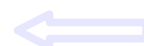
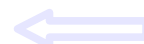
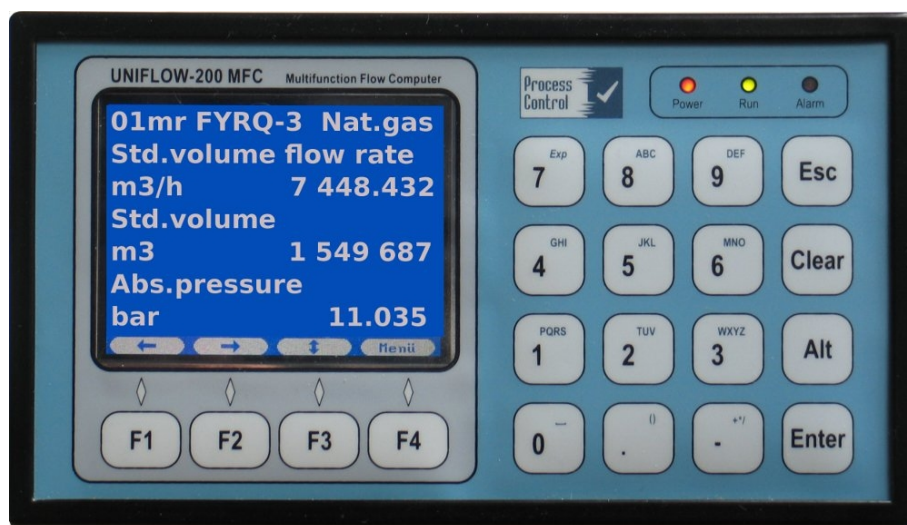


UNIFLOW-200 MFC

Multifunction – 8+4 in 1 – Flow Computer



Cost effective flow measurement without compromise

Whatever the fluid and the flow meter – UNIFLOW calculates it all

Ideal platform for even the most demanding applications

Advanced measurement technology, fast digital signal processing, versatile data communication, high capacity storage, user friendly operator interface

- Measures 8 fluid flows in closed conduits simultaneously according to international standards and recommendations
- Provides 4 additional station totalizations
- Calculates the physical properties of more than 30 fluids (gases, liquids and steam) including the properties required for energy flow calculations
- Can be used with a very wide range of flow meters
- Calculates the CO₂ emission
- Cost effective process applications, ideal solution for custody transfers and fiscal measurements
- Redundant metering systems can be implemented at a moderate cost
- Hourly metering data archives for 400 days
- New methods and fluids implementation on request in short term
- U200ToolBox software for configuration support

Measure reliably!



UNIFLOW-200 MFC Multifunction Flow Computer

probably the most flexible flow computer in the world

Process Control Kft has been developing and manufacturing flow computers since more than 20 years. With more than one thousand successful applications it enjoys solid reputation from its customers. Our mission from the very beginning has been to develop and manufacture state-of-the-art, user friendly, highly reliable and cost effective flow computers, flexible enough for a wide range of applications and to provide additional benefits to the end user as compared to similar products available on the market. Our flow computers are equally at home in the oil and gas, power generation and chemical industries, in food and pharmaceutical industries etc.

8 in 1 FLOW COMPUTER

UNIFLOW-200 MFC represents the next generation of flow computers incorporating more than 20 years of experience in development and manufacturing. UNIFLOW-200 incorporates improved hardware and software capabilities to match the large variety of requirements for flow computer functionality in the markets. Whatever the flowing fluid, liquid, gas or steam, whatever the flow meter, orifice, turbine meter, ultrasonic meter or any other, UNIFLOW-200 offers unpaired capabilities and flexibility in flow measurement. It helps to improve process efficiency and to reduce operating costs.

One single UNIFLOW-200 can measure 8 fluid streams simultaneously so that it replaces 8 single stream flow computers in one case. It can remarkably reduce the CAPEX and OPEX costs. Any change in the existing metering applications or any new application can be implemented easily, quickly and cost effectively in the UNIFLOW-200.

UNIFLOW-200 provides the total solution for flow measurement as a stand alone flow computer. Versatile communication protocols ensure easy integration with complex SCADA/HMI systems.

It also gives you the peace of mind knowing that, whatever your future requirements the UNIFLOW-200 can be adapted quickly, easily and cost-effectively.

