RUDOLF

BECAUSE WE CARE

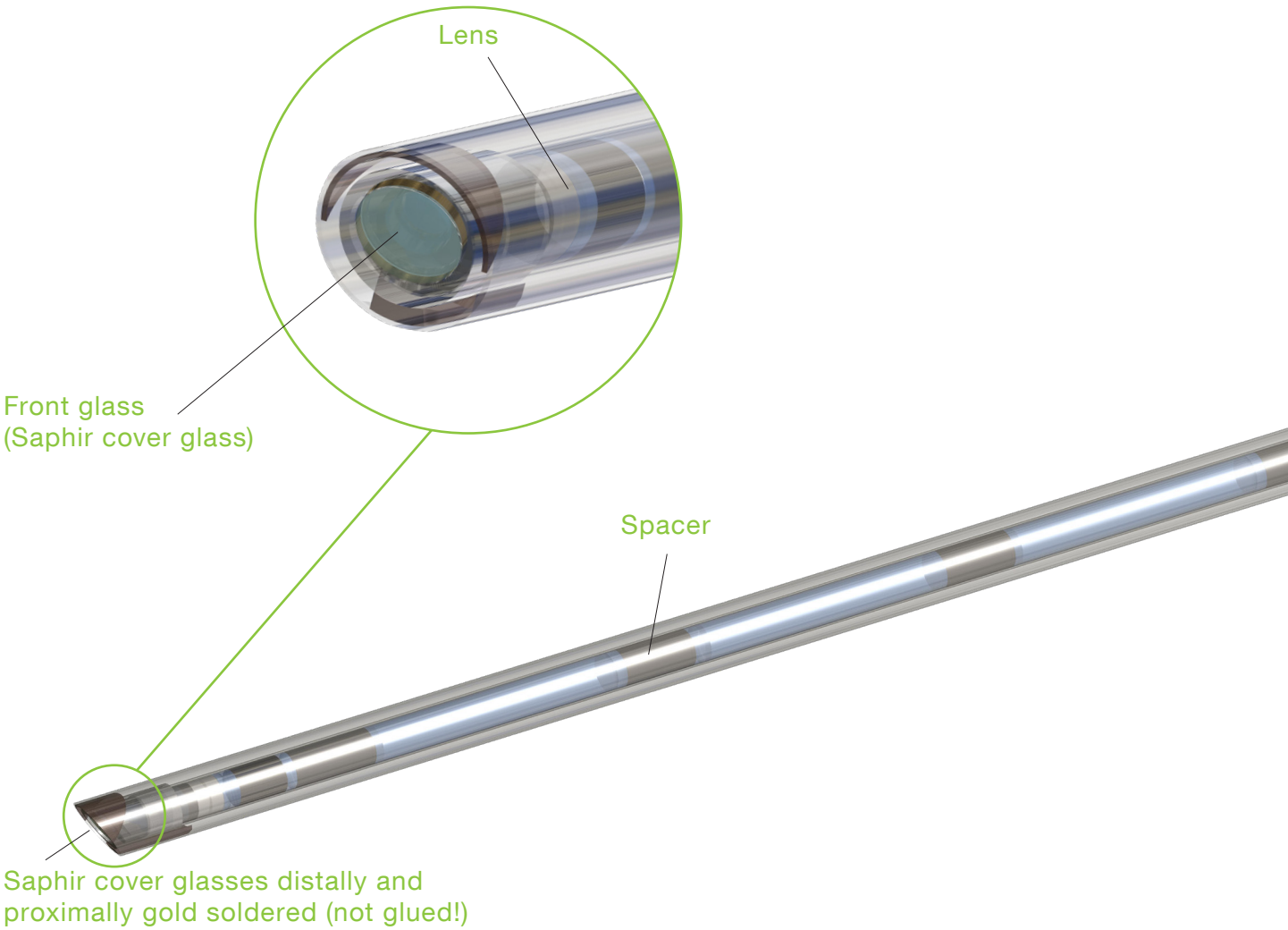
Endoscopes

The visible difference in endoscopy

ZK 582 EN

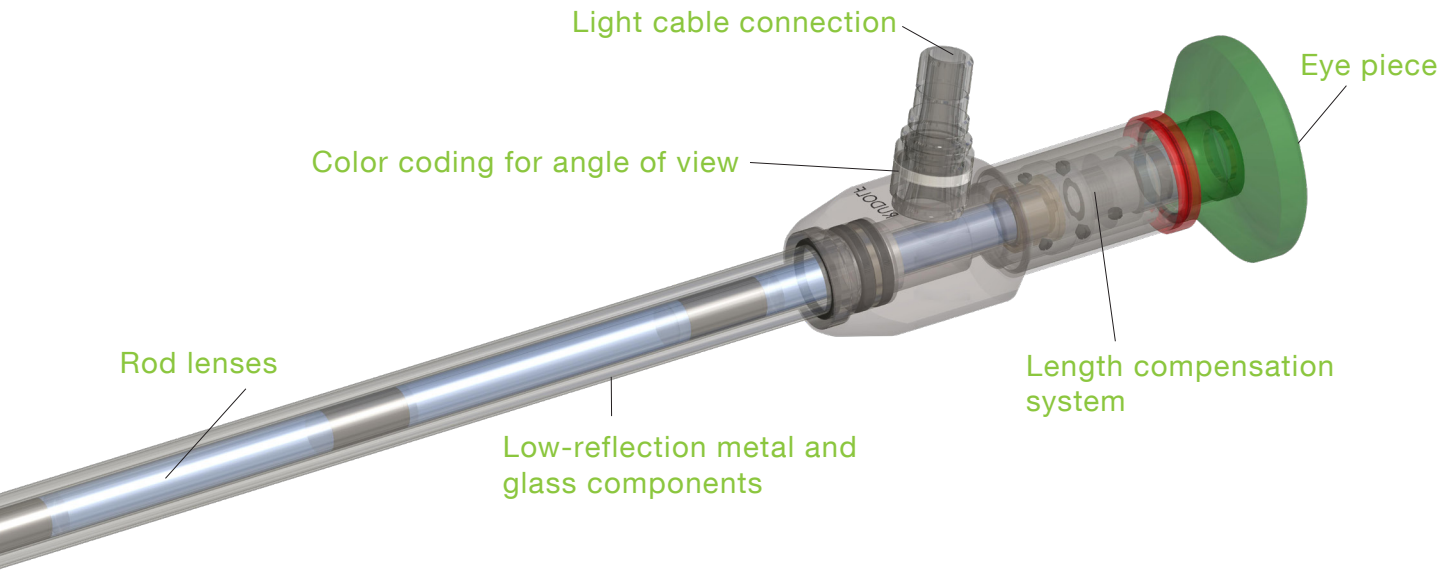
The continuous development of camera technology with ever higher image resolution requires endoscopes of the highest quality and precision. RUDOLF endoscopes are high-tech devices consisting of optical and mechanical precision parts. All components are perfectly adjusted to achieve a perfect image. Whether HD or 4K endoscopes from RUDOLF all endoscopes convince with high detail and colour rendering in all image areas.

RUDOLF endoscopes are „Made in Germany“ from the ground up. In addition to using the highest quality components from leading manufacturers, our endoscopes are manufactured using state-of-the-art technology. Assembly is carried out under clean room-like conditions using the latest laser welding technology. Nevertheless, our endoscopes are also a piece of individual handwork, carried out by highly qualified specialists.



Rigid endoscopes consist of a tube shaft containing several optical components. These so-called rod lenses are made of special high-quality sapphire glass and consist of several glued elements. The built-in lens also consists of various prisms and defines the direction and the angle of view of the endoscope. A specially calculated arrangement of the entire lens system ensures the best image quality. The illumination of the operating field is provided by the finest glass fibres, which are also built into the tube shaft of the endoscope. A glass cone, integrated in the so-called light guide connection, bundles the light, which is generated by the cold light source and which is transported via a light cable. Thust this glass cone ensures optimal viewing conditions in situ.

