Description

Unlike other methods of operation the calorimetric principle of FlowVision Flow monitoring systems, which relies upon heat dissipation measured between two sensors, can be used to monitor the rate of flow of almost all media capable of moving through a pipeline, irrespective of their electrical conductivity, density, viscosity and contamination, and within a wide range of temperatures and pressures.
For accuracy of operation, calorimetric flow monitoring systems must convert a specific flow rate into a consistently equivalent voltage. To meet this requirement, FlowVision monitoring heads are equipped with two sensors, one of which is used as a temperature reference.
FlowVision monitoring heads are sophisticated high-precision sensors. Approximately parallel temperature response curves of the sensors are ensured by keeping the thermal contact resistances as small and constant as possible: the more parallel the temperature curves of the two sensors, the lower the temperature drift.

Two alternative calorimetric methods are employed in FlowVision designs:

CP (Constant Power) method: The calorific power of the body is kept constant. The volume flow is determined by measuring the temperature difference between the two sensors. All FlowVision Flow Monitors type SW and FS are based on this method.

CTD (Constant Temperature Difference) method: The temperature difference between the two sensors is kept constant. The volume flow is determined by measuring the calorific power. The calorimetric monitoring heads of the FlowVision Flow Meter FC01 models are based on this method.

System properties as a function of above methods:

Property	**CP method**	**CTD method**
Response	medium	fast
Temperature drift	medium	low
Safe from overtemperature	max. medium temperature	yes
Power consumption	high	medium
Resolution	good	very good

Benefits of the FC01 family

- Customer specific adjustment
- Measurement of flow velocity
- Measurement of volume flow
- Measurement of mass flow
- Totaliser function
- Temperature measurement
- Peak detector for flow velocity and temperature
- Limit value monitoring of flow and temperature
- Scalable analogue outputs
- Frequency output for external totaliser
- Error indication
- Free measured-value scaling
- Measured-value filter
- Ease of monitoring head installation
- Ease of monitoring head replacement
- Prefabricated cables for Ex monitoring heads available on request
- Uncomplicated connection by means of clamping connectors
- Protected from unauthorised access to configuration and parameter data
- DC or AC 24 V supply
- Analogue outputs: voltage or current outputs
- Signal outputs: relay or transistor outputs
- Temperature difference: ΔT of calorimetric monitoring heads CST, CSP and CSF

	all FC01 (without FC01-Ex)	FC01-Ex
liquids	ΔT = 10 Kelvin	ΔT = 3.5 Kelvin
gases	ΔT = 23 Kelvin	ΔT = 10 Kelvin

Advantages of the calorimetric measuring principle

1. Widespread applications: Suitable even for highly contaminated liquids, slurries, solid matters, powdered and granular media, gases and vapours. Once adjusted to the applicable media, the switching point need not be readjusted.
2. Invasive measurement
3. It is a local flow-proportional procedure. Generally, it is not the average velocity that is measured.
4. High dependability: No moving parts in the flowstream, no wear, maintenance-free.
5. Mass flow measurement.
6. High resolution.
7. Wide dynamic range: > 100:1.
8. High repeatability.
9. Independent of viscosity, electrical conductivity.
10. Wide pipe diameter range.

Typical applications

- Process control
- Climatic engineering
- Power plants
- Water supply
- Compressed-air supply
- Process engineering
- Automotive systems
- Mechanical engineering – cooling systems, protective gas

Operating principle