Modular multi-run and multi-station design

- eight meter runs
- four station totalizations
- user configurable meter runs

The UNIFLOW-200 MFC was specifically designed for hydrocarbon gas and liquid flow measurement. The standard features of the instrument make it ideal for fiscal measurement and custody transfer. However, it is cost effectively applicable for process applications as well. The accurate flow calculation helps in process optimization.

The flow computer has the EC-type examination certificate from the Hungarian Office of Measure (OMH) according to the Directive 2004/22/EC (MID) as a gas volume conversion device. The flow computer is OIML R117 compliant. It is certified for custody transfer measurement of liquids, like crude oil and refined products.

The UNIFLOW-200 can be used for single or multi-run applications up to eight meter runs. In a multi-run system different types of fluids can be assigned to different meter runs. For example the operator can configure two runs for gas and three runs for liquid process media. In addition four virtual meter runs can be configured, as station totalizers. They can for example summarize flows in parallel meter runs, or can subtract one meter run flow from the other. Based on the input and output flows, calculation of efficiency for a given part of the technology can be implemented.

Set up of material and energy balance calculations is equally easy.

UNIFLOW-200 is ideal for example for a gas engine CHP plant efficiency calculation as it can measure not only the gas, steam and water flows but the electrical power as well.

Every meter run can be configured with different types of flow meters.

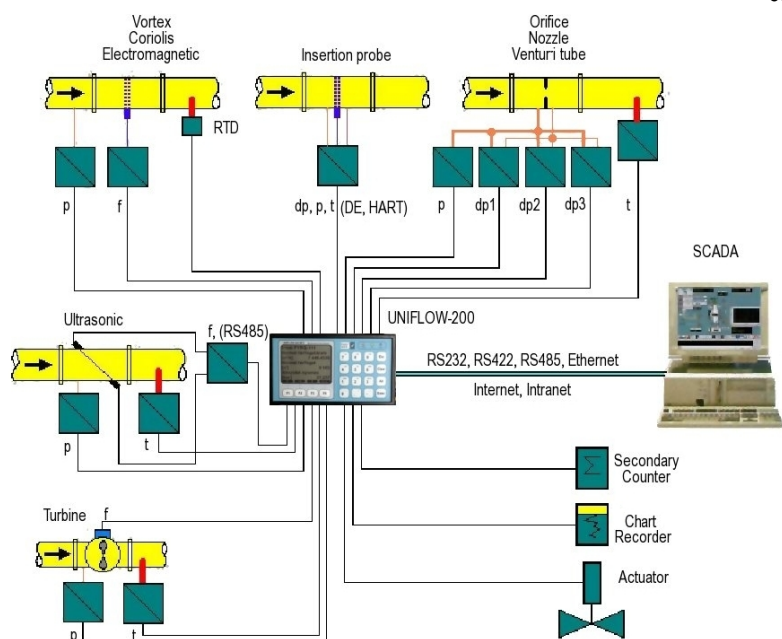
The entire configuration can be done using the instrument display and keypad, or by means of a PC based parameter configuration software (U200ToolBox). The configuration is simple and straightforward. No special programming skill or knowledge of a special programming language is required. The operator simply selects the built-in features required for the particular application.

Supported fluids

- hydrocarbons
 - natural gas, coke oven gas, blast furnace gas, crude oils, refined products
- Industrial gases
 - air, nitrogen, oxygen, argon, hydrogen, carbon-dioxide, carbon-monoxide, propane, ethylene, ammonium, synthesis gas for ammonium, hydrogen reach natural gas, general gases
- Liquids other than water
 - ethanol, MTBE, ETBE, general liquid
- Water, water steam, water-glycol mixture - energy flow (heat transfer) calculation

Supported flow meters

- orifice, Venturi tube, nozzle, V-Cone, Annubar, Vortex, turbine, positive displacement, ultrasonic, electromagnetic, Coriolis



Wide range of flow calculation standards

- ISO, AGA, EN, GOST, ASTM

The UNIFLOW-200 MFC software includes most of the standards widely used in the flow measurements in different countries.

For differential pressure devices the operator can select:

- ISO 5167 (edition 1991, 1998 and 2003),
- GOST 8.563-97, GOST 8.586-2005, or
- V-Cone meter, Annubar meter according to the manufacturer's method.

Natural gas properties calculation includes:

- compression factor calculation according to AGA8 (edition 1985 and 1992) detailed and gross methods, GERG 91, AGA NX19, GOST 30319,
- heating value, relative density and base density calculation according to ISO 6976 (edition 1995),
- dynamic viscosity and isentropic exponent calculation according to GOST 30319.

