ENDOSCOPIC EAR SURGERY
Surgical Manual of Standard Procedures

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Introduction

The increasingly widespread acceptance of endoscopic techniques emerging in the past decades had – and still has – a considerable impact on otology, and in particular, on endoscopic surgery of the middle ear. During the 1990s, endoscopy was adopted in otology only as a diagnostic modality and was never used for surgical procedures performed via the transtympanic route. Significant advancements have been made recently in the field of endoscopic-assisted middle ear surgery and have provided the surgeon with an unprecedented, extremely detailed view of the “in vivo” anatomy of the middle ear.\(^{16,32,36}\) It is generally known that the middle ear is a very small space, which – especially in some of its subunits – is virtually not amenable to microscopic inspection. The complexity of middle ear anatomy has prompted experienced otosurgeons to devise a host of techniques for exploring areas that are difficult to visualize with the operating microscope. Despite the illumination and magnification offered by the operating microscope, its use has proved to be associated with distinct limitations. Only those structures that are located directly in the line of sight are visually accessible and it is impossible to “look around corners”. The straight line of sight, a surgeon typically has to cope with when performing middle ear surgery through a microscope, is associated with blind spots. These limitations can be compensated for by the complementary use of scopes, that provide a direction of view other than 0 degree (e.g., 30°-scopes).\(^{33}\) Apart from a more comprehensive examination of the anatomy, endoscopy allows to explore and better understand the physiology and ventilation pathways of the middle ear which can become blocked as a result of specific pathological alterations.\(^9\)

While instruments and auxiliary devices used in endoscopic ear surgery are similar to those of traditional otosurgical procedures, curved instruments have been adapted to the current otoscopic approaches – as determined by principles of good surgical practice – resulting in longer and thinner instruments, with single or double curvature, with various angles and more delicate extremities (Figs. 1.1, 1.2).

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**Fig. 1.1** Left ear. Cadaveric dissection. An ear hook, curved to the left, is used to mobilize the chorda tympani in a stenotic external auditory canal.

**Fig. 1.2** Right ear. Cadaveric dissection. Double-ended curette used for a complete exposure of the attic.

**Fig. 1.3** Right ear. Panoramic view of the tympanic cavity before (a) and after (b) use of CLARA visualization mode. These specific modes of the digital image enhancement system is used effectively to brighten dark aspects of the image thus allowing for improved detail recognition.
In recent years, major advancements in the field of videoendoscopic imaging technology have been introduced in otolaryngology allowing surgeons to derive particular advantages in terms of real-time enhanced visualization. An outstanding example of such an up-to-date high-definition (HD) camera system is the IMAGE1 S (KARL STORZ Tuttlingen, Germany). The modular design of the system allows the operator to choose between various visualization modes (CLARA, CHROMA and SPECTRA A*/B**), which have been designed to modify the video signal’s chrominance components and to improve the perception of details. The main feature of CLARA mode is that it provides a more distinct appearance of darker areas by harmonizing density values in all parts of the endoscopic image. SPECTRA A*/B** mode and CHROMA mode have in common that they facilitate evaluation of the mucosal surface and the subepithelial vascularization, and this is very useful to distinguish healthy tissue from pathology, especially during cholesteatoma surgery (Figs. 1.3–1.6).

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

Fig. 1.4 SPECTRA B** visualization mode. The visual appearance of vascularity is enhanced and differentiation between the cholesteatoma matrix and adjacent structures is improved.

Fig. 1.5 Tympanic membrane demonstrated by standard visualization (a), Views of the same site using CLARA (b) and CHROMA (c) image enhancement modes.

Fig. 1.6 Tympanic cavity demonstrated by standard visualization (a) and by use of CHROMA (b) image enhancement mode. Note the highly vascularized area over the promontory region.
The middle ear can be conceptually divided into subspaces on the basis of their relationships with the mesotympanum: the mesotympanum is the portion that an observer can visualize through the external ear canal by the use of an otoscope or a microscope. Posteriorly to it lies the retrotympanum, superiorly the epitympanum, anteriorly the protympanum, and inferiorly the hypotympanum (Fig. 2.1).

2.1. Retrotympanum

The retrotympanum is a complex structure consisting of various spaces located in the posterior aspect of the tympanic cavity. The retrotympanum is a space divided by a bony crest (termed subiculum) into superior and inferior components. The pyramidal eminence is the fulcrum of the retrotympanum (Fig. 2.2). From this structure two bony structures arise: the chordal ridge and the ponticulus. The chordal ridge extends outward and transversally toward the chordal eminence, and separates the facial recess superiorly and the lateral tympanic sinus inferiorly. The ponticulus extends inward and transversally to the promontory region dividing the sinus tympani inferiorly and the posterior tympanic sinus superiorly. The sinus tympani lies medial to the pyramidal eminence, the stapedius muscle, and the facial nerve and is located lateral to the posterior semicircular canal and vestibule.

**Fig. 2.1** Right ear. Schematic drawing of the tympanic cavity. Chorda (ct); malleus (ma); incus (in); stapes (s); promontory (pr). By courtesy of Georg Thieme Verlag KG, Stuttgart, Germany.

**Fig. 2.2** Right ear. 45° endoscopic view. The retrotympanum. Note the pyramidal eminence, the tympanic tract of the facial nerve, the stapedial region and the round window niche. The cochleariform process is also visible.
The superior limit of this space is represented by the ponticulus. The inferior anatomical boundary is a prominent ridge (termed subiculum) that extends from the styloid eminence to the posterior rim of the cochlear window niche (Figs. 2.3, 2.4). Recent anatomical studies have been focused on the sinus tympani and the feasibility of gaining endoscopic access to this cavity.\(^4,11,14\) The morphology of the sinus tympani was classified on the basis of intraoperative findings and the anatomical variations of the ponticulus were also described.

### 2.2. Epitympanum

The epitympanic space is a pneumatized portion of the temporal bone superior to the mesotympanum. Various authors have studied the anatomy of the epitympanic compartments. From an anatomical point of view, it is possible to classify the epitympanum into two distinct compartments: a larger and posterior one (posterior epitympanic space, PES) and a smaller and anterior compartment (anterior epitympanic space, AES). Depending on the conformation of the cog and tensor tympani fold, the boundary between the AES and the PES can be the cog itself or can be drawn by a coronal plane located at the level of the cochleariform process. The body and short process of the incus along with the malleus head occupy most of the posterior epitympanic space (Fig. 2.5).
2.2.1. Epitympanic Diaphragm and Prussak Space

The epitympanic diaphragm consists of three malleal ligamental folds (anterior, lateral, and posterior), the posterior incudal ligamental fold, and two purely membranous folds (the tensor tympani fold and the lateral incudomalleal fold) together with the malleus and incus (Fig. 2.6).

Palva and colleagues described the anatomy of the epitympanic diaphragm when studying ventilation pathways of the epitympanum. They observed that the aeration pathway from the eustachian tube leads directly to the mesotympanic and hypotympanic spaces, whereas the epitympanum is set apart from the direct air stream and is only aerated through the tympanic isthmus. The 0°- and 45°-scopes provide a magnified view of the space between the incudostapedial joint and cochleariform process including the tensor tendon (Fig. 2.7).

2.3. Hypotympanum

The hypotympanum is part of the tympanic cavity that lies beneath the level of the eardrum at the junction of the tympanic and petrous parts of the temporal bone. It is usually shaped like an irregular bony groove, extending from the finiculus posteriorly toward the eustachian tube orifice anteriorly (Fig. 2.8). The inferior aspect of the hypotympanum corresponds to the juncture of its outer and inner walls and it separates the tympanic cavity from the jugular bulb. The inferior aspect of the hypotympanum varies considerably due to the presence of bony recesses on its floor and its close proximity to the inferior retrotympanum (Fig. 2.9).
2.4. Protympanum

The protympanic space is a pneumatic portion of the middle ear that lies anteriorly to the mesotympanum, inferiorly to the AES, and superiorly to the hypotympanum (Figs. 2.10–2.12). The cochleariform process and the tensor fold with the tensor tympani canal represent the upper limit of the protympanic space, while it is commonly bounded posteriorly by the promontory. In middle ear surgery, the protympanic space is less important than other spaces because chronic disease seldom involves this recess, however, it is yet noteworthy that some important structures are located there. The protympanum can be divided into two portions: the supratubal recess superiorly, and the eustachian tube orifice inferiorly.

3.1. Endoscopic Myringoplasty

3.1.1. Rationale

Although in general microscopic myringoplasty is considered a safe operation, the endoscopic technique is probably even safer due to the absence of an external incision, which minimizes the risk of postoperative wound infection or hematoma formation. The procedure obviates the need for bone drilling to create an adequately wide access, which otherwise is fraught with the risk of postoperative external auditory canal (EAC) stenosis or anomalous healing processes. The direct visualization of the entire medial aspect of the middle ear (including the facial nerve) adds support to that concept.

