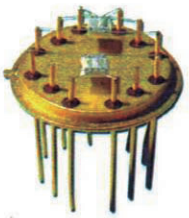
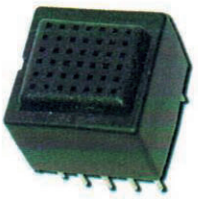
UST-gas sensors are used for many applications. Typical uses for gas sensors and gas sensor arrays are:

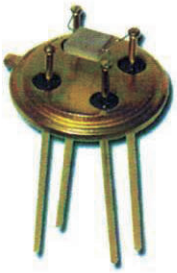
- Measuring of air quality
- Detection of smouldering fires
- Mobile leak detection
- Stationary observation of LEL

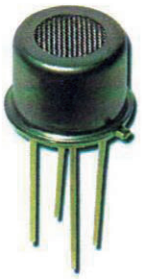
in automobiles, industry and buildings.





Array gas sensor

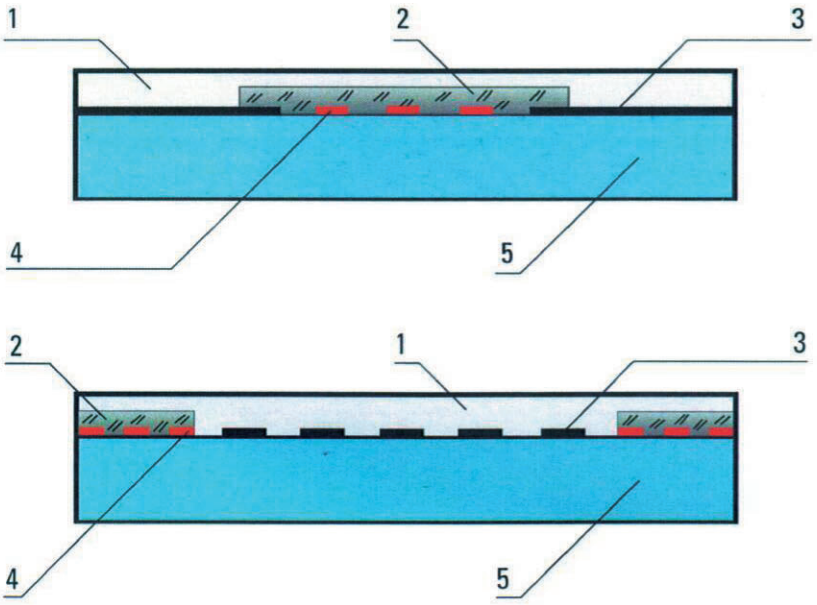




Single gas sensor

The effectiveness of UST-gas sensors is based on the principle of changes in conductivity of a sensitive semi-conductive layer when exposed to oxidisable and reducable gases. The measuring range is dependant on gases from a few ppb into the %-volume range. This is governed by physical chemical limits.

The gas sensors are produced in hybrid technology. They consist of a ceramic carrier substrate with a structured platinum layer, which is constructed of heater strips and contact electrodes. Onto these is bonded an insulating layer and the sensitive top layer.



Structure of UST-gas sensors

1 sensitive layer

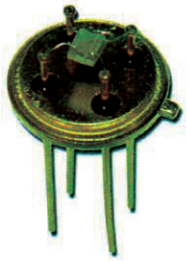
2 insulating layer

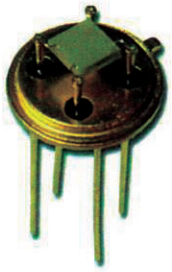
3 Pt-electrodes

4 Pt-heater

5 ceramic substrate

UST UMWELT SENSOR TECHNIK





In order to select the correct sensor for a chosen application, the following selection criteria should be observed:

- Sensor type
- Construction
- Heater resistance class
- Accuracy requirements
- Ambient meduim

Through a range of possible modifications the gas sensors can be adapted to specific applications.

Upon request it is possible to produce data relating to sensor behaviour against a wide selection of gases.

