INSTRUMENT MANUAL

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March 2008

PerkinElmer 2030

Multilabel Reader

PerkinElmer®
precisely.

PerkinElmer 2030

Multilabel reader

Valid for instruments with software version 4.0

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Warning

This equipment must be installed and used in accordance with the manufacturer's recommendations. Installation and service must be performed by personnel properly trained and authorized by PerkinElmer Life and Analytical Sciences.

Failure to follow these instructions may invalidate your warranty and/or impair the safe functioning of your equipment.

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PerkinElmer 2030 multilabel reader

Introduction

PerkinElmer 2030 multilabel reader is a complete platform for quantitative detection of light-emitting, or light absorbing markers. *Depending on the model of the instrument you have*, it is suitable for flash or glow luminometry, fluorometry, high-sensitivity time-resolved fluorometry (DELFIA®), UV absorbance, photometry, homogeneous time-resolved fluorescence assays (LANCE™ option) and fluorescence polarization. It is a compact bench top unit with features such as stacker, dispensers, shaker, temperature control, top or bottom counting and scanning. The software is a 32-bit application running under Windows XP on a PC connected to the instrument. Plates with up to 1536 wells can be counted, as well as Petri dishes, slides filters and Terasaki plates. Plates can be loaded manually or with stackers for automatic operation. Output can be to a file on the PC and/or to a laser printer.

PerkinElmer 2030 has an optional Enhanced Security mode intended for facilities that have to comply with 21 CFR Part 11 regulation from the Food and Drug Administration (FDA) of the USA. During installation you can select if you want to use the Enhanced Security mode. This mode is described in the User manual.

Models and Options

2030-0010 dedicated luminometry model – for luminometry only.

2030-0020 fluorescence and luminescence model – for fluorometry and luminometry.

2030-0030 photometry model – for fluorometry, luminometry and photometry (including UV absorbance)

2030-0040 time-resolved fluorometry model – for fluorometry, luminometry, photometry, (including UV absorbance) and time-resolved fluorometry.

2030-0050 all five leading technologies model - for fluorometry, luminometry, photometry (including UV absorbance), TR-fluorometry and fluorescence polarization.

All models include temperature control and shaker operation.

The following options are available for all models:
1420-221 Barcode reader
1420-2550 …. 1420-2580 One dispenser … 4 dispensers
2030-3010 Enhanced security mode software option
2030-1010 Stacker option

1420-113 Red sensitive PMT option is available for all models except 2030-0010

1420-110 The time-resolved fluorometry option can be fitted in the field to 2030-0020 and 2030-0030

1420-3050 WorkOut 2.5 Data Analysis software is included in models 2030-0030, 2030-0040 and 2030-0050 as standard and is available as an option for other models

Single plate models

In the models without stackers, a single microplate is loaded into the reader.

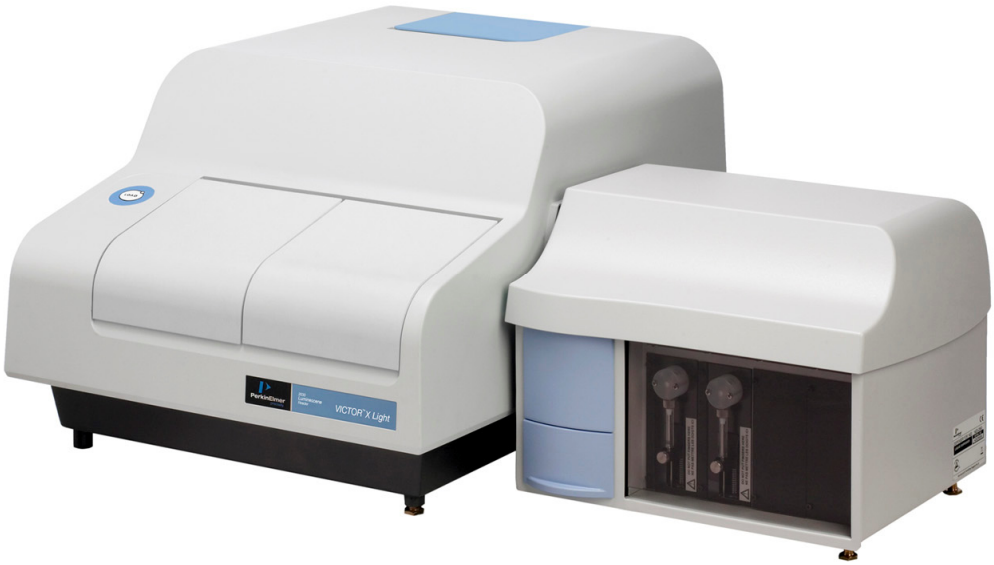
Stacker models

In the stacker operation, plates are loaded into the input stacker with the first plate to be measured at the bottom. The empty output stacker is fitted first into the multilabel reader; it occupies the left hand position. Then the input stacker with plates is fitted in the right hand position. During operation the plates are moved one by one from the input stacker to the measurement position. After each plate has been measured, it is moved to the output stacker. When measurement is complete the output stacker can be removed. A quick release mechanism allows the plates to be emptied easily from the stacker.
Note: the stacker model can also be used as a single plate model if required.

Barcode reader option

An optional barcode reader can be included. This allows loading of barcode labelled plates, which are identified by the barcode reader. This identification can be by plate number or protocol number. In the former case, the protocol to be used for the measurement must be specified. In the latter, the barcode identifies the protocol to be used for that plate. This system is especially useful for the stacker models.

Dispenser option



The optional dispenser allows measurements to be made that require e.g. the addition of reagent to start the process as in the case of flash luminescence or start and stop an enzyme reaction. It can also be used for dispensing Enhancement Solution for a DELFIA time-resolved

fluorometry measurement. It can be used with any of the technologies supported by PerkinElmer 2030.

The dispenser can have up to four pumps fitted. This allows separate pumps to be dedicated for specific purposes. All the needles are directed to the same well allowing dispensing of more than one reagent to the same well. The number of pumps fitted and the total volume of each pump are set during installation. This information then appears when dispenser maintenance is selected. The default setting for the dispensed volume can be between 5 to 350 microliters.

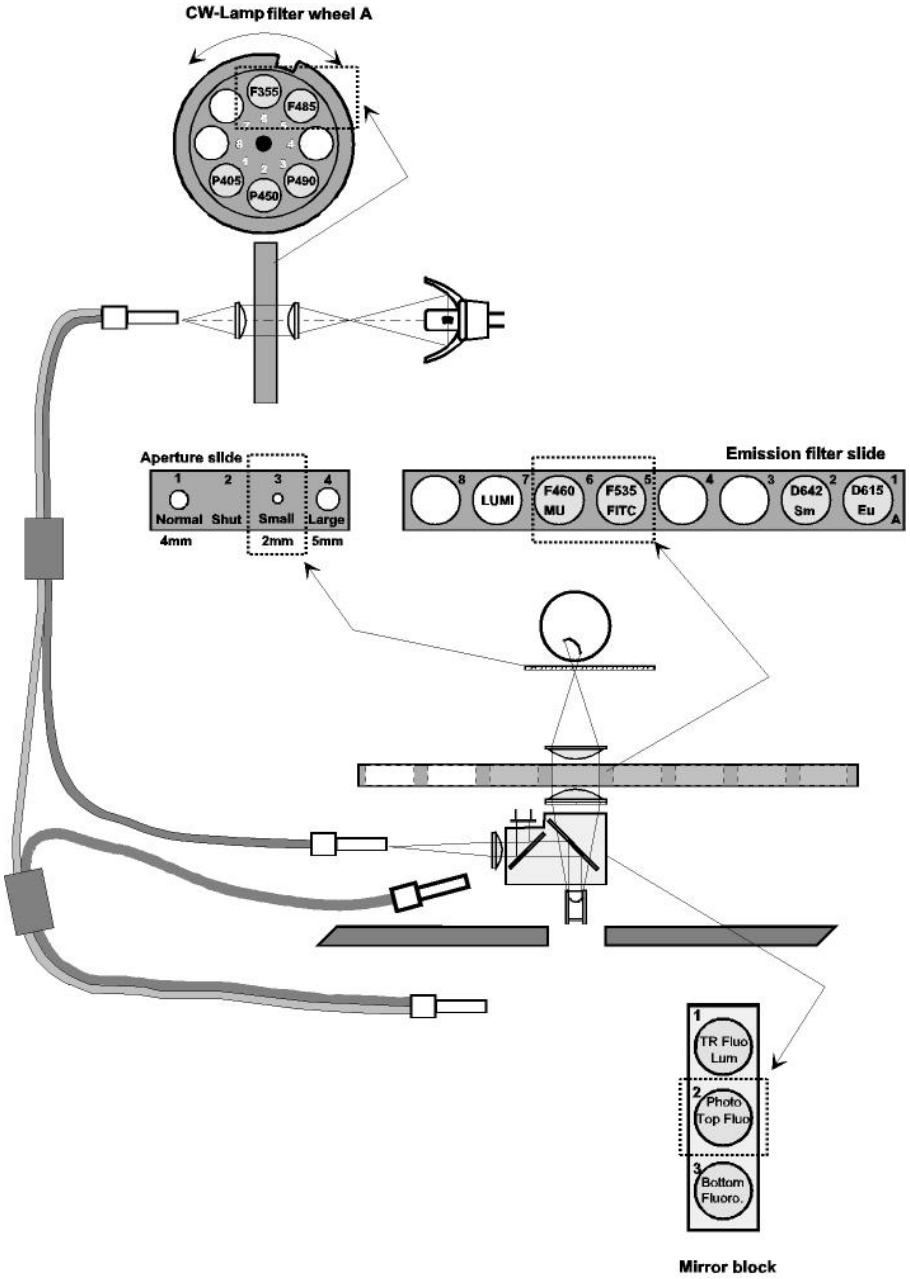
The optional dispenser is a separate unit from PerkinElmer 2030 itself making for convenient maintenance and flexibility in syringe selection.

Features of all models except PerkinElmer 2030-0050

Note: PerkinElmer 2030-0050 features are described separately at the end of this chapter.

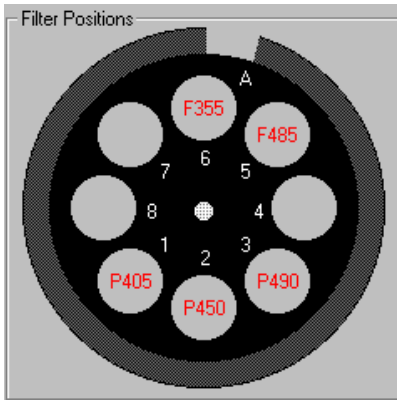
Fluorometry (top counting)

For PerkinElmer 2030-0020, -0030, -0040

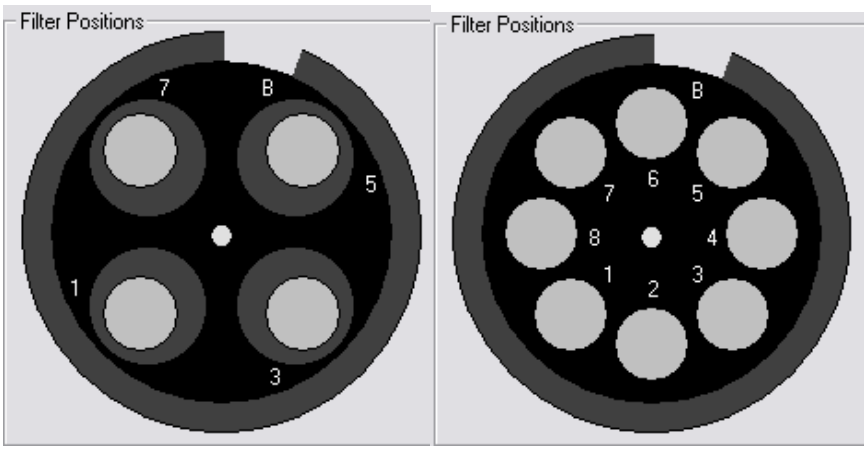


Inside PerkinElmer 2030 there is a tungsten-halogen continuous wave lamp (75 w, spectral range 320 - 1000 nm) This is used as the light source for fluorometry and photometry measurements. The actual wavelength used is selected by means of a wheel containing up to 8 filters. The filter to be used can be selected by means of the software. The spectral range of the CW-Lamp is 320 - 1000 nm. Two positions of the standard 8-position filter wheel (filter wheel A) are used for filters of 355 and 485 nm, which are specially designed for fluorescence excitation. All standard filters are high quality interference filters with a diameter of 15 mm.

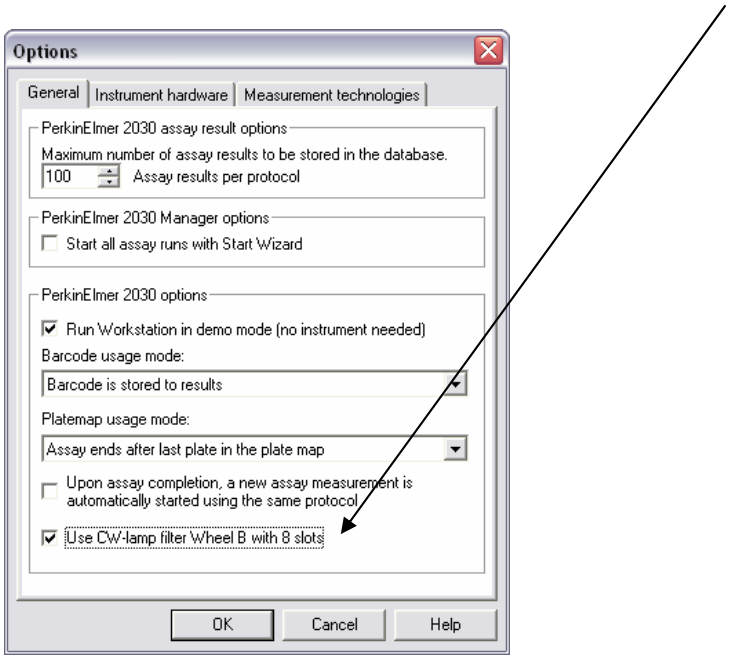
There are three empty filter positions into which customized filters can be inserted.



There are also two optional filter wheels: filter wheel B and filter wheel B2. Filter wheel B(left side figure) has four positions for the most common size of commercial filters i.e. "round one inch". Filter wheel B2 (right-hand figure) has 8 positions for filters with a diameter of 15 mm. Both wheels are supplied empty but with locking rings.



The system recognizes automatically if the type of wheel is A or B. However, if a B2 wheel is used instead of the default type B you need to inform the system through the workstation software. This is done by selecting “Use CW-lamp filter wheel B with 8 slots” in Tools/Options/General:



Light of the selected wavelength having passed through the light guide is collimated through the sample. You have the choice of using either stabilized energy mode or constant voltage mode for ensuring that the results are calculated for constant illumination.

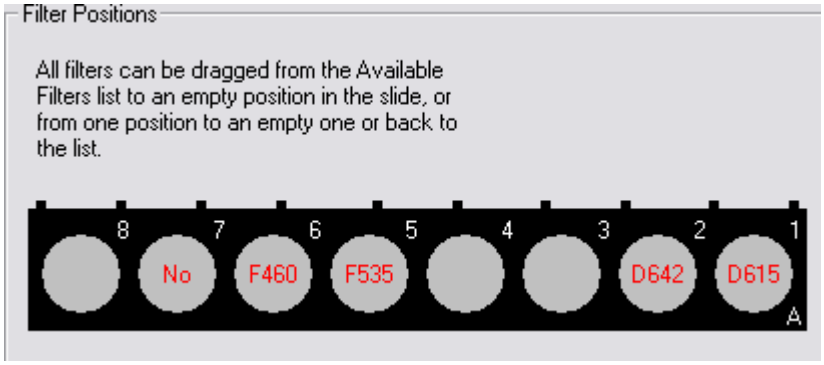
In stabilized energy mode a photodiode monitors the light used to illuminate the sample and sends a signal to the CW-lamp to adjust the voltage as required to maintain constant illumination.

In constant voltage mode, the CW-lamp voltage is not adjusted unlike in the stabilized energy mode. A photodiode monitors the light used to illuminate the sample. The change in the signal from this photodiode is used in the software to correct for changes in lamp intensity so as to ensure that the results are calculated for the same illumination. In constant voltage mode it is recommended that the lamp is run at full power. Constant voltage mode is recommended when counting kinetic dual excitation fluorescence labels.

In both modes, the energy range is user adjustable to help find the optimum linear range for samples being measured and thus keep the output signal within the linear range of the instrument.

In top counting the sample is illuminated from above and then the fluorescence shines up from the sample and passes through a mirror slide, a lens system and an 8-position emission filter slide to a low noise photomultiplier (spectral range 400 - 700 nm) equipped with fast single photon counting electronics. There is also a combined shutter and aperture slide.

In the standard emission filter slide (A) there are two positions for emission filters of conventional fluorescence at wavelengths of 460 and 535 nm.



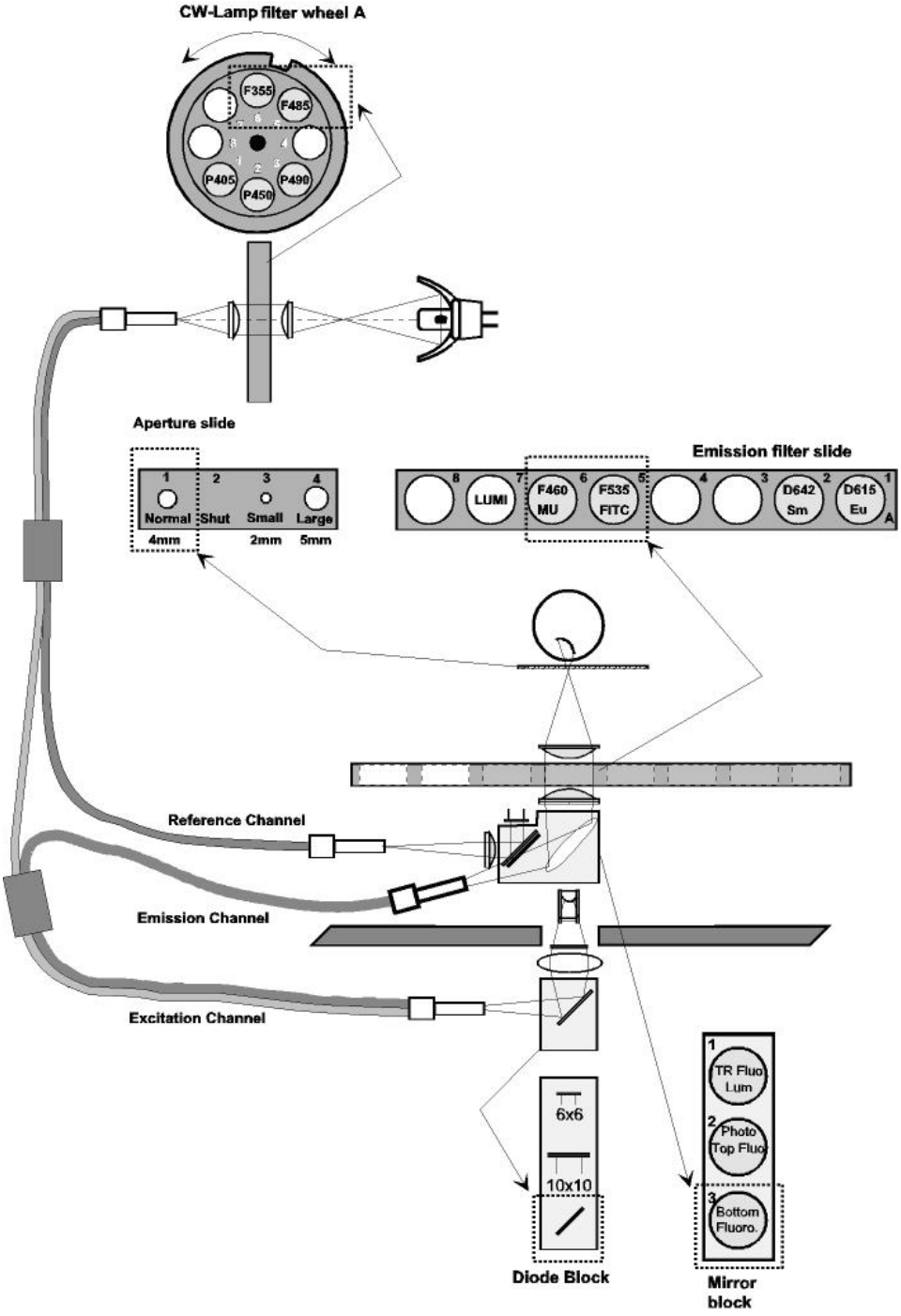
Emission filter slide A can be replaced with another one which has no predefined filters, so you can choose which filters you want to load. There are eight positions, the same as in filter type A. The size is “round one inch”.

The excitation/emission pairs with wavelengths 355/460 and 485/535 are used for e.g. umbelliferone and fluorescein, respectively.

Note: when the properties of a label are defined, then the filters to be used for measurements with that label are specified. When a protocol is selected for a measurement, the appropriate filters are moved into position automatically.

Fluorometry (bottom counting)

For PerkinElmer 2030-0020, -0030, -0040

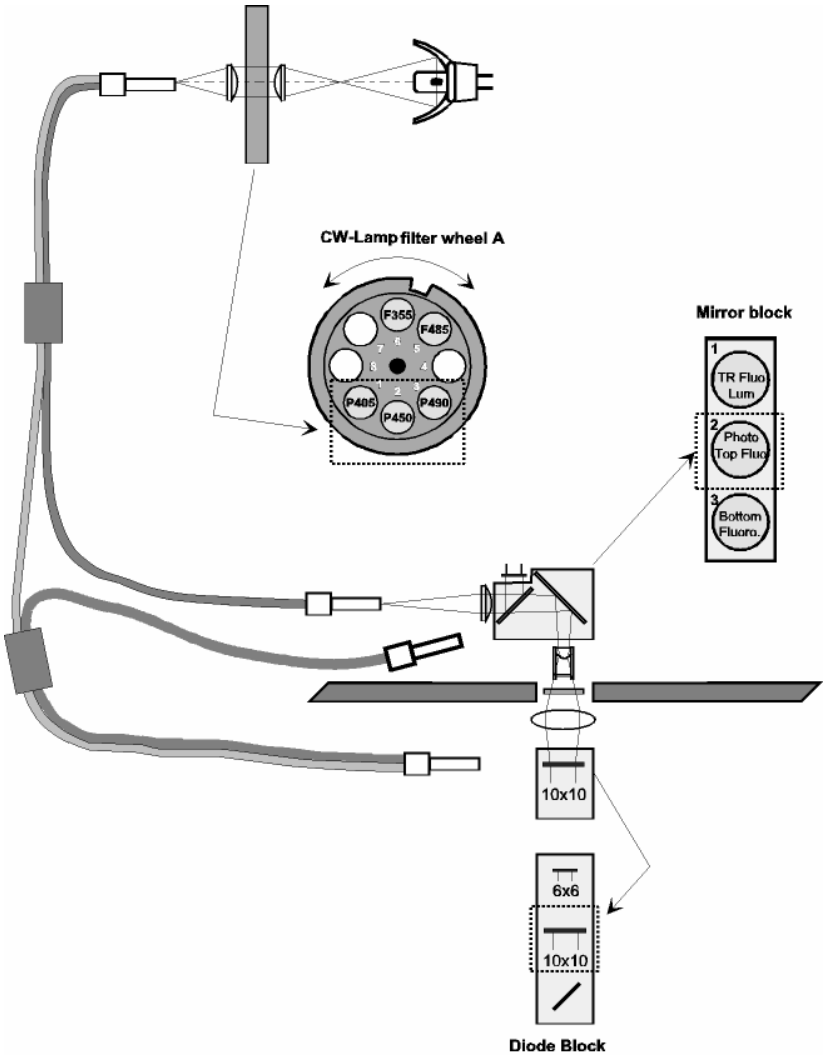


In the case of bottom counting of prompt fluorescence samples, excitation light is directed through a light guide underneath the plate. Emission light from the bottom of the sample goes back along the same light guide to the optical block where the emission filter is and from there to the PMT. Bottom counting allows measurements to be made for samples in which cells are at the bottom of the wells or there are lids on wells.

Switching between top and bottom counting is done by software and both methods can be used for the same plate.

Photometry

For PerkinElmer 2030-0020, -0030, -0040



For absorbance measurements the same excitation system is used as for prompt fluorescence. The wavelength of the light can be in the range 320 -1000 nm.

There are three positions in filter wheel A that are fitted with filters for the most common absorption wavelengths i.e. 405, 450 and 490 nm.

In absorption measurements, light passes through the well to a photodiode beneath the sample plate.

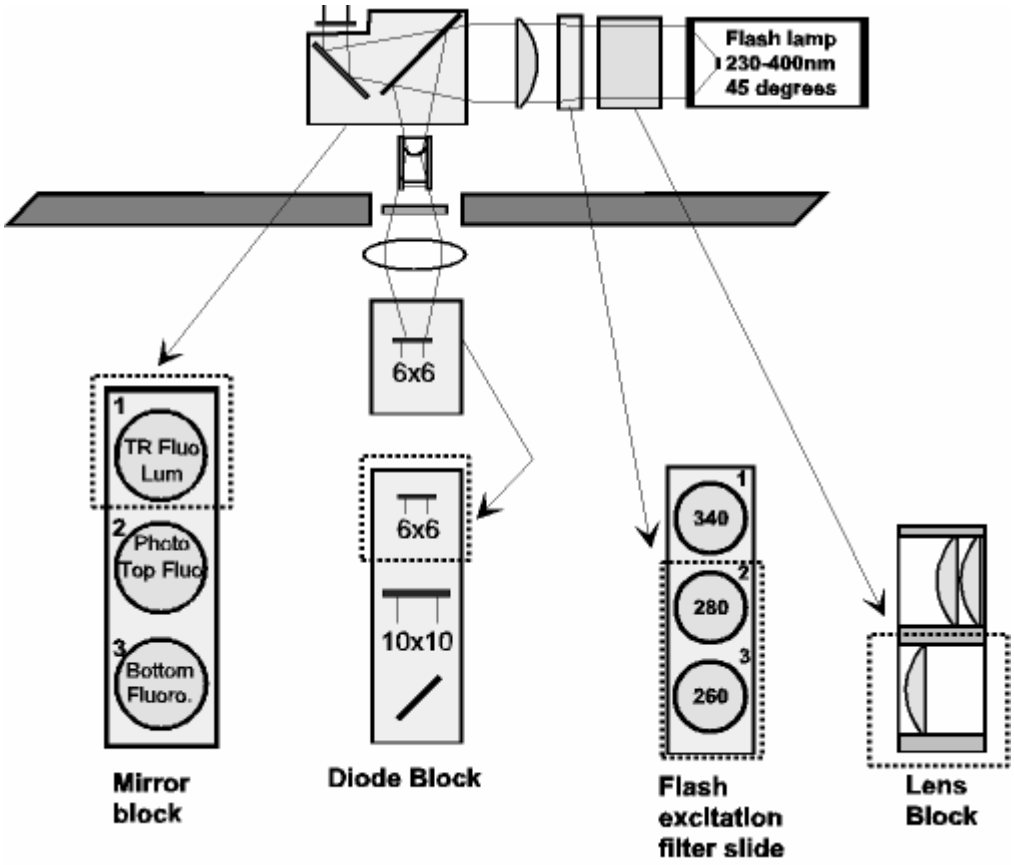
The intensity of the filtered and stabilised beam is first measured without any sample and then the samples in one plate are measured. The absorbance value is then calculated from the equation:

$$A = - \log (I / I_0),$$

where I_0 is the light intensity measured without any sample (a reference beam) and I is the intensity after an absorbing or reflecting medium. Because the optical surfaces of the empty well reflect backward about 8 % of optical energy, the measured absorbance values are always about 0.04 A for a empty clear plate.

UV absorbance

For PerkinElmer 2030-0040 and -0050



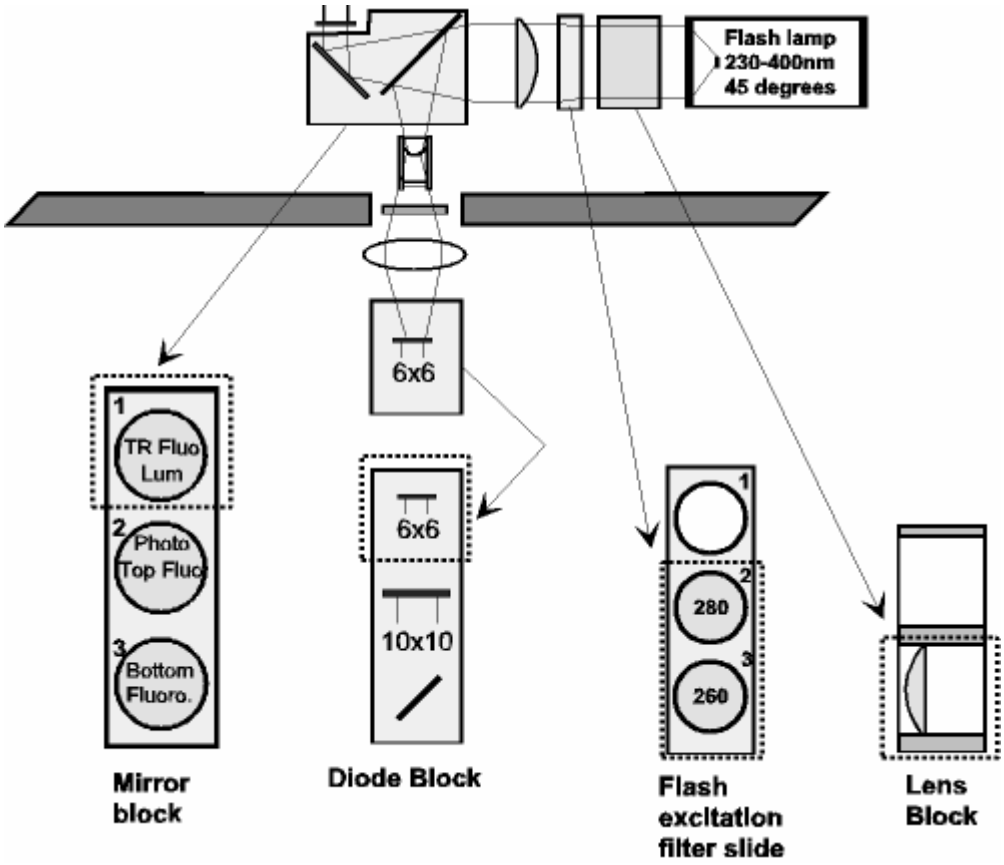
For UV absorbance measurements the same excitation system is used as for time-resolved fluorescence. The wavelength of the light can be in the range 230 -320 nm.

