

Product Datasheet - Technical Specifications



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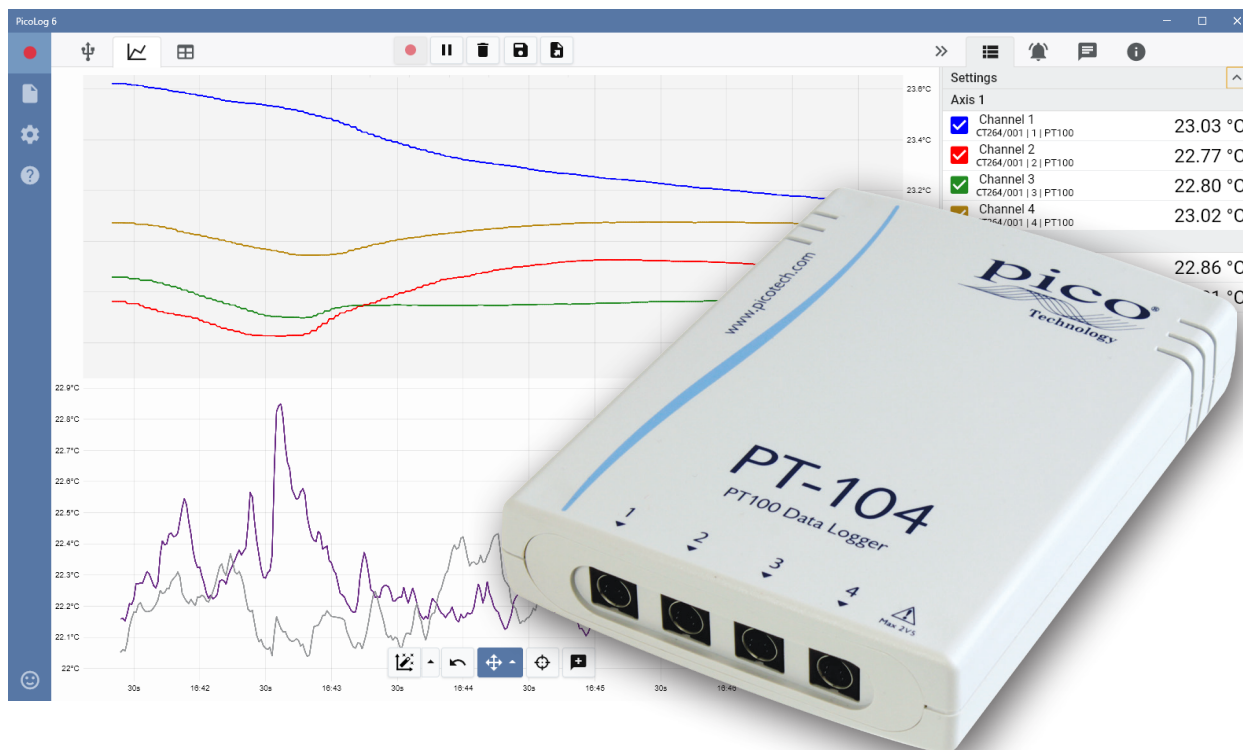
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PT-104 Data Logger

High accuracy platinum resistance data logger



The ultimate in resolution and accuracy

0.001 °C

0.015 °C

Measures and records up to 4 platinum resistance thermometers

Works with PT100 and PT1000 sensors

Supports 2, 3 and 4-wire sensors

Also measures voltage and resistance

24-bit resolution

Uses calibrated reference resistors for stability

PicoLog 6 data logging software available as a free download

USB interface ensures easy installation

Ethernet interface for remote operation

Powered by USB port or Power-over-Ethernet (PoE)

Multiple units can be run on a single PC

PT-104 PRT Data Logger

Flexible: measures temperatures with either PT100 or PT1000 sensors, as well as resistance and voltage.

Adaptable: can measure and record temperatures ranging from -200 to $+800$ °C.

