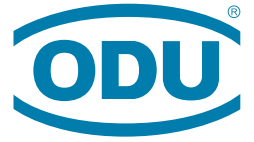


A PERFECT ALLIANCE.



ODU AUTOMOTIVE / EMOBILITY ADVANCED CONNECTOR SOLUTIONS



A PERFECT ALLIANCE.

ODU 5 STAR CUSTOMER EXPERIENCE



ODU AUTOMOTIVE / EMOBILITY

ADVANCED CONNECTOR SOLUTIONS

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

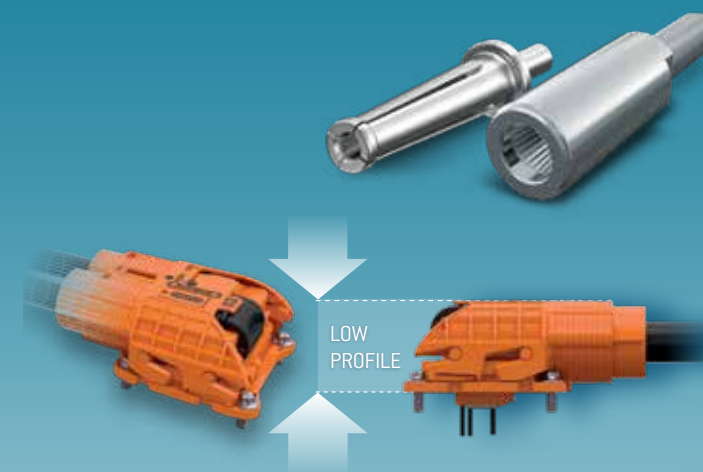
We operate in the following markets: medical, military and security, test and measurement, industrial, energy, and eMobility

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.



ELECTRICAL CONTACTS 04

HIGH VOLTAGE 06



DOCKING / BATTERY SWAP 08

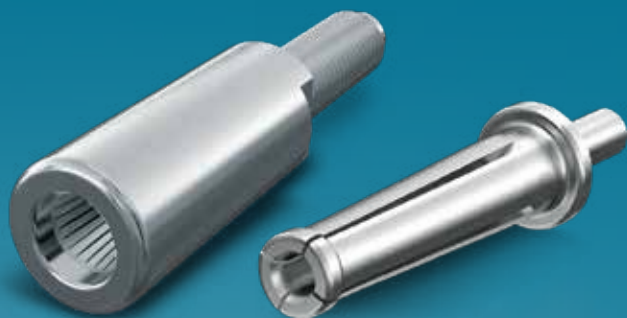


CHARGING 10

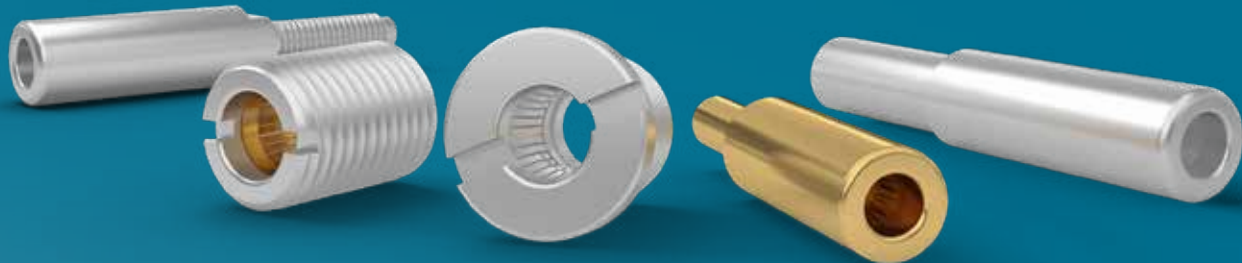


CUSTOM SOLUTIONS 14

ODU ELECTRICAL CONTACTS



	ODU LAMTAC® CONTACT SYSTEM	ODU TURNTAC® CONTACT SYSTEM
Mating cycles	10,000	10,000
Size	1.5 mm to 30 mm	0.3 mm to 12 mm
Misalignment	Up to 1°	Up to 5°
Termination type	Solder / Screw / Crimp	Crimp
Contact type	Lamella	Turned, slotted