The heater resistance has a defined temperature co-efficient, which permits accurate control of the working temperature of the sensor.

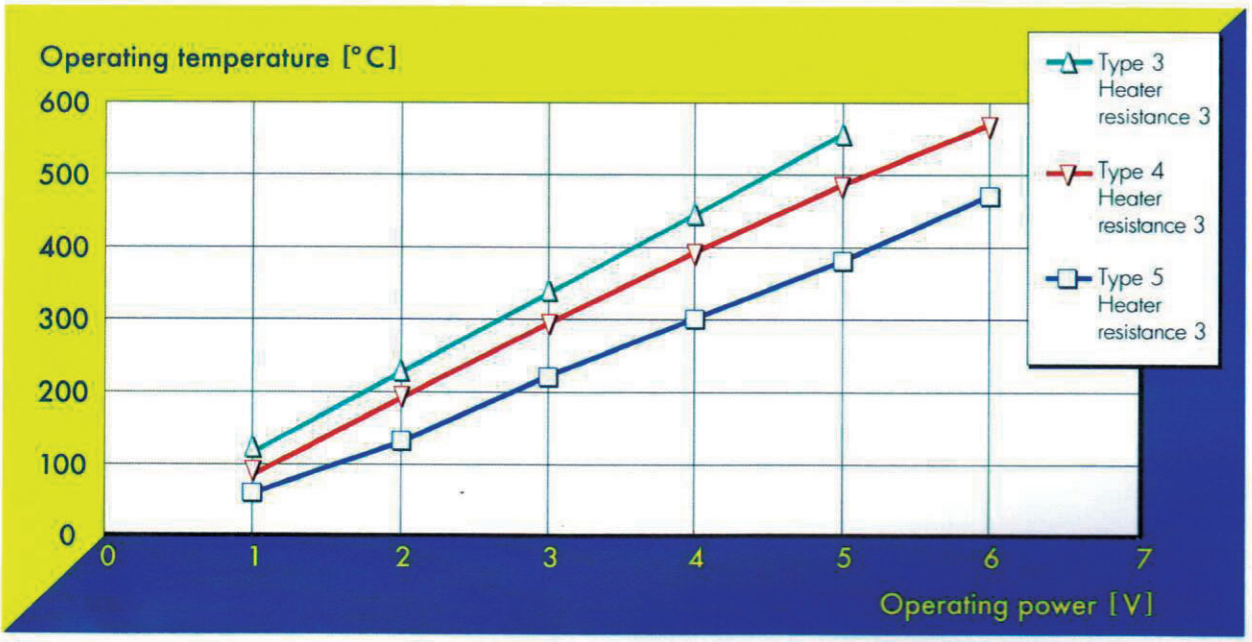
The calculation formulae for the operating temperature of the sensors is:

$$T_H = -\left[\frac{A}{2B} + \sqrt{\frac{A^2}{4B^2} - \frac{R_{H0} - U_H/I_H}{R_{H0}\,B}}\right]$$

Whereby:

T_H Operating temperature
R_{H0} Heater resistance at 0°C [Ω]
R_H Heater resistance at T_H [Ω]
A linear temperature co-efficient: $3.9083 \times 10^{-3}\ °C^{-1}$
B squared temperature co-efficient: $-5.775 \times 10^{-7}\ °C^{-2}$

The insulating resistance between heater and sensitive layer is at the respective operating temperature above 2 M Ω.



Operating temperature of GGS-sensors in TO39 housing in ambient air T_U = 25 °C, air flow = 0 m/s

UST UMWELT SENSOR TECHNIK

Construction - Code number

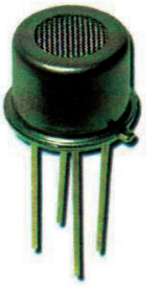
Code Number	Chip dimensions Width [mm]	Length [mm]	Average heater performance P_H [mW] at T_H = 380 °C, air flow = 0 m/s
3	3.0	3.0	800
4	2.0	2.3	500
5	1.5	1.5	280
6	1.2	1.2	240
Others upon request			

