NIST Detachable Leads

by MONNIT

NIST Detachable Leads

General Description

NIST Standard and Low Temperature and Humidity Detachable Leads connect to compatible ALTA Industrial and Enterprise Sensor Bases. Each lead has its own serial ID.

The sensor base and lead connect to each other via sealed M8 6-pin connectors. The ALTA Sensor bases are sensor-specific, so you can only connect the same type of NIST Detachable Lead.

Key Features

- Connect leads to compatible ALTA Industrial and Enterprise Sensor Bases.
- Leads can be hot-swapped and NIST-certified independently.
- Configurable thresholds for critical condition monitoring.
- Standard Temperature NIST Detachable Lead:
  - Measurement Range:
    - Leaded Probe: -40°C to 125°C (-40°F to 257°F)
  - Resolution: 0.1°C (0.18°F)
  - Accuracy: ± 1°C (± 1.8°F)
  - Calibrated Accuracy: ± 0.25°C (± 0.45°F)
- Low Temperature NIST Detachable Lead:
  - Measurement Range: -200°C to 0°C (-328°F to 32°F)
  - Resolution: 0.1°C (0.18°F)
  - Standard Accuracy (at 0°C): ± 3.3°C (± 5.9°F)
  - Calibrated Accuracy (at 0°C): ± 0.5°C (± 0.9°F)
- Humidity NIST Detachable Lead:
  - Measurement Range: 0 to 100%
  - Temperature Measurement Range:
  - Leaded Probe: -25°C to 70°C (-13°F to 158°F)
  - Resolution: 0.01% RH, 0.01°C
  - Accuracy:
    - ± 3% RH, 0.3°C Typical
    - ± 5% RH, 0.5°C Maximum

Principles of Operation

Connect compatible, sensor-specifc NIST Detachable Leads to an ALTA Sensor Base via a M8 6-pin sealed connector.

Each detachable lead has a memory circuit that stores a serial number, sensor-specific lead properties, and calibration values. When the sensor connects or disconnects, the green LED on the base power button overlay will flash once, then the sensor will communicate with the gateway.

After connecting a lead, the iMonnit Software will upload calibration values from the sensor. iMonnit also logs the connection/disconnection times for any lead along with the associated lead serial ID and application name.

