

STA 6000 Installation and Hardware Guide



Release History

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Introduction

Pyris Installation

NOTE: If you are going to install multiple analyzers, or just want to install a universal serial bus, see *Install Multiple Analyzers* before you begin to install an analyzer.

This user's guide gives information on the installation of your PerkinElmer Thermal Analysis System, and details about the operation and maintenance of the hardware. This information can also be found in the Pyris Installation and Hardware Help provided with your Pyris software.

Information on the operation of the Pyris software can be found in the software Help.

In general, the installation procedure consists of the following steps:

- Prepare the laboratory
- Unpack the thermal analysis system
- Set up the required system components (for example, purge gases, cooling supply, and analyzer-specific items)
- Connect the system components
- Configure the analyzer
- Calibrate the analyzer

Safety and Regulatory
Information

Symbols Used in this Help

Bold text refers to text that is displayed on the screen.

UPPERCASE text, for example ENTER or ALT, refers to keys on the computer keyboard. '+' is used to show that you have to press two keys at the same time, for example, ALT+F.

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

Notes, Cautions and Warnings

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.

**Caution (Achtung)**

Bedeutet, daß die genannte Anleitung genau befolgt werden muß, um einen **Geräteschaden** zu vermeiden.

**Caution (Bemærk)**

Dette betyder, at den nævnte vejledning skal overholdes nøje for at undgå en **beskadigelse af apparatet**.

**Caution (Advertencia)**

Utilizamos el término **CAUTION (ADVERTENCIA)** para advertir sobre situaciones que pueden provocar **averías graves en este equipo** o en otros. En los recuadros como éste se proporciona información sobre este tipo de circunstancias.

**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.

**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.

**Caution (Opgelet)**

Betekent dat de genoemde handleiding nauwkeurig moet worden opgevolgd, om **beschadiging van het instrument** te voorkomen.

**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.



Warning (Warnung)

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



Warning (Advarsel)

Betyder, at brugeren kan blive **kvæstet**, hvis anvisningen ikke overholdes.



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.



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.



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.



Warning (Waarschuwing)

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



Warning (Aviso)

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

Symbols Used on the Instruments



Caution, hot surface.

Attention surface chaude.



Caution, risk of electric shock.

Attention, risque d'électrocution.



Caution

Documentation must be consulted to determine the nature of the potential hazard and any actions which have to be taken.

Attention





La documentation doit être consultée pour déterminer la nature du risque potentiel et des actions qui doit être pris.



Caution – Cold surface

Attention, Surface froide

The following additional graphic symbols used on the instrument:

	Indicates alternating current
	Indicates the primary protective grounding terminal
	Indicates the <i>off</i> position of the main power switch
	Indicates the <i>on</i> position of the main power switch

Electrical Warnings



Connect the instrument to an AC line power outlet that has a protective ground connection. To ensure satisfactory and safe operation of the instrument, it is essential that the protective ground conductor (the green/yellow lead) of the line power cord is connected to true electrical ground. Any interruption of the protective ground conductor, inside or outside the instrument, or disconnection of the protective ground terminal may impair the protection provided by the instrument.



Connectez l'instrument à une prise de courant de ligne AC qui a une connexion de terre de protection. Pour assurer un fonctionnement satisfaisant et sécurisé de l'instrument, il est essentiel que le conducteur de terre de protection (le fil vert / jaune) du cordon d'alimentation de la ligne soit connecté à une vraie terre électrique. Toute interruption du conducteur de terre de protection, à l'intérieur ou à l'extérieur de l'instrument, ou la déconnexion de la borne de terre de protection peut nuire à la protection fournie par l'instrument.



Do not operate the instrument with any covers or parts removed.



AVERTISSEMENT

Ne pas utiliser l'instrument avec des couvertures ou des pièces retirées.



Do not attempt to make adjustments, replacements, or repairs to this instrument except as described in this help file. Only a PerkinElmer service representative should be permitted to service the instrument.



AVERTISSEMENT

N'essayez pas de faire des ajustements, des remplacements ou des réparations à cet instrument, sauf comme décrit dans ce fichier d'aide. Seul un représentant du service PerkinElmer devrait être autorisé à servir l'instrument.



WARNING

Use only fuses with the required current rating and of the specified type for replacement.



AVERTISSEMENT

N'utilisez que des fusibles avec la note de courant requise et du type spécifié pour le remplacement.

Electromagnetic Compatibility (EMC)

Europe

All information concerning EMC standards is in the Declaration of Conformity, and these standards may change as the European Union adds new requirements.

PerkinElmer instruments have been designed and manufactured, having regard to the state of the art, to ensure that:

- the electromagnetic disturbance generated does not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended;
- it has a level of immunity to the electromagnetic disturbance to be expected in its intended use which allows it to operate without unacceptable degradation of its intended use.

South Korea

This device complies with MSIP (Ministry Of Science, ICT, and Future Planning) EMC Registration requirements. This instrument is registered as a Class B instrument for residential and/or business use.

B급 기기 (가정용 방송통신기자재)

이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

United States (FCC)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential environment may cause harmful interference in which the user will be required to correct the interference at their own expense.

NOTE: Changes or modifications not expressly approved by PerkinElmer could cause the instrument to violate FCC (U.S. Federal Communications Commission) emission regulations, and because of this violation could void the user's authority to operate this equipment.

Electrical Safety

This analyzer conforms to IEC publication 61010-1 ("Safety requirements for electrical equipment for measurement, control and laboratory use") as it applies to IEC Class 1 (earthed) appliances, and therefore meets the requirements of the Low Voltage Directive 2006/95/EC.

Pollution Degree 2

This product will operate safely in environments that contain nonconductive foreign matter up to Pollution Degree 2 in EN/IEC 61010-1.

Normally only non-conductive POLLUTION occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

WEEE Instructions for PerkinElmer Products



or



A label with a crossed-out wheeled bin symbol and a rectangular bar indicates that the product is covered by the Waste Electrical and Electronic Equipment (WEEE) Directive and is not to be disposed of as unsorted municipal waste. Any products marked with this symbol must be collected separately, according to the regulatory guidelines in your area.

The objectives of this program are to preserve, protect and improve the quality of the environment, protect human health, and utilize natural resources prudently. Requirements for waste collection, reuse, recycling, and recovery programs vary by regulatory authority at your location. Contact your local responsible body (for example, your laboratory manager) or authorized representative for information regarding applicable disposal regulations. Contact PerkinElmer at the web site listed below for information specific to PerkinElmer products.

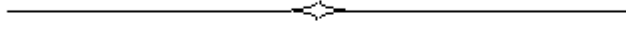
Web address:

www.perkinelmer.com/WEEE

For Customer Care telephone numbers select "Contact us" on the web page.

Products from other manufacturers may also form a part of your PerkinElmer system. These other producers are directly responsible for the collection and processing of their own waste products under the terms of the WEEE Directive. Please contact these producers directly before discarding any of their products.

Consult the PerkinElmer web site (above) for producer names and web addresses.



Prepare the Laboratory

Prepare the Laboratory

The following sections describe requirements for your Thermal Analysis System. Make sure your laboratory meets all of the requirements before you try to install the system. You should step through the topics in the order presented below.

Before starting installation, please read the Safety and Regulatory Information.

- Electrical Requirements
- Environmental Requirements
- Purge Gas and Pneumatic Supply Requirements
- Space Requirements

Electrical Requirements

Power Source

An independent power source should be provided for the system, including the computer. The power source should not be associated with heavy-duty equipment such as large motors, or with possible sources of high-frequency interference such as photocopying systems, discharge lamps, or radio transmitters. The power supply should be fused at a maximum of 20 A (120 V systems) or 16 A (200–240 V systems).

Line Voltage

PerkinElmer analyzers and their associated instruments are designed to operate within a line voltage range of 10% of the nameplate voltage or other such voltage selected at installation to suit the particular country or region. (The range for 240 V systems is +6%, –10%.) The supply must be smooth, clean, earthed and free of transient voltages over 40 V.

The frequency range is $\pm 1\%$ for 50 Hz and 60 Hz systems.

Instrument Maximum Power Requirements

Refer to the Safety Precautions for the instrument.

Environmental Requirements

You must provide the following laboratory conditions for your Thermal Analysis System:

- A clean area, free from vibration and strong magnetic fields.
- An adequate and stable power source for all system components.
- The area must have a relative humidity of 20–75% (without condensation). The furnace in the STA 6000/8000 must be protected from condensation, for example, by using a dry box.
- For optimum performance, the temperature of the area should be between 10 °C and 35 °C (50 °F and 95 °F).

- The instrument will operate safely between 5 °C and 40 °C.
- Place the system components in an area that is not in direct sunlight or direct contact with heating and cooling ducts or units.
- The instruments are for indoor use only.
- The storage temperature is between 20 °C and 60 °C.
- The altitude limitation for the operation of this instrument is 2000 m.
- The altitude for storage of this instrument is 0–12000 m.
- The installation overvoltage category for all instruments is Category II.
- The pollution degree is 2 for all instruments. (This product will operate safely in environments that contain nonconductive foreign matter up to Pollution Degree 2 in EN/IEC 61010-1.)
- The instrument must be positioned so that the appliance coupler can be removed to completely disconnect the power from the instrument.

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

Purge Gas and Pneumatic Supply

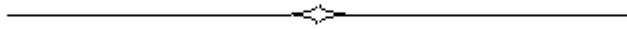
The recommended purge gas for all Thermal Analyzers at ambient temperatures is argon or nitrogen with a minimum purity of 99.9%. Other gases, such as air or oxygen, may also be used. Air or oxygen is recommended for the purge gas when performing oxidation studies (DSC analyses).

The purge gas for any instrument must be dry. Use a size 1A cylinder equipped with a pressure regulator that has a shutoff valve at the outlet. The shutoff valve should have 1/4-in. NPT male threads on the outlet side for connection to the analyzer's purge gas line.

Space Requirements

Refer to the Safety Precautions for the instrument.

Once all of the above requirements are met, you can install your analyzer.



Install Multiple Analyzers

Install Multiple Analyzers

The only way to attach multiple instruments to your computer is via a universal serial bus. PerkinElmer no longer supports the Multiport RS-232 Card (P/N 09402018). Installation of the universal serial bus MUST be done before installing any analyzer.

A Pyris Series USB Multiport is an RS-232 module that uses the USB port on the PC and features plug-and-play intelligent connectivity. The USBs supported by PerkinElmer are the EdgePort/4 (P/N 09402020) and EdgePort/8 (P/N 09402019). They eliminate the need to install cards into dedicated computer slots and reconfigure the system. Computers with standard USB allow peripherals to be automatically configured as soon as they are physically attached without the need to reboot or run setup.

NOTE: Some PerkinElmer analyzers now have USB ports in addition to, or sometimes in place of, RS-232 ports. If you are working with these analyzers, you will need to use a USB hub device instead of the Edgeport to connect multiple analyzers to a single computer. A suitable 7-port USB hub is available (P/N HH10151008). Contact your PerkinElmer Service Representative for further information.

To install an EdgePort:

1. Attach one end of the USB cable to one of the USB connectors at the back of the computer.

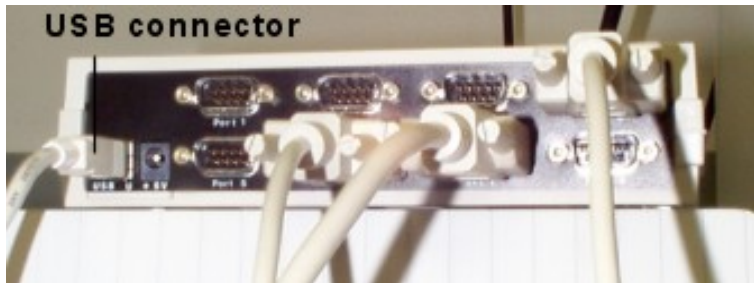


2. Attach the other end of the connector cable to the USB port on the EdgePort.

EdgePort/4

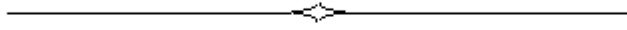


EdgePort/8



DO NOT connect any instruments to the EdgePort at this time.

If your computer is connected to the Internet, it will now download the software drivers for the EdgePort. Once this process is completed, you can install the individual analyzers by connecting them to the RS-232 ports on the EdgePort and configuring them in the Pyris software.



Install an STA 6000

Safety Precautions for the STA 6000



WARNING

Be sure that all instrument operators read and understand the following precautions. It is advisable to post a copy of these precautions on or near the instrument itself.



AVERTISSEMENT

Assurez-vous que tous les opérateurs d'instruments lisent et comprennent les précautions suivantes. Il est conseillé de publier une copie de ces précautions sur ou près de l'instrument lui-même.

The following precautions must be observed before and during use of the STA 6000:

- Before connecting the STA 6000 to the main outlet, check the main voltage setting and fuse.
- The STA 6000 requires a good earth ground that is common to the earth ground of the computer.
- Check that the power cord supplied is appropriate for your country and is undamaged before connecting it to the main voltage supply.
- Use proper lifting posture when lifting the analyzer. The STA 6000 with autosampler weighs 19 kg. Lift the autosampler from underneath. Never attempt to lift the analyzer by the autosampler (if installed) or by any cables attached.
- When cleaning the instrument, consult PerkinElmer if there is any doubt about the compatibility of decontamination or cleaning agents with parts of the equipment or with material contained in it.



