

Maintenance Manual of Karry

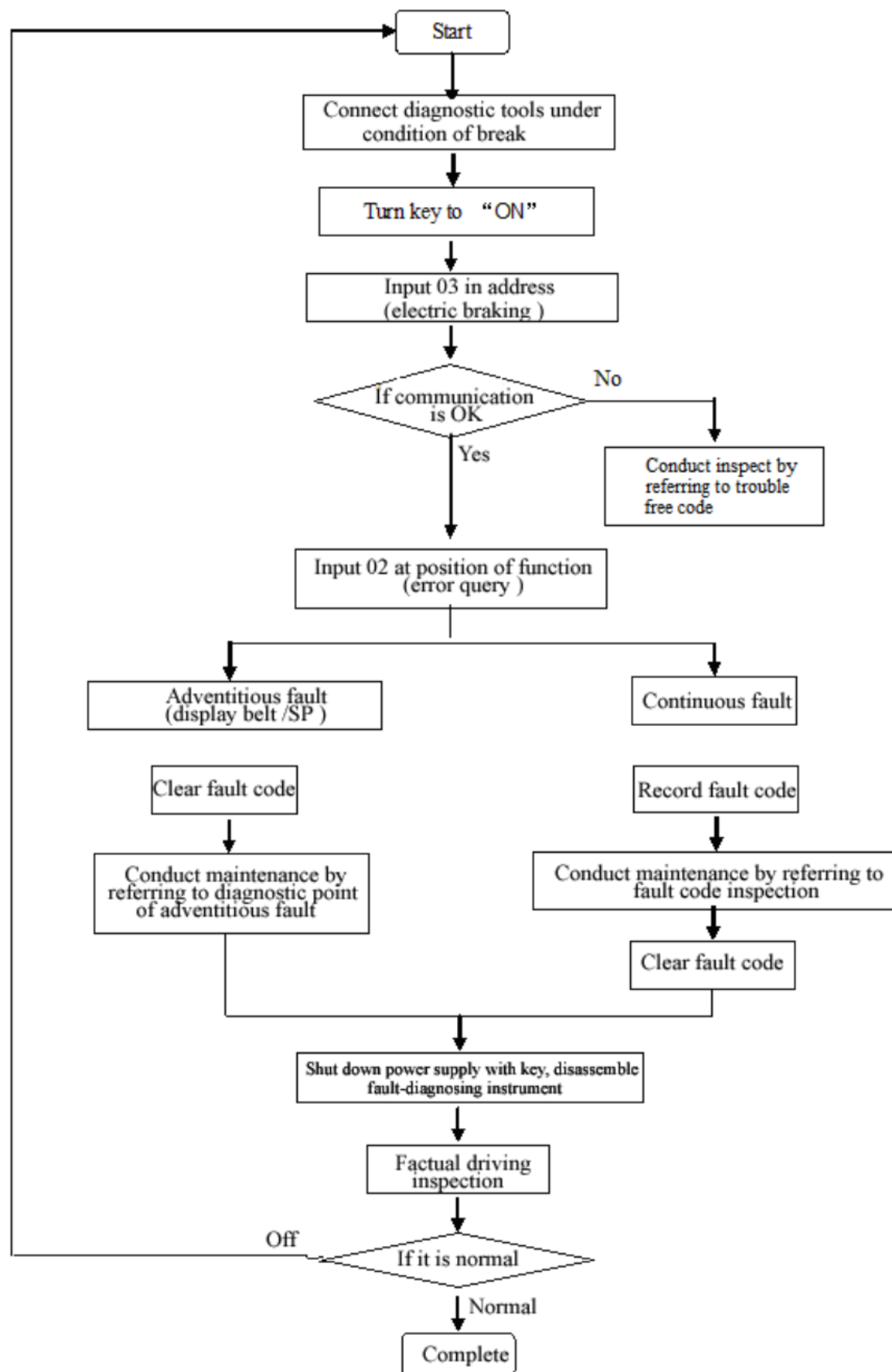
(MK60 ABS)

Service Department of Chery Automobile Distribution CO., Ltd

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1. Flow chart of trouble diagnosis



2. Precautions for fault diagnosis

ABS adopts electric hydraulic control, in condition of normal operation, following phenomenon are normal, while not be fault.

Phenomenon	Description
Self checking sound of system	After started engine, impacting sound might be sent out from engine room of engine, the sound is self-checking sound of ABS, while not abnormal.
Sound vocalizing during action of ABS	1. Sound of electromotor in ABS hydraulic unit. 2. Sound generating from libration with brake pedal. 3. During operation of ABS, impacting sound of suspension, or noise of friction between tire and ground might be caused from brake. Note: Tire might be sent out noise during normal operation of ABS.
ABS is activated, but braking distance is too long	On snow or sandstone ground, braking distance of vehicle that has ABS maybe slip longer distance than vehicle has no ABS. Please drive carefully while driving on abovementioned ground.

3. Operational method and function introduction of fault-diagnosing device

3.1 Operational method

- * Connect fault-diagnosing device to diagnosing socket under condition of break, then switch on ignition switch.
- * Input 03 and press key of OK to enter operational condition of ABS.
- * Input function code you wanted.
- * Input 06 and press OK to exit.
- * Disassemble fault-diagnosing device after break.

3.2 Introduction on function code

- * Function01-display state information
- * Function02-fault query
- * Function03-diagnosis on hydraulic control unit
- * Function04-Charging and air bleed
- * Function05-clear fault record
- * Function06-complete, exit
- * Function07-Coding of controller
- * Function08-Display measuring data (such as wheel speed signal etc.)

3.3 Functional key

- * ← - Cancel, modify input data and current menu
- * OK - Confirm input
- * → - Next step

4. Servicing point of adventitious fault

In electric control system, instantaneous loose contact maybe occurs at position of electric loop and input/output signal, and cause adventitious fault or remain fault code during ECU self inspection. In case that fault reason existing continuously, it is possible to find out abnormal parts by inspecting according to fault code. In some case, fault reason maybe disappears automatically, so it is difficult to find out the fault reason.

In this condition, it is possible to check if fault occurs again by simulate fault according to flowing measure.

I. In case that vibration might be primary reason:

- * Shake connector lightly.
- * Shake wire harness lightly.
- * Shake sensor lightly.
- * Shake other operating parts lightly (such as wheel bearing).

Note: It is necessary to replace new parts if the wire harness is twist off or broke from too big tension. Occasional open/short circuit with sensor might be caused from upward /downward movement of suspension system, so it is necessary to conduct actual driving test while inspect sensor signal.

II. In case that overheat or overcool might be primary reason:

- * Heat the parts that be considered as failure one with blowing machine.
- * Check if cold welding occurs by using cooling nebula.

III. In case that too big contact resistance of power loop might be primary reason:

- * Open switches of all electrical equipments, which include head light switch and defrost switch.

In case that the fault does not occur again, It is possible to diagnose and maintain only while the fault occurs again. In generally, adventitious fault should be worse and worse, while not better.

5. MK 60 ABS System

5.1 Inspection on ABS warning lamp

Check if warning lamp lights according to following mode:

- I. Turn ignition switch to “ON”, ABS warning lamp lights for 1.7 seconds, then extinguishes.
- II. Please check fault code if abovementioned did not occur.
- III. Please refer to fault list of faultless code if warning lamp did not light completely.

5.2 Reading of state information

After connected diagnostic device, input 03 in position of address (Addresswort) and press key of OK, the screen should display following state information:

1. For example, ECU figure number and version number

2. Code (Codierung): 00001

5.3 Read fault code

Input 02 in position of function selection (Funktionanwählen), and press OK to display quantity of fault. The display fault code and content of each fault in order by pressing key of “^”.

5.4 Eliminate fault code

Input 05 in position of function selection (Funktionanwählen) and press key of OK to eliminate fault code. In case that fault code is not eliminable, it is denoted that the fault exists all along. In case that saved faults are eliminable, it is denoted that the fault is an adventitious fault, which could be checked only in mode of actual driving.

5.5 Display mode of fault code

System problems		Displayed code
No problem existing (ABS warning lamp does not light)	Had not occurred before	No fault code
	Occurred before	Adventitious fault code
Problem is existing (ABS warning lamp lights)	Had not occurred before	Nonadventitious fault code
	Occurred before	Adventitious fault code and nonadventitious fault code

6. Diagnosis of hydraulic control unit

6.1 It is possible to diagnose hydraulic control unit by using fault-diagnosing device. Input 03 in position of function selection, and operate according to following steps.

