

OCCUPANT DETERMINATION DEVICE

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[0001] This application is based on and claims priority under 35 U.S.C. § 119 with respect to Japanese Application No. 2002-348377 filed on Nov. 29, 2002, the entire contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] This invention generally relates to an occupant determination device for a vehicle seat. More particularly, this invention pertains to an occupant determination device for a vehicle seat operated based on a load value output from a load sensor that is provided on the vehicle seat.

BACKGROUND OF THE INVENTION

[0003] In case where an air bag is provided for protecting an occupant sitting on a vehicle seat, an occupant determination device is provided at the vehicle seat for determining whether an occupant is seated or not on the corresponding seat, the occupant is an adult or a child, or the like. Japanese Patent Laid-open Publication No. 09-207638 discloses a known occupant determination device. The disclosed device includes a plurality of load sensors provided at a plurality of fixing positions respectively of a seat body facing a vehicle floor, and a controller for calculating a detection load value based on load values output from the plurality of load sensors and for determining whether or not an occupant is seated on the vehicle seat based on the calculated detection load value. More specifically, the controller calculates a detection load value by summing up the load values output from the plurality of load sensors using an adder, compares this detection load value with a load value set in advance (threshold value for determination) using a determination processing circuit, and determines whether or not an occupant is seated on the vehicle seat by comparing the detection load value and the threshold value for determination.

[0004] When the occupant determination to determine a child or an adult is made based on the difference between a detection load value and a determination threshold value, if the detection load value corresponding to a weight of an adult is close to the determination threshold value, the changing of the determination (from a child to an adult or vice versa) may be frequently made due to the vibration of the vehicle or the change of the occupant posture. In order to prevent such frequent changes of determination, a delay time is provided at changing the determination. However, since the vibration of the vehicle or the change of the posture of the occupant may occur not periodically or may continue for not constant time, the delay time setting is not a sufficient solution for the problems. In another known art, Japanese patent Application published as 11-198705, a proposal has been made to use an output pattern of an antenna embedded in the seat back to improve the accuracy of the occupant determination. In further known art, Japanese Patent Application published as 2000-127890, the device disclosed in this art detects a seatbelt tension and corrects the determination threshold value based on the tension value to improve the accuracy of the occupant determination. However, in such known art method, it is necessary to provide a detecting element for exclusive use which may lead to cost increase.

SUMMARY OF THE INVENTION

[0005] According to an aspect of the present invention, an occupant determination device for a vehicle seat includes a

load sensor provided at a seat body, a controller for calculating a detection load value based on a load value output from the load sensor. The controller determines whether an occupant seated on the vehicle seat is an adult or a child. The device includes hysteresis provided for changing the occupant determination from either a child or an adult to an adult or a child.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0006] The foregoing and additional features and characteristics of the present invention will become more apparent from the following detailed description considered with reference to the accompanying drawing figures in which like reference numerals designate like elements.

[0007] FIG. 1 is a perspective view of a vehicle seat according to an embodiment of the present invention;

[0008] FIG. 2 is a side view of the vehicle seat according to the embodiment of the present invention;

[0009] FIG. 3a is a front view of a sensor bracket provided on a front side of the vehicle seat;

[0010] FIG. 3b is a front view of a sensor bracket provided on a rear side of the vehicle seat;

[0011] FIG. 4 is a block diagram of an electrical structure of the embodiment of the present invention; and

[0012] FIG. 5 is a flowchart of an occupant determination operation according to the embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0013] An embodiment of the present invention is explained referring to FIGS. 1 to 5. FIG. 1 is a perspective view of a seat body 1 of a vehicle seat. The seat body 1 is provided on a passenger seat side of a vehicle. A pair of supporting frames 2 provided on right and left sides respectively in FIG. 1 is fixed on a vehicle floor (not shown) in a longitudinal direction of the vehicle (in arrow X direction in FIG. 1).

[0014] Brackets 3 formed by two pairs of brackets, each provided on front and rear sides in FIG. 1 of the seat body 1 are fixed on an upper face of the respective supporting frames 2. A pair of lower rails 4 provided on right and left sides in FIG. 1 is fixed to the respective pairs of brackets 3 along the supporting frames 2. Each lower rail 4 obtains a U-shape in cross section, whose upper portion opens and extends in the longitudinal direction of the vehicle to thereby form a sliding groove 5.

[0015] A pair of upper rails 6 provided on right and left sides in FIG. 1 is slidable in the sliding grooves 5 formed at the respective lower rails 4. As shown in FIG. 2, each upper rail 6 is connected to each lower arm 16 that supports a seat cushion 9 and a seat back 10 of the seat body 1 with keeping a predetermined distance between the lower arm 16 and the upper rail 6 via one of a pair of front side sensor brackets 7 provided on right and left front sides in FIG. 1 and one of a pair of rear side sensor brackets 8 provided on right and left rear sides in FIG. 1.