WARNING

Never touch the outer and inner furnace lids. The temperature of the furnace can reach as high as 445 °C. Use tweezers to remove the lids.



AVERTISSEMENT

Ne touchez jamais les couvercles extérieurs et intérieurs du four. La température du four peut atteindre 445 °C. Utiliser une pince à épiler pour enlever les couvercles.



WARNING

Do not touch the inside of the furnace; it might be hot.



AVERTISSEMENT

Ne pas toucher l'intérieur du four; il pourrait être chaud.



WARNING

Always ensure that there is adequate ventilation when operating the STA 6000. Operate the STA 6000 in a fume hood when running samples that give off toxic gases, because the reaction gases escape through the furnace lids.



AVERTISSEMENT

Veillez toujours à ce qu'il y ait une ventilation adéquate lorsque vous utilisez le STA 6000. Utilisez le STA 6000 dans une hotte lorsqu'il exécute des échantillons qui dégagent des gaz toxiques, car les gaz de réaction s'échappent par les couvercles du four.



WARNING

Never operate the STA 6000 in a condensing atmosphere. Any liquid water present could reach the electronics at the base of the sensor.



AVERTISSEMENT

Ne faites jamais fonctionner le STA 6000 dans une atmosphère de condensation. Tout l'eau liquide présente pourrait atteindre l'électronique à la base du capteur.

CAUTION

Do NOT expose the sensor surfaces to mechanical stress. If no external cooling is applied, do not operate the STA 6000 above 50 °C.

ATTENTION

NE PAS exposer les surfaces du capteur aux contraintes mécaniques. Si aucun refroidissement externe n'est appliqué, ne pas utiliser le STA 6000 au-dessus de 50 °.

CAUTION *Do not exert excessive forces on the sensor disks.*

ATTENTION *Ne pas exercer de forces excessives sur les disques du capteur.*

Important Specifications

Maximum power consumption	340 VA
Supply voltage	100–120 V or 220–240 V
Supply voltage frequency	50–60 Hz
Fuses	6.3 AT or 3.15 AT
Safe temperature range	10–40 °C
Dimensions L x H x D	36 x 17.5 x 35 cm (H 29 cm with autosampler)
Weight	16 kg (19 kg with autosampler)

Decontamination and Cleaning

Decontamination

Before using any cleaning or decontamination methods except those specified by PerkinElmer, users should check with PerkinElmer that the proposed method will not damage the equipment.

Customers wishing to return instrumentation and/or associated materials to PerkinElmer for repair, maintenance, warranty or trade-in purposes are advised that all returned goods must be certified as clean and free from contamination.

The customer's responsible body is required to follow the "Equipment Decontamination Procedure" and complete the "Certificate of Decontamination". These documents are available on the PerkinElmer public website:

http://www.perkinelmer.com/Content/technicalinfo/dts_instrumentdeconprocedure.pdf

If you do not have access to the internet contact Customer Care:

Customer Care USA:	1-800-762-4000	(inside the USA)
(8:30 a.m. – 7 p.m. EST)	(+1) 203-925-4602	(outside the USA)
Customer Care Canada:	800-561-4646	
Customer Care EU:	0800 40 858	(Brussels)
	0800 90 66 42	(Monza)

If you are located outside of these regions, please call your local PerkinElmer sales office for more information.

Cleaning the Instrument

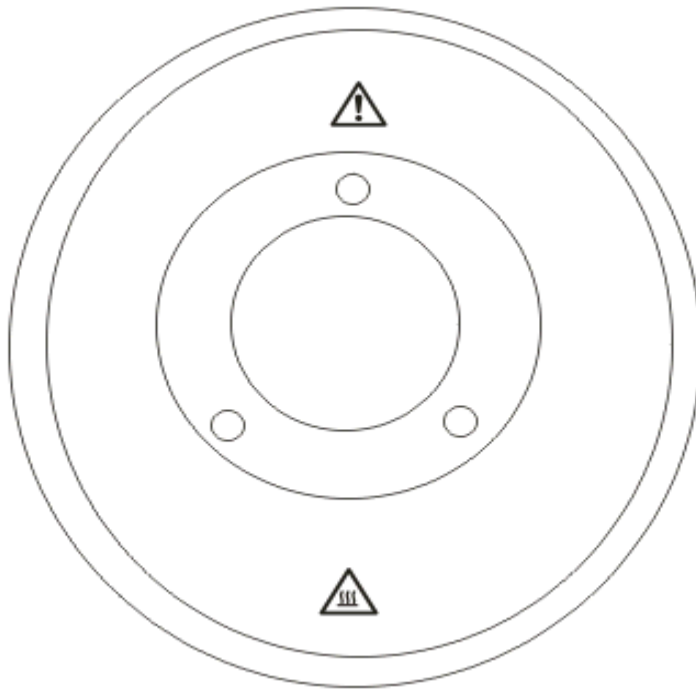
Exterior surfaces may be cleaned with a soft cloth, dampened with a mild detergent and water solution. Do not use abrasive cleaners or solvents.

General Laboratory Safety

Your laboratory should have all equipment ordinarily required for the safety of individuals working with chemicals (fire extinguishers, first-aid equipment, safety shower and eye-wash fountain, spill cleanup equipment, etc.).

STA 6000 Warning Labels

Warning Labels on the Upper Ring Around the Furnace



WARNING

HOT SURFACE

The furnace at the center of the ring may be hot.



AVERTISSEMENT

SURFACE CHAUDE

Le four au centre de l'anneau peut être chaud.

NOTE: If you have an autosampler installed, this label is positioned on the autosampler.



WARNING

Toxic Gases – Fume Ventilation System

Without adequate ventilation, potentially toxic vapors can build up in the laboratory. Your laboratory must have a reliable fume ventilation system before you use this instrument.

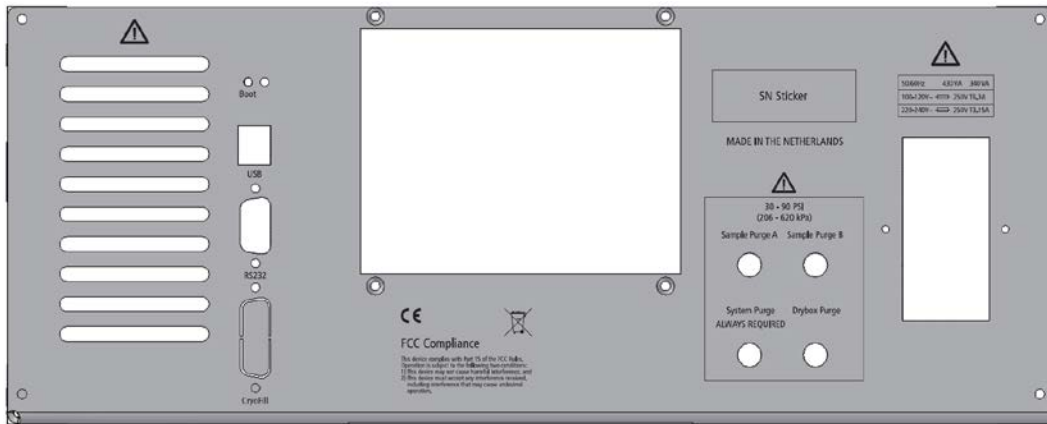


AVERTISSEMENT

Gaz toxiques - Système de ventilation des fumées

Sans ventilation adéquate, des vapeurs potentiellement toxiques peuvent s'accumuler en laboratoire. Votre laboratoire doit disposer d'un système de ventilation fiable avant d'utiliser cet instrument.

Warning Labels on the Back of the STA 6000



WARNING

Always keep airflow unobstructed

To maintain adequate ventilation do not block the back of the instrument.



AVERTISSEMENT

Toujours garder le flux d'air dégagé

Pour maintenir une ventilation adéquate, ne bloquez pas l'arrière de l'instrument.



WARNING

For protection against fire hazard replace only with the same type and rating of fuse.



AVERTISSEMENT

Pour la protection contre les risques d'incendie, remplacer uniquement par le même type et le même type de fusible.



WARNING

Grounding circuit continuity is vital for the safe operation of equipment. Never operate equipment with the grounding connector disconnected. Disconnect supply cord before operating.



AVERTISSEMENT

La continuité du circuit de mise à la terre est essentielle pour la sécurité de fonctionnement de l'équipement. N'utilisez jamais d'équipement avec le connecteur de mise à la terre déconnecté. Débranchez le cordon d'alimentation avant d'utiliser.

Installing an STA 6000

The installation procedure for the STA 6000 consists of the following steps:

- Prepare the Laboratory (refer to page 20)
- Unpack the STA 6000
- Set Up the STA 6000 System Components
- Connect the STA 6000 System Components
- Configure the STA 6000
- Calibrate the STA 6000

Unpacking the STA 6000

The STA 6000 consists of the following components:

- STA 6000
- Personal Computer
- Printer (Optional)
- Chiller (Optional)
- Autosampler (optional)

The STA 6000 comes set up to operate at voltages of 200–240 V. However, it can easily be set up to run at voltages of 100–120 V. Follow the instructions found in the section on selecting the correct voltage to set up your STA 6000 to the proper voltage for your laboratory.

The STA 6000 comes wrapped in plastic and is surrounded by foam on all sides of the analyzer. To unpack the analyzer, follow the steps below:

1. Remove the foam inserts from the box.
2. Remove the analyzer from the box.



WARNING

Use the proper lifting posture when taking the analyzer out of the shipping carton base. Bend your knees when lifting and securely hold on to the analyzer as you lift.



AVERTISSEMENT

Utilisez la position de levage appropriée lorsque vous retirez l'analyseur de la base du carton d'expédition. Pliez vos genoux lors du levage et maintenez-le bien sur l'analyseur lorsque vous soulevez.

3. Remove the foam from all sides, resting the analyzer on its left or right side as necessary.
4. Remove the tape and plastic from around the analyzer.
5. Remove the tape from the outer furnace lid and remove the lid. Place it to the side.
6. Remove the packing material from inside the furnace area.
7. Remove the tape from the connectors on the rear of the instrument.

It is recommended that you keep the shipping foam should the analyzer require shipment or movement to another facility in the future.

Parts Included

The STA 6000 comes in two boxes and consists of the following components:

- STA 6000
- Pyris software
- Spares and Accessory Kit

The Spares and Accessories Kit contains the following parts:

Item	Part Number	Quantity
Sensor	N5202083	1
Indium Calibrating Reference Material	03190033	1
Silver Calibrating Reference Material	N5370438	1
Tweezers (pointed for sensor installation and loading pans)	09908400	1
Tweezers (for sensor removal)	N5202093	1
Calibration Weight	N5200042	1
Alsiflex Paper (5 pieces)	N5376819	1
Ceramic Sample Pans (Pack of 3)	N5200040	1
Ceramic Sample Pans (Pack of 45) (with autosampler instrument)	N5200045	1
Tubing Adaptor (1/8" to 1/4")	09903906	1
Gas Restrictor	01541498	1

Also included with the STA 6000 are:

- Tygon tubing for connection of liquid coolant to the cooling chamber.
- Hose clamps.
- Teflon tubing for purge gas connection.
- USB cable for communicating to the computer.
- Power cord.

The procedure for unpacking the STA 6000 is complete.

Set Up the STA 6000 System Components

Place the STA 6000 on your laboratory bench. Do not plug in the power cord until instructed. The computer and printer should already be on the bench and installed according to each instrument's instructions.

Be sure to set up all of the system components listed below before switching on the STA 6000:

- Select the correct voltage
- Install the purge gases
- Remove the shipping/alignment tool
- Install the sensor
- Install the cooling device

Select the Correct Voltage for the STA 6000

The STA 6000 is able to accept the following two voltages: 100–120 V and 200–240 V (50/60 Hz).



The STA 6000 is configured and shipped with 220–240 V selected. Selection of the voltage can be done at the AC inlet plug at the rear of the STA 6000.

First check whether the voltage selection corresponds to the voltage in your laboratory. This can be seen easily: the voltage range with the text in an upright position and the arrow pointing at the small line represents the voltage that has been selected.



