Product Information
Version 1.0

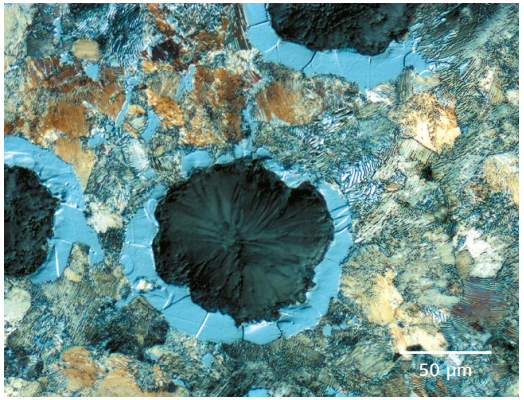
ZEISS Axio Observer

Your Inverted Microscope System for Metallography

We make it visible.

Your Inverted Microscope System for Metallography

Fast, flexible, economic: Take advantage of Axio Observer's inverted construction to investigate a large number of samples in no time at all – or to explore heavy ones, just as efficiently. There's no need to refocus, even when changing magnification or switching samples. Axio Observer combines the proven quality of ZEISS optics with automated components to give you reliable, reproducible results. Using dedicated software modules you can analyze, for example, non-metallic inclusions, grain sizes and phases – it's fully automatic. Axio Observer is your open imaging platform: invest in only the features you need today.
As requirements change, a simple upgrade keeps your system ready for all materials applications.



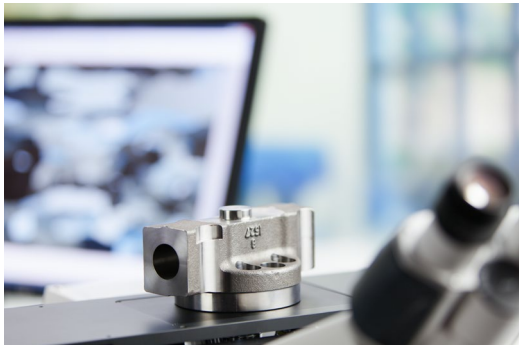
Spherulitic graphite in nodular cast iron seen in C-DIC contrast.

Simpler. More intelligent. More integrated.

Save Time in Metallographic Investigations
As an inverted microscope platform, Axio Observer makes work so much more enjoyable. Whether investigating a large number or even heavy samples, you'll save time in both sample preparation and investigation. Meanwhile, its inverted design facilitates parallel alignment to the objective lens. Observe more samples in less time: simply put your specimen on the stage, focus once and keep the focus for all further magnifications and samples.

Count on Reliable Results and Brilliant Images
You will appreciate the stable imaging conditions of Axio Observer, especially when working with high magnifications. Homogeneous illumination across the entire field of view produces brilliant images. And you will get reliable, reproducible results every time, thanks to the proven optical quality of ZEISS combined with automated components. Profit from short time-to-image for your metallographic structure analysis with dedicated software modules, e.g. NMI, Grains, Multiphase.

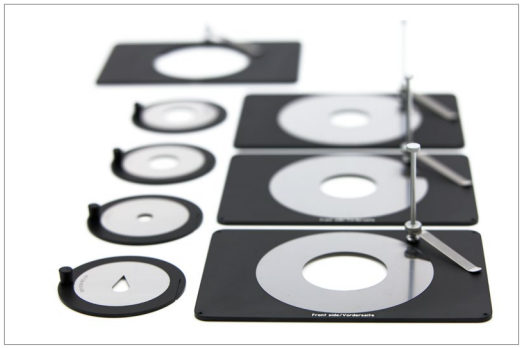
Upgrade Your System
Keep an eye on your budget as well as your samples. With Axio Observer, you invest only in the features you need now. You can always upgrade your system, simply and economically, any time you need to. Choose between encoded or motorized components and a range of accessories – you can depend on having any relevant contrasting techniques your application requires.



Expand Your Possibilities

Choose Between Three Different Stands

- Control all motorized components of your Axio Observer 7 materials with its touchscreen display. Automatic Component Recognition (ACR) means it will always recognize the settings for objectives and filtersets you have chosen.
- Axio Observer 5 materials – nearly all components can be read out or even motorized
- Axio Observer 3 materials with an encoded nosepiece, light manager, CAN and USB interface that enables a read-out of the magnification



Take Advantage of a Variety of Stage Inserts

Select from a variety of stage inserts to tailor the system to your needs. The high-grade spring steel will not yield under loads, even when examining many samples. Thus you can be sure that the optical reference plane is maintained. Stage inserts come with different inside apertures to match standard specimen diameters, plus a 10 mm aperture for very small specimens.

