Measuring and control technology for hygienic processes

AFRISO

EN 837-1

316 ss

−0,5   1,0

0   0,5

−1,0   1,5

bar   Cl. 1.0

△ AFRISO

A comprehensive range of measuring technology for **hygienic systems and processes.**

Innovations and fast development characterise the production processes in the beverages and food industries as well as in the biotechnology and pharmaceutical industries. The production processes in these industries are particularly demanding. Specific product properties need to comply with special hygienic requirements. The products are manufactured in highly complex and sometimes sterile processes.

Measuring and control components in machines and production facilities must therefore meet the highest standards. Sterile process separation, hygienic design of devices, superior quality of materials and superior measuring accuracy are some of the key factors for maximum process reliability.

AFRISO components and system solutions are adapted to suit specific production processes and comply with the pertinent hygienic regulations and recommendations to meet the most stringent requirements. Our robust measuring devices deliver perfect measurement results and reliably monitor and control simple to highly complex processes. Sophisticated kit systems and innovative ideas such as the seal-free design of diaphragm seals, pressure transmitters and thermometers help in the continuous optimisation of production facilities.

Discover new possibilities for your applications. With AFRISO.

Requirements for sterile processes

Manufacturing and processing food, cosmetics and pharmaceuticals involve highly demanding production technologies. A vast array of standards and stringent directives cover all aspects of the hygienic design of machines, systems and, of course, peripheral equipment such as measuring instruments. AFRISO products con-sider these standards. National and international approvals and certificates ensure superior quality.

Good Manufacturing Practice

GMP is based on special directives implemented to improve and secure the quality of drugs as well as food and animal feed.

Continuous monitoring of the production processes of our products is our contribution to good manufacturing practice. Our ISO 9001-compliant quality management system as well as certification according to the environmental standard ISO 14001 serve as the basis for efficient GMP compliance. Ever since the early 1990s, AFRISO has focused on these issues to secure compliance with production process specifications and to lay the foundation for the protection of health and environment.

Connection technology with numerous versions, diffusion-tight and extremely robust: pressure transducer DMU 02 Vario

AFRISO products are subject to stringent requirements

PED/DGRL
(Pressure Equipment Directive 2014/68/EU)

Ex
(Explosion Protection Directive 2014/34/EU)

SIL
Safety Integrity Level as per IEC 61508/IEC 61511

GOSSTANDART
Official certificate for the use or operation of measuring instruments in Russia. Issued by the Russian Metrological Institute.

FDA
Food and Drug Administration

Organisation of the US Department of Health. Issues recommendations, directives and test methods for the examination of materials.

3-A
Sanitary Standards, Inc.

Non-profit organisation (USA) for product safety in processes of the food and pharmaceutical industries.

EHEDG
(European Hygienic Engineering & Design Group)

Specifies directives with characteristics for the hygienic design of devices for processing food. It provides recommendations for the design of components and test methods for using and cleaning devices.

Measuring technology for hygienic processes

Hygienic production equipment is designed in such a way as to avoid external contamination and microbiological pollution and to ensure easy cleaning. All wetted parts, i.e. materials coming into contact with the medium, must have been tested and classified as hygienic.

The materials used in hygienic AFRISO measuring systems meet FDA requirements for contact with food and drugs as per CFR (Code of Federal Regulations), part 21. These materials comprise metals as well as elastomers for seals or oils for transmission in chemical seals.

The EHEDG recommendations are taken into account in the design of hygienic measuring instruments. AFRISO has been an EHEDG member since 2010.

Precision turning and polishing assure a surface quality of the wetted parts with an arithmetic average of the roughness profile of Ra ≤ 0.8 μm. On customer request, even a value as low as Ra ≤ 0.4 μm is possible.

The cleanability of components in closed systems is ensured by CIP (cleaning in place) or SIP (sterilisation in place) cleaning methods. CIP with circulation or flushing methods involve flushing a plant or parts of a plant with alkaline and acid cleaning agents as well as alcoholic disinfection agents and then flushing with ultra-pure water. SIP uses hot steam to kill micro-organisms for sterilisation.

