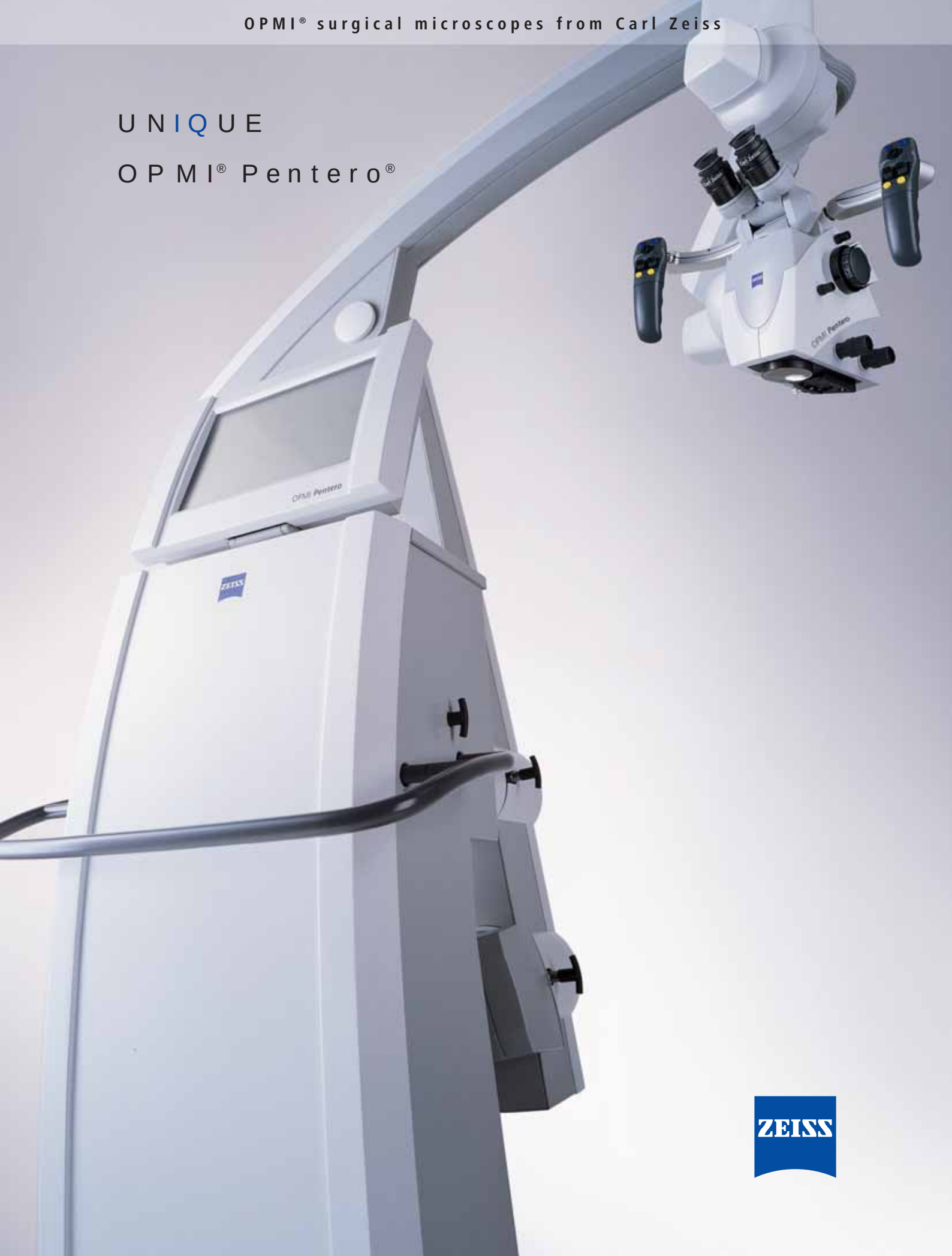
UNIQUE

OPMI® Pentero®



ZEISS

