ENDOSPINE® – THE MOBILE OPERATING TUBE
for the Treatment of Central to Far Lateral
Disc Herniation and Bilateral Lumbar Canal
Decompression via Unilateral Approach

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© 2015 Published by EndoPress®. Tuttlingen
Printed in Germany, ISBN 978-3-89756-802-0
P.O. Box, D-78503 Tuttlingen, Germany
Phone: +49 (0) 7461/14590
Fax: +49 (0) 7461/708-529
E-mail: Endopress@t-online.de

Editions in languages other than English and German are in preparation. For up-to-date information, please contact publisher Tuttlingen, Germany, at the address shown above.

Typography and color image reproduction:
EndoPress®, D-78532 Tuttlingen, Germany

Printed by:
Straub Druck+Medien AG,
D-78713 Schramberg, Germany

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1.0 Introduction

The incidence of lumbar intervertebral disc prolapse is a common occurrence. Although its treatment seldom involves surgery, each year more than 200,000 procedures are carried out in the United States and more than 40,000 in Germany.

Standard surgical treatment is discectomy with a posterior approach. With the ENDOSPINE® operating tube, the same approach and surgical technique can be used while reducing the size of the skin incision and access route (particularly in obese patients and in any deeply located site of operation, such as foraminal hernias or spinal canal stenosis) as the surgeon’s eye is focused right inside the body close to the problem which must be eliminated.

Apart from the aesthetic benefit, the shortened access route and reduced length of the skin incision minimize post-operative discomfort and allow for rapid resumption of normal physical activities, including sports.

Why did we develop the new Duo System?

The ENDOSPINE® Duo System has been designed to reduce the size of the incision. The indications are identical to those of the standard ENDOSPINE® system; nevertheless, the reduced size and weight of the Duo System – when coupled to a HD camera head – is responsible for a relative loss of stability and requires some strength to guide and hold it during the surgical procedure. Therefore, the Duo System is mainly used for cosmetic reasons, especially in young ladies.

The New 2-part Duo Operating Tube with modified obturator and working insert.

Standard ENDOSPINE® Version and the new Duo ENDOSPINE® System. The Duo System has a diameter of 23.5 mm compared to 29 mm with the Standard System. Using the Duo System allows the incision to be reduced by 5.5 mm.

### Table 1

<table>
<thead>
<tr>
<th>Item Nr.</th>
<th>Operating Tube</th>
<th>Operating Tube</th>
<th>Obturator</th>
<th>Obturator</th>
<th>Working Insert</th>
<th>Working Insert</th>
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<tbody>
<tr>
<td>Length</td>
<td>28163 DWS= 25 mm</td>
<td>28163 DW= 40 mm</td>
<td>–</td>
<td>51.5 mm</td>
<td>41.5 mm</td>
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<tr>
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<td>–</td>
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<td>–</td>
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<tr>
<td>Working channel diam.</td>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>8 mm</td>
<td>8 mm</td>
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<tr>
<td>Suction channel diam.</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4.6 mm</td>
<td>4.6 mm</td>
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<tr>
<td>Nerve Retractor profile</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>swallow tail</td>
<td>straight</td>
</tr>
<tr>
<td>Nerve Retractor length</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>112 mm</td>
<td>112 mm</td>
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### Table 2

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Duo System</th>
<th>Standard System</th>
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<tr>
<td>ENDOSPINE® DESTANDAU Operating Tube includes:</td>
<td>28163 DWS</td>
<td>28163 DW</td>
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<td>Operating Tube</td>
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<td>28163 DW</td>
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<td>Operating Tube Attachment</td>
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<td>Obturator</td>
<td>28163 DOS</td>
<td>28163 DO</td>
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<tr>
<td>ENDOSPINE® DESTANDAU Working Insert includes:</td>
<td>28163 DXS</td>
<td>28163 DXH</td>
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<tr>
<td>Working Insert</td>
<td>28163 DXS</td>
<td>28163 DXH</td>
</tr>
<tr>
<td>Nerve Retractor</td>
<td>28163 DPS</td>
<td>28163 DPH</td>
</tr>
</tbody>
</table>
2.0 Technique

The ENDOSPINE® system consists of an operating tube which is positioned on the laminae after incising the skin and the aponeurosis and detaching the muscles from the spinous process. The ENDOSPINE® working insert has an integrated channel for the telescope. There are two additional channels, one for the suction tube and the other one for the operating instruments.

