# Measuring and control technology for hygienic processes.








AFRISO


0
0,5
EN 837-1
-0,5
1,0
-1,0
316 ss
1,5
bar
CL. 1.0
AFRISO

PRESSURE. TEMPERATURE. LEVEL.

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

Innovation and rapid development characterise the production processes in the cosmetics, beverages, food, 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 maximum 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 stringent requirements. Our robust measuring devices deliver perfect measuring 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.

We know your industry.

# 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 consider these standards. National and international approvals and certificates ensure superior quality.

Highly versatile connection technology with numerous variants, diffusion-tight and extremely robust: Pressure transducer DMU 02 Vario

## 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 and 100 % inspection of each individual product is our contribution to GMP. Our ISO 9001-compliant quality management system as well as certification according to the environmental standard EN ISO 14001 serves 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.

## AFRISO products are subject to stringent requirements

**PED/DGRL**
(Pressure Equipment Directive)
Pressure Equipment Directive 97/23/EG

**ATEX**
(Product directive 94/9/EG, workplace directive 1999/92/EG)

**SIL**
(Safety integrity level as per IEC 61508/IEC 61511)

**GOSSTANDART**
Official certificate for the general use or the operation of measuring instruments in Russia. Issued by the Russian Meteorological 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 recommends the design of components and test methods for using and cleaning such 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 diaphragm seals.

The EHEDG recommendations are considered in the design of hygienic measuring instruments. AFRISO has been an EHEDG member since 2010; various process connections are EHEDG-certified (EL - Class I).

Precision turning/polishing assure a surface quality of the wetted parts with a medium roughness of Ra ≤ 0.8 µm. Please enquire for an even higher quality of up to Ra ≤ 0.4 µm.

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 or acid cleaning agents and alcoholic disinfection agents and then rinsing with ultra-pure water. SIP uses hot steam to kill micro-organisms for sterilisation.

With maximum precision, AFRISO makes welding seams by means of a laser with a roughness of Ra ≤ 0.8 µm. 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/PFTE coatings, plastic materials
- FDA-listed materials
- Device design as per EHEDG recommendations
- EHEDG certificates: Type EL - Class I
- Welding seams with a roughness height of Ra ≤ 0.8 µm
- Surface quality with a roughness height of Ra ≤ 0.8 µm (optionally 0.4 µm)
- Perfect external cleanability due to stainless steel housing with a degree of protection of up to IP 69
- 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 EHEDG, SIL, GOST, 3-A, ATEX are available, others such as Kosher, Halal can be optionally provided

# Mechanical and electronic
# Robust pressure gauges a
# pressure transmitters

## Bourdon tube and capsule type pressure gauges

- Measuring system and housing made of stainless steel
- Housing welded to process connection
- Available with optional housing filling
- Window made of safety glass or acrylic glass

**Nominal size**
50 – 63 – 100 – 160

**Accuracy class**
1.0 or 1.6

**Range**
-25/0 mbar to -1000/0 mbar
-1/0 bar to -1/+15 bar
0/0.6 bar to 0/4000 bar

**Temperature range**
Medium: $T_{max}$ +150 °C
Ambient: -20/+60 °C

**Process connection**
G½B, G¼B; EN 837-1

## Bourdon tube pressure gauges with electrical contacts

- Up to 4 contacts possible
- Electrical contact as magnetic spring contact, electronic contact, reed contact or inductive contact

**Nominal size**
63 – 100 – 160

**Accuracy class**
1.0 or 1.6

**Range**
-1/+0.6 bar to -1/+15 bar
0/1.6 bar to 0/1000 bar

**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

**Temperature range**
Medium: $T_{max}$ +100 °C
Ambient: -20/+60 °C

**Process connection**
- Clamp as per ISO 2852, 2"
- Screw-in thread
- Various flange connections

## Bourdon tube pressure gauge 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 or 1.6

**Range**
-1/0 bar to -1/+15 bar
0/0.6 bar to 0/600 bar

**Temperature range**
Medium: $T_{max}$ +150 °C
Ambient: -20/+60 °C

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

# c pressure measurement: and high-precision

Field housing for DMU available on request

## Pressure transducer DMU 04 MR

- Low measuring ranges possible
- Optional field housing
- Optional ATEX approval

