# SCC Inc.

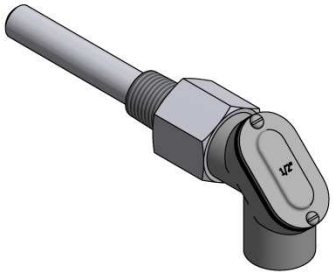
## Technical Instructions

Document No. SEN-1000

July 18, 2018

# QAx… Series

## QAC… QAE… QAM… 544…
## Temperature Sensors



## Description

QAx… and 544… temperature sensors are resistance temperature detectors (RTDs). RTDs work on the principal that the resistance of the sensing element changes as a direct function of the temperature.

## Features

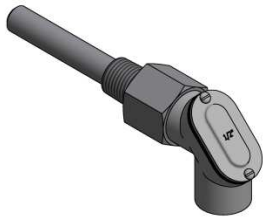
- Accurate and reliable indication of temperature
- Easy installation requiring no special tools
- Suitable for media -58 °F to 900 °F depending on model

## Application

QAx… and 544… sensors are used to measure water, steam, air, exhaust, or FGR temperature. A variety of sensors are available in order to meet the needs of different applications. QAx… and 544… temperature sensors are capable of reliably measuring temperatures as low as -58 °F or as high as 900 °F.

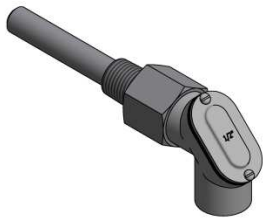
# Specifications

**QAE2012.001**



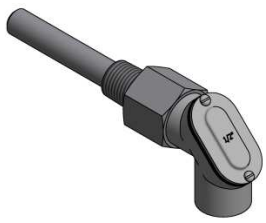
| | |
|---|---|
| Sensing element | Platinum, 1000 Ohm, 2-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -4 to 374 °F [-20 to 190 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 2.5” insertion, stainless steel |
| Weather head | Aluminum, 1/2” NPT |
| Primary use | Water / ambient air temperature sensor for LMV5x / RWF40 / RWF50 / RWF55 |

**QAE2020.001**



| | |
|---|---|
| Sensing element | Platinum, 100 Ohm, 3-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -4 to 374 °F [-20 to 190 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 2.5” insertion, stainless steel |
| Weather head | Aluminum, 1/2” NPT |
| Primary use | Water temperature sensor for LMV5x / RWF10 / RWF40 / RWF50 / RWF55 |

**QAE2020.005**



| | |
|---|---|
| Sensing element | Nickel, 1000 Ohm, 2-wire |
| Characteristic | LG (see Appendix A, page 13) |
| Operating temperature | -13 to 266 °F [-25 to 130 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 2.5” insertion, stainless steel |
| Weather head | Aluminum, 1/2” NPT |
| Primary use | Water / ambient air temperature sensor for LMV5x / RWF40 / RWF55 |

# Specifications (continued)

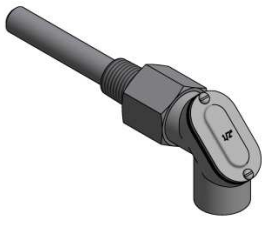
**QAE2020.010**

| | |
|---|---|
| Sensing element | Nickel, 1000 Ohm, 2-wire |
| Characteristic | LG (see Appendix A, page 13) |
| Operating temperature | -13 to 266 °F [-25 to 130 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 4” insertion, stainless steel |
| Weather head | Aluminum, 1/2” NPT |
| Primary use | Water / ambient air temperature sensor for LMV5x / RWF40 / RWF55 |

**QAE2020.015**

| | |
|---|---|
| Sensing element | Nickel, 1000 Ohm, 2-wire |
| Characteristic | LG (see Appendix A, page 13) |
| Operating temperature | -13 to 266 °F [-25 to 130 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 6” insertion, stainless steel |
| Weather head | Aluminum, 1/2” NPT |
| Primary use | Water / ambient air temperature sensor for LMV5x / RWF40 / RWF55 |