To protect the inside of the optical system from dirt and moisture, RUDOLF endoscopes are sealed under vacuum conditions and closed with gold solder using a special laser welding technique. In daily use, this manufacturing process allows machine reprocessing and sterilisation in an autoclave at temperatures up to 134°C.



Laparoscopes

Adapters included for connection standards

Storz / Aesculap
Olympus Adapter (RZ100-000)

Wolf Adapter (RZ100-010)

ACMI / Olympus Anschluss
Connector

5

Ordering no.	Diameter	View direction	Working length	Identification colour
LP150-000	5 mm	0°	300 mm	green
LP150-030	5 mm	30°	300 mm	red

10

Ordering no.	Diameter	View direction	Working length	Identification colour
LP100-000	10 mm	0°	340 mm	green
LP100-030	10 mm	30°	340 mm	red
LP100-045	10 mm	45°	340 mm	black

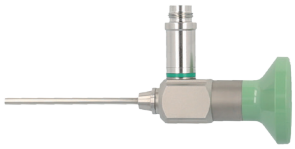
10

Ordering no.	Diameter	View direction	Working length	Identification colour
LP105-000	10 mm	0°	425 mm	green
LP105-030	10 mm	30°	425 mm	red
LP100-045	10 mm	45°	425 mm	black

More instruments can be found in ZK 360-2 Laparoscopy

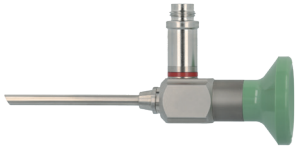
ENT endoscopes

2,7



Ordering no.	Diameter	View direction	Working length	Identification colour
EN127-000	2.7 mm	0° Otoscope	50 mm	green
EN127-030	2.7 mm	30° Otoscope	50 mm	red

4



Ordering no.	Diameter	View direction	Working length	Identification colour
EN140-100	4 mm	0° Otoscope	50 mm	green
EN140-130	4 mm	30° Otoscope	50 mm	red

2,7

Ordering no.	Diameter	View direction	Working length	Identification colour
EN127-100	2.7 mm	0° Sinuscope	175 mm	green
EN127-130	2.7 mm	30° Sinuscope	175 mm	red
EN127-170	2.7 mm	70° Sinuscope	175 mm	yellow

4

Ordering no.	Diameter	View direction	Working length	Identification colour
EN140-000	4 mm	0° Sinuscope	175 mm	green
EN140-030	4 mm	30° Sinuscope	175 mm	red
EN140-045	4 mm	45° Sinuscope	175 mm	black
EN140-070	4 mm	70° Sinuscope	175 mm	yellow

More instruments can be found in ZK 308 ENT

Cystoscopes

Adapters included for connection standards

Storz / Aesculap
Olympus Adapter (RZ100-000)

Wolf Adapter (RZ100-010)

ACMI / Olympus Anschluss
Connector

2.7

Ordering no.	Diameter	View direction	Working length	Identification colour
EU127-000	2.7 mm	0°	302 mm	green
EU127-030	2.7 mm	30°	302 mm	red

2.9

Ordering no.	Diameter	View direction	Working length	Identification colour
EU129-000	2.9 mm	0°	302 mm	green
EU129-030	2.9 mm	30°	302 mm	red

4

Ordering no.	Diameter	View direction	Working length	Identification colour
EU140-000	4 mm	0°	302 mm	green
EU140-012	4 mm	12°	302 mm	black
EU140-030	4 mm	30°	302 mm	red
EU140-070	4 mm	70°	302 mm	yellow

More instruments can be found in ZK 390-2 Urology

Hysteroscopes

2

Light transmission by optical fibres

Ordering no.	Diameter	View direction	Working length	Identification colour
GY120-000	2 mm	0°	260 mm	green
GY120-030	2 mm	30°	260 mm	red

2.7

Ordering no.	Diameter	View direction	Working length	Identification colour
GY127-000	2.7 mm	0°	302 mm	green
GY127-030	2.7 mm	30°	302 mm	red
GY127-070	2.7 mm	70°	302 mm	yellow