The gas composition for the natural gas properties calculation can be

- read on-line from a gas chromatograph,
- downloaded from a supervisory system, or
- set as fixed value.

Properties calculation for most popular industrial gases (air, nitrogen, oxygen, argon, carbon-dioxide, carbon-monoxide, hydrogen, propane, ammonium, ethylene, other gases) are also included.

Crude oil and refined product temperature and pressure volume correction factor calculation includes:

- ASTM D1250/API 2540 Tables 54A, 54B, 54C,
- API MPMS Chapter 11.2.1M and 11.2.2M.

Liquids other than water includes ethanol, ETBE and general liquid.

Water and water steam properties are accurately calculated according to IAPWS-IF97 publication.

The UNIFLOW-200 MFC is a Gas-volume electronic conversion device complying with EN 12405 and OIML R140.

The UNIFLOW-200 MFC is approved as Calculator for Dynamic measuring system for liquids other than water according to OIML R 117-1.

The UNIFLOW-200 calculates the CO₂ emission for gaseous and liquid fuels according to 2004/156/EC and IPCC 1996. The CO₂ emission reporting is simplified to the reading of the appropriate counters from the flow computer at the end of a reporting period.

Any type of flow meter is welcome:

- pressure differential devices,
- ultrasonic meters,
- turbine and Vortex meters,
- mass flow meters,
- and many more.

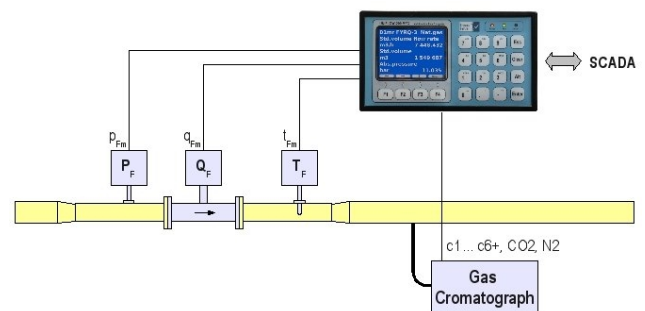
The UNIFLOW-200 MFC can be configured to perform the flow calculation for a very wide range of flow meters.

Besides the standard differential pressure devices (orifice plate, nozzle, Venturi tube according to ISO 5167) other devices such as Annubar, V-Cone, segmental orifice plate, or a flow meter with power characteristics (e.g. Parshall flumes) can also be configured.

The flow calibration data (flow coefficient vs. flow rate) can be entered for non-standard devices.

For gas flow metering devices with pulse output (turbine meter, Vortex meter) dual pulse input is provided. The continuous comparison of the main and check pulse trains allows instant detection of turbine meter blade damage.

Pulse integrity check according to ISO 6551 level B is provided for liquid turbine meters.



Natural Gas Flow Measurement with Ultrasonic Meter

Ultrasonic meters can be connected to the flow computer via pulse input like a turbine meter. It is also possible to use the serial link to acquire the flow information from ultrasonic meters. The ultrasonic meter is inherently bidirectional and therefore the UNIFLOW-200 distinguishes the forward and reverse flows and displays and totalizes them in separate runs.

Error curve correction is available for the flow calibrated flow meters.

The error correction method can be

- linear interpolation with up to 16 error curve points, or
- polynomial interpolation with up to 6th power.

The log(flow rate/viscosity) vs. K-factor error curve correction is also available for liquid turbine meters.

Flexible process connections

- galvanically isolated I/O points
- trouble-free, no potentiometers, no batteries
- input and output software calibration

The UNIFLOW-200 MFC can accommodate up to 5 I/O boards. Different combinations of analog, PRT, pulse and digital inputs, analog, pulse and digital outputs make the UNIFLOW-200 MFC suitable to solve any flow measurement problem. The input and output channel assignment is freely configurable. Different meter runs can share the signal output of the same transmitter. Several output channels can be assigned to the same variable (e.g. flow rate), if different interfacing systems require independent output channels.

All input and output channels are galvanically isolated and protected against overvoltage and miswiring (short circuit and overload). No earthing problem in the current input loops.

Resistance thermometers are connected to RTD inputs using the 4-wire connection method. In case of individually calibrated sensors the flow computer converts the measured resistance to temperature using the Calendar Van Dusen A, B, C and R0 constants.

