



AMETEK ATMi Series Intrinsically Safe Temperature Module User Manual

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AMETEK[®]
SENSORS, TEST & CALIBRATION

ATMi Series Operation Manual
for Intrinsically Safe Advanced Temperature Module



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Overview

INTRODUCTION

The Crystal ATMi series of intrinsically safe temperature modules allow you to add temperature measurement capability to your HPC50 pressure calibrator. The ATMi uses the same reliable, high accuracy, digital temperature compensated technology found in other Crystal instruments, housed in a rugged enclosure with a selectable length cable to connect to your HPC50 calibrator. Two ATMi modules can be connected to a single HPC50 calibrator.

Note: Currently, the HPC50 is the only Crystal calibrator supported by the ATMi pressure module.

Note: This manual includes information on the ATMi modules only. For details on the operation of the HPC50 Series, please refer to the User Manual.

What's Included

Each unit includes an ATMi temperature module, an interface cable of your choice (1, 3, or 10 meter), ISO 17025 Accredited Calibration Certificate, NIST traceable calibration certificate, and AMETEK product CD. Crystal Engineering calibration facilities are A2LA accredited, (#2601.01) which is internationally recognized by ILAC. See ordering information below for probe options.

ORDERING INFORMATION

Model ATMi

Temperature Sensor

No Probe (omit)
PT100 Probe, IS certied, -40 to 150° C w/o certT
PT100 Probe, IS certied, -40 to 150° C w certT4
STS050 Probe*, -45 to 400° C w/ certT5

Interface Cable Length

1 m / 3.3 ft(omit)
3 m / 10 ft3M
10 m / 33 ft10M

Note: Options T / T4 / T5 include a large padded soft carrying case with shoulder strap (p/n SPK-HHC-003).

SAMPLE PART NUMBERS

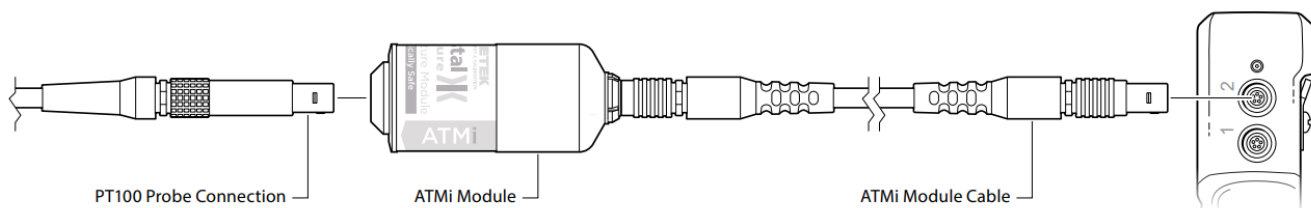
ATM-T ATMi with a PT100 probe and 1 meter cable.
ATMi-T4-10M ATMi with a PT100 probe (with calibration certificate) and 10 meter cable.
ATMi-T5-3M ATMi with a STS050 probe (with calibration certificate) and 3 meter cable.

Operation

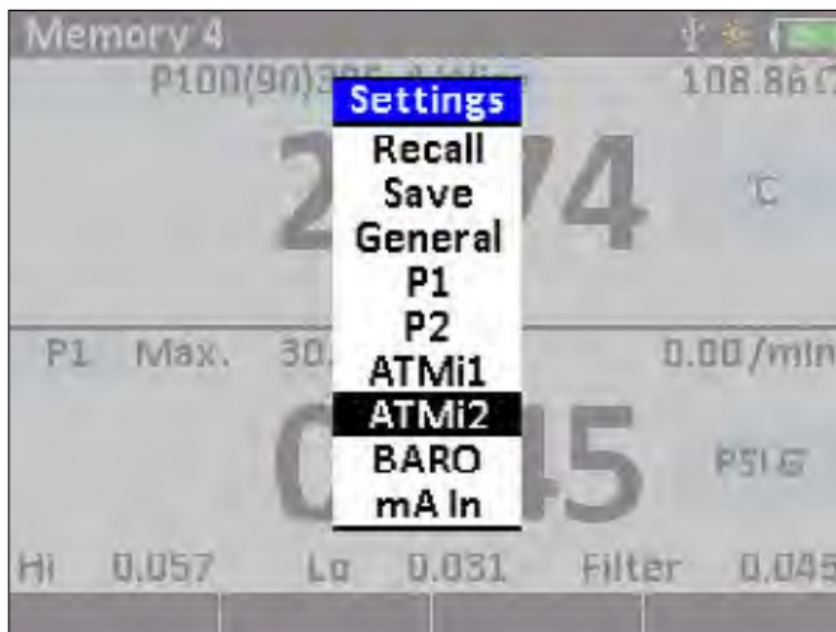
ADVANCED TEMPERATURE MODULE ATMi INSTRUCTIONS

To Measure Temperature

1. Connect Pt100 probe to the ATMi temperature module at the LEMO connection.
2. Connect the ATMi cable to either port on the HPC50 pressure calibrator.