With maximum precision, AFRISO makes welding seams with an arithmetic average of the roughness profile of Ra ≤ 0.8 μ using laser technology. This is required by 3-A Sanitary Standards Inc. and EHEDG.

AFRISO components for hygienic processes

- Hygienic design of wetted parts in view of materials and surface quality: stainless steel 316 Ti/ 316 L, Monel, Hastelloy, platinum, titanium, PFA/ PTFE coatings, plastic materials
- FDA-listed materials
- Device design as per EHEDG recommendations
- Welding seams with Ra ≤ 0.8 μm
- **Surface quality** with Ra ≤ 0.8 μm (optionally 0.4 μm)
- Perfect external cleanability due to stainless steel housings with a degree of protection of up to IP 67

- Resistance to acid, alkaline and alcoholic cleaning agents
- Suitable for CIP and SIP
- High resistance to vibration and temperature
- Numerous process connections for optimum adaptation to the application
- Relevant certificates such as SIL, GOST, 3-A, Ex are available, others such as EHEDG, Kosher, Halal can be optionally provided

Mechanical and electronic pressu
Robust pressure gauges and high

Bourdon tube and capsule pressure gauges

➕ Measuring system and housing made of stainless steel

➕ Housing welded to process connection

➕ Available with liquid filling

➕ Window made of safety glass or plastic

Nominal size
40 – 50 – 63 – 100 – 160

Accuracy class
1.0 – 1.6 – 2.5

Range
–25/0 mbar to –1,000/0 mbar
–1/0 bar to –1/+15 bar
0/0.6 bar to 0/4,000 bar

Operating temperature range
Medium: T_{max} +200 °C
Ambient: –20/+60 °C

Process connection
G½B, G¼B, G⅛ B (EN 837-1)

Bourdon tube pressure gauges with electrical contacts

➕ Up to 4 switching contacts possible

➕ Electrical contact as magnetic spring contact, electronic contact, Reed contact or inductive contact

Nominal size
50 – 63 – 100 – 160

Accuracy class
1.0 – 1.6 – 2.5

Range
–1/+0.6 bar to –1/+15 bar
0/1.6 bar to 0/1,000 bar

Operating temperature range
Medium: T_{max} +150 °C
Ambient: –20/+60 °C

Process connection
G½B, G¼B (EN 837-1)

Diaphragm pressure gauges

➕ Dry measuring cell

➕ No transmission medium

➕ Clamp connection specially for hygienic processes

Nominal size
100 – 160

Accuracy class
1.6

Range
0/1 bar to 0/6 bar

Operating temperature range
Medium: T_{max} +100 °C
Ambient: –20/+60 °C

Process connection
■ Clamp as per ISO 2852, 2"
■ Connection thread
■ Various flange connections

Bourdon tube pressure gauges with diaphragm seal

➕ For high process temperatures

➕ For pressure measurements without dead space

➕ Suitable for SIP/CIP

Nominal size
63 – 100 – 160

Accuracy class
1.0 – 1.6

Range
0/0.6 bar to 0/600 bar

Operating temperature range
Medium: T_{max} +150 °C
Ambient: –20/+60 °C

Process connection
■ G½ as per DIN 3852 type A
■ Screwed pipe connection DIN 11851,
   DIN 11887, DIN 11864, SMS 1147
■ Clamp ISO 2852, DIN 32676
■ Tri-Clamp
■ VARIVENT®/VARINLINE® (EHEDG)
■ NEUMO BioControl® (EHEDG)

re measurement:
n-precision pressure transmitters

Field housing for DMU available on request

Pressure transducer DMU 04 MR

➕ Low measuring ranges possible

➕ Optional field housing

➕ Optional Ex approval

Measuring range
–1/0 bar and –1/+5 bar
0/0.25 bar to 0/40 bar (relative)

Transmission medium
Multi-grade oil, FDA-listed

Output
4–20 mA / 2-wire

Operating temperature range
Medium:　–10/+125 °C
　　　　　short-term up to 150 °C
Ambient:　–40/+85 °C

Process connection
Tapered socket DIN 11851
DN 25 up to DN 50

Pressure transducer DMU 02 Vario CP

➕ Connection technology used worldwide

➕ Version without internal seals

Measuring range
–1/0 bar and –1/+24 bar
0/1 bar to 0/40 bar (relative)

