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(54) Title of Invention **VEHICLE SPEED AUTOMATIC CONTROL DEVICE**

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SPECIFICATION

1. Title of the Invention

VEHICLE SPEED AUTOMATIC CONTROL DEVICE

2. Scope of Patent Claims

(1) A vehicle speed automatic control device, comprising an actuator that drives a throttle valve; a controller that sends a command to the actuator according to a difference between an actual vehicle speed and a stored vehicle speed; and a stored vehicle speed display unit that indicates the stored vehicle speed; wherein the vehicle speed automatic control device is provided with a signal line that cancels the corresponding stored vehicle speed display when the stored vehicle speed and the controller is cleared.

3. Detailed Description of the Invention

(Industrial Applicability)

The present invention relates to a vehicle speed automatic control device that is used to automatically control travel speed of a vehicle to a certain set value.

(Related Technology)

FIG. 1, for example, illustrates a configuration of a conventional vehicle speed automatic control device.

In FIG. 1, 1 is a speed sensor that generates a signal is proportional to the actual vehicle speed, 2 and 3 are command switches that generate a cruise command signal, and of these command switches, 2 is a set switch and 3 is a resume switch. Further, 5 is a brake switch that turns on and off when the brakes are operated, and 6 is a clutch switch that turns on and off when the clutch is operated and functions as an inhibitor switch for automatic vehicles. Moreover, signals from the speed sensor 1, the set switch 2, the resume switch 3, the brake switch 5, and the clutch switch 6 are input into a microcomputer 9 that resides in a controller 7 via an input interface 8 that similarly resides in the controller 7. A vehicle speed storage part that stores the vehicle speed when the set switch 2 is operated is embedded in the microcomputer 9, and a failsafe 10 that cancels the stored vehicle speed of the vehicle speed storage part by detecting various types of abnormalities is also embedded in the microcomputer 9, and a power circuit 12 is provided that contacts and external power supply 11.

Further, output from the microcomputer 9 is sent to an actuator 16 and a cruise lamp 17 via an output interface 15. The actuator 16, as also illustrated in FIG. 2, is provided with a vacuum valve 18, vent valve 19, and a safety valve 20, wherein the vent valve 19 and one and of the safety valve 20 are open to the atmosphere while one end of the vacuum valve 18 is connected to the intake manifold (negative pressure source). Moreover, the other ends of each of the valves 18, 19, and 20 communicate with a negative pressure chamber 23 formed by the casing 21 and one surface side (right surface side in FIG. 2) of the diaphragm 22; and one end side of a control wire 24 is connected to the other surface side (left surface side in FIG. 2) of the diaphragm 22, while the other end side of the control wire 24 is linked to the throttle valve shaft 25.

Next, a description will be given of the operation of the vehicle speed automatic control device

having this type of configuration with reference to FIG. 3, and first the operation of the vehicle speed automatic control device begins with turning on the main switch. The speed sensor 1 generates a pulse proportionate to the actual vehicle speed, and this pulse signal is input into microcomputer 9 of the controller 7 and performs sampling within fixed periods so that a pulse count proportionate to the vehicle speed is always recognized by the microcomputer 9. When, for example, a set signal is sent at the time t_1 in this state by the set switch 2 of the command switches, the cruise lamp 17 illuminates, and the microcomputer 9 stores the pulse count according to the vehicle speed at that time into the vehicle speed storage part while at the same time the stored vehicle speed is indicated on the stored vehicle speed indicator portion in the driver side meter. The vent valve 19 and the safety valve 20 close to block the negative pressure chamber 23 from the outside atmosphere, and the vacuum valve 18 opens to introduce negative pressure into the negative pressure chamber 23, and the throttle valve shaft 25, via the control wire 24, can be held in a predetermined position. Thereafter, the throttle valve shaft 25 is held in the predetermined position even when releasing the accelerator pedal and constant speed travel control begins. Furthermore, after this, a command is sent from the microcomputer 9 to the actuator 16 so that the pulse count according to the detected actual vehicle speed is equivalent to the stored pulse count (which is to say the stored vehicle speed), and a state of negative pressure in the negative pressure chamber 23 of the actuator 16 is controlled by controlling the on and off states of the vacuum valve 18 and the vent valve 19. For example, when the actual vehicle speed is smaller than the stored vehicle speed by only a predetermined value, the vacuum valve 18 is switched on by a signal from the microcomputer 9 to introduce negative pressure into the negative pressure chamber 23. By this, the throttle valve shaft 25 pivots slightly to the valve open direction to increase the vehicle speed. Meanwhile, when the actual vehicle speed is greater than the stored vehicle speed by only a predetermined value, the vent valve 19 is switched off by a signal from the microcomputer 9 to introduce outside air into the negative pressure chamber 23. By this, the throttle valve shaft 25 pivots slightly to the valve close direction to decrease the vehicle speed. Moreover, a constant vehicle speed is controlled by repeating this type of operation.

