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1. General

The Motorcycle Anti-Lock Brake System (MABS) is an active safety device attached to the existing brake system of motorcycle. It helps prevent wheel lock-up due to excessive brake pressure applied to the braking system during hard braking. Therefore it ensures stability and good steering control in the process of braking and reduces in some situations the braking distance by making the best use of the frictional force of tire and road surface.

MABS helps improve the safety performances of vehicles in the following ways:

- ★ It maintains steering control. Drivers can operate the steering wheel to avoid obstacles during emergent stop.
- ★ It reduces the braking distance. Under the conditions of concrete or asphalt pavement, it will reduce the braking distance by 10% at minimum; in some situations of slippery road surfaces like ice or snow covered surfaces, it will reduce the braking distance by approximately 30%.
- ★ It reduces the tire wear, hence reduces the maintenance cost.
- ★ It greatly improves the sense of braking for the driver. The ABS-based braking is smooth and stable without any surge.
- ★ It ensures the safe vehicle driving.

2. System Arrangement



The system includes wheel speed sensor (including gear ring and Holzer sensor), electronic control unit (ECU), electromagnetic control valve, wire harness and ABS warning lights and other components.

Note: ECU location may vary with different vehicle model and condition.

3. System Installation and Component Test

3.1 Mounting the annulus

The annulus shall be mounted reliably to the wheel hub. The axial variation after the mounting is completed shall be less than 0.02 mm and the height difference between the adjacent teeth shall be less than 0.04 mm.

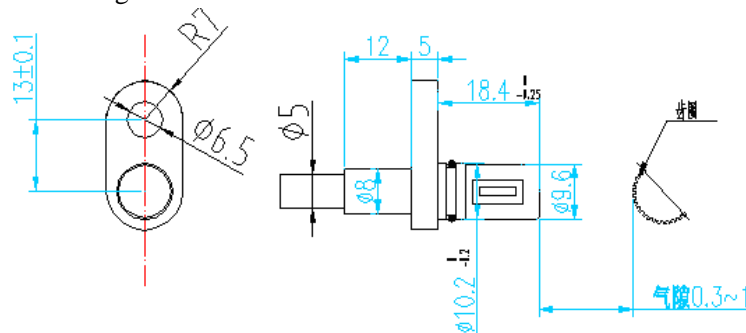


Note: The annulus shall be mounted in place, otherwise conflict in form of friction or bump may occur between the displaced annulus and sensor holder or other stationery parts on the wheel axle, resulting damage of the annulus and malfunction of the ABS.

3.2 Sensor

3.2.1 Fit of sensor and annulus

The clearance between the sensor and annulus should be less than 0.75 mm, the maximum clearance value shall not exceed 1mm. Sensor wiring harness must be reliable protection, the use of polyurethane cable or sets of bellows and other measures, the sensor wiring harness generally with the brake tubing to.



