

# Rosemount 1075 and 1099 Series High-Temperature Thermocouples

- *Accurate temperature measurements in heat treatment and combustion processes*
- *Reliable temperature measurements in hot gas environments of ceramic and metals industries*
- *Ceramic protection tube materials available for use up to 1800 °C (3272 °F)*
- *Metal protection tube materials, such as Super Kanthal, for use up to 1700 °C (3092 °F)*
- *Wide range of precious- metal, and base-metal thermocouples*
- *Maximum measurement reliability obtained through calibration services*
- *Complete point solutions with integrated or remote temperature transmitter and mounting accessories*



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# Rosemount 1075 and 1099 Series

## Overview

Rosemount 1075 Series standard thermocouples conform to the requirements of the DIN EN 60584-1/2 (IEC 584) standards and are manufactured with premium materials. The DIN EN 50446 (new) standard defines all protection tube designs. By using a state-of-the-art manufacturing process, the thermocouples can be used in many different applications including the monitoring and control of process temperatures up to 1800 °C (3272 °F).

Our German Calibration Service (DKD) certified calibration laboratory perform thermocouple and resistance thermometer calibration for comparative and fixed point measurements for every customer sensor. As the equipment traceability requirements of DIN EN/ISO 9000 become more stringent, Emerson Process Management keeps our customers internationally competitive by providing certificates and documents for quality assurance systems.

## Technical References

### Thermoelectric Effect

A thermocouple is a connection between two different metals that produces a change of the thermoelectric emf in comparison with a temperature change. It provides a thermoelectric voltage in millivolts D.C. dependant on the temperature difference between the hot (exposed to the measurement temperature) and cold (known temperature) junctions. A thermocouple has two different connected leads called positive and negative leg. These leads are connected to extension or compensating cable, or directly to the transmitter in the local connection head. The simplest thermocouple consists of two wires welded together at one end which form the measuring tip.

### Thermocouple Materials

The IEC 584 (DIN EN 60584) standards define the basic values and tolerances of the thermocouple types at a temperature range between 0 °C (32 °F) and 1800 °C (3272 °F). For high-temperature measurements from 1200 °C (2192 °F) to 1800 °C (3272 °F), a precious-metal thermocouple must be used. Generally, precious-metal (platinum) thermocouples are stable and can be used up to 1800 °C (3272 °F). See Table 1. The most commonly used base-metal thermocouple, Type K, covers most industrial applications.

TABLE 1. Characteristics of Standard Thermocouples

Thermocouple Type	Alloy of Leads + / -	Temperature Range	Output [mV d.c.]
K	NiCr-Ni	0 to 1200 °C (32 to 2192 °F)	0 to 48.828
R	PtRh87/13%-Pt	0 to 1600 °C (32 to 2912 °F)	0 to 18.842
S	PtRh90/10%-Pt	0 to 1600 °C (32 to 2912 °F)	0 to 16.771
B	PtRh70/30%-Pt Rh94/6%	0 to 1800 °C (32 to 3272 °F)	0 to 13.585

### NOTE

Rosemount 1099 Series precious metal thermocouples (Type B, R, and S) need to be ordered using the model code. For more information, see Table 8 on page 15; Table 10 on page 18; Table 12 on page 22; and Table 14 on page 26.

### Tolerances

All thermocouples manufactured and supplied by Emerson are in accordance with IEC 584-2 (DIN EN 60584-2) limit tolerances. Calibration of one or more customer-specific measuring points can be provided on request with a DKD-certificate up to 1200 °C (2192 °F) and a works certificate (WERKSZERTIFIKAT from Germany) up to 1300 °C (2372 °F).

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### **Important information About High-Temperature Thermocouple Installation**

To reduce risk of damage of gas-tight, ceramic protection tubes by thermal shock, the thermocouple assembly needs to be pre-heated before installation. Slowly inserting the thermocouple into the ceramic protection tube avoids damage that could be caused by rapid change of temperature. Vertical assembly is recommended at high temperatures to avoid bending from the sensor's own weight. For horizontal assembly, additional support is required to avoid bending or breakage. A hair-line fracture can cause contamination and drift. The temperature at the connection head and the terminal block must not exceed 200 °C (392 °F).

## Rosemount 1075 and 1099 Series

## Standard Application Thermocouples

## Introduction

The Rosemount 1075 Series thermocouples conform to DIN EN 50446 standard, and can be ordered as complete thermocouple assemblies.

TABLE 2. Thermocouple Type Selection Guide

Information Table	Type	Temp. Type/ Max. Temp	Diameter	Max. Length	Inner Tube Material
Table 5 on page 8	BM DIN B with Metal Protection Tube (Max Temp. 1200 °C [2192 °F])	K / 1200 °C (2192 °F)	15 x 2 mm (0.59 x 0.08 in.)	2000 mm (78.74 in.)	Without
Table 6 on page 11	AM DIN A with Metal Protection Tube (Max Temp. 1200 °C [2192 °F])	K / 1200 °C (2192 °F)	22 x 2 mm (0.87 x 0.08 in.)	6000 mm (236.22 in.)	Without
Table 7 on page 14	AMK DIN A with Metal Protection Tube and Ceramic Inner Tube (Max Temp. 1350 °C [2462 °F])	R and S / 1600 °C (2912 °F)	22 x 2 mm (0.87 x 0.08 in.)	6000 mm (236.22 in.)	C610
Table 9 on page 17	BK DIN B with Ceramic Protection Tube (Max Temp. 1800 °C [3272 °F])	K / 1200 °C (2192 °F) R and S / 1600 °C (2912 °F) B / 1800 °C (3272 °F)	10 x 1.5 mm (0.39 x 0.06 in.)	1000 mm 39.37 in.)	Without
Table 11 on page 20	AK DIN A with Ceramic Protection Tube (Max Temp. 1800 °C [3272 °F])	K / 1200 °C (2192 °F) R and S / 1600 °C (2912 °F) B / 1800 °C (3272 °F)	15 x 2 mm (0.59 x 0.08 in.) 15 x 2.5 mm (0.59 x 0.10 in.)	2000 mm (78.74 in.)	Without
Table 13 on page 24	AKK DIN A with Ceramic Protection Tube and Inner Tube (Max Temp. 1800 °C [3272 °F])	K / 1200 °C (2192 °F) R and S / 1600 °C (2912 °F) B / 1800 °C (3272 °F)	26 x 4 mm (1.02 x 0.16 in.) 24 x 3 mm (0.94 x 0.12 in.) 25 x 5 mm (0.98 x 0.20 in.)	2000 mm (78.74 in.)	C610/799

## Thermocouple Design

TABLE 3. Tolerances of Thermocouples According to DIN EN 60584-2

Type	Alloy	Temperature Range	Tolerance DIN EN 60584-2	Tolerance Class
Base-Metal Thermocouples				
K	NiCr-Ni	-40 to 375 °C (-40 to 707 °F)	1.5 °C	1
		375 to 1000 °C (707 to 1832 °F)	0.004 x (t)	
		-40 to 333 °C (-40 to 631 °F)	2.5 °C	2
		333 to 1200 °C (631 to 2192 °F)	0.0075 x (t)	
Precious-Metal Thermocouples				
R	PtRh87/13%-Pt	0 to 1100 °C (32 TO 2012 °F)	1.0 °C	1
		1100 to 1600 (2012 t to 2912 °F)	1+0.003 x (t-1100 °C)	
		0 to 600 °C (32 TO 1112 °F)	1.5 °C	2
		600 to 1600 (1112 t to 2912 °F)	0.0025 x (t)	
S	PtRh90/10%-Pt	0 to 1100 °C (32 TO 2012 °F)	1.0 °C	1
		1100 to 1600 (2012 t to 2912 °F)	1+0.003 x (t-1100 °C)	
		0 to 600 °C (32 TO 1112 °F)	1.5 °C	2
		600 to 1600 (1112 t to 2912 °F)	0.0025 x (t)	
B	PtRh70/30%-PtRh94/6%	600 to 1700 °C (1112 to 3092 °F)	0.0025 x (t)	2

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### NOTE

Rosemount 1099 Series precious metal thermocouples (Type B, R, and S) need to be ordered using the model code. For more information, see Table 8 on page 15; Table 10 on page 18; Table 12 on page 22; and Table 14 on page 26.

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The thermocouple wire diameter varies with the design of the thermocouple. The standard diameter is 0.5 mm (0.02 in.) and is recommended for long-term stability. However, a wire diameter of 0.35 mm (0.01 in.) is also available.

### Protection Tube Design

A protection tube shields thermocouples from pressure, flow, corrosion, and mechanical and chemical influences. Selecting a suitable protection tube is crucial to the service life of the thermocouple assembly. Multiple designs using different materials and alloys were standardized for the use of our thermocouple assemblies. The Rosemount 1075 and 1099 Series offers a wide range of application specific protection tubes dependent on the process conditions.

Heat-resistant metal protection tubes, such as Inconel or CrNi-steel, provide high-mechanical stress protection and can be used with temperatures up to 1200 °C (2192 °F). Emerson offers, as standard design, protection tubes of the following materials: AISI 446 (1.4762) and AISI 314 (1.4841). Protection tubes of Kanthal AF and Kanthal Super are also available for temperatures up to 1350 °C (2463 °F) or

1700 °C (3092 °F), e.g. in corrosive furnace atmospheres. Kanthal protection tubes can be used for multiple applications in refuse incinerators.

Ceramic protection tubes are used for high-temperature ranges. Table 4 on page 6 identifies the characteristics and fields of application for standard materials and Ceramic Types C530, C610, and C799.

