PTP-1 Fluorescence
User's Guide

Release History

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Introduction

Introduction

The Peltier Temperature Programmer (PTP) model PTP-1 permits spectrophotometric measurements at controlled temperatures between 0 and 100 °C. Measurements can be made at constant or variable temperatures according to a prefixed program. The PTP-1 can be connected to an LS 55, LS 50B or LS 45 spectrometer, however an LS 45 must have the LS 45 Accessory Upgrade Kit (L2250162) fitted. The PTP-1 can be interfaced with a PC running Temp Scan software, or it can be programmed from the unit itself.

Heating and cooling is obtained by thermoelectrical means, the Peltier effect. It is possible, therefore, to study dependences of spectrophotometric properties with temperature and investigate temperature-dependent transitions, for example, protein denaturation. The sample can be agitated by placing a magnetic stirrer in the cuvette.

This User's Guide contains the following chapters:

- Introduction;
- Warnings and Safety Information;
- Installation;
- Description;
- Operation;
- Configuration and Maintenance.

Conventions Used

Definitions

OPERATOR: Person operating the equipment for its intended purpose.

RESPONSIBLE BODY: Individual or group responsible for the use and maintenance of the equipment and for ensuring that the **OPERATORS** are adequately trained.

SETPOINT: The setpoint is the required temperature.

RAMP: Ramp is a period of increase or decrease in temperature.

SOAK: Soak is a period when there is no change in temperature.

Text conventions

Normal text is used to provide information and instructions.

Italic text is used to provide commentary.

All eight digit numbers are PerkinElmer part numbers unless stated otherwise.

Three terms, in the following standard formats, are also used to highlight special circumstances and warnings.

NOTE: A note indicates additional, significant information that is provided with some procedures.

CAUTION	*We use the term CAUTION to inform you about situations that could result in **serious damage to the instrument** or other equipment. Details about these circumstances are in a box like this one.*
D	***Caution (Achtung)*** *Bedeutet, daß die genannte Anleitung genau befolgt werden muß, um einen **Geräteschaden** zu vermeiden.*
DK	***Caution (Bemærk)*** *Dette betyder, at den nævnte vejledning skal overholdes nøje for at undgå en **beskadigelse af apparatet**.*
E	***Caution (Advertencia)*** *Utilizamos el término **CAUTION** (ADVERTENCIA) para advertir sobre situaciones que pueden provocar **averías graves en este equipo** o en otros. En recuadros éste se proporciona información sobre este tipo de circunstancias.*
F	***Caution (Attention)*** *Nous utilisons le terme **CAUTION** (ATTENTION) pour signaler les situations susceptibles de provoquer de **graves détériorations de l'instrument** ou d'autre matériel. Les détails sur ces circonstances figurent dans un encadré semblable à celui-ci.*
I	***Caution (Attenzione)*** *Con il termine **CAUTION** (ATTENZIONE) vengono segnalate situazioni che potrebbero arrecare **gravi danni allo strumento** o ad altra apparecchiatura. Troverete informazioni su tali circostanze in un riquadro come questo.*
NL	***Caution (Opgelet)*** *Betekent dat de genoemde handleiding nauwkeurig moet worden opgevolgd, om **beschadiging van het instrument** te voorkomen.*
P	***Caution (Atenção)*** *Significa que a instrução referida tem de ser respeitada para evitar a **danificação do aparelho**.*

WARNING

*We use the term WARNING to inform you about situations that could result in **personal injury** to yourself or other persons. Details about these circumstances are in a box like this one.*

D

Warning (Warnung)
*Bedeutet, daß es bei Nichtbeachten der genannten Anweisung zu einer **Verletzung** des Benutzers kommen kann.*

DK

Warning (Advarsel)
*Betyder, at brugeren kan blive **kvæstet**, hvis anvisningen ikke overholdes.*

E

Warning (Peligro)
*Utilizamos el término **WARNING** (PELIGRO) para informarle sobre situaciones que pueden provocar **daños personales** a usted o a otras personas. En los recuadros como éste se proporciona información sobre este tipo de circunstancias.*

F

Warning (Danger)
*Nous utilisons la formule **WARNING** (DANGER) pour avertir des situations pouvant occasionner des **dommages corporels** à l'utilisateur ou à d'autres personnes. Les détails sur ces circonstances sont données dans un encadré semblable à celui-ci.*

I

Warning (Pericolo)
*Con il termine **WARNING** (PERICOLO) vengono segnalate situazioni che potrebbero provocare **incidenti alle persone**. Troverete informazioni su tali circostanze in un riquadro come questo.*

NL

Warning (Waarschuwing)
*Betekent dat, wanneer de genoemde aanwijzing niet in acht wordt genomen, dit kan leiden tot **verwondingen** van de gebruiker.*

P

Warning (Aviso)
*Significa que a não observância da instrução referida poderá causar um **ferimento*** ao usuário.

Warnings and Safety Information

General Operating Conditions

This instrument has been designed and tested in accordance with the safety requirements of the International Electrotechnical Commission (IEC). The spectrometer conforms to IEC publication 61010-2-010 ('Safety requirements for electrical equipment for measurement, control and laboratory use – particular requirements for laboratory equipment for the heating of materials') as it applies to IEC Class 1 (earthed) appliances and therefore meets the requirements of EC Low Voltage Directive 73/23/EEC, amended by 93/68/EEC.

Only use the instrument indoors and under the following conditions:

Temperature	15 ^{o}C to 35 ^{o}C
Relative Humidity	75% maximum (non-condensing)

If possible, avoid any adjustment, maintenance and repair of the opened, operating instrument. If any adjustment, maintenance and repair of the opened instrument are necessary, this must be done by a responsible person who is aware of the hazard involved.

Whenever it is likely that the instrument is unsafe, make it inoperative. The instrument may be unsafe if it:

- Shows visible damage;
- Fails to perform the intended measurement;
- Has been subjected to prolonged storage in unfavorable conditions;
- Has been subjected to severe transport stresses.

Environmental Conditions

The instrument has been designed to be safe under the following conditions:

- Indoor use;
- Altitude up to 2000 m;
- Ambient temperatures of 5 ^{o}C to 40 ^{o}C;
- A maximum relative humidity of 80% for temperatures up to 31 ^{o}C, decreasing linearly to 50% relative humidity at 40 ^{o}C;
- Mains fluctuations not exceeding $\pm$ 10% of the nominal voltage.

