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Portable wheelchair scale

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Wheelchair scale is available, but is usually of floor type and huge in size. Our scale is aimed to be similar to the bathroom scale, portable and inexpensive. The maximum capacity of the common bathroom scale is 440 lbs. Because the weight of the wheelchair is about 200 to 300 lbs and the weight of a patient could be 120 to 300 lbs. So the capacity of a wheelchair scale should be about 600 lbs. This figure is just above the maximum limit of the bathroom scale. Therefore, we need to build one by ourselves. The design of the wheelchair scale is similar to bathroom scale but bigger is size and higher in capacity. But to our surprise no schematic diagram can be found in the computer internet. And it is difficult to figure out the circuit from the existing scale, because it is in printed circuit board. However, the whole device is simple so we started from scratch. We use strain gage as the sensor, NPN transistor as the power supply for constant current. Then the signal is amplified and the analogue output is converted to BCD signal and BCD signal is converted to 7-segments code for LED display. In the whole paper, the detailed schematic diagram is included. Also because the audience in the conference is not all in electric engineering, so some additional explanations will be provided for binary, BCD and 7-segments code etc. To find those parts from electronic supply companies is another challenge to us but they are found. The device is built and the picture is attached. The accuracy of the scale is set that at 450 lbs the error is zero. Away from 450 lbs the error increasing gradually depends on the linearity of the strain gages. Exact error chart and the procedure to reach to this accuracy will be given in the paper.

Biography

Shuh Jing Ying graduated from Provincial Shao-Hing High School. Because of the World War II, he was in military service graduating through Chinese Air Force Technology Institute. He served 4 years in the Engine Overhaul Factory in Taiwan China as a Lieutenant, and then he entered National Cheng-Kung University, Majored in mechanical engineering. He, in 1958, completed MSc at Brown University and PhD at Harvard University in 1966. He received Outstanding Faculty Award in 1975, Engineer of Year Award in 1985, elected as Fellow of American Society of Mechanical Engineers in 1995, and published a text book 'Advanced Dynamics' in 1997. He retired in the year of 2000 and earned a title of Emeritus Professor. He is currently working in a part-time job in the University of South Florida.

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