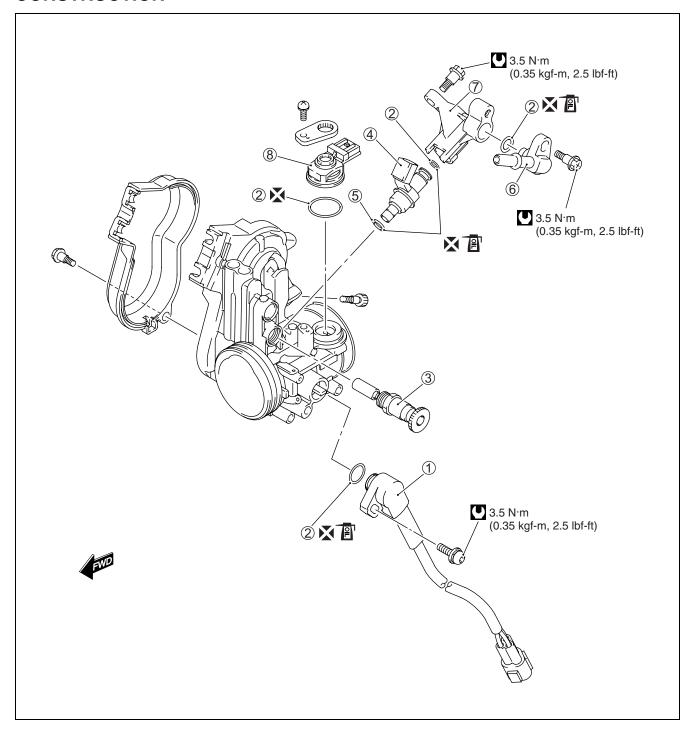
89 ml (3.0/3.1 US/Imp oz) or more/10 sec.

#### NOTE:

The battery must be in fully charged condition.



# **THROTTLE BODY** CONSTRUCTION



1	TP sensor	<b>⑤</b>	Cushion seal
2	O-ring	6	Fuel joint
3	Starter knob/idle screw	7	Fuel pipe
4	Fuel injector	8	IAP sensor

# **REMOVAL**

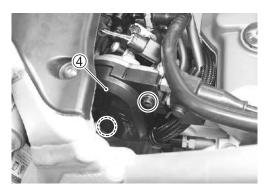
- Remove the seat and radiator covers. ( 5-2)
- Remove the fuel tank. ( 13-3)
- Disconnect the TP sensor coupler ① and fuel injector coupler



• Disconnect the IAP sensor coupler ③.



• Remove the throttle cable cover 4.



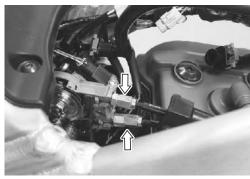
• Disconnect the throttle cables from the pulley.

#### **NOTICE**

With the throttle cable disconnected, if the throttle valve is snapped back from the wide open to the fully closed position, the throttle valve and the throttle body can suffer damage.

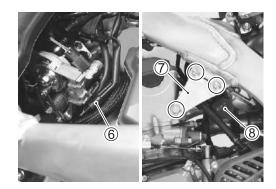
Care should be used in handling the throttle body.

• Disconnect the fuel hose ⑤. ( 13-2)





- Disconnect the condenser coupler 6.
- Remove the engine mounting upper bracket (LH) ⑦ and condenser ⑧.



 Loosen the clamp screws and remove the throttle body assembly.

#### NOTE:

Do not put force on the throttle position sensor when removing the throttle body assembly, or the throttle sensor position will be moved.



# **DISASSEMBLY**

• Remove the starter knob/idle screw ①.

#### NOTE:

Do not turn the starter knob/idle screw unless it is necessary.



• Remove the TP sensor 2.

#### NOTE:

Prior to disassembly, mark the sensor original position with a paint or scribe for accurate reinstallation.



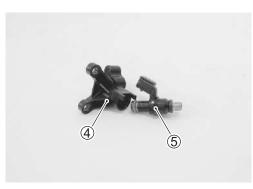
• Remove the fuel joint ③.



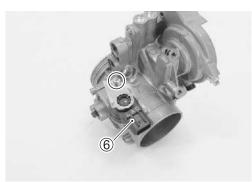
• Remove the fuel pipe 4 along with fuel injector 5.



• Remove the fuel injector ⑤ from the fuel pipe ④.



• Remove the IAP sensor 6.



• Remove the condenser bracket 7.

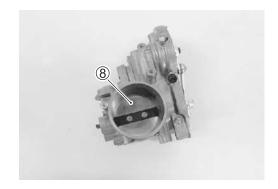


#### **NOTICE**

Removing or adjusting the throttle body components unnecessarily can lead to troubles.

To avoid trouble to the throttle body, be sure to take the following precautions:

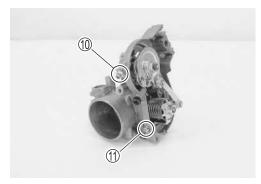
- \* Never remove the throttle valve 8.
- \* Never remove the throttle valve linkage 9.





#### NOTE:

These adjusting screws (1), 1) are factory adjusted at the time of delivery and therefore avoid removing or turning them unless otherwise necessary.



#### **CLEANING**

#### **WARNING**

Some carburetor cleaning chemicals, especially dip-type soaking solutions, are very corrosive and must be handled carefully.

Always follow the chemical manufacturer's instructions on proper use, handling and storage.

· Clean all passageways with a spray-type carburetor cleaner and blow dry with compressed air.

#### **NOTICE**

- \* Do not use wire to clean passages. Wire may damage them.
- \* Never spray cleaning fluid (petroleum solvent) directly on throttle valve. Cleaning fluid, if splayed, may attack the sensors.
- \* If the throttle valve is molybdenum-coated, avoid applying cleaning fluid to the coated surfaces. Cleaning fluid loosens the coating, so the air-tightness of the throttle valve would be impaired.
- \* When the throttle body is contaminated with carbon deposits, varnish and/or gum, dip-type cleaning chemicals may be used for cleaning. When using such type of cleaning chemicals, closely follow the manufacturer's instructions. Otherwise the throttle body could be damaged.
- \* Do not apply any cleaning fluid to parts made of rubber and plastic materials. Cleaning fluids may damage these parts.

#### INSPECTION

Check following items for any damage or clogging.

- \* O-ring
- \* Throttle valve
- \* Fuel pipe
- \* Fuel joint
- \* Cushion seal
- \* Fuel injector

#### REASSEMBLY

Reassemble the throttle body in the reverse order of disassembly. Pay attention to the following points:

• Tighten the new condenser bracket bolts to the specified torque.

#### NOTE:

Replace the condenser bracket bolts with new ones.

Condenser bracket bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



• Install a new O-ring ①.

#### NOTE:

Replace the O-ring 1 with a new one.

• Install the IAP sensor as shown.



 Apply thin coat of engine oil to new O-ring ② and new cushion seal ③.

#### NOTE:

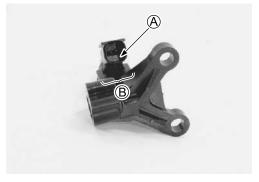
Replace the O-ring 2 and cushion seal 3 with new ones.



• Install the fuel injector by pushing it straight to fuel pipe.

#### NOTE:

- \* Never turn the injector while pushing it.
- \* Align the coupler (A) of the injector with groove (B) of the fuel pipe.



• Install the fuel injector by pushing it straight to the throttle body.

#### NOTE:

Never turn the injector while pushing it.

• Tighten the fuel pipe mounting screws to the specified torque.

Fuel pipe mounting screw: 3.5 N⋅m (0.35 kgf-m, 2.5 lbf-ft)

- Apply thin coat of the engine oil to the new O-ring.
- Install the fuel joint 4 to the fuel pipe 5.

#### NOTE:

- \* Replace the O-ring with a new one.
- \* Never turn the fuel joint while pushing it.
- Tighten the fuel joint mounting screws to the specified torque.
- Fuel joint mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)
- Apply thin coat of the engine oil to the O-ring.
- Align the throttle shaft end © with the groove D of TP sensor.
- Apply grease to the throttle shaft end © if necessary.
- With the throttle valve fully closed, install the TP sensor and tighten the TP sensor mounting screw to the specified torque.

### ÆAH 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent

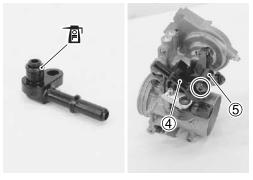
TP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)

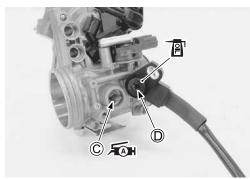
#### NOTE:

Make sure the throttle valve open or close smoothly.

- Install the starter knob/idle screw 6.
- Adjust the TP sensor ( 12-42)









# **INSTALLATION**

Install the throttle body assembly in the reverse order of removal. Pay attention to the following points:

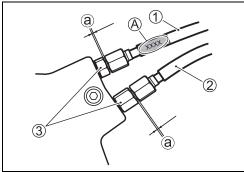
- Fit the projection on the throttle body in the depression of the intake pipe.
- Position the clamps correctly. ( 20-23)



- Connect the throttle pulling cable ① and throttle returning cable ② to the pulley.
- Turn in each throttle cable adjuster fully and locate each outer cable so that the clearance is 0 − 1.5 mm (0 − 0.06 in) (a).
- Tighten each lock-nut 3 to the specified torque.

Cable adjuster lock-nut: 4.5 N·m (0.45 kgf-m, 3.25 lb-ft)

A Marking



- Adjust the throttle cable play. ( 2-22)
- Install the engine mounting upper bracket (LH). (\$\sumsymbol{LH}\$).

#### **INSPECTION AFTER INSTALLATION**

- Wiring harness, cable and hose routing (220-20 to -23)
- Fuel leakage
- Throttle cable play (\$\sum\_2\$-22)
- Engine idle speed ( 2-24)
- TP sensor setting condition ( 12-42)

#### **FUEL INJECTOR REMOVAL**

- Remove the throttle body assembly. ( 13-10)
- Remove the fuel injector. ( 13-12)

# **FUEL INJECTOR INSPECTION**

Check fuel injector filter for evidence of dirt and contamination. If present, clean and check for presence of dirt in the fuel lines and fuel tank.

#### NOTE:

The fuel injector can be checked without removing it from the throttle body. ( 12-36)



### **FUEL INJECTOR INSTALLATION**

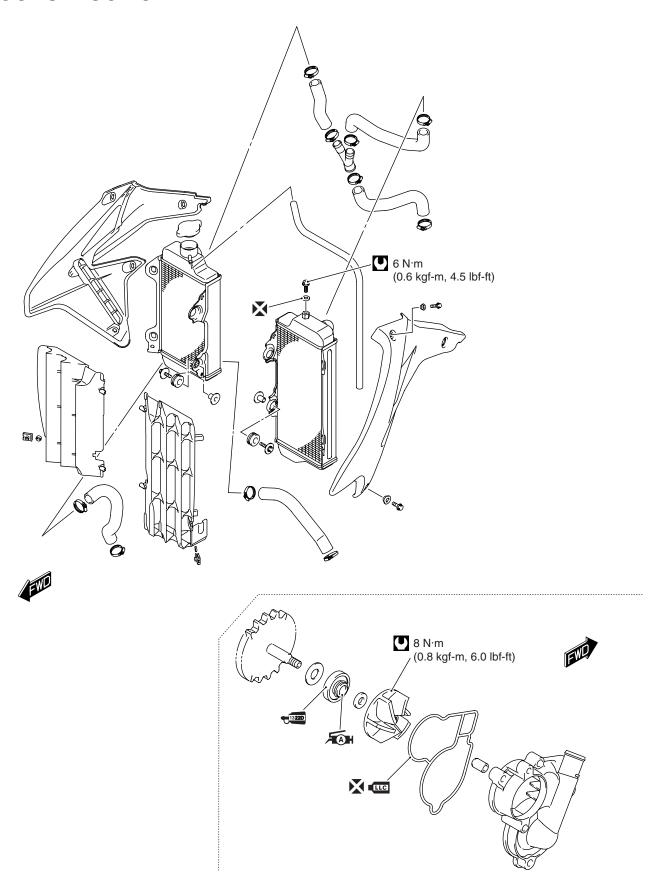
- · Apply thin coat of the engine oil to new cushion seal and new O-ring. ( 13-15)
- Install the injector by pushing it straight. Never turn the injector while pushing it. ( 13-15, -16)
- Install the throttle body assembly. ( 13-17)

# **COOLING SYSTEM**

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INSTALLATION	14- 9

# **CONSTRUCTION**



# **ENGINE COOLANT** REPLACEMENT

#### **WARNING**

Engine coolant is harmful if swallowed or if it comes in contact with your skin or eyes.

Keep engine coolant away from children and pets. Call your doctor immediately if engine coolant is swallowed and induce vomiting. Flush eyes or skin with water if engine coolant gets in eyes or comes in contact with skin.



#### **WARNING**

You can be injured by scalding fluid or stream if you open the radiator cap when the engine is hot.

Do not open the radiator cap when the engine is hot.

Wait until engine cools.

- · Open the radiator cap.
- Remove the drain bolt ① and drain engine coolant.
- Fit a new gasket washer and tighten the drain bolt 1 to the specified torque.

#### NOTE:

Replace the gasket washer with a new one.

Engine coolant drain bolt: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

- Remove the air bleeder bolt 2.
- Pour specified engine coolant up to the bottom of filler hole. ( 2-19)

Engine coolant capacity: 1 150 ml (1.2/1.0 US/Imp qt)





- Tighten the air bleeder bolt ② to the specified torque.
- Radiator air bleeder bolt: 6 N⋅m (0.6 kgf-m, 4.5 lbf-ft)
- Add specified engine coolant up to the radiator inlet.
- Tighten the radiator cap securely.
- · After warming up and cooling down the engine, check the engine coolant level.



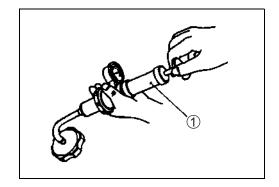
# COOLING CIRCUIT INSPECTION

• Remove the radiator cap.

#### **WARNING**

Engine coolant is harmful if swallowed or if it comes in contact with your skin or eyes.

Keep engine coolant away from children and pets. Call your doctor immediately if engine coolant is swallowed and induce vomiting. Flush eyes or skin with water if engine coolant gets in eyes or comes in contact with skin.



#### **WARNING**

You can be injured by scalding fluid or stream if you open the radiator cap when the engine is hot.

Do not open the radiator cap when the engine is hot.

Wait until engine cools.

- Connect the tester 1 to the filler.
- Give a pressure of about 120 kPa (1.2 kgf/cm², 17.0 psi) and see if the system holds this pressure for 10 seconds.
- If the pressure would fall during this 10-second interval, it
  means that there is a leaking point in the system. In such a
  case, inspect the entire system and replace the leaking component or part.

#### **A** WARNING

When removing the radiator cap tester, put a rag on the filler to prevent spouting of engine coolant.

#### **NOTICE**

Raising the pressure too much can cause the radiator to suffer damage.

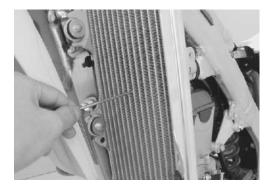
In inspecting the radiator, do not exceed the radiator cap pressure.

## **RADIATOR**

#### INSPECTION

#### **RADIATOR**

- Visually inspect the radiators and hose for damage.
- Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.



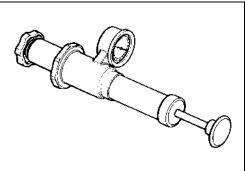
#### **RADIATOR CAP**

- Fit the cap to the radiator cap tester.
- Build up pressure slowly by operating the tester. Make sure that the pressure build-up stops at 95 – 125 kPa (0.95 – 1.25 kgf/cm<sup>2</sup>, 14 - 18 psi) and that, with the tester held standstill, the cap is capable of holding that pressure for at least 10 sec-
- Replace the cap if it is found not to satisfy either of these two requirements.



Standard: 95 - 125 kPa

(0.95 - 1.25 kgf/cm<sup>2</sup>, 14 - 18 psi)



#### REMOVAL

#### **WARNING**

Engine coolant is harmful if swallowed or if it comes in contact with your skin or eyes.

Keep engine coolant away from children and pets. Call your doctor immediately if engine coolant is swallowed and induce vomiting. Flush eyes or skin with water if engine coolant gets in eyes or comes in contact with skin.

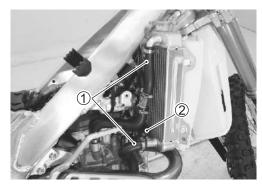
#### **WARNING**

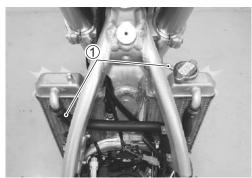
You can be injured by scalding fluid or stream if you open the radiator cap when the engine is hot.

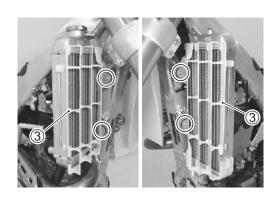
Do not open the radiator cap when the engine is hot.

Wait until engine cools.

- Remove the seat, radiator covers and fuel tank. ( 5-2)
- Drain engine coolant. ( 14-3)
- Disconnect the radiator hoses (1) and remove the radiator hose 2.
- Remove the radiator louvers 3, left and right.
- · Remove the radiators, left and right.







#### INSTALLATION

Install the radiator in the reverse order of removal.

- Connect the radiator hoses securely. (20-24)
- Inspect the engine coolant level and leakage. ( 2-19, -20)

# **WATER PUMP REMOVAL**

#### **WARNING**

Engine coolant is harmful if swallowed or if it comes in contact with your skin or eyes.

Keep engine coolant away from children and pets. Call your doctor immediately if engine coolant is swallowed and induce vomiting. Flush eyes or skin with water if engine coolant gets in eyes or comes in contact with skin.

#### **WARNING**

You can be injured by scalding fluid or stream if you open the radiator cap when the engine is hot.

Do not open the radiator cap when the engine is hot.

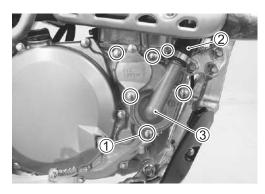
Wait until engine cools.

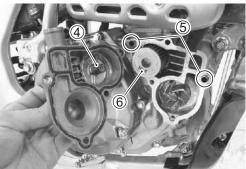
#### **WATER PUMP CASE**

- Drain engine oil. ( 2-14)
- Drain engine coolant by removing the drain bolt ①.
- Disconnect the radiator hose 2.
- Remove the water pump case 3.



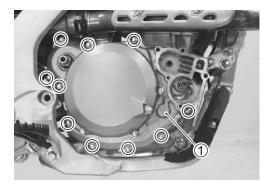
• Remove the dowel pins (5) and oil filter (6).





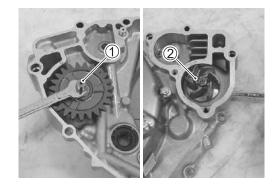
#### **CRANKCASE COVER**

- Remove the brake pedal. ( 17-18)
- Remove the kick starter lever. ( 8-3)
- Remove the right crankcase cover ①, dowel pins, gasket and O-ring.

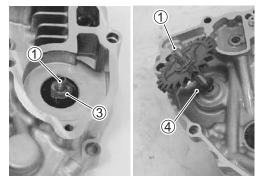


#### **IMPELLER AND WATER PUMP SHAFT**

• Hold the water pump shaft ① with a wrench and remove the impeller 2.



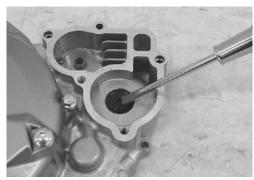
• Remove the washers (3, 4) and water pump shaft 1.



• Remove the oil seal.

#### NOTE:

- \* Do not reuse the removed oil seal.
- \* If there is no abnormal condition, the oil seal removal is not necessary.



#### INSPECTION

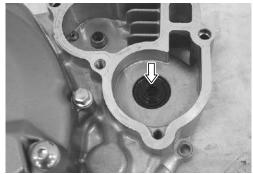
#### **IMPELLER AND WATER PUMP SHAFT**

- Inspect the impeller and water pump shaft for damage.
- If necessary, replace the defective part with a new one.



#### **OIL SEAL**

- Visually inspect the oil seal for damage.
- If any defects are found, replace the oil seal with a new one.



#### **INSTALLATION**

Install the water pump in the reverse order of removal. Pay attention to the following points:

#### **OIL SEAL**

• Apply thread lock to the outer surface of the oil seal.



or equivalent

• Press the new oil seal with the suitable size socket wrench.

#### NOTE:

Replace the oil seal with a new one.





• Check engine oil flow before installing the water pump shaft.

#### **NOTICE**

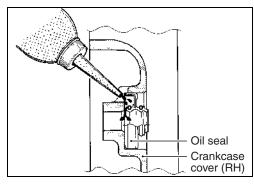
Installing the oil seal improperly can cause damage to the engine.

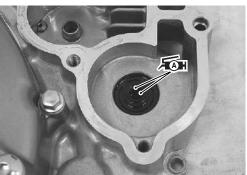
Make sure that engine oil flows to the bearing part of oil seal as shown in the illustration.

If the oil does not flow, replace the oil seal with a new one again.

Apply grease to the oil seal lips.



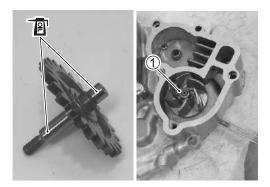




#### **IMPELLER AND WATER PUMP SHAFT**

- Apply engine oil to the water pump shaft.
- Hold the water pump shaft with a wrench and tighten the impeller 1 to the specified torque.

Impeller: 8 N⋅m (0.8 kgf-m, 6.0 lbf-ft)

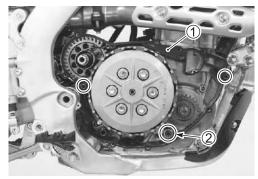


#### **CRANKCASE COVER**

• Install the dowel pins, new gasket ① and new O-ring ②.

#### NOTE:

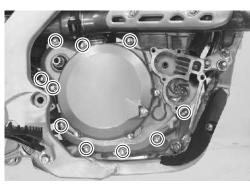
Replace the new gasket 1 and new O-ring 2 with new ones.



- Fit the right crankcase cover.
- Tighten the crankcase cover bolts to the specified torque.

#### Right crankcase cover bolt: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

- Install the brake pedal. ( 17-18)
- Install the kick starter lever. ( 8-7)

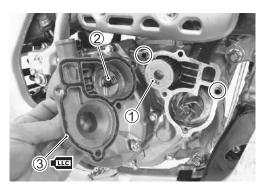


#### **WATER PUMP CASE**

- Install the dowel pins and oil filter 1.
- Install the spring ② and new gasket ③.
- Apply engine coolant to the gasket ③.

#### NOTE:

Replace the gasket 3 with a new one.



- Fit the water pump case.
- Fit the new gasket washers to the water pump case bolts A.

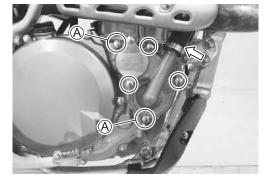
#### NOTE:

Replace the gasket washers with new ones.

• Tighten the water pump case bolts to the specified torque.

# Water pump case bolt: 11 N⋅m (1.1 kgf-m, 8.0 lbf-ft)

• Connect the radiator hose and pour engine coolant. ( 14-3, 20-24)



#### **INSPECTION AFTER INSTALLATION**

- Engine oil level and leakage (2-2-13)
- Engine coolant level and leakage (2-19, -20)

# **ELECTRICAL SYSTEM**

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## 15

# **CAUTIONS IN SERVICING**

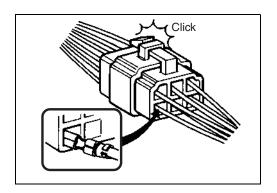
#### CONNECTOR

- When connecting a connector, be sure to push it in until a click is felt.
- Inspect the connector for corrosion, contamination and breakage in its cover.
- Avoid applying grease or other similar material to connector/ coupler terminals to prevent electric trouble.

# Click

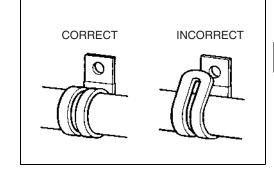
#### COUPLER

- With a lock type coupler, be sure to release the lock when disconnecting, and push in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler itself and do not pull the lead wires.
- Inspect each terminal on the coupler for being loose or bent.
- Push in the coupler straightly. An angled or skewed insertion may cause the terminal to be deformed, possibly resulting in poor electrical contact.
- Inspect each terminal for corrosion and contamination.
- Before refitting the sealed coupler, make sure its seal rubber is positioned properly. the seal rubber may possibly come off the position during disconnecting work and if the coupler is refitted with the seal rubber improperly positioned, it may result in poor water sealing.



#### **CLAMP**

- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute for the band type clamp.

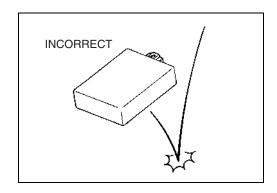


#### **SWITCH**

Never apply grease material to switch contact points to prevent damage.

#### **SEMI-CONDUCTOR EQUIPPED PART**

- Be careful not to drop the part with a semi-conductor built in such as a ECM.
- When inspecting this part, follow inspection instruction strictly.
   Neglecting proper procedure may cause damage to this part.



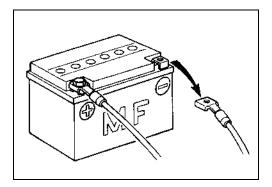
#### **CONNECTING THE BATTERY**

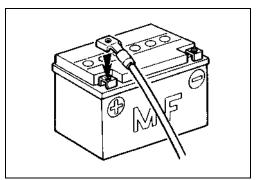
#### WHEN USING THE BATTERY LEAD WIRE

(Optional part: 36890-28H00)

- When disconnecting terminals from the battery for servicing, be sure to disconnect the 

   battery lead wire, first.
- When connecting the battery lead wires, be sure to connect the  $\oplus$  battery lead wire, first.





#### WIRING PROCEDURE

Properly route the wire harness according to the "WIRING HARNESS ROUTING" section. (20-20, -21)

#### **USING THE MULTI CIRCUIT TESTER**

- Properly use the multi circuit tester ⊕ and ⊖ probes. Improper use can cause damage to the motorcycle and tester.
- If the voltage and current values are not known, begin measuring in the highest range.
- When measuring the resistance, make sure that no voltage is applied. If voltage is applied, the tester will be damaged.
- After using the tester, be sure to turn the switch to the OFF.



09900-25008: Multi circuit tester set

#### **NOTICE**

Using the tester in a wrong manner can cause damage to the tester.

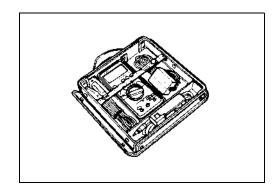
Before using the multi circuit tester, read its instruction manual.

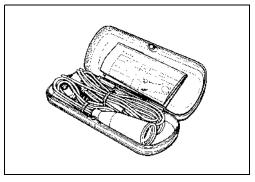
#### NOTE:

- \* When connecting the multi circuit tester, use the needle-point probe to the back side of the lead wire coupler and connect the probes of tester to them.
- \* Use the needle-point probe to prevent the rubber of the water proof coupler from damage.

