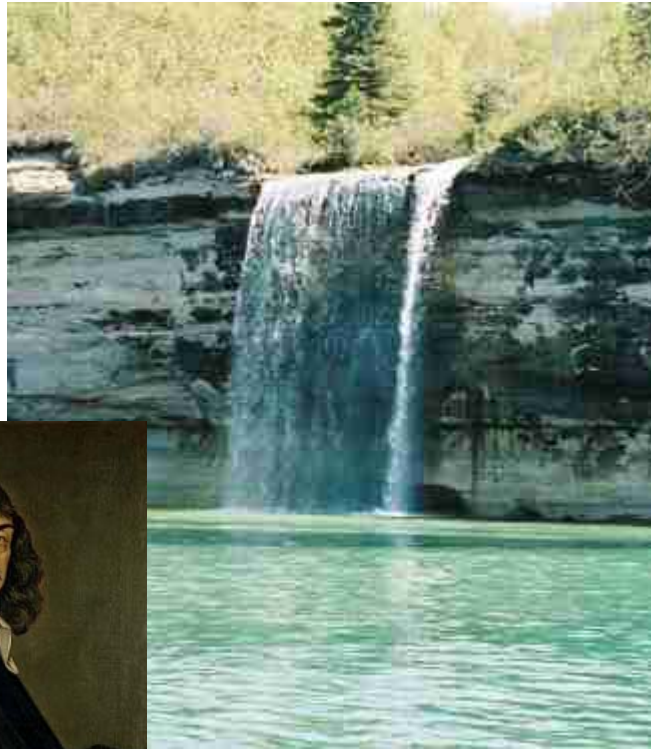


A STEADY STREAM OF DATA IS COMING YOUR WAY

market barometer



René Descartes

Q3 2007

Focus this Quarter: Pressure transmitters and steam flow measurement

A *Worldflow* publication

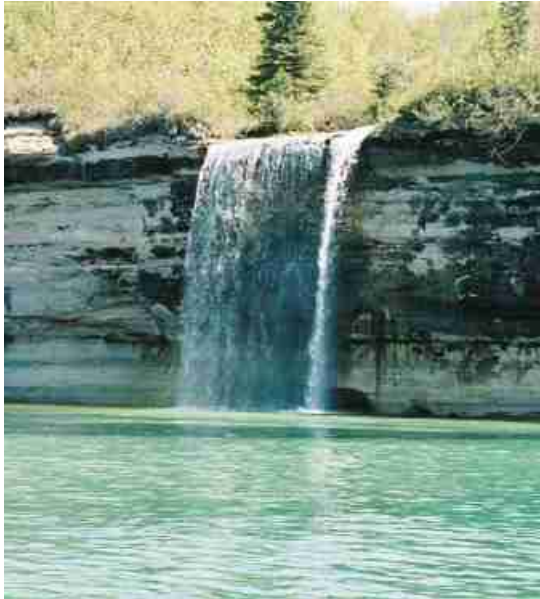


Flow Research, Inc.

The **Market Barometer** is the component of Worldflow that focuses on the flowmeter industry. Every quarter, the **Market Barometer** shines its spotlight on this industry, looking for important events to discuss or highlight.

We find the events, report them, and place them in the context of the flowmeter industry. The **Market Barometer** explains and interprets the importance of new technologies, new products, mergers, and acquisitions. We give you the information and ideas you need to generate forecasts, make budget decisions, and implement winning strategies.

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The *Worldflow Monitoring Service* is a package of resources designed to serve the information needs of flowmeter and instrumentation manufacturers, distributors, and end-users. Each component offers timely data, meaningful news, and insightful commentary on the markets it covers. Each complements and updates the studies that Flow Research regularly conducts in the same markets, and keeps readers informed of events and trends in their industry.

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Market Barometer (MB) (40–60 pages) This quarterly publication focuses on the flowmeter industry. *MB* reports on important technology introductions, mergers and acquisitions, and application trends. “State of the Industry” highlights recent industry events and their meaning. And, in every issue, we review each flowmeter technology and interpret changes, giving you the information and ideas you need to implement winning product strategies and to make more informed decisions. Your subscription includes *Flash Reports*, a PDF file of each issue, and two printed and bound hardcopy volumes.

