URETEROSCOPY
Use in Special Situations

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1.0 Introduction

There has been a rise in the prevalence and incidence of urolithiasis worldwide.14 The lifetime risk of stone disease is variable but quoted to be about 7–13%.20 There has also been a proportionate rise in the number of interventions for stone disease, especially ureteroscopic stone surgery.19 Ureteroscopy (URS) started its journey with treatment of simple ureteric and kidney stones but has now taken on treatment of stones in special circumstances such as large stones, bleeding diathesis, obesity, pregnancy, kidney malformations and paediatric stone disease. It has also been used for treatment of bilateral stone disease and for diagnostic and therapeutic upper urinary tract tumour disease.

2.0 Armamentarium for Ureteroscopy

The armamentarium for URS is variable depending on the complexity of cases, surgeon experience/preference and availability of resources.15, 16, 18 Here is a list of common disposable and reusable items needed for URS cases.

- **Guidewire** – to gain safe access to upper tract and allow stent and catheter passage.
- **Ureteral catheter** – for guidewire positioning, retrograde pyelogram (RPG) or obtaining urine sample from upper tract.
- **Ureteral access sheath** (UAS) – to facilitate ureterorenoscopy and stone retrieval possibly improving the irrigant flow and visibility.
- **Port seal** – used on the working channel of flexible URS scopes to prevent leaks while using the laser fiber or extraction devices.
- **Stone extraction devices** – such as stone graspers, baskets and forceps. These allow removal of stones or taking tissue biopsy samples.
- **Irrigation** – saline is commonly used and mostly pressurised by a pump/irrigator or irrigation bag.
- **Ureteral drainage** – stents of ureteral catheters. The stents vary in their size, shape and material.
- **Laser fiber** – disposable or re-usable fiber, varying in diameter from 150µm-400 µm, used to fragment stones or ablate tumours.
- **Ureteroscopes** – A choice of different size and lengths of rigid and flexible ureteroscopes. The flexible ureteroscopes can be fibreoptic (KARL STORZ FLEX-X®) or digital (KARL STORZ FLEX-X®) with the latter having a much improved vision.

3.0 Ureteroscopy for Large Stones

With evolution in URS technique and availability of accessories, in a quest to decrease the invasiveness in managing large stones, ureteroscopy and laser fragmentation (URSL) has evolved in managing these stones. While the overall stone free rate (SFR) is comparable to percutaneous nephrolithotomy (PCNL), the risk of major complications is decreased with URSL, with most stones up to 2 cm and beyond treated with good results.1

The use of UAS in such cases is variable but possibly helpful to lower the intra-renal pressure and might help decrease the rate of infective complications.7 Although the SFR of over 90% can be achieved, the patients must be warned about the need for staged procedures. Although risk of major complications have reduced significantly over the years, the SFR and complications became less favorable with treatment of stones >3 cm in size.6

With endourologists now pushing the boundaries of treatment, urologists routinely perform URSL for stone sizes up to and beyond 2 cm. However, patients need to be informed of surgeons/centres data on the SFR and complication rate.
4.0 Ureteroscopy for Stones in Bleeding Diathesis

Stone disease in patients with bleeding diathesis poses a unique treatment challenge. Patients on anticoagulation or with coagulopathies either need to have it reversed or corrected prior to treatment. However, the latter may not be easy or safe in some circumstances especially for those who need urgent treatment.

The risk of haemorrhage or haematoma related complications are high with PCNL and SWL if this bleeding diathesis is not corrected. Ureteroscopy might be the only viable option in these patients. Holmium lasers offer hemostatic capabilities besides fragmenting the stones.

Our review on URSL for patients with bleeding diathesis found only 3 retrospective studies in the literature reporting on a small number of patients. A SFR of 88% for a mean stone size of 13 mm (5–33 mm) and a minor complication rate of 11% (risk of minor bleeding at 4%) was noted.

Although URSL in patients with bleeding diathesis can be safely performed, a rationale judgment should be taken on correcting the bleeding diathesis, which might be possible on the majority of patients.

