

Product Overview
Temperature Measurement



Welcome to the World of Sensors and Measuring Instruments



Baumer – a name known worldwide for more than 55 years – is recognised as a leading producer of innovative sensor solutions for the factory and for the process automation industry.

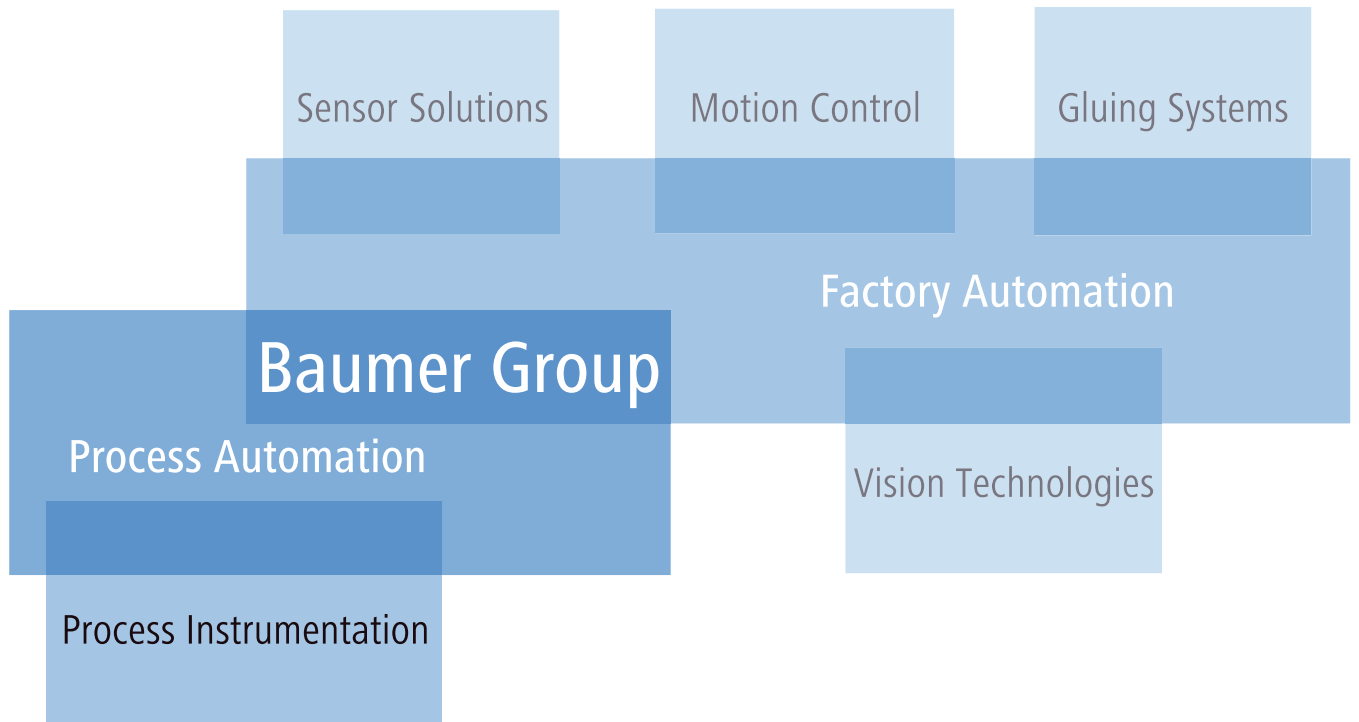
More than 2,000 employees in 32 countries work in the product segments: Sensor Solutions, Motion Control, Vision Technologies, Process Instrumentation and Gluing Systems. Our products keep processes running in innumerable fields.

The demands placed on sensors by the industry can only be met by a company which constantly works innovatively. It is for this reason that Baumer maintains an outstandingly staffed development department in an international network of highly qualified specialists.

A global presence, offering the highest level of expertise with regard to consultation, sales and service, assures you of the well known Baumer standard of quality around the world.

In this catalog you will find a broad range of products for temperature measurement.

Your Partner for Innovative Sensor Design



Process Instrumentation

In the product segment Process Instrumentation, Baumer manufactures mechanical and electronic measuring instruments and offers customers one-stop solutions for pressure, temperature, level and conductivity measurement.

