HAVAL H5 Cruise Control System

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长城汽车
中国造 长城车

Contents

I. CCS Overview

1. CCS Overview

When the vehicle has been traveling for a long time on the highway, the CRUISE CONTROL SYSTEM (CCS), after being activated by the driver, will automatically adjust the output power and torque according to the rolling resistance. In this way, the driver may drive the vehicle at a fixed setting speed without controlling the accelerator pedal.

The application of CCS can relieve the driver's efforts, alleviate unnecessary speed change, enhance the comfortableness and safety in driving , save fuel and cut down emission.

2. The Development of CCS

The first stage (from the 1960s to the middle of 1970s)：in early stage, there are mainly two kinds of CCS: mechanical CCS and air-actuated mechanical CCS.

For example, since 1965, Toyota Motor Corporation has installed mechanical CCS on its vehicles.

The second stage (from the 1970s to the middle of 1980s)：there came out the digital signal-based CCS.

In order to realize cruise speed regulation, the micro processor completes all data processing, produces drive signal output of stepping motor and changes the valve opening according to the instructed speed, actual speed, other input signal and preset procedures.

The third stage (from 1990s): there appeared the intelligence-centered automatic CCS and the fixed distance-controlled self-adaptive CCS abroad.

The system detects the vehicle distance to the vehicle ahead by the FMCW radar, figures out relative speed and distance and provides these data to electronic control unit by the processing unit and regulates the speed through throttle, which is controlled by actuators.

3. Functions of CCS

(1) Maintaining the set speed: the uniform running is realized through the driver's set system, which takes the set speed as the targeted speed.

(2) Fine adjusting the target speed: fine adjust the set speed to achieve the expected speed.

(3) Resuming the speed: after relieving cruise control initiatively or passively and before disconnecting master switch, resume the speed set previously by pressing "Reset".

(4) Relieving cruise control in abnormal speed change:

In cruise, the CCS will cancel the cruise control mode automatically when the speed changes abruptly in 1 second (for instance, the speed error is over 15km/h).

(5) Manipulating the process of cruise control relief : the driver disengages cruise control by pressing brake pedal and clutch pedal in cruise.

4. Advantages of CCS

(1) Maintaining a constant speed: whether the vehicle travels uphill, downhill or on even and straight road, the CCS guarantees it to travel at uniform speed as long as the engine's power is in agreeable range.

(2) Enhancing the comfortableness in driving: the application of CCS relieves driver's fatigue.

(3) Saving the fuel: when the vehicle is traveling at constant speed, the system can realize the optimum match of fuel consumption and output power of the engine.

Ⅱ The Components and Working Principle of HAVAL H5 CCS

1. The components of CCS

The CCS is mainly composed of cruise control switch, brake switch, clutch switch, speed sensor, engine ECU, actuators and indicator lamp.

As the HAVAL H5 CCS is installed with an automatic transmission, the driver hasn't to use clutch switch. As for the manual transmission model, if the driver presses the clutch in cruise, the system will cancel the cruise control mode automatically.

Cruise switch

Speed sensor

Engine ECU

Fuel injector

Brake switch

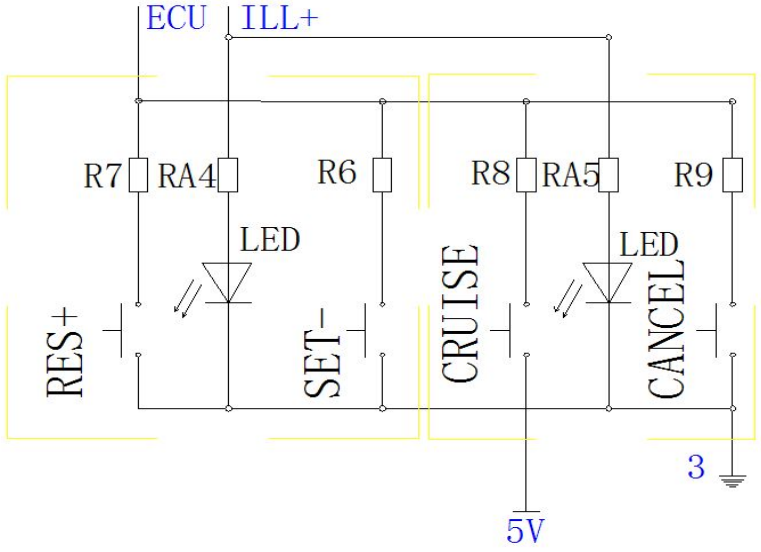
Schematic diagram for the components of HAVAL H5 CCS

Cruise switch

When the cruise switch is at different positions, the current earths and provides various voltage signals to engine ECU after flowing through resistors with different resistance values. Then the engine ECU estimates the driver's purposes based on these voltage signals received.