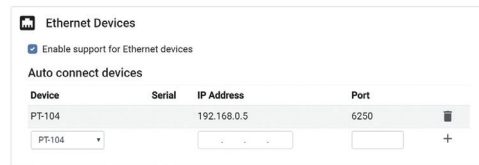
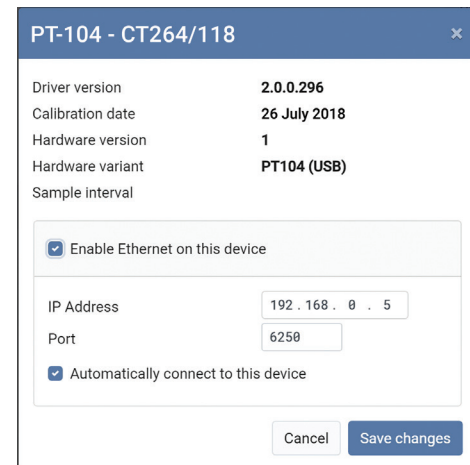
Stable: Instead of voltage references, which tend to drift with temperature, the PT-104 uses high-precision reference resistors for improved stability.

Expandable: Use up to 20 units simultaneously on one PC.

The ultimate in portability

With both USB and Ethernet interfaces the PT-104 can be used in a variety of situations. If you need a portable solution that can be used at various locations and is fast to set up and use, simply connect your laptop to the PT-104 by USB. Need to monitor a situation over a period of hours or days, or from a remote location? Plug your PT-104 into a spare port on your network and then access it remotely either from your LAN or over the internet (using Power over Ethernet (PoE) technology means that you don't even need a separate power supply).

Ethernet connectivity is only supported in PicoLog under Windows operating systems.



Accuracy and resolution

Although accurate temperature sensors are widely available, it has been difficult to take advantage of them due to errors caused by the measuring device. The PT-104 however, is inherently accurate due to its innovative design. Rather than relying on voltage references (which tend to be temperature sensitive) it uses 'reference' resistors which are extremely stable (low temperature coefficient and drift). The exact value of each resistor is stored in an EEPROM to provide the ultimate in accuracy (yearly recalibration is recommended). A high-performance 24-bit ADC is used to achieve the 0.001 °C resolution.



Rear panel connections and indicators

- A: Ethernet port
- B: USB port
- C: Ethernet Data indicator
- D: Ethernet Link indicator
- E: Power/Status indicator

Front panel connections

4 x mini-DIN sockets for the connection of compatible platinum resistance thermometers or the optional screw terminal adaptor.

Temperature

The PT-104 measures temperature using platinum resistance thermometers (PRTs). Both common industry standards (PT100 and PT1000) are supported. The unit is compatible with two, three and four-wire sensors (four-wire PT100 sensors are recommended for best accuracy). A wide range of PT100 sensors are available for use with your PT-104.

Resistance

When measuring resistance, the PT-104 uses a four-wire circuit to give the greatest possible accuracy. Two resistance ranges are available (0 to 375 Ω and 0 to 10 k Ω). The unit is calibrated for 0 to 375 Ω so this range should be used for best accuracy.

Voltage

For voltage measurements, each input connector can be treated as a differential input with ground, or two single-ended inputs. Both inputs must be zero volts or above, though it does not matter which input has the higher voltage.

Two voltage ranges are available (0 to 115 mV and 0 to 2500 mV). For the most accurate measurements use the 0 to 2500 mV range.

PicoLog software – straightforward from the start

PicoLog is a complete data acquisition software package for the PT-104 data logger, and is compatible with Windows, macOS and Linux. With its clear and user-friendly layout, ideal for use with a mouse or a touchscreen, PicoLog allows you to set up the logger and start recording with just a few clicks of the mouse, whatever your level of data logging experience. Set up simple or advanced acquisitions quickly, and record, view and analyze your data with ease.

