

ACT-80R Series High-Precision Thermometer Readout Module

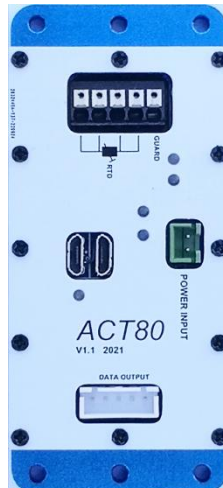
Highlight Features

- High accuracy: up to $\pm 1\text{mK}^*$
- High resolution: up to 0.1mK
- Super low drift: $< 1\text{mK}/24\text{ hours}^*$ with built-in temperature regulated reference resistor
- Fast updating rate: 0.4s
- Flexible sensor selection: 10-200 ohm PRT, SPRT, IPRT, RTD sensors, RTD probes
- Supports ITS-90 and CVD coefficients
- 2-, 3-, 4-wire[#] sensor configuration
- Flexible probe/sensor parameter adjustment and setting
- Modular design, easy to integrate into any instrument or test equipment
- RS232 interface, can be customized with TTL RS232, CAN, SPI, I2C etc.
- SCPI protocol supported, customized protocol upon request
- Single +5V power input

Applications

- Laboratory, education, research calibration and testing applications
- Instrument design and integration
- Industrial testing and control equipment design and integration
- Industries: chemical, pharmaceuticals and cosmetics; food and beverage; petroleum industry; renewable energy applications

Overview



The ACT-80R is an affordable, compact-size, high-precision and versatile system-style thermometer readout module. The ACT-80R is designed to measure platinum resistance thermometers (10 to 200 ohm PRT, SPRT, IPRT, RTD) in 2-, 3- and 4-wire[#] mode. The module uses resistance ratio topology with a built-in temperature regulated reference resistor that normally has only been seen in high-end resistance bridges, to achieve super low noise level and high-

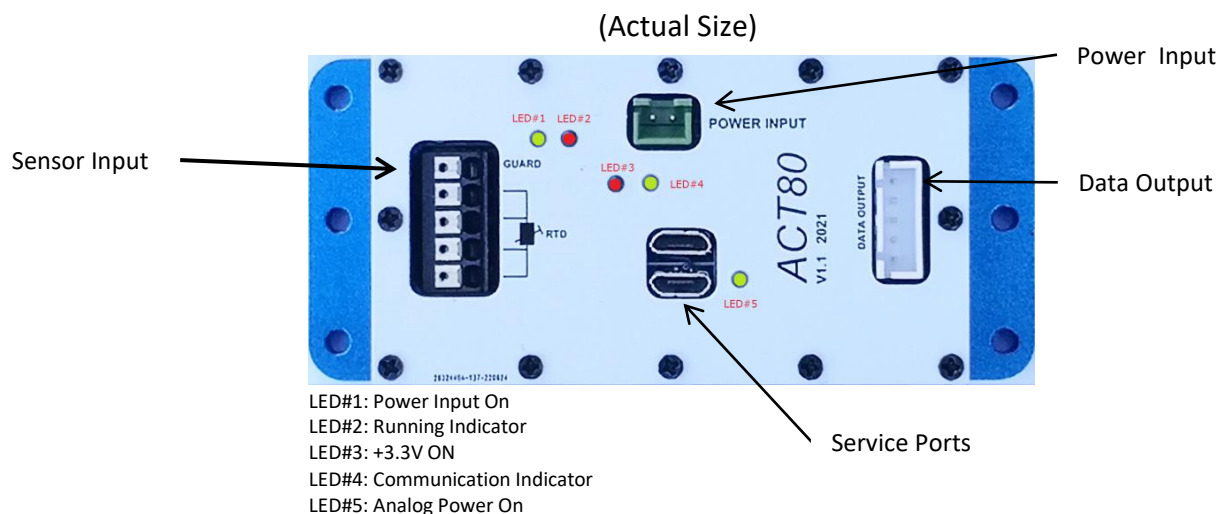
accuracy measurement. The ACT-80R also uses the thermal EMF canceling technique to remove EMF from measurements, allowing ACT-80R to reach a new level of short- and long-term stability.

The embedded MCU in the module calculates measured temperature by following the ITS-90 standard, or according to the Callendar-Van Dusen equation. The module can be easily connected to any host system (such as embedded MCU, PC, PLC, etc.), going through flexible customized interface. The SCPI protocol is used for remote control by default, but a simple, high-efficiency communication protocol is also provided.

