

HQS-TC1 Thermocouple Interface Module



FEATURES

- Allows PTE-1 and ST-2H to measure temperature with a thermocouple
- Pre-programmed to accept the 8 most common thermocouple types
- Selectable units of measure: °C, °F, °K, °R and millivolts
- Automatic or manually selectable resolution to 1°, .1° or .01°
- Provides auto internal or manual external reference junction settings

Well known as the industry leader in precision field and laboratory pressure measurement, the Heise® PTE-1 handheld calibrator and ST-2H digital indicator can now be equipped for thermocouple temperature measurement as well.

By simply inserting the HQS-TC1 interface module, a thermocouple measuring device can be attached to the calibrator for a variety of temperature measurement applications.

The HQS-TC1 thermocouple interface module further expands the utility of both the PTE-1 and ST-2H, making them among the most useful and versatile measuring instruments available.

PRODUCT SPECIFICATIONS

Model

Designation: HQS-TC1

Thermocouple

Compatibility: With the HQS-TC1 interface module installed, the PTE-1 and ST-2H contain programming to read types J, K, T, E, R, S, B and N thermocouples and display the measurement in units of temperature measure or millivolts. Other types of thermocouples may also be read by using the direct millivolt readout.

Note: Firmware Version 3.01 (PTE-1) and 2.00 (ST-2H) required to operate HQS-TC1 (for older firmware versions, consult factory regarding base unit firmware upgrade).

Units of Measure

(selectable): °C, °F, °K, °R and millivolts.

Reference Junction

(selectable): Automatic Mode: The HQS-TC1 module incorporates an internal resistor/thermistor based reference junction, which may be selected for use in the temperature readout mode only.

Manual Mode: An external reference junction may be used in place of the internal junction. External reference junctions may be applied in the temperature or direct millivolt readout modes.

Resolution; Reading in Temp. Units

(selectable): 1, .1 or .01 degrees. Also includes "auto" mode selection that allows the PTE-1 and ST-2H to automatically configure the readout to the highest significant resolution (resolution closest to the tolerance) for the thermocouple type selected.

Resolution; Reading in Millivolts:

.001 millivolts.

Thermocouple Connection (to Interface Module):

Requires a "miniature thermocouple connector," (Omega® type SMP), specifically matched to the type thermocouple to be used. These connectors may be purchased as an accessory under the following part numbers:

Thermocouple Type	Heise P/N
J	828X161-01
K	828X161-02
T	828X161-03
E	828X161-04
R	828X161-05
S	828X161-06
B	828X161-07
N	828X161-08

HQS-TC1 Thermocouple Interface Module

SYSTEM ACCURACY (READING IN TEMPERATURE UNITS):

Includes the base unit and HQS-TC1 interface module. (Does not include inaccuracy of the thermocouple device. Consult thermocouple manufacturer or ANSI MC96.1 for thermocouple accuracy specifications. Typical inaccuracies range from ± 1 to $\pm 2.2^\circ\text{C}$.)

Thermocouple Type	Measurement Range ($^\circ\text{C}$)	Accuracy @ 25°C Ambient (Not Including Internal Reference Junction) Expressed As $\pm^\circ\text{C}$	Accuracy @ 25°C Ambient (Including Internal Reference Junction) Expressed As $\pm^\circ\text{C}$	Max. Additional Error Due To Ambient Temperature Deviation From 25°C . Expressed As Additional $^\circ\text{C}$ Deviation from 25°C
J	-210 to -151	0.7	1.1	0.02
	-150 to -1200	0.3	0.4	0.01
K	-240 to -201	1.5	2.2	0.05
	-200 to -101	1.0	1.5	0.03
	-100 to 999	0.5	0.8	0.02
T	-250 to -201	1.5	2.2	0.05
	-200 to -101	0.8	1.2	0.03
	-100 to 400	0.5	0.8	0.02
E	-250 to -201	1.2	2.0	0.04
	-200 to -101	0.6	1.1	0.02
	-100 to 400	0.3	0.6	0.01
R & S	-50 to 299	3.4	3.6	0.10
	300 to 1768	1.2	1.3	0.04
B	100 to 199	14.0	14.0	0.44
	200 to 499	5.0	5.0	0.16
	500 to 999	3.0	3.0	0.08
	1000 to 1820	1.2	1.2	0.04
N	-250 to -226	4.3	5.7	0.14
	-225 to -101	2.1	2.8	0.07
	-100 to 1300	1.0	1.4	0.02

Conversion Factors (to convert $^\circ\text{C}$ specifications to other units of measure):

To convert from $^\circ\text{C}$ to $^\circ\text{F}$: $^\circ\text{F} = (1.8 \times ^\circ\text{C}) + 32$

To convert from $^\circ\text{C}$ to $^\circ\text{K}$: $^\circ\text{K} = ^\circ\text{C} + 273.15$

To convert from $^\circ\text{C}$ to $^\circ\text{R}$: $^\circ\text{R} = (1.8 \times ^\circ\text{C}) + 427.67$

Ambient Temperature Effect: To calculate, multiply degrees deviation from 25°C x the value listed in the far right column in Table I. Only applies when using the internal reference junction, within the ambient temperature window of 0 - 50°C .

To calculate total system/measurement accuracy:

$$\text{Accuracy} = \text{System Accuracy @ } 25^\circ\text{C} + \text{System Ambient Temperature Effect} + \text{Inaccuracy of Thermocouple Device}$$

SYSTEM ACCURACY (BASED ON DIRECT MILLIVOLT READING FROM THERMOCOUPLE):

Includes the base unit and HQS-TC1 interface module. (Does not include inaccuracy due to the thermocouple device. Reference junction not applicable to direct millivolt readings.)

Input Range of Module	Accuracy @ 25°C	Max. Additional Error Due To Ambient Temperature Deviation From 25°C . Expressed As Additional Millivolt Error Per Each $^\circ\text{C}$ Deviation From 25°C
-10 to 100mV	± 10 to 100mV	.001