



Temperature sensors

Keeping your processes in the optimal range

ifm.com/cnt/temperature

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Never too hot, never too cold. Solutions for accurate and reliable temperature monitoring

Freezing cold? Room temperature? Or boiling hot? Every processing method, every production step, every system is different. And so is the definition of its ideal temperature. When that temperature drifts out of range, the consequences can be serious: product defects, equipment wear, failures – or complete shutdowns.

Our comprehensive portfolio of temperature sensors ensures your systems and processes stay consistently within their optimal operating range. Whether you're working with -100 °C or +2,500 °C, invasive, non-invasive or infrared measurement, analogue or IO-Link,

fast-responding or self-monitoring sensors – whatever your requirements for your next temperature sensor, we have the right solution for you – including the appropriate process connection.

From adapters, sensors and data infrastructure to IIoT-ready solutions at the IT level – we provide everything you need for continuous temperature monitoring, all from a single source.

Pretty cool, right?



The right product
for your application
ifm.com/cnt/temperature



Temperature sensors in contact with the medium	Sensor type	Max. measuring range [°C]
Compact temperature sensors for industrial applications	TA	-50...150
	TN	-50...150
	TK	-20...140
	TV	-50...150
Compact temperature sensors for mobile applications	TA / TU	-50...150
	TM	-40...150
Compact temperature sensors for hygienic applications	TA	-50...200
	TD	-50...150
	TCC	-50...160
Sensors with fast response times for hygienic applications	TA	-50...200
The modular concept	TM	-40...150
	TS	-100...600
	TT	-40...150
	TR	-100...600
	TP	-100...600
Non-contact temperature sensors	Sensor type	Max. measuring range [°C]
Passive surface temperature probes	TSM	-25...160
Infrared temperature sensors for hot objects	TW	50...1350
	TW (measuring)	-30...2500

*All our products have CE, cULus, CPA, UKCA as standard

Max. installation depth [mm]	Display	One piece design	Approvals*	Page
150	–	√	DNV	06 – 11
150	√	√	UL	
250	–	√	–	
30	–	√	–	
200	√	–	UL	12 – 13
50	–	√	–	
350	–	√	EHEDG, 3A, FDA	14 – 19
350	√	√	UL	
450	–	√	–	
83	–	√	EHEDG, 3A, FDA, UL	20 – 21
250	–	–	EHEDG, 3A, FDA, UL	22 – 25
250	–	–	UL, DNV	
200	–	–	EHEDG, FDA, UL	
560	–	–	UL	
–	–	–	UL	
Max. installation depth [mm]	Display	One piece design	Approvals*	Page
	–	–	UL	26 – 27
	√	√	–	28 – 29
	√	√	–	

Compact temperature sensors for industrial applications

TK type temperature sensors

- Easy adjustment of the switch points via two setting rings allowing optimum read-out.
- Mechanical lock to prevent accidental adjustment.

T05 / T09: 1 / 3 s.

Accuracy [K]: ± 3 .



Measuring range [°C]	Process connection	Insertion depth [mm]	Order no.
Normally open / normally closed complementary			
-20...140	G¼	50	TK6110
2 x NO			
-20...140	G¼	50	TK7110
1 x NO / 1 x NC			
-20...140	G½	250	TK7460

Communicative:

Temperature sensors with switching outputs or continuous transmission of measured values via IO-Link.

Convenient:

Switch point setting via setting ring (type TK) or via moneo software and IO-Link (type TV).

Precise:

High accuracy thanks to the adjustment of the PT element and the electronics.

Robust:

Pressure resistance up to 400 bar.

Flexible:

Different process connections and installation depths.

**TV type
temperature sensors**

- Two solutions: continuous transmission of measured values via IO-Link and two switching outputs.

T05 / T09: 1 / 3 s.

Accuracy [K]: ± 0.3.



Measuring range [°C]	Process connection	Insertion depth [mm]	Order no.
2 switching outputs			
-50...150	G¼	25	TV7105
-50...150	G½	30	TV7405

Good to know:

Devices with NPT process connection and °F scaling available at ifm.com



Compact temperature sensors for industrial applications

TA type temperature transmitters

- The stainless steel housing with a high protection rating is suited for use in harsh industrial environments.

T05 / T09: 1 / 3 s.

Accuracy [K]:
± 0.3 + (± 0.1 % Ms).



Measuring range [°C]	Process connection	Insertion depth [mm]	Factory setting [°C]	Order no.
Analogue output 4...20 mA				
-50...150	G¼	25	-50...150	TA2105
-50...150	G¼	25	0...100	TA2107
-50...150	G¼	50	-50...150	TA2115
-50...150	G¼	50	0...100	TA2117
-50...150	G¼	100	-50...150	TA2135
-50...150	G¼	150	-50...150	TA2145
-50...150	G½	30	-50...150	TA2405
-50...150	G½	50	-50...150	TA2415
-50...150	G½	50	0...100	TA2417
-50...150	G½	100	-50...150	TA2435
-50...150	G½	100	0...100	TA2437
-50...150	G½	150	-50...150	TA2445
-50...150	G½	150	0...100	TA2447

Informative:

Temperature transmitter with current output, LED operating status indication and IO-Link.

Simple:

Preset measuring ranges configurable via moneo and IO-Link.

Precise:

High accuracy thanks to the adjustment of the PT element and the electronics.

Functional:

LED operating status indication signals voltage supply.

Robust:

Fully welded stainless steel housing for extreme installation conditions.

**Temperature sensors**

Temperature is the physical variable most often measured in machines and installations.

In the food, beverage and pharmaceutical industries, temperature sensors are used to ensure that products are at the correct temperature. In machine tool and automotive applications, the temperature or temperature difference measured at drives, gears and motors plays

an important role as an indicator of the machine condition. In the steel, metal and glass industries, temperature monitoring of cooling circuits serves to prevent overheating of plants.

A large selection of ifm temperature sensors is offered to suit different temperature ranges, installation depths, environmental conditions and media.

**Temperature sensors in operation**

Emission-free
inland shipping
ifm.com/cnt/koedood

Compact temperature sensors for industrial applications



TN type temperature sensors

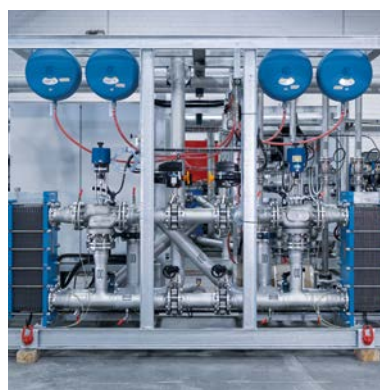
- User-friendly setting with only 3 push-buttons and selectable colour display for easy handling.

T05 / T09: 1 / 3 s.

Accuracy [K]:
 $\pm 0.3 + (\pm 0.1 \% Ms)$.



Measuring range [°C]	Process connection	Insertion depth [mm]	Factory setting [°C]	Order no.
1 switching output and 1 analogue output 4...20 mA or 0...10 V				
-50...150	Internal thread M18 x 1.5	45	-40...150	TN2511
2 switching outputs				
-50...150	Internal thread M18 x 1.5	45	-40...150	TN7511



Temperature sensors in operation



**Efficient cooling
circuit monitoring**
ifm.com/cnt/leffek

Plug & play:

The one-piece design enables quick and flexible set-up.

Unmistakable:

Clear indication of acceptable ranges. Programmable red / green display.

Simple:

Setting via display and buttons on the device or via IO-Link.

Visible:

345° rotatability – for optimum readability.

Elaborate:

Fast access to the data sheet via QR code.



Measuring range [°C]	Process connection	Insertion depth [mm]	Factory setting [°C]	Order no.
2 switching outputs or 1 switching and 1 analogue output 4...20 mA or 0...10 V				
-50...150	G¼	25	-50...150	TN2105
-50...150	G¼	50	-50...150	TN2115
-50...150	G½	30	-50...150	TN2405
-50...150	G½	50	-50...150	TN2415
-50...150	G½	100	-50...150	TN2435
-50...150	G½	150	-50...150	TN2445

Accessories:

For process adapters and thermowells, see pages 30–33.





Compact temperature sensors for mobile applications



TA / TU type temperature transmitters

- Welded stainless steel housing perfectly adapted to mobile applications.

T05 / T09: 1 / 3 s.

Accuracy [K]:
± 0.3 + (± 0.1 % Ms).

Measuring range [°C]	Process connection	Insertion depth [mm]	Connector	Order no.	
Analogue output				4...20 mA	0.5...4.5 V
-50...150	G¼	25	M12	TA3105	TU3105
-50...150	G¼	50	M12	TA3115	–
-50...150	G¼	200	M12	TA3155	–
-50...150	G¼	25	DEUTSCH	TA4105	TU4105
-50...150	G¼	50	DEUTSCH	TA4115	–
-50...150	G¼	25	AMP	TA5105	TU5105
-50...150	G¼	50	AMP	TA5115	–
0...100	SAE 6	25	DEUTSCH	–	TU4707

Suitable:

Temperature transmitters with current or voltage output or PT1000.

