CONNECTOR SOLUTIONS

ODU®

ODU GROUP – FACTS & FIGURES

- More than 80 years of experience in the connector technology
- Over 2,600 employees worldwide
- 150 R&D employees
- 160 apprentices and dual students
- 90,000 different products
- 80 % vertical integration
- Approx. 6,000 customers around the world

- **Production and logistics sites**
- **Sales locations**
- **Product development center**
- **Sales partner**

ALL UNDER ONE ROOF

- Design and development
- In-house testing laboratory
- Tool and special machine construction
- Injection
- Stamping
- Turning
- Surface technology
- Assembly
- Cable assembly

ODU Headquarters
Mühldorf a. Inn, Germany

PLASTIC CIRCULAR CONNECTORS

	Keying	Sizes	No. of possible mechanical coding	Diameter plug (mm)	Max. cable diameter (mm)	Max. No. of contacts	Solder	Crimp	Print
ODU MEDI-SNAP® PUSH-PULL • Up to IP68 • Autoclavable & fully sterilizable • IEC 60601-1 compliant housings[1] • Right angle version available 	Pin and groove	1	6	13.7	6.5	14	•	•	•
		2	3	18.5	9.2	34			
		3.5	2	23	10.5	41	•		•
ODU MEDI-SNAP® BREAK-AWAY • Up to IP68 • Autoclavable & fully sterilizable • Up to 5,000 mating cycles 	Pin and groove	1	6	15.8	7.5	14	•		
		2	1	19	11.5	26			
ODU MEDI-SNAP® HIGH-VOLTAGE • Touch proof according to IEC 60664-1 • 2x HV, 2x signal interlock, 1x ground/FMLB • Nominal voltage up to 1,000 V AC / 16 A • Hot-plugging prevention 	Pin and groove	2	3	18.5	9.2	5	•		
ODU MINI-MED® • Space saving design • Pre-assembled solution • Up to 1,000 mating cycles 	Pin and groove	1	1	11.5 / 11.2	4.4	6	•		

[1] Up to 2 MOPP / 2 MOOP – working voltage of medical device max. 250 V AC

	IP Class in mated condition	IP Class in unmated condition	Mating cycles plug	Mating cycles receptacle	Locking principle	Coding options (optical)	Transmission options
ODU MEDI-SNAP® PUSH-PULL	Up to IP64	Up to IP68	> 2,000	> 5,000	Push-Pull	Arrow marking, color keying	Signal, power, fluids, fiber optic
	Up to IP68	Up to IP68					
ODU MEDI-SNAP® BREAK-AWAY	Up to IP67	Up to IP68	> 5,000	> 5,000	Break-Away	Arrow marking, color coding	Signal, power
	Up to IP64		> 2,000				
ODU MEDI-SNAP® HIGH-VOLTAGE	Up to IP64	IP50	> 2,000	> 5,000	Push-Pull	Arrow marking, color coding	High-voltage
ODU MINI-MED®	IP67	IP50	> 1,000	> 1,000	Break-Away	Arrow marking	Signal

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ODU MEDI-SNAP® Size 3.5

METAL CIRCULAR CONNECTORS

		Keying	Sizes	No. of possible mechanical coding	Diameter plug (mm)	Max. cable diameter (mm)	Max. no. of contacts	Solder	Crimp	Print
ODU MINI-SNAP® L • IP50 • 5,000 mating cycles • IEC 60601-1 compliant option • USB® 3.2 Gen 1x1 + USB® 2.0 + Ethernet		Pin and groove	00	4	6.4	3.5	04	•	•	•
			0	8	9	5.6	10			
			1		11.5	7.7	16			
			2		14.5	9.9	26			
			3		17.5	11.9	30			
			4		25.0	16.0	40			
ODU MINI-SNAP® K • IP68 • 5,000 mating cycles • IEC 60601-1 compliant option • USB® 3.2 Gen 1x1 + USB® 2.0 + Ethernet		Pin and groove	0	8	11.0	5.0	10	•	•	•
			1		13.0	7.0	16			
			2		16.0	9.0	26			
			3		19.0	10.5	30			
			4		25.0	14.0	40			
ODU MINI-SNAP® B • IP68 • 5,000 mating cycles • USB® 3.2 Gen 1x1 + USB® 2.0 + Ethernet		Pin and groove	0	8	9.4	5.0	10	•	•	•
			1	9	12.0	7.0	16			
			2	10	15.0	9.0	26			
			3	13	18.0	10.5	30			

The contact arrangement of an ODU data transmission connector differs from a standard data transmission connector due to the robust ODU specific design.
However, the ODU design meets the electrical specifications that are derived from the respective standard data transmission protocol.

