Spirit™ Flow-X series
High accuracy flow computers
Measurement made easy

The SpiritIT Flow-X is the most accurate and secure flow computer on the market today with a modern design and user interface. It can be used for gas, liquid and steam and provides configurable functionality to control any flow measurement system. Its hardware and software are certified against the most stringent legal metrology standards.
The core is the Flow-X/M module
One module, different enclosures

The core of the SpiritIT Flow-X product family is the Flow-X/M module. One and the same module is used for all enclosures and applications.

Each module is a stand-alone flow computer with its own LCD display and provides sufficient input and output signals to handle any gas or liquid flow meter.

The SpiritIT Flow-X module can be used in several types of enclosures. The different enclosures provide flexibility in the way a SpiritIT Flow-X flow computer can be installed ranging from a control room with panel mounted flow computers to space efficient rack mounted solutions in the field.

A version 1 module supports one gas or liquid meter run, while a version 2 module with its more powerful CPU supports up to 3 gas or 2 liquid meter runs.

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### Each module provides:

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Analog Input (4-20 mA, 1 - 5 / 0 - 5 V DC)</td>
</tr>
<tr>
<td>4</td>
<td>HART inputs</td>
</tr>
<tr>
<td>2</td>
<td>PT100 temperature inputs</td>
</tr>
<tr>
<td>4</td>
<td>Analog outputs</td>
</tr>
<tr>
<td>16</td>
<td>Digital I/O (*open collector, **configurable threshold)</td>
</tr>
<tr>
<td>2</td>
<td>Serial input (RS-232 / RS-422 / RS-485)</td>
</tr>
<tr>
<td>2</td>
<td>Ethernet (RJ45 , TCP/IP)</td>
</tr>
</tbody>
</table>

### Each of the 16 digital I/O channels can be assigned to:

<table>
<thead>
<tr>
<th>Description</th>
<th>Version 1: 1 (dual) inputs</th>
<th>Version 2: 4 (dual) inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse input (single/dual)</td>
<td>max. 4 signals</td>
<td>max. 4 signals</td>
</tr>
<tr>
<td>Time period input (density)</td>
<td>max. 4 signals</td>
<td>max. 4 signals</td>
</tr>
<tr>
<td>Prover detector input</td>
<td>max. 4 signals</td>
<td>max. 4 signals</td>
</tr>
<tr>
<td>Status input</td>
<td>max. 16 signals</td>
<td>max. 16 signals</td>
</tr>
<tr>
<td>Status output</td>
<td>max. 16 signals</td>
<td>max. 16 signals</td>
</tr>
<tr>
<td>Pulse output</td>
<td>max. 4 signals</td>
<td>max. 4 signals</td>
</tr>
<tr>
<td>Prover bus output</td>
<td>max. 1 signal</td>
<td>max. 1 signal</td>
</tr>
</tbody>
</table>
**Flow-X/P**

The Flow-X/P is a panel mounted enclosure for 1 up to 4 Flow-X/M modules.
- Touchscreen display;
- Additional three serial RS232/RS485 interfaces (located on the back);
- Additional on-board station module;
- Additional processor capacity & internal memory;
- Horizontally or vertically positioned.
- Up to 4 gas or 4 liquid meter runs (1 per module).

**Flow-X/C**

The Flow-X/C is a compact panel mounted enclosure with an integral Flow-X/M module.
- Touchscreen display;
- Three serial RS232/RS485 interfaces (located on the back);
- Horizontally or vertically positioned.
- Up to 3 gas or 2 liquid meter runs.

**Flow-X/K**

Flow-X/K is the DIN-rail rack enclosure for 1 Flow-X/M module.
- Clean & compact design;
- Connection through two 37 pin D-Sub connectors;
- 2 Ethernet ports;
- Option to connect a separate touch panel PC to have a touch interface;
- DIN rail mounting, directly against the wall or in a 19 inch rack (using a DIN rail - rack adapter).
- 1 gas or 1 liquid with version 1 module
- 3 gas or 2 liquid with version 2 module

**Flow-X/S**

Flow-X/S is the DIN-rail mountable enclosure for 1 Flow-X/M module.
- Termination of the wires directly on the Flow-X/S backplane;
- 2 Ethernet ports;
- Option to connect a separate touch panel PC to have a touch interface;
- DIN rail mounting or directly against the wall.
- 1 gas or 1 liquid with version 1 module
- 3 gas or 2 liquid with version 2 module

**Flow-X/R**

The Flow-X/R is a 19 inch rack enclosure for up to 8 Flow-X/M modules.
- Each Flow-X/M has its own power supply;
- Each Flow-X/M has its own two Ethernet ports;
- Option to connect a separate touch panel PC, which creates a touch interface with each of the modules inside the rack.
- 1 gas or 1 liquid per version 1 module
- 3 gas or 2 liquid per version 2 module
Made to integrate
Field I/O & user interface

Field I/O
Except for the Flow-X/S, which provides on-board wiring terminals, the field signals are connected through a terminal block that connects via a D-Sub cable to the flow computer. Either a standard terminal block or the Flow-X/B breakout board can be used.

