

Source Temperature Controller

- Easy and Safe front loading
- Multiple temperature range models
 - 15°C- 40°C
 - 35°C-70°C (1)
 - 55°C-90°C (1)
- Static accuracy 0.2°C
- Level sensing options
 - Quartz
 - Stainless
- Multiple ampules
 - Styles
 - Materials
 - Sizes
- Alphanumeric Display



• Remote Electronic Models

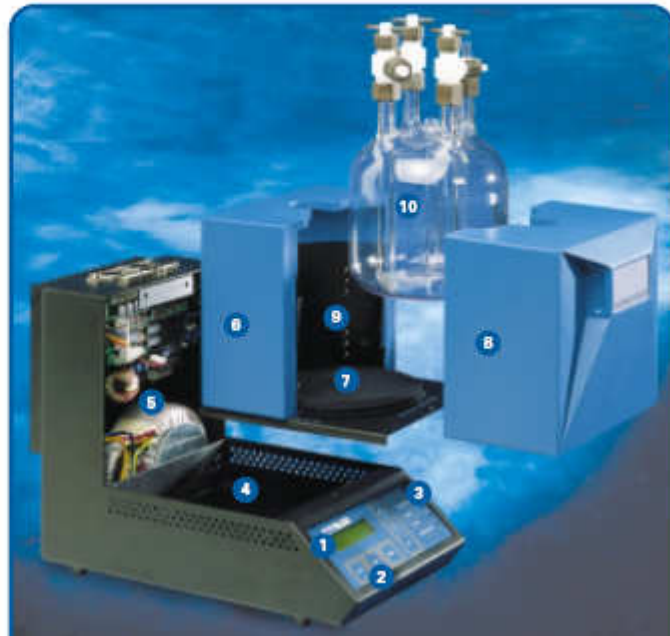
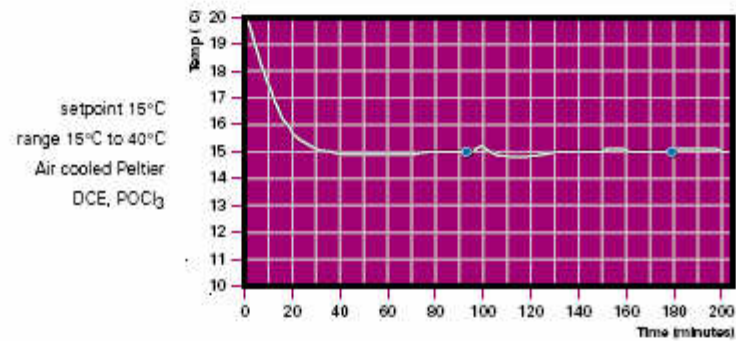




TC 2000™ Model C/H (Cool/Heat)

The model C/H uses an air cooled Peltier element to either heat or cool the ampule. Because there are no moving parts, this heating/cooling system is very reliable. Under normal operating conditions, the Peltier element has an average lifetime of 100,000 hours. The operating temperature range of the Model C/H is 15°C to 40°C. The Model C/H is designed to control source materials such as DCE, POCl₃ which require operating temperatures near room temperature. It has a built-in, removable spill containment system as one of its safety features.

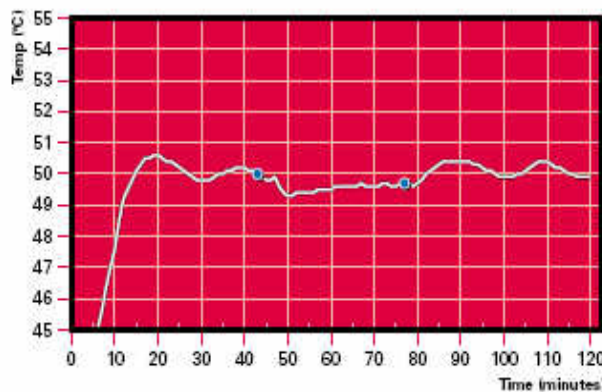
The temperature response curve shown below explains the ampule temperature versus time. At the first dot the process is started and at the second dot the process is stopped.



TC 2000™ Model H (Heat) Model HH (Ultraheat)

The model H and HH use a low voltage resistance type heating element to control the temperature of the ampule. The heater consists of an outer cover made from fiberglass reinforced silicone rubber which is resistant to attack by most chemicals and will not deteriorate with age. The resistance element is interwoven with a glass thread to provide additional breakage protection. The entire assembly is vulcanized to provide a tough, tear resistant heating element. The operating temperature range of the Model H is 35°C to 70°C and from the Model HH 55°C to 90°C. Both models are designed to control source materials such as TEOS which require higher operating temperatures. It has a built-in, removable spill containment system as one of its safety features.

The temperature response curve shown below explains the ampule temperature versus time. At the first dot the process is started and at the second dot the process is stopped.



setpoint 65°C
range 35°C to 70°C
Low voltage heater
TEOS, ...

