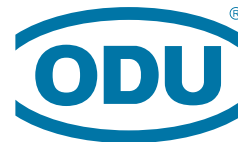


A PERFECT ALLIANCE.

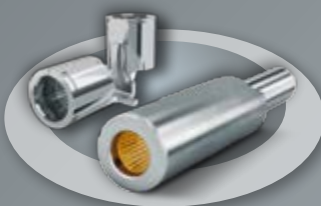


# ELECTRICAL CONTACTS

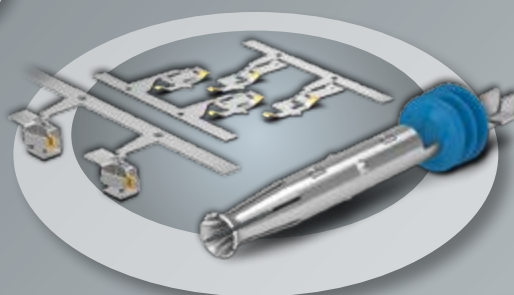
THE CONTACT MAKES THE DIFFERENCE.



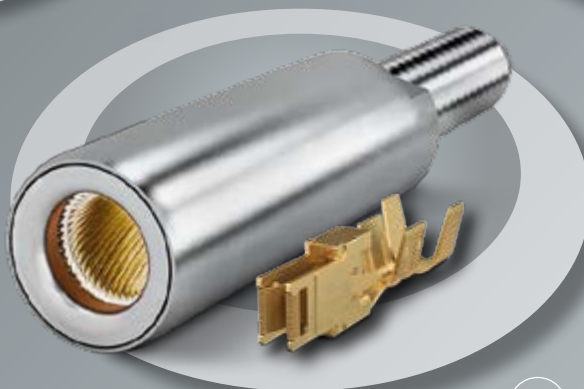
ODU TURNTAC®



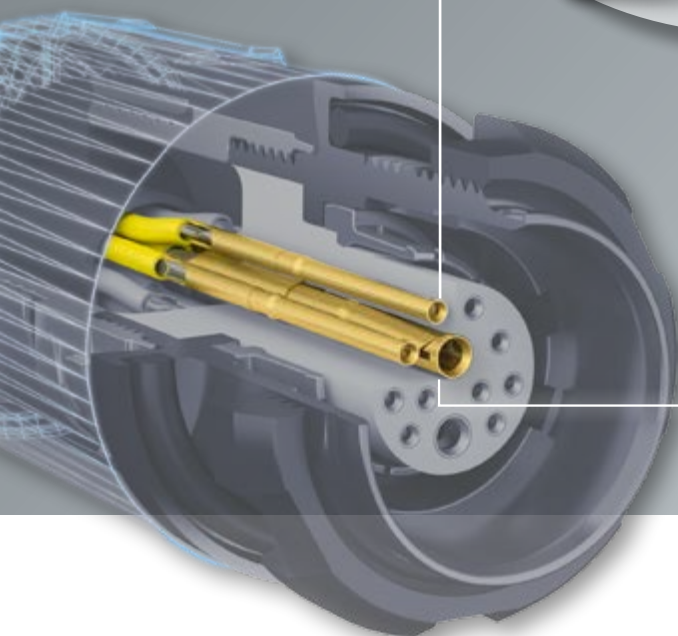
ODU LAMTAC®



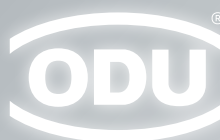
ODU STAMPTAC®



ODU SPRINGTAC®



• 80 YEARS



CONTACTS •

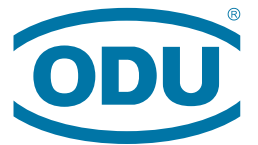
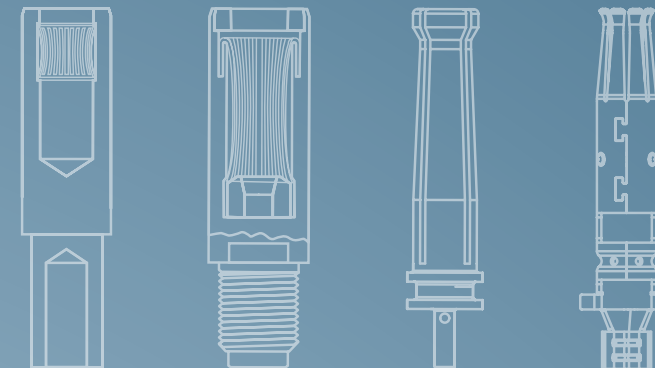
# OUR COMPETENCE. YOUR BENEFIT.

ODU is a global leader in the development and production of high performance contacts for electrical connector technology. Electrical contacts from ODU that – depending on the application – can successfully complete up to one million mating cycles without any loss of reliability or transmission capacity continue to set the highest attainable standards. The same is true for current-carrying capacity in high temperatures or application-specific optimization of mating and demating forces.

ODU possesses the necessary skills for perfectly adapting contact systems to precisely meet the customers' needs. Thereby, in terms of functions and properties, every contact system is custom-fit to each application, while also being available in a wide variety of diameters and termination types.