The cruise switch is installed on steering wheel.

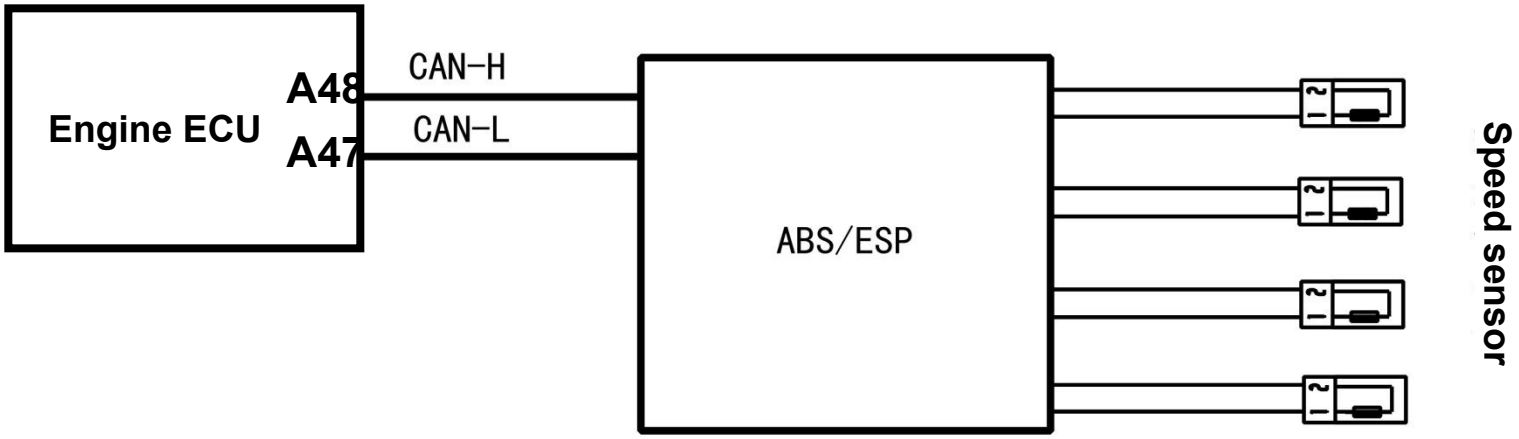
Cruise switch



Schematic diagram for circuit of cruise switch

Speed sensor

The K5N2-type vehicle is subject to overall CAN communication. The engine ECU receives speed signal through CAN and implements closed loop control to cruise speed.

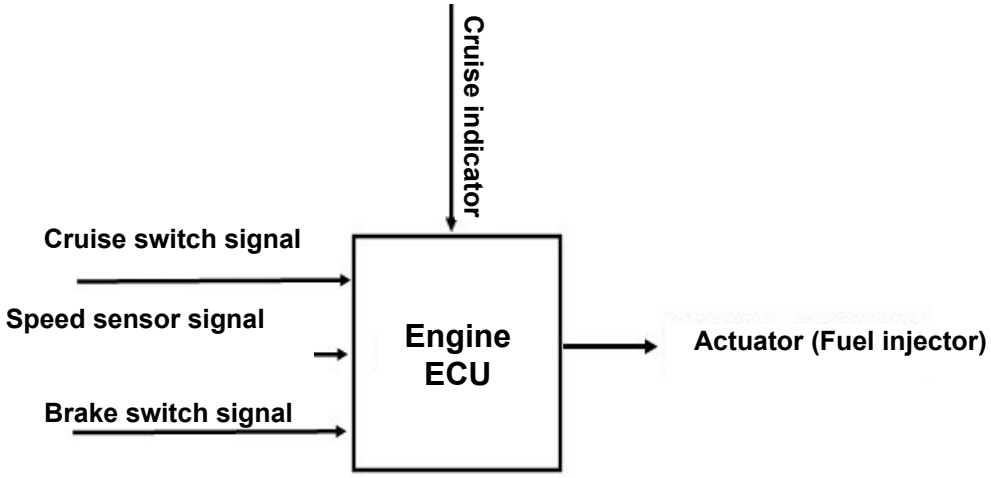


Schematic diagram for circuit of speed control

2. Working principle of CCS

The engine ECU receives signals out of the cruise switch. If the difference between the tested actual speed and the set speed is beyond the allowable range, the engine ECU, after comparing those two signals, will produce and send a control signal to the fuel injector, so as to regulate the output power and torque. Then a constant speed is maintained.

Recently, the cruise control function is only available for luxurious, super-luxurious, elite and scuttle-configured HAVAL H5, which has 4D20 engine with corresponding 5AT automatic transmission.



