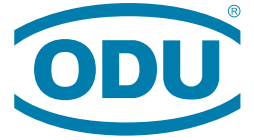


A PERFECT ALLIANCE.



# ADVANCED CONNECTOR SOLUTIONS



⊕ CIRCULAR CONNECTORS



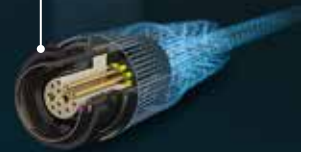
⊕ ELECTRICAL CONTACTS



⊕ MODULAR CONNECTORS

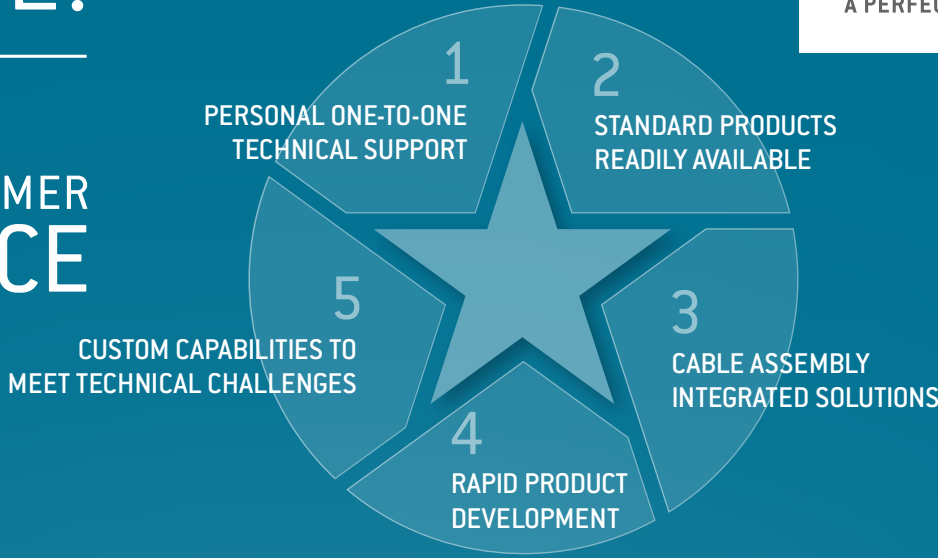


⊕ CABLE ASSEMBLY



# A PERFECT ALLIANCE.

## ODU 5 STAR CUSTOMER EXPERIENCE



### ODU GROUP OVERVIEW

- More than 80 years of experience in connector technology
- Over 2,300 employees worldwide
- 10 sales subsidiaries in China, Denmark, France, Germany, Italy, Japan, Korea, Sweden, the UK and the US as well as 5 production and logistics sites
- All technologies under one roof: Design and development, machine tool and special machine construction, injection, stamping, turning, surface technology, assembly and cable assembly

We operate in the following markets: medical, military and security, test and measurement, industrial, energy, and automotive / emobility

As of February 2019

### CERTIFIED QUALITY

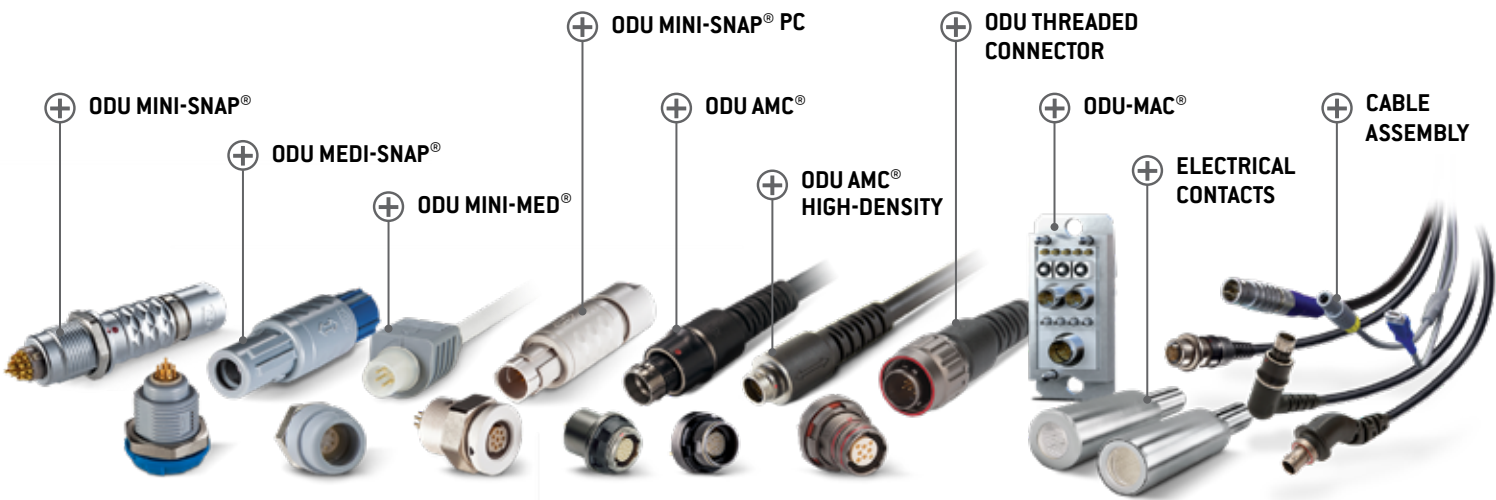
- ISO 9001
- IATF 16949
- ISO 13485
- ISO 14001
- ISO 50001
- Wide range of UL, CSA, VG and VDE licenses
- UL certified cable assembly

