YAMAHA 2010

SERVICE MANUAL

XT1200Z(Z)

SUPER TÉNÉRÉ

23P-28197-E0

EAS20040

XT1200Z(Z) 2010
SERVICE MANUAL

First edition, March 2010

EAS20071

IMPORTANT

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

Yamaha Motor Company, Ltd. is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

TIP

Designs and specifications are subject to change without notice.

EAS20081

IMPORTANT MANUAL INFORMATION

Particularly important information is distinguished in this manual by the following notations.

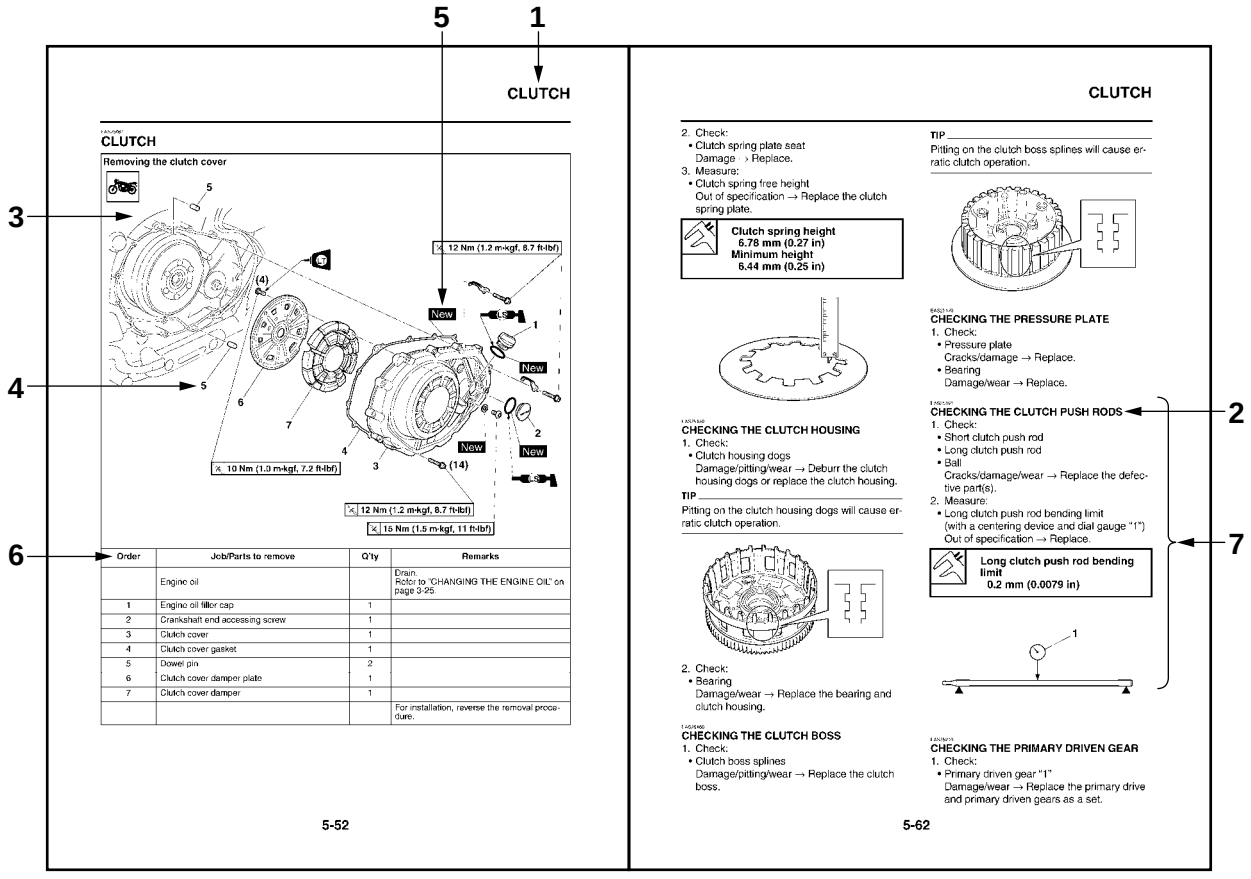
⚠	**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**
⚠ WARNING	**A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
NOTICE	**A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.**
TIP	A TIP provides key information to make procedures easier or clearer.

EAS20091

HOW TO USE THIS MANUAL

This manual is intended as a handy, easy-to-read reference book for the mechanic. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and check procedures are laid out with the individual steps in sequential order.

- The manual is divided into chapters and each chapter is divided into sections. The current section title "1" is shown at the top of each page.
- Sub-section titles "2" appear in smaller print than the section title.
- To help identify parts and clarify procedure steps, there are exploded diagrams "3" at the start of each removal and disassembly section.
- Numbers "4" are given in the order of the jobs in the exploded diagram. A number indicates a disassembly step.
- Symbols "5" indicate parts to be lubricated or replaced.
  Refer to "SYMBOLS".
- A job instruction chart "6" accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
- Jobs "7" requiring more information (such as special tools and technical data) are described sequentially.



