

precision

temperature

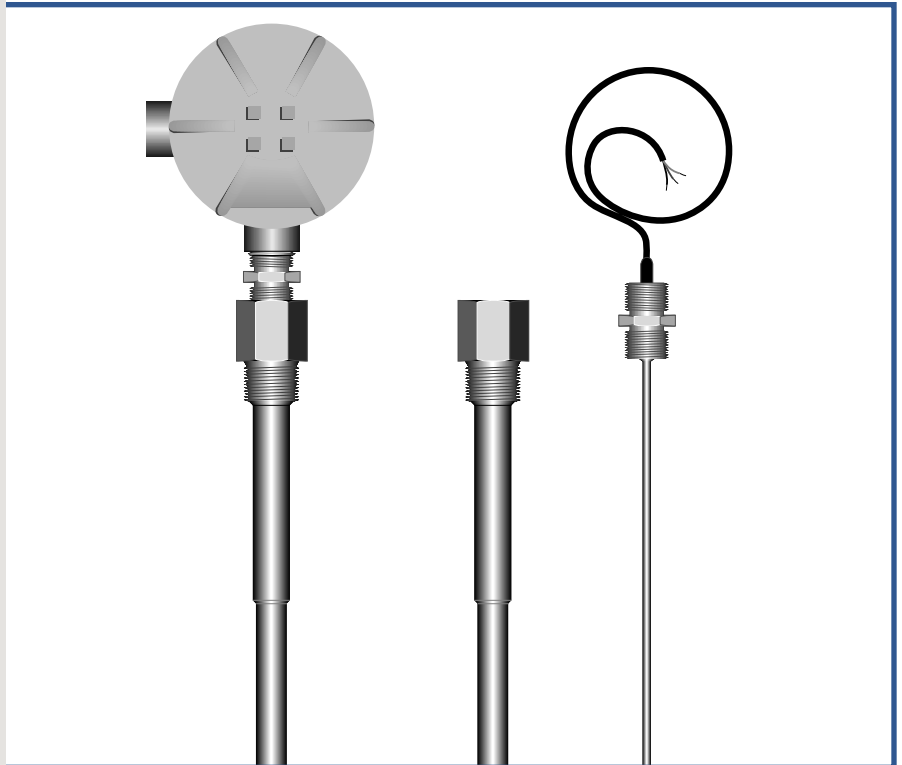
sensor/transmitter

Model TEM General Specification

TEM

Features

- ▶ RTD or 4–20 mA current output (linear)
- ▶ Factory calibrated over selected range
- ▶ Rugged design
- ▶ Thermowell included



EMCO's TEM platinum resistance temperature sensors measure process fluid temperature for most applications. The TEM uses a resistance temperature device (RTD) to measure process temperature. RTDs operate on the principle that the resistance of the sensing device is proportional to the temperature, producing a highly repeatable and exceptionally stable resistance versus temperature relationship.

The TEM may be selected with either a direct RTD output or with an industry standard 4-20 mA current output. The current output includes a preamplifier that is factory scaled and calibrated to one of several standard temperature ranges in either degrees Fahrenheit or Celsius.

The TEM is thermowell mounted to allow installation and removal without process shutdown. Several immersion lengths are available to accommodate a wide range of pipe sizes.



Engineering Measurements Company

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Performance Specifications

RTD Sensor

Accuracy (Ice Point)
 $\pm 0.12\%$ ($1000 \pm 1.2 \Omega$)

Interchangeability

Accuracy ± 0.9 °F or 0.8% (± 0.5 °C)

Stability

Better than ± 0.45 °F (± 0.25 °C) per year

Sensing Element Coefficient

$0.00385 \Omega/\Omega/^\circ\text{C}$

Preamplifier

Accuracy

$\pm 0.1\%$ of span

Ambient Temperature Effect

Zero..... $0.03 + 0.005\%$ of span per °C

Span..... $0.02 + 0.003\%$ of span per °C

Operating Specifications

Temperature Ranges

OUTPUT	PREAMPLIFIER MODEL SUFFIX CODE	TEMPERATURE RANGE
RTD Sensor	RTD	-40 to 800 °F (-40 to 426 °C)
Transmitter (4 to 20 mA)	T09	32 to 68 °F
	T10	0 to 250 °F
	T11	-40 to 150 °F
	T12	212 to 400 °F
	T13	212 to 500 °F
	T20	-17.7 to 121.1 °C
	T21	-40 to 65 °C
	T22	100 to 204 °C
	T24	100 to 260 °C
T23	100 to 426 °C	