Device settings, Graph and Table

Easily set up and adjust acquisition and math channels on one or more data loggers and check their status at a glance. You can also select **Graph** view to see live data trend lines and **Table** view to see data in tabular form in real-time.

Capture controls

Separate **Record**, **Pause** and **Reset** buttons make it harder to press any of them by mistake.

Save and Export options

Copy your graph to the clipboard, save it as a PDF, export the raw data to a CSV file, or save the data and configuration as a robust .picolog database file.

Alarms

Set up alarms to alert you to a range of events. Alarms can take the form of sounds, visual notifications, graph annotations and more.

Notes & annotations

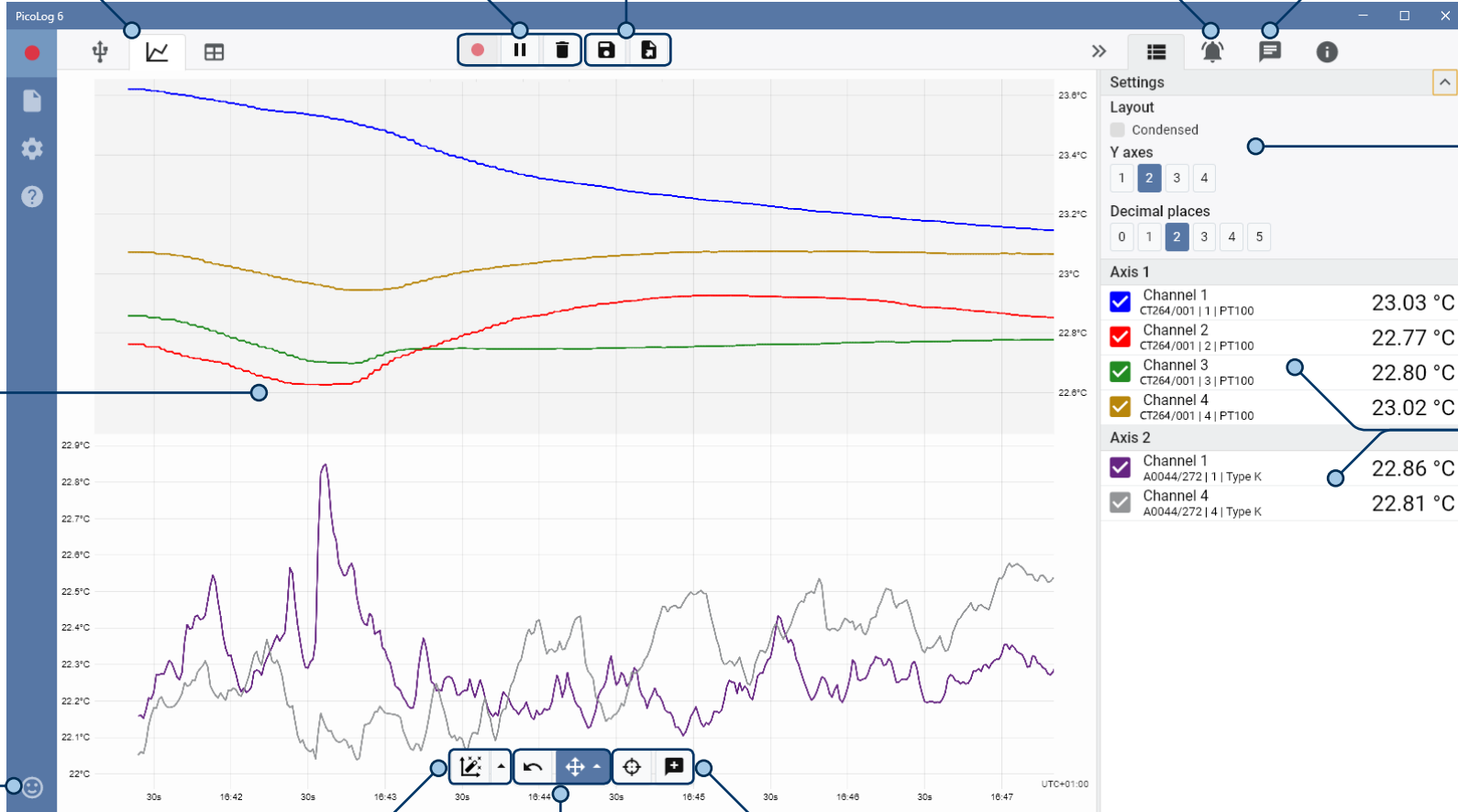
Add notes about the dataset as a whole or annotations about particular points on the graph.