EAS20101
SYMBOLS

The following symbols are used in this manual for easier understanding.

TIP

The following symbols are not relevant to every vehicle.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Serviceable with engine mounted		Gear oil
	Filling fluid		Molybdenum disulfide oil
	Lubricant		Brake fluid
	Special tool		Wheel bearing grease
	Tightening torque		Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed		Silicone grease
	Electrical data		Apply locking agent (LOCTITE®).
	Engine oil	New	Replace the part with a new one.

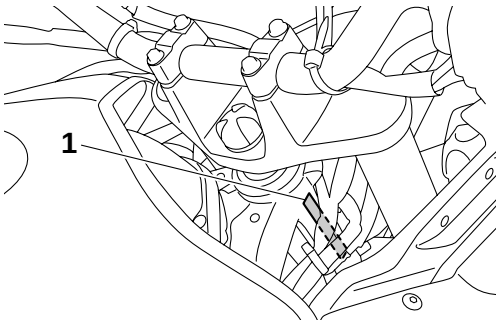
EAS20110

TABLE OF CONTENTS

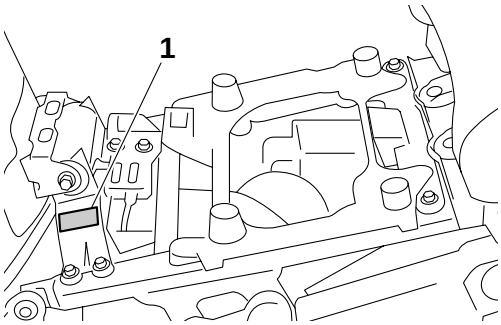
GENERAL INFORMATION

EAS20130
IDENTIFICATION

EAS20140
VEHICLE IDENTIFICATION NUMBER
The vehicle identification number “1” is stamped into the right side of the frame.



EAS20150
MODEL LABEL
The model label “1” is affixed to the frame under the rider seat. This information will be needed to order spare parts.



EAS20170
FEATURES

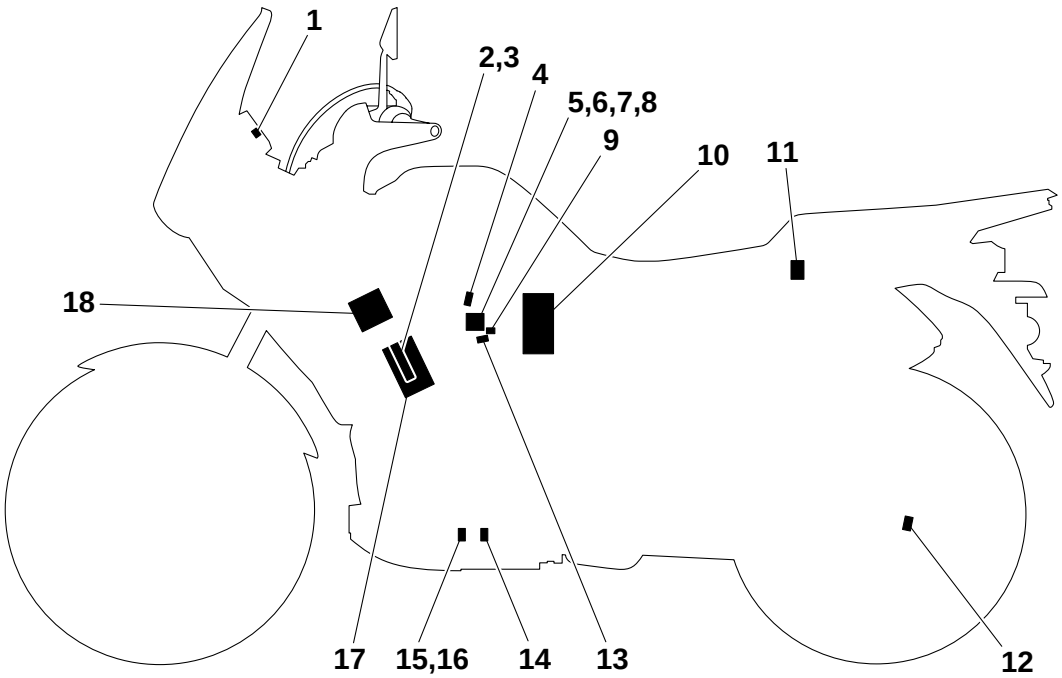
EAS30340
OUTLINE OF THE FI SYSTEM

The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions and the atmospheric temperature. In the conventional carburetor system, the air-fuel ratio of the mixture that is supplied to the combustion chamber is created by the volume of the intake air and the fuel that is metered by the jet used in the respective carburetor.

Despite the same volume of intake air, the fuel volume requirement varies by the engine operating conditions, such as acceleration, deceleration, or operating under a heavy load. Carburetors that meter the fuel through the use of jets have been provided with various auxiliary devices, so that an optimum air-fuel ratio can be achieved to accommodate the constant changes in the operating conditions of the engine.