5.0 Ureteroscopy for Stones in Obese Patients

Obesity is a risk factor for urolithiasis and poses difficulties in diagnostic imaging, anaesthetic risks and in the choice of surgical approach. While SWL has limited success due to the skin to stone distance in these patients, PCNL can cause both anaesthetic and surgical challenges. Prone positioning increases respiratory compromise and impedes venous return while obesity increases the risk of PCNL related surgical re-interventions with an inferior SFR.

Our review on the use of URSL for obese patients (mean BMI – 42) was found to be relatively safe with SFR of 88% for mean stone size of 1.4 cm. The success rates were noted to be higher for stones in the ureter and stones < 2 cm in size. While the risk of complication was 11%, most related to urinary tract infections and settled with antibiotics.

The patient’s size and girth has no effect on the ureter and URSL is a safe and efficient treatment method in obese patients with a relatively short operating time and reduced anesthetic risks.

6.0 Ureteroscopy for Stones in Pregnancy

Urolithiasis in pregnancy can affect up to 1 in 200 females and is usually diagnosed after the first trimester. Although conservative management is preferred, declining renal function or urosepsis prompts a surgical intervention. There is potential risk to mother and the child from infective, obstructive stones and ureteric stenting or percutaneous nephrostomy (PCN) is used to temporarily drain the kidney. Due to rapid encrustations of the tubes in pregnancy, there is a need for frequent and multiple exchanges.

URSL has emerged as a viable treatment option for stone disease in pregnancy. Our review of 271 patients show a SFR of 85% for a mean stone size of 7.6 mm and 78% of these procedures were done without fluoroscopy. There were no maternal or foetal deaths reported with four cases of preterm labour/delivery.

Although URSL is safe and effective, only 20–30% of these patients need surgical intervention and this should ideally be done by experienced endourologists in conjunction with their obstetric colleagues.
7.0 Ureteroscopy for Stone Disease in Kidney Malformations

Kidney malformations range from ectopic position, malrotation, pelvi-ureteric junction abnormalities, and a horseshoe kidney (HSK) which is found in 1 in 400 patients. These patients have altered urinary drainage leading to a higher incidence of stone disease, and the difficulties with pelvicalyceal anatomy pose a challenge in their management. There is also a risk of overlying bowel injury with PCNL in patients with pelvic kidneys.

Ureteroscopy has emerged as a viable treatment option to SWL and PCNL in these patients. Our review of URSL in patients with HSK showed a SFR of 78% for a mean stone size of 16 mm. Minor complications were seen in up to a third of the patients but with no Clavien III-V complications.

URSL seems to be a less invasive treatment option in patients with kidney malformations and allows navigation through the pelvicalyceal system overcoming some of the anatomical difficulties encountered in PCNL, laparoscopy or open surgical intervention in these patients. For this group of patients URSL should therefore be considered for stone management prior to more invasive options.
8.0 Ureteroscopy for Stone Disease in Paediatric Patients

Paediatric stone disease results from metabolic and genitourinary abnormalities and has seen a rise in recent years. Treatment options range from open surgery, SWL, PCNL and more recently URSL. Modern ureteroscopes with finer calibre, better optics/vision and the use of laser technology have allowed URSL to push the boundaries in paediatric stone management.

Our review on URSL for paediatric stone management (for 1718 procedures) shows a SFR of 87.5% for mean stone size of 1 cm. In 2.2% there was a failure to complete the initial URSL procedure leading to an alternative procedure. Complication rates were 10.5% with no Clavien IV or V complication, although a higher failure rate (4.4%) and complication rate (24%) was noted in children <6 years of age. As an alternative to PCNL, staged URSL is also increasing for large paediatric renal stones.

URSL is a safe treatment option in children with a high SFR. However, it should be undertaken by experienced surgeons/teams familiar with difficulties in management of pediatric patients.

9.0 Bilateral Ureteroscopy for Stone Disease

An increase in the incidence and prevalence of stones disease has also seen a rise of multiple and bilateral ureteric and/or renal stones. Depending on the stone size and overall stone burden the treatment options remain the same as that of unilateral stone disease. However, this can be done as a multi-staged procedure or combined to bilateral simultaneous procedure done under the same anaesthetic session possibly reducing the overall hospital stay, complication rate and cost associated with treatment.

