A PERFECT ALLIANCE.

ODU-MAC®

Compact modular connector system.
Up to 6,300 V, 20 bar, 10 Gbit/s, 100,000 mating cycles and 9.0 GHz.
FEATURES

- Robust design
- High number of mating cycles (> 100,000)
- Stable low contact resistance
- Vibration resistance
- High reliability
- Wide variety of transmission modules
- Compact solution possibilities
- Maximum packing density
- Blind mating

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- Medical
- Industrial
- Measurement and testing
- Military and security
- Energy
- eMobility

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Strain relief housing

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Shielded implementation/high-speed connector
Blank modules/spacer modules/coding modules/pin protection modules

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Current-carrying capacity
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For assembly instructions please refer to our website: www.odu-connectors.com/downloads
A PERFECT ALLIANCE.

CREATING CONNECTIONS, BUILDING ALLIANCES, COLLABORATING INTO THE FUTURE: WHETHER TWO TECHNICAL COMPONENTS COME TOGETHER TO FORM A UNIT OR PEOPLE COME TOGETHER TO STRIVE FOR GREAT RESULTS — THE KEY IS TO ASPIRE IN ACHIEVING SUPERB RESULTS. THIS GOAL DRIVES OUR WORK. PERFECT CONNECTIONS THAT INSPIRE AND DELIVER ON THE PROMISES.

ODU WORLDWIDE

ODU GROUP OVERVIEW
- More than 70 years of connector experience
- €146 million* in turnover
- Over 1,650 employees worldwide
- 9 sales subsidiaries: China, Denmark, France, Germany, Italy, Japan, Sweden, the UK and the US
- All technologies under one roof: Design and development, machine tool and special machine construction, injection, stamping, turning, surface technology, assembly and cable assembly

*As of February 2016

CERTIFIED QUALITY
- DIN EN ISO 9001
- ISO/TS 16949
- DIN EN ISO 14001
- ISO 13485
- Wide range of UL, CSA, VG and DVA licenses
- UL-certified cable assembly

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

**PERFECT SOLUTIONS**

ODU’s PRODUCT PORTFOLIO.

- Circular connector series in robust metal or plastic housing
- Contacts for soldering, crimping and PCB termination
- With Push-Pull locking mechanism for a secure connector
- 2 up to 55 contacts
- IP 50 to IP 69
- Autoclavable for medical applications
- Application-specific hybrid interface
- For manual mating and automatic docking
- The highest packing density
- Flexible modular construction
- Multitude of data transmission modules
- Variety of locking options available
- For the transmission of signals, power, high current, high voltage, coax, high-speed data, fiber optics and other media such as air or fluid
- Mating cycles scalable as required from 10,000 to over 100,000 (1 million)

- Versatile connector solutions for transmission of power, signals, data, or media – ODU never fails to offer the right interface when quality and absolute reliability are the top priorities.

- Complete systems from a single source based on years of assembly expertise
- State-of-the-art production facilities with 100% end testing, high-voltage testing, component testing and pressure testing up to 100 bar
- Cleanroom production
- Hot-melt and high-pressure injection molding
- Customer-specific labeling
- Rapid prototyping of samples

- Extremely durable even under extreme/harsh environments
- Interference-free and secure connection, even under vibration
- High-level vertical manufacturing – all competences and key technologies under one roof
- Expert advice based on mutual partnership
- Fast development and production

- Contacts, connectors and assemblies for the highest technical requirements as well as special applications
- First-class implementation expertise
- High level of vertical manufacturing – all competences and key technologies under one roof
- Expert advice based on mutual partnership
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- Fast development and production
AppLiCATiON-SpeCifiC SOLUTiONs
Demands that can't be pigeon-holed call for creative specialists who think outside the box. ODU offers the type of expertise that focuses solely on the specific requirements of our customers. For every development order we get, we not only perform a thorough check to make sure it's feasible, we intensively incorporate our customers in the ongoing design process. This guarantees an impressive, custom-fit final result. Our solutions are frequently based on the modifications of our products, especially for the ODU MINI SNAP and ODU-MAC connectors.

MORE THAN A CONNECTION
OUR KNOW-HOW FOR YOUR SUCCESS.

HIGH PERFORMANCE CONNECTOR TECHNOLOGY FOR DEMANDING KEY MARKETS
Customers rely on ODU technology wherever first-class, high-performance connector solutions are required. All our skills go into our products to ensure your success. In addition to the top quality, reliable stability and maximum flexibility in customer-specific requirements, our products also stand for dynamics, reliability, safety, precision, efficiency and sustainability. And they guarantee unrestricted functionality for the final product due to our high quality connectors.

ODU – A PERFECT ALLIANCE.

APPLICATION-SPECIFIC SOLUTIONS
Demands that can't be pigeon-holed call for creative specialists who think outside the box. ODU offers the type of expertise that focuses solely on the specific requirements of our customers. For every development order we get, we not only perform a thorough check to make sure it's feasible, we intensively incorporate our customers in the ongoing design process. This guarantees an impressive, custom-fit final result. Our solutions are frequently based on the modifications of our products, especially for the ODU MINI SNAP and ODU-MAC connectors.

HIGH LEVEL OF VERTICAL INTEGRATION
ODU combines all the competences and key technologies for the connector manufacturing. These include design and development, machine tool and special machine construction, injection, stamping, turning, surface technology, assembly and cable assembly and our own test laboratory.

INDIVIDUAL CABLE ASSEMBLY
Our production skills together with our cutting edge production facilities from Europe, China and the USA enable us to deliver to our customers local tested assemblies and also global ones.
ODU-MAC® – A MODULAR ALL-ROUNDER FOR THE MOST VARIED APPLICATIONS

THE SMART SOLUTION FOR CUSTOMIZED CONNECTIONS

The ODU-MAC’s flexible, modular design enables multiple connection types to be combined within single contacts. Whether signal, power, high current, high voltage, coax, high-speed data transmission, fiber optic and other media such as air or fluid – all types can be selected from the module and integrated into the individual connector solution. The connection options are just as versatile.

Many options are available for a variety of applications in industry or medical technology. For example, automated docking systems can use our stable aluminium frames, or a manual connection can be made with our robust housing design.

The result is an effective, compact and attractive complete connection that cannot be beaten in terms of functionality. Confusion due to an excessive number of connections is a thing of the past – an ODU-MAC customized to meet your requirements is today’s solution.

ODU-MAC is available in two basic versions: a flexible and adjustable aluminium frame for automatic docking or in the housing for manual mating.

Find out more about custom configurations on the following pages.

The ODU-MAC leaves nothing to be desired:

- 100,000 mating cycles and more
- Versions in the docking frame for automatic docking
- Versions in rugged housing suitable for use in harsh environments
- Easy locking of the housing with Snap-In, spindle or lever
- Many different module options available
- Extremely compact due to the high contact density

ADDITIONAL INFORMATION PROVIDED IN VIDEOS
WWW.YOUTUBE.COM/ODUSTECKVERBINDE

ODU-MAC® – A MODULAR ALL-UNDER FOR THE MOST VARIED APPLICATIONS

THE MODULARITY AT A GLANCE:

2 Possible applications: automatic docking or manual mating

43 Cable hood versions

6 Different docking frames independently configurable length

3 Locking types: Snap-In (Break-Away), spindle or lever locking

5 Different spindle geometries

34 Modules to choose from: signal, power, high current, high voltage, coax, media such as air or fluid, high-speed data transmission and fiber optic

6 Variations of bulkhead mounted and surface mounted housing and various sizes of cable-to-cable-hoods

Our new performance class offers a true alternative – request our ODU-MAC Blue-Line catalog to find out more.
ODU-MAC® WEB CONFIGURATOR

Individual configuration of your ODU-MAC® connection.

With ODU-MAC web configurator it’s possible to configure your connection simply according to your requirements. The configurator guides you through the different choices step by step and offers many continuative information. There are two ways to access the ODU-MAC web configurator:

1. ACCESS: THROUGH WWW.ODU-CONNECTORS.COM

Entry via www.odu-connectors.com provides you with a great deal of product information and many application examples prior to configuration of your ODU-MAC.

2. ACCESS: DIRECTLY THROUGH WWW.ODU-MAC.COM

www.odu-mac.com takes you directly to the configuration spacer, allowing you to start assembling your ODU-MAC immediately.

Videos explaining the functions of automatic docking and manual mating can be found under explanation on the welcome page of the configurator at www.odu-mac.com.

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YOUR WAY TO AN INDIVIDUAL CONNECTION

How to configure your ODU-MAC®.

INDIVIDUAL REQUIREMENTS – INDIVIDUAL CONFIGURATION

With ODU-MAC, we offer a modular connector system configured to your requirements. This means that you always receive the appropriate hybrid connection.

SELECT & REQUEST OFFERS

You will receive a drawing and a detailed offer within one working day of submitting your request. When placing an order you will receive the complete article number for connections preassembled by ODU® (contacts supplied as accompanying loose items). We ask you to ensure directly about customized versions not covered by the standard.

ODU-MAC® silver-Line

1ST STEP: FRAME SELECTION

Depending upon your requirements, you can choose 6 different frame types as a base for automatic docking.

Frames

<table>
<thead>
<tr>
<th>ODU-MAC® S (Standard)</th>
<th>ODU-MAC® T (Transverse)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ODU-MAC® L (Large)</td>
<td>ODU-MAC® P+ (Power)</td>
</tr>
<tr>
<td>ODU-MAC® M+ (Mini)</td>
<td>ODU-MAC® OCH (quick change head) (connector saver)</td>
</tr>
</tbody>
</table>

2ND STEP: MODULE SELECTION

Choose from 34 different modules for transferring signal, power, high current, high voltage, coax, high-speed data transmission, fiber optic and other media such as air or fluid and assemble your ODU-MAC individually.

Modules

<table>
<thead>
<tr>
<th>Signal</th>
<th>Compressed air and fluid model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Fiber optic</td>
</tr>
<tr>
<td>High current</td>
<td>Shielded implementation / high-speed connector</td>
</tr>
<tr>
<td>High voltage</td>
<td>Blank modules / spacer modules / coding modules / pin protection module</td>
</tr>
<tr>
<td>Coax</td>
<td></td>
</tr>
</tbody>
</table>

For information to the configuration of your connector please refer to our website: www.odu-mac.com

1ST STEP: LOCKING

Select the type of lock in this first step. You have the choice between Snap-In, lever and spindle locking.

<table>
<thead>
<tr>
<th>Snap-In locking</th>
<th>Spindle locking</th>
<th>Lever locking</th>
</tr>
</thead>
</table>

Transverse locking available on request.

Lever locking only in metal housing; spindle locking possible in plastic and metal housing.

2ND STEP: CONNECTOR HOUSING

Depending upon the lock, choose the housing suited to your requirements. The following housings are available:

<table>
<thead>
<tr>
<th>Snap-In locking</th>
<th>90° Cable exit</th>
<th>Cable hood</th>
<th>Metal/plastic housing</th>
<th>Cable hood</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45° Cable exit</td>
<td>Cable hood XXL</td>
<td>Cable hood XXL</td>
<td>Cable hood</td>
</tr>
<tr>
<td></td>
<td>0° Cable exit</td>
<td>Cable hood wide</td>
<td>Cable hood wide</td>
<td></td>
</tr>
</tbody>
</table>

3RD STEP: RECEPTACLE SELECTION

Depending upon the requirements for the receptacle and the selected connector housing, a wide variety of designs is available.

<table>
<thead>
<tr>
<th>Snap-In locking</th>
<th>Receptacle</th>
<th>Cable hood</th>
<th>Cable hood XXL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bulkhead mounted housing</td>
<td>Metal/plastic housing</td>
<td>Bulkhead mounted housing</td>
</tr>
<tr>
<td></td>
<td>Surface mounted housing</td>
<td>Metal/plastic housing</td>
<td>Surface mounted housing</td>
</tr>
<tr>
<td></td>
<td>Cable to cable hood</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The cable hood wide housing is only compatible with the bulkhead and surface mounted housing for cable hood wide housings.

4TH STEP: MODULE SELECTION

Choose from 34 different modules for transferring signal, power, high current, high voltage, coax, high-speed data transmission, fiber optic and other media such as air or fluid and assemble your ODU-MAC individually.

Modules

See page 52
OVERVIEW OF DOCKING FRAMES.

ODU-MAC in the docking frame is used only for automatic docking. Choose from a variety of different frames, adjust the length individually and assemble the frame with the modules you need for your requirements.

With ODU-MAC you can always find the perfect solution. And should your requirements for a connection go beyond the standard solutions, we also offer customized special solutions.

ODU-MAC is configured for 3 to 60 grid units (more upon request), meaning that up to 600 contacts can be installed when the 10 contacts module with a module width of 2.54 mm (1 unit) is used. Versions for limited space (ODU-MAC M+ (Mini)), increased requirements for floating support (ODU-MAC L (Large)) and increased mechanical load (ODU-MAC P+ (Power)) are also available.

FURTHER INFORMATION FROM PAGE 34.

The length of the frames can be ordered individually depending upon the number of modules.

3–60 UNITS STANDARD
> 60 UNITS ON REQUEST
ODU-MAC® white-Line®

MODULARITY AND ERGONOMIC DESIGN FOR THE SMALLEST OF SPACES.

The ODU-MAC® ZERO – Modular Multitasker.

The ODU-MAC ZERO is a space-saving hybrid connector that combines the widest variety media – the ideal choice from the ODU-MAC product family. Its symmetric housing geometry enables a generous range – up to 9 units – of signals, power, light waves, data-rate and coax modules. In place of an aluminum frame, the plastic housing parts have integrated rails, making the use of magnetic components no longer necessary.

This is how a solid, effective, and attractive overall connection is created – pure functionality that is hard to ignore. Confusion due to an excessive number of connections? This challenge belongs to the past – because the customized ODU-MAC ZERO is today’s solution.

FURTHER INFORMATION FROM PAGE 50.

- Housing made of 2 plastic half-shells which also form the frame
- All touchable parts nickel-free
- Bio-compatibility upon request
- Coding: by guiding pins (Ø 4 mm, length 16 mm), housing geometry, coding modules and color-coded cable bend relief varieties
- Suitable for a wide range of ODU-MAC modules
- Up to 60,000 mating cycles
- 3 different cable outlets: straight, 45°, 90°
- Simple, safe housing locking
  (break-away function/emergency release)

SNAP-IN LOCKING

Easy mating, automatic locking, quick demating option when necessary:

- Quick, reliable housing locking thanks to snap fits and sealing strip (frictional locking principle)
- Low mating/demating forces (approx. 7 N for the housing) guarantee quick connection demating (break-away function/emergency release)

Solid grip
Blind mating
Non-magnetic
Space-saving

<table>
<thead>
<tr>
<th>Size</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZERO</td>
<td>9</td>
</tr>
</tbody>
</table>
Overview of housings with spindle locking

In the case of spindle locking, the housings can be equipped with an easy to operate precision locking spindle. This spindle enables easy closing and opening of the housing with a single turning movement. The mating and sliding forces overcome in this way ease handling significantly. Only 5 units of space are required for this purpose.

Especially in case of high connection frequency and limited space for locking, the use of precision locking is a preferred option.

Depending upon the application scenario, the mechanisms are designed for up to 30,000 locking cycles. Easy to mount replacement sets are available for larger numbers of mating cycles (See page 52).

FURTHER INFORMATION FROM PAGE 54.

- Low profile – less space for operation than lever latching
- Ease of use – one hand operation
- Ergonomic design – easy single spindle knob
- Improved reliability – preferred design for high mating cycles
- Fully enclosed – internal mechanism prevents damage
- Repairable – can be replaced without removal of the hood or frame
- User friendly – lower force required for operation
- Precision – materials, design and tolerances assist the life of contacts over time

<table>
<thead>
<tr>
<th>Size</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>34</td>
</tr>
</tbody>
</table>

CABLE HOOD XXL:

<table>
<thead>
<tr>
<th>Size</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>34</td>
</tr>
</tbody>
</table>

5 units of space required for spindle. XXL housing only possible in metal version.
ODU-MAC® white-Line®
MANUAL MATING.

Overview of housings with lever locking

ODU-MAC with lever locking offers a wide variety of combination possibilities for manual mating. With the exception of the dual housing, all housings can be combined with one another.

Appropriate frames in various sizes are available for use in the standard DIN EN 175301-801:2007 housing with lever. Size 4, for example, can receive up to 34 modules with a module width of 2.54 mm (1 unit), meaning that a total of 34 modules (34 units), or 340 contacts in the case of 10 contacts, can be accommodated. Size 6 of the dual housing can accommodate up to 680 contacts.

FURTHER INFORMATION FROM PAGE 66.

<table>
<thead>
<tr>
<th>Size</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>34</td>
</tr>
</tbody>
</table>

CABLE HOOD XXL:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>34</td>
</tr>
</tbody>
</table>

CABLE HOOD WIDE:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>48</td>
</tr>
<tr>
<td>6</td>
<td>68</td>
</tr>
</tbody>
</table>

FULLY COMPATIBLE
BEST CONNECTIONS – THE CONTACT PRINCIPLE

ODU contacts fulfil the highest quality standards and enable secure and reliable connections. ODU has the highest performance contact technologies at its disposal. Principally, a differentiation of lathe-turned contacts is made between lamella, springwire and slotted contacts. The socket side differ in architecture, but the pins are always the same and always solid.

ODU SPRINGTAC®
Contacts with springwire technology.

The ODU SPRINGTAC is the most effective contact system on the market. Constant transfer is always guaranteed thanks to the large number of individual, independently flexible springwires. Even with the smallest contact diameter of $\varnothing 0.76$ mm, 15 individual springs are still installed, meaning that even this small diameter provides 15 contact surfaces for current transfer. Correspondingly more for larger diameters.

ADVANTAGES

- Greater than 100,000 mating cycles (up to 1 million mating cycles can be achieved)
- High current-carrying capacity – surge current capacity
- Low contact resistances
- Large number of independently flexible contact springs, e.g. 40 springs with a diameter of 5 mm
- Low mating and demating forces
- Extremely secure connection
- High vibration and shock resistance
- Individual contacts upon request

Standard contact principle for:

<table>
<thead>
<tr>
<th>Signal</th>
<th>14 to 5 contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>4 to 2 contacts</td>
</tr>
<tr>
<td>High current</td>
<td>2 contacts</td>
</tr>
<tr>
<td>High voltage</td>
<td>4 contacts</td>
</tr>
<tr>
<td>Coax</td>
<td>2 contacts</td>
</tr>
<tr>
<td>Shielded implementation</td>
<td>8, 5, 4-contacts</td>
</tr>
</tbody>
</table>

ODU LAMTAC®
Contacts with lamella technology.

The ODU LAMTAC contact consists of a lathe-turned body in which one or more stamped lamella strips are mounted. The individual bars of the lamella provide numerous contact points which guarantee high contact reliability and optimum conductive properties. The adopted contact force ensures low mating and demating forces, and a long service life with low wear. The mating cycles here are minimum 10,000.

ADVANTAGES

- > 10,000 mating cycles
- High current-carrying capacity – surge current capacity
- Low contact resistances
- Low mating and demating forces
- Secure connection
- High vibration and shock resistance
- Economical alternative to springwire contacts
- Individual contacts upon request

Standard contact principle for:

<table>
<thead>
<tr>
<th>High current</th>
<th>2 to 1 contact(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High voltage</td>
<td>1 contact</td>
</tr>
<tr>
<td>Coax</td>
<td>4 contacts</td>
</tr>
<tr>
<td>Shielded implementation</td>
<td>Shielded transmission</td>
</tr>
</tbody>
</table>

BEST CONNECTIONS – THE CONTACT PRINCIPLE
ODU TURNtAC®
Contacts in slotted version.

The universal ODU TURNtAC contact system combines the very best contact properties and high quality with economic prices. By means of the optimum guidance and assembly in the ODU-MAC system, the longevity of 10,000 mating cycles and more can be achieved.

The contact principle can even be used in dimensions as tiny as 0.3 mm in diameter. Depending on the variety of slotted contact, the connector systems offers two or four contact areas.

ADVANTAGES
• > 10,000 mating cycles
• Economical solution
• The smallest dimensions are possible
• Individual contacts upon request

Standard contact principle for:
- Shielded implementation
- Signal contacts

ODU STAMPTAC®
Contacts in stamped version.

Thanks to its economical manufacture, the ODU STAMPTAC is the most affordable alternative for large numbers of units. Available in various coil sizes for processing with hand crimper and (semi-) automatic stripper crimper. This reduces the preparation time enormously. This contact is used in the 10 contacts module [see page 104/105].

ADVANTAGES
• 5,000 mating cycles
• High quality materials and surfaces with selective plating
• Most affordable alternative for large numbers of units
• Cost-effective processing
• Automatic processing from tape reel possible

Standard contact principle for:
- Signal
- 10 contacts
CONTACT RETENTION WITH THE CLIP PRINCIPLE (STANDARD)

The adjacent photo shows how the contact is fixed in the insulator. The contact is pushed from the termination area (rear insertion) into the insulator and locked in by a metal clip (barbed hook) snapping behind a flange.

The contacts can be easily removed again at any time with a removal tool.

Compared with permanent connections, crimp technology allows replacement of contacts and easy repair. Voltage values can be increased by leaving contact positions free. Contact assembly can be performed independently of the insulator.

Not all modules are equipped with the clip principle, but removal is possible. The 10-position module does not have a removable contact system.

Most of the modules include this fastening technology.

3 mounting lugs for optimal stability.
APPLICATION SPECIFIC SOLUTIONS

Problem solvers who think outside the box are required when standard solutions find their limits. ODU offers you just this kind of expert: the ones who focus on your specific requirements. For every development order we get, we not only perform a thorough review study, we intensively involve our customers in the ongoing design process. This guarantees an impressive, custom-fit final result. Our standard connectors are frequently the base for custom modifications.

FOR INDUSTRIAL

MANUAL MATING

An insulator developed specific to the application, equipped with coaxial and signal contacts, forms the connector between the MRI device and the individual body coils.

Advantages

• Minimum 50,000 locking cycles
• Non-magnetic
• 1.3 and 2.8 GHz frequency range
• 50 Ω
• High packing density

MANUAL MATING

Well-known manufacturers worldwide trust in the ODU-MAC system as a reliable connector between the various patient coils and the MRI device. To help streamline operations, the connector is also available in a version with non-magnetic materials.

Advantages

• Non-magnetic version, e.g. for MRI application
• Plastic sleeve housing with individual monobloc
• Customized contact configuration possible
• Spindle locking

FOR MEDICAL

ODU-MAC® FOR SPARK WAVE® THERAPY DEVICE

The Spark Wave® therapy device for urogenital treatment applications contains the ODU-MAC modular connector. This ensures a secure connection between the device and the applicator, which sends out bundled sound waves. The sophisticated cable assembly is also provided by ODU.

Advantages

• Extremely easy change of applicator via a fully automatic locking and unlocking function
• Hybrid solution with signals, high voltage and fluids
• System solution including cable assembly

MONOBLOC INSULATOR

Customers install this insulator block, equipped with standard ODU-MAC contacts, into its own custom housing.

COMPLETE DOCKING UNIT

Three ODU-MAC rows incl. spindle locking are mounted in a special stainless steel frame.

Advantages

• Special floating support with tolerance compensation +/- 3 mm

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ODU-MAC®

CONFIGURE THE ODU-MAC®.
SIMPLY ONLINE AT WWW.ODU-MAC.COM

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**SYSTEM REQUIREMENTS AND TOLERANCES**

High mating cycles and perfect transfer rates – in order to ensure these for automatic docking over the long term, the docking system must be a design consideration (e.g. centering systems).

Clean and smooth docking is secured by special guiding pins that are designed for the forces which guide the connector. Please note the mechanical requirements behind the design.

### MAXIMUM PERMISSIBLE OFFSET + STANDARD GAP MEASURE IN MATED CONDITION (RADIAL PLAY)

<table>
<thead>
<tr>
<th>Frame</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>+/- 0.6 mm</td>
</tr>
<tr>
<td>L</td>
<td>+/- 1.2 mm</td>
</tr>
<tr>
<td>M</td>
<td>+/- 0.6 mm</td>
</tr>
</tbody>
</table>

The maximum permissible gap between socket and pin pieces is 0.5 mm as a standard. Extension with long contact pins is possible.

### MAXIMUM PERMISSIBLE ANGLE DEVIATION WHEN MATING

2°

### EXAMPLE OF AN S FRAME SYSTEM

Strain relief for cables/braids must be provided by the customer. Draw your attention to our strain relief housing page 46.

The values for the connected condition (pin S in B) result from the axial play of the centering sockets.

### NOTE: AUTOMATIC DOCKING SYSTEMS

- The pin piece of the ODU-MAC S is to be fixed with the accompanying centering sockets and has mounted floating pins for self-centering of ODU-MAC®
- The guiding systems of the ODU-MAC require additional guiding hardware for the system
- The maximum permissible gap between socket and pin pieces is 0.5 mm as standard. Extension with long contact pins is possible.
- An alignment system (e.g. guide rails, etc.) is necessary to achieve high mating cycles. The max. permissible alignment error is, for example, with the ODU-MAC S frame, less than +/- 0.6 mm radial
- Strain relief for the cables/braids must be provided by the customer or use our strain relief housing see page 46.