Step	Action of operator	Displaying content	Result in normal condition
01		Hydraulisch ABS Pumpe V64 (Test of hydraulic pump)	
02		Bremse Bestätigung (Tread brake pedal)	
03	Tread brake pedal all along	EVL: 0V AVL: 0V Rad blockiert (Normally open valve: 0V Normally closed valve: 0V lock Break?)	Lock break
04		EVL: UBAT AVL: 0V Rad blockiert (Normally open valve: electrified Normally closed valve: 0V Lock Break?)	Lock break
05		EVL: UBAT AVL: UBAT Rad frei (Normally open valve: electrified Normally closed valve: Electrified If wheel could rotate freely?)	Wheel could rotate freely, pedal rebounds, operating noise of pump motor is audible
06		EVL: UBAT AVL: 0V Rad frei (Normally open valve: electrified Normally closed valve: 0V If wheel could rotate freely?)	Wheel could rotate freely
07		EVL: 0V AVL: 0V Rad blockiert (Normally open valve: 0V Normally closed valve: 0V Lock Break?)	Lock break Pedal goes down automatically and lightly
08	Loose brake pedal	Bremse lösen (loose brake pedal)	

6.1 Perform above test with each wheel in order: left front^right front^left rear^ right rear

7. Indexed list for rapid trouble shooting

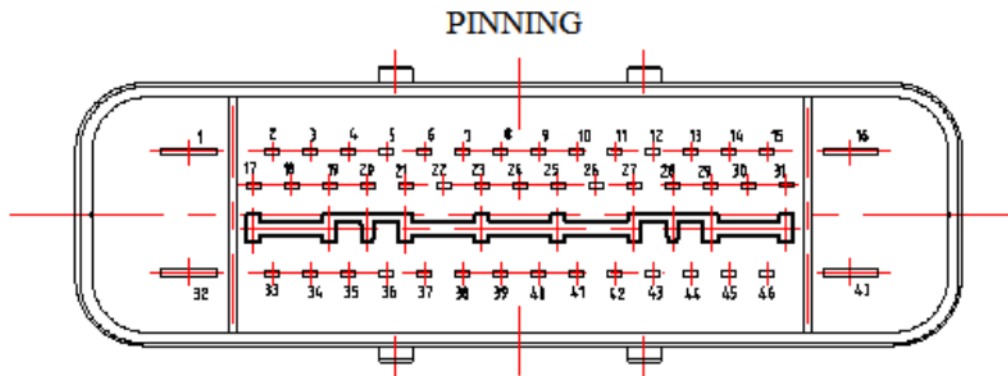
7.1 Index for fault inspecting list of fault code

Diagnosis code	Fault description	Diagnosis content	SN of inspecting list	Reference page
00003	Electronic control unit	Damaged		P. 27
01276	ABS hydraulic pump	Electromotor cannot operate normally	1	P.11
00283	Sensor of left front wheel	Electric and mechanical fault	2, 3, 4	P.12, P. 13, P. 14
00285	Sensor of right front wheel			
00290	Sensor of left rear wheel			
00287	Sensor of right rear wheel			
01044	ABS coding error		5	P. 15
00668	Power terminal 30		6	P. 16
01130	ABS operates abnormally	Signal is unreasonable	7	P. 17

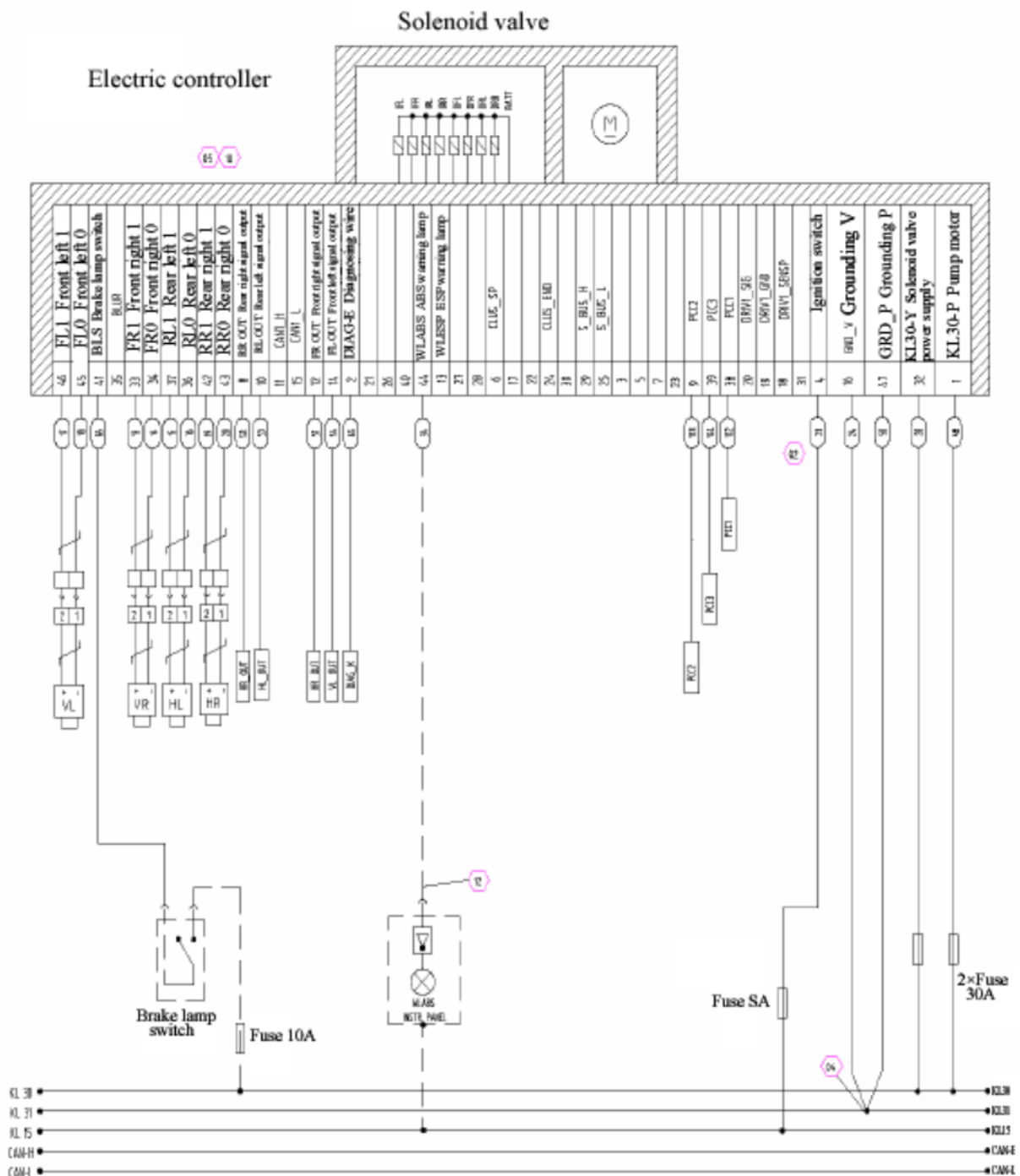
7.2 Index for fault inspecting list of faultless code

State of fault		SN of inspecting list	Reference page
Turn ignition switch to “ON” (under state of burning out), ABS warning lamp does not light		1	P18
After starting of engine, warning lamp did not extinguish		2	P19
ABS operates abnormally	Brake force on two sides are inhomogeneous	3	P20
	Brake fore is lacking		
	ABS operates while treading brake pedal slightly (the vehicle is in state of resting)		
	ABS operates while treading brake pedal slightly (the vehicle is in state of running)		
	Brake pedal vibrates smartly during operation of ABS		
Stroke of brake pedal is too long		4	P21
Too large force is needed while treading brake pedal		5	P22
No fault code output (it is unable to communicate with fault diagnosing device)		6	P23

8. ABS ECU Socket



9. Electric wiring diagram



Note: For connection of bouncing pins, please refer to relevant electric wiring diagram.