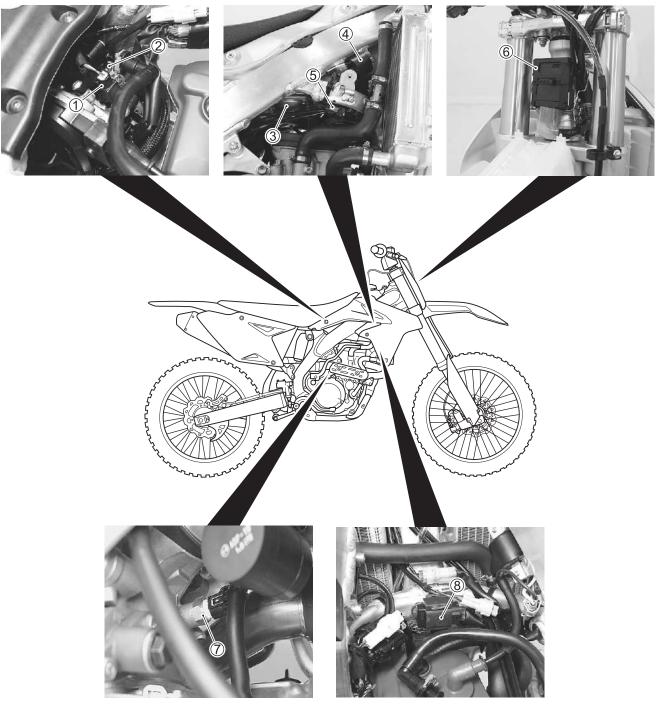


09900-25009: Needle-point probe set



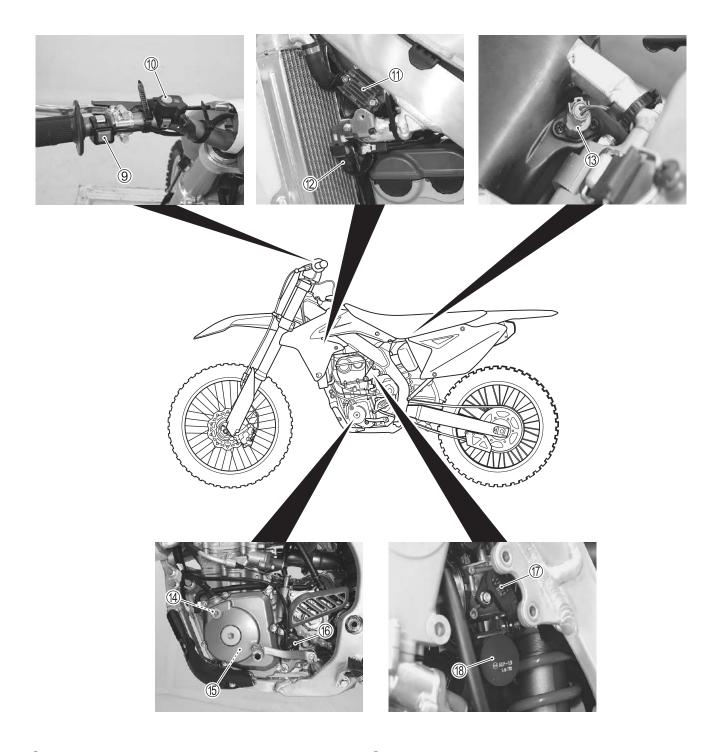


# **LOCATION OF ELECTRICAL COMPONENTS**



- ① Fuel injector (CF12-36)
- ② IAP sensor ( 12-27)
- ③ Fuel pump ( 13-7)
- 4 Ignition coil (15-13)

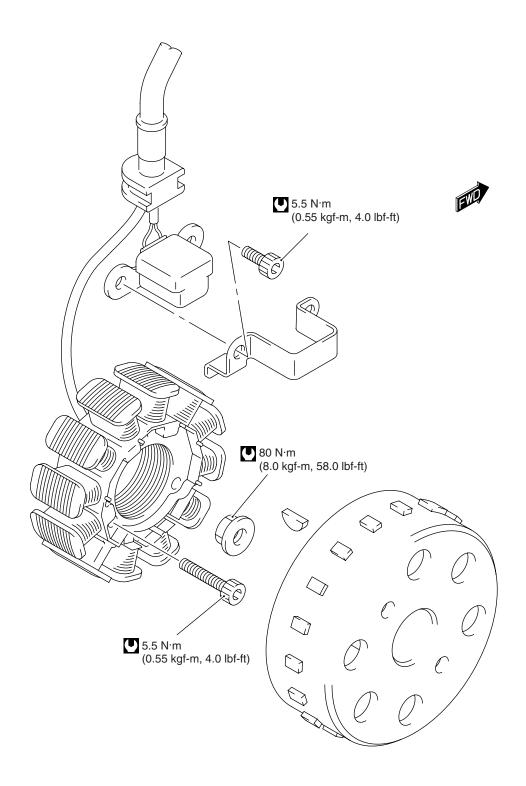
- ⑤ Service coupler (CF12-16)
- 6 ECM
- ⑦ ECT sensor (ご 12-25)
- ® TO sensor (☐ 12-32)



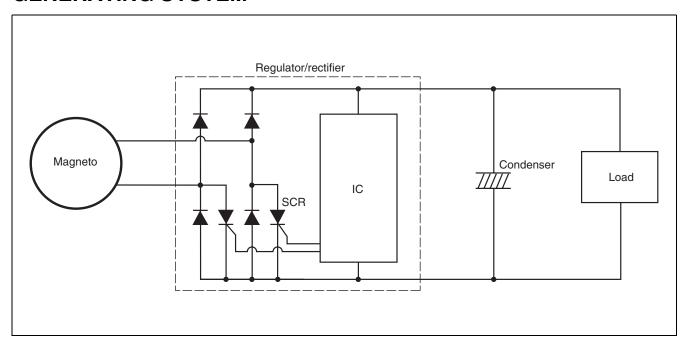
- 9 Engine stop switch ( 15-16)
- ① S-HAC switch (15-20)
- 1 Regulator/rectifier (15-10)
- 12 Mode select coupler (1374-3)
- (13) IAT sensor (12-30)

- ( CKP sensor ( 12-21)
- ⓑ Magneto (☐ 15-9)
- 16 GP switch (12-34)
- ① TP sensor ( 12-23)
- **18 Condenser**

# CONSTRUCTION MAGNETO



#### **GENERATING SYSTEM**



#### INSPECTION

#### **REGULATED VOLTAGE**

- Remove the fuel tank. ( 13-3)
- Insert the needle-point probes (A) to the condenser coupler (1).
  - + Prove: R lead wire
  - ─ Prove: B/W lead wire
- Temporarily install the fuel tank and connect the fuel pump coupler.
- Connect the special tool to the high-tension cord. ( 2-24)

# 09900-26006: Engine tachometer

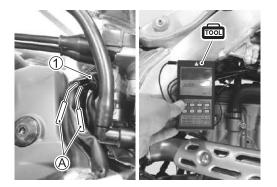
- Kick start the engine and keep it running at 5 000 r/min.
- Measure the DC voltage using the multi circuit tester. If the voltage is not within the specified value, inspect the magneto and regulator/rectifier. ( 15-9, -10)

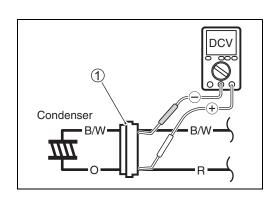
#### Regulated voltage (Charging output):

13.5 - 15.0 V at 5 000 r/min

09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set

Tester knob indication: Voltage (==)





#### **CHARGE COIL RESISTANCE**

- Remove the fuel tank. ( 13-3)
- Disconnect the magneto lead wire coupler ①.
- Measure the charge coil resistance.
   If the resistance is out of specified value, replace the stator with a new one. Also, check that the magneto core is insulated properly.

Charge coil resistance: 1.2 – 2.5  $\Omega$  (Yellow – Yellow)

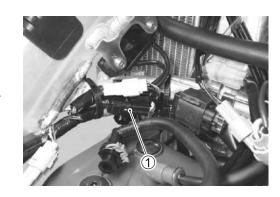
 $\infty \Omega$  (Yellow – Ground)

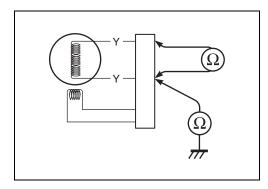
09900-25008: Multi circuit tester set

 $\square$  Tester knob indication: Resistance ( $\Omega$ )

#### NOTE:

When making above test, it is not necessary to remove the magneto.





#### MAGNETO NO-LOAD PERFORMANCE

- Lift and hold the fuel tank. ( 13-3)
- Disconnect the regulator/rectifier coupler ①.
- Connect the special tool to the high-tension cord. ( 2-24)

#### 09900-26006: Engine tachometer

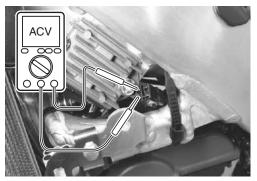
- Connect a 12 volt battery to the service coupler using the battery lead wire (optional part). ( 12-16)
- · Connect the fuel pump coupler.
- Kick start the engine and keep it running at 5 000 r/min.
- Measure the AC voltage using the multi circuit tester. If the tester reads under the specified value, replace the magneto with a new one.

Magneto no-load performance (When engine is cold): 100 V or more at 5 000 r/min (Black – Black)

09900-25008: Multi circuit tester set 36890-28H00: Battery lead wire (option)

Tester knob indication: Voltage (~)





#### **REGULATOR/RECTIFIER**

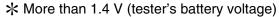
- Remove the fuel tank. ( 13-3)
- Disconnect the regulator/rectifier coupler ①.
- Measure the voltage between the lead wires using the multi circuit tester as indicated in the table below. If the voltage is not within the specified value, replace the regulator/rectifier with a new one.

09900-25008: Multi circuit tester set

Tester knob indication: Diode test (⊢←)

Unit: V

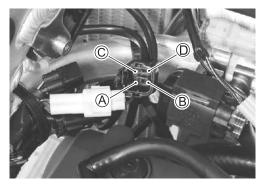
	Probe of tester to:				
		(Y/R)		© (Br)	(R)
e of to:	A (Y/R)		*	0.1 – 0.8	*
Probe tester to		*		0.1 - 0.8	*
Test	© (Br)	*	*		*
·	① (R)	0.1 – 0.8	0.1 – 0.8	0.2 - 0.9	



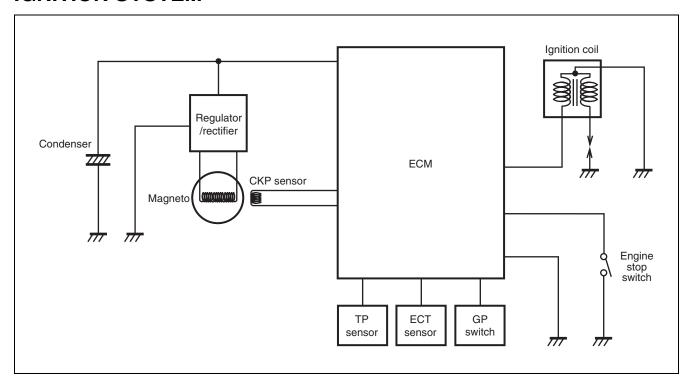
#### NOTE:

If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.





## **IGNITION SYSTEM**



#### NOTE:

The fuel cut-off circuit is incorporated in this ECM in order to prevent over-running of engine.

## **TROUBLESHOOTING**

#### No spark or poor spark

#### Step 1

1) Check the ignition system couplers for poor connections. Is there connection in the ignition system couplers?

YES	Go to Step 2.
NO	Poor connection of couplers

#### Step 2

1) Measure the ignition coil primary peak voltage. (15-13) Is the peak voltage OK?

YES	Go to Step 3.
NO	Go to Step 4.

#### Step 3

1) Inspect the spark plug. ( 2-9) Is the spark plug OK?

YES	Poor connection of the spark plug
	Go to Step 4.
NO	Faulty spark plug

## Step 4

1) Measure the ignition coil resistance. ( 15-14) Is the ignition coil resistance OK?

YES	Go to Step 5.
NO	Faulty ignition coil

#### Step 5

1) Measure the CKP sensor peak voltage and its resistance. ( 15-15, -16) Are the peak voltage and resistance OK?

YES	Go to Step 6.
NO	Faulty CKP sensor
	Metal particles or foreign material being stuck on the CKP sensor and rotor tip

#### Step 6

1) Check the stator. ( 15-9) Is the stator OK?

YES	Go to Step 7.
NO	Faulty stator

1) Measure the engine stop switch resistance. (15-16) Is the resistance OK?

YES	Faulty ECM
	Open or short circuit in wire harness
NO	Faulty engine stop switch

#### **INSPECTION**

#### **IGNITION COIL PRIMARY PEAK VOLTAGE**

- Remove the seat, radiator covers and fuel tank. ( 5-2)
- Disconnect the spark plug cap ①.



 Connect a new spark plug to spark plug cap and ground it to the cylinder head.

#### **NOTICE**

Giving an electrical impact to magnesium parts can cause the parts to be damaged.

Avoid grounding the spark plug and suppling the electrical shock to the cylinder head cover (magnesium parts).

Measure the ignition coil primary peak voltage using the multi circuit tester in the following procedure.

• Insert the needle-point probes (A) to the ignition coil lead wire coupler (2).

#### NOTE:

Use the special tool, to prevent the rubber of the water proof coupler from damage.







 Connect the multi circuit tester with the peak voltage adaptor as follows.

+ Probe: Black/White lead wire Probe: White/Blue lead wire

NOTE:

Do not disconnect the ignition coil lead wire coupler.

09900-25008: Multi circuit tester set

 Measure the ignition coil primary peak voltage by depressing the kick starter lever several times forcefully.

#### NOTE:

When using the multi circuit tester and peak volt adaptor, refer to the appropriate instruction manual.

• Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage. If the voltage is lower than the standard values, inspect the ignition coil. (Œ below)

#### **WARNING**

Touching the tester probes and spark plug while testing can receive electric shock.

Do not touch the tester probes and spark plug while testing.

Ignition coil primary peak voltage: 170 V or more

Tester knob indication: Voltage (---)

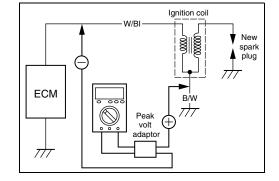
#### **IGNITION COIL RESISTANCE**

- Remove the seat, radiator covers and fuel tank. ( 5-2)
- Disconnect the ignition coil lead wire coupler ① and spark plug cap 2.
- Measure the ignition coil resistance in both the primary and secondary windings using the multi circuit tester. If the resistance is not within the standard range, replace the ignition coil with a new one.

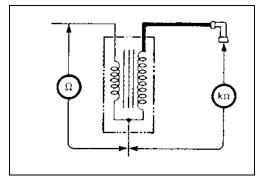
DATA Ignition coil resistance

**Primary:**  $0.17 - 0.70 \Omega (W/BI - B/W)$ Secondary: 9 – 14 k $\Omega$  (Spark plug cap – B/W)

09900-25008: Multi circuit tester set Tester knob indication: Resistance ( $\Omega$ )

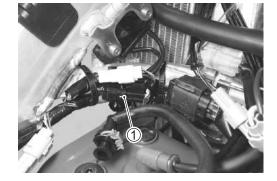






#### **CKP SENSOR PEAK VOLTAGE**

- Remove the fuel tank. ( 13-3)
- Disconnect the magneto lead wire coupler ①.



 Connect the multi circuit tester with the peak volt adaptor as follows.

probe	Red wire
⊝ probe	Green wire



09900-25008: Multi circuit tester set

 Measure the highest peak voltage by depressing the kick starter lever several times forcefully.

#### NOTE:

When using the multi circuit tester and peak volt adaptor, refer to the appropriate instruction manual.

 Repeat the above procedure a few times and measure the highest sensor peak voltage.

**DATA** CKP sensor peak voltage: 2.8 V or more

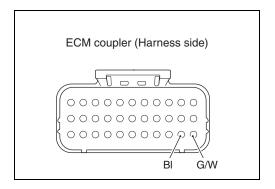
Tester knob indication: Voltage (---)

If the peak voltage is within the specification, check the continuity between the magneto lead wire coupler and ECM coupler.

#### **NOTICE**

Forcing the probe into the terminal can cause damage to the terminal.

Use the needle-point probe to the backside of the lead wire coupler to prevent the terminal bend and terminal alignment.

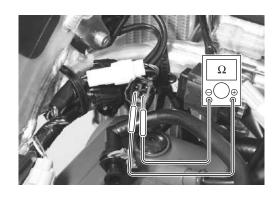


#### **CKP SENSOR RESISTANCE**

- Remove the fuel tank. ( 13-3)
- Disconnect the magneto lead wire coupler.
- · Measure the resistance between the lead wires using the multi circuit tester. If the resistance is not within the specified value, replace the stator with a new one.

**PATA** CKP sensor resistance: 80 – 120  $\Omega$  (Red – Green)

09900-25008: Multi circuit tester set  $\square$  Tester knob indication: Resistance ( $\Omega$ )



#### **ENGINE STOP SWITCH**

- Remove the fuel tank. ( 13-3)
- Disconnect the engine stop switch lead wire coupler ①.



 Measure the engine stop switch resistance between B/Y lead wire and B/W lead wire.

**DATA** Engine stop switch resistance:

ON: Under 1  $\Omega$  (B/Y – B/W) **OFF:**  $\infty \Omega$  (Infinity) (B/Y – B/W)

09900-25008: Multi circuit tester set 09900-25009: Needle-point probe set

Tester knob indication: Resistance ( $\Omega$ )

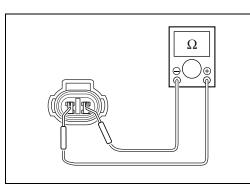
If the measurement is out of the specification, the cause may lie in the engine stop switch.

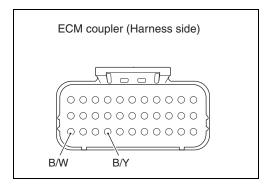
If the measurement is within the specification, check the continuity between the engine stop switch lead wire coupler and ECM coupler.

#### **NOTICE**

Forcing the probe into the terminal can cause damage to the terminal.

Use the needle-point probe to the backside of the lead wire coupler to prevent the terminal bend and terminal alignment.





# **MAGNETO ROTOR**

#### **REMOVAL**

- Remove the fuel tank. ( 13-3)
- Drain engine oil. ( 2-14)
- Disconnect the magneto lead wire coupler.
- Remove the clamps.
- Remove the gearshift lever. ( 9-3)
- Remove the magneto cover ①.

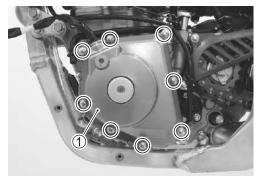


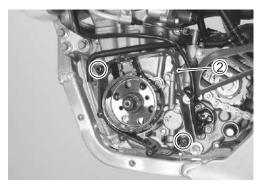
• Hold the magneto rotor with the special tool and remove the rotor nut ③.

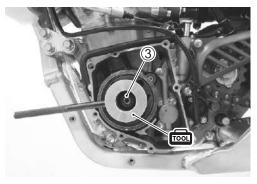




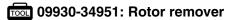




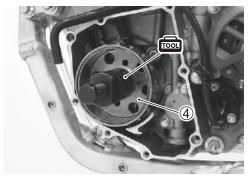


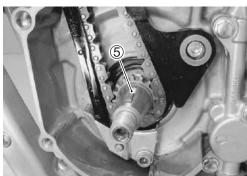


• Remove the magneto rotor 4 with the special tool.



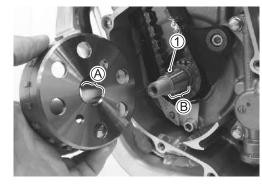
• Remove the magneto rotor key ⑤.





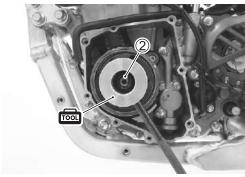
#### **INSTALLATION**

- Remove any grease from the tapered portion (A) of the magneto rotor and crankshaft B.
- Fit the magneto rotor key 1 to the crankshaft.



- Install the magneto rotor.
- Hold the magneto rotor with the special tool and tighten the magneto rotor nut 2 to the specified torque.
- Magneto rotor nut: 80 N·m (8.0 kgf-m, 58.0 lbf-ft)





• Install the dowel pins and new gasket ③.

#### NOTE:

Replace the gasket 3 with a new one.



- Install the magneto cover 4.
- Fit the new gasket washers to the bolts (A).

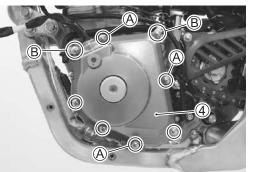
#### NOTE:

Replace the gasket washers with new ones.

- Fit the clamps to the bolts B.
- Tighten the magneto cover bolts to the specified torque.

#### Magneto cover bolt: 11 N⋅m (1.1 kgf-m, 8.0 lbf-ft)

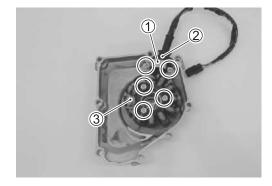
- Install the gearshift lever. ( 9-7)
- Pour engine oil and install the left front protector. ( 2-14)



# **STATOR**

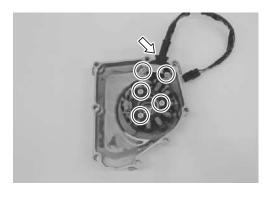
#### REMOVAL

- Remove the magneto cover. ( 15-17)
- Remove the clamp 1.
- Remove the CKP sensor ② along with stator ③.



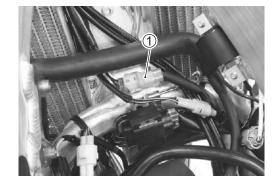
#### INSTALLATION

- Install the stator, CKP sensor and clamp.
- Fit the grommet to the magneto cover.
- Tighten the stator bolts and CKP sensor bolts to the specified torque.
- Magneto stator bolt: 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft) CKP sensor bolt: 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)
- Install the magneto cover. ( above)



#### S-HAC SWITCH INSPECTION

- Remove the fuel tank. ( 13-3)
- Disconnect the S-HAC switch lead wire coupler 1.



• Measure the S-HAC switch resistance between R/Y lead wire and B/W lead wire.

#### DATA S-HAC switch resistance:

ON: Under 1  $\Omega$  (R/Y – B/W) **OFF:**  $\infty \Omega$  (Infinity) (R/Y – B/W)

09900-25008: Multi circuit tester set  $\square$  Tester knob indication: Resistance ( $\Omega$ )

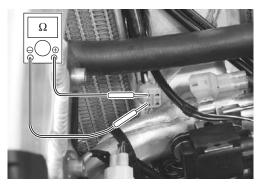
If the measurement is out of the specification, the cause may lie in the S-HAC switch.

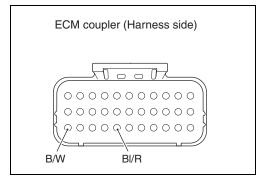
If the measurement is within the specification, check the continuity between the S-HAC switch lead wire coupler and ECM coupler.

#### **NOTICE**

Forcing the probe into the terminal can cause damage to the terminal.

Use the needle-point probe to the backside of the lead wire coupler to prevent the terminal bend and terminal alignment.

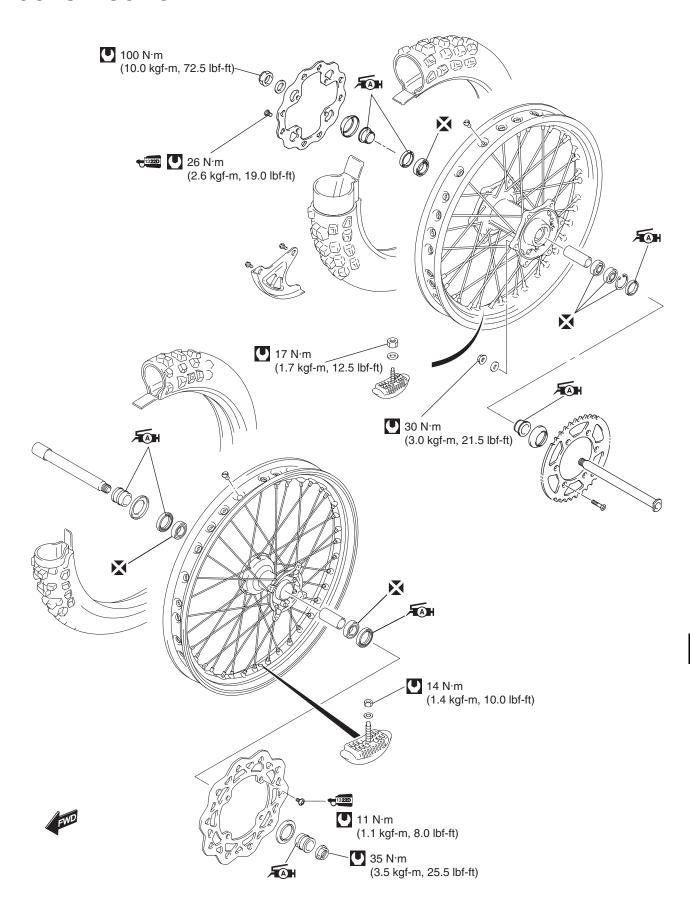




# FRONT AND REAR WHEELS

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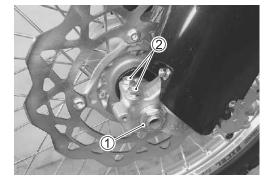
# **CONSTRUCTION**



#### FRONT WHEEL

#### REMOVAL

- Remove the front axle nut 1.
- Loosen the left axle holder bolts 2.



- Place the motorcycle on a block to lift front wheel off the ground.
- Loosen the right axle holder bolts 3.
- Remove the front axle 4.
- · Remove the front wheel.



#### INSPECTION

#### **SPACER AND DUST SEAL**

- Remove the wheel spacers ① from the front wheel.
- Inspect the right and left wheel spacers ① and dust seals ② for wear and cracks.
- If any defects are found, replace the spacer together with the dust seal.

#### NOTE:

Apply grease to the spacers and dust seals before reassembling.



- Support the axle shaft with the V blocks and measure the axle shaft runout.
- If the runout exceeds the limit, replace the axle shaft with a new one.

#### NOTE:

Shaft runout is half amount of dial gauge reading.

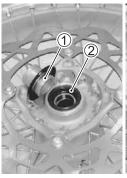
PATA Axle shaft runout

**Service Limit: 0.25 mm (0.010 in)** 

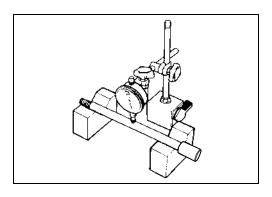
1001 09900-20607: Dial gauge

09900-20701: Dial gauge chuck

09900-21304: V blocks







#### WHEEL RIM

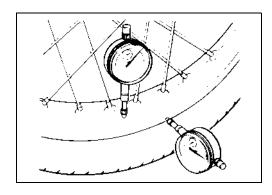
• Measure the wheel rim runout with the dial gauge.

• If the runout exceeds the limit, replace the bearings or wheel.

Service Limit: 2.0 mm (0.08 in) ... axial and radial

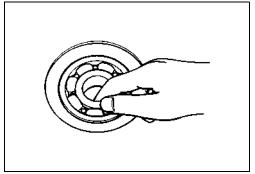
09900-20607: Dial gauge

09900-20701: Dial gauge chuck



#### WHEEL BEARING

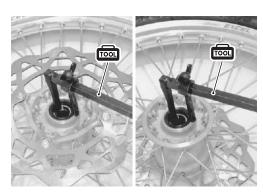
- Turn the inner race by finger and inspect it for smooth move-
- Inspect for bearing damage.
- If any defects are found, replace the bearing with a new one.



#### **DUST SEAL AND BEARING REPLACEMENT**

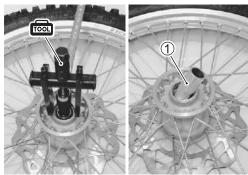
• Remove the dust seals with the special tool.