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Flash Reports (2–6 pages each) Just as the *Worldflow Monitoring Service* informs during the interval between studies, *Flash Reports* activate as soon as important news breaks. *Flash Reports* include both the key facts and a “What it Means” section. Subjects of recent *Flash Reports* include Racine Federated’s purchase of Asahi America’s vortex flowmeters, the API’s formulation of standards for vortex flowmeters, and Nu-Flo’s acquisition of Caldon.

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Market Barometer Q3 2007

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Market Barometer is part of the Worldflow Monitoring Service. Other publications in this service include the **Energy Monitor** and **Flash Reports**. Periodic **White Papers** provide a more detailed look at particular topics. The **Living Database** provides more in-depth information and analysis about the instrumentation business.

Here is the **Worldflow** publication schedule for the rest of 2007 and the first part of 2008:

Q4 2007

Market Barometer—January 2008

Energy Monitor—February 2008

Q1 2008

Market Barometer—March 2008

Energy Monitor—April 2008

Q2 2008

Market Barometer—May 2008

Energy Monitor—June 2008

State of the Industry Report: Third Quarter, '07

Full speed ahead—with caution

By Jesse Yoder, PhD

Anyone who has followed the instrumentation business for more than the past few years knows that it goes through ups and downs, somewhat like a wave. The most recent trough in this market occurred in the years 2001 to 2003, following the events of 9/11/2001 in the United States. Of course, the instrumentation business was not the only one experiencing a trough. The US economy experienced a recession in 2001. Europe and Japan also experienced downturns during this same period.

Apart from the Internet bubble and collapse of 2000, the previous trough of this type occurred in 1997 during the collapse of the currency markets. This collapse began in Thailand in 1997. It then spread to other Asian countries. After the currency collapse, spending on Y2K absorbed much of the technology-related spending for many companies. In the end, Y2K turned out to be pretty much a non-event.

The purpose of revisiting these negative events is simply to provide perspective on today, and on the past several years. The instrumentation markets are riding a wave of capital spending and investment that began in 2004, and is continuing today. How long can this last? There is a credit crisis brewing in the United States that is related to the housing market. High energy prices are cutting into consumer spending. Despite these clouds on the horizon, instrumentation markets are continuing to expand. It's important to remember that these markets are global in nature, and that they do not depend solely on the strength of the US economy.

Of course, no one can completely predict the future, and we are all at the mercy of world events at times. Here is something I wrote in *The World Market for Coriolis Flowmeters* in July 20001:

Prospects are good for a gradual return to improved growth in the second half of 2001. The stock market is recovering in July 2001, and some companies are reporting favorable growth.

This was written just two months before 9/11/2001.

At the same time, there are some very encouraging signs on the horizon. Violence in Iraq is down, and tensions between the US and North Korea and the US and Iran are easing somewhat. While Vladimir Putin in Russia and Hugo Chavez in Venezuela are setting their own course, tensions with these countries are still at a manageable level.

Full Speed Ahead – With Caution

I can't think of a better way to characterize what I believe to be the most logical attitude today to the instrumentation markets than "Full speed ahead – with caution." Anyone who is determined to be negative can always find dark clouds on the horizon, whether it's the housing crisis, rising energy costs, Hugo Chavez's desire to be president for life, or Iran's alleged desire to have nuclear weapons.

(Continued on page 8)

Full speed ahead—with caution (cont.)

(Continued from page 7)

At the same time, the world is searching for more energy, and billions of people are looking for the energy to power their increasingly upscale lives. Instrumentation suppliers have a vital role to play in this energy search, and it isn't limited to finding more oil and gas. Renewable energy will play an increasingly important role as prices for oil and natural gas increase, demand increases, and supply is constricted. In addition to the search for energy, many new process plants are being built in China, India, and Southeast Asia, and new construction is also occurring in Europe. These plants require instrumentation, and who better to provide it than instrumentation suppliers?

Instrumentation Trends

The above is a very abbreviated look at some of the macro trends impacting the instrumentation markets. What are the specific instrumentation trends?

I have personally been following instrumentation markets since 1993, and I have never seen more clearly than today the evidence of a shift away from traditional technology flowmeters and towards new-technology flowmeters. Which flowmeter types are most affected by this trend?

The traditional technology flowmeters that are most affected by this shift are turbine, positive displacement, and variable area. Differential pressure (DP) flowmeters are also affected, but their installed base is very large and suppliers are introducing new products such as multivariable DP transmitters and even new primary elements. There are still some applications where DP flow remains the best solution. As a result, the DP flowmeter market is still experiencing significant growth.