**Measuring range**
-1/0 bar and -1/+5 bar
0/0.4 bar to 0/40 bar (relative)

**Transmission medium**
Multi-grade oil, FDA-listed

**Output**
4-20 mA / 2-wire

**Temperature range**
Medium: -25/+125 °C
Ambient: -25/+85 °C

**Process connection**
Cone connection DIN 11851
DN 25 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

**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
- Insensitive to vibrations

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

**Transmission medium**
Multi-grade oil, FDA-listed

**Outout**
4-20 mA / 2-wire

**Temperature range**
Medium: -10/+125 °C
Ambient: -10/+105 °C

**Process connection**
NEUMO BioControl®
DN 25 to DN 80
EHEDG-certified:
Type EL - Class I

## Pressure transducer DMU 02 Vario VT

- Hygienic design as per EHEDG
- 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

**Outout**
4-20 mA / 2-wire

**Temperature range**
Medium: -10/+125 °C
Ambient: -10/+105 °C

**Process connection**
VARIVENT®/VARINLINE®
design F (DN 50), design N (DN 68)
EHEDG-certified:
Type EL - Class I

# For hygienic separation of measuring instrument and

## 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 (instrument and seal). Welding or screwing 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 fluid. This transmission fluid transmits the process pressure to the instrument. The 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.

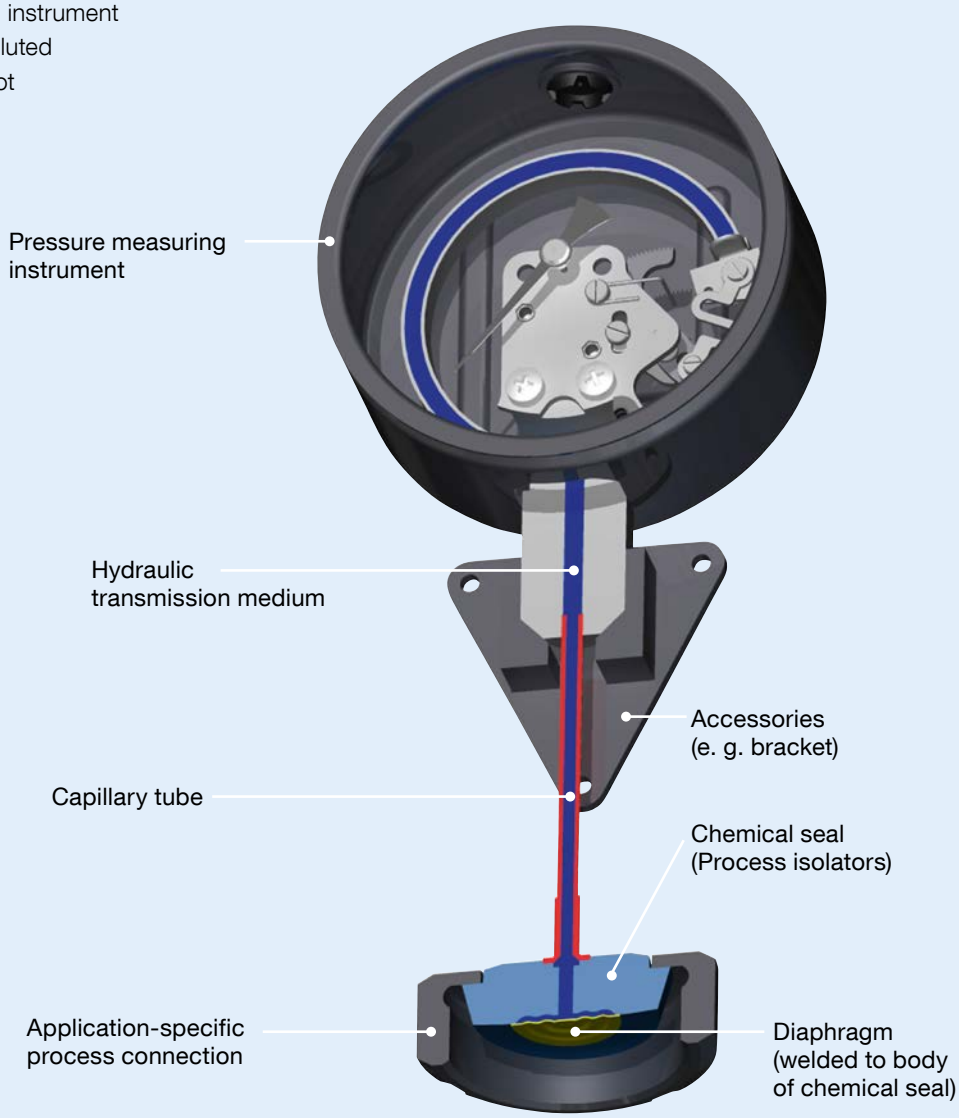
### In-line chemical seals with clamp connection

- In-line measurement in pipes
- No turbulence of the medium resulting from installations or T pieces

**Measuring range**
0/1.6 bar to 0/16 bar

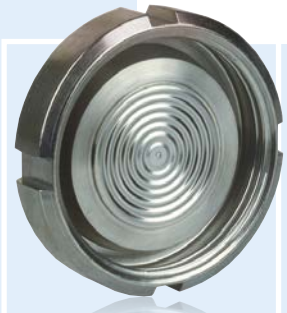
**Transmission medium**
Paraffin oil (FM09), FDA-listed

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




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.