Endoscopic Middle Ear Surgical Procedures and Case Histories
3.1.2. Endoscopic Myringoplasty with Tragal Cartilage and Perichondrium

**Case 1**

Left subtotal eardrum perforation (Figs. 3.1, 3.2). Using a 0° endoscope, the EAC is infiltrated with a mixture of mepivacaine 2% with epinephrine. The edges of the tympanic perforation are debrided circumferentially under endoscopic control. The EAC is incised from the 6 o’clock to the 12 o’clock position. The tympanomeatal flap is detached from the bone while using cottonoids soaked in epinephrine (50% with saline solution) to avoid excessive bleeding. Flap dissection proceeds medially, pushing the skin medially and anteriorly, encompassing the incision until the fibrous annulus is identified. The fibrous annulus is raised with a microhook which offers a good view of the middle ear. Dissection of the flap proceeds from posterior to anterior, making sure that the flap remains adherent to the anterior edge of the malleus handle. The flap is dissected from the malleus handle using a sickle-shaped scalpel.

Once the appropriate plane has been developed, the tympanomeatal flap can be dissected proceeding in a posteroanterior and superoinferior direction, completely releasing the malleus handle from tympanic residues and exposing the anterior annulus (Fig. 3.3).

The middle ear is explored to remove any epidermis fragments that may be present, so as to avoid iatrogenic cholesteatoma as well as ventilation patterns (in particular, isthmus and the tensor tympani fold are also evaluated (Fig. 3.4).
A circumferential island of cartilage is formed as determined by the eardrum defect. The perichondrial layer on the posterior surface of the cartilage is modeled making sure that adherence to the cartilage is maintained. The cartilage graft is finally positioned by passing it above the malleus handle and making contact with the medial face of the residual eardrum (Figs. 3.5, 3.6).

3.2. Endoscopic Stapedotomy

3.2.1. Rationale

Since the introduction of the classic stapedectomy technique by Shea, the many different procedures have been described in the literature from an microscopic point of view. The operating microscope provides magnified images of highest quality, however with line of vision being limited to objects located straight ahead, and the field of view reaching only the narrowest segment of the ear canal. The main advantages of the endoscopic approach are that there is virtually no trauma to the chorda tympani in cases where there is no curetting or drilling, and that one has excellent visualization of the anterior crus of the stapes, its superstructure, and the oval window niche. In the course of the operation, the surgeon may choose a close-up view and then swiftly change to panoramic vision simply by advancing or withdrawing the scope. Another option is on-axis rotation of the scope in order to obtain a circumferential view. In cases of facial prolapse or dehiscence, use of the scope can be very helpful in evaluating the stapes footplate (platina) and performing stapedotomy in the right position, eliminating the risk of iatrogenic injury to the facial nerve. Besides, the endoscopic technique is used effectively in cases of stapes malformation or in revision surgery where meticulous anatomical scrutiny is needed to better understand the real relationship between the surrounding anatomical structures with the microscope.
3.2.2. Endoscopic Stapedotomy

**Case 2**

Left ear (Fig. 3.7). Using a 0°-endoscope, a tympanomeatal flap is raised at the wall of the EAC from the 5 o’clock to the 12 o’clock position (Figs. 3.8, 3.9). The posterior bony part of the EAC may occasionally be curetted or drilled to better expose the incudostapedial joint. The middle ear is inspected with a 0°-scope to check the most important anatomical landmarks (Figs. 3.10–3.12).

**Fig. 3.7** Left ear. Normal appearance of the tympanic membrane.

**Fig. 3.8** The skin of the external auditory canal is incised from the 5 o’clock to the 12 o’clock position.

**Fig. 3.9** Left ear. The tympanomeatal flap is harvested and raised until the fibrous annulus is revealed, using a curved otologic dissector, working length 5.5 cm. Cottonoids saturated with adrenalin solution facilitate hemostasis during this surgical step.

**Fig. 3.10** The stapedial region is exposed. The flap is elevated with a delicate cupped ear forceps, 1 x 4.5 mm, working length 8 cm. Occasionally, the posterior bony part of the EAC can be curetted or drilled to facilitate exposure of the incudostapedial joint. When curetting (or drilling) is needed, special care is given to the chorda tympani to prevent causing iatrogenic damage to this structure.

**Fig. 3.11** Left ear. High-definition endoscopic view of incudostapedial joint. Stapedial tendon, posterior crus and stapes footplate are clearly exposed. A micro hook curved to the right is used to confirm the presence of stapes fixation.

**Fig. 3.12** Left ear. High-definition endoscopic view of incudostapedial joint visualized with a 45°-scope. Note the anterior and posterior crura, stapes footplate and facial nerve which can be appreciated in great detail.
Attention is directed at the facial nerve to ensure that it is not prolapsed onto the footplate. Following a brief test on the status of the ossicular chain, the incudostapedial joint is disarticulated sharply in an anteroposterior plane. The stapedial tendon is divided with small curved scissors (Fig. 3.13). The stapes superstructure is downfractured with delicate force and removed, leaving the footplate intact (Fig. 3.14). A platinotomy is created at the midportion or the posterior portion of the footplate with a standard small drill (Fig. 3.15). A standard teflon or titanium prosthesis (0.5 mm in diameter and usually 4.75 mm longer) is calibrated by measuring the distance from the footplate to the medial surface of the incus. The prosthesis is placed between the oval window and the incus. The malleus is carefully palpated to ensure unimpeded movement of the ossicles all the way through the prosthesis (Fig. 3.16).

An endoscopic close-up view of the oval window and the prosthesis offers better control of the final result of surgery. The tympanomeatal flap is repositioned and sealed with Gelfoam on the external auditory canal (Fig. 3.17).

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Fig. 3.13 Left ear. The stapedial tendon is divided with a curved microscissors.

Fig. 3.14 The stapes superstructure is downfractured with delicate force and removed, leaving the footplate intact. A small drill or a laser may also be used for this purpose.

Fig. 3.15 The platinotomy is performed under endoscopic direct control, making sure that integrity of the facial nerve is preserved, even in case of malformations.

Fig. 3.16 The stapes prosthesis is placed between the oval window and the incus. Placement of the prosthesis is the most challenging surgical step because this maneuver is performed with one hand only.

Fig. 3.17 The tympanomeatal flap is repositioned.
3.3. Endoscopic Cholesteatoma Surgery

3.3.1. Rationale

The transmeatal endoscopic approach has shown to be a feasible and safe minimally invasive technique for the exposure and excision of cholesteatoma confined to the middle ear cavity and its extensions.\textsuperscript{17,34,35} Improved eradication of the cholesteatoma by endoscopic removal of hidden pathology from the facial recess, sinus tympani, anterior epitympanic space, and eustachian tube is one of the well-accepted benefits of endoscopic ear surgery (EES)\textsuperscript{2,3,23} (Fig. 3.18).

Considering that decision-making on the surgical technique to be adopted is largely dependent of the extent of disease, preoperative otoscopic and radiological findings can play a crucial role in defining an individualized surgical treatment strategy, which should be based on the findings according to the cholesteatoma classification, differentiating between the following groups:

1. Primary acquired cholesteatoma.
2. Secondary acquired cholesteatoma.

The pathogenesis of cholesteatoma remains incompletely understood. From recent studies with endoscopic techniques new theories about the genesis of the primary acquired cholesteatoma in the attic region can be postulated.\textsuperscript{12,27,30,31}

3.3.2. General Indications

The transcanal endoscopic approach enables good control of the whole tympanic cavity and of the blind areas (retrotympanum, hypotympanum, and protympanum). Use of this technique is indicated as first-line treatment option in patients with congenital cholesteatoma limited to the tympanic cavity, mesotympanic primary acquired cholesteatoma with focal retraction of the pars tensa, and secondary acquired cholesteatoma limited to the middle ear (Fig. 3.19).

![Fig. 3.18](image)

Fig. 3.18 Left middle ear cholesteatoma extending to all spaces of the tympanic cavity.

![Fig. 3.19](image)

Fig. 3.19 Schematic drawing showing the range of indications for endoscopic ear surgery (EES) (a–c) as determined by the site of pathology. The extension of disease into the tympanic cavity is highlighted in glaring red. Limited attic cholesteatoma (a). Cholesteatoma involving the tympanic cavity without mastoid cell involvement (b). Attic cholesteatoma with extension to the antrum and periantral cells in a patient with a small mastoid exhibiting a poorly-pneumatized cell system (in this case, a transcanal endoscopic open approach is indicated). Contraindication (d): cholesteatoma with involvement of the mastoid air cells (in this case, a microscopic approach is required). By courtesy of Georg Thieme Verlag KG, Stuttgart, Germany.\textsuperscript{22}
3.3.3. Attic Cholesteatoma

The main goals of the transcanal endoscopic surgical approach to attic cholesteatoma removal are:

- Direct approach to pathology with complete removal of cholesteatoma.
- Restoration of the ventilation of the upper unit by clearing the tympanic isthmus of pathological tissue and mucosal folds that could create a blockage of this important anatomical region, and thus creating a second ventilation pathway by removal of the tensor fold. This procedure is aimed at establishing a direct communication between the anterior attic region and the protympanum.
- Preservation of the mastoid mucosa and of the transmucosal gas exchange.