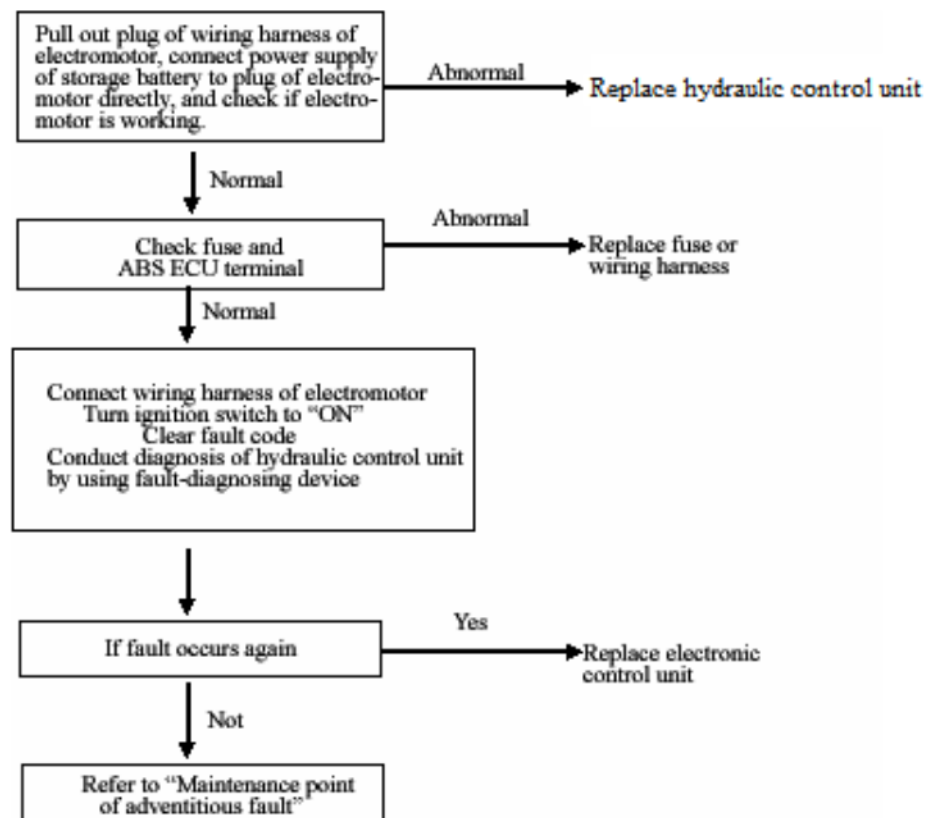
10. Fault inspecting list of fault code

1	Fault code is 01276	Possible reason
[Explanation] The fault code should be recoded if ABS ECU finds out that engine is operating abnormally in case that vehicle running in speed of 20km/h or above. [Prompt] In case that connection of wiring harness between engine and ECU gets loose, the fault code maybe occurs. It is possible to drive engine to perform the test by using function test of hydraulic unit of fault diagnosing device.		• Power supply is short circuit or earthed • Wiring harness of electromotor gets loose • Electromotor is damaged

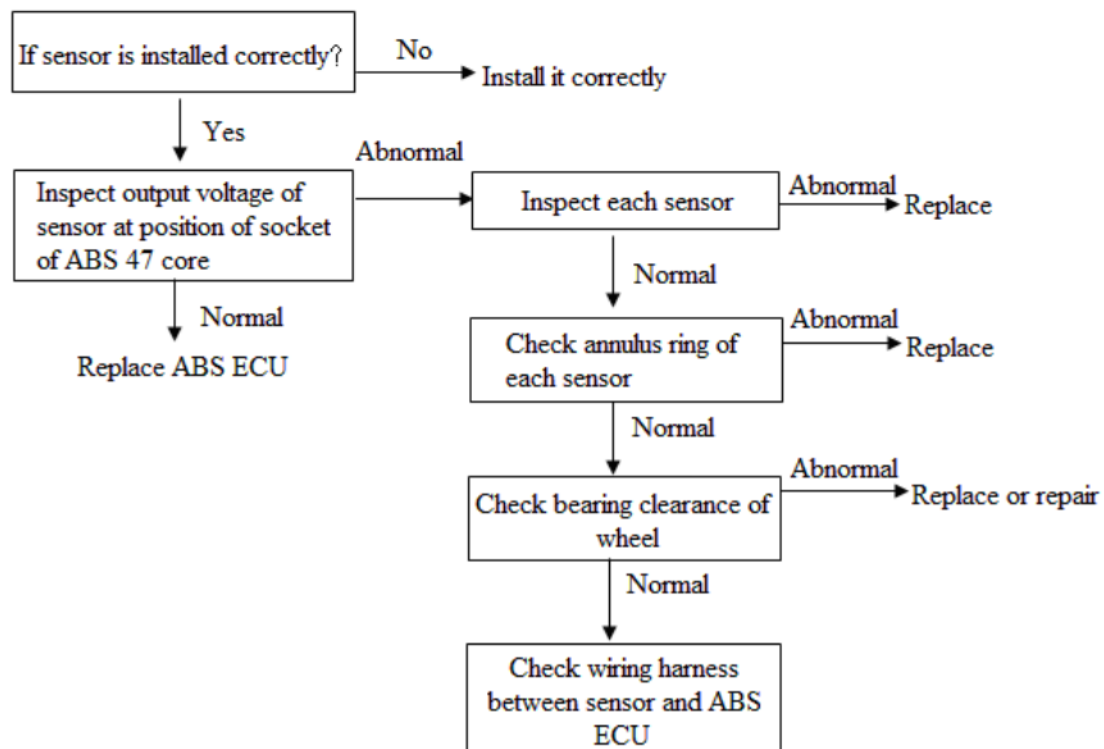
Note:

Electromotor should not be drove if storage battery is discharged in excess, please check if voltage of storage battery is normal prior to perform driving test with electromotor.

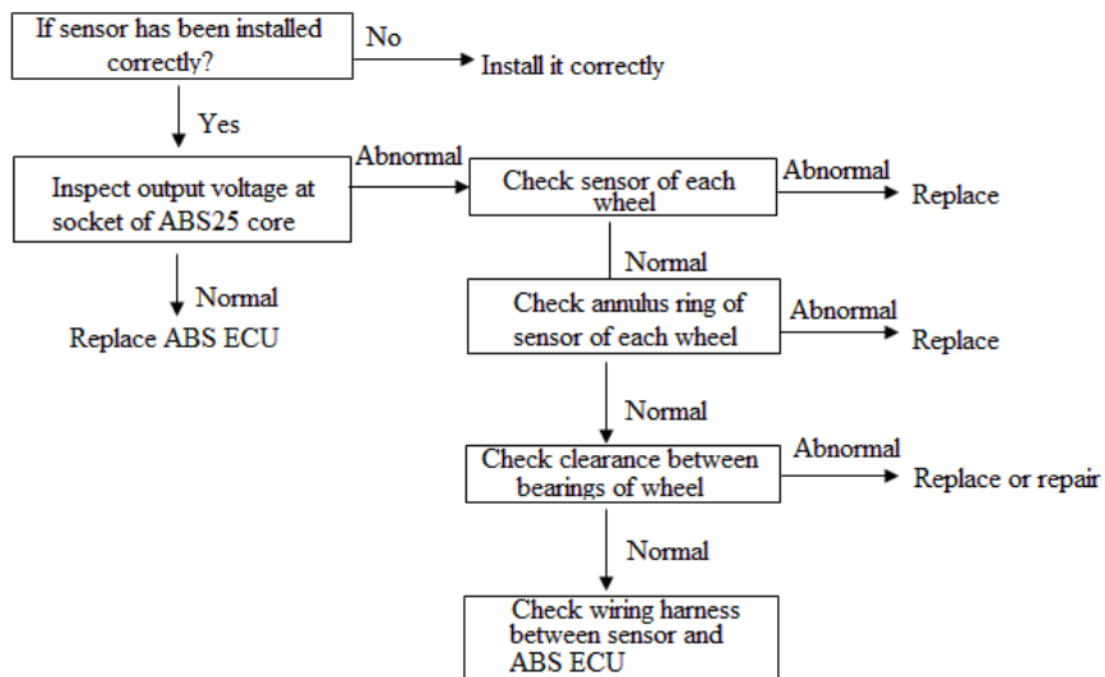
It is possible to perform driving test with electromotor while vehicle is in state of resting.