For a complete list of our certifications, please visit our website.



www.odu-usa.com

## ODU CONNECTIVITY SOLUTIONS AND CAPABILITIES



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	ODU MINI-SNAP®	ODU MEDI-SNAP®	ODU MINI-MED®	ODU MINI-SNAP® PC	ODU AMC®	ODU AMC® High-Density	ODU Threaded Connector	ODU-MAC®	Electrical Contacts
Push-Pull locking	•	•		•	•				
Break-Away locking	•	•	•		•	•		•	•
Spindle or lever locking								•	
High-speed data transmission (> 480 Mbit/S)	•				•	•	•	•	
Mechanical coding	•	•	•	•	•	•	•	•	
Blind mate/ blind insertion	•	•	•	•	•	•	•	•	
360° Shielding	•				•	•	•	•	
Watertight	•	•	•	•	•	•	•	•	
High mating cycles (> 5,000)	•			•	•	•		•	•
High mating cycles (< 100,000 and more)								•	•
Vibration & shock resistant	•	•		•	•	•	•	•	•
Rack panel w/ docking frame								•	
Threaded technology							•		
Silicone overmold	•	•*				•**			

\* Approved for ODU MEDI-SNAP® Break-Away Plugs in PSU

\*\* Available in ODU-AMC® High-Density Chrome-Plated

ODU CUSTOM CONNECTOR CAPABILITIES

EXTREME DESIGNS - PUSHING THE LIMITS

See below some of our technical capabilities that have been used for specific custom applications. We continuously work with our customers to meet the most extreme technical challenges.

CONTACT OUR ENGINEERING TEAM  
Email us at: myapplications@odu-usa.com



Requirement	Extremes ODU has achieved
High current	2,400 A
High voltage	56 kV (DC) 36 kV (AC)
Water protection	IP67 / IP68 / IP69K / IP6K9K
Vacuum tightness	1 × 10 <sup>-9</sup> mbar l/s
Salt spray	700 hours
EMC / EMI protection	> 75 dB [0 – 5 MHz] / > 65 dB [5 MHz – 500 MHz]
High speed data rate	USB® 3.2 Gen 1x1 – 5 GBit/s <sup>1</sup> / HDMI® 2.0 – 14.4 Gbit/s <sup>1</sup> / 10 Gbit Ethernet – 10 Gbit/s <sup>1</sup>
Operating temperature	Up to 300 °C
Pressure	650 bar [9427 psi] operating receptacle / 500 bar [7251 psi] operating mated condition / 1,000 bar [14503 psi] burst
Vibration	LV214 Severity Level 4 [20 g, 10 – 2000 Hz, 22 h] Four-time multisinus per three-dimensional axis [16 g, 20 – 2000 Hz, 65 h per axis]
Mating cycles	> 1 Million
Hydraulic connection	25 bar [362 psi] operating
Pneumatic connection	20 bar [290 psi] operating
Fiber optic	< 1 dB typical @ 100,000 mating cycles single mode/multimode
Magnetic permeability	Magnetic permeability $\mu$ r < 1.0005
Environmental	Salt spray / fog, chemical resistance, UV, Arizona dust, radiation, sterilization
Shock	1,000 g
Contact density	1 contact/mm <sup>2</sup>
Smallest contact diameter	0.3 mm
Smallest circular connector diameter	5 mm
On driving test	Electric vehicle adapter
Self finding solutions	+/- 5 mm float (shield and tight)

<sup>1</sup> These ODU specific connectors can transmit common data transmission protocols such as USB® 3.2 Gen 1x1, HDMI® 2.0 and Ethernet, but they are not USB®, HDMI®- and Ethernet-standard connectors.

