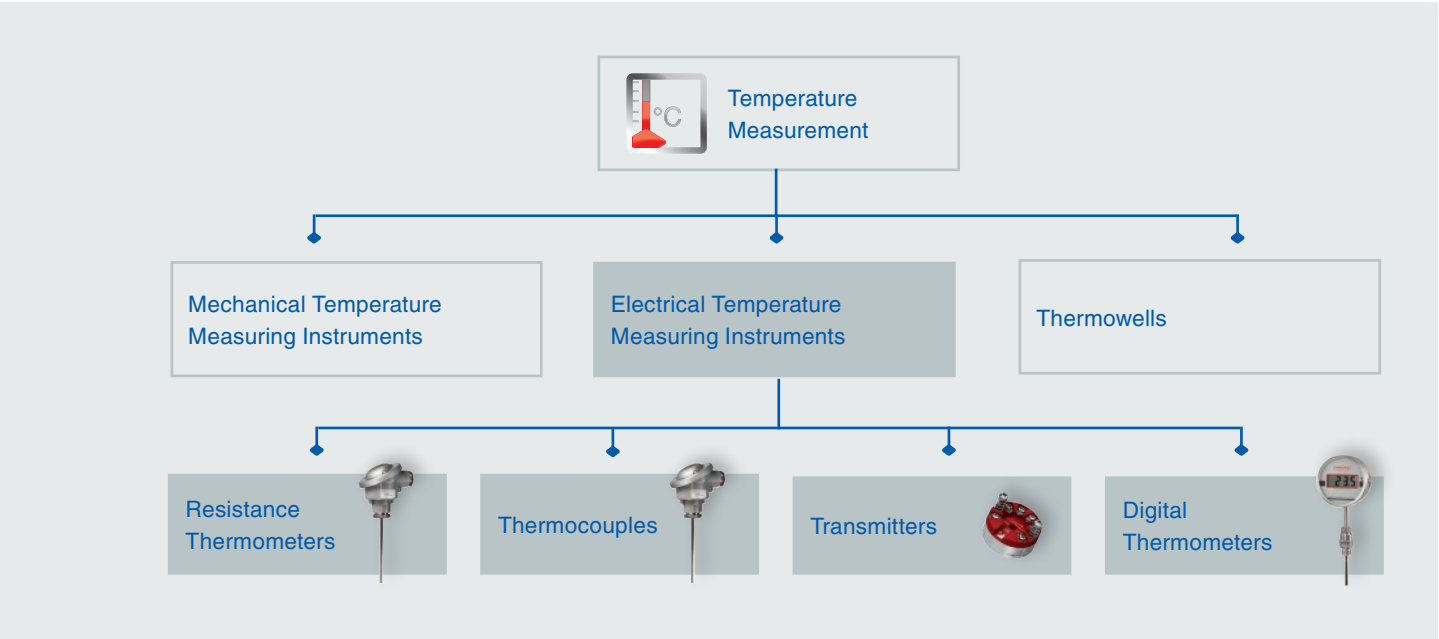
Heading 8E

Electrical Temperature Measurement

ARMANO Messtechnik GmbH



Quality Made in Germany

Electrical Temperature Measurement

The ARMANO Messtechnik GmbH represents tradition and innovation in the production and distribution of precision pressure and temperature measuring instruments, which have an excellent reputation worldwide – for more than 100 years.

We are continually developing customer-specific solutions for a variety of applications requiring pressure and temperature measuring technology. Their use is manifold and there are always new applications.

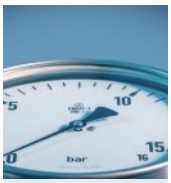
Our production range of the segment mechanical temperature measurement includes bimetal thermometers, gas-actuated thermometers as well as thermometer thermowells and other accessories.

In the division electrical temperature measurement we manufacture resistance thermometers, thermocouples and digital thermometers for almost all applications and industries. From very large to very small, from high- to low-temperature, as customised solution or off-the-shelf.

In this brochure, you will find a selection of temperature measuring instruments for the electrical temperature measuring technology only.

Your instrument is not listed here? Jointly, we will find a suitable solution for your application.
Do not hesitate to contact us!