There is an angle of 12° between the working channel and the channel used by the telescope. This angle always enables the surgeon to see the tips of the instruments and to use a suction tube as second instrument.

The ENDOSPINE® system includes a nerve root retractor. This allows the nerve to be medialized thus removing any fragile structure from the operating area.

The HOPKINS® 0°-telescope offers a wide field of vision of the operating area without distortion and emits the light generated by a cold light source and transmitted to the endoscope via a fiber optic light cable. The entire procedure is performed under constant video-endoscopic control via the monitor screen. By resecting part of the superior lamina, the articular processes and the yellow ligament, the nerve root, and then the hernia are exposed. The latter is removed and a microdiscectomy can be performed. Once full decompression of the nerve has been confirmed, perfect hemostasis of the muscles can be achieved while withdrawing the ENDOSPINE® operating tube. A special dressing enables the patient to shower or bathe on the same day.
3.0 Advantages

The ENDOSPINE® system offers four essential advantages during surgery.

- The ENDOSPINE® operating tube is mobile. This enables the surgeon to illuminate and explore even hidden recesses, and to produce images of them. This means rapid and multi-task use.
- Perfect quality of vision
  Provided by a 4 mm HOPKINS® telescope with no shadow or eclipse.
- Magnification of anatomical structures and a wide field of vision: the eye is practically “inside the spine”.
- Because of its special design, the surgeon can permanently see the tips of the surgical instruments and the different anatomical structures. This provides better control, increased comfort and, above all, increased safety for the patient.

Indications for the use of the ENDOSPINE® system. The ENDOSPINE® operating tube is a multiple indication surgical device; it is designed for all types of disc herniation and particularly for foraminal hernias. For bilateral decompression of narrow lumbar canals a simple unilateral posterior approach can be used.

Using the ENDOSPINE® System

The ENDOSPINE® operating tube is inserted and the obturator removed. The working insert and the HOPKINS® telescope are placed in position.

The system remains in place without further support. The fiber optic light cable must rest on a table to avoid its slipping along the patient and pulling on the ENDOSPINE®. The ENDOSPINE® operating tube is thus in a stable position and does not need to be held or fixed.

The position of the ENDOSPINE® operating tube may be readjusted:

- using the left hand and the suction tube through its appropriate channel,
- with the right hand and an operating instrument (here a Kerrison bone punch) through its appropriate channel.

When the device is tilted or displaced, the ENDOSPINE® operating tube follows, and the tip of the instrument is constantly in the field of the endoscope.

- It may easily be readjusted using both hands alternately.

The working insert may be fixed to the operating tube in different positions:

- in the superior position, resection of the bone and yellow ligament is facilitated;
- in the inferior position, the zoom effect facilitates dissection of the nerve root.
Introducing the ENDOSPINE® operating tube using the blunt obturator.

Stable position of the ENDOSPINE® operating tube when in place.

The tilted ENDOSPINE® operating tube with a suction tube.

The ENDOSPINE® operating tube with an operating instrument.

ENDOSPINE® with suction tube and operating instrument.
4.0 Surgical Technique

Patient Positioning
The patient, under general or spinal anesthesia, is placed in a modified knee-chest position on a special operating table.

Marking the Entry Point
A special localization device with two arms is used under fluoroscopic control to determine the point of the skin incision. The target disc is centered on the monitor screen of the image intensifier. The localization device is placed in position and is modified until both arms are aligned with the disc.

The working insert in upper position in the operating tube.

The working insert in the lower position in the operating tube.

Patient positioning.

Fluoroscopic-guided placement of the localization device to determine the point of insertion of the ENDOSPINE® operating tube.
The point of incision is marked on the skin and the direction of the ceiling light is adjusted to the direction of the approach i.e. to the orientation plane of the disc. This direction is a line of reference throughout the operation.