Our products are designed to provide precise measurement results whatever the environment. Through our expertise and knowledge, we are able to meet your requirements worldwide from standard to customised solutions.



Product Groups

Electronic Temperature Measurement

Flexible Building-block Concept

The **CombiTemp** system comprises a series of basic elements which can be combined into various temperature sensors and -transmitters.

The system includes a wide range of standard and hygienic process connections.

Several sensor elements and user-configurable transmitters can be selected to meet the actual requirements.

Housings for **CombiTemp** are either standard DIN-B or Baumer $\varnothing 80$ mm stainless steel.

- Hygienic connections with high cleanability and bacteria tightness.
- 4-wire Pt100 cable sensors.
- DIN-A or -B, single or duplex Pt100 elements.
- Fast response sensor tips ensure accurate measurements.
- Optional loop or battery powered local display.
- Accessories such as brackets for wall- or pipe mounting, adaptors, clamp rings, etc...
- Ex versions available.

Being a building block system, **CombiTemp** offers optional user-specified solutions.

The non-hygienic process connections are used in the general industry for measurements on water or steam whereas the hygienic connections are ideal in CIP systems, breweries, dairies and in the pharmaceutical industry.



Replaceable Process Connections

CombiConnect is a series of replaceable, hygienic connections for **CombiTemp** sensors.

The products comply with the strict demands from the food industry (EHEDG).

CombiConnect also fits many of our pressure transmitters, allowing site standardisation for greater flexibility of stock and maximized cost savings.



Temperature Switches

Digital Temperature Switches

ETTN range digital temperature switches are intended for temperature control for industrial process management. Based on microprocessor technology, they can be configured completely on site.

The measuring range is adjustable between -200°C and $+400^{\circ}\text{C}$ with an accuracy of $\pm 0.5^{\circ}\text{C}$.

The ETTN range comprises either temperature measurement by a submerged probe or by surface contact.

Mechanical Temperature Switches

These instruments are designed to maintain a constant temperature around a chosen preset value, or actuate an alarm or safety circuit when the temperature being monitored reaches a critical level.

Thermometers

Mechanical thermometers are still a solution for the local indication near the process. They work reliably even if there is no power on the system and allow to check the state of the process and therefore also improve the safety of the installation. Gas filled thermometers with electrical contacts can control a process or issue a warning signal.

Bi-metal Thermometers

- For temperature measurement on pipes.
- For industry and laboratories.
- Especially suitable for central heating units.
- For heavy industry and particularly robust against vibrations.

Gas filled Thermometers

For the following processing industries: Oil, Chemicals, Energy, Agro-Food, Biotechnology and Pharmaceuticals.



Baumer Temperature Products keep processes running in:

- Chemical, Petrochemical industry
 - Food and Beverage
 - Drinking and Waste Water
 - Transportation
 - Power Plants, Wind Turbines
 - Pharmaceutical, Bio Technology
 - HVAC
 - Mining
- And many others.

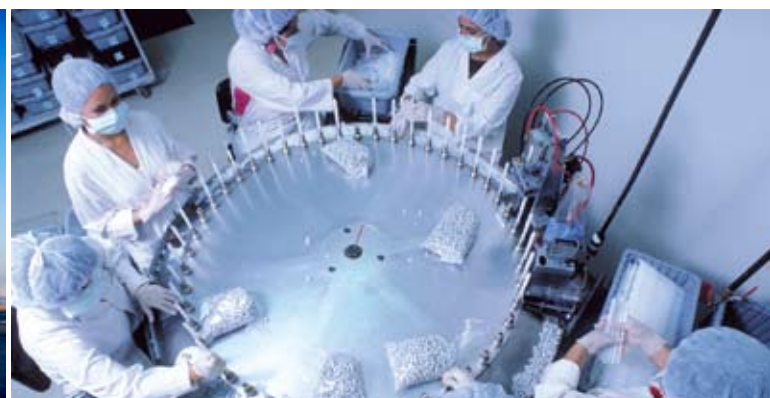


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Temperature Building Block Systems





CombiTemp

Whatever you want!