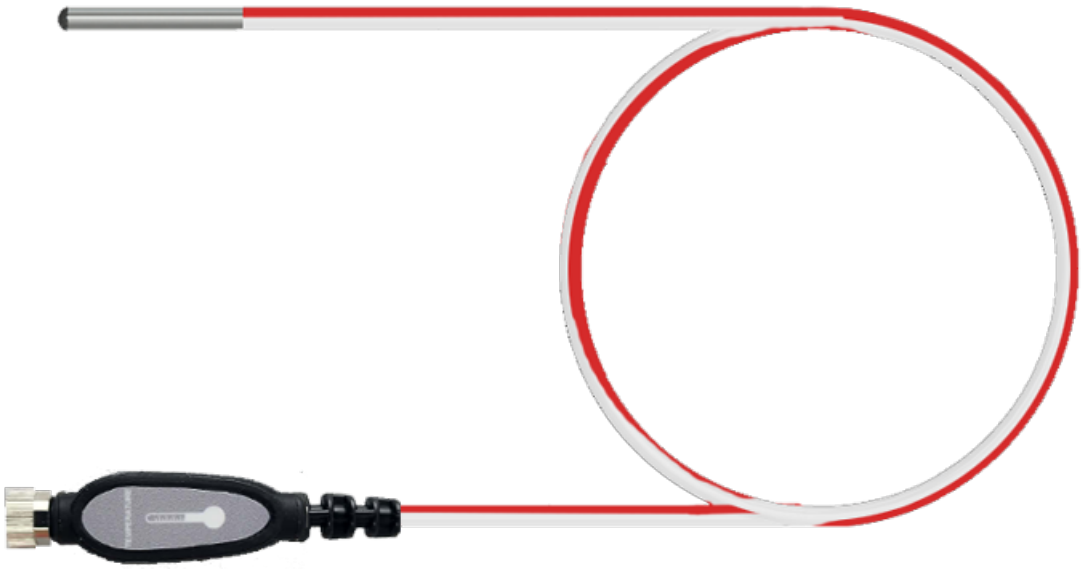
Example Applications

- Facilities Management
- Commercial Refrigeration
- Labs & Pharmaceuticals
- Food Services
- Manufacturing & Production
- Greenhouses & Grow Houses
- Agriculture & Livestock
- Data Centers & Server Rooms
- Hospitals & Clinics
- Hospitality & Lodging
- Logistics & Warehousing
- Pest Remediation
- Additional applications

Technical Specification | NIST Detachable Lead for Standard Temperature Sensor		
Temperature Measurement	Range - Leaded probe	-40°C to 125°C (-40°F to 257°F)[1]
	Range - Non-leaded probe	** Limited to operational range of sensor body -40°C to 85°C (-40°F to 185°F)
	Accuracy @ 25°C (77°F)	± 1°C (±1.8°F)
	Calibrated accuracy	± 0.25°C (± 0.45°F)
	Resolution	0.1°C (0.18°F)
	Response time	50 seconds (10 second time constant)[2]
Overmold	Material	UV resistant thermoplastic hotmelt polyamide resin.
	Temperature Rating	-40°C to 150°C (-40°F to 302°F)
Interface	Connector	M8 6-pin Female Keyed Connector with Sealing O-Ring
Non-Leaded Probe	Construction	Single PCA incorporating thermistor temperature sensing element and memory circuitry, encapsulated in unibody overmold with stainless steel bullet and M8 6-pin connector.
	Dimensions	50 mm L x 17 mm W x 9 mm T (1.97" L x 0.67" L x 0.36" T)
Leaded Probe	Transducer Type	10 KOhm NTC Thermistor (β = 3455 K)
	Tip dimension	5.00 mm (0.197") diameter by 35 mm (1.38")
	Tip material	Type 304 stainless steel
	Connector end construction	PCA with memory and circuitry to support the RTD probe end, overmolded and sealed.
	Connector end dimensions	69mm L x 17mm x 9mm T (2.72" L x 0.67" W x 0.36" T)
	Cable material	Waterproof high-temperature ABS with EMF shielding
	Cable diameter	3.45 mm (0.136")
	Cable length	Standard: 0.9m (3')

1. Operating below 0°C (-32°F) degrees will reduce battery life.
2. Response time defined as five time constants for 99.3% of actual temperature.

The sensor reports the temperature (in °C or °F) of the thermistor.



Technical Specification | NIST Detachable Lead for Low Temperature Sensor		
Temperature Measurement	Range - Leaded probe	-200°C to 0°C (-328°F to 32°F)
	Accuracy @ 0°C (32°F)	± 3.3°C (±5.9°F)
	Calibrated accuracy @ 0°C (32°F)	± 0.5°C (± 0.9°F)
	Resolution	0.1°C (0.18°F)
	Response time	50 seconds (10 second time constant)[1]
Overmold	Material	UV resistant thermoplastic hotmelt polyamide resin.
	Temperature Rating	-40°C to 150°C (-40°F to 302°F)
Leaded Probe	Transducer type	Glass-coated platinum RTD, IEC 751-95 Class A
	Tip dimension	4.00 mm (0.157") diameter by 30 mm (1.18")
	Tip material	Type 304 stainless steel
	Connector end construction	PCA with memory and circuitry to support the thermistor probe end, overmolded and sealed.
	Connector end dimensions	69mm L x 17mm x 9mm T (2.72" L x 0.67" W x 0.36" T)
	Cable material	Waterproof Teflon cable with lucency jacket
	Cable diameter	2.6 mm (0.102")
	Cable length	Standard: 0.9m (3') Optional: 3m (10'), 7.5m (25')
	Connector	M8 6-pin Female Keyed Connector with Sealing O-Ring
	Seal Rating	IP67 ?????

