HITACHI
Inspire the Next

General guide for answering inquiries: 7 questions

Choose model by:

I. Specification

II. Application

U-5100

UH5300

U-2900/2910

UH4150

U-3900/3900H

UH5700

New

(only in Asia)

7 questions

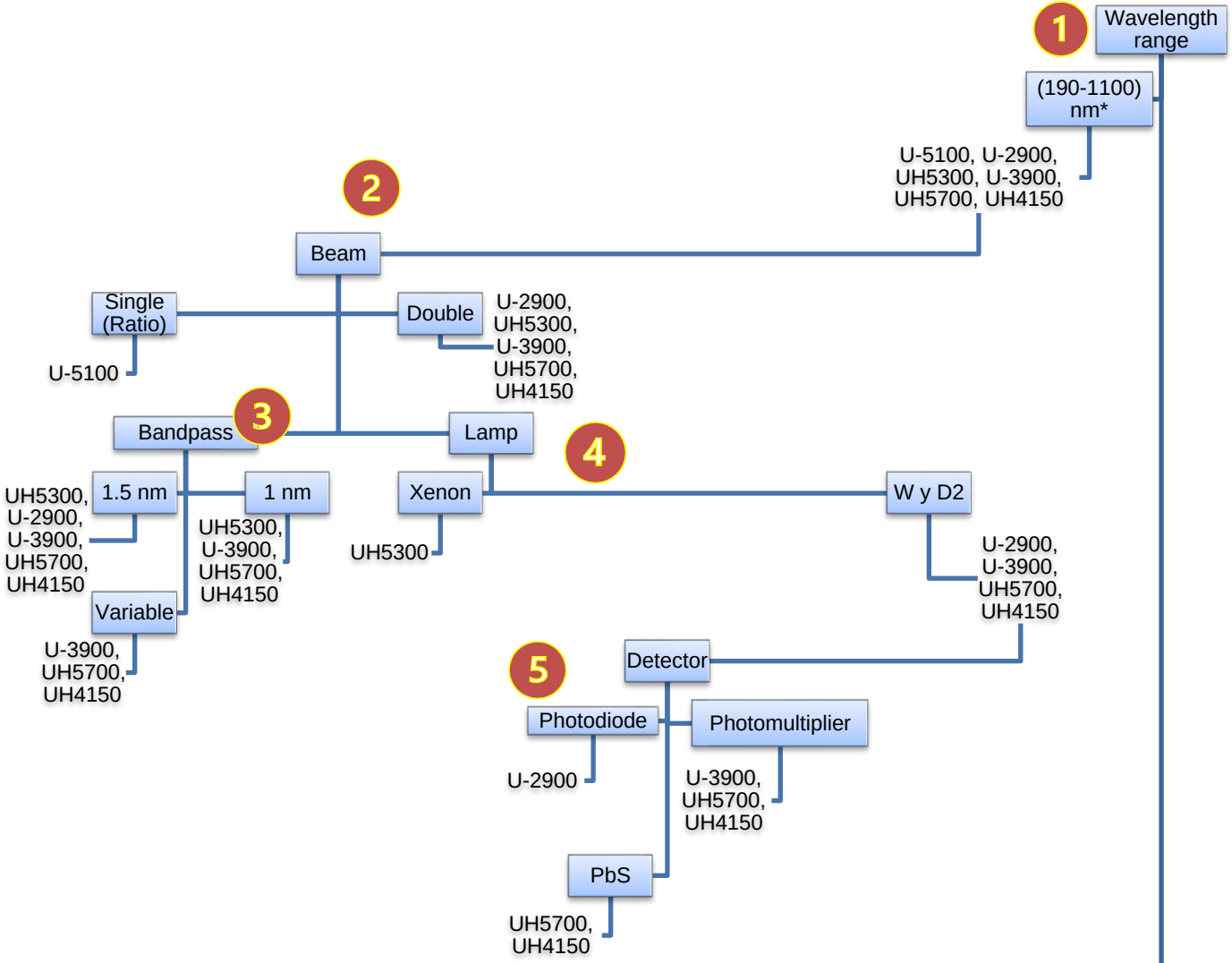
HITACHI
Inspire the Next

1. Wavelength range?
2. What type of beam?
3. Bandpass necessary?
4. Xenon or D2/W lamp?
5. Detector type?
6. Liquid or solid sample?
7. If liquid, temperature control?

Or if solid, Reflectance/Transmittance/Absorbance?

I. Choose UV spectro according to specifications

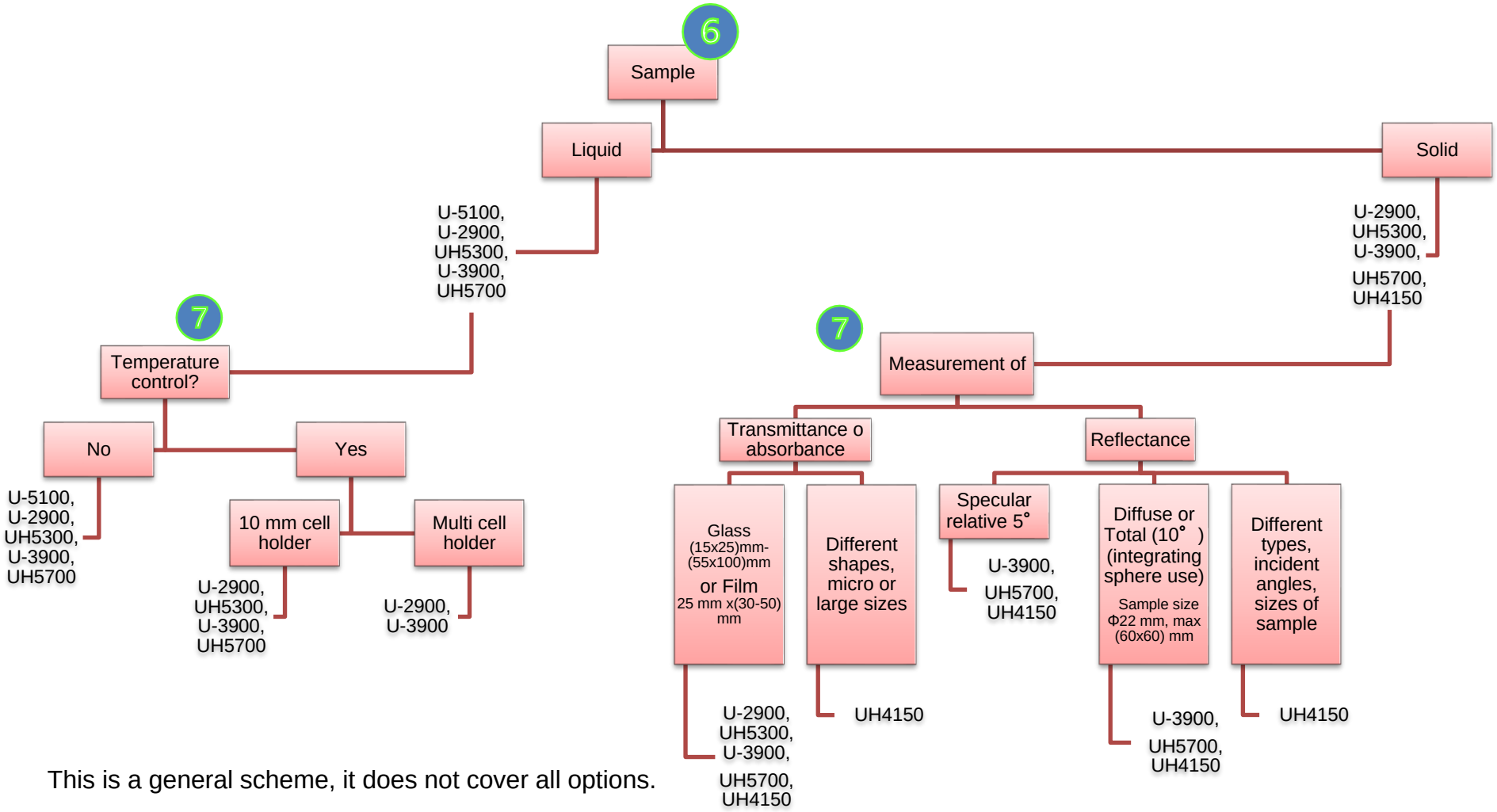
HITACHI
Inspire the Next



Clasification for U-2900 is the same for U-2910; same that U-3900's for U-3900H.
*Standard version of U-3900/3900H is to 900 nm. There is an available version up to 1100 nm.

