SUZUKI

SV650/S

SERVICE MANUAL

99500-36120-03E

IMPORTANT

All street-legal Suzuki motorcycles with engine displacement of 50 cc or greater are subject to Environmental Protection agency emission regulations. These regulations set specific standards for exhaust emission output levels as well as particular servicing requirements. This manual includes specific information required to properly inspect and service SV650/S in accordance with all EPA regulations. It is strongly recommended that the chapter on Emission Control, Periodic Servicing and FUEL SYSTEM be thoroughly reviewed before any type of service work is performed.

Further information concerning the EPA emission regulations and U.S. Suzuki's emission control program can be found in the U.S. SUZUKI EMISSION CONTROL PROGRAM MANUAL/SERVICE BULLETIN.

FOREWORD

This manual contains an introductory description on the SUZUKI SV650/S and procedures for its inspection/service and overhaul of its main components. Other information considered as generally known is not included.

Read the GENERAL INFORMATION section to familiarize yourself with the motorcycle and its maintenance. Use this section as well as other sections to use as a guide for proper inspection and service. This manual will help you know the motorcycle better so that you can assure your customers of fast and reliable service.

- *This manual has been prepared on the basis of the latest specifications at the time of publication. If modifications have been made since then, differences may exist between the content of this manual and the actual motorcycle.*
- *Illustrations in this manual are used to show the basic principles of operation and work procedures. They may not represent the actual motorcycle exactly in detail.*
- *This manual is written for persons who have enough knowledge, skills and tools, including special tools, for servicing SUZUKI motorcycles. If you do not have the proper knowledge and tools, ask your authorized SUZUKI motorcycle dealer to help you.*

⚠ WARNING

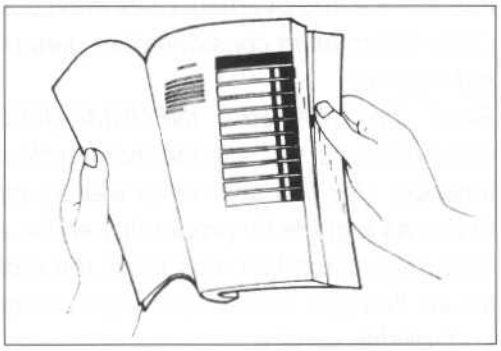
Inexperienced mechanics or mechanics without the proper tools and equipment may not be able to properly perform the services described in this manual.
Improper repair may result in injury to the mechanic and may render the motorcycle unsafe for the rider and passenger.

SUZUKI MOTOR CORPORATION

GROUP INDEX

HOW TO USE THIS MANUAL
TO LOCATE WHAT YOU ARE LOOKING FOR:

1. The text of this manual is divided into sections.
2. The section titles are listed in the GROUP INDEX.
3. Holding the manual as shown at the right will allow you to find the first page of the section easily.
4. The contents are listed on the first page of each section to help you find the item and page you need.



