A PERFECT ALLIANCE.

ODU-MAC® Silver-Line White-Line

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

AUTOMATIC DOCKING
MANUAL MATING

ODU-MAC® SILVER-LINE | ODU-MAC® WHITE-LINE

ODU-MAC® BLUE-LINE

ODU-MAC® Silver-Line White-Line

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

APPLICATIONS

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

All shown connectors are according to IEC 61984:2008 (VDE 0627:2009); connectors without breaking capacity (COC).

Tested acc. UL 1977/CSA C22.2 No. 1823. Tested acc. MIL/SAE/EIA. (ODU-USA is registered with the DDTC and able to complete ITAR restricted manufacturing projects.)

All dimensions in mm.
Most of the pictures are illustrations.
All data and specifications subject to change without notice.

Issue: 2017-02

FireWire

USB 2.0

USB 3.0

Network

CAT 6$_A$

HDMI

Non-magnetic

ODU-MAC® ZERO

TABLE OF CONTENTS

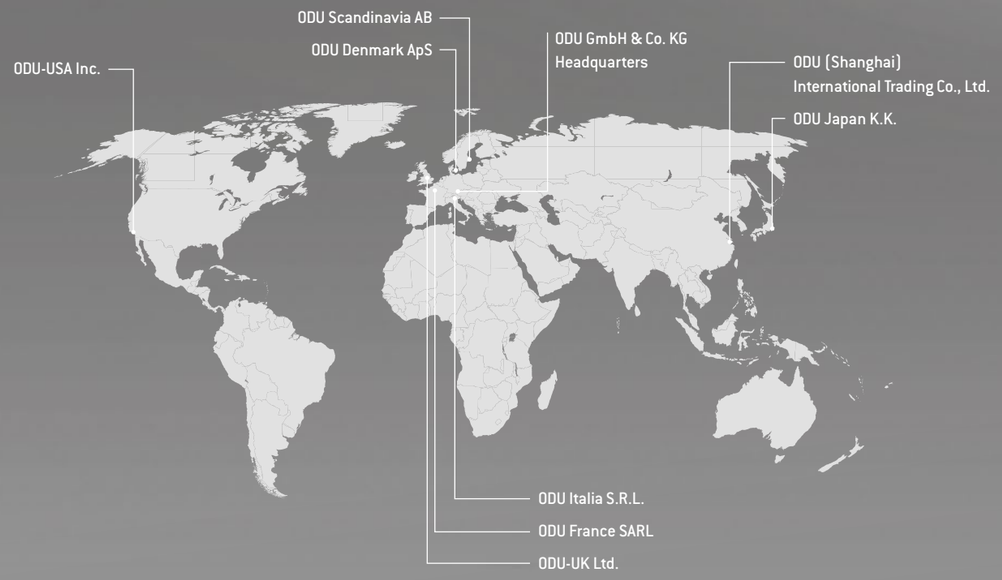
For assembly instructions please refer to our website: www.odu-connectors.com/downloads.

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 A PERFECT ALLIANCE.

ODU WORLDWIDE



ODU GROUP OVERVIEW

- 75 years of experience in connector technology
- €150 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 2017

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.

A PERFECT ALLIANCE.

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.

COMPACT MODULAR CONNECTOR SOLUTIONS

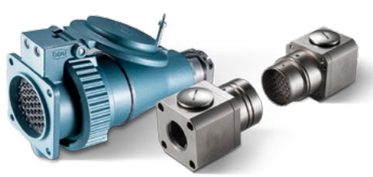
- Application-specific hybrid interface
- For manual mating and automatic docking
- The highest packing density
- Flexible modular construction
- Multitude of data transmission modules
- Variety of locking options available
- For the transmission of signals, power, high current, high voltage, coax, high-speed 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)

PUSH-PULL CIRCULAR CONNECTORS

- 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

SINGLE CONTACTS

- Versatile connector technologies
- Outstanding reliability, lifetime and durability
- Up to 1 million mating cycles
- Current-carrying capacity of up to 2,400 amperes and more
- Rugged contact systems, suitable even for harsh environment
- Economical solutions for automatic processing



HEAVY-DUTY & DOCKING AND ROBOTIC CONNECTOR SOLUTIONS

- Extremely durable even under extreme / harsh environments
- Interference-free and secure connection, even under vibration
- Up to 500 A (higher currents upon request)
- High contact security due to the springwire technology
- High pin density due to a minimum contact diameter
- Low contact resistance

APPLICATION AND CUSTOMER-SPECIFIC SOLUTIONS

- 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
- Fast development and production

CABLE ASSEMBLY

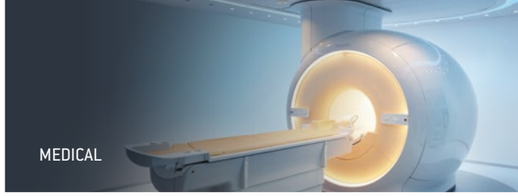
- Complete systems from a single source based on years of assembly expertise
- State-of-the-art production facilities with 100% end testing, high-voltage testing, component testing and pressure testing up to 100 bar
- Cleanroom production
- Hot-melt and high-pressure injection molding
- Customer-specific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

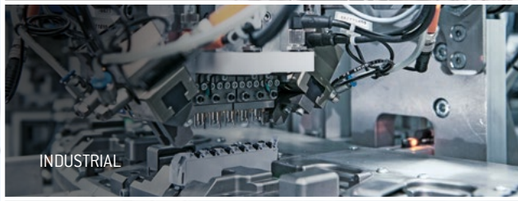
THE ODU GROUP

MORE THAN A CONNECTION

OUR KNOW-HOW FOR YOUR SUCCESS.

A PERFECT ALLIANCE.





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.

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

PRODUCT INFORMATION

ODU-MAC®

Table of Contents

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

THE SMART SOLUTION FOR CUTOMIZED 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 todays'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.

Silver-Line

AUTOMATIC DOCKING.

White-Line

MANUAL MATING.

ODU-MAC ZERO

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

YouTube ADDITIONAL INFORMATION PROVIDED IN VIDEOS
WWW.YOUTUBE.COM/ODUSTECKVERBINDER

ODU-MAC® Blue-Line

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

THE MODULARITY AT A GLANCE:

100,000 Mating cycles and more

2 Possible applications: automatic docking or manual mating

43 Cable hood versions

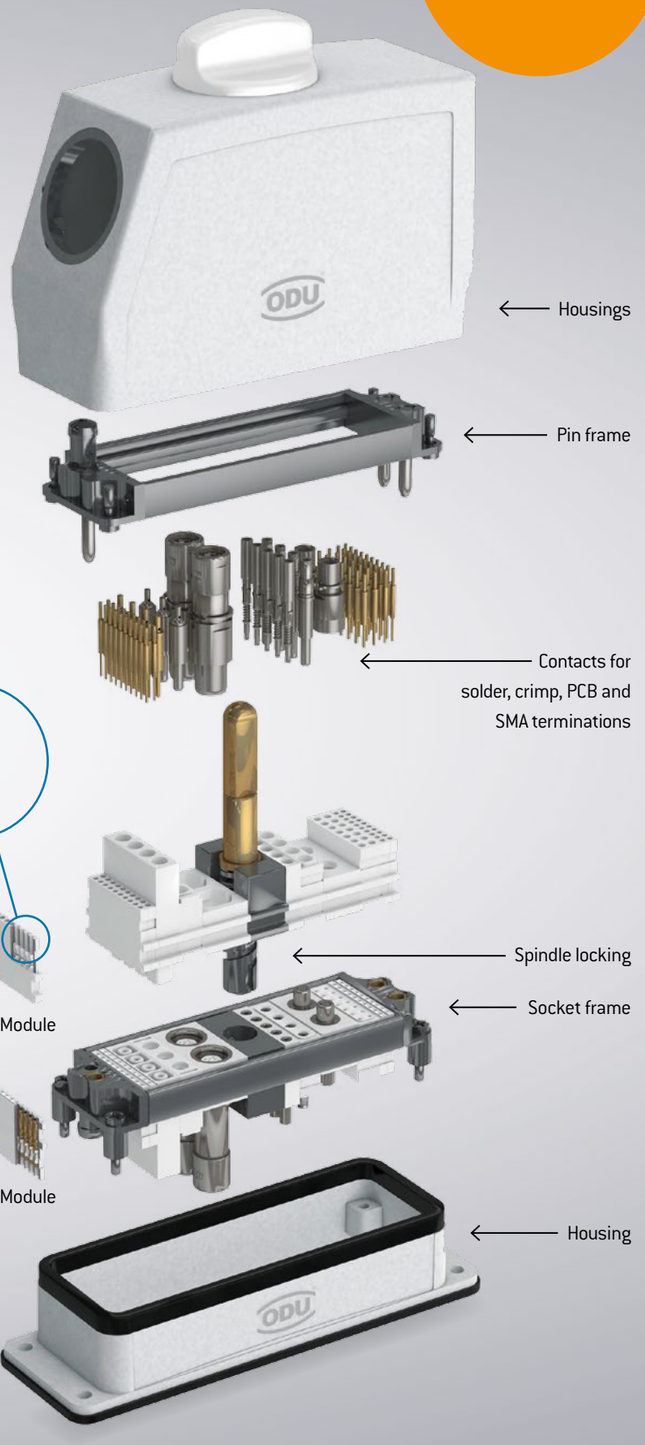
6 Different docking frames independently configurable length

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



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.

Access to the configurator via the product category **Modular Connectors**.

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.

PRODUCT VIDEOS ON FUNCTIONALITY

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**.

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 enquire directly about customized versions not covered by the standard.**

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

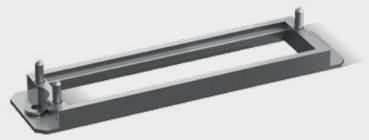
ODU-MAC® Silver-Line

AUTOMATIC DOCKING.

1ST STEP: FRAME SELECTION

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

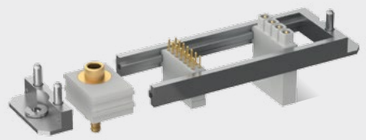
Frames	
ODU-MAC® S (Standard)	ODU-MAC® T (Transverse)
ODU-MAC® L (Large)	ODU-MAC® P+ (Power)
ODU-MAC® M+ (Mini)	ODU-MAC® QCH (quick change head) (connector saver)



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	
Signal	Compressed air and fluid model
Power	Fiber optic
High current	Shielded implementation / high-speed connector
High voltage	Blank modules / spacer modules / coding modules / pin protection module
Coax	



PRODUCT INFORMATION

ODU-MAC® White-Line

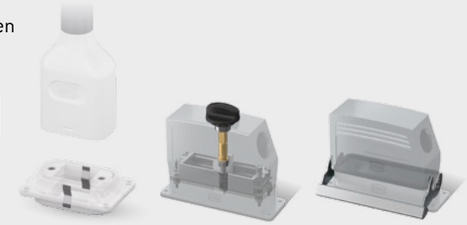
MANUAL MATING.

1ST STEP: LOCKING

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

Snap-In locking	Spindle locking	Lever locking

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:

Snap-In locking	Spindle locking	Lever locking
90° Cable exit	Cable hood Metal/plastic housing	Cable hood
45° Cable exit	Cable hood XXL	Cable hood XXL
0° Cable exit		Cable hood wide

3RD STEP: RECEPTACLE SELECTION

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

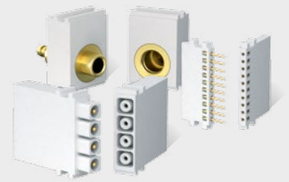
Snap-In locking	Cable hood	Cable hood XXL
Receptacle	Bulkhead mounted housing Metal/plastic housing	Bulkhead mounted housing
	Surface mounted housing Metal/plastic housing	Surface mounted housing
	Cable to cable hood	

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 92



ODU-MAC® Silver-Line
AUTOMATIC DOCKING.

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.

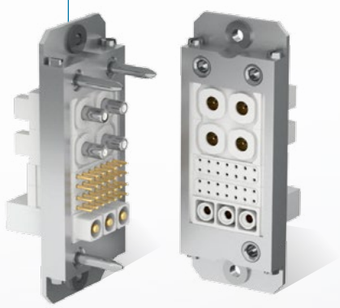
FURTHER INFORMATION FROM PAGE 34.

ODU-MAC® S (STANDARD) P. 38

Standard solution for docking tasks.
Tolerance compensation: +/– 0.6 mm.

ODU-MAC® L (LARGE) P. 39

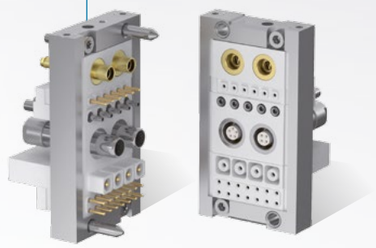
Frame with higher tolerance compensation and reinforced guiding bushes, as well as extended guiding pins.
Tolerance compensation: +/– 1.2 mm.



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

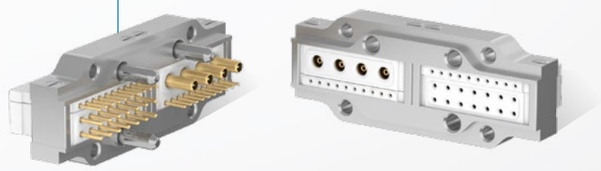
ODU-MAC® M+ (MINI) P. 40

Compact size with the smallest space requirement
Tolerance compensation: +/– 0.6 mm.



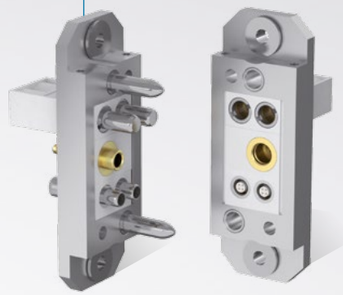
ODU-MAC® T (TRANSVERSE) P. 44

Transverse frames for installation in customized housing solutions or where low clearance heights make this necessary.



ODU-MAC® P+ (POWER) P. 41

The frame for the highest requirements thanks to reinforced frame design.
Tolerance compensation: +/– 2.5 mm.



ODU-MAC® QCH (QUICK CHANGE HEAD) P. 45

Docking frames for the highest requirements with regard to mating cycles (connector saver) with the lowest maintenance time and expense thanks to easy exchange of the replacement parts.
Tolerance compensation: +/– 0.6 mm.

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 (∅ 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)

Solid grip | Blind mating | Non-magnetic | Space-saving

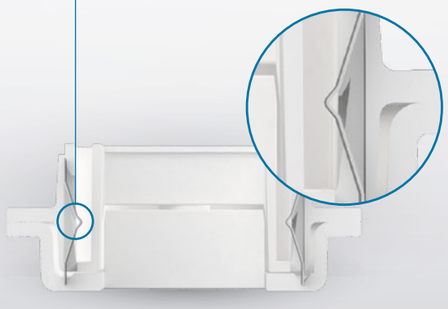
Size	Units 2.54 mm	
ZERO	9	

HOUSING
PLASTIC HALF-SHELL INCLUDING RAILS FOR MODULAR INSERTS

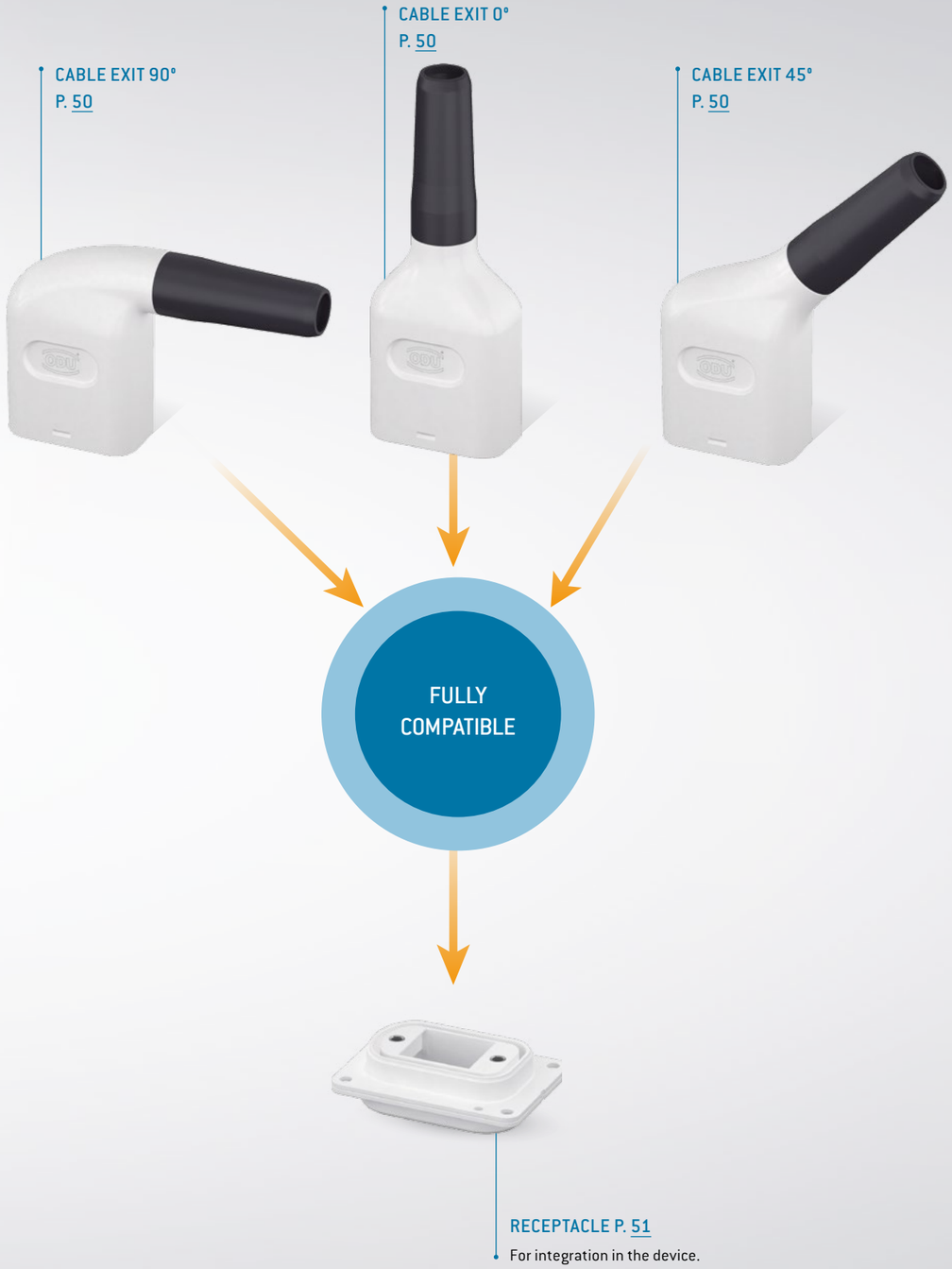
SNAP-IN LOCKING

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)



CONNECTOR HOUSING FOR ASSEMBLY



RECEPTACLE P. 51
For integration in the device.

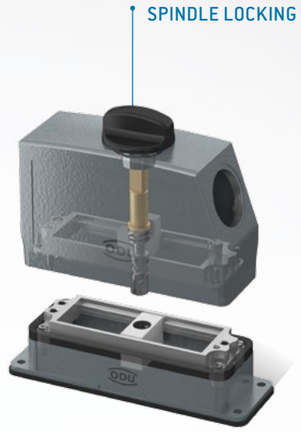
ODU-MAC® White-Line
MANUAL MATING.

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

Size	Units[1]	
2	16	
3	24	
4	34	

CABLE HOOD XXL[2]:

4	34	

[1] 5 units of space required for spindle. [2] 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.

Size	Units	
1	10	
2	16	
3	24	
4	34	
CABLE HOOD XXL:		
4	34	
CABLE HOOD WIDE:		
5	48	
6	68	

CABLE HOOD WIDE
WITH TOP CABLE ENTRY P. 70
Connector housing for double frame assembly.

CABLE HOOD WIDE
WITH SIDE CABLE ENTRY P. 70
Connector housing for double frame assembly.

BULKHEAD MOUNTED HOUSING
FOR CABLE HOOD WIDE P. 71
For mounting on your device with lever locking (with and without cover).

CABLE HOOD
WITH TOP CABLE ENTRY P. 66
Connector housing for assembly on the cable.

CABLE HOOD XXL
WITH TOP M50 CABLE ENTRY P. 67
Connector housing with expanded assembly space.
For assembly on the cable.

CABLE HOOD
WITH SIDE CABLE ENTRY P. 66
Connector housing for assembly on the cable.

CABLE HOOD XXL
WITH SIDE
M50 CABLE ENTRY P. 67
Connector housing with expanded assembly space.
For assembly on the cable.

FULLY COMPATIBLE

BULKHEAD MOUNTED HOUSING P. 68
For mounting on your device with lever locking (with and without cover).

SURFACE MOUNTED HOUSING P. 69
For surface mounting on your device/ wall with two side cable entries (with and without cover).

CABLE TO CABLE HOOD P. 72
For a flying cable to cable connection with lever locking and top cable entry.

BEST CONNECTIONS – THE CONTACT PRINCIPLE

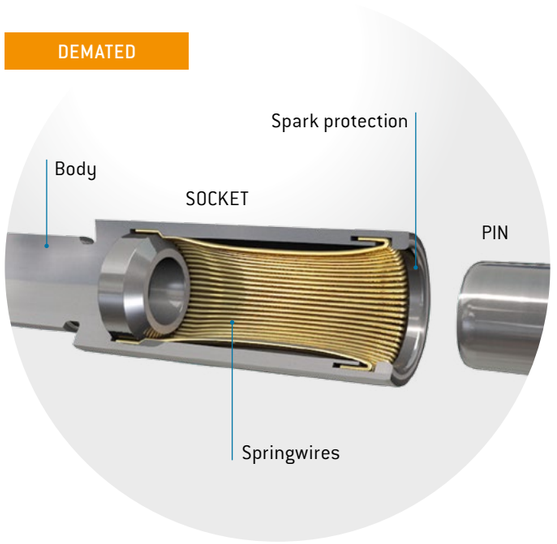
ODU contacts fulfil the highest quality standards and enable secure and reliable connections. ODU has the highest performance contact technologies at its disposal. Principally, a differentiation of lathe-turned contacts is made between lamella, springwire and slotted contacts. The socket side differ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

ODU SPRINGTAC®

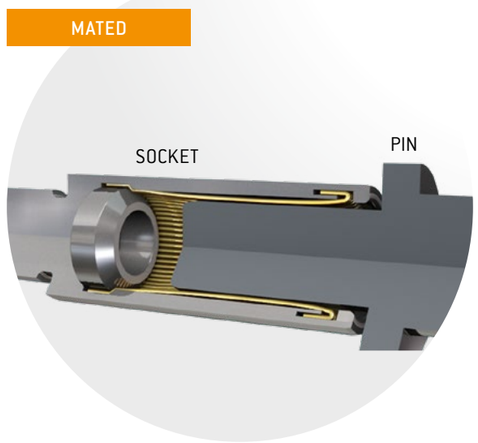
Contacts with springwire technology.

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 ∅ 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.

DEMATED



MATED



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

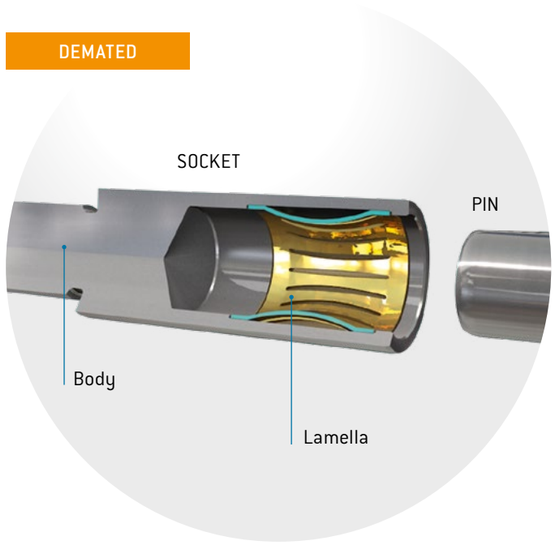
Standard contact principle for:	
Signal	14 to 5 contacts
Power	4 to 2 contacts
High current	2 contacts
High voltage	4 contacts
Coax	2 contacts
Shielded implementation	8, 5, 4 contacts

ODU LAMTAC®

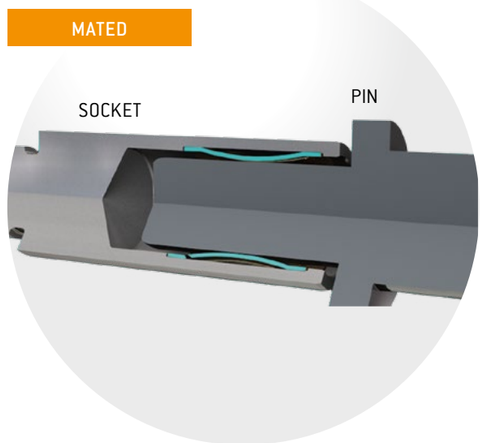
Contacts with lamella technology.

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 adapted contact force ensures low mating and demating forces, and a long service life with low wear. The mating cycles here are minimum 10,000.

DEMATED



MATED



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:	
High current	2 to 1 contact(s)
High voltage	1 contact
Coax	4 contacts
Shielded implementation	Shielded transmission

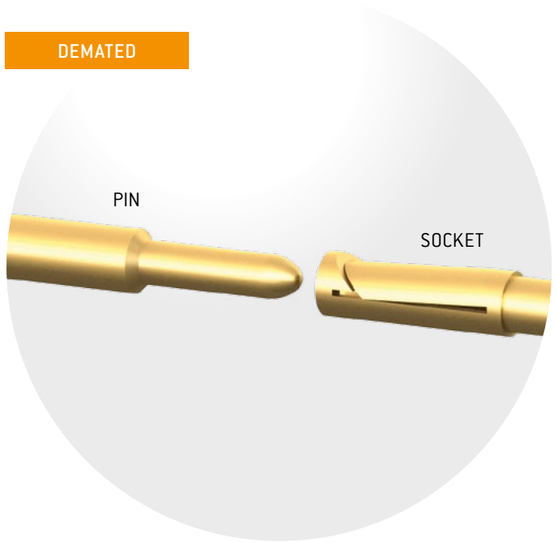
ODU TURNTAC®

Contacts in slotted version.

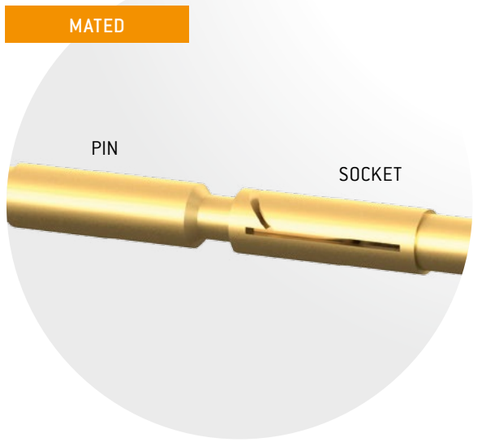
The universal ODU TURNTAC contact system combines the very best contact properties and high quality with economic prices. By means of the optimum guidance and assembly in the ODU-MAC system, the longevity of 10,000 mating cycles and more can be achieved.

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.

DEMATED



MATED



ADVANTAGES

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

Standard contact principle for:	
Shielded implementation	Signal contacts

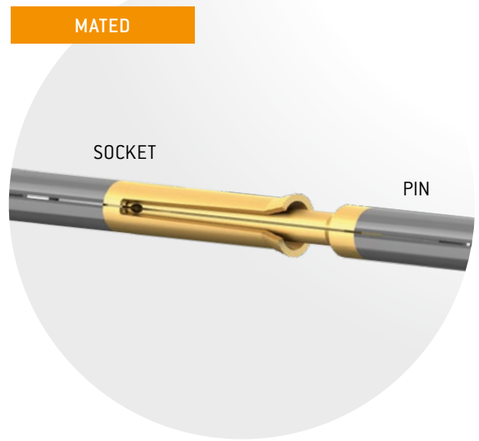
ODU STAMPTAC®

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 crimpers and (semi-) automatic stripper crimpers. This reduces the preparation time enormously. This contact is used in the 10 contacts module (see page 104/105).

DEMATED

MATED



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

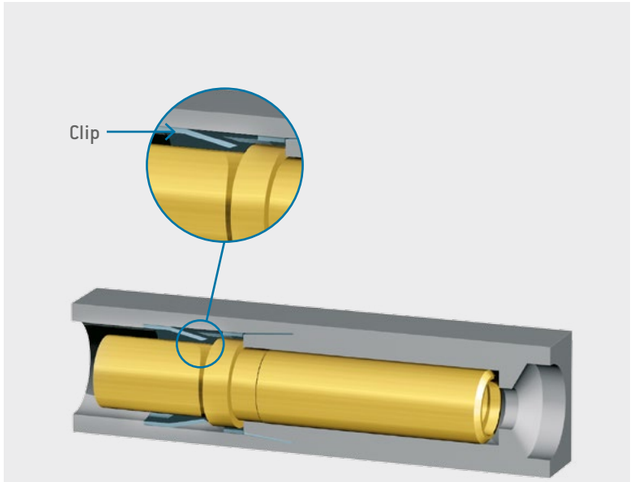
CONTACT RETENTION WITH THE CLIP PRINCIPLE (STANDARD)

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.

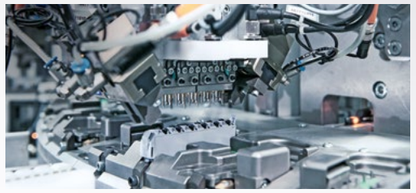
3 mounting lugs for optimal stability.

FOR YOUR NOTES

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



FOR MEDICAL

MONOBLOC INSULATOR

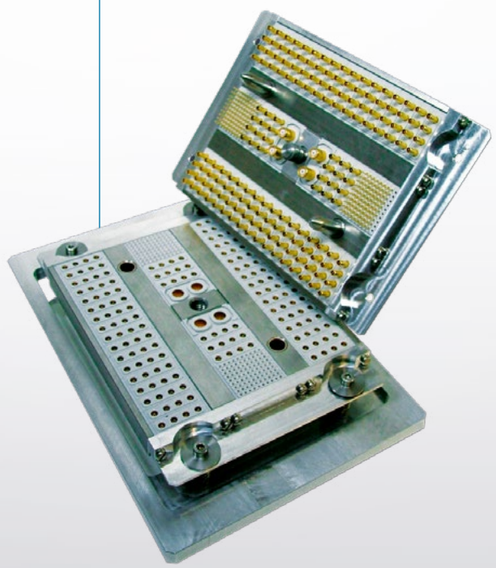
Customers install this insulator block, equipped with standard ODU-MAC contacts, into its own custom housing.

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



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 steamline 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

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

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

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

AUTOMATIC DOCKING

ODU-MAC®

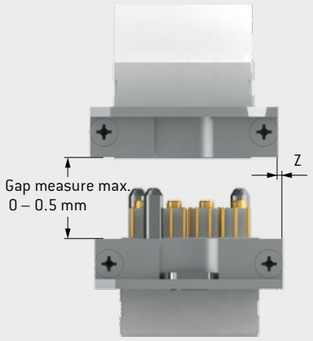
Table of Contents

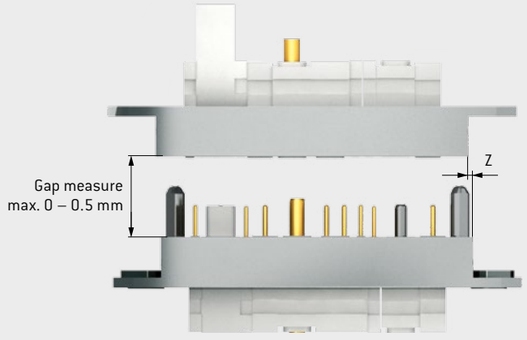
SYSTEM REQUIREMENTS AND TOLERANCES

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)



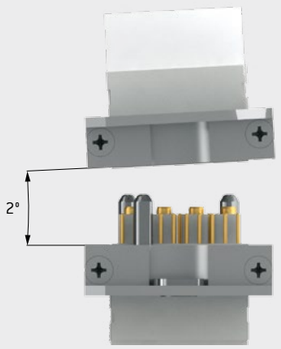


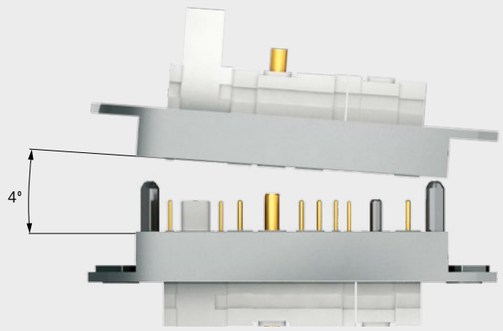
Frame	Tolerance z
S	+/– 0.6 mm
L	+/– 1.2 mm
M+	+/– 0.6 mm

Frame	Tolerance z
T	On request
P+	+/– 2.5 mm
QCH	+/– 0.6 mm

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

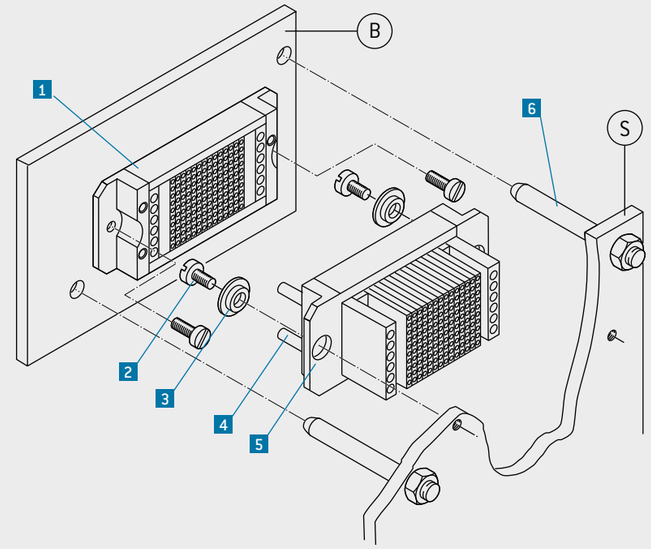
MAXIMUM PERMISSIBLE ANGLE DEVIATION WHEN MATING





OUR TEAM IS HAPPY TO ANSWER ANY ENQUIRIES YOU MAY HAVE.

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.

1. ODU-MAC® socket piece (fixed) (screwed tight without play to wall B)
2. Fastening screw
3. Tolerance compensation in the example of an S frame:
   Axial play: 0.2 mm
   Radial play: +/– 0.6 mm
4. Pins for self-centering of ODU-MAC®
5. ODU-MAC® pin piece (floating) (with play via centering socket; screwed tight to wall S)
6. Pin for guiding walls B and S (customer performance)

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
- The guiding system of the ODU-MAC requires 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.

FAILURE TO OBSERVE THESE SPECIFICATIONS MAY RESULT IN DAMAGE.

ODU-MAC® S (STANDARD)

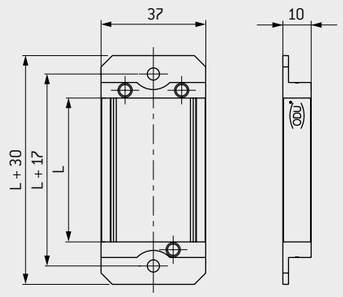
Standard solutions for docking applications.

TECHNICAL DATA

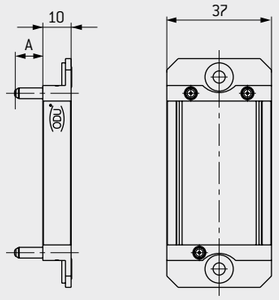
- Tolerance compensation:
  Axial play: 0.2 mm
  Radial play: +/– 0.6 mm
- Pin piece floating supported
- Minimum 100,000 mating cycles

Non-magnetic version available upon request.

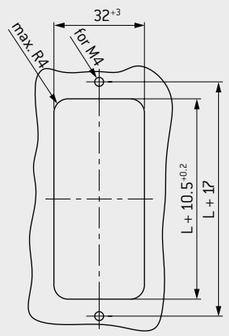
SOCKET FRAME WITH GUIDING HOLE



PIN FRAME WITH GUIDING PIN



PANEL CUT-OUT



Description	Part number	Dim. A	Note
Pin frame	611.020.0__.600.000	10	
Socket frame	610.020.0__.600.000		
Pin frame	611.021.0__.600.000	12.5	
Socket frame	610.020.0__.600.000		
Pin frame	611.025.0__.600.000	21	Model for spindle locking
Socket frame	610.020.0__.600.000		
Pin frame	611.050.0__.600.000	10	With labelling
Socket frame	610.050.0__.600.000		

L = Number of units × 2.54
__ = Here please register number of desired units (03 to 60, above 61 on request)

ODU-MAC® L (LARGE)

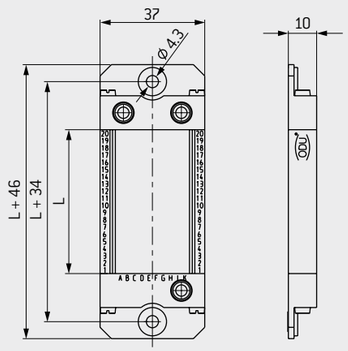
Frame with higher tolerance compensation and reinforced guiding bushes as well as extended guiding pins.

