

## GPS BASED VARIABLE VEHICLE SPEED CONTROLLER

### TECHNICAL ART

The present invention relates to vehicle speed controller and in particular, to variable vehicle speed controller (VSC) with GPS based, and is a system for controlling the vehicle speed in motion.

### BACKGROUND OF THE INVENTION

This present invention relates to vehicle speed controllers.

According to studies and various reports published in the newspapers, vehicle speed is involved in about one third fatal crashes. It is the third leading contributing factor to traffic crashes. While injuries and fatalities due to other dangerous behaviours, such as driving while impaired and not wearing seatbelts, have been significantly reduced, however, speeding by the driver is still a challenge.

Automatic vehicle speed controllers as manufactured in the past have functioned to maintain a vehicle at a predetermined set speed without any assistance from the operator. Such vehicle speed controllers, which are commonly called "cruise controls", act to automatically decelerate the vehicle when it exceeds the set speed, and to automatically accelerate the vehicle when it falls below the set speed. When the cruise control is turned on, the driver removes his foot from the accelerator and allows the cruise control to make the accelerator adjustments that are necessary to maintain the vehicle at the set speed.

In the present scenario, every country has various highways/ expressways on which the speed limit is very high, while is low in the city area. There are different speed limits in the city, eg. Hospitals, Schools, etc., or vehicles crossing international borders, such as Malaysia and Singapore, or Thailand and Malaysia. The road speed is different in the respective countries and driving awareness is also different. Generally, cross border vehicles normally being driven very rashly and lead to road accidents.

US Patent No. 8321085 relates to a working vehicle comprising an engine, a splitter for dividing an output of the engine between a working apparatus system and a traveling system, a clutch connected to said engine via the splitter, a torque converter connected to the clutch, a transmission connected to the torque converter and transmitting drive force to drive wheels, a vehicle speed detection means which detects actual vehicle speed, and a

controller which performs control so that the actual vehicle speed detected by the vehicle speed detection means becomes equal to a target vehicle speed set in advance.

US Patent No. 6662098 discloses a method and a device for setting a gear ratio of the transmission installed in the drive train of a motor vehicle, while a distance and/or vehicle-speed control system (ACC system) is activated. A setpoint variable, as a function of which at least the driving motor of the vehicle is controlled, is input while the distance and/or vehicle-speed control system is activated.

US Patent No. 7343238 relates to a speed controller for a car using telematics, the speed controller comprising: a sensor unit to detect the speed of the car according to travelling, a distance from the car to an object in front, and an operating status of a brake pedal and an accelerator pedal; a telematics system to output a signal to control the travel speed of the car automatically and a gear shifting signal so as to prevent a collision accident with the object in front, when the travel speed of the car and the distance from the car to the object in front exceeds a preset range of an approaching distance, in response to the signal detected by the sensor unit; a speed regulation system to maintain the travel speed of the car within a speed limit by controlling an accelerator pedal and a brake pedal control unit, in response to the control signal outputted by the telematics system; and an automatic transmission system to set a gear shifting level corresponding to the travel speed of the car controlled by the speed regulation system by automatically controlling a gear shifting lever control unit, in response to a gear shifting signal outputted by the telematics system.

Accordingly, it is a main object of the present invention to provide a GPS based Variable Vehicle speed controller which can be used to overcome the existing drawbacks of the conventional vehicle speed controller.

## **SUMMARY OF THE INVENTION**

In accordance with this invention, the foregoing drawbacks are overcome by providing a variable vehicle speed controller which is GPS based for use in an automatic or manual drive vehicle which is in motion from One Speed zone to another Speed zone, the vehicle speed is automatically controlled and vehicle not allowed to go beyond the specified speed limit of the zone, said variable vehicle speed controller comprising: a micro controller unit (40) to read, measure and control of a plurality of functions of the vehicle; a speed sensor interface (30) linked to the micro controller unit (40) for reading the speed of the vehicle; a GPS module (32) including a GPS antenna (22) for determining the location of the vehicle and linked to the micro controller unit (40); a digital map data memory (60) having the

database of Speed Limits for all Speed Zones, and linked to the micro controller unit (40); a speed control interface (62) linked to the micro controller unit (40) for controlling the speed of the vehicle; a digital input interface (42) linked to the micro controller unit (40) for reading the status of ignition switch of the vehicle; and a digital output interface (52) for lighting up an indicator showing the speed control in operation.

The present invention provides a variable vehicle speed controller which will reduce road accidents due to over speeding on roads where there are speed limit, and thus the present invention provides benefit of saving previous human life, and also saving expenses as a result of road accidents. With the working of the variable vehicle speed controller, the invention allows reduction in wear and tear of the engine of the vehicle, chassis and tires, thereby increasing the life span of the vehicle.