## CUSTOMIZED DEVELOPMENTS

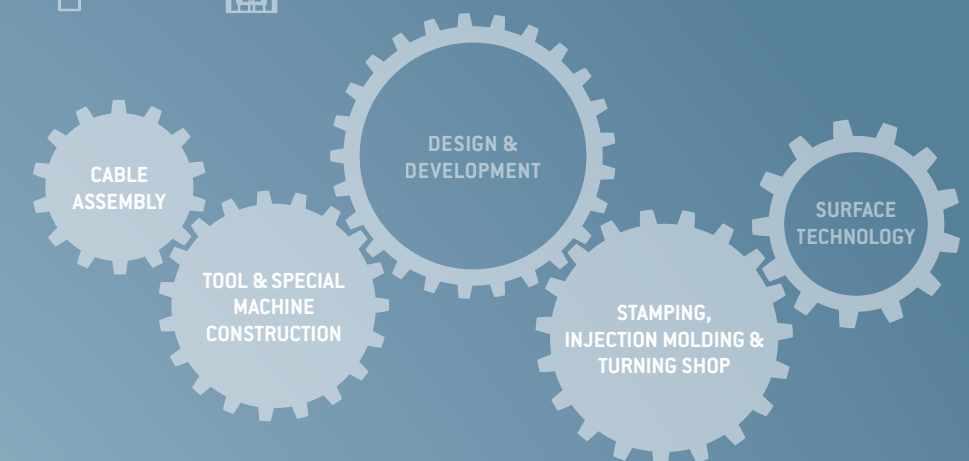
Innovative, reliable solutions to perfectly fit the customer's specifications – either based on ODU's time-tested contact technologies or as a brand-new customer-specific application.



A PERFECT ALLIANCE.

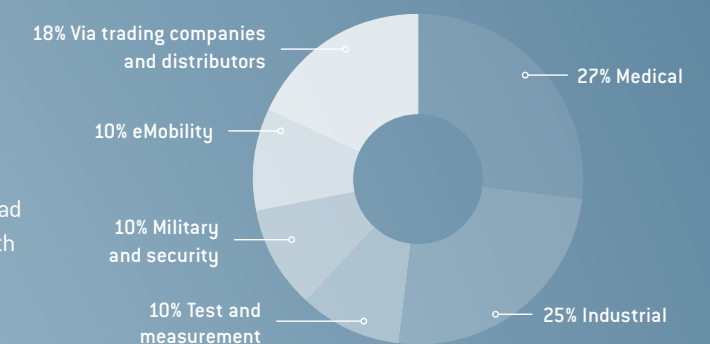
## HIGH LEVEL OF VERTICAL INTEGRATION

ODU consolidates all necessary expertise under one roof.



## CROSS-INDUSTRY KNOW-HOW

ODU has extensive expertise in a wide range of industries. This provides added value to our customers through a broad range of know-how and practical experience combined with significant business acumen and efficiency.



## CUSTOMER PROXIMITY ACROSS THE GLOBE

ODU has an international presence. Its company headquarters are located in Germany, with 9 sales subsidiaries in Germany, Denmark, England, France, Italy, Sweden, the US, China and Japan.



# ELECTRICAL CONTACTS FOR RELIABLE CONNECTOR SOLUTIONS

Reliable contact technology always results from the right combination of different contact properties: contact resistance, contact force, contact security, mating cycles, plus mating and demating forces. To create durable connectors, these properties must be adjusted to each individual application and designed to perfectly fit the respective specifications. ODU's diverse contact portfolio offers solutions for the most varied requirements – and thus the perfect connector technology for every need. It covers extremely durable springwire contacts, high-performance lamella contacts, universal turned and slotted contacts, as well as economically stamped contact solutions for use in large serial production. Termination technology also plays an important role, determining to a major extent the quality of the connection and its durability.

Further information at [www.odu-connectors.com/electrical-contacts](http://www.odu-connectors.com/electrical-contacts)



Outstanding reliability, lifetime and durability with up to 1 million mating cycles



ODU SPRINGTAC®

ODU SPRINGTAC® Flatsocket

Maximum current-carrying capability and temperature resistance of up to 180 °C



ODU LAMTAC®

Rugged and universal contact system suitable even for harsh environments



ODU TURNTAC®

Economical contact systems for automatic processing



ODU STAMPTAC®

Contact technology	Springwire technology	Springwire technology
Contact security	+++	+++
Contact diameter	from Ø 0.76 mm	from 0.64 x 0.64 mm
Mating cycles	> 100,000 (up to 1 million)	> 50,000
Operating temperature range	–40 °C to +120 °C	–40 °C to +120 °C
High temperature range	up to +300 °C (on request)	
Surfaces	Ag (Au up to Ø 1.02 mm)	Ag / Au
Termination technologies	crimp / screw solder	crimp / solder / ODU QCH <sup>1</sup>
Through-hole design	+	

Lamella technology	Turned, slotted contacts	Stamping technology
++	+	++
from Ø 1.5 mm	from Ø 1.5 mm	Ø 3 und Ø 6 mm
> 10,000	> 10,000	> 10,000
–40 °C to +150 °C	–40 °C to +120 °C	–40 °C to +105 °C
up to +180 °C (on request)		
Ag	Ag	Ag
crimp / screw solder	crimp / screw solder	crimp
+		

<sup>1</sup> ODU QCH = ODU quick-change head

## SPRINGWIRE TECHNOLOGY



### SUBMARINE CHARGING CONNECTOR

ODU springwire contacts are used in a special high-performance charging connector at submarine mooring points, where the tough environmental conditions place high demands on the connection. ODU SPRINGTAC contacts are particularly well suited for the task, thanks to their extreme reliability and durability.