II. Choose UV spectro according to applications

HITACHI
Inspire the Next



This is a general scheme, it does not cover all options.

HITACHI
Inspire the Next

DETAILS

Guide for answering inquiries: 7 questions

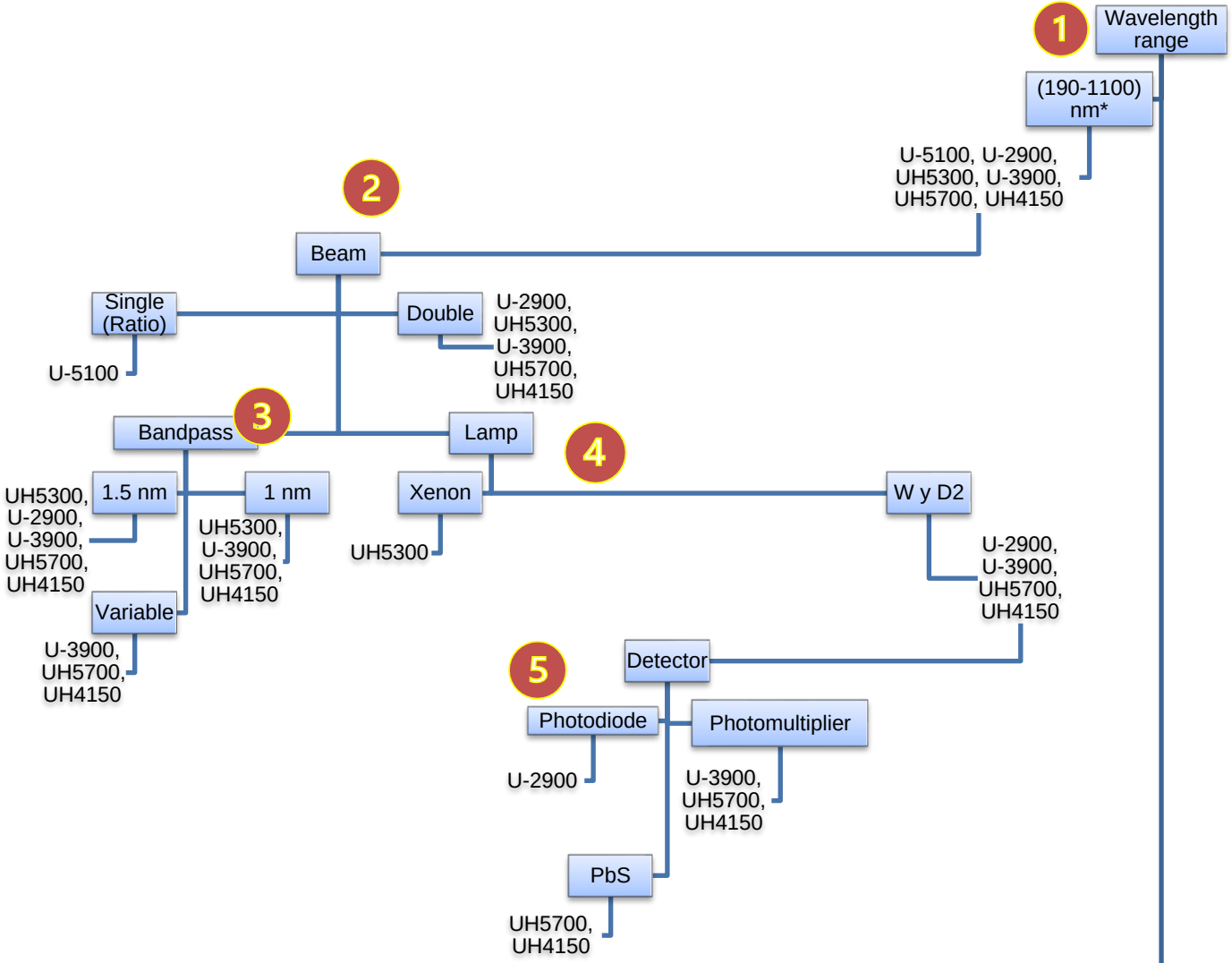
Choose model by:

I. Specification

II. Application

I. Choose UV spectro according to specifications

HITACHI
Inspire the Next



Clasification for U-2900 is the same for U-2910; same that U-3900's for U-3900H.
*Standard version of U-3900/3900H is to 900 nm. There is an available version up to 1100 nm.

1. Wavelength range

HITACHI
Inspire the Next

UV VIS NIR

UH4150/UH4150

175nm

3300nm

UH5700

NEW
(only in Asia)

Coming soon for other regions

190nm

3300nm

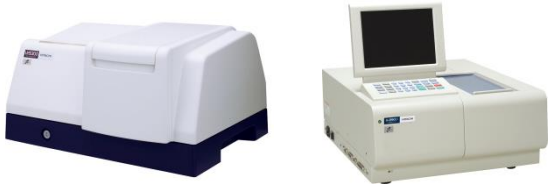
U-3900/3900H

190nm

900nm

(1100 nm version available)

