



Датчики температуры серии S

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Ульяновск(8422)24-23-59,
Уфа(347)229-48-12,
Челябинск(351)202-03-61,
Череповец(8202)49-02-64,
Ярославль(4852)69-52-93

Thermo-Sensor

Head types (other models on request)



(1) RUEGER DIN B: Aluminium alloy and IP 66

(2^a) Ex(d): Aluminium alloy and IP 65

(2^b) Ex(d): AISI 316 stainless steel and IP 65

(3^a) SCCA: screwed cap with chain, aluminium alloy and IP 6:

(3^b) SCCI: screwed cap with chain, AISI 316 stainless steel and IP 65

(4) BBK: plastic material and IP 54

(5^a) BUZH: Aluminium alloy and IP 65

(5^b) BUZ: Aluminium alloy and IP 65

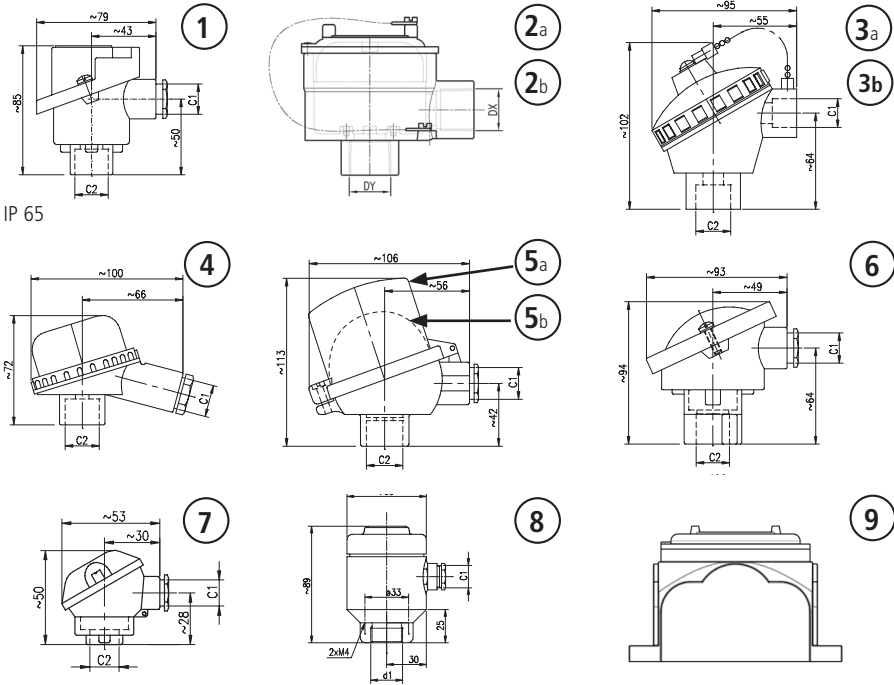
(6) DIN A: Aluminium alloy and IP 54

(7) MIGNON: Aluminium alloy and IP 65

(8) SANITARY: stainless steel, IP 54

(9) GUB... aluminium Ex d (S96)