**544-577-25**



| | |
|---|---|
| Sensing element | Platinum, 1000 Ohm, 2-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -40 to 240 °F [-40 to 116 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 2.5” insertion, stainless steel |
| Weather head | Aluminum, 1/2” NPT |
| Primary use | Water / ambient air temperature sensor for LMV5x / RWF40 / RWF55 |

# Specifications (continued)

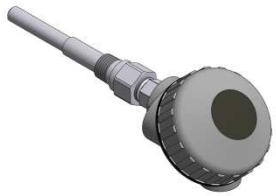
**544-577-40**

| | |
|---|---|
| Sensing element | Platinum, 1000 Ohm, 2-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -40 to 240 °F [-40 to 116 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 4” insertion, stainless steel |
| Weather head | Aluminum, 1/2” NPT |
| Primary use | Water / ambient air temperature sensor for LMV5x / RWF40 / RWF55 |

**544-577-60**

| | |
|---|---|
| Sensing element | Platinum, 1000 Ohm, 2-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -40 to 240 °F [-40 to 116 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 6” insertion, stainless steel |
| Weather head | Aluminum, 1/2” NPT |
| Primary use | Water / ambient air temperature sensor for LMV5x / RWF40 / RWF55 |

**QAE2012.903**



| | |
|---|---|
| Sensing element | Platinum, 100 Ohm, 3-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -58 to 900 °F [-50 to 482 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 4” insertion, stainless steel |
| Weather head | Aluminum, 3/4” NPT |
| Primary use | Water / steam temperature sensor for LMV5x / RWF10 / RWF40 / RWF50 / RWF55 |
| Accessories | **QAE-AC-903P:** 0-900° to 4-20 mA transmitter |

# Specifications (continued)

### QAE2012.9002

| | |
|---|---|
| Sensing element | Platinum, 1000 Ohm, 2-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -58 to 900 °F [-50 to 482 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | 1/2” NPT on thermowell |
| Thermowell | 4” insertion, stainless steel |
| Weather head | Aluminum, 3/4” NPT |
| Primary use | Water / steam temperature sensor for LMV5x / RWF10 / RWF40 / RWF50 / RWF55 |
| Accessories | **QAM-AC-210:** 0-480° to 4-20 mA transmitter |

### QAC22

| | |
|---|---|
| Sensing element | Nickel, 1000 Ohm, 2-wire |
| Characteristic | LG (see Appendix A, page 13) |
| Operating temperature | -58 to 158 °F [-50 to 70 °C] |
| Accuracy | See Appendix A, page 14 |
| Process connection | None |
| Thermowell | None |
| Weather head | Integral, hole for M16 connection |
| Primary use | Ambient air temperature sensor for LMV52 / RWF40 / RWF55 |

### QAM-P206

| | |
|---|---|
| Sensing element | Platinum, 1000 Ohm, 2-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -58 to 900 °F [-50 to 482 °C] |
| Accuracy | See Appendix A, page 14 |
| Probe | 1/4” diameter, 6” long, stainless steel |
| Process connection | 1/2” NPT |
| Thermowell | None |
| Weather head | Aluminum, 3/4” NPT |
| Primary use | Stack or FGR temperature sensor for LMV52 |
| Accessories | **QAM-AC-210:** 0-480° to 4-20 mA transmitter |

# Specifications (continued)

**QAM-P210**

| | |
|---|---|
| Sensing element | Platinum, 1000 Ohm, 2-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -58 to 900 °F [-50 to 482 °C] |
| Accuracy | See Appendix A, page 14 |
| Probe | 1/4” diameter, 10” long, stainless steel |
| Process connection | 1/2” NPT |
| Thermowell | None |
| Weather head | Aluminum, 3/4” NPT |
| Primary use | Stack temperature sensor for LMV52 |
| Accessories | **QAM-AC-210:** 0-480° to 4-20 mA transmitter |