U-2900/UH5300



190nm

1100nm

U-5100

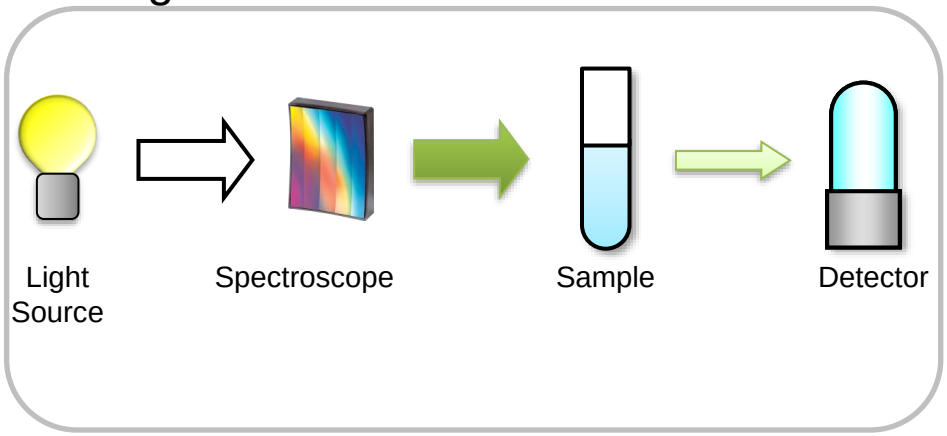
190nm

1100nm

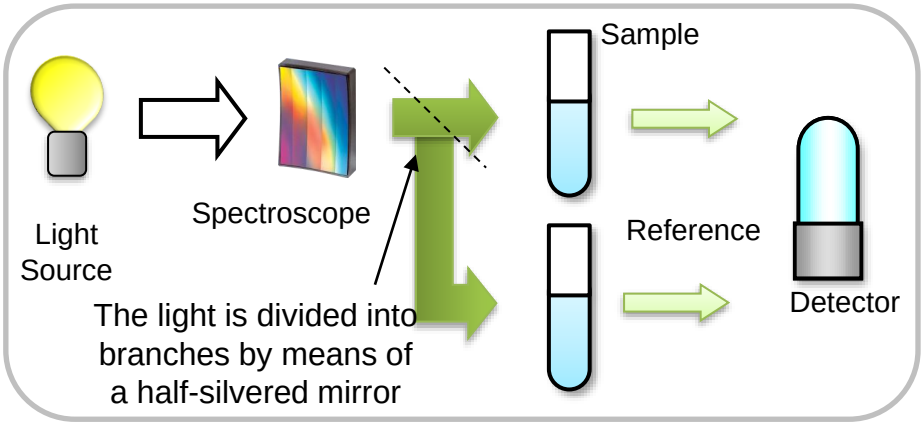
2. Beam: Single beam and double methods

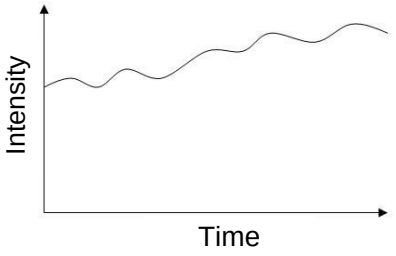
HITACHI
Inspire the Next

Single Beam



Double Beam

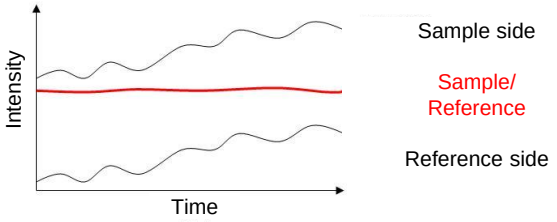


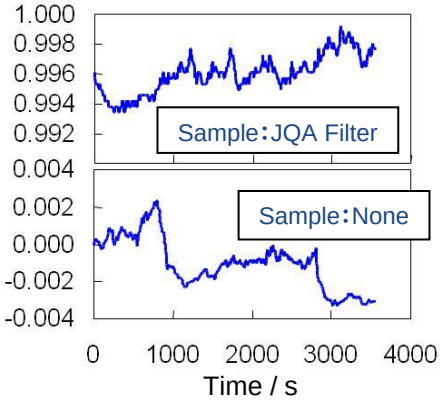


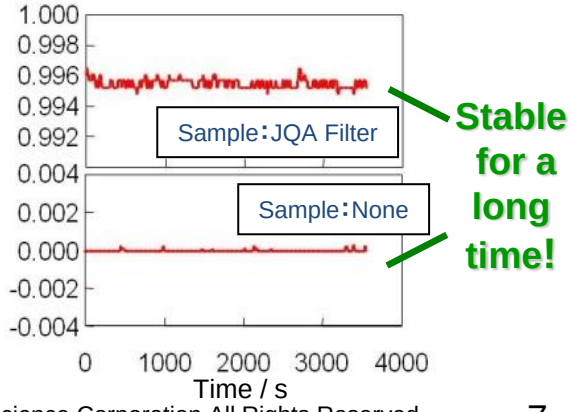
The intensity of the light source is not stable, but oscillates due to changes in temperature, humidity, wind patterns, and so on.

By taking the ratio of the intensity of a sample to that of a control, the oscillation can be corrected (the baseline becomes stable, after a time).

For long-time, continuous measurements or enzyme activity measurements, the double beam method is highly recommended!



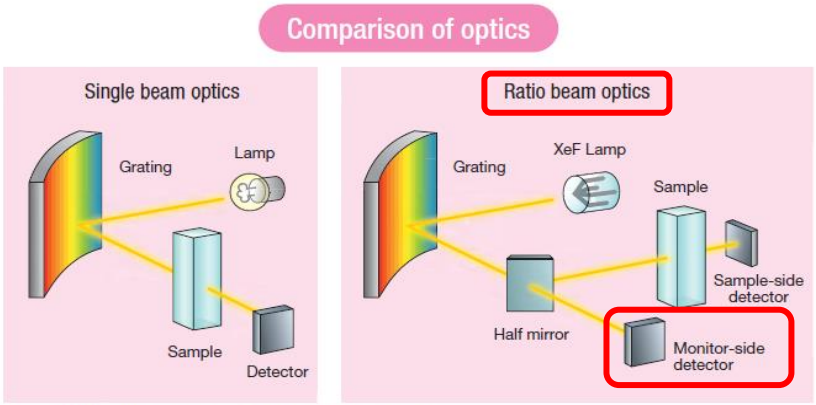




2. Hitachi Ratio and Double beam

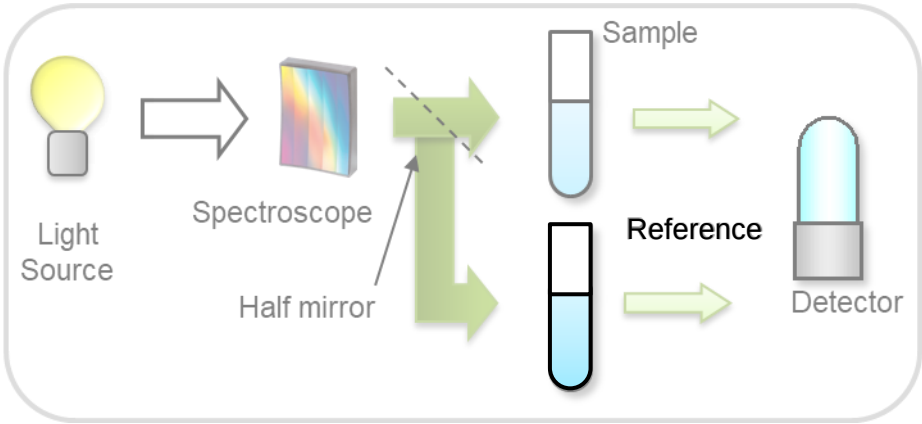
HITACHI
Inspire the Next

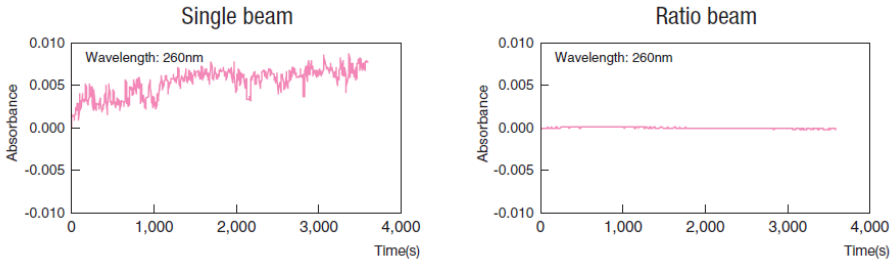
Comparable with single beam



* These diagrams represent design concepts, not actual optical system structures.

Double beam





Better than single beam: Excellent baseline stability!

UH5300

U-2900/2910

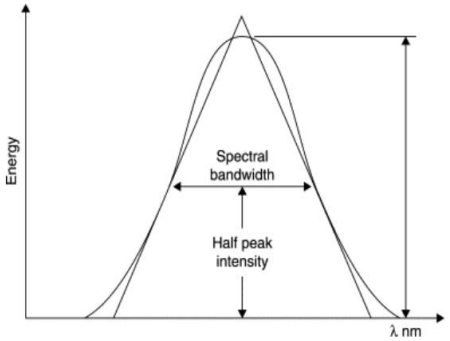
UH5700

UH4150

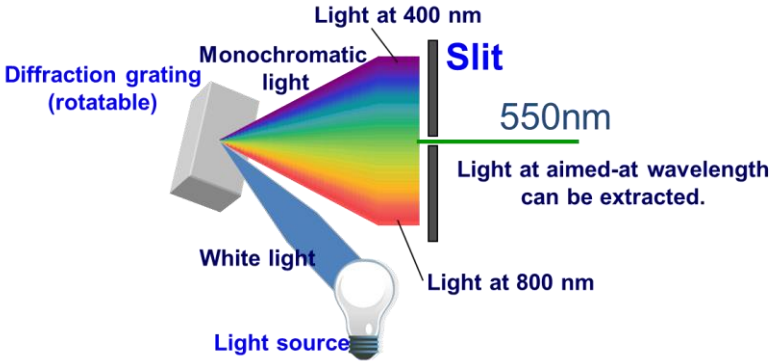
U-5100

U-3900/3900H

3. Spectral bandwidth (bandpass)



Source: Asim Kumar Roy Choudhury, in Principles of Colour and Appearance Measurement, 2014



The spectral bandwidth is related to the physical slit width.

