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ENDOSCOPES FOR ANESTHESIOLOGY AND EMERGENCY MEDICINE

6th EDITION 1/2018
Important Notes:

It is recommended to check the suitability of the product for the intended procedure prior to use.

Endoscopes and accessories contained in this catalog have been designed in part with the cooperation of physicians and are manufactured by the KARL STORZ group. If subcontractors are hired to manufacture individual components, these are made according to proprietary KARL STORZ plans or drawings. Furthermore, these products are subject to strict quality and control guidelines of the KARL STORZ group. Both contractual and general legal provisions prohibit subcontractors from supplying components manufactured by order of KARL STORZ to competitors.

Any assumptions that competitors’ endoscopes and accessories are acquired from the same suppliers as the KARL STORZ products are not correct. Moreover, endoscopes and instruments provided by competitors are not manufactured according to the design specifications of KARL STORZ. This means it cannot be assumed that these endoscopes and accessories – even if they look identical on the outside – are constructed in the same manner and have been tested according to the same criteria.

Standardized Design and Labeling

KARL STORZ participates both in national and international bodies involved in the development of standards for endoscopes and endoscopic accessories. Standardized design and development therefore have long been implemented consistently by KARL STORZ. The user can rest assured that all products by the KARL STORZ group have been designed and constructed not only in compliance with strict internal quality guidelines, but also with international standards. All data relevant for safe use, such as viewing direction, sizes and diameters, or notes regarding sterilization of telescopes, are applied to the instruments, have been formulated according to international standards, and therefore provide reliable information.

As we constantly seek to improve and modify our products, we reserve the right to make changes in design that vary from catalog descriptions.

Original or Counterfeit

KARL STORZ products are name brand articles renowned around the world and represent the state of the art in important areas of healthcare. A large number of “copy cat” products are currently being offered in many markets. These products are designed intentionally to resemble KARL STORZ products and use marketing strategies that at least point out their compatibility with KARL STORZ products. These products are by no means genuine products, since genuine KARL STORZ products are sold worldwide exclusively under the name of KARL STORZ, which appears on the packaging and the product. In the absence of such labeling, the product is not from KARL STORZ.

KARL STORZ, therefore, is unable to ensure that such products are actually compatible with genuine KARL STORZ products or can be used with them without injury to the patient.

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Basic Sets for Intubation

<table>
<thead>
<tr>
<th>Order No.</th>
<th>8403 AX</th>
<th>C-MAC® Video Laryngoscope MAC #3</th>
<th>8403 BX</th>
<th>C-MAC® Video Laryngoscope MAC #4</th>
<th>8403 YDLK</th>
<th>C-MAC® PM Set</th>
<th>8403 YDL</th>
<th>Charging Unit for C-MAC® PM</th>
<th>8403 YZ</th>
<th>Protection Cap*</th>
<th>8403 GXC</th>
<th>C-MAC® Video Laryngoscope MIL #1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway Management Set</td>
<td>11300 B3</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Intubation Set Prehospital, ULM model</td>
<td>8400 C1</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
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* including USB data cable, ** included with 8403 XDK

**Intubation Set Prehospital, ULM model**

**Special Features:**

- Recommended bag for storing the entire intubation equipment
- Padded bag designed for difficult working and environmental conditions in prehospital settings
- Recommended intubation set for prehospital intubation and mobile settings
- Suitable for direct and indirect intubation
- With component to facilitate the attachment of a suction catheter, O₂ catheter or AINTREE catheter
- Always ready for use thanks to exchangeable and rechargeable battery pack
- Intelligent power management with rechargeable Li-ion batteries and capacity indicator
- Completely watertight (IPX08)

- Simultaneous documentation of freeze frames (JPEG) and video sequences (MPEG4) on internal memory in real time
- Additional standard: RTCA/DO-160F
- MAGILL forceps, modified by BOEDEKER, for video-assisted foreign body removal
**Airway Management Set**

**Special Features:**
- The set for all demands in Difficult Airway Management
- 2 different intubation endoscopes
- 5 different laryngeal masks
- 2 laryngeal tubes, size 3 and 4
- Instruments for cricothyrotomy
- LED battery light source allows operation without AC power connection
- Sturdy case

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Description</th>
<th>Included in Set</th>
</tr>
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<tbody>
<tr>
<td>8403 XDA</td>
<td>Battery for C-MAC® PM, rechargeable</td>
<td>Yes</td>
</tr>
<tr>
<td>809125 MAVIGL Forceps modified</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>809120 MAVIGL Forceps for children</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>88295 MAVIGL Forceps, 25 cm</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>11302 BD2 Fiberscope 3.7 mm x 65 cm</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>10231 BK Retromolar Induction</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>11301 D2 Battery Light Source LED</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>11331 B2K Retromolar Induction</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Larynx mask and larynx tubes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Coniotomy Set</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Case/Bag</td>
<td>Yes</td>
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**Table:**

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<th>Item Code</th>
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<tr>
<td>8403 YE</td>
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</table>

**Notes:**
- 27677 BK

**Image:**
- Photograph of the Airway Management Set kit.
Difficulties in securing the airways in intraclinical settings – whether expected or unexpected – cannot always be avoided.

If intubation problems are foreseeable, an elective fiber optic intubation, preferably under topical anesthesia and light sedation should be regarded as the “gold standard.”

If “cannot intubate” or even “cannot ventilate – cannot intubate” situations occur unexpectedly, fast and well-considered action becomes necessary in order to manage an acute life-threatening situation for the patient. Any person wishing to perform an intubation must be able to answer the question: “What do I do, if the intubation is unsuccessful?” Once the situation has occurred, there is no time for lengthy consideration. For this reason, organizations such as the American Society of Anesthesiologists (ASA) or European Resuscitation Council (ERC) developed algorithms for such situations that range from a procedure using modified laryngoscope blades to instruments such as the laryngeal tube or laryngeal mask through to coniotomy, in order to enable the intubator to achieve the greatest benefit for his/her patients.

The prerequisite for successful airway management is that the user has an advance plan for proceeding in case of difficulties; that he/she has both theoretical knowledge and practical experience in alternative techniques and, above all, that these instruments can also be made available in a sufficiently short time. This problem can be handled relatively easily in the OR setting but becomes considerably more difficult with regard to intubation problems in emergency patients on a ward.

This Airway Management Set was developed to provide the entire line of recommended instruments and equipment for expectedly and unexpectedly difficult airway management. With its relatively low weight, small dimensions and a LED battery-powered light source, this set can be used quickly and flexibly. In addition to flexible fiber optics, this set also provides the user with a retromolar intubation endoscope, a laryngeal tube, standard and intubation laryngeal masks as well as instruments for a coniotomy.

Prof. Dr. Dr. med. M.D.W. LIPP, Dr. N. GOLECKI, Johannes Gutenberg University Mainz, Germany
Recommended Set for Difficult and Standard Intubation

11300 B3  **Airway Management Set**, for the difficult airway
including:
- **Intubation Fiberscope**, 3.7 mm x 65 cm
- **Retromolar Intubation Endoscope**, 5 x 40, autoclavable
- **Battery Light Source LED for Endoscopes**
- **Mask Adaption “MAINZ Adaptor”**, blue, package of 5
- **Laryngeal Tube**, size 4
- **Laryngeal Tube**, size 3
- **Spiral Tube**, size 6, for single use
- **Laryngeal Mask**, standard, reusable, size 1
- **Laryngeal Mask**, standard, reusable, size 2
- **Laryngeal Mask**, standard, reusable, size 4
- **Intubation Laryngeal Mask**, reusable, size 3
- **Intubation Laryngeal Mask**, reusable, size 4
- **Laryngeal Mask Tube**, diameter 7 mm
- **Laryngeal Mask Tube**, diameter 7.5 mm
- **LMA Tube Stabilizer**
- **MAGILL Forceps**, length 25 cm
- **Scalpel**, for single use, package of 10
- **COTTLE Nasal Speculum**, blade length 55 mm, length 13 cm
- **Emergency Laryngoscope Blade**, cold light, universal size
- **Handle Sleeve**, ISO 7376
- **Battery Insert Set LED**, with cap
- **Case**
- **Cleaning Brush**
- **Pressure Compensation Cap**
- **Leakage Tester**
- **Irrigation Adaptor**, for machine cleaning, reusable
- **Suction Valve**, sterile, for single use, package of 20
- **LIPP Tube Holder**
- **Tube Holder**, for ETT
- **Bronchoscope Insertion Tube**, size 4
- **Bronchoscope Insertion Tube**, size 2
- **Plug**, black, package of 10

For further product information see pages 18, 22, 26, 88, 93, 99
Components/Spare Parts see chapter 6
Intubation Set -C22-, ULM Model

The C-MAC Video Laryngoscope in Prehospital Emergency Medicine

Establishing a secure airway is the top priority in most algorithms for emergency patient care. In prehospital emergency medicine, endotracheal intubation (ETI) is widely accepted as the “gold standard”. However, prehospital ETI faces many obstacles that are not encountered with ETI in the clinical setting: The work environment is often cramped and optimal positioning of the patient is far more difficult to achieve than on an operating table. The emergency physician has no knowledge of the previous airway management history of the individual patient. In addition, the compromised vital functions of emergency patients frequently force the emergency physician to act swiftly.

As difficult intubation is often associated with difficult laryngoscopy, video laryngoscopes prove useful for equipment optimization. To ensure first pass success, however, the video laryngoscope should be used in the first intubation attempt and not as an alternative when other intubation attempts with standard laryngoscopes have failed. This method offers several advantages: The prospects of first pass success in airway management are greatly enhanced thanks to improved laryngoscopy conditions.

Emergency physicians who routinely use video laryngoscopes have more experience with using this technical aid and will have no problems handling the product.

Emergency patients have a markedly reduced hypoxia tolerance due to illness or injury. Consequently, optimal conditions for time-sensitive airway securement have to be created during the first intubation attempt. The video laryngoscope should not be used as an extra alternative as this only prolongs the time needed for a definitive secure airway and to oxygenate the patient. One of the many distinguishing features of the C-MAC® video laryngoscope from KARL STORZ is the possibility to combine indirect, video laryngoscopic visualization with direct laryngoscopy via a standard MACINTOSH blade, without the need to change the laryngoscope.

On the CHRISTOPH 22 rescue helicopter in Ulm, a C-MAC® video laryngoscope has been routinely used (for every (!) prehospital intubation) since 2009 while the C-MAC® PM with the folding monitor on the handle has been used exclusively since 2011. This monitor is always in the direct view of the emergency physician.

Whereas intubation with the MACINTOSH blades 2, 3 and 4 is almost always successful, the use of a malleable intubation catheter is a useful aid for intubation with a curved D-BLADE. In addition to the MILLER blades in sizes 0 and 1, this tool is also included in the instrument set on the CHRISTOPH 22 helicopter for the intubation of pediatric patients.

The new, robust and water-resistant intubation bag -C22- offers clearly arranged storage for the C-MAC® PM as well as aforementioned blades, a malleable intubation catheter, a set of tubes and fixing material in the emergency backpack.

Based on many years of experience, we can strongly recommend the C-MAC® PM video laryngoscope for the prehospital setting. Like any other equipment to be used on patients, the medical practitioner should receive instructions on handling the video laryngoscope and become thoroughly familiar with its use.

B. HOSSFELD, M.D.,
Bundeswehrkrankenhaus Ulm,
Germany
Intubation Set Prehospital, ULM Model

Basic Set

8400 C1

Intubation Set Prehospital, ULM model including:
- C-MAC® Video Laryngoscope MAC #3
- C-MAC® Video Laryngoscope MAC #4
- C-MAC® Video Laryngoscope MIL #1
- Battery, for C-MAC® PM, rechargeable
- C-MAC® PM Set, including USB data cable and protection cap
- Charging Unit, for C-MAC® PM
- Bag, for intubation set -C22-, ULM model
- MAGILL Forceps, for adults, modified
- MAGILL Forceps, for children, modified
- C-MAC® PM Connecting Cable

Optional

8403 HXK

C-MAC® Video Laryngoscope D-BLADE Set, for adults, CMOS technology, for difficult intubation, with C-MAC® system interface, documentation of images and video sequences via BlueButton, with catheter introduction sizes 16 – 18 Fr., including C-MAC® GUIDE adapted to blade shape, for use with C-MAC® Connecting Cable 8403 X for C-MAC® Monitor 8403 ZX or C-HUB® II 20 2903 01 as well as C-MAC® PM 8403 XD including:
- C-MAC® GUIDE

For further product information see pages 26, 42-44, 47-51
Components/Spare Parts see chapter 6
DIRECT LARYNGOSCOPY

LARYNGOSCOPE BLADES, COLD LIGHT (XENON/LED), HANDLES, HANDLE SLEEVES, BATTERY INSERTS .................11-25

ACCESSORIES .........................26
Laryngoscope Blades

- MACINTOSH Laryngoscope Blades
- MILLER Laryngoscope Blades
- PHILIPS Laryngoscope Blades
- Emergency Laryngoscope Blades
- Laryngoscope Blades for Pediatrics

- Handles, with battery inserts
- Handles, with rechargeable battery inserts
MACINTOSH Laryngoscope Blades
Cold Light – Fiber Optic Light Carrier Incorporated

Illustrations may not be to scale.
MACINTOSH Laryngoscope Blades
Cold Light – Fiber Optic Light Carrier Incorporated

8546
8546 LD1
8549 LDX
8546 AK
8547
8547 AK
8547 BK
8547 LDX
8548
8548 LDX1

8541 AA – E

8541 AA  MACINTOSH Laryngoscope Blade, size 5
8541 A  Same, size 4
8541 B  Same, size 3
8541 C  Same, size 2
8541 D  Same, size 1
8541 E  Same, size 0

Handles 8546, 8547 and 8548 as well as compatible Light Sources see pages 22-24
ILLUSTRATIONS MAY NOT BE TO SCALE.
MILLER Laryngoscope Blades
Cold Light – Fiber Optic Light Carrier Incorporated

MILLER Laryngoscope Blade, size 4
8537 A
Same, size 3
8537 B
Same, size 2
8537 C
Same, size 1
8537 D
Same, size 0
8537 E

Handles 8546, 8547 and 8548 as well as compatible Light Sources see pages 22-24
Illustrations may not be to scale.
PHILIPS Laryngoscope Blades
Cold Light – Fiber Optic Light Carrier Incorporated

8546
8546 LD1
8549 LDX
8546 AK
8547
8547 AK
8547 BK
8547 LDX
8548
8548 LDX1

8535 C/CA

8535 C
8535 CA

PHILIPS Laryngoscope Blade, size 2
Same, size 1

Handles 8546, 8547 and 8548 as well as compatible Light Sources see pages 22-24
The blade design allows it to replace the MACINTOSH laryngoscope blades, size 2 – 4, which are traditionally used. The working length of the blade is 120 mm, putting it exactly between the length of the MACINTOSH 3 and 4 to enable intubation under large anatomical conditions.

The blade tip has a width of 11 mm, corresponding to the MACINTOSH laryngoscope blade, size 2, allowing intubation of emergency patients from one year of age to adult. The tapered shape of the blade is especially helpful. Along with the required length, the blade also has the correct width for the respective age group.

An inadvertent introduction of the blade too deeply in the case of children is also prevented by 2 approximating, weight-calibrated markings on the front and rear of the blade.

The blade is only slightly curved, especially in the front, making intubation of small children easier.

The tapering of the blade from 0° at the tip to 20° at the rear permits a better view when introducing the blade horizontally. Together with the very low height of 16 mm, this also facilitates rapid intubation in emergency situations and when the mouth opening is limited, as well as its low profile enables fast intubation in emergency situations and where the mouth opening is restricted, especially when performed by less practiced persons.

By limiting the selection to just two intubation blades, uncertainty about choosing the correct blade size under urgent treatment conditions is greatly diminished.

AGNN
Arbeitsgemeinschaft in Norddeutschland tätiger Notärzte e.V.
Germany

Special Features:
● The special design of the blade makes it suitable for intubating both small children and adults.
● The thin front section makes this blade very suitable for ENT, e.g., hypertrophic tonsils.
● The overall low height of this blade permits easy intubation even when patients cannot open their mouth wide, e.g., in case of lockjaw or poor relaxation.
● Forward placement of the light outlet provides good illumination.
● Less space is required at the worksite with just one blade size (helpful for rescue services).
● Uniform blade sizes enable easier and standardized training, e.g., for emergency medical personnel.
Emergency Laryngoscope Blade
Cold Light – Fiber Optic Light Carrier Incorporated

8546
8546 LD1
8549 LDX
8546 AK
8547
8547 AK
8547 BK
8547 LDX
8548
8548 LDX1

8535 B

8535 B  Emergency Laryngoscope Blade, universal size

Handles 8546, 8547 and 8548 as well as compatible Light Sources see pages 22-24
Laryngoscope Blades for Pediatrics
Cold Light – Fiber Optic Light Carrier Incorporated

Illustrations may not be to scale.
Laryngoscope Blades for Pediatrics
Cold Light – Fiber Optic Light Carrier Incorporated

8546
8546 LD1
8549 LDX
8546 AK
8547
8547 AK
8547 BK
8547 LDX
8548
8548 LDX1

8537 F – H

8537 F  Laryngoscope Blade for Pediatrics, large
8537 G  Same, medium
8537 H  Same, small

Handle 8547 see pages 23, 24
Standard Handle with Light Sources
for Cold Light Laryngoscope Blades

Special Features:
- Rechargeable lithium-ion batteries
- Extremely bright LED of more than 50 lm/> 100 klx
- Absolute white light due to LED technology (5500 K)
- Special lens system allows optimal light adjustment at the blade connector
- LED provides a lifetime of more than 50,000 hours
- Burning time up to 240 min at 100% brightness
- Rechargeable lithium-ion batteries, >1000 charging cycles
- ISO 7376 compatible

8546
Handle Sleeve, with green silicone coating, ISO 7376, autoclavable, standard P-GRIP® handle, for use with Inductive Charging Unit 8546 LE1, Battery Insert Xenon 8546 AK, Battery Insert LED 8546 LD1, rechargeable, Battery Insert Set LED 8549 LDX and cold light laryngoscopes

LED Inserts
8546 LD1
Battery Insert, rechargeable, length 12 cm, for Handle Sleeve 8546, with high-power LED, > 56 lm / > 100 klx, lithium-ion battery insert, burning time at 100% brightness 240 min, charging via Inductive Charging Unit 8546 LE1

8549 LDX
Battery Insert Set LED, length 12 cm, with high-power LED, > 56 lm / > 100 klx, burning time at 100% brightness > 120 min, for use with Handle Sleeve 8546 and cold light laryngoscopes
including:
2x Batteries, Mignon cells, LR 06, 1.5 V
Cap

Xenon Inserts
8546 AK
Battery Insert Set Xenon, length 12 cm, with 2 Batteries 121306 S and Xenon Lamp 8546 XA

121306 S
Batteries, baby cells, LR 14, for Battery Insert Set Xenon 8546 AK, package of 2

8546 XC
Xenon Lamp, 2.5 V, for Battery Insert Sets 8546 AK, 8547 AK and 8547 BK, package of 6

Components/Spare Parts see chapter 6
Slim Handle with Light Sources
for Cold Light Laryngoscope Blades

Particularly suitable for use with blade sizes 0 and 1

8547 Handle Sleeve, with green silicone coating, ISO 7376, *autoclavable*, slender P-GRIP® handle, for use with battery insert set LED, slim 8547 LDX, battery insert sets Xenon, slim 8547 AK, 8547 BK and cold light laryngoscopes

LED Inserts

8547 LDX Battery Insert Set LED, slim, length 12 cm, *with high-power LED*, burning time at 100% brightness > 120 min, functions with 1x AA battery, for use with Handle Sleeve 8547 and cold light laryngoscopes

including:

- Battery
- Cap

Xenon Inserts

8547 AK Battery Insert Set Xenon, length 12 cm, with 2 Batteries 121306 KS and Xenon Lamp 8546 XA

8547 BK Battery Insert Set Xenon, slim, *rechargeable*, length 12 cm, charging via Inductive Charging Unit 8546 LE1, for use with Handle Sleeve 8547 and cold light laryngoscopes, with Xenon Lamp 8546 XA

8546 XC Xenon Lamp, 2.5 V, for Battery Insert Sets 8546 AK, 8547 AK and 8547 BK, package of 6

121306 KS Batteries, Mignon cells, LR 06, 1.5 V, package of 2, for use with Battery Insert 8547 AK and Battery Insert Set High-Power LED 8549 LDX

Components/Spare Parts see chapter 6
Short Handle with Light Source (Stubby)
for Cold Light Laryngoscope Blades

