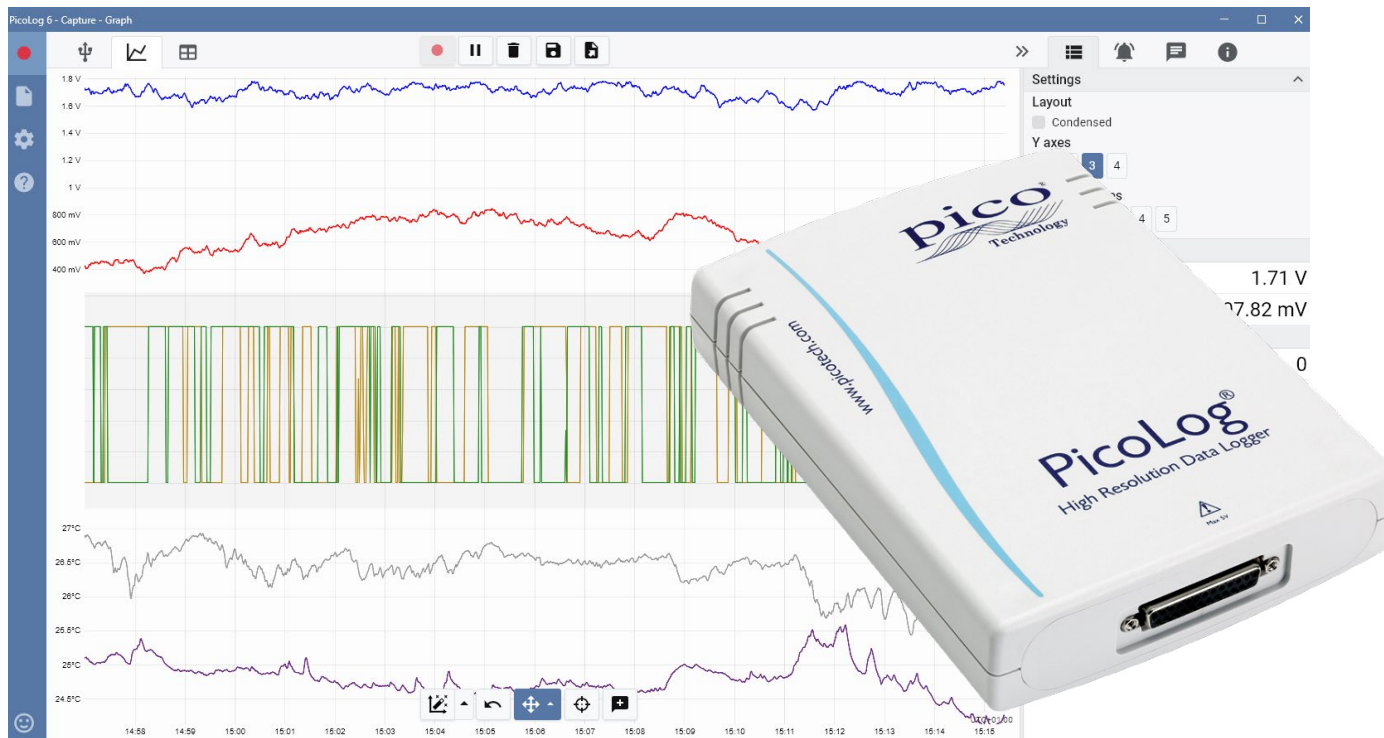# ADC-20 and ADC-24

High resolution data logger

Low cost, high precision

20 or 24-bit resolution

Measures up to 16 channels

Inputs configurable as single-ended or differential

Terminal board available for easy connections

Up to 7 input ranges (±39 mV to ±2.5 V)

Digital control outputs

USB isolation

Up to 15 measurements per second

Powered from USB port

Free to download PicoLog 6 data logging software

Multiple units can be run on a single PC

Compatible with Windows, macOS and Linux

www.picotech.com

High-resolution data acquisition

With up to 24-bit resolution, the ADC-20 and ADC-24 USB data loggers are able to detect small signal changes. Features such as true differential inputs, galvanic isolation and software-selectable sampling rates all contribute to a superior noise-free resolution and ensure that your measurements are reliable and accurate.