Our Products at a Glance



Mechanical Pressure Measurement

Electronic Pressure Measurement

Chemical Seal Mounting

Calibration Technology

Mechanical Temperature Measurement

Electrical Temperature Measurement

Thermowells & Accessories

Resistance Thermometers

Resistance thermometers are equipped with platinum thin-film measuring resistors according to DIN EN 60 751 as measuring element, which are usually embedded in stems made of sheathed, mineral insulated cable. The temperature-dependent change of resistance of the platinum is used as measuring effect and can be metrologically processed in the form of a relatively linear resistance signal. Depending on the construction type and the used measuring element, temperatures of –200 °C up to +800 °C (–328 °F to +1472 °F) can be measured with resistance thermometers.



	Without Thermowell	For the Installation into Thermowells	For the Installation into Thermowells
Model	**TPtMiA/TPtMiAT**	**TPtHoA/TPtHoAT**	**TPtHrA/TPtHrAT**
Installation	for plugging or for mounting into the process with compression fitting	for the installation into thermowells	for the installation into thermowells
Construction type	mineral insulated stem	without neck tube	with neck tube
Connection heads	B, BUZ, BUZ-H, BUZ-H-W or NS	B, BUZ or BUZ-H	B, BUZ, BUZ-H, BUZ-H-W, BEG, NS or GG
Measuring element	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751
Measuring insert	not replaceable	acc. to DIN EN 43 735, replaceable	acc. to DIN EN 43 735, replaceable
Operating temperature range	–200 / +600 °C (–328 / +1112 °F)	–200 / +600 °C (–328 / +1112 °F)	–200 / +600 °C (–328 / +1112 °F)
Degree of protection	IP65	IP54[1)]	IP65[1)]
Data sheet	8510	8520	8521


	With Fabricated Thermowell	With Fabricated Thermowell According to DIN 43 772
Model	**TPtHoSrA/TPtHoSrAT**	**TPtSrA/TPtSrAT**
Installation	for screwing into the process	for plugging, screwing or for flange mounting into the process
Construction type	without neck tube	with neck tube
Connection heads	B, BUZ or BUZ-H	B, BUZ, BUZ-H, BUZ-H-W, BEG, NS or GG
Measuring element	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751
Measuring insert	acc. to DIN EN 43 735, replaceable	acc. to DIN EN 43 735, replaceable
Operating temperature range	–200 / +600 °C (–328 / +1112 °F)	–200 / +600 °C (–328 / +1112 °F)
Degree of protection	IP54	IP65
Data sheet	8530	8531

[1)] when mounted in a thermowell

With resistance thermometers, the highest accuracies in the entire temperature measuring technology can be achieved. The accuracy classes AA, A and B according to DIN EN 60 751 are available for you as standard.
We manufacture various resistance thermometers for all applications: resistance thermometers with connection head, sheathed resistance thermometers, compact resistance thermometers for the engineering industry, versions for air and surface temperature measurement and others.

			
	Compact Design	**Compact Design**	**Sheathed Resistance Thermometer**
Model	**TPtMfSt/TPtMfStT**	**TPtMfA/TPtMfAT**	**TPtMi**
Installation	for screwing into the process	for screwing or for mounting into the process with compression fitting	various mounting options
Version	plug connector M12 or acc. to DIN EN 175 301	for constricted rooms	with connection cable or plug connector
Measuring element	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751
Measuring insert	not replaceable	replaceable	not replaceable
Operating temperature range	–100 / +250 °C (–148 / +482 °F)	–200 / +600 °C (–328 / +1112 °F)	–200 / +600 °C (–328 / +1112 °F)
Degree of protection	IP65	IP65	IP65
Data sheet	–	8551	8560

			
	Measuring Insert	**Ambient Temperature Measurement**	**Ambient Temperature Measurement**
Model	**TPtMiAo/TPtMiAoT**	**TPtRA/TPtRAT**	**TPtRG/TPtRTGT**
Installation	replacement part for the installation into connection heads	for wall mounting	plastic wall-mount housing
Connection heads	–	B, BUZ or BEG	–
Measuring element	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751
Measuring insert	acc. to DIN EN 43 735	not replaceable	–
Operating temperature range	–200 / +600 °C (–328 / +1112 °F)	TPtRA: –40 / +100 °C (–40 / +212 °F) TPtRAT: –40 / +85 °C (–40 / +185 °F)	–40 / +85 °C (–40 / +185 °F)
Degree of protection	IP00[1)]	IP65	IP65
Data sheet	8561	8580	8581

[1)] Measuring inserts are intended for the installation into protective fittings for electrical thermometers, which are equipped with an appropriate degree of protection for safe operation.

