Advanced Automation for Sierra 100 Series Instruments

FEATURES

- RS-485 communication with MODBUS RTU protocol allows digital multi-drop networks
- Available with optional LCD display
- Internal gas flow totalizer with adjustable pulse output
- Two digital outputs and 1 analog input can be configured by user with MODBUS or included software for a wide variety of process controls including:
    - Gas mixing and blending
    - Batch control
    - Gas ratio control
    - Pressure monitoring and control
    - Internal performance monitoring
    - Alarm Setpoints
- Starting or resuming gas flows automatically under different conditions
    - Gas flow totalization
    - And many more...

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Compod for Sierra 100 Series

DESCRIPTION

Compod™ is a programmable control module for Sierra Instruments' 100 Series that makes Smart-Trak® even smarter.

The Compod™ mounts to any Sierra Smart-Trak® Model 100, converting the instrument's internal RS-232 communications into multi-drop RS-485/ MODBUS RTU. With MODBUS, multiple instruments can be daisy-chained over a single network. When used with a PLC or master computer, each instrument equipped with Compod becomes a node on the MODBUS network, capable of sending and receiving data and commands. Even complex process control systems can be automated with the power of Compod and Sierra's Smart-Trak Model 100.

Users can utilize Sierra's included software or write proprietary software using open-source MODBUS protocol to configure standard functions for the Smart-Trak. Compod's two digital output channels, analog input channel and configurable pulse output channel can automate gas processes without the need for an external PLC or computer.

With these advanced capabilities, Smart-Trak with Compod can easily be integrated into complete process control systems.

Performance Specifications

Outputs (when connected to Sierra 100 Series instruments):
• 2 Digital Outputs (can be linked to an alarm). These digital outputs can be replaced by 2 analog relays if the CM-Relays option is ordered.
• Analog Pulse Output—pulse every time totalizer counts; pulse width adjustable from 2.5 to 500 msec

Inputs (when connected to Sierra 100 Series instruments):
• RS-485 MODBUS RTU, optically isolated
• 2 Analog Inputs (user configurable for voltage 0-10V or current 0-20 mA). If Pulse Output option is selected, then only 1 analog input is available

Maximum Baud Rate:

57,600 (factory default set at 19,200)

Power Requirement:

24 VDC; Compod requires 100 mA minimum above the power required by the connected 100 Series instrument. The Compod can be powered from the Sierra 100 Series instrument where it is mounted or it can be powered directly and it will provide power to the Sierra 100 Series instrument.

TYPICAL APPLICATIONS

Compod can be utilized in many common gas process control applications. In simple systems, it replaces expensive PLCs or computers and controls the process directly. In others, it is a key link between a master computer or process controller and the gas control instruments.

