

TECHNICAL NEWSLETTER

Accelerator Pedal Position Sensor (APP)



Worldwide Exporter
of Automotive Technology

CONCEPT:

Drive by Wire, also known as Electronic Throttle, was first used in Formula One by the McLaren team. This system uses an electronic complex (pedal position sensor, motorized throttle body and the ECU) to accelerate the engine, thus eliminating the old and problematic throttle cable. Such system ensures comfort to the driver, with a smooth drive, providing fuel economy and lower pollutant emissions.

PRINCIPLE:

The accelerator pedal position sensor includes two potentiometers, the main potentiometer, and the safety potentiometer, integrated in the same space. Both are supplied with 5 V on an independent basis. The output voltage of the first potentiometer ranges from 0 to 5 V, depending on the position of the accelerator pedal. On the other hand, the instantaneous value of the output voltage of the second potentiometer is equal to half the output voltage of the first potentiometer. This redundancy increases the level of reliability of the information sent by the sensor.

When the pedal is pressed, the electrical signal of the sensor is used by the ECU, which, on its turn, identifies the position of the pedal. With data sent by the other sensors (sensor of water temperature of the engine, MAP sensor...), the ECU makes some corrections and manages the demand for torque through the throttle plate, so it has an exact opening.

The throttle plate is controlled by an electric motor that can reach its total opening, obtaining total acceleration and a perfect idle.

Manufactured with magnetic technology, the DS Acceleration Pedal Position Sensor avoids corrosion problems related to humidity, wear, and poor contact, and it also ensures greater accuracy and durability.

LOCATION:

The sensor may be fixed to a device that connects the throttle cable to the electric wiring harness or the pedal, as shown in the images below:



1. 2201 Sensor (Renault) connected to the throttle cable.



2. Acceleration pedal with embedded potentiometer (no cables).

PROCEDURE FOR INSTALLATION OF THE CARD

1 – Remove the set screws from the lid very carefully in order to avoid damage to the contact pads that connect with the card;

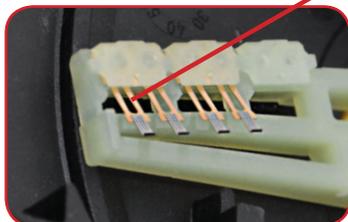


2 – Remove the lid very carefully, keeping the knuckle contact;

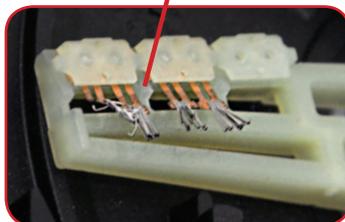


WARNING:

If they are damaged, we recommend the replacement of the whole pedal.



PRESERVED



DAMAGED

3 – Remove the damaged card;



4 – Place DS card according to the direction of the contact pads, always holding it by the sides. Avoid contact with the signal traces and conducting wires as much as possible;



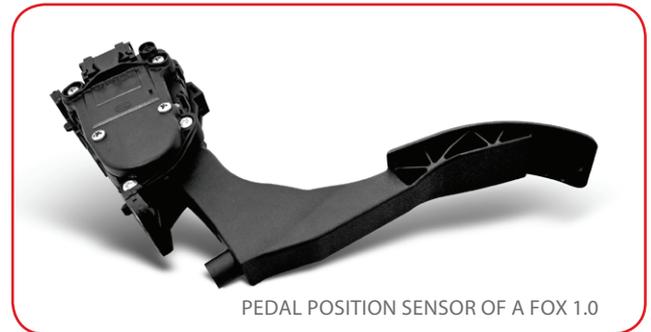
5 – Place the lid in the center of the oblong space and tighten the screws;

OBLONG
SPACE FOR DISPLACEMENT
AND ADJUSTMENT OF THE LID



6 – Reinstall the pedal in the vehicle.

PEDAL PINS	FUNCTION
1	Supply of the 2 nd potentiometer
2	Supply of the 1 st potentiometer
3	Grounding of the 1 st potentiometer
4	Sign of the 1 st potentiometer
5	Grounding of the 2 nd potentiometer
6	Sign of the 2 nd potentiometer



1 - Check the sensor supply:

- Turn on the ignition without starting the engine;
- Adjust the multimeter to the VDC scale (DC voltage);
- Insert the test leads into pins 1 and 5 to check the supply of the 2nd potentiometer;
- The voltage obtained should be around 5 V ±0.1;
- Insert the test leads into pins 2 and 3 to check the supply of the 1st potentiometer;
- The voltage obtained should be around 5 V ±0.1.