Thermocouples

Thermocouples contain metallic wires made of different alloys according to DIN EN 60 584, which are welded to one another. Those wires are either embedded in stems made of sheathed, mineral insulated cable or electrically insulated by ceramic components. The thermoelectric effect, which results from the different material combinations, can be metrologically processed in the form of a temperature-dependent voltage. Depending on the construction type and the used material combination, temperatures of –200 °C up to +1600 °C (–328 °F up to +2912 °F) can be measured with thermocouples.



	Without Thermowell	For the Installation into Thermowells	For the Installation into Thermowells
Model	**TTeMiA/TTeMiAT**	**TTeHoA/TTeHoAT**	**TTeHrA/TTeHrAT**
Installation	for plugging or for mounting into the process with compression fitting	for the installation into thermowells	for the installation into thermowells
Construction type	mineral insulated stem	without neck tube	with neck tube
Connection heads	B, BUZ, BUZ-H, BUZ-H-W or NS	B, BUZ or BUZ-H	B, BUZ, BUZ-H, BUZ-H-W, BEG, NS or GG
Measuring element	K, N, J, S acc. to DIN EN 60 584	K, N, J, S acc. to DIN EN 60 584	K, N, J, S acc. to DIN EN 60 584
Measuring insert	not replaceable	acc. to DIN EN 43 735, replaceable	acc. to DIN EN 43 735, replaceable
Operating temperature range	up to +1175 °C (+2147 °F)	up to +1175 °C (+2147 °F)	up to +1175 °C (+2147 °F)
Degree of protection	IP65	IP54[1)]	IP65[1)]
Data sheet	8610	8620	8621


	With Fabricated Thermowell	With Fabricated Thermowell According to DIN 43 772
Model	**TTeHoSrA/TTeHoSrAT**	**TTeSrA/TTeSrAT**
Installation	for screwing into the process	for plugging, screwing or for flange mounting
Construction type	without neck tube	with neck tube
Connection heads	B, BUZ or BUZ-H	B, BUZ, BUZ-H, BUZ-H-W, BEG, NS or GG
Measuring element	K, N, J, S acc. to DIN EN 60 584	K, N, J, S acc. to DIN EN 60 584
Measuring insert	acc. to DIN EN 43 735, replaceable	acc. to DIN EN 43 735, replaceable
Operating temperature range	up to +800 °C (+1472 °F)	up to +800 °C (+1472 °F)
Degree of protection	IP54	IP65
Data sheet	8630	8631

[1)] when mounted in a thermowell

Thermocouples are very robust, resistant to mechanical stress and can be manufactured in very small dimensions. Our thermocouples are supplied with accuracy class 1 according to DIN EN 60 584 as standard.
We manufacture various thermocouples for all applications: straight thermocouples, sheathed thermocouples, multipoint thermocouples, versions for surface temperature measurement and others.

	With Metal Protection Tube	With Ceramic Protection Tube	Sheathed Thermocouple
Model	**TTeMA/TTeMAT**	**TTeKA/TTeKAT**	**TTeMi**
Installation	for mounting into the process	for mounting into the process	various mounting options
Version	–	–	with connection cable or plug connector
Connection heads	A, AUZ or AUZ-H	A, AUZ or AUZ-H	–
Measuring element	K, N, J, S acc. to DIN EN 60 584	K, N, S acc. to DIN EN 60 584	K, N, J, S acc. to DIN EN 60 584
Measuring insert	metal protection tube closed on one side with ceramic insulated thermocouple(s)	ceramic protection tube closed on one side made of C610 or C799 with ceramic insulated thermocouple(s)	–
Operating temperature range	up to +1200 °C (+2192 °F)	up to +1600 °C (+2912 °F)	up to +1175 °C (+2147 °F)
Degree of protection	IP54	IP54	IP65
Data sheet	8650	8651	8660