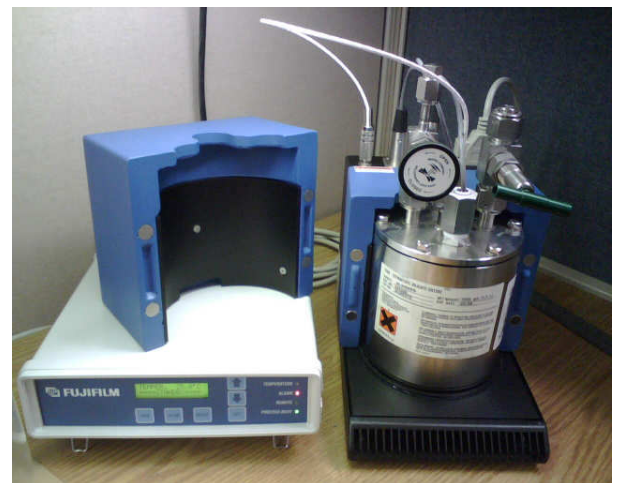
Components

- 1 Alpha-numeric LCD dot matrix display with LED back lighting
- 2 Push buttons to select menus and program parameters
- 3 LED indicators for Temperature (red/green)
 - Alarm
 - Remote control active
 - Process busy
- 4 Removable spill containment pan
- 5 Electronics and power supply section isolated from chemicals
- 6 Fixed polyurethane insulation cover
- 7 Anodized aluminium hot plate/cool plate
- 8 Removable polyurethane insulation cover to allow front loading
- 9 Liquid level sensors for Empty
 - 1 cm
 - 2 cm
 - Start auto refill
 - Stop auto refill
 - Overflow safety
- 10 0.5/1.0/1.5 liter quartz ampules
0.5/1.2 liter stainless steel ampules

Level Sensing

Chemicals are contained in either a Quartz ampoule or in a Stainless Steel ampoule. These ampoules are inserted into the easy opening front of the TC-2000. The containers are NOT part of the TC-2000 but can be ordered separately from FFEM. Both containers integrate with the TC-2000 level sensors and controls.

- IR light sensors monitor the level inside of the Quartz ampoule. IR transmitters are located on one side of the TC-2000, and receivers are on the other. If the level drops below the IR beam, the light is received by the sensor, and the signal is interpreted by the TC-2000. For refilling operations, the TC-2000 monitors six levels: empty, 1 cm, 2 cm, refill, stop refill, and high/overflow. For non-refill operation, operators can choose the appropriate level for ampoule exchange.
- Stainless Steel ampoules utilize quartz rods for level sensors. Quartz rods, with IR transmitters and receivers, are part of the SS ampoule. The standard FFEM SS containers have three quartz level sensors to monitor 4 levels: empty, refill, stop refill, and overflow/high. Two level sensor cables plug directly into the top of the TC-2000 to communicate this information to the TC-2000.
- Refill control and communication is via a separate liquid level controller, or a more complicated Valve Junction Box.



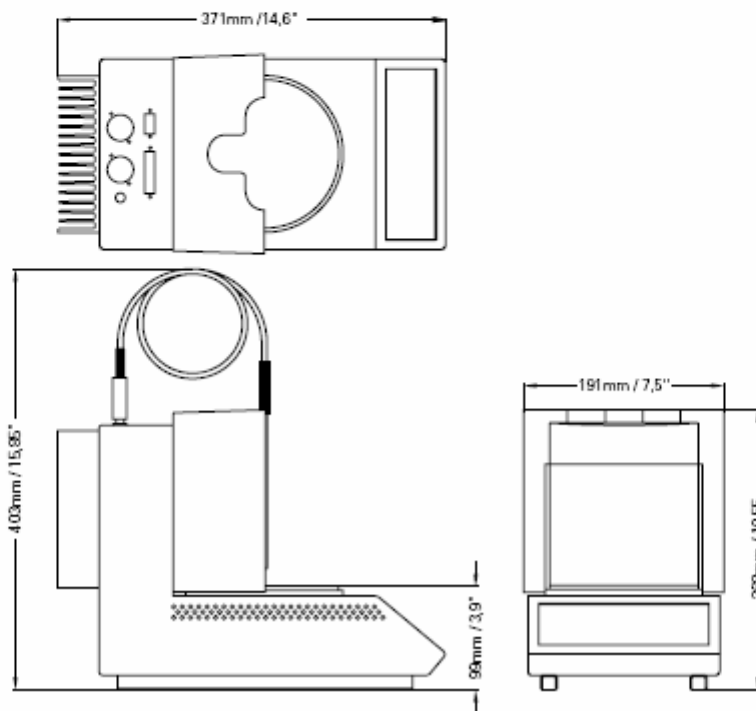
**Remote model
pictured**

TC 2000™ Source Temperature Controller

Key Features

Accuracy: _____ 0.2°C
 Level sensing: _____ 6 point for quartz, 2 or 4 point for stainless steel
 Alphanumeric display: _____ menu based, alarm messages, standby and run mode
 Adaptable for: _____ 0.5/1.0/1.5 liter quartz ampules; 0.5/1.2 liter stainless steel ampules - autorefill capable
 Spill containment: _____ stainless steel trap
 Overtemperature shutdown: _____ hard & software
 Weight: _____ 11 kg.
 Remote I/O connector
 Isolated electronics from chemical compartment

Outline TC2000™



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