Case 3

Attic Cholesteatoma of the Right Ear

During endoscopic evaluation, an epitympanic perforation with scutum erosion and attic cholesteatoma is revealed (Fig. 3.20). The tympanomeatal flap is harvested and elevated. Dissection is performed with cottonoids soaked in epinephrine solution (Fig. 3.21). The flap is elevated using a microdissector, applying traction with the cottonoids on the bone surface. Due caution should be exercised during inferior transposition of the pars flaccida and pars tensa. During this step, the cholesteatoma matrix must be separated from the eardrum, which is relocated inferiorly on the long process of the malleus and separated from the umbo (Fig. 3.22). An atticotomy is performed in order to facilitate exposure of the epitympanic spaces (Fig. 3.23).

Fig. 3.20 Right ear. Transcanal endoscopic approach. The examination reveals an epitympanic cholesteatoma and the mesotympanum is found to be well-pneumatized.

Fig. 3.21 Epinephrine solution is injected in the posterior portion of the ear canal. The incision is made clockwise passing from the 3 o’clock to the 9 o’clock position, 1.5 to 2 cm from the annulus, using an angled round knife.

Fig. 3.22 The pars flaccida is accurately dissected from the cholesteatoma sac, passing from top to bottom. The tympanomeatal flap is transposed inferiorly on the malleus.

Fig. 3.23 The cholesteatoma is located laterally with respect to the ossicular chain. The drum is detached from the umbo.
The Prussak space and the ossicular chain are now evaluated and particular attention is paid to look for signs of erosion of the chain (Fig. 3.24). If this is not confirmed, then the standard surgical maneuvers are carried out carefully in order not to damage this vulnerable structure. After complete removal of cholesteatoma, the middle ear cavity is thoroughly inspected with a 45°-scope to make sure that no residual disease is left behind. Isthmus and tensor fold are evaluated to restore normal ventilation in case of blockage (Fig. 3.25). Once a tragal incision has been made, a piece of cartilage with perichondrium is used to reconstruct the scutum. The tympanomeatal flap is finally repositioned (Figs. 3.26, 3.27).

Fig. 3.24 View of the ossicular chain upon complete exposure.

Fig. 3.25 Final aspect of the tympanic cavity after cholesteatoma removal. Careful inspection of the ossicular chain is particularly aimed at detecting signs of erosion. All spaces of the tympanic cavity are thoroughly inspected to check for residual disease.

Fig. 3.26 The lateral bony wall of the attic is reconstructed using a tragal cartilage graft.

Fig. 3.27 The tympanomeatal flap is repositioned and a few Gelfoam pledges are placed in the EAC.
Case 4

Congenital Cholesteatoma of the Left Ear

The tympanic membrane is examined with a 0°-otoscope. A huge cholesteatoma of the middle ear is revealed (Potsic stage III, Fig. 3.28). Following infiltration with a topical solution of anestetic and adrenalin, the tympanomeatal flap is harvested. The cholesteatoma is found to occupy the entire tympanic cavity (Fig. 3.29). With gentle dissection, the cholesteatoma sac is detached from the mesotympanic and protympanic spaces (Fig. 3.30).

Fig. 3.28 Endoscopic view of the left tympanic membrane. Cholesteatoma is revealed in the mesotympanum.

Fig. 3.29 The tympanomeatal flap is completely harvested. The tympanic cavity is extensively occupied by the cholesteatoma. Only the long process of malleus is visualized.

Fig. 3.30 The cholesteatoma sac is gently dissected.

Fig. 3.31 The cholesteatoma matrix is gradually dissected. The stapes is found to be eroded, the platina is clearly visualized.
The malleus head is transected to expose the medial aspect of the epytympanum. Owing to cholesteatoma invasion, the chorda tympani also needs to be transected. The promontory is gradually exposed, thereby removing the cholesteatoma matrix.

The head of malleus is sectioned and removed in order to expose the medial aspect of the epytympanum (Figs. 3.31–3.33). The cholesteatoma is completely removed using a 45°-scope and angled instruments (Fig. 3.34). At the end of surgery, an ossiculoplasty is performed with the remodelled head of malleus (Figs. 3.35–3.37).

Ossiculoplasty with the remodelled malleus head is performed to reconstruct the sound-conducting system. Pieces of Gelfoam are placed around the malleus to provide stable support.
3.3.4. Second-Look Surgery with Ossiculoplasty after Cholesteatoma Removal

Case 5

Left ear. After tympanomeatal flap elevation, the tympanic cavity is exposed through a transcanal endoscopic approach (Fig. 3.38). The incus is absent, because it has been eroded by the cholesteatoma and removed during previous surgery. Middle ear mucosa is normal, with no evidence of residual cholesteatoma, in particular, the retrotympanum is free from disease. The stapes is present and in good condition. After small retroauricular incision, a fragment of cortical mastoid bone is harvested and modeled for ossiculoplasty (Fig. 3.39). A temporalis fascia is also taken. The bone fragment is remodeled and placed on the stapes (Fig. 3.40).

Fig. 3.38 Left ear. After tympanomeatal flap elevation, the retrotympanum is clearly seen through a transcanal endoscopic approach. Note the ponticulus, a bony ridge extending from the pyramidal process to the promontory region separating the sinus tympani from the posterior tympanic sinus. The facial nerve and the stapes are clearly demonstrated.

Fig. 3.39 A mastoid cortical bone fragment is used to reconstruct the ossicular chain.

Fig. 3.40 Once the mastoid bone cortical fragment has been, carved to appropriate size and shape, it is placed under the stapes making sure that good contact is maintained.
Reconstruction is completed placing the temporalis fascia over the ossiculoplasty and under the drum (Figs. 3.41–3.43).

**Fig. 3.41** The ossicular reconstruction is stabilized with pieces of Gelfoam positioned all around.

**Fig. 3.42** A temporalis fascia graft is placed over the ossiculoplasty and beneath the drum.

**Fig. 3.43** The tympanomeatal flap is laid back down over the graft and the ossiculoplasty.


Instrument Set for Endoscopic Ear Surgery
Instrument Set for Endoscopic Ear Surgery

1. 227201 **Ear Hook**, curved right, length 16 cm
2. 227202 **Same**, curved left
3. 227203 **Same**, curved backwards
4. 227206 **Ear Dissector**, curved right, length 16 cm
5. 227207 **Same**, curved left
6. 227208 **Same**, curved backwards
7. 227211 **Curette**, spoon-shaped, diameter 1.0 mm, length 16 cm
8. 227213 **Curette**, double-ended, spoon-shaped tips: diameter 1.0 mm and 1.5 mm, 90° curved, length 17 cm
9. 226213 **THOMASSIN Dissector**, double-ended, distal tips angled 90° to right or left, length 18 cm
10. 226212 **Dissector**, double-ended, tips double curved right and left, length 18 cm
11. 226211 **Same**, distal tips with single curve to right or to left
12. 224003 **HOUSE Curette**, medium, spoon sizes 1 x 1.8 mm and 2 x 3.5 mm, length 15 cm
13. 224004 **HOUSE Double Curette**, medium, spoon sizes 1 x 1.8 mm and 2 x 2.8 mm, length 18 cm
14. 227230 **Round Knife**, diameter 3 mm, easy to handle due rotating tube olive, length 19 cm
15. 204359 C **Suction Cannula**, curved 3 mm, LUER-Lock, outer diameter 1 mm, length 8 cm, conical
16. 204361 C **Suction Cannula**, curved 6 mm, LUER-Lock, outer diameter 1 mm, length 8 cm, conical
17. 204362 C **Suction Cannula**, curved 6 mm, LUER-Lock, outer diameter 1.2 mm, length 8 cm, conical
18. 204365 C **Suction Cannula**, curved 8 mm, LUER-Lock, outer diameter 1.2 mm, length 8 cm, conical
19. 204366 C **Suction cannula**, curved 8 mm, LUER-Lock, outer diameter 1.6 mm, length 8 cm, conical
20. 204367 C **Suction Cannula**, curved 6 mm, LUER-Lock, outer diameter 1.6 mm, length 8 cm, conical
21. 204357 **Suction Cannula**, curved 3 mm, LUER-Lock, outer diameter 0.6 mm, length 10 cm
22. 204358 **Same**, outer diameter 0.8 mm
23. 204359 **Same**, outer diameter 1.0 mm
24. 204360 **Suction Cannula**, curved 6 mm, LUER-Lock, outer diameter 0.8 mm, length 10 cm
25. 204361 **Same**, outer diameter 1.0 mm
26. 204362 **Same**, outer diameter 1.2 mm
27. 204365 **Suction Cannula**, curved 8 mm, LUER-Lock, outer diameter 1.2 mm, length 10 cm
28. 204366 **Same**, outer diameter 1.6 mm, length 10 cm
29. 204200 FISCH **Suction Handle**, with cut-off hole, LUER cone, length 5.5 cm
30. 600019 **LUER Cone Connector**, male, rotating
31. 227255 **Ear Forceps**, curved downwards, retrograde, extra delicate, oval cupped jaws, 0.9 mm, working length 10 cm
32. 227253 **Same**, 45° curved upwards, extra delicate, oval cupped jaws, 0.6 mm
33. 227251 **Same**, 45° curved right
34. 227252 **Same**, 45° curved left