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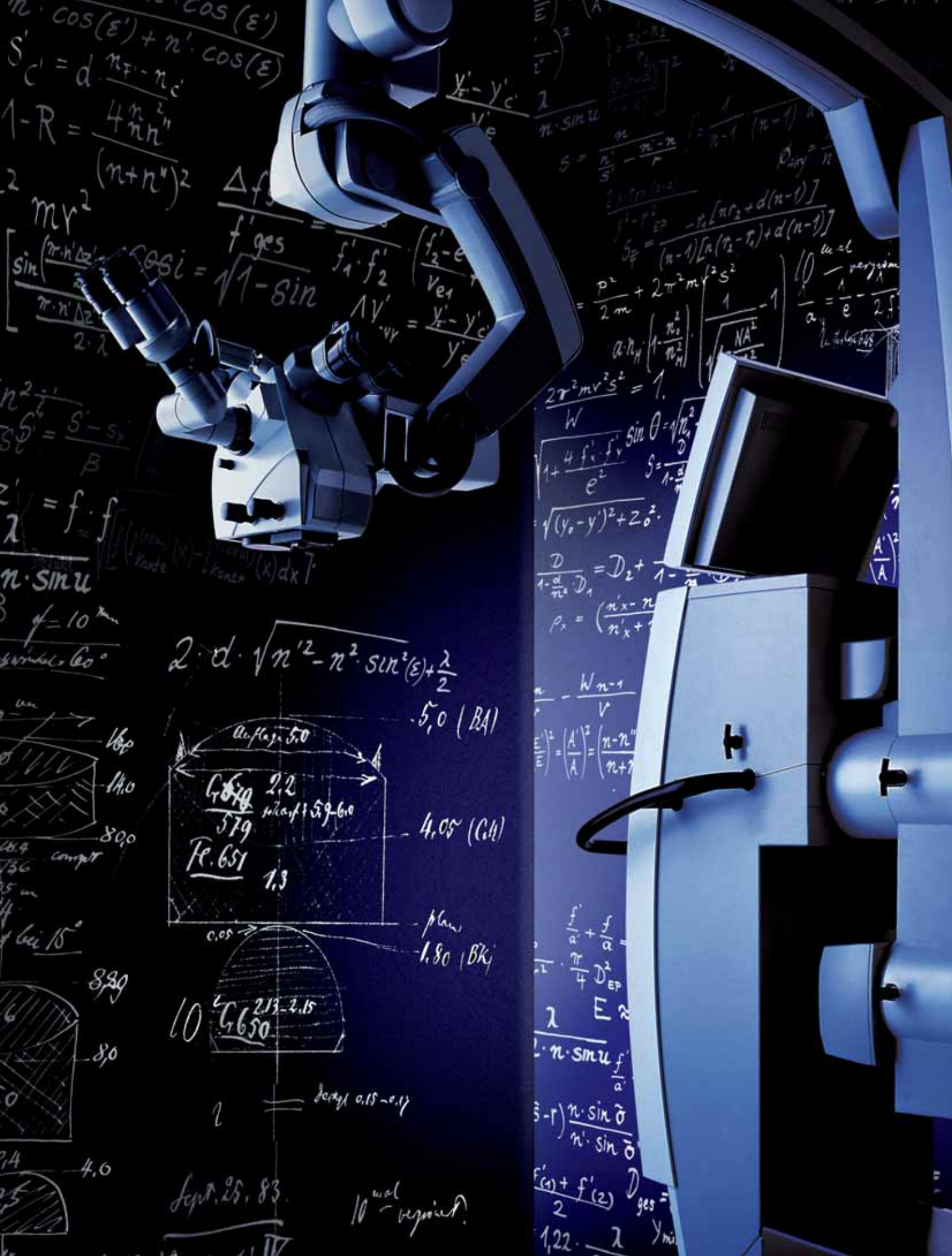