In general, reducing the physical slit width decreases the spectral bandwidth and improves the resolution (ability of the instrument to resolve close peaks). However, it decreases the energy reaching the sample, which might increase noise levels.

Fixed slit:

U-5100

U-2900/2910

UH5300

Bandpass: 5 nm 1.5 nm 1 nm

In pharmaceutical companies a spectral bandwidth of 1.5 nm is generally accepted.

Variable slit:

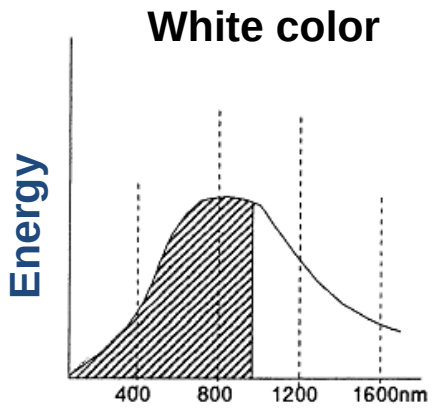
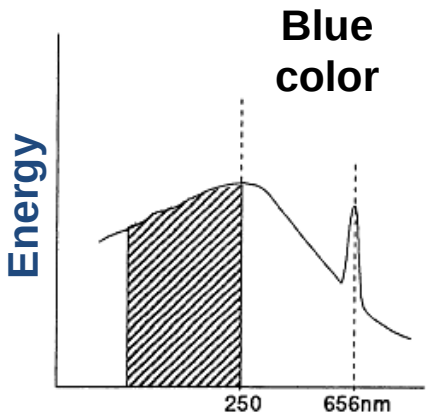
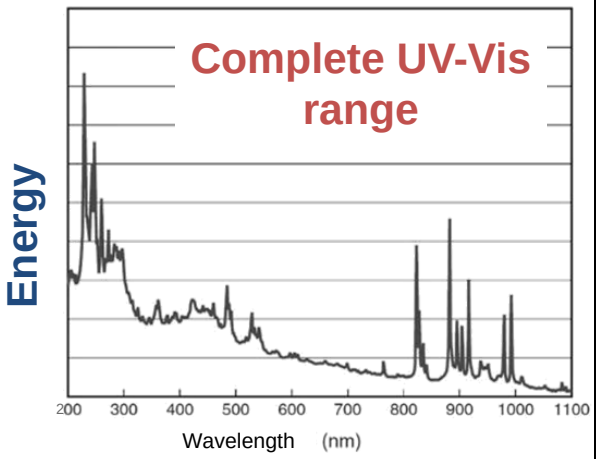
U-3900/3900H

UH5700

UH4150

Variable bandwidth will be useful for customers that require compliance to multiple regulations and/or applications.

4. Light source

Kind	Incandescent lamp Tungsten	Deuterium discharge lamp	Flash Xenon lamp
Symbol	W, WI	D_2	Xe
Characteristic	Emitting continuous spectrum of 300-3000nm	Emitting continuous spectrum of 168-500nm with energy peak at 250nm	Emitting continuous spectrum of 200 nm- 1100 nm Long lifetime
Wavelength	340～1100 nm	185～360 nm	200 nm- 1100 nm
Energy			

HITACHI
Inspire the Next

Types of detector

Photodiodes (photocells)

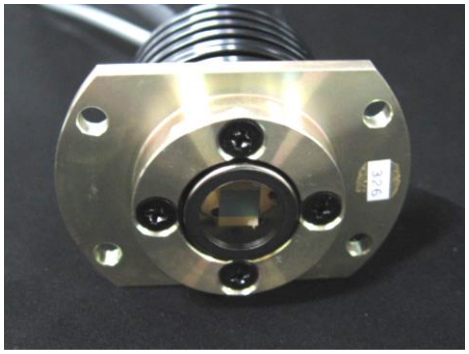
Cover the visible region. It is common for photocells to be made of cadmium sulfide and photovoltaic cells of silicon. It is small and also sensitive to light with a relatively short wavelength.

Photomultiplier tube (photomultiplier)

Side-on type photomultiplier

Equipped with phototubes sensitive to both the UV and visible regions, and multipliers that amplify roughly 107 times.
The sensitivity can be broadly varied by increasing the applied voltage.

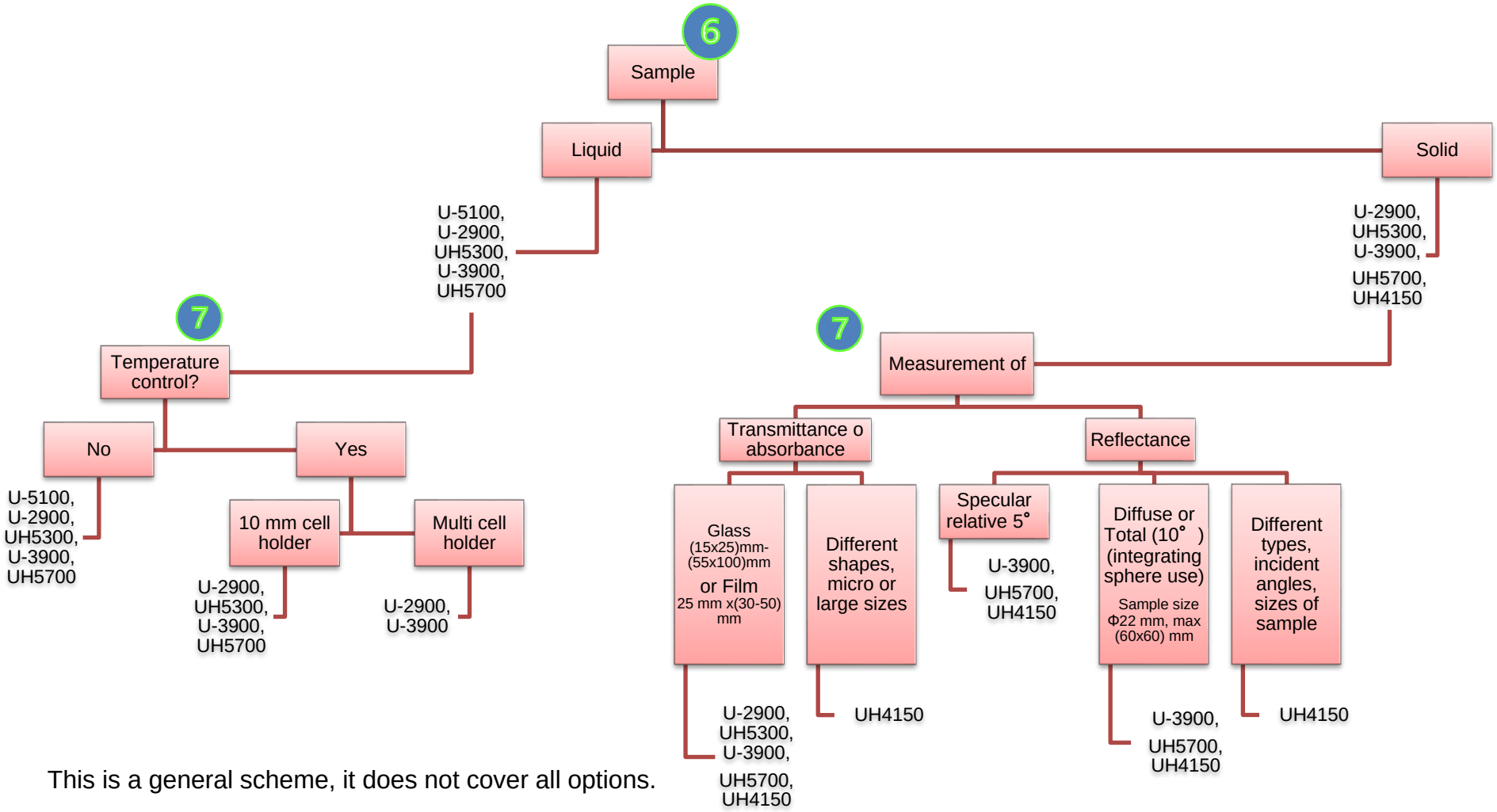
PbS (lead sulfide)



Detector sensitive to the near-infrared region

II. Choose UV spectro according to applications

HITACHI
Inspire the Next



This is a general scheme, it does not cover all options.