It is recommended to check the suitability of the product for the intended procedure prior to use.
Endoscopic-Guided Middle Ear Diagnosis
Recommended Set according to Dr. M. TARABICHI
HOPKINS® Telescopes and Accessories

1215 AA/BA

Tele-Otoscope with HOPKINS® Straight Forward Telescope 0°, diameter 4 mm, length 6 cm, autoclavable, fiber optic light transmission incorporated, color code: green

1215 BA

Tele-Otoscope with HOPKINS® Forward-Oblique Telescope 30°, diameter 4 mm, length 6 cm, autoclavable, fiber optic light transmission incorporated, color code: red

1230 AA

HOPKINS® Straight Forward Telescope 0°, diameter 2.7 mm, length 11 cm, autoclavable, fiber optic light transmission incorporated, color code: green

1230 BA

HOPKINS® Forward-Oblique Telescope 30°, diameter 2.7 mm, length 11 cm, autoclavable, fiber optic light transmission incorporated, color code: red

723773

STAMMBERGER Telescope Handle, round, length 6.5 cm, for use with HOPKINS® telescopes with diameter 2.7/3 mm and length 11 cm

1218 S

Stand, for 3 tele-otoscopes 1215, 1216, 1218, cartridges with color codes green, red and yellow, autoclavable, dimensions: 180 x 105 x 80 mm (w x h x d)

203710

Suction Tube, cylindrical, Luer, outer diameter 1 mm, working length 9 cm
LED Battery Light Sources for Endoscopes

11301 D4  **LED Battery Light Source for Endoscopes**, with fast screw thread, brightness > 110 lm / > 150 klx, burning time > 120 min, weight approx. 150 g ready for use, **suitable for wipe disinfection**

11301 DE  **Battery Light Source LED for Endoscopes**, rechargeable, with click connection, boost mode for temporary increase in brightness, color temperature 5500 K, lithium-ion batteries, charging time 60 min, burning time at 100% brightness 40 min, weight approx. 150 g, **suitable for wipe disinfection**

11301 DF  **Battery Light Source LED for Endoscopes**, rechargeable, with fast screw thread, boost mode for temporary increase in brightness, color temperature 5500 K, lithium-ion batteries, charging time 60 min, burning time at 100% brightness 40 min, weight approx. 150 g, **suitable for wipe disinfection**

11301 DG  **Charging Unit**, for 11301 DE/11301 DF, for two LED battery light sources, with fix integrated power supply and adaptor for EU, UK, USA and Australia, power supply 110 – 240 VAC, 50/60 Hz, **suitable for surface disinfection**

094129  **Battery Charger Li-Ion**, for charging the rechargeable Battery Box 091424 or Battery Light Source 11301 DE/DF, for use with Mains Cord 094127, power supply 100 – 240 VAC, 50/60 Hz

094127  **Mains Cord**, for Battery Charger 094129, length 150 cm
### Endoscopic-Guided Middle Ear Surgery

**Recommended Set according to Dr. M. TARABICHI**

**HOPKINS® Telescopes and Accessories**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7220</td>
<td><strong>HOPKINS® Straight Forward Telescope 0°</strong>, enlarged view, diameter 3 mm, length 14 cm, autoclavable, fiber optic light transmission incorporated, color code: green</td>
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<tr>
<td>7230</td>
<td><strong>HOPKINS® Forward-Oblique Telescope 30°</strong>, enlarged view, diameter 4 mm, length 18 cm, autoclavable, fiber optic light transmission incorporated, color code: red</td>
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</table>

**Accessories**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>152201</td>
<td>WAGENER Ear Hook, ball end, size 1, length 15.5 cm</td>
</tr>
<tr>
<td>152202</td>
<td>Same, size 2</td>
</tr>
<tr>
<td>152203</td>
<td>Same, size 3</td>
</tr>
<tr>
<td>152301</td>
<td>Ear Hook, without ball end, size 1, length 15.5 cm</td>
</tr>
<tr>
<td>152302</td>
<td>Same, size 2</td>
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<tr>
<td>204250</td>
<td>FISCH Adaptor, for Suction Tubes 204352 – 204354, with long thumb grip, cut-off hole diameter 1 mm, inner diameter 1.7 mm, Luer cone, length 5.5 cm</td>
</tr>
<tr>
<td>204005</td>
<td>Suction Cannula, angular, Luer-Lock, outer diameter 0.5 mm, working length 6 cm</td>
</tr>
<tr>
<td>204007</td>
<td>Same, outer diameter 0.7 mm</td>
</tr>
<tr>
<td>204008</td>
<td>Same, outer diameter 0.8 mm</td>
</tr>
<tr>
<td>204010</td>
<td>Same, outer diameter 1 mm</td>
</tr>
<tr>
<td>204013</td>
<td>Same, outer diameter 1.3 mm</td>
</tr>
<tr>
<td>204015</td>
<td>Same, outer diameter 1.5 mm</td>
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<tr>
<td>204020</td>
<td>Same, outer diameter 2 mm</td>
</tr>
<tr>
<td>204025</td>
<td>Same, outer diameter 2.5 mm</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>221100</td>
<td>HARTMANN Ear Forceps, extra delicate, serrated, 1 x 4.5 mm, working length 8 cm</td>
</tr>
<tr>
<td>221150</td>
<td>Same, working length 12.5 cm</td>
</tr>
<tr>
<td>221210</td>
<td>FISCH Ear Forceps, extra delicate, pointed, smooth, 1 x 4.5 mm, working length 8 cm</td>
</tr>
<tr>
<td>221201</td>
<td>FISCH Ear Forceps, extra delicate, serrated, 0.4 x 3.5 mm, working length 8 cm</td>
</tr>
<tr>
<td>221304</td>
<td>Ear Forceps, extra delicate, serrated, curved to right, working length 8 cm</td>
</tr>
<tr>
<td>221305</td>
<td>Same, curved to left</td>
</tr>
<tr>
<td>221307</td>
<td>Same, curved upwards</td>
</tr>
<tr>
<td>221310</td>
<td>THOMASSIN Ear Forceps, very fine, serrated, retrograde backwards curved, working length 8 cm</td>
</tr>
<tr>
<td>162500</td>
<td>STRÜMPEL Ear Forceps, working length 8 cm</td>
</tr>
</tbody>
</table>
222900

**HOUSE-DIETER Malleus Nipper**, upbiting, working length 8 cm

222900

**Same**, downbiting

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221450 – 221454

221454

**FISCH Ear Forceps**, round cupped jaws, working length 12.5 cm, diameter 3 mm

221406 – 221709

221509

**WULLSTEIN Ear Forceps**, extra delicate, oval cupped jaws, curved to right, oval, 0.9 mm, working length 8 cm

221609

**Same**, curved to left

221709

**Same**, curved upwards
222500 – 222605

222602  HOUSE-BELLUCCI **Scissors**, extra delicate, working length 8 cm

222604 R  BELLUCCI **Scissors**, delicate, curved to right, working length 8 cm

222605 L  **Same**, curved to left

152301  **Ear Hook**, without ball end, size 1, length 15.5 cm

223100  **PLESTER Knife**, round, vertical, standard size: 3.5 x 2.5 mm, length 16 cm

223101  **Same**, medium size: 4 x 2 mm

223500  **ROSEN Elevator**, tip angled 15°, 12 mm long, width 1.5 mm, length 16 cm

223890  **Seeker**, extra delicate, angled 25°, with ball end diameter 0.6 mm, length 16 cm
224001 HOUSE Curette, large, spoon sizes 2 x 3.2 mm and 1.6 x 2.6 mm, length 15 cm