	Measuring Insert	Tube Surface Measurement
Model	**TTeMiAo/TTeMiAoT**	**TTeO/TTeOT**
Installation	replacement part for the installation into connection heads	for fixation with stainless steel tightening strap
Connection heads	–	B, BUZ, BUZ-H, BEG, NS or GG
Measuring element	K, N, J, S acc. to DIN EN 60 584	K, N, J, S acc. to DIN EN 60 584
Measuring insert	acc. to DIN EN 43 735	acc. to DIN EN 43 735, not replaceable
Operating temperature range	up to +1175 °C (+2147 °F)	up to +1175 °C (+2147 °F)
Degree of protection	IP00[1)]	IP65 (connection head)[2)]
Data sheet	8661	8670

[1)] Measuring inserts are intended for the installation into protective fittings for electrical thermometers, which are equipped with an appropriate degree of protection for safe operation.
[2)] The degree of protection at the temperature sensor depends on its installation beneath the tube insulation.

Marking according to ATEX and IECEx

Hazardous Locations and Zone Classification for the Electrical Temperature Measuring Instruments of ARMANO

II 1G Ex ia

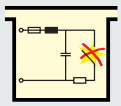
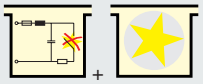
Product Group

I	mining
II	all other areas

Classification of Hazardous Locations

Combustible substances	Temporary behaviour of combustible substances – explosive medium:	Classification of hazardous locations	Marking of the equipment: Product group	Marking of the equipment: Product category			Equipment protection level (EPL)		
gases mists vapours	present continuously, for long periods or frequently	zone 0	II	1G			Ga		
	present occasionally	zone 1	II		2G			Gb	
	probably not present, if present, only rarely/briefly	zone 2	II			3G			Gc
dusts	present continuously, for long periods or frequently	zone 20	II	1D			Da		
	present occasionally	zone 21	II		2D			Db	
	probably not present, if present, only rarely/briefly	zone 22	II			3D			Dc

Ignition Protection Types

	Explosion protection concept		
Single protection concepts		Ex ia	**intrinsic safety** energy limitation of the circuit and hot surfaces; prevention of sparks
		Ex db	**flameproof enclosure** prevention of explosion propagation from the case
		Ex tb	**protection by enclosure** the ingress of dust into the case is prevented
Combined protection concepts		Ex ia + Ex db	**intrinsic safety and flameproof enclosure** combined protection concept for gas atmospheres
		Ex ia + Ex tb	**intrinsic safety and protection by enclosure** combined protection concept for dust atmospheres

Approvals

marking according to ATEX

marking according to IECEx

IIC T6...T1 Ga

Permissible atmospheres	Permissible zones
gas dust	0, 1, 2 20, 21, 22
gas	1, 2
dust	20, 21
gas	0, 1, 2
dust	20, 21, 22

Explosion Groups and Temperature Classes

Explosion group			Different examples, depending on - explosion group - temperature class					
IIA	IIB	IIC	ammonia methane ethane propane	ethanol cyclohexane n-butane	petrol diesel fuel fuel oil n-hexane	acetalde- hyde		
					ethyl glycol hydrogen sulphide	ethyl ether		
			hydrogen	acetylene				carbon disulphide
			T1 < 450 °C	Please note: this list is only an extract of possible flammable substances!				
			T2 < 300 °C					
			T3 < 200 °C					
			T4 < 135 °C					
			T5 < 100 °C					
			T6 < 85 °C					
			The equipment can be used for temperature classes T1 to T6. The temperature class indicates the maximum permissible surface temperature of the equipment. For dust explosion protection, the maximum surface temperature is specified directly (e.g. T80 °C).					
			temperature classes					

Explosion group			Dust classification
IIIA	IIIB	IIIC	combustible lint
			non-conductive dust
			conductive dust

Resistance Thermometers & Thermocouples with Ex Approval

Our explosion-protected temperature sensors are used for measurement, control and limit value monitoring of process temperatures. Depending on the model, they are intended for the application in hazardous locations of zone 0 or 1 and 20 or 21.
The temperature sensors can be designed as ignition protection type “intrinsic safety” (i), “flameproof enclosure” (d) or “protection by enclosure” (t). The combination of the ignition protection types intrinsic safety and flameproof enclosure, or



