FlowCalc™ Flow Computer

FlowCalc™ Advantage:

- Flexible design with power and communication options to meet site needs
- Custody compliant
- Local data logging capabilities
- Advanced diagnostic software can continually monitor and verify the meter's primary flow element health and confirm output uncertainty
- Advanced diagnostic software can reduce need to re-calibrate resulting in less time spent on site
- User configurable for multiple differential pressure primary flow elements. Such as: orifice, venturi, flow nozzle, wedge, cone
- Push button interface
- Volumetric or mass flow monitoring of most liquids, gases, and steam
- Mass flow equations - real gas, ideal gas, AGA 8, API 2540
- When used in conjunction with VorTek Instruments' VorCone™, FlowCalc can provide a measurement of fluid density, volumetric flow rate and mass flow rate without any fluid information being required from an external source
- When used in conjunction with VorTek Instruments' VorCone™, FlowCalc can provide a reliable steam quality (steam dryness) measurement as well as mass flow measurement.
- When used in conjunction with VorTek Instruments' VorCone™, FlowCalc can calculate the density of changing gas mixtures. For example, natural gas is typically a composition of many different gases which can vary over time and vary by application
- Energy Monitoring–ability to compute and output energy consumption with select fluids. Steam, water, and heat transfer fluids
- Low power
- Modbus, BACnet, Power over Ethernet (PoE) communications available
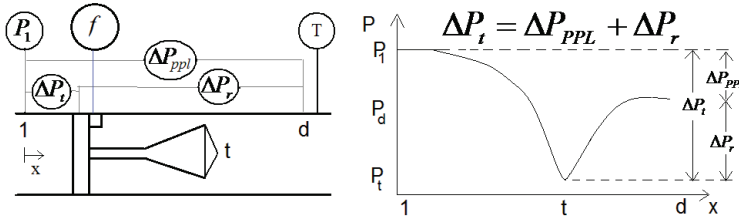- HART protocol communications – Standard
- Approvals pending

VorTek Instruments' FlowCalc flow computer is a field mounted flow computer which can be used for liquid and gas applications, including custody or non-custody measurements. FlowCalc is the most powerful flow computer of its kind and represents some of the latest advancements in operation, performance, and modularity.

FlowCalc has been designed to meet the requirements of a wide variety of specialized industries using a single hardware platform thus reducing spare parts requirements, training and calibration costs, and lowers the overall cost of ownership.

When used for differential pressure applications, advanced diagnostic software is able to continually monitor and verify the meter's primary element health and confirm output uncertainty.

The FlowCalc product line is available with a wide range of options and configurations to meet your specific application requirements.
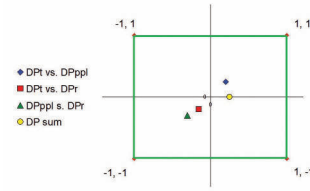
VorTek INSTRUMENTS

Differential Pressure Verification System – DP Health Check™

DP Health Check is a comprehensive verification system for Differential Pressure (DP) meters. Utilizing a third pressure port downstream of the DP meter and reading three DPs, DP Health Check analyses not just the traditional single DP reading, but the entire pressure field. The additional information expands the capability of the DP meter, offering a full diagnostic suite. DP Health Check creates a smart DP meter allowing for condition based maintenance operations.
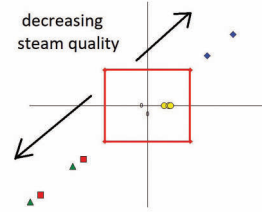

$$\Delta P_t = \Delta P_{PPL} + \Delta P_r$$

Fig 1. DP Health CheckTM Ready Cone DP Meter and Associated Pressure Field

Fig 2. Display for Correctly Operating Meter

Fig 3. Display for Varying Quality Saturated Steam Flow
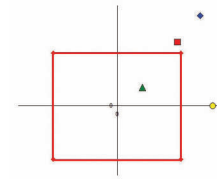