ODU PRODUCT AVAILABILITY



CIRCULAR



MODULAR



ELECTRICAL CONTACTS



CUSTOM SOLUTIONS



CABLE ASSEMBLY

ODU DIRECT SALES

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or call 805.484.0540

ODU WEBSTORE

Visit us at [store.odu-usa.com](http://store.odu-usa.com)

ODU DISTRIBUTION



ODU HIGH-DENSITY & LIGHTWEIGHT CONNECTOR PORTFOLIO

FAST SAMPLE AVAILABILITY  
Email us at: [sales@odu-usa.com](mailto:sales@odu-usa.com)

RAPID CABLE ASSEMBLY  
MANUFACTURING



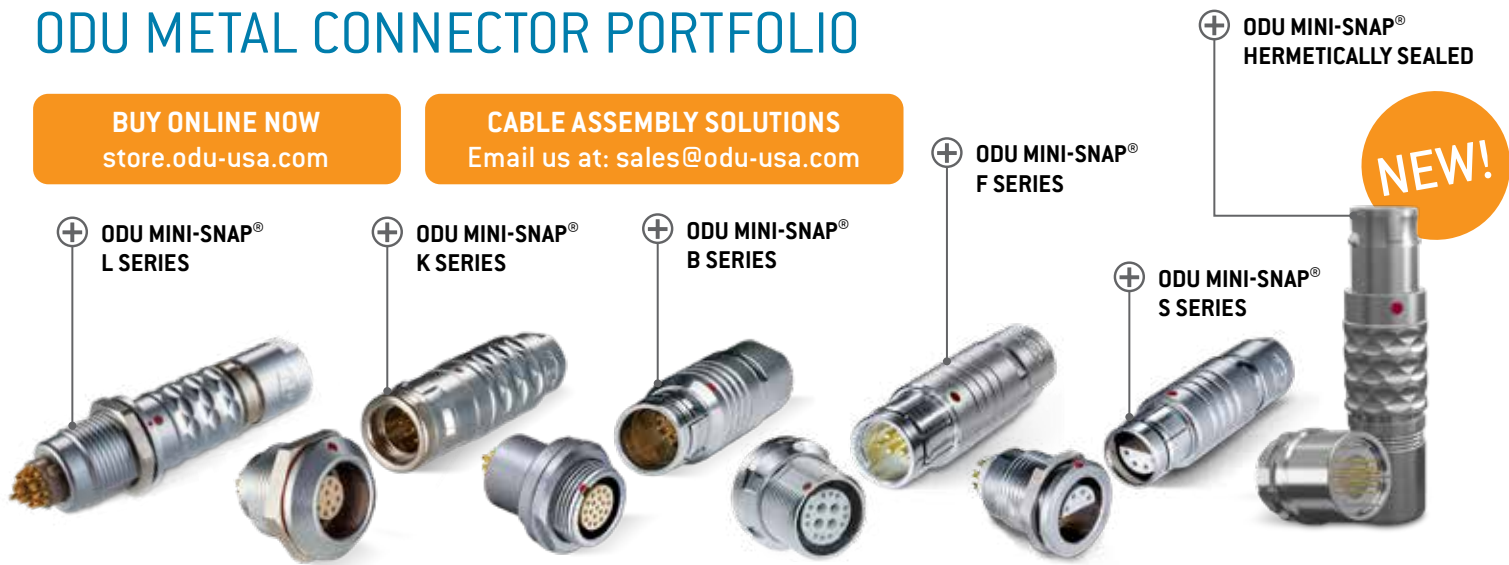
	Coding	Sizes	No. of possible mechanical coding	Diameter plug (mm)	Max. cable diameter (mm)	Max. no. of contacts	Solder	Crimp	Print	IP Class in mated condition	IP Class in unmated condition
<b>ODU AMC® High-Density</b> <ul style="list-style-type: none"><li>70 % weight and size reduction</li><li>Cable assembly solutions</li><li>IP68 (20 m submersion)</li><li>Chrome plated version available</li><li>USB® 3.2 Gen 1x1 + USB® 2.0 + HDMI® 2.0 + Ethernet<sup>1</sup></li></ul>	Pin and groove	00	4	9.8	5.0	7	•		•	IP6K8	IP68
		0		12.8	7.0	16					
		1		14.8	8.5	27					
		1.5		16.8	10.5	40					
<b>ODU AMC® High-Density Screw-Lock</b> <ul style="list-style-type: none"><li>High vibration resistance</li><li>High speed data transfer</li><li>IP68</li><li>High contact density: 2-16 contacts / 2 sizes</li></ul>	Pin and groove	00	4	9.8	5.0	7	•		•	IP6K8	IP68
		0		12.8	7.0	16					
<b>ODU AMC® Push-Pull</b> <ul style="list-style-type: none"><li>IP68 and IP6K9K</li><li>&gt; 5,000 mating cycles</li><li>High speed data technology</li><li>Quick and easy mating and locking</li></ul>	Pin and groove	0	4	14.0	5.5	10	•		•	Up to IP6K9K	IP68
		1		15.9	6.5	16					
		1.5		16.5	8.0	19					
		2		19.6	10.0	26					
		3		23.9	11.5	37					
<b>ODU AMC® Break-Away</b> <ul style="list-style-type: none"><li>IP68 and IP6K9K</li><li>&gt; 5,000 mating cycles</li><li>High speed data technology</li><li>Quick and easy demating and locking</li></ul>	Pin and groove	0	4	11.9	5.5	10	•		•	Up to IP6K9K	IP68
		1		13.9	6.5	16					
		1.5		15.9	8.0	19					
		2		17.6	10.0	26					
<b>ODU AMC® Easy-Clean</b> <ul style="list-style-type: none"><li>Fast and easy cleaning</li><li>Break-Away function</li><li>&gt; 5,000 mating cycles</li><li>Contact inserts with pogo pins</li></ul>	Pin and groove	0	4	11.9	5.5	7	•		•	Up to IP6K9K	IP6K8
		1		13.9	6.5	16					
		1.5		15.9	8.0	19					
<b>ODU THREADED CONNECTOR</b> <ul style="list-style-type: none"><li>High shock and vibration</li><li>Signal and power</li><li>IP68</li></ul>	Pin and groove	1.5	2	17.5	8.5	19	•		•	IP6K8	IP68
		3		24.9	12.8	26					






