



VTT produces research services that enhance international competitiveness of companies, society and other customers at all stages of their innovation process, and thereby creates the prerequisites for growth, employment and wellbeing.

VTT promotes the realisation of innovative solutions and new businesses by foreseeing the future needs of its customers already in strategic research.

With its 2,700 employees, VTT is the largest research organization in Northern Europe. VTT's Ventures operation creates profitable and growing technology and wellbeing as well as more effective use of VTT produced Intellectual Property Rights.

## Novel Potentiometer Sensor Interface DiagSens™

### THE PROBLEM

Potentiometers offer a simple, cheap method of getting absolute position measurements, but potentiometer wear and its resistive track gets dirty and becomes oxidised over time causing an increase of contact resistance and intermittent contact losses. Also sensor wiring could short circuit or break. Studies show that of over 80 % of the field returns, the cause for malfunction was not found, and less than 10 % of samples were actually worn out.

### THE INVENTION

The invention is to use a slightly modified electrical interface for the sensor potentiometer. This interface makes it possible to detect and identify all potentiometer sensor and wiring faults. After a single fault it is still possible to measure the wiper position in 64 % of the cases (pseudoredundancy). It makes it also possible to measure contact resistance continuously during the operation and predict the wear. The interface also has other benefits, like insensitivity to disturbances. (Patent pending)

### THE SOLUTION

This novel interface can be used either in control systems or field test equipment. It is very simple to implement and does not need excessive computing power. Accurate fault detection speeds up corrective actions and reduces unnecessary sensor replacements. Pseudoredundancy increases availability and wear prediction makes predictive maintenance possible.

VTT is looking for an industrial partner to license the invention.

### Contact

Juhani Pesälä  
Business Development Manager Ventures  
P.O.BOX 1000  
FI-02044 VTT, Finland  
Tel. +358 20 722 5679  
GSM +358 40 522 7179  
Fax +358 20 722 7090  
[juhani.pesala@vtt.fi](mailto:juhani.pesala@vtt.fi)