220-240V selected

To change the voltage:

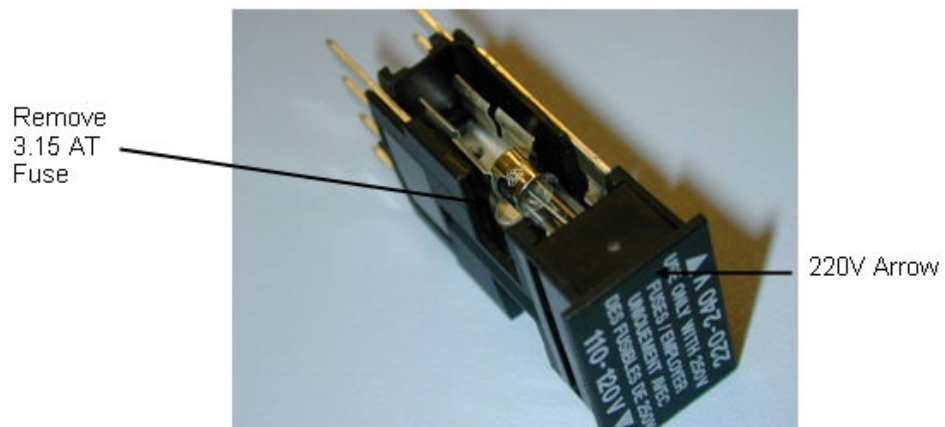
 WARNING	<p><i>Ensure that the mains power lead is disconnected from the instrument before proceeding.</i></p>
 AVERTISSEMENT	<p><i>Assurez-vous que le cordon d'alimentation secteur est débranché de l'instrument avant de continuer.</i></p>

1. Remove the fuse holder with a screwdriver by gently prying it out of the compartment.



2. Once the holder is out far enough to hold onto, slide the fuse holder out of the slot.
3. Remove the fuse (3.15 AT) from the 230 V position. This can be done using the point of a pencil to gently lift the fuse out of the holder.

NOTE: It may be necessary to move the fuse slightly toward the back of the fuse pack before prying it out of the holder.



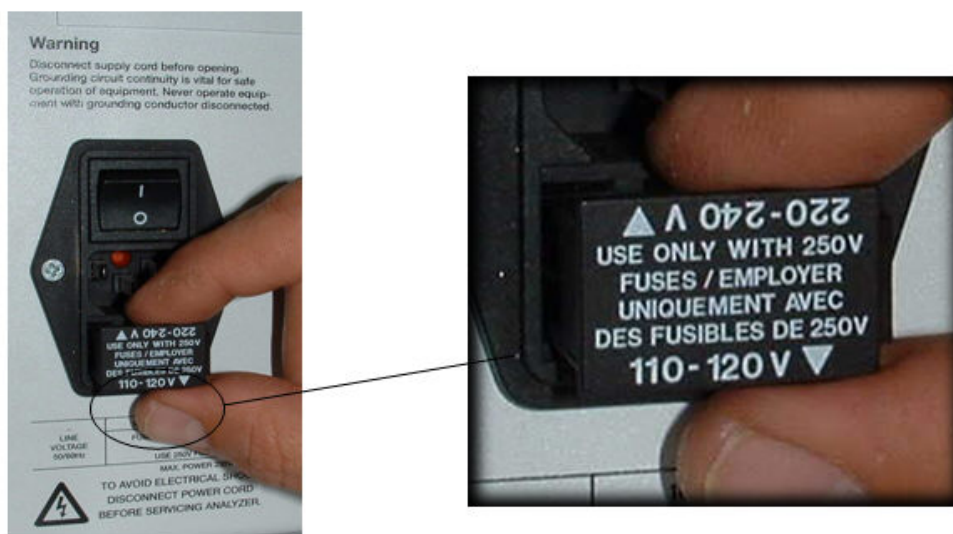
NOTE: The figure above shows where the fuses go. The fuse that is installed is for 230V.

4. Insert the fuse (6.3 AT) for 110 V (this goes into the right side when 110–120 V is in the upright (legible) position).

NOTE: Ensure that the head of the fuse makes contact at both ends of the fuse holder.



5. Reinsert the fuse holder.



Connect the Purge Gas Supply to the STA 6000

The STA 6000 has a system purge gas inlet and two sample purge gas inlets at the back of the analyzer. The system purge gas purges the outer portion of the sample holder/heat exchanger assembly with dry gas. This facility must ALWAYS be used when working with the analyzer. The dry gas, preferably dry nitrogen, prevents condensation of water vapor on the measuring cell. The system purge gas flow rate is controlled by a needle valve inside the analyzer, and is preset to 40 ml/min.

NOTE: The STA 6000 analyzer has a mass flow controller built into the analyzer. However, if you have an autosampler and are using the dry box purge, this does not have a mass flow controller. Therefore, it is necessary to use either an H restrictor (P/N 01541498) or a Float Displacement Flow Meter (P/N 02901624) to obtain the proper flow rates. **The gas must be dry.** A flow rate of between 20 and 40 ml/min is recommended.

The sample purge gas inlets (A and B) are used to purge the furnace, and are part of the internal gas selector (which has two inlets and one outlet). Argon or nitrogen of 99.9% minimum purity is recommended for purging the sample area. Other gases such as air or oxygen may also be used. The flow rate of the sample purge gas is controlled using the software.

NOTE: The gas must be dry. A flow rate of between 20 and 40 ml/min is recommended.

The procedure for connecting the purge gas supply includes the following steps:

- Connect the purge gas line to the system gas supply.
- Install a filter dryer (optional).
- Connect the purge gas lines to the STA 6000.

Connect the Purge Gas and System Purge Gas Lines to the STA 6000

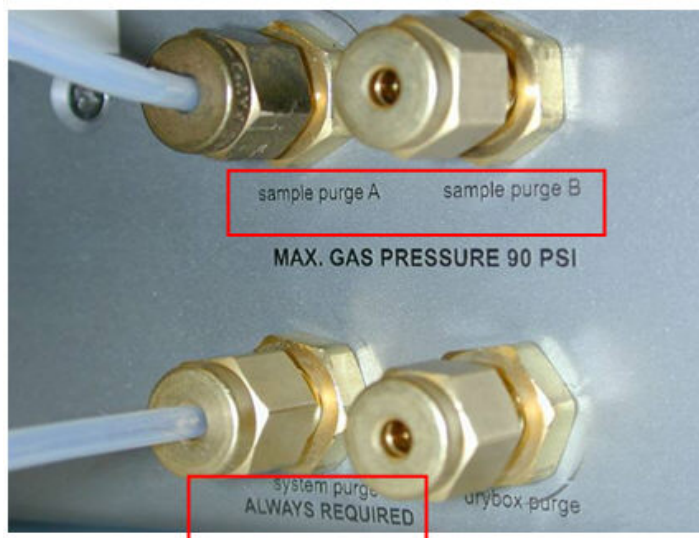
Perform the following procedure to connect your sample purge gas and system purge gas lines to the STA 6000 analyzer regardless of the other components in the purge gas line. Assuming all the other components of the purge gas line are installed, you will now connect 1/8-in. Teflon tubing to the STA 6000 using a female connector.

The STA 6000 System Purge Gas for Balance (1 pc) and Sample Purge Gas (2 pcs) connectors are mounted to the back of the analyzer.

1. Place the 1/8-in. Teflon tubing from your dry purge gas line onto the inlet labelled System Purge Gas ALWAYS REQUIRED.
2. Place the 1/8-in. Teflon tubing from your Sample Purge Gas line onto the inlet sample purge A.

If required, a second sample purge line (1/8-in. Teflon tubing) can be connected to the purge B inlet.

Connecting purge and system gas lines to the STA 6000 (Your instrument may show a slight variation):



NOTE: The dry box purge inlet is only used when an autosampler is installed on the instrument.

Remove the Shipping/Alignment Tool

The STA 6000 is shipped with a tool inserted through the furnace into the balance mechanism to minimize vibration during transportation. This tool is also used to align the system after replacing a furnace or balance. It is important that you keep this tool in a safe place. It is also recommended that you save the shipping foam should the analyzer require shipment to another facility in the future.

1. Remove the furnace cover and the foam inserts.
2. Grip the upper part of the shipping/alignment tool using flat tweezers and carefully lift it straight upwards and out of the furnace.

To replace the shipping/alignment tool:

- Insert the tool into the hole in the bottom of the furnace.
The flat plate must be pointing towards the front of the analyzer.

To prepare the analyzer for shipment:

1. Position the two-part foam insert on top of the shipping/alignment tool within the furnace.
2. Place the cylindrical foam insert on top of the first foam insert.
3. Replace the furnace cover and tape it shut.

Install the Sensor

Insert the sensor into the hole in the bottom of the furnace. The flat plate must be toward the front of the analyzer so that the contacts on the sensor engage the PCB in the balance properly. When the sensor is properly aligned, an audible beep will be heard when contact is made. Continue inserting the sensor until it is fully engaged.

Connect the Cooling Device to the STA 6000

The STA 6000 has an integrated cooling jacket that accepts various types of cold gases and liquids. The recommended cooling system is the Polyscience Chiller, which operates between -20 and 200 °C. The recommended temperature range of the coolant is 15–25 °C.

CAUTION

Low temperature cooling should only be used with caution on the STA 6000, as any condensation in the furnace area could damage the electronic circuits.

ATTENTION

Le refroidissement à basse température ne doit être utilisé qu'avec prudence sur le STA 6000, car toute condensation dans la zone du four pourrait endommager les circuits électroniques.

NOTE: For analyzers without an autosampler, a mini dry box accessory (P/N N5202070) is available which sits on top of the furnace and is recommended to help prevent condensation forming when the furnace is at low temperature in a humid atmosphere. This accessory is not purged, so there is no need to connect a gas supply to the dry box purge inlet on the instrument.

Connecting to the Chiller

CAUTION

An appropriate fluid must be used with the chiller. Distilled water is recommended for operation at temperatures between 10 °C and 90 °C. Alternatively, normal tap water can be used. For operation at -20 °C to 100 °C, 50% ethylene glycol in water is recommended.

ATTENTION

Un fluide approprié doit être utilisé avec le refroidisseur. L'eau distillée est recommandée pour un fonctionnement à des températures comprises entre 10 °C et 90 °C. Alternativement, l'eau de robinet normale peut être utilisée. Pour une utilisation de -20 °C à 100 °C, 50% d'éthylène glycol dans l'eau sont recommandés.

CAUTION

Ensure that the cooling air vents at the front and rear of the cooler are not blocked. Maintain a minimum space of 15–20 cm.

ATTENTION

Assurez-vous que les événements d'air de refroidissement à l'avant et à l'arrière du refroidisseur ne sont pas bloqués. Maintenir un espace minimum de 15-20 cm.

When using the chiller, connect the cooling supply to the STA 6000 as follows:

1. Make sure that the chiller is switched off but that its power cord is plugged into a power supply.
2. Screw one of the barbed hose couplings shipped with the chiller into the OUTLET connection on the chiller unit, and tighten with a suitable wrench.
Couplings suitable for several different hose sizes are provided with the chiller.
3. Push a hose (compatible with the desired coolant) onto the OUTLET coupling and secure with a hose clamp.
4. Slide the other end of the hose over the metal tube labeled COOLING LIQUID IN on the thermal analyzer. Place a hose clamp around the hose and metal tube to secure the hose in place.
5. Screw a barbed hose coupling into the INLET connection on the chiller unit, and tighten with a suitable wrench.
6. Push a hose onto the INLET coupling and secure with a hose clamp.
7. Connect the other end of the hose to the COOLING LIQUID OUT connector on the analyzer. Place a hose clamp around the hose and the metal tube to secure the hose in place.

Setting Up The Chiller

1. Fill the reservoir with coolant.
Ensure that the cooling coils are completely covered. The maximum coolant level is 25 mm below the top of the reservoir.
2. Switch the chiller on at the mains supply and at the switch on the rear of the control unit (NOT using the Power switch on the front of the control unit).
3. When switching on the chiller for the first time, select the display language by rotating the Select/Set control on the front panel, and then pressing to select the desired option.
The chiller controller will continue with its start-up sequence and then display "Standby" when ready.
4. Set the safety set temperature on the controller using a flat screwdriver to rotate the control to the maximum temperature to which the bath should be heated.
5. Press the Power switch on the front panel.
The pump will begin operating.
6. Top up the coolant reservoir to compensate for the fluid in the external circuit.
7. Rotate the Select/Set control on the front panel until the Pump/AutoTune menu is displayed.
8. Press the Select/Set control until the pump speed bar is highlighted.
9. Rotate the Select/Set control to adjust the pump speed, and press the control to accept the new setting.

CAUTION

The heat exchanger of the STA 6000 will NOT accept pressure. Use the lowest flow rate that provides sufficient cooling for your experiment to minimize the pressure in the system.

ATTENTION

L'échangeur de chaleur du STA 6000 n'acceptera PAS la pression. Utilisez le débit le plus bas qui procure un refroidissement suffisant pour votre expérience afin de minimiser la pression dans le système.

CAUTION

It is essential to maintain a very constant flow rate of coolant. The liquid should be free of air bubbles. Changes in the liquid flow rate or the presence of air bubbles will reduce the quality of the measurement signal.

ATTENTION

Il est essentiel de maintenir un débit constant de liquide de refroidissement. Le liquide doit être exempt de bulles d'air. Des changements dans le débit de liquide ou la présence de bulles d'air réduiront la qualité du signal de mesure.

Setting the Coolant Temperature

When using a circulator, the temperature must be controlled to within 0.2 °C (set point \pm 0.1 °C).

1. Press and release the Select/Set control on the front panel.
The set point temperature value is highlighted.
2. Turn the control to set the temperature to the nearest whole degree Celsius.
3. Press the control again.
The degree fraction figures are highlighted.
4. Turn the control to select the desired fraction of a degree.
5. Press the control to accept the value.