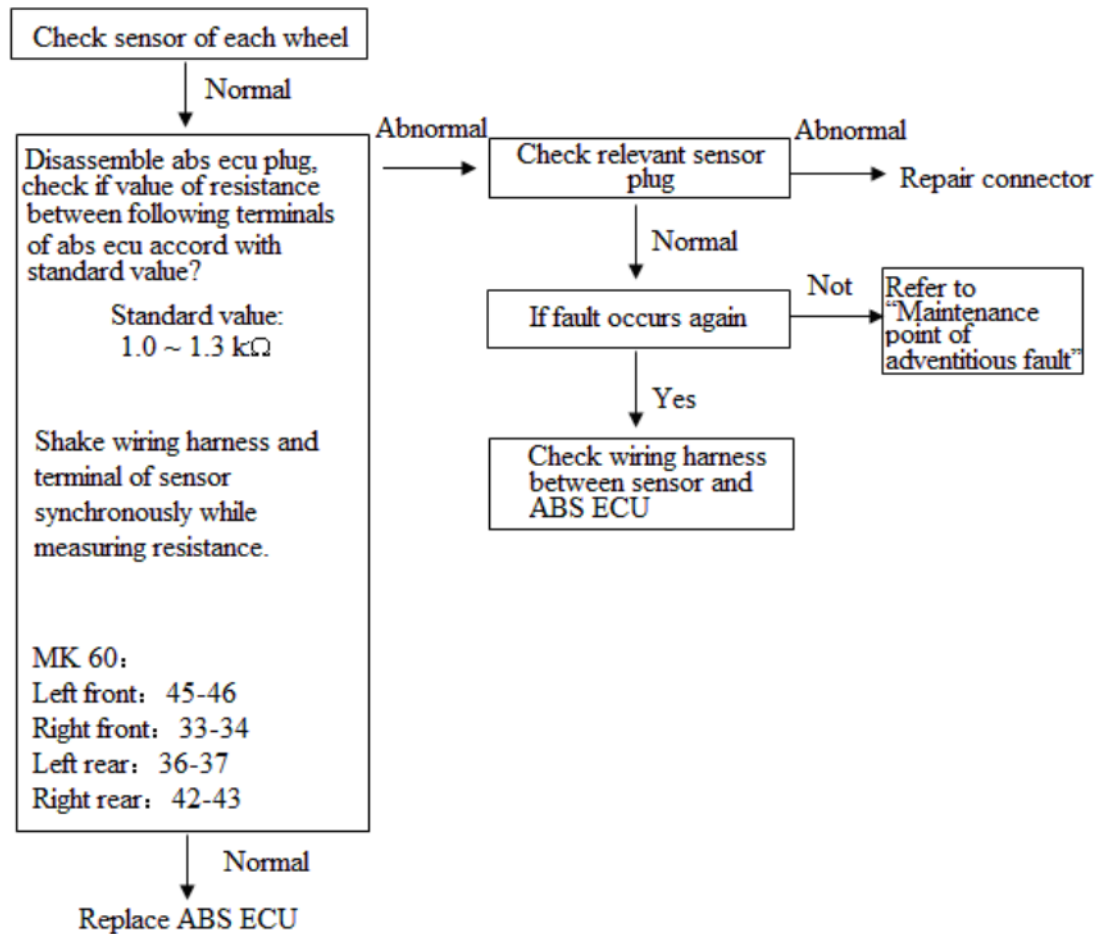
2	Fault code is 00283, 00285, 00290, 00287	Possible reason
[Explanation] The fault code should occur if no loop disconnection is inspected and no signal is output while vehicle is running in speed of 20km/ h or above. [Prompt] It is possible to be caused in case of missing installation of sensor, short circuit of sensor coil or wiring harness, clearance between sensor and annulus ring is too big, or damage of annulus ring etc.		• Missing installation of sensor • Short circuit of sensor coil or wiring harness • Clearance between sensor and annulus ring is too big • Missing installation of annulus ring • ABS ECU fault



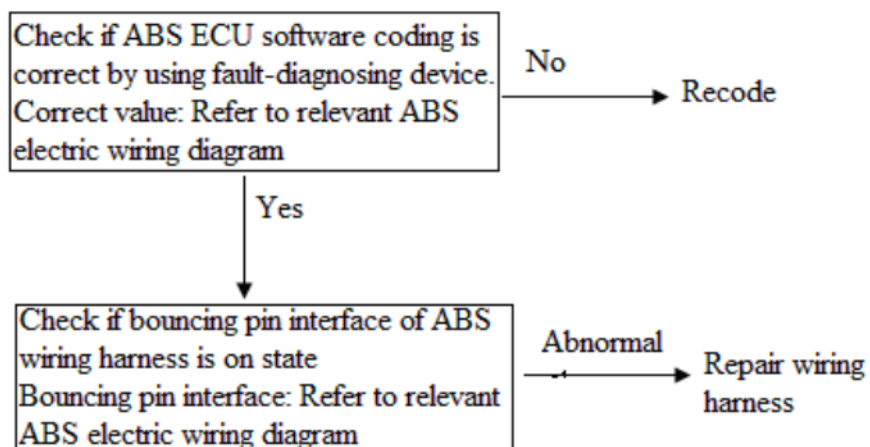
3	Fault code is 00283, 00285, 00290, 00287	Possible reason
[Explanation] The fault code should occur if sensor signal exceeds tolerance range while vehicle is running in speed of 20km/ h or above. [Prompt] It is possible to be caused in intermittent loose contact or intermittent short circuit between sensor coils or wiring harness, as well as too weak sensor signal caused in damage of tooth of annulus ring or too big clearance existing between sensor and annulus ring.		• Intermittent loose contact or intermittent short circuit between sensor coils or wiring harness • Too big or too small clearance existing between sensor and annulus ring • Damage of tooth of annulus ring • Too big clearance existing between bearings. • ABS ECU fault



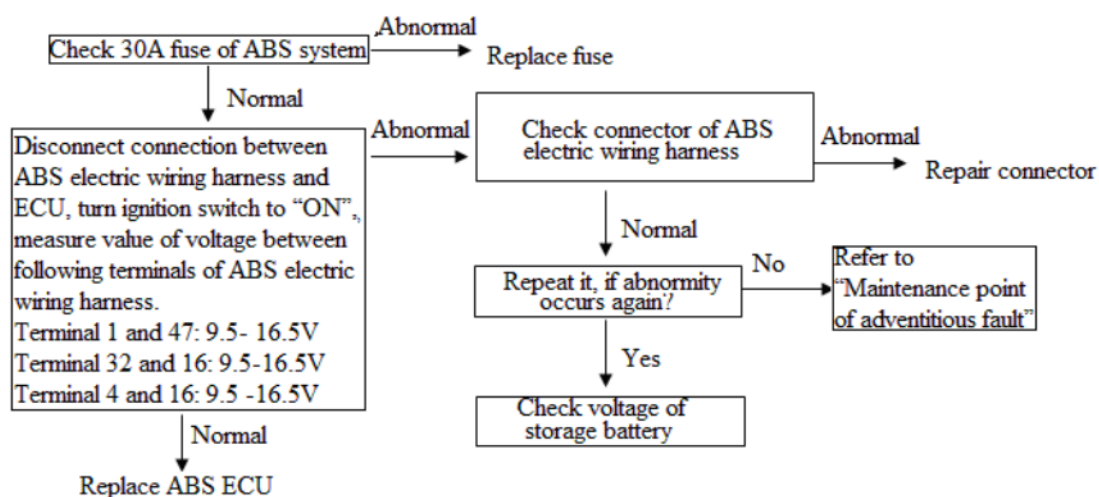
4	Fault code is 00283, 00285, 00290, 00287	Possible reason
[Explanation] The fault code should occur if distinguishable disconnection existing with sensor. [Prompt] It is possible to be caused in fault of process circuit of sensor in ABS ECU, or loose contact of sensor.		• Disconnection with coil or connector of sensor • Short circuit existing between sensor plug/wiring harness and earth/power supply • Fault with signal processing circuit of abs ecu sensor



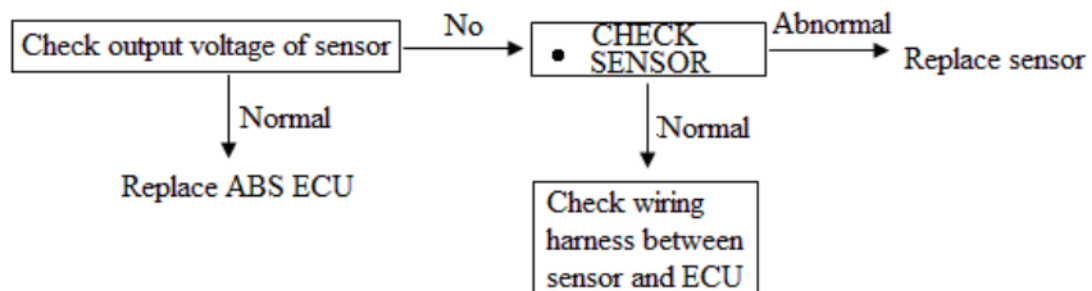
5	Fault code is 01044	Possible reason
[Explanation] The fault code should occur while connection between hardware bouncing pin of ABS wiring harness and ECU software coding is inconsistent		• Error with bouncing pin connection in ABS wiring harness • Error with ABS ECU coding



6	Fault code is 00668	Possible reason
[Explanation] The fault code should occur while voltage supplied by supply terminal 30 is too high or zero.		• Fuse of ABS system is blown out • Voltage of storage battery is too high or too low • ABS electric wiring harness is damaged • ABS ECU is damaged