# f
# d medium



## Diaphragm seals with screwed pipe connection

- Diary fitting according to standard
- Ideal for diary and fruit juice plants
- For operating pressures up to 40 bar

**Measuring range**
-1/0 bar and –1/+24 bar
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 installation

**Measuring range**
-1/0 bar and –1/+24 bar
0/0.6 bar to 0/40 bar

**Transmission medium**
Paraffin oil (FM09), FDA-listed

**Process connection**
- Clamp as per ISO 2852, ¾" to 3"
- Clamp as per DIN 32676 DN 25 to DN 65
- Tri-Clamp 1" to 3"

3-A®
74-03

### 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, EHEDG-certified: Type EL - Class I
- Metal stop
- Clamp connection

**Measuring range**
-1/0 bar and –1/+24 bar
0/0.6 bar to 0/25 bar

**Transmission medium**
Paraffin oil (FM09), FDA-listed

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

CERTIFIED EHEDG HYGIENIC ENGINEERING & DESIGN GROUP EUROPEAN
TYPE EL - CLASS I
NOVEMBER 2011

## Diaphragm seal NEUMO BioControl®

- Hygienic design, EHEDG-certified: Type EL - Class I
- Metal stop
- Flange connection

**Measuring range**
-1/0 bar and –1/+24 bar
0/0.6 bar to 0/16 bar

**Transmission medium**
Paraffin oil (FM09), FDA-listed

**Process connection**
NEUMO BioControl®
DN 25 to DN 80

CERTIFIED EHEDG HYGIENIC ENGINEERING & DESIGN GROUP EUROPEAN
TYPE EL - CLASS I
NOVEMBER 2011

# Mechanical and electronic t
# Versatile and application-sp

## Bimetal-thermometers

- Proven technology
- For temperatures up to 160 °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, diary connection or thread for different thermowells

## Gas filled thermometers

- For extremely demanding measuring applications
- Short response time

**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, diary connection or thread for different thermowells

## Gas filled thermometers with capillary tube

- High measurement 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

## V-Form-Industrial thermometers

- Vibration-resistant glass thermometers

**Nominal size (mm)**
110 x 30 – 150 x 36 – 200 x 36

**Accuracy**
DIN 16195

**Range (°C)**
-30/+50, 0/60, 0/120, 0/160

**Connection position**
straight, 90° or 135°

# temperature measurement: pecific

## Resistance thermometer WTh 28

- Hygienic process connections such as clamp, VARIVENT®, dairy and many others

**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) Design B, type BUZ; aluminium cast (IP 54)


## Resistance thermometer WTh 30 clamp

- Hygienic design as per EHEDG recommendations
- 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 recommendations
- 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® design

# Individual or complete solu
# measurement, evaluation

## Magnetostrictive level indicator MagFox® MMG 01

- For liquid, non-adhesive and not highly viscous media
- Evaluation with microcontroller
- High-precision, temperature-compensated measuring principle
- HART protocol (option)

**Measuring range**
0/100 mm to 0/6,000 mm

**Measuring accuracy**
±0.25 mm, resolution < 0.1 mm

**Output**
4–20 mA

**Temperature range**
Medium: -40/+125 °C
Ambient: -40/+85 °C

## Guided micropulse level indicator PulsFox® PMG 10

- For liquid, powdery, solid, electrically conductive or non-conductive media
- Versions for foaming and adhesive media
- Optional ATEX approval

**Measuring range**
0/1 m to 0/24 m

**Output**
4–20 mA, HART

**Temperature range**
Medium: -30/+200 °C
Ambient: -30/+60 °C

**Process connections**
- G threads
- Flanges

## Hydrostatic level indicator HydroFox® DMU 07

- High resistance to overload
- Mechanically insensitive ceramic sensors
- High long-term stability
- Low temperature error

