

# FlowCalc™ Flow Computer

## Model FC Flow Computer



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.

### 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 option
- Modbus, BACnet, Power over Ethernet (PoE) communications available
- HART protocol communications – Standard
- FM, FMC, ATEX, IECEx Approved



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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, (multiple outputs)

DCHPOE option: 12-28 VDC or Power over Ethernet, 5W maximum (multiple outputs)

### 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

FM, FMC CLASS I, DIV. 1, GROUPS B,C,D  
CLASS II/III, DIV. 1, GROUPS E,F,G  
Type 4X and IP66, T6, Ta = -40 to 60°C  
CSA C22.2

ATEX II 2 G Ex d IIB + H2 T6  
II 2 D EX tD A21 IP66 T85°C, Ta = -40 to 60°C

IECEX Ex d IIB + H2 T6  
Ex tD A21 IP66 T85°C, Ta = -40 to 60°C

### Metal Parts:

Any metal components can be separated and recycled through your local metal recycling facility.

### Packaging Materials:

Recycle or reuse packaging materials such as cardboard or plastics, following local recycling guidelines.

For local disposal sites, refer to:

- Call2Recycle (USA, Canada)
- Earth911 (USA, Canada)
- SERI (International)

In the USA, for more information, visit:

- EPA's battery disposal guide
- EPA's electronics recycling page

By following these guidelines, you help reduce waste and support environmental sustainability.

## Product Disposal Information

To ensure environmental safety and compliance, please follow these disposal instructions for the product and its components:

### Electronic Components:

This product contains electronics that must be recycled through approved e-waste recycling programs. Electronics can contain harmful materials and should be prevented from entering landfills. Do not place electronics in regular trash.



**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.

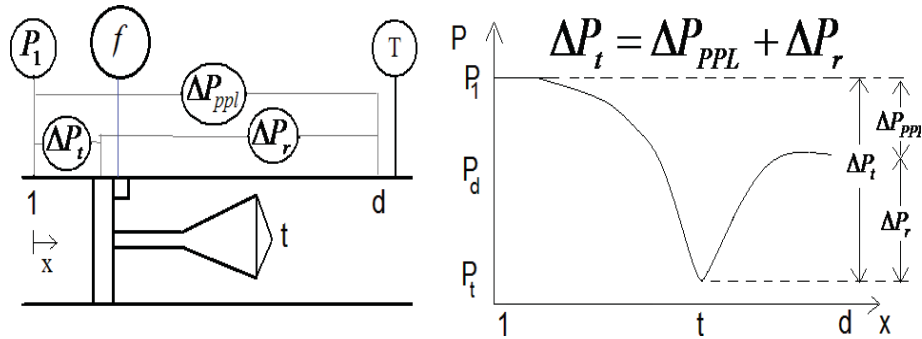


Figure 1 - DP Health Check™ Ready Cone DP Meter and Associated Pressure Field

DP Health Check creates seven diagnostic checks, i.e. one DP integrity check, three separate inter-compatible flowrate predictions, and three DP ratios compatible 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 respectively. Pattern recognition technology allows the source of the problem to be directly identified

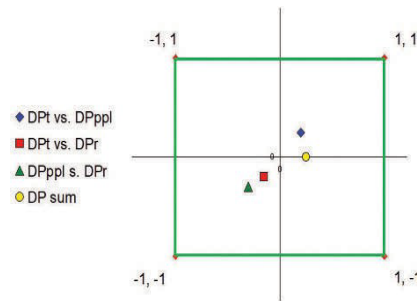


Figure 2 - Display for Correctly Operating Meter

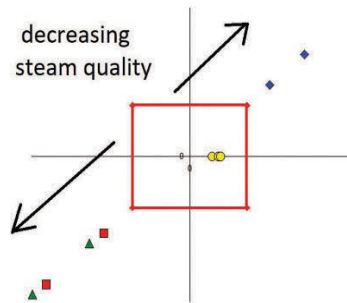


Figure 3 - Display for Varying Quality Saturated Steam Flow

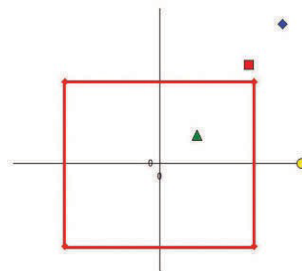


Figure 4 - Display for Drifting DP Transmitter

## Model Number Information - FlowCalc™ Model FC 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, 1AB, 3AH, 3AM, 3AB

**DCHPOE** 12-28 VDC or Power Over Ethernet, 5W max. – required on 1AMIP, 1ABIP, 3AMIP, 3ABIP

**AC** 100-240 VAC, 50/60 Hz Line Power, 5 Watts maximum, 1AH, 1AM, 1AB, 3AH, 3AM, 3AB

### Feature 3: Output

**1AH** One analog output (4-20mA), one alarm, one pulse, HART Communication Protocol, DCH or AC option only \*

**1AM** One analog output (4-20mA), one alarm, one pulse, MODBUS RTU Communication Protocol, DCH or AC option only \*

**1AMIP** One analog output (4-20mA), one alarm, one pulse, MODBUS TCP/IP Communication Protocol, DCHPOE option only \*

**1AB** One analog output (4-20mA), one alarm, one pulse, BACnet MS/TP Communication Protocol, DCH or AC option only \*

**1ABIP** One analog output (4-20mA), one alarm, one pulse, BACnet/IP Communication Protocol, DCHPOE option only \*

**3AH** Three analog outputs (4-20mA), three alarms, one pulse, HART, VT or VTP option only, DCH or AC option only \*

**3AM** Three analog outputs (4-20mA), three alarms, one pulse, MODBUS RTU, VT or VTP option only, DCH or AC option only \*

**3AMIP** Three analog outputs (4-20mA), three alarms, one pulse, MODBUS TCP/IP, VT or VTP option only, DCHPOE option only \*

**3AB** Three analog outputs (4-20mA), three alarms, one pulse, BACnet MS/TP, VT or VTP option only, DCH or AC option only \*

**3ABIP** Three analog outputs (4-20mA), three alarms, one pulse, BACnet/IP, VT or VTP option only, DCHPOE option only \*

\*Includes scaled frequency output

### Feature 4: DP Diagnostics

**DP** DP Diagnostics Available \*Must select DCHPOE option