TECHNICAL DATA

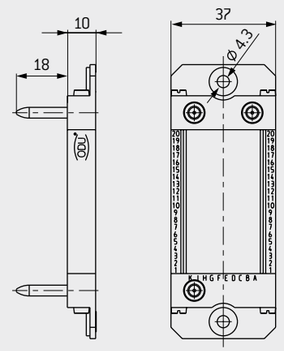
- Tolerance compensation:
  Axial play: 0.4 mm
  Radial play: +/– 1.2 mm
- Double-sided floating supported
- Minimum 100,000 mating cycles

Non-magnetic version available upon request.

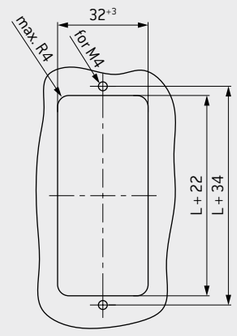
SOCKET FRAME WITH GUIDING BUSHES



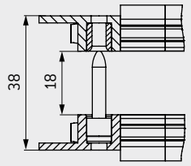
PIN FRAME WITH GUIDING PIN



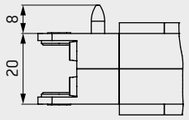
PANEL CUT-OUT



UNMATED



MATED



Description	Part number
Pin frame	611.009.0__.600.000
Socket frame	610.009.0__.600.000

L = Number of units × 2.54
__ = Here please register number of desired units (03 to 60, above 61 on request)

ODU-MAC® M+ (MINI)

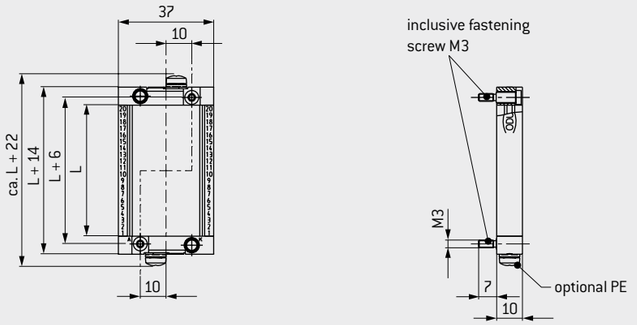
Compact design with minimal space requirements and optional PE transmission.

TECHNICAL DATA

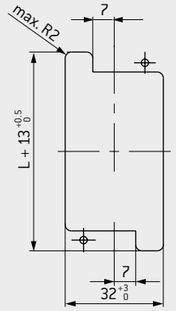
- Tolerance compensation:
  Axial play: 0.4 mm
  Radial play: +/– 0.6 mm
- Double-sided floating supported
- Minimum 100,000 mating cycles
- Optional PE transmission see page 42

Non-magnetic version available upon request.

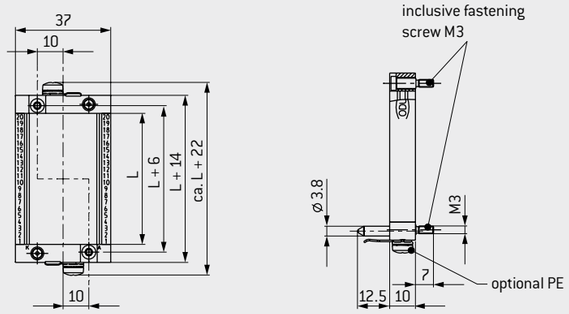
SOCKET FRAME WITH GUIDING HOLE



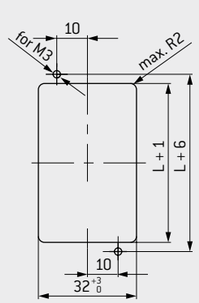
PANEL CUT-OUT



PIN FRAME WITH GUIDING PIN



PANEL CUT-OUT



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
(03 to 60, above 61 on request)

NOT COMPATIBLE WITH ODU-MAC M FRAME.

ODU-MAC® P+ (POWER)

**The frame for highest requirements by a reinforced frame design.
High tolerance compensation +/– 2.5 mm.**

TECHNICAL DATA

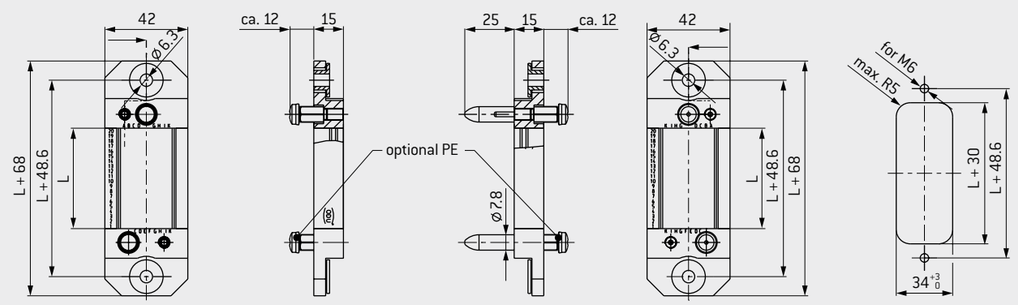
- Tolerance compensation:
  Axial play: 1 mm
  Radial play: +/– 2.5 mm
- Double-sided floating supported
- Advisable for modules
  with contact diameter > 5 mm
  and frame length > 40 units (depending on configuration)
- Contact diameter > 8 mm: this frame has to be used
- Minimum 100,000 mating cycles
- Optional PE transmission see page 43

Non-magnetic version available upon request.

SOCKET FRAME WITH GUIDING BUSHES

PIN FRAME WITH GUIDING PIN

PANEL CUT-OUT



Description	Part number
Pin frame	611.730.0 __.600.000
Socket frame	610.730.0 __.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)

ODU-MAC P+ FRAME WITHOUT OPTIONAL PE TRANSMISSION BACKWARDS COMPATIBLE WITH ODU-MAC P FRAME.

PE TRANSMISSION FOR ODU-MAC M+(MINI)

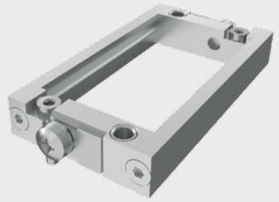
GROUNDING KIT FOR M+ SOCKET FRAME

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.

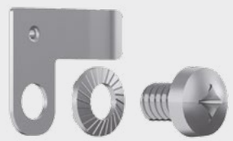
GROUNDING KIT MOUNTED



Part number	Connection threads
190.270.001.000.000	M4

Max. 4 mm² lug connection for PE transmission.

GROUNDING KIT FOR M+ PIN FRAME

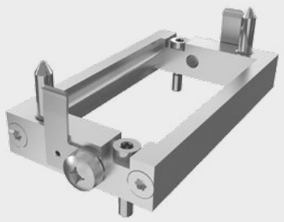


TECHNICAL DATA

- 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



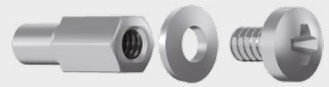
Part number	Connection threads
190.270.002.000.000	M4

Max. 4 mm² lug connection for PE transmission.

CONTACT RESISTANCE COMPLIANT WITH < 0,1 Ω NORM.

PE TRANSMISSION FOR ODU-MAC P+ (POWER)

GROUNDING KIT FOR P+ SOCKET FRAME

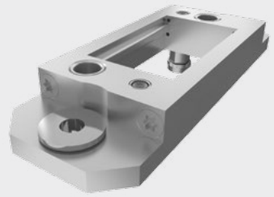


TECHNICAL DATA

- 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.

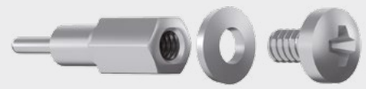
GROUNDING KIT MOUNTED



Part number	Connection threads
174.100.100.201.100	M5

Max. 10 mm² lug connection for PE transmission.

GROUNDING KIT FOR P+ PIN FRAME

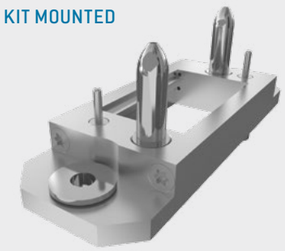


TECHNICAL DATA

- 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



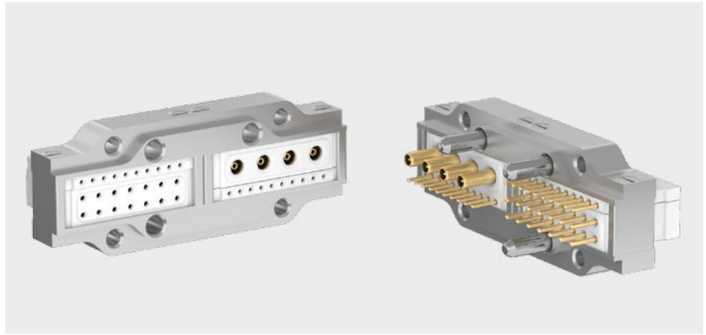
Part number	Connection threads
180.100.000.301.100	M5

Max. 10 mm² lug connection for PE transmission.

CONTACT RESISTANCE COMPLIANT WITH < 0,1 Ω NORM.

ODU-MAC® T (TRANSVERSE)

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



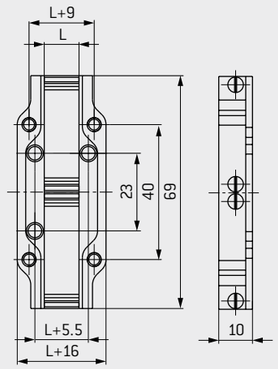
TECHNICAL DATA

- Installation even in housing solution

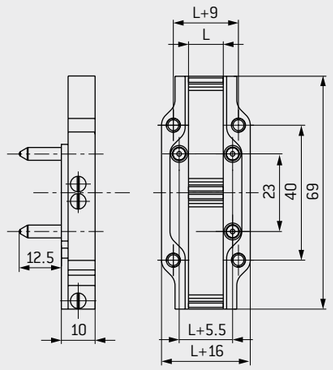
These models are available on request.
Technical specifications have to be clarified in detail.

Standard non-magnetic.

SOCKET FRAME WITH GUIDING HOLE

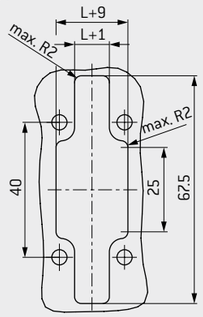


PIN FRAME WITH GUIDING PIN



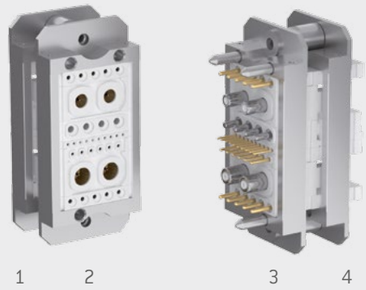
Part number Pin frame	Part number Socket frame	Dim. L mm	Units
611.055.029.303.600	610.055.029.103.600	7.62	3 × 2
611.055.029.304.600	610.055.029.104.600	10.16	4 × 2
611.055.029.305.600	610.055.029.105.600	12.7	5 × 2
611.055.029.306.600	610.055.029.106.600	15.24	6 × 2
611.055.029.307.600	610.055.029.107.600	17.78	7 × 2
611.055.029.308.600	610.055.029.108.600	20.32	8 × 2
611.055.029.309.600	610.055.029.109.600	22.86	9 × 2
611.055.029.310.600	610.055.029.110.600	25.4	10 × 2

PANEL CUT-OUT



ODU-MAC® QCH (QUICK CHANGE HEAD)

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



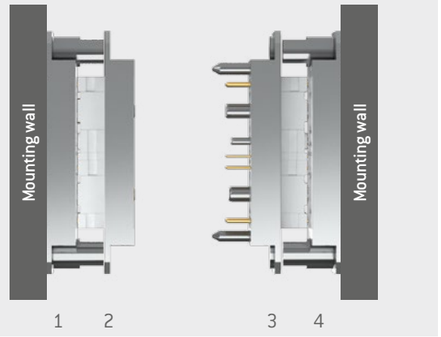
TECHNICAL DATA

- 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

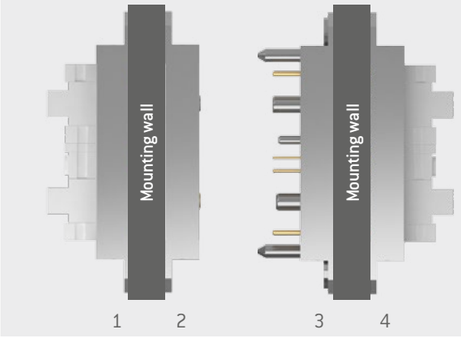
These models are available on request.
Technical specifications have to be clarified in detail.

Non-magnetic version available upon request.

MOUNTING WALL BACK



MOUNTING WALL CENTRAL – FOR WALL THICKNESS 10 MM



Description	Part number
Part 1: Base part incl. distance piece	610.026.0 __.600.000
Part 2: Socket frame – interchange part	610.020.0 __.600.000
Part 3: Pin frame – interchange part	611.021.0 __.600.000
Part 4: Base part incl. distance piece	610.026.0 __.600.000
Distance piece as a spare part	610.026.201.304.000

Description	Part number
Part 1: Base part	610.027.0 __ .600.000
Part 2: Socket frame – interchange part	610.020.0__.600.000
Part 3: Pin frame – interchange part	611.021.0__.600.000
Part 4: Base part	611.027.0__.600.000

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.

FRAMES FOR THE QUICK CHANGE HEAD SYSTEM

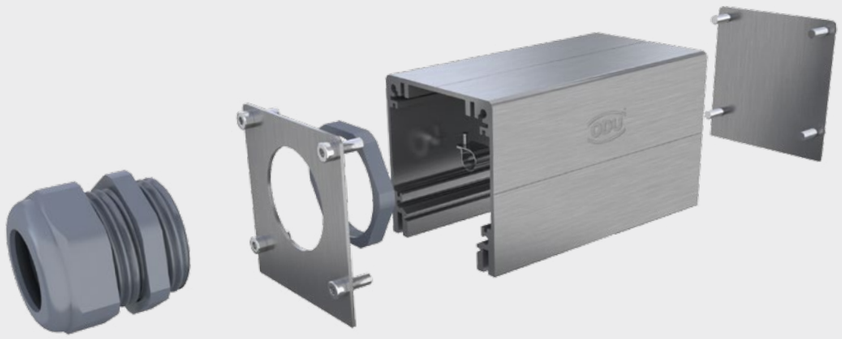
The standard ODU-MAC S docking frames can be used for the connector saver. ODU-MAC L docking frames upon request. (M+ and P+ frames are not possible).

MODULES AND CONTACTS FOR THE QUICK CHANGE HEAD SYSTEM

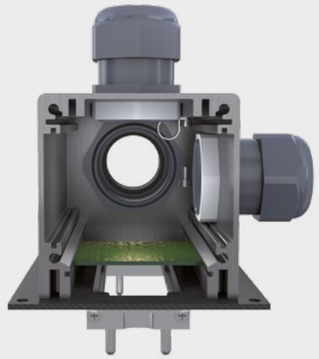
All modules with depths not exceeding 19 mm can be used in the connector saver system. PCB contacts are installed in pieces 2 and 3. All socket contacts (crimp and PCB termination) suitable for pieces 2 and 3 can be used in pieces 1 and 4.

ODU-MAC® SILVER-LINE STRAIN RELIEF HOUSING

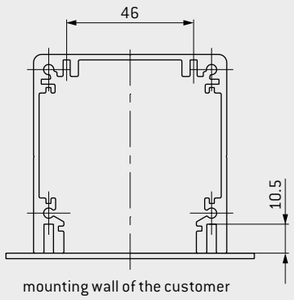
The accessories for docking solutions.



APPLICATION EXAMPLE



Additional M32 cable clamps can be placed by the customer.



TECHNICAL DATA

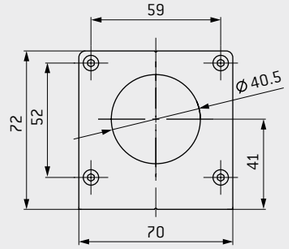
- Material: aluminium
- Operating temperature: –40 °C to +125 °C
- Protection class[1] can be adjusted individually
- Cable clamps, see page 79
- Locknut for cable clamp see page 80

CHARACTERISTICS

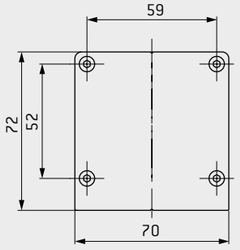
- Resistant and compact
- Protection of the termination area
- Individual strain-relief variations, cable entries as well as grounding connections
- Suitable for all ODU-MAC docking frames
- 6 standard lengths, compatible with all ODU-MAC docking frame varieties (further lengths available on request)
- 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

[1] A higher protection class is possible for additional sealing of the housing.

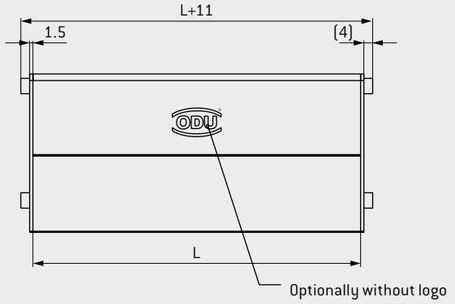
COVER WITH HOLE



COVER WITHOUT HOLE



HOUSING SET INCLUDING COVER



For mounting on an existing mounting wall of the customer.

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

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.

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

ODU-MAC®

MANUAL MATING

Table of Contents

ODU-MAC® ZERO

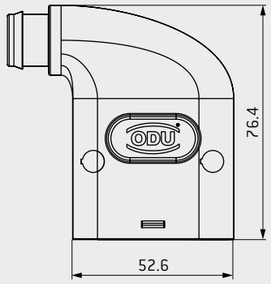
Connector housing for mounting on the cable with different cable entries.
ODU-MAC rail for installing the insulator is already integrated in the housing.

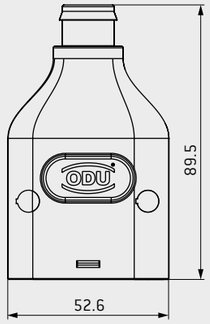
SNAP-IN LOCKING (BREAK-AWAY FUNCTION)

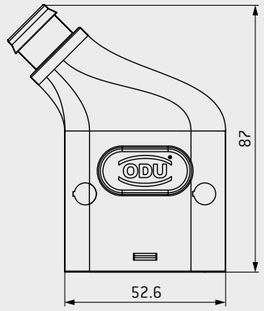
90° CABLE EXIT

0° CABLE EXIT

45° CABLE EXIT







Part number	Cable exit	Size	Units[1] 2.54 mm
656.560.004.001.000	90°	ZERO	9 Units
656.560.006.001.000	0°	ZERO	9 Units
656.560.002.001.000	45°	ZERO	9 Units

TECHNICAL DATA

Color of housing	White black/gray on request
Locking cycles	60,000
Material	PC Lexan (PEI on request)
Protection class[2]	IP 54
Operating temperature	–40 °C to +125 °C
Cable-∅	8 to 14.5 mm

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

SUITABLE MODULES ARE MARKED.

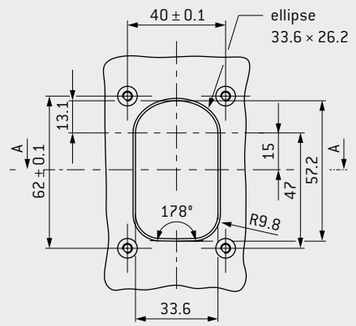
[1] The frame is already permanently integrated and consists of nine units. [2] IEC 60529:2013 (VDE 0470-1:2014).

RECEPTACLE

For integration in the device.

SNAP-IN LOCKING (BREAK-AWAY FUNCTION)

PANEL CUT-OUT

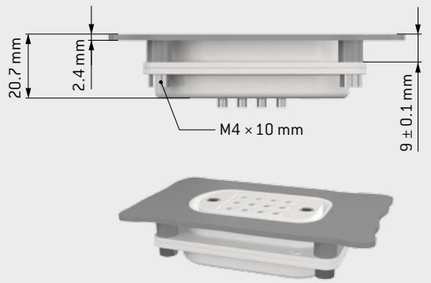


TECHNICAL DATA

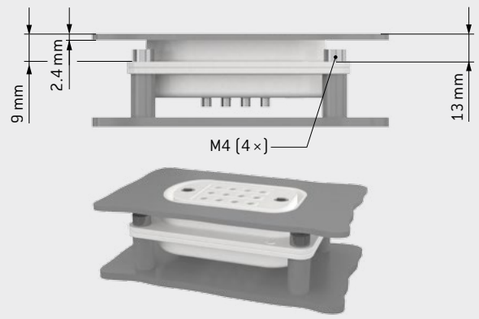
Color of housing	White black/gray on request
Locking cycles	60,000
Material	PC Lexan (PEI on request)
Protection class[1]	IP 54
Operating temperature	–40 °C to +125 °C

Part number	Units[2] 2.54 mm
656.560.001.001.000	9 Units

MOUNTING FROM BELOW



MOUNTING FROM ABOVE



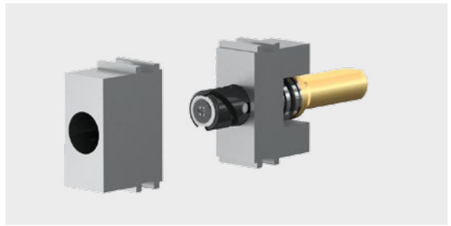
MAXIMUM MATING SECURITY THROUGH MECHANICAL CODING (D-SHAPE) AND EASY HANDLING.

[1] IEC 60529:2013 (VDE 0470-1:2014). [2] The frame is already permanently integrated and consists of nine units.

SPINDLE LOCKING

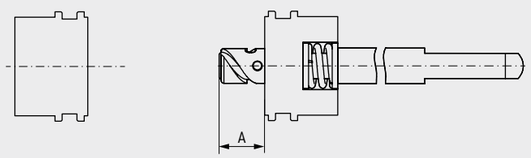
Module for installation in ODU-MAC® frames for housings. Quick-action locking system with 30,000 locking cycles. Simple replacement of the front (spindle exchange set) enables further mating cycles of the complete system.

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



CENTER MODULE

SPINDLE LOCKING

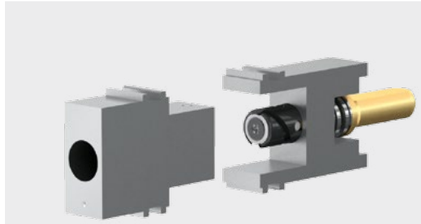


Size	Part number Center module for bulkhead mounted and surface mounted housing	Part number Spindle locking for cable hood	Angle of rotation	Dim. A mm
2 (52 mm high)	614.090.001.304.000	615.091.003.200.000	180°	12
2 (72 mm high)	614.090.001.304.000	615.091.001.200.000	180°	12
3/4	614.090.001.304.000	615.092.021.200.003	360°	21.5
4/XXL	614.090.001.304.000	615.093.021.200.003	360°	21.5

- Max. locking cycles 30,000[1]
- Space requirement 5 units (5 × 2.54 mm)
- Further spindle geometries on request
- Spindle with coding function
see page 88

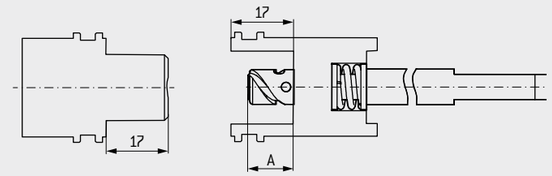
[1] 30,000 cycles depending on mating force of the used modules.

VERSION 2: FOR PINS IN BULKHEAD MOUNTED OR SURFACE MOUNTED HOUSING AND SOCKETS IN CABLE HOOD (REVERSED GENDER)



CENTER MODULE

SPINDLE LOCKING



Size	Part number Center module for bulkhead mounted and surface mounted housing	Part number Spindle locking for cable hood	Angle of rotation	Dim. A mm
2 (52 mm hoch)	614.090.002.304.000	615.091.004.200.000	180°	12
2 (72 mm hoch)	614.090.002.304.000	615.091.002.200.000	180°	12
3/4	614.090.002.304.000	615.092.022.200.003	360°	21.5
4/XXL	614.090.002.304.000	615.093.022.200.003	360°	21.5

- Max. locking cycles 30,000[1]
- Space requirement 5 units (5 × 2.54 mm)
- Further spindle geometries on request
- Spindle with coding function available upon request.

REPLACEMENT SPINDLE SET FOR VERSION 1 AND 2

Part number spindle exchange set	Angle of rotation	Dim. A mm
615.090.104.249.000	180°	12
615.090.104.249.003	360°	21.5

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

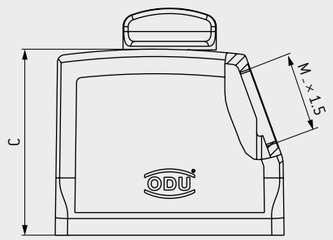
Connector housing for assembly on the cable with side cable entry.

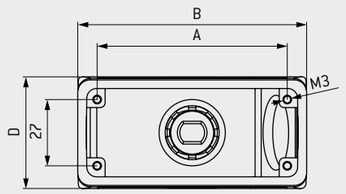
SPINDLE LOCKING

A GRAY MODEL (STANDARD)

B WHITE MODEL

C WHITE MODEL WITH BLACK KNOB





TECHNICAL DATA

Color of housing	Gray (standard, similar to RAL 7001) or white (similar RAL 9010)
Material	Aluminium die casting
Protection class[1]	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

Size	Part number A Color of housing gray/ spindle knob black	Part number B Color of housing white/ spindle knob white	Part number C Color of housing white/ spindle knob black	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable entry	Part number protective cover gray (see page 82)
2	613.091.513.644.208	613.091.513.653.203	–	57	73	52	43	M25	491.097.613.644.000
	613.091.514.644.208	613.091.514.653.203	613.091.514.653.208	57	73	72	43		
3	613.092.514.644.208	613.092.514.653.203	613.092.514.653.208	77.5	93.3	76	45.5	M32	492.097.613.644.000
4	613.093.514.644.208	613.093.514.653.203	613.093.514.653.208	104	120	76	45.5		493.097.613.644.000
	On request	On request	613.093.515.653.008	104	120	76	45.5	M40	493.097.613.644.000

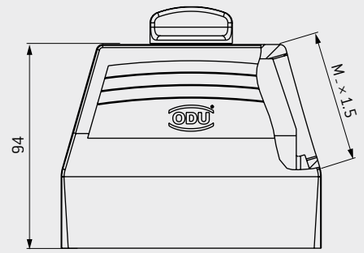
[1] IEC 60529:2013 (VDE 0470-1:2014) (Depends on the cable clamp(s) and spindle type used).

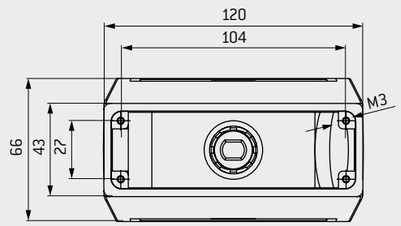
CABLE HOOD XXL

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

SPINDLE LOCKING

A GRAY MODEL





TECHNICAL DATA

Color of housing	Gray (similar to RAL 7001) white on request
Material	Aluminium die casting
Protection class[1]	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

Size	Part number Color of housing gray/ spindle knob black	Dim. M Cable entry	Part number protective cover (see page 82)
4	613.093.516.644. 208	M50	493.097.613.644.000

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

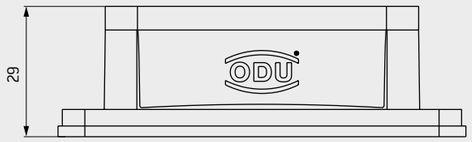
BULKHEAD MOUNTED HOUSING

For mounting on the device.

SPINDLE LOCKING

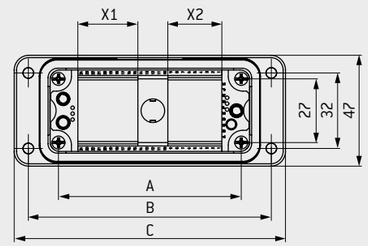
A GRAY MODEL (STANDARD)

B WHITE MODEL

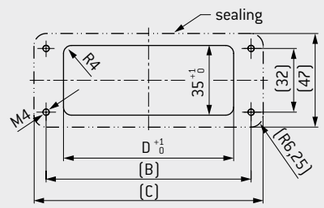


TECHNICAL DATA

Color of housing	Gray (standard, similar to RAL 7001) or white (similar to RAL 9010)
Material	Aluminium die casting
Protection class[1]	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



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

Size	Part number A Color of housing gray	Part number B Color of housing white	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D Panel cut-out mm	X1 Units 2.54 mm	X2 Units 2.54 mm
2	612.091.010.644.000	612.091.010.653.000	57	83	95	65.2	5	6
3	612.092.010.644.000	612.092.010.653.000	77.5	103	115	85.5	9	10
4	612.093.010.644.000	612.093.010.653.000	104	130	143	112.2	14	15

[1] IEC 60529:2013 (VDE 0470-1:2014) (Depends on the spindle type used).

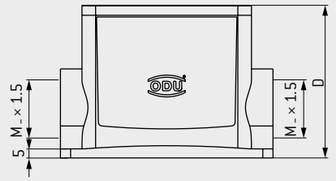
SURFACE MOUNTED HOUSING

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

SPINDLE LOCKING

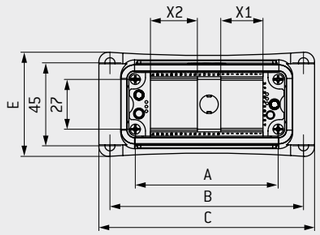
A GRAY MODEL (STANDARD)

B WHITE MODEL



TECHNISCHE DATEN

Color of housing	Gray (standard, similar to ral 7001) white on request
Material	Aluminium die casting
Protection class[1]	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 Adapter	See page 79 for PG clamp See page 80



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

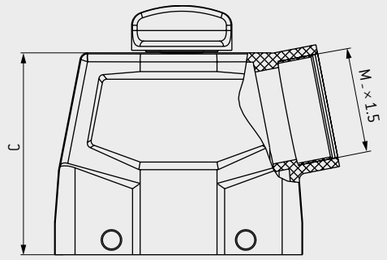
Size	Part number A Color of housing gray	Part number B Color of housing white	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	X1 Units 2.54 mm	X2 Units 2.54 mm	Dim. M Cable entry
2	612.091.025.644.102	612.091.025.653.102	57	82	92.5	74	55.5	5	6	M32
3	612.092.025.644.102	612.092.025.653.102	77.5	105	117	84	56.5	9	10	M32
4	612.093.025.644.102	612.093.025.653.102	104	132	144	84	57.5	14	15	M32

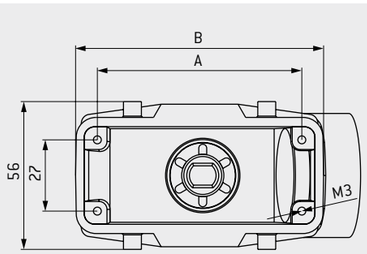
[1] IEC 60529:2013 (VDE 0470-1:2014) (Depends on the cable clamp(s) and spindle type used).

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[1]	IP 50 IP 65 on request
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 mm	Dim. B mm	Dim. C mm	Dim. M cable entry	Part number protective cover (see page 62)
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

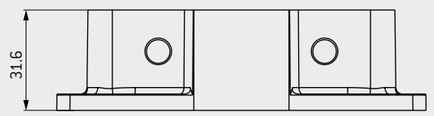
REDUCTION OF M40 TO M32; SEE PAGE 79.

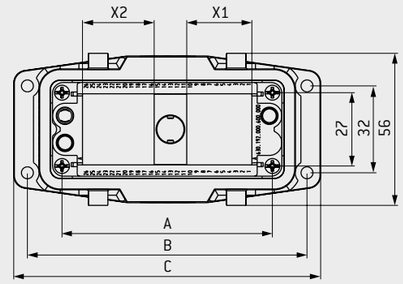
[1] IEC 60529:2013 (VDE 0470-1:2014) (Depends on the cable clamp(s) and spindle type used).

PLASTIC BULKHEAD MOUNTED HOUSING

For assembly of your device with spindle locking.

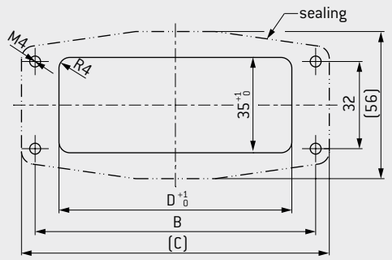
SPINDLE LOCKING





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

PANEL CUT-OUT



TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF
Protection class[1]	IP 50 IP 65 on request
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material

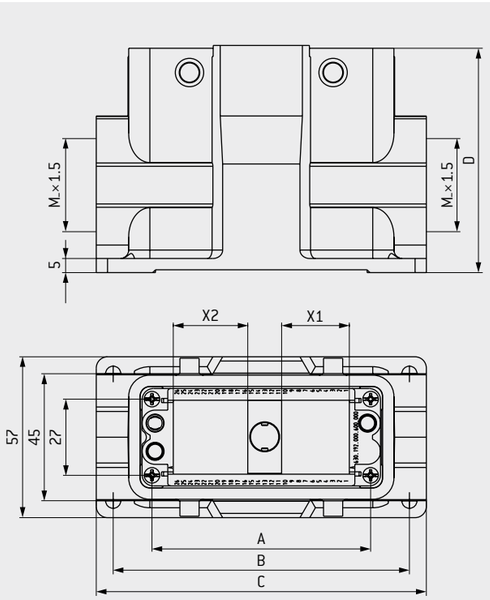
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D panel cut-out mm	X1 Units 2.54 mm	X2 Units 2.54 mm	Part number protective cover (see page 61)
2	612.091.010.908.000	57	83	93	67	5	6	491.097.612.908.001
3	612.092.010.908.000	77.5	103	114	87	9	10	492.097.612.908.001
4	612.093.010.908.000	104	130	140	114	14	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.

SPINDLE LOCKING



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

TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF
Protection class[1]	IP 50 IP 65 on request
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material
Cable clamp	see page 79

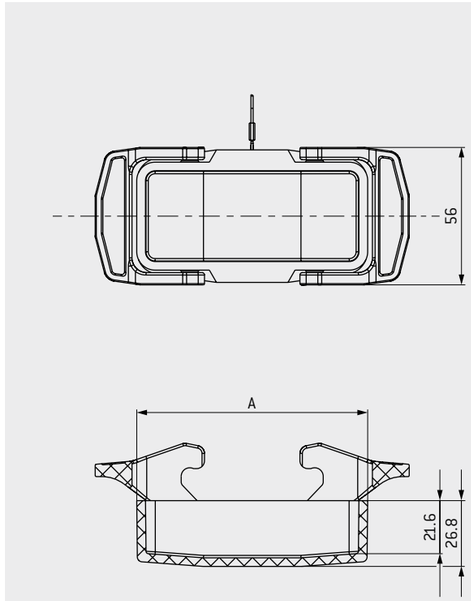
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	X1 Units 2.54 mm	X2 Units 2.54 mm	Dim. M Cable entry	Part number protective cover (see page 61)
2	612.091.020.908.000	57	82	94	81.5	5	6	M32	491.097.612.908.001
3	612.092.020.908.000	77.5	105	117	81.5	9	10	M40	492.097.612.908.001
4	612.093.020.908.000	104	132	144	81.5	14	15	M40	493.097.612.908.001

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 PROTECTIVE COVER

For bulkhead and surface mounted housing with lanyard.



TECHNICAL DATA

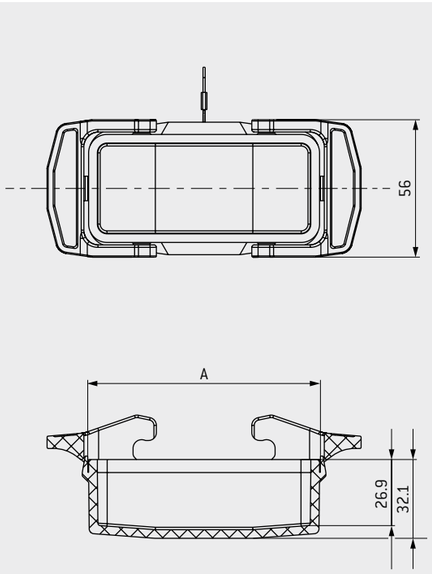
Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF
Protection class[1]	IP 65
Operating temperature	–40 °C to +125 °C
Locking	via the side-bar locking included in the delivery

Size	Part number	Dim. A mm
2	491.097.612.908.001	74
3	492.097.612.908.001	94
4	493.097.612.908.001	121

[1] IEC 60529:2013 (VDE 0470-1:2014)

PLASTIC PROTECTIVE COVER

For cable hood with lanyard.