Fig 4. Display for Drifting DP Transmitter

DP Health Check creates seven diagnostic checks, i.e. one DP integrity check, three separate inter-comparible flowrate predictions, and three DP ratios comparible with the baselines. The HMI (human-machine interface) is designed for simplicity: the seven diagnostics are plotted as four points on a graph with a 1x1 box. All points inside the box shows the meter is functioning normally (see Fig 2). Any points outside the box shows a potential metering issue. Figs. 3 and 4 show response to varying saturated steam quality and single phase DPt reading error resectively. Pattern recognition technology allows the source of the problem to be directly identified

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Specifications

Ambient Temperature
Ambient Operating: -40 to 140°F (-40 to 60°C)
Ambient Storage: -40 to 185°F (-40 to 85°C)

Power Requirements
DCH option: 12-36 VDC, 300mA, 9W max
DCHPOE: 12-28 VDC or Power over Ethernet, 5 Watts maximum

Display
Alphanumeric 2 line x 16 character LCD digital display Six pushbuttons for full field configuration Pushbuttons can be operated with magnetic wand without removal of enclosure covers Display can be mounted in 90° intervals for better viewing

Input Signals
4-20mA (Flow, Pressure, Temperature)
Pulse
Frequency
RTD (Ohm)
Modbus
BACnet

Output Signals
Analog: 4-20 mA (Volumetric flow, mass flow, density, pressure, temperature)
Alarm: Solid state relay, 40 VDC
Totalizer Pulse: 50 millisecond pulse, 40 VDC
Volumetric or Loop Powered Mass: One analog, one totalizer pulse, HART
Multivariable option: Up to three analog signals, three alarms, one totalizer pulse, HART
Multivariable option: Modbus or BACnet process monitoring

CPU
Type: 32 bit 250 MHz
Flash: 8 MB
RAM: 64 MB DDR2

Approvals
Pending

Model Number Information - FlowCalc™ Flow Computer

Parent Number Code	FC	Flow Computer

Feature 1: Multivariable Options

VEI	External Flow Input
VEIET	External Flow Input and External RTD Temperature Input
VEIETEM	External Flow Input, External RTD Temperature Input, External RTD Temperature Input

Feature 2: Input Power

DCH	12-36 VDC, 300mA, 9W max. – use with 1AH, 1AM, 3AH, 3AM	
DCHPOE	12-28 VDC or Power over Ethernet, 5 Watts maximum, required on 1AMIP, 1ABIP, 3AMIP, 3ABIP	*Adds additional input options
AC	100-240 VAC, 50/60 Hz line power, 5W max. – use with 1AH, 1AM, 3AH, 3AM	

Feature 3: Output

1AH	One analog output (4-20 mA), one alarm, one pulse, HART Communication Protocol, DCH or AC option only *
1AM	One analog output (4-20 mA), one alarm, one pulse, MODBUS RTU Communication Protocol, DCH or AC option only *
1AMIP	One analog output (4-20 mA), one alarm, one pulse, MODBUS TCP/IP Communication Protocol, DCHPOE ONLY*
1AB	One analog output (4-20 mA), one alarm, one pulse, BACnet MS/TP Communication Protocol, DCH or AC option only *
1ABIP	One analog output (4-20 mA), one alarm, one pulse, BACnet/IP Communication Protocol, DCHPOE ONLY *
3AH	Three analog outputs (4-20 mA), three alarms, one pulse, HART (VT,VTP only), DCH or AC option only *
3AM	Three analog outputs (4-20 mA), three alarms, one pulse, MODBUS RTU (VT,VTP only), DCH or AC option only *
3AMIP	Three analog outputs (4-20 mA), three alarms, one pulse, MODBUS TCP/IP (VT,VTP only), DCHPOE ONLY*
3AB	Three analog outputs (4-20 mA), three alarms, one pulse, BACnet MS/TP (VT,VTP only), DCH or AC option only *
3ABIP	Three analog outputs (4-20 mA), three alarms, one pulse, BACnet/IP (VT,VTP only), DCHPOE ONLY * *Includes scaled frequency output

Feature 4: DP Diagnostics

	DP	DP Diagnostics Available	*Must select DCHPOE option