- Ingenious user-configurable system.
- Stainless steel ø80mm housing or DIN-B housing.
- Standard or hygienic process connection.
- Sensor or transmitter.
- Cover or LC-Display.
- All in one data sheet – for a clear overview.

The choice is yours – challenge us with your requirements.

Model	CombiTemp		Accessories
			
Structure	User-configurable building block system	User-configurable building block system	- Temperature pockets - Welding parts - FlexView, 4...20 mA LC-Display - BattTemp Pt100 LC-Display - Cooling neck - Hygienic pipe system
Housing	DIN-B	Baumer ø80 mm	
Material	Metal Alloy, grey	Stainless steel	
Process connections	20 standard or hygienic	20 standard or hygienic	
Operating temperature	Sensor -50...+400°C Transmitter -40...+85°C ambient	Sensor -50...+400°C Transmitter -40...+85°C ambient	
Pt100 elements	DIN-A 1/1 ; DIN-B 1/1, 1/3, 1/6 Single or duplex	DIN-A 1/1 ; DIN-B 1/1, 1/3, 1/6 Single or duplex	
Response time (6 mm tube) $\tau_{0,5}$	1.5...6.1 sec., measured in liquids	1.5...6.1 sec., measured in liquids	
Customer specified features	yes	yes	
Options	- Cover - FlexTop transmitter	- Cover, FlexView, BattTemp - FlexTop transmitter	

Temperature Building Block Systems






TE system

Small and powerful

- Hygienic design - rugged, nice looking, compact, flexible.
- More than 20 different process connections.
- TE1, standard field housing - with space for a FlexTop in-head transmitter.
- TE2, compact case - combines flexibility, high accuracy and cost efficiency.
- TE2 option: User-configurable built-in configurable transmitter.

TE sets new standards for compact temperature measurement.

			
Model	TE1	TE2	Accessories
Structure	User-configurable building block system	User-configurable building block system	- Temperature pockets - Welding parts - Cooling neck - Hygienic pipe system
Housing	Ø55 mm field housing M16 cable gland or M12 plug	Ø18 mm case M12 or DIN 43650-A plug	
Material	Stainless steel	Stainless steel	
Process connections	10 standard or hygienic	6 standard or hygienic	
Operating temperature	Sensor -50...+250°C Transmitter -40...+85°C ambient	Sensor -50...+250°C Transmitter -40...+85°C ambient	
Pt100 elements	DIN-A 1/1 ; DIN-B 1/3 Single or duplex	DIN-A 1/1 ; DIN-B 1/1, 1/3, 1/6 Single or duplex	
Response time (6 mm tube) $\tau_{0,5}$	3 sec., measured in liquids	3 sec., measured in liquids	
Customer specified features	yes	yes	
Options	- Cover - FlexTop transmitter	- Integrated FlexTop transmitter	

Cable Temperature Sensors



Pt100 sensors

Sense the difference

- Part of the CombiTemp system.
- DIN-A or DIN-B – single or duplex element.
- Pt100 sensors for standard mounting in a protection pipe for easy service.
- Air sensor for mounting in a ventilation duct.
- Insertion sensor for meat cooking.
- Hygienic conical sensor for welding into a pipe or tank wall.