Size	Part number	Dim. A mm
2	491.097.613.908.001	74
3	492.097.613.908.001	94
4	493.097.613.908.001	121

TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF
Protection class[1]	IP 65
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material
Locking	via the side-bar locking included in the delivery

[1] IEC 60529:2013 (VDE 0470-1:2014)

FOR YOUR NOTES

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.

Medium	Material PA6 + GF	
	Resistant	With limited resistance
Ammonia, 10% aqueous solution	•	
Ammonia gas	At room temperature	At 100 °C
Ammonium carbonate	•	
Ammonium chloride	•	
Aniline		•
Asphalt	•	
Beer	•	
Butane gas	•	
Cooking salt, aqueous solution	•	
Copper sulphate, 10% aqueous solution	•	
Cresol solution		•
Cresylic acid		•
Cyclohexane	•	
Diesel	•	
Diluted glycerol	•	
Diluted glycol	•	
Diluted phenol		•
Dioctylphthalate	•	
Ethyl alcohol, not denatured	•	
Fruit juices	•	
Glycerol	•	
Heptane	•	
Hexane	•	
Hydrogen sulphide	Gaseous	Diluted solution
Ink	•	
Isopropyl + ethanol	•	
Isopropyl alcohol	•	
Lactic acid	•	
Linseed oil	•	
Lubricating oil	•	
Mercury	•	
Methyl alcohol, diluted 50%	•	
Mineral oil	•	
Mineral-based oil	•	
Moth balls	•	
Motor oil	•	
n-Butanol	•	
Naphthalene	•	
Octane	•	

Medium	Material PA6 + GF	
	Resistant	With limited resistance
Oleic acid	•	
Paraffin oil	•	
Petrolium	•	
Potassium carbonate	•	
Potassium chloride	•	
Potassium iodide	•	
Potassium nitrate	•	
Potassium sulphate	•	
Regular grade petrol	•	
Seawater	•	
Silicone oil	•	> 100 °C
Soap solution	•	
Sodium bicarbonate	•	
Sodium bisulfate, aqueous solution	•	
Sodium carbonate	•	
Sodium chlorate	•	
Sodium chloride	•	
Sodium hydroxide 12.5%	At room temperature	
Sodium nitrate	•	
Sodium nitrite		•
Sodium perborate	•	
Sodium phosphate	•	
Sodium silicate	•	
Sodium sulphate	•	
Sodium sulphide	•	
Sodium thiosulphate	•	
Solution for developing photos	•	
stearic acid	•	
Stearic acids	•	
Sulphur	•	
Sulphur dioxide		•
Tallow	•	
Tar	•	
Tartaric acid	•	
Transformer oil	•	
Urea, diluted	•	
Urine	•	
Vegetable oil	•	
Water	•	

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 happy to assist you.

CABLE HOOD

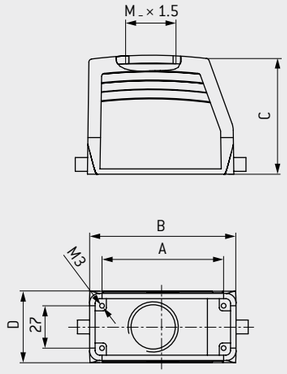
Connector housing for assembly on the cable. With straight and side cable entry.

LEVER LOCKING

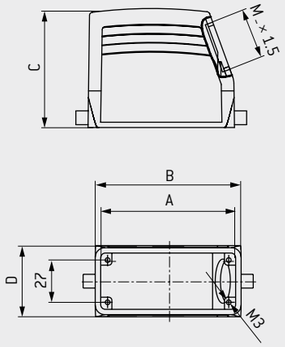
A TOP CABLE ENTRY

B SIDE CABLE ENTRY

A TOP CABLE ENTRY



B SIDE CABLE ENTRY



TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP 65 in mated condition
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 79
Adapter	for PG clamp see page 80

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

Size	Part number A Top cable entry	Part number B Side cable entry	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable entry	Part number protective cover (see page 82)
1	490.214.450.644.102	490.414.450.644.102	44	60	52	43	M25	490.097.500.644.000
	490.215.450.644.102	490.415.450.644.102			72		M32	
2	491.214.450.644.102	491.414.450.644.102	57	73	52	43	M25	491.097.212.644.000
	491.215.450.644.102	491.415.450.644.102			72		M32	
3	492.215.450.644.102	492.415.450.644.102	77.5	93.5	76	45.5	M32	492.097.214.644.000
4	493.215.450.644.102	493.415.450.644.102	104	120	76	45.5	M32	493.097.214.644.000
	493.217.550.644.000	493.417.550.644.000					M40	

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

CABLE HOOD XXL

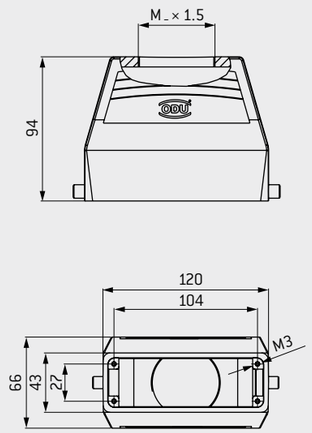
Connector housing for assembly on the cable. With expanded assembly space as well as side and top M50 cable entry.

LEVER LOCKING

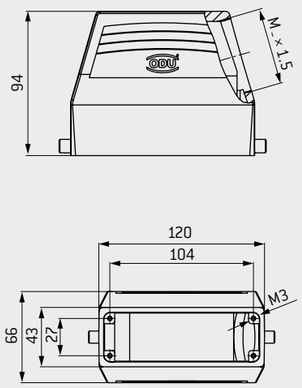
A TOP CABLE ENTRY

B SIDE CABLE ENTRY

A TOP CABLE ENTRY



B SIDE CABLE ENTRY



TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP 65 in mated condition
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 79

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

Size	Part number A Top cable entry	Part number B Side cable entry	Dim. M Cable entry	Part number protective cover (see page 82)
4	493.218.550.644.000	493.419.550.644.000	M50	493.097.214.644.000

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

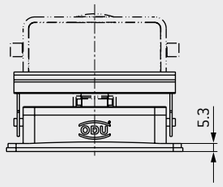
BULKHEAD MOUNTED HOUSING

For mounting on the device.

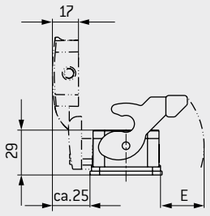
LEVER LOCKING

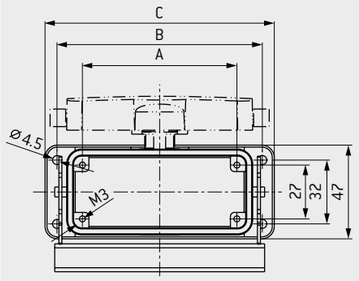
A WITHOUT COVER

B WITH COVER

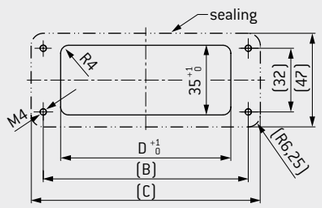


Lever locking (just an example)





PANEL CUT-OUT



TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP 65 in mated condition
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)

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

Size	Part number A Without protective cover	Part number B With protective cover	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D Panel cut-out mm	Dim. E mm
1	490.130.400.644.000	490.131.400.644.000	44	70	82	52.2	≈ 22
2	491.130.400.644.000	491.131.400.644.000	57	83	95	65.2	≈ 27
3	492.130.400.644.000	492.131.400.644.000	77.5	103	115	85.5	≈ 28
4	493.130.400.644.000	493.131.400.644.000	104	130	143	112.2	≈ 28

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

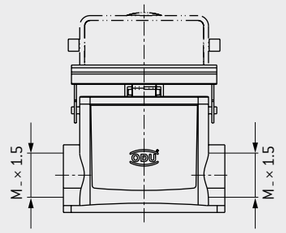
SURFACE MOUNTED HOUSING

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

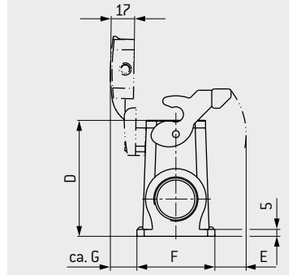
LEVER LOCKING

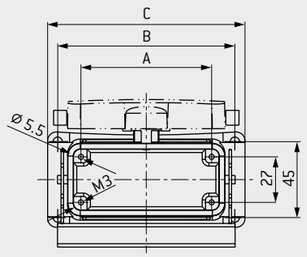
A WITHOUT COVER

B WITH COVER



Lever locking (just an example)





TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP 65 in mated condition
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)
Adapter	for PG clamp 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.

Size	Part number A Without protective cover	Part number B With protective cover	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	Dim. F mm	Dim. G mm	Dim. M Cable entry
1	490.133.450.644.102	490.135.450.644.102	44	70	82	74	≈ 17	55.5	20	M32
2	491.133.450.644.102	491.135.450.644.102	57	82	92.5	74	≈ 23	55.5	20	
3	492.133.450.644.102	492.135.450.644.102	77.5	105	117	84	≈ 23	56.5	20	
4	493.133.450.644.102	493.135.450.644.102	104	132	144	84	≈ 22	58	19	

M40 CABLE ENTRY AVAILABLE UPON REQUEST.

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

CABLE HOOD WIDE

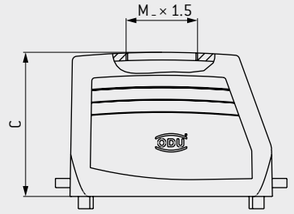
With straight and side cable entry for double contact arrangement on the frame.

LEVER LOCKING

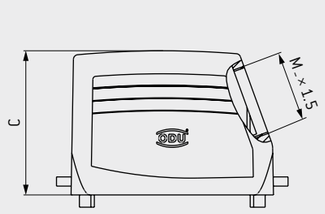
A TOP CABLE ENTRY

B SIDE CABLE ENTRY

A TOP CABLE ENTRY



B SIDE CABLE ENTRY



TECHNICAL DATA

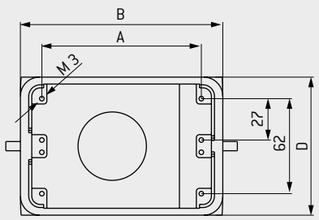
Color of housing	Gray (standard, similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP 65 in mated condition
Operating temperature	without housing sealing: –40 °C to +125 °C
Cable clamp	see page 79

Housing suitable for two standard frames size 3 or 4.

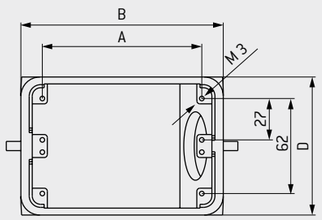
2 × size 3 = size 5
2 × size 4 = size 6

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

A TOP CABLE ENTRY



B SIDE CABLE ENTRY



Size	Part number A Top cable entry	Part number B Side cable entry	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable entry
5	494.215.550.644.000	494.415.550.644.000	77.5	94	79	82.5	M40
6	495.215.550.644.000	495.415.550.644.000	104	132	94	90	M50

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

Table of Contents

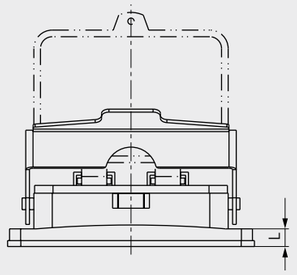
BULKHEAD MOUNTED HOUSING FOR CABLE HOOD WIDE

For mounting on the device.

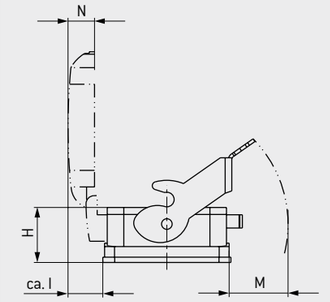
LEVER LOCKING

A WITHOUT COVER

B WITH COVER



Lever locking (just an example)

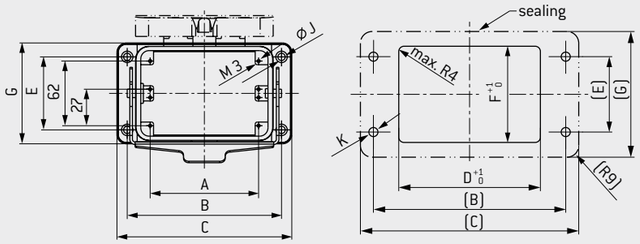


TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP 65 in mated condition
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)

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

PANEL CUT-OUT



Size	Part number A Without protective cover	Part number B With protective cover	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	Dim. F mm	Dim. G mm	Dim. H mm	Dim. I mm	Dim. J mm	Dim. K mm	Dim. L mm	Dim. M mm	Dim. N mm
5	494.130.500.644.000	494.131.500.644.000	77.5	110	127	79	65	74	89	38	≈ 23	5.5	M5	7	31	17
6	495.130.500.644.000	495.131.500.644.000	104	148	168	117	70	80	96.7	41.5	≈ 26	7	M6	12	43	20

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

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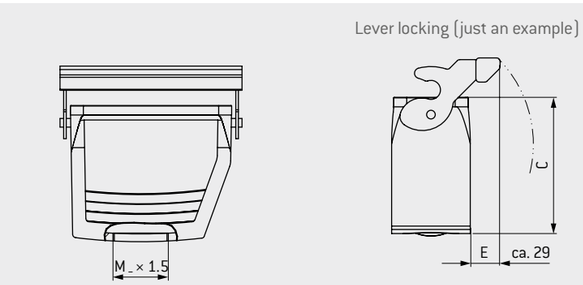
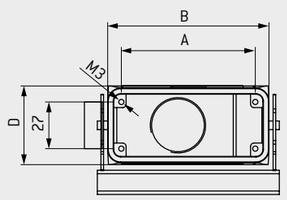
CABLE TO CABLE HOOD

With top cable entry. For a flying cable to cable connection.

LEVER LOCKING





TECHNICAL DATA

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[1]	IP 65 in mated condition
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 79
Adapter	for PG clamp 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.

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable entry	Part number Protective cover (see page 82)
1	490.331.450.644.102	44	60	75	43	M32	490.097.500.644.001
2	491.331.450.644.102	57	73	75	43		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.

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

TRANSVERSE LOCKING

Housing with side lockings. On request.

TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	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.

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

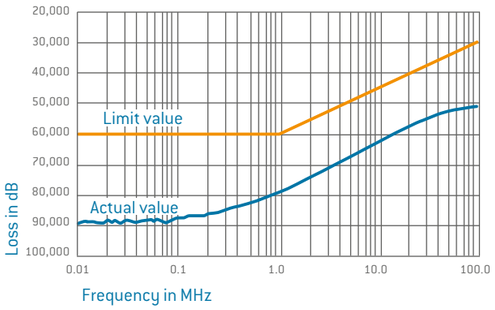
CABLE HOOD IN IP 68/IP 69

For applications with extreme requirements. With 360° EMC shielding according to VG 95373-41:1997.
On request.

A TOP CABLE ENTRY

B SIDE CABLE ENTRY

INSERTION LOSS



TECHNICAL DATA

EMC model

Surface	Electrically conductible
Sealing	Inside
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[1]	IP 68, IEC 60529:2013 (VDE 0470-1:2014) IP 69, IEC 60529:2013 (VDE 0470-1:2014)
Screw locking	

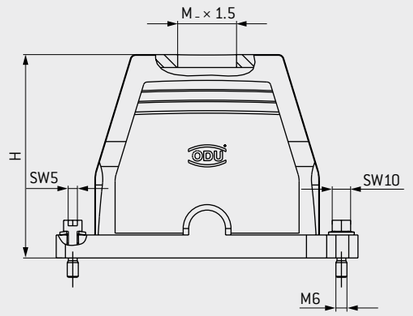
Application areas

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

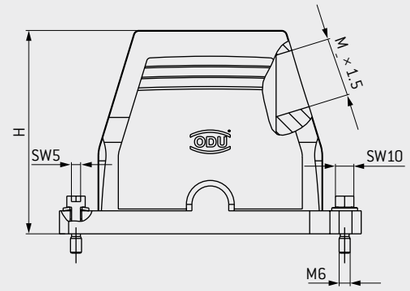
Size	Part number A Top cable entry	Part number B Side cable entry	Dim. B mm	Dim. C mm	Dim. M mm	Dim. H mm
1	490.260.550.641.000	490.261.550.641.000	132	44	M32	100.5
2	491.262.550.641.000	491.263.550.641.000	144	57	M32	100.5
3	492.262.550.641.000	492.263.550.641.000	164	77.5	M32	110.5
4	493.262.550.641.000	493.263.550.641.000	191	104	M40	110.5

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

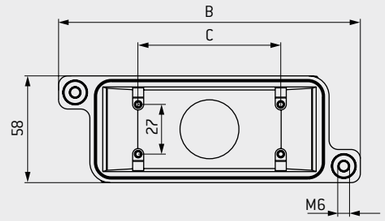
A TOP CABLE ENTRY



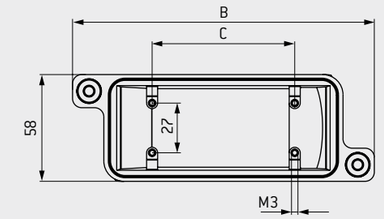
B SIDE CABLE ENTRY



A



B



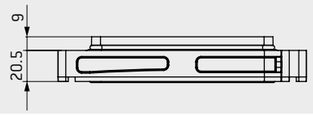
BULKHEAD MOUNTED- AND SURFACE MOUNTED HOUSING IN IP 68/IP 69

For applications with extreme requirements. With 360° EMC shielding according to VG 95373-41:1997.
On request.

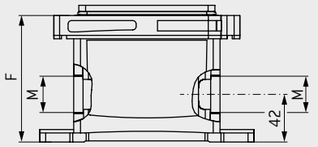
A BULKHEAD MOUNTED HOUSING

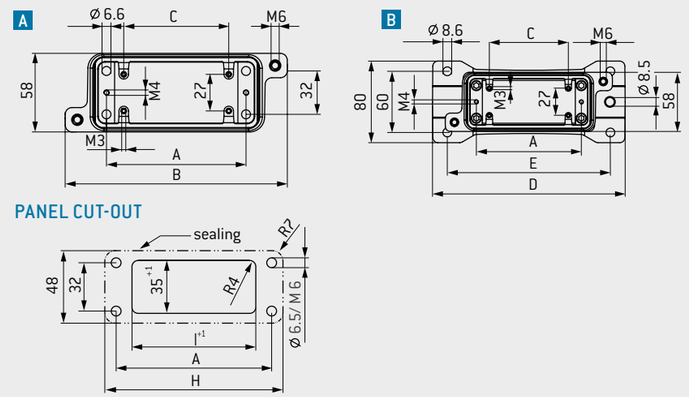
B SURFACE MOUNTED HOUSING

A BULKHEAD MOUNTED HOUSING



B SURFACE MOUNTED HOUSING





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[1]	IP 68, IEC 60529:2013 (VDE 0470-1:2014) IP 69, IEC 60529:2013 (VDE 0470-1:2014)
Sealing	Conductive silicone

Application areas

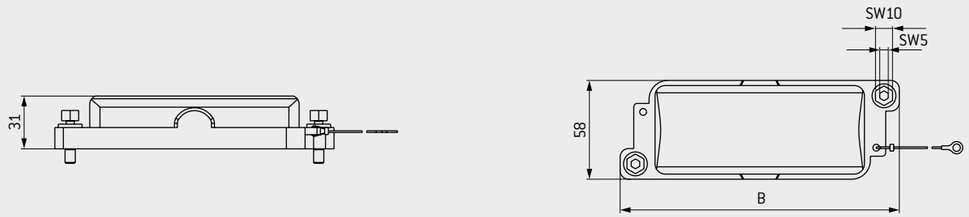
Used in EMC shielded applications.
Housing construction according to IEC 61373:2010 (VDE 0115-106:2011, bogie) from rail engineering.

Size	Part number Bulkhead mounted housing	Part number Surface mounted housing	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	Dim. F mm	Dim. H mm	Dim. I mm	Dim. M Cable entry
1	490.160.500.641.000	490.161.550.641.000	70	132	44	156	127	100.5	85	48	M32
2	491.161.500.641.000	491.162.550.641.000	83	144	57	169	140	100.5	98	60	M32
3	492.161.500.641.000	492.162.550.641.000	103	164	77.5	189	160	111.5	118	82	M32
4	493.161.500.641.000	493.162.550.641.000	130	191	104	216	187	111.5	145	108	M40

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

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.

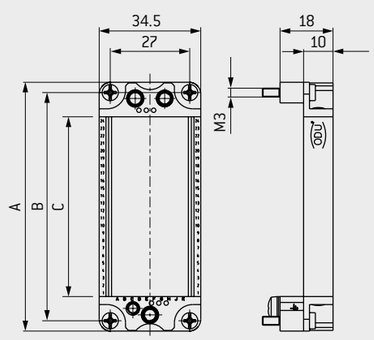


Size	Part number protective cover for bulkhead mounted and surface mounted housing with lanyard	Dim. B mm
1	490.060.500.641.000	132
2	491.060.500.641.000	144
3	492.060.500.641.000	164
4	493.060.500.641.000	191

ODU-MAC® FRAME FOR HOUSING

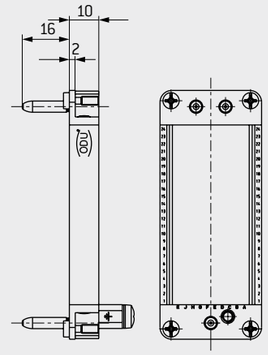
With grounded housing. (The frame is not required for the ODU-MAC® ZERO.)

SOCKET FRAME WITH GUIDING BUSHES



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.

PIN FRAME WITH GUIDING PIN



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

Size	Part number Socket frame	Part number Pin frame	Max. units 2.54 mm[1]	Dim. A mm	Dim. B mm	Dim. C mm
ZERO	No frame required.	No frame required.	9	–	–	–
1	610.190.000.600.000	611.190.000.600.000	10	51	44	25.5
2	610.191.000.600.000	611.191.000.600.000	16	64	57	40.8
3	610.192.000.600.000	611.192.000.600.000	24	84.5	77.5	61.1
4/XXL	610.193.000.600.000	611.193.000.600.000	34	111	104	86.5
FRAMES FOR CABLE HOOD WIDE						
5	2 × part number size 3	2 × part number size 3	2 × 24	84.5	77.5	61.1
6	2 × part number size 4	2 x part number size 4	2 × 34	111	104	86.5

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).

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CABLE CLAMP AND REDUCING RING

CABLE CLAMP[1] FOR HOUSINGS ACCORDING TO IEC 62444:2010 (VDE 0619:2014)

TECHNICAL DATA

Material Body	PA
Sealing	NBR; sealing material
Protection class	IP 68 to 5 bar
Temperature range	–40 °C to +100 °C

EMC clamp on request.

Part number	Thread	Color	Width across flats	Tightening torque Nm	Cable diameter mm min.	Cable diameter mm max.
027.825.060.130.007	M25 × 1.5	Gray	30	8	6	13
027.825.090.170.007					9	17
027.832.070.150.007	M32 × 1.5		36	10	7	15
027.832.110.210.007					11	21
027.840.190.280.007	M40 × 1.5		46	13	19	28
027.850.270.350.007	M50 × 1.5		55	15	27	35
027.825.060.130.003	M25 × 1.5	White	30	8	6	13
027.825.090.170.003					9	17
027.832.070.150.003	M32 × 1.5		36	10	7	15
027.832.110.210.003					11	21
027.840.190.280.003	M40 × 1.5		46	13	19	28
027.832.070.150.008	M32 × 1.5	Black	36	10	7	15
027.832.110.210.008					11	21
027.840.190.280.008	M40 × 1.5		46	13	19	28

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

Part number	External thread	Internal thread
921.000.006.000.356	M40 × 1.5	M32 × 1.5

[1] Delivery doesn't contain cable clamp, but o-ring is enclosed with the housing.

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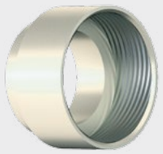
ADAPTER RING, BLIND GROMMET AND LOCKNUT

ADAPTER RING FOR CABLE CLAMPS WITH PG THREAD



TECHNICAL DATA

Material Nickel-plated brass

Part number	External thread	Internal thread
921.000.006.000.254	M25 × 1.5	PG 21
921.000.006.000.255	M32 × 1.5	PG 29
921.000.006.000.267	M32 × 1.5	M40 × 1.5

BLIND GROMMET FOR SURFACE MOUNTED HOUSING

TECHNICAL DATA

Color	Gray
Material	PA fiber glass reinforced
Protection class	IP68
Temperature range	–40 °C to +125 °C
Sealing	NBR; sealing material

Part number	Thread
921.000.006.000.279	M25 × 1.5
921.000.006.000.268	M32 × 1.5
On request	M40 × 1.5
On request	M50 × 1.5

LOCKNUT FOR CABLE CLAMP

TECHNICAL DATA

Material Nickel-plated brass

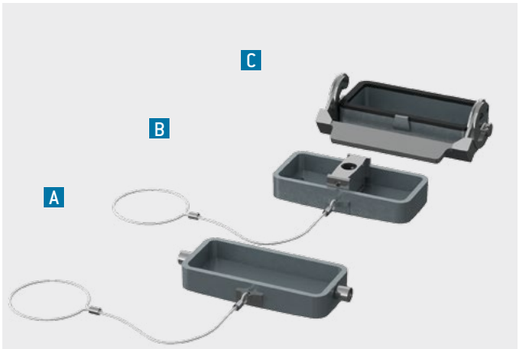
Part number	Thread
931.000.003.000.112	M32 × 1.5
931.000.003.000.113	M40 × 1.5

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

FOR YOUR NOTES

PROTECTIVE COVER

For metal housing.



TECHNICAL DATA

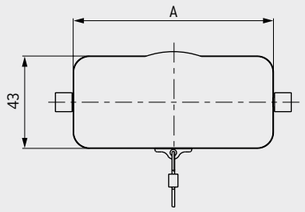
Color	Gray (standard, similar to RAL 7001)

Protection class IP 65 in locked condition
Metal protective cover with locking latch (C)
Metal protective cover with bolt and lanyard (A)

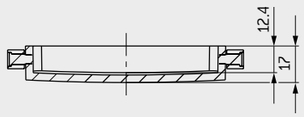
Protection class IP 54 in locked condition

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

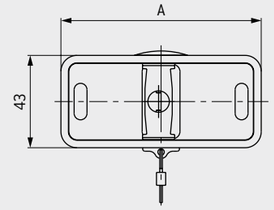
A METAL PROTECTIVE COVER
for bulkhead mounted, surface mounted housing and cable-to-cable-hoods



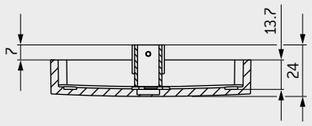
A VIEW WITHOUT LANYARD



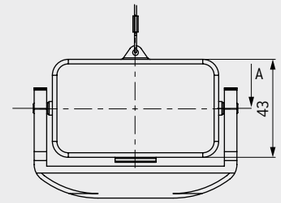
B METAL PROTECTIVE COVER
for cable hood and cable hood XXL
for spindle locking



B VIEW WITHOUT LANYARD

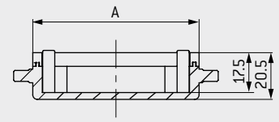


C METAL PROTECTIVE COVER
for cable hood and cable hood XXL
for lever locking



Lever locking just an example.

C VIEW WITHOUT LOCKING LATCH



Size	IP 65 Part number A Metal protective cover with bolt and lanyard	IP 50 Part number B Metal protective cover for spindle locking with lanyard and middle section	IP 65 Part number C Metal protective cover with locking latch	Dim. A mm
1	490.097.500.644.001	–	490.097.500.644.000	60
2	491.097.133.644.000	491.097.613.644.000	491.097.212.644.000	73
3	492.097.133.644.000	492.097.613.644.000	492.097.214.644.000	93.5
4/XXL	493.097.133.644.000	493.097.613.644.000	493.097.214.644.000	120

PROTECTIVE TRANSPORT COVER

For protection of the assembled connector during transport.

TECHNICAL DATA

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

Size	Part number With carry lanyard	Part number Without carry lanyard
1	490.097.900.924.000	490.097.900.924.101
2	491.097.900.924.000	491.097.900.924.101
3	492.097.900.924.000	492.097.900.924.101
4/XXL	493.097.900.924.000	493.097.900.924.101

SILICONE BEND RELIEFS FOR ODU-MAC® ZERO

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.

Part number	Dim. L mm	Cable jacket (Ø outside) min.	 max.
704.023.___.965.080	60	8	10
704.023.___.965.100		10	12
704.023.___.965.120		12	14
704.023.___.965.140		14	16

Color code	Color	RAL no.[1] (similar)
202	Red	3020
203	White[2]	9010
204	Yellow	1016
205	Green	6029
206	Blue	5002
207	Gray[2]	7005
208	Black[2]	9005

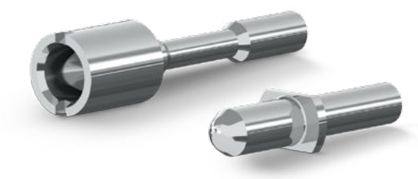
[1] Due to variations in raw materials, colors may differ slightly from RAL numbers. [2] Standard colors with short delivery period.

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.

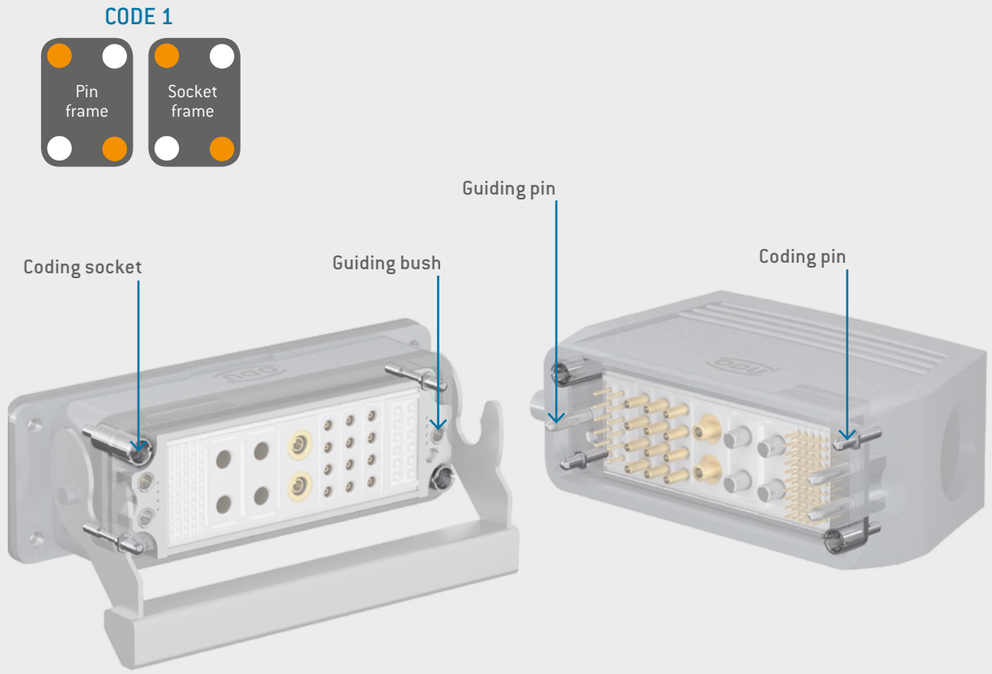


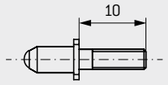
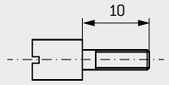
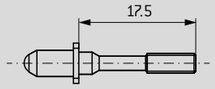
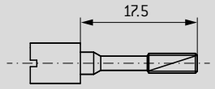
CODING OPTIONS

= Coding pin

= Coding socket

CODING EXAMPLE



Frame	Part number matching the frame no.	Coding	
		Part number pin	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	611.090.304.902.000 	610.090.303.902.000 

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.

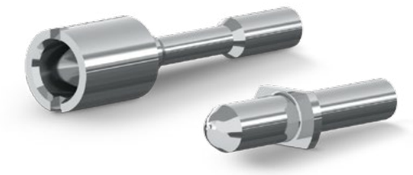
CODING OPTIONS
FOR HOUSING WITH SPINDLE LOCKING

To prevent mismating.

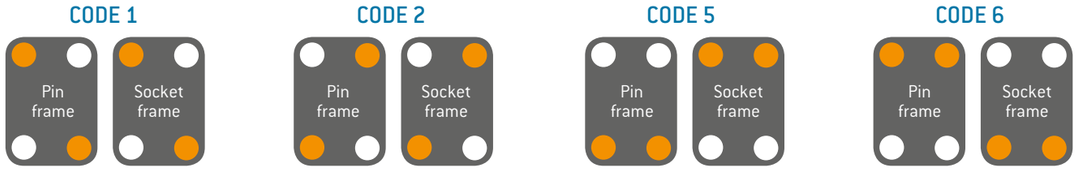
In order to prevent mismating, it is in some cases useful to provide the connection systems with a coding system.

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.



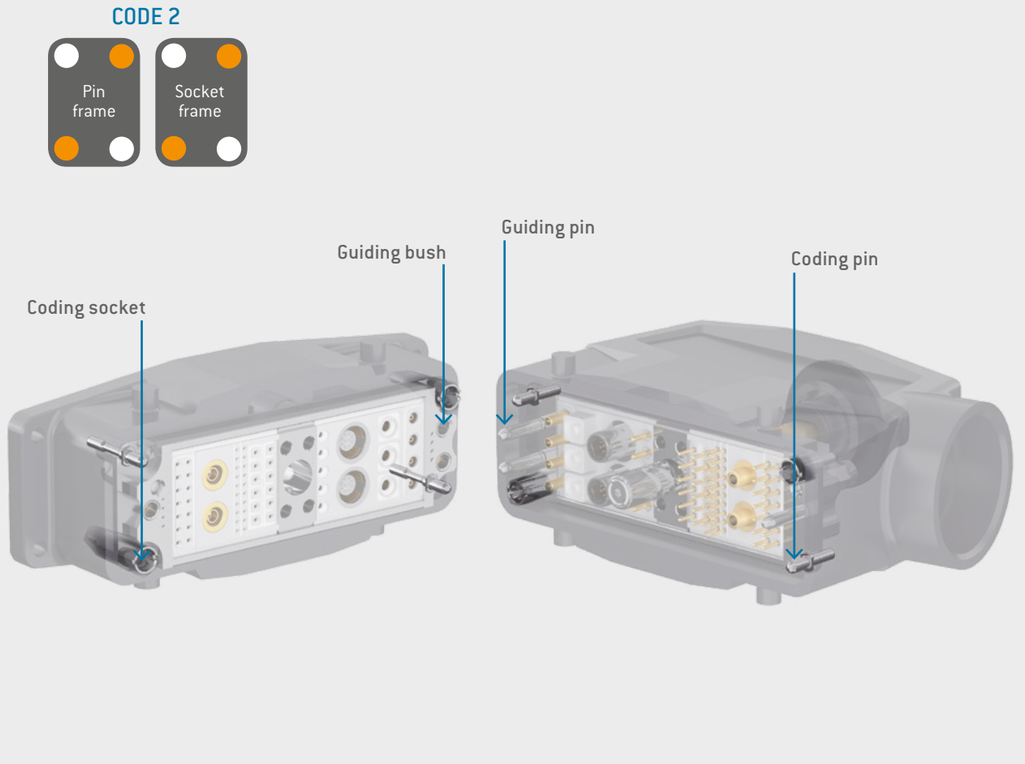
CODING OPTIONS

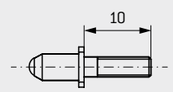
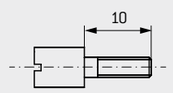
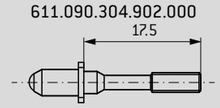
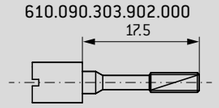


= Coding pin

= Coding socket

CODING EXAMPLE



Frame	Part number matching the frame no.	Coding	
		Part number pin	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	611.090.304.902.000 	610.090.303.902.000 

PART NUMBER BASIC TOOL, TORQUE 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 CODED SPINDLE

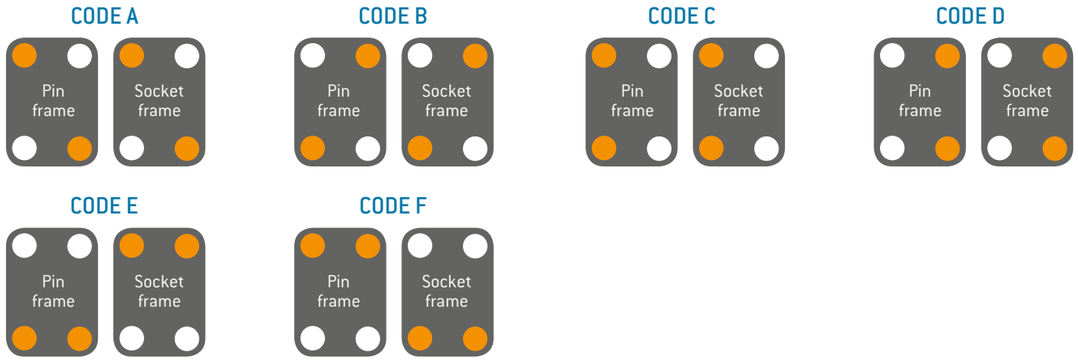
To prevent mismating.