The surgeon stands on the side where the hernia is located. To his left is the instrument table on which the video camera and cold light cables are resting; this avoids any traction on the ENDOSPINE® operating tube which remains balanced.

Adjust the ceiling light to find the appropriate direction of approach.

In the first instance the technique will be described for a left L5-S1 hernia, then for different types of hernia.

Position of the assistant and the instrument table for a left-sided herniated disk.

Scalpel incision.
The skin incision is made 5 mm from the midline, at the lateral edge of the spinous process.

Hemostasis is carried out by bipolar coagulation. The aponeurosis is dissected with scissors that are used in combination with a bone chisel to detach the muscles from the spinous process and lamina. A cotton swab attached to a thread is slid upwards to retract the muscles and provide hemostasis.

The ENDOSPINE® operating tube is advanced along the spinous process on the lamina. It can sometimes be difficult to remove the obturator; if this is the case, pushing in with the thumbs on the operating tube will separate it from the obturator so that the latter can be withdrawn easily.
It is essential for the rest of the procedure that soft tissue be removed from the end of the operating tube to expose the superior lamina and yellow ligament as clearly as possible. Muscle vessels are coagulated using the bipolar forceps. The first step of the endoscopic stage of the procedure involves partial resection of the superior lamina to detach the yellow ligament. Resection is initiated at the medial part of the superior lamina and continues laterally. Once detached, the yellow ligament is resected using a Kerrison bone punch.

Position of the distal end of the operating tube (transverse section indicated above) on the superior lamina.
In the next step, the external border of the dural sheath in the superior part of the operating field is exposed and a cotton swab can be slid into place. Resection of the lateral extension of the yellow ligament and the internal part of the underlying articular mass exposes the nerve root. This can be dissected.

The nerve root retractor is inserted into the spinal canal. A second cotton swab is slid downwards, aiding hemostasis and shifting the nerve medially. This allows the nerve root retractor to be removed in order to regain the mobility of the system.

Any free fragments are removed and a partial nucleotomy is performed. The disc cavity is irrigated with isotonic solution under controlled inflow pressure.

The disc cavity may be inspected by inserting the HOPKINS® telescope.

The ENDOSPINE® operating tube is withdrawn and hemostasis of the muscle vessels can be completed.
Topographic Variations: Right Posterolateral Disc Herniation

For a right-sided lumbar disc hernia, the surgeon is positioned to the right of the patient with a table to his/her left, above the feet of the patient, to support the cables. The technique is identical, but difficulties may be encountered during partial resection of the superior lamina. This resection should be started from the medial part of the lamina making a notch there. From this notch the bone can easily be resected outwards. This is continued until the canal is open.

Central Disc Herniation

In central disc hernias, the approach is from the side where the symptoms predominate.

In large medial hernias, it is impossible to expose the apex of the hernia. A hook may aid in extracting the hernia.
Foraminal / Extraforaminal Disc Herniation

In foraminal and extraforaminal disc hernias, the target is no longer the disc but the foramen. On the fluoroscopic image intensifier screen, the two arms of the localization device must be brought in line with the superior third of the foramen, parallel to the disc.

The skin incision is likewise 5 mm from the midline but slightly higher. The muscles are dissected laterally to expose the lateral limit of the isthmus.

The nerve root retractor, that is not useful in this type of hernia, may serve as a muscle retractor. For this purpose, it should be introduced prior to the operating tube and the curved part directed laterally, following the contour of the paravertebral muscles.

Bone resection begins with the inferior part, i.e. at the superior extremity of the articular mass.

Frequently, bleeding from a muscle artery occurs, which must be controlled by repeated coagulation.

Bone resection continues upwards until the foraminal ligament has been elevated from the bone. Normally, the nerve root is visible running around the pedicle. If this is not the case, bone resection continues until arriving at the base of the pedicle to expose the nerve. In the next step, the ligament is separated from the root, and then resected by use of Kerrison forceps.