WARNING

If the equipment is used in a manner not specified herein, the protection provided by the equipment may be impaired.

Electrical Safety

Connect the PTP-1 to a power supply line that includes a switch or other adequate means of disconnection from the electricity supply.

Only plug the PTP-1 into an electricity supply socket that is provided with a protective ground (earth) connection.

To ensure satisfactory and safe operation of the instrument it is essential that the green/yellow lead of the line power cable is connected to a true electrical ground.

If any part of the instrument is not installed by a PerkinElmer Service Engineer, ensure that the line power plug is correctly wired.

	Cable Lead Colors	
Terminal	**International**	**USA**
Live	Brown	Black
Neutral	Blue	White
Earth/Ground	Green/Yellow	Green

WARNING

Any interruption of the protective ground (earth) conductor inside or outside the instrument or disconnection of the protective ground (earth) terminal can make the instrument dangerous.

Intentional interruption is prohibited.

Even with the power switch off, line power voltages can still be present within the instrument.

If the fuses need replacing, use only those with the required current rating and the specified type. Do not use makeshift fuses and do not short-circuit fuse holders.

When the instrument is connected to the electricity supply, the terminals may be live. Removing covers other than those which can be removed by hand is likely to expose live parts.

Capacitors inside the instrument may still be charged even if the instrument has been disconnected from all voltage sources.

Disconnect the instrument from all voltage sources before it is opened for any adjustment, replacement, maintenance or repair. Any adjustment, replacement, maintenance or repair must be carried out by a PerkinElmer Service Engineer or other responsible body who is aware of the hazard involved.

Electrical Protection

Installation Category - the instruments are able to withstand transient overvoltages typically present on the MAINS supply. The normal level of transient overvoltages is impulse withstand (overvoltage) category II of IEC 60364-4-443.

Pollution Degree 2 – usually only non-conductive atmospheric pollution of the equipment occurs; occasionally, however, a temporary conductivity caused by condensation must be expected.

Insulation Class 1 rating for external circuits – only connect equipment that meets the requirements of IEC 61010-1, IEC 60950 or equivalent standards.

Electrical Requirements

Supply Voltage	110 V, 120 V, 220 V, 240 V, AC 50/60 Hz

NOTE: See Figure 9 and Figure 10 on page 55 for instructions how to set the correct voltage on the fuse block located on the back panel above the power switch.

Power consumption	100 VA

Location and Ventilation

To allow for adequate cooling the system should not be sited near to room heating equipment, for example, central heating radiators.

CAUTION

Do not obstruct the cooling vents on the top panel of the PTP-1.

WARNING

To prevent accidental spillages and damage to the PTP-1, do not stand cups of liquid on top of the instrument.

If any liquid does enter the main body of the PTP-1, switch off the accessory immediately and make it inoperative. Contact your local PerkinElmer Service Engineer.

WARNING

Make sure that the electricity supply inlets on the instrument are not obstructed i.e. leave a gap to allow easy disconnection from the electricity supply.

EMC Compliance

EC directive

This instrument has been designed and tested to meet the requirements of the EC Directive 89/336/EEC. The instrument complies with the EMC standard EN 61326-1 (EMC standard for electrical equipment for measurement, control and laboratory use).

FCC rules and regulations

This product is classified as a digital device used exclusively as industrial, commercial, or medical test equipment. It is exempt from the technical standards specified in Part 15 of the FCC Rules and Regulations, based on Section 15.103 (c).

Installation

Installation

Unpack the components carefully and lay them out for easy identification. Keep the packing material for possible future storage or shipment.

Examine the components for signs of damage in shipment. In the event of damage, file an immediate claim with the authorized carrier and contact your nearest PerkinElmer office or representative.

Figure 1 PTP-1 with LS 55 spectrometer

The Biokinetic Accessory

The Biokinetic Accessory (L2250145) is a thermostatted, stirred single cell holder which is used with the PTP-1 for fluorescence measurements. The accessory accepts 12.5 mm (10 mm pathlength) square cuvettes. The temperature of the sample can be regulated by circulating a thermostatically controlled liquid through an internal passage in the cell holder. A reaction taking place in the cell can be stirred using a magnetic stirrer which is controlled from the PC using the Status dialog in the FL WinLab software. The cell requires 3 ml of solution for analysis. The Biokinetic Accessory also has the facility for event marking.

NOTE: A thermostatically controlled water bath and pump are required. The accuracy of the temperature control depends largely on the performance of the water bath. The temperature difference across a cell is approximately 0.5 °C at 37 °C.

The Status dialog displays the Block Temperature, which is the temperature that the Biokinetic Accessory reads (the maximum readable temperature is 100 °C). The temperature of the sample may be different from the block temperature, but it can be calculated using the Temperature Factor (see *Setting the Temperature Calibration Parameters* on page 43).

CAUTION *Never connect or disconnect any cables while the spectrometer is switched on. Damage to the printed circuit boards may occur.*

Installation of the Biokinetic Accessory

To install the cell holder:

1. Open the sample compartment cover and remove the existing accessory.

2. Feed the flat connecting cable from the Biokinetic Accessory into and through the rear of the sample compartment and then fasten the cable to the Cell Holder socket on the rear of the PTP-1.

   You may need to loosen the sample compartment cover so that you can feed the cable through.

3. Fit the Biokinetic Accessory to the front of the instrument and press the two quick-release fasteners to lock the accessory into place.

4. Plug the 19-pin plug into the right-hand 19-pin socket and secure by tightening the captive knurled screw.

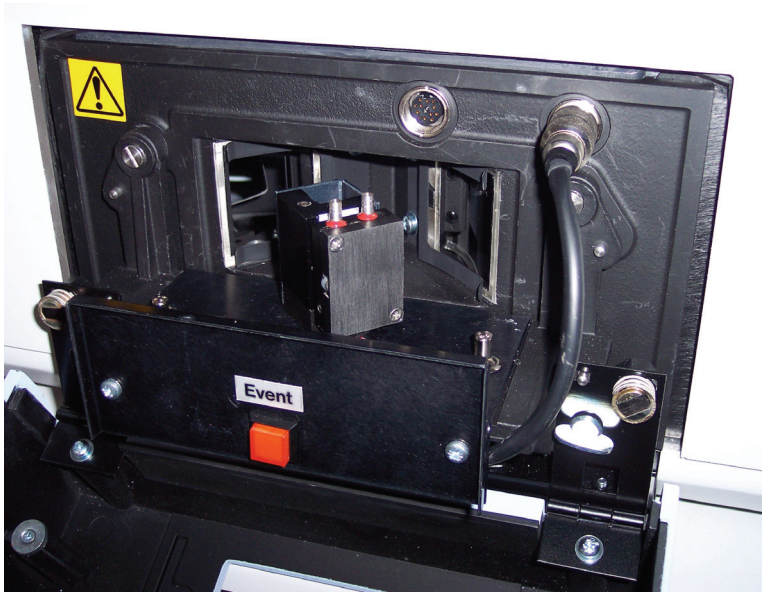


Figure 2 The Biokinetic Accessory installed in a LS 55 spectrometer

5. Connect one end of each of the flexible lengths of tubing supplied (PerkinElmer Part Number 04973213) to the metal connecting tubes on top of the cell turret, ensuring that the tubing covers the ribbing on the tubes.

