Realflo

Multi-Run Gas Flow Computer Software

Schneider Electric

Product Overview Realflo
Features

Overview

Realflo is a family of hardware and software technologies that provides custody transfer natural gas flow measurement for one to ten gas flow runs. Realflo software converts any[†] SCADAPack Smart RTU into a full function gas flow computer (GFC), while retaining the RTU's inherent logic programmability. The measurement and control tasks are fully independent. The result is a versatile gas flow computer that is well suited to a wide variety of oil and natural gas applications. Any application requiring gas flow measurement, a PLC for local control and an RTU for communication, is a candidate for automation with a Realflo enabled SCADAPack.

APPLICATIONS

- Well head measurement and automation
- Liquid flow totalization
- Separator measurement and control
- Flow measurement
- Industrial energy consumption measurement
- Pipeline balancing
- Pipeline transmission station automation
- Coal bed methane production optimization
- "POD" automation

Realflo provides AGA-3 orifice plate, V-Cone, Wafer Cone, AGA-11 Coriolis, and AGA-7 turbine/pulse meter flow measurement with AGA-8 or NX-19 gas density calculations. In meeting the requirements of API 21.1, Custody Transfer Realflo provides 35 days of hourly and daily averages, 700 user changes and events as well as 300 process alarms. No additional logic programming is required to use Realflo; it is complete and ready for configuration and use.

Realflo configuration is provided by an intuitive, windows-based program that executes on Windows 2000/XP/VISTA/7 operating systems. Users who wish to integrate Realflo gas flow computers into existing SCADA systems will benefit from the fact that they use Modbus and EFM Modbus as native communication protocols. Custom protocols can also be added by implementing the C and C++ toolkits.

With the SCADAPack32 for example, 10baseT Ethernet can be used for highspeed remote configuration and data collection via wireless Ethernet radios. Any HMI software package, Distributed Control System, or SCADA master that utilizes Modbus protocol can be used as the front-end. Any host computer can read historical data logs, and reconfigure the Realflo GFC through the SCADA communication system. Realflo integrates seamlessly into existing SCADA systems.

Schneider Electric also offers ClearSCADA SCADA Management Software with a fully integrated Realflo driver.

[†] Except SCADAPack E Smart RTUs

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Features & Benefits

Modbus Protocol Interface
The Realflo GFC is completely configurable and accessible using standard Modbus protocol commands generated either by the Realflo Configuration Utility, provided by Schneider Electric, or any other host computer equipped with Modbus. Configuration and historical data retrieval can be done locally, or through the SCADA network. Gas composition can be changed from the SCADA master. Field technicians don't need laptop computers or flow computer training when changing orifice plates.

Standard EFM Modbus Interface
Schneider Electric Electronic Flow Measurement (EFM) Modbus interface is used with "Enron Modbus" collection systems. This standard EFM interface allows SCADAPack GFCs to be integrated into existing EFM SCADA networks. Schneider Electric's unique architecture provides two simultaneous methods of communication with one SCADAPack gas flow computer, even if only one communication port is used. The first method of communication accesses data through a uniquely addressed Standard EFM Modbus interface and the second accesses data through the usual Modbus addressed RTU/PLC interface. Flow measurement data collection is obtained by addressing the EFM Modbus interface while the Modbus protocol interface is used for monitoring and programming ladder logic programs on line, collecting logged data and downloading custom C/C++ programs.

Programmable for Control

The Realflo GFC includes a software extension in the SCADAPack. This means that the RTU's Telepace Relay Ladder Logic, multitasking C/C++ or IEC 61131 programmability remains available for sequencing and feedback control applications. You can use the Realflo GFC to measure gas flow while Relay Ladder Logic, PID controllers, and C/C++ programs can be used to control the process, switch meter runs, etc. Realflo combines the functions of a PLC, a multi-run flow computer and an RTU, in a compact, cost effective package.

Universal Primary Variable Interface
Realflo is compatible with 4-20ma/1-5Vdc transmitters, plus single or multivariable transmitters using HART, Modbus and Ethernet. If you choose to use a SCADAPack Multi-Variable Transmitter (MVT) or other Modbus-based MVTs, Realflo allows you to completely configure and calibrate the transmitter from within the Realflo Configuration Utility.