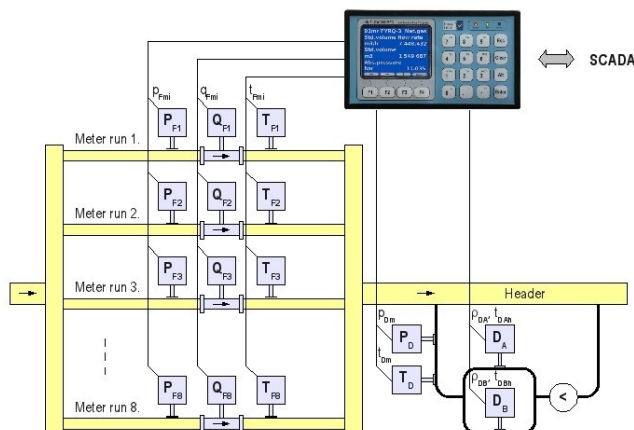
High frequency inputs can receive pulse or frequency signals from flow meters. They can be configured for density transducers, too. The input signal level is software selectable from NAMUR, active 5 V, active 15 V or open collector.

Digital inputs can be used to signal the status of any dual state device, e.g. on/off valves. It also accepts low frequency (max. 50 Hz) pulse signals from flow meters (e.g. positive displacement meters).

Digital outputs can be configured as:

- pulse output representing flow totals,
- alarm output signaling high or low limit of any input channel or flow rate,
- control output to open or close valves for example,
- repeat the change of state of any digital input, or
- time base.

The NO or NC state of the digital output is selectable.



Measuring System for Custody Transfer
Crude Oil or Refined Products

Smart interfaces for smart instruments

- HART and Honeywell DE transmitter protocols
- serial interfaces for gas chromatographs and ultrasonic flow meters (Modbus, Instromet US meter protocols)

The UNIFLOW-200 MFC is capable to receive flow rate, pressure, differential pressure and temperature signals from smart transmitters according to HART and Honeywell DE protocols, eliminating this way the uncertainty related to D/A and A/D conversion in the transmitter and in the flow computer.

The UNIFLOW-200 is prepared to poll process gas chromatographs (Daniel, Yamatake) for on-line gas composition data. It is also prepared for the on-line gas properties calculation, further improving the accuracy of the flow and energy content calculation.

The UNIFLOW-200 is able to interface with flow metering devices (e.g. ultrasonic meter) via serial link. It allows not only the acquisition of flow information (uncorrected volume flow rate) digitally, but makes it possible to read and display the diagnostic information from the flow meters as well. There is no need to run special service software to check the ultrasonic meter; its correct operation (its "health status") can be checked any time using the display of the flow computer.

The UNIFLOW-200 has built-in protocol for Sick, Instromet, Daniel, Siemens, Flexim and Panametrics ultrasonic meters.

Excellent communications

- multiple RS232/RS485/RS422 serial ports up to 38 400 bit/sec
- 10/100 Ethernet port
- USB port

The UNIFLOW-200 MFC offers three serial ports. Each of them can be independently configured for point to point or for multi-drop communication (RS232 or RS422 or RS485). The selectable protocols include standard Modbus and Daniel/Enron/Omni Modbus versions as well. Serial ports are galvanically isolated and protected against overvoltage and miswiring.

The Ethernet 10BaseT interface makes use of the Modbus/TCP protocol for flexibility and network connectivity. The built-in web server (coming soon) makes the remote access to the flow computer data very convenient from any point of the LAN or WAN.

The USB port allows the operator to transfer the archive data file into a pen drive within seconds and to analyze the data using the office PC.

- User friendly operator interface**
- configurable 3.5" QVGA display
 - foil protected membrane keyboard
 - configuration software

The UNIFLOW-200 MFC keypad contains 12 numeric keys, 4 keys for data editing and 4 multifunctional navigation keys. Visibility of the bright 320x240 dot QVGA display is excellent in any light conditions. The color display can show the trend of any measured or calculated variable.

The tree structured menu allows the operator to display any parameter by only a few keystrokes. The most important calculated parameters and totals are grouped together in summary displays. The summary displays are editable. The operator can create his/her own summary displays showing the most important data of the particular application.

Access to the parameters is performed on three different password levels.

The Guest level allows looking at everything but no change in parameters is possible.

The Operator level allows changing some of the parameters (e.g. limits, transmitter ranges).

The Engineer level has full access to any parameter of the flow computer.