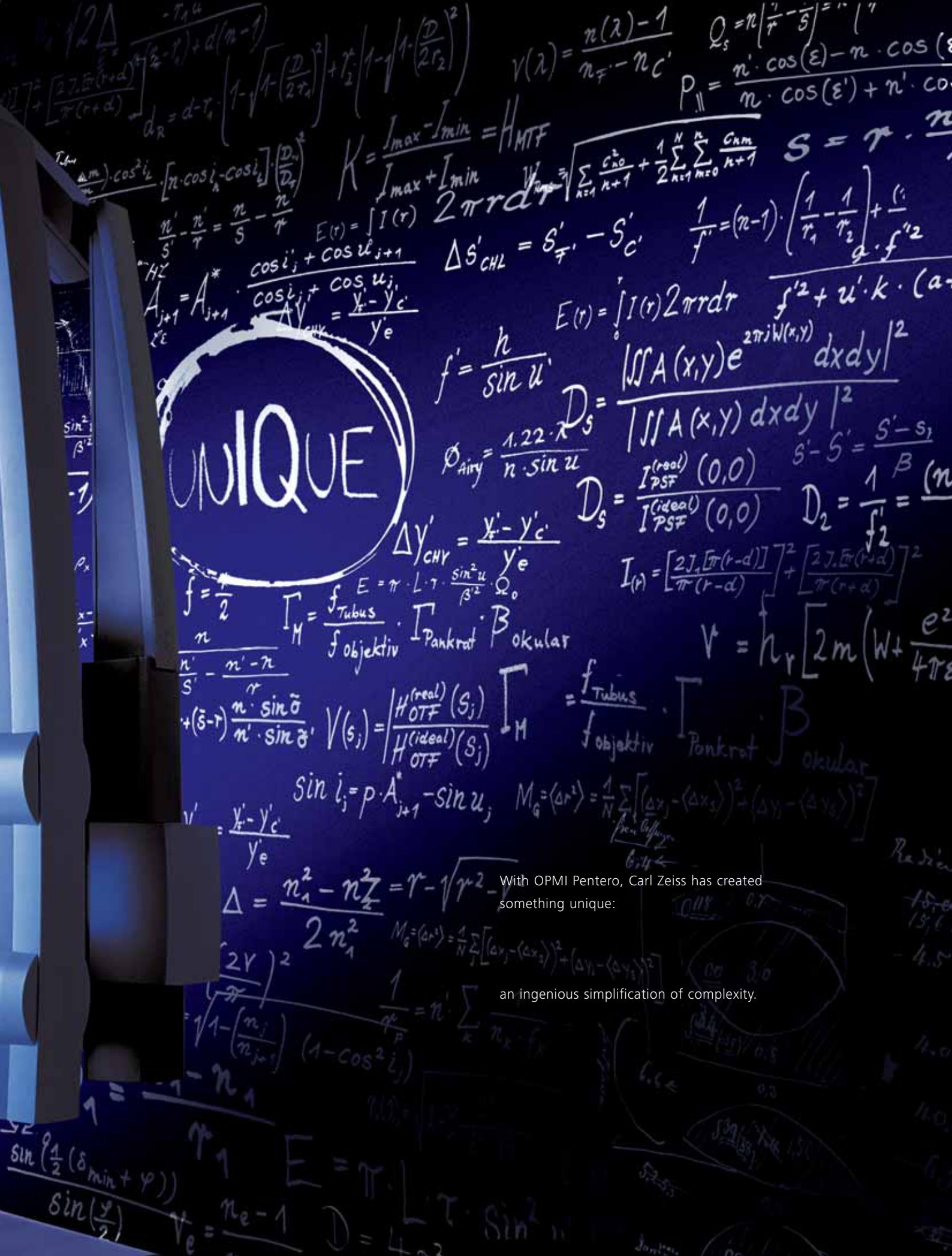

With OPMI Pentero, Carl Zeiss has created something unique:

an ingenious simplification of complexity.

The Sum of 50 Years of Knowledge

"OPMI Pentero, the new microscope of Carl Zeiss has exceeded all my expectations. The motorized X/Y movement; increased headroom; single-lever pistol grip movement; completely internalized video, cameras, and cables; elimination of the drape bulk with a vacuum system; single-button autobalance; and unparalleled binocular vision with superb lighting make this highly integrated microscope system the most important tool for the practice of neurosurgery."

Robert F. Spetzler, M.D., Chairman and Medical Director Barrow Neurological Institute, Phoenix, Arizona, USA

For more than 50 years, Carl Zeiss surgical microscopes have been delivering excellence to the world's most challenging professions. Surgeons' needs have been the driving force behind our quest to provide ever more refined, more multifunctional systems.

An OPMI is no longer just at the center of the microsurgical procedure, it is now an information and communication cockpit; not only the window to the operating field, but also a gateway to the outside world.

But how can a sophisticated, high-tech surgical microscope assist in simplifying very complex surgical procedures?

OPMI Pentero is the answer.

reddot design award
winner 2004


Carl Zeiss
Carl Zeiss
OPMI Pentero

Trust

"I have been using Carl Zeiss microscopes for the last two and half decades. They have provided the best in optics and have been constantly upgrading the technology. My team and I trust Carl Zeiss optics."

