



## ARTICLE

### **Detection principle Catalytic Combustion (CC)**

The measuring and warning devices for explosive gases and vapours primarily use the catalytic combustion measuring principle.

The catalytic combustion measurement is performed with the help of a "Wheatstone bridge." One side of the bridge has two sensors, which are located inside the measuring chamber. The sensors are made from thin platinum wire that is rolled into a spiral, similar to the wire in a light bulb. The other side of the bridge is situated in the electronics of the transmitter. The potentiometer on this side of the bridge makes on-site (single person) calibration possible.

One sensor, the detecting sensor (D-sensor), is catalytically active. Catalytic combustion takes place at the D-sensor. The catalytic combustion of the gas and the oxygen in the atmosphere causes a rise in temperature at the platinum spiral. With this rise in temperature, the wire's resistance changes.

The change in resistance upsets the Wheatstone bridge. The second sensor is the compensating sensor (K-sensor). The K-sensor is catalytically inactive and no reaction takes place. The K-sensor is used to compensate for temperature, pressure, and humidity.

On the D-sensor all combustible gases are burned and converted into a signal. The signal height depends on the energy that is released when the gas burns. When the sensor is calibrated for one gas, the amplification of the bridge is adjusted so that the concentration of the gas corresponds to the display on the monitor.

### **Safe Calibration**

The advantage of catalytic combustion lies in its unique ability to detect all combustible gases and vapours. Through safe calibration the transmitter can be calibrated for a gas to which the catalytic combustion reacts with the least cross-sensitivity. The alarm is then more reliable, and independent from the attacking gas.

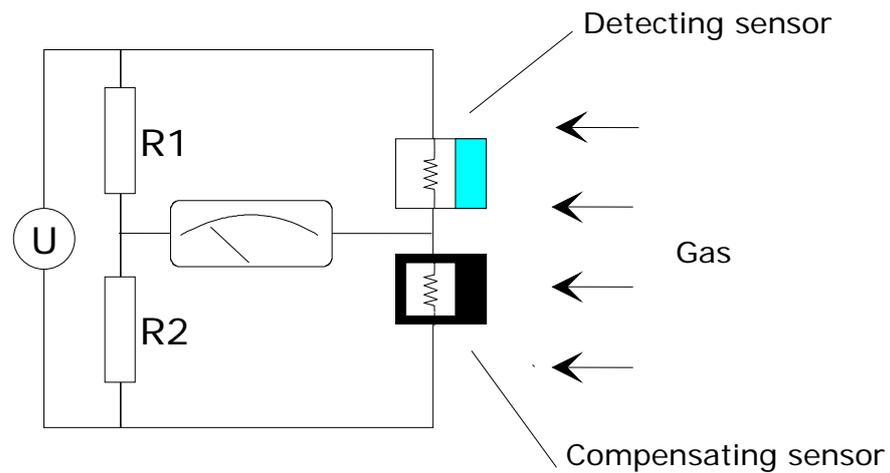
### **Catalytic Poisons**

In catalytic combustion it should be noted that some materials can damage the catalyst. These are, in particular, heavy metal combinations (lead, quicksilver, etc.), sulphur, and halogen compounds like silicone. In these circumstances, special



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poison resistant sensors or infrared instruments are used. In addition, the sensor should be tested for cross-sensitivity regularly.



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