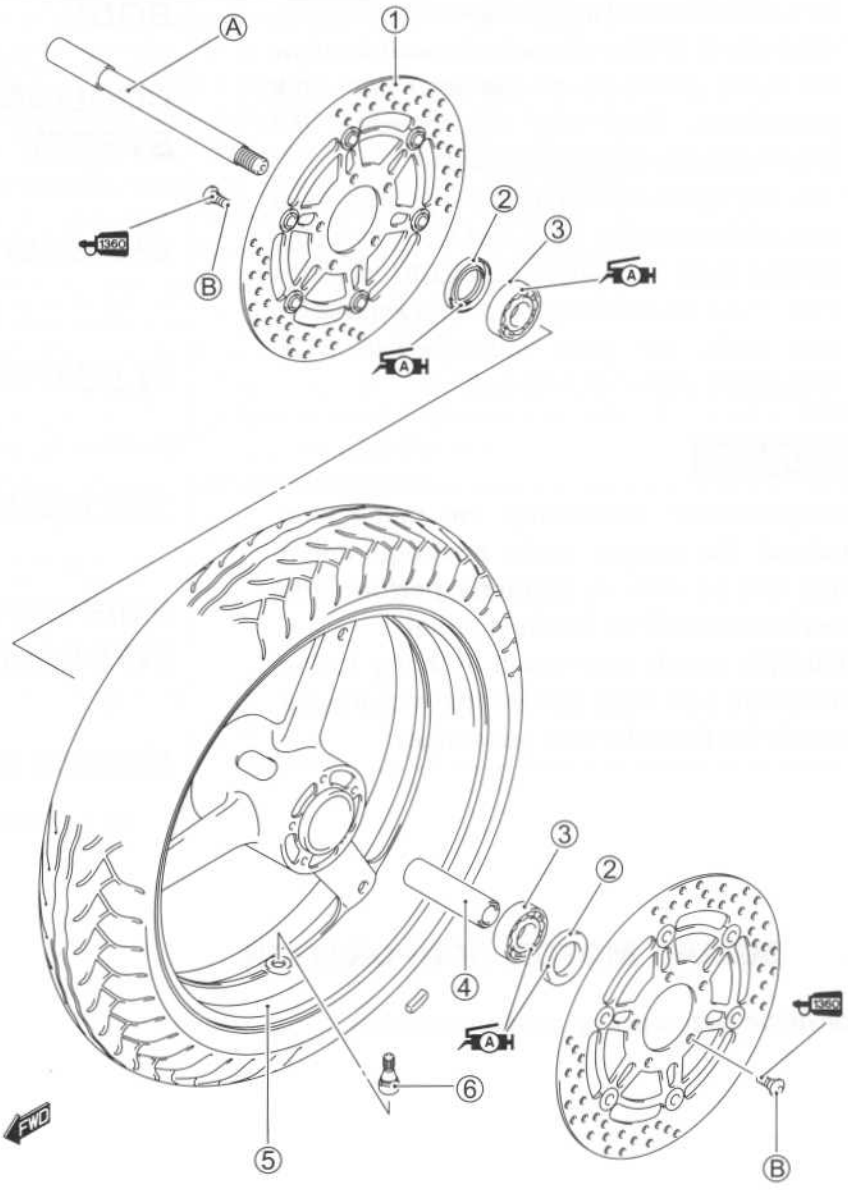
COMPONENT PARTS AND WORK TO BE DONE

Under the name of each system or unit, is its exploded view. Work instructions and other service information such as the tightening torque, lubricating points and locking agent points, are provided.

Example: Front wheel

① Brake disc
② Dust seal
③ Bearing
④ Center spacer
⑤ Front wheel
⑥ Tire valve

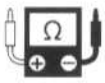
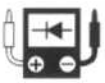
Ⓐ Front axle
Ⓑ Brake disc bolt



ITEM	N·m	kgf-m	lb-ft
Ⓐ	65	6.5	47.0
Ⓑ	23	2.3	16.5

SYMBOL

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

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Torque control required. Data beside it indicates specified torque.		Apply THREAD LOCK SUPER "1360". 99000-32130
	Apply oil. Use engine oil unless otherwise specified.		Use engine coolant.
	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1:1)		Use fork oil. 99000-99001-SS8
	Apply SUZUKI SUPER GREASE "A". 99000-25030 (USA) 99000-25010 (Others)		Apply or use brake fluid.
	Apply SUZUKI MOLY PASTE. 99000-25140		Measure in voltage range.
	Apply SUZUKI SILICONE GREASE. 99000-25100		Measure in current range.
	Apply SUZUKI BOND "1215". 99000-31110 (Except USA)		Measure in resistance range.
	Apply SUZUKI BOND "1207B". 99104-31140 (USA) 99000-31140 (Others)		Measure in diode test range.
	Apply THREAD LOCK SUPER "1303". 99000-32030		Measure in continuity test range.
	Apply THREAD LOCK SUPER "1322". 99000-32110 (Except USA)		Use special tool.
	Apply THREAD LOCK "1342". 99000-32050		Indication of service data.

ABBREVIATIONS USED IN THIS MANUAL

A

ABDC	: After Bottom Dead Center
AC	: Alternating Current
ACL	: Air Cleaner, Air Cleaner Box
API	: American Petroleum Institute
ATDC	: After Top Dead Center
ATM Pressure	: Atmospheric Pressure Atmospheric Pressure Sensor (APS)
A/F	: Air Fuel Mixture

B

BBDC	: Before Bottom Dead Center
BTDC	: Before Top Dead Center
B+	: Battery Positive Voltage

C

CKP Sensor	: Crankshaft Position Sensor (CKPS)
CKT	: Circuit
CLP Switch	: Clutch Lever Position Switch (Clutch Switch)
CMP Sensor	: Camshaft Position Sensor (CMPS)
CO	: Carbon Monoxide
CPU	: Central Processing Unit