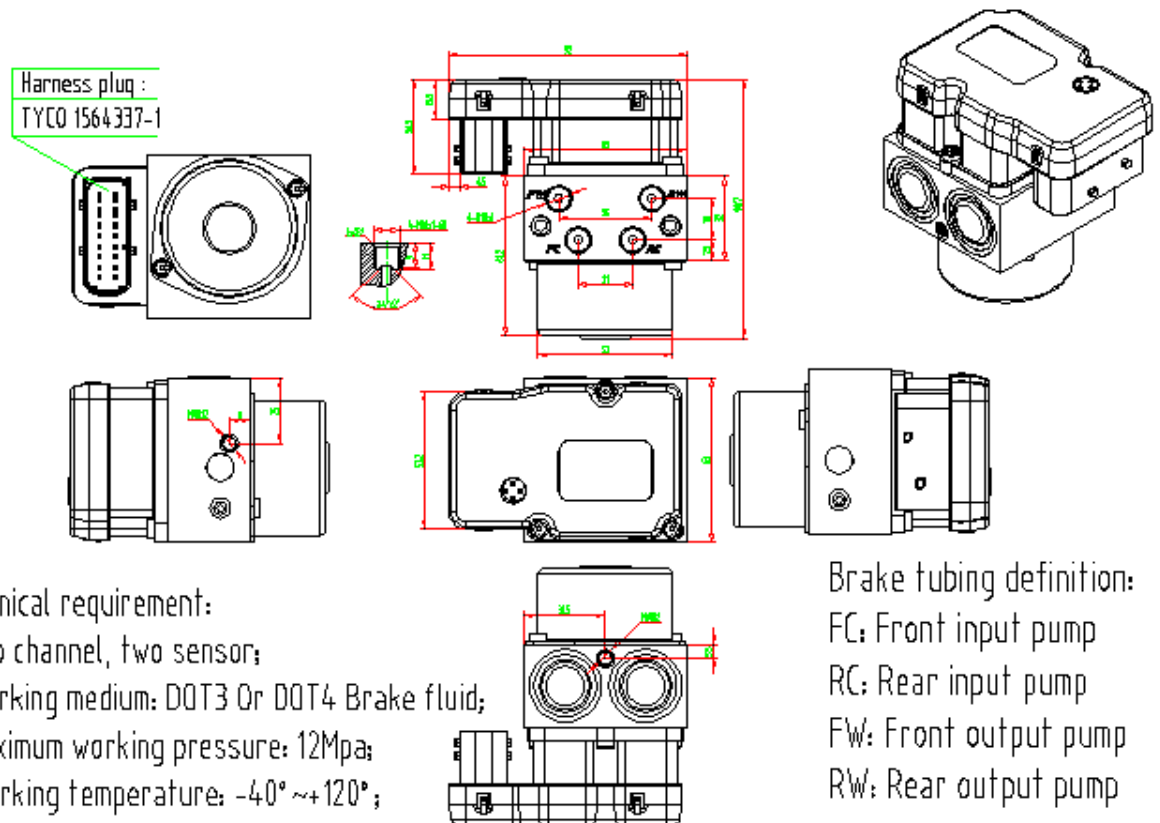
Note: The sensor of different type may need different installation mode, according to the actual one.

3.3 MABS control assembly and tubing installation

The MABS control assembly shall be installed in a place with good ventilation and convenient installation and maintenance, and fixed firmly to reduce the vibration of the electric control unit. Two lines before and after the brake pump with MABS control assembly on the two oil inlet FC (front pump), RC (rear wheel pump) connected to the MABS control on the assembly oil outlet FW (front pump), RW (rear wheel pump) are respectively connected with the front and rear brake forceps pump.

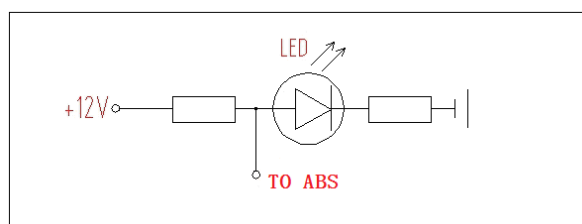
After the completion of the installation of exhaust brake pipe, recommend the use of vacuum tools for system exhaust, ensure the front and rear wheel cylinder and the pipe without air bubbles, and check the brakes before and after the exhaust pump, pump and ABS control assembly of all joints shall not have leakage phenomenon. Recommended DOT4 level of brake fluid..

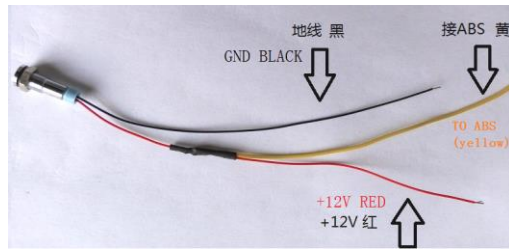
Note: 1, the connection must be in accordance with the MABS control assembly of the marked connection, do not take the wrong!
2, the use of high-pressure oil pipe, in the braking process does not produce expansion of the tubing,



3.4 Indicator light installation

MABS indicator light is a light alarm device which reflects the real time state of ABS to the driver. At the same time, ABS also use the indicator light to the maintenance personnel in a specific way to pass the fault information system.