* available with head transmitter



Thermo-Sensor

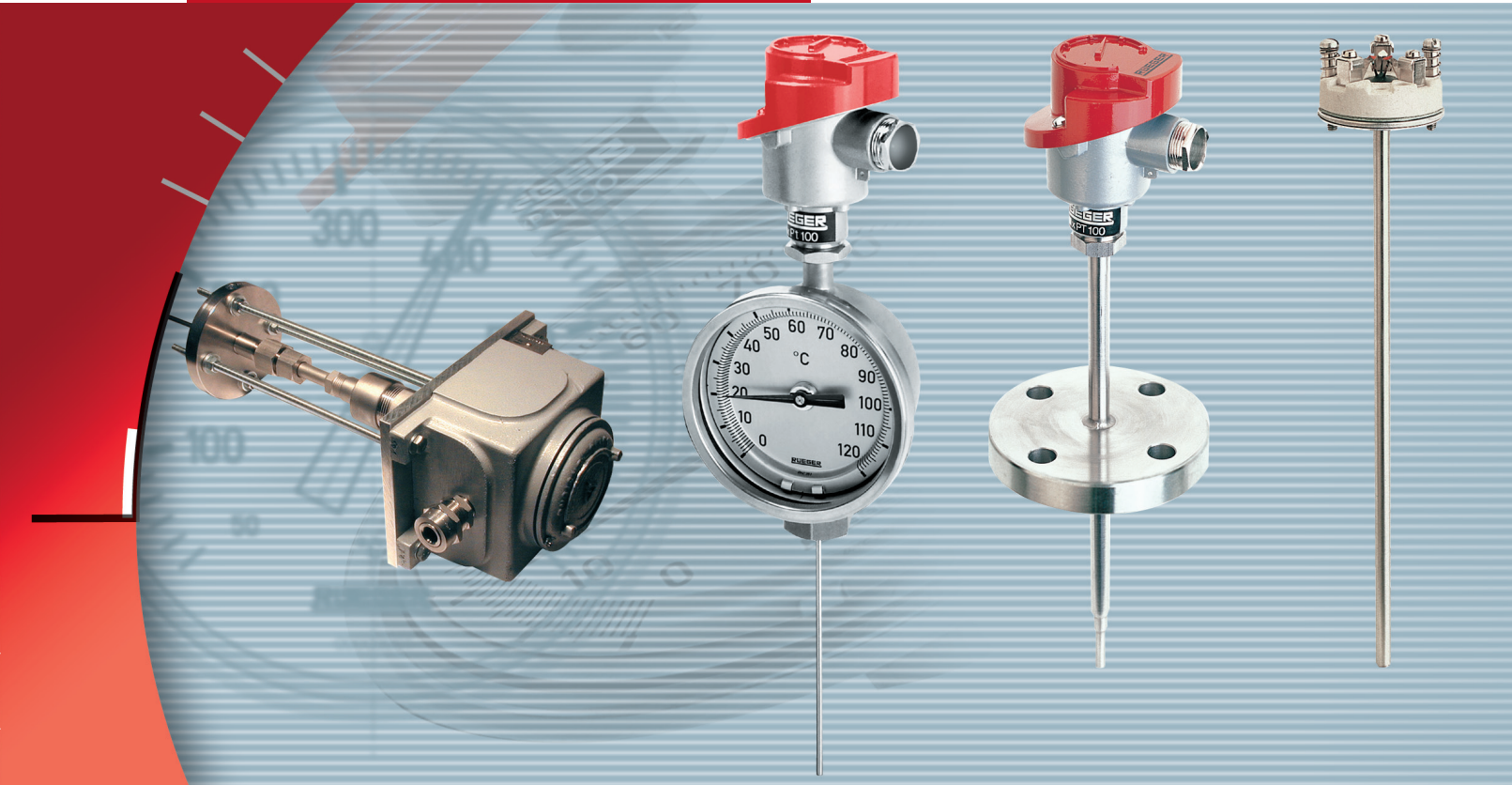
Transmitters

Rüeger type	S95.1	S95.2	STANDARD	S95.3xxx	HART®	PROFIBUS®	S95.4xxx	FONDATION FIELBUS®
Input signal	Pt100 or TC "K,J" single range	Pt100 or TC "K" 4 selectable ranges	Free programmable via interface	Free programmable via interface	Free programmable via interface	Free programmable via interface	Free programmable via interface	Free programmable via interface
Output signal	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA + HART protocole		Digital output Profibus PA™	Digital output Foundation Fieldbus™	
Power supply	14 ... 40 V DC	12 ... 36 V DC (82000) 14-40 V DC (ALM 46)	11.5 ... 30 V DC 11.5-29.4 V DC Ex-	8.5 ... 30 V DC 8.5-29.4 V DC Ex		9 ... 32 V DC 9-17,5 V DC Ex	9 ... 32 V DC 8.5-24 V DC Ex	
ATEX EEx options (FM & CSA on request)	non available	Ex ia IIC T4 ATEX version to come	U11- ATEX II 2G Ex [ia]ib IIC T6 U21- ATEX II 1G Ex ia IIC T6 U31- ATEX II 1G Ex ia IIC T5/T6 U41- ATEX II 1G Ex ia IIC T6 U51- ATEX II 2G Ex [ia]ib IIC T6	U12- ATEX II 2G Ex [ia]ib IIC T6 U22- ATEX II 1G Ex ia IIC T6/T5/T4 U32- ATEX II 1G Ex ia IIC T5/T6 U42- ATEX II 1G Ex ia IIC T6/T5/T4 U52- ATEX II 2G Ex [ia]ib IIC T6		U13- ATEX II 1G Ex ia IIC T6 U23- ATEX II 1G Ex ia IIC T6/T5/T4 U33- ATEX II 1G Ex ia IIC T4/T5	U14-ATEX II 1G Ex ia IIC T6	
Gavanic separation	no	no	1,5KV AC	1,5KV AC		1,5KV AC	1,5KV AC	
Lineary error (nominal conditions)	≤ 0,15%	≤ 0,10%	≤ 0,2% or 0,2K/80m Ω*	≤ 0,2% or 0,2K/80m Ω*		≤ 0,2 % or 0,2K*	≤ 0,2 % or 0,1K*	
Other options	- calibration certificate	- calibration certificate - HF-option (high electromagnetic fields) - factory adjustment	- calibration certificate - execution in field housing - dito with temperature indicator	- calibration certificate - execution in field housing - dito with temperature indicator		- calibration certificate - execution in field housing - dito with temperature indicator	- calibration certificate - execution in field housing - dito with temperature indicator	
Connection head min. (DIN B=33mm) head size	dia. 43 mm h = 29 mm DIN B	dia. 43 mm h = 25/29 mm DIN B	dia. 44 mm h = 22,5 mm DIN B	dia. 44 mm h = 22,5 mm DIN B		dia. 60 mm h = 35 mm BUZH	dia. 44,4 mm h = 25,5 mm DIN B	