ODU LAMTAC®

- + Electrical contact with lamella technology
- + > 10,000 mating cycles
- + Able to withstand harsh environments
- + High temperature resistance – up to 200° C
- + High current-carrying capacity

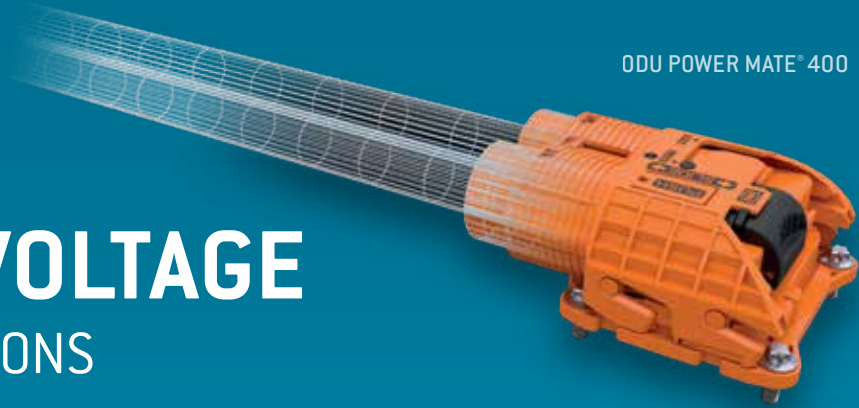


ODU TURNTAC®

- + Able to withstand harsh environments
- + Turned slotted contact
- + 5° misalignment ideal for charging applications
- + Smallest dimensions possible, down to 0.3 mm contact diameter
- + > 10,000 mating cycles

Contact us for additional technical information at sales@oduautomotive.com

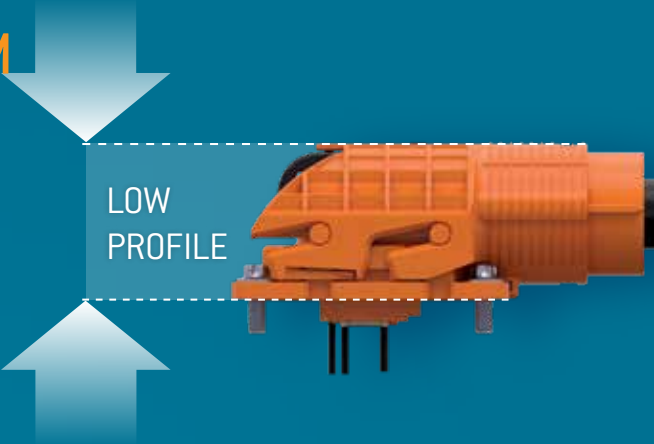
ODU HIGH VOLTAGE CONNECTOR SOLUTIONS



ODU POWER MATE® 400

ODU POWER MATE® 400 2 POLE HV CONNECTOR SYSTEM

- + 400 A continuous makes this an ideal connector for battery and charging applications
- + Slide latch allows for low-profile making packaging easy
- + HVIL for quick power disconnect
- + Temperature sensor for temperature monitoring
- + < 75 N allows for easy mating*
- + Can be used with either aluminum or copper wire



