



KROHNE

▶ measure the facts

KROHNE, Inc. Process Measurement Solutions

Product Overview



▶ SMARTPAT and OPTISENS

Analytical sensors and measuring systems featuring integrated transmitter technology

A large portfolio of sensors and accessories, including loop powered HMI and displays, connection tools and mounting assemblies, assures that SMARTPAT and OPTISENS products will fit into your application.

The complete circuitry of the SMARTPAT transmitter has been miniaturized and fits into the sensor head. This cuts the price significantly compared to all other measuring systems on the market. Thanks to its special circuit technology, miniaturization and special encapsulation, the SMARTPAT sensors offer process reliability at a level previously unknown while also greatly improving lifecycle through simpler and more effective calibration.

OPTISENS and OPTISYS analysis devices greatly enhance process operations with state of the art performance and sensor technology.

Products



SMARTPAT PH 8150

High temperature, pressure resistant for chemical industry and industrial wastewater



SMARTPAT PH 2390

NPT connection, PTFE diaphragm for waste water applications



SMARTPAT COND 3200

2-electrode stainless steel for conductivity measurement



OPTISYS IND 8100

Measuring system inductive conductivity. Ideal for clean in place applications.



TSS 7000

Total solids sensor for sanitary applications (fat applications)



OPTISENS TUR 1050

Turbidity measurement with automatic ultrasonic cleaning system



OPTISYS CL 1100

Measuring system for free chlorine, chlorine dioxide and ozone with automatic sensor cleaning system



▶ OPTITEMP

Temperature transmitters and sensor assemblies featuring one-of-a-kind SmartSense resistance monitoring detects moisture in the thermowell

- Transmitters for a wide variety of requirements
- SIL2, NAMUR, FM, and CSA approved
- Easy configuration, installation, and maintenance with ConSoft, HART
- Complete temperature assemblies
- Robust design with sensor backup function reduces the influence of external disturbances

Products



TT53C/R

SIL Rated, accurate with no long term drift
Head or rail mounted temperature transmitter with universal input, galvanic isolation, HART® and wireless communication. Programmable via PC, HART® handheld or the OPTICHECK Temperature Mobile app using Bluetooth® or NFC
Accuracy $\pm 0.08\%$



TT 51C/R

Head or Rail-mounted temperature transmitter with universal dual input, galvanic isolation, HART® and SIL
Accuracy $\pm 0.05\%$



TT 33 C/R

Head or rail mounted temperature transmitter with universal input, galvanic isolation, HART® and wireless communication. Programmable via PC, HART® handheld or the OPTICHECK Temperature Mobile app using Bluetooth® or NFC
Accuracy $\pm 0.08\%$



Temperature assemblies

With measuring insert (RTD or TC)
With ASME-, DIN- and NAMUR-style thermowells or customer-specific designs
Various process connections available
For temperature measurement across a wide range of industrial applications



▶ OPTIWAVE and OPTIFLEX

Level Measurement solutions for solids or liquids applications

- Loop powered FMCW radar, TDR and ultrasonic devices
- Advanced diagnostics, configuration, visualization and trending software
- Choice of metal or plastic horns and drop antenna for radar
- Choice of single, dial or coaxial TDR probes
- Choice of high performance converters - including remote electronics to 328 feet
- Liquids interface TDR, level switches available for liquids and solids
- Mechanical level indicators



OPTIFLEX
Time Domain Reflectometry



OPTIFLEX 7200
2-wire TDR guided radar for solids and liquids



OPTIFLEX 3200
2-wire TDR guided radar for solid, liquid and interface hygienic applications

OPTIWAVE 1400
2-wire 24 GHz FMCW radar for WWW applications



OPTIWAVE
FMCW Radar



OPTIWAVE 5400
General purpose 2 wire 24 GHz FMCW Radar with available drop antenna

OPTIWAVE 7400
High Performance 2-wire 24 GHz FMCW radar for liquids available with horn antenna



OPTIWAVE 7500
High Performance 80 GHz 2-wire FMCW radar for liquids



OPTIWAVE 6500
2-wire 80 GHz FMCW radar for solids



PACTware with KROHNE DTMs included at no charge with every instrument

▶ OPTISOUND and OPTISWITCH

Level Measurement solutions for solids or liquids applications



OPTISWITCH

Vibration and conductive level switches for solids or liquids

OPTISOUND VU30

Ultrasonic level transmitter for open channel liquid flow includes weir and flume computations. Also suited for liquid or solid level applications.