Versatile:

Connector versions M12, DEUTSCH and AMP selectable.

Economical:

Operating voltage as of 8 V.

Robust:

Fully welded stainless steel housing and high pressure resistance of up to 400 bar.

Simple:

Plug and Play via preset measuring ranges.

Flexible:

Different process connections and installation depths.



Measuring range [°C]	Process connection	Insertion depth [mm]	Connector	Order no.
PT1000				
-40...150	G¼	25	M12	TM5101
-40...150	G½	50	M12	TM5411
-40...150	G¼	25	DEUTSCH	TM6101

PT1000 with type TM process connection

- Screw-in sensors without evaluation unit.

T05 / T09: 1 / 3 s.

Accuracy [K]:

± (0.15 + 0.002 x |t|).



Accessories:

For process adapters and thermowells, see pages 30–33.



Compact temperature sensors for hygienic applications



TA type temperature transmitters

- The stainless steel housing with a high protection rating is suited for use in hygienic environments.

T05 / T09: ≤ 0.5 / ≤ 2 s.

**Accuracy [K]:
 ± 0.3 + (± 0.1 % Ms).**

Measuring range [°C]	Process connection	Insertion depth [mm]	Order no. / factory setting		
			0...200 [°C]	0...100 [°C]	-10...150 [°C]
Analogue output 4...20 mA, probe Ø 6 mm					
-50...200	Ø 6 mm	50	TA2212	–	–
-50...200	Ø 6 mm	100	TA2232	–	–
-50...200	Ø 6 mm	150	TA2242	TA2247	TA2241
-50...200	Ø 6 mm	250	TA2262	–	–
-50...200	Ø 6 mm	350	TA2292	–	–
-50...200	G½ with sealing cone	Flush mount	–	TA3597 ¹⁾	–
-50...200	G½ with sealing cone	30	TA2502	–	–
-50...200	G½ with sealing cone	50	TA2512	TA2517	TA2511
-50...200	G½ with sealing cone	100	TA2532	TA2537	TA2531
-50...200	G½ with sealing cone	150	TA2542	–	–
-50...200	Clamp ½ - ¾"	25	TA2002	–	–
-50...200	Clamp ½ - ¾"	60	TA2012	–	–
-50...200	Clamp 1 - 1.5"	30	TA2802	–	–
-50...200	Clamp 1 - 1.5"	50	TA2812	–	–
-50...200	Clamp 1 - 1.5"	100	TA2832	–	–
-50...200	Clamp 1 - 1.5"	150	TA2842	–	–

¹⁾No IO-Link

Informative:

Temperature transmitter with current output, LED operating status indication and IO-Link.

Precise:

High accuracy thanks to temperature adjustment at three reference points.

Verified:

Free 3-point factory certificate available at ifm.com.

Extended:

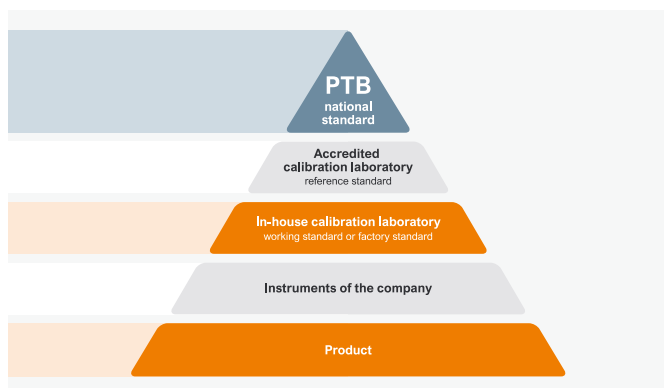
Measuring range from -50 to 200 °C; preset measuring ranges configurable via IO-Link.

Flexible:

Adapter system for all common process connections such as Varivent, SMS or DIN11851 pipe fitting.

**Did you know?**

During calibration, the deviation of a measuring device from a reference device is determined and documented in a traceable manner. The regular calibration of a measuring device ensures the accuracy and reproducibility of the measurement data.



Find out more about the calibration service

ifm.com/cnt/calibration-service

**Accessories:**

For process adapters and thermowells, see pages 30–33.



Compact temperature sensors for hygienic applications

Measuring range [°C]	Process connection	Insertion depth [mm]	Order no. / factory setting	
			-10...150 [°C]	0...100 [°C]
Analogue output 4...20 mA				
-50...150	Clamp 1 - 1.5"	30	TD2801	TD2807
-50...150	Clamp 1 - 1.5"	50	TD2811	TD2817
-50...150	Clamp 1 - 1.5"	100	TD2831	TD2837
-50...150	Clamp 1 - 1.5"	150	TD2841	TD2847
-50...150	Clamp 2"	30	TD2901	TD2907
-50...150	Clamp 2"	50	TD2911	TD2917
-50...150	Clamp 2"	100	TD2931	TD2937
-50...150	Clamp 2"	150	TD2941	TD2947

Informative:

Temperature transmitter with current output, display and IO-Link.

Robust:

Fully welded stainless steel housing protects against the ingress of moisture and prevents temperature drift.

Precise:

High accuracy thanks to temperature adjustment at three reference points.

Verified:

Free 3-point factory certificate available at ifm.com.

Flexible:

Further process connections available via a flexible adapter system.


Temperature transmitters with TD type display

- Compact design with a clearly visible 4-digit LED display.

T05 / T09: 1 / 3 s.

Accuracy [K]:
± 0.3 + (± 0.1 % Ms).



Measuring range [°C]	Process connection	Insertion depth [mm]	Order no. / factory setting	
			-10...150 [°C]	0...100 [°C]
Analogue output 4...20 mA				
-50...150	Ø 6 mm	50	TD2211	TD2217
-50...150	Ø 6 mm	100	TD2231	TD2237
-50...150	Ø 6 mm	150	TD2241	TD2247
-50...150	Ø 6 mm	200	TD2251	TD2257
-50...150	Ø 6 mm	250	TD2261	TD2267
-50...150	Ø 6 mm	300	TD2271	TD2277
-50...150	Ø 6 mm	350	TD2291	TD2297
-50...150	G½ with sealing cone	30	TD2501	TD2507
-50...150	G½ with sealing cone	50	TD2511	TD2517
-50...150	G½ with sealing cone	100	TD2531	TD2537
-50...150	G½ with sealing cone	150	TD2541	TD2547



Compact temperature sensors for hygienic applications



Self-monitoring TCC temperature transmitters

- The diagnostic function offers maximum safety for your temperature-sensitive processes.

T05 / T09: 1.5 / 4 s.

Accuracy [K]: ± 0.2.

Insertion depth [mm]	Process connection			
	G½ sealing cone Order no.	1 - 1.5" clamp Order no.	2" clamp Order no.	Ø 6 mm Order no.
2 switching outputs or 1 switching and 1 analogue output 4...20 mA or 0...10 V				
30	TCC501	–	–	–
50	TCC511	TCC811	TCC911	–
100	TCC531	TCC831	TCC931	TCC231
150	TCC541	–	–	TCC241
250	–	–	–	TCC261
350	–	–	–	TCC291
450	–	–	–	TCC281
550	–	–	–	TCC201
1000	TCC551	–	–	–

Unrivalled:

Integrated drift monitoring with two different resistance elements (PT and NTC: different characteristics for reliable drift detection).

Safe:

Permanent drift monitoring between the calibration intervals increases machine uptime and process safety.

Documented:

All process values (measuring element and reference element) can be logged via IO-Link (data logging).

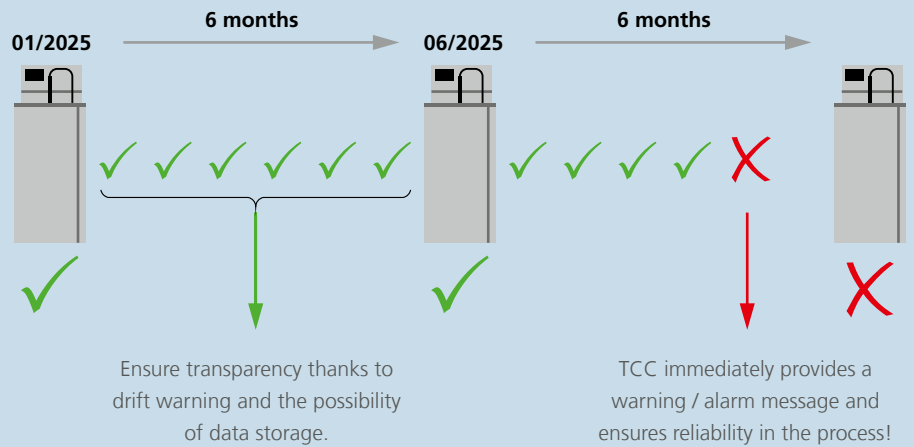
Good to know:

Developed for standard as well as critical temperature processes (CCPs = critical control points).

Verified:

Free 3-point factory certificate available at ifm.com.