Special Features:
- Extremely powerful LED with over 56 lm/ > 100 klx
- Absolutely white light thanks to LED technology (5500 K)
- Small handle with photo battery
- Optimal light adjustment at the laryngoscope thanks to a special lens system
- LED service life of more than 50,000 hours
- Burning time up to 240 min at 100% brightness
- ISO 7376 compatible

8548 Handle Sleeve, with green silicone coating, ISO 7376, autoclavable, short P-GRIP® handle, for use with Battery Insert Set LED 8548 LDX1 and cold light laryngoscopes

8548 LDX1 LED Battery Insert Set, length 6 cm, with high-power LED, > 56 lm / > 100 klx, burning time at 100% brightness > 120 min, for use with Handle Sleeve 8548 and cold light laryngoscopes
including:
Cap
Inductive Battery Charger
for Rechargeable Laryngoscope Handles

Special Features:
● Modified with larger inner diameter for the new P-GRIP® handles
● Backward compatible with previous handles
● No open contacts thanks to inductive technology
● No corrosion or contact problems
● Service life is extended by eliminating voltage peaks
● Rechargeable battery inserts can be charged with or without the handle sleeve; also in sterile packaging
● For use with LED or rechargeable Xenon handles

8546 LE1 Inductive Charging Unit, for two battery inserts with handle sleeve (chrome-plated and with green silicone coating), with fully integrated mains adaptor and power adaptor for EU, UK, USA/JP and Australia, power supply 110 – 240 VAC, 50/60 Hz, suitable for wipe disinfection

8546 R1 Reduction Sleeve, for use with Inductive Charging Unit 8546 LE1 and Handle 8547 with Battery Insert 8547 B

11301 DH Holder, for mounting on a surface, for use with Charging Units 11301 DG, 8546 LE, 8546 LE1 and 8401 XDL
**Accessories**

for Cold Light Laryngoscope Blades

- **809125** MAGILL Forceps, modified, length 25 cm, suitable for endoscopic foreign body removal, for use with video laryngoscopes sizes 2 – 4

- **809120** MAGILL Forceps, for children, modified, length 20 cm, suitable for endoscopic foreign body removal, for use with video laryngoscopes size 1 and 2

- **809025** MAGILL Forceps, for the introduction of endo-tracheal tubes, for adults, length 25 cm

- **809020** Same, for children, length 20 cm

- **794014** ROCHESTER-PEAN Artery Forceps, anatomical, straight, length 14 cm

- **8400 A** Bag for Intubation Set, splash-protected
VIDEO INTUBATION SYSTEMS

C-MAC® MONITOR, C-MAC® PM, C-HUB® II,
C-MAC® VIDEO LARYNGOSCOPE,
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FLEXIBLE INTUBATION VIDEO ENDOSCOPE (FIVE), FIVE S, C-MAC® VS,
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C-CAM®, FLEXIBLE INTUBATION FIBERSCOPE, RETROMOLAR
INTUBATION ENDOSCOPE . . . . . . . . . . .83-100
Airway Management

Video Laryngoscopes

Intubation Video Endoscopes

Eye piece Endoscopes
Airway Management

Anesthesia/OR
The patient is prepared for surgery in this area – with endotracheal intubation playing a major role. Hence this area is predestined for airway management system and, consequently, the entire C-MAC® system. The anesthesiologist must be able to master the challenges of the normal as well as the expected difficult and unexpected difficult airways. The product portfolio from KARL STORZ offers the right solution for this purpose.

Critical Care Medicine
A significant percentage of airway complications occur in the intensive care unit. In most cases, access to the head is severely restricted, the patient is not fasting and the airway conditions of the patient are not clear. Each intubation, extubation or reintubation is therefore difficult to access. The fast and mobile C-MAC® system from KARL STORZ offers several solutions for these challenges. The main fields of application of its broad portfolio are chiefly bronchial lavage, inspection of the upper and lower airways as well as the optical monitoring of percutaneous tracheostomy. The flexible intubation video endoscopes (FIVE) provide support with straightforward handling, excellent image quality and a system solution.

Emergency Room
As all emergency cases enter the clinic here, the risk of unexpected difficult intubations is most likely in this area. The C-MAC® video laryngoscope system can provide rapid assistance and safety for both experienced and inexperienced emergency physicians. Furthermore, additional components can be connected to the C-MAC® monitor such as, for example, the video rhino-laryngoscope or the video otoscope for rapid and straightforward inspection of the upper airways or the auditory meatus. Thanks to the broad product portfolio, the user is ideally equipped for different requirements in the emergency room.

Prehospital Emergency Medicine
An estimated 150 – 200 intubations a year are performed on German rescue helicopters; even fewer intubations are carried out by ground-based rescue services. However, these patients constitute up to 50% of unexpected difficult airways. This is more often due to adverse conditions than the airway conditions of the patients. The C-MAC® video laryngoscope system offers valuable assistance in these circumstances. Its weatherproof, robust design is geared towards extreme conditions and the standard MACINTOSH and MILLER video laryngoscopes are easy to use, even for inexperienced intubators. These can also be used for direct laryngoscopy, if required.
Airway Management

Versatility
Airway management is not confined to a specific location. In ORs, emergency rooms, intensive care units through to prehospital emergency settings, medical practitioners are confronted with the challenges of a difficult airway. KARL STORZ offers mobile and optimal solutions for managing difficult airway situations wherever and whenever they occur.

All a Matter of Organization
Our videocarts – ranging from the space-saving and functional mobile stand to the individually configurable airway management cart – combine ergonomics with functionality and are therefore customized to meet all necessary requirements. Our TROLL-E airway trolley provides the optimal solution for your equipment for any algorithm, regardless of its definition.

Optimal Visualization
Video-assisted intubation using a laryngoscope offers tremendous advantages over conventional laryngoscopy. Indirect laryngoscopy widens the angle of view from approx. 10° to 80°. This factor alone enables most difficult intubation cases to be downgraded to standard intubation. The major advantage of the C-MAC® video laryngoscope is the fact that it allows optimal use of both direct and indirect laryngoscopy for teaching and training purposes or under critical lighting conditions.

For the Greatest Challenges
Spinal injuries, trauma patients, maxillofacial injuries – you can count on KARL STORZ to help you master the most difficult airway situations. We are the only company to offer such a comprehensive range of endoscopic solutions for difficult airway management.

Solutions to Meet your Needs
From the MACINTOSH laryngoscope to the MILLER laryngoscope or the emergency laryngoscope, KARL STORZ offers you a wide range of laryngoscopes. The main feature of these laryngoscopes, however, is the LED handle which offers unique benefits. All our laryngoscopes are, of course, compatible with DIN ISO 7376 standards.

The Clever Alternative for Experts
The C-MAC® VS offers a proven alternative for managing difficult airways. The video stylet is more robust than a flexible intubation fiberscope and is especially designed for the difficult airway. A restricted mouth opening or cervical spine immobilization are only two indications for this video endoscope.
Tradition with a Future
From video laryngoscope to video laryngoscope system

2000

1st Generation:
KARL STORZ developed, in conjunction with Prof. ILIAS (Vienna, Austria), the first videolaryngoscope for routine use in anesthesiology. This mobile instrument was equipped with the state-of-art TELE PACK monitor technology available at the time.

2001

2nd Generation:
The second model was developed in conjunction with Prof. BERCI/Dr. KAPLAN (Los Angeles, USA) and was equipped with MVM technology (Micro Video Module). This resulted in a smaller camera and, consequently, improved ease of use.

2003

3rd Generation:
V-MAC® – this innovative development employed DCI® technology (Direct Coupled Interface) and enabled several instruments to be connected to a DCI® camera system via a one-chip camera head.

2008

4th Generation:
The C-MAC® video laryngoscopes have been equipped with a CMOS chip, LED and Li-ion batteries ever since the first generation. This makes the video laryngoscope more mobile and portable and allows more flexible use.

2012

C-MAC® as System
FIVE (flexible intubation video endoscope) can be directly connected to the C-MAC® monitor. This marks the beginning of a complete system for airway management.

2016

5th Generation:
Video laryngoscopy from KARL STORZ has reached its latest evolutionary step. Featuring a new design, enhanced image quality and a new KARL STORZ interface, the C-MAC® video laryngoscopes are setting the trend for airway management. The C-MAC® system has become even more flexible and multifunctional thanks to its new interface.
From Direct Laryngoscopy to the C-MAC® POCKET MONITOR System
The development from a complex functional system to frugal innovation

Manuel Garcia is generally regarded as a pioneer in laryngoscopy when he viewed the vocal cords with the use of a dentist’s mirror.

Prof. Peter Bumm – Head of ENT at Augsburg Central Hospital (Zentralklinikum) in Germany performs the 1st video laryngoscopy using a rigid endoscope from KARL STORZ.

Andreas Vesalius performs the 1st endotracheal intubation on an animal and recognizes its use for humans.

Sir Robert Reynolds Macintosh invents the MACINTOSH laryngoscope blade

John Knox McEwan performs the 1st orotracheal intubation

Robert Arden Miller invents the MILLER laryngoscope

KARL STORZ develops the 1st video laryngoscope.

Alfred Kirstein performs the 1st laryngoscopy

1543 1855 1878 1895 1941 1943 1989 2000

1878

1941

1989

2000

System Features

2000

Rüschi X-Lite® – Dismantable handle with exchangeable blades; image transmission integrated in the blade; handle fitted with video camera; relatively large and heavy light & image transmission

2001

MVM Video Laryngoscope – Micro Video Module ensures compatibility with other intubation endoscopes at the same video control unit for the first time

2003

DCI® Video Laryngoscope – blade and handle are combined in a fixed unit; camera head is inserted into the handle; image and video documentation possible for the first time; image adjustment directly on the handle; ergonomic handle design
V-MAC® – the 3rd generation of video laryngoscopes with DCI® technology from KARL STORZ.

C-MAC® – the 4th generation of video laryngoscopes, now equipped with CMOS technology from KARL STORZ.

C-MAC® – the 5th generation has become more flexible and versatile with the C-MAC® system interface. The premium class of video laryngoscopy.

1. C-MAC® video laryngoscope with a monitor on the handle

2001

2003

2008

2012

2016

2008

C-MAC® Video Laryngoscope – imaging via CMOS video chip; electronic module replaces camera head; improved hygiene: contact and blade geometries simplified; less control buttons on the handle: image & video capture

2012

1st C-MAC® Video Laryngoscope with monitor on the handle; electronic module and monitor form a portable unit; OTI display: monitor with 3-axis articulation; monitor completely watertight (IPX8)

2016

C-MAC® POCKET MONITOR – 2nd generation; compatibility expanded through the integration of the C-MAC® system interface; one-button technology: BlueButton for documentation; closed system: electronic unit integrated in the handle; hygiene: completely watertight system (IPX8); battery management: replaceable battery

Prof. Berci/Dr. Kaplan develop, in conjunction with KARL STORZ, the 2nd generation of video laryngoscopes with MVM technology.

V-MAC® – the 3rd generation of video laryngoscopes with DCI® technology from KARL STORZ.

C-MAC® – the 4th generation of video laryngoscopes, now equipped with CMOS technology from KARL STORZ.

C-MAC® – the 5th generation has become more flexible and versatile with the C-MAC® system interface. The premium class of video laryngoscopy.
Benefits of Video Laryngoscopy

Intubation via direct laryngoscopy provides the user with an angle of view of approx. 10° – 15°. The special camera technology of the video laryngoscope directs the observer's eye to the blade tip, providing an angle of view of approx. 60° – 80°. This principle of video laryngoscopy offers the user a much larger and more detailed view of the larynx, which greatly increases patient safety. Improved visualization of the video laryngoscope means that the instrument exerts considerably less force on the patient’s jaw during laryngoscopy. This alone greatly reduces the risk of dental damage resulting from intubation.

Not only do the video laryngoscopes from KARL STORZ provide a decisive advantage for daily use and difficult airway management, they are also very effective teaching and training tools for novices. The trainee can observe the entire procedure for laryngoscopy and intubation on the monitor and not over the shoulder of the instructor – mostly with little success – as is the case in direct laryngoscopy or intubation. It also enables the instructor to supervise the trainee at each step on the monitor and, if necessary, offer more appropriate help.

The recording function key on the handle enables still images and video sequences for laryngoscopy and intubation to be captured and stored in a simple and straightforward manner. This data is ideally suited for training and documentation purposes, especially in the case of difficult intubation.

Based on 70 years of experience in endoscopy and 20 years of experience in the field of video laryngoscopy, the new C-MAC® video laryngoscope from KARL STORZ combines various technical disciplines. Great attention has again been paid to actual market requirements such as handling, hygiene, mobility,
The C-MAC PM® was completely redesigned, specifically for mobile and prehospital use. In addition to its familiar benefits, the pocket monitor features a 3.5" display, replaceable and rechargeable batteries in a monitor with a running time of 1 hour as well as the possibility to capture and archive images and videos. The data documented in the hard disk integrated in the monitor can be read directly on a PC/laptop with the help of a USB cable.

Image: Dr. med. B. HOSSFELD, Bundeswehrkrankenhaus Ulm, Germany

The blades with completely redesigned shorter and ergonomic handles contain all the electronics in a compact, closed housing. The connector positioned on top allows all blades to be directly connected with the C-MAC PM® or to the C-MAC® monitor with a suitable cable as before.

AGNN
Arbeitsgemeinschaft in Norddeutschland tätiger Notärzte e. V., Germany

universal use and robustness in the process. As a result, the system is suitable for routine clinical procedures in the OR, the intensive care unit and the emergency room as well as for prehospital procedures using ground or air-based life-saving equipment.

The stainless steel laryngoscope blade can be reprocessed at temperatures up to 93° and, therefore, meets all hygienic standards. Furthermore, the blade's optimized (minimized) height and flattened proximal end ensures minimal discomfort for the patient, even when the oral aperture is greatly restricted. The original MACINTOSH blade shape is available in sizes 2, 3 and 4. Two highly curved blades, the D-BLADE and D-BLADE ped., are available for difficult airways in adults and children. MACINTOSH 0 as well as MILLER 0 and 1 blade shapes are available for use in neonatology and pediatrics.

Optimal visualization is allowed with the high-resolution CMOS chip via the approx. 60° angle of view as well as high-power LED illumination. In addition, fogging of the telescope due to the heating-up of the LED is practically eliminated. To enable safe navigation, the blade tip generally appears at the top of the image border. The C-MAC® system is ready for use within seconds. Rechargeable lithium-ion batteries guarantee use for two hours – equivalent to approx. 200 intubations.

The monitor is made of shock-resistant plastic and is also splash-proof (IP54). A resolution of 1280 x 800 pixels makes the screen very fast. The video laryngoscope enables individual images as well as video sequences to be captured and stored on a SD card in a JPEG or MPEG4 format. Complicated menu navigation was consistently avoided. The documented images and videos can now be replayed on a laptop or PC or can also be directly displayed on the C-MAC® monitor (8403 ZXK)

It is now possible to connect two endoscopes to the monitor at the same time so that any alternative intubation aid that may be required can be connected in advance and is thus immediately available if necessary. The lightweight C-MAC® system can be stored in a practical, water-repellent protective bag and is, therefore, ideal for prehospital use.

Image: Dr. med. B. HOSSFELD, Bundeswehrkrankenhaus Ulm, Germany
The development and implementation of a local algorithm for the unexpected difficult airway

Guidelines and algorithms are playing an increasingly greater role in shaping modern medicine. This is a welcome development in terms of patient safety and for providing the best treatment options possible. However, various national algorithms on the “unexpected difficult airway” do not seem to provide concrete and practical proposals but rather list diverse options for each escalation step. This is why we firmly believe that national algorithms should only form the basis for “local, department-specific algorithms”. In emergency situations, it is imperative not to provoke any loss of time through unnecessary discussions (such as “what do we do now” or “which tool should we now use”) but to take action according to clear guidelines based on algorithms that have been developed and firmly implemented in the local clinical situation.

The establishment and implementation of our local algorithm for the unexpected difficult airway raises questions with regard to structural, economic, medical and educational aspects and, of course, which procedure can be considered as the most practical and feasible for plan A, plan B, plan C and plan D. Another crucial factor to be considered is the type of equipment to be used and which systems can be combined via a modular structure so that no staff member has to leave the scene of an emergency to retrieve equipment. It is also important to determine whether reusable equipment or single-use material is preferable in routine clinical use in view of the desired goal of continuous training.

Based on the principle that only the techniques that are used and practiced on a daily basis are effective and successful in emergency situations, we developed and implemented the “Reutlingen Algorithm for the Unexpected Difficult Airway”. This algorithm is based on the principle of prevention on the one hand and the optimal utilization of limited resources and good trainability in everyday clinical practice on the other.

In our view, the recommendations of many national algorithms do not explicitly mention that anesthesia induction should not be performed unless adequate preoxygenation with a defined end-tidal O₂ target value (etO₂) is first achieved. In Reutlingen, we have therefore determined that preoxygenation of the patient using a well-sealed face mask should take place up to an end-tidal oxygen concentration of >80% O₂ before a hypnotic agent can be administered. This consistently enables the time up to a possible desaturation to be significantly extended (up to 9 minutes) if intubation difficulties are encountered.

There is no doubt that video laryngoscopy provides a much better view of the larynx than conventional laryngoscopy. Nevertheless, there are always cases where tube placement can be difficult despite excellent visibility. This is why we chose to use the C-MAC® video laryngoscope as the standard procedure in our clinic (plan A). Optimal handling as well as speedy and competent decision-making in critical situations is only possible through routine use of the instrument. The view that classical laryngoscopy can no longer be mastered due to a lack of training because of video laryngoscopy can be contradicted: Classical laryngoscopy can indeed be learned when using a MACINTOSH blade with the C-MAC® system by turning the monitor away from the intubator. This feature makes the C-MAC® an excellent teaching tool. Our clinic has clearly seen a dramatic reduction in difficult intubations since the widespread implementation of video laryngoscopy. Nevertheless, it has been important for us to define adequate and easy-to-master alternative options (plans B, C and D).

We use the retromolar intubation endoscope as plan B. This is mainly because the initial plan to intubate the patient should not be discarded. Thanks to the modular principle of the Storz system (where the retromolar intubation endoscope can be quickly and easily connected via C-CAM® to the C-MAC® monitor), no staff member has to leave the scene so that plan B can be initiated immediately.

In comparison to other fiber optic procedures, the learning curve for the retromolar intubation endoscope is very steep. After approx. 30 intubations, the flat part of the learning curve has already been achieved and only approx. 25 seconds is required to perform successful intubation. As training with the retromolar intubation endoscope is easy and fast in the day-to-day clinical routine, this technique is also appropriate for use with large teams. In our clinic, we perform intubations with the retromolar intubation endoscope in many operating rooms on a daily basis according to the principle “continuous training” and the “team concept”. We are thus able to achieve acceptance of this technique among medical and nursing staffs.
Good and effective assistance from the medical staff is essential for successful use of the retromolar intubation endoscope: Using the Esmarch technique (jaw thrust maneuver), the tongue and epiglottis are effectively lifted from the posterior pharyngeal wall in order to access the larynx by the assistant. Visualization of the procedure on the C-MAC® monitor enables all participants to successfully coordinate airway manipulation.

Should plan B fail, use of the ProSeal laryngeal mask is defined as plan C in our algorithm. When intubation is not successful, oxygenation becomes the top priority. The ProSeal larynx mask of the 2nd generation LMA is the supraglottic airway device of choice for routine use and is therefore used in emergency situations according to our philosophy: “Only items used on a daily basis can be successfully used in the OR”. Should oxygenation and ventilation of the patient be possible, an “exchange maneuver” is performed. Using flexible fiber optics (a conventional fiberscope via C-CAM® or the flexible intubation video endoscope FIVE) and under direct vision via the C-MAC® monitor, it is possible to insert a tube through the laryngeal mask via an exchange catheter using the Seldinger technique. Again it is important to note that this “exchange maneuver” can also be easily practiced in the daily clinical routine. The training of fiber optic intubation on anesthetized patients is also performed daily in an operating room and is an integral part of our Airway Management Program.

If oxygenation and ventilation with the laryngeal mask is not possible, then cricothyrotomy as a last resort is used as plan D. We currently use the Quick-Trach system which also features a rapid learning curve and is trained once a year on an animal model. We are aware of the fact that the “scalpel bougie technique” is considered to be more effective and successful on an international level. However, as long as we do not see adequate teaching and training opportunities, we consider a more difficult but better trainable approach to be more appropriate.