2.9

Ordering no.	Diameter	View direction	Working length	Identification colour
GY129-000	2.9 mm	0°	302 mm	green
GY129-030	2.9 mm	30°	302 mm	red

4

Ordering no.	Diameter	View direction	Working length	Identification colour
GY140-000	4 mm	0°	302 mm	green
GY140-012	4 mm	12°	302 mm	black
GY140-030	4 mm	30°	302 mm	red
GY140-070	4 mm	70°	302 mm	yellow

More instruments can be found in ZK 340-2 Gynecology

Arthroscopes

Adapters included for connection standards

Storz / Aesculap
Olympus Adapter (RZ100-000)

Wolf Adapter (RZ100-010)

ACMI / Olympus Anschluss
Connector

MAX. 134 °C / 273 °F 2,3 BAR
AUTOKLAVIERBAR
AUTOCLAVABLE

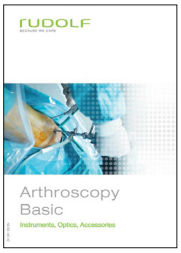
2,7

Ordering no.	Diameter	View direction	Working length	Identification colour
AT127-030	2.7 mm	30°	110 mm	red

4

Ordering no.	Diameter	View direction	Working length	Identification colour
AT140-000	4 mm	0°	175 mm	green
AT140-030	4 mm	30°	175 mm	red
AT140-070	4 mm	70°	175 mm	yellow

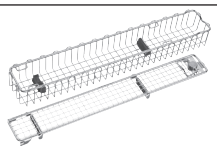
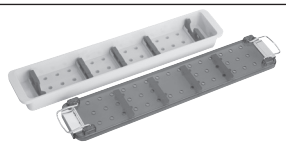
More instruments can be found in ZK 591 Arthroscopy



Accessories

With the increasing miniaturisation of endoscopes, the components have also become more and more filigree. Careful handling of the optics is therefore even more crucial for a long service life. Strong mechanical stresses such as impacts/hits or strong bending, as well as improper reprocessing, demage the highly precise and complex endoscopes. Optical repairs are time-consuming and cause costs that are often avoidable. In addition to careful handling, the care and storage of your endoscopes are of great importance. Therefore RUDOLF also offers you the right accessories to protect your investments from unwanted damage.

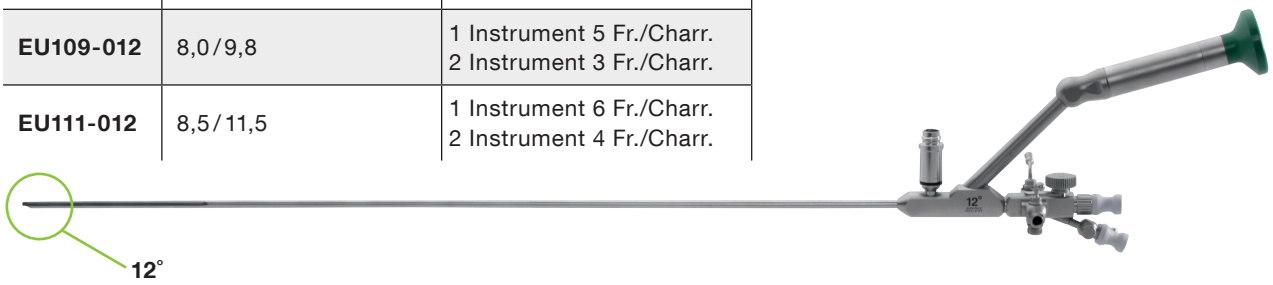
Accessories for rigid endoscopes

Ordering no.	Designation	For optics Ø mm	Dimensions (L x W x H)	
RZ010-000	**PLASTIC SLEEVE for optics**	1 – 5 mm	190 mm	
RU 8908-11	**STAINLESS STEEL BASKET for optics**	1 – 10 mm	460 x 80 x 52 mm	
RU 8908-02	**STAINLESS STEEL BASKET for optics**	1 – 10 mm	670 x 80 x 52 mm	
RU 8930-00	**PLASTIC CONTAINER for optics**	5 – 10 mm	275 x 70 x 35 mm	
RU 8908-12	**PLASTIC CONTAINER for optics**	5 – 10 mm	457 x 70 x 35 mm	
RU 8908-14	**PLASTIC CONTAINER for optics**	5 – 10 mm	394 x 70 x 35 mm	
RU 8930-01	**PLASTIC CONTAINER for optics**	1 – 10 mm	271 x 70 x 35 mm	