Which are the new-technology flowmeters benefiting most from this shift? The clear winners here are Coriolis and ultrasonic flowmeters. Vortex flowmeters are also benefiting from the shift. Magnetic and thermal flowmeters are benefiting the least, even though these markets are also expanding.

One reason for the shift towards new-technology flowmeters is that many flowmeter suppliers are voting with their pocketbooks and putting their research and development dollars towards new new-technology flowmeters. Here is some anecdotal evidence to support this claim.

We have been publishing the Market Barometer since 2002, and we “update every flow technology every quarter.” If you are familiar with the structure of the Market Barometer, you know that we have a section each quarter devoted to each flow technology, and that we provide some type of update for each flow technology in each issue, to the extent that this is possible. The update usually is in the form of a product announcement, or possibly some data from a market study on the subject.

My experience over the past five years has been that it's never hard to come up with product announcements for new-technology flowmeters, especially Coriolis and ultrasonic. The main

(Continued on page 9)

Full speed ahead—with caution (cont.)

(Continued from page 8)

suppliers regularly announce product upgrades, bring out entirely new products, or announce new products designed for specific industries or applications.

Finding new product announcements for positive displacement and turbine flowmeters is a different experience altogether. For this issue, I visited the website of every positive displacement supplier I'm aware of, and came up empty. Finally, I found an announcement from Titan Enterprises in the UK about a positive displacement totalizer that tracks the number of pints of beer delivered in a session (e.g., an evening). The purpose of this totalizer is to detect any tampering with the dispenser (see page 38).

From a practical point of view, it is a very short inference from the difficulty in finding new product announcements for turbine and positive displacement flowmeters to the conclusion that the PD and turbine suppliers are simply not coming out with new products at anywhere close to the same rate as the Coriolis and ultrasonic suppliers. And this fact in itself is helping to shape the markets.

Not only are existing new-technology flowmeter suppliers regularly upgrading their product lines. Many of them are choosing to broaden their product lines by offering new types of flowmeters. Some of these changes are a result of acquisitions, some are from internal research and development, and some are private label arrangements based on alliances and partnerships. Here are some examples.

- Sierra Instruments (www.sierrainstruments.com) has added ultrasonic flowmeters to its line of thermal flowmeters and mass flow controllers.
- Blue-White (www.blue-white.net), long known as a supplier of variable area flowmeters, is introducing a new clamp-on ultrasonic flowmeter in February 2008.
- Fluid Components Int'l (www.fluidcomponents.com) has broadened its product line by adding Coriolis flowmeters.
- GE Sensing (www.gesensing.com) has augmented its comprehensive group of ultrasonic flowmeters by adding a vortex flowmeter called the Panaflow.
- Siemens (www.siemens.com) has chosen the acquisition mode to broaden its product line. Most recently, Siemens acquired Controlotron and its clamp-on ultrasonic flowmeters. These flowmeters have been absorbed into Siemens' FUS line of ultrasonic meters.
- Racine Federated (www.racinefed.com) has added vortex flowmeters to its product line by first acquiring the industrial line of vortex flowmeters from J-Tec, and then purchasing the vortex flowmeter line from Asahi America.

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State of the Industry Report: Third Quarter, '07

(Continued from page 9)

- Aalborg (www.aalborg.com) has augmented its line of mass flow controllers and variable area flowmeters with the vortex flowmeter product line from Venture Measurement.
- Endress+Hauser (www.endress.com) got into the ultrasonic flowmeter business several years ago with its line of clamp-on ultrasonic flowmeters.
- Honeywell (www.honeywell.com) has formed an alliance with KROHNE (www.krohne.com), and is reselling KROHNE's flowmeters. KROHNE only has new-technology flowmeters, apart from their variable area meters. KROHNE manufactures magnetic, Coriolis, vortex, and ultrasonic flowmeters.
- Flow Technology (www.ftimeters.com) has announced that it is now selling magnetic flowmeters. Flow Technology is mainly known as a supplier of positive displacement and turbine flowmeters.
- Cameron (www.c-a-m.com) acquired Caldon (www.caldon.net) in January 2006. Caldon is a supplier of ultrasonic flowmeters for the nuclear industry, and is also selling ultrasonic flowmeters into the petroleum industry. Caldon is one of the two Company Korner in this issue of the Market Barometer (see page 30).
- IDEX Corporation (www.idexcorp.com) acquired Faure Herman (www.faureherman.com). Faure Herman has an 18-path ultrasonic flowmeter for petroleum liquid measurement. Faure Herman also manufactures turbine flowmeters and flow computers.