<sup>1</sup> These ODU specific connectors can transmit common data transmission protocols such as USB®, HDMI®, Ethernet, CAT 5 and CAT 6A, but they are not USB®, HDMI®- and Ethernet- standard connectors.

ODU METAL CONNECTOR PORTFOLIO

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		Coding	Sizes	No. of possible mechanical coding	Diameter plug (mm)	Max. cable diameter (mm)	Max. no. of contacts	Solder	Crimp	Print	IP Class in mated condition	IP Class in unmated condition
<b>ODU MINI-SNAP® L</b> <ul style="list-style-type: none"><li>IP50</li><li>5,000 mating cycles</li><li>Hermetically sealed option</li><li>USB® 3.1 Gen 1 + USB® 2.0 + Ethernet¹</li></ul>		Pin and groove	00	4	6.4	3.5	04					
			0		9	5.6	10					
			1		11.5	7.7	16					
			2	8	14.5	9.9	26	•	•	•	IP50	Up to IP68
			3		17.5	11.9	30					
			4		25.0	16.0	40					
<b>ODU MINI-SNAP® K</b> <ul style="list-style-type: none"><li>IP68</li><li>5,000 mating cycles</li><li>USB® 2.0 + Ethernet¹</li></ul>		Pin and groove	0		11.0	5.0	10					
			1		13.0	7.0	16					
			2	8	16.0	9.0	26	•	•	•	IP68	Up to IP68
			3		19.0	10.5	30					
			4		25.0	14.0	40					
<b>ODU MINI-SNAP® B</b> <ul style="list-style-type: none"><li>IP68</li><li>5,000 mating cycles</li><li>USB® 2.0 + Ethernet¹</li></ul>		Pin and groove	0	8	9.4	5.0	10					
			1	9	12.0	7.0	16					
			2	10	15.0	9.0	26	•	•	•	IP68	Up to IP68
			3	13	18.0	10.5	30					
<b>ODU MINI-SNAP® S</b> <ul style="list-style-type: none"><li>IP50 and IP68</li><li>Coax and triax</li></ul>		Insulator	0		9.4	5.0	04					
			1	1	12.0	7.0	06	•		•	Up to IP68	Up to IP68
			2		15.0	9.0	10					
<b>ODU MINI-SNAP® F</b> <ul style="list-style-type: none"><li>IP50 and IP68</li><li>5,000 mating cycles</li><li>Ethernet¹</li></ul>		Half shell	0		9.4	5.0	09					
			1		12.0	7.5	14					
			1.5	3	13.0	7.5	19	•	•	•	Up to IP68	Up to IP68
			2		15.0	9.5	19					
			3		18.0	11.5	27					


¹ These ODU specific connectors can transmit common data transmission protocols such as USB® 3.1 Gen 1, USB® 2.0, and Ethernet, but they are not USB®- and Ethernet- standard connectors.