More reliability in the process



Learn more about the self-monitoring TCC temperature sensor
ifm.com/cnt/tcc



Trust is good, control is better

"The temperature sensors from ifm can be used to ensure high product quality in dairy applications."

ifm.com/cnt/berchtesgadener-landmolkerei



Automation for the love of the craft

"Why a Swiss cheese dairy relies on sensors from ifm for the production of its specialties."

ifm.com/cnt/wildberg



Sensors with fast response times for hygienic applications



Measuring range [°C]	Process connection	Insertion depth [mm]	Order no. / factory setting		
			0...200 [°C]	0...100 [°C]	-10...150 [°C]
Analogue output 4...20 mA, probe Ø 3 mm					
-50...200	M12 x 1.5 with sealing cone	17	TA1102	TA1107	TA1101
-50...200	G¾ 2)	83	TA1322	TA1327	TA1321

²⁾ Suitable for installation in thermowells

TA type temperature transmitters

- Due to the fast response time, the 3 mm system ensures highest performance.

T05 / T09:
< 0.25 / < 1 s.

Accuracy [K]:
± 0.3 + (± 0.1 % Ms).

Accessories:

For process adapters and thermowells, see pages 30–33.



Performance:

Fast response times $< 0.25 / < 1$ s
[T05/T09] allow precise temperature control.

Flexible:

Ideal for small nominal pipe diameters
and confined installation spaces.

Hygienic:

Zero void adapters enable rapid and
easy cleaning.

Verified:

Free 3-point factory certificate
available online.



Temperature sensors in operation

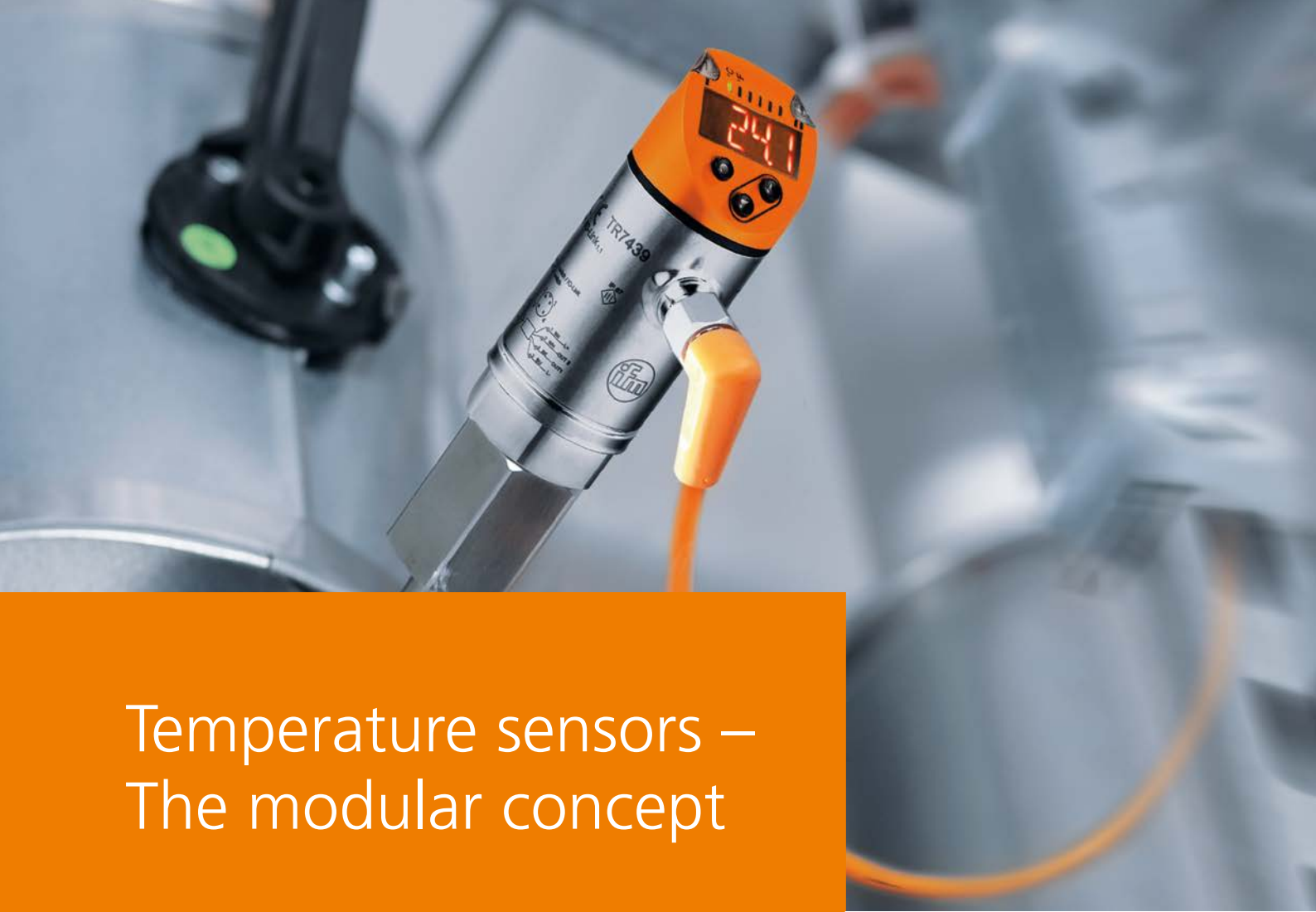


End-to-end solutions
for vertical indoor
farming

ifm.com/cnt/ucs

Measuring range [°C]	Process connection	Insertion depth [mm]	Order no.
Analogue output 4...20 mA			
-50...200	G $\frac{1}{8}$	15	TA1602
-50...200	G $\frac{1}{8}$	25	TA1612





Temperature sensors – The modular concept



TR type evaluation units

- Selectable colour display.
- Scalable analogue output 4...20 mA / 0...10 V.
- Freely configurable switching output.
- Automatic detection of the temperature probe.
- Accuracy [K]: $\pm 0.3 + (\pm 0.1 \% Ms)$.



TP type measured signal converters

- Operating and switching status indication by LED.
- Scalable analogue output 4...20 mA.
- Temperature measuring range -100...600 °C.
- 0.01 K resolution facilitates control tasks.
- Hygienic stainless steel housing.
- Accuracy [K]: $\pm 0.1 K$.

Individual:

Configure your measurement system according to your requirements.

Suitable:

Broad range of combination options.

Visual:

Evaluation units with or without colour display.

Flexible:

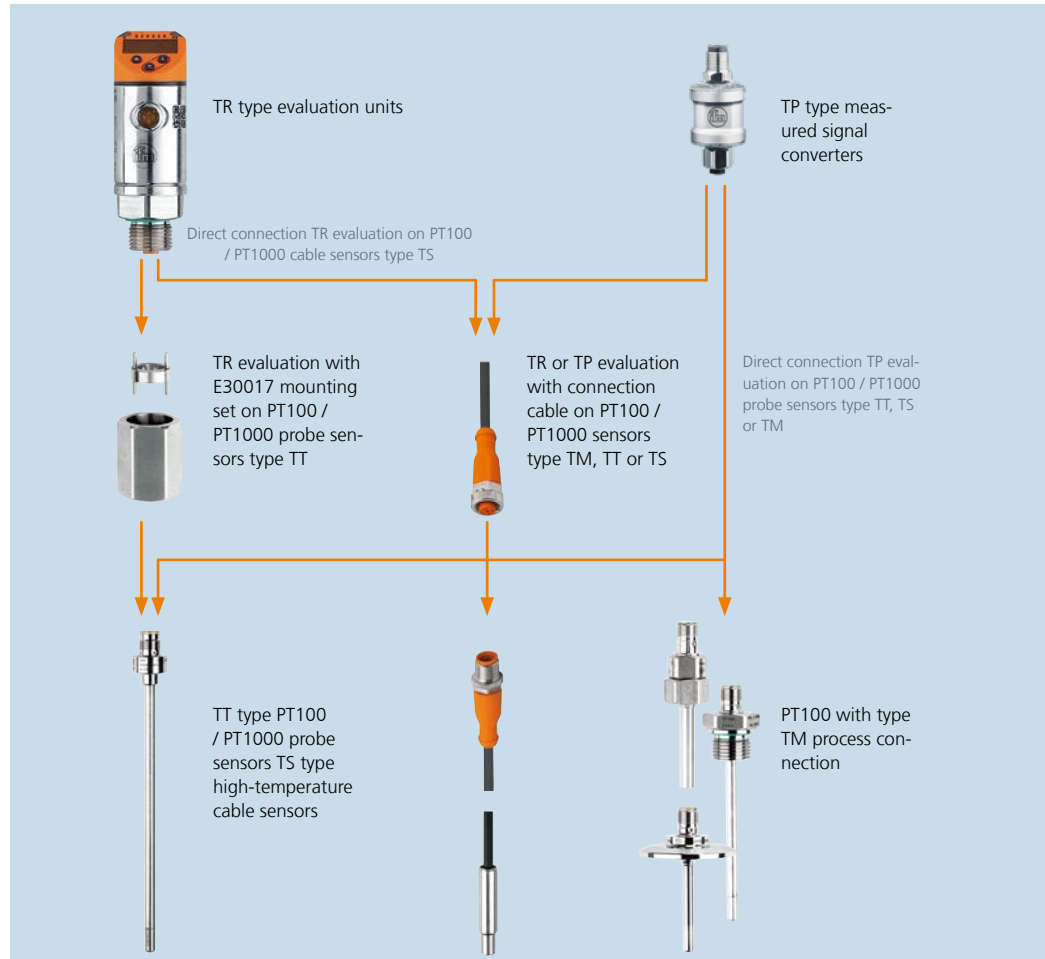
Different process connections and installation depths.