This is not to say that no one is adding traditional technology flowmeters to their product line. There are some examples, but the new-technology additions substantially outnumber the traditional technology additions. Here are two:

- IDEX Corporation acquired Sponsler (www.sponsler.com), a supplier of turbine flowmeters.
- Emerson Process Management (www.emersonprocess.com) acquired Bristol Babcock (www.bristolbabcock.com). Bristol manufactures pressure transmitters and flow computers.

Interviews with end-users also provide more support for the idea that a shift is occurring towards new-technology flowmeters. In a large survey of end-users, published in January of 2006, we asked end-users what types of flowmeters they are buying now, and what types they expect to be buying in 2008. For all the new-technology flowmeters, including Coriolis, mag-

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Full speed ahead—with caution (cont.)

(Continued from page 10)

netic, ultrasonic, vortex, and thermal, a higher percentage of end-users expect to be buying them in 2008, compared to 2004. For positive displacement and turbine flowmeters, a lower percentage of end-users expect to be buying them in 2008 as compared to 2004. For more details on this survey, see **Worldwide Survey of Flowmeters Users, 2nd Edition**, or contact Flow Research for more information.

Why is this shift occurring? Here are several reasons:

- End-users are looking for higher accuracy and higher reliability in their flowmeters. They perceive that new-technology flowmeters are more reliable and accurate than traditional meters.
- End-users are looking for flowmeters with no moving parts that do not create a pressure drop. They perceive that new-technology flowmeters for the most part do not have moving parts and create minimal pressure drop, unlike traditional meters.
- More new new-technology flowmeters are available than new traditional meters, since new-technology flowmeter suppliers are continuing to update their new-technology flowmeter lines.
- The drive to find more energy sources, together with the higher prices of crude oil and natural gas, is putting a premium on petroleum measurement. As the price of oil goes higher, accurate measurement becomes more important. This benefits Coriolis and ultrasonic flowmeters for liquid petroleum measurement, and ultrasonic flowmeters for measurement of natural gas, especially for custody transfer applications in natural gas distribution.
- Industry associations, including the American Gas Association (AGA), the American Petroleum Institute (API), and the International Organization of Legal Metrology (OIML) have all come out with standards for new-technology flowmeters for custody transfer purposes. This especially includes ultrasonic and Coriolis flowmeters, although the API published a draft standard for vortex flowmeters for custody transfer applications in January 2007. Previously, the organizations only had approvals for DP and turbine flowmeters.

How quickly is the shift from traditional technology to new-technology flowmeters occurring? We hope to be able to answer that question in a few months, when we publish our updated version of **Volume X, The World Market for Flowmeters**, 2nd Edition. We also expect to cover two emerging technologies, sonar and optical, in this new study. Until then, we will continue to monitor the industry-wide shift to new-technology flowmeters.

State of the Industry Report: Third Quarter, '07

Full speed ahead—with caution (cont.)