Further, when wanting to decrease the speed of a constant speed travel, pressing and holding the set switch 2 at the time t_3 of FIG. 3 opens the vent valve 19 to introduce outside air into the negative

pressure chamber 23 which decreases the speed by applying an engine brake, and releasing the set switch 2 at the time t_4 stores to vehicle speed while simultaneously indicating the newly stored vehicle speed on the stored vehicle speed display unit in the meter and constant speed travel is entered again. In addition, when operating a braking operation at the time t_5 cancels the system and turns off the cruise lamp 17. At this time, even if the system is canceled, the stored vehicle speed display remains as is displayed on the stored vehicle speed display unit in the meter. Moreover, operating the resume switch 3 at the time t_6 that the vehicle speed has not fallen below a lower limit value (for example, 40 to 50 km/hrr), resumes constant speed travel at the speed prior to the braking operation, which is to say the speed indicated in the stored vehicle speed display unit, and if the resume switch 3 is operated at the time t_7, the vehicle speed gradually increases, and after the time t_8 when the resume switch 3 is released, it returns to the stored vehicle speed prior to the time t_7 and constant speed travel resumes, and operating the clutch in a manual vehicle or putting the shift lever of an automatic vehicle into the N or P position at the time t_9 cancels the system. At this time, the stored vehicle speed prior to the system being canceled is still displayed on the stored vehicle speed display unit in the meter.

However, in this type of conventional vehicle speed automatic control device, if the system is canceled because the failsafe 10 is moved for some reason, the stored vehicle speed prior to cancellation continues to be indicated on the stored vehicle speed display unit in the driver side meter even if the content of the vehicle speed storage part in the microcomputer 9 is canceled at zero. Because the displayed stored vehicle speed value remains until a new vehicle speed storage signal is input, there is a problem in that the driver is led to determine that the stored vehicle speed still remains and leads them to believe that resuming is possible by operating the resume switch 3.

(Object of the Invention)

In light of the conventional problems described above, an object of the present invention is to provide a vehicle speed automatic control device having a stored vehicle speed display unit in the driver side meter where the stored vehicle speed display in the stored vehicle speed display unit is canceled at the same time that the system is canceled by movement by the failsafe 10 for some reason, and the stored vehicle speed is displayed by the stored vehicle speed display unit only at such time that a stored vehicle speed exists.

(Configuration of the Invention)

The present invention is a vehicle speed automatic control device that includes an actuator that drives a throttle valve; a controller that sends a command to the actuator according to a difference between an actual vehicle speed and a stored vehicle speed; and a stored vehicle speed display unit that indicates the stored vehicle speed; wherein the vehicle speed automatic control device is provided with a signal line that cancels the corresponding stored vehicle speed display when the stored vehicle speed and the controller is cleared.

(Embodiment)

FIGS. 4 to 7 illustrate embodiments of the present invention, and FIG. 4 is a system block diagram of the vehicle speed automatic control device. In FIG. 4, the portions of the configuration that are the same as FIG. 1 are given the same reference numerals and descriptions thereof are omitted.

In FIG. 4, 31 is a controller for the speedometer, and a memory cancel signal S sent from the controller 7 is input into a microcomputer 33 via an input interface 32, and output of the microcomputer 33 sends a control signal to the driver seat side speedometer 35 via an output interface 34. The speedometer 35 is provided with a digital actual vehicle speed display unit 36 and a stored vehicle speed display unit 37.

Next, a description will follow of the conditions for changing the vehicle speed in the vehicle speed automatic control device and for changing the actual vehicle speed display unit 36 and the stored vehicle speed display unit 37.

FIG. 5 is a diagram illustrating display changes in the speedometer 35 according to operation of the command to switch after turning on power, and when the memory cancel signal S sent from the controller 7 without constant speed travel is in a Hi state, display is not shown in the stored vehicle speed display unit 37, but the actual vehicle speed is displayed on the actual vehicle speed display unit 36.

Next, when turning on the set switch 2 at the time t_1 when reaching a speed of 70 km/hr, a constant speed travel is initiated at a speed of 70 km/hr, and at the same time the stored vehicle speed 70 km/hr is displayed on the stored vehicle speed display unit 37. Here, the vehicle speed displayed on the stored vehicle speed display unit 37 is displayed by transferring (not illustrated) the

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