Far reaching:

Measuring ranges from -100 to 600 °C.

User-friendly:

Thermowells enable sensor replacement without interrupting the process.



PT100 / PT1000

TT type probe sensors

- Different installation lengths up to 560 mm.
- Measuring probes Ø 6 and 10 mm.
- Protection rating: IP67 (industry) / IP69K (hygiene).
- T05 / T09: 1 / 3 s.
- Accuracy [K]: $\pm (0.15 + 0.002 \times |t|)$.



PT100 / PT1000

TS type cable sensors

- Measuring probes Ø 5, 6 and 10 mm.
- Screw-in sensors in M5 and M6 sizes.
- Bolt-on sensors for M6 and M10 screws.
- Temperature probes for the ATEX zone.
- Different cable materials.
- Protection rating IP67.
- T05 / T09: 3 / 10 s.
- Accuracy [K]: $\pm (0.15 + 0.002 \times |t|)$.



PT100 / PT1000

with type TM process connection

- Industrial and hygienic process connections.
- Different installation lengths up to 250 mm.
- Measuring probe Ø 6 mm.
- Accuracy class A.
- Pressure resistance up to 160 bar.
- Protection rating: IP67 (industry) / IP69K (hygiene).
- T05 / T09: 1 / 3 s.
- Accuracy [K]: $\pm (0.15 + 0.002 \times |t|)$.

Temperature sensors – modular concept for industrial and hygienic applications



TR type evaluation units

Process connection	Measuring range [°C]	Factory setting [°C]	Order no.
1 switching output and 1 analogue output 4...20 mA or 0...10 V			
G½	-100...600	-40...300	TR2439
2 switching outputs			
G½	-100...600	-40...300	TR7439



TP type measured signal converters

Measuring range	Factory settings	Order no.
M12 connections · output function 4...20 mA Switching output · IO-Link 1.1		
-100...600 °C	-100...600 °C	TP2009
-100...300 °C	-50...300 °C	TP2008
-100...300 °C	-50...150 °C	TP2005
-100...300 °C	-10...150 °C	TP2001
-100...300 °C	0...100 °C	TP2007
-148...572 °F	0...300 °F	TP2003
M12 connections · output function 0...10 V Switching output · IO-Link 1.1		
-100...300 °C	0...100 °C	TP2017



TT type PT100 / PT1000 probe sensors
TS type high-temperature cable sensors

Measuring range [°C]	Ø probe / installation depth [mm]	Order no.	Order no.
Applications		Industry	Hygienic
-40...150	6 / 50	TT9281	TT9291
-40...150	6 / 70	TT7281	–
-40...150	6 / 100	TT0281	TT0291
-40...150	6 / 150	TT1281	TT1291
-40...150	6 / 200	TT4281	–
-40...150	6 / 250	TT2281	TT2291
-40...150	6 / 300	TT6281	–
-40...150	6 / 350	TT3281	TT3291
-40...150	10 / 160	TT1081	–
-40...150	10 / 260	TT2081	–
-40...150	10 / 360	TT3081	–
-40...150	10 / 560	TT5081	–
-40...150	6 / 160	TT1250¹⁾	–
-40...150	6 / 260	TT2250¹⁾	–
-40...150	6 / 360	TT3250¹⁾	–
-40...150	10 / 160	TT1050¹⁾	–
-40...150	10 / 260	TT2050¹⁾	–
-40...150	10 / 360	TT3050¹⁾	–
-40...150	10 / 560	TT5050¹⁾	–
-100...600	6 / 100	TS2451	–
-100...600	6 / 150	TS2452	–
-100...600	6 / 200	TS2453	–
-100...600	6 / 250	TS2454	–

¹⁾ PT1000 sensor element



TS type PT100 / PT1000 cable sensors

Process connection	Measuring range [°C]	Cable / plug / length [m]	Order no.
Industrial applications			
Ø 5 mm ATEX	-20...80	Silicone / – / 3	TS325A
	-40...90	PUR / M12 / 2	TS2289
	-40...90	PUR / M12 / 2	TS2269¹⁾
Ø 6 mm	-40...90	PUR / M12 / 2.5	TS9289
	-40...90	PUR / M12 / 5	TS5289
	-50...250	PTFE / M12 / 0.15	TS9256¹⁾
	-50...250	PTFE / M12 / 2	TS2256
Ø 10 mm	-40...90	PUR / M12 / 2	TS2089
	-40...90	PUR / M12 / 2	TS2069¹⁾
	-40...90	PUR / M12 / 5	TS5089
	-50...250	PTFE / M12 / 2	TS2056
Bolt-on sensor 12 x 8.7 x 51 mm	-40...90	PUR / M12 / 2	TS2229
Bolt-on sensor 12.5 x 8.7 x 47 mm	-40...90	PUR / – / 2	TS2239
Bolt-on sensor ATEX 10 x 10 x 48 mm	-20...115	Silicone / – / 5	TS502A¹⁾
Bolt-on sensor ATEX 10 x 10 x 42 mm	-20...115	Silicone / – / 5	TS522A
M5 screw-in sensor	-40...90	PUR / M12 / 2	TS2789
	-40...90	PUR / M12 / 0.5	TS9789
	-30...180	Silicone / M12 / 2	TS2759
	-30...180	Silicone / – / 4	TS4759
	-30...180	Silicone / M12 / 10	TS0759
Screw-in sensor M6	-40...90	PUR / M12 / 2	TS2689
	-30...180	Silicone / M12 / 2	TS2659
Screw-in sensor M8	-20...115	Silicone / – / 2	TS285A

¹⁾ PT1000 sensor element

PT100 with type TM process connection

Process connection	Measuring range [°C]	Insertion depth [mm]	Order no.
Industrial applications			
G¼	-40...150	25	TM4101
	-40...150	25	TM5101¹⁾
G½	-40...150	50	TM4411
	-40...150	50	TM5411¹⁾
	-40...150	100	TM4431
	-40...150	150	TM4441
	-40...150	250	TM4461
	-40...125	60	TM9950
Hygienic applications			
G½ with sealing cone	-50...140	Flush mount	TM4599
	-40...150	20	TM4591
	-40...150	30	TM4501
	-40...150	50	TM4511
	-40...150	100	TM4531
Clamp 1 - 1.5"	-40...150	150	TM4541
	-40...150	30	TM4801
	-40...150	50	TM4811
	-40...150	100	TM4831
	-40...150	150	TM4841
Clamp 2"	-40...150	30	TM4901
	-40...150	50	TM4911
	-40...150	100	TM4931
	-40...150	150	TM4941

¹⁾ PT1000 sensor element

Passive surface temperature probes – fast, precise, non-invasive



TSM type temperature sensors

- Measuring range of -25...160 °C.
- t05 / t09 = 7.5 s / 25 s.
- Clamp-on solution.

External pipe diameter [mm]	Nominal width	Order no.
17...21	DN15	TSM201
21...24	DN20	TSM301
25...30	DN25	TSM401
32...36	DN32	TSM501
38...45	DN40	TSM601
48...54	DN50	TSM701

Simple process monitoring:

Set up temperature measuring points quickly, flexibly, and with ease.

Non-contact:

Clamp-on solution reduces installation costs and effort.

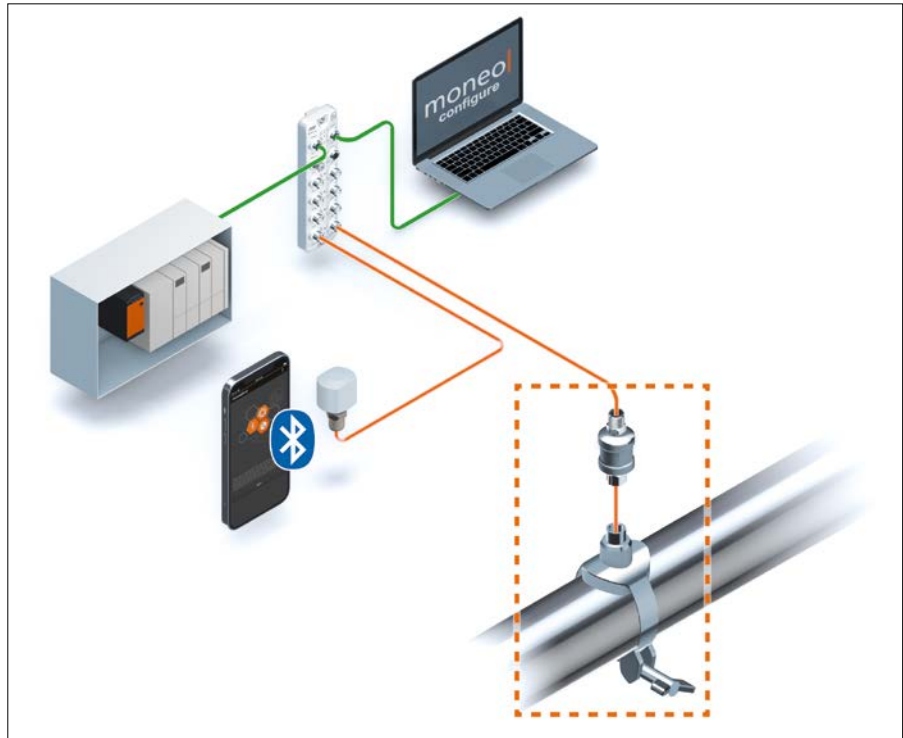
Tested hygienic suitability:

Temperature-resistant up to 160 °C and rated IP69K, the probe is ideal for use in hygienic environments.