Connecting to the Intracooler C6 Chiller

CAUTION

Antifreeze must be used. Pure water would freeze if used with the chiller. We recommend a standard automobile antifreeze; the volume required is 0.5 l. The antifreeze should be effective down to -20 °C. Any lower than that would impair the conveyance power of the pump.

ATTENTION

L'antigel doit être utilisé. L'eau pure glacerait si elle était utilisée avec le refroidisseur. Nous recommandons un antigel d'automobile standard; le volume requis est de 0,5 l. L'antigel devrait être efficace jusqu'à -20 °C. Tout inférieur à celui qui nuirait à la puissance de transport de la pompe.

CAUTION

The air necessary for cooling the compressor is drawn in at the rear of the cooler and is blown out of the side. Therefore, do not block the rear of the device. Maintain a minimum space of 15–20 cm. The side vents must also not be blocked.

ATTENTION

L'air nécessaire pour refroidir le compresseur est aspiré à l'arrière du refroidisseur et est soufflé hors du côté. Par conséquent, ne bloquez pas l'arrière de l'appareil. Maintenir un espace minimum de 15 à 20 cm. Les événements latéraux ne doivent pas non plus être bloqués.

NOTE: The internal circulating pump must first be vented in order to allow the coolant to circulate.

When using the C6 Chiller, connect the cooling supply to the STA 6000 as follows:

1. Make sure that the chiller is switched off but that its power cord is plugged in to a power supply.
2. Remove the container stoppers from the top and fill the container with antifreeze. The cooling coils should be well covered to enable full transfer of cooling power.
3. Insert one of the hose couplings shipped with the chiller into the end of a cooling tube. Connect the tube to the Wasservorlauf connector (liquid out) and hold the other end in a bucket or like container.

To connect the hose to the chiller, push the connector on the back of the chiller in as you insert the hose connector into it. Let go of the chiller's connector to lock the hose in place.

4. Power on the chiller. The pump runs and vents because the antifreeze is being pumped into the bucket. When there is a stream of antifreeze into the bucket, power off the chiller.
5. Slide the end of the tube connected to the chiller over the metal tube labeled Cooling Liquid In at the rear of the analyzer. Place a hose clamp, supplied with the analyzer, around the hose and metal tube to secure the hose in place.
6. Insert the other hose coupling into one end of the other hose and attach it to the Wasserücklauf connector on the chiller.
7. Connect the other end of the Wasserücklauf tube to the Cooling Liquid Out connector on the analyzer. Place a hose clamp around the hose and metal tube to secure it in place.

Rear of the Intracooler C6 Chiller:



8. Switch the chiller back on. The pump runs and vents the system. Initially, the antifreeze level sinks dramatically as a result of the venting process. The lost amount of antifreeze must be replaced.

CAUTION	<i>It is absolutely necessary that the decrease in antifreeze level be observed in order to avoid the supply pump from running dry. Antifreeze should be added while venting is in progress.</i>
ATTENTION	<i>Il est absolument nécessaire que la diminution du niveau de l'antigel soit observée afin d'éviter que la pompe d'alimentation ne sèche. L'antigel devrait être ajouté alors que l'évacuation est en cours.</i>

When using a circulator, the temperature must be controlled within 0.2 °C (set point ± 0.1 °C).

CAUTION

The heat exchanger of the STA 6000 will NOT accept pressure. Therefore, flow regulation should be done before the liquid enters the STA 6000.

ATTENTION

L'échangeur de chaleur du STA 6000 n'acceptera PAS la pression. Par conséquent, la régulation du débit devrait être effectuée avant que le liquide entre dans le STA 6000 ...

CAUTION

It is essential to maintain a very constant flow rate of approximately 5 l/h (80–90 ml/min). The liquid should be free of air bubbles. Changes in the liquid flow rate or the presence of air bubbles will negatively influence the quality of the measurement signal.

ATTENTION

Il est essentiel de maintenir un débit très constant d'environ 5 l/h (80-90 ml/min). Le liquide doit être exempt de bulles d'air. Les changements dans le débit de liquide ou la présence de bulles d'air influenceront négativement la qualité du signal de mesure.

Connecting to tap water

When using tap water:

1. Make sure the tap water is conveniently located near the STA 6000.
2. Connect a hose to the Cooling Liquid In connector. Secure with a clamp.
3. Connect the other end of this hose to the tap.
4. Connect the other hose to the Cooling Liquid Out connector. Secure with a clamp.
5. Connect the other end of the hose to a suitable drain.

The cooling inlet and outlet are located at the rear of the analyzer and are correspondingly marked Cooling Liquid In and Cooling Liquid Out. In order to connect the cooling supply to the STA 6000, connect black tubing supplied to the inlet and outlet (outer diameter is 8 mm). When using tap water, connect the inlet to the tap and the outlet to a suitable drain. When using a circulator, connect the inlet of the STA 6000 to the outlet of the circulator, and the outlet of the STA 6000 to the inlet of the circulator.

The temperature of the cooling liquid should not change more than 0.4 °C/hour in the case of tap water.

CAUTION

The heat exchanger of the STA 6000 will NOT accept pressure. Therefore, flow regulation should be done before the liquid enters the STA 6000.

ATTENTION

L'échangeur de chaleur du STA 6000 n'acceptera PAS la pression. Par conséquent, la régulation du débit devrait être effectuée avant que le liquide entre dans le STA 6000.

CAUTION

It is essential to maintain a very constant flow rate of approximately 5 l/h (80–90 ml/min). The liquid should be free of air bubbles. Changes in the liquid flow rate or the presence of air bubbles will negatively influence the quality of the measurement signal.

ATTENTION

Il est essentiel de maintenir un débit très constant d'environ 5 l/h (80–90 ml/min). Le liquide doit être exempt de bulles d'air. Les changements dans le débit de liquide ou la présence de bulles d'air influenceront négativement la qualité du signal de mesure.

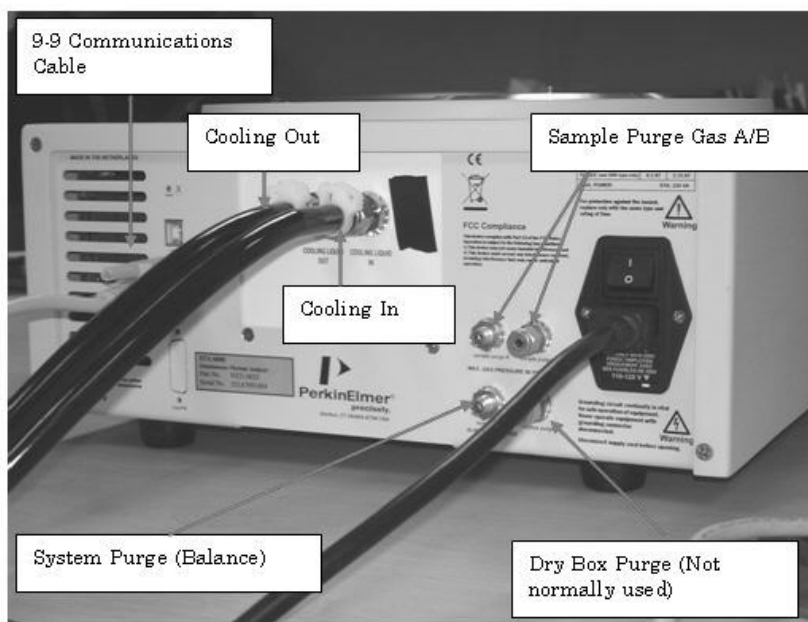
Connect the STA 6000 Components

The computer and optional printer should already be connected together and the Pyris software already installed. To complete the connection of the system components, the STA 6000 has to be connected to the computer.

CAUTION *Make sure that the computer is off before plugging in the STA 6000.*

ATTENTION *Assurez-vous que l'ordinateur est éteint avant de brancher le STA 6000.*

The image below shows the connections on the STA 6000 (Your instrument may show a slight variation):



Make sure all components are turned off and unplugged before you begin.

1. Connect one end of the USB cable to the back of the STA 6000.
2. Connect the other end of the USB cable to the back of the computer.
3. Connect the printer and printer cable to the computer.
4. Connect the analyzer, printer and computer power cords to AC outlets.
5. Once the system connections are made, switch on the system in the following order:
 - Computer
 - STA 6000
 - Printer
6. Turn on the purge gas and dry gas, the water for the STA 6000 cooling system or any other accessories for the cooling device you are using.


Configure the STA 6000

The Pyris software must be configured for the STA 6000. This must be done before the STA 6000 Application can be recognized.

1. Select **Pyris Config** from the Pyris group under PerkinElmer Applications in the Programs menu accessed from the Start button.
OR
Select Configure Analyzer from the Pyris Manager Start button menu.
The Pyris Configuration dialog box appears on the screen.
2. Click the **Add Analyzer** button. The Add Analyzer dialog box appears.
3. From the list of available ports, select the port to which you connected the analyzer.
Remember that COM5 appears when an analyzer is connected to port 1 of an EdgePort USB Converter.
4. Click the **Add** button.
The STA 6000 Configuration dialog box is displayed. The system detects the type of analyzer that is attached and displays the default name and other information for an STA 6000 in this dialog box.
5. Select the accessories that are attached to the analyzer.
6. Click **OK** to accept the selections.
7. Click **OK** to exit the Configuration dialog box.
OR
Select Add Analyzer to add another analyzer to the configuration.
Remember that the analyzer must be connected to the communications port and switched on, otherwise it will not be recognized by the Pyris software.

Once the Pyris software has been configured for the STA 6000, the STA 6000 Application can be started from Pyris Manager.

Starting the Pyris Manager

1. Select **Pyris Manager** from the Pyris group under PerkinElmer Applications in the Programs menu accessed from the Start menu.
The Pyris Manager is displayed on the screen.
2. Select **STA 6000** from the Pyris Manager.
The STA 6000 control panel is displayed.
3. Now that the system is switched on, heat the sample holder to approximately 150 °C to burn off any excess moisture. Enter 150 °C in the temperature field beneath the Go To Temp button  on the control panel and click the button.

The configuration for the STA 6000 is complete. The analyzer is ready to be calibrated.

Calibrate the STA 6000

The STA 6000 has been calibrated at the factory for both temperature and heat flow. As a result of the use of high-precision sensors, the temperature accuracy does not vary over the temperature range and remains constant for long periods of time. Under normal conditions, the only calibrations required at installation are the weight calibration and baseline optimization. The weight calibration should also be performed if the analyzer is physically moved, and the baseline optimization should be repeated if there is a substantial change in chiller temperature or purge gas flow rate, or when the sensor is replaced.

We do recommend that the temperature and heat flow calibrations are verified using the samples of indium and silver (which are provided in the Spares and Accessory Kit) before obtaining data. When performing a new calibration, carry out the steps in the following order:

1. Weight Calibration and Verification
2. Sensor Calibration
3. DTA Baseline Optimization
4. Temperature Verification
5. Heat Flow Verification

Weight Calibration

1. Once all the system components are installed and the system purge and coolant flow have been turned on, leave the instrument for 4–8 hours to fully equilibrate and stabilize the balance to the laboratory environment.
2. Open the calibration routine and click **Start Calibration**.
3. Enter the value of the calibration weight.
4. Use a Class '0' 100 mg weight or the weight provided with the STA 8000.
5. Click **Run Calibration** and follow the instructions on the screen.
6. At the end of the calibration, save and close the calibration.
7. Remove the weight.

Weight Verification

1. After the balance has stabilized and the weight has been calibrated, tare an empty pan, place the weight provided into the pan and record the weight displayed in the status panel.
2. Verify that the weight reading differs from the actual value by $\leq 0.1\%$.

Sensor Calibration

1. In the Sensor Calibration screen of the calibration routine, enter a **Starting Temperature** that is achievable with the coolant being used, and enter an appropriate **Ending Temperature**.

Suggested values are 30 and 1000 °C. The calibration will program the analyzer to take measurements at nine equally-spaced isothermal points. This will take approximately 1 hour.

2. Place an empty sample pan in the analyzer.
3. Click **Run Calibration**.
4. Follow the instructions on the screen.
5. Click **Finish** and **Save** to save the sensor calibration.


DTA Baseline Optimization

This optimizes the DTA scanning baseline between two temperatures selected by the user. The resultant DTA curve is fitted to an equation that flattens the baseline. The process takes approximately 1 hour.

- In the DTA baseline optimization screen, select the **Start Temperature**, **End Temperature** and the **Scan Rate**, and then click **Run Calibration**.
- Select start and end temperatures which include the range you will use for your measurements. It is important to choose a start temperature below that which you will use in experiments to ensure that the baseline optimization covers the full range of temperatures needed. Suggested values are 30 and 1000 °C. Use a scan rate that you plan to use for most analyses; suggested values are 10–20 °C/min.

Temperature and Heat Flow Verification

During normal use, it is usually only necessary to verify that the existing calibration gives accurate data by running a test with a standard and checking that the temperature and heat flow measurements agree with the accepted values. Indium is used to verify the temperature and heat flow performance. An example of a suitable procedure is given below.

