1. Product Introduction

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FlexCOR™ coriolis mass flowmeters measure flow in kilograms or pounds. The measurement is independent of changes in process conditions such as temperature, density, pressure, viscosity, conductivity and flow profile.

FCI FlexCOR™ mass flowmeters are for the direct measurement of:

- Mass flow rate
- Total mass
- Density
- Temperature
- Volumetric flowrate
- Total volume
- Fraction flow
- % fraction (e.g. °Brix)
- Total fraction

Typical applications are found in all industries. E.g.:

- Water industry: Dosing of chemicals for waste water treatment.
- Food industry: Dairy products, beer, wine, soft-drinks, fruit juices and pulps.
- Chemical industry: Detergents, pharmaceuticals, acids, alkalies.
- Automotive industry: Fuel injection nozzle testing, filling of a.c.units, ABS brake test.
- Other industry: Filling of gas bottles, furnace control for district heating, paper pulp.

FlexCOR™ mass flowmeters are characterised by simplicity:

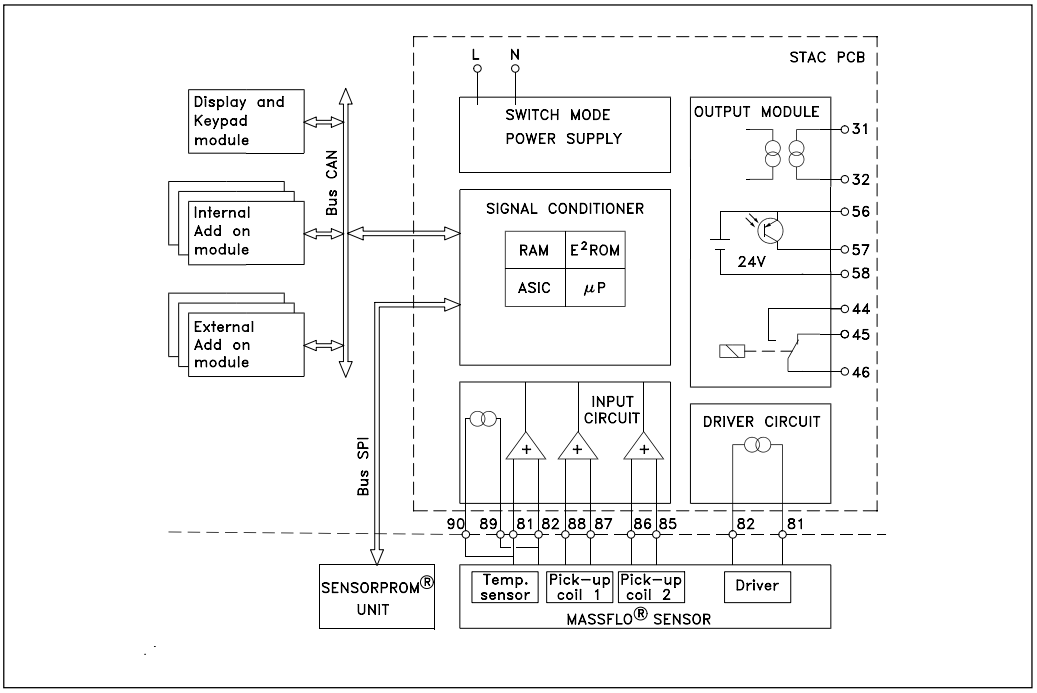
⇒ Simple to install
⇒ Simple to commission
⇒ Simple to operate
⇒ Simple to maintain

The unique **SENSORPROM® flow memory unit** contains sensor data and signal converter settings. The unit is located on the connection board for the signal converter. Immediately on starting, the signal converter uploads the calibration data and factory settings matching the sensor and commences measurement. All customer application settings are retained in the SENSORPROM® unit. If the signal converter is replaced, the new converter will upload all previous settings and resume measurement without any need for reprogramming.

⚠ Documentation needs to be consulted.

⚠ The user shall be made aware of that, if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1.1 Mode of operation



The flow measuring principle is based on the Coriolis law of movement. The flowmeter consists of a sensor and a transmitter.

Sensor
The sensor is energized by the driver circuit which oscillates the pipe at its resonant frequency. Two pick-up's, 1 and 2 are placed symmetrically on either side of the driver. If liquid or gas flows through the sensor, the Coriolis force will act on the measuring pipe and cause a pipe deflection which can be measured as a phase shift on pick-up 1 and 2.

Transmitter
The transmitter consist of a number of function blocks which convert the sensor signals into flow readings.

Driver circuit
This module excitates the sensor at its resonant frequency. The amplitude of the driver signal is automatically regulated via a "Phase Locked Loop", to ensure a stable output from the 2 pick-up's.

Power supply
2 different types of power supplies are available. 12 - 24 V a.c./d.c. or a 115 - 230 V a.c. switch mode type.

Input circuit
The flow proportional signal from the 2 pick-up's is conditioned in this circuit to a digital signal for further signal processing. The temperature output from the sensor is measured with a current loop and an optional amplifier in a wheatston configuration. The temperature signal is also converted into a 32 bit digital format.

Digital signal processor
The signals from the 2 pick-up's, the temperature measurement and the driver frequency is converted into flow proportional signals used for calculation of mass flow, volume flow, fraction flow, temperature and density. Inaccuracies in the signal converter as a result of long-term drift and temperature drift are monitored and continously compensated for via the self-monitoring circuit. The analog to digital conversion takes place in an ultra low noise ASIC with 23 bit signal resolution. The dynamic range of the signal converter is thus unsurpassed, with a turn down ratio of min. 3000:1.

CAN communication. The signal converter operates internal via a internal CAN communication bus. Signals are transferred to/from a signal conditioner to the display module, internal/external option modules and the dialog module.

Dialog module. The display unit consist of a 3 line display and a 6 key keypad. The display will show a flowrate or a totalizer value as a primary reading.

The output module converts flow data to an analog, a digital and a relay output. The outputs are galvanically isolated and can be individually set to suit a particular application.