Fast and accurate:

Fast response time and high measurement accuracy for a clear process overview.

IP69K

**Simple process monitoring even on small pipes**

The temperature probe for surface mounting enables quick, flexible and easy measuring point configuration. The passive temperature probe is particularly suitable for use on small pipe diameters where invasive temperature monitoring would significantly affect the flow of the medium. As the values are recorded non-invasively, there is no risk of contamination of the medium. Instead, the installation is easy and does not require time-consuming and cost-intensive drilling and welding, so that the measuring point can also be installed in the running process.

Perfect duo: temperature sensor and plug

The resistance values of the passive surface temperature sensor can be analysed with the TP temperature plug. It converts the values of the PT100 and PT1000 elements into analogue or IO-Link signals.

**TP temperature plug**

More on the temperature plug: pages 22–23.



Infrared temperature sensors for hot objects

TW70 type temperature sensors

- For object detection (0...100%).



Measuring range [°C]	Wave length range [µm]	Order no.
Detecting system		
2 binary switching outputs		
50...500	8...14	TW7000²⁾
250...1250	1...1.7	TW7001²⁾
350...1350	1...1.7	TW7011^{1) 2)}

¹⁾ Sensor for fibre-optics and measuring head

²⁾ No IO-Link

Type	Order no.
Fibre optic 2 m	E35061
Fibre optic 5 m	E35062
Measuring head	E35060



Without contact:

Exact temperature measurement even of objects that are difficult to access.

Far reaching:

For object temperatures of -30...2,500 °C.

Informative:

Clearly visible display.

Precise:

LED pilot light for alignment and control.

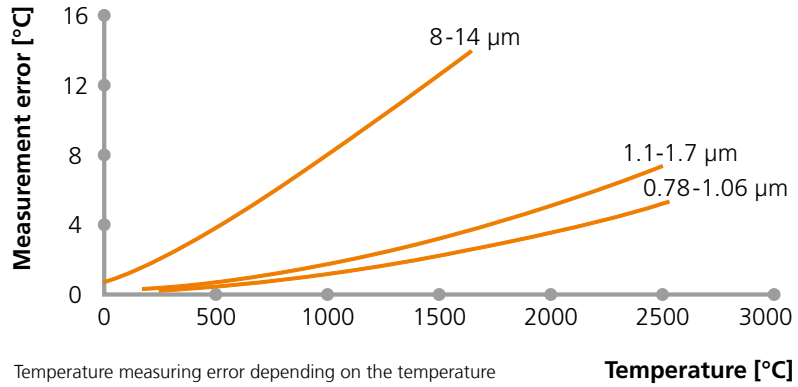
Precise:

Scratch-resistant precision lenses for minimum sensitivity to ambient light.



TW2 type temperature sensors

For object measurement
(-30...2,500 °C).

**Choosing the optimal sensor**

Select a sensor with the shortest possible wavelength: The shorter the wavelength and the smaller the spectral range, the lower the impact of changes of the object's emission factor on the measurement.



Measuring range [°C]	Wave length range [μm]	LED pilot light	Order no.
Measuring system			
Analogue output 4...20 mA and switching output			
500...2500	0.78...1.06	No	TW2002
250...1600	1...1.7	No	TW2001
300...1600	1...1.7	No	TW2011³⁾
250...1600	1...1.7	Yes	TW2101
0...999.5	8...14	No	TW2000
-30...300	8...14	No	TW2003
0...999.5	8...14	Yes	TW2100

³⁾ Sensor incl. fibre optics and measuring head

Type	Order no.
Air purge	E35063
Cooling jacket	E35068
Mounting bracket	E35065
Protective tube	E35066
Insulating tube	E35067
Calibration certificates	
Factory calibration sheet for infrared temperature sensors	ZC0061
Recalibration for TW2 infrared temperature sensor	ZC0062
Recalibration for TW2002 infrared temperature sensor	ZC0063



Accessories

Process adapters and thermowells for temperature sensors



Screw-in thermowell up to 16 bar

Welding thermowell up to 400 bar

Device connection	Process connection	Insertion depth [mm]	Order no.	For sensor type
Industrial applications				
G¼	G¼	27	E37700	TA2115, TN2115, TKx110, TT0281 ¹⁾
G¼	G¼	74	E37710	TA2135, TT1281 ¹⁾
G¼	G¼	124	E37720	TA2145, TT3281 ¹⁾
G½	G½	27	E37600	TA241x, TN2415, TM4411, TT0281 ¹⁾
G½	G½	74	E37610	TA243x, TN2435, TM4431, TT1281 ¹⁾
G½	G½	82	E35010	TT1281 ¹⁾
G½	G½	124	E37620	TA244x, TN2445, TM4441, TT2281 ¹⁾
G½	G½	174	E37630	TT12281 ¹⁾
G½	G½	182	E35020	TT2081 ¹⁾
G½	G½	224	E37640	TM4461, TT3281 ¹⁾
G½	G½	274	E37650	TT3281 ¹⁾
G½	G½	282	E35030	TT3081 ⁴⁾
G½	G½	482	E35050	TT5081 ⁴⁾
Ø 6 mm	G½	33	E37603	TA2212, TD221x, TT9281
Ø 6 mm	G½	83	E37613	TA2232, TD223x, TCC231, TT0281
Ø 6 mm	G½	128	E37623	TA2242, TD224x, TCC241, TT1281
Ø 6 mm	G ½	233	E37643	TD226x, TCC261, TT2281
Ø 6 mm	G½	333	E37663	TD229x, TCC291, TT3281
Industrial applications / hygienic applications				
1½" NPS ³⁾	Ø 38.1 mm	191	E37430	TD227x ¹⁾ , TT3281 ¹⁾
½" NPS ³⁾	Ø 38.1 mm	267	E37450	TD229x ¹⁾ , TT3281 ¹⁾

Progressive ring fitting



Clamp fitting



Clamp adapter



Type	Device connection	Process connection	Order no.	For sensor type
Industrial applications				
Progressive ring fitting	Ø 6 mm	G¼	E33431	TA, TD, TT
	Ø 6 mm	M12 x 1.0	E33433	TA, TD, TT
	Ø 6 mm	G½	E30047	TA, TD, TT
Progressive ring fitting	Ø 10 mm	G½	E30016	TT
	Ø 10 mm	½" NPT	E30024	TT
Clamping fitting	6 / 8 / 10 mm	G½	E30018	TA, TCC, TD, TS, TT
	6 / 8 / 10 mm	½" NPT	E30025	TA, TCC, TD, TS, TT
Hygienic applications				
Clamp adapter	Ø 6 mm	G½ with sealing cone	E37450	TA, TCC, TD, TT

In combination with ¹⁾adapter E30018 / E30047 / E33431, ²⁾adapter E30144; ³⁾suitable for G½ and ½" NPT in combination with ⁴⁾fitting E30016 / E30018



Screw-in thermowell up to 16 bar



Clamp thermowell up to 25 bar



Welding thermowell up to 300 bar



Thermowell for temperature sensors



Welding adapter

Device connection	Process connection	Installation depth [mm]	Order no.	For sensor type
Industrial applications				
G½ with sealing cone	G½ with sealing cone	68	E37511	TA253x, TD253x, TM4531, TT1291
		118	E37521	TA2542, TD254x, TM4541, TT2291 ²⁾
G½ with sealing cone	Ø 34 mm	49	E37411	TA2512, TCC511, TD251x, TM4511, TT0291 ²⁾
		99	E37421	TA253x, TCC531, TD253x, TM4531, TT1291 ²⁾
		149	E37431	TA2542, TCC541, TD254x, TM4541, TT2291 ²⁾
½" NPS ³⁾	Clamp 1–1.5"	64	E37810	TA243x, TA2333, TD224x ¹⁾ , TM4431, TM4331, TT1291 ¹⁾
		115	E37820	TA244x, TA2343, TD225x ¹⁾ , TM4441, TM4341, TT2291 ¹⁾
		191	E37830	TD227x ¹⁾ , TT3291 ¹⁾
		267	E37850	TD227x ¹⁾ , TT3291 ¹⁾
½" NPS ³⁾	Clamp 2"	64	E37910	TA2435, TA2333, TD224x ¹⁾ , TM4431, TM4331, TT1291 ¹⁾
		115	E37920	TA2445, TA2343, TD225x ¹⁾ , TM4441, TM4341, TT2291 ¹⁾
		191	E37930	TD227x ¹⁾ , TT3291 ¹⁾
		267	E37950	TD229x ¹⁾ , TT3291 ¹⁾