6. Route the two lengths of flexible tubing through the two holes, one each side, in the base of the sample compartment and connect them to the inlet and outlet of the water bath and pump combination.

7. Test the system for leaks.

8. Place a magnetic stirrer in the cell.

9. Place the cell in the holder.

10. Close the sample compartment cover.

11. The instrument does not require re-initializing as it recognizes that a new accessory has been fitted.

    The operating conditions must be set up on the Status dialog. For more information see *Remote Control Mode* on page 42.

Connecting a Computer

- Connect the serial cable provided between the PTP-1 and the PC running the Temp Scan software.

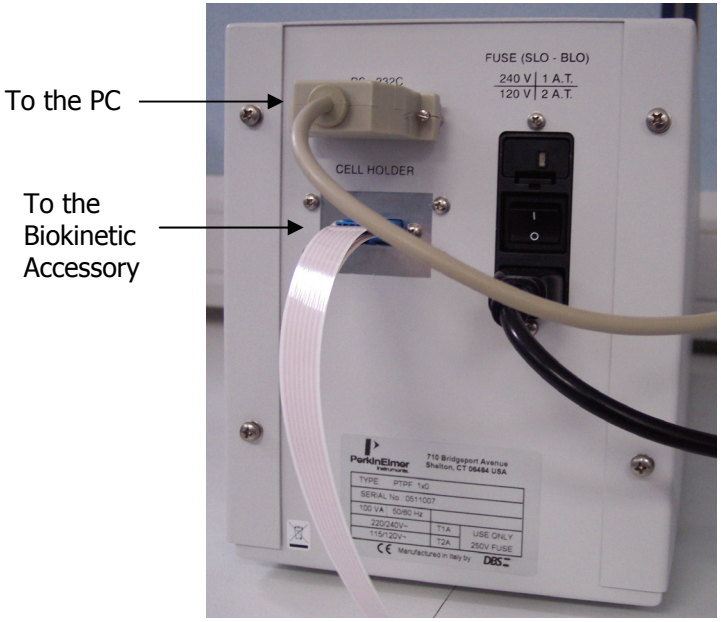
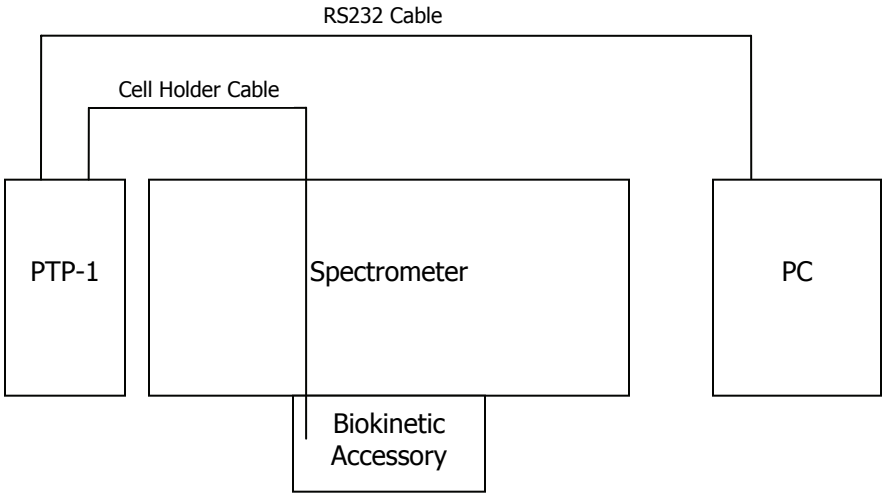


Figure 3 Rear View of the PTP-1

System Connections



Connecting a Flowing Water Source

CAUTION	*A minimum water flow of 200 ml/min is mandatory for proper operation.*

1. Cut the PVC tube provided into two equal lengths.
2. Remove two bungs from the front of the sample compartment and pass each tube through the holes.
   Ensure the tubes do not obstruct the light path.
3. Ensure the tubes are securely fixed to the olives of the heat sinks.
4. Connect the other end of the tubing to the water source.

Alignment Procedure

- Follow the procedure provided in the spectrometer manual and/or changer unit manual to align the cell holder in the light path.

Operation with a Reference Cell

A reference spectrum can be easily obtained using the software provided. Running a blank experiment in the same cell that will be used for the sample and then subtracting from the experimental results will give the best data.

Good results are obtained as the effects of temperature, environment and the materials used are all accounted for.

If the effects of temperature are not relevant in the experiment, the reference standard cell holder can be used as a reference.

