Product Data Sheet
July 2016
00813-0100-4119, Rev BB

Rosemount™ Multipoint Thermocouple and RTD Profiling Sensors

Features

- Efficiently monitor a temperature profile for a wide range of applications, including hot-spot detection in reactors
- Single process insertion for up to 60 independent measurement points
- Compact design of independent measurement points
- Reduces cost of individual measurement points
- Sensing elements can be individually replaced in the field
- Enclosure, sensor, and protection tube can be ordered as a complete assembly.

EMERSON™
Process Management

Rosemount Multipoint Thermocouple and RTD Profiling Sensor

Optimize plant efficiency and increase measurement reliability with industry proven design

- Measure reactor profiles with only one temperature probe instead of multiple probes
- Optimized sensor design with more then six basic designs and many variations
- Up to 60 measuring points within one probe
- Designs for single measuring point replacement

Easy implementation and installation in existing application

- Available in a wide variety of process connections, junction boxes and designs
- Specific designs allow installation without the use of a crane or protection tube

Achieve optimal efficiency with advanced High Density Transmitter technology

- Decrease the installation and engineering costs further by using Rosemount 848T High Density Transmitters

Explore the benefits of a Complete Point Solution™ from Rosemount Temperature Measurement

- If requested, Emerson can provide a complete point temperature solution, delivering an installation ready transmitter and sensor assembly
- Emerson has a complete portfolio of Single Point and High Density Temperature Measurement solutions, allowing you to effectively measure and control your processes with the reliability you trust from Rosemount products

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Experience global consistency and local support from numerous worldwide Rosemount Temperature sites

- Experienced Instrumentation Consultants help select the right product for any temperature application and advise on best installation practices.
- An extensive global network of Emerson™ service and support personnel can be on-site when and where they are needed.

Introduction

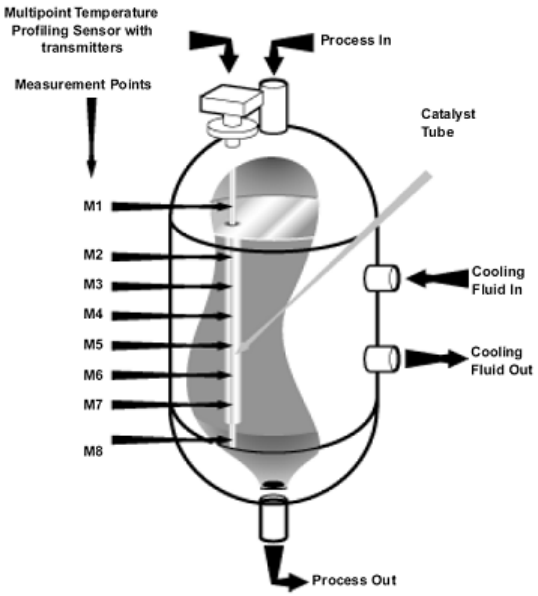
Multipoint Temperature Profiling Sensors measure the temperature at different points along its length. These sensors are frequently used in chemical and petrochemical industries because they provide an excellent temperature profile for chemical reactors, catalytic crackers and fractionation towers. For these applications, Multipoint Temperature Profiling Sensors are the most efficient cost, maintenance and data acquisition solution. Multipoint Temperature Profiling Sensors allow, with a single pipe penetration, the reading of up to 60 points that can be evaluated to provide a complete temperature profile of the column, tank or reactor.

Typical applications

Reactors

Multipoint Temperature Profiling Sensors improve monitoring and control of the reaction process within chemical reactors. A prime example of how Multipoint Temperature Profiling Sensors are used is in the production of organic acid. Many organic acids are produced through an exothermic oxidation process. This chemical reaction takes place in multiple tubes filled with catalysts. The reaction components flow into the tubes, form reactions due to the catalyst, then flow out as an acid. These tubes are cooled by running a coolant around the tubes. A critical process parameter is the control of the operating temperature. A Multipoint Temperature Profiling Sensor can measure the temperature profile inside a reaction tube. Through monitoring the temperature profile, the flow of reaction components and coolant can be controlled to maximize the process output and reaction efficiency. A high local resolution of the temperature profile is required to ensure that the hot-spot (maximum measured temperature) does not reach the maximum allowable process temperature.

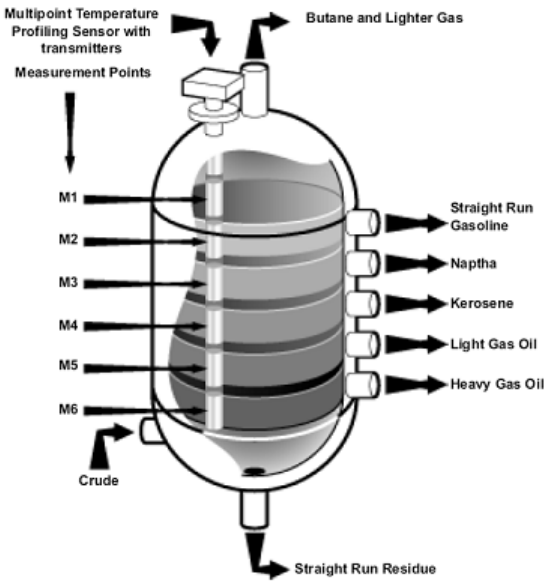
Figure 1. Reactor



Distillation columns/fractionators

In crude oil distillation processes, crude oil is heated and run into a distillation column or fractionators, where a significant temperature gradient is observed - high temperatures at the bottom, cooler at the top. Inside the column, crude oil is separated into components or fractions according to weight and boiling point. As these component vapors travel up, they condense to liquid form. These condensed components are captured by strategically mounted trays or “decks,” located at a height where the column temperature matches a specific component’s condensation point. The tray locations, or cut-points, are where products are then drawn from the column. Multipoint Temperature Profiling Sensors can be used to monitor the temperature at these cut-points and therefore control the temperature profile of the distillation column.

Figure 2. Distillation Column/Fractionator



Rosemount 1080C Thermocouple Multipoint Sensor - Compact Design

The Rosemount 1080C is a compact Multipoint Sensor. The sensing elements are single ungrounded thermocouples. The high number of measurement points allow the monitoring of temperature profiles with a very good local resolution. The Rosemount 1080C is often used for:

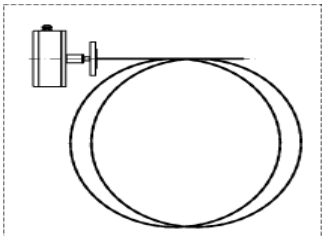
- hot-spot detection
- temperature profile monitoring

in:

- tall reactors
- distillation columns

The Rosemount 1080C is delivered without a thermowell because the thermowell typically already exists at the installation site. If a thermowell is required, please contact Emerson Process Management. The Rosemount 1080C is delivered either with an insert tube or in the bundled version (see Figure 4 on page 6). The function of the insert tube is to fix the sensing elements and give mechanical stability to the sensor. The Rosemount 1080C, with an insert tube, can be shipped up to a length of 10 m (33 ft) and cannot be coiled for shipping. The Rosemount 1080C in the bundled version can be delivered up to a length of 30 m (99 ft) and is shipped as a coil (see Figure 3).