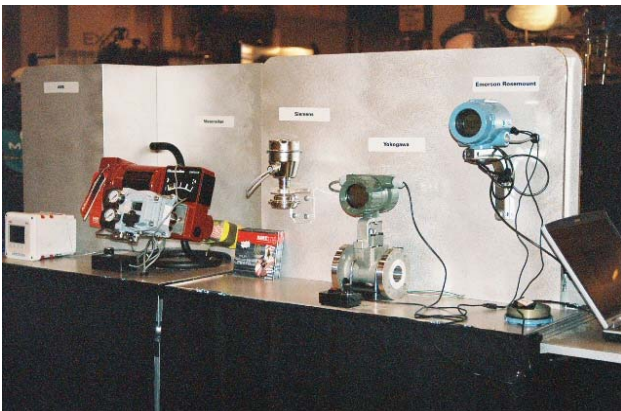
Some Photos from ISA 2007



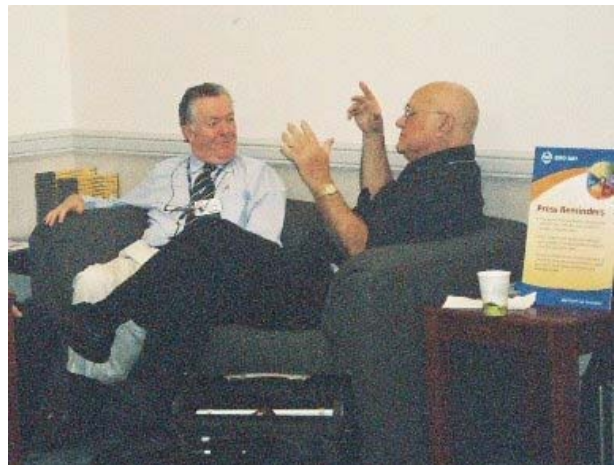
A shot of the floor at the 2007 ISA show.



John Harris, Matt Migliore, and Kevin McCarthy (from left) of Flow Control show a spirit of unity in the press room.



*Interoperability on display at ISA
All photos by Flow Research*



Dick Morley (right) with Eoin Ó Riain, of The Read-Out Instrumentation Signpost in Ireland

Reflections on ISA 2007

Attendance at ISA shows has been down the past several years, but this year's ISA show still drew 12,000 people (see page 24). Besides the decline in attendance, participation is down from the large instrumentation suppliers. There are several reasons for this:

- Many end-users feel that they can get a lot of the product information they need from the Internet, and don't need to go to a trade show for this purpose anymore.
- Many of the large instrumentation suppliers are sponsoring their own end-user conferences. They are also choosing to go to more industry specific shows than ISA.

Despite these trends, the ISA show still remains a good place to meet and greet, and Houston seems to be its best venue. So ISA will be back in Houston in 2008—we'll see you there!

Worldflow Focus: Pressure Transmitters

Pressure transmitter market shows strong growth

Wakefield, Massachusetts (December 13, 2007) — A new research study finds strong growth for the pressure transmitter market.

The new study from Flow Research (www.flowresearch.com), called **The World Market for Pressure Transmitters, 2nd Edition**, found that the worldwide pressure transmitter market totaled \$1.93 billion in 2006, with a projected yearly growth of 6.1 percent through 2011. The most rapid growth is occurring where new process plants are being built, primarily in China, the Middle East, and in developing countries in Asia.

Rapid growth in the multivariable transmitter market drove much of the growth in the pressure transmitter market. The market for multivariable DP transmitters for flow more than doubled in the past four years, the study found. In addition, a large number of current users reluctant to abandon their investment assures sustained growth in the differential pressure transmitter market. Even when faced with a need for higher performance levels, many of these users will choose to stick with differential pressure transmitter technology as suppliers provide advanced features. A need for

higher performance also encourages users to move up the ladder from pressure transducers to pressure transmitters.

Pressure transmitters are widely used in the oil and gas industry, which is currently undergoing rapid growth. Increases in the price of crude oil have generated a major increase in upstream oil and gas activity. It is now profitable to drill for oil in many locations that were previously too expensive for oil exploration and production. Other industries where pressure transmitters are widely used include refining, chemical, and power.

According to Dr. Jesse Yoder, president of Flow Research, the future looks bright for pressure transmitters. “Instrumentation markets are riding a wave of capital expansion in the process industries that began in 2004. Pressure transmitters are benefiting from that expansion. Growth in the process industries, together with increased activity in the oil and gas industry, is expected to drive the pressure transmitter market to new revenue levels in the next several years.”