3. On the HPC50 calibrator select the appropriate ATMi port from the **menu**.



Note: For details on the HPC50 navigation process, see the HPC50 manual.

4. The HPC50 will display the measured temperature.

Specifications

TEMPERATURE MEASUREMENT

Accuracy: $\pm(0.015\% \text{ of rdg}) + 0.02 \text{ Ohm}$

Range: 0 to 400 Ohms

Resolution: 0.01 on all scales

Units: °C, K, °F, R, Ω

TCR: $0.003850 \Omega/\Omega/^{\circ}\text{C}$ (IEC 60751)

Wiring: 4-wire support

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

Combine with part number 127387 for a -45 to 150° C temperature sensor. Contact us to add a calibration certificate.

OUTPUT

Temperature Resolution 0.01

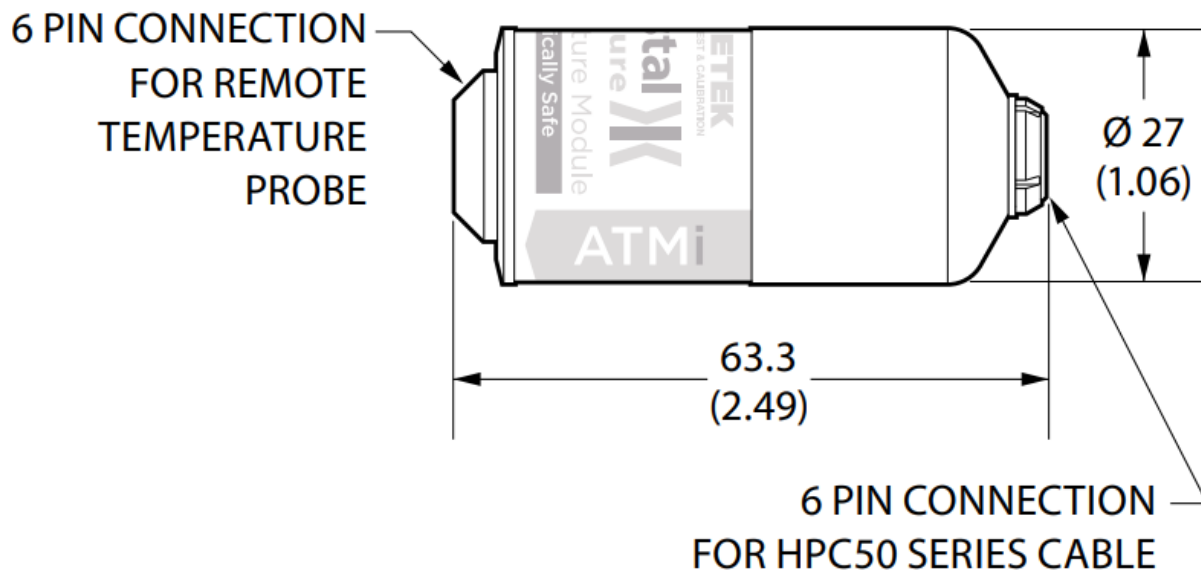
Display Update up to 10 per second

Temperature resolution and display update are the maximum values available. The resolution of your Crystal device may be different.

ENCLOSURE

Dimensions 2.5 x 1.1 in (63.3 x 27.0 mm)

Weight 0.31 lbs (141.0 g)



COMMUNICATION

Connector 6-pin LEMO

Serial RS-422, 9600 baud, 8 data, no parity, 1 stop

Protocol ASCII command language

The proper selection of the RTD sensing element is very important as the error associated with this device is the majority of the overall system measurement uncertainty. IEC 751 is the standard that defines the temperature versus resistance for 100, 0.00385 $\Omega/\Omega/^\circ\text{C}$ platinum RTDs. IEC 751 defines two classes of RTDs: Class A and B. Class A RTDs operate over the -200 to 630 $^\circ\text{C}$ range versus -200 to 800 $^\circ\text{C}$ for the Class B elements. For example, the Class A uncertainty is about half that of the Class B elements as illustrated in the following table.