1. Place an empty sample pan onto the sensor, and tare the weight of the empty pan.
2. Place a piece of indium (10–20 mg) into the pan and record the weight.
3. Create a method to heat the indium up to 200 °C at 20 °C/min.
4. Start the method.
5. After the data have been collected, calculate the onset temperature and heat flow for the melting peak as follows:
 - Click  to open Data Analysis, and open the files of the experiments run using the standards.
 - Perform a peak area and onset calculation by clicking **Calc > Peak Area** and selecting the **Onset** box.

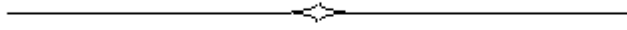
- Move the X markers on the chart into position at the beginning and end of the melt peak and click **Calculate**.
If the peak does not show a straight leading edge (which makes it difficult to accurately measure the onset temperature), rerun the method after equilibrating at the start temperature.
- Record the results for each standard.

The indium sample should still be in the analyzer and the indium method still resident in the method editor.

6. Verify that the indium melting temperature is $156.6\text{ }^{\circ}\text{C} \pm 1.0\text{ }^{\circ}\text{C}$ and the heat flow is $28.45\text{ J/g} \pm 5.0\text{ J/g}$.
7. Remove the indium sample for future use.

If the results for the standards give values for temperature or heat flow that are not within the limits above, then a new calibration must be performed. Refer to the Pyris software Help for further details.

The STA 6000 installation is complete.



STA 6000 Hardware

STA 6000 Hardware Overview

The STA 6000 Simultaneous Thermal Analyzer offers performance, reliability and productivity you can depend on. Designed with routine and research applications in mind, the STA 6000 Simultaneous Thermal Analyzer applies leading edge sensor technology to yield higher accuracy and quality results. The patent pending SaTurnA™ sensor and proven compact furnace allows for better temperature control, more consistent measurements and the rapid cool-down time.

The STA 6000 is controlled by Pyris Software on the computer to which the analyzer is connected. The information it provides is essential to industries such as plastics and polymers; automotive; semiconductors and electronics; adhesives; paints and coatings; fuels; ceramics, clays, and soil; food; pharmaceuticals; and medical devices and equipment. The STA 6000 applies the innovative patent pending SaTurnA sensor for high quality, simultaneous TG and DTA/DSC measurements. It combines the sample pan holder and a precision platinum thermocouple reference ring which is designed to match the thermal characteristics of the sample pan. The advanced sensor is optimized to achieve flat DTA baselines and excellent sensitivity. Both sample and reference temperature are directly measured for best analytical performance. The pan support and reference ring is made of pure platinum which is corrosive resistant for a wide variety of applications. Also, since measurements can be performed in a well-defined atmosphere, the behavior of a sample in atmospheres other than air can be studied easily.

The STA 6000 has an integrated cooling system. You can use various types of cooling liquids with temperatures higher than 0 °C (noncondensing). During operation, the cooling liquid must flow through the heat exchanger at a maximum flow rate of 100 ml/min (6 l/h). The cooling liquid should be at a temperature such that there is no condensation inside the analyzer. The recommended cooling device is the Chiller (P/N N5370220/N5370221, 120 V and 220 V, respectively).

A unique feature of the STA 6000 is its top-loading microbalance. The sample pan is placed onto the sample holder which connects to the microbalance via the SaTurnA Sensor. The top-loading balance has many advantages over a hangdown wire design. With this design, however, placement of the sample in the sample pan and of the sample pan in the sample holder is very important. The microbalance is very sensitive to sample positioning.

The furnace has a large isothermal zone. The sample position in the STA 6000 is approximately in the middle of the isothermal zone. This increases reproducibility of temperature measurements.

The rapid cooling rate of the furnace is achieved by mounting the furnace in a liquid-cooled jacket. To reduce the heating power at high temperatures, the cooling jacket is nickel plated. Also, there is forced air cooling. A small air pump is mounted inside the instrument and activated by clicking the Cooling Air button on the control panel. Liquid cooling is also used to keep the temperature of the balance housing constant. The cooling jacket is mounted on and thermally insulated from the balance housing. Temperature gradients are eliminated as much as possible.

For more information on the features of the STA 6000, see the topics below:

- Safety Precautions
- Sample Handling
- Heating
- Calibration
- Maintenance
- Part Numbers
- AS 8000 Autosampler

Sample Handling

The STA 6000 measures the change in temperature (relative to a reference) and weight of a sample as a function of temperature and/or time. The materials and techniques used to obtain data with an STA 6000 are discussed below.

Sample Preparation

The instrument analyzes solid samples in powder, crystal, or granular form. Although quantitative accuracy will remain the same regardless of sample shape, the qualitative appearance of a run may be affected by the sample configuration. The best sample form for optimum performance is powder or fine granules. Solid materials can be sliced into small pieces with a razor or knife.

If you are using the AS 8000 with the STA 6000, the sample size should be approximately 40 mg.

Sample Pans

The preferred sample pan is the self-centering, thin-walled, ceramic sample pan provided with the instrument. The sample centers itself in the pan and the pan centers itself on the sample holder. Three sample pans are provided in the Spares kit.

Other sample pans can also be used. The only requirement that the pans must meet is that they do not react or melt within the temperature range of interest and that the sample does not form alloys with the material of the sample pan.

Sample Atmosphere

It is important that the STA 6000 be able to operate in various gas atmospheres. The change from one atmosphere to another should be quick. The STA 6000 has one purge gas inlet for the system purge gas inlet and two sample purge gas inlets at the back of the analyzer. The system purge gas should be a dry inert gas that flows through the microbalance chamber. This keeps the environment of the balance constant, prevents absorption or desorption of vapors, and protects the balance against gaseous products evolving from the samples. The system purge gas flow rate is 40 ml/min. Since the equilibration time of the analyzer is significant, it is recommended that the system purge gas be present at all times.

You can control the atmosphere in which the sample is run by using a sample reactive or purge gas to displace or introduce reactive gases into the sample furnace. Recommended purge gases are air, nitrogen, argon, oxygen, and helium. When changing from one purge gas to another, always check the temperature calibration. A sample purge flow rate of 20–40 ml/min is recommended. A purge gas inlet pressure of 2–3 bar (30–45 psi) is suitable, with a maximum pressure of 6.2 bar (90 psi).

The reaction gas enters the furnace/sample area directly, just below the sample, and flows via the furnace wall to the sample. Thus, dead volume can be low resulting in a small gas change time constant. The time constant depends on the flow rate.

The gas atmosphere should be pure (99.9% minimum), especially if you use nitrogen. There should be no trace of oxygen as this could lead to unwanted reactions. **The gas must be dry.** A size 1A cylinder equipped with a suitable regulator is recommended.

The degradation byproducts from the sample leave the instrument directly via a small hole in the furnace cover. These byproducts could be harmful so use adequate protection such as placing the instrument in a fume hood. There is some condensation of less volatile products on the cold spots of the analyzer: the lower side of the cover and the upper inner side of the cooling jacket. These spots can be cleaned easily with a suitable solvent. Condensation may also occur on the top inner side of the cooling jacket. To prevent this, use the porous ceramic furnace cover to absorb the less volatile byproducts. When necessary, this ring should be changed.

Loading the Sample into the STA 6000

NOTE: Good quality data require uniform thermal contact between the pan and the support. Avoid spilling sample materials into the support.

Use the following procedure to load samples or remove samples:

1. Using tweezers, remove the stainless steel cover from the top of the analyzer. Place it on the stainless steel ring surrounding the opening to the furnace.
2. Place the sample inside the sample pan.
3. With tweezers, carefully place the sample pan with sample onto the sample holder and make sure that the pan is centered.
4. Replace the cover.

CAUTION

Take exceptional care not to drop sample pans or sample material into the furnace. If this should happen, stop the experiment immediately and cool the furnace.

ATTENTION

Prenez des soins exceptionnels pour ne pas laisser tomber les poêles d'échantillons ou les échantillons dans le four. Si cela se produit, arrêtez l'expérience immédiatement et refroidissez le four.

STA 6000 Maintenance

The STA 6000 analyzer needs little routine maintenance other than giving it the proper treatment of a sensitive electromechanical device. Avoid contamination of the furnace by always using a system purge gas and, ideally, a sample purge gas. If the furnace should become contaminated, clean it as soon as possible.

When cleaning the analyzer, use the following procedures:

- Cleaning the Furnace and Sample Holder
- Cleaning the Cover

Cleaning the Furnace and Sample Holder

When the furnace and sample holder have become contaminated with reaction products, the best method of cleaning them is to heat the furnace up to 995 °C in an air or oxygen atmosphere for approximately 10 minutes. This should remove all products that can be oxidized.

CAUTION

Do not touch the sample thermocouple (in the TGA 4000).

ATTENTION

Ne pas toucher l'échantillon de thermocouple (dans le TGA 4000).

CAUTION

Do not remove the furnace lid when heating at high temperatures.

ATTENTION

Ne pas enlever le couvercle du four lorsqu'il chauffe à des températures élevées.

If the sample holder becomes contaminated, remove it from the furnace and clean it gently with a small brush.

When a sample has dropped into the furnace, remove the sample holder first, if present, and then remove the sample material, preferably with a vacuum. Take care that material does not fall into the hole for the sensor.

Cleaning the Cover

The reaction byproducts from the samples run inside the STA 6000, TGA 4000 and Pyris 6 TGA furnace and condense on cold spots of the instrument: the bottom side of the cover and the top inner part of the cooling jacket. The bottom side of the cover can be cleaned easily with a tissue and some solvent. This should be done on a regular basis. The top inner side of the cooling jacket can be cleaned in a similar manner. To keep the top of the cooling jacket clean, a ring of porous ceramic material is provided and should be positioned around the entrance to the furnace. The ring should be replaced when necessary.

STA 6000 Part Numbers

Supplies, accessories, and replacement parts can be ordered directly from PerkinElmer. www.perkinelmer.com/supplies, PerkinElmer's web-based catalog service, offers a full selection of high-quality thermal analysis supplies.

To place an order, request a free catalog, or ask for information:

If you are located within the U.S., call toll free at 1-800-762-4000, 8:30 a.m.–7 p.m. EST. Your order will be shipped promptly, usually within 24 hours.

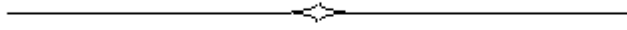
If you are located outside the U.S., call your local PerkinElmer sales office, or go on-line to www.perkinelmer.com.

Below is a list of the part numbers that are included with the STA 6000:

Part No.	Description
N5200040	Ceramic Sample Pans (pack of 3)
03190033	Indium Calibration Reference Material
N5370438	Silver Calibration Reference Material
09908400	Tweezers
09903906	Connector (1/8 to 1/4-in.)
01541498	Restrictor (autosampler instrument)

Also included with the STA 6000 are:

- Tygon tubing (P/N 02506519) (5 m) for connection of liquid coolant
- Teflon tubing (P/N 02506483) (6 m) for purge gas connection
- USB cable for communicating with the computer
- Power cord
- Male RJ45 to DB9 modem cable (P/N 09410042)
- Nickel-plated 5/16-in. tubing (2 pieces) for use on Swageloks on the cooling liquid connections
- Calibration Data Sheet



AS 8000 Autosampler

AS 8000 Autosampler

The AS 8000 autosampler accessory brings automation capability to the DSC 4000, DSC 6000, STA 6000 and TGA 4000 when used in conjunction with the Pyris software Player feature.

NOTE: If you have an STA 6000, then you will need firmware for Pyris version 9.1 or later to operate the AS 8000 autosampler. Select **Programs > Pyris Software > Pyris User manuals > Pyris Installation manuals > Upgrading Pyris Software Installation.pdf** for more information.

Maximum load	0.5A
Maximum supply voltage	24V DC
Fuses	Fused by parent instrument (0.9A)
Pollution degree	2
Overvoltage category	II
Protection class	IP20

- The autosampler is powered by the power supply of the parent instrument.
- The part of the autosampler that manipulates the sample pan is called the gripper. It comprises three fingers, 120° apart from each other. They extend out of the end of the gripper housing.
- There are only two ranges of motion for the gripper: the gripper arm moves up and down and rotates. This allows the gripper to access each sample pan in the trays, transfer a pan from the tray, through the furnace access hole in the base plate, to the furnace, and then return it to its position on the tray. Movement in these two directions also allows the gripper a sufficient range of motions to access the furnace lid(s) and move it on and off the furnace access hole.
- For the DSC 4000 and DSC 6000, you can use the existing robotic sample pans sealed with the Universal crimper press. All other standard sample pans (sealed and vented) can also be used. For the TGA 4000 and the STA 6000 the standard crucible (ceramic pan) is used.
- The AS 8000 communicates with the computer via the parent instrument's connection to the computer via the RS-232 port.
- The parent instrument communicates with the AS 8000 via an I2C bus.
- The autosampler operates over the full temperature ranges of the TGA 4000, STA 6000, DSC 4000 and DSC 6000.
- When power is supplied the three-finger gripper mechanism, the metal shrinks and the fingers open; when power is not supplied, the metal expands and the fingers close.
- The autosampler operates with a feedback system from the instrument. When a sample pan is located properly on the sensor the autosampler senses this and rises up out of the furnace.

