Telescopes, Visualization and Documentation Systems
for Video-Assisted Cardiac Surgery and Open Heart Surgery with Minimal Access
The Use of Telescopes in Heart Surgery

In heart surgery we are increasingly working with the support of imaging systems such as the endoscopy unit. More and more interventions are being performed minimally invasively, but telescopes are also employed in open heart surgery for visualization on monitors and for documenting the procedure. The different applications place a variety of demands on the telescopes.

The HOPKINS® rod lens system from KARL STORZ guarantees the best possible image quality with optimal brightness, contrast and detail features for every telescope. In combination with the FULL HD camera system from KARL STORZ even the finest structures can be identified, providing the surgeon with the highest level of security and precision.
In video-assisted mitral valve surgery, 30° telescopes with a diameter of 5 or 10 mm are employed as standard. The mitral valve and the surrounding tissue are visualized by means of an access through the right intercostal space and the right atrium.

For endoscopic atrial ablations most surgeons prefer 0° telescopes with a diameter of 5 or 10 mm, which are introduced through a trocar and make the operating field visible. This allows accurate positioning of the ablation device.

To allow you to adapt the viewing direction to the situation at hand at any time, the ENDOCAMELEON® with an adjustable viewing direction of 0° to 120° provides all round vision in both mitral valve surgery and in minimally invasive atrial ablation and thereby offers an added safety bonus as well.
HOPKINS® Telescopes

Diameter 5 mm, length 24 cm

HOPKINS® Forward-Oblique Telescope 30°,
enlarged view, diameter 5 mm, length 24 cm,
autoclavable, fiber optic light transmission incorporated,
color code: red

HOPKINS® Straight Forward Telescope 0°,
enlarged view, diameter 5 mm, length 24 cm,
autoclavable, fiber optic light transmission incorporated,
color code: green

Diameter 5 mm, length 29 cm

HOPKINS® Forward-Oblique Telescope 30°,
enlarged view, diameter 5 mm, length 29 cm,
autoclavable, fiber optic light transmission incorporated,
color code: red

HOPKINS® Straight Forward Telescope 0°,
enlarged view, diameter 5 mm, length 29 cm,
autoclavable, fiber optic light transmission incorporated,
color code: green

HOPKINS® Telescope 45°, enlarged view, diameter 5 mm,
length 29 cm, autoclavable, fiber optic light transmission
incorporated,
color code: black

Fiber Optic Light Cables 495 NL / NAC / ND recommended
Wire Trays 39501 B1 / 39501 B2 recommended
HOPKINS® Telescopes
Diameter 10 mm, length 31 cm

HOPKINS® Straight Forward Telescope 0°,
enlarged view, diameter 10 mm, length 31 cm,
autoclavable, fiber optic light transmission
incorporated, color code: green

HOPKINS® Forward-Oblique Telescope 30°,
enlarged view, diameter 10 mm, length 31 cm,
autoclavable, fiber optic light transmission
incorporated, color code: red

HOPKINS® Telescope 45°, enlarged view,
diameter 10 mm, length 31 cm, autoclavable,
fiber optic light transmission incorporated,
color code: black

Wire Trays recommended

Wire Tray for Cleaning, Sterilization and Storage
of one rigid endoscope, including holder for light post
adaptors, silicone telescope holders and lid, external
dimensions (w x d x h): 430 x 65 x 52 mm, for use
with rigid endoscopes up to diameter 10 mm and
working length 34 cm

Wire Tray for Cleaning, Sterilization and Storage
of two rigid endoscopes and one light cable, including
holder for light post adaptors, silicone telescope
holders and lid, external dimensions (w x d x h):
487 x 125 x 54 mm, for use with rigid endoscopes up to
diameter 10 mm and working length 34 cm

Fiber Optic Light Cables 495 NB / NCSC / NE recommended
In minimally invasive cardiac surgery, access to the heart with a 5 mm or 10 mm telescope through the second, third, or fourth intercostal space is preferable.