All Pico data acquisition products run PicoLog software that you can freely download from www.picotech.com/downloads. PicoLog is a complete data acquisition Pico software package for Pico Technology data loggers. It provides a visual, easy-to-use interface for you to quickly set up simple or complex acquisitions and to record, view and analyze data.

Multipurpose data acquisition

Both the ADC-20 and ADC-24 feature true differential inputs for excellent noise rejection. For greater flexibility each differential input can also be configured as two single-ended inputs. With up to eight differential or 16 single-ended inputs on the ADC-24, this gives you complete control over which type of inputs you use. If you require more channels, you can use multiple PicoLog data loggers on the same PC.

With seven bipolar voltage ranges on the ADC-24 and two on the ADC-20 they are versatile enough to be used with a wide range of sensors and signal types. There's also an external terminal board with screw terminals to allow you to quickly connect and disconnect different sensors.
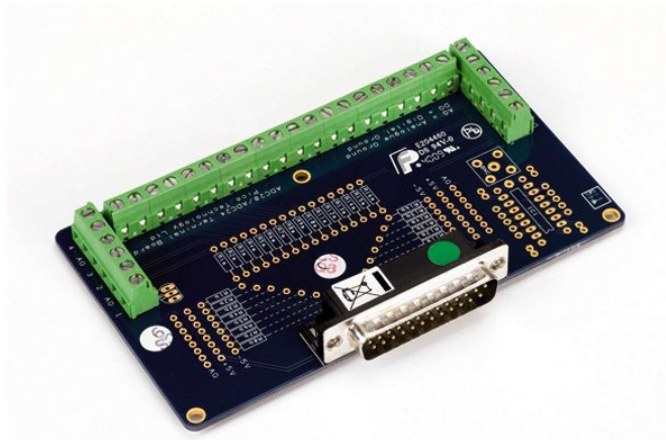
Additionally, the ADC-24 has four configurable digital input/output channels that can be used to control alarms or other devices. The flexibility of the ADC-20 and ADC-24 allows you to use these precision data loggers as an advanced multichannel data acquisition system with a low cost per channel.
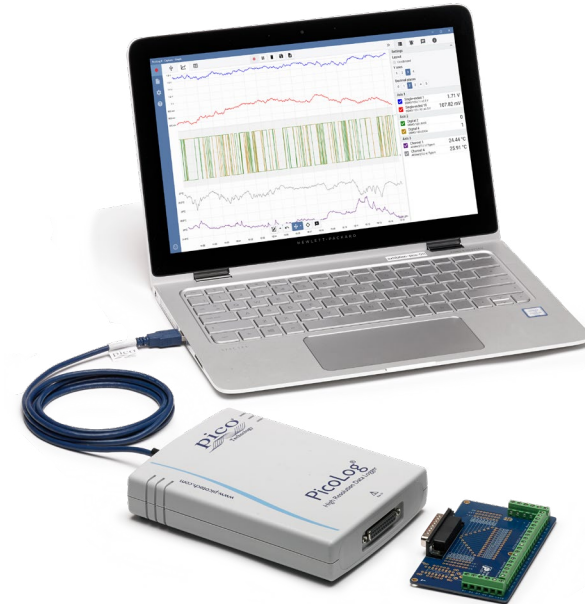
No need for power supplies or batteries

The high-resolution ADC-20 and ADC-24 are powered directly by your PC — eliminating the need for batteries or a separate power supply, and making them ideal when you need a portable data logger.

The answer to your data acquisition needs

High resolution, true differential inputs, galvanic isolation, and selectable sampling rates combine to ensure that your measurements are always precise and accurate. Configurable inputs, digital inputs and outputs, and programmable voltage ranges give you a truly flexible answer to your data acquisition needs.

When you need the ultimate in high resolution and accuracy, the versatile ADC-20 and ADC-24 provide you with a portable answer with the performance and flexibility you need.