Schematic diagram for the components of H5 CCS

3. Introduction to the functions of cruise switch

Cruise master switch: CRUISE

a. When you press the master switch, the indicator on the instrumentation lights on, which represents that the cruise is on standby. Besides being on standby, in cruise the indicator lamp is also on.

b. Press the “CRUISE” button in cruise to close the cruise function.

CRUISE: master switch

Combination button for cruise setting and deceleration: SET/-

Cruise setting

Accelerate the vehicle to the desired speed. Then, press the “SET/-” button on the steering wheel and release the accelerator simultaneously.

SET/-: Combination button for cruise setting and deceleration

Combination button for cruise setting and deceleration: SET/- Reducing cruise speed

a. When the user presses and holds the “SET/-” , the cruise speed will reduce constantly. Release the button at your desired cruise speed.

b. The cruise speed will lower 3km/h for each pulse of “SET/-” button.

SET/- :Combination button for cruise setting and deceleration

RES/+: Combination button for cruise resumption and acceleration

Resetting speed

If the cruise control is cancelled in cruise (pressing brake pedal for example) but the system is still on standby, click the button to resume the speed before the cancellation of function as long as the corresponding conditions are satisfied.

RES/+: Combination button for cruise resumption and Acceleration

RES/+: Combination button for cruise resumption and acceleration

Cruise acceleration

a. When you press and hold the “RES/+”button in cruise, the cruise speed will increase continuously.

b. The speed will increase 3km/h for each time for each pulse of “RES/+” button.

RES/+: Combination button for cruise resume and Acceleration

CANCEL: Cancellation button for cruise control

If you click the “CANCEL” button in cruise, the cruise control will be cancelled.

CANCEL: Cancellation button for cruise control

Cruise control strategies and setting

Cruise setting

a. Accelerate the vehicle to the desired speed (a speed over 60km/h is compulsory.) and click master switch “CRUISE” . Then, the indicator lamp on instrumentation lights up and will keep on in cruise (please refer the attached diagram for details) .

b. Then, click the “SET/-” button on steering wheel and release accelerator pedal simultaneously. The vehicle will run at your set speed, which will be screened on the LCD of instrumentation as number.

Cruise control indicator

After you press the master switch “CRUISE”, the indicator lamp on instrumentation will light up; the lamp will be always on both in ready status and in cruise.

Increasing the cruise speed

The speed in cruise control can be accelerated by any one of the following operations:

a. When you press and hold the “RES/+” (for more than 0.4s), the cruise speed is increasing continuously; and then relieve the button at your desired speed. That is to say the vehicle can cruise at this speed.

b. The speed will increase 3km/h for each pulse of the “RES/+”(less than 0.4s).

Increasing cruise speed provisionally

If you want to increase speed provisionally in cruise, press the accelerator pedal to a certain value.

The speed increase has no influence on the operation of CCS and the set speed. After you release the accelerator pedal, the set cruise speed will resume.

Reducing the cruise speed

The speed in cruise can be lowered in any one of the following cases:

a. When you press and hold the “SET/-” button (for more than 0.4s but less than 100s), the speed is increasing continuously. Release the button at your desired speed.

b. The cruise speed will lower 3km/h for each pulse of the “SET/-”(less than 0.4s).

Caution: the cruise control will be cancelled automatically at the speed lower than 60km/h.

Cruise cancellation

The cruise control is disengaged in any one of the following cases:

a. Pressing the brake pedal;
b. Pressing the “CANCLE” button on steering wheel;
c. The speed is lower than 60km/h or quicker than 170km/h;
d. Cancellation resulted from malfunction;
e. The gear lever in transmission is operated to the Gear N;
f. Others.

Caution: canceling cruise doesn’t mean closing cruise function.

Resume cruise after cancellation

If the cruise control is cancelled in cruise but the system is still on standby, click the “RES/+” button to resume the speed before the cancellation of function as long as the following conditions are satisfied:

a. The speed is over 60km/h;

b. The master switch “CRUISE” is never closed.

Closing cruise

The cruise can be closed in any one of the following cases：

a. Press the “CRUISE” button and the indicator lamp on the instrumentation will go out;

b. Turn off the ignition switch.

If you want to resume the cruise mode after it was closed, reset the cruise according to “Cruise Setting”.

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4. Utilization Precautious

The cruise control can maintain a speed not lower than 60km/h without the accelerator pedal being pressed. It is advisable to engage the cruise control on straight and smooth motorway.

It is not advisable to engage the cruise control in urban area, on zigzag, wet and sliding roads or in rainy and snowy days or any other atrocious weather. otherwise heavy traffic accidents may happen.

Review

I. CCS Overview

II. CCS Components and Working Principle

III. Cruise Control Strategies and Setting

End!