6. Solid samples

HITACHI
Inspire the Next

Reflectance of small samples

Transmittance (absorbance)

Glass filter holder
(P/N 210-2109)

Used for transmittance/absorbance measurement of a solid sheet sample such as glass filter.

Specifications

Sample thickness	0.5 to 5 mm
Sample size	Minimum : 12 x 25 mm Maximum : 55 x 100 mm

Film holder
(P/N 210-2112)

Convenient for measurement of film-shaped samples.

Specifications

Film frame	Width 25 mm, height 30 to 55 mm
Beam aperture	Width 10 mm, height 20 mm

Polarizer holder
(P/N 210-2130)

Sample beam is linearly polarized for measurement of polarization characteristics or a sample is placed between the polarizer and analyzer for measurement of optical rotary power.

Specifications

Wavelength range	400 to 750 nm
Sample area	Minimum 12 mm x 25 mm Maximum 55 mm x 100 mm
Sample thickness	0.5 to 5 mm

UH5300

U-2900/2910

U-3900/3900H

UH5700

φ60 Integrating Sphere
(P/N 2J3-0176)

This is used for absorbance measurements of turbid samples and reflectance measurements of solid sample surfaces.

Wavelength range	220 to 2600 nm
Samples that can be installed	Transmission: Rectangular cells with 10, 20, 30, and 40 mm optical path length* Reflection: Plate specimens with sizes of φ30 to 80 mm, 30×30 to 80×80 mm, and thicknesses of 10 mm or less
Aperture ratio	8.1%
Incidence angle for reflection sample mounting position* *RS in reversed state	Sample side: 0° Control side: 8°

*For transmission, when measuring plate-shaped specimens, please order sample clamp with transmission opening (P/N: 130-2070) and cell stand (P/N: 130-2076) separately.

UH5700

5° specular reflectance accessory
Different P/N for each model

Using mirror reflection of a sample, relative reflectance is measured with respect to the standard reflection plate (aluminum-evaporated plane mirror). Applicable to film thickness measurement and spectral reflectance measurement.

Specifications

Angle of incidence	5°
Sample area	25 mm in diameter or more

U-3900/3900H

UH5700

φ150 integrating sphere accessory
(P/N 2J2-0175)

Designed for diffuse reflectance measurement of a solid sample surface and absorbance measurement of a turbid sample. With an aperture ratio as small as 2 %, this unit is usable for high-accuracy colorimetric measurement.

Specifications

Wavelength range	350 to 750 nm
100 %T line flatness	±0.5 %T
Aperture ratio	2 %
Light trap	Mountable

φ60 integrating sphere accessory
(P/N 2J2-0176)

Designed for absorbance measurement of a turbid sample and reflection measurement of a solid sample surface.

Specifications

Wavelength range	250 to 800 nm
100 %T line flatness	±1 %T
Aperture ratio	7.8 %
Specular reflection measurement attachment	Standard-equipped

U-3900/3900H

6. Solid samples

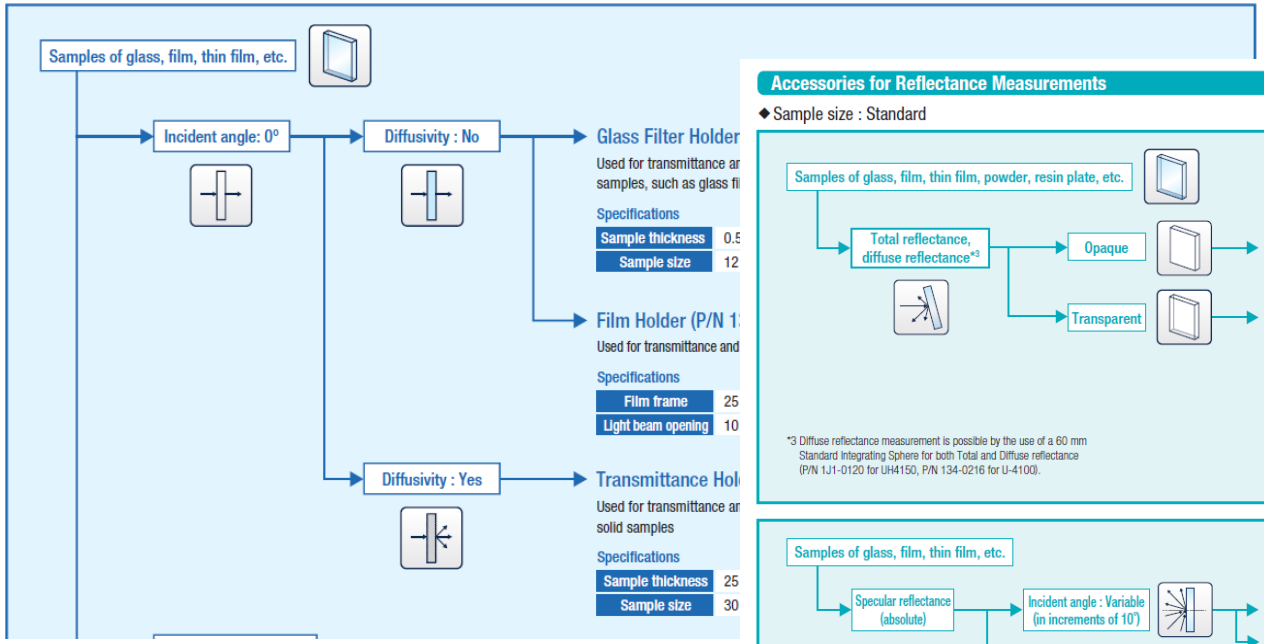
HITACHI
Inspire the Next

UH4150

Transmittance/Absorbance and Reflectance:
Different sizes, types of solid samples
Details on accessories brochure.
Please check configuration with Hitachi sales.

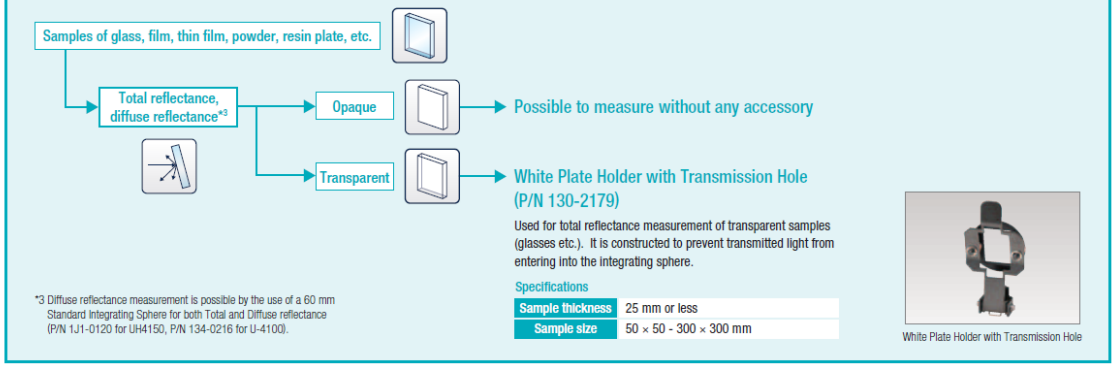
Accessories for Transmittance and Absorbance Measurements