Figure 3. Bundled Multipoint Sensor Coiled for Shipping



Specifications

Functional

Number of measurement points

2 to 60

Temperature limits

-40 to 750 °C (-40 to 1382 °F)

Physical

Table 1. Available Insert Tube Outer Diameters

mm	inch	Maximum measurement points
3.5	0.14	25
4.5	0.18	30
5.0	0.20	40
6.0	0.24	60
8.0	0.32	60

Table 2. Length Limits

With insert tube		Bundled version	
m	ft	m	ft
10	33	30	99

Performance

Ambient temperature limits

For enclosures and transmitters is –40 to 80 °C (–40 to 176 °F)

Insulation resistance

Greater than 1000 MOhm at room temperature. See Table 3 for applied voltage

Table 3. Applied Voltage for Insulation Resistance Measurement (based on minearally insulated cable outside diameter)

mm	inch	Test voltage
0.34	0.013	75 VDC
0.50	0.020	100 VDC
1.00	0.039	250 VDC

Accuracy

Table 4. Limits of Error Interchangeability for Class I Thermocouples

Type	
E	1.5 °C or 0.004 |t|[(1)], -40 to 750 °C
J	1.5 °C or 0.004 |t|[(1)], -40 to 750 °C
K	1.5 °C or 0.004 |t|[(1)], -40 to 750 °C
N	1.5 °C or 0.004 |t|[(1)], -40 to 750 °C

1. Whichever is greater. “t” is in degrees Celsius.

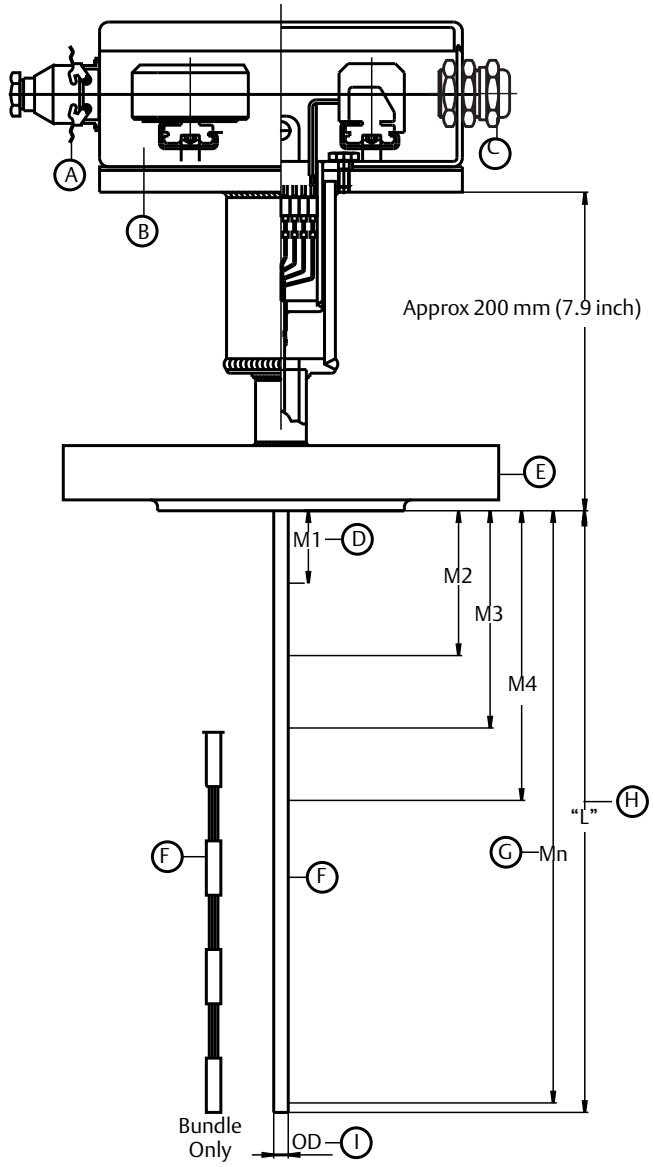
Enclosures

The enclosures are described in "Enclosures with mounting hardware" on page 29.

Individual sensor identification data

By default, sensor 1 is closest to the flange. Remaining points are numbered incrementally. Use the C1 option and the CDS if a different numbering system is desired.

Figure 4. Multipoint Sensor Rosemount 1080C Compact



A. Enclosure entry (Han®-Plug Connection)
B. Enclosure type (see "Enclosures with mounting hardware" on page 29)
C. Enclosure entry (cable glands)
D. First measurement point location
E. Mounting style
F. Insert tube material (stainless steel/alloy insert)
G. Number of measurement points
H. Insertion length "L"
I. Insert tube outer diameter

Ordering information

Table 5. Rosemount 1080C Ordering Information

Model	Product description			
1080C	Rosemount 1080C Thermocouple Multipoint Profiling Sensor - Compact Design - Tolerance Class 1			
Thermocouple type		**Operating temperature range**		
		°C	**°F**	
E1	E	-40 to 750	-40 to 1382	
J1	J	-40 to 750	-40 to 1382	
K1	K	-40 to 750	-40 to 1382	
N1	N	-40 to 750	-40 to 1382	
Number of measurement points				
08	8			
16	16			
24	24			
32	32			
40	40			
48	48			
XX	Other quantities (minimum = 02; maximum = 60)			
Transmitter mounting hardware[(1)]		**Maximum measuring points**		
A	Mounting hardware for Rosemount 848T	48		
B	Mounting hardware for Rosemount 644H	24		
C	Mounting hardware for Rosemount 248H	24		
D	Mounting hardware for Rosemount 148H	24		
N	No transmitter hardware; terminal strips only	60		
Enclosure type[(1)]		**Material**	**IP rating**	**NEMA® rating**
A	EEx d CENELEC Flameproof Approval (consult factory for availability)	Aluminum	65	NEMA 4
B	EEx e CENELEC Increased Safety Approval (consult factory for availability)	Aluminum	65	NEMA 4
C	EEx i Intrinsically Safety acc. EN 50014 and EN 50020 with manufacturer declaration for Ex i use in Zone 1	Aluminum	65	NEMA 4
D	Standard aluminum	Aluminum	65	NEMA 4
E	Standard polyester	Polyester	65	NEMA 4
S	Special enclosure type (Configuration Data Sheet required)			

Table 5. Rosemount 1080C Ordering Information

Enclosure entry			
1	Single multi-core cable gland		
2	Multiple cable glands M20 x 1.5 (one per measurement point)		
3	Han-Plug Connection IP65		
4	Customer specified (Configuration Data Sheet required)		
Insert tube material		**Maximum temperature**	
		°C	**°F**
D	Stainless steel - DIN 1.4404 (ANSI 316L)	450	842
P	Alloy	750	1382
B	Bundle only - DIN 1.4404 (ANSI 316L) (no insertion tube)	450	842
C	Bundle only - alloy (no insertion tube)	750	1382
S	Special tube material - customer specified (Configuration Data Sheet required)		
Insert tube outer diameter		**Maximum measuring points**	
00	No insert tube (used with insert tube material codes B and C)		
35	3.5 mm (0.14 inch)	25	
45	4.5 mm (0.18 inch)	30	
50	5.0 mm (0.20 inch)	40	
60	6.0 mm (0.24 inch)	60	
80	8.0 mm (0.32 inch)	60	
Insertion length "L"			
01000	1000 mm (39 inch)	Length code is in mm. To convert to mm multiply the length in inches by 25.4.	
02000	2000 mm (79 inch)		
03000	3000 mm (118 inch)		
05000	5000 mm (197 inch)		
07000	7000 mm (276 inch)		
10000	10000 mm (394 inch)		
XXXXX	Other lengths (maximum 10000mm [394 inch] with insert tube) (maximum 30000mm [1181 inch] bundle only)		
Measurement point distribution			
A	Equally distributed points		
C	Customer specified (Configuration Data Sheet required)		
First measurement point location (distance from base of mounting flange)			
00500	500 mm (20 inch)		
01000	1000 mm (39 inch)		
02000	2000 mm (79 inch)		
03000	3000 mm (118 inch)		

Table 5. Rosemount 1080C Ordering Information

04000	4000 mm (158 inch)	
XXXXX	Other lengths	
Mounting style–flange material=DIN 1.4571 (ANSI 316Ti)		**Process connection**
F06	Flanged, ANSI	1-in. Class 150 RF
F12	Flanged, ANSI	1 1/2-in. Class 150 RF
F18	Flanged, ANSI	2-in. Class 150 RF
F24	Flanged, ANSI	1-in. Class 300 RF
F30	Flanged, ANSI	1 1/2-in. Class 300 RF
F36	Flanged, ANSI	2-in. Class 300 RF
F42	Flanged, ANSI	1-in. Class 600 RF
F48	Flanged, ANSI	1 1/2-in. Class 600 RF
F54	Flanged, ANSI	2-in. Class 600 RF
F66	Flanged, ANSI	1 1/2-in. Class 900 RF
F72	Flanged, ANSI	2-in. Class 900 RF
D06	Flanged, DIN	DN 25 PN 16
D12	Flanged, DIN	DN 25 PN 40
D18	Flanged, DIN	DN 40 PN 16
D24	Flanged, DIN	DN 40 PN 40
D28	Flanged, DIN	DN 50 PN 40
CDS	Customer specified (Configuration Data Sheet required)	
Additional options		
Special tagging and configuration options		
C1[2]	Customer specified tagging and transmitter configuration–Configuration Data Sheet Required	
Thermowell options		
R16	Ring joint flange (ASME B16.5 ANSI flanged thermowells only)	
Typical model number: 1080C J1 08 D 1 D 35 01000 A 00500 F36		

1. Transmitter must be ordered separately.
2. Shipped with default numbered tagging of all measurement points. The first measurement point (closest to the enclosure) is tag "1." If other configuration is required, order option code C1.