The breakout board provides additional components such as fuses, pull-up resistors and relays¹ for convenient connection to the field equipment. For fully wired I/O two terminal blocks or two breakout boards are required per module.

Operator interface
The Flow-X/P and Flow-X/C have an integral touch screen for local operation, while the other enclosures may be operated from a separate, optional operator panel. Furthermore the full operator interface is accessible from a web browser for remote operation.

The operator interface is used for the daily operation and maintenance of the flow metering system. The same operator interface can also be used for basic configuration of the flow computer itself.

¹ Fuses and relays are NOT included with the delivery of the Flow-X/B.
### Different enclosures

For panel, rack & wall mount installations

Flow-X/M modules can be delivered with various mounting assemblies to create a variety of form factors, each with specific features for maximum flexibility and different system architectures. All enclosure options require an external 24 V DC power supply. A redundant power supply can be connected as well.

<table>
<thead>
<tr>
<th>Flow-X Flow Computers</th>
<th>Approximate weight</th>
<th>Overall dimensions (h x w x d)</th>
<th>Mount type</th>
<th>Max. Flow-X/Ms</th>
<th>Maximum I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow-X/M</td>
<td>0.8 kg 1.7 lbs</td>
<td>166 x 50 x 115 mm 6.5 x 2.0 x 4.5 inch</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>Flow-X/S*</td>
<td>2.5 kg 5.4 lbs</td>
<td>250 x 142 x 164 mm 9.8 x 5.6 x 6.5 inch</td>
<td>Wall / DIN rail 1</td>
<td>2 x 39 pin screw terminals 2 x RJ45 1 x 8 pin power</td>
<td></td>
</tr>
<tr>
<td>Flow-X/K*</td>
<td>1.7 kg 3.6 lbs</td>
<td>353 x 60 x 131 mm 139.0 x 2.4 x 5.2 inch</td>
<td>Wall / DIN rail / Rack*** 1</td>
<td>2 x 37 pin D-Sub 2 x RJ45 1 x 4 pin power</td>
<td></td>
</tr>
<tr>
<td>Flow-X/C</td>
<td>2.7 kg 6.0 lbs</td>
<td>237 x 139 x 142 mm 9.3 x 5.5 x 5.6 inch</td>
<td>Panel / Rack 1 (Integrated)</td>
<td>2 x 37 pin D-Sub 1 x 9 pin D-Sub 2 x RJ45 1 x 4 pin power</td>
<td></td>
</tr>
<tr>
<td>Flow-X/P0**</td>
<td>3.7 kg 8.2 lbs</td>
<td>235 x 137 x 322 mm 9.3 x 5.4 x 12.7 inch</td>
<td>Panel / Rack 4</td>
<td>8 x 37 pin D-Sub 3 x 9 pin D-Sub 2 x RJ45 1 x 4 pin power</td>
<td></td>
</tr>
<tr>
<td>Flow-X/R0**</td>
<td>5.0 kg 11.0 lbs</td>
<td>355 x 482 x 135 mm 14.0 x 19.0 x 5.3 inch</td>
<td>Rack / Wall 8</td>
<td>16 x 37 pin D-Sub 16 x RJ45 8 x 4 pin power</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow-X Accessories</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Flow-X/B</td>
<td>130 x 482 x 55 mm 5.1 x 19.0 x 2.2 inch</td>
<td>Wall</td>
<td>N.A.</td>
<td>1 x 37 pin D-Sub 1 x 5 pin power 8 x 5 pin DI connector 2 x 3 pin AO connector 3 x 3 pin AI connector 1 x 4 pin PRT connector 1 x 4 pin I/O ground connector</td>
<td></td>
</tr>
</tbody>
</table>

* Including Flow-X/M module
** Excluding Flow-X/M modules
*** In combination with a DIN rail - Rack adapter
**Complete & flexible**

**Flow-Xpress configuration software**

Use one of the standard applications

The Spirit® Flow-X flow computer comes with 4 different standard software applications:

- Liquid, metric
- Liquid, US customary
- Gas, metric
- Gas, US customary

These standard applications provide all functionality that is required for most flow metering systems. Although the standard applications are ready to go, full customization is possible through the Spirit® Flow-Xpress software. Calculations, displays, reports, alarms, Modbus or HART communication interfaces and much more can be freely defined from a rich library of functions and tools.