Gas Transmission Option
Pipeline applications that require frequent updates from an on-line gas chromatograph will benefit from the Gas Transmission option which provides Gas Quality History based on hourly gas component averaging. The SCADA Host polls the gas chromatograph and writes gas analysis to the flow computer where it is averaged each hourly period.

Versatile Communications
All Realflo components support radio, Ethernet, dial-up modem and dedicated modem communications. This versatility allows users to configure the Realflo GFC, download new C/C++ programs, as well as monitor and change logic programs, remotely over the communications network. Future upgrades to the RTU firmware and AGA standards can also be remotely upgraded.

I/O Expandable to over 650 points
Realflo uses the powerful SCADAPack smart RTU or a SCADAPack 4203 as its hardware platform. With standard I/O counts from as small as four points, these RTUs can be expanded to more than 650 I/O points, simply by plugging in more I/O Expansion modules*. You can use the same hardware for all your oil and gas automation needs.

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Realflo Components

A Realflo gas flow computer consists of the following hardware and software components:

- SCADAPack 100, SCADAPack 32, SCADAPack 300 or SCADAPack 4203 GFC.

- Embedded software extension

- Realflo PC-based configuration utility.

SCADAPack Hardware Platform

The Realflo GFC runs in all SCADAPack RTUs. Each is ideally suited to support EFM applications.

- The SCADAPack 100 is a 1 run flow computer that is ideally suited for EFM applications requiring small amounts of IO while maintaining custody transfer gas measurement data.

- The SCADAPack 300 smart RTU offers a 32-bit CPU, 100baseT Ethernet, Modbus over USB, and measures up to 4 gas flow runs.

- The SCADAPack 32 is a high-powered 10 run flow computer utilized wherever wells are either close together, or where many runs are measured together such as at headers, gas plants, transmission stations or coal bed methane pods. The SCADAPack 32P is the processor-only version and is suited for locations where local PLC control of I/O is not required. With Ethernet capability, the SCADAPack 32 and 32P are ideal candidates for LAN applications and are currently installed in several production fields that utilize wireless Ethernet.

- The SCADAPack 4203 is a tightly integrated gas flow computer incorporating a multivariable sensor and a complete PLC. 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 can be used as a two-run gas flow computer.

- The SCADAPack 4102 Modbus Multivariable Transmitter, while not being a Gas Flow Computer, is an integral component of the Realflo EFM system. The 4102 measures differential pressure, static pressure and flow temperature and makes the data available over serial and/or Ethernet communications. All Realflo instances running in SCADAPack RTUs have an inherent function that polls 4102s.

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Realflo Configuration Utility

The Realflo Configuration Utility operates on a PC running Windows, and is used to download and configure the Realflo GFC. The Realflo Configuration Utility was designed in consultation with end users to make commissioning a flow computer as intuitive and as efficient as possible. It allows on-line or off-line configuration of the gas flow run operating parameters. History and event data may be uploaded from the Realflo GFC in CFX or CSV format and subsequently exported in CFX format for import into Flow-Cal's EGM Software for further use and analysis with any spreadsheet or database gas measurement software. This utility offers a user-friendly environment that is intuitive for any user familiar with Windows. It also provides all the tools necessary to confirm correct operation of the SCADA system interface to the flow computations during system startup and configuration.

The Realflo Configuration Utility can also configure the SCADAPack 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.

Custom register views can be created to display any combination of flow computer and RTU IO database registers thereby facilitating process data monitoring.

Realflo offers two modes of operation. The Expert Mode is what users have grown to know with legacy versions of Realflo. The new Maintenance Mode has been introduced to accommodate the novice measurement technician that operates a Realflo unit on an infrequent basis. The wizard within the Maintenance Mode of Realflo makes scheduled maintenance functions such as calibration, history downloads, plate change and gas analysis update, easy and intuitive.

Modbus Multi-Variable Transmitter Integration

The Realflo Configuration Utility allows users to completely configure and calibrate any SCADAPack (or any similarly mapped) multi-variable transmitter from within the gas flow computer itself. This feature greatly simplifies installation and maintenance when multiple transmitters are connected to one SCADAPack. It also allows for remote re-spanning of ranges for optimal measurement without a site visit.