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.

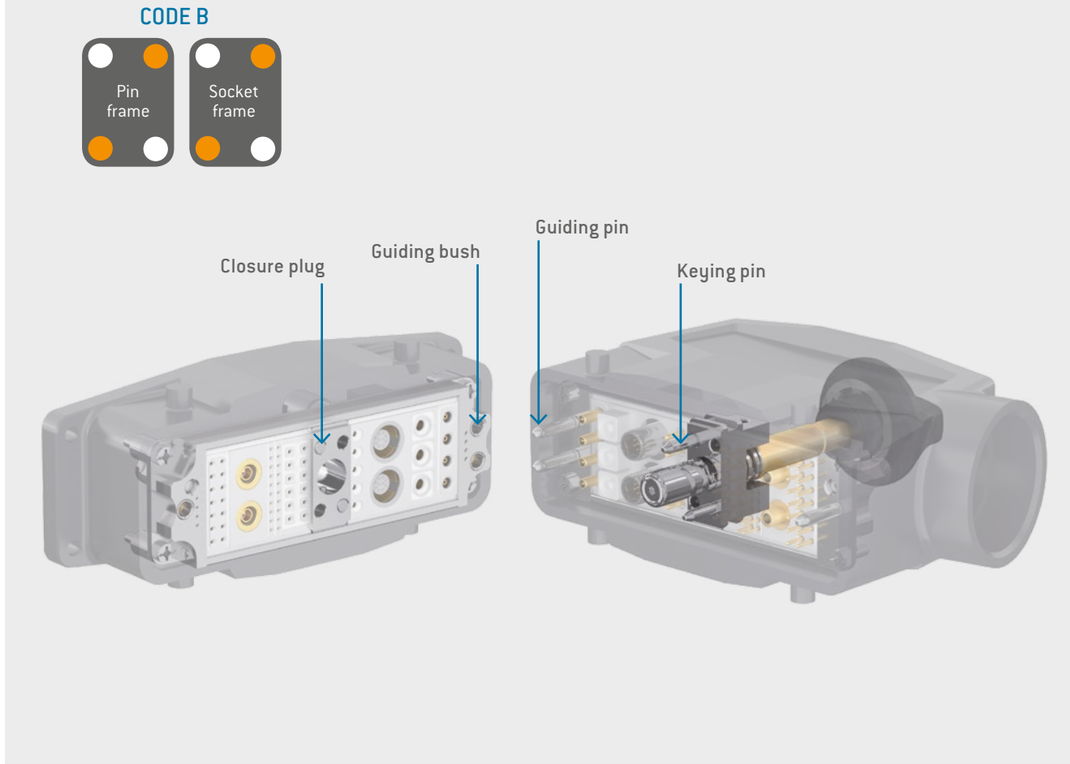
CODING OPTIONS



= Keying pin

= closure plug

CODING EXAMPLE



Size	WITH CODING[1]		Angle of rotation
	Part number Center module for bulkhead mounted, surface mounted housing and cable-to-cable-hoods	Part number Spindle locking for cable hoods	
2 (52 mm high)	614.090.001.304.010	615.091.003.200.010	180°
2 (72 mm high)	614.090.001.304.010	615.091.001.200.010	180°
3/4	614.090.001.304.010	615.092.021.200.013	360°
XXL	614.090.001.304.010	615.093.021.200.013	360°

[1] Keying pins and closure plugs are included as loose parts.

ONLY IF A REPLACEMENT IS REQUIRED[2]	
Part number keying pin	Part number closure plug
	
615.090.107.902.000	614.090.107.902.000

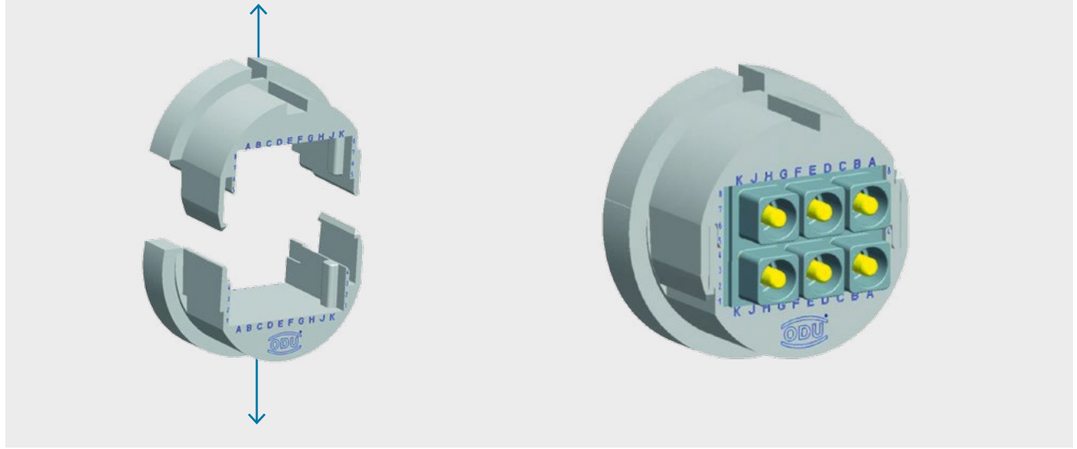
[2] They are included in the standard scope of delivery.

TORQUE SCREWDRIVER/0.9 NM FOR LEFT-HAND THREAD
PART NUMBER BIT SLOT FOR THE ASSEMBLY OF THE SPINDLE CODING: 598.054.109.000.000

An overview of all tools is on page 174.

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

Description	Part number Insulator socket	Part number Insulator pin
Insulator half-shells	209.610.000.000.000	209.611.000.000.000

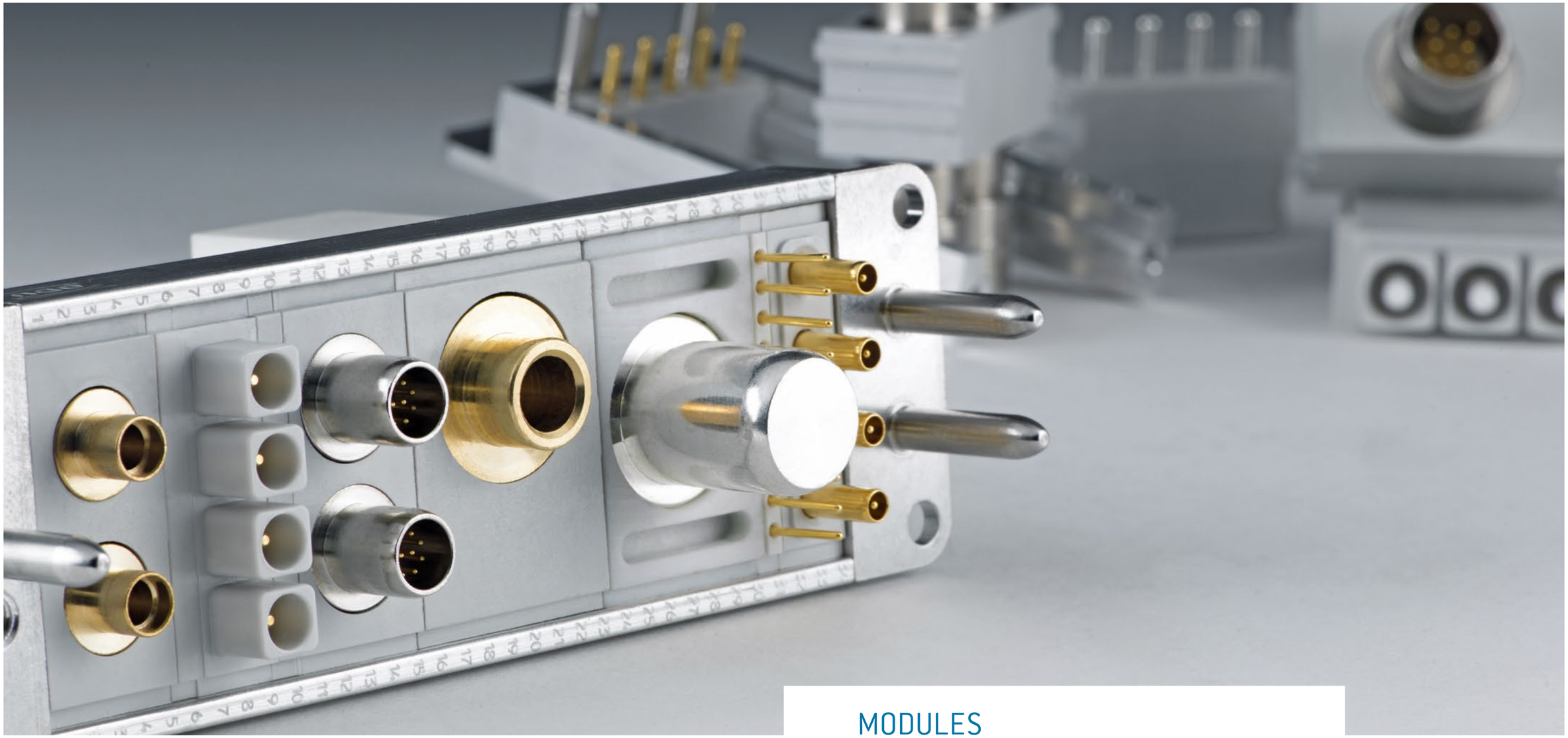
NOTE

- Please use only protruding contacts from ∅ 1.02 mm
- Assembly instruction available on our website
- Delivery times according to series 209 and ODU DOCK

APPLICATION EXAMPLES

ODU-MAC®
IN ODU DOCK

ODU-MAC®
IN HEAVY DUTY CONNECTOR SERIES 209



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

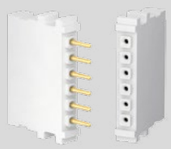
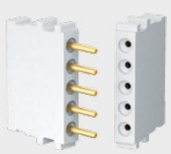
MODULES

ODU-MAC®

Table of Contents

OVERVIEW OF ALL MODULES

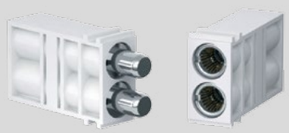
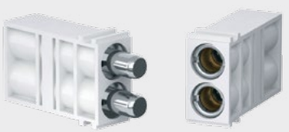
Modules marked with this symbol can be used in the ODU-MAC® ZERO.

	Modules	Description	Units/width	Features		Page
Signal		14 contacts for turned contacts Contact Ø: 1.02 mm	3 Units 7.62 mm ZERO	High contact density Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	320 V 2,500 V 13.5 A for 0.5 mm² 2 minimum 100,000	100
		10 contacts for turned contacts Contact Ø: 0.76 mm	1 Unit 2.54 mm ZERO	Highest contact density Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	250 V 1,500 V 11 A for 0.38 mm² 2 minimum 100,000	102
		10 contacts for stamped contacts Contact Ø: 0.7 mm	1 Unit 2.54 mm ZERO	Economical solution Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	32 V 1,500 V 6 A for 0.38 mm² 2 minimum 5,000	104
		6 contacts for turned contacts Contact Ø: 1.02 mm	2 Units 5.08 mm ZERO	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	400 V 3,000 V 13.5 A for 0.5 mm² 2 minimum 100,000	106
		5 contacts for turned contacts Contact Ø: 1.5 mm	2 Units 5.08 mm ZERO	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	500 V 2,500 V 27 A for 1.5 mm² 2 minimum 100,000	108
Power		4 contacts for turned contacts Contact Ø: 2.41 mm	3 Units 7.62 mm ZERO	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	500 V 3,000 V 41 A for AWG 12 2 minimum 100,000	110

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008) for degree of pollution 2. [2] Definition max. continuous current see page 187.

OVERVIEW OF ALL MODULES

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

	Modules	Description	Units/width	Features		Page
Power		3 contacts for turned contacts Contact Ø: 3 mm	3 Units 7.62 mm ZERO	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	500 V 3,000 V 58 A for 6 mm² 2 minimum 100,000	112
		3 contacts for turned contacts Contact Ø: 3 mm	4 Units 10.16 mm ZERO	High voltage Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	2,500 V 10,000 V 58 A for 6 mm² 2 minimum 100,000	114
		2 contacts for turned contacts Contact Ø: 5 mm	5 Units 12.7 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	1,000 V 4,000 V 119 A for 16 mm² 2 minimum 100,000	116
High current		2 contacts for turned contacts with ODU SPRINGTAC® [3] Contact Ø: 8 mm	6 Units 15.24 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	500 V 3,000 V 142 A for 25 mm² 2 minimum 100,000	118
		2 contacts for turned contacts with ODU LAMTAC® [4] Contact Ø: 8 mm	6 Units 15.24 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	500 V 3,000 V 154 A for 25 mm² 2 minimum 10,000	120
		1 contact for turned contacts with ODU LAMTAC® [4] Contact Ø: 10 mm or Contact Ø: 12 mm	7 Units 17.78 mm for both versions	Highest current Model Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution Mating cycles	10 mm 250 V 4,000 V 179 A for 35 mm² 2 min. 10,000	12 mm 200 V 3,000 V 220 A for 50 mm² 2 min. 10,000	122

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008). [2] Definition max. continuous current see page 187. [3] Contact with springwire technology. [4] Contact with lamella technology.

OVERVIEW OF ALL MODULES

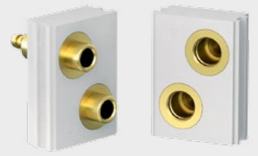
Modules marked with this symbol can be used in the ODU-MAC® ZERO.

	Modules	Description	Units / width	Features		Page
High voltage		4 contacts for turned contacts Contact Ø: 1.5 mm	3 Units 7.62 mm	High contact density high voltage Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	 2,500 V 10,000 V 27 A for 1.5 mm² 2 minimum 100,000	124
		1 contact Contact Ø: 2 mm	8 Units 20.32 mm	High voltage Operating voltage[1] Rated impulse voltage[1] Degree of pollution[1] Mating cycles	 6,300 V 20,000 V 2 minimum 10,000	126
Coax		4 contacts for 50 Ω coax contacts	3 Units 7.62 mm	High contact density Frequency range Mating cycles	 0 to 1.3 GHz minimum 60,000	128
		2 contacts for 50 Ω coax contacts SMA termination	5 Units 12.7 mm	9.0 GHz Frequency range Mating cycles	 0 to 9.0 GHz minimum 100,000	130
		2 contacts for 50 Ω coax contacts	5 Units 12.7 mm	Frequency range Mating cycles	0 to 2,4 GHz minimum 100,000	132
		2 contacts for 50 Ω coax contacts	5 Units 12.7 mm	High voltage Frequency range Mating cycles	 0 to 2.8 GHz minimum 100,000	134

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008) for degree of pollution 2. [2] Definition max. continuous current see page 187.

OVERVIEW OF ALL MODULES

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

	Modules	Description	Units / width	Features		Page
Coax		2 contacts for 75 Ω coax contacts	5 Units 12.7 mm	Frequency range Mating cycles	0 to 3.0 GHz minimum 100,000	136
Compressed air and fluid modules		2 contacts for Compressed air valves	5 Units 12.7 mm	20 bar Tube diameter Mating cycles	 M5 or max. 4 mm minimum 100,000	138
		2 contacts for Compressed air valves	16 Units 40.64 mm	12 bar Tube diameter Mating cycles	 max. 6 mm minimum 100,000	140
		1 contact for Compressed air valve	8 Units 20.32 mm	12 bar Tube diameter Mating cycles	 max. 6 mm minimum 100,000	142
		2 contacts for fluid coupling plug	5 Units 12.7 mm	10 bar Tube diameter Mating cycles	 M5 internal thread minimum 100,000	144
Fiber optic		5 contacts for fiber optic contacts for plastic fiber (POF)	2 Units 5.08 mm	High contact density Insertion loss typical Mating cycles	 1.5 dB for 670 nm minimum 40,000	148

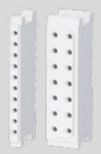
OVERVIEW OF ALL MODULES

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

	Modules	Description	Units / width	Features	Page
Fiber optic		2 contacts for fiber optic contacts for plastic fiber (POF)	5 Units 12.7 mm	Mating cycles minimum 100,000 Insertion loss typical 1.5 dB for 670 nm	150
		3 contacts for fiber optic contacts for fiber glass (GOF)	4 Units 10.16 mm	Mating cycles minimum 100,000 Insertion loss typical 1 dB for 670 nm	152
Shielded implementation/high-speed connector		2 to 10 contacts for inserts size 0	5 Units 12.7 mm	Mating cycles minimum 10,000 Suitable for all common bus systems	154
		2 to 14 contacts for inserts size 1	6 Units 15.24 mm	Mating cycles minimum 10,000 With springwire minimum 60,000 Suitable for all common bus systems	156
		4 to 16 contacts for inserts size 2	7 Units 17.78 mm	Mating cycles minimum 10,000 With springwire minimum 60,000 Suitable for all common bus systems	158
		10 to 30 contacts for inserts size 3	8 Units 20.32 mm	Mating cycles minimum 10,000 Suitable for all common bus systems	160

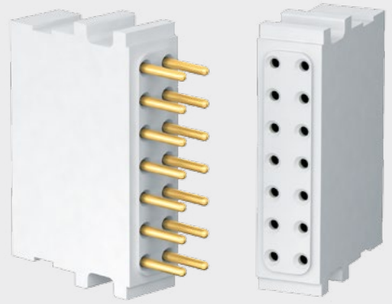
OVERVIEW OF ALL MODULES

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

	Modules	Description	Units / width	Features	Page
Blank modules / spacer modules / coding modules / pin protection modules		Blank modules	1 Unit 3 Units 2.54 mm 7.62 mm 5 Units 12.7 mm	Used to fill incomplete frames.	162
		Spacer module	1 Unit 2 Units 2.54 mm 5.08 mm 3 Units 5 Units 7.62 mm 12.7 mm	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.	163
		Coding modules	1 Unit 2.54 mm	Arranged between the modules to create keyed guiding system.	164
		Pin protection modules	1 Unit 2.54 mm	Used to protect the pins in conjunction with small pin diameters.	165

MODULES 14 CONTACTS

SIGNAL



Contact diameter: 1.02 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 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).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 168.

TECHNICAL DATA

Voltage information[2]

Operating voltage	320 V	100 V
Rated impulse voltage	2,500 V	2,500 V
Degree of pollution	2	3

Voltage information acc. to MIL[3]

Operating voltage	950 V
Test voltage	2,850 V

Mechanical data

Total mating force (average)	18.9 N / Module
Total sliding force (average)	13.7 N / Module
Contact diameter	1.02 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 TOOL I (ANGLED)

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

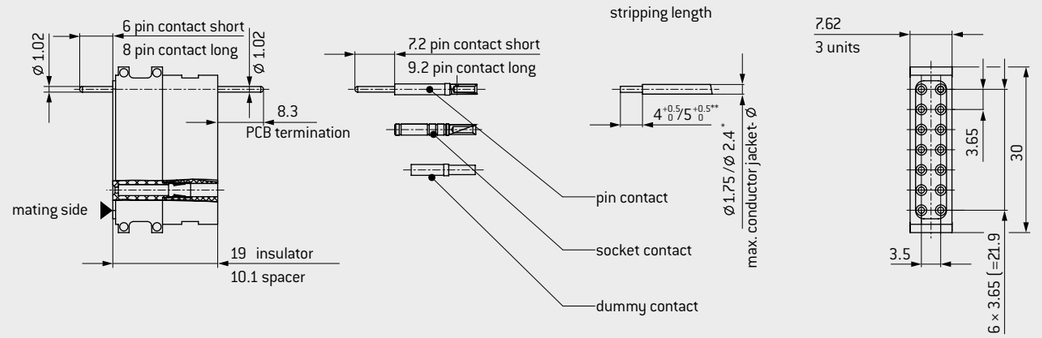
REMOVAL TOOL II

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.

[1] Definition max. continuous current see page 187. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [3] See page 185.

INSULATOR PIN AND SOCKET



Module 14 contacts	Part number
Insulator	611.130.114.923.000
Spacer	611.130.111.923.000
Dummy contact	021.341.124.923.000

* ≤ Ø 1.75 removal possible / ≤ Ø 2.4 removal not possible.

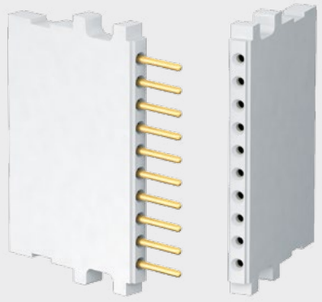
** $4^{+0.5}_{0}$: AWG 24/28; 0.25/0.08 mm²
$5^{+0.5}_{0}$: AWG 20/22; 0.5/0.38 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG/mm	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact short[1]	180.362.000.307.000	0.5 / 0.38	20 / 22	9	7	13.5	2.1
Pin contact long[1]	180.382.000.307.000						
Socket contact	170.362.700.207.000						
Pin contact short[1]	180.544.000.307.000	0.25 / 0.08	24 / 28	6	5	9	2.1
Pin contact long[1]	180.574.000.307.000						
Socket contact	170.544.700.207.000						
Pin contact short[1]	180.818.000.307.000		PCB termination Ø 1.02 mm	9	7	13.5	2.1
Pin contact long[1]	180.819.000.307.000						
Socket contact	170.818.700.207.000						

[1] Non-magnetic version on request. [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.

MODULE 10 CONTACTS FOR TURNED CONTACTS

SIGNAL



Contact diameter: 0.76 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 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[2]		
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[3]		
Operating voltage	500 V	
Test 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 acc. to UL 1977, Second edition, max. 75 °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 TOOL I (ANGLED)

Removal of the already assembled contact (incl. cable).
PART NUMBER: 087.170.361.000.000

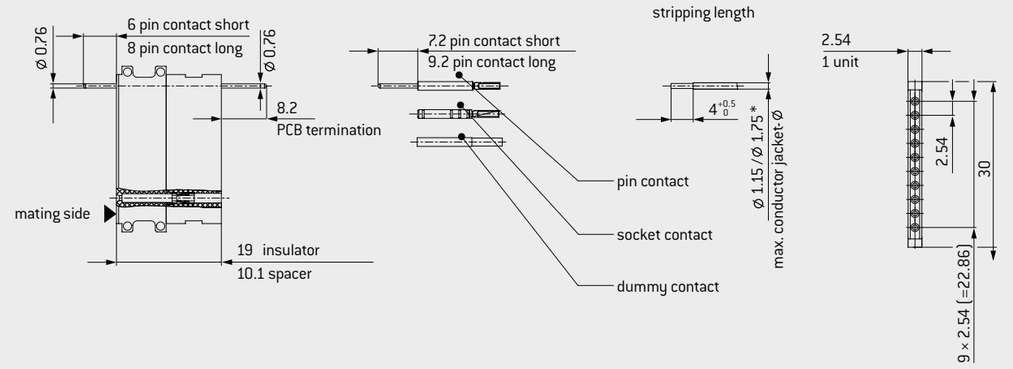
REMOVAL TOOL II

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.

[1] Definition max. continuous current see page 187. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [3] See page 185.

INSULATOR PIN AND SOCKET



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

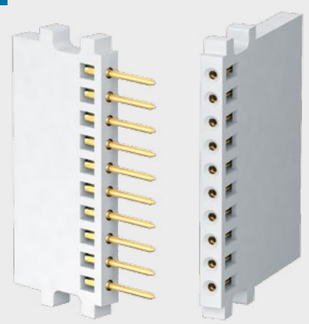
Module 10 contacts	Part number
Insulator	611.122.110.923.000
Spacer	611.122.111.923.000
Dummy contact	021.341.123.923.000

Description	Part number	Conductor cross-section mm²	Termination AWG/mm	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact short[1]	180.361.000.307.000	0.38	22	7.5	6	11	3.8
Pin contact long[1]	180.381.000.307.000						
Socket contact[1]	170.361.700.207.000						
Pin contact short[1]	180.540.000.307.000	0.25/0.08	24 / 28	6	5	9	3.8
Pin contact long[1]	180.570.000.307.000						
Socket contact[1]	170.540.700.207.000						
Pin contact short[1]	180.850.000.307.000		PCB termination Ø 0.76 mm	7.5	6	11	3.8
Pin contact long[1]	180.851.000.307.000						
Socket contact[1]	170.850.700.207.000						

[1] Non-magnetic version on request. [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.

MODULE 10 CONTACTS FOR STAMPED CONTACTS

SIGNAL



Contact diameter: 0.7 mm
Mating cycles: minimum 5,000
Current-carrying capacity[1]: 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

Voltage information[2]

Operating voltage	32 V	10 V
Rated impulse voltage	1,500 V	1,500 V
Degree of pollution	2	3

Voltage information acc. to MIL[3]

Operating voltage	450 V
Test voltage	1,350 V

Mechanical data

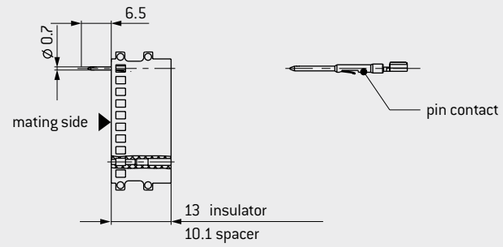
Total mating force (average)	5 N / Module
Total sliding force (average)	4.8 N / Module
Contact diameter	0.7 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 5,000

Materials

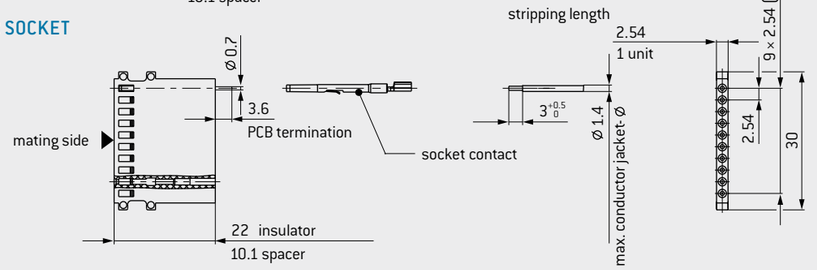
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact	CuSn6 alloy
Contact finish	
in termination area	Sn over Ni
in contact area	Au over Ni

[1] Definition max. continuous current see page 187. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [3] See page 185.

INSULATOR PIN



INSULATOR SOCKET



Module 10 contacts	Part number
Insulator socket (crimp)	610.158.110.923.000
Insulator pin (crimp)	611.158.110.923.000
Insulator socket (PCB equipped)	610.158.010.923.000
Spacer	611.122.111.923.000

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact	186.080.103.535.1__	0.14/0.08	26/28	3.5	2.5	4.5	3.8
Socket contact	176.082.103.535.1__						
Pin contact	186.080.103.535.2__	0.38/0.25	22/24	4.5	3.5	6	3.8
Socket contact	176.082.103.535.2__						

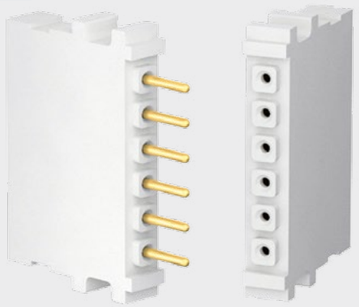
Packaging unit for crimp model (per reel)

Quantity	500	900	5,000	10,000	20,000
Code number	51	52	54	55	50

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

MODULE 6 CONTACTS

SIGNAL



Contact diameter: 1.02 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 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).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 168.

TECHNICAL DATA

Voltage information[2]

Operating voltage	400 V	160 V
Rated impulse voltage	3,000 V	3,000 V
Degree of pollution	2	3

Voltage information acc. to MIL[3]

Operating voltage	850 V
Test voltage	2,550 V

Mechanical data

Total mating force (average)	8.1 N / Module
Total sliding force (average)	5.9 N / Module
Contact diameter	1.02 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 TOOL I (ANGLED)

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

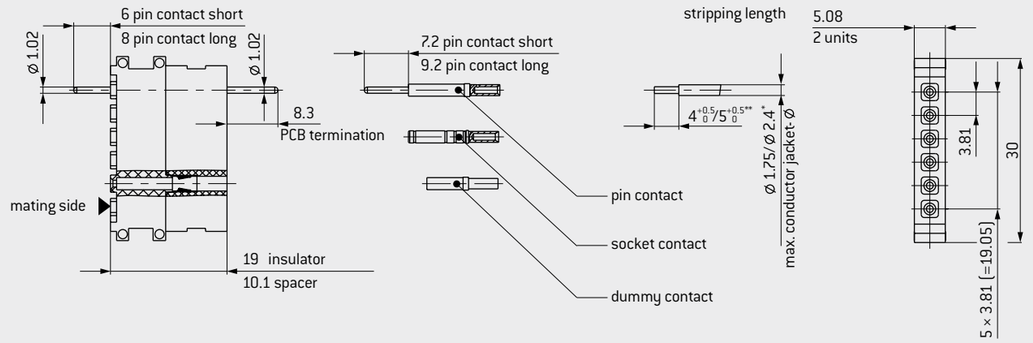
REMOVAL TOOL II

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.

[1] Definition max. continuous current see page 187. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [3] See page 185.

INSULATOR PIN AND SOCKET



Module 6 contacts	Part number
Insulator	611.123.106.923.000
Spacer	611.123.111.923.000
Dummy contact	021.341.124.923.000

* ≤ ø 1.75 removal possible / ≤ ø 2.4 removal not possible.

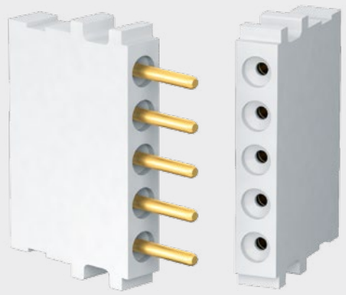
** $4^{+0.5}_{0}$: AWG 24/28; 0.25/0.08 mm²
$5^{+0.5}_{0}$: AWG 20/22; 0.5/0.38 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact short[1]	180.362.000.307.000	0.5 / 0.38	20 / 22	9	8	13.5	2.1
Pin contact long[1]	180.382.000.307.000						
Socket contact[1]	170.362.700.207.000						
Pin contact short[1]	180.544.000.307.000	0.25 / 0.08	24 / 28	6	6	9	2.1
Pin contact long[1]	180.574.000.307.000						
Socket contact[1]	170.544.700.207.000						
Pin contact short[1]	180.818.000.307.000		PCB termination ø 1.02 mm	9	8	13.5	2.1
Pin contact long[1]	180.819.000.307.000						
Socket contact[1]	170.818.700.207.000						

[1] Non-magnetic version on request. [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.

MODULE 5 CONTACTS

SIGNAL



Contact diameter: 1.5 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 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).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 168.

TECHNICAL DATA

Voltage information[2]

Operating voltage	500 V	200 V
Rated impulse voltage	2,500 V	2,500 V
Degree of pollution	2	3

Voltage information acc. to MIL[3]

Operating voltage	750 V
Test voltage	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
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	
Contact body	Au over Ni
Contact springs	Ag

REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL I (ANGLED)

Removal of the already assembled contact (incl. cable).
PART NUMBER: 087.170.363.000.000

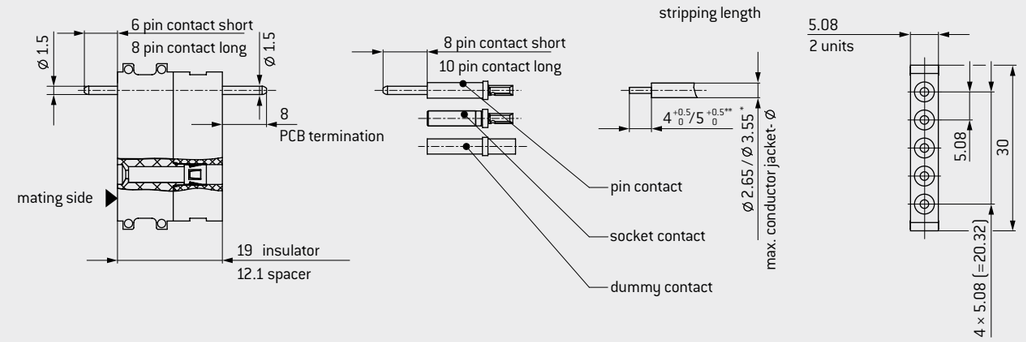
REMOVAL TOOL II

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.

[1] Definition max. continuous current see page 187. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [3] See page 185.

INSULATOR PIN AND SOCKET



Module 5 contacts	Part number
Insulator	611.124.105.923.000
Spacer	611.124.111.923.000
Dummy contact	021.341.125.923.000

* ≤ Ø 2.65 removal possible / ≤ Ø 3.55 removal not possible.

** $4^{+0.5}_{0}$: AWG 24/28; 0.25/0.08 mm²
$5^{+0.5}_{0}$: AWG 20/22; 0.5/0.38 mm²
AWG 14/18; 0.75/1.5 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact short[1]	180.363.000.307.000	1.5	14	18	14.5	27	0.95
Pin contact long[1]	180.383.000.307.000						
Socket contact[1]	170.363.700.201.000						
Pin contact short	180.543.000.307.000		16	18	14.5	27	0.95
Pin contact long	180.573.000.307.000						
Socket contact	170.543.700.201.000						
Pin contact short[1]	180.545.000.307.000	1 / 0.75	18	16	13	22.5	0.95
Pin contact long[1]	180.575.000.307.000						
Socket contact[1]	170.545.700.201.000						
Pin contact short[1]	180.541.000.307.000	0.5 / 0.38	20/22	10	8	15	0.95
Pin contact long[1]	180.571.000.307.000						
Socket contact[1]	170.541.700.201.000						
Pin contact short	180.857.000.307.000	0.25 / 0.08	24/28	6	6	9	0.95
Pin contact long	180.856.000.307.000						
Socket contact	170.857.700.201.000						
Pin contact short	180.539.000.307.000		PCB termination Ø 1.5 mm	18	14.5	27	0.95
Pin contact long	180.569.000.307.000						
Socket contact	170.539.700.201.000						

[1] Non-magnetic version on request. [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.

MODULE 4 CONTACTS

POWER

Contact diameter: 2.41 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 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 181).
- Crimp information see page 168.

TECHNICAL DATA

Voltage information[2]		
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[3]	
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

REMOVAL TOOL I (STRAIGHT)

Removal of the already assembled contact (incl. cable).
PART NUMBER: 087.170.139.000.000

REMOVAL TOOL I (ANGLED)

Removal of the already assembled contact (incl. cable).
PART NUMBER: 087.170.365.000.000

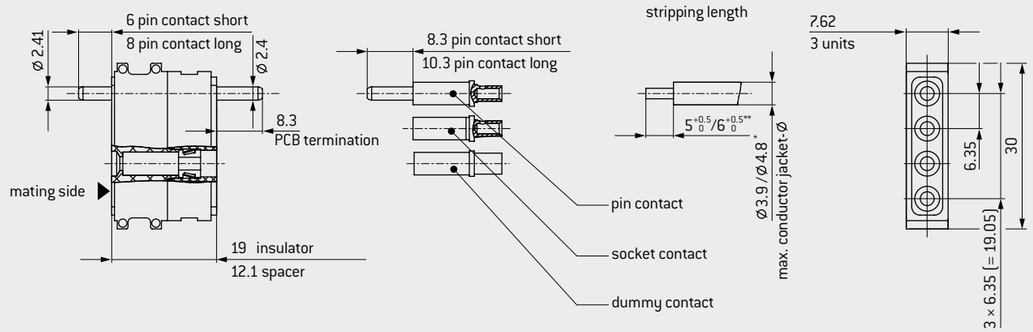
REMOVAL TOOL II

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.

[1] Definition max. continuous current see page 187. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [3] See page 185.