	Flameproof enclosure	Intrinsically safe	Flameproof enclosure
Model	**TPtHrXdA/TPtHrXdAT**	**TPtHrXiA/TPtHrXiAT**	**TPtSrXdA/TPtSrXdAT**
Installation	for the installation into thermowells	for the installation into thermowells	for plugging, screwing or for flange mounting
Construction type	with neck tube	with neck tube	with fabricated thermowell
Connection heads	XD-AD, XD-AD-W, XD-SD or XD-SD-W	XE-BUZ, XE-BUZ-H, XI-BUZ or XI-BUZ-H	XD-AD, XD-AD-W, XD-SD or XD-SD-W
Measuring element	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751
Measuring insert	special measuring insert with sleeve, replaceable	acc. to DIN EN 43 735, replaceable	special measuring insert with sleeve, replaceable
Operating temperature range	–200 / +600 °C (–328 / +1112 °F)	–200 / +600 °C (–328 / +1112 °F)	–200 / +600 °C (–328 / +1112 °F)
Degree of protection	IP66 – 68[1]	IP67[1]	IP66 – 68
Data sheet	8525	8526	8535



	Intrinsically safe	Measuring insert intrinsically safe	With process display
Model	**TPtSrXiA/TPtSrXiAT**	**TPtMiXiAo/TPtMiXiAoT**	**TPtPAXd**
Installation	for plugging, screwing or for flange mounting	replacement part for the installation into connection heads	for the installation into thermowells
Construction type	with fabricated thermowell	measuring insert	with neck tube
Connection heads	XE-BUZ, XE-BUZ-H, XI-BUZ or XI-BUZ-H	–	aluminum die-cast case with LC graphic display
Measuring element	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751	Pt100 acc. to DIN EN 60 751
Measuring insert	acc. to DIN EN 43 735, replaceable	acc. to DIN EN 43 735	special measuring insert with sleeve
Operating temperature range	–200 / +600 °C (–328 / +1112 °F)	–200 / +600 °C (–328 / +1112 °F)	–200 / +600 °C (–328 / +1112 °F)
Degree of protection	IP67	IP00[2]	IP66 – 68
Data sheet	8536	8566	8590

[1] when mounted in a thermowell, depending on the screwed cable gland used
[2] measuring inserts are intended for the installation into protective fittings for electrical thermometers, which are equipped with an appropriate degree of protection for safe operation

intrinsic safety and protection by enclosure is possible as well. Optionally, the Ex d and the Ex t sensors can be equipped with an integrated process display. With the models TPtPAXd and TTePAXd, customers now have a temperature-indicating 4…20 mA transmitter in a flameproof field housing, which also features the ignition protection type intrinsic safety.



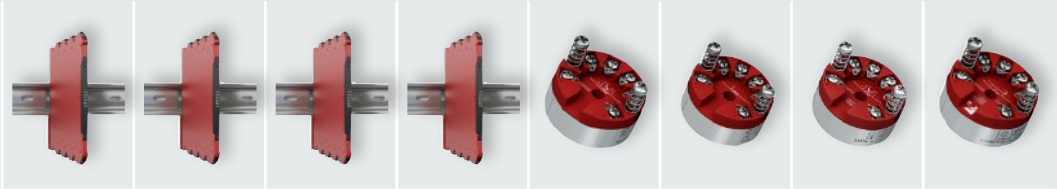
	Flameproof enclosure	Intrinsically safe	Flameproof enclosure
Model	**TTeHrXdA/TTeHrXdAT**	**TTeHrXiA/TTeHrXiAT**	**TTeSrXdA/TTeSrXdAT**
Installation	for the installation into thermowells	for the installation into thermowells	for plugging, screwing or for flange mounting
Construction type	with neck tube	without neck tube	with fabricated thermowell
Connection heads	XD-AD, XD-AD-W, XD-SD or XD-SD-W	XE-BUZ, XE-BUZ-H, XI-BUZ or XI-BUZ-H	XD-AD, XD-AD-W, XD-SD or XD-SD-W
Measuring element	K, N, J, S acc. to DIN EN 60 584	K, N, J, S acc. to DIN EN 60 584	K, N, J, S acc. to DIN EN 60 584
Measuring insert	special measuring insert with sleeve, replaceable	acc. to DIN EN 43 735, replaceable	special measuring insert with sleeve, replaceable
Operating temperature range	up to +1175 °C (+2147 °F)	up to +1175 °C (+2147 °F)	up to +800 °C (+1472 °F)
Degree of protection	IP66 – 68[1)]	IP67[1)]	IP66 – 68
Data sheet	8625	8626	8635