There are two fixed positions in the flash excitation filter slide that are fitted with filters for the UV absorption wavelengths i.e. 260 and 280 nm.

The measurement is as for normal photometry.

UV absorbance (photometry model)

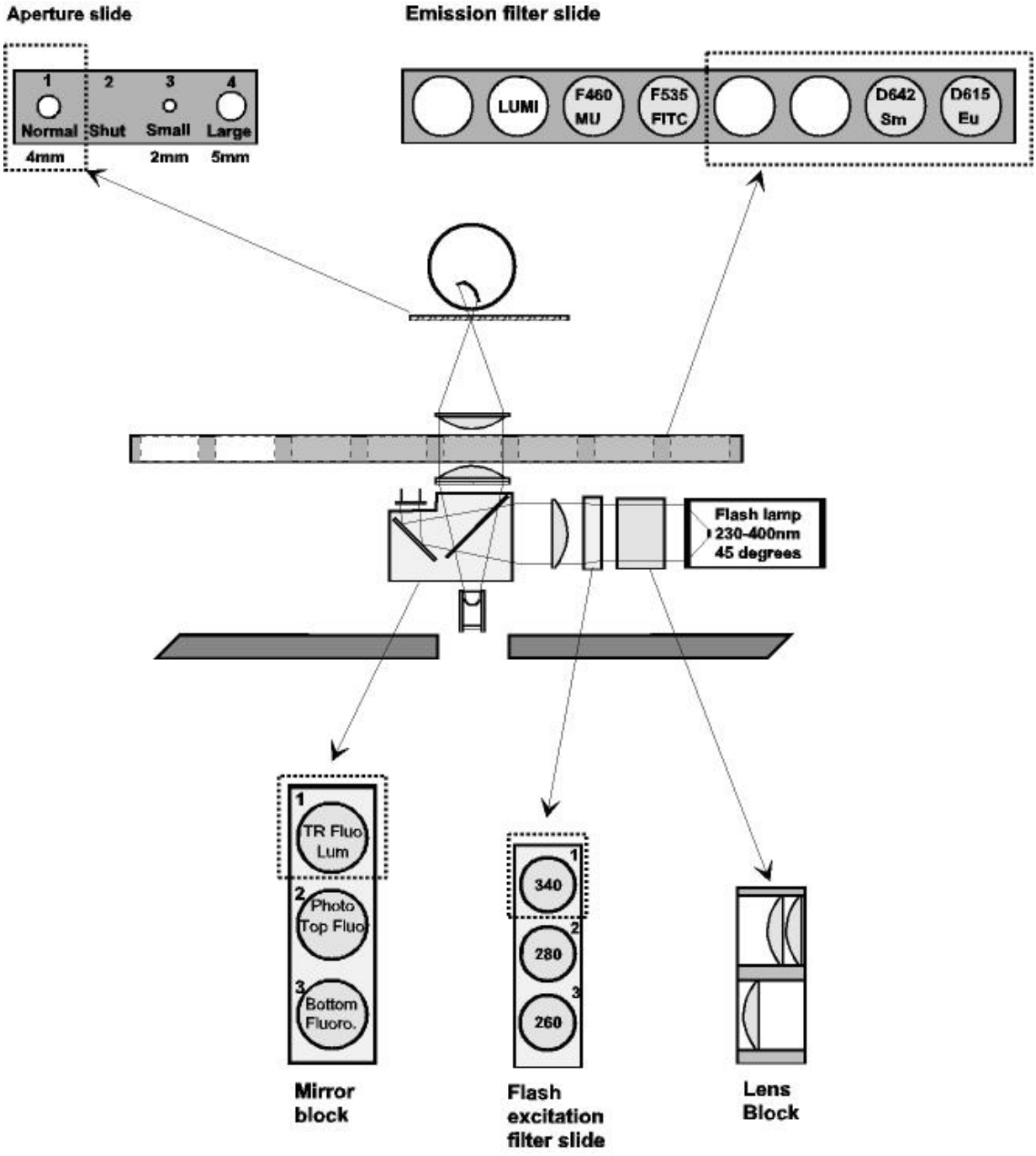
For PerkinElmer 2030-0030



The operation is as for normal PerkinElmer 2030 UV absorbance.

Time-resolved fluorometry

For PerkinElmer 2030-0040



This configuration is used for both types of time-resolved fluorescence measurements i.e. DELFIA®, involving dissociation and enhancement, and LANCE homogeneous assays. For enhanced performance with LANCE it is possible to install an optional red-sensitive detection unit (PMT).

In time-resolved fluorometry, excitation light is produced by a UV xenon flash lamp (spectral range 230 - 400 nm). The light passes through an excitation filter fitted into a slide. This slide is not accessible to the user, unlike the CW-Lamp wheel and emission filter slide where filters or the whole wheel or slide can be changed.

A lens and mirror system is used to direct the light through the sample well. Emission light from the sample then passes through a lens and filter system to the photomultiplier just as in the fluorescence case.

Both excitation and emission light are directed from the top of the well. If the adjustable beam size option is installed then there is an additional flash excitation lens slide.

Two positions of the standard 8-position emission filter slide (A) are used for emission filters suitable for labels of rare-earth chelates, i.e. Europium (615) and Samarium (642). Both these filters are high-quality interference filters with quite narrow (6 - 8 nm) bandwidths and exceptionally high peak transmissions (> 70%).

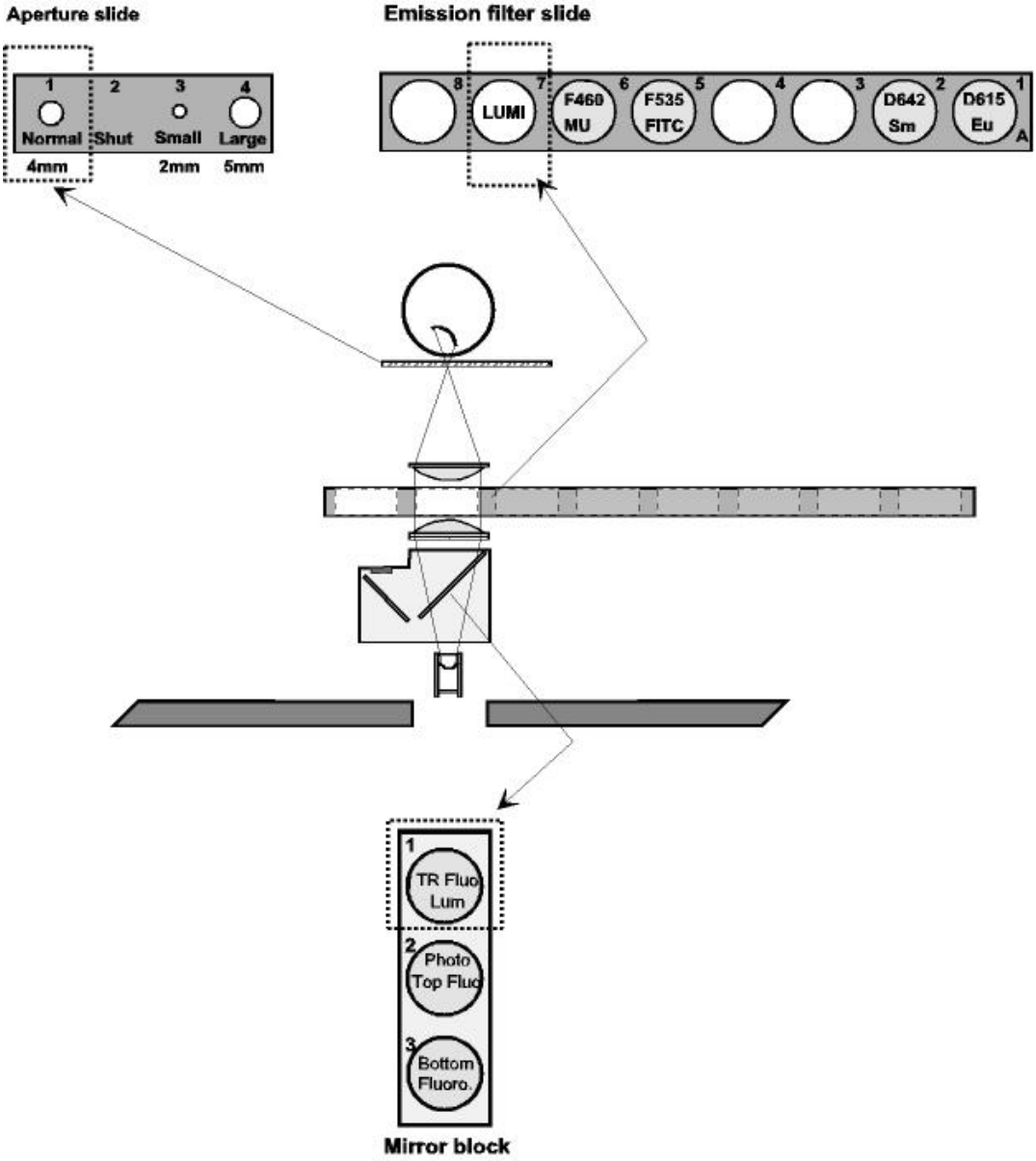
Note: these filters are only present if the time-resolved fluorometry option is included in the instrument.

Homogeneous time-resolved fluorometry, LANCE™

To make LANCE measurements a correction procedure is required. This is handled in the software by means of a normalization wizard, as described in the user manual and help. A more detailed description of how the correction is applied is given as an appendix to this chapter

Luminometry

For PerkinElmer 2030-0020, -0030, -0040

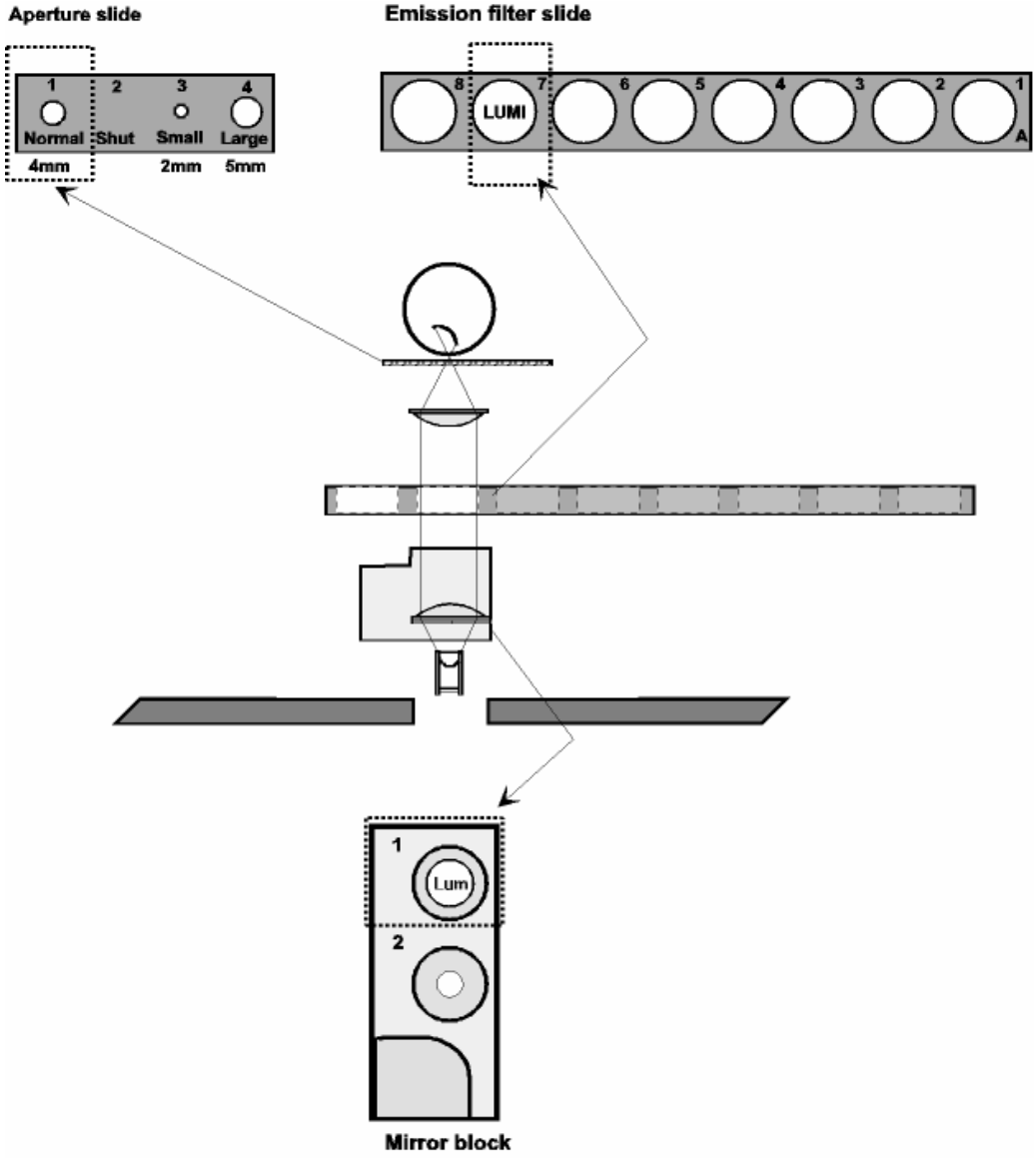


Measurement of glow, flash and dual-type luminescence is possible with PerkinElmer 2030. In luminometry there is no external excitation but the light is produced in the sample and then passes through a lens and an empty position in the emission filter slide to the photomultiplier. Although one filter position in the standard slide (A) is empty and is intended for luminescence measurements, any of the filters can be specified to be used with a luminescent sample.

Flash-type luminescence makes use of the dispenser option to initiate reactions by dispensing reagent directly into the wells of the plate. See the information on the dispenser option described earlier.

Luminometry (luminometry model)

For PerkinElmer 2030-0010



Actual operation is as for normal PerkinElmer 2030 Luminometry.

Shaking of plates

The plate conveyor also acts as a shaker. You can specify how long, how fast and with what amplitude the plate is shaken. A further feature is that the mode of shaking can be linear, orbital or double orbital (figure of eight). Shaking occurs when the conveyor has moved the plate to the measuring position.

Kinetic measurements

For reactions taking time, repeat measurements are necessary. PerkinElmer 2030 allows these kinetic measurements to be made. The number of repeats (up to 300) can be specified and the time between repeats, up to 3600 s. These fast kinetic measurements can only be made if "well mode" is selected. Slow kinetic measurements can also be made using plate repeats.

Scanned measurements

Measurements can be made at different points of a well for samples in which the light output is not homogeneous, e.g. in cell culture wells. The number of spots to be measured can be defined. Up to ten spots can be measured in both the horizontal and vertical directions (maximum of 100 points altogether). The distance between spots can be set. The distribution of the measurement spots can be square or rounded.

Temperature control

The temperature control option maintains plates at a temperature specified by the user. This can be between room temperature + 2^{o}C and 50^{o}C. The measuring chamber itself is heated, so no special plate holder is needed. The PMT tube environment is maintained at 25^{o}C.

Dual filter measurements

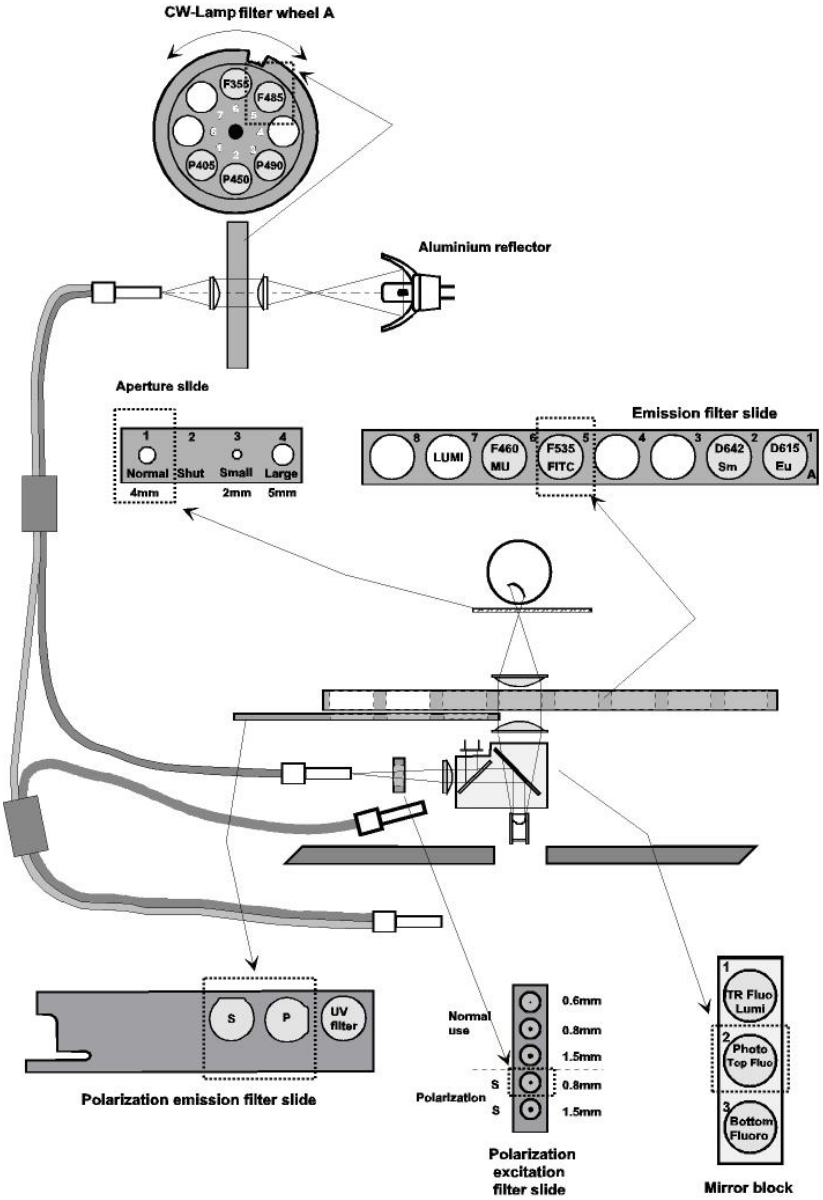
A second filter and other parameters can be specified for dual label measurements. In this case the system rapidly changes the filter and immediately makes the second measurement for the same well with no adjustments needing to be made in between.

PerkinElmer 2030-0050 features

This model allows fluorescence polarization measurements in addition to the technologies available in other models of PerkinElmer 2030. Fluorescence polarization requires a somewhat different internal design so new pictures are shown here and the differences noted.

Fluorescence polarization

For PerkinElmer 2030-0050



Light is produced by the same tungsten-halogen continuous wavelength lamp used for normal fluorometry and photometry. In fluorescence polarization, the excitation energy control is only by means of the constant voltage mode. The lamp is run at full power, with no voltage adjustment.

Light from the CW-lamp is directed via a light-guide through a polarization excitation filter slide. This has two positions with small and normal apertures. You can select which is of these is to be used. The filter polarizes the light in the S-plane.

The polarized light is then directed by means of a mirror block onto the sample.

The polarized emission light passes back through the mirror block and through a polarization emission filter. There are two of these in a slide. One filter is polarized in the S-plane and the other at a right angle in the P-plane. Finally the light passes through an emission filter and then to the PMT. One measurement is made with the S emission filter slide and the other with the P emission filter slide. The final result is calculated by combining these measurements in the formula:

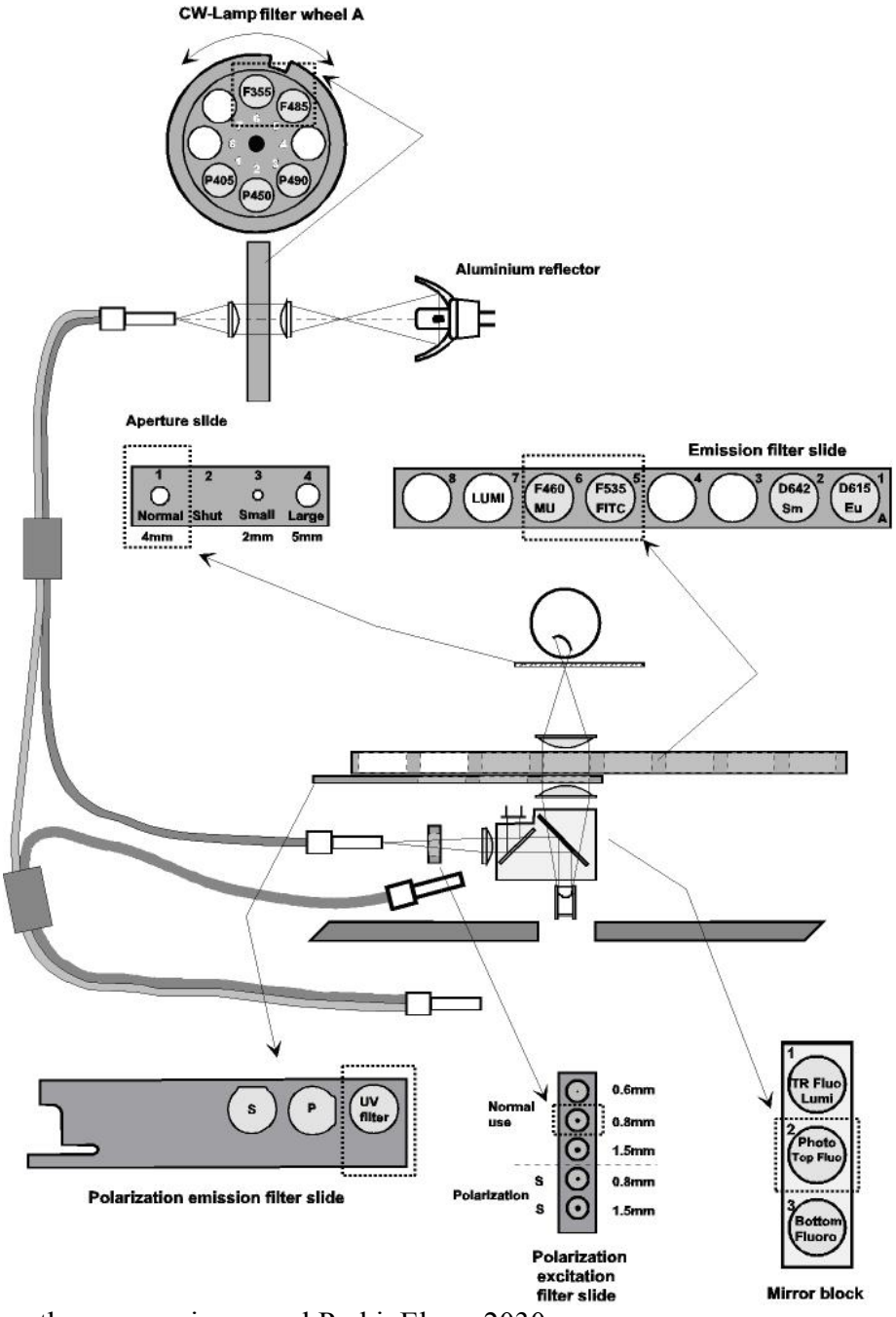
$$Polarization\ (mP) = 1000 * \frac{(S - G * P)}{(S + G * P)}$$

Where S and P are the measured results with the S and P emission filters respectively. G is a factor to correct for the effect of emission filter transmission variation and sample viscosity.

See the PerkinElmer application note on Fluorescence polarization assays for more details.

Fluorometry (top counting)

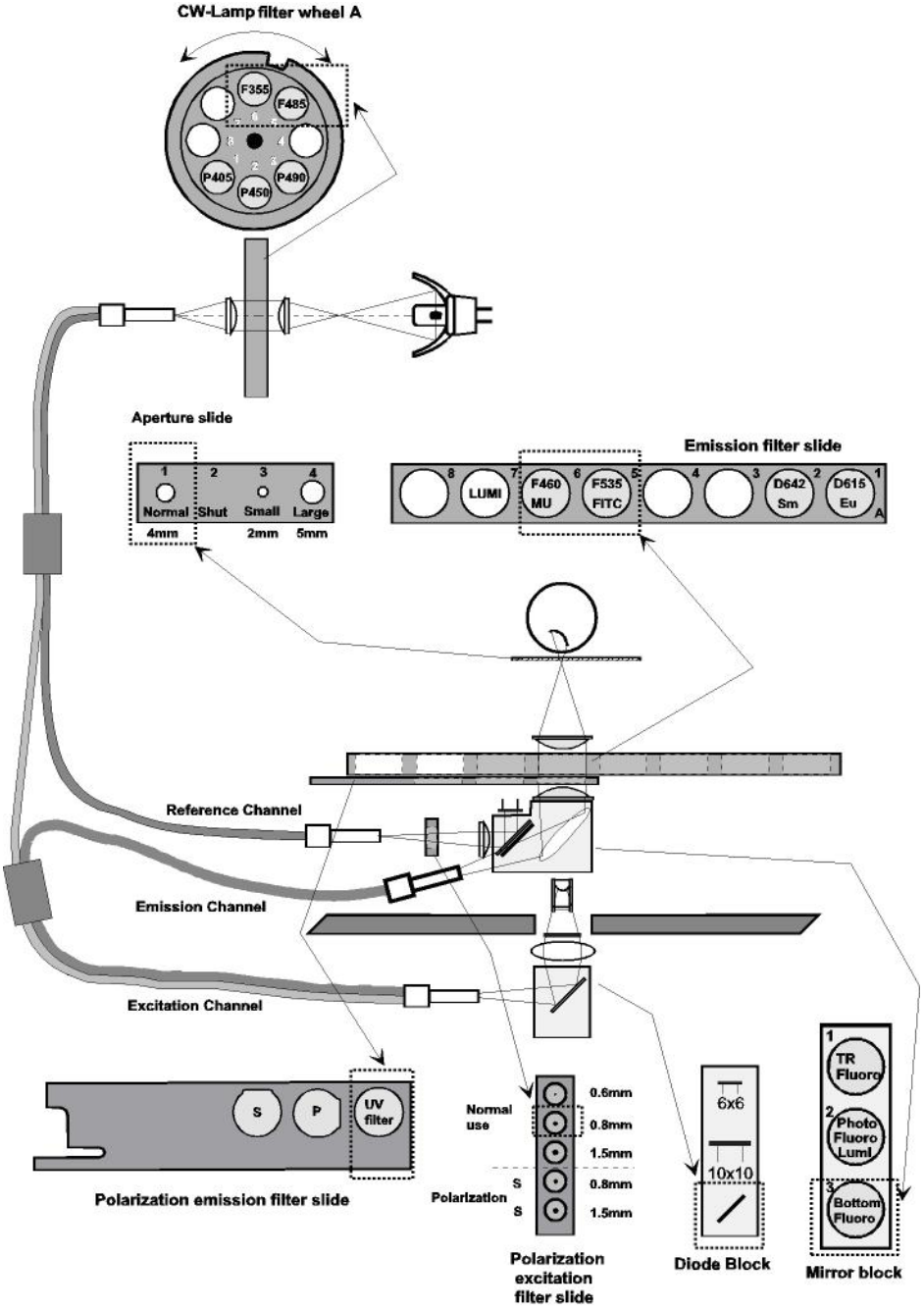
For PerkinElmer 2030-0050



This functions the same as in normal PerkinElmer 2030.