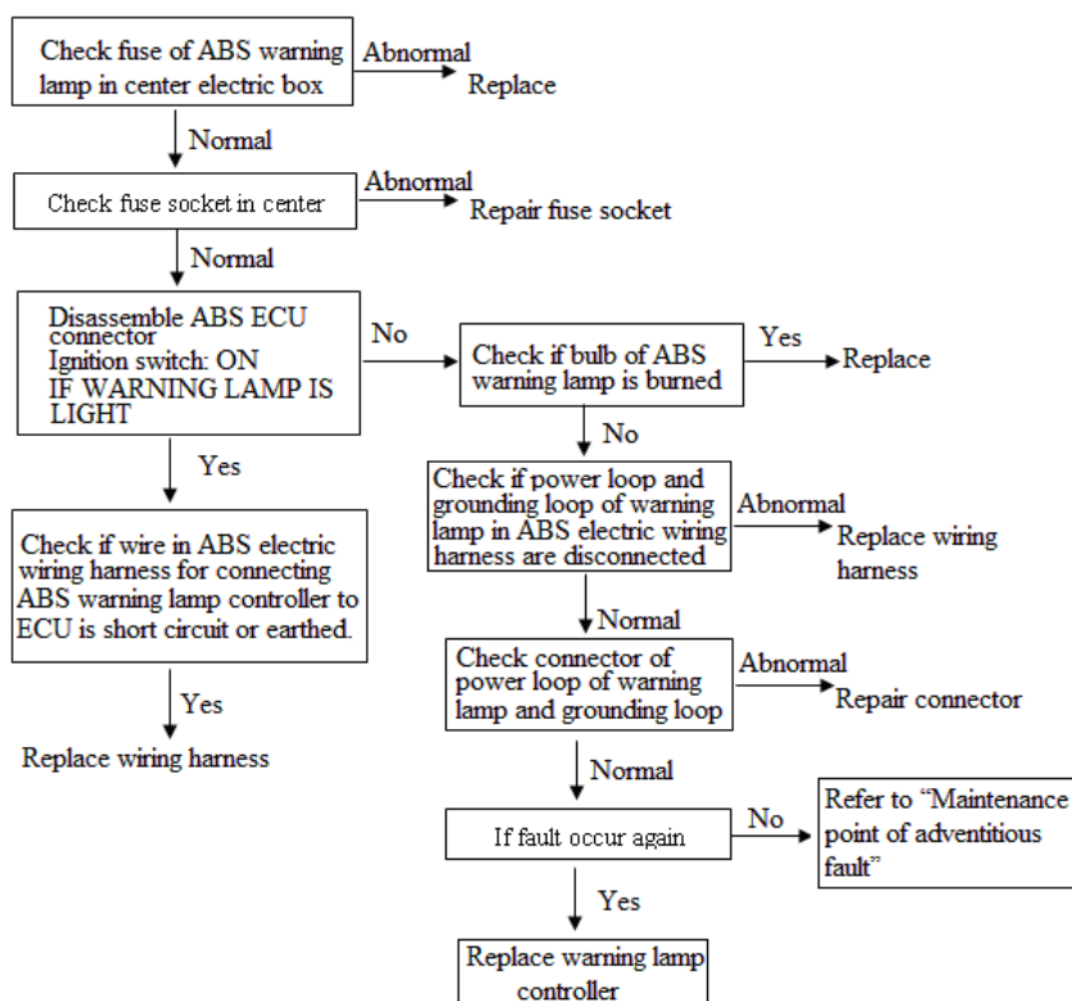


7	Fault code is 01130	Possible reason
[Explanation] The fault code should occur while ABS is disturbed by HF electromagnetic wave, or MP does not consider that the input speed signal is creditable.		• Disturbance of HF electromagnetic wave • Sensor or wiring harness is damaged • ABS ECU is damaged



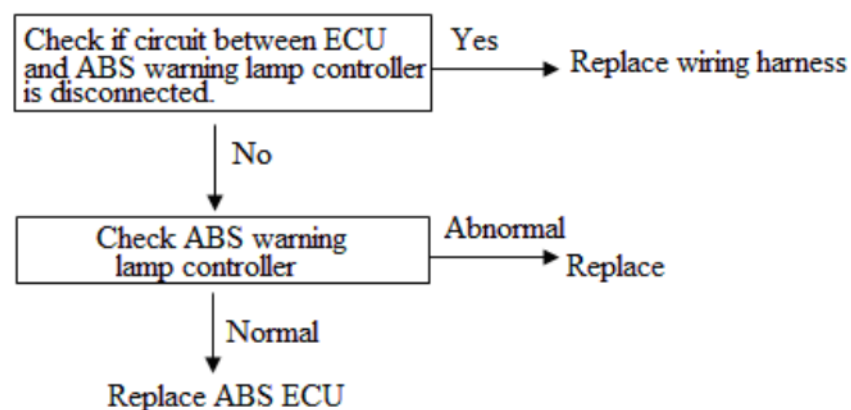
11. Fault inspecting list of faultless code

1	Ignition switch is turned to ON (engine is extinct), while ABS warning lamp is not light	Possible reason
[Explanation] It might be caused in disconnection of power loop of warning lamp, burning of bulb, or damage of controller of warning lamp.		• Fuse is burned • Bulb of ABS warning lamp is burned • Open circuit of power circuit • Controller of ABS warning lamp is damaged

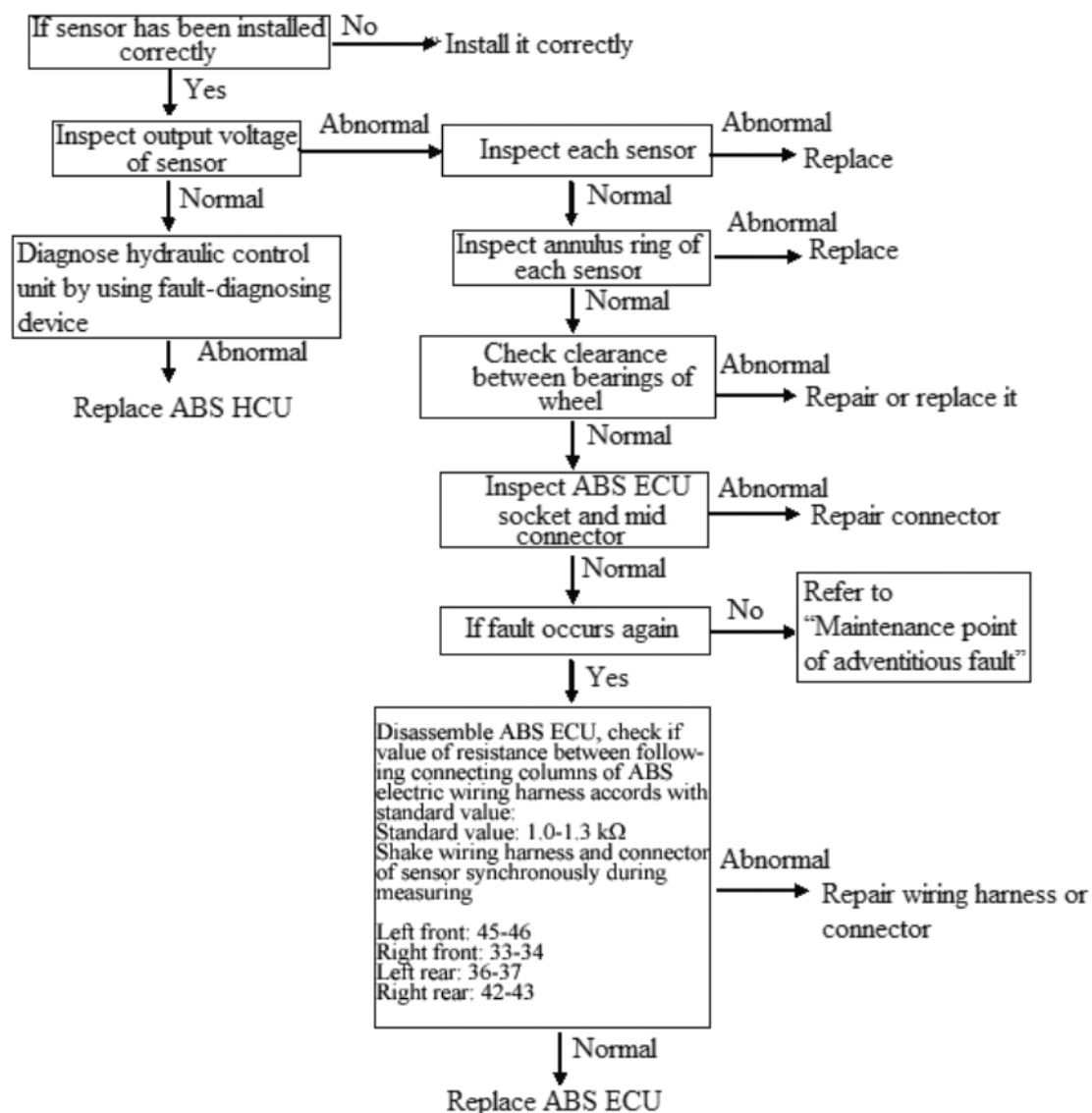


2	ABS warning lamp lights after engine is started	Possible reason
[Explanation] It is possible to be caused in damage of ABS warning lamp controller or disconnection of ABS warning lamp loop		• Warning lamp controller is damaged • Loop of abs warning lamp controller is disconnected • ABS ECU is damaged