* which ever is greater

Thermo-Sensor

Manufacturing range



A wide range of reliable Thermo-Sensor executions

Thermoresistances

- Mineral insulated execution
- Single or double element
- Electrical circuit: 2, 3 or 4 wires
- Temperature range: -200 ... + 800°C
- E(x) sensor, ATEX 94/9/EC certified

Thermocouples

- Ceramic or mineral insulated execution
- Single or double element
- Type: E, J, K, N, T, S, R, B (others on request)
- Temperature range: -200 ... + 1'800°C
- E(x) sensor, ATEX 94/9/EC certified

Certifications

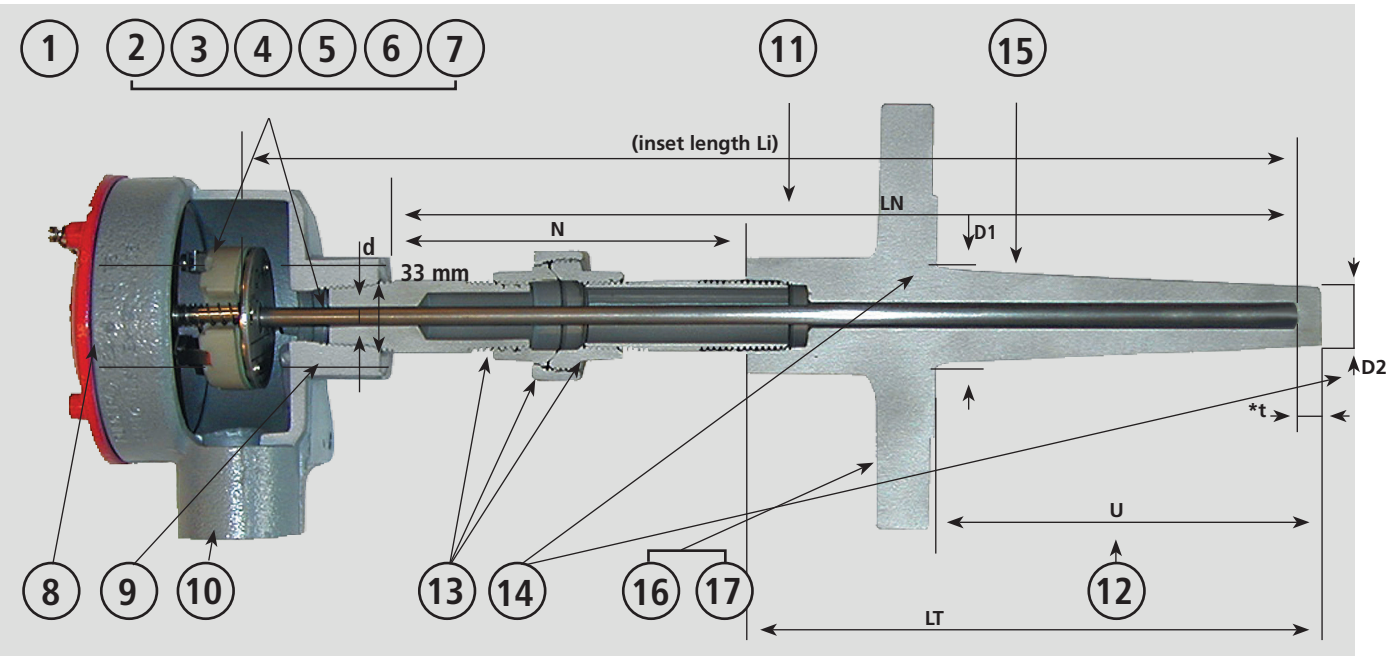
- ISO 9001 - 2008
- Ex(i), Ex(e), Ex(d) ATEX 94/9/EC acc. EN 60079

Applications

- Chemical & petrochemical industries (HPI; CPI)
- Machinery industry
- Laboratories, engineering
- Food & beverages processing
- Heating, ventilation, air conditioning (HVAC)
- Compressors and diesel engines

Services

- Works calibration of sensors (3 and 5 points)
- Certificate of compliance EN 10204/2.1
- Test report EN 10204/2.2
- Inspection certificate EN 10204/3.1
- Thermowell Karman stress calculation ANSI PTC 19.3
- Hydraulic and dye penetrant tests
- X-ray examination
- PMI examination



"DIN executions" please refer for length definition to www.Instrugate.com "details" drawings

(1) execution: thermoresistance (RTD) or thermocouple (TC) in standard/special executions for hazardous areas. Without thermowell see data sheets S10, S50.