### Frame Tolerance

<table>
<thead>
<tr>
<th>Frame</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>+/- 0.6 mm</td>
</tr>
<tr>
<td>T</td>
<td>On request</td>
</tr>
<tr>
<td>P+</td>
<td>+/- 2.5 mm</td>
</tr>
<tr>
<td>QCH</td>
<td>+/- 0.6 mm</td>
</tr>
</tbody>
</table>

### Limitations

- Only for ODU-MAC® S (screwed tight without play to wall B)
- Fastening screw
- Tolerance compensation in the example of an S frame:
  - Axial play: 0.2 mm
  - Radial play: +/- 0.6 mm
- Pins for self-centering of ODU-MAC®
- ODU-MAC® pin piece (floating) [with play via centering socket; screwed tight to wall S]
- Pin for guiding walls B and S [customer performance]
### ODU-MAC® S (STANDARD)

Standard solutions for docking applications.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Dim. (mm)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin frame</td>
<td>611.020.0...600.000</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Socket frame</td>
<td>610.020.0...600.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin frame</td>
<td>611.021.0...600.000</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>Socket frame</td>
<td>610.020.0...600.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin frame</td>
<td>611.025.0...600.000</td>
<td>21</td>
<td>Model for spindle locking</td>
</tr>
<tr>
<td>Socket frame</td>
<td>610.020.0...600.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin frame</td>
<td>611.050.0...600.000</td>
<td>10</td>
<td>With labelling</td>
</tr>
<tr>
<td>Socket frame</td>
<td>610.050.0...600.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **TECHNICAL DATA**
  - Tolerance compensation:
    - Axial play: ±0.3 mm
    - Radial play: ±0.3 mm
  - Pin piece floating supported
  - Minimum 100,000 mating cycles

Non-magnetic version available upon request.

### ODU-MAC® L (LARGE)

Frame with higher tolerance compensation and reinforced guiding bushes as well as extended guiding pins.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Dim. (mm)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin frame</td>
<td>611.009.0...600.000</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Socket frame</td>
<td>610.009.0...600.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **TECHNICAL DATA**
  - Tolerance compensation:
    - Axial play: ±0.6 mm
    - Radial play: ±0.6 mm
  - Double-sided floating supported
  - Minimum 100,000 mating cycles

Non-magnetic version available upon request.
**ODU-MAC® M+ (MINI)**

Compact design with minimal space requirements and optional PE transmission.

**TECHNICAL DATA**
- Tolerance compensation:
  - Axial play: ±0.6 mm
  - Double-sided floating supported
  - Minimum 100,000 mating cycles
  - Optional PE transmission see page 42

Non-magnetic version available upon request.

---

**ODU-MAC® P+ (POWER)**

The frame for highest requirements by a reinforced frame design. High tolerance compensation ±/− 2.5 mm.

**TECHNICAL DATA**
- Tolerance compensation:
  - Axial play: ±0.6 mm
  - Double-sided floating supported
  - Advisable for modules with contact diameter > 5 mm and frame length > 40 units (depending on configuration)
  - Contact diameter > 8 mm: this frame has to be used
  - Minimum 100,000 mating cycles
  - Optional PE transmission see page 43

Non-magnetic version available upon request.

---

**Description** | **Part number**
---|---
Pin frame | 611.716.0_600.000
Socket frame | 610.716.0_600.000

L = Number of units × 2.54
--- = Here please register number of desired units
(05 to 60 in steps of 5, above 61 on request)

---

**NOT COMPATIBLE WITH ODU-MAC M FRAME.**
PE TRANSMISSION FOR ODU-MAC M+(MINI)

**TECHNICAL DATA**
- Tolerance compensation:
  - Axial play: 0.4 mm
  - Radial play: +/- 0.6 mm
  - Minimum 100,000 mating cycles
  - Double-sided version
  - Surface: nickel-plated

Non-magnetic version available upon request.

**GROUNDING KIT MOUNTED**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Connection threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>190.270.001.000.000</td>
<td>M4</td>
</tr>
</tbody>
</table>

Max. 4 mm² lug connection for PE transmission.

---

PE TRANSMISSION FOR ODU-MAC P+ (POWER)

**TECHNICAL DATA**
- Tolerance compensation:
  - Axial play: 1 mm
  - Radial play: +/- 2.5 mm
  - Minimum 100,000 mating cycles
  - Double-sided version
  - Surface: Ag

Non-magnetic version available upon request.

**GROUNDING KIT MOUNTED**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Connection threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>174.100.100.201.100</td>
<td>M5</td>
</tr>
</tbody>
</table>

Max. 10 mm² lug connection for PE transmission.

---

**CONTACT RESISTANCE COMPLIANT WITH < 0.1 Ω NORM**

---

**GROUNDING KIT FOR M+ SOCKET FRAME**

---

**GROUNDING KIT FOR M+ PIN FRAME**

---

**GROUNDING KIT FOR P+ SOCKET FRAME**

---

**GROUNDING KIT FOR P+ PIN FRAME**

---

**GROUNDING KIT MOUNTED**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Connection threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>190.270.002.000.000</td>
<td>M4</td>
</tr>
</tbody>
</table>

Max. 4 mm² lug connection for PE transmission.

---

**GROUNDING KIT MOUNTED**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Connection threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>180.100.000.301.100</td>
<td>M5</td>
</tr>
</tbody>
</table>

Max. 10 mm² lug connection for PE transmission.

---

**CONTACT RESISTANCE COMPLIANT WITH < 0.1 Ω NORM**

---

Non-magnetic version available upon request.

---

Max. 10 mm² lug connection for PE transmission.
**ODU-MAC® T (TRANSVERSE)**

Transverse frame, for when a low installation height is required.

**TECHNICAL DATA**

- Installation even in housing solution

These models are available on request. Technical specifications have to be clarified in detail.

Standard non-magnetic.

![Image of Docking Frame](image_url)

**Categories:**
- Frames for the highest cycle requirements (connector saver) and with a low maintenance downtime, due replaceable parts.

**OUD-MAC® QCH (QUICK CHANGE HEAD)**

Frames for the highest cycle requirements (connector saver) and with a low maintenance downtime, due replaceable parts.

**TECHNICAL DATA**

- Tolerance compensation:
  - Axial play: 0.2 mm
  - Radial play: ± 0.6 mm
- Pin piece floating supported
- Unlimited number of mating cycles (min. 100,000 mating cycles)
- Replacement of the interchange parts without assembly effort

These models are available on request. Technical specifications have to be clarified in detail.

Non-magnetic version available upon request.

![Image of Docking Frame](image_url)

**Categories:**
- The quick change head (connector saver) consists of 4 frames. Pin and socket frames are disconnected or connected when disconnecting or connecting between the second and third frame.
- Pieces 1 and 2 or 3 and 4 always remain together.
- In the event of damage or wear to the contacts, both replacement parts 2 and 3 are disconnected from pieces 1 and 4 and can be quickly and easily replaced with the new replacement parts without time spent on assembly. The connection is ready to use again within a matter of seconds.

---

**Table of Contents**

- Frames for the highest cycle requirements (connector saver) and with a low maintenance downtime, due replaceable parts.
- Technical specifications have to be clarified in detail.

---

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>610.026.0...</td>
<td>Part 1: Base part incl. distance piece</td>
<td>610.026.0...</td>
<td>Part 2: Socket frame – interchange part</td>
</tr>
<tr>
<td>610.020.0...</td>
<td>Part 2: Socket frame – interchange part</td>
<td>610.021.0...</td>
<td>Part 3: Pin frame – interchange part</td>
</tr>
<tr>
<td>610.027.0...</td>
<td>Part 4: Base part incl. distance piece</td>
<td>610.026.201.304.000</td>
<td>Distance piece as a spare part</td>
</tr>
</tbody>
</table>

**Module and Contacts for the Quick Change Head System**

All modules with depths not exceeding 19 mm can be used in the connector saver. ODU-MAC L docking frames upon request. (M+ and P+ frames are not possible).

---

**FDU-MAC® QC**

Part number

- 610.055.029.103.100
- 610.055.029.105.100
- 610.055.029.107.100
- 610.055.029.108.100
- 610.055.029.110.100

**MODULES AND CONTACTS FOR THE QUICK CHANGE HEAD SYSTEM**

All modules with depths not exceeding 19 mm can be used in the connector saver. PCB contacts are installed in pieces 2 and 3. All socket contacts (Crimp and PCB termination) suitable for pieces 2 and 3 can be used in pieces 1 and 4.

---

**Table of Contents**

- Frame for the highest cycle requirements (connector saver) and with a low maintenance downtime, due replaceable parts.
- Technical specifications have to be clarified in detail.

---

**Table of Contents**

- Technical specifications have to be clarified in detail.
ODU-MAC® SILVER-LINE STRAIN RELIEF HOUSING

The accessories for docking solutions.

APPLICATION EXAMPLE

Additional M32 cable clamps can be placed by the customer.

TECHNICAL DATA

• Material: aluminium
• Operating temperature: −40 °C to +125 °C
• Protection class 1 can be adjusted individually
• Cable clamps, see page 72
• Locknut for cable clamp, see page 80

CHARACTERISTICS

• Resistant and compact
• Protection of the termination area
• Individual strain-relief variations, cable entries as well as grounding connections
• Suitable for all ODU-MAC docking frames
• 6 standard lengths, compatible with all ODU-MAC docking frame varieties [further lengths available on request]
• Optional fixing of the PCBs and components in the protected interior
• ODU logo included as a standard; customer logo can also be delivered upon request

CHARTERISTICS

• resistant and compact
• protection of the termination area
• individual strain-relief variations, cable entries as well as grounding connections
• suitable for all ODU-MAC docking frames
• 6 standard lengths, compatible with all ODU-MAC docking frame varieties [further lengths available on request]
• optional fixing of the PCBs and components in the protected interior
• ODU logo included as a standard; customer logo can also be delivered upon request

APPLICATION EXAMPLE

Additional M32 cable clamps can be placed by the customer.

Additional M32 cable clamps can be placed by the customer.

For mounting on an existing mounting wall of the customer.

The set comprises a housing profile including 2 covers and corresponding fastening screws for assembly of the included cover. Fastening material for an existing mounting wall of the customer is not included in the scope of delivery.

<p>|</p>
<table>
<thead>
<tr>
<th>Part number</th>
<th>Part number</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 × cover without hole</td>
<td>1 × cover with/1 × cover without hole</td>
<td>2 × cover with hole</td>
</tr>
<tr>
<td>Units</td>
<td>Dim. L</td>
<td></td>
</tr>
<tr>
<td>2.54 mm</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>616.010.100.600.000</td>
<td>616.010.114.600.000</td>
<td>616.010.144.600.000</td>
</tr>
<tr>
<td>10</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>616.020.100.600.000</td>
<td>616.020.114.600.000</td>
<td>616.020.144.600.000</td>
</tr>
<tr>
<td>20</td>
<td>123</td>
<td></td>
</tr>
<tr>
<td>616.030.100.600.000</td>
<td>616.030.114.600.000</td>
<td>616.030.144.600.000</td>
</tr>
<tr>
<td>30</td>
<td>149</td>
<td></td>
</tr>
<tr>
<td>616.040.100.600.000</td>
<td>616.040.114.600.000</td>
<td>616.040.144.600.000</td>
</tr>
<tr>
<td>40</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td>616.050.100.600.000</td>
<td>616.050.114.600.000</td>
<td>616.050.144.600.000</td>
</tr>
<tr>
<td>50</td>
<td>199</td>
<td></td>
</tr>
<tr>
<td>616.060.100.600.000</td>
<td>616.060.114.600.000</td>
<td>616.060.144.600.000</td>
</tr>
<tr>
<td>60</td>
<td>224</td>
<td></td>
</tr>
</tbody>
</table>

1 A higher protection class is possible for additional sealing of the housing.
CONFIGURE THE ODU-MAC®
SIMPLY ONLINE AT WWW.ODU-MAC.COM

MANUAL MATING

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**ODU-MAC® ZERO**

Connector housing for mounting on the cable with different cable entries. ODU-MAC rail for installing the insulator is already integrated in the housing.

**SNAP-IN LOCKING (BREAK-AWAY FUNCTION)**

![90° CABLE EXIT](image1)

![0° CABLE EXIT](image2)

![45° CABLE EXIT](image3)

**TECHNICAL DATA**

- **Color of housing**: White
- **Locking cycles**: 60,000
- **Material**: PC Lexan (PEI on request)
- **Protection class**: IP 54
- **Operating temperature**: −40 °C to +125 °C

The cable bend relief must be ordered separately see page 83.

---

**RECEPTACLE**

For integration in the device.

**SNAP-IN LOCKING (BREAK-AWAY FUNCTION)**

![Panel Cut-Out](image4)

**TECHNICAL DATA**

- **Color of housing**: White
- **Locking cycles**: 60,000
- **Material**: PC Lexan (PEI on request)
- **Protection class**: IP 54
- **Operating temperature**: −40 °C to +125 °C

**Table of Contents**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Cable exit</th>
<th>Size</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>656.560.004.001.000</td>
<td>90°</td>
<td>ZERO</td>
<td>9</td>
</tr>
<tr>
<td>656.560.006.001.000</td>
<td>0°</td>
<td>ZERO</td>
<td>9</td>
</tr>
<tr>
<td>656.560.002.001.000</td>
<td>45°</td>
<td>ZERO</td>
<td>9</td>
</tr>
</tbody>
</table>

**SUITABLE MODULES ARE MARKED.**

---

1 The frame is already permanently integrated and consists of nine units.
SPINDLE LOCKING

Module for installation in ODU MAC® frames for housings. Quick-action locking system with 30,000 locking cycles. Simple replacement of the front (spindle exchange set) enables further mating cycles of the complete system.

VERSION 1: FOR SOCKETS IN BULKHEAD MOUNTED OR SURFACE MOUNTED HOUSING AND PINS IN CABLE HOOD

<table>
<thead>
<tr>
<th>Size</th>
<th>Part number center module for bulkhead mounted and surface mounted housing</th>
<th>Part number spindle locking for cable hood</th>
<th>Angle of rotation</th>
<th>Dim. A mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 (52 mm high)</td>
<td>614.090.001.304.000</td>
<td>615.091.003.200.000</td>
<td>180°</td>
<td>12</td>
</tr>
<tr>
<td>2 (72 mm high)</td>
<td>614.090.001.304.000</td>
<td>615.091.001.200.000</td>
<td>180°</td>
<td>12</td>
</tr>
<tr>
<td>3/4</td>
<td>614.090.001.304.000</td>
<td>615.092.021.200.003</td>
<td>360°</td>
<td>21.5</td>
</tr>
<tr>
<td>4 /XXL</td>
<td>614.090.001.304.000</td>
<td>615.093.021.200.003</td>
<td>360°</td>
<td>21.5</td>
</tr>
</tbody>
</table>

• Max. locking cycles 30,0001
• Space requirement 5 units [5 x 2.54 mm]
• Further spindle geometries on request
• Spindle with coding function available upon request.

REPLACEMENT SPINDLE SET FOR VERSION 1 AND 2

<table>
<thead>
<tr>
<th>Part number spindle exchange set</th>
<th>Angle of rotation</th>
<th>Dim. A mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>615.090.104.249.000</td>
<td>180°</td>
<td>12</td>
</tr>
<tr>
<td>615.090.104.249.003</td>
<td>360°</td>
<td>21.5</td>
</tr>
</tbody>
</table>

Replacement set for easy and rapid replacement of spindle screw from the front.

1 30,000 cycles depending on mating force of the used modules.
**CABLE HOOD**

Connector housing for assembly on the cable with side cable entry.

**TECHNICAL DATA**

- **Color of housing:** Gray (standard, similar to RAL 7001) or white (similar RAL 9010)
- **Material:** Aluminium die casting
- **Protection class:** IP 50/IP 65 on request
- **Operating temperature:** –40 °C to +125 °C
- **Cable clamp:** see page 79
- **Number of locking cycles:** see page 52
- **Adapter for PG clamp:** see page 80

** внешне Title**

**SIZE**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>613.091.513.644.208</td>
<td>613.091.513.653.203</td>
<td>–</td>
<td>57</td>
<td>73</td>
<td>52</td>
<td>43</td>
<td>M25</td>
<td>491.097.613.444.000</td>
</tr>
<tr>
<td>3</td>
<td>613.092.514.644.208</td>
<td>613.092.514.653.203</td>
<td>613.091.514.632.208</td>
<td>57</td>
<td>73</td>
<td>72</td>
<td>43</td>
<td>M32</td>
<td>492.097.613.444.000</td>
</tr>
<tr>
<td>4</td>
<td>613.093.514.644.208</td>
<td>613.093.514.653.208</td>
<td>613.093.514.653.208</td>
<td>104</td>
<td>120</td>
<td>76</td>
<td>45.5</td>
<td>M40</td>
<td>493.097.613.444.000</td>
</tr>
</tbody>
</table>

On request

**CABLE HOOD XXL**

Connector housing for assembly on the cable. With expanded assembly space and side M50 cable entry.

**TECHNICAL DATA**

- **Color of housing:** Gray (similar to RAL 7001) or white on request
- **Material:** Aluminium die casting
- **Protection class:** IP 50/IP 65 on request
- **Operating temperature:** –40 °C to +125 °C
- **Cable clamp:** see page 79
- **Number of locking cycles:** see page 52

** внешне Title**

**SIZE**

<table>
<thead>
<tr>
<th>Size</th>
<th>Part number</th>
<th>Dim. M</th>
<th>Part number protective cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>613.094.513.644.208</td>
<td>M50</td>
<td>491.097.613.444.000</td>
</tr>
<tr>
<td>3</td>
<td>613.095.514.644.208</td>
<td>M50</td>
<td>492.097.613.444.000</td>
</tr>
<tr>
<td>4</td>
<td>613.096.515.653.208</td>
<td>M50</td>
<td>493.097.613.444.000</td>
</tr>
</tbody>
</table>

1. **IEC 60529:2013 (VDE 0470-1:2014) [Depends on the cable clamp(s) and spindle type used].**
### BULKHEAD MOUNTED HOUSING

For mounting on the device.

**SPINDLE LOCKING**

#### TECHNICAL DATA

- **Color of housing**
  - Gray (standard, similar to RAL 7001)
  - White on request
- **Material**
  - Aluminium die casting
- **Protection class**
  - IP 65
- **Operating Temperature**
  - −40 °C to +125 °C (short duration)
  - −40 °C to +85 °C (operating)
- **Sealing**
  - NBR; sealing material FKM on request (higher temperature range)

#### PANEL CUT-OUT

For frames depicted must be ordered separately, see page 78.

#### SPINDLE LOCKING A  GRAY MODEL (STANDARD) B  WHITE MODEL

### SURFACE MOUNTED HOUSING

For surface mounting on your device/wall with two side cable entries.

**SPINDLE LOCKING**

#### TECHNICAL DATA

- **Color of housing**
  - Gray (standard, similar to RAL 7001)
  - White on request
- **Material**
  - Aluminium die casting
- **Protection class**
  - IP 65
- **Operating Temperature**
  - −40 °C to +125 °C (short duration)
  - −40 °C to +85 °C (operating)
- **Sealing**
  - NBR; sealing material FKM on request (higher temperature range)
- **Cable clamp**
  - See page 73
- **Adapter**
  - for PG clamp
  - See page 73

#### PANEL CUT-OUT

The frames depicted must be ordered separately, see page 78.

#### SPINDLE LOCKING A  GRAY MODEL (STANDARD) B  WHITE MODEL

### Table

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Color of housing gray</td>
<td>Color of housing white</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>Units 2.54</td>
<td>Units 2.54</td>
</tr>
<tr>
<td>2</td>
<td>612.091.010.644.000</td>
<td>612.091.010.653.000</td>
<td>57</td>
<td>82</td>
<td>95</td>
<td>62.2</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>612.092.010.644.000</td>
<td>612.092.010.653.000</td>
<td>77.5</td>
<td>103</td>
<td>115</td>
<td>85.5</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>612.093.010.644.000</td>
<td>612.093.010.653.000</td>
<td>104</td>
<td>130</td>
<td>143</td>
<td>112.2</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

1. IEC 60529:2013 (VDE 0470-1:2014) (depends on the spindle type used).
PLASTIC CABLE HOOD

Plastic cable hood for assembly on cable and side cable entry.

SPINDLE LOCKING

TECHNICAL DATA

- Color of housing: Black (RAL 9005)
- Material: Plastic PA6 GF
- Protection class: IP 50
- Operating temperature: −40 °C to +125 °C
- Cable clamp: see page 79
- Number of locking cycles: see from page 52

Size | Part number | Dim. A | Dim. B | Dim. C | Dim. M cable entry | Part number protective cover (see from page 52)
---|---|---|---|---|---|---
2 | 613 091.514 908 308 | 57 | 74 | 72.5 | M32 | 491 097 613 908 001
3 | 613 092.514 908 308 | 77.5 | 94 | 76.5 | M40 | 492 097 613 908 001
4 | 613 093.514 908 308 | 104 | 121 | 76.5 | M40 | 493 097 613 908 001

REDUCTION OF M40 TO M32, SEE PAGE 79.

1 IEC 60529:2013 (VDE 0470-1:2014) (Depends on the cable clamp(s) and spindle type used).

PLASTIC BULKHEAD MOUNTED HOUSING

For assembly of your device with spindle locking.

SPINDLE LOCKING

TECHNICAL DATA

- Color of housing: Black (RAL 9005)
- Material: Plastic PA6 GF
- Protection class: IP 50
- Operating temperature: −40 °C to +125 °C
- Sealing: NBR; sealing material

Size | Part number | Dim. A | Dim. B | Dim. C | Dim. D panel cut-out | X1 | X2 X1 X2 | Part number protective cover (see page 51)
---|---|---|---|---|---|---|---|---|---|---
2 | 612 091.010 908 000 | 57 | 74 | 72.5 | M32 | 57 | 32 | 56 | 6 | 491 097 612 908 001
3 | 612 092.010 908 000 | 77.5 | 94 | 76.5 | M40 | 77.5 | 103 | 114 | 9 | 10 | 492 097 612 908 001
4 | 612 093.010 908 000 | 104 | 121 | 76.5 | M40 | 104 | 130 | 140 | 114 | 15 | 493 097 612 908 001

1 IEC 60529:2013 (VDE 0470-1:2014) (Depends on the spindle type used).
PLASTIC SURFACE MOUNTED HOUSING

For surface mounting on your device/wall with two side cable entries.

TECHNICAL DATA

- Color of housing: Black (RAL 9005)
- Material: Plastic PA6 GF
- Protection class: IP 65 on request
- Operating temperature: −40 °C to +125 °C
- Sealing: NBR; sealing material
- Cable clamp: see page 72

<table>
<thead>
<tr>
<th>Size</th>
<th>Part number</th>
<th>Dim. A (mm)</th>
<th>Dim. B (mm)</th>
<th>Dim. C (mm)</th>
<th>Dim. D (mm)</th>
<th>X1 Diameter 2.54 mm</th>
<th>X2 Diameter 2.54 mm</th>
<th>Dim. M</th>
<th>Part number protective cover (see page 71)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>612.091.020.908.000</td>
<td>57</td>
<td>82</td>
<td>94</td>
<td>81.5</td>
<td>5</td>
<td>6</td>
<td>M32</td>
<td>491.097612.908.0001</td>
</tr>
<tr>
<td>3</td>
<td>612.092.020.908.000</td>
<td>77.5</td>
<td>105</td>
<td>117</td>
<td>81.5</td>
<td>9</td>
<td>10</td>
<td>M40</td>
<td>492.097612.908.0001</td>
</tr>
<tr>
<td>4</td>
<td>612.093.020.908.000</td>
<td>104</td>
<td>132</td>
<td>144</td>
<td>81.5</td>
<td>14</td>
<td>15</td>
<td>M40</td>
<td>493.097612.908.0001</td>
</tr>
</tbody>
</table>

REDUCTION OF M40 TO M32, SEE PAGE 79.

1 IEC 60529:2013 (VDE 0470-1:2014) (Depends on the cable clamp(s) and spindle type used).

PLASTIC PROTECTIVE COVER

For bulkhead and surface mounted housing with lanyard.

TECHNICAL DATA

- Color of housing: Black (RAL 9005)
- Material: Plastic PA6 GF
- Protection class: IP 65
- Operating temperature: −40 °C to +125 °C
- Locking: via the side-bar locking included in the delivery

<table>
<thead>
<tr>
<th>Size</th>
<th>Part number</th>
<th>Dim. A (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>491.097612.908.001</td>
<td>74</td>
</tr>
<tr>
<td>3</td>
<td>492.097612.908.001</td>
<td>94</td>
</tr>
<tr>
<td>4</td>
<td>493.097612.908.001</td>
<td>121</td>
</tr>
</tbody>
</table>

1 IEC 60529:2013 (VDE 0470-1:2014)
PLASTIC PROTECTIVE COVER

For cable hood with lanyard.

TECHNICAL DATA
Color of housing: Black (RAL 9005)
Material: Plastic PA6 GF
Protection class: IP 65
Operating temperature: −40 °C to +125 °C
Sealing: NBR, sealing material
Locking: Via the side-bar locking included in the delivery

Table

<table>
<thead>
<tr>
<th>Size</th>
<th>Part number</th>
<th>Dim. A (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>491.097613 908.001</td>
<td>74</td>
</tr>
<tr>
<td>3</td>
<td>492.097613 908.001</td>
<td>94</td>
</tr>
<tr>
<td>4</td>
<td>493.097613 908.001</td>
<td>121</td>
</tr>
</tbody>
</table>

1 IEC 60529:2013 (VDE 0470-1:2014)
INFORMATION ON PLASTIC HOUSING

Plastic housing is primarily used for applications in which a high degree of chemical resistance is required. The glass-fiber reinforced plastic housing reduces the weight and impresses in mechanical robustness.

In the case of plastic housings in the ODU-MAC White-Line, the proven ODU spindle technology with a minimum of 30,000 locking cycles is used, having good ergonomic properties and thereby greatly simplifying the mating for the user. An additional grounding of the plastic housing is unnecessary, due to the antistatic, thermoplastic housing.

The plastic housing thereby represents a technological and economical enhancement of the housing varieties.

### Table of Contents

This list represents an abstract of the chemical resistance of the plastic housing. Please contact the ODU team if you have any further questions. They will be happy to assist you.

<table>
<thead>
<tr>
<th>Medium</th>
<th>Material PA6 + GF</th>
<th>Resistance</th>
<th>With limited resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia, 10% aqueous solution</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammonia gas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammonium carbonate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aniline</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphalt</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beer</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butane gas</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper sulphate, 10% aqueous solution</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creosol solution</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cresylic acid</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyclohexane</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diesel</td>
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<tr>
<td>Diluted glycerol</td>
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<tr>
<td>Diluted glycol</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Diluted phenol</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Diisxylophthalate</td>
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<td></td>
</tr>
<tr>
<td>Ethyl alcohol, not denatured</td>
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<td></td>
</tr>
<tr>
<td>Fruit juices</td>
<td>+</td>
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<td></td>
</tr>
<tr>
<td>Glycerol</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexane</td>
<td>+</td>
<td></td>
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<tr>
<td>Hydrogen sulphide</td>
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<td></td>
</tr>
<tr>
<td>Ink</td>
<td>+</td>
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<td></td>
</tr>
<tr>
<td>Isopropl + ethanol</td>
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<td></td>
</tr>
<tr>
<td>Isopropyl alcohol</td>
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<td>Lubricating oil</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl alcohol, diluted 50%</td>
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<td></td>
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<tr>
<td>Mineral oil</td>
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</tr>
<tr>
<td>Mineral-based oil</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Methyl butyl</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor oil</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>n-Butanol</td>
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<tr>
<td>Naphthalene</td>
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<td></td>
</tr>
<tr>
<td>Octane</td>
<td>+</td>
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</table>

<table>
<thead>
<tr>
<th>Medium</th>
<th>Material PA6 + GF</th>
<th>Resistance</th>
<th>With limited resistance</th>
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<tbody>
<tr>
<td>Oleic acid</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Paraffin oil</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potassium carbonate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potassium chloride</td>
<td>+</td>
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</tr>
<tr>
<td>Potassium iodide</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potassium nitrate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potassium sulphate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular grade petrol</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seawater</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone oil</td>
<td>+</td>
<td></td>
<td>&gt; 100 °C</td>
</tr>
<tr>
<td>Soap solution</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium bicarbonate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium bisulphate, aqueous solution</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sodium carbonate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium chlorate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium hydroxide 12.5%</td>
<td>+</td>
<td></td>
<td>≥ 100 °C</td>
</tr>
<tr>
<td>Sodium nitrate</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sodium nitrite</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sodium perborate</td>
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<td></td>
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</tr>
<tr>
<td>Sodium phosphate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium silicate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium sulphate</td>
<td>+</td>
<td></td>
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</tr>
<tr>
<td>Sodium thiosulphate</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solution for developing photos</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Stearic acid</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stearic acids</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sulphur</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulphur dioxide</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tar</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tallow</td>
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<tr>
<td>Transformer oil</td>
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</tr>
<tr>
<td>Urea, diluted</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Urine</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetable oil</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CABLE HOOD

Connector housing for assembly on the cable. With straight and side cable entry.

TECHNICAL DATA
- Color of housing: Gray (standard similar to RAL 7001)
- Material: Aluminium die casting
- Protection class: IP 65
- Operating temperature: −40 °C to +125 °C
- Cable clamp: see page 79
- Adapter: see page 80

With lever locking minimum 5,000 locking cycles are possible with lubrication. Up to 500 mating cycles there is no lubrication required.

<table>
<thead>
<tr>
<th>Size</th>
<th>Part number A</th>
<th>Part number B</th>
<th>Dim. A</th>
<th>Dim. B</th>
<th>Dim. C</th>
<th>Dim. D</th>
<th>Dim. M</th>
<th>Cable entry</th>
<th>Part number protective cover (see page 82)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>490 214 450.644.102</td>
<td>490 214 450.644.102</td>
<td>44</td>
<td>60</td>
<td>52</td>
<td>43</td>
<td>M25</td>
<td>490.097.500.644.000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>491 215 450.644.102</td>
<td>491 215 450.644.102</td>
<td>57</td>
<td>73</td>
<td>52</td>
<td>43</td>
<td>M25</td>
<td>491.097.512.644.000</td>
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</tr>
<tr>
<td>3</td>
<td>492 215 450.644.102</td>
<td>492 215 450.644.102</td>
<td>77.5</td>
<td>93.5</td>
<td>76</td>
<td>45.5</td>
<td>M32</td>
<td>492.097.214.644.000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>493 215 450.644.102</td>
<td>493 215 450.644.102</td>
<td>104</td>
<td>120</td>
<td>76</td>
<td>45.5</td>
<td>M32</td>
<td>493.097.214.644.000</td>
<td></td>
</tr>
</tbody>
</table>

CABLE HOOD XXL

Connector housing for assembly on the cable. With expanded assembly space as well as side and top M50 cable entry.

TECHNICAL DATA
- Color of housing: Gray (standard similar to RAL 7001)
- Material: Aluminium die casting
- Protection class: IP 65
- Operating temperature: −40 °C to +125 °C
- Cable clamp: see page 79
- Adapter: see page 80

With lever locking minimum 5,000 locking cycles are possible with lubrication. Up to 500 mating cycles there is no lubrication required.

<table>
<thead>
<tr>
<th>Size</th>
<th>Part number A</th>
<th>Part number B</th>
<th>Dim. M</th>
<th>Part number protective cover (see page 82)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>493 218 550.644.000</td>
<td>493 219 550.644.000</td>
<td>M50</td>
<td>493.097.071.644.000</td>
</tr>
</tbody>
</table>

1 IEC 60529:2013 (VDE 0470-1:2014) (Depends on the cable clamp[s] used).

**BULKHEAD MOUNTED HOUSING**

For mounting on the device.

**LEVER LOCKING**

**PANEL CUT-OUT**

With lever a locking minimum 5,000 locking cycles are possible with lubrication. Up to 500 mating cycles there is no lubrication required.

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Color of housing</th>
<th>Gray (standard similar to RAL 7001)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Aluminium die casting</td>
</tr>
<tr>
<td>Protection class¹</td>
<td>IP65 in mated condition</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>−40 °C to +125 °C (short duration)</td>
</tr>
<tr>
<td></td>
<td>−40 °C to +85 °C (operating)</td>
</tr>
<tr>
<td>Sealing</td>
<td>NBR; sealing material</td>
</tr>
<tr>
<td>Adapter</td>
<td>for PG clamp</td>
</tr>
</tbody>
</table>

¹ IEC 60529:2013 (VDE 0470-1:2014) (Depends on the hood cable clamp(s) used).

---

**SURFACE MOUNTED HOUSING**

For surface mounting on your device/wall with two side cable entries.

**LEVER LOCKING**

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Color of housing</th>
<th>Gray (standard similar to RAL 7001)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Aluminium die casting</td>
</tr>
<tr>
<td>Protection class¹</td>
<td>IP65 in mated condition</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>−40 °C to +125 °C (short duration)</td>
</tr>
<tr>
<td></td>
<td>−40 °C to +85 °C (operating)</td>
</tr>
<tr>
<td>Sealing</td>
<td>NBR; sealing material</td>
</tr>
<tr>
<td>Adapter</td>
<td>for PG clamp</td>
</tr>
</tbody>
</table>

¹ IEC 60529:2013 (VDE 0470-1:2014) (Depends on the base and hood cable clamps used).
CABLE HOOD WIDE

With straight and side cable entry for double contact arrangement on the frame.

LEVER LOCKING

A TOP CABLE ENTRY

B SIDE CABLE ENTRY

TECHNICAL DATA

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>5</td>
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<td>494.415.550.644.000</td>
<td>77.5</td>
<td>94</td>
<td>79</td>
<td>82.5</td>
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<tr>
<td>6</td>
<td>495.215.550.644.000</td>
<td>495.415.550.644.000</td>
<td>104</td>
<td>132</td>
<td>94</td>
<td>90</td>
<td>M50</td>
<td></td>
</tr>
</tbody>
</table>

1) IEC 60529:2013 (VDE 0470-1:2014) (Depends on the hood cable clamp(s) used).

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BULKHEAD MOUNTED HOUSING FOR CABLE HOOD WIDE

For mounting on the device.

LEVER LOCKING

A WITHOUT COVER

B WITH COVER

TECHNICAL DATA

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
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<tbody>
<tr>
<td>5</td>
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<td>494.131.500.644.000</td>
<td>77.5</td>
<td>110</td>
<td>127</td>
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<td>65</td>
<td>74</td>
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<td>495.131.500.644.000</td>
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<td>168</td>
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<td>80</td>
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</table>

1) IEC 60529:2013 (VDE 0470-1:2014) (Depends on the hood cable clamp(s) used).

PANEL CUT-OUT

Leaver locking (just an example)
CABLE TO CABLE HOOD

LEVER LOCKING

To build a cable to cable connection. Suitable for use with cable hoods (page 66).

Color of housing: Gray (standard similar to RAL 7001)
Material: Aluminium die casting
Protection class: IP 65 in mated condition
Operating temperature:
-40 °C to +125 °C (short duration)
-40 °C to +85 °C (operating)
Sealing: nBr; sealing material nBr on request (higher temperature range)
Cable clamp: see page 79
Adapter: see page 80

With lever a locking minimum 5,000 locking cycles are possible with lubrication. Up to 500 mating cycles there is no lubrication required.

TECHNICAL DATA

Size | Part number | Dim. A (mm) | Dim. B (mm) | Dim. C (mm) | Dim. D (mm) | Dim. M | Part number
--- | --- | --- | --- | --- | --- | --- | ---
1 | 490.331.450.644.102 | 44 | 60 | 75 | 43 | Cable entry | 490.097.500.644.001
2 | 491.331.450.644.102 | 57 | 73 | 75 | 43 | M32 | 491.097.133.644.000
3 | 492.331.450.644.102 | 77.5 | 93.3 | 79 | 45.5 | | 492.097.133.644.000
4 | 493.331.450.644.102 | 104 | 120 | 79 | 45.5 | | 493.097.133.644.000

M40 CABLE ENTRY AVAILABLE UPON REQUEST.

TRANVERSE LOCKING

Housing with side lockings. On request.

TECHNICAL DATA

Color of housing: Gray (standard similar to RAL 7001)
Material: Aluminium die casting
Protection class: IP 65 in mated condition
Operating temperature:
-40 °C to +125 °C (short duration)
-40 °C to +85 °C (operating)
Sealing: nBr; sealing material

With lever a locking minimum 5,000 locking cycles are possible with lubrication. Up to 500 mating cycles there is no lubrication required.
CABLE HOOD IN IP 68/IP 69
For applications with extreme requirements. With 360° EMC shielding according to VG 95373-41:1997.
On request.

### INSERTION LOSS

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<th>Loss in dB</th>
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<td>Actual value</td>
</tr>
<tr>
<td>20</td>
<td>Actual value</td>
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<td>40</td>
<td>Actual value</td>
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<tr>
<td>60</td>
<td>Actual value</td>
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<tr>
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<tr>
<td>90,000</td>
<td>Limit value</td>
</tr>
<tr>
<td>100,000</td>
<td>Limit value</td>
</tr>
</tbody>
</table>

### TECHNICAL DATA

- **EMC model**
- **Surface**
- **Sealing**
- **Housing**
- **Seawater resistance**
- **Temperature range**
- **Shielding attenuation**
- **Corrosion protection model**
- **Pressure tightness**
- **Color**
- **Protection class**
- **Screw locking**

### Application areas

Used in EMC shielded applications.
Housing construction according to IEC 61373-2010 (VDE 0115-106:2011)
Cat. 2 (boigie) from rail engineering.

### Table of Contents

<table>
<thead>
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<td>Side cable entry</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
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<td>490.260.550.641.000</td>
<td>490.261.550.641.000</td>
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<td>44</td>
<td>M32</td>
<td>100.5</td>
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<td>2</td>
<td>491.262.550.641.000</td>
<td>491.263.550.641.000</td>
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<td>57</td>
<td>M32</td>
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<td>191</td>
<td>104</td>
<td>M40</td>
<td>110.5</td>
</tr>
</tbody>
</table>

**BULKHEAD MOUNTED- AND SURFACE MOUNTED HOUSING IN IP 68/IP 69**

For applications with extreme requirements. With 360° EMC shielding according to VG 95373-41.1997.

On request.

---

**TECHNICAL DATA**

**EMC model**
- Surface: Electrically conductible
- Sealing: Inside protected
- Housing: Aluminium die-casting alloy
- Seawater resistance
- Temperature range: -50 °C to +120 °C
- Shielding attenuation: ca. 65 dB

**Corrosion protection model**
- Pressure tightness: > 5 bar
- Color: Black (similar to RAL 9002)
- Protection class: ip 68, ip 69 (IEC 60529:2013 [VDE 0470-1:2014])
- Sealing: Conductive silicone

**Application areas**

---

**Panel Cut-Out**

**Protective Cover for Bulkhead Mounted and Surface Mounted Housing in IP 68/IP 69**

For applications with extreme requirements. With 360° EMC shielding according to VG 95373-41.1997.

On request.

---

**Table of Contents**

<table>
<thead>
<tr>
<th>Size</th>
<th>Part number protective cover for bulkhead mounted and surface mounted housing with lanyard</th>
<th>Dim. B (mm)</th>
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<tr>
<td>1</td>
<td>490.060.500.641.000</td>
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<tr>
<td>2</td>
<td>491.060.500.641.000</td>
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<tr>
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**CABLE CLAMP AND REDUCING RING**

**CABLE CLAMP® FOR HOUSINGS ACCORDING TO IEC 62444-2010 (VDE 0619:2014)**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Thread</th>
<th>Color</th>
<th>Width across flats</th>
<th>Tightening torque</th>
<th>Cable diameter mm</th>
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<tbody>
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<td>027.825.060.130.007</td>
<td>M25 × 1.5</td>
<td>Gray</td>
<td>30</td>
<td>8</td>
<td>6 to 13</td>
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<tr>
<td>027.825.090.170.007</td>
<td>M32 × 1.5</td>
<td>Gray</td>
<td>36</td>
<td>10</td>
<td>7 to 15</td>
</tr>
<tr>
<td>027.832.070.150.007</td>
<td>M40 × 1.5</td>
<td>Gray</td>
<td>46</td>
<td>13</td>
<td>19 to 28</td>
</tr>
<tr>
<td>027.832.110.210.007</td>
<td>M50 × 1.5</td>
<td>Gray</td>
<td>55</td>
<td>15</td>
<td>27 to 35</td>
</tr>
<tr>
<td>027.825.060.130.003</td>
<td>M25 × 1.5</td>
<td>White</td>
<td>30</td>
<td>8</td>
<td>6 to 13</td>
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<tr>
<td>027.825.090.170.003</td>
<td>M32 × 1.5</td>
<td>White</td>
<td>36</td>
<td>10</td>
<td>7 to 15</td>
</tr>
<tr>
<td>027.832.070.150.003</td>
<td>M40 × 1.5</td>
<td>White</td>
<td>46</td>
<td>13</td>
<td>19 to 28</td>
</tr>
<tr>
<td>027.832.110.210.003</td>
<td>M50 × 1.5</td>
<td>White</td>
<td>55</td>
<td>15</td>
<td>27 to 35</td>
</tr>
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<td>6 to 13</td>
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<td>027.825.090.170.008</td>
<td>M32 × 1.5</td>
<td>Black</td>
<td>36</td>
<td>10</td>
<td>7 to 15</td>
</tr>
<tr>
<td>027.832.070.150.008</td>
<td>M40 × 1.5</td>
<td>Black</td>
<td>46</td>
<td>13</td>
<td>19 to 28</td>
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<tr>
<td>027.832.110.210.008</td>
<td>M50 × 1.5</td>
<td>Black</td>
<td>55</td>
<td>15</td>
<td>27 to 35</td>
</tr>
</tbody>
</table>

**TECHNICAL DATA**

- **Material**
  - Body: PA6
  - Sealing: NBR; sealing material
  - Protection class: IP68 to 5 bar
  - Temperature range: −40 °C to +100 °C
- **EMC clamp on request.**

**REDUCING RING FOR PLASTIC HOUSING**

**TECHNICAL DATA**

- **Color**
  - Black (RAL 9005)
- **Material**
  - Plastic PA6 GF20
- **Protection class**
  - IP65
- **Temperature range**
  - −40 °C to +125 °C
- **Sealing**
  - NBR; sealing material

<table>
<thead>
<tr>
<th>Part number</th>
<th>External thread</th>
<th>Internal thread</th>
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<tbody>
<tr>
<td>921.000.016.000.356</td>
<td>M40 × 1.5</td>
<td>M32 × 1.5</td>
</tr>
</tbody>
</table>

---

**ODU-MAC® FRAME FOR HOUSING**

With grounded housing. (The frame is not required for the ODU-MAC® ZERO.)

- **Part number**
  - 921.000.006.000.356

**SOCKET FRAME WITH GUIDING BUSHES**

**PIN FRAME WITH GUIDING PIN**

Sockets in bulkhead mounted housing; cable to cable hood or surface mounted housing. Pins in cable hood. Modules are mounted, contacts are not fixed enclosed. Coding possibilities see page 84.

For the height of the contact pins the same dimensions are valid as described by the respective modules.

<table>
<thead>
<tr>
<th>Size</th>
<th>Part number</th>
<th>Socket frame</th>
<th>Part number</th>
<th>Pin frame</th>
<th>Max. units</th>
<th>Dim. A</th>
<th>Dim. B</th>
<th>Dim. C</th>
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<tr>
<td>ZERO</td>
<td>No frame required</td>
<td>No frame required</td>
<td>9</td>
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<td>--</td>
<td>--</td>
<td>--</td>
</tr>
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<td>1</td>
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<td>611.190.000.600.000</td>
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<td>51</td>
<td>44</td>
<td>25.5</td>
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<td>2</td>
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<td>111</td>
<td>104</td>
<td>86.5</td>
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</table>

### FRAMES FOR CABLE HOOD WIDE

- **Size**
  - 5
  - 6
- **Part number size 3**
  - 2 × part number size 3
  - 2 × part number size 3
- **Part number size 4**
  - 2 × part number size 4
  - 2 × part number size 4

Please note that when equipping size 5 and 6 housings two frames are required.

---

1. If the configuration doesn’t fill the frame completely, please use blank modules. (see page 162.)

2. Delivery doesn’t contain cable clamp, but o-ring is enclosed with the housing.
ADAPTER RING, BLIND GROMMET AND LOCKNUT

ADAPTER RING FOR CABLE CLAMPS WITH PG THREAD

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Material</th>
<th>Nickel-plated brass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>External thread</td>
</tr>
<tr>
<td>921.000.006.000.279</td>
<td>M25 × 1.5</td>
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<tr>
<td>921.000.006.000.255</td>
<td>M32 × 1.5</td>
</tr>
<tr>
<td>921.000.006.000.267</td>
<td>M32 × 1.5</td>
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</tbody>
</table>

BLIND GROMMET FOR SURFACE MOUNTED HOUSING

TECHNICAL DATA

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<tr>
<th>Color</th>
<th>Gray</th>
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<tbody>
<tr>
<td>Material</td>
<td>PA fiber glass reinforced</td>
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<tr>
<td>Protection class</td>
<td>IP68</td>
</tr>
<tr>
<td>Temperature range</td>
<td>−40 °C to +125 °C</td>
</tr>
<tr>
<td>Sealing</td>
<td>NBR, sealing material</td>
</tr>
<tr>
<td>Part number</td>
<td>Thread</td>
</tr>
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<td>921.000.006.000.279</td>
<td>M25 × 1.5</td>
</tr>
<tr>
<td>921.000.006.000.268</td>
<td>M32 × 1.5</td>
</tr>
<tr>
<td>On request</td>
<td>M40 × 1.5</td>
</tr>
<tr>
<td>On request</td>
<td>M50 × 1.5</td>
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LOCKNUT FOR CABLE CLAMP

TECHNICAL DATA

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<tbody>
<tr>
<td>Part number</td>
<td>Thread</td>
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<td>M32 × 1.5</td>
</tr>
<tr>
<td>931.000.003.000.113</td>
<td>M40 × 1.5</td>
</tr>
</tbody>
</table>

For fixing the cable clamp in the ODU-M AC strain relief housing.

FOR YOUR NOTES

Table of Contents
PROTECTIVE COVER
For metal housing.

TECHNICAL DATA
Color: Gray (standard, similar to RAL 7001)

Protection class IP 65 in locked condition:
- Metal protective cover with locking latch [C]
- Metal protective cover with bolt and lanyard [A]

Protection class IP 54 in locked condition:
- Metal protective cover with middle section for spindle locking with lanyard [B]

Material: Aluminium die casting (body)
Temperature range: –40 °C to +125 °C
Sealing: NBR, sealing material

PARTS LIST
- Metal protective cover with bolt and lanyard [A]: 490.097.500.644.001 – 490.097.500.644.000
- Metal protective cover with middle section for spindle locking and lanyard [B]: 491.097.613.644.000
- Metal protective cover with locking latch [C]: 493.097.614.644.000

PROTECTIVE TRANSPORT COVER
For protection of the assembled connector during transport.

TECHNICAL DATA
Material: Plastic PP / antistatic
Color: Black (similar to RAL 9002)

TECHNICAL DATA
Material: Silicone
Temperature: –50 °C to +200 °C

DESCRIPTION
Bend reliefs for cable Ø 8 – 14.5 mm
(MINI-SNAP Size 4, Silicone)
Ideal for color coding.

SILICONE BEND RELIEFS FOR ODU-MAC® ZERO

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CODING OPTIONS FOR LEVER LOCKING

To prevent mismating.

In order to prevent mismating, it is in some cases useful to provide the connection systems with a coding system.

Instead of cylinder screws, coding pins and coding sockets can be used in the ODU MAC in the housing. ODU offers 16 different coding options. Standard frames do not include additional coding upon delivery. If several adjacent connectors are used, this can prevent mismating.

CODING OPTIONS

<table>
<thead>
<tr>
<th>CODE 1</th>
<th>CODE 2</th>
<th>CODE 3</th>
<th>CODE 4</th>
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<td>Socket frame</td>
<td>Pin frame</td>
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<table>
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<th>CODE 12</th>
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<td>Socket frame</td>
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CODING EXAMPLE

CODING OPTIONS

<table>
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<th>CODE 2</th>
<th>CODE 3</th>
<th>CODE 4</th>
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<tr>
<td>Pin frame</td>
<td>Socket frame</td>
<td>Pin frame</td>
<td>Socket frame</td>
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<th>CODE 8</th>
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<td>Socket frame</td>
<td>Pin frame</td>
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<table>
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<th>CODE 11</th>
<th>CODE 12</th>
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</thead>
<tbody>
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<td>Socket frame</td>
<td>Pin frame</td>
<td>Socket frame</td>
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</tbody>
</table>

<table>
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<th>CODE 14</th>
<th>CODE 15</th>
<th>CODE 16</th>
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<tbody>
<tr>
<td>Pin frame</td>
<td>Socket frame</td>
<td>Pin frame</td>
<td>Socket frame</td>
</tr>
</tbody>
</table>

= Coding pin

= Coding socket

Frame | Part number matching the frame no. | Part number pin | Coding | Part number socket
---|-----------------------------------|----------------|--------|-------------------|
Pin | 611.19X.000.600.000 | 611.090.303.902.000 | 610.090.304.902.000 |
Socket | 610.19X.000.600.000 | 610.090.303.902.000 | 610.090.304.902.000 |

PART NUMBER BASIC TOOL, SCREWDRIVER/1,2 NM: 598.054.002.000.000
PART NUMBER TOOL INSERT FOR CODING PIN: 598.054.203.000.000
PART NUMBER TOOL INSERT FOR CODING SOCKET: 598.054.110.000.000

An overview of all tools is on page 174.
CODING OPTIONS FOR HOUSING WITH SPINDLE LOCKING

To prevent mismating.

In order to prevent mismating, it is in some cases useful to provide the connection systems with a coding system.

Instead of cylinder screws, coding pins and coding sockets can be used in the ODU-MAC in the housing. ODU offers 4 coding variations with these coding options in combination with spindle locking. Standard frames do not include additional coding upon delivery. If several adjacent connectors are used, this can prevent mismating.

Alternatively, if additional coding options are required, ODU offers an innovative option with the coded spindle of pages 88–89.

CODING OPTIONS

- **CODE 1**
  - Pin frame
  - Socket frame

- **CODE 2**
  - Pin frame
  - Socket frame

- **CODE 5**
  - Pin frame
  - Socket frame

- **CODE 6**
  - Pin frame
  - Socket frame

- □ = Coding pin
- □ = Coding socket

CODING EXAMPLE

<table>
<thead>
<tr>
<th>Frame</th>
<th>Part number matching the frame no.</th>
<th>Part number pin</th>
<th>Coding</th>
<th>Part number socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin</td>
<td>611.19X.000.600.000</td>
<td>611.090.303.902.000</td>
<td>610.090.304.902.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>611.090.303.902.000</td>
<td>610.090.304.902.000</td>
<td></td>
</tr>
<tr>
<td>Socket</td>
<td>610.19X.000.600.000</td>
<td>610.090.304.902.000</td>
<td>610.090.304.902.000</td>
<td></td>
</tr>
</tbody>
</table>
CODING OPTIONS FOR CODED SPINDLE

To prevent mismating.

In order to prevent mismating, it is in some cases useful to provide the connection systems with a coding system.

For this purpose, ODU has developed innovative coding to provide housing variation that is directly integrated into the spindle of the ODU-MAC. ODU provides up to six different coding options with the installation of 2 keying pins in the spindle locking and 2 closure plugs in the center module. If several adjacent connectors are used, this can prevent mismating.

Reversed gender version on request only.

CODING OPTIONS

To prevent mismating, it is in some cases useful to provide the connection systems with a coding system.

For this purpose, ODU has developed innovative coding to provide housing variation that is directly integrated into the spindle of the ODU-MAC. ODU provides up to six different coding options with the installation of 2 keying pins in the spindle locking and 2 closure plugs in the center module. If several adjacent connectors are used, this can prevent mismating.

Reversed gender version on request only.

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Reversed gender version on request only.

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Reversed gender version on request only.

CODING OPTIONS

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Reversed gender version on request only.

CODING OPTIONS

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For this purpose, ODU has developed innovative coding to provide housing variation that is directly integrated into the spindle of the ODU-MAC. ODU provides up to six different coding options with the installation of 2 keying pins in the spindle locking and 2 closure plugs in the center module. If several adjacent connectors are used, this can prevent mismating.

Reversed gender version on request only.

CODING OPTIONS

To prevent mismating, it is in some cases useful to provide the connection systems with a coding system.

For this purpose, ODU has developed innovative coding to provide housing variation that is directly integrated into the spindle of the ODU-MAC. ODU provides up to six different coding options with the installation of 2 keying pins in the spindle locking and 2 closure plugs in the center module. If several adjacent connectors are used, this can prevent mismating.

Reversed gender version on request only.
FLEXIBLE CIRCULAR CONNECTORS WITH ODU-MAC® INSERTS

Suitable for rugged housing from series 209 and housing ODU DOCK.

Modular circular connectors from the existing portfolio can be easily configured with the flexible ODU-MAC inserts. The flexible insulators (half shells) are compatible with the housings of the series 209 and ODU DOCK and can be easily installed in them. The result is a modular circular connector with a very robust housing.

The flexible use provides space for ODU-MAC modules with 8 units. Thanks to the divided insulator, installation of ODU-MAC modules is possible without a large expenditure of time. The modules are easily inserted into the insulator. Following the completed contact arrangement, the two halves are clipped together and integrated into the respective housing.

Due to the combination of two proven ODU products you can arrange the inserts individually:

- Combination of ODU DOCK housings with integrated modules from the ODU-MAC program
- Space for 8 units (1 unit = 2.54 mm)
- Material insulator: PBT

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Insulator socket</th>
<th>Part number</th>
<th>Insulator pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator half-shells</td>
<td>209 610 000 000 000</td>
<td>209 611 000 000 000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE

- Please use only protruding contacts from Ø 1.02 mm
- Assembly instruction available on our website
- Delivery times according to series 209 and ODU DOCK
### CONFIGURE THE ODU-MAC®
SIMPLY ONLINE AT WWW.ODU-MAC.COM

### MODULES

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview</td>
<td>94</td>
</tr>
<tr>
<td>Signal</td>
<td>100</td>
</tr>
<tr>
<td>Power</td>
<td>110</td>
</tr>
<tr>
<td>High current</td>
<td>118</td>
</tr>
<tr>
<td>High voltage</td>
<td>124</td>
</tr>
<tr>
<td>Coax</td>
<td>128</td>
</tr>
<tr>
<td>Compressed air and fluid modules</td>
<td>138</td>
</tr>
<tr>
<td>Fiber optic</td>
<td>148</td>
</tr>
<tr>
<td>Shielded implementation/high-speed connector</td>
<td>154</td>
</tr>
<tr>
<td>Blank modules/spacer modules/coding modules/pin protection modules</td>
<td>162</td>
</tr>
</tbody>
</table>
### Modules marked with this symbol can be used in the ODU-MAC® ZERO.

<table>
<thead>
<tr>
<th>Modules</th>
<th>Description</th>
<th>Units/width</th>
<th>Features</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 contacts for turned contacts</td>
<td>High contact density</td>
<td>3 7.62 mm</td>
<td>Operating voltage: 320 V, Rated impulse voltage: 2,500 V, Max. continuous current: 15.4 A for 0.5 mm², Degree of pollution: 2, Mating cycles: 100,000</td>
<td>500</td>
</tr>
<tr>
<td>10 contacts for turned contacts</td>
<td>Highest contact density</td>
<td>1 2.54 mm</td>
<td>Operating voltage: 250 V, Rated impulse voltage: 1,500 V, Max. continuous current: 11 A for 0.38 mm², Degree of pollution: 2, Mating cycles: 5,000</td>
<td>102</td>
</tr>
<tr>
<td>10 contacts for stamped contacts</td>
<td>Economical solution</td>
<td>1 2.54 mm</td>
<td>Operating voltage: 32 V, Rated impulse voltage: 1,500 V, Max. continuous current: 6 A for 0.38 mm², Degree of pollution: 2, Mating cycles: 5,000</td>
<td>104</td>
</tr>
<tr>
<td>6 contacts for turned contacts</td>
<td></td>
<td>2 5.08 mm</td>
<td>Operating voltage: 400 V, Rated impulse voltage: 3,000 V, Max. continuous current: 13.5 A for 0.5 mm², Degree of pollution: 2, Mating cycles: 100,000</td>
<td>106</td>
</tr>
<tr>
<td>5 contacts for turned contacts</td>
<td></td>
<td>2 5.08 mm</td>
<td>Operating voltage: 500 V, Rated impulse voltage: 2,500 V, Max. continuous current: 27 A for 1.5 mm², Degree of pollution: 2, Mating cycles: 100,000</td>
<td>108</td>
</tr>
<tr>
<td>4 contacts for turned contacts</td>
<td></td>
<td>3 7.62 mm</td>
<td>Operating voltage: 500 V, Rated impulse voltage: 3,000 V, Max. continuous current: 41.4 A for AWG 12, Degree of pollution: 2, Mating cycles: 100,000</td>
<td>110</td>
</tr>
<tr>
<td>3 contacts for turned contacts</td>
<td>Operating voltage</td>
<td>3 7.62 mm</td>
<td></td>
<td>112</td>
</tr>
<tr>
<td>3 contacts for turned contacts</td>
<td></td>
<td>4 10.16 mm</td>
<td>Operating voltage: 2,500 V, Rated impulse voltage: 10,000 V, Max. continuous current: 27 A for 1.5 mm², Degree of pollution: 2, Mating cycles: 100,000</td>
<td>114</td>
</tr>
<tr>
<td>2 contacts for turned contacts</td>
<td></td>
<td>5 12.7 mm</td>
<td>Operating voltage: 1,000 V, Rated impulse voltage: 4,000 V, Max. continuous current: 119 A for 16 mm², Degree of pollution: 2, Mating cycles: 100,000</td>
<td>116</td>
</tr>
<tr>
<td>2 contacts for turned contacts</td>
<td>Operating voltage</td>
<td>6 15.24 mm</td>
<td></td>
<td>118</td>
</tr>
<tr>
<td>2 contacts for turned contacts with ODU SPrINGTAC®</td>
<td></td>
<td>6 15.24 mm</td>
<td>Operating voltage: 500 V, Rated impulse voltage: 3,000 V, Max. continuous current: 142 A for 25 mm², Degree of pollution: 2, Mating cycles: 100,000</td>
<td>120</td>
</tr>
<tr>
<td>1 contact for turned contacts</td>
<td>Operating voltage</td>
<td>7 17.78 mm for both versions</td>
<td></td>
<td>122</td>
</tr>
</tbody>
</table>

1 Acc. to IEC 60664-1:2007 (VDE 0110-1:2008) for degree of pollution 2. 2 Definition max. continuous current see page 187. 3 Contact with springwire technology. 4 Contact with lamella technology.
## OVERVIEW OF ALL MODULES

Modules marked with this symbol can be used in the ODU-MAC® ZERO.

<table>
<thead>
<tr>
<th>Modules</th>
<th>Description</th>
<th>Units / width</th>
<th>Features</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>High voltage</td>
<td>4 contacts for turned contacts Contact Ø 1.5 mm</td>
<td>7.42 mm</td>
<td>High contact density high voltage</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Operating voltage¹: 2,500 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rated impulse voltage¹: 10,000 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Max. continuous current²: 27 A for 1.5 mm²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Degree of pollution¹: 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mating cycles</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High voltage</td>
<td>1 contact Contact Ø 2 mm</td>
<td>20.32 mm</td>
<td>High voltage</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Operating voltage¹: 6,300 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rated impulse voltage¹: 20,000 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Degree of pollution¹: 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mating cycles</td>
<td></td>
</tr>
<tr>
<td>Coax</td>
<td>4 contacts for 50 Ω coax contacts</td>
<td>7.42 mm</td>
<td>High contact density</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mating cycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,4 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,8 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coax</td>
<td>2 contacts for 50 Ω coax contacts SMA termination</td>
<td>12.7 mm</td>
<td>0 to 1.3 GHz Mating cycles</td>
<td></td>
</tr>
<tr>
<td>Coax</td>
<td>2 contacts for 50 Ω coax contacts</td>
<td>12.7 mm</td>
<td>Frequency range Mating cycles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.0 GHz</td>
<td></td>
<td>0 to 9.0 GHz Mating cycles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mating cycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressed air and fluid modules</td>
<td>2 contacts for Compressed air valves</td>
<td>12.7 mm</td>
<td>Frequency range Mating cycles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 bar Tube diameter</td>
<td></td>
<td>0 to 3.0 GHz Mating cycles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mating cycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 bar Tube diameter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mating cycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber optic</td>
<td>2 contacts for fluid coupling plug</td>
<td>12.7 mm</td>
<td>0 to 2.4 GHz Mating cycles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mating cycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 bar Tube diameter</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Mating cycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber optic</td>
<td>5 contacts for fiber optic contacts for plastic fiber (PDF)</td>
<td>5.08 mm</td>
<td>High contact density</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Insertion loss typical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mating cycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.5 dB for 670 nm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


---

Table of Contents

---

Table of Contents
### Modules Description Units / width Features Page

#### Fiber optic
- **2 contacts for fiber optic contacts for plastic fiber (POF)**
  - **Units**: 5
  - **Width**: 12.7 mm
  - **Features**: Mating cycles minimum 100,000, Insertion loss typical 1.5 dB for 670 nm

#### Fiber optic
- **3 contacts for fiber optic contacts for fiber glass (GOF)**
  - **Units**: 4
  - **Width**: 10.16 mm
  - **Features**: Mating cycles minimum 100,000, Insertion loss typical 1 dB for 670 nm

#### Shielded implementation/high-speed connector
- **2 to 10 contacts for inserts size 0**
  - **Units**: 5
  - **Width**: 12.7 mm
  - **Features**: Mating cycles minimum 10,000, Suitable for all common bus systems

#### Shielded implementation/high-speed connector
- **2 to 14 contacts for inserts size 1**
  - **Units**: 6
  - **Width**: 15.24 mm
  - **Features**: Mating cycles minimum 10,000, With springwire minimum 60,000, Suitable for all common bus systems

#### Shielded implementation/high-speed connector
- **4 to 16 contacts for inserts size 2**
  - **Units**: 7
  - **Width**: 17.78 mm
  - **Features**: Mating cycles minimum 10,000, With springwire minimum 60,000, Suitable for all common bus systems

#### Shielded implementation/high-speed connector
- **10 to 30 contacts for inserts size 3**
  - **Units**: 8
  - **Width**: 20.32 mm
  - **Features**: Mating cycles minimum 10,000, Suitable for all common bus systems

### Modules Description Units / width Features Page

#### Blank modules
- **1**
  - **Width**: 2.54 mm
  - **Features**: Used to fill incomplete frames.

#### Spacer module
- **1**
  - **Width**: 2.54 mm, 5.08 mm
  - **Features**: Not equipped, enable the pluggability despite different contact equipment in the pin piece. For information on the individual spacer modules please look at the corresponding modules.

#### Coding modules
- **1**
  - **Width**: 2.54 mm
  - **Features**: Arranged between the modules to create keyed guiding system.

#### Pin protection modules
- **1**
  - **Width**: 2.54 mm
  - **Features**: Used to protect the pins in conjunction with small pin diameters.
Contact diameter: 1.02 mm
Mating cycles: minimum 100,000
Current-carrying capacity: 13.5 A

**TECHNICAL NOTES**
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0110-2-1008 (see page 181).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 168.

**TECHNICAL DATA**

### Voltage information

<table>
<thead>
<tr>
<th>Operating voltage</th>
<th>Rated impulse voltage</th>
<th>Degree of pollution</th>
</tr>
</thead>
<tbody>
<tr>
<td>320 V</td>
<td>2,500 V</td>
<td>2</td>
</tr>
<tr>
<td>100 V</td>
<td>2,000 V</td>
<td>3</td>
</tr>
</tbody>
</table>

### Voltage information acc. to MIL

<table>
<thead>
<tr>
<th>Operating voltage</th>
<th>Test voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>950 V</td>
<td>2,850 V</td>
</tr>
</tbody>
</table>

### Mechanical data

<table>
<thead>
<tr>
<th>Total mating force (average)</th>
<th>Contact diameter</th>
<th>Operating temperature</th>
<th>Mating cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.9 N / Module</td>
<td>1.02 mm</td>
<td>–40 °C to +125 °C</td>
<td>minimum 100,000</td>
</tr>
</tbody>
</table>

### Materials

- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy
- Contact spring: CuBe alloy
- Contact processing: Au over Ni

### Description of Parts

**Insulator**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>611.130.114.923.000</td>
<td>Insulator</td>
</tr>
</tbody>
</table>

**Spacer**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>611.130.111.923.000</td>
<td>Spacer</td>
</tr>
</tbody>
</table>

**Dummy contact**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>021.341.124.923.000</td>
<td>Dummy contact</td>
</tr>
</tbody>
</table>

**Insulator Pin and Socket**

- **Pin contact short**
  - Part number: 180.362.000.307.000
  - Cross-section: 0.5 / 0.38 mm²
  - Nominal current: 9 A
  - Contact resistance: 1.2 mm
- **Pin contact long**
  - Part number: 180.382.000.307.000
  - Cross-section: 24 / 28 mm²
  - Nominal current: 7 A
  - Contact resistance: 1.2 mm
- **Socket contact**
  - Part number: 170.362.700.207.000
  - Cross-section: 9 A
  - Nominal current: 13.5 A
  - Contact resistance: 2.1 mm

---

1. Definition max. continuous current see page 183.
3. See page 185.
4. Non-magnetic version on request.
5. Definition max. continuous current see page 187.
MODULE 10 CONTACTS FOR TURNED CONTACTS

Contact diameter: 0.76 mm
Mating cycles: minimum 100,000
Current-carrying capacity: 11 A

TECHNICAL NOTES
• The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 181).
• The 10 contacts modules with turned contacts are not compatible with stamped contacts or modules.
• Contacts and insulators up to 200 °C on request.
• Crimp information see page 168.

TECHNICAL DATA
Voltage information
Operating voltage 250 V 32 V
Rated impulse voltage 1,500 V 1,500 V
Degree of pollution 2 3
Voltage information acc. to MIL
Operating voltage 500 V
Text voltage 1,500 V

Mechanical data
Total mating force (average) 13.5 N / Module
Total sliding force (average) 9.8 N / Module
Contact diameter 0.76 mm
Operating temperature –40 °C to +125 °C
Mating cycles minimum 100,000

Materials
Insulator Thermoplastic fiber glass reinforced acc. to UL 94
Contact body Cu alloy
Contact spring CuBe alloy
Contact processing Au over Ni

Removal of the already assembled contact (incl. cable).
PART NUMBER: 087.170.362.000.000

Removal of unassembled contacts, or contacts from which the cable has been removed.
PART NUMBER: 087.611.001.001.000
For an overview of all tools please see from page 175.

* ≤ Ø 1.15 removal possible / ≤ Ø 1.75 removal not possible.

Module 10 contacts

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Conductor cross-section</th>
<th>Termination</th>
<th>Nominal current</th>
<th>Max. continuous current</th>
<th>Contact resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin contact short ¹</td>
<td>180 361 000 307 000</td>
<td>0.38</td>
<td>22</td>
<td>7.5</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Pin contact long ²</td>
<td>180 361 000 307 000</td>
<td>0.38</td>
<td>22</td>
<td>7.5</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Socket contact ³</td>
<td>170 361 700 207 000</td>
<td>0.25/0.08</td>
<td>24/28</td>
<td>6</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Pin contact short ³</td>
<td>180 540 000 307 000</td>
<td>0.25/0.08</td>
<td>24/28</td>
<td>6</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Pin contact long ³</td>
<td>180 850 000 307 000</td>
<td>0.25/0.08</td>
<td>24/28</td>
<td>6</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Socket contact ³</td>
<td>170 850 700 207 000</td>
<td>0.25/0.08</td>
<td>24/28</td>
<td>6</td>
<td>5</td>
<td>9</td>
</tr>
</tbody>
</table>

¹ Definition max. continuous current see page 187. ² Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K.
³ Definition max. continuous current see page 187.

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MODULE 10 CONTACTS FOR STAMPED CONTACTS

Contact diameter: 0.7 mm
Mating cycles: minimum 5,000
Current-carrying capacity: 6 A

TECHNICAL NOTES
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 181).
- The 10 contacts modules with turned contacts are not compatible with stamped contacts or modules.
- Contacts are not removable.
- Crimp information see page 168.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Voltage information</th>
<th>Operating voltage</th>
<th>32 V</th>
<th>10 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated impulse voltage</td>
<td>1,500 V</td>
<td>1,500 V</td>
<td></td>
</tr>
<tr>
<td>Degree of pollution</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Voltage information acc. to MIL

| Operating voltage | 450 V |
| Text voltage      | 1,350 V |

Mechanical data

| Total mating force (average) | 5 N / Module |
| Total sliding force (average) | 4.8 N / Module |
| Contact diameter           | 0.7 mm |
| Operating temperature      | -40°C to +125°C |
| Mating cycles              | minimum 5,000 |

Materials

- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact: CuSn6 alloy
- Contact finish in termination area: Sn over Ni
- Contact finish in contact area: Au over Ni

Packaging unit for crimp model (per reel)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>500</th>
<th>900</th>
<th>5,000</th>
<th>10,000</th>
<th>20,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code number</td>
<td>51</td>
<td>52</td>
<td>54</td>
<td>55</td>
<td>50</td>
</tr>
</tbody>
</table>

1 Definition max. continuous current see page 181. 2 VDE 0110-1:2008 see page 181. 3 See page 185.

Module 10 contacts

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Conductor cross-section</th>
<th>Termination</th>
<th>Nominal current</th>
<th>Max. continuous current</th>
<th>Contact resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin contact</td>
<td>186.080.103.535.1...</td>
<td>0.14/0.08</td>
<td>26/28</td>
<td>3.5</td>
<td>2.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Socket contact</td>
<td>176.082.103.535.1...</td>
<td>0.38/0.25</td>
<td>22/24</td>
<td>4.5</td>
<td>3.5</td>
<td>6</td>
</tr>
</tbody>
</table>

Packaging unit for crimp model (per reel)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>500</th>
<th>900</th>
<th>5,000</th>
<th>10,000</th>
<th>20,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code number</td>
<td>51</td>
<td>52</td>
<td>54</td>
<td>55</td>
<td>50</td>
</tr>
</tbody>
</table>

Contact diameter: 1.02 mm  
Mating cycles: minimum 100,000  
Current-carrying capacity: 13.5 A

**TECHNICAL NOTES**
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 181).  
- Crimp information see page 159.

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Voltage information</th>
<th>400 V</th>
<th>160 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated impulse voltage</td>
<td>3,000 V</td>
<td>3,000 V</td>
</tr>
</tbody>
</table>

| Degree of pollution | 2 | 3 |

**Voltage information acc. to MIL**

<table>
<thead>
<tr>
<th>Operating voltage</th>
<th>850 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test voltage</td>
<td>2,550 V</td>
</tr>
</tbody>
</table>

**Mechanical data**

<table>
<thead>
<tr>
<th>Total mating force (average)</th>
<th>8.1 N / Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sliding force (average)</td>
<td>5.9 N / Module</td>
</tr>
<tr>
<td>Contact diameter</td>
<td>1.02 mm</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>−40 °C to +125 °C</td>
</tr>
<tr>
<td>Mating cycles</td>
<td>minimum 100,000</td>
</tr>
</tbody>
</table>

**Materials**

<table>
<thead>
<tr>
<th>Insulator</th>
<th>Thermoplastic fiber glass reinforced acc. to UL-94</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact body</td>
<td>Cu alloy</td>
</tr>
<tr>
<td>Contact spring</td>
<td>Cu alloy</td>
</tr>
<tr>
<td>Contact processing</td>
<td>Au over Ni</td>
</tr>
</tbody>
</table>

**Removal Tool I (Angled)**

Removal of the already assembled contact (incl. cable).  
**PART NUMBER:** 087.170.362.000.000

**Removal Tool II**

Removal of unassembled contacts, or contacts from which the cable has been removed.  
**PART NUMBER:** 087.611.001.001.000

For an overview of all tools please see from page 175.

**Module 6 contacts**

- Insulator: 611.123.106.923.000  
- Spacer: 611.123.111.923.000  
- Dummy contact: 021.341.124.923.000

**Description**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Conductor cross-section</th>
<th>Termination</th>
<th>Nominal current</th>
<th>Max. continuous current</th>
<th>Contact resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin contact short</td>
<td>180.362.000.307/000</td>
<td>1.75 / 2.4*</td>
<td>AWG 20 / 22</td>
<td>20 / 22</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Pin contact long</td>
<td>180.362.000.307/000</td>
<td>1.75 / 2.4*</td>
<td>AWG 20 / 22</td>
<td>20 / 22</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Socket contact</td>
<td>170.362.700.207/000</td>
<td>1.02 mm PCB termination</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin contact short</td>
<td>180.544.000.307/000</td>
<td>7×3.81(=19.05)</td>
<td>AWG 20 / 22</td>
<td>20 / 22</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Pin contact long</td>
<td>180.574.000.307/000</td>
<td>7×3.81(=19.05)</td>
<td>AWG 20 / 22</td>
<td>20 / 22</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

*Non-magnetic version on request.  
**Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K.  
*Definition max. continuous current see page 187.
Contact diameter: 1.5 mm
Mating cycles: minimum 100,000
Current-carrying capacity: 27 A

### TECHNICAL NOTES
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 181).
- Crimp information see page 187.

### TECHNICAL DATA
- Operating voltage: 500 V, 200 V
- Rated impulse voltage: 2,500 V, 2,000 V
- Degree of pollution: 2, 3
- Voltage information acc. to MIL:
  - Operating voltage: 750 V, 2,250 V
- Mechanical data:
  - Total mating force (average): 15 N/Module
  - Total sliding force (average): 11.3 N/Module
  - Contact diameter: 1.5 mm
  - Contact operating temperature: –40 °C to +125 °C
  - Mating cycles: minimum 100,000
- Materials:
  - Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
  - Contact body: Cu alloy
  - Contact spring: CuSn alloy
  - Contact finish: Au over Ni
  - Contact springs: Ag

### Module 5 contacts

**Description** | **Part number** | **Conductor cross-section** | **Termination** | **Nominal current** | **Max. continuous current** | **Contact resistance**
--- | --- | --- | --- | --- | --- | ---
Pin contact short | 180.363.000.307.000 | 0.75 | 16 | 18 | 22.5 | 0.95
Pin contact long | 180.383.000.307.000 | 1 / 0.75 | 18 | 16 | 13 | 22.5 | 0.95
Socket contact* | 170.363.700.201.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95
Pin contact short | 180.543.000.307.000 | 0.5 / 0.38 | 20 / 22 | 10 | 8 | 15 | 0.95
Pin contact long | 180.573.000.307.000 | 0.25 / 0.08 | 24 / 28 | 6 | 6 | 9 | 0.95
Socket contact | 170.543.700.201.000 | 1 | 18 | 14.5 | 27 | 0.95
Pin contact short | 180.559.000.307.000 | 0.75 | 20 / 22 | 6 | 6 | 9 | 0.95
Pin contact long | 180.569.000.307.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95
Socket contact | 170.539.700.201.000 | 16 | 18 | 14.5 | 27 | 0.95

*Non-magnetic version on request. ¹ Determined acc. to IEC 60512-5-2002 [DIN EN 60512-5-2003] at a temperature increase of 45 K
² Definition max. continuous current see page 187

For an overview of all tools please see from page 175.
**MODULE 4 CONTACTS**

**Contact diameter:** 2.41 mm  
**Mating cycles:** minimum 100,000  
**Current-carrying capacity:** 41 A

### TECHNICAL NOTES
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 187).
- Crimp information see page 168.

### TECHNICAL DATA

#### Voltage information
- Operating voltage: 500 V, 200 V  
- Rated impulse voltage: 3,000 V, 3,000 V  
- Degree of pollution: 2, 3

#### Voltage information acc. to MIL
- Operating voltage: 1,100 V  
- Test voltage: 3,300 V

#### Mechanical data
- Total mating force (average): 13 N / Module  
- Total sliding force (average): 12 N / Module  
- Contact diameter: 2.41 mm  
- Operating temperature: -40 °C to +125 °C  
- Mating cycles: minimum 100,000

#### Materials
- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy
- Contact spring: CuSn alloy
- Contact finish: Ag

### Module 4 contacts

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Conductor cross-section</th>
<th>Termination</th>
<th>Nominal current1</th>
<th>Max. continuous current1</th>
<th>Contact resistance1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin contact short</td>
<td>180 365.000.301.000</td>
<td>12</td>
<td>28</td>
<td>25</td>
<td>41</td>
<td>0.45</td>
</tr>
<tr>
<td>Pin contact long</td>
<td>180 385.000.301.000</td>
<td>2.5</td>
<td>24</td>
<td>19</td>
<td>33.5</td>
<td>0.45</td>
</tr>
<tr>
<td>Socket contact</td>
<td>170 365.100.201.000</td>
<td>1.5</td>
<td>14</td>
<td>18</td>
<td>27</td>
<td>0.45</td>
</tr>
<tr>
<td>Pin contact short</td>
<td>180 910.000.301.000</td>
<td>1.0</td>
<td>18</td>
<td>16</td>
<td>23.5</td>
<td>0.45</td>
</tr>
<tr>
<td>Pin contact long</td>
<td>180 911.000.301.000</td>
<td>1/0.75</td>
<td>18</td>
<td>16</td>
<td>23.5</td>
<td>0.45</td>
</tr>
<tr>
<td>Socket contact</td>
<td>172 604.100.201.000</td>
<td>0.5</td>
<td>0.38</td>
<td>20/22</td>
<td>10.5</td>
<td>0.55</td>
</tr>
<tr>
<td>Pin contact short</td>
<td>182 820.000.301.000</td>
<td>0.5/0.38</td>
<td>20</td>
<td>22</td>
<td>10.5</td>
<td>0.55</td>
</tr>
<tr>
<td>Pin contact long</td>
<td>182 821.000.301.000</td>
<td>0.5</td>
<td>0.38</td>
<td>20/22</td>
<td>10.5</td>
<td>0.55</td>
</tr>
</tbody>
</table>

1 Definition max. continuous current see page 187.
## Module 3 Contacts

Contact diameter: 3 mm
Mating cycles: minimum 100,000
Termination cross-section: from 0.38 to 6 mm²

### Technical Notes
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 [see page 181].
- Crimp information see page 168.

### Technical Data

| Voltage Information¹ | VDE 0298-4:2013 
|-----------------------|------------------
| Operating voltage     | 500 V            |
| Rated impulse voltage | 3,000 V          |
| Degree of pollution   | 2                |
| Mating cycles         | ≥ 100,000        |
| Termination cross-section | from 0.38 to 6 mm² |

### Mechanical Data

| Total mating force (average) | 13.5 N / Module |
| Total sliding force (average) | 98 N / Module |
| Contact diameter             | 3.0 mm         |
| Operating temperature        | -40 °C to +125 °C |
| Mating cycles                | minimum 100,000 |

### Materials

- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy
- Contact spring: CuSn alloy
- Contact finish: Ag

### Module 3 Contacts

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator</td>
<td>611.127.103.923.000</td>
</tr>
<tr>
<td>Spacer</td>
<td>611.127.111.923.000</td>
</tr>
<tr>
<td>Dummy contact</td>
<td>021.341.128.923.000</td>
</tr>
</tbody>
</table>

### Power

#### Power Module 3 Contacts

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator</td>
<td>611.127.103.923.000</td>
</tr>
<tr>
<td>Spacer</td>
<td>611.127.111.923.000</td>
</tr>
<tr>
<td>Dummy contact</td>
<td>021.341.128.923.000</td>
</tr>
</tbody>
</table>

### Removable Tool

#### Removable Tool I (Straight)

Removal of the already assembled contact (incl. cable). PART NUMBER: 087.170.138.000.000

#### Removable Tool II

Removal of unassembled contacts, or contacts from which the cable has been removed. PART NUMBER: 087.611.001.001.000

### Table of Contents

- [Board termination] / crimp termination at 6 mm², protection against contact in the termination area recommended, e.g. heat-shrink tubing.
- [Non-magnetic version on request.]
- [Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K.]

---

Contact diameter: 3 mm  
Mating cycles: minimum 100,000  
Current-carrying capacity*: 58 A

**TECHNICAL NOTES**
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0110-1:2008 (see page 181).
- Crimp information see page 185.

**TECHNICAL DATA**
- Voltage information:
  - Operating voltage: 2,500 V / 1,000 V
  - Rated impulse voltage: 10,000 V / 8,000 V
  - Degree of pollution: 2 / 3
- Voltage information acc. to MIL:
  - Operating voltage: 2,500 V
  - Test voltage: 7,500 V

**Mechanical data**
- Total mating force (average): 13.5 N / Module
- Total sliding force (average): 9.8 N / Module
- Contact diameter: 3 mm
- Operating temperature: -40 °C to +125 °C
- Mating cycles: minimum 100,000

**Materials**
- Insulator: Thermoplastic fiber glass reinforced acc. to UL 94
- Contact body: Cu alloy
- Contact spring: CuSn alloy
- Contact finish: Ag

**Module 3 contacts**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Conductor cross-section</th>
<th>Termination</th>
<th>Nominal current*</th>
<th>Max. continuous current*</th>
<th>Contact resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin contact</td>
<td>182.980.000.301.000</td>
<td>6</td>
<td>39</td>
<td>30</td>
<td>58</td>
<td>0.3</td>
</tr>
<tr>
<td>Pin contact long</td>
<td>182.981.000.301.000</td>
<td>4</td>
<td>39</td>
<td>30</td>
<td>58</td>
<td>0.3</td>
</tr>
<tr>
<td>Socket contact</td>
<td>172.976.100.201.000</td>
<td>2.5</td>
<td>25</td>
<td>21</td>
<td>37</td>
<td>0.3</td>
</tr>
<tr>
<td>Socket contact short</td>
<td>180.366.000.301.000</td>
<td>1.5</td>
<td>14</td>
<td>19</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Socket contact long</td>
<td>180.365.000.301.000</td>
<td>1.0/0.75</td>
<td>18</td>
<td>16.5</td>
<td>14</td>
<td>24.5</td>
</tr>
<tr>
<td>Pin contact short</td>
<td>182.584.000.301.000</td>
<td>0.5/0.38</td>
<td>20/22</td>
<td>11.5</td>
<td>9.5</td>
<td>1</td>
</tr>
<tr>
<td>Pin contact long</td>
<td>182.585.000.301.000</td>
<td>1.0/0.75</td>
<td>18</td>
<td>16.5</td>
<td>14</td>
<td>24.5</td>
</tr>
<tr>
<td>Socket contact short</td>
<td>182.586.000.301.000</td>
<td>0.5/0.38</td>
<td>20/22</td>
<td>11.5</td>
<td>9.5</td>
<td>1</td>
</tr>
<tr>
<td>Socket contact long</td>
<td>182.587.000.301.000</td>
<td>1.0/0.75</td>
<td>18</td>
<td>16.5</td>
<td>14</td>
<td>24.5</td>
</tr>
</tbody>
</table>

*Definition max. continuous current see page 187.  
2 Determined acc. to VDE 0110-1:2008 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K.

**REMOVAL TOOL I (ANGLE)**
- Removal of the already assembled contact (incl. cable).  
  PART NUMBER: 087.170.362.000.000

**REMOVAL TOOL II**
- Removal of unassembled contacts, or contacts from which the cable has been removed.  
  PART NUMBER: 087.611.001.001.000

For an overview of all tools please see page 175.
MODULES

MODULE 2 CONTACTS

Contact diameter: 5 mm
Mating cycles: minimum 100,000
Current-carrying capacity¹: 119 A

TECHNICAL NOTES
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 187).
- When automatic docking due to the high mating forces and the high cable cross sections we recommend the assembly in the ODU-MAC P+ (Power) frame (see page 41).
- Contacts and insulators up to 200 °C on request.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Operating voltage</th>
<th>Rated impulse voltage</th>
<th>Degree of pollution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 V</td>
<td>4,000 V</td>
<td>2</td>
</tr>
<tr>
<td>250 V</td>
<td>4,000 V</td>
<td>3</td>
</tr>
</tbody>
</table>

Voltage information acc. to MIL²

<table>
<thead>
<tr>
<th>Operating voltage</th>
<th>Test voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,250 V</td>
<td>3,750 V</td>
</tr>
</tbody>
</table>

Mechanical data

<table>
<thead>
<tr>
<th>Total mating force (average)</th>
<th>Total sliding force (average)</th>
<th>Contact diameter</th>
<th>Operating temperature</th>
<th>Mating cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 N / Module</td>
<td>15 N / Module</td>
<td>5 mm</td>
<td>–40 °C to +125 °C</td>
<td>minimum 100,000</td>
</tr>
</tbody>
</table>

Materials

- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy
- Contact spring: CuSn alloy
- Contact finish: Ag.

Removal of the already assembled contact (incl. cable).

PART NUMBER: 087.170.391.000.000

For an overview of all tools please see from page 175.

POWERS

Determination of the maximum continuous current see page 187.

² Definition max. continuous current see page 187.

³ Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K. ⁴ Definition max. continuous current see page 187.
MODULE 2 CONTACTS

ODU SPRINGTAC® (contacts with springwire technology)

Contact diameter: 8 mm
Mating cycles¹: minimum 100,000
Current-carrying capacity²: 142 A

TECHNICAL NOTES
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 181).
- When automatic docking due to the high mating forces and the high cable cross sections we recommend the assembly in the ODU-MAC P+ (Power) frame (see page 41).
- Crimp information see page 168.

TECHNICAL DATA
- Voltage information¹: Operating voltage 500 V 200 V
  Rated impulse voltage 3,000 V 3,000 V
  Degree of pollution 2 3

- Voltage information acc. to MIL: Operating voltage 700 V
  Test voltage 2,100 V

- Mechanical data: Total mating force (average) 54 N / Module
  Total sliding force (average) 39 N / Module
  Contact diameter 8 mm
  Operating temperature –40 °C to +125 °C
  Mating cycles¹: minimum 100,000

Materials
- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy
- Contact spring: Cu alloying
- Contact finish: Ag

PART NUMBER: 087.611.002.001.000
Locking torque: 2.7 Nm ± 0.3 Nm
For an overview of all tools please see from page 175.

1 Higher mating cycles by easy exchange of the wear parts (pin/socket from front) possible. The termination area remains unaffected, because of two-part contact.
2 Definition max. continuous current see page 187.
MODULE 2 CONTACTS

ODU LAMTAC® (contacts with lamella technology).

Contact diameter: 8 mm
Mating cycles¹: minimum 10,000
Current-carrying capacity²: 154 A

TECHNICAL NOTES
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 181).
- When automatic docking due to the high mating forces and the high cable cross sections we recommend the assembly in the ODU-MAC P+ (Power) frame (see page 41).
- Crimp information see page 168.

TECHNICAL DATA

Voltage information¹
- Operating voltage: 500 V
- Rated impulse voltage: 3,000 V
- Degree of pollution: 2

Voltage information acc. to MIL²
- Operating voltage: 900 V
- Test voltage: 2,700 V

Mechanical data
- Total mating force (average): 60 N / Module
- Total sliding force (average): 45 N / Module
- Contact diameter: 8 mm
- Operating temperature: –40°C to +125°C
- Mating cycles: minimum 10,000

Materials
- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy
- Contact lamella: CuBe alloy
- Contact finish: Ag

Table of Conductors

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Conductor cross-section²</th>
<th>Nominal current²</th>
<th>Max. continuous current²</th>
<th>Contact resistance²</th>
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<tr>
<td>Pin contact</td>
<td>181.874.100.200.000</td>
<td>10 mm²</td>
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<tr>
<td>Socket contact</td>
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<td>16</td>
<td>90</td>
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¹ Higher mating cycles by easy exchange of the wear parts (pin/socket from front) possible. The termination area remains unaffected, because of two-part contact.
² Definition max. continuous current see page 187.
³ See page 185.

PART NUMBER: 087.611.002.001.000
Locking torque: 2.7 Nm ± 0.3 Nm
For an overview of all tools please see from page 175.

REQUIRED ASSEMBLY TOOL
For screwing and releasing the contacts.

PART NUMBER: 087.611.161.002.001.000
Locking torque: 2.7 Nm ± 0.3 Nm
For an overview of all tools please see from page 175.

PART NUMBER: 087.611.002.001.000
Locking torque: 2.7 Nm ± 0.3 Nm
For an overview of all tools please see from page 175.

*10 + 0.5: 16 mm²
18 + 0.5: 25 mm²

In comparison to the ODU SPRINGTAC contact, ODU LAMTAC offers a lower number of contact surfaces. One or more of the stamped lamellas are mounted in a lathe-turned body (see also page 27).
## Module 1 Contact

**ODU LAMTAC** (Contacts with lamella technology).

### Contact Diameter: 10 mm or 12 mm

- **Mating cycles**: minimum 10,000
- **Current-carrying capacity**: max. 220 A

### Technical Notes

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDe 0298-4:2013 (see page 18).
- **When automatic docking due to the high mating forces and the high cable cross sections we recommend the assembly in the ODU-MAC P+ (Power) frame** (see page 41).
- **Crimp information see page 168**.

### Technical Data

#### Voltage Information

<table>
<thead>
<tr>
<th>Contact Diameter</th>
<th>Operating Voltage</th>
<th>Test Voltage</th>
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</thead>
<tbody>
<tr>
<td>Ø 10 mm</td>
<td>250 V</td>
<td>600 V</td>
</tr>
<tr>
<td>Ø 12 mm</td>
<td>200 V</td>
<td>600 V</td>
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</table>

#### Mechanical Data

- **Total Mating Force**: 23 N / Module
- **Total Sliding Force**: 24 N / Module
- **Contact Diameter**: 10 mm or 12 mm
- **Operating Temperature**: -40 °C to +125 °C
- **Mating Cycles**: minimum 10,000

### Materials

- **Insulator**: Thermoplastic fiber glass reinforced acc. to UL-94
- **Contact Body**: Cu alloy
- **Contact Lamella**: CuBe alloy
- **Contact Finish**: Ag

### ODU LAMTAC (Contacts with Lamella Technology)

In comparison to the ODU SPRINGTAC contact, ODU LAMTAC offers a lower number of contact surfaces. One or more of the stamped lamellas are mounted in a lathe-turned body (see also page 27).

### Required Assembly Tool

For screwing and releasing the contacts.

- For contact diameter 10 mm
  - **PART NUMBER**: 087.611.003.001.000
  - **Locking Torque**: 3.5 Nm ± 0.5 Nm

- For contact diameter 12 mm
  - **PART NUMBER**: 087.611.004.001.000
  - **Locking Torque**: 3.5 Nm ± 0.5 Nm

For an overview of all tools please see from page 179.
 MODULES

MODULE 4 CONTACTS

Contact diameter: 1.5 mm
Mating cycles: minimum 100,000
Operating voltage: 2,500 V

TECHNICAL NOTES
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 [see page 181].
- Crimp information see page 168.

TECHNICAL DATA

Voltage information
- Operating voltage: 2,500 V, 1,000 V
- Rated impulse voltage: 10,000 V, 8,000 V
- Degree of pollution: 2, 3
- Voltage information acc. to MIL
  - Operating voltage: 2,500 V
  - Test voltage: 7,500 V

Mechanical data
- Total mating force (average): 12 N / Module
- Total sliding force (average): 9.2 N / Module
- Contact diameter: 1.5 mm
- Operating temperature: -40 °C to +125 °C
- Mating cycles: minimum 100,000

Materials
- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy
- Contact spring: CuSn alloy
- Contact finish: Au over Ni
- Contact spring: Ag

Table of Contents

Description | Part number | Conductor cross-section | Termination | Nominal current | Max. continuous current | Contact resistance |
---|---|---|---|---|---|---|
Pin contact short | 180.363.003.307.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Pin contact long | 180.383.003.307.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Socket contact | 170.363.700.201.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Pin contact short | 180.543.003.307.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Pin contact long | 180.573.003.307.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Socket contact | 170.543.700.201.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Pin contact short | 180.545.003.307.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Pin contact long | 180.575.003.307.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Socket contact | 170.545.700.201.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Pin contact short | 180.541.003.307.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Pin contact long | 180.571.003.307.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |
Socket contact | 170.541.700.201.000 | 1.5 | 14 | 18 | 14.5 | 27 | 0.95 |

1) Non-magnetic version on request. 2) Determined acc. to IEC 60512-5-1:2002 (EN 60512-5-1:2003) at a temperature increase of 45 K.

For an overview of all tools see page 175.
MODULE 1 CONTACT

HIGH VOLTAGE

Contact diameter: 2 mm
Mating cycles: minimum 10,000
Operating voltage: 6,300 V

TECHNICAL NOTES
• The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 181).
• Center contact soldered.
• Outer contact crimped.
• Recommended cable construction see page 127.

TECHNICAL DATA
 Voltage information¹
 Operating voltage 6,300 V 2,500 V
 Rated impulse voltage 20,000 V 20,000 V
 Degree of pollution 2 3
 Clearance distance > 32 mm
 Creepage distance > 32 mm
 Test of the partial discharge voltage (PDV) acc. to VDE
 PDV inception voltage 6,000 V
 PDV extinction voltage 5,700 V
 Mechanical data
 Total mating force (average) 17 N / Module
 Total sliding force (average) 15 N / Module
 Contact diameter 2 mm
 Operating temperature −40 °C to +125 °C
 Mating cycles minimum 10,000
 Materials
 Insulator Thermoplastic fiber glass reinforced acc. to UL-94
 Contact body / insulator Cu alloy / PTFE
 Contact spring CuBe alloy
 Contact finish
 Outer contact gal. Ni
 Center contact gal. Ag

Table of Contents

Module 1 contact

<table>
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<tr>
<th>Description</th>
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<th>Nominal current (A)</th>
<th>Contact resistance average ≤3</th>
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<td>122.138.001.201.000</td>
<td>082.000.039.106.000</td>
<td>22 / 24</td>
<td>3.5</td>
<td>0.4</td>
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<td>Socket contact</td>
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<tr>
<td>High voltage line¹</td>
<td>921.000.001.000.718</td>
<td>080.000.039.000.000</td>
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<td>Crimping tool for shielding sleeve</td>
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</table>

¹ EC 60664-1:2007 (VDE 0110-1:2008) see page 181

² Partial discharge test carried out with recommended cable construction.

In application with a housing please check the cable space requirement.
**MODULE 4 CONTACTS FOR 50 Ω**

**Mating cycles:** minimum 60,000

**Non-magnetic**

**Frequency range**: 0–1.3 GHz

**TECHNICAL NOTES**

- Crimp information see page 168.

**TECHNICAL DATA**

- **Frequency range**: 0–1.3 GHz
- **Insulation resistance**: > 100 GΩ
- **Voltage information acc. to MIL**
- **Operating voltage**: 350 V
- **Test voltage**: 1,050 V

**Mechanical data**

- **Total mating force (average)**: 17.8 N / Module
- **Total sliding force (average)**: 15.3 N / Module
- **Operating temperature**: –40 °C to +125 °C
- **Mating cycles**: minimum 60,000

**Materials**

- **Insulator**: Thermoplastic fiber glass reinforced acc. to UL-94
- **Contact body / insulator**: Cu alloy / PTFE
- **Contact spring**: CuSn / CuBe alloy
- **Contact finish**: Au over CuSnZn

**Cable termination**

- **Part number**: 087.170.000.000

**REMOVAL TOOL I (STRAIGHT)**

Removal of the already assembled contact (incl. cable)

**PART NUMBER**: 087.170.000.000

**REMOVAL TOOL I (ANGLED)**

Removal of the already assembled contact (incl. cable)

**PART NUMBER**: 087.170.365.000

**REMOVAL TOOL II**

Removal of unassembled contacts, or contacts from which the cable has been removed.

**PART NUMBER**: 087.611.001.000.000

For an overview of all tools please see from page 175.

---

**Insulator for Pin and Socket**

**Recommended cable construction / stripping length**
MODULE 2 CONTACTS FOR 50 Ω WITH SMA TERMINATION

Mating cycles: minimum 100,000
Frequency range: 0–9.0 GHz

TECHNICAL NOTES
Frequency range: 0–9.0 GHz
Insulation resistance: > 100 GΩ
Voltage information acc. to MIL:
Operating voltage: 350 V
Test voltage: 1,050 V

Mechanical data
Total mating force (average): 11.9 N / Module
Total sliding force (average): 8.5 N / Module
Operating temperature: -40 °C to +125 °C
Mating cycles: minimum 100,000

Materials
Insulator: Thermoplastic
Fiber glass reinforced
(acc. to UL-94)
Contact body/insulator: Cu alloy / PTFE
Contact spring: CuSn / CuBe alloy
Contact finish: Center contact: Au over Ni
Outer contact: Ni

PART NUMBER: 087.122.349.000.000
For an overview of all tools please see from page 175.
**Module 2 Contacts for 50 Ω**

**COAX**

Mating cycles: minimum 100,000
Frequency range\(^1\): 0–2.4 GHz

**Technical Notes**
- Crimp information see page 168.

**Technical Data**
- Frequency range\(^1\): 0–2.4 GHz
- Insulation resistance: > 100 GΩ
- Voltage information acc. to MIL 2
  - Operating voltage: 400 V
  - Test voltage: 1,200 V

**Mechanical Data**
- Total mating force (average): 11.9 N / Module
- Total sliding force (average): 8.5 N / Module
- Operating temperature: -40 °C to +125 °C
- Mating cycles minimum: 100,000

**Materials**
- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy / PTFE
- Contact spring: CuSn- / CuBe alloy
- Contact finish:
  - Center contact: Au over Ni
  - Outer contact: Ni

**High Frequency Characteristics for 50 Ω Coax Contacts**

**Insulator for Pin and Socket**

**Cable Termination**

**Recommended Cable Construction / Stripping Length**

**Module 2 Contacts**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Characteristic Impedance(s)</th>
<th>Frequency range (GHz)</th>
<th>Cable(s)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Part number crimp inserts</th>
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<td>1.25</td>
<td>RG 178/180</td>
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<tr>
<td>Pin contact</td>
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<td>2.1</td>
<td>RG 174/180 / RG 316</td>
<td>1.75</td>
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</tr>
</tbody>
</table>

**Crimping Tool for Shielding Sleeve**

**Insulator for Pin and Socket**

**Cable Termination**

**Recommended Cable Construction / Stripping Length**

---

\(^1\) Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 x 5 cm conductor length. \(^2\) See from page 185.
MODULES

MODULE 2 CONTACTS FOR 50 \(\Omega\) AND HIGH VOLTAGE

Non-magnetic

Frequency range\(^1\): 0–2.8 GHz

TECHNICAL NOTES

- Crimp information see page 156.

TECHNICAL DATA

Voltage information

- Frequency range\(^1\): 0–2.8 GHz
- Insulation resistance: > 100 GΩ

Voltage information according to MIL 2

- Operating voltage: 850 V
- Test voltage: 2,600 V

Mechanical data

- Total mating force (average): 13.9 N / Module
- Total sliding force (average): 9.9 N / Module
- Operating temperature: –40 °C to +125 °C
- Mating cycles: minimum 100,000

Materials

- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy / PTFE
- Contact spring: CuSn / CuBe alloy
- Contact finish: Au over CuSnZn

Insertion loss

- Frequency in GHz

Voltage standing-wave ratio VSWR

- Frequency in GHz

REMOVAL TOOL

PART NUMBER: 087.170.391.000.000

For an overview of all tools please see from page 175.

CABLE TERMINATION

Recommended cable construction / stripping length

Module 2 contacts: Part number

- Insulator: 611.551.102.923.000
- Dummy contact: 021.341.179.923.000

Pin contact

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Characteristic impedance</th>
<th>Frequency range GHz</th>
<th>Cable (^*)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Part number crimp inserts</th>
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<tbody>
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Socket contact

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<th>B</th>
<th>C</th>
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<td>3.15</td>
<td>4.5</td>
<td>5.2</td>
<td>6.15</td>
<td>082.000.039.106.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crimping tool for shielding sleeve

080.000.039.000.000

\(^*\) Special lines on request.

\(^{1}\) Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 x 5 cm conductor length. \(^{2}\) See from page 165.
MATING CYCLES: MINIMUM 100,000
FREQUENCY RANGE: 0–3.0 GHz

TECHNICAL NOTES
• Crimp information see page 168.

TECHNICAL DATA
- Frequency range: 0–3.0 GHz
- Insulation resistance: > 100 GΩ

VOLTAGE INFORMATION ACC. TO MIL
- Operating voltage: 475 V
- Test voltage: 1,425 V

MECHANICAL DATA
- Total mating force (average): 13.3 N / Module
- Total sliding force (average): 9.5 N / Module
- Operating temperature: –40 °C to +125 °C
- Mating cycles minimum: 100,000

MATERIALS
- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Contact body: Cu alloy / PTFE
- Contact spring: CuSn / CuBe alloy
- Contact finish: Center contact: Au over Ni
- Outer contact: Ni

COAX

HIGH FREQUENCY CHARACTERISTICS FOR 75 Ω COAX CONTACTS

<table>
<thead>
<tr>
<th>Insertion loss</th>
<th>Log in dB</th>
<th>Frequency in GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.6</td>
</tr>
<tr>
<td></td>
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<td>0.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.8</td>
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<td></td>
<td></td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.0</td>
</tr>
</tbody>
</table>

LOSS IN dB

LOSS LEVELS DEPEND ON USED CONDUCTOR TYPE AT A VSWR OF 1.25. FURTHER ARE AVAILABLE ON REQUEST. TESTED WITH PER 2 X 5 CM CONDUCTOR LENGTH.

REMOVAL TOOL

PART NUMBER: 087.170.391.000

For an overview of all tools please see from page 175.

CABLE TERMINATION

INSULATOR FOR PIN AND SOCKET

RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH

Table of Contents
MODULE 2 CONTACTS FOR COMPRESSED AIR VALVES

Operating pressure: 20 bar
Mating cycles: minimum 100,000
Inner diameter tube: M5 or max. 4 mm

TECHNICAL NOTES
- The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Vacuum model and further termination types on request.
- No O2 model.

TECHNICAL DATA

| Mechanical data |  
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Valid max. operating pressure | 20 bar |  
| Total mating force (average) |  
| non shut-off | 27 N / Module |  
| one side shut-off | 28 N / Module |  
| both side shut-off | 29 N / Module |  
| Total sliding force (average) |  
| non shut-off | 12.6 N / Module |  
| one side shut-off | 12.6 N / Module |  
| both side shut-off | 9.2 N / Module |  
| Operating temperature | -40 °C to +125 °C |  
| Mating cycles | minimum 100,000 |  
| Tube termination |  
| Insulator | Thermoplastic |  
| Fiber glass reinforced acc. to UL-94 |  
| Valve body | Cu alloy, blank |  
| Sealing | NBR / FKM |  

FLOW RATE DIAGRAM

The flow rate diagram refers to the locking version with a maximum gap between socket and pin piece of ≤ 0.5 mm. If the clearance is modified, the drop of pressure increases.

---

1 Specified mating cycles through regular service intervals possible. 2 Not suitable for mixtures containing more than 25% oxygen content and explosive gases.
MODULE 2 CONTACTS FOR COMPRESSED AIR VALVES

Inner diameter of tube max. 6 mm.

**COMPRESSED AIR**

Non shut-off version

One side shut-off version

Operating pressure: 12 bar
Mating cycles\(^1\): minimum 100,000
Inner diameter tube: max. 6 mm

---

**TECHNICAL NOTES**

- The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Vacuum model and further termination types on request.
- No O\(_2\) model.

---

**TECHNICAL DATA**

**Mechanical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid max. operating pressure</td>
<td>12 bar</td>
</tr>
<tr>
<td>Total mating force (average)</td>
<td>10.8 N / Module</td>
</tr>
<tr>
<td>non shut-off</td>
<td>12.8 N / Module</td>
</tr>
<tr>
<td>Total sliding force (average)</td>
<td>6.8 N / Module</td>
</tr>
<tr>
<td>non shut-off</td>
<td>6.8 N / Module</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>(-40 °C \text{ to } +125 °C)</td>
</tr>
<tr>
<td>Mating cycles(^2)</td>
<td>minimum 100,000</td>
</tr>
</tbody>
</table>

**Materials**

- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Valve body: Cu alloy, blank
- Sealing: NBR

---

**FLOW RATE DIAGRAM**

The flow diagram refers to the blocking variant with a maximum gap between socket and pin piece of \(\leq 0.5\) mm. The pressure reduction increases in the event of a changed gap measurement.

---

\(^1\) Specified mating cycles through regular service intervals possible. \(^2\) Not suitable for mixtures containing more than 25% oxygen content and explosive gases.

---

**Module 2 contacts**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Dim. A (\text{mm})</th>
<th>Dim. X (\text{mm})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator socket</td>
<td>610.140.102.923.000</td>
<td>8</td>
<td>13</td>
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<tr>
<td>Insulator pin</td>
<td>611.140.102.923.000</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Plug sleeve (non shut-off)</td>
<td>196.001.001.300.000</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Coupling plug (non shut-off)</td>
<td>196.001.003.300.000</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Plug sleeve (non shut-off)</td>
<td>196.002.001.300.000</td>
<td>6</td>
<td>17.5</td>
</tr>
<tr>
<td>Coupling plug (non shut-off)</td>
<td>196.002.003.300.000</td>
<td>6</td>
<td>17.5</td>
</tr>
<tr>
<td>Coupling plug (shut-off)</td>
<td>196.001.002.300.000</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Coupling plug (shut-off)</td>
<td>196.002.002.300.000</td>
<td>6</td>
<td>17.5</td>
</tr>
</tbody>
</table>

---

The table and diagrams provide detailed specifications and components for Module 2 contacts, ensuring compatibility and performance for compressed air valves.
MODULE 1 CONTACT FOR COMPRESSED AIR VALVES

Inner diameter of tube max. 6 mm.

Operating pressure: 12 bar
Mating cycles\(^1\): minimum 100,000
Inner diameter tube: max. 6 mm

**TECHNICAL NOTES**
- The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Vacuum model and further termination types on request.
- No \(^2\) model.

**TECHNICAL DATA**

**Mechanical data**
- Valid max. operating pressure: 12 bar
- Total mating force (average)
  - non shut-off: 6.4 N / Module
  - one side shut-off: 6.4 N / Module
- Total sliding force (average)
  - non shut-off: 3.4 N / Module
  - one side shut-off: 3.4 N / Module
- Operating temperature: -40 °C to +125 °C
- Mating cycles\(^1\): minimum 100,000

**Materials**
- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Valve body: Cu alloy, Blank
- Sealing: NBR

**Flow rate diagram**

The diagram refers to the blocking variant with a maximum gap between socket and pin piece of ≤ 0.5 mm. The pressure reduction increases in the event of a changed gap measurement.

\(^1\) Specified mating cycles through regular service intervals possible. \(^2\) Not suitable for mixtures containing more than 25% oxygen content and explosive gases.
MODULE 2 CONTACTS

Suitable for conducting air, water and other fluids.

Operating pressure: 10 bar low-leakage model
Mating cycles: minimum 100,000
Inner diameter tube: M5

TECHNICAL NOTES
• The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
• The use of flammable or explosive liquids or gases is not allowed.
• No O2 model.

TECHNICAL DATA
Mechanical data
- Valid max. operating pressure: 10 bar
- Tube termination: M5 internal thread for commercially available push-in connections
- Total mating force (average): 64 N / Module
- Total sliding force (average): 0 N / Module
- Operating temperature: -40 °C to +125 °C
- Mating cycles: minimum 100,000

Materials
- Insulator: Thermoplastic, fiber glass reinforced acc. to UL-94
- Fluid model: Stainless steel (1.4305)
- Sealing: NBR

FLOW RATE DIAGRAM AIR

FLOW RATE DIAGRAM WATER

The flow diagram refers to the blocking variant with a maximum gap between socket and pin piece of ≤ 0.5 mm. The pressure reduction increases in the event of a changed gap measurement.

1 Specified mating cycles through regular service intervals possible. 2 Not suitable for mixtures containing more than 25% oxygen content and explosive gases.
**ACCESSORIES**

**COMPRESSED AIR AND FLUID MODEL**

**TERMINATION TYPE I**
- Nipple fitting

**TERMINATION TYPE II PUSH-IN**
- Push-in fitting
- L connection

---

**TECHNICAL NOTES**
- Tightening torque 1.5 Nm

**TECHNICAL DATA**

**Mechanical data**
- Valid operating pressure (static): 0.95 to 14 bar
- Operating temperature: -10 °C to +80 °C
- Thread termination: M5

---

**CONSTRUCTION FOR ACCESSORIES WITH FLUID COUPLING AND RETAINER RING.**

**Description** | **Part number** | **Dim. A** | **Dim. B** | **Dim. C** | **Dim. D** | **Dim. E** | **Dim. F** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
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<td>Nipple fitting</td>
<td>945.000.001.000.123</td>
<td>2</td>
<td>10.2</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Nipple fitting</td>
<td>945.000.001.000.136</td>
<td>3</td>
<td>14.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nipple fitting</td>
<td>945.000.001.000.137</td>
<td>4</td>
<td>15.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push-in fitting</td>
<td>945.000.001.000.138</td>
<td>3</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push-in fitting</td>
<td>945.000.001.000.139</td>
<td>4</td>
<td>13.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push-in fitting</td>
<td>945.000.001.000.140</td>
<td>6</td>
<td>14.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L connection Push-in</td>
<td>945.000.001.000.141</td>
<td>3</td>
<td>14</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L connection Push-in</td>
<td>945.000.001.000.142</td>
<td>4</td>
<td>14.9</td>
<td>15.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L connection Push-in</td>
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<td>6</td>
<td>17.2</td>
<td>16.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**ASSAMLY OF THE MODEL (DEPENDING ON MODEL)**

1. Insert model in insulator.
2. Screw termination accessories in model. Tightening torque 1.5 Nm.

---

1. Insert model in insulator and assemble retaining ring.
2. Screw termination accessories in model. Tightening torque 1.5 Nm.
MODULE 5 CONTACTS FOR PLASTIC FIBER POF

FERRULE

Mating cycles: minimum 40,000

Non-magnetic on request

TECHNICAL NOTES
- Conditional with the function, the contacts are pre-stressed in the mated state. This pre-stressing must be maintained by the frame via a holding device.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Mechanical data</th>
<th>1 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>POF (Polymer Optical Fiber)</td>
<td>2.2 mm – 2.3 mm</td>
</tr>
<tr>
<td>Fiber fastening</td>
<td>Crimp</td>
</tr>
<tr>
<td>Insertion loss</td>
<td>Typical: 1.5 dB at 670 nm, &lt; 2 dB at 670 nm</td>
</tr>
<tr>
<td>Operating temperature (depending on fiber)</td>
<td>Standard fiber: –40 °C to +85 °C, High temperature fiber: –40 °C to +115 °C</td>
</tr>
<tr>
<td>Mating cycles</td>
<td>Minimum 40,000</td>
</tr>
</tbody>
</table>

Materials
- Insulator: Thermoplastic fiber glass reinforced acc. to UL-94
- Fiber optic contact: Cu alloy
- Type of fiber: Plastic fiber POF

Removal Tool II

Removal from front, cutting off not necessary.

PART NUMBER: 087.611.001.002.000

For an overview of all tools please see from page 175.

For assembly instructions please refer to our website: www.odu-connectors.com/downloads.
MODULE 2 CONTACTS FOR PLASTIC FIBER POF / MOST

FERRULE

Mating cycles: minimum 100,000
Type of plastic fiber: POF / MOST

TECHNICAL NOTES
• The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
• Lens connector on request.

TECHNICAL DATA

Mechanical data
POF (Polymer Optical Fiber) 1 mm
Outer diameter 2.2 mm – 2.3 mm
Fiber fastening Clamping
Insertion loss
Typical 1.5 dB at 670 nm
During life-time ≤ 2 dB at 670 nm
Total mating force (average) 16.0 N
Operating temperature (depending on fiber)
Standard fiber –40 °C to +85 °C
High temperature fiber –40 °C to +115 °C
Mating cycles minimum 100,000

Materials
Insulator Thermoplastic
Fiber optic contact Cu alloy
Type of fiber Plastic fiber 980/1.000 (POF)
or 980/1.550 (MOST)

For assembly instructions please refer to our website: www.odu-connectors.com/downloads
MODULES

MODULE 3 CONTACTS FOR FIBER GLASS GOF

FIBER OPTIC

Ceramic Ferrule
Single-mode / multi-mode
Mating cycles¹: minimum 100,000

TECHNICAL NOTES
• The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
• Lens connector on request.

TECHNICAL DATA
Mechanical data
Fiber glass
Fiber fastening
Surface polished²
Sheath crimped
Insertion loss typical
< 1 dB for 670 nm
Total mating force (average)
≤ 36 N
Assembly holding force
10 N to 12 N / contact
Operating temperature
-40 °C to +85 °C
Mating cycles¹
minimum 100,000

Materials
Insulator
Thermoplastic
Fiber glass reinforced
acc. to UL-94
Nickel silver
Ferrule holder
Ferrule
Ceramic
Spring

INSULATOR PIN

INSULATOR SOCKET

Module 3 contacts | Part number
--- | ---
Insulator pin piece | 611 162 103 923 000
Insulator socket piece | 610 162 103 923 000

For assembly instructions please refer to our website: www.odu-connectors.com/downloads.

¹ Specified mating cycles through regular service intervals possible. ² Fiber assembly (glue and polish) on request.

For an overview of all tools please see page 175.

REMOVAL TOOL I (STRAIGHT)

Removal of the already assembled contact (incl. cable).
PART NUMBER: 087.170.136.000.000

REMOVAL TOOL II

Removal of unassembled contacts, or contacts from which the cable has been removed.
PART NUMBER: 087.611.001.001.000

Table of Contents
MATING CYCLES: MINIMUM 10,000
USB 2.0, USB 3.0, CAT 5
2 to 10 contacts

TECHNICAL NOTES
• The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems with transfer rates up to 10 MHz.
• For example, PROFIBUS, USB 1.1, RS485, FlexRay, CAN-Bus and RS232.
• Selected inserts are suitable and qualified for data rates up to 5 GBit/s (USB 3.0). For example, Fast-Ethernet, USB 2.0, USB 3.0, FireWire S400 (on request), IEEE 1394.

Table of Contents
• Selected inserts are suitable and qualified for data rates up to, for example, profibus, USB 1.1, RS485, flexray, CAN-Bus and RS232.
• The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems with transfer rates up to 10 MHz.

Table
- Number of contacts: 2 to 10
- Contacts: 2 to 10
- Cable: 1.5 to 2.5 mm
- Part number: 653.001.001.304.000
- Dummy contact: 021.341.182.300.000
- Insulator complete: 611.148.102.923.000
- Assembly set: see next page

ASSEMBLY SET

<table>
<thead>
<tr>
<th>Order</th>
<th>Base parts</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Insulator</td>
<td>611.148.102.923.000</td>
</tr>
<tr>
<td>2</td>
<td>Socket housing complete</td>
<td>653.001.001.304.000</td>
</tr>
<tr>
<td>2</td>
<td>Connector housing complete</td>
<td>653.001.002.304.000</td>
</tr>
<tr>
<td>3</td>
<td>Dummy contact</td>
<td>021.341.182.300.000</td>
</tr>
<tr>
<td>4</td>
<td>Insert complete solder contacts¹</td>
<td>see next page</td>
</tr>
<tr>
<td>4</td>
<td>Assembly set</td>
<td>see table on the right</td>
</tr>
</tbody>
</table>

² Available with crimp contact upon request.

¹ Insert crimp model on request.

**Modules**

**Module for Multi-Position, Shielded Implementation/High-Speed Connector**

Size 1 (e.g., insert in bus systems)

### Technical Notes

- The inserts listed here for shielded implementations/high-speed connectors are optimally suitable for all common bus systems with transfer rates up to 10 MHz. For example, Profinet, RS485, FlexRay, CAN-Bus and RS232.
- Selected inserts are suitable and qualified for data rates up to 1 Gbit/s. For example, Gigabit-Ethernet, Fast-Ethernet, IEEE 1394, USB 2.0, FireWire S400 (on request).

### Assembly Set

<table>
<thead>
<tr>
<th>Order</th>
<th>Base parts</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Insulator</td>
<td>611.167.102.923.000</td>
</tr>
<tr>
<td>2</td>
<td>Socket housing complete</td>
<td>653.002.001.304.000</td>
</tr>
<tr>
<td>2</td>
<td>Connector housing complete</td>
<td>653.002.002.304.000</td>
</tr>
<tr>
<td>3</td>
<td>Dummy contact</td>
<td>021.341.186.300.000</td>
</tr>
<tr>
<td>3</td>
<td>Insert complete solder contacts*</td>
<td>see next page</td>
</tr>
<tr>
<td>4</td>
<td>Assembly set</td>
<td>see table on the right</td>
</tr>
</tbody>
</table>

### Table of Contents

1. Available with crimp contact upon request.

---

**Insert with ODU TurnTAC** (Mating Cycles Minimum 10,000)

<table>
<thead>
<tr>
<th>Number of contacts</th>
<th>Contact diameter (mm)</th>
<th>Termination (inzination)</th>
<th>Panel voltage</th>
<th>Contact resistance (μΩ)</th>
<th>Degree of pollution</th>
<th>Nominal voltage</th>
<th>Model</th>
<th>Category3</th>
<th>Insert complete4</th>
<th>Total mating force (N)</th>
<th>Total sliding force (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1.3</td>
<td>20</td>
<td>32</td>
<td>550</td>
<td>Socket</td>
<td>701.844.724.002.200</td>
<td>8.5</td>
<td>75</td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>1.3</td>
<td>20</td>
<td>32</td>
<td>550</td>
<td>Socket</td>
<td>701.744.724.002.200</td>
<td>8.5</td>
<td>75</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.9</td>
<td>22</td>
<td>32</td>
<td>500</td>
<td>Pin</td>
<td>701.849.724.004.200</td>
<td>10.5</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.9</td>
<td>22</td>
<td>32</td>
<td>500</td>
<td>Pin</td>
<td>701.749.724.004.200</td>
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<td>5</td>
<td>0.9</td>
<td>22</td>
<td>32</td>
<td>450</td>
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<td>400</td>
<td>Pin</td>
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<td>10</td>
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<td>32</td>
<td>333</td>
<td>Pin</td>
<td>701.849.724.008.200</td>
<td>13</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.5</td>
<td>26</td>
<td>32</td>
<td>333</td>
<td>Pin</td>
<td>701.749.724.008.200</td>
<td>13</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.5</td>
<td>28</td>
<td>25</td>
<td>333</td>
<td>Pin</td>
<td>701.841.724.010.200</td>
<td>15</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>0.5</td>
<td>28</td>
<td>25</td>
<td>300</td>
<td>Pin</td>
<td>701.841.724.014.200</td>
<td>15</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Insert with ODU SpringTAC** (Mating Cycles Minimum 60,000)

<table>
<thead>
<tr>
<th>Number of contacts</th>
<th>Contact diameter (mm)</th>
<th>Termination (inzination)</th>
<th>Panel voltage</th>
<th>Contact resistance (μΩ)</th>
<th>Degree of pollution</th>
<th>Nominal voltage</th>
<th>Model</th>
<th>Category3</th>
<th>Insert complete4</th>
<th>Total mating force (N)</th>
<th>Total sliding force (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.76</td>
<td>22</td>
<td>25</td>
<td>450</td>
<td>Pin</td>
<td>701.842.724.004.700</td>
<td>7.5</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.76</td>
<td>22</td>
<td>25</td>
<td>400</td>
<td>Pin</td>
<td>701.842.724.005.700</td>
<td>8.5</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

MATING CYCLES: minimum 10,000 / 60,000
CAT 5, CAT 6A, HDMI
4, 8 and 16 contacts

TECHNICAL NOTES
- The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems with transfer rates up to 10 MHz.
- For example, Profinet, RS485, Flexray, CAN-Bus and RS232.
- Selected inserts are suitable and qualified for data rates up to 10 Gbit/s. E.g. 10 Gigabit-Ethernet, Gigabit-Ethernet, Fast-Ethernet, IEEE 1394, HDMI.

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR

ORDER | BASE PARTS                  | PART NUMBER
1     | Insulator                    | 611.170.101.923.000
2     | Socket housing complete      | 653.003.001.304.000
2     | Connector housing complete   | 653.003.002.304.000
3     | Insert complete solder       | see next page
      | contacts†                   |                             
4     | Assembly set                 | see table on the right

ASSEMBLY SET

<table>
<thead>
<tr>
<th>ORDER</th>
<th>CABLE Ø</th>
<th>CONTACT NUMBER</th>
<th>TERMINATION</th>
<th>CROSS-SECTION</th>
<th>RATED VOLTAGE</th>
<th>RATED IMPULSE VOLTAGE</th>
<th>DEGREE OF POLLUTION</th>
<th>NOMINAL VOLTAGE</th>
<th>MODEL</th>
<th>NUMBER OF CONTACTS</th>
<th>TOT. INSTALLING FORCE</th>
<th>TOT. SLIDING FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2.5</td>
<td>20</td>
<td>40</td>
<td>4</td>
<td>650</td>
<td>Pin CAT 5</td>
<td>500</td>
<td>550</td>
<td>Socket HDMI</td>
<td>11.5</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1.5</td>
<td>32</td>
<td>250</td>
<td>5</td>
<td>350</td>
<td>Pin CAT 6A</td>
<td>250</td>
<td>550</td>
<td>Socket HDMI</td>
<td>11.5</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>1.0</td>
<td>13</td>
<td>20</td>
<td>2</td>
<td>500</td>
<td>Pin CAT 5</td>
<td>30</td>
<td>100</td>
<td>Socket HDMI</td>
<td>11.5</td>
<td>10.5</td>
<td></td>
</tr>
</tbody>
</table>

† Available with crimp contact upon request.

INSULATOR PIN

INSULATOR SOCKET

CONTACT ARRANGEMENTS

INSERT WITH ODU TURNATAC™ (MATING CYCLES MINIMUM 10,000)

<table>
<thead>
<tr>
<th>ORDER</th>
<th>CONTACT NUMBER</th>
<th>TERMINATION</th>
<th>CROSS-SECTION</th>
<th>RATED VOLTAGE</th>
<th>RATED IMPULSE VOLTAGE</th>
<th>DEGREE OF POLLUTION</th>
<th>NOMINAL VOLTAGE</th>
<th>MODEL</th>
<th>NUMBER OF CONTACTS</th>
<th>TOT. INSTALLING FORCE</th>
<th>TOT. SLIDING FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>20</td>
<td>40</td>
<td>4</td>
<td>650</td>
<td>Pin CAT 5</td>
<td>10</td>
<td>3</td>
<td>500</td>
<td>Socket HDMI</td>
<td>11.5</td>
<td>10.5</td>
</tr>
<tr>
<td>8</td>
<td>22</td>
<td>20</td>
<td>3</td>
<td>350</td>
<td>Pin CAT 6A</td>
<td>10</td>
<td>5</td>
<td>350</td>
<td>Socket HDMI</td>
<td>11.5</td>
<td>10.5</td>
</tr>
<tr>
<td>16</td>
<td>26</td>
<td>10</td>
<td>1.5</td>
<td>250</td>
<td>Pin CAT 5</td>
<td>10</td>
<td>10</td>
<td>250</td>
<td>Socket HDMI</td>
<td>11.5</td>
<td>10.5</td>
</tr>
</tbody>
</table>

INSULATOR SPRINGATAC™ (MATING CYCLES MINIMUM 60,000)

<table>
<thead>
<tr>
<th>ORDER</th>
<th>CONTACT NUMBER</th>
<th>TERMINATION</th>
<th>CROSS-SECTION</th>
<th>RATED VOLTAGE</th>
<th>RATED IMPULSE VOLTAGE</th>
<th>DEGREE OF POLLUTION</th>
<th>NOMINAL VOLTAGE</th>
<th>MODEL</th>
<th>NUMBER OF CONTACTS</th>
<th>TOT. INSTALLING FORCE</th>
<th>TOT. SLIDING FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>22</td>
<td>16</td>
<td>2</td>
<td>350</td>
<td>Pin CAT 5</td>
<td>10</td>
<td>3</td>
<td>550</td>
<td>Socket HDMI</td>
<td>11.5</td>
<td>10.5</td>
</tr>
</tbody>
</table>

† Acc. to IEC 60601-1-2007 (VDE 0110-1-2008), see page 181
‡ Acc. to DIN 346-200-2008, SAE AS 23441:2004 method 3031.1
§ Classification acc. to ISO/IEC 11801:2002. † Insert crimp contact upon request.
MODULE FOR MULTI-POSITION, SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

Size 3 (e.g. for use in bus systems).

SHIELDED IMPLEMENTATION-HIGH-SPEED CONNECTOR

Mating cycles: minimum 10,000
10 to 30 contacts

TECHNICAL NOTES
- The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems with transfer rates to 10 MHz.
  For example, Profinet, RS485, FlexRay, CAN-Bus and RS232.
- Selected inserts can be qualified for data rates.

INSULATOR PIN

INSULATOR SOCKET

CONTACT ARRANGEMENTS

ASSEMBLY SET

Table of Contents
BLANK MODULES

To be used to fill any gaps, in incomplete frames. The frame has to be fully mounted with insulators, spacers or blank modules.

**TECHNICAL DATA**

| Insulator | Thermoplastic: fiber glass reinforced acc. to UL-94 |

<table>
<thead>
<tr>
<th>Units</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>611.122.113.923.000</td>
</tr>
<tr>
<td>3</td>
<td>611.130.113.923.000</td>
</tr>
<tr>
<td>5</td>
<td>611.128.113.923.000</td>
</tr>
</tbody>
</table>

SPACER MODULES

Supplied without contact arrangements and enable blind mating despite differing contact arrangements. This is the case, for example, with test lanes with various testing scenarios. This means that various tasks can be carried out with one contact arrangement.

**TECHNICAL DATA**

| Insulator | Thermoplastic: fiber glass reinforced acc. to UL-94 |

Cannot be retroactively equipped with contacts. Information on the availability of the individual intermediate pieces can be found with the respective modules.
CODING MODULES

Coding modules are placed between the modules to enable coding in addition to the guide system.

<table>
<thead>
<tr>
<th>Description</th>
<th>Units</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coding module (pin)</td>
<td>1</td>
<td>611.161.101.923.000</td>
</tr>
<tr>
<td>Coding module (socket)</td>
<td>1</td>
<td>610.161.101.923.000</td>
</tr>
</tbody>
</table>

TECHNICAL DATA

Insulator: Thermoplastic fiber glass reinforced acc. to UL-94

PIN PROTECTION MODULES

For connections with small pin diameters, these modules serve as protection for the pins. Especially in the case of small contact diameters (Ø 0.76 / 1.02 mm), pin protection modules provide additional protection against unintentional bending of the pins.

<table>
<thead>
<tr>
<th>Description</th>
<th>Units</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin protection module (pin)</td>
<td>1</td>
<td>611.122.115.923.000</td>
</tr>
<tr>
<td>Pin protection module (socket)</td>
<td>1</td>
<td>610.122.115.923.000</td>
</tr>
</tbody>
</table>

TECHNICAL DATA

Insulator: Thermoplastic fiber glass reinforced acc. to UL-94

Alternatively, these modules can be used to extend clearance and creepage distances.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact processing and crimping</td>
<td>168</td>
</tr>
<tr>
<td>Crimping tools</td>
<td>169</td>
</tr>
<tr>
<td>Tensile strength diagram for crimp terminations</td>
<td>171</td>
</tr>
<tr>
<td>Crimp information</td>
<td>172</td>
</tr>
<tr>
<td>Assembly aid</td>
<td>174</td>
</tr>
<tr>
<td>Removal of contacts</td>
<td>176</td>
</tr>
<tr>
<td>Maintenance kit</td>
<td>177</td>
</tr>
</tbody>
</table>
TERMINATION TECHNOLOGY

ODU offers three different contact termination technologies for the single contacts:

- Crimp
- Solder
- PCB

CRIMP TERMINATION

Using contacts to establish connecting lines through crimping creates a permanent, secure and corrosion-free connection. For most people, crimping is easy and quick to carry out.

Through crimping, the conductor and contact materials in the compressed areas become so dense as to create a connection which is nearly gas-tight, and with a tensile strength befitting the conductor material.

Crimping can be carried out on the tiniest of diameters as well as in larger diameters. For small diameters (0.08 – 2.5 mm²), eight-point crimp tools are used; six-point crimp tools are used for larger dimensions. The corner measurement of the crimping is never larger than the original diameter. The cable insulation is not damaged in the process and can be directly attached to the connector end.

For error-free crimping, the bore diameter must be perfectly fitted to the cable. Such error-free crimping is only guaranteed if using ODU-recommended crimping tools. In order to correctly advise you, we need to know your cable type and profile, preferably by means of a sample and corresponding data sheet.

For further crimp information please refer to the table on page 172.

CRIMPING TOOLS

8-POINT CRIMPING TOOL FOR CONDUCTOR CONNECTIONS FROM 0.08 TO 1.5 MM²

- With user-friendly digital display
- PART NUMBER: 080.000.051.000.000

POSITIONER FOR CONTACT DIAMETER FROM 0.76 TO 3 MM

- PART NUMBER: 080.000.051.101.000
- Has to be ordered separately.

8-POINT CRIMPING TOOL FOR CONDUCTOR CONNECTIONS FROM 1.5 TO 6 MM²

- With user-friendly digital display
- PART NUMBER: 080.000.057.000.000

POSITIONER FOR CONTACT DIAMETER FROM 1.5 TO 3 MM

- PART NUMBER: 080.000.057.101.000
- Has to be ordered separately.

HEXAGONAL CRIMPING TOOL FOR CROSS-SECTIONS (AWG 12), 4 TO 6.0 MM²

- With blocking system
- PART NUMBER: 080.000.062.000.000

MECHANICAL HEXAGONAL HAND CRIMPING TOOL FROM 10 TO 50 MM²

- PART NUMBER: 080.000.064.000.000
- High pressing force with low manual force through precision mechanics. Folding head facilitates processing of unwieldy connector forms and changing of crimp inserts.

CRIMPING JAWS FOR CONTACT DIAMETER FROM 5 TO 12 MM SEE PAGE 173

- Has to be ordered separately.

FOR ASSEMBLY INSTRUCTIONS PLEASE REFER TO OUR WEBSITE: WWW.ODU-CONECTORS.COM
CRIMPING TOOLS

For further crimp information please refer to the table on page 172.

HEXAGONAL CRIMPING TOOL FOR COAX CONTACTS

With blocking system.
PART NUMBER PLIER: 080.000.039.000.000
CRIMPING JAWS PLEASE SEE PAGE 172
Has to be ordered separately.

HAND CRIMPING TOOL FOR SINGLE CRIMP CONTACTS (STAMPED CONTACTS)

PART NUMBER: 080.000.040.000.000
Single contacts are positioned manually in the pliers and get crimped.

HAND CRIMPERS WITH ROLL FOR SPOOL GOODS (STAMPED CONTACTS)

PART NUMBER: 080.000.041.000.000
Contacts are supplied on the reel and are automatically isolated. The feed occurs by hand operation.
• Suitable for coil size: 115 mm.
• Therefore 500/900 contacts can be processed.
• Processing with automatic stripper crimper possible,
  Further information on request.

CRIMP CONNECTIONS


Tensile strength diagram of a crimp termination depending upon the conductor cross-section IEC 60352-2:2013 [DIN EN 60352-2:2014]. Example: A 2.5 mm² conductor must achieve a minimum tensile strength of approx. 320 N.

<table>
<thead>
<tr>
<th>Conductor cross-section in mm²</th>
<th>Tensile strength in N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>5</td>
</tr>
<tr>
<td>0.1</td>
<td>10</td>
</tr>
<tr>
<td>0.2</td>
<td>20</td>
</tr>
<tr>
<td>0.5</td>
<td>40</td>
</tr>
<tr>
<td>1</td>
<td>80</td>
</tr>
<tr>
<td>1.5</td>
<td>120</td>
</tr>
<tr>
<td>2</td>
<td>160</td>
</tr>
<tr>
<td>2.5</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>320</td>
</tr>
<tr>
<td>6</td>
<td>480</td>
</tr>
<tr>
<td>10</td>
<td>1,000</td>
</tr>
</tbody>
</table>

NOTE

Internal standards and guidelines are used for cross-sections (> 10 mm²), as these are not clearly defined in the international standard.

TESTING ELECTRICAL CONTINUITY FOLLOWING ASSEMBLY / TESTING OF WIRING:

One of the most important functional features is the observance of the specified mating and sliding forces. All socket contacts in fully automatic systems supplied by ODU are therefore tested for 100% observance of these values in the context of process monitoring. This takes place with the correctly chosen testing systems without damage to the socket. However, ODU points out that incorrectly chosen test systems (e.g. test pin) or processing methods (e.g. test speed) following packaging can damage the sockets/pins. Please note the instructions in the assembly instructions (www.odu-connectors.com/downloads/assembly-instructions).

We recommend using suitable test adapters here.
## CRIMP INFORMATION

### Contact diameter | Termination cross-section | Stripping length | Hand crimping tool | Hexagonal crimping tool | Hand crimping tool stamped contacts | Hexagonal crimping tool stamped contacts
---|---|---|---|---|---|---
0.76 | 24/28 | 0.25/0.08 | 4<sup>**a**</sup> | 1/0.67 | |   
1.02 |  |  | 2/0.67 |  1.5 |  |  080.000.000.000.000  
1.5 |  |  | 3/0.67 |  080.000.000.000.000  
0.7 | 26/28 | 3<sup>**a**</sup> | | | |  
0.7 | 22/24 | | | | |  
0.76 | 22 | 0.38 | 4<sup>**a**</sup> | 1/0.67 | |  
1.02 | | | 2/0.67 |  1.5 | |  
2.41 | 20/22 | 0.5/0.38 | 5<sup>**a**</sup> | | |  
3 | | | 3/1.12 |  3 | |  
1.5 | 18 | 1/0.75 | 5<sup>**a**</sup> | | |  
2.41 | | | 3/1.12 |  2.41 | |  
3 | | | 5/1.12 |  | |  
1.5 | 16 | 5<sup>**a**</sup> | 3/1.42 | 10/1.42<sup>b</sup> | |  
1.5 | | 3/1.32 | 10/1.42<sup>b</sup> | 3 | |  
2.41 | 1.5 | 5<sup>**a**</sup> | 4/1.32 | 9/1.42<sup>b</sup> | |  
3 | | 5/1.32 | 6/1.42<sup>b</sup> | 3 | |  
2.41 | 14 | 5<sup>**a**</sup> | 4/1.42 | 9/1.42<sup>b</sup> | |  
3 | | 5/1.42 | 6/1.42<sup>b</sup> | 3 | |  
2.41 | 2.5 | 6<sup>**a**</sup> | 4/1.42 | 9/1.42<sup>b</sup> | |  
2.41 | | 3/1.67<sup>b</sup> | 6/1.67<sup>b</sup> | 3 | |  
2.41 | 12(7/20) | 6<sup>**a**</sup> | 3/1.21<sup>b</sup> | Profile no 2 | |  
2.41 | 12(19/26) | 6<sup>**a**</sup> | 9/1.21<sup>b</sup> | | |  
3 | 4 | 6<sup>**a**</sup> | 6/1.21<sup>b</sup> | Profile no 3 | |  
3 | 10 | 6<sup>**a**</sup> | 8/2.22<sup>b</sup> | Profile no 3 | |  
5 | 10 | 10<sup>**a**</sup> | 8/2.22<sup>b</sup> | | |  
5 | | 6/2.22<sup>b</sup> | | | |  
8 | 16 | 10<sup>**a**</sup> | 8/2.22<sup>b</sup> | | |  
8 | 25 | 18<sup>**a**</sup> | 8/2.22<sup>b</sup> | | |  
12 | | 10 | 6<sup>**a**</sup> | 7<sup>**a**</sup> | |  
5 | 10 | 10<sup>**a**</sup> | 6/2.22<sup>b</sup> | 080.000.064.110.000 | |  
5 | 16 | 10<sup>**a**</sup> | 6/2.22<sup>b</sup> | 080.000.064.101.000 | |  
8 | 16 | 10<sup>**a**</sup> | 6/2.22<sup>b</sup> | 080.000.064.116.000 | |  
8 | 25 | 18<sup>**a**</sup> | 6/2.22<sup>b</sup> | 080.000.064.125.000 | |  
12 | | 35 | 18<sup>**a**</sup> | 080.000.064.135.000 | |  
12 | 35 | 18<sup>**a**</sup> | 6/2.22<sup>b</sup> | 080.000.064.135.000 | |  
12 | 50 | 18<sup>**a**</sup> | 6/2.22<sup>b</sup> | 080.000.064.150.000 | |  

**Notes:**
- The listed cross section corresponds to a finely stranded conductor design according to IEC 60228:2004 (VDE 0295:2005) class 5 or a finely stranded conductor design (7/19 stranded) according to AWS ASTM B258-14.  
- Recommended by ODU as a standard tool and setting.
## ASSEMBLY AID

<table>
<thead>
<tr>
<th>Description</th>
<th>For use in</th>
<th>Part number</th>
<th>Nm</th>
<th>Recommended tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque wrench</td>
<td>With cross handle, fixed automatic release (for inner hexagonal bits with C6.3- or EE6.3-shaft). Bit has to be ordered separately.</td>
<td>598.054.001.000.000</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>598.054.002.000.000</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>598.054.003.000.000</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>598.054.004.000.000</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>598.054.005.000.000</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>598.054.006.000.000</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>598.054.007.000.000</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>Bit slot 2.5 (0.4/70)</td>
<td>Mounting of spindle coding</td>
<td>598.054.103.000.000</td>
<td>0.9 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit slot 3.5 (0.5/50)</td>
<td>Screwing of the rails in the T frame</td>
<td>598.054.108.000.000</td>
<td>0.9 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit slot 5.5 (0.8/50)</td>
<td>Screwing of the rails in the L frame</td>
<td>598.054.101.000.000</td>
<td>1.2 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit slot 8 (1.2/50)</td>
<td>Mounting of frame coding (coded socket)</td>
<td>598.054.110.000.000</td>
<td>1.2 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Special bit</td>
<td>Coding pin for frames in a housing</td>
<td>598.054.203.000.000</td>
<td>1.2 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit comb slot size 1</td>
<td>Mounting screw on frames in a housing</td>
<td>598.054.102.000.000</td>
<td>1.2 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit Phillips cross slot size 1</td>
<td>Grounding screw on frames in a housing and M+ frame</td>
<td>598.054.106.000.000</td>
<td>1.2 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit Phillips cross slot size 1</td>
<td>Grounding plug socket for P+ frame</td>
<td>598.054.106.000.000</td>
<td>1.5 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit Phillips cross slot size 1</td>
<td>Grounding pin for P+ frame</td>
<td>598.054.106.000.000</td>
<td>3.0 Nm +/- 0.3 Nm</td>
<td></td>
</tr>
<tr>
<td>SW 8</td>
<td>Mounting of grounding socket P+ frame</td>
<td>598.054.111.000.000</td>
<td>2.2 Nm +/- 0.3 Nm</td>
<td></td>
</tr>
<tr>
<td>SW 8</td>
<td>Mounting of grounding pin P+ frame</td>
<td>598.054.111.000.000</td>
<td>4.2 Nm +/- 0.5 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit Torx TX 8</td>
<td>Rails on frames in a housing</td>
<td>598.054.103.000.000</td>
<td>0.9 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit Torx TX 10</td>
<td>Screwing of the rails in the S and M+ frame</td>
<td>598.054.104.000.000</td>
<td>1.2 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit Torx TX 10</td>
<td>Mounting of ODU-MAC ZERO housing</td>
<td>598.054.104.000.000</td>
<td>0.6 Nm +/- 0.1 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit Torx TX 20</td>
<td>Screwing of the rails in the P+ frame</td>
<td>598.054.105.000.000</td>
<td>3.0 Nm +/- 0.3 Nm</td>
<td></td>
</tr>
<tr>
<td>Bit for coding pin</td>
<td>Mounting of coding pins</td>
<td>598.054.203.000.000</td>
<td>1.2 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Distance spacer/QCH S frame for quick-change head and rear mounting panel</td>
<td>598.054.204.000.000</td>
<td>1.2 Nm +/- 0.2 Nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiving of back nut</td>
<td>For mounting, shielded implementation size 0</td>
<td>598.055.002.000.000</td>
<td>0.6 Nm +/- 0.1 Nm</td>
<td></td>
</tr>
<tr>
<td>Receiving of back nut</td>
<td>For mounting, shielded implementation size 1</td>
<td>598.055.001.000.000</td>
<td>1.0 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Receiving of back nut</td>
<td>For mounting, shielded implementation size 2</td>
<td>598.055.003.000.000</td>
<td>2.0 Nm +/- 0.2 Nm</td>
<td></td>
</tr>
<tr>
<td>Receiving of back nut</td>
<td>For mounting, shielded implementation size 3</td>
<td>598.055.004.000.000</td>
<td>3.5 Nm +/- 0.3 Nm</td>
<td></td>
</tr>
</tbody>
</table>

### ASSEMBLY TOOL HIGH CURRENT

Necessary assembly tool for screwing and releasing of the contacts.

**PART NUMBER: 087.611.001.001.000**

With _, please register the respective figure for contact diameter 8 to 12 mm.

See table below.

### INSERTION TOOL Ø 0.76–1.5 MM

For assembly aid of contacts with flexible/thin conductors (pin and socket side).

**PART NUMBER: 085.611.001.001.000**

### EXTRACTION TOOL Ø 0.76–1.5 MM

Extraction tool for sockets and pins by use of the removal tool.

**PART NUMBER: 087.611.005.001.000**

<table>
<thead>
<tr>
<th>Contact Ø</th>
<th>Assembly tool high current</th>
<th>Assembly aid insertion tool</th>
<th>Assembly aid extraction tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.76</td>
<td>085.611.001.001.000</td>
<td>087.611.005.001.000</td>
<td></td>
</tr>
<tr>
<td>0.8</td>
<td>085.611.001.001.000</td>
<td>087.611.005.001.000</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>085.611.001.001.000</td>
<td>087.611.005.001.000</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>085.611.001.001.000</td>
<td>087.611.005.001.000</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>085.611.001.001.000</td>
<td>087.611.005.001.000</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>087.611.002.001.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>087.611.003.001.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>087.611.004.001.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## ASSEMBLY AID

Receiving and assembly of contacts is only possible with ODU tools.
REMOVAL OF CONTACTS

REMOVAL TOOL I
Removal of the already assembled contact (incl. cable). The removal tool is pressed from behind into the insulator until a quiet click is heard. The contact is removed from the insulator by pulling on the cable or by lightly pressing the contact with the extraction tools.

REMOVAL TOOL II
Removal of unassembled contacts, or contacts from which the cable has been removed. The removal tool is pressed from behind into the insulator until a quiet click is heard. The contact can be removed from the insulator by lightly pushing it with the extraction tools.

REMOVAL ONLY POSSIBLE WITH ODU TOOLS.

<table>
<thead>
<tr>
<th>Contact</th>
<th>Removal tool I</th>
<th>Removal tool II</th>
<th>Removal tool I</th>
<th>Removal tool II</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.76²</td>
<td>087.170.361.000.000</td>
<td>087.611.001.001.000</td>
<td>087.170.362.000.000</td>
<td>087.611.001.001.000</td>
</tr>
<tr>
<td>1.0²</td>
<td>087.170.362.000.000</td>
<td>087.611.001.001.000</td>
<td>087.170.363.000.000</td>
<td>087.611.001.001.000</td>
</tr>
<tr>
<td>1.5³</td>
<td>087.170.138.000.000</td>
<td>087.611.001.001.000</td>
<td>087.170.365.000.000</td>
<td>087.611.001.001.000</td>
</tr>
<tr>
<td>2.41</td>
<td>087.170.139.000.000</td>
<td>087.611.001.001.000</td>
<td>087.170.366.000.000</td>
<td>087.611.001.001.000</td>
</tr>
<tr>
<td>3</td>
<td>087.170.136.000.000</td>
<td>087.611.001.001.000</td>
<td>087.170.137.000.000</td>
<td>087.611.001.001.000</td>
</tr>
<tr>
<td>5</td>
<td>087.170.391.000.000</td>
<td>087.170.391.000.000</td>
<td>087.170.392.000.000</td>
<td>087.170.392.000.000</td>
</tr>
<tr>
<td>Coax 50Ω 4 contacts</td>
<td>087.170.139.000.000</td>
<td>087.611.001.001.000</td>
<td>087.170.365.000.000</td>
<td>087.611.001.001.000</td>
</tr>
<tr>
<td>Coax 50Ω 2 contacts</td>
<td>087.170.391.000.000</td>
<td>087.170.391.000.000</td>
<td>087.170.392.000.000</td>
<td>087.170.392.000.000</td>
</tr>
<tr>
<td>Coax 75Ω 2 contacts SMA</td>
<td>087.122.349.000.000</td>
<td>087.170.391.000.000</td>
<td>087.170.391.000.000</td>
<td>087.170.391.000.000</td>
</tr>
<tr>
<td>Fiber optic 5 contacts</td>
<td>087.170.136.000.000</td>
<td>087.611.001.002.000</td>
<td>087.611.001.002.000</td>
<td>087.611.001.002.000</td>
</tr>
<tr>
<td>Fiber optic 3 contacts</td>
<td>087.170.136.000.000</td>
<td>087.611.001.001.000</td>
<td>087.611.001.001.000</td>
<td>087.611.001.001.000</td>
</tr>
</tbody>
</table>

1 In use with high voltage module, 4 contacts, [see page 124] the angled version cannot be used.
2 With cable [h+0] 002.331, only removal tool I is usable.

MAINTENANCE PACKAGE FOR ODU SPRINGTAC® AND ODU LAMTAC® CONTACTS

Contact lubrication improves the mechanical properties of contact systems. Cleaning the contact surfaces prior to lubrication is also recommended in order to remove pollution. With appropriate care, wear due to high mating frequency can be significantly minimised and the mating and unmating forces reduced. The cleaning and lubricating interval must be individually adapted to circumstances and should only be carried out with products recommended by the contact manufacturer.

ODU has put together a maintenance package to this purpose, so that lubrication can be carried out directly on location. A cleaning brush and a special cleaning cloth, as well as precise instructions allow optimal care of the contacts. In the absence of other specifications, the maintenance package can be used for all ODU contacts and connections.

PART NUMBER: 170.000.000.000.100

For technical properties of the maintenance package please refer to our website: www.odu-connectors.com/downloads.

CLEANING INFORMATION
Maintenance instruction 003.1 70.000.000.000

FURTHER INFORMATION
Never submerge the connector in liquid. The connector may only be put back into operation again when it has been assured that it is completely dry.

Ensure that contact pins are not bent or otherwise damaged. The connector may no longer be used when damage or other signs of wear are detected. Clean with maximum 2.5 bar compressed air to avoid contact damage. A slight blackening of the contact points may occur over the course of the service life and represents no impairment of the electrical properties.

Recommended cleaning agent
Soap: liquid soaps on sodium bicarbonate or potassium base. Alcohol: ethanol 70%, isopropyl alcohol 70%.
INTERNATIONAL PROTECTION CLASSES


<table>
<thead>
<tr>
<th>Code number</th>
<th>Protection against access to hazardous parts / Protection against ingress of solid foreign objects</th>
<th>Code number</th>
<th>Protection against harmful effects due to the ingress of water</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No protection / No protection against contact / No protection against solid foreign objects</td>
<td>0</td>
<td>No protection against water</td>
</tr>
<tr>
<td>1</td>
<td>Protection against contact with the back of the hand / Protection against solid foreign objects</td>
<td>1</td>
<td>Protection against dripping water</td>
</tr>
<tr>
<td>2</td>
<td>Protection against medium-sized foreign objects</td>
<td>2</td>
<td>Protection against vertically falling waterdrops of ≤ 15° from the vertical</td>
</tr>
<tr>
<td>3</td>
<td>Protection against small foreign objects</td>
<td>3</td>
<td>Protection against spray water (any angle up to 60° from the vertical)</td>
</tr>
<tr>
<td>4</td>
<td>Protection against granular foreign objects</td>
<td>4</td>
<td>Protection against splashing water from all directions</td>
</tr>
<tr>
<td>5</td>
<td>Dustproof / Protection against uncontrolled ingress of dust</td>
<td>5</td>
<td>Protection against water jet from all directions</td>
</tr>
<tr>
<td>6</td>
<td>Dustproof / Complete protection against ingress of dust / Protection against powerfull water</td>
<td>6</td>
<td>Protection against powerfull water jet from all directions</td>
</tr>
<tr>
<td>7</td>
<td>Protection against the effects of temporary immersion in water</td>
<td>7</td>
<td>Protection against ingress of harmful quantities of water by temporary submersion into water</td>
</tr>
<tr>
<td>8</td>
<td>Protection against the effects of continuous immersion in water</td>
<td>8</td>
<td>Protection against ingress of harmful quantities of water by continuous submersion into water</td>
</tr>
<tr>
<td>9</td>
<td>Protection against high pressure and high-temperature</td>
<td></td>
<td>Protection against water from all directions for high pressure and high temperatures</td>
</tr>
</tbody>
</table>

**International Protection Code**
The International Protection Code (IP) is a system used to indicate the degree of protection provided by electrical equipment against access to hazardous parts and ingress of solid foreign objects. It is defined by the IEC 60529 standard and is used in many countries around the world. The code is a combination of two digits, where the first digit indicates the degree of protection against solid foreign objects, and the second digit indicates the degree of protection against water.

**Explanation of IP Codes**
- **IP00**: No protection against solid foreign objects.
- **IP01**: Protection against ingress of solid foreign objects when body of hand is used.
- **IP02**: Protection against ingress of solid foreign objects when fingers are used.
- **IP03**: Protection against ingress of solid foreign objects when a wire is used.
- **IP04**: Protection against ingress of solid foreign objects for uncontrolled and unattended ingress.
- **IP05**: Protection against ingress of solid foreign objects if water jet from all directions.
- **IP06**: Protection against ingress of solid foreign objects if powerfull water jet from all directions.
- **IP07**: Protection against ingress of solid foreign objects if high pressure and high-temperature.
- **IP08**: Protection against ingress of solid foreign objects if high pressure.
- **IP09**: Protection against ingress of solid foreign objects if high-temperature.
- **IP1X**: Protection against ingress of solid foreign objects if water jet.
- **IP2X**: Protection against ingress of solid foreign objects if spray water.
- **IP3X**: Protection against ingress of solid foreign objects if splashing water.
- **IP4X**: Protection against ingress of solid foreign objects if water jet.
- **IP5X**: Protection against ingress of solid foreign objects if water jet from all directions.
- **IP6X**: Protection against ingress of solid foreign objects if powerfull water jet from all directions.
- **IP6X**: Protection against ingress of solid foreign objects if high pressure and high-temperature.
- **IP7X**: Protection against ingress of solid foreign objects if high pressure.
- **IP8X**: Protection against ingress of solid foreign objects if high-temperature.
- **IP9X**: Protection against ingress of solid foreign objects.

**Technical Information**

**Explanations and Information on Insulation Coordination**

**Overvoltage Category**
The necessary rated surge voltage is defined through the overvoltage category according to table F.1, together with the nominal voltage used. Depending upon the installation location, the respective overvoltage category is selected according to the criteria listed below for operating media that is fed directly from the low voltage mains.

**Operating media fed by the fixed installation that consume energy**
- For example, household devices, portable tools and similar devices.

**Overvoltage Category I**
Operating media for connection to circuits in which measures for limiting the transient overvoltages to an appropriately low value have been taken. For example, connectors for the voltage supply of computer hardware permanently connected to a power supply with electronic overvoltage limitation.

**Overvoltage Category II**
For example, switches in permanent installations and cases for similar devices.

**Overvoltage Category III**
For example, electricity meters and primary overcurrent protection devices.

**Overvoltage Category IV**
Operating media for use at the termination point of the installation. For example, electricity meters and primary overcurrent protection devices.

**Overvoltage Category V**
Operating medium for use at the termination point of the installation. For example, electricity meters and primary overcurrent protection devices.
EXPLANATIONS AND INFORMATION ACCORDING TO VDE

DEGREE OF POLLUTION
Potentially occurring pollution combined with moisture can influence the insulation capacity on the surface of the connector. In order to define various rating parameters, a degree of pollution according to the criteria listed below must be selected for the operating medium.

In the case of a connector with a degree of protection of minimum IP 54 IEC 60529-2013 (VDE 0470-1:2014), the insulating parts may be measured enclosed according to the standard for a low degree of pollution. This also applies for mated connectors for which enclosure is ensured by the connector housing and which are only disconnected for testing and maintenance purposes.

Degree of pollution 1
No or only dry, non-conductive pollution is present. The pollution has no influence. For example, computer systems and measuring devices in clean, dry or air-conditioned rooms.

Degree of pollution 2
Only non-conductive pollution is present. However, temporary conductivity due to condensation must be anticipated. For example, devices in laboratories, residential, sales and other business areas.

Degree of pollution 3
(= standard, when no special degree of pollution is indicated)
Conductive pollution occurs or dry, non-conductive pollution that becomes conductive because of dewfall must be expected. For example, devices in industrial, commercial and agricultural operations, unheated storage areas and workshops.

Degree of pollution 4
Permanent conductivity is present, caused by conductive dust, rain or moisture. For example, devices in the open air or outdoor facilities and construction machinery.

Operating voltage (VDE: Rated voltage): Value of a voltage that is specified by the manufacturer for a component, device or operating medium and relates to the operating and performance features.

Depending upon the indicated degree of pollution, the rated voltage is dependent upon the insulating material group of the connector and the respective creepage distances between the individual contacts. The rated voltage may be significantly influenced by the use of blank modules and varying positioning of the contacts in the insulator. Operating media may have more than one value or one range for rated voltage (see table F4 in IEC 60664-1:2007 [VDE 0110-1:2008]).

NOMINAL VOLTAGE
A suitably rounded voltage value indicated by the manufacturer for the designation or identification of an operating medium. In these explanations, the term nominal voltage is used for the value of the issued voltage indicated by the power supply company (PSC) or by the manufacturer of the voltage source for classification of the overvoltage category.

RATED IMPULSE VOLTAGE
Value of an impulse withstand voltage that is indicated by the manufacturer for an operating medium or a part of this, and which indicates the defined endurance of its insulation against transient (brief, duration of a few milliseconds) overvoltages. The impulse withstand voltage is the highest value of the surge voltage of a defined form and polarity which will not result in the dielectric breakdown of the insulation under defined conditions.

Depending upon the indicated degree of pollution, the rated surge voltage depends upon the clearance distance between the individual contacts. The rated surge voltage may be influenced significantly by the usage of blank modules and varied positioning of the contacts in the insulators. [see table F2 in IEC 60664-1:2007 [VDE 0110-1:2008]].

In the most recent edition of IEC 60664-1:2007 [VDE 0110-1:2008], the minimum clearance distances for operating media not connected directly to the low voltage mains should be measured according to the possible permanent voltages, the temporary overvoltages or periodic peak voltages (see table F7 in IEC 60664-1:2007 [VDE 0110-1:2008]).

IMPULSE TEST VOLTAGE / POWER FREQUENCY TEST VOLTAGE
Highest value of the surge voltage of a defined form and polarity that will not result in a dielectric breakdown or flashover of the insulation under defined conditions.

CLEARANCE DISTANCE
The shortest distance in the air between two conductive parts.

CREEPAGE DISTANCE
The shortest distance between two conductive parts over the surface of an insulation material. The creepage distance is influenced by the degree of pollution applied.

TEST VOLTAGE
The dielectric strength of the connector is confirmed according to the standard corresponding to the indicated rated surge voltage by applying the test voltage according to table F5 over a defined time range.

IEC 60664-1:2007 [VDE 0110-1:2008] : table F.5 – test voltages for testing clearance distances at different altitudes (the voltage levels are valid only to verify the clearance distances).

<table>
<thead>
<tr>
<th>Rated impulse voltage</th>
<th>Test impulse voltage at sea level</th>
<th>Test impulse voltage at 200 m elevation</th>
<th>Test impulse voltage at 500 m elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>kV</td>
<td>kV</td>
<td>kV</td>
</tr>
<tr>
<td>0.33</td>
<td>0.357</td>
<td>0.355</td>
<td>0.350</td>
</tr>
<tr>
<td>0.5</td>
<td>0.541</td>
<td>0.537</td>
<td>0.531</td>
</tr>
<tr>
<td>0.8</td>
<td>0.934</td>
<td>0.920</td>
<td>0.899</td>
</tr>
<tr>
<td>1.5</td>
<td>1.751</td>
<td>1.725</td>
<td>1.685</td>
</tr>
<tr>
<td>2.5</td>
<td>2.920</td>
<td>2.874</td>
<td>2.808</td>
</tr>
<tr>
<td>4</td>
<td>4.923</td>
<td>4.874</td>
<td>4.875</td>
</tr>
<tr>
<td>6</td>
<td>7.385</td>
<td>7.236</td>
<td>7.013</td>
</tr>
<tr>
<td>8</td>
<td>9.847</td>
<td>9.648</td>
<td>9.950</td>
</tr>
</tbody>
</table>
The values specified in the catalog correspond to SAE AS 13441:2004 method 3001.1. The table values were determined according to EIA 364-20D:2008. The inserts were tested while mated, and the test current was applied to the pin insert.

75% of the dielectric withstanding voltage is used for the further calculation. The operating voltage is 1/3 of this value.

All tests were conducted at normal indoor climate and apply up to an altitude of 2,000 m. If there are any deviations, the derating factors are to be factored in according to the applicable standards.

**ATTENTION:**

With certain applications, the safety requirements for electrical devices are very strict in terms of operating voltage. In such cases, the operating voltage is defined according to the clearance and creepage distances between parts which could be touched.

When selecting such a connector, please contact us and let us know the safety standard which the product must meet.

Test voltage: Dielectric withstanding voltage × 0.75
Operating voltage: Dielectric withstanding voltage × 0.75 × 0.33

### CONVERSIONS/AWG (AMERICAN WIRE GAUGE)

<table>
<thead>
<tr>
<th>AWG</th>
<th>Diameter</th>
<th>Cross-section</th>
<th>Weight</th>
<th>Max. resistance</th>
<th>Max. allowable current</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (1)</td>
<td>0.1020</td>
<td>2.5900</td>
<td>2.5700</td>
<td>47.000</td>
<td>3.45</td>
</tr>
<tr>
<td>12 (1)</td>
<td>0.1109</td>
<td>2.7500</td>
<td>4.5300</td>
<td>43.600</td>
<td>4.13</td>
</tr>
<tr>
<td>14 (1)</td>
<td>0.0808</td>
<td>2.0500</td>
<td>3.1100</td>
<td>29.500</td>
<td>5.45</td>
</tr>
<tr>
<td>16 (1)</td>
<td>0.0670</td>
<td>1.7000</td>
<td>1.9400</td>
<td>18.000</td>
<td>9.94</td>
</tr>
<tr>
<td>18 (1)</td>
<td>0.0508</td>
<td>1.2900</td>
<td>1.3100</td>
<td>11.600</td>
<td>15.70</td>
</tr>
<tr>
<td>20 (1)</td>
<td>0.0403</td>
<td>1.0200</td>
<td>0.8200</td>
<td>7.320</td>
<td>22.18</td>
</tr>
<tr>
<td>22 (1)</td>
<td>0.0348</td>
<td>0.8200</td>
<td>0.6200</td>
<td>5.380</td>
<td>27.92</td>
</tr>
<tr>
<td>24 (1)</td>
<td>0.0293</td>
<td>0.6900</td>
<td>0.4400</td>
<td>3.500</td>
<td>34.37</td>
</tr>
<tr>
<td>26 (1)</td>
<td>0.0238</td>
<td>0.5800</td>
<td>0.2500</td>
<td>2.300</td>
<td>40.72</td>
</tr>
<tr>
<td>28 (1)</td>
<td>0.0200</td>
<td>0.4800</td>
<td>0.1300</td>
<td>1.500</td>
<td>47.24</td>
</tr>
<tr>
<td>30 (1)</td>
<td>0.0165</td>
<td>0.3900</td>
<td>0.0700</td>
<td>1.000</td>
<td>53.33</td>
</tr>
<tr>
<td>32 (1)</td>
<td>0.0136</td>
<td>0.3100</td>
<td>0.0400</td>
<td>0.800</td>
<td>58.00</td>
</tr>
</tbody>
</table>

The American Wire Gauge (AWG) is based on the principle that the cross-section of the wire changes by 26% from one gauge number to the next. The AWG numbers decrease as the wire diameter increases, while the AWG numbers increase as the wire diameter decreases. This only applies to solid wire.

However, stranded wire is predominately used in practice. This has the advantage of a longer service life under bending and vibration as well as greater flexibility in comparison with solid wire.

Stranded wires are made of multiple, smaller-gauge wires (higher AWG number). The stranded wire then receives the AWG numbers of a solid wire with the next closest cross-section to that of the stranded wire. In this case, the cross-section of the stranded wire refers to the sum of the copper cross-sections of the individual wires.

Accordingly, strands with the same AWG number but different numbers of wires differ in cross-section. For instance, an AWG 20 strand of 7 AWG 28 wires has a cross-section of 0.563 mm², while an AWG 20 strand of 19 AWG 32 wires has a cross-section of 0.616 mm².

**Operating Voltage**


The values specified in the catalog correspond to SAE AS 13441:2004 method 3001.1. The table values were determined according to EIA-364-20D:2008. The inserts were tested while mated, and the test current was applied to the pin insert.

75% of the dielectric withstanding voltage is used for the further calculation. The operating voltage is 1/3 of this value.

All tests were conducted at normal indoor climate and apply up to an altitude of 2,000 m. If there are any deviations, the derating factors are to be factored in according to the applicable standards.

Test voltage: Dielectric withstanding voltage × 0.75
Operating voltage: Dielectric withstanding voltage × 0.75 × 0.33

**ATTENTION:**

With certain applications, the safety requirements for electrical devices are very strict in terms of operating voltage. In such cases, the operating voltage is defined according to the clearance and creepage distances between parts which could be touched.

When selecting such a connector, please contact us and let us know the safety standard which the product must meet.

**Source:** Gore & Associates, Pleinfeld
**BASE FOR CURRENT-CARRYING CAPACITY**


The current-carrying capacity of a connector is determined by measurement. It is determined taking self-heating by Joule heat and the ambient temperature into account, and is limited by the thermal properties of the contact materials used. Their upper limit temperature may not be exceeded in the process.

The relationship between current, the resulting temperature increase, conditioned by the dissipation loss at the contact resistance, and the ambient temperature is represented in a curve. The curve is plotted in a linear coordinate system with current \( i \) as y-axis and temperature \( t \) as x-axis. The upper limiting temperature forms the limit of the diagram.

Over three measurements, the temperature rise due to Joule heat \( \Delta t \) is measured respectively for different currents on minimum three connectors, and the resulting values are joined to produce the parabolic basic curve. The basic curve is then used to derive the corrected current-carrying capacity curve (derating curve). The safety factor \((0.8 \times \ln)\) also makes allowance for factors such as manufacturing tolerances and uncertainties in temperature measurement or the measuring arrangement.

**CURRENT LOAD**

(In dependence on VDE 0276-1000:1995).

**RATED CURRENT (NOMINAL CURRENT)**

The metrologically determined current which is permitted to flow continuously through all contacts at the same time and will increase the contact temperature by 45 Kelvin. The amperage is determined according to the derating measurement method [DIN EN 60512-5-2:2003] and derived from the derating curve. The values specified in the catalog apply to either individual contacts or completely assembled inserts/modules, as indicated.

**DERATING FACTORS**

In the case of multi-position connectors and cables, heating is greater than with individual contacts. It is therefore calculated with a derating factor. There are no direct regulations for connectors in this context. The derating factors for multi-core cables pursuant to VDE 0298-4:2013 are applied. The derating factor assumes relevance as of 5 live wires.

Example:

4k cable with 24 wires is used (24 contacts). The nominal cross-section of a wire is 6 mm². A derating factor of 0.4 (e.g., cable installed in the open air) is to be presumed for the load reduction depending upon the number of live cable wires. A 6 mm² Cu line (contact diameter 3.0 mm) can be used according to current-carrying capacity with 39 ampere. The 24 contacts plug can thus be loaded with a max. of 15.6 A / contact \((0.4 \times 39 \text{ A})\).

**NOTE**

Designs may differ depending upon the wiring of the modules and be verified with a heating test.
CURRENT-CARRYING CAPACITY DIAGRAM

FOR SINGLE CONTACTS

CURRENT-CARRYING CAPACITY DIAGRAM

FOR FULLY EQUIPPED MODULES

The values of the 4 contact high voltage module (page 124) correspond to the values of the 5 contacts signal module (page 125).

The values of the 3 contacts power module (page 124) correspond to the values of the 2 contacts power module (page 122).
LINE CURRENT LOAD

The current-carrying capacity of the individual conductors is frequently lower than that of the individual contacts used. When determining the maximum current-carrying capacity, the lowest value is always to be taken into account.

<table>
<thead>
<tr>
<th>Laying procedure</th>
<th>Exposed in air</th>
<th>or on surfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-wire lines</td>
<td>PVC, PE, PUR, TPE heat resistant</td>
<td>Multi-wire highly flexible lines for hand-held devices, wire/sheath cold-resistant, PVC insulated</td>
</tr>
<tr>
<td>Multi-wire moveable lines</td>
<td>PVC, PE, PUR, TPE standard program harmonised series</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of loaded wires</th>
<th>PVC, PE, PUR, TPE, heat resistant</th>
<th>Copper conductor in mm²</th>
<th>Current load in A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>0.14¹</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>0.25¹</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>0.34¹</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>0.5²</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>0.75²</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>1.5</td>
<td>24</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>2.5</td>
<td>32</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>3.5</td>
<td>42</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>4</td>
<td>54</td>
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<tr>
<td>11</td>
<td></td>
<td>6</td>
<td>73</td>
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<td></td>
<td>8</td>
<td>98</td>
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<td>13</td>
<td></td>
<td>10</td>
<td>129</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>11</td>
<td>158</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>12</td>
<td>198</td>
</tr>
</tbody>
</table>

Current load acc. to: VDE 0298-4:2013 table 11

CRIMP BARREL
A terminal sleeve which can accommodate one or more conductors and be crimped by a crimping tool.

CRIMP CONNECTION (CRIMP TERMINATION)
The permanent, non-detachable and solder-free mounting of a contact to a conductor via deforming or shaping under pressure to make a good electrical and mechanical connection. Executed with crimping tool, press or automatic crimping machine (see page 169).

CRIMP TERMINATION
Termination technology, see crimp connection.

CRIMPING AREA
The specified area of the crimp barrel in which the crimp termination is executed by means of deforming or shaping the barrel under pressure around the conductor.

CURRENT-CARRYING CAPACITY (NOMINAL CURRENT AND MAXIMUM CONTINUOUS CURRENT)
The data relates to adequately dimensioned connection cable in accordance with IEC 60228:2004 (VDE 0295:2005; class 5), so that no significant temperature increase here. The indicated temperature increase takes place through the contact. The specifications are average values.

DEGREE OF POLLUTION
The insulation coordination is explained in detail from page 182.

DELIVERY FORM
Connectors can be delivered in assembled form or as individual parts.

DERATING CURVE
See page 196.

DERATING FACTOR
According to VDE 0298-4:2013, with connectors and cables over 5 contacts, the heating is greater than it is with individual contacts. For that reason, the aforementioned standard is calculated with a derating factor. See page 197.

¹ DIN VDE 0691-1:1990.
MATING AND SLIDING FORCE (UNMATING FORCE)

Wires consist of a CuSn alloy and are also silver or gold-plated. The lamellas consist of a CuBe alloy and silver or gold-plated. The pins and bodies of the sockets are manufactured from a CuZn alloy and silver or gold-plated.

MATING CYCLES

Mechanical actuation of connectors by mating and sliding. A mating cycle consists of one mating and sliding action. 10,000 mating cycles are the standard value for ODU TURN-TAC and ODU LAM-TAC contacts; 50,000 mating cycles for flat sockets and 100,000 mating cycles for springwire contacts. These values only apply under the following circumstances: clean environment, appropriate radial guidance, impeccable counterpins.

MAX. CONTINUOUS CURRENT

The metrologically determined amperage at room temperature (approx. 20 °C) which increases the contact temperature to the limit temperature. The values specified in the catalog apply to either individual contacts or completely assembled inserts / modules, as indicated.

NOMINAL CURRENT


See page 186.

NOMINAL SINGLE CONTACT CURRENT LOAD

The current-carrying capacity which each individual contact can be loaded with on its own (see from page 186).

NOMINAL VOLTAGE

The voltage which the manufacturer specifies for a connector and which the operating and performance features relate to.

OPERATING TEMPERATURE FOR ODU-MAC

See uppermost limit temperature (see page 192). Single modules may differ from the indicated temperature values. Here you find the technical information on the appropriate pages.

PCB TERMINATION

Production of a conductive connection between the PCB and an element in through-hole assembly, THT (through-hole technology).

RATED CURRENT (NOMINAL CURRENT)

See page 187.

RATED VOLTAGE

According to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) standard "Value of a voltage which is specified by the manufacturer for a component, device or operating medium and relates to the operating and performance features."

SOLDER CONNECTION (SOLDER TERMINATION)

Termination technology in which a molten additional metal (solder) with a lower melting point than the base materials to be connected is used to attach two metallic materials to one another.

SOLDER TERMINATION

Termination technology, see solder connection.

SPINDLE LOCKING

Locking of two halves of a connector pair by one or more screws, which are generally fluted or have a toggle for easier activation. To extend the provided service life, re-lubrication with a suitable lubricant is recommended.

TERMINATION CROSS-SECTION

The specified cross-sections correspond to a "fine-wire" conductor structure pursuant to IEC 60228:2004 (VDE 0295:2005; Class 5) or a "fine-wire" conductor structure (7/19 wire) according to AWS (ASTM B258-14).

TERMINATION TECHNOLOGIES

Methods for connecting the leads to the electro-mechanical element, such as solder-free connections pursuant to IEC 60352 (DIN EN 60352); crimp, screw connection etc. or soldering connection (see page 188).

TIGHTNESS IEC 60529:2013 (VDE 0470-1:2014)

See protection types on page 188.

UPPERMOST LIMIT TEMPERATURE

The maximum permissible temperature at which a connector may be operated. It includes contact heating through current-carrying capacity. With contacts with standard springwire, it amounts to +120 °C, with contacts with standard lamella +150 °C. Please consult ODU for high-temperature applications.

WIRE

Wires (solid conductors) are available with an insulator sleeve and/or electrical shielding. Cables or conductors may be made up of one or more wires.

GENERAL NOTE

The connectors listed in this catalog are intended for use in high voltage and frequency ranges. Suitable precautionary measures must be taken to ensure that people do not come into contact with live conductors during installation and operation. All entries in this catalog were thoroughly reviewed before printing. ODU reserves the right to make changes based on the current state of knowledge without prior notice without being obliged to provide replacement deliveries or refinements of older designs.
A PERFECT ALLIANCE.

ODU GROUP WORLDWIDE

HEADQUARTERS
ODU GmbH & Co. KG
Pregelstraße 11, 84453 Mühldorf a. Inn, Germany
Phone: +49 8631 6156 - 0, Fax: +49 8631 6156 - 49, E-mail: zentral@odu.de

SALES SUBSIDIARIES
ODU Denmark ApS
Phone: +45 2233 5335
E-mail: odu.denmark@odu.de
www.odu-denmark.dk

ODU France SARL
Phone: +33 1 3935 - 4690
E-mail: odu@odu.fr
www.odu.fr

ODU Italia S.R.L.
Phone: +39 331 8708847
E-mail: sales@odu-italia.it
www.odu-italia.it

ODU Japan K.K.
Phone: +81 3 6441 3210
E-mail: sales@odu.co.jp
www.odu.co.jp

ODU Scandinavia AB
Phone: +46 176 18262
E-mail: sales@odu.se
www.odu.se

ODU (Shanghai)
International Trading Co., Ltd.
Phone: +86 21 58347828 - 0
E-mail: oduchina@odu.com.cn
www.odu.com.cn

ODU-UK Ltd.
Phone: +44 330 002 0640
E-mail: sales@odu-uk.co.uk
www.odu-uk.co.uk

ODU-USA Inc.
Phone: +1 805 4840540
E-mail: sales@odu-usa.com
www.odu-usa.com

Further information and specialized representatives can be found at:
www.odu.de/sales

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