Device connection	Process connection	Insertion depth [mm]	Order no.
Industrial applications			
G¾	G½ with sealing cone	20	E38505
G¾	Clamp 1...1.5"	30	E38515
G¾	Clamp ½...¾"	83	E38825
G¾	Ø 34 mm	83	E38795
G¾	Welding adapter Ø 12 mm	83	E38395
G¾	Welding adapter Ø 25 mm	83	E38425
G¾	Ingold Ø 12 mm	3	E38826

Device connection	Process connection	Insertion depth [mm]	Order no.
Industrial applications			
G½	Welding adapter Ø 18 mm	Tube wall thickness 1.25 mm	E38827
G½	Welding adapter Ø 18 mm	Tube wall thickness 1.50 mm	E38828
G½	Welding adapter Ø 18 mm	Tube wall thickness 2.00 mm	E38829
G½	Welding adapter Ø 18 mm	Tube wall thickness 1.25 mm	E38830

Accessories

Process adapters, connection cables and certificates for temperature sensors



Adapter



Welding
adapter, ball

Type	Device connection	Process connection	Order no.	For sensor type
Stainless steel adapter	M18 x 1.5	G½	E30073	TM, TN
Titanium adapter	M18 x 1.5	G½	E40114	TM, TN
Hastelloy adapter	M18 x 1.5	G½	E40175	TM, TN
Brass adapter	M18 x 1.5	G½	E40097	TM, TN
Plastic adapter	M18 x 1.5	Ø 23 mm	E40138	TM, TN
Ball 24.7 mm	Ø 6 mm	Clamp adapter	E30108	TA, TD, TT
Ball 25 mm	Ø 6 mm	Clamp adapter	E30407	TA, TD, TT



Process adapter

Type	Device connection	Process connection	Order no.	For sensor type
Metal-to-metal seal	G1 Aseptoflex Vario	Clamp 1 - 1.5"	E33701	–
Metal-to-metal seal	G1 Aseptoflex Vario	DIN 11851 DN32	E33711	–
Metal-to-metal seal	G1 Aseptoflex Vario	Varivent DN25	E33721	–
Metal-to-metal seal	G1 Aseptoflex Vario	SMS DN40	E33731	–
Sealing by O-ring	G1 Aseptoflex Vario	Clamp 1 - 1.5"	E33201	–
Sealing by O-ring	G1 Aseptoflex Vario	DIN 11851 DN32	E33211	–
Sealing by O-ring	G1 Aseptoflex Vario	Varivent DN25	E33221	–
Sealing by O-ring	G1 Aseptoflex Vario	DN/OD 33.7	E33304	–
Sealing by O-ring	G1 Aseptoflex Vario	DRD flange	E33242	–
Metal-to-metal seal	G½ with sealing cone	Clamp 1 - 1.5"	E33401	TA, TCC, TD, TM
Metal-to-metal seal	G½ with sealing cone	DIN 11851 DN25	E43304	TA, TCC, TD, TM
Metal-to-metal seal	G½ with sealing cone	Varivent DN25	E43306	TA, TCC, TD, TM
Metal-to-metal seal	G½ with sealing cone	SMS DN25	E33430	TA, TCC, TD, TM
Metal-to-metal seal	G½ with sealing cone	G¾	E43302	TA, TCC, TD, TM
Metal-to-metal seal	G½ with sealing cone	G1	E43303	TA, TCC, TD, TM
Metal-to-metal seal	G½ with sealing cone	Ø 35 mm	E30055	TA, TCC, TD, TM TT ²⁾
Metal-to-metal seal	G½ with sealing cone	Ø 45 mm	E30056	TA, TCC, TD, TM TT ²⁾

In connection with: ²⁾ adapter E30144



Jumper cable type EVC
with M12 plug / socket (selection)



Connection cable type EVF
with M12 socket (selection)

Plug / socket	Cable length [m]	Order no.
Industrial applications		
Straight / angled	1	EVC017
Straight / angled	5	EVC019
Angled / straight	1	EVC027
Angled / straight	5	EVC029
Angled / angled	1	EVC032
Angled / angled	5	EVC034
Straight / straight	1	EVC012
Straight / straight	5	EVC014
Hygienic applications		
Straight	5	EVF001
Straight	10	EVF002
Angled	5	EVF002
Angled	10	EVF005



Calibration and material certificates Type	Order no.
Declaration of compliance EN10204-2.1	ZC0001
Inspection certificate material EN10204-3.1	ZC0003 ⁵⁾
3-point DAkkS calibration temperature sensors	ZC0013
5-point DAkkS calibration temperature sensors	ZC0014
n-point DAkkS calibration temperature sensors	ZC0015
3-point ISO calibration temperature sensors	ZC0016
5-point ISO calibration temperature sensors	ZC0017
n-point ISO calibration temperature sensors	ZC0018

⁵⁾ Only available for selected article numbers



Back to normal

ifm's calibration service ensures reliable processes and product quality

One bar is one bar, eleven degrees are eleven degrees and four-point-three litres are four-point-three litres. How nice it would be if it were always that simple. If process sensors measured as accurately and precisely throughout their lives as they did on their first day. But they don't. Over time, they become inaccurate and drift due to the constant stress. The extent to which they do so is determined and documented in the course of calibration. This deviation can then be taken into account in the control system (as long as it is still within the tolerance range), so that the temperature, pressure, flow etc. are correctly maintained until the end of the process and the quality of the product is assured.

True, precise, accurate

What exactly happens during such a calibration? Well, it is determined how true, precisely and accurately a sensor actually still fulfils its original task – measuring. True? Precise? Accurate? Isn't that the same thing? In this case: no. We can explain this in detail if you are interested in the differences between these terms. Or you can take a look at our website. There we have presented the three criteria in a comprehensible way.

Accredited competence for traceable calibration

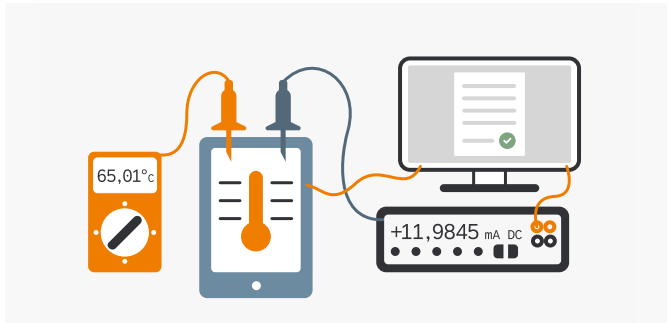
Why do we focus so much on these three criteria? Because that is our service for you. In other words: because we calibrate your ifm sensors for you and examine the measuring precision, the measuring trueness and the measuring accuracy very closely. Namely for pressure, temperature, flow and analysis sensors. And, as an accredited laboratory, traceable to the

highest standard size in the hierarchy. In Germany, for example, these are guarded by the Physikalisch Technische Bundesanstalt (highest-ranking national authority for metrology). Professional knowledge in passing: the standard sizes are internationally valid and are still being further refined today. (If you are interested, just search the net for the Avogadro project or the Boltzmann constant.)

Out of tolerance? Minimal loss of time!

But before we go into further raptures and revelry about standard sizes, let's get back to our offer to you. Whenever you want to calibrate your ifm process sensor: contact us. We have the precise equipment required to accurately calibrate your sensors. Incidentally, we offer a free factory certificate for many of our process sensors even before initial delivery, which shows whether the sensors work within their specified accuracy. So you can use them in your process with peace of mind. What's more, we know our sensors and have a replacement device ready should your sensor fail the recalibration. In such a case, the downtime for you is reduced to a minimum.

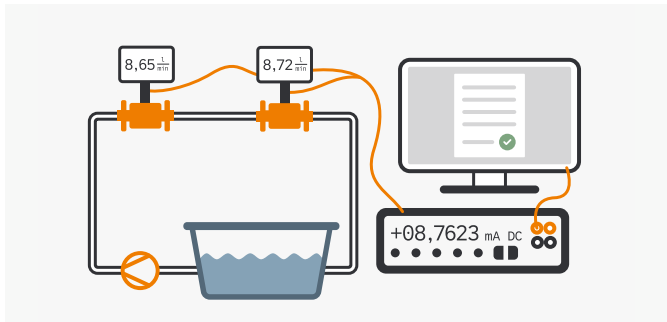
Sounds good? We think so, too. That is why we are so pleased to offer you this service.