Fluorometry (bottom counting)

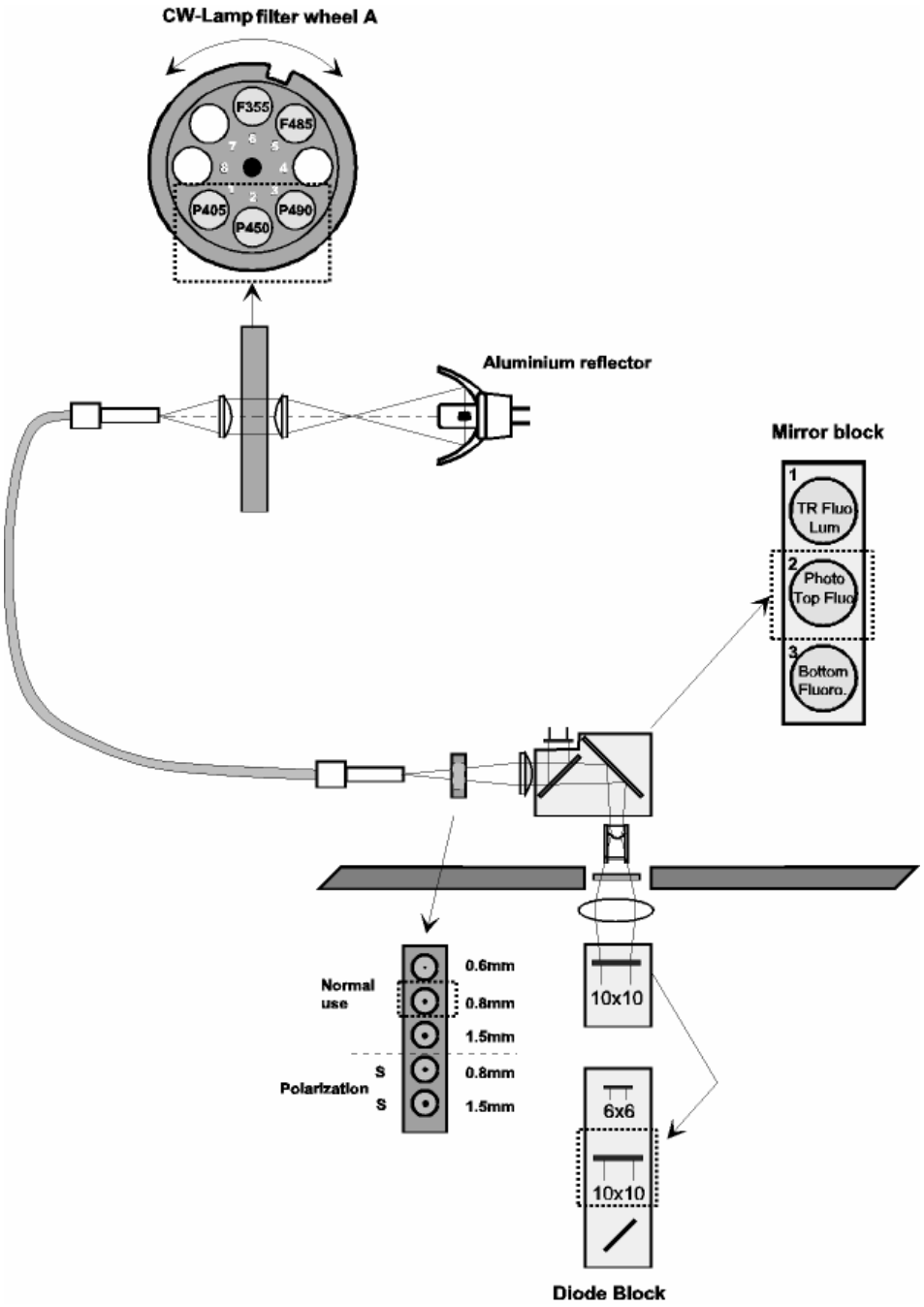
For PerkinElmer 2030-0050



This functions as in normal PerkinElmer 2030.

Photometry

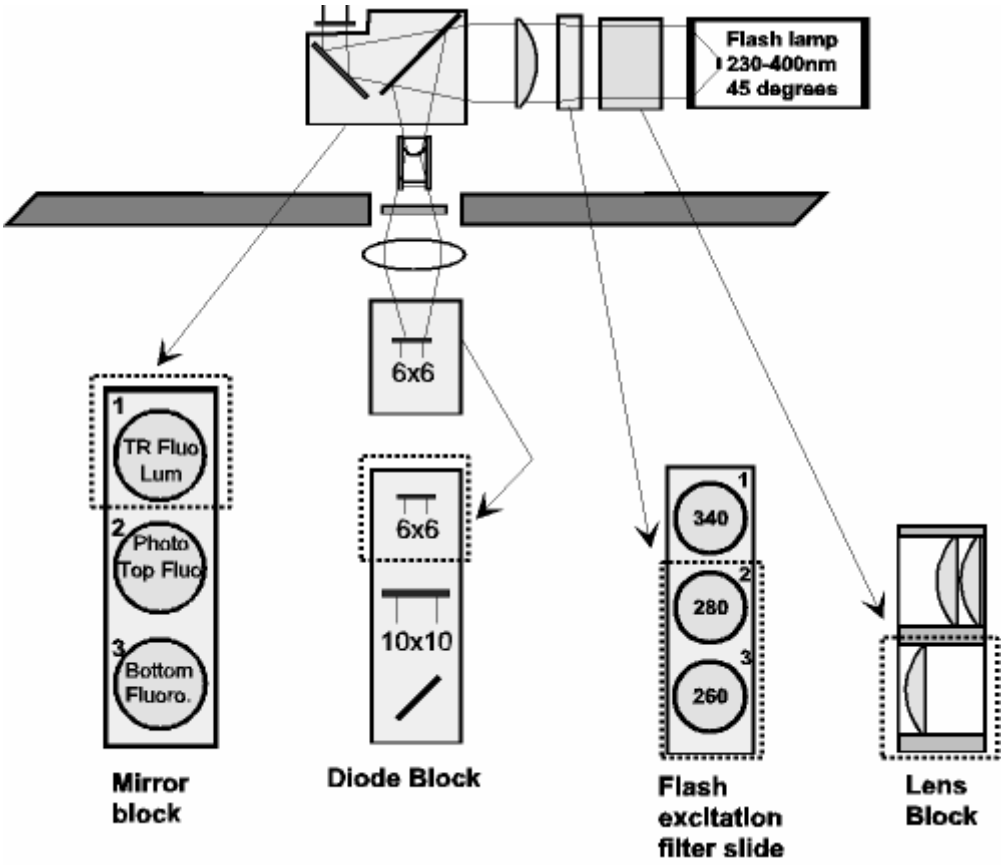
For PerkinElmer 2030-0050



This functions as in normal PerkinElmer 2030.

UV absorbance

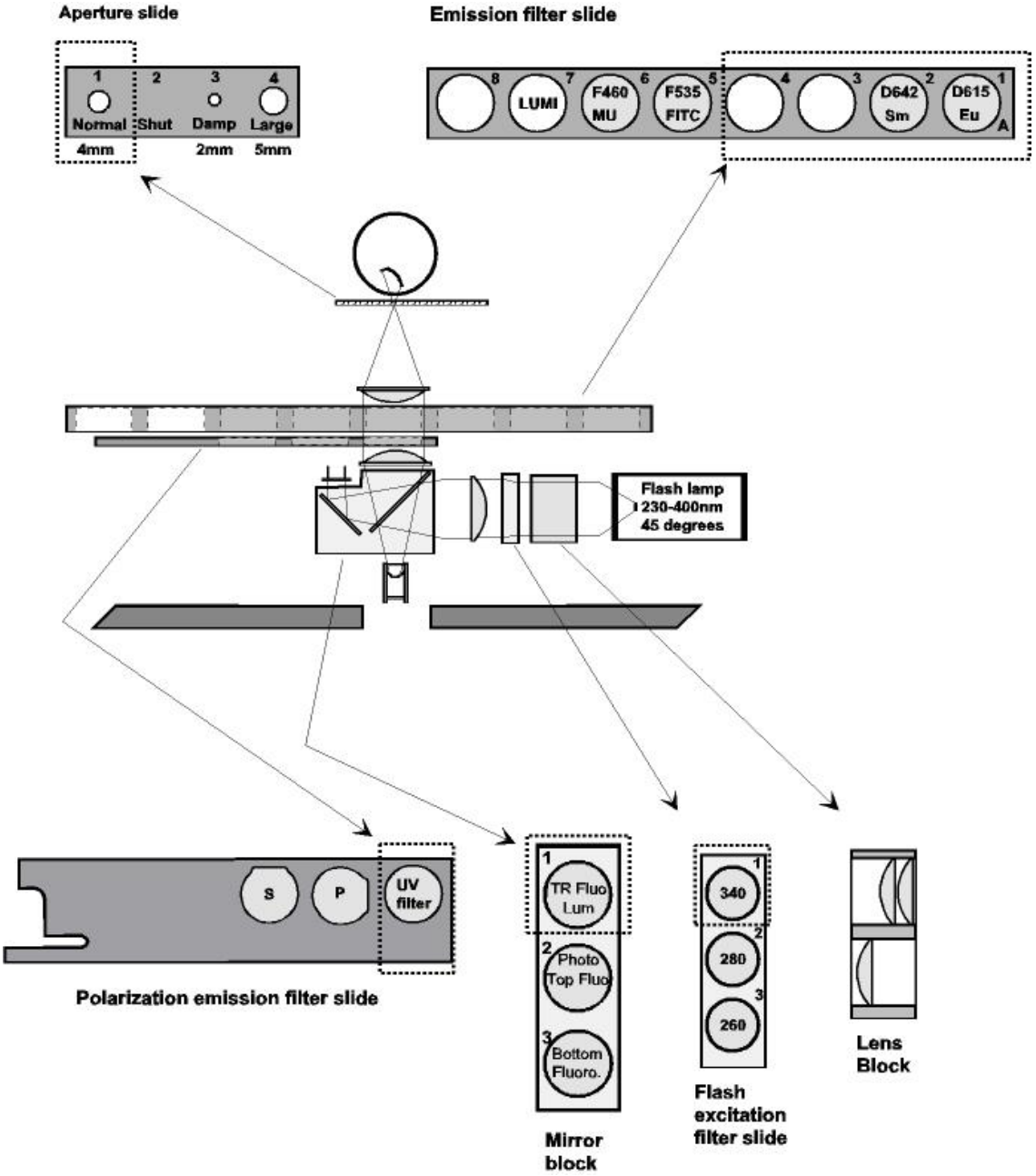
For PerkinElmer 2030-0050



This functions as in normal PerkinElmer 2030.

Time-resolved fluorometry

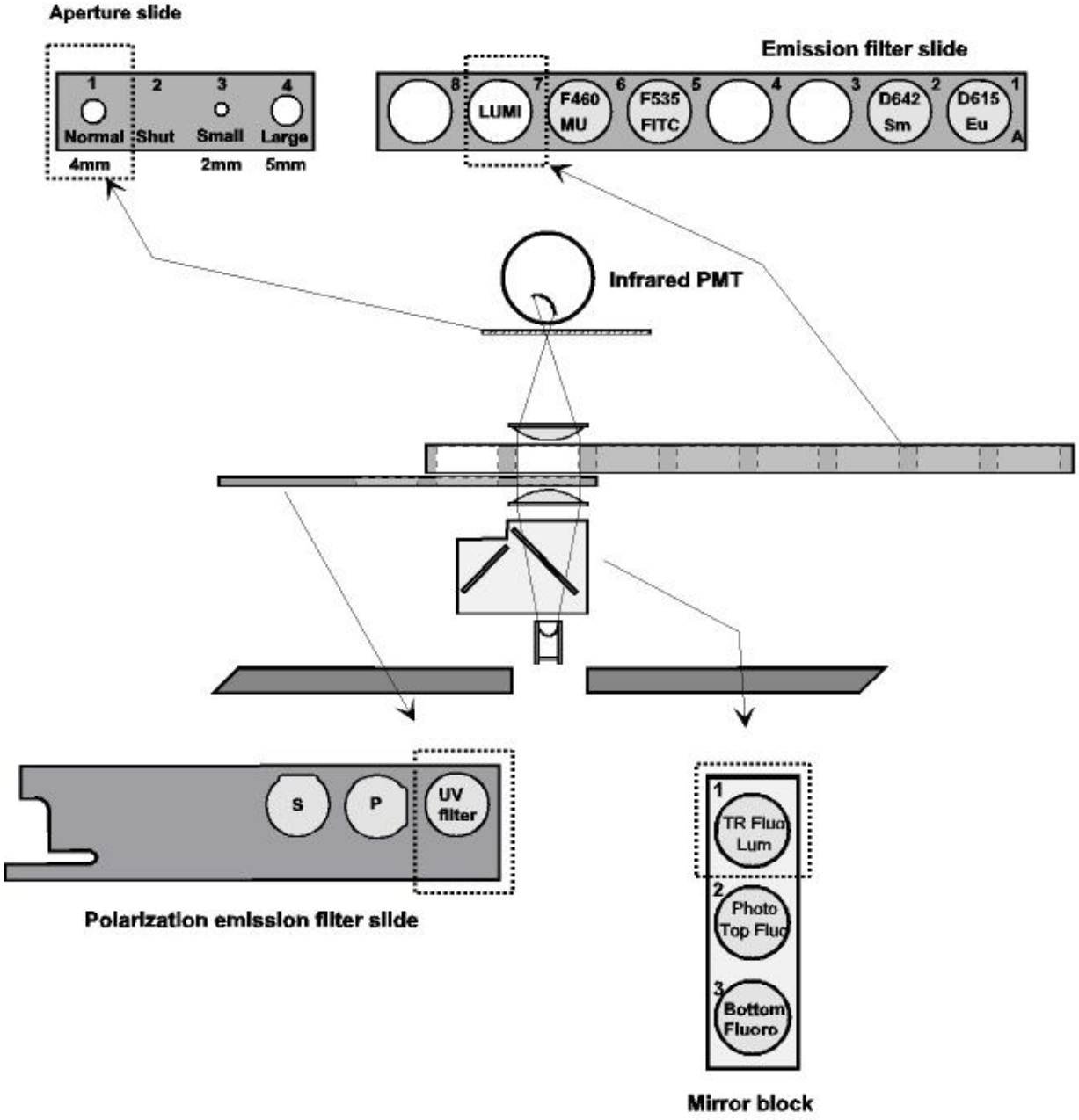
For PerkinElmer 2030-0050



This functions as in normal PerkinElmer 2030. The same configuration is used for both DELFIA and LANCE technologies.

Luminometry

For PerkinElmer 2030-0050



This functions as in normal PerkinElmer 2030.

Appendix: Calculation method for LANCE TR-FRET normalization

Introduction

Before LANCE homogenous time-resolved fluorometry measurements can be made, the instrument must be normalized for the protocol to be used. This procedure corrects for the following effects in LANCE measurements:
- background from the plate
- crosstalk of the donor signal into the acceptor window
- quenching.

The final result is normalized to the maximum donor intensity.
This procedure is handled by a normalization wizard. The measurements and calculations used to obtain the final results are described in this appendix.

Note: if the normalization is only required for a particular plate then normalization samples can be included on the plate and run at the same time as the assay samples instead of using the wizard.

In LANCE TR-FRET assays the sample interference can be corrected from the time-resolved acceptor signal (A) based on the fact that the energy transfer signal is a direct function of the excited states of donors in the complex. This traditional 'ratio measurement' is improved by subtracting both blank (Bl) and donor crosstalk (c x D where D is the donor signal) values from the time-resolved integral of acceptor signal (A) before calculating the ratio. The corrected values are defined as a **blank-corrected normalized ratio** (R_n). Use of the equation requires a configuration plate (or wells) where background due to the plate blank and the contribution of the donor to the signal in the acceptor window can be measured. Maximum energy transfer samples are also measured on the plate to allow actual sample measurements to be normalized to the maximum donor value and thus eliminate the effect of any quenching that there might be in the sample.

Note that all measurements have to be done with identical instrumental parameters with the exception of filters (for donor and acceptor). This means that the microplate, buffer, reagent concentrations and volumes should be the same as those to be used in the actual sample measurements.

Configuration wells

Dispense the configuration samples (preferably in duplicate)

1. Blank control. Colourless pure assay buffer (Bl)

2. Crosstalk control. Donor-labelled reagent (e.g. Eu) in the buffer. This is used to calculate the cross-talk factor, c, expressed as the fraction of donor signal in the acceptor measuring window.

3. High reference. Wells containing all the reagents required to form maximal energy transfer signal. The donor intensity, D_{max} is used to calculate the normalized ratio giving numeric values similar to the unquenched energy transfer intensity.

Normalization measurements

The configuration plate/wells can be run separately or as part of the assay. Each well is measured with both donor (D) and acceptor (A) filters using identical time-windows. The following values are needed for calculations:

Bl: - The measurement of the buffer wells (1) i.e. the plate background in the acceptor window (e.g. at 665 nm)

c (=(A_{donor}-Bl)/D_{donor}), this crosstalk factor is obtained from the crosstalk control wells (2). The contribution of the blank-corrected donor signal in the acceptor window (A_{donor}-Bl) e.g. with 665 nm filter using a time window from 50 to 150 µs is calculated. This is divided by the donor signal in the donor window (D_{donor}) e.g. with a 613 nm filter in the identical time-window (50 – 150 µs). A typical crosstalk for the PerkinElmer chelate W1024 is 0.0025 (0.25 %)

D_{max}: The donor signal from high reference wells (3). This value is used for normalization.

Sample measurements

All samples are measured in the same windows to obtain the uncorrected results (D and A). These results are then corrected using the following equation to give the final result (R_n):

$$R_n = (A-Bl-c \times D) \times (D_{max} / D)$$

Where:

A is the fluorescence intensity of the sample in the acceptor window
D is the fluorescence intensity of the sample in the donor window
Bl, c and D_{max} are obtained from the configuration
(A-Bl-c x D) = ET the actual energy transfer from the donor to the acceptor.

If there is quenching in the sample, it will affect both the A and D measurements. The ratio **(D_{max} / D)** normalizes the result to the maximum intensity value and eliminates the effect of quenching in the sample.

This can be seen in the following numerical example.

Example:

The three (normally three with duplicates) first wells contain the configuration samples.

Calibrator	D (613 nm)	A (665 nm)	Calculations	R_n
Blank	150	100		
Eu-component	500 000	1350	c = 0.0025	(0)
High standard	400 000 (D_{max})	50 000 (A_{max})	ET_{max} = 48 900 ET_{max}/D_{max} = 0.12225	(48 900)

The following table gives the corrected values calculated for two samples. The first has a 50 % lowered complex formation and is thus a true positive. The second sample is quenched by 50 % and without further correction appears as a (false) positive. I.e. the apparent energy transfer in each case is the same 24 450 cps. The normalization Dmax/D reveals the true situation showing the first result to be a true positive and the second not.

Samples	D (613 nm)	A (665 nm)	Calculations	R_n
1. (50 % inhibition)	450 000	25 675	ET=24 450 ET/D = 0.0543	21 733
2. (50 % quenched)	200 000	25 050	ET = 24 450 ET/D = 0.12225	48 900

Note: When using the blank corrected and normalized result as here, the linearity of assay response is slightly over expressed. For example the sample inhibiting the complex formation by 50 % (sample 1) gives a value which is only 44 % from the high standard. This is due to the fact that at the same time as the energy transfer is increased, the donor signal is decreased.

2. Information about user instructions and warnings

Information about user instructions

There are several forms of user instructions:

Installation instructions

These are part of the instrument manual and are not normally needed by the regular user but only by the engineer who installs the PerkinElmer 2030 system. However you might need them if you have to reinstall the system in another location at a future time.

User manual

This is a separate manual from this instrument manual. It gives information necessary for operation of PerkinElmer 2030.

On-line help

This is supplied with the PerkinElmer 2030 software and can be accessed by clicking Help in any PerkinElmer 2030 window. This help gives detailed information about all features of the operation which concern the normal user (service information is not provided).

Routine maintenance

This is maintenance intended to be performed by the user and is described in a separate chapter of this instrument manual. Any other maintenance than what is described there should be performed by a qualified service person.

Warnings

The following warnings are found in the User manual

Note: Errors in protocol selection or plate layout definition will lead to incorrect results.
See page 29 Starting Operation with Start Wizard

CAUTION: do not put your fingers into the sample loading area
See pages 35 and 37 Stacker operation

Note: make sure you do not operate this mechanism when the stacker is loaded in PerkinElmer 2030 because you may jam the conveyor.
See page 36 Stacker operation

Note: changes to protocols should only be made by authorized persons.
See page 47 Protocol editor

Note: These operations can affect the whole system and should only be undertaken by a person qualified to do them.
See page 73 Tools menu.

In the Instrument manual on pages 92 and 95 users are reminded to make sure they save the Admin username and Password that are used in the case of Enhanced Security mode installations.

3. Routine maintenance

Cleaning the instrument
Dispenser maintenance
Compacting the database
Changing the CW-Lamp

Routine Maintenance

Cleaning the instrument

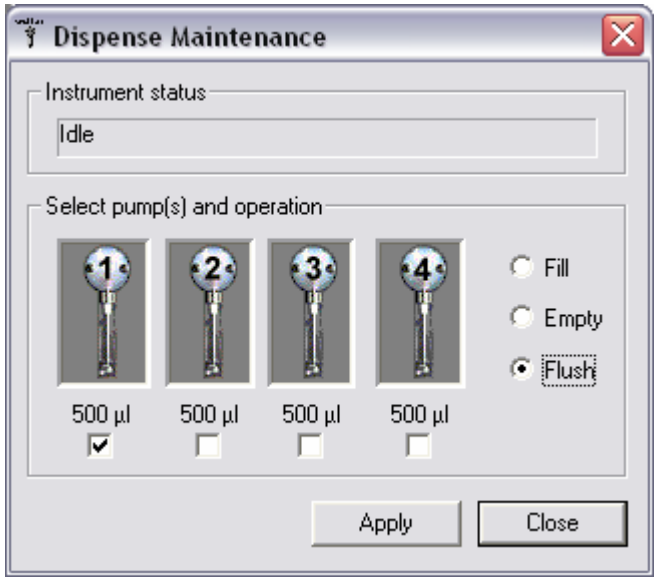
The conveyor surface should be kept clean to avoid dust and dirt entering into the optics at the measuring position. The conveyor surface should be cleaned at least once a week using a soft cloth or tissue paper soaked in a mild detergent solution or alcohol.

Instruments having TR-fluorometry mode

In case of spillage of a sample containing any signal generation component, clean the area where the spillage occurred in a similar way to that described above, except that you first use Enhancement Solution to remove e.g. the europium, then a mild detergent or alcohol and finally distilled water. Let the area dry before starting to use the instrument.

Dispenser maintenance

In the Tools menu there is an item called Dispenser Maintenance. There is also an icon with the same function. Clicking this menu command or icon invokes the Dispenser Maintenance Setup dialogue to perform common dispenser maintenance operations. This is enabled only when working with a system that has the dispenser installed. The current state of the instrument server is shown at the top of the dialogue.



The setup dialogue presents you with a graphical representation of the number of pumps (1 - 4) available when performing an operation. You can select the pump(s) that are going to perform the operation by checking boxes under the respective pump pictures. The operation to be

performed can be either Fill, Empty or Flush; you can select the operation you wish to perform. This is then performed on all the selected pumps.

Fill is used for filling the syringe and tubing before operation begins.
Empty is used after operation ends to empty the contents of the syringe and tubing back into the bottle.
Flush is used for cleaning the syringe and tubing after it has been emptied.

Note: before performing this operation, make sure the tubing from each dispenser has been put into water, as described earlier. Take the tubing out from the water. Empty any water remaining in the tubing by clicking Fill. This draws air into the tubing and expels any water drops. Fit the end of the tubing into the reagent bottle. Click Fill to fill the tubing with reagent.

Needle maintenance

Every time the dispenser has been used, the tubing must be flushed properly. When this is done, the needles are rinsed at the same time. However, it is good to regularly clean the outside of the needles.

Avoid touching the needles with your fingers. To clean the needles use e.g. a stick with a tip of soft material dipped in ethanol, or use a spray bottle filled with ethanol. Be very gentle when touching the needles so that they are not bent out of shape. Rinse with water.

The position of the needles is very critical for high quality performance. If a needle is bent, call the service engineer to get the needle replaced. *Do not try to re-adjust the damaged needle because the quality of dispensing could be affected*. Both the needle and the tubing will be replaced as a set.

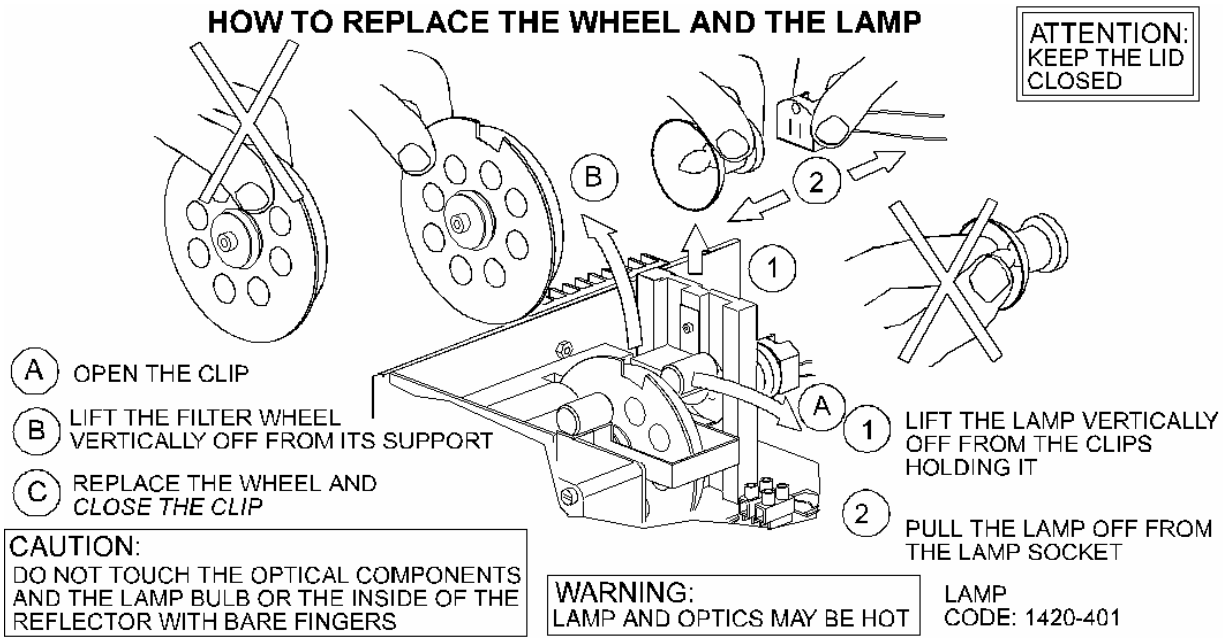
It is good to check the flow of liquid dispensed (during flushing). If the flow is not normal it might indicate that the needle is partly blocked. If this has happened due to dried reagents, use water and e.g. ethanol to dissolve the plug. If that does not help, the needle needs to be changed; contact Service.

Compacting the database

You should run the PerkinElmer 2030 Database Maintenance program on a regular basis (weekly or monthly depending how much you run PerkinElmer 2030). This program will compact your database and will in some situations increase the software performance drastically. If you do not do this you will find that after a while your PerkinElmer 2030 software is not running as fast as it used to.
You can find this program by clicking the PerkinElmer 2030 icon in your Windows Start menu. It is called PerkinElmer 2030 Database maintenance.

Changing the CW-Lamp

If the CW-Lamp needs replacing - lift the cover to get access to the lamp. *Make sure the lamp is switched off and give the lamp chance to cool before removing it* and replacing it. Follow the instructions on the inside of the cover. You will probably find it easier to use your left hand to remove the lamp from the clips holding it.

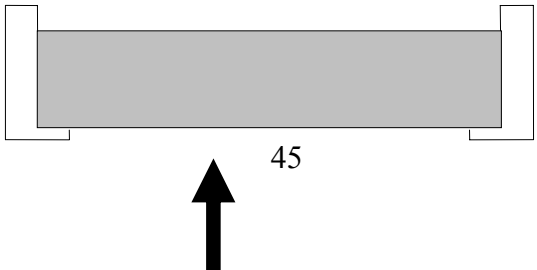


When you have replaced the lamp, close the cover and switch power on.

Handling the optical filters

The optical excitation and emission filters should be handled with care and touching the filter surface should be avoided. If a filter is added or removed from the excitation filter wheel or the emission filter slide, it should be handled at the edges only. If cleaning is required, any dust or loose particles should be first removed with dry pressurized air. If necessary, gently wipe the surfaces using lint-free lab towels and anhydrous alcohol. Use fresh towels for every wipe.

In a typical excitation and emission filter there is an arrow on the edge of the filter indicating the direction of light rays. In filters with a mounting ring the direction of light is usually determined by the direction of the ring (see fig).



The direction of light in the excitation filter wheel and emission filter slide is illustrated in the figures below.

4. Specifications

Specifications

Power requirements

PerkinElmer 2030

Power consumption: 400 VA
Mains voltage 110 -120 V/ 220 - 240 V, 50/60 Hz

Liquid Dispenser

Power consumption: 200 VA
Mains voltage 100 – 240 V, 50/60 Hz

Safety standards

The instrument is designed to meet the following safety standards:

1. EN61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements.

2. EMC-Directive - EN50082-1 (immunity) and EN50081-1, EN61000-3-2 (emission)

Environmental conditions

Temperature 15 - 35°C

Relative humidity 10 - 85 %.

Light sources

Continuous light source for fluorometric and photometric measurements:
1. Tungsten-halogen lamp, 75W, lifetime > 300h, Spectral range 320 - 1000 nm
2. Rotatable filter wheel A, provided with 8 filter positions (Ø 15 mm). Standard high quality interference filters 405 nm, 450 nm, 490 nm, 355 nm (not for fluorescence polarization), 485 nm. Changeable rotatable filter wheel B, provided with 4 filter positions (Ø 25.4 mm). Changeable rotatable filter wheel B2, provided with 8 filter positions (Ø 15 mm)

Optional flash light source for TR-fluorometric measurements:
1. UV xenon flash tube, L4642 or equivalent, spectral range 230 - 400 nm.
2. Filter slide, provided with 3 filter positions (Ø22.4mm). Filters 340, 260 and 280 nm.