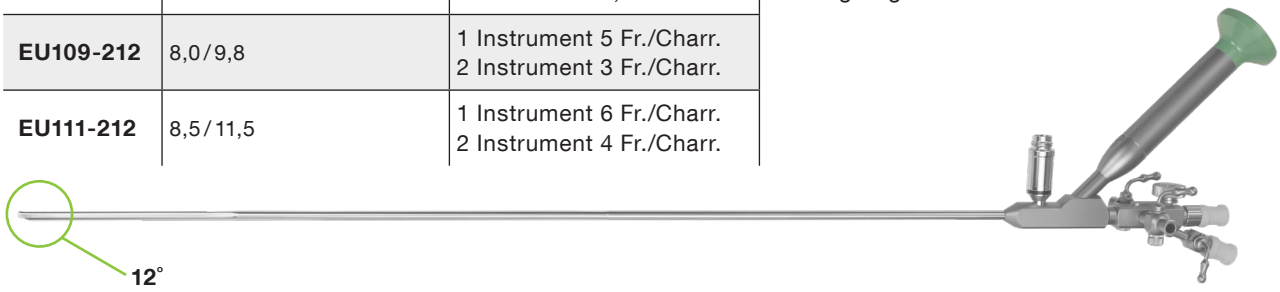
Semi-Rigid Uretero Renoscopes

Semi-Rigid uretero-renoscope with integrated irrigation-/instrument channel and silicone automatic valve

Ordering no.	*Fr. / Charr.*	*Instrument channel*	*Proximal end*
EU107-012	6,0 / 7,5	1 Instrument 4 Fr./Charr. 2 Instrument 2,4 Fr./Charr.	*laterally offset eyepiece, working length 430mm*
EU109-012	8,0 / 9,8	1 Instrument 5 Fr./Charr. 2 Instrument 3 Fr./Charr.	
EU111-012	8,5 / 11,5	1 Instrument 6 Fr./Charr. 2 Instrument 4 Fr./Charr.	



Ordering no.	*Fr. / Charr.*	*Instrument channel*	*Proximal end*
EU107-212	6,0 / 7,5	1 Instrument 4 Fr./Charr. 2 Instrument 2,4 Fr./Charr.	*lateral eyepiece, working length 430mm*
EU109-212	8,0 / 9,8	1 Instrument 5 Fr./Charr. 2 Instrument 3 Fr./Charr.	
EU111-212	8,5 / 11,5	1 Instrument 6 Fr./Charr. 2 Instrument 4 Fr./Charr.	



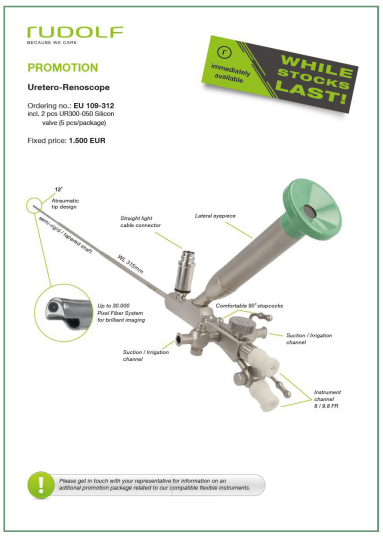
Compatible, semi-rigid and flexible instruments to find in catalogue ZK 390-2 Urology

Accessories

Accessories for semi-rigid uretero-renoscope

Ordering no.	*Description*	
UR300-000	*Guide adaptor* *for lithotripsy handle*	
UR300-050	*Silicone automatic valve,* *Ø 3.9 mm, 5 pieces / package*	
RZ200-000	*Rubber cap* *for instrument channel*	
RF406-601	*Flexible Cleaning brush* *for instrument channel from Ø 1.5 mm, length 600 mm*	
RU 8908-50	*Plastic container URS* for sterilisation and storage, 670 x 195 x 67 mm (without optics and adapter)	

