

CLAIMS

1. A vehicle speed signal falsification detection apparatus, comprising:
 - a vehicle speed sensor which outputs a pulse signal proportional to a rotational speed of a drive wheel;
 - a wheel speed sensor which outputs a pulse signal proportional to a rotational speed of a driven wheel; and
 - a control unit which includes a computer,wherein the control unit calculates a vehicle speed according to a pulse signal output from the vehicle speed sensor, calculates a simulated vehicle speed according to a pulse signal output from the wheel speed sensor, and determines, on the basis of comparison between the vehicle speed and the simulated vehicle speed, whether a vehicle speed signal has been falsified, and forbids the determining whether the vehicle speed signal has been falsified when a value obtained by subtracting the vehicle speed from the simulated vehicle speed is equal to or less than a predetermined value.
- ~~2. The vehicle speed signal falsification detection apparatus according to claim 1,~~
~~wherein the control unit determines that a vehicle speed signal has been falsified~~
~~when a difference between the vehicle speed and the simulated vehicle speed~~
~~exceeds a first predetermined value.~~
- ~~3. The vehicle speed signal falsification detection apparatus according to claim 1,~~
~~wherein the control unit determines that a vehicle speed signal has been falsified~~
~~when a value obtained by subtracting the vehicle speed from the simulated vehicle~~
~~speed exceeds a second predetermined value.~~

42. The vehicle speed signal falsification detection apparatus according to claim 1, further comprising an alarm lamp which warns that a vehicle speed signal has been falsified,

wherein the control unit turns the alarm lamp on when the control unit determines that a vehicle speed signal has been falsified.

53. The vehicle speed signal falsification detection apparatus according to claim 42, wherein the control unit turns the alarm lamp on when calculation of the vehicle speed and the simulated vehicle speed is disabled.

64. The vehicle speed signal falsification detection apparatus according to claim 1, wherein the control unit outputs a falsification detection signal to an engine control unit that electronically controls an engine when the control unit determines that a vehicle speed signal has been falsified.

75. A vehicle speed limiting apparatus comprising:

a vehicle speed sensor which outputs a pulse signal proportional to a rotational speed of a drive wheel;

a wheel speed sensor which outputs a pulse signal proportional to a rotational speed of a driven wheel;

a first control unit which includes a computer; and

a second control unit which includes a computer,

wherein the first control unit calculates a vehicle speed according to a pulse signal output from the vehicle speed sensor, calculates a simulated vehicle speed according to a pulse signal output from the wheel speed sensor, and outputs a falsification detection signal to the second control unit when the first control unit determines, on the basis of comparison between the vehicle speed and the

simulated vehicle speed, that a vehicle speed signal has been falsified,

wherein the second control unit suppresses an output of an engine when the second control unit receives a falsification detection signal from the first control unit.

86. The vehicle speed limiting apparatus according to claim 75, wherein the first control unit determines that a vehicle speed signal has been falsified when a difference between the vehicle speed and the simulated vehicle speed exceeds a first predetermined value.

97. The vehicle speed limiting apparatus according to claim 75, wherein the first control unit determines that a vehicle speed signal has been falsified when a value obtained by subtracting the vehicle speed from the simulated vehicle speed exceeds a second predetermined value.

108. The vehicle speed limiting apparatus according to claim 75, further comprising an alarm lamp which warns that a vehicle speed signal has been falsified,

wherein the first control unit turns the alarm lamp on when the first control unit determines that a vehicle speed signal has been falsified.

119. The vehicle speed limiting apparatus according to claim 108, wherein the first control unit turns the alarm lamp on when calculation of the vehicle speed and the simulated vehicle speed is disabled.

1210. The vehicle speed limiting apparatus according to claim 75, wherein the first control unit outputs a falsification detection signal to the second control unit when

calculation of the vehicle speed and the simulated vehicle speed is disabled.

4311. The vehicle speed limiting apparatus according to claim 75, wherein the second control unit suppresses an output of an engine when communication with the first control unit is ~~not normal~~prevented.

4412. The vehicle speed limiting apparatus according to claim 75, further comprising an indicator lamp which indicates that the output of the engine is being suppressed,

wherein the second control unit turns the indicator lamp on when the output of the engine is suppressed.

4513. A vehicle speed signal falsification detection method ~~wherein-in which~~ a control unit including a computer executes the following steps, the steps comprising:

~~calculates-calculating~~ a vehicle speed according to a pulse signal proportional to the rotational speed of a drive wheel₁ and ~~calculates-a simulated~~ vehicle speed according to a pulse signal proportional to the rotational speed of a driven wheel₂; and

~~determines-determining~~, on the basis of comparison between the vehicle speed and the simulated vehicle speed, whether a vehicle speed signal has been falsified, and

forbidding the determining whether the vehicle speed has been falsified when a value obtained by subtracting the vehicle speed from the simulated vehicle speed is equal to or less than a predetermined value.

4614. A vehicle speed limiting method ~~wherein-in which~~ a first control unit

including a computer executes the following steps, the steps comprising:

~~calculates~~ calculating a vehicle speed according to a pulse signal proportional to the rotational speed of a drive wheel, ~~and~~ calculates a simulated vehicle speed according to a pulse signal proportional to the rotational speed of a driven wheel; and

~~outputs~~ outputting a falsification detection signal to a second control unit including a computer when falsification of a vehicle speed signal it is determined; on the basis of comparison between the vehicle speed and the simulated vehicle speed, that a vehicle speed signal has been falsified, while and

the second control unit executes the following step, the step comprising:

~~suppresses~~ suppressing the output of an engine when the falsification detection signal is received from the first control unit.

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1. A vehicle speed signal falsification detection apparatus, comprising:
 - a vehicle speed sensor which outputs a pulse signal proportional to a rotational speed of a drive wheel;
 - a wheel speed sensor which outputs a pulse signal proportional to a rotational speed of a driven wheel; and
 - a control unit which includes a computer,wherein the control unit calculates a vehicle speed according to a pulse signal output from the vehicle speed sensor, calculates a simulated vehicle speed according to a pulse signal output from the wheel speed sensor, determines, on the basis of comparison between the vehicle speed and the simulated vehicle speed, whether a vehicle speed signal has been falsified, and forbids the determining whether the vehicle speed signal has been falsified when a value obtained by subtracting the vehicle speed from the simulated vehicle speed is equal to or less than a predetermined value.
2. The vehicle speed signal falsification detection apparatus according to claim 1, further comprising an alarm lamp which warns that a vehicle speed signal has been falsified,
 - wherein the control unit turns the alarm lamp on when the control unit determines that a vehicle speed signal has been falsified.
3. The vehicle speed signal falsification detection apparatus according to claim 2, wherein the control unit turns the alarm lamp on when calculation of the vehicle speed and the simulated vehicle speed is disabled.

4. The vehicle speed signal falsification detection apparatus according to claim 1, wherein the control unit outputs a falsification detection signal to an engine control unit that electronically controls an engine when the control unit determines that a vehicle speed signal has been falsified.

5. A vehicle speed limiting apparatus comprising:

- a vehicle speed sensor which outputs a pulse signal proportional to a rotational speed of a drive wheel;

- a wheel speed sensor which outputs a pulse signal proportional to a rotational speed of a driven wheel;

- a first control unit which includes a computer; and

- a second control unit which includes a computer,

wherein the first control unit calculates a vehicle speed according to a pulse signal output from the vehicle speed sensor, calculates a simulated vehicle speed according to a pulse signal output from the wheel speed sensor, and outputs a falsification detection signal to the second control unit when the first control unit determines, on the basis of comparison between the vehicle speed and the simulated vehicle speed, that a vehicle speed signal has been falsified,

wherein the second control unit suppresses an output of an engine when the second control unit receives a falsification detection signal from the first control unit.

6. The vehicle speed limiting apparatus according to claim 5, wherein the first control unit determines that a vehicle speed signal has been falsified when a difference between the vehicle speed and the simulated vehicle speed exceeds a predetermined value.

7. The vehicle speed limiting apparatus according to claim 5, wherein the first control unit determines that a vehicle speed signal has been falsified when a value obtained by subtracting the vehicle speed from the simulated vehicle speed exceeds a predetermined value.
8. The vehicle speed limiting apparatus according to claim 5, further comprising an alarm lamp which warns that a vehicle speed signal has been falsified,
wherein the first control unit turns the alarm lamp on when the first control unit determines that a vehicle speed signal has been falsified.
9. The vehicle speed limiting apparatus according to claim 8, wherein the first control unit turns the alarm lamp on when calculation of the vehicle speed and the simulated vehicle speed is disabled.
10. The vehicle speed limiting apparatus according to claim 5, wherein the first control unit outputs a falsification detection signal to the second control unit when calculation of the vehicle speed and the simulated vehicle speed is disabled.
11. The vehicle speed limiting apparatus according to claim 5, wherein the second control unit suppresses an output of an engine when communication with the first control unit is prevented.
12. The vehicle speed limiting apparatus according to claim 5, further comprising an indicator lamp which indicates that the output of the engine is being suppressed,
wherein the second control unit turns the indicator lamp on when the output of the engine is suppressed.

13. A vehicle speed signal falsification detection method in which a control unit including a computer executes the following steps, the steps comprising:

calculating a vehicle speed according to a pulse signal proportional to the rotational speed of a drive wheel, and a simulated vehicle speed according to a pulse signal proportional to the rotational speed of a driven wheel;

determining, on the basis of comparison between the vehicle speed and the simulated vehicle speed, whether a vehicle speed has been falsified, and

forbidding the determining whether the vehicle speed has been falsified when a value obtained by subtracting the vehicle speed from the simulated vehicle speed is equal to or less than a predetermined value.

14. A vehicle speed limiting method in which a first control unit including a computer executes the following steps, the steps comprising:

calculating a vehicle speed according to a pulse signal proportional to the rotational speed of a drive wheel, and a simulated vehicle speed according to a pulse signal proportional to the rotational speed of a driven wheel; and

outputting a falsification detection signal to a second control unit including a computer when falsification of a vehicle speed signal is determined on the basis of comparison between the vehicle speed and the simulated vehicle speed, and

the second control unit executes the following step, the step comprising:

suppressing the output of an engine when the falsification detection signal is received from the first control unit.