Instromet®

GAS SYSTEM SOLUTIONS

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INSTROMET SOLUTIONS

Instromet has specialised in gas measurement for more than 30 years. During this time, Instromet has not only proven to be a reliable manufacturer of the highest quality, but also a flexible solution provider of high accuracy measurement systems. The turn-key solutions are tailor made and range from small district reduction stations to custody transfer border metering stations. Instromet provides gas measurement systems using standard products, pipeline & telemetry systems, and calibration facilities.

Gas measurement system

STANDARD PRODUCTS

Instromet has five factories world-wide producing standard products. These are principally ultrasonic meters, turbine meters and rotary meters. Also manufactured are flow computers, volume correctors and gas chromatographs. Measurement & control stations, calibration installations and supervisory systems are constructed in our principal factories where Instromet has dedicated engineering and design teams.

Dry calibration of Q.Sonic ultrasonic gas meter

GAS METERS

Instromet supplies a full range of gas meters, from the small economical devices used for process control to large, high pressure reference meters.

The turbine meters have been in production for more than 30 years and are well known throughout the industry for their accuracy and reliability. Over the years 200,000 meters have been produced, ranging from 2" to 30".
Ten years ago Instromet radically redesigned the rotary piston meter considerably increasing its range, accuracy and application. The unique, patented IRM Duo is now to be found as a master reference in some of the world's most prestigious calibration facilities.

The ultrasonic meter has redefined gas metering. Highly accurate and repeatable metering is now possible without any moving parts, independent of pressure, temperature or gas composition. As a design the meter is without pressure drop and capable of measuring the gas flow in either direction. Instromet has supplied fully two thirds of the world's large, high pressure ultrasonic meters.

Regulators, both simple and sophisticated are also manufactured by Instromet, and are integrated into our complete solutions systems.

Flow computer model 2000

CORRECTORS AND FLOW COMPUTERS

Instromet has been producing digital gas flow correctors and computers since 1982, and is now a leader in its field.

To date more than : 50,000 gas flow correctors
15,000 gas flow computers
1,500 gas metering systems
have been delivered by Instromet.

The correctors have often been used as stand-alone units for direct read-out. Now most are read remotely using serial links and SCADA systems.

The flow computers are suitable for gas applications with rotary, turbine, ultrasonic and orifice metering. They can be used alone, but are typically used together with a station controller or are integrated into a gas metering system with a supervisory computer.

All of the correctors and computers are approved by international certification bodies, such as NMi, PTB and others.

GAS ANALYSERS

Instromet also integrates all necessary gas analysers into measurement systems. To determine the gas composition the Encal 2000 gas chromatograph is used. This chromatograph has been developed especially for on-line analysis of natural gas, combining high accuracy and repeatability with fast throughput. The Encal is PTB and NMi approved.

Other analysers include density, specific gravity, water and hydrocarbon dew point, total sulphur, H_2S, oxygen, etc. All analysers may be assembled into one integrated analyzer house by Instromet.

Encal 2000 Gas Chromatograph

SUPERVISORY SYSTEM

Instromet has extensive experience in supervisory systems specific to gas applications, as reflected in the Instromet Supervisory Suite (ISS). Unlike SCADA systems, the extremely sophisticated package is designed specifically with metering in mind. Central to ISS are its fast calculations, including a complete flow library, and its reporting capabilities. ISS also provides all SCADA functionality, like graphic mimic displays, alarming, real-time and historical trending. Extensive communication are available over LAN, fixed lines, leased lines, radio or mobile telephone links.

The integrated ISS web server provides metering information to all departments and customers over the company intranet or over internet. SQL database support is available when needed.

Dual redundant supervisory system

ENGINEERING AND MANUFACTURING

Instromet specialises in custom specific solutions, particularly skid mounted systems, minimising on-site installation.

Electrical and instrumentation engineering

The engineering team has been designing complete metering and regulation stations for more than 25 years. This knowledge and experience ensure the optimum solution for metering and control requirements.

Engineering includes mechanical, electrical, instrumentation, analyzer and computer system design. All manufacturing is done in-house to ensure that maximum quality is achieved.

After welding all seams undergo strenuous radiographic, ultrasonic and / or dye penetration examination. The pipe spools are subject to a hydrostatic strength test. All parts will be cleaned with shot blast before being painted. After sub-assembly, the systems are subjected to a pressure leak test before final coating.

All measurement equipment and correctors are calibrated and certified by Instromet or national weight and measures authorities before being integrated into a system.

M&R Stations Manufacturing Plant, Essen, Belgium

GAS METERING SYSTEMS

The systems are designed to optimise accuracy and to reduce the cost of ownership, all within the customer's budget.