	Intrinsically safe	Measuring insert intrinsically safe	With process display
Model	**TTeSrXiA/TTeSrXiAT**	**TTeMiXiAo/TTeMiXiAoT**	**TTePAXd**
Installation	for plugging, screwing or for flange mounting	replacement part for the installation into connection heads	for the installation into thermowells
Construction type	with fabricated thermowell	measuring insert	with neck tube
Connection heads	XE-BUZ, XE-BUZ-H, XI-BUZ or XI-BUZ-H	–	aluminum die-cast case with LC graphic display
Measuring element	K, N, J, S acc. to DIN EN 60 584	K, N, J, S acc. to DIN EN 60 584	K, N, J, S acc. to DIN EN 60 584
Measuring insert	acc. to DIN EN 43 735, replaceable	acc. to DIN EN 43 735	special measuring insert with sleeve
Operating temperature range	up to +800 °C (+1472 °F)	up to +1175 °C (+2147 °F)	up to +1175 °C (+2147 °F)
Degree of protection	IP67	IP00[2)]	IP66 – 68
Data sheet	8636	8666	8690

Transmitters for Resistance Thermometers

Transmitters convert the thermometer resistance into a proportional and stable current or voltage signal. Every resistance thermometer with connection head is optionally available with head-mount transmitter. If the conversion to a standard signal shall not be carried out in the connection head, we offer various transmitters for DIN rail (top-hat rail) mounting.



Model			TT3102	TT3331	TT3333	TT3337	TT5331	TT5333	TT5337	TT5437
Input	2- and 3-wire							✓		
	2-, 3- and 4-wire		✓	✓	✓	✓	✓		✓	✓[1]
Output	Current	Active	✓							
		Passive		✓	✓	✓	✓	✓	✓	✓
	Voltage		✓							
	HART®					✓			✓	✓
Auxiliary energy			24 VDC	loop	loop	loop	loop	loop	loop	loop
Galvanic separation				✓		✓	✓		✓	✓
Mounting			DIN rail	DIN rail	DIN rail	DIN rail	head-mount	head-mount	head-mount	head-mount

[1] dual input available

Transmitters for Thermocouples

Transmitters convert the thermoelectric voltage into a proportional and stable current or voltage signal. Every thermocouple with connection head is optionally available with head-mount transmitter. If the conversion to a standard signal shall not be carried out in the connection head, we offer various transmitters for DIN rail (top-hat rail) mounting.






Model			TT3101	TT3331	TT3337	TT5334	TT5337	TT5437
Input	Type J and K		✓	✓	✓			
	Multi[1]					✓	✓	✓[2]
Output	Current	Active	✓					
		Passive		✓	✓	✓	✓	✓
	Voltage		✓					
	HART®				✓		✓	✓
Auxiliary energy			24 VDC	loop	loop	loop	loop	loop
Galvanic separation				✓	✓	✓	✓	✓
Mounting			DIN rail	DIN rail	DIN rail	head-mount	head-mount	head-mount