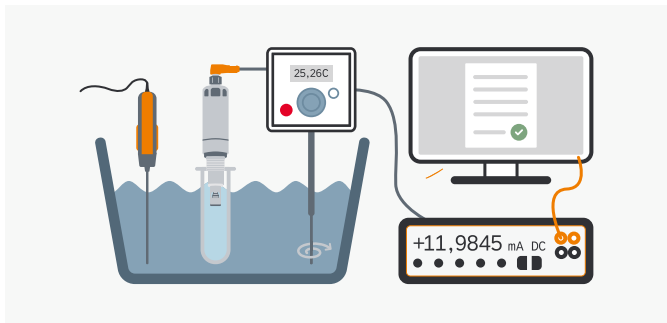
Liquid bath temperature calibration



Calibration of pressure gauges by using pressure compensators



Calibration of water flow sensors



Calibration of analytical sensors

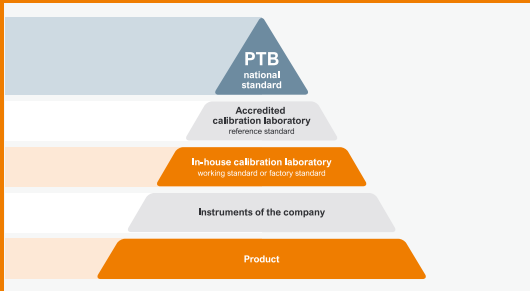


What does “calibration” mean anyway?

Calibration is the act of determining and documenting, in a traceable manner, the deviations between a measuring instrument called device under test (DUT) and a reference device called reference standard.

The result of this comparison shows the measuring deviations at different measurement points and can be provided in absolute or relative form. The regular calibration of measurement instruments ensures the precision and reproducibility of the measurement data. The reference measurement is made with a reference device.

Traceability refers to the uninterrupted chain of comparative measurements related to the measuring results of a measuring instrument and the specific, higher-ranking national standard.



Find out more about the calibration service

ifm.com/cnt/calibration-service



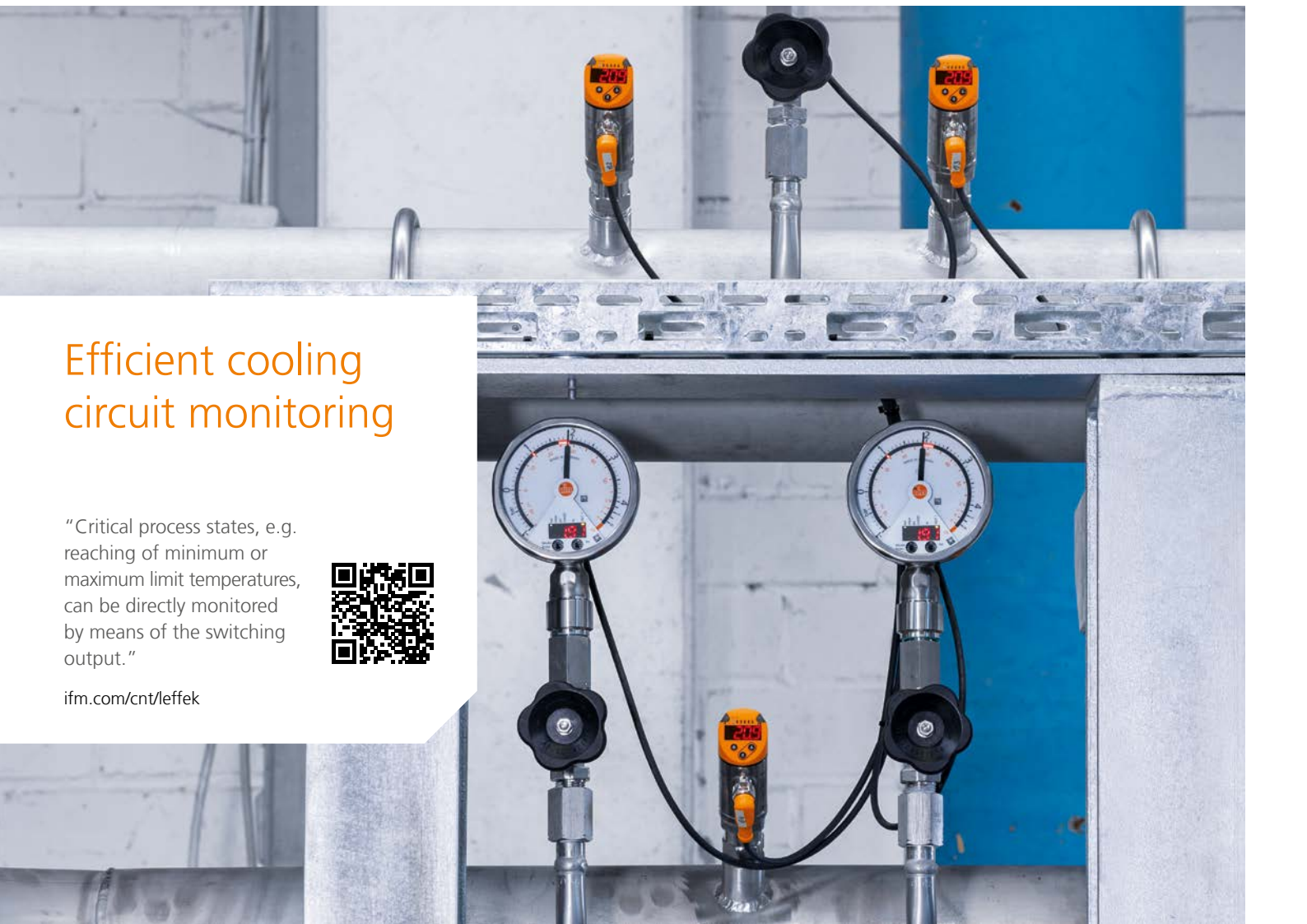
A close-up photograph of industrial machinery featuring several TCC sensors. One sensor in the foreground has a green LED light and a label showing '5.80.93' and '0-150.0°C'. Another sensor is visible in the background. Orange cables are connected to the sensors.

Trust is good, control is better

"We use the TCC sensors for in-process measurement of product temperature, cleaning temperature and sterilisation temperature."



ifm.com/cnt/berchtesgadener-landmolkerei



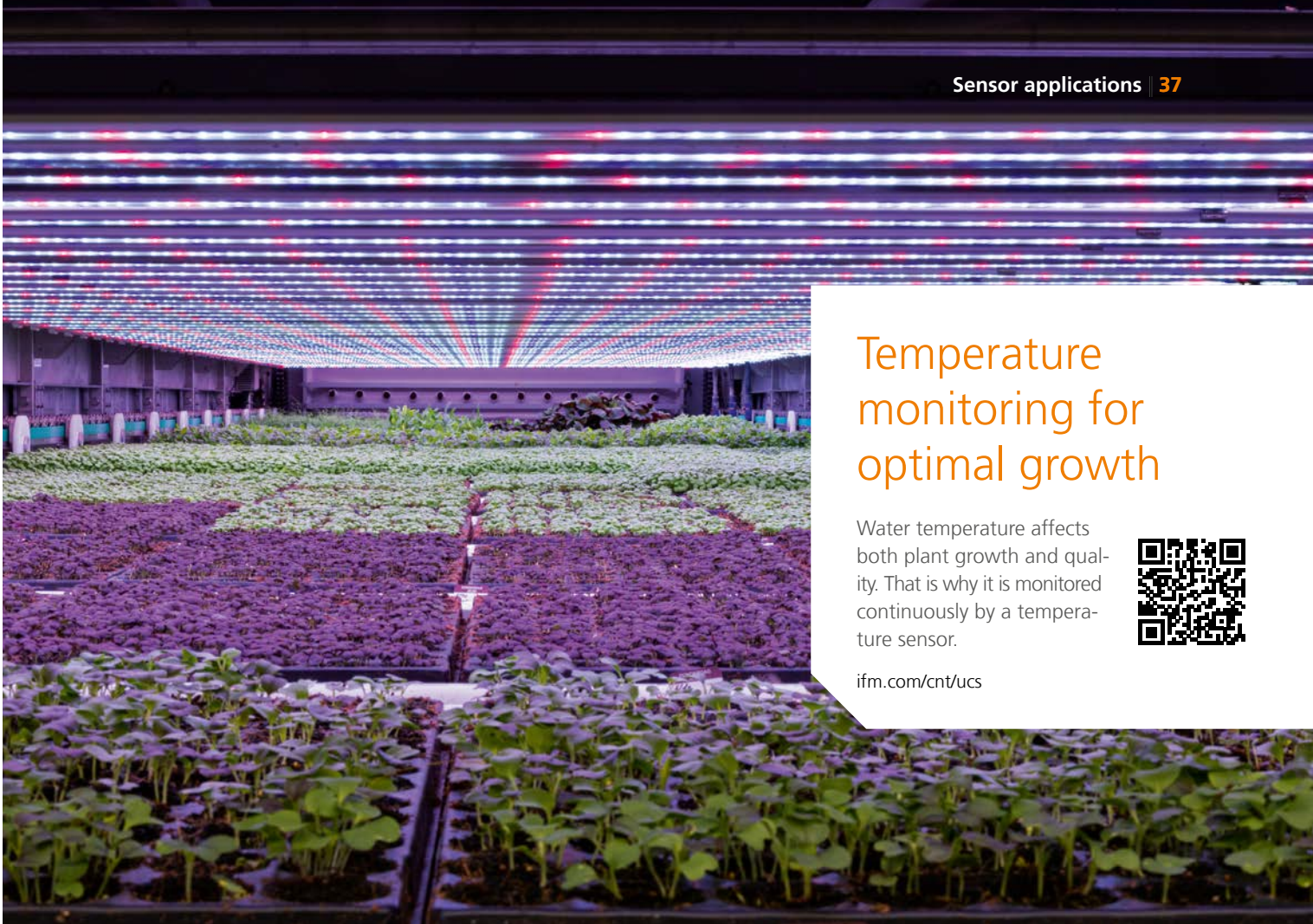
A photograph showing a cooling circuit monitoring setup. Two pressure gauges are mounted on a metal frame. Below them, two orange digital temperature sensors are connected to the circuit via black cables. The sensors display '20.2' on their screens.