Current

1 mA recommended, 2 mA maximum

Insulation Resistance

100 m Ω minimum at 300 VDC at 75 °F

Optional Preamplifier

Output

4 to 20 mA, 2-wire

Power Supply

24 VDC nominal, operable from 12 to 40 VDC

Load Resistance

600 at 24 VDC; depends upon power supply voltage

Ambient Temperature Limit

-30 to 160 °F (-34 to 71 °C)

Storage Temperature Limit

-60 to 185 °F (-51 to 85 °C)

Ambient Humidity Limit

0 to 100% relative humidity

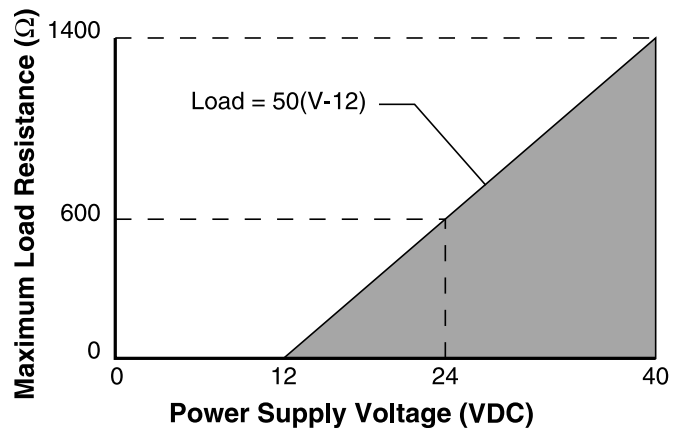
Thermowell Pressure Limit

3500 psig (241 barg) at 1140 °F (615 °C)

RTD Sensor

Output

3-wire RTD



Physical Specifications

Materials

Sensing Element

1000 Ω thin film platinum

RTD Sheath

316 stainless steel

Junction Box

Aluminum

Thermowell

316 stainless steel

Process Connection (Thermowell)

1/2" NPT

Electrical Connection

Junction box with terminal block for external wiring.

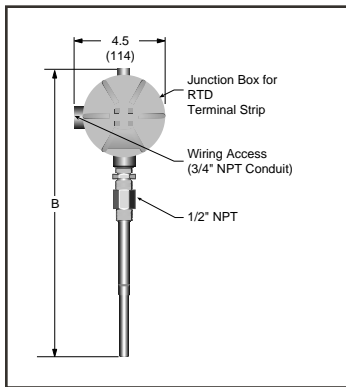
3/4" NPT female connection for conduit.

Weight (with 6" Thermowell)

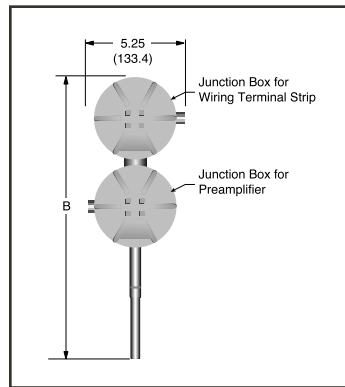
3 lb (1.4 kg)

Dimensions

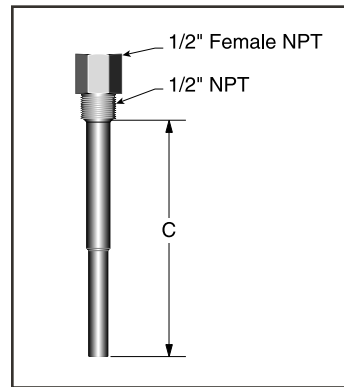
TEM Probe without Preamp



TEM Probe with Preamp



Thermowell



Note
Dimensions are in inches (millimeters).