ODU PLASTIC CONNECTOR PORTFOLIO

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		Coding	Sizes	No. of possible mechanical coding	Diameter plug (mm)	Max. cable diameter (mm)	Max. No. of contacts	Solder	Crimp	Print	IP Class in mated condition	IP Class in unmated condition
<b>ODU MEDI-SNAP® PUSH-PULL</b> <ul style="list-style-type: none"><li>IP50 and IP64</li><li>Autoclavable &amp; fully sterilizable</li><li>High voltage insert up to 1,000 V AC</li><li>IEC 60601-1 compliant housings¹</li><li>Right angle version available</li></ul>		Pin and groove	1	6	13.7		14				Up to IP64	IP68
			2	3	18.5	9.2	26	•	•	•		
<b>ODU MEDI-SNAP® BREAK-AWAY</b> <ul style="list-style-type: none"><li>IP64 / IP67</li><li>Autoclavable</li><li>Break-Away for minium of 2,000 mating cycles</li></ul>		Pin and groove	1	6	15.8	5.5	14				Up to IP67	IP68
			2	1	18.3	11.5	26	•			Up to IP64	
<b>ODU MEDI-SNAP® HIGH-VOLTAGE</b> <ul style="list-style-type: none"><li>Touch proof according to IEC-60664-1</li><li>Hot-Plugging prevention</li><li>2X HV, 2X Signal interlock, 1X Ground/FMLB</li><li>Nominal voltage up to 1,000 V AC &amp; 16 A</li></ul>		Pin and groove	2	3	18.5	9.2	5	•			Up to IP64	IP50
<b>ODU MINI-MED®</b> <ul style="list-style-type: none"><li>Space saving design</li><li>Pre-assembled solution</li><li>Up to 1,000 mating cycles</li></ul>		Pin and groove	1	1	11.5 / 11.2	4.4	6	•			IP67	IP50
<b>ODU MINI-SNAP® PC</b> <ul style="list-style-type: none"><li>Plastic connector</li><li>IP50 and IP67</li><li>Shielded version available</li></ul>		Half shell	1		12.5	6.0	14					
			2	3	15.7	9.0	19	•	•	•	Up to IP67	IP50
			3		18.7	10.5	27					

¹ Up to 2 MOPP / 2 M00P

ODU MODULAR / RECTANGULAR CONNECTOR PORTFOLIO



100,000 mating cycles and more



100,000 mating cycles and more



100,000 mating cycles and more



10,000 mating cycles and more



NEW!

ODU-MAC® Silver-Line

Automatic docking.

ODU DOCK Silver-Line

Automatic docking & robot systems.

ODU-MAC® White-Line

Manual mating.

ODU-MAC® Blue-Line

A new performance class.

ODU-MAC® Blue-Line PUSH-LOCK

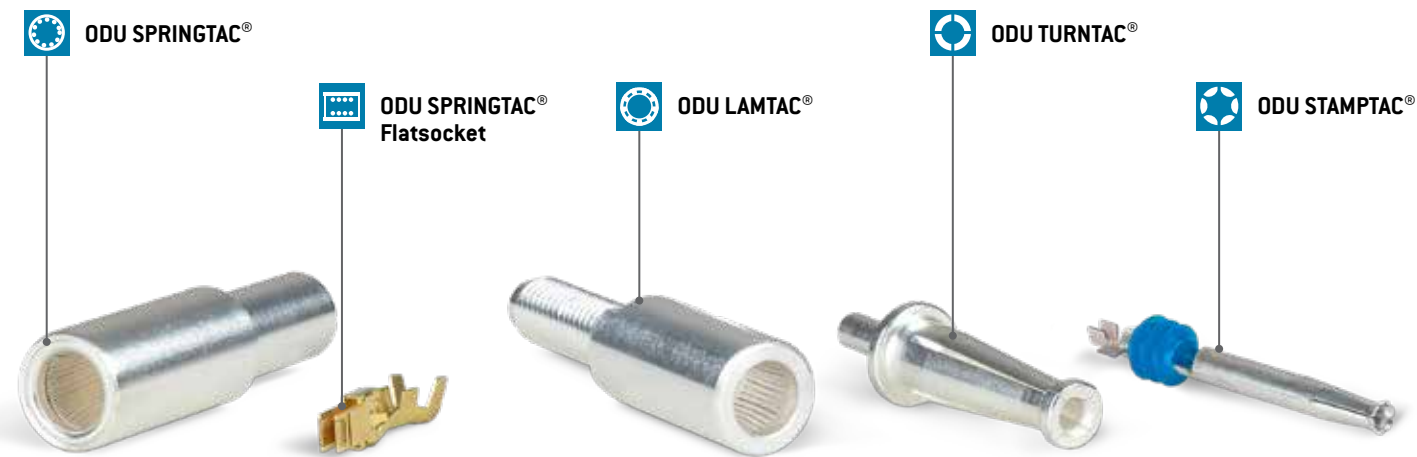
Easy one handed operation.

	ODU-MAC® Silver-Line	ODU DOCK Silver-Line	ODU-MAC® White-Line	ODU-MAC® Blue-Line	ODU-MAC® Push-Lock Blue-Line
Mating cycles	> 100,000	> 100,000	> 100,000	> 10,000	5,000
Mating principle	Automatic docking	Automatic docking	Manual mating	Manual mating, automatic docking	Manual mating
Automatic docking	6 Frame varieties, Quick-change head option	3 Sizes Quick change head option		1 Frame variety, 4 sizes	
Locking			Spindle / lever locking Snap-In [ZERO]	Spindle / lever locking	Push-locking
Housing	Metal frame	3 housing varieties available in plastic and metal	Available in plastic and metal	Available in plastic and metal	Plastic Plastic sleeve / Metal frame
Strain relief	•	•	•	•	•
Highest packing density on the market	•	•	•	•*	•
Non-magnetic version	•		•		

