

SITRANS FUG1010 Clamp-on Gas Flowmeters

The WideBeam ultrasonic transit time measurement principle, patented by Siemens, ensures flow measurement tolerance of most wet gas conditions allowing for continuous operation in situations where competing meters fail.



Thanks to Siemens patented WideBeam ultrasonic transit time technology, the SITRANS FUG1010 non-intrusive ultrasonic gas flowmeters are tolerant of most wet gas environments. This feature enables them to perform accurate readings despite the presence of air bubbles. Such conditions are so challenging that most competing meters are incapable of delivering readings, which only underlines the strength of the WideBeam technology. It has proven its reliability and accuracy in numerous field installations around the world.

The WideBeam technology makes the FUG1010 flowmeters ideal for

most natural, specialty, and process gas industry applications, including:

- Check metering
- Lost and unaccounted for (LAUF) analysis
- Allocation
- Flow survey verification
- Production
- Storage
- Gas fired power stations

As with any other clamp-on flow device from Siemens, it is not necessary to cut the pipe or shut down operations to install the flowmeter; the transducers are quickly and easily mounted on the outside of the pipe, minimizing

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maintenance expenses and preventing deposits from forming. The clamp-on design also eliminates the need to modify pipes or interrupt the flow.

Quality-assured features

The built-in Data View analytical software provides the FUG1010 with diagnostic capabilities delivering crucial information about the application and meter performance. This data can be extracted and downloaded to a PC for thorough analysis and systems check.

For additional verification purposes, a speed of sound calculation in compliance with the American Gas Association's AGA-10 standard is incorporated in the software. In addition, an internal AGA-8 compliant table for fixed gas composition is available for standard volume computation.

When installation conditions require it, the transducers can be delivered in rugged stainless steel weld seal enclosures permitting permanent direct burial. For additional protection the transducers can be sealed with denso couplant or RTV silicone that completely covers the seals.

A feature that makes commissioning of the FUG1010 flowmeters particularly easy is the Zeromatic Path function. After installing the meter, it interrogates the ultrasonic signal in order to update the zero offset value under normal operation. This way, the flowmeter dynamically

compensates for changing conditions which would normally result in zero drift. The Zeromatic Path is recommended for applications which experience large temperature extremes often found in gases.

The WideBeam principle

All FUG1010 clamp-on flowmeters employ Siemens patented WideBeam ultrasonic transit time technology, in which the pipe wall is utilized as an amplifier to optimize the signal to noise ratio. This technology increases precision by reducing the sensitivity to any change in the medium type or pressure. In addition, it also makes the flowmeter immune to most pressure reducing valve noises.

The WideBeam principle can be used for steel, aluminum, titanium and plastic pipes and through several field tests, it has proven especially valuable for gas as well as hydrocarbon applications.

Flexible product offering

Clamp-on ultrasonic gas meters are available in three different enclosures: standard IP65 (NEMA 4X) for wall-mount installation; explosion proof compact IP65 (NEMA 7); and explosion proof wall mount with an IP66 (NEMA 7) enclosure. Depending on the required measurement accuracy and the flow profile, the FUG1010 meters are available in single, dual, or optional four beam versions.



SITRANS FUG1010 gas flowmeters provide several benefits:

- WideBeam transit time technology ensures excellent accuracy and tolerance of most wet conditions
- Data extraction and analysis through DataView diagnostics tool
- AGA-8 and AGA-10 compliance for software accuracy verification
- Optional weld seal transducer enclosure permits transducer burial
- Accommodates various flow profiles through option between single, dual and four beam versions
- Easy installation and commissioning

Siemens Industry, Inc.
Industry Automation Division
CoC Ultrasonic Flow
Hauppauge, NY 11788
USA

www.siemens.com/flow

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Order No.: E20001-A270-P730-X-7600
Printed in the USA
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SITRANS FUH1010 Clamp-on Hydrocarbon Flowmeters

Dynamic compensation for viscosity changes due to shifting liquid properties makes clamp-on ultrasonic flowmeters from Siemens the perfect choice for a wide array of storage and transmission installations within the hydrocarbon industry.