The variable viewing angle of 0° to 120° of the ENDOCAMELEON® offers all-round vision and makes it even easier for the surgeon to visualize the mitral valve or the pulmonary veins. If the ENDOCAMELEON® is fastened in the holding arm, it is no longer necessary to alter the position of the whole arm, but rather simply the viewing angle. This is done by means of a control wheel on the proximal end of the telescope. The ENDOCAMELEON® makes it easier for the surgeon to place the trocar and the telescope inside the sterile area and, at the same time, outside of his own working area.

The adjustable viewing angle avoids damaging the intercostal nerves and rib trauma as there is no leverage of the telescope.
ENDOCAMELEON® HOPKINS® Telescope, diameter 10 mm, length 32 cm, autoclavable, variable direction of view 0° – 120°, with adjusting knob for selecting the direction of view, fiber optic light transmission incorporated, color code: gold

Diameter 10 mm, length 32 cm
VITOM® Exoscope System
A Unique Visualization System for Open Surgery with Minimal Access

Today, most surgical procedures still involve open surgery, while a steadily growing proportion is performed endoscopically. As a full-range supplier in minimally invasive surgery, KARL STORZ takes account of this fact with the new HAVE 1™ concept. In conjunction with the innovative VITOM® system, KARL STORZ camera and documentation systems can be used for visualizing and documenting open surgeries as well. Combining technologies for minimally invasive procedures with those for open surgery is efficient, economic, and improves the workflow in the operating room. HAVE 1™ – the visualization and documentation solution for minimally invasive and open surgery from a single source.

Benefits of HAVE 1™:
- Only KARL STORZ offers the VITOM® system, which allows visualization and documentation of open surgeries in all medical specialties
- Excellent FULL HD image quality
- Great depth of field
- Large working distance
- Ergonomic work via the monitor
- Compact design requiring minimal space in the OR
- Use of existing KARL STORZ FULL HD endoscopy system possible

Brilliant Visualization in FULL HD
KARL STORZ HAVE 1™:
- IMAGE1 S: FULL HD camera platform
- AIDA™ compact NEO HD: Medical Data Management System
- VITOM®: Brilliant visualization of open surgeries
- Endoscopy: The diamond standard in minimally invasive surgery
- Complete solution from a single source: Your contact for imaging and documentation
Brilliant Visualization in FULL HD
The IMAGE1 S FULL HD camera system provides optimal support for all interventions in minimally invasive and open surgery.

Visualization
The VITOM® system provides excellent depth of field, optimal magnification as well as good contrast and excellent color reproduction, which are the ideal prerequisites for the best possible visualization of interventions in open surgery.

Ergonomic Work
Enhanced images of the open surgical procedure can be observed via a FULL HD monitor from a convenient distance by the surgeon, the assistant as well as the entire OR team. The system offers everyone present in the OR an optimal view of the surgical field.

Teaching and Training
The VITOM® system is an excellent tool for teaching and training purposes as the system offers an unrestricted and magnified view of the surgical site both inside and outside the OR.

Fields of Application
The VITOM® system offers an innovative way of displaying open surgical procedures with minimal access and has been successfully used in cardiovascular surgery, e.g., mitral valve surgery and pediatric surgery. Moreover, the VITOM® system is an excellent teaching and training aid and an ideal tool for documentation.
VITOM® Exoscope System

System Overview

- VITOM® Scope 0° with Integrated Illuminator
- Clamping Cylinder
- Mechanical Holding Arm
- IMAGE1 S H3-Z Three-Chip FULL HD Camera Head
- IMAGE1 S Camera System
- 26" FULL HD Monitor
- Fiber Optic Light Cable
- Cold Light Fountain XENON 300 SCB
- AIDA™ Documentation System

Part Numbers:
- 49021 DA
- 28272 CN
- 28272 UGK
- 28272 HC
- 28272 HR
- TH 100
- TC 200DE, TC 300
- 9826 NB
- 495 TIP
- 20133101-1
- WD 250-XX
Object field approx. 5 cm with H3-Z camera zoom 1x
Object field approx. 3.5 cm with H3-Z camera zoom 2x

Reproduction scale with
26" Monitor:
H3-Z camera zoom 1x: approx. 8x
H3-Z camera zoom 2x: approx. 16x

42" Monitor:
H3-Z camera zoom 1x: approx. 14x
H3-Z camera zoom 2x: approx. 28x

52" Monitor:
H3-Z camera zoom 1x: approx. 17x
H3-Z camera zoom 2x: approx. 34x

Depth of field approx. 3.5 cm
VITOM® Exoscope System

Exoscope and illumination

49021 AA  VITOM® Telescope 0° with Integrated Illuminator,
VITOM® HOPKINS® straight forward telescope 0°, working
distance 25-75 cm, length 11 cm, autoclavable, with fiber
optic light transmission incorporated and condensor lenses,
color code: green
Note: The telescope used in this set is assigned the order
number 20 916025 AA.

