

# Steam Metering Concepts

## Typical Saturated Steam Metering System Using Vortex Flowmeter and Electronic Flow Computer

This document was created to aid in the explanation of the measurement of Saturated Steam by a vortex steam flowmeter system and the related service operations.

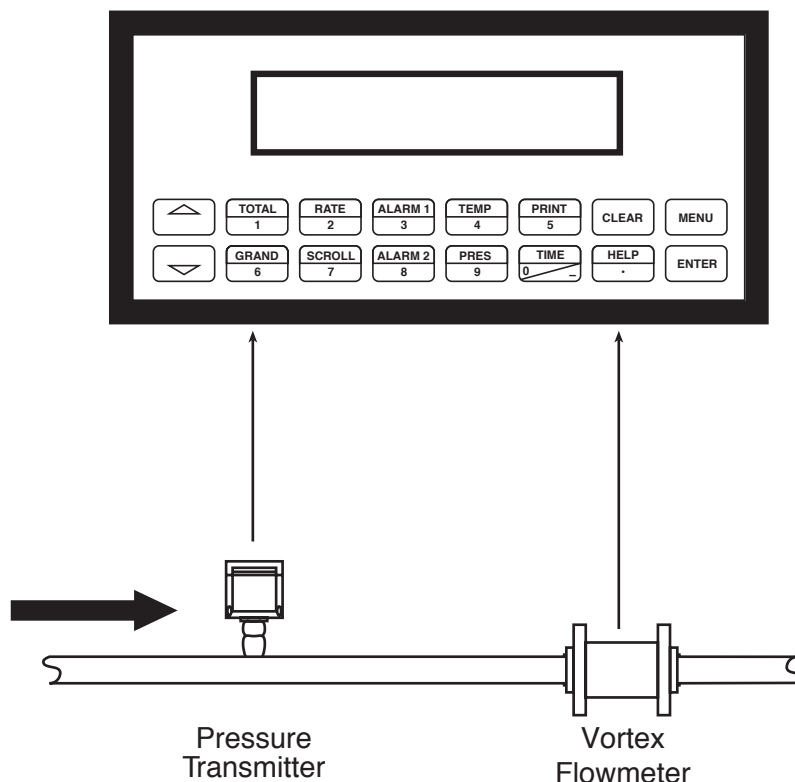
### General

A typical Saturated Steam-metering system typically consists of several components:

- Vortex Flow Meter installed in the saturated steam line
- A static pressure transmitter and/or temperature transmitter to measure steam conditions
- A Flow Computer to compute the Saturated Steam flow
- A Data Logger/Modem to monitor the customer site and provide trend information

**NOTE:** If remote metering is supported, a remote PC, modem, and remote metering software may be used in conjunction with this system.

**HELP TIP:** The piping surrounding the location where the flowmeter and related transmitters are installed is called the “meter run”.



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## Equipment Selection

The flowmeter is sized by the manufacturer, based on the expected line conditions and flow rate anticipated in the application. This normally requires that the line size, Saturated Steam pressure range and expected Saturated Steam flow rate range be known. The vortex flowmeter is selected for Saturated Steam service with a measurement range that will meet or exceed the maximum flowrate. The static pressure transmitter is selected for Saturated Steam service with a measurement range that will meet or exceed the range of static line pressure to be encountered in the application. The flow computer performs the necessary calculations needed to compute the Saturated Steam flow from the electrical signals being fed into it. The datalogger and modem permit remote monitoring of the information fed into the data logger. The information is sent to the datalogger by either the input measurement or the computed outputs from the flow computer. A remote PC with modem can access the information either in the data logger or in the current readings of the flow computer.

## Factory Calibration

The flow meter, transmitters, flow computer, and data logger are **calibrated** by their respective manufacturer's prior to being supplied to a utility company, in accordance with the instructions provided when the units are purchased.

## Installation

During installation the flowmeter and static pressure transmitters are installed in accordance with industry guidelines and manufacturers' instructions.

The individual calibration and setup documents provided by the manufacturers are reviewed.

## Startup

During startup the individual components of the systems are **setup** so that they operate correctly.

For the transmitters this normally involves double-checking of each transmitter range and optional features using a hand held terminal.

The flow computer is **setup** by entering the information on the flowmeter and static pressure transmitter. In addition, the items to be included in the data logger are also setup. This is usually done from the front keypad, although connecting the device to a laptop and using a special program supplied by the manufacturer can also be used. Setup may also be accomplished remotely via the modem connection.

The setup of each individual item is verified. For each measurement, there is a transmitter to scale and send an electrical signal to the receivers that need this information. The scaling of each transmitter must also be set into the corresponding flow computer input channel. If a change is made to one, it must be made to all.

The basic operation of the system can be verified by checking that the respective sensors are producing the correct signals, based on the observed signal, the flow range setup in the sender and receiver of the information, and the observed process conditions in the Saturated Steam line. Signal simulators and multi-meters may also be used.

There is a "low flow cutoff" that should be set to prevent the system from metering when no flow is present. This also limits the low flow measurement range, so it is usually set to the lowest practical value.

## Meter Readings

Meters may be read either locally by taking a reading from the flow computer, or remotely by taking a reading from the flow computer via modem, or by reading the data logger. The operational status of the metering system is also checked periodically.



## Servicing the Metering System

Often a utility will perform various inspections each year on each Saturated Steam meter. Manufacturers of the components used in a Saturated Steam system provide a number of service and test aids for Service personnel that permit them to interrogate a component to determine if it is operating properly. From time to time problems may occur in any system. The transmitters flow computer, and data logger usually have some **diagnostic capability** and can assist in problem detection and notification.

If it becomes necessary, for any reason, the flowmeter may be **changed out**. This sometimes occurs when the heating load changes or the actual Saturated Steam range is different than the expected range as a result of inaccurate sizing information. When a change out occurs the information on the new flowmeter must also be set into corresponding transmitter and the flow computer flow input channel. If a change is made to one, the change must be made to all.

If a transmitter is changed by either **replacement, re-scaling, or re-spanning** then the new scaling of that transmitter must also be set into corresponding flow computer input channel. If a change is made to one, the change must be made to all.

Most utilities remove portions of the meter system from service after several years for recalibration. The flow computer and data logger can usually be checked in place using simulators. They can be removed from service if needed and replaced with another device that then must be setup for use as described earlier. Inputting known pressure using a special hydrostatic pressure pump may check many pressure transmitters. In other cases, the transmitters are replaced with a calibrated replacement unit

## KEP Flow Computer

Kessler-Ellis Products (KEP) offers the Supertr 2 Flow Computer for Steam Metering applications. It is available in a variety of housings to suit a wide range of application environments.



## SUPERtr II

- “EZ Setup”- Guided Setup for First Time Users
- Liquid, Gas, Steam and Heat Flow Equations
- Utility Metering
- Menu Selectable Hardware & Software Features
- Internal Data Logging Option
- Isolated Pulse and Analog Outputs Standard
- RS-232 Port Standard, RS-485 Optional
- Windows™ Setup Software
- NX19 Gas Equations, Stacked DP Transmitters

- DDE Server & HMI Software Available
- Remote Metering by Wireless or Modem
- NEW! - Attractive Wall Mount Enclosure