Our review of bilateral simultaneous ureteroscopy (BS-URS) for stone disease on 702 renal unites showed an overall SFR of 91% for a stone size which ranged from 4–21 mm and almost 86% of patients had a post-operative ureteric stent inserted. The overall complication rate was 45%, and although two-thirds of these were Clavien I complications, 10% had a ureteric or mucosal injury. Our own results on 25 BS-URS procedures for a stone burden of 21 mm showed a SFR of 93% with 3 minor complications.

BS-URS is an effective option for patients with bilateral ureteric/renal stones but patient and equipment selection is crucial to improve outcomes and decrease complications.
10. References


Recommended Set for Ureter-Renoscopy in Special Situations

- Video-Uretero-Renoscope FLEX-X
- Flexible Uretero-Renoscope FLEX-X\textsuperscript{2S}
- Ultra-Thin Uretero-Renoscope
- CALCULASE II Holmium Laser System for Endoscopic Stone Therapy
- IMAGE1 S Camera System
Video-Uretero-Renoscope FLEX-X\textsuperscript{C} in combination with the IMAGE1 S camera system

With the IMAGE1 S System, KARL STORZ has developed a new FULL HD camera platform that supports urologists with innovative visualization technologies for diagnosis and surgery. By combining this platform with the flexible 8.5 Fr. video uretero-renoscope FLEX-X\textsuperscript{C}, the user benefits from excellent visualization as well as the high image quality of the video uretero-renoscope.

**Special Features:**
- Excellent image quality: Due to CMOS technology
- Extremely thin and steerable sheath: Minimal sheath circumference of only 8.5 Fr. and maximum 270° deflection in either direction
- Ergonomic handle: Integrated LED light source allows convenient work without requiring an additional light cable
- Easier access to the kidney: Direct implementation of hand movements through to the distal end thanks to high torque stability facilitates access to the kidney
- Modular camera platform: Homogeneous illumination, contrast enhancement and clearer tissue differentiation by shifting the color spectrum in various modes from the IMAGE1 S System

It is recommended to check the suitability of the product for the intended procedure prior to use.
Flexible Video Uretero-Renoscope
for access to the entire intrarenal collecting system

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Deflection of distal tip</th>
<th>Direction of view</th>
<th>Angle of view</th>
<th>Working length</th>
<th>Working channel inner diameter</th>
<th>Sheath size</th>
</tr>
</thead>
</table>
| 11278 VK / 11278 VSK  
with positive deflection mechanism | 0° 90° 70 cm 3.6 Fr. 8.5 Fr. | 0° | 90° | 70 cm | 3.6 Fr. | 8.5 Fr. |

Image 1 S Camera System
for use with all visualization modes
Flexible Video-Uretero-Renoscope
for access to the entire intrarenal collecting system

Set 11278 VK/VUK/VSK/VSUK Video-Uretero-Renoscope FLEX-X®, steerable
The following accessories are included:

- 27677 X Case
- 11278 V/VU/VS/VSU Video Uretero-Renoscope FLEX-X®, steerable
- 13242 XL Leakage Tester, with bulb and manometer
- 27651 AL Cleaning Brush, round, flexible, outer diameter 2 mm, for working channel diameter 1.2–1.8 mm, length 150 cm
- 27014 Y Luer-Adaptor, with seal
## Optional Accessories