Take a look at our current stock sale offer

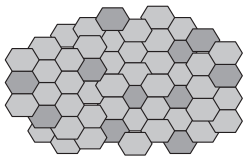


Cold Light Cables / HTT Cables

20% more light transmission
than with standard cables

HTT-Cables

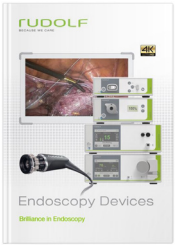
High Transmission Technology
Assembled fibres



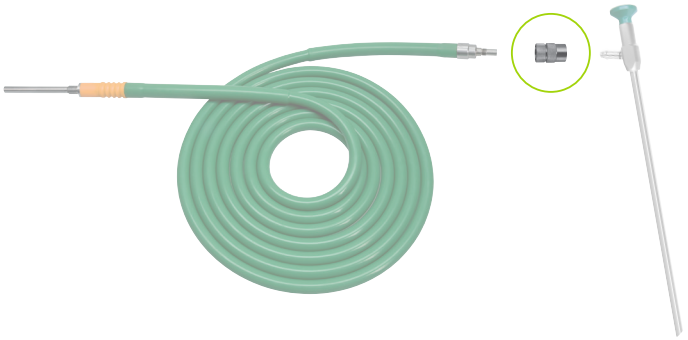
For endoscope < Ø 5 mm → light cable Ø 3.5 mm
For endoscope > Ø 5 mm → light cable Ø 4.8 mm

		without fittings	*incl. RUDOLF / Storz fitting IM220-020 + IM220-040 (Endoscope and light source side)*
Length	***Diameter***	***Ordering no.***	***Ordering Set no.***
1.8 m	Ø 3.5 mm	**IM201-181**	**IM201-1811**
2.3 m	Ø 3.5 mm	**IM201-231**	**IM201-2311**
3.0 m	Ø 3.5 mm	**IM201-301**	**IM201-3011**
3.5 m	Ø 3.5 mm	**IM201-351**	**IM201-3511**
1.8 m	Ø 4.8 mm	**IM202-181**	**IM202-1811**
2.3 m	Ø 4.8 mm	**IM202-231**	**IM202-2311**
3.0 m	Ø 4.8 mm	**IM202-301**	**IM202-3011**
3.5 m	Ø 4.8 mm	**IM202-351**	**IM202-3511**

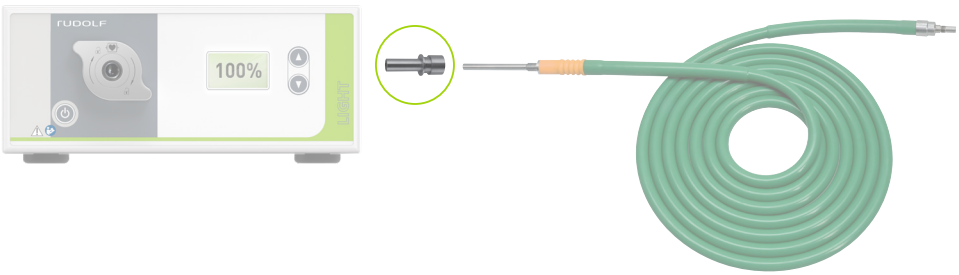
More units can be found in
ZK 583-02 Endoscopy Devices



Fittings for Cold Light Cables



Adapter Endoscope Side (Light Output)	*Connection*	*Ordering no.*
RUDOLF / Storz		**IM220-020**
Wolf (Snap-In)	9 mm	**IM220-021**
ACMI (Snap-In)	7,5 mm	**IM220-022**
Stryker		**IM220-025**