Detection units

Photometry: Photo diode, photometric range 320-1000 nm
Fluorometry, luminometry and optional TR-fluorometry:
1. Photomultiplier tube, R 1527, optional R4632
2. Emission filter slide A, provided with 8 filter positions (Ø25.4mm) with the following filters:
535 nm and 460 nm
Changeable emission filter slide B, provided with 8 filter positions (Ø25.4mm)
Optional filters: 615 nm, 642 nm

Plates

1 to 1536-well plates are compatible with the instrument.

Note: for luminometry and bottom reading, well densities above 384 are not recommended.

The user can define non-standard plate configurations. The maximum outer dimensions are 86.0 x 128.2 x 25 mm. For Terasaki plates and petri dishes, optional cassettes are available. Minimum plate height is 4.0 mm.

Both opaque and clear plates are suitable (for photometric measurement a clear bottom is required).

Plate shaking

Three plate shaking modes are available: linear, orbital and double orbital. Three speed levels can be selected and the amplitude of the movement is adjustable.

Scanning

Scanning of wells (several measuring points within a well) are available for all technologies.

Repeats

Repeated measurements or operations can be defined by plate, strips or well.

Measurement time

Detection time per well is software selectable between 0.1 - 600 seconds.

Performance

Technology	Feature	Performance	Valid for
Fluorometry	Fluorescein detection limit	< 2 fmol / well	All models except 2030-0010
Fluorescence polarization	Precision @ 1 nM fluorescein	< 5 mP	2030-0050
TR-fluorometry	Europium detection limit	< 6 amol / well	2030-0040, -0050
	Eu-linearity	5 decades	
Photometry	Measurement range @ 405 nm	0- 4 A	All models except 2030-0010, -0020
	Accuracy @ 405 nm	< 2 % or +/- 0.01 A	
	Precision @ 405 nm	< 0.5 % or +/- 0.01 A	
UV-absorbance	Measurement range @ 280 nm	0- 4 A	2030-0030, -0040, -0050
	Accuracy @ 280 nm	< 2 % or +/- 0.01 A	
	Precision @ 280 nm	< 0.5 % or +/- 0.01 A	
Luminometry	Lower limit of detection	< total flux from sample of 10^5 photons/s	All models

Physical dimensions

Weight	46 kg (without stackers)
	52 kg (stacker model)
Height	354 mm (510 mm stacker model)
Width	493 mm
Depth	595 mm

Software

The instrument program is run under Windows XP on a Pentium computer, minimum 128 MB memory, equipped with a CD-ROM, XGA display minimum resolution 1024 x 768 pixels, 64K colours and a Wallac instrument interface card.

Input/Output connections

PC: coaxial ARCNET connector (93 ohm).	The PC must be provided with a Wallac Instrument Interface.
Dispenser connection	
Printers:	Connected to PC, parallel port or USB

Options

Stackers

A semi-automated plate loading option, including an input stacker, and an output stacker. 20 plates/load (1420-216) or 40 plates/load (1420-217 Input stacker, 1420-218 Output stacker). The stacker is designed to take plates that fulfil the following requirements:

Length:	127.2 – 128.2 mm
Width:	84.5 – 86.0 mm
Height:	14.0 – 25.0 mm
Ledge height:	1.5 – 6.5 mm

Barcode reader (1420-221)

Barcodes that can be read: EAN, UPC, 2 of 5 interleaved, CODEBAR, CODE39, CODE128

Temperature control

The temperature of the measuring chamber can be regulated from "ambient +2 ^{o}C" to 50 ^{o}C. The PMT is isolated and kept at 25 ^{o}C.

TR-fluorometry (1420-110)

The TR-fluorometry optics are based on a xenon flash lamp. The counting delay can be set from 0 to 65515 s. Included in this option are flash absorbance and dual window TR-fluorescence counting.

Expanded wavelength range to IR (1420-113)

The wavelength range is expanded up to 850 nm.

Dispenser options:

1-channel Dispenser (1420-2550)
2-channel Dispenser (1420-2560)
3-channel Dispenser (1420-2570)
4-channel Dispenser (1420-2580)

From 1 to 4 channels can be directed to a single well depending on the option used.
The default volume range is 5-350 µL in 1 µL increments.

Accuracy typically	<5% for 5 µL
	<0.5% for 50 µL
	<0.05% for 350 µL.
Precision typically:	<1.4% for 5 µL
	<0.2% for 50 µL
	<0.02% for 350 µL.

Speed: minimum and maximum speed are related to the volume.

Dead volume	<0.5 mL	
Tubing	Inner diameter	0.7 mm
	Outer diameter	2.0 mm
	Material	PTFE

Enhanced security mode

The Enhanced Security mode is intended for facilities that have to comply with the 21 CFR Part 11 regulation from the Food and Drug Administration (FDA) of the USA. If required, it must be selected during installation.

Counting modes

Note: counting modes included depend on the model.

Fluorescence (320 – 700 nm,) (emission up to 850 nm optional)
Bottom fluorescence (320-700 nm) (up to 850 nm optional)
Time-resolved fluorometry (TRF)
LANCE
Fluorescence polarization
Dual window TRF
Glow luminescence
Flash luminescence
Dual luminescence
Photometry (320-1000 nm)
UV absorbance (230 - 320 nm)
Dual excitation fluorescence
Dual emission fluorescence
Scanning
Fast and slow kinetic measurements

5. WEEE instructions for PerkinElmer products

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 and rationally. Specific treatment of WEEE is indispensable in order to avoid the dispersion of pollutants into the recycled material or waste stream. Such treatment is the most effective means of protecting the customer's environment.

Requirements for waste collection, reuse, recycling, and recovery programs vary by regulatory authority at your location. Contact your local responsible body (e.g., 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:
http:///las.perkinelmer.com/OneSource/Environmental-directives.htm

Customer Care: **1-800-762-4000** **(inside the USA)**
(+1) 203-925-4602 **(outside the USA)**

0800 40 858 **(Brussels)**
0800 90 66 42 **(Monza)**

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.

PerkinElmer®
precisely.

6. Installation information

PerkinElmer 2030 Installation Instructions
Liquid Dispenser Installation
Liquid Dispenser Calibration
Performance Test

Instrument Installation

Environment

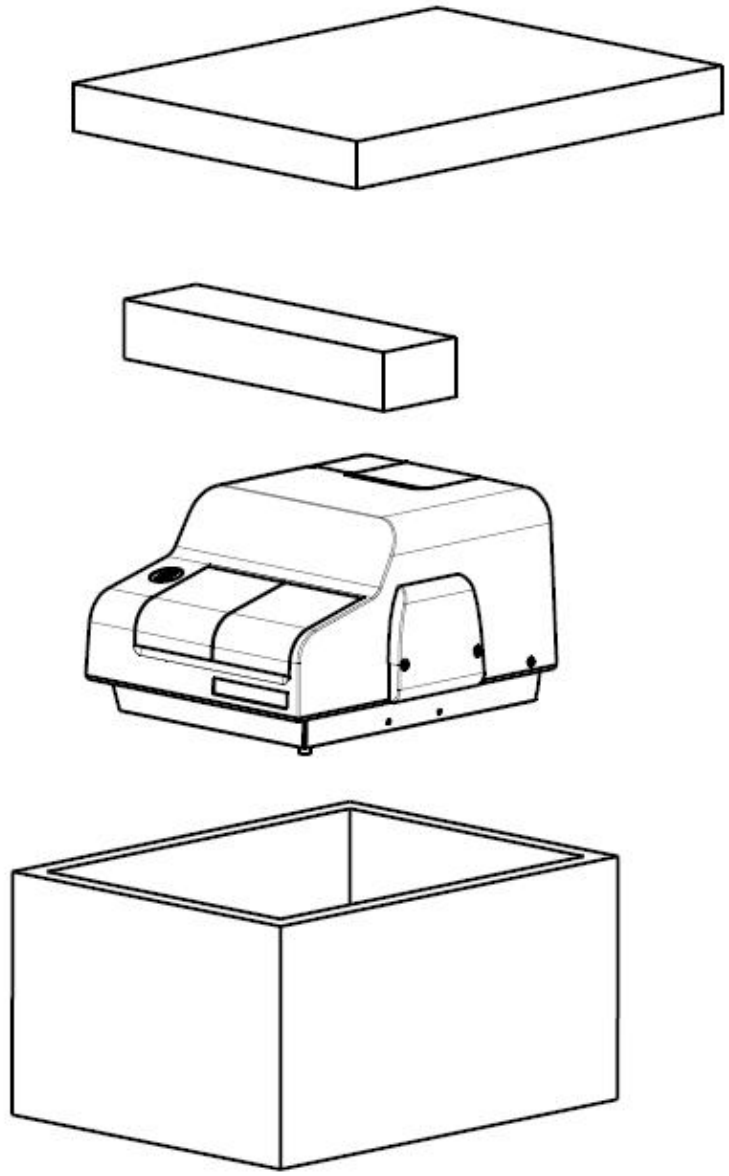
Although normal clean laboratory conditions are usually quite satisfactory as an operational environment it is useful to take the following points into consideration.

Ventilation in the room should be adequate for all conditions of use, the temperature should be reasonably constant at about 22^0C, relative humidity should not be excessive, and direct sunlight should not be able to reach the instrument.

Electric power

Three electrical outlets each with a protective earth should be available, with, if possible, a separate power line for the instrument itself having an isolation switch and a fuse box. If excessive fluctuations in the mains voltage are anticipated, a mains stabilizer may be necessary.

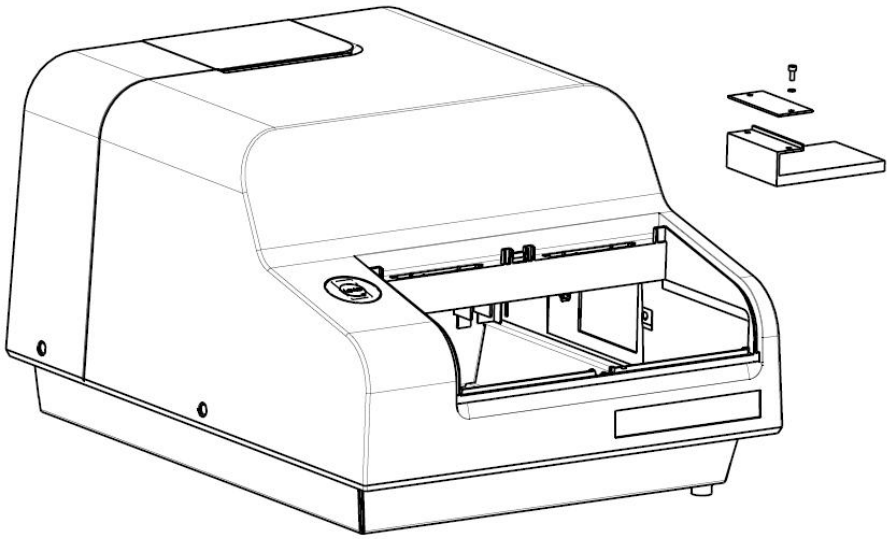
Unpacking



1. Cut the belts and remove the screws
2. Lift the lid off
3. Lift out the accessories and check them according to the packing list
4. Lift the instrument up and move it to its place of operation
5. For the stacker model, remove the transport protection piece (see fig. on next page)
6. Check for possible damage

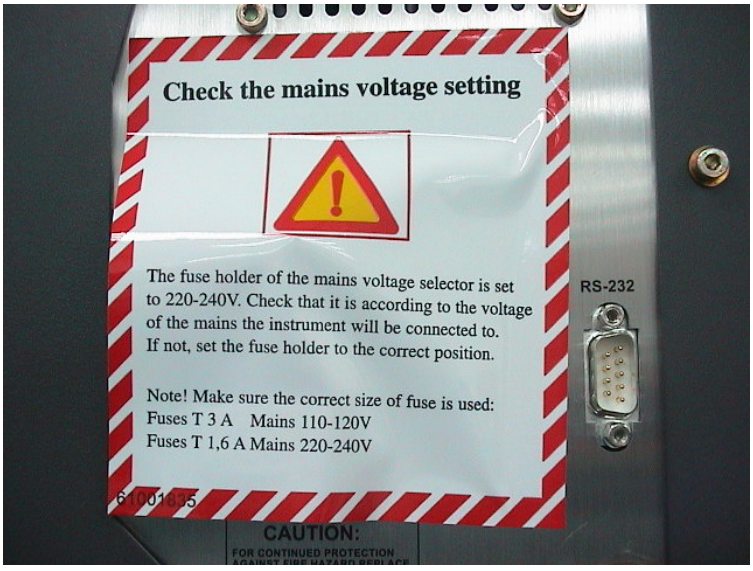
Removing the Transport Protection Piece

For preventing the stacker from moving and getting damaged during the transport, there is a protection piece assembled. Remove this by opening the screws and slide the piece out from the stacker.



Check the mains voltage setting

The fuse holder of the mains voltage selector is covered by the following sticker.



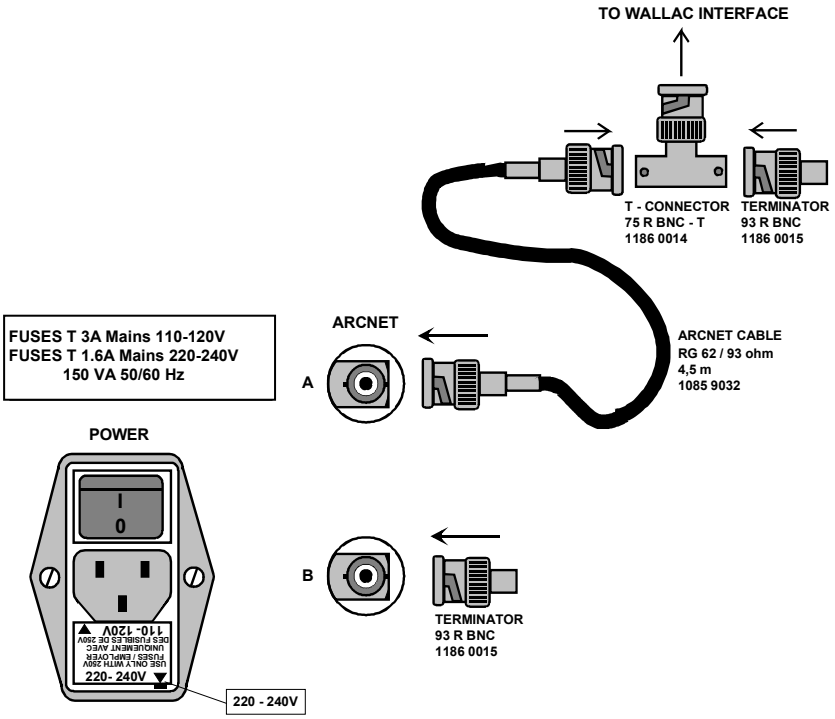
Its purpose is to alert you to the fact that the fuse holder is set for 220-240 V.

If this setting is not suitable because of the voltage of the mains the instrument is to be connected to, you must change the voltage selector. To do this, pull out the voltage selector, change the fuses, turn it round and replace it. See the pictures on the next page. ***Make sure you use the correct fuses***.

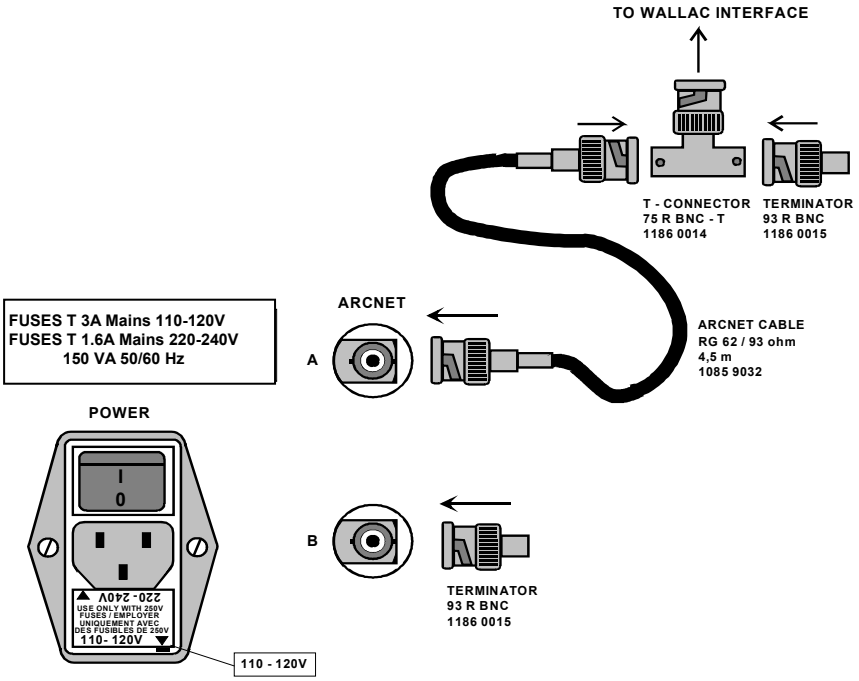
- connect the mains cable
- connect the ARCNET cable to port A

- check that the terminator is properly fitted into port B

Mains 220 - 240V



Mains 110 - 120V



Software Installation

Minimum System Requirements

- Windows XP
- Intel Pentium Processor
- 128 MB RAM (or more)
- 30 MB free hard disk space (or more)
- CD-ROM Drive
- XGA Drive (minimum setting is 1024 by 768 pixels)
- Wallac Instrument Interface Board

Printer Installation

Install the printer according to the instructions accompanying the printer.

Instrument Interface Card Driver Installation

The following ARCNET adapters can be used:

6000 0569 PerkinElmer ARCNET adapter model Wallac ROG

1224-2030 PerkinElmer ARCNET adapter model USB22-CXB

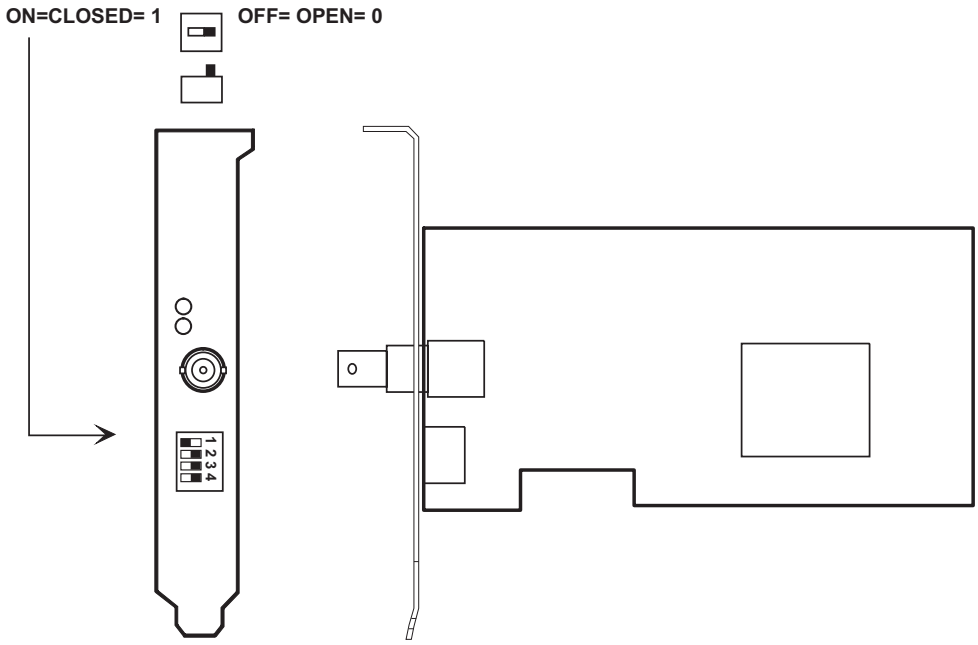
Installation of the DriverX device ROG

Note: If the desktop PC is ordered from PerkinElmer with the instrument, this instrument interface card and the software are already installed and the instrument can be directly connected to the PC.

Installation of the following ARCNET card is described here:
6000 0569 PerkinElmer ARCNET adapter model Wallac ROG for personal computers

Note: see the separate section for how to install the USB adapter if you are using it instead.

Configure the Wallac instrument interface card in the following way:

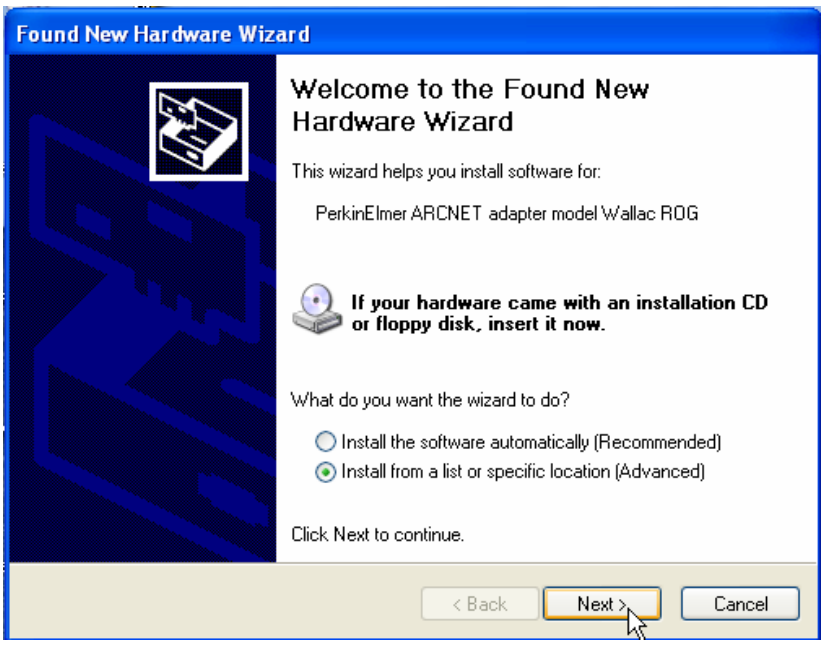


Install the instrument interface card to the PC. Please refer to the PC manufacturer's instructions for adding expansion cards.

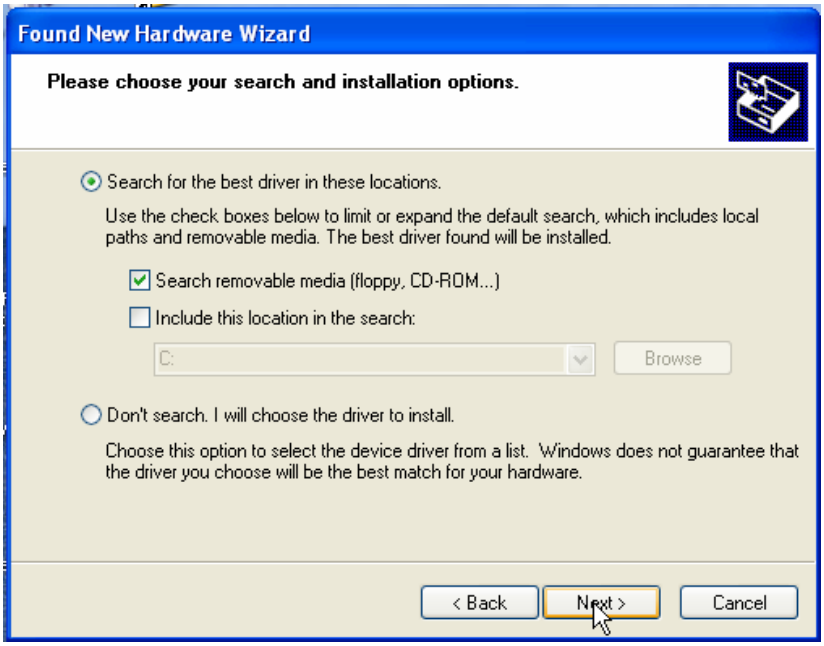
Start the PC. Once up and running, you will get a message that the computer has found a new piece of hardware.

Note: "Found New Hardware Wizard" may not start right after the operating system is up and running. Please wait for a while.

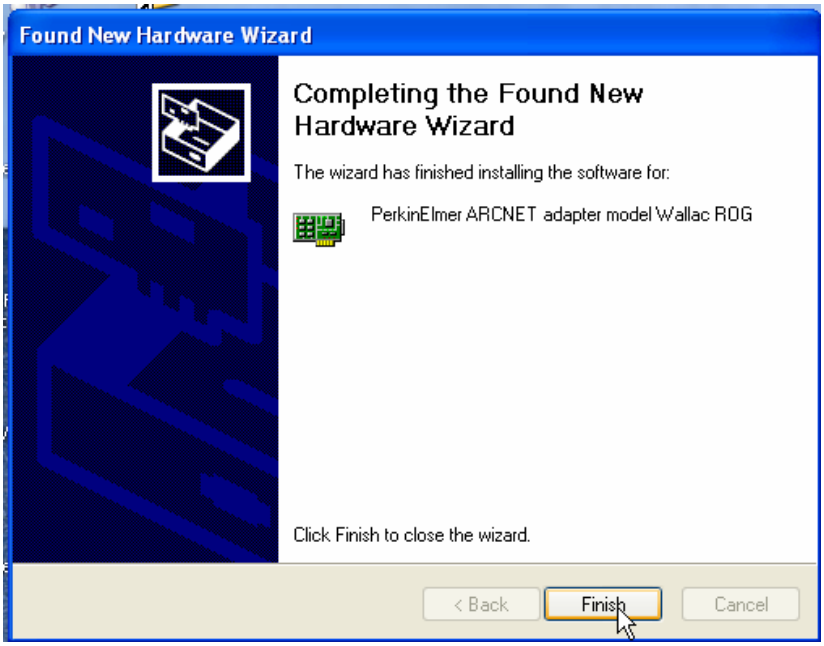
When you start up the computer the ARCNET card installed the following instructions will guide you through the installation procedure.



First insert the PerkinElmer 2030 CD then select “Install from a list or specific location (Advanced)”. Click **Next**.

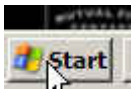


The option “Search for the best driver in these locations” and check box “Search removable media” should be selected. Click **Next**. The driver will be found and installed.

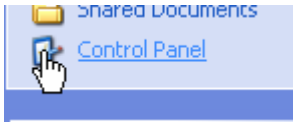


Click **Finish** to close the wizard.

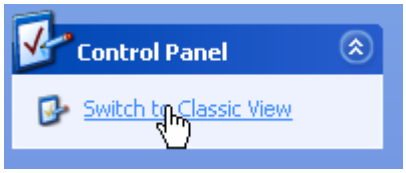
ARCNET card device check



Click **Start.**

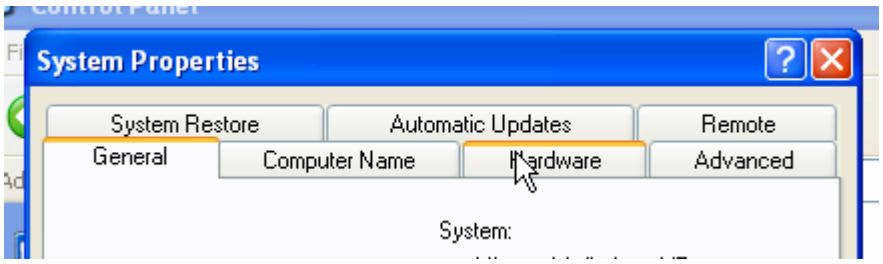


Select **Control Panel**.

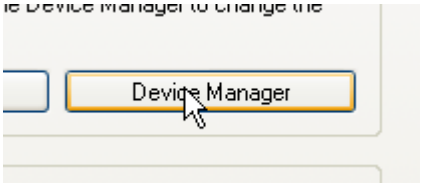


From the control panel select **Switch to Classic View**.

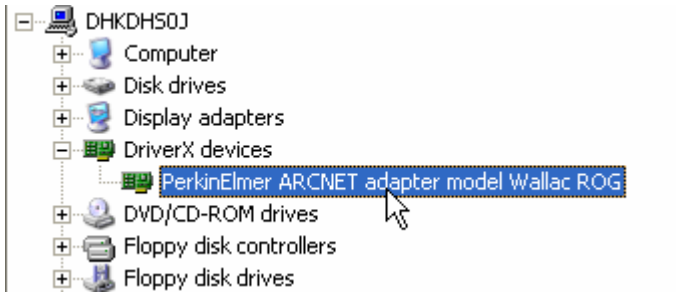
Then select the **System** icon.



Select the **Hardware** tab.

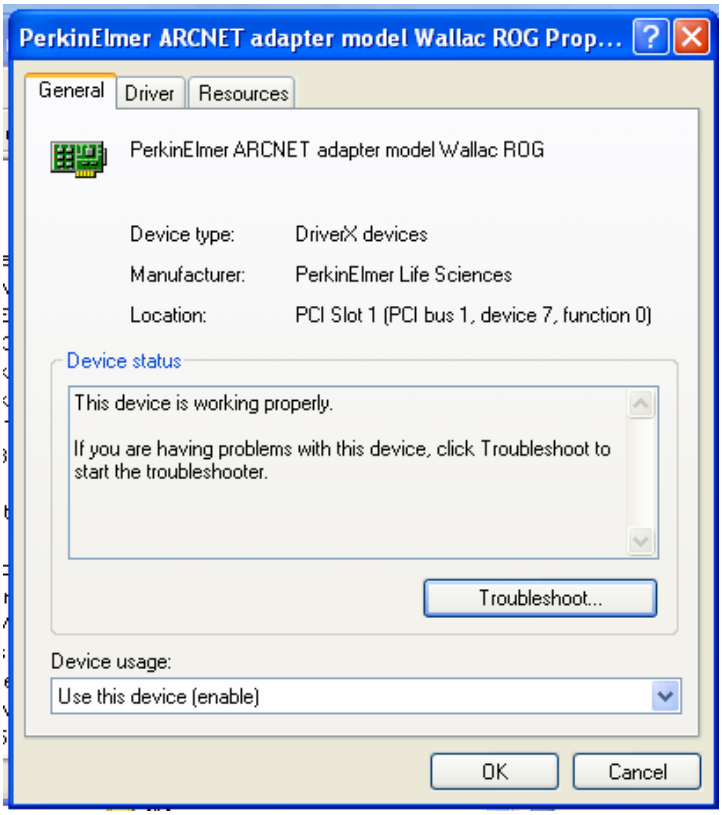


Click the **Device manager** button.