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11014 Y</td>
<td><strong>Fiber Fixation</strong>, instrument port for the insertion and fixation of LASER fibers, stone baskets, wires etc. in flexible endoscopes</td>
</tr>
<tr>
<td>6927691</td>
<td><strong>Adaptor for Two-Way Stopcock</strong>, Luer-Lock with O₂ tube connection</td>
</tr>
<tr>
<td>11275 FE</td>
<td><strong>Grasping Forceps</strong>, double action jaws, flexible, 3 Fr., length 100 cm</td>
</tr>
<tr>
<td>11275 ZE</td>
<td><strong>Biopsy Forceps</strong>, double action jaws, flexible, 3 Fr., length 100 cm</td>
</tr>
<tr>
<td>27023 TD</td>
<td><strong>Stone Basket</strong>, nitinol, with tip, helical, 2.5 Fr., length 120 cm, 4 wires, basket diameter 16 mm, sterile, for single use</td>
</tr>
<tr>
<td>11770 T</td>
<td><strong>Coagulation Electrode</strong>, unipolar, 3 Fr., length 110 cm</td>
</tr>
<tr>
<td>39406 AS</td>
<td><strong>Plastic Container for Flexible Endoscopes</strong>, specially suited for gas and hydrogen peroxide (Sterrad™) sterilization and storage, for use with one flexible endoscope, external dimensions (w x d x h): 550 x 260 x 90 mm</td>
</tr>
<tr>
<td>27550 N</td>
<td><strong>Seal</strong>, for Instrument Ports 27001 G/GF/GH/GP, package of 10, single use recommended</td>
</tr>
<tr>
<td>27001 RA</td>
<td><strong>Cleaning Adaptor</strong></td>
</tr>
<tr>
<td>TC 002</td>
<td><strong>IMAGE1 HUB™ FLEX-X² Adaptor</strong>, video endoscope adaptor, for use with IMAGE1 HUB™ and FLEX-X² (11278 VSK/VSUK)</td>
</tr>
</tbody>
</table>
Flexible Uretero-Renoscope FLEX-X₂S

As Every Detail Counts!

The new dimension of the KARL STORZ Uretero-Renoscope FLEX-X₂S delivers unprecedented detail sharpness and brilliance thanks to double fiber capacity. This optical enhancement, in conjunction with already familiar and proven properties, provides a perfect overview of all situations – as every detail counts.

Excellent visualization
- The minimal 7.5 Fr. sheath provides maximum patient comfort. The FLEX-X2S offers excellent visualization even in the most confined spaces thanks to the double amount of fibers – as every detail counts.

Minimal sheath of 7.5 Fr.
- Minimal sheath circumference for atraumatic, patient-friendly treatment and easy access.

Torsion-resistant, stable sheath
- The sheath design incorporates state-of-the-art materials to provide 1:1 torque for enhanced steerability.

Intuitive control
- The advanced vertebra design provides anatomy-conforming deflection – regardless of anatomical anomalies.
## Flexible Uretero-Renoscope FLEX-X²S
for access to the entire intrarenal collecting system

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Uretero-Reno-Fiberscope</th>
<th>Deflection of distal tip</th>
<th>Direction of view</th>
<th>Angle of view</th>
<th>Working length</th>
<th>Working channel inner diameter</th>
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<td>with positive deflection</td>
<td>0°</td>
<td>88°</td>
<td>67 cm</td>
<td>3.6 Fr.</td>
<td>7.5 Fr.</td>
<td></td>
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<tr>
<td>11278 AUK</td>
<td>with contrapositive deflection</td>
<td>0°</td>
<td>88°</td>
<td>67 cm</td>
<td>3.6 Fr.</td>
<td>7.5 Fr.</td>
<td></td>
</tr>
</tbody>
</table>

The following accessories are included:

- **27677 X**  
  Case

- **13242 XL**  
  Leakage Tester, with bulb and manometer

- **27651 AL**  
  Cleaning Brush, round, flexible, outer diameter 2 mm, for working channel diameter 1.2-1.8 mm, length 150 cm

- **27014 Y**  
  Luer-Adaptor, with seal
Optional Accessories

11014 Y  **Fiber Fixation**, instrument port for the insertion and fixation of laser fibers, stone baskets, wires etc. in flexible endoscopes

6927691  **Adaptor for Two-Way Stopcock**, Luer-Lock with O₂ tube connection

11275 FE  **Grasping Forceps**, double action jaws, flexible, 3 Fr., length 100 cm

11275 ZE  **Biopsy Forceps**, double action jaws, flexible, 3 Fr., length 100 cm

27023 LB  **Stone Basket**, nitinol, without tip, straight, 1.9 Fr., length 120 cm, 4 wires, basket diameter 12 mm, sterile, for single use

11770 T  **Coagulation Electrode**, unipolar, 3 Fr., length 110 cm

27025 P  **Guide Wire**, with ball end, 3 Fr., sterile, package of 10

27550 N  **Seal**, for Instrument Ports 27001 G/GF/GH/GP, package of 10, single use recommended

27001 RA  **Cleaning Adaptor**

39402 AS  **Plastic Container for Sterilization**, especially suited for gas and hydrogen peroxide (Sterrad®) sterilization and storage, perforated, with lid, for use with flexible endoscopes up to max. 95 cm working length, external dimensions (w x d x h): 550 x 260 x 92 mm
Ultra-Thin Uretero-Renscope