As the requirements for the engine to deliver more performance and cleaner exhaust gases increase, it becomes necessary to control the air-fuel ratio in a more precise and finely tuned manner. To accommodate this need, this model has adopted an electronically controlled fuel injection (FI) system, in place of the conventional carburetor system. This system can achieve an optimum air-fuel ratio required by the engine at all times by using a microprocessor that regulates the fuel injection volume according to the engine operating conditions detected by various sensors.

The adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions.

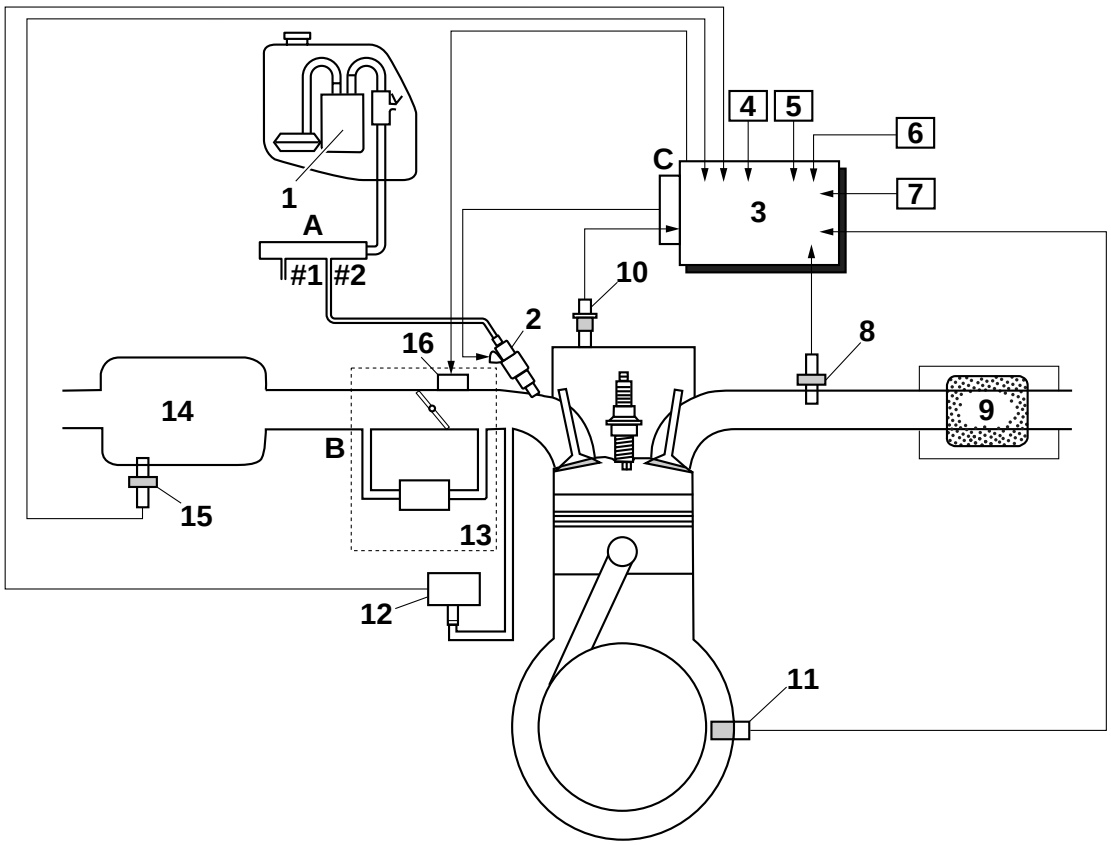


1. Engine trouble warning light
2. Ignition coils
3. Spark plugs
4. Intake air temperature sensor
5. Throttle position sensor
6. Accelerator position sensor
7. Intake air pressure sensor
8. Throttle servo motor
9. Fuel injectors
10. Fuel pump
11. Lean angle sensor
12. Rear wheel sensor
13. Coolant temperature sensor
14. Crankshaft position sensor
15. O_2 sensor #1
16. O_2 sensor #2
17. Battery
18. ECU (engine control unit)

EAS23P1100
FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at 324 kPa (3.24 kgf/cm², 47.0 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, accelerator position sensor, coolant temperature sensor, lean angle sensor, crankshaft position sensor, intake air pressure sensor, intake air temperature sensor, rear wheel sensor and O_2 sensors enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.