1. Response time defined as five time constants for 99.3% of actual temperature.

RTD Accuracy Over Temperature			
Temperature (°C)	Accuracy (±°C)		
	Uncalibrated Sensor	Calibrated Sensor	IEC 751-95 Class "A" RTD Only
-200°C	4.30	1.50	0.55
-180°C	4.20	1.40	0.51
-160°C	4.10	1.30	0.47
-140°C	4.00	1.20	0.43
-120°C	3.90	1.10	0.39
-100°C	3.80	1.00	0.35
-80°C	3.70	0.90	0.31
-60°C	3.60	0.80	0.27
-40°C	3.50	0.70	0.23
-20°C	3.40	0.60	0.19
0°C	3.30	0.50	0.15

The sensor reports the temperature (in °C or °F) of the RTD.

Technical Specification | NIST Detachable Lead for Humidity Sensor		
Humidity Measurement	Range	0 to 100% RH (non-condensing)
	Accuracy	± 1.5% RH typical, ± 3.5% RH max
	Resolution	0.01 %RH
	Response time	40 seconds (8-second time constant)[1]
Temperature Measurement	Range - Leaded probe	-25°C to 80°C (-13°F to 176°F)[2]
	Accuracy	± 0.3°C (0.54°F) Typical[1]
	Resolution	0.01°C (0.018°F rounded to 0.01 decimal place)
	Response time - Leaded probe	15 seconds (3 second time constant)[1]
Overmold	Material	UV resistant thermoplastic hotmelt polyamide resin.
	Temperature Rating	-40°C to 150°C (-40°F to 302°F)
Dust Cap	Materials	Filter: PTFE with polyester scrim
	Temperature Rating	-40°C to 125°C (-40°F to 257°F)
	Seal Rating	IP5x
Interface	Connector	6-pin M8 female keyed connector with sealing o-ring
Non-Leaded Probe	Construction	Single PCA incorporating a high-accuracy digital temp/humidity sensing element and memory circuitry, encapsulated in unibody overmold with dust cap and M8 6-pin connector.
	Dimensions	50mm L x 17mm W x 9mm T (1.97" L x 0.67" L x 0.36" T)

Leaded Probe	Tip construction	PCA with high-accuracy digital temp/humidity sensing element, soldered interface wires, partially encapsulated in overmolding with dust cap.
	Tip dimensions	33mm L x 23mm W x 7mm T (1.3" L x 0.9" W x 0.28" T)
	Connector end construction	PCA with memory and pass through data circuitry to support humidity sensing element at tip of cable, overmolded and sealed.
	Connector end dimensions	69mm L x 17mm x 9mm T (2.72" L x 0.67" W x 0.36" T)
	Wire details	4-conductor, 26 AWG, stranded copper
	Insulation	PVC, 0.010"
	Shield	No Shield
	Jacket	PVC (black)
	Overall Diameter	4.25 ± 0.2 mm (0.17" ± 0.007)
	Ratings / Approvals	UL AWM STYLE 2464, cUL AWM I/II A 80°C 300V FT1 LF
	Temperature Rating	-25°C to 80°C (-13°F to 176°F)
	Voltage Rating	300 V Max
	Dielectric Strength	1500 V RMS
	Cable length	Standard: 0.9 m (3 ft)

1. Response time (τ of 99.3%) is significantly affected by air flow and the conditions present in the immediate vicinity of the sensing element.
2. High temperature limited by cable/base of body at 80°C. The sensor electronics in the lead are rated to 125°C and will not fail at 80°C but the cable itself may degrade above this temperature.

The sensor reports the relative humidity (RH) in %, and temperature (in °C or °F).

Warnings

The leads are only considered sealed when fully connected to the sensor base. If disconnected, the exposed connector port may corrode if exposed to moisture.

NIST Detachable Leads for Low Temperature Sensors should not be used in submersible applications. They *may* be used in liquid nitrogen applications without any concern of sensor failure.

MONNIT

Monnit Corporation
3400 South West Temple • Salt Lake City, UT 84115 • 801-561-5555
www.monnit.com