**Low mating and demating forces**  
for low coupling forces

**Outstanding reliability**  
and durability

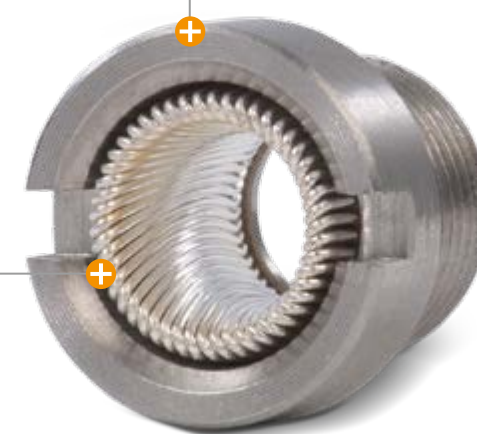


### FREEZE-DRYING FACILITY





The connection of heating plates in a pharmaceutical freeze-drying facility is achieved through contacts with ODU springwire technology. The heating plates are simultaneously fixed and connected by means of a lock pin. ODU SPRINGTAC contacts are installed on the base plate as well as in the cold chamber of the freeze-drying facility.

**Compact contact design**  
for a short mating depth

**Low contact resistance**  
for reliable function



Connectors using the springwire technology offer maximum reliability for a wide variety of applications requiring longevity. This technology provides over one million mating cycles. The multiple independent springwire contact elements ensure top contact security and stable, yet low contact resistance – even for highly demanding applications.

-  Very high contact security
-  Very high vibration resistance
-  High current-carrying capacity
-  Low contact resistance



## LAMELLA TECHNOLOGY

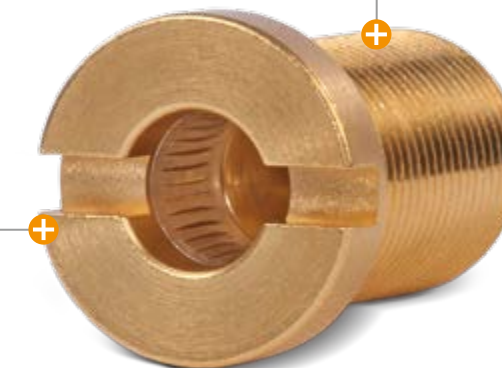


## ELECTRIC SURFBOARD

Even a novel electric surf board, had a requirement for ODU lamella technology. The ODU LAMTAC contacts serve as an interface between the power supply, speed regulator and drive motor.

**Easy assembly**  
due to screw termination

**Low contact resistance**  
for perfect performance



## SNOW GROOMER ENGINE

ODU lamella contacts form an interface between the inverter and the electric power system, of the snow groomer's engine. For this customer-specific solution, the high-current carrying ODU LAMTAC contacts were integrated into the smallest of construction spaces.

**Compact contact design**  
for low space requirements

**Very high current-carrying capacity**  
due to lamella technology



## ODU LAMTAC® THE HIGH PERFORMANCE CONTACT

Connectors using the lamella technology offer maximum current-carrying capacity. Its minimal power loss enables top performance integration even in the smallest of construction spaces. In addition, its high temperature resistance of up to 180 °C makes this universally adaptable contact, perfectly suited to all high current connector requirements, in the most varied high-performance applications.

- + Current-carrying capacity of up to 2,400 amperes and more
- + More than 10,000 mating cycles
- + High vibration resistance
- + Automated lamella assembly



## TURNED, SLOTTED CONTACTS

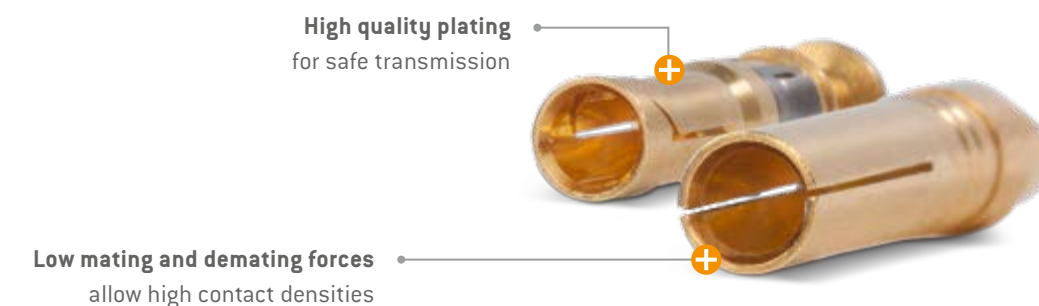


This universally applicable contact system is based on turned and slotted contacts and offers the best contact properties and qualities for economical prices. It has proven reliable even in harsh environments and excels through its extraordinarily robust nature when misalignment occurs on mating – no matter how high the mating cycle rate. Even the smallest contact diameters (from 0.3 mm) offer top quality performance and through the profile design, enable the greatest contact densities.