Gas-tight protection tubes made of silicon carbide are available upon request and are used in high dust loads and corrosive environments with temperatures of up to 1400 °C (2552 °F). Extended service life under extreme operating conditions is guaranteed by special characteristics of reactions sintered, silicon infiltrated silicon-carbide protection tubes.

High-temperature thermocouples are used for temperature measurements in heat treatment and combustion processes. They are also used in the hot gas environments including the glass, ceramic, and metal industries.

The most frequent applications are temperature monitoring and control of incinerators, industrial furnaces, and reactors.

The ceramic protection tube is usually cemented into a holding tube for easy installation of the connection head. Because the temperature above the fitting is generally lower, unalloyed steel is used for holding tubes. However, if a holding tube is exposed to the surface heat, heat resistant steel is used.

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TABLE 4. Protection Tube Material/Application Selection Guide

Material	Max. Temperature	Suitable for High Pressure? (> 1 bar)	Maximum Sizes		Protection Tube Material's Resistance to:				
			Pipe Size (mm)	Length (mm)	Physical Gas Permeation	Thermal Shock	Chemical Sulfurous Gases	Chemical Nitrogenous Gases	Abrasion
<b>Metal Protection Tubes</b>									
1.4762 AISI 446	1200 °C (2192 °F)	Yes	15 x 2 22 x 2	2000 6000	No	High	High	Low	Low
1.4767 Kanthal AF™	1300 °C (2372 °F)	Yes	22 x 2	6000	No	High	High	Low	Low
Kanthal Super™	1700 °C (3092 °F)	Yes	22 x 4,5	1500	No	High	High	Low	Low
1.4841 AISI 314	1200 °C (2192 °F)	Yes	15 x 2	2000	No	High	Low	High	Low
<b>Ceramic Protection Tubes (DIN VDE 0335)</b>									
Type C530 (Al <sub>2</sub> O <sub>3</sub> )	1400 °C (2552 °F)	No	26 x 4	2000	Yes	Medium	High	High	High
Type C610 (60% Al <sub>2</sub> O <sub>3</sub> )	1400 °C (2552 °F)	No	10 x 1,5 15 x 2,5	1000 2000	Yes	Low	High	High	High
Type C799 99,7% Al <sub>2</sub> O <sub>3</sub>	1800 °C (3272 °F)	No	10 x 1,5 15 x 2,5	1000 2000	No	Low	High	High	High

Connection head versions that differ in size and type of cover are also available. All connection heads have a rubber o-ring-seal on the cable entry that limits the temperature to approximately 80 °C (176 °F).

If using a silicone o-ring-seal, the maximum temperature for the aluminum-alloy connection head is 200 °C (392 °F). Suitable connection heads are listed in "Accessories" on page 30.

In addition to our standard connection heads with inserted terminal blocks, thermocouples are also available with head-mounted transmitters (Rosemount 248 and 644 Series). These transmitters can be inserted into the cover of the connection head TZ-A/BL or TZ-/AL, but this reduces the maximum temperature the connection head can be exposed to 70 °C (158 °F).

A summary of some of the available transmitters is listed in "Accessories" on page 30.

The process connections are supplied with adjustable, removable and welded elements. We offer adjustable stop flanges, threaded fittings, adjustable flanges and welded flanges in a variety of sizes. All process connections are sealed except for the stop flanges.

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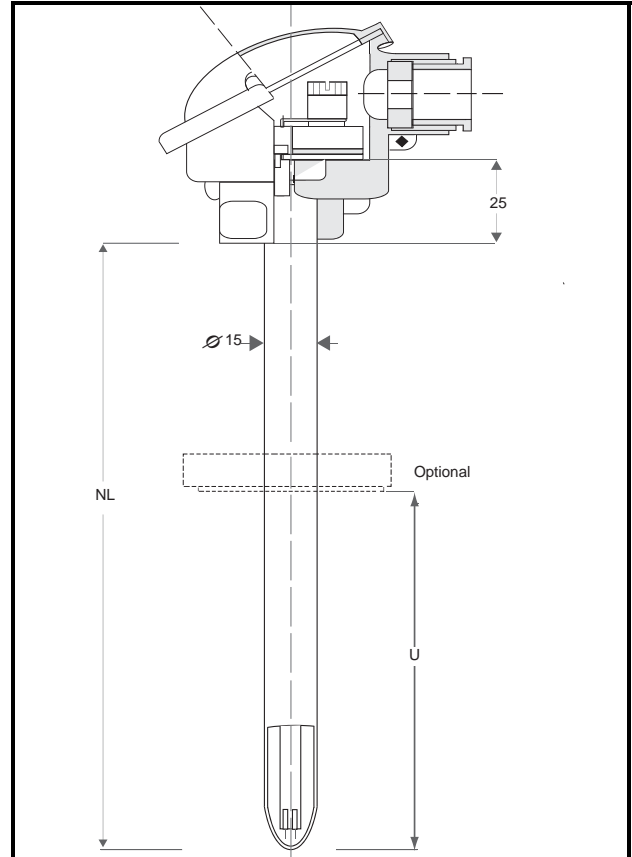
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## 1075 Series Immersion Thermocouples, with Metal Protection Tube (Form 1, Type BM)

This design consists of a ceramic-insulated thermocouple with a protection tube housing, according to DIN EN 50446.

The thermocouple legs are insulated with ceramic elements. Oxidation can occur in Type K thermocouples operating between 800 and 1000 °C (1472 and 1832 °F) particularly in low-oxygen, and reducing atmospheres so minimally insulated thermocouple are recommended for these temperatures.

Protection tubes are available in standard heat resistance steel 1.4762 and 1.4841. Protection tubes made of material 1.4749 have no weld and are recommended for temperatures up to 1200 °C (2192 °F).



All dimensions are in millimeters

# Rosemount 1075 and 1099 Series

TABLE 5. Order Table: Rosemount 1075 Series Immersion Thermocouples with Metal Protection Tube (Form 1, Type BM)

Model	Product Description		
1075	Thermocouple, IEC 584 (DIN EN 60584-1), Tolerance Class 1 acc. to IEC 584 (DIN EN 60584-2)		
Model	Product Form		
1	BM - DIN B with Metal Protection Tube (Max Temp 1200 °C, Max length 2000 mm)		
Code	Connection Head	IP Rating	Conduit Entry
L <sup>(1)</sup>	TZ-A/BL (BUZH), Aluminum	54	M20 x 1.5
U	GN-BL, Aluminum, DIN 43729	43	M20 x 1.5
Y	HR-A/BL (BUS), Aluminum	54	M20 x 1.5
Code	Sensor Connection		
2	Terminal Block Form B		
Code	Number of Elements	Thermocouple Type	
01	Single	K	
02	Dual	K	
Code	Thermocouple Type		
K	K		
Code	Wire Diameter (mm)	Thermocouple Type	Maximum Temperature (°C)
13	1.38 (Use with Dual Element)	K	1200
20	2 (Use with Single Element)	K	1200
Code	Protection Tube Material	Maximum Temperature (°C)	
A	1.4762 (AISI 446), 15 x 2	1200	
B	1.4841 (AISI 314), 15 x 2	1200	
Code	Nominal Length (NL) (mm)		
0250	250		
0500	500		
0710	710		
1000	1000		
XXXX	Other lengths (Maximum 2,000)		
Code	Process Connection	Material	
A1	Adjustable stop flange (15 mm)	GTW-35 (cast iron)	
B1	Adjustable threaded fitting with G 3/4	1.0711 (steel)	
C4	Adjustable Flange 1 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C5	Adjustable Flange 1 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C6	Adjustable Flange 1 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D4	Adjustable Flange 1 1/2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D5	Adjustable Flange 1 1/2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D6	Adjustable Flange 1 1/2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E4	Adjustable Flange 2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E5	Adjustable Flange 2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E6	Adjustable Flange 2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
F4 <sup>(2)</sup>	Welded Flange 1 inch Class 150 Requires Flange immersion length (UXXXX)		
F5 <sup>(2)</sup>	Welded Flange 1 inch Class 300 Requires Flange immersion length (UXXXX)		
F6 <sup>(2)</sup>	Welded Flange 1 inch Class 600 Requires Flange immersion length (UXXXX)		
G4 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 150 Requires Flange immersion length (UXXXX)		
G5 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 300 Requires Flange immersion length (UXXXX)		
G6 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 600 Requires Flange immersion length (UXXXX)		
H4 <sup>(2)</sup>	Welded Flange 2 inch Class 150 Requires Flange immersion length (UXXXX)		
H5 <sup>(2)</sup>	Welded Flange 2 inch Class 300 Requires Flange immersion length (UXXXX)		
H6 <sup>(2)</sup>	Welded Flange 2 inch Class 600 Requires Flange immersion length (UXXXX)		
NN	No fitting		
Code	Holding Tube Material/Length		
N000	No Holding Tube		

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TABLE 5. Order Table: Rosemount 1075 Series Immersion Thermocouples with Metal Protection Tube (Form 1, Type BM)

Model	Product Description
Code	Options
<b>Calibration Options</b>	
W02	Works Cert: Comparison measurement at 2 temperature points (WERKSZERTIFIKAT)
W05	Works Cert: Comparison measurement at 5 temperature points (WERKSZERTIFIKAT)
K02	DKD Calibration Cert: DKD Cert for 2 temperature points specified by customer
K05	DKD Calibration Cert: DKD Cert for 5 temperature points specified by customer
<b>Mounting Options</b>	
XA	Assemble sensor to temperature transmitter
<b>Welded Flange Options</b>	
U1500	Length from Welded flange face to sensor tip (1500 mm) must be welded to Holding tube
UXXXX	Length from Welded flange face to sensor tip Non-standard length (xxxx mm) must be welded to Holding tube
<b>Other Options</b>	
R24	TAG plate, stainless steel
M99	Order specific drawing

