

## Peltier temperature control

### Integrated thermostating and temperature ramping options for your Thermo Scientific UV-Vis Spectrophotometer

Temperature control and sample stirring are important for many UV-Visible analysis methods. Thermo Scientific™ Peltier Thermostatted Accessories outperform traditional heater/chiller units to deliver superior performance with:

- Compact integrated design
- Simple setup
- Fast, precise temperature control

#### Air-cooled Peltier Accessory for the Thermo Scientific GENESYS™ 140-180 and Thermo Scientific BioMate™ 160 Spectrophotometers

- Integrated temperature measurements with no external controller
- Precise temperature control from 20 to 60 °C
- In-cuvette magnetic stirring
- Zero maintenance and worry-free performance

Control temperature and in-cuvette stirring directly on the touch screen software or through computer control software.



#### Liquid-cooled Peltier Accessories for the Thermo Scientific Evolution™ Spectrophotometers

- Wider temperature range from 0 to 110 °C
- Multiple cell efficiency for higher sample throughput
- Controlled temperature ramping capability in Thermo Scientific Insight™ Pro Software for DNA melting experiments
- Choose between coolant (pictured) or water-based systems
- Flexible options to fit many lab configurations



# Advantages of Peltier Thermostating Systems

## Exceptional stability

Unlike recirculating water systems that rely on the transfer of heat to a large volume of liquid, Peltier-based temperature control devices offer exceptional temperature stability and fast temperature transitions. The data in Figure 1 illustrates the small temperature differential between the set temperature of the accessory and the temperature as measured inside a standard, 1 cm cuvette.

| Set temperature (°C) | Measured temperature (°C) |
|----------------------|---------------------------|
| 20                   | 20.4                      |
| 37                   | 36.8                      |
| 60                   | 58.9                      |

Table 1. Temperature difference after 20 minutes.

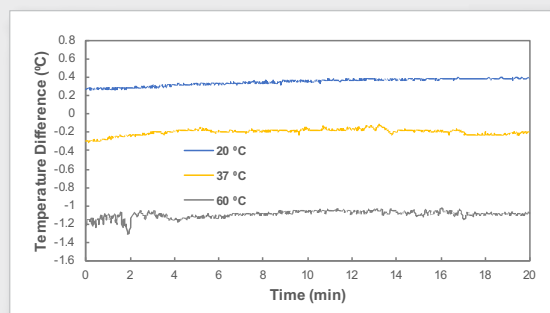


Figure 1. Deviation between the set point temperature (Peltier block temperature) and the temperature measured inside a standard, 1 cm cell filled with water. Data obtained using a Peltier Thermostatted Cell Holder with a GENESYS 180 Spectrophotometer.

## Less maintenance and flood risk

Compared to traditional large-volume recirculator systems that rely on 4 L or more of water/anti-freeze mixture, Peltier Thermostating Systems eliminate or substantially reduce both routine maintenance and flood impact in the event of a hose failure. Thermo Scientific liquid-cooled systems use a small volume of recirculating liquid (water or coolant) that requires only occasional topping up and different stop-gap measures to shut the system off in the event of failure (such as with hoses or water levels).

- Zero maintenance with air-cooled designs
- Low maintenance with water-cooled designs
- No additional pumps or tanks required
- No flood risk



SPG-1A Air-cooled Peltier System for GENESYS 140–180 and BioMate 160



6-Cell Peltier Accessory

## Single-cell and Multi-cell Peltier Accessories for the Evolution Series

### Thermostating with external control

Use the external controller to specify temperature to a precision of 0.1 °C in water-cooled Peltier Accessories in the Evolution Series Spectrophotometer. Choose from multiple cell configurations, including single, 6-, and 8-cell holders. The single-cell holder can cool to 0 °C and heat up to 110 °C. The 8-cell holder can be cooled to 5 °C and heated to 100 °C.

## Fast ramping

All Thermo Scientific Peltier Accessories offer precise temperature control with careful approach to the set point temperature. Precision electronics allow thermal equilibrium to be reached rapidly inside the cell without exceeding the set point temperature and risking damage to the sample. Figure 2 shows the ramping profile of the SPG-1A Air-cooled accessory as the set point temperature approaches 25 °C. The efficiency of the ramping is also demonstrated in Table 2 where equilibrium data for two common temperature transitions is given.

