

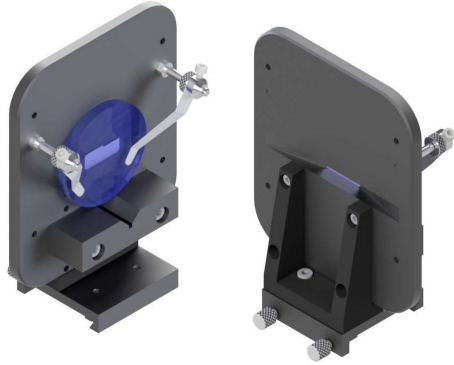
Spectrophotometer Photon RT

The spectrophotometer Photon RT is designed for automatic measurement of the reflection and transmission of optical coatings for p- and s- polarisations of light beams under the incident angles from 0° up to 75° (transmission) and from 8° up to 75° (reflection) in the wavelength range from 185nm up to 5200nm without manual adjustment of the measured plane samples with the size up to 152.4mm as well as cubes and prisms with complicated forms with size up to 50mm. The software and its mathematical algorithms allow to derive the spectral characteristics of the refractive indices and absorption coefficients of the glass substrates and coating layers as well as the thicknesses of the coating layers.

available spectral ranges:	185-1700nm 380-3500nm 185-5200nm 380-1700nm 185-3500nm 380-5200nm
photometric functions:	absolute transmission and reflection for p- and s- polarisations
variable angle measurements:	0° - 75° (transmission) 8° - 75° (reflection) up to 85° optional
optical density:	up to OD4
min. clear aperture of sample:	6mm x 2mm
beam displacement compensation:	+/-60mm (depends on AOI)
wavelength resolution:	0.3nm for 185- 350nm 0.6nm for 350-990nm 1.2nm for 990-2450nm 2.4 up for 2450-5200nm
wavelength accuracy:	+/-0.25nm for 185- 350nm +/-0.5nm for 350-990nm +/-1.0nm for 990-2450nm +/-2.0nm for 2450-5200nm
repeating accuracy:	+/-0.12nm for 185- 350nm +/-0.25nm for 350-990nm +/-0.5nm for 990-2450nm +/-1.0nm for 2450-5200nm
scanning speed:	600 wavelength points per minute
angle resolution:	0.01°
max. plane sample size:	CA 120mm (up to 152.4mm possible)
max. cube / prism size:	50x50x50mm (up to 152.4mm possible)
device size:	425 x 656 x 285mm (W x D x H)
device weight:	up to 50kg
power input:	110/220V, 50/60Hz



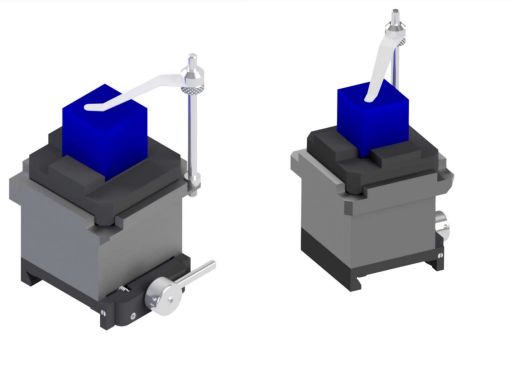
Spectrophotometer Photon RT



Standard non-motorized sample stage

included in basic delivery set

transmission and reflection measurements on plane surfaces at angles of incidence 0° up to 75°

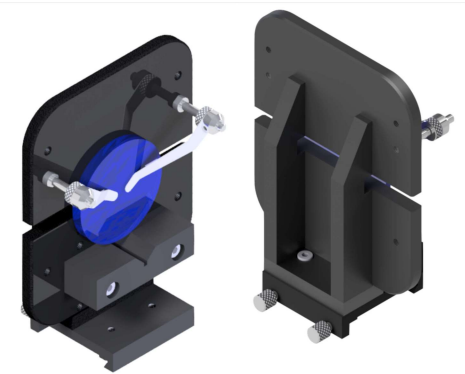


Standard non-motorized stage for prism measurements

included in basic delivery set

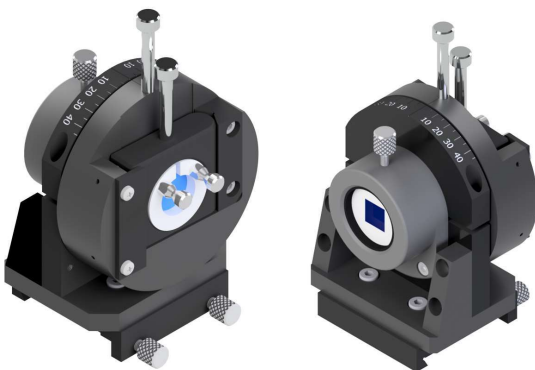
transmission and reflection measurements on cubes and prisms under variable transmission and reflection angles as well as the angles of incidence

consists of basic stage and inserts 25.4mm and 12.7mm



7085 non-motorized stage

transmission and reflection measurements on plane surfaces under the angles of incidence $70^\circ \dots 85^\circ$



