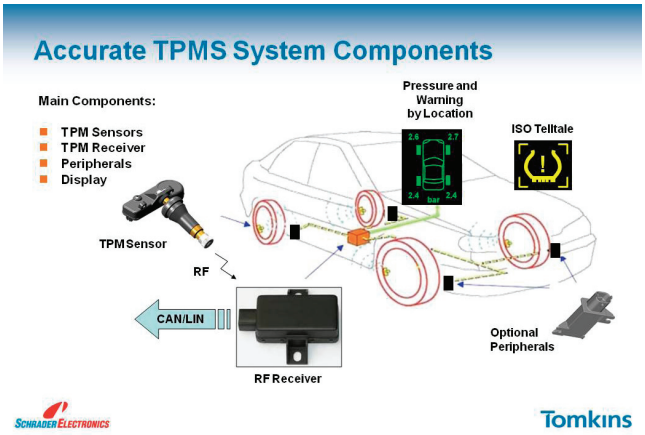
TPMS

Why TPMS is a hot topic?

In 2012 it becomes obligatory for all new models of passenger vehicles sold in the EU to be fitted with a tyre pressure monitoring system (TPMS) - as of 2014, all new cars must have TPMS. The United Nations Economic Commission for Europe (UNECE) has decided on a set of criteria that TPMS technology must achieve, determining how accurate the system must be and thus the degree of benefit it will offer drivers. These criteria are currently being criticized by many environmental and safety organisation such as Transport and Environment (T&E) and ETRMA as being severely insufficient to deliver any benefits to motorists. The European Commission is therefore suggesting to integrate the criteria of R64 of the UNECE with a second set of more stringent criteria to be phased-in into the European market at a later stage (2015).

TPMS detect under-inflation of tyres, whether as a result of natural air dissipation or through puncturing, and alert the driver. This is of enough value to be made mandatory across all cars as its employment can reduce road accidents, fuel use and consequently CO2 emissions.

The accuracy of the TPMS clearly has a direct impact on the advantages it can offer. The current debate at European level focuses on agreeing the amount of deflation below recommended pressures which should trigger the warning system and, more contentiously, how quickly the information is relayed to the driver.



Direct vs Indirect TPMS

There are two types of tyre pressure monitoring systems (TPMS): indirect and direct. A direct system uses separate radio sensors mounted inside a vehicle's tyres to measure pressure. If deflation occurs, this is communicated to the integrated or stand-alone Electronic Control Unit (ECU) and the driver quickly alerted by a dashboard-mounted display. Deflation warnings are displayed in the same way by an indirect system, however, the way they detect deflation is different. Indirect systems use ABS sensors to measure and compare rotational speeds of the tyres and, in some cases, vibration through the wheels. The ECU's analysis of the data produces a deduced rather than absolute tyre pressure measurement.

Direct systems detect deflation much more quickly than indirect systems and require no user maintenance throughout their lifetime. They are, however, more expensive per unit. Indirect systems suffer fundamental flaws, such as requiring the car owner to re-calibrate the system every time tyres are inflated or a wheel changed, a process which can easily introduce user error into this safety system. The amount of time indirect TPMS take to detect a deflation along with the accuracy of their measurement are other points of contention.

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Environmental and safety groups are strongly in favour of the fast-responding and accurate direct TPMS. These systems keep drivers better informed on their car's tyre pressures, encouraging the right level of inflation, which reduces the risk of accidents, the amount of fuel used and CO2 emissions, all of which rise significantly when tyres are under-inflated. Vehicle manufacturers have largely lined up behind indirect TPMS which is projected to cost them 17 Euros less per system than the direct option.

EU compromises reaction time for indirect TPMS

In the recent meeting to discuss the proposed EU legislation making the installation of TPMS systems obligatory, the maximum time these devices should be allowed to alert drivers to a drop in pressure of 20% was discussed. The majority of journeys completed on the continent are of 20 minutes, the time which has been adopted for the activation of TPMS fitted to vehicles in the USA. However, the EU had suggested the notification of incorrect pressure after one hour of driving, a period of time criticised as being too long by campaigners.

EU legislators have therefore settled for an initial compromise arrangement for the alert to be transmitted to the driver between 20 and 60 minutes when the tyre pressure drops by 20% or more.

The Transport and Environment organisation has called for a stricter limit to maximise the future safety and environmental benefits to European motorists. However, with the existing state of technology, it would be difficult for indirect systems to achieve this. The FIA has called for a five minute maximum for a single tyre and 15 minutes maximum for multiple tyres.

IN THE NEWS

FIA says indirect TPMS currently 'unsuitable' for Europe

The representative group for European motoring clubs has expressed doubt over the current indirect TPMS technology to adequately fulfil the demands of the EU's road users. Chief among those was the need for the user to recalibrate the system whenever a tyre was inflated or wheel changed. "It's too complicated," said the FIA's Technical Director, Wilfried Klanner. "We think that it needs to be re-calibrated when new tyres are fitted but not when the air is topped up." He was not aware of any indirect system currently available which could do this.

Klanner also criticised the inability of an indirect TPMS to run on anything other than the OE tyres. "We do not recommend any system which requires OE tyres to be fitted at every replacement. Buying a replacement tyre is much cheaper than buying the original equipment tyre." In the same report, Klanner said he expects suitable future indirect systems to be available 'soon'.

(Information taken from European Rubber Journal Nov/Dec 2009)

Motorists want to steer clear of recalibrating safety devices

Research undertaken by *fast*.MAP on behalf of Schrader Electronics has revealed 69% of drivers do not wish to undertake the responsibility of manually resetting a TPMS for safety reasons. Due to the absence of pressure sensors, a vehicle equipped with an indirect TPMS requires the device to be recalibrated by the driver after tyre pressure is modified or a tyre is changed. For the TPMS to work effectively, all four tyres must be inflated to the correct recommended pressure and in the optimum conditions. However, research has shown that due to inaccurate gauges on forecourts, tyres are often inflated to incorrect levels which then become the benchmark for the recalibration of the device. This in turn provides a false sense of security to the driver who often remains oblivious to the danger. Furthermore, it was noted by respondents that car companies do not allow drivers to recalibrate airbag, ABS or ESP® systems following activation.

TPMS to be included in eSafety Challenge 2010

Awareness of TPMS technology will receive a giant boost this year following its inclusion as part of the hugely successful eSafety Challenge. The European-wide campaign to highlight advances in vehicle safety technology, supported by notables such as Michael Schumacher, Tom Kristensen and Jean Todt, has events running throughout 2010. At these events, technologies are demonstrated to attendees, giving them insight into their benefits to road safety.

INDUSTRY COMMENT

Cost should not compromise safety of motorists

Debate has continued surrounding the higher cost of implementing a direct TPMS versus an indirect alternative, with claims that the former could add several hundred extra Euros on top of the price of new cars. Schrader Electronics has refuted this argument as the premium which a direct system commands would be negligible, and should not become an important factor when the European Commission makes its final decision relating to the technical specification. Alfonso Di Pasquale, Vice President of business development at Schrader Electronics explains: “We believe motorists purchasing a new car should have the safest possible product available on the market and a direct TPMS should be the system of choice. If it is priced competitively by car companies in the same vein as ABS or ESC, then the cost passed on to the motorist will be no more than 30 or 40 Euros.”