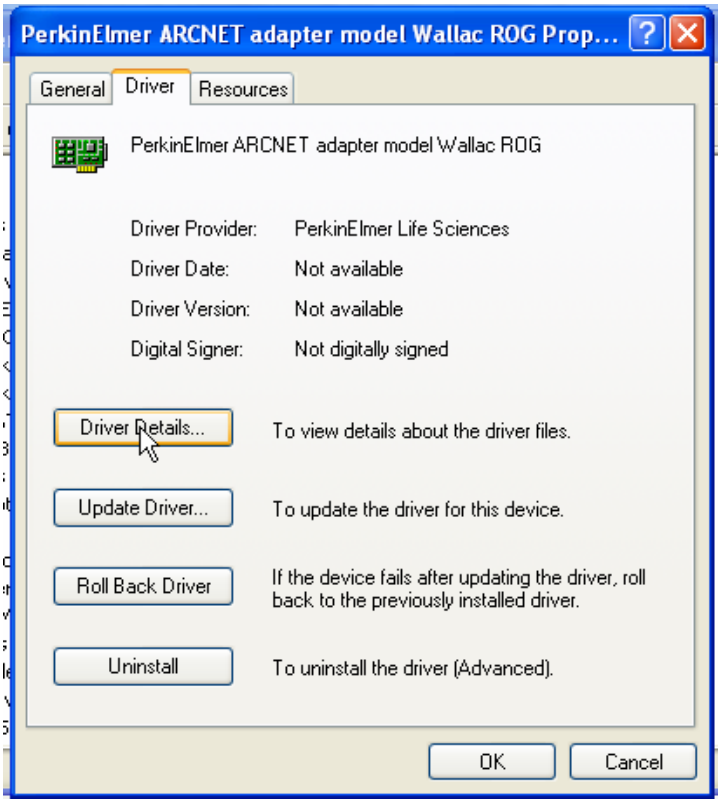
Check that the correct driver is installed.

Double-click on the driver.

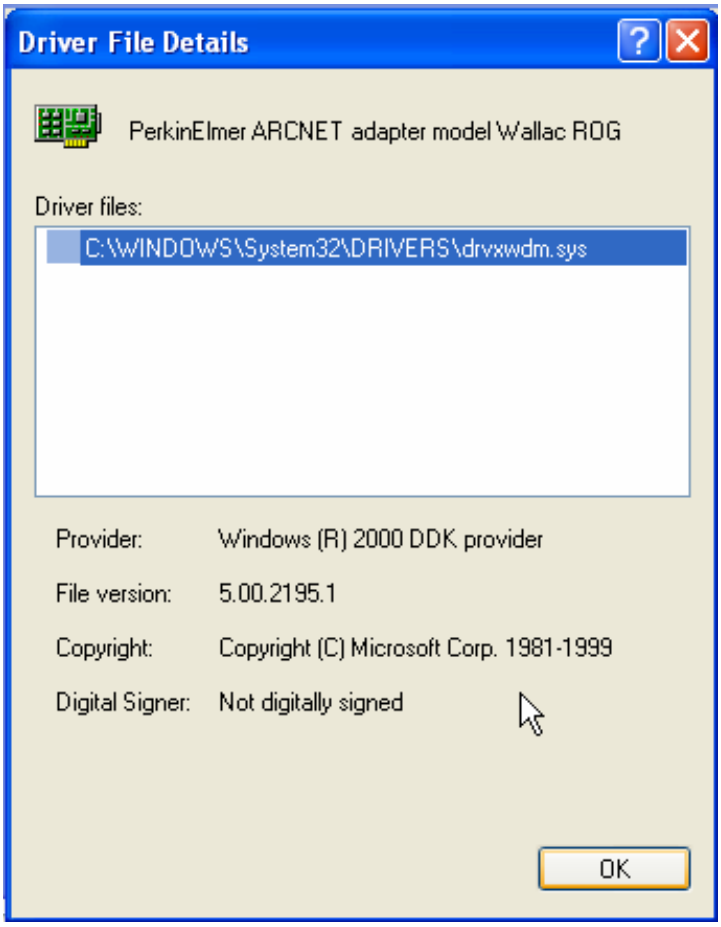


Check that you get the message that the device is working properly.

Click the **Driver** tab.

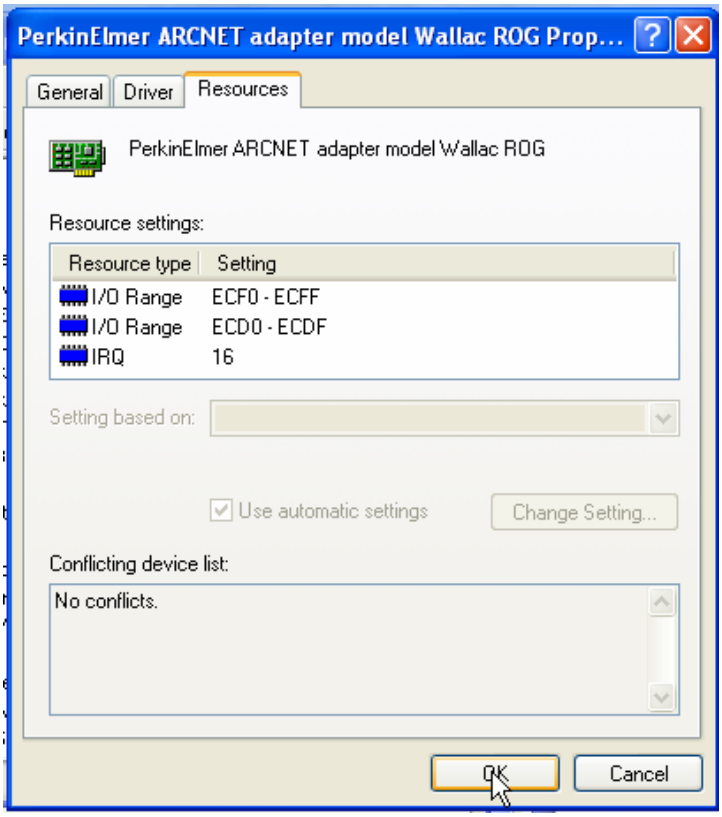


Click the **Driver details** button.



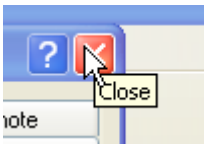
Check that the driver shown in the picture is the one in use on your system. Click **OK**.

Click the **Resources** tab.



Check that “No conflicts” appears. The information should be as shown in the appropriate figure.

Close the device information display.



Close the device manager.

Close the control panel.

Connect the instrument to the PC

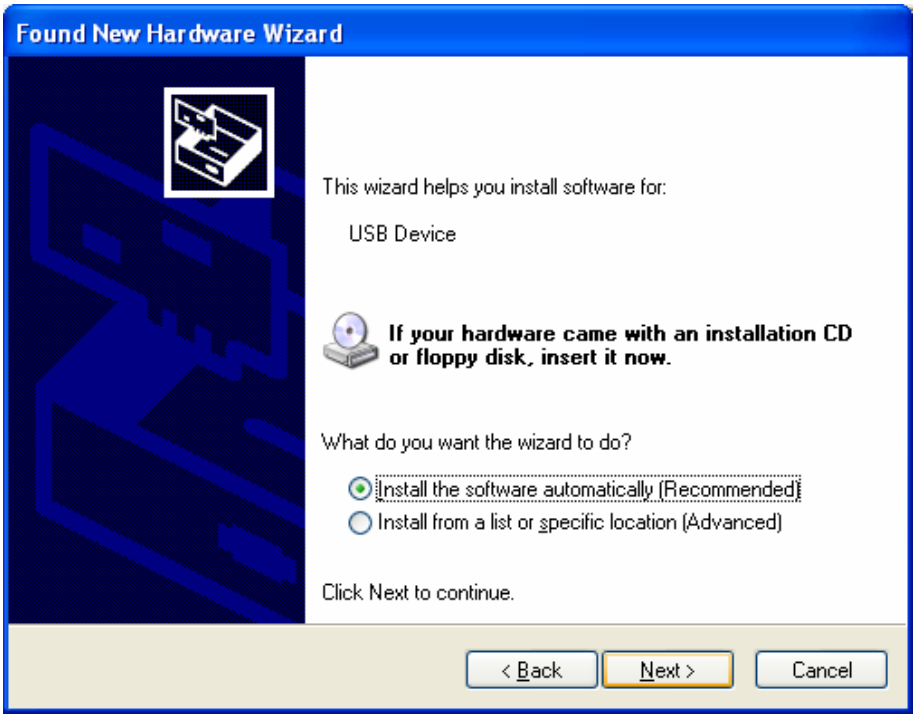
Connect the coaxial cable between the instrument and the Wallac instrument interface card installed in the computer. Switch on the instrument.

Installation of the USB22 adapter

Connect the USB22 adapter to the USB port you will use for the instrument connection. The ‘Found New Hardware Wizard’ will open (other ports need separate installations).

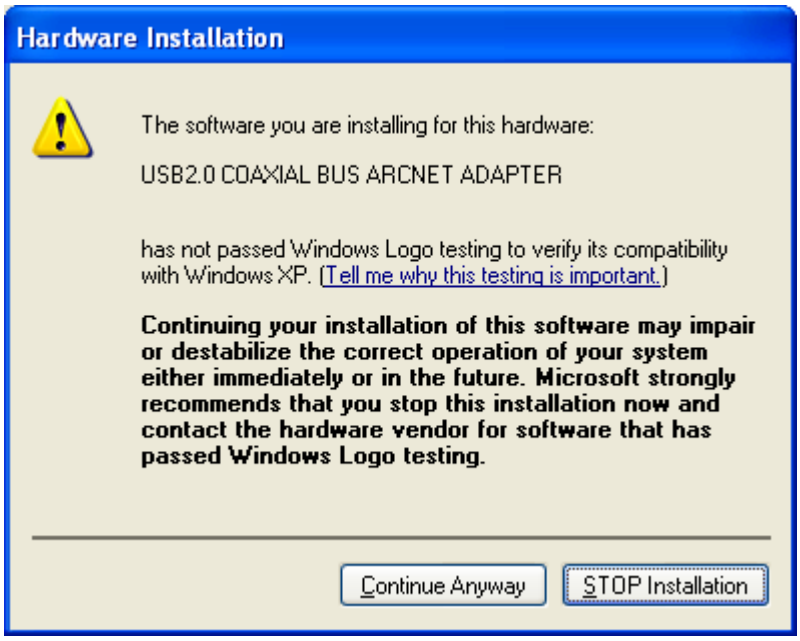
Select ‘No’ for Windows Update connection and click ‘Next>’.

The installation requires ‘Found New Hardware Wizard’ to be run twice. The first time a generic USB Device is found.

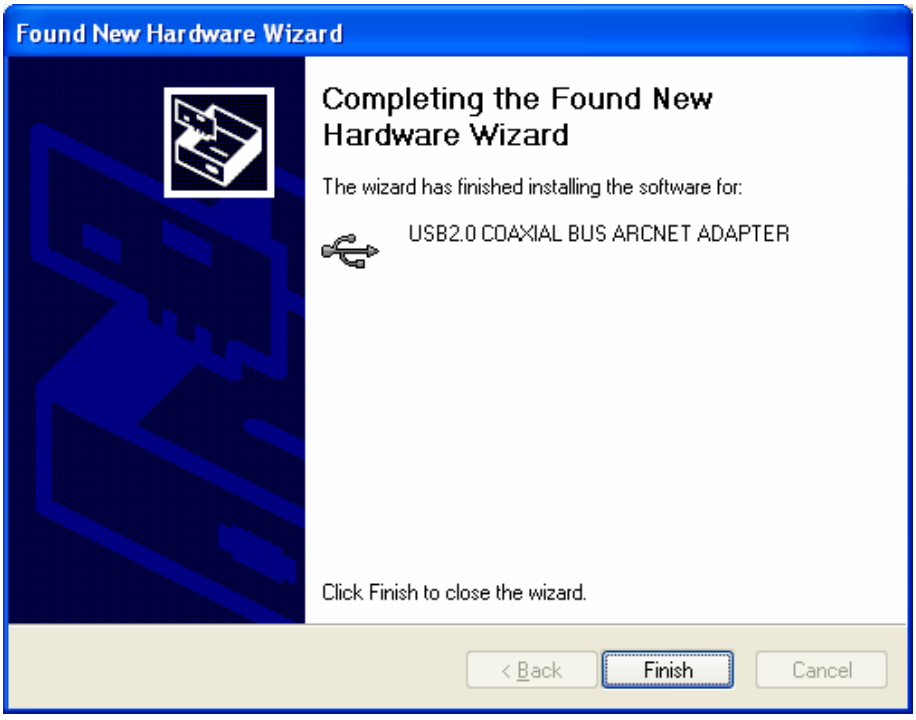


Insert the 2030 Software CD into the drive, select ‘Install the software automatically’ and click ‘Next>’.

While installing the software the following dialog will appear.

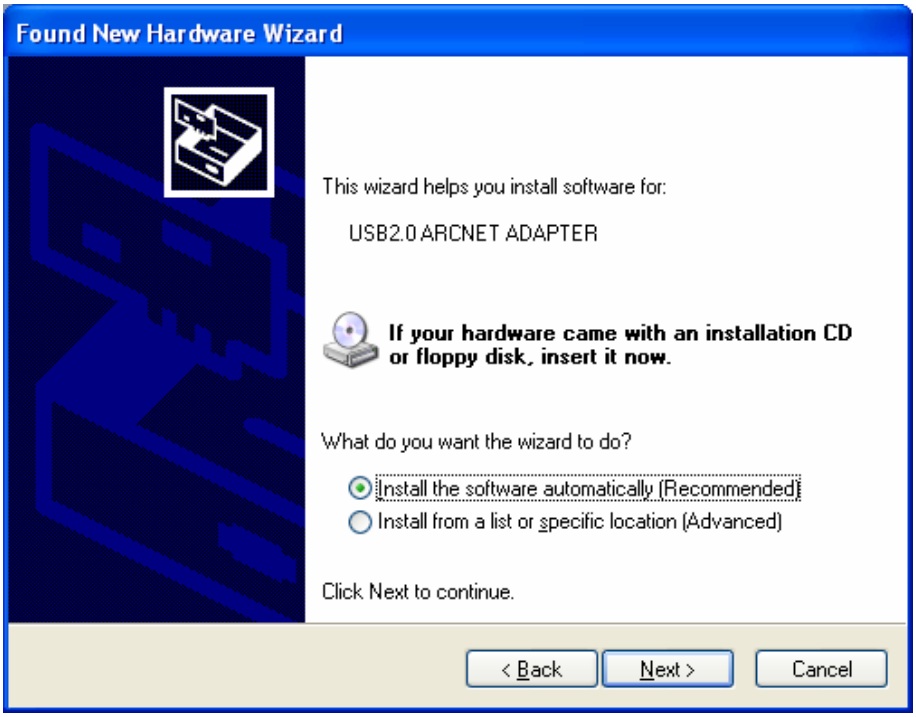


Click ‘Continue Anyway’.

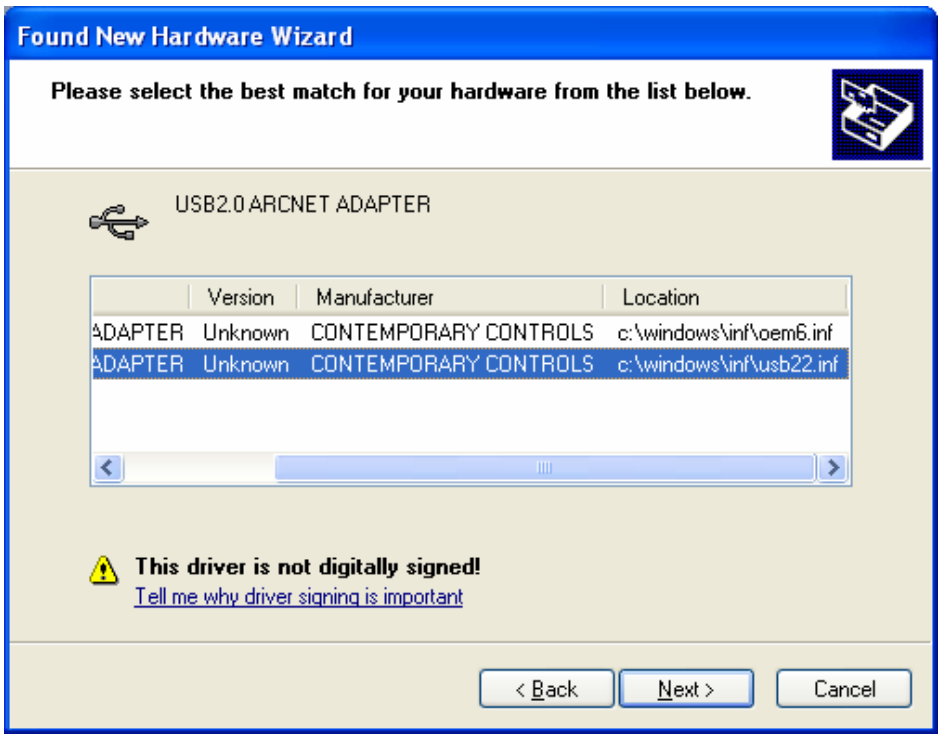


Click ‘Finish’ and wait until ‘Found New Hardware Wizard’ opens again.

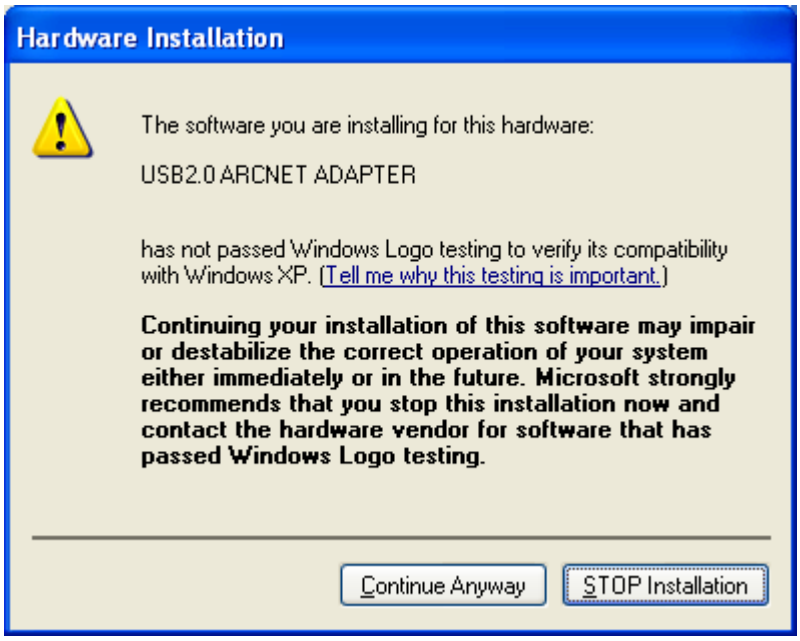
Select ‘No’ for Windows Update connection and click ‘Next>’.



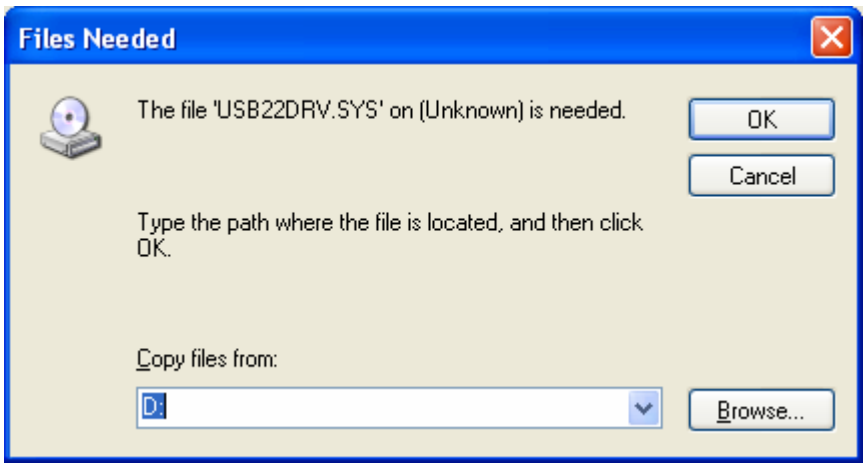
The USB ARCNET adapter is found and software for it will be installed. Select ‘Install the software automatically’ and click ‘Next>’.



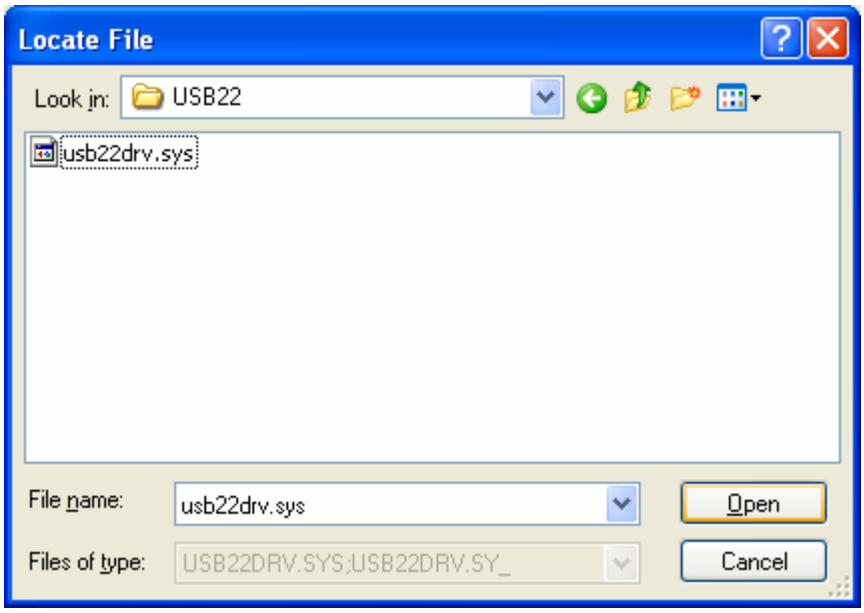
Select usb22.inf and click ‘Next>’.

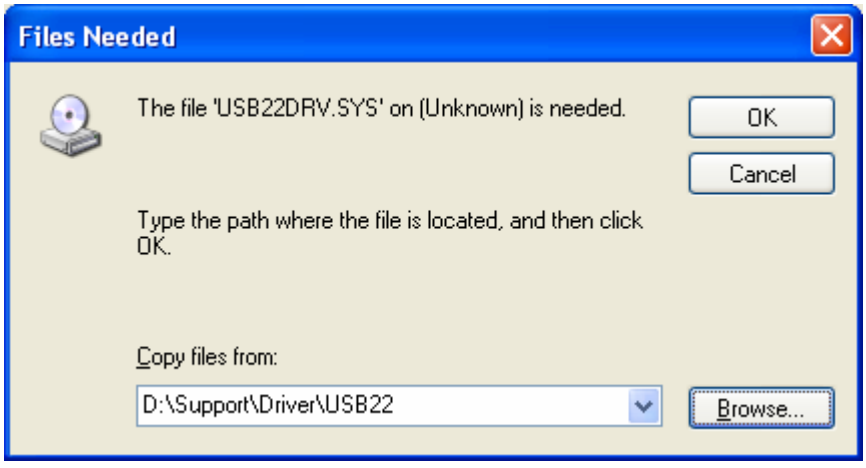


Click ‘Continue Anyway’.

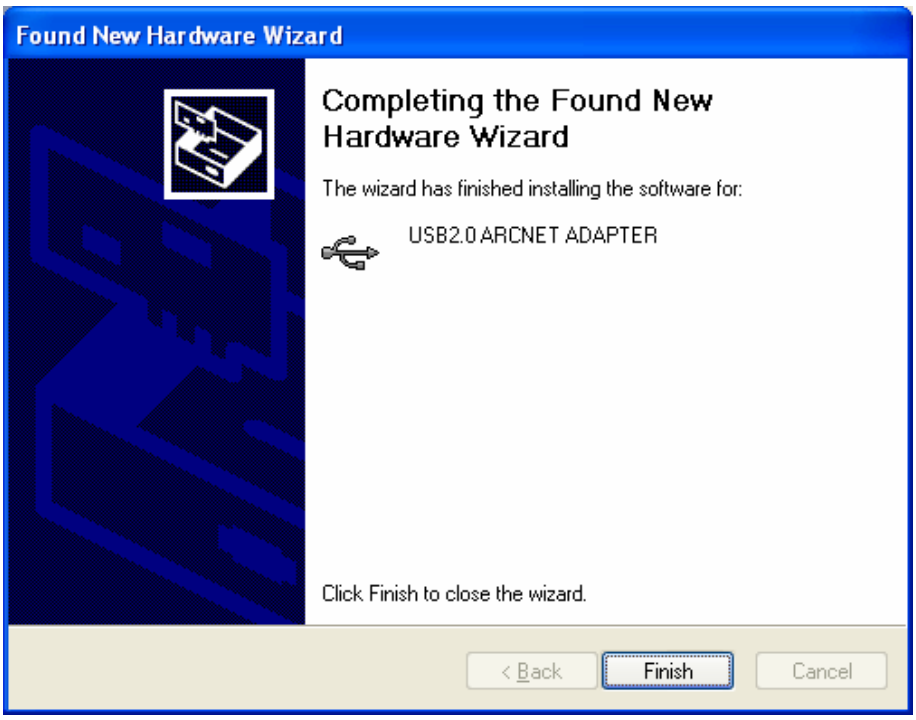


Browse the Support\Driver\USB22 folder for the USB22DRV.SYS file.



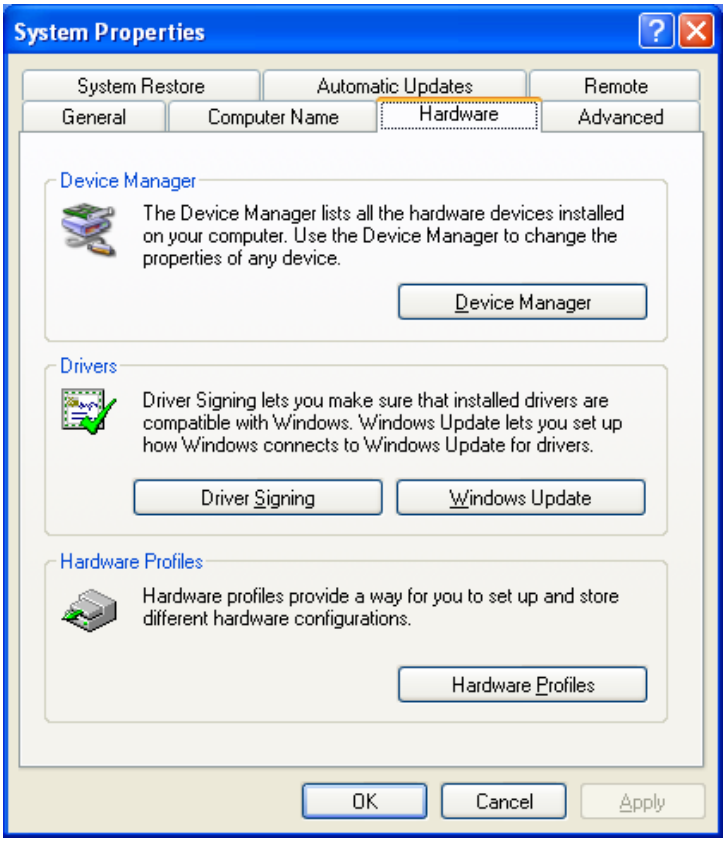


Click ‘OK’ to copy the file.



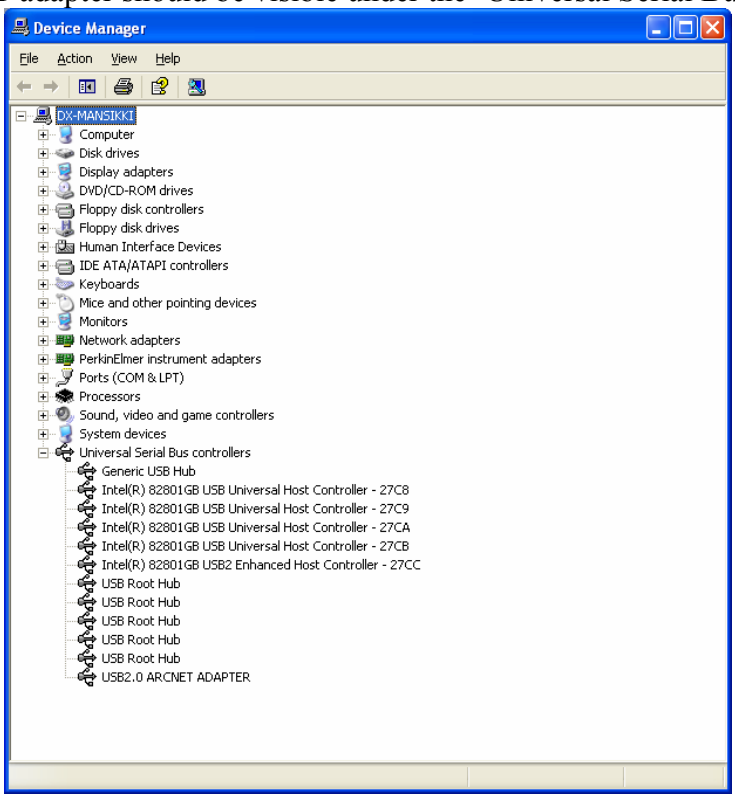
Complete the wizard by clicking ‘Finish’. The installation of the USB22 ARCNET adapter is now ready.