For those applications that require more of a flowmeter than the mere capability of accurately measuring flow, the Siemens SITRANS FUH1010 high-precision clamp-on ultrasonic flowmeters are just right. They are designed specifically for hydrocarbon applications where dynamic viscosity compensation that goes beyond the capabilities of standard ultrasonic flowmeters is a prerequisite.

SITRANS FUH1010 flowmeters for the hydrocarbon industry are ideal for a very wide number of applications, including:

- Ship off-loading
- Pipeline transportation

- Line balance and allocation
- Transmix and check metering
- Liquid quality monitoring
- Process control metering
- Offshore production
- Water injection/recovery
- Storage tank inflow/outflow

As with any other clamp-on flow device from Siemens, it is not necessary to cut the pipe or shut down operations to install the flowmeter; the transducers are quickly and easily mounted on the outside of the pipe minimizing maintenance expenses and preventing deposits from forming. The clamp-on design also eliminates the need to modify pipes or interrupt the flow.

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The WideBeam principle

All FUH1010 clamp-on flowmeters employ Siemens patented WideBeam ultrasonic transit time technology. The technology enables increased precision by reducing sensitivity to any change in the medium type or pressure. And by utilizing the pipe wall as an amplifier, the signal to noise ratio is optimized considerably resulting in a stronger ultrasonic signal. WideBeam also makes the flowmeter immune to most pressure reducing valve noises and permits continued operation over an exceptional range of viscosity.

WideBeam can be used for steel, aluminum, titanium and plastic pipes and through numerous field tests it has proven especially valuable for hydrocarbon as well as gas applications.

Automatic zero adjustment

A feature that makes commissioning of the FUH1010 flowmeters particular easy is the automatic zero adjustment. At the end of initial setup, an automatic zero (AutoZero) routine is automatically invoked.

The AutoZero routine, which is performed on a full pipe, carries out a one-time analysis of the pipe wall component of the ultrasound signal to quantify any residual mismatch in the hardware. Once AutoZero is complete, the system memorizes the zero offset and subtracts this value from the flow reading.

Flexible product offering

There are two types of FUH1010 flowmeters: a viscosity compensated

volume meter and a standard volume (mass) meter.

The viscosity compensated volume meter dynamically compensates for changes of viscosity as liquid properties change for continuous correction of Reynolds number. It allows analog output of inferred viscosity values in addition to valuable diagnostic data.

In addition to the functionalities of the viscosity compensated meter, the standard volume (mass) meter has additional features. Volume is compensated to a standard temperature, which can be individually defined by the user. This requires a dynamic temperature input and pressure input if the pressure varies significantly.

The meter infers the density for mass calculation and outputs the density and API values and for even more precise density compensation, an analog input from a densitometer can be utilized. Multiple analog outputs are generated when a liquid interface passes and a separate relay output for when a scraper passes.

The clamp-on ultrasonic hydrocarbon meters are available in three different enclosures: standard IP65 (NEMA 4X) for wall-mount installation; explosion proof compact IP65 (NEMA 7); and explosion proof wall mount with an IP66 (NEMA 7) enclosure. Depending on the required measurement accuracy and the flow profile, the FUH1010 meters are available in dual, triple or optional four beam versions.



SITRANS FUH1010 hydrocarbon flowmeters provide several benefits:

- WideBeam ultrasonic transit time technology ensures excellent accuracy
- Automatic zero adjustment makes installation and commissioning easy
- Choice between viscosity compensated gross volume and standard volume (mass) meter provides a solution for any application
- Multiple analog outputs enable interface and scraper distinction
- Accuracy tailored to application with option between dual, triple or optional four beam versions
- Three enclosures available to fit a variety of installation requirements
- No need to stop the flow or cut the pipe

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Industry Automation Division
CoC Ultrasonic Flow
Hauppauge, NY 11788
USA

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Order No.: E20001-A290-P730-X-7600
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SITRANS FUH1010 Clamp-on Interface Detection Meter

Sonic velocity and the rate of change in the sonic velocity combined with temperature as well as pressure compensation enables Siemens clamp-on interface detection meters to precisely detect crude oil and multi-product interfaces.



By calculating multiple variables such as sonic velocity, rate of change, and pressure as well as temperature compensation, the SITRANS FUH1010 clamp-on ultrasonic interface detection meter from Siemens supplies oil companies with extremely reliable and precise crude oil and multi-product interface detection. Interfaces are detected through the direct measurement method that results in substantial savings; both in means of equipment and slop oil treatment. And that is exactly what oil companies are looking for.