In summary, we consider the modular C-MAC® system – consisting of the C-MAC® video laryngoscope and C-CAM®, which allows the connection of both the retromolar intubation endoscope and the conventional fiberscope as well as the new FIVE (Flexible Intubation Video Endoscope) – to be the ideal technical basis for modern airway management. Bearing in mind that visualization for the entire team as well as steep learning curves and continuous training determine a successful outcome in emergency situations, we have established our algorithm with this equipment. The modular C-MAC® system provides excellent support and offers decisive advantages from an economic point of view.
Airway Management in the Emergency Room

The number of medical emergencies continues to rise in Germany. More and more emergency rooms are now stand-alone departments within hospitals. All patients who face danger to life and limb receive urgent medical assistance in the emergency room. Emergency rooms are available to patients 24 hours a day, 365 days a year. The entire personnel are trained to deal with any acute life-threatening situations. The causes of life-threatening situations presented by patients in emergency rooms are very varied and often diverse. Breathing disorders represent a large and very significant aspect.

The possible causes for breathing disorders are listed in the table below:

**Possible causes of respiratory distress:**
- Injuries to the airway
- Glottal edema
- Epiglottitis
- Pneumothorax
- Bronchial asthma
- COPD
- Pneumonia
- Pulmonary edema
- Pleural effusions
- Bronchial carcinoma
- Pulmonary embolism
- Neuromuscular disorders

Patients arriving in the emergency room are frequently unannounced and obtaining a patient history is often not possible.

Examination of the airway in the trauma room is considerably more difficult and problematic than elective intubation. Nevertheless, the indication for or against intubation must be decided quickly.

If a decision is made to perform intubation, then patient preparation must take place immediately and without delay. Each member of the emergency room team must be able to prepare for intubation according to a checklist and an established algorithm.

In our clinic, the C-MAC® video laryngoscope is primarily used for intubation in the emergency setting. The use of video laryngoscopy enhances the safety of the patient. The intubation process can be displayed or visualized for the entire team. Any problems that may occur can be treated under direct vision. The impact of assistance can also be clearly presented or visualized.

Various complications, e.g., hypoxia, a fall in blood pressure etc., may arise during intubation. These must be avoided whenever possible. The so-called First Pass Success should thus be achieved. Intubation must be uncomplicated, fast and proceed successfully from the first step onwards.
The need to use auxiliary tools, such as a bougie or a MAGILL forceps, is better understood and can be implemented in a timely fashion if there is a view of the airway. It also makes it easier for the entire team to perceive and understand the need for any changes to the procedure, e.g., for an alternative airway. In addition, all members of the team should be able to identify a difficult airway. Often only seconds to a few minutes are available for this realization.

It is useful to have algorithms in place for the intubation process that familiarize the medical personnel with various steps in airway management in terms of the equipment available to them in their own emergency room.

Our clinic has developed an algorithm for airway management that the personnel are expected to observe. In addition to plan A, the emergency room also has a plan B and plan C.

All materials and instruments are kept on an airway cart. The personnel are prepared and trained for intubation in appropriate training courses.

New physicians are trained in the use of the video laryngoscope as well as intubation techniques for both direct and indirect laryngoscopy. The instructors can observe the new staff members throughout all phases of intubation and are able to supervise the process.

The use of the C-MAC® system also provides the opportunity to discuss the intubation afterwards by means of documentation such as video sequences or photos.

Reprocessing of the C-MAC® system blade is straightforward and fast. The blade can be machine cleaned up to a temperature of 93 °C. If this is not possible, the blade can be reprocessed via specially validated wipe disinfection (the Tristel company).

All in all, the use of the C-MAC® video laryngoscope has allowed us to take another step towards the improvement of patient safety. It has also enabled us to integrate a visualization system into the daily clinical routine that facilitates teamwork as it keeps the entire team informed about day-to-day handling as well as difficult airway management.

For Plan B in airway management at our emergency department, we stock supraglottic devices (laryngeal masks, laryngeal tubes) as well as the C-MAC® video stylet (C-MAC® VS). This rigid stylet with movable tip allows intubation even in patients with a very small mouth opening, e.g., lockjaw due to an abscess. The stylet can be inserted into the mouth using the retromolar technique or in the midsagittal plane. After reaching the glottal level, the tube is advanced under visualization on the monitor. If the view is obstructed by blood or mucous, a high flow of oxygen is fed into the stylet through a port on the tube holder. On the one hand, this provides apnoeic oxygenation during the intubation process and, on the other hand, blood and mucous are moved away from the tip of the stylet to ensure a clear view.

We consider the C-MAC® VS, which we have integrated into our algorithm, to be an excellent addition to the materials and instruments we keep in stock.

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Zentrale Notaufnahme
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Christoph 11
Germany
When KARL STORZ continues to expand its highly successful C-MAC® product family with the fifth generation of video laryngoscopes and a wide range of new instruments, customers can justifiably expect more than superficial adaptations to current chip technology. The outstanding feature of the new-generation C-MAC® platform is the universal C-MAC® system interface. The result is the new C-MAC® system, which is now even more flexible and offers the user numerous possibilities for securing the airway.

We understand Airway Management!

Video Systems for Airway Management

- OR1™ Monitor
- C-HUB® II
- C-MAC® Monitor
- C-MAC® PM POCKET MONITOR
- C-MAC® Connecting Cable
- C-MAC® S Pediatric IMAGER
- C-MAC® S IMAGER
- C-CAM®
- E-Box
- Flexible Intubation Video Endoscopes
- FIVE
- FIVE S
- Video Laryngoscopes
- C-MAC® S
- C-MAC®
- Video Stylet
- C-MAC® VS
- Endoscopes/Fiberoscopes (eyepiece)
C-MAC® Monitor
The heart of the C-MAC® system

Special Features:
- Two endoscope inputs: Rapid toggling at the front end possible -> your “plan B” is already connected
- HDMI output for connection to an external monitor
- Playback of images and videos on the C-MAC® and an external monitor possible
- Documentation of still images (JPEG) and video sequences (MPEG4) on a SD memory card in real time
- Data backup also possible on USB flash drive
- 7" TFT wide angle view display (160°) with premium image quality
- Connection for C-MAC® system endoscopes
- Weighs only 1000 g
- Can be run while charging and with rechargeable Li-ion batteries
- New design; easy to clean (IP54)
- System open to future C-MAC® components (forward and backward compatible)

8403 Z XK

C-MAC® Monitor for CMOS Endoscopes Set, screen size 7” with 1280 x 800 pixel resolution, two camera inputs, a USB and a HDMI port, optimized user interface, video and image capture in real time on SD card, playback of recorded video clips and still images, data transfer from SD card to USB flash drive possible, splash-proof according to IP54, suitable for wipe disinfection, shock-resistant ABS plastic housing, intelligent power management with rechargeable Li-ion batteries, VESA 75 mounting option, power adaptor for EU, UK, USA and Australia, power supply 110 – 240 VAC, 50/60 Hz, for use with CMOS video endoscopes
including:
SD Card ULTRA, 8 GB
Protection Cap
VESA 75 Quick Clip
Mains Adaptor Set

8403 X

C-MAC® Connecting Cable, with C-MAC® system interface, for C-MAC® Monitor 8403 Z XK or C-HUB® II 20 2903 01, length 200 cm, for use with C-MAC® video laryngoscopes 8403 xxx
The C-MAC® PM is as easy to handle as a direct laryngoscope but offers all the advantages of indirect laryngoscopy. Robust and easy to handle, the C-MAC® PM is ideal for prehospital use. The OTI display allows easy handling and is therefore always ready for use. The two-axis system allows the position of the monitor to be adjusted according to individual needs.

For quality assurance, the C-MAC® PM guarantees real-time documentation of images and video sequences (up to 50 minutes) on a hard drive. Data export takes place via USB transmission.

The POCKET MONITOR was specifically designed for emergency settings (pre- and in-hospital). Its 3.5" monitor delivers a contrast-rich image, even in bright sunlight. The C-MAC® PM is guaranteed to be waterproof (protection class IPX8). It can be used with any endoscope with a C-MAC® system interface such as, for example, the C-MAC® VS.
Consequently, it is an ideal complement to the C-MAC® system.
C-MAC® PM – The POCKET MONITOR
The C-MAC® system for mobile use

Special Features:

- Universal C-MAC® system interface, tailored to your airway management
- Exchange of C-MAC® video laryngoscopes and the C-MAC® VS within seconds
- Documentation of images (JPEG) and video sequences (MPEG4) on internal memory in real time
- High-resolution 3.5” wide-view angle display (160°)
- No additional on/off buttons thanks to the “Open-to-Intubate display” (OTI)
- Due to the closed design, the entire POCKET MONITOR unit can be fully immersed in disinfection solution (IPX8)
- One hour operating time
- Always ready for use thanks to exchangeable, replaceable battery
- Rechargeable Li-ion battery with capacity control and intelligent power management
- Suitable and validated for the following low-temperature reprocessing methods: Manual cleaning and disinfection, sterilization with Steris®, Sterrad® and High-Level Disinfection (HLD) acc. to US standards and Tristel Trio Wipes System
- Additional standard: RTCA/DO-160F

8403 XDK

C-MAC® PM Set, unit with LCD monitor and power supply for all C-MAC® laryngoscopes, with C-MAC® system interface, screen size 3.5”, documentation of images and video sequences saved on internal memory, monitor movable via two rotation axes, rechargeable Li-ion battery, 1 h operation time, exchangeable battery pack, 2 h charging time, power management with capacity indicator, protection class IPX8, for use with C-MAC® Video Laryngoscopes 8403 xxx including:

- Battery, rechargeable
- USB Data Cable
- Protection Cap, for reprocessing

Intubation Set Prehospital, ULM Model 8400 C1 see page 6
Components/Spare Parts see chapter 6
C-MAC® PM – The POCKET MONITOR

The C-MAC® system for mobile use

8403 XDA  **Battery**, rechargeable Li-ion battery for power supply of C-MAC® PM 8403 XD, charging via Charging Unit 8403 XDL, optimal operation time of 60 min, suitable for wipe disinfection

8403 XDL  **Charging Unit**, for one rechargeable battery for C-MAC® PM, with power supply and mains adaptor for EU, UK, USA and Australia, power supply 100 – 240 VAC, 50/60 Hz, suitable for wipe disinfection, for use with Battery 8403 XDA and C-MAC® PM 8403 XD

8403 XDD  **USB Data Cable**, USB 2.0 port, for data transfer from C-MAC® PM 8403 XD to a computer, length 200 cm

8403 XDP  **C-MAC® PM Connecting Cable**, for the transmission of digital signals from C-MAC® PM 8403 XD to C-MAC® Video Laryngoscopes 8403 xxx (C-MAC® system interface), length 50 cm
C-HUB® II
Components for the C-MAC® system

Nothing could be easier
C-HUB® II was specially designed for the integration of existing installations. With extensive connectivity via USB 2.0, HDMI and S-Video, it can easily be connected to computers and monitors as well as the OR1™ system.

The galvanic isolation in the C-HUB® II makes it possible to link medical-grade products to non-medical equipment (e.g., computers/monitors).
C-HUB® II is compatible with all endoscopes in the C-MAC® family.
C-HUB® II
Components for the C-MAC® system

Special Features:
● Can be connected to all endoscopes in the C-MAC® family
● Video editor for displaying, recording, and processing endoscopic image material
● Highest safety standards thanks to galvanic isolation

20 2903 01
C-HUB® II Camera Control Unit, for use with C-CAM® Camera Head 20 2901 32, Electronic Module 8402 X, C-MAC® Connecting Cable 8403 X or compatible CMOS video endoscopes, Interfaces: USB 2.0, S-Video output (NTSC), HDMI output, power socket
including:
Power Supply, including country-specific plugs
S-Video (Y/C) Connecting Cable
USB Connecting Cable
KARL STORZ Video Editor

8403 XA
Extension Cable, length 200 cm, for the transmission of analog and digital signals, dustproof according to IP50 standards (not waterproof), for use with C-HUB® II Camera Control Unit 20 2903 01 and C-MAC® Monitor 8403 ZX in conjunction with all endoscopes of the KARL STORZ Office Line (8-pin instruments)

Components/Spare Parts see chapter 6
C-MAC® Video Laryngoscopes
for direct and indirect endotracheal intubation
**Special Features:**
- Robust yet light: Great stability and shock resistance; light alloy design
- Meets the highest ergonomic standards – specially shaped and shortened handle
- Proximal slanted blade protects teeth
- BlueButton: Documentation via innovative multifunctional button and individual color coding
- Blade tips of all blade types visible for safe navigation
- Universal C-MAC® system interface for C-MAC® Monitor 8403 ZX and C-MAC® PM 8403 XD
- Suitable and validated for the following reprocessing methods up to max. 93 °C: Manual/machine cleaning and disinfection, sterilization with Steris®, Sterrad® and High-Level Disinfection (HLD) acc. to US standards as well as the Tristel Trio Wipes System

**MACINTOSH**
- For direct and indirect laryngoscopy
- For routine clinical use and training
- Original English MACINTOSH blade shape

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**8403 BXC**  
*C-MAC® Video Laryngoscope MAC #4,* CMOS technology, with MACINTOSH laryngoscope blade, size 4, with C-MAC® system interface, documentation of images and video sequences via BlueButton, for use with C-MAC® Connecting Cable 8403 X for C-MAC® Monitor 8403 ZX or C-HUB® II 202903 01 as well as C-MAC® PM 8403 XD

8403 AXC  
*Same,* size 3

8403 KXC  
*Same,* size 2

8403 EXC  
*Same,* size 0
MACINTOSH C-MAC® Video Laryngoscopes
for direct and indirect endotracheal intubation

Special Features:
MACINTOSH
- For direct and indirect laryngoscopy
- For routine clinical use and training
- Original English MACINTOSH blade shape
- With catheter introduction for positioning a suction catheter, O₂ catheter or an AINTREE catheter

8403 AX/BX

8403 BX  C-MAC® Video Laryngoscope MAC #4, CMOS technology, with MACINTOSH laryngoscope blade, size 4, with C-MAC® system interface, documentation of images and video sequences via BlueButton, with catheter introduction sizes 16 – 18 Fr., for use C-MAC® Connecting Cable 8403 X for C-MAC® Monitor 8403 ZX or C-HUB® II 20 2903 01 as well as C-MAC® PM 8403 XD

8403 AX  Same, size 3, with catheter introduction sizes 14 – 16 Fr.
Special Features:

MILLER

- For pediatrics and neonatology
- Particularly flat model; anatomically optimized tip
- For direct and indirect laryngoscopy
- For routine clinical use and training

8403 MXC  
C-MAC® Video Laryngoscope MIL #2, CMOS technology, with MILLER laryngoscope blade, size 2, with C-MAC® system interface, documentation of images and video sequences via the BlueButton, for use with C-MAC® Connecting Cable 8403 X for C-MAC® Monitor 8403 ZX or C-HUB® II 20 2903 01 as well as C-MAC® PM 8403 XD

8403 GXC  
Same, size 1

8403 DXC  
Same, size 0
Special Features:
D-BLADE
● Special curved blade shape for difficult intubation
● With catheter introduction

C-MAC® Video Laryngoscope D-BLADE Set, for adults, CMOS technology, for difficult intubation, with C-MAC® system interface, documentation of images and video sequences via BlueButton, with catheter introduction sizes 16 – 18 Fr., including C-MAC® GUIDE adapted to blade shape, for use with C-MAC® Connecting Cable 8403 X for C-MAC® Monitor 8403 ZX or C-HUB® II 20 2903 01 as well as C-MAC® PM 8403 XD

C-MAC® GUIDE

C-MAC® Video Laryngoscope D-BLADE, for adults, CMOS technology, for difficult intubation, with catheter introduction sizes 16 – 18 Fr., with C-MAC® system interface, documentation of images and video sequences via BlueButton, for use with C-MAC® Connecting Cable 8403 X for C-MAC® Monitor 8403 ZX or C-HUB® II 20 2903 01 as well as C-MAC® PM 8403 XD

Optional Accessories:

C-MAC® GUIDE, guide rod made of stainless steel with atraumatic tip, distal region is adapted to the blade shape of the C-MAC® video laryngoscope D-BLADE, fixation of endotracheal tube with the integrated tube holder possible, package of 10, for use with C-MAC® video laryngoscopes
In view of the familiar benefits of the reusable C-MAC® video laryngoscopes, great value was also attached to maintaining the standard MACINTOSH blade shape for single-use C-MAC® S video laryngoscopes as well. The D-BLADE is also available as a C-MAC® S version. The IMAGER enables blades to be exchanged in seconds and, as a camera, it forms the interface to the C-MAC® monitor. Flexibility and mobility are preserved while the otherwise necessary time-consuming transport and reprocessing steps could be reduced to a minimum.

The special design of the C-MAC® S video laryngoscope enables the blade to be discarded along with the handle after use so that the risk of cross-contamination is drastically reduced. A hygienic guard at the proximal handle offers the IMAGER additional protection. The product design ensures that C-MAC® S video laryngoscopes are extremely break-resistant.
C-MAC® S Video Laryngoscopes

The C-MAC® system for single use

Special Features:

- Handling tailored to meet stringent hygiene standards
- Risk of cross-contamination drastically reduced: Hygienic guard at the proximal end of the handle offers protection
- Exchange of C-MAC® S video laryngoscopes within seconds
- Universal C-MAC® system interface for C-MAC® Monitor 8403 ZX and C-MAC® PM 8403 XD as well as C-HUB® II 20 2903 01

- Suitable and validated for the following low temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris® and High-Level Disinfection (HLD) acc. to US standards as well as the Tristel Trio Wipes System

8403 XSI

C-MAC® S IMAGER, with C-MAC® system interface, for manual and machine disinfection up to 65 °C and High Level Disinfection (HLD) acc. to US standards, for use with C-MAC® Connecting Cable 8403 X, C-MAC® Monitor 8403 ZX, C-MAC® PM 8403 XD or C-HUB® II 20 2903 01 and single-use C-MAC® S video laryngoscopes 051113-10, 051114-10, 051116-10
MACINTOSH C-MAC® S Video Laryngoscopes
The C-MAC® system for single use

Special Features:
- Blade and handle form one continuous piece: Optimal protection against cross-contamination
- Extremely break-resistant
- Ergonomically shaped handle
- Compact design

- For use with C-MAC® S IMAGER
- For direct and indirect laryngoscopy
- For routine clinical use and training
- With original MACINTOSH blade shape

051114-10* C-MAC® S Video Laryngoscope MAC #4, with MACINTOSH laryngoscope blade, size 4, for single use, package of 10, for use with C-MAC® S IMAGER 8402 XS, 8403 XS or 8403 XSI

051113-10* Same, size 3

*
C-MAC® S Video Laryngoscopes D-BLADE
The C-MAC® system for single use

Special Features:
● Special curved blade shape for difficult intubation
● With short handle

051116-10

C-MAC® S Video Laryngoscope D-BLADE, with laryngoscope blade for difficult intubation, for single use, package of 10, for use with C-MAC® S IMAGER 8402 XS, 8403 XS or 8403 XSI

Optional Accessories:

8401 DS

C-MAC® GUIDE, guide rod made of stainless steel with atraumatic tip, distal region is adapted to the blade shape of the C-MAC® video laryngoscope D-BLADE, fixation of endotracheal tube with the integrated tube holder possible, package of 10, for use with C-MAC® video laryngoscopes
Special Features:

- Handling tailored to meet stringent hygiene standards
- C-MAC® S video laryngoscope exchange within seconds
- For use with C-MAC® Monitor 8403 ZX and C-MAC® PM 8403 XD as well as C-HUB® II 202903 01

- Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris® and High-Level Disinfection (HLD) acc. to US standards as well as the Tristel Trio Wipes System

8403 XSPK C-MAC® S Pediatric IMAGER Set, with C-MAC® system interface, for manual and machine disinfection up to 65 °C and High Level Disinfection (HLD) acc. to US standards, for use with C-MAC® Connecting Cable 8403 X, C-MAC® Monitor 8403 ZX, C-MAC® PM 8403 XD or C-HUB® II 20 2903 01 and single-use C-MAC® S video laryngoscopes 051110-10, 051111-10 including:
- Pressure Compensation Cap
- Leakage Tester
MILLER C-MAC® S Video Laryngoscopes
The C-MAC® system for single use

Special Features:
- Blade and handle form one continuous piece: Optimal protection against cross-contamination
- Extremely break-resistant
- Ergonomically shaped handle
- Compact design

- For direct and indirect laryngoscopy
- For routine clinical use and training
- With original MILLER blade shape

051111-10 C-MAC® S Video Laryngoscope MILLER #1, for single use, package of 10, for use with C-MAC® S Pediatric IMAGER 8403 XSP/XSPK

051110-10 Same, size 0
The Flexible Intubation Video Endoscope (FIVE) from KARL STORZ offers the anesthesiologist and intensive care physician a range of flexible endoscopes for diagnosis and therapy that are not only technologically advanced but have been completely redesigned. Available with outer diameters of 6.5 mm, 5.5 mm, 4 mm and 3 mm, the first three FIVE models mentioned are equipped with a working channel.