**QAM-P310**

| | |
|---|---|
| Sensing element | Platinum, 100 Ohm, 3-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -58 to 900 °F [-50 to 482 °C] |
| Accuracy | See Appendix A, page 14 |
| Probe | 1/4” diameter, 10” long, stainless steel |
| Process connection | 1/2” NPT |
| Thermowell | None |
| Weather head | Aluminum, 3/4” NPT |
| Primary use | Stack temperature sensor for LMV52 |
| Accessories | **QAE-AC-903P:** 0-900° to 4-20 mA transmitter |

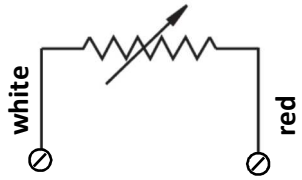
**QAM-P224**

| | |
|---|---|
| Sensing element | Platinum, 1000 Ohm, 2-wire |
| Characteristic | 385 (see Appendix A, page 12) |
| Operating temperature | -58 to 900 °F [-50 to 482 °C] |
| Accuracy | See Appendix A, page 14 |
| Probe | 1/4” diameter, 24” long, stainless steel |
| Process connection | 1/2” NPT |
| Thermowell | None |
| Weather head | Aluminum, 3/4” NPT |
| Primary use | Stack or FGR temperature sensor for LMV52 |
| Accessories | **QAM-AC-210:** 0-480° to 4-20 mA transmitter |

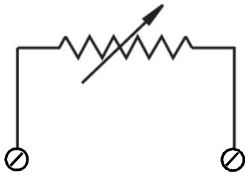
# Wiring

**QAE2012.001, QAE2020.005, QAE2020.010, QAE2020.015, 544-577-25, 544-577-40, 544-577-60**

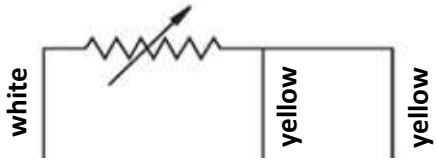

**QAE2012.9002, QAM-P206, QAM-P210, QAM-P224**



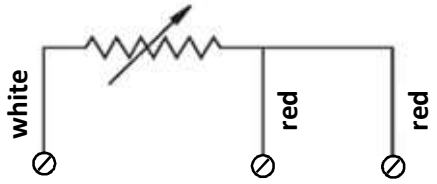

**QAC22**



**QAE2020.001**




**QAE2012.903, QAM-P310**




| | | | |
|---|---|---|---|
| G1+ | M1 | I1 | RWF40… water / steam |
| 3 | 4 | 5 | RWF10… water / steam |
| 11 | 12 | 14 | RWF55… water / steam |
| 11 | 12 | 13 | RWF50… water / steam |
| X60.1 | X60.2 | X60.4 | LMV5x… water / steam |

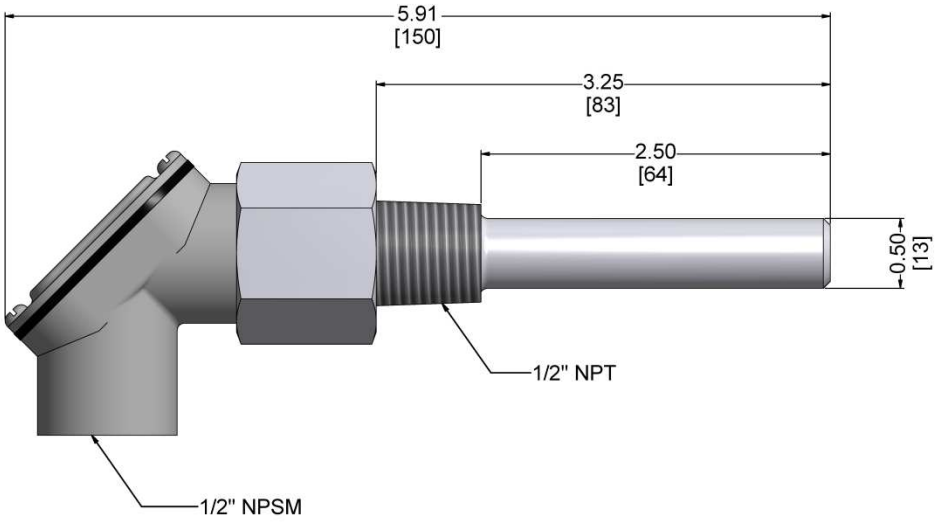
| | | |
|---|---|---|
| G1+ | M1 | RWF40… water / steam |
| B9 | M9 | RWF40… ambient air |
| 11 | 14 | RWF55… water / steam |
| 31 | 32 | RWF55… ambient air |
| 11 | 13 | RWF50… water / steam |
| X60.3 | X60.4 | LMV5x… water / steam |
| X86.1 | X86.2 | LMV52… exhaust |
| X87.1 | X87.2 | LMV52… ambient air |