The new, ultra-thin uretero-renoscope with a distal tip of only 6.5 Fr. features small dimensions, a brilliant image, and an excellent view that is ensured by the maximum irrigation output afforded by a large working channel. Therefore, the instrument can be used in adult as well as in pediatric urology. The minimal sheath diameter and the atraumatic sheath end enable atraumatic insertion into the ureter, even in cases of difficult anatomic conditions. Excellent gliding properties ensure the highest patient comfort. Due to the minimal diameter of the uretero-renoscope, the insertion of a ureteral catheter may not be required, which makes this instrument particularly economical in daily hospital use.

- Minimal sheath circumference
- Sheath with very smooth, long taper step
- Excellent gliding properties for highest patient comfort
- Maximum irrigation flow thanks to a large working channel
- Excellent view
- Easy handling

27000 L/K  Distal tip: 6.5 Fr.
Instrument sheath: 7 Fr., 1 step, 9.9 Fr.
Working channel: 4.8 Fr., for use with instruments up to 4 Fr.
Telescope: KARL STORZ fiber optic system, direction of view 6°
Length: 43/34 cm
Eyepiece: angled, rigid
Accessories for Uretero-Renoscopes and Ureteroscopes

For use with 27000 L

The following accessories are included in delivery:

- **27001 E**  Insertion Aid, for guide wires
- **27001 G**  Instrument Port with Sealing System and Quick Release Lock, 1 channel
- **27504**  Flow Control Stopcock
- **27500**  LUER-Lock Tube Connector, male, tube diameter 9 mm
- **27502**  LUER-Lock Tube Connector, with stopcock, dismantling
- **39501 X**  Wire Tray, 644 x 150 x 80 mm
  including:
  Cleaning Adaptor, for Instrument Ports 27001 G/GF/GH

Optional accessories:

- **27001 GF**  Instrument Port with Sealing System and Quick Release Lock, 2 channels
- **27001 GH**  Instrument Port with Sealing System and Quick Release Lock, 2 channels, (1 straight channel, 1 lateral channel)
- **27550 N**  Seal, for Instrument Ports 27001 G/GF/GH/GP, LUER-Adaptor 27014 Y and 26252 BS/BL, package of 10, single use recommended
## Accessories for Uretero-Renoscopes and Ureteroscopes

For use with 27001 L/K

<table>
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<th>Code</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>27424 F</td>
<td><strong>Grasping Forceps</strong>, rigid, for stone fragments, double action jaws, 4 Fr., length 60 cm, color code: blue</td>
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<tr>
<td>27424 P</td>
<td><strong>Grasping Forceps</strong>, rigid, for larger stones and fragments, double action jaws, 4 Fr., length 60 cm, color code: blue</td>
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<td>27424 Z</td>
<td><strong>Biopsy Forceps</strong>, rigid, double action jaws, 4 Fr., length 60 cm, color code: blue</td>
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<tr>
<td>27424 R</td>
<td><strong>PÉREZ-CASTRO Forceps</strong>, rigid, long double action jaws, for Steinstrasse, 4 Fr., length 60 cm, color code: blue</td>
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<td>27424 U</td>
<td><strong>Splitting Forceps</strong>, rigid, cutting upwards, single action jaws, 4 Fr., length 60 cm, color code: blue</td>
</tr>
<tr>
<td>27023 VB</td>
<td><strong>Stone Basket</strong>, sterile, for single use, 2.5 Fr., length 120 cm</td>
</tr>
<tr>
<td>27023 Y</td>
<td><strong>Brush for Cytology</strong>, unsterile, for single use, 3 Fr., package of 5</td>
</tr>
</tbody>
</table>
CALCULASE II
LASER System for Endoscopic Stone Therapy and Soft Tissue Treatment

LASER System for the Treatment of Bladder, Ureter and Kidney Stones and for opening stenoses/strictures as well as tumor ablations