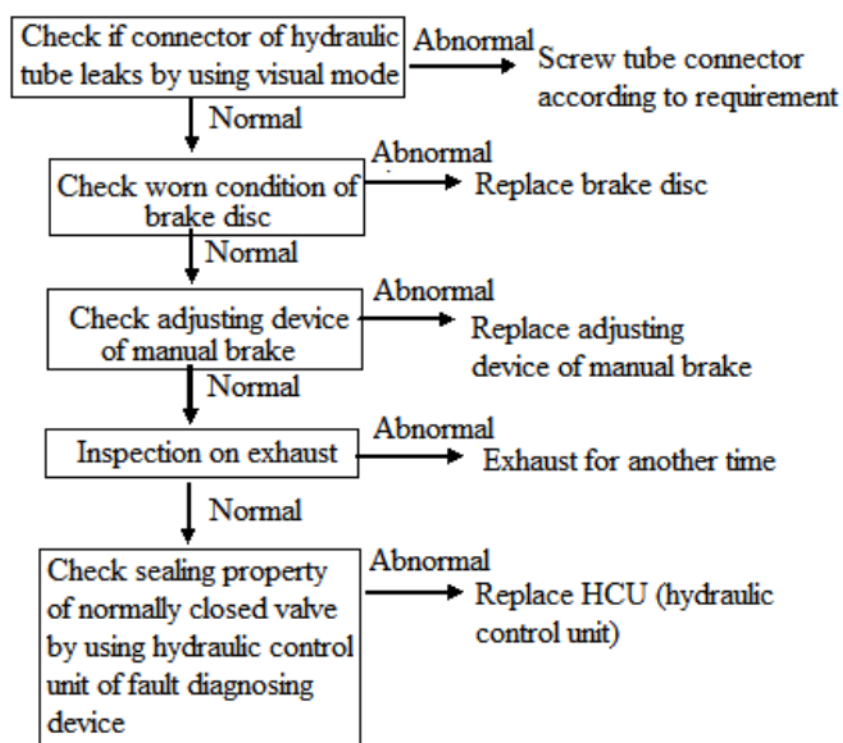
Note: The fault format is limited to condition of communication between system and fault-diagnosing device is available (ABS ECU is supplied normally), and no fault code occurs.



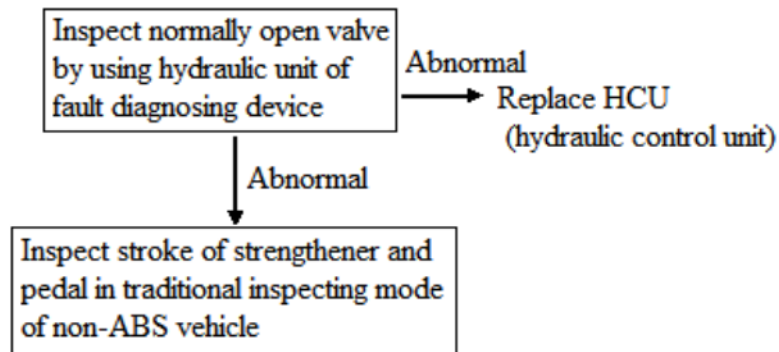
3	ABS operates abnormally	Possible reason
[Explanation] It is uneasy to perform the fault diagnosis because the problem is nearly correlative with driving condition and ground condition. But it is possible to perform following in condition of no fault code record.		• Sensor is installed incorrectly • Fault with wiring harness of sensor • Sensor is damaged • Annulus ring is damaged • Foreign matter attaches on sensor • Bearing of wheel is damaged • ABS HCU (hydraulic unit) is damaged • ABS ECU (electric control unit) is damaged



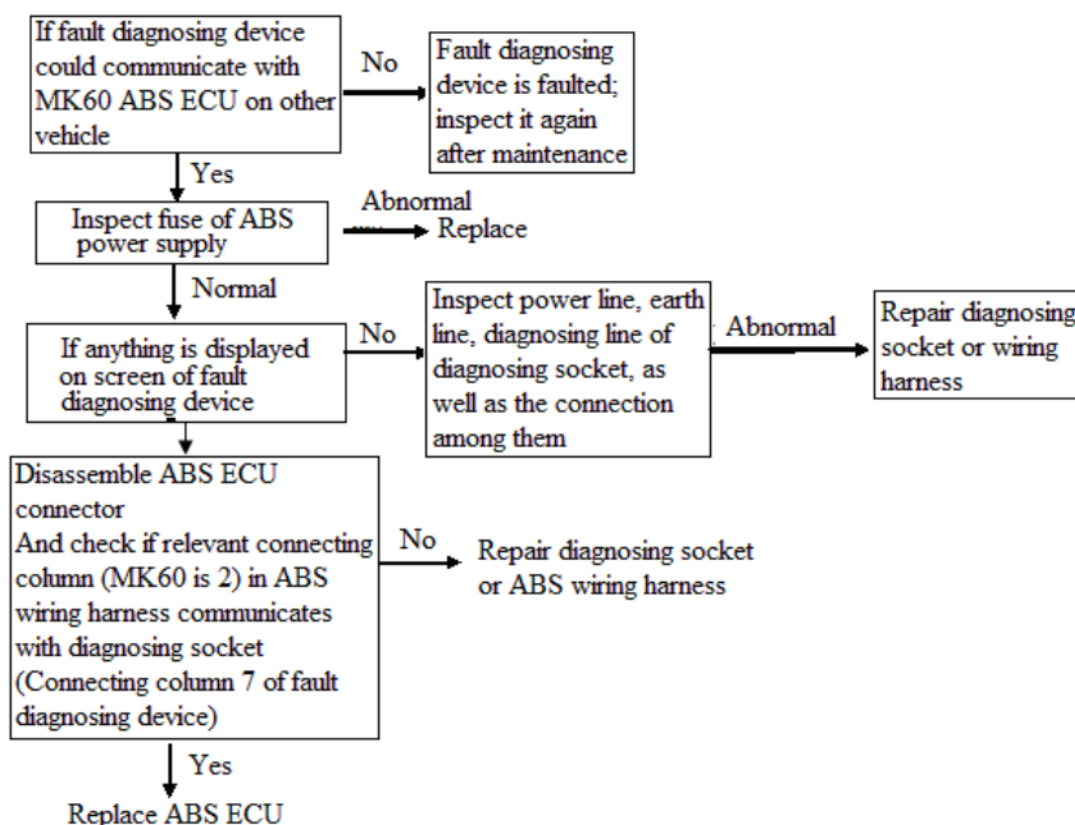
4	Stroke of brake pedal is too long	Possible reason
[Explanation] Check if external leakage or mechanical fault exists by using visual mode. Check if air existing in system by using mode of exhausting air. Check if normally closed valve leaks by using function test of hydraulic unit of fault diagnosing device.		• Brake liquid leaks • Normally closed valve leaks • Air existing in system • Brake disc is worn seriously • Adjustment of manual brake is NG



5	Tread pedal with too big force	Possible reason
[Explanation] Check stroke of brake pedal and strengthener in traditional mode. And inspect fault of normally open valve by using function test of hydraulic unit of fault diagnosing device.		• Strengthener is NG • Normally open valve is NG



6	No diagnosis code output (cannot communicate with fault diagnosing device)	Possible reason
[Explanation] it is possible to be caused in disconnection of power loop of ABS ECU or loop of diagnosing wire.		• Fuse is burned • Diagnosing wire is broke or connector is loose • ABS ECU is damaged • Fault diagnosing device is NG