ADC-20 and ADC-24 data loggers

PicoLog software – straightforward from the start

PicoLog is a complete data acquisition software package for the ADC-20 and ADC-24 data loggers, and is fully 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 taps, 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.
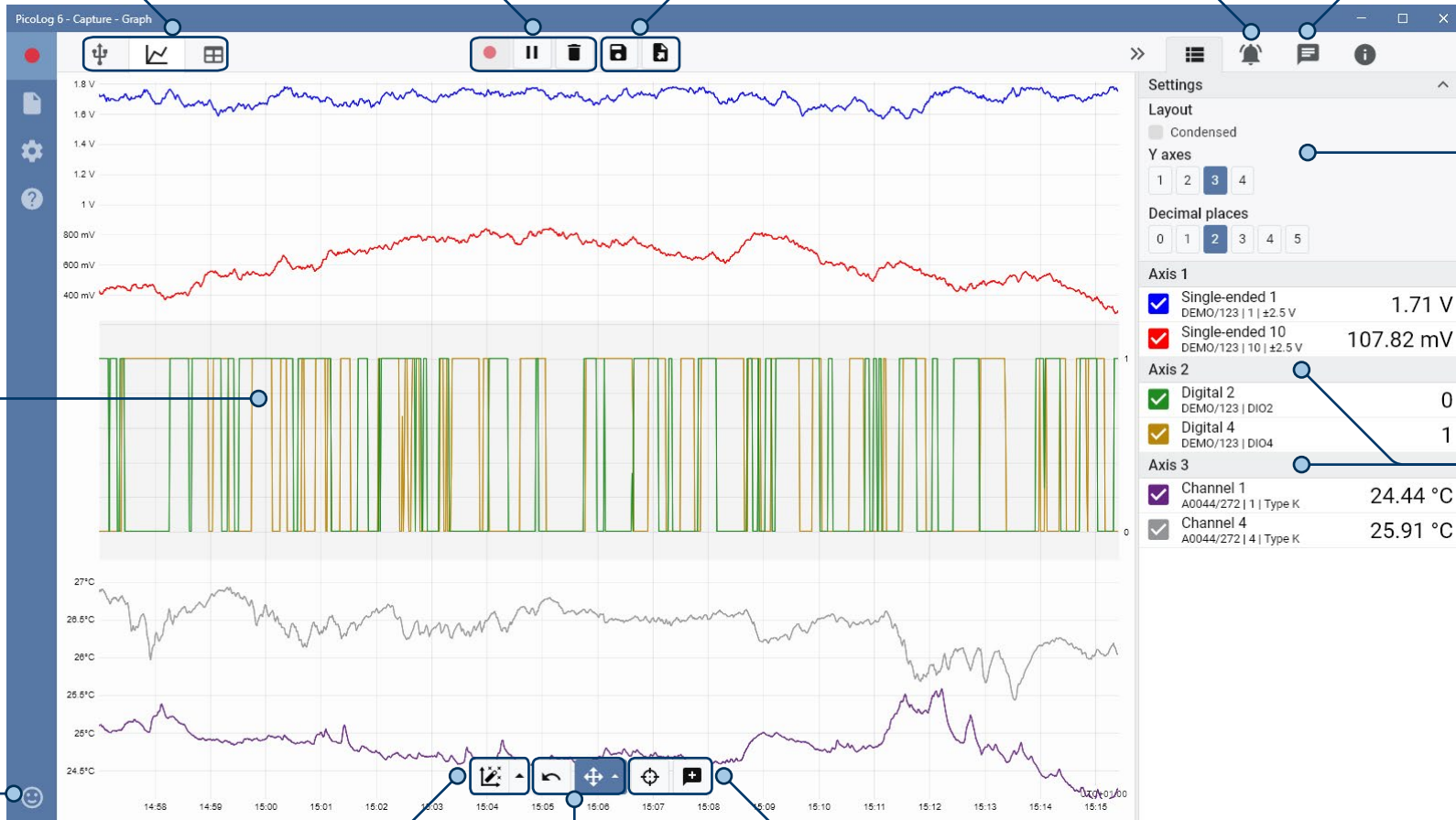
Pullout information panel
Manage your channel and axis settings, alarms, notes and capture information in this easy-to-read layout. Close the panel to make more room for the capture graph, and reopen it at any time.