Dr. A. S. Hegde, Chairman Neurosciences, Sri Sathya Sai Institute of Higher Medical Sciences, Bangalore, India

"With the tremendous improvements to the co-observation tube, the OPMI Pentero really helps the assistant. The tube provides a better view of the operating field and does not move when the microscope is repositioned."

J.J. van Overbeeke M.D., Ph.D., St. Elisabeth Hospital, Tilburg, The Netherlands

The challenge: to develop a new optical design that once again substantially improves depth of field, light and working distance.

Bringing it all within reach

State-of-the-art apochromatic optics deliver the legendary crystal-clear images, sharp details and natural colors associated with Carl Zeiss. The innovative optical design, with a new Varioskop™, provides a larger working range and virtually ensures comfortable working conditions – even when using long instruments. The depth of field has been increased by 17 % and can be doubled by activating the DeepView function.

Bringing Light to the Darkness

Surgeons now have 20 % more light to work with, the assistant even more. Spot illumination precisely adjusts the light cone – all without reflections. The patented, two-channel illumination system delivers light wherever it's needed – a distinct advantage, which provides higher-contrast images in narrow and deep canals.

Focus at the Push of a Button

The high-speed autofocus automatically delivers razor-sharp images at all times, regardless of magnification. And when focusing manually? An intuitive laser-focusing aid assists in selecting the exact focal point – particularly helpful when using the mouth switch.

Stress Free

Whether the surgeon remains standing or seated, the 30 % more compact design of OPMI Pentero allows for freedom of hand and instrument movement while providing a short distance to the surgical field.

Thanks to its overhead design, the suspension system can be placed in any position – even behind the surgeon.

14-function foot control panel

Rocker switch

Foot switch

Effortless

Maneuvring OPMI Pentero? Child's play! Whether using the handgrip or the mouth switch, the new movement system enables OPMI Pentero to be effortlessly repositioned.

AutoBalanced at the Touch of a Button

The patented AutoBalance system provides outstanding balance with a single, simple touch of a button, regardless of the position of the microscope.

Robotic X/Y Movements

Fine and precise adjustments of the OPMI body are possible without even releasing the brakes – and without the usual limitations. OPMI Pentero's X/Y really can move in any direction.

Beauty and Functionality All in One

The new rotatable, easy-to-use video touchscreen has been perfectly integrated into the system. It intuitively guides the user through all functions. Digital patient files allow instantaneous access to important information – even during surgery. Various users can quickly retrieve their pre-programmed, personal settings.

The touchscreen also serves as a display for the integrated MediLive® digital video camera. Its full-screen mode eliminates the need for an additional video monitor.

Mouth switch

Touchscreen

"OPMI Pentero is an operating microscope designed by surgeons for surgeons. It incorporates cutting edge technology in a compact, innovative and brilliant design. Carl Zeiss has combined efficiency, efficacy and ergonomics to create a microscope that brings neurosurgery and spinal surgery to an exciting new level."

Daniel L. Barrow M.D., Professor and Chairman, Neurosurgery Department, Emory University, Atlanta, USA

Anticipates Your Every Desire

“ Carl Zeiss has created a virtual cockpit which allows me to access my information at any time. Everything I need is displayed in the eyepiece at the push of a button.”

Professor Dr. Yoshiaki Shiokawa, Chairman, Department of Neurosurgery, Kyorin University Hospital, Tokyo, Japan

How can a surgeon process the constant stream of diagnostic, navigation and system information without having to take his or her eyes off the operating field?

MultiVision™

MultiVision enables the surgeon to superimpose color data into both eyepieces. Moreover, video data and the entire touchscreen interface can be injected into the MultiVision display and controlled using the joystick.

MultiVision provides a glimpse of where the OPMI is heading.

Onscreen display. Everything at a glance.

Touchscreen. View and control OPMI Pentero in the eyepiece.

Endoscope images. Endoscope towers are a thing of the past.

Navigation overlays. Superimposition of color contours and data.

Image Viewer. Injection of pre-operative data.

Intraoperative Fluorescence·

Surgeons can only treat what they can see – and Carl Zeiss enables them to see more. OPMI Pentero is the world's first surgical microscope to offer completely integrated support for fluorescence-based angiography and tumor resection.·

" OPMI Pentero is a considerable advance in microscope technology. Especially its optional support for ICG-based angiography, 5ALA fluorescence-based tumor resection and digital video represent unique new tools for intraoperative diagnostics and documentation during microneurosurgical procedures."