D

DC	: Direct Current
DMC	: Dealer Mode Coupler
DOHC	: Double Over Head Camshaft
DRL	: Daytime Running Light

E

ECM	: Engine Control Module Engine Control Unit (ECU) (FI Control Unit)
ECT Sensor	: Engine Coolant Temperature Sensor (ECTS), Water Temp. Sensor (WTS)
EVAP	: Evaporative Emission
EVAP Canister	: Evaporative Emission Canister (Canister)

F

FI	: Fuel Injection, Fuel Injector
FP	: Fuel Pump
FPR	: Fuel Pressure Regulator
FP Relay	: Fuel Pump Relay

G

GEN	: Generator
GND	: Ground
GP Switch	: Gear Position Switch

H

HC	: Hydrocarbons

I

IAP Sensor	: Intake Air Pressure Sensor (IAPS)
IAT Sensor	: Intake Air Temperature Sensor (IATS)
IG	: Ignition

L

LCD	: Liquid Crystal Display
LED	: Light Emitting Diode (Malfunction Indicator Lamp)
LH	: Left Hand

M

MAL-Code	: Malfunction Code (Diagnostic Code)
Max	: Maximum
MIL	: Malfunction Indicator Lamp (LED)
Min	: Minimum

N

NOx	: Nitrogen Oxides

O

OHC	: Over Head Camshaft
OPS	: Oil Pressure Switch

P

PCV	: Positive Crankcase Ventilation (Crankcase Breather)

R

RH	: Right Hand
ROM	: Read Only Memory

S

SAE	: Society of Automotive Engineers
STC System	: Secondary Throttle Control System (STCS)
STP Sensor	: Secondary Throttle Position Sensor (STPS)
ST Valve	: Secondary Throttle Valve (STV)
STV Actuator	: Secondary Throttle Valve Actuator (STVA)

T

TO Sensor	: Tip Over Sensor (TOS)
TP Sensor	: Throttle Position Sensor (TPS)

V

VD	: Vacuum Damper

SAE-TO-FORMER SUZUKI TERM

This table lists SAE (Society of Automotive Engineers) J1930 terms and abbreviations which may be used in this manual in compliance with SAE recommendations, as well as their former SUZUKI names.

SAE TERM		FORMER SUZUKI TERM
FULL TERM	ABBREVIATION	
A		
Air Cleaner	ACL	Air Cleaner, Air Cleaner Box
B		
Barometric Pressure	BARO	Barometric Pressure, Atmospheric Pressure (APS, AP Sensor)
Battery Positive Voltage	B+	Battery Voltage, +B
C		
Camshaft Position Sensor	CMP Sensor	Camshaft Position Sensor (CMPS)
Crankshaft Position Sensor	CKP Sensor	Crankshaft Position Sensor (CKPS), Crank Angle
D		
Data Link Connector	DLC	Dealer Mode Coupler
Diagnostic Test Mode	DTM	—
Diagnostic Trouble Code	DTC	Diagnostic Code, Malfunction Code
E		
Electronic Ignition	EI	—
Engine Control Module	ECM	Engine Control Module (ECM) FI Control Unit, Engine Control Unit (ECU)
Engine Coolant Level	ECL	Coolant Level
Engine Coolant Temperature	ECT	Coolant Temperature, Engine Coolant Temperature Water Temperature
Engine Speed	RPM	Engine Speed (RPM)
Evaporative Emission	EVAP	Evaporative Emission
Evaporative Emission Canister	EVAP Canister	— (Canister)
F		
Fan Control	FC	—
Fuel Level Sensor	—	Fuel Level Sensor, Fuel Level Gauge
Fuel Pump	FP	Fuel Pump (FP)
G		
Generator	GEN	Generator
Ground	GND	Ground (GND, GRD)