In accordance with the present invention, variable vehicle speed controller will increase the fuel economy of the vehicle, and operational efficiency. The vehicle speed controller allows automatic switching of speed limit on various speed zones, and therefore no penalty as a result of any over speeding of the vehicle. Additionally, the speed switching is accurate based on the vehicle location.

A more specific object of the invention is to provide a variable vehicle speed controller, wherein the controller controls the speed of vehicle without intervention of the driver of the vehicle. A further object of the invention is to provide a variable vehicle speed controller, wherein a speed signal is connected from the speed sensor (20) to the speed controller, and the speed sensor (20) is provided on the gear box and the antenna (22) of the GPS.

A further object of the invention is to provide a variable vehicle speed controller, wherein the vehicle ignition switch (44) and LED are connected to the speed controller, and the controller starts to function when the ignition switch (44) of the vehicle is made ON.

Yet a further object of the present invention is to provide a variable vehicle speed controller, wherein GPS modules (32) reads the current location of the vehicle. The vehicle speed limit for a current location is determined from the digital map data memory containing database for location and Speed limit.

Still a further object of the present invention is to provide a variable vehicle speed controller, wherein the current vehicle speed is determined by the speed sensor (20), and the digital input interface is connected to the vehicle ignition switch (42) and obtains signal from the vehicle ignition switch (42).

Yet another object of the present invention is to provide a variable vehicle speed controller, wherein the digital output interface (52) is linked to a speed limit indication lamp (54), and the micro controller unit (40) controls the speed of the vehicle via the Speed Control Interface using data feedback by the speed sensor, GPS Module, and Digital Map Data Memory.

Still a further object of the present invention is to provide a variable vehicle speed controller, wherein the speed of the vehicle is read by the speed sensor interface (30), and the speed of the vehicle is automatically controlled by the speed control interface.

Other objects and advantages of the invention will be apparent from the following description.

## **DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a block diagram showing the relationship of the components that makes up the variable vehicle controller in accordance with the present invention.

## **DESCRIPTION OF THE PREFERRED EMBODIMENT**

FIG. 1 is a block diagram showing the components of the variable vehicle speed controller (VSC) in accordance with the present invention. The variable vehicle speed controller which is GPS based and is used in an automatic or manual drive vehicle which allows the vehicle to increase vehicle speed and to decrease vehicle speed. The variable vehicle speed controller comprises: a micro controller unit (40) to read, measure and control of a plurality of functions of the vehicle; a speed sensor interface (30) linked to the micro controller unit (40) for reading the speed of the vehicle; a GPS module (32) including a GPS antenna (22) for determining the current location of the vehicle and linked to the micro controller unit (40); a digital map data memory (60) for determining the speed limit based on current location and linked to the micro controller unit (40); a speed control interface (62) linked to the micro controller unit (40) for controlling the speed of the vehicle; a digital input interface (42) linked to the micro controller unit (40) for reading the status of ignition switch of the vehicle; and a digital output interface (52) for lighting up an indicator (54) showing the speed control in operation.

As shown in the figure, GPS based variable vehicle speed controller (VSC) is a system for controlling the vehicle speed in motion of a vehicle. In the present preferred embodiment, the VSC includes a speed sensor interface (30) for reading the vehicle speed, a GPS module (32) for determining the vehicle location, a digital map data memory (60) for

determining Speed Limits of a specific area or road, a speed control interface (62) to control the speed of the vehicle, a digital input interface (42) for reading the status of the ignition switch of a vehicle, a digital output interface (52) for lighting up the LED / Lamp (54) for showing the speed control is in operation, and a microcontroller unit (40) to read, measure and control the various functions. The speed sensor (30), the GPS module (32), the digital input interface (42), the digital output interface (52), the speed control interface (62) and the digital map data memory (60) are coupled or linked to the micro controller unit (40).

In accordance with the present invention, the VSC starts to function when the vehicle ignition switch is turned ON. The GPS module (32) starts reading the current location of the vehicle. Accordingly, the speed limit of the vehicle at that specific location is determined from the location map data memory (60). Also, the current speed of the vehicle is determined by the speed sensor (20). If the current speed of the vehicle is approaching or beyond the current vehicle speed limit, the speed control interface (62) starts to control the speed of the vehicle and keeps the speed to be within the statutory speed limit stored in the location data memory (60). This operation is kicked in until the driver wants to reduce the speed of the vehicle. The VSC keep the Speed Control automatic and no driver intervention is required to perform the control action.

In view of the preferred embodiment of the present invention, the controller controls the speed of vehicle without intervention of the driver of the vehicle, and a speed signal is connected from the speed sensor (20) to the controller. A Vehicle battery supply (12) via a DC-DC converter (10) is provided to the speed controller. The speed sensor (20) is installed on the gear box and the antenna (22) of the GPS module (32) mounted on dashboard or suitable location to have a open sky view.

The vehicle ignition switch (44) of the vehicle is connected to the speed controller, LED connected to the speed controller, and the controller starts to function when the ignition switch (44) of the vehicle is made ON. The GPS module (32) reads the current location of the vehicle to find out the vehicle speed limit for the current location. The vehicle speed limit for a specific location of vehicle is determined from the location contained in digital map data memory (60), and the current vehicle speed is determined by the speed sensor (20). In accordance with the present invention, the vehicle ignition switch (44) is connected to the digital input interface (42) and obtains signal from the vehicle ignition switch (44), and the digital output interface (52) is linked to a speed limit indication lamp (54). The micro controller unit (40) controls the speed of the vehicle via the speed control interface (30) using data feedback by the speed sensor (20), the GPS module (32), and the digital

map data memory (60). The speed of the vehicle is read by the speed sensor interface (30), and is automatically controlled by the speed control interface (30).

Various changes and modifications may be made without departing from the spirit of the invention, and all of such changes are contemplated as may come within the scope of the claims.

**What I claim is:**

1. A variable vehicle speed controller which is GPS based for use in an automatic or manual drive vehicle which is in motion from One Speed zone to another Speed zone,  
5 the vehicle speed is automatically controlled and vehicle not allowed to go beyond the specified speed limit of the zone, said variable vehicle speed controller comprising:  
  
a micro controller unit (40) to read, measure and control of a plurality of functions of the vehicle;  
  
10 a speed sensor interface (30) linked to the micro controller unit (40) for reading the speed of the vehicle;  
  
a GPS module (32) including a GPS antenna (22) for determining the location of the vehicle and linked to the micro controller unit (40);  
  
15 a digital map data memory (60) having the database of Speed Limits for all the Speed Zones, and linked to the micro controller unit;  
  
a speed control interface (62) linked to the micro controller unit (40) for controlling the speed of the vehicle;  
  
a digital input interface (42) linked to the micro controller unit (40) for reading the status of ignition switch of the vehicle; and  
  
20 a digital output interface (52) for lighting up an indicator showing the speed control in operation.
2. The variable vehicle speed controller as in Claim 1, wherein the controller controls the speed of vehicle without intervention of the driver of the vehicle.
3. The variable vehicle speed controller as in Claim 1, wherein a battery supply is  
25 provided to the speed controller.
4. The variable vehicle speed controller as in Claim 1, wherein a speed signal is connected from the speed sensor (20) to the controller.

5. The variable vehicle speed controller as in Claim 4, wherein the speed sensor (20) is installed on the gear box and the antenna (22) of the GPS mounted on dashboard or suitable location to have a open sky view.

6. The variable vehicle speed controller as in Claim 1, wherein the vehicle ignition switch (44) of the vehicle are connected to the speed controller.

7. The variable vehicle speed controller as in Claim 1, wherein the LED connected to the speed controller.

8. The variable vehicle speed controller as in Claim 1, wherein the controller starts to function when the ignition switch (44) of the vehicle is made ON.

9. The variable vehicle speed controller as in Claim 1, wherein GPS modules (32) reads the location of the vehicle based on the vehicle speed limit.

10. The variable vehicle speed controller as in Claim 9, wherein the vehicle speed limit for a specific location of vehicle is determined from the location contained in digital map data memory.

11. The variable vehicle speed controller as in Claim 9, wherein the current vehicle speed is determined by the speed sensor (20).

12. The variable vehicle speed controller as in Claim 1, wherein the digital input interface is connected to the vehicle ignition switch (42) and obtains signal from the vehicle ignition switch (42).

13. The variable vehicle speed controller as in Claim 1, wherein the digital output interface (52) is linked to a speed limit indication lamp (54).

14. The variable vehicle speed controller as in Claim 1, wherein the micro controller unit (40) controls the speed of the vehicle via the Speed Control Interface using data feedback by the speed sensor, GPS Module, and Digital Map Data Memory.

15. The variable vehicle speed controller as in Claim 1, wherein the speed of the vehicle is read by the speed sensor interface (30).

16. The variable vehicle speed controller as in Claim 1, wherein the speed of the vehicle is automatically controlled by the speed control interface.