09913-50121: Oil seal remover



- Remove the bearing with the special tool.
- Remove the spacer ① and bearing with the special tool.

09921-20240: Bearing remover set





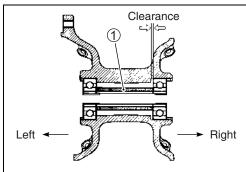
#### NOTE:

Replace the bearings with new ones.

09924-84510: Bearing installer set

 After installing the bearings, inspect the bearings for smooth movement.





Install new dust seals and apply grease to their lips.

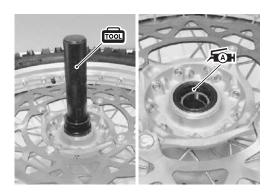
#### NOTE:

- \* Replace the dust seals with new ones.
- \* When installing the dust seal, place the manufacturer's code indicated side of the dust seal outside.

09913-70210: Bearing installing set (10 – 75  $\phi$ ) Bearing:  $\phi$  40 Attachment

**1** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent



#### DISC PLATE REPLACEMENT

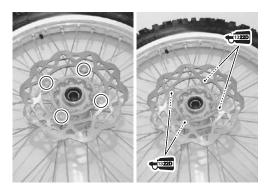
- Remove the disc plate.
- · Apply thread lock to the bolts.

99000-32150: THREAD LOCK CEMENT "1322D"

or equivalent

• Tighten the bolts to the specified torque.

Disc plate bolt: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

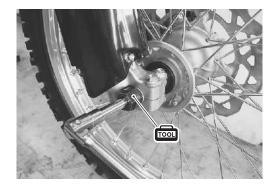


## **INSTALLATION**

• Hold the front axle shaft with the special tool and tighten the front axle nut temporarily.



09940-34581: Front fork assembling attachment (F)



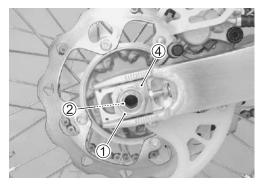
- Remove the block from under the chassis tube and move the front forks up and down several times.
- Tighten the front axle nut to the specified torque.
- Front axle nut: 35 N·m (3.5 kgf-m, 25.5 lbf-ft)
- Tighten the left and right axle holder bolts to the specified torque.
- Axle holder bolt: 21 N·m (2.1 kgf-m, 15.0 lbf-ft)

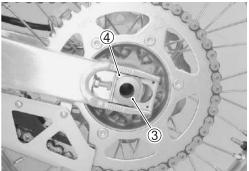


## **REAR WHEEL**

## **REMOVAL**

- Loosen the rear axle nut 1.
- Place the motorcycle on a block to lift the rear wheel off the
- Remove rear axle nut 1 and washer 2.
- Remove the rear axle shaft ③ and chain adjuster washers ④.





- Disengage the drive chain ⑤.
- Remove the rear wheel 6.



## **INSPECTION**

### **SPACER AND DUST SEAL**

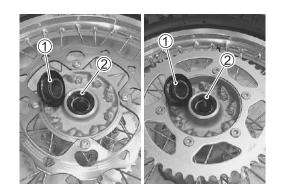
- Remove the wheel spacers ① from the rear wheel.
- Inspect the rear wheel spacers ① and dust seals ② for wear and cracks.
- If any defects are found, replace the spacer together with the dust seal.

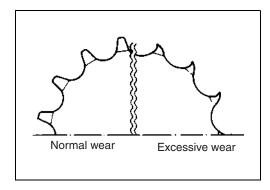
### NOTE:

Apply grease on the spacers and dust seals before reassembling.

### **SPROCKET**

- Inspect the sprocket teeth for wear.
- If they are worn as shown, replace the two sprockets and drive chain as a set.





AXLE SHAFT ( 16-3)

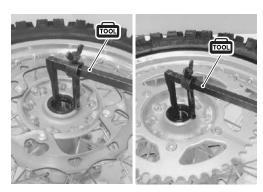
**WHEEL RIM (**□ 16-4)

WHEEL BEARING (16-4)

## **DUST SEAL AND BEARING REPLACEMENT**

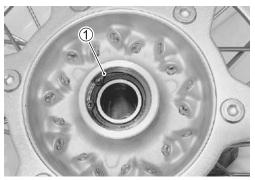
• Remove the dust seals with the special tool.

09913-50121: Oil seal remover



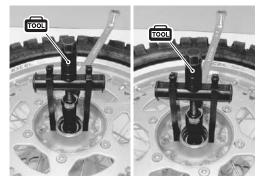
• Remove the snap ring 1.

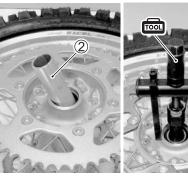
09900-06108: Snap ring pliers (Close type)



- Remove the bearings with the special tool.
- Remove the spacer ② and bearing with the special tool.

09921-20240: Bearing remover set





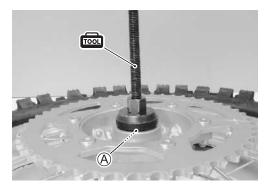
First install each left side (sprocket side) bearing, then install
the spacer ② and right side bearing with the special tool and
suitable spacer ⑥ that matches for the outside dimension of
bearing.

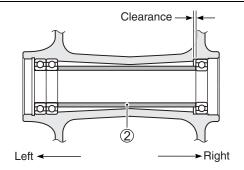
## NOTE:

Replace the bearings with new ones.

**100** 09941-34513: Bearing installer

 After installing the bearings, inspect the bearings for smooth movement.





• Install a new snap ring.

### NOTE:

- \* Replace the snap ring with a new one.
- \* Take care not to scratch the sealed bearing by the snap ring pliers when installing the snap ring.

09900-06108: Snap ring pliers (Close type)



• Install new dust seals and apply grease to their lips.

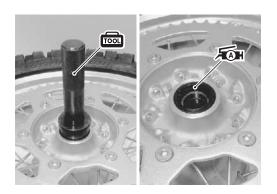
### NOTE:

- \* Replace the dust seals with new ones.
- \* When installing the dust seal, place the manufacturer's code indicated side of the dust seal outside.

**1** 09913-70210: Bearing installing set (10 – 75  $\phi$ ) Oil seal:  $\phi$  42 Attachment

**★**AH 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent



## DISC PLATE REPLACEMENT

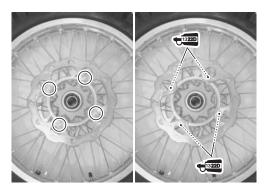
- Remove the disc plate.
- Apply thread lock to the bolts.

99000-32150: THREAD LOCK CEMENT "1322D"

or equivalent

• Tighten the bolts to the specified torque.

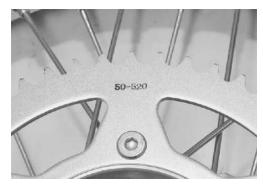
Disc plate bolt: 26 N·m (2.6 kgf-m, 19.0 lbf-ft)



## REAR SPROCKET REPLACEMENT

- Remove the rear sprocket.
- · Install the new rear sprocket as the letter on the sprocket surface faces outside.
- Tighten the nuts to the specified torque.

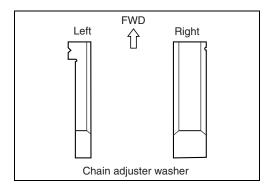
Rear sprocket nut: 30 N·m (3.0 kgf-m, 21.5 lbf-ft)





## **INSTALLATION**

- Install the rear wheel, chain adjuster washers and axle shaft.
- Adjust the drive chain slack. ( 2-31)



• Tighten the rear axle nut to the specified torque.

Rear axle nut: 100 N·m (10.0 kgf-m, 72.5 lbf-ft)



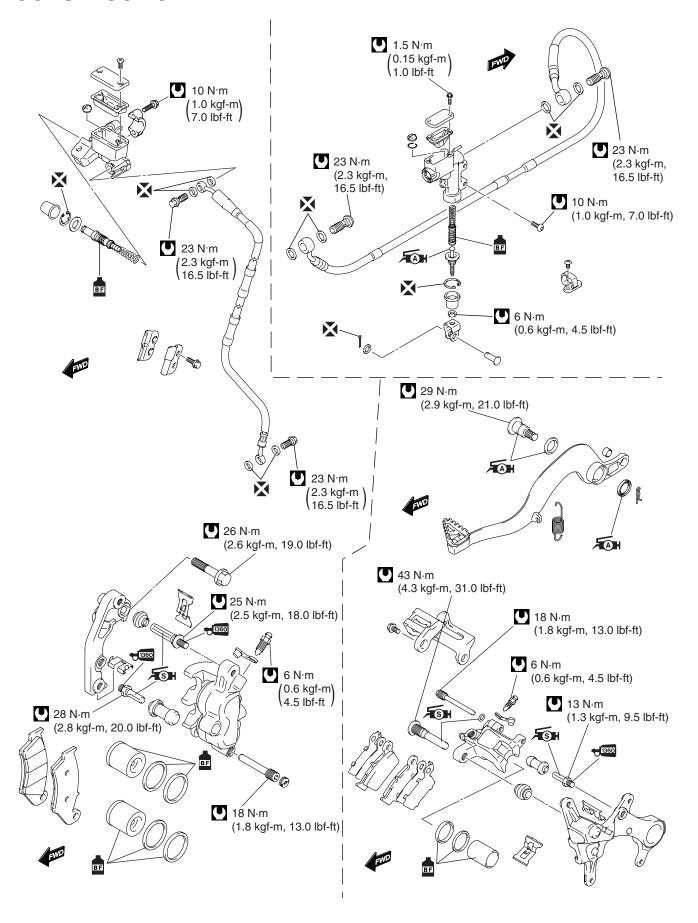
## **REAR WHEEL SPOKES REPLACEMENT**

( ] 20-29)

## FRONT AND REAR BRAKES

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## CONSTRUCTION



## **BRAKE FLUID AIR BLEEDING**

## **WARNING**

Brake fluid can be hazardous to humans and pets. Brake fluid is harmful or fatal if swallowed, and harmful if it comes in contact with your skin or eyes.

Keep brake fluid away from children. Call your doctor immediately if brake fluid is swallowed and induce vomiting. Flush eyes or skin with water if brake fluid gets in eyes or comes in contact with skin.

### **WARNING**

The use of any fluid except DOT 4 brake fluid from a sealed container can damage the brake system and lead to an accident.

Use only DOT 4 brake fluid from sealed container. Never use or mix different types of brake fluid.

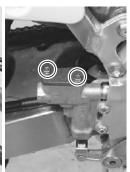
### **NOTICE**

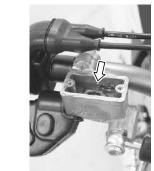
Spilled brake fluid can damage painted surfaces and plastic parts.

Be careful not to spill any brake fluid when servicing brake fluid. Wipe spilled fluid up immediately.

• Remove the reservoir cap.









• Pour brake fluid up to the UPPER line.

房 Specification and classification: DOT 4

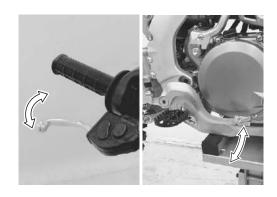
- Connect a transparent tube to the bleeder valve and set the other end into a receptacle.
- Pump the brake lever/pedal until air bubbles stop coming out from the reservoir.
- Hold the brake lever/pedal in the squeezed position.
- Open the bleeder valve and tighten the bleeder valve.
- Release the brake lever/pedal.
- Repeat this sequence until air bubbles stop coming out from the bleeder valve.

### NOTE:

- \* Do not release the brake lever/pedal while the bleeder valve is opened.
- \* Replenish brake fluid to the UPPER line when the brake fluid level drops below LOWER line.
- Tighten the air bleeder valve.

## Brake air bleeder valve: 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

- Pour brake fluid up to the UPPER line.
- Reassemble the reservoir cap. ( 20-27)







## BRAKE FLUID REPLACEMENT

- Remove the reservoir cap. ( 17-3)
- Suck up the brake fluid as much as possible.
- Drain the old brake fluid as much as possible.
- Fill the reservoir with new brake fluid.





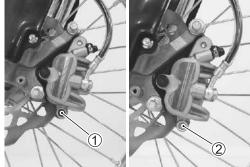
- Connect a transparent tube to the bleeder valve and set the other end into a receptacle.
- Loosen the bleeder valve and pump the brake lever/pedal until old brake fluid is completely out of the brake system.
- Bleed air from the brake system. ( 17-3)





## BRAKE PADS REPLACEMENT FRONT BRAKE PADS

• Remove the pad mounting pin cap 1 and pad mounting pin 2.



• Remove the brake pads 3.

### NOTE:

Replace the two brake pads as a set.

- Fit the new brake pads into the caliper.
- Tighten the pad mounting pin ② to the specified torque.

## Brake pad mounting pin: 18 N⋅m (1.8 kgf-m, 13.0 lbf-ft)

- Install the pad mounting pin cap.
- Pump the brake lever several times to seat the brake pads after reassembling.

## **REAR BRAKE PADS**

- Remove the pad mounting pin ①.
- Remove the brake pads 2.

### NOTE:

Replace the two pads 2 as a set.

- Fit the new brake pads into the caliper.
- · Apply grease to the O-ring.

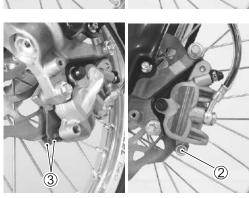
## FSH 99000-25100: SUZUKI SILICONE GREASE

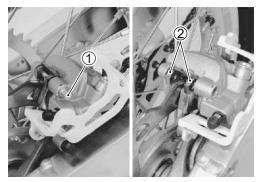
or equivalent

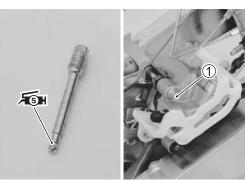
• Tighten the brake pad mounting pin ① to the specified torque.

## Brake pad mounting pin: 18 N⋅m (1.8 kgf-m, 13.0 lbf-ft)

• Pump the brake pedal several times to seat the brake pads after reassembling.







## BRAKE DISC INSPECTION

- · Inspect the brake discs for damage or cracks.
- Measure the front and rear brake disc thicknesses.
- Replace the disc if the thickness is less than the service limit or if damage is found.

### DATA Brake disc thickness

Service limit (Front): 2.5 mm (0.10 in)

(Rear): 3.5 mm (0.14 in)

09912-66310: Micrometer (0 – 25 mm)

· Measure the front and rear brake disc distortions.

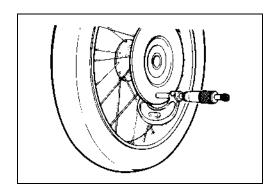
Replace the disc if the distortion exceeds the service limit.

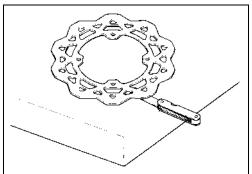
DATA Brake disc distortion

**Service limit: 0.30 mm (0.012 in)** 

1 09900-20803: Thickness gauge

BRAKE DISC REPLACEMENT (16-5, -10)





## CALIPER

## **WARNING**

Brake fluid can be hazardous to humans and pets. Brake fluid is harmful or fatal if swallowed, and harmful if it comes in contact with your skin or eyes.

Keep brake fluid away from children. Call your doctor immediately if brake fluid is swallowed, and induce vomiting. Flush eyes or skin with water if brake fluid gets in eyes or comes in contact with skin.

### **WARNING**

The use of any brake fluid except DOT 4 brake fluid from a sealed container can damage the brake system and lead to an accident.

Use only DOT 4 brake fluid from a sealed container. Never use or mix different types of brake fluid.

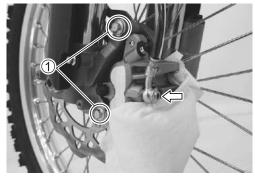
### **NOTICE**

Spilled brake fluid can damage painted surfaces and plastic parts.

Be careful not to spill any fluid when servicing the caliper. Wipe spilled fluid up immediately.

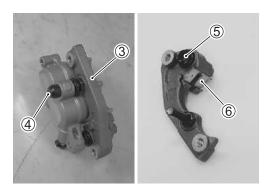
## FRONT CALIPER REMOVAL AND **DISASSEMBLY**

- Place a rag under the brake hose union bolt to catch spilled brake fluid.
- Disconnect the brake hose by removing the union bolt.
- Remove the caliper mounting bolts ①.
- Remove the caliper.
- Remove the brake pads. (\$\sumsymbol{17-5}\$)
- Remove the spring 2.





- Remove the caliper bracket ③ from the caliper.
- Remove the boots 4 and 5.
- Remove the spring 6.



- Wrap the caliper with a rag to prevent brake fluid scatter and piston pop-out.
- Apply low-pressure air into the caliper through the hole to remove the pistons.

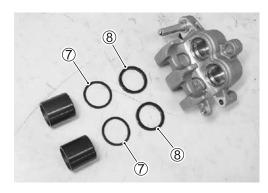
## **WARNING**

Fingers can get caught between piston and caliper body when removing the piston.

Do not place your fingers on the piston when removing the piston.

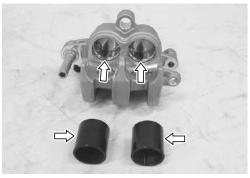


Remove the dust seals ⑦ and piston seals ⑧.



## CALIPER INSPECTION

- Inspect the caliper cylinders for scuffing, wear and damage.
- Inspect the pistons for scuffing, wear and damage.
- If necessary, replace the defective part with a new one.



## CALIPER CLEANING

- · Flush the caliper ports with pressurized air.
- · Wash the caliper pistons and cylinders with fresh brake fluid.

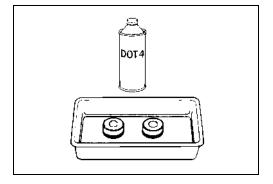


Specification and classification: DOT 4

### **NOTICE**

Use of improper solvent or detergent can cause damage to the caliper components.

Always use the specified brake fluid.



## FRONT CALIPER REASSEMBLY AND INSTALLATION

Reassemble and install the brake caliper in the reverse order of removal and disassembly. Pay attention to the following points:

· Apply brake fluid to the new piston seals, new dust seals and pistons and fit the piston seals, dust seals and pistons.



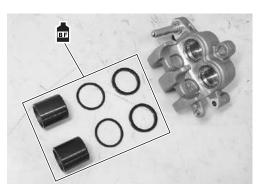
房 Specification and classification: DOT 4

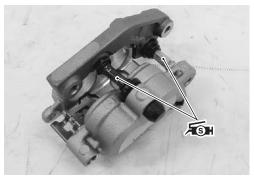
- · Install the springs and boots.
- · Apply grease to the caliper axles.



or equivalent

- · Install the caliper bracket.
- Install the brake pads.
- Temporarily tighten the brake pad mounting pin.





• Tighten the caliper mounting bolts 1 to the specified torque.

## Brake caliper mounting bolt:

26 N·m (2.6 kgf-m, 19.0 lbf-ft)

• Tighten the brake pad mounting pin ② to the specified torque.

## Brake pad mounting pin: 18 N⋅m (1.8 kgf-m, 13.0 lbf-ft)

• After the brake hose union has contacted the stopper, tighten the brake hose union bolt 3 to the specified torque.

### NOTE:

Replace the seal washers with new ones.

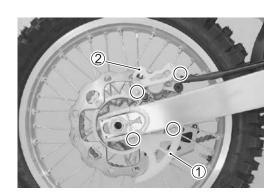
## Brake hose union bolt: 23 N⋅m (2.3 kgf-m, 16.5 lbf-ft)

- Install the pad mounting pin cap.
- Refill brake fluid and bleed air from the brake system. ( 717-3)



## REAR CALIPER REMOVAL AND **DISASSEMBLY**

• Remove the disc cover 1 and caliper protector 2.



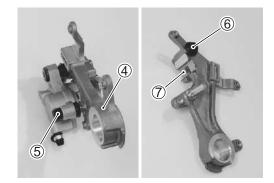
- Place a rag under the brake hose union bolt to catch spilled brake fluid.
- Disconnect the brake hose by removing the union bolt.
- Remove the rear wheel. ( 16-7)
- Remove the caliper.



- Remove the brake pads. ( 17-5)
- Remove the spring ③.



- Remove the caliper bracket ④ from the caliper.
- Remove the boots ⑤ and ⑥.
- Remove the spring ⑦.



- Wrap the caliper with a rag to prevent brake fluid scatter and piston pop-out.
- Apply low-pressure air into the caliper through the hole to remove the piston.

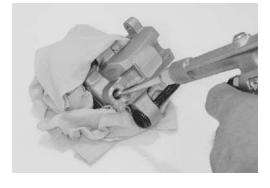
## **WARNING**

Fingers can get caught between piston and caliper body when removing the piston.

Do not place your fingers on the piston when removing the piston.

• Remove the dust seal ® and piston seal 9.

Brake caliper inspection and cleaning (17-8)





## REAR CALIPER REASSEMBLY AND INSTALLATION

Reassemble and install the brake caliper in the reverse order of removal and disassembly. Pay attention to the following points:

· Apply brake fluid to the new piston seal, new dust seal and piston fit the piston seal, dust seal and piston.

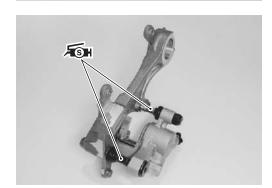


- · Install the springs and boots.
- · Apply grease to the caliper axles.

## FSH 99000-25100: SUZUKI SILICONE GREASE

or equivalent

• Install the caliper bracket.



- Install the brake pads.
- · Apply grease to the O-ring.

## FSH 99000-25100: SUZUKI SILICONE GREASE

or equivalent

• Temporarily tighten the brake pad mounting pin.



- Install the caliper and rear wheel. ( 16-11)
- Tighten the brake pad mounting pin ① to the specified torque.

## ■ Brake pad mounting pin: 18 N·m (1.8 kgf-m, 13.0 lbf-ft)

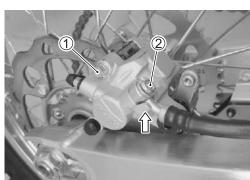
• Set the brake hose end between the hose stoppers, then tighten the brake hose union bolt ② to the specified torque.

### NOTE:

Replace the seal washers with new ones.

## Brake hose union bolt: 23 N⋅m (2.3 kgf-m, 16.5 lbf-ft)

• Refill brake fluid and bleed air from the brake system. ( 3717-3)



## **WARNING**

Brake fluid can be hazardous to humans and pets. Brake fluid is harmful or fatal if swallowed, and harmful if it comes in contact with your skin or eyes.

Keep brake fluid away from children. Call your doctor immediately if brake fluid is swallowed, and induce vomiting. Flush eyes or skin with water if brake fluid gets in eyes or comes in contact with skin.

### **WARNING**

The use of any fluid except DOT 4 brake fluid from a sealed container can damage the brake system and lead to an accident.

Use only DOT 4 brake fluid from a sealed container. Never use or mix different types of brake fluid.

### **NOTICE**

Spilled brake fluid can damage painted surfaces and plastic parts.

Be careful not to spill any fluid when filling the brake fluid reservoir. Wipe spilled fluid up immediately.

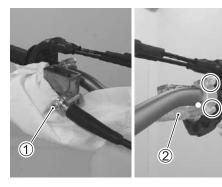
## FRONT MASTER CYLINDER REMOVAL AND DISASSEMBLY

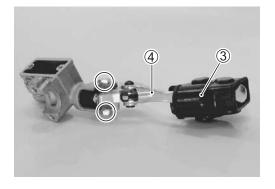
- Drain brake fluid. ( 17-4)
- Place a rag under the brake hose union bolt ① to catch spilled brake fluid.
- Disconnect the brake hose by removing the union bolt ①.
- Remove the master cylinder ② by removing the master cylinder holder bolts.

### NOTE:

Mark the paint mark to the matching surface of master cylinder holder and handlebars.

- Remove the boot 3.
- Remove the brake lever 4.

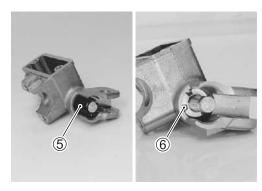


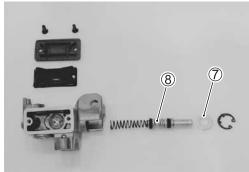


• Remove the dust boot ⑤ and snap ring ⑥.

09900-06108: Snap ring pliers (Close type)

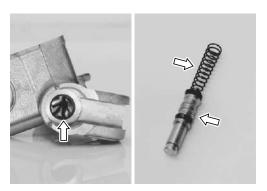
• Remove the washer ⑦ and piston/cup set ⑧.





## FRONT MASTER CYLINDER INSPECTION

- Inspect the cylinder bore and piston for scuffing, wear and damage.
- · Inspect the spring for damage.
- If necessary, replace the defective part with a new one.



## FRONT MASTER CYLINDER CLEANING

- Flush the master cylinder ports with pressurized air.
- Wash the master cylinder bore and piston with fresh brake fluid.

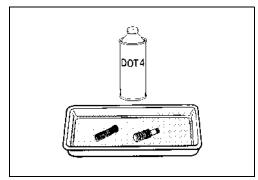


B Specification and classification: DOT 4

## **NOTICE**

Use of improper solvent or detergent can cause damage to the master cylinder components.

Always use the specified brake fluid.



## FRONT MASTER CYLINDER REASSEMBLY AND INSTALLATION

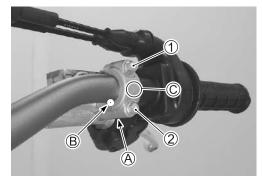
Reassemble and install the master cylinder in the reverse order of removal and disassembly. Pay attention to the following points:

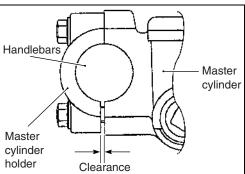
- Install the brake lever. ( 17-17)
- Align the matching mark (B) on the handlebars with the master cylinder matching surface (A).
- Tighten the master cylinder holder upper bolt ① first temporarily to provide clearance on the lower side and then tighten both the master cylinder holder bolts (①, ②) to the specified torque.

### NOTE:

Make sure that the "UP" mark © faces up.

Master cylinder holder bolt : 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft)



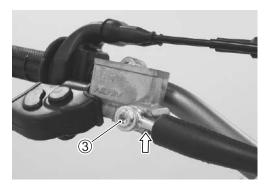


• Set the brake hose end between the hose stoppers, then tighten the brake hose union bolt ③ to the specified torque.

### NOTE:

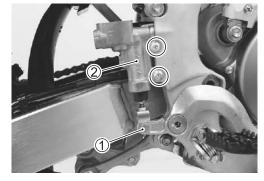
Replace the seal washers with new ones.

- Brake hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
- Refill brake fluid and bleed air from the brake system. ( 17-3)



## **REAR MASTER CYLINDER REMOVAL AND DISASSEMBLY**

- Drain brake fluid. ( 17-4)
- Remove the cotter pin and then master cylinder rod pin 1 and washer.
- Remove the master cylinder ② by removing the bolts.

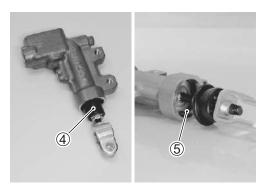


- Place a rag under the brake hose union bolt ③ to catch spilled brake fluid.
- Disconnect the brake hose by removing the union bolt ③.
- Remove the master cylinder.

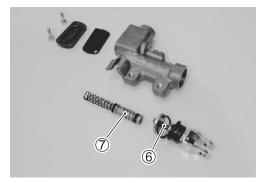


• Remove the dust boot 4 and snap ring 5.

