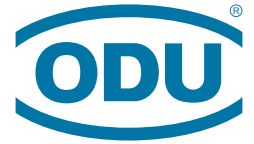


A PERFECT ALLIANCE.



# NEW PRODUCTS CIRCULAR CONNECTORS

Benefit from top performance for  
your specific requirements!

HERMETIC SEALING  
HIGH VOLTAGE  
TOUCH PROOF  
BIOCOMPATIBILITY  
STERILIZATION



CIRCULAR CONNECTORS

MODULAR CONNECTORS

ELECTRICAL CONTACTS

# HERMETIC SEALING – NEW ODU MINI-SNAP® RECEPTACLES

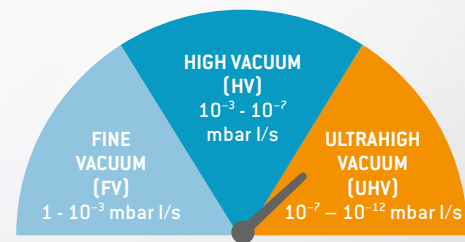
The requirements for the sealing of electrical transmission interfaces are strongly growing. They have increased from general dust and water tightness (IP rating) in industrial applications to high pressure tightness under water to now almost complete – **hermetic sealing**.

## LEVELS OF SEALING REQUIREMENTS



## HERMETIC SEALING

Hermetic sealing is required for example when a vacuum needs to be created in an enclosed area. Between different quality levels of hermetic sealing are distinguished: a.o. fine, high and ultra-high vacuums.



+ > 500 AUTOCLAVING CYCLES<sup>2</sup>

+ GLASS POTTING

tested helium leakage rate  
<  $10^{-9}$  mbar l/s



+ DATA TRANSMISSION

USB® 2.0<sup>1</sup>, HDMI® 2.0<sup>1</sup>, Ethernet<sup>1</sup>

**PLUG COMPATIBLE**  
with ODU MINI-SNAP® Series L

**RECEPTACLE**  
Rear panel installation (screwtype)

**5,000 MATING CYCLES**

**TEMPERATURE RANGE**  
-20 °C to +120 °C

**TERMINATION TECHNOLOGY**  
Print



## ULTRA “CLEAN” – HIGH SPEED

Hermetic sealing means equipment, rooms, production systems etc. are completely protected from the ingress of even the smallest contaminants on a molecular level. With its new series of receptacles, ODU raises the bar in this field. Thanks to glass potting, they not only meet the demanding requirements of UHV-suitable interfaces, but also comply with another major customer requirement – high performance data transfer.

ODU MINI-SNAP® Part number	G80L0Q- PU5RF00-00V0	G80L0Q- PU5QF00-00V0	G81L0Q- PD8RC00-00V0	G81L0Q- PD8QC00-00V0	G82L0Q- P16RC00-00V0	G82L0Q- P16QC00-00V0
Ø Panel cut-out	9.1 mm + 0.1	9.1 mm + 0.1	12.1 mm + 0.1	12.1 mm + 0.1	15.1 mm + 0.1	15.1 mm + 0.1
Number of contacts	5	5	8	8	16	16
Contact style	Pin	Socket	Pin	Socket	Pin	Socket
He leakage rate acc. to DIN EN 60512-14-2:2006	Tested at <math>10^{-9}</math> mbar l/s					
Insulator material	Glass + PEEK					
Data transfer protocol	USB® 2.0 <sup>1</sup>		Ethernet (CAT 5) <sup>1</sup>		HDMI® 2.0 <sup>1</sup>	
Data transfer rate	480 Mbit/s		1 Gbit/s		14.4 Gbit/s	
Single contact nominal current	4 A		3.8 A		4.2 A	
Nominal current insert	3 A		2.4 A		2.1 A	
Nominal voltage acc. to IEC 60664	10 V AC	7.5 V AC	32 V AC		32 V AC	

### INDUSTRIAL

a. o. semiconductor production equipment

### MEDICAL

a. o. high-end endoscopes

### TEST AND MEASUREMENT

a. o. vacuum sensors



<sup>1</sup> These ODU specific connectors can transmit common data transmission protocols such as USB® 2.0, Ethernet (CAT 5) and HDMI® 2.0, but they are not USB®, Ethernet (CAT 5)- and HDMI®-standard connectors.

<sup>2</sup> Acc. to DIN EN 13060:2015



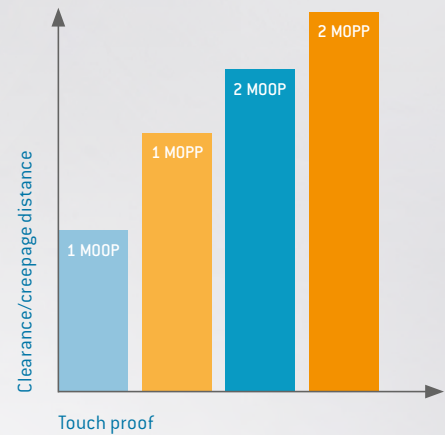
# IEC 60601-1 COMPLIANT ODU MEDI-SNAP® SOLUTIONS

## Maximum patient and operator protection

The medical standard IEC 60601-1 specifies the strictest requirements for contact protection of medical devices and their components to guarantee maximum protection against electric shock for both patients and operators. To keep the risk as low as possible, the standard specifies means of protection (MOP) for medical electric devices and systems that are divided into two categories:

- Means of patient protection (MOPP)
- Means of operator protection (MOOP)

Classification	Insulation	Creepage/ clearance distance	Creepage distance extension
1 MOOP	1,500 V AC	2.5 mm / 2.0 mm	Basic
2 MOOP	3,000 V AC	5.0 mm / 4.0 mm	Double
1 MOPP	1,500 V AC	4.0 mm / 2.5 mm	Basic
2 MOPP	4,000 V AC	8.0 mm / 5.0 mm	Double



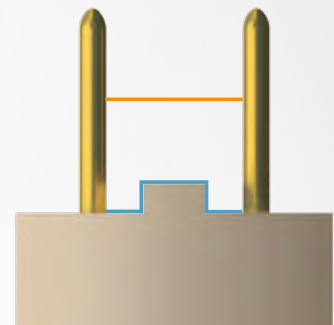
Working voltage: 250 V AC, pollution degree 2: The information refers to plugs in mated condition.

## THE ODU CONCEPT: IMPLEMENTATION IN CONFORMANCE WITH IEC 60601-1

The IEC 60601-1 standard requires that medical electrical devices and systems must always feature two integrated protection measures against electric shock, both for patients and for operators (2 MOPP or 2 MOOP).

**In other words, if one protection fails, the other one replaces it!**

To ensure this, either two different or two times the same protective measure(s) can be implemented on two separate components (e.g. power supply and connector). In order for circular connectors to achieve protection level 2 MOPP (patient protection) or 2 MOOP (operator protection), the clearance and creepage distances between the contacts must be increased.



— Clearance distance  
— Creepage distance

## FIRST-ORDER CRITERION SELECTION OF SPECIAL HOUSINGS

Achieving the necessary protection is based on the style of the receptacle or in-line receptacle. The mating connector is not relevant in this scenario.

Thicker front nuts on selected styles of receptacles produce a longer insulation distance and simultaneously ensure that patients and operators cannot easily touch the contacts.

THICKER  
FRONT NUT



2 MOPP		G 4 Size 1		G E Size 1		2 MOPP
		G 9 Size 1		G A Size 1	G 4 Size 2	
1 MOPP		G 6 Size 1		G 1 Size 1		1 MOPP
		K 1 Size 1		G 5 Size 1	G 5 Size 2	
		K 2 Size 1		G 8 Size 1		
				G 1 Size 2		

The information refers to plugs in mated condition.

## SECOND-ORDER CRITERION SELECTION OF SPECIAL PIN LAYOUTS

Achieving the necessary protection is based on the adjustment of the insulator. The style of the receptacle or in-line receptacle is not relevant in this scenario.

Adjustment of the insulator with additional domes, an asymmetrical arrangement of the pins and insulating sleeves can increase the original protection class from 1 MOPP / 1 MOPP to 2 MOPP / 2 MOPP.



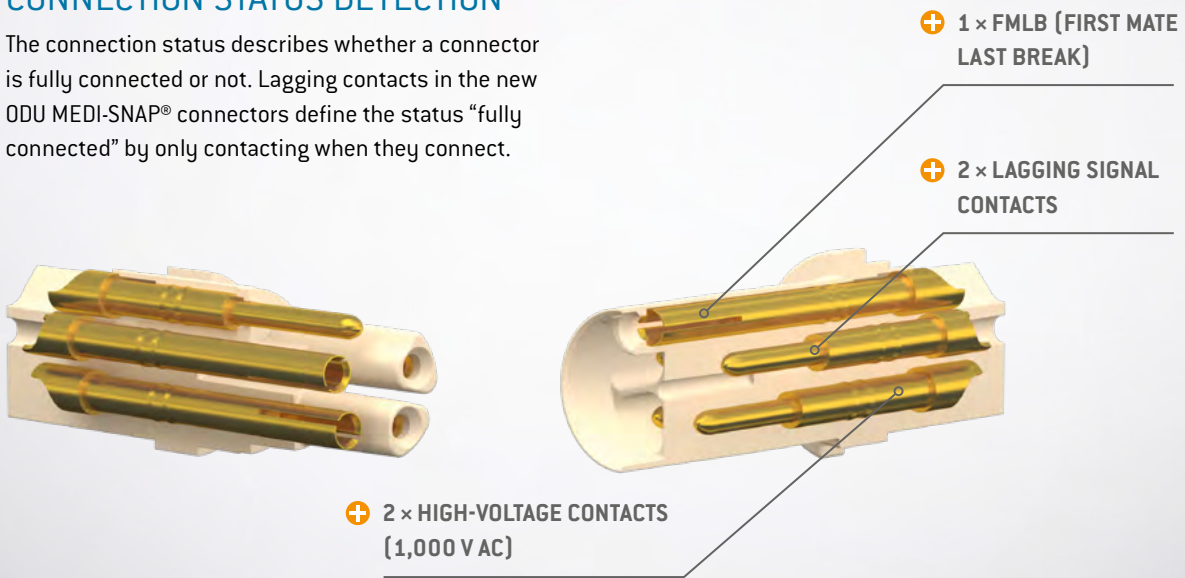
# THE POWER-HOUSE – ODU MEDI-SNAP®

All new, high voltage inserts for the ODU MEDI-SNAP® are enabling the reliable transmission of up to 1,000 V AC acc. to IEC 60664. Further they are capable of preventing “hot plugging” by featuring a special pin-layout design with lagging contacts in the smallest possible installation space.

UP TO  
1,000 V AC

## CONNECTION STATUS DETECTION

The connection status describes whether a connector is fully connected or not. Lagging contacts in the new ODU MEDI-SNAP® connectors define the status “fully connected” by only contacting when they connect.



## + MATING STATUS RECOGNITION

+ NOMINAL VOLTAGE  
up to 1,000 V AC

+ DAISY-CHAIN CAPABILITY

+ TOUCH PROOF  
according to IEC 60664-1

TERMINATION TECHNOLOGY  
soldering

2,000 MATING CYCLES

IP50 OR IP64

POLLUTION DEGREE 3





VARIOUS HOUSING TYPES



## AVOIDANCE OF “HOT-PLUGGING” IN THE ODU MEDI-SNAP®

Corresponding switching units in the device can use the clear identification of the connection status. This can be used to switch the power on or off in a targeted way. This means that electric voltage is only applied at the interface when the connection has been fully and correctly established. This rules out both mating and demating connectors under load and therefore also prevents a resulting damage. It also ensures the long-term functional reliability of the interface itself as well as the connected device.

### ODU MEDI-SNAP®

Type	Connector	Receptacle	Connector	Receptacle
Number of contacts	2 (HV) + 2 (Signal, lagging) + 1 (FMLB)	2 (HV) + 2 (Signal) + 1 (FMLB)	2 (HV) + 2 (Signal) + 1 (FMLB)	2 (HV) + 2 (Signal, lagging) + 1 (FMLB)
				
Contact style	4 × Pin + 1 × Socket	4 × Socket + 1 × Pin	4 × Socket + 1 × Pin	4 × Pin + 1 × Socket
Nominal voltage acc. to IEC 60664-1	up to 1,000 V AC (HV contacts)	up to 1,000 V AC (HV contacts)	up to 1,000 V AC (HV contacts)	up to 1,000 V AC (HV contacts)
Nominal current	16 A	16 A	16 A	16 A
Max. termination cross-section	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>
Connector housing diameter	18.5 mm	–	18.5 mm	–
Panel cut-out diameter	–	17.1 mm	–	17.1 mm

<sup>1</sup> HV: High-Voltage / FMLB: First mate last break







# STERILIZABLE ODU MEDI-SNAP® MATERIALS

**Absolutely hygienic – 100 % germ free!**

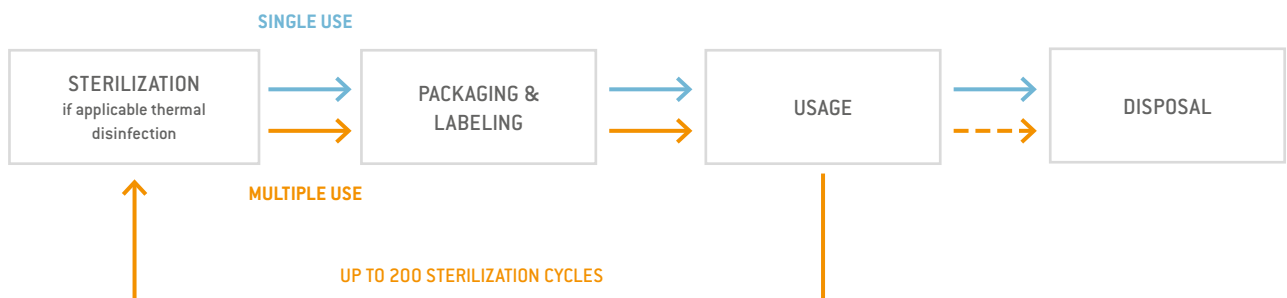
Especially in the medical field, hospitals must comply with the highest requirements. Frequently, a sterile environment is a basic condition. The option of sterilization allows long term, germ-free equipment in sensitive environments.

## STERILIZATION OF ODU MEDI-SNAP®<sup>1</sup>

- + Autoclavability up to 134 °C
- + Ethylene oxide sterilization with EO gas
- + Sterrad sterilization with hydrogen peroxide gas
- + Gamma radiation

<sup>1</sup> A list of compliant materials can be send to you upon demand.

## ODU MEDI-SNAP® FOR SINGLE OR MULTIPLE USE





# BIOCOMPATIBLE ODU MEDI-SNAP® MATERIALS

Using biocompatible materials for the ODU MEDI-SNAP® ensures maximum patient protection against skin and tissue irritations.

## OPTIMAL LONG-TERM SKIN TOLERANCE

Biocompatibility in medicine designates materials that have no negative influence on the metabolic processes of living tissue when in direct contact with it. Patient health is the focus at all times. That's why it is so important to avoid additional disease symptoms such as allergic reactions in the form of rashes. Therefore, to protect patients, the medical product act requires that medical products undergo extensive testing before they are released on the market. The relevant biocompatibility test procedures are defined in DIN EN ISO 10993.

The used materials for ODU MEDI-SNAP® variants with black and gray housing made of PSU and gray housing made of PEI comply with all standards of the respective norms of DIN EN ISO 10993-5, -10, -11 and -18.

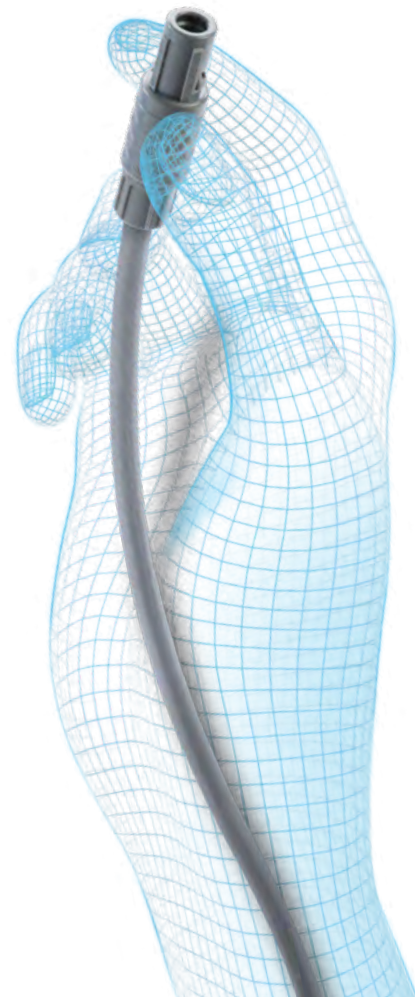
## BIOCOMPATIBILITY ACC. TO DIN EN ISO 10993

**DIN EN ISO 10993-5:** Tests for in vitro cytotoxicity. Testing determines whether toxic components from the material cause cell damage.

**DIN EN ISO 10993-10:** Tests for irritation and skin sensitization. The test for skin irritations and skin sensitization is designed to determine irritating and sensitizing characteristics of medical products.

**DIN EN ISO 10993-11:** Tests for systemic toxicity.

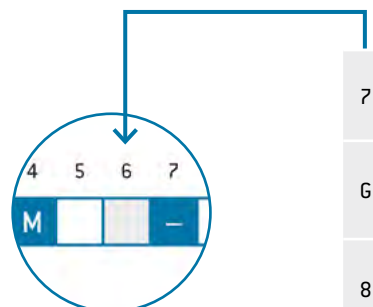
**DIN EN ISO 10993-18:** Chemical characterization of medical device materials within a risk management process.



## CHOOSE BIOCOMPATIBLE MATERIALS!

The material is stated in digit 6 of the part number.

You can find more about this in our catalog.



Insert at part number for item 6.

	Housing material
7	Standard Plastic, Gray (PSU)
6	Standard Plastic, Gray (PEI)
8	Standard Plastic, Black (PSU)

# MAXIMUM FLEXIBILITY: THE NEW ODU MEDI-SNAP® RECEPTACLES

**Top patient protection – Maximum efficiency – High robustness**

In order to meet the increasing call for improved patient protection according to the IEC 60601-1 as well as the ever-growing cost pressure and demand for high robustness, the ODU MEDI-SNAP® portfolio has been extended to include three new styles of receptacle.



Neither water nor dust can ingress into the GA receptacle providing you with the maximum operational reliability.



# THE ADVANTAGES OF THE NEW RECEPTACLES

- The IEC 60601-1 medical standard requires affected devices and their components to provide patients and operators with the maximum level of protection from electric shock. Increased clearance and creepage distances fulfill the highest requirements of IEC 60601-1 (2 MOPP / 2 MOOP).
- Our outstandingly cost-effective solutions feature optimized components while maintaining top notch quality.
- The new **GA receptacle type** stands out due to its robust design. An additional sealing system has been designed to meet the IP68 standard even in unmated condition. Therefore it provides ingress protection from water and dust which are constant challenges in demanding industrial and medical applications.

TOP PATIENT PROTECTION

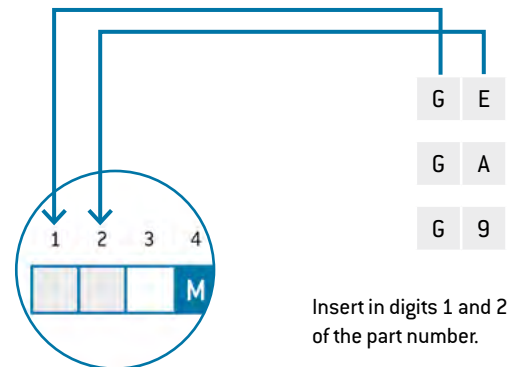
MAXIMUM EFFICIENCY

HIGH ROBUSTNESS

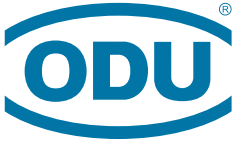
## THE ODU PART NUMBERS

The receptacle type is indicated in digits 1 and 2 of the part number.

You can find more about this in our catalog.

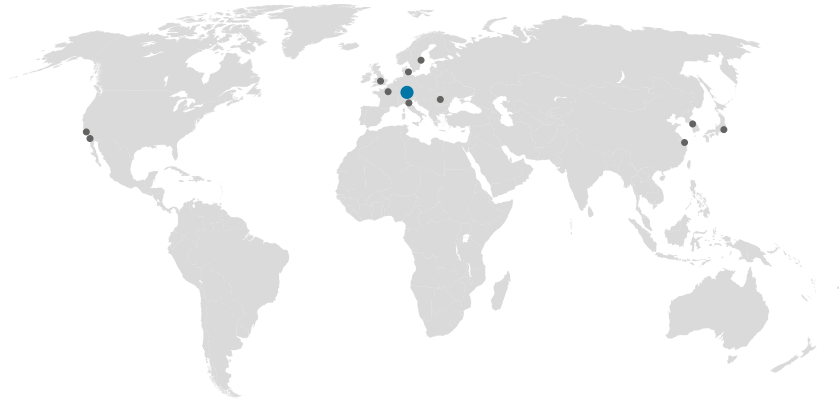






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## ODU GROUP WORLDWIDE



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Fax: +49 8631 6156-49  
E-mail: zentral@odu.de  
www.odu.de

### PRODUCTION AND LOGISTICS SITES

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<b>China</b>	ODU (Shanghai) Connectors Manufacturing Co.Ltd
<b>Mexico</b>	ODU Mexico Manufacturing S.R.L. de C.V.
<b>Romania</b>	ODU Romania Manufacturing S.R.L.
<b>USA</b>	ODU North American Logistics

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#### Further information and specialized representatives can be found at:

www.odu-usa.com/contact

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