Transmission medium
Multi-grade oil, FDA-listed

Output
4–20 mA / 2-wire

Operating temperature range
Medium:　–10/+125 °C
Ambient:　–10/+105 °C

Process connection
▪ Clamp ISO 2852, DIN 32676
▪ Tri-Clamp DN 25 to DN 80
　or ¾" to 3"

Pressure transducer DMU 02 Vario BC

➕ Hygienic Design as per EHEDG guidelines

➕ Insensitive to vibrations

Measuring range
–1/0 and –1/+24 bar
0/2.5 bar to 0/16 bar (relative)

Transmission medium
Multi-grade oil, FDA-listed

Output
4–20 mA / 2-wire

Operating temperature range
Medium:　–10/+125 °C
Ambient:　–10/+105 °C

Process connection
NEUMO BioControl®
DN 25 to DN 80
EHEDG certificate: Type EL – Class I

Pressure transducer DMU 02 Vario VT

➕ Hygienic Design as per EHEDG guidelines

➕ High overload safety

Measuring range
–1/0 and –1/+24 bar
0/1 bar to 0/25 bar (relative)

Transmission medium
Multi-grade oil, FDA-listed

Output
4–20 mA / 2-wire

Operating temperature range
Medium:　–10/+125 °C
Ambient:　–10/+105 °C

Process connection
VARIVENT® / VARINLINE®
Type F (DN 50), type N (DN 68)
EHEDG certificate: Type EL – Class I

For hygienic separation of and medium

Chemical seals

Chemical seals are mechanical process separators. They use a diaphragm to separate the medium to be measured from the measuring system. This separating diaphragm is joined to the body of the chemical seal, in hygienic applications usually by means of welding.

Chemical seal systems

A chemical seal system consists of two connected devices (pressure measuring instrument and seal). Welding or screwing the components together turn the chemical seal and the instrument (e.g. Bourdon tube pressure gauge, pressure transducer or pressure switch) into a single, inseparable unit. Spaces in the measuring element and channel holes are evacuated and then filled with a hydraulic transmission medium. This filling liquid transmits the process pressure to the measuring instrument. The measuring instrument and the medium to be measured are protected this way: The instrument cannot come into contact with hot, polluted or corrosive media and the medium is not polluted by corrosion or bacteria.

In hygienic processes, AFRISO uses only FDA-listed hydraulic oils or, on customer request, special vegetable oil to exclude the risk of contamination of the medium in the case of a rupture of the diaphragm.

In-line chemical seal with clamp connection

➕ In-line measurement for pipes

➕ No turbulence of the medium resulting from installations or t-pieces

Measuring range
0/1.6 bar to 0/16 bar

Transmission medium
Paraffin oil (FM09), FDA listed

Process connection
Clamp as per ISO 2852, 1" to 3"