Automatic Audit Trail and Log Retrieval

The Realflo Configuration Utility's unique scripting capability allows users to automatically retrieve all the data required by API 21.1 audit trail requirements. Scripts may be launched from an HMI or Windows scheduler with data being saved in Realflo binary format as well as standard CSV or CFX files.

Custom C/C++ Enhancements and User Defined Events

C Function libraries are provided to allow users to extend the Realflo GFC application for custom protocol drivers, enhanced data acquisition for pilot projects, or automatic configuration of flow computer parameters on power up. With the versatility provided by C/C++, the user can add virtually any function.

Relay Ladder Logic and C/C++ programs can store custom events in the event log, along with previous and new values. This capability is particularly valuable to record special events that are not normally part of the gas flow computer operations. Examples could include communication error events and process alarm conditions. Userdefined events are allocated to a specific numeric range to prevent tampering of flow computer events.

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Specifications

>	Realflo
Specifications	
Flow Calculations	• AGA-3 (1985) [SCADAPack 32 and SCADAPack 300 only] • AGA-3 (1992/2000) • AGA-7 • AGA-11 • V-Cone • Wafer Cone
Density Calculations	• AGA-8 (1992) • NX-19
Measurement Update	Once per second; up to 10 Gas Flow Runs
AGA 3, 7, 11, V-Cone, Wafer Cone Calculation Update	Once per second
Alarm and Event Log	300/700 (per API 21.1 and Measurement Canada)
Hourly History	35 days
Daily History	35 days
Gas Quality History	• Hourly gas component averaging [SCADAPack 32 and SCADAPack 300 only] • Requires Gas Transmission option (Gas Quality History, when enabled, reduces the maximum number of flow runs to 4 on the SCADAPack 32. There is no reduction in SCADAPack 300.)
Passwords	Four levels with log of user ID during access
Hardware	
Hardware	SCADAPack 100, SCADAPack 32, SCADAPack 300, SCADAPack 4203 GFC
Maximum I/O	Expandable to more than 650 I/O points *
PID Controller Blocks	32, single or cascaded
Communications	Radio, leased line, phone, cellular, microwave, Ethernet or Satellite
Protocols	• Modbus RTU/ASCII standard, ModbusTCP, DNP3, EFM Modbus (Enron) • DF1 optional • Custom protocols possible
Multivariable Transmitter	Seamless integration of SCADAPack Multi-Variable Transmitter (including configuration and calibration)or any similarly mapped Modbus-based MVT.
PC Requirements to run Realflo Configuration Software	• Windows 2000/XP/VISTA/7 operating systems • Minimum 32 MB of memory • 35 Mbytes hard disk space • Mouse or compatible pointing device

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Ordering Guide

>	Realflo
Part Number	**Description**
TBUM327023	Realflo Gas Flow Computer Configuration Application, collection of historical flow
TBUM327048	Realflo Gas Flow Computer Configuration Application with Measurement Canada Approval
TBUM327024	Realflo upgrade for existing users of Realflo to latest version
TBUM327096	Realflo Gas Flow Computer Configuration Application, collection of historical flow. For PEMEX RTUs
TBUM327097	Realflo Gas Flow Computer Configuration Application, collection of historical flow. GOST certified
Gas Flow Run License Activations – not applicable for SCADAPack E RTUs	
TBUM327069	One Run Gas Flow run-time target license activation (SCADAPack 100 only)
TBUM327049	Two Run Gas Flow run-time target license activation
TBUM327050	Four Run Gas Flow run-time target license activation
TBUM327053	Ten Run Gas Flow run-time target license activation (SCADAPack 32 only)
TBUM327051	Upgrade from Two Run to Four Run Gas Flow run-time target license activation
TBUM327055	Upgrade from Two Run to Ten Run Gas Flow run-time target license activation (SCADAPack 32 only)
TBUM327057	Upgrade from Four Run to Ten Run Gas Flow run-time target license activation (SCADAPack 32 only)
TBUM327099	Upgrade to Gas Transmission version of Gas Flow run-time target license activation

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