Instead of using the technique with fiber optic bundles for image transmission that has been popular for many years, visualization is now provided by means of a high-resolution CMOS chip at the distal tip of the endoscope. Instead of a circular image, the image is displayed in a 4:3 format that fills the entire screen. This innovative technology (which is also used in other products such as, for example, the proven C-MAC® video laryngoscopes) guarantees a high-resolution image display. The FIVE is operated with the C-MAC® monitor. All functions, e.g., image and video documentation are also available here. A major innovation is the absence of a classical eyepiece. Thanks to the plug & play technology, this eliminates the need to focus and refocus the camera or to connect and regulate the light source.

The FIVE is used for a wide range of indications. In anesthesiology, expected intubation problems are the main field of application. Despite the fact that intubation in many of these situations are currently performed with video laryngoscopes under anesthesia, intubation on awake or lightly sedated patients with spontaneous respiration using the flexible intubation endoscope still has the highest recommendation grade, according to the S1 guidelines on airway management by the German Society of Anesthesiology and Intensive Care Medicine (DGAI) in 2015 ("should be applied"). Further areas of application in anesthesia are intubation in the case of an unexpectedly difficult respiratory airway as well as intubation via supraglottic airways, e.g., the intubation laryngeal mask (ILMA) or the intubation larynx (ILTS-D).

Both the S1 guidelines of the DGAI and the British Difficult Airway Society (DAS) discourage “blind” advancement of the endotracheal tube and instead recommend intubation under visualization with the help of a flexible endoscope. Furthermore, a flexible endoscope with appropriate dimensions is considered to be essential for verifying the position of double lumen tubes or for the placement of endobronchial blockers in thoracic anesthesiology.

Diagnosis, and often treatment, with the FIVE is one of the most commonly performed invasive procedures in intensive care medicine. For these interventions in particular, a reliable technique with high-resolution image display and precise control is essential to reduce the procedure time to a minimum on patients who are often critically ill and have restricted respiration.

The working channel with a diameter between 3 mm and 1.5 mm – depending on the thickness of the entire endoscope – offers diverse possibilities. During intubation, it allows the suctioning of secretion or blood as well as the administration of oxygen or a local anesthetic. In intensive care medicine, the application range of the working channel is typically expanded to include the extraction of biological material (bronchial secretions and bronchoalveolar lavage fluid) for microbiological and cytological diagnosis. Special instruments that can be inserted through the working channel also allow the use of brush swabs or tissue biopsies. Foreign bodies can be removed with the help of special grasping forceps and, finally, medications can be administered, e.g., vasoconstrictors for the endobronchial hemostasis of hemoptysis.

In conclusion, the FIVE forms the cornerstone of an innovative and forward-looking concept of interchangeable C-MAC® components based on CMOS technology, making the FIVE suitable for use in anesthesia, in the intensive care unit as well as in clinical and prehospital emergency medicine.

Prof. Dr. med. C. BYHAHN, Evangelisches Krankenhaus Oldenburg, Germany
The FIVE 6.5, FIVE 5.5, FIVE 4.0 and FIVE 3.0 flexible intubation video endoscopes from KARL STORZ set a new direction for airway management. The convenient 4:3 rectangular image format provides a better overview of the working area. Similar to the C-MAC® video laryngoscopes, the flexible intubation video endoscope delivers clear, pixel-free images without a Moiré pattern.

The flexible intubation video endoscopes can be directly connected to the C-MAC® monitor. This enables immediate changeover to the C-MAC® video laryngoscope, if required. Real-time documentation can be directly started from the FIVE. The FIVE thus represents a further component within the C-MAC® system.
The flexible intubation video endoscope for universal use

**Special Features:**
- Working channel of 3 mm
- Designed for use in the intensive care unit
- Suitable for inspection of the respiratory tracts and suction of bronchial mucus
- ETT with good gliding properties
- For the placement of Endotracheal Tubes (ETT) as of size 7 mm
- For versatile use in foreign body removal
- Ergonomic design; acoustic and tactile zero position control
- For use with the new C-MAC® Monitor 8403 ZX and the new C-HUB® II 202903 01
- High image resolution and video imaging in 4:3 format – no tunnel vision
- For airway inspection
- Practical tube fixation with special adaptor
- Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards

**11304 BCXK Flexible Intubation Video Endoscope Set 6.5 x 65,**
CMOS technology, with suction valve, for use with C-MAC® Monitor 8403 ZX and C-HUB® II 202903 01
Direction of view: 0°
Angle of view: 100°
Working length: 65 cm
Total length: 94 cm
Working channel inner diameter: 3.0 mm
Distal tip outer diameter: 6.5 mm
Deflection up/down: 180°/140°

Optional Accessories for FIVE see page 79
Components/Spare Parts see chapter 6
Special Features:
- Exceptional stiffness with very good guidance properties
- Ergonomic design; acoustic and tactile zero position control
- ETT with good gliding properties
- For the placement of Endotracheal Tubes (ETT) as of size 6 mm
- For use with the new C-MAC® Monitor 8403 ZX and the new C-HUB® II 20 2903 01
- High image resolution and video imaging in 4:3 format – no tunnel vision
- For position check of Double Lumen Tubes (DLT) in adults
- For airway inspection
- Practical tube fixation via special adaptor
- Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards

Flexible Intubation Video Endoscope Set 5.5 x 65,
CMOS technology, with suction valve, for use with C-MAC® Monitor 8403 ZX and C-HUB® II 20 2903 01
Direction of view: 0°
Angle of view: 100°
Working length: 65 cm
Total length: 94 cm
Working channel inner diameter: 2.1 mm
Distal tip outer diameter: 5.5 mm
Deflection up/down: 140°/140°
FIVE 4.0
The flexible intubation video endoscope for universal use

Special Features:
- Exceptional stiffness with very good guidance properties
- Ergonomic design; acoustic and tactile zero position control
- ETT with good gliding properties
- For the placement of Endotracheal Tubes (ETT) as of size 4.5 mm
- For use with the new C-MAC® Monitor 8403 ZX and the new C-HUB® II 20 2903 01
- High image resolution and video imaging in 4:3 format – no tunnel vision
- For position check of Double Lumen Tubes (DLT) in adults
- For airway inspection
- Practical tube fixation with special adaptor
- Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards

11302 BDXK

Flexible Intubation Video Endoscope Set 4.0 x 65, CMOS technology, with suction valve, for use with C-MAC® 8403 ZX and C-HUB® 20 290301
Direction of view: 0°
Angle of view: 100°
Working length: 65 cm
Total length: 94 cm
Working channel inner diameter: 1.5 mm
Distal tip outer diameter: 4.1 mm
Deflection up/down: 140°/140°

Optional Accessories for FIVE see page 79
Components/Spare Parts see chapter 6
FIVE 3.0
The flexible intubation video endoscope for pediatrics

Special Features:
● Small diameter yet exceptional stiffness with very good guidance properties
● Ergonomic design; acoustic and tactile zero position control
● For the placement of Endotracheal Tubes (ETT) as of size 3.5 mm
● ETT with good gliding properties
● For use with the new C-MAC® Monitor 8403 ZX and the new C-HUB® II 20 2903 01
● High image resolution and video imaging in 4:3 format – no tunnel vision
● Two LED’s at the distal tip; optimal illumination

● For airway inspection
● Practical tube fixation with special adaptor
● Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards and the Tistel Trio Wipes System

11301 ABXK Flexible Intubation Video Endoscope Set 3.0 x 52, CMOS technology, with suction valve, for use with C-MAC® Monitor 8403 ZX and C-HUB II 20 2903 01
Direction of view: 0°
Angle of view: 100°
Working length: 52 cm
Total length: 72 cm
Distal tip outer diameter: 2.85 mm
Deflection up/down: 140°/140°

Optional Accessories for FIVE see page 79
Components/Spare Parts see chapter 6
### FIVE
Flexible Intubation Video Endoscopes

<table>
<thead>
<tr>
<th>Intubation Video Endoscope</th>
<th>CMOS technology</th>
<th>Deflection up/down</th>
<th>Direction of view</th>
<th>Angle of view</th>
<th>Working length</th>
<th>Total length</th>
<th>Working channel inner diameter</th>
<th>Distal tip outer diameter</th>
<th>Recommended ETT diameter as of **</th>
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</thead>
<tbody>
<tr>
<td>6.5 x 65</td>
<td>11304 BCXK</td>
<td>0° 100°</td>
<td>65 cm</td>
<td>94 cm</td>
<td>3.0 mm</td>
<td>6.5 mm</td>
<td>7.0 mm</td>
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<tr>
<td>5.5 x 65</td>
<td>11303 BNXK</td>
<td>0° 100°</td>
<td>65 cm</td>
<td>94 cm</td>
<td>2.1 mm</td>
<td>5.5 mm</td>
<td>6.0 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0 x 65</td>
<td>11302 BDXK</td>
<td>0° 100°</td>
<td>65 cm</td>
<td>94 cm</td>
<td>1.5 mm</td>
<td>4 mm</td>
<td>4.5 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 x 52</td>
<td>11301 ABXK</td>
<td>0° 100°</td>
<td>52 cm</td>
<td>72 cm</td>
<td>-</td>
<td>2.85 mm</td>
<td>3.5 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Accessories included in delivery:**

- **27677 SL** Case for Flexible Endoscopes, without accessories
- **27677 SM** Case for Flexible Endoscopes, with accessories
- **11025 E** Pressure Compensation Cap, for ventilation during gas and plasma sterilization
- **13242 XL** Leakage Tester, with bulb and manometer
- **11301 CFX** Tube Holder, for use with Flexible Intubation Video Endoscopes 11304 BCX, 11303 BNX, 11302 BDX and 11301 ABX
- **29100** Plug, for Luer-Lock irrigation connector for cleaning, black, **autoclavable**, package of 10
- **10309** Bronchoscope Insertion Tube, size 4, with integrated mouthpiece, insertion length 85 mm, made from EVA, sterile, for single use, package of 10
- **10310** Same, size 2, insertion length 65 mm

**Please note that the accuracy of the ETT diameter may vary depending on the manufacturer’s quality.
### Accessories included in delivery:

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning Brush, with double-sided brush, length 120 cm, brush diameter 3.2 mm, unsterile, for single use, for use with flexible endoscopes with working channel diameters 2.6 – 3 mm</td>
<td>10x 110950-01*</td>
</tr>
<tr>
<td>Cleaning Brush, with double-sided brush, length 90 cm, brush diameter 2.6 mm, unsterile, for single use, for use with flexible endoscopes with working channel diameters 2 – 2.3 mm</td>
<td>10x 110940-01*</td>
</tr>
<tr>
<td>Cleaning Brush, length 90 cm, brush diameter 1.7 mm, unsterile, for single use, for use with flexible endoscopes with working channel diameters 1.2 – 1.5 mm</td>
<td>10x 110930-01*</td>
</tr>
<tr>
<td>Irrigation Adaptor, for machine cleaning, reusable, for fiberscopes</td>
<td>110301 CD1</td>
</tr>
<tr>
<td>Suction Valve, sterile, for single use, package of 20, for use with Flexible Intubation Video Endoscopes 11301 BNX and 11302 BDX as well as Flexible HD Video Cystoscopes 11272 VH/VHU</td>
<td>091011-20*</td>
</tr>
<tr>
<td>Protection Cap, for the C-MAC® system interface on C-MAC® Video Laryngoscopes 8403 xxx and C-MAC® PM 8403 XD as well as C-MAC® Connecting Cable 8403 X</td>
<td>8403 YZ</td>
</tr>
</tbody>
</table>

### Additional Accessories

- **Cleaning Brush**
- **Irrigation Adaptor**
- **Suction Valve**
- **Protection Cap**
The new single-use FIVE S (Flexible Intubation Video Endoscope) from KARL STORZ offers a single-use solution that is impressive in every respect. Its compatibility to the multifunctional C-MAC® monitor allows the new FIVE S to be perfectly integrated into the existing C-MAC® system. Although the new FIVE S is a flexible endoscope for single use, image quality is not compromised. Instead the endoscope fits seamlessly into the excellent image quality of the FIVE product family and is therefore a successful addition to the product portfolio.

You can continue to enjoy the unique benefits of the C-MAC® system that allows you to switch to an alternative endoscope within seconds so that plan B is always at the ready. The special sheath design provides the proper rigidity to ensure the handling you already know from the reusable flexible endoscopes. Furthermore, the gliding properties of the tube have been enhanced. Due to the sterile packaging and elimination of the reprocessing step, permanent availability can be ensured. Consequently, workflows no longer need to be adapted to product availability and thus gain flexibility and speed.
FIVE S 3.5
The flexible intubation video endoscope for single use

Special Features:
- Compatible with C-MAC® Monitor 8403 ZX and C-HUB® II 202903 01
- Excellent image quality
- Video imaging in 4:3 format – no tunnel vision
- Brightness can be adjusted to ambient conditions within seconds
- Possible to switch to an alternative endoscope within seconds
- Highest hygiene standards with permanent availability
- Endoscope in sterile packaging
- Compact design and ergonomic handle shape

091361-06

Flexible Intubation Video Endoscope 3.5 x 65, sterile, for single use, package of 6, for use with
E-Box TP 010
Direction of view: 0°
Angle of view: 90°
Working length: 65 cm
Outer diameter: 3.5 mm
Working channel diameter: 1.2 mm
Deflection up/down: 180°/180°

091361-06

E-Box, for flexible video endoscopes for single use, compatible with C-MAC® Monitor 8403 ZX and C-HUB® II 202903 20

Key Features:
- Outstanding rigidity with very good tube guidance
- Good ETT gliding properties due to special sheath design
- For the placement of Endotracheal Tubes (ETT) as of size 4.5 mm
- Checks positioning of the Double Lumen Tube (DLT)
- For inspection of the airways
- Practical tube fixation thanks to the special endoscope geometry
- Documentation and data backup

TP 010
FIVE S 3.0
The flexible intubation video endoscope for single use

Special Features:
- Compatible with C-MAC® Monitor 8403 ZX and C-HUB® II 20 2903 01
- Excellent image quality
- Video imaging in 4:3 format – no tunnel vision
- Brightness can be adjusted to ambient conditions within seconds
- Possible to switch to an alternative endoscope within seconds
- Highest hygiene standards with permanent availability
- Endoscope in sterile packaging
- Compact design and ergonomic handle shape
- Outstanding rigidity with very good tube guidance
- Good ETT gliding properties due to special sheath design
- For the placement of Endotracheal Tubes (ETT) as of size 4 mm
- Checks positioning of the Double Lumen Tube (DLT)
- For inspection of the airways
- Practical tube fixation thanks to the special endoscope geometry
- Documentation and data backup

Flexible Intubation Video Endoscope 3.0 x 65, sterile, for single use, package of 6, for use with E-Box TP 010
- Direction of view: 0°
- Angle of view: 90°
- Working length: 65 cm
- Outer diameter: 2.9 mm
- Working channel diameter: 1.2 mm
- Deflection up/down: 180°/180°

E-Box, for flexible video endoscopes for single use, compatible with C-MAC® Monitor 8403 ZX and C-HUB® II 20 2903 20
FIVE S 3.0
The flexible intubation video endoscope for single use

Special Features:
- Compatible with C-MAC\textsuperscript{®} Monitor 8403 ZX and C-HUB\textsuperscript{®} II 20 2903 01
- Excellent image quality
- Video imaging in 4:3 format – no tunnel vision
- Brightness can be adjusted to ambient conditions within seconds
- Possible to switch to an alternative endoscope within seconds
- Highest hygiene standards with permanent availability
- Endoscope in sterile packaging
- Compact design and ergonomic handle shape
- Outstanding rigidity with very good tube guidance
- Good ETT gliding properties due to special sheath design
- For the placement of Endotracheal Tubes (ETT) as of size 4 mm
- Checks positioning of the Double Lumen Tube (DLT)
- For inspection of the airways
- Practical tube fixation thanks to the special endoscope geometry
- Documentation and data backup

**Flexible Intubation Video Endoscope 3.0 x 52**, sterile, for single use, package of 6, for use with E-Box TP 010
- Direction of view: 0°
- Angle of view: 90°
- Working length: 52 cm
- Outer diameter: 2.9 mm
- Working channel diameter: 1.2 mm
- Deflection up/down: 180°/180°

**E-Box**, for flexible video endoscopes for single use, compatible with C-MAC\textsuperscript{®} Monitor 8403 ZX and C-HUB\textsuperscript{®} II 20 2903 20

*AN-DAM-V 37*
The C-MAC® Video Stylet (C-MAC® VS) is an innovative intubation video endoscope with a deflectable tip at the distal end. To complement the existing application options of the C-MAC® video laryngoscopes in flexible intubation or video-assisted laryngoscopy with different blade shapes, the C-MAC® VS combines the diverse properties of various intubation endoscopes.

The design of the C-MAC® VS differs in that it combines the properties of both flexible and rigid intubation endoscopes. The result is a hybrid of the flexible intubation endoscope and the retromolar intubation endoscope. It features a flexible tip that can be steered via the handle and allows precise guidance of the instrument up to the glottis.

This hybrid design combines all options of the various intubation endoscopes and is unique in laryngoscopy. The intuitive maneuvering of the endotracheal tube within the oropharynx is facilitated by the rigid part of the instrument while the flexible tip permits the user-controlled deflection of the tube in the glottis. This feature is currently unmatched in video laryngoscopy. It is very helpful in patients with a very small mouth opening or limited spinal mobility as well as in obese patients and those with obstructive pathologies.

Compared to video-assisted laryngoscopy, a smaller mouth opening is sufficient to advance into the oropharynx. In addition, the loaded tube protects the lens from soiling by secretions. In comparison to flexible instruments, the largely rigid C-MAC® VS is easier to maneuver than a flexible instrument but still offers the same flexibility during use thanks to the deflectable tip.

The insertion technique corresponds to that of other intubation endoscopes. Lubricant is applied to the tube, which is loaded onto the instrument in such a way that it just barely extends beyond the distal end. Any conventional laryngoscope can be used to open the mouth, but this step is not required. Simply lifting the jaw with the left hand creates sufficient space to insert the C-MAC® VS in the midsagittal plane in the direction of the posterior pharynx.

Through a video image captured at the tip of the instrument, the structures of the soft palate and uvula are displayed after insertion into the mouth. The rigid design of the new C-MAC® VS also allows the gentle advancement of the loaded endotracheal tube past any potential pharyngeal obstruction into the supraglottic area. Deflecting the tip in this position displays the larynx on the video image. In the immediate vicinity of the vocal cords (visible on the left and right on the video image), the endotracheal tube is advanced into the glottis while the instrument remains in place. Straightening the tip facilitates advancing the tube over the instrument so that the latter can be retracted and removed from the endotracheal tube.

If the midsagittal technique is problematic, the C-MAC® VS can also be inserted using the retromolar technique to improve the maneuverability of the instrument within the oropharynx. In case of problems inserting the tube despite a sufficient view of the laryngeal inlet, the endotracheal tube can be rotated with or without the instrument or lifted by deflecting the distal end. During rotation, however, the tip deflection should be deactivated by lifting the control lever at the handle.

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Columbia University Medical Center
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C. HAGBERG, MD
Anesthesiology, Critical Care and Pain Medicine
The University of Texas
Houston, USA
The C-MAC® VS (Video Stylet) can be considered as the successor to the legendary retromolar intubation endoscope and assumes the function of a conventional backup device for other C-MAC® components. It is of particular benefit, however, for indications with restricted mouth opening or cervical spine problems. The patented distal angulation, which allows simultaneous bending of the attached ETT, provides even more possibilities for swift and systematic placement of the ETT. Despite enormous bending forces, the distal bend can easily be adapted to specific anatomical conditions. The high-resolution CMOS chip ensures clear, pixel-free images in a 4:3 format without the Moiré effect.

“What you see – is what you get” – this applies to the C-MAC® VS in any position as the camera is protected in the ETT. The C-MAC® video stylet is directly connected to the C-MAC® monitor. This makes it possible to switch to another C-MAC® component within a very short time. Real-time documentation can be started directly from the C-MAC® VS. The C-MAC® VS is another component in the C-MAC® system.
**C-MAC® VS**

The intubation video endoscope with the deflectable tip

---

**Special Features:**

- Patented distal deflection mechanism with passive return, also with ETT
- Deflection up to 60° with loaded ETT
- For the placement of ETT as of size 6 mm
- Universal C-MAC® system interface for C-MAC® 8403 ZX and C-MAC® PM 8403 XD
- BlueButton: Documentation with the innovative multifunctional button and individual color coding
- Particularly suitable for the unexpected difficult airway
- Particularly suitable for patients with cervical spine problems or restricted mouth opening
- Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris® and High-Level Disinfection (HLD) acc. to US standards as well as the Tristel Trio Wipes System

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**C-MAC® VS Set,** rigid intubation video endoscope, with deflectable tip, CMOS technology, with C-MAC® system interface, documentation of images and video sequences via BlueButton, for use with C-MAC® Connecting Cable 8403 X for C-MAC® Monitor 8403 ZX or C-HUB® II 20 2903 01 as well as C-MAC® PM 8403 XD

- Deflection up/down: 60°/0°
- Direction of view: 0°
- Angle of view: 100°
- Working length: 41 cm
- Total length: 60 cm
- Distal tip outer diameter: 5.5 mm
The C-MAC® system offers numerous possibilities not only for airway management but also for other types of examinations as well. The video rhino-laryngoscope is therefore used for both FEES (Functional Endoscopic Evaluation of Swallowing) diagnostics and to evaluate swelling in the pharynx and larynx prior to extubation in the intensive care unit.