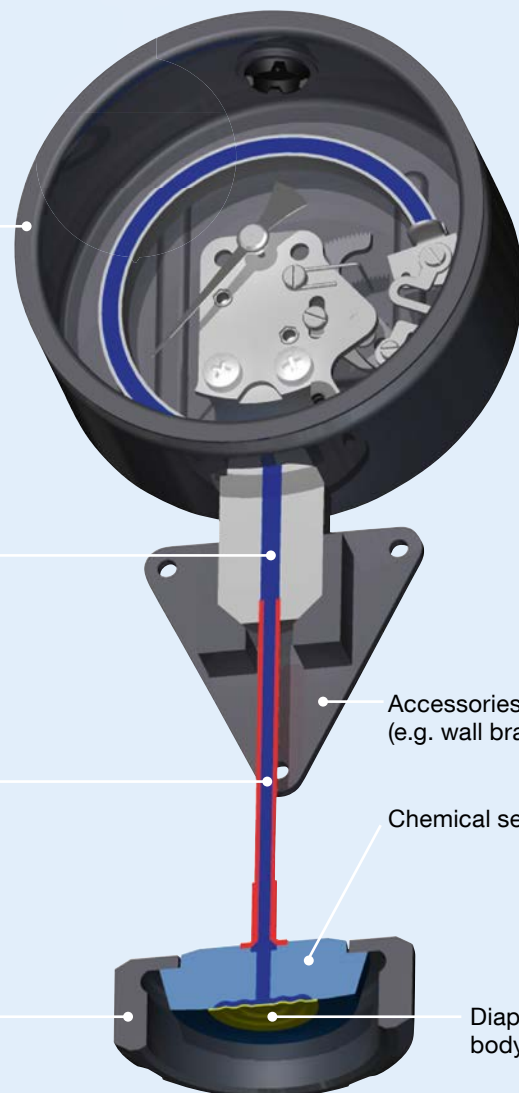Pressure measuring instrument

Hydraulic transmission medium

Capillary tube

Application-specific process connection

Accessories (e.g. wall bracket)

Chemical seal

Diaphragm (welded to body of chemical seal)

measuring instrument

Diaphragm seals with screwed pipe connection

+ Diary fitting according to standard

+ Ideal for dairy and fruit juice plants

+ For operating pressures of up to 40 bar

Measuring range
0/0.6 bar to 0/40 bar

Transmission medium
Paraffin oil (FM09), FDA listed

Process connection
- Tapered/threaded socket DIN 11851 (DIN 11887), DN 25 to DN 65
- Tapered/threaded socket SMS 1147 1½" to 2½", DIN 11864

Diaphragm seals with clamp connection

+ 3-A-certified in conjunction with various pressure gauges and chemical seals

+ Connection technology used worldwide

+ Easy mounting

Measuring range
0/0.6 bar to 0/40 bar

Transmission medium
Paraffin oil (FM09), FDA listed

Process connection
- Clamp as per ISO 2852, ¾" to 2½"
- Clamp as per DIN 32676 DN 25 to DN 65
- Tri-Clamp 1" to 2½"

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Materials
According to the pertinent recommendations and directives, only non-toxic metals, elastomers and oils are used as materials. Body and diaphragms are made of AISI 316 L (material number 1.4404 / 1.4435). Other alloys are available, depending on the measuring point conditions. Wetted parts can be coated and even complete coatings with polymers such as PTFE, PFA and similar are possible.

Filling liquids
AFRISO uses paraffin oil (medical white oil) as the standard transmission liquid for hygienic measuring points. Paraffin is FDA CFR 21-listed and NSF-H1-tested. Neobee M-20 with identical evaluations is optionally used. Glycerine/water mixtures and vegetable oils are available on request.

Diaphragm seals for VARIVENT®/VARINLINE® housings

+ Hygienic Design as per EHEDG guidelines

+ Metal stop

+ Bracket connection

Measuring range
0/0.6 bar to 0/25 bar

Transmission medium
Paraffin oil (FM09), FDA listed

Process connection
- Type F DN 25 and 1" (nominal installation diameter 50 mm)
- Type N DN 40–125 and 1½"–4" (nominal installation diameter 68 mm)

Diaphragm seals NEUMO BioControl®

+ Hygienic Design as per EHEDG guidelines

+ Metal stop

+ Flange connection

Measuring range
0/0.6 bar to 0/16 bar

Transmission medium
Paraffin oil (FM09), FDA listed

Process connection
NEUMO BioControl®
DN 25 to DN 80

Mechanical and electronic t
Versatile and application-sp

Bimetal thermometers

+ Proven technology

+ Many ranges up
  to 600 °C

Nominal size
63 – 80 – 100

Accuracy class (EN 13190)
Class 1

Range (°C)
−40/+40, −40/+60, −30/+50,
−20/+40, −20/+60, 0/60, 0/80,
0/100, 0/120, 0/160, 0/200, 0/250,
0/300, 0/400, 0/500, 0/600

Process connection
Centre back or bottom
Clamp, dairy or thread
for different thermowells

Gas filled thermometers

+ For extremely demanding
  measuring applications

+ Fast response

Nominal size
100 – 160

Accuracy class (EN 13190)
Class 1

Range (°C)
−20/+60, 0/60, 0/120, 0/160,
0/200, 0/300, 0/400, 0/500

Process connection
Centre back or bottom
Clamp, dairy or thread
for different thermowells

Gas filled thermometers
with capillary tube

+ High measuring accuracy

+ For remote measurement

Nominal size
100 – 160

Accuracy class (EN 13190)
Class 1

Range (°C)
−20/+60, 0/60, 0/120, 0/160,
0/200, 0/300, 0/400, 0/500

Resistance thermometer WTh 28

➕ Hygienic process connections such as clamp, dairy, VARIVENT® etc.