224002 Same, small, spoon sizes 1 x 1.6 mm and 1.3 x 2 mm

224003 Same, medium, spoon sizes 1 x 1.8 mm and 2 x 2.8 mm

224004 HOUSE Double Curette, medium, spoon sizes 1 x 1.8 mm and 2 x 2.8 mm, length 18 cm

224005 HOUSE Curette, angular, extra small, spoon sizes 0.6 x 0.8 mm and 0.8 x 1 mm, length 17 cm

224011 HOUSE Curette, straight, extra large, spoon sizes 2.3 x 3.5 mm and 2.7 x 4.3 mm, length 15 cm

224301 WULLSTEIN Needle, strong long curve, length 16.5 cm

224302 Same, medium curve

224303 Same, slight curve

226211 THOMASSIN Dissector, double-ended, distal tips with single curve to right or to left, length 18 cm

226212 Same, distal tips with double curve to right or to left

226213 THOMASSIN Dissector, double-ended, distal tips angled 90° to right or left, length 18 cm

226815 Round Knife 45°, diameter 1.5 mm, length 16 cm

226825 Same, diameter 2.5 mm

226835 Same, diameter 3.5 mm
**UNIDRIVE® S III ENT SCB/UNIDRIVE® S III ECO**

The multifunctional unit for ENT

---

### Special Features:

- **Touch Screen:** Straightforward function selection via touch screen
- **Set values of the last session are stored**
- **Optimized user control due to touch screen**
- **Choice of user languages**
- **Operating elements are single and clear to read due to color display**
- **One unit – multifunctional:**
  - Shaver system for surgery of the paranasal sinuses and anterior skull base
  - INTRA Drill Handpieces (40,000 rpm and 80,000 rpm)
  - Sinus Shaver
  - Micro Saw
  - Dermatome
  - High-Speed Handpieces (60,000 rpm and 100,000 rpm)
- **Two motor outputs:** Two motor outputs enable simultaneous connection of two motors:
  - For example, a shaver and micro motor
- **Soft start function**
- **Textual error messages**
- **Integrated irrigation and coolant pump:**
  - Absolutely homogeneous, micro-processor controlled irrigation rate throughout the entire irrigation range
  - Quick and easy connection of the tubing set
- **Easy program selection via automated motor recognition**
- **Continuously adjustable revolution range**
- **Maximum number of revolutions and motor torque:** Microprocessor-controlled motor rotation speed. Therefore the preselected parameters are maintained throughout the drilling procedure
- **Maximum number of revolutions can be preset**
- **SCB model with connections to the KARL STORZ Communication Bus (KARL STORZ-SCB)**
- **Irrigator rod included**
## Motor Systems

### Specifications

#### System specifications

<table>
<thead>
<tr>
<th>Mode</th>
<th>Order No.</th>
<th>rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shaver mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation mode:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. rev. (rpm):</td>
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<td></td>
</tr>
<tr>
<td>oscillating</td>
<td>407120 50</td>
<td>10,000*</td>
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<tr>
<td>in conjunction with Handpiece:</td>
<td></td>
<td></td>
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<tr>
<td>DRILLCUT-X® II Shaver Handpiece</td>
<td>407120 55</td>
<td>10,000*</td>
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<tr>
<td><strong>Sinus burr mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation mode:</td>
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<td></td>
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<tr>
<td>Max. rev. (rpm):</td>
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<td></td>
</tr>
<tr>
<td>rotating</td>
<td>407120 50</td>
<td>12,000</td>
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<tr>
<td>in conjunction with Handpiece:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRILLCUT-X® II Shaver Handpiece</td>
<td>407120 55</td>
<td>12,000</td>
</tr>
<tr>
<td><strong>High-speed drilling mode</strong></td>
<td></td>
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</tr>
<tr>
<td>Operation mode:</td>
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</tr>
<tr>
<td>Max. rev. (rpm):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>counterclockwise or clockwise</td>
<td>207120 33</td>
<td>60,000/100,000</td>
</tr>
<tr>
<td>in conjunction with:</td>
<td></td>
<td></td>
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<tr>
<td>High-Speed Micro Motor</td>
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<tr>
<td><strong>Drilling mode</strong></td>
<td>[207110 33][207111 73]</td>
<td>40,000/80,000</td>
</tr>
<tr>
<td>Operation mode:</td>
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<td></td>
</tr>
<tr>
<td>Max. rev. (rpm):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>counterclockwise or clockwise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in conjunction with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>micro motor</td>
<td>[207110 33][207111 73]</td>
<td>15,000/20,000</td>
</tr>
<tr>
<td>and connecting cable</td>
<td></td>
<td></td>
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<tr>
<td><strong>Micro saw mode</strong></td>
<td>[207110 33][207111 73]</td>
<td>8,000</td>
</tr>
<tr>
<td>Max. rev. (rpm):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in conjunction with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>micro motor</td>
<td>[207110 33][207111 73]</td>
<td>8,000</td>
</tr>
<tr>
<td>and connecting cable</td>
<td></td>
<td></td>
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<tr>
<td><strong>Dermatome mode</strong></td>
<td></td>
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<tr>
<td>Max. rev. (rpm):</td>
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<td></td>
</tr>
<tr>
<td>in conjunction with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>micro motor</td>
<td>[207110 33][207111 73]</td>
<td>8,000</td>
</tr>
<tr>
<td>and connecting cable</td>
<td></td>
<td></td>
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<tr>
<td><strong>Power supply:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 – 240 VAC, 50/60 Hz</td>
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<td></td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
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</tr>
<tr>
<td>(w x h x d)</td>
<td>300 x 165 x 265 mm</td>
<td></td>
</tr>
<tr>
<td><strong>Two outputs for parallel connection of two motors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Integrated irrigation pump:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow:</td>
<td>adjustable in 9 steps</td>
<td></td>
</tr>
</tbody>
</table>

* Approx. 4,000 rpm is recommended as this is the most efficient suction/performance ratio.

### UNIDRIVE® S III ENT SCB

<table>
<thead>
<tr>
<th>Touch Screen:</th>
<th>6.4&quot; / 300 cd/m²</th>
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</thead>
<tbody>
<tr>
<td>Weight:</td>
<td>5.2 kg</td>
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<tr>
<td>Certified to:</td>
<td>IEC 601-1 CE acc. to MDD</td>
</tr>
<tr>
<td>Available languages:</td>
<td>English, French, German, Spanish, Italian, Portuguese, Greek, Turkish, Polish, Russian</td>
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</table>

### UNIDRIVE® S III ECO

<table>
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<tr>
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<tbody>
<tr>
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<tr>
<td>Certified to:</td>
<td>IEC 60601-1</td>
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<tr>
<td>Available languages:</td>
<td>numerical codes</td>
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</table>
Motor Systems
Special features of high-performance EC micro motor II and of the high-speed micro motor

Special features of high-performance EC micro motor II:
- Self-cooling, brushless high-performance EC micro motor
- Smallest possible dimensions
- Autoclavable
- Reprocessable in a cleaning machine
- Detachable connecting cable

INTRA coupling enables a wide variety of applications
- Maximum torque 4 Ncm
- Number of revolutions can be continuously adjusted up to 40,000 rpm
- Provided a suitable handle is used, the number of revolutions can be continuously adjusted up to 80,000 rpm

High-Performance EC Micro Motor II, for use with UNIDRIVE® II/UNIDRIVE® ENT/OMFS/NEURO/ECO and Connecting Cable 20711073, or for use with UNIDRIVE® S III ENT/ECO/NEURO and Connecting Cable 20711173

Connecting Cable, to connect High-Performance EC Micro Motor 20711033 to UNIDRIVE® S III ENT/ECO/NEURO

Special Features of the high-speed micro motor:
- Brushless high-speed micro motor
- Smallest possible dimensions
- Autoclavable
- Reprocessable in a cleaning machine
- Maximum torque 6 Ncm

Maximum torque 6 Ncm
- Number of revolutions can be continuously adjusted up to 60,000 rpm
- Provided a suitable handle is used, the number of revolutions can be continuously adjusted up to 100,000 rpm

High-Speed Micro-Motor, max. speed 60,000 rpm, including connecting cable, for use with UNIDRIVE® S III ENT/NEURO
UNIDRIVE® S III ENT SCB
UNIDRIVE® S III ECO

Recommended System Configuration

**UNIDRIVE® S III ENT SCB**

![Image of UNIDRIVE® S III ENT SCB]

**UNIDRIVE® S III ECO**

![Image of UNIDRIVE® S III ECO]

40701620-1 UNIDRIVE® S III ENT SCB, motor control unit with color display, touch screen, two motor outputs, integrated irrigation pump and SCB module, power supply 100–240 VAC, 50/60 Hz including:

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

40701401 UNIDRIVE® S III ECO, motor control unit with two motor outputs and integrated irrigation pump, power supply 100–240 VAC, 50/60 Hz including:

- Mains Cord
- Two-Pedal Footswitch, two-stage, with proportional function
- Clip Set, for use with silicone tubing set
- Single Use Tubing Set*, sterile, package of 3