Graph view

Display your data in real time, as it is collected, on up to four independent Y axes simultaneously: set them up by dragging and dropping the entries in the **Channels & Axes** panel on the right.

Give instant feedback

We want to hear from you! Click here to contact Pico with your comments.



Pullout information panel

Manage your channel and axis settings, alarms, notes and capture information in this easy-to-read layout. Close the panel to make more room for the capture graph, and reopen it at any time.

Multiple devices

Log data on up to 20 devices at the same time. Here, two separate data loggers are in use: a PT-104 platinum resistance thermometer logger and a TC-08 temperature data logger.

Data view

Display all the data collected so far or keep the graph scale the same and pan along as new samples appear.

Pan and zoom controls

Zoom in, zoom out, zoom to a selection or pan through the data with these tools. If you make a mistake, just click **Undo**.

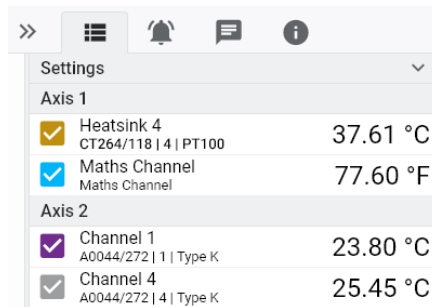
Cursors and annotations

Use cursors to highlight the data value and time at any point on the graph, or click **Add annotation** to mark that point with a text note.

Math channels

Sometimes you need to use data from one or more measurement channels to graph and record a calculated parameter. You can use the PicoLog equation editor to set up simple math channels such as A-B or more complex functions such as log, sqrt, abs, round, min, max, mean and median.

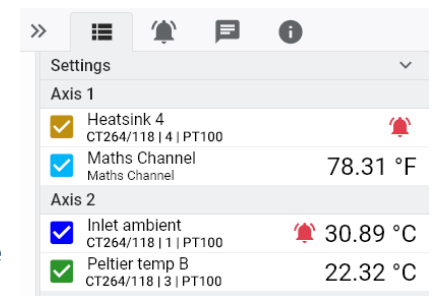
PicoLog treats math channels like any other channel, so you can still set alarms and annotate them.



Settings		
Axis 1		
<input checked="" type="checkbox"/>	Heatsink 4 CT264/118 4 PT100	37.61 °C
<input checked="" type="checkbox"/>	Maths Channel Maths Channel	77.60 °F
Axis 2		
<input checked="" type="checkbox"/>	Channel 1 A0044/272 1 Type K	23.80 °C
<input checked="" type="checkbox"/>	Channel 4 A0044/272 4 Type K	25.45 °C

Alarms

In PicoLog, you can set up alarms to alert you to various events. These can be as simple or as complex as you like: alarms can trigger on a signal threshold or disconnection of the data logger, or you can set up a logic expression of your own. Alarms can play sounds, display visual alerts, run applications or mark when the event occurred on the graph.