- + Rugged contact system, suitable even for harsh environments
- + More than 10,000 mating cycles
- + Mating possible at an angle of up to 5°
- + Tiniest dimensions possible, down to 0.3 mm contact diameter

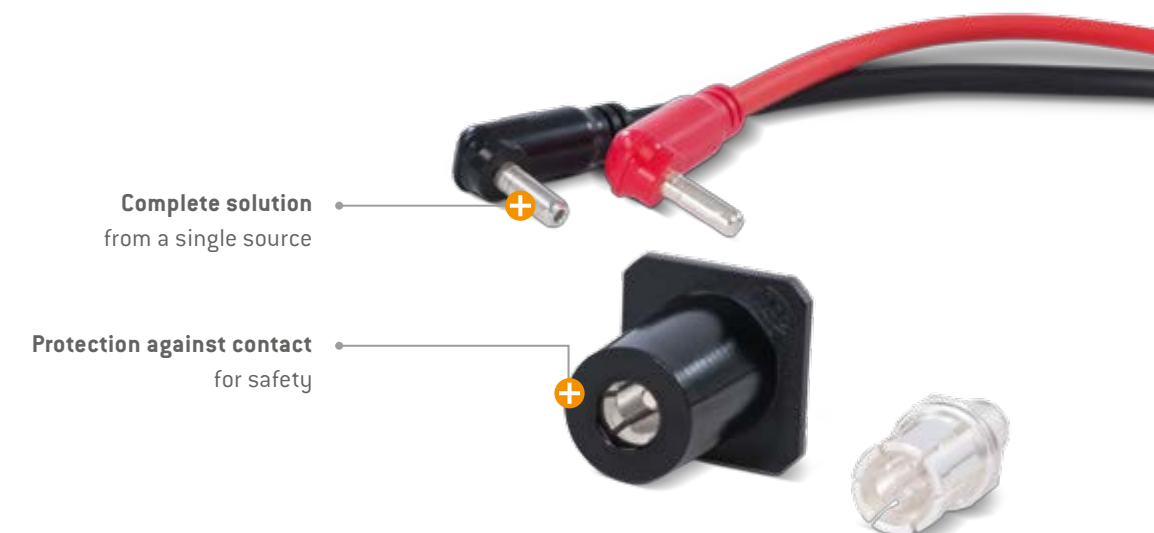
## CONTACTS FOR CONNECTORS

The universal properties of the ODU TURNTAC typically make it the number one choice for connectors in automation or other industrial applications. Even the smallest of dimensions allow for high contact density. The sophisticated contact technology combined with our surface engineering enable reliable contacting even in the most challenging operating conditions.



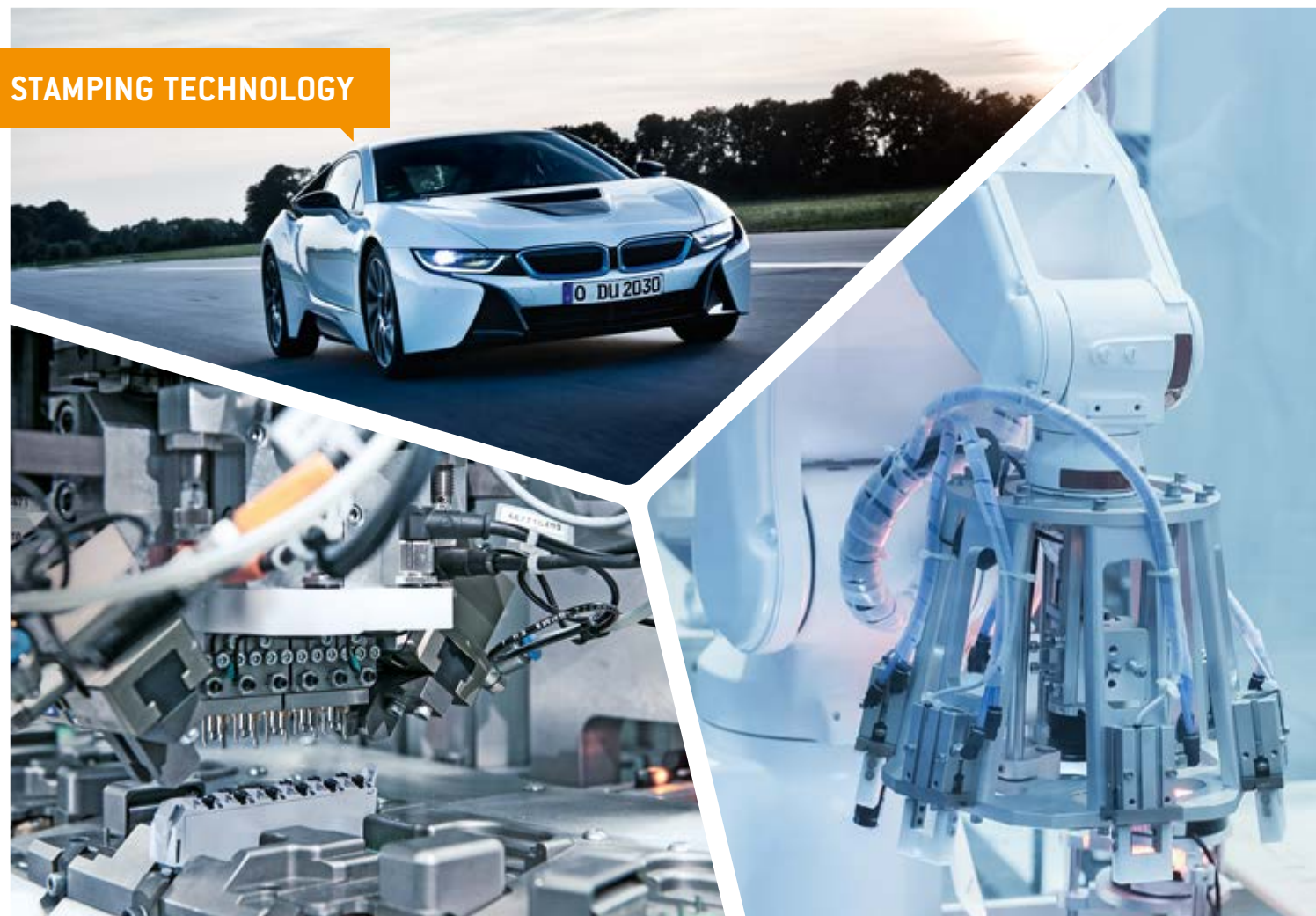
## BATTERY STORAGE SYSTEM

The angled ODU pin contact mates with an ODU TURNTAC socket, which in-turn completes the circuit between the module block and battery storage system. The ODU product, which we manufacture completely including the cable assembly, guarantees easy installation of the system. Additional protection against unintentional mating, creates perfect connections.