**Measuring range**
Relative pressure: 0/40 mbar to 0/20 bar

**Output**
4–20 mA

**Temperature range**
Medium: -40/+125 °C

**Process connection**
G1½B front flush diaphragm

## Conductivity level switch CoFox® ELT 680

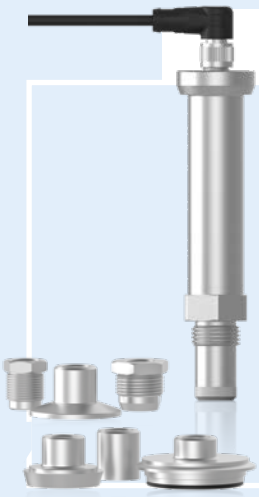
- For electrically conductive, foaming or adhesive media
- Conductivity level switch, suitable for food grade sensors
- Adjustable conductivity value
- Detection of interface layers possible, e. g. milk/water

**Output**
1 voltage-free changeover contact

**Time day**
0/20 s, adjustable

**Operating temperature range**
Ambient: -10/+60 °C

# utions for level and event reporting



## Universal ultrasonic level switch SonarFox® USG 20

- Without any interfering contours: Perfect for piggable pipes and CIP/SIP cycles
- Modular process connection concept
- WHG approval

**Minimum density of the medium**
Independent of density

**Max. viscosity of the medium**
10,000 mPa • s

**Operating temperature range**
Medium: -20/+100 °C
Wetted parts can be cleaned up to 150 °C (60 min)

**Process connection**
- G thread
- Adapters: Weld-in socket, tri-clamp, VARIVENT, Dairy fitting etc.

## Compact vibration level switch VibraFox® GVG

- Compact design
- WHG approval
- High resistance to chemicals

**Minimum density of the medium**
0.7 kg/dm³...2.5 kg/dm³

**Max. viscosity of the medium**
0.1...10,000 mm²/s

**Temperature range**
Medium: -40/+100 °C

**Process connection**
- G thread
- Clamp
- Diary


## Digital display and control device VarioFox® 24

- Integrated sensor supply
- 4 relay outputs
- Selectable units
- Text-based menu
- Data logger function via SD memory card or RS 485 interface

**Linearity**
± 0.1 % of measuring range

**Input**
0–20 mA, 4–20 mA, 0–10 V

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

**Operating temperature range**
Ambient: 0/50 °C


## Event reporting systems EMS 220/442

- For remote monitoring of facilities and buildings
- Error messages and hazard alarms directly to the mobile phone via text messages
- Optional AFRISO Net web service for visualisation

**Sensor supply**
1 x DC 24 V, max. 25 mA

**Alarm input**
- 1 x 4–20 mA
- 1 x 0/5 V
- 2 x digital 24 VDC

**Data transmission**
GSM short text message

**Operating temperature range**
Ambient: -20/+50 °C

# Accessories

## Accessories for pressure gauges

Complete range of accessories, adapted to AFRISO portfolio:

- Damping units
- Pressure gauge stop valves
- Thermowells
- Siphon pipes
- 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**
Indication of unit: 0 to 9,999

**Ausgang**
- 4 freely programmable, voltage-free limit values


## Digital plug-on display DA 06

- For local indicationand as switching output
- Indication scalable as required
- 1 Open collector switching output/PNP
- Optional ATEX 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
- Freely selectable units, can be labelled as desired
- Either 2 or 4 voltage-free chan-geover contacts
- Limit value functions: Window, trend (rising/falling)

**Measuring range**
±99,999 digit (can be scaled as required)

**Display**
Graphic LCD, 5 digits

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

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

Suitable servicing systems for any application.

# AFRISO servicing devices

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.


Handheld electronic thermometer TM7/TMD7


Handheld pressure instruments series S4600 ST


Humidity and air temperature measuring instruments FT30 - FT50


Universal digital pressure gauge DIM 20


Handheld system for adjusting and servicing combustion systems EUROLYZER STx

AFRISO service.

# Our Service - Your Benefit

### Information and presentation

Whether telephone support or on site: Our consultants speak your language – we provide you with personal and individual consulting worldwide. Please visit www.afriso.de/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 1,500,000 individual devices and instruments are available ex stock.

### After-Sales-Service

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

### Rental service

You cannot afford to do without your instrument? No problem, our on-site service ensures that you remain on duty. We will have your instrument picked up and send you a rental instrument. For a low rental fee. Ask for availability of this service in your country.

The experience of more than 145 years.