Measuring range
–35/+200 °C

Sensor
1 x Pt 100, 2-, 3- or 4-wire, class B, IEC 751

Installation lengths
100, 125, 160, 250, 400 mm

Connection head (degree of protection)
Type B, type BUZ; aluminium cast (IP 54)

Resistance thermometer WTh 30 Clamp

➕ Hygienic Design as per EHEDG guidelines

➕ High accuracy

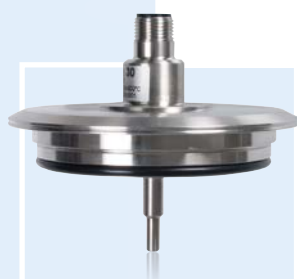➕ Short response time

➕ Transducer can be integrated

Measuring range
–50/+200 °C

Sensor
1 x Pt 100, 4-wire, class A, IEC 751

Installation lengths
30, 35, 50, 100, 150, 200 mm

Process connection
▪ Clamp as per ISO 2852 DN 25 to DN 40
▪ Tri-Clamp 1" and 1½"

Resistance thermometer WTh 30 VT

➕ Hygienic Design as per EHEDG guidelines

➕ High accuracy

➕ Short response time

➕ Transducer can be integrated

Measuring range
–50/+200 °C

Sensor
1 x Pt 100, 4-wire, class A, IEC 751

Installation lengths
30, 35, 50, 100, 150, 200 mm

Process connection
VARIVENT® type N

Individual or complete solu
measurement, evaluation a

Guided micropulse level measuring instruments PulsFox® PMG 20

+ For liquid, powdery, solid, electrically conductive or non-conductive media

+ Versions available for foaming or adhesive media

+ Optional Ex approval

Measuring range
0/1 m to 0/40 m

Output
4–20 mA, HART, 2-wire

Operating temperature range
Medium: –40/+300 °C
Ambient: –30/+70 °C

Process connection
- G thread
- Tri-Clamp

Ultrasonic level indicator SonarFox® UST 20

+ For liquid, mushy and pasty media

+ Non-contact level measurement

+ Easy adjustment even without medium

+ Optional Ex approval

Measuring range
0.15/2 m to 0.5/20 m

Output
4–20 mA, HART, 2-wire

Operating temperature range
Medium: –30/+70 °C

Process connection
- G thread
- Flange EN 1092-1

Hydrostatic level indicator HydroFox® DMU 07

+ High resistance to overload

+ Mechanically insensitive ceramic sensors

+ High long-term stability

+ Small temperature error

Measuring range
Relative pressure:
0/40 mbar to 0/10 bar

Output
4–20 mA

Operating temperature range
Medium: –40/+125 °C

Process connection
G1½B flush diaphragm

Conductivity level switch CoFox® ELT 680

+ For electrically conductive. foaming or adhesive media

+ Conductivity level switch, suitable for food grade probes

+ Adjustable conductance

+ Detection of interface layers possible, e.g. milk/water

Output
1 voltage-free changeover contact

Delay
0/20 s, adjustable

Operating temperature range
Ambient: –10/+60 °C

Capacitance level switch CapFox® ENT 21

- [+] Compact design
- [+] For temperatures of the medium of up to 300 °C
- [+] Partially or fully insulated electrode possible

Operating temperature range
Medium: –40/+200 °C
High-temperature version up to 300 °C

Process connection
- G thread
- 3/4" NPT
- Tri-Clamp

Compact vibration level switch VibraFox® GVG

- [+] Compact design
- [+] WHG approval
- [+] High resistance to chemicals

Density of the medium
0.7 kg/dm³ – 2.5 kg/dm³

Viscosity of the medium
0.1 – 10,000 mPa • s

Operating temperature range
Medium: –40/+100 °C
High-temperature version up to 150 °C