## STAMPING TECHNOLOGY



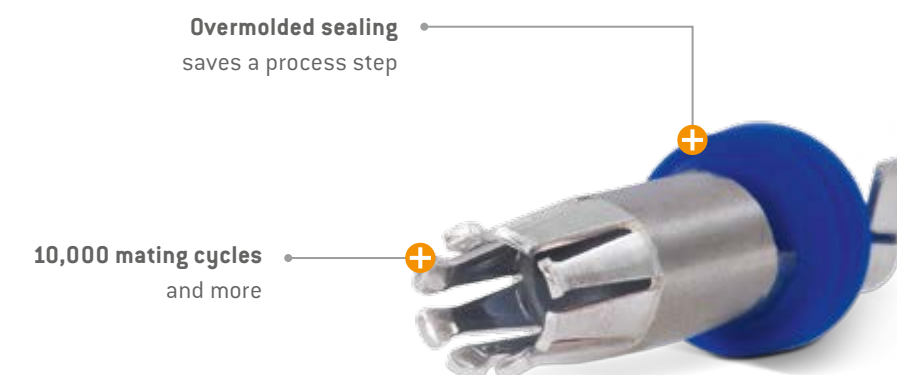
## CONTACT WITH PUSH-IN TERMINAL

These high-performance stamped contacts, used within automation technology assembly, do not just require precise manufacturing, but also demand a great deal of experience and knowhow in matters of design and contact. Optimal functioning, however, can only occur through perfect surfaces. Our ODU STAMPTAC technology therefore relies on our ODU surface technology. The selective gold-plating we apply is resource-friendly and ensures reliable connecting.



## CHARGING CONNECTOR FOR ELECTRIC VEHICLES

Our ODU STAMPTAC standard contacts for automated processing in the serial production of charging plugs (IEC) are a cost-efficient alternative for high volumes. Thanks to the integration of an overmolded sealing element, customers have the additional benefit of shortening the process chain while still achieving IP 67.



## ODU STAMPTAC® THE HIGH VOLUME CONTACT

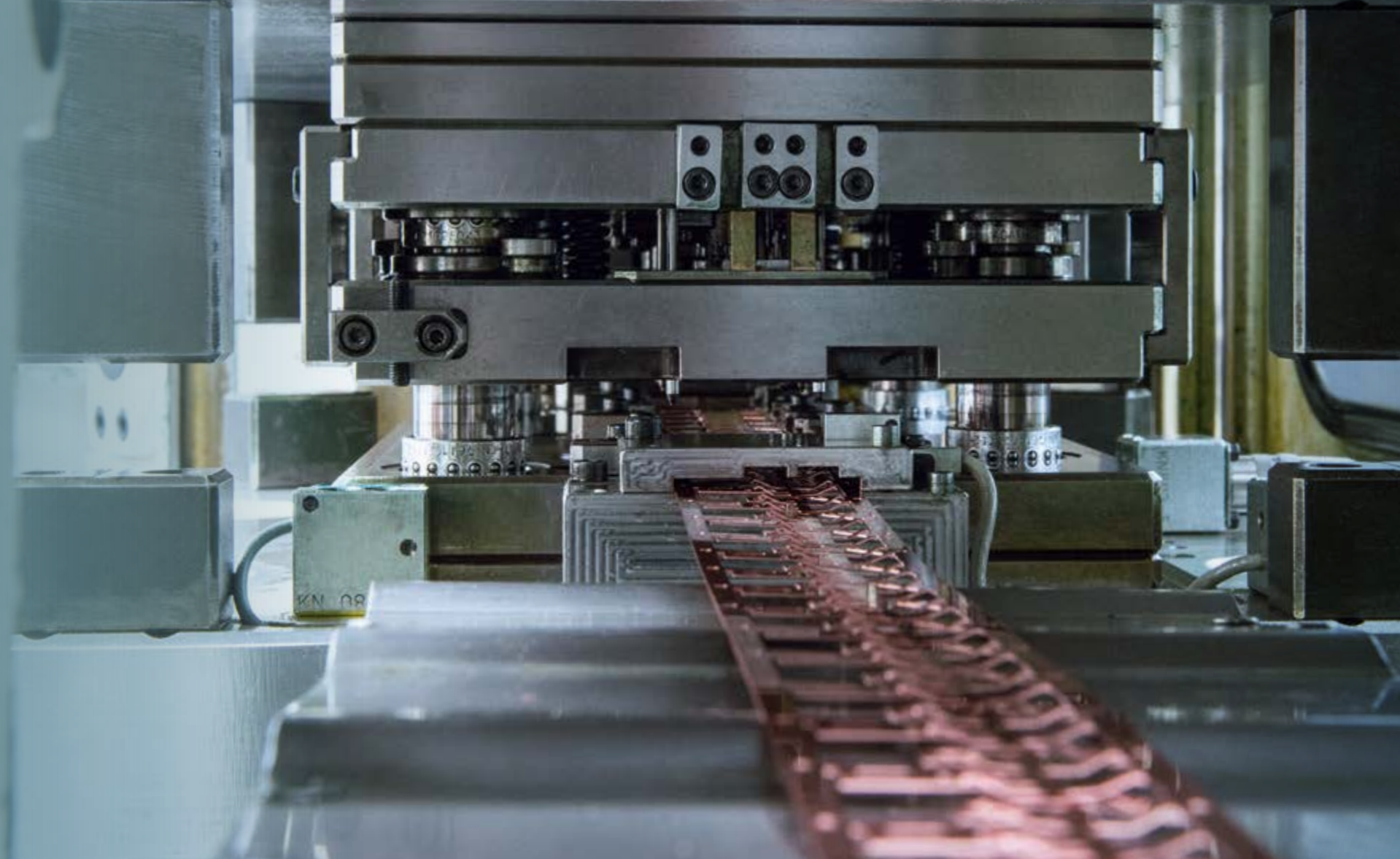
A combination of top contact design and stamping technology offers an efficient and economical solution for large serial production. Optimally designed for automated processing, the most complex geometries can be developed. Thanks to its flexible contact design, it can be tailored perfectly to customer needs – whilst also offering the reliable and durable contacts that customers have come to expect from ODU. System solutions, from simple modules to complete assemblies, can be developed, using this contact design.