To check that the driver is working properly, right-click ‘My Computer’ and select ‘Properties’.

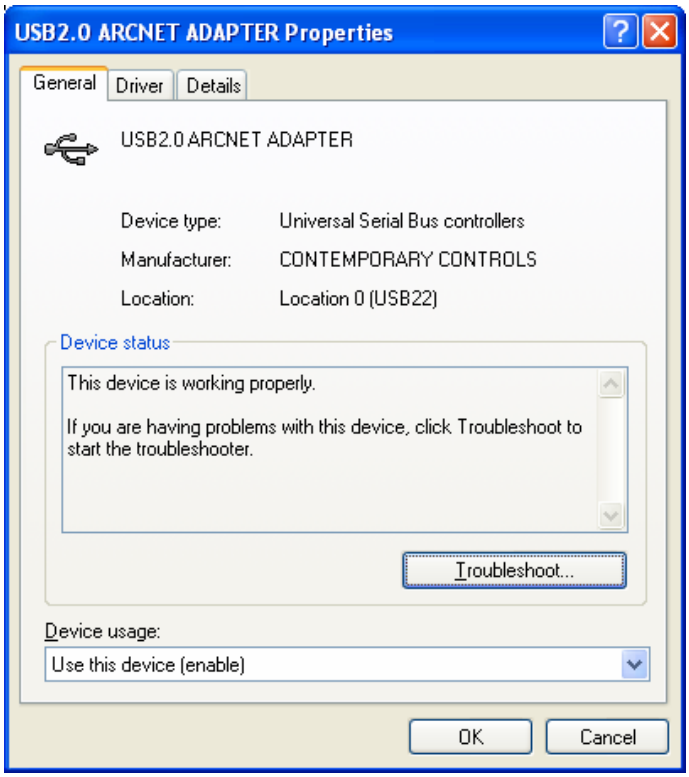


On the ‘Hardware’ tab of ‘System Properties’ click ‘Device Manager’.

The USB ARCNET adapter should be visible under the ‘Universal Serial Bus Controllers’.



Right-click to see the properties of the adapter. Check the device status.



Connect the instrument to the PC

Connect the coaxial cable between the instrument and the Wallac instrument interface card installed in the PC. Switch on the instrument and the PC.

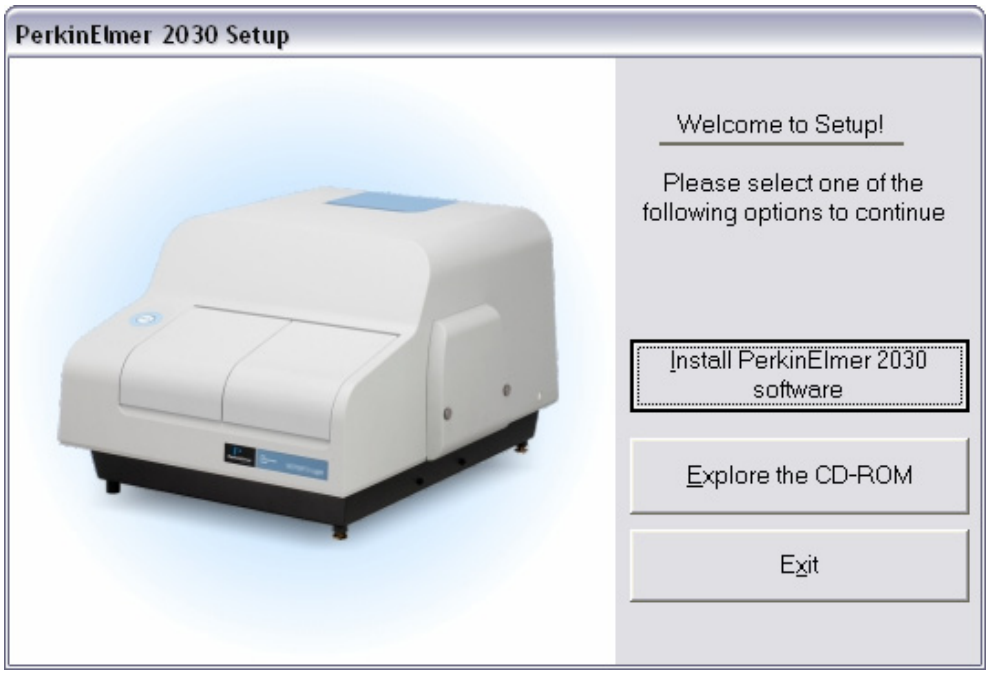
PerkinElmer 2030 Software Installation

When installing the PerkinElmer 2030 Software, you MUST belong to the local Administrators group. Otherwise the security system of Windows prevents the correct installation of the PerkinElmer 2030 Software.

Any end user of the PerkinElmer 2030 Software must belong either to the 'Administrators' or 'Power Users' group.

Note: Do not use more than one account at the same time (without logouts) in Windows XP.

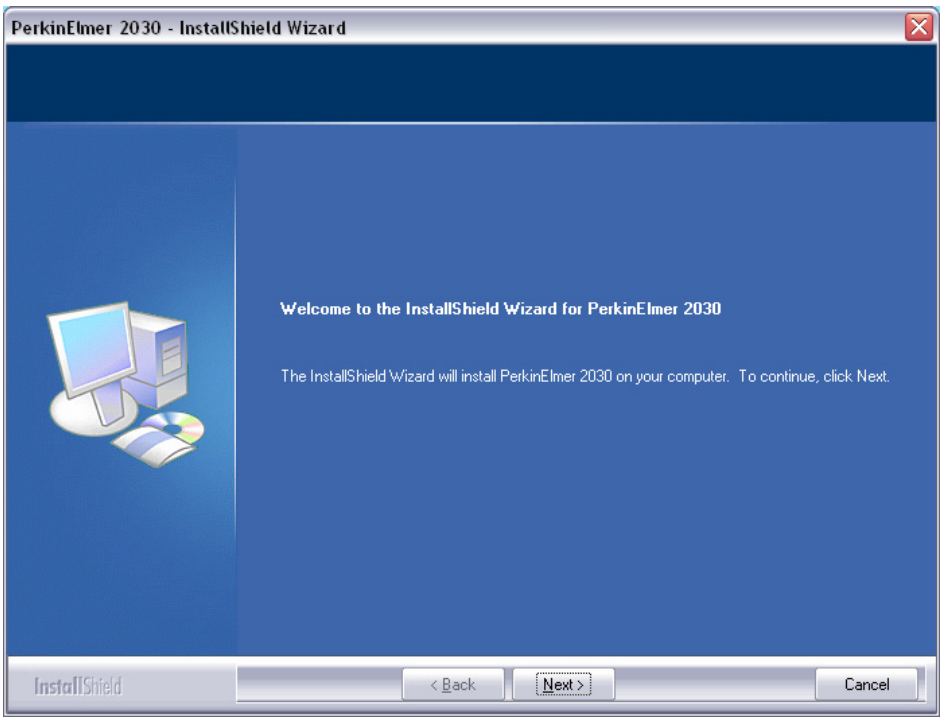
Note: In Enhanced security mode the Administrator should prevent power users being able to change the system clock.



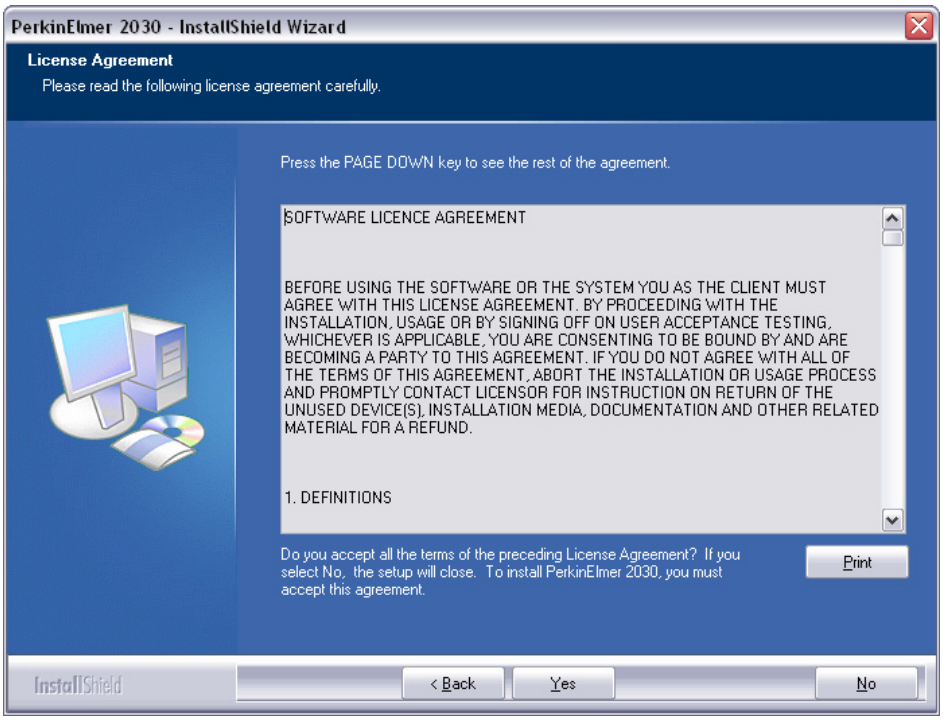
Setup

Exit all Windows programs and insert the PerkinElmer 2030 Software CD-ROM into the PC; the setup will start automatically. If not click the setup on the CD:

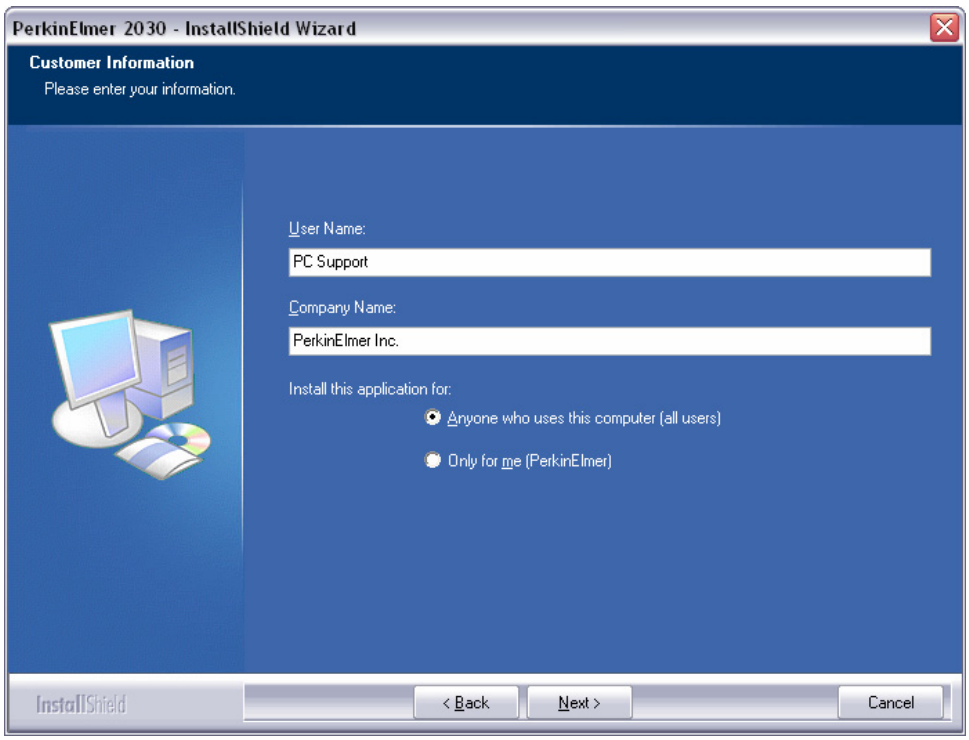
The following dialogues will appear when the setup is started. Read them carefully and follow the instructions (for first time installation the default values should normally be used).



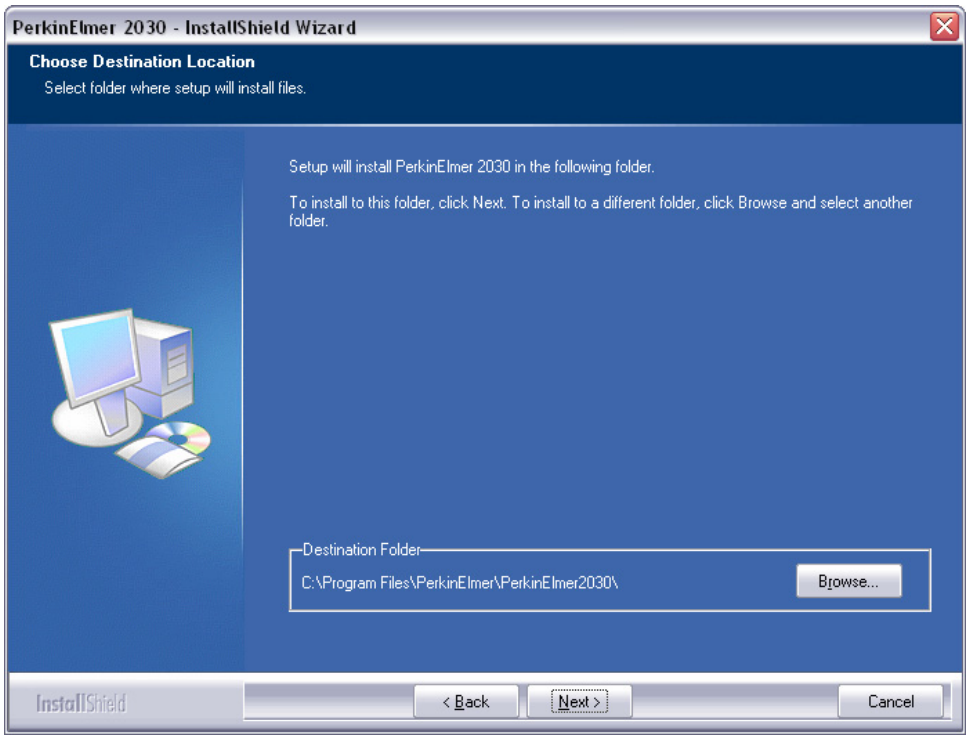
Click **Next** to proceed:



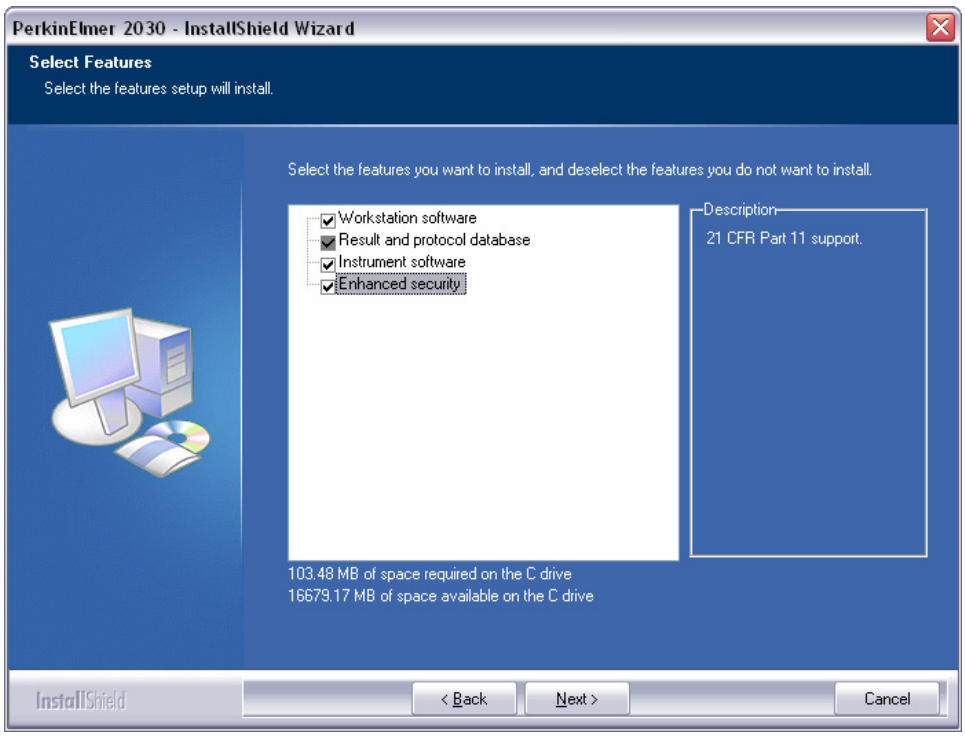
Read the terms of the licence agreement, then click **Yes.**



This screenshot shows an example user name and company name. Enter your own information, then click **Next.**



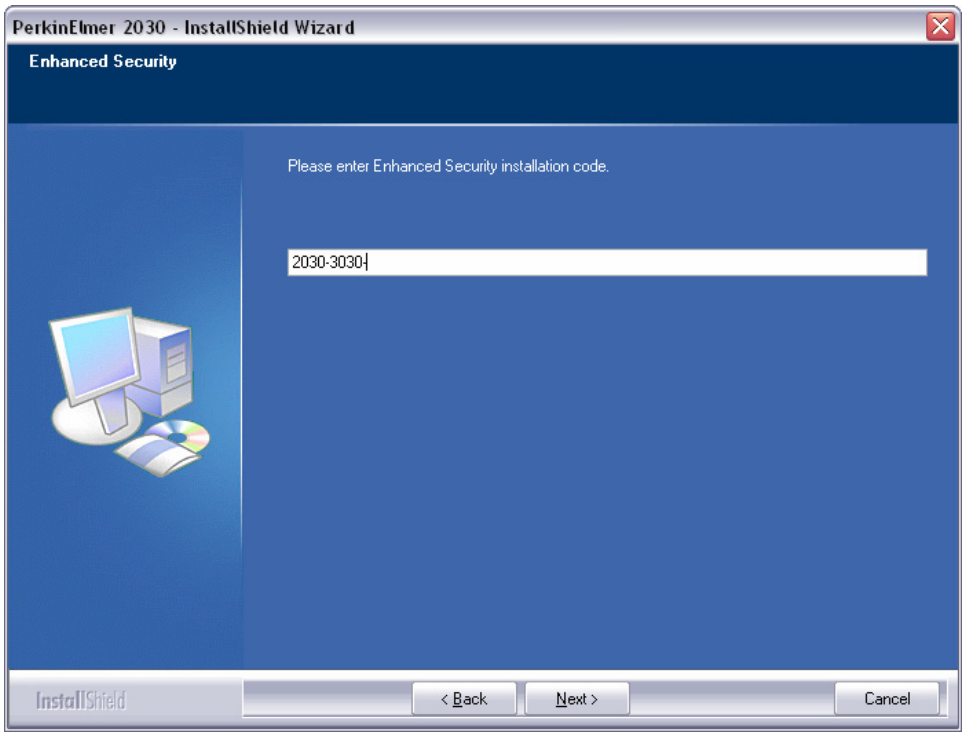
If the proposed destination folder is OK, click **Next**. Otherwise click **Browse** and select a new destination folder. When you have done this, then click **Next**.



Select the features you want to install, then click **Next**. The "Result and protocol database" option is selected by default and greyed.

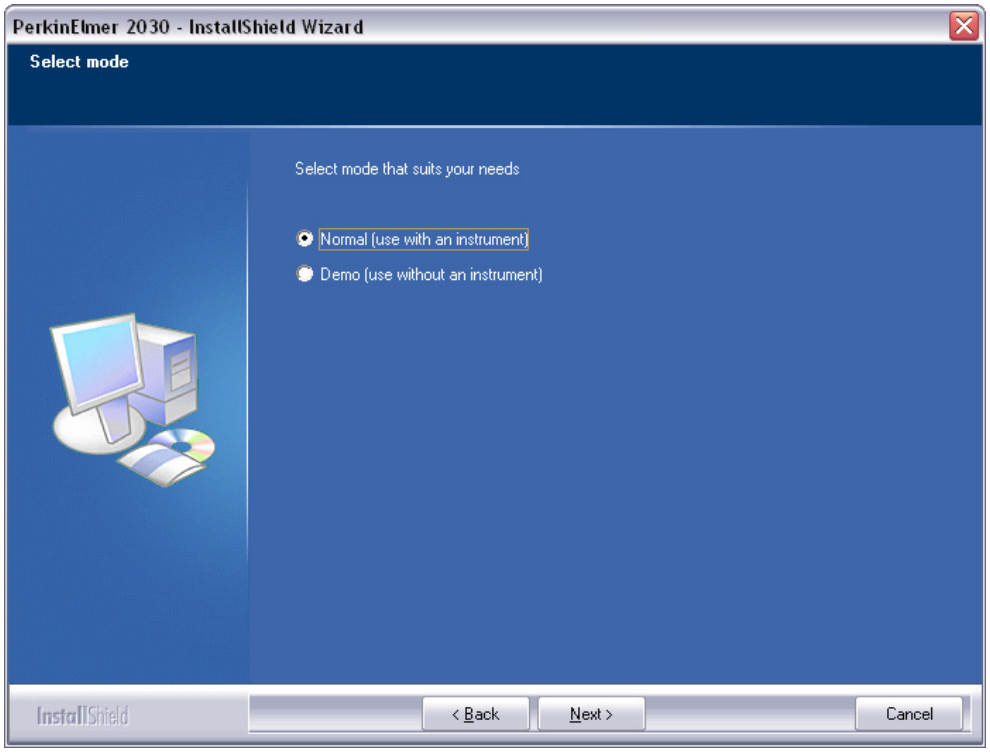
If you have not selected Enhanced security mode, the next dialogue to appear is the Select mode dialogue (see the screen shot at the bottom of the next page).

If you have selected Enhanced security then you must give the Enhanced security installation code as shown in the following screenshot. You will find this number on a sticker with the software CD.

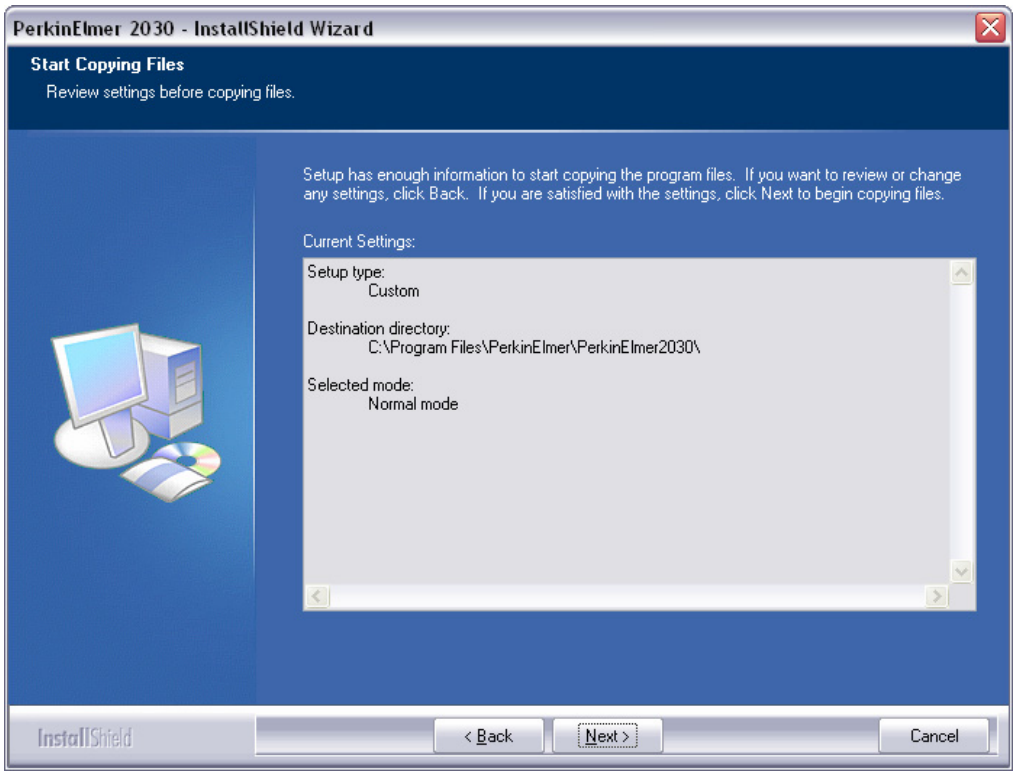


Note: Make sure you save the Enhanced Security installation code in case you need it in the future.

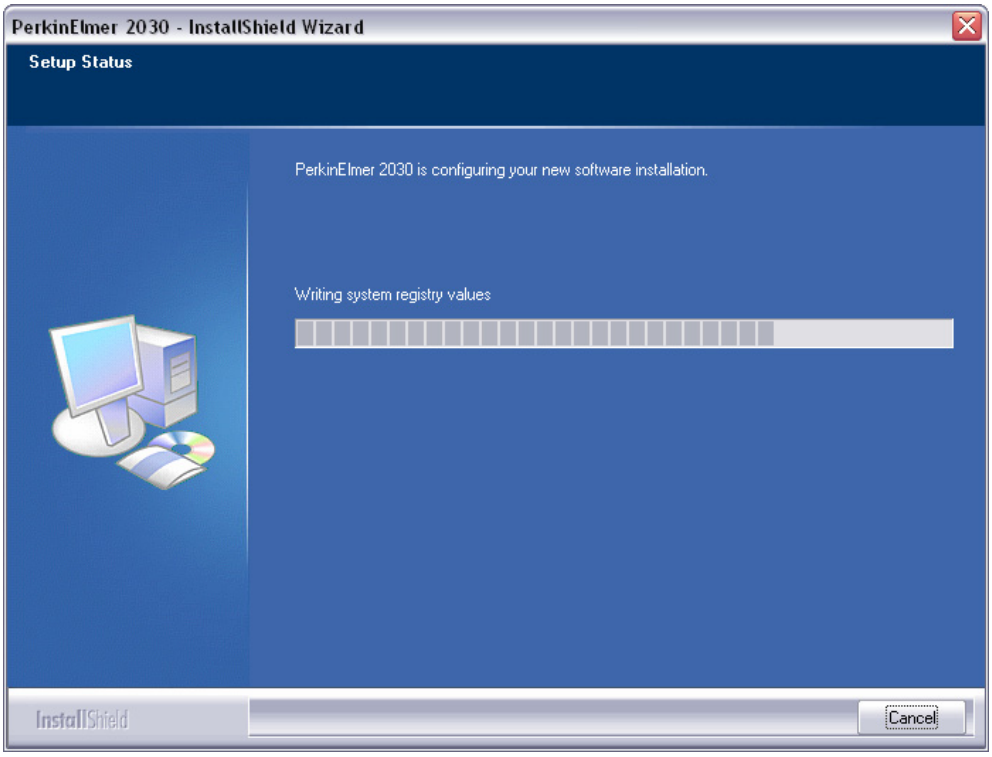
When you have given the installation code, click **Next**.



Click **Next** if your PC is connected to the instrument. With no instrument, the workstation can be run in demo mode and the software itself simulates the instrument. In that case select **Demo** and click **Next**.

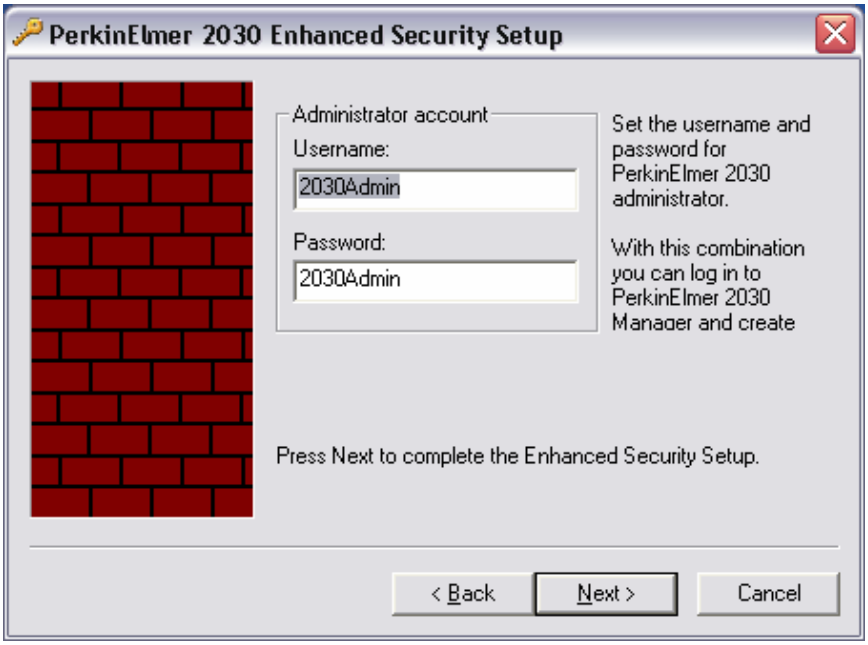


If all settings are OK, click **Next**.



