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The Indres Technology

Novotechnik developed a new type of sensor on the basis of inductive and resistive principles as a contactless supplement to potentiometers.

To this end, a primary and secondary coil having one winding respectively are mounted on a carrier board. The two coils are enveloped by a movable ferrite with air gap. According to the law of induction, the primary current generates a secondary voltage which, however, contains no position information. Yet, since the field flux is concentrated in the air gap of the ferrite, this potential front moves along with the ferrite when latter is shifted (Fig. 1). The object is to read out this potential and to convert it into an output signal.

This is achieved by means of a resistor network (e.g. resistor pressure) in the secondary circuit, which registers the change in location. The output voltage changes depending on the position of the ferrite, and given a constant resistance layer, it follows the path and angle movements linearly.

The new sensor works like a customary voltage divider (Fig. 3); however, in this case the output voltage is proportional to the conductance ratio.

Since there is only one primary winding, it would have to be activated with high current to obtain a correspondingly high and interference-immune output signal. If the ferrite is designed as a resonant circuit, the primary current only has to compensate the ohmic losses of the oscillating circuit.

The very low coefficients of temperature and humidity of <30ppm/K or <1ppm/% rel. humidity can be realized without additional compensation. The relative permeability is independent of the humidity; the dew point is passed without affecting the measured value. The sensor can also be used under oil or other chemicals.

This measuring technology called "Indres" (inductive-resistive) is insensitive to vibrations, and it is not affected by static magnetic fields or dynamic and static electric fields. Its good EMC properties exclude interference, the linearity values, depending on the design, are up to ±0.1% without linearization, and the resolution reaches 16 bit. The ambient temperature may be between -40 and 150 °C.

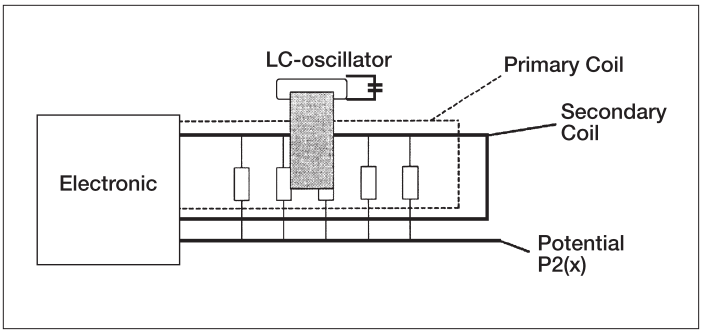

Figure 1: *Transmitter with resistor network.*

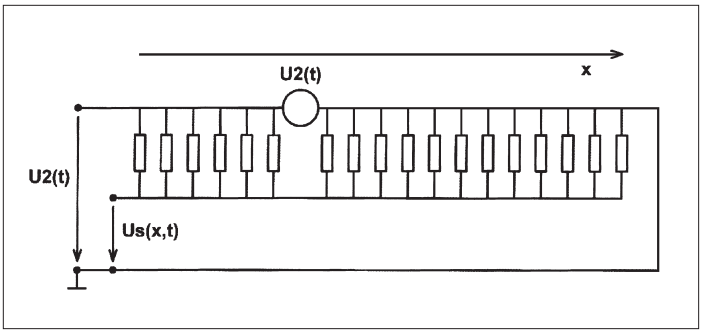

Figure 2: *Secondary circuit schematic.*

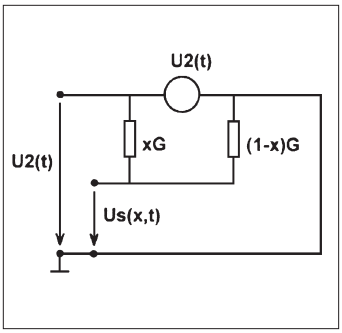

Figure 3: *Simplified equivalent-circuit schematic.*

Subject to changes