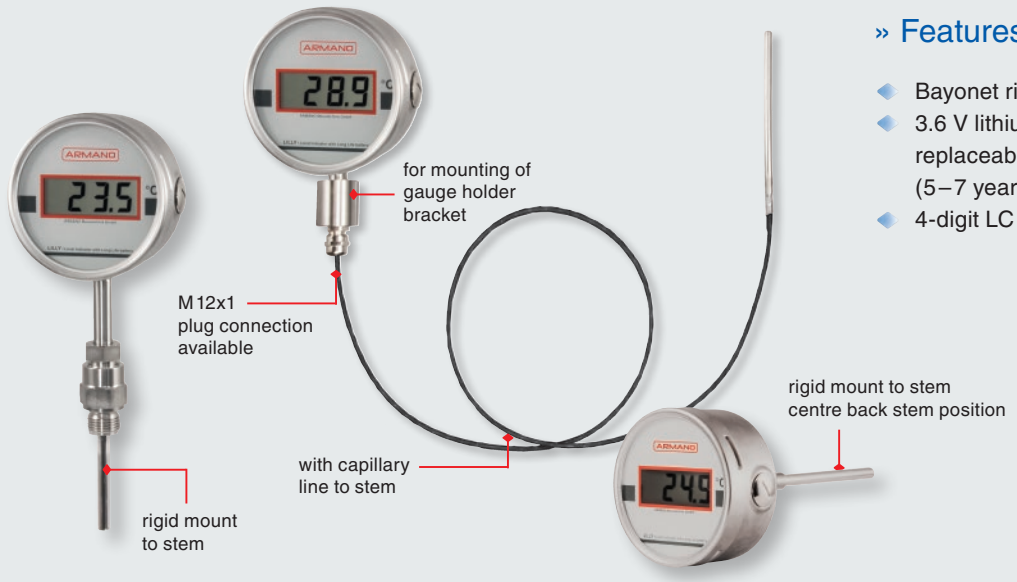
[1] Types B, E, J, K, L, N, R, S, T, U W3, W5, LR
[2] dual input available

Digital Thermometers – LILLY

Local, Battery-operated Digital Indicator in Bayonet Ring Case

The electronic thermometers of our product line LILLY can be manufactured with the same construction types as bimetal or gas-actuated thermometers. Additionally, very short installation lengths and increased accuracies (0.3 % ±1 dgt ±sensor tolerance) are available. LILLY thermometers can be manufactured with a rigid stem (back stem position or bottom stem position), as turnable and adjustable version, and as remote reading thermometer with cable probe.

Local Indicator with Long Life Battery - in Various Versions



» Features «

- Bayonet ring case stainless steel
- 3.6 V lithium battery, replaceable (5–7 years battery life)
- 4-digit LC display

	Rigid Mount to Stem	Cable to Stem
Model	**TDSCh**	**TDKCh**
Installation/stem	various mounting options	various mounting options
Nominal case size	63, 100 mm (2½, 4")	63, 100 mm (2½, 4")
Measuring element	Pt1000 DIN EN 60 751	Pt1000 DIN EN 60 751
Operating temperature range	–99.9 / +550 °C (–147.82 / +1022 °F)	–99.9 / +550 °C (–147.82 / +1022 °F)
Degree of protection	IP65	IP65
Data sheet	8301	8321

Digital Thermometers – LILLY$_{plus}$

The battery-operated digital thermometer LILLYplus is the latest product from our proven and robust standard LILLY line. With an exceptionally high accuracy of 0.1 % FS, the medium temperature is displayed precisely. Another highlight is a high-contrast graphic LC display, which allows for easy readability from large distances up to 10 m. With the degree of protection IP65 and resistance against ambient temperatures of –20 °C to +70 °C at a relative humidity of up to 95 %, the LILLYplus can be applied even in harsh industrial environments. Thus, the digital thermometer is suitable for an extraordinarily wide range of applications, which requires high precision at extreme ambient conditions, e.g. as an alternative for industrial mercury glass thermometers.

	Rigid Mount to Stem	Cable to Stem
Model	**TDPSCh 100**	**TDPKCh**
Installation/stem	various mounting options	various mounting options
Nominal case size	100 mm (4")	100 mm (4")
Measuring element	Pt1000 DIN EN 60 751	Pt1000 DIN EN 60 751
Operating temperature range	–99.9 / +500 °C (–147.82 / +932 °F)	–99.9 / +500 °C (–147.82 / +932 °F)
Degree of protection	IP65	IP65
Data sheet	8302	8322

Features

- High accuracy due to individual sensor calibration
- Large graphic LC display, readable from a distance of 10 m
- Lithium battery replaceable by the customer
- Battery life >1 year, depending on application (with a set measuring rate of ≥10 s)
- Minimum and maximum value memory for checking the adherence of process parameters
- Wide range of construction types analogous to mechanical thermometers
- Units switchable °C / °F
- Measuring rate adjustable from 1 s to 30 s

Thermowells

Connection between Temperature Sensor and Process

Thermowells separate the temperature sensor from the medium and protect it against mechanical and corrosive stress. Depending on the construction type, they also allow a replacement of the measuring insert or of the entire temperature sensor during operation.

