

# Multi-Run Flow Computer for Gas & Liquids

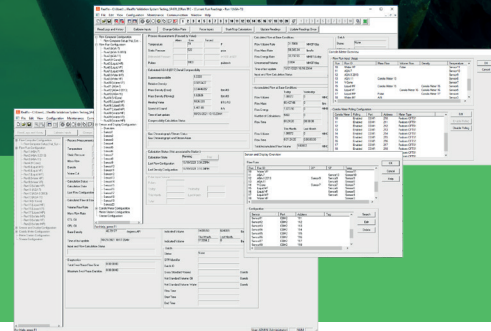
## Realflo Flow Computer

### Unique features

The Realflo™ Flow Computer is a software solution that works with SCADAPack™ Smart RTUs to provide natural gas, pure gas, and liquid flow measurement for applications such as well test, allocation measurement, production optimization, and well pad control.

Realflo is easy-to-use, API 21.1 and 21.2-compliant, and delivers robust cost-effective gas and liquid measurement for gathering, midstream, and transmission applications. Realflo includes a security lock feature to support TSA Pipeline Directive Part II Compliance.

The SCADAPack Smart RTU is a flexible and powerful platform that, with the Realflo Flow Computer, can support up to 20 flow runs with IEC 61131-3 logic, to perform control and monitoring tasks for applications such as production optimization, tank monitoring, and well pad and flow control. The Realflo Flow Computer can report information using Modbus™, Enron Modbus, and DNP3 protocols. SCADAPack Smart RTUs are available with the Realflo Flow Computer application installed and pre-licensed from the factory and licenses may be added later in the field.



### Benefits

- Powerful and easy-to-use environment for configuration, calibration, diagnostics, and field capture of flow data
- API 21.1 and 21.2-compliant audit trails and flow calculations facilitate data capture and reporting
- Multi-variable transmitters provide high-accuracy sensor data measurements directly to the flow computer
- Flexible, rugged, and powerful platform that can support up to 20 flow runs and IEC 61131-3 logic, ladder logic, or C/C++ applications
- Supported by the latest generation of SCADAPack x70 Smart RTUs

# Flow Computer

The Realflo Flow Computer uses API 11 calculations for temperature and pressure compensation of liquid flow measurements.

The Realflo Flow Computer performs Net Oil Computation (NOC) for liquid runs using 2 or 3-phase separators or direct well production measurement. Net oil and water can be determined using inferred water cut with Coriolis meters or direct measurement with on-line water cut meters.

Realflo supports well test operations with start/stop batch-style measurement available for both liquid and gas runs. Up to 200 batch or well test summary records can be stored by the flow computer. Hourly records, for use in continuous measurement applications, indicate which records correspond to a specific well test.

For gas measurement, Realflo Flow Computer provides:

- AGA-3 orifice plate
- AGA-8 (2017 and 1994) detailed compressibility calculations including GERG-2008 standards
- AGA-7 turbine/pulse meter flow measurement
- AGA-9 ultrasonic metering
- V-Cone
- Wafer Cone
- AGA-11 Coriolis
- Speed of sound calculated by AGA-8 (2017) using the method described in AGA-10 (2003)
- NX-19 Supercompressibility

Flow history includes:

- 35 days of hourly and daily averages
- 700 user changes and events
- 300 process alarms for API 21.1 and 21.2-compliant audit trails.

SCADAPack Smart RTUs support Modbus, Enron-Modbus, and DNP3 protocols. These industry-standard protocols provide communication to many SCADA host systems, including EcoStruxure™ Geo SCADA Expert software from Schneider Electric, and OASyS SCADA and AVEVA™ System Platform Software from AVEVA.

## Applications

- Upstream gas and liquid production measurement and automation
- Production optimization
- Separator measurement
- Allocation and proration measurement
- Natural gas measurement in midstream and gas transmission
- Pure gas measurement for hydrogen, nitrogen, CO<sub>2</sub>, H<sub>2</sub>S, CO, argon, oxygen and more



# Cost-Effective & Intuitive

## Cost-Effective

SCADAPack Smart RTU flow computers combine configurable oil, gas, and water calculations in one rugged device that also can be used like a PLC to perform control applications.