In the emergency room, this short and flexible endoscope provides a fast and convenient solution for the assessment of trauma and swelling in the upper respiratory tract.

The video otoscope can also be used to visualize swelling and inflammation in the auditory canal. This increases the value of the C-MAC® system and eliminates the need to acquire additional video towers.
Special Features:
● “All-in-one” solution meets convenience – the video rhino-laryngoscope in conjunction with the C-MAC® system allows optimum mobility
● Suitable for universal diagnostics in the emergency room and intensive therapy
● High image resolution and video imaging in 4:3 format – no tunnel vision
● Integrated LED light source for optimal illumination
● 140° deflection in both directions
● Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/mechanical cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards

Video Rhino-Laryngoscope
for diagnostics in the emergency room and intensive therapy

11101 CMK

CMOS Video Rhino-Laryngoscope KIT
for use with C-MAC® Monitor 8403 ZX
Direction of view: 0°
Angle of view: 85°
Working length: 30 cm
Outer diameter: 3.7 mm
Deflection up/down: 140°/140°
**Video Otoscope**
for diagnostics in the emergency room and intensive therapy

Special Features:
- **“All-in-one” solution meets convenience** – the video otoscope in conjunction with the C-MAC® system allows optimum mobility
- For imaging and documentation of the auditory canal and eardrum
- High-resolution sensor
- Integrated LED illumination with high light intensity
- High-quality optical system
- Optimal hygiene thanks to exchangeable, single-use ear specula
- Lightweight, ergonomic design
- Manual focus ring

121200 K

**CMOS Video Otoscope KIT**, with integrated LED illumination, for use with C-HUB® II 20 2903 01, Monitor 8402 ZX and Monitor 8403 ZX

including:
**Ear Speculum**, package of 100

121204

**Ear Speculum**, for CMOS video otoscope and USB video otoscope, outer diameter 4 mm, black, unsterile, for single use, package of 1000
Accessories
for the C-MAC® system

8403 YD  Protective Bag, blue, for C-MAC® system, made of water-resistant and sturdy material, washable, separate compartments for the monitor and three C-MAC® video laryngoscopes

8403 YE  Bag for Intubation Set -C22-, ULM model, made of water-resistant and sturdy material, washable, two separate compartments for C-MAC® video laryngoscopes with C-MAC® PM and for conventional laryngoscopes, for use with C-MAC® PM 8401 XD/8403 XD, C-MAC® Video Laryngoscopes 8401 xxx/8403 xxx and conventional laryngoscopes

8403 XDD  USB Data Cable, USB 2.0 port, for data transfer from C-MAC® PM 8403 XD to a computer, length 200 cm

8403 XDP  C-MAC® PM Connecting Cable, for the transmission of digital signals from C-MAC® PM 8403 XD to C-MAC® Video Laryngoscopes 8403 xxx (C-MAC® system interface), length 50 cm

Please note: The products displayed above are not included in the intubation bag.
Accessories

Please note: The products displayed above are not included in the intubation bag.
Accessories
for Flexible Intubation Video Endoscopes (FIVE)

Accessories included in delivery

29100 Plug, for Luer-Lock irrigation connector for cleaning, black, autoclavable, package of 10

2x 11301 CD1 Irrigation Adaptor, for machine cleaning, reusable, for use with Flexible Intubation Video Endoscopes 11301 BNX, 11302 BDX, 11303 BNX and 11304 BCX

091011-20* Suction Valve, sterile, for single use, package of 20, for use with Flexible Intubation Video Endoscopes 11301 BNX and 11302 BDX as well as Flexible HD Video Cystoscopes 11272 VH/VHU

10309 Bronchoscope Insertion Tube, size 4, with integrated mouthpiece, insertion length 85 mm, made from EVA, sterile, for single use, package of 10

10310 Bronchoscope Insertion Tube, size 2, with integrated mouthpiece, insertion length 65 mm, made from EVA, sterile, for single use, package of 10

11301 CFX Tube Holder, for use with Flexible Intubation Video Endoscopes 11304 BCX, 11303 BNX, 11302 BDX and 11301 ABX

27677 SL Case for Flexible Endoscopes, without accessories

27677 SM Case for Flexible Endoscopes, with accessories

11025 E Pressure Compensation Cap, for ventilation during gas and plasma sterilization

13242 XL Leakage Tester, with bulb and manometer

10x 110950-01* Cleaning Brush, with double-sided brush, length 120 cm, brush diameter 3.2 mm, unsterile, for single use, for use with flexible endoscopes with working channel diameters 2.6 – 3 mm

10x 110940-01* Same, length 90 cm, brush diameter 2.6 mm

10x 110930-01* Cleaning Brush, length 90 cm, brush diameter 1.7 mm, unsterile, for single use, for use with flexible endoscopes with working channel diameters 1.2 – 1.5 mm

8403 YZ Protection Cap, for the C-MAC® system interface on C-MAC® Video Laryngoscopes 8403 xxx and C-MAC® PM 8403 XD as well as C-MAC® Connecting Cable 8403 X
Optional Accessories:

110284-10* Biopsy Forceps, with oval jaws, coated, working length 120 cm, sterile, for single use, package of 10, for use with flexible endoscopes with working channels as of diameter 2 mm

11301 CA* Leaflet Valve, unsterile, for single use, package of 20

11301 CB1 Suction Valve, reusable, for use with Flexible Intubation Video Endoscopes 11301 BNX and 11302 BDX

39405 AS Plastic Container for Flexible Endoscopes, suitable for gas and hydrogen peroxide (Sterrad®) sterilization and storage, external dimensions (w x d x h): 550 x 260 x 90 mm, for use with one flexible endoscope

11301 BM Adaptor, for leakage test, for Belimed washer-disinfectors

11301 FF2 Adaptor for MIELE Cleaning Machines, with safety valve, for automatic leakage test of flexible KARL STORZ endoscopes

11301 GG2 Adaptor, for cleaning and disinfecting the irrigation and working channels of flexible endoscopes, for MIELE-ETD washer/disinfectors

11301 HH Adaptor for BHT Cleaning Machines, for automatic leakage test of flexible KARL STORZ endoscopes

11301 KK2 Adaptor, for working channel of flexible endoscopes, for MIELE-ETD 03 washer/disinfectors

Please note: Adaptors 11301 FF2 and 11301 GG2 have to be ordered separately!

ET65-778063 Flushing Hose Adaptor, for closing open flushing lines of cleaning machines, for use with 11301 FF2 only

100010-10* Sealing Cap "Endoscopic Seal", for working channels of 3 – 7 Fr. instruments, sterile, for single use, package of 10
Accessories for Flexible Intubation Video Endoscopes (FIVE)

Respiration
11008 C  **Mask Adaption “MAINZ Adaptor”**, for endoscopic inspection and simultaneous respiration, blue, sterile, package of 5

11008 D  **Cover**, for “MAINZ Adaptor”, inner diameter 2 mm, package of 5

11008 F  **Cover**, for “MAINZ Adaptor”, inner diameter 3.5 mm, package of 5

Anti-Fogging Solution
15006 B  “ULTRA STOP” **Antifog Solution**, 25 ml, pipette bottle

15006 C  **Same**, 30 ml, sterile pierce bottle

15006 D  **Same**, 15 ml, atomizer bottle
Eyepiece Endoscopes
Intubation Fiberscopes and Retromolar Intubation Endoscopes

The C-CAM® camera head integrates KARL STORZ intubation fiberscopes and retromolar intubation endoscopes into the C-MAC® system. The C-CAM® is a high-quality CMOS camera that meets the high demands of the C-MAC® system. The C-MAC® monitor is at the core of all imaging systems. It also merges the fiberscope world and the CMOS world into one unit.

Fiber endoscope illumination is ensured via the high-power LED battery light source. KARL STORZ thus demonstrates that high quality and mobility need not be mutually exclusive.
C-MAC® Monitor
The heart of the C-MAC® system

Special Features:

- Two endoscope inputs: Rapid toggling at the front end possible - your "plan B" is already connected
- HDMI output for connection to an external monitor
- Playback of images and videos on the C-MAC® and an external monitor possible
- Documentation of still images (JPEG) and video sequences (MPEG4) on a SD memory card in real time
- Data backup also possible on USB flash drive
- 7" TFT wide angle view display (160°) with premium image quality
- Connection for C-MAC® system endoscopes
- Weighs only 1000 g
- Can be run while charging and with rechargeable Li-ion batteries
- New design; easy to clean (IP54)
- System open to future C-MAC® components (forward and backward compatible)

8403 Z XK

8403 Z XK  C-MAC® Monitor for CMOS Endoscopes Set, screen size 7" with 1280 x 800 pixel resolution, two camera inputs, a USB and a HDMI port, optimized user interface, video and image capture in real time on SD card, playback of recorded video clips and still images, data transfer from SD card to USB flash drive possible, splash-proof according to IP54, suitable for wipe disinfection, shock-resistant ABS plastic housing, intelligent power management with rechargeable Li-ion batteries, VESA 75 mounting option, power adaptor for EU, UK, USA and Australia, power supply 110 – 240 VAC, 50/60 Hz, for use with CMOS video endoscopes including:
  - SD Card ULTRA, 8 GB
  - Protection Cap
  - VESA 75 Quick Clip
  - Mains Adaptor Set

8403 X

8403 X  C-MAC® Connecting Cable, with C-MAC® system interface, for C-MAC® Monitor 8403 Z XK or C-HUB® II 202903 01, length 200 cm, for use with C-MAC® video laryngoscopes 8403 xxx

Components/Spare Parts see chapter 6
**C-CAM® and C-HUB® II**  
Components for the C-MAC® system

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20 2901 32  **C-CAM® Camera Head, 8-pin**, one-chip CMOS camera head, resolution 640 x 480, focal length f = 20 mm, for use with C-HUB® 20 2901 01 and C-HUB® II 20 2903 01, Monitor 8402 ZX and Monitor 8403 ZX

20 2901 32

20 2903 01  **C-HUB® II Camera Control Unit**, for use with C-CAM® Camera Head 20 2901 32, Electronic Module 8402 X, C-MAC® Connecting Cable 8403 X or compatible CMOS video endoscopes, Interfaces: USB 2.0, S-Video output (NTSC), HDMI output, power socket including:
- **Power Supply**, including country-specific plugs
- **S-Video (Y/C) Connecting Cable**
- **USB Connecting Cable**
- **KARL STORZ Video Editor**

8403 XA  **Extension Cable**, length 200 cm, for the transmission of analog and digital signals, dustproof according to IP50 standards (not waterproof), for use with C-HUB® II Camera Control Unit 20 2903 01 and C-MAC® Monitor 8403 ZX in conjunction with all endoscopes of the KARL STORZ Office Line (8-pin instruments)
Intubation Fiberscopes
For fiber optic intubation and airway inspection

KARL STORZ provides the instruments you need to meet the special challenges of patients who cannot be intubated with conventional methods. Nasopharyngeal awake intubation is regarded as the gold standard of difficult airway management. We offer solutions for any challenge!

Our versatile intubation fiberscopes can be used in all clinical settings whether in intensive care units or emergency rooms as well as for patients with anticipated difficult airways during induction. The various sheath diameters enable you to select the ideal instrument for your patient and allow a swift reaction thanks to the compact, flexible LED light sources.

Special Features:

- Sheath stiffness adapted to anesthesiological requirements
- Suitable for both fiber optic intubation and airway inspection
- Patented sheath surface special treatment requires only minimal lubrication and provides optimal tube insertion
- Developed for use in the OR, ICU, ER
- Even safer tube introduction due to video-assisted control on the monitor
- Tube position of ETT, LMA, DLT can be verified
- Video-assisted monitoring for percutaneous tracheostomy
- Adaptable for foreign body removal or bronchial lavage

- Various outer diameters:
  5.2; 3.7; 2.8 mm
- Working channel diameters:
  2.3; 1.5; 1.2 mm
- Extremely bright, white light due to the LED light source with rechargeable Li-ion batteries
- Intubation fiberscope can be directly connected to the C-MAC® system with the mobile camera head C-CAM®
- Suitable and validated for the following low-temperature reprocessing methods up to a max. of 65 °C: Manual/mechanical cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards

Intubation fiberscope – eyepiece version, with optional LED battery light source
Intubation Fiberscope 5.2 x 65
The intubation fiberscope for universal use

Intubation Fiberscope 5.2 x 65
The 5.2 x 65 intubation fiberscope creates an ideal balance between image size, working channel size and the number of image and light fibers. Effective suction is possible via the 2.3 mm working channel. The fiberscope is also suitable for removing foreign bodies or for bronchial lavage. Using a mobile LED light source and C-CAM®, the intubation fiberscope can be directly connected to the C-MAC® system.

Special Features:
- Suitable for use with endotracheal tubes as of 5.5 mm
- Increased stiffness and smoother passage of the endotracheal tube
- For airway inspection
- Optimized for use with mobile light sources
- Intubation fiberscope can be connected to the C-MAC® system via the mobile C-CAM® camera head
- Practical tube fixation via special adaptor
- Suitable and validated for the following low-temperature reprocessing methods up to a max. of 65 °C: Manual/mechanical cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards

11301 BNK1

Intubation Fiberscope 5.2 x 65,
Direction of view: 0°
Angle of view: 120°
Working length: 65 cm
Total length: 93 cm
Working channel inner diameter: 2.3 mm
Distal tip outer diameter: 5.2 mm
Deflection up/down: 140°/140°

Optional Accessories for Intubation Fiberscopes see pages 93 and 96-100
Components/Spare Parts see chapter 6
Intubation Fiberscope 3.7 x 65

The 3.7 x 65 intubation fiberscope is a universal working instrument as it provides gold standard intubation for both adult and pediatric patients. Due to its small diameter, it is an excellent tool for the placement of double lumen tubes. Using a mobile LED light source and C-CAM®, the intubation fiberscope can be directly connected to the C-MAC® system.

11302 BDK2

**Intubation Fiberscope 3.7 x 65**

**Special Features:**
- Suitable for use with endotracheal tubes as of 4.5 mm
- Increased stiffness and smoother passage of the endotracheal tube
- Position check of Double Lumen Tubes (DLT)
- For airway inspection
- Optimized for use with mobile light sources
- Intubation fiberscope can be connected to the C-MAC® system via the mobile C-CAM® camera head
- Practical tube fixation via special adaptor
- Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards

**Optional Accessories for Intubation Fiberscopes** see pages 93 and 96-100

**Components/Spare Parts** see chapter 6
Intubation Fiberscope 2.8 x 65
The intubation fiberscope for pediatrics

Intubation Fiberscope 2.8 x 65

The 2.8 x 65 intubation fiberscope is ideal for use in neonatology due to its small outer diameter of 2.8 mm. The special sheath surface combined with increased stiffness improves the gliding properties of the ETT over standard intubation fiberscopes. The use of a mobile LED light source enables independent work under optimal lighting conditions. Using C-CAM®, the intubation fiberscope can be directly connected to the C-MAC® system.

Special Features:
- Suitable for use with endotracheal tubes as of 3.5 mm
- Increased stiffness and smoother passage of the endotracheal tube
- Position check of Double Lumen Tubes (DLT)
- For airway inspection
- Optimized for use with mobile light sources
- Intubation fiberscope can be connected to the C-MAC® system via the mobile C-CAM® camera head
- Practical tube fixation via special adaptor
- Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards

Optional Accessories for Intubation Fiberscopes see pages 93 and 96-100
Components/Spare Parts see chapter 6
# Intubation Fiberscopes

**Eyepiece Versions**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Intubation Fiberscopes</th>
<th>Eyepiece</th>
<th>Deflection up/down</th>
<th>Direction of view</th>
<th>Angle of view</th>
<th>Working length</th>
<th>Total length</th>
<th>Working channel inner diameter</th>
<th>Distal tip outer diameter</th>
<th>Recommended ETT diameter as of*</th>
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<tbody>
<tr>
<td>11301 AAK1</td>
<td>5.2 x 65</td>
<td>0°</td>
<td>120°</td>
<td>65 cm</td>
<td>93 cm</td>
<td>2.3 mm</td>
<td>5.2 mm</td>
<td>5.5 mm</td>
<td></td>
<td></td>
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<tr>
<td>11302 BDK2</td>
<td>3.7 x 65</td>
<td>0°</td>
<td>120°</td>
<td>65 cm</td>
<td>93 cm</td>
<td>1.5 mm</td>
<td>3.7 mm</td>
<td>4.5 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11301 BNK1</td>
<td>2.8 x 65</td>
<td>0°</td>
<td>90°</td>
<td>65 cm</td>
<td>98 cm</td>
<td>1.2 mm</td>
<td>2.8 mm</td>
<td>3.5 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Accessories included in delivery:**

- **Case**, with accessories: 27677 SZ
- **Pressure Compensation Cap**, for ventilation during gas and plasma sterilization: 11025 E
- **LIPP Tube Holder**, for intubation fiberscopes: 11301 CF
- **Plug**, for LUER-Lock irrigation connector for cleaning, black, *autoclavable*, package of 10: 29100
- **Bronchoscope Insertion Tube**, size 4, with integrated mouthpiece, insertion length 85 mm, made from EVA, sterile, for single use, package of 10: 10309
- **Same**, size 2, insertion length 65 mm: 10310
- **Leakage Tester**, with bulb and manometer: 13242 XL
### Accessories (included in delivery)

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case</td>
<td>27677 SZ</td>
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<tr>
<td>Pressure Compensation Cap</td>
<td>11025 E 13242 XL</td>
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<tr>
<td>Leakage Tester</td>
<td>11301 CF</td>
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<tr>
<td>LIPP Tube Holder</td>
<td>2x</td>
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<tr>
<td>Cleaning Brush</td>
<td>10x</td>
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<td>Plug</td>
<td>29100</td>
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<tr>
<td>Irrigation Adaptor</td>
<td>11301 CD</td>
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<tr>
<td>Suction Valve</td>
<td>091010-20</td>
</tr>
<tr>
<td>Biopsy Forceps</td>
<td>10309</td>
</tr>
</tbody>
</table>

### Additional Accessories

- **Case:** 27677 SZ, **Pressure Compensation Cap:** 11025 E, **Leakage Tester:** 13242 XL, **LIPP Tube Holder:** 11301 CF, **Cleaning Brush:** 10x, **Plug:** 29100, **Irrigation Adaptor:** 11301 CD, **Suction Valve:** 091010-20, **Biopsy Forceps:** 10309.

### Accessories included in delivery:

- **Cleaning Brush**, with double-sided brush, length 90 cm, brush diameter 2.6 mm, unsterile, for single use, for use with flexible endoscopes with working channel diameters 2 – 2.3 mm.
- **Cleaning Brush**, length 90 cm, brush diameter 1.7 mm, unsterile, for single use, for use with flexible endoscopes with working channel diameters 1.2 – 1.5 mm.
- **Irrigation Adaptor**, for machine cleaning, reusable, for use with KARL STORZ fiberscopes.
- **Suction Valve**, sterile, for single use, package of 20, for use with KARL STORZ fiberscopes.
- **Biopsy Forceps**, with oval jaws, coated, working length 120 cm, sterile, for single use, package of 10.

