KAYE

Kaye Ice Point Reference Systems

Z1255, Rev B September 2014

General Information

All *Kaye Ice Point Reference Systems* are functionally similar. Series K150 and K170 contain reference thermocouples installed in the ice point wells. Model K140-4 has four open wells which permit the user to install his own reference thermocouples or other sensors.

Principles of Operation

The instruments continuously maintain the reference cell at 0°C. This *reference temperature* is established by the physical equilibrium of ice and water within the sealed *reference cell*. Equilibrium is sustained by a *thermoelectric cooler* that is automatically controlled by a bellows-microswitch *sensing mechanism* that responds to the relative volumes of ice and water in the sealed cell. Thus, the reference well and installed thermocouples, or other sensors, are continuously surrounded by an ice water mixture.

General Operating Instructions

1. Connect the 3-prong line cord to a power source. The instrument operates from 117 VAC @60 Hz (standard) or 220/240 VAC @50 Hz (optional). The product must be grounded and should not be used unless grounded.
2. Turn the instrument ON. The pilot light will glow and remain on for 30 to 90 minutes, depending upon ambient conditions. It will subsequently cycle ON and OFF. The cycling of the pilot light is a positive indication that the unit is operating properly and maintaining a 0°C reference temperature.

Special Instructions for K140-4

Always immerse the temperature probe to the full depth of the well. It is recommended that the well be filled to the top with suitable non-corrosive oil in order to maximize coupling between temperature probe and well. Heavy mineral oil is usually adequate and easily obtainable. When the unit will be operating for long periods of time, condensation may take place within the reference well resulting in the displacement of the oil by water. This condition may be prevented by sealing off the top of the well with grease.

Attention!
Never put mercury into the well without a suitable chemically inert liner to prevent contact of the mercury with the metal walls of the reference well. Plastic liners are provided for use with the Model K140-4.

Special Instructions for all Models Containing Built-In Thermocouples

A variety of thermocouple terminations are provided for the various *Ice Point Reference Systems*. Where input and output binding posts or terminal strips are provided, they are identified on the panel. When connectors are used, identification is included on the last page of these instructions.

Maintenance

Routine verification and cleaning should be part of the general maintenance procedure. Should a pilot light (life expectancy exceeds ten years) fail, system operation will continue normally. The clicking sound made by the microswitch can serve as an adequate cycling indication in the absence of a pilot light.

Troubleshooting

The *Ice Point Reference Systems* have been designed for years of trouble-free performance. However, if the pilot light is ON but not cycling, or is OFF and the microswitch is not operating, the reference temperature should be checked. If the temperature is below 0°C, it is a clear indication of cell failure, in which case the instrument should be returned to the factory for replacement of the sealed chamber of water.

If the instrument is referencing at a temperature above 0°C, the problem will either be in the power supply or the thermoelectric module. In either case, the instrument should be returned to the factory for replacement of the power supply or thermoelectric module.

IMPORTANT:*Before returning any instrument, please contact Amphenol Advanced Sensors at the address below or by calling: +1 814-834-9140*

Attention!
Never allow the instrument to remain in freezing ambient temperatures. Freezing can rupture the sealed chamber of water in the instrument. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Export Models

All export models are tagged to indicate proper operating voltage.

The K170 Ice Point Reference performs ice point referencing for up to 75 thermocouples. The user wires external thermocouples to the unit's input terminals which are in turn connected to matching internal TC's that terminate to copper at the temperature of a thermoelectrically produced ice-water mixture. Thermocouple grade copper wire is taken from ice to MIL style connectors for output. Individual pass thru shield connections can also be provided.

High stability Ice Point Reference Equipment to get the highest accuracy possible from your thermocouples

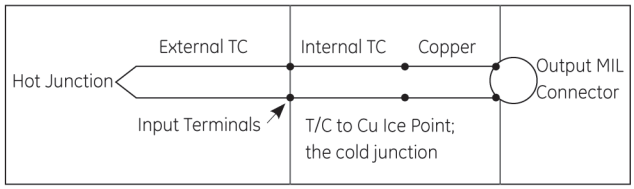
The Kaye Ice Point references offer the ultimate in accuracy in automatic referencing. Used in applications ranging from precision calibration work to routine production testing, the units provide zero long term drift maintaining reference temperature at 0°C.
Three models, K140, K150 and K170, provide ice point references for multiple sensors.

Ice Point Reference with External Calibration Wells
The K140 ice point reference, provides 4 calibration wells which accept a number of thermocouples depending on diameter-up to 16 type T, for example.

Ice Point Reference with Built-in Thermocouples
For applications where frequent connections are made or when calibrating temperature instruments, the K150 or K170 is convenient. The models have built-in thermocouples connected to matching material posts.