Multiple devices
Log data on up to 20 devices at the same time. Here, two separate data loggers are in use: one ADC-24 voltage input data logger and one 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**.
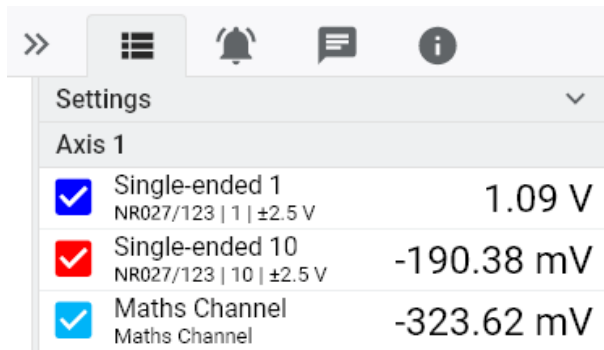
Cursors and annotations
Use cursors to highlight the data value and time at any point on the graph, or click **Add annotation** to mark that point with a text note.

ADC-20 and ADC-24 data loggers

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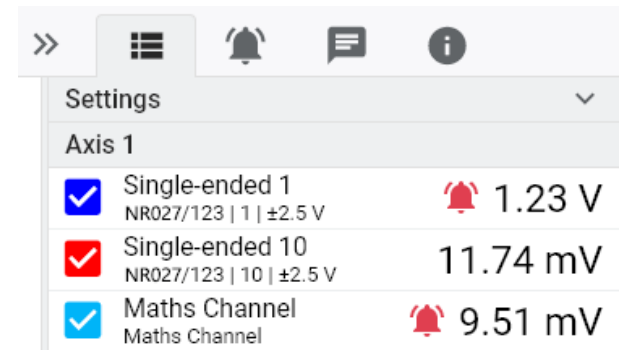
PicoLog treats math channels like any other channel, so you can still set alarms and annotate them.

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.
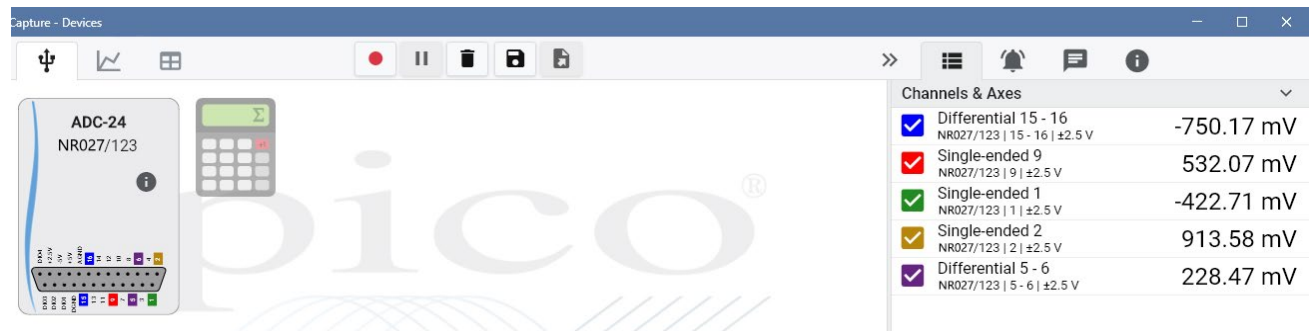

Intuitive logger and channel setup

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 ADC-24 logger set up for a combination of single-ended and differential inputs.

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 and will resume capturing 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 *ADC-20 and ADC-24 User's Guide* (which includes the 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.

ADC-20 and ADC-24 data loggers

Specifications

	ADC-20	ADC-24
Resolution	**20 bits**	**24 bits**
Number of channels[1]	4 differential / 8 single-ended	8 differential / 16 single-ended
Conversion time (per channel)	660 ms, 340 ms, 180 ms, 100 ms, 60 ms	
Voltage ranges	±2500 mV ±1250 mV	±2500 mV ±1250 mV ±625 mV ±312 mV ±156 mV ±78 mV ±39 mV
Gain error	0.2% of reading	0.1% (±39 mV to ±1250 mV ranges) 0.2% (±2500 mV range)
Offset accuracy	6 µV (±39 mV range) 7 µV (±78 mV range) 9 µV (±156 mV range) 13 µV (±313 mV range) 20 µV (±625 mV range) 36 µV (±1250 mV range) 400 µV (±2500 mV range)	

[1] The ADC-20 and ADC-24 have four and eight true differential input channels respectively. For flexibility each of these channels can be configured as either one differential channel or two single-ended channels.