The SITRANS FUH1010 clamp-on ultrasonic interface detectors

are ideal for a wide variety of applications, including:

- Gasoline interface detection
- Multi-product interface detection
- Product identification
- Auto batching control
- Detection of entrained water and gas in all products
- Scraper ("pig") detection

As with any other clamp-on meters from Siemens, it is not necessary to cut the pipe or shut down operations to install the interface detector; the transducers are quickly and easily mounted on the outside of the pipe, minimizing maintenance expenses

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and preventing deposits from forming. The clamp-on design also eliminates the need to modify pipes or interrupt the flow.

The WideBeam principle

The FUH1010 clamp-on interface detector employ Siemens patented WideBeam ultrasonic transit time technology, providing the highest degree of performance. The technology enables increased precision by reducing sensitivity to any change in the medium type or pressure. And by utilizing the pipe wall as an amplifier, the signal to noise ratio is optimized considerably, resulting in a stronger ultrasonic signal. WideBeam also makes the meter immune to most pressure reducing valve noises and permits continued operation over an exceptional range of viscosity.

WideBeam can be used for steel, aluminum, titanium and plastic pipes and through numerous field tests it has proven especially valuable for hydrocarbon as well as gas applications.

Liquident measurement

One major feature of the FUH1010 is the meter's use of the liquident to detect interfaces, which has clear implications on the meter's accuracy. A liquid's liquident can be compared to a human being's unique finger print and therefore, it is an extremely precise way to distinguish products that have even very close densities. And by combining sonic velocity, rate of change in sonic velocity, temperature, pressure as well as

density to calculate the liquident instead of density alone, the meter becomes very sensitive, exceeding the accuracy of a densitometer by far.

Other features of the FUH1010 interface detector include a user settable relay to indicate a rate of change alarm. This feature notifies the user or automated controller that an interface has occurred. The relay set point parameters are user programmable to allow the sensitivity to be adjusted for fast/quick or long/slow interfaces. In addition, data outputs include API number, density, and specific gravity at base temperature and pressure; and also at actual operating conditions.

Flexible product offering

For enhanced performance and accuracy the FUH1010 is available with up to four beams that improve the measurement of the sonic velocity. In addition, it has the capability of gauging temperature, density and viscosity compensation. If the application requires it, other versions of the FUH1010 interface detector are available that can combine interface detection with flow measurement.

The clamp-on ultrasonic interface detection meter is available in three different enclosures: standard IP65 (NEMA 4X) enclosure for wall-mount installation, explosion proof compact IP65 (NEMA 7) and explosion proof wall mount IP66 (NEMA 7) enclosure.



The SITRANS FUH1010 interface detector provides several benefits:

- Liquident calculation ensures extremely precise interface detection capabilities
- Data outputs include API number, density and temperature and pressure-compensated specific gravity
- User settable alarm to indicate interface detection
- WideBeam ultrasonic transit time technology ensures excellent accuracy
- Reliable interface detection through direct measurement method
- No pressure drop
- No need to stop the liquid flow or cut the pipe
- Three enclosures available to fit various installation requirements

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Industry Automation Division
CoC Ultrasonic Flow
Hauppauge, NY 11788
USA

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Clamp-on Leak Detection and Pipeline Management Solutions

With benefits that include sensitivity, accuracy, reliability and robustness, Siemens clamp-on ultrasonic leak detection systems offer customers a real-time solution for small and large product releases in installations ranging from oil pipelines to processing plants

Whether customers are looking for increased pipeline control, protection against theft or are under regulatory constraints, Siemens SITRANS FUH1010 clamp-on ultrasonic leak detection system is the answer, offering four distinct benefits:

- Extreme sensitivity
- High accuracy
- Proven reliability
- Continuous robustness

Sensitive

The leak detection system from Siemens is based on the normalized volume balance technology. Combine this with temperature and pressure computation models, continuous Reynolds number flow profile compensation and sonic signature liquid density and viscosity identification and the result is an extremely sensitive solution.