Process connection
- G thread
- NPT thread
- Clamp
- Dairy

Digital display and control unit VarioFox® 24

- [+] Integrated sensor supply
- [+] 4 switching outputs
- [+] Selectable units
- [+] Text-based user interface
- [+] Data logger function via SD memory card or RS485 interface

Linearity
±0.1 % of measuring range

Input
0–20 mA, 4–20 mA, 0–10 V

Outputs
1 x 0/4–20 mA
1 x 0–10 V
4 voltage-free changeover contacts

Operating temperature range
Ambient: 0/50 °C

Multi-channel process display MPA 10

- [+] 40 configurable display elements
- [+] 10 configurable displays with 1 to 12 elements
- [+] Integrated web server and remote operation

Measuring ranges
Current inputs: 0–20 mA
Input resistance: 50 Ohm
Voltage inputs: 0–10 V
Input resistance: 100 kOhm

Indication
TFT display 3.5"

Interfaces
- RS 485 (Modbus RTU)
- RS 232
- USB host
- Ethernet (Modbus TCP)

Accessories

Accessories for pressure gauges

Complete range of accessories, adapted to AFRISO measuring and control portfolio:

- Throttling devices
- Pressure gauge shut-off valves
- Thermowells
- Siphon pipe
- Overpressure safety devices

Multifunctional transducer MFU 12/14

- Universally programmable, multifunctional transducer for power, voltage, resistance transmitters (Pt 100 and others), potentiometer

Accuracy
±0.2 % of full scale value

Range
0 to 9,999 digits indication of unit

Output
- 4 freely programmable, voltage-free limit values

Digital plug-in display DA 06

- For local indication and as switching output
- Indication scalable as required
- 1 open collector-switching output/PNP
- Optional Ex approval

Accuracy
0.1 % ±1 Digit

Display
LED, 4 digits

Input signal
4–20 mA, 2-wire

Degree of protection
IP 65 (EN 60529)

Digital display unit DA 10/12/14

- Text-based user interface
- Selectable and labelable units
- Either 2 or 4 voltage-free changeover contacts
- Limit value function: window, trend (rising/falling)

Measuring range
±99,999 digits (scalable as required)

Display
Graphical LCD, 5 digits

Input signal
All analogue standard signals (mA, V, …)

Degree of protection (front)
IP 65 (EN 60529)

Suitable service instruments for any application.
AFRISO service instruments

Our portable measuring systems are professional solutions for adjustment work, servicing, maintenance and repairs. You benefit from a range of devices adapted to each other that keeps setting new standards.

Universal digital pressure gauge DIM 20

Handheld temperature measuring instruments TM7/TMD7/TMD9

Handheld pressure measuring instruments Series S4600 ST

Universals sensor module system CAPBs®

Handheld system for adjusting and servicing combustion systems EUROLYZER S1

Our Service – Your Benefit

Information and presentation

Support either by phone or right at your site. Our consultants speak your language – we provide you with personal and individual consulting worldwide. Please visit **www.afriso.com/contact** for further information on your specific contact person.

Stocks and logistics

Maximum availability, short delivery times. Our range comprises more than 25,000 different products. More than 3,000 of them are on stock. A total of more than 1,600,000 individual devices and instruments are available ex stock.

Service

Whether commissioning, professional maintenance, calibration or function checks – a network of service centres and our specialists support you and ensure full operability of your AFRISO product. For safe processes, precise measurement results, compliance with legal requirements and a long service life.