Description

Front Panel

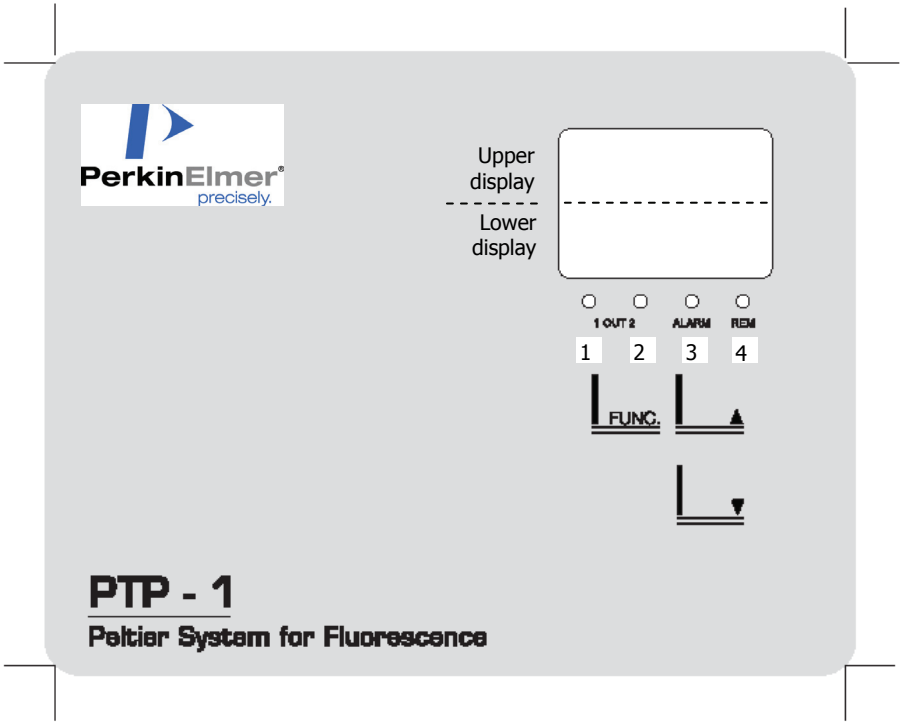


Figure 4 PTP-1 Front Panel

Display

The display is split into two parts – an Upper display and a Lower display. The numbers in the Upper display are green, while the numbers in the Lower display are red.

The status of the PTP, that is RUN or STOP, determines the contents of each display. The exact contents are discussed further in the appropriate sections.

Upper Display

During the programming procedure, in controller mode, the display will show the temperature (°C) for the setpoint and/or alarms. In programmer mode, the display will show the temperature values (°C) or the time values (hours, minutes) for the segments of the pattern.

Lower Display

In controller mode, the lower display shows the parameter code, that is the setpoint and alarms. In programmer mode, the lower display shows the number of the stored pattern, setpoint value and associated time values for the segments of the pattern, and the number of cycles.

LEDs

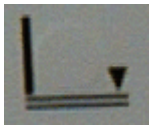
There are 4 LEDs on the front panel of the PTP-1, which have the following functions:

LED (as numbered in Figure 4)	**Meaning when lit**
1	Heating is in progress
2	Cooling is in progress
3	When LED 3 (Alarm) is flashing it indicates that an alarm is active. This means that the temperature is out of range, or the sensor is interrupted or short-circuited.
4	When the LED is lit, PTP is in RUN status. When the LED is flashing, PTP is in RUN status but is being controlled remotely, for example, by a PC.

NOTE: When LED 4 is not lit, the instrument is in STOP status.

Other Buttons

As well as the split display and the LEDs, the front panel consists of the following buttons:

Button	Description
	The FUNC button is used to access configuration and cycle modes. Holding the button for two seconds ("hold") or a single quick press ("press") can have different actions.
	The up button is used to increase the selected value or move between modes.
	The down button is used to decrease the selected value or move between modes.

Specification

Temperature Range	0 – 100 °C
Temperature Readout Resolution	0.1 °C
Temperature Readout Stability	± 0.1 °C
Alarms (Cell holder)	Alarms to be set for high and low temperature limits through keyboard. Configuration parameters P-01 and P-02 (see page 50).
Alarms (Whole system)	If the temperature of the heat sink on the cell holder reaches 70 °C the system is automatically switched off
Accuracy of the set temperature	Better than +0.7 °C at 0 °C Better than ± 0.3 °C at 30 °C Better than -1.5 °C at 100 °C
Difference between set and actual temperature in the cell	Better than +1.2 °C at 0 °C Better than ± 0.5 °C at 30 °C Better than -3 °C at 100 °C
Achievable temperature programming rate (heating and cooling)	Better than 10 °C min^{-1}
Memory for patterns (non volatile)	2 methods (8 steps)
Stirring Speed	Up to approximately 1800 rpm
Maximum RMS current input	550 mA

Operation

Operation

WARNING

Consider the boiling points of the solvents used in the experiments.

Measurements at high temperatures can produce hazards.

When heated, tightly stoppered cells can produce an overpressure in the cell, and an explosion may result.

CAUTION

Temperatures below room temperature can create condensation on the cell windows and thereby affect the accuracy of the measurement. A gentle flow of dry gas (for example, air, nitrogen) in the cell compartment can avoid this effect.

Before explaining how the PTP-1 operates, the following points should be noted:

- The PTP-1 can be guaranteed to reach a fixed temperature very quickly. A stable temperature in the cell holder is obtained after 90 seconds. However, the temperature in the cell will only be stable after a few minutes. This is due to the lower thermal conductivity of glass (or silica) and of the sample with respect to metal. The use of plastic cells is not recommended, particularly at high and low temperatures. Due to the differences in thermal conductivity, a difference between the temperature of the cell holder and that of the cell will always be present. This difference will be very low between 20 ^{o}C and 50 ^{o}C, but could be relevant at the limit temperatures.

- Stirring makes it easier to reach a thermal equilibrium, and it is strongly advisable in the case of studies of variations of spectrophotometric properties with temperature at programmed rates. The lower the ramping rate, the less difference that will be present between the cell holder and the cell itself.

- Due to their principles of operation, Peltier elements require effective heat dissipation on their "warm" side. In the PTP-1 cell holder this is achieved through the heatsink, where a stream of water must flow (at least 200 ml/min), if overheating of the cell holder is to be avoided. A security switch is present which will switch off the heating/cooling program as the temperature in the heat sink reaches 70 °C.

Switching the PTP on

The PTP is turned on using the power switch at the rear of the machine. Initially, the Upper display shows the firmware revision and the Lower display shows the release date (month/year). The cell holder must be installed before switching the unit on.

Modes of Operation

There are two modes of operation – Local control mode and Remote control mode. In Local control mode, control of the PTP is via the front panel of the instrument. In Remote control mode, the instrument is controlled using software on a PC connected to the instrument.

The PTP-1 can act as a controller and as a programmer.

Local Control Mode

When the instrument is in Local control mode it can either be in STOP status (stand-by), or RUN status. It will not necessarily be in STOP status when the unit is switched on. In both STOP and RUN status, the Upper display shows the temperature acquired. The Lower display is dependent on the current status.

NOTE: When using the instrument as a controller, it will heat or cool at the maximum rate until the setpoint is reached. This means that the setpoint will be reached quickly, but it will only become stable after one to two minutes. To avoid overshooting the temperature, insert the sample in the cell holder after the setpoint has been reached. Alternatively, use the instrument as a programmer as described in the next section.