	IP Class in mated condition	IP Class in unmated condition	Mating cycles	Transmission options
ODU MINI-SNAP® L	IP50	Up to IP68 (only for receptacles)	> 5,000	Signal, data, power
ODU MINI-SNAP® K	IP68	Up to IP68	> 5,000	Signal, data, power
ODU MINI-SNAP® B	IP68	Up to IP68	> 5,000	Signal, data, power

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METAL CIRCULAR CONNECTORS

ODU MINI-SNAP® F

- IP50 and IP68
- 5,000 mating cycles
- Ethernet + USB® 2.0

Keying	Sizes	No. of possible mechanical coding	Diameter plug (mm)	Max. cable diameter (mm)	Max. no. of contacts	Solder	Crimp	Print
Half shell	0	3	9.4	5.0	09	•	•	•
	1		12.0	7.5	14			
	1.5		13.0	7.5	19			
	2		15.0	9.5	19			
	3		18.0	11.5	27			

The contact arrangement of an ODU data transmission connector differs from a standard data transmission connector due to the robust ODU specific design.
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	IP Class in mated condition	IP Class in unmated condition	Mating cycles	Transmission options
ODU MINI-SNAP® F	Up to IP68	Up to IP68	> 5,000	Signal, data, power

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HIGH-SPEED & HIGH-DENSITY CONNECTORS

	Keying	Sizes	No. of possible mechanical coding	Diameter plug (mm)	Max. cable diameter (mm)	Max. no. of contacts
ODU AMC® HIGH-DENSITY • 70 % weight and size reduction • IP6K8 (20 m submersion) • Chrome plated version available • USB® 3.2 Gen 1x1 + USB® 2.0 + HDMI® + Ethernet	Pin and groove	00	4	9.8	5.0	7
		0		12.8	7.0	16
		1		14.8	8.5	27
ODU AMC® HIGH-DENSITY SCREW-LOCK • High vibration resistance • 70 % weight and size reduction • IP6K8 (20 m submersion) • USB® 3.2 Gen 1x1 + USB® 2.0 + HDMI® + Ethernet	Pin and groove	00	4	9.8	5.0	7
		0		12.8	7.0	16
		1		14.8	8.5	27
ODU AMC® PUSH-PULL • IP68 / IP6K9K • > 5,000 mating cycles • High speed data technology • Quick and easy mating and locking	Pin and groove	0	4	14.0	5.5	10
		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
		4.5		33.0	17.5	55
ODU AMC® BREAK-AWAY • IP68 / IP6K9K • > 5,000 mating cycles • High speed data technology • Quick and easy demating and locking	Pin and groove	0	4	11.9	5.5	10
		1		13.9	6.5	16
		1.5		15.9	8.0	19
		2		17.6	10.0	26
		3		21.9	11.5	37

The contact arrangement of an ODU data transmission connector differs from a standard data transmission connector due to the robust ODU specific design.
However, the ODU design meets the electrical specifications that are derived from the respective standard data transmission protocol.

	Solder	Crimp	Print	IP Class in mated condition	IP Class in unmated condition
ODU AMC® HIGH-DENSITY	•		•	IP6K9K	IP68
ODU AMC® HIGH-DENSITY SCREW-LOCK	•		•	IP6K9K	IP68
ODU AMC® PUSH-PULL	•		•	Up to IP6K9K	IP68
ODU AMC® BREAK-AWAY	•		•	Up to IP6K9K	IP68