BM 26

Mechanical level magnetic bypass level indicator for liquid and interface applications



OPTISOUND VU31

Dual sensor ultrasonic level transmitter for open channel liquid flow includes weir and flume computations. Also suited for liquid or solid level applications

▶ OPTIBAR

Pressure instrumentation

- High accuracy and measurement stability under all process conditions
- Modular converter platform for all applications
- Process temperatures up to 150°C / 302° F diaphragm seal
- Wear-free measuring cell guarantees minimum service or maintenance
- Extensive diagnostic and setup via display module or free DTM
- Ranges from absolute vacuum to high pressure protection
- Overload resistant and overpressure

Products



OPTIBAR 5060/7060 C

Bluetooth programmable pressure or differential pressure transmitters for flow, level, differential pressure, density and interface.



OPTIBAR P 1010 C

Universal pressure transmitter for general applications



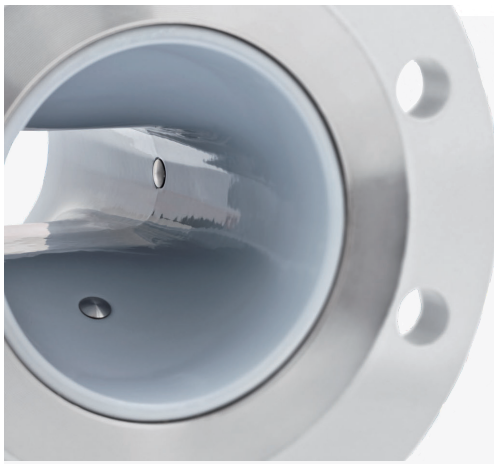
OPTIBAR P2010 C

Hygienic pressure transmitter with flush welded diaphragm



OPTIBAR P 3050 C

Compact pressure transmitter with internal diaphragm



Unique solutions:

- 2-wire, hybrid design
- Low noise electrodes
- Pulsating flow
- Field calibration
- SIL
- Partially filled pipes
- Virtual reference
- Special liners
- Battery powered, remote water flow monitoring
- OD/OD, low velocities



TIDALFLUX



AF-E 400



BATCHFLUX

► Electromagnetic flow meters

For all applications with conductive liquids

From basic applications to demanding flow and custody transfer (CT) measurements

- Designs and liner materials for various applications - from potable water to extremely adhesive, abrasive or aggressive fluids
- Nominal sizes starting at 1/10" up to 120", with a wide range of liner and electrode choices



Products



OPTIFLUX 1000

Economical sensor for OEM applications for liquids with solid content $\leq 70\%$ and fluid temperatures -13 to $+248^\circ\text{F}$ (-25 to $+120^\circ\text{C}$) Wafer-style design: 3/8" to 6" to ASME 300#



OPTIFLUX (ENVIROMAG) 2000

Popular sensor for all standard water and wastewater applications Compact converter version suitable to IP69, remote version IP68 Flanged 1" to 120" to ASME 300#, suitable for OD/OD installation in combination with IFC300 converter



OPTIFLUX 4000

The choice for tough applications including low conductivity ($>1 \mu\text{S}/\text{cm}$) or high solids content with chemically resistant liners and many optional features Compact converter version suitable to IP69, remote version IP68 Flanged 1/10" to 120" to ASME 300#



OPTIFLUX 5000

Sensor for advanced process, custody transfer or master meter applications High accuracy with ceramic tube for aggressive and abrasive liquids with solid contents $\leq 70\%$ and temperatures to $+180^\circ\text{C}$ / $+356^\circ\text{F}$. Available with 1/2" to 12" flanges up to ASME 300#



OPTIFLUX 6000

The sensor for advanced hygienic applications featuring a PFA liner reinforced with embedded stainless steel grid for vacuum resistance. High accuracy for exact dosing or filling in the food sector available from 1/10" to 6" with many 3A or EHEDG certified hygienic fitting tions



IFC 300 / IFC400

Powerful, highest accuracy flow converter for any sensor with wide choice of analog and pulse/frequency outputs and digital communication protocols. Rated to Class 1 Div 1 in XP or IS. Compact, or remote Wall or Field mount housings (shown). IFC 400 is SIL rated.