**Specifications:**

<table>
<thead>
<tr>
<th>Feature</th>
<th>UNIDRIVE® S III ENT SCB</th>
<th>Dimensions w x h x d</th>
<th>Weight</th>
<th>Certified to</th>
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<tbody>
<tr>
<td>Touch Screen</td>
<td>6.4&quot;/300 cd/m²</td>
<td>300 x 165 x 265 mm</td>
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<td>EC 601-1, CE acc. to MDD</td>
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<td>Flow</td>
<td>9 steps</td>
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<tr>
<td>Power supply</td>
<td>100–240 VAC, 50/60 Hz</td>
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<td></td>
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</tbody>
</table>

*mtp medical technical promotion gmbh,
take-off GewerbePark 46, 78579 Neuhausen ob Eck/Germany,
Phone: +49 (0)7467 94504-0, Fax: +49 (0)7467 94504-99,
E-Mail: info@mtp-tut.com, www.mtp-tut.com
UNIDRIVE® S III ENT SCB
UNIDRIVE® S III ECO
System Components

**UNIT SIDE**

- Two-Pedal Footswitch
- Single Use Tubing Set

**PATIENT SIDE**

- High-speed Micro Motor
- High-performance EC Micro Motor II
- High-Speed Handpieces
- INTRA Drill Handpieces
- Micro Saw
- Dermatome

Products:

- Two-Pedal Footswitch: 20016630
- Single Use Tubing Set: 031131-10
- High-speed Micro Motor: 20712033
- High-performance EC Micro Motor II: 20711033, 20711173
- High-Speed Handpieces: 252660 – 252692
- INTRA Drill Handpieces: 252575 – 252590
- Micro Saw: 254000 – 254300
- Dermatome: 253000 – 253300
**Optional Accessories**

for UNIDRIVE® S III ENT SCB and UNIDRIVE® S III ECO

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>280053</td>
<td><strong>Universal Spray</strong>, 6x 500 ml bottles – HAZARDOUS GOODS – UN 1950</td>
</tr>
<tr>
<td></td>
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<tr>
<td>280053 C</td>
<td><strong>Spray Nozzle</strong>, for the reprocessing of INTRA burr handpieces,</td>
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<tr>
<td></td>
<td>for use with Universal Spray 280053 B</td>
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<tr>
<td>031131-10*</td>
<td><strong>Tubing Set</strong>, for irrigation, for single use, sterile,</td>
</tr>
<tr>
<td></td>
<td>package of 10</td>
</tr>
</tbody>
</table>

* mtp medical technical promotion gmbh,  
  take-off GewerbePark 46, 78579 Neuhausen ob Eck/Germany,  
  Phone: +49 (0) 74 67 9 45 04-0, Fax: +49 (0) 74 67 9 45 04-99,  
  E-Mail: info@mtp-tut.com, www.mtp-tut.com
INTRA Drill Handpieces
for Ear Micro Surgery

Special Features:
- Tool-free closing and opening of the drill
- Right/left rotation
- Max. rotating speed up to 40,000 rpm / 80,000 U/min
- Detachable irrigation channels
- Lightweight construction
- Operates with little vibrations
- Low maintenance
- Reprocessable in a cleaning machine
- Safe grip

252570 INTRA Drill Handpiece, angled, length 12.5 cm, transmission 1:1 (40,000 rpm), for use with KARL STORZ high-performance EC micro motor II and straight shaft burrs

252573 INTRA Drill Handpiece, angled, length 12.5 cm, transmission 1:2 (80,000 rpm), for use with KARL STORZ high-performance EC micro motor II and straight shaft burrs

252590 INTRA Drill Handpiece, straight, length 11 cm, transmission 1:1 (40,000 rpm), for use with KARL STORZ high-performance EC micro motor II and straight shaft burrs
Burrs

Straight Shaft Burrs, length 7 cm, for use with INTRA Drill Handpieces 252590, 252570, 252573

<table>
<thead>
<tr>
<th>Detail</th>
<th>Size</th>
<th>Dia. mm</th>
<th>Standard</th>
<th>Tungsten Carbide</th>
<th>Transverse Tungsten Carbide</th>
<th>Diamond</th>
<th>Diamond, coarse</th>
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<tbody>
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<td>261007</td>
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<td>260014</td>
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<tr>
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<td>−</td>
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<td>261070</td>
<td>−</td>
<td>−</td>
<td>262070</td>
<td>262270</td>
</tr>
</tbody>
</table>

260000  **Standard Straight Shaft Burr**, stainless, sizes 006–070, length 7 cm, set of 15
261000  **Tungsten Carbide Straight Shaft Burr**, stainless, sizes 006–070, length 7 cm, set of 15
261100  **Tungsten Carbide Straight Shaft Burr**, with cross cut, stainless, sizes 014–060, length 7 cm, set of 6
262000  **Diamond Straight Shaft Burr**, stainless, sizes 006–070, length 7 cm, set of 15
262200  **Rapid Diamond Straight Shaft Burr**, stainless, with coarse diamond coating for precise drilling and abrasion without hand pressure and generating minimal heat, sizes 023–070, length 7 cm, set of 9, color code: gold


### Burrs

**Straight Shaft Burrs, length 5.7 cm, for use with INTRA Drill Handpieces 252590, 252570, 252573**

<table>
<thead>
<tr>
<th>Size</th>
<th>Dia. mm</th>
<th>Standard</th>
<th>Tungsten Carbide</th>
<th>Transverse Tungsten Carbide</th>
<th>Diamond</th>
<th>Diamond, coarse</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1.4</td>
<td>649614 K</td>
<td>649614 HK</td>
<td>649614 Q</td>
<td>649714 K</td>
<td>–</td>
</tr>
<tr>
<td>018</td>
<td>1.8</td>
<td>649618 K</td>
<td>649618 HK</td>
<td>–</td>
<td>649718 K</td>
<td>–</td>
</tr>
<tr>
<td>023</td>
<td>2.3</td>
<td>649623 K</td>
<td>649623 HK</td>
<td>649623 Q</td>
<td>649723 K</td>
<td>649723 GK</td>
</tr>
<tr>
<td>027</td>
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<td>649627 HK</td>
<td>–</td>
<td>649727 K</td>
<td>649727 GK</td>
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<tr>
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<td>649631 HK</td>
<td>649631 Q</td>
<td>649731 K</td>
<td>649731 GK</td>
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<td>3.5</td>
<td>649635 K</td>
<td>649635 HK</td>
<td>–</td>
<td>649735 K</td>
<td>649735 GK</td>
</tr>
<tr>
<td>040</td>
<td>4</td>
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<td>649640 HK</td>
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<td>649740 GK</td>
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<td>649645 HK</td>
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<td>649745 GK</td>
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<tr>
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<td>5</td>
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<td>649650 HK</td>
<td>649650 Q</td>
<td>649750 K</td>
<td>649750 GK</td>
</tr>
<tr>
<td>060</td>
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<td>649660 K</td>
<td>649660 HK</td>
<td>649660 Q</td>
<td>649760 K</td>
<td>649760 GK</td>
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<tr>
<td>070</td>
<td>7</td>
<td>649670 K</td>
<td>649670 HK</td>
<td>–</td>
<td>649770 K</td>
<td>649770 GK</td>
</tr>
</tbody>
</table>

- **649600 K**  *Standard Straight Shaft Burr*, stainless, sizes 014–070, length 5.7 cm, set of 11
- **649600 HK** *Tungsten Carbide Straight Shaft Burr*, stainless, sizes 014–070, length 5.7 cm, set of 11
- **649700 K**  *Diamond Straight Shaft Burr*, stainless, sizes 014–070, length 5.7 cm, set of 11
- **649700 GK** *Rapid Diamond Straight Shaft Burr*, stainless, with coarse diamond coating for precise drilling and abrasion without hand pressure and generating minimal heat, sizes 023–070, length 5.7 cm, set of 9, color code: gold

**Straight Shaft Burrs, cylindrical, barrel-shaped, and bud-shaped**

<table>
<thead>
<tr>
<th>Size</th>
<th>Dia. mm</th>
<th>Cylindrical</th>
<th>Barrel-shaped</th>
<th>Bud-shaped</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>length 7 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>2</td>
<td>–</td>
<td>262560</td>
<td>–</td>
</tr>
<tr>
<td>040</td>
<td>4</td>
<td>–</td>
<td>262561</td>
<td>–</td>
</tr>
<tr>
<td>050</td>
<td>5</td>
<td>265050</td>
<td>–</td>
<td>263050</td>
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</tr>
<tr>
<td>070</td>
<td>7</td>
<td>265070</td>
<td>–</td>
<td>263070</td>
</tr>
</tbody>
</table>
Burrs and Accessories

LINDEMANN Burrs, conical, stainless, length 7 cm

<table>
<thead>
<tr>
<th>Size</th>
<th>Diameter mm</th>
<th>Conical</th>
<th>sterilizable</th>
</tr>
</thead>
<tbody>
<tr>
<td>018</td>
<td>1.8</td>
<td>263518</td>
<td></td>
</tr>
<tr>
<td>021</td>
<td>2.1</td>
<td>263521</td>
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</tr>
<tr>
<td>023</td>
<td>2.3</td>
<td>263523</td>
<td></td>
</tr>
</tbody>
</table>