09900-06108: Snap ring pliers (Close type)



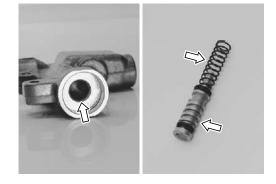
- Remove the push rod 6.
- Remove the piston/cup set ⑦.



### REAR MASTER CYLINDER INSPECTION

- Inspect the cylinder bore and piston for scuffing, wear and damage.
- Inspect the spring for damage.

Master cylinder cleaning (17-13)



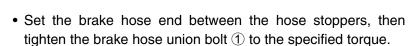
## REAR MASTER CYLINDER REASSEMBLY AND INSTALLATION

Reassemble and install the master cylinder in the reverse order of removal and disassembly. Pay attention to the following points:

• Apply grease to the contact point between piston and push



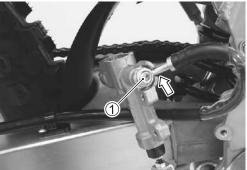
or equivalent



NOTE:

Replace the seal washers with new ones.

Brake hose union bolt: 23 N⋅m (2.3 kgf-m, 16.5 lbf-ft)

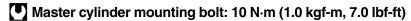


 Tighten the master cylinder mounting bolts ② to the specified torque.

### **NOTICE**

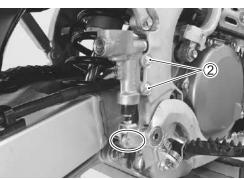
Improper brake hose routing can damage the brake hose.

Ensure the brake hose has enough clearance to the rear suspension spring.



- Install the master cylinder rod pin, washer and new cotter pin.
- Refill brake fluid and bleed air from the brake system. ( 317-3)

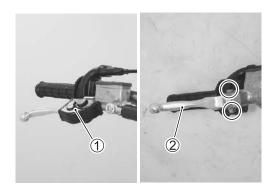




## **BRAKE LEVER**

## **REMOVAL**

• Remove the boot ① and brake lever ②.



• Remove the brake lever adjuster return spring 3.



## INSTALLATION

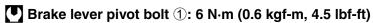
Install the brake lever in the reverse order of removal. Pay attention to the following points:

• Apply grease to the brake lever adjuster return spring, pivot bolt and contact point between piston and brake lever.



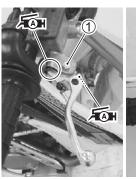
or equivalent

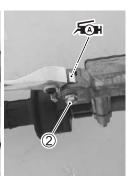
• Tighten the brake lever pivot bolt and lock-nut to the specified torque.



Brake lever pivot bolt lock-nut 2:

6 N·m (0.6 kgf-m, 4.5 lbf-ft)

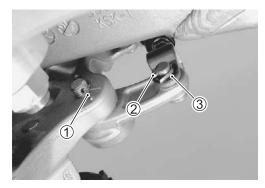




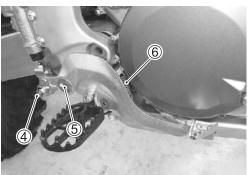
## **BRAKE PEDAL**

## **REMOVAL**

- Remove the clip ①.
- Remove the cotter pin 2 and washer 3.



- Remove the master cylinder rod pin 4.
- Remove the brake pedal pivot bolt ⑤ and return spring ⑥.



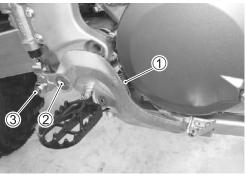
## **INSTALLATION**

• Apply grease to the oil seals and brake pedal pivot bolt.

Fa⊩ 99000-25011: SUZUKI SUPER GREASE "A" or equivalent



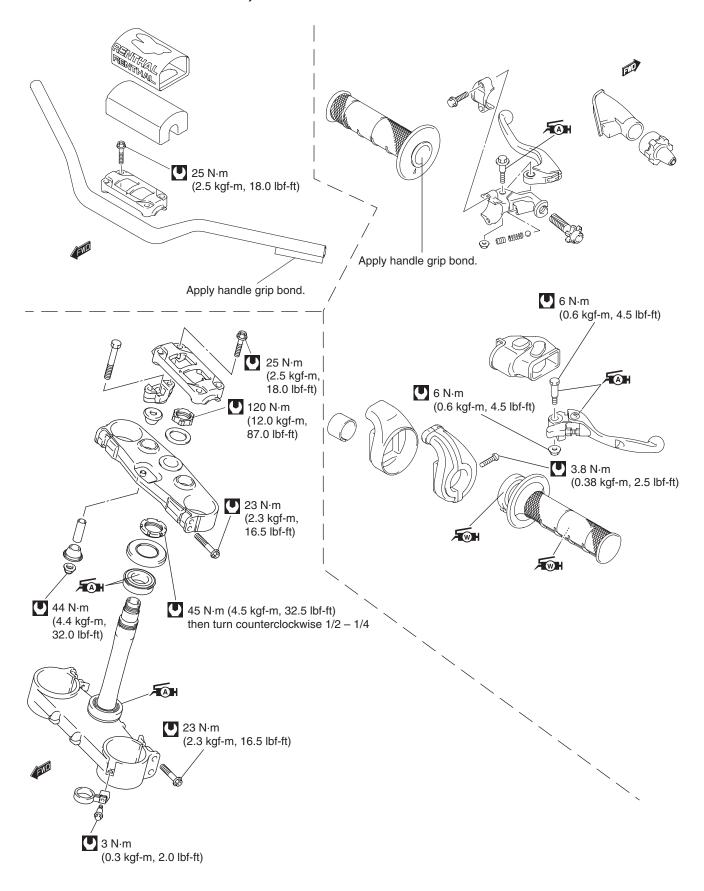
- Install the return spring ① properly. ( 20-25)
- Tighten the brake pedal pivot bolt ② to the specified torque.
- Brake pedal pivot bolt: 29 N·m (2.9 kgf-m, 21.0 lbf-ft)
- · Install the clip.
- Install the master cylinder rod pin ③, washer and new cotter pin.
- Adjust the brake pedal height. ( 2-36)



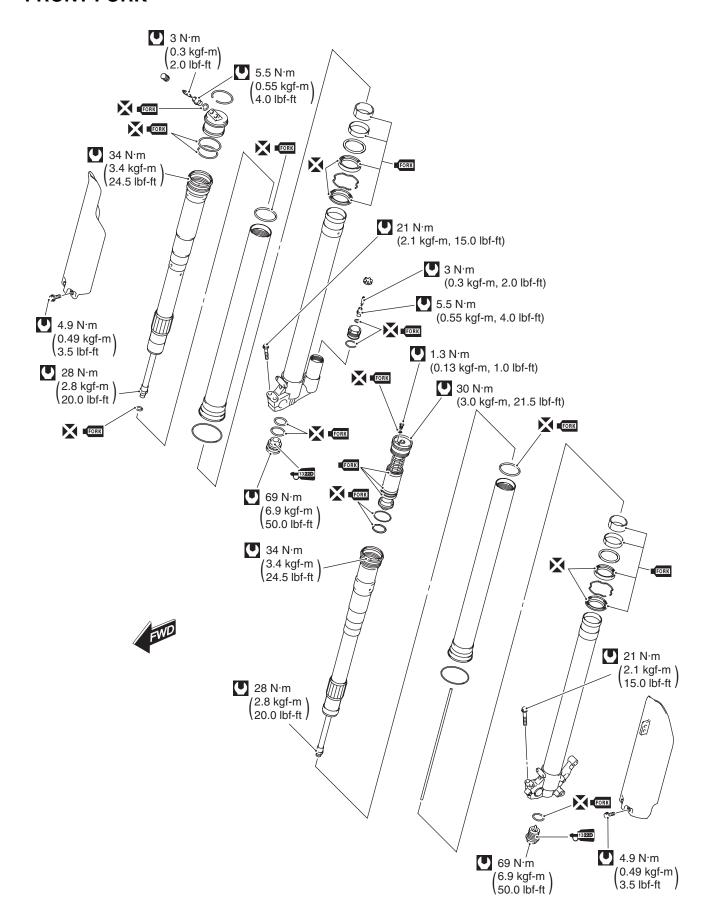
## FRONT FORK AND STEERING

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# CONSTRUCTION HANDLEBAR CONTROLS, STEERING



## **FRONT FORK**



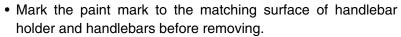
## **FRONT FORK**

### NOTE:

The left and right front forks are installed symmetrically and therefore the removal/installation procedure for one side is the same as that for the other side.

## **REMOVAL**

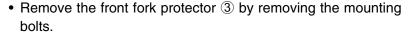
- Place the motorcycle on a block to lift front wheel off the ground.
- Remove the front wheel. ( 16-3)
- Remove the front number plate ①.
- Remove the handlebar pad 2.



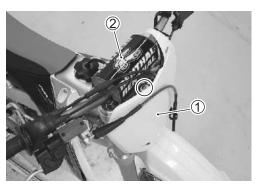
• Remove the handlebars.

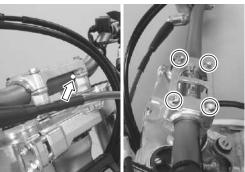
### NOTE:

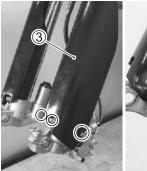
Do not turn the front brake master cylinder upside down.













- Loosen the front fork upper clamp bolts ⑤.
- Loosen the fork cylinder unit (LH) or air cylinder unit (RH) 1 -2 turns to facilitate later disassembly.

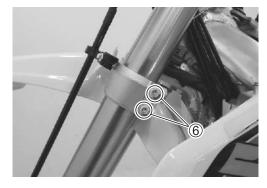
## NOTE:

Before loosening the air cylinder unit, remove the air valve caps.

09941-53630: Front fork cap socket wrench (50 mm)

- Hold the fork body and loosen the front fork lower clamp bolts
- Remove the front fork.





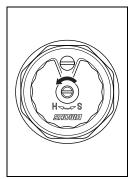
## LEFT FRONT FORK DISASSEMBLY

- · Set rebound and compression damper settings to the minimum settings (softest) before disassembling. Record the settings before turning the adjusters.
- Thoroughly clean the fork before disassembly.

### **NOTICE**

Scratches or other damage on the inner tube or on the oil seal lip will cause oil leakage.

Avoid scratching or damaging the inner tube or the oil seal. Use a mild detergent or car wash soap and sponge out dirt with plenty of water.





### **FORK CYLINDER UNIT**

· Clamp the lower clamp mounting part of outer tube with a vise. Protect the outer tube with a rag when using a vise.

### **WARNING**

Clamping the outer tube too tight can damage it. Outer tube damage will affect riding stability.

Do not clamp the outer tube too tight.

 Loosen and remove the fork cylinder unit ① from the outer tube and slowly slide down the outer tube.

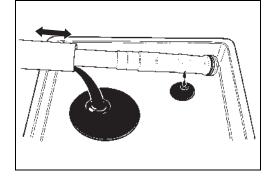


• Place a drain pan under the front fork and drain fork oil.

### NOTE:

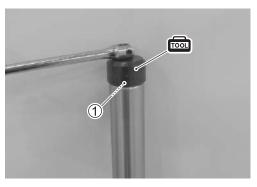
Move the outer tube several strokes to drain fork oil.





 Raise the outer tube and temporarily tighten the fork cylinder unit 1 to the outer tube.





 Clamp the brake caliper mounting part of axle holder ② with a vise. Protect the axle holder ② with a rag when using a vise.

## **WARNING**

Clamping the axle holder ② too tight can damage it. Axle holder damage will affect riding stability.

Do not clamp the axle holder 2 too tight.

 Loosen the center bolt ③ completely with a 21 mm socket wrench.

### **NOTICE**

Use of an impact wrench may damage the center bolt ③.

Do not use impact wrench.

Compress the outer tube by hand.





Hold the lock-nut ④ with a wrench and remove the center bolt
 ③.

### **NOTICE**

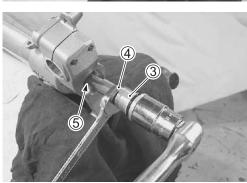
Loosening the center bolt ③ with the piston rod ⑤ touching the axle holder threads can damage the piston rod. Piston rod damage can result in inner parts damage.

Keep the piston rod ⑤ apart from the axle holder threads when loosening the center bolt ③.

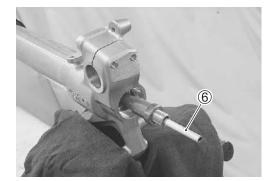
## NOTICE

If the lock-nut 4 is removed, the piston rod 5 can slip into the fork cylinder unit and fork cylinder unit threaded can damage the oil seal.

Do not remove the lock-nut 4.

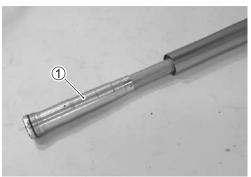


• Remove the push rod ⑥.

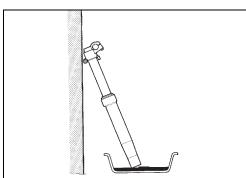


• Remove the fork cylinder unit ①.





• Hold the front fork (inner and outer tubes) inverted position for more than 20 minutes to allow the fork oil to fully drain.



### **COMPRESSION DAMPER UNIT**

Clamp the head (octagonal part) of the fork cylinder unit ① with a vise. Protect the fork cylinder unit ① with a rag when using a vise.

### **NOTICE**

Clamping the fork cylinder unit ① too tight can damage it.

Do not clamp the fork cylinder unit 1 too tight.

 Loosen the compression damper unit ② completely with the special tool.



• Remove the compression damper unit ② from the fork cylinder unit ①.

### **NOTICE**

Improper removal of compression damper unit ② may cause damage to the bushing.

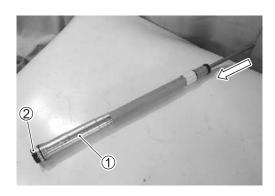
Take sufficient care so as not to damage the bushing of the compression damper unit ②.

### NOTE:

Slowly compress the piston rod ③ until it stops so that the compression damper unit ② can be removed easily.

• Drain the fork oil from the fork cylinder unit by moving the piston rod ③ several strokes.







## **INNER TUBE AND OUTER TUBE**

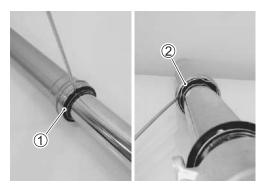
- Remove the dust seal ①.
- Remove the stopper ring 2.

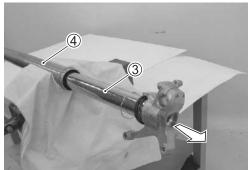
## NOTICE

Scratches on the inner tube could cause oil leaks.

Avoid scratching when removing.

• Separate the inner tube ③ out of the outer tube ④.





• Remove the slide bushing ⑤ from the inner tube ③.



• Remove the following parts from the inner tube ③.

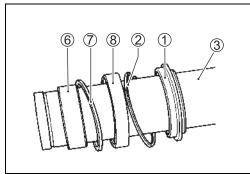
Guide bushing ⑥

Seal retainer 7

Oil seal ®

Stopper ring ②

Dust seal (1)



## LEFT FRONT FORK INSPECTION

### **CENTER BOLT**

• Inspect the adjuster rod of the center bolt for damage. If it is damaged, replace it with a new one.



### **COMPRESSION DAMPER UNIT**

· Inspect the compression damper unit for damage. If it is damaged, replace it with a new one.

### **NOTICE**

Disassembling the compression damper unit can cause damage or out of adjustment. It will result in loss of performance.

Do not disassemble the compression damper unit.



#### **INNER TUBE AND OUTER TUBE**

- Inspect the inner tube for scratches. If it has scratches, replace it with a new one.
- Inspect the outer tube for dent. If it is dented all the way to the inner side, replace it with a new one.



• Measure the inner tube runout using the V blocks and dial gauge.

### NOTE:

Inner tube runout is half amount of dial gauge reading.

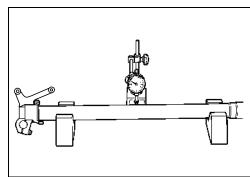
DATA Inner tube runout

Service Limit: 0.4 mm (0.02 in)

09900-20607: Dial gauge

09900-20701: Dial gauge chuck

09900-21304: V blocks



## **FORK CYLINDER UNIT**

• Inspect the fork cylinder unit for scratches or bending. If it has scratches or is bent, replace it with a new one.



### SLIDE BUSHING AND GUIDE BUSHING

- Inspect the teflon coating metals (slide bushing and guide bushing) for wear or damage. If they are worn or damaged, replace them with new ones.
- Inspect the teflon coating metals surface. If they are not clean, clean them with a nylon brush and fork oil.



## LEFT FRONT FORK REASSEMBLY

#### **NOTICE**

When assembling the O-rings, oil seal, dust seal, bushings, compression damper unit and other sliding parts, if an oil other than the specified fork oil is coated, it can lead to oil leakage or operation failure.

Always use the specified fork oil.

#### NOTE:

- \* Clean all fork parts before reassembling.
- \* Wipe off the fork oil from the fork parts before reassembling.
- \* Replace the O-rings, oil seal and dust seal with new ones.

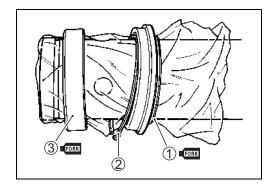
### **INNER TUBE AND OUTER TUBE**

- Apply fork oil to the oil seal lip and the dust seal.
- Cover the inner tube with a vinyl film.
- Install the following parts to the inner tube.

New dust seal 1

Stopper ring ②

New oil seal (3)



### **WARNING**

Attach the oil seal indicating face to the stopper ring side.

If the oil seal is attached reversely, oil leak may occur when the front fork is stroked; oil adhering to the front brake, the brake may loose its effective-ness and, in the end, all this may lead to an accident.

Attach securely the indicating face of the oil seal to the stopper ring side.

## **NOTICE**

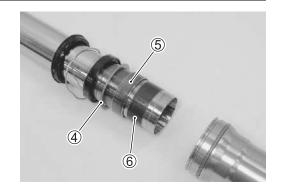
Installing the oil seal ③ and dust seal ① improperly can cause damage to the seal lip.

In installation, cover the inner tube with a protective vinyl film and fit the oil seal 3 and dust seal 1 over the film.

- Remove the vinyl film and then install the seal retainer 4, guide bushing 5 and slide bushing 6.
- Clean the parts and keep them free from dust.

#### NOTE:

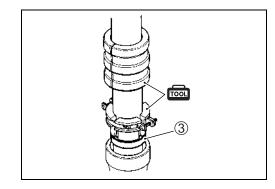
Inspect the bushings for burrs. If there is a burr, remove it with a knife, taking care not to peel off the teflon coating. If the bushings have a large crack or excessive play after installing them, replace them with new ones.



- Insert the inner tube into the outer tube.
- Install a new oil seal ③ with the special tool until the stopper ring groove of the outer tube can be seen.

## 09940-52861: Front fork oil seal installer set

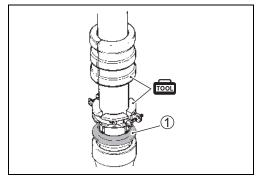
 Attach the stopper ring securely to the stopper ring groove of the outer tube.



• Attach the dust seal 1.

#### NOTE:

After attaching the dust seal, make sure that there are no cracks around the circumference of the seal. Cracks could allow water, mud and the like to enter and cause an oil leak.



#### FORK CYLINDER UNIT AND COMPRESSION DAMPER UNIT

- Stop up the oil hole (A) with finger.
- With the piston rod in fully extended position, pour the specified amount of fork oil.

## Fork cylinder unit oil quantity:

314 ml (10.6/11.1 US/Imp oz)



• With the fork cylinder unit held in vertical position, slowly move the piston rod ① several strokes.

#### **NOTICE**

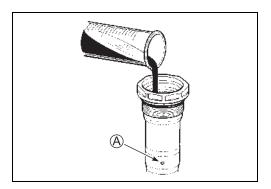
Improper expansion and contraction of the piston rod ① may cause damage to piston rod ①.

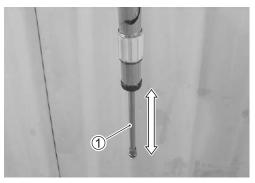
Take sufficient care so as not to damage the piston rod ①.

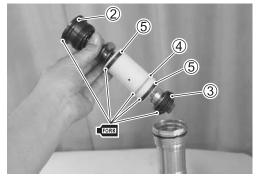
- Clean each thread part before installing.
- Apply fork oil to the new O-rings (2, 3), piston ring 4 and bushings 5 on the compression damper unit.

#### NOTE:

Replace the O-rings (2, 3) with new ones.







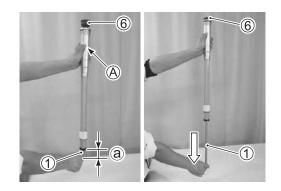
- Insert the compression damper unit (6) into fork cylinder unit at the position where the piston rod ① is extended further to 20 -30 mm (0.8 - 1.2 in) ⓐ from fully compressed position.
- Stop up the oil hole A of the fork cylinder unit with finger, and extend the piston rod ① slowly, then the compression damper unit will be pulled into the fork cylinder unit.
- Temporarily tighten the compression damper unit 6 to the fork cylinder unit.
- Clamp the head (octagonal part) of the fork cylinder unit with a vise. Protect the fork cylinder unit with a rag when using a vise.

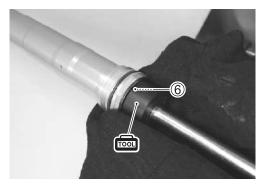


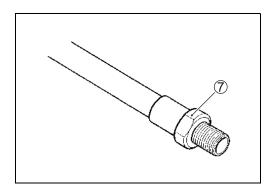
Clamping the fork cylinder unit too tight can damage it.

Do not clamp the fork cylinder unit too tight.

- Tighten the compression damper unit 6 to the specified torque with the special tool.
- Compression damper unit: 30 N·m (3.0 kgf-m, 21.5 lbf-ft)
- 09940-32810: Spring adjuster wrench
- Tighten the lock-nut 7 by hand completely.







- With the fork cylinder unit held in vertical position, slowly move the piston rod ① several strokes by 100 mm (3.9 in) ⑤.
- With the fork cylinder unit held in vertical position, compress the piston rod ① fully to discharge an excess of oil.

## **A** CAUTION

Oil may jet out from the oil hole (A) of the fork cylinder unit and may stick to your eyes and mouth.

Cover the oil hole  $ext{ } ext{ }$ 

#### NOTE:

- \* Protect the inner rod end with a rag.
- \* Cover the oil hole A with a rag.
- \* Set the compression damper setting to the softest.
- Remove the air bleeder valve (8).
- Force out the remaining oil (discharged oil) using compressed air completely.

#### **A** CAUTION

Oil may jet out from fork cylinder unit oil hole and air bleeder. Jet-out oil may stick to your eyes and mouth.

Protect your eyes and mouth with a proper eye protection gear and musk.

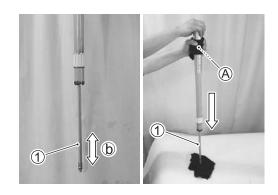
• Apply fork oil to the new O-ring and tighten the air bleeder valve (8).

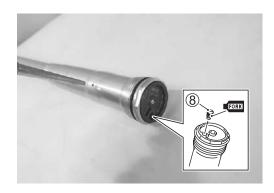
#### NOTE:

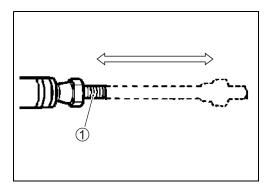
Replace the O-ring with a new one.

## Front fork air bleeder valve: 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)

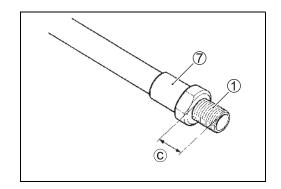
- Move the piston rod ① by hand to inspect it if operating smoothly.
- With the fork cylinder unit in horizontal position, check if the piston rod ① extends to fully extended position spontaneously from its fully compressed position.
- If the piston rod ① is not fully extend, repeat the "COMPRES-SION DAMPER UNIT" procedures (Pour the specified amount fork oil and discharge an excess of oil). (13-14)



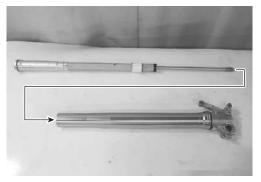




- Tighten the lock-nut 7 by hand completely.
- Make sure approx. 10 mm (0.4 in) © of piston rod thread ① is exposed on the end.

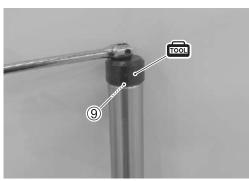


- Completely wipe off the fork oil from the fork cylinder unit.
- Insert the fork cylinder unit assembly into the outer tube.



• Temporarily tighten the fork cylinder unit 9.

09941-53630: Front fork cap socket wrench (50 mm)

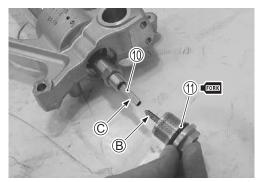


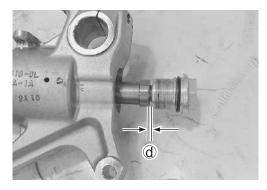
- Insert the push rod 10 into the piston rod.
- Apply fork oil to the new O-ring ①.

#### NOTE:

Replace the O-ring 11 with a new one.

- Insert the shaped projection ® of center bolt into the push rod ©.
- · Slowly tighten the center bolt completely and check the clearance between the lock-nut and center bolt to provide 1 mm (0.04 in) @ or more.





- Turn the lock-nut counterclockwise until it contacts with the center bolt.
- With the lock-nut held immovable using a wrench, tighten the lock-nut/center bolt to the specified torque.

## **NOTICE**

Tightening the center bolt with the piston rod touching the axle holder threads can damage the piston rod. Piston rod damage can result in inner parts damage.

Keep the piston rod apart from the axle holder threads when tightening the center bolt.



• Clamp the brake caliper mounting part of axle holder with a vise. Protect the axle holder with a rag when using a vise.

## **WARNING**

Clamping the axle holder too tight can damage it.

Axle holder damage will affect riding stability.

Do not clamp the axle holder too tight.

• Apply thread lock to the center bolt.

**←**1322D 99000-32150: THREAD LOCK CEMENT "1322D"

or equivalent

- Slowly raise the outer tube.
- Tighten the center bolt to the specified torque.
- Center bolt: 69 N·m (6.9 kgf-m, 50.0 lbf-ft)





• Loosen and remove the fork cylinder unit from the outer tube and slowly slide down the outer tube.

09941-53630: Front fork cap socket wrench (50 mm)

• Apply fork oil to the new O-ring ②.

NOTE:

Replace the O-ring 12 with a new one.

• Pour the specified amount of fork oil into the outer tube.

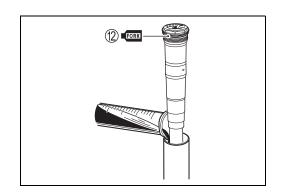
Outer tube oil quantity: 320 ml (10.8/11.3 US/Imp oz)

FORK SHOWA SUSPENSION FLUID SS-19 or equivalent

• Raise the outer tube and temporarily tighten the fork cylinder unit.

09941-53630: Front fork cap socket wrench (50 mm)

• Turn the adjusters to the recorded settings.





## RIGHT FRONT FORK DISASSEMBLY

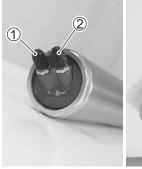
· Thoroughly clean the fork before disassembly.

#### **NOTICE**

Scratches or other damage on the inner tube or on the oil seal lip will cause oil and air leakages.

Avoid scratching or damaging the inner tube or the oil seal. Use a mild detergent or car wash soap and sponge out dirt with plenty of water.