(1) Connection head suitable for mounting a transmitter inside (Rosemount 248 and 644)

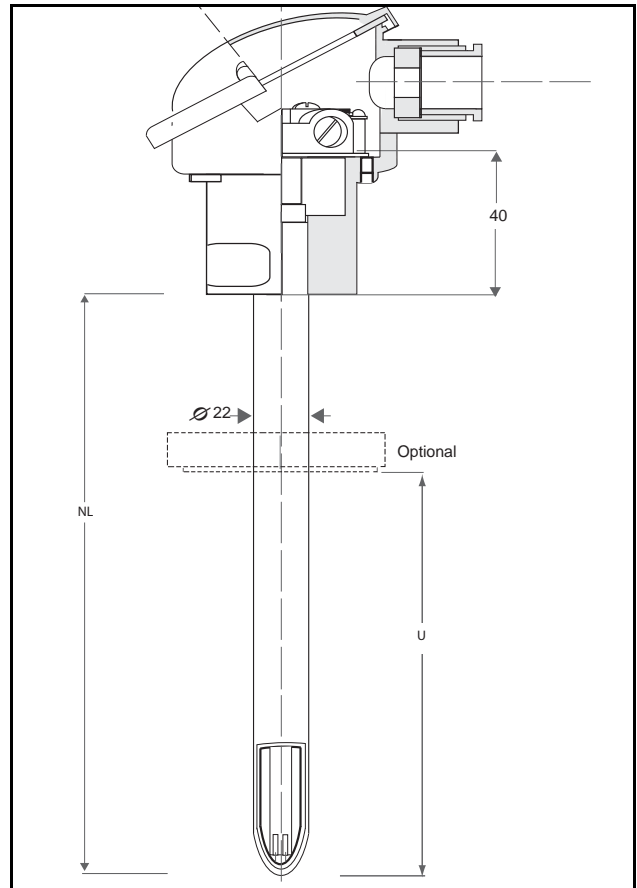
(2) Welded flange immersion length (U) must not be greater than nominal length minus 50 mm. Immersion length (UL) must not be less than Nominal length minus holding tube length (NL - RL).

## Rosemount 1075 and 1099 Series

### 1075 Series Immersion Thermocouples with Metal Protection Tube (Form 2, Type AM)

This design consists of a base-metal thermocouple Type K, and a housing with a protective Design Type AM, according to DIN EN 50446. The thermocouple legs are insulated with ceramic elements.

A gas-tight threaded fitting is needed for gas-tight installation of the protection tube (pressure load of up to a maximum of 1 bar). Our standard heat-resistant materials for protection tubes are 1.4762 and 1.4841.



All dimensions are in millimeters

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TABLE 6. Order Table: Rosemount 1075 Series Immersion Thermocouples with Metal Protection Tube (Form 2, Type AM)

Model	Product Description		
1075	Thermocouple IEC 584 (DIN EN 60584-1), Tolerance Class 1 acc. to IEC 584 (DIN EN 60584-2)		
Model	Product Form		
2	AM - DIN A with Metal Protection Tube (Max Temp 1200 °C, Max length 6000 mm)		
Code	Connection Head	IP Rating	Conduit Entry
E	HR-AL (AUS), Aluminum	54	M20 x 1.5
G <sup>(1)</sup>	TZ-AL (AUZH), Aluminum	54	M20 x 1.5
P	GN-AL, Aluminum, DIN 43729	43	M20 x 1.5
Code	Sensor Connection		
3	Terminal Block, Form A		
Code	Number of Elements	Thermocouple Type	
01	Single	K	
02	Dual	K	
Code	Thermocouple Type		
K	K		
Code	Wire Diameter (mm)	Thermocouple Type	Maximum Temperature (°C)
20	2 (Dual)	K	1200
30 <sup>(2)</sup>	3 (Single)	K	1200
Code	Protection Tube Material	Maximum Temperature (°C)	
C	1.4762 (AISI 446), 22 x 2	1200 / K	
D	1.4841 (AISI 446), 22 x 2	1200 / K	
Code	Nominal Length (NL) (mm)		
0500	500		
0710	710		
1000	1000		
1400	1400		
XXXX	Other lengths (Maximum 6000)		
Code	Process Connection	Material	
A2	Adjustable stop flange (22 mm)	GTW-35 (cast iron)	
B2	Adjustable threaded fitting with G 1	1.0711 (steel)	
C4	Adjustable Flange 1 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C5	Adjustable Flange 1 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C6	Adjustable Flange 1 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D4	Adjustable Flange 1 1/2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D5	Adjustable Flange 1 1/2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D6	Adjustable Flange 1 1/2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E4	Adjustable Flange 2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E5	Adjustable Flange 2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E6	Adjustable Flange 2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
F4 <sup>(3)</sup>	Welded Flange 1 inch Class 150 Requires Flange immersion length (UXXXX)		
F5 <sup>(3)</sup>	Welded Flange 1 inch Class 300 Requires Flange immersion length (UXXXX)		
F6 <sup>(3)</sup>	Welded Flange 1 inch Class 600 Requires Flange immersion length (UXXXX)		
G4 <sup>(3)</sup>	Welded Flange 1 1/2 inch Class 150 Requires Flange immersion length (UXXXX)		
G5 <sup>(3)</sup>	Welded Flange 1 1/2 inch Class 300 Requires Flange immersion length (UXXXX)		
G6 <sup>(3)</sup>	Welded Flange 1 1/2 inch Class 600 Requires Flange immersion length (UXXXX)		
H4 <sup>(3)</sup>	Welded Flange 2 inch Class 150 Requires Flange immersion length (UXXXX)		
H5 <sup>(3)</sup>	Welded Flange 2 inch Class 300 Requires Flange immersion length (UXXXX)		
H6 <sup>(3)</sup>	Welded Flange 2 inch Class 600 Requires Flange immersion length (UXXXX)		
NN	No fitting		
Code	Holding Tube Material/Length		
N000	No Holding Tube		

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TABLE 6. Order Table: Rosemount 1075 Series Immersion Thermocouples with Metal Protection Tube (Form 2, Type AM)

Model Code	Product Description Options
<b>Calibration Options</b>	
W02	Works Cert: Comparison measurement at t 2 measurement points (WERKSZERTIFIKAT)
W05	Works Cert: Comparison measurement at with 5 measurement points (WERKSZERTIFIKAT)
K02	DKD Calibration Cert: DKD Cert for 2 temperature points specified by customer
K05	DKD Calibration Cert: DKD Cert for 5 temperature points specified by customer
<b>Mounting Options</b>	
XA	Assemble sensor to temperature transmitter
<b>Welded Flange Options</b>	
U1500	Length from Welded flange face to sensor tip (1500 mm) must be welded to Holding tube
UXXXX	Length from Welded flange face to sensor tip Non-standard length (xxxx mm) must be welded to Holding tube
<b>Other</b>	
R24	TAG plate, stainless steel
M99	Order specific drawing

(1) Connection head suitable for mounting a transmitter inside (Rosemount 248 and 644)

(2) 3 mm suitable for better long term stability

(3) Welded flange immersion length (U) must not be greater than nominal length minus 50 mm. Immersion length (UL) must not be less than Nominal length minus holding tube length (NL - RL).

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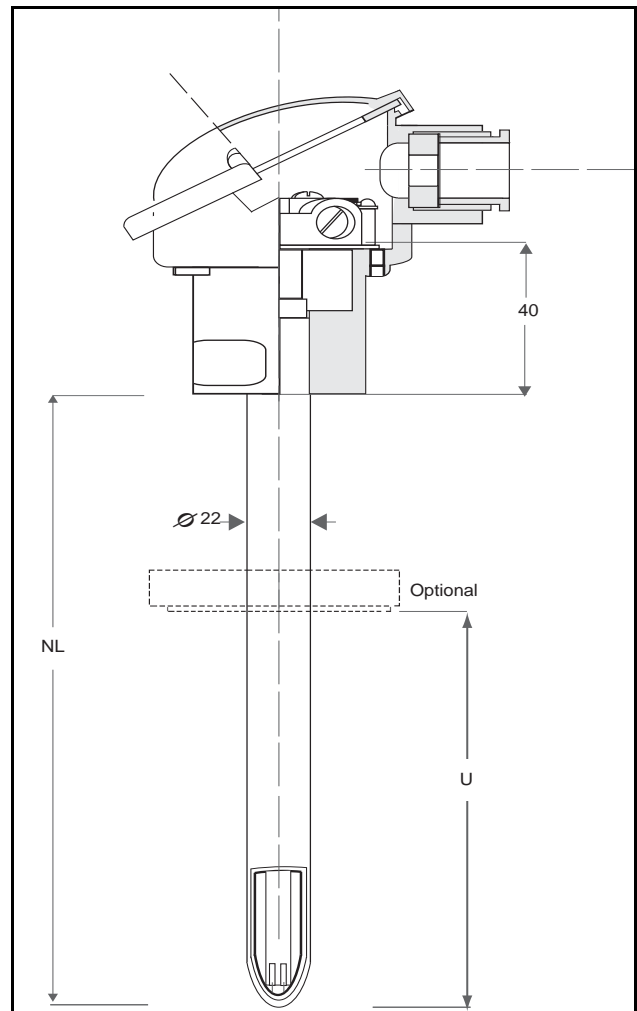
## 1075 Series Immersion Thermocouples with Metal Protection Tube and with Ceramic Inner Tube (Form 3, Type AMK)

This design consists of precious-metal thermocouples Types R, S, or B, and a housing with a protection tube design Type AMK, according to DIN EN 50446. Precious-metal thermocouples are insulated with a Ceramic insulating rod and have a gas-tight inner tube of 15 x 2 mm (0.59 x 0.08 in.).