Rosemount 1080C Configuration Data Sheet (CDS)

Page one

Copy this form, complete it as required, and fax it to the appropriate fax number listed on the next page

Customer name: _____

Address: _____

Contact person: _____

Phone: _____ Fax: _____

Date: _____ Number of pages: _____

Rosemount order / Quote number: _____

Model number: _____

Enclosure type:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement: _____

_____

Enclosure entry:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement: _____

_____

Insert tube material:
- ❑ Selected as Standard option inmodel structure
- ❑ Special requirement:
  - ❑ DIN 1.4401 (ANSI 316)
  - ❑ DIN 2.4816 (ASTM A494 [Alloy])
  - ❑ Other: _____

Mounting style:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement:
  - ❑ Flange rating: _____
  - ❑ Flange material:
    - ❑ DIN 1.4401 (ANSI 316)
    - ❑ DIN 2.4816 (ASTM A494 [Alloy])
    - ❑ Other: _____

Page two

Measurement point distribution:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement (fill in table below)

Tagging:
- ❑ Default
- ❑ Special requirement (fill in table below)– use with option code C1.

Point	Distance from mounting point	Point tag	Transmitter tag	Transmitter range
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
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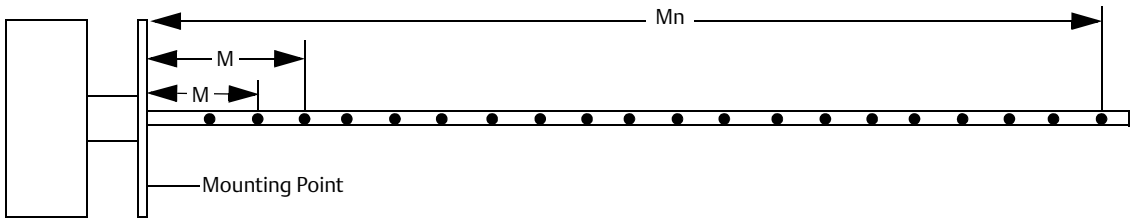


Rosemount 1080F Thermocouple Multipoint Sensor – Contacting Fixture Design

The Rosemount 1080F Multipoint Sensor is versatile, robust, and designed for exceptional reliability with a long life expectancy. The individual measurement elements are ungrounded single thermocouples and the number of measurement points is limited to 20. These sensors are to be used for measurement of temperature profiles where a high local resolution is not required. The Rosemount 1080F can be ordered with or without a thermowell and is available in three different sensor configurations: Individual Guide Tube design, Radial Spring design, and Laminated Spring design.

Individual guide tube design

The individual guide tube design offers the advantage of replaceable individual elements (see Figure 5). Mineral insulated thermocouple elements are inserted into each guide tube and guided to the specified measurement point. When ordered with spring loaded fittings, good thermal contact (fast response time) is achieved, but the inside of the thermowell is not sealed from the atmosphere. When ordered with compression fittings, the thermowell is sealed from the atmosphere but the thermal contact isn't as good. The guide tube design, with or without a thermowell, cannot be coiled– which should be considered when shipping.

Radial spring design

This design provides good thermal contact between the thermocouple and thermowell. In this design, a radial spring presses the thermocouple against the inner wall of the thermowell. The flattened MI cable has full thermal contact with the thermowell. This design ensures the best possible response time. If ordered without a thermowell, it will be shipped as a coil. The individual thermocouples cannot be replaced.

Laminated spring design

This design provides good thermal contact between the thermocouple and the thermowell, facilitating a fast-time response. The laminated spring presses the thermocouple against the inner wall of the thermowell (see Figure 5) and is appropriate if the mounting flange is angled to the thermowell. The advantage of this design is the flexibility of the insert, which is similar to the flexibility of an oil dipstick. This design allows the sensor to follow the contour of the thermowell. If the laminated spring multipoint sensor is ordered without thermowell, it will be shipped as a coil. The individual thermocouples cannot be replaced.

Thermowell

Every Rosemount 1080F requires a thermowell for operation. When the Rosemount 1080F is ordered without thermowell, check the inner diameter of the existing thermowell (see Table 6). The inner wall of the thermowell must be smooth, especially at the welding joints, to ensure that the multipoint sensor will not be damaged during insertion.

Specifications

Functional

Number of measuring points

2 to 20

Temperature limits

- Type E and J: -40 to 750 °C (-40 to 1382 °F)
- Type K and N: -40 to 800 °C (-40 to 1472 °F)

Physical

Length limits

- 10 m (33 ft) with thermowell– all designs
- 30 m (99 ft) without thermowell– Radial and Laminated designs only

Physical dimensions

Table 6. Thermowell Diameter for Guide Tube and Laminated Spring Design

Number of measurement points	O.D.		I.D.	
	mm	inch	mm	inch
2-in. schedule 80				
2 to 5	60.33	2.34	49.25	1.94
2 1/2-in. schedule 80				
6 to 8	73	2.9	59	2.3
3-in. schedule 80				
9 to 20	88.9	3.5	73.7	2.9

Table 7. Thermowell Diameter for Radial Spring Design

Number of measurement points	O.D.		I.D.	
	mm	inch	mm	inch
2 to 8	73.0	2.9	59.0	2.3
9 to 20	88.9	3.5	73.7	2.9

Performance

Ambient temperature limits

For the enclosures and transmitters is –40 to 80 °C (–40 to 176 °F)

Insulation resistance

Greater than 1000 MOhm at room temperature, test voltage is 500 VDC

Accuracy

Table 8. Limits of Error Interchangeability for Class I Thermocouples

Type	
E	1.5 °C or 0.004 |t|[(1)], -40 to 750 °C
J	1.5 °C or 0.004 |t|, -40 to 750 °C
K	1.5 °C or 0.004 |t|, -40 to 800 °C
N	1.5 °C or 0.004 |t|, -40 to 800 °C