TYPICAL APPLICATIONS: PROCESS MONITORING

A Smart-Trak MFC controls the flow rate, while the Compod facilitates monitoring the pressure and temperature of the process. This makes the information available from one node on an RS485 network.
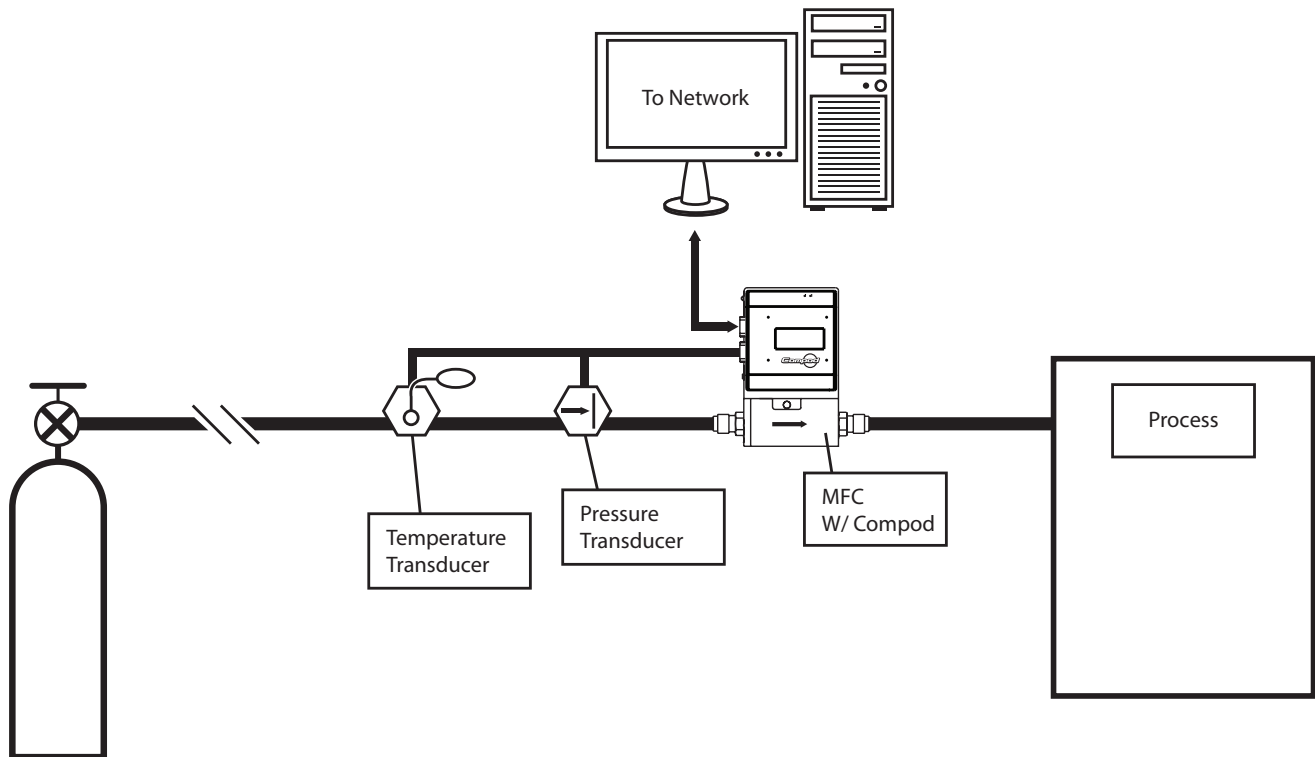

Temperature and pressure transducers are installed near the MFC. The 4-20mA signals from both are fed to the analog inputs of the Compod.
The Compod communicates via its RS485 MODBUS output to the network. When the master control system needs to know information on this process, it sends a request to the Compod, which then reports the flow, temperature and pressure. The control system can also regulate the flow by sending setpoint commands to the MFC via the Compod.