(2) inset diameter "d": TC inset diameters 0.5 to 8mm; 3.0 to 12.7mm for surface temperature measurement (S70). RTD inset diameters 3 to 8mm.

(3) sensing element: choice of sensing element relative to temperature and environmental conditions. Standard thermocouple types J, K, T, E, N or RTD Pt100.

(4) precision class: choice of precision class according to international standards: Cl. A, B according to IEC 60751 and class 1,2,3 according to IEC 60584-2. Other precision classes on request.

(5) sensing element: this is the most commonly a TC or platinum RTD element. The element is the actual sensor of the measured temperature. Different executions according to customer needs.

(6) electrical circuit: with RTD's, the standard lead arrangement is the 3-wire form. Optional with 2 & 4 wires per circuit.

(7) sheathed inset: the sensing element (RTD/TC) within the inset is embedded in a compacted MgO powder, protected by a metal sheath. This sheath is free of pores and can be bent to a limited curvature.

(8) head type: materials vary to suit your needs from lightweight plastic or aluminium to stainless steel. Explosion proof executions are available.

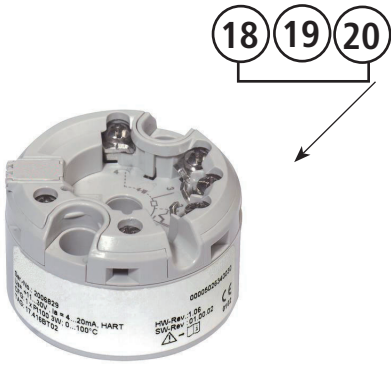
(9) head mounting: standard threads are M24x1.5 or 1/2 NPT.

(10) cable entry: choice of different threads with/without cable gland. Standard is M20x1,5; 1/2 NPT, 3/4 NPT or other on request.

(11) nominal length "LN": this is the total length from the bottom of the head to the tip of the inset, when installed. The length Li of the replacement inset S01 depends on the dimensions of the instrument.

(12) insertion length "U": this is the length for the instrument to be inserted into the process. Any special design or length can be executed once all the needed dimensions are given.

* **tip thickness t:** if not indicated by customer:
t = 5mm for barstock t = 3mm for built-up thermowells



(13) lag extension "N": the standard is "nipple-union-nipple" configuration with standard length N = 120 mm. This design eases installation of the assembly into the process and allows easy rotation of the connection head to facilitate the wiring and the removal of the inset S01, if necessary. A telescopic lag extension is recommended when inset length is not exactly known or to reduce the inventory of replacement insets.

(14) thermowell dimensions D1/D2: root (D1) and tip (D2) diameter of the thermowell, according to customer needs. Standard values according to ISA or DIN 43772. Other dimensions available on request. In standard execution with inset dia "d" = 6mm, the thermowell is drilled 7 mm diameter (inside diameter = "d" + 1mm). LT = total length of the thermowell.

(15) thermowell: thermowell can be manufactured in built-up or in bar stock execution. See executions S20, S21, S22, S29 and S30, S31, S60, S61, S62 for comparison. A large range of materials can be chosen.

(16), (17) process connection: process connection depends on thermowell type. It can be flanged, welded or threaded.

(18), (19), (20) transmitter: choice of transmitters according to specified application. From a fixed range, adjustable range, programmable, programmable HART™, fieldbus PROFIBUS PA™ and Foundation FIELDBUS™ transmitter, a wide range is available.

Thread	1/2" NPT	G 1/2	1/4" NPT	G 1/4	M12x1.5	M8x1
Inset dia						
8 mm	●	●	-	-	-	-
6 mm	●	●	●	○	●	-
4.5 mm	●	○	●	●	●	●
3 mm	●	●	●	○	●	●

● standard executions ○ optional on request - not available

Figure 6. ATX-Compression fittings

Thermowells

Thermowells are used to protect the sensor against chemical attacks and mechanical forces. They are either machined out of barstock or built-up by welding tubes with threaded or flanged connecting parts. A full description of the thermowell would include the following information: well material, type of thermowell, shape, outer diameter at tip and root, bore diameter(s), tip thickness, process and instrument connection, insertion and total length.