- The light switch sensors by the furnace hole detect the presence of a sample pan or furnace lid being placed in the furnace hole. If the autosampler is supposed to be removing a lid, for example, and the gripper fails to pick up the lid, it is detected by the sensors and an error message is displayed.
- The autosampler is fully automated and controlled by the software. The two-piece sample tray holds up to 45 samples for efficient unattended operation. One tray holds 22 samples and the other 23 samples. This difference means that you cannot mistakenly place one tray in the wrong position. The trays have recesses on the bottom which catch positioning pins in the base plate. The positioning pins for one tray are located in different places than those for the other tray, which also prevents one tray from being inserted into the wrong location. The trays can be removed independently so that you can load one with fresh samples while the autosampler runs samples in the other. You could also add samples to the tray "in use" to replace samples that are completed by pausing the play list.

The Pyris Player feature allows for creation of sequences or play lists to operate the autosampler and instrument. During an autosampler sequence, you can perform multiple experiments, curve optimization, calculations, and printing. With Pyris Player, you can create Sample Groups that group similar analyses together to be run in any order. See the Software help for details.

The following topics discuss the AS 8000 autosampler in more detail:

- Safety Precautions
- How the Autosampler Works
- Autosampler Gripper Alignment
- Sample Handling
- Running a Play List
- Troubleshooting
- Maintenance

Safety Precautions for the AS 8000

The safety precautions to be followed when using the AS 8000 autosampler are the same as those for the parent instrument: STA 6000, DSC 4000, DSC 6000, or the TGA 4000. In addition, the following two precautions should be kept in mind:



WARNING

To remove the furnace lid(s) of the parent instrument, always use tweezers. The furnace lid(s) might be hot.



AVERTISSEMENT

Pour retirer le (s) couvercle (s) du four de l'instrument parent, utilisez toujours une pince à épiler. Le (s) couvercle (s) du four pourrait être chaud.

CAUTION

Before switching on the parent instrument, make sure that the AS 8000 is properly attached to the base plate on the parent instrument.

ATTENTION

Avant d'allumer l'instrument parent, assurez-vous que l'AS 8000 est bien attaché à la plaque de base de l'instrument parent.

25V  **0.5A**



How the AS 8000 Autosampler Works

The autosampler has to be configured into the DSC 4000, the DSC 6000, the STA 6000 or the TGA 4000 via the Pyris Configuration dialog box in order for the software to recognize it. See the software Help for details.

The AS 8000 autosampler is computer controlled and fully automated. Information between the host computer with the Pyris software and the AS 8000 is sent via the parent instrument's connection to the computer via the RS-232 port. Light switch sensors by the furnace access hole detect the presence or absence of a furnace lid or sample pan. An error message is generated and displayed in the software and on the LCD of the parent instrument if the sensors detect the presence of an object when there should not be one, and vice versa.

NOTE: The instrument cannot detect if a sample pan is present in the furnace from a previous power-on period. If you turn off the instrument with a sample pan in the furnace, you must remove the pan before loading another sample during the following power-on session.

In general, you place samples in sample pans and load the pans in the sample trays. The sample trays are then placed on the base plate on the parent instrument. At the beginning of a run, the gripper arm is up all the way and is over the home position. The fingers are closed. The furnace lid (for the TGA 4000 and STA 6000) or lids (for the DSC 4000 or DSC 6000) are on the lid holders in the furnace access hole. The gripper device is instructed via a command in the Pyris software to begin a session.

Autosampler Work Cycle

When you begin a sample run by starting a play list, the autosampler performs a typical work cycle. If you use the Sample Group instead of a regular play list, many steps are automatically added to the play list by the software. These additional steps are seen when you select View History. For example, if you wish to run two or more samples, you have to include a Return Sample line after the Start Method line for each sample before a Load Sample. When using Sample Group, the software adds that Return Sample line automatically when the play list is played back.

NOTE: Play lists created in previous versions of software are compatible with new versions of Pyris software. However, new play lists may not be compatible with older versions of Pyris, or with older instruments.

A typical work cycle for the autosampler on a DSC 4000 or a DSC 6000 and used with a play list is as follows:

NOTE: Before the start of a play list, the gripper should be over the home position and there should be no sample pan in the furnace. The lower furnace lid and the upper lid should be in place.

1. Start the play list. Your play list may have an explicit **Load Sample** command, or, if using a Sample Group, the entry Sample List implies Load Sample. Upon reaching this line in the list, the gripper swings around to remove the upper lid and place it on the ring.
2. The gripper then removes the lower lid and places it on the ring.

3. The gripper retrieves the sample pan and places it in the furnace.
4. The lower lid is placed within the furnace.
5. The upper lid is placed on the furnace.
6. The gripper returns to the home position.
7. The method runs.
8. At the end of the run, the system removes the upper lid and places it on the ring.
9. The system removes the lower lid and places it on the ring.
10. The sample pan is removed from the furnace and returned to its place in the tray.
11. The system places the lower lid back into the furnace.
12. The upper lid is placed back on the lid holder.
13. The gripper goes to the home position.
14. The data analysis list for the sample is performed.
15. If there is another sample in the list, the work cycle, starting with step 1, begins again. To remove the last sample from the furnace, set "Prepare Sample -Return Sample # #" as the last Play list step, where # # is the last sample loaded.

A typical work cycle for the autosampler on a TGA 4000 or an STA 6000 and used with a play list is as follows:

NOTE: Before the start of a play list, the gripper should be over the home position and there should be no sample pan in the furnace. The lower furnace lid and the upper lid should be in place.

1. Start the play list. Your play list may have an explicit **Load Sample** command, or, if using a Sample Group, the entry Sample List implies Load Sample. Upon reaching this line in the list, the gripper swings around to remove the furnace lid and place it on the ring.
2. The gripper retrieves the specified sample pan and places it in the furnace.
3. The furnace lid is placed on the lid holder.
4. The gripper returns to the home position.
5. The method runs.
6. At the end of the run, and after the end condition temperature is achieved, the system removes the furnace lid and places it on the ring.
7. The sample pan is removed from the furnace and returned to its place in the tray.
8. The furnace lid is placed back on the lid holder.
9. The gripper goes to the home position.

10. The data analysis list for the sample is performed.
11. If there is another sample in the list, the work cycle, starting with step 1, begins again.

Reduced Time Cycle

A reduced time cycle is available for the STA 6000, TGA 4000, DSC 4000 and DSC 6000.

This feature is accomplished by using either a Sample Group or by doing successive Load Sample commands without an explicit Return Sample.

If you do this, the steps where the furnace lids are replaced are eliminated and the next sample is immediately loaded.

The procedure below is for the work cycle for DSC 4000/DSC 6000 for multiple samples using the reduced cycle time.

1. Start the play list. Your play list may have an explicit Load Sample command, or, if using a Sample Group, the entry Sample List implies Load Sample. Upon reaching this line in the list, the gripper swings around to remove the upper lid and place it on the ring.
2. The gripper then removes the lower lid and places it on the ring.
3. The gripper retrieves the sample pan and places it in the furnace.
4. The lower lid is placed within the furnace.
5. The upper lid is placed on the furnace.
6. The gripper returns to the home position.
7. The method runs.
8. The data analysis list for the sample is performed.
9. The system removes the upper lid and places it on the ring.
10. The system removes the lower lid and places it on the ring.
11. The sample pan is removed from the furnace and returned to its place in the tray.
12. The gripper retrieves the next sample pan and places it in the furnace.
13. The system places the lower lid back into the furnace.
14. The upper lid is placed back on the lid holder.
15. The gripper goes to the home position.

The procedure for the STA 6000/TGA 4000 is similar to the procedure above.

AS 8000 Autosampler Gripper Alignment

The autosampler is aligned at the factory. However, if you install a reference pan into your DSC instrument or change the sample thermocouple of your TGA instrument, change the sensor, or if the gripper does not grasp the sample pans correctly, you should perform a gripper alignment procedure.

1. Start the procedure from the Autosampler Control dialog box which is displayed by



clicking the Autosampler Control button on the control panel of your instrument. Click **Align** to open the Autosampler Alignment Wizard.

NOTE: When running an autosampler alignment, make sure that the temperature is 22 °C (ambient temperature). If the temperature is too high the grippers will not align.

2. The first screen informs you that the upper furnace lid should be in place on top of the furnace access hole for either parent instrument. The lower furnace lid for the DSC 4000 or 6000 should be in its place on the ring. It is not necessary to have sample pans in positions 12 and 33. If you wish to use the previous calibration's values as a start for this calibration, click on the radio button. (The calibration values are stored in the firmware on the AS 8000 controller board.) Otherwise, the default values will be used to start. Click **Next** to continue.
3. The gripper moves from the home position to location 12. The buttons in the next wizard are used to move the gripper with respect to the dimple of location 12 so that the fingers are even around the dimple. You also have to adjust the height of the fingers above the tray surface. There should be only 0.1 mm between the tray and the finger. Use the buttons on the wizard to move the gripper up and down and left and right. When satisfied with the positioning, click **Next**. The gripper swings around to position 33.
4. Do the same thing for position 33 as you did for 12. Click **Next**.
5. The last wizard screen is displayed. Click **Finish** to exit from the Autosampler Alignment Wizard and return to the Autosampler Control dialog box.

NOTE: After you complete the alignment procedure, check your purge gas. If the purge gas was turned off during the alignment procedure, turn the purge gas back on.

AS 8000 Sample Handling

Sample Preparation

See the sample preparation instructions for the parent instrument.

Sample Pans

The types of sample pans that you can use for the DSC 4000 and DSC 6000 with autosampler are all sizes of the standard robotics sample pans that are available. The sample pans must be sealed using the Universal Crimper press which comes with the system. The capacities for the sample pans are 10, 25, 30, and 50 μL .

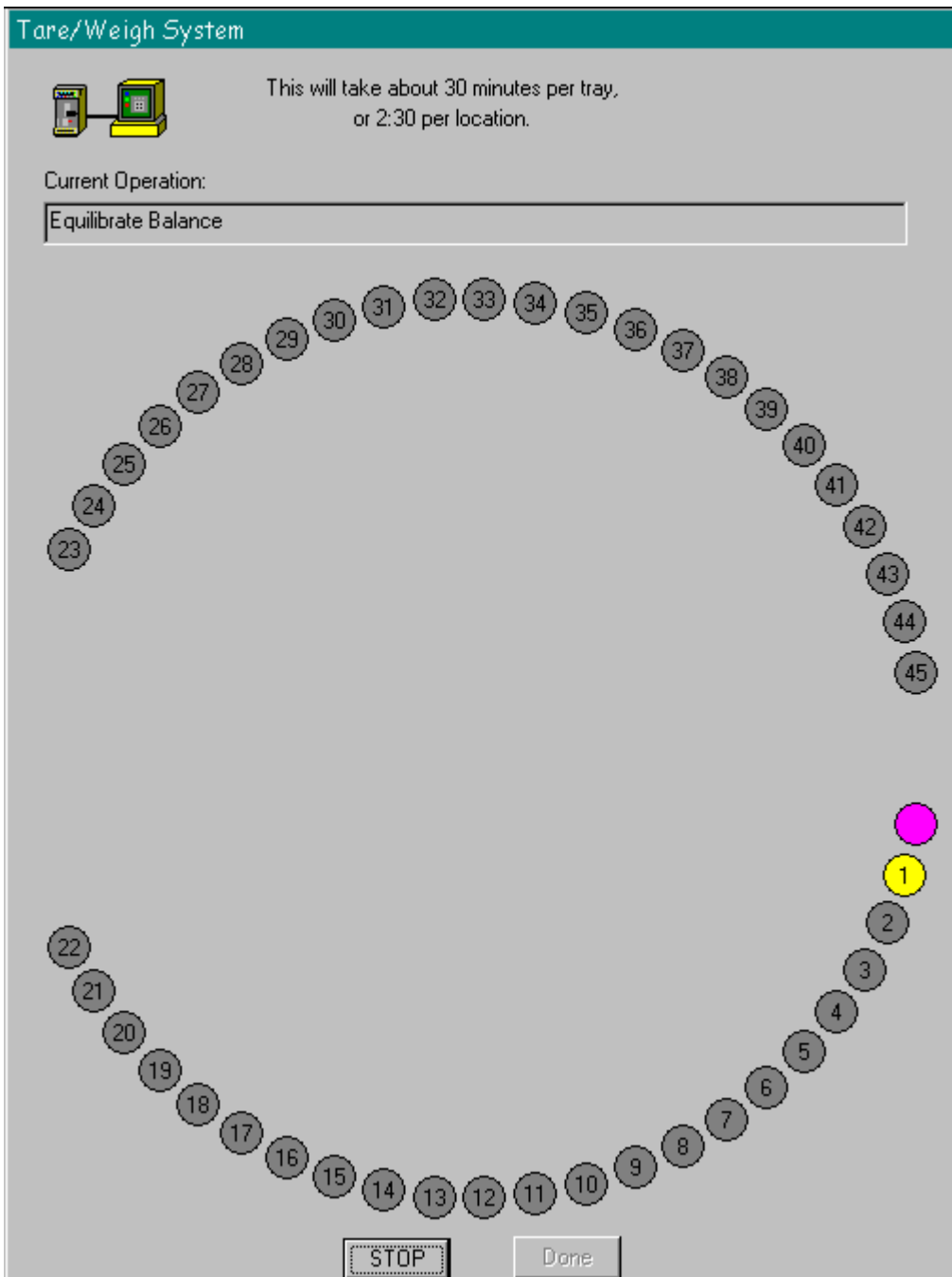
Sample Loading

Before loading the sample into the crucibles for the TGA 4000 or STA 6000, you will have to tare the crucibles, that is, have the system weigh them so the weight of the crucible is not included in the data. Load the empty crucibles into the sample trays. You can do this with the trays either separate from the autosampler or while they are still in place. After filling the locations with crucibles, carefully place the trays back onto the autosampler, making sure that the two "buttons" on the bottom side of each tray engage the holes in the autosampler. If you keep the trays on the autosampler, load the sample into each crucible while it is off the tray and then use tweezers to place the crucible onto the tray.