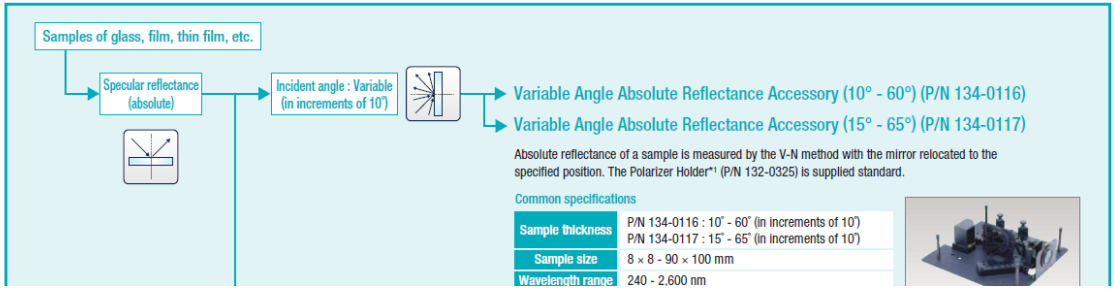
◆Sample size : Standard



Accessories for Reflectance Measurements

◆Sample size : Standard





7. Liquid samples (no temperature control)

HITACHI
Inspire the Next

Single cell holder

U-5100

Single cell holder (P/N 3J2-0110)

Use this holder to measure with a square cells with a 10-mm optical path.
Accommodates one cell.

Holder base (P/N 3J1-0109)

Used as a base when the following samples holders are used in the instrument

Single cell holder (P/N 3J1-0106)

Used for measuring samples placed in a 10 mm path length cell

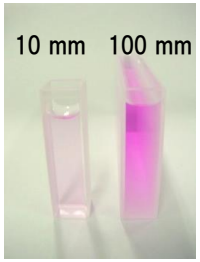
Options that require the holder base

Product name	P/N
Single cell holder	3J1-0106
Rectangular cell holder	210-2107
Glass filter holder	210-2109
Film holder	210-2112
Light polarizer holder	210-2130

UH5300

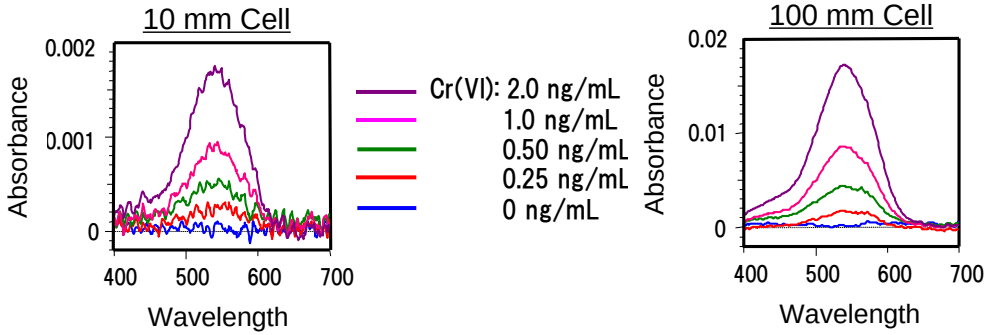
Variable Optical Path Length

Measurement of low concentration samples



Comparison of each cell

$$\text{Absorbance} = \log_{10}\frac{I_0}{I} = \varepsilon\, c\, L$$



Rectangular long path cell holder (P/N 210-2107)

Used for measuring samples placed in rectangular long path cells of up to 100 mm path length

Light path length	10, 20, 30, 40, 50, 100 mm
Lateral width	12.75 mm

UH5300

U-2900/2910

UH5700

U-3900/3900H

Rectangular long path cell holder (P/N 3J2-0111)

U-5100

7. Liquid samples (no temperature control)

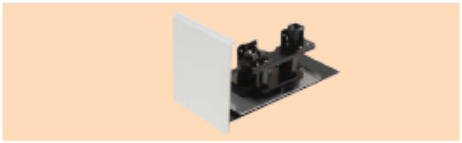
HITACHI
Inspire the Next

Micro volume cells

Micro cell holder

(P/N 122-0060)

Suitable for measurement of trace samples in medical and biochemical fields.



Specifications (cell required separately)

Wavelength range	220 to 950 nm
Cell mounting /demounting repeatability	Within ±0.3%T
Baseline flatness	Within ±0.005 Abs (50 mL micro-volume cell used)

Mask for Micro cell

To be inserted into a standard rectangular cell holder for measurement of a trace sample.

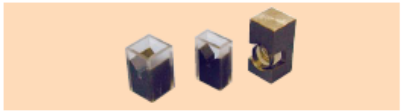
Specifications

200-1537	Mask for Micro cell (1.5 mm)
200-1538	Mask for Micro cell (1.2 mm)

Cell

124-0357	Micro quartz cell, 10 mm
200-0551	Black quartz micro cell, 10 mm

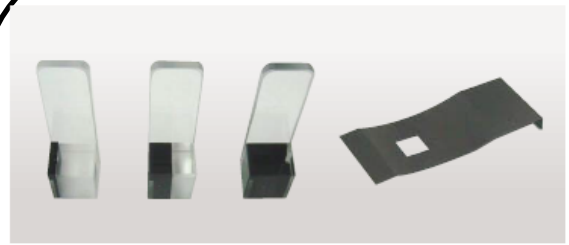
The following cells are usable for the above micro cell holder (P/N 122-0060).



Part No.	Part name	Capacity	Optical path length
130-0622	50 micro cell	50 µL	10 mm
130-0623	25 micro cell	25 µL	5 mm
130-0621	5 micro cell	5 µL	0.5 mm

U-2900/2910

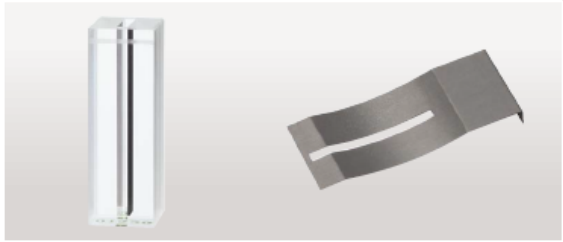
U-3900/3900H



Ultra-micro volume sample measurement

Ultra-micro volume cells are used in the sample chamber of the UH5300 in combination with the holder base (3J1-0109), single cell holder (3J1-0106), and trace sample cell mask (3J1-0116). It is suited for the measurement of a trace sample of about 1.5 to 90 µL.

Product name	P/N	Capacity (µL)	Light path length name
1.5 µL trace sample cell	3J2-0120	1.5 to 4.0 µL	1 mm
12 µL trace sample cell	3J2-0121	12 to 40 µL	5 mm
50 µL trace sample cell	3J2-0122	50 to 90 µL	10 mm
Mask for trace sample cell	3J1-0116	—	—



Micro cell

Micro cells are used in the sample chamber of the UH5300 in combination with the holder base (3J1-0109), single cell holder (3J1-0106), and micro cell mask (200-1537). It is suited for the measurement of a small amount of sample of about 340 to 600 µL.

Product name	P/N	Capacity (µL)	Light path length
Micro quartz cell, 10 mm	124-0357	340 to 600 µL	10 mm
Black quartz micro cell, 10 mm	200-0551		
Mask for micro cell	200-1537	—	—

U-5100

UH5300

UH5700

Uses regular 10 mm single cell holder. Easier to use

Requires holder accessory.
Cell manipulation is not so easy.

7. Liquid samples (no temperature control)

HITACHI
Inspire the Next

Cylindrical long path cell holder

Cylindrical long path cell holder
(P/N 210-2108)

This holder is for cylindrical cell (φ30 mm)

Cells to be used are exclusive from Hitachi:
P/N: (123-)1023,1027,1031,1035,1039,1043,1047,1051,1055

Custom order holder (2J0-0171) available for 22 mm cell, usual size available from cell vendors

U-3900/3900H

Multi cell

5-position turret cell holder
(P/N 210-2110)

Five 10 mm rectangular cells can be mounted on the sample beam side, and a micro-cell mask (200-1537, 200-1538) can be inserted in each cell holder. (Cells and micro-cell mask are not included.) It is recommended to prepare a set of five cells.