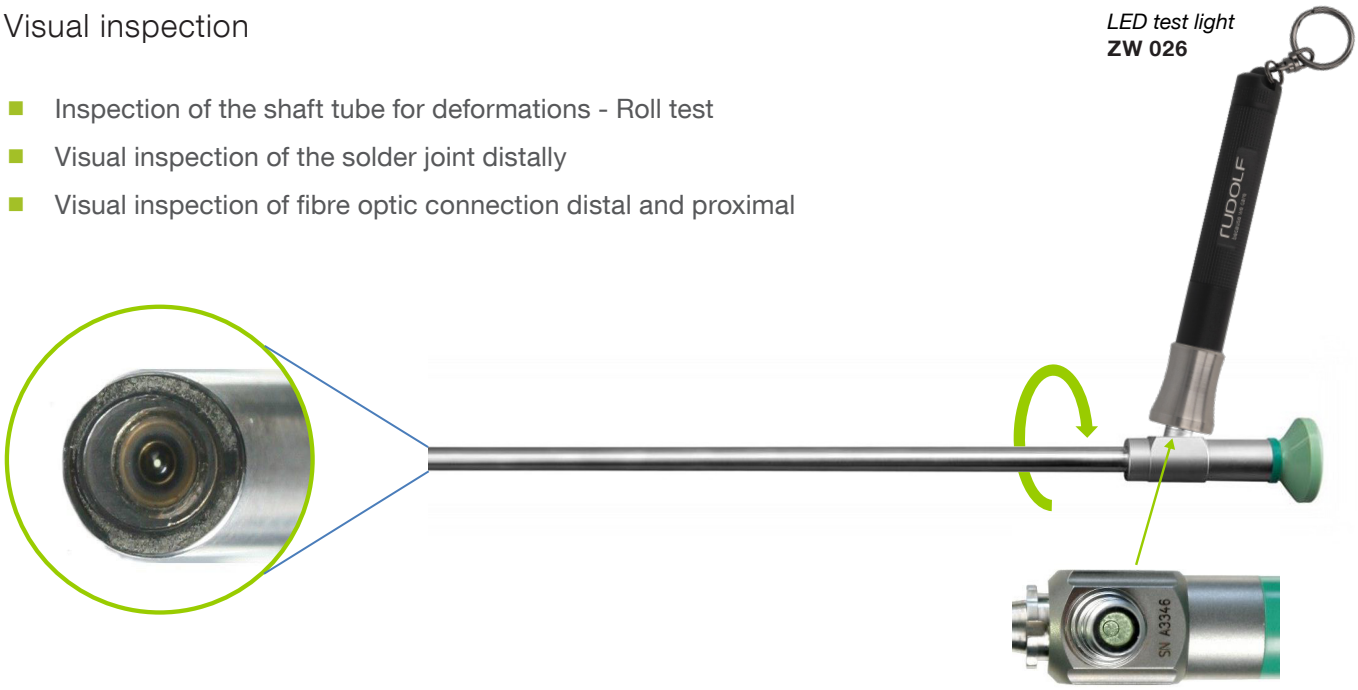
Adapter Light Source Side (Light Input)	*Connection*	*Ordering no.*
RUDOLF / Storz		**IM220-040**
Wolf		**IM220-041**
ACMI / Stryker		**IM220-042**
Olympus		**IM220-043**

Inspection of the endoscopes

In the following, we would like to provide you with some information on how you can easily check your endoscopes yourself. This will help you to quickly recognise whether an endoscope is already defective and whether this endoscope needs to be repaired. In this way, you ensure that the optics that will be used are fully functional and provide the surgeon with an optimal view.

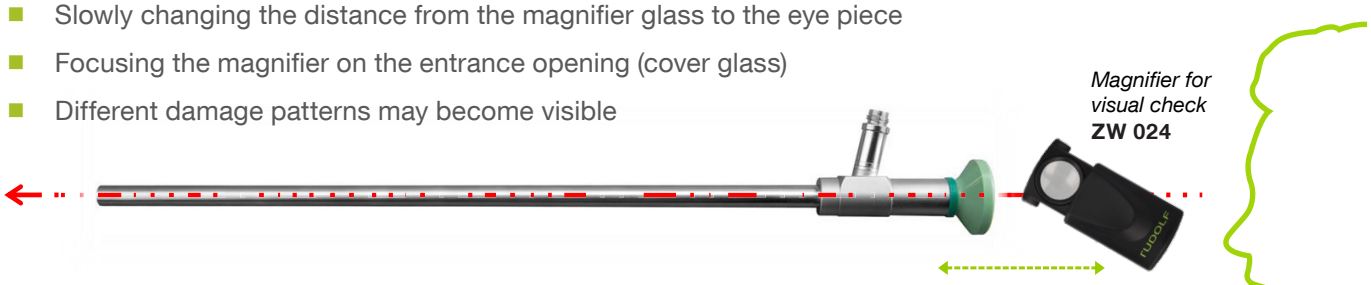
Visual inspection

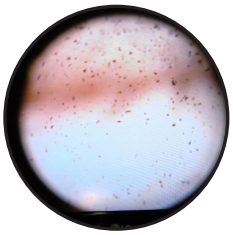
- Inspection of the shaft tube for deformations - Roll test
- Visual inspection of the solder joint distally
- Visual inspection of fibre optic connection distal and proximal



Inspection of the rod lens system

- Placing a magnifying glass on the eye piece
- Slowly changing the distance from the magnifier glass to the eye piece
- Focusing the magnifier on the entrance opening (cover glass)
- Different damage patterns may become visible

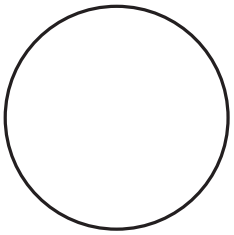




Humidity

Rod lens fracture

Abrasion by ultrasound

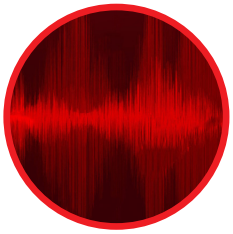


Perfect condition

Avoiding damage to endoscopes

Important tips to help you avoid expensive damage to endoscopes.

- ***Avoid mechanical influences***
  A fall or strong bending of the tube usually results in breakage of the sensitive rod lenses made of glass! An endoscope is a highly sensitive optical device that does not forgive improper handling. One or more broken rod lenses interrupt the image transmission and significantly deteriorate the image!
- ***Never pre-clean in ultrasound***
  Never place rigid endoscopes in the ultrasound for pre-cleaning. The high sound frequencies loosen the adhesions of the rod lenses inside and produce a cloudy image.
- ***Use only approved cleaning agents***
  Only use cleaning agents that are approved for cleaning our optics! You will find these in our reprocessing instructions! Incorrect cleaners may attack soldered or glued joints and cause leaks!
- ***Respect the specified exposure time of cleaning agents***
  Pay attention to the exposure times of the cleaning agents specified by the manufacturer and rinse carefully afterwards. Cleaners often attack the materials of endoscopes if they are left on for too long. Here, too, leaks can occur due to attacked soldered or glued joints.
- ***Protect endoscopes from HF or rotating instruments***
  Users should take care not to touch endoscopes with rotating instruments (e.g. shavers). The sharp cutting edges damage the endoscopes and cause leaks through which moisture penetrates into the interior of the optics. Touching the endoscope with current-carrying instruments (e.g. HF probes) also causes permanent damage.
- ***Clean and remove coatings from the fibre optics connections***
  Remove coatings from the fibre optic connections and make sure that the optical fibres of the endoscope and the optical cables used are intact. Defective light fibres (black dots) cannot transport light and convert the light energy into heat. The correct size of the light cable also helps to avoid excessive heat generation!
- With every use, reprocessing or sterilisation, endoscopes are exposed to ***thermal, chemical or mechanical stress.*** Nevertheless, we grant you a durability of 1000 cycles with proper and careful handling.

RUDOLF Medical GmbH + Co. KG, represented worldwide, translates its belief in lasting values by fostering close customer relationships and offering innovative high technology products, hand instruments, rigid endoscopes as well as efficient services for numerous surgical disciplines.

RUDOLF
BECAUSE WE CARE

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