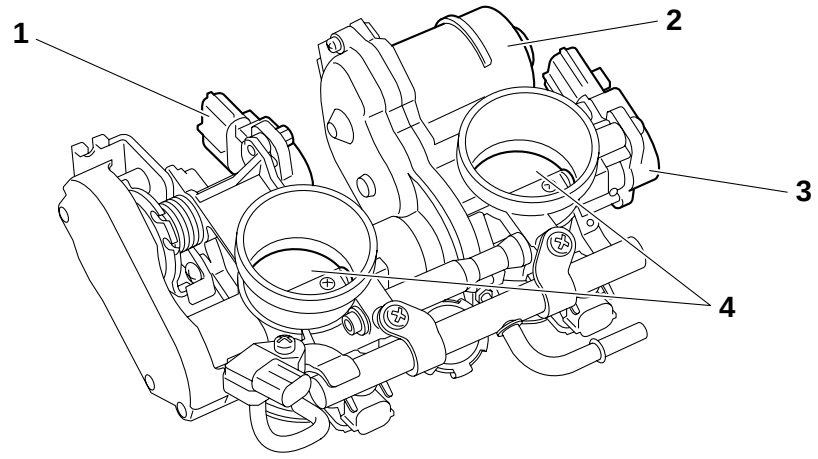
1. Fuel pump
2. Injector
3. ECU (engine control unit)
4. Throttle position sensor
5. Accelerator position sensor
6. Rear wheel sensor
7. Lean angle sensor
8. O_2 sensor
9. Catalytic converter
10. Coolant temperature sensor
11. Crankshaft position sensor
12. Intake air pressure sensor
13. Throttle body
14. Air filter case
15. Intake air temperature sensor
16. Throttle servo motor

A. Fuel system
B. Air system
C. Control system

EAS23P1098
YCC-T (Yamaha Chip Controlled Throttle)

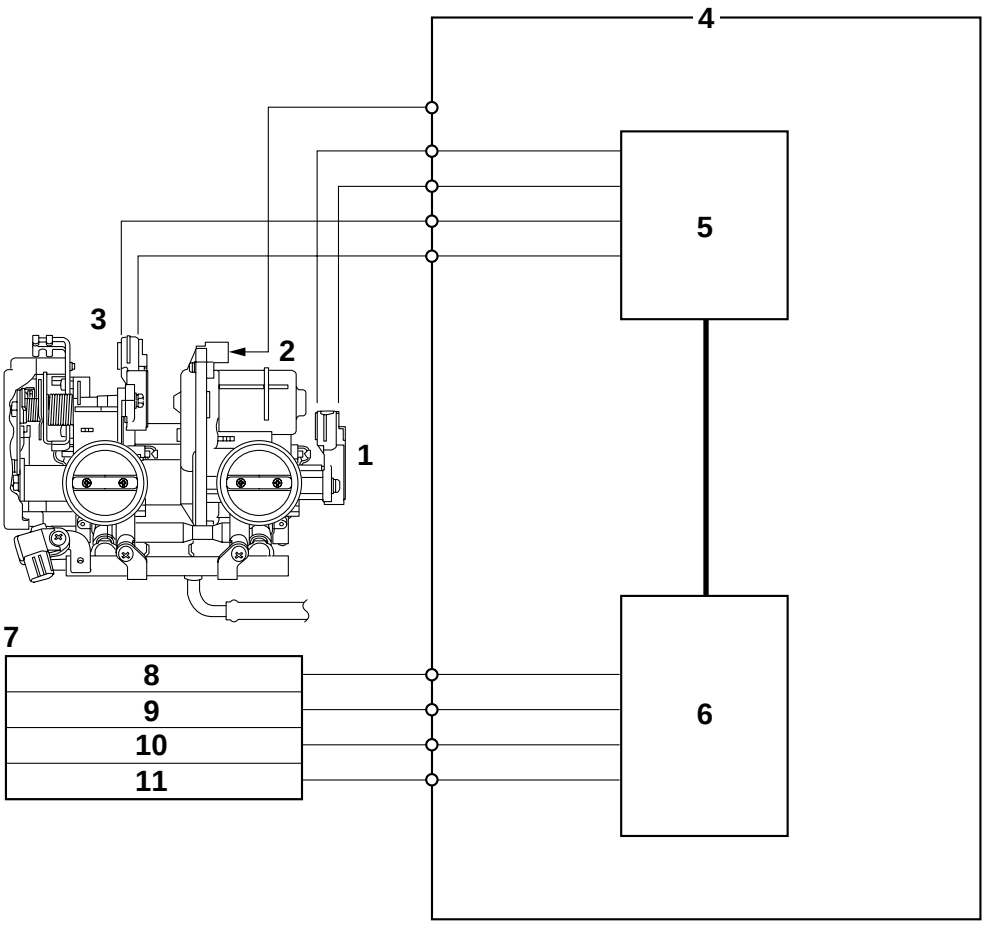
Mechanism characteristics
Yamaha developed the YCC-T system employing the most advanced electronic control technologies. Electronic control throttle systems have been used on automobiles, but Yamaha has developed a faster, more compact system specifically for the needs of a sports motorcycle. The Yamaha-developed system has a high-speed calculating capacity that produces computations of running conditions every 1/1000th of a second.
The YCC-T system is designed to respond to the throttle action of the rider by having the ECU instantaneously calculate the ideal throttle valve opening and generate signals to operate the motor-driven throttle valves and thus actively control the intake air volume.
The ECU contains two CPUs with a capacity about five times that of conventional units, making it possible for the system to respond extremely quickly to the slightest adjustments made by the rider. In particular, optimized control of the throttle valve opening provides the optimum volume of intake air for easy-to-use torque, even in a high-revving engine.