12. Inspection on ABS system

Inspected item	Gear of ignition switch	Binding post	Standard value	Unit
		MK60		
Voltage of storage battery (electromotor)	OFF	1-47	10.1-14.5	V
Voltage of storage battery (solenoid valve)	↑	32-16	↑	V
Insulating property of power supply	↑	4-16	0.00-0.5	V
Insulating property of earth	↑	16-47	↑	V
Power voltage	ON	4-16	10.0-14.5	V
ABS warning lamp	OFF	ECU is not connected	Warning lamp extinguishes	Visual
	ON		Warning lamp lights	Visual
	OFF	Connect with ECU	Warning lamp extinguishes	Visual
	ON		Warning lamp extinguishes 1.7 seconds after lighted	Visual
Function of brake lamp switch Pedal is not trod	ON	16-41	0.0-0.5	V
Function of brake lamp switch Pedal is trod	ON	16-41	10.0-14.5	V
Diagnosis interface	OFF	Diagnosis interface K and 2	0.0-0.5	Ω
Resistance value of speed sensor of left front wheel	OFF	45-46	1.0-1.3	kΩ
Resistance value of speed sensor of right front wheel	OFF	33-34	1.0-1.3	kΩ
Resistance value of speed sensor of left rear wheel	OFF	37-36	1.0-1.3	kΩ
Resistance value of speed sensor of right rear wheel	OFF	42-43	1.0-1.3	kΩ
Output voltage of sensor of left front wheel	OFF	45-46	7	mV/ Hz
Output voltage of sensor of right front wheel	OFF	33-34	7	mV/ Hz
Output voltage of sensor of left rear wheel	OFF	37-36	>12.2	mV/ Hz
Output voltage of sensor of right rear wheel	OFF	42-43	>12.2	mV/ Hz
Output voltage ratio of sensors	$\frac{\text{Max crest voltage}}{\text{Min crest voltage}} \cong 2$			
Type Identification	OFF	For details, please refer to ABS electric wiring diagram	0.0-1.0	Ω

Inspected item	Gear of key switch	Operation	Standard value	Remark
Note: It is necessary to introduce vacuum effect on vacuum booster while performing following inspection				
Leakproofness of normally open valve and normally closed valve of left front wheel	ON	Tread pedal	Pedal does not sink while left front wheel cannot turn freely.	Inspection on normally closed valve
	ON (Electrify these two valves and pump synchronously)	Tread pedal	Pedal does not sink while left front wheel is turning freely.	Inspection on normally open valve
Leakproofness of normally open valve and normally closed valve of right front wheel	ON	Tread pedal	Pedal does not sink while right front wheel cannot turn freely.	Inspection on normally closed valve
	ON (Electrify these two valves and pump synchronously)	Tread pedal	Pedal does not sink while right front wheel is turning freely.	Inspection on normally open valve
Leakproofness of normally open valve and normally closed valve of left rear wheel	ON	Tread pedal	Pedal does not sink while left rear wheel cannot turn freely.	Inspection on normally closed valve
	ON (Electrify these two valves and pump synchronously)	Tread pedal	Pedal does not sink while left rear wheel is turning freely.	Inspection on normally open valve
Leakproofness of normally open valve and normally closed valve of right rear wheel	ON	Tread pedal	Pedal does not sink while right rear wheel cannot turn freely.	Inspection on normally closed valve
	ON (Electrify these two valves and pump synchronously)	Tread pedal	Pedal does not sink while right rear wheel is turning freely.	Inspection on normally open valve

Note: The inspection is performed with “diagnosis on hydraulic control unit (function 03)” of fault diagnosing device.

13. Inspection on ABS operation

13.1 Inspection on output voltage of speed sensor of wheel

1. Check if clearance between speed sensor of wheel and annulus ring accords with standard value.
Standard value of front wheel: Refer to assembly drawing of front wheel.
Standard value of rear wheel: Refer to assembly drawing of rear wheel.
2. Jack up wheel and loose manual brake
3. Disassemble ABS electric wiring harness, and measure at position of connector of wiring harness.
4. Rotate wheel in speed of 1/2 circle about per second, and measure output voltage by using multimeter or oscilloscope.
MK60
Left front wheel: connecting column 4 5-46
Right front wheel: connecting column 3 3-34
Left rear wheel: connecting column 37-36
Right rear wheel: connecting column 42-43

Output voltage:

Measure with multimeter:

Front wheel: Refer to drawing of sensor of front wheel.

Rear wheel: Refer to drawing of sensor of rear wheel.

Measure with oscilloscope:

Front wheel: Refer to standards relating to it.

Rear wheel: Refer to standards relating to it.

5. In case that output voltage is not in range of abovementioned, it is possible to be caused in following reasons:
 - * Air clearance between sensor and annulus ring is too big.
 - * Sensor fault.
 - * Inspect resistance value of sensor (1.0-1.3k Ω).
 - * Check air clearance between speed sensor of wheel and annulus ring by gathering four points on annulus ring (annulus ring is distorted).

13.2 Check hydraulic control unit (HCU)

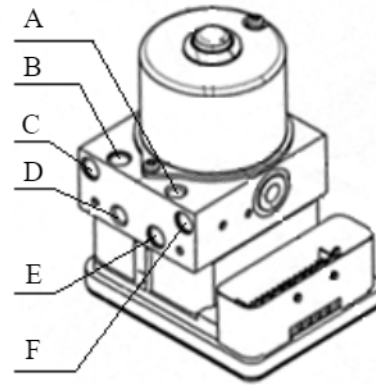
1. Jack up vehicle; check if wheel could rotate freely.
2. Loose manual brake.
3. After connected to fault diagnosing device, turn ignition switch to "ON". It is needless to start engine at this time.
4. Conduct inspection by referring to "Diagnosis on hydraulic control unit".

Note: Please turn ignition switch to "OFF" while connecting or disassembling fault diagnosing device.

14. Disassembly and assembly

14.1 Precautions

- * Conduct maintenance after found out fault reason by using diagnosing device.
- * Unpack package of spare parts only before assembly.
- * Use parts produced by original factory only.
- * Please pay attention to cleanness during maintenance; wipe with scrubber has no nap only.
- * Wipe up appearance with cleanser that has no mineral oil before maintenance.
- * While opening system, do not use compressed air or move vehicle.
- * Please plug up each hydraulic outlet with corresponding plug as soon as possible after disassembled ABS assembly.
- * Disassemble other parts that might disturb operation.
- * Please use DOT 4 brake liquid, while not use mineral oil.
- * Soak sealing parts or O ring with brake liquid; do not use machine oil or brake unction.
- * After maintenance, please check if functions of general brake system and ABS brake system are correct.
- * Check if there is leakage on all connectors of hydraulic tube.



- A-Interface of brake channel of right rear wheel
- B-Interface of brake channel of left rear wheel
- C-Interface of sub brake cylinder
- D-Interface of brake channel of right front wheel.
- E-Interface of brake channel of left front wheel.
- F-Interface of primary brake cylinder

14.2 Disassembly of MK60 HECU assembly

- * Turn off ignition switch, and disconnect cathode wire of storage battery.
- * Disassemble electric wiring harness form ABS assembly.
- * Tread pedal (>60mm) and fix it with pedal plank. This action should close center valve of general pump to prevent brake liquid out flowing from outlet while opening system.
- * Disassemble hard brake tube that locating on HCU and connecting to general pump and mark it. Plug up outlet with plug immediately.
- * Disassemble brake liquid tubes connecting with wheels and mark them. Plug up outlet with plug immediately.
- * Please plug up hydraulic outlet with corresponding plug as soon as possible after disassembled ABS assembly.
- * Disassemble nut used for fixing HECU on plank.
- * Disassemble the whole HECU from plank.

14.3 Reinstallation of ABS assembly

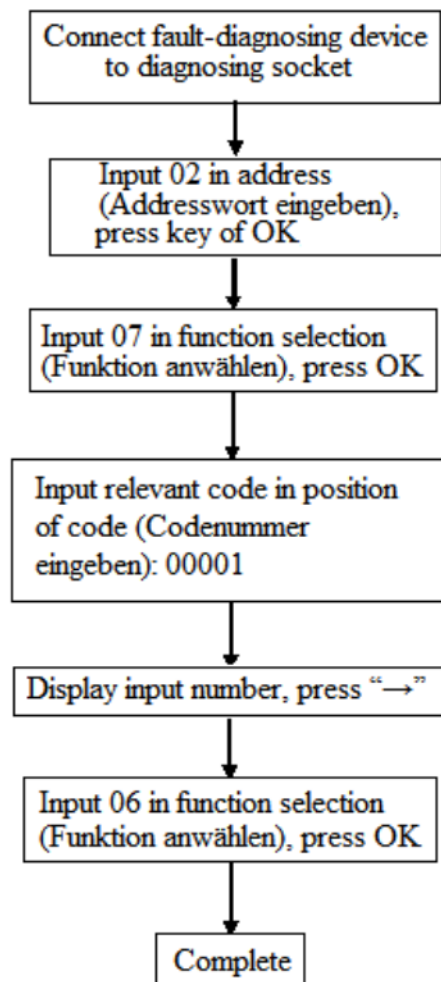
Note: Please disassemble plug that used for plugged hydraulic opening only after assembled hard brake tube to avoid foreign materials entering into brake system.

