



## USB RTD/Thermistor isoPod™ (Model EPU358)



- -25 to +125 °C electronic thermometer
- Use with 1000 ohm Pt RTD or 30 kohm thermistor
- High accuracy, user calibration not required
- Software controlled
- Plug and play with Pod-Vu software
- Electrical isolation minimizes noise and crosstalk

### Description

An electrically isolated, compact signal conditioner with a USB/virtual serial port connection, enabling continuous recording of temperature from suitable platinum RTD or NTC thermistor probes.

### Compatibility

The RTD/Thermistor isoPod can be used with:

- ET020 Thermistor Probe
- ET021 Pt-RTD Probe

The isoPod is compatible with Windows XP or later computers with USB port. A virtual serial port is created. Can be used with serial compatible software such as such as:

- Connect™, [www.labtronics.com/DI/RS232\\_Software.htm](http://www.labtronics.com/DI/RS232_Software.htm)
- WinVWedge®, [www.taltech.com/products/winwedge.html](http://www.taltech.com/products/winwedge.html)
- Tera Term, <http://logmett.com/>
- Pod-Vu, <http://www.edaq.com/>

or with your own software written in LabView, Visual Basic or C++ etc.

### Applications

The isoPod can be used as a general purpose laboratory thermometer for both research and teaching, including melting and boiling point determinations, measurements of heats of reaction, and calorimetric kinetic experiments.

### Calibration

High accuracy probes are used and the signal automatically calibrated with the Callendar-Van Dusen equation (ET021 RTD) or with the Steinhart-Hart equation (ET020 thermistor).

User calibration is not required for normal operation.

### Pod-Vu Software

A demonstration version of eDAQ Pod-Vu software is included on the isoPod Installer USB stick. If you have purchased Pod-Vu then a license code will also have been provided to enable all Pod-Vu features.

Pod-Vu will automatically configure the virtual serial ports and locate all connected USB isoPods. Refer to the Pod-Vu manual for operating instructions. Pod-Vu will communicate with up to eight isoPod units, calibrate sensors, log data, and graphically display the signals in real time.

### Specifications

Probe types:	1000 ohm Pt RTD, or 30 kohm thermistor
Connectors:	BNC, and mini USB
Accuracy:	$\pm 0.2^{\circ}\text{C}$ (0 – 70°C) ET020 Thermistor probe $\pm [0.10 + n/600]^{\circ}\text{C}$ at n°C ET021 RTD probe
Ranges:	-25 to +125°C with ET020 or ET021 probe -10 to +70°C with ET020 probe
DC drift:	< 5 $\mu\text{V}/^{\circ}\text{C}$
DC offset error:	< 0.1% full scale
Amplifier noise:	< 6 $\mu\text{V}$ p-p
Isolation:	> 250 V rms
Output data:	ASCII or 32 bit binary IEEE floating point
Output rate:	Up to 100 /s
Power:	< 50 mA from USB connection
Dimensions (l x w x h):	108 x 58 x 35 mm
Weight:	~200 g

*eDAQ Pty Ltd reserves the right to alter these specifications at any time.*

Notes:  
RTD, resistance temperature device.  
NTC, negative temperature coefficient.

[www.edaq.com](http://www.edaq.com)

E-mail: [info@edaq.com](mailto:info@edaq.com)

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## Serial Communications

The isoPod is fitted with a USB port. This can be used as a virtual serial port with Windows, Mac OSX, and Linux computers. USB drivers for Windows XP and later computers are located on the eDAQ USB stick supplied with the isoPod. Otherwise you can download a suitable driver from

<http://www.ftdichip.com/Drivers/VCP.htm>

Software can then be written to communicate with the isoPod as a serial (RS232) device, for example using LabView, Visual Basic, or C++.

The serial port number must first be established. Serial Ports 1 and 2 on Windows computers are reserved for the mother board. Thus it is common to find that the isoPod is located on serial port 3 (COM3) or greater.

The virtual serial port should be configured as 115200 baud, 8 bits, 1 stopbit, no parity. Set the flow control to NONE.

When correctly configured the unit will send the prompt **EPU358>** to indicate that a new command can be sent.

## Interactive Communication

You can use terminal emulation software (eg Tera Term) to manually interact with the isoPod:

1. Download the Tera Term installer from <http://logmeit.com>
2. Install Tera Term choosing the 'Compact Installation' option to reduce unnecessary extras.
3. Connect the isoPod and provide the computer with the isoPod Installer USB stick if a USB driver is requested.
4. Open the Windows device manager and find the isoPod and its corresponding COM port listed under 'Ports (COM & LPT)'. On first use there is no way to know in advance what COM port will be assigned to the isoPod, except that it will be COM3 or greater.
5. Start the Tera Term software, go to the Serial port... command in the Setup menu and configure the serial port as above. Click OK to return to the main Tera Term window and use the Return key to get the **EPU358>** prompt.

Once interactive communication is established you can be confident that the serial communications are working and can proceed to write your own software.

## Serial Protocol

**EPU358> help**

**EPU358> ?**

Returns a list of commands

**EPU358> set mode pt1k**

Set for use with a 1000 ohm platinum RTD  
A confirmation string is returned.

**EPU358> set mode therm**

Set for use with a 30 kohm NTC thermistor.  
A confirmation string is returned.

**EPU358> get mode**

Returns the present mode.

**EPU358> set dp <n>**

Set the number, <n>, of decimal places to be displayed from 0 – 3.  
A confirmation string is returned.

**EPU358> get dp**

Returns the decimal place setting.

**EPU358> set range <r>**

The thermistor probe can have a range setting, <r>, of 75 or 125 (in °C).  
The range is always set to 125°C in RTD mode.

**EPU358> get range**

Returns the range setting.

**EPU358> r**

Return a single reading. Can be repeated at up to 10 Hz.

**EPU358> v**

Return a single value. That is, the reading is returned as a number, without extraneous text such as unit name etc. Can be repeated at up to 10 Hz.

**EPU358> sample ascii <freq> [N]**

**EPU358> sample binary <freq> [N]**

Return readings at a frequency of <freq>, an integer between 1 and 100 Hz. Readings are returned as ASCII or 32 bit binary IEEE floating point data. Specify an optional integer, [N], to return that number of samples. Send ! to exit this mode. If <freq> is the character # the a single sample is returned every time a # is sent, or send ! to exit this mode.

**EPU358> interval ascii <time> [N]**

**EPU358> interval binary <time> [N]**

Return one sample every <time> seconds. Specify an optional integer, [N], to return a fixed number of samples. Send ! to exit this mode.

**EPU358> version**

Returns the firmware version number.

**EPU358> prompt off**

Turns off the **EPU358>** prompt.

**prompt on**

Reinstates the **EPU358>** prompt.

## How to start

If you intend to write your own software using these protocols then it is a good idea to commence by sending each command manually to the isoPod using a terminal emulation program for example Tera Term, see above. This will confirm the responses expected, so that you can be sure that any recent changes in the protocols will be accounted for.