49021 DA  VITOM® Telescope 90° with Integrated Illuminator,
VITOM® HOPKINS® telescope 90°, working distance 25-75 cm,
length 11 cm, autoclavable, with fiber optic light transmission
incorporated and condensor lenses,
color code: blue
Note: The telescope used in this set is assigned the order
number 20 916025 DA.

Wire Tray recommended

39501 A2  Wire Tray for Cleaning, Sterilization and Storage of two
rigid endoscopes and one light cable, including holder
for light post adaptors, silicone telescope holders and lid,
external dimensions (w x d x h): 352 x 125 x 54 mm, for rigid
endoscopes up to diameter 10 mm and working length 20 cm
Trocars

Sizes 6 and 11 mm with insufflation stopcock

Special Features:
The trocar length of 6.5 cm, which is specially customized to meet the needs of minimally invasive cardiac surgery, allows simple, safe use. Even when the trocar is completely inserted, there is still a sufficient distance maintained to the heart to avoid injuries and guarantee safe handling. The 45° insufflation stopcock with the LUER-Lock connector allows the positioning of several trocars in neighboring intercostal spaces.

<table>
<thead>
<tr>
<th>Size:</th>
<th>6 mm</th>
<th>11 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working length:</td>
<td>6.5 cm</td>
<td>6.5 cm</td>
</tr>
<tr>
<td>Color code:</td>
<td>black</td>
<td>green-white</td>
</tr>
<tr>
<td>Trocar, with blunt tip</td>
<td>49160 HA</td>
<td>49103 HA</td>
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<tr>
<td>including:</td>
<td></td>
<td></td>
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<tr>
<td>Cannula, with insufflation stopcock</td>
<td>49160 H1</td>
<td>49103 H1</td>
</tr>
<tr>
<td>Trocar</td>
<td>49160 A</td>
<td>49103 A</td>
</tr>
<tr>
<td>Silicone Leaflet Valve</td>
<td>30120 L1</td>
<td>30103 L1</td>
</tr>
</tbody>
</table>

For KARL STORZ Trocars only the individual component parts are numbered. The catalog number for the complete instrument is not on the instrument. In the table, the catalog number for the complete instrument is printed in bold.
The ENDOCRANE® holding arm is the system of choice if a particularly fast, accurate and safe positioning of instruments or endoscopes is required, i.e. in laparoscopy.

The ENDOCRANE® holding arm helps surgeons and assistant surgeons save time as the positioning of instruments and telescopes is faster and easier than with a manual holding system. The system also relieves the assistant surgeon of camera guidance and delivers steady images.

The ENDOCRANE® holding system features a special piezoelectric locking joint mechanism. This achieves positioning without misalignment as well as rapid locking (30 ms), meeting the demands of a clinical setting.

The system can be used with one hand and the large working radius of 50 cm allows variable use. A holding capacity of 20 N (2 kg) is possible in any position. The holding arm features a fail-safe function which prevents a loss of retention force in the case of malfunction, i.e. power failure.

The system is very compact and can be mounted directly on standard OR table rails.
ENOCRANE® Holding System

28272 EH  ENOCRANE®, piezoregulated holding arm, including stand, including:
Socket, to clamp to the OR table
Control Unit
Cover*, sterile, package of 20
Spring Balance
Mains Cord
Case

Mechanical Holding System

28272 HC  Articulated Stand, L-shaped, long, reinforced version, especially large swivel range, with one mechanical central clamp for all five joint functions, height 48 cm, swivel range 66 cm, with quick release coupling KSLOCK (female)

28172 HR  Rotation Socket, to clamp to the operating table, with one mounted Butterfly Nut 28172 HRS, for European and US standard rails, with lateral clamp for height and angle adjustment of the articulated stand

28272 UGK  Clamping Jaw, with ball joint, large, clamping range 16.5 to 23 mm, with quick release coupling KSLOCK (male), for use with all square-headed KARL STORZ HOPKINS® telescopes

28272 CN  Clamping Cylinder, folding, for flexible mounting of 10 mm telescopes to telescope sheath, autoclavable. The clamping cylinder allows vertical movement and rotation of the telescope. For use with Clamping Jaws 28272 UGN/UGK and POINT SETTER® universal adaptor 10-15 mm.