Aims and advantages of using YCC-T
- Increased engine power
  By shortening the air intake path, higher engine speed is possible → Increased engine power.
- Improved driveability
  Air intake volume is controlled according to the operating conditions → Improved throttle response to meet engine requirement.
  Driving force is controlled at the optimal level according to the transmission gear position and engine speed → Improved throttle control.
- Engine braking control
  Due to the throttle control, optimal engine braking is made possible.
- Simplified idle speed control (ISC) mechanism
  The bypass mechanism and ISC actuator are eliminated → A simple mechanism is used to maintain a steady idle speed.
- Reduced weight
  Compared to using a sub-throttle mechanism, weight is reduced.



1. Accelerator position sensor
2. Throttle servo motor
3. Throttle position sensor
4. Throttle valves

YCC-T system outline



1. Throttle position sensor
2. Throttle servo motor
3. Accelerator position sensor
4. ECU (engine control unit)
5. YCC-T CPU
6. FI CPU
7. Sensor input
8. Neutral switch
9. Crankshaft position sensor
10. Rear wheel sensor
11. Coolant temperature sensor

EAS23P1060
OUTLINE OF THE UBS

This model is equipped with a unified brake system (UBS) that operates the rear brake when the brake lever is squeezed.
When the brake lever is squeezed, the rear brake force is controlled electronically according to the brake lever input (hydraulic pressure) and vehicle speed (deceleration). During tandem riding or when the vehicle is carrying a heavy load, the rear brake force generated by the UBS is higher to increase vehicle stability.
If the brake pedal is operated before the brake lever, the UBS will not operate. However, if the brake pedal is operated while the UBS is operating, the UBS will continue to operate until the brake pedal input exceeds the rear brake force generated by the UBS. Then, the rear braking will switch to rider control.

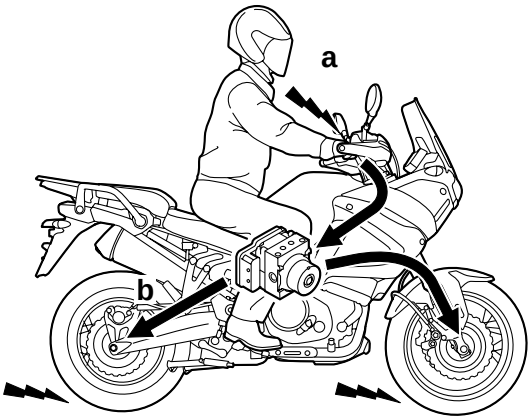
TIP

If the brakes are operated while the vehicle is traveling at low speeds, the UBS will only generate a small brake force.

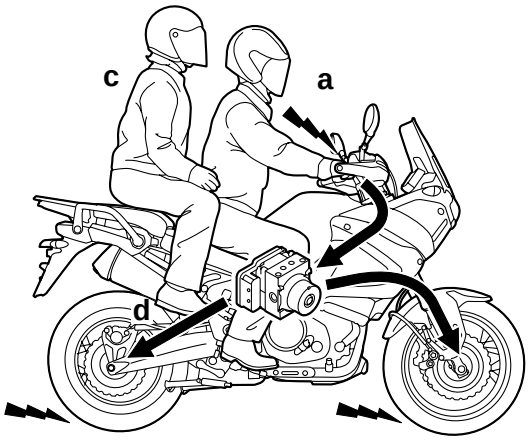
UBS operation

• Brake lever input only: Front braking and rear braking with hydraulic pump (with UBS operation)

Brake lever only operated (UBS operation)



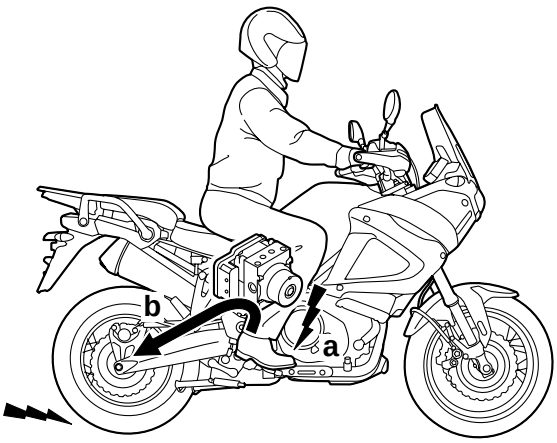
a. Input
b. Automatic pressurization (normal)



a. Input
c. During tandem riding or when carrying a load
d. Automatic pressurization (high)

• Brake pedal input only: Rear braking (without UBS operation)