			Class A				Class B			
Temperature $^\circ\text{C}$	HPC50/ATMi Uncertainty		Class A Uncertainty		HPC50/ATMi + Class A Uncertainty		Class B Uncertainty		HPC50/ATMi + Class B Uncertainty	
	$\pm\Omega$	$\pm^\circ\text{C}$	$\pm\Omega$	$\pm^\circ\text{C}$	$\pm\Omega$	$\pm^\circ\text{C}$	$\pm\Omega$	$\pm^\circ\text{C}$	$\pm\Omega$	$\pm^\circ\text{C}$
-200	0.02	0.05	0.24	0.55	0.24	0.55	0.56	1.3	0.56	1.3
-40	0.03	0.08	0.09	0.23	0.1	0.24	0.2	0.5	0.2	0.51
0	0.04	0.09	0.06	0.15	0.07	0.17	0.12	0.3	0.12	0.31

50	0.04	0 · 1	0.1	0.25	0.1	0.2 7	0.2 1	0.5 5	0.2 2	0.5 6
100	0.04	0 · 1 1	0.13	0.35	0.1 4	0.3 7	0.3	0.8	0.3 1	0.8 1
150	0.04	0 · 1 2	0.17	0.45	0.1 7	0.4 6	0.3 9	1.0 5	0.3 9	1.0 6
200	0.05	0 · 1 3	0.2	0.55	0.2 1	0.5 6	0.4 8	1.3	0.4 8	1.3 1
400	0.06	0 · 1 7	0.33	0.95	0.3 3	0.9 6	0.7 9	2.3	0.7 9	2.3 1
600	0.07	0 · 2 1	0.43	1.35	0.4 4	1.3 7	1.0 6	3.3	1.0 6	3.3 1
800	0.08	0 · 2 5	0.52	1.75	0.5 3	1.7 7	1.2 8	4.3	1.2 8	4.3 1

OPERATING TEMPERATURE

Temperature Range -20 to 50° C (-4 to 122° F)

< 95% RH, non-condensing. No change in accuracy over operating temperature range. Gauge must be zeroed to achieve rated specification.

Applies to all modules.

STORAGE TEMPERATURE

Temperature Range -40 to 75° C (-40 to 167° F)

INTRINSIC SAFETY APPROVALS



Ex ia IIC T4/T3 Ga
FTZU 18 ATEX 0043X



Ex ia IIC T4/T3 Ga
IECEx FTZU 18.0012X



Exia Intrinsically Safe and Non-Incendive for Hazardous Locations: Class I, Division 1, Groups A, B, C, and D; Temperature Code T4/T3. Class I, Zone 0, AEx ia IIC T4/T3 Ga.

ENTITY PARAMETERS

Ui = 5.0 V

Ii = 740 mA

Pi = 880 mW

$C_i = 8.8 \mu F$
 $L_i = 0$

CERTIFICATIONS



We declare that the ATMi is in accordance with the Electromagnetic Compatibility Directive per our declaration(s).



This HPC50 is approved for use as a portable test instrument for Marine use and complies with DNV GL Rules for Classification of Ships, High Speed & Light Craft, and Oshore Units.

Support

CALIBRATION

If adjustment is required, we recommend returning the ATMi to the factory. Factory service offers benefits you won't find anywhere else. Factory calibration tests your ATMi utilizing NIST traceable standards, resulting in calibration certificates that provide performance data and uncertainties. Our calibration facilities are A2LA accredited (cert #2601.01) to ISO 17025:2005 & ANSI/NCSL Z540-1-1994. A2LA is internationally recognized as an accreditation body by the International Laboratory Accreditation Cooperation, ILAC. Furthermore, upgrades may be available to add or enhance operating features. We designed the product to last, and we support it so that you can get the most from your investment.

Under normal operating conditions, we recommend the ATMi be calibrated on an annual basis. Your quality system may require more or less frequent calibration, or your experience with the gauge, or operating environment may suggest longer or shorter intervals.

There are no internal potentiometers. The ATMi has a "span factor" (userspan), set to approximately 1 (as shipped from the factory). As components age this may need to be changed to a value slightly higher or lower, to slightly increase or decrease all readings. This adjustment can be made with a computer through our free CrystalControl software.

WARRANTY

Crystal Engineering Corporation warrants the ATMi (Advanced Pressure Module) to be free from defects in material and workmanship under normal use and service for one (1) year from date of purchase to the original purchaser. It does not apply to batteries or when the product has been misused, altered or damaged by accident or abnormal conditions of operation.

Crystal Engineering will, at our option, repair or replace the defective device free of charge and the device will be returned, transportation prepaid. However, if we determine the failure was caused by misuse, alteration, accident or abnormal condition of operation, you will be billed for the repair.

CRYSTAL ENGINEERING CORPORATION MAKES NO WARRANTY OTHER THAN THE LIMITED WARRANTY STATED ABOVE. ALL WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, ARE LIMITED TO A PERIOD OF ONE (1) YEAR FROM THE DATE OF PURCHASE. CRYSTAL ENGINEERING SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT, TORT OR OTHERWISE.

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Documents / Resources

	<p>AMETEK ATMi Series Intrinsically Safe Temperature Module [pdf] User Manual ATMi Series, Intrinsically Safe Temperature Module, Safe Temperature Module, Intrinsically Temperature Module, Temperature Module, Module, ATMi Series</p>
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