Part No.	Part name
124-0352	10 mm quartz cell set (five cells in set)
124-0378	10 mm glass cell set (five cells in set)

U-2900/2910

U-3900/3900H

4 Position rectangular long path cell holder (P/N 150-0940)

Four rectangular absorption cells can be mounted on the sample side, and these cells can be switched from the outside. This accessory requires a front panel (P/N: 3J1-3214). Ordered separately.

Cell length	100 mm, 50 to 10 mm long path cells are usable

UH5300

U-2900/2910

U-3900/3900H

(6 positions is standard for U-5100 and UH5300)

7. Liquid samples (no temperature control)

HITACHI
Inspire the Next

Auto sipper

U-5100

Auto sipper (P/N 3J2-0105)

The automatic sipper takes a sample from a test tube and can automatically measure it.

Minimum sample volume	0.6 mL
Carryover	1% maximum
Cell size	Approx. 50 µL

Auto sipper (P/N 3J1-0101)

Effective for quick measurement of multiple samples. When the lever is depressed, the automatic sipper takes a sample from a test tube and measures it automatically.

Minimum sample volume	0.6 mL
Carry over	1 % or less
Cell capacity	Approximately 50 µL

UH5300

Auto sipper

Different P/N for each model

This computer-controlled sample sipper is provided with a sample recovery function and other versatile functions. In combination with an autosampler, this unit will further advance automation and labor saving in the preparatory stage. This sipper cannot control temperature.

Specifications

Minimum sample volume	0.6 mL
Carryover	1% or less
Cell capacity	About 50 µL
Optical path length	10 mm
Reference beam side	10 mm rectangular cell mountable

U-2900/2910

U-3900/3900H

UH5700

Auto sampler

Autosipper is required

AS-1010 Auto sampler
(P/N 3J1-0131 for 115 V)
(P/N 3J1-0132 for 200 V)

In combination with the auto sipper or in flow injection analysis, As-1010 is used for multiple sample measurement. A suction needle can be moved in three directions X, Y and Z.
Remote control via wireless LAN allows the user to check the data in real time while away from the instrument.

Sample tube size	Outer diameter 12 mm, height 105 mm Outer diameter 15 mm, height 105 mm (Option)

(Sample tube is not included)

UH5300

AS-1010 Auto sampler

(P/N 2J1-0121/0122)

U-2900/2910

U-3900/3900H

UH5700

7. Liquid samples with temperature control

HITACHI
Inspire the Next

Require circulatory water bath:

Temperature of the water bath:

Water circulated cell holder with stirrers

Different P/N for each model

A magnetic stirrer agitates the sample solution, allowing measurement with high temperature accuracy. Using Starna's magnetic stirred micro cells allows for measuring a small amount of sample.

Operating temperature range		5 °C to 60 °C
Compatible cells		Capacity
10 mm square cell		2.4 to 3.5 mL
Starna's magnetic stirring cell	9-Q-10-MS, 29-Q-10-MS	1.0 to 1.5 mL
	18-Q-10-MS, 28-Q-10-MS	600 to 800 µL

UH5300 *UH5700*

Water circulated cell holder

(P/N 210-2111)

Water from a thermostatic chamber is circulated through this cell holder to maintain a sample cell at a constant temperature.

Specifications

(circulating thermostatic chamber and cell not included in this product)

Operating temperature range	From normal temperature to 40°C
Temperature stability	Within ±0.3°C

U-2900/2910 *U-3900/3900H*

UH5700

Temperature regulated by thermostat, circulating water for cooling (circulating tap water OK)

Electronic thermostatted cell holder

(P/N 131-0301 for 115 V)

(P/N 131-0302 for 200 V)

Electronically controlled constant-temperature cell holder using a Peltier device. This accessory requires front panel (P/N: 3J1-3214). Place an order separately.

Temperature range	0 to 100 °C (can be set in increments of 0.1 °C) (normal temperature : 25 °C)
Temperature accuracy	within ±2 °C* (difference between set temperature and sample temperature)
Temperature stability	within ±0.5 °C*
Includes constant temperature drop function	

*Room temperature : 25 °C Sample: distilled water
Circulating water temperature: 22 °C Set temperature : -10 °C to 105 °C
A circulating constant-temperature bath is required.

UH5300 *U-2900/2910* *U-3900/3900H*

UH5700

6-cell positioner with temperature control

(P/N 2J1-0103/0104)

Six 10 mm cells can be mounted on the sample beam side, and they can be changed over automatically at certain intervals. (Temperature control : S only)

Specifications

Repeatability in cell changeover	Within ±0.5 % (at 100 %T)
Applicable cell	10 mm cell (not included in this unit)
Setting temperature	20 to 40 °C

*: Not including circulatory thermostatic oven and cell

U-2900/2910 *U-3900/3900H*

7. Liquid samples with temperature control

HITACHI
Inspire the Next

Electronic thermostatted cell holder

(P/N 131-0306/0307)

This cell holder comes standard with an incorporated magnet stirrer. The temperature of sample in a cell is maintained at a constant level, and a temperature value down to 0.1 °C can be indicated. Since this unit is of electronic thermostatted type with forced air cooling, quick heating and cooling can be performed without a water circulating thermostatic oven. (Temperature control : S only)

U-2900/2910

U-3900/3900H

Specifications

Temperature range	10 °C to 60 °C (settable in increments of 0.1 °C, under condition of 25 °C room temperature)
Temperature control accuracy	Within ±2 °C (✱) (difference between set temperature and actual sample temperature)
Temperature stability	Within ±0.5 °C (✱)
Applicable cell	10 mm cell (cell not supplied)

✱:Room temperature : 25 °C, sample : distilled water

No need for water bath, higher cost

Electronic thermostatted auto sipper

Different P/N for each model

The flow cell section is maintained at a constant temperature level under accurate control.

Specifications (reference beam side not temperature-controlled)

Minimum sample volume	0.6 mL
Carryover	1 % or less
Cell capacity	Approx. 50 µL
Sample beam side	Flow cell (Path leyth:10 mm)
Setting temperature	20 to 40 °C
Setting accuracy	Within ±0.5 °C
Reference beam side	10 mm rectangular cell mountable

✱:Exchangeable with 10 mm retangular cell holder (standard equipment). Cell is not included.

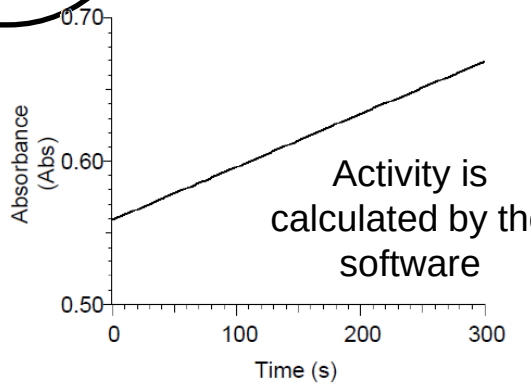
UH5700

U-3900/3900H

U-2900/2910

Enzyme activity

Trypsin is a kind of digestive enzyme found in pancreas and used for antiflatulents and amino acid sequence analysis.