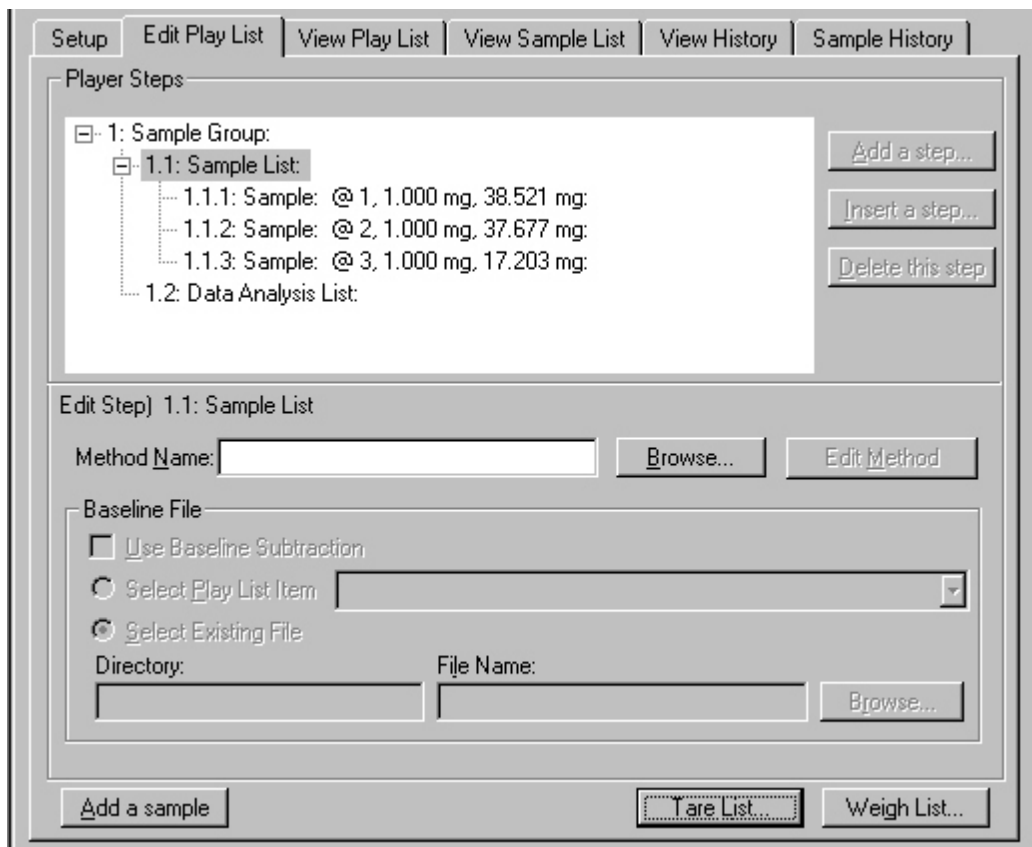
You can tare all of the crucibles in the tray using the Pyris Player Tare All feature. To do this, your play list must contain a Sample Group. If you are creating a new play list, select Sample Group as the first entry. If you are using an existing play list, it should have a Sample Group in it in order to use the tare feature.

In a new play list, with Sample Group highlighted, click the **Tare All** button to display the Advanced Tare Options dialog box. If you choose **This Group Only; Populate from Tray**, the Sample List is filled with a line for each position in the trays that contains a crucible and the tare weight of the crucible is included. You can also add sample lines yourself and then select **This Group Only; Sample List Items Only** from the dialog box. Only the crucibles in the positions that you selected for your Sample List will be tared.

When you click the **OK** button in the Advanced Tare Options dialog box, the Tare/Weigh System screen appears:



The Sample List will now display the tare weights of the crucibles:



Once the empty crucibles are tared, remove each crucible and load the prepared sample into each one. Return the crucible to the correct position in the tray. Now the system can weigh all the samples before running the play list, or you can have each sample weighed at the beginning of its run. With Sample List highlighted, click the **Weigh List** button. The Tare/Weigh System dialog box appears. The system automatically starts the program to weigh each sample in the list. After the last sample, if there was a missing sample encountered, a message is displayed:

The following samples could not be weighed. It is possible that the crucibles are empty.

A list of samples follows. Click the dialog box's **Close** button to clear the box.

Click the **Done** button in the Tare/Weigh System window. The Sample List will now display the weights of each sample.

For efficient use of the autosampler and to increase sample throughput, you can remove one tray after the samples have been run and replace the crucibles with empty ones while the samples in the other tray are being run.

Running a Play List with the AS 8000

Pyris Player is the backbone of Pyris software automation. It was created with autosamplers in mind. In addition to the standard play list items — Load Sample, Run Method, Return Sample — there is also a Sample Group. The Sample Group simplifies grouping similar samples together (as you would have in a sample tray of the autosampler). These similar samples use the same test method and data analysis as part of the Sample Group. A Sample Group consists of a Sample List and a Data Analysis List. A specific method is selected for the samples in the Sample List. The Data Analysis List allows you to access all necessary functions for data recall, curve manipulation, optimization, and calculations for automatic data analysis.

Before starting a run, perform the steps below:

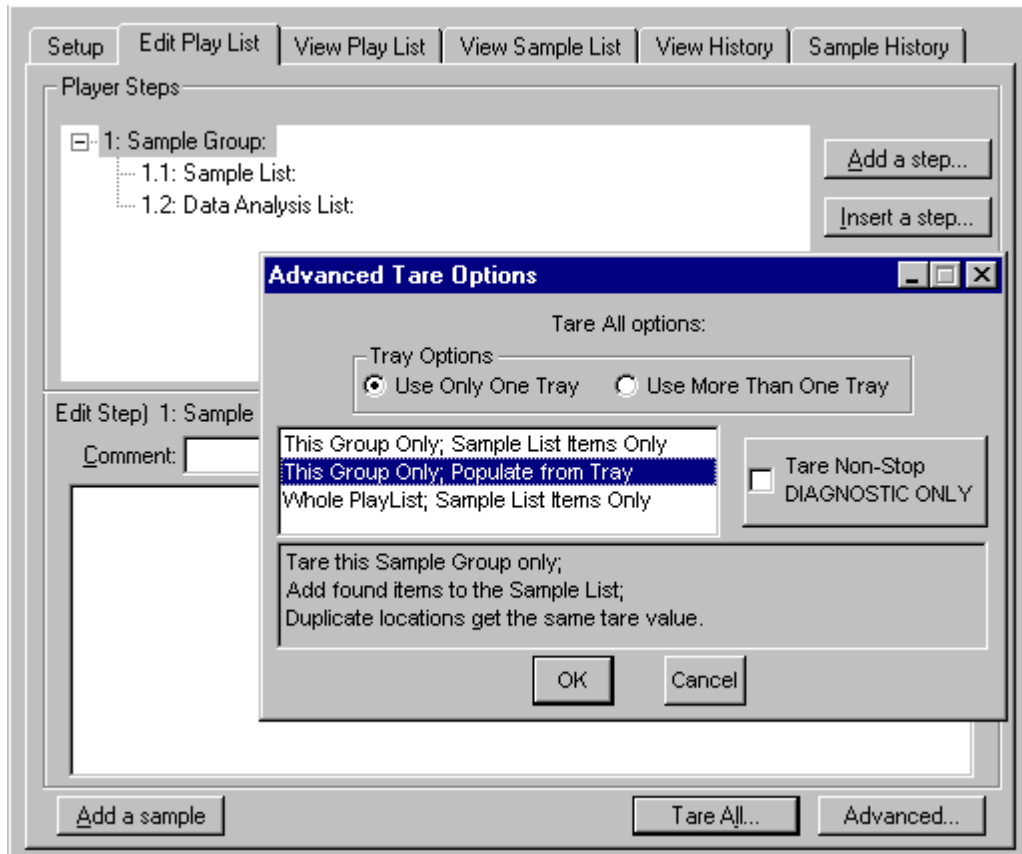
NOTE: Pyris play lists created using previous version of Pyris software are usually compatible in later versions of Pyris. And play lists created for one instrument may be compatible with other instruments of the same type. However, play lists created in later versions of software may not be compatible with earlier versions of software.

1. Review the safety and warning notes for the analyzer.
2. Verify that the purge gas (if you are using it) and cooling device tubes are properly connected at the rear of the instrument.
3. Turn on the gas and adjust the pressure.
4. Turn on the chiller and adjust according to its instructions.
5. Verify that the electrical and cable connections between the computer and the instrument and other components of the system are properly connected.
6. Turn on the power to the system components.
7. Prepare your samples.
8. Start Pyris Software and click on the parent instrument's button in the Pyris Manager.

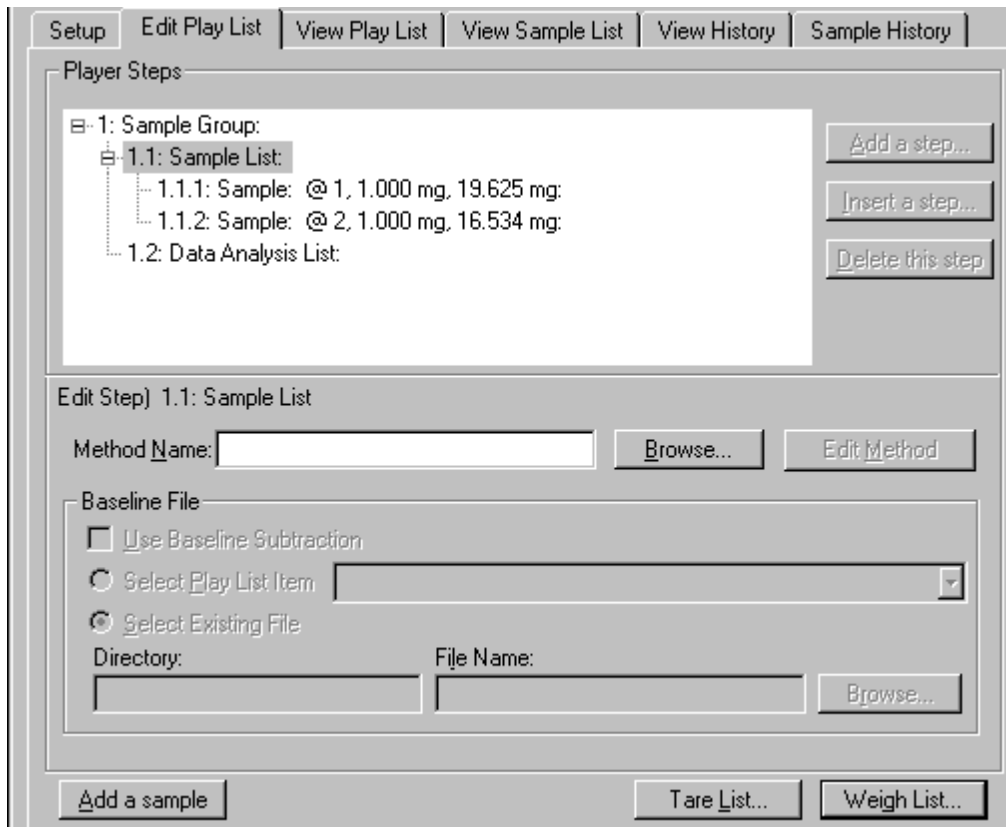
Click the Pyris Player button on the toolbar: . Either open an existing play list or create a new one.