The UNIFLOW-200 PC based parameter configuration software (U200ToolBox) allows the user to prepare the configuration offline and download it into the flow computer in few seconds.

Reporting and data archiving

- stored reports
- extensive data archiving
- remote archive uploader
- alarm and event logging

The UNIFLOW-200 MFC's extensive reporting system keeps track of the measurement history organized in different reporting periods. Hourly, shift, daily, multi-day and monthly reports are stored in the non volatile memory. Besides the periodic totals, average, minimum and maximum values of the inputs and calculated parameters are stored in the reports.

Archived data can be called up on the display, can be printed out using the serial link, can be copied to the pendrive via USB port and can be transferred by means of the U200ToolBox software.

Alarms are stored with time stamps in the alarm file.

Any modification of the flow computer parameters is recorded in the event file.

Gas composition data downloaded from a supervisory system or read from a gas chromatograph are recorded as well.

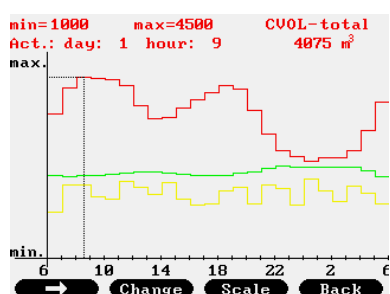
The alarm, event and download archives can be called up on the display, can be copied to the pendrive and can be uploaded to a PC for further investigation. The storage capacity (500 MB) allows archiving metering data, alarms and event log for 400 days.

01.Str. Natural gas 1	
CVOL	243 941 m ³
CVOL flowrate	56 916.0281 m ³ /h
Abs. pressure	7.6660 bar
Temperature	19.3892 °C
Current day CVOL	243 938 m ³
02.Str. Natural gas 2	
CVOL	226 136 m ³
CVOL flowrate	65 958.0000 m ³ /h
Abs. pressure	8.9378 bar
Temperature	21.7300 °C
Current day CVOL	226 136 m ³
2009.06.22. 13:39:45	
Menu	

01.Str. Natural gas 1	
CVOL	256 522 m ³
ENERGY	9 687 GJ
CVOL flowrate	60 627.3477 m ³ /h
Abs. pressure	7.6668 bar
Temperature	19.3798 °C
Temp. at '+' side	19.3798 °C
Inuse diff.press.	344.0794 mbar
Relative density	0.5548
Base density	0.6798 kg/m ³
Line density	5.1292 kg/m ³
Inf.cal.value	34.0051 MJ/m ³
Sup.cal.value	37.7705 MJ/m ³
2009.06.22. 13:53:08	
← → ↕ Menu	

The screenshot shows the UNISetup software interface. The top window is titled 'UNISetup Version 1.0.8.0' and shows 'Project' and 'current project: [ayxc]'. Below it are 'IO Board setup' options for IO Board 1 through 5, each with a 'Setup' button and a dropdown menu. The 'General parameters' section has a 'Setup' button. The 'Stream parameters' section has a 'Setup' button and a 'Physical stream' dropdown. A sub-window titled '1 IO Board - ani8' shows 'ANi8 signal parameters' with fields for Channel, Signal name, Signal type, Unit, Transmitter type, LO_current, HI_current, and LO_scale. Another sub-window titled '1 Stream parameters - FOLDGÁZ' shows 'Stream setup' with tabs for Fluid, Flow meter, Stream setup, and Premium limits. The 'Stream setup' tab is active, showing 'Fluid selected: natural gas', 'Units: Total, Flow', 'Volume: m3, m3/h', 'Mass: kg, kg/h', 'Energy: GJ, GJ/h', 'Flow meter: gas turbine', 'Flow signal: measured', 'Flow signal: 2 IO, 1 ch.', 'Check signal: no', and 'cut off: 0.000000 %'.

01. Natural gas 1	
CVOL	
[m ³]	281 658
CVOL flowrate	
[m ³ /h]	60 631.6016
Abs. pressure	
[bar]	7.6676
Menu ↓ ↑	



Contact the manufacturer if you need any assistance.

Phone +36/1-215-4161
 Mobil +36/20-9452477
 Fax +36/1-215-6730
 Email info@processcontrol.hu
 Web www.processcontrol.hu

Menu

SPECIFICATIONS

Analog inputs

Symmetrical inputs with galvanic isolation	
Input range	0/4-20 mA *
Accuracy	+/- 0,02 %
Input voltage drop	5 V max.
Potential diff. among inputs	50 V max.