Note: There is no polarity when wiring a 2-wire RTD.

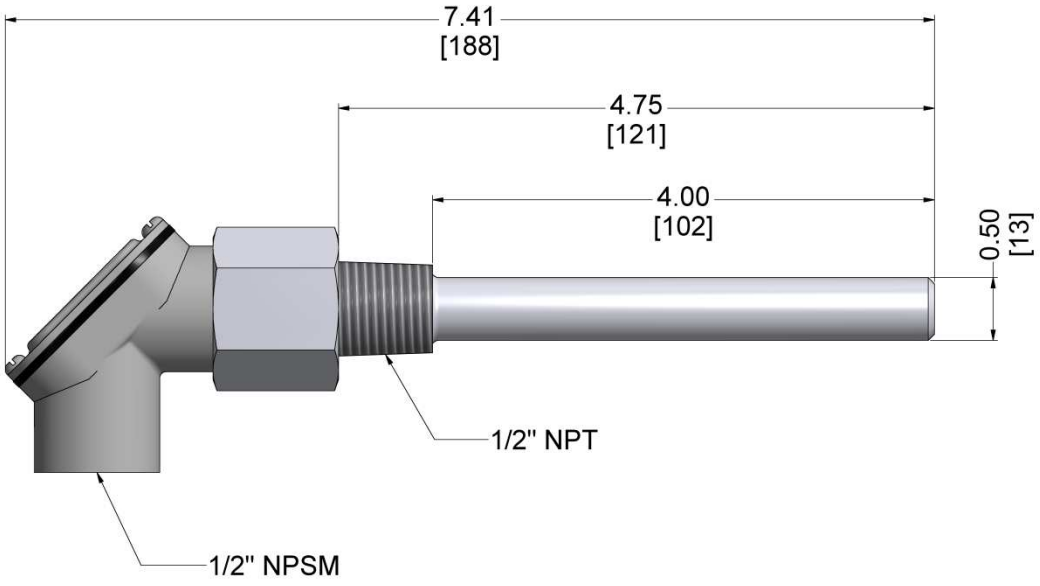
# Dimensions

Dimensions in inches; millimeters in brackets

QAE2012.001, QAE2020.001, QAE2020.005, 544-577-25



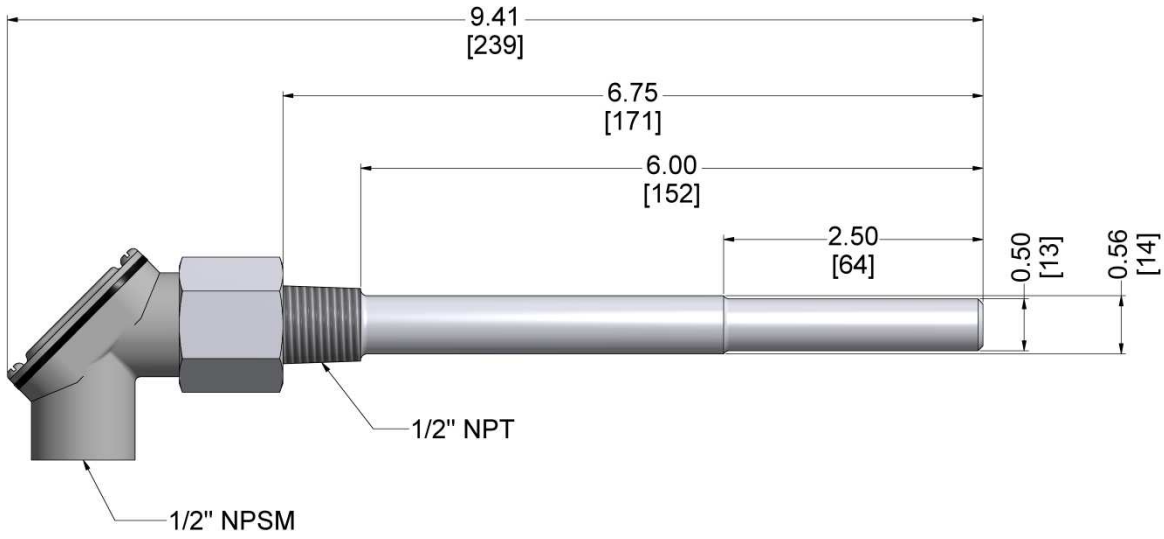

QAE2020.010, 544-577-40



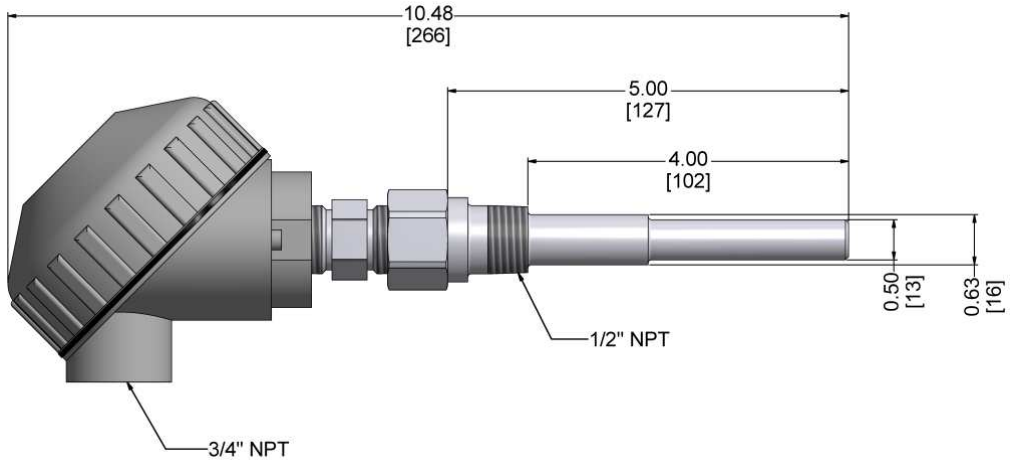
# Dimensions (continued)