INSULATOR PIN AND SOCKET



Module 4 contacts	Part number
Insulator	611.126.104.923.000
Spacer	611.126.111.923.000
Dummy contact	021.341.127.923.000

* ≤ Ø 3.9 removal possible / ≤ Ø 4.8 removal not possible.

** $5^{+0.5}_{0}$: AWG 14/22; 0.38/1.5 mm²
$6^{+0.5}_{0}$: AWG 12; 2.5 mm²

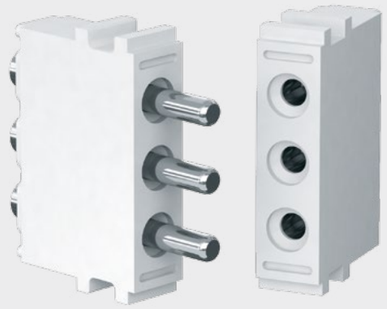
*** PCB termination / crimp termination at 6 mm², protection against contact in the termination area recommended, e. g. heat-shrink tubing.

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact short	180.365.000.301.000						
Pin contact long	180.385.000.301.000		12	28	25	41	0.45
Socket contact	170.365.100.201.000						
Pin contact short[1]	180.910.000.301.000						
Pin contact long[1]	180.911.000.301.000	2.5		24	19	33.5	0.45
Socket contact[1]	170.910.100.201.000						
Pin contact short	182.607.000.301.000						
Pin contact long	182.604.000.301.000	1.5	14	18	15	27	0.45
Socket contact	172.604.100.201.000						
Pin contact short	182.606.000.301.000						
Pin contact long	182.603.000.301.000	1/0.75	18	16	13	23.5	0.45
Socket contact	172.603.100.201.000						
Pin contact short	182.608.000.301.000						
Pin contact long	182.605.000.301.000	0.5/0.38	20/22	10.5	8	15.5	0.55
Socket contact	172.605.100.201.000						
Pin contact short	180.820.000.301.000						
Pin contact long	180.821.000.301.000		PCB termination Ø 2.4 mm	28	25	41	0.45
Socket contact	170.820.100.201.000						

[1] Non-magnetic version on request. [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.

MODULE 3 CONTACTS

POWER



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 information[1]

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[2]

Operating voltage	1,200 V
Test voltage	3,600 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

REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL I (ANGLED)

Removal of the already assembled contact (incl. cable).
PART NUMBER: 087.170.366.000.000

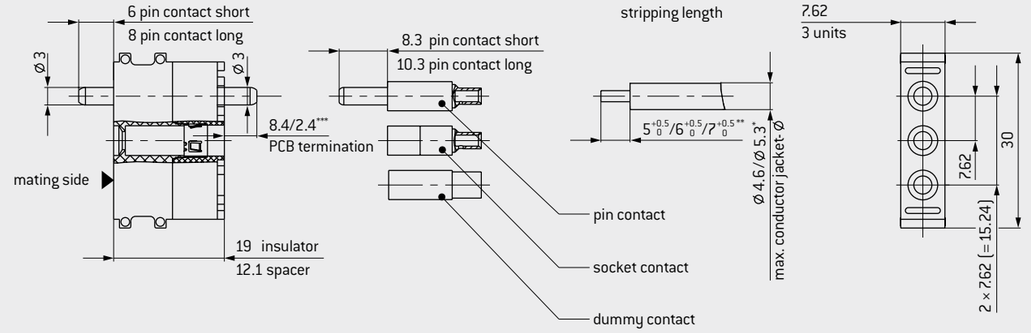
REMOVAL TOOL II

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.

[1] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [2] See page 185.

INSULATOR PIN AND SOCKET



* ≤ Ø 4.6 removal possible / ≤ Ø 5.3 removal not possible.

** $5^{+0.5}_{0}$: AWG 14/22; 0.38/4 mm²
$6^{+0.5}_{0}$: 2.5/4 mm²
$7^{+0.5}_{0}$: 6 mm²

*** PCB termination / crimp termination at 6 mm², protection against contact in the termination area recommended, e. g. heat-shrink tubing.

Module 3 contacts	Part number
Insulator	611.127.103.923.000
Spacer	611.127.111.923.000
Dummy contact	021.341.128.923.000

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact short	182.980.000.301.000	6		39	30	58	0.3
Pin contact long	182.981.000.301.000						
Socket contact	172.978.100.201.000						
Pin contact short[1]	180.366.000.301.000	4		39	30	58	0.3
Pin contact long[1]	180.386.000.301.000						
Socket contact[1]	172.366.100.201.000						
Pin contact short	180.546.000.301.000	2.5		25	21	37	0.3
Pin contact long	180.576.000.301.000						
Socket contact	170.546.100.201.000						
Pin contact short[1]	182.582.000.301.000	1.5	14	19	16	28	1
Pin contact long	182.583.000.301.000						
Socket contact[1]	172.582.100.201.000						
Pin contact short	182.584.000.301.000	1/0.75	18	16.5	14	24.5	1
Pin contact long[1]	182.585.000.301.000						
Socket contact[1]	172.584.100.201.000						
Pin contact short	182.586.000.301.000	0.5/0.38	20/22	11.5	9.5	17	0.4
Pin contact long	182.587.000.301.000						
Socket contact	172.586.100.201.000						
Pin contact short	182.571.000.301.000		PCB termination Ø 3.0 mm	39	30	58	0.3
Pin contact long	182.572.000.301.000						
Socket contact	172.843.100.201.000						

[1] Non-magnetic version on request. [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.

MODULE 3 CONTACTS

POWER

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

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

Contact diameter: 3 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 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 0298-4:2013 (see page 181).
- Crimp information see page 168.

TECHNICAL DATA

Voltage information[2]

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[3]

Operating voltage	2,500 V
Test voltage	7,500 V

Mechanical data

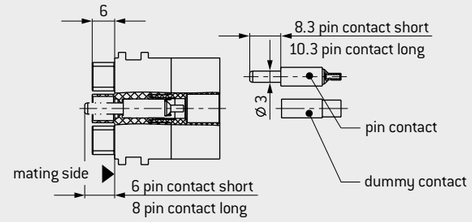
Total mating force (average)	13.5 N / Module
Total sliding force (average)	9.8 N / Module
Contact diameter	3 mm
Operating temperature	–40 °C to +125 °C acc. to UL 1977, Second Edition, max. 75 °C
Mating cycles	minimum 100,000

Materials

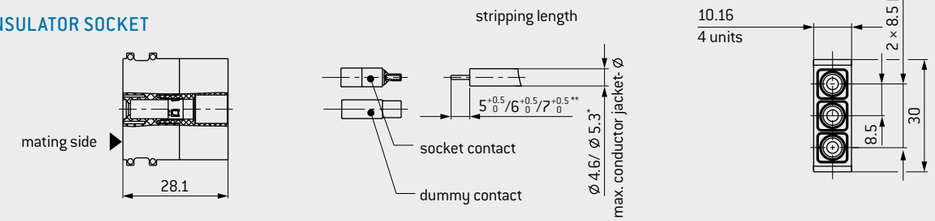
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy
Contact spring	CuSn alloy
Contact finish	Ag

[1] Definition max. continuous current see page 187. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [3] See page 185.

INSULATOR PIN



INSULATOR SOCKET



Module 3 contacts	Part number
Insulator socket	610.162.103.923.000
Insulator pin	611.162.103.923.000
Dummy contact	021.341.128.923.000

* ≤ Ø 4.6 removal possible / ≤ Ø 5.3 removal not possible.

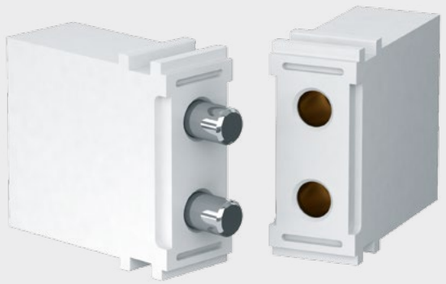
** $5^{+0.5}_{0}$: AWG 14/22; 0.38/4 mm²
$6^{+0.5}_{0}$: 2.5/4 mm²
$7^{+0.5}_{0}$: 6 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact	182.980.000.301.000	6		39	30	58	0.3
Pin contact long	182.981.000.301.000						
Socket contact	172.978.100.201.000						
Pin contact short[1]	180.366.000.301.000	4		39	30	58	0.3
Pin contact long[1]	180.386.000.301.000						
Socket contact[1]	172.366.100.201.000						
Pin contact short	180.546.000.301.000	2.5		25	21	37	0.3
Pin contact long	180.576.000.301.000						
Socket contact	170.546.100.201.000						
Pin contact short[1]	182.582.000.301.000	1.5	14	19	16	28	1
Pin contact long	182.583.000.301.000						
Socket contact[1]	172.582.100.201.000						
Pin contact short	182.584.000.301.000	1/0.75	18	16.5	14	24.5	1
Pin contact long[1]	182.585.000.301.000						
Socket contact[1]	172.584.100.201.000						
Pin contact short	182.586.000.301.000	0.5/0.38	20/22	11.5	9.5	17	1
Pin contact long	182.587.000.301.000						
Socket contact	172.586.100.201.000						

[1] Non-magnetic version on request. [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.

MODULE 2 CONTACTS

POWER



Contact diameter: 5 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 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 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.
- Contacts and insulators up to 200 °C on request.

REMOVAL TOOL

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.

TECHNICAL DATA

Voltage information[2]

Operating voltage	1,000 V	250 V
Rated impulse voltage	4,000 V	4,000 V
Degree of pollution	2	3

Voltage information acc. to MIL[3]

Operating voltage	1,250 V
Test voltage	3,750 V

Mechanical data

Total mating force (average)	21 N / Module
Total sliding force (average)	15 N / Module
Contact diameter	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	Ag

[1] Definition max. continuous current see page 187. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [3] See page 185.

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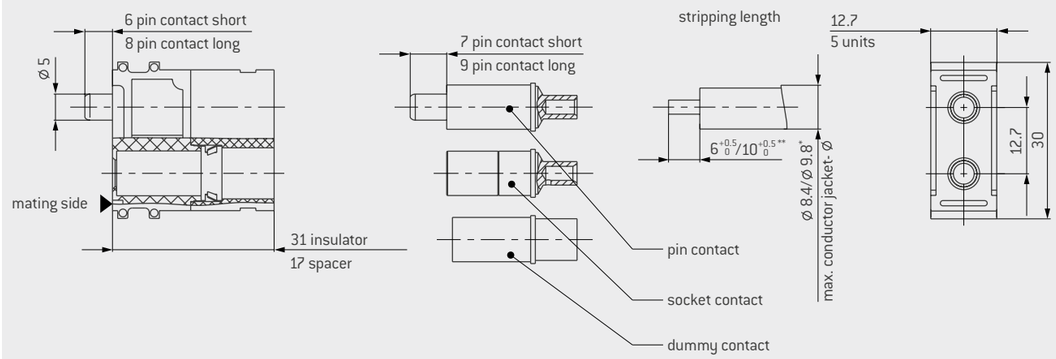
INSULATOR PIN AND SOCKET



Module 2 contacts	Part number
Insulator	611.129.102.923.000
Spacer	611.129.111.923.000
Dummy contact	021.341.130.923.000

* ≤ Ø 8.4 removal possible / ≤ Ø 9.8 removal not possible.

** $6^{+0.5}_{0}$: 4 mm²
$10^{+0.5}_{0}$: 10–16 mm²

Description	Part number	Conductor cross-section mm²	Nennstrom[1] Single contact A	Nennstrom[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact short	182.891.000.301.000	16	80	70	119	0.21
Pin contact long	182.892.000.301.000					
Socket contact	172.891.100.201.000					
Pin contact short	180.490.000.301.000	10	65	57	97	0.21
Pin contact long	180.491.000.301.000					
Socket contact	170.490.100.201.000					
Pin contact short	180.369.000.301.000	4	39	34	58	0.21
Pin contact long	180.389.000.301.000					
Socket contact	170.369.100.201.000					

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

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MODULE 2 CONTACTS

ODU SPRINGTAC® (contacts with springwire technology).

HIGH CURRENT

Contact diameter: 8 mm
Mating cycles[1]: minimum 100,000
Current-carrying capacity[2]: 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.

REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts.

PART NUMBER: 087.611.002.001.000
Locking torque: 2.7 Nm ± 0.1 Nm

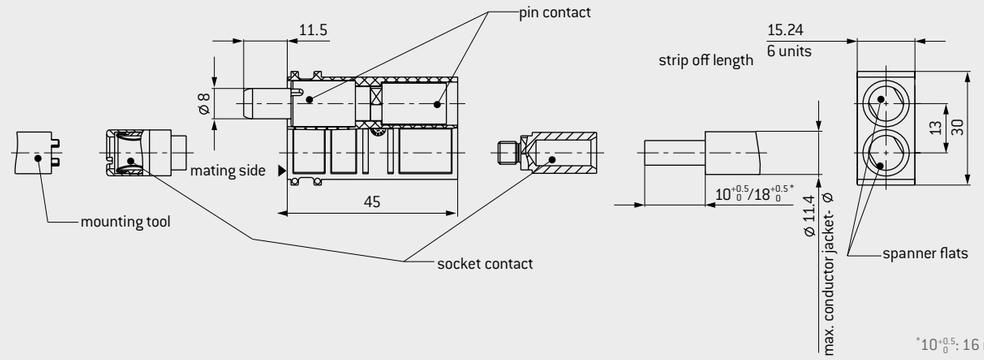
For an overview of all tools please see from page 175.

TECHNICAL DATA

Voltage information[3]		
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[4]		
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 cycles[1]	minimum 100,000	
Materials		
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94	
Contact body	Cu alloy	
Contact spring	CuSn alloy	
Contact finish	Ag	

[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] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [4] See page 185.

INSULATOR PIN AND SOCKET



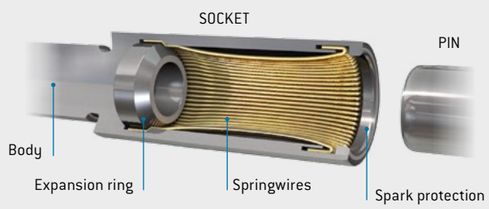
In application with a housing please check the cable space requirement.

*10+0.5 0: 16 mm²
18+0.5 0: 25 mm²

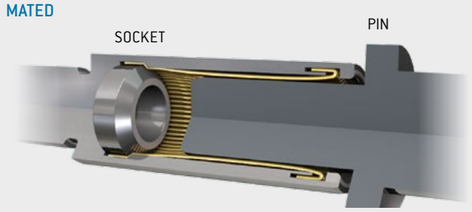
ODU SPRINGTAC® (CONTACTS WITH SPRINGWIRE TECHNOLOGY)

ODU SPRINGTAC offers a large number of contact surfaces. The wires are mounted individually and connected with a lathe-turned body. The springwires contact and flex independently from one another (see also page 26).

DEMATED



MATED



Module 2 contacts	Part number
Insulator	611.173.102.923.000

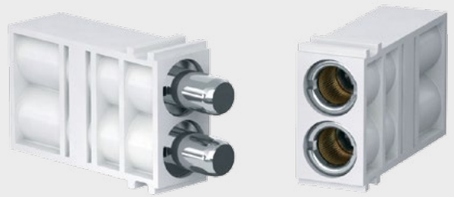
Description	Part number	Conductor cross-section[1] mm²	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact	181.873.100.200.000	25	100	95	142	0.2
Socket contact	170.045.100.201.000					
Pin contact	181.872.100.200.000	16	75	70	111	0.2
Socket contact	171.045.100.201.000					

[1] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005; class 5), class 5. [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.

MODULE 2 CONTACTS

ODU LAMTAC® (contacts with lamella technology).

HIGH CURRENT



Contact diameter: 8 mm
Mating cycles[1]: minimum 10,000
Current-carrying capacity[2]: 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.

REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts.

PART NUMBER: 087.611.002.001.000
Locking torque: 2.7 Nm ± 0.1 Nm

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

TECHNICAL DATA

Voltage information[3]

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[4]

Operating voltage	900 V
Test voltage	2,700 V

Mechanical data

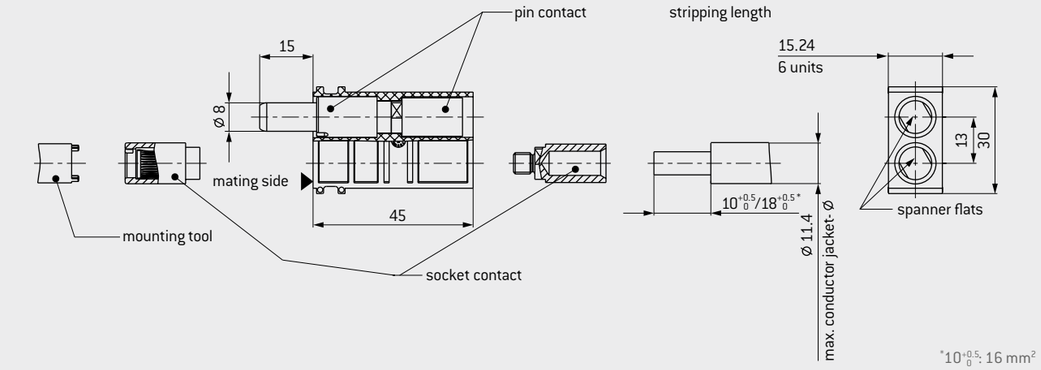
Total mating force (average)	60 N / Module
Total sliding force (average)	45 N / Module
Contact diameter	8 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 10,000

Materials

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

[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] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [4] See page 185.

INSULATOR PIN AND SOCKET



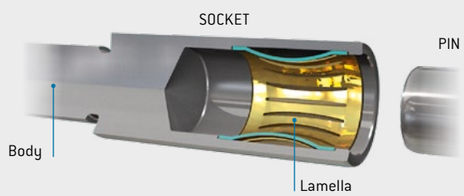
In application with a housing please check the cable space requirement.

*10+0.5: 16 mm²
18+0.5: 25 mm²

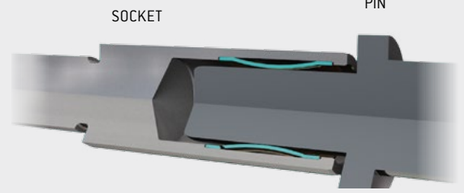
ODU LAMTAC® (CONTACTS WITH LAMELLA TECHNOLOGY)

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).

DEMATED



MATED



Module 2 contacts	Part number
Insulator	611.161.102.923.000

Description	Part number	Conductor cross-section[1] mm²	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact	181.874.100.200.000	25	105	100	154	0.2
Socket contact	178.874.100.201.000					
Pin contact	181.875.100.200.000	16	90	85	133	0.2
Socket contact	178.875.100.201.000					

[1] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005; class 5), class 5. [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.

MODULE 1 CONTACT

ODU LAMTAC® (Contacts with lamella technology).

HIGH CURRENT

Contact diameter: 10 mm or 12 mm
Mating cycles[1]: minimum 10,000
Current-carrying capacity[2]: 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 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.

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

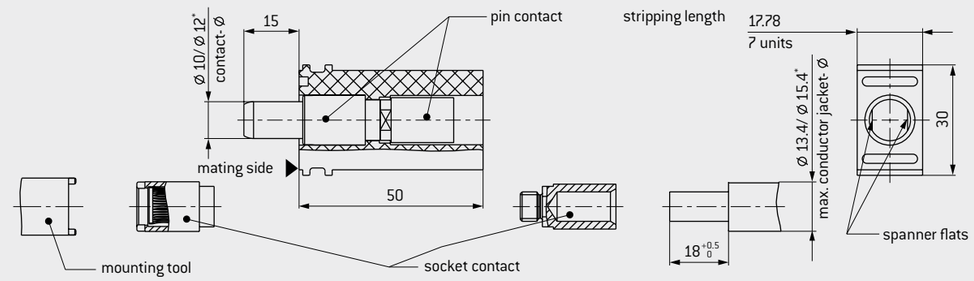
For an overview of all tools please see from page 175.

TECHNICAL DATA

Voltage information[3]		
Operating voltage		
Ø 10 mm	250 V	160 V
Ø 12 mm	200 V	63 V
Rated impulse voltage		
Ø 10 mm	4,000 V	4,000 V
Ø 12 mm	3,000 V	3,000 V
Degree of pollution		
Ø 10 mm and Ø 12 mm	2	3
Voltage information acc. to MIL[4]		
Operating voltage		
Ø 10 mm	2,000 V	
Ø 12 mm	1,500 V	
Test voltage		
Ø 10 mm	6,000 V	
Ø 12 mm	4,500 V	
Mechanical data		
Total mating force (average)		
Ø 10 mm	33 N / Module	
Ø 12 mm	45 N / Module	
Total sliding force (average)		
Ø 10 mm	24 N / Module	
Ø 12 mm	30 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	

[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] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [4] See page 185.

INSULATOR PIN AND SOCKET



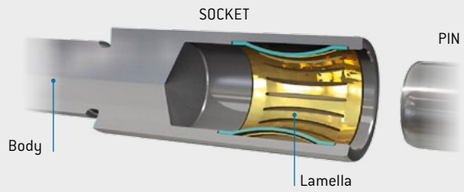
In application with a housing please check the space requirement.

*Ø 13.4: contact-Ø = 10
Ø 15.4: contact-Ø = 12

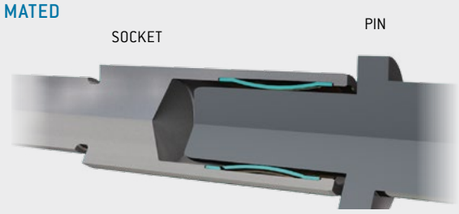
ODU LAMTAC® (CONTACTS WITH LAMELLA TECHNOLOGY)

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).

DEMATED



MATED



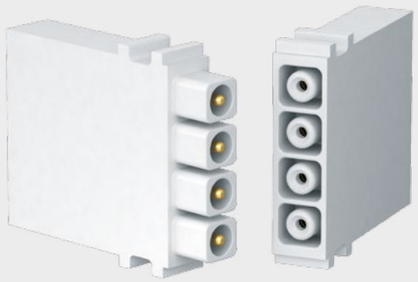
Module 1 contact	Part number
Insulator for contact Ø 10 mm	611.169.101.923.000
Insulator for contact Ø 12 mm	611.172.101.923.000

Description	Part number	Conductor cross-section[1] mm²	Nominal current[2] Single contact A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact Ø 10 mm	181.878.100.200.000	35	120	179	0.15
Socket contact Ø 10 mm	178.878.100.201.000				
Pin contact Ø 10 mm	181.946.100.200.000	25	110	163	0.15
Socket contact Ø 10 mm	178.954.100.201.000				
Pin contact Ø 12 mm	181.943.100.200.000	50	145	220	0.1
Socket contact Ø 12 mm	178.943.100.201.000				
Pin contact Ø 12 mm	181.945.100.200.000	35	135	200	0.1
Socket contact Ø 12 mm	178.953.100.201.000				
Pin contact Ø 12 mm	181.944.100.200.000	25	115	172	0.1
Socket contact Ø 12 mm	178.948.100.201.000				

[1] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005; class 5), class 5. [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.

MODULE 4 CONTACTS

HIGH VOLTAGE



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[1]		
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[2]	
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	
Contact body	Au over Ni
Contact spring	Ag

REMOVAL TOOL I (STRAIGHT)

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

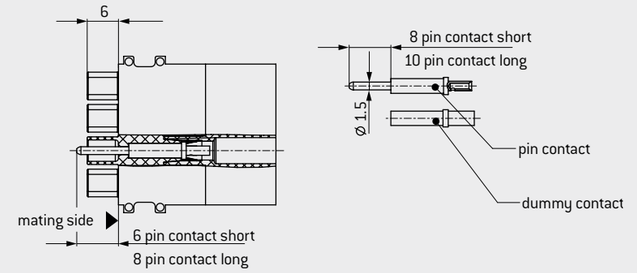
REMOVAL TOOL II

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

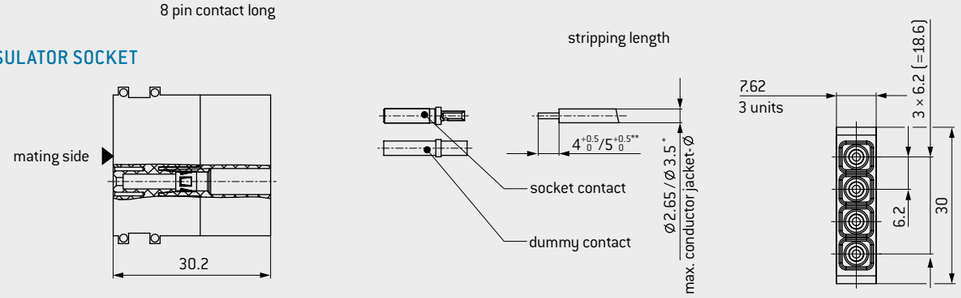
For an overview of all tools please see from page 175.

[1] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181. [2] See page 185.

INSULATOR PIN



INSULATOR SOCKET



Module 4 contacts	Part number
Insulator socket	610.159.104.923.000
Insulator pin	611.159.104.923.000
Dummy contact	021.341.125.923.000

* ≤ Ø 2.65 removal possible / ≤ Ø 3.5 removal not possible.

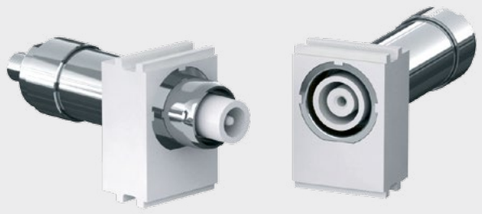
** 4 +0.5 0 : AWG 24/28; 0.25/0.08 mm²
5 +0.5 0 : AWG 20/22; 0.5/0.38 mm²
AWG 14/18; 0.75/1.5 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG/mm	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact short[1]	180.363.000.307.000	1.5	14	18	14.5	27	0.95
Pin contact long[1]	180.383.000.307.000						
Socket contact[1]	170.363.700.201.000						
Pin contact short	180.543.000.307.000		16	18	14.5	27	0.95
Pin contact long	180.573.000.307.000						
Socket contact	170.543.700.201.000						
Pin contact short[1]	180.545.000.307.000	1 / 0.75	18	16	13	22.5	0.95
Pin contact long[1]	180.575.000.307.000						
Socket contact[1]	170.545.700.201.000						
Pin contact short[1]	180.541.000.307.000	0.5 / 0.38	20 / 22	10	8	15	0.95
Pin contact long[1]	180.571.000.307.000						
Socket contact[1]	170.541.700.201.000						
Pin contact short	180.857.000.307.000	0.25 / 0.08	24 / 28	6	6	9	0.95
Pin contact long	180.856.000.307.000						
Socket contact	170.857.700.201.000						

[1] Non-magnetic version on request. [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.

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 information[1]

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

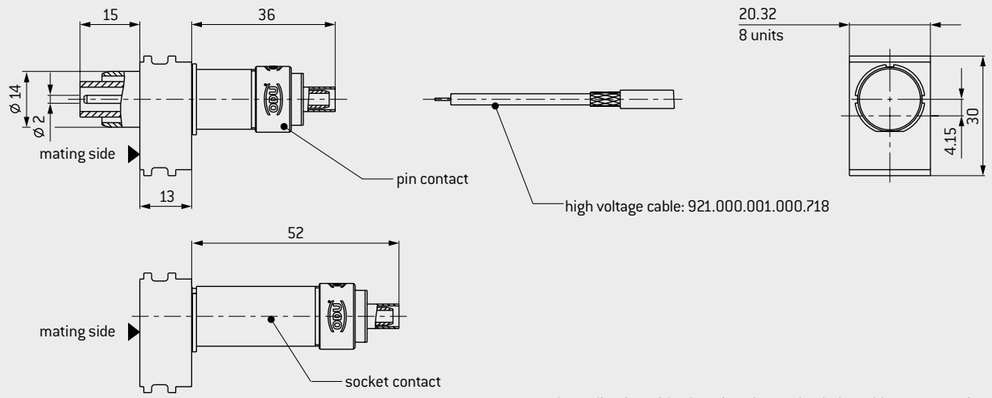
Total mating force (average)	17 N / Module
Total sliding force (average)	15 N / Module
Contact diameter	2 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 10,000

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

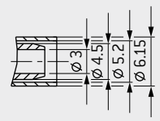
[1] IEC 60664-1:2007 (VDE 0110-1:2008) see page 181.

INSULATOR FOR PIN AND SOCKET

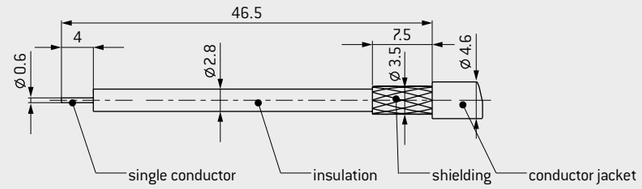


In application with a housing please check the cable space requirement.

CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 1 contact	Part number
Insulator	611.171.101.923.000

Description	Part number	Part number crimp insert	Conductor cross-section AWG / mm²	Nominal current A	Contact resistance average mΩ
Pin contact	122.138.001.201.000	082.000.039.106.000	22 / 24	3.5	0.4
Socket contact	122.138.002.201.000				
High voltage line[1]	921.000.001.000.718		0.25		
Crimping tool for shielding sleeve	080.000.039.000.000				

[1] Partial discharge test carried out with recommended cable construction.

MODULE 4 CONTACTS FOR 50 Ω

COAX

Mating cycles: minimum 60,000
Non-magnetic
Frequency range[1]: 0–1.3 GHz

TECHNICAL NOTES

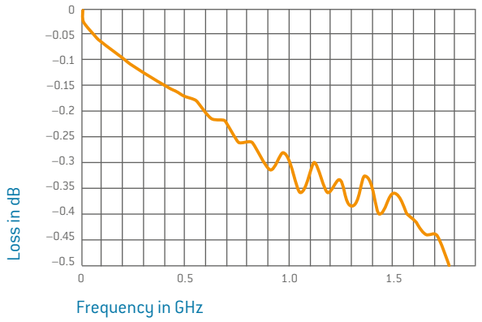
- Crimp information see page 168.

TECHNICAL DATA

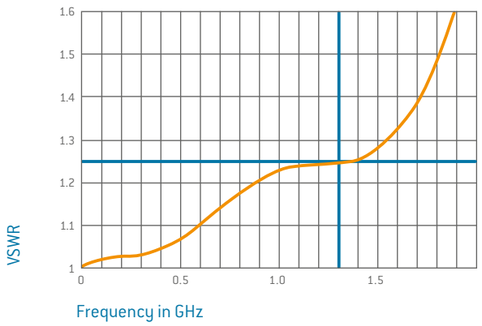
Frequency range[1]	0–1.3 GHz[1]
Insulation resistance	> 100 GΩ
Voltage information acc. to MIL[2]	
Operating voltage	350 V
Test voltage	1,050 V
Mechanical data	
Total mating force (average)	17.8 N / Module
Total sliding force (average)	15.3 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	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

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss



Voltage standing-wave ratio VSWR



[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 185.

REMOVAL TOOL I (STRAIGHT)

Removal of the already assembled contact (incl. cable).
PART NUMBER: 087.170.139.000.000

REMOVAL TOOL I (ANGLED)

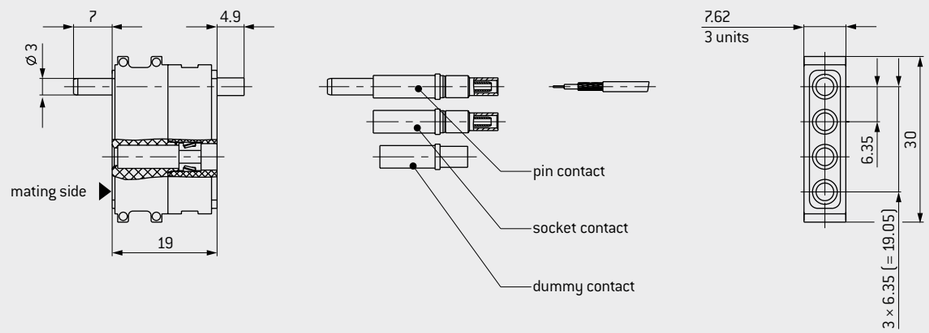
Removal of the already assembled contact (incl. cable).
PART NUMBER: 087.170.365.000.000

REMOVAL TOOL II

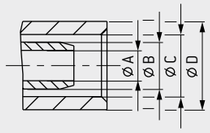
Removal of unassembled contacts, or contacts from which the cable has been removed.
PART NUMBER: 087.611.001.001.000

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

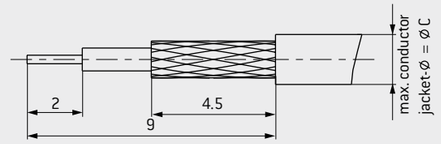
INSULATOR FOR PIN AND SOCKET



CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 4 contacts	Part number
Insulator	611.149.104.923.000
Dummy contact	021.341.127.923.000

Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable[1]	A	B	C	D	Part number crimp inserts
Pin contact	122.120.001.257.000	50	1.3	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Pin contact	122.120.003.257.000		0.8	RG 174 / RG 188 / RG 316 (75 Ω: RG 179, RG 187)	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.120.011.257.000		0.85	G 02232 (H+S)[2]	1.75	2.7	3.5	4.3	082.000.039.103.000
Socket contact	122.120.002.257.000	50	1.3	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Socket contact	122.120.004.257.000		0.8	RG 174 / RG 188 / RG 316 (75 Ω: RG 179, RG 187)	1.75	2.7	3.2	3.8	082.000.039.102.000
Socket contact	122.120.012.257.000		0.85	G 02232 (H+S)[2]	1.75	2.7	3.5	4.3	082.000.039.103.000
Crimping tool for shielding sleeve	080.000.039.000.000								

[1] Special lines and alternative models on request. [2] Removal tool II is not possible due to the conductor diameter.

MODULE 2 CONTACTS FOR 50 Ω WITH SMA TERMINATION

COAX

Mating cycles: minimum 100,000
Frequency range[1]: 0–9.0 GHz

TECHNICAL NOTES

Frequency range[1]	0–9.0 GHz
Insulation resistance	> 100 GΩ

Voltage information acc. to MIL[2]

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

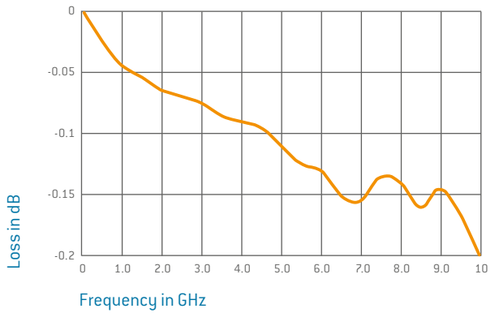
REMOVAL TOOL

PART NUMBER: 087.122.349.000.000

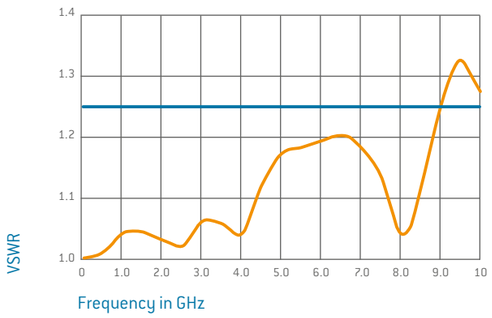
For an overview of all tools please see from page 175.

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss

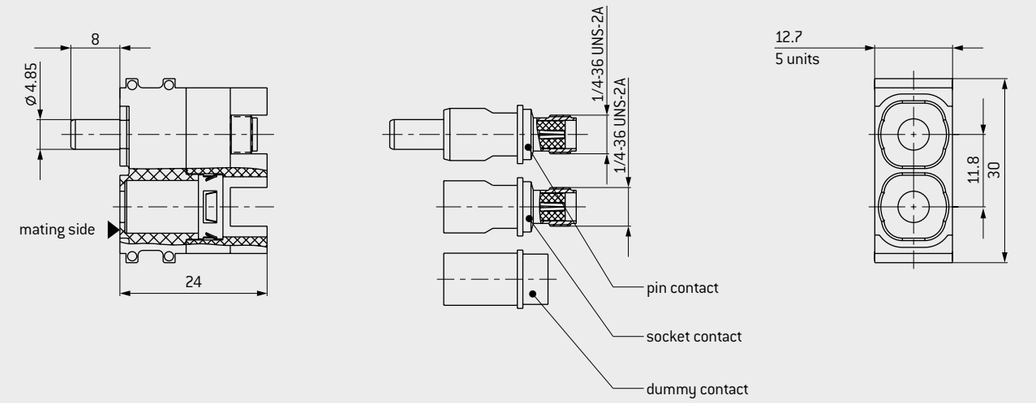


Voltage standing-wave ratio VSWR



[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 185.