A gas-tight threaded fitting is needed for gas-tight installation of the protection tube (pressure load of up to a maximum of 1 bar). Our standard heat-resistant materials for protection tubes are 1.4762 and 1.4841. We also have a protection tube type made of heat-resistant Kanthal with an outer diameter of 22 mm (0.67 in.).

Protection tubes of Kanthal AF offer the following advantages:

- Temperature resistance to 1350 °C (2462 °F)
- Longer service life with a wall thickness of 2.0 mm (0.08 in.)
- Greater heat transfer because low wall thickness leads to a better response time
- Greater temperatures create a form fitting alumina film that keeps away impurities
- Resistance to oxidation that is superior to most iron and nickel-base alloys



All dimensions are in millimeters

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TABLE 7. Order Table: Rosemount 1075 Series Immersion Thermocouples with Metal Protection Tube and with Ceramic Inner Tube (Form 3, Type AMK)

Model	Product Description		
1075	Thermocouple IEC 584 (DIN EN 60584-1), Tolerance Class 1 acc. to IEC 584 (DIN EN 60584-2)		
Model	Product Form		
3	AMK - DIN A with Metal Protection Tube and Ceramic Inner Tube (Max Temp 1350 °C, Max length 6000 mm)		
Code	Connection Head	IP Rating	Conduit Entry
E	HR-AL (AUS), Aluminum	54	M20 x 1.5
G <sup>(1)</sup>	TZ-AL (AUZH), aluminum	54	M20 x 1.5
P	GN-AL, Aluminum, DIN 43729	43	M20 x 1.5
Code	Sensor Connection		
3	Terminal Block, Form A		
Code	Number of Elements		
XX	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 8)		
Code	Thermocouple Type		
X	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 8)		
Code	Wire Diameter (mm)	Thermocouple Type	Maximum Temperature (°C)
XX	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 8)		
Code	Protection Tube Material	Inner Tube Material	Maximum Temperature (°C)
E	1.4762 (AISI 446), 22 x 2	Type C610, 15 x 2	1200 / B, R,S
F	1.4841 (AISI 446), 22 x 2	Type C610, 15 x 2	1200 / B, R, S
G	1.4767 (Kanthal AF), 22 x 2	Type C610, 15 x 2	1350 / B, R, S
Code	Nominal Length (NL) (mm)		
0500	500		
0710	710		
1000	1000		
1400	1400		
XXXX	Other lengths (Maximum 4000)		
Code	Process Connection	Material	
A2	Adjustable stop flange (22 mm)	GTW-35 (cast iron)	
B2	Adjustable threaded fitting with G 1	1.0711 (steel)	
C4	Adjustable Flange 1 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C5	Adjustable Flange 1 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C6	Adjustable Flange 1 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D4	Adjustable Flange 1 1/2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D5	Adjustable Flange 1 1/2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D6	Adjustable Flange 1 1/2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E4	Adjustable Flange 2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E5	Adjustable Flange 2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E6	Adjustable Flange 2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
F4 <sup>(2)</sup>	Welded Flange 1 inch Class 150 Requires Flange immersion length (UXXXX)		
F5 <sup>(2)</sup>	Welded Flange 1 inch Class 300 Requires Flange immersion length (UXXXX)		
F6 <sup>(2)</sup>	Welded Flange 1 inch Class 600 Requires Flange immersion length (UXXXX)		
G4 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 150 Requires Flange immersion length (UXXXX)		
G5 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 300 Requires Flange immersion length (UXXXX)		
G6 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 600 Requires Flange immersion length (UXXXX)		
H4 <sup>(2)</sup>	Welded Flange 2 inch Class 150 Requires Flange immersion length (UXXXX)		
H5 <sup>(2)</sup>	Welded Flange 2 inch Class 300 Requires Flange immersion length (UXXXX)		
H6 <sup>(2)</sup>	Welded Flange 2 inch Class 600 Requires Flange immersion length (UXXXX)		
NN	No fitting		
N000	No Holding Tube		

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# Rosemount 1075 and 1099 Series

TABLE 7. Order Table: Rosemount 1075 Series Immersion Thermocouples with Metal Protection Tube and with Ceramic Inner Tube (Form 3, Type AMK)

Model Code	Product Description Options
<b>Calibration Options</b>	
W02	Works Cert: Comparison measurement at 2 measurement points (WERKSZERTIFIKAT)
W05	Works Cert: Comparison measurement at 5 measurement points (WERKSZERTIFIKAT)
K02	DKD Calibration Cert: DKD Cert for 2 temperature points specified by customer
K05	DKD Calibration Cert: DKD Cert for 5 temperature points specified by customer
<b>Mounting Options</b>	
XA	Assemble sensor to temperature transmitter
XB	Assemble to temperature thermocouple Model 1099 (Table 8)
<b>Welded Flange Options</b>	
U1500	Length from Welded flange face to sensor tip (1500 mm) must be welded to Holding tube
UXXXX	Length from Welded flange face to sensor tip Non-standard length (xxxx mm) must be welded to Holding tube
<b>Other</b>	
R24	TAG plate, stainless steel
M99	Order specific drawing

(1) Connection head suitable for mounting a transmitter inside (Rosemount 248 and 644)

(2) Welded flange immersion length (U) must not be greater than nominal length minus 50 mm. Immersion length (UL) must not be less than Nominal length minus holding tube length (NL - RL).

TABLE 8. Order Table: Rosemount 1099 Series

Model	Product Description		
1099	Precious-metal thermocouple wire assembled to model		
Model	Product Form		
A3	Assembled to 1075 Form 3		
Code	Number of Elements		
01	Single		
02	Dual		
Code	Thermocouple Type		
R	R		
S	S		
B	B		
Code	Wire Diameter (mm)	Thermocouple Type	Maximum Temperature (°C)
03	0.35	B, R, S	1400/R, S; 1600/B
05	0.5	B, R, S	1600/R, S; 1800/B
Code	Nominal Length (NL) (mm)		
0500	500		
0710	710		
1000	1000		
1400	1400		
XXXX	Other lengths		
Code	Additional Options		
XB	Assemble to Model 1075		

## Rosemount 1075 and 1099 Series

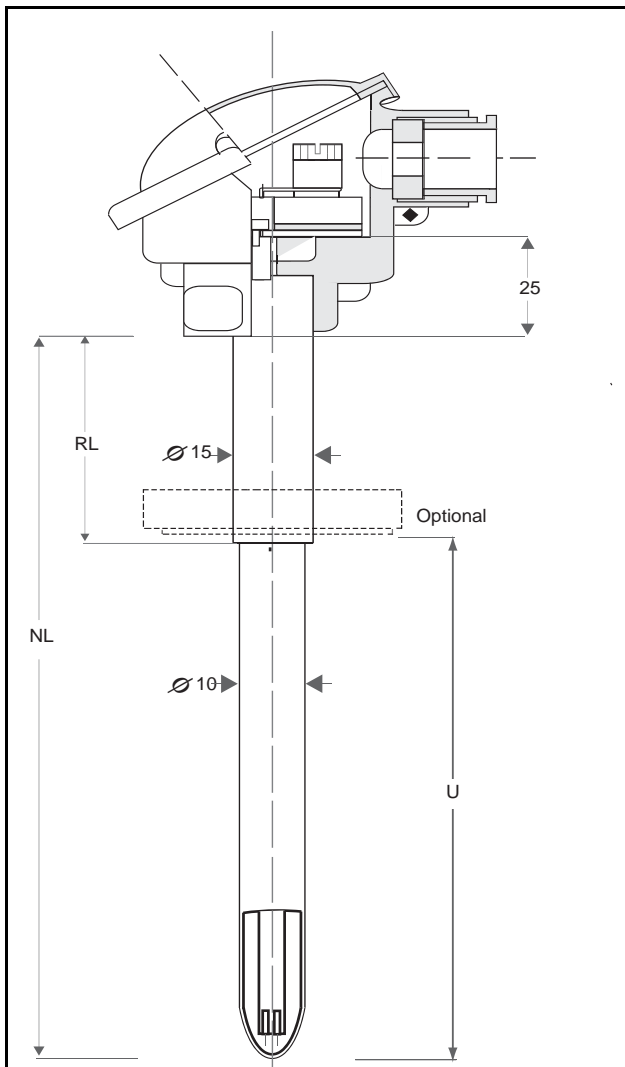
### 1075 Series Immersion Thermocouples with Ceramic Protection Tube (Form 4, Type BK)

This design consists of a base-metal thermocouple Type K or precious-metal thermocouples Type R, S, or B and a housing with a protection tube Type BK, according to DIN EN 50446.

The Single or Dual Type K thermocouple legs are insulated with ceramic elements.

Precious-metal thermocouples are insulated with a ceramic insulating rod.

Installation requires stop flanges and threaded fittings. Standard materials for the protection tubes are Ceramic Types C610 and C799, and the hold tube is made of materials AISI (1.4841), AISI 446 (1.4762) or mild steel (1.0305).