Clamp Connection	Screw Connection	Weld Connection	Flange Connection
			
detachable connection	detachable connection	robust, non-detachable connection	robust, detachable connection

Our thermowells are manufactured according to international and national standards. In addition to the fabricated standard thermowells for electrical temperature sensors Form 2, Form 2G and 2F according to DIN 43 772, we offer solid drilled and fabricated thermowells in a wide range of designs for higher process loads. Those can then be combined with our temperature sensors for the installation into thermowells.

We provide thermowell solutions for almost all industries; from sterile process technologies to chemical as well as petrochemical industries to high-temperature applications in power stations or waste incineration plants – we will find the ideal solutions concerning material, construction type or coating.

More Safety with Calculation for Your Specific Case of Application

Thermowells are mechanically highly stressed components. With special calculations, we can determine whether the thermowell geometry and the material meet the specific operating conditions.

A completely filled in checklist for the thermowell calculation[1] with all necessary application data is required.

The certificate includes:

- Thermowell data
- Application and calculation data
- Calculation according to DIN 43 772 / ASME PTC 19.3
  or according to DIN 43 772 with load diagram upon request


Checklist for the Calculation of a Thermowell according to DIN 43 772

ARMAND

Handing 0.1

Thermowell information

Application / Media Information

Graphic Depiction of the Thermowell Rating

[1] The checklist is available for download on our website.

Thermowells

Materials and Coatings

Materials

Depending on the process, a wide range of materials are applied to meet the demands on temperature resistance, mechanical strength and chemical resistance. Additionally, we provide particularly economic, material-saving construction types for special materials. There, only the wetted parts of the thermowell are made of the special material, e.g. tantalum coating sleeves or welded flange thermowells with sealing face insert.

Coatings

A coating is a method to achieve an increased corrosion resistance. In special processes, the wetted part of the thermowell is coated, generally with polymers such as PTFE or ECTFE.

Class of Materials for Thermometer Thermowells	
Standard	
stainless steel grades	e.g. 1.4571 or 1.4404
Upon request	
duplex and super duplex steels	e.g. 1.4462, 1.4501
heat-resistant steel grades	e.g. 1.4841, 1.4762, 1.4876
creep-resistant steel grades	e.g. 16Mo3, 10CrMo9-10
nickel-base alloys	e.g. various Monel, Hastelloy, Inconel grades
other materials	e.g. titanium or tantalum (as coating sleeve)

Certificates

We Issue the Following Certificates Upon Request

- Test certificate 3.1 and 3.2 according to EN 10 204
- Special and material tests available upon request
- Non-destructive weld inspections
- Pressure tests

Customer Solutions – Since Anyone Can Do Off-the-Shelf

Benefit from Our Experience and Flexibility

Mechanical measuring instruments offer numerous advantages, as for example the operation without any auxiliary energy, a high degree of standardisation or their favourable price. The advantage of the electrical temperature measuring instruments is their tremendous versatility. They are suitable to perform challenging measuring tasks:

- Rapid measurements owing to the low thermal mass
- Wide operating temperature ranges from –200 °C up to more than +1600 °C (–328 °F up to more than +2912 °F)
- Flexible probe lines, which can be manufactured at any length without loss of measuring accuracy
- Digital processing

No matter what requirements and needs your application has, together with our technicians we will find an ideal solution for you – Please contact us!

We Provide the Right Solutions for:

- Abrasive media
- Aggressive media
- Mechanical stress
- Difficult installation conditions
- Extreme medium temperatures
- Extreme ambient conditions
- High precision requirements
- Requirements concerning high measuring rates

Certificates and Approvals

Standards

Our company is certified according to the highest quality standards and our product portfolio meets the highest quality demands. We do not only manufacture according to product-specific instrument standards, we also offer versions with special approvals for application areas with specific requirements. The ARMANO Messtechnik GmbH is certified according to DIN EN ISO 9001.

SIL 2
SIL 3