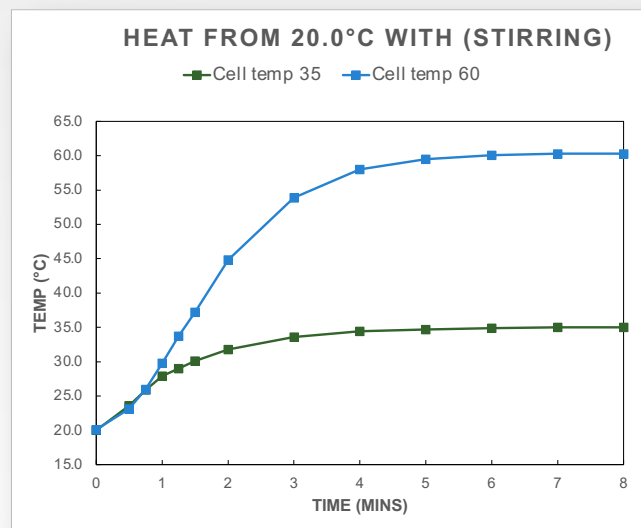


Figure 2. The temperature of two solutions were monitored in standard quartz cuvettes while stirring. The temperature of the solution was measured with a probe over 8 min while heating from 25 °C to 35 °C and from 25 °C to 60 °C.

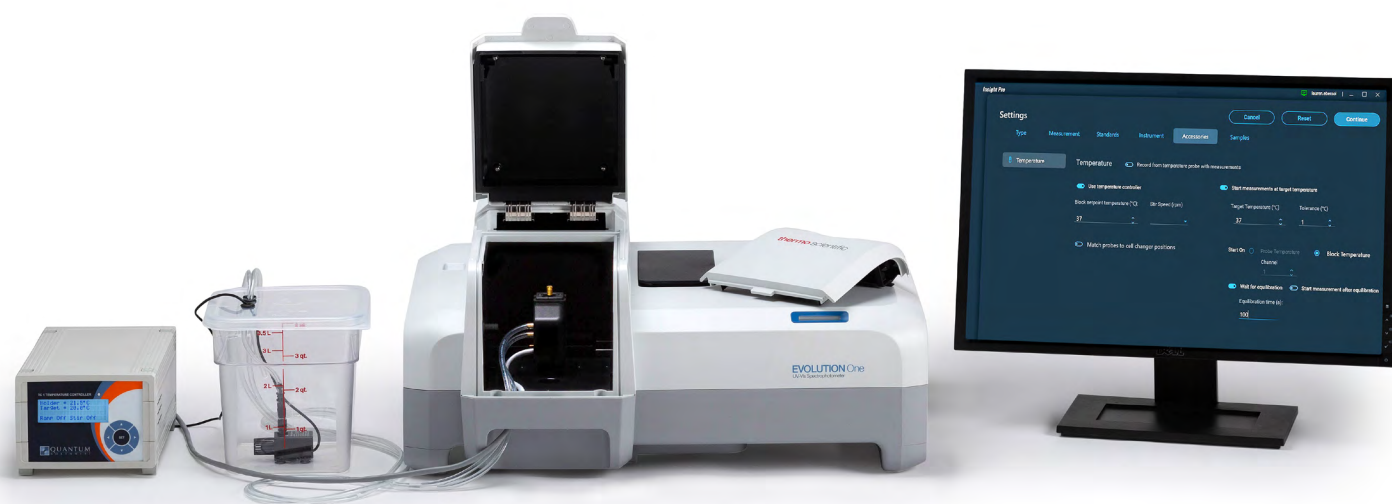
| Temperature change (°C) | Time to Equilibrium (min) |
|-------------------------|---------------------------|
| 20–35                   | 4.5                       |
| 20–60                   | 5.5                       |

# Liquid-cooled power for extended temperature range on Evolution Spectrophotometers

The Thermo Scientific Peltier module integrates a control module and a recirculator to provide both electronic control of temperature and a flow of liquid to act as a heat sink for the Peltier element in the sample compartment. No laboratory water flow are required.

## Precise thermostating

Peltier Accessories for the Evolution UV-Visible Spectrophotometers utilize re-circulating water as an effective heat sink to allow the Peltier element to heat or cool the block over a wide temperature range. The single-cell holder can reach as low as 0 °C and as high at 110 °C. Thermo Scientific offers 3 Peltier options to cover many possible applications, including a multi-cell unit. Stirring control for the single cell holders is provided when you place a micro-stir bar inside the cuvette. Unlike thermostating with a traditional re-circulating water bath where a large volume of liquid must be heated or cooled, heating or cooling the cell holder with the Peltier effect means more rapid and more precise temperature control. Choose between water or chemical coolant to best fit your needs.



Single-cell Peltier System with water reservoir for Evolution Spectrophotometers.