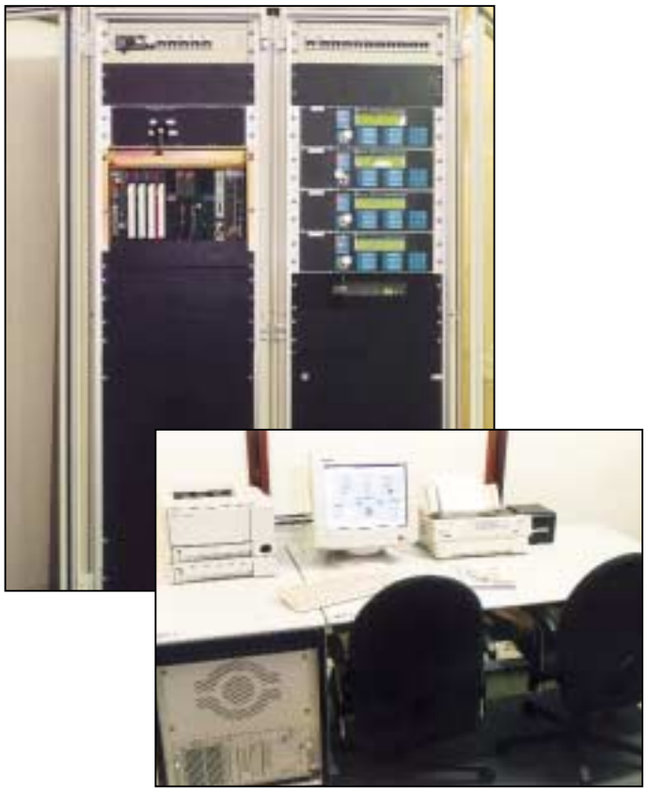
Operation is made easier by a good visual overview of the system, by alerting the operator when something is wrong and by providing historical information on demand. Valves can be operated, either automatically or remotely from a central location. Reporting can be fully tailored to meet various accounting and maintenance needs.

The maintenance free metering concept continuously checks for any indication of accuracy degradation.

TURBINE METERING

Turbines are used in many different applications from district reduction stations to border metering stations and from internal process control to high pressure calibrations.

Turbine metering station 100,000 m³/h at 70 bar



Three run turbine energy metering system

ORIFICE METERING

Orifice metering has been traditionally selected for many applications because of the lack of moving parts and the possibility of on-site verification, even though its accuracy is limited.

Instromet's expertise is often called upon to produce complete measurement systems based on orifice meters. To maintain the accuracy of orifice metering, regular calibrations of all transmitters must be performed, potentially increasing the Cost-of-Ownership. Instromet includes computer aided calibration in its supervisory system to reduce the cost associated with this task.

Border metering 1,200,000 m³/h at 75 bar

Redundant orifice metering 4,700,000 m³/h at 60 bar

ULTRASONIC METERING

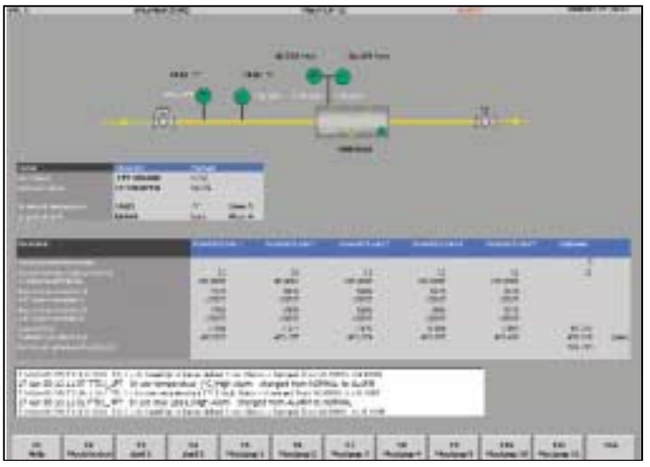
Ultrasonic gas flow meters are ideal for many applications, even with contaminated gas, from simple check metering to custody transfer metering.

Ultrasonic metering for wet gas

Instromet has been in the forefront of the ultrasonic meter development and has been involved in many metering projects. To reduce the Cost-of-Ownership and increase the throughput as well as the measurement accuracy, many large metering sites are changing over from turbine or orifice metering to ultrasonic metering.

Ultrasonic metering 10,000,000 m³/h at 75 bar

The supervisory system fully meets the recommendations of AGA-9. It has an extensive set of diagnostic tools which provide on-line performance and health checks of the meter. This lessens the need for re-calibration. One typical example is the verification of the calculated against measured velocity of sound.



Performance monitoring via remote support

TOTAL ENERGY MEASUREMENT

Today, third party access to the gas pipelines makes accuracy in measurement more important than ever. The best way to guarantee optimum accuracy is to use two measurement principles in series with similar accuracy and compare the two volumes generated in real-time. Instromet has this technology in-house and providing combined turbine and ultrasonic measurement systems.

Six run energy system 2,300,000 m³/h at 60 bar

Third party access also makes the measurement of energy imperative. Instromet offers complete packages called "Total Energy Measurement" which is tailored to meet these requirements.