All dimensions are in millimeters



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# Rosemount 1075 and 1099 Series

TABLE 9. Ordering Table: Rosemount 1075 Series Immersion Thermocouples with Ceramic Protection Tube (Form 4, Type BK)

Model	Product Description		
1075	Thermocouple IEC 584 (DIN EN 60584-1), Tolerance Class 1 acc. to IEC 584 (DIN EN 60584-2)		
Model	Product Form		
4	BK - DIN B with Ceramic Protection Tube (Max Temp 1800 °C, Max length 1000 mm)		
Code	Connection Head	IP Rating	Conduit Entry
L <sup>(1)</sup>	TZ-A/BL (BUZH), Aluminum	54	M20 x 1.5
U	GN-BL, Aluminum, DIN 43729	43	M20 x 1.5
Y	HR-A/BL (BUS), Aluminum	54	M20 x 1.5
Code	Sensor Connection		
2	Terminal Block, Form B		
Code	Number of Elements	Thermocouple Type	
01	Single Type K thermocouple wire only	K	
02	Dual Type K thermocouple wire only	K	
XX	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 10)		
Code	Thermocouple Type		
K	K		
X	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 10)		
Code	Wire Diameter (mm)	Thermocouple Type	Maximum Temperature (°C)
13	1.38	K	1200 K
XX	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 10)		1600 / R, S; 1800 / B
Code	Protection Tube Material	Inner Tube Material	Maximum Temperature (°C)
J	Type C610 / 10 x 1.5	without	1000 / K; 1400 / R, S
L	Type C799 / 10 x 1.5	without	1600 / R, S; 1800 / B
Code	Nominal Length (NL) (mm)		
0250	250		
0500	500		
0710	710		
XXXX	Other lengths (Maximum 1000)		
Code	Process Connection	Material	
A1	Adjustable stop flange (15 mm)	GTW-35 (cast iron)	
B1	Adjustable threaded fitting with G <sup>3</sup> / <sub>4</sub>	1.0711 (steel)	
C4	Adjustable Flange 1 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C5	Adjustable Flange 1 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C6	Adjustable Flange 1 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D4	Adjustable Flange 1 1/2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D5	Adjustable Flange 1 1/2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D6	Adjustable Flange 1 1/2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E4	Adjustable Flange 2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E5	Adjustable Flange 2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E6	Adjustable Flange 2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
F4 <sup>(2)</sup>	Welded Flange 1 inch Class 150 Requires Flange immersion length (UXXXX)		
F5 <sup>(2)</sup>	Welded Flange 1 inch Class 300 Requires Flange immersion length (UXXXX)		
F6 <sup>(2)</sup>	Welded Flange 1 inch Class 600 Requires Flange immersion length (UXXXX)		
G4 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 150 Requires Flange immersion length (UXXXX)		
G5 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 300 Requires Flange immersion length (UXXXX)		
G6 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 600 Requires Flange immersion length (UXXXX)		
H4 <sup>(2)</sup>	Welded Flange 2 inch Class 150 Requires Flange immersion length (UXXXX)		
H5 <sup>(2)</sup>	Welded Flange 2 inch Class 300 Requires Flange immersion length (UXXXX)		
H6 <sup>(2)</sup>	Welded Flange 2 inch Class 600 Requires Flange immersion length (UXXXX)		
NN	No fitting		

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# Rosemount 1075 and 1099 Series

TABLE 9. Ordering Table: Rosemount 1075 Series Immersion Thermocouples with Ceramic Protection Tube (Form 4, Type BK)

Model	Product Description
<b>Code</b>	<b>Holding Tube Material</b>
A	1.4762 (AISI 446), 15 x 2
B	1.4841 (AISI 316), 15 x 2
C	1.0305 (mild steel), 15 x 2
<b>Code</b>	<b>Holding Tube Length (mm)</b>
080	80
XXX	Other length
<b>Code</b>	<b>Options</b>
<b>Calibration Options</b>	
W02	Works Cert: Comparison measurement at 2 measurement points (WERKSZERTIFIKAT)
W05	Works Cert: Comparison measurement at 5 measurement points (WERKSZERTIFIKAT)
K02	DKD Calibration Cert: DKD Cert for 2 temperature points specified by customer
K05	DKD Calibration Cert: DKD Cert for 5 temperature points specified by customer
<b>Mounting Options</b>	
XA	Assemble sensor to temperature transmitter
XB	Assemble to precious-metal thermocouple wire (Table 10)
<b>Welded Flange Options</b>	
U1500	Length from Welded flange face to sensor tip (1500 mm) must be welded to Holding tube
UXXXX	Length from Welded flange face to sensor tip Non-Standard length (xxxx mm) must be welded to Holding tube
<b>Other</b>	
R24	TAG plate, stainless steel
M99	Order specific drawing

(1) Connection head suitable for mounting a transmitter inside (Rosemount 248 and 644)

(2) Welded flange immersion length (U) must not be greater than nominal length minus 50 mm. Immersion length (UL) must not be less than Nominal length minus holding tube length (NL - RL).

TABLE 10. Order Table: Rosemount 1099 Series

Model	Product Description		
1099	Precious-metal thermocouple wire assemble to model		
<b>Model</b>	<b>Product Form</b>		
A4	Assembled to 1075 Form 4		
<b>Code</b>	<b>Number of Elements</b>		
01	Single		
02	Dual		
<b>Code</b>	<b>Thermocouple Type</b>		
B	B		
R	R		
S	S		
<b>Code</b>	<b>Wire Diameter (mm)</b>	<b>Thermocouple Type</b>	<b>Maximum Temperature (°C)</b>
03	0.35	B, R, S	1400/R, S; 1600/B
05	0.5	B, R, S	1600/R, S; 1800/B
<b>Code</b>	<b>Nominal Length (NL) (mm)</b>		
0250	250		
0500	500		
0710	710		
XXXX	Other Lengths (Maximum 1000)		
<b>Code</b>	<b>Additional Options</b>		
XB	Assemble to Model 1075		

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# Rosemount 1075 and 1099 Series

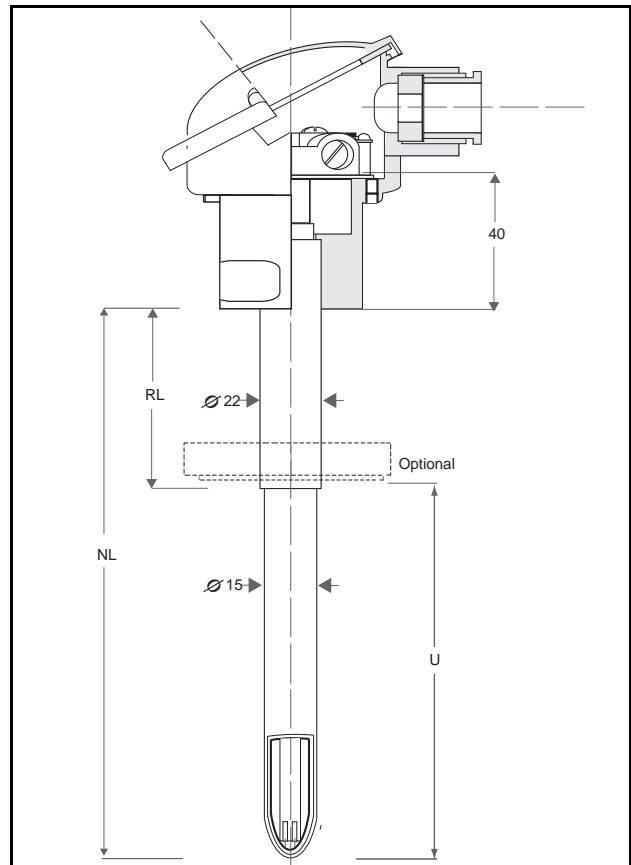
## 1075 Series Immersion Thermocouple with Ceramic Protection Tube (Form 5, Type AK)

This design consists of a base-metal thermocouple Type K or precious-metal thermocouples Type R, S, or B and a housing with a protection tube Type AK, according to DIN EN 50446.

The Single or Dual Type K thermocouple legs are insulated with ceramic elements.

Precious-metal thermocouples are insulated with a ceramic insulating rod.

Installation requires stop flanges and threaded fittings, Standard materials for the protection tubes are Ceramic Types C610 and C799 and the holding tube is made of materials AISA 314 (1.4841), AISI 446 (1.4762), or mild steel (1.0305).