Dimensions in inches; millimeters in brackets

QAE2020.015, 544-577-60



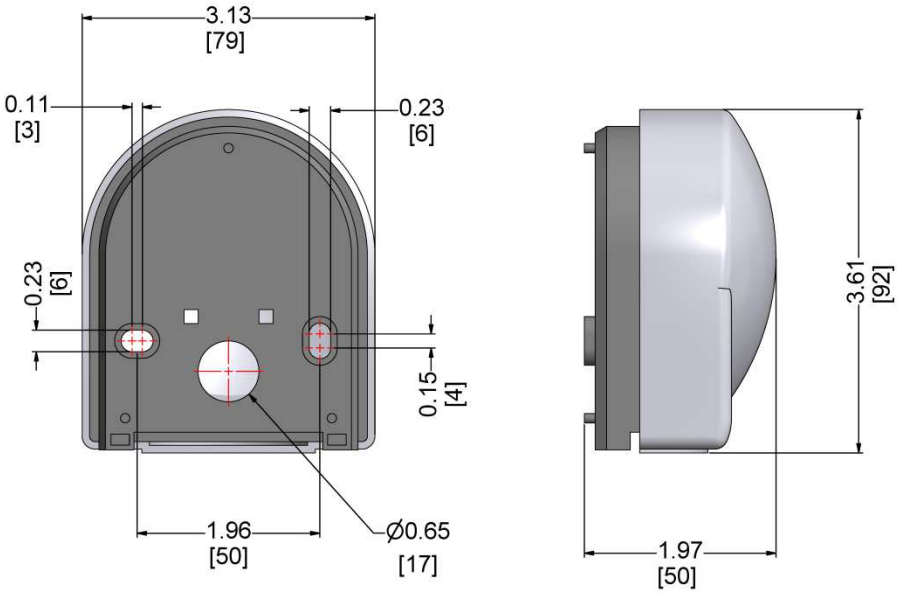

QAE2012.903, QAE2012.9002



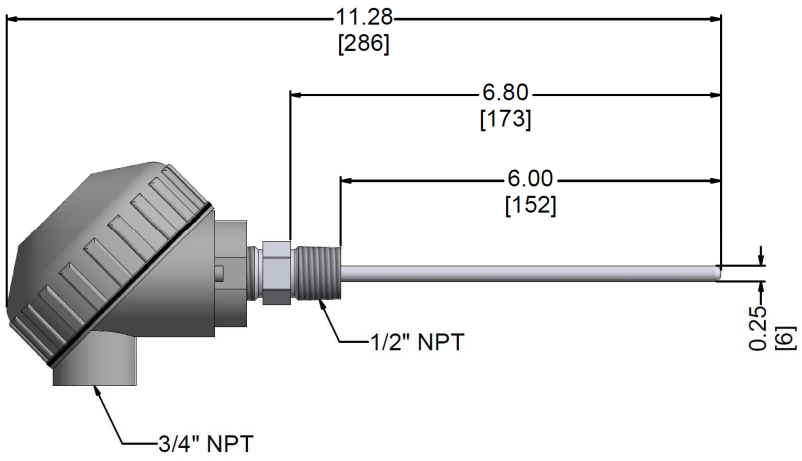
# Dimensions (continued)