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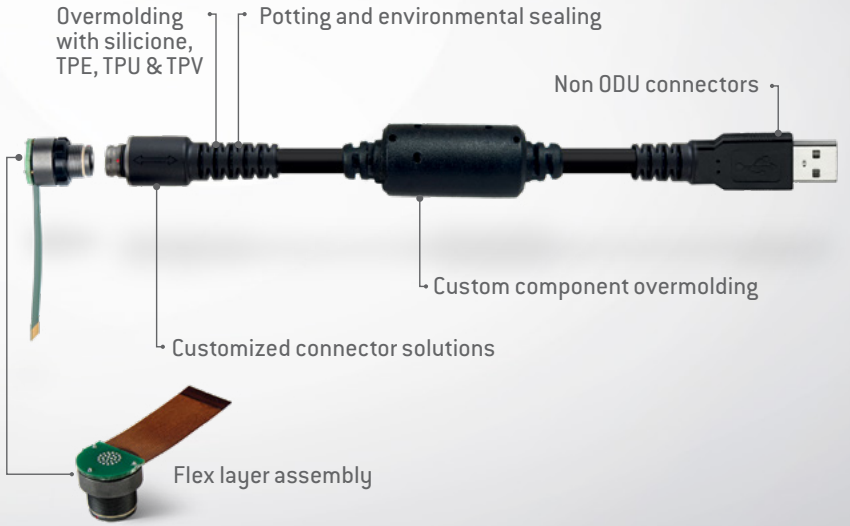

HIGH-SPEED & HIGH-DENSITY CONNECTORS

	Keying	Sizes	No. of possible mechanical coding	Diameter plug (mm)	Max. cable diameter (mm)	Max. no. of contacts
ODU AMC® Easy-Clean • Fast and easy cleaning • Break-away function • > 5,000 mating cycles • Contact inserts with pogo pins 	Pin and groove	0	4	11.9	5.5	7
		1		13.9	6.5	16
		1.5		15.9	8.0	19
ODU AMC® Series T • 3-way lock to 1 receptacle: push-pull, break-away or thread-lock • High vibration resistance • Waterproof in accordance with MIL-Standard 810 • Field assembly capability 	Pin and groove	9	4	18.4	7.6	10
				18.5		
				21		
		12		24.2	14.6	18
				24.9		
				26		
ODU AMC® NP • Current rating up to 7.5 A per contact • > 2,000 mating cycles • Break-away function 	Pin and groove	6	11	12.4	6.65	7

The contact arrangement of an ODU data transmission connector differs from a standard data transmission connector due to the robust ODU specific design.
However, the ODU design meets the electrical specifications that are derived from the respective standard data transmission protocol.

	Solder	Crimp	Print	IP Class in mated condition	IP Class in unmated condition
ODU AMC® Easy-Clean	•		•	Up to IP6K9K	IP6K8
ODU AMC® Series T	•	•	•	Up to IP6K9K	IP68
ODU AMC® NP	•	•	•	IP68 20 m (120 min.)	IP68 20 m (120 min.)

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NEW! high current contacts!

ODU AMC® NP

MODULAR CONNECTORS

	ODU-MAC® Blue-Line Flexible universal solution	ODU-MAC® White-Line Manual mating
Mating cycles	> 10,000	> 100,000
Mating type	Manual mating, automatic docking	Manual mating
Automatic docking	1 frame, 4 sizes	
Locking	Per spindle / Locking lever / Push-Pull (PUSH-LOCK)	Per spindle / Locking lever / Snap-In (ZERO)
Housing	Available in plastic and metal	Available in plastic and metal
Non-magnetic version		•

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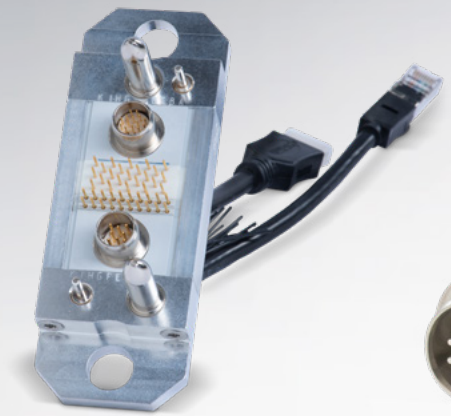
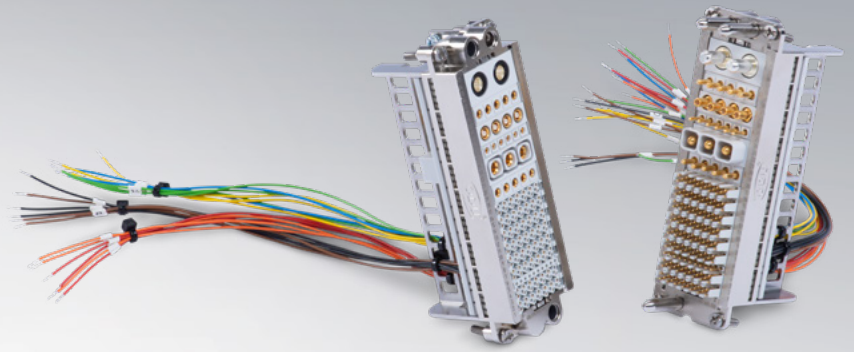


Cable assembly integrated solutions!