All dimensions are in millimeters

# Rosemount 1075 and 1099 Series

TABLE 11. Order Table: Rosemount 1075 Series Immersion Thermocouple with Ceramic Protection Tube (Form 5, Type AK)

Model	Product Description		
1075	Thermocouple IEC 584 (DIN EN 60584-1), Tolerance Class 1 acc. to IEC 584 (DIN EN 60584-2)		
Model	Product Form		
5	AK - DIN A with Ceramic Protection Tube (Max Temp 1800 °C, Max length 2000 mm)		
Code	Connection Head	IP Rating	Conduit Entry
E	HR-AL (AUS), Aluminum	54	M20 x 1.5
G <sup>(1)</sup>	TZ-AL (AUZH), Aluminum	54	M20 x 1.5
P	GN-AL, Aluminum, DIN 43729	43	M20 x 1.5
Code	Sensor Connection		
3	Terminal Block, Form A		
Code	Number of Elements	Thermocouple Type	
01	Single	K	
02	Dual	K	
XX	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 12)		
Code	Thermocouple Type		
K	K		
X	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 12)		
Code	Wire Diameter (mm)	Thermocouple Type	Maximum Temperature (°C)
13	1.38 (Dual)	K	1200
30	3.0 (Single)	K	1200
XX	B, R, S, Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 12)		
Code	Protection Tube Material	Inner Tube Material	Maximum Temperature (°C)
P	Type C610, 15 x 2	without	1200 / K; 1400 / R, S
R	Type C799, 15 x 2	without	1600 / R, S; 1800 / B
Code	Nominal Length (NL) (mm)		
0500	500		
0710	710		
1000	1000		
1400	1400		
XXXX	Other lengths (Maximum 2,000)		
Code	Process Connection	Material	
A2	Adjustable stop flange (22 mm)	GTW-35 (cast iron)	
B2	Adjustable threaded fitting with G 1	1.0711 (steel)	
C4	Adjustable Flange 1 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C5	Adjustable Flange 1 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C6	Adjustable Flange 1 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D4	Adjustable Flange 1 1/2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D5	Adjustable Flange 1 1/2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D6	Adjustable Flange 1 1/2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E4	Adjustable Flange 2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E5	Adjustable Flange 2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E6	Adjustable Flange 2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
F4 <sup>(2)</sup>	Welded Flange 1 inch Class 150 Requires Flange immersion length (UXXXX)		
F5 <sup>(2)</sup>	Welded Flange 1 inch Class 300 Requires Flange immersion length (UXXXX)		
F6 <sup>(2)</sup>	Welded Flange 1 inch Class 600 Requires Flange immersion length (UXXXX)		
G4 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 150 Requires Flange immersion length (UXXXX)		
G5 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 300 Requires Flange immersion length (UXXXX)		
G6 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 600 Requires Flange immersion length (UXXXX)		
H4 <sup>(2)</sup>	Welded Flange 2 inch Class 150 Requires Flange immersion length (UXXXX)		
H5 <sup>(2)</sup>	Welded Flange 2 inch Class 300 Requires Flange immersion length (UXXXX)		
H6 <sup>(2)</sup>	Welded Flange 2 inch Class 600 Requires Flange immersion length (UXXXX)		
NN	No fitting		

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# Rosemount 1075 and 1099 Series

TABLE 11. Order Table: Rosemount 1075 Series Immersion Thermocouple with Ceramic Protection Tube (Form 5, Type AK)

Model	Product Description
<b>Code</b>	<b>Holding Tube Material</b>
D	1.4762 (AISI 446), 22 x 2
E	1.4841 (AISI 314), 22 x 2
F	1.0305, 22 x 2
<b>Code</b>	<b>Holding Tube Length (mm)</b>
150	150
XXX	Other length
<b>Code</b>	<b>Options</b>
	<b>Calibration Options</b>
W02	Works Cert: Comparison measurement at 2 measurement points (WERKSZERTIFIKAT)
W05	Works Cert: Comparison measurement at 5 measurement points (WERKSZERTIFIKAT)
K02	DKD Calibration Cert: DKD Cert for 2 temperature points specified by customer
K05	DKD Calibration Cert: DKD Cert for 5 temperature points specified by customer
	<b>Mounting Options</b>
XA	Assemble sensor to temperature transmitter
XB	B, R, S, Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 12)
	<b>Welded Flange Options</b>
U1500	Length from Welded flange face to sensor tip (1500 mm) must be welded to Holding tube
UXXXX	Length from Welded flange face to sensor tip Non-Standard length (xxxx mm) must be welded to Holding tube
	<b>Other</b>
R24	TAG plate, stainless steel
M99	Order specific drawing

(1) Connection head suitable for mounting a transmitter inside (Rosemount 248 and 644)

(2) Welded flange immersion length (U) must not be greater than nominal length minus 50 mm. Immersion length (UL) must not be less than Nominal length minus holding tube length (NL - RL).

# Rosemount 1075 and 1099 Series

TABLE 12. Order Table: Rosemount 1099 Series

Model	Product Description		
1099	Precious-metal thermocouple wire assemble to model		
Model	Product Form		
A5	Assembled to 1075 Form 5		
Code	Number of Elements		
01	Single		
02	Dual		
Code	Thermocouple Type		
B	B		
R	R		
S	S		
Code	Wire Diameter (mm)	Thermocouple Type	Maximum Temperature (°C)
03	0.35	B, R, S	1400/R, S; 1600/B
05	0.5	B, R, S	1600/R, S; 1800/B
Code	Nominal Length (NL) (mm)		
0500	500		
0710	710		
1000	1000		
1400	1400		
XXXX	Other Lengths (Maximum 2000)		
Code	Additional Options		
XB	Assemble to Model 1075		

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# Rosemount 1075 and 1099 Series

## 1075 Series Immersion Thermocouple with Ceramic Protection Tube and Ceramic Inner Tube (Form 6, Type AKK)

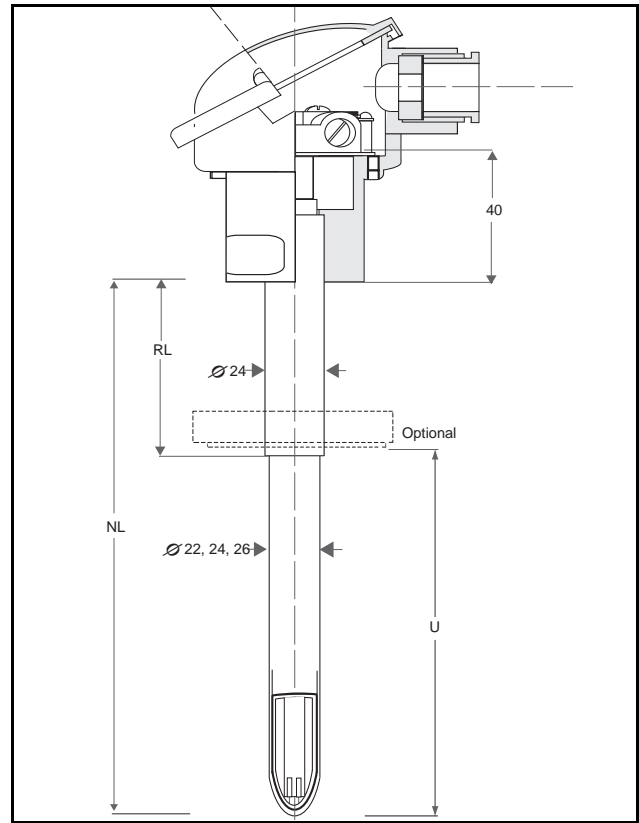
This design consists of a base-metal thermocouple Type K or precious-metal thermocouples Type R, S or B and a housing with a protection tube Type AKK, according to DIN EN 50446.

The Single or Dual Type K thermocouple legs are insulated with ceramic elements.

Precious-metal thermocouples are insulated with a 4-hole insulating rod and provided a gas-tight inner tube made of Ceramic Type C610 or C799.

Installation requires stop flanges or threaded fittings. Standard materials for the protection tubes are Ceramic Types C530, C610 and C799.

Gas-tight ceramic materials are sensitive to thermal shock and stress impact with a tolerance level that can be optimized by selecting the proper materials for protection and inner tubes



All dimensions in millimeters

For recommended combinations of ceramic protection and inner tube combinations, consult with your Emerson representative.

The standard holding tube is made of material 1.0305 and is recommended for temperatures to 200 °C (392 °F). For temperatures exceeding 200 °C (392 °F), The Rosemount 1075 Series offers holding tubes made of heat resistant materials AISI 446 (1.4762) or AISI 314 (1.4841).

Kanthal Super protection tubes consist of sintered material and have the following properties:

- Temperature resistant to 1700 °C (3092 °F)
- Not as porous or brittle, and can be used in higher temperatures and in corrosive furnace atmospheres
- Suppress electromagnetic noise that could disturb the thermocouple function

# Rosemount 1075 and 1099 Series

TABLE 13. Ordering Table: Rosemount 1075 Series Immersion Thermocouple with Ceramic Protection Tube and Ceramic Inner Tube (Form 6, Type AKK)