- * Assemble ABS assembly on plank with moment of $20 \pm 4 \text{ Nm}$.
- * Disassemble plug on hydraulic opening, and assemble hard brake tube, check if connection of hard tube is correct.
- * Assemble hard brake tube connecting to general pump.
- * Fastening moment for assembling hard brake tube is $12 \pm 4 \text{ Nm}$ (M10 · 1) and $15 \pm 3 \text{ Nm}$ (M12 · 1).
- * Add new brake liquid into liquid tank until level achieves to MAX, exhaust air according to regulated method.
- * Turn ignition switch to ON, ABS warning lamp should crush out 1.7 seconds after lighted.
- * Clear fault code record, and check if any fault code exists.
- * Finally, confirm function of ABS in mode of actual driving (it is necessary to feel rebound of pedal).

15. ECU coding

It is necessary to perform coding with new HECU during replacement of HECU, or ABS warning lamp should flash, and system should not operate normally.

It is possible to code HECU by using fault-diagnosing device in following steps:



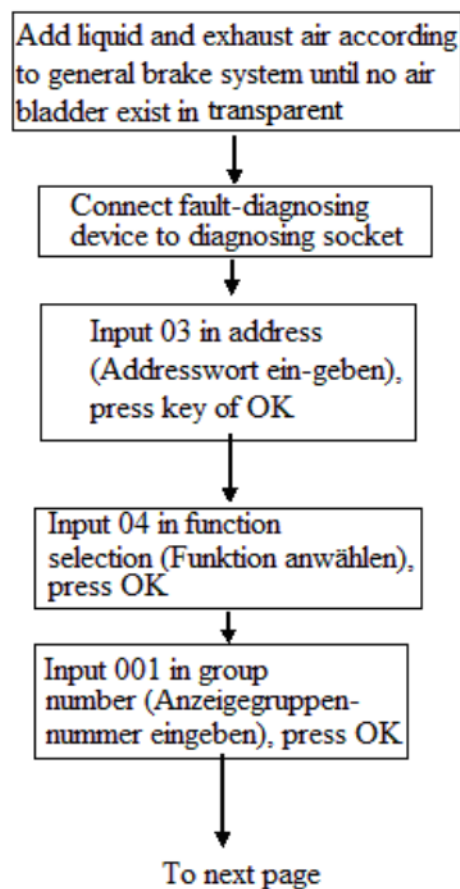
16. Liquid adding and exhaust

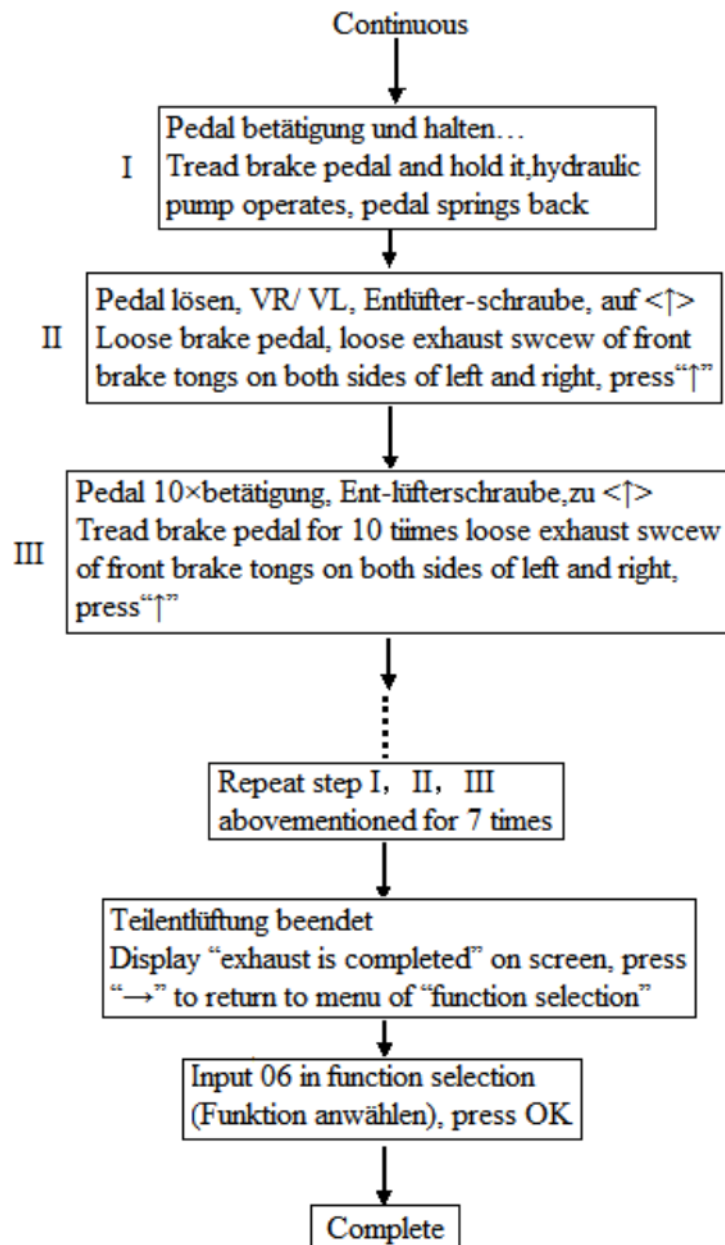
16.1 Wet-type HECU

In case that spare parts is wet-type HCU, it is possible to replace HCU by adding liquid and exhausting air according to method of general brake system only.

16.2 Dry-type HECU

In case that spare parts is dry-type HECU, it is necessary to conduct exhaust with 2nd loop of HECU after replacement, except add liquid and exhaust air according to method of general brake system. Operating order for use of fault-diagnosing device is shown as following:





ABS Q&A

↘ **What is ABS?**

ABS is abbreviation of “**Anti-lock Brake System**”, which has functions of achieving brake stability and steering capability at same time of ensuring vehicle obtain perfect brake distance while running on different ground.

↘ **Why does ABS is necessary?**

During brake, vehicle should lose steering capability if front wheel is lock brake, while wandering or skidding may be caused if rear wheel is lock brake. ABS should help driver to keep controlling vehicle during braking by prevent wheels from lock brake, as well as steer clear of barrier via steering.

↘ **How to differentiate if ABS is installed on your car?**

It is recommended to adopt following two methods: observe if ABS warning lamp lights on instrument panel or switch panel for short period, an easier one is to ask your supplier directly.

↘ **How does ABS work?**

According to signal of speed sensor and definite control logic, electric controller in ABS should adjust pressure on brake of wheel via solenoid valve, which just likes an experienced driver to brake by repeating point brake, while PC should response more quickly than human being, so better effect can be achieved.

↘ **How to differentiate if ABS is operating?**

During operation of ABS, you will feel chattering of brake pedal, and hear operating noise of hydraulic controller at same time. Note: do not fear, just tread brake pedal firmly.

↘ **If brake distance of vehicle that has ABS is longer than it of vehicle that has no ABS?**

The distance should be longer in most condition, especially for snow or wet ground. But you'd better to turn steering wheel to steer clear of barrier at key moment.

↘ **What should be done if ABS is ineffective?**

Once ABS is ineffective, ABS warning lamp should keep lighting continuously and ABS should not work, at time, the general brake system is effective, all your need is to brake according to general method.

↘ **What time should ABS warning lamp light?**

ABS warning lamp should crush out 1.7 seconds about after startup of vehicle, after this, warning lamp should light only in condition that ABS is ineffective. Please go to service station for maintenance immediately if ABS warning lamp light, and it is not recommended to repair ABS by yourself.

Four requirements and four inhibitions for use of ABS

“Four requirement”

Please always tread brake pedal with foot to ensure enough, continuous brake force and effective operation of ABS.

Please keep enough brake distance. It is necessary to keep a distance of three seconds brake time from front vehicle at least while running on good ground, and keep brake distance of longer brake time while running NG ground.

Please train to use ABS prior in advance to make yourself adapt chattering of brake pedal during operation of ABS. Parking area and plaza are best place for training to use ABS in condition of emergency brake.

Please read driver manual in advance to realize various operational illuminations provided by manufacturer of vehicle that installed with ABS ulteriorly.

“Four inhibitions”

Do not driver vehicle that equipped with ABS too casually. Even for ABS vehicle, sharp turning, rapid change, and other operation of turning steering wheel rapidly are unsuitability and unsafe.

Do not tread brake pedal repeatedly. During driving ABS vehicle, it is possible to make ABS work discontinuously, reduce brake efficiency and increase brake distance if tread brake pedal repeatedly. In fact, ABS will increase or decrease brake force automatically in higher speed, and provide steering wheel with effective, controllable capability.

Do not forget turning steering wheel. Although ABS should provide driver with controllable capability of steering wheel, it could not complete steering operation by itself.

Do not fear operating noise caused in normal hydraulic operation of ABS and chattering of brake pedal. The noise and chattering are normal, which should make driver realize that ABS is working.