

APPLICATION GUIDE

TO MASS FLOW
MEASUREMENT

In Steam Generation
and Distribution

SIERRA[®]
INSTRUMENTS, INC.
THE MASS FLOW COMPANY

Simple Solutions

Sierra Instruments' mass flow meters offer you simple solutions to boiler control and energy management problems. This poster illustrates how accurate flow monitoring improves process quality and efficiency, reduces downtime and facilitates cost-allocation in the steam generation and distribution process.

Applications include:

- Steam header monitoring
- Point-of-use monitoring
- Fuel flow monitoring
- Condensate return measurement

If you are designing or retrofitting a steam boiler, we hope you'll consider Sierra Instruments' high performance mass flow meters for this critical requirement. Look inside and see how these instruments can help you:

- Improve combustion efficiency and reduce waste
- Calculate boiler efficiency quickly and easily
- Reduce pumping costs
- Improve measurement accuracy during low-demand states

Sierra's Innova-Mass[®] Multi-Parameter Vortex Mass Flow Meter provides a reading of five process parameters from a single entry point in the pipeline. Simultaneous 4-20 mA outputs are available for your choice of three of these five process variables:

- mass flow rate
- volumetric flow rate
- temperature
- pressure
- fluid density

Sensing all process parameters at a single location greatly improves measurement accuracy, and eliminates the requirement of additional line penetrations.

The Innova-Mass smart electronics are accessed locally via six infrared switches activated by finger-touch through the window in the explosion-proof enclosure. The field-configurable device provides an intuitive and easy-to-use menu for configuring

and reviewing the following functions:



Innova-Mass 240/241

Call or write today for additional information on Sierra's broad range of mass flow meters. Or visit our web site and see how some of our successful customers have applied these simple solutions to their flow measurement problems.

Innova-Mass is available in both in-line and insertion configurations



Innova-Flo 220/221

Sierra's Innova-Flo™ volumetric vortex meter effectively eliminates the two most common problems associated with this technology: reduced rangeability, and errors caused by pipeline vibrations. Using constant values for the fluid's density and viscosity, the instruments' smart electronics automatically corrects for Reynolds numbers down to 5000, greatly extending its rangeability.



Innova vortex meters can be "hot-tapped" into steam lines

The innovative Nova-Balance™ vortex velocity sensor eliminates spurious signals caused by pipeline vibrations and pumps. The resulting "clean" output signal is strictly related to the frequency of the vortices. The result is a more reliable and accurate measurement, especially for lower flows.

The Innova-Flo smart electronics are accessed locally via six buttons, operable either directly on the display panel or with a hand-held magnet through the explosion-proof enclosure. By using this method, you can field-configure the device without compromising its hazardous location integrity.

S-Series 640/780

Sierra's Smart Thermal Mass Flow Meters provide a direct reading of gas mass flow rate. Their outstanding low-velocity sensitivity and wide rangeability make them the ideal instrument for fuel and air flow monitoring applications.

The S-Series meters integrate the functions of flow measurement, flow-range adjustment, meter validation and diagnostics in a single microprocessor-based transmitter. Mass flow rate and totalized flow, as well as other configuration variables, are displayed on an optional 2 x 12 LCD panel. The meter is easily configured via an RS232 communication port and interface software, or via the display and membrane switches on the instrument panel.

An intuitive menu-driven program helps you configure or change these parameters:

- flow range
- totalizer
- alarm settings
- time response
- zero flow cut-off
-

calibration correction factor

The Model 780S in-line meter features built-in flow conditioning to improve measurement accuracy. Extensive testing has demonstrated that the Model 780S reduces upstream piping requirements to less than three diameters after most common flow disturbances. The meter is available with ASA or DIN flanges, NPT or butt-weld connections.



The Model 780S features a built-in flow conditioning element



The Model 640S insertion meter is available with a variety of electronic enclosure options

Fuel Flow

Sierra's Instruments offers two types of mass flow meters for measuring fuel flows. First, the Innova-Mass[®] Multi-Parameter Vortex Mass Flow Meter for fuel oils and high pressure natural gas. Second, the Steel-Trak[™] Thermal Mass Flow Meter for natural gas flows to small or mid-size boilers.

Because they provide you with a reading of mass flow, these devices facilitate feed forward boiler control to help you improve combustion efficiency and reduce waste.

1 Liquid & Gas Fuel Flow

Innova-Mass is ideal for measuring #2 diesel or other fuel oils, and provides the following benefits in this application:

- No moving parts—no maintenance
- No ports to clog or foul—ideal for fuel oil
- High temperature and pressure capability
- One-third to one-half the pressure drop of typical orifice or mechanical type fuel meters.