	ODU-MAC® Silver-Line Connector for docking systems	ODU DOCK Silver-Line Automatic docking for robots
Mating cycles	Up to 10 million	Up to 10 million
Mating type	Automatic docking	Automatic docking
Automatic docking	7 frame varieties, individual length, quick change head option	3 sizes quick change head option
Locking		
Housing	Strain relief housing	3 housing varieties avaliable in plastic and metal
Non-magnetic version	•	

MODULAR CONNECTORS – VARIETY OF MODULES



	ODU-MAC® Blue-Line Flexible universal solution	ODU-MAC® White-Line Manual mating
Signal	Up to 33 A / 2.5 mm²	Up to 27 A / 1.5 mm²
Power	Up to 58 A / 6 mm²	Up to 119 A / 16 mm²
High current	Up to 225 A / 50 mm²	Up to 225 A / 50 mm²
High voltage	Up to 4 kV / 1 mm²	Up to 6.3 kV / 0.25 mm²
Coax	Up to 12 GHz	Up to 9.0 GHz
Compressed air	–0.8 up to 12 bar	–0.8 up to 20 bar
Fluid	Up to 10 bar	Up to 20 bar
Fiber optic POF / GOF	PC / APC / Expanded Beam	PC / APC / Expanded Beam Performance
Transfer rates / high-speed	SPE / CAT 6_A / USB® / HDMI® / DisplayPort®	SPE / CAT 6_A / USB® / HDMI® / DisplayPort®
Optional pin protection	Integrated with 20-pin signal module	Integrated with 20-pin signal module or freely positioned
Termination technology	Crimp / solder / print through PCB termination modules	Crimp / solder / print

The contact arrangement of an ODU data transmission connector differs from a standard data transmission connector due to the robust ODU specific design. However, the ODU design meets the electrical specifications that are derived from the respective standard data transmission protocol.

Find your product

	ODU-MAC® Silver-Line Connector for docking systems	ODU DOCK Silver-Line Automatic docking for robots
Signal	Up to 27 A / 1.5 mm²	Up to 27 A / 1.5 mm²
Power	Up to 119 A / 16 mm²	Up to 119 A / 16 mm²
High current	Up to 225 A / 50 mm²	Up to 225 A / 50 mm²
High voltage	Up to 6.3 kV / 0.25 mm²	Up to 2.5 kV / 1.5 mm²
Coax	Up to 9.0 GHz	Up to 9.0 GHz
Compressed air	–0.8 up to 20 bar	–0.8 up to 20 bar
Fluid	Up to 25 bar	Up to 10 bar
Fiber optic POF / GOF	•	•
Transfer rates / high-speed	SPE / CAT 6_A / USB® / HDMI® / DisplayPort®	SPE / CAT 6_A / USB®
Optional pin protection	Integrated with 20-pin module or freely positioned	
Termination technology	Crimp / solder / print	Crimp / solder

Tolerance compensation
up to +/– 4 mm

Cable assembly integrated solutions!

ELECTRICAL CONTACTS

	ODU SPRINGTAC®	ODU SPRINGTAC® Flatsocket	ODU LAMTAC®
Primary attribute	High mating cycles	Test & measurement	High current
Contact technology	Springwire technology	Springwire technology	Lamella technology
Contact security	● ● ●	● ● ●	● ●
Points of contact	360° circular	Double sided	360° circular
Contact diameter	From 0.76 mm	From 0.64 x 0.64 mm	From 1.0 mm
Mating cycles	> 100,000 (up to 1 million)	> 50,000	> 10,000
Operating temperature range	–40° C to +125° C	–40° C to +125° C	–40° C to +150° C
High temperature range	Up to +300 °C (on request)		
Surfaces	Ag / Au	Ag / Au	Ag / Au
Termination technologies	Crimp / screw / solder	Crimp / solder / QCH (quick change head)	Crimp / screw / solder
Current (∅ 6 mm / 16 mm²) per IEC 60512-5-2:2002	110 A		115 A
Contact material	CuSn alloy or CuBe	CuSn	CuBe alloy