- ⊕ Cost-efficient alternative for high volumes
- ⊕ Suitable for automatic processing
- ⊕ Complete assemblies available
- ⊕ Selective plating possible



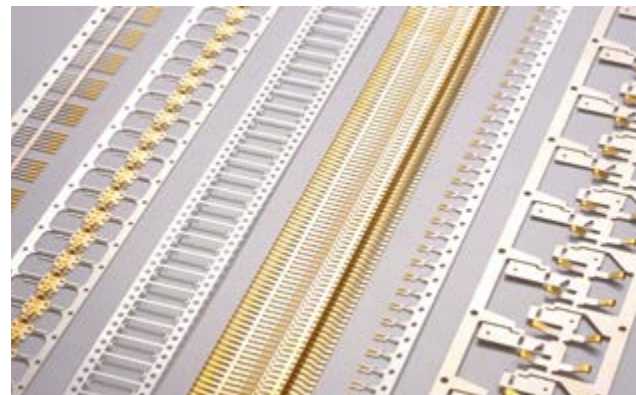
## QUALITY AND EFFICIENCY IN EVERY DETAIL

Two different metal machining processes are particularly important in contact manufacturing: stamping or stamp-bending and machining. For the assembly as well as for further processing of the electrical contacts efficient automated processes are used – quality inspection included.



### TURNERY

Over 110 automatic lathes equipped with up to 12 axes, numerous special tools, some equipped with high frequency spindles, provide significant production flexibility with consistently high quality.

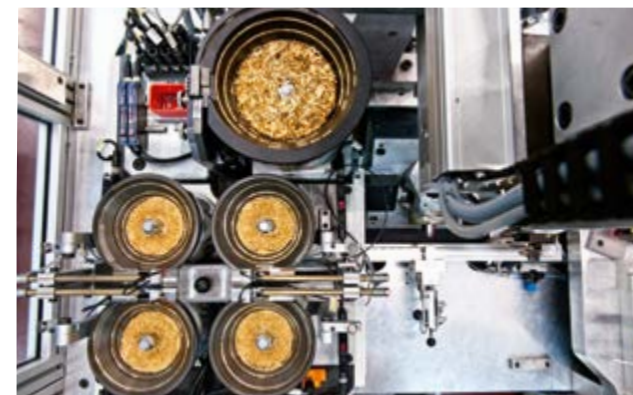


### STAMPING TECHNOLOGY

High-precision, mass-produced contacts are manufactured from various materials at 1,400 strokes/min and 300 kN in material thicknesses of 0.07 mm to 1.5 mm. The tooling technologies for this are naturally from ODU.

### PRECISE, VERSATILE AND FLEXIBLE

- + Best quality from the connector expert
- + Overall machining and assembly processes
- + 8 decades of experience in the field of electrical connector technology



### ASSEMBLY

Starting with customer specific, single-unit production and continuing up to high volumes, all processes at ODU are individually assembled and adjusted to meet the requirements. The results are economic solutions for the production of the contact up to the complete cable assembly.



# DEMANDING REQUIREMENTS – OUTSTANDING FUNCTIONAL SURFACES

Electrical contacts obtain their specific electrical and mechanical properties through application-specific surface treatment. Contact resistance, wear resistance and many other properties are achieved by means of a layering system applied to the base body.

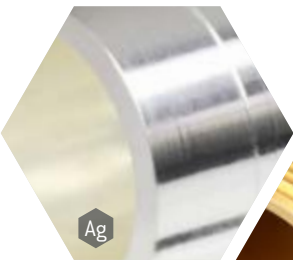
## BARREL/VIBROBOT PROCEDURE

for coatings of turned contacts and loose components with nickel, electrolessnickel (mid-phos./high phos.), gold, silver and white bronze.

## PLATING SYSTEMS FOR HIGHEST DEMANDS

ODU is a leading provider of high-quality plating systems, or “functional surfaces”. Through the integration of surface treatment technology at an early stage of all development and production processes, ODU contacts are guaranteed to have a finishing quality that is precisely tailored to each special requirement.