Growth factors for the pressure transmitter market

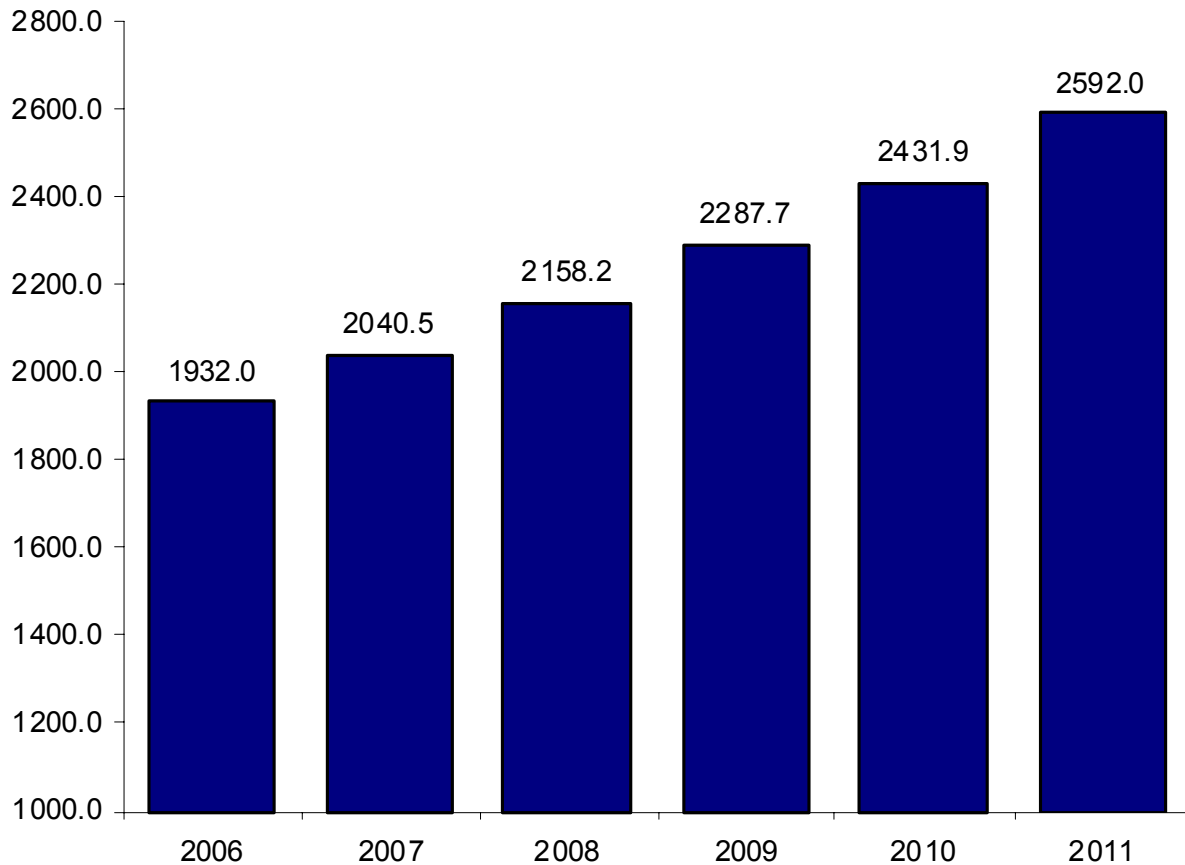
Several factors account for the growth in the transmitter market. The pressure transmitter market has grown due to growth in the number of capital projects in Asian and other countries, and especially due to growth in China and the Middle East. Secondly, there has been a tremendous increase in the amount of activity in oil & gas exploration and production in the past several years, due to increases in the price of oil and natural gas. Finally, suppliers have made significant technological improvements to their pressure transmitters, resulting in more stable and accurate products, and this has given customers a reason to buy into this market, or to upgrade their existing products.

Much of the growth in the pressure transmitter market is due to growth in the multivariable transmitter market. The market for multivariable DP transmitters for flow has more than doubled in the past four years. In 2002, this market was valued at about \$49 million, while in 2006 it was valued at just over \$112 million worldwide. Multivariable transmitters measure more than one process variable. These are usually pressure, differential pressure, and temperature. Many multivariable transmitters use these values to compute mass flow, while others output

Worldflow Focus: Pressure Transmitters

Pressure transmitter market shows strong growth

Figure 1. Total Shipments of Pressure Transmitters Worldwide
(Millions of Dollars)



these values to a flow computer for calculation. Multivariable pressure transmitters are widely used to measure steam flow. They were first introduced by Bristol Babcock in 1992. Since that time, Emerson Rosemount and Honeywell have been the main suppliers. More recently, ABB, Foxboro, and now Yokogawa have entered this market.

Installed base is probably the single biggest factor that has sustained growth in the pressure transmitter market in the past four years. Many companies have invested very heavily in pressure transmitter technology, and are not likely to abandon this investment. Changing technologies often requires changing suppliers, and also has additional start-up and educational costs. Many end-users will choose to stay with their pressure transmitters unless they have a particular problem with them, or are required to change technologies by regulations or due to a need to move to a higher performance level. Even in this case, technology improvements by pressure transmitter suppliers may persuade end-users to stick with pressure transmitter technology.