VARIETY OF MODULES

Signal	Up to 27 A / 1.5 mm²	Up to 27 A / 1.5 mm²	Up to 27 A / 1.5 mm²	Up to 33 A / 2.5 mm²	Up to 33 A / 2.5 mm²
Power	Up to 119 A / 16 mm²	Up to 119 A / 16 mm²	Up to 119 A / 16 mm²	Up to 58 A / 6 mm²	Up to 58 A / 6 mm²
High current	Up to 225 A / 50 mm²	Up to 225 A / 50 mm²	Up to 225 A / 50 mm²	Up to 225 A / 50 mm²	Up to 58 A / 6 mm²
High voltage	Up to 6.3 kV / 1.5 mm²	Up to 2.5 kV / 1.5 mm²	Up to 6.3 kV / 1.5 mm²	Up to 2.5 kV / 6 mm²	Up to 2.5 kV / 6 mm²
Coax	Up to 9.0 GHz	Up to 9.0 GHz	Up to 9.0 GHz	Up to 12 GHz	Up to 12 GHz
Compressed air	Up to 25 bar	Up to 25 bar	Up to 25 bar	Up to 16 bar	Up to 16 bar
Fluid	Up to 25 bar	Up to 25 bar	Up to 25 bar	Up to 16 bar	Up to 16 bar
Fiber optic POF / GOF	•	•	•	• [GOF only on request]	• [GOF only on request]
Transfer rates / high-speed	CAT 6 <sub>A</sub> <sup>1</sup> / USB <sup>®1</sup> / HDMI <sup>®1</sup>	CAT 6 <sub>A</sub> <sup>1</sup> / USB <sup>®1</sup> / HDMI <sup>®1</sup>	CAT 6 <sub>A</sub> <sup>1</sup> / USB <sup>®1</sup> / HDMI <sup>®1</sup>	CAT 6 <sub>A</sub> <sup>1</sup> / USB <sup>®1</sup>	CAT 6 <sub>A</sub> <sup>1</sup> / USB <sup>®1</sup>
Optional pin protection	Module can be freely positioned		Module can be freely positioned	Integrated with 20-pin signal module	Integrated with 20-pin signal module
Termination technology	Crimp / solder / print	Crimp / solder	Crimp / solder / print	Crimp / solder / print through PCB termination modules	Crimp / solder / print through PCB termination modules

ODU ELECTRICAL CONTACT PORTFOLIO



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	ODU SPRINGTAC®	ODU SPRINGTAC® Flatsocket	ODU LAMTAC®	ODU TURNTAC®	ODU STAMPTAC®
Contact technology	Springwire technology	Springwire technology	Lamella technology	Turned, slotted contacts	Stamping technology
Contact security	• • •	• • •	• •	•	• •
Contact diameter	From Ø 0.76 mm	From 0.64 x 0.64 mm	From Ø 1.5 mm	From Ø 1.5 mm	Ø 3 and Ø 6 mm
Mating cycles	> 100,000 (up to 1 million)	> 50,000	> 10,000	> 10,000	> 10,000
Operating temperature range	–40° C to +125° C	–40° C to +125° C	–40° C to +150° C	–40° C to +125° C	–40° C to +105° C
High temperature range	Up to +300 °C (on request)		Up to +150°C		
Surfaces	Ag (Au up to Ø 1.02 mm)	Ag / Au	Ag / Au	Ag	Ag
Termination technologies	Crimp / screw / solder	Crimp	Crimp / screw / solder	Crimp / screw / solder	Crimp
Current (6 mm) per IEC 60512-5-2:2002	100 A		130 A	100 A	
Angular misalignment	+/- 1°		+/- 1°	+/- 5°	+/- 1°
Contact material	CuSn alloy or CuBe		CuBe alloy	CuZnPb	CuSn alloy
Primary attribute	High mating cycles	Test & Measurement	High current	High volume	High volume
Points of contact	360° circular	Single or double sided	360° circular	1,2,4,6 Times circular	2,4,6 Times circular

ODU AUTOMOTIVE CONNECTOR SOLUTIONS



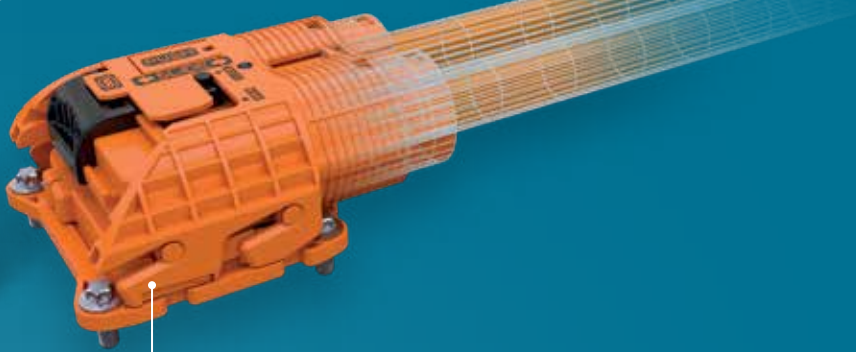
**ODU DOCKING MATE®**  
Tolerance compensating connector systems enable a wide range of applications