## Temperature ramping

Insight Pro Software takes control and allows you to implement programmed temperature ramping with multiple ramp and hold cycles.

Add a thermocouple and thermocouple hub and you can monitor the exact temperature in each cell as you perform heating and cooling cycles to study DNA denaturation and renaturation or other complex temperature programmed experiments using Insight Pro Software.

|   |                            |
|---|----------------------------|
| Maximum ramp and hold cycles per experiment | 20                         |
| Maximum ramp rate                           | 10 °C per minute           |
| Minimum ramp rate                           | At least 0.4 °C per minute |



Single-cell PCCU1 Peltier System for Evolution Spectrophotometers.



## Air-cooled simplicity for GENESYS and BioMate Systems

The Peltier Thermostatted Single Cell Holder Accessory for the GENESYS 140/150/180 and BioMate 160 delivers precise fixed point temperature control between 20 and 60 °C. Quickly specify the temperature for the analysis to a precision of 0.1 °C, and control the rate of stirring. The temperature is controlled directly through the instrument touch screen software which enables easy experiment setup. Full temperature control with PC software is also available with optional Thermo Scientific VISIONlite™ Software.

### Lower cost, more bench space, and no maintenance

The air-cooled Peltier Accessory is less expensive than most re-circulating liquid temperature controllers and delivers better performance with absolutely no maintenance. The Peltier control system provides high accuracy temperature control without the need to watch water levels, mix in anti-freeze or anti-bacterial, or plumb the accessory with hoses and clamps. Additionally, the accessory is room light resistant which enables measurements to be taken with the lid open or removed.

### Ideal for life science assays

Designed for biologically relevant assays that require temperature control at 25, 37, 40 and 50 °C, the Air-cooled Peltier accessory is ideal for the life science laboratory. A perfect companion for the GENESYS and BioMate Spectrophotometers, this accessory gives you temperature control for kinetics or routine life science analysis. With a wide 20 to 60 °C temperature range, a variety of assays can be accomplished with this accessory.



## Selection guide, specifications, and ordering information

| Unit                                | Peltier Thermostatted Cell Holder for GENESYS  | Single-cell water-cooled Peltier Accessory     | 6-Cell water-cooled rotary Peltier Accessory   | 8-cell water-cooled Peltier Accessory |
|-------------------------------------|--|--|--|---------------------------------------|
| Applications                        | <ul style="list-style-type: none"> <li>Biochemical kinetics</li> <li>Enzymatic food analysis</li> <li>Equilibrium studies</li> </ul> |  | <ul style="list-style-type: none"> <li>Kinetics studies</li> <li>Equilibrium studies</li> <li>DNA melting</li> </ul>   |                                       |
| Compatible spectrophotometers       | <ul style="list-style-type: none"> <li>GENESYS 140</li> <li>GENESYS 150</li> <li>BioMate 160</li> <li>GENESYS 180</li> </ul>         |  | <ul style="list-style-type: none"> <li>Evolution One</li> <li>Evolution One Plus</li> <li>Evolution Pro</li> </ul>   |                                       |
| Control from remote control unit    | No, local instrument control   | Yes  | Yes  | Yes                                   |
| Control from computer software      | Yes with VISION <sup>lite</sup> Software   | Yes with Insight Pro Software                  | Yes with Insight Pro Software  | Yes with Insight Pro Software         |
| Accessible temperature range        | 20–60 °C   | 0–110 °C <sup>1</sup>                          | 0–110 °C <sup>1</sup>  | 5–100 °C                              |
| Ramp rate <sup>2</sup> (per minute) | NA   | 0.01–10 °C                                     | 0.01–10 °C   | 0.4–10 °C                             |
| Includes stirring                   | Yes  | Yes  | Yes  | Yes                                   |
| Part number                         | 840-306600   | 699-131100<br>(coolant based system: 912A1199) | 912A1279 <sup>3</sup><br>912A1280 <sup>3</sup><br>912A1281 <sup>3</sup><br>912A1282 <sup>3</sup><br>912A1283 <sup>3</sup><br>912A1284 <sup>3</sup><br>840-406600 | 699-131200                            |

<sup>1</sup> Maximum setpoint with external controller is 101 °C. Maximum setpoint in Insight Pro Software is 110 °C.

<sup>2</sup> Maximum achievable ramp rates listed are near the mid-point of the accessible temperature range. Maximum ramp rates near the limits of the accessory's temperature range are lower.

<sup>3</sup> These part numbers allow to bundle the purchase of a Peltier with an Evolution instrument for the best value.