INSULATOR PIN AND SOCKET

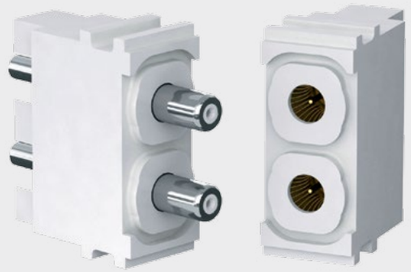


Module 2 contacts	Part number
Insulator	611.152.102.923.000
Dummy contact	021.341.177.300.000

Description	Part number	Characteristic impedance Ω	Frequency range GHz
Pin contact	122.349.001.207.000	50	9.0
Socket contact	122.349.002.207.000		

MODULE 2 CONTACTS FOR 50 Ω

COAX



Mating cycles: minimum 100,000
Frequency range[1]: 0–2.4 GHz

TECHNICAL NOTES

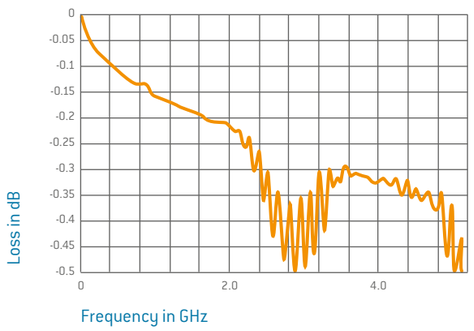
- Crimp information see page 168.

TECHNICAL DATA

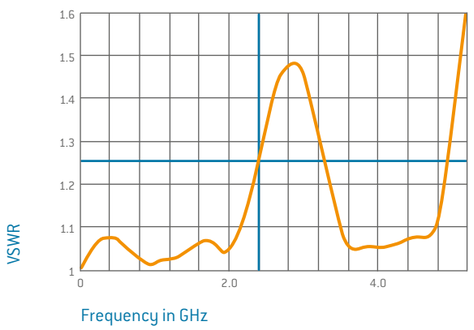
Frequency range[1]	0–2.4 GHz
Insulation resistance	> 100 GΩ
Voltage information acc. to MIL[2]	
Operating voltage	400 V
Test voltage	1,200 V
Mechanical data	
Total mating force (average)	11.9 N / Module
Total sliding force (average)	8.5 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	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[1]

Insertion loss



Voltage standing-wave ratio VSWR



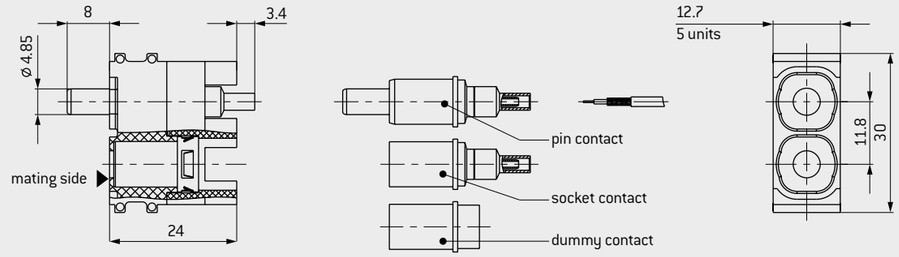
REMOVAL TOOL

PART NUMBER: 087.170.391.000.000

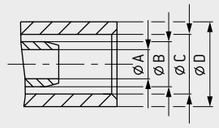
For an overview of all tools please see from page 175.

[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 185.

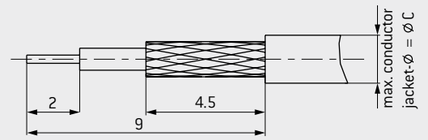
INSULATOR FOR PIN AND SOCKET



CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 2 contacts	Part number
Insulator	611.152.102.923.000
Dummy contact	021.341.177.300.000

Description	Part number	Charac-teristic impedance Ω	Fre-quency range GHz	Cable[1]	A	B	C	D	Part number crimp inserts
Pin contact	122.346.001.207.000	50	1.25	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Pin contact	122.346.003.207.000		2.1	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.346.005.207.000			RG 122 (2YCY 0,4 / 2,5-75 Ω)	2.75	3.7	4.2	5	082.000.039.104.000
Pin contact	122.346.007.207.000		2.4	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
Pin contact	122.346.009.207.000			RG 223	3.15	4.5	5.5	6.15	082.000.039.108.000
Pin contact	122.346.011.207.000		2.1	G 02232 D (H+S) RG 316 D	1.75	2.7	3.5	4.3	082.000.039.103.000
Socket contact	122.346.002.207.000	50	1.25	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Socket contact	122.346.004.207.000		2.1	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Socket contact	122.346.006.207.000			RG 122 (2YCY 0,4 / 2,5-75 Ω)	2.75	3.7	4.2	5	082.000.039.104.000
Socket contact	122.346.008.207.000		2.4	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
Socket contact	122.346.010.207.000			RG 223	3.15	4.5	5.5	6.15	082.000.039.108.000
Socket contact	122.346.012.207.000		2.1	G 02232 D (H+S) RG 316 D	1.75	2.7	3.5	4.3	082.000.039.103.000
Crimping tool for shielding sleeve	080.000.039.000.000								

[1] Special lines on request.

MODULE 2 CONTACTS FOR 50 Ω AND HIGH VOLTAGE

COAX

Mating cycles: minimum 100,000
Non-magnetic
Frequency range[1]: 0–2.8 GHz

TECHNICAL NOTES

- Crimp information see page 168.

TECHNICAL DATA

Voltage information

Frequency range[1]	0–2.8 GHz
Insulation resistance	> 100 GΩ

Voltage information acc. to MIL[2]

Operating voltage	850 V
Test voltage	2,600 V

Mechanical data

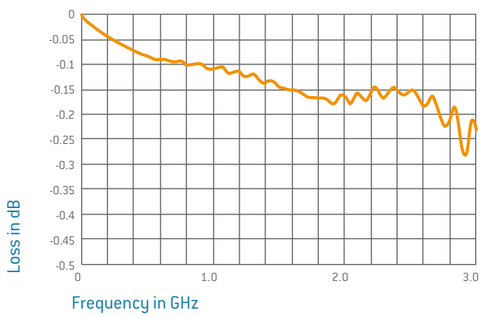
Total mating force (average)	13.9 N / Module
Total sliding force (average)	9.9 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

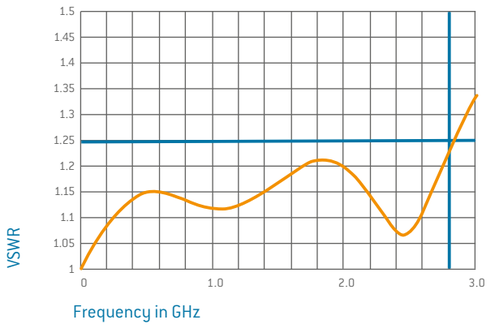
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy / PTFE
Contact spring	CuSn / CuBe alloy
Contact finish	Au over CuSnZn

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss



Voltage standing-wave ratio VSWR



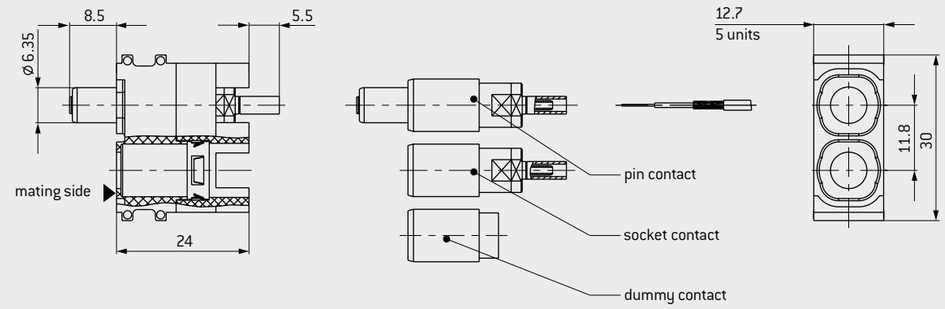
REMOVAL TOOL

PART NUMBER: 087.170.391.000.000

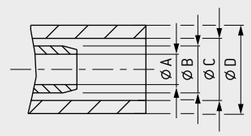
For an overview of all tools please see from page 175.

[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 185.

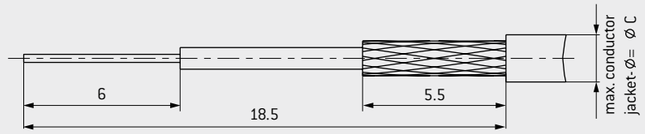
INSULATOR FOR PIN AND SOCKET



CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 2 contacts	Part number
Insulator	611.155.102.923.000
Dummy contact	021.341.179.923.000

Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable[1]	A	B	C	D	Part number crimp inserts
Pin contact	122.126.001.257.000	50	0.3	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Pin contact	122.126.003.257.000		2.0	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.126.013.257.000		2.8	RG 223	3.15	4.5	5.9	6.75	082.000.039.106.000
Pin contact	122.126.007.257.000		2.6	RG 58	3.15	4.5	5.2	6.15	082.000.039.108.000
Socket contact	122.126.002.257.000	50	0.3	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Socket contact	122.126.004.257.000		2.0	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Socket contact	122.126.014.257.000		2.8	RG 223	3.15	4.5	5.9	6.75	082.000.039.108.000
Socket contact	122.126.008.257.000		2.6	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
Crimping tool for shielding sleeve	080.000.039.000.000								

[1] Special lines on request.

MODULE 2 CONTACTS FOR 75 Ω

COAX

Mating cycles: minimum 100,000
Frequency range[1]: 0–3.0 GHz

TECHNICAL NOTES

- Crimp information see page 168.

TECHNICAL DATA

Frequency range[1]	0–3.0 GHz
Insulation resistance	> 100 GΩ

Voltage information acc. to MIL[2]

Operating voltage	475 V
Test voltage	1,425 V

Mechanical data

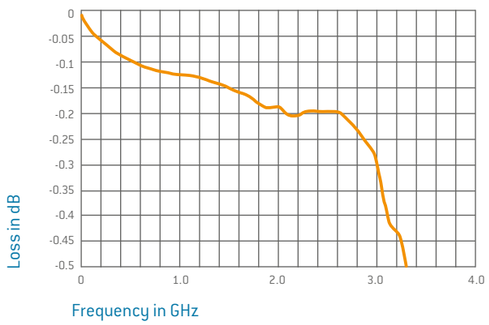
Total mating force (average)	13.3 N / Module
Total sliding force (average)	9.5 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

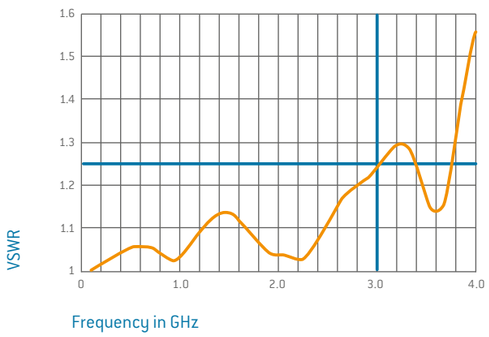
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy/PTFE
Contact spring	CuSn/CuBe alloy
Contact finish	
Center contact	Au over Ni
Outer contact	Ni

HIGH FREQUENCY CHARACTERISTICS FOR 75 Ω COAX CONTACTS[1]

Insertion loss



Voltage standing-wave ratio VSWR



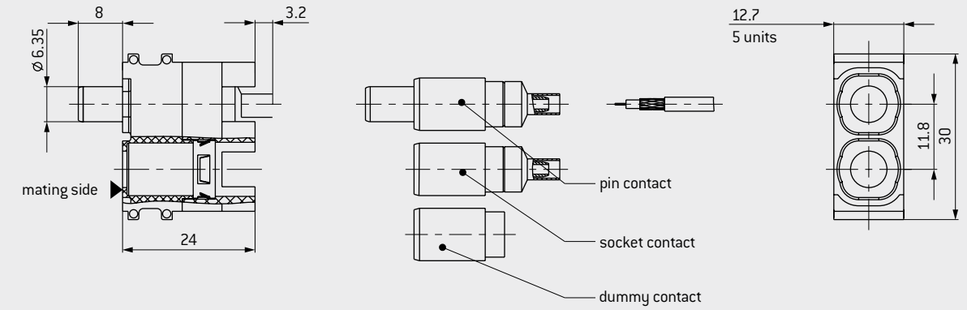
REMOVAL TOOL

PART NUMBER: 087.170.391.000.000

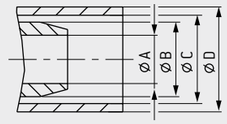
For an overview of all tools please see from page 175.

[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 185.

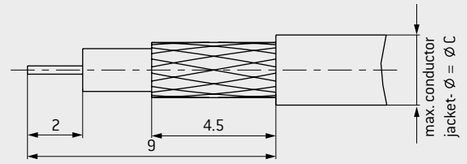
INSULATOR FOR PIN AND SOCKET



CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 2 contacts	Part number
Insulator	611.155.102.923.000
Dummy contact	021.341.179.923.000

Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable[1]	A	B	C	D	Part number crimp inserts
Pin contact	122.348.003.207.000	75	3.0	RG 179/RG 187	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.348.007.207.000		0.55	G 03233 (H+S)	3.15	4.5	5.2	6.15	082.000.039.106.000
Pin contact	122.348.009.207.000		3.0	RG 59	4	5.4	6.3	7.2	082.000.039.109.000
Socket contact	122.348.004.207.000	75	3.0	RG 179/RG 187	1.75	2.7	3.2	3.8	082.000.039.102.000
Socket contact	122.348.008.207.000		0.55	G 03233 (H+S)	3.15	4.5	5.2	6.15	082.000.039.106.000
Socket contact	122.348.010.207.000		3.0	RG 59	4	5.4	6.3	7.2	082.000.039.109.000
Crimping tool for shielding sleeve	080.000.039.000.000								

[1] Special lines on request.

MODULE 2 CONTACTS FOR COMPRESSED AIR VALVES

Inner diameter of tube max. 4 mm, Push-in diameter max. 6 mm.

COMPRESSED AIR

Non shut-off

Shut-off

Operating pressure: 20 bar
Mating cycles[1]: 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 O_2 model[2].

TECHNICAL DATA

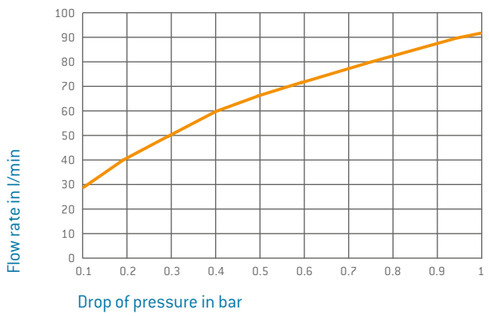
Mechanical data

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[1]	minimum 100,000
Tube termination	M5 internal thread for commercially available Push-in connections

Materials

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

FLOW RATE DIAGRAM

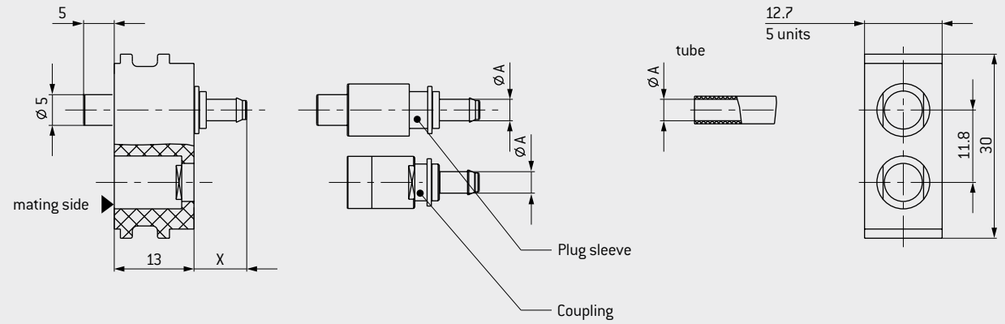


The flow rate diagram refers to the locking version with a maximum gap between socket and pin piece of ≤ 0.5 mm. If the clearance is modified, the drop of pressure increases.

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

INSULATOR PIN AND SOCKET

ACCESSORIES SEE PAGE 146



Module 2 contacts	Part number
Insulator	611.141.102.923.000

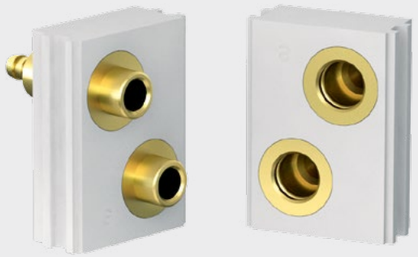
Description	Part number	Dim. A mm	Dim. X mm	Termination types see page 146 I	II
Plug sleeve (non shut-off)	196.023.001.300.000	3	8.5	x	
Plug sleeve (non shut-off)	196.024.001.300.000	4	10.5	x	
Plug sleeve (non shut-off)	196.025.001.300.000	M5	–		x
Coupling plug (non shut-off)	196.023.003.300.000	3	8.5	x	
Coupling plug (non shut-off)	196.024.003.300.000	4	10.5	x	
Coupling plug (non shut-off)	196.025.003.300.000	M5	–		x
Plug sleeve (shut-off)[1,2]	196.025.014.300.000	M5	–		x
Coupling plug (shut-off)	196.023.002.300.000	3	8.5	x	
Coupling plug (shut-off)	196.024.002.300.000	4	10.5	x	
Coupling plug (shut-off)[2]	196.025.012.300.000	M5	–		x

[1] Only pluggable on coupling plug 196.025.012.300.000. [2] Material sealing: FKM.

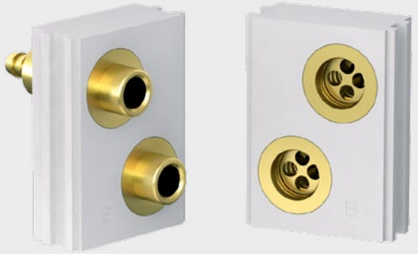
MODULE 2 CONTACTS FOR COMPRESSED AIR VALVES

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[2].

TECHNICAL DATA

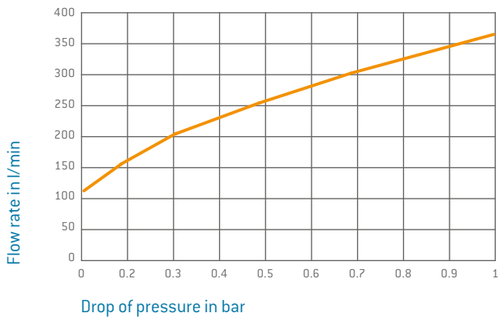
Mechanical data

Valid max. operating pressure	12 bar
Total mating force (average)	
non shut-off	10.8 N / Module
one side shut-off	12.8 N / Module
Total sliding force (average)	
non shut-off	6.8 N / Module
one side shut-off	6.8 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

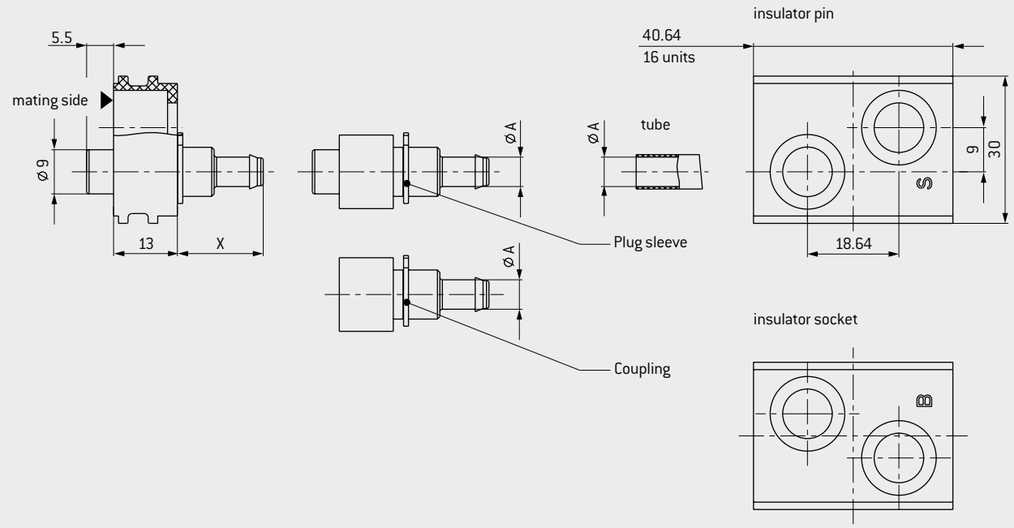
FLOW RATE DIAGRAM



The 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.

INSULATOR PIN AND SOCKET



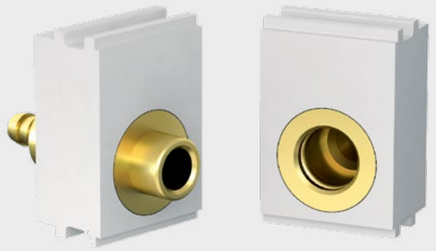
Module 2 contacts	Part number
Insulator socket	610.140.102.923.000
Insulator pin	611.140.102.923.000

Description	Part number	Dim. A mm	Dim. X mm
Plug sleeve (non shut-off)	196.001.001.300.000	4	15
Plug sleeve (non shut-off)	196.002.001.300.000	6	17.5
Coupling plug (non shut-off)	196.001.003.300.000	4	15
Coupling plug (non shut-off)	196.002.003.300.000	6	17.5
Coupling plug (shut-off)	196.001.002.300.000	4	15
Coupling plug (shut-off)	196.002.002.300.000	6	17.5

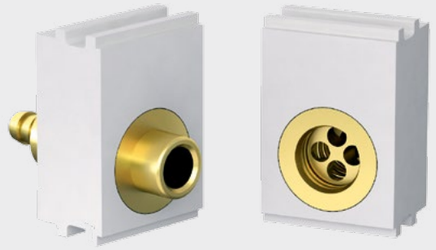
MODULE 1 CONTACT FOR COMPRESSED AIR VALVES

Inner diameter of tube max. 6 mm.

COMPRESSED AIR



Non shut-off version



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[2].

TECHNICAL DATA

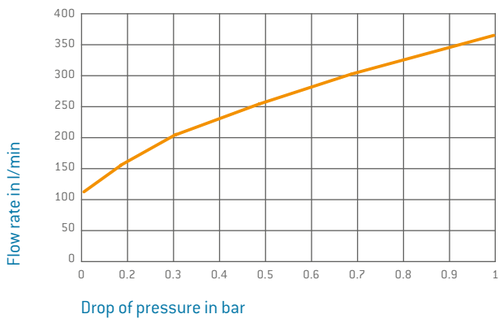
Mechanical data

Valid max. operating pressure	12 bar
Total mating force (average)	
non shut-off	5.4 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

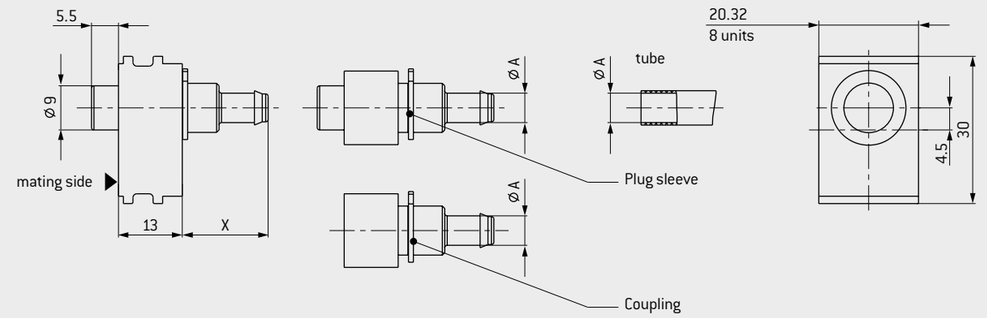
FLOW RATE DIAGRAM



The 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.

INSULATOR PIN AND SOCKET



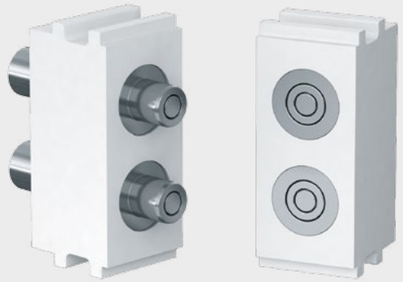
Module 1 contact	Part number
Insulator	611.142.101.923.000

Description	Part number	Dim. A mm	Dim. X mm
Plug sleeve (non shut-off)	196.001.001.300.000	4	15
Plug sleeve (non shut-off)	196.002.001.300.000	6	17.5
Coupling plug (non shut-off)	196.001.003.300.000	4	15
Coupling plug (non shut-off)	196.002.003.300.000	6	17.5
Coupling plug (shut-off)	196.001.002.300.000	4	15
Coupling plug (shut-off)	196.002.002.300.000	6	17.5

MODULE 2 CONTACTS

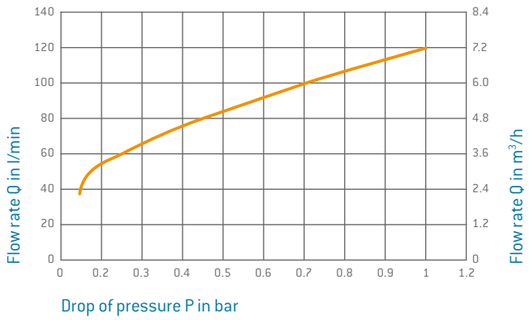
Suitable for conducting air, water and other fluids.

FLUID MODEL

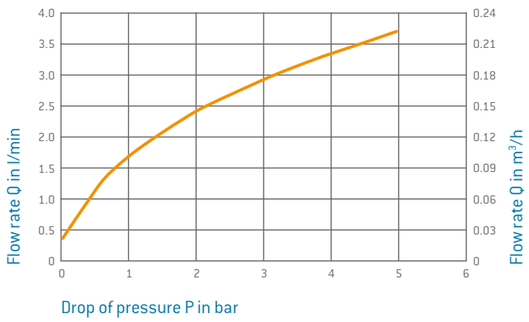


Both side shut-off

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.

Operating pressure: 10 bar low-leakage model
Mating cycles[1]: 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 O_2 model[2].

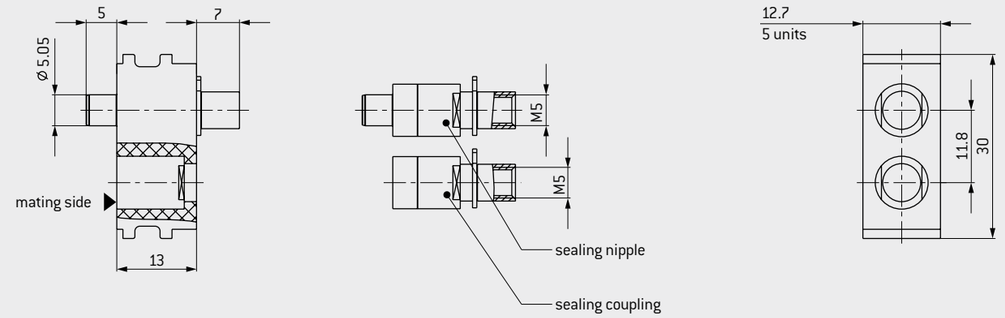
TECHNICAL DATA

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[1]	minimum 100,000
Materials	
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Fluid model	Stainless steel (1.4305)
Sealing	NBR

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

INSULATOR PIN AND SOCKET

ACCESSORIES SEE PAGE 146



Module 2 contacts	Part number
Insulator	611.141.102.923.000

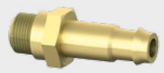
Description	Part number	Termination mm
Plug sleeve (pin piece)	196.025.015.902.001	M5
Coupling plug (socket piece)	196.025.016.902.001	M5

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

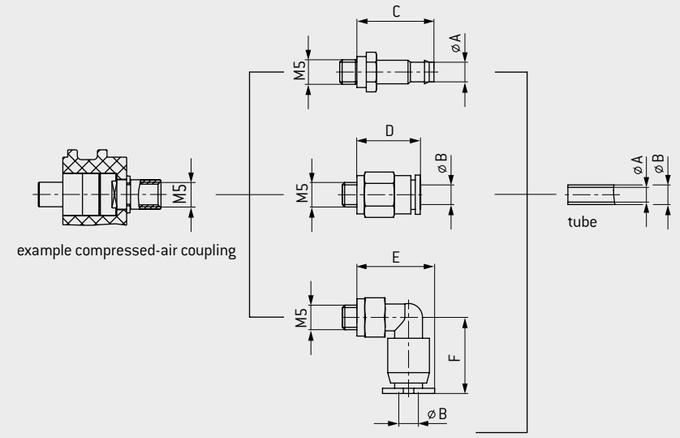
TECHNICAL DATA

Mechanical data

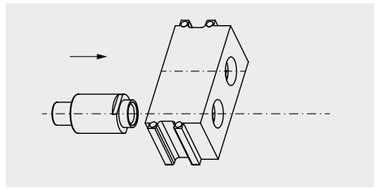
Valid operating pressure (static)	0.95 to 14 bar
Operating temperature	–10 °C to +80 °C
Thread termination	M5

Description	Part number	Dim. A Inner diameter of tube mm	Dim. B Outer diameter of tube mm	Dim. C mm	Dim. D mm	Dim. E mm	Dim. F mm
				incl. sealing washer			
Nipple fitting	945.000.001.000.123	2		10.2			
Nipple fitting	945.000.001.000.136	3		14.2			
Nipple fitting	945.000.001.000.137	4		15.8			
Push-in fitting	945.000.001.000.138		3		13		
Push-in fitting	945.000.001.000.139		4		13.2		
Push-in fitting	945.000.001.000.140		6		14.2		
L connection Push-in	945.000.001.000.141		3			14	11
L connection Push-in	945.000.001.000.142		4			14.9	15.6
L connection Push-in	945.000.001.000.143		6			17.2	16.2

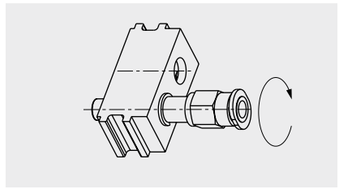
TERMINATION DIMENSIONS, FOR ACCESSORIES USED WITH FLUID COUPLING AND RETAINER RING.



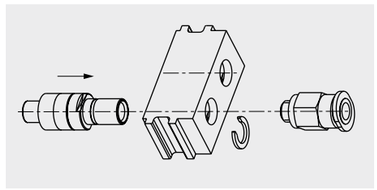
ASSEMBLY OF THE MODEL (DEPENDING ON MODEL)



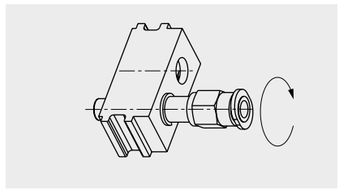
1. Insert model in insulator.



2. Screw termination accessories in model.
   Tightening torque 1.5 Nm.



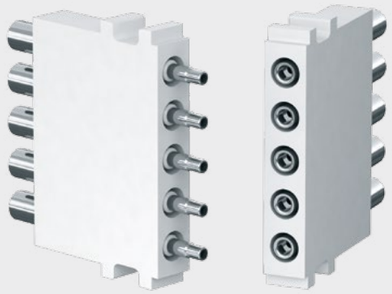
1. Insert model in insulator
   and assemble retaining ring.



2. Screw termination accessories in model.
   Tightening torque 1.5 Nm.

MODULE 5 CONTACTS FOR PLASTIC FIBER POF

FIBER OPTIC



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

Mechanical data

POF (Polymer Optical Fiber)	1 mm
Outer diameter	2.2 mm–2.3 mm
Fiber fastening	Crimp
Insertion loss	
Typical	1.5 dB at 670 nm
During life-time	< 2 dB at 670 nm
Total mating force (average)	< 17.5 N
Operating temperature (depending on fiber)	
Standard fiber	–40 °C to +85 °C
High temperature fiber	–40 °C to +115 °C
Mating cycles	minimum 40,000

Materials

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Fiber optic contact	Cu alloy
Type of fiber	Plastic fiber 980/1.000 (POF)

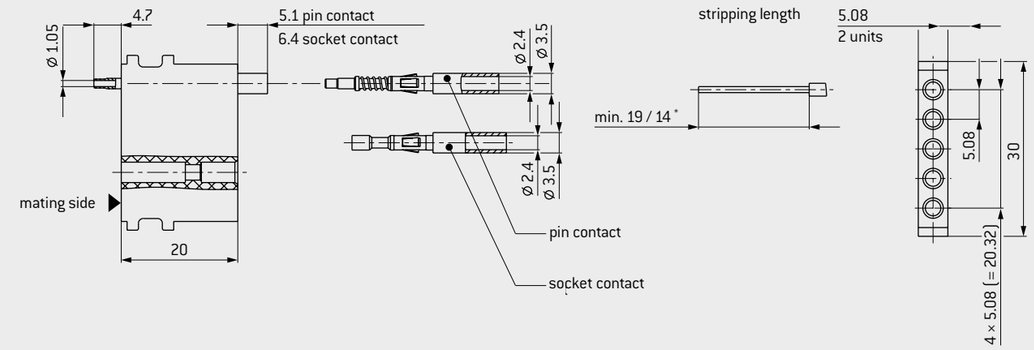
REMOVAL TOOL II

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.

INSULATOR PIN AND SOCKET



* min. 19 pin contact / min. 14 socket contact

Module 5 contacts	Part number
Insulator	611.163.105.923.000

Description	Part number
Socket contact 980 / 1,000 µm	196.503.001.901.000
Pin contact 980 / 1,000 µm	196.503.002.901.000
Processing set (multi-purpose and crimping tool)	080.000.048.000.000
Cutting/stripping universal pliers	080.000.048.100.000
Crimping tool	080.000.048.200.000

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

MODULE 2 CONTACTS FOR PLASTIC FIBER POF / MOST

FIBER OPTIC

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

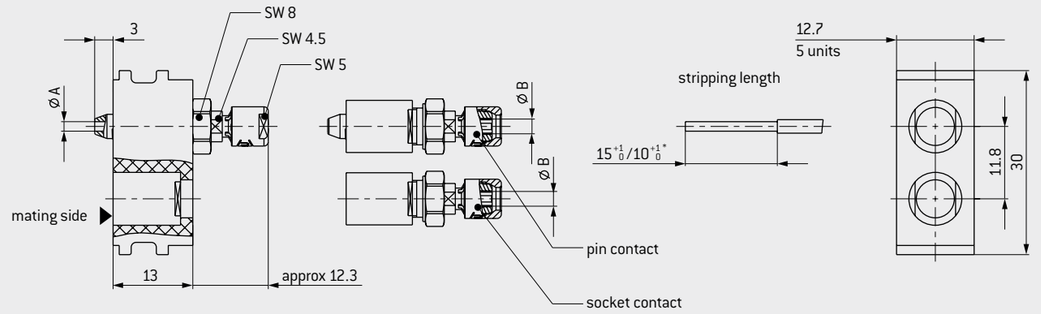
Mechanical data

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 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 glass reinforced acc. to UL-94
Fiber optic contact	Cu alloy
Type of fiber	Plastic fiber 980/1.000 (POF) or 980/1.550 (MOST)

INSULATOR PIN AND SOCKET



*15+1 0 pin contact /10+1 0 socket contact

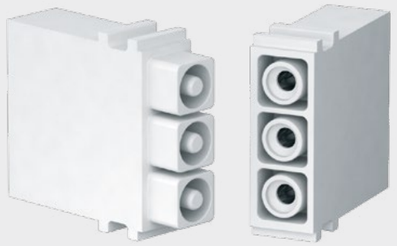
Module 2 contacts	Part number
Insulator	611.141.102.923.000

Description	Part number	Dim. A mm	Dim. B mm
Socket contact 980 / 1,000 µm	196.501.001.901.000	1.05	2.25
Pin contact 980 / 1,000 µm	196.501.002.901.000	1.05	2.25
Socket contact 980 / 1,550 µm (MOST standard)	196.502.001.901.000	1.6	2.35
Pin contact 980 / 1,550 µm (MOST standard)	196.502.002.901.000	1.6	2.35
Cable-stripping tool	598.501.001.000.000		
Spanner wrench 4.5 mm	598.501.002.000.000		
Spanner wrench 5 mm	598.700.001.016.000		
Nutdriver 8 mm	598.501.003.000.000		
Polish-device for socket	598.501.004.000.000		
Spare blades	598.501.006.000.000		
Polish-device for pin	598.501.007.000.000		
Lapp foils, 12 µm, 5 µm	598.501.010.000.000		

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

MODULE 3 CONTACTS FOR FIBER GLASS GOF

FIBER OPTIC



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

For an overview of all tools please see page 175.