An article must be checked for leakage. The regulator R1 is set manually to the leak-test pressure. This is usually a pressure above operating pressure of the DUT (device under test). A Smart-Trak MFC is given a setpoint appropriate to fill the DUT at a moderate rate. The MFC's Compod monitors the flow rate. When the flow rate drops to zero, the pressure in the DUT is equal the pressure of R1. The internal software in Compod senses that the flow has stopped and the Compod closes the valve in the MFC and trips an alarm (light) for the operator telling him the DUT is pressurized and the leak test is ready to begin. The operator sees the alarm light and opens the ball valve V2 manually. After waiting several minutes for the system to come to equilibrium, the leak test begins. The mass flow meter measures the flow rate. So long as the flow rate is below a pre-determined level (flow noise), the DUT passes the test. If the flow rate is above this defined level, the Compod sends an alarm indicating the DUT is leaking and the DUT is failed.
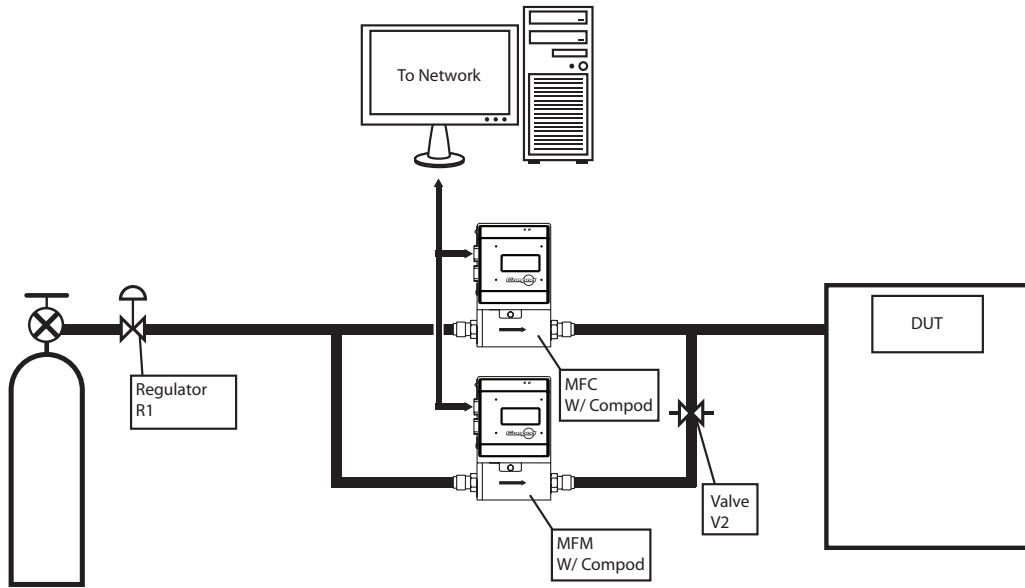
A specific gas blend must be produced. In this example, synthetic air composition is maintained at 78% N2, 21% O2 and 1% Ar. A PLC (Programmed Logic Controller) and controls the system automatically. The PLC communicates to three mass flow controllers (via their attached Compods) and a pressure transducer mounted inside the tank. Each MFC regulates the flow of one gas into the tank. The PLC maintains the exact proportion defined above by constantly monitoring these MFCs. When the pressure reaches the set point, the PLC commands the Compods to stop the flow controllers. Should the pressure drop below the set point, the PLC sends a flow command to each controller to resume gas flow into the tank. The system is fully automatic. Each Compod includes a safety program that monitors the gas flow through its attached controller. Should the flow through a controller drop off when the setpoint from the PLC remains on, the Compod detects that the gas supply has been interrupted (such as when a bottle runs out) and triggers an alarm that shuts down the system. If the ratio of the gases in the synthetic air mixture needs to be modified, simply change the recipe in the PLC and the system provides the new mixture, immediately and automatically.