**Please note that the accuracy of the ETT diameter may vary depending on the manufacturer’s quality.**

Product information on Flexible Bronchoscopes see catalogs THORAX and ENT

LED Battery Light Source for Endoscopes (optional) see page 98.
Retromolar Intubation Endoscopes

The backup instrument in the C-MAC® system in airway management combines technical sophistication with utmost reliability

Unexpected difficult airways are always an additional challenge in airway management. With the retromolar intubation endoscope and its versatile intubation techniques, these situations can be brought under control. The endotracheal tube is guided into the trachea under direct vision while the possibility of simultaneous application of oxygen provides more safety. KARL STORZ meets the most stringent hygiene demands – the autoclaving of the SILVER LINE. When connected to the C-CAM® camera head, these instruments represent further components of the C-MAC® system.
Retromolar Intubation Endoscopes

Special Features:
- SILVER LINE – autoclavable
- Particularly suitable for the unexpected difficult airway
- Use in the case of minimal mouth opening possible
- Introduction of the tube under visualization: What you see – is what you get!
- Continuous O₂ flow via tube adaptor between tube and instrument
- One-person intubation possible
- Extremely bright, white light due to the LED light source with rechargeable Li-ion batteries
- Intubation fiberscope can be directly connected to the C-MAC® system with the mobile camera head C-CAM®
- Suitable and validated for the following low-temperature reprocessing methods up to a max. of 65 °C: Manual/mechanical cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards

10331 B2K
Retromolar Intubation Endoscope Set, with movable eyepiece, autoclavable, 35,000 pixels, outer diameter 5 mm, for ETT > 5.5 mm, working length 40 cm, distal bending 40°
including:
Tube Holder, for tube fixation and O₂ application

10332 BK1
Retromolar Intubation Endoscope, with movable eyepiece, outer diameter 3.5 mm, for ETT 4 – 5.5 mm, usable sheath length 35 cm, distal bending 40°
including:
Tube Holder, for tube fixation and O₂ application

LED Battery Light Source for Endoscopes (11301 D1/D3), optional, see page 97
Components/Spare Parts see chapter 6
Retromolar Intubation Endoscopes

Special Features:

- Particularly suitable for the unexpected difficult airway
- Use in the case of minimal mouth opening possible
- Introduction of the tube under visualization: What you see – is what you get!
- Continuous O₂ flow via tube adaptor between tube and instrument
- One-person intubation possible

- Suitable and validated for the following low-temperature reprocessing methods up to max. 65 °C: Manual/machine cleaning and disinfection, sterilization with Steris®, Sterrad® and EtO gas; High-Level Disinfection (HLD) acc. to US standards
- Intubation fiberscope can be directly connected to the C-MAC® system with the mobile camera head C-CAM®
- Recommended for video-assisted intubation with the DCI® camera to TELE PACK X

Intubation Endoscope Set, with eyepiece, outer diameter 2 mm, for ETT 2.5 – 3.5 mm, working length 22 cm, distal bending 40°, angle of view 80°, for use with LED Battery Light Sources (11301 D1, D3, D4, DE, DF), C-CAM® Camera Head (8-pin) 20 2901 32

Including:
- Case
- Tube Holder, for tube fixation, with O₂ application

LED Battery Light Source for Endoscopes (11301 D1/D3), optional, see page 97

Components/Spare Parts see chapter 6
SMART SCOPE®
Accessories for Intubation Fiberscopes and Endoscopes

Special Features:
- Ready for use anywhere and anytime (Plug & Play)
- Ready for immediate use
- Allows the recording of photos and videos and transmission to third parties
- Information can be shared and exchanged with colleagues
- Compatible with various smartphones and endoscopes
- For iPhone 6/6s and 7 as well as Samsung Galaxy S6 and S7

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20 2880 01-16

20 2880 01
SMART SCOPE, smartphone adaptor, for coupling a smartphone camera to an endoscope, for straightforward documentation of endoscopic images or videos on a smartphone, compatible with all endoscopes with standard eyepieces and smartphone covers

20 2880 01-I6
SMART SCOPE with iPhone 6/6s Holder, for coupling a smartphone camera to an endoscope, for straightforward documentation of endoscopic images or videos on a smartphone, compatible with all endoscopes with standard eyepieces

20 2880 01-I7
Same, with iPhone 7/8 holder

20 2880 01-S6
SMART SCOPE with Galaxy S6 Holder, for coupling a smartphone camera to an endoscope, for straightforward documentation of endoscopic images or videos on a smartphone, compatible with all endoscopes with standard eyepieces

20 2880 01-S7
Same, with Galaxy S7 holder
## Retromolar Intubation Endoscopes

<table>
<thead>
<tr>
<th>Intubation Endoscopes</th>
<th>Eyepiece</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 x 40</td>
<td>10331 B2K</td>
<td></td>
</tr>
<tr>
<td>3.5 x 35</td>
<td>10332 BK1</td>
<td></td>
</tr>
<tr>
<td>2 x 22</td>
<td>11605 CK</td>
<td></td>
</tr>
</tbody>
</table>

**Accessories included in delivery:**

- **10332 BA**
  - **Tube Holder for ETT**, for tube fixation, with \( \text{O}_2 \) application connection, inner diameter 3.5 mm

- **10331 BA**
  - **Tube Holder**, inner diameter 5 mm
<table>
<thead>
<tr>
<th>Angle of View</th>
<th>Working length</th>
<th>Total length</th>
<th>Distal tip outer diameter</th>
<th>Recommended ETT diameter</th>
<th>Accessories (incl. in delivery)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100°</td>
<td>40 cm</td>
<td>52 cm</td>
<td>5.0 mm</td>
<td>5.5 mm</td>
<td>10331 BA</td>
</tr>
<tr>
<td>100°</td>
<td>35 cm</td>
<td>47 cm</td>
<td>3.5 mm</td>
<td>4.0 mm</td>
<td>10332 BA</td>
</tr>
<tr>
<td>100°</td>
<td>22 cm</td>
<td>32 cm</td>
<td>2.0 mm</td>
<td>2.5 mm</td>
<td>10332 BA</td>
</tr>
</tbody>
</table>

**Optional Accessories:**

39501 F

Wire Tray for Cleaning, Sterilization and Storage of one retromolar intubation endoscope, including holder for light post adaptors, silicone telescope holders and lid, external dimensions (w x d x h): 570 x 80 x 52 mm

* Please note that the accuracy of the ETT diameter may vary depending on the manufacturer’s quality.

LED Battery Light Source for Endoscopes, optional, see page 97

Please note: The instruments displayed are not included in the sterilization and storage tray.
KARL STORZ offers a comprehensive product range to manage the expected and unexpected difficult airway. Therefore, it is absolutely necessary to have a mobile light source which meets the high demands required in these situations. With over 100 lm/140 lm brightness, 5500 K color temperature and weighing under 120 g, the BRITE LITE battery-operated LED light source sets new standards.

“All the brightness you need!”
Battery Light Source LED BRITE LITE

Special Features:
- Battery light source with extremely high light intensity
- Available as battery and rechargeable version
- Absolute white light due to LED technology
- Special light focus allows optimal light adjustment at the endoscope connector
- LED provides up to 50,000 hours lifetime
- Burning time of 120 min
- Waterproof, fully immersible for cleaning and disinfection (11301 D1/D3)

11301 D1/D3/DE/DF

Battery Light Source LED for Endoscopes, with fine screw thread, boost mode for temporary increase in brightness, burning time > 120 min, weight approx. 78 g, for use with KARL STORZ endoscopes

11301 D3

Same, with coarse thread

121306 P

Photo Battery, lithium, 3 V, CR 123 A

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

Same, with fast screw thread

11301 DG

Charging Unit, for two LED battery light sources, with fixed integrated power supply and adaptor for EU, UK, USA and Australia, power supply 110 – 240 VAC, 50/60 Hz, suitable for wipe disinfection, for use with Battery Light Source LED 11301 DE/DF

11301 DH

Holder, for mounting on a surface, for use with Charging Units 11301 DG, 8546 LE, 8546 LE1 and 8401 XDL
Accessories included in delivery:

- **11025 E** Pressure Compensation Cap, for ventilation during gas and plasma sterilization
- **13242 XL** Leakage Tester, with bulb and manometer
- **11301 CF** LIPP Tube Holder, for intubation fiberscopes
- **110950-01** Cleaning Brush, with double-sided brush, length 120 cm, brush diameter 3.2 mm, unsterile, for single use, for use with flexible endoscopes with working channel diameters 2.6 – 3 mm
- **110940-01** Same, length 90 cm, brush diameter 2.6 mm
- **110930-01** Cleaning Brush, length 90 cm, brush diameter 1.7 mm, unsterile, for single use, for use with flexible endoscopes with working channel diameters 1.2 – 1.5 mm
- **29100** Plug, for LIVER-Lock irrigation connector for cleaning, black, autoclavable, package of 10
- **2x 11301 CD** Irrigation Adaptor, for machine cleaning, reusable, for use with KARL STORZ fiberscopes
- **091010-20** Suction Valve, sterile, for single use, package of 20, for use with KARL STORZ fiberscopes
- **10309** Bronchoscope Insertion Tube, size 4, with integrated mouthpiece, insertion length 85 mm, made from EVA, sterile, for single use, package of 10
- **10310** Same, size 2, insertion length 65 mm

* indicates single use, for use with flexible endoscopes only.
## Accessories
for Flexible Intubation Fiberscopes

### Optional Accessories:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>11301 CA*</td>
<td><strong>Leaflet Valve</strong>, unsterile, for single use, package of 20</td>
<td></td>
</tr>
<tr>
<td>11301 BM</td>
<td><strong>Adaptor</strong>, for leakage test, for Belimed washer-disinfectors</td>
<td></td>
</tr>
<tr>
<td>11301 FF2</td>
<td><strong>Adaptor for MIELE Cleaning Machines</strong>, with safety valve, for automatic</td>
<td>leakage test of flexible KARL STORZ endoscopes</td>
</tr>
<tr>
<td>11301 GG2</td>
<td><strong>Adaptor</strong>, for cleaning and disinfecting the irrigation and working</td>
<td>channels of flexible endoscopes, for MIELE-ETD washer/disinfectors</td>
</tr>
<tr>
<td>11301 HH</td>
<td><strong>Adaptor for BHT Cleaning Machines</strong>, for automatic leakage test of</td>
<td>flexible KARL STORZ endoscopes</td>
</tr>
<tr>
<td>ET65-778063</td>
<td><strong>Flushing Hose Adaptor</strong>, for closing open flushing lines of cleaning</td>
<td>machines, for use with 11301 FF2 only</td>
</tr>
<tr>
<td>11301 CB</td>
<td><strong>Suction Valve</strong>, reusable</td>
<td></td>
</tr>
<tr>
<td>110284-10*</td>
<td><strong>Biopsy Forceps</strong>, with oval jaws, coated, working length 120 cm, sterile,</td>
<td>for single use, package of 10</td>
</tr>
<tr>
<td>962200 82</td>
<td><strong>Microfiber Bag</strong>, for SMART SCOPE</td>
<td></td>
</tr>
</tbody>
</table>

Please note: Adaptors 11301 FF2 and 11301 GG2 have to be ordered separately!
## Accessories

**for Flexible Intubation Fiberscopes**

### Respiration

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Volume</th>
<th>Package Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>11008 C</td>
<td><strong>Mask Adaption “MAINZ Adaptor”</strong>, for endoscopic inspection and simultaneous respiration, blue, sterile, package of 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11008 D</td>
<td><strong>Cover</strong>, for “MAINZ Adaptor”, inner diameter 2 mm, package of 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11008 F</td>
<td><strong>Cover</strong>, for “MAINZ Adaptor”, inner diameter 3.5 mm, package of 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Anti-Fogging Solution

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Volume</th>
<th>Bottle Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>15006 B</td>
<td>“ULTRA STOP” <strong>Antifog Solution</strong>, 25 ml, pipette bottle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15006 C</td>
<td><strong>Same</strong>, 30 ml, sterile pierce bottle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15006 D</td>
<td><strong>Same</strong>, 15 ml, atomizer bottle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BRONCHOSCOPES AND TRACHEOSCOPES FOR FOREIGN BODY REMOVAL
The aspiration of foreign bodies is potentially life-threatening and is associated with morbidity and mortality in both prehospital and clinical settings. Foreign body aspiration occurs most frequently among children aged six months to four years as well as in elderly or neurologically impaired patients. The most common aspirated object is food (primarily nuts, grapes, carrots) or, in the case of older toddlers, small toy parts and household objects.

The clinical presentation and spectrum of symptoms following foreign body aspiration can be classified as acute (< 24 h after the incident), subacute (> 24 h) or chronic (weeks, months). Airway obstruction can be either partial (most cases) or complete (rare) and may be secondary to compression of the larynx/trachea caused by a foreign body in the proximal esophagus or a respiratory tract infection induced by a foreign body.

Obtaining a patient history and performing a physical examination is critical for detecting foreign body aspiration in children presenting with a sudden onset of symptoms while eating or playing. Frequently, there is no recall of the aspiration event or it is not witnessed by parents or caregivers. Most cases present with a sudden fit of coughing that gradually subsides or disappears completely and may be associated with respiratory distress, stridor, expiratory wheezing and/or cyanosis. Symptoms can be subtle: What is important is that the possibility of foreign body aspiration is taken into consideration.

Depending on the location, size and consistency of the foreign body, careful auscultation of both lungs in alternation often reveals inspiratory/expiratory stridor or expiratory wheezing. This may be accompanied with unilateral decreased, localized reduced or even absent breath sounds. In some cases, undetected foreign body aspiration presents with secondary symptoms in the form of an acute or chronic respiratory tract infection, e.g., lobar and/or aspiration pneumonia or a chronic cough. The diagnostic value of chest X-rays, particularly with regard to foreign body aspiration, remains controversial. However, chest radiographs prove useful for ingested foreign bodies as, in contrast to aspirated foreign bodies, most ingested foreign bodies are radiopaque.

Foreign body ingestion can lead to the impaction of coins, magnets, batteries, sharp or large objects in the proximal esophagus, posing a danger of secondary tracheal compression or grave damage to the mucous membrane (batteries). This may be indicated by dysphagia or excessive drooling. The ingestion of acids or alkalis (e.g., bathroom cleaning products) can lead to coagulative and/or colliquative necrosis of the mucous membrane. If such symptoms occur or a similar case history is presented, it is important to consider foreign body aspiration or ingestion and to perform a focused history and physical examination (re-evaluation). If a case history cannot clearly rule out foreign body aspiration or ingestion, endoscopy is recommended if any doubt exists.

The management strategy for the treatment of children after foreign body aspiration or ingestion varies from facility to facility. In general, this concerns the following specialist disciplines: Pediatrics/pediatric pneumology, ENT medicine, pediatric anesthesia and pediatric intensive care and, in the case of ingestion in the lower esophageal segments, pediatric gastroenterology and/or pediatric surgery. The disciplines, departments and endoscopy services involved should come to an agreement on the evaluation of the patient, indications, timing as well as the anesthetic and endoscopic techniques to be used (what? who? where? when? how?). Often the decision to proceed with foreign body endoscopy is a judgement call. The indications for endoscopy should be interpreted more liberally if there is any doubt.

An interdisciplinary consensus should be reached on patient eligibility for urgent endoscopy or whether to wait for adequate fasting. In general, the possibility of performing the intervention at a more convenient time with the availability of an optimal team should be taken into consideration.

In the case of an acute aspiration event (< 24 h) or if a foreign body is lodged in the upper respiratory tract (larynx, trachea) and/or if a child presents with acute dyspnea and/or in the case of an infant, an appropriate fasting interval is generally not observed as the foreign body could become dislodged and cause a complete airway obstruction.

An appropriate fasting interval should, however, be allowed for a subacute aspiration event (> 24 h) or chronic aspiration events (> 2 weeks) or if a foreign body is lodged in the lower respiratory tract without dyspnea.

The presence of esophageal foreign bodies, particularly impacted coins, magnets or batteries, is considered to be an urgent case and children are treated without adequate fasting.

The longer a tracheobronchial foreign body remains in the airway, the more difficult it becomes to remove the offending object as it may become encased in granulation tissue within days. Granulated tissue may cause bleeding during foreign body extraction and thus obscure the view of the situation. When evaluating eligibility for urgent endoscopy, it is important to wait until the optimal team for emergency endoscopy is assembled and the full functionality of instruments is ensured, incl. OR sets for potential emergency coniotomy or tracheotomy before proceeding to anesthesia induction – unless the situation is life-
Endoscopy for Foreign Body Diagnosis and Extraction

threatening due to the (immediate risk) of complete airway obstruction. In this situation, emergency oxygenation, emergency laryngoscopy or emergency intubation and cardiopulmonary resuscitation naturally have top priority. In emergency laryngoscopy for an acute and total airway obstruction, an immediate attempt should be made to remove a supraglottic foreign body with a MAGILL forceps or a similar tool.

If foreign body aspiration seems less likely or the probability of foreign body aspiration is ruled out in the case of protracted or chronic symptoms, a less invasive form of flexible tracheobronchoscopy is preferred at first. If, however, foreign body aspiration is probable, rigid tracheo-bronchoscopy is the procedure of choice as this is a more established approach to the extraction of foreign bodies. Some practitioners prefer a flexible technique for extraction, however, it must be possible to switch to rigid endoscopy at any time in any situation.

**Video Laryngo- and Hypopharyngoscopy**

For an initial assessment of the hypopharynx, larynx or the entry to the esophagus, a video laryngoscopy system with blades in sizes appropriate for all age groups proves useful. A sufficiently long and slender MILLER blade is suitable for visualizing the upper esophagus. For the purposes of endoscopy, appropriate grasping instruments as well as a conventional and/or modified MAGILL forceps (with horizontal opening) and a robust foreign body grasper (e.g., peanut grasping forceps) should be immediately available in case it becomes necessary to extract foreign bodies from the larynx or hypopharynx.

**Rigid Tracheobronchoscopy**

Rigid tracheobronchoscopy is generally used to extract foreign bodies from the airway, especially in children. A tracheoscope with a side vent allows ventilation of the patient during the procedure (e.g., manual ventilation, relatively high respiratory pressure, uncertain capnography). The grasped foreign body is either captured in the tracheobronchoscope or directly removed with a foreign body grasper or similar instrument. Rigid tracheoscope tubes in various lengths and sizes, bronchoscope tubes (e.g. DOESEL-HUZLY bronchoscopes, sizes 2.5 – 6), micro laryngoscope tubes ranging from very small to large sizes (e.g., KLEINSASSER, PARSONS, HOLINGER-TUCKER, or BENJAMIN, sizes 1 – 3) as well as straight forward and angled telescopes (0°, 30° and 70°) should be provided for rigid endoscopy.

In children, the cricoid is the narrowest portion of the upper respiratory tract. For rigid endoscopy, therefore, it is important to select a tube that can pass through the cricoid to prevent the risk of mucosal swelling and postoperative stridor. To allow ventilation through the tracheoscope and bronchoscope tubes during endoscopy, suitable telescopes with airtight ports are required. So-called optical forceps are available for bronchoscopes from size 2.5. This allows simultaneous passage of the telescope with a grasping instrument through the tube. Various suction tubes should also be at hand. Also useful are various grasping instruments such as peanut grasping forceps, alligator, bean jaw forceps as well as small serrated, double spoon and grasping forceps. OR assistants, endoscopists and anesthetists should be thoroughly familiar with the instruments used and the planned procedure. Before induction of anesthesia, all appropriate instruments should be ready for use. As an established anesthetic technique, particularly for rigid tracheobronchoscopy, Total Intravenous Anesthesia (TIVA) with muscle relaxation can be recommended.

**Flexible Tracheobronchoscopy**

If foreign body aspiration is questionable or if potential foreign body aspiration can be ruled out, flexible tracheobronchoscopy may be considered as this technique is less invasive, potentially less traumatic and allows a lighter form of anesthesia. For this purpose, flexible fiberscopes in various sizes should be provided. Endoscopes with diameters ranging from 2.5 to 5 mm cater for all pediatric age groups. Ventilation and oxygenation of the patient during flexible tracheobronchoscopy requires the use of an airway interface (Mainz adaptor with laryngeal mask or endotracheal tube and/or FREI endoscopy mask). If a foreign body is to be removed with a flexible endoscope (possible from an outer diameter of 3.7 mm), additional flexible instruments such as grasping forceps, foreign body baskets or snares (with diameters 1 – 1.8 mm) should be available. To access peripheral foreign bodies, the possibility of inserting a flexible fiberoptic bronchoscope through a rigid bronchoscope tube can be taken into consideration. The selection of an appropriate instrument minimizes the risk of a foreign body being released prematurely and causing secondary trauma. Adequate suction should also be ensured. When using flexible endoscopy for foreign body extraction, the possibility to switch to rigid tracheobronchoscopy should always be anticipated during the preparation phase.

**Esophagoscopy**

Esophagoscopy can be performed with rigid or flexible endoscopes. Foreign bodies in the proximal esophagus, which cannot be accessed with a videolaryngoscopic MILLER blade (see above), can be easily removed with a rigid tube as a rule. Here the foreign bodies are captured in the esophagoscope and removed or the tube is advanced to the level of the foreign body, which is then grasped by an alligator, bean jaw, peanut...
grasping or spoon forceps and withdrawn through the endoscope. To perform this procedure, pediatric esophagoscopes are required in various lengths and inner diameters. Particularly in the case of sharp-pointed foreign bodies or batteries, possible damage to the mucosa should always be assessed. It may also be necessary to fit a nasogastric tube. Flexible esophagscopy can prove to be of invaluable assistance, especially for removing foreign bodies from portions of the lower esophageal segments, i.e. near the cardia. Endoscopes between 2.8 and 6 mm are available for this purpose. Foreign bodies can be removed with small forceps, foreign body baskets or snares.