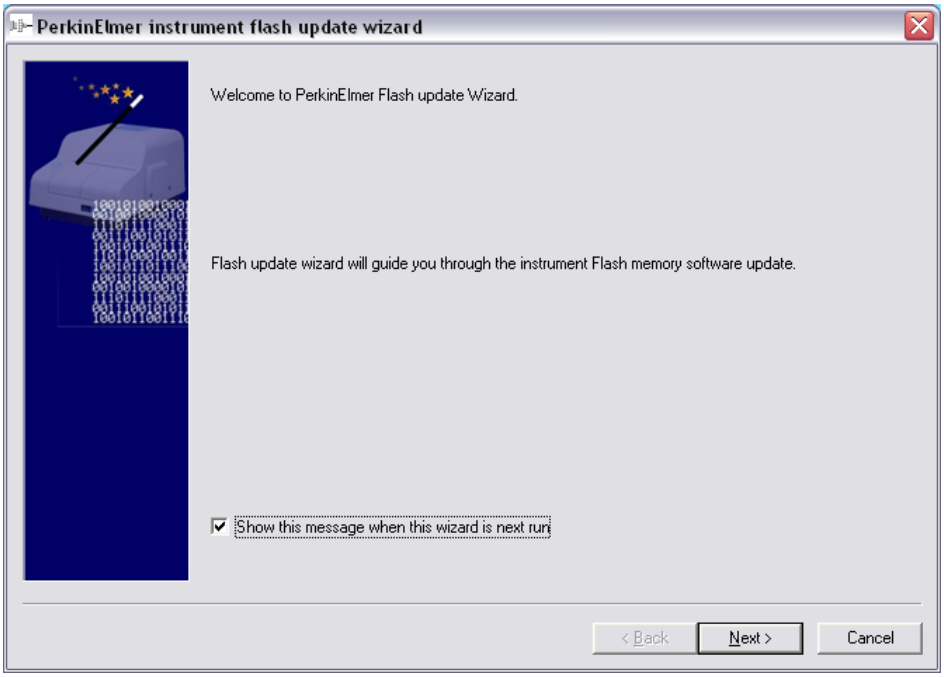
Wait until the setup is completed.

If you have selected Enhanced security mode, the following two dialogues will appear before the flash update procedure begins. If you have not selected it, the software installation will continue directly with the flash update.



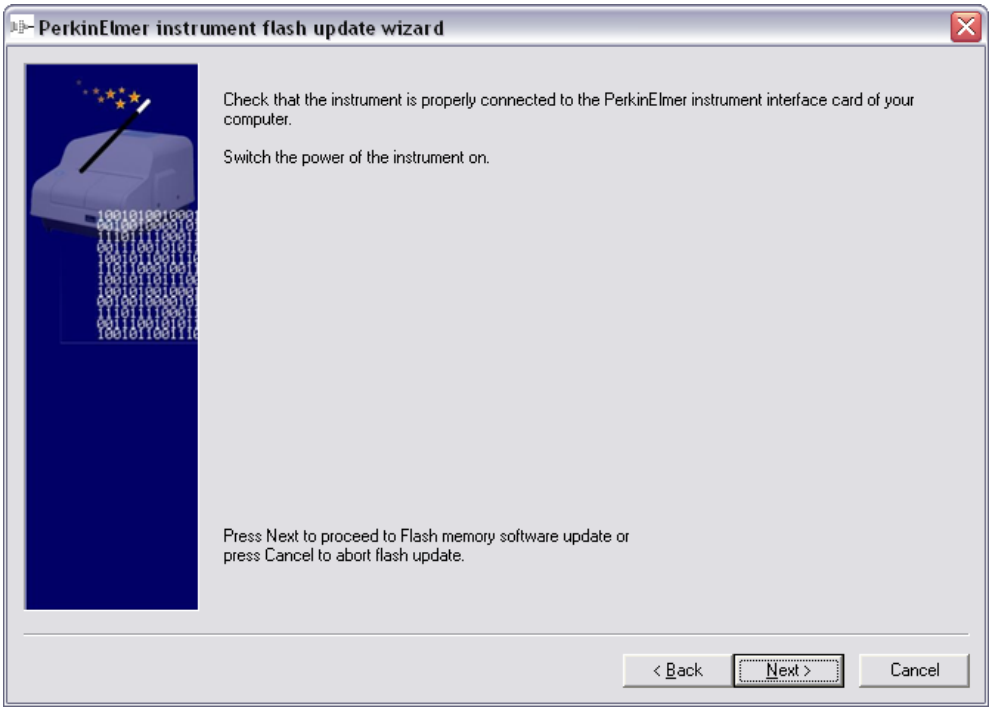
Give the username and password for the Administrator in the Enhanced security mode. Click **Next.**

Click Close. In demo mode the installation will jump to the last screen of the installation process (Installshield wizard complete). In normal mode when the instrument is connected, the installation will continue with the flash update.



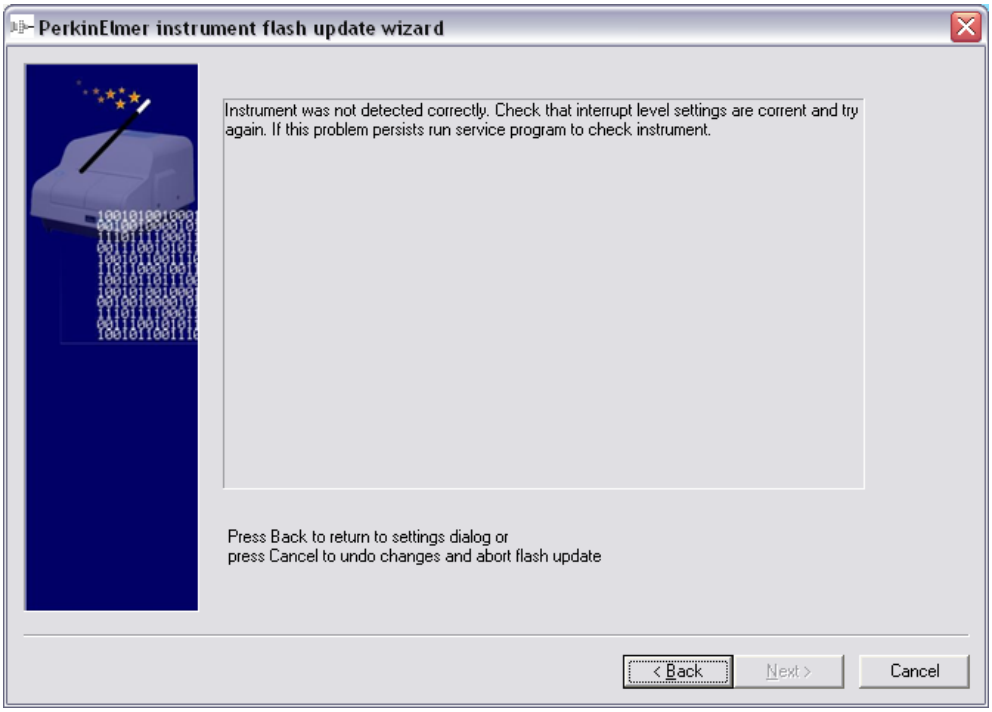
Note: If the software with Enhanced Security is uninstalled and then reinstalled, it will not ask for a new Username and Password. It is therefore important that you keep the Admin. Username and password.

Click **Next** (this part is for setting up the communication between the PC and PerkinElmer 2030).



If all connections are OK and the instrument is switched on, click **Next**.

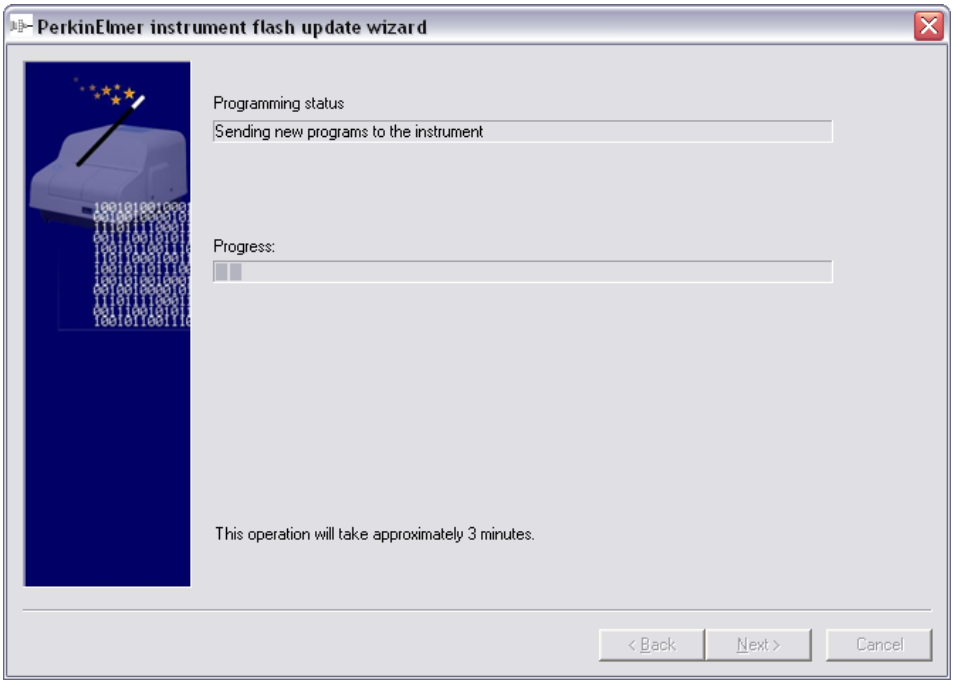
If the instrument is not connected you will get the following dialogue.



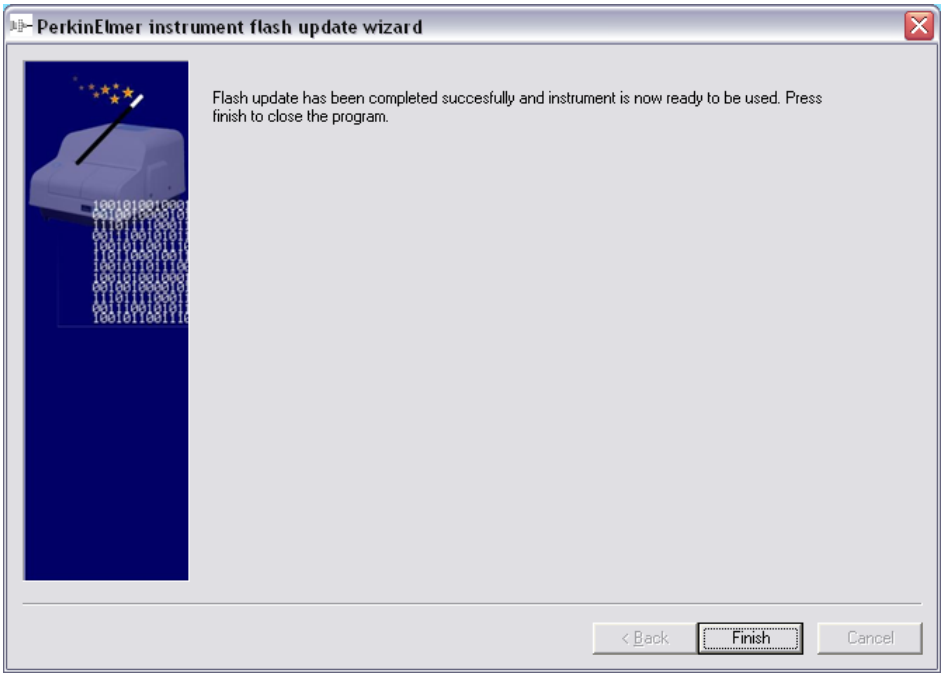
In this case the instrument was not switched on so the connection could not be established. Check connections and power and click the **Back** button when everything is OK.

Click the **Next** button again.

If a connection can be established, the flash ROMs are updated (=”BIOS ROMs” of the instrument) so that they correspond to the program version of the instrument.

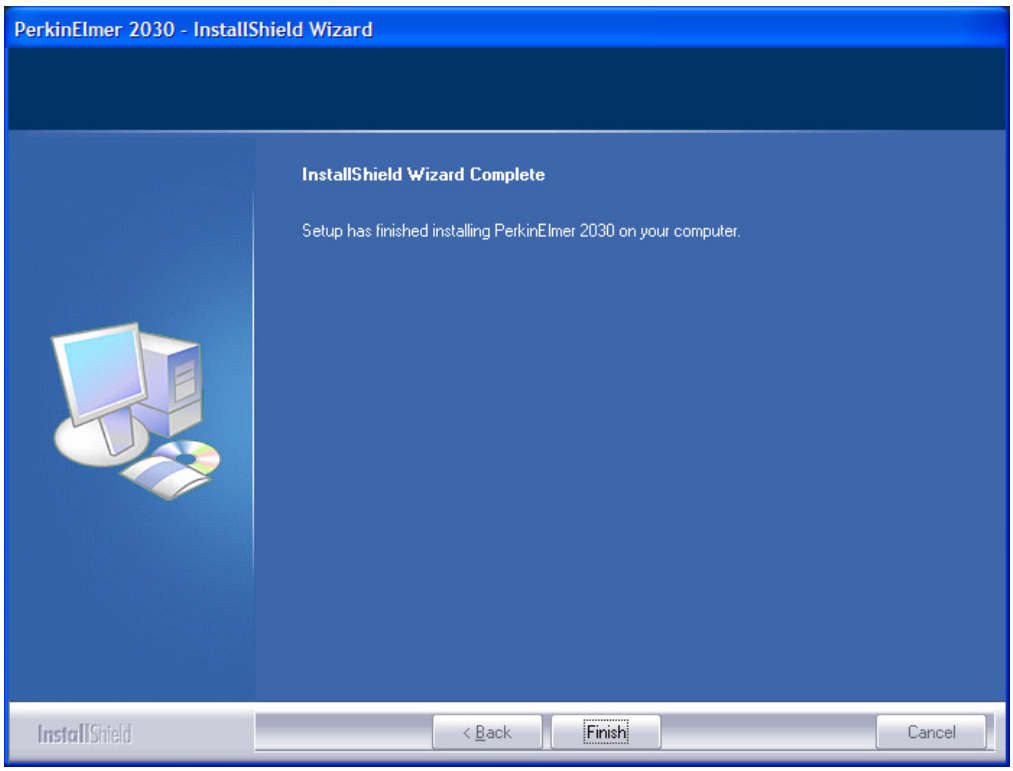


Warning! Do not interrupt this procedure by switching off the PC or the instrument. Wait until the update is completed because an interrupt can cause permanent damage on the microcontroller boards and the only way to recover from this is to replace the boards!



.....and when the update is finished the following dialogue is shown:

Click **Finish** to end the flash update procedure.



Click **Finish** to proceed. Remove the PerkinElmer 2030 Software CD from the drive.

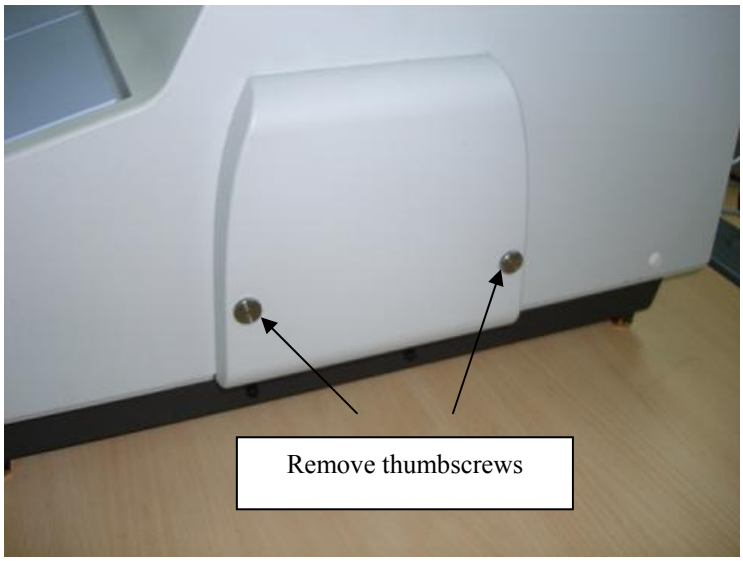
Continue with dispenser installation, if required, then do the performance test.

Liquid dispenser installation

1. Unpacking

Open the package and carry the instrument to its place of operation.

Unscrew the two thumbscrews and remove the side cover. Keep the screw aside as they will be used to secure the dispenser after installation..

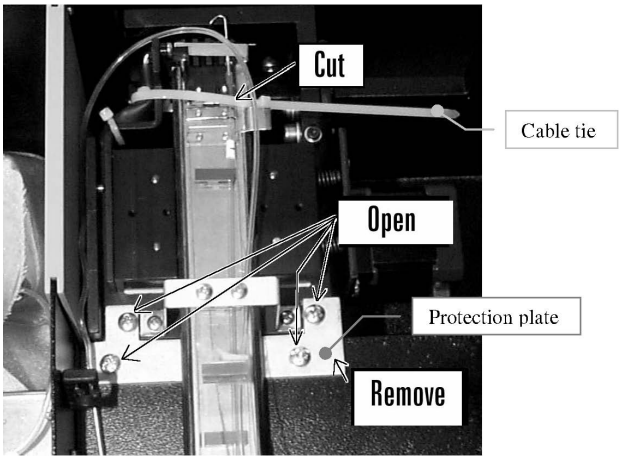


Remove the cover by unfastening the three side screws and the pressing on the two catches on the front end of the instrument (see fig below).

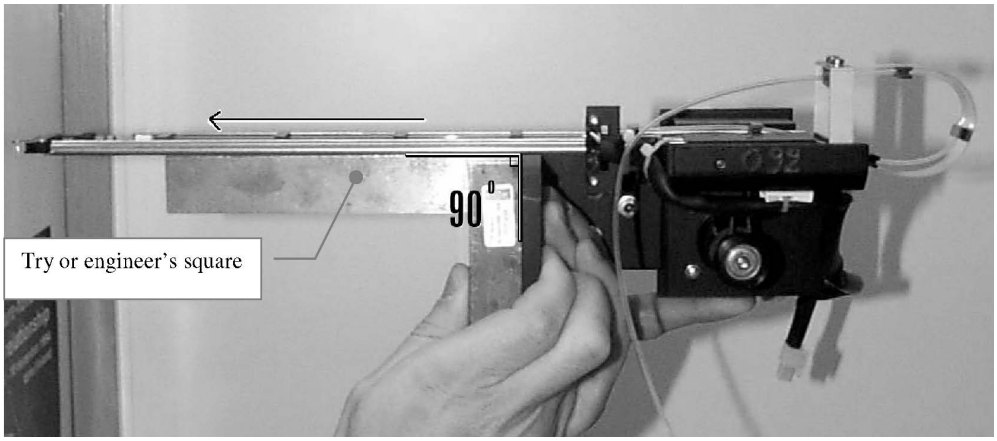
2. Setting the robotic arm

Open the lid of the dispenser unit. The robotic arm block is attached to the dispenser unit with a metallic protection plate and the arm is locked with a cable tie during transportation.

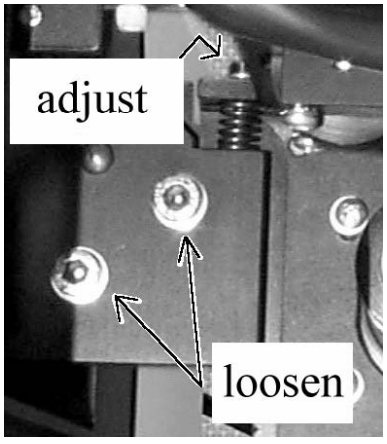
Remove the robotic arm from the dispenser unit by removing the cable tie and protection plate as indicated in the figure below.



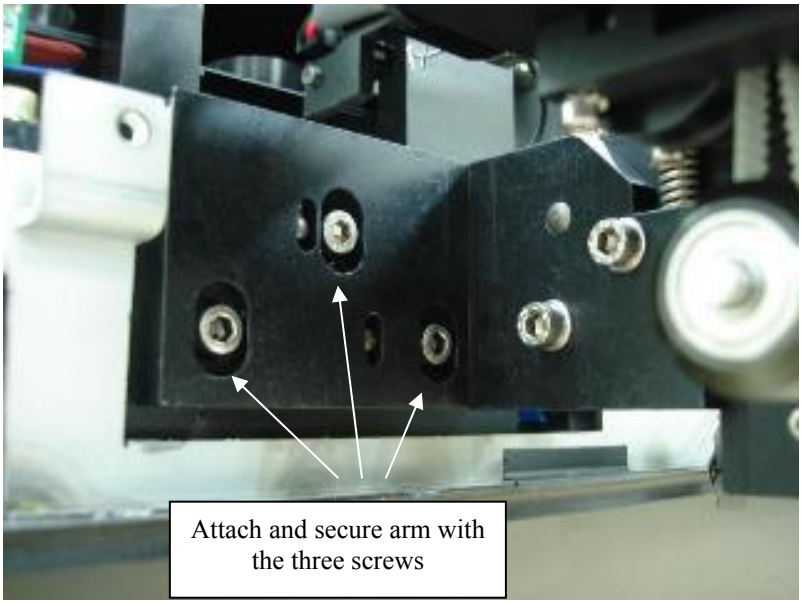
Check that the robotic arm is perpendicular to the base by using a try square or an engineer's square as indicated in the next figure. Ensure that they are at a right angle (90º) to each other.



If they are not perpendicular, loosen (2x) and adjust (1x) the screws on the base (see the figure below). Turning it clockwise will adjust the robotic arm downwards while turning it anti-clockwise will adjust the robotic arm upwards.

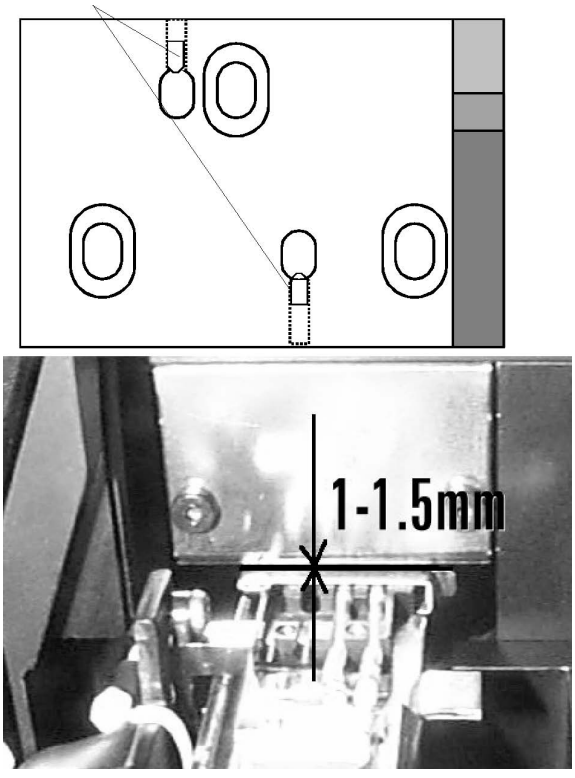


Once the robotic arm is perpendicular, secure it to PerkinElmer 2030 (see fig below) by means of screws (3x). Adjust the height of the arm before tightening them (for detailed instructions, please see below).



To adjust the height of the robotic arm - locate the arm to a couple of millimeters away from PerkinElmer 2030 and adjust the screws for the guide pins so that the height between PerkinElmer 2030 and the arm is 1-1.5 mm. Push the arm completely into the instrument and check that it moves freely without touching the measurement head on the way in.

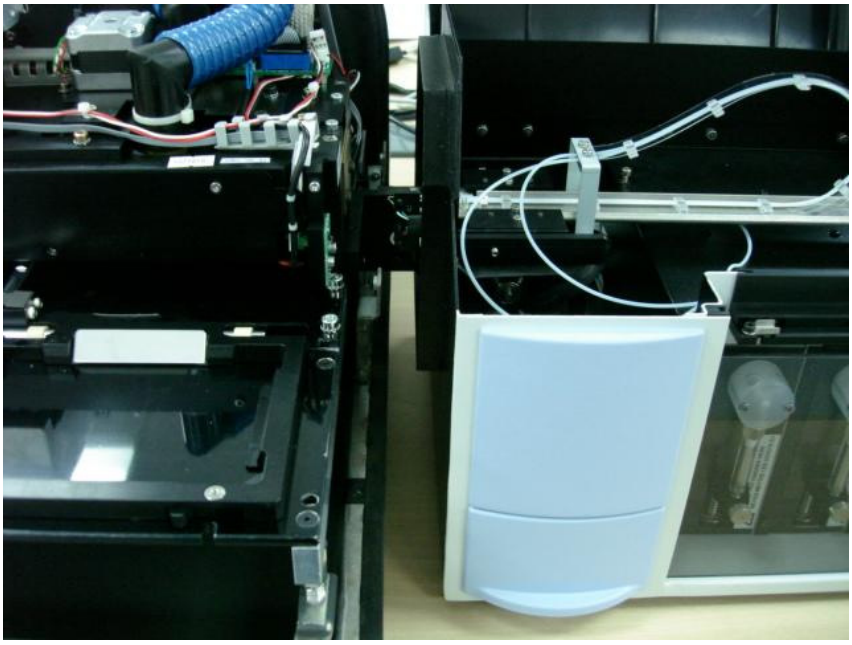
Adjust height position of the arm



When the height is O.K, tighten the three screws.

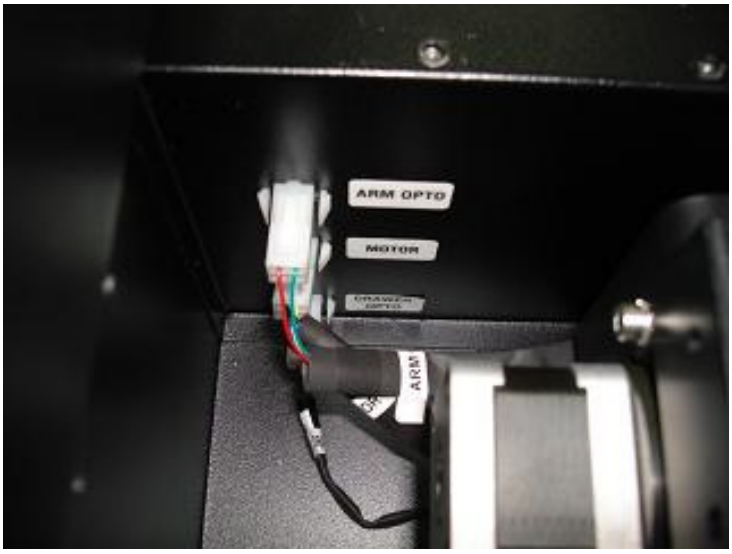
3. Electrical connections setup

Slide the dispenser unit over the arm

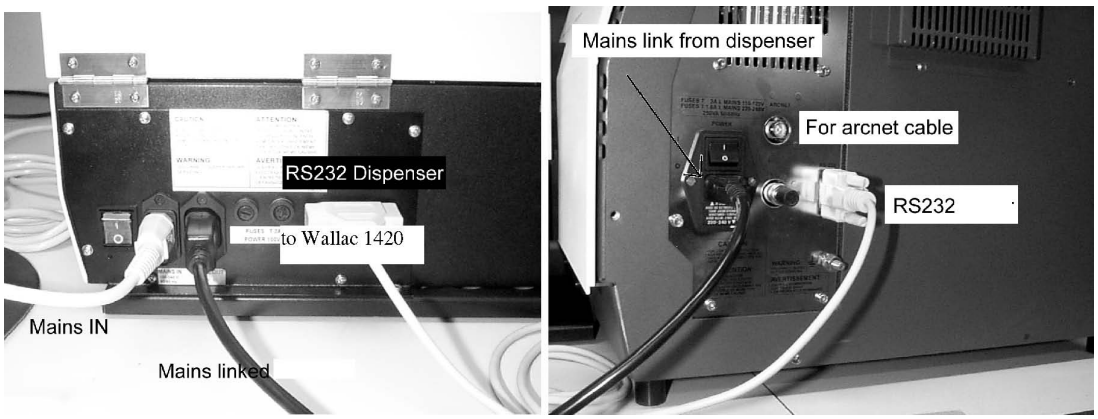


Connect the two connectors (Opto and Motor) for the robotic arm to the main instrument.

Note: Be careful to get the connections the right way round.



Connect the RS-cable and the power cable between PerkinElmer 2030 and the dispenser unit. Connect the dispenser unit to the mains voltage and switch the power on for both PerkinElmer 2030 and the dispenser unit.