Ceramic Ferrule
Single-mode / multi-mode
Mating cycles[1]: 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

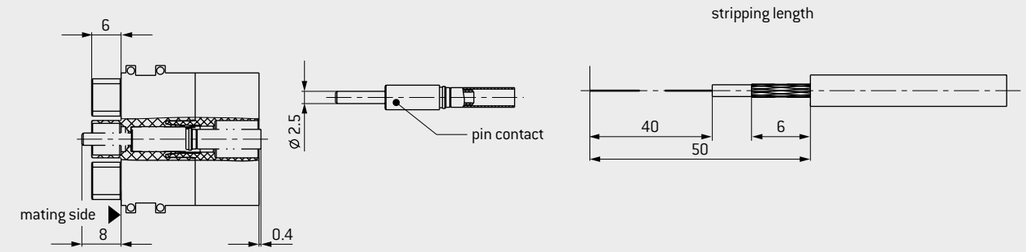
Fiber glass	Single-mode – 9/125 µm Multi-mode – 50/125 µm Multi-mode – 62.5/125 µm
Fiber fastening	Fiber optic glued[2] Surface polished[2] Sheath crimped
Insertion loss typical	< 1 dB for 670 nm
Total mating force (average)	≤ 36 N
Assembly holding force	10 N to 12 N / contact
Operating temperature	–40 °C to +85 °C
Mating cycles[1]	minimum 100,000

Materials

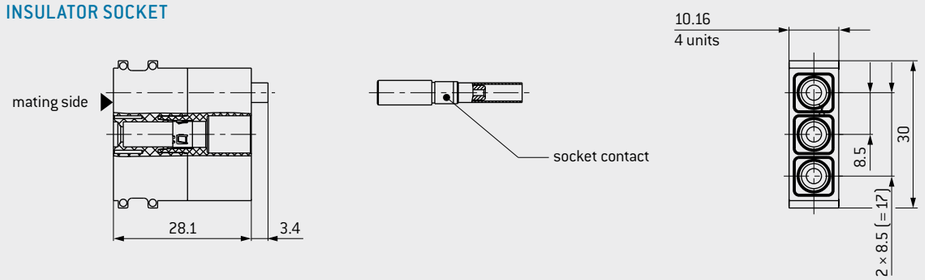
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Ferrule holder	Nickel silver
Ferrule	Ceramic
Spring	CrNi steel

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

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

Description	Part number	Part number crimp insert	Optical fiber
Pin contact	196.603.002.901.000	082.000.039.102.000	50 / 125 µm; 62.5 / 125 µm
Pin contact	196.603.004.901.000		9 / 125 µm
Socket contact	196.603.001.901.000		50 / 125 µm; 62.5 / 125 µm
Socket contact	196.603.003.901.000		9 / 125 µm
Crimping tool for shielding sleeve	080.000.039.000.000		

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

MODULE FOR MULTI-POSITION, SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

Size 0 (e. g. insert in bus systems).

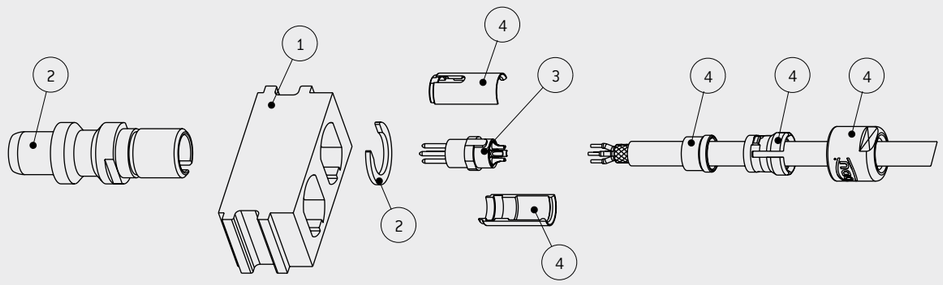
SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

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 GBits/s. For example, Fast-Ethernet, USB 2.0, USB 3.0, FireWire S400 (on request), IEEE 1394.

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



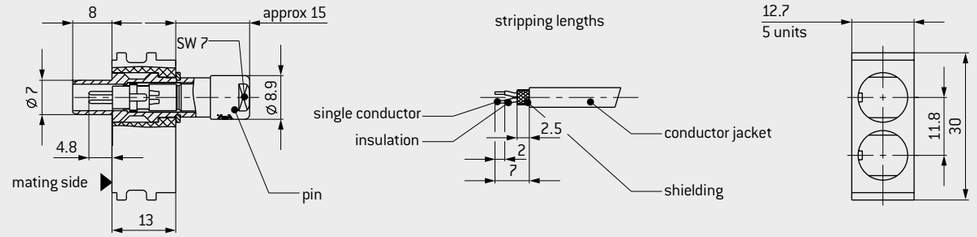
Order	Base parts	Part number
1	Insulator	611.148.102.923.000
2	Socket housing complete	653.001.001.304.000
2	Connector housing complete	653.001.002.304.000
	Dummy contact	021.341.182.300.000
3	Insert complete solder contacts[1]	see next page
4	Assembly set	see table on the right

[1] Available with crimp contact upon request.

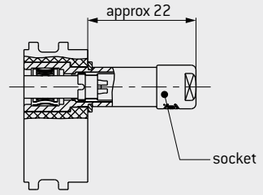
ASSEMBLY SET

Cable ∅ mm	Part number
1.5 to 2	653.001.001.304.020
2 to 2.5	653.001.001.304.025
2.5 to 3	653.001.001.304.030
3 to 3.5	653.001.001.304.035
3.5 to 4	653.001.001.304.040
4 to 4.5	653.001.001.304.045
4.5 to 5	653.001.001.304.050
5 to 6.1	653.001.001.304.061

INSULATOR PIN

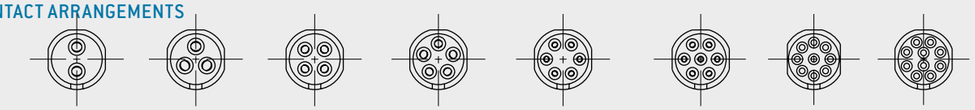


INSULATOR SOCKET



In application with a housing please check the space requirement.

CONTACT ARRANGEMENTS



Number of contacts	Contact diameter mm	Termination cross-section AWG	Rated voltage[1] V	Rated impulse voltage[1] kV	Degree of pollution[1]	Nominal voltage[2] V AC	Model	Category[3]	Insert complete[4] Part number	Total mating force N	Total sliding force N
INSERT WITH ODU TURNTAC® (MATING CYCLES MINIMUM 10,000)											
2	0.9	22	10	2	3	500	Pin		700.849.724.002.200	20	15
			32	2	2		Socket		700.749.724.002.200		
3	0.9	22	32	1.5	2	400	Pin		700.849.724.003.200		
							Socket		700.749.724.003.200		
4	0.7	26	32	1.5	2	300	Pin	CAT 5	700.848.724.004.200	22	17
							Socket		700.748.724.004.200		
4	0.7	22	32	1.5	2	300	Pin	USB 2.0	700.848.724.404.221		
							Socket		700.748.724.404.200		
5	0.7	26	32	1.5	2	366	Pin		700.848.724.005.200		
							Socket		700.748.724.005.200		
6	0.5	28	32	1.5	2	300	Pin		700.841.724.006.200		
							Socket		700.741.724.006.200		
7	0.5	28	32	1.5	2	300	Pin		700.841.724.007.200		
							Socket		700.741.724.007.200		
9	0.5	28	10	1.2	2	200	Pin		700.841.724.009.200	23.5	18
							Socket		700.741.724.009.200		
10	0.5	28	10	1.2	2	200	Pin		700.841.724.010.221		
							Socket		700.741.724.010.221		
10	6 × 0.3 4 × 0.5	28 24	10	1.2	2	100	Pin	USB 3.0	700.831.724.410.D00	16	12
							Socket		700.731.724.410.D00		

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 181. [2] Acc. to EIA-364-20D:2008, SAE AS 13441:2004 method 3001.1. [3] Classification acc. to ISO/IEC 11801:2002.
[4] Insert crimp model on request.

MODULE FOR MULTI-POSITION, SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

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

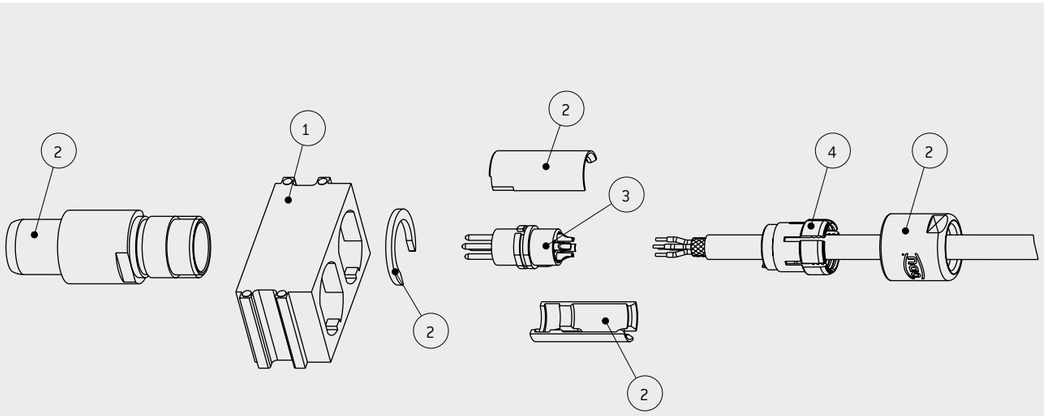
SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

Mating cycles: minimum 10,000 / 60,000
USB 2.0, CAT 5
2 to 14 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, 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).

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



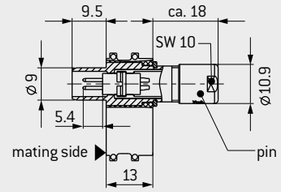
Order	Base parts	Part number
1	Insulator	611.167.102.923.000
2	Socket housing complete	653.002.001.304.000
2	Connector housing complete	653.002.002.304.000
	Dummy contact	021.341.186.300.000
3	Insert complete solder contacts[1]	see next page
4	Assembly set	see table on the right

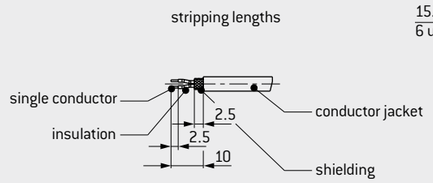
[1] Available with crimp contact upon request.

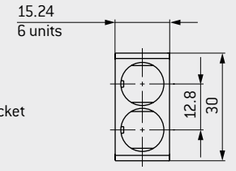
ASSEMBLY SET

Cable ∅ mm	Part number
1.5 to 2.1	751.020.188.304.022
2 to 3.2	751.020.188.304.032
3 to 4.2	751.020.188.304.042
4 to 5.2	751.020.188.304.052
5 to 6.2	751.020.188.304.062
6 to 7.2	751.020.188.304.072
7 to 7.7	751.020.188.304.077

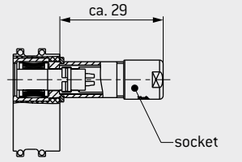
INSULATOR PIN





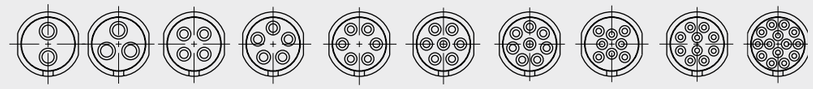


INSULATOR SOCKET



In application with a housing please check the space requirement.

CONTACT ARRANGEMENTS



2 contacts, 3 contacts, 4 contacts (CAT 5, USB 2.0), 5 contacts, 6 contacts, 7 contacts, 8 contacts, 8 contacts (CAT 5), 10 contacts, 14 contacts

Number of contacts	Contact diameter mm	Termination cross-section AWG	Rated voltage[1] V	Rated impulse voltage[1] kV	Degree of pollution[1]	Nominal voltage[2] V AC	Model	Category[3]	Insert complete[4] Part number	Total mating force N	Total sliding force N
INSERT WITH ODU TURNTAC® (MATING CYCLES MINIMUM 10,000)											
2	1.3	20	32	2	3	550	Pin		701.844.724.002.200	8.5	7.5
			80		2		Socket		701.744.724.002.200		
3	1.3	20	16	2	3	500	Pin		701.844.724.003.200	8.5	7.5
			40		2		Socket		701.744.724.003.200		
4	0.9	22	10	2	3	500	Pin	CAT 5	701.849.724.004.200	10.5	9
			32		2		Socket		701.749.724.004.200		
4	0.9	22	10	2	3	500	Pin	USB 2.0	701.849.724.004.D00	10.5	9
			32		2		Socket		701.749.724.004.D00		
5	0.9	22	32	1.5	2	450	Pin		701.849.724.005.200	10.5	9
							Socket		701.749.724.005.200		
6	0.7	22	32	1.5	2	400	Pin		701.848.724.406.200	13	10
							Socket		701.748.724.406.200		
7	0.7	22	32	1.5	2	400	Pin		701.848.724.407.200	13	10
							Socket		701.748.724.407.200		
8	0.7	22	32	1.5	2	333	Pin		701.848.724.408.200	13	10
							Socket		701.748.724.408.200		
8	0.5	26	32	1.5	2	333	Pin	CAT 5	701.841.724.408.D00	13	10.5
							Socket		701.741.724.408.D00		
10	0.5	28	25	1.5	2	333	Pin		701.841.724.010.400	15	12
							Socket		701.741.724.010.200		
14	0.5	28	25	1.5	2	300	Pin		701.841.724.014.400	15	12
							Socket		701.741.724.014.200		
INSERT WITH ODU SPRINGTAC® (MATING CYCLES MINIMUM 60,000)											
4	0.76	22	25	2	3	450	Pin	CAT 5	701.842.724.004.700	7.5	7
			63		2		Socket		701.742.724.004.700		
5	0.76	22	25	1.5	3	400	Pin		701.842.724.005.700	8.5	8
			63		2		Socket		701.742.724.005.700		

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 181. [2] Acc. to EIA-364-20D:2008, SAE AS 13441:2004 method 3001.1.
[3] Classification acc. to ISO/IEC 11801:2002. [4] Insert crimp model on request.

MODULE FOR MULTI-POSITION, SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

Size 2 (e. g. insert in bus systems).

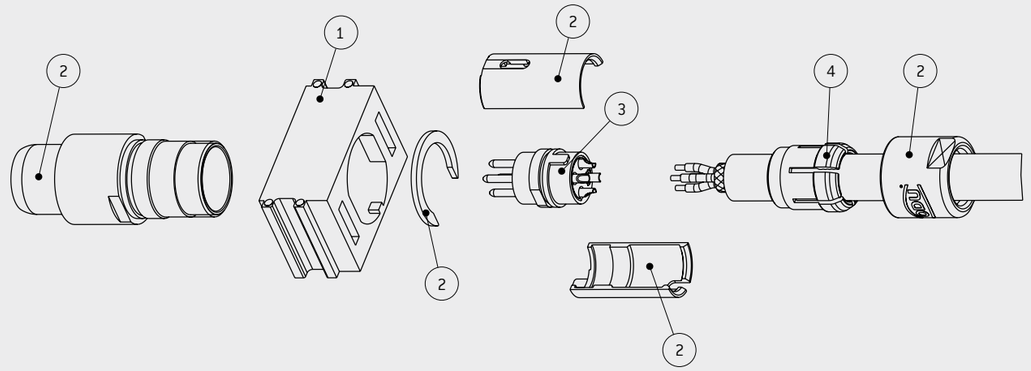
SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

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, Profibus, 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



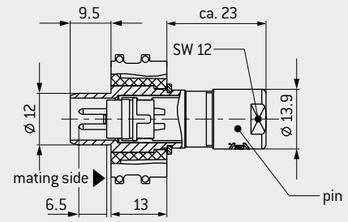
Order	Base parts	Part number
1	Insulator	611.170.101.923.000
2	Socket housing complete	653.003.001.304.000
2	Connector housing complete	653.003.002.304.000
3	Insert complete solder contacts[1]	see next page
4	Assembly set	see table on the right

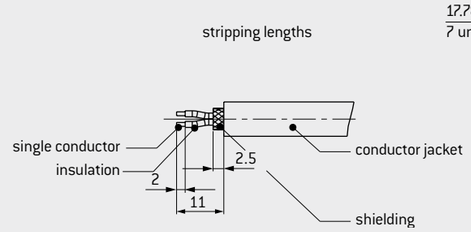
ASSEMBLY SET

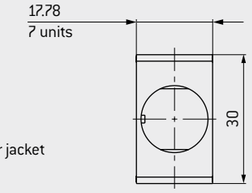
Cable Ø mm	Part number
2 to 3.2	752.020.188.304.032
3 to 4.2	752.020.188.304.042
4 to 5.2	752.020.188.304.052
5 to 6.2	752.020.188.304.062
6 to 7.2	752.020.188.304.072
7 to 8.2	752.020.188.304.082
8 to 9.2	752.020.188.304.092
9 to 9.9	752.020.188.304.099

[1] Available with crimp contact upon request.

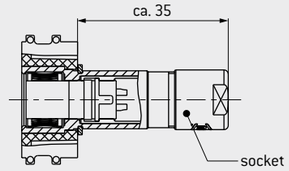
INSULATOR PIN





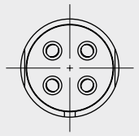


INSULATOR SOCKET

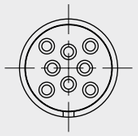


In application with a housing please check the space requirement.

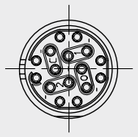
CONTACT ARRANGEMENTS



4 contacts
CAT 5



8 contacts
CAT 5
CAT 6A



16 contacts
HDMI

Number of contacts	Contact diameter mm	Termination cross-section AWG	Rated voltage[1] V	Rated impulse voltage[1] kV	Degree of pollution[1]	Nominal voltage[2] V AC	Model	Category[3]	Insert complete[4] Part number	Total mating force N	Total sliding force N
INSERT WITH ODU TURNTAC® (MATING CYCLES MINIMUM 10,000)											
4	1.3	20	40	2.5	3	650	Pin	CAT 5	702.844.724.004.200	8.5	8
			160		2		Socket		702.744.724.004.200		
8	0.9	22	20	2	3	500	Pin	CAT 6A	702.849.724.008.D00	14.7	12.6
			50		2		Socket		702.749.724.008.D00		
16	0.5	26	10	1.5	3	250	Pin	HDMI	702.841.724.416.D00	30	23
			32		2		Socket		702.741.724.416.D00		
INSERT WITH ODU SPRINGTAC® (MATING CYCLES MINIMUM 60,000)											
8	0.76	22	16	2	3	550	Pin	CAT 5	702.842.724.008.D00	11.5	10.5
			40		2		Socket		702.742.724.008.D00		

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 181. [2] Acc. to EIA-364-20D:2008, SAE AS 13441:2004 method 3001.1.
[3] Classification acc. to ISO/IEC 11801:2002. [4] Insert crimp model on request.

MODULE FOR MULTI-POSITION, SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

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

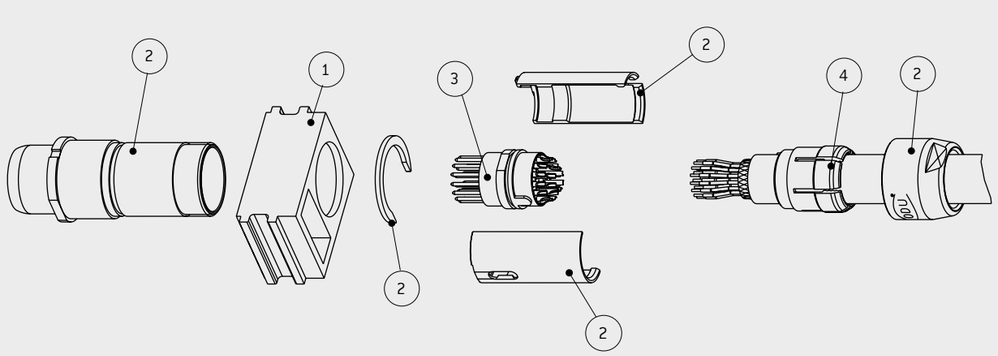
SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

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, Profibus, RS485, Flexray, CAN-Bus and RS232.
- Selected inserts can be qualified for data rates.

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



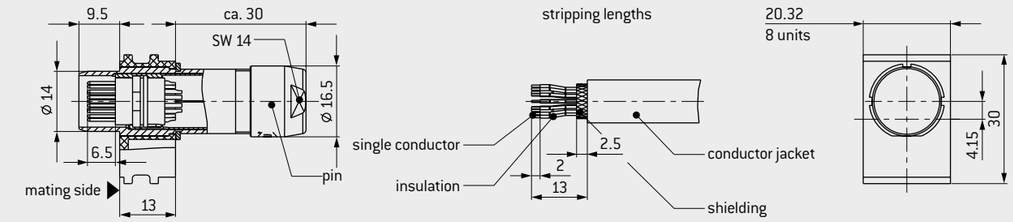
Order	Base parts	Part number
1	Insulator	611.171.101.923.000
2	Socket housing complete	653.004.001.304.000
2	Connector housing complete	653.004.002.304.000
3	Insert complete solder contacts[1]	see next page
4	Assembly set	see table on the right

ASSEMBLY SET

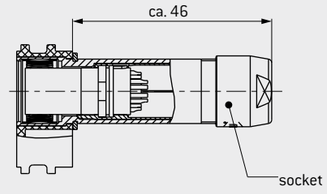
Cable Ø mm	Part number
3 to 4.2	753.020.188.304.042
4 to 5.2	753.020.188.304.052
5 to 6.2	753.020.188.304.062
6 to 7.2	753.020.188.304.072
7 to 8.2	753.020.188.304.082
8 to 9.2	753.020.188.304.092
9 to 10.2	753.020.188.304.102

[1] Available with crimp contact upon request.

INSULATOR PIN

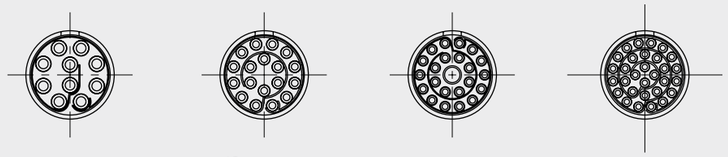


INSULATOR SOCKET



In application with a housing please check the space requirement.

CONTACT ARRANGEMENTS



10 contacts | 18 contacts | 22 contacts | 30 contacts

Number of contacts	Contact diameter mm	Termination cross-section AWG	Rated voltage[1] V	Rated impulse voltage[1] kV	Degree of pollution[1]	Nominal voltage[2] V AC	Model	Category[3]	Insert complete[4] Part number	Total mating force N	Total sliding force N
INSERT WITH ODU TURNTAC® (MATING CYCLES MINIMUM 10,000)											
10	1.3	20	20	2	3	450	Pin		703.844.724.010.200	21.6	19.1
			50	2	2		Socket		703.744.724.010.200		
18	0.9	22	10	2	3	450	Pin		703.849.724.018.200	23.3	20.8
			32	2	2		Socket		703.749.724.018.200		
22	0.7	26	32	1.5	2	366	Pin		703.848.724.022.200	21.7	19.7
							Socket		703.748.724.022.200		
30	0.7	26	32	1.5	2	300	Pin		703.848.724.030.200	28.1	24.5
							Socket		703.748.724.030.200		

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 181. [2] Acc. to EIA-364-20D:2008, SAE AS 13441:2004 method 3001.1.
[3] Classification acc. to ISO/IEC 11801:2002. [4] Insert crimp model on request.

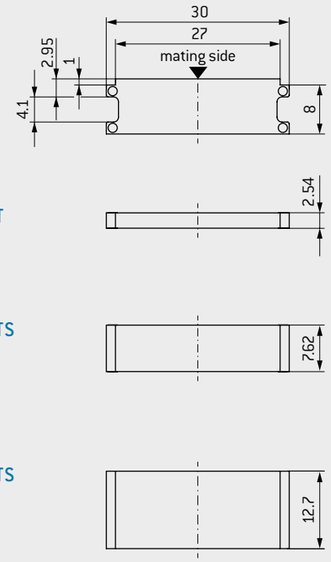
BLANK MODULES

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

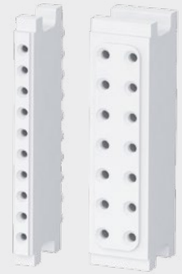
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94



Units	Part number
1	611.122.113.923.000
3	611.130.113.923.000
5	611.128.113.923.000

SPACER MODULES

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

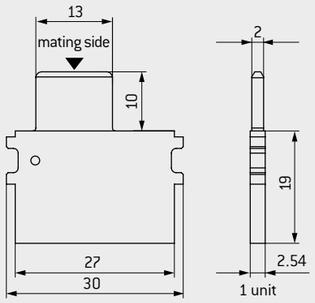
CODING MODULES

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

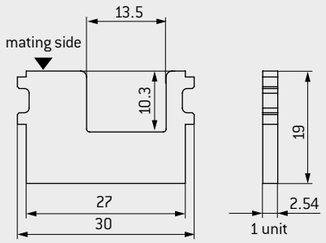
TECHNICAL DATA

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94

PIN



SOCKET



Description	Units	Part number
Coding module (pin)	1	611.161.101.923.000
Coding module (socket)	1	610.161.101.923.000

PIN PROTECTION MODULES

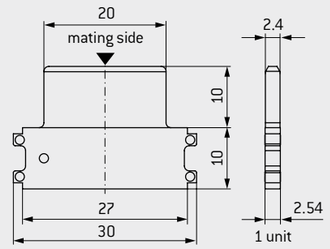
PIN PROTECTION MODULES

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

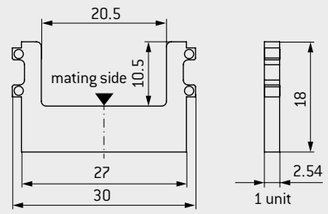
TECHNICAL DATA

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94

PIN

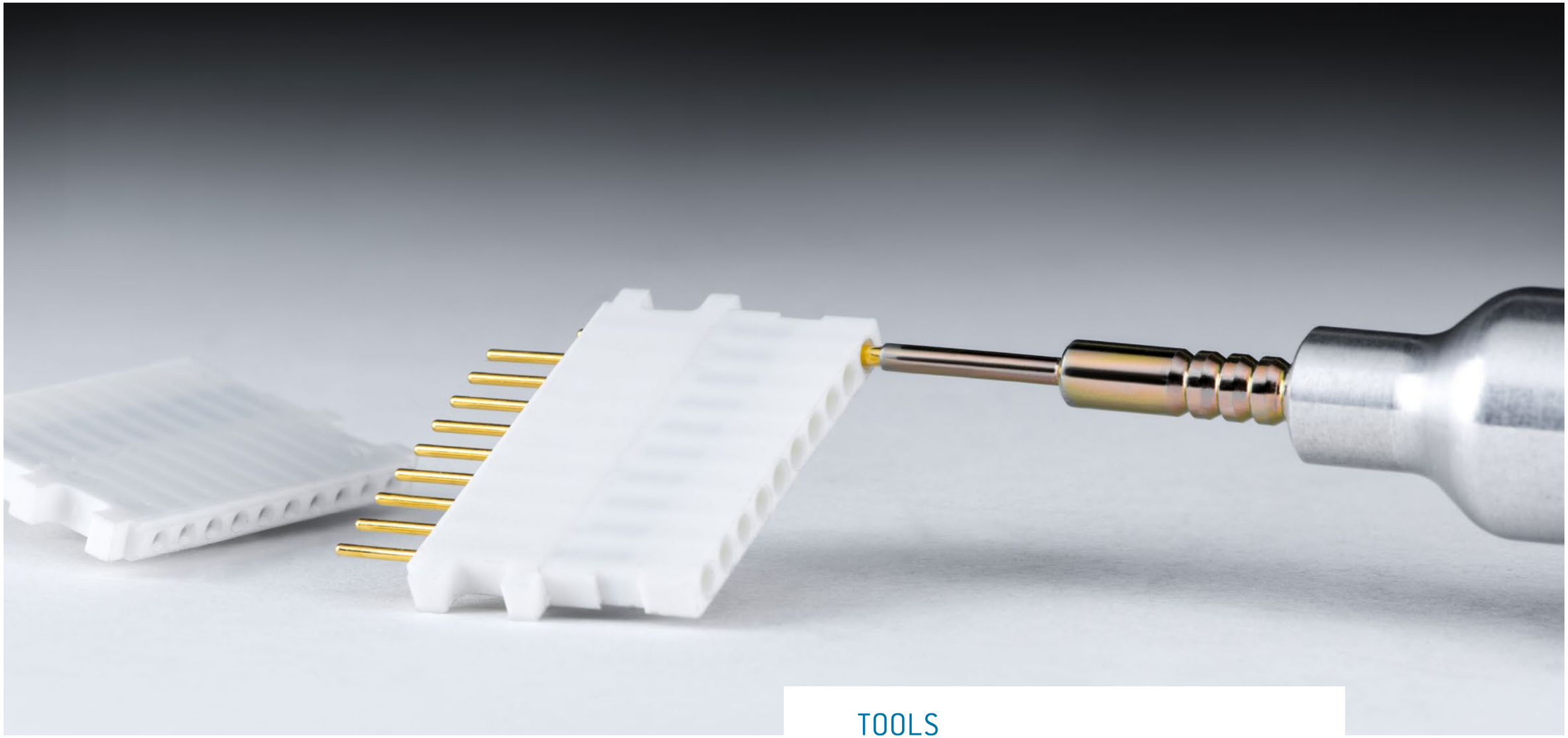


SOCKET



Description	Units	Part number
Pin protection module (pin)	1	611.122.115.923.000
Pin protection module (socket)	1	610.122.115.923.000

Alternatively, these modules can be used to extend clearance and creepage distances.



TOOLS

ODU-MAC®

Table of Contents

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.

HEXAGONAL CRIMPING

8-POINT CRIMPING

FOR ASSEMBLY INSTRUCTIONS PLEASE REFER TO OUR WEBSITE: WWW.ODU-CONNECTORS.COM.

CRIMPING TOOLS

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

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.

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

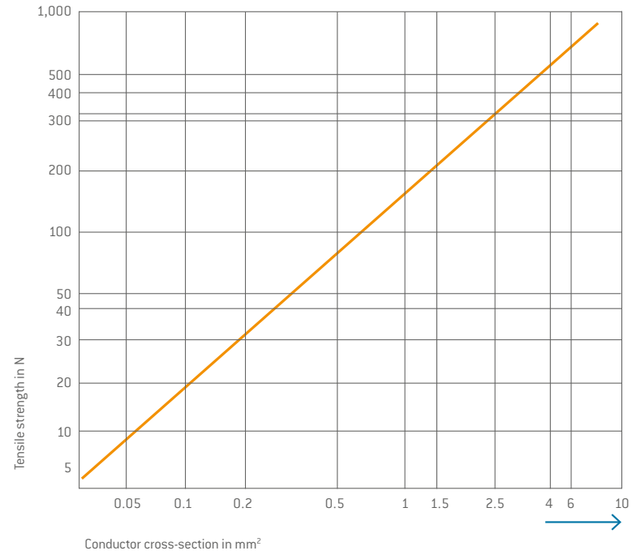
Contacts are supplied on the reel and are automatically isolated. The feed occurs by hand operation.

- 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

IEC 60352-2:2013 (DIN EN 60352-2:2014)

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.



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[1]		Stripping length	8-pt crimping tool 080.000.051.000.000 without positioner Positioner 080.000.051.101.000	8-pt crimping tool 080.000.057.000.000 without positioner Positioner 080.000.057.101.000	Crimping tool for coax 080.000.039.000.000	Hexagonal crimping tool 080.000.062.000.000
mm	AWG	mm²	mm	position / adjustment dim.	position / adjustment dim.	Crimping jaws	
0.76	24/28	0.25/0.08	4+0.5	1/0.67			
1.02				2/0.67			
1.5				3/0.67			
0.7	26/28		3+0.5				
0.7	22/24						
0.76	22	0.38	4+0.5	1/0.67			
1.02	20/22	0.5/0.38	5+0.5	2/0.92			
1.5				3/0.92			
2.41				4/0.92			
3				5/0.92			
1.5	18	1/0.75	5+0.5	3/1.12			
2.41				4/1.12			
3				5/1.12			
1.5	16		5+0.5	3/1.42	10/1.42[2]		
1.5		1.5	5+0.5	3/1.32	10/1.42[2]		
2.41				4/1.32	9/1.42[2]		
3				5/1.32	6/1.42[2]		
1.5	14		5+0.5	3/1.42	10/1.42[2]		
2.41				4/1.42	9/1.42[2]		
3				5/1.42	6/1.42[2]		
2.41		2.5	6+0.5		9/1.67[2]		
3					6/1.67[2]		
2.41	12(7/20)		6+0.5		9/2.12[2]		Profile no.2
2.41	12(19/26)		6+0.5		9/1.92[2]		
3		4	6+0.5		6/2.12[2]		Profile no.3
5					9/1.92[2]		
3	10	6	7+0.5		8/2.22[2]		Profile no.3
5		10	10+0.5				
5		16	10+0.5				
8		16	10+0.5				
8		25	18+0.5				
10							
12							
10		35	18+0.5				
12							
12		50	18+0.5				
RG 178/RG 196			(9/4.5/18.5/21) See module description			082.000.039.101.000	
RG 174/RG 188/RG 316/RG 179/RG 187						082.000.039.102.000	
G 02232 D/K 02252 D						082.000.039.103.000	
RG 122/2YCY 0.4/2.5						082.000.039.104.000	
RG 58/G 03233 (H&S)						082.000.039.106.000	
RG 223						082.000.039.108.000	
RG 59						082.000.039.109.000	

TOOLS

CRIMP INFORMATION

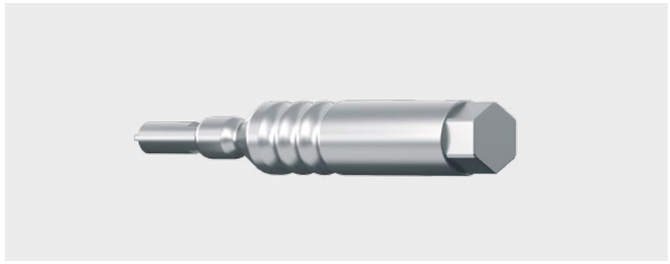
Contact diameter	Termination cross-section[1]		Stripping length	Hexagonal crimping tool 080.000.064.000.000	Hand crimping tool stamped contacts	Hand crimping tool stamped contacts
mm	AWG	mm²	mm	Pressbacken		Spool goods
0.76	24/28	0.25/0.08	4+0.5			
1.02						
1.5						
0.7	26/28		3+0.5		080.000.040.000.000	080.000.041.000.000
0.7	22/24				080.000.040.000.000	080.000.041.000.000
0.76	22	0.38	4+0.5			
1.02	20/22	0.5/0.38	5+0.5			
1.5						
2.41						
3						
1.5	18	1/0.75	5+0.5			
2.41						
3						
1.5	16		5+0.5			
1.5		1.5	5+0.5			
2.41						
3						
1.5	14		5+0.5			
2.41						
3						
2.41		2.5	6+0.5			
3						
2.41	12(7/20)		6+0.5			
2.41	12(19/26)		6+0.5			
3		4	6+0.5			
5						
3	10	6	7+0.5			
5		10	10+0.5	080.000.064.110.000		
5		16	10+0.5	080.000.064.101.000		
8		16	10+0.5	080.000.064.116.000		
8		25	18+0.5	080.000.064.125.000		
10						
12						
10		35	18+0.5	080.000.064.135.000		
12						
12		50	18+0.5	080.000.064.150.000		

[1] The listed cross section correspond 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 AWG ASTM B258-14). [2] Recommended by ODU as a standard tool and setting.