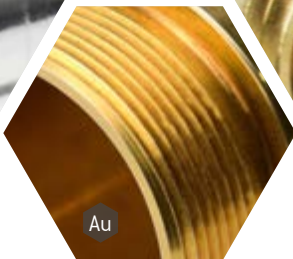
**SILVER**  
For ideal power transmission



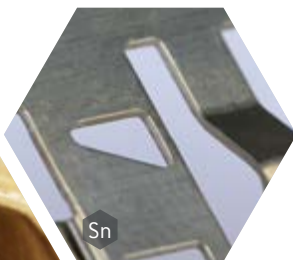
**ONIP / ONIP-A**  
Wear resistant



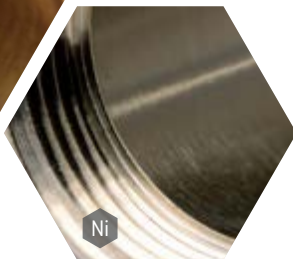
**GOLD**  
For best signal transmission



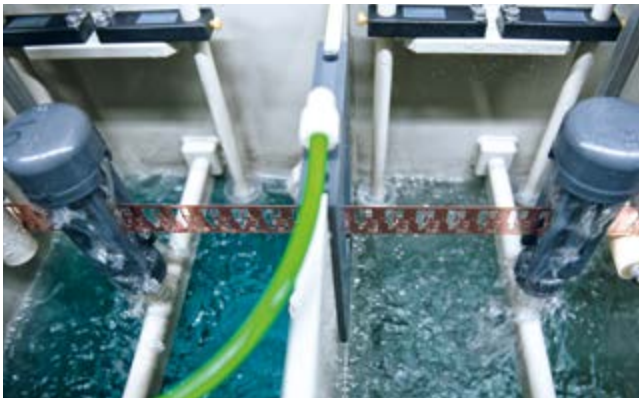
**WHITE BRONZE**  
Non-magnetic



**TIN**  
Very good solderability



**NICKEL**  
For high temperatures



## CONVEYOR BELT SYSTEM

for coatings of stamped contact strips with nickel, gold, brushed gold, immersion gold and tin.



## RACK SYSTEM

for silver coatings of big or heavy contacts.



## FROM A SINGLE SOURCE – THE SYSTEMS APPROACH

The termination and cable can have a decisive impact on the overall system. Therefore, a perfect connector system offers a perfect interplay of the contact, termination technology and cable assembly. To ensure this, we offer our customers complete solutions in which potential factors impacting the system's properties have been carefully assessed.

### THE TERMINATION FOR A PERFECT CONNECTION

ODU has the relevant expertise for developing and manufacturing reliable solutions that are stable for the long-term, even for critical, performance-limiting termination areas. To achieve this, ODU mainly use crimp, solder and screw termination types, as well as different welding processes.



### IT IS NOT A GIVEN, AT ODU, IT'S INCLUSIVE

- + 100% final inspection
- + Production possible in cleanroom in accordance with EN ISO 14644-1
- + Customer-specific labeling possible



### OVERMOLDING

Overmolded solutions are perfect to reduce components like housings or sealing and to reduce the effort for assembling. Form and colour can be adjusted to individual customer requirements.



## PREMIUM QUALITY THROUGH COMPREHENSIVE TESTING SYSTEMATICS

To guarantee functionality, reliability, quality and security of electrical contacts a profound understanding of the underlying physical interrelations is necessary. Our Technology Test Center – T<sup>2</sup>C for short – is the central linchpin for application-specific baseline investigations as well as for the development and use of many different testing procedures.

### MATERIAL SELECTION AND TESTING

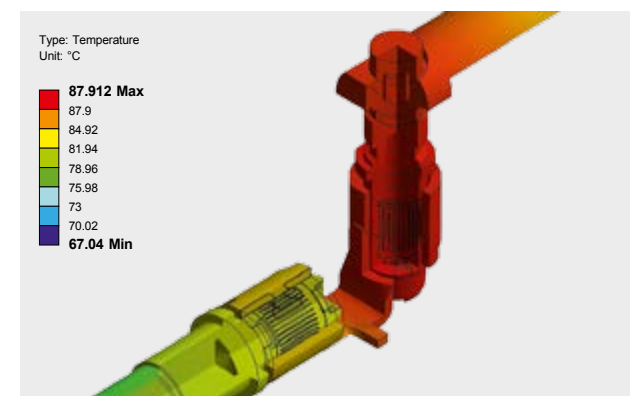
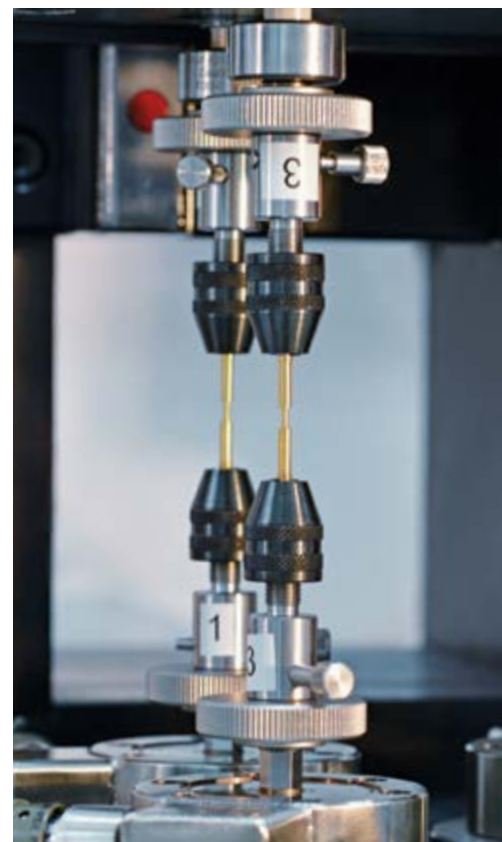
- Mechanical data of basic material (temperature-dependent)
- Coating thickness measurement
- Metallographic examination