For well pad and facility operations, the SCADAPack x70 is available with a 20-flow run license option for supporting larger and centralized installations.

The SCADAPack 4203 Gas Flow Computer is a one-box solution that helps to reduce installation costs with reduced wiring, and contributes to improved reliability and reduced downtime through distributed automation in upstream facilities. It includes multi-variable sensors for high-accuracy measurement of Differential Pressure, Static Pressure, and Temperature within a single explosion-proof housing.

## Easy Configuration

The Realflo software application provides configuration wizards to guide operator entry and facilitate the creation of flow computer configuration templates.

Realflo's user-created templates support the rapid installation of multiple sites with common configurations. Templates help installers to concentrate on site-specific configurations. This approach speeds up deployment and helps to reduce user-configuration errors.

## Flexible Historian

Flow history includes user-defined records for the recording of data not already included in the standard flow computer QTRs (Quantity Transaction Records). Gas and Liquid flow run data is supported with well test (batch) QTRs. Each liquid or water run QTR can include up to 5 user-selected parameters.

Gas flow applications associated with storage facilities benefit from bi-directional flow measurement; users can configure the Realflo Flow Computer to monitor bi-directional logical or physical flow runs.

## Regulatory-Compliant

The Realflo Flow computer stores flow history records including well test (batch) and 35 days of auditable hourly and daily records compliant with API 21.1 and API 21.2.

- 200 well test (batch) records
- 300 alarms
- 700 events

Hourly records are associated with continuous measurement and specific well tests.

## Powerful and Customizable

Using IEC 61131-3<sup>1</sup>, ladder logic, or C/C++<sup>2</sup>, user-created programs may be employed in parallel with the flow computer for applications such as production optimization, flow control, or well test, or to customize and extend the flow computer.

<sup>1</sup> Using SCADAPack x70 or SCADAPack 3xx with IEC61131-3 option.

<sup>2</sup> C/C++ applications are supported on the SCADAPack 3xx and SCADAPack 32 Smart RTUs using programming and compiling optional tools.



# Flexible and Efficient

## Wide Product Range

Realflo Flow Computer supports a wide range of gas calculations such as AGA-3, AGA-7, and AGA-9 for natural gas and pure gases, in addition to API 11 calculations for multiple products including crude, natural gas liquids, and produced or injected water.

## Configurable Modbus Protocol Polling

Flow runs include automatic configurable polling of Coriolis meters such as the Foxboro™ CFT51, E&H Promass® 83, 200, 300, and Micro Motion® 2700 MVD and F Series sensors.

Gas flow runs support configurable automatic polling of gas chromatographs.

With the SCADAPack x70 Smart RTU, the Modbus scanner feature can be quickly used to create scan lists for other Modbus devices that may be used with the Realflo Flow Computer.

## Remote Access

Realflo Flow Computer can be accessed locally or remotely using Modbus, Enron Modbus, or DNP3 protocols. Flow computer configuration, retrieval of flow computer history and alarms, upgrades to SCADAPack Smart RTU firmware, and upgrades to the flow computer application can be performed remotely.

Configuration changes such as orifice plate changes, gas quality updates, and clock synchronization can be performed with SCADA host-initiated interaction.

## Local Retrieval of Flow Data

When an operator is at the site, the Realflo application may be used to retrieve flow history data and configuration. This data may be exported to XML, CSV, or tamper-resistant CFX files.

Local access to the flow computer for data and diagnostics, benefits from a rapid and easy connection when using USB<sup>3</sup> as no configuration is required by the operator to establish communications.

<sup>3</sup> USB available only on SCADAPack x70 and 3xx Smart RTUs.