Get Crisp Images with Polarization Contrast

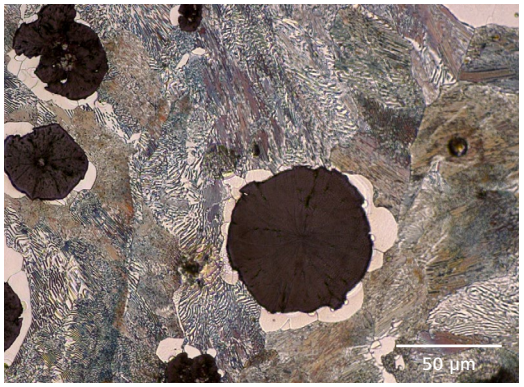
Investigate your samples with polarization contrast using fixed analyzers, a measuring analyzer rotating through 360° and a rotating analyzer with rotating full-wave plate.

Now, you can also use a rotatable polarizer to change the direction of incidence of the polarized light. This also makes bireflection and pleochroism visible on anisotropic samples. In addition, some ore phases display anisotropy in the polarized reflected light, whereby a color change is generated depending on the placement of the polarizer a few degrees +/- from the marked position.

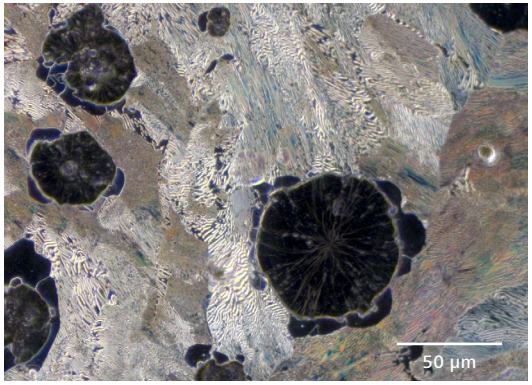
Tailored Precisely to Your Applications

Typical Applications, Typical Samples	Task	ZEISS Axio Observer Offers
Grain Size Analysis	Analyze grain size supporting ASTM E 112, ASTM E 1382, DIN EN ISO 643.	Perform a standard-supporting grain size analysis using variable methods: automatic reconstruction of grain boundaries and determination of individual grain sizes; semiautomatic linear intercept methods; comparison to reference series images; present the result of the analysis in a report.
NMI (Non-Metallic Inclusions)	Determine steel purity level supporting EN 10247, DIN 50602, ASTM E45, ISO 4967, JIS G 0555, GB/T 10561; determine the percentage of non-reflective inclusions and rate non-metallic inclusions.	Analyze steel purity in accordance with current international standards; overview of results in image and chart form; selection of various gallery views with corresponding analysis and classification data; storage and management of all analysis data such as charts, images, galleries, reports, testing procedures in the asset archive.
Birefringent Samples: Ores, Metals, Metal Alloys, Coals, Ceramic	Analyze anisotropic samples such as Barker etched aluminum alloys, zinc alloys, graphite, titanium alloys and magnetic materials.	Analyze anisotropic samples under polarization contrast with a range of polarization accessories such as analyzer and polarizer.
Analyze Layer Thickness	Measure layer thickness and geometric properties of e.g. electrodes.	Analyze simple and complex layers; identify layers by color value or gray scale; precise, individual, and automatic calculation of the course of measuring axis for each layer, regardless of the number of layers; presentation of results in an easy-to-read report with sample data and findings such as maximum and minimum axis length, mean value, and standard deviation.
Analyze Graphite Particles	Analyze of shape, size and distribution of the graphite particles.	Analyze the shape, size and distribution of the graphite particles and classify them in line with standards using automated image analysis. Determine size and shape in accordance with EN ISO 943 or nodularity in accordance with SAE J 1887; present the results with all classifications in a report.
Multiphase Analysis	Measure phase distribution in multiphase samples.	Analyze your samples' phase distribution; measure up to 32 phases and determine phase percentages or other parameters like size, shape, and orientation of particles; classify the detected particles and document the results in a report.

ZEISS Axio Observer at Work



Brightfield

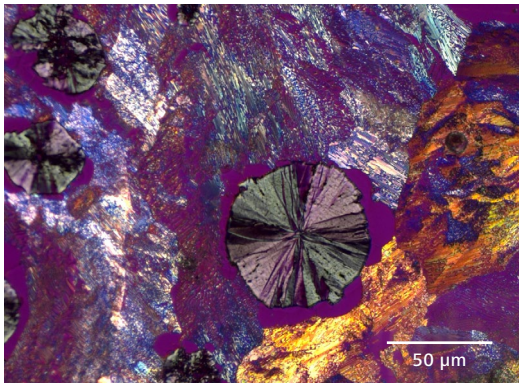


Darkfield

Contrasting Technique	Reflected Light	Transmitted Light
Brightfield	●	●
Darkfield	●	●
DIC	●	●
C-DIC	●	
Fluorescence	●	
Phase Contrast		●
Polarization		●

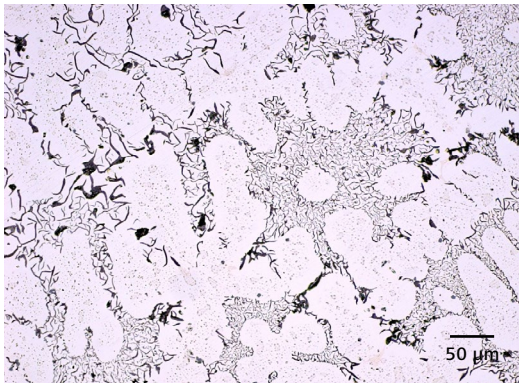
Spherulitic graphite in nodular grey cast iron, spheruliths with ferrite envelope and perlitic ground mass, same position acquired in reflected light with different contrasting techniques, objective: EC Epiplan-NEOFLUAR 50×/0.80 HD DIC

Polarization Contrast

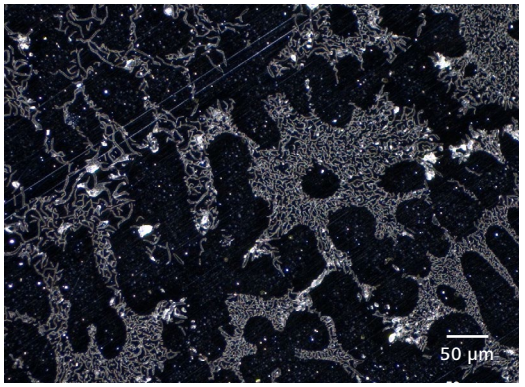


Polarization with Additional Lambda Plate

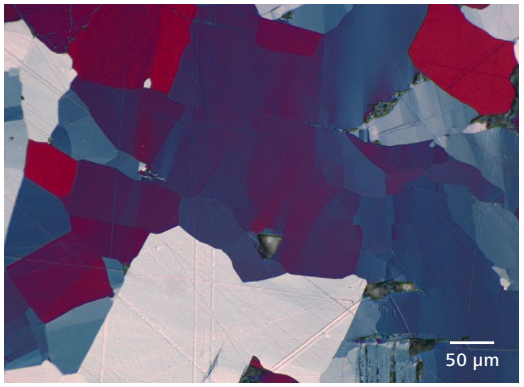
ZEISS Axio Observer at Work



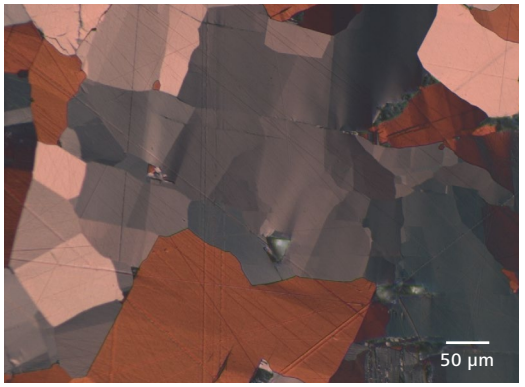
Cast aluminum-silicon, reflected light, brightfield, objective: EC Epiplan-NEOFLUAR 20×/0.50 HD DIC



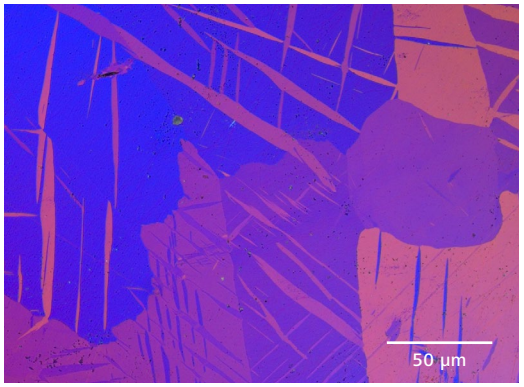
Cast aluminum-silicon, reflected light, darkfield, objective: EC Epiplan-NEOFLUAR 20×/0.50 HD DIC



Niccolite, reflected light, polarization contrast with lambda plate, objective: EC Epiplan-NEOFLUAR 20×/0.50 HD DIC

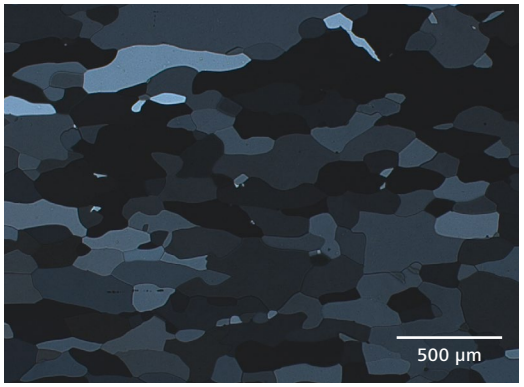


Niccolite, reflected light, polarization contrast with slightly twisted polarizers, objective: EC Epiplan-NEOFLUAR 20×/0.50 HD DIC

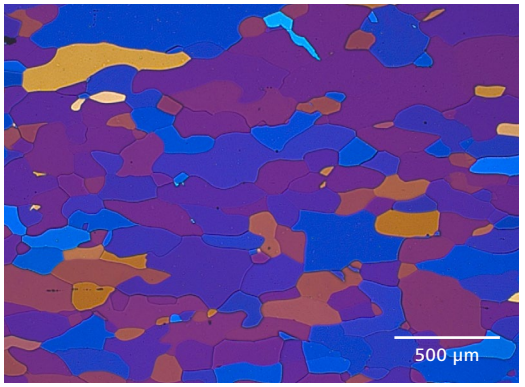


Zinc, reflected light, polarization contrast with lambda plate, objective: EC Epiplan-NEOFLUAR 20×/0.50 HD DIC

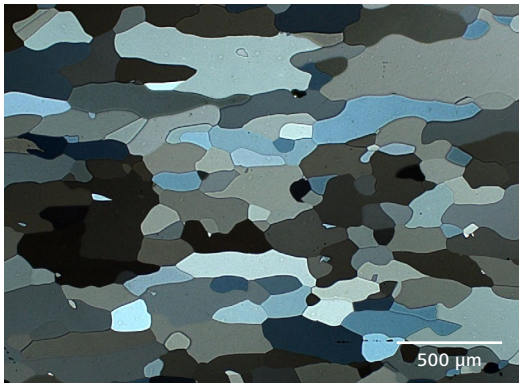
ZEISS Axio Observer at Work



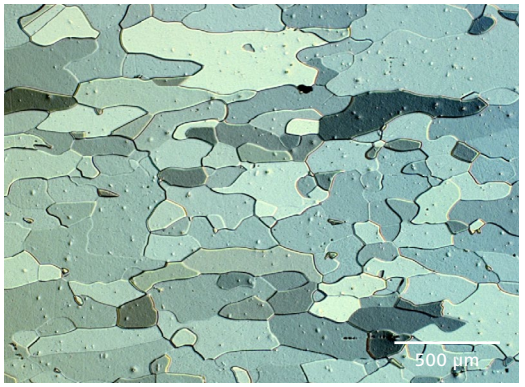
Barker-etched aluminum, reflected light, polarization contrast, objective: EC Epiplan-NEOFLUAR 5×/0.13 HD DIC



Barker-etched aluminum, reflected light, polarization contrast with lambda plate, objective: EC Epiplan-NEOFLUAR 5×/0.13 HD DIC



Barker-etched aluminum, reflected light, circular polarization contrast, objective: EC Epiplan-NEOFLUAR 5×/0.13 HD DIC



Barker-etched aluminum, reflected light, differential interference contrast with circular polarized light (C-DIC), objective: EC Epiplan-NEOFLUAR 5×/0.13 HD DIC

Your Flexible Choice of Components

1 Microscope
- Axio Observer 3 materials (encoded)
- Axio Observer 5 materials (encoded, partly motorized)
- Axio Observer 7 materials (motorized)

2 Objectives
- EC Epiplan
- EC Epiplan-NEOFLUAR
- EC Epiplan-APOCHROMAT

3 Illumination

Reflected light:
- microLED
- HAL 100
- HBO

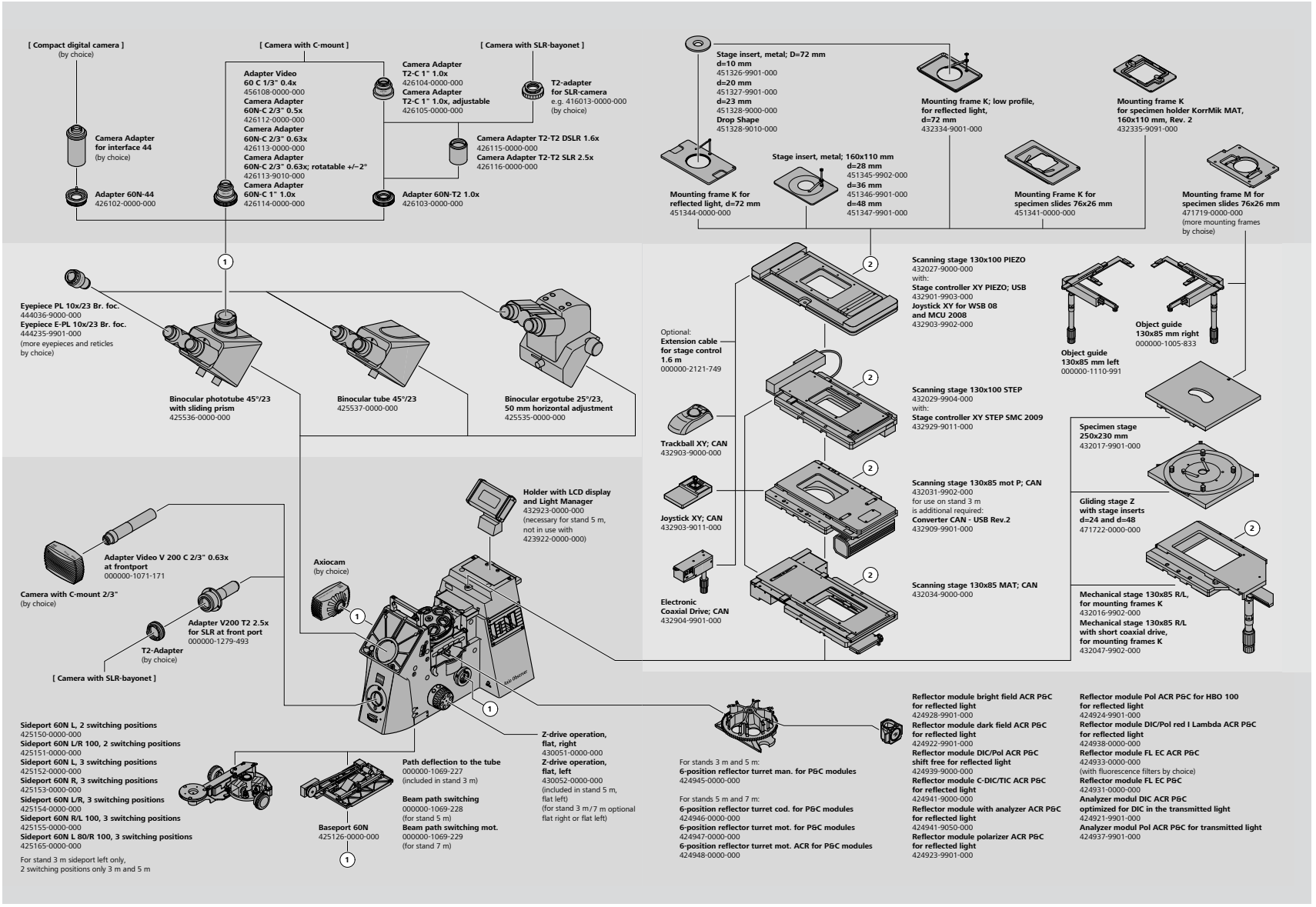
Transmitted light:
- HAL 100
- microLED

4 Cameras
- Axiocam HRc
- Axiocam MRc 5
- Axiocam MRc
- Axiocam 506 color
- Axiocam 503 color
- Axiocam ICc 5
- Axiocam ICc 1
- Axiocam 105 color

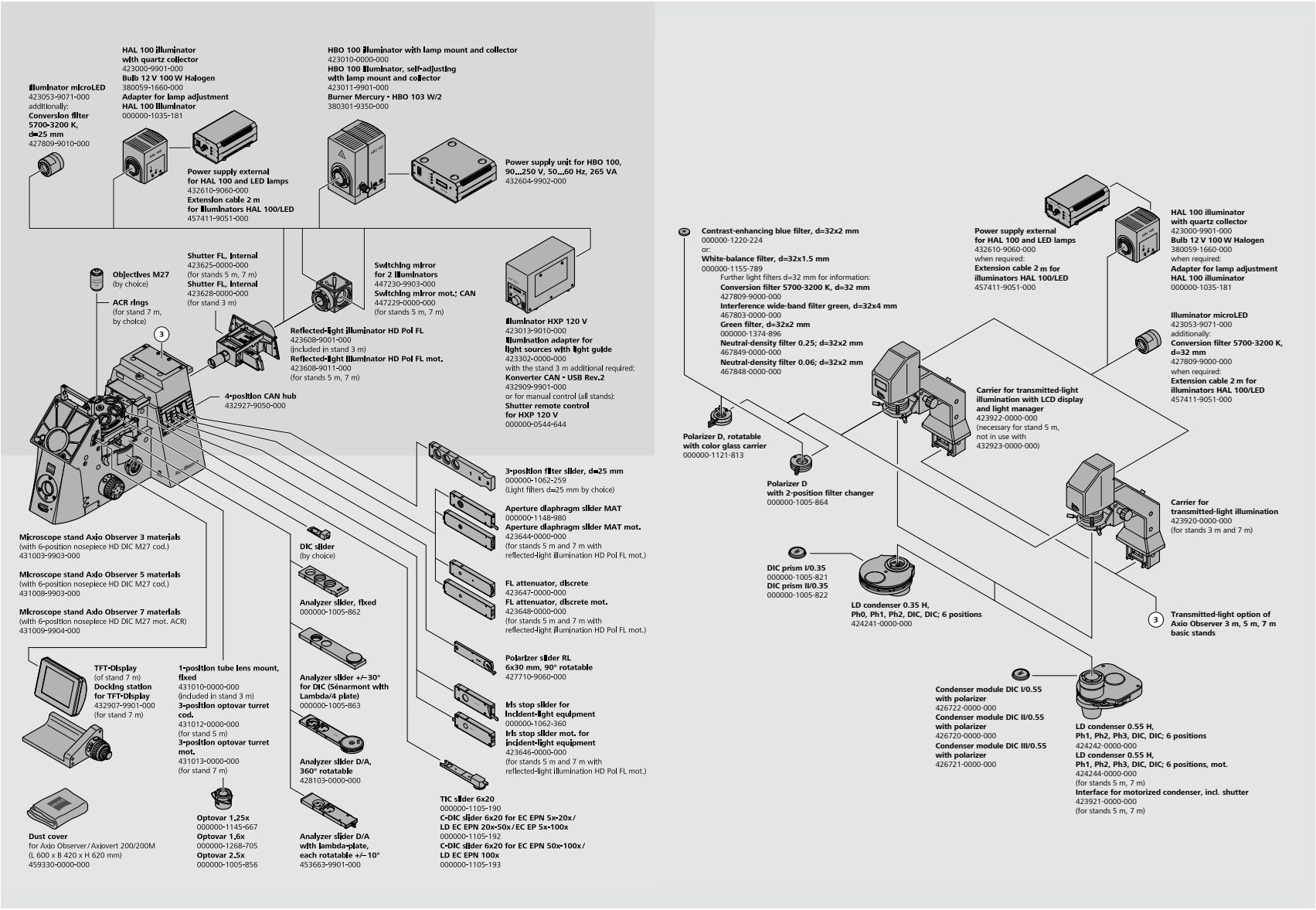
5 Software
- AxioVision
- AxioVision LE
- ZEN 2 core
- ZEN 2 starter

6 Accessories
- Correlative Microscopy
- Fixed, measuring, rotating analyzer and polarizers
- Gliding stage, scanning stages

System Overview



System Overview



Technical Specifications

Equipment	Option	Axio Observer 3 materials	Axio Observer 5 materials	Axio Observer 7 materials
Stand	Manual	●	●	
	Motorized		O*	●
Encoding	Readable by PC	●	●	●
Display	LCD display		O**	
	TFT display			●
	Docking Station			O
Interfaces	CAN	●	●	●
	RS 232	●	●	●
	USB	●	●	●
	TCP/IP		●	●
	Socket for external UNIBLITZ shutter		●	●
	Trigger socket (In/Out) for shutter		●	●
CAN hub, 4 pos.			O	O
Light Manager		●	●	●
Contrast Manager				●
Circular Operation Key Unit	Right		●	●
	Left			●
Z-focus Drive	Manual (2 mm / 0.2 mm)	●	●	
	Motorized, stepper motor drive (z-step size 10 nm)			●
Adjustable Limit Stop for Z-focus	Manual		●	

● Included in stand
●[1)] Contains reflected light illuminator HD Pol FL (423608-9001-000)
O Optionally available
O* Optional: motorized reflector turret, reflected light illumination, LD condenser 0.55
O** Either holder with LCD display and light manager (432923-0000-000) or carrier for transmitted-light illumination (423922-0000-000) required

Technical Specifications

Equipment	Option	Axio Observer 3 materials	Axio Observer 5 materials	Axio Observer 7 materials
Automatic Component Recognition (ACR)	Nosepiece ACR			●
	Reflector turret ACR		○	○
Power Supply	Internal	●	●	
	External			●
Z-Drive Operation (Flat Control Knob)	Right	○		○
	Left	○	●	○
Z-drive, 13 mm Extended Travel Range	Manual	○	○	
	Motorized			○
Nosepiece	6 pos. HD DIC cod.	●	●	
	6 pos. HD DIC mot. ACR			●
Compensator Mount 6 x 20		●	●	●
Tube Lens Mount, Fixed/Optovar Turret	1 pos. tube lens mount, fixed	●	○	○
	3 pos. optovar turret, encoded		○	
	3 pos. optovar turret, motorized			○
Sideport (Type)	2 or 3 pos. man. (exit to the left only)	●		
	2 or 3 pos. man. L/R		●	
	3 pos. mot. L/R			●

● Included in stand
●[1)] Contains reflected light illuminator HD Pol FL (423608-9001-000)
○ Optionally available
○* Optional: motorized reflector turret, reflected light illumination, LD condenser 0.55
○** Either holder with LCD display and light manager (432923-0000-000) or carrier for transmitted-light illumination (423922-0000-000) required

Technical Specifications

Equipment	Option	Axio Observer 3 materials	Axio Observer 5 materials	Axio Observer 7 materials
Sideport (Accessory)	60N L, 2 switching positions (100% vis : 0% L / 20% vis : 80% L)	O	O	
	60N L 100, 2 switching positions (100% vis : 0% L / 0% vis : 100% L)	O	O	
	60N L, 3 switching positions (100% vis : 0% L / 0% vis : 100% L / 50% vis : 50% L)	O	O	O
	60N R, 3 switching positions (100% vis : 0% R / 0% vis : 100% R / 50% vis : 50% R)		O	O
	60N L/R 3 switching positions (100% vis : 0% LR / 0% vis : 100% L / 20% vis : 80% R)		O	O
	60N R/L 100, 3 switching positions (100% vis : 0% LR / 0% vis : 100% L / 0% vis : 100% R)		O	O
	60N L 80/R 100, 3 switching positions (100% vis : 0% LR / 20% vis : 80% L / 0% vis : 100% R)		O	O
Path Deflection to the Tube (VIS only)		●	O	O
Beam Path Switching (for VIS/Frontport/Baseport)	Manual		O	
	Motorized			O
Baseport/Frontport			O	O

● Included in stand
●[1)] Contains reflected light illuminator HD Pol FL (423608-9001-000)
O Optionally available
O* Optional: motorized reflector turret, reflected light illumination, LD condenser 0.55
O** Either holder with LCD display and light manager (432923-0000-000) or carrier for transmitted-light illumination (423922-0000-000) required

Technical Specifications

Equipment	Option	Axio Observer 3 materials	Axio Observer 5 materials	Axio Observer 7 materials
Scanning Stages	Scanning stages 130x85 CAN		O	O
	Scanning stages 130x85 CAN and CAN – USB converter	O		
	Scanning Stage 130x100 STEP	O	O	O
	Scanning Stage 130x100 PIEZO	O	O	O
	Holder without LCD display	O		O
	Holder with LCD display		O**	
Condensers	LD 0.35/0.55, manual	O	O	O
	LD 0.55, motorized		O	O
	Axio Imager 0.8/1.4 (see PL 40.19.04)	O	O	O
Shutter for Transmitted Light	Internal		O	O
	External, High Speed (with int. controller)		O	O
Reflected Light Illumination	Manual	●[1)]	O	O
	Motorized		O	O
Slider for Reflected Light Illumination	Manual	O	O	O
	Motorized		O	O
Polarizer Slider A 6 x 30 mm, 90° Rotatable		O	O	O
Shutter for Reflected Light	Shutter FL, internal	O	O	O
	High Speed, external (with int. controller)		O	O

● Included in stand
●[1)] Contains reflected light illuminator HD Pol FL (423608-9001-000)
O Optionally available
O* Optional: motorized reflector turret, reflected light illumination, LD condenser 0.55
O** Either holder with LCD display and light manager (432923-0000-000) or carrier for transmitted-light illumination (423922-0000-000) required

Technical Specifications

Equipment	Option	Axio Observer 3 materials	Axio Observer 5 materials	Axio Observer 7 materials
Reflector Turret	6 pos. manual	O	O	
	6 pos. encoded		O	O
	6 pos. motorized		O	O
	6 pos. motorized ACR		O	O
Excitation Filter Wheel (8 Positions) mot. CAN	Motorized		O	O
Switching Mirror Mot.; CAN	Motorized		O	O
ApoTome/ApoTome.2			O	O

● Included in stand
●[1)] Contains reflected light illuminator HD Pol FL (423608-9001-000)
O Optionally available
O* Optional: motorized reflector turret, reflected light illumination, LD condenser 0.55
O** Either holder with LCD display and light manager (432923-0000-000) or carrier for transmitted-light illumination (423922-0000-000) required

Technical Specifications

Ambient Conditions

Storage (in Packaging)	Permissible Ambient Temperature	+5 °C to +40 °C
	Permissible Air Humidity (without Condensation)	max. 75% at +35 °C
Transport (in Packaging)	Permissible Ambient Temperature	-40 °C to +70 °C
	Permissible Air Humidity (without Condensation)	max. 75% at +35 °C
Operation	Permissible Ambient Temperature	+10 °C to +35 °C, optimally 22 °C
	Permissible Relative Air Humidity	max. 65 % at 30 °C
	Air Pressure	800 hPa to 1060 hPa
	Degree of Pollution	2
	Highest Permitted Altitude of Use	max. 2000 m
Dimensions (Width x Depth x Height)	Axio Observer 3 materials, 5 materials, 7 materials stand	approx. 295 mm x 805 mm x max. 707 mm
Weight	Axio Observer 3 materials	approx. 27 kg
	Axio Observer 5 materials	approx. 30 kg
	Axio Observer 7 materials	approx. 36 kg

Operating Data

Operating Area	Enclosed rooms
Protection Class	I
Ingress Protection Rating	IP 20
Electrical Safety	DIN EN 61010-1 (IEC 61010-1) and CSA and UL regulations
Overvoltage Category	II
Suppression of Interference	acc. to EN 55011 Class B
Noise Immunity	acc. to DIN EN 61326-1
Line Voltage (Axio Observer 3 materials and 5 materials)	100 V to 127 V and 200 V to 240 VAC ±10 %
Line Voltage of External Power Supply Unit of Axio Observer 7 materials	100 V to 240 VAC ±10 % A change of the line voltage is not required!
Mains Frequency	50 Hz to 60 Hz
Power Consumption of Axio Observer 3 materials and 5 materials, manual	max. 300 VA
Power Consumption of External Power Supply Unit of Axio Observer 7 m, mot.	max. 190 VA

Technical Specifications

Power Supply Unit (Ballast Unit) HBO 100		
Operating Area	Enclosed rooms	
Protection Class	I	
Ingress Protection Rating	IP 20	
Line Voltage	100 V to 240 VAC	
Mains Frequency	0 Hz to 60 Hz	
Power Consumption if Operating with HBO 100	155 VA	

Fuses in Accordance with IEC 127		
Microscope Stand Axio Observer 3 materials and 5 materials, manual	T 5 A/H / 250 V, 5x20 mm	
Power Supply Unit VP232-2 for Axio Observer	T 4.0 A/H / 250 V, 5x20 mm	
HBO 100 Power Supply Unit (Ballast Unit)	T 2.0 A/H / 250 V, 5x20 mm	

Light Sources		
HBO 50W/AC Mercury Vapor Short-arc lamp	Output	50 W
	Average service life	100 h
HBO 103 W/2 Mercury Vapor Short-arc lamp	HBO 103 W/2 mercury vapor short-arc lamp	100 W

Optical-Mechanical Data	
Stand with Stage Focussing	With coarse focusing drive approx. 2mm/rotation and fine focusing drive approx. 1/10 coarse/fine focus transmission ratio. Total travel approx. 10 mm, 13 mm also possible
Change of Objective	Via 6 position nosepiece
Objectives	With M27 screw thread
Eyepieces	Plug-in diameter 30 mm, field number 23

Optical Risk Group Classification acc. to DIN EN 62471:2009	
HBO 100	Risk group 2 acc. to DIN EN 62471:2009
HXP 120	Risk group 2 acc. to DIN EN 62471:2009
HAL 100	Risk group 1 acc. to DIN EN 62471:2009
VIS-LED	Risk group 1 acc. to DIN EN 62471:2009
microLED	Risk group 1 acc. to DIN EN 62471:2009

Count on Service in the True Sense of the Word

Because the ZEISS microscope system is one of your most important tools, we make sure it is always ready to perform. What's more, we'll see to it that you are employing all the options that get the best from your microscope. You can choose from a range of service products, each delivered by highly qualified ZEISS specialists who will support you long beyond the purchase of your system. Our aim is to enable you to experience those special moments that inspire your work.

Repair. Maintain. Optimize.
Attain maximum uptime with your microscope. A ZEISS Protect Service Agreement lets you budget for operating costs, all the while reducing costly downtime and achieving the best results through the improved performance of your system. Choose from service agreements designed to give you a range of options and control levels. We'll work with you to select the service program that addresses your system needs and usage requirements, in line with your organization's standard practices.

Our service on-demand also brings you distinct advantages. ZEISS service staff will analyze issues at hand and resolve them – whether using remote maintenance software or working on site.

Enhance Your Microscope System.
Your ZEISS microscope system is designed for a variety of updates: open interfaces allow you to maintain a high technological level at all times. As a result you'll work more efficiently now, while extending the productive lifetime of your microscope as new update possibilities come on stream.

Profit from the optimized performance of your microscope system with services from ZEISS – now and for years to come.

>> www.zeiss.com/microservice

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We make it visible.

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