Special Features:
- 20 Watt for effective and precise treatment: precise cutting effect in the case of stenoses
- Extremely fast lithotripsy
- Automatic fiber detection:
  - High user-friendliness
  - Increased safety
- Green pilot laser: Good visibility even in challenging situations
- Special design with:
  - Mobile desktop housing
  - Automatically controlled energy output
  - Integrated low-noise cooling system

- Least possible tissue damage
- High success rate independent of stone composition
- Lithotripsy under endoscopic control
- For use with rigid, semiflexible and flexible endoscopes
- For use on endoscopic equipment carts
- Easy to maintain
CALCULASE II
Holmium LASER System for Endoscopic Stone Therapy and Soft Tissue Treatment, Recommended System Configuration

**27 7502 01-1**  CALCULASE II, Holmium LASER system, power supply 230 VAC, 50/60 Hz
including:
- Mains Cord
- One-Pedal Footswitch
- Key Set, package of 2, for key-operated switch
- Remote Interlock Connector
- Safety Goggles Ho:YAG LASER 2080 µm
- Ion Exchanger

**27 7502 01U1**  Same, power supply 115 VAC, 50/60 Hz

Please note:
Each lithotripsy system requires a separate basic fiber set: **27 7502 87** or **27 7502 86**.

### Parameters for 230 µm Fibers

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### Parameters for 365 µm and 600 µm Fibers

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<tr>
<td>1.7 J</td>
<td></td>
<td>6.8 W</td>
<td>10.2 W</td>
<td>13.6 W</td>
<td>17 W</td>
<td>–</td>
</tr>
<tr>
<td>2 J</td>
<td></td>
<td>8 W</td>
<td>12 W</td>
<td>16 W</td>
<td>20 W</td>
<td>–</td>
</tr>
</tbody>
</table>

Parameter settings are selected via the LASER fiber code.
CALCULASE II

Accessories

**Fiber Sets, reusable**

- **27 7502 71-P6** CALCULASE II Fiber 230 µm, reusable, sterile, length 300 cm, package of 6
- **27 7502 72-P6** CALCULASE II Fiber 365 µm, reusable, sterile, length 300 cm, package of 6
- **27 7502 73-P6** CALCULASE II Fiber 600 µm, reusable, sterile, length 300 cm, package of 6

**Fiber Sets, for single use**

- **27 7502 77-P6** CALCULASE II Fiber 230 µm, for single use, sterile, length 300 cm, package of 6
- **27 7502 78-P6** CALCULASE II Fiber 365 µm, for single use, sterile, length 300 cm, package of 6
- **27 7502 79-P6** CALCULASE II Fiber 600 µm, for single use, sterile, length 300 cm, package of 6

**27 7502 86** CALCULASE II Fiber Kit including:
- 3x CALCULASE II Fiber 230 µm, reusable
- 3x CALCULASE II Fiber 365 µm, reusable
- 3x CALCULASE II Fiber 600 µm, reusable

**Additional accessories**

- **27 7500 82** Fiber Cutter
- **27 7502 80** Fiber Stripper Set, sterilizable, for use with CALCULASE II fibers including:
  - Silicone Pad
  - Ceramic Knife
  - Fiber Strippers 230, 365 and 600 µm
- **27 7500 95** Safety Goggles Ho:YAG Laser, 2080 µm

The CALCULASE II fibers above are compatible with the previous model CALCULASE (27 7501 20-1).

* Not for Sale in the U.S.
CALCULASE II Equipment Cart

Special Features:
- Flexible use of CALCULASE II in various ORs
- Spacious storage room for accessories and expendable materials in two lockable drawers (LASER safety goggles or LASER fibers)
- Integrated cable winding and footswitch holder maintain an uncluttered OR
- Easy to transport due to large, smoothrunning and antistatic dual wheels
- Powder-coated panels and shelves meet the most stringent quality and hygiene standards

UG 210 Equipment cart, wide, low, rides on 4 antistatic dual wheels equipped with locking brakes, mains switch on cover, double rear panel with integrated electrical subdistributors with 6 sockets, potential earth connectors,