The nerve root is dissected, the hernia is exposed and removed.
Lumbar Canal Stenosis
This endoscopic technique may be used for treatment of a segmental stenosis of the spinal canal.
The aim of the procedure is to decompress the nerve roots on both sides using a unilateral access route.
The approach is the same and is performed on the right or on the left side, depending on which side the symptoms predominate.
Part of the superior lamina and the medial part of the articular mass are resected to expose the lateral limit of the dural sheath and a cotton swab is slid into place.
The lateral expansion of the yellow ligament and a part of the articular mass are resected downwards to decompress the left part of the dural sheath and the root on the left side.
The next step consists of removing a small part of the posterior arch of the superior vertebra so as to be able to slide in a swab on the opposite side in the superior part of the field. From there, the yellow ligament and the subjacent articular mass can be resected, in a supero-inferior direction, and the dural sheath and nerve root on the contralateral side are decompressed.
Decompression is assessed on both sides.

5.0 Post-operative Care
The patient is mobilized immediately after recovering from anesthesia. A muscle relaxant is given systematically.
Physiotherapy is given immediately to mobilize the spine and loosen the muscles. With an impermeable dressing the patient may take a bath or shower straight away.
The resumption of former physical activities is encouraged as soon as possible, particularly sports. There are no post-operative patient restrictions.
6.0 Complications

Complications are the same as for conventional surgery of herniated discs.

Postoperative spondylodiscitis is less common with endoscopy than with classic techniques, probably because the instruments which enter the herniated disc never touch the skin.

Dural Tear

Dural tear is a relatively common complication following spine surgery, which in Dr. Destandau's series occurred in 1.8% of cases. Dural tears are more frequent in cases of hernia recurrence due to the presence of scar tissue making it more difficult to dissect the nerve root and the thecal sac. Another frequent cause for the occurrence of dural tears is when the dura mater is accidentally pinched by the blind side of the Kerrison bone punch. The tear is usually small and is generally accompanied by a CSF leak, although in a few rare cases, the arachnoid membrane remains intact.

The objective of treatment is to repair the tear. Depending on the size, one can use a simple patch of SURGICEL or GELFOAM, muscle fragment, biological glue, a suture or clips. We recommend tightly suturing the fascia. Generally speaking, dural tears normally have no effect on the duration of hospital stay or on the post-operative recovery time.

In a certain number of cases, the tear is responsible for complications such as:

- **Orthostatic Headaches.** These headaches are usually relieved by advising the patient to remain in the horizontal position, and under normal circumstances the symptoms disappear within a few days.
- **Meningocele.** Meningoceles are frequently asymptomatic and do not require any treatment. In certain exceptional cases, revision surgery can be necessary to repair the tear.
- **CSF fistula.** This complication requires surgical repair in order to patch the tear and suture the various surgical planes.
- **Trans-dural Radicular Hernia.** In very rare cases, a nerve root of the cauda equina may herniate through the dural tear and cause very acute pain. The clinical symptoms are often very pronounced, contrary to the radiological exams which are normal. It is often the intensity of the pain which leads one back to the operating room and to the subsequent detection of this complication. The treatment is straightforward and involves repositioning of the root in the dural sac and closure of the defect.

Since 1993 this technique has been used on more than 10,000 patients with excellent results.

7.0 Advantages of Endoscopy

The reduced dimension of the access route minimizes muscular trauma and post-operative pain; this considerably facilitates the rapid resumption of physical activities.

Patients appreciate the aesthetic outcome of endoscopic-guided operations.

The surgeon's eye is practically "inside the spine". This provides improved control of the operating field, facilitating the identification of the anatomical structures which largely compensates for the absence of three-dimensional vision. The result is increased safety for the patient.

The endoscopic view facilitates hemostasis not only of deeply located structures but also of muscles, thus contributing to improve post-operative comfort. In addition, the large field of vision and the good depth of focus provided by the HOPKINS® endoscope are the outstanding differences between this technique and other minimally invasive techniques, especially appreciated when the operating field is deep. This is particularly true for foraminal and extraforaminal disc hernias, spinal canal stenosis and when treating obese patients.