IFC 050

Converter for water, wastewater or general use with 1000, 2000, 3000, 4000 & 6000 series sensors. Choice of analog, pulse/frequency outputs or digital protocols (HART or Modbus). Housing, Blind or without display, for compact or wall mount configurations.



IFC 100

Mid-tier converter for most process applications with 1000, 2000, 3000, 4000, 5000 & 6000 series sensors. Choice of analog, pulse/frequency outputs or digital protocols (HART or Modbus). Housing features a touchpad display for compact or wall mount configurations.



IFC 070

The converter for custody transfer water metering with the WATERFLUX 3000 sensor. Built in battery is ideal for autonomous installation with absolute encoder and telemetry options. Compact or remote mount IP68 housing is suitable for permanent submergence



WATERFLUX 3000

Rilsan® lined flow sensor with temperature & pressure sensor for district leak monitoring. Adapts to OD/OD installations in 1" to 24" to ASME 150#. Option for direct burial (shown with SS junction box, soldered cable).





▶ OPTIMASS

Coriolis mass flow meters

- Multi-variable instrument features: mass and volume flow, density and temperature
- Liquid or gas measurement, 0 to 100% entrained gas available on all sensors
- Straight or bent tube designs with low pressure and widest selection of sizes and materials
- High pressure secondary containment standard
- Solutions for cryogenic & high temperature versions
- Custody transfer NTEP/MC, SIL and Bluetooth® capability

Products



OPTIMASS 1400

Twin straight-tube sensor with excellent performance on general process applications. Available in ½" to 4" diameters with flanges rated to ASME 600# or with choice of hygienic fittings. Available with compact (shown) or remote converter



OPTIMASS 6400

Twin bent-tube sensor for extended temperature or pressure applications. Available in sizes from ½" to 12", suitable for fluid temperatures ranging from -328° to 752°F and pressure ratings to ASME 1500#. Available with compact (shown) or remote converter



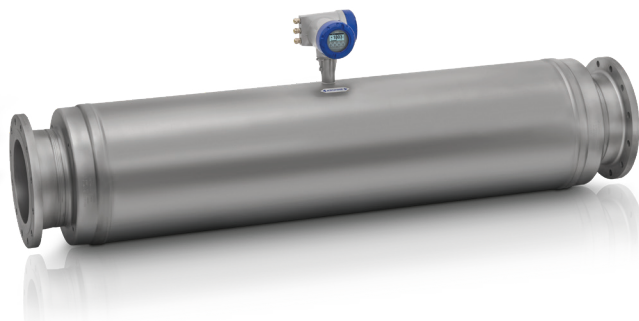
OPTIMASS 3400

Single bent tube surface mounted sensor for extremely low gas or liquid mass flow rates (<0.01 lb/min) and pressure ratings to 4352 PSIG with ½" flanges, threaded or clamp connections. Available with compact (shown) or remote converter



OPTIMASS 7400

High performance single straight measuring tube sensor available with titanium, stainless steel, Hastelloy® or tantalum wetted material choices for challenging applications in tube sizes from ½" to 4" with pressure rating to ASME 600#. Available with compact (shown) or remote converter



OPTIMASS 2400

This largest capacity mass flow sensor can handle up to 169,000 lb/minute mass flow rate with twin straight tube construction. Available in 4" to 16" diameters with flanges rated to ASME 1500# it is fully compliant with North American CT requirements. Available with compact (shown) or remote converter



MFC 400 Converter

Coriolis mass flow converter for combination with all OPTIMASS mass flow sensors in compact or remote field housing (shown)

Features secure wireless access via Bluetooth® or HART, or at the device with infrared and touchpad user interface even in safety related applications.

Wide choice of analog and digital output combinations including all popular digital protocols.



OPTISONIC

Ultrasonic flow meters for bi-directional measurement of liquid, gas, or steam

- 100% wet calibration
- In-line liquid or gas measurement- cryogenic & high temperature versions
- Clamp-on UFM available in 3 size ranges for liquids
- High accuracy independent of viscosity, temperature and conductivity
- Very low pressure loss, no flow obstructions
- No maintenance requirements for recalibration
- Wide measuring range, excellent low flow sensitivity
- Speciality designs for challenging gas, liquid or steam flow measurement



Products



**OPTISONIC 6300/
6300 P**
Fixed or Portable Clamp-on liquid
flowmeter



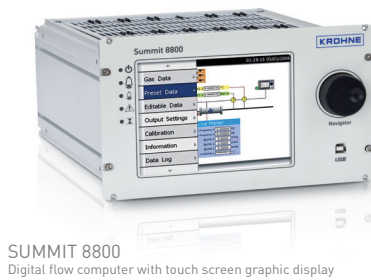
OPTISONIC 3400
Universal 3-beam device for in-line
measurement of liquid and flow of
liquids



OPTISONIC 7300
Universal 2-beam device for in-
line measurement of process or
biogases



OPTISONIC 8300
Ultrasonic flowmeter for high
temperature gas or superheated
steam



► KROHNE Solutions

Instruments and Systems for Oil & Gas and Other Industries

Liquid and Gas Custody Metering Systems

- Highest degree of accuracy and repeatability, independent of media properties such as viscosity, temperature, density and electrical conductivity
- Excellent long term stability, no recalibration
- Sealed systems to prevent unauthorized manipulation
- Proven long term stability with no drift in measurement
- No moving parts or parts that protrude into the measuring pipe
- Low capital and operating costs because of non-wearing and maintenance free properties

Supervisory and flow computing systems

- Touch screen operation, scroll and click menu navigation, web access of current and historical data
- Wide area network capability; Fully redundant ethernet
- Full audit trail, separation of fiscal and maintenance data, multi-level access and authorization

Pipeline leak detection and management systems

- Liquids, gases, LPG, multiproduct applications
- Underground, subsea and land pipelines. Transport and product pipelines
- Reacts quickly and reliably to external damage, theft, corrosion leaks, contamination, explosions, legislation, safety issues, environmental issues
- Stationary and highly dynamic pipelines
- Batch and pig tracking
- No false alarms!



Other available solutions:

- SynEnergy - Hydrocarbon asset management systems
- CALSYS - Analyzer quality management system
- Provers, master meters, telemetry and modular process skids

► ALTOSONIC

Custody Transfer Ultrasonic Flowmeters for Liquids and Gases



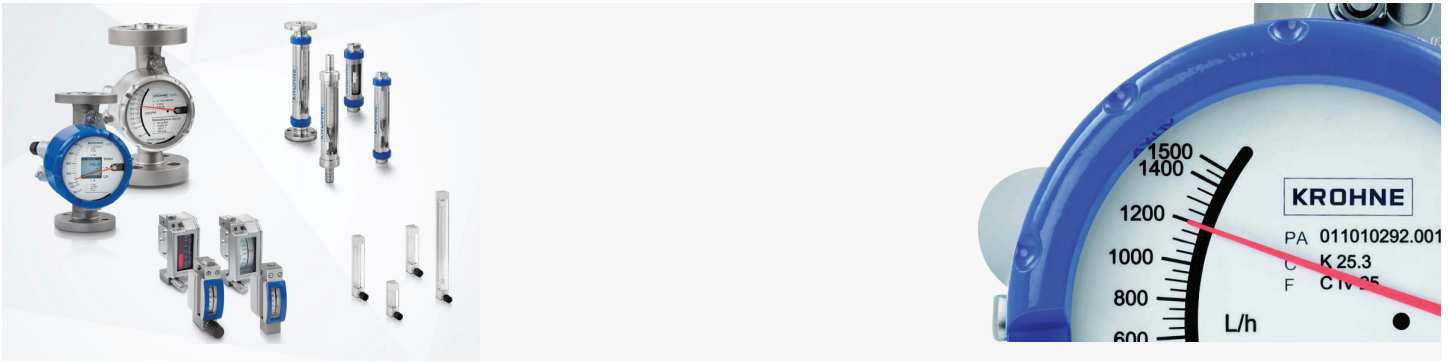
ALTOSONIC 5

5-beam device for custody transfer measurement of crude oil and crude oil products



ALTOSONIC V12

12-beam device for custody transfer measurement of gas



▶ Proven technology with new impulses

Variable area flow meters

For simple and cost-effective flow measurement of gases or liquids without auxiliary power

- Glass and metal tube purgemeters for low-flow application <DN15 / 1/2"
- Glass and metal tube process meters up to DN150 / 6"
- Optional electronics: limit switches, analogue outputs, digital communication