Burrs Accessories

280090  Size Template, for drills, stainless steel, sterilizable
280080  Brush, for cleaning atraumatic jaws, sterilizable, package of 5
280120  Temporal Bone Holder, bowl-shaped, with 3 fixation screws for tensioning the petrosal bone and with evacuation tube for irrigation liquid
Accessories for Burrs

280030  **Rack**, for 36 straight shaft burrs with a length of 7 cm, foldable, sterilizable, size 22 x 11.5 x 2 cm

280030 K  **Metal Bar**, for fixation at Rack 280030, to hold 18 burrs with a length of 7 cm and 16 burrs with a length of 5.7 cm, size 16 x 2.5 x 1 cm

280033  **Rack**, for 36 straight shaft burrs with a length of 9.5 cm, foldable, sterilizable, size 22 x 14 x 2 cm

280034  **Rack**, for 36 straight shaft burrs with a length of 12.5 cm, foldable, sterilizable, size 22 x 17 x 2 cm

280035  **Rack**, for 54 straight shaft burrs with a length of 5 cm (36 pieces) and 7 cm (18 pieces), foldable, sterilizable, size 22 x 12.5 x 3 cm

280040  **Rack**, flat model, to hold 21 straight shaft burrs with a length of up to 6 cm (6 pcs) and 7 cm (15 pcs), folding model, sterilizable, size 17.5 x 9.5 x 1.2 cm

280043  **Rack**, flat model, to hold 21 straight shaft burrs with a length of 7 cm (6 pcs) and 9.5 cm (15 pcs), folding model, sterilizable, size 17.5 x 11.5 x 1.2 cm

**Please note:** The burrs displayed are not included in the rack.
Accessories for Burrs

39552 A **Wire Tray**, provides safe storage of accessories for KARL STORZ drilling/grinding systems during cleaning and sterilization, includes tray for small parts, for use with Rack 280030, rack **not** included

**for storage of:**
- Up to 6 drill handpieces
- Connecting cable
- EC micro motor
- Small parts

39552 B **Wire Tray**, provides safe storage of accessories for KARL STORZ drilling/grinding systems during cleaning and sterilization, includes tray for small parts, for use with Rack 280030, rack **included**

**for storage of:**
- Up to 6 drill handpieces
- Connecting cable
- EC micro motor
- Up to 36 drill bits and burrs
- Small parts

**Please note:** The instruments displayed are not included in the sterilizing and storage trays.
UNIDRIVE® S III ENT SCB
High-Speed Handpieces, angled, 100,000 rpm

For use with High-Speed Drills, shaft diameter 3.17 mm
and with High-Speed Micro Motor 20712033

![High-Speed Handpiece](image)

252680 High-Speed Handpiece, short, angled, 100,000 rpm,
for use with High-Speed Micro-Motor 20712033

252681 High-Speed Handpiece, medium, angled, 100,000 rpm,
for use with High-Speed Micro-Motor 20712033
UNIDRIVE® S III ENT SCB
High-Speed Handpieces, angled and straight, 60,000 rpm

For use with High-Speed Drills, shaft diameter 2.35 mm
and with High-Speed Micro Motor 20712033

60,000 rpm
diameter 5.5 mm

252660  High-Speed Handpiece, extra short, angled, 60,000 rpm,
for use with High-Speed Micro-Motor 20712033

252661  High-Speed Handpiece, short, angled, 60,000 rpm,
for use with High-Speed Micro-Motor 20712033

252690  High-Speed Handpiece, extra short, straight, 60,000 rpm,
for use with High-Speed Micro-Motor 20712033

252691  High-Speed Handpiece, short, straight, 60,000 rpm,
for use with High-Speed Micro-Motor 20712033
UNIDRIVE® S III ENT SCB
High-Speed Standard Burrs, High-Speed Diamond Burrs

For use with High-Speed Handpieces, 100,000 rpm

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>Short</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
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<td>350110 M</td>
</tr>
<tr>
<td>2</td>
<td>350120 S</td>
<td>350120 M</td>
</tr>
<tr>
<td>3</td>
<td>350130 S</td>
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<td>350150 M</td>
</tr>
<tr>
<td>6</td>
<td>350160 S</td>
<td>350160 M</td>
</tr>
<tr>
<td>7</td>
<td>350170 S</td>
<td>350170 M</td>
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<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>Short</th>
<th>Medium</th>
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</thead>
<tbody>
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<td>350230 M</td>
</tr>
<tr>
<td>4</td>
<td>350240 S</td>
<td>350240 M</td>
</tr>
<tr>
<td>5</td>
<td>350250 S</td>
<td>350250 M</td>
</tr>
<tr>
<td>6</td>
<td>350260 S</td>
<td>350260 M</td>
</tr>
<tr>
<td>7</td>
<td>350270 S</td>
<td>350270 M</td>
</tr>
</tbody>
</table>
### UNIDRIVE® S III ENT SCB
**High-Speed Diamond Burrs, High-Speed Acorns, High-Speed Barrel Burrs, High-Speed Neuro Fluted Burr**

For use with High-Speed Handpieces, 100,000 rpm

![252680 and 252681]

<table>
<thead>
<tr>
<th>Diameters in mm</th>
<th>Short</th>
<th>Medium</th>
</tr>
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<td>350330 M</td>
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<td>350340 M</td>
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<tr>
<td>5</td>
<td>350350 S</td>
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<td>350360 M</td>
</tr>
<tr>
<td>7</td>
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<td>350370 M</td>
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</table>

**High-Speed Coarse Diamond Burrs, 100,000 rpm, for single use, sterile, package of 5**

Diameter in mm | Short | Medium |
---|---|---|
7.5 | 350675 S | 350675 M |
9 | 350690 S | 350690 M |

**High-Speed Acorns, 100,000 rpm, for single use, sterile, package of 5**

Diameter in mm | Short | Medium |
---|---|---|
6 | 350960 S | 350960 M |
9.1 | 350991 S | 350991 M |

**High-Speed Barrel Burrs, 100,000 rpm, for single use, sterile, package of 5**

Diameter in mm | Short | Medium |
---|---|---|
1.8 | 350718 S | 350718 M |
3 | 350730 S | 350730 M |

**High-Speed Neuro Fluted Burr, 100,000 rpm, for single use, sterile, package of 5**

Diameter in mm | Short | Medium |
---|---|---|
1.8 | 350718 S | 350718 M |
3 | 350730 S | 350730 M |
UNIDRIVE® S III ENT SCB
High-Speed Standard Burrs, High-Speed Diamond Burrs

For use with High-Speed Handpieces, 60,000 rpm

---

**High-Speed Standard Burrs, 60,000 rpm, for single use, sterile, package of 5**

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>extra short</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>330110 ES</td>
<td>330110 S</td>
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<tr>
<td>2</td>
<td>330120 ES</td>
<td>330120 S</td>
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<td>3</td>
<td>330130 ES</td>
<td>330130 S</td>
</tr>
<tr>
<td>4</td>
<td>330140 ES</td>
<td>330140 S</td>
</tr>
<tr>
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<td>330150 ES</td>
<td>330150 S</td>
</tr>
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<td>330160 S</td>
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<td>7</td>
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<td>330170 S</td>
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</table>

**High-Speed Diamond Burrs, 60,000 rpm, for single use, sterile, package of 5**

<table>
<thead>
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<th>Diameter in mm</th>
<th>extra short</th>
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<td>330206 S</td>
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<td>330210 ES</td>
<td>330210 S</td>
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<tr>
<td>1.5</td>
<td>330215 ES</td>
<td>330215 S</td>
</tr>
<tr>
<td>2</td>
<td>330220 ES</td>
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<td>330240 S</td>
</tr>
<tr>
<td>5</td>
<td>330250 ES</td>
<td>330250 S</td>
</tr>
<tr>
<td>6</td>
<td>330260 ES</td>
<td>330260 S</td>
</tr>
<tr>
<td>7</td>
<td>330270 ES</td>
<td>330270 S</td>
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</table>
**UNIDRIVE® S III ENT SCB**

High-Speed Diamond Burrs, High-Speed Cylinder Burrs, LINDEMANN High-Speed Fluted Burrs

For use with High-Speed Handpieces, 60,000 rpm

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>extra short</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>330330 ES</td>
<td>330330 S</td>
</tr>
<tr>
<td>4</td>
<td>330340 ES</td>
<td>330340 S</td>
</tr>
<tr>
<td>5</td>
<td>330350 ES</td>
<td>330350 S</td>
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<tr>
<td>6</td>
<td>330360 ES</td>
<td>330360 S</td>
</tr>
<tr>
<td>7</td>
<td>330370 ES</td>
<td>330370 S</td>
</tr>
</tbody>
</table>