Finally the reduced rate of infectious complications is a crucial advantage of this technique.
Instruments and Equipment for the ENDOSPINE® – The Mobile Operating Tube

HOPKINS® Straight Forward Telescope
DESTANDAU ENDOSPINE® Operating Tube and Working Insert
Operating Instruments
IMAGE1 S Camera System
Systems for Data Management and Documentation
Accessories for Video Documentation
Endoscopic Microdiscectomy

HOPKINS® Straight Forward Telescope 0°, enlarged view
DESTANDAU ENDOSPINE® Operating Tube and Working Insert

Recommended Set acc. to J. DESTANDAU, M.D.

- **HOPKINS® Straight Forward Telescope 0°**, enlarged view, diameter 4 mm, length 18 cm, autoclavable, fiber optic light transmission incorporated, color code: green

- **DESTANDAU ENDOSPINE® Operating Tube**, oval, with Obturator 28163 DO, for use with Working Insert 28163 DXH

- **Obturator**, blunt, for use with Operating Tube 28163 DW

- **ENDOSPINE® Retractor Blade**, conical, length 5 cm, for use with ENDOSPINE® Operating Tube 28163 DW and 28163 DWS (not illustrated)

- **DESTANDAU ENDOSPINE® Working Insert**, with positioning detent, with adjustable Nerve Protector 28163 DPH, for use with ENDOSPINE® Operating Tube 28163 DW, with working channel diameter 8 mm and irrigation channel, for use with HOPKINS® Telescope 28095 AA

It is recommended to check the suitability of the product for the intended procedure prior to use.
Endoscopic Microdiscectomy
DESTANAU ENDOSPINE® Operating Tube and Working Insert

Recommended Set acc. to J. DESTANAU, M.D.

28163 DWS DESTANAU ENDOSPINE® Operating Tube, short, oval, with ENDOSPINE® Obturator 28163 DOS and ENDOSPINE® Tube Attachment 28163 DVS, for use with ENDOSPINE® Working Insert 28163 DXS

28163 DOS ENDOSPINE® Obturator, blunt, for use with short ENDOSPINE® Operating Tube 28163 DWS and ENDOSPINE® Tube Attachment 28163 DVS

28163 DRG ENDOSPINE® Retractor Blade, conical, length 5 cm, for use with ENDOSPINE® Operating Tube 28163 DW and 28163 DWS (not illustrated)

28163 DXS DESTANAU ENDOSPINE® Working Insert, short version, with positioning detent, for use with ENDOSPINE® Operating Tube 28163 DWS, with working channel diameter 8 mm and irrigation channel, for use with HOPKINS® Telescope 28095 AA, with adjustable ENDOSPINE® Nerve Protector 28163 DPS

28163 DD Localization Device for fluoroscopic determination of the point of incision for ENDOSPINE® Operating Tube 28163 DW
Endoscopic Microdiscectomy
Bone Punches, Trephine and Spoon Forceps

Recommended Set acc. to J. DESTANDAU, M.D.

- **Bone Punch**, dismantling, 90° upbiting, not through-cutting, 3 mm, working length 18 cm

- **Bone Punch**, dismantling, upbiting 45° forward, not through-cutting, 3 mm, working length 18 cm

- **Trephine**, with round handle, diameter 3 mm, working length 22 cm

- **Spoon Forceps**, dismantling, robust, oval, single action jaws, spoon size 3 x 10 mm, working length 15 cm
Endoscopic Microdiscectomy
Fine MANHES TAKE-APART® Bipolar Coagulating Forceps
Flat chisel and elevator

Recommended Set acc. to J. DESTANDAU, M.D.

28163 DZ  MANHES TAKE-APART®
Bipolar Coagulating Forceps,
with connecting pin for bipolar coagulation,
width of jaws 1 mm, diameter 5 mm,
working length 20 cm,
including:
Handle
Outer Sheath, diameter 5 mm
MANHES Forceps Insert

28163 DG  Chisel, flat, straight, with handle, distal width 15 mm,
working length 9 cm

28163 DNN  Elevator, spatula slightly curved, distal width 5 mm,
working length 13 cm
Endoscopic Microdiscectomy
Palpation Hook, FERGUSON Suction Tube, Surgical Handle with Blades

Recommended Set acc. to J. DESTANDAU, M. D.