# AFRISO profile

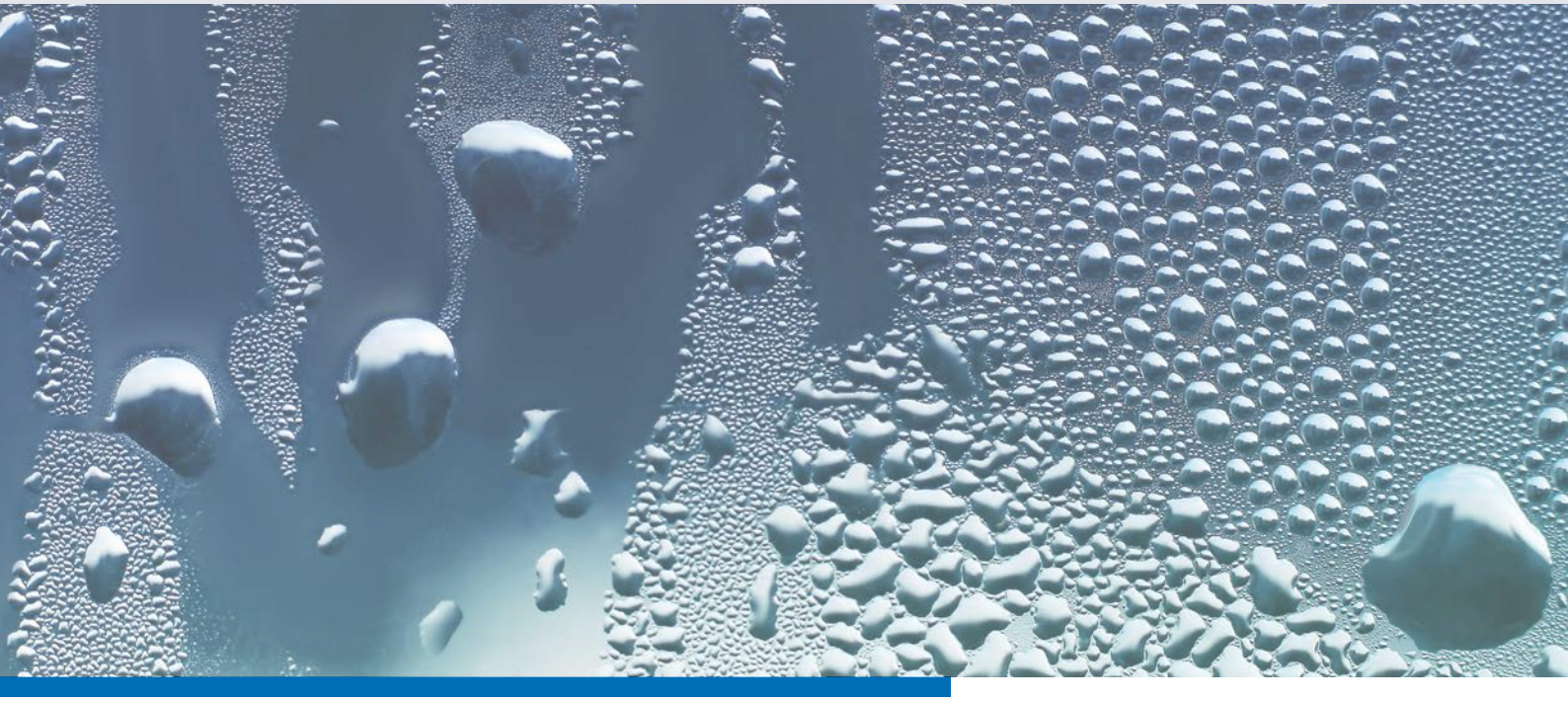
A total of more than 1,000 employees are at work for you worldwide. More than 550 at the four sites in Germany. We respond to current market requirements with a broad product portfolio, complex special products and complete system solutions in addition to being a reliable partner to craftspeople, commerce, OEMs and the industry.

### Company data

- Industry: Measuring and control technology
- Founding year: 1869
- Legal form: Limited liability company, owned and managed by family, independent of corporate group
- Place of business: Güglingen, Germany
- Equity ratio: > 50 %
- Branches: 19
- Exports to 65 countries
- Staff: > 1,000 worldwide, > 550 in Germany
- Production sites: Güglingen (DE), Amorbach (DE), Illmensee (DE), Alsenz (DE), Crawley (UK), Bukarest (RO), Arlöv (SE), Rynfield (ZA), 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



Ident-Nr. 991517 06698 06/18

Technology for Environmental Protection
Measuring. Controlling. Monitoring.

AFRISO

AFRISO-EURO-INDEX GmbH · Lindenstr. 20 · 74363 Güglingen · Germany · Phone +49 7135 102-0 · Fax +49 7135 102-147 · info@afriso.com · www.afriso.com