The K150 provides references for 2, 4, 6, or 8 sensors. The K-170 Unit provides accurate simultaneous reference for up to 75 thermocouples.

The K170 models with 6 to 75 channels are rack mounted and with matching material terminal strip inputs and Military Standard connectors for outputs-includes mating connectors with wiring diagrams. Shielding can be provided for input and output terminals.



Thermocouple circuit of the K170 with external T/C wire connected to input terminals.

Table 1: Ice Point Reference Specifications

	K140-4	K150	K170
Reference Temperature	0°C	0°C	0°C
Ambient Operating Range	5 to 40°C	5 to 40°C	5 to 40°C
Long Term Drift	None	None	None
Stability	0.01°C typ. 0.025°C guar.	0.02°C typ. 0.05°C guar.	0.02°C typ. 0.05°C guar.
Total Instrument Error*	0.02°C typ. 0.05°C max.	0.05°C max.	0.05°C max.
Accuracy with 10 °C ambient temperature change from 25 ±5°C	0.05°C max.	0.05°C max.	0.05°C max.
Number of Channels	4 Wells	Up to 8	Up to 75
Display Screen Type	No Display		
Screen Resolution	N/A		
PC Connection	N/A		
Power	115VAC, 60Hz or 230VAC, 50Hz	115VAC, 60Hz or 230VAC, 50Hz	115VAC, 60Hz or 230VAC, 50Hz
Dimensions (H* W *L), max, mm	10.6”H x 6.4”W x 13.5”L (269H x 163W x 343mmL)	11.0”H x 6.4”W x 13.5”L (279H x 163W x 343mmL)	15.75”H x 19”W x 10.75”L (400H x 483W x 273mmL)
			Height for K170 Ch Non-Shielded T/C Shielded 6 178mm (7") 178mm (7") 12 178mm (7") 178mm (7") 24 178mm (7") 178mm (7") 36 178mm (7") 311mm (12.25") 50 311mm (12.25") 311mm (12.25") 75 311mm (12.25") 400mm (15.75")
Max weight, kg	12.8	13.7	**16.8**
Operation Conditions: **Ambient Temperature °C** **Relative Humidity**	5 to 40°C No Restrictions	5 to 40°C No Restrictions	5 to 40°C No Restrictions
Conditions for Transporting and Storage: **Ambient Temperature °C** **Relative Humidity%**	Must be Greater Than 0°C No Restrictions		
Service Time Estimate Before Failing/Malfunctioning, Hours	One Year (Calibration Time)		
Service Time Expentancy, Years	10 Years		

Warranty

Each instrument manufactured by Amphenol Thermometrics, Inc. is warranted to be free from defects in material and workmanship. Liability under this warranty is limited to restoring the instrument to normal operation or replacing the instrument, at the sole discretion of Amphenol Thermometrics, Inc. Fuses and batteries are specifically excluded from any liability. This warranty is effective from the date of delivery to the original purchaser. If Amphenol Thermometrics, Inc. determines that the equipment was defective, the warranty period is:

- one year for general electronic failures of the instrument
- one year for mechanical failures of the sensor

If Amphenol Thermometrics, Inc. determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified by Amphenol Thermometrics, Inc. the repairs are not covered under this warranty.

The warranties set forth herein are exclusive and are in lieu of all other warranties whether statutory, express or implied (including warranties or merchantability and fitness for a particular purpose, and warranties arising from course of dealing or usage or trade).

Return Policy

If a Amphenol Thermometrics, Inc. instrument malfunctions within the warranty period, the following procedure must be completed:

1. Notify Amphenol Thermometrics, Inc., giving full details of the problem, and provide the model number and serial number of the instrument. If the nature of the problem indicates the need for factory service, Amphenol Thermometrics, Inc. will issue a RETURN AUTHORIZATION number (RA), and shipping instructions for the return of the instrument to a service center will be provided.
2. If Amphenol Thermometrics, Inc. instructs you to send your instrument to a service center, it must be shipped prepaid to the authorized repair station indicated in the shipping instructions.
3. Upon receipt, Amphenol Thermometrics, Inc. will evaluate the instrument to determine the cause of the malfunction.

Then, one of the following courses of action will then be taken:

- If the damage is covered under the terms of the warranty, the instrument will be repaired at no cost to the owner and returned.
- If Amphenol Thermometrics, Inc. determines that the damage is not covered under the terms of the warranty, or if the warranty has expired, an estimate for the cost of the repairs at standard rates will be provided. Upon receipt of the owner's approval to proceed, the instrument will be repaired and returned.

Customer Support Centers

U.S.A.
Sales and Services
(Repair/Calibration):
Amphenol Thermometrics, Inc.
St Marys Center
967 Windfall Road
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Technical content subject to change without notice.

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