ASSEMBLY AID

Description	For use in	Part number	Nm	Recommended tightening torque
Torque wrench With cross handle. fixed. automatic release (for inner hexagonal bits with C6.3- or E6.3-shaft). Bit has to be ordered separately.		598.054.001.000.000	0.9	
		598.054.002.000.000	1.2	
		598.054.003.000.000	3	
		598.054.004.000.000	1.5	
		598.054.005.000.000	0.6	
		598.054.006.000.000	2.2	
		598.054.007.000.000	4.2	
Bit slot 2.5 (0.4/70)	Mounting of spindle coding	598.054.109.000.000		0.9 Nm +/– 0.2 Nm
Bit slot 3.5 (0.5/50)	Screwing of the rails in the T frame	598.054.108.000.000		0.9 Nm +/– 0.2 Nm
Bit slot 5.5 (0.8/50)	Screwing of the rails in the L frame	598.054.101.000.000		1.2 Nm +/– 0.2 Nm
Bit slot 8 (1.2/50)	Mounting of frame coding (coded socket)	598.054.110.000.000		1.2 Nm +/– 0.2 Nm
Special bit	Coding pin for frames in a housing	598.054.203.000.000		1.2 Nm +/– 0.2 Nm
Bit combi slot size 1	Mounting screw on frames in a housing	598.054.102.000.000		1.2 Nm +/– 0.2 Nm
Bit Phillips cross slot size 1	Grounding screw on frames in a housing and M+ frame	598.054.106.000.000		1.2 Nm +/– 0.2 Nm
Bit Phillips cross slot size 1	Grounding plug socket for P+ frame	598.054.106.000.000		1.5 Nm +/– 0.2 Nm
Bit Phillips cross slot size 1	Grounding pin for P+ frame	598.054.106.000.000		3.0 Nm +/– 0.3 Nm
SW 8	Mounting of grounding socket P+ frame	598.054.111.000.000		2.2 Nm +/– 0.3 Nm
SW 8	Mounting of grounding pin P+ frame	598.054.111.000.000		4.2 Nm +/– 0.5 Nm
Bit Torx TX 8	Rails on frames in a housing	598.054.103.000.000		0.9 Nm +/– 0.2 Nm
Bit Torx TX 10	Screwing of the rails in the S and M+ frame	598.054.104.000.000		1.2 Nm +/– 0.2 Nm
Bit Torx TX 10	Mounting of ODU-MAC ZERO housing	598.054.104.000.000		0.6 Nm +/– 0.1 Nm
Bit Torx TX 20	Screwing of the rails in the P+ frame	598.054.105.000.000		3.0 Nm +/– 0.3 Nm
Bit for coding pin	Mounting of coding pins	598.054.203.000.000		1.2 Nm +/– 0.2 Nm
Distance spacer/QCH	S frame for quick-change head and rear mounting panel	598.054.204.000.000		1.2 Nm +/– 0.2 Nm
Receiving of back nut	For mounting, shielded implementation size 0	598.055.002.000.000		0.6 Nm +/– 0.1 Nm
Receiving of back nut	For mounting, shielded implementation size 1	598.055.001.000.000		1.0 Nm +/– 0.2 Nm
Receiving of back nut	For mounting, shielded implementation size 2	598.055.003.000.000		2.0 Nm +/– 0.2 Nm
Receiving of back nut	For mounting, shielded implementation size 3	598.055.004.000.000		3.5 Nm +/– 0.3 Nm

ASSEMBLY AID

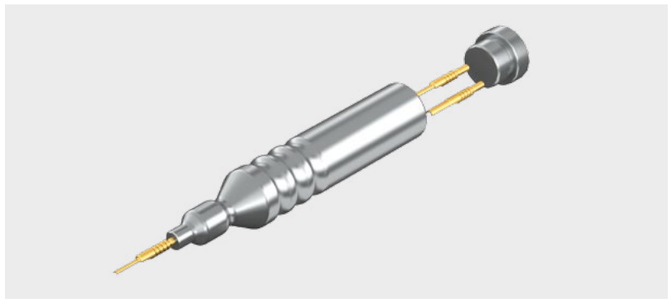


ASSEMBLY TOOL HIGH CURRENT

Necessary assembly tool for screwing and releasing of the contacts.

PART NUMBER: 087.611.00_.001.000

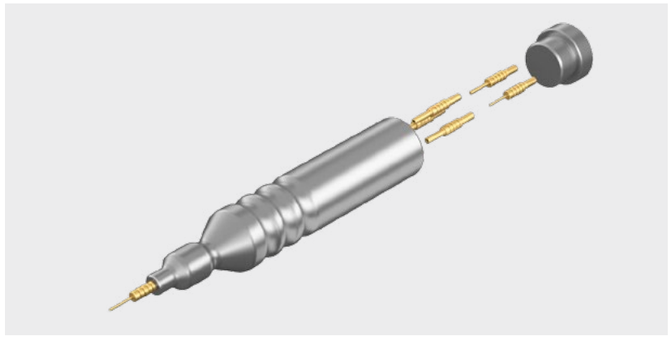
With _ please register the respective figure for contact diameter 8 to 12 mm.
See table below.



INSERTION TOOL ∅ 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 ∅ 0.76–1.5 MM

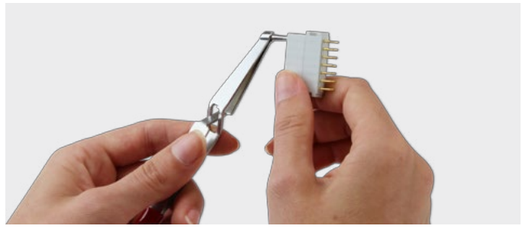
Extraction tool for sockets and pins by use of the removal tool.

PART NUMBER: 087.611.005.001.000

Contact ∅	Assembly tool high current	Assembly aid insertion tool	Assembly aid extraction tool
0.76		085.611.001.001.000	087.611.005.001.000
1.02		085.611.001.001.000	087.611.005.001.000
1.5		085 .611.001.001.000	087.611.005.001.000
8	087.611.002.001.000		
10	087.611.003.001.000		
12	087.611.004.001.000		

REMOVAL 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.

Contact Ø	Removal tool I straight	Removal tool I angled	Removal tool II	Removal tool	Removal tool
					
0.76[2]		087.170.361.000.000	087.611.001.001.000		
1.02[2]		087.170.362.000.000	087.611.001.001.000		
1.5[2]	087.170.138.000.000	087.170.363.000.000[1]	087.611.001.001.000		
2.41	087.170.139.000.000	087.170.365.000.000	087.611.001.001.000		
3	087.170.136.000.000	087.170.366.000.000	087.611.001.001.000		
5				087.170.391.000.000	
Coax 50Ω 4 contacts	087.170.139.000.000	087.170.365.000.000	087.611.001.001.000[2]		
Coax 50Ω 2 contacts				087.170.391.000.000	
Coax 50Ω 2 contacts SMA				087.122.349.000.000	
Coax 75Ω 2 contacts				087.170.391.000.000	
Fiber optic 5 contacts					087.611.001.002.000
Fiber optic 3 contacts	087.170.136.000.000		087.611.001.001.000		

[1] In use with high voltage module, 4 contacts, (see page 124) the angled version cannot be used.
[2] With cable (H+S) 602232 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 our website: www.odu-connectors.com/downloads.

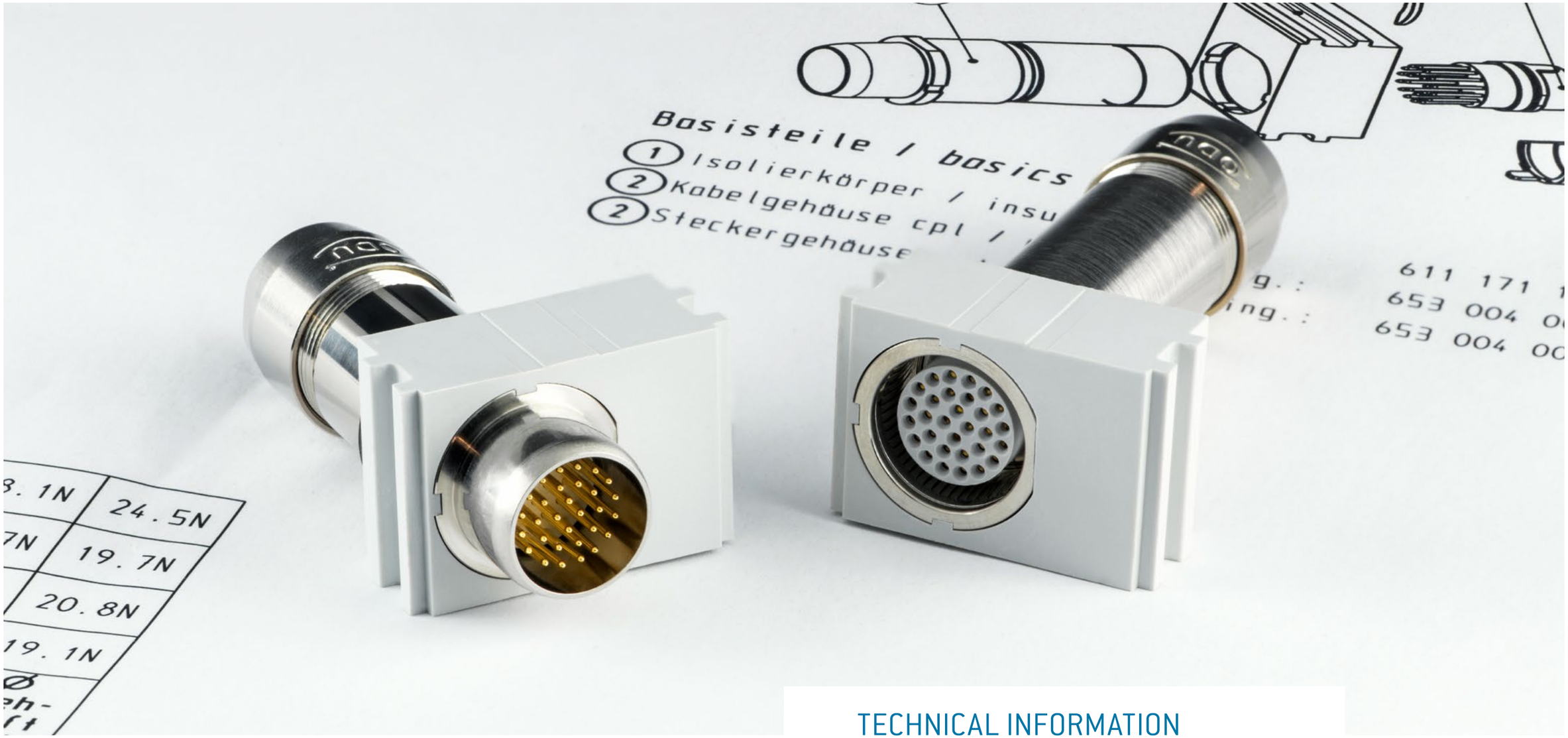
CLEANING INFORMATION

Maintenance instruction 003.170.000.000.000

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%.

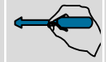
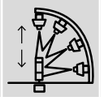


TECHNICAL INFORMATION

ODU-MAC®

INTERNATIONAL PROTECTION CLASSES

Acc. IEC 60529:2013 (VDE 0470-1:2014).

Code letters (International Protection) IP	First code number (Degrees of protection against access to hazardous parts respectively against solid foreign objects) 6			Second code number (Degrees of protection against water) 5			
Code number	Protection against access to hazardous parts / Protection against ingress of solid foreign objects			Code number	Protection against harmful effects due to the ingress of water		
0	No protection		No protection against contact / No protection against solid foreign objects	0	No protection against water		No protection against water
1	Protection against large foreign objects		Protection against contact with the back of the hand / Protection against solid foreign objects Ø ≥ 50 mm	1	Protection against dripping water		Protection against vertically falling waterdrops
2	Protection against medium-sized foreign objects		Protection against contact with the fingers / Protection against solid foreign objects Ø ≥ 12.5 mm	2	Protection against dripping water (tilted)		Protection against falling water-drops when tilted (any angle up to 15° from the vertical)
3	Protection against small foreign objects		Protection against contact with tools / Protection against solid foreign objects Ø ≥ 2.5 mm	3	Protection against spray water		Protection against spray water (any angle up to 60° from the vertical)
4	Protection against granular foreign objects		Protection against contact with a wire / Protection against solid foreign objects Ø ≥ 1.0 mm	4	Protection against splashing water		Protection against splashing water from all directions
5	Dustproof		Protection against contact with a wire / Protection against uncontrolled ingress of dust	5	Protection against water jet		Protection against water jet from all directions
6	Dustproof		Protection against contact with a wire / Complete protection against ingress of dust	6	Protection against power-ful water jet		Protection against powerful water jet from all directions
				7	Protection against the effects of temporary immersion in water		Protection against ingress of harmful quantities of water by temporary submersion into water
				8	Protection against the effects of continuous immersion in water		Protection against ingress of harmful quantities of water by continuous submersion into water
				9	Protection against high pressure and high water jet temperatures		Protection against water from all directions by high pressure and high temperatures

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EXPLANATIONS AND INFORMATION ON INSULATION COORDINATION

IEC 60664-1:2007 (VDE 0110-1:2008): TABLE F.1 – RATED SURGE VOLTAGE FOR OPERATING MEDIA FED DIRECTLY FROM THE LOW VOLTAGE MAINS.

Nominal voltage of the power supply system (network) acc. to IEC 60038:2009 (VDE 0175-1:2012)		Voltage conductor to neutral conductor derived from nominal voltages a.c. or d.c. up to and including	Rated impulse voltage Overvoltage category			
Three-phase-system V	Single-phase-system V	V	I V	II V	III V	IV V
		50	330	500	800	1,500
		100	500	800	1,500	2,500
	120 to 240	160	800	1,500	2,500	4,000
230/400 277/480		300	1,500	2,500	4,000	5,000
400/692		600	2,500	4,000	6,000	8,000
1,000		1,000	4,000	6,000	8,000	12,000

APPLICABLE STANDARDS

IEC 60664-1:2007 (VDE 0110-1:2008) and IEC 61984:2008 (VDE 0627:2009), original (IEC 60664-1:2007 VDE 0110-1:2008) and IEC 61984:2008 (VDE 0627:2009) remains definitive for all of the technical information named).

GENERAL

The selection of a connector cannot only take functionality, number of contacts, current or voltage parameters into account. In fact, consideration of the place of use and the installation conditions prevailing there is indispensable.
Depending upon the installation and ambient conditions, the connector can be used in accordance with the standards in a variety of voltage and current ranges. All of the voltage data listed in this catalog refers to the use of insulators in the ODU-MAC solid frame for housings or in the ODU-MAC docking frame.
All of the connectors shown here involve connectors without contact rating (COC) in accordance with IEC 61984:2008 (VDE 0627:2009).

The most important influence variables and the electrical parameters harmonised with these will be explained in more detail in the following. Our technicians would be happy to assist you with any further questions. The following texts and tables are excerpts from the indicated standards.

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.

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

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

Overvoltage category III

(= standard, when no special overvoltage category is indicated)
Operating media in permanent installations and cases for which special requirements for reliability and availability of the operating media exist. For example, switches in permanent installations and operating media for industrial use with permanent connection to the permanent installation.

Overvoltage category IV

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

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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 F.4 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 F.2 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 F.7 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 F.5 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).

Rated impulse voltage û kV	Test impulse voltage at sea level û kV	Test impulse voltage at 200 m elevation û kV	Test impulse voltage at 500 m elevation û kV
0.33	0.357	0.355	0.350
0.5	0.541	0.537	0.531
0.8	0.934	0.920	0.899
1.5	1.751	1.725	1.685
2.5	2.920	2.874	2.808
4	4.923	4.874	4.675
6	7.385	7.236	7.013
8	9.847	9.648	9.950
12	14.770	14.471	14.025

CONVERSIONS/AWG (AMERICAN WIRE GAUGE)

Circular wire					
AWG	Diameter		Cross-section	Weight	Max. resistance
	Inch	mm	mm²	kg/km	Ω/km
10 (1)	0.1020	2.5900	5.2700	47.000	3.45
10 (37/26)	0.1109	2.7500	4.5300	43.600	4.13
12 (1)	0.0808	2.0500	3.3100	29.500	5.45
12 (19/25)	0.0895	2.2500	3.0800	28.600	6.14
12 (37/28)	0.0858	2.1800	2.9700	26.300	6.36
14 (1)	0.0641	1.6300	2.0800	18.500	8.79
14 (19/27)	0.0670	1.7000	1.9400	18.000	9.94
14 (37/30)	0.0673	1.7100	1.8700	17.400	10.50
16 (1)	0.0508	1.2900	1.3100	11.600	13.94
16 (19/29)	0.0551	1.4000	1.2300	11.000	15.70
18 (1)	0.0403	1.0200	0.8200	7.320	22.18
18 (19/30)	0.0480	1.2200	0.9600	8.840	20.40
20 (1)	0.0320	0.8130	0.5200	4.610	35.10
20 (7/28)	0.0366	0.9300	0.5600	5.150	34.10
20 (19/32)	0.0384	0.9800	0.6200	5.450	32.00
22 (1)	0.0252	0.6400	0.3240	2.890	57.70
22 (7/30)	0.0288	0.7310	0.3540	3.240	54.80
22 (19/34)	0.0307	0.7800	0.3820	3.410	51.80
24 (1)	0.0197	0.5000	0.1960	1.830	91.20
24 (7/32)	0.0230	0.5850	0.2270	2.080	86.00
24 (19/36)	0.0252	0.6400	0.2400	2.160	83.30
26 (1)	0.1570	0.4000	0.1220	1.140	147.00
26 (7/34)	0.0189	0.4800	0.1400	1.290	140.00
26 (19/38)	0.0192	0.4870	0.1500	1.400	131.00
28 (1)	0.0126	0.3200	0.0800	0.716	231.00
28 (7/36)	0.0150	0.3810	0.0890	0.813	224.00
28 (19/40)	0.0151	0.3850	0.0950	0.931	207.00
30 (1)	0.0098	0.2500	0.0506	0.451	374.00
30 (7/38)	0.0115	0.2930	0.0550	0.519	354.00
30 (19/42)	0.0123	0.3120	0.0720	0.622	310.00
32 (1)	0.0080	0.2030	0.0320	0.289	561.00
32 (7/40)	0.0094	0.2400	0.0350	0.340	597.10
32 (19/44)	0.0100	0.2540	0.0440	0.356	492.00
34 (1)	0.0063	0.1600	0.0201	0.179	951.00
34 (7/42)	0.0083	0.2110	0.0266	0.113	1,491.00
36 (1)	0.0050	0.1270	0.0127	0.072	1,519.00
36 (7/44)	0.0064	0.1630	0.0161	0.130	1,322.00
38 (1)	0.0040	0.1000	0.0078	0.072	2,402.00
40 (1)	0.0031	0.0800	0.0050	0.043	3,878.60
42 (1)	0.0028	0.0700	0.0038	0.028	5,964.00
44 (1)	0.0021	0.0540	0.0023	0.018	8,660.00

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.

Source: Gore & Associates, Pleinfeld

OPERATING VOLTAGE

EIA-364-20D:2008 (SAE AS 13441:2004 method 3001.1).

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

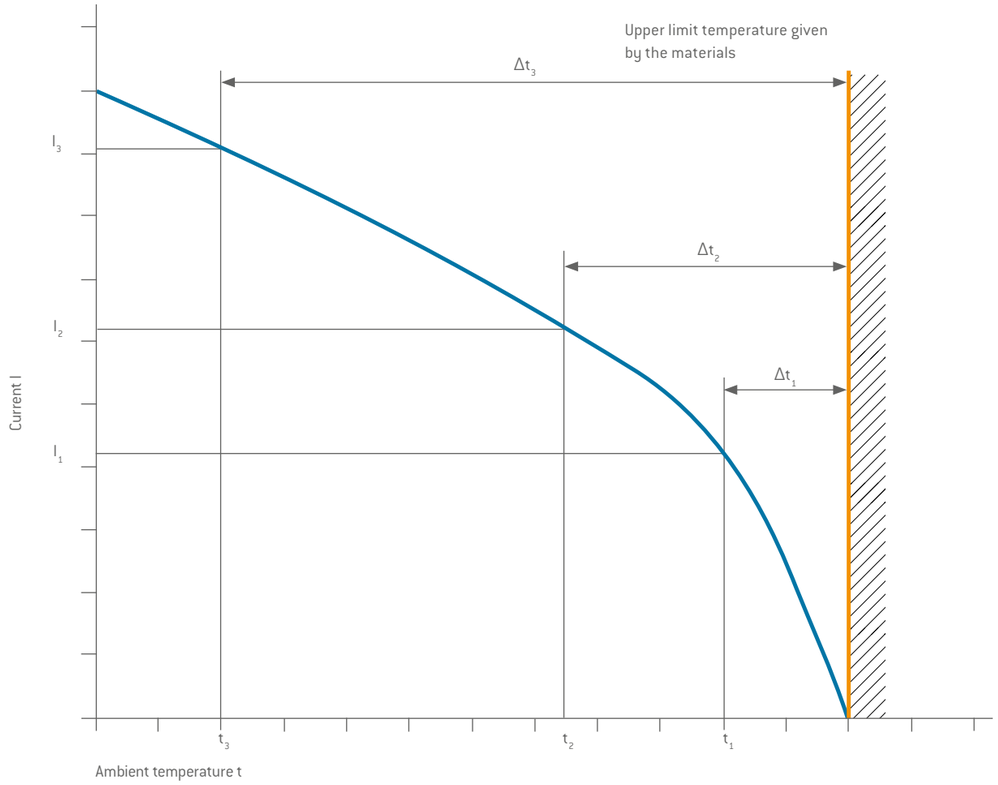
ATTENTION:
With certain applications, the safety requirements for electrical devices are very strict in terms of operating voltage. In such cases, the operating voltage is defined according to the clearance and creepage distances between parts which could be touched.

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

BASE FOR CURRENT-CARRYING CAPACITY

Derating measurement procedure IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003).

STRUCTURE OF THE BASE CURRENT-CARRYING CAPACITY CURVE



A current-carrying capacity curve metrologically determined according to the method described in IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) depending on the permissible limit temperature of the materials.

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 (Δt) 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 × In) 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.

MAX. CONTINUOUS CURRENT

The measured 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.

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.

Number of loaded wires	Derating factor
5	0.75
7	0.65
10	0.55
14	0.5
19	0.45
24	0.4
40	0.35
61	0.3

Load and derating factors
Multi-core plastic cable with conductor cross-section of 1.5 to 10 mm² when installed in the open air.

Example:
VA 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 × 39 A).

NOTE
Designs may differ depending upon the wiring of the modules and be verified with a heating test.

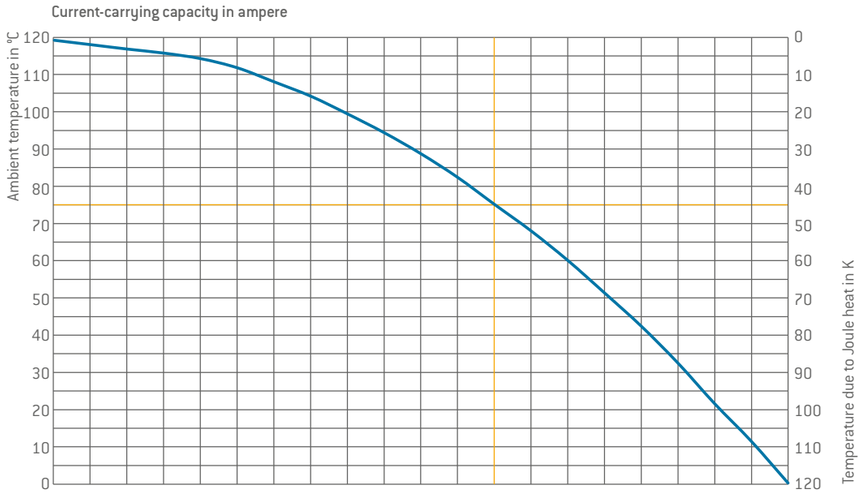
CURRENT-CARRYING CAPACITY DIAGRAM

FOR SINGLE CONTACTS

Measurement made in acc. with IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) (derived base curve shown = 0.8 × Base curve).

Upper limit temperature: +120 °C.

Termination with nominal cross-section.



Contact	Contact Ø	Termination cross-section mm²	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
ODU SPRINGTAC®	0.76	0.25	0		1		2		3		4		5		6		7		8		9		10
		0.38	0	I	1.5	I	2.5	I	3.5	I	5	I	6	I	7.5	I	8.5	I	9.5	I	11	I	12
	1.02	0.25	0		1		2		3		4		5		6		7		8		9		10
		0.5	0	I	1.5	I	3	I	4.5	I	6	I	7.5	I	9	I	10.5	I	12	I	13.5	I	14.5
	1.5	0.25	0		1		2		3		4		5		6		7		8		9		10
		0.5	0	I	1.5	I	3.5	I	5	I	6.5	I	8	I	10	I	11.5	I	13	I	15	I	16.5
		1	0		2.5		5		7.5		10		12.5		15		17.5		19.5		22.5		24.5
		AWG 16	0	I	3	I	6	I	9	I	12	I	15	I	18	I	21	I	24	I	27	I	29.5
		1.5	0		3		6		9		12		15		18		21		24		27		29.5
	2.41	0.5	0	I	1.5	I	3.5	I	5	I	7	I	8.5	I	10.5	I	12	I	13.5	I	15.5	I	17.5
		1	0		2.5		5.5		8		10.5		13		16		18.5		21		23.5		26
		1.5	0	I	3	I	6	I	9	I	12	I	15	I	18	I	21	I	24	I	27	I	30
		2.5	0		4		8		12		16		20		24		27.5		31.5		35.5		39
		AWG 12	0	I	4.5	I	9	I	13.5	I	18.5	I	23	I	28	I	32	I	36.5	I	41	I	45
	3	0.5	0		2		4		5.5		7.5		9.5		11.5		13		15		17		18.5
		1	0	I	2.5	I	5.5	I	8	I	11	I	13.5	I	16.5	I	19	I	21.5	I	24.5	I	27
		1.5	0		3		6		9		12		15.5		19		22		25		28		31
		2.5	0	I	4	I	8	I	12	I	16	I	20	I	25	I	29	I	33	I	37	I	41
		4	0		6		13		19		25		32		39		45		51		58		64
		6	0	I	6	I	13	I	19	I	25	I	32	I	39	I	45	I	51	I	58	I	64
	5	4	0		6		13		19		25		32		39		45		51		58		64
		10	0	I	11	I	21	I	32	I	42	I	53	I	65	I	75	I	85	I	97	I	106
		16	0		13		26		39		52		65		80		93		106		119		130
	8	16	0	I	12.5	I	25	I	37	I	49	I	62	I	75	I	87	I	99	I	111	I	123
		25	0		18		36		52		68		84		100		114		128		142		155
ODU LAMTAC®	8	16	0	I	15	I	29	I	44	I	59	I	74	I	90	I	104	I	118	I	133	I	147
		25	0		17		34		52		69		87		105		121		137		154		171
	10	25	0	I	18	I	36	I	54	I	72	I	90	I	110	I	127	I	144	I	163	I	180
		35	0		20		39		59		79		99		120		139		158		179		196
	12	25	0	I	19	I	38	I	57	I	75	I	95	I	115	I	133	I	152	I	172	I	188
		35	0		22		44		66		89		111		135		156		178		200		220
		50	0	I	24	I	48	I	72	I	96	I	120	I	145	I	170	I	195	I	220	I	240
																				Nominal current		Max. continuous current

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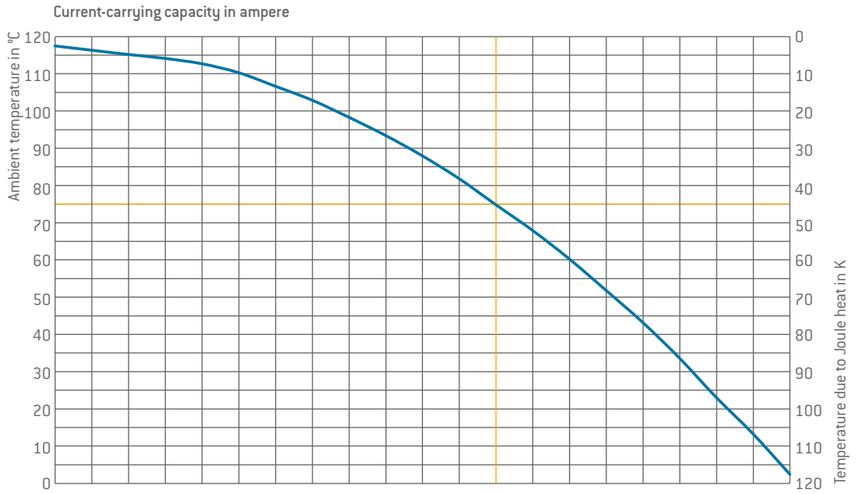
CURRENT-CARRYING CAPACITY DIAGRAM

FOR FULLY EQUIPPED MODULES

Measurement made in acc. with IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) (derived base curve shown = 0.8 × Base curve). Upper limit temperature: +120 °C. Termination with nominal cross-section.

The values of the 4 contact high voltage module (page 124) correspond to the values of the 5 contacts signal module (page 108).

The values of the 3 contacts power module (page 114) correspond to the values of the 3 contacts power module (page 112).



Contact	Module	Contact Ø	Termination cross-section mm²	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
ODU SPRINGTAC®	10 contacts	0.76	0.25	0		1		2		3		3.5		4		5		6		7		8		8.5
			0.38	0	I	1	I	2	I	3	I	4	I	5	I	6	I	7	I	8	I	9	I	10
	6 contacts	1.02	0.25	0		1		2		3		4		5		6		7		8		9		10
			0.5	0	I	1.5	I	3	I	4.5	I	6	I	7	I	8	I	9.5	I	11	I	12.5	I	14
	14 contacts	1.02	0.25	0		1		2		3		3.5		4.5		5		6		7		8		9
			0.5	0	I	1.5	I	2.5	I	4	I	5	I	6	I	7	I	8.5	I	9.5	I	11	I	12
	5 contacts	1.5	0.25	0		1		2		3		4		5		6		7		8		9		10
			0.5	0	I	1.5	I	2.5	I	4	I	5	I	6.5	I	8	I	9	I	10.5	I	11.5	I	13
			1	0		2		4.5		6.5		9		11		13		15		17.5		20		22
			AWG 16	0	I	2.5	I	5	I	7.5	I	10	I	12.5	I	14.5	I	17.5	I	20		22.5	I	25
			1.5	0		2.5		5		7.5		10		12.5		14.5		17.5		20		22.5		25
	4 contacts	2.41	0.5	0	I	1.5	I	3	I	4	I	5.5	I	7	I	8	I	9.5	I	11	I	12.5	I	14
			1	0		2.5		5		7		9		11		13		15.5		18		20.5		23
			1.5	0	I	2.5	I	5	I	7.5	I	10	I	12.5	I	15	I	18	I	21	I	24	I	27
			2.5	0		3.5		7		10		13		16		19		22.5		26		29.5		33
			AWG 12	0	I	4	I	8	I	12.5	I	16.5	I	20.5	I	25	I	29	I	33	I	37	I	41
	3 contacts	3	0.5	0		2		3.5		5		6.5		8		9.5		10.5		12		13		14.5
			1	0	I	2.5	I	5	I	7	I	9.5	I	12	I	14	I	16.5	I	19	I	21.5	I	24
			1.5	0		2.5		5.5		8		11		13.5		16		19		21.5		24.5		27
			2.5	0	I	3.5	I	7	I	10.5	I	14	I	17.5	I	21	I	25	I	29	I	33	I	37
			4	0		5		10		15		20		25		30		35.5		41		46.5		52
			6	0	I	5	I	10	I	15	I	20	I	25	I	30	I	35.5	I	41	I	46.5	I	52
	2 contacts	5	4	0		5.5		11		17		22.5		28		34		39.5		45		50.5		56
			10	0	I	9.5	I	19	I	28	I	37.5	I	47	I	56.5	I	66	I	75	I	84.5	I	94
			16	0		11.5		23		34.5		46		58		70		81		92		103		114
	2 contacts	8	16	0	I	11.5	I	23	I	34	I	46	I	58	I	70	I	81	I	92	I	103	I	114
			25	0		16		32		48		64		79		95		109		124		138		152
ODU LAMTAC®	2 contacts	8	16	0	I	14	I	28	I	42	I	55.5	I	70	I	85	I	98	I	111	I	126	I	139
			25	0		16		33		49		65		82		100		116		132		149		164
																				Nominal current		Max. continuous current	

Table of Contents

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.

Laying procedure	Exposed in air	or on surfaces		
	Single-wire lines PVC, PE, PUR, TPE heat resistant	Multi-wire highly flexible lines for hand-held devices, wire/sheath cold-resistant, PVC insulated		Multi-wire movable lines PVC, PE, PUR, TPE standard program harmonised series
Number of loaded wires	1	2	3	4
Nominal cross-section copper conductor in mm²	Current load in A			
0.14[1]	3			2
0.25[1]	5			4
0.34[1]	8			6
0.5[1]	12	3	3	9
0.75	15	6	6	12
1	19	10	10	15
1.5	24	16	16	18
2.5	32	25	20	26
4	42	32	25	34
6	54	40		44
10	73	63		61
16	98			82
25	129			108
35	158			135
50	198			168
Current load acc. to:	VDE 0298-4:2013 table 11			

Carrying capacity of cables with a rated voltage of up to 1,000 V and of heat resistant cables.
The specification of data does not release one from the need to conduct the test.
The original standards remain authoritative for all of the listed technical specifications.

[1] DIN VDE 0891-1:1990.

TECHNICAL TERMS

AMBIENT TEMPERATURE

Temperature of the air or other medium in which a piece of equipment is intended to be used in. (IEC 44/709/CDV:2014 (VDE 0113-1:2014)).

AWG

American Wire Gauge – see page 184.

BASE CURVE

See page 186.

CHEMICAL RESISTANCE

Many secondary processing procedures use adhesives, cleaning agents or other chemicals on our products. Contact with unsuitable chemicals may have an adverse effect on the mechanical and electrical properties of the insulation and housing materials which specified properties may not be able to withstand. For information on our plastic housings go to page 64.

CLEARANCE DISTANCE

The shortest distance in the air between two conductive parts. The insulation coordination is explained in detail from page 181.

CONNECTORS

Also known as connectors without contact rating (COC): (IEC 61984:2008 (VDE 0627:2009)). An element which enables electrical conductors to be connected and is intended to create and/or separate connections with a suitable counterpart.

CONTACT RESISTANCE

Total resistance value measured from terminal to terminal. In this case, the resistance is significantly lower than the contact resistance. The specifications are average values.

CORES

Electrical conductor, solid wire or multi-wire strand, with insulation as well as any conductive layers. Cables or leads may have one or more cores.

CREEPAGE DISTANCES

The shortest distance between two conductive parts along the surface of a solid insulation material. This factors in all elevations and recesses in the insulator, as long as defined minimum dimensions are on hand. The insulation coordination is explained in detail from page 181.

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 186.

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 187.

TECHNICAL TERMS

DERATING MEASUREMENT METHOD IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003)

See page 186.

INSULATOR

Part of a connector which separates conductive parts with different potentials from one another; usually identical to the contact carrier.

KEYING (ORIENTATION)

Arrangement with which differing polarization of otherwise identical connectors prevents interchangeability. This is a good idea if two or more identical connectors are attached to the same device (see also compatible connectors, see page 84).

MATERIALS (STANDARD DESIGN)

Pins and bodies of the sockets are manufactured from a CuZn alloy and silver or gold-plated. The lamellas consist of a CuBe alloy and are also silver or gold-plated. The springwire contact wires consist of a CuSn alloy and are also silver or gold-plated.

MATING AND SLIDING FORCE (UNMATING FORCE)

The force required to fully insert or withdraw pluggable elements without the influence of a coupling or locking device. The higher value of the mating force is caused by the “attachment peak”. Subsequently, only the pure sliding force has an effect. In the case of lamella contacts, the data refers to contacts in the lubricated state (status at delivery) and after approx. 30 mating cycles. The forces are/may be higher in new condition (lubricated). In the case of springwire contacts, the data refers to contacts in new condition. The data represents average values with a potential fluctuation of ± 50%.

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 TURNTAC and ODU LAMTAC 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 IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003)

See rated current.

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 193).
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.

TECHNICAL INFORMATION

TECHNICAL TERMS

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 AWG (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 168).

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

See protection types on page 180.

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

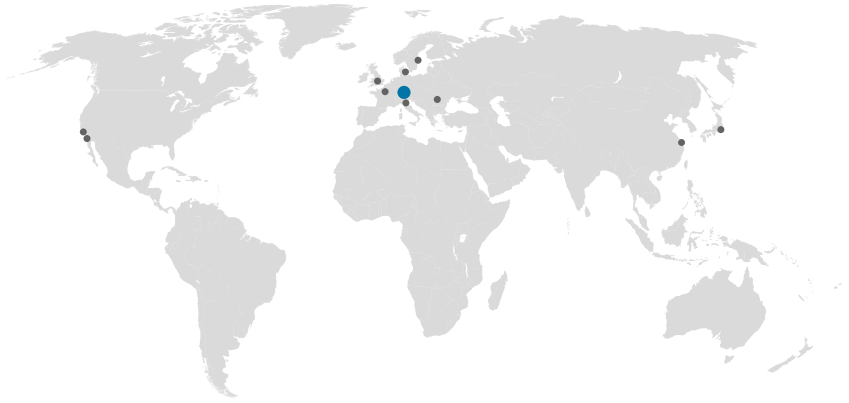
Wires (solid conductors) are available with an insulator sleeve and/or electrical shielding. Cables or conductors may be made up of one or more wires.

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



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