Remote Control Mode

In Remote control mode, the Upper display shows the temperature acquired. The Lower display shows the setpoint. LED 4 is flashing to showing that the instrument is being controlled remotely. The instrument is in RUN status.

Local Control Mode

Starting Temperature Control

NOTE: As previously mentioned it is good procedure to allow the system to reach a stable temperature before inserting a sample. Once the temperature is stable, this control can be useful for pre-heating samples before running a cycle.

1. Press or hold FUNC until **C-01**, **C-02**, **S.SP** or **Conf** is displayed in the Lower display (STOP status).

2. Use the arrow buttons  and  to scroll through these modes until **S.SP** is displayed in the Lower display.

   The Upper display shows the current temperature in the cell changer.

3. Press FUNC.

   The temperature control starts. The Lower display shows the set temperature and the Upper display shows the actual temperature.

Modifying the Setpoint

1. When standard temp control is running press the arrow buttons to change the setpoint.

2. To save the setpoint release the arrow buttons.

Stopping Temperature Control

- Hold FUNC until the system 'beeps'.

  The system returns to STOP status and maintains this setpoint.

To set up or edit a cycle program

An example is described on page 40.

1. The system must be in STOP status.
   The display should show **C-01**, **C-02**, **S.SP** or **Conf** in the Lower display.

2. Using the up and down arrows, select **C-01**.
   This enables you to program cycle number one, alternatively select **C-02** to program cycle number two.

3. Hold FUNC for approximately two seconds until the system 'beeps'.
   The Lower display shows **S.Set** and the Upper display flashes.

4. Use the arrow buttons  and  to enter a temperature.
   This is the starting temperature ("setpoint"). The entered temperature is displayed in the Upper display.

5. Press FUNC.
   The Lower display shows **S-01** – this is Step One.

6. Enter the time duration of the step using the arrow buttons.
   This is done in the format HH.MM.

7. Press FUNC.
   The system now prompts for a temperature ("setpoint") in the flashing Upper display and continues to show **S-01** in the Lower display.

8. Use the arrow buttons to enter a temperature.
   Set this the same as the starting temperature for a soak, or set it different for a ramp.

9. Press FUNC.
   The Lower display shows **S-02**. To add another step to the cycle, repeat the programming from procedure 6 above

   OR

   set the time to 00.00 to end the program. Up to eight steps can be programmed into a cycle. Use two steps in place of one if the maximum time available is not sufficient for one step.

10. Press FUNC.
    The Lower display shows **Rep**.

11. Use the arrow buttons to set the number of cycle repetitions.
    Entering this value as 1 will run the program once only.

12. Press FUNC.
    This completes the cycle program and this will be stored by the machine until it is edited. The system returns to STOP mode. The Upper display shows the current temperature, whilst the Lower display shows **C-01** or **C-02**, depending on the cycle you were editing.

Example

The following example starts the samples at room temperature and maintains this for 40 minutes. The program then ramps the samples slowly up to 37 °C and holds for 40 minutes before ramping down to 26 °C, holding for another 40 minutes and then returning to the start of the cycle.

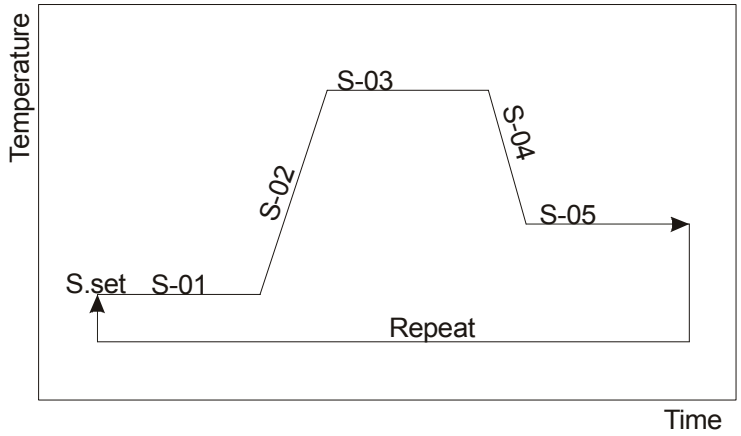


Figure 5 In this example, steps 1, 3 and 5 are soaks, whilst 2 and 4 are ramps. The cycle repeats after completion.

Step	Time (HH.MM)	Temperature (°C)
S.set	N/a	21
S-01	00.40	21
S-02	00.20	37
S-03	00.40	37
S-04	00.30	26
S-05	00.40	26

To start a stored cycle

1. Use the arrow buttons  and  to set the Lower display to **C-01** for cycle one or **C-02** for cycle two.

2. Press FUNC to start the cycle.
   The system in now in RUN status.

3. Press FUNC repeatedly to step through the sequence of information: setpoint, cycle time, current step.
   To determine the performance of the setup, compare the red setpoint figure with the green figure (actual temperature). The cycle time gives the total running time and the current step is displayed as **S-01**, for example.

4. The cycle can be modified whilst it is running. Use the arrow buttons to change the setpoint, cycle time or current step value as it is shown in the Lower display.

5. To end the cycle prematurely, hold FUNC for two seconds until the system 'beeps'.
   When the cycle has ended without intervention, the Lower display shows **END** and the Upper display shows the current temperature.

NOTE: It is important to always use limit alarms to avoid damage to the samples and/or the cells. Undesired overheating or overcooling may occur if the alarms are not used. Refer to parameters P-01 and P-02 in *Configuration Parameters* on page 50.

Remote Control Mode

The PTP-1 can also be controlled using the Temp Scan add-in to FL WinLab software, which needs to be installed on a PC connected to the instrument.

Setting the Stirrer Speed

The magnetic stirrer is controlled from the Status dialog.

1. Click  on the toolbar in FL WinLab.
   The Status dialog is displayed.

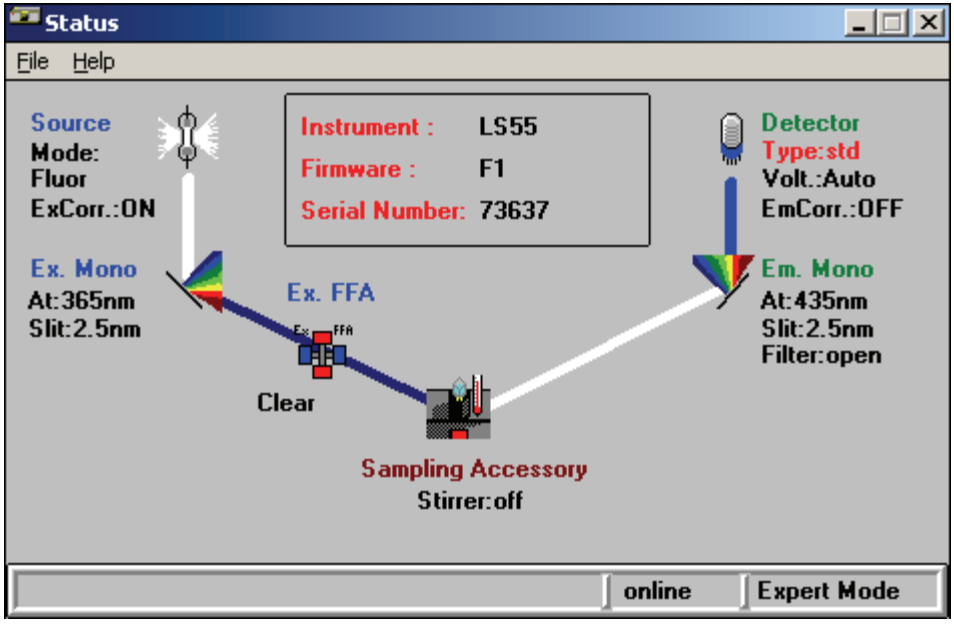


Figure 6 The Status Dialog

2. Click 

.
   The Setup Biokinetics Accessory Parameters page is displayed.

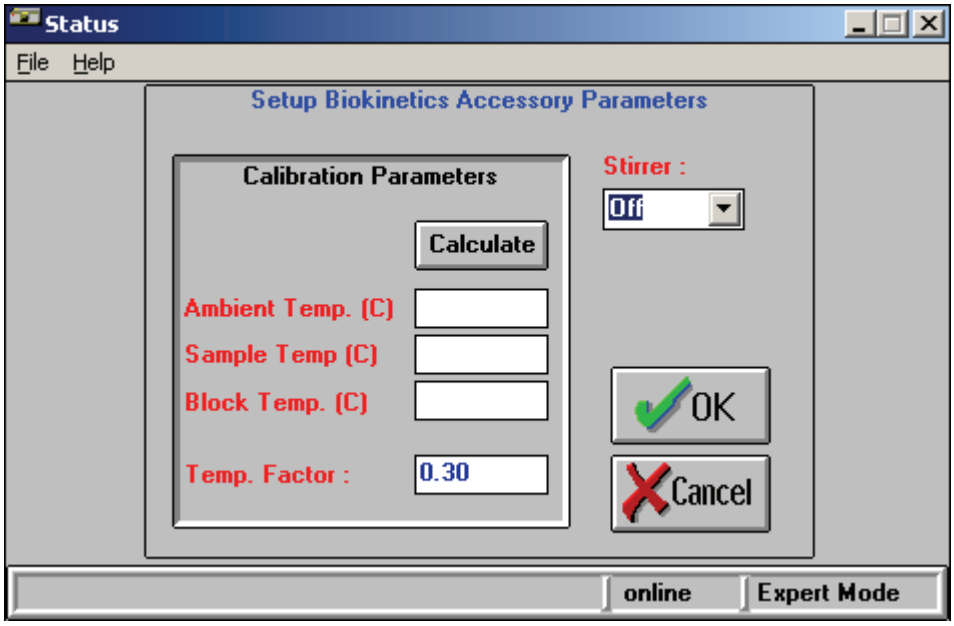


Figure 7 Setup Biokinetics Accessory Parameters

3. Select the required speed from the **Stirrer** drop-down list.
   Use **Low** for cell suspensions or biochemical samples, and **High** for very rapid mixing.
   The stirrer speed changes immediately.

4. Click **OK**.

Setting the Temperature Calibration Parameters

The temperature sensor can be calibrated so that during a run the temperature of the sample itself is displayed rather than the Block Temperature.

The Block Temperature is the temperature of the Biokinetic Accessory (the maximum readable temperature is 100 °C). The temperature of the sample may be different from the Block Temperature, but it can be calculated from the Block Temperature using the Temperature Factor.

To calibrate the temperature sensor, the Temperature Factor for the temperature correction must be calculated:

1. Open the Setup Biokinetics Accessory Parameters page of the Status dialog.
2. In the **Ambient Temp. (C)** text box, enter the ambient temperature of the cell holder in °C.

   Use the water bath to heat the cuvette to the highest temperature you intend to use. Then, measure the temperature in the cuvette using a suitable procedure.
3. In the **Sample Temp. (C)** text box, enter the temperature within the cuvette in °C.
4. Click **Calculate**.

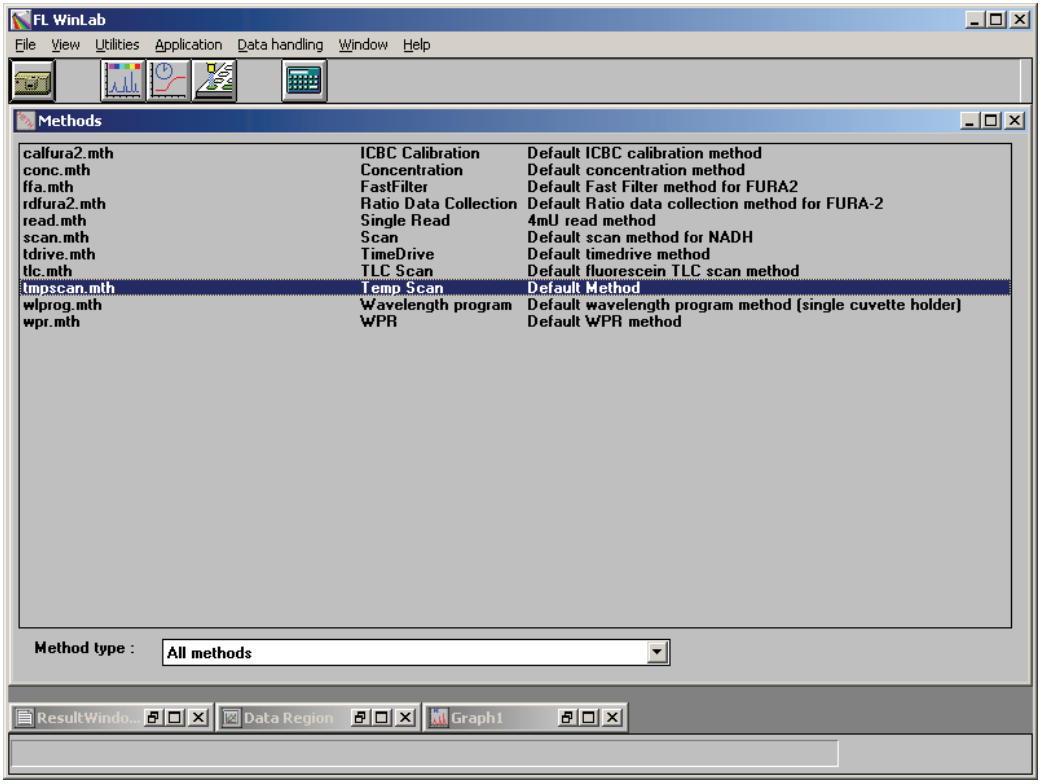
The instrument measures the **Block Temp. (C)** and then uses it to calculate a value for the **Temp. Factor** using the following equation:

$$Temp.Factor = \frac{(SampleTemp. - BlockTemp.)}{(BlockTemp. - AmbientTemp.)}$$

If a temperature sensor has previously been calibrated, that temperature correction factor can be used. In this case, enter the determined temperature factor for your measurement in the **Temp. Factor** text box.

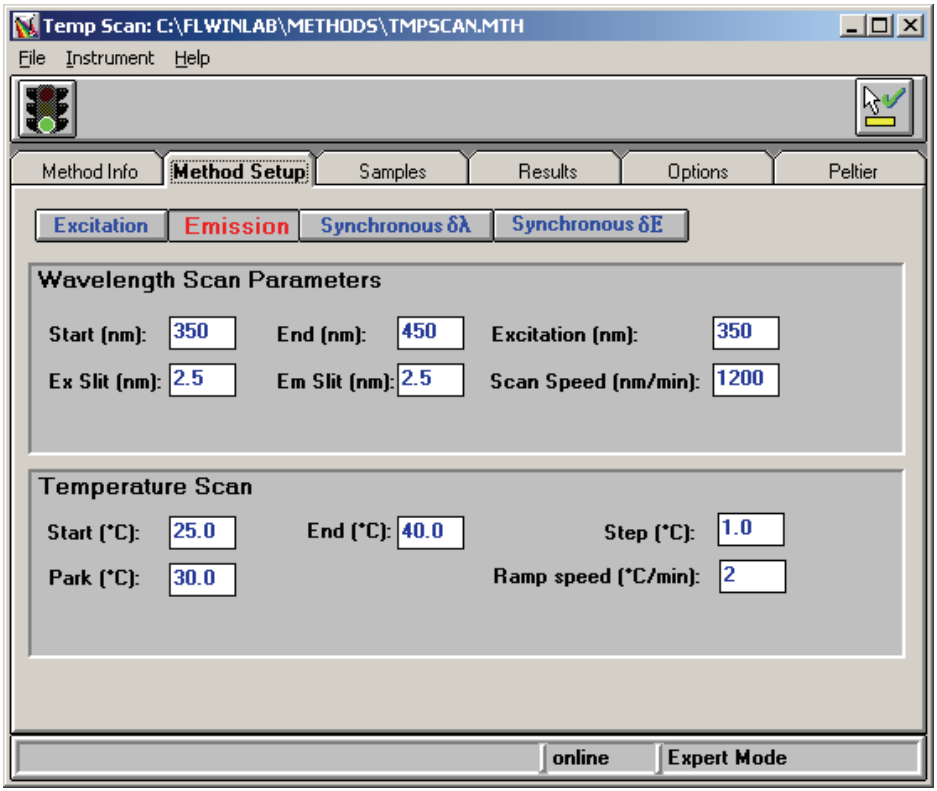
Setting up a Software Method

The software method is created using the Temp Scan add-in to FL WinLab. When you have installed Temp Scan, the default method is added to the Methods list.



1. To open the Temp Scan add-in simply double-click **tmpscan.mth**, or select **Temp Scan** from the Application menu.

   The Temp Scan method window opens.



2. Create your method by entering the required values on each of the pages.
   A short description of each parameter is displayed when you roll the mouse over the field. If the descriptions are not displayed, click  .

3. Click  to start the method.

NOTE: Temp Scan sets the block to a fixed temperature. It does not regulate the PTP-1 temperature dynamically.

Event Marking

The **Event** button on the front panel of the Biokinetic Accessory can be used for event marking. Any point in time during a Time drive measurement can be marked by pressing the button.

Spares

Description	**PerkinElmer Part Number**
Pack of 6 Magnetic Stirrer Fleas	04978499

Configuration and Maintenance

Configuration Parameters

Perhaps the most important parameters are the upper and lower temperature limits, as these can be used to limit damage to the sample or equipment and to prevent hazards resulting from heating of the sample.

Accessing the parameters

1. In STOP status, use the arrow buttons  and  to select **CONF**.

2. Hold FUNC for approximately two seconds until the system 'beeps'.
   This enters the configuration mode. The Upper display shows **0000** and the Lower display shows **PASS**.
   The system is prompting for the passcode, which must be entered within ten seconds.

3. Enter the four-digit passcode (1111), using the arrow buttons to change the flashing digit and FUNC to move to the next digit. Press FUNC after the fourth digit to input the passcode.
   The flashing Lower display shows the parameter number (for example, **P-01)**, the Upper display shows the corresponding value and parameters can now be modified.

Setting the parameters

1. Whilst the lower display is flashing, use the arrow buttons to move between the parameters.

2. Once the desired parameter has been selected, press FUNC.
   The Upper display will flash.

3. Use the arrow buttons to increase (or decrease) the value shown.

4. Press FUNC to set the value.
   The Lower display flashes.

5. The arrow buttons can be used again to select a parameter.

6. Hold FUNC for two seconds until the system 'beeps' to return to the STOP status.
   The Lower display shows **C-01**, **C-02**, **S.SP** or **Conf.**

Calibrating the temperature

If the temperature achieved in the cell, measured using a calibrated thermometer, does not match the setpoint read out on the PTP, the temperature can be recalibrated as follows.

1. Using the setpoint control mode (page 37), set the temperature to 0 °C and allow to stabilize.
2. Read the temperature on a calibrated thermometer, inserted in a cell of water in the cell holder.
3. Record this value for use in parameter P-03 (Offset).
4. Exit the setpoint control mode.
5. Enter the configuration parameter P-03 (Offset) into the system as described in *Setting the parameters* on page 50.