By means of alarm thresholds that can be set in accordance with user requirements to accommodate specific operating conditions, the leak detection system detects releases in real-time. If an imbalance between the inlet and outlet data is detected during any four integration periods (1, 5, 15 or 60 minutes)

an alarm is activated, calling for operator attention. On the user-friendly display the operator can quickly and easily identify where a release is located. In addition, a visual trend line is shown, facilitating identification of very small releases that occur before the alarm thresholds are breached.

Given the sensitivity of the ultrasonic flow measurement technology, a leak detection system from Siemens also provides:

- Product type and quality identification
- Measurement under flow and no flow conditions
- Bi-directionality
- Pig passage alarm and tracking

Accurate

Since the SITRANS FUH1010 leak detection system is based on compensated balance technology, it provides very accurate estimation parameters for location, flow rate and total volume in the case of a product release. This accuracy allows an event to be located within +/-150 meters and enables recognition between a leak and other pipeline operations such as pump start-up. In addition,

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pigs or product changes can be easily recognized and tracked.

While most leak detection providers only offer the software-part of the system, Siemens also supplies the complete range of flow and temperature instrumentation that provides information for the software to analyze. This not only provides customers with a very accurate and integrated detection solution, it also adds the benefit of one-stop-shopping.

Reliable

The proven and high reliability of the Siemens system lies in its ability to provide reliable decisions on the existence of a release. Several functionalities are in place to create this level of reliability:

- To avoid false alarms, the system senses pipeline application conditions, such as liquid aeration, empty pipe, temperature changes, interface arrival, line packing and dynamically compensates the affected area until conditions improve
- Multiple flow meters can be installed, allowing continuous line balancing measurement; even if one goes off line
- Database stores system history for audits, troubleshooting purposes and performance analyses
- Data communication options allow operators to work on the system from a remote location

Robust

Being that the Siemens leak detection solution has no moving parts to wear, and external sensors that do not require periodic cleaning, it is very robust.

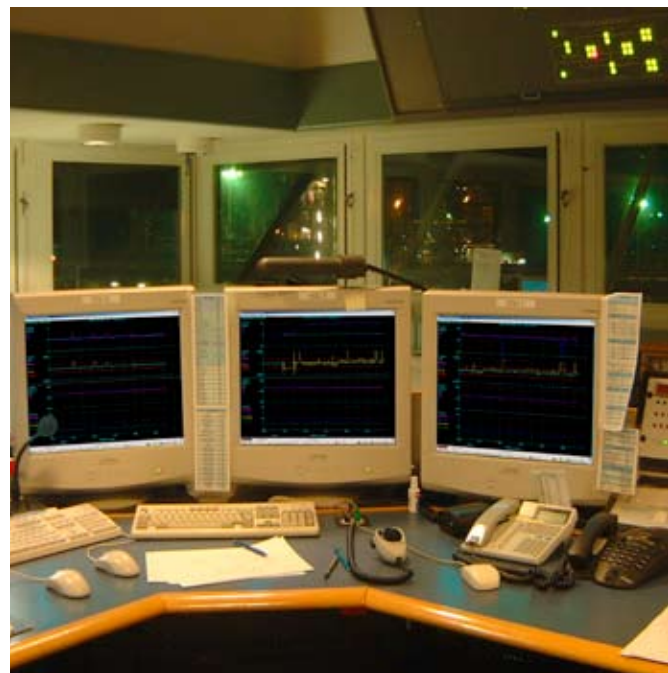
Operation is maintained despite liquid property changes such as inferred density, temperature and pressure. For this to properly work, the system gathers a wealth of information that is available to the operator by the push of a button: flow rate, batch size and location, scraper location, interface location, liquid API number, Reynolds number, site station diagnostics etc.

The clamp-on difference

As with any other clamp-on flow device from Siemens, it is not necessary to cut the pipe or shut down operations to install the flowmeters that are so vital in leak detection systems; the sensors are quickly and easily mounted on the outside of the pipe, minimizing maintenance expenses and preventing deposits from forming. The clamp-on design also eliminates the need to modify pipes or interrupt the flow.

Key features at a glance

- Complete software and hardware solution
- Real-time detection of small and large product releases
- Easily accessible pipeline performance data
- Operation unaffected by changes in liquid properties
- Easy system installation and optimization



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Industry Automation Division
CoC Ultrasonic Flow
Hauppauge, NY 11788
USA

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Order No.: PIFL-LDUSF-0409
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