### MEASURING, TESTING, UNDERSTANDING AND CONTROLLING

At this point, not all of ODU's in-house measuring and testing methods, which are also an expression of the company's consistent quality strategy, can and should be listed. The examples of procedures named here are those upon which ODU places particular value and where the particular application knowledge contributes to the continuous development of product functionality.

### MECHANICAL TESTING

- Mating and demating forces
- Contact normal force
- Mating cycles
- Vibration and shock resistance



### ELECTRICAL TESTING

- Contact resistance
- Current-carrying capacity and temperature-rise test
- Thermal time constant
- Short-circuit load resistance



### ENVIRONMENTAL TESTING

- Temperature cycles and humidity
- Temperature shock
- Salt-spray
- Corrosive gas



# INGENIOUS IDEAS PERFECT SOLUTIONS

ODU'S PRODUCT PORTFOLIO.

+ Versatile connector solutions for transmission of power, signals, data, or media – ODU never fails to offer the right interface when quality and absolute reliability are the top priorities.



## COMPACT MODULAR CONNECTOR SOLUTIONS

- Application-specific hybrid interface
- For manual mating and automatic docking
- The highest packing density
- Flexible modular construction
- Multitude of data transmission modules
- Variety of locking options available
- For the transmission of signals, power, high current, high voltage, coax, high-speed data, fiber optics and other media such as air or fluid.
- Mating cycles scalable as required from 10,000 to over 100,000 (1 million)



## PUSH-PULL CIRCULAR CONNECTORS

- Circular connector series in robust metal or plastic housing
- Contacts for soldering, crimping and PCB termination
- Optional selectable Push-Pull locking ensuring a secure connection at all times as well as easy to release Break-Away function
- 2 up to 55 contacts
- IP 50 to IP 69
- Autoclavable for medical applications
- Hybrid inserts for combined transmission



## ELECTRICAL CONTACTS

- Versatile connector technologies
- Outstanding reliability, lifetime and durability
- Up to 1 million mating cycles
- Current-carrying capacity of up to 2,400 amperes and more
- Rugged contact systems, suitable even for harsh environments
- Economical solutions for automatic processing



## HEAVY-DUTY & DOCKING AND ROBOTIC CONNECTOR SOLUTIONS

- Extremely durable even under extreme / harsh environments
- Interference-free and secure connection, even under vibration
- Up to 500 A (higher currents upon request)
- High contact security due to the springwire technology
- High pin density due to a minimum contact diameter
- Low contact resistance



## APPLICATION AND CUSTOMER-SPECIFIC SOLUTIONS

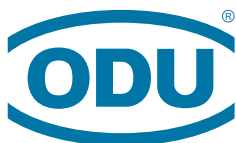
- Contacts, connectors and assemblies for the highest technical requirements as well as special applications
- First-class implementation expertise
- High level of vertical manufacturing – all competences and key technologies under one roof
- Expert advice based on mutual partnership
- Fast development and production



## CABLE ASSEMBLY

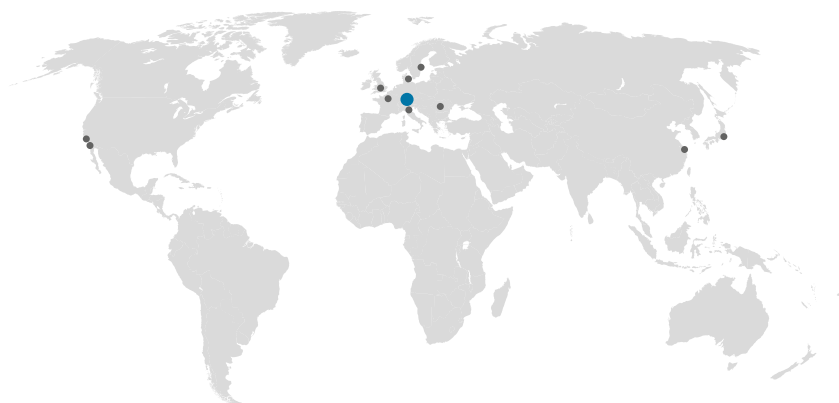
- Complete systems from a single source based on years of assembly expertise
- State-of-the-art production facilities with 100% end testing, high-voltage testing, component testing and pressure testing up to 100 bar
- Cleanroom production
- Hot-melt and high-pressure injection molding
- Customer-specific labeling
- Rapid prototyping of samples





A PERFECT ALLIANCE.

## ODU GROUP WORLDWIDE



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Further information and specialized  
representatives can be found at:

[www.odu-connectors.com/contact/](http://www.odu-connectors.com/contact/)

### PRODUCTION SITES

Germany Otto Dunkel GmbH

China ODU (Shanghai) Connectors Manufacturing Co. LTD

Mexico ODU Mexico Manufacturing S.R.L. de C.V.

Romania ODU Romania Manufacturing S.R.L.

USA ODU-USA, Inc.



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