   The offset is the correction needed to bring the temperature back to zero. For example, if the calibrated thermometer shows 0.5 °C and P-03 is currently at zero, reset this value to 0.5.
6. Using the setpoint control mode, set the temperature to 100 °C and allow to stabilize.
7. Read the temperature on the calibrated thermometer again.
8. Record this value for use in parameter P-04 (Gain).
9. Exit the setpoint control mode.
10. Enter the configuration parameter P-04 (Gain) into the system.

    For example, if the calibrated thermometer shows 99.5 °C and P-04 is currently at 1.000, reset this value to 0.995.
11. Recheck the reference temperatures 0 and 100 °C and recalibrate if necessary.

Table of parameters

Number	Description	
P-01	Lower limit of setpoint scale (°C)	
P-02	Upper limit of setpoint scale (°C)	
P-03	Offset (°C)	
P-04	Gain (multiplier)	
P-05	Dead band (°C)	
P-06	Proportional band in heating (°C)	
P-07	Integral action time in heating (seconds)	
P-08	Derivative action time in heating (seconds)	
P-09	Proportional band in cooling (°C)	
P-10	Integral action time in cooling (seconds)	
P-11	Derivative action time in cooling (seconds)	
P-12	Type of protocol in emulation:	
	0	ERO TFS S03 proprietary protocol, 4800 baudrate, 8 bit, no parity. Timeout 3 sec
	1	ERO TFS S03 proprietary protocol, 9600 baudrate, 8 bit, no parity. Timeout 3 sec
	2	ERO TFS S03 proprietary protocol, 4800 baudrate, 7 bit, EVEN. Timeout 3 sec
	3	ERO TFS S03 proprietary protocol, 9600 baudrate, 7 bit, EVEN. Timeout 3 sec
	4	ASCON proprietary protocol, 4800 baudrate, 8 bit, no parity. Timeout 3 sec
	5	ERO TFS S03 proprietary protocol, 4800 baudrate, 8 bit, no parity. Timeout 6 sec
	6	ERO TFS S03 proprietary protocol, 9600 baudrate, 8 bit, no parity. Timeout 6 sec
	7	ERO TFS S03 proprietary protocol, 4800 baudrate, 7 bit, EVEN. Timeout 6 sec
	8	ERO TFS S03 proprietary protocol, 9600 baudrate, 7 bit, EVEN. Timeout 6 sec
	9	ASCON proprietary protocol, 4800 baudrate, 8 bit, no parity. Timeout 6 sec
P-13	Protocol address	
P-14	Up gradient (0.1/999.9 °C/min)	
P-15	Down gradient (0.1/999.9 °C/min)	

Maintenance

Cleaning the PTP-1

WARNING

Switch off the mains voltage and remove the mains cord before cleaning.

You can clean the outside of the unit using a damp cloth. Mild detergent may be used, if necessary. Always perform a patch test on an inconspicuous area before you clean the entire accessory.

Avoid spilling liquid into the accessory. Clean all external spills immediately. If anything that is spilled enters the main body of the unit, make the PTP-1 inoperative and then contact a PerkinElmer Service Engineer.

Changing the Fuse

WARNING

Disconnect the instrument from the main power supply by unplugging the line power plug from the power module.

1. Pry open the fuse compartment located at the rear of the PTP-1 (Figure 8) using a screwdriver.

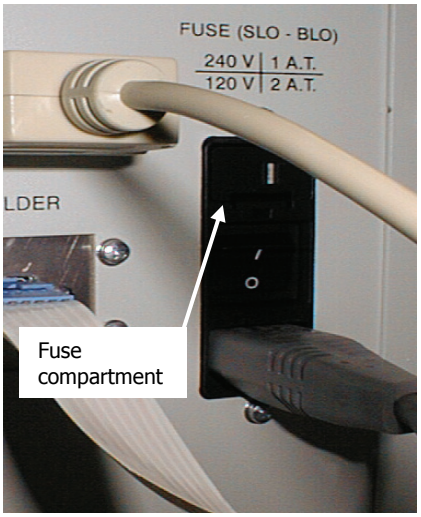


Figure 8 Rear of PTP controller showing fuse compartment

2. Replace both fuses, even if only one fuse has failed.
   If one has failed the other fuse will have been weakened. The neutral and live fuses are the same, and are detailed in the table.

Voltage supply	Fuse
220/240 V	1 AT, 250 V
110/120 V	2 AT, 250 V

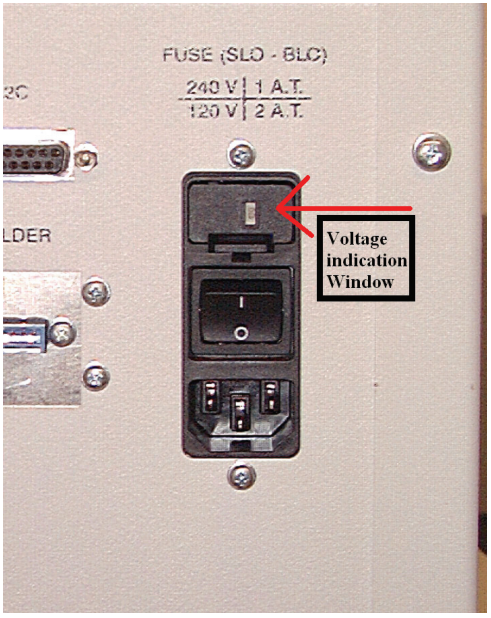


Figure 9 Location of the voltage indication window on the fuse compartment

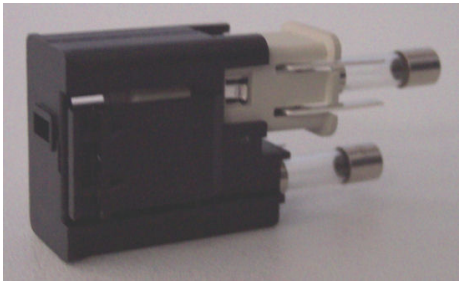


Figure 10 Fuse block removed from the PTP-1

3. Ensure that the correct voltage will be displayed in the voltage indication window, and then insert the fuse block (see Figures 9 & 10).
   The voltage can be set to 110 V, 120 V, 220 V or 240 V.

4. Close the fuse compartment.