# Robust Hardware Platform

## SCADAPack

Designed to be rugged with remote operations in mind, SCADAPack Smart RTU hardware features conformal-coated boards and wide operating temperatures of -40...70 °C (-40...158 °F). Class I, Div. 2 and Zone 2 hazardous area certifications are available <sup>4</sup>.

The Realflo Flow Computer runs on the following SCADAPack Smart RTUs:

- **SCADAPack x7x Smart RTU:** is the latest generation of SCADAPack Smart RTUs, equipped with a Dual ARM® Cortex® A7, 500 MHz processor, object-based database, and EcoStruxure Control Expert (Unity Pro)-based software with 5-language support for IEC 61131-3. They're available with 3, 6, 12, or 20 flow runs in any combination of gas, hydrocarbon liquids, or water. The SCADAPack 470 is optimized for sites where limited local I/O is required. The SCADAPack 47x includes four high-speed counters for direct connection to linear flow and turbine meters, including a turbine preamplifier for direct connection to turbine coils <sup>4</sup>.
- **Standard SCADAPack RTU:** consists of the legacy 32-bit CPU SCADAPack 3xx. The SCADAPack 3xx can provide up to 9 flow runs offered in combinations of gas, liquid, and water runs and includes Ethernet, USB, and support for C/C++ and IEC 61131-3 applications.
- **SCADAPack 4102 MVT:** while not incorporating a Flow Computer itself, the 4102 MVT is an integral component of the Realflo Flow Computer system. The 4102 MVT measures differential pressure, static pressure and temperature and makes the data available over serial and/or Ethernet communications. Realflo Flow Computer instances running on SCADAPack Smart RTUs have the facility for configuration and polling of 4102 MVTs.
- **SCADAPack 4203 GFC:** is a tightly integrated gas and liquids flow computer, incorporating a multivariable sensor and a Smart RTU. It can be used in a wide range of process control applications including: well optimization, pressure control, odorant injection and more. Coupled with a second multivariable transmitter, the SCADAPack 4203 GFC can be used as a 2-run gas flow computer.

<sup>4</sup> See applicable RTU datasheet for further details.



SCADAPack 470



SCADAPack 474



SCADAPack 570



SCADAPack 574



SCADAPack 575



SCADAPack 330



SCADAPack 334



SCADAPack 350



SCADAPack 357



4203 GFC  
4102 MVT  
(low profile  
sensor shown)



4203 GFC  
4102 MVT  
(standard  
sensor shown)

# Software Application

## Realflo Configuration Software

Realflo configuration software operates on a PC running Windows®, and can be used to configure the Realflo Flow Computer and to access the data stored on it. Realflo configuration software allows on-line or off-line configuration of the flow run operating parameters. History and event data may be uploaded from the flow computer and exported in XML, CSV, and tamper-resistant CFX formats.

This application offers a user-friendly environment. Realflo configuration software can also configure standard SCADAPack Smart RTU's operational parameters, including communication port settings, I/O register assignment, real time clock and DNP settings, and provides a utility to automatically scale any SCADAPack process I/O.

Realflo configuration software offers two modes of operation:

- Expert Mode provides access to configuration and flow history data.
- Maintenance Mode provides a simplified interface to enable fast access to common functions and configurations for field personnel. The wizards within Maintenance Mode of Realflo configuration software help to make scheduled maintenance tasks such as calibration, history downloads, plate change and gas analysis update, easy for users to perform.

## Multi-Variable Transmitter Integration

Realflo configuration software allows users to configure and calibrate any SCADAPack MVT. This feature simplifies installation and maintenance when multiple transmitters are connected to one SCADAPack Smart RTU.

## Automatic Audit Trail and Log Retrieval

Realflo configuration software's unique scripting capability allows users to automatically retrieve the flow history data. Scripts may be launched from an HMI or Windows scheduler with data being saved in Realflo Flow Computer binary format as well as standard CSV, XML, or CFX files.