High-Speed Coarse Diamond Burrs, 60,000 rpm, for single use, sterile, package of 5

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>extra short</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>330440 ES</td>
<td>330440 S</td>
</tr>
<tr>
<td>6</td>
<td>330460 ES</td>
<td>330460 S</td>
</tr>
</tbody>
</table>

High-Speed Cylinder Burrs, 60,000 rpm, for single use, sterile, package of 5

<table>
<thead>
<tr>
<th>Diameter in mm (diameter x length)</th>
<th>extra short</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter 2.1/11</td>
<td>330511 ES</td>
<td>330511 S</td>
</tr>
<tr>
<td>Diameter 2.3/26</td>
<td>330526 ES</td>
<td>330526 S</td>
</tr>
</tbody>
</table>
Oscillating Micro Saws

254000 Oscillating Micro Saw, inbuilt irrigation tube, max. recommended number of revolutions 15,000 rpm corresponds to 15,000 oscillations/min., without saw blades, with fork wrench

Saw blades, short shaft, for use with 254000

254024 Saw Blade, short shaft, blade thickness 0.3 mm, width of blade 6 mm, working length 11 mm, package of 1, for use with 254000

254025 Same, width of blade 10 mm

254026 Same, width of blade 15 mm

254030 Same, blade thickness 0.15 mm, width of blade 6 mm

Saw blades, long shaft, for use with 254000

254027 Saw Blade, long shaft, blade thickness 0.3 mm, width of blade 6 mm, working length 26 mm, package of 1, for use with 254000

254028 Same, width of blade 10 mm

254029 Same, width of blade 15 mm

254031 Same, blade thickness 0.15 mm, width of blade 6 mm
Micro Compass Saws, Osseo Scalpel

254100  Micro Sagittal Saw, without saw blades, integrated irrigation tube, with fork wrench, recommended maximum speed: 20,000 rpm

Saw blades, for use with 254100

254170  Saw Blade, blade thickness 0.35 mm, width of blade 4 mm, working length 10 mm, package of 12, for use with Micro Sagittal Saw 254100

254171  Same, width of blade 6 mm, working length 10 mm

254172  Same, width of blade 6 mm, working length 15 mm

254173  Same, width of blade 10 mm, working length 15 mm

254174  Same, width of blade 12 mm, working length 27 mm

254175  Same, width of blade 6 mm, working length 10 mm

254200  Osseo Scalpel, Micro Saw, with axial/sagittal channel, pendulum stroke, especially appropriate for 3-dimensional incision guiding, without saw blades, inbuilt irrigation tube, max. recommended number of revolution 20,000 rpm, with fork wrench

Saw blades, for use with 254200

254235  Saw Blade, blade thickness 0.35 mm, working length 12 mm, package of 12, for use with Osseo Scalpel, Micro Saw 254200

254236  Same, working length 18 mm

254237  Same, working length 24 mm
Micro Compass Saws

254300  Micro Compass Saw, without saw blades, detachable irrigation tube, with fork wrench, recommended maximum speed: 15,000 rpm

Saw blades, for use with 254300

254312  Saw Blade, blade thickness 0.25 mm, working length 11 mm, package of 12, for use with 254300

254313  Same, working length 14 mm

254314  Same, working length 18 mm

254315  Same, working length 22 mm

254316  Same, working length 26 mm
Micro Saws – Accessories

39553 A **Sterilizing and Storage Basket**, provides safe storage of accessories for the KARL STORZ micro saw system during cleaning and sterilization, includes basket for small parts

**for storage of:**
- Up to 6 saw handpieces
- Connecting cable
- EC micro motor
- Saw blades
Dermatomes

Special features:
- For removing skin and mucosa
- Dermaplaning for obtaining small pieces of skin from behind the ear
- Can be easily adapted to motor
- Optimal setting of the incision depth
- Lightweight construction

253000  **Dermatome**, with INTRA coupling, width of incision 12 mm, max. number of rev. 8000 rpm

253001  **Replacement Blades**, for dermatome 253000, width of incision 12 mm, non-sterile, package of 10

253100  **Dermatome**, with INTRA coupling, width of incision 25 mm, max. number of rev. 8000 rpm

253101  **Replacement Blades**, for dermatome 253100, width of incision 25 mm, non-sterile, package of 10

253200  **Dermatome**, with INTRA coupling, width of incision 50 mm, max. number of rev. 8000 rpm

253201  **Replacement Blades**, for dermatome 253200, width of cut 50 mm, non-sterile, package of 10

253300  **Dermatome**, with INTRA coupling, width of incision 75 mm, max. number of rev. 8000 rpm

253301  **Replacement Blades**, for dermatome 253300, width of incision 75 mm, non-sterile, package of 10
Dermatome – Accessories

39554 A  Sterilizing and Storage Basket, provides safe storage of accessories for the KARL STORZ dermatome system during cleaning and sterilization

for storage of:
– Up to 2 dermatomes
– Connecting cable
– EC micro motor with INTRA coupling
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
IMAGE1 S Camera System

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*

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:**

<table>
<thead>
<tr>
<th>HD video outputs</th>
<th>Format signal outputs</th>
<th>LINK video inputs</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>3x</td>
<td>4x USB, (2x front, 2x rear)</td>
<td>2x 6-pin mini-DIN</td>
</tr>
</tbody>
</table>

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) 22220056-3, 22220056-3, 22220056-3, 22220060-3, 22220061-3, 22220054-3, 22220065-3 (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 $\frac{1}{3}“$ 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 $\frac{1}{3}“$ 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, 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

KARL STORZ HD and FULL HD Monitors

<table>
<thead>
<tr>
<th>Wall-mounted with VESA 100 adaption</th>
<th>19&quot;</th>
<th>26&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor no.</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>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 (type)</td>
<td>500 cd/m² (type)</td>
</tr>
<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>
</tr>
<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 max.</td>
<td>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>

Optional accessories:
- 9826 SF Pedestal, for monitor 9826 NB
- 9626 SF Pedestal, for monitor 9619 NB
Cold Light Fountains and Accessories

Fiber Optic Light Cable,  
with straight connector,  
diameter 2.5 mm, length 180 cm  
495 NT

Fiber Optic Light Cable,  
with 90° deflection to the cold light  
fountain on the fountain side,  
diameter 2.5 mm, length 180 cm  
495 NTW

Same, length 230 cm  
495 NTX

Cold Light Fountain XENON NOVA® 175

20131501 Cold Light Fountain XENON NOVA® 175,  
power supply:  
100–125 VAC/220–240 VAC, 50/60 Hz  
including:  
Mains Cord

20132026 XENON Spare Lamp,  
175 watt, 15 volt

Cold Light Fountain XENON 300 SCB

20133101-1 Cold Light Fountain XENON 300 SCB  
with built-in antifog air-pump, and integrated  
KARL STORZ Communication Bus System SCB  
power supply:  
100–125 VAC/220–240 VAC, 50/60 Hz  
including:  
Mains Cord  
SCB Connecting Cord, length 100 cm

20133027 Spare Lamp Module XENON  
with heat sink, 300 watt, 15 volt

20133028 XENON Spare Lamp, only,  
300 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.
Equipment Cart

**Equipment Cart**
wide, high, rides on 4 antistatic dual wheels
equipped with locking brakes
3 shelves,
mains switch on top cover,
central beam with integrated electrical subdistributors
with 12 sockets, holder for power supplies,
potential earth connectors and cable winding
on the outside,

**Dimensions:**
- Equipment cart: 830 x 1474 x 730 mm (w x h x d),
- shelf: 630 x 510 mm (w x d),
- caster diameter: 150 mm

including:
- **Base module equipment cart**, wide
- **Cover equipment**, equipment cart wide
- **Beam package equipment**, equipment cart high
- 3x **Shelf**, wide
- **Drawer unit with lock**, wide
- 2x **Equipment rail**, long
- **Camera holder**

**Monitor Swivel Arm,**
height and side adjustable,
can be turned to the left or the right side,
swivel range 180°, overhang 780 mm,
overhang from centre 1170 mm,
load capacity max. 15 kg,
with monitor fixation VESA 5/100,
for usage with equipment carts UG xxx
Recommended Accessories for Equipment Cart

**UG 310**
*Isolation Transformer,*
200 V–240 V; 2000 VA with 3 special mains socket, expulsion fuses, 3 grounding plugs, dimensions: 330 x 90 x 495 mm (w x h x d), for usage with equipment carts UG xxx

**UG 410**
*Earth Leakage Monitor,*
200 V–240 V, for mounting at equipment cart, control panel dimensions: 44 x 80 x 29 mm (w x h x d), for usage with isolation transformer UG 310

**UG 510**
*Monitor Holding Arm,*
height adjustable, inclinable, mountable on left or right, turning radius approx. 320°, overhang 530 mm, load capacity max. 15 kg, monitor fixation VESA 75/100, for usage with equipment carts UG xxx
Notes: