



Virtual Flow Computer

On-line flow calculations in Windows[®]

- Unlimited number of streams
- Interface to any field bus or protocol
- OPC Server/Client support
- Certified function block library
- Secured access to office network / Internet
- Very short cycle time
- Graphical editor

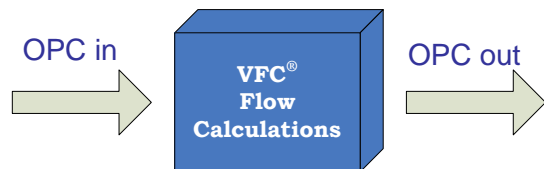
VFC - The flexible and low-cost solution for on-line flow calculations

The **Virtual flow computer** Windows® software program is the next generation in flow computing.

Like the conventional flow computer it can perform volume correction, flow totalization, turbine linearization, meter proving and so on.

The *Virtual flow computer* is by far the most economical option in case of multiple flow measurements (3 or more). It is also a logical consequence of the fieldbus trend in the process industry that will (partially) replace conventional hardwired I/O.

Based on the successful function block concept, already in use for the FC50 series of flowcomputer since 1995, the Virtual flow computer uses a library of proven and certified function blocks to perform its flow calculations.



OLE for Process Control

The *Virtual flow computer* uses the **OPC** interface standard to read in data from the field transmitters and analyzers. Also, all the calculated values (densities, flow rates, totals, etc.) are made available as OPC items that can be read by any Windows-based SCADA, Control, Plant Information and Accounting system.

The *Virtual flow computer*, as opposed to a traditional flow computer, supports an unlimited number of meter runs, so in theory only one *Virtual flow computer* is required for any metering system. It is obvious that a *Virtual flow computer* in combination with distributed I/O or a fieldbus leads to drastic savings in hardware costs, especially for larger metering systems. Because of its independence of hardware, it runs on state-of-the-art computer platforms resulting in far lower cycle times as for conventional flow computers.

Why a Virtual Flow Computer?

The most obvious benefit of a Virtual flow computer exists for systems with a lot of flow measurements for which conventional flow computer hardware requires a significant investment, even in case of multi-stream flow computers.

Besides of this obvious benefit, there are some trends in (fiscal) flow metering that make virtual flow computers also very interesting.

The first trend is that smaller fields are being exploited more and more. In most cases it is uneconomical to apply a flow computer for every flow line. The *Virtual flow computer* system is an attractive alternative, even more because it can be integrated with reservoir engineering and flash calculation software.

A second trend is that the international gas market becomes more and more open and transparent (deregulation). Gas contracts periods shift from long-term (several years) to short-term (down to less than an hour), especially in the U.S.A. and Western Europe. This puts an entirely different demand on the availability of data. Actual flow data have to be sent to a central accounting system far more frequently (e.g. every 5 minutes) and with minimum delay. The fewer layers between the primary transmitter and the accounting system, the better this goal can be achieved.

Because of the more competitive market the need for reduction of the total cost of ownership increases, resulting in a shift of functionality from hardware to software. Software solutions are far more flexible and require virtually no maintenance.

Another trend is that flow meters and transmitters are becoming smarter and are able to communicate in a digital format via a fieldbus, instead of supplying a conventional 4-20 mA signal that required D/A and A/D conversion. So, the need for accurate (expensive) A/D conversion diminishes.

Intelligent flow meters like ultrasonic and coriolis devices calculate flow rates and production totals directly. Instead of adding a flowcomputer to each meter it is often more suitable to use a single *Virtual flow computer* that processes the flow data from all the meters.

What about the hardware?

Traditional flow computers can be directly connected to field transmitters and flow meters. They have a number of on-board provisions that ensure accurate and reliable signal processing. The added value of traditional flow computers is especially visible in

Virtual Flow Computer

dedicated (fiscal) metering skids with conventional transmitters and flow meters, which can be directly connected to the flow computer. The flow computer performs the flow calculations, providing a clean fiscal system boundary.

However flow meters and field transmitters are becoming more **intelligent** and are now capable of transferring their measured values directly in engineering units via a serial communications link, a fieldbus or Ethernet. Connecting these type of transmitters and meters to a traditional flow computer is a cost-ineffective solution since the sophisticated (i.e. expensive) signal processing provisions of such a flow computer have become superfluous.

A more logical and economical solution is to connect these intelligent transmitters and flow meters up to a (industrial) computer with all its benefits. Opposed to a traditional flow computer that can be considered as a black box, an 'ordinary' computer can be equipped with any type of extension board and communication protocol. OPC drivers are now available for virtually any type of fieldbus or proprietary protocol. The Virtual flow computer software acquires the field data through OPC and serves as the central module for all flow calculations in a secure, robust and traceable manner.