Settings		
Axis 1		
<input checked="" type="checkbox"/>	Heatsink 4 CT264/118 4 PT100	
<input checked="" type="checkbox"/>	Maths Channel Maths Channel	78.31 °F
Axis 2		
<input checked="" type="checkbox"/>	Inlet ambient CT264/118 1 PT100	30.89 °C
<input checked="" type="checkbox"/>	Peltier temp B CT264/118 3 PT100	22.32 °C

Intuitive logger and channel setup

The **Devices** view lets you set up a multichannel acquisition system in a simple way, with the option to use multiple different Pico data loggers simultaneously. PicoLog shows you an image of each connected device, so you can quickly and easily enable or disable channels and set up their properties.

On the right, you can see the device setup including two data loggers, a PT-104 and TC-08.



Robust file format

At the heart of PicoLog is the file system, which stores live capture data directly to a robust database, rather than to a single file that is vulnerable to corruption and data loss. If the computer is shut down and rebooted, PicoLog will only lose the data during the outage – saving resumes when you restart the software.

This file system also means that the size of the dataset you can capture is virtually unlimited – the only restriction is the size of your computer's hard disk!

The .picolog file format is compatible across all operating systems, and there is no need to set up a file to save to before the capture is complete. You can also save mid-capture if you wish to share the data collected so far. Since anyone can download and install PicoLog for free, you can easily share saved data with co-workers, customers and suppliers for offline post-analysis.

PicoSDK®

Pico's software development kit, PicoSDK, is available free of charge and allows you to write your own software and interface to third-party software packages.

Pico also maintains repositories of example code on GitHub (github.com/picotech), showing how to use PicoSDK with software packages such as Microsoft Excel, National Instruments LabVIEW and MathWorks MATLAB, or with programming languages including C, C++, C# and Visual Basic .NET.

PicoSDK and the *PT-104 Programmer's Guide* are available to download from www.picotech.com/downloads.



Try the PicoLog software today!

PicoLog's built-in demo mode allows you to try out the full functionality of the software with a choice of virtual devices and simulated live data. You also can use PicoLog to view previously saved data, even with no device connected. Visit www.picotech.com/downloads and select **PicoLog Data Loggers** to get your copy.

Specifications

Input/output			
Type	Temperature	Resistance	Voltage
Sensor	PT100, PT1000	n/a	n/a
Range	-200 to +800 °C	0 to 375 Ω 0 to 10 kΩ	0 to 115 mV 0 to 2.5 V
Accuracy (unit at 23 ±2 °C)	0.015 °C + 0.01% of reading	20 ppm at 100 Ω	0.4%
Temperature coefficient	5 ppm/°C	5 ppm/°C	100 ppm/°C
RMS noise with filter	0.01 °C	10 ppm	10 ppm
Resolution	0.001 °C	1 μΩ	0.156 μV
Overload protection	±30 V		
Number of inputs	4		
Converter resolution	24 bits		
Conversion time	720 ms per channel		
Input connectors	4-pin mini-DIN		
Input impedance			> 1 MΩ
Software			
PicoLog and PicoSDK	Available from www.picotech.com/downloads		
PicoSDK example code	Available from Pico's GitHub organization page, github.com/picotech		
PicoLog user interface languages	English, French, Italian, German, Spanish, Chinese, Japanese, Korean, Russian		
PC requirements			
PicoLog	Microsoft Windows 7, 8 or 10, 32-bit and 64-bit versions, macOS 10.9 (Mavericks) or later, 64-bit only, Linux*, 64-bit only Hardware requirements as operating system. *PicoLog for Linux is distributed as an AppImage, so you can install it without superuser permissions: see appimage.org for further information. The software has been tested on OpenSUSE and Ubuntu.		
PicoSDK ^[1]	Only available for Windows. Drivers also available for 64-bit Linux and macOS.		
PC interface	USB 2.0 full speed (USB 1.1 and USB 3.1 compatible)		
^[1] PicoSDK 10.6.11 are the last versions compatible with Microsoft Windows XP (SP3) and Vista SP2, and they are also compatible with the Windows versions above.			
Environmental			
Operating environment			
Temperature range	0 to 70 °C (20 to 30 °C for quoted accuracy)		
Humidity range	20 to 90 %RH, non-condensing		
Storage environment			
Temperature range	-20 to +80 °C		
Humidity	5 to 95 %RH, non-condensing		