Efficient cooling circuit monitoring

"Critical process states, e.g. reaching of minimum or maximum limit temperatures, can be directly monitored by means of the switching output."



ifm.com/cnt/leffek



Temperature monitoring for optimal growth

Water temperature affects both plant growth and quality. That is why it is monitored continuously by a temperature sensor.



ifm.com/cnt/ucs

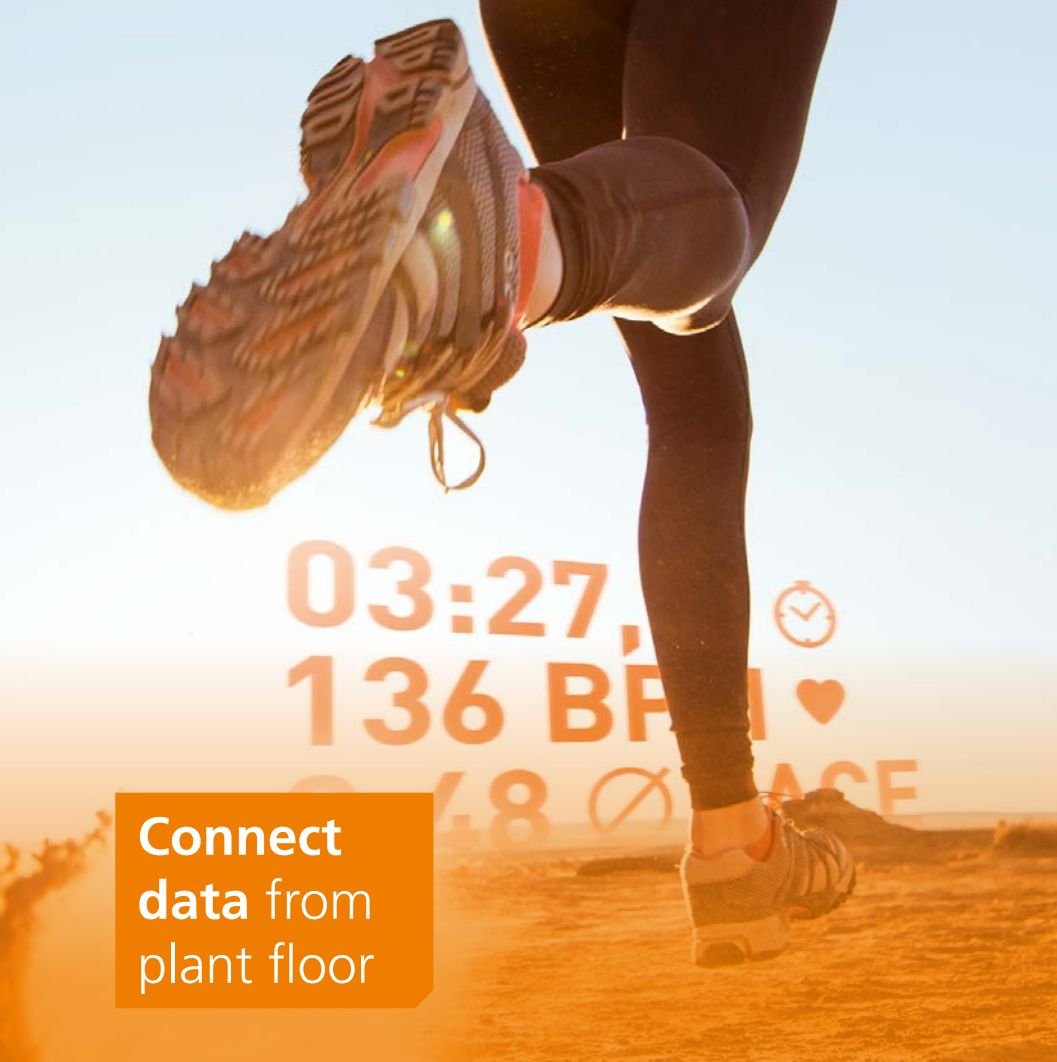


Maximising energy yield

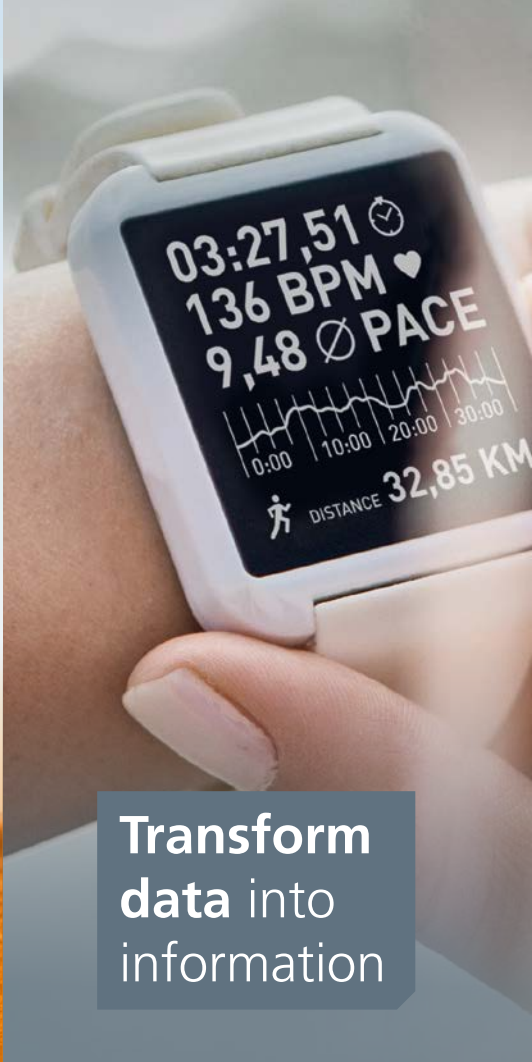
Temperature sensors help maintain a stable operating temperature in the fuel cells.



ifm.com/cnt/koedood



Connect
data from
plant floor



Transform
data into
information

Use the full power of your data

moneo: the IIoT platform for those who care about their plants

"My pulse frequency is 45 per minute when I'm asleep and healthy. If I am ill, it is about 55. Under full exertion, my heart pumps more than three times per second. I run my usual ten-kilometre route in less than 50 minutes on a good day and at a temperature of about 20°C. How do I know all that?"

The fitness tracker on my wrist collects my body data and my performances on a daily basis and analyses them for me. It helps me understand my body system. I can tell at a glance whether my body can cope with the exertion or whether I'm in the red zone and overexerting."

The sensors on my wrist makes my complex human organism transparent to me. While such a thing may have been difficult to imagine in the past, it is hardly anything special for us today. Take a glance at your wrist to check how your body is doing. It's as simple as that.

moneo: the result of a deep understanding of the machine

Monitoring the status and current condition of your machines and plants is very simple as well. With moneo. For more than half a century, we have had our finger on the pulse of the industry, shaping the evolution of automation. We are now distilling this expertise and in-depth understanding of all kinds of machines and plants from the OT level and combine it with the inexhaustible possibilities of digitalisation. Thanks to our IIoT platform, you can check the condition of your plant at any time. It will show you whether everything is running in the green zone or whether performance is declining, consumption values are getting out of hand or maintenance is required.



Get actionable insights

Data becomes information. Information becomes added value

Your plant already offers the preconditions for it: sensors permanently provide data on temperature, pressure, level and object presence. In most cases, however, this data only reaches the controller. And this only accounts for about 5 per cent of the wealth of knowledge that is available. Thanks to moneo, you can easily benefit from the remaining 95 per cent. Like a fitness tracker, our IIoT platform collects the incoming data, evaluates it and generates information you can use to optimise your processes and workflows and to fine-tune maintenance schedules.

Never again in the red zone

Temperature curves, compressed air consumption, cycle times, operating hours, levels and vibration behaviour – whatever may affect the **performance, production quality or energy efficiency** of your industrial organism: With moneo, you will be able to act before your plants will run out of steam, and before wear, lacking supplies or defects will lead to downtime

or precious energy will escape ineffectively through leaks. That is real added value. It saves money, nerves and time. You can, for example, rather invest the time you save after work to improve your personal best over 10 kilometres.

Do you want to understand your machines and plants better and keep them fit? Are you ready for more information, performance and efficiency?

Then start now. With moneo!