Special hydrostatic tests, KARMAN stress calculations and x-ray inspection can be performed when the thermowell is to be installed in critical service areas. Factors affecting the choice of material and type of thermowell would include the process temperature, corrosiveness of the medium being measured, medium density and velocity of the flow, pressure, style of connection, insertion length and overall length. Quality control includes various non-destructive testing methods.

Thermowells classified according to DIN 43772

Form 1	Form 2	Form 2G	Form 2F	Form 3	Form 3F	Form 3G	Form 4	Form 4F
-	S20	S20	TW21	S21	S21	S21	TW10 12	TW10 S2

Thermowells classified according to ISA

ISA 115, 117	ISA 131, 133	Nickel based material
		Inconel 600 Incoloy 800 Monel 400 Hastelloy B Hastelloy C Hastelloy X
TW50 32	TW50 42	

Austenitic stainless steel

Nr.	AISI	DIN designation	Application
1.4301	304	X5 CrNi 18 10	widely used for lower temperature (max. 1200°F) applications across industry since not affected by most organic and inorganic chemicals.
1.4306	304L	X2 CrNi 19 11	Low carbon version of 304 to solve the problem of carbide precipitation during welding.
1.4401	316	X5 CrNiMo 17 12 2	widely used for lower temperature (max 1200 °F) applications where corrosive resistance is required, especially in chlorides.
1.4404	316L	X2 CrNiMo 17 13 2	Low carbon version of 316 to solve the problem of carbide precipitation during welding
1.4571	316Ti	X6 CrNiMoTi 17 12 2	widely used for temperatures up to 1200°F, titanium stabilized, good corrosion resistance