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	ODU TURNTAC®
Primary attribute	High volume
Contact technology	Turned, slotted contacts
Contact security	•
Points of contact	4 and 6 tines circular
Contact diameter	From 1.5 mm
Mating cycles	> 10,000
Operating temperature range	–40° C to +125° C
High temperature range	
Surfaces	Ag / Au
Termination technologies	Crimp / screw / solder
Current (∅ 6 mm / 16 mm²) per IEC 60512-5-2:2002	100 A
Contact material	CuZnPb

SYSTEM SOLUTIONS FROM ONE SOURCE

Standard cables and accessories

- For circular and modular connectors assembled by ODU
- Standard cables and accessories from a predefined pool of purchases
- Quick and easy offer
- Fast delivery and fast samples

Customer-specific overmoldings

- Very cost-effective tooling
- Customer-specific shapes of overmolding
- Worldwide availability
- Short delivery times

Silicone-overmolded system solutions

- Specified up to 500 autoclaving cycles
- Hygienic surface with prevention of the stick-slip effect
- Bend protection due to special shape of overmolding
- Medical technology testing according to DIN EN ISO 10993-5
- Individual laser marking possible (in accordance with the UDI)

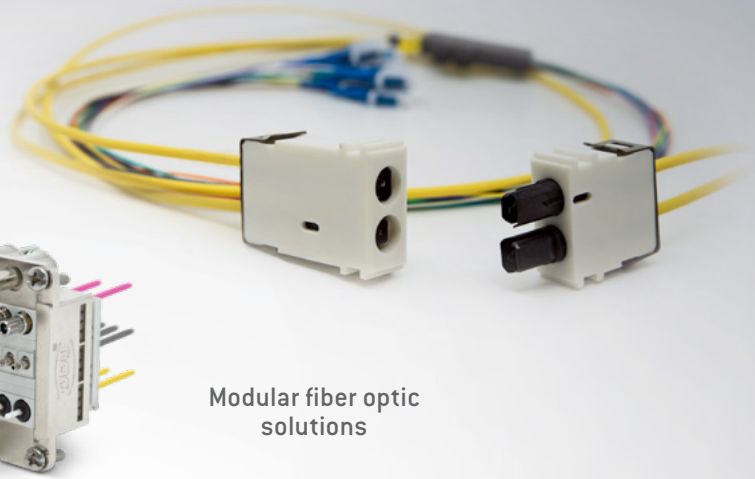
FIBER OPTIC SYSTEM SOLUTIONS

When it comes to challenging applications, our expanded beam performance as well as our expanded beam technology offers high-end transmission characteristics over a high number of mating cycles. The excellent optical performance remains unchanged even under mechanical stress, environmental influences and harsh ambient conditions.

The portfolio also includes reliable physical contact technology that is characterized by very low insertion loss, which makes up to 1,000 mating cycles possible.

For short transmission distances, polymer optical fiber (POF) system solutions are available as a cost-efficient optical connection.

- GOF (multimode/singlemode) and POF system solutions
- Fiber-only and hybrid systems
- High number of mating cycles
- Available as a fully assembled solution



Modular fiber optic solutions

Expanded Beam Performance | Expanded Beam | Physical Contact | Polymer Optical Fiber

CUSTOM CONNECTOR SOLUTIONS

Brochure Video

Requirements	Achievements
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 1x1 – 10 Gbit/s / HDMI® – 14.4 Gbit/s / 10 Gbit Ethernet – 10 Gbit/s
Operating temperature	Up to 300 °C
Pressure	650 bar (9,427 psi) operating receptacle / 500 bar (7,251 psi) operating mated condition / 1,000 bar (14,503 psi) burst
Vibration	LV214 Severity Level 4 (20 g, 10 – 2,000 Hz, 22 h) Four-time multisinus per three-dimensional axis (16 g, 20 – 2,000 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	Insertion loss >0.7 dB (Singlemode) / >0.3 dB (Multimode) with 25,000 mating cycles (Expanded Beam Performance)
Magnetic permeability	Magnetic permeability μr < 1.0005
Environmental	Salt spray / fog, chemical resistance, UV, Arizona dust, radiation, sterlization
Shock	1,000 g
Contact density	1 contact / mm^2
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)


















ODU CONNECTORS AROUND THE WORLD

All dimensions are in mm.
Some figures are for illustrative purposes only. Subject to change without notice. Errors and omissions excepted. We reserve the right to change our products and their technical specifications at any time in the interest of technical improvement. This publication supersedes all prior publications.

ODU CONNECTOR SOLUTIONS / B / 1223 / US

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