Model	Product Description		
1075	Thermocouple, IEC 584 (DIN EN 60584-1). Tolerance Class 1 acc. to IEC 584 (DIN EN 60584-2)		
Model	Product Form		
6	AKK - DIN A with Ceramic Protection Tube and Inner Tube (Max Temp 1800 °C, Max length 2000 mm)		
Code	Connection Head	IP Rating	Conduit Entry
E	HR-AL (AUS), Aluminum	54	M20 x 1.5
G <sup>(1)</sup>	TZ-AL (AUZH), aluminum	54	M20 x 1.5
P	GN-AL, Aluminum, DIN 43729	43	M20 x 1.5
Code	Sensor Connection		
3	Terminal Block, Form A		
Code	Number of Elements	Thermocouple Type	
01	Single	K	
02	Dual	K	
XX	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 14)		
Code	Thermocouple Type		
K	K		
X	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 14)		
Code	Wire Diameter (mm)	Maximum Temperature (°C)	
20	2.0 Type K Dual Element	1200	
30	3.0 Type K Single Element	1200	
XX	B, R, S; Thermocouple wire specified in separate line XB option required (See Model 1099 on Table 14)		
Code	Protection Tube Material	Inner Tube Material	Maximum Temperature (°C)
H	Kanthal Super (Maximum length 1500 mm), 22 x 4,5	Type C799, 10 x 1,5	1700 / B
T	Type C530, 26 x 4	Type C610, 15 x 2	1200 / K 1400 / R, S
V	Type C530, 26 x 4	Type 799, 15 x 2,5	1600 / R, S
W	Type C799, 24 x 3	Type 799, 15 x 2,5	1200 / B, R, S
Code	Nominal Length (NL) (mm)		
0500	500		
0710	710		
1000	1000		
1400	1400		
2000	2000		
XXXX	Other lengths (Maximum 2,000,1500 for protection material H)		
Code	Process Connection	Material	
A3	Adjustable stop flange (32 mm)	GTW-35 (cast iron)	
B3	Adjustable threaded fitting with G 1 <sup>1</sup> / <sub>4</sub>	1.0711 (steel)	
C4	Adjustable Flange 1 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C5	Adjustable Flange 1 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
C6	Adjustable Flange 1 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D4	Adjustable Flange 1 1/2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D5	Adjustable Flange 1 1/2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
D6	Adjustable Flange 1 1/2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E4	Adjustable Flange 2 inch Class 150	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E5	Adjustable Flange 2 inch Class 300	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
E6	Adjustable Flange 2 inch Class 600	1.4571 (SS316Ti) Flange/1.0711 Steel Compression fitting	
F4 <sup>(2)</sup>	Welded Flange 1 inch Class 150 Requires Flange immersion length (UXXXX)		
F5 <sup>(2)</sup>	Welded Flange 1 inch Class 300 Requires Flange immersion length (UXXXX)		
F6 <sup>(2)</sup>	Welded Flange 1 inch Class 600 Requires Flange immersion length (UXXXX)		
G4 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 150 Requires Flange immersion length (UXXXX)		
G5 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 300 Requires Flange immersion length (UXXXX)		
G6 <sup>(2)</sup>	Welded Flange 1 1/2 inch Class 600 Requires Flange immersion length (UXXXX)		
H4 <sup>(2)</sup>	Welded Flange 2 inch Class 150 Requires Flange immersion length (UXXXX)		

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# Rosemount 1075 and 1099 Series

TABLE 13. Ordering Table: Rosemount 1075 Series Immersion Thermocouple with Ceramic Protection Tube and Ceramic Inner Tube (Form 6, Type AKK)

Model	Product Description		
Code	Process Connection	Material	
H5 <sup>(2)</sup>	Welded Flange 2 inch Class 300 Requires Flange immersion length (UXXXX)		
NN	No fitting		
Code	Holding Tube Material		
G	1.4762 (AISI 446), 32 x 2		
H	1.4841 (AISI 314), 32 x 2		
J	1.0305, 32 x 2		
Code	Holding Tube Length (mm)		
200	200	200	200 mm
XXX	Other length	XXX	Other length
Code	Options		
Calibration Options			
W02	Works Cert: Comparison measurement at 2 measurement points (WERKSZERTIFIKAT)		
W05	Works Cert: Comparison measurement at 5 measurement points (WERKSZERTIFIKAT)		
K02	DKD Calibration Cert: DKD Cert for 2 temperature points specified by customer		
K05	DKD Calibration Cert: DKD Cert for 5 temperature points specified by customer		
Mounting Options			
XA	Assemble sensor to temperature transmitter		
XB	Assemble to precious-metal thermocouple wire (B, R, S) Model 1099 on Table 14		
Welded Flange Options			
U1500	Length from Welded flange face to sensor tip (1500 mm) must be welded to Holding tube		
UXXXX	Length from Welded flange face to sensor tip Non-Standard length (xxxx mm) must be welded to Holding tube		
Other			
R24	TAG plate, stainless steel	R24	TAG plate, stainless steel
M99	Order specific drawing	M99	Order specific drawing

(1) Connection head suitable for mounting a transmitter inside (Rosemount 248 and 644)

(2) Welded flange immersion length (U) must not be greater than nominal length minus 50 mm. Immersion length (UL) must not be less than Nominal length minus holding tube length (NL - RL).

## Rosemount 1075 and 1099 Series

TABLE 14. Order Table: Rosemount 1099 Series

<b>Model</b>	<b>Product Description</b>		
1099	Precious-metal thermocouple wire assemble to model		
<b>Model</b>	<b>Product Form</b>		
A6	Assembled to 1075 Form 6		
<b>Code</b>	<b>Number of Elements</b>		
01	Single		
02	Dual		
<b>Code</b>	<b>Thermocouple Type</b>		
B	B		
R	R		
S	S		
<b>Code</b>	<b>Wire Diameter (mm)</b>	<b>Thermocouple Type</b>	<b>Maximum Temperature (°C)</b>
03	0.35	B, R, S	1400/R, S; 1600/
05	0.5	B, R, S	1600/R, S; 1800/B
<b>Code</b>	<b>Nominal Length (NL) (mm)</b>		
0500	500		
0710	710		
1000	1000		
1400	1400		
2000	2000		
XXXX	Other Lengths Non-Standard Nominal Length		
<b>Code</b>	<b>Additional Options</b>		
XB	Assemble to Model 1075		

**Calibration and Certificates**

**Calibration with DKD-Certificate**

The calibration of temperature sensors is done in our DKD calibration laboratory accredited according to DIN EN ISO/IEC 17025: 2005.

The Deutscher Kalibrierdienst (DKD) is an association of calibration laboratories including industrial firms research institutes, technical authorities, inspection and testing institutes.

The DKD calibration certificates provide traceability to national standards as required in the standard's family ISO 9000 and the ISO/IEC 17025 which allow the user to trust the reliability of the measurement results.

While compiling a DKD or works certificate, the thermocouple or measuring system is checked using comparison standards regarding measurement accuracy.

Our laboratory is authorized to issue DKD calibration certificates for temperature in the measurement ranges shown in Table 15 on page 27. The measurement uncertainties are defined in the various calibration points and based on the Dual standard deviation ( $k = 2$ ), (probable coincidence approximately 95%).

The calibrations carried out by our laboratory are services provided to the customer. Our intention is to meet the quality requirements of the customer in relation to thermocouple calibration, including traceability to national standards and accomplishing the contract commitments with the accreditation authority - DAR (German Accreditation Council). The thermocouple, which provides the measurement result on its own or as a measuring chain, is compared with the national standards. This comparison measurement produces quantitative verification of traceability.

A report is issued in the form of a calibration certificate according to DKD specifications (Figure 2 on page 29).

TABLE 15. DKD Laboratory Accreditation Ranges for Thermocouple Calibration

Subject of Calibration	Temperature Range	Measurement Conditions	Measurement Uncertainty	Remarks
Thermocouples	0 to 1200 °C (32 to 2192 °F)	Comparison with standard thermocouples in tube furnaces	1.5K	
Thermocouples Type S and R	0 to 1100 °C (32 to 2012 °F)		1K	Comparison without protection tube in a PT cap
Transmitter with connected thermocouples	same as for thermocouples	same as for thermocouples	U(TE) + 500mK	U(TE) is the measurement uncertainty of calibrating the thermocouple by itself.

**Works Certificates (WERKSZERTIFIKAT)**

Thermocouples with a works certificate show documentation of measurements in the service and quality assurance department.

Using the comparison method, the calibrated values are certified on a works certificate. The maximum test temperature is 1300 °C (2372 °F).

The customer must specify the number and values of the calibrated test variables.

**NOTE**

Before specifying a temperature value, consider the temperature limits of the thermocouple. For individual order options see the Ordering Tables.

# Rosemount 1075 and 1099 Series

FIGURE 1. DAR Accreditation Certificate



FIGURE 2. DKD Certificate and Test Report Example

### DEUTSCHER KALIBRIERDIENST **DKD**

Kalibrierlaboratorium für die Messgröße Temperatur  
 Calibration laboratory for measuring of temperature  
 Akkreditiert durch die / accredited by the  
 Akkreditierungsstelle des Deutschen Kalibrierdienstes

**Kalibrierschein**  
Calibration Certificate

**Gegenstand**  
Object: Thermocouple assembly

**Hersteller**  
Manufacturer: Emerson Process Management GmbH & Co. OHG

**Typ**  
Type: 1075BKU201K13X500NNB080R24

**Fabrikat/Serien-Nr.**  
Serial number: 00000000/000/0

**Auftraggeber**  
Customer: Mustermann

**Auftragsnummer**  
Order No.: 00000000

**Anzahl der Seiten**  
Number of pages of the certificate: 3

**Datum der Kalibrierung**  
Date of calibration: 00.00.0000

**Kalibrierzeichen**  
Calibration mark: 00-00

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Der DKD ist Unterzeichner der multilateralen Übereinkommen der Europäischen Co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine. Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This certificate realizes the traceability to the SI. The DKD agrees for Accreditation Co-operation (EA) and the International Laboratory Accreditation Cooperation (ILAC) to the mutual recognition of calibration certificates. For the compliance with a reasonable time for the repetition of the calibration is the user responsible.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. A der Genehmigung sowohl der Akkreditierungsstelle des DKD als auch des zu Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit. This calibration certificate may not be reproduced other than in full except with the approval of the DKD and the issuing laboratory. Calibration certificates without signature or stamp have no validity.