SAE TERM		FORMER SUZUKI TERM
FULL TERM	ABBREVIATION	
I		
Idle Speed Control	ISC	—
Ignition Control	IC	Electronic Spark Advance (ESA)
Ignition Control Module	ICM	—
Intake Air Temperature	IAT	Intake Air Temperature (IAT), Air Temperature
M		
Malfunction Indicator Lamp	MIL	LED Lamp Malfunction Indicator Lamp (MIL)
Manifold Absolute Pressure	MAP	Intake Air Pressure (IAP), Intake Vacuum
Mass Air Flow	MAF	Air Flow
O		
On-Board Diagnostic	OBD	Self-Diagnosis Function Diagnostic
Open Loop	OL	—
P		
Programmable Read Only Memory	PROM	—
Pulsed Secondary Air Injection	PAIR	Pulse Air Control (PAIR)
Purge Valve	Purge Valve	Purge Valve (SP Valve)
R		
Random Access Memory	RAM	—
Read Only Memory	ROM	ROM
S		
Secondary Air Injection	AIR	—
Secondary Throttle Control System	STCS	STC System (STCS)
Secondary Throttle Valve	STV	ST Valve (STV)
Secondary Throttle Valve Actuator	STVA	STV Actuator (STVA)
T		
Throttle Body	TB	Throttle Body (TB)
Throttle Body Fuel Injection	TBI	Throttle Body Fuel Injection (TBI)
Throttle Position Sensor	TP Sensor	TP Sensor (TPS)
V		
Voltage Regulator	VR	Voltage Regulator
Volume Air Flow	VAF	Air Flow

WIRE COLOR

B	: Black	Gr	: Gray	R	: Red
Bl	: Blue	Lbl	: Light blue	W	: White
Br	: Brown	Lg	: Light green	Y	: Yellow
Dg	: Dark green	O	: Orange		
G	: Green	P	: Pink		

B/Bl	: Black with Blue tracer	B/Br	: Black with Brown tracer
B/G	: Black with Green tracer	B/O	: Black with Orange tracer
B/R	: Black with Red tracer	B/W	: Black with White tracer
B/Y	: Black with Yellow tracer	Bl/B	: Blue with Black tracer
Bl/G	: Blue with Green tracer	Bl/R	: Blue with Red tracer
Bl/W	: Blue with White tracer	Bl/Y	: Blue with Yellow tracer
Br/B	: Brown with Black tracer	Br/W	: Brown with White tracer
G/B	: Green with Black tracer	G/R	: Green with Red tracer
G/Y	: Green with Yellow tracer	Gr/B	: Gray with Black tracer
Gr/R	: Gray with Red tracer	Gr/W	: Gray with White tracer
O/B	: Orange with Black tracer	O/Bl	: Orange with Blue tracer
O/G	: Orange with Green tracer	O/R	: Orange with Red tracer
O/W	: Orange with White tracer	O/Y	: Orange with Yellow tracer
P/W	: Pink with White tracer	R/B	: Red with Black tracer
R/W	: Red with White tracer	W/B	: White with Black tracer
W/Bl	: White with Blue tracer	W/R	: White with Red tracer
Y/B	: Yellow with Black tracer	Y/Bl	: Yellow with Blue tracer
Y/G	: Yellow with Green tracer	Y/R	: Yellow with Red tracer

GENERAL INFORMATION

1

CONTENTS

WARNING/CAUTION/NOTE

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

⚠ WARNING

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

CAUTION

Indicates a potential hazard that could result in motorcycle damage.

NOTE:
Indicates special information to make maintenance easier or instructions clearer.

Please note, however, that the warnings and cautions contained in this manual cannot possibly cover all potential hazards relating to the servicing, or lack of servicing, of the motorcycle. In addition to the WARNINGS and CAUTIONS stated, you must use good judgement and basic mechanical safety principles. If you are unsure about how to perform a particular service operation, ask a more experienced mechanic for advice.

GENERAL PRECAUTIONS

⚠ WARNING

- **Proper service and repair procedures are important for the safety of the service mechanic and the safety and reliability of the motorcycle.**
- **When 2 or more persons work together, pay attention to the safety of each other.**
- **When it is necessary to run the engine indoors, make sure that exhaust gas in forced outdoors.**
- **When working with toxic or flammable materials, make sure that the area you work in is well-ventilated and that you follow all of the material manufacturer's instructions.**
- **Never use gasoline as a cleaning solvent.**
- **To avoid getting burned, do not touch the engine, engine oil, radiator and exhaust system until they have cooled.**
- **After servicing the fuel, oil, water, exhaust or brake systems, check all lines and fittings related to the system for leaks.**

