A PERFECT ALLIANCE.

# ODU-MAC® Blue-Line

A new performance class.
Up to 2,500 V, 12 bar, 10 Gbit/s, > 10,000 mating cycles and 12.0 GHz

MANUAL MATING
AUTOMATIC DOCKING



ODU-MAC® BLUE-LINE

ODU-MAC® SILVER-LINE | ODU DOCK SILVER-LINE

ODU-MAC® WHITE-LINE

www.odu-connectors.com

# ODU-MAC® Blue-Line

## FEATURES

- Economical, efficient solution
- Rugged version
- > 10,000 mating cycles
- Modules assembled flexibly and conveniently using the clip principle
- Low contact resistances
- High reliability
- Maximum packing density

## APPLICATIONS

- Medical
- Industrial
- Test and measurement
- Military and security
- Energy
- eMobility



**Data transmission protocols**

These ODU-specific connectors can transmit common data transmission protocols such as USB® 1.1, USB® 2.0, USB® 3.1 Gen1, FireWire®, FlexRay®, Ethernet, Profibus®, CAN-Bus, CAT 5, and CAT $6_A$, but they are not USB®, FireWire®, FlexRay®, Ethernet, Profibus®, CAN-Bus or CAT standard connectors.

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

The majority of ODU-MAC® modules and contacts have been certified according to UL 1977/CSA C22.2 no. 182.3 (E file no.: E110586) and tested to MIL/SAE/EIA.

Issue: 2019-10

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

# A PERFECT ALLIANCE.

**Creating connections, building alliances, collaborating into the future:** Whether two technical components come together to form a unit or people come together to strive for great results – the key is to aspire to achieve superb results. This goal drives our work. **Perfect connections that inspire and deliver on the promises.**



A PERFECT ALLIANCE.

# WORLDWIDE CUSTOMER PROXIMITY




## ODU GROUP OVERVIEW

- More than 75 years of experience in connector technology
- A turnover of € 200 million
- Over 2,300 employees worldwide
- Sales subsidiaries in China, Denmark, France, Germany, Italy, Japan, Korea, Sweden, UK and the US as well as 5 production and logistics sites
- All technologies under one roof: Design and development, machine tool and special machine construction, injection, stamping, turning, surface technology, assembly and cable assembly

As of February 2019

## CERTIFICATES & APPROVALS

- ISO 9001
- IATF 16949
- ISO 13485
- ISO 14001
- ISO 50001
- Wide range of UL, CSA, VG and VDE approvals
- UL Wiring Harnesses certified

For a complete list of our certifications and approvals, please visit our website.

# INGENIOUS IDEAS
## PERFECT SOLUTIONS

Product portfolio of ODU



### ELECTRICAL CONTACTS

- Versatile connector technologies
- Outstanding reliability, lifetime and durability
- Up to 1 million mating cycles
- Current-carrying capacity of up to 2,400 A
- Rugged contact systems, suitable even for harsh environments
- Economical solutions for automatic processing
- Including cable assembly – complete solution



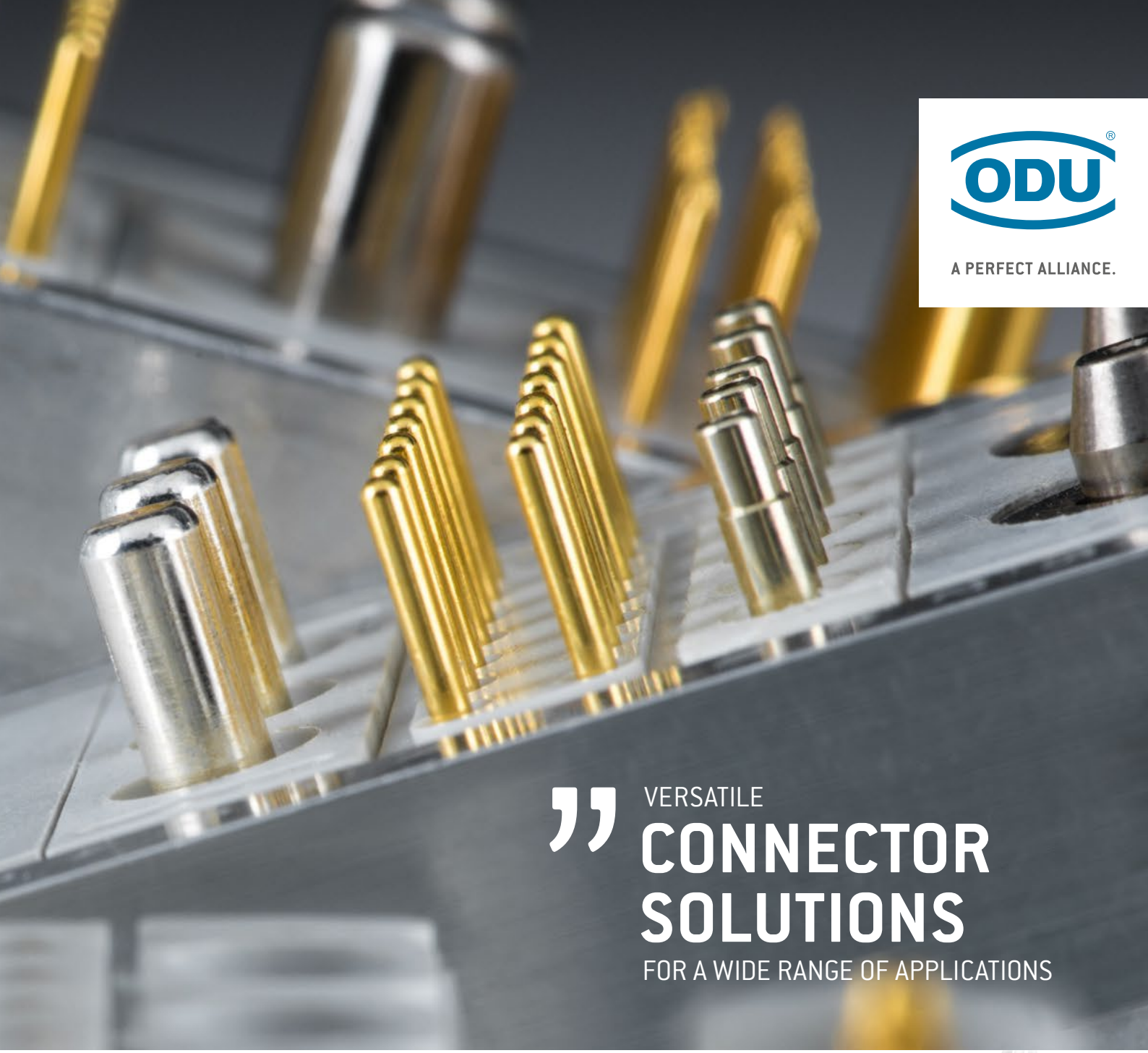
### CIRCULAR CONNECTORS

- Circular connector series in robust metal or plastic housing
- Contacts for soldering, crