ADVANCED CIRCULAR CONNECTOR SOLUTIONS

Push-Pull, Break-Away and Screw-Locking

ODU MINI-SNAP®
ODU MEDI-SNAP®
ODU MINI-MED®
ODU MINI-SNAP®PC
ODU AMC®
ODU AMC® HIGH-DENSITY
ODU THREADED CONNECTOR

A PERFECT ALLIANCE.
A PERFECT ALLIANCE.

ODU GROUP OVERVIEW
• More than 80 years of experience in connector technology
• Over 2,300 employees worldwide
• 18 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 / e-mobility

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 CIRCULAR CONNECTOR SOLUTIONS AND CAPABILITIES

<table>
<thead>
<tr>
<th>ODU MINI-SNAP®</th>
<th>ODU MEDI-SNAP®</th>
<th>ODU MINI-MED®</th>
<th>ODU MINI-SNAP® PC</th>
<th>ODU AMC®</th>
<th>ODU AMC® High-Density</th>
<th>ODU Threaded Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push-Pull locking</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Break-Away locking</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>High-speed data transmission (&gt; 480 Mbit/S)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Mechanical coding</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Blind mate/ blind insertion</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>360º Shielding</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Watertight</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>High mating cycles (&gt; 5,000)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Vibration &amp; shock resistant</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Threaded technology</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Silicone overmold</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

* Approved for ODU MEDI-SNAP® Break-Away Plugs in PSU
** Available in ODU AMC® High-Density Chrome Plated
## ODU HIGH-DENSITY & LIGHTWEIGHT CONNECTOR PORTFOLIO

**FAST SAMPLE AVAILABILITY**
Email us at: sales@odu-usa.com

**RAPID CABLE ASSEMBLY MANUFACTURING**

### ODU AMC® PUSH-PULL

<table>
<thead>
<tr>
<th>Pin and groove</th>
<th>0</th>
<th>14.0</th>
<th>5.5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>4</td>
<td>15.9</td>
<td>8.5</td>
<td>16</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>16.5</td>
<td>8.0</td>
<td>19</td>
</tr>
<tr>
<td>1.5</td>
<td>2</td>
<td>19.6</td>
<td>10.0</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>23.9</td>
<td>11.5</td>
<td>37</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>33.0</td>
<td>17.5</td>
<td>55</td>
</tr>
</tbody>
</table>

### ODU AMC® BREAK-AWAY

<table>
<thead>
<tr>
<th>Pin and groove</th>
<th>0</th>
<th>11.9</th>
<th>5.5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>4</td>
<td>13.9</td>
<td>6.5</td>
<td>16</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>15.9</td>
<td>8.0</td>
<td>19</td>
</tr>
<tr>
<td>1.5</td>
<td>2</td>
<td>17.6</td>
<td>10.0</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>21.9</td>
<td>11.5</td>
<td>37</td>
</tr>
</tbody>
</table>

### ODU AMC® EASY-CLEAN

<table>
<thead>
<tr>
<th>Pin and groove</th>
<th>0</th>
<th>11.9</th>
<th>5.5</th>
<th>7</th>
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</thead>
<tbody>
<tr>
<td>0.5</td>
<td>4</td>
<td>13.9</td>
<td>6.5</td>
<td>16</td>
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<tr>
<td>1</td>
<td>1</td>
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<td>8.0</td>
<td>19</td>
</tr>
<tr>
<td>1.5</td>
<td>2</td>
<td>17.6</td>
<td>10.0</td>
<td>26</td>
</tr>
</tbody>
</table>

### ODU THREADED CONNECTOR

<table>
<thead>
<tr>
<th>Pin and groove</th>
<th>1.5</th>
<th>2</th>
<th>175</th>
<th>8.5</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>13.9</td>
<td>6.5</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>2</td>
<td>15.9</td>
<td>8.0</td>
<td>19</td>
<td></td>
</tr>
</tbody>
</table>

### ODU AMC® HIGH-DENSITY

<table>
<thead>
<tr>
<th>Pin and groove</th>
<th>1</th>
<th>1.5</th>
<th>175</th>
<th>8.5</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>13.9</td>
<td>6.5</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>2</td>
<td>15.9</td>
<td>8.0</td>
<td>19</td>
<td></td>
</tr>
</tbody>
</table>

### ODU THREADED CONNECTOR

<table>
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<tr>
<th>Pin and groove</th>
<th>1.5</th>
<th>2</th>
<th>175</th>
<th>8.5</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>13.9</td>
<td>6.5</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>2</td>
<td>15.9</td>
<td>8.0</td>
<td>19</td>
<td></td>
</tr>
</tbody>
</table>

1. These ODU specific connectors can transmit common data transmission protocols such as USB® 3.2 Gen 1x1, USB® 2.0, HDMI® 2.0, Ethernet, CAT 5 and CAT 6A, but they are not USB®, HDMI®- and Ethernet- standard connectors.

---

**NEW!**

**FAST SAMPLE AVAILABILITY**
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**RAPID CABLE ASSEMBLY MANUFACTURING**

**ODU AMC® HIGH-DENSITY**

**ODU AMC® HIGH-DENSITY BREAK-AWAY**

- 70% weight and size reduction
- Cable assembly solutions
- IP68 (20 m submersion)
- Chrome plated version available
- USB® 3.2 Gen 1x1 + USB® 2.0 + HDMI® 2.0 + Ethernet¹

**ODU AMC® HIGH-DENSITY SCREW-LOCK**

- High vibration resistance
- High speed data transfer
- IP68
- High contact density:
  - 2–16 contacts / 2 sizes

**ODU AMC® PUSH-PULL**

- IP68 and IP6K9K
- > 5,000 mating cycles
- High speed data technology
- Quick and easy mating and locking

**ODU AMC® BREAK-AWAY**

- IP68 and IP6K9K
- > 5,000 mating cycles
- High speed data technology
- Quick and easy mating and locking

**ODU AMC® EASY-CLEAN**

- Fast and easy cleaning
- Break-Away function
- > 5,000 mating cycles
- Contact inserts with pogo pins

**ODU THREADED CONNECTOR**

- High shock and vibration
- Signal and power
- IP68
<table>
<thead>
<tr>
<th>ODU MINI-SNAP® L</th>
<th>ODU MINI-SNAP® K</th>
<th>ODU MINI-SNAP® B</th>
<th>ODU MINI-SNAP® S</th>
<th>ODU MINI-SNAP® F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cabling</strong></td>
<td><strong>Pin and groove</strong></td>
<td><strong>Pin and groove</strong></td>
<td><strong>Insulator</strong></td>
<td><strong>Half shell</strong></td>
</tr>
<tr>
<td><strong>Sizes</strong></td>
<td>00</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>No. of possible mechanical setting</strong></td>
<td>4</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Max. nominal pressure (mbar)</strong></td>
<td>6.4</td>
<td>11.0</td>
<td>9.4</td>
<td>9.4</td>
</tr>
<tr>
<td><strong>Max. cable diameter (mm)</strong></td>
<td>3.5</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td><strong>Max. no. of contacts</strong></td>
<td>04</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Solder</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Comp.</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Rend.</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>IP Class in mated condition</strong></td>
<td><strong>IP50</strong></td>
<td><strong>IP68</strong></td>
<td><strong>IP68</strong></td>
<td><strong>IP68</strong></td>
</tr>
<tr>
<td><strong>Mating cycles</strong></td>
<td><strong>Up to &gt;5,000</strong></td>
<td><strong>Push-Pull</strong> (L principle)</td>
<td><strong>Up to &gt;5,000</strong></td>
<td><strong>Up to &gt;5,000</strong></td>
</tr>
<tr>
<td><strong>Locking principle</strong></td>
<td><strong>Signal, data, power</strong></td>
<td><strong>Signal, data, power</strong></td>
<td><strong>Signal, data, power</strong></td>
<td><strong>Signal, data, power</strong></td>
</tr>
</tbody>
</table>

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

#### ODU MEDI-SNAP® PUSH-PULL
- IP50 and IP64
- Autoclavable & fully sterilizable
- High voltage insert up to 1,000 V AC
- IEC 60601-1 compliant housings*
- Right angle version available

<table>
<thead>
<tr>
<th>Pin and groove</th>
<th>1</th>
<th>6</th>
<th>13.7</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>18.5</td>
<td>9.2</td>
<td>26</td>
</tr>
</tbody>
</table>

---

#### ODU MEDI-SNAP® BREAK-AWAY
- IP64 / IP67
- Autoclavable
- Break-Away for minimum of 2,000 mating cycles

<table>
<thead>
<tr>
<th>Pin and groove</th>
<th>1</th>
<th>6</th>
<th>15.8</th>
<th>5.5</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>18.3</td>
<td>11.5</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>

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#### 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

<table>
<thead>
<tr>
<th>Pin and groove</th>
<th>2</th>
<th>3</th>
<th>18.5</th>
<th>9.2</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>18.3</td>
<td>11.5</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>

---

#### ODU MINI-MED®
- Space saving design
- Pre-assembled solution
- Up to 1,000 mating cycles

<table>
<thead>
<tr>
<th>Pin and groove</th>
<th>1</th>
<th>1</th>
<th>11.5 / 11.2</th>
<th>4.4</th>
<th>6</th>
</tr>
</thead>
</table>

---

#### ODU MEDI-SNAP® PC
- Plastic connector
- IP50 and IP67
- Shielded version available

<table>
<thead>
<tr>
<th>Half shell</th>
<th>1</th>
<th>12.5</th>
<th>6.0</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>15.7</td>
<td>9.0</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>18.7</td>
<td>10.5</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>

---

Footnote:
*Up to 2 MOPP / 2 MOOP

### FAST SAMPLE AVAILABILITY
Email us at: sales@odu-usa.com

### CABLE ASSEMBLY SOLUTIONS
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sales@odu-usa.com

### WEB
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**ODU HYBRID CONNECTOR SOLUTIONS**

**TYPES OF TRANSMISSION YOU CAN COMBINE IN A HYBRID CONNECTOR**

**Electrical:** Signal, power, data, special designs (e.g., coax)

**Physical:** Gas, liquids

**ESSENTIAL CONSIDERATIONS TO BE MADE PRIOR TO DETERMINING YOUR HYBRID INTERFACE**

- Description of the application
- What types of transmissions are needed in your interface?
- How many transmission types do you want to combine?
- Available space
- Environmental conditions (e.g., temperature, water, dust, chemicals)

**TYPES OF TRANSMISSION YOU CAN COMBINE IN A HYBRID CONNECTOR**

- Electrical: Signal, power, data, special designs (e.g., coax)
- Physical: Gas, liquids

**MOST COMMONLY REQUESTED COMBINATIONS**

- Power + signals
- Power + data
- Signals + data
- Coax + liquid
- Coax + gas

**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.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Extreme ODU has achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>High current</td>
<td>2,400 A</td>
</tr>
<tr>
<td>High voltage</td>
<td>56 kV (DC) 36 kV (AC)</td>
</tr>
<tr>
<td>Water protection</td>
<td>IP67 / IP68 / IP69K / IP6K9K</td>
</tr>
<tr>
<td>Vacuum tightness</td>
<td>1 × 10⁻⁹ mbar l/s</td>
</tr>
<tr>
<td>Salt spray</td>
<td>700 hours</td>
</tr>
<tr>
<td>EMC / EMI protection</td>
<td>&gt; 75 dB (0 – 5 MHz) / &gt; 65 dB (5 MHz – 500 MHz)</td>
</tr>
<tr>
<td>High speed data rate</td>
<td>USB® 3.2 Gen 1x1 – 5 GBit/s¹ / HDMI® 2.0 – 14.4 Gbit/s¹ / 10 Gbit Ethernet – 10 Gbit/s</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Up to 300 °C</td>
</tr>
<tr>
<td>Pressure</td>
<td>650 bar (9427 psi) operating receptacle / 500 bar (7251 psi) operating mated condition / 1,000 bar (14503 psi) burst</td>
</tr>
<tr>
<td>Vibration</td>
<td>LxX14 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)</td>
</tr>
<tr>
<td>Mating cycles</td>
<td>&gt; 1 Million</td>
</tr>
<tr>
<td>Hydraulic connection</td>
<td>25 bar (362 psi) operating</td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>20 bar (290 psi) operating</td>
</tr>
<tr>
<td>Fiber optic</td>
<td>&lt; 1 dB typical @ 100,000 mating cycles single mode/multimode</td>
</tr>
<tr>
<td>Magnetic permeability</td>
<td>Magnetic permeability µr &lt; 1.0005</td>
</tr>
<tr>
<td>Environmental</td>
<td>Salt spray / fog, chemical resistance, UV, Arizona dust, radiation, sterilization</td>
</tr>
<tr>
<td>Shock</td>
<td>1,000 g</td>
</tr>
<tr>
<td>Contact density</td>
<td>1 contact/mm²</td>
</tr>
<tr>
<td>Smallest contact diameter</td>
<td>0.3 mm</td>
</tr>
<tr>
<td>Smallest circular connector diameter</td>
<td>5 mm</td>
</tr>
<tr>
<td>On driving test</td>
<td>Electric vehicle adapter</td>
</tr>
<tr>
<td>Self finding solutions</td>
<td>+/- 5 mm float (shield and tight)</td>
</tr>
</tbody>
</table>

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

**ODU PRODUCT AVAILABILITY**

**ODU DIRECT SALES**

Email us at sales@odu-usa.com or call 805.484.0540

**ODU WEBSTORE**

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**ASK OUR ENGINEERS**

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---

**CIRCULAR**

**MODULAR**

**ELECTRICAL CONTACTS**

**CUSTOM SOLUTIONS**

**CABLE ASSEMBLY**
ODU CABLE ASSEMBLY SOLUTIONS & CONNECTORS FROM ONE SOURCE

OVERMOLDS WITH SILICONE, TPE, TPU & TPV

POTTING AND ENVIRONMENTAL SEALING

CUSTOM COMPONENT OVERMOLD (Custom Requirement)

CUSTOMIZED CONNECTOR SOLUTIONS

NON ODU CONNECTORS
• High-speed standard connectors such as: USB® 3.2 Gen 1x1, USB® 2.0, HDMI® 2.0 and Ethernet CAT 5
• Military and medical connectors
• Wire to board connectors

100% 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 require all USB®, HDMI®, Ethernet or CAT - standard connectors.

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

FLEX LAYER ASSEMBLY

ODU CABLE ASSEMBLY SOLUTIONS & CONNECTORS FROM ONE SOURCE

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ASK OUR ENGINEERS
Email us at 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.

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

OEU NORTH AMERICA CAPABILITIES
- Environmentally controlled presurized 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
- Cleanroom EN ISO 14644-1
- 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

ODU INTERNATIONAL CAPABILITIES
- Cleanroom EN ISO 14644-1
- 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

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

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