Model	Cable sensors	Insertion sensors	Conical sensors
Characteristics	<ul style="list-style-type: none"> - Sensors with 4-wire silicone cable - For pockets or tubes - 4-wire air sensors 	<ul style="list-style-type: none"> - Sensor tube in stainless steel - Fast response time - Tolerates damp - 4-wire air sensors 	<ul style="list-style-type: none"> - Hygienic, without gasket - Compact mounting - Fast response time - High accuracy - Wide temperature range - Acid-proof, stainless steel
Measuring range	-50...+205°C	-50...+205°C	-50...+205°C
Sensor tube	Acid-proof stainless steel AISI 316 (W 1.4571)	FPM and Acid-proof stainless steel AISI 304 (W 1.4301)	Acid-proof stainless steel AISI 316L (W 1.4404)
Sheath dimensions	5.8 x 60 mm (with 8 holes for air measuring)	105 x Ø3 mm	Tip Ø3 mm Length 20 or 25 mm
Response time $\tau_{0,5}$	< 8 sec., measured in liquids 0.4 m/sec.	< 1.5 sec. in Water at 0.4 m/sec., < 25 sec. in Air at 3 m/sec.	< 1 sec., measured in liquids 0.4 m/sec.
Accuracy	DIN/EN/IEC 60751 1/1 DIN-B: $\pm(0.3 + 0.005 \times t)^\circ\text{C}$ 1/1 DIN-A: $\pm(0.15 + 0.002 \times t)^\circ\text{C}$	DIN/EN/IEC 60751 1/1 DIN-B: $\pm(0.3 + 0.005 \times t)^\circ\text{C}$ 1/1 DIN-A: $\pm(0.15 + 0.002 \times t)^\circ\text{C}$	DIN/EN/IEC 60751 1/1 DIN-B: $\pm(0.3 + 0.005 \times t)^\circ\text{C}$ 1/1 DIN-A: $\pm(0.15 + 0.002 \times t)^\circ\text{C}$
Media pressure	< 25 bar (water flow 3 m/sec.)	N.a.	< 25 bar (water flow 3 m/sec.)
Protection	IP65 (not air sensor)	IP65	IP65
Cable type	High-flexible silicone, grey	High-flexible silicone, grey	High-flexible silicone, grey

Digital Thermometer Display



BattTemp digital Pt100 thermometer

[The upfront alternative](#)

- Part of the CombiTemp system.
- Memorisation of highest and lowest temperature.
- Offset function for precise calibration.
- High readability even in faint light.
- High cleanability and rugged design.
- Battery life time over 3 years.



Model	BattTemp		
Characteristics	- Ø80 mm housing in stainless steel AISI 304 (W 1.4301) - Front-configurable display - Battery powered - Part of the CombiTemp series - Direct or remote mounting		
Measuring range	-200...+850°C		
Temperature sensor input	Pt100, 2-wire, DIN/EN/IEC 60751		
Accuracy	±0.3°C		
Operating temperature	-10...+70°C		
Protection / Approvals	IP65 Ex ia IIC T4/T5 ATEX II 1G		

Configurable Temperature Transmitters






FlexTop In-head mounted transmitters

Higher value for less money

- User-configurable, in-head transmitters.
- On-site configuring with the dedicated tool, FlexProgrammer 9701.
- Up-front technology.
- 4...20 mA, HART® or ProfiBus PA output.
- Designed for OEM.

Flexibility is the key.

			
Model	FlexTop 2201	FlexTop 2211 / 2221	FlexTop 2231
Output	4...20 mA	4...20 mA / HART®	Profibus PA
Pt100, 2-, 3-, 4-wire	yes	yes	yes
Pt100 dual sensor	yes
T/C, mVolt and Ohm input	...	yes	yes
Namur NE21	yes	yes	yes
Linearisation table	...	0...30 points	...
Damping	0...30 sec.	0...30 sec. / 0...15 sec.	0...30 sec.
Accuracy (Pt100)	< 0.25°C	< 0.1°C	< 0.1°C
Galvanic isolation	...	3.75 kVAC	2 kVAC
Resolution	14 bit	16 bit	16 bit
Operating temperature	-40...+85°C	-40...+85°C	-30...+85°C
Status indication	23/3.5 mA	23/3.5 mA	Profibus PA, ver 3.0
Power supply	8...35 VDC	6.5...35 VDC / 8...35 VDC	9...32 VDC
FlexProgrammer	yes	yes	...
Approvals	Ex ia IIC T5/T6, ATEX II 1G	Ex ia IIC T5/T6, ATEX II 1G	Ex ia IIC T4/T5, ATEX II 1G

Configurable Temperature Transmitters






DIN-rail mounted transmitters

For all temperature measurements

- Compact DIN-rail housing.
- User-configurable transmitters like FlexTop.
- Damping and status indication.
- On-site configuring with the dedicated tool, FlexProgrammer 9701.
- Up-front technology.
- 4...20 mA or HART® output.
- Designed for OEM.

Easy configuration and service.