Dimensions Table

THERMOWELL LENGTH MODEL SUFFIX CODE	B w/o PREAMP in. (mm)	B w/ PREAMP in. (mm)	C in. (mm)
2"	10.5 (266.7)	15 (292.1)	2 (51)
3"	11.5 (292.1)	16 (406.4)	3 (76)
4"	12.5 (317.5)	17 (431.8)	4 (102)
6"	14.5 (368.3)	19 (482.6)	6 (152)

THERMOWELL LENGTH MODEL SUFFIX CODE	B w/o PREAMP in. (mm)	B w/ PREAMP in. (mm)	C in. (mm)
8"	16.5 (419.1)	21 (533.4)	8 (203)
10"	18.5 (469.9)	23 (584.2)	10 (254)
12"	20.5 (520.7)	25 (635)	12 (305)

Model and Suffix Codes

CATEGORY	DESCRIPTION	SUFFIX CODES
<i>Model</i>	Precision RTD with thermowell	TEM-30
<i>Preamplifier (Temperature Range)</i>	None (RTD output only)	... RTD
	Preamplifier scaled from: 32 to 68°F (liquid or gas)	... T09
	Preamplifier scaled from: 0 to 250°F (liquid or gas)	... T10
	Preamplifier scaled from: -40 to 150°F (liquid or gas)	... T11
	Preamplifier scaled from: 212 to 400°F (liquid or gas)	... T12
	Preamplifier scaled from: 212 to 500°F (steam)	... T14
	Preamplifier scaled from: 212 to 800°F (steam)	... T13
	Preamplifier scaled from: -17.7 to 121.1°C (liquid or gas)	... T20
	Preamplifier scaled from: -40 to 65°C (liquid or gas)	... T21
	Preamplifier scaled from: 100 to 204°C (steam)	... T22
	Preamplifier scaled from: 100 to 260°C (liquid or gas)	... T24
	Preamplifier scaled from: 100 to 426°	... T23
	Transmitters can be scaled to accommodate special requests and bar scaling	... TXX
<i>Thermowell Length</i>	2" thermowell length 2 ...
	3" thermowell length 3 ...
	4" thermowell length 4 ...
	6" thermowell length 6 ...
	8" thermowell length 8 ...
	10" thermowell length 10 ...
	12" thermowell length 12 ...
<i>RTD wires (internal)</i>	Teflon, -4 to 400°F (-40 to 204°C) T
	Fiberglass, 150-800°F (65 to 427°C) F

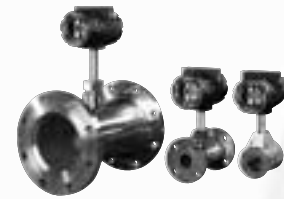
Example

→ TEM-30-T13-6-F

Providing innovative flowmeter products and services for over three decades . . .

Engineering Measurements Company (EMCO) is a long established manufacturer of precision flowmeters for liquid, gas, and steam applications for commerce and industry. Manufactured under an ISO 9001 certified quality system, which includes extensive flow calibration capability, engineering, applications, and service, underpinning a world-wide sales and service organization totally focused on providing the best flowmeters and customer service in the industry.

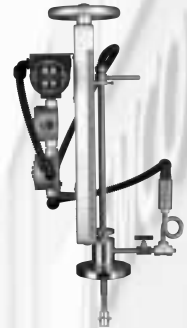
- ▶ Manufacturing is housed in a modern plant located in Longmont, Colorado
- ▶ Modern clean-room, mechanized assembly equipment, and computer based testing ensure the highest quality product
- ▶ Trained professional flow specialists and technicians offer timely customer assistance
- ▶ Factory trained and certified field technicians provide product support services



Vortex PhD™ Inline Vortex



V-Bar™
Insertion
Vortex



Turbo-Bar™
Insertion
Turbine



MAGFLO® Electromagnetic



PDH Helix



PDP Piston



Sono-Trak™



P/N 990103 Rev.G

Specifications subject to change without notice

Engineering Measurements Company

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