Dimensions in mm (w x h x d):
Equipment cart: 830 x 1265 x 730,
shelf: 630 x 25 x 510,
caster diameter: 150 mm,

including:
Base module, equipment cart, wide
Cover, equipment cart, wide
Beam package, equipment cart, low
Shelf, wide
2x Drawer unit with lock, wide
2x Equipment rail, long
IMAGE1 S Camera System

Economical and future-proof
- Modular concept for flexible, rigid and 3D endoscopy as well as new technologies
- Forward and backward compatibility with video endoscopes and FULL HD camera heads
- Sustainable investment
- Compatible with all light sources

Innovative Design
- Dashboard: Complete overview with intuitive menu guidance
- Live menu: User-friendly and customizable
- Intelligent icons: Graphic representation changes when settings of connected devices or the entire system are adjusted

- Automatic light source control
- Side-by-side view: Parallel display of standard image and the Visualization mode
- Multiple source control: IMAGE1 S allows the simultaneous display, processing and documentation of image information from two connected image sources, e.g., for hybrid operations

Dashboard

Live menu

Intelligent icons

Side-by-side view: Parallel display of standard image and Visualization mode
Brilliant Imaging
- Clear and razor-sharp endoscopic images in FULL HD
- Natural color rendition

- Reflection is minimized
- Multiple IMAGE1 S technologies for homogeneous illumination, contrast enhancement and color shifting

FULL HD image

CLARA

FULL HD image

CHROMA

FULL HD image

SPECTRA A*

FULL HD image

SPECTRA B**

* SPECTRA A: Not for sale in the U.S.
** SPECTRA B: Not for sale in the U.S.
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

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

### Specifications:

| HD video outputs | - 2x DVI-D  
| Format signal outputs | 1920 x 1080p, 50/60 Hz  
| LINK video inputs | 3x  
| USB interface | 4x USB, (2x front, 2x rear)  
| SCB interface | 2x 6-pin mini-DIN  
| Power supply | 100–120 VAC/200–240 VAC  
| Power frequency | 50/60 Hz  
| Protection class | I, CF-Defib  
| Dimensions w x h x d | 305 x 54 x 320 mm  
| Weight | 2.1 kg

For use with **IMAGE1 S**

**IMAGE1 S CONNECT Module TC 200EN**

TC 301

**IMAGE1 X-LINK**, link module, for use with flexible video endoscopes, power supply 100–120 VAC/200–240 VAC, 50/60 Hz, for use with **IMAGE1 CONNECT TC 200EN** including:

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

### Specifications:

| Camera System |  
| Supported camera heads/video endoscopes | 11900 AP/AN, 11900 BP/BN, 11101 VP/VN, 13820 PKS/NKS, 13821 PKS/NKS, 13885 PKS/NKS, 13924 PKS/NKS, 13925 PKS/NKS, 11272 VPI/VNI, 11272 VPIU/VNIU, 11272 VP/U/VNIU, 11272 VP/U/VNU, 11272 VNU/VNI, 11278 V, 11278 VU (IMAGE1 S modes available)  
| LINK video outputs | 1x  
| Power supply | 100–120 VAC/200–240 VAC  
| Power frequency | 50/60 Hz  
| Protection class | I, CF-Defib  
| Dimensions w x h x d | 305 x 54 x 320 mm  
| Weight | 1.86 kg
Monitors

9619 NB  
19" HD Monitor,  
color systems PAL/NTSC, max. screen  
resolution 1280 x 1024, image format 4:3,  
power supply 100–240 VAC, 50/60 Hz,  
wall-mounted with VESA 100 adaption,  
including:  
External 24 VDC Power Supply  
Mains Cord

9826 NB  
26" FULL HD Monitor,  
wall-mounted with VESA 100 adaption,  
color systems PAL/NTSC,  
max. screen resolution 1920 x 1080,  
image format 16:9,  
power supply 100–240 VAC, 50/60 Hz  
including:  
External 24 VDC Power Supply  
Mains Cord
### Monitors

<table>
<thead>
<tr>
<th>KARL STORZ HD and FULL HD Monitors</th>
<th>19&quot;</th>
<th>26&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wall-mounted with VESA 100 adaption</strong></td>
<td>9619 NB</td>
<td>9826 NB</td>
</tr>
</tbody>
</table>