Heater resistance - Code number

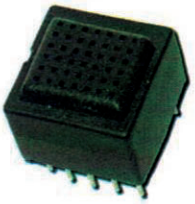
Code Number	Heater resistance R_{H0} at 0 °C [Ω]
3	10.0 ± 0.5
7	16.0 ± 1.0
Others upon request	

Accuracy - Code number

Code Number	Accuracy definition	
	Sensorresistance R_{S0} at ambient air gas	Sensitivity R_S/R_{S0} against calibration
0	R_{S0} ± 75 %	R_S/R_{S0} ± 30 %
1	R_{S0} ± 50 %	R_S/R_{S0} ± 10 %
2	R_{S0} ± 30 %	R_S/R_{S0} ± 10 %
3	R_{S0} ± 20 %	R_S/R_{S0} ± 10 %



TO39-housing



DIL-housing

SMD-housing

During manufacturing process the sensors are pre-aged and selected to accuracy classes with reference to the sensor resistance R_{S0} and the sensitivity against calibration gas R_S/R_{S0}.

Silicon and sulphur containing substances and an-organic contaminations could lead to damage or changes in the sesnor resistance or accuracy of the sensors.

Example for the article number 53014701

GGS 1470 T:

GGS Gas sensor (Single gas sensor)

1 Sensor type

4 Construction (Chip= 2.0 mm x 2.3 mm)

7 Heater resistance (R_{H0} = 16.0 Ω ± 1.0 Ω)

0 Accuracy (R_{S0}± 75%; R_S/R_{S0} ± 30%)

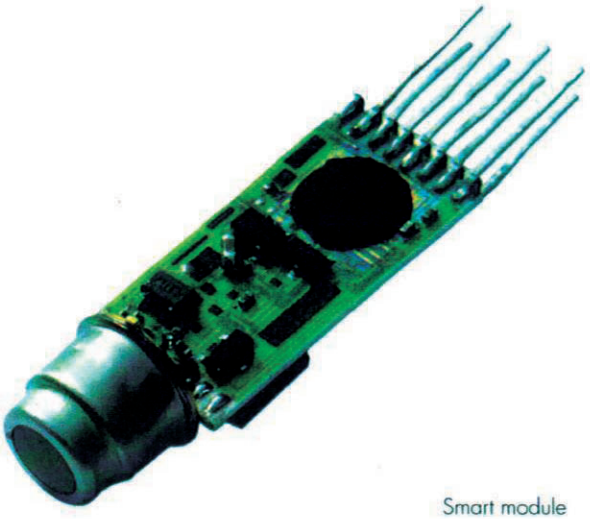
T Sensor in the TO39 housing with stainless steel lid

UST UMWELT SENSOR TECHNIK

Sensor types differ based on
- Sensitivity relating to specific gases
- Cross sensitivity and
- Response time.

The detection range is determined by the used sensor type and the type of gas to be detected.

To assist in the selection of the correct sensor we are glad to offer our extensive experiences.



Smart module

Sensor type	
GGS 1000T	wide range sensor especially suitable for the leak detection of flammable gases
GGS 2000T	sensor with high sensitivity to CO, H_2 and C_2H_5OH and low sensitivity to CH_4
GGS 3000T	sensor for hydrocarbons C_xH_y (from C_1 to C_8), suitable for stationery monitoring of LEL
GGS 4000T	sensor for NH_3 detection, with low cross sensitivity to CH_4, CO and H_2
GGS 5000T	sensor for NO_2 and O_3 detection
GGS 6000T	sensor for H_2 detection with lowest CH_4, CO and C_2H_5OH cross sensitivity
GGS 7000T	sensor for NO_2 detection

Sensor type	
GGS 8000T	sensor for C_2H_5OH detection with low CH_4, CO and H_2 cross sensitivity
GGS 9000T	sensor for detection of R134a, especially suitable for leak detection of CFC's
GGS 10000T	sensor for detection of contaminants in ambient air at trace level, especially suitable for stationary observation of air quality

UST UMWELT SENSOR TECHNIK