LOW
PROFILE

	ODU POWER MATE® 400 2 POLE HV CONNECTOR SYSTEM	ODU GEN2 – 2 POLE HV CONNECTOR SYSTEM	ODU K12* – 3 POLE HV CONNECTOR SYSTEM – RIGHT ANGLE	ODU K8* – 3 POLE HV CONNECTOR SYSTEM – STRAIGHT
Current rating	[95 mm²]: 400 A* at 85° C	[35 mm²]: 160 A at 85° C	[50 mm²]: 240 A at 85° C	[25 mm²]: 145 A at 85° C
Working voltage	1000 V DC, test voltage 4,000 V DC	750 V AC, test voltage 2700 V AC	750 V AC	750 V DC
Operating temperature	–40° C to 140° C	–40° C to 140° C	–40° C to 150° C	–40° C to 140° C
IP Sealing	IP6K9K, IP68	IP6K9K, IP68	IP6K9K, IP68	IP6K9K, IP68
Vibration class	Level 3**	Level 2	LV214, PG17, Level 4	LV214, PG17, Level 3
Cable cross section	50 mm², 70 mm², 95 mm²	16 mm², 25 mm², 35 mm²	35 mm², 50 mm²	16 mm², 25 mm²
Cable type	Copper / Alu	Copper	Copper	Copper
Shielding	360°	360°	360°	360°
HVIL	Yes [optional]	Yes	N/A	N/A
Termination	Ultrasonic weld	Crimp	Crimp	Crimp
Contact size	12 mm	8 mm	12 mm	8 mm
Mating cycles	50	50	50	50
Temperature sensor	Yes [optional]	N/A	N/A	N/A

* Custom solution
** Testing in progress



ODU GEN2 – 2 POLE HV CONNECTOR SYSTEM

- + Compact size allows for easy packaging
- + Available in both right angle and straight making it the most versatile ODU 2 pole connector
- + Can reach temperatures up to 140° C for high temperature applications



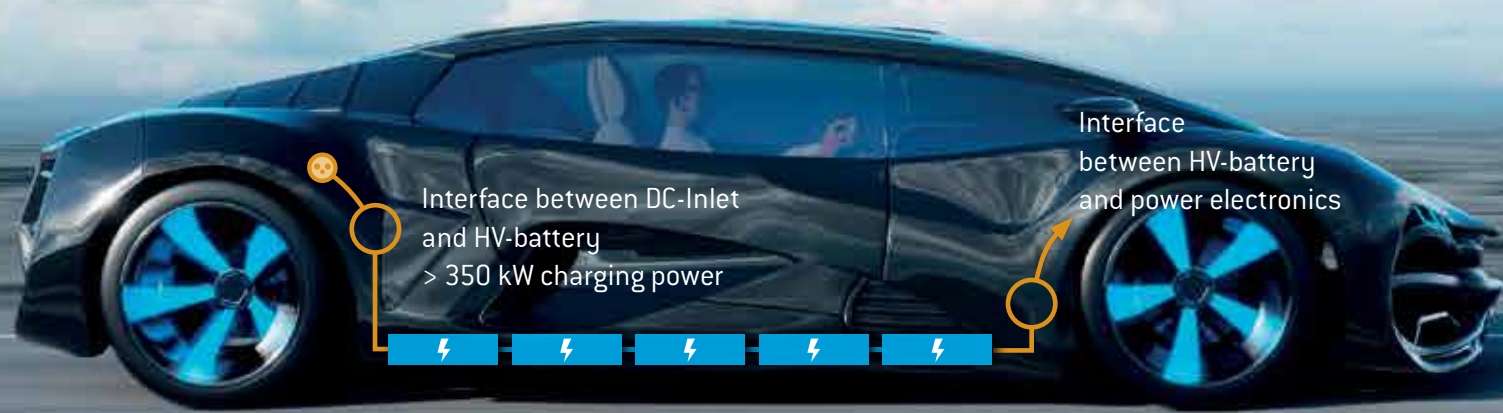
ODU K12* – 3 POLE HV CONNECTOR SYSTEM – RIGHT ANGLE

- + Class 4 vibration
- + Sealed connector system
- + Up to 240 A with 50 mm² wire
- + Rugged aluminum housing



ODU K8* – 3 POLE HV CONNECTOR SYSTEM – STRAIGHT

- + Can withstand up to 140° C making it ideal for high temperature applications
- + Smallest 3 pole ODU offering for easy packaging
- + Able to withstand class 3 vibration
- + Up to 145 A with 25 mm² wire



Interface between DC-Inlet
and HV-battery
> 350 kW charging power

Interface
between HV-battery
and power electronics

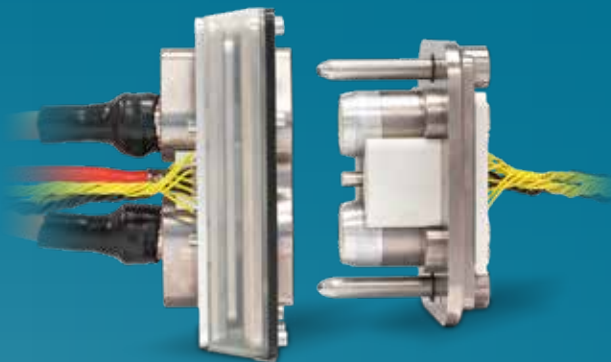
Contact us for additional technical information
at sales@oduautomotive.com

* Custom solution

ODU DOCKING/ BATTERY SWAP CONNECTOR SOLUTIONS



ODU DOCKING MATE®



ODU BRS Battery replacement system

- + Self-finding docking of HV-battery & drivetrain module ideal blind mating
- + +/- 5 mm of tolerance allows easy blind mating without damage to pins

ODU BATTERY SWAP

- + The highest mating cycles of all ODU docking connectors
- + Ground pins for first mate last break
- + Water tightness in both mated and unmated conditions

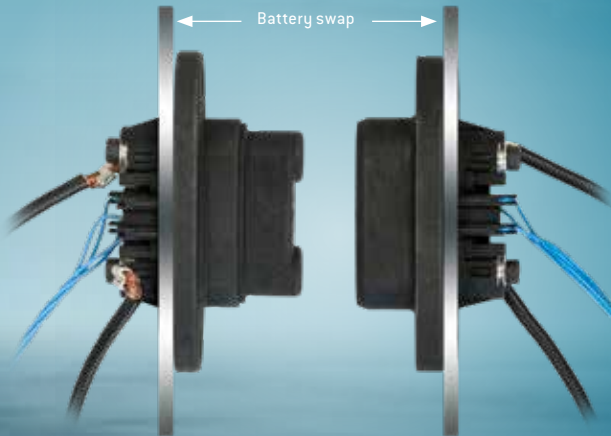


Photo: courtesy of KTM Sportmotorcycle GmbH

ODU DOCKING MATE®

- + Self-finding docking of HV-battery & drivetrain module ideal blind mating
- + +/- 5 mm of tolerance allows easy blind mating without damage to pins
- + Multiple pin configurations and shell size available upon request

ODU DOCKING MATE® – CUSTOMIZE SIZE AND INSERTS:



ODU BATTERY SWAP TCS — Tolerance compensation system

- + Self-finding connector system making it ideal for battery swap applications
- + 3,000 cycles allow for multiple connections without replacement
- + Small package size will fit easily into smaller battery applications

Contact us for additional technical information
at sales@oduautomotive.com

ODU CHARGING CONNECTOR SOLUTIONS

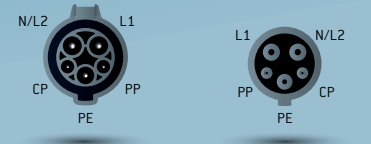
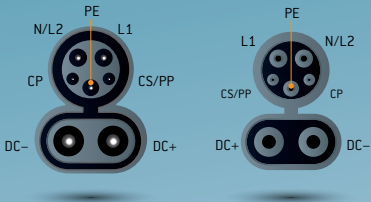
	ODU SAE ADAPTER	ODU GB/T INLET	ODU CUSTOM CHARGING HANDLES & ASSEMBLIES
Working voltage	240 V DC	750 / 1,000 V DC	1,000 V DC
Current rating	80 A	250 A at 50° C	200 A
IP Sealing	Sealing upon request	Sealing upon request	Sealing upon request
Temperature range	−30° C to 50° C	−30° C to 50° C	−30° C to 50° C
Mating cycles	10,000	10,000	10,000

ODU SAE ADAPTER

- + Contact technology: ODU TURNTAC®
- + 10,000 mating cycles
- + Misalignment: 5°
- + Temperature: −30° C to 50° C
- + Touch proof



SAE J1772



- == DC – DIRECT CURRENT
- ~ AC – ALTERNATING CURRENT

Nominal current	Nominal current CP/PP	Number of contacts
Up to 80 A	2 A	2 (Contact-Ø: 1.5 mm) 1 (Contact-Ø: 2.8 mm) 2 (Contact-Ø: 3.6 mm)
DC – 200 A	2 A	2 (Contact-Ø: 8 mm)

~ AC – ALTERNATING CURRENT

Nominal current 1-Phase / 3-Phase	Nominal current CP/PP	Number of contacts
Up to 80 A	2 A	2 (Contact-Ø: 1.5 mm) 1 (Contact-Ø: 2.8 mm) 2 (Contact-Ø: 3.6 mm)



ODU GB/T INLET

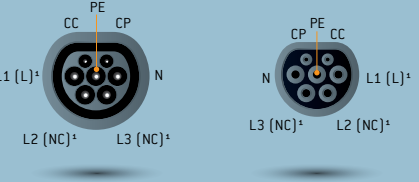
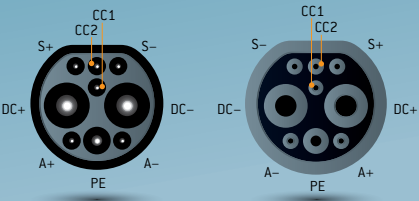
Contact technology: ODU TURNTAC®

- + 10,000 mating cycles
- + Meets GB/T standard
- + Pin misalignment up to 5°
- + Temperature: −30° C to 50° C



The ODU TURNTAC® design has been specially developed for charging technology applications. The turned contacts provide a high level of flexibility and ensure more than 10,000 charging cycles.

GB/T 20234



¹ Single phase current

== DC – DIRECT CURRENT

Nominal current DC	Nominal current S	Nominal current CC1/CC2	Nominal current A	Number of contacts
125 A / 250 A	2 A	2 A	20 A	6 (Contact-Ø: 3 mm) 1 (Contact-Ø: 6 mm) 2 (Contact-Ø: 12 mm)

~ AC – ALTERNATING CURRENT

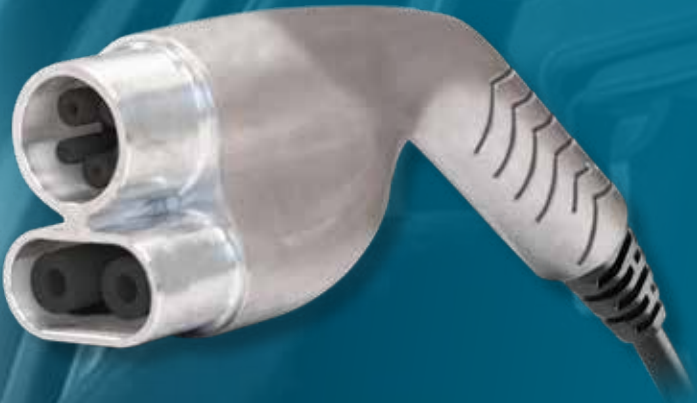
Nominal current 1-Phase / 3-Phase	Nominal current CC/PP	Number of contacts
10 A / 16 A / 32 A (250 V) 16 A / 32 A / 63 A (440 V)	2 A	2 (Contact-Ø: 3 mm) 5 (Contact-Ø: 6 mm)

Contact us for additional technical information at sales@oduautomotive.com

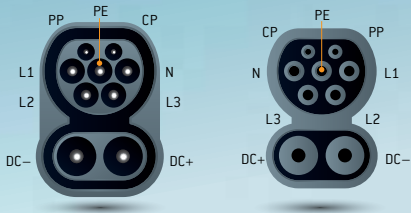
IEC CHARGING CONNECTOR
ODU TURNTAC®

Robust contact technology for efficient charging operations. This ODU TURNTAC® design has been specifically developed for charging technology applications. The turned contacts therefore ensure a high level of flexibility and low wear at over 10,000 charge cycles.

Contacts can be sold separately for your custom specific applications including, but not limited to: charging kits, charging handles, cable assemblies, inlets and trailer electronics.



IEC 62196 (VDE 0623-5)



- DC – DIRECT CURRENT
- AC – ALTERNATING CURRENT

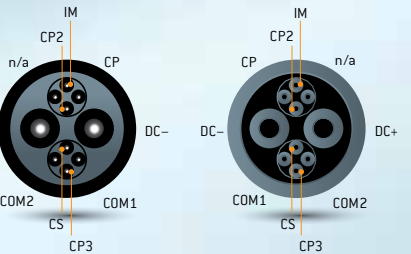
Nominal current	Nominal current CP/PP	Number of contacts
16 A / 32 A (2.5 / 6 mm²) 63 A (16 mm²)	2 A	2 (Contact-Ø: 3 mm) 5 (Contact-Ø: 6 mm)
DC – 400 A	2 A	2 (Contact-Ø: 8 mm)



- AC – ALTERNATING CURRENT

Nominal current 1-Phase / 3-Phase	Nominal current CP/PP	Number of contacts
16 A / 32 A (2.5 / 6 mm²) 63 A (16 mm²)	2 A	2 (Contact-Ø: 3 mm) 5 (Contact-Ø: 6 mm)

CHADEMO



- DC – DIRECT CURRENT

Nominal current DC	Nominal current CP/CP2	Number of contacts
50 A – 200 A	2 A	2 (Contact-Ø: 9 mm) 8 (Contact-Ø: 1.5 mm)

ODU CUSTOM CHARGING HANDLES

- + Ruggedized charging handles
- + Can meet J1772, IEC62916 and CCS charging standards
- + 10,000 mating cycles
- + Sizes 1.5 mm, 2.8 mm, 3.6 mm and 8 mm
- + Termination: Crimp
- + Able to withstand harsh environments
- + Turned slotted contact
- + 5° pin misalignment ideal for charging applications

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ODU CUSTOM SOLUTIONS

Since 1942 ODU has been supplying customers with custom contact and connector solutions. Rapid prototyping and product development coupled with local one to one engineering support has led ODU's reputation as an expert in custom solutions. Thermoplastic injection molding design, CNC tooling design and development, and bonding/laser etching are just a few of ODU's core competencies.

For assistance with your customized connector needs call us at 805-484-0540 or email us at sales@oduautomotive.com.



FAST DEVELOPMENT

- Simulation software
- Highest level of vertical integration
- Local R&D centers in America, Europe and China



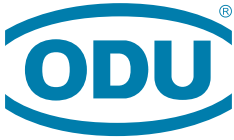
PRODUCTION

under one roof means high added value:

- Toolmaking
- Injection Shop
- Turnery
- Stamping
- Surface Technology & Electroplating Shop
- Assembly
- Cable Assembly

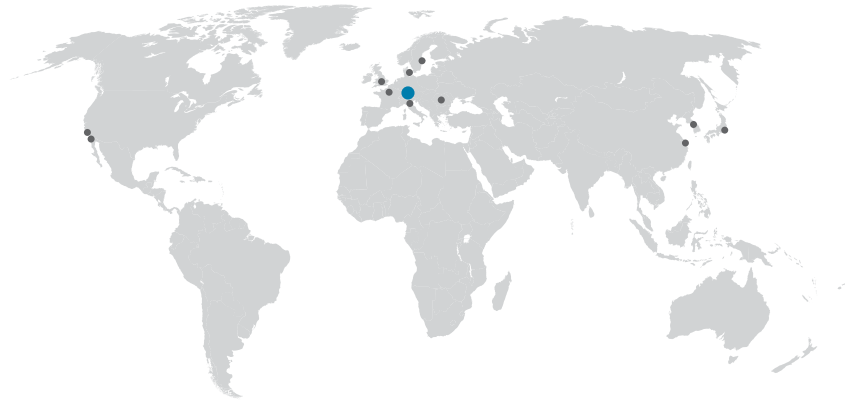
TEST CENTER

ODU Technology Test Center for continuous strict quality control delivers data and a unique important knowledge base through the complete development process.



A PERFECT ALLIANCE.

ODU GROUP WORLDWIDE



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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 North American Logistics

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