Dimensions in inches; millimeters in brackets

QAC22

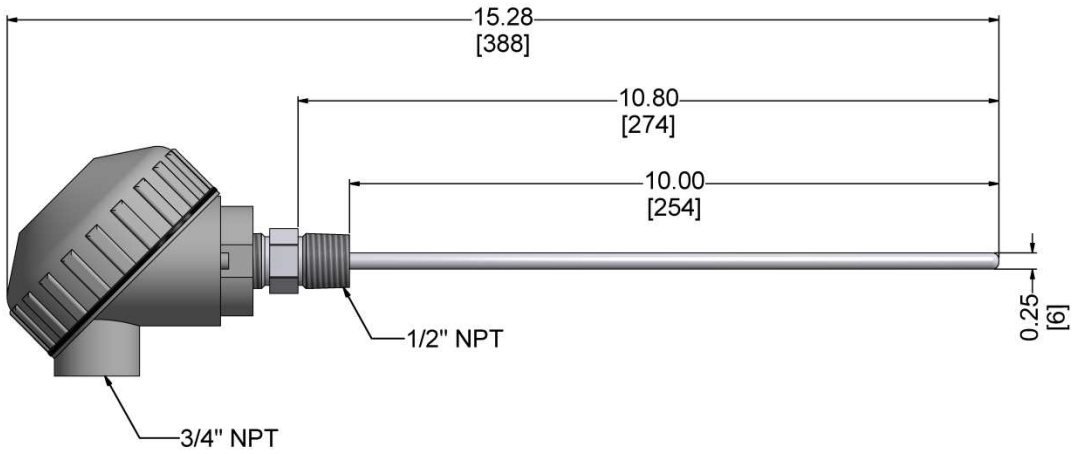



QAM-P206

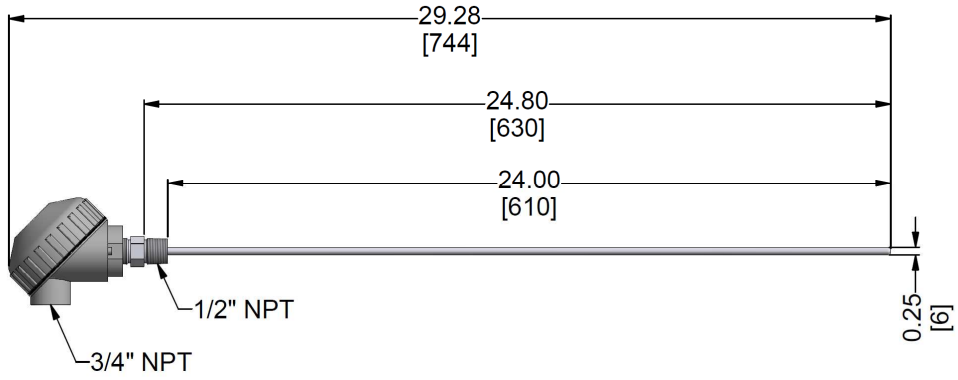


# Dimensions (continued)

QAM-P210, QAM-P310



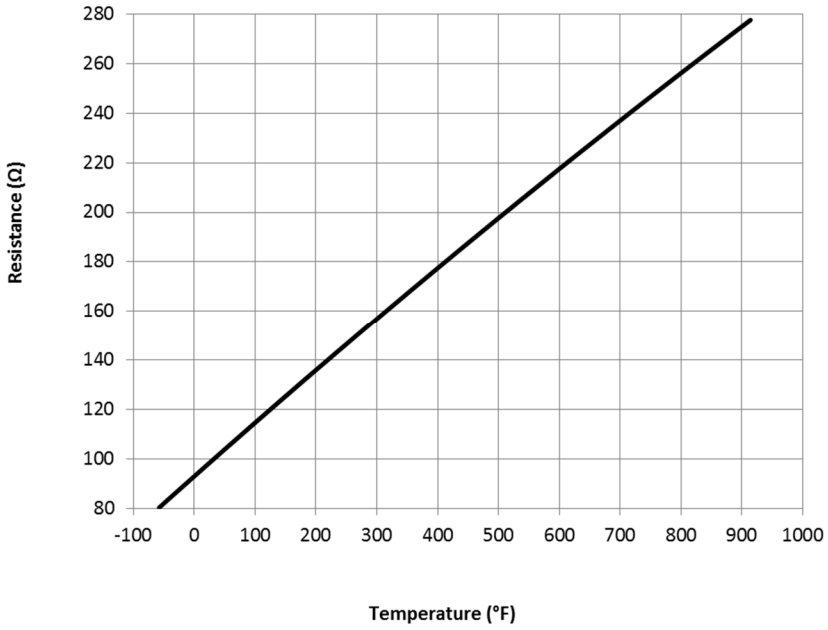

QAM-P224



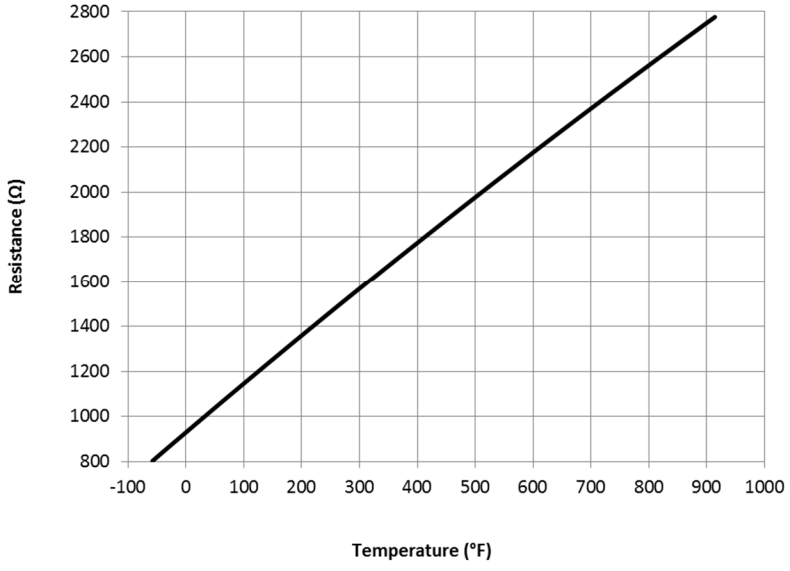
# Appendix A

## Resistance vs. Temperature Charts

### Pt100, 385 characteristic (QAE2012.903, QAE2020.001, QAM-P310)



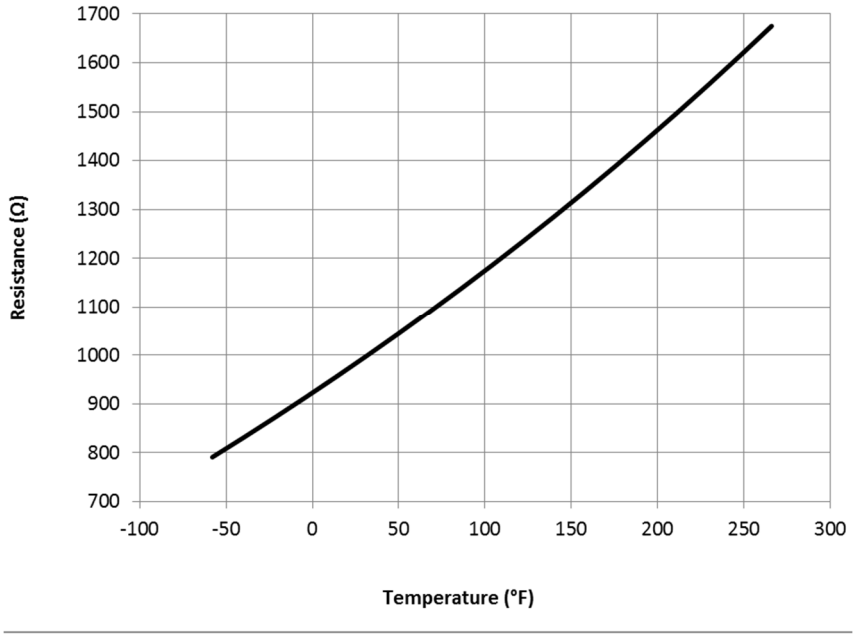

