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ODU ELECTRICAL CONTACTS

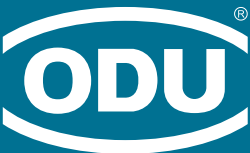
A PERFECT ALLIANCE.

ODU SPRINGTAC®
ODU LAMTAC®
ODU STAMPTAC®
ODU TURNTAC®
ODU SPRINGTAC® FLATSOCKET

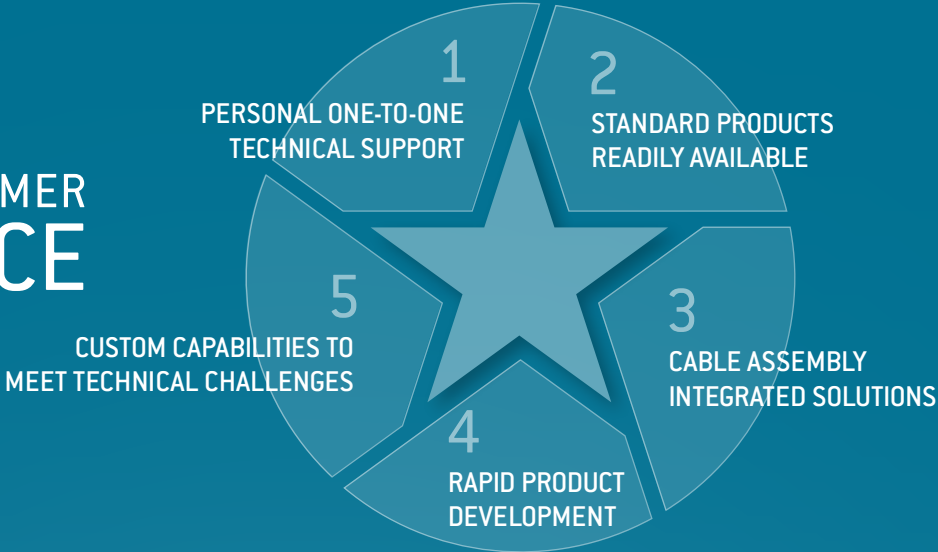
Springwire, lamella, turned, slotted and stamped contacts



A PERFECT ALLIANCE.



ODU 5 STAR CUSTOMER EXPERIENCE



ODU GROUP OVERVIEW

- More than 75 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

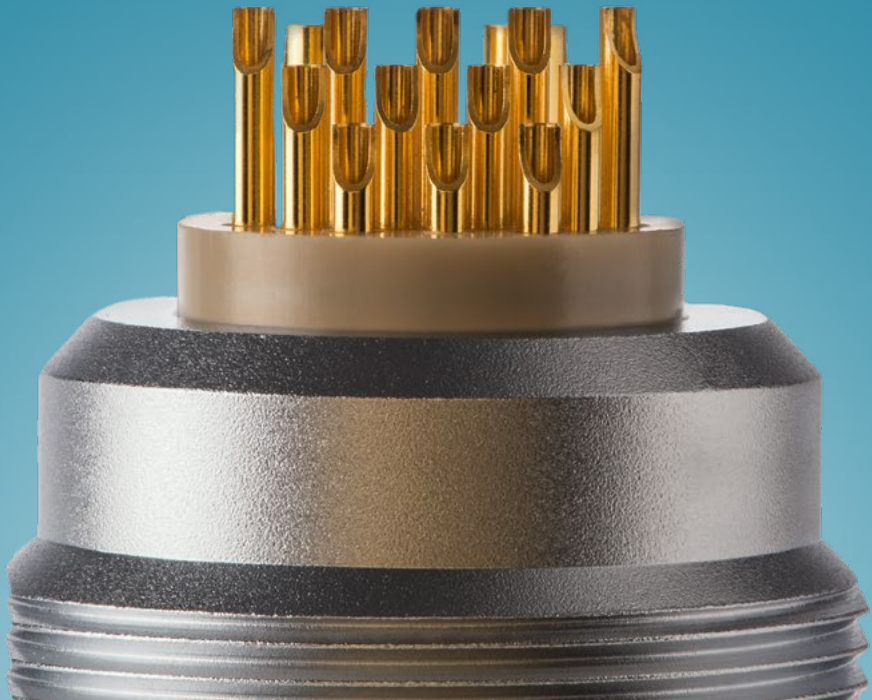
We operate in the following markets: medical, military and security, test and measurement, industrial, energy, and automotive/emobility

As of February 2019

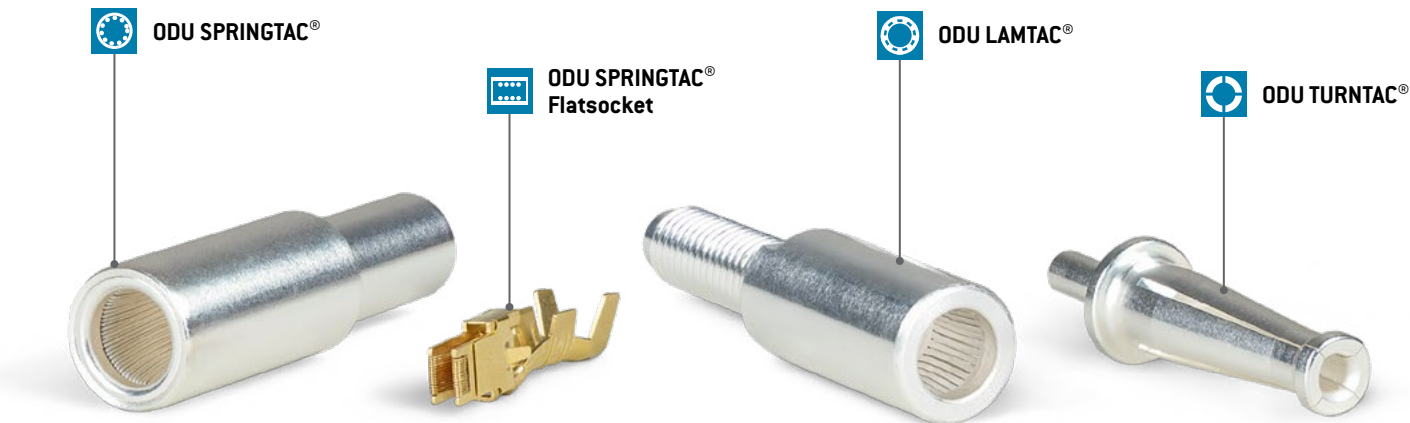
CERTIFIED QUALITY

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

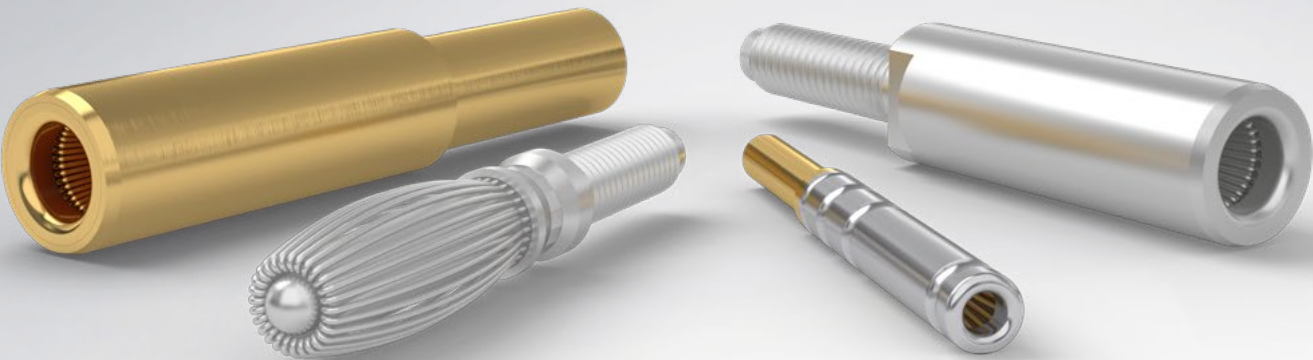
For a complete list of our certifications, please visit our website.



ODU ELECTRICAL CONTACT PORTFOLIO



	ODU SPRINGTAC®	ODU SPRINGTAC® Flatsocket	ODU LAMTAC®	ODU TURNTAC®
Contact technology	Springwire technology	Springwire technology	Lamella technology	Turned, slotted contacts
Contact diameter	From Ø 0.76 mm	From 0.64 x 0.64 mm	From Ø 1.5 mm	From Ø 0.3 mm
Mating cycles	> 100,000 (up to 1 million)	> 50,000	> 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
High temperature range	Up to +300° C (on request)		Up to +150° C	
Surfaces	Ag / Au (Au up to Ø 1.02 mm)	Ag / Au	Ag / Au	Ag / Au
Termination technologies	Crimp / screw / solder	Crimp	Crimp / screw / solder	Crimp / screw / solder
Current (6 mm) per IEC 60512-5-2:2002	100 A		115 A – 145 A	100 A
Angular misalignment	+/- 1°		+/- 1°	+/- 5°
Contact material	CuSn alloy or CuBe		CuBe alloy	CuZnPb
Primary attribute	High mating cycles	Test & Measurement	High current	High volume
Points of contact	360° circular	Single or double sided	360° circular	1,2,4,6 times circular



ODU SPRINGTAC®

High reliability, up to 1,000,000 mating cycles

- + Electrical contact with patented springwire technology
- + 100,000 mating cycles (potential up to 1 million)
- + High-current carrying capacity up to 2,000 A
- + High vibration resistance
- + Low mating and demating forces
- + Low contact resistance
- + Secure mating forces for reliability
- + Electrical contacts ideal for medical, industrial, test & measurement, and automotive / eMobility applications
- + Available in 0.76 mm (size 22) contact sizes and larger

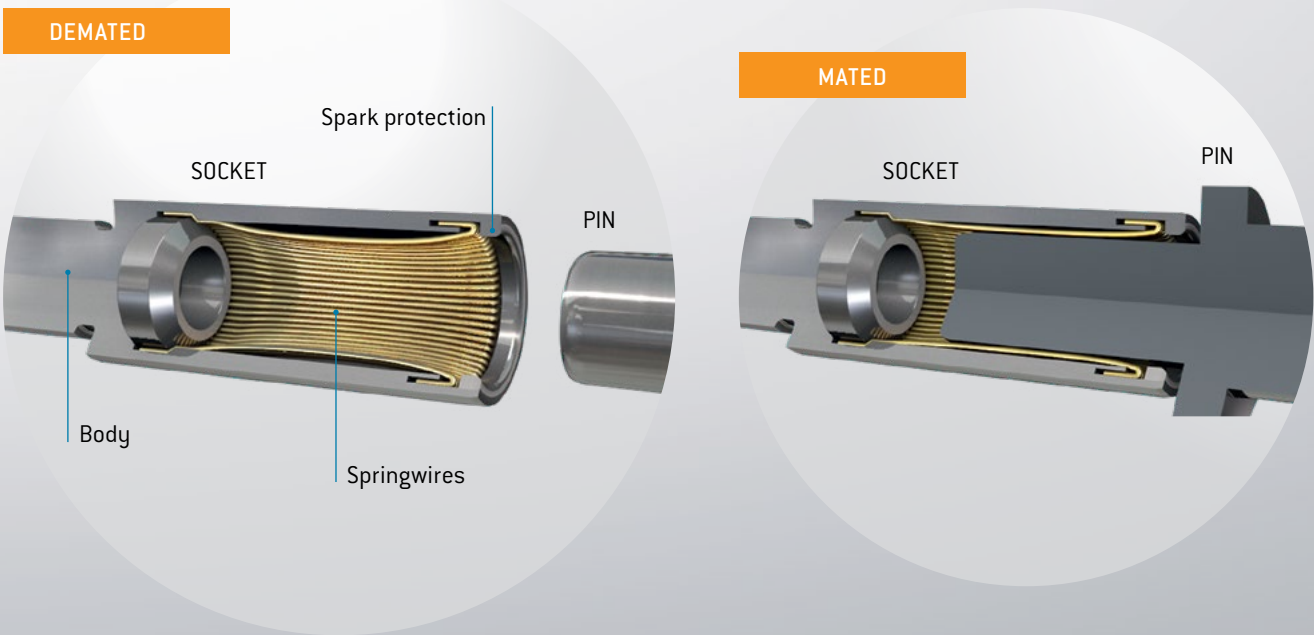
Low mating and demating forces
for low coupling forces

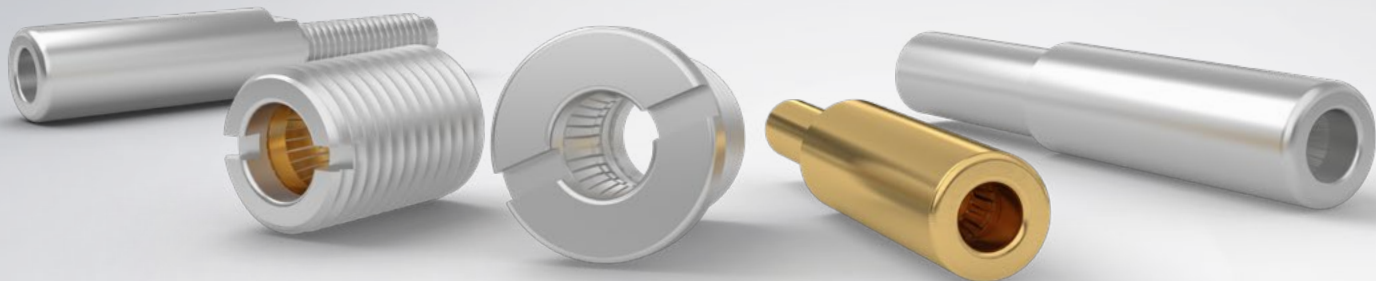
Outstanding reliability
and durability

Compact contact design
for a short mating depth

Low contact resistance
for reliable function

Inner diameter: 4 mm
Outer diameter: 9 mm





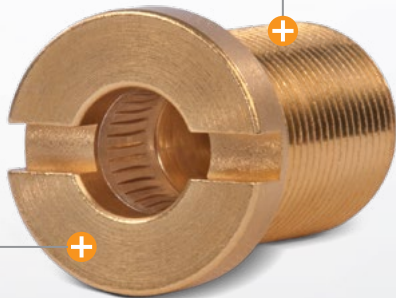
ODU LAMTAC®

Maximum current-carrying capacity and temperature resistance

- + Electrical contact with lamella technology
- + > 10,000 mating cycles
- + Current carrying capacity up to 2,400 A
- + Temperature up to 150° C
- + Low contact resistance
- + Cost efficient
- + Secure mating forces for reliability
- + 360° contact area
- + Self-cleaning contacts
- + Electrical contacts ideal for medical, industrial, test & measurement, and automotive / eMobility applications
- + Low mating and demating forces
- + Available in 1.5 mm contact sizes and larger

Easy assembly
due to screw termination

Low contact resistance
for perfect performance



Compact contact design
for low space requirements

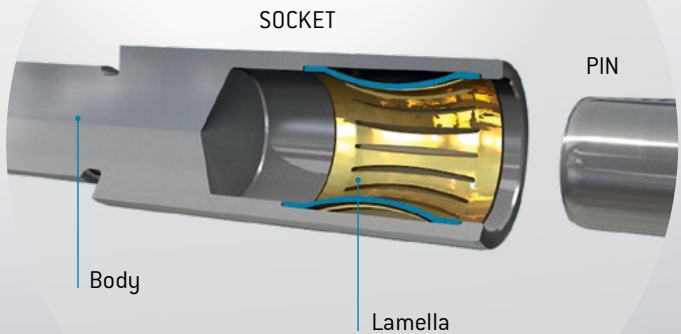
High current-carrying capacity
due to lamella technology



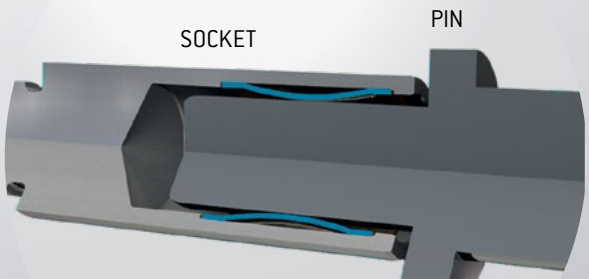
ODU LAMTAC®

Contact technology	Lamella technology
Operating temperature range	– 40° C to + 150° C
Contact diameter	from Ø 1.5 mm
Mating cycles	> 10,000
Surfaces	Ag / Au
Termination technologies	crimp / screw / solder

DEMATED



MATED



Derating curve ODU LAMTAC® see page 13

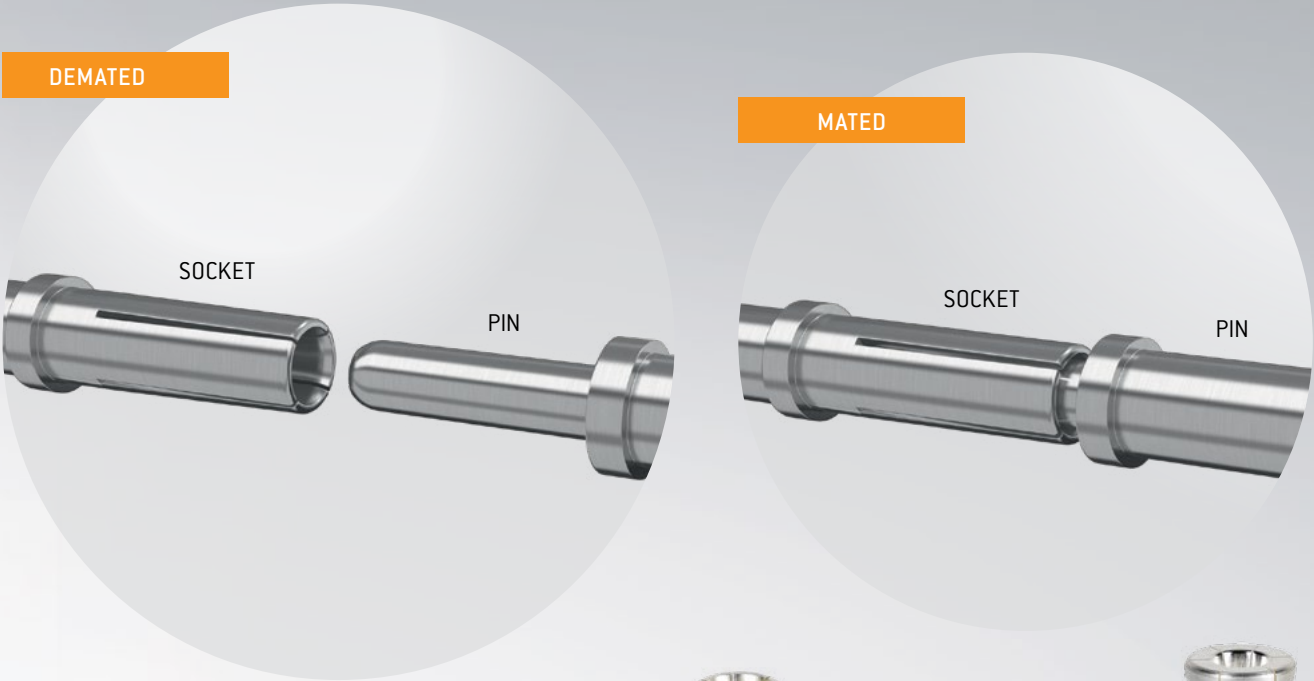
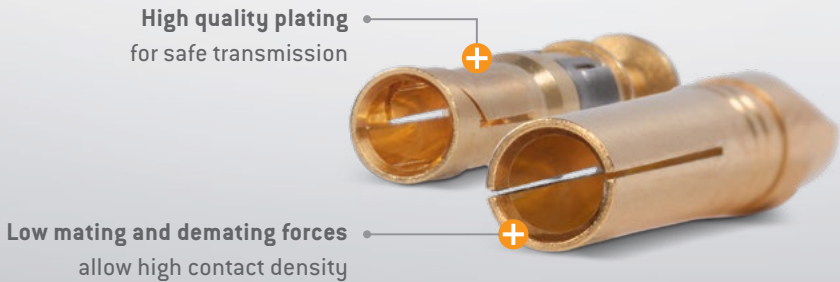
TURNED, SLOTTED CONTACTS



ODU TURNTAC®

Turned, slotted contacts suitable even for harsh environments

- + Turned, slotted contacts
- + Rugged contact system, suitable even for harsh environment
- + > 10,000 mating cycles
- + Low and stable mating and demating forces
- + Smallest dimensions possible, down to 0.3 mm contact diameter
- + Mating possible at an angle of up to a 5 degrees
- + Electrical contacts ideal for medical, industrial, test & measurement, and automotive / eMobility applications



Customer specific solutions



ODU TURNTAC® ELECTRICAL CONTACTS FOR STANDARD CHARGING INTERFACES



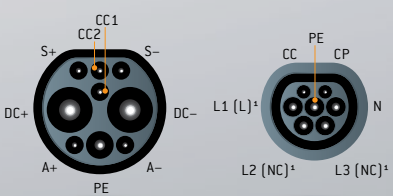
IEC 62196 (VDE 0623-5)



SAE J1772



GB/T 20234



STAMPED TECHNOLOGY

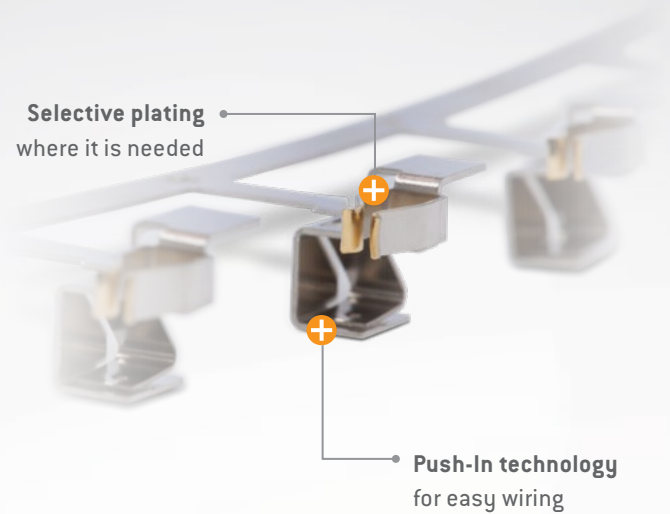


ODU STAMPTAC®

Economical contact systems for automatic processing

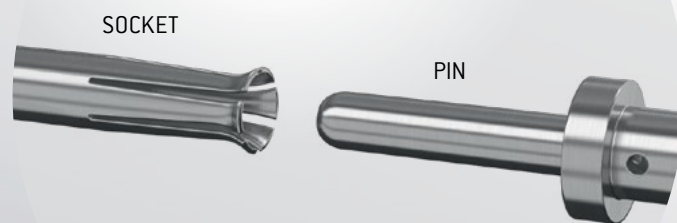
- + Stamped and formed contacts
- + Economical contact systems for automatic processing
- + > 10,000 mating cycles
- + Sealing possible up to IP67
- + Cost-efficient alternative for high volumes
- + Electrical contacts ideal for medical, industrial, test & measurement, and automotive / eMobility applications

Selective plating
where it is needed

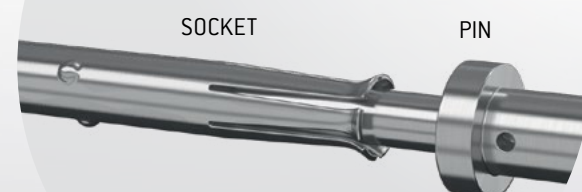


Push-In technology
for easy wiring

DEMATED



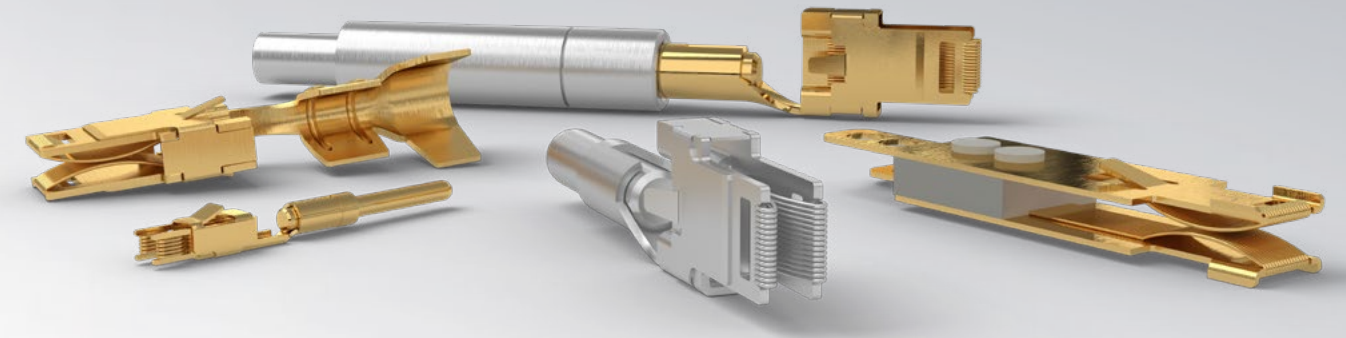
MATED



FLATSOCKET WITH SPRINGWIRE TECHNOLOGY

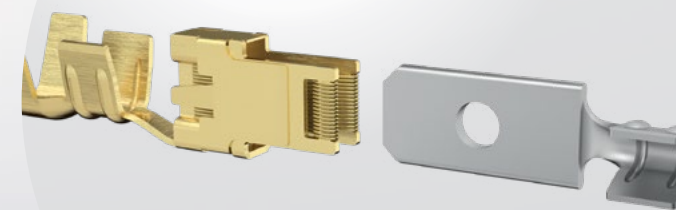


ODU SPRINGTAC® FLATSOCKET

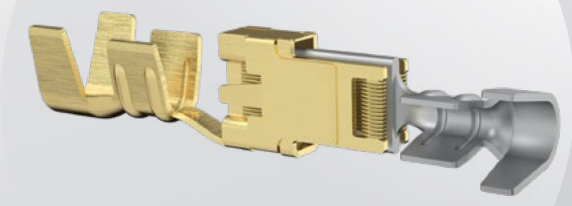


- + Low, stable contact resistance
- + Versions for 2-wire and 4-wire measurement (Kelvin measurement)
- + Ideal for test adapters and replacement inserts
- + > 50,000 mating cycles
- + High current-carrying capacity
- + Electrical contacts ideal for test & measurement applications

DEMATED



MATED



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.



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 ⁻⁹ 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 1x2 – 10 GBit/s¹ / HDMI® 2.0 – 14.4 Gbit/s¹ / 10 Gbit Ethernet – 10 Gbit/s¹
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/mm²
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)

¹ These ODU specific connectors can transmit common data transmission protocols such as USB® 3.2 Gen 1x2, HDMI® 2.0 and Ethernet, but they are not USB®, HDMI®- and Ethernet-standard connectors.

ODU PRODUCT AVAILABILITY



CIRCULAR



MODULAR



ELECTRICAL CONTACTS



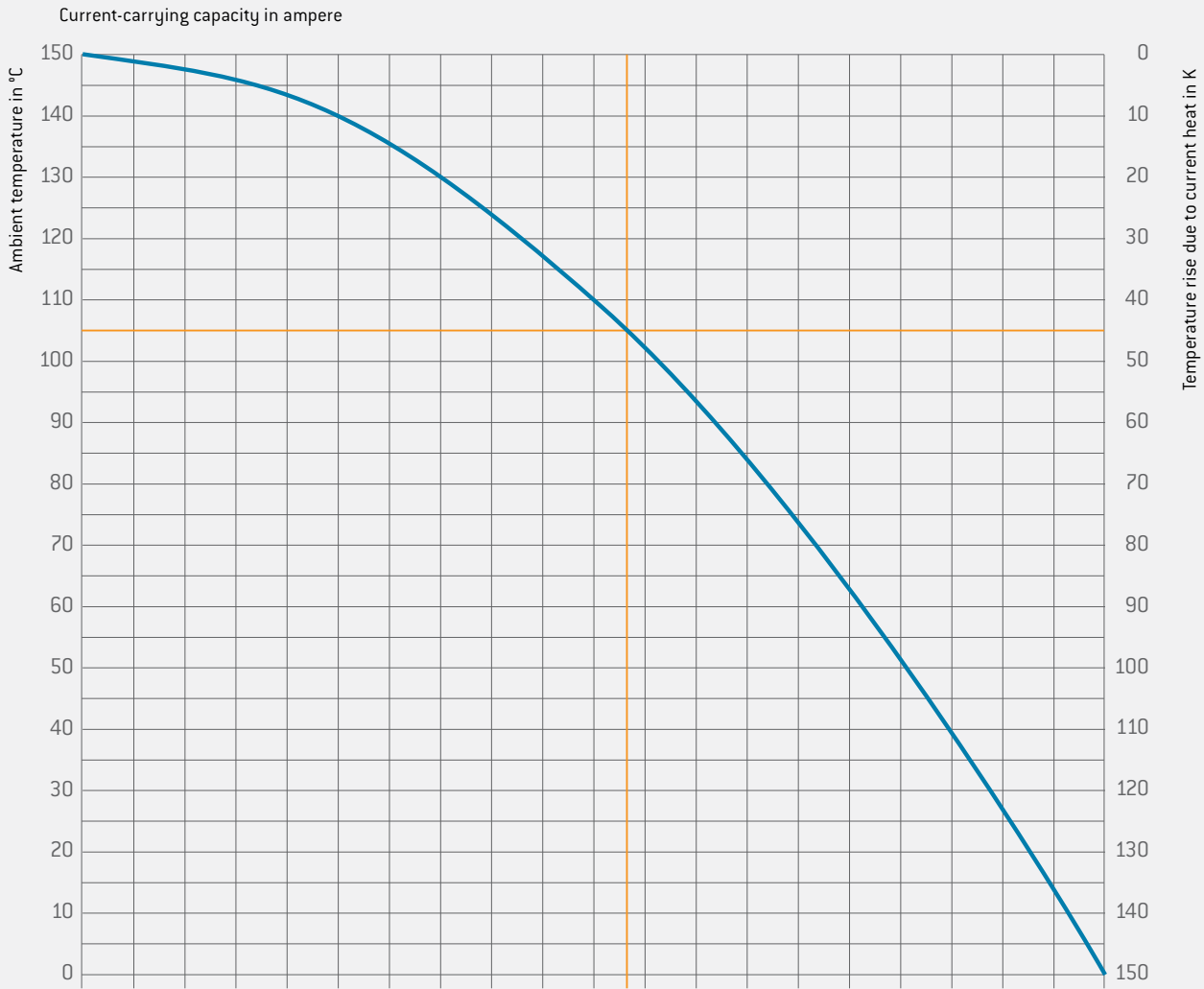
CUSTOM SOLUTIONS



CABLE ASSEMBLY



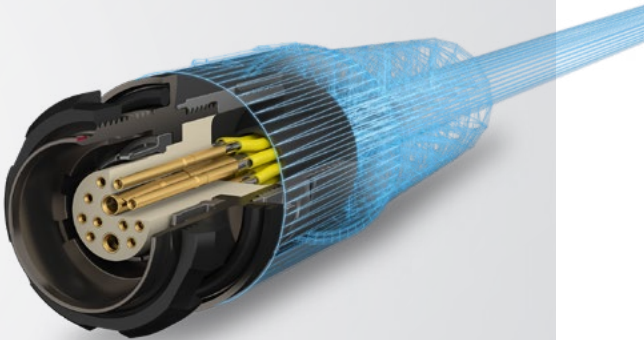
DERATING CURVE – ODU LAMTAC®
CURRENT-CARRYING CAPACITY DIAGRAM



Contact diameter mm	Nominal current															Max. continuous current			
Ø 1.5	0		7		11		16		22		28		37		42		49		52
Ø 2	0		9		14		21		28		36		47		54		62		67
Ø 3	0		12		19		28		38		50		66		76		88		95
Ø 4	0		15		25		35		50		65		85		100		115		125
Ø 5	0		25		35		55		70		90		120		135		155		170
Ø 6	0		35		55		80		110		145		195		225		260		280
Ø 8	0		40		70		105		140		185		245		285		330		355
Ø 10	0		50		85		130		170		230		310		355		410		445
Ø 12	0		50		85		130		175		235		315		360		420		455
Ø 16	0		90		145		210		280		370		490		560		650		700
Ø 20	0		115		185		275		370		490		650		750		870		935
Ø 24	0		140		240		365		495		670		910		1,055		1,235		1,340
Ø 28	0		190		320		485		655		885		1,195		1,375		1,610		1,745
Ø 30	0		220		365		545		735		990		1,330		1,535		1,790		1,940

Measurement in accordance with IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003-01) (base curve is shown). Upper limit temperature +150 °C. Connection with the largest specified nominal cross-section.

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

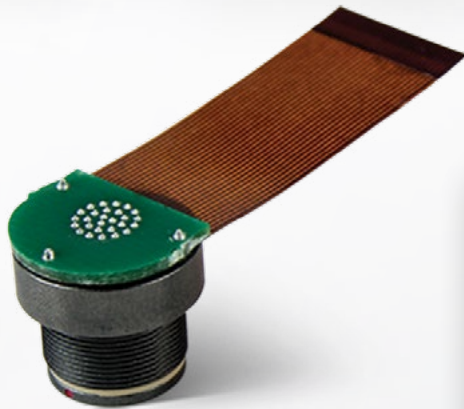
- High-speed standard connectors such as: USB® 3.2 Gen 1x1, USB® 2.0, HDMI® 2.0 and Ethernet CAT 5¹
- Military and medical connectors
- Wire to board connectors

¹ODU 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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