BeyondHMI

Gas Flow Computer Library

Overview

The Beyond HMI Gas Flow Computer Library (BhiLibGasAGA3) for Wago e!COCKPIT provides natural gas flow computing features for Wago e!COCKPIT programs. The flow computer features conform to API 21.1 standards for electronic flow measurement. Data is transferred from the PLC using industry-standard CFX files. These files can be directly imported into hydrocarbon accounting systems.

Additionally, the library supports multi-access-level user authentication and authorization.

The library supports up to six AGA3 meters on up to six stations.

The BhiLibGasAGA3 library uses runtime licensing. A license is required for each PLC which executes the library code. The program will run for approximately 4 days in trial mode before a license is required. Licenses must be purchased from Beyond HMI, Inc.

Library Features

The library uses the concept of stations and meters. Stations describe gas properties and base conditions. Meters are assigned to Stations. The library supports orifice flow meters only.

Meter Calculations	Orifice flow calculations	per AGA-3 (2013)
	Meter calculation frequency	Full calc performed once per second
	Calculated parameters	Volume, Mass, Energy
	Aggregated values available	Flow Rate, Current Hour Total, Last Hour Total, Today Total, Yesterday Total, Current Month Total, Prior Hour Total, Lifetime Total
Gas Property Calculations	Supercompressibility and Density	per AGA-8 GERG (2017)
	Gas Property Calculation Frequency	Full calc performed once per second
Data Retention	per API 21.1	Periodic (hourly) history, events, alarms
	Periodic history retention	Configurable by meter. Minimum of 35 days – ranging to file system capacity
	Event retention	256 events per meter per "day"
	Alarm retention	64 alarms per meter per "day"
Data Transfer Method (Collection)	Via CFX files	Quorum/FLOWCAL Common File Exchange Format (CFX) 8.5.0
		Minimum of 1 CFX per day
		Per API 21.1, new file is created whenever calculation parameters are changed
		CFX file stored on PLC file system (password protected)
	Manual/Local collection	Users with limited permissions and network access can copy CFX files from the PLC to another computer for transfer to hydrocarbon accounting system
	Remote/SCADA collection	Via secure FTP or SSH
Supported Meter Configurations	Orifice Meter	Flange taps, Upstream static pressure tap only

Contract Hour	Configurable	Per station
Units of Measure	Customary U.S. units only	Inches, psi, inches of water (68 degrees), degrees F, flow rates per day, volumes in MSCF, energy in MMBTU, mass in Mlbs
Diagnostics	Station calculations	Z_s, $Density_s$, Z_b, $Density_b$, Gas Gravity from Composition – corrected for standard conditions
	Meter configuration	Z_f, $Density_f$, , R_e, C_d, E_v, Y_1, F_{pv} , Temperature-corrected Orifice size, Tube size, Beta
	Configuration validation Features	Library validates configuration and provides error/warning messages
SCADA Interface	Implemented in PLC program	
Configuration Loading/Transfer	Via text file	Library provides features to save configuration to file
		Library provides features to load all or part of the configuration from file
Power Loss Behavior	Configuration is retained	PLC persistent memory
	Flow History is retained	PLC persistent memory and file system
	Flow that occurs while PLC is not powered	Not measured
	When power is restored	Broken *day* is saved as CFX file and calculations resume
User Login	Configurable user authentication and authorization	User login information is compared against installed authentication file.
		No limit to number of users in authentication file
Licensing	Free for developer	Library file is free and can be added to any Wago e!COCKPIT instance
	Runtime Licensed	Library generates a site code
		Beyond HMI, Inc. generates a license file from site code
		License file is installed on the PLC. License is perpetual but only usable on that PLC.
		Library features will execute for about 4 days after restart

		in *trial mode*. License must be installed before this period expires or data will be lost (unrecoverable).