## User-Defined Events

RemoteConnect IEC 61131-3 logic, relay ladder logic, and C/C++ applications can store custom events in the flow computer event log, along with previous and new values. This capability is particularly valuable to record special events that are not normally part of the flow computer operations. Examples could include communication error events and process alarm conditions.

## XML Export

Realflo configuration software provides an option to export flow history data, alarms, events, and configuration to an XML file. To help confirm that the data file is 'as-original', a checksum is included.



## Expanded options for security lock

Helps users to comply with regulations such as TSA Pipeline Directive Part II Compliance with the enhanced security lock feature. Customers can control access to the flow computer while maintaining routine operations. User selected Realflo flow computer configuration commands can be executed when the RTU is locked.

# Specifications

| Realflo Flow Computer     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Specifications            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Flow Computer             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Gas Flow Calculations     | AGA-3 (1985), AGA-3 (1992/2000), AGA-7, AGA-9, AGA-11, V-Cone, Wafer Cone, NX-19                                                                                                                                                                                                                                                                                                                                                                                    |
| Gas Density Calculations  | AGA-8 (2017) part 1 and part 2, AGA-8 GERG-2008, AGA-8 (1994), AGA-9, NX-19                                                                                                                                                                                                                                                                                                                                                                                         |
| Pure Gases Measured       | <ul style="list-style-type: none"> <li>• Methane</li> <li>• Nitrogen</li> <li>• Carbon Dioxide</li> <li>• Ethane</li> <li>• Propane</li> <li>• Water</li> <li>• Hydrogen Sulfide</li> <li>• Hydrogen</li> <li>• Carbon Monoxide</li> <li>• Oxygen</li> <li>• Total Butanes: iButane, nButane</li> <li>• Total Pentanes: iPentane, nPentane</li> <li>• Total Hexane Plus: nHexane, nHeptane, nOctane, nNonane, nDecane</li> <li>• Helium</li> <li>• Argon</li> </ul> |
| Liquids                   | <ul style="list-style-type: none"> <li>• Crude Oil, Fuel Oil, Jet Fuel, Transition Zone, Gasoline, Lubrication Oil, LNG, NGL, LPG, produced or injected Water</li> <li>• API 11 calculations for pressure and temperature</li> </ul>                                                                                                                                                                                                                                |
| Net Oil Computation (NOC) | <ul style="list-style-type: none"> <li>• Inferred water cut with Coriolis meter</li> <li>• Direct measurement with on-line water cut meter</li> </ul>                                                                                                                                                                                                                                                                                                               |
| Measurement Update        | Once per second                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Flow Calculation Update   | Once per second                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Alarm and Event Log       | 300/700 records (per API 21.1, API 21.2)                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Well Test (Batch) Log     | 200 records (QTRs)                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Hourly History            | 35 days                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Daily History             | 35 days                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Gas Quality History       | Hourly gas component averaging <sup>5</sup>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Passwords                 | 4 user role-based access levels with access log                                                                                                                                                                                                                                                                                                                                                                                                                     |

<sup>5</sup> Included with the SCADAPack x7x flow computer. Requires a separate gas transmission license for the SCADAPack 3xx and 32; the Gas Transmission option (Gas Quality History, when enabled, reduces the maximum number of flow runs to 4 on the SCADAPack 32.)