<b>Stempel</b> Date	00.00.0000	<b>Leiter des Kalibrierlaboratoriums</b> Head of the calibration laboratory

Emerson Process Management GmbH & Co. OHG, Frankenstraße 21, 63737 Keltern, Tel.: +49 (0)188 992-182 Telefax: +49 (0)188) 992-112, DKD-Kalibrierlabor

### EMERSON

**Werkzertifikat**  
Specific Test Report

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 Frankenstraße 21, 63737 Keltern, Germany  
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 F +49 (0)188) 992-112  
 www.emersonprocess.com

<b>Kalibriergegenstand</b>	Thermoelement
<b>Objekt</b>	thermocouple assembly
<b>Typ</b>	1075BKU201K13X500NNB080R24
<b>Seriennummer / Serial number</b>	00000000/000/0
<b>Hersteller / Manufacturer</b>	Emerson Process Management Temperature GmbH
<b>Form / Auftraggeber / Customer</b>	Mustermann
<b>Auftragsnummer / Order number</b>	00000000
<b>Messeinrichtungen / Bezugsnormale</b>	Thermoelement 552218 (145DKD08); reference Thermocouple 552218 145DKD08
<b>Equipment / Reference standards</b>	
<b>Kalibriernummer / Calibration mark</b>	A-8064
<b>Grundwertreihe / table of basic values</b>	DIN EN 60584-1

**Kalibrierverfahren / Procedure**  
 Die Kalibrierung erfolgte nach der Richtlinie DKD-R 5-3 vom Dezember 2000 des Deutschen Kalibrierdienstes (DKD) für die Kalibrierung von Thermoelementen.  
 The calibration was made in accordance to the guideline DKD-R 5-3 december 2000 for the calibration of thermocouples.

Die Kalibrierung erfolgte bei einer Eintauchtiefe von 365 mm.  
 The calibration was performed with an immersion depth of 365 mm.

**Messergebnisse / Results**  
 Messstelle 1 / measuring circuit 1

Temperatur $t_a$ temperature $t_a$ in °C	Thermospannung $E$ (t <sub>a</sub> ) thermoelement $E$ (t <sub>a</sub> ) in $\mu$ V	Abw. gegen Div. gegen DIN EN 60584 in $\mu$ V	Abw. gegen Div. gegen DIN EN 60584 in °C	Messunsicherheit uncertainty in K
100	8266.9	-3.3	-0.162	1.5
200	7337.1	-3.5	-0.176	1.5
300	6429.9	-3.3	-0.169	1.5
400	5577.1	-3.0	-0.153	1.5
500	4748.3	-3.2	-0.161	1.5
600	3939.9	-3.7	-0.183	1.5
700	3159.9	-3.5	-0.176	1.5
800	2409.9	-3.4	-0.169	1.5
900	1689.9	-3.1	-0.153	1.5
1000	977.9	-3.6	-0.183	1.5
1100	289.9	-3.2	-0.161	1.5
1200	-399.9	-3.5	-0.176	1.5

Messstelle 2 / measuring circuit 2

Temperatur $t_a$ temperature $t_a$ in °C	Thermospannung $E$ (t <sub>a</sub> ) thermoelement $E$ (t <sub>a</sub> ) in $\mu$ V	Abw. gegen Div. gegen DIN EN 60584 in $\mu$ V	Abw. gegen Div. gegen DIN EN 60584 in °C	Messunsicherheit uncertainty in K
100	8267.2	-0.0	-0.162	1.5
200	7336.6	-0.4	-0.176	1.5
300	6440.1	-0.1	-0.153	1.5
400	5577.9	-0.8	-0.161	1.5
500	4748.3	-10.2	-0.505	1.5
600	3939.9	-10.7	-0.533	1.5

**Messunsicherheit / Uncertainty**  
 Angaben zu die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor  $k = 2$  ergibt. Ein Anteil für die Langzeitstabilität ist dabei nicht enthalten.  
 All uncertainties were determined at the various calibration points and are based on two times the standard deviation ( $k=2$ ). Possible longterm drifts are not included.

00.00.0000  
 Datum der Kalibrierung  
 Date of calibration

Seite 1 / page 1 von 1  
 Unterschrift  
 Signature

Emerson Process Management Frankenstraße 21 63737 Keltern Deutschland/Germany	Kalibrierlabor Frankenstraße 21 63737 Keltern Deutschland/Germany	Emerson Process Management Frankenstraße 21 63737 Keltern Deutschland/Germany	Emerson Process Management Frankenstraße 21 63737 Keltern Deutschland/Germany	Emerson Process Management Frankenstraße 21 63737 Keltern Deutschland/Germany
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## Rosemount 1075 and 1099 Series

### Accessories

#### Transmitters

Rosemount head-mounted transmitters 248H and 644H can be assembled to the extended cover of the connection head Types TZ-A/BL (BUZH) or TZ-AL (AUZH). These transmitters have the following common properties:

- Complete installation ready assembly
- Improved accuracy with cold junction, and ambient temperature compensation
- Micro Processor controlled, with user selectable inputs and 4–20mA/HART® or Foundation™ fieldbus communication protocols
- Meets NAMUR NE21, and is resistant to Radio Frequency and Electro Magnetic Interference
- Epoxy sealed electronics ensure reliable performance

The Rosemount 3144P transmitter can be ordered and assembled to the 1075 thermocouple. The 3144P features a sealed dual-compartment housing, an LCD meter display, Hot Backup sensor redundancy, and a Thermocouple Diagnostic function to detect drifting thermocouple conditions.

The Rosemount 848T Multi-Input Temperature Transmitter is capable of accepting up to eight thermocouple inputs into one transmitter. The 848T is ideally suited for high density temperature measurement applications.

#### Connection Head



Figure 3 on page 31 shows the technical data of the connection heads mentioned in this Product Data Sheet. The screw cable gland is available with thread M 20 x 1.5.

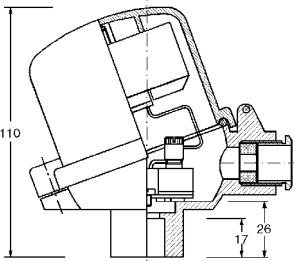
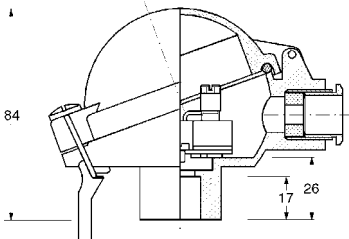
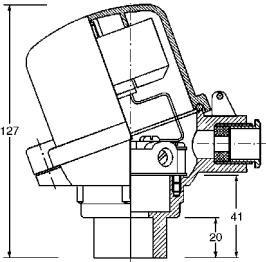
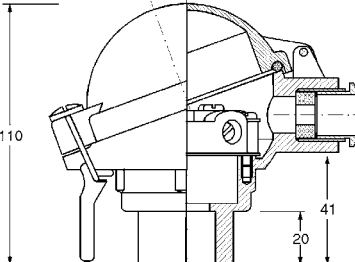
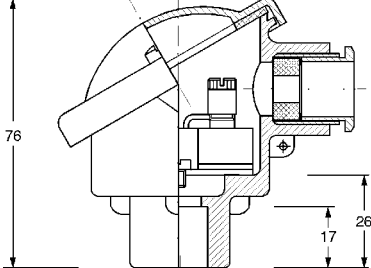
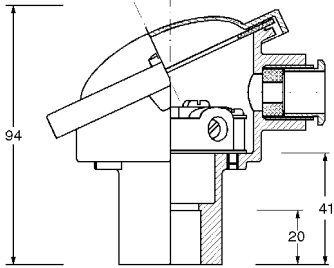
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# Rosemount 1075 and 1099 Series

FIGURE 3. Connection Head Dimensional Drawings and Information (All Temperature Limits -40 to 80 °C [-40 to 176 °C])

TZ-A/BL (BUZH) (Option L)	HR-A/BL (BUS) (Option Y)
	
<p><b>Materials:</b> Housing Aluminum; Form B acc. to DIN 43729; Finish Aluminum lacquer; O-Ring-Seal Rubber  <b>Weight:</b> 0.20 kg  <b>Protection Class:</b> IP 54  <b>Cover:</b> Hinged lid, screw  <b>Transmitter Inst.:</b> Within cover</p>	<p><b>Materials:</b> Housing Aluminum; Form B acc. to DIN 43729; Finish Aluminum lacquer; O-Ring-Seal Rubber  <b>Weight:</b> 0.24 kg  <b>Protection Class:</b> IP 54  <b>Cover:</b> Hinged lid, with lever lock  <b>Transmitter Inst.:</b> Yes</p>
TZ-AL (AUZH) (Option G)	HR-AL (AUS) (Option E)
	
<p><b>Materials:</b> Housing Aluminum; Form A acc. to DIN 43729; Finish Aluminum lacquer; O-Ring-Seal Rubber  <b>Weight:</b> 0.22 kg  <b>Protection Class:</b> IP 54  <b>Cover:</b> Hinged lid, screw  <b>Transmitter Inst.:</b> Within cover</p>	<p><b>Materials:</b> Housing Aluminum; Form A acc. to DIN 43729; Finish Aluminum lacquer; O-Ring-Seal Rubber  <b>Weight:</b> 0.24 kg  <b>Protection Class:</b> IP 54  <b>Cover:</b> Hinged lid, with lever lock  <b>Transmitter Inst.:</b> Yes</p>
GN-BL (B) (Option V)	GN-AL (A) (Option P)
	
<p><b>Materials:</b> Housing Aluminum; Form B acc. to DIN 43729; Finish Aluminum lacquer; O-Ring-Seal Rubber  <b>Weight:</b> 0.18 kg  <b>Protection Class:</b> IP 43  <b>Cover:</b> Lose lid, with 2 screws  <b>Transmitter Inst.:</b> Not Available</p>	<p><b>Materials:</b> Housing Aluminum; Form A acc. to DIN 43729; Finish Aluminum lacquer; O-Ring-Seal Rubber  <b>Weight:</b> 0.20 kg  <b>Protection Class:</b> IP 43  <b>Cover:</b> Lose lid, with 2 screws  <b>Transmitter Inst.:</b> Not Available</p>

Dimensions are in millimeters

# Rosemount 1075 and 1099 Series

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