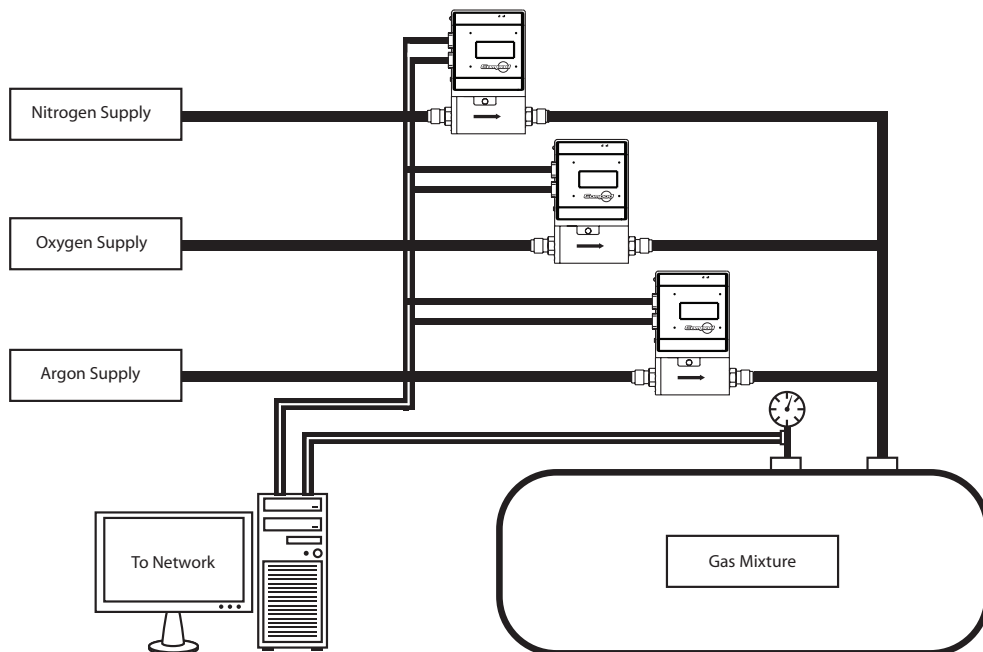
A pharmaceutical company grows a particular culture in a controlled bioreactor. After the culture is incubated, it is removed to a growth chamber and a new reactor prepared for the next batch. As the batch begins, the reactor chamber is flooded with clean, dry air for 1 minute at 10 slpm to make certain it is dry. Next, the flow rate is reduced to 1 slpm while a culture is injected into the bioreactor. For the next hour, air is injected into the reactor for 30 seconds every 10 minutes at a flow rate 5 slpm. This is to aerate the culture and promote homogeneous growth. After the hour is complete, the reactor vessel is transported to the growth area and a new bioreactor takes its place. The cycle resumes. In this application, Compod is a part of a larger process controlled by a process computer, but it is responsible for managing all the air requirements of the bioreactor during the batch. In addition, the Compod also receives an analog input signal from a pressure transducer inside the reactor vessel. Should the pressure exceed 15 psig, this tranducer sends a signal to the Compod, which stops the flow to prevent breaking the vessel and sends an alarm signal to the master computer.
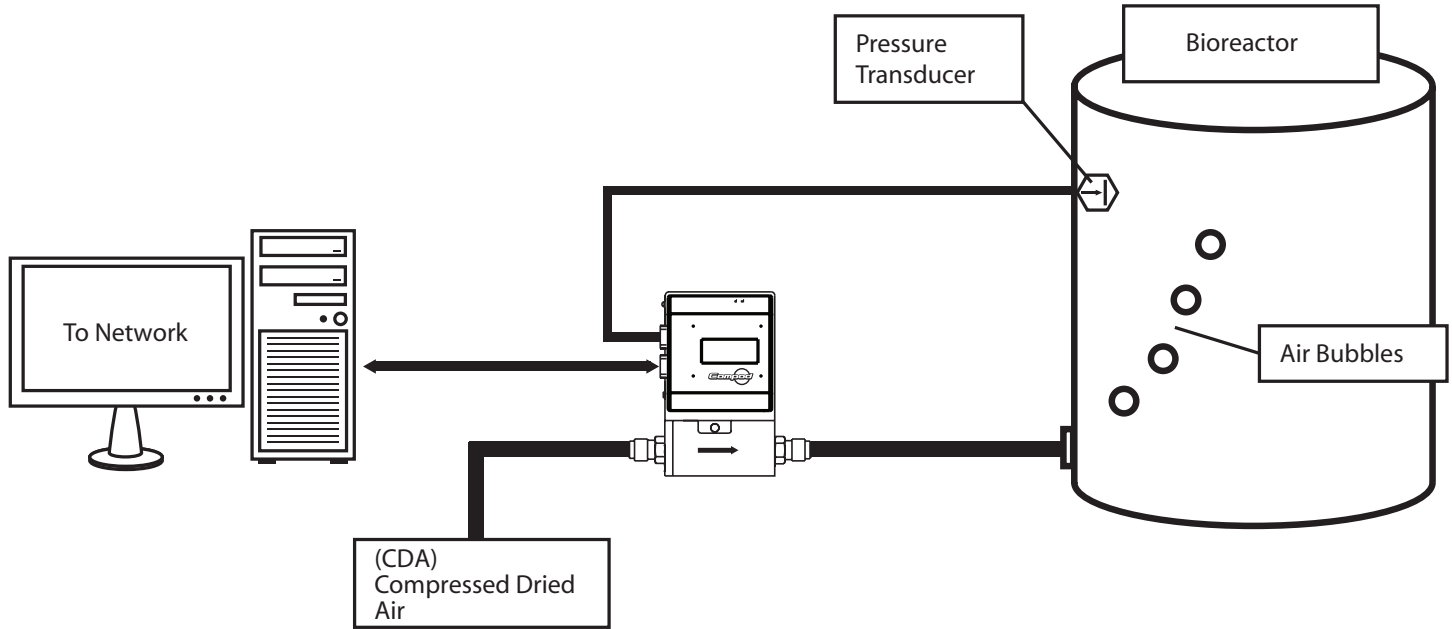
ORDERING THE COMPOD FOR MODELS 100, 101 AND 180

Instructions: To order a Compod please select the code from the corresponding options below.

The SmartTrak 100 and MicroTrak 101 adds RS-485 capability with the addition of the Compod. When ordered, it will come in a module mounted to the front of the instrument (similar to the Pilot Module). The MaxTrak 180 Compod is mounted internally in the NEMA 6 enclosure.

Compod Display Option	
CMNR**	Compod with RS-485 Modbus communication mounted on the enclosure
CMDD**	Compod with RS-485 Modbus communication and Display mounted on the enclosure

DIMENSIONAL DRAWINGS

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