**Inputs:**
- DVI-D
- Fibre Optic
- 3G-SDI
- RGBS (VGA)
- S-Video
- Composite/FBAS

**Outputs:**
- DVI-D
- S-Video
- Composite/FBAS
- RGBS (VGA)
- 3G-SDI

**Signal Format Display:**
- 4:3
- 5:4
- 16:9
- Picture-in-Picture
- PAL/NTSC compatible

**Specifications:**

<table>
<thead>
<tr>
<th>KARL STORZ HD and FULL HD Monitors</th>
<th>19&quot;</th>
<th>26&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Desktop with pedestal</strong></td>
<td>optional</td>
<td>optional</td>
</tr>
<tr>
<td><strong>Product no.</strong></td>
<td>9619 NB</td>
<td>9826 NB</td>
</tr>
<tr>
<td><strong>Brightness</strong></td>
<td>200 cd/m² (type)</td>
<td>500 cd/m² (type)</td>
</tr>
<tr>
<td><strong>Max. viewing angle</strong></td>
<td>178° vertical</td>
<td>178° vertical</td>
</tr>
<tr>
<td><strong>Pixel distance</strong></td>
<td>0.29 mm</td>
<td>0.3 mm</td>
</tr>
<tr>
<td><strong>Reaction time</strong></td>
<td>5 ms</td>
<td>8 ms</td>
</tr>
<tr>
<td><strong>Contrast ratio</strong></td>
<td>700:1</td>
<td>1400:1</td>
</tr>
<tr>
<td><strong>Mount</strong></td>
<td>100 mm VESA</td>
<td>100 mm VESA</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>7.6 kg</td>
<td>7.7 kg</td>
</tr>
<tr>
<td><strong>Rated power</strong></td>
<td>28 W</td>
<td>72 W</td>
</tr>
<tr>
<td><strong>Operating conditions</strong></td>
<td>0–40°C</td>
<td>5–35°C</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>-20–60°C</td>
<td>-20–60°C</td>
</tr>
<tr>
<td><strong>Rel. humidity</strong></td>
<td>max. 85%</td>
<td>max. 85%</td>
</tr>
<tr>
<td><strong>Dimensions w x h x d</strong></td>
<td>469.5 x 416 x 75.5 mm</td>
<td>643 x 396 x 87 mm</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>100–240 VAC</td>
<td>100–240 VAC</td>
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<tr>
<td><strong>Certified to</strong></td>
<td>EN 60601-1, protection class IPX0</td>
<td>EN 60601-1, UL 60601-1, MDD93/42/EEC, protection class IPX2</td>
</tr>
</tbody>
</table>

**Optional accessories:**
- 9826 SF Pedestal, for monitor 9826 NB
- 9626 SF Pedestal, for monitor 9619 NB
Data Management and Documentation
KARL STORZ AIDA® – Exceptional documentation

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.
Workflow-oriented use

**Patient**
Entering patient data has never been this easy. AIDA seamlessly integrates into the existing infrastructure such as HIS and PACS. Data can be entered manually or via a DICOM worklist. All important patient information is just a click away.

**Checklist**
Central administration and documentation of time-out. The checklist simplifies the documentation of all critical steps in accordance with clinical standards. All checklists can be adapted to individual needs for sustainably increasing patient safety.

**Record**
High-quality documentation, with still images and videos being recorded in FULL HD and 3D. The Dual Capture function allows for the parallel (synchronous or independent) recording of two sources. All recorded media can be marked for further processing with just one click.

**Edit**
With the Edit module, simple adjustments to recorded still images and videos can be very rapidly completed. Recordings can be quickly optimized and then directly placed in the report. In addition, freeze frames can be cut out of videos and edited and saved. Existing markings from the Record module can be used for quick selection.

**Complete**
Completing a procedure has never been easier. AIDA offers a large selection of storage locations. The data exported to each storage location can be defined. The Intelligent Export Manager (IEM) then carries out the export in the background. To prevent data loss, the system keeps the data until they have been successfully exported.

**Reference**
All important patient information is always available and easy to access. Completed procedures including all information, still images, videos, and the checklist report can be easily retrieved from the Reference module.
Notes