Change in Absorbance of Trypsin

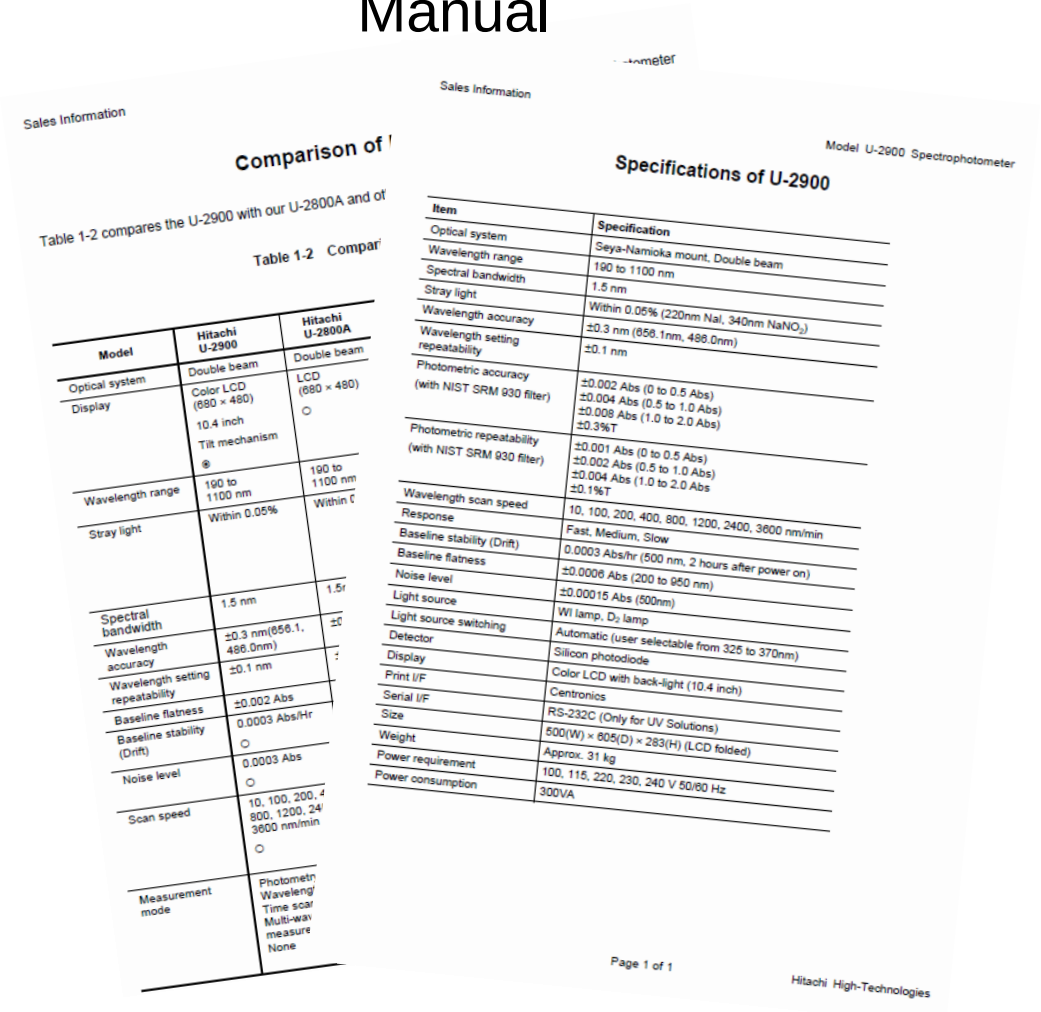
Activity is calculated by the software

Sheet No. UV090015-01

More details:

HITACHI
Inspire the Next

“Sales information”, Manual



Sales Information

Comparison of

Table 1-2 compares the U-2900 with our U-2800A and ot

Table 1-2 Compari

Model	Hitachi U-2900	Hitachi U-2800A
Optical system	Double beam	Double beam
Display	Color LCD (680 × 480) 10.4 inch Tilt mechanism	LCD (680 × 480)
Wavelength range	190 to 1100 nm	190 to 1100 nm
Stray light	Within 0.05%	Within 0
Spectral bandwidth	1.5 nm	1.5
Wavelength accuracy	±0.3 nm(656.1, 486.0nm)	±0
Wavelength setting repeatability	±0.1 nm	
Baseline flatness	±0.002 Abs	
Baseline stability (Drift)	0.0003 Abs/Hr	
Noise level	0.0003 Abs	
Scan speed	10, 100, 200, 4 800, 1200, 24 3600 nm/min	
Measurement mode	Photometri Wavelengt Time scar Multi-wav measure None	

Sales Information

Model U-2900 Spectrophotometer

Specifications of U-2900

Item	Specification
Optical system	Seya-Namioka mount, Double beam
Wavelength range	190 to 1100 nm
Spectral bandwidth	1.5 nm
Stray light	Within 0.05% (220nm NaI, 340nm $NaNO_2$)
Wavelength accuracy	±0.3 nm (656.1nm, 486.0nm)
Wavelength setting repeatability	±0.1 nm
Photometric accuracy (with NIST SRM 930 filter)	±0.002 Abs (0 to 0.5 Abs) ±0.004 Abs (0.5 to 1.0 Abs) ±0.008 Abs (1.0 to 2.0 Abs) ±0.3%T
Photometric repeatability (with NIST SRM 930 filter)	±0.001 Abs (0 to 0.5 Abs) ±0.002 Abs (0.5 to 1.0 Abs) ±0.004 Abs (1.0 to 2.0 Abs) ±0.1%T
Wavelength scan speed	10, 100, 200, 400, 800, 1200, 2400, 3600 nm/min
Response	Fast, Medium, Slow
Baseline stability (Drift)	0.0003 Abs/hr (500 nm, 2 hours after power on)
Baseline flatness	±0.0006 Abs (200 to 950 nm)
Noise level	±0.00015 Abs (500nm)
Light source	WI lamp, D_2 lamp
Light source switching	Automatic (user selectable from 325 to 370nm)
Detector	Silicon photodiode
Display	Color LCD with back-light (10.4 inch)
Print I/F	Centronics
Serial I/F	RS-232C (Only for UV Solutions)
Size	500(W) × 605(D) × 283(H) (LCD folded)
Weight	Approx. 31 kg
Power requirement	100, 115, 220, 230, 240 V 50/60 Hz
Power consumption	300VA

Page 1 of 1

Hitachi High-Technologies

Accesories: End of each brochure and in the manual of each accesory

Double-Beam Spectrophotometer UH5300

Option

A wide range of accessories is available to support various applicat

Sample Handling Accessories

Accessories

The UH5300 offers a variety of accessories to meet your analytical needs. These accessories support your measurement effort for a wide range of applications.

Auto sipper (P/N 3J1-0101)

Effective for quick measurement of multiple samples. When the lever is depressed, the automatic sipper takes a sample from a test tube and measures it automatically.

AS-1010 Auto sampler (P/N 3J1-0131 for 115 V) (P/N 3J1-0132 for 200 V)

In combination with the auto sipper or in flow injection analysis, As-1010 is used for multiple sample measurement. A suction needle can be moved in three directions, X, Y and Z. Remote control via wireless LAN allows the user to check the data in real time while away from the instrument.

Water circulated cell holder with stirrers (P/N 3J1-0104)

A magnetic stirrer agitates the sample solution, allowing measurement with high temperature accuracy. Using Starna's magnetic stirred micro cells allows for measuring a small amount of sample.

Single cell holder (P/N 3J1-0106)

Used for measuring samples placed in a 10 mm path length cell

Rectangular long path cell holder (P/N 210-2107)

Used for measuring samples in rectangular long path cells of up to 100 mm path length

Electronic thermostatted cell holder (P/N 121-0301 for 115 V) (P/N 121-0302 for 230 V)

Electronically controlled standard temperature cell holder using a Peltier device. This accessory requires front panel (P/N 3J1-3214). Place an order separately.

Glass filter holder (P/N 210-2106)

Used to measure the transmittance or absorbance of a plate-like solid sample such as a glass filter.

Film holder (P/N 210-2112)

Used to measure a film-shaped sample

2. SPECIFICATIONS

- Outside diameter of cylindrical cell usable : 30 mm
- Optical path length of cylindrical cell usable : From 10 mm to 100 mm

Cylindrical Cell (not included in the standard equipment of the cylindrical cell holder)

Fig. 5 Setting of Cylindrical Cell

Follow us on:

Hitachi High-Tech Science Corporation

SI News; HitachiHightech

For Hitachi applications register in S.I. Navi:
https://biz.hitachi-hightech.com/sinavi/asi_toppage?viewLanguage=en_US