			
Model	FlexTemp 2301	FlexTemp 2311	FlexTemp 2321
Output	4...20 mA	4...20 mA	4...20 mA with HART®
Pt100, 2-, 3-, 4-wire	yes	yes	yes
Pt100 dual sensor
T/C, mVolt and Ohm input	...	yes	yes
Namur NE21	yes
Linearisation table	...	0...30 points	0...30 points
Damping	0...30 sec.	0...30 sec.	0...15 sec.
Accuracy (Pt100)	< 0.25°C	< 0.1°C	< 0.1°C
Galvanic isolation	...	2 kVAC	2 kVAC
Resolution	14 bit	16 bit	16 bit
Operating temperature	-40...+85°C	-40...+85°C	-40...+85°C
Status indication	23/3.5 mA	23/3.5 mA	23/3.5 mA
Power supply	8...35 VDC	6.5...35 VDC	8...35 VDC
FlexProgrammer	yes	yes	yes

Temperature Switches






Mechanical or digital model

[Switch off the engine](#)

Temperature switches are used in simple on/off applications to prevent unwanted results and waste of materials or energy. They are ideal for safety circuits to prevent hazards to men and machinery.

- ETTN is configurable with display – enables dynamic operator-invention. It can be configured on site.
- The ETTNM with RS485 serial port and Modbus RTU communication protocol.

[ETTN and YTTN - for your safety.](#)

			
Model	RTA / RTN	RT2N / RT2E / RT2Y	ETTN / YTTN
Type	Mechanical	Mechanical	Digital
Temperature range	-46...+350°C	-40...+ 350°C	-200...+ 400°C
Ambient temperature	-30...+55°C	-30...+70°C	-25...+85°C
Repeatability	±2% F.S.	±2% F.S.	±0.2% F.S.
Set points	1 or 2	1	2
Current rating	5 mA...10 A 250 VAC max. / 220 VDC max.	10 mA...10 A 250 VAC max. / 220 VDC max.	4...20 mA, 2 threshold outputs, PNP transistors, 400 mA at 24 VDC
Electrical connection	Via internal terminal block	Via internal terminal block	M12-5 pin connector
IP	IP 65	IP 65	IP 65
Sensor type	Rigid stem or Capillary tube	Rigid stem or Capillary tube	Pt1000 probe, class A
Sensor material	Stainless steel	Stainless steel AISI 316L (1.4404)	Stainless steel AISI 316L (1.4404)
Connection	Stainless steel sliding male connection (G½-½NPT)	Stainless steel sliding male connection (G½-½NPT)	Sliding union G¼, G½, ¼ NPT or ½ NPT
Body/Housing material	Aluminium Alloy	Zamak plated black/Plastic	Stainless steel AISI 316L (1.4404)
Options	- RTNE: Explosion Proof - RTXY: Intrinsically safe - Electronuclear version	- RT2E: Explosion Proof - RT2Y: Intrinsically safe	- YTTN: Intrinsically safe - ETTNM: Modbus communication, outputs: static relays, 400 mA at 60 VDC or 40 VAC

Bi-metal Thermometers






TB series

When the going gets tough...

The TB series is especially developed for use in tough environments. The "every angle" version solves the problem with readability versus mounting position.

- Versions for HVAC and Industry.
- All housings in stainless steel.
- TBHI liquid fillable for applications with heavy vibration.
- Protection up to IP 68.
- High accuracy.

We view solutions from several angles.

			
Model	TB / TBH	TBI / TBHI	Accessories
Housing	80, 100, 160 mm dia.	80, 100, 120, 130, 160 mm dia.	- Thermowells - Screw connections
Case material	Stainless steel AISI 304 (1.4301)	Stainless steel AISI 304 (1.4301)	
Sensing element	Bi-metal	Bi-metal	
Immersion tube material	Stainless steel AISI 316 Ti (1.4571) or Cu-Alloy ($\leq 250^{\circ}\text{C}$)	Stainless steel AISI 316 Ti (1.4571)	
Temperature range	$-30\dots+500^{\circ}\text{C}$	$-70\dots+600^{\circ}\text{C}$	
Accuracy	Class 1 ($\leq 250^{\circ}\text{C}$) Class 2 ($> 250^{\circ}\text{C}$)	Class 1 ($\leq 250^{\circ}\text{C}$) Class 2 ($> 250^{\circ}\text{C}$)	
Protection	IP50	TBI: IP67 / TBHI: IP68	
Option	- Wall mounting flange - Zero adjustment (TBH)	- St. steel housing 1.4404 (316L) - "Every-angle" housing - Safety glass	

Gas filled Thermometers



TS series




Direct reading or remote measurement

Why mechanical instruments in an electrified world?