28172 HM  Extension Rod, 50 cm, with lateral clamp for height adjustment of the articulated stand, for use with Articulated Stands 28272 HA/HB/HC and Sockets 28172 HK/HR
IMAGE1 S Camera System

The perfect system for superior imaging and documentation of your choice

**TH 100**

**IMAGE1 S™ H3-Z Three-Chip FULL HD Camera Head**, progressive scan, soakable, gas- and plasma-sterilizable, with integrated Parfocal Zoom Lens, focal length \( f = 15-31 \text{ mm} \) (2x), 2 freely programmable camera head buttons, for use with IMAGE1 S™ and IMAGE 1 HUB™ HD/IMAGE1 HD

**TH 101**

**IMAGE1 S H3-ZI Three-Chip FULL HD Inline Camera Head**, S-Technologies available, 0° cable exit (inline), progressive scan, soakable, gas- and plasma-sterilizable, with integrated Parfocal Zoom Lens, focal length \( f = 15-31 \text{ mm} \) (2x), 2 freely programmable camera head buttons, for use with IMAGE1 S and IMAGE 1 HUB™ HD/IMAGE1 HD
**TC 200EN**

**IMAGE1 S CONNECT™**, connect module, for use with up to 3 link modules, resolution 1920 x 1080 pixels, with integrated **KARL STORZ-SCB** and digital Image Processing Module, power supply 100-120 VAC/ 200-240 VAC, 50/60 Hz including:

- **Mains Cord**, length 300 cm
- **DVI-D Connecting Cable**, length 300 cm
- **SCB Connecting Cable**, length 100 cm
- **USB Flash Drive**, 32 GB
- **USB Silicone Keyboard**, with touchpad, US

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**TC 300**

**IMAGE1 S™ H3-LINK**, link module, for use with **IMAGE1 FULL HD three-chip camera heads**, power supply 100-120 VAC/200-240 VAC, 50/60 Hz, for use with **IMAGE1 S CONNECT™ TC 200EN** including:

- **Mains Cord**, length 300 cm
- **Link Cable**, length 20 cm

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**Light Sources**

**201331 01-1**

**Cold Light Fountain XENON 300 SCB**, with integrated KARL STORZ-SCB, including an integrated anti-fog pump, a 300 Watt Xenon bulb and KARL STORZ light connection, power supply 100-125/220-240 VAC, 50/60 Hz, including:

- **Mains Cord**
- **SCB Connecting Cable**, length 100 cm

* Also available in the following languages: DE, ES, FR, IT, PT, RU
Exact depth perception inside the human body is essential for any endoscopic procedure. Studies\(^1\) have shown that even experienced surgeons benefit from three-dimensional display technology with regard to the duration and precision of an intervention. The IMAGE1 S 3D system’s excellent depth of field permits precise hand-eye coordination in the site and makes particularly complex endoscopic procedures easier for the surgeon. This first-class stereoscopic system from KARL STORZ leads to significant improvements in surgical efficiency and patient safety in the operating room. IMAGE1 S 3D consists of 3D video endoscopes with a 0° or 30° direction of view with 10 mm diameter, 3D camera modules and 3D monitors with passive-polarized 3D glasses. The lightweight design makes the 3D video endoscopes easy to use, even after long hours of surgery. Furthermore, the 3D video endoscopes from KARL STORZ are autoclavable. Two image sensors at the distal end are precisely aligned mechanically. Complemented by precise electronics in the endoscope and camera control unit, the system generates endoscopic 3D images that are true to life. Combined with 3D monitors, this system offers the surgeon an excellent complete system that makes it easy to switch between 2D and 3D applications.

