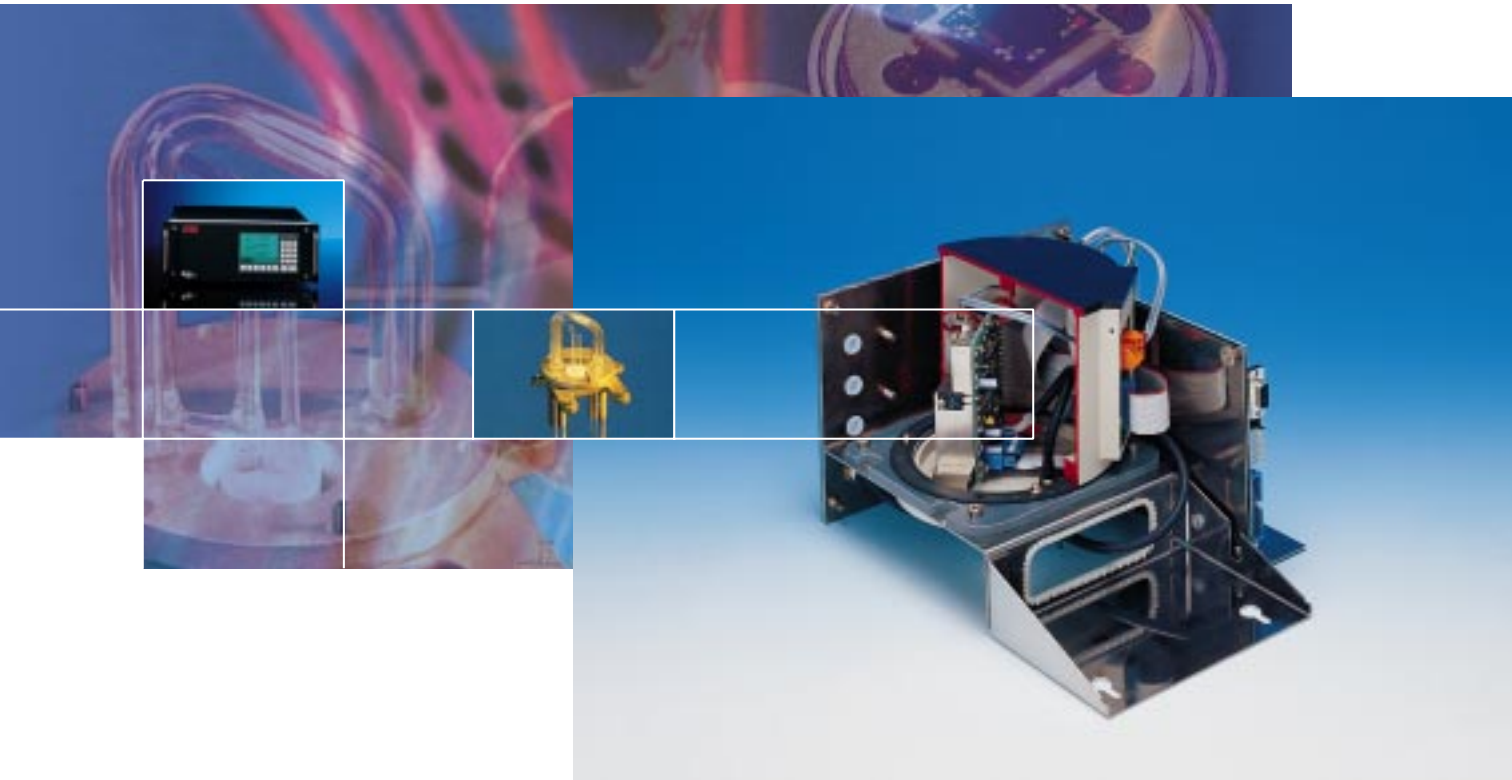# Advance Optima – High Performance Measurement Technology
Thermal Conductivity Analyzer Module Caldos 15/17

■ **Part of the Advance Optima product family, with all advantages**

Caldos 15
■ **Highly corrosion-resistant glass-coated measuring cell**
■ **Purged analyzer for flammable or corrosive gases**
■ **Pressure independent measuring signal**

Caldos 17
■ **Fast process measurements using a micro-structured silicon sensor**
■ **Short T_{90} time, independent of flow rate**
■ **Calibration without test gas bottles**
■ **Freely selectable measuring ranges**
■ **Stable for extremely long periods of time**

The Advance Optima features one housing, a single system controller module, one user interface and multiple analyzer modules. All these analyzer modules have the same mechanical and electrical interfaces and plug directly into the standard housing. Other than the analyzer modules, all components are standard throughout the system.