28163 DHN  
Palpation Hook, blunt, distally angled 90°,  
hook length 5.5 mm, working length 13 cm

28163 DU  
FERGUSON Suction Tube,  
angled, with cut-off hole,  
diameter 3.7 mm,  
working length 11 cm

748000  
Surgical Handle,  
Fig. 7, length 16.5 cm, for Blades 208010 – 15, 208210 – 15

208211  
Blade, Fig. 11, sterile, package of 100

208215  
Same, Fig. 15, sterile, package of 100
Accessories for Sterile Containers

Tray for Sterile Containers

Aluminium Tray for Sterilization and Storage, from DESTANDAU ENDOSPINE® instrument sets, twolevel storage, with lid, external dimensions (w x d x h): 525 x 248 x 95 mm including:

1. Lid
2. Bottom Part, height 43 mm, Tray 1
3. Bottom Part, height 43 mm, Tray 2

39771 A
UNIDRIVE® S III NEURO SCB NEW
Recommended Standard Set Configurations

40 7017 01-1 UNIDRIVE® S III NEURO SCB, motor control unit with color display, touch screen, two motor outputs, integrated irrigation pump and integrated SCB module, power supply 100 – 240 VAC, 50/60 Hz including:

- Mains Cord
- Irrigator Rod
- Two-Pedal Footswitch, two-stage, with proportional function
- Silicone Tubing Set, for irrigation, sterilizable
- Clip Set, for use with tubing set
- SCB Connecting Cable, length 100 cm
- Single Use Tubing Set*, sterile, package of 3

Specifications:

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* mtp medical technical promotion gmbh,
Take-Off GewerbePark 46, 78579 Neuhausen ob Eck, Germany
UNIDRIVE® S III NEURO SCB
High-Speed Micro Motor

Special Features:
- Self-cooling and brushless high-speed micro motor
- Smallest possible dimensions
- Autoclavable
- Can be processed in a cleaning machine
- Maximum torque 6 Ncm
- Number of revolutions can be continuously adjusted from 1000 – 60,000 rpm
- Possible to adjust the number of revolutions to 100,000 rpm with the appropriate handle

Accessories:

280053 Universal Spray, 6x 500 ml bottles – HAZARDOUS GOODS – UN 1950
including:
Spray Nozzle

031131-10* Tubing Set, for irrigation, for single use, sterile, package of 10

* mtp medical technical promotion gmbh,
Take-Off GewerbePark 46, 78579 Neuhausen ob Eck, Germany
ENDOSPINE® – The Mobile Operating Tube for the Treatment of Central to Far Lateral Disc Herniation and Bilateral Lumbar Canal Decompression via Unilateral Approach

UNIDRIVE® NEURO
The Multifunctional Unit for Neuro-Endoscopy

252663  High-Speed Handpiece,
         long, angled, 60,000 rpm,
         for use with High-Speed Micro-Motor 20712033

330120 L  High-Speed Standard Burr,
           long, diameter 2 mm, shaft diameter 2.35 mm,
           for single use, sterile, package of 5,
           for use with 60,000 rpm High-Speed Handpiece 252663

330140 L  High-Speed Standard Burr,
           long, diameter 4 mm, shaft diameter 2.35 mm,
           for single use, sterile, package of 5,
           for use with 60,000 rpm High-Speed Handpiece 252663

330150 L  High-Speed Standard Burr,
           long, diameter 5 mm, shaft diameter 2.35 mm,
           for single use, sterile, package of 5,
           for use with 60,000 rpm High-Speed Handpiece 252663

330240 L  High-Speed Diamond Burr,
           long, diameter 4 mm, shaft diameter 2.35 mm,
           for single use, sterile, package of 5,
           for use with 60,000 rpm High-Speed Handpiece 252663