2 Gas Fuel Flow

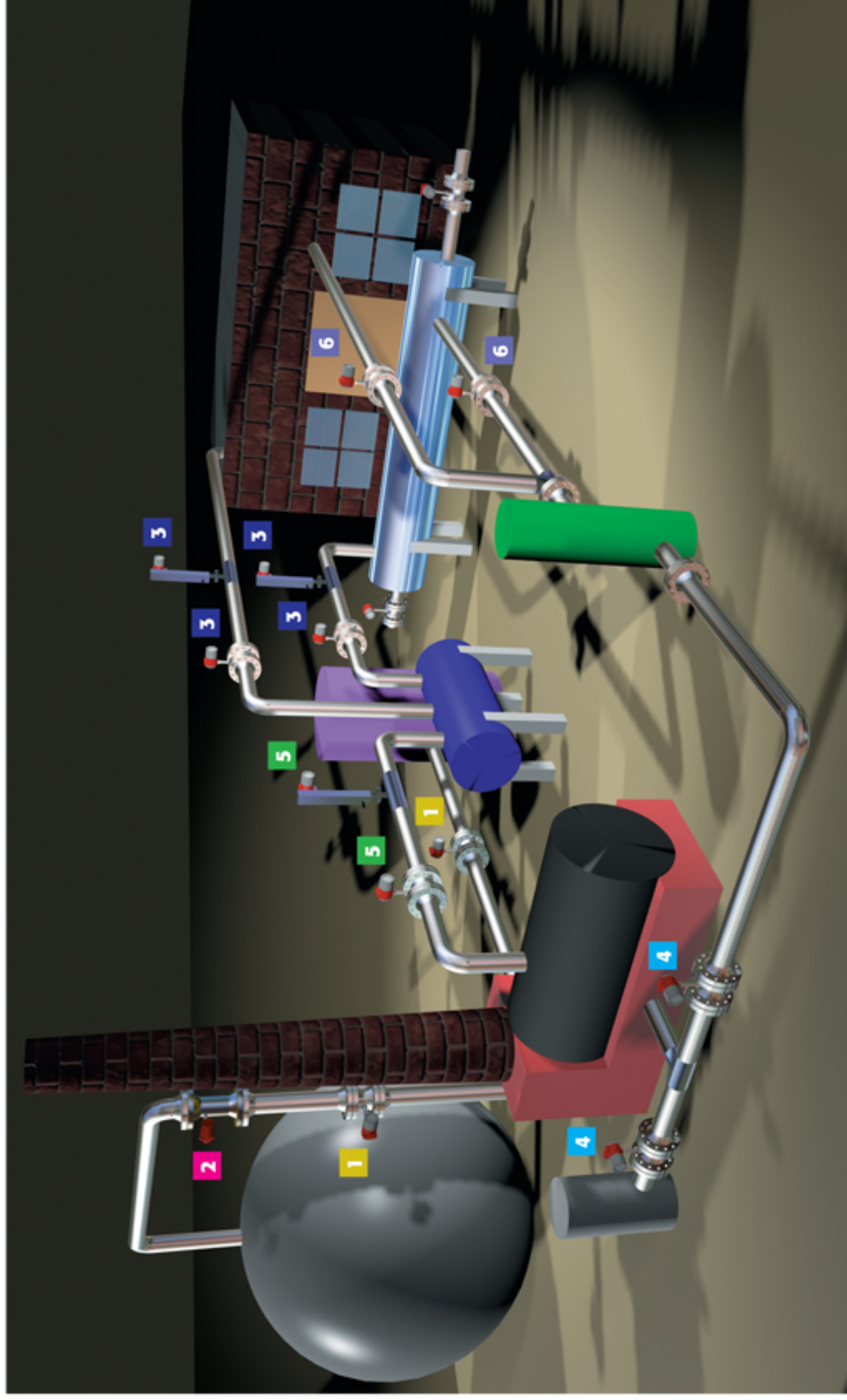
Sierra Smart Thermal Mass Flow Meters are the instrument of choice for measuring low-pressure gases. They offer the following benefits in combustion processes:

- Outstanding rangeability—100 to 1
- Built-in flow conditioning to reduce upstream piping requirements
- Field-validation of flow meter calibration
- One-second response to changes in flow rate.

3 Point of Use Monitoring

The high turnaround capability of Innova-Mass provides you with an accurate mass flow measurement in both high-demand and low-demand conditions, eliminating the need for multiple metering installations. A built-in totalizer and three simultaneous outputs of process variables facilitate:

- Heat efficiency and BTU calculations
- Cost-allocation based on actual pounds of steam consumed
- System diagnostics, such as clogged tubes or pipe leakage.



4 Boiler Feed Water Measurement

Sierra's Innova-Flo volumetric vortex meter provides the following advantages in the measurement of water:

- Low pressure drop to reduce pumping costs
- Fast response to flow demand requirements
- High temperature and pressure capabilities
- No moving parts design to reduce maintenance requirements

5 Steam Header Monitoring

Sierra's Innova-Mass delivers readings of steam mass flow rate, temperature and pressure to simplify:

- Production monitoring
- Boiler efficiency calculations
- Alarming for a rapid decline in pressure
- Alarming for high pressure states that may indicate clogging.

6 Condensate Return Measurement

The flow, temperature and pressure outputs from Innova-Mass can be easily integrated into your control system to help you calculate:

- Make-up water requirements
- Heating efficiency
- Leak detection.



5 Harris Court, Building L
Monterey CA 93940
800-866-0200
831-373-0200
fax: 831-373-4402
www.sierrainstruments.com

SIERRA INSTRUMENTS, B.V.
Bijlmansweid 2
1934RE Egmond a/d Hoef
The Netherlands
+ 31 72 507 1400
fax: + 31 72 507 1401

SIERRA INSTRUMENTS, ASIA
Rm. A618, Tomson Centre
188 Zhang Yang Rd
Pu Dong New District, Shanghai,
P.R. China 200122
+8621 5879 8521/22
fax +8621 5879 8586