- Remove the inner chamber air valve cap ①, outer chamber air valve cap ② and balance chamber air valve cap ③.
- Check each air pressure setting before disassembling. Record the settings before releasing air pressure.





• With the front fork held in vertical position, release each air pressure in the order of the balance chamber, inner chamber and outer chamber.

## **A** CAUTION

Oil may jet out from the air valves of the front fork and may stick to your eyes and mouth.

When releasing the air pressure, place a rag over the air valves and use the tip of a screwdriver etc. to press the air valves.





#### **AIR CYLINDER UNIT**

• Push down the chamber cap ① and remove the stopper ring 2.

#### NOTE:

If the chamber cap 1 does not push easily, lightly tap it using a plastic hammer. Be careful not to damage the chamber cap 1 when using a plastic hammer.

- Cover the chamber cap ① with a rag.
- Remove the chamber cap ① by compressing the outer tube.

## **A** CAUTION

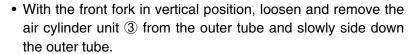
Sudden compression of the outer tube can cause the chamber cap 1 to fly out, creating the risk of personal injury.

When compressing the outer tube, cover the chamber cap ① with a rag.

• Place a drain pan under the front fork and drain fork oil.

#### NOTE:

Move the outer tube several strokes to drain fork oil.

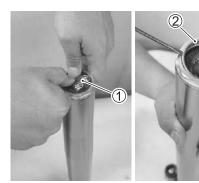


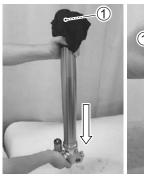
09941-53630: Front fork cap socket wrench (50 mm)

Place a drain pan under the front fork and drain fork oil.

#### NOTE:

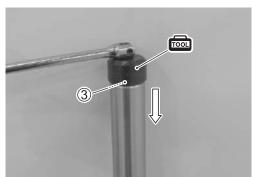
Move the outer tube several strokes to drain fork oil.





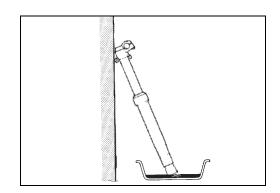






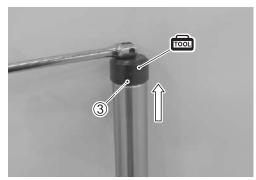


• Hold the front fork inverted position for more than 20 minutes to allow the fork oil to fully drain.



• Raise the outer tube and temporarily tighten the air cylinder unit ③ to the outer tube.

09941-53630: Front fork cap socket wrench (50 mm)



 Clamp the flat part of axle holder ④ with a vise. Protect the axle holder ④ with a rag when using a vise.

## **WARNING**

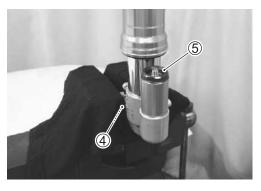
Clamping the axle holder ④ too tight can damage it. Axle holder damage will affect riding stability.

Do not clamp the axle holder ④ too tight.

- Remove the plug bolt ⑤ with a 32 mm socket wrench.
- Place a drain pan under the front fork and drain fork oil.

## NOTE:

Move the outer tube several strokes to drain fork oil.





• Clamp the flat part of axle holder 4 with a vise. Protect the axle holder 4 with a rag when using a vise.

## **WARNING**

Clamping the axle holder 4 too tight can damage it. Axle holder damage will affect riding stability.

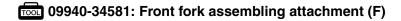
Do not clamp the axle holder 4 too tight.

• Loosen the sealing bolt 6 completely with the special tool.

#### **NOTICE**

Use of an impact wrench may cause damage to the sealing bolt 6.

Do not use impact wrench.



- Pull out the sealing bolt 6.
- Hold the lock-nut with a wrench and remove the sealing bolt 6.

#### **NOTICE**

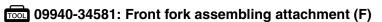
Loosening the sealing bolt 6 with the piston rod 8 touching the axle holder threads can damage the piston rod. Piston rod damage can result in air pressure leakage.

Keep the piston rod 8 apart from the axle holder threads when loosening the sealing bolt 6.

#### **NOTICE**

into the air cylinder unit and air cylinder unit threaded can damage the oil seal.

Do not remove the lock-nut 7.



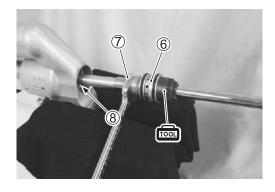
Loosen and remove the air cylinder unit 3.

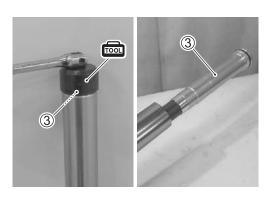
#### **NOTICE**

Removing the air cylinder unit 3 with the piston rod **8** touching the front fork body can damage the piston rod. Piston rod damage can result in air pressure leakage.

Keep the piston rod ® apart from the front fork body when removing the air cylinder unit 3.







- Place a drain pan under the air cylinder unit.
- Move the piston rod ® at least 10 strokes to drain fork oil.

#### **A** CAUTION

Oil may jet out from the hole of the piston rod @ and may stick to your eyes and mouth.

Protect your eyes and mouth with a proper eye protection gear and musk.

#### NOTE:

Moving the piston rod ® at least 10 strokes can be performed to stabilize the remaining balance chamber oil volume.

Balance chamber remaining oil quantity:

Approx. 6 ml (0.20/0.21 US/Imp oz)

## **INNER TUBE AND OUTER TUBE**

• Procedure of removing the inner tube from the outer tube is the same as that of the left front fork. ( 18-10)

## RIGHT FRONT FORK INSPECTION

#### **INNER TUBE AND OUTER TUBE**

Inspection procedure of the inner tube and the outer tube is the same as that of the left front fork. ( 18-11)

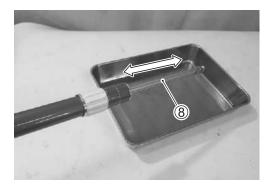
#### **AIR CYLINDER UNIT**

• Inspect the air cylinder unit for scratches or bending. If it has scratches or is bent, replace it with a new one.



## **SLIDE BUSHING AND GUIDE BUSHING**

Inspection procedure of the slide bushing and the guide bushing is the same as that of the left front fork. ( 18-12)



## RIGHT FRONT FORK REASSEMBLY

#### **NOTICE**

When assembling the O-rings, oil seal, dust seal, bushings and other sliding parts, if an oil other than the specified fork oil is coated, it can lead to air leakage or operation failure.

Always use the specified fork oil.

#### NOTE:

- \* Clean all fork parts before reassembling.
- \* Wipe off the fork oil from the fork parts before reassembling.
- \* Replace the O-rings, oil seal and dust seal with new ones.

#### **INNER TUBE AND OUTER TUBE**

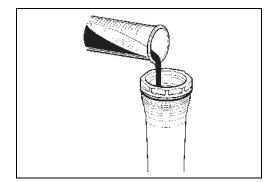
Procedure of installing the inner tube to the outer tube is the same as that of the left front fork. (13-13)

#### **AIR CYLINDER UNIT**

• With the piston rod in fully extended position, pour the specified amount of fork oil.

Inner chamber oil quantity: 100 ml (3.4/3.5 US/Imp oz)

FORK SHOWA SUSPENSION FLUID SS-19 or equivalent



• Apply fork oil to the new O-rings (1), 2).

#### NOTE:

Replace the O-rings (1,2) with new ones.

• Push down the chamber cap 3.



- Install the stopper ring 4.
- Set the chamber cap ③ to the correct position by compressing the piston rod.
- Check that the stopper ring 4 is installed correctly.





- Connect the inner chamber air valve using a hand-operated air pump. ( 4-7)
- Adjust the air pressure to the specified value.

#### **A** CAUTION

Sudden pressurization will cause the piston rod to fly out, creating the risk of piston rod damage and personal injury.

Do not apply sudden pressurization.



Standard: 1 200 kPa (12 kgf/cm<sup>2</sup>, 171 psi)

• Measure the air cylinder unit free length ⓐ. If the length is not within the standard range, replace it with a new one.

#### NOTE:

If measurement of air cylinder unit free length a is difficult, measure piston rod length b.

Air cylinder unit free length @:

Standard: 944.5 - 946.5 mm

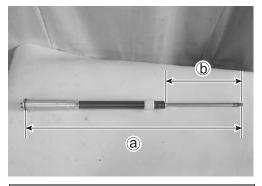
(37.18 – 37.26 in)

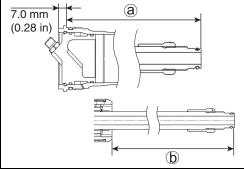
Piston rod length **(b)**:

Standard: 341.5 - 343.5 mm

(13.44 - 13.52 in)







• Insert the air cylinder unit ⑤ into the outer tube.

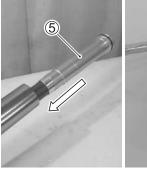
#### **NOTICE**

Inserting the air cylinder unit ⑤ with the piston rod touching the front fork body can damage the piston rod. Piston rod damage can result in air pressure leakage.

Keep the piston rod apart from the front fork when inserting the air cylinder unit ⑤.

• Temporarily tighten the air cylinder unit ⑤.

09941-53630: Front fork cap socket wrench (50 mm)



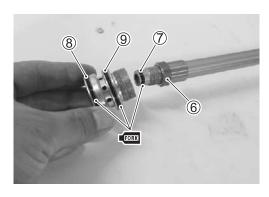


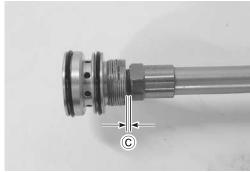
- Tighten the lock-nut 6 by hand completely.
- Apply fork oil to the new O-rings (7, 8, 9).

#### NOTE:

Replace the O-rings (7, 8, 9) with new ones.

• Slowly tighten the sealing bolt completely and check the clearance between the lock-nut and sealing bolt to provide 1.5 mm (0.06 in) © or more.





- Turn the lock-nut counterclockwise until it contacts with the sealing bolt.
- With the lock-nut held immovable using a wrench, tighten the lock-nut/sealing bolt to the specified torque.

## NOTICE

Tightening the sealing bolt with the piston rod touching the axle holder threads can damage the piston rod. Piston rod damage can result in air pressure leakage.

Keep the piston rod apart from the axle holder threads when tightening the sealing bolt.

Lock-nut/sealing bolt: 28 N·m (2.8 kgf-m, 20.0 lbf-ft)

09940-34581: Front fork assembling attachment (F)



 Clamp the flat part of axle holder with a vise. Protect the axle holder with a rag when using a vise.

## **WARNING**

Clamping the axle holder too tight can damage it. Axle holder damage will affect riding stability.

Do not clamp the axle holder too tight.

• Apply thread lock to the sealing bolt.

## 99000-32150: THREAD LOCK CEMENT "1322D"

or equivalent

- Slowly raise the outer tube.
- Tighten the sealing bolt to the specified torque.
- Sealing bolt: 69 N·m (6.9 kgf-m, 50.0 lbf-ft)

09940-34581: Front fork assembling attachment (F)

• Loosen and remove the air cylinder unit from the outer tube and slowly slide down the outer tube.

09941-53630: Front fork cap socket wrench (50 mm)

• Apply fork oil to the new O-ring 10.

#### NOTE:

Replace the O-ring 10 with a new one.

• Pour the specified amount of fork oil into the outer tube.

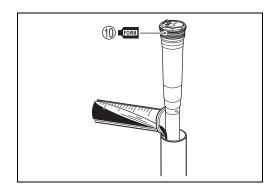
Outer chamber oil quantity: 250 ml (8.5/8.8 US/Imp oz)

FORK SHOWA SUSPENSION FLUID SS-19 or equivalent

 Raise the outer tube and temporarily tighten the air cylinder unit.

09941-53630: Front fork cap socket wrench (50 mm)







- Connect the outer chamber air valve using a hand-operated air pump. ( \$\sum 4-7)
- Adjust the air pressure within 50 100 kPa (0.5 1.0 kgf/cm², 7 - 14 psi).

#### **A** CAUTION

Sudden pressurization can damage the fork parts.

Do not apply sudden pressurization.

· Pour the specified amount of fork oil into the balance chamber.

#### NOTE:

When disassembling the right front fork, leave approx. 6 ml (0.20/0.21 US/Imp oz) of fork oil in the balance chamber. When reassembling, replenish 4 ml (0.135/0.141 US/Imp oz) of fork oil.

Balance chamber oil quantity (When reassembling): 4 ml (0.135/0.141 US/Imp oz) Balance chamber total oil quantity:

10 ml (0.3/0.4 US/Imp oz))

## FORK SHOWA SUSPENSION FLUID SS-19 or equivalent

• Clamp the flat part of axle holder with a vise. Protect the axle holder with a rag when using a vise.

#### **WARNING**

Clamping the axle holder too tight can damage it. Axle holder damage will affect riding stability.

Do not clamp the axle holder too tight.

Apply fork oil to the new O-ring ①.

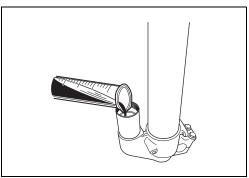
## NOTE:

Replace the O-ring 11 with a new one.

• Tighten the plug bolt ② to the specified torque.

Plug bolt: 45 N·m (4.5 kgf-m, 32.5 lbf-ft)









- Connect the balance chamber air valve using a hand-operated air pump. ( 3-4-7)
- Adjust the air pressure to the specified value.

#### **A** CAUTION

Sudden pressurization can damage the fork parts.

Do not apply sudden pressurization.

## **DATA** Balance chamber air pressure:

1 200 kPa (12 kgf/cm<sup>2</sup>, 171 psi)

- Connect the outer chamber air valve using a hand-operated air pump. ( 4-7)
- Adjust the air pressure to the specified value.

Outer chamber pressure: 0 kPa (0 kgf/cm², 0 psi)



- Install the air valve caps ((13,(4),(5)) by hand.
- After installing the front fork, adjust each air pressure to the record settings in the right front fork air pressure adjustment procedure. (2-4-12)

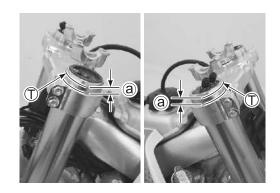


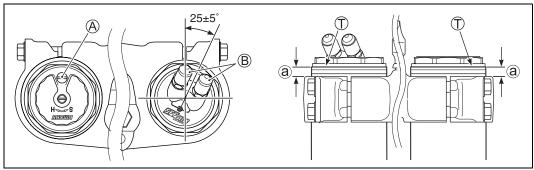




## **INSTALLATION**

- ullet Install the front fork with the upper surface  $oxed{\mathbb{T}}$  of the outer tube positioned 8.0 mm (0.31 in) @ from the upper surface of the upper bracket.
- $\bullet$  Check that the air bleeder valve  $\ensuremath{\mathbb{A}}$  or air valves  $\ensuremath{\mathbb{B}}$  are positioned at the front side as shown.





- Tighten the front fork lower clamp bolts to the specified torque.
- Front fork lower clamp bolt: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



• Tighten the fork cylinder unit (LH) or air cylinder unit (RH) to the specified torque.

#### NOTE:

Before tightening the air cylinder unit, remove the air valve caps.

Fork cylinder unit: 34 N·m (3.4 kgf-m, 24.5 lbf-ft)
Air cylinder unit: 34 N·m (3.4 kgf-m, 24.5 lbf-ft)

09941-53630 : Front fork cap socket wrench (50 mm)

• Tighten the front fork upper clamp bolts to the specified torque.

## Front fork upper clamp bolt:

23 N·m (2.3 kgf-m, 16.5 lbf-ft)

#### NOTE:

Check that the valve is positioned at the front side.

- Install the handlebars. (2718-40, 20-28)
- Install the front wheel. ( 16-6)
- Install the brake caliper. (LH only) ( 17-9)
- Install the front fork protector.
- Front fork protector bolt: 4.9 N·m (0.49 kgf-m, 3.5 lbf-ft)

#### INSPECTION AFTER INSTALLATION

- Front fork ( 2-37)
- Steering (2-39)
- Wiring harness, cable and hose routing
   (20-20, -22, -26)

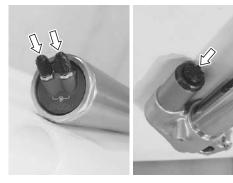


## **DISPOSAL**

#### For right front fork

High pressure air is sealed in the right front fork unit. Be sure to release high pressure air before disposing the right front fork unit.

• Remove the air valve caps.



· Press the valves with a screwdriver.

## **WARNING**

Releasing high pressure air from the right front fork unit can be hazardous.

Place a rag over the valves and push the valves with a screwdriver to release high pressure air. Do not use your finger to push the valve, and direct the valve away from your face and body.



#### RIGHT FRONT FORK LABEL

#### WARNING







This unit contains high-pressure air. Mishandling can cause explosion.

- \* Keep away from fire and heat.
- \* Read owner's manual for more information.

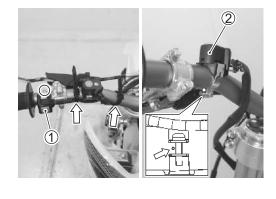
#### NOTE:

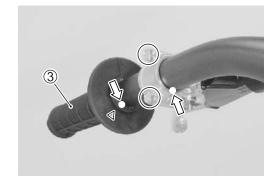
Ask your Suzuki dealer to dispose of the right front fork.

## **STEERING REMOVAL**

#### **HANDLEBARS**

- Place the motorcycle on a block to lift front wheel off the ground.
- Remove the front number plate and handlebar pad. ( 18-4)
- Remove the clamps and engine stop switch 1.
- Mark the paint mark on the handlebars between the S-HAC switch clamps before removing.
- Remove the S-HAC switch 2.
- Mark the paint marks to the matching surfaces of clutch lever holder and handlebars, left handlebar grip and handlebars.
- Remove the clutch lever holder.
- Remove the left handlebar grip 3.





- · Mark the paint mark to the matching surface of master cylinder holder and handlebars before removing.
- Remove the front brake master cylinder holder.

#### NOTE:

Do not turn the front brake master cylinder upside down.

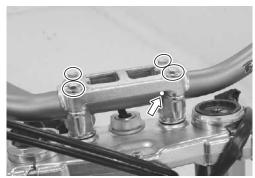
- Mark the paint mark to the matching surface of throttle case and handlebars before removing.
- Remove the throttle case screws.



• Slightly loosen the handlebar holder set nuts.

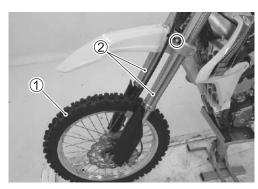


- · Mark the paint mark to the matching surface of handlebar holder and handlebars before removing.
- Remove the handlebars by removing the handlebar clamp bolts.



#### **STEERING STEM**

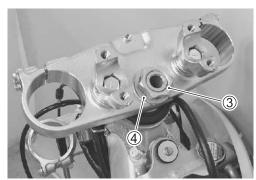
- Remove the front wheel ①. (16-3)
- Remove the brake hose guide.
- Remove the front forks ②. ( 18-4)



• Remove the front fender.



- Remove the steering stem head nut ③ and washer ④.
- Remove the steering stem upper bracket.



• Remove the handlebar holder set bolts and nuts.



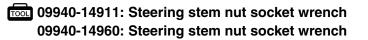
Remove the handlebar holders, damper bushings and spacers.



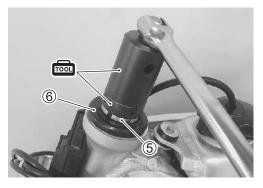
• Remove the steering stem nut ⑤ and steering upper cover ⑥ with the special tools.

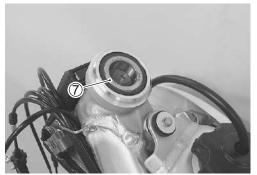
#### NOTE:

Hold the steering stem lower bracket to prevent it from falling.



- Remove the steering stem lower bracket and lower bearing.
- Remove the upper bearing ⑦.





## **INSPECTION**

- Inspect the removed parts for the following abnormalities.
  - Distortion of the steering stem
  - Bearing wear or damage
  - Abnormal bearing noise
  - Race wear or damage
  - Damper bushing wear or damage
- If any abnormal points are found, replace defective parts with new ones.



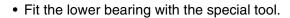






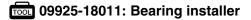
## **BEARING REPLACEMENT**

• Remove the lower bearing.



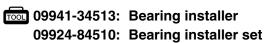
NOTE:

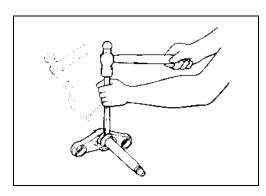
Replace the outer race and bearing as a set.

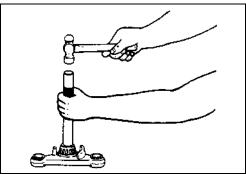


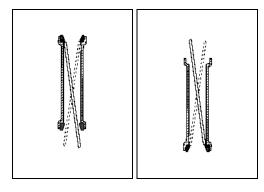
• Drive out the outer races using the steel rod.

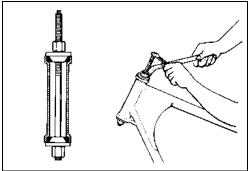












## **INSTALLATION**

Install the steering in the reverse order of steering removal. Pay attention to the following points:

#### STEERING STEM

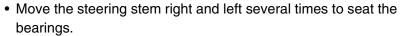
Apply grease to the bearings.

**→** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent

- Install the steering stem lower bracket, upper bearing, steering upper cover and steering stem nut.
- Tighten the steering stem nut with the special tools. [45 N·m (4.5 kgf-m, 32.5 lbf-ft)]

09940-14911: Steering stem nut socket wrench 09940-14960: Steering stem nut socket wrench



• Loosen the steering stem nut 1/4 – 1/2 turn.

Steering stem nut: 45 N·m (4.5 kgf-m, 32.5 lbf-ft) then turn counterclockwise 1/4 – 1/2

• Install the damper bushings, spacers and handlebar holders. NOTE:

Make sure that the notch mark (A) on the handlebar holder faces backward.

• Temporarily tighten the handlebar holder set nuts.

- Fit the steering stem upper bracket and washer.
- Temporarily tighten the steering stem head nut.

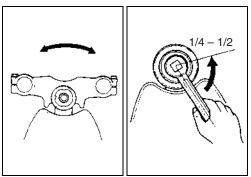
#### NOTE:

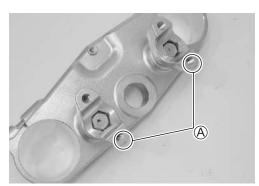
Pay attention to the direction of the washer.

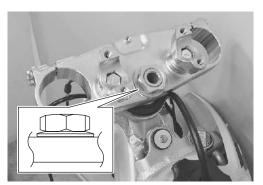








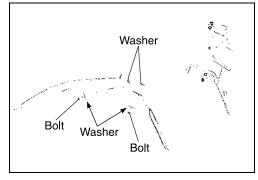




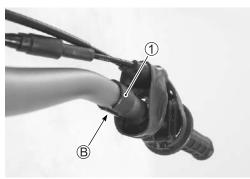
- Temporarily install the front forks to the steering stem, and tighten the lower clamp bolts.
- Tighten the steering stem head nut to the specified torque.
- Steering stem head nut: 120 N·m (12.0 kgf-m, 87.0 lbf-ft)



- · Install the front fender as shown.
- Reinstall the front forks. ( 18-31)
- Install the front wheel. ( 16-6)



- Insert the collar ① and throttle assembly onto the handlebars.
- Face the cut-line (B) of collar (1) to the lower side.

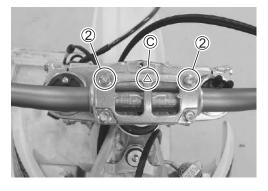


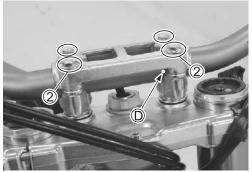
- Set the mark © on the handlebar holder forward.
- Tighten the handlebar clamp bolts to the specified torque.

#### NOTE:

When tightening the handlebar clamp bolts, first tighten the bolts ②.





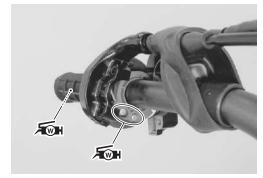


- Tighten the handlebar holder set nuts to the specified torque.
- Handlebar holder set nut: 44 N⋅m (4.4 kgf-m, 32.0 lbf-ft)



- · Apply grease to the sliding surface of the handlebars and throttle grip.
- Apply grease to the throttle cable spool.

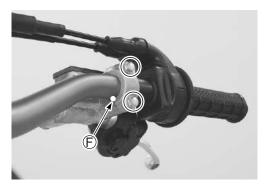
**FWH** 99000-25350: SUZUKI WATER RESISTANT **GREASE EP2 or equivalent** 



- Align the matching mark © on the handlebars with the throttle case matching surface.
- Tighten the throttle case screws to the specified torque.
- Throttle case screw: 3.8 N·m (0.38 kgf-m, 2.75 lbf-ft)

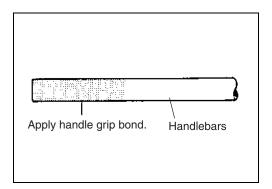


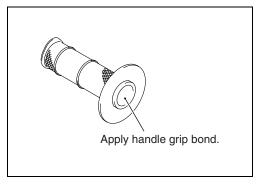
- ullet Align the matching mark ullet on the handlebars with the master cylinder matching surface.
- Tighten the upper bolt first temporarily to provide clearance on the lower side and then tighten both the bolts to the specified torque.
- Master cylinder holder bolt : 10 N⋅m (1.0 kgf-m, 7.0 lbf-ft)



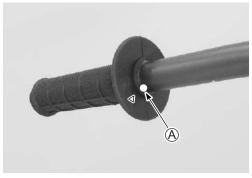
## **HANDLEBARS**

• Apply handle grip bond to the left handlebar and inside of the left handlebar grip.





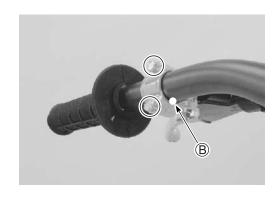
• Align the "△" mark on the left handlebar grip with the matching mark (♠) on the handlebars.

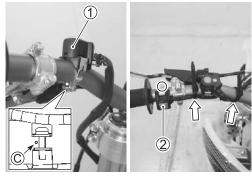


- Align the matching mark (B) on the handlebars with the clutch lever holder matching surface.
- Tighten the upper bolt first temporarily to provide clearance on the lower side and then tighten both the bolts to the specified torque.

## Clutch lever holder bolt: 3 N·m (0.3 kgf-m, 2.0 lbf-ft)

- Position the S-HAC clamp to the matching mark © on the handlebars.
- Install the S-HAC switch ①.
- Install the engine stop switch 2 and clamps.
- Install the front number plate and handlebar pad.