CAUTION

* If parts replacement is necessary, replace the parts with Suzuki Genuine Parts or their equivalent.
* When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation.
* Be sure to use special tools when instructed.
* Make sure that all parts used in reassembly are clean. Lubricate them when specified.
* Use the specified lubricant, bond, or sealant.
* When removing the battery, disconnect the negative cable first and then the positive cable.
* When reconnecting the battery, connect the positive cable first and then the negative cable, and replace the terminal cover on the positive terminal.
* When performing service to electrical parts, if the service procedures not require use of battery power, disconnect the negative cable the battery.
* When tightening the cylinder head and case bolts and nuts, tighten the larger sizes first. Always tighten the bolts and nuts diagonally from the inside toward outside and to the specified tightening torque.
* Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, self-locking nuts, cotter pins, circlips and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces.
* Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.
* Use a torque wrench to tighten fasteners to the specified torque. Wipe off grease and oil if a thread is smeared with them.
* After reassembling, check parts for tightness and proper operation.

* To protect the environment, do not unlawfully dispose of used motor oil, engine coolant and other fluids: batteries, and tires.
* To protect Earth's natural resources, properly dispose of used motorcycle and parts.

SUZUKI SV650 ('03-MODEL)

RIGHT SIDE

LEFT SIDE

- Difference between photographs and actual motorcycles depends on the markets.

SUZUKI SV650S ('03-MODEL)

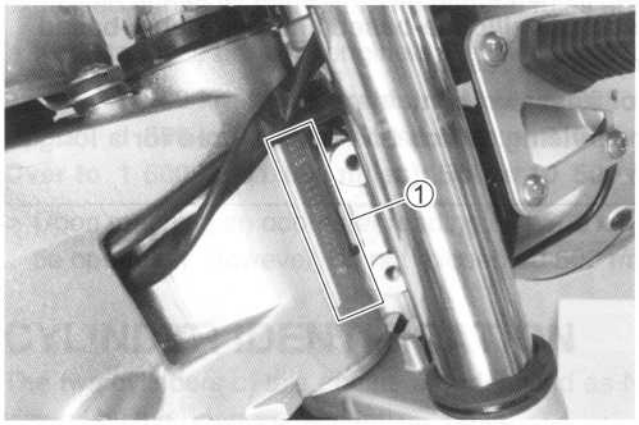
RIGHT SIDE

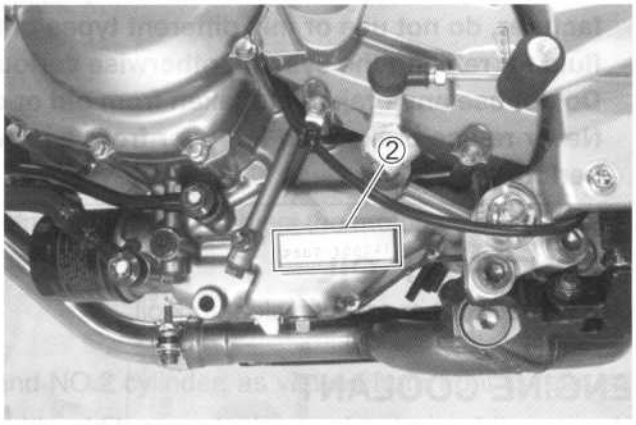
LEFT SIDE

- Difference between photographs and actual motorcycles depends on the markets.

SERIAL NUMBER LOCATION

The frame serial number or V.I.N. (Vehicle Identification Number) ① is stamped on the right side of the steering head. The engine serial number ② is located on the left side of the crankcase. These numbers are required especially for registering the machine and ordering spare parts.





FUEL, OIL AND ENGINE COOLANT RECOMMENDATION

FUEL (FOR USA AND CANADA)

Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method.

Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10 % ethanol, or less than 5 % methanol with appropriate cosolvents and corrosion inhibitor is permissible.

FUEL (FOR OTHER COUNTRIES)

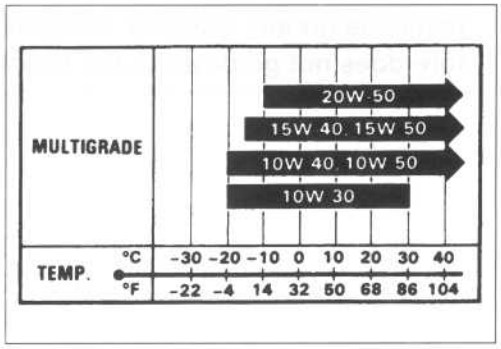
Gasoline used should be graded 91 octane (Research Method) or higher. Unleaded gasoline is recommended.