In conclusion, the following three aspects are essential in order to ensure safe and effective treatment of patients after foreign body aspiration and ingestion:
1. Consider! (Patient history, re-evaluation)
2. If in doubt, perform endoscopy!
3. Interdisciplinary consultation!


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Klinik für Hals-Nasen-Ohren-Heilkunde,
KRH Klinikum Nordstadt, Hannover and
Kinder- und Jugendkrankenhaus Auf der Bult, Hannover
(both Germany)

For further information on Bronchoscopes and Laryngoscopes see HNO and THORAX catalogs
Universal Bronchoscopes for Adults
with fiber optic light carrier for distal illumination

- **10318 BK**  
  Universal Bronchoscope, size 8.5, length 43 cm  
  including:  
  Fiber Optic Light Carrier

- **10318 CK**  
  Universal Bronchoscope, size 7.5, length 43 cm  
  including:  
  Fiber Optic Light Carrier

- **10318 DK**  
  Universal Bronchoscope, size 6.5, length 43 cm  
  including:  
  Fiber Optic Light Carrier

- **10315 N**  
  Rubber Telescope Guide

- **10318 S**  
  Instrument Guide, for suction catheter

**Further Sizes and Adaptors** see THORAX catalog
HOPKINS® Telescope and Optical Forceps

Special Features:
- The jaws of the forceps are well visualized prior to and during the procedure

For use with Bronchoscope 10318 and Optical Forceps 10350

10320 AA  HOPKINS® Straight Forward Telescope 0°, diameter 5.5 mm, length 50 cm, autoclavable, fiber optic light transmission incorporated, color code: green

10350 HF/KF  Optical Forceps, for the controlled grasping of hard foreign bodies, with force-limited handle, incl. cleaning adaptor

10350 HF  Optical Forceps, with alligator jaws, for the controlled grasping of hard foreign bodies, with force-limited handle, incl. cleaning adaptor

10350 KF  Optical Forceps, for the controlled grasping of peanuts and soft foreign bodies, with force-limited handle, incl. cleaning adaptor

Further Telescopes and Optical Forceps see THORAX catalog
Container for the Sterilization and Storage of Telescopes see HYGIENE catalog

STORZ KARL STORZ — ENDOSCOPE
Special Features:
- The jaws of the forceps are well visualized prior to and during the procedure

For use with Bronchoscope 10318 and Optical Forceps 10352

10328 AA  HOPKINS® Straight Forward Telescope 0°, diameter 4.5 mm, length 50 cm, autoclavable, fiber optic light transmission incorporated, color code: green

10352 H  Optical Forceps, with alligator jaws, for the controlled grasping of hard foreign bodies, with force-limited handle, incl. cleaning adaptor

10352 KF  Optical Forceps, for the controlled grasping of peanuts and soft foreign bodies, with force-limited handle, incl. cleaning adaptor

Further Telescopes and Optical Forceps see THORAX catalog
Container for the Sterilization and Storage of Telescopes see HYGIENE catalog
Pediatric Bronchoscopes
with proximal illumination

Special Features:
● Absence of distal light carrier does not restrict inner diameter
● Prismatic Light Deflector 10101 FA inserted proximally ensures best illumination and enables full use of lumen through operating instruments

10339 A – CD

10339 A
DOESEL–HUZLY Bronchoscope, size 6, length 30 cm

10339 BB
Same, size 4.5

10339 CD
Same, size 3.5

10101 FA
Prismatic Light Deflector, autoclavable, with connection to fiber optic light cable

10338 N
Rubber Telescope Guide

10338 S
Instrument Guide, for suction catheters

10338 RK
Telescope Bridge, for fixed position between HOPKINS® Telescope 10324 AA and pediatric Bronchoscopes 10339 A/B/BB/C/CD/EEE/G and pediatric Esophagoscopes 12030 A/B/C

Further Sizes and Adaptors see THORAX catalog
HOPKINS® Telescope and Optical Forceps
for Pediatric Bronchoscopes size 6 – 3.5, length 30 cm

Special Features:
- Forceps specially designed for hard and soft foreign bodies allow foreign bodies to be removed in a controlled manner under precise visual control
- The small size of the forceps allows insertion through pediatric bronchoscopes, size 3.5 and larger

For use with 30 cm DOESEL-HUZLY Bronchoscopes, 10339 A/BB/CD

10324 AA  HOPKINS® Straight Forward Telescope 0°, diameter 2.9 mm, length 36 cm, autoclavable, fiber optic light transmission incorporated, color code: green

10378 CF  Optical Forceps, 2 x 2 teeth, for the controlled grasping of coins and flat foreign bodies, with force-limited handle, incl. cleaning adaptor

10378 HF  Optical Forceps, with alligator jaws, for the controlled grasping of hard foreign bodies, with force-limited handle, incl. cleaning adaptor

10378 KF  Optical Forceps, with KILLIAN bean jaws, for the controlled grasping of peanuts and soft foreign bodies, with force-limited handle, incl. cleaning adaptor

10378 KSF  Optical Forceps, VANCOUVER model, with extra delicate jaws, for the controlled grasping of peanuts and soft foreign bodies, with force-limited handle, incl. cleaning adaptor

Further Telescopes and Optical Forceps see THORAX catalog
Container for the Sterilization and Storage of Telescopes see HYGIENE catalog
ESOPHAGOSCOPY AND HYPOPHARYNGOSCOPY

**Esophagoscopes**
- **Size 12 x 16**
  - 12060 A: Robert-Jesberg Esophagoscope, oval, size 12 x 16, length 50 cm
  - 12060 B: Same, length 30 cm

- **Size 10 x 14**
  - 12060 C: Robert-Jesberg Esophagoscope, oval, size 10 x 14 mm, length 50 cm
  - 12060 D: Same, length 30 cm

- **Size 8 x 12**
  - 12060 F: Robert-Jesberg Esophagoscope, oval, size 8 x 12, length 30 cm

- **Size 7 x 9**
  - 12060 H: Robert-Jesberg Esophagoscope, oval, size 7 x 10, length 30 cm

**Hypopharyngoscopes**
- **Size 10 x 14**
  - 12060 S: Robert-Jesberg Hypopharyngoscope, oval, size 10 x 14 mm, length 20 cm
For proximal illumination
10101 FA  **Prismatic Light Deflector, autoclavable**, with connection to fiber optic light cable

For distal illumination
12061 A  **Fiber Optic Light Carrier**, length 50 cm, for use with esophagoscopes
12061 B  **Same**, length 30 cm
12061 C  **Fiber Optic Light Carrier**, length 20 cm, for use with hypopharyngoscopes

Further Accessories
12070  **Handle**, for esophagoscopes
HOPKINS® Telescope and Optical Forceps

For use with Esophagoscopes 12060, lengths 50 cm and 40 cm

12015 AA  HOPKINS® Straight Forward Telescope 0°, diameter 5.5 mm, length 53 cm, autoclavable, fiber optic light transmission incorporated, color code: green

Instruments for use with HOPKINS® Telescope 12015 AA

12016 K  Optical Forceps, for the controlled grasping of peanuts and soft foreign bodies, incl. cleaning adaptor

12016 M  Optical Forceps, with alligator jaws, for the controlled grasping of hard foreign bodies, incl. cleaning adaptor

12016 X  Telescope Guide, for use with Esophagoscopes 12060 A/C/E and HOPKINS® Telescope 12015 AA

Container for the Sterilization and Storage of Telescopes see HYGIENE catalog
Pediatric Bronchoscopes
with proximal illumination

Special Features:
- Absence of distal light carrier does not restrict inner diameter
- Prismatic Light Deflector 10101 FA inserted proximally ensures best illumination and enables full use of lumen through operating instruments
- Excellent view of operation area
- Lateral channel for introduction of instruments and catheters

12030 A   Esophagoscope Tube, size 6, length 30 cm
12030 C   Same, size 4
10101 FA  Prismatic Light Deflector, autoclavable, with connection to fiber optic light cable
10338 N   Rubber Telescope Guide
10338 RK  Telescope Bridge, for fixed position between HOPKINS® Telescope 10324 AA and pediatric Bronchoscopes 10339 A/B/BB/C/CD/EEE/G and pediatric Esophagoscopes 12030 A/B/C

For use through lateral working channel of esophagoscopes, length 30, under control of HOPKINS® Telescope 10324 AA

10338 U   Forceps, alligator, spoon-shaped, single action jaws, semiflexible, sheath diameter 1 mm, with cleaning connector, working length 35 cm

Compatible Telescopes see page 109
Further Sizes and Adaptors see THORAX catalog
For Adult Bronchoscopes and Esophagoscopes

Sheath diameter 2.5 mm, working length 50 cm

10370 H  **Forceps**, alligator, for hard foreign bodies, with Luer-Lock irrigation connector for cleaning, double action jaws, sheath diameter 2.5 mm, working length 50 cm

10370 J  **Same**, pointed, serrated, for coins and flat foreign bodies

10370 K  **Same**, for peanuts and soft foreign bodies
For Pediatric Bronchoscopes and Esophagogoscopes, sizes 6 and 4

Sheath diameter 2 mm, working length 35 cm

10371 H  **Forceps**, alligator, for hard foreign bodies, double action jaws, sheath diameter 2 mm, working length 35 cm

10371 J  **Same**, pointed, serrated, for coins and flat foreign bodies

10371 K  **Same**, for peanuts and soft foreign bodies
Accessories for Bronchoscopy and Esophagoscopy
Suction Tubes and Foreign Body Baskets

Suction Tubes

10380 A – B

10383 A – B

10381 A – B

Working length 50 cm
10380 A  Suction Tube, diameter 4 mm
10383 A  Suction Tube, with cut-off hole, diameter 4 mm
10381 A  Suction Tube, with rubber tip, straight, diameter 4 mm

Working length 35 cm
10380 B  Suction Tube, diameter 3 mm
10383 B  Suction Tube, with cut-off hole, diameter 3 mm
10381 B  Suction Tube, with rubber tip, straight, outer diameter 2 mm

Foreign Body Baskets

10386 A/B

Working length 50 cm
10386 A  Foreign Body Basket, with ring handle

Working length 35 cm
10386 B  Same

Further Suction Tube Sizes see THORAX catalog
**Equipment Cart**, narrow, tall, rides on 4 antistatic dual wheels equipped with locking brakes, mains switch on cover, energy beam with integrated electrical subdistributors with 12 sockets, grounding plugs.

Dimensions:
- Equipment cart: 660 x 1474 x 730 mm (w x h x d),
- Shelf: 450 x 25 x 510 mm (w x h x d),
- Caster diameter: 150 mm

including:
- **Base Module**, equipment cart, narrow
- **Cover**, equipment cart, narrow
- **Beam Package**, equipment cart, large
- 3x **Shelves**, narrow
- **Drawer Unit with Lock**, narrow
- 2x **Equipment Rails**, long
- **Camera Holder**
- 2x **Mains Cord**, length 100 cm

**Equipment Cart**, narrow, small, rides on 4 antistatic dual wheels equipped with locking brakes, mains switch on cover, energy beam with integrated electrical subdistributors with 6 sockets, grounding plugs.

Dimensions:
- Equipment Cart: 660 x 1265 x 730 mm (w x h x d),
- Shelf: 450 x 25 x 510 mm (w x h x d),
- Caster diameter: 150 mm

including:
- **Base Module**, equipment cart, narrow
- **Cover**, equipment cart, narrow
- **Beam Package**, equipment cart, small
- 2x **Shelves**, narrow
- **Drawer Unit with Lock**, narrow
- 2x **Equipment Rails**, long
- 2x **Mains Cords**, length 100 cm
Please note: The instruments displayed are not included with the equipment cart.
Components/Spare Parts see chapter 6
## Accessories
for the COR Equipment Cart

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
</table>
| ① | 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 mount with VESA 100 adaptor including:  
**External 24VDC Power Supply**  
**Mains Cord** |
| ② | UG 601 | **Drawer Unit with Lock**, small, max. shelf load 60 kg, max. drawer load 5 kg, with cable slot, Dimensions: 450 x 126 x 510 mm (w x h x d), for use with Equipment Carts UG xxx |
| ③ | UG 603 | **Shelf**, narrow, load capacity max. 60 kg, Dimensions: 450 x 25 x 510 mm (w x h x d), for use with Equipment Carts UG xxx |
| ④ | UG 501 | **Monitor Holder Adaptor**, for central mounting of monitor holding arms on the rear attachment points of the COR equipment carts UG xxx for use with UG 500, UG 510 and UG 520 |
| ⑤ | UG 500 | **Monitor Holder**, height adjustable, swiveling and tilting, central mount, swivel range approx. 360°, loading capacity max. 18 kg, with monitor mount VESA 75/100, for use with Equipment Carts UG xxx |
| ⑥ | UG 630 | **Bracket**, for mounting standard bars (diameter 25 mm) to equipment rails, package of 2 |
|   | ET43-302703 | **Stainless Steel Round Pipe**, length 25 cm, diameter 25 mm, for use with Stand 8401 YA |
| ⑦ | 8401 YAA | **Crossbar**, for Stand 8401 YA, 50 cm x diameter 25 mm, for positioning C-MAC® Monitors 8401 ZX, 8402 ZX and 8403 ZX, for use with VESA 75 Quick Clip 8401 YCA and Clamp 8401 YB |
| ⑧ | 8401 YAB | **Same**, 70 cm x diameter 25 mm |
|   | 29005 IFH | **Holder for Flexible Endoscopes**, for mounting to standard tubes, incl. installation accessories |
### Accessories

**for the COR Equipment Cart**

<table>
<thead>
<tr>
<th>Accessory Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>11301 BC</td>
<td><strong>ProShield Protective Tube</strong>, for flexible telescopes, unsterile, for single use, package of 10, distal closed, for use with Holder for Flexible Endoscopes 29005 IFH</td>
</tr>
<tr>
<td>UG 623</td>
<td><strong>Multifunctional Holder</strong>, 2-part, for mounting poles, diameter 25 mm, package of 2, for use with Equipment Carts UG xxx</td>
</tr>
<tr>
<td>8401 YB</td>
<td><strong>Clamp</strong>, VESA 75 standard, for fixation of C-MAC® monitor to round profile with diameter 20 – 43 mm and square profile with diameter 16 – 27 mm, for use with Monitors 8401 ZX, 8402 ZX and 8403 ZX</td>
</tr>
<tr>
<td>20 9190 10</td>
<td><strong>DVI to HDMI Cable</strong>, length 100 cm</td>
</tr>
<tr>
<td>UG 610</td>
<td><strong>Sliding Tray Holder</strong>, narrow, load capacity max. 10 kg, Dimensions: 450 x 510 mm (w x d), for use with Equipment Carts UG xxx</td>
</tr>
<tr>
<td>UG 628</td>
<td><strong>COR Service Cover</strong>, straight, small, with locking screw and storage tray, for use with COR equipment carts</td>
</tr>
<tr>
<td>UG 612</td>
<td><strong>Camera Holder</strong>, for mounting camera heads, with detachable inlays, compatible with all endoscopy cameras from KARL STORZ, for use with Equipment Carts UG xxx</td>
</tr>
<tr>
<td>UG 609</td>
<td><strong>Bottle Holder</strong>, for CO₂ bottles, max. diameter 210 mm, Dimensions: 230 x 280 x 210 mm (w x h x d), for use with Equipment Carts UG xxx</td>
</tr>
</tbody>
</table>
## Accessories
for the COR Equipment Cart

| 10330 BE | **Fixation Device**, for Holder 10330 BC/BD to Standard Equipment Rail 29003 GS, 25 x 10 mm |
| 10330 BC | **Holder**, for Retromolar Intubation Endoscopes 10331 B2K and 10332 BK1, made of plexiglass, distal open |
| 8403 XSH | **Holder for C-MAC® S IMAGER**, plexiglass tube, distal end open, for fixation to a standard rail, for use with C-MAC® S IMAGER 8402 XS, 8402 XSB, 8403 XS, 8403 XSI and C-MAC® S Pediatric IMAGER 8403 XSP |
| 10331 BXH | **Holder for C-MAC® VS**, made of plexiglass, distal end open, for fixation to a standard rail |
TROLL-E Mobile Stand
The large solution

TROLL-E Airway Mobile Stand, rides on 4 antistatic dual wheels, 2 equipped with locking brakes, for mounting monitors with VESA 75/100 connection, integrated cable conduit in vertical beam, load capacity for monitor: max. 15 kg,
Dimensions:
Mobile stand: 670 x 1660 x 670 mm (w x h x d),
Caster diameter: 100 mm
Trolley is delivered unassembled.
including:
Subrack, for mobile stand
Beam Module, with tube
Drawer
Equipment Rail
Cross Tube Adaptor
Stainless Steel Round Pipe, length 25 cm

Please note: Monitor 9619 NB recommended
The instruments displayed are not included with the equipment cart.
Components/Spare Parts see chapter 6
TROLL-E Mobile Stand

The small solution

20 0200 86  TROLL-E C-MAC® Mobile Stand, rides on 4 antistatic dual wheels, 2 equipped with locking brakes, with stainless steel tube,
Dimensions:
Mobile stand: 670 x 1500 x 670 mm (w x h x d),
Caster diameter: 100 mm
Trolley is delivered unassembled.
including:
Subrack, for mobile stand
Top Cover, with guide sleeve
Stainless Steel Tube, length 135 cm
Equipment Rail
Cross Tube Adaptor
Stainless Steel Round Pipe, length 25 cm

Please note: The instruments displayed are not included with the equipment cart.
Components/Spare Parts see chapter 6
### Accessories for the TROLL-E Mobile Stand

<table>
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<th>Item</th>
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<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>20 0200 47</td>
<td><strong>Shelf,</strong> incl. installation accessories, max. capacity 12 kg, dimensions: 490 x 395 mm (w x d), for use with subracks for Mobile Stands 20 0200 60 and 20 0200 61</td>
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<tr>
<td>2</td>
<td>20 0200 68</td>
<td><strong>Subdrawer,</strong> incl. installation accessories, lockable, max. load capacity within drawer 5 kg, only for mounting below Drawer 20 0200 67 (not for separate use), dimensions: 485 x 130 x 350 mm (w x h x d)</td>
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<tr>
<td>3</td>
<td>20 0200 67</td>
<td><strong>Drawer,</strong> incl. installation accessories, lockable, max. load capacity on drawer 12 kg and within drawer 5 kg, dimensions: 485 x 145 x 350 mm (w x h x d), for use with Subracks 20 0200 60 and 20 0200 61</td>
</tr>
<tr>
<td>4</td>
<td>20 0200 49</td>
<td><strong>Equipment Rail,</strong> for mounting to vertical beam, incl. installation accessories, dimensions: 450 x 25 x 10 mm (w x h x d), for use with Subrack for Mobile Stands 20 0200 60 and 20 0200 61</td>
</tr>
<tr>
<td>5</td>
<td>11301 BC</td>
<td><strong>ProShield Protective Tube,</strong> for flexible telescopes, unsterile, for single use, package of 10, distal closed, for use with Holder for Flexible Endoscopes 29005 IFH</td>
</tr>
<tr>
<td>6</td>
<td>29005 IFH</td>
<td><strong>Holder for Flexible Endoscopes,</strong> for mounting to standard tubes, incl. installation accessories</td>
</tr>
<tr>
<td>7</td>
<td>10330 BE</td>
<td><strong>Fixation Device,</strong> for Holder 10330 BC/BD to Standard Equipment Rail 29003 GS, 25 x 10 mm</td>
</tr>
<tr>
<td>8</td>
<td>10330 BC</td>
<td><strong>Holder,</strong> for Retromolar Intubation Endoscopes 10331 B2K and 10332 BK1, made of plexiglass, distal open</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
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<tr>
<td>8403 XSH</td>
<td><strong>Holder for C-MAC® S IMAGER</strong>, plexiglass tube, distal end open, for fixation to a standard rail, for use with C-MAC® S IMAGER 8402 XS, 8402 XSB, 8403 XS, 8403 XSI and C-MAC® S Pediatric IMAGER 8403 XSP</td>
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</tr>
<tr>
<td>10331 BXH</td>
<td><strong>Holder for C-MAC® VS</strong>, made of plexiglass, distal end open, for fixation to a standard rail</td>
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</tr>
<tr>
<td>29005 AK</td>
<td><strong>Wire Tray</strong>, for accessories, for mounting to equipment rails, dimensions (w x h x d): 300 x 200 x 100 mm, for use with equipment carts</td>
<td></td>
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<tr>
<td>ET43-303125</td>
<td><strong>Basket Holder</strong>, with standard rail, length 27 cm, rail support and star grip</td>
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<tr>
<td>ET43-304392</td>
<td><strong>Basket Holder</strong>, with standard rail with lateral slip protection (length 450 mm) and one-piece fixation clamps for use and assembly on Stand Rod ET43-303126</td>
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</tr>
<tr>
<td>8401 YH</td>
<td><strong>Holder Set</strong>, consisting of two parts: 1 holder for five C-MAC® video laryngoscope blades and 1 holder for one electronic module, made of thermoplastic material, wipe disinfection, to be fixed to a tray</td>
<td></td>
</tr>
<tr>
<td>UG 500</td>
<td><strong>Monitor Holder</strong>, height adjustable, swiveling and tilting, central mount, swivel range approx. 360°, loading capacity max. 18 kg, with monitor mount VESA 75/100, for use with Equipment Carts UG xxx</td>
<td></td>
</tr>
<tr>
<td>8401 YB</td>
<td><strong>Clamp</strong>, VESA 75 standard, for fixation of C-MAC® monitor to round profile with diameter 20 – 43 mm and square profile with diameter 16 – 27 mm, for use with Monitors 8401 ZX, 8402 ZX and 8403 ZX</td>
<td></td>
</tr>
<tr>
<td>UG 612</td>
<td><strong>Camera Holder</strong>, for mounting camera heads, with detachable inlays, compatible with all endoscopy cameras from KARL STORZ, for use with Equipment Carts UG xxx</td>
<td></td>
</tr>
</tbody>
</table>
Special Features:
- Longer equipment rails (45 cm instead of 30 cm) makes it possible to mount a storage basket and a Bonfils holder.
- The new stainless steel star-shaped base increases stability, especially under full load conditions.
- Two dual wheels equipped with locking brakes.