1. Whichever is greater. "t" is in degrees Celsius.

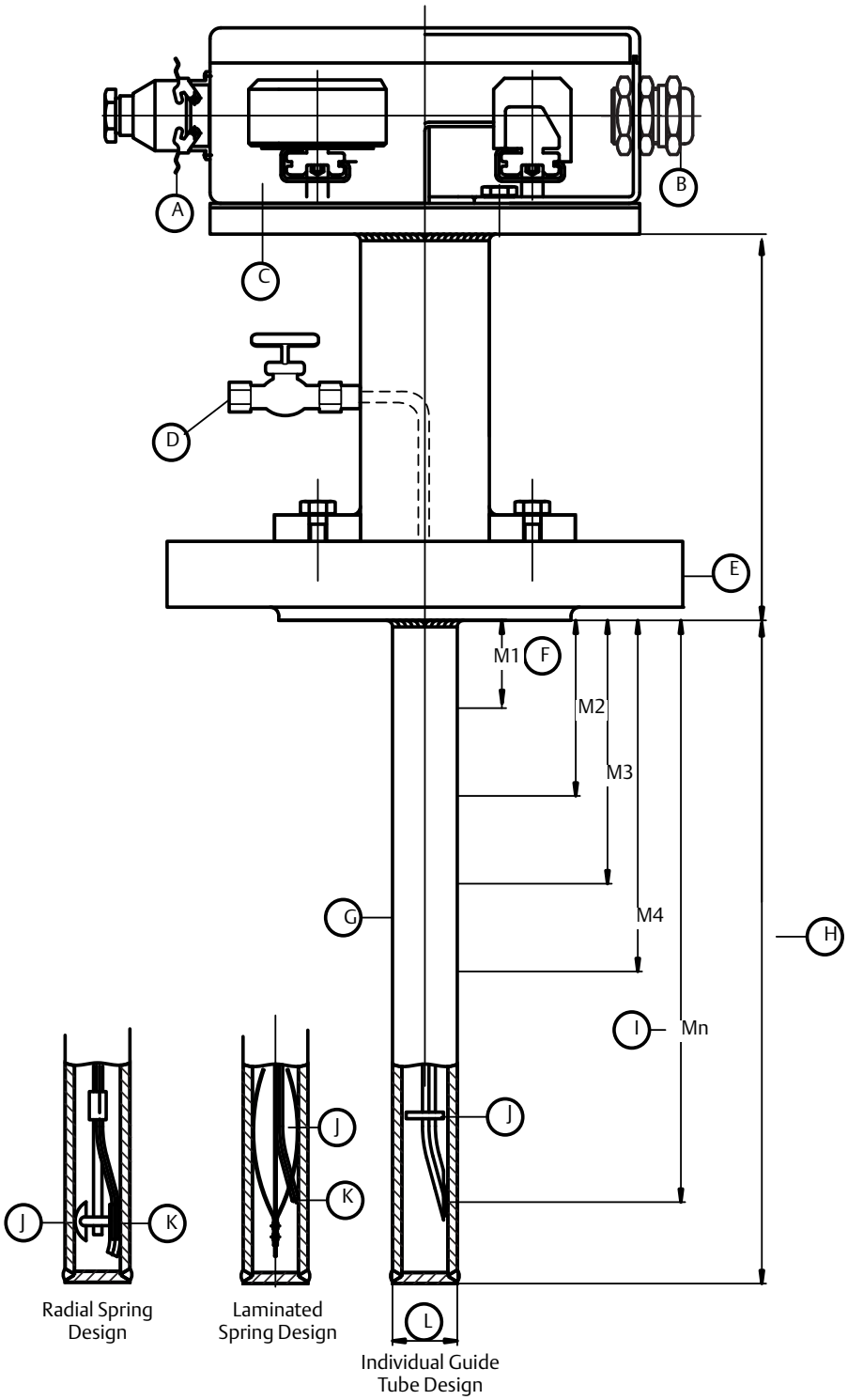
Enclosures

The enclosures are described in "Design overview" on page 27.

Individual sensor identification data

By default, sensor 1 is closest to the flange. Remaining points are numbered incrementally. Use the C1 option and the CDS if a different numbering system is desired.

Figure 5. Multipoint Sensor Rosemount 1080F Thermocouple Multipoint Sensor (Contacting Fixture Design)



A. Enclosure entry (Han-Plug connection)
B. Enclosure entry (Cable glands)
C. Enclosure type (see "Enclosures with mounting hardware" on page 29)
D. Leak check valve (optional)
E. Mounting style
F. First measurement point location
G. Thermowell material
H. Immersion length "U"
I. Number of measurement points
J. Element of fixation method
K. Thermocouple type
L. Thermowell diameter

Ordering information

Table 9. Rosemount 1080F Ordering Information

Model	Product description			
1080F	Rosemount 1080F Thermocouple Multipoint Profiling Sensor– Contacting Fixture Design, Tolerance Class 1			
Code	**Element fixation method**			
1	Individual guide tubes, compression fittings, replaceable elements			
2	Individual guide tubes, spring loaded fittings, replaceable elements			
3	Laminated spring design, compression fittings, fixed elements			
4	Radial spring design, fixed elements			
Code	**Thermocouple type**		**Operating temperature range**	
			°C	**°F**
E1	E		-40 to 750	-40 to 1382
J1	J		-40 to 750	-40 to 1382
K1	K		-40 to 800	-40 to 1472
N1	N		-40 to 800	-40 to 1472
Code	**Number of measurement points**			
03	3			
08	8			
12	12			
16	16			
20	20			
XX	Other quantities (minimum. 02; maximum. 20)			
Code	**Transmitter mounting hardware[(1)]**		**Maximum measuring points**	
A	Mounting hardware for Rosemount 848T		20	
B	Mounting hardware for Rosemount 644H		20	
C	Mounting hardware for Rosemount 248H		20	
D	Mounting hardware for Rosemount 148H		20	
N	No transmitter hardware (terminal strips only)		20	
Code	**Enclosure type[(1)]**	**Material**	**IP rating**	**NEMA rating**
A	EEx d CENELEC Flameproof Approved (consult factory for availability)	Aluminum	65	NEMA 4
B	EEx e CENELEC Increased Safety Approval (consult factory for availability)	Aluminum	65	NEMA 4
C	EEx i Intrinsically Safety acc. EN 50014 and EN 50020 with manufacturer declaration for Ex i use in Zone 1	Aluminum	65	NEMA 4
D	Standard aluminum	Aluminum	65	NEMA 4
E	Standard polyester	Polyester	65	NEMA 4
S	Special enclosure type (Configuration Data Sheet required)			

Table 9. Rosemount 1080F Ordering Information

Code	Enclosure entry		
1	Single multi-core cable gland		
2	Multiple cable glands M20 x 1.5 (one per measurement point)		
3	Han-Plug connection IP65		
4	Customer specified (Configuration Data Sheet required)		
Code	**Thermowell material**	**Maximum temperature**	
		°C	**°F**
D	Stainless steel - DIN 1.4404 (ANSI 316L)	450	842
P	Heat resistant steel–DIN 1.7380 (ANSI 182-F22)	800	1472
S	Special tube material - customer specified (Configuration Data Sheet required)	Consult factory	
N	No thermowell		
Code	**Thermowell diameter**		
A	Standard–see Table 7		
C	Customer specified (Configuration Data Sheet required)		
Code	**Immersion length "U"**		
01000	1000 mm (39 inch)	Note: Length code is in mm. To convert to mm multiply the length in inches by 25.4.	
02000	2000 mm (79 inch)		
03000	3000 mm (118 inch)		
05000	5000 mm (197 inch)		
07000	7000 mm (276 inch)		
10000	10000 mm (394 inch)		
XXXXX	Other length maximum 10000mm (394 inch with thermowell) (maximum 30000 mm (1181 inch) without thermowell–laminated and radial spring designs only)		
Code	**Measurement point distribution**		
A	Equally distributed points (last point placed approx 50 mm from the bottom of the thermowell)		
C	Customer specified (Configuration Data Sheet required)		
Code	**First measurement point location–distance from base of mounting flange**		
00500	500 mm (20 in)		
01000	1000 mm (39 in)		
02000	2000 mm (79 in)		
Code	**First measurement point location–distance from base of mounting flange**		
03000	3000 mm (118 in)		
04000	4000 mm (158 in)		
XXXXX	Other lengths		

Table 9. Rosemount 1080F Ordering Information

Code	Mounting style–flange material= DIN 1.4404 (ANSI 316L)	Process connection
F36	Flanged, ANSI	2-in. Class 300 RF
F74	Flanged, ANSI	2 1/2-in. Class 300 RF
F76	Flanged, ANSI	3-in. Class 300 RF
F54	Flanged, ANSI	2-in. Class 600 RF
F78	Flanged, ANSI	2 1/2-in. Class 600 RF
F80	Flanged, ANSI	3-in. Class 600 RF
F72	Flanged, ANSI	2-in. Class 900 RF
F82	Flanged, ANSI	2 1/2 -in. Class 900 RF
F84	Flanged, ANSI	3-in. Class 900 RF
D26	Flanged, DIN	DN 50 PN 25/40
CDS	Customer specified (Configuration Data Sheet required)	
Code	**Additional options**	
	Special tagging and configuration options	
C1[2]	Customer specified tagging and transmitter configuration (Configuration Data Sheet required)	
	Thermowell options	
Q8	Thermowell material certification, DIN EN 10204 3.1.B	
R01	Thermowell pressure testing	
R03	Thermowell dye penetration testing	
R07	Full penetration weld	
R16	Ring joint flange (ASME B16.5 ANSI flanged thermowells only)	
	Process connection options	
P01	Leak check valve	
Typical model number: 1080F 2 J1 08 A D 1 D A 01000 A 00500 F36 R01 P01		

1. Transmitter must be ordered separately.
2. Shipped with default numbered tagging of all measurement points. The first measurement point (closest to the enclosure) is tag "1." If other configuration is required, order option code C1.