ENGINE OIL (FOR USA)

SUZUKI recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL or an oil which is rated SF or SG under the API (American Petroleum Institute) service classification. The recommended viscosity is SAE 10W-40. If an SAE 10W-40 oil is not available, select and alternative according to the following chart.

ENGINE OIL (FOR OTHER COUNTRIES)

Use a premium quality 4-stroke motor oil to ensure longer service life of your motorcycle. Use only oils which are rated SF or SG under the API service classification. 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.



BRAKE FLUID

Specification and classification: DOT 4

⚠ WARNING

Since the brake system of this motorcycle is filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will result.
Do not use any brake fluid taken from old or used or unsealed containers.
Never re-use brake fluid left over from a previous servicing, which has been stored for a long period.

FRONT FORK OIL

Use fork oil SS8 or an equivalent fork oil.

ENGINE COOLANT

Use an anti-freeze/engine coolant compatible with an aluminum radiator, mixed with distilled water only.

WATER FOR MIXING

Use distilled water only. Water other than distilled water can corrode and clog the aluminum radiator.

ANTI-FREEZE/ENGINE COOLANT

The engine coolant perform as a corrosion and rust inhibitor as well as anti-freeze. Therefore, the engine coolant should be used at all times even though the atmospheric temperature in your area does not go down to freezing point.
Suzuki recommends the use of SUZUKI COOLANT anti-freeze/engine coolant. If this is not available, use an equivalent which is compatible with an aluminum radiator.

LIQUID AMOUNT OF WATER/ENGINE COOLANT

For engine coolant mixture information, refer to cooling system section, page 6-2

CAUTION

Mixing of anti-freeze/engine coolant should be limited to 60 %. Mixing beyond it would reduce its efficiency. If the anti-freeze/engine coolant mixing ratio is below 50 %, rust inhabiting performance is greatly reduced. Be sure to mix it above 50 % even though the atmospheric temperature does not go down to the freezing point.

BREAK-IN PROCEDURES

During manufacture only the best possible materials are used and all machined parts are finished to a very high standard but it is still necessary to allow the moving parts to "BREAK-IN" before subjecting the engine to maximum stresses. The future performance and reliability of the engine depends on the care and restraint exercised during its early life. The general rules are as follows.

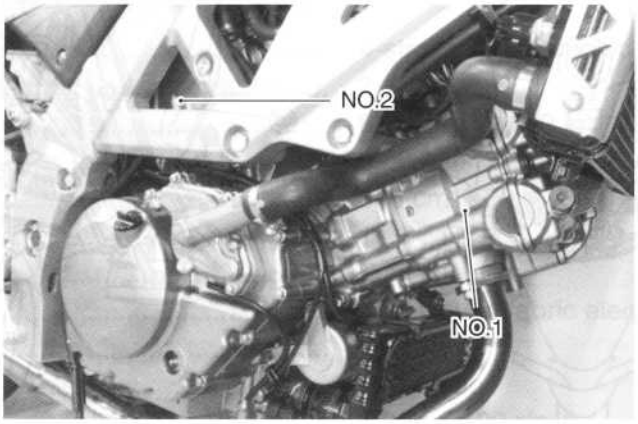
- Keep to these break-in engine speed limits:

Initial 800 km (500 miles): Below 5 000 r/min
Up to 1 600 km (1 000 miles): Below 8 000 r/min
Over to 1 600 km (1 000 miles): Below 10 500 r/min

- Upon reaching an odometer reading of 1 600 km (1 000 miles) you can subject the motorcycle to full throttle operation. However, do not exceed 10 500 r/min at any time.