8401 YA

**Stand**, for C-MAC® monitor, height 120 cm, rollable with five feet and antistatic castors, crossbar 25 cm x diameter 25 mm, for positioning the monitor, with tray for laryngoscopes, dimensions (w x d x h): 30 x 20 x 10 cm.

Configuration example
<table>
<thead>
<tr>
<th>No.</th>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11301 BC</td>
<td><strong>ProShield Protective Tube</strong>, for flexible telescopes, unsterile, for single use, package of 10, distal closed, for use with Holder for Flexible Endoscopes 29005 IFH</td>
</tr>
<tr>
<td>2</td>
<td>29005 IFH</td>
<td><strong>Holder for Flexible Endoscopes</strong>, for mounting to standard tubes, incl. installation accessories</td>
</tr>
<tr>
<td>3</td>
<td>8401 YH</td>
<td><strong>Holder Set</strong>, for C-MAC®, consisting of two parts: 1 holder for five C-MAC® video laryngoscope blades and 1 holder for one electronic module, made of thermoplastic material, wipe disinfection, to be fixed to a tray</td>
</tr>
<tr>
<td>4</td>
<td>29005 AK</td>
<td><strong>Wire Tray</strong>, for accessories, for mounting to equipment rails, dimensions (w x h x d): 300 x 200 x 100 mm, for use with equipment carts</td>
</tr>
<tr>
<td>5</td>
<td>8401 YB</td>
<td><strong>Clamp</strong>, VESA 75 standard, for fixation of C-MAC® monitor to round profile with diameter 20 – 43 mm and square profile with diameter 16 – 27 mm, for use with Monitors 8401 ZX, 8402 ZX and 8403 ZX</td>
</tr>
<tr>
<td>6</td>
<td>10330 BE</td>
<td><strong>Fixation Device</strong>, for Holder 10330 BC/BD to Standard Equipment Rail 29003 GS, 25 x 10 mm</td>
</tr>
<tr>
<td>7</td>
<td>10330 BC</td>
<td><strong>Holder</strong>, for Retromolar Intubation Endoscopes 10331 B2K and 10332 BK1, made of plexiglass, distal open</td>
</tr>
<tr>
<td>8</td>
<td>ET43-303127</td>
<td><strong>Cross Tube Adaptor</strong>, for connecting 2 round pipes with diameter 25 mm</td>
</tr>
</tbody>
</table>
### Accessories for the Stand

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>29005 KHN</td>
<td><strong>Camera Holder</strong>, for mounting camera heads, with removable inserts, suitable for all KARL STORZ endoscopy camera heads</td>
</tr>
<tr>
<td>ET43-302703</td>
<td><strong>Stainless Steel Round Pipe</strong>, length 25 cm, diameter 25 mm, for use with Stand 8401 YA</td>
</tr>
<tr>
<td>8401 YAA</td>
<td><strong>Crossbar</strong>, for Stand 8401 YA, 50 cm x diameter 25 mm, for positioning C-MAC® Monitors 8401 ZX, 8402 ZX and 8403 ZX, for use with VESA 75 Quick Clip 8401 YCA and Clamp 8401 YB</td>
</tr>
<tr>
<td>8401 YAB</td>
<td><strong>Same</strong>, 70 cm x diameter 25 mm</td>
</tr>
<tr>
<td>8403 XSH</td>
<td><strong>Holder for C-MAC® S IMAGER</strong>, plexiglass tube, distal end open, for fixation to a standard rail, for use with C-MAC® S IMAGER 8402 XS, 8402 XSB, 8403 XS, 8403 XSI and C-MAC® S Pediatric IMAGER 8403 XSP</td>
</tr>
<tr>
<td>10331 BXH</td>
<td><strong>Holder for C-MAC® VS</strong>, made of plexiglass, distal end open, for fixation to a standard rail</td>
</tr>
</tbody>
</table>
The chapter “Components / Spare Parts” contains detailed information on KARL STORZ instruments.

For easy location and reference, an index is available which lists the order number of the spare parts as well as those of the entire instrument, set or unit.

**Hotline**

Queries concerning products, exchange, maintenance and cleaning can be addressed to Technical Support: +49 (0)7461/708-980, from Monday to Thursday from 7 – 8 h and Friday from 7 – 17 h.

**Example:**

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<tr>
<td>11605 CK Intubation Endoscope Set</td>
<td>94</td>
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**Components / Spare Parts Catalog Page**

- **495 F** Receptacle, diameter 9 mm, for Wolf fiber optic light cable
- **495 G** Screw Base, for KARL STORZ fiber optic light cables and Olympus Corporation
- **10331 BA** Tube Holder for ETT, for tube fixation, with O₂ application connection, inner diameter 5 mm
- **10332 BA** Tube Holder for ETT, for tube fixation, with O₂ application connection, inner diameter 3.5 mm
### INSTRUMENTS

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<td><strong>11302 BD2</strong> Intubation Fiberscope, 3.7 mm x 65 cm</td>
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<tr>
<td><strong>10331 B2K</strong> Retromolar Intubation Endoscope, 5 x 40, autoclavable</td>
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<td><strong>11301 D3</strong> Battery Light Source LED for Endoscopes</td>
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<td><strong>11008 C</strong> Mask Adaption “MAINZ Adaptor”, blue, package of 5</td>
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<td><strong>9049 A</strong> Laryngeal Tube, size 4</td>
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<td><strong>9049 B</strong> Laryngeal Tube, size 3</td>
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<td><strong>9045 I</strong> Spiral Tube, size 6, for single use</td>
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<td><strong>9045 A</strong> Laryngeal Mask, standard, reusable, size 1</td>
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<td><strong>9045 N</strong> Laryngeal Mask Tube, diameter 7 mm</td>
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<td><strong>9045 O</strong> Laryngeal Mask Tube, diameter 7.5 mm</td>
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<td><strong>9045 T</strong> LMA Tube Stabilizer</td>
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<td><strong>809025</strong> MAGILL Forceps, length 25 cm</td>
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<td><strong>9045 P</strong> Scalpel, for single use, package of 10</td>
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<tr>
<td><strong>403655</strong> COTLTE Nasal Speculum, blade length 55 mm, length 13 cm</td>
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<td><strong>8535 B</strong> Emergency Laryngoscope Blade, cold light, universal size</td>
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<td><strong>8546</strong> Handle Sleeve, ISO 7376</td>
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<tr>
<td><strong>8549 LDX</strong> Battery Insert Set LED, with cap</td>
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<td><strong>27677 BK</strong> Case</td>
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<td><strong>27561 AL</strong> Cleaning Brush</td>
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<td><strong>11025 E</strong> Pressure Compensation Cap</td>
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<td><strong>13242 XL</strong> Leakage Tester</td>
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<tr>
<td><strong>11301 CD</strong> Irrigation Adaptor, for machine cleaning, reusable</td>
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<tr>
<td><strong>091010-20</strong> Suction Valve, sterile, for single use, package of 20</td>
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<tr>
<td><strong>11301 CF</strong> LIPP Tube Holder</td>
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<td><strong>10331 BA</strong> Tube Holder for ETT</td>
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<td><strong>10309</strong> Bronchoscope Insertion Tube, size 4</td>
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<td><strong>10310</strong> Bronchoscope Insertion Tube, size 2</td>
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<tr>
<td><strong>29100</strong> Plug, black, package of 10</td>
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<td>8400 C1</td>
<td>Intubation Set Prehospital, ULM model</td>
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<tr>
<td>8403 AX</td>
<td>C-MAC® Video Laryngoscope MAC #3</td>
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<tr>
<td>8403 BX</td>
<td>C-MAC® Video Laryngoscope MAC #4</td>
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<td>8403 GXC</td>
<td>C-MAC® Video Laryngoscope MIL #1</td>
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<td>8403 XDA</td>
<td>Battery, for C-MAC® PM, rechargeable</td>
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<tr>
<td>8403 XDK</td>
<td>C-MAC® PM Set</td>
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<tr>
<td>8403 XDL</td>
<td>Charging Unit, for C-MAC® PM</td>
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<tr>
<td>8403 YE</td>
<td>Bag, for intubation set -C22-, ULM model</td>
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<tr>
<td>809125</td>
<td>MAGILL Forceps, for adults, modified</td>
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<tr>
<td>809120</td>
<td>MAGILL Forceps, for children, modified</td>
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<td>8403 XDP</td>
<td>C-MAC® PM Connecting Cable</td>
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### Spare Part

- **8938291 Cap**

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<td><strong>8548 LD1</strong> Battery Insert, high-power LED</td>
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<td><strong>8938292 Cap</strong></td>
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<td><strong>8547 LDX</strong> Battery Insert Set LED</td>
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<td><strong>8547 LD</strong> Battery Insert, high-power LED</td>
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<td><strong>8938392 Cap</strong></td>
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### Spare Part

- **8938292 Cap**
# Handle Sleeves, Inductive Charging Unit

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<td>8548 Handle Sleeve</td>
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## Spare Part

- **Switch Socket**
  - 7854791

## Components / Spare Parts

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## Spare Parts

- **Reduction Sleeve**
  - 8546 R1
- **Primary Plug Australia**
  - ET27-30-0003205
- **Primary Plug EU**
  - ET27-30-0003148
- **Plug Adaptor USA/Japan**
  - ET38-1717715
- **Primary Plug UK**
  - ET27-30-0003206
# C-MAC® Monitor

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<td>C-MAC® Monitor for CMOS Endoscope Set</td>
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<td>8403 ZX</td>
<td>C-MAC® Monitor</td>
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<tr>
<td>8401 YSD</td>
<td>SD Card ULTRA, 8 GB</td>
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<tr>
<td>8401 YZ</td>
<td>Protection Cap</td>
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<td>8401 YCA</td>
<td>VESA 75 Quick Clip</td>
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<td>ET27-30-0004696</td>
<td>Mains Adaptor Set</td>
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## Spare Parts

- **ET27-30-0004695**
  - Power Supply, for use with C-MAC® Monitor 8403 ZX

- **ET27-30-0004698**
  - Plug Adaptor UK, for Power Supply
  - ET27-30-0004695

- **ET27-30-0004370**
  - Adaptor Cable USA/JP

- **20919010**
  - DVI to HDMI Cable, length 100 cm

- **8401 YSD**
  - Ultra II SD Card, 8 GB

- **ET27-30-0004699**
  - Plug Adaptor USA/JP, for Power Supply
  - ET27-30-0004695

- **ET27-30-0004700**
  - Plug Adaptor AUS, for Power Supply
  - ET27-30-0004695

- **ET27-30-0004701**
  - IEC (ROW) Plug, for Power Supply
  - ET27-30-0004695

- **20040282**
  - USB Flash Drive, 32 GB
C-MAC® PM – The POCKET MONITOR, Charging Unit

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<td>8403 XDA Battery, rechargeable</td>
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<td>8403 XDD USB Data Cable</td>
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<td>ET27-30-0005770 Power Supply Set, power supply 100 – 240 V, 50/60 Hz, including country-specific adaptors</td>
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Flexible Intubation Fiberscopes

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<td>11301 BNK1 Intubation Fiberscope 5.2 x 65</td>
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<tr>
<td>11302 BDK2 Intubation Fiberscope 3.7 x 65</td>
<td>86, 88</td>
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<tr>
<td>11301 AAK1 Intubation Fiberscope 2.8 x 65</td>
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</tbody>
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Spare Parts

- **495 F**
  - **Receptacle**, diameter 9 mm, for Wolf fiber optic light cable

- **495 G**
  - **Screw Base**, for KARL STORZ fiber optic light cables and Olympus Corporation

- **11301 CF**
  - **Suction Valve Holder**, for intubation fiberscopes

- **091010-20**
  - **Suction Valve**, sterile, for single use, package of 20

- **29100**
  - **Plug**, for LUER-Lock irrigation connector for cleaning, black, autoclavable, package of 10

- **11301 CB**
  - **Suction Valve**, reusable
Flexible Intubation Video Endoscopes

Components / Spare Parts

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<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>11304 BCXK</td>
<td>Flexible Intubation Video Endoscope Set 6.5 x 65</td>
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<td>11303 BNXK</td>
<td>Flexible Intubation Video Endoscope Set 5.5 x 65</td>
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<td>11302 BDXK</td>
<td>Flexible Intubation Video Endoscope Set 4 x 65</td>
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<td>Flexible Intubation Video Endoscope Set 3 x 52 (without working channel)</td>
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Spare Parts

- **11301 CB1**
  - Suction Valve, reusable
- **11301 CFX**
  - Tube Holder
- **091011-20**
  - Suction Valve, for single use, package of 20
- **11301 CD1**
  - Irrigation Adaptor, reusable
- **8403 YZ**
  - Protection Cap
- **10309**
  - Bronchoscope Insertion Tube, size 4, sterile, for single use, package of 10
- **10310**
  - Bronchoscope Insertion Tube, size 2, sterile, for single use, package of 10

* Spare Parts are only compatible with flexible intubation video endoscopes with working channels.
Retromolar Intubation Endoscopes

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<td>11605 CK Intubation Endoscope Set</td>
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Spare Parts

495 F
Receptacle, diameter 9 mm, for Wolf fiber optic light cable

10331 BA
Tube Holder for ETT, for tube fixation, with O₂ application connection, inner diameter 5 mm

495 G
Screw Base, for KARL STORZ fiber optic light cables and Olympus Corporation

10332 BA
Tube Holder for ETT, for tube fixation, with O₂ application connection, inner diameter 3.5 mm

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<td>20288100-S6 Galaxy S6 Holder</td>
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<td>20288100-S7 Galaxy S7 Holder</td>
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<td>20288100-i6 iPhone 6/6s Holder</td>
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<td>20288100-i7 iPhone 7/8 Holder</td>
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<td>HOPKINS® Straight Forward Telescope 0°</td>
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<td>10324 AA</td>
<td>HOPKINS® Straight Forward Telescope 0°</td>
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<td>HOPKINS® Straight Forward Telescope 0°</td>
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#### Spare Parts

- **495 F**
  - Receptacle, diameter 9 mm, for Wolf fiber optic light cable

- **495 G**
  - Screw Base, for KARL STORZ fiber optic light cables and Olympus Corporation

### Components / Spare Parts

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<td>Optical Forceps</td>
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<td>10352 H</td>
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<td>10352 KF</td>
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<td>10378 CF</td>
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#### Spare Parts

- **8295391**
  - Cleaning Adaptor

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#### Spare Part

- **8295391**
  - Cleaning Adaptor
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<tr>
<td>20290320</td>
<td>C-HUB® II</td>
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</tr>
<tr>
<td>20290120-PS</td>
<td>Power Supply, incl. primary plugs</td>
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<tr>
<td>547 S</td>
<td>S-Video (Y/C) Connecting Cable</td>
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<tr>
<td>20200073</td>
<td>USB Connecting Cable</td>
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<tr>
<td>2004445-V02</td>
<td>KARL STORZ Video Editor</td>
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</tbody>
</table>

#### Spare Parts

- **ET27-30-0004357**
  - **Adaptor Australia**, for Power Supply 20290120-PS

- **ET27-30-0004077**
  - **Adaptor UK**, for Power Supply 20290120-PS and C-HUB® charging units

- **ET27-30-0004078**
  - **Adaptor USA/JP**, for Power Supply 20290120-PS
## Equipment Carts

<table>
<thead>
<tr>
<th>Components / Spare Parts</th>
<th>Catalog Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>UG 120 Equipment Cart</td>
<td></td>
</tr>
<tr>
<td>UG 010 Base Module, equipment cart, narrow</td>
<td></td>
</tr>
<tr>
<td>UG 020 Cover, equipment cart, narrow</td>
<td></td>
</tr>
<tr>
<td>UG 051 Beam Package, equipment cart, high</td>
<td></td>
</tr>
<tr>
<td>UG 603 Shelf, narrow</td>
<td></td>
</tr>
<tr>
<td>UG 601 Drawer Unit with Lock, narrow</td>
<td></td>
</tr>
<tr>
<td>UG 608 Equipment Rail, long</td>
<td></td>
</tr>
<tr>
<td>UG 612 Camera Holder</td>
<td></td>
</tr>
<tr>
<td>UG 700 Mains Cord, length 100 cm</td>
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</tbody>
</table>

![Equipment Cart UG 120](image1)

<table>
<thead>
<tr>
<th>Components / Spare Parts</th>
<th>Catalog Page</th>
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</thead>
<tbody>
<tr>
<td>UG 110 Equipment Cart</td>
<td></td>
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<tr>
<td>UG 010 Base Module, equipment cart, narrow</td>
<td></td>
</tr>
<tr>
<td>UG 020 Cover, equipment cart, narrow</td>
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</tr>
<tr>
<td>UG 041 Beam Package, equipment cart, small</td>
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<tr>
<td>UG 603 Shelf, narrow</td>
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</tr>
<tr>
<td>UG 601 Drawer Unit with Lock, narrow</td>
<td></td>
</tr>
<tr>
<td>UG 608 Equipment Rail, long</td>
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</tr>
<tr>
<td>UG 700 Mains Cord, length 100 cm</td>
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</table>

![Equipment Cart UG 110](image2)
## Equipment Carts

<table>
<thead>
<tr>
<th>Components / Spare Parts</th>
<th>Catalog Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>20020085</strong>  TROLL-E Airway Mobile Stand</td>
<td>123</td>
</tr>
<tr>
<td><strong>20020060</strong>  Subrack, for mobile stand</td>
<td></td>
</tr>
<tr>
<td><strong>20020063</strong>  Beam Module, with tube</td>
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<tr>
<td><strong>20020067</strong>  Drawer</td>
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</tr>
<tr>
<td><strong>20020049</strong>  Equipment Rail</td>
<td></td>
</tr>
<tr>
<td><strong>ET43-303127</strong>  Cross Tube Adaptor</td>
<td></td>
</tr>
<tr>
<td><strong>ET43-302703</strong>  Stainless Steel Round Pipe, length 25 cm</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Components / Spare Parts</th>
<th>Catalog Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>20020086</strong>  TROLL-E C-MAC® Mobile Stand</td>
<td>124</td>
</tr>
<tr>
<td><strong>20020060</strong>  Subrack, for mobile stand</td>
<td></td>
</tr>
<tr>
<td><strong>20020064</strong>  Top Cover, with guide sleeve</td>
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<tr>
<td><strong>20020065</strong>  Stainless Steel Tube, length 135 cm</td>
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<tr>
<td><strong>20020049</strong>  Equipment Rail</td>
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<tr>
<td><strong>ET43-303127</strong>  Cross Tube Adaptor</td>
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<tr>
<td><strong>ET43-302703</strong>  Stainless Steel Round Pipe, length 25 cm</td>
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</table>
## Equipment Carts

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<thead>
<tr>
<th>Components / Spare Parts</th>
<th>Catalog Page</th>
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<tbody>
<tr>
<td>8401 YA Stand</td>
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<tr>
<td>ProShield Protective Tube</td>
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<tr>
<td>Holder Set, for C-MAC®</td>
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<tr>
<td>Clamp</td>
<td>128</td>
</tr>
<tr>
<td>Crossbar, for C-MAC®</td>
<td>129</td>
</tr>
<tr>
<td>Crossbar, 50 cm x diameter 25 mm</td>
<td>129</td>
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</table>