\(^1\) 3D visualization in medical applications (Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut HHI, April 2013)
IMAGE1 S 3D in FULL HD

26605 BA

**TIPCAM®1 S 3D LAP**, with two distal FULL HD image sensors, direction of view 30°, diameter 10 mm, **autoclavable**, freely programmable camera head buttons, including video connecting cable, for use with IMAGE1 S

26605 AA

Same, with direction of view 0°

TC 200EN*

**IMAGE1 S CONNECT™**, connect module, for use with up to 3 link modules, resolution 1920 x 1080 pixels, with integrated **KARL STORZ-SCB** and digital Image Processing Module, power supply 100-120 VAC/ 200-240 VAC, 50/60 Hz including:
- **Mains Cord**, length 300 cm
- **DVI-D Connecting Cable**, length 300 cm
- **SCB Connecting Cable**, length 100 cm
- **USB Flash Drive**, 32 GB
- **USB Silicone Keyboard**, with touchpad, US

* Also available in the following languages: DE, ES, FR, IT, PT, RU

39501 XTC

**Wire Tray for Cleaning, Sterilization and Storage** of TIPCAM®1 S 3D LAP Video Endoscopes 26605 AA/BA and one light cable, **autoclavable**, external dimensions (w x d x h): 640 x 150 x 87 mm
9826 NB-3D **26” 3D Monitor**, color systems PAL/NTSC, max. screen resolution 1920 x 1080, image format 16:9, power supply 100-240 VAC, 50/60 Hz, wall mounting with VESA 100 adaptor, Video inputs: 2x DVI, 2x HD-SDI, VGA, S-Video, Composite, Video outputs: DVI, 2x HD-SDI, VGA, S-Video, Composite including:

External 24 VDC Power Supply
Mains Cord
3x 3D Glasses, passive (as of SN K4IA10065 with anti-fog coating)

9832 NB-3D **32” 3D Monitor**, with integrated power supply, color systems PAL/NTSC, max. screen resolution 1920 x 1080, image format 16:9, power supply 100-240 VAC, 50/60 Hz, wall mounting with VESA 200 adaptor, for use with Monitor Stand 9832 SFH including:

Mains Cord
3x 3D Glasses, passive (as of SN L41A10085 with anti-fog coating)

9800 GF **3D Polarization Glasses**, fogless, passive, package of 2, for use with 3D monitors

9800 C **3D Clip-on Glasses**, circularly polarized, for use with 3D monitors

495 TIP **Fiber Optic Light Cable**, with straight connector, extremely heat-resistant, enhanced light transmission, diameter 4.8 mm, length 300 cm
The name AIDA™ stands for the comprehensive implementation of all documentation requirements arising in surgical procedures: A tailored solution that flexibly adapts to the needs of every specialty and thereby allows for the greatest degree of customization. This customization is achieved in accordance with existing clinical standards to guarantee a reliable and safe solution. Proven functionalities merge with the latest trends and developments in medicine to create a fully new documentation experience – AIDA™.

AIDA™ seamlessly integrates into existing infrastructures and exchanges data with other systems using common standard interfaces.

WD 200-XX* **AIDA™ Documentation System**, for recording still images and videos, dual channel up to FULL HD, 2D/3D, power supply 100-240 VAC, 50/60 Hz

including:

- USB Silicone Keyboard, with touchpad
- ACC Connecting Cable
- DVI Connecting Cable, length 200 cm
- HDMI-DVI Cable, length 200 cm
- Mains Cord, length 300 cm

WD 250-XX* **AIDA™ Documentation System**, for recording still images and videos, dual channel up to FULL HD, 2D/3D, including SMARTSCREEN® (touch screen), power supply 100-240 VAC, 50/60 Hz

including:

- USB Silicone Keyboard, with touchpad
- ACC Connecting Cable
- DVI Connecting Cable, length 200 cm
- HDMI-DVI Cable, length 200 cm
- Mains Cord, length 300 cm

*XX Please indicate the relevant country code (DE, EN, ES, FR, IT, PT, RU) when placing your order.
It is recommended to check the suitability of the product for the intended procedure prior to use.