2 – Analyze the sensor signal:

PERFECT CONDITION



Place the cap of the pedal in the center of the oblong space. (Ideal position for adjustment). Still with the multimeter at the VDC scale (DC voltage) and the ignition on, check the sensor signal as follows:

PINS	PEDAL AT REST
3 and 4	0,70V to 0,80V
5 and 6	0,35V to 0,40V

Note: In this condition, we have the perfect idle speed at 900 rpm with a good pedal response time.

ACCEPTABLE CONDITION



If the cap is in the total clockwise position, it will show the following:

PINS	PEDAL AT REST
3 and 4	0,50V
5 and 6	0,25V

Note: In this condition, we have the perfect idle at 900 rpm, but the pedal response time will be longer.

IRREGULAR CONDITION



If the cap is in a total counterclockwise position, it will show the following:

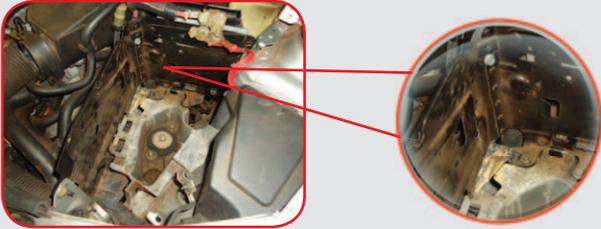
PINS	PEDAL AT REST
3 and 4	0,90V
5 and 6	0,45V

Note: In this condition, we have a high idle at 1,500 rpm as, in pins 3 and 4; the limit for adjustment is 0.85V. If it is higher than that, there will be an error when we increase the idle.

PROCEDURE FOR INSTALLATION OF THE DS 2201 – RENAULT CLIO 1.6 16V 2006:

Step 1: Disconnect and remove the battery;

Step 2: Disconnect the ECU wiring harness and remove it with the support;



Step 3: You may verify the device now. Pull it up and remove the bad sensor;



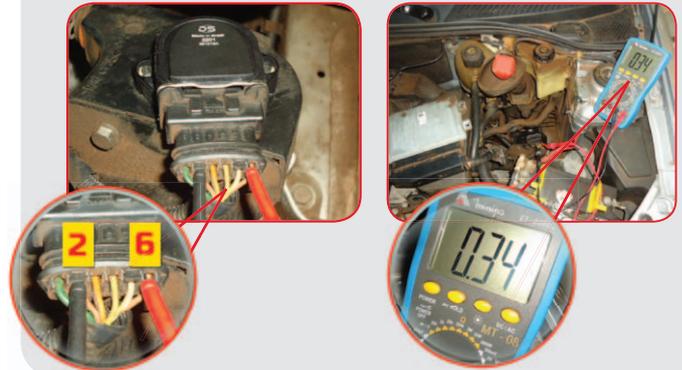
Step 4: For required adjustments, you will need to place the battery back and connect it. At this moment, you do not need to fix it in the correct position;

Step 5: Remove the ECU from the support and connect the harness;



Step 6: Install the DS 2201 in the center of the oblong space. Tighten it slightly, only to fit the part so that it spins in the device. Connect the harness;

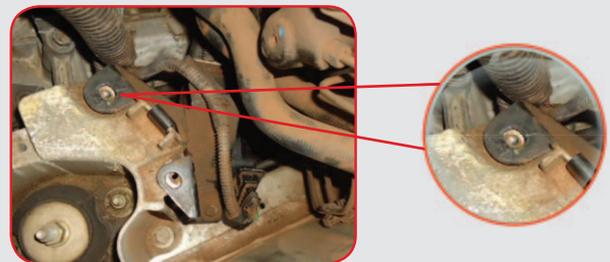
Step 7: Adjust the multimeter at the continuous voltage scale (20 V) and check pins 2 and 6. The voltage obtained should be 0.35 (± 0.05 volts). If not, spin the part in the device until you get the correct reading;



Step 8: Keep the part position and check pins 2 and 5. The voltage obtained should be 0.70 (± 0.05 volts), in other words, it should double pin 6;



Step 9: With the part correctly positioned, tighten the screws very well;
Step 10: Place the sensor device correctly and temporarily fix it with one screw, so that the device does not move in the next step;



Step 11: Start the engine and check the throttle response. If you can, check it with the scanner;



WARNING:

If the throttle cable is stretched (out of position), throttle will not work.

Step 12: If the throttle response is correct, stop the engine. Remove the ECU and the battery from the temporary place and correctly assemble all items in their proper places.



ADVANTAGES OF THE ELECTRONIC THROTTLE:

- Better performance;
- Total control of the acceleration;
- Great engine response;
- Better control of the idle;
- Soft acceleration;
- Better resumption;
- Saving of fuel.



CUIDADOS:

- Fix the screws tightly;
- Evaluate the conservation state of the electric wiring harness;
- If possible, apply a seal paint on the screws;
- A low battery results in a loss of synchronism (pedal/ECU/throttle body).