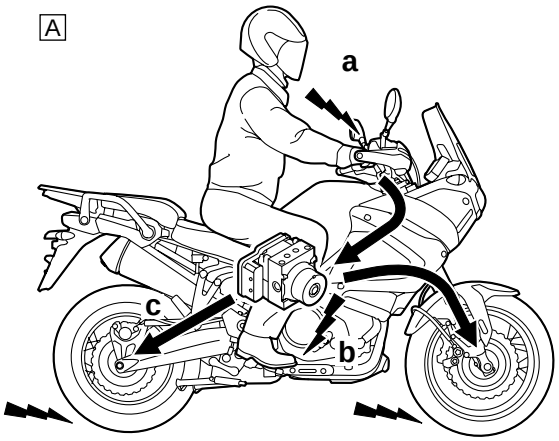
Brake pedal only operated



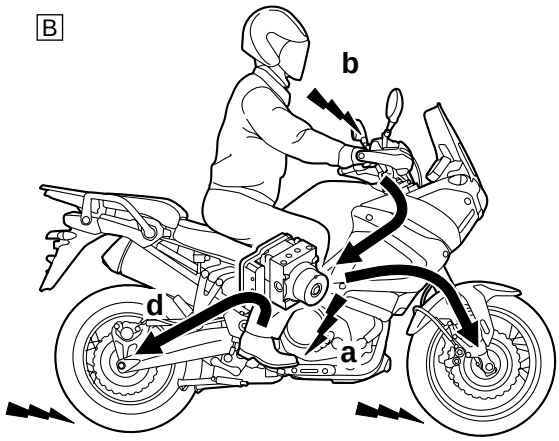
a. Input
b. No automatic pressurization

• Brake lever input and brake pedal input: Front braking and rear braking (with and without UBS operation)

Brake lever and brake pedal both operated

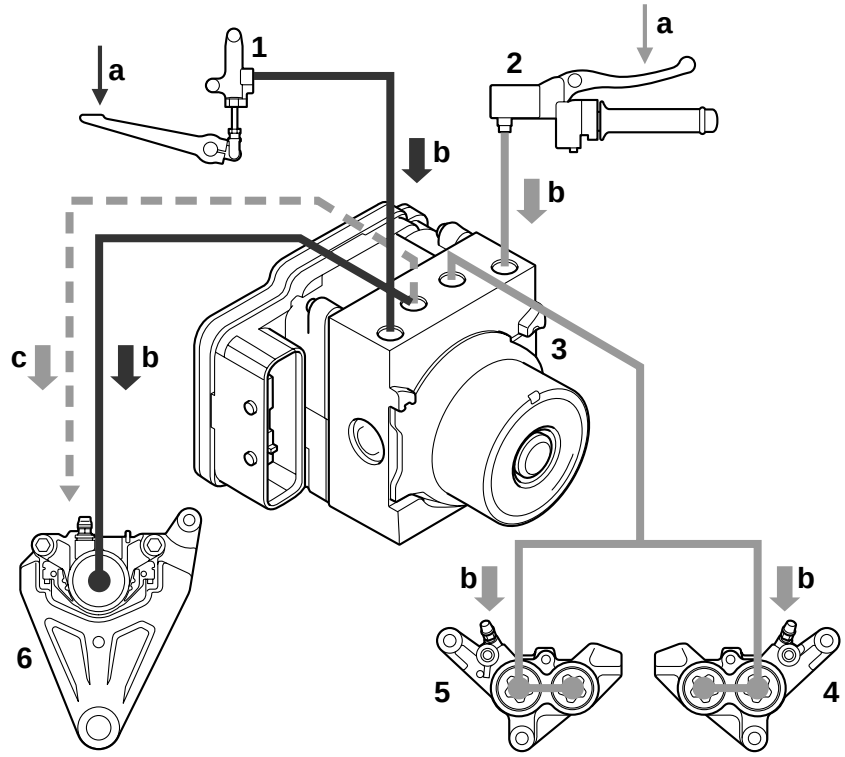


A. Brake lever is operated before brake pedal
a. First input
b. Second input
c. Brake fluid is automatically pressurized until the second input exceeds the automatic pressurization



B. Brake pedal is operated before brake lever
a. First input
b. Second input
d. No automatic pressurization

UBS diagram



1. Rear brake master cylinder
2. Front brake master cylinder
3. Hydraulic unit assembly (ABS ECU)
4. Right front brake caliper
5. Left front brake caliper
6. Rear brake caliper

a. Input
b. Pressurization
c. Pressurization (hydraulic pump pressurization by UBS)

When the brake lever is squeezed, the front brake master cylinder pressure sensor in the hydraulic unit detects the hydraulic pressure. The ABS ECU calculates the appropriate rear brake force according to the detected hydraulic pressure and sends a signal to the rear brake hydraulic pump. The hydraulic pump pressurizes the rear brake caliper using electronic control to operate the rear brake.

TIP

- If the brake pedal is depressed while the brake lever is being squeezed, the brake pedal may feel hard due to the operation of the UBS, but this does not indicate a malfunction.
- If the rider squeezes the brake lever while resting their foot on the brake pedal, a vibration can be felt at the brake pedal due to the operation of the UBS, but this does not indicate a malfunction.