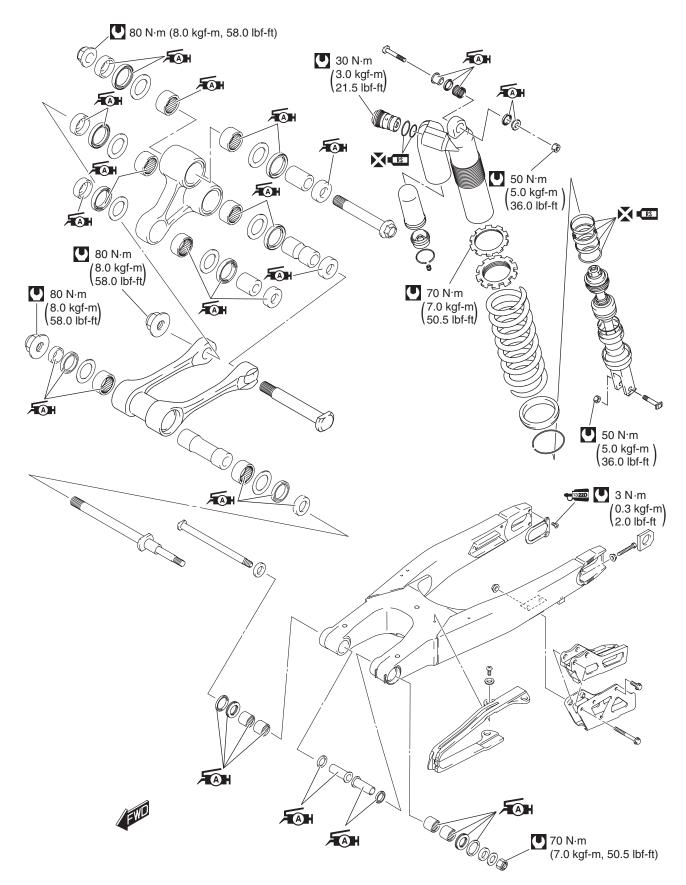
#### INSPECTION AFTER INSTALLATION

- Front fork (\$\insert{2}-37)\$
- Steering ( 2-39)
- · Wiring harness, cable and hose routing ( 20-20, -22, -26)
- Handlebars set-up ( 20-28)

# REAR SUSPENSION

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# CONSTRUCTION REAR SUSPENSION

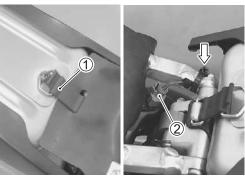


# **REAR SHOCK ABSORBER REMOVAL**

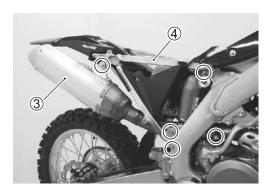
- Place a block under chassis tube.
- Remove the seat and right frame cover. ( 5-2)
- Loosen the air cleaner outlet tube clamp screw.



- Remove the rubber band 1).
- Disconnect the IAT sensor coupler ② and remove the clamp.



 $\bullet$  Remove the muffler  $\ensuremath{\mathfrak{D}}$  and seat rail assembly  $\ensuremath{\mathfrak{A}}.$ 





• Remove the rear shock absorber upper mounting bolt and nut.



· Remove the rear shock absorber lower mounting bolt and nut. NOTE:

If necessary, move the swingarm up or down to facilitate this mounting bolt/nut removal.

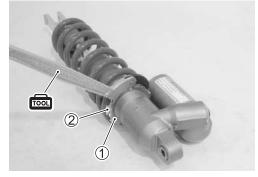
• Remove the rear shock absorber.



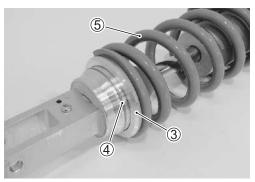
## SPRING REPLACEMENT

- Loosen the lock-nut 1 with the special tool and turn it fully to the end of the thread.
- Turn the adjuster ② as well as the lock-nut ①.

09910-60611: Universal clamp wrench



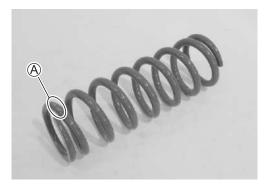
- Depress the spring seat ③ and remove the stopper ring ④.
- Remove the spring seat 3 and the spring 5 from the rear shock absorber.

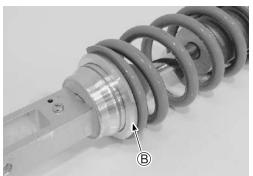


• Install the lock-nut, adjuster, spring, spring seat and stopper ring.

#### NOTE:

- \* Install the spring as its painted side (Small diameter side) faces bottom.
- \* When installing the spring seat, insert the tapered end B of the spring seat to the bottom.





· Adjust the spring set length and tighten the lock-nut.

## **DATA** Standard spring set length:

5 mm (0.2 in) compressed from the free length Spring set length adjustable range:

248 - 262 mm (9.8 - 10.3 in)

[at spring free length 265 mm (10.4 in)]

**a:** Hardest spring setting

**b**: Softest spring setting

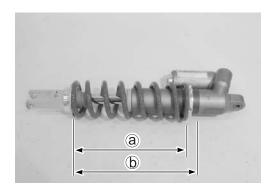
Spring adjuster lock-nut: 70 N·m (7.0 kgf-m, 50.5 lbf-ft)

#### NOTE:

Be sure to perform the rear suspension sag adjustment after installing the rear shock absorber. ( 4-18)

## INSPECTION

- Inspect the rear shock absorber for oil leakage.
- Inspect the damper rod for bends and smooth movement.
- Inspect the bump rubber for deterioration and damage.
- Inspect the damper rod hidden by the bump rubber by moving the bump rubber.
- If necessary, replace the defective part with a new one.
- Inspect the spacers and dust seals for damage.
- Inspect the bearing for excessive play and smooth movement.
- If necessary, replace the defective part with a new one.

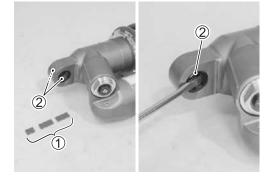






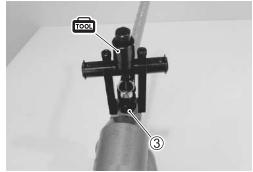
## **BEARING REPLACEMENT**

- Remove the spacers.
- Remove the needle roller bearings ①. (26 pieces of needle roller bearing)
- Remove the dust seals 2.



• Remove the needle roller bearing cage 3 with the special tool.

09921-20240: Bearing remover set



• Press the new needle roller bearing cage with the special tool and a suitable size socket wrench.

#### NOTE:

When installing the needle roller bearing cage, the stamped mark on the bearing must face left side.

Position the needle roller bearing cage by referring to the illustration of page 19-23.

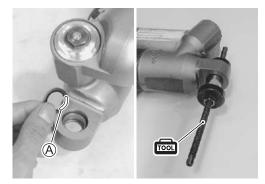


• Press the new dust seals with the special tool and a suitable size socket wrench.

#### NOTE:

When installing the dust seal, the stamped mark (A) on the dust seal must face inside.

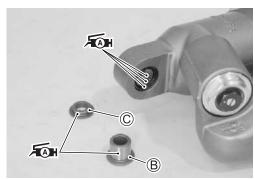




- · Apply grease to the needle roller bearings and install them.
- Apply grease to the dust seals and spacers.
- Install the spacers B and C.
  - B For right side
  - © For left side



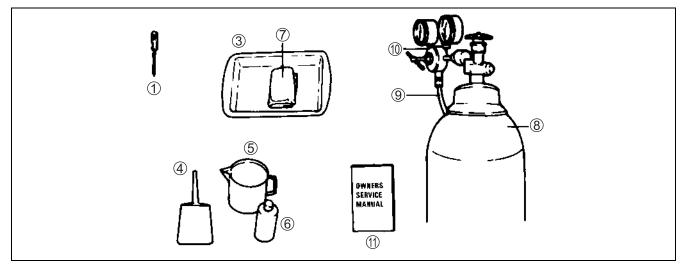
or equivalent



#### OIL REPLACEMENT

#### **TOOLS AND EQUIPMENT**

Following tools and equipment are required to perform oil replacement.



- 1 Screwdriver or small punch
- 2 Vise\*
- ③ Drain Pan
- 4 Oil can
- (5) Beaker
- 6 Specified Shock Oil (SS25)
- \* Not shown in the illustration

- 7 Rags
- 8 Nitrogen tank
- 9 Filler Hose and Nozzle
- 10 Regulator Assembly
- 11 Owner's Service Manual

#### **OIL REPLACEMENT PROCEDURE**

- Remove the rear shock absorber unit from the frame (\$\sum\_19-3\$), clean and dry it.
- Remove the spring from the rear shock absorber unit. (19-4)

#### NOTE:

Inspect the rear shock absorber unit for oil leakage.

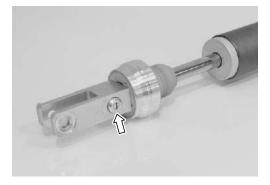
Turn the rebound damping force adjuster screw counterclockwise until it stops so that the rear suspension oil can be poured easily.

 Remove the valve cap. Press the valve with a screwdriver to bleed out nitrogen gas.

#### **WARNING**

Releasing high pressure gas from the rear shock absorber unit can be hazardous.

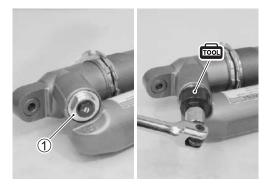
Never perform any servicing until the nitrogen gas pressure has been released from the rear shock absorber unit. When releasing the gas pressure, place a rag over the gas valve and use the tip of a screwdriver etc. to press the valve. Do not use your finger to depress the gas valve, and direct the valve away from your face and body.





• Remove the compression adjuster assembly ① with the special tool from the rear shock absorber.

09941-53660: RCU socket wrench



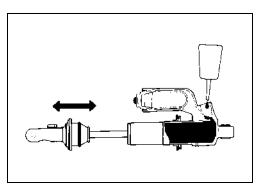
- Place a drain pan under the rear shock absorber unit.
- · Move the rod and drain the oil completely.
- Push the valve core again to equalize the bladder to atmospheric pressure.



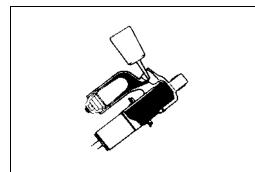
 Pour the fresh specified rear suspension oil as shown while moving the rod.

#### NOTE:

Be sure to extend the rod after filling the oil.



- Tilt the shock absorber unit as shown and pour the fresh rear suspension oil fully into the reservoir.
- REAR SUSPENSION OIL SS-25 or equivalent
- Oil capacity: 383 ml (13.0/13.5 US/Imp oz)



- Cover the compression adjuster hole with the root of your
- Tilt and shake the rear shock absorber unit to fill the reservoir with the oil.
- Add the oil and repeat the above procedure until the reservoir is filled with the oil completely.



- Replace the O-rings on the compression adjuster assembly with new ones.
- Apply rear suspension oil to the O-rings.



• Reinstall the compression adjuster assembly 1.

09941-53660: RCU socket wrench

Compression adjuster assembly:

30 N·m (3.0 kgf-m, 21.5 lbf-ft)

- Fill the rear shock absorber unit with nitrogen gas to 784 kPa (7.8 kgf/cm², 111.5 psi).
- Tighten the valve cap.
- Reinstall the spring. (\$\sumsymbol{19-4}\$)

#### **WARNING**

Use of flammable gas for pressuring the rear shock absorber unit can be hazardous. Flammable gas such as gas welding oxygen can cause a fire hazard.

Use nitrogen gas. If nitrogen gas is not available, compressed air free from water can be substituted.

#### **NOTICE**

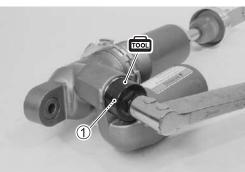
Applying too much pressure to the rear shock absorber unit may rupture the rear shock absorber unit.

Be sure to fill the rear shock absorber unit to the specified pressure.

### NOTICE

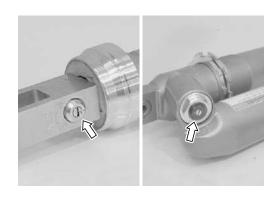
Riding the motorcycle with abnormal gas pressure can damage the rear shock absorber unit. Low gas pressure can result in oil leakage. Abnormal gas pressure cannot provide normal rear shock absorber unit performance.

Be sure to fill the rear shock absorber unit to the specified pressure.



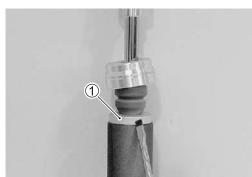
### DISASSEMBLY AND INSPECTION

- Clean and dry the rear shock absorber.
- Remove the spring from the rear shock absorber. ( 19-4)
- Turn the rebound damping force adjuster and compression damping force adjusters to the softest position. Record the settings before turning the adjusters.
- Press the valve with a screwdriver to bleed out nitrogen gas. ( 319-7)
- Remove the compression adjuster assembly and drain the oil. ( 19-8)
- Vise the rear shock absorber unit in inverted position.
- Depress the bump rubber fully to protect the damper rod.





• Evenly hammer the stopper 1 with a screwdriver or equivalent and remove it from the rear shock absorber body.



• Depress the seal case ② with a screwdriver until the circlip ③ is fully exposed.



• Remove the circlip 3.

#### **NOTICE**

Removing the circlip in an improper manner can cause damage to the shock absorber body.

In the removal operation, use caution not to cause damage.

- Slowly draw the damper rod assembly 

   until the O-ring on the seal case is seen.
- Draw out the seal case 2.
- Cut the special tool so that the clearance on its cutting surface become 1 mm or less when the special tool is set to the circlip groove (A).

#### NOTE:

The tapered side <sup>®</sup> of special tool faces shock absorber body side.

### 09943-02810: Rear cushion guard ring

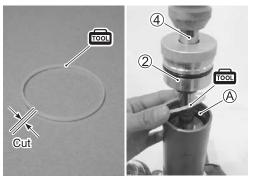
- Extract the damper rod assembly ④ from the shock absorber body.
- Remove the special tool.

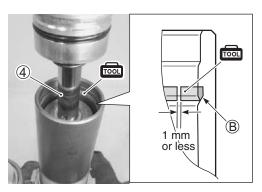
#### NOTE:

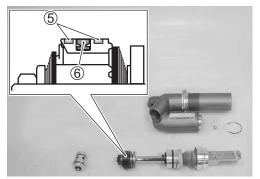
The special tool is not necessary when reassembling.

- Inspect the damper rod for bends and scratches.
- Inspect the inner surface of the body.
- Replace the O-rings with new ones.
- Replace the piston rings ⑤ and packing ⑥ with new ones if necessary.









#### REASSEMBLY

- Apply the rear suspension oil to the O-ring, piston rings and packing.
- Insert the damper rod assembly ① and fit a new circlip ②.
- Pull up the damper rod assembly 1 until it is stopped by the circlip 2.
- Fit the stopper to the shock absorber body.
- Fill the specified rear suspension oil in the rear shock absorber. ( 19-8)

# REAR SUSPENSION OIL SS-25 or equivalent

### Oil capacity: 383 ml (13.0/13.5 US/Imp oz)

- Reinstall the compression adjuster assembly. (2719-9)
- Pressure the rear shock absorber unit with nitrogen gas to 784 kPa (7.8 kgf/cm<sup>2</sup>, 111.5 psi). ( 19-9)
- Reassemble the spring and adjust the spring set length. ( 19-4, -5)
- Tighten the valve cap.
- Turn the adjusters to the recorded settings.

#### INSTALLATION

Install the rear shock absorber in the reverse order of removal. Pay attention to the following points:

• Tighten the rear shock absorber lower mounting bolt and nut to the specified torque.

#### NOTE:

If necessary, move the swingarm up or down to facilitate this mounting bolt/nut tightening.

Rear shock absorber lower mounting nut:

50 N·m (5.0 kgf-m, 36.0 lbf-ft)

- Tighten the upper mounting bolt and nut to the specified torque.
- Rear shock absorber upper mounting nut:

50 N·m (5.0 kgf-m, 36.0 lbf-ft)







### **DISPOSAL**

High pressure nitrogen gas is sealed in the rear shock absorber unit. Be sure to release gas before disposing the rear shock absorber unit.

• Remove the valve cap.



· Press the valve with a screwdriver.

#### **A WARNING**

Releasing high pressure gas from the rear shock absorber unit can be hazardous.

Place a rag over the valve and push the valve with a screwdriver to release nitrogen gas. Do not use your finger to push the valve, and direct the valve away from your face and body.



#### **REAR SUSPENSION LABEL**

#### **WARNING**







This unit contains high-pressure nitrogen gas. Mishandling can cause explosion.

- \* Keep away from fire and heat.
- \* Read owner's manual for more information.

#### NOTE:

Ask your Suzuki dealer to dispose of the rear suspension unit.

# **SWINGARM**

### **REMOVAL**

- Place the motorcycle on a block to lift rear wheel off the ground.
- Remove the rear wheel. ( 16-7)
- Remove the chain guide.



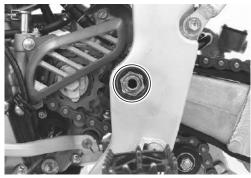
- Remove the master cylinder mounting bolts and brake hose guide bolt.
- Remove the rear brake caliper from the swingarm.



- Remove the cushion rod bolt and nut.
- Remove the cushion lever bolt and nut.



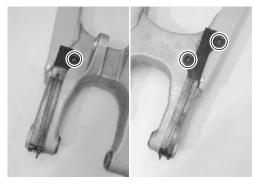
• Remove the swingarm pivot nut and washer.



- Depress the rear brake pedal and remove the pivot shaft.
- Remove the swingarm.



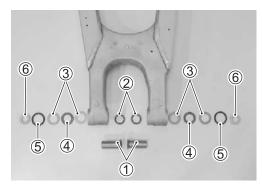
· Remove the chain buffer.



• Remove the plates.



- Remove the following parts from the swingarm.
  - Spacer ①
  - Oil seal ②
  - Washer ③
  - Thrust bearing ④
  - Dust seal ⑤
  - Spacer 6



### INSPECTION

#### **PIVOT SHAFT**

- Measure the pivot shaft runout with the dial gauge and V
- If any the runout exceeds the limit, replace the pivot shaft with a new one.

#### NOTE:

Shaft runout is half amount of dial gauge reading.

**DATA** Swingarm pivot shaft runout

Service Limit: 0.3 mm (0.01 in)

1001 09900-20607: Dial gauge

09900-20701: Dial gauge chuck

09900-21304: V blocks

#### **CHAIN BUFFER AND CHAIN GUIDE**

- Inspect the chain buffer and chain guide for damage and excessive wear.
- If any defects are found, replace the chain buffer or guide with a new one.



#### **PLATE**

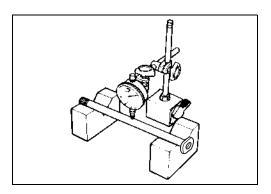
- Inspect the plate for damage and excessive bend.
- If any defects are found, replace the plate with a new one.



#### **SWINGARM**

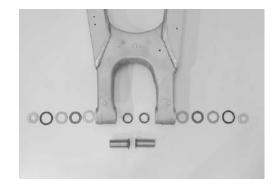
- Inspect the swingarm for cracks and damage.
- If any defects are found, replace the swingarm with a new one.





#### BEARING, SPACER, DUST SEAL, OIL SEAL

- Inspect the bearings, spacers, dust seals and oil seals for damage.
- If necessary, replace the defective part with a new one.



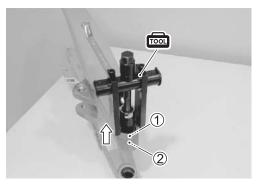
- Insert the spacer into the bearings and inspect them for play and smooth movement.
- If excessive play is noted, replace the bearings with new ones.



### BEARING REPLACEMENT

• Remove the bearings 1 and 2 with the special tool.





• Press the new bearings ① and ② with the suitable socket wrench and special tool. (2719-24)

#### NOTE:

When installing the bearings 1 and 2, the stamped mark on each bearing must face outside.

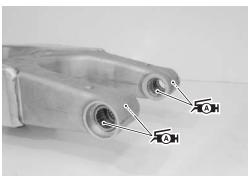
09924-84521: Bearing installer set

A Direction of outside

· Apply grease to the bearings.

**1** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent



### **INSTALLATION**

Install the swingarm in the reverse order of removal. Pay attention to the following points:

- Install the following parts into the swingarm.
  - 1 Oil seal
- (5) Washer
- 2 Spacer
- 6 Dust seal
- 3 Washer
- 7 Spacer
- 4 Thrust bearing
- Apply grease to the dust seals, bearings and oil seals.

# **√**A**H** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent

· Apply thread lock to the plate screws.



or equivalent

• Tighten the plate screws securely.

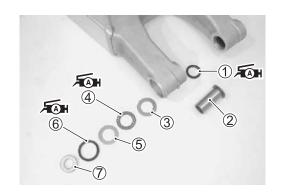
Swingarm rear axle plate screw: 3 N⋅m (0.3 kgf-m, 2.0 lbf-ft)

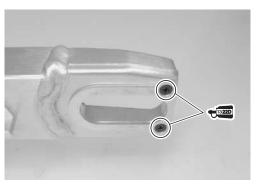
- · Install the chain buffer.
- Install the swingarm.
- Tighten the swingarm pivot nut to the specified torque.
- Swingarm pivot nut: 70 N·m (7.0 kgf-m, 50.5 lbf-ft)

- · Install the cushion lever and cushion rod.
- Tighten the cushion lever nut and cushion rod nut to the specified torque.
- Cushion lever nut: 80 N·m (8.0 kgf-m, 58.0 lbf-ft) Cushion rod nut: 80 N·m (8.0 kgf-m, 58.0 lbf-ft)
- Tighten the master cylinder mounting bolts to the specified torque.
- Master cylinder mounting bolt:

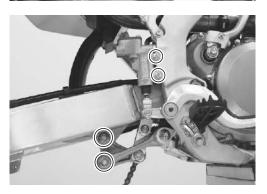
10 N·m (1.0 kgf-m, 7.0 lbf-ft)

- Install the rear wheel. ( 16-11)
- Adjust the drive chain slack. ( 2-31)

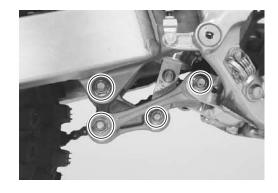






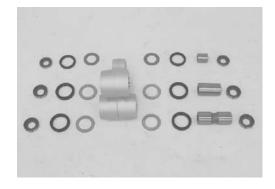


- Place a block under the chassis tubes.
- Remove the rear cushion rod bolts and nuts.
- Remove the cushion lever bolt and nut.
- Remove the rear shock absorber lower mounting bolt and nut.



• Remove the collars, dust seals, washers and spacers.

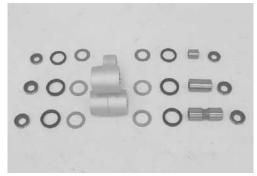




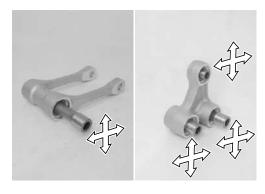
### **INSPECTION**

- Inspect the cushion rod and cushion lever for damage.
- Inspect the dust seals and spacers for damage.
- If necessary, replace the defective part with a new one.





- Insert the spacers into the bearings and inspect them for excessive play and smooth movement.
- If excessive play is noted, replace the bearing with a new one.



### **BEARING REPLACEMENT**

- Remove the collars, dust seals, washers and spacers. ( 19-19)
- Remove the needle roller bearings.

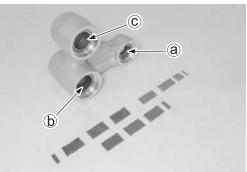
Cushion rod bearing

(One side 32 pieces of needle roller bearing)

Cushion lever bearing

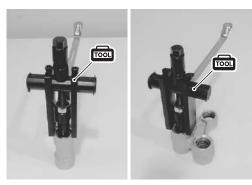
- (a) (26 pieces of needle roller bearing)
- (b) (One side 32 pieces of needle roller bearing)
- © (One side 32 pieces of needle roller bearing)





• Remove the needle roller bearing cages with the special tool.





• Press fit the new needle roller bearing cages with the special tool and a suitable size socket wrench.

#### NOTE:

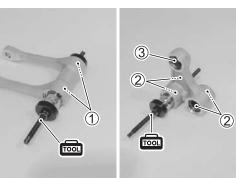
- \* When installing the needle roller bearing cages ① and ②, the stamped mark on each bearing must face outside. (③: right side)
- \* Position the needle roller bearing cages by referring to the illustration of page 19-23.

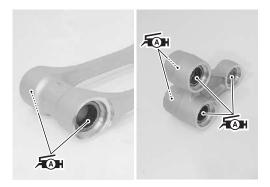


• Apply grease to the needle roller bearings and install them.



or equivalent





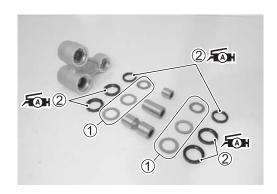
### **INSTALLATION**

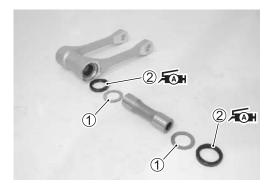
Install the rear suspension linkage in the reverse order of removal. Pay attention to the following points:

- Install the washers ①.
- Position the dust seals ② so that the manufacturer's code indicated side of each seal face outside.
- Apply grease to the dust seals.

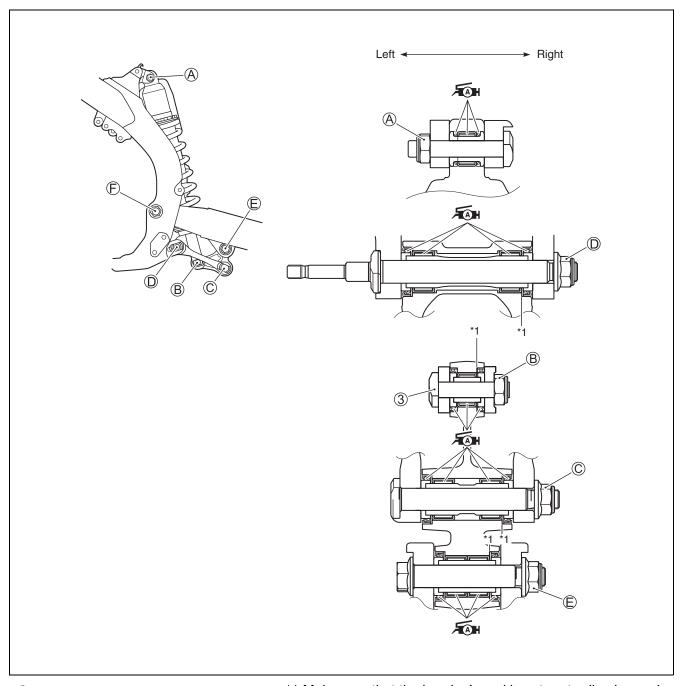
**1** 99000-25011: SUZUKI SUPER GREASE "A"

or equivalent

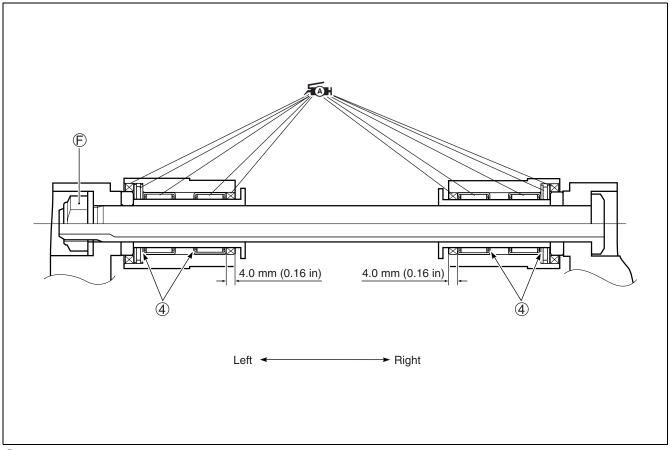




• Tighten the cushion lever, cushion rod and swingarm nuts to the specified torque.