4-wire RTD inputs

Sensor type	Pt100 ** standard or individually calibrated
Accuracy	+/- 0,1 °C
Maximum loop resistance	500 ohms

Pulse-frequency input (including NAMUR)

Signal processing	without loss of pulses
Frequency range	0 ... 10 000 Hz
Input signal level	2 V ... 10 V
Signal form	square, unipolar
Inaccuracy of freq. meas.	0,001 % max.

Digital inputs

Potential-free contacts, open collector (transistor) and 24 VDC inputs can be accepted and used as static inputs, or pulse inputs (frequency: 50 Hz max., 50 % fill in ratio) without any further activity required from the user
Potential-free inputs are supplied with power from the circuit board (15 VDC, 6,8 kohm)

Analog outputs

Output channels with individual galvanic isolation	
Output range	0/4-20 mA *
Resolution	12 bits
Load	500 ohm max.

Digital outputs

Galvanically isolated open collector (transistor), overvoltage- and overcurrent-protected outputs
Load 100 mA, 40 Vdc max.

Field bus inputs

HART	point to point or multidrop connections using HART protocol complete with 24 Vdc power supply
Honeywell DE	Single or Multivariable transmitters using the DE protocol, complete with 24 Vdc power supply

Digital communication

RS232/RS422/RS485*	
Baud rate	1200 ... 38400 bit/sec*
Protocol	Modbus (RTU, ASCII)
Length of cable	RS232 15 m max. RS485/422 1200 m max.
10 / 100 Ethernet	RJ45
Protocol	Modbus TCP
USB	USB 1.1 for data saving to pendrive

Operator Panel

3,5" QVGA (320 x 240) backlit TFT color LCD display
Foil protected membrane keyboard

Uncertainty

Calculated data, pulse outputs:	
Under reference conditions	less than +/- 0.05 %
In the 0...50 °C temperature range	less than +/- 0.1 %

Environment

Operating temperature	-10 ... 50°C
Operating humidity	0 ... 90 % non-condensing
Storage temperature	-25 ... 70°C

Power Requirements

Dual power input with automatic switch over	
Power inputs	230 (110) Vac +10 %, -15 %, 50-60 Hz 24 Vdc (20 ... 35 V)
Power consumption	25W max.
Transmitter power	1 x 24 Vdc, 200 mA max.

Dimensions

Panel cut-out	186 mm W x 91 mm H
Case depth	260 mm
Front panel	195 mm W x 110 mm H
Weight	4,3 kg

Compliances and certificates

EN 12405, OIML R117, OIML R140,
EC-type certificate,
Available with European CE Mark.

Standards used in the calculations

Flow meters	ISO 5167 (1991, 1998, 2003), EN 12405, GOST 8.563
Gas	AGA 8 (1991, 1998), ISO 6976, GERG 91, NX19, PTZ, GOST 30319
Oil	API 2540, API 11.2.1M, API 11.2.2M
Water, steam	IAPWS-IF97

I/O moduls ***

ANI8	8 ch 4-20 mA
PT4	4 ch Pt100 **
ANI4PT2	4 ch 4-20 mA, 2 ch Pt100 **
PDIO484	4 ch pulse input, 8 ch digital input 4 ch digital output
AODIO484	4 ch 4-20 mA output, 8 ch digital input 4 ch digital output
HTI4x15	4 loops to scan 15 HART PV/loop (multidrop) or 4 pcs HART transmitters (point to point), using HART protocol
DE4	2 pcs multivariable, or 4 pcs single transmitters using DE protocol

Supported flow meters

orifice, Venturi tube, nozzle, V-Cone, Annubar, Vortex, turbine, positive displacement, ultrasonic, Coriolis

Supported fluids

hydrocarbons:	natural gas, coke oven gas, blast furnace gas crude oils, refined products
Industrial gases	air, nitrogen, oxygen, hydrogen, argon, carbon-dioxide, carbon-monoxide, ethylene, ammonium, propane, synthesis gas for ammonium, hydrogen reach natural gas, general gases.
Liquids other than water:	ethanol, MTBE, ETBE, general liquid
Water, water steam,	water-glycol mixture - energy flow (heat transfer) calculation

* software selectable
** optionally Pt500 or Pt1000 is also possible
*** one UNIFLOW-200 MFC can accommodate up to 5 I/O boards in any combination