	insets			low pressure						medium pressure			high pressure (with TW)		heavy duty (with TW)			high temperature		surface temp.	special executions		special duty					
	S01	S02	S03	S10	S50	S80	S81	S82	S83	S10 + TW10 ... (S20)	S10 + TW10 ... (S21)	S10 + TW10 ... (S22)	S10 + TW10 ... (S30)	S10 + TW10 ... (S31)	S50 + TW50... (S60)	S50 + TW50... (S61)	S50 + TW50... (S62)	S40	S41	S70	S29	SD	S90	S91	S92	S96		
for more information, kindly refer to Rüeger's CD-rom or www.instrugate.com																												
* for sensor with transmitter please consult table "Thermo Sensor Transmitters"																												
TR:	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	TR:
TC:	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	TC:
type:	Pt100 / K,N,I,T,E	K,N,I,T,E	R,S,B	Pt100/K,N,I,T,E	Pt100/K,N,I,T,E	K,N,I,T,E	Pt100/Pt1000	K,N,I,T,E	Pt100/Pt1000	Pt100/K,N,I,T,E	Pt100/K,N,I,T,E	Pt100/K,N,I,T,E	Pt100/K,N,I,T,E	Pt100/K,N,I,T,E	Pt100/K,N,I,T,E	Pt100/K,N,I,T,E	Pt100/K,N,I,T,E	K,I,N,E,T	R,S,B	K		K; Pt100	Pt100 + bimetal / gas	Pt100/TC "K" + gas	K; Pt100 + gas	Pt100/K,N,R,S	type:	
*Ex-protection:	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6			Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	Ex ia IIC T6 Ex e IIC T6	Ex ia IIC T6	Ex ia IIC T6	Ex ia IIC T6	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6			Ex ia IIC T6 Ex d IIC T6 Ex e IIC T6	on request	Ex ia IIC T6	on request	on request	on request	on request	*Ex-protection:	
Max temperature range: low: -200°C to 300°C Medium: 300°C to 1100°C High: 1100°C to 1600°C	low ... medium	high	high	low .. medium	low .. medium	medium	low ... medium	medium	low ... medium	low ... medium	low ... medium	low ... medium	low ... medium	low ... medium	low ... medium	low ... medium	low ... medium	low ... medium	medium .. high	medium ... very high	medium .. high	low	medium	low ... medium	low ... medium	medium	medium	Max temperature range: low: -200°C to 300°C Medium: 300°C to 1100°C High: 1100°C to 1600°C
max pressure range:	see thermowell	see thermowell	see thermowell	see thermowell	see thermowell	low ... medium	low ... medium	low ... medium	low ... medium	medium	medium	medium	high	high	high	high	high	low	low	medium	medium	medium	see thermowell	see thermowell	see thermowell	medium ... high	max pressure range:	
vibration resistance:	medium	low	low	medium	medium	medium	medium	medium	medium	medium	medium	medium	medium	medium	medium	medium	medium	low	low	medium	medium	very high	medium	high	very high	low	vibration resistance:	
inset insulation:	MgO	ceramic	ceramic	MgO	MgO	MgO	MgO	MgO	MgO	MgO	MgO	MgO	MgO	MgO	MgO	MgO	MgO	ceramic	ceramic	MgO	MgO	MgO/ceramic/composite	plastic / ceramic	fiber glass / ceramic	MgO	MgO	inset insulation:	
diameter :	3 ... 8	8.5/14	5.5/8.5	3 ... 8	3 ... 8	0.5 ... 9.5	3 ... 8	0.5 ... 9.5	3 ... 8	3 ... 8	3 ... 6	3	3 ... 8	3 ... 8	3 ... 8	3 ... 8	3 ... 8	8.5 / 14	5.5 / 8.5	3 ... 12.7	3 ... 8	6 / 9.5	6 ... 13	8 ... 13	13	0.5,...6.35mm	diameter :	
sheath material:	316 L	w/o	w/o	AISI 316 AISI 316 / Inconel 600	AISI 316 AISI 316 / Inconel 600	AISI 316 / Inconel 600	AISI 316	AISI 316/Inconel 600	AISI 316	AISI 316 / Inconel 600	AISI 316 / Inconel 600	AISI 316 / Inconel 600	AISI 316 / Inconel 600	AISI 316 / Inconel 600	AISI 316 Inconel	AISI 316 Inconel	AISI 316 Inconel	w/o	w/o	AISI 446 / Inconel 600	AISI 316 AISI 316Ti	AISI 316 Inconel 600	AISI 304 AISI 316	AISI 316	AISI 316	AISI 316 Inconel 600	sheath material:	
termination:	terminal block DIN B	terminal block DIN A	terminal block DIN A	head see list	head see list	cable	cable	connector	connector	head see list	head see list	head see list	head see list	head see list	head see list	head see list	head see list	head DIN A	head DIN A	see head list	see head list	see head list	Head DIN B	Head DIN B	wire	head	termination:	
protection IP:	IP00	IP00	IP00	IP54/IP66	IP54/IP66	IP00	IP00	IP54	IP66	IP54 ... IP66	IP54 ... IP66	IP54 ... IP66	IP54 ... IP66	IP54 ... IP66	IP54 ... IP66	IP54 ... IP66	IP54 ... IP66	IP53	IP53	IP54 ... IP66	IP54 ... IP56	IIP54 ... IP56	IP65	IP65	IP65	min. IP54	protection IP:	
terminal material:	ceramic	ceramic	ceramic	Al alloy PA plastic / nylon stainless steel	Al alloy stainless steel	plastic mat. fiberglass composite	plastic mat. fiberglass	plastic mat. ceramic	Al alloy	Al alloy PA plastic / nylon stainless steel	Al alloy PA plastic / nylon stainless steel	Al alloy PA plastic / nylon stainless steel	Al alloy PA plastic / nylon stainless steel	Al alloy PA plastic / nylon stainless steel	Al alloy stainless steel	Al alloy stainless steel	Al alloy stainless steel	Al alloy	Al alloy	Al alloy	Al alloy	Al alloy PA plastic stainless steel	Al alloy stainless steel	Al alloy	PTFE	Al alloy PA plastic stainless steel	terminal material:	
extension:	w/o	w/o	w/o	lag	lag	w/o	w/o	w/o	w/o	lag	lag	lag	lag	lag	lag	lag	lag	pipe	pipe	lag	lag	lag	lag	lag	lag	lag	extension:	
type:				acc. DIN 43772, telescopic	nipple/nipp.-un-nipp., telescopic					acc. DIN 43772, telescopic	acc. DIN 43772, telescopic	acc. DIN 43772, telescopic	acc. DIN 43772, telescopic	acc. DIN 43772, telescopic	nipple/nipp.-union-nipp., telescopic	nipple/nipp.-union-nipp., telescopic	nipple/nipp.-union-nipp., telescopic			nipple/nipp.-union-nipp., telescopic	tube	tube, DIN 43772	tube	tube	nipple/nipp.-union-nipp.- telescopic	type:		