They offer the utmost safety during power-drop, extreme ruggedness, media compatibility and ability to work in harsh environmental conditions.

- Flexible system with fix stem or capillary tube.
- Wide range of diameters.
- All stainless steel design.
- Suitable for high temperature up to 800°C.
- Electrical contacts available.

Imagine a life without mechanical devices.

			
Model	TSS	TSF	Accessories
Housing	63, 80, 100, 160, 250 mm dia.	63, 80, 100, 160, 250 mm dia.	- Thermowells - Screw connections
Case and sleeve material	Stainless steel AISI 304 (1.4301) or AISI 316L (1.4404)	Stainless steel AISI 304 (1.4301) or AISI 316L (1.4404)	
Sensing element	Plunger	Capillary tube + plunger	
Material wetted parts	Stainless steel 1.4541	Stainless steel 1.4541	
Temperature range	-200...+800°C	-200...+800°C	
Accuracy	Class 1 (Option 0.5 and 0.6)	Class 1 (Option 0.5 and 0.6)	
Protection	IP65	IP65	
Option	- Electrical contacts (TSSE): 100 and 160 mm case	- Electrical contacts (TSFE): 100 and 160 mm case	

Temperature Measuring Device




TAR Temperature probe

We adapt to your demands

The hygienic pipe is inseparably fixed with the temperature measuring instrument. The rounded shape, adapted to the tube diameter, does not create additional flow resistance. This ensures a safe, accurate and ultimately hygienic solution.

- All parts in stainless steel and welded.
- Surface measurement – at the inner side of the pipe.
- No "dead zones".
- Cleaning-In-Place (CIP) and Sterilization-In-Place (SIP) without major disassembly and assembly work.

The final solution.

			
Model	TAR		
Structure	Hygienic pipe system		
Cleaning	SIP and CIP		
Temperature range	-20...+200°C		
Ambient temperature	-25...+80°C		
Accuracy	Pt 100 class B		
Wetted parts	W 1.4571 or W 1.4435		
Process connection	Clamp ISO 2852 Thread type DIN 11887		
Protection	IP65		

Programmer




FlexProgrammer 9701

Flexibility is the key

- Dedicated configuring tool for Baumer products.
- Portable flexibility with battery supply.
- Operated and recharged from a USB port.
- Display for remote monitoring.
- DTM-based device drivers.
- Easy-to-use dedicated software.

FlexProgrammer – The engineers magic wand.

		
Model	FlexProgrammer 9701	
Characteristics	<ul style="list-style-type: none"> - Easy configuring with menu control function - Data transfer from PC to device via USB - Configuration of a device on the spot without a PC - Robust plastic case with digital display and buttons - Rechargeable battery type NiMH 2,4 V, 450mAh - Free FlexProgram updates from our web site 	
Supply voltage	From USB-port or from rechargeable battery	
Software	FDT based, user-friendly menus with help function	
Ambient values	0...+50°C, rel. humidity <90%	
Protection class	IP 42	

Additional Sensors from our extensive range

Pressure Measurement

- Comprehensive choice of measurement technologies
- Rugged all stainless steel design
- Different outputs (I/U or fieldbus)
- Wide range of mechanical design and electrical outputs

More information at: www.baumerprocess.com



Sensors for Level Measurement

- 6 measurement technologies
- For solid and liquid materials
- 3A-Sanitary Standard
- With or without contact with the media
- Distance measuring up to 2.5 metres

More information at: www.baumerprocess.com

Sensors for Angle and Position Measurement

- Rotary encoders and actuators in Stainless steel
- Inductive sensors in complete metal housing
- Vision Sensor *VeriSens*® in stainless steel, ideal for inspection of profile, presence and position of objects
- Optical sensors on fibre optic light guide basis for difficult conditions

More information at: www.baumergroup.com



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