Technical Specifications	
Measuring range	Temperature: $-260\text{ }^{\circ}\text{C}$ to $+660\text{ }^{\circ}\text{C}^{***}$. Resistance: $0\text{ }\Omega$ to $340\text{ }\Omega$
Resolution	Temperature: 0.1mK (Pt 100) Resistance: $<0.1\text{m}\Omega$
Measurement accuracy**	Temperature: $\pm 1\text{mK}$ (Pt 100) Resistance: $\pm 400\text{ }\mu\Omega$
Sensor types	10 to 200 ohm PRT, SPRT, IPRT, RTD sensors, RTD probes.
Sensor connection	2-, 3-, 4-wire [#]
Excitation current	0.5mA
Internal reference resistor	$50\text{ }\Omega$ (temperature regulated)
Number of sensor inputs	1
Measuring time	0.4 seconds
Data output interface	RS232 (default), optional TTL RS232, CAN, SPI, I2C
Communication protocol	SCPI or customized
Operating condition	$10\text{ }^{\circ}\text{C}$ to $35\text{ }^{\circ}\text{C}$ (for highest accuracy, $20\text{ }^{\circ}\text{C}$ to $25\text{ }^{\circ}\text{C}$ recommended; wider temperature range upon request), $< 80\%$ RH non-condensing
Power input	+5V DC, 80mA (150mA max during start-up)

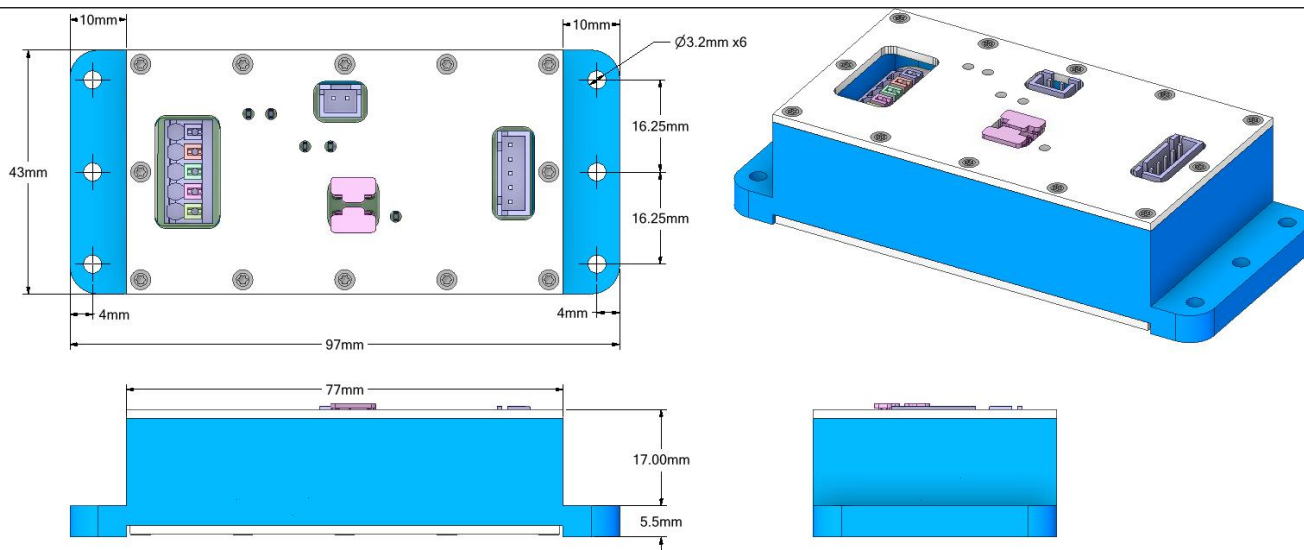
Power on stabilizing time	180 seconds (max)
Custom calibration data	Up to 32 calibration values can be stored to work with optional multiplexer
Coefficients standard	ITS-90 or CVD coefficients can be used for custom calibration
Physical Specifications	
Dimensions (L × W × H)	97 mm × 43 mm × 25 mm
Weight	130 g
Mechanical/Case	CNC Anodized Aluminum

Connections and Status Indicators



Sensor input connector	5-contact Push-in Clamping Terminal
Power input connector	2 position JSK XH connector
Data output connector	5 position JSK XH connector

Outline Dimensions



Ordering Information	
Model Number	Description
ACT-80R-S232	RS232 interface, SCPI standard protocol
ACT-80R-S232T	TTL level RS232 interface, SCPI standard protocol
ACT-80R-CAN	CAN bus interface, customized protocol
ACT-80R-SPI	SPI interface
ACT-80R-I2C	I2C interface

Accessories

Model Number	Description
ATRP-L250	Precision 4-wire Pt100 RTD probe, -50 to 250°C (-58 to 482°F), 250 mm (9.85")
ATRP-L250-H450	Precision 4-wire Pt100 RTD probe, -50 to 450°C (-58 to 842°F), 250 mm (9.85")
ATRP-NIST-CAL	Precision 4-wire Pt100 RTD probe calibration at five points (NIST traceable)
AT820-INSTRUMENT-CAL	Calibration for instrument alone (NIST traceable)
AT820-SYS-CAL	Calibration of instrument and sensor together at five points (no NIST)
AT820-SYS-COR-CAL	Calibration of instrument and sensor together, after initial calibration of sensor only and programming of corrections (no NIST)

* ACT-80R module only, accuracy of the connected probe or sensor is not counted.

** Refers to the calibration of the reference resistor without contribution of the sensor (confidence level: 95 %, number of measurement values: 50, reference temperature: 23 °C)

*** for PT100

default setting

Technical Support

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For the user manual and more information, please contact

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