material:				stainless steel	stainless/carbon steel					stainless steel	stainless steel	stainless steel	stainless steel	stainless steel	stainless/carbon steel	stainless/carbon steel	stainless/carbon steel	stainless/carbon steel	stainless/carbon steel	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel	material:	
connection to well:				metric threads	tapered threading					M24x1.5	M24x1.5	M24x1.5	cylindrical M14, M18 G1/2	cylindrical M14, M20, G1/2	tapered threading	tapered threading	tapered threading	cyl. dia 21.3 mm	cyl. dia 21.3, 32 mm	w/o	M24x1.5	M24x1.5	thread	thread	thread	tapered threading 1/2" NPT	connection to well:	
thermowell:	w/o	w/o	w/o	w/o	w/o	w/o	w/o	w/o	w/o	cyl	conical	stepped	conical	cyl.	cyl./conical	cyl./conical	cyl./conical	cyl.	cyl.	w/o	w, w/o	w, w/o	w	w	w	w	thermowell:	
type:										welded built-up	welded built-up	welded built-up	bar stock	bar stock	bar stock	bar stock	bar stock	welded built-up and/or ceramic	straight ceramic	w/o	welded built-up	w/o, built-up, bar stock	w/o, built-up, bar stock	w/o, built-up, bar stock	w/o, built-up, bar stock	acc. to customer specifications	type:	
form:										DIN 43772 form 2	DIN 43772 form 3		DIN 43772 form 4	DIN 43772 form 6	ISA dS 49 form 115 + 117	ISA dS 49 form 125 + 127	ISA dS 49 form 131 + 133			w/o	DIN 43772 form 2	cylindric / conical, DIN 43772 form 2, cust. specifications	acc. to customer specifications	acc. to customer specifications	acc. to customer specifications	acc. to customer specifications	form:	
connection to process:	n/a	n/a	n/a	see thermowell or G1/2	see thermowell or 1/2 NPT	ATX Compression fitting	ATX Compression fitting	ATX Compression fitting	ATX Compression fitting	flanges or threadings acc. DIN, EN, ISO	flanges or threadings acc. DIN, EN, ISO	flanges or threadings acc. DIN, EN, ISO	pipe welding or flanged	flanges or threadings	tapered threading NPT	tapered threading NPT	flanges acc. ASME, ANSI	flanges acc. DIN 43734	flanges acc. DIN 43734	welding on process pipe	aseptic flanges or welded in process	see thermowell "G" / "M" threading	threadings AMX compression fittings	threadings AMX compression fittings	threadings AMX compression fittings	flanges or threadings	connection to process:	
material:				ATX see accessories	ATX see accessories	Stainless steel	Stainless steel	stainless steel	stainless steel	Stainless steel / Nickel alloys / steel / other material on request.	AISI 316Ti / 1.4571	AISI 316L / 1.4404	carbon steel / Mo steel, austenitic steel, nickel alloys	carbon steel / Mo steel, austenitic steel, nickel alloys	carbon steel / Mo steel, austenitic steel, nickel alloy	carbon steel / Mo steel, austenitic steel, nickel alloy	carbon steel / Mo steel, austenitic steel, nickel alloy	high temperature steel, ceramics	ceramics	welding pad knife-edge AISI 446/310 inconel 600	AISI 316Ti / 1.4571 AISI 316L / 1.4435 AISI 316L / 1.4404	AISI 303 AISI 304 AISI 316 AISI 446	AISI 303 AISI 316	AISI 303 AISI 316	carbon steel / Mo steel, austenitic steel, nickel alloy	material:		
options:	transmitters			transmitters, weld pad for pipings	transmitters, weld pad for pipings	weld pad for pipings	weld pad for pipings	weld pad for pipings	weld pad for pipings	transmitters, claddings, coatings, stress calculation, material certificates	transmitters, claddings, coatings, stress calculation, material certificates	transmitters, claddings, coatings, stress calculation, material certificates	transmitters, claddings, coatings, stress calculation, material certificates, exhaust "gas" measurement	transmitters, claddings, coatings, stress calculation, material certificates	transmitters, claddings, coatings, stress calculation, material certificates	transmitters, claddings, coatings, stress calculation, material certificates	transmitters	transmitters	transmitters	transmitters, electropolishing, material certificates	transmitters	transmitters	transmitters	transmitters	acc. to customer specifications - transmitters - indicators	options:		
applications:	spare parts for sensors with DIN heads or similar	spare parts for S40 only	spare parts for S41 only	spare parts for wells acc. DIN 43772	spare parts for wells acc. ISA	machines, laboratories, gas turbines, cooling sytems, heating plates	machines, laboratories, gas turbines, cooling sytems, heating plates	machines, laboratories, gas turbines, cooling sytems, heating plates	machines, laboratories, gas turbines, cooling sytems, heating plates	direct mounting on vessels, cooling systems	direct mounting on vessels, cooling systems	direct mounting on vessels, cooling systems	direct mounting on pipes	direct mounting on pipes	direct mounting on pipes and vessels	direct mounting on pipes and vessels	direct mounting on pipes and vessels	incineration ovens, exhaust gases, metal baths	incinerators, metal baths, glass baths	fired heaters, reformers	pharma and food processes	cooling systems, turbo charger & exhaust gas for diesel engines	reactors, vessels	diesel engines, reactors, vessels	diesel engines, exhaust gas lines, reactors, vessels	reactors	applications:	

