BEST CONNECTIONS

High-tech connector systems for medical applications

www.odu-connectors.com

In an emergency, a few seconds can sometimes make the difference.

All critical information must be made available quickly via fail-safe and reliable technology, and the respective devices must be intuitive to use.

This is what ODU stands for with its products that reliably transmit signals, power, data, media such as air and liquids, as well as fiber optic.

We make sure your customers can concentrate on what really matters: **their patients.**

MATHIAS WUTTKE

Business Development Manager
Medical Europe

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Clickable page numbers

The contact arrangement of an ODU data transmission connector differs from a standard data transmission connector due to the robust ODU specific design. However, the ODU design meets the electrical specifications that are derived from the respective standard data transmission protocol.

INNOVATION AND EXPERTISE FOR CUTTING-EDGE MEDICAL TECHNOLOGY

ODU is your dependable partner for future-focused medical technology – for diagnostics, treatment, hybrid operating rooms and patient monitoring.

YOU CAN COUNT ON IT

Upon request, ODU is able to meet the high quality requirements set out in the EN ISO 13485:2016 international standard as well as the IEC 60601-1 series of technical standards for the medical field.

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RELIABLE EVERY TIME

Thanks to their outstanding contact safety even in highly demanding environments, ODU connectors ensure reliable transmission of data, power, medical gases, and fluids. Our high-quality interfaces provide the perfect contact technology for almost every application and requirement.

- Extremely high contact safety even with a high number of mating cycles
- 100 % non-magnetic options also available
- Corrosion-resistant
- Long service life
- Reliable data transmission

EASY, SAFE HANDLING

In terms of handling, all our connectors ensure simple, unambiguous mating and reliable operation:
The locking mechanism in the docking area is easy to use for both staff and patients.

- Simple, ergonomic mating
- Automatic, user-friendly docking systems for mobile devices
- Maintenance-free operation
- Touch protection – optionally in compliance with VDE/UL
- Maximum patient safety during use:
  - Compliance with clearance and creepage distances
  - Implementation of IEC 60601-1 (especially 2 MOPP and 2 MOOP)
- Variety of locking systems
- EMC

Absolutely hygienic

Our connectors, cables, and enclosures are all sterilizable and autoclavable. They combine excellent chemical resistance with thermal stability, and guarantee extreme tightness in compliance with the highest protection classes.

- Sterilizable and disinfectable
- Autoclavable at up to 134 °C and 3 bar in accordance with DIN EN 13060-2019-02
- Chemical resistance to detergents and disinfectants
- Easy-to-clean enclosures and surfaces
- Antimicrobial versions available on request
- Biocompatibility test (cytotoxicity) in accordance with ISO 10993-5
- Tests with the MediClean forte cleaning agent from Dr. Weigert

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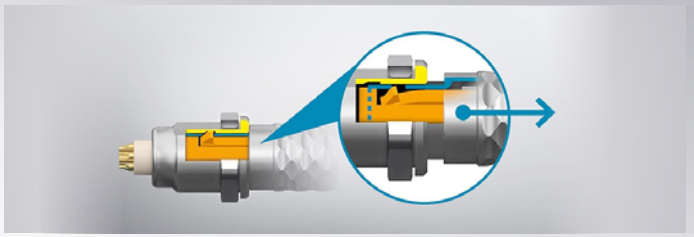
DEPENDABLE TECHNOLOGY – PERFECT CONNECTIONS

Push-pull locking



Fast, secure connections:

- Automatic locking after mating
- No unintentional demating – even if the cable is pulled

Spindle locking

- Convenient quick-action locking system
- Simple and ergonomic handling
- Suitable for multi-position interfaces

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EMC shielding

For interference-free signals:

- Development and optimization of complete systems with optimal EMC results
- Elaborate in-house simulations for quality assurcance
- versatile solutions with convenient cable assembly

High-density technology

Miniaturization as a current trend:

- High-density technology allows the maximum number of contacts in the smallest possible space
- Despite their small footprint, the contacts' dependability and robustness are guaranteed

100 % non-magnetic

BROWSE CATALOG

For guaranteed non-magnetic components and systems:

- Optimized imaging without interference
- Use of common control methods and proprietary, patented magnetic testing technology

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High-speed data technology

HDMI

ODU HIGH SPEED DATA TECHNOLOGY

Analog and digital signals:

- Reliable and innovative solutions for modern high-speed data transmission
- Highest contact safety for reliable transmissions in the high-frequency range
- EEPROMs for smart communications in the operating room

Fiber optic

High-performance:

- Highest data rates
- Fast, interference-free transmissions in medical technology
- Top quality and stability for a wide range of demanding applications

Customized solutions

Application-specific:

- Special insulators, designed in accordance with IEC 60601-1
- Implementation of clearance and creepage distances
- Requirements in the low-voltage and high-voltage range

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Silicone-overmolded system solutions

Hygienic and robust:

- Non-sticky surface
- Easy to clean and steam-sterilizable
- Can withstand autoclaving processes
- Tested in accordance with DIN EN ISO 10993-5

Customized overmoldings

Economical:

- Cost-effective tools
- Customized overmoldings
- Global availability
- Fast delivery

Cable assemblies and system solutions

Reliable:

- First-class, customized cable assembly – including under class 9 cleanroom conditions
- Space-saving arrangement of hoses, cables, and plugs for device modules
- Large selection of cables and third-party products in stock for immediate further processing
- Saves time and resources

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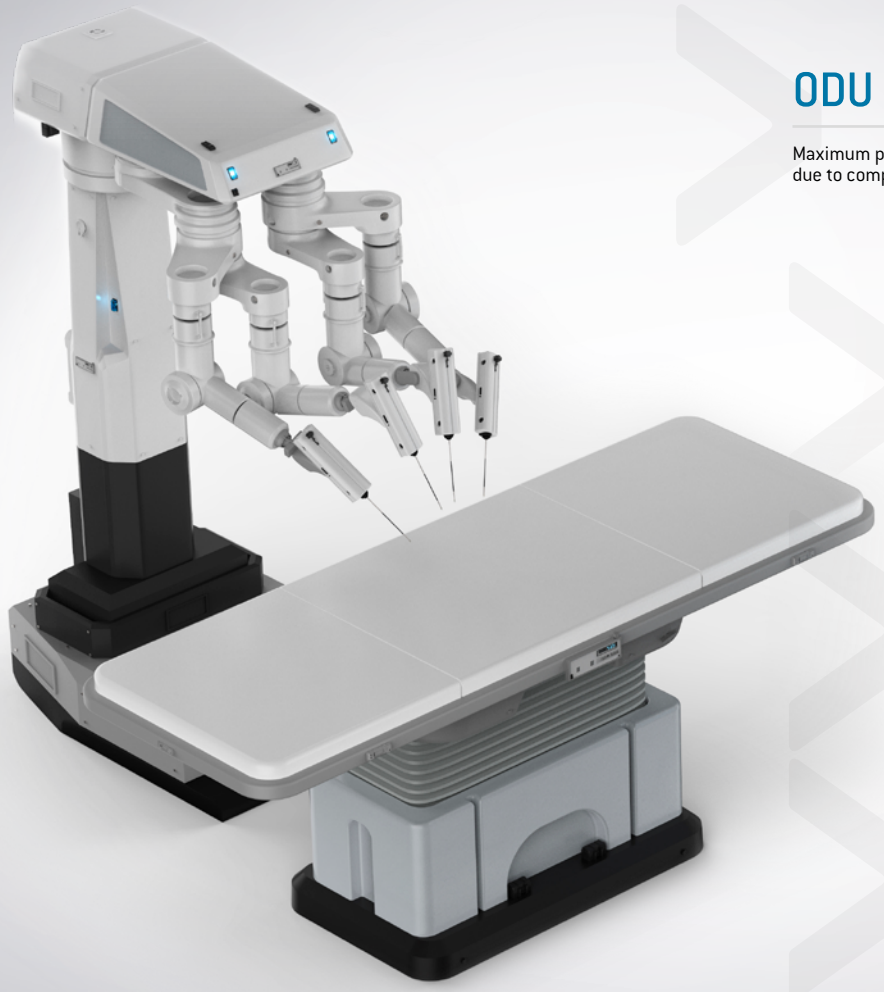
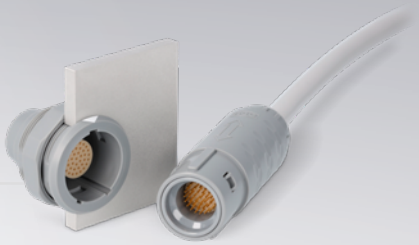
HIGH-TECH CONNECTOR SOLUTIONS ...



ODU MEDI-SNAP®

Maximum patient and operator protection due to compliance with IEC 60601-1



ODU MINI-SNAP®

Extremely robust metal housing, rated for at least 500 autoclaving cycles

Laser marking

UDI-compliant product labeling for easier traceability

Fiber optic solutions

Powerful optical technologies for a broad and demanding range of applications

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... FOR MEDICAL APPLICATIONS

ODU-MAC®

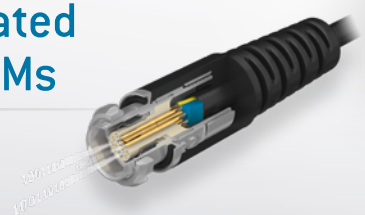
Customized hybrid connector solutions

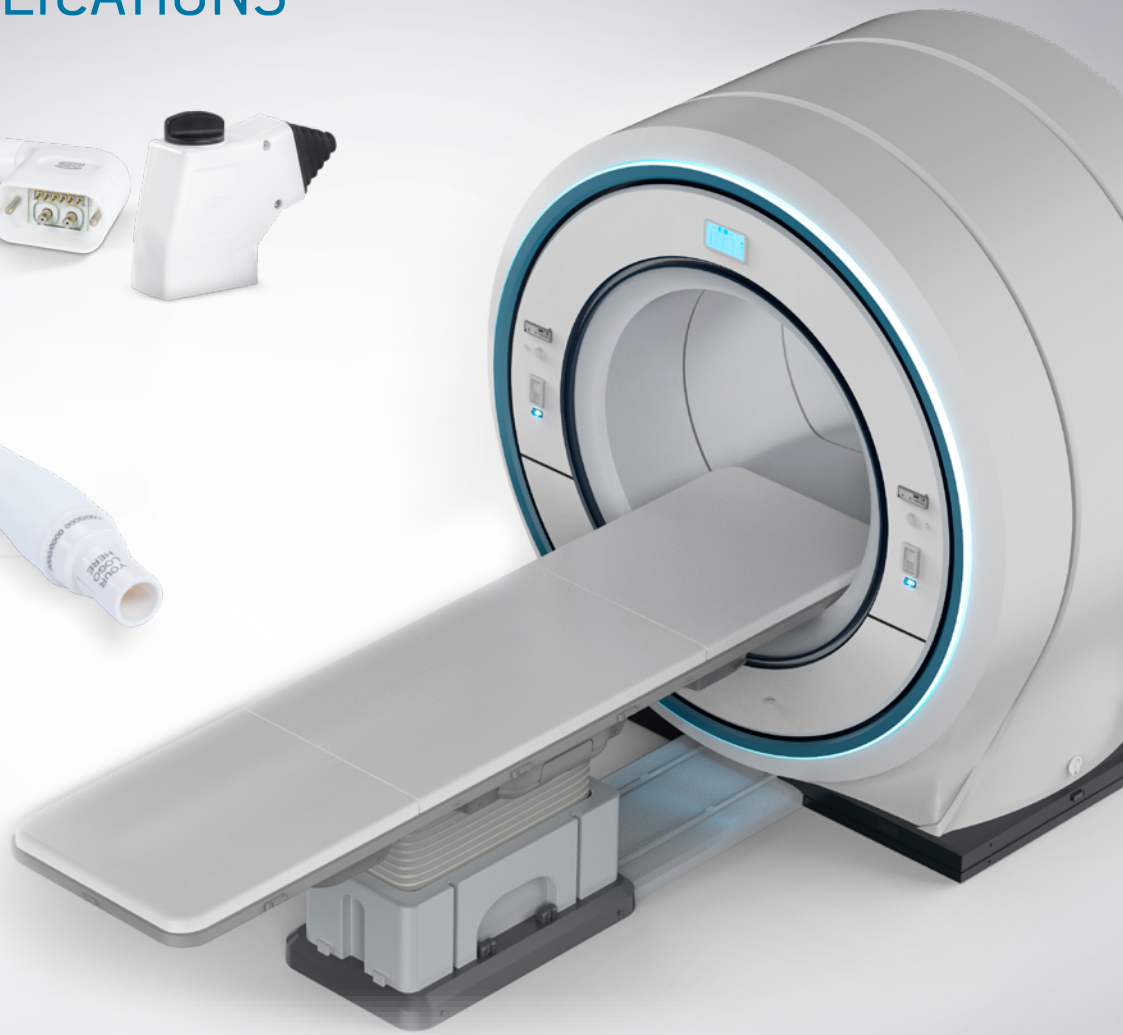
Silicone-overmolded system solutions

Complies with DIN EN ISO 10993-5, new surface with unique haptics – no stick-slip effect

Connectors with integrated EEPROMs

Self-identifying connectors and components





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A GENUINE PARTNERSHIP FOR TRUE ADDED VALUE

As a sought-after partner in the field of medical technology, we have had the privilege of implementing many exciting projects with our customers over the decades.

Through close, goal-oriented collaboration with our customers, ODU's specialists develop the right technology within a product-specific design that provides the ideal application solution.

These customers rely on ODU:

(A selection from our customer portfolio)

··· COLDPLASMATECH · WHALE IMAGING · SIEMENS HEALTHCARE · WEINMANN · PROLOG AIRCLEAN · REMOD · PARI · DÜRR DENTAL · BRUMABA ···

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HERE'S WHAT OUR CUSTOMERS SAY

"ODU met our requirement for maximum reliability and safety, while ensuring intuitive and safe handling, by providing an optimal solution that is a perfect fit for our product."

Heye Heegardt, Head of Electronic Systems Development at WEINMANN Emergency

"Thanks to their extensive experience and expertise in the conceptual design of connectors, we were able to develop an optimized and customized solution with ODU."

Dr. Carsten Mahrenholz, CEO, COLDPLASMATECH GmbH

"BRUMABA and ODU are similar in many ways. Aside from the fact that both companies are family businesses, it's our highly meticulous nature and high degree of innovation that bring us together. We want to give our customers the best possible solution and an ideal product."

Andreas Ciupa, Head of Sales at BRUMABA GmbH & Co. KG

MRI SYSTEMS

High-tech connections in magnetic resonance imaging

Many manufacturers worldwide trust in the ODU-MAC® system as a reliable interface between the various patient coils and the MRI device. We pay attention to intuitive operability and the use of non-magnetic materials.

- 100 % non-magnetic
- Large number of mating cycles and consistently high transmission quality
- Ergonomic, intuitive locking systems

Automatic docking system

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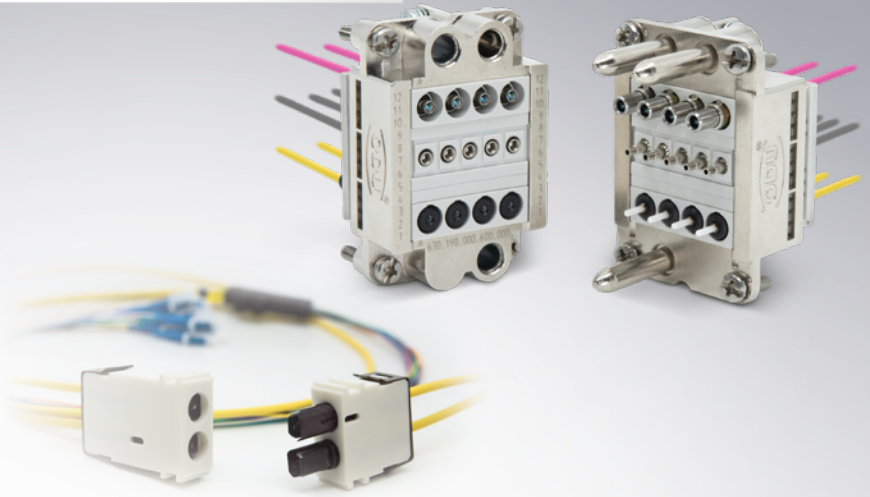
Modern clinical diagnostics require cutting-edge technology

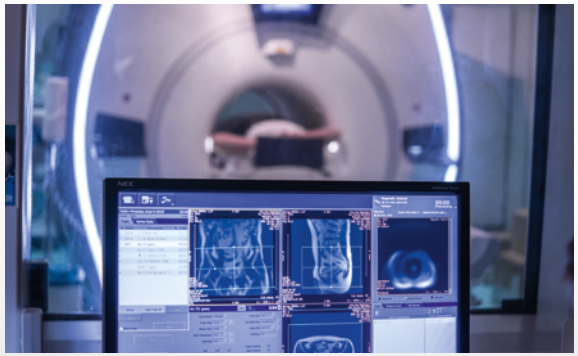
In magnetic resonance imaging (MRI), a very powerful static magnetic field is generated that affects the protons in the water inside the patient's body. This pulsed RF magnetic field, which is emitted via RF coils, excites these protons. When the RF magnetic field is turned off, the protons send out small magnetic signals which are registered by means of special patient coils. These signals ultimately generate the desired sectional image.



- Excellent image quality through high contact security
- Customized solutions in a compact plastic housing
- HF transmission via coax, as well as new trailblazing solutions
- Solutions for digital transmission via fiber optics (GOF/POF)

ODU Fiber Optic is the ideal connection technology whenever the highest data rates and fast, interference-free transmissions are needed. It can therefore be used in diagnostic imaging devices without any problems.

Spindle locking for easy use



Optimal data quality for secure image transmission

Customized connector with innovative locking system

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MOBILE X-RAY MACHINES AND SURGICAL ROBOTS

X-ray imaging requires interfaces that are flexible, compact, and reliable in operation.

The ODU-MAC® modular connector is the optimal interface between the mobile X-ray unit (C arm) and the monitor cart, reliably establishing the required connection for high-current, data, and signal transmission in a single plugging step.

- Wide variety of modules to fit almost any application
- Hybrid solutions based on a modular system
- Robust, maintenance-free systems for routine clinical use
- Reliable long-term solutions

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Safe handling

The ODU-MAC® line includes spindle locking for additional operational safety.

Thanks to audio, visual, and tactile feedback, the locking status is clearly recognizable at all times.

Modular variety

Whether you need to transmit signals, power, high-current, high-voltage, RF signals (coax), media such as air or fluids, data or fiber optic signals – an ODU-MAC® system can accommodate a variety of interfaces to suit your application.

The ODU-MAC® line offers scalable solutions for 5,000 – 100,000 mating cycles.

Fiber optic solutions

ODU Fiber Optic solutions are ideal for controlling minimally invasive, robotic-assisted surgery systems.

ODU's newly developed Expanded Beam Performance technology enables reliable high-speed fiber optic data transmission between the tower, control console, and robot.

This creates the basis for precise and safe surgery based on simple and reliable communications in the operating room.

NEW!

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INHALERS

As a specialist in the field of inhaler technology, PARI uses an application-specific system solution in a hermaphroditic design for various devices based on its eFlow® oscillating membrane nebulizer platforms. These systems are currently undergoing clinical trials both in the homecare sector and in medical practices. The ODU connector solution forms the interface between the controller and the nebulizer.

- System solution including assembly
- Customized, compact design
- Low mating and demating forces

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EMERGENCY/TRANSPORT VENTILATOR

Reliable support in emergency situations

The MEDUMAT Standard² ventilator from WEINMANN Emergency is suitable for various applications, from primary care to transporting intensive-care patients or contaminant transports. Nevertheless, it is quick, easy, and intuitive to use. Treatment can be started almost immediately thanks to the device's short start-up time and a quick set-up option based on the patient's body size, as well as an emergency mode.

The versatile options for differentiated ventilation are easy to operate due to the clear menus, thus ensuring maximum reliability and safety for patients and users in emergencies.

The challenge

- Small housing shape for a connector with 2 MOPP to ensure increased patient protection and reduce the risk of electric shocks for patients and users

The solution

- A standard sealed device socket with a larger front nut that can be mounted inside a small enclosure
- A higher IP protection rating was achieved by means of the receptacle
- Complies with 2 MOPP in accordance with IEC 60601-1

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PLASMA WOUND TREATMENT

Innovative plasma treatment

Coldplasmatech was the first company worldwide to develop an active wound dressing that effectively treats wounds.

This device vastly simplifies the treatment of wounds that are difficult to heal. The cold plasma technology allows the treatment of everything from diabetic feet to open leg sores and is already helping many people. It uses ionized gas that kills germs and microorganisms, stimulates the regeneration of damaged tissue, and at the same time promotes the growth of blood vessels, thereby accelerating wound healing.

The challenge

- High loads on the connector for technical and application-related reasons
- 1-contact plug for transmission of high-voltages
- Development of a new connector type

The solution

- High-voltage power transmission of up to 10 kV
- Suitable for wipe disinfection
- Autoclavable transmission solution
- Detection of the mated state

MEDICAL DEVICE REGULATION

ODU helps you ensure compliance with all requirements

The Medical Device Regulation (MDR) changed the requirements for manufacturers and distributors of medical devices. It was drawn up in response to an increased number of risk reports concerning medical devices in the EU. This new regulation is designed to eliminate loopholes in the previously valid directive and thus ensure patient and user safety.

Specifically, we support you as follows:

- Technical documentation to support medical device approvals
- Risk management: risk assessments for each product group taking into account ISO 14971
- Change management: for changes to products and processes with an impact on quality
- Management of CMR substances: designation on the products
- Continuous tracing of products and components to the respective manufacturing orders
- Retention period for technical documents: full data storage in accordance with your requirements
- Guaranteed compliance with requirements in the supply chain by means of supplier management

IEC 60601-1 COMPLIANT SYSTEM SOLUTIONS

Maximum patient and operator protection

BROWSE BROCHURE

BROWSE WHITE PAPER

IEC 60601-1 sets out stringent requirements for protection against electric shock in medical applications in which patients and operators come into direct contact with electrical equipment and systems.

To reduce this risk to a minimum, manufacturers must always integrate two protective measures into their products:

- **2 MOPP** (Means of Patient Protection) > **protective measures for patients**
- **2 MOOP** (Means of Operator Protection) > **protective measures for operators**

For professionally operated medical equipment without patient contact:
2 x MOOP electrical isolation

Example: typical hospital environment

ECG monitor with electrical connections and direct patient contact:
2 x MOPP electrical isolation

Electrically operated hospital bed:
2 x MOPP electrical isolation

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Solutions with up to 2 MOPP / 2 MOOP*

ODU MEDI-SNAP®

- High-voltage solutions for up to 1,000 V AC / 16 A
- Up to 5,000 mating cycles
- 2–34 contacts, up to IP68

ODU MINI-SNAP®

- 500 autoclaving cycles
- 5,000 mating cycles and more
- Advanced electromechanical shielding option

ODU MINI-MED®

- Space-saving and compact product design
- 1,000 mating cycles and more
- 2–6 contacts, IP67

ODU-MAC® PUSH-LOCK

- Highly modular
- Easy handling thanks to ODU's well-known push-pull locking system

*Valid for medical devices with a maximum operating voltage of 250 V rms

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DISPOSABLE CONNECTOR SYSTEMS

Our product range at a glance

ODU MEDI-SNAP® disposable products are a reliable and economical solution for high-volume projects.

Other benefits at a glance:

- Compatible with the ODU MEDI-SNAP® series
- The mating connectors can be sterilized (including autoclaving)
- Durable receptacle – up to 5,000 mating cycles

IEC 60601-1 compliant: up to 2 MOPP / 2 MOOP

Lower total cost of ownership thanks to:

- Optimized manufacturing technologies / assembly processes
- Completely assembled ODU solutions

Do you need a solution for...?

- Dermatology
- Endoscopy
- Ventilators
- Catheters
- Patient monitoring

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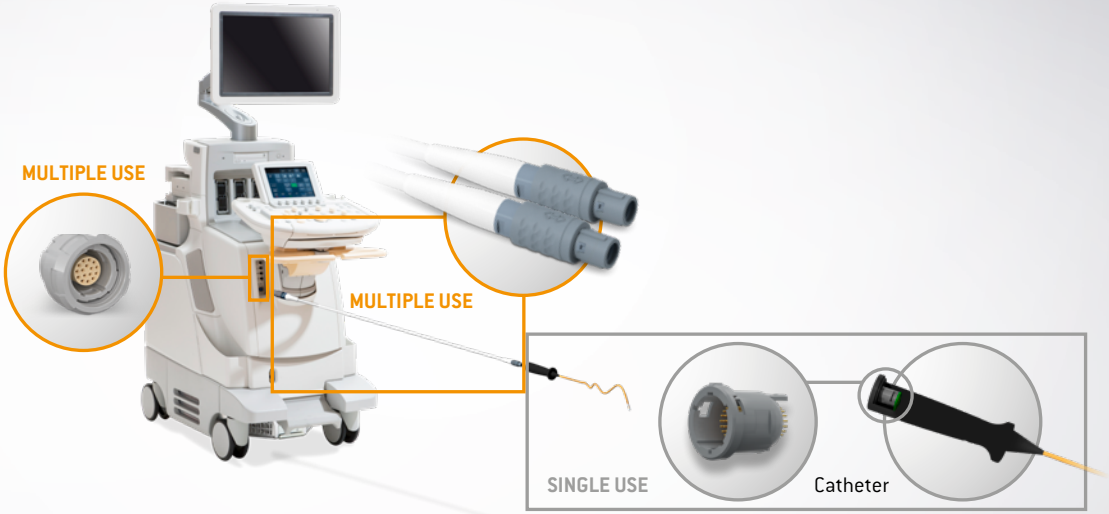
SpO_2 measurement instrument

This medical device is used to measure and monitor the oxygen saturation in the patient's blood – the assembled ODU MEDI-SNAP® disposable break-away connector forms a safe and economical interface between the monitor display and the attached finger clip.

- Customized break-away connector
- 2 – 8 contact versions available
- Up to IP67 in mated condition

Ablation catheters

Catheter ablation is a process in which abnormal heart tissue is destroyed by means of extremely cold temperatures or electricity, thus eliminating risky arrhythmias. The ODU MEDI-SNAP® disposable receptacle is installed in the disposable catheter handle and used in combination with a sterilizable ODU MEDI-SNAP® connector to transmit signals to the monitor.



- Compact receptacle for front-wall mounting
- Up to 34 contacts in a space-saving design
- Fast, simplified assembly process thanks to snap-in solution

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FIBER OPTIC

Expanded Beam Performance

BROWSE CATALOG

This technology is an advanced fiber optic solution with outstanding optical performance. The available fiber types are singlemode and multimode with configurations up to 12 fibers.

Optical characteristics

		Typical	Max.
Insertion loss	SM	< 0.35 dB	< 0.7 dB
	MM	< 0.15 dB	< 0.3 dB
		Typical	Min.
Return loss	SM	> 60 dB	≥ 55 dB
	MM	> 45 dB	≥ 35 dB

Mechanical characteristics / Environmental data

Mating cycles	5,000*
IP class in mated condition	IP6K8
Operating temperature	–40 °C to +85 °C

* Contact transition allows up to 25,000 mating cycles with cleaning every 5,000 mating cycles under controlled conditions. Specifics of the connector series may deviate.

Cable specification

	Singlemode	Multimode
Fiber	G.657A2	OM4
Jacket	LSZH black (halogen free)	
Cable diameter	6.0 ± 0.2 mm	
Min. bending radius (static)	60 mm	
Min. bending radius (dynamic)	120 mm	
Crush resistance	300 N (operation)	

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System solutions

As digitalization is progressing, the demands on high-performance and interference-free data networks are growing, too. ODU Fiber Optic technologies enable maximum data transmission and minimum latency to be combined with a range of future-oriented functionalities.

Expanded Beam Performance | Expanded Beam | Physical Contact | Polymer Optical Fiber

Fiber optic portfolio

When it comes to challenging medical applications, we can offer a solution with our expanded beam technology that offers high-end transmission characteristics over up to 100,000 mating cycles.
The excellent optical performance remains unchanged even under mechanical stress, environmental influences and harsh ambient conditions.

The portfolio also includes reliable physical contact technology that is characterized by very low insertion loss, which makes up to 1,000 mating cycles possible.
For short transmission distances, polymer optical-fiber system solutions are also available as a cost-efficient optical connection.

Modular fiber optic solutions

- GOF (multimode/singlemode) and POF system solutions
- Fiber-only and hybrid systems
- High number of mating cycles
- Available as a fully assembled solution

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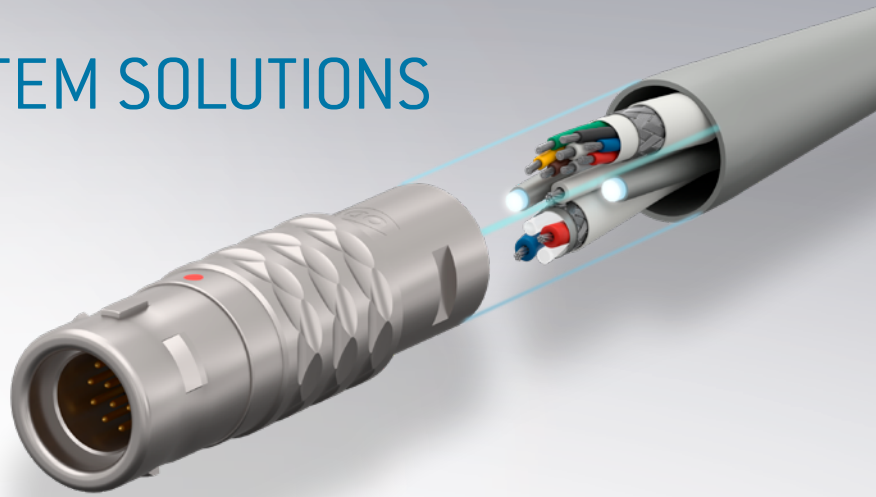
SILICONE-OVERMOLDED SYSTEM SOLUTIONS



When and where are they needed?

Applications in medical technology are often exposed to significant mechanical and chemical stresses. As a leading connector manufacturer, ODU offers a flexible, complete system consisting of the connector, overmolding, and cable with matching assembly and optional labeling.

Our assemblies are subjected to rigorous testing, including high-voltage and insulation tests, length tests, occupancy tests, function and component tests for cable systems, runtime measurements, tensile strength tests, torsion and bending fatigue tests, as well as leak tests for our molded components.

For this purpose, ODU has its own laboratory as well as high-tech development centers in Germany and the USA. This means you get products that are specifically tailored to your needs and always state of the art.

neodisher® MediClean Forte

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In-house production

- LSR and HCR production possible
- Metal and plastic plugs with molded cable assembly
- Development of customized solutions
- HCR production to ISO 13485 possible

Features

- Cytotoxicity test in accordance with DIN EN ISO 10993-5 – passed
- Autoclave cycle test: up to 500 cycles – passed
- Flexing cycles test – passed
- Compatible with a variety of disinfectants and cleaning agents
- Non-sticky surface
- Laser marking in compliance with MDR/UDI

When is silicone used?

- Whenever resistance to mechanical shock, autoclavability, or a minimum number of flexing cycles are required
- For example, in robotic systems, endoscopy, dental technology, and diagnostic imaging systems

Autoclavability

Laser marking

Prevents the stick-slip effect

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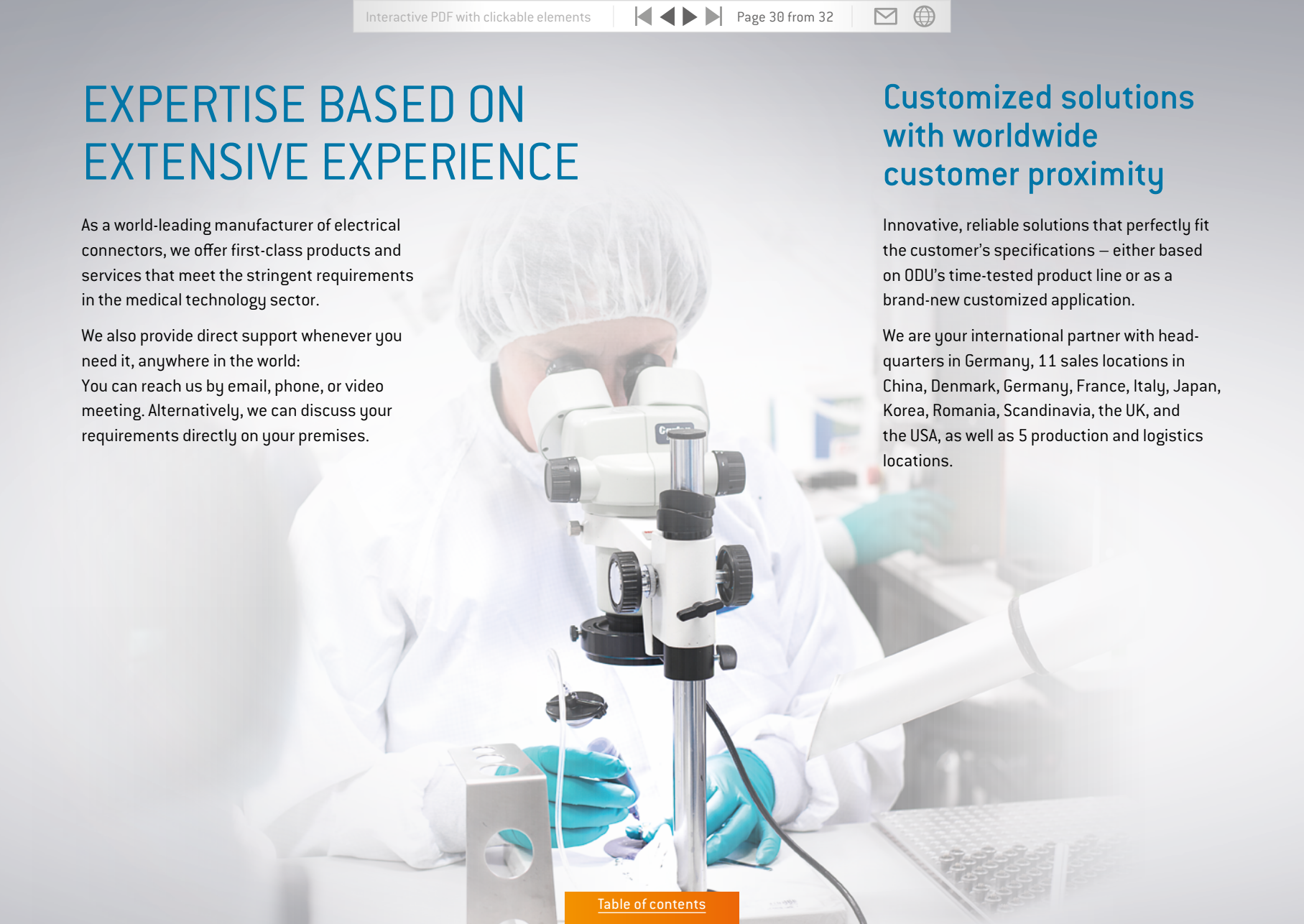
EXPERTISE BASED ON EXTENSIVE EXPERIENCE

As a world-leading manufacturer of electrical connectors, we offer first-class products and services that meet the stringent requirements in the medical technology sector.

We also provide direct support whenever you need it, anywhere in the world:
You can reach us by email, phone, or video meeting. Alternatively, we can discuss your requirements directly on your premises.



Customized solutions with worldwide customer proximity

Innovative, reliable solutions that perfectly fit the customer's specifications – either based on ODU's time-tested product line or as a brand-new customized application.

We are your international partner with headquarters in Germany, 11 sales locations in China, Denmark, Germany, France, Italy, Japan, Korea, Romania, Scandinavia, the UK, and the USA, as well as 5 production and logistics locations.

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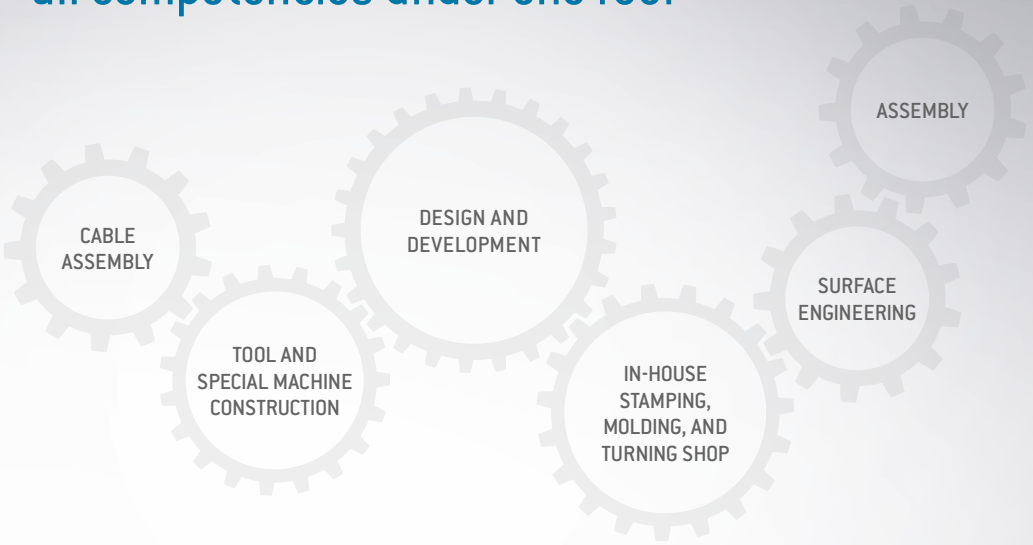
Cross-industry know-how

ODU combines extensive expertise in a wide range of industries with additional customer benefits:

Broad range of know-how and practical experience combined with significant business acumen and efficiency.

- Medical
- Test and measurement
- Military and security
- Industrial
- Automotive

75 % degree of vertical integration – all competencies under one roof



For specific medical requirements, we offer production in a class 9 cleanroom.

We can also offer a completely sterile manufacturing environment from production right through to packaging.

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All dimensions are in mm.
Some figures are for illustrative purposes only. Subject to change without notice. Errors and omissions excepted. We reserve the right to change our products and their technical specifications at any time in the interest of technical improvement. This publication supersedes all prior publications.

HIGH-TECH CONNECTOR SOLUTIONS FOR MEDICAL TECHNOLOGY / B / 0224 / EN

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