



المعايير الفنية المرجعية لمكونات المدينة الذكية بأمانة العاصمة المقدسة

((المكون التاسع)) الوزن الآلي للمركبات



صفحة وحدة مدينتي ذكية

<http://www.holymakkah.gov.sa/mundeps/SmartCity>

البريد الإلكتروني لوحدة مدينتي ذكية

smartcity@holymakkah.gov.sa

المعايير الفنية للوزن الآلي للمركبات

المواصفات

Measuring directly	<p>Measuring directly is the way, which measured and collected by placing the vehicle on the scale while the vehicle is at rest. Some disadvantages of this method was mentioned but the other disadvantage is that ,the sensors which are normally used for measuring have an overload capacity and more than this capacity causes pressure on the sensor, therefore it cannot illustrate the real weight of the load. According that the loads usually fall down from high height on the vehicle, this hit on the sensor is usually 10 times more than its weight and it is natural that this amount of weight will not be tolerated by sensor. Therefore a system which be considered for measuring the weight of the load, must be able to tolerate this extra pressure. This point is the main advantage of the sensor that we described below.</p>
Measuring indirectly	<p>Measuring distance by digital ruler</p> <ul style="list-style-type: none">• Measuring angle change of spring• Measuring side spring pressure on weight sensor
Measuring distance by digital ruler	<p>In this way, we can measure the weight changes of vehicle at any moment by putting a digital ruler between back chassis and axle of vehicle. This way has some problem such as:</p> <ul style="list-style-type: none">• High price of digital ruler• Shock and Moisture sensitivity
Measuring angle change of spring	<p>Spring angle, changes with weight changes, so with using an angle measurement module, we can measure the weight changes of vehicle. Problem of this way is that these sensors' action is based on the magnetic changes of poles and if it is placed near power cable or metal, loses its precision.</p>
Measuring spring pressure on weight sensor	<p>Components:</p> <ul style="list-style-type: none">• A base of weight sensor• A weight sensor capable of weighing up 20 kilograms• A spring capable of increasing pressure up to 20 kilograms• A ball bearing placed on the spring• A device that converts the system`s resistance to 1 to 10 volt• AVL devices

	<ul style="list-style-type: none"> • The central computer that calculates the voltage and changes it to a weight proportionate with the weight of the vehicle • Communication Cables(a medium to transfer data) • A data transfer system that provides communication between computer and sensor
<p>Operating mechanism of weight sensor device</p>	<p>The weight sensor (20 kilograms) is attached to the base of the vehicle from one side and to the spring valid for 20 kilograms from the other side. The other side of spring is placed on the flat spring of the vehicle. When the weight of the vehicle increases, the spring is jammed and it produces a power towards the weight sensor and changes the output resistance. The pivot in the device changes the sensor resistance into voltage in a way that the pivot shows 1 voltage if there is no load on chassis and it shows 10 if there is the maximum weight on the chassis .This voltage is set on the AVL and it sends to the central computer via wireless communication network such as GPRS, 3G, Local wireless, dedicated wireless network, other wireless networks to the central server. The central server estimates the weight according to a calibration chart.</p>
<p>Benefits of measuring spring pressure on weight sensor</p>	<ul style="list-style-type: none"> • Pieces are cheap • Low depreciation of device • Accuracy and Precision
<p>Device Specifications</p>	<ul style="list-style-type: none"> • Safe and Nondestructive • Waterproof and Shock absorber • Small size • Easy install on all kind of vehicle • Accuracy and Precision with minimum error • The vehicle load at an instant is computed by measuring changes in to vehicle suspension system. • The changes in the vehicle suspension system are measured by a variation in pressure applied on the load cell in the weigh sensing device at an instant. • The weight sensing device case a circuit board for measuring a pressure applied on the load cell and converting the applied pressure level into a resistance value. • The weight sensor device is connected to the AVL system through a wired connection or wireless connection. • The AVL is provided with a monitor to display the vehicle load and the vehicle location data simultaneously. • The central computer receives the voltage data from the voltage conversion unit through the AVL

	<p>system to calculate the vehicle load at an instant using a pre-calibrated chart.</p> <ul style="list-style-type: none"> • The central computer receives the vehicle location data and the voltage data from the AVL system to monitor a vehicle location and the vehicle load at any instant. • The central computer receives a position data, and wherein the position data includes a longitude, latitude and altitude of the vehicle at any instant, a speed of the vehicle, bearing data and a time data from the AVL.
Sensitivity	(2.0±0.1%) mV/V
Combined Error	±0.02% F.S
Zero Balance	±1% F.S
Input Resistance	750±5Ω
Insulation Resistance	≥5000MΩ
Operating Temp. Range	-30 ~ +70
Maximum Safe Over Load	150% F.S
Ultimate Over Load	300% F.S
Element Material	Alloy Steel, Stainless Steel