Rosemount 1080F Configuration Data Sheet (CDS)

Page one

Copy this form, complete it as required, and fax it to the appropriate fax number listed on the next page

Customer name: _____

Address: _____

Contact person: _____

Phone: _____ Fax: _____

Date: _____ Number of pages: _____

Rosemount order / Quote number: _____

Model number: _____

Enclosure type:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement: _____

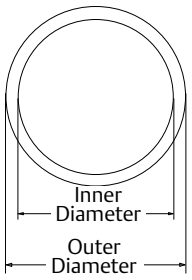
_____

Enclosure entry:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement: _____

_____

Thermowell material:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement:
  - ❑ DIN 1.4401 [ANSI 316]
  - ❑ DIN 2.4816 [ASTM A494 (Alloy)]
  - ❑ Other: _____

Thermowell diameter:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement:
  - ❑ Dimensions in millimeters
  - ❑ Dimensions in inches
  - Outer diameter: _____
  - Inner diameter: _____



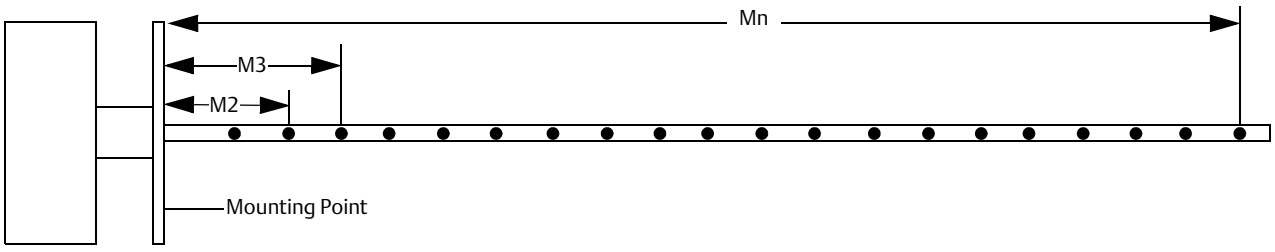
Mounting style:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement:
  - ❑ Flange rating: _____
  - ❑ Flange material:
    - ❑ DIN 1.4401 [ANSI 316]
    - ❑ DIN 2.4816 [ASTM A494 (Alloy)]
    - ❑ Other: _____

Page two

Measurement point distribution:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement (fill in table below)

Tagging:
- ❑ Default
- ❑ Special requirement (fill in table below)– use with option code C1.

Point	Distance from mounting point	Point tag	Transmitter tag	Transmitter range
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				



Rosemount 1082R RTD Multipoint Sensor– Contacting Fixture Design

The Rosemount 1082R Multipoint Sensor is a robust sensor with a long life expectancy. The individual measurement elements are resistance elements. The standard is a 4-wire RTD. The number of measurement points is restricted to 12. The Rosemount 1082R is used when a high local resolution is not required. These multipoint sensors can be ordered with or without thermowells.

The Rosemount 1082R is the best solution when data acquisition equipment requires an RTD output signal. However, a thermocouple multipoint sensor (such as the Rosemount 1080F) may be the optimal solution if transmitters are used (higher temperature range, more measurement points, same output). The Rosemount 1082R offers two different element fixation methods: the Radial Spring design and the Spacer Design.

Radial spring design

This design provides very good thermal contact between the RTD and the thermowell. A radial spring presses the RTD element against the inner wall of the thermowell ensuring the best possible response time (see Figure 6). If ordered without a thermowell, it will be shipped as a coil. The individual RTD elements cannot be replaced.

Spacer design

This design (see Figure 6) uses spacer disks to guide the resistance elements into position. The individual RTD elements are not replaceable. For shipping purposes, the spacer design, with or without a thermowell, cannot be coiled.

Thermowell

Every Rosemount 1082R requires a thermowell for operation. When the Rosemount 1082R is ordered without a thermowell, check the inner diameter of the existing thermowell (see Table 10). The inner wall of the thermowell must be smooth, especially at the welding joints, to ensure that the multipoint sensor will not be damaged by insertion.

Specifications

Functional

Number of measurement points

2 to 12

Temperature limits

-40 to 450 °C (-40 to 842 °F)

Physical

Physical dimensions

Table 10. Thermowell Required Diameters for the Radial Spring and Spacer Design

Number of Measurement point	O.D.		I.D.	
	mm	inch	mm	inch
2 to 8	73	2.9	59	2.3
9 to 12	88.9	3.5	73.7	2.9

Length limits

10 m (33 ft) with thermowell
30 m (99 ft) without thermowell– Radial Spring design only

Performance

Ambient temperature limits

For the enclosures and transmitters is –40 to 80 °C (–40 to 176 °F)

Insulation resistance

Greater than 1000 MOhms at room temperature, test voltage is 500 VDC

Accuracy

Table 11. Accuracy in Accordance to DIN EN 60751

Class	
A	±(0.15K+0.0020*|t|)
B	±(0.30K+0.0050*|t|)
"t" is the temperature in °C.	

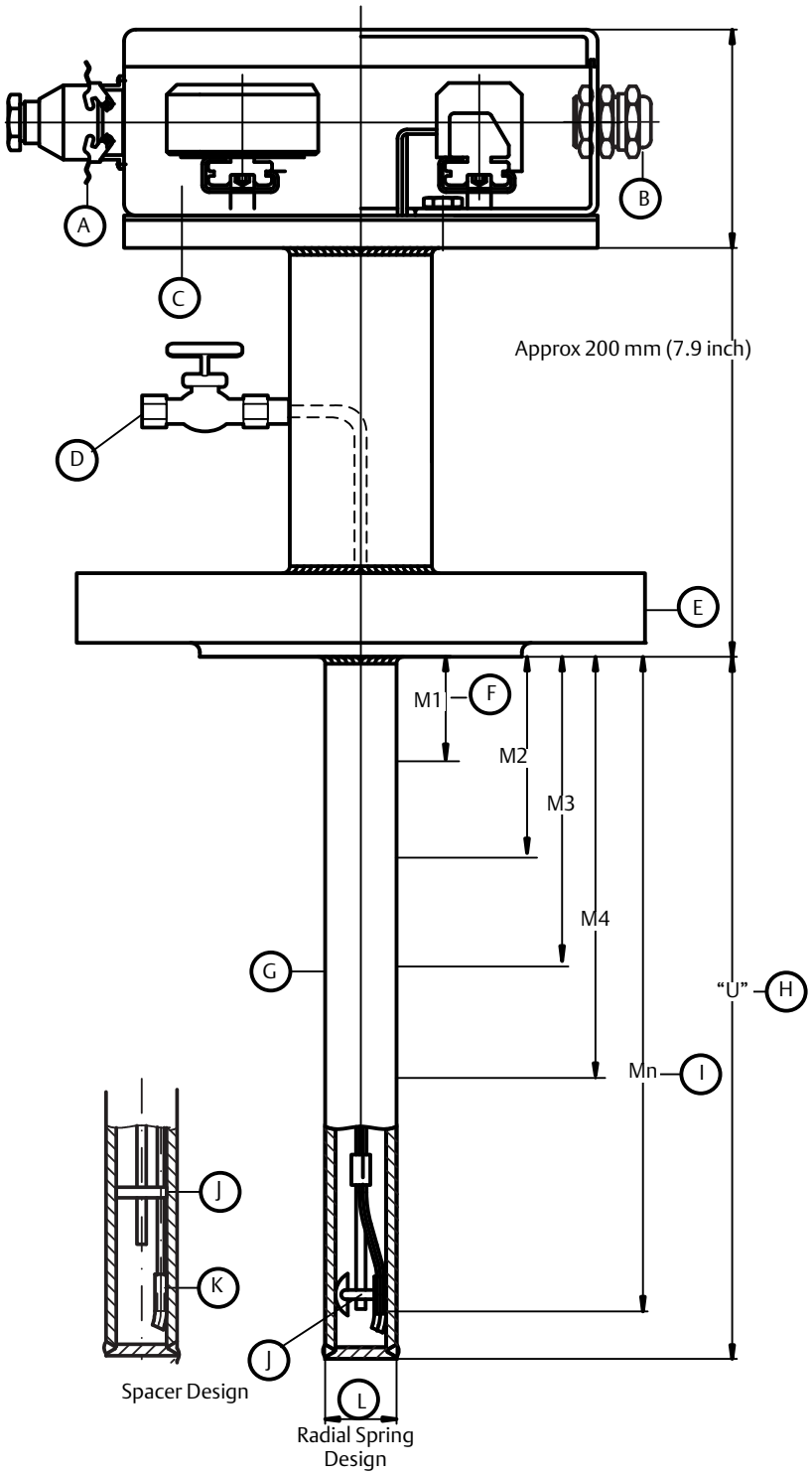
Enclosures

The enclosures are described in "Enclosures with mounting hardware" on page 29.

Individual sensor identification data

By default, sensor 1 is closest to the flange. Remaining points are numbered incrementally. Use the C1 option and the CDS if a different numbering system is desired.