AFRISO profile

A total of more than 1,300 employees are at work for you worldwide, more than 650 of them at our four sites in Germany. We respond to current market requirements wit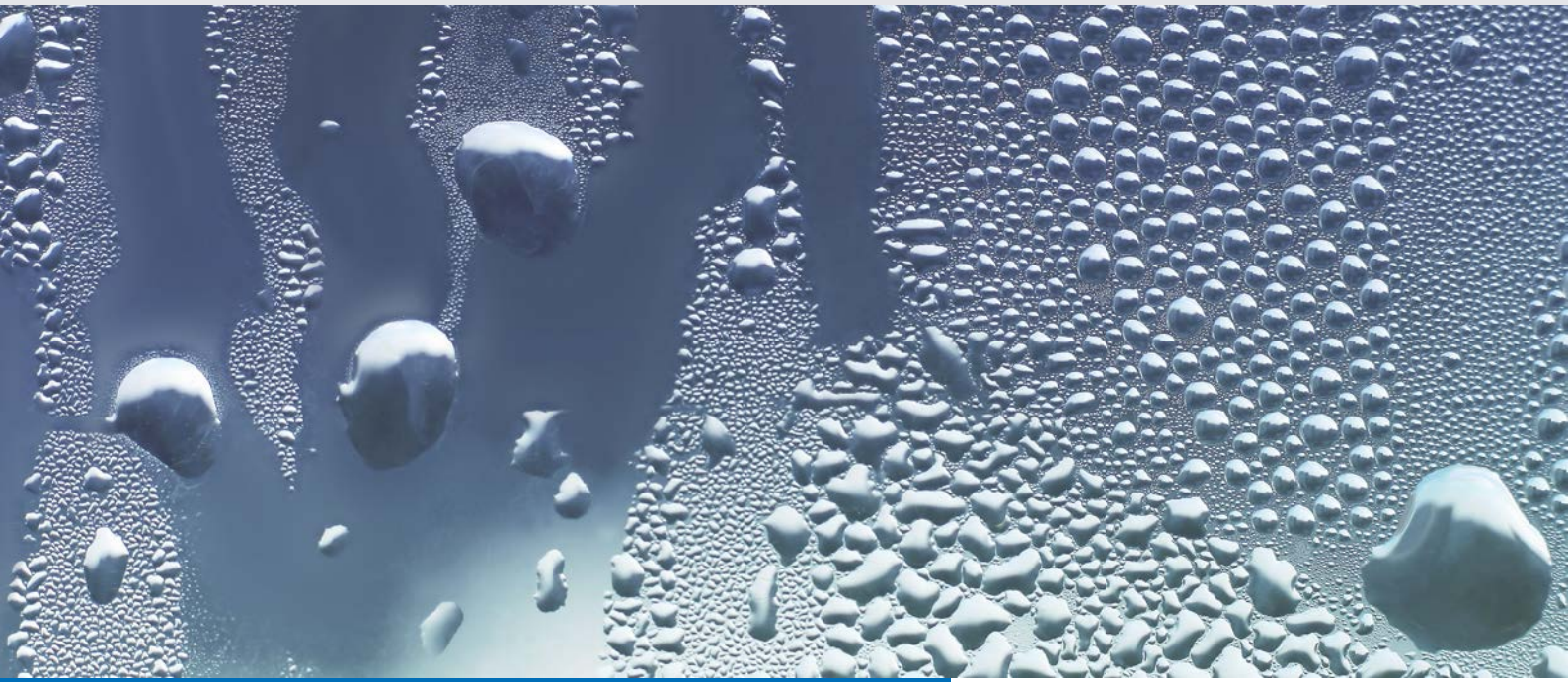h a broad product portfolio, complex special products and complete system solutions in addition to being a reliable partner to craftspeople, commerce, OEMs and the industry.

Company data

- Industry: Measuring and control technology
- Founding year: 1869
- Type of company: Limited liability company, owned and managed by family, independent of corporate group
- Headquarters: Güglingen, Germany
- Equity ratio: > 50 %
- Representations and offices: 17
- Exports to 65 countries
- Staff: > 1,300 worldwide, > 650 in Germany
- Production sites: Güglingen (DE), Amorbach (DE), Illmensee (DE), Alsenz (DE), Rotselaar (BEL), Crawley (UK), Szałsza (PL), Bucharest (RO), Arlöv (SE), Suzhou (CN)

Portfolio

- Measuring, control and monitoring technology for domestic, industrial and environmental applications
- Competitively priced, proven series products
- Special custom products
- System solutions
- Research and development
- Production
- Consulting and engineering
- App development/software programming
- Delivery
- Commissioning
- Training
- After sales