Thermal Conductivity Analyzer Modules Caldos 15 and Caldos 17

The Caldos 15 and 17 analyzer modules measuring principle is based on the differences in the thermal conductivity between gases. Individual gas components are quantitatively analyzed in a binary or quasi binary mixture based on their thermal conductivity.

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Technical Data

Measuring Principle:
Difference in thermal conductivity of various gases

Caldos 15

**Sample Components and Smallest
Measuring Ranges (Examples):**
H_2 in N_2 or air   0...0.3 Vol.-%
SO_2 in N_2 or air   0...1.5 Vol.-%
H_2 in Cl_2 0...0.5 Vol.-%

Calibration:
▌ Zero-point calibration with sample component-free
   process gas or substitute gas
▌ End-point calibration with process gas having a
   known sample gas concentration or with substitute gas

Dynamic Respone:
$T_{90 \text{ typical}} = 10...20$ s, Option $T_{90} < 6$ s

Caldos 17

**Sample Components and Smallest
Measuring Ranges (Examples):**
Ar in O_2 0...2 Vol.-%
H_2 in Ar   0...0.25 Vol.-%
H_2 in N_2 or air   0...0.3 Vol.-%
CH_4 in N_2 or air 0...2 Vol.-%
Ar in N_2 97.5...100 Vol.-%
He in N_2 85...100 Vol.-%

Calibration:
▌ Zero-point calibration with sample component-free
   process gas or substitute gas
▌ End-point calibration with process gas having a
   known sample gas concentration or with substitute gas
▌ Simplified calibration with standard gas avoids the
   need for separate zero- and end-point calibration with
   test gases
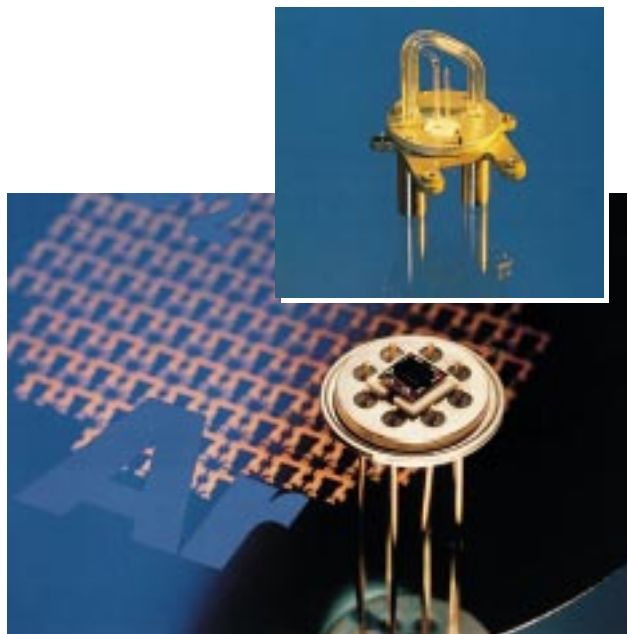▌ Automatic calibration via built-in pneumatic module

Dynamic Response:
$T_{90} \leq 2$ s

The **Caldos 15** is designed for highly corrosive applications. The resistors in the measuring cell are glass-coated making the analyzer resistant to corrosive gases. Caldos 15 is ideal for measuring hydrogen in chlorine with a flowing reference gas, sulfur dioxide in smelter off-gas or ammonia dissociation. Since the Caldos is not sensitive to variations in sample gas pressure, no pressure correction is required.

Using a silicon-based sensor, the **Caldos 17** can measure extremely low ranges. In addition, the micro-structure of the cell gives the Caldos 17 a very short T_{90} response time. An extremely stable span point means that the Caldos 17 remains stable over long periods and allows calibration with only one test gas. Typical applications for this thermal conductivity module include hydrogen purity measurement, turbo generator monitoring, inert gas monitoring as well as LEL monitoring.

The thermal conductivity analyzer modules Caldos 15 and 17 can also be used in hazardous areas when installed in an explosion-proof housing (EEx d). The standard unit is certified for Class I, Division 2 hazardous areas.

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