Create your own application

With Flow-Xpress Professional users can add custom functionality to the standard applications and even write their own applications (training is needed).

Configure without restart

The Flow-Xpress Online mode can be used to manage configurations and users without the need to restart the flow computer, hence the term ‘Online’.

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**Flow-Xpress Basic Mode**

**Flow-Xpress Professional mode**

**Flow-Xpress Online mode**
Testing & Debugging

**Advanced verification and troubleshoot capability** through an embedded Modbus / HART protocol analyzer, emulation capability to check the configuration and calculations without a physical flow computer and an online debugger to (remotely) troubleshoot a flow computer.

Security & Traceability

**Personal user-login password** protection instead of roll-based protection. Changes can be traced back to any particular user in the Audit Trail. Predefined access levels can be configured for each user. **Log files** keep track of all user activities.

Prover Support

All prover types are supported: **small-volume, compact, bidirectional and unidirectional.**

Master meter proving is supported for both liquid and gas. Supports up to 30(!) runs per proving sequence, including detailed results for each run. Supports the API MPMS 4.8 alternate method to accommodate proving of Ultrasonic and Coriolis flow meters.

Advanced control functions

**Embedded flow, flow/pressure, valve and sampling control functions** eliminate the need for a PLC and sampling controller, depending on the application and client specification.

External systems

**Web services automation interface** allows for full integration of real-time, historical and configuration data in external systems.

Reporting & Archiving

The reporting function provides a readable **printout** for the user, while archives are accessible by remote systems for further processing. **With 1 GB storage capacity** the Spirit™ Flow-X can keep months of hourly and years of daily report data in its memory.

Device communication

The Spirit™ Flow-X applications provide **generic inputs** to connect to any measurement device. A generic input can be an analog signal, typically 4 to 20 mA, a HART signal or a variable communicated via Modbus over a serial or Ethernet link. Generic inputs are provided for the following measurement devices:

- Flow meters*
- Differential pressure transmitters
- Static pressure transmitters
- Temperature transmitters**
- Density meters***
- Gas quality analysers
- Viscosity analysers
- Water cut meters

The Spirit™ Flow-X supports communication with smart devices from the following vendors:

- Ultrasonic flow meters: Caldon, Daniel, FMC, Faure Herman, GE, Instromet, Krohne, General Electric, RMG, Sick
- Coriolis flow meters: ABB, Endress + Hauser, MicroMotion
- Density meters: Solartron/Micromotion, UGC, Sarasota, Anton Paar
- Gas chromatographs / quality analysers: ABB, Angus, Daniel, Eister, Siemens, Yamatake

* In addition to single and dual pulse inputs signals
** In addition to Pt100 sensors inputs
*** Density meter algorithms for Solartron/Micromotion, UGC, Sarasota, Anton Paar
Standards, calculations & certificates

Standards & calculations

**Liquid**
- API 5, 6, 23, 24, 53, 54, 59 and 60 tables (A.B. D and E)
- API 11.1 1980 (API 2540) and 2004/2007
- API 1952 historical tables
- API 11.2.1, 11.2.2, 12.2, 21.1, 21.2
- API 11.3.2.1 Ethylene (API-2565)
- GPA TP15, TP16, TP25, TP27
- Propylene (API 11.3.2.2)
- Butadiene (ASTM D1550)
- Ethylene (IUPAC 1988, NIST 1045, API 2565)
- Carbon dioxide (NIST)
- Ethanol / Alcohol (OIML R22)

**Gas**
- AGA5, AGA7, AGA8 Parts 1 and 2, AGA10, AGA11
- AGA-NX19
- SGREG-88
- GERG-2008
- GOST 30319-2
- GPA 2172
- IAPWS-IF97 (steam and water)
- ISO 6976 (all editions)
- GSSSD MR113

**Flow**
- ISO 5167-1, 2, 3 and 4 (all editions)
- ISO/TR15377
- AGA3
- GOST 8-586
- V-cone

Regulatory compliance

**EU Directives**
- 2014/32/EU Measuring Instruments Directive
- 2014/30/EU Electromagnetic Compatibility Directive
- 2012/19/EU WEEE Directive (WEEE 2)
- 2011/65/EU RoHS

**UL / CSA**
- CAN/CSA C22.2 No 61010-1: 2012/05/11 Ed:3
- ANSI/UL 61010-1, Issued 2012/05/11 Ed:3

**IEC Standards**
- IEC 60068-2-1
- IEC 60068-2-2
- IEC 60068-2-3
- IEC 60068-2-31
- IEC 60068-2-36
- IEC 60654-2
- IEC 61000-4-2 :2008
- IEC 61000-4-4:2012
- IEC 61000-4-6 :2014
- IEC 61000-4-8:2009
- IEC 61000-4-29:2000
- IEC 61000-6-2:2016