QW non-motorized stage

transmission measurement of the phase retardation plates with external mounting diameter 25mm

the phase plate is manually rotated around the beam propagation axis at $\pm 45^\circ$

built-in analyzer 220-2200nm, or 380-2200nm, or 1500-5000nm

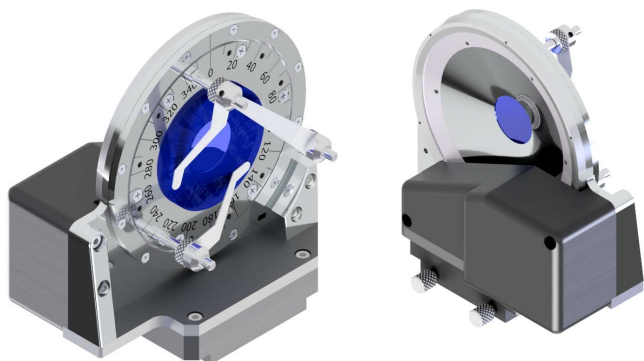
Spectrophotometer Photon RT



Z motorized stage

unattended baseline calibration and measurement of the sample without opening the lid. Especially useful when the sample needs to be measured under the same ambient conditions

transmission and reflection measurements under the angles of incidence up to 75°



R motorized stage

3D reflection/transmission analyses

sample rotation around the beam propagation axis

sample size dia 25mm ... dia 70mm

transmission and reflection measurements under the angles of incidence up to 60°

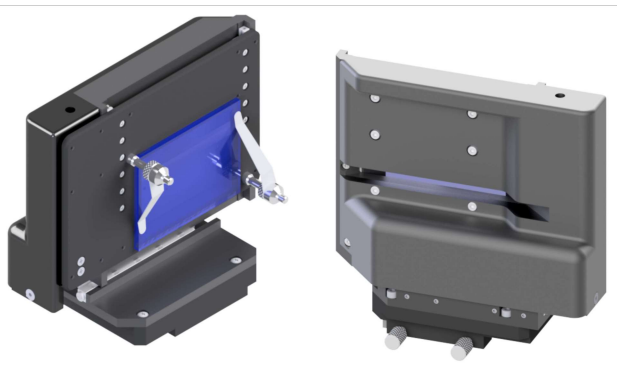


MP10 TR45 multiposition motorized stage

sequential baseline calibration and measurement of multiple samples with equal diameter

transmission and reflection measurements under angles of incidence up to 45°

consists of a stage base and a separate replaceable multiposition wheels with 10 positions dia 25/25.4mm or 20 positions dia 12.5/12.7mm



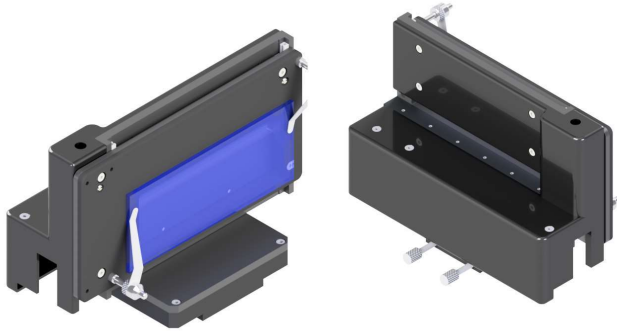
XY TR45 motorized stage

XY mapping of the sample for verification of the uniformity of the coating

X-range +/-25mm, Y-range +/-20mm, mapping area 50x40mm, sample size 134x91mm

transmission and reflection measurements under angles of incidence up to 45°

Spectrophotometer Photon RT

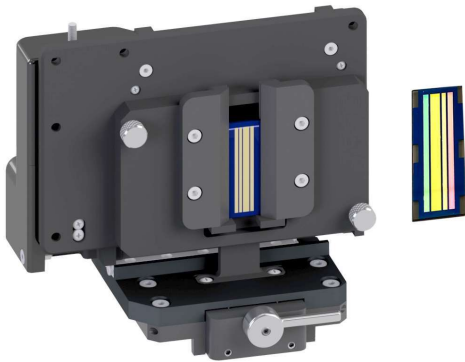


XY T10 motorized stage

XY mapping of the sample for verification of the uniformity of the coating

X-range +/-55mm, Y-range +/-20mm, mapping area 110x40mm, sample size 180x91mm

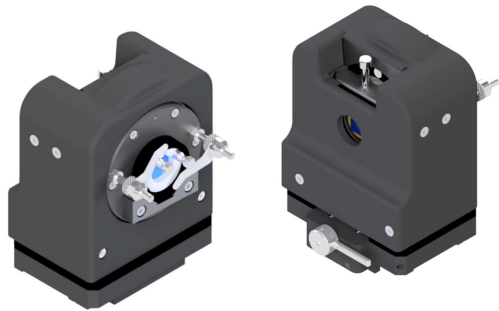
transmission measurements under angles of incidence up to 10°



XY-MZF motorized stage

unattended transmission measurement of multizone filters and linear variable filters

- 0.3mm width of the beam spot
- width of individual filter zone down to 0,7mm
- measurement step down to 0,1 mm
- maximum coated filter area (X Y): 50,0x40,0mm
- computer-controlled zone detection, zone centering measurement, filter mapping



QW motorized stage

transmission measurement of the phase retardation plates with external mounting diameter 12.7mm and 25.4mm

the phase plate is rotated around the beam propagation axis +/-45°

built-in analyzer 220-2200nm, or 380-2200nm, or 1500-5000nm

Spectrophotometer Linza 150

The spectrophotometer Linza 150 is designed for automatic measurement of the reflection and transmission of optical coatings on lenses and lens assemblies for p- and s- polarisations of light beams in the wavelength range from 185nm up to 1700nm without manual adjustment of the measured samples with concave or convex surfaces with the size up to 120mm (reflection) or up to 150mm (transmission). The samples may be single lenses with curvature radii $<-10^\circ$ or $>+10^\circ$ as well as lens assemblies with focal lengths $<-15\text{mm}$ or $>+15\text{mm}$. The software and its mathematical algorithms allow to derive the spectral characteristics of the refractive indices and absorption coefficients of the glass substrates and coating layers as well as the thicknesses of the coating layers.

available spectral ranges:	185-1700nm 380-1700nm
photometric functions:	absolute transmission and reflection for p- and s- polarisations
lens diameter, mm	transmittance: 10-150mm reflectance: 10-115mm
reflectance measurement lens radius:	$-10\text{mm} \dots \infty / +10\text{mm} \dots \infty$
transmittance measurement focal length :	$-20\text{mm} \dots \infty \dots +20\text{mm}$
max. lens tilt angle: (off-axis)	50°
angle of incidence: (on-axis/off-axis)	12°
min. clear aperture of sample:	6mm x 2mm
ultimate spectral resolution:	2nm for 185-990nm 4nm for 990-1700nm
wavelength accuracy:	$\pm 0.5\text{nm}$
repeating wavelength accuracy:	$\pm 0.25\text{nm}$
scanning speed, nm/min:	3000 (at 5 wavelength sampling pitch)
wavelength sampling pitch, nm:	0.5 - 100
lens assembly dimensions,mm:	150 x 240 (W x L)
device size:	680mm x 440mm x 360mm (W x D x H)
device weight:	50kg
power input:	110/220V, 50/60Hz



Optical Monitoring Systems for Vacuum Coaters

EssentOptics develops and manufactures optical monitoring systems for installation in the vacuum coaters. The systems are used for the in-situ control of the vacuum deposition processes, where high process reproducibility and precise optical parameters are critical. The systems incorporate originally designed spectrometers and monochromators and are classified into two groups by the measuring method:

- AKRA series with monochromators
- IRIS series with spectrometers

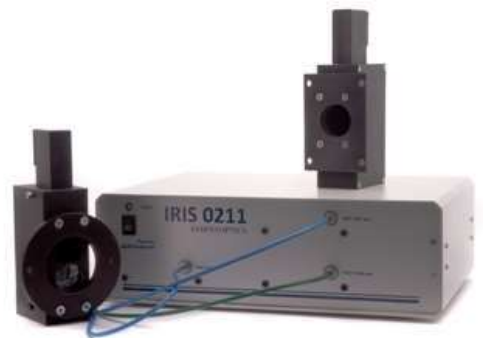
AKRA Single Wavelength Optical Monitoring System

AKRA Single Wavelength Optical Monitoring Systems are designed for single wavelength monitoring of the deposition processes of all major types of coatings in the spectral range from 200nm up to 5000nm. The final spectral control range can be chosen in accordance to the actual needs and applications. Additionally, the user can scan the entire measured spectrum after the deposition of each layer and compare the obtained spectrum with calculated one. The AKRA systems give the field-proven possibility to control the deposition process of the complex coatings in the infrared range. It means the direct control in the range of 1.5 μ m up to 5.0 μ m and the second-order control up to 14 μ m.



IRIS Broadband Optical Monitoring System

IRIS Broadband Optical Monitoring Systems offer unmatched monitoring speed and are designed for the real-time full-spectrum control of the deposition of coatings in the range from 190nm up to 1700nm depending on the chosen system configuration. The spectrometer allows to display the entire spectrum of growing layer on the system's control screen at any time. This opens the possibilities to high-yield production of the complex optical coatings like band-pass filters, cut-off filters, dichroic filters etc., including those in which required optical characteristics shall be obtained at specific wavelengths or within several spectral intervals. The feature of the IRIS systems is a "from-process-to-process" high reproducibility of the optical parameters also for sophisticated coatings.



Software Capabilities

The software package includes the following main features:

- Screen zooming of the photometric function (Oy) and spectral range (Ox)
- Possibility to display up to 5 optical spectra on the process screen
- Selection of the spectra color (up to 10 colors) for more distinctive and comfortable use
- Layer-by-Layer uploading of the calculated spectra and their comparison with the deposited spectra for correction and fine-tuning of the deposition process
- Choice of the optimal measurement time, averaging criteria, as well as the level of sensitivity of the detector
- Process report save and print-out function contains graphs, tabular values, time and date of the report, coating name, including necessary comments to any coating or completed process run
- Process spectra can be saved as a graphic and/or text file for easy data and process analysis
- Vast database of optical glasses is pre-loaded for calibration of control system
- End-point detection capability
- Real time re-calibration and direct broadband monitoring for production of multi-layer sophisticated coatings (for substrates placed on calotte)

IRIS Technical Specifications (broadband, spectrometer)

	IRIS 0204	IRIS 0207	IRIS 0211	IRIS 0407	IRIS 0411	IRIS 1017	IRIS 0417
spectral range, nm	190-380	190-740	190-1100	380-740	380-1100	950-1700	380-1700
spectral resolution, nm	0.8	0.8 (<380) 1.6 (>380)	0.8 (<380) 1.6 (>380)	1.6	1.6	3.2	1.8 (<1050) 3.6 (>1050)
spectral reproducibility, nm	0.2	0.4	0.4	0.4	0.4	0.8	0.4 (<1050) 0.8 (>1050)
accuracy of wavelength setting, nm	0.4	0.8	0.8	0.8	0.8	1.6	0.8 (<1050) 1.6 (>1050)
measurement accuracy, $\Delta T/T$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
reproducibility of measurement, $\Delta T/T$	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
stability, %/hour	<1	<1	<1	<1	<1	<1	<1
scattered light level, $\Delta T/T_{\max}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
measurement time, ms	10-80	10-80	10-80	10-80	10-80	10-80	10-80
power consumption, W	50	50	50	30	30	30	30
power supply, VAC	100-240	100-240	100-240	100-240	100-240	100-240	100-240
power supply, Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60
weight net, kg	10	12	14	14	10	12	10
communication port	USB 2.0	USB 2.0	USB 2.0	USB 2.0	USB 2.0	USB 2.0	USB 2.0

AKRA Technical Specifications (single wavelength, monochromator)

	AKRA 0211	AKRA 0411	AKRA 0217	AKRA 0417	AKRA 0426	AKRA 1550	AKRA 0450
spectral range, nm	200-1100	380-1100	200-1700	380-1700	380-2600	1500-5000	380-5000
spectral resolution, nm	2.4	2.4	2.4 (<1050) 4.8 (>1050)	2.4 (<1050) 4.8 (>1050)	2.4 (<1050) 4.8 (>1050)	4.8 (<3000) 9.6 (>3000)	2.4 (<1000) 4.8 (<3000) 9.6 (>3000)
spectral reproducibility, nm	0.25	0.25	0.25	0.25	0.5	1.0	0.5 (<1000) 1.0 (>1000)
accuracy of wavelength setting, nm	0.5	0.5	0.5	0.5	1.0	2.0	1.0 (<1000) 2.0 (>1000)
measurement accuracy, $\Delta T/T$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
reproducibility of measurement, $\Delta T/T$	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
stability, %/hour	<1	<1	<1	<1	<1	<1	<1
scattered light level, $\Delta T/T_{\max}$	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
measurement time, single line, ms	100	100	100	100	100	100	100
measurement time, complete range, s	60-150	20-30	60-150	60-150	60-150	60-150	150-300
power consumption, W	80	50	80	50	50	50	50
power supply, VAC	100-240	100-240	100-240	100-240	100-240	100-240	100-240
power supply, Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60
weight net, kg	10	12	14	14	10	12	10
communication port	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232