There are many ways to use the play list with the autosampler. A quick way to create a play list for an STA 6000 or a TGA 4000 using the Sample Group feature is given below:

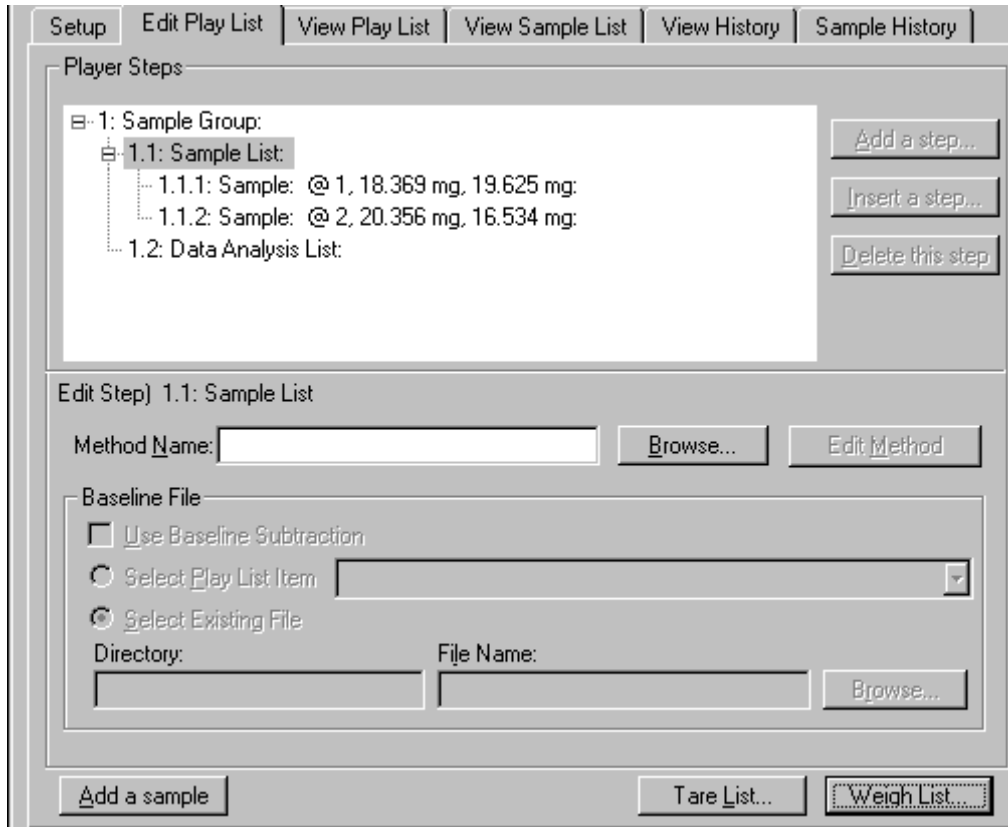
- Load empty sample pans into the locations you want to use in the sample tray. Create a new play list that contains only a Sample Group. Click the **Tare All** button. In the Advanced Tare Options dialog box, select **This Group Only; Populate from Tray**.



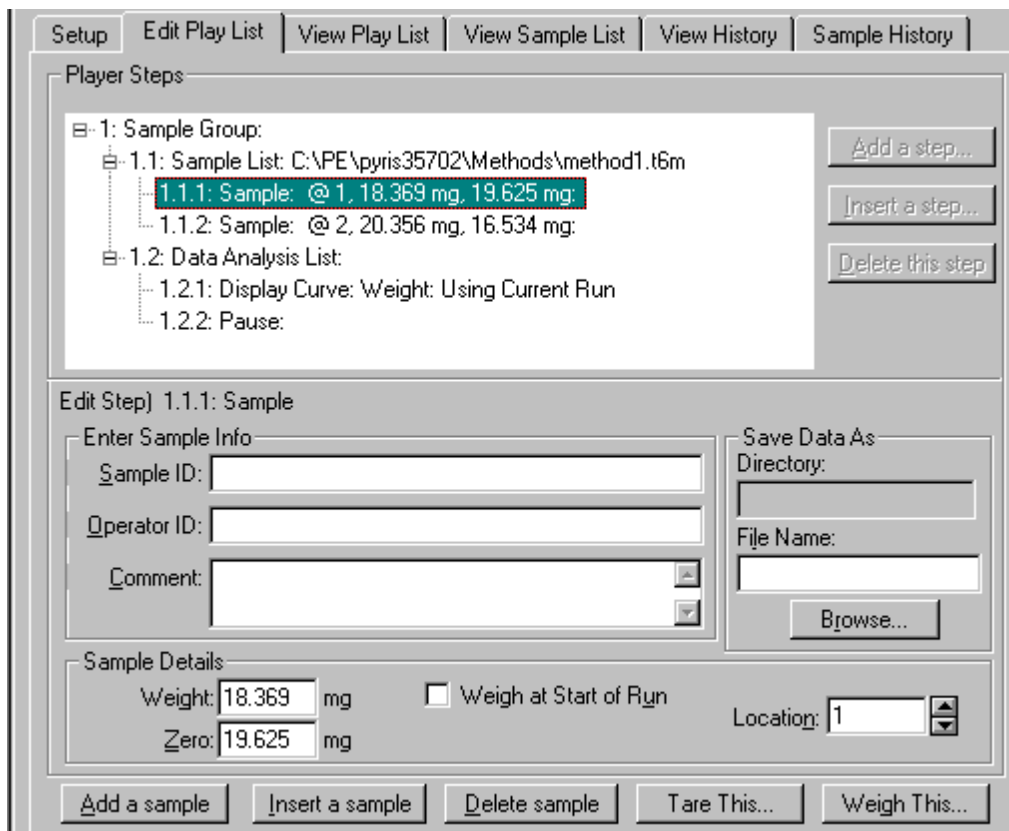
- Click **OK** and the Tare/Weigh System dialog box appears. The AS 8000 begins the procedure of taring the sample pans present on the sample trays. As it finds and tares each pan, it populates the Sample List and includes the tare weight for the sample pan in the Sample line. When taring is complete, click the **Done** button. The Sample List will be filled in.



- Remove the sample trays from the autosampler, or leave them in place, to load the crucibles. If you removed the trays, carefully return them to the autosampler and make sure that the two knobs on the bottom of each tray engage the holes in the autosampler plate.
- Now you can have the system weigh each sample in the list. You can also choose to have each sample weighed right before the run starts. To weigh all the samples before starting the play list, highlight the Sample List line. A message informing you that a method has not been selected is displayed. You can select the method after the samples have been weighed. Click **Weigh List**. The Tare/Weigh System screen appears and the system begins to weigh the samples listed in the Sample List. When finished, the weights are displayed, along with the tare weights, in each Sample line.



- Next you need to add some items to the Data Analysis List. If you have not entered a method for the Sample List, however, you cannot fill in the Data Analysis List. To enter a method, highlight the Sample List line. Type in the name of the method in the Method Name field or click the **Browse** button and find and select the method you want to use. Edit the method's program and initial state parameters by clicking the **Edit Method** button. When finished editing, close the Method Editor by clicking the window's **Close** button in the upper-right-hand corner.
- Click the Data Analysis List line and then **Add a step**. Select **Display Curve**. The default selection in the Edit Step area is **Use Current Run**. After adding the display of a curve, addition items are listed in the Player Step Options box when you add another step.



9. Save the play list by selecting Save Player from the File menu.
10. Start playback of the play list by clicking the Start at Top button or the Start at Current Item button on the Player toolbar. These are the first two buttons on the toolbar:



NOTE: If you select the Start at Current Item button, the focused item must be a main-level item, that is, Prepare Sample, Data Analysis, or Sample Group. However, if you are in a Sample Group, you can start a play list from a Sample line in the Sample List.

NOTE: If you select Go To Load, Go To Temp, or Hold at Temp from the control panel while a play list is running, the current sample run will end and the playback of the play list ends.

This is just one example of using a play list with the AS 8000 autosampler. The AS 8000 autosampler on a DSC 4000 or DSC 6000 does not have the Tare/Weigh feature so the creation of a Sample Group is not automated. You will have to weigh the samples before placing them in the sample pans and crimping the pans. You have to enter the weights into the Sample Details area of the Edit Step: Sample section.

Troubleshooting

When the AS 8000 autosampler malfunctions, in most cases it will generate an error message which is sent to the computer and is displayed in the Pyris software. The troubleshooting list below should be used if the AS 8000 malfunctions.

To continue normal operation with the parent instrument, switch off the instrument and then switch it back on after 10 seconds. Depending on the error, normal operation may or may not be possible. If normal operation can not be resumed, the problem has to be resolved by a service engineer.

Error message ID	Error	Possible Cause	Corrective Action
ERR_NO_12VOLT	No +12 V power supply available (stepper motor power supply)	Overload condition in switched power supplies 12 V power supply not OK	Check stepper motor wires Replace AS 8000 assembly Replace controller PCB
ERR_HOR_STEP_BLOCKED	Horizontal stepper motor blocked	Blocked gear wheels Blocked by external object	Check gear wheels Remove external object
ERR_VER_STEP_BLOCKED	Vertical stepper motor blocked	Incorrect calibration Blocked gear wheels Blocked by external object Inner lid of DSC misplaced	Recalibrate the AS 8000 Check gear wheels Remove external object Replace DSC inner lid
ERR_DUE_TO_PARENT	Parent instrument has entered fatal error state that results in the AS 8000 also entering error state	Error occurred in parent instrument	Check parent instrument

Error message ID	Error	Possible Cause	Corrective Action
ERR_GRP_WIRE_BROKEN	Gripper wire is broken or no AS 8000 mechanics connected	<p>Gripper wire is broken</p> <p>AS 8000 connector not connected</p> <p>AS 8000 cable not OK</p>	<p>Replace gripper assembly</p> <p>Connect AS 8000 connector</p> <p>Check AS 8000 cable</p>
ERR_GRP_NO_SAMPLE	<p>Gripper contains no sample when entering furnace. Light switch in state</p> <p>CST_FURN_PUT_SAMPLE</p> <p>during an automatic calibration</p>	There was no sample pan at the reserved position on the sample tray	Place a sample on position 0 of the sample tray
ERR_GRP_NOT_EMPTY	<p>Gripper still holds sample while moving OUT of furnace during state</p> <p>CST_FURN_PUT_SAMPLE</p> <p>or in state</p> <p>CST_PERFORM_TEST</p>	Sample sticks to gripper fingers	<p>Clean gripper tips</p> <p>Use clean sample pans</p>
ERR_LIGHT_SWITCH	Light switches are not functioning or are blocked when the gripper is in raised position	<p>Light switch is blocked</p> <p>Light switch in not OK</p> <p>AS 8000 cable is not OK</p>	<p>Remove object that blocks light switch</p> <p>Replace AS 8000 mechanics</p> <p>Check/replace AS 8000 connection board</p>
ERR_MICRO_SWITCH	Microswitch is activated when gripper is NOT in reset state	<p>Microswitch is not OK</p> <p>Microswitch wiring not OK</p> <p>AS 8000 cable not OK</p>	<p>Replace gripper assembly</p> <p>Check microswitch wiring</p> <p>Check/replace AS 8000 connection board</p>

Error message ID	Error	Possible Cause	Corrective Action
ERR_FURN_NOT_EMPTY	Furnace still contains a sample while trying to load a new one. This error can be generated only after loading at least one sample after power on, as the instrument cannot detect if a sample is present in the furnace from a previous power on period	<p>Failure picking sample out of furnace</p> <p>Incorrect horizontal baseplate adjustment</p> <p>Incorrect horizontal calibration</p> <p>AS 8000 run was interrupted after putting a sample in furnace and restarting</p>	<p>Check if gripper fingers are bent. Replace gripper assembly</p> <p>Adjust baseplate</p> <p>Recalibrate the AS 8000</p> <p>Reset parent instrument and setup link again</p>
ERR_NOT_AT_SENS	Sensor position not reached during autocalibrating the sensor position	Vertical stepper missed steps because it was blocked while running at slow speed. (During slow gripper speed, the stepper blocked detection is disabled.)	Check the DSC lower lid position
ERR_NO_ZERO_DETECT	Zero position is not detected	<p>No detection of the gripper fingers because of direct sunlight at the light switches</p> <p>Gripper assembly displaced</p>	<p>Do not place instrument in direct sunlight</p> <p>Align gripper assembly</p>

Error Messages from the STA 6000

Error message ID	Error	Possible Cause	Corrective Action
ERR_DUE_TO_AUTOSAMPLER	AS 8000 entered fatal error state. This caused STA 6000 to enter fatal error state	Refer to the AS 8000 error message	Refer to AS 8000 troubleshooting (above)
ERR_AUTOSAMPLER_RESPONS	Timeout on command. Response from command transmitted to AS 8000	I2C connection cable defective	Replace I2C cable
ERR_AUTOSAMPLER_I2C_WD	No link between STA 6000 and AS 8000 via I2C	I2C connection cable defective	Replace I2C cable

AS 8000 Autosampler Maintenance

The exterior surfaces of the AS 8000 may be cleaned with a soft cloth, dampened with a mild detergent and water solution.

The bushings of the gripper fingers should also be kept clean. Use a Q-tip dampened with a mild detergent and water solution to carefully wipe them clean. Use the same method to clean the two sample trays.

Cleaning and Decontamination

Before using any cleaning or decontamination methods except those specified by PerkinElmer, you should check with PerkinElmer that the proposed method will not damage the equipment.



WARNING

There are no user-serviceable parts inside the autosampler. Refer all servicing to a qualified PerkinElmer Instruments service engineer.



AVERTISSEMENT

Il n'y a pas de pièces réparables par l'utilisateur à l'intérieur de l'échantillonneur automatique. Renvoyez tous les services à un ingénieur de service qualifié PerkinElmer Instruments ...