Noise-free resolution and conversion time

Conversion time per channel	Voltage ranges & noise-free resolution (bits) for the full range of conversion times						
	±39 mV	±78 mV	±156 mV	±313 mV	±625 mV	±1250 mV	±2500 mV
	ADC-24 only					ADC-20 and ADC-24	
660 ms	17	18	19	20	20	20	20
340 ms	17	18	19	19	19	20	20
180 ms	16	17	18	19	19	19	19
100 ms	16	17	18	18	18	19	19
60 ms	15	16	17	18	18	18	18

	ADC-20	ADC-24
Noise rejection	120 dB typical at 50/60 Hz	
Input impedance	Differential: 2 MΩ Single-ended: 1 MΩ	
Common mode input range, channel to common	±1.9 V (±39 mV to ±1250 mV ranges) ±3.0 V (±2500 mV range)	
Common mode input range, common to earth ground	±30 V	

ADC-20 and ADC-24 data loggers

	ADC-20	ADC-24
Common mode rejection ratio, channel to common	95 dB (DC to 60 Hz)	
Common mode rejection ratio, common to earth ground	> 125 dB (DC to 60 Hz)	
Overvoltage protection	±30 V between any input and common	
Digital I/O	None	4 bidirectional (3.3 V CMOS) Output level, high: > 2.40 V Output level, low: < 0.40 V Input level, high: > 2.20 V Input level, low: < 0.88 V
Isolation (input to input)	None	
Isolation (input to ground)	Galvanic up to ±30 V AGND and DGND isolated	
Reference output	+2.5 V ±2.5 mV @ 2 mA +5 V ±1.0 V @ 2 mA −5 V ±1.5 V @ 2 mA	
Software		
PicoLog and PicoSDK	Available from www.picotech.com/downloads	
Example code	Available from Pico's GitHub organization page, github.com/picotech	
PicoLog user interface languages	English, French, Italian, German, Spanish, Korean, Japanese, Chinese (simplified), 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[2]	Only available for Windows. Drivers also available for 64-bit Linux and macOS.	
PC interface	USB 1.1 (USB 2.0 and 3.1 compatible)	
[2]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		
Temperature range, operating, for quoted accuracy	20 to 30 °C	
Temperature range, operating	0 to 45 °C	
Temperature range, storage	−20 to +60 °C	
Humidity range, operating	5 to 80 %RH, non-condensing	
Humidity range, storage	5 to 95 %RH, non-condensing	

ADC-20 and ADC-24 data loggers

General	
I/O connector	25-way D female
Power requirements	Powered from USB port, 100 mA (max.) A 4.4 m (13.8 ft) USB cable is permanently attached to the logger
Dimensions	135 x 184 x 36 mm (5.31 x 7.24 x 1.41 in)
Weight	Approx. 505 g (17.8 oz)
Compliance	European EMC and LVD standards FCC Rules Part 15 Class A
Warranty	5 years

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ESIS
Industrial Electronics

ADC-20 and ADC-24 data loggers

Ordering information

Order code	Product name	Description	USD*	EUR*	GBP*
PP308	ADC-20 Data Logger	8 channel, 20-bit resolution precision data logger	329	279	225
PP311	ADC-20 Data Logger including terminal board	8 channel, 20-bit resolution precision data logger including terminal board	359	309	249
PP309	ADC-24 Data Logger	16 channel, 24-bit resolution precision data logger	659	559	459
PP312	ADC-24 Data Logger including terminal board	16 channel, 24-bit resolution precision data logger including terminal board	689	589	479

Optional accessories

Order code	Product name	Description	USD*	EUR*	GBP*
PP310	ADC-20/24 terminal board	Allows easy connection to the ADC-20/24 data loggers.	42	35	29
CC008	Calibration: voltage logger	Calibration service offered by Pico on its voltage input data loggers.	83	70	58

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