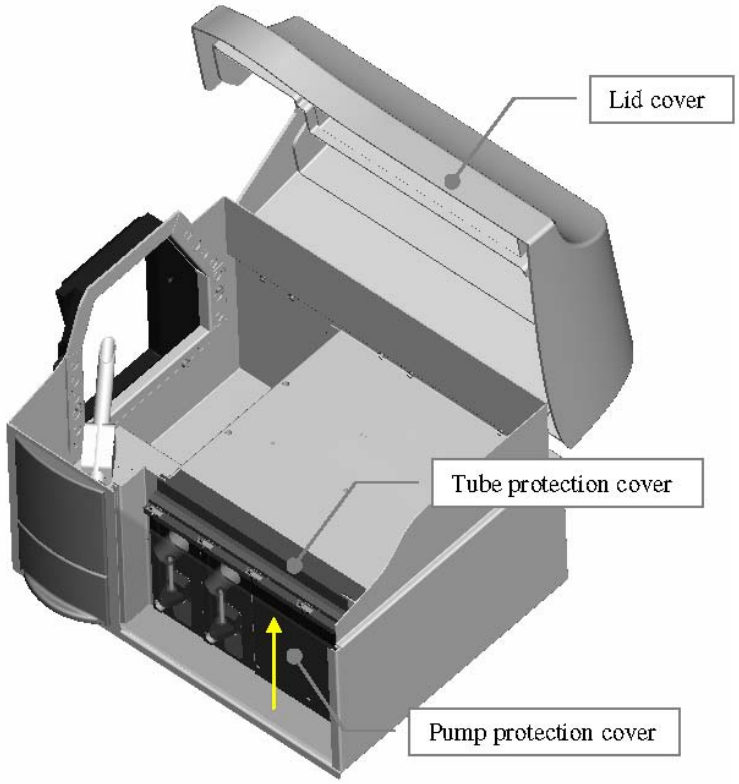


Load the PerkinElmer 2030 Service Program, initialize and then select the dispenser unit:

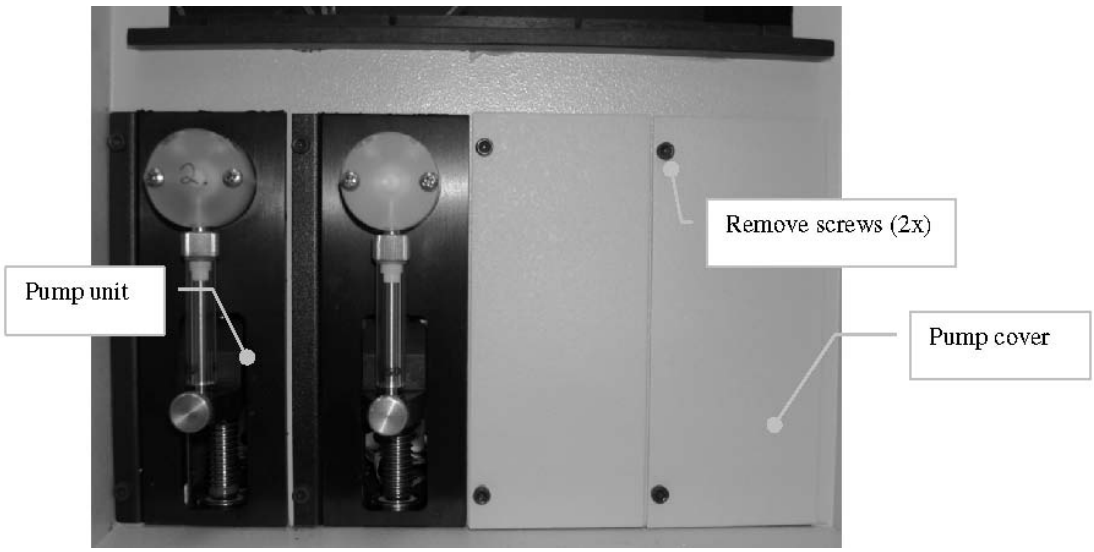
Check first the existing options: System, Options, Show, and then SetOptions, add Dispenser to the existing options. Calibrate the arm (see calibration instructions).

4. Installation of the pump unit

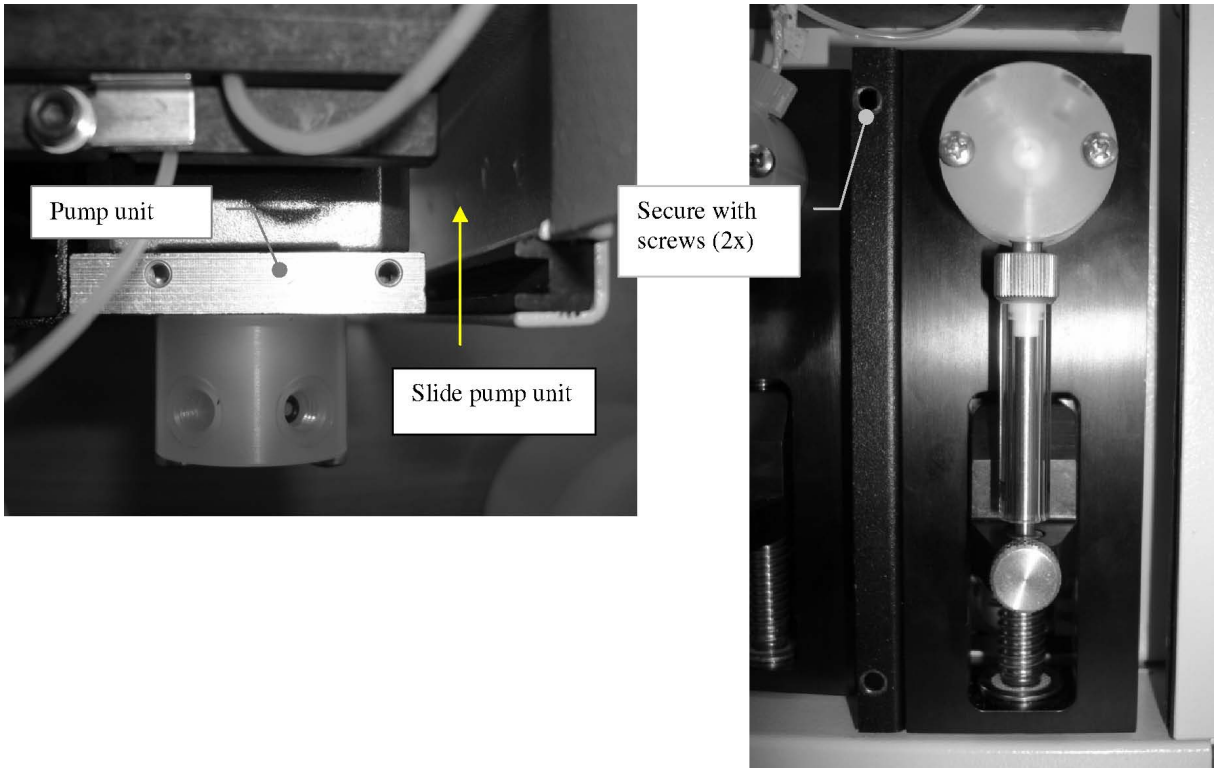
Open the lid cover and remove the tube and pump protection cover (see the figure below).



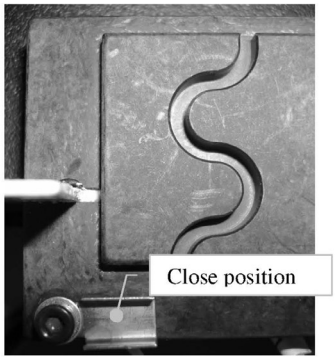
Remove the pump cover and screws (2x) before installing the pump unit.

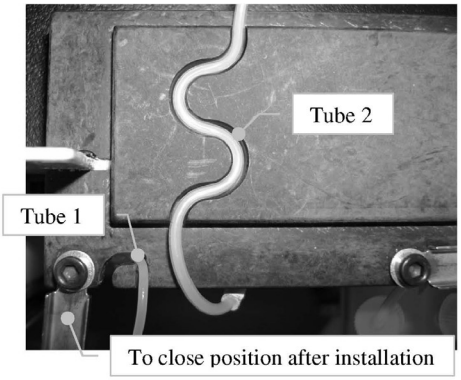


To install the pump unit, simply slide the pump unit into position (as indicated in the picture below) before securing it to the dispenser unit with screws (2x).

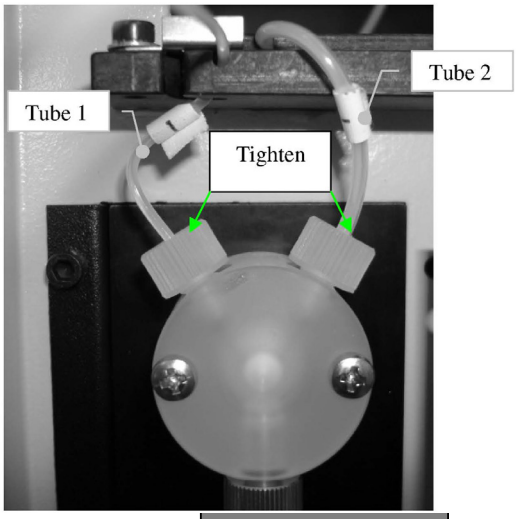


Connect the tubes (2x) to the pump unit as indicated in the pictures.





Before installation



After installation

5. Dispenser calibration

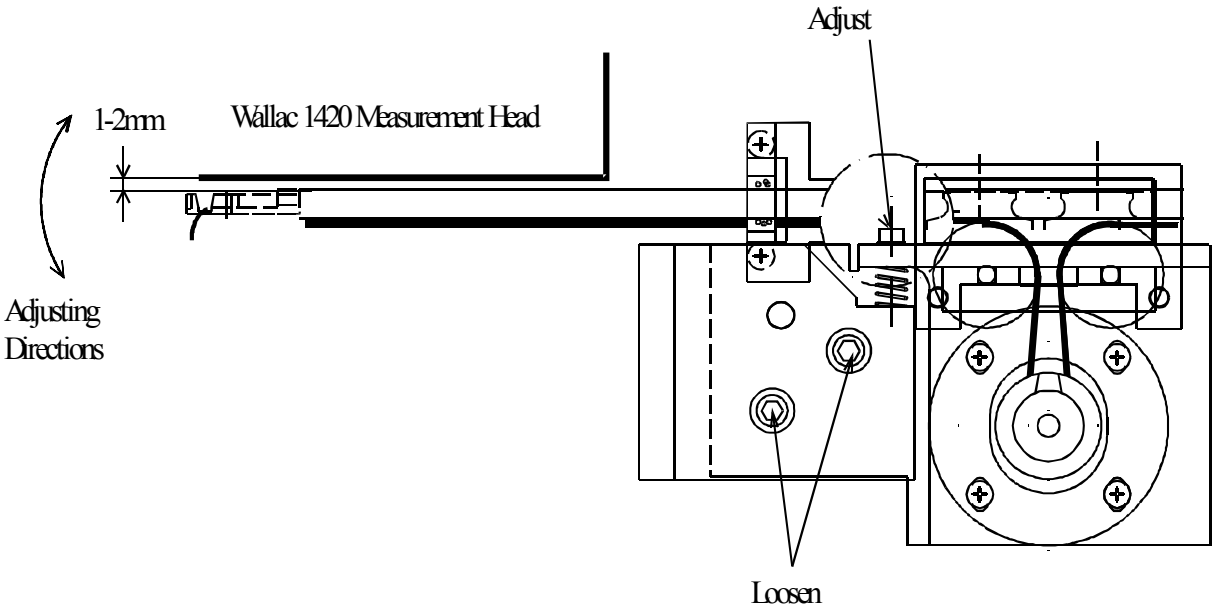
Equipment needed:

- 96-well solid clear plate
- 1086 3400 Adjustment tool for the dispenser arm

Horizontal angle of the dispenser arm

With the power switched off, open the top cover of the dispenser and check the arm by moving it manually in and out. Check that the arm does not scratch the upper part of the measurement head and that the space between the arm and the upper part of the measurement head is 1 – 2 mm.

Note: If the arm is too low it will hit against the measurement plate during normal use and the dispenser needle(s) might be damaged.

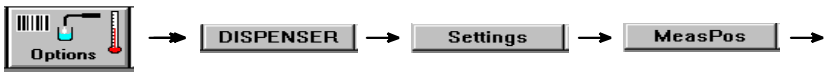


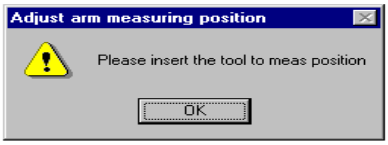
Once the arm looks OK, manually switch the system on and go to the next step:

Measurement position of the dispenser arm

Check the position of the arm in the following way.

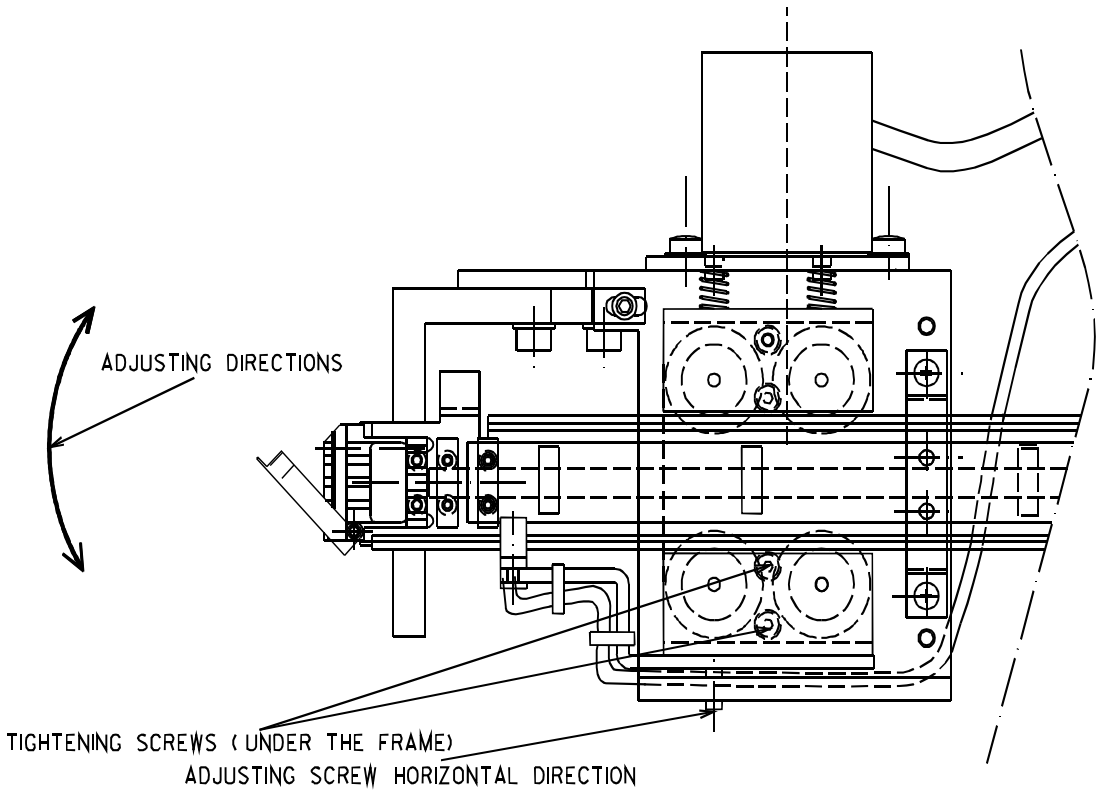
Load and initialize the service program and run the arm to the measurement position:





Insert the adjustment tool and click OK, then run the arm to the measurement position by clicking:

Now the arm goes to the measurement position. Check that the horizontal angle is OK. Click GoToCurrent a couple of times and check. If everything is OK, with the adjustment tool mirror check the position of the needle(s). Calibrate the needle(s) to the center sideways with right or left buttons and the in & out position by adjusting with the adjustment screw (see fig below).



Once the needles are in the center, click Save and GoToCurrent for a last check. Remove the calibration tool and make the following test of the dispenser:

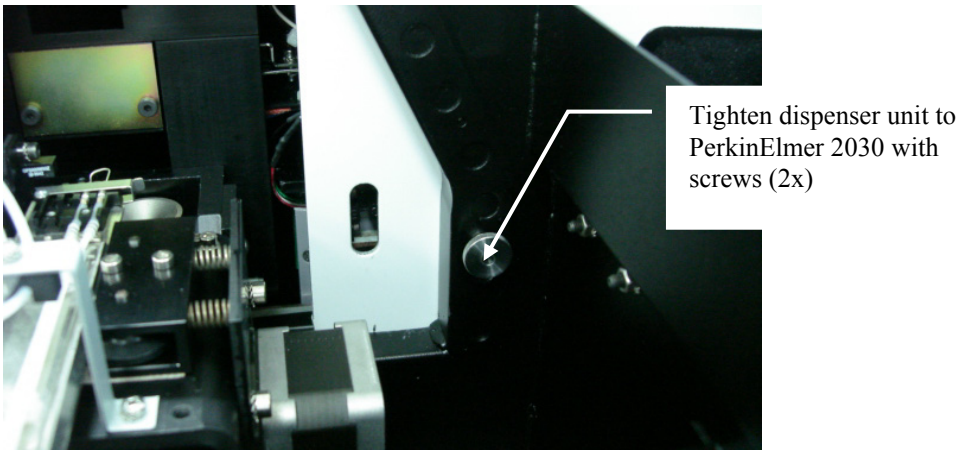
Dispenser test

Fill the pump(s) with water by clicking the prime button twice.
Use a 96-well solid clear plate for the test. Test each pump separately.
Dispense 50 µl/well into the first strip (speed 4).
If there is water outside the well or on the walls, calibrate the arm again.
If the water is dispensed into the wells normally, dispense twice to the whole plate,
100 µl/well (speed 4). Check the result.

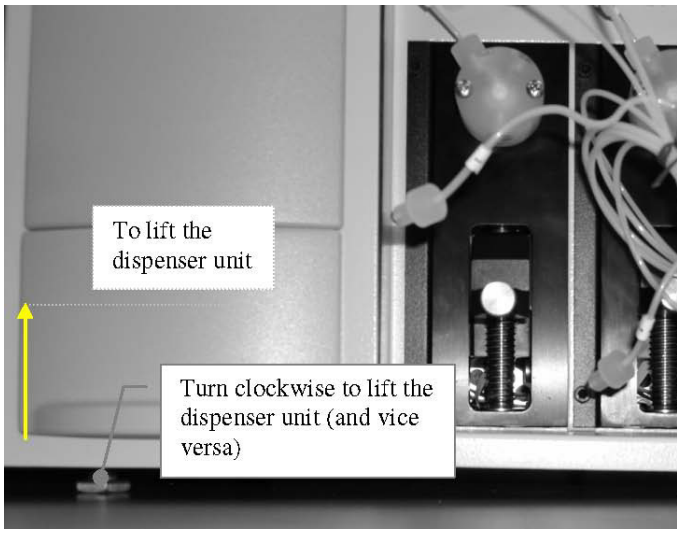
Final installation

After calibrating the arm, install the PerkinElmer 2030 cover and secure with the side screws (3x). Slide the dispenser against the PerkinElmer 2030. Ensure the dispenser fits into the grooves on the side.

Secure the dispenser with the thumb screws (2x) (see the figure below).



Adjust the height of the dispenser by turning the feet of the dispenser until all four feet rest flat on the surface. Turning the screw clockwise to lift the dispenser and anti-clockwise to lower it



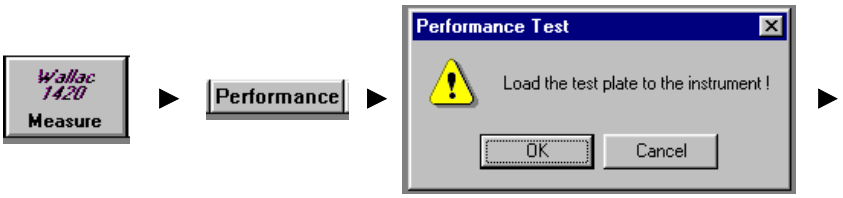
PerkinElmer 2030 Performance Test

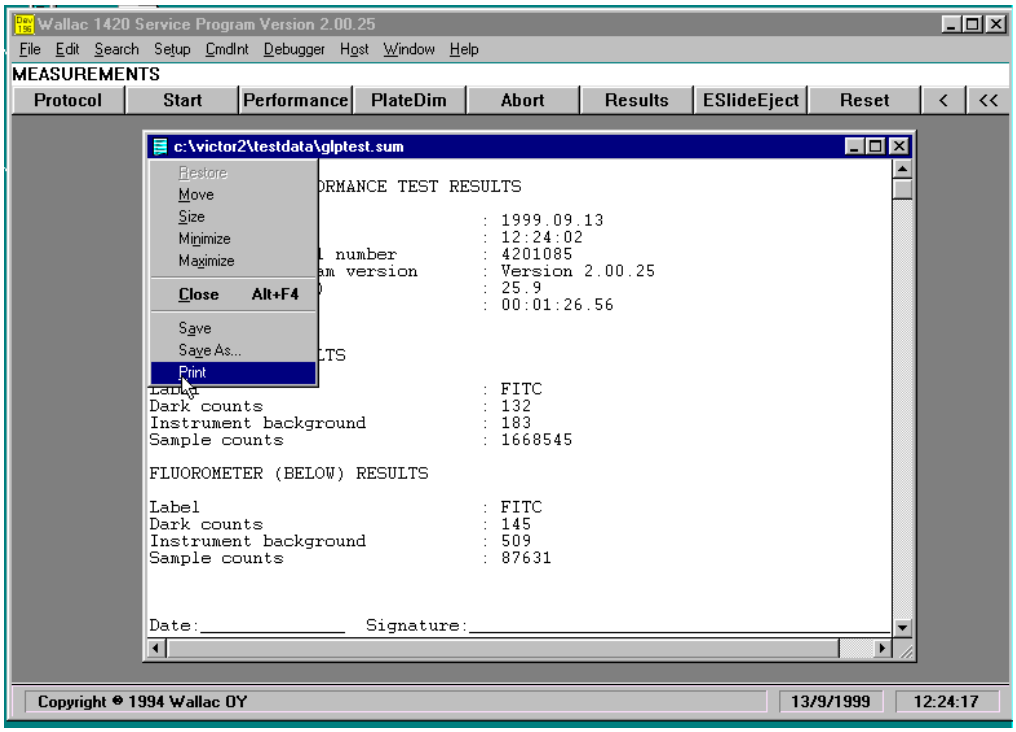
Equipment needed:

1420-442 Testplate 1420-442

Test procedure

Load the service program and run the service program performance test. Print the results:





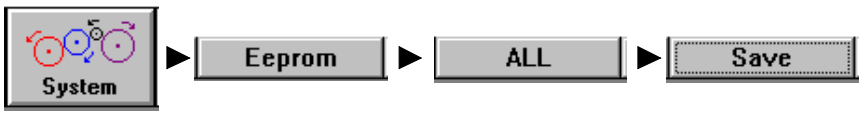
Check that the results are within the limits shown on the next page. Note that not all instruments have all the options and the different models have different limits.

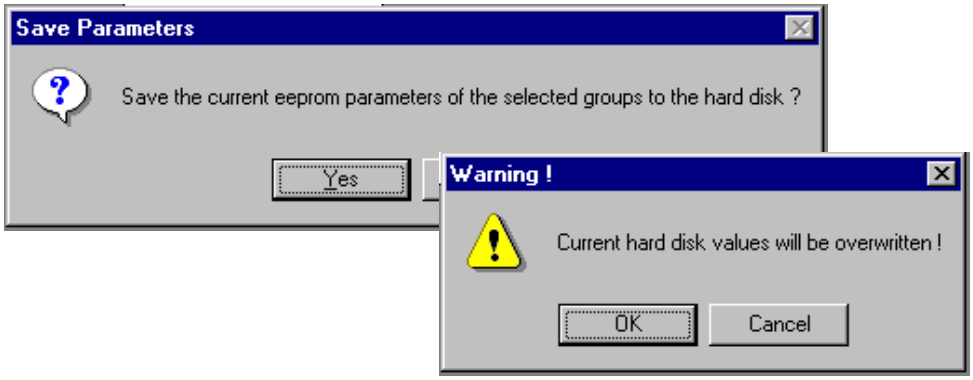
PERKINELMER 2030 PERFORMANCE TEST RESULTS

Limits:		**Normal**	**Red sensitive tube option**	**FP models**
TIME-RESOLVED FLUOROMETER RESULTS				
Dark counts	:	< 150	<600	<600
Instrument background	:	<600	<3800	<3800
Sample counts	:	>30000	>30000	>30000
Sample flashes	:	900 – 1250	900 – 1250	400-700
UV PHOTOMETER RESULTS				
Filter	:	280 nm	280 nm	280 nm
Sample absorbance	:	1.6 – 2.2 A	1.6 – 2.2 A	1.6 – 2.2 A
Sample flashes	:	1000	1000	1000
TIME-RESOLVED FLUOROMETER (2MM BEAM) RESULTS				
Label	: Europium			
Dark counts	:	<450	<1800	<1800
Instrument background	:	<1800	<5400	<5400
Sample counts	:	>30000	>30000	>30000
Sample flashes	:	2500 – 4000	2500 – 4000	1000-2500
FLUOROMETER (TOP COUNTING) RESULTS				
Label	: FITC			
Dark counts	:	<350	<1500	<1500
Instrument background	:	<3500	<12000	<12000
Sample counts	:	>500000	>500000	>500000
FLUOROMETER (BOTTOM COUNTING) RESULTS				
Label	: FITC			
Dark counts	:	<350	<1500	<1500
Instrument background	:	<10000	<10000	<10000
Sample counts	:	>75000	>75000	>75000
PHOTOMETER RESULTS				
Filter	: 405 nm			
Sample absorbance	:	Test Plate Value +/-10% (all models)		
LUMINOMETER RESULTS				
Dark counts	:	<350	<1500	<1500
Instrument background	:	<350	<1500	<1500
Sample counts	:	>10000	>10000	>10000
FLUORESCENCE POLARIZATION RESULTS				
Signal S	:			>100 000
Signal P	:			NS
Polarization	:			>400 mP

Saving the EEPROM parameters to the hard disk

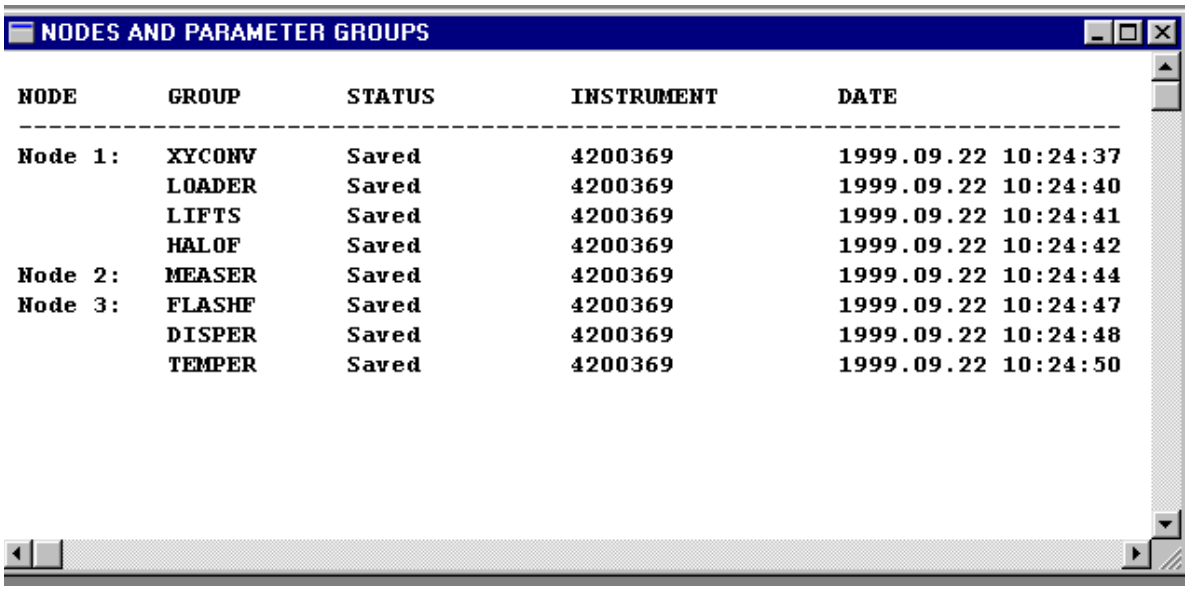
Save all EEPROM parameters on the hard disk. The parameters can be restored if the LCC-C board(s) has to be replaced.





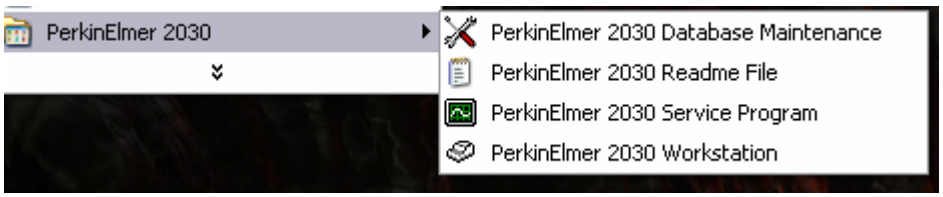
Click Yes

Click OK

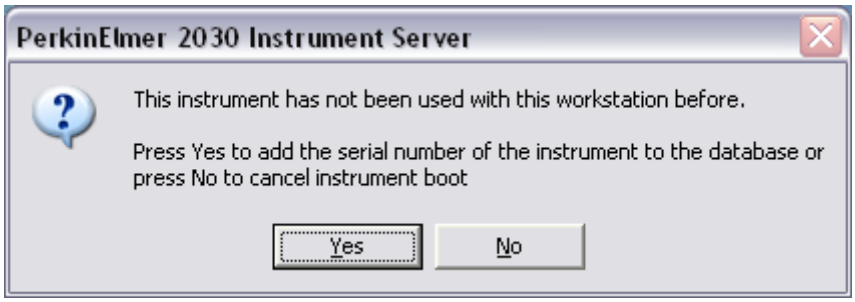


First time start up

The first time you start the software after installation, click your Windows Start button. Select programs and from that menu PerkinElmer 2030. Select PerkinElmer 2030 Workstation as shown in the picture.



The following dialogue will appear.



Click **Yes**. The workstation software will then start up normally. See the user manual for operation information.

7. Index

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