In some occasions transmitters and meters are already connected to a process control system (or a DCS) and there is no need to use additional flow computer hardware. By connecting a single (or redundant) computer to this central control system, a low-cost flow computing system is obtained.

In case of many flow measurements it is quite attractive to use distributed I/O systems instead of conventional flow computer hardware. For each of these systems OPC drivers are available which enable the Virtual flow computer to acquire data from the field. For these larger systems, distributed I/O systems are far more cost-effective and, when selected carefully as accurate as flow computer hardware.

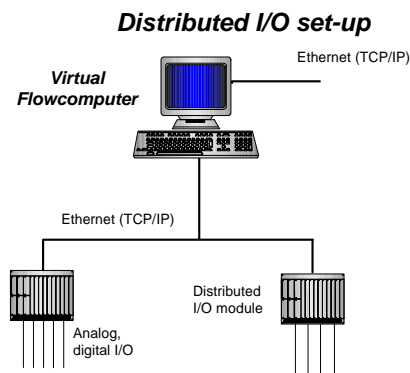
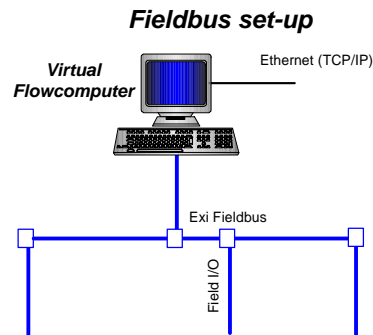
What about stability and security?

The *Virtual flow computer* is a software program. Its stability mainly depends on the operating system and the hardware platform.

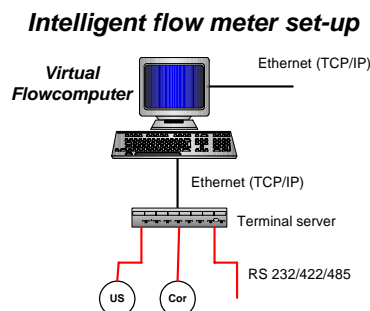
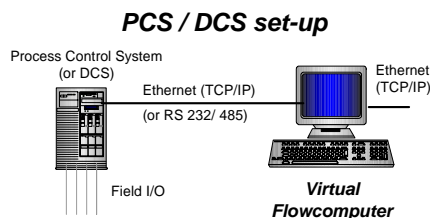
For less critical flow measurements a single desktop computer might be a sufficient platform. When the environment is more harsh an industrial computer can be considered. When high availability of flow measurement is crucial, a redundant industrial computer system is most appropriate.

Virtual flow computer software runs on Windows® 2003/XP, which have proven to be stable operating systems. The extensive security mechanism prohibits unauthorized persons to access the system. On top of that the *Virtual flow computer* provides its own password security mechanism.

Furthermore the *Virtual flow computer* has robust and secure provisions to restore parameter and totalizer values after a restart.

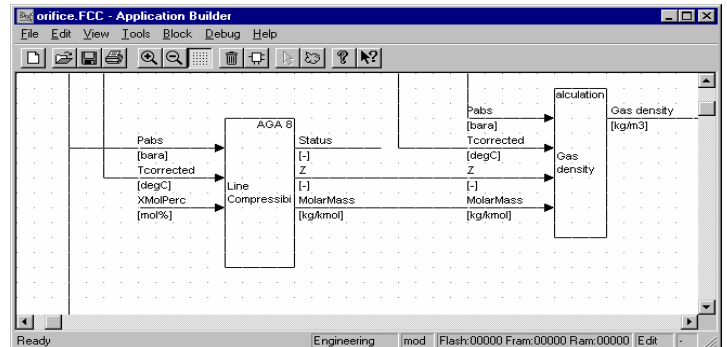


Any combination of set-ups is possible



Benefits

- Cost-effective flow metering solution
- Uses standard hardware
- Requires less hardware
- Easy to adapt and extend
- Easy to integrate
- Reduced maintenance
- Less spare parts



Key features

- On-line flow calculations
- Supports unlimited number of flow measurements
- Interfaces to any fieldbus
- Supports any communication protocol
- No flow computer hardware required
- Cycle time down to 0.1 sec
- Direct access to Office networks and Internet
- NMI certified and flexible function block concept
- Graphical editor
- Acts as an OPC Server (Data Access 2.0)
- Acts as an OPC Client (Data Access 1.0 and 2.0)
- Uses template / binding concept (for easy extension and for standardisation)

KROHNE Oil & Gas

Office address: Minervum 7441, 4817 ZG Breda, the Netherlands

Postal address: P.O. Box 9310, 4801 LH Breda, the Netherlands

Tel: +31 (0)76 711 2000

Fax: +31 (0)76 711 2001

Email: koginfo@krohne-oilandgas.com

URL: www.krohne-oilandgas.com