Physical properties	
Dimensions	184 x 135 x 36 mm (approx 5.31 x 7.24 x 1.42 in)
Weight	350 g (approx 12.3 oz)
General	
Additional hardware (supplied)	USB 2.0 cable, Ethernet cable, user manuals
PC interface	USB 2.0 full speed (USB 1.1 and 3.1 compatible) and Ethernet
Power requirements	Powered from USB port or power over Ethernet compatible port
Compliance	European EMC and LVD standards FCC Rules Part 15 Class A RoHS compliant
Warranty	5 years



Compatible platinum resistance thermometers

Pico Technology offers a range of platinum resistance thermometers (PRTs) for use with the PT-104. The PT-104 is compatible with all standard PT100 and PT1000 PRTs, which offer high accuracy, resolution and stability.

Order code	Model	Temperature	Accuracy	Cable length	Material
SE017	PT100 air probe	-75 to +250 °C	±0.15 °C @ 0 °C Class A	1 m	Stainless steel probe, PVC cable
SE018	PT100 air probe	-60 to +500 °C	±0.3 °C @ 0 °C Class B	1 m	Stainless steel probe, PVC cable
SE012	PT100 probe 1/10 DIN accuracy	-50 to +250 °C	±0.03 °C @ 0 °C 1/10-DIN	2 m	Stainless steel probe, PTFE cable
SE011	PT100 general purpose probe	-30 to +350 °C	±0.15 °C @ 0 °C Class A	2 m	Stainless steel probe, PVC cable
SE016	PT100 heavy duty probe	-60 to +500 °C	±0.3 °C @ 0 °C Class B	1 m	Stainless steel probe, PVC cable
SE041	PT100 high-temperature stainless steel braided cable probe	-60 to +500 °C	±0.3 °C @ 0 °C Class B	2 m	Wire-wound sensor, four-core nickel conductors insulated in high-temperature fiberglass with stainless steel overbraid
SE014	PT100 immersion probe	-75 to +250 °C	±0.15 °C @ 0 °C Class A	1 m	Stainless steel probe, PVC cable
SE015	PT100 insertion probe	-75 to +250 °C	±0.15 °C @ 0 °C Class A	1 m	Stainless steel probe, PVC cable
SE019	PT100 low cost probe	-75 to +260 °C	±0.15 °C @ 0 °C Class A	1 m	Stainless steel probe, PVC cable

Also measures voltage and resistance

The optional PT-104 screw terminal adaptor (order code PP660) plugs into one channel on the data logger and has a set of 4 screw terminals, allowing you to connect wire-ended PRT sensors and custom circuits with voltage or resistance outputs to the data logger without any need for soldering. The four screw terminals allow for wire sizes of 2.5 mm² solid, 1.5 mm² stranded and 14-22 AWG with a maximum input range of 0 to 2.5 V.



Ordering information

Order code	Product name	Description
PP682	PT-104 Platinum Resistance Data Logger	Four-channel temperature, resistance and voltage measuring data logger

Optional accessories

Order code	Product name	Description
PP660	Screw terminal adaptor for PT-104	Connection accessory for PT-104
MI106	USB 2.0 cable, 1.8 m**	Replacement Pico blue USB 2.0 cable, 1.8 m
TA268	USB 2.0 cable, 0.5 m**	Pico blue USB 2.0 cable, 0.5 m
CC006	Calibration certificate for RTD loggers	Calibration service offered by Pico on its resistance temperature detector data loggers.



** Pico blue USB cables are designed and built specifically for use with Pico Technology oscilloscopes and data loggers in order to minimize voltage drop and noise. Take care to use your PT-104 data logger with Pico blue USB cables only.

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