### Pt1000, 385 characteristic (QAE2012.001, 544-577-25, 544-577-40, 544-577-60, QAE2012.9002, QAM-P206, QAM-P210, QAM-P224)



# Appendix A (continued)

## Resistance vs. Temperature Charts

### Ni1000, LG characteristic (QAE2020.005, QAE2020.010, QAE2020.015, QAC22)



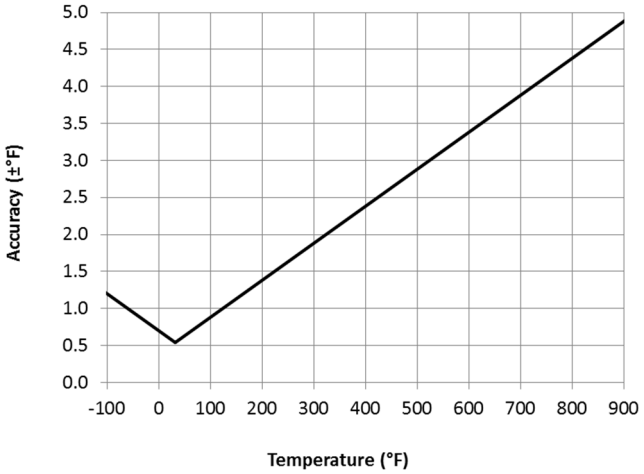
# Appendix A (continued)

## Accuracy

### Pt100 and Pt1000 Sensors (QAE2012.001, QAE2020.001, 544-577-25, 544-577-40, 544-577-60, QAE2012.903, QAE2012.9002, QAM-P206, QAM-P210, QAM-P310, QAM-P224)

Accuracy = ± [0.54 + (0.005 x |T - 32|)]

T = Temperature in degrees Fahrenheit




### Ni1000 Sensors (QAE2020.005, QAE2020.010, QAE2020.015, QAC22)

For T < 32: Accuracy = ± [0.72 + (0.028 x |T - 32|)]
For T > 32: Accuracy = ± [0.72 + (0.007 x |T - 32|)]

T = Temperature in degrees Fahrenheit