Products



H250 M40

- For explosion proof, intrinsically safe or general purpose areas.
- Features unique modular 'cassette' design including upgradable features such as mechanical indicator to 4...20 mA/HART®7, FF, Profibus-PA and/or totalizer
- Suitable for any installation position: vertical, or optionally adaptable to horizontal or down flow installations
- Flanged sizes from 1/2" to 6" or threaded with NPT or G. Also, most popular hygienic connections.
- Temperature range from -196 to +400°C / -320 to +752°F
- Pressures to 1000 barg / 14500 psig



DK32, 34

- Metal tube meter for low flows in high pressures or rugged conditions
- Compact mechanical indicator, optional 4...20 mA/HART®7, MIN/MAX switches and needle valve
- Sturdy metal design: stainless steel or alloy
- Thread: G1/4, 1/4 NPT, etc.
- Temperatures range from -40 to +200°C / +392°F, max.
- Pressures to 220 barg / 3190 psig



Glass meters

Small and compact meters, sturdy devices with low pressure loss, for maximum safety requirements

- Suitable for gas or liquid sample flow monitoring
- Available with a variety of process connection options
- Wide variety of available scale lengths for optimal resolution
- -20 to +100°C / -4...+212°F
- Pressures to 10 barg / 145 psi





OPTISWIRL

Vortex flow meters

For steam, gas, free air delivery or liquid applications

- High turndown, loop powered
- Integrated temperature and/or pressure measurement for true compensated flow
- Reliable referenced sensor construction provides immunity to process vibration
- Simple maintenance with no recalibration needed
- Unique valve option for pressure sensor isolation
- Available in flanged or wafer styles for sizes 1/2" through 12"
- Built-in line size reducer



Products



OPTISWIRL 4200 Sandwich

The first vortex loop powered flowmeter with integrated pressure and temperature compensation and built in flow computer.

- Wafer version: 1/2 to 4"
- 2-wire, 4...20 mA, HART®, FF, Profibus-P
- For liquids, (wet) gases, saturated and superheated steam (+240°C / +464°F)



OPTISWIRL 4200 Flanged

Universal device with integrated temperature and pressure compensation for saturated steam with built in flow computer

- Flanged 1/2 to 12"
- 2-wire, 4...20 mA, HART®, FF, Profibus-P
- For liquids, (wet) gases, saturated and superheated steam (+240°C / +464°F)



OPTISWIRL 2100

Vortex flowmeter for basic utility applications

- For liquids, (wet) gases, saturated and superheated steam (+240°C / +464°F)
- Available with integrated nominal diameter reduction for a large measurement span also in pipelines with large diameters
- Flange: 1/2 to 12"; wafer version to 4"



OPTISWIRL 5080

Vortex flowmeter for high temperature applications

- For liquids, gases and steam up to +427°C / +800°F
- Adaptive filtering and signal conditioning
- Flange: 3/4 to 12"
- Pressure rated to ASME 1500 lb
- Sandwich version: max. 8"
- 2-wire, 4...20 mA, HART®

► TECHNICAL SUPPORT SERVICES

Technical Application Support Center

Trained, experienced technicians available by phone or email for product application, installation, operation or troubleshooting questions - 24/7 at no cost - and without a service contract

Field Application Engineers

Technical and application support where it is most useful - in the field

Field Service

Regional resources for faster, cost-effective and efficient field service

Product Repair

Comprehensive factory repair department focused on providing fast repair assessments and product turn-around

CALIBRATION SERVICES

Complete, traceable services for volumetric or Coriolis mass liquid flow meters

► World class process measuring technology now produced in Beverly, Massachusetts

- KROHNE is a global, family-run industrial process instrumentation leader since 1921 with more than 4,100 employees worldwide with 16 production sites in 11 countries
- The North American production and headquarters facility opened in 2018 in Beverly and features state of the art production lines for coriolis mass, mag and vortex flowmeters
- An extensive network of sales, technical support and field service covers the entire region



Contact:

KROHNE, Inc.
55 Cherry Hill Drive
Beverly, MA 01915
1-800-356-9464

KROHNE, Inc.
11700 Katy Freeway Suite 775
Houston, TX 77079
1-800-356-9464

Email: info@krohne.com
Website: us.krohne.com