ECA23P1054

NOTICE

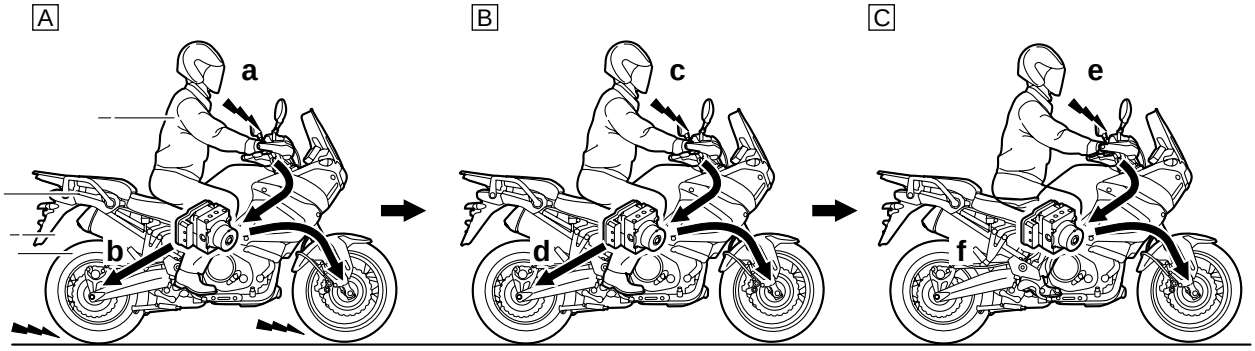
- **The UBS does not operate before the vehicle starts off.**
- **If the vehicle is stopped by operating the brake lever only, the brake force due to the operation of the UBS will be maintained while the brake lever is squeezed. However, if the brake lever is released, then squeezed again, the UBS will not operate.**

ECA23P1055

NOTICE

- **The unified brake system is a system to assist the brake operation. However, both the brake lever and the brake pedal must be operated for maximum braking effect.**
- **Because the balance between the front brake calipers and the rear brake caliper in the unified brake system is determined electronically, be sure to use the specified brake pads.**
- **Each set of brake pads should be checked individually and replaced if necessary.**

When vehicle is stopped using brake lever only



A. Deceleration
a. Input
b. Automatic pressurization

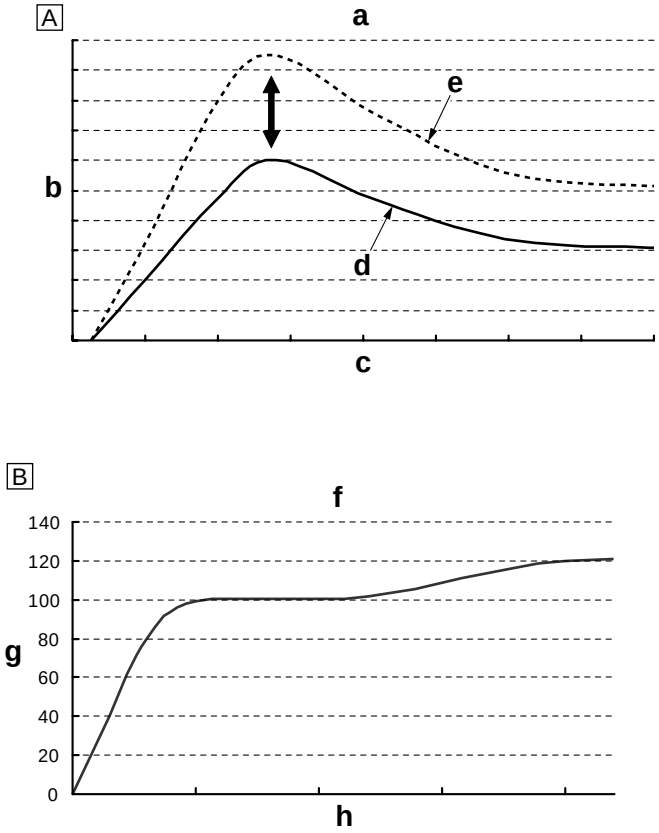
B. Vehicle stopped
c. Input maintained
d. Pressurization maintained

C. Brake lever released, then squeezed again, after vehicle stops
e. Brake lever released, then squeezed again
f. No automatic pressurization

UBS hydraulic pressure map

The appropriate hydraulic pressure is distributed according to the load being carried by the vehicle. See figure “A”.

The coefficient is set according to the vehicle speed when the brake input starts and remains constant until the brake input stops. When the brakes are operated continuously to slow the vehicle, the coefficient (UBS brake force) does not decrease together with the vehicle speed. See figure “B”.