# Specifications

| Realflo Flow Computer       |                          |                                                                                                                                                                                                                                             |             |            |
|-----------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|
| Specifications (cont'd)     |                          |                                                                                                                                                                                                                                             |             |            |
| Hardware                    |                          |                                                                                                                                                                                                                                             |             |            |
| RTU / Flow Run Combinations | RTU/GFC                  | Gas Runs                                                                                                                                                                                                                                    | Liquid Runs | Water Runs |
|                             | SCADAPack 470, 474       | 3, 6, 12, or 20<br>In any combination of gas, hydrocarbon liquids, or water                                                                                                                                                                 |             |            |
|                             | SCADAPack 570, 574 & 575 |                                                                                                                                                                                                                                             |             |            |
|                             | SCADAPack 4203R GFC      | 1                                                                                                                                                                                                                                           | -           | -          |
|                             |                          | 2                                                                                                                                                                                                                                           | -           | -          |
|                             | SCADAPack 4203S GFC      | 1                                                                                                                                                                                                                                           | 1           | 1          |
|                             |                          | 2                                                                                                                                                                                                                                           | -           | -          |
|                             | SCADAPack 3xx Smart RTU  | 1                                                                                                                                                                                                                                           | 1           | 1          |
|                             |                          | 2                                                                                                                                                                                                                                           | 2           | 2          |
|                             |                          | 3                                                                                                                                                                                                                                           | 3           | 3          |
|                             |                          | -                                                                                                                                                                                                                                           | 4           | 4          |
|                             |                          | 2                                                                                                                                                                                                                                           | -           | -          |
|                             |                          | 4                                                                                                                                                                                                                                           | -           | -          |
| Maximum I/O                 |                          | Expandable to more than 150 I/O points <sup>6</sup>                                                                                                                                                                                         |             |            |
| Protocols                   |                          | <ul style="list-style-type: none"><li>• Modbus RTU/ASCII<sup>7</sup> standard protocol, Modbus/TCP protocol</li><li>• DNP3</li><li>• Enron-Modbus protocol</li><li>• DF1 optional<sup>7</sup></li><li>• Custom protocols possible</li></ul> |             |            |
| Multivariable Transmitter   |                          | Seamless integration of SCADAPack and Foxboro Multi-Variable Transmitters (including configuration and calibration)                                                                                                                         |             |            |

<sup>6</sup> Applies to SCADAPack x70 and SCADAPack 3xx.

<sup>7</sup> Standard SCADAPacks only.

# Specifications

| Realflo Flow Computer   |                                                                                                                                                                                                                                                                            |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Specifications (cont'd) |                                                                                                                                                                                                                                                                            |
| Hardware                |                                                                                                                                                                                                                                                                            |
| Linear Meters           | <ul style="list-style-type: none"><li>• Pulse or analog input from any meter (e.g. Turbine, Coriolis, PD, Water Cut, Density)</li><li>• Foxboro CFT51, E&amp;H Promass 83, Micro Motion 2700 MVD, Micro Motion F Series (Configurable automatic polling support)</li></ul> |
| PC Requirements         | <ul style="list-style-type: none"><li>• Windows 8.1 Professional (32-bit or 64-bit)</li><li>• Windows 10 Professional (32-bit or 64-bit)</li><li>• Hard drive space: 60 Mb</li></ul>                                                                                       |

# Model Code

| Realflo Configuration Software and Flow Run Licensing                        |                                                                                    |
|------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Model Code                                                                   |                                                                                    |
| Part Number                                                                  | Description                                                                        |
| TBUM327023                                                                   | Realflo configuration software                                                     |
| TBUM327024                                                                   | Realflo configuration software upgrade to latest version                           |
|                                                                              |                                                                                    |
| Gas & Liquids Flow Run License Activations (SCADAPack x70 Only)              |                                                                                    |
| TBUM327249                                                                   | 3 runs, any combination of gas, liquid or water                                    |
| TBUM327250                                                                   | 6 runs, any combination of gas, liquid or water                                    |
| TBUM327251                                                                   | 12 runs, any combination of gas, liquid or water                                   |
| TBUM327255                                                                   | 20 runs, any combination of gas, liquid or water                                   |
|                                                                              |                                                                                    |
| Gas Flow Run License Activations                                             |                                                                                    |
| TBUM327049                                                                   | 2 runs gas flow run-time target license activation                                 |
| TBUM327050                                                                   | 4 runs gas flow run-time target license activation                                 |
| TBUM327051                                                                   | Upgrade from 2 runs to 4 runs gas flow run-time target license activation          |
| TBUM327099                                                                   | Upgrade to gas transmission version of gas flow run-time target license activation |
|                                                                              |                                                                                    |
| Upgrade Existing Gas, Liquids or Water Flow Run License (SCADAPack x70 Only) |                                                                                    |
| TBUM327252                                                                   | 3 runs Gas & Liquids to 6 runs Gas, Liquids & Water                                |
| TBUM327253                                                                   | 6 runs Gas & Liquids to 12 runs Gas, Liquids & Water                               |
| TBUM327254                                                                   | 3 runs Gas & Liquids to 12 runs Gas, Liquids & Water                               |
| TBUM327256                                                                   | 6 runs Gas & Liquids to 20 runs Gas, Liquids & Water                               |
| TBUM327257                                                                   | 3 runs Gas & Liquids to 20 runs Gas, Liquids & Water                               |
| TBUM327258                                                                   | 10 runs Gas & Liquids to 12 runs Gas, Liquids & Water                              |
| TBUM327259                                                                   | 12 runs Gas & Liquids to 20 runs Gas, Liquids & Water                              |