Prof. Dr. Volker Seifert,
Chairman, Department of Neurosurgery,
Johann Wolfgang Goethe University,
Frankfurt, Germany

(1)

(2)

◁ *“ Anatomical (1) and ICG angiographic image (2) showing a large paraclinoid aneurysm after surgical clipping. ICG angiography demonstrates complete clip occlusion of the aneurysm and the patent internal carotid artery. Note the high spatial image resolution of the ICG angiography with visibility of flow even in vessels of sub-millimeter diameter.”*

Prof. Dr. Andreas Raabe, Chairman, Department of Neurosurgery, Bern University Hospital, Bern, Switzerland

“ Images of a resection cavity during an operation for glioblastoma multiforme as observed through the surgical microscope. Conventional white light illumination (3) is insufficient for distinguishing viable tumor margins. When enhanced using the fluorescence mode in combination with pre-operatively administered 5-ALA (4), the tumor extensions are more clearly delineated by their strong red fluorescence.”

Prof. Dr. Walter Stummer, Associate Professor and Vice Chairman, Department of Neurosurgery, Heinrich-Heine University, Düsseldorf, Germany

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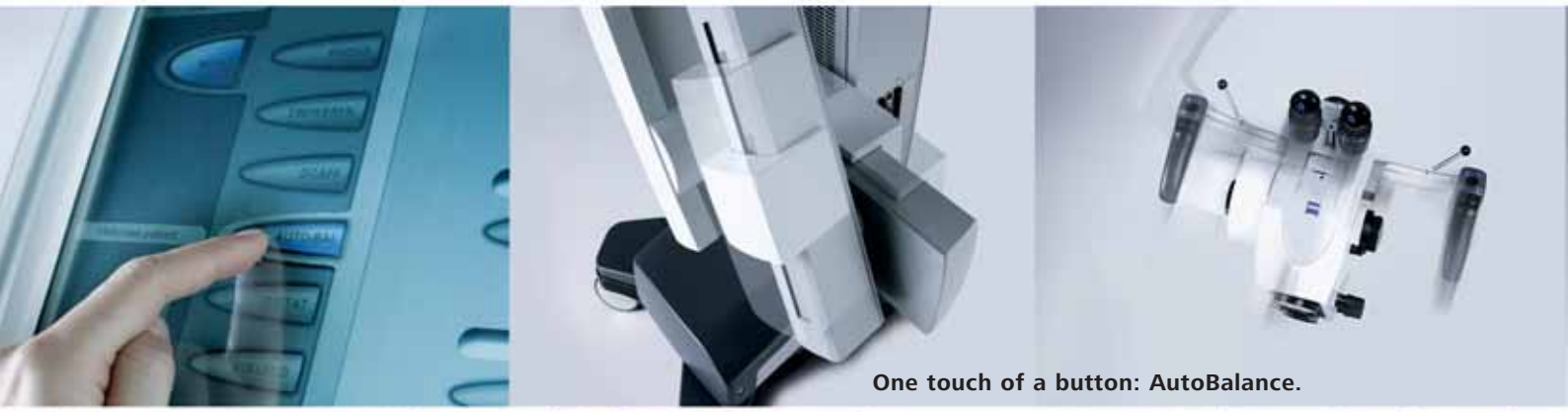
(4)

(3)

· *In Europe (EU), intraoperative fluorescence technologies are in compliance with the requirements of the European Medical Device directive 93/42/EEC. In the United States, INFRARED 800 and BLUE 400 fluorescence technologies have been completely integrated into the OPMI Pentero® and OPMI Pentero® C microscopes and both fluorescence platforms are available for sale. They are also available in other markets, however, depending on national regulations, additional authorization may be required in the country in which the instrument and application will be used. Please contact your local Carl Zeiss representative for further information.*

Riding on rails down the hallway: FlexiTrak™.



One touch of a button: AutoBalance.

Tango in a cramped room: FlexiTrak.

Air evacuation for an excellent fit: AutoDrape® System.

Changing lamps and modules has never been easier:

Superlux® 330.