- ③: Rear shock absorber lower mounting bolt
- Tightening torque:
- (A): 50 N⋅m (5.0 kgf-m, 36.0 lbf-ft)
- B: 50 N·m (5.0 kgf-m, 36.0 lbf-ft)
- ©: 80 N·m (8.0 kgf-m, 58.0 lbf-ft)
- \*1 Make sure that the bearing's end is not protruding beyond the lever surface or rod surface. (Both sides)
- ①: 80 N·m (8.0 kgf-m, 58.0 lbf-ft)
- **(E):** 80 N⋅m (8.0 kgf-m, 58.0 lbf-ft)
- **(F):** 70 N⋅m (7.0 kgf-m, 50.5 lbf-ft)



4: Stamped mark

Tightening torque:

**(F):** 70 N⋅m (7.0 kgf-m, 50.5 lbf-ft)

#### **NOTICE**

Improperly reassembled rear suspension linkage bolts can interfere with suspension movement and damage the rear suspension linkage.

To avoid damage to the rear suspension linkage, be sure to take the following precautions:

- \* Make sure that the rear shock absorber rebound damping force adjuster on the bottom bracket of the rear shock absorber is located to the right side.
- \* Insert the rear shock absorber lower mounting bolt 3 from the left side. Make sure that the nut (B) is in the recess of the rear shock absorber bottom bracket.

# SERVICING INFORMATION

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# **SERVICE DATA**

# **VALVE + GUIDE**

Unit: mm (in)

ITEM		STANDARD	LIMIT
Valve diam.	IN.	36 (1.4)	_
	EX.	31 (1.2)	_
Tappet clearance (when cold)	IN.	0.09 - 0.16 (0.004 - 0.006)	_
	EX.	0.17 - 0.24 (0.007 - 0.009)	_
Valve guide to valve stem clearance	IN.	0.010 - 0.037 (0.0004 - 0.0015)	_
	EX.	0.030 - 0.057 (0.0012 - 0.0022)	_
Valve stem deflection	IN. & EX.	_	0.25 (0.010)
Valve guide I.D.	IN. & EX.	5.500 - 5.512 (0.2165 - 0.2170)	_
Valve stem O.D.	IN.	5.475 - 5.490 (0.2156 - 0.2161)	_
	EX.	5.455 - 5.470 (0.2148 - 0.2154)	_
Valve stem runout	IN. & EX.	_	0.05 (0.002)
Valve seat width	IN. & EX.	0.9 - 1.1 (0.035 - 0.043)	_
Valve head radial runout	IN. & EX.	_	0.03 (0.001)
Valve spring free length	IN. & EX.	_	35.8 (1.41)
Valve spring tension	IN. & EX.	146 – 168 N (14.9 – 17.1 kgf, 32.8 – 37.7 lbs) at length 30.9 mm (1.22 in)	_

# **CAMSHAFT + CYLINDER HEAD**

ITEM		STANDARD	LIMIT
Cam height	IN.	35.58 - 35.63 (1.401 - 1.403)	35.28 (1.389)
	EX.	34.53 - 34.58 (1.359 - 1.361)	34.23 (1.348)
Camshaft journal oil clearance	IN. & EX.	0.032 - 0.066 (0.001 - 0.002)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.012 - 22.025 (0.8667 - 0.8671)	_
Camshaft journal O.D.	IN. & EX.	21.959 – 21.980 (0.8645 – 0.8654)	_
Camshaft runout		<del>-</del>	
Cam chain pin		14th pin	
Cylinder head distortion		<del>-</del>	0.05 (0.002)

Unit: mm (in)

### **CYLINDER + PISTON + PISTON RING**

CYLINDER + PISTON + P	Unit: mm (in)		
ITEM		STANDARD	LIMIT
Compression pressure (Automatic decomp. actuated)	300 I	kPa (3.0 kgf/cm², 43 psi) or more	_
Piston to cylinder clearance		0.035 - 0.045 (0.0014 - 0.0018)	
Cylinder bore		96.000 – 96.015 (3.7795 – 3.7801)	Nicks or scratches
Piston diam.	Measure	95.960 – 95.975 (3.7779 – 3.7785) at 16 mm (0.6 in) from the skirt end.	95.880 (3.7748)
Cylinder distortion		_	0.05 (0.002)
Piston ring free end gap	1st	Approx. 8.7 (0.34)	7.0 (0.28)
Piston ring end gap	1st	0.20 - 0.30 (0.008 - 0.012)	0.50 (0.020)
Piston ring to groove clearance	1st	_	0.180 (0.007)
Piston ring groove width	1st	0.78 - 0.80 (0.0307 - 0.0315)	_
		1.30 - 1.32 (0.0512 - 0.0520)	_
	Oil	2.01 - 2.03 (0.0791 - 0.0799)	_
Piston ring thickness		0.71 - 0.76 (0.0279 - 0.0299)	_
	1st	1.08 - 1.10 (0.0425 - 0.0433)	_
Piston pin bore		19.002 - 19.008 (0.7425 - 0.7433)	19.030 (0.7492)
Piston pin O.D.		18.992 – 19.000 (0.7477 – 0.7480)	18.980 (0.7472)

### **CONROD + CRANKSHAFT**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	19.018 – 19.038 (0.7487 – 0.7495)	19.050 (0.7500)
Conrod deflection	_	3.0 (0.12)
Conrod big end side clearance	0.20 - 0.65 (0.008 - 0.026)	1.0 (0.04)
Conrod big end width	19.75 – 19.80 (0.778 – 0.780)	_
Crank web to web width	61.9 - 62.1 (2.437 - 2.445)	_
Crankshaft runout	_	0.08 (0.003)

### **OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pressure (at 50 °C, 122 °F)	50 kPa (0.5 kgf/cm², 7.1 psi) at 4 000 r/min	_

**CLUTCH** Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch lever clearance	2 – 3 (0.08 – 0.12)	_
Drive plate thickness (No.1 & No.2)	3.07 - 3.23 (0.121 - 0.127)	2.77 (0.109)
Drive plate claw width (No.1 & No.2)	13.85 – 13.95 (0.545 – 0.549)	13.05 (0.514)
Driven plate distortion	_	0.10 (0.004)
Clutch spring free length	51.94 (2.045)	49.4 (1.94)

### **RADIATOR + ENGINE COOLANT**

ITEM	S.	TANDARD/SPECIFICATION	LIMIT
ECT sensor resistance	20 °C (68 °F)	Approx. 2.58 kΩ	_
	50 °C (122 °F)	Approx. 0.77 kΩ	_
	80 °C (176 °F)	Approx. 0.28 kΩ	_
Radiator cap valve opening pressure	(0.9	95 – 125 kPa (0.95 – 1.25 kgf/cm², 14 – 18 psi)	
Engine coolant type		Use an anti-freeze/coolant compatible with aluminum radiator.	
Engine coolant capacity		1 150 ml (1.2/1.0 US/Imp qt)	_

# **TRANSMISSION + DRIVE CHAIN**

Unit: mm (in) Except ratio

ITEM			STANDARD	LIMIT
Primary reduction ratio	)	2.625 (63/24)		_
Final reduction ratio			3.846 (50/13)	_
Gear ratios	Low		1.800 (27/15)	_
	2nd		1.470 (25/17)	_
	3rd		1.235 (21/17)	_
	4rh		1.050 (21/20)	_
	Тор		0.909 (20/22)	_
Shift fork to groove cle	arance	No.1, 2, 3 0.1 – 0.3 (0.004 – 0.012)		0.5 (0.02)
Shift fork groove width		No.1, 2, 3	5.0 – 5.1 (0.197 – 0.201)	_
Shift fork thickness		No.1, 2, 3	4.8 – 4.9 (0.189 – 0.193)	_
Drive chain		Туре	DID520MXV4	_
		Links	114	_
Drive chain plate height		Inner	15.0 (0.59)	12.75 (0.502)
		Outer	12.8 (0.50)	11.20 (0.441)
Drive chain slack			35 – 45 (1.4 – 1.8)	_

# INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	9.5 – 11.5 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	89 ml (3.0/ 3.1 US/lmp oz) or more /10 sec.	
Fuel pressure regulator operating set pressure	Approx. 294 kPa (2.94 kgf/cm², 41.81 psi)	

### **FI SENSORS**

ITEM	S	TANDARD/SPECIFICATION	NOTE
CKP sensor resistance		80 – 120 Ω	
CKP sensor peak voltage		2.8 V or more	
IAP sensor input voltage		4.5 – 5.5 V	
IAP sensor output voltage		0.98 – 2.86 V at idle speed	
TP sensor input voltage		4.5 – 5.5 V	
TP sensor output voltage	Closed	0.60 - 0.64 V	
	Opened	3.60 – 4.00 V	
ECT sensor input voltage		4.5 – 5.5 V	
ECT sensor resistance	Ap	Approx. 2.58 kΩ at 20 °C (68 °F)	
IAT sensor input voltage		4.5 – 5.5 V	
IAT sensor resistance	Ap	Approx. 2.58 kΩ at 20 °C (68 °F)	
TO sensor resistance	Ap	prox. 19.4 kΩ at 20 °C (68 °F)	
TO sensor voltage	Normal	Normal 0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage		0.6 V or more	
Injector voltage		Battery voltage	

# **THROTTLE BODY**

ITEM	SPECIFICATION			
Bore size	43 mm			
I.D. No.	28H5			
Idle r/min	2 100 ± 50 r/min			
Idle screw	5 – 6 turns back			
Throttle cable play	2 – 4 mm (0.08 – 0.16 in)			

**ELECTRICAL** Unit: mm (in)

ITEM	S	STANDARD/SPECIFICATION		
Ignition timing	12° B.T.D.C. at 2 100 r/min.			
Spark plug	Type	NGK: DIMR8A10		
	Gap	0.9 - 1.0 (0.035 - 0.039)		
Spark performance		Over 8 (0.3) at 1 atm.		
CKP sensor resistance		80 – 120 Ω	R – G	
Charge coil resistance		$1.2 - 2.5 \Omega$	Y – Y	
CKP sensor peak voltage		2.8 V or more		
Ignition coil resistance	Primary $0.17 - 0.70 Ω$		W/BI – B/W	
	Secondary	9 – 14 kΩ	Plug cap – B/W	
Ignition coil primary peak voltage		170 V or more		
Magneto no-load voltage (When engine is cold)	100			
Regulated voltage				
Engine stop switch resistance		B/Y – B/W		
S-HAC switch resistance		Under 1 $\Omega$	R/Y – B/W	

# **BRAKE + WHEEL**

Unit: mm (in)

ITEM		STANDARD	LIMIT
Brake lever adjuster length		11 – 15 (0.4 – 0.6)	
Rear brake pedal height		0 – 10 (0 – 0.4)	
Brake disc thickness	Front	$3.0 \pm 0.2$ $(0.118 \pm 0.008)$	2.5 (0.10)
	Rear	4.0 ± 0.15 (0.157 ± 0.006)	3.5 (0.14)
Brake disc distortion	Front & Rear	_	0.3 (0.012)
Master cylinder bore	Front	11.000 - 11.043 (0.4331 - 0.4348)	_
	Rear	11.000 - 11.043 (0.4331 - 0.4348)	_
Master cylinder piston diam.	Front	10.957 - 10.984 (0.4314 - 0.4324)	_
	Rear	10.957 - 10.984 (0.4314 - 0.4324)	_
Brake caliper cylinder bore	Front	27.000 - 27.050 (1.0630 - 1.0650)	_
	Rear	25.400 - 25.450 (1.0000 - 1.0020)	_
Brake caliper piston diam.	Front	26.900 - 26.950 (1.0591 - 1.0610)	_
	Rear	25.335 - 25.368 (0.9974 - 0.9987)	_
Brake fluid type		DOT 4	_
Wheel rim runout	Axial	_	2.0 (0.08)
	Radial	_	2.0 (0.08)
Wheel rim size	Front	1.60 × 21	_
	Rear	2.15 × 19	_
Wheel axle runout	Front	_	0.25 (0.010)
	Rear		0.25 (0.010)

# **TIRE**

ITEM	S1	STANDARD/SPECIFICATION		
Cold inflation tire pressure	Front & Rear			
Tire size	Front	80/100-21 51M	_	
	Rear	110/90-19 62M	_	
Tire type	Front	BRIDGESTONE: M403	_	
	Rear	BRIDGESTONE: M404	_	
Tire tread depth (Recommend depth)	Front & Rear	_	4.0 mm (0.16 in)	

# **SUSPENSION**

ITEM	ITEM		LIMIT	NOTE
Front fork stroke	Front fork stroke		_	
Front fork inner tube O.I	D.	49 (1.9)	_	
Left front fork damping force adjuster	Rebound	MAX – 13 clicks turn counterclockwise		
	Compression	MAX – 8 clicks turn counterclockwise		
Left front fork air pressu	ire	0 kPa (0 kgf/cm², 0 psi)	1	
Right front fork air pressure	Inner chamber	1 200 kPa (12 kgf/cm², 171 psi)		
	Outer chamber	0 kPa (0 kgf/cm², 0 psi)	_	
	Balance chamber	1 200 kPa (12 kgf/cm², 171 psi)	_	
Rear shock absorber ga	Rear shock absorber gas pressure			
Rear shock absorber sp length	oring set	5 (0.2)		5 mm (0.2 in) com- pressed from spring free length
Rear shock absorber sp	oring rate	55.9 N/mm (5.70 kgf/mm)	_	
Rear shock absorber damping force adjuster	Rebound	MAX – 12 clicks turn counterclockwise	1	
	Compression (High speed)	MAX – 2 turns counterclockwise	1	
	Compression (Low speed)			
Rear wheel travel		310 (12.2)		
Swingarm pivot shaft ru	nout	_	0.3 (0.01)	

Unit: mm (in)

# **FUEL + OIL**

ITEM		SPECIFICATION	NOTE	
Fuel type	Use only un	lleaded gasoline of at least 90 pump	E-03, 28	
	octane (R/2	+ M/2 method).	L-03, 28	
	Use only un	Use only unleaded gasoline of at least 95 octane.		
	(Research r	,	The others	
Fuel tank capacity		6.2 L (1.6/1.4 US/Imp gal)		
Engine oil type	SAE	10W-40, API SG/SH/SJ/SL with	E-03	
		JASO MA/MA1/MA2	L-03	
	MOTUL 3	00V 10W-40 (Recommendation oil) or		
	SAE	10W-40, API SG/SH/SJ/SL with	The others	
		JASO MA/MA1/MA2		
Engine oil capacity	Change	1 050 ml (1.1/0.9 US/Imp qt)		
	Filter change	1 100 ml (1.2/1.0 US/Imp qt)		
	Overhaul	1 200 ml (1.3/1.1 US/Imp qt)		
Air cleaner element oil type	MOT	UL AIR FILTER OIL or equivalent		
Front fork oil type	SHO	WA SUSPENSION FLUID SS-19 or equivalent		
Left front fork oil capacity		320 ml (10.8/11.3 US/Imp oz)	Outer tube oil quantity	
		314 ml (10.6/11.1 US/lmp oz)	Fork cylinder unit oil quantity	
Right front fork oil capacity		100 ml (3.4/3.5 US/lmp oz)		
	250 ml (8.5/8.8 US/lmp oz)		Outer chamber oil quantity	
	10 ml (0.3/0.4 US/Imp oz)		Balance cham- ber oil quantity	
Rear shock absorber oil type	SHOWA SUSPENSION FLUID SS-25 or equivalent			
Rear shock absorber oil capacity		383 ml (13.0 /13.5 US/Imp oz)		

# **TIGHTENING TORQUE ENGINE**

PART		N⋅m	kgf-m	lbf-ft
Cylinder head cover bolt		14	1.4	10.0
Spark plug		11	1.1	8.0
Cylinder head bolt	(Initial)	25	2.5	18.0
	(Final)	51	5.1	37.0
Cylinder head base bolt	'	10	1.0	7.0
Cylinder base bolt		10	1.0	7.0
Camshaft journal holder bolt		10	1.0	7.0
Oil gallery bolt (journal holder)		10	1.0	7.0
Primary drive gear nut		110	11.0	79.5
Magneto rotor nut		80	8.0	58.0
Clutch sleeve hub nut		90	9.0	65.0
Clutch spring set bolt		10	1.0	7.0
Clutch release camshaft retainer bolt		10	1.0	7.0
Gearshift arm stopper		23	2.3	16.5
Gearshift cam driven pin		24	2.4	17.5
Pawl lifter screw		8.5	0.85	6.0
Bearing retainer screw		8.5	0.85	6.0
Kick starter guide bolt		10	1.0	7.0
Cam chain tension adjuster mounting bolt		10	1.0	7.0
Cam chain tension adjuster cap bolt		23	2.3	16.5
Cam chain tensioner bolt		10	1.0	7.0
Cam chain guide retainer bolt		10	1.0	7.0
Right crankcase cover bolt		11	1.1	8.0
Engine oil drain plug		12	1.2	8.5
Engine oil check bolt		5.5	0.55	4.0
Oil filter cap bolt		11	1.1	8.0
Oil gallery plug		10	1.0	7.0
Oil pump No.1 bolt		5.5	0.55	4.0
Oil pump No.2 bolt		11	1.1	8.0
Engine oil strainer cap		21	2.1	15.0
Crankcase bolt		11	1.1	8.0
Clutch cover bolt		11	1.1	8.0
TDC plug		14	1.4	10.0
Magneto cover bolt		11	1.1	8.0
Crankshaft hole plug		11	1.1	8.0
Magneto stator bolt		5.5	0.55	4.0
Ignition coil mounting bolt		10	1.0	7.0
Regulator/rectifier mounting bolt		10	1.0	7.0
Condenser bracket bolt		10	1.0	7.0
Air cleaner bolt		5	0.5	3.5

PART		N∙m	kgf-m	lbf-ft
Engine mounting bolt		55	5.5	40.0
Engine mounting nut (front)		66	6.6	47.5
Engine mounting nut (lower)		66	6.6	47.5
Engine mounting bracket nut (front)		66	6.6	47.5
Engine mounting bracket bolt (upper)		40	4.0	29.0
Intake pipe bolt	(Initial)	1	0.1	0.7
	(Final)	10	1.0	7.0
Engine sprocket bolt		32	3.2	23.0
Engine sprocket cover bolt		11	1.1	8.0
Kick starter lever bolt		29	2.9	21.0
Kick starter lever screw		10	1.0	7.0
Exhaust pipe nut		23	2.3	16.5
Muffler connector clamp bolt		17	1.7	12.5
Muffler mounting front bolt		21	2.1	15.0
Muffler mounting rear bolt		23	2.3	16.5
Exhaust pipe cover bolt		11	1.1	8.0
Rear muffler body mounting bolt		10	1.0	7.0
Front protector bolt		12	1.2	8.5

# FI SYSTEM AND INTAKE AIR SYSTEM

ITEM	N⋅m	kgf-m	lbf-ft
CKP sensor bolt	5.5	0.55	4.0
IAT sensor mounting screw	1.3	0.13	0.95
GP switch mounting bolt	6.5	0.65	4.7
Fuel joint mounting screw	3.5	0.35	2.5
Fuel pipe mounting screw	3.5	0.35	2.5
Fuel pump mounting bolt	10	1.0	7.0
TP sensor mounting screw	3.5	0.35	2.5
ECT sensor	12	1.2	8.5
ECM bracket mounting bolt	10	1.0	7.0
TO sensor bracket bolt	8.5	0.85	6.0

# **COOLING SYSTEM**

ITEM	N⋅m	kgf-m	lbf-ft
Impeller	8	0.8	6.0
Water pump case bolt	11	1.1	8.0
Engine coolant drain bolt	11	1.1	8.0
Radiator air bleeder bolt	6	0.6	4.5
Water hose clamp screw	1.5	0.15	1.0

# **CHASSIS**

PART	N⋅m	kgf-m	lbf-ft
Handlebar clamp bolt	25	2.5	18.0
Handlebar holder set nut	44	4.4	32.0
Front fork upper clamp bolt (right and left)	23	2.3	16.5
Front fork lower clamp bolt (right and left)	23	2.3	16.5
Steering stem head nut	120	12.0	87.0
Steering stem nut		n (4.5 kgf-m, 32.5 n turn back 1/4 –	
Fork cylinder unit	34	3.4	24.5
Air cylinder unit	34	3.4	24.5
Lock-nut/center bolt	28	2.8	20.0
Lock-nut/sealing bolt	28	2.8	20.0
Front fork center bolt	69	6.9	50.0
Front fork sealing bolt	69	6.9	50.0
Front fork compression damper unit	30	3.0	21.5
Front fork air bleeder valve	1.3	0.13	1.0
Front fork air valve	5.5	0.55	4.0
Front fork valve core	3	0.3	2.0
Front fork protector bolt	4.9	0.49	3.5
Front brake master cylinder holder bolt	10	1.0	7.0
Rear brake master cylinder mounting bolt	10	1.0	7.0
Rear brake master cylinder rod lock-nut	6	0.6	4.5
Rear brake master cylinder reservoir cap screw	1.5	0.15	1.0
Brake lever pivot bolt	6	0.6	4.5
Brake lever pivot bolt lock-nut	6	0.6	4.5
Brake pedal pivot bolt	29	2.9	21.0
Brake hose union bolt (front and rear)	23	2.3	16.5
Brake hose guide bolt (front)	3	0.3	2.0
Brake caliper mounting bolt (front)	26	2.6	19.0
Brake pad mounting pin (front and rear)	18	1.8	13.0
Front brake caliper axle bolt (caliper)	25	2.5	18.0
Front brake caliper axle bolt (bracket)	28	2.8	20.0
Rear brake caliper axle bolt (caliper)	43	4.3	31.0
Rear brake caliper axle bolt (bracket)	13	1.3	9.5
Brake air bleeder valve (front and rear)	6	0.6	4.5
Disc plate bolt (front)	11	1.1	8.0
Disc plate bolt (rear)	26	2.6	19.0
Front axle nut	35	3.5	25.5
Front axle holder bolt	21	2.1	15.0
Rear axle nut	100	10.0	72.5
Rear sprocket nut	30	3.0	21.5
Drive chain roller bolt and nut	23	2.3	16.5
Spoke nipple	6	0.6	4.5
Front wheel rim lock	14	1.4	10.0
Rear wheel rim lock	17	1.7	12.5

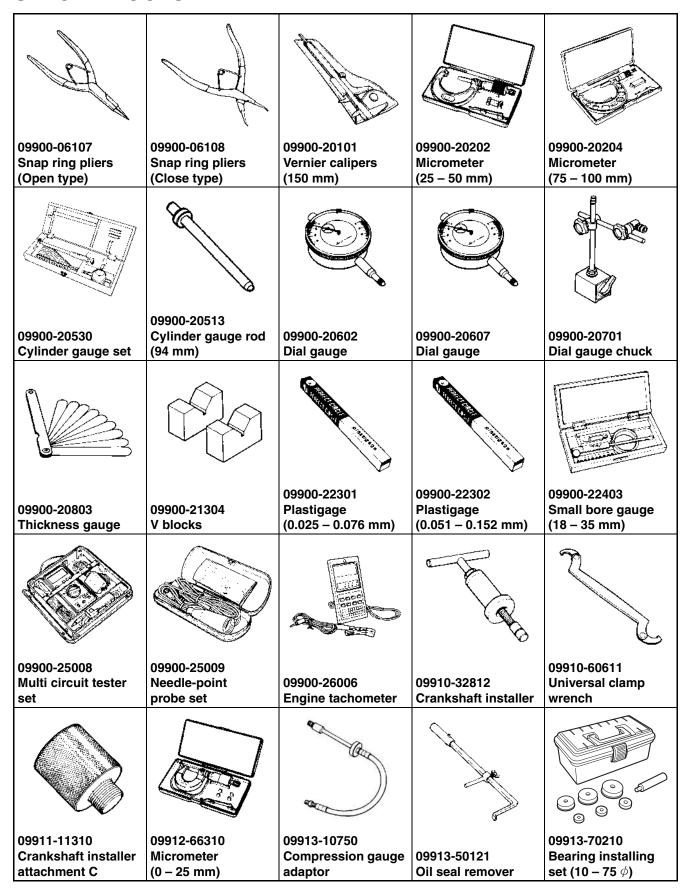
PART	N⋅m	kgf-m	lbf-ft
Throttle cable adjuster lock-nut	4.5	0.45	3.25
Clutch cable adjuster lock-nut	2.2	0.22	1.60
Clutch cable bracket bolt	7	0.7	5.0
Throttle case screw	3.8	0.38	2.75
Clutch lever holder bolt	3	0.3	2.0
Clutch lever pivot bolt	4	0.4	3.0
Clutch lever pivot bolt lock-nut	4	0.4	3.0
Swingarm pivot nut (engine mounting)	70	7.0	50.5
Swingarm rear axle plate screw	3	0.3	2.0
Rear shock absorber upper mounting nut	50	5.0	36.0
Rear shock absorber lower mounting nut	50	5.0	36.0
Rear shock absorber compression adjuster assembly	30	3.0	21.5
Rear cushion lever nut (upper and lower)	80	8.0	58.0
Rear cushion rod nut	80	8.0	58.0
Rear shock absorber spring adjuster lock-nut	70	7.0	50.5
Seat rail bolt (upper and lower)	23	2.3	16.5
Footrest bolt	35	3.5	25.5

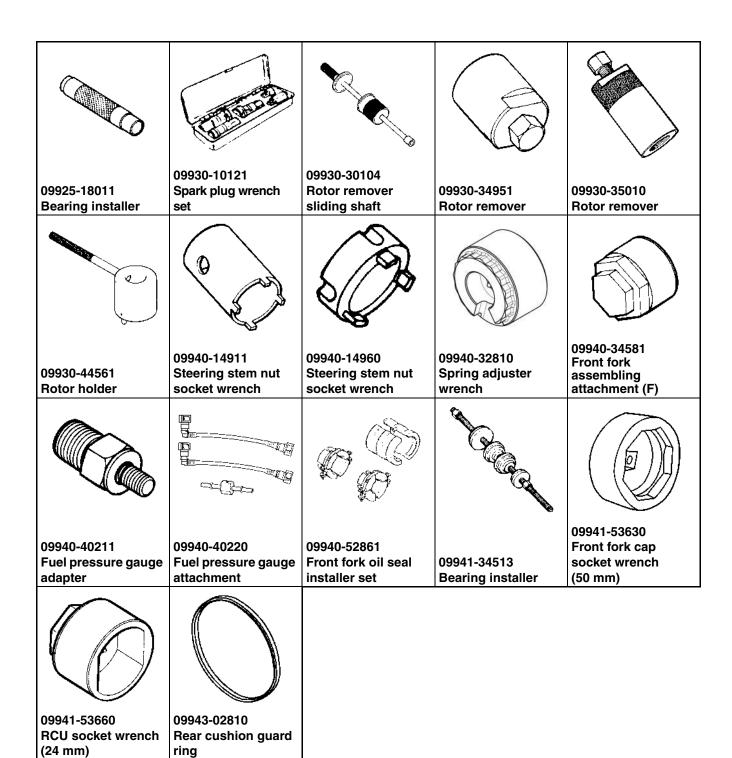
Each fastener should be tightened to the torque specified in "TIGHTENING LIST". If no description or specification is provided, refer to the following tightening torque chart for the applicable torque for each fastener.