# Model Code

| Realflo Flow Computer Flow Run Licensing                                           |                                                                                                                  |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Model Code cont'd                                                                  |                                                                                                                  |
| Part Number                                                                        | Description                                                                                                      |
| <b>Gas &amp; Liquids Flow Run License Activations (SCADAPack 3xx Only)</b>         |                                                                                                                  |
| TBUM327218                                                                         | Gas & Liquids 1: Supports 1 gas run, 1 liquid run, and 1 water run                                               |
| TBUM327219                                                                         | Gas & Liquids 2: Supports 2 gas runs, 2 liquid runs, and 2 water runs                                            |
| TBUM327220                                                                         | Gas & Liquids 3: Supports 3 gas runs, 3 liquid runs, and 3 water runs                                            |
| TBUM327221                                                                         | Liquids 4: Supports 4 liquid runs and 4 water runs                                                               |
| <b>Upgrade Existing Gas &amp; Liquids Flow Run License (SCADAPack 3xx Only)</b>    |                                                                                                                  |
| TBUM327223                                                                         | Gas & Liquids 1 to Gas & Liquids 2                                                                               |
| TBUM327224                                                                         | Gas & Liquids 2 to Gas & Liquids 3                                                                               |
| TBUM327225                                                                         | Gas & Liquids 1 to Gas & Liquids 3                                                                               |
| TBUM327103                                                                         | Gas & Liquids 1 to Liquids 4                                                                                     |
| TBUM327104                                                                         | Gas & Liquids 2 to Liquids 4                                                                                     |
| TBUM327105                                                                         | Gas & Liquids 3 to Liquids 4                                                                                     |
| <b>Upgrade Existing Gas Flow Run License to Gas &amp; Liquids Flow Run License</b> |                                                                                                                  |
| TBUM327243                                                                         | 2 runs Gas Flow Controller to Gas & Liquids 2                                                                    |
| TBUM327244                                                                         | 2 runs Gas Flow Controller to Gas & Liquids 3                                                                    |
| TBUM327245                                                                         | 4 runs Gas Flow Controller to Gas & Liquids 3                                                                    |
| TBUM327226                                                                         | 4203S Gas Flow to 4203S Gas & Liquids 1: Supports 1 gas run, 1 liquid run, and 1 water run - Requires I/O Code S |

## Disclaimer:

The information provided in this document contains general descriptions and/or technical characteristics of the performance of the described products or services. For detailed specification, performance and instruction of use, refer to corresponding Catalogs and user guides if available.

To the extent permitted by applicable law, no responsibility or liability is assumed by Schneider Electric and its subsidiaries for any errors or omissions in the informational content of this document or consequences arising out of or resulting from the reliance upon the information contained herein.

Schneider Electric reserves the right to make changes or updates with respect to or in the content of this document or the format thereof, at any time without notice.

## Schneider Electric

35 rue Joseph Monier  
92500 Rueil-Malmaison, France  
Email: RemoteOperations@se.com

www.se.com

Life Is On

**Schneider**  
Electric