- Compensation of tolerances up to +/- 5 mm possible
- Custom power & signal combinations available
- Ideal for hot swapping / blind mating applications



**ODU GEN2 – 2 POLE HV CONNECTOR SYSTEM**

- Trouble-free: Shielding attenuation > 60 db
- Tested: As per the requirements of LV215
- Sealing: IP6K9K sealing class



**ODU POWER MATE® 400**  
Low Profile High Voltage

- Up to 400 A
- 1000 V
- Up to 95 mm² cable
- Extremely low profile
- Ideal for HV battery / inverter applications specifically where space is critical



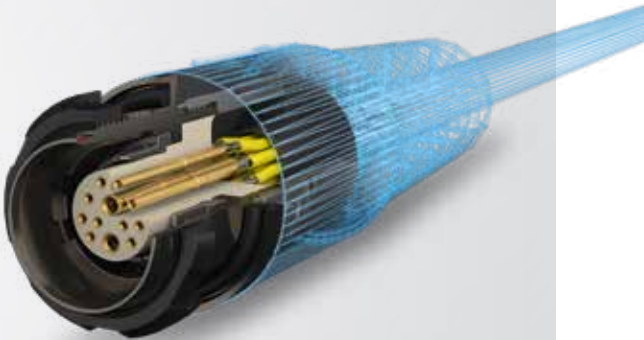
**IEC CHARGING CONNECTOR**

- Rugged ODU TURNTAC® contact system suitable for harsh environments
- Rated up to 10,000 cycles
- Mating possible at angle of up to 5° making this an ideal contact for charging applications
- Custom charging handles available upon request



FOR MORE INFORMATION  
Visit: [www.oduautomotive.com](http://www.oduautomotive.com)

# ODU CABLE ASSEMBLY SOLUTIONS & CONNECTORS FROM ONE SOURCE



OVERMOLDS WITH SILICONE, TPE, TPU & TPV



POTTING AND ENVIRONMENTAL SEALING



CUSTOM COMPONENT OVERMOLD  
[Custom Requirement]

NON ODU CONNECTORS

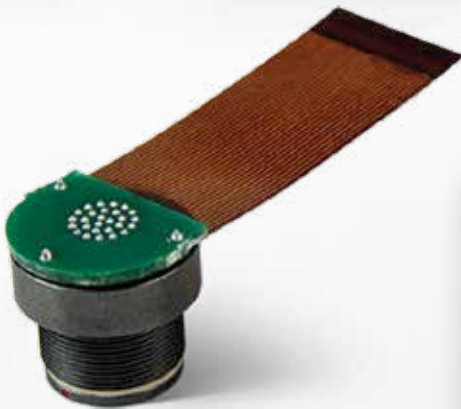
- High-speed standard connectors such as: USB® 3.2 Gen 1x1, USB® 2.0, HDMI® 2.0 and Ethernet CAT 5<sup>1</sup>
- Military and medical connectors
- Wire to board connectors

<sup>1</sup>ODU specific connectors can transmit common data transmission protocols such as USB® 3.2 Gen 1x1, USB® 2.0, HDMI® 2.0, and Ethernet CAT 5, but they are not USB®, HDMI®, Ethernet- or CAT - standard connectors.

CUSTOMIZED CONNECTOR SOLUTIONS



FLEX LAYER ASSEMBLY



## ODU TESTING & QUALITY



- In-process checking
- Data rate testing
- 100% final inspection
- EMC compatible assembly

- Potting and environmental sealing
- IPC/WHMA-A-620
- Production possible in cleanroom in accordance with EN ISO 14644-1



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ASK OUR ENGINEERS  
Email us at: [sales@odu-usa.com](mailto:sales@odu-usa.com)

# ODU CABLE ASSEMBLY SERVICES

## WORLDWIDE PRESENCE SERVING LOCAL MARKETS



**ODU NORTH AMERICA CABLE ASSEMBLY FACILITY**

**VALUE ADDED SERVICES**

The ODU North America facility specializes in rapid prototyping and projects ranging from medium to large sized volumes.