330250 L  High-Speed Diamond Burr,
           long, diameter 5 mm, shaft diameter 2.35 mm,
           for single use, sterile, package of 5,
           for use with 60,000 rpm High-Speed Handpiece 252663
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

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

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
**IMAGE1 S Camera System**

TC 200EN

**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:**

<table>
<thead>
<tr>
<th>HD video outputs</th>
<th>Format signal outputs</th>
<th>USB interface</th>
<th>SCB interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 2x DVI-D</td>
<td>1920 x 1080p, 50/60 Hz</td>
<td>4x USB, (2x front, 2x rear)</td>
<td>2x 6-pin mini-DIN</td>
</tr>
</tbody>
</table>

- 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 300

**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

**Specifications:**

<table>
<thead>
<tr>
<th>Camera System</th>
<th>TC 300 (H3-Link)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported camera heads/video endoscopes</td>
<td>TH 100, TH 101, TH 102, TH 103, TH 104, TH 106 (fully compatible with IMAGE1 S) <strong>22</strong>2220055-3, <strong>22</strong>2220056-3, <strong>22</strong>2220053-3, <strong>22</strong>2220060-3, <strong>22</strong>2220061-3, <strong>22</strong>2220054-3, <strong>22</strong>2220055-3 (compatible without IMAGE1 S technologies CLARA, CHROMA, SPECTRA*)</td>
</tr>
<tr>
<td>LINK video outputs</td>
<td>1x</td>
</tr>
<tr>
<td>Power supply</td>
<td>100–120 VAC/200–240 VAC</td>
</tr>
<tr>
<td>Power frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Protection class</td>
<td>I, CF-Defib</td>
</tr>
<tr>
<td>Dimensions w x h x d</td>
<td>305 x 54 x 320 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1.86 kg</td>
</tr>
</tbody>
</table>

* SPECTRA A: Not for sale in the U.S.
** SPECTRA B: Not for sale in the U.S.
For use with IMAGE1 S Camera System

IMAGE1 S CONNECT Module TC 200EN, IMAGE1 S H3-LINK Module TC 300
and with all IMAGE1 HUB™ HD Camera Control Units

**TH 100**  
**IMAGE1 S H3-Z** Three-Chip FULL HD Camera Head,  
50/60 Hz, IMAGE1 S compatible, progressive scan,  
soakable, gas- and plasma-sterilizable, with integrated  
Parfocal Zoom Lens, focal length f = 15–31 mm (2x),  
2 freely programmable camera head buttons,  
for use with IMAGE1 S and IMAGE1 HUB™ HD/HD

**Specifications:**

<table>
<thead>
<tr>
<th>IMAGE1 FULL HD Camera Heads</th>
<th>IMAGE1 S H3-Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product no.</td>
<td>TH 100</td>
</tr>
<tr>
<td>Image sensor</td>
<td>3x 1/3” CCD chip</td>
</tr>
<tr>
<td>Dimensions w x h x d</td>
<td>39 x 49 x 114 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>270 g</td>
</tr>
<tr>
<td>Optical interface</td>
<td>integrated Parfocal Zoom Lens, f = 15–31 mm (2x)</td>
</tr>
<tr>
<td>Min. sensitivity</td>
<td>F 1.4/1.17 Lux</td>
</tr>
<tr>
<td>Grip mechanism</td>
<td>standard eyepiece adaptor</td>
</tr>
<tr>
<td>Cable</td>
<td>non-detachable</td>
</tr>
<tr>
<td>Cable length</td>
<td>300 cm</td>
</tr>
</tbody>
</table>

**TH 104**  
**IMAGE1 S H3-ZA** Three-Chip FULL HD Camera Head,  
50/60 Hz, IMAGE1 S compatible, autoclavable,  
progressive scan, soakable, gas- and plasma-sterilizable,  
with integrated Parfocal Zoom Lens, focal length  
f = 15–31 mm (2x), 2 freely programmable camera head buttons,  
for use with IMAGE1 S and IMAGE1 HUB™ HD/HD