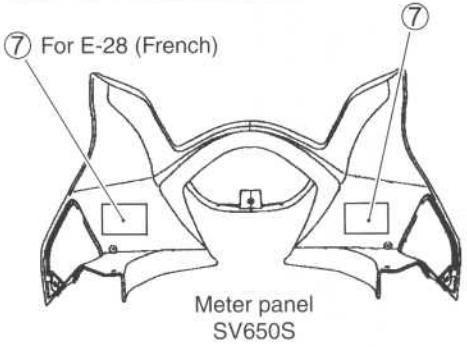
CYLINDER IDENTIFICATION

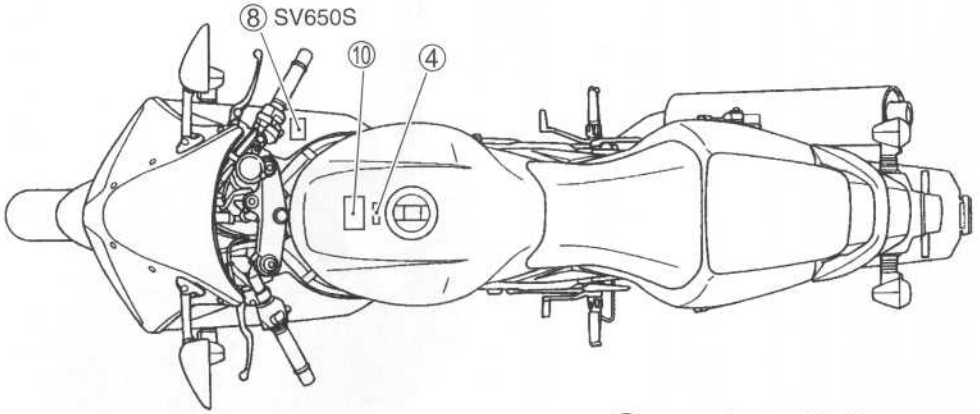
The two cylinders of this engine are identified as NO.1 and NO.2 cylinder, as viewed from front to rear (as viewed by the rider on the seat).

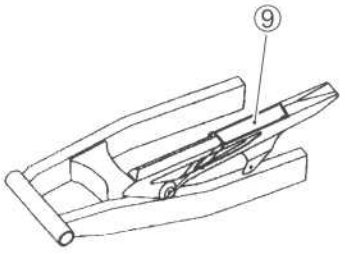


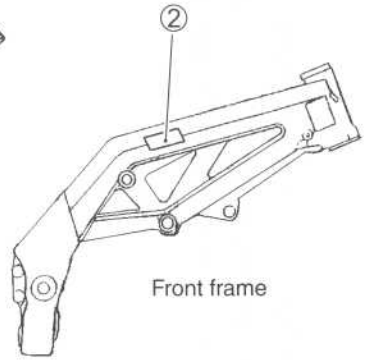
INFORMATION LABELS

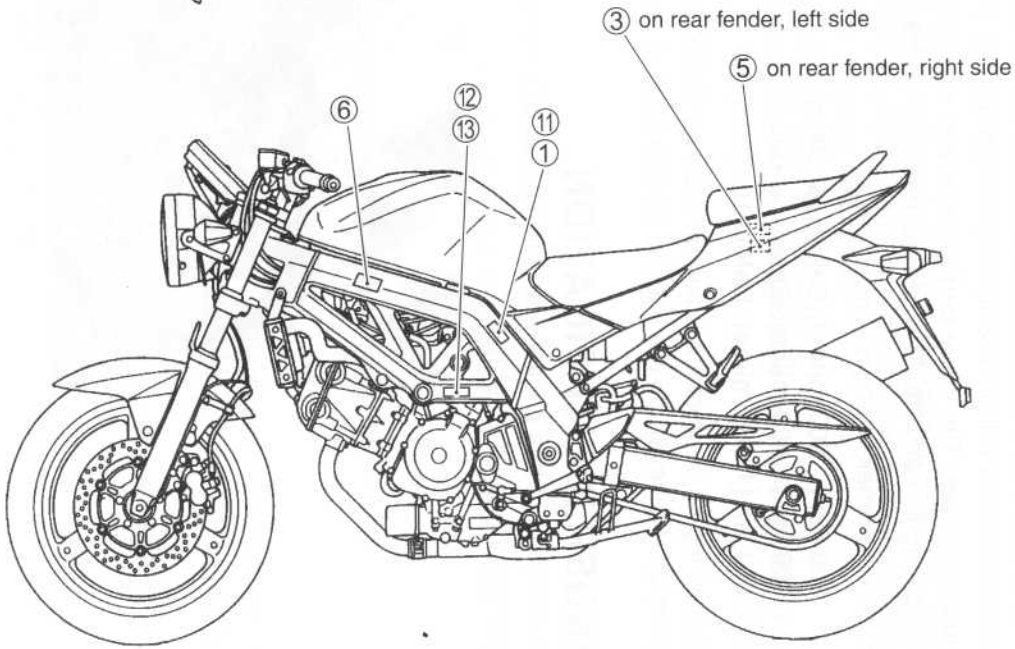
① Noise label (For E-03, 24, 33)
② Information label (For E-03, 28, 33)
③ Vacuum hose routing label (For E-33)
④ Fuel caution label (For E-02, 24)
⑤ Manual notice label (For E-03, 33)
⑥ Frame caution label
⑦ Screen warning label (SV650S)
⑧ Steering warning label (SV650S)
⑨ Tire information label
⑩ Warning safety label
⑪ ICES Canada label (For E-28)
⑫ ID plate (Except for E-03, 28, 33)
⑬ Safety plate (For E-03, 28, 33)











SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 125 mm (83.7 in)	SV650
	2 130 mm (83.9 in)	SV650S
Overall width	745 mm (29.3 in)	SV650
	730 mm (28.7 in)	SV650S
Overall height	1 085 mm (42.7 in)	SV650
	1 175 mm (46.3 in)	SV650S
Wheelbase	1 440 mm (56.7 in)	SV650
	1 430 mm (56.3 in)	SV650S
Ground clearance	150 mm (5.9 in)	SV650
	155 mm (6.1 in)	SV650S
Seat height	800 mm (31.5 in)	
Dry mass	167 kg (368 lbs)	SV650
	171 kg (376 lbs)	SV650S

ENGINE

Type	4-stroke, liquid-cooled, DOHC, 90 °-degree V-twin
Number of cylinders	2
Bore	81.0 mm (3.189 in)
Stroke	62.6 mm (2.465 in)
Displacement	645 cm^3 (39.4 cu.in)
Compression ratio	11.5 : 1
Carburetion	Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 300 ± 100 r/min

DRIVE TRAIN

Clutch	Wet multi-plate type	
Transmission	6-speed constant mesh	
Gearshift pattern	1-down, 5-up	
Primary reduction ratio	2.088 (71/34)	
Final reduction ratio	3.000 (45/15)	SV650
	2.933 (44/15)	SV650S
Gear ratios, Low	2.461 (32/13)	
2nd	1.777 (32/18)	
3rd	1.380 (29/21)	
4th	1.125 (27/24)	
5th	0.961 (25/26)	
Top	0.851 (23/27)	
Drive chain	DID 525 V8, 110 links	SV650
	DID 525 V8, 108 links	SV650S

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Link type, coil spring, oil damped
Front fork stroke	130 mm (5.1 in)
Rear wheel travel	134 mm (5.3 in)
Caster	25 °
Trail	102 mm (4.02 in) SV650
	100 mm (3.94 in) SV650S
Steering angle	32 ° (right & left)..... SV650
	30 ° (right & left)..... SV650S
Turning radius	3.0 m (9.8 ft) SV650
	3.2 m (10.5 ft) SV650S
Front brake	Disc brake, twin
Rear brake	Disc brake
Front tire size	120/60 ZR17 MC (55 W), tubeless
Rear tire size	160/60 ZR17 MC (69 W), tubeless

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	7 ° B.T.D.C. at 1 300 r/min
Spark plug	NGK CR8E, or DENSO U24ESR-N
Battery	12V 36.0 kC (10 Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	30 A
Fuse	15/10/10/10/10/10 A SV650
	15/15/15/10/10/10 A SV650S
Headlight	12 V 60/55 W (H4)..... SV650
	12 V 60/55 W (H4) × 2.. SV650S
Position light	12 V 5 W..... SV650 (Except E-03, 24, 33)
	12 V 5 W × 2..... SV650S
Brake light/Taillight	LED
License plate light	12 V 5 W
Turn signal light	12 V 21 W
Speedometer light	LED
Turn signal indicator light	LED
Neutral indicator light	LED
High beam indicator light	LED
Oil pressure/Coolant temperature/ Fuel injection warning light	LED
Fuel injection light	LED

CAPACITIES

Fuel tank, including reserve	16 L (4.2/3.5 US/Imp gal)	E-33
	17 L (4.5/3.7 US/Imp gal)	Others
Engine oil, oil change	2 300 ml (2.4/2.0 US/Imp qt)	
with filter change	2 700 ml (2.9/2.4 US/Imp qt)	
overhaul	3 100 ml (3.3/2.7 US/Imp qt)	
Coolant	1.7 L (1.8/1.5 US/Imp qt)	

These specifications are subject to change without notice.

COUNTRY AND AREA CODES

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

CODE	COUNTRY or AREA
E-02	U.K.
E-03	U.S.A. (Except for california)
E-19	EU
E-24	Australia
E-28	Canada
E-33	California (U.S.A.)