**ADVANCED CUSTOMER BENEFITS**

- One-to-one technical support
- Global & regional footprint
- Rapid product development
- Vertically integrated connector manufacturer

ISO 9001 | IATF 16949 | ISO 13485 | ISO 14001 | ISO 50001 | UL Certified Cable Assembly | ITAR Authorized Operation

## ODU COMPLETE CABLE ASSEMBLY SOLUTIONS ACROSS MULTIPLE MARKETS:

### MEDICAL



### MILITARY AND SECURITY



### TEST AND MEASUREMENT



### AUTOMOTIVE



# ODU SILICONE CABLE ASSEMBLY SOLUTIONS

## + CUSTOMER BENEFITS

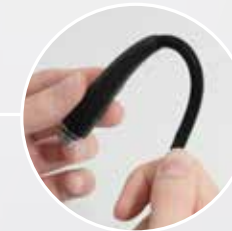
- Up to 500 autoclave cycles
- Approved LSR and HTV processes globally available
- Tested for medical technology use
- Individual laser labeling possible
- Various standard overmolding inserts available
- Halogen and latex-free



SECONDARY SILICONE SURFACE TREATMENT – OPTIONAL



AUTOCLAVABILITY



BEND PROTECTION AND SMOOTH TRANSITIONING OVERMOLDING



## + ODU NORTH AMERICA CAPABILITIES

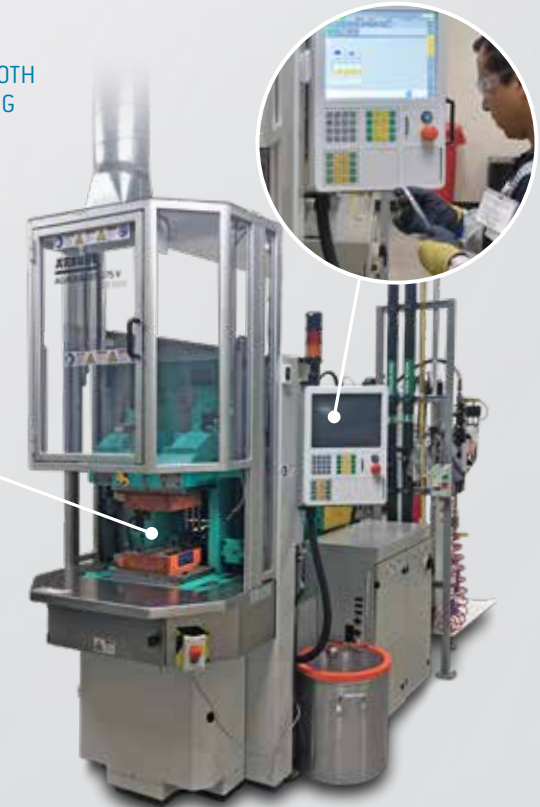
- Environmentally controlled pressurized workroom
- Dedicated silicone overmold work area
- ARBURG-ALLROUNDER 275 V:
  - Vertical free-space system
  - Clamping force: 28 tones
  - Injection unit: 1.4 oz, 2.3 oz



## + ODU INTERNATIONAL CAPABILITIES



- Cleanroom EN ISO14644-1
- ISO 13485
- Tool shop customized molds
- Electroplating shop: The turned or stamped contact can be coated based on customer requirements
- On-site laboratory
- On-site technology test center



ARBURG-ALLROUNDER 275 V

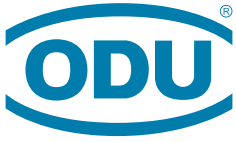
## + TEST AND VALIDATION

### ISO 10993-5 CERTIFIED

- Cytotoxicity test according to DIN EN ISO 10993-5
- Management system certified according to ISO 9001
- Documentation of tests available

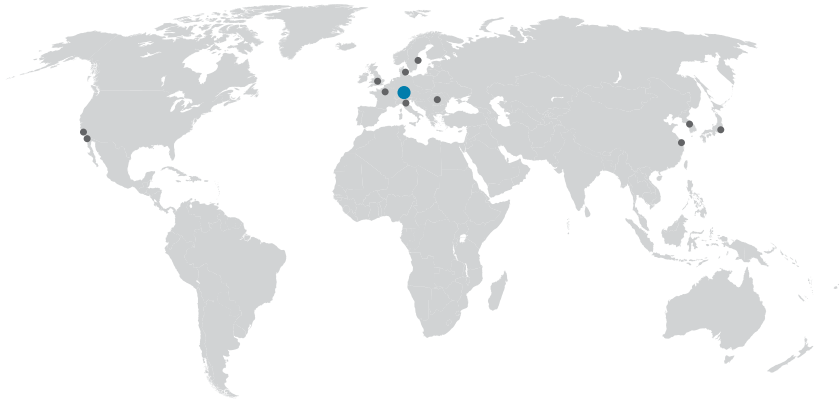
- High-voltage and insulation tests
- Functional and component tests for cable systems
- Runtime measurement
- Tensile strength tests
- Torsional and bending fatigue tests
- Leakage tests for molded components

\* Available upon request



A PERFECT ALLIANCE.

## ODU GROUP WORLDWIDE



### ODU USA

#### ODU-USA, Inc.

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