**Specifications:**

<table>
<thead>
<tr>
<th>IMAGE1 FULL HD Camera Heads</th>
<th>IMAGE1 S H3-ZA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product no.</td>
<td>TH 104</td>
</tr>
<tr>
<td>Image sensor</td>
<td>3x 1/3” CCD chip</td>
</tr>
<tr>
<td>Dimensions w x h x d</td>
<td>39 x 49 x 100 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>299 g</td>
</tr>
<tr>
<td>Optical interface</td>
<td>integrated Parfocal Zoom Lens, f = 15–31 mm (2x)</td>
</tr>
<tr>
<td>Min. sensitivity</td>
<td>F 1.4/1.17 Lux</td>
</tr>
<tr>
<td>Grip mechanism</td>
<td>standard eyepiece adaptor</td>
</tr>
<tr>
<td>Cable</td>
<td>non-detachable</td>
</tr>
<tr>
<td>Cable length</td>
<td>300 cm</td>
</tr>
</tbody>
</table>
Monitors

9619 NB
19" HD Monitor,
color systems PAL/NTSC, max. screen resolution 1280 x 1024, image format 4:3,
wall-mounted with VESA 100 adapation,
including:
External 24 VDC Power Supply
Mains Cord

9826 NB
26" FULL HD Monitor,
wall-mounted with VESA 100 adapation,
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

### KARL STORZ HD and FULL HD Monitors

<table>
<thead>
<tr>
<th></th>
<th>19&quot;</th>
<th>26&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall-mounted with VESA 100 adaption</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**

#### Optional accessories:

- **9826 SF Pedestal**, for monitor 9826 NB
- **9619 NB Pedestal**, for monitor 9619 NB

#### Specifications:

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

**Fiber Optic Light Cable and Cold Light Fountains**

- **Fiber Optic Light Cable**, with straight connector, diameter 3.5 mm, length 230 cm

### Cold Light Fountain XENON 300

- **Cold Light Fountain XENON 300**, lamp type: 300 W XENON lamp, power supply: 100 – 125/220 – 240 VAC, 50/60 Hz, including:
  - KARL STORZ Cold Light Fountain XENON 300 Mains Cord
  - BNC/BNC Connecting Cable, length 180 cm
  - Spare Lamp, 300 W, 15 V
  - Spare Lamp Module, 300 W, 15 V

### Cold Light Fountain XENON NOVA® 175

- **Cold Light Fountain XENON NOVA® 175**, power supply: 100–125 VAC/220–240 VAC, 50/60 Hz, including:
  - Mains Cord
  - XENON Spare Lamp, 175 watt, 15 volt
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.
Units and Accessories
High Frequency Electrosurgical AUTOCON® II 400,
Suction and Irrigation System ENDOMAT® LC

AUTOCON® II 400 SCB

20535201-125 AUTOCON® II 400 High End, Set SCB
- power supply 220 - 240 VAC, 50/60 Hz
- HF connecting sockets:
  - Bipolar combination, Multifunction,
  - Unipolar 3-pin + Erbe Neutral electrode combination 6.3 mm, jack and 2-pin
- System requirements: SCB R-UI Software Release 20090001-43 or higher
  including:
  - AUTOCON® II 400, with KARL STORZ SCB Mains Cord
  - SCB Connecting Cable, length 100 cm

Subject to the needs of the customer, additional accessories must be ordered and acquired separately.

ENDOMAT® LC SCB
Suction and Irrigation System

20330301-1 ENDOMAT® LC SCB,
- roller pump for irrigation or suction,
- power supply 100-240 VAC, 50/60 Hz
- System requirements: SCB control system with integrated SCB control software Release 20090001-22, or higher,
  including:
  - ENDOMAT® LC, with KARL STORZ-SCB Mains Cord
  - Silicone Tubing Set, for irrigation, sterilizable
  - Silicone Tubing Set, for suction, sterilizable
  - SCB Connecting Cable, length 100 cm

Subject to the needs of the customer, additional accessories must be ordered and acquired separately.

Please note that the described products in this medium may not be available yet in all countries due to different regulatory requirements.
WITH COMPLIMENTS OF
KARL STORZ—ENDOSKOPE