Strength	Unit		Thread diameter (Nominal diameter) (A [mm]							
	Unit	4	5	6	8	10	12	14	16	18
A equivalent of 4T strength fastener without flange	N∙m	1.5	3.0	5.5	13	29	45	65	105	160
	kgf-m	0.15	0.30	0.55	1.3	2.9	4.5	6.5	10.5	16.0
	lbf-ft	1.0	2.0	4.0	9.5	21.0	32.5	47.0	76.0	115.5
A equivalent of 4T strength fastener with flange	N⋅m	1.7	3.3	6	14	32	50	72	116	176
	kgf-m	0.17	0.33	0.6	1.4	3.2	5.0	7.2	11.6	17.6
	lbf-ft	1.0	2.5	4.5	10.0	23.0	36.0	52.0	84.0	127.5
A equivalent of 7T strength fastener without flange and small crown shape bolt *1	N∙m	2.3	4.5	10	23	50	85	135	210	240
(T) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A	kgf-m	0.23	0.45	1.0	2.3	5.0	8.5	13.5	21.0	24.0
	lbf-ft	1.5	3.5	7.0	16.5	36.0	61.5	97.5	152.0	173.5
A equivalent of 7T strength fastener with flange except small crown shape bolt	N⋅m	2.5	5	11	25	55	94	149	231	264
	kgf-m	0.25	0.5	1.1	2.5	5.5	9.4	14.9	23.1	26.4
	lbf-ft	2.0	3.5	8.0	18.0	40.0	68.0	107.5	167.0	191.0

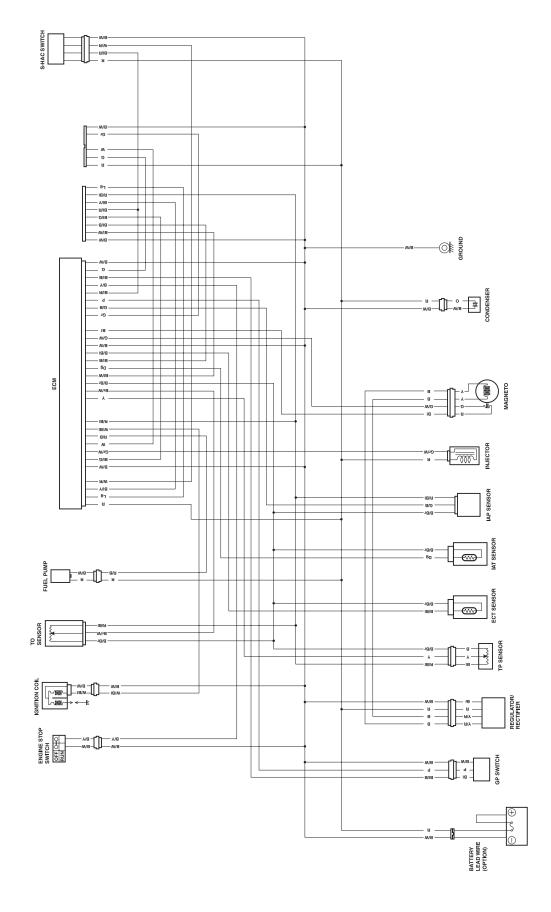
<sup>\*1:</sup> Small crown shape bolt (crown shape bolt with flange either " $\triangle$  = 5 &  $\bigcirc$  = 7" or " $\triangle$  = 6 &  $\bigcirc$  = 8")

# **SPECIAL TOOLS**

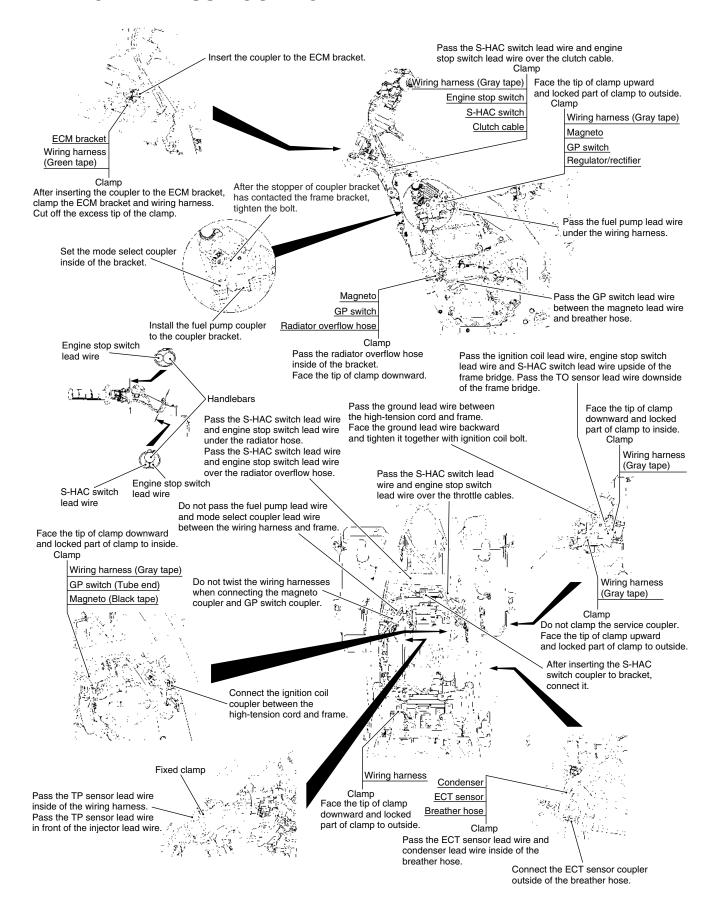


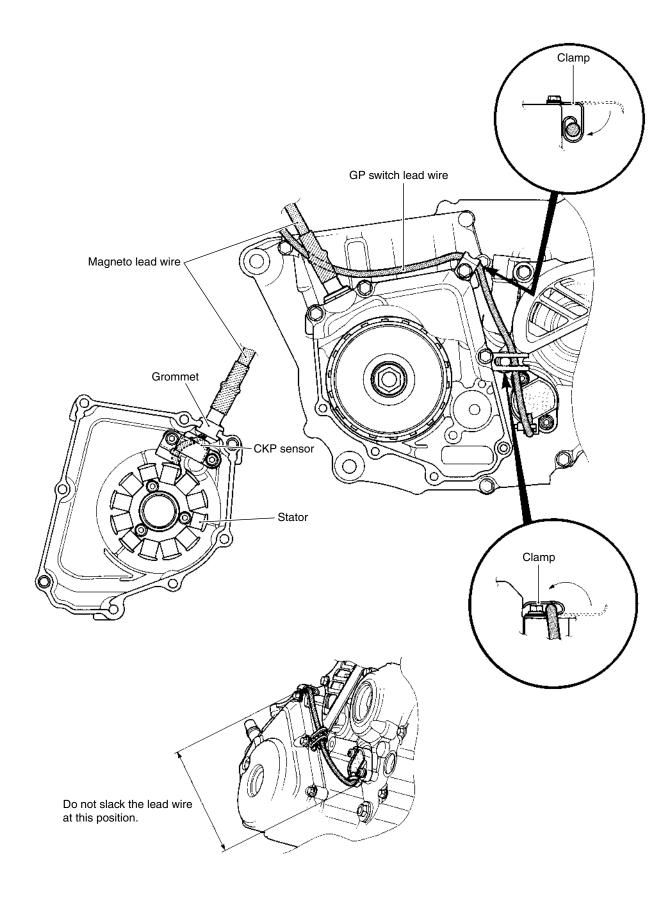


# **WIRING DIAGRAM**

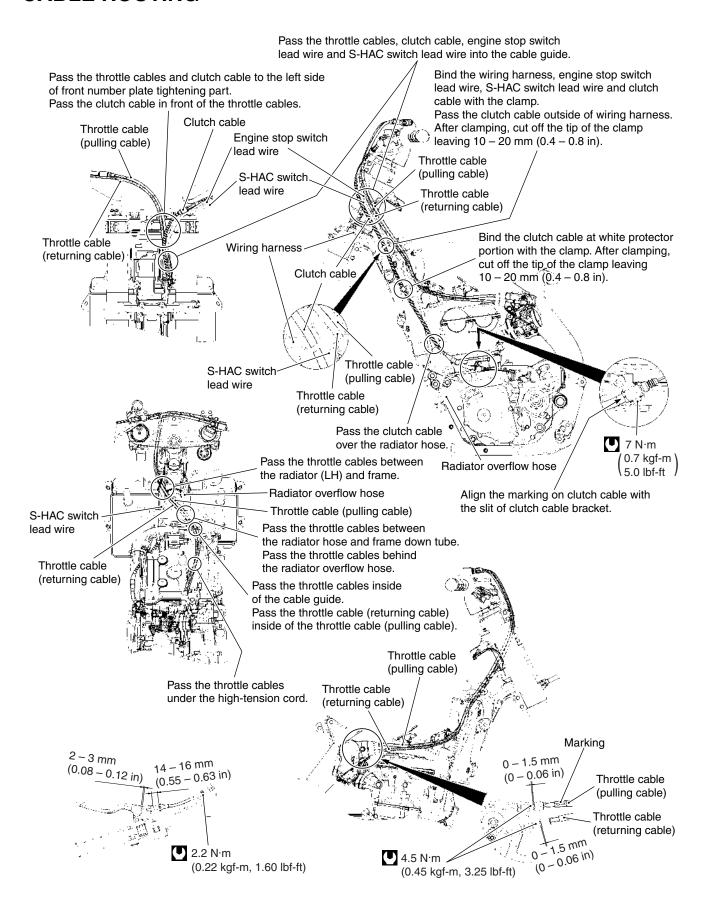


#### WIRING HARNESS ROUTING

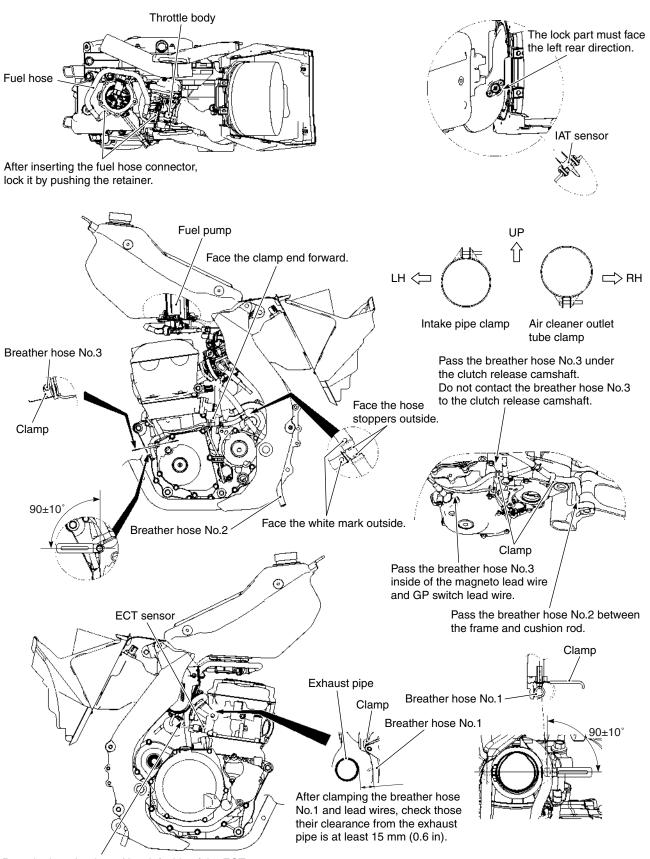




#### CABLE ROUTING

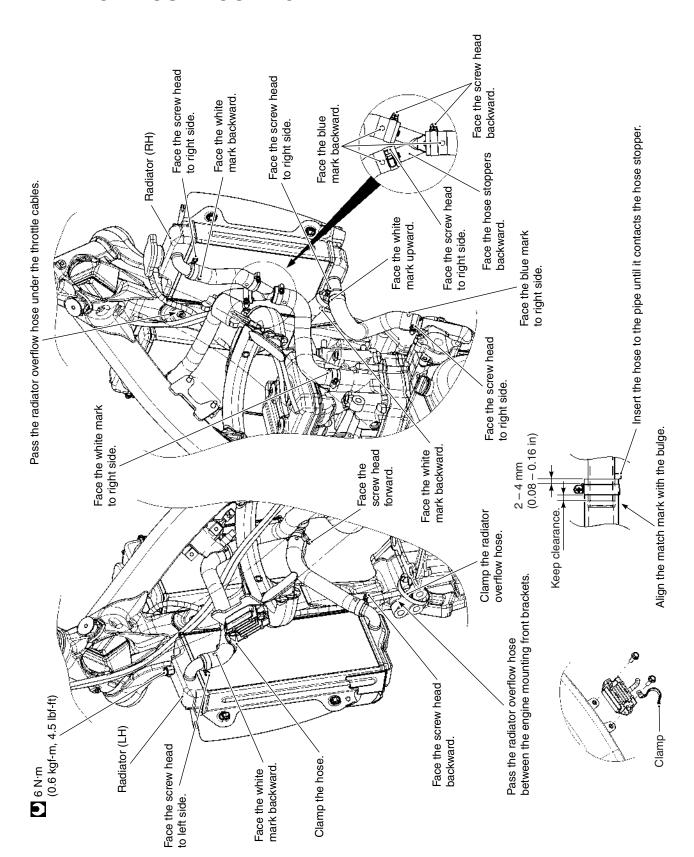


#### THROTTLE BODY INSTALLATION

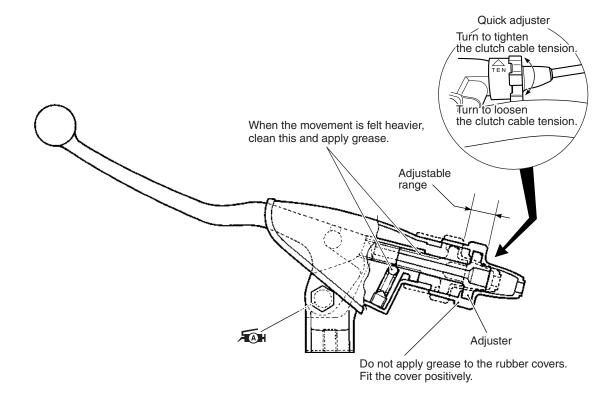


Pass the breather hose No.1 left side of the ECT sensor. Do not slack the breather hose No.1 around the throttle body.

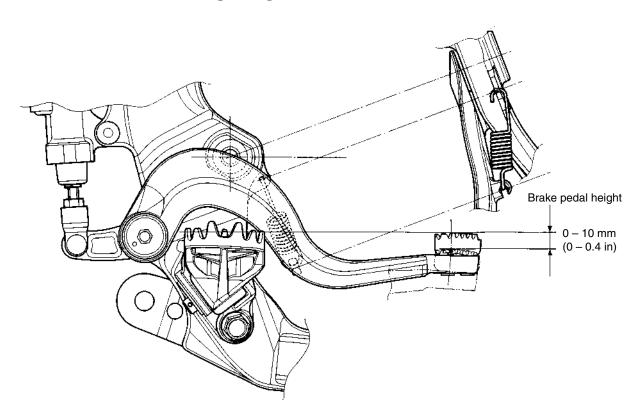
### **RADIATOR HOSE ROUTING**



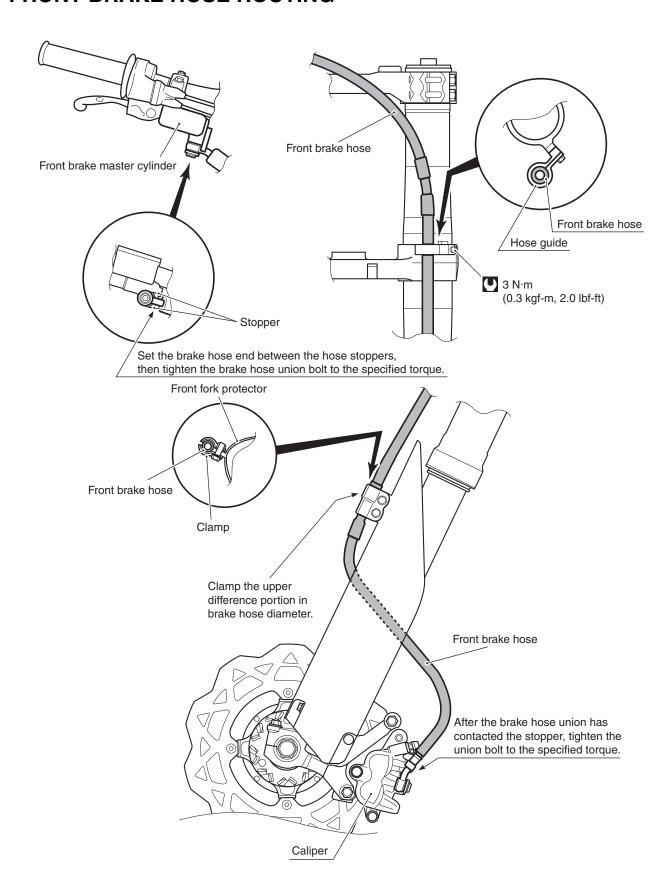
### **CLUTCH CABLE ADJUSTER**



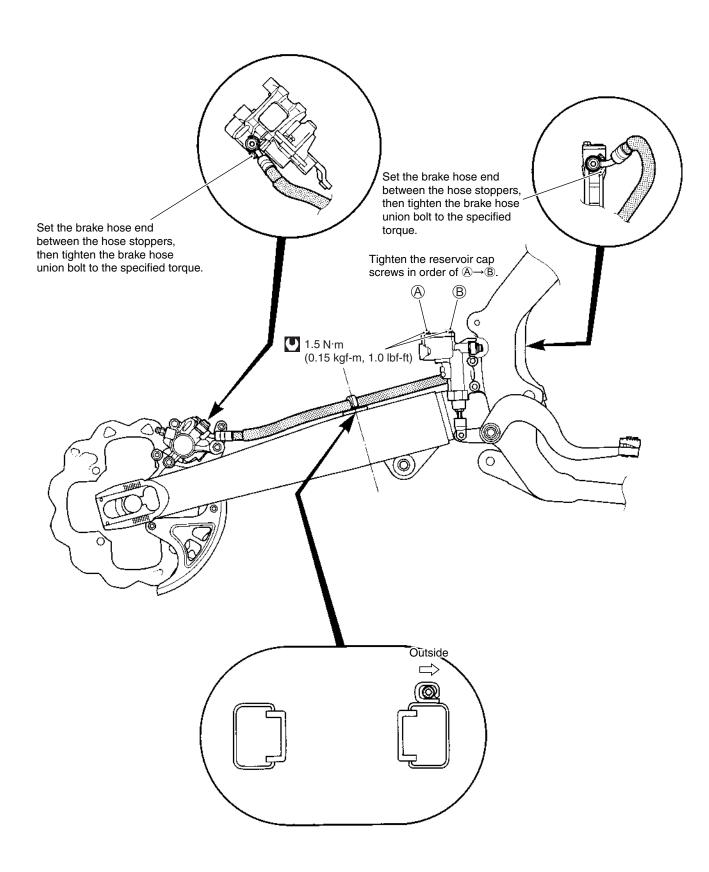
### **REAR BRAKE PEDAL SET-UP**



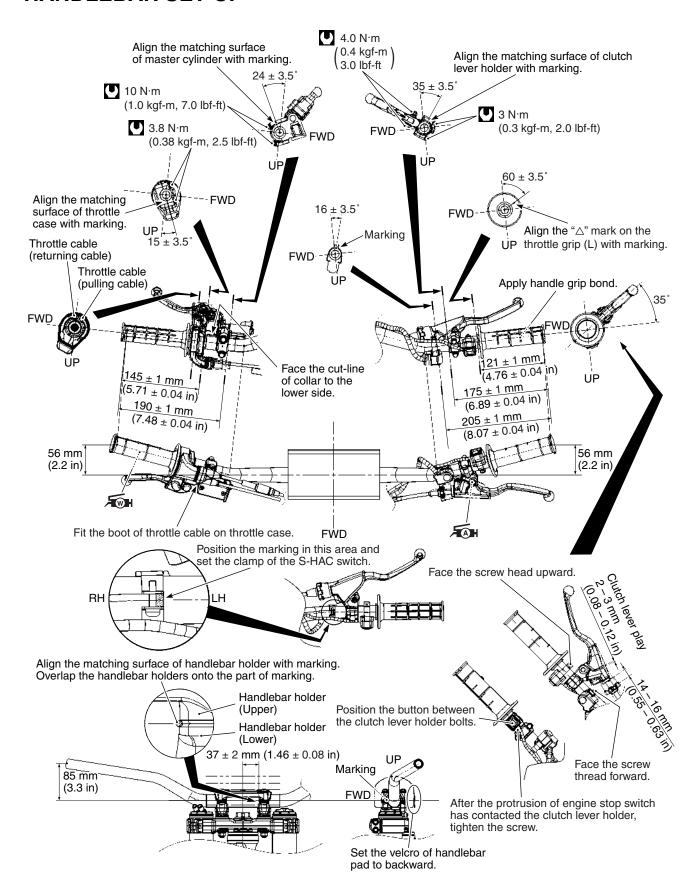
### FRONT BRAKE HOSE ROUTING



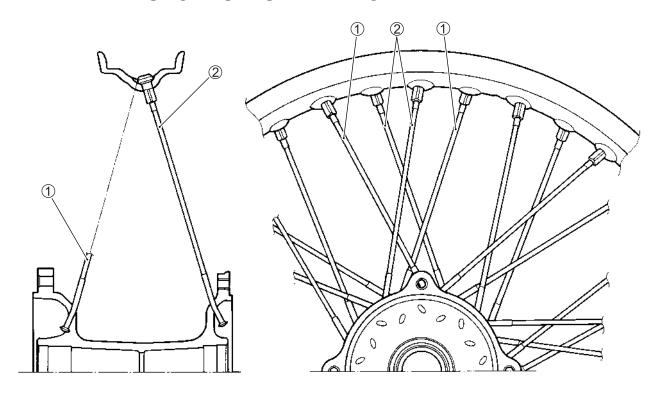
### **REAR BRAKE HOSE ROUTING**



#### HANDLEBAR SET-UP

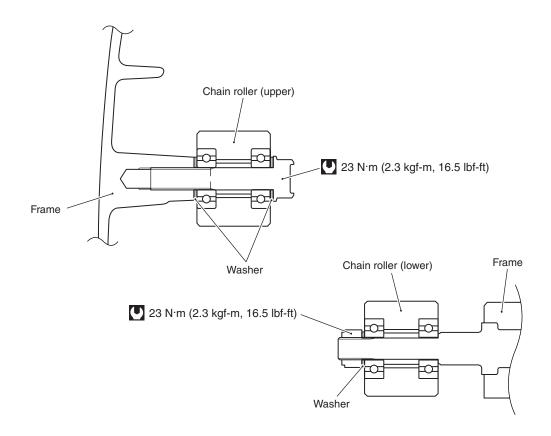


### **REAR WHEEL SPOKES INSTALLATION**



- ① Spoke (inner) L: 206.5 mm (8.13 in)
- 2 Spoke (outer) L: 204.5 mm (8.05 in)

## **CHAIN ROLLER INSTALLATION**



## **SPECIFICATIONS DIMENSIONS AND CURB MASS**

Overall length	2 190 mm (86.2 in)
Overall width	830 mm (32.7 in)
Overall height	1 270 mm (50.0 in)
Wheelbase	1 495 mm (58.9 in)
Ground clearance	325 mm (12.8 in)
Seat height	955 mm (37.6 in)
Curb mass	112 kg (247 lbs)

### **ENGINE**

Type	Four-stroke, liquid-cooled, DOHC
Number of cylinders	1
Bore	96.0 mm (3.780 in)
Stroke	62.1 mm (2.445 in)
Displacement	449 cm³ (27.4 cu. in)
Compression ratio	12.5 : 1
Fuel system	Fuel injection
Air cleaner	Polyurethane foam element
Starter system	Primary kick
Lubrication system	Semi dry sump
Idle speed	2 100 ± 50 r/min

### **DRIVE TRAIN**

Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	2.625 (63/24)
Gear ratios, Low	1.800 (27/15)
2nd	1.470 (25/17)
3rd	1.235 (21/17)
4th	1.050 (21/20)
Тор	0.909 (20/22)
Final reduction ratio	3.846 (50/13)
Drive chain	DID520MXV4, 114 links

#### **CHASSIS**

Front suspension	Inverted telescopic, air spring, oil damped
Rear suspension	Link type, coil spring, oil damped
Front suspension stroke	310 mm (12.2 in)
Rear wheel travel	310 mm (12.2 in)
Caster	28° 40'
Trail	125 mm (4.92 in)
Steering angle	45° (right & left)
Turning radius	1.95 m (6.4 ft)
Front brake	Disc brake
Rear brake	Disc brake
Front tire size	80/100-21 51M tube type

### **ELECTRICAL**

Ignition type	Electronic ignition (CDI)
Ignition timing	12° B.T.D.C. at 2 100 r/min
Spark plug	NGK DIMB8A10

### **CAPACITIES**

Fuel tank		6.2 L (1.6 / 1.4 US/Imp gal)
Engine oil	(change)	1 050 ml (1.1 / 0.9 US/Imp qt)
	(with filter change)	1 100 ml (1.2 / 1.0 US/Imp qt)
	(overhaul)	1 200 ml (1.3 / 1.1 US/Imp qt)
Coolant		1 150 ml (1.2 / 1.0 US/Imp qt)

# **SPARE PARTS LIST**

ITEM	PART NAME	PART NUMBER	Q'TY
1	PARTS SET, SPARE	19900-28H10	1
1	GASKET, MAGNETO COVER	11483-28H00	1
2	GASKET, CLUTCH COVER OUTER	11484-28H00	1
3	GASKET, EXHAUST, PIPE	14181-35G00	1
4	CONNECTOR, MUF JT	14771-42F10	1
5	FILTER COMP, ENGINE OIL	16510-35G00	1
6	O-RING, WATER POMP CASE	17431-28H00	1
7	D-RING, SPROCKET SPACER	27515-28H00	1
8	8 LEVER, BRAKE 57310-37F00		1
9	LEVER, CLUTCH	57621-35G10	1
10	O-RING, OIL FILTER CAP	09280-39001	1
2	JOINT SET, DRIVE CHAIN	27620-35G01	1

# **OPTIONAL PARTS**

	PART No.	NUMBER OF TEETH	COMMENTS
	64511-37E00	48	114 L
REAR SPROCKET	64511-28E00	49	114 L
	64511-40261	51	116 L
BATTERY LEAD WIRE	36890-28H00	_	_
FRONT BRAKE DISC COVER	59231-36E30	_	_

Rear suspension spring: ( 34-18)

# **SETTING DATA**

		DATE	/ /	/ /	/ /	
l <sub>⊨</sub>	DATE/ LOCATION	RACE/COURSE	/	/	/	
EVENT	ATE	TEMP./HUMIDITY	/	/	/	
	WEATHER					
		COURSE COUDITION				
빌	ODA DIC DI LIO					
ENGINE		ECM MAP SELECT MODE				
		OIL CAPACITY (LH)	ml	ml	ml	
	X	COMP. ADJ. POSITION (LH)				
	FO	RE-BOUND ADJ. POSITION (LH)				
	FRONT FORK	INNER CHAMBER AIR PRESSURE (RH)	kPa	kPa	kPa	
	FR(	OUTER CHAMBER AIR PRESSURE (RH)	kPa	kPa	kPa	
		BALANCE CHAMBER AIR PRESSURE (RH)	kPa	kPa	kPa	
	NO	SPRING				
SIS	OISI	SPRING SET LENGTH	mm	mm	mm	
IAS(	CHASSIS REAR SUSPENSION	SUG	mm	mm	mm	
占	sns	COMP. ADJ. POSITION LOW				
	AR (	COMP. ADJ. POSITION HIGH				
	RE,	RE-BOUND ADJ. POSITION				
		FINAL REDUCTION RATIO	/	/	/	
	NT 3E	MAKER/SIZE				
	FRONT	PRESSURE	kPa	kPa	kPa	
	REAR TIRE	MAKER/SIZE				
	RE, TIF	PRESSURE	kPa	kPa	kPa	
		COMMENT:				
* N / A I/						

<sup>\*</sup>MAKE COPIES.