A Rockwell Automation Company

Hinz
Flow Computer Modules

The Client:

Hinz is a single discipline Engineering firm focused on System Integration in the areas of SCADA, electrical, communications, plant, and machine automation. Hinz can supply engineering services from the field systems such as instrumentation or panel and wiring specifications, through to the control room where graphics systems, host systems, and networking are created and maintained. Standard services also include applications, database, and IS connectivity.

The Requirement:

Client interest and internal Hinz needs drove the need for a cost-effective solution for PLC-based flow measurement and control. Since PLCs are an accepted standard platform in industrial control, and flow measurement is often a requirement along with control functions, a solution is based on a PLC platform.

The increased functionality of the latest generation of PLC co-processors provides an environment well suited to these advanced applications, and the integration of a flow computer with the PLC simplifies the traditional serial communications solution between multi-vendor devices. This reduces hardware duplication, which adds up to an overall cost-saving solution.

The Design Solution:

The Flow Computer 90, a GE Fanuc co-processor programmed for flow calculations and integrated into GE's standard hardware was the result.

All GE Fanuc 90-70 and 90-30 models 331 and higher can use the Flow Computer. The flow computations are all performed with floating-point math, however, a PLC CPU with floating-point capability is not required. The format of the interface data in the PLC data table is integer or ASCII. Data requiring more accuracy is formatted with implied decimals or is resident in a configuration file that is downloaded to the Flow Computer module. Sensor input data is typically from PLC analog inputs with 12-bit (0-4095) or 14-bit (0-16384) analog to digital resolution.

The basic flow applications use a configuration file to map the data table addresses where the input data is located, and store the scaling values for the conversion to the units required by the computations. The scaling is flexible and can be used to convert raw 12-bit or 14-bit input, convert units, or provide an adjustable offset. On startup or reset, the basic flow application reads in the data from the configuration file and sets the runtime variables needed to interface the Flow Computer to the PLC.

The Flow Computer 90 reads and writes all interface data into the PLC data table. Input data read by the Flow Computer includes the sensed measurement variables, temperature, pressure, gravity/density, composition, etc. Input data read also includes calibration data that is routinely modified, such as meter factors. Output data includes rates, volumes, factors and averages, etc. that are specific to each basic flow application. A block of control flags are read from PLC coils to provide control and status interface to/from the Flow Computer module for each meter. This includes restart, option selection, heartbeat, report output control and error status. These are specific to each basic flow application.

By using the PLC data table as an interface, the results of the flow computations can be used by the PLC for control, or easily transmitted to a host computer or SCADA system. The historical data generated by the Flow Computer Manager software is stored in the Flow Computer 90 battery-backed RAM and is available via file copy to a PC.

The Flow Computer 90 is available programmed for the one of the following options:

- Gas Flow Computer
- Liquid Flow Computer
- Dock Flow Computer

Two optional available applications include:

- Flow Computer Manager
- process data and audit trail archives
- Meter Prove Manager (for the LFC)
- performs proper volume correction and meter factor calculations for meters configured in the Flow Computer 90.

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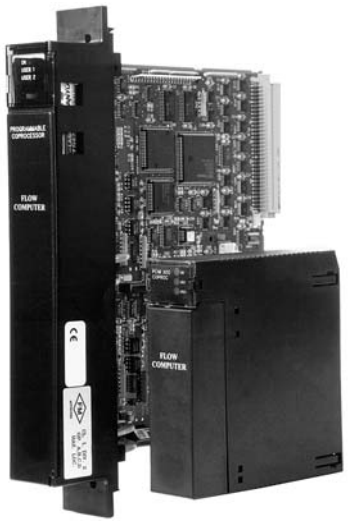

System Specifications:

Flow Computer Specifications

The mapping of variables to data table addresses and data scaling is user-configurable. A configuration file that is downloaded to the Flow Computer 90 module's battery-backed RAM is read on startup. The configuration file provides the Flow Computer 90 with the data table addresses of the interface registers and the scaling parameters to be used.

- FM approved for Class 1 Division 2 hazardous locations
- 4 meter elements per Flow Computer 90
- Recommended maximum of 10 Flow Computers per 90-70 PLC
- Maximum of 4 Flow Computers per 90-30 PLC
- Application program secure in EPROM
- Clock resolution +/- 1 msec.
- Configurable process input scaling allows high accuracy scaling and conversion to engineering units used by the application

Required Hardware

- I/O Modules to interface with sensors
  - 4-20ma analog input
  - high-speed counter
  - Horner RTD input
- GE Fanuc Series 90TM PLC
  - any 90-70 PLC
  - 331 or larger 90-30 CPU
- Flow Computer 90 module (up to 4 meters/module)
- PC and standard serial port

Hardware Specifications

- Operating Temperature: 0° to 60°C (32° to 140°F) modules with the "RA" suffix have been tested over an extended temperature range of -40° to 60°C
- Storage Temperature: 40° to 85°C (40° to 185°F)
- Humidity: 5% to 95% non-condensing
- Vibration: 3.5mm, 5-9 Hz: 1G, 9-150 Hz
- Shock: 15 g's for 11 msec
- Backup Battery: Lithium, long life
  - typical life under load: 6 months @ 40°C ambient
  - shelf life, no load : 8 to 10 years @ 25°C ambient
- Serial Communications: 2 ports, RS 232 and RS 485 capabilities
- FM approved for Class 1 Division 2 hazardous locations

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com