Figure 6. Multipoint Sensor Rosemount 1082R, Radial Spring and Spacer Design (Pt 100 RTD)



A. Enclosure entry (Han-Plug connection)
B. Enclosure entry (Cable glands)
C. Enclosure type (see "Enclosures with mounting hardware" on page 29)
D. Leak check valve (optional)
E. Mounting style
F. First measurement point location
G. Thermowell material
H. Immersion length "U"
I. Number of measurement points
J. Element fixation method
K. Pt100 RTD
L. Thermowell outside diameter

Ordering Information

Table 12. Rosemount 1082R RTD Ordering Table

Model	Product description			
1082R	Rosemount 1082R RTD Multipoint Profiling Sensor–Contacting Fixture Design			
Code	**Element fixation method**			
1	Radial springs design			
2	Spacer design			
Code	**Sensor type**	**Operating temperature range**		
		°C	**°F**	
A	Pt100 Class A	–40 to 450	–40 to 842	
B	Pt100, Class B	–40 to 450	–40 to 842	
Code	**Number of measurement points**			
05	5			
08	8			
12	12			
XX	Other quantities (minimum. 02; maximum. 12)			
Code	**Transmitter mounting hardware[(1)]**	**Maximum measuring points**		
A	Mounting hardware for Rosemount 848T	12		
B	Mounting hardware for Rosemount 644H	12		
C	Mounting hardware for Rosemount 248H	12		
D	Mounting hardware for Rosemount 148H	12		
N	No transmitter hardware (terminal strips only)	12		
Code	**Enclosure type[(1)]**	**Material**	**IP rating**	**NEMA rating**
A	EEx d CENELEC Flameproof Approved (consult factory for availability)	Aluminum	65	NEMA 4
B	EEx e CENELEC Increased Safety Approval (consult factory for availability)	Aluminum	65	NEMA 4
C	EEx i Intrinsically Safety acc. EN 50014 and EN 50020 with manufacturer declaration for Ex i use in Zone 1	Aluminum	65	NEMA 4
D	Standard aluminum	Aluminum	65	NEMA 4
E	Standard polyester	Polyester	65	NEMA 4
S	Special enclosure type (Configuration Data Sheet required)			
Code	**Enclosure entry**			
1	Single multi-core cable gland			
2	Multiple cable glands M20 x 1.5 (one per measurement point)			
3	Han-Plug connection IP65			
4	Customer specified–consult factory (Configuration Data Sheet required)			

Table 12. Rosemount 1082R RTD Ordering Table

Code	Thermowell material	Maximum temperature	
		°C	°F
D	Stainless steel - DIN 1.4404 (ANSI 316L)	450	842
P	Heat resistant steel–DIN 1.7380 (ANSI 182-F22)	750	1382
S	Special tube material - customer specified (Configuration Data Sheet required)	Consult factory	
N	No thermowell		
Code	**Thermowell diameter**		
A	Standard (see Table 10)		
C	Customer specified (Configuration Data Sheet required)		
Code	**Immersion length "U"**		
01000	1000 mm (39 inch)	Note: Length code is in mm. To convert to mm multiply the length in inches by 25.4.	
02000	2000 mm (79 inch)		
03000	3000 mm (118 inch)		
05000	5000 mm (197 inch)		
07000	7000 mm (276 inch)		
10000	10000 mm (394 inch)		
XXXXX	Other lengths maximum 10000mm (394 in) with thermowell) (maximum 30000 without thermowell–radial spring design only)		
Code	**Measurement point distribution**		
A	Equally distributed points (last point placed approx 50 mm from the bottom of the thermowell)		
C	Customer specified (Configuration Data Sheet required)		
Code	**First measurement point location–distance from base of mounting flange**		
00500	500 mm (20 inch)		
01000	1000 mm (39 inch)		
02000	2000 mm (79 inch)		
03000	3000 mm (118 inch)		
04000	4000 mm (158 inch)		
XXXXX	Other lengths		
Code	**Mounting style–flange material= DIN 1.4404 (ANSI 316L)**	**Process connection**	
F36	Flanged, ANSI	2-in. Class 300 RF	
F74	Flanged, ANSI	2 1/2-in. Class 300 RF	
F76	Flanged, ANSI	3-in. Class 300 RF	
F54	Flanged, ANSI	2-in. Class 600 RF	
F78	Flanged, ANSI	2 1/2-in. Class 600 RF	
F80	Flanged, ANSI	3-in. Class 600 RF	
F72	Flanged, ANSI	2-in. Class 900 RF	

Table 12. Rosemount 1082R RTD Ordering Table

F82	Flanged, ANSI	2 1/2 -in. Class 900 RF
F84	Flanged, ANSI	3-in. Class 900 RF
D26	Flanged, DIN	DN 50 PN 25/40
CDS	Customer specified (Configuration Data Sheet required)	
Code	**Additional options**	
	Special tagging and configuration options	
C1[2]	Customer specified tagging (Configuration Data Sheet required)	
	Thermowell options	
Q8	Thermowell material certification, DIN EN 10204 3.1.B	
R01	Thermowell pressure testing	
R03	Thermowell dye penetration testing	
R07	Full penetration weld	
R16	Ring joint flange (ASME B16.5 ANSI flanged thermowells only)	
	Process connection options	
P01	Leak check valve	
Typical model number: 1082R 1 A 08 A D 1 D A 01000 A 00500 F36 R01		

1. Transmitter must be ordered separately.
2. Shipped with default numbered tagging of all measurement points. The first measurement point (closest to the enclosure) is tag "1." If other configuration is required, order option code C1.

Rosemount 1082R Configuration Data Sheet (CDS)

Page one

Copy this form, complete it as required, and fax it to the appropriate fax number listed on the next page

Customer name: _____

Address: _____

Contact person: _____

Phone: _____ Fax: _____

Date: _____ Number of pages: _____

Rosemount order / Quote number: _____

Model number: _____

Enclosure type:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement: _____

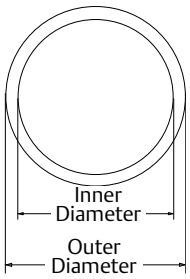
_____

Enclosure entry:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement: _____

_____

Thermowell material:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement:
  - ❑ DIN 1.4401 [ANSI 316]
  - ❑ DIN 2.4816 [ASTM A494 (Alloy)]
  - ❑ Other: _____

Thermowell diameter:
- ❑ Selected as Standard option in model structure
- ❑ Special requirement:
  - ❑ Dimensions in millimeters
  - ❑ Dimensions in inches
  - Outer diameter: _____
  - Inner diameter: _____



Mounting style:

❑ Selected as Standard option in model structure

❑ Special requirement: ❑ Flange rating: _____

❑ Flange material:

❑ DIN 1.4401 [ANSI 316]

❑ DIN 2.4816 [ASTM A494 (Alloy)]

❑ Other: _____

Page two

Measurement point distribution:

❑ Selected as Standard option in model structure

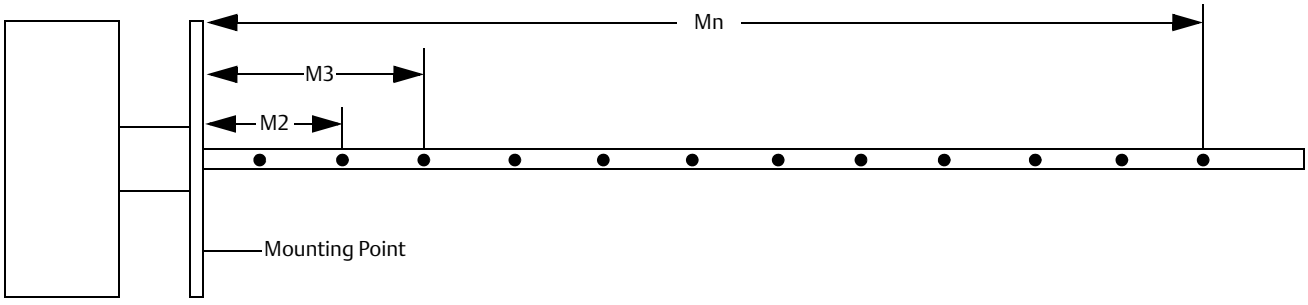
❑ Special requirement (fill in table below)

Tagging:

❑ Default

❑ Special requirement (fill in table below)– use with option code C1.