Lag extension

Aside from ambient temperature variations, heat from the process, in a direct mounting configuration, is transferred from the thermowell to the connecting head and transmitter, when located in head. If the expected process temperature is near or beyond the transmitter specification limits, consider the use of additional thermowell lagging, an extension nipple, or a remote mounting configuration to isolate the connection head and the transmitter from these excessive temperatures.

Figure 3 provides an example of the relationship between connecting head temperature rise and extension length.

Example: The rated ambient temperature specification for the transmitter is 85°C. If the maximum ambient temperature is 40°C and the temperature to be measured is 540°C, the maximum allowable housing temperature rise is the rated temperature specification limit minus the existing ambient temperature (85-40), or 45 °C.

As shown in Figure 3 with a process temperature of 540°C, a lag extension "N" of 90 mm will result in a housing temperature rise of 22 °C. An "N" dimension of 100 mm would therefore be the minimum recommended length, and would provide a safety margin of about 25 °C. A longer "N" dimension, such as 120 mm, would be desirable in order to reduce errors caused by transmitter temperature effect, although in that case the transmitter may require extra support.

Fixed lag extension

The fixed lag extension may be achieved by nipples, nipple-unions or nipple-union-nipple (N-U-N) as well as extension tubes, depending on the type of the thermo-sensor. Material of the lag extension is in general AISI 316 stainless steel, but may be also galvanized steel (nipples & unions).

Telescopic lag extension

The Rüeger patented lag extension will provide for a standard and Ex(d) executions a variable lag extension in order to use for each length of a thermowell an inset of normalized length LN. This results in a dramatic reduction of spare insets.

Example: the total thermowell length LT of 135 mm through 210 mm will only require one normalized inset of LN = 330 mm

Compression fittings

RUEGER compression fittings provide a leak-proof, torque-free seal at all tubing connections and eliminate costly, hazardous leaks in instrumentation and processing tubing.

RUEGER compression fittings are easily installed with no special tool required. When mounted for the first time, the compression ferrule is compressed onto the tube by tightening the nut. A metal sealing is the result. The union can be disassembled by loosening the nut. However, the compression ferrule remains on the tube.

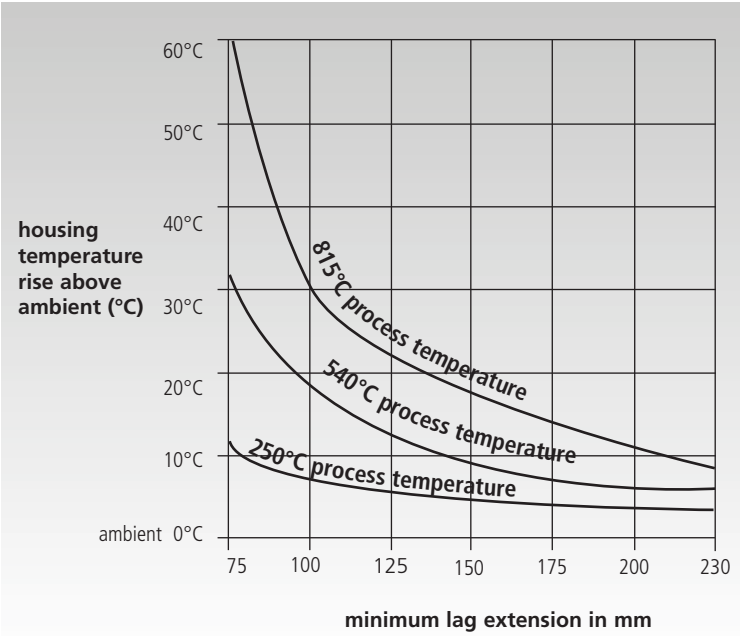
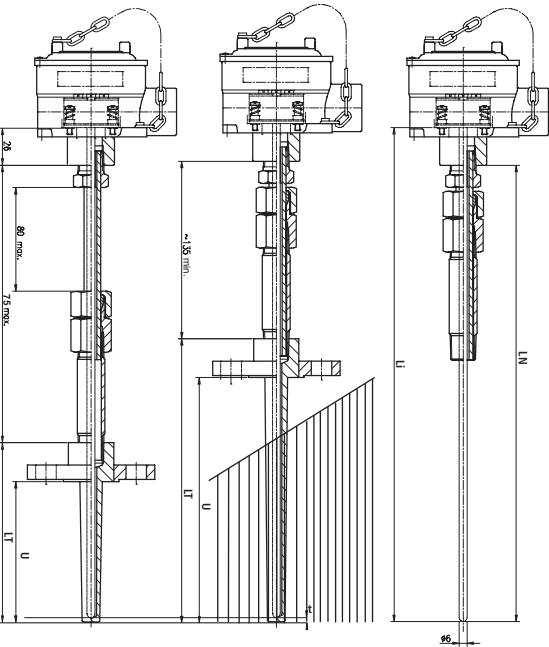


Figure 3. Connection head temperature due to process temperature



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