Totally Digital

“ It’s really here – a completely integrated digital video chain in a surgical microscope. I can immediately produce and process my digital video and take it with me on a DVD. ”

Professor Dr. Yoshiaki Shiokawa, Chairman, Department of Neurosurgery, Kyorin University Hospital, Tokyo, Japan

Record several hours of surgery, find and edit the most important sequences, integrate them into PowerPoint presentations or save them to DVD for archival in the patient file – all in a matter of seconds. All incorporated into one, very easy-to-use instrument.

Digital Dreams become reality

The integrated 3-chip MediLive® video camera (also available as a stereo version) enables OPMI Pentero to digitally record videos and images. Digitally processed from creation to output, the entire video image chain delivers outstanding quality. Data can be digitally streamed directly onto the internal hard drive and simultaneously stored on DVD or CD. In addition, the integrated camera is equipped with both a Progressive Scan and DV output, providing flicker-free images with even higher resolution.

The integrated digital video chain is further proof of OPMI Pentero’s unique design.

Record. *The touchscreen intuitively guides the user.*

Select *a video sequence or application image.*

Edit. *Mark, edit and add comments to selected sequences.*

Review *the edited sequences before archiving or presentation.*

Archive *to the hard drive, DVD, CD-ROM or USB memory stick.*

Present. *Moving pictures enhance your lecture.*

OPMI Pentero connects ...

... with colleagues around the world – via DICOM, for example. But let's start right here with the hospital network. OPMI Pentero can export or import patient data (e.g. demographic data, images and video clips) to other hospital computers via the network or DICOM interface. Preoperative data can also be imported.

Navigation included

The navigation interface enables fast and easy connection to all leading navigation systems without external components and irritating wiring. The Carl Zeiss open interface system permits the use of the same workstation and the same cable with other ZEISS surgical microscopes.

New and unique: binocular, color injection and superimposition of navigation data.

As a result of the innovative robotic X/Y design with three motorized axes, OPMI Pentero provides real tool tracking for viewing every point in the working and tilting range of the OPMI.

The laser-guided, high-speed autofocus system delivers precise navigation by focusing to a fraction of a millimeter and precisely identifying the displayed point.

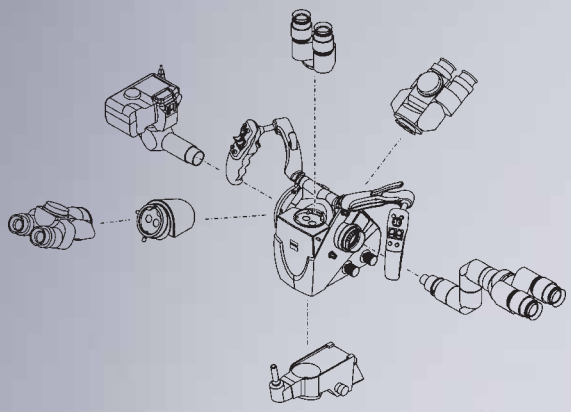
And in case of an emergency?

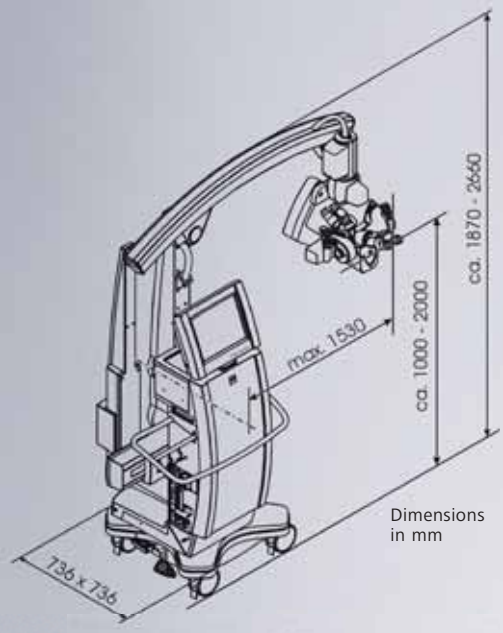
We keep a vigilant eye on OPMI Pentero. Global, networked support centers provide 24/7 service and are supported by a help-desk database as well as a remote service function. Diagnosis and troubleshooting is carried out via the internet or telephone with assistance from the Service Online Protocol.

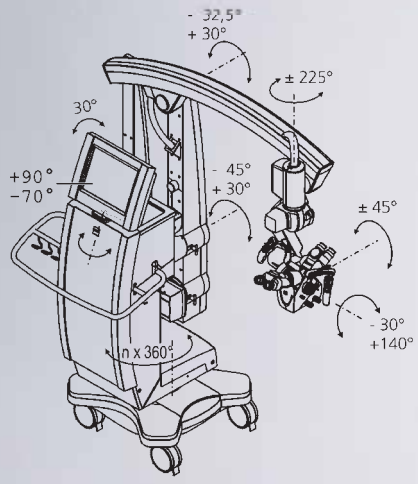
" With the launch of OPMI Pentero, Carl Zeiss has introduced a totally new service concept for the surgical microscope. Our worldwide support and remote diagnostic capabilities are the benchmark in the industry. At Zeiss, meeting the needs of our customers is our number one priority."

Matthew Ferrante, Director of Service, Carl Zeiss Surgical, Inc., NY, USA

From a technical standpoint:







Magnification System
- Motorized zoom, apochromatic, 1:6 ratio
- Magnification displayed on touchscreen and in the ocular (on demand)
- User specific start position

Focusing System
- Varioskop, apochromatic, 200–500 mm working range
- Internal, motorized, continuous adjustment
- Focusing speed adjustable to magnification
- High-speed laser autofocus, accurate to +/- 0.5 mm (Class II Laser)
- Visual focusing aid with two converging laser spots
- Working distance displayed on touchscreen and in the ocular (on demand)
- User specific start position

MultiVision System
- Integrated data display with shutter function
- SVGA 800 x 600, color, 50-60 Hz
- Color, binocular, injection and superimposition of contours and data
- Supported external data signals
  - Computer data (VGA Signal)
    - I.e. data from navigation systems
  - Y/C video data (PAL / NTSC)
    - I.e. data from endoscopy systems
- Superimposition of system information (focus, zoom, light)
- Injection of the touchscreen user interface into the eyepiece for sterile control of the system

Tubes and Co-Observation
- Main tube: 0–180° rotatable, f = 170, f = 200*
- Eyepieces 10x/21B, 12.5x/18B*
- Integrated beam splitter for lateral and face-to-face co-observation
- Stereo co-observation tube* remains fixed when tilting the OPMI
- Spine adapter for symmetric face-to-face configurations
- Integrated rotary tube adapters

AutoBalance
- AutoBalance of the microscope, suspension system or entire system by pushing a button
- Microscope AutoBalance independent of position or accessories
- Fine balancing with mouthswitch
- Drape weight compensation

AutoDrape System
- Integrated vacuum system to remove air from sterile drape for fast and easy draping

Integrated Digital Video Chain
- 3CCD-Video camera PAL/NTSC
  - Video output on touchscreen
  - Digital video output: Firewire/DV
  - Analog video outputs: FBAS (BNC), Y/C, RGB, Progressive Scan (VGA)
  - Optional stereo camera
- Image capture
  - Image freeze function
  - Image capture as TIFF, JPG, BMP
  - Image annotation
  - Still image archiving via CD/DVD/USB and optional DICOM interface
- Digital video recording system*:
  - MPEG2 recording
  - Parallel HDD/DVD recording
  - Editing function
  - Video clip archiving via CD/DVD/USB and optional DICOM interface

Hospital Workflow Integration
- Navigation interface
- LAN interface and modem
- DICOM* data interface
- Microphone and speaker
- Patient data management allowing archival of image, video and audio data
- Service file
- Remote service interface

Illumination System
- Superlux 330 light source with two 300 W Xenon daylight character lamps
- Integrated light source and light guide
- Integrated two-way illumination brightens shadows
- Variable spot illumination, minimum diameter 10 mm
- Automatic, fast action lamp exchange
- Display of remaining lamp life on Touchscreen
- Brightness regulation via handgrips
- Magnification dependant automatic brightness adjustment
- Synchronized camera flash system
- Safety functions

Electrical Data
- Voltage supply: 115 V~ (100–125 V~ ±10%)
  230 V~ (220–240 V~ ±10%)
- Voltage consumption: 115 V: max. 12 A;
  230 V: max. 6 A
- Frequency: 50–60 Hz
- Line protection: automatic circuit breaker

Standards/Compliance
- IEC 60601-1/DIN EN 60601-1
- UL 60601-1
- CAN/CSA C 22.2 No. 601.1-M90
- Protection class I, type B
  (in accordance with above named standards)

CE 0297 c SP us 176164

*Option

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