Point	Distance from mounting point	Point tag	Transmitter tag	Transmitter range
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				



Design overview

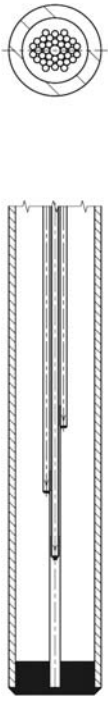
Compact design

The Compact Multipoint Sensor design is available in diameters from 2.5 mm (0.1 in.) to 40 mm (1.6 in.). Up to 60 measuring points can be monitored by this design using small diameter thermocouples in a single sheath. The high number of measurement points allows monitoring of temperature profiles with very good local resolution, making it the perfect solution for hot-spot detection in tall reactors or distillation columns. The compact design is available in two protection options, including bundled or insert tube. Insert tubes position the sensing elements in place and give mechanical stability to the sensor, but only give limited protection against the process medium.

Table 13. Available Insert Tube Outer Diameters

Diameter		Maximum measurement points
mm	inch	
3.5	0.14	25
4.5	0.18	30
5.0	0.20	40
6.0	0.24	60
8.0	0.32	60

Figure 7. Compact Design

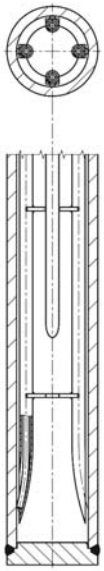


Guiding tube design

The Guide Tube Multipoint design is available with grounded or ungrounded thermocouples, and can be used for 1-in. pipes or above. Between two and eight mineral insulated grounded or ungrounded thermocouple sensors are inserted into individual guide tubes and fed to the specified measurement point. A slight bend at the tip of the measuring element ensures contact with the protection tube surface, giving optimum temperature response. Due to the construction of this design a minimum inner protection tube diameter of one inch is required and the maximum immersion length is limited to 10 m (32.8 ft.) even if no protection tube is required. RTD elements cannot be used in this design due to the physical constraints of bending the sheath.

Emerson Process Management offers this design with two different methods of mounting the elements inside the enclosure: sealed or unsealed. To ensure fast response time and a good thermal contact, two designs of spring loaded fittings are available, but the spring loaded fittings do not provide an environmental seal. Compression fittings provide an environment seal but this comes at the expense of good thermal contact. The protection tube size limits the number of measuring points as this design is not flexible and the guide tubes mounting and fixation need space. This makes this sensor a perfect solution for all profiling applications where lower local resolution is acceptable and a high process availability is needed.

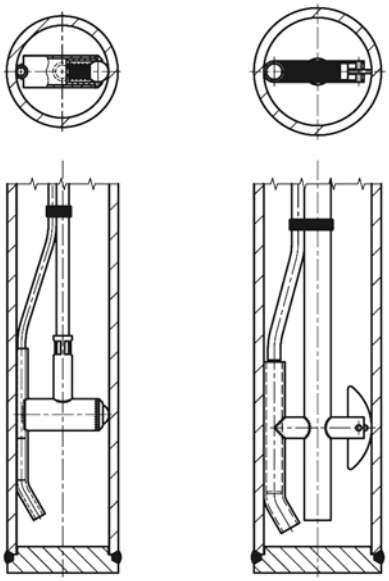
Figure 8. Guiding Tube Design



Radial spring design

The Radial Spring Multipoint design is available for diameters of 26 mm and above. This design uses between two and twenty flattened mineral insulated grounded or ungrounded thermocouples or RTD elements pressed against the inner wall of the protection tube by radial springs to provide better thermal contact with the process and ensure the best possible response time. The design of the spring loaded brace with angled blade and sliding head compensates for tube wall thickness and glides over obstacles in the tube for easy assembly. The head of the spring loaded brace is available in two different versions. The design shown in Figure 9 shows a ball at the end of the radial spring and is used if space is limited to inner protective diameters smaller then 30 mm (1.18 in.). This design is limited to a maximum length of 3 m (9.8 ft.). The design shown in Figure 9 uses a semicircular metal plate and is ideal in applications where enough space is available. Neither Radial Spring Multipoint design allows individual thermocouples to be replaced, but the entire sensor assembly can be replaced as one unit. This sensor design can be delivered with a maximum length of 30 m (98.4 ft.) as a coil if no protection tube is required. The maximum length is restricted to 10 m (32.8 ft.) if a protection tube is required that does not allow to coil the sensor for shipping.

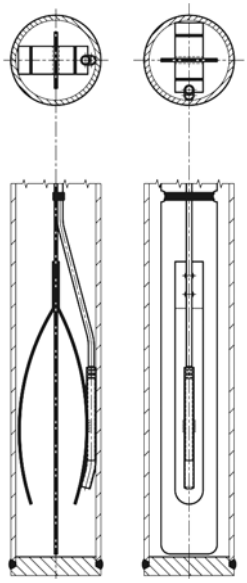
Figure 9. Radial Spring Design



Laminated spring design

The Laminated Spring Multipoint design is available for a maximum of 10 measuring points and is available in diameters of 40 mm (1.58 in.) and above. The laminated spring presses the thermocouple against the inner wall of the protection tube to provide good thermal contact between the thermocouple and the protection tube, enabling a fast time response. The advantage of this design is that the support framework is as flexible as an oil dipstick and can follow the contour of the protection tube even if the mounting flange is at an angle to the protection tube and the design can also be used in applications with high refractory wrapage. The individual thermocouples cannot be replaced in this design, but the entire sensor assembly can be replaced as one unit. This sensor design can be delivered with a maximum length of 30 m (98.4 ft.) as a coil if no protection tube is required. The maximum length is restricted to 10 m (32.8 ft.) if a protection tube is required that does not allow to coil the sensor for shipping.

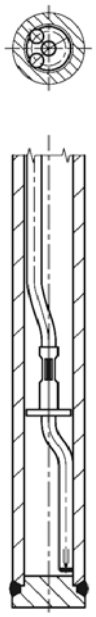
Figure 10. Laminated Spring Design



Spacer design

The Spacer Multipoint design is available for diameters of 18 mm (0.7 in.) and above making it the perfect solution for diameters where the laminated and radial spring design can not be used. This design uses spacer disks to guide and hold the tip of up to 10 measuring points measuring elements in position. The individual elements are permanently connected to the spacer disk and are not replaceable. The spacer disk design is primarily used in applications where response time is not critical or where the size of the protection tube prevents the use of a different design.

Figure 11. Spacer Design



Freely bendable design

The freely bendable multipoint design uses several MI-Cable thermocouple or RTD sensors that are inserted directly into the process or several compact design multipoint sensors inside an annealed protection tube. The individual MI cables allow three dimensional temperature measurements at high pressures with only one process penetration by passing the individual elements to any required position inside the reactor or vessel. Once the MI cables are passed through the process penetration, the sensors can be positioned to the desired three-dimensional array by simply bending the MI cable. This eliminates the need to have multiple horizontal or vertical straight-run multipoint sensors installed to accomplish the same effect. The drawback to this design is that it has limited pressure ratings.

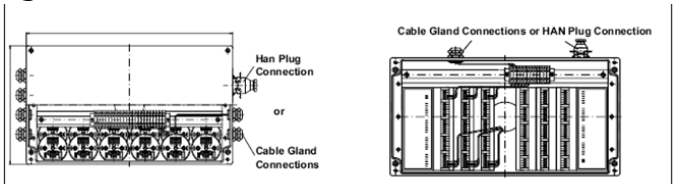
Other designs

Emerson offers various other designs that are specifically designed to customer applications. Contact an Emerson representative for more information.

Enclosures with mounting hardware

The drawings in Figure 12 show examples of junction boxes with different transmitter types and plugs. Transmitters must be ordered separately. The size of the junction is influenced by the number and type of transmitters or terminal strips.

Figure 12. Enclosures



Protection tube

Protection tubes are needed for most of the multipoint designs and function as a barrier between the measuring element and the process. The optimal size depends on the multipoint design and number of measuring points as well as on the process conditions. The choice of the material and wall thickness is absolutely crucial and has to be done according the process pressure, temperature and medium. The choice of the wrong material and sizes can lead to dramatically reduced sensor lifetimes and early failures. Protection tubes can be already installed or can be delivered by Emerson according application specifications.