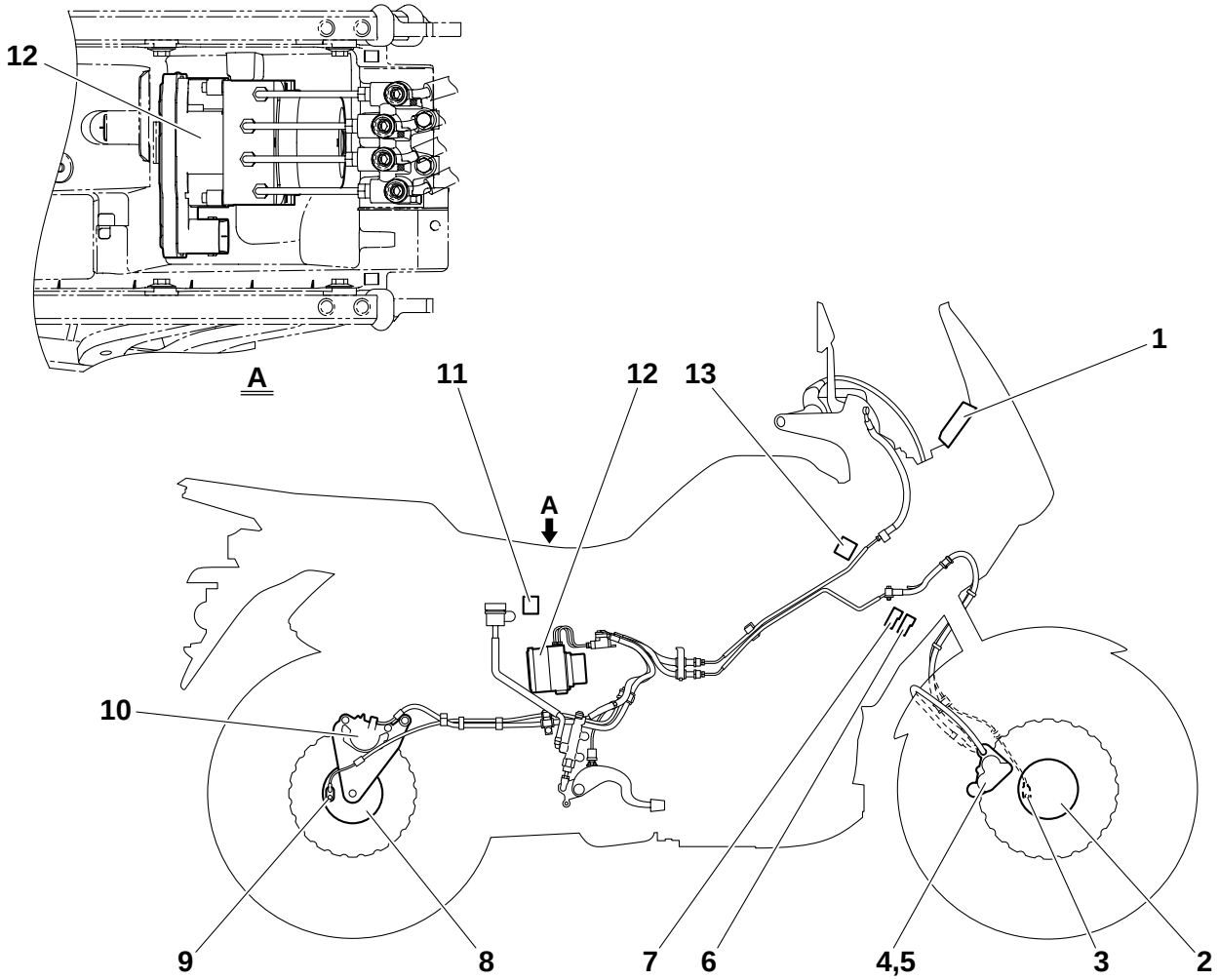


a. Hydraulic pressure distribution
b. Rear brake output (bars)
c. Front brake input (bars)
d. Rider only
e. When carrying the maximum load
f. Vehicle speed coefficient
g. Coefficient (%)
h. Speed (km/h)

EAS23P1061
OUTLINE OF THE ABS

1. This model is equipped with the latest, advanced type of ABS, which has improved feeling during operation and smoother braking than previous ABS brakes. The ABS ECU detects the hydraulic pressure using the pressure sensors and controls the pressure linearly using continuously variable adjustments to obtain the appropriate pressure when the wheels have a tendency to lock or according to the operation input (hydraulic pressure) from the brake lever or brake pedal.
2. If the wheels have a tendency to lock during brake lever input, brake pedal input, or UBS control, the ABS will operate.
3. The hydraulic unit assembly, which is the main component of the ABS, is centrally located on the vehicle to increase mass centralization.

ABS layout



1. ABS warning light
2. Front wheel sensor rotor
3. Front wheel sensor
4. Right front brake caliper
5. Left front brake caliper
6. ABS ECU fuse
7. ABS solenoid fuse
8. Rear wheel sensor rotor
9. Rear wheel sensor
10. Rear brake caliper
11. ABS test coupler
12. Hydraulic unit assembly
13. ABS motor fuse

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