3.5 installation of wiring harness

MABS is equipped with special beam, which is specially designed according to the characteristics of the transmission signal, which has strong anti interference performance and good environmental adaptability.

All parts of the system shall be connected with the special wire harness provided by the manufacturer, and the electrical connection shall be strictly according to the technical requirements of the system electrical wiring diagram (Appendix 1). And should pay attention to the following points:

Note: 1, the end of the wire connector application wire fixation, in order to avoid the bad contact connector suspended by vibrating the line.

2, the electrical wiring diagram of the fuse should be selected according to the requirements specification, can not cross or select a large fuse.

3, MABS wiring harness connection should ensure that the connection is reliable. It is recommended that the connection through welding, and do a good job in waterproof protection, so as to avoid poor contact will lead to ABS failure or abnormal working.

4. System fault diagnosis and elimination

The MABS has a self-diagnostic function. If a system fault occurs, the system can identify the fault and store the error message while energizing the MABS light on the integral instrument panel to inform the driver of the system fault so that service personnel may obtain the error message necessary for troubleshooting.

4.1 Definition

- Fault: cause of anti-lock braking function failure.
- Fault code: numeric character indicating a specific fault.
- Flash code: fault code in the form of ABS light flashing.
- Fault diagnosis: the process of reading the fault code and identifying the fault content.

4.2 Fault code identification and fault code table

4.2.1 Normal operation:

When ignition switch is turned to “ON” position, the ABS light is on for 3 second and then goes off; short ABS motor operating sounds can be heard;

The ABS light is off when the car is in normal running condition;

The ABS light stays on after the ABS is disabled;

The ABS light stays on after the ABS ECU is removed.

4.2.2 Fault:

If the MABS system fails, the MABS indicator light long or flashing .The ABS in this case

will be out of service, but it will not hamper the operation of the conventional brake system.

4.2.3 Fault type:

1) Static fault: Faults of this type can be detected when the vehicle is in the state of inaction. For example, if the ABS light stays on 3 seconds after turning the ignition switch to “on” position or the ABS light remains off, it indicates that an ABS fault of this type occurs.

2) Dynamic fault: Faults of this type cannot be detected when the vehicle is static. If the ABS light stays on when the vehicle speed exceeds 20 kilometers per hour, it indicates that a dynamic fault may have occurred.

4.2.4 Fault code:

The possible faults have been coded and stored in the memory. All the fault information can be read in the form of light flashes.

4.2.5 Fault code connotation and fault location

A fault code comprises two digits, such as 3-2 or 2-1. The value of each digit is interpreted by continuous flashing times of the ABS light (each flash lasts about 0.3 second). After the first digit is displayed, the ABS light will be off for about 0.8 second, then the second digit is displayed. If more than one fault are present, there will be a two-second pause between the two faults. For example, if the two codes 3-2 and 2-1 are to be displayed, the timeline of the flashing code should go like in Fig.6-1 below:

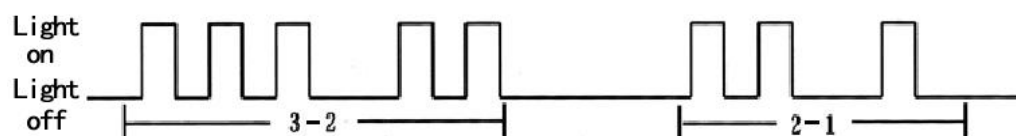


Fig.6-1 Time sequence of the flashing code

Meanings conveyed in the fault codes and relevant corrections are described in the Table 6-1 below:

Table 6-1 Fault Code Table

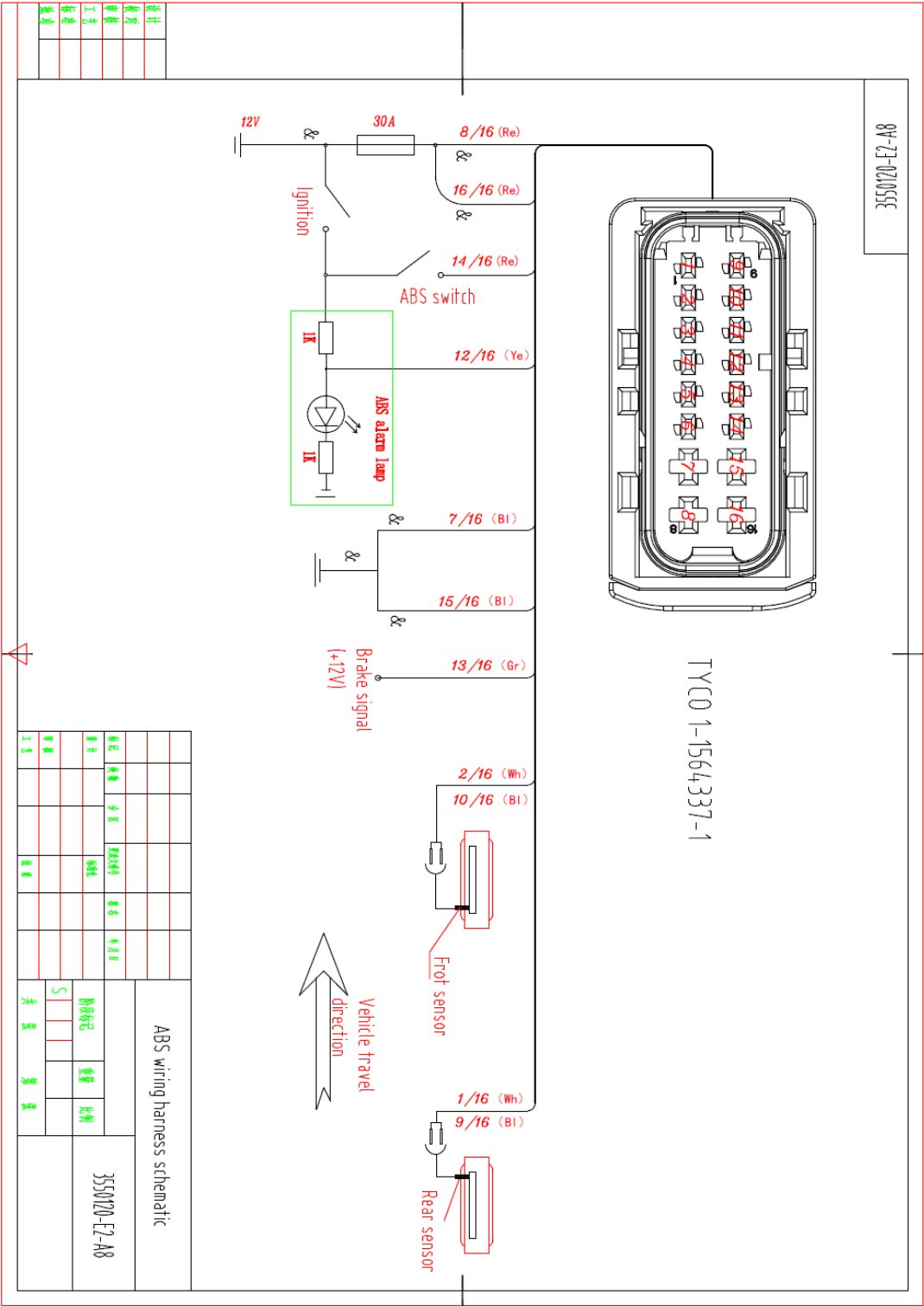
Flashes	Fault	Inspection
1-2	No fault	System in normal operation condition
2-1 2-2 2-3 2-4	Circuit breaker	ABS system control part of the hardware failure, the need to replace the ECU
3-1	Internal failure of wheel speed sensor	ABS system control part of the hardware failure, the need to replace the ECU
3-2	wheel speed sensor circuit broken	To detect the connection line and the plug of the sensor, to find the problems of short circuit or reverse connection, or to replace the sensor.
4-1	Front Wheel-speed sensor circuit broken,	The sensor indicates circuit breaking or poor contact.
4-2	Rear Wheel-speed sensor circuit broken,	The sensor indicates circuit breaking or poor contact.
5-1	Loss of wheel speed signal, front wheel	Examine the installation of speed sensor on right front wheel and fit with the annulus.

5-2	Loss of wheel speed signal, rear wheel	Examine the installation of speed sensor on left front wheel and fit with the annulus.
6-1	ABS Motor power failure	Check ABS motor circuit with no power supply
6-2	ABS solenoid valve power failure	Check ABS solenoid valve power supply
6-3	No brake signal	Check the brake signal power supply

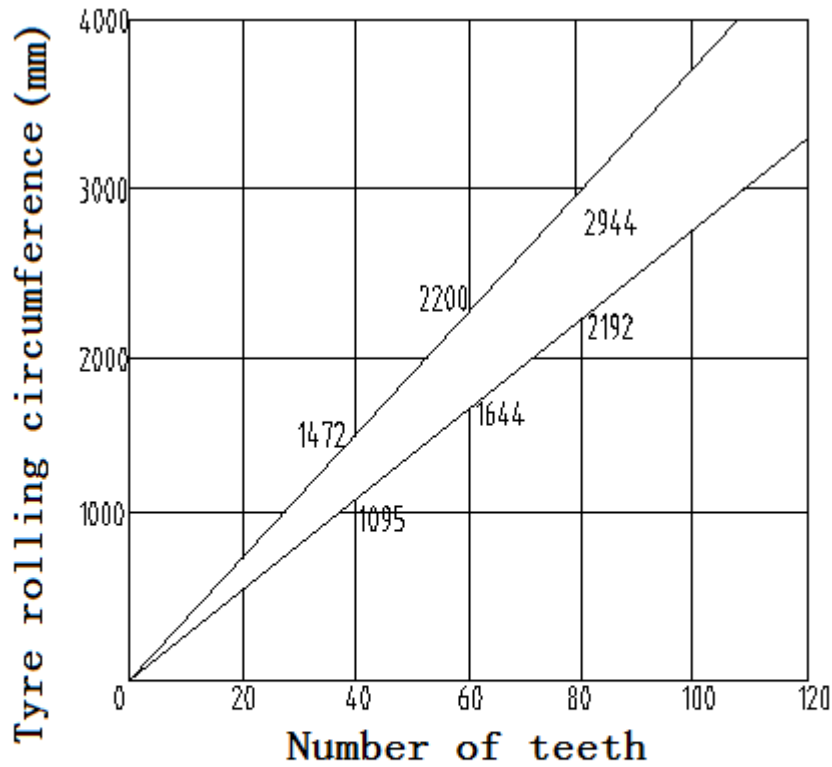
5. Cautions for Use of MABS

- ▲ Disconnect the ECU control box before charging the vehicle battery with external power supply, or the ECU may be damaged under excessive external voltage.
- ▲ If weld operation is required, always disconnect ECU first. Do not measure the ECU control box with multimeter.
- ▲ Regularly monitor the generator voltage for consistency.
- ▲ When servicing skids/shoes, take care not to damage the annulus and sensor. Carefully clean the annulus and sensor and push the sensor in the direction of annulus until it is fully engaged.
- ▲ Disconnect the power supply before disassembling and reassembling any parts and components. Keep the parts and components clean and dry.
- ▲ Do not change the fuse rating or short-circuit it.
- ▲ Replace the light in time when it is broken.
- ▲ Do not clean the ECU with water spray.

Appendix 1: MABS wiring schematic diagram



Appendix 2: The relationship between the number of teeth and the length of the tire in the standard product program



Standard product, the corresponding relationship between the circumference of the tire and the number of the ring gear teeth.

Note: the user can inform the front and rear tire size and the number of gear ring, according to the user's data to adjust the parameters of the program

Appendix 3: Wire harness plug definition