Model examples

Figure 13. Radial Spring Multipoint Design

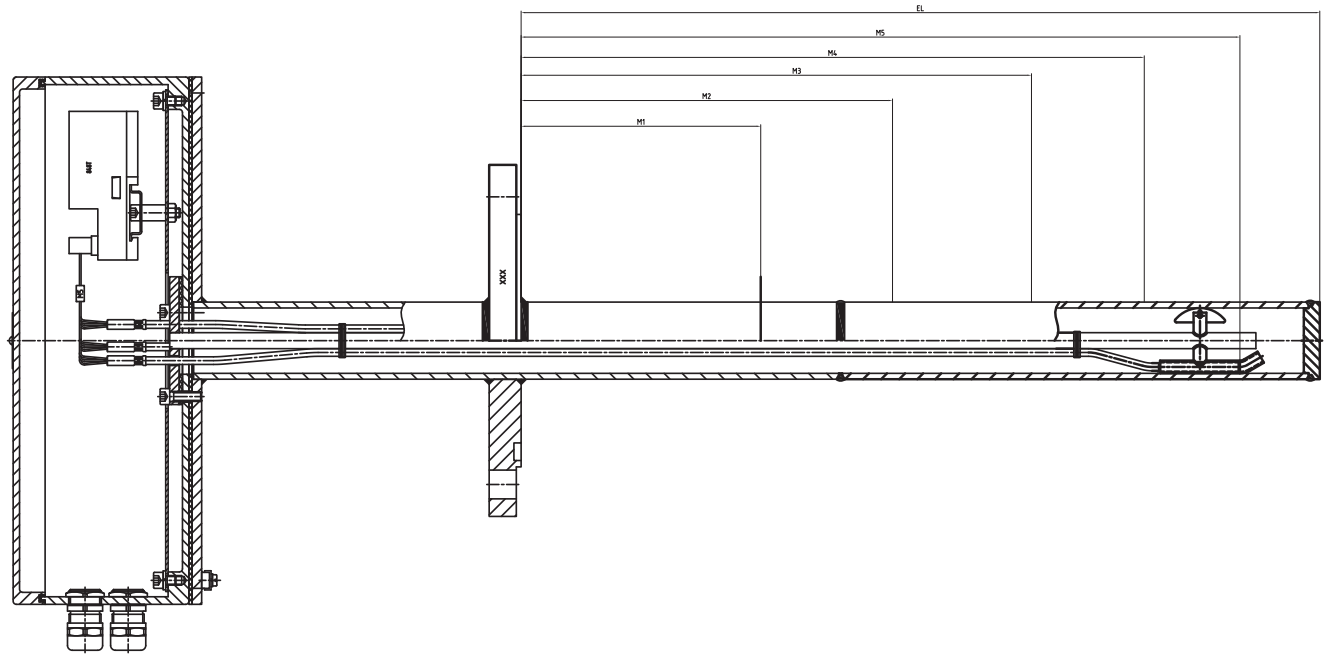


Figure 14. Compact Multipoint Design

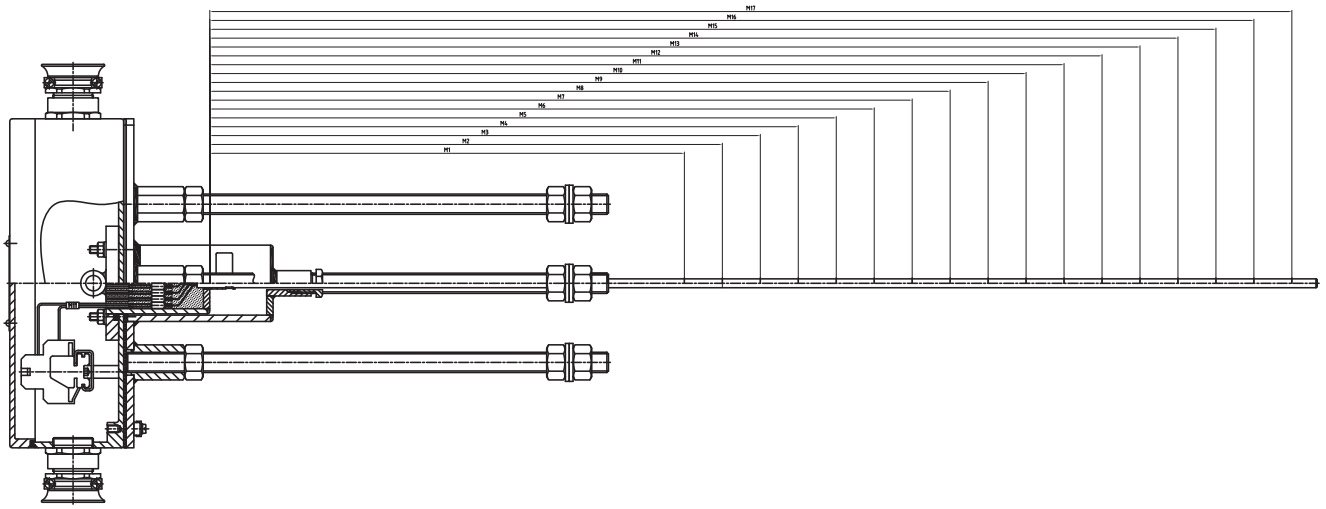


Figure 15. Laminated Spring Multipoint Design

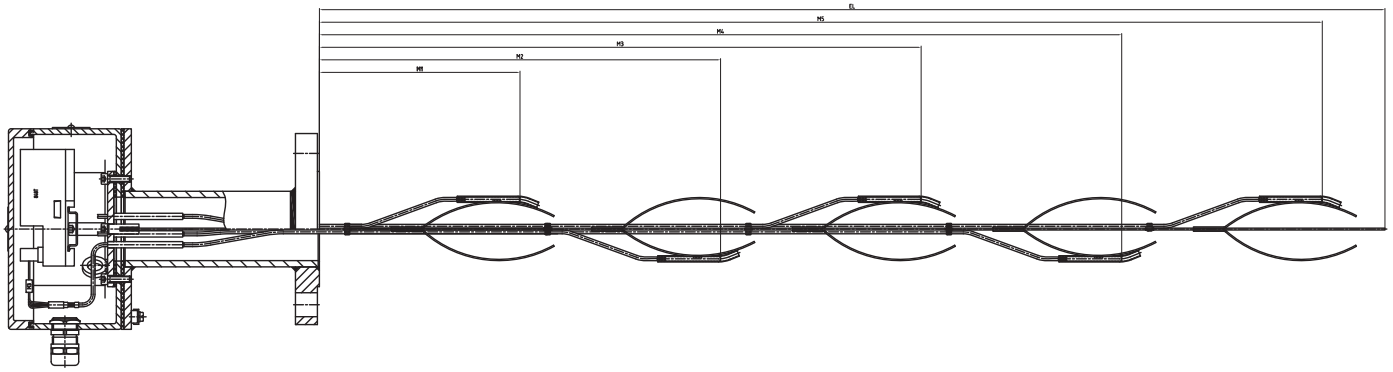
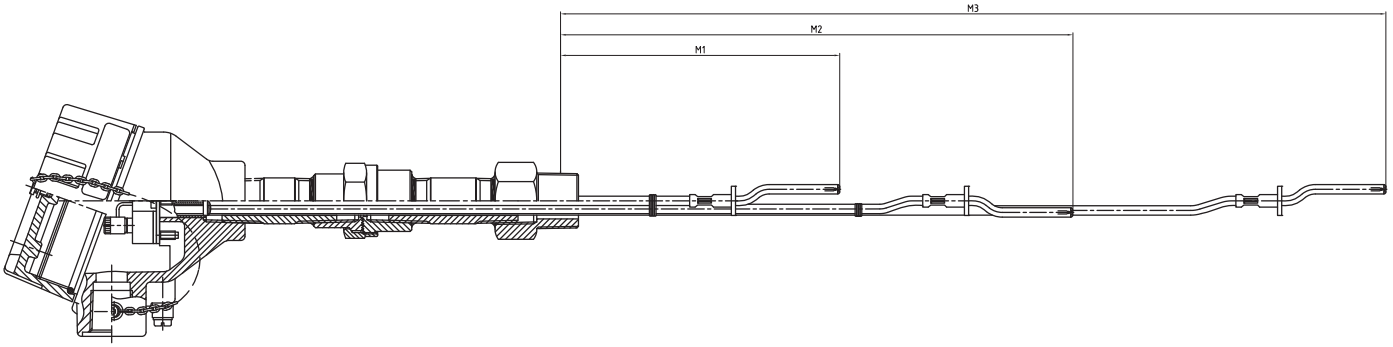


Figure 16. Spacer Multipoint Design



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