Not only does Instromet offer the most accurate turbine and ultrasonic meters on the market, but also provides the associated gas chromatographs, approved flow computers and the most sophisticated supervisory systems available. Several such stations have been installed at border metering sites.

TELEMETRY AND REMOTE METERING

With the new developments in gas transportation and distribution, accurate and cost effective volume and energy metering, control and supervision are becoming of the utmost importance.

With its roots in the gas business, Instromet is a logical choice. Instromet has a thorough knowledge of gas and gas metering, has flow computer and telemetry equipment and provides state of the art supervisory systems.

PIPELINE TELEMETRY AND CONTROL

For pipeline control systems a real-time overview of the complete status of the pipeline is important. Since the metering sites are often unmanned, control of the metering sites and the block valve operations is often centralised in the gas control centre.

Traditionally, pipeline SCADA systems are used in conjunction with telemetry over telephone lines, radio or satellite. Today, where fiber optic cables are becoming cost effective, local area networks and intranet technology are becoming more popular.

Gas supervisory system

In pipeline networks many functions are needed such as tracking, tracing, mass balancing, underground storage, leak detection, load sharing and compressor optimization. Many solutions are available, including, at the high end, sophisticated pipeline modelling.

DISTRIBUTION TELEMETRY AND CONTROL

In order to control a distribution network effectively at least the pressure and volume must be measured regularly at several points and transmitted to the control centre. Appropriate pressure and flow control must also be available.

At city gate stations and large customer facilities, flow computer and control systems which are suitable for communication are typically installed. At regulation stations and medium sized industries it is often necessary to install remote terminal units (RTU's) for suitable control.

Private or leased lines, fiber optics cables or radio links can be used for communication.

As with pipelines, a supervisory computer system performs all functions from a central control system to allow proper dispatching and planning. Special functions include peak shaving, leak minimization, leak detection, historical archiving, prediction, scheduling, planning, maintenance and reporting.

Integration with remote metering allows better prediction of consumption and allows the combining and comparing of meter readings.

REMOTE METERING

Remote reading is a cost effective way to access data. With tariff systems it is essential for distribution companies to measure on an hourly basis. This means that a logging volume corrector with remote reading capability is needed. These correctors store information, such as hourly averages over an extended period until they are read.

Instromet 999 Electronic Volume Corrector

A supervisory system calls all stations to gather this information into a central database. Stations may also call the supervisory system when an alarm situation occurs.

Communication is typically over telephone lines or mobile telephone links. In a centralised system, special software is used to supervise the stations, to transmit the data to accounting and to assist with preventative maintenance.

CALIBRATION SYSTEMS

Instromet offers a full range of gas meter calibration systems from simple low pressure installations to high pressure, high volume calibration facilities.

LOW PRESSURE CALIBRATION SYSTEMS

These systems are designed for the calibration of small turbine and rotary meters at pressures up to 8 bar. The reference is the Instromet IRM Duo rotary meter which offers a perfect solution for calibrating meters up to 1000 m³/h capacity.

Low pressure calibration system

INSTROMET ROTARY PISTON PROVER

The world's most prestigious calibration facilities use the new IRPP (Instromet Rotary Piston Prover) as the transfer standard. With the IRPP a total uncertainty of 0.15 % traceable to primary standards is possible.

IRPP System at Westerbork
High Pressure Calibration Facility

Using the IRPP, Instromet builds complete systems suitable for larger volumes. Due to its high accuracy and scalable size, such systems are ideal for calibration laboratories and for large gas calibration facilities, where the IRPP can be used in dynamic series with the reference standards.

HIGH PRESSURE CALIBRATION SYSTEMS

Instromet is actively involved in working to increase the accuracy of national reference standards and calibration facilities. Most of them use Instromet reference meters and Instromet itself has several calibration stations, including an 8 barg facility using natural gas.

Instromet is also deeply involved in the creation of the largest calibration facility in the world in Winnipeg, Canada. In this sophisticated facility, meters can be calibrated at flows up to 3,300,000 m³/h at 65 bar.

High pressure calibration facility Winnipeg

The SM-RI-X turbine and Q.Sonic ultrasonic meters are installed in series as master reference meters. On-line proving is also provided by an IRPP installation. Instromet was responsible for delivering the expertise, the metering and supervisory system.

Calibration supervisory system

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INSTROMET has a continuing program of product research and development. Technical specifications and construction may change due to improvements. This publication serves as general information only, and all specifications are subject to confirmation by INSTROMET.

Products & Services:

- Ultrasonic gas meters
- Turbine gas meters
- Rotary gas meters
- Insertion gas meters
- Electronic volume correctors
- Flow computer systems
- Calorimeters
- Gas chromatographs
- Supervisory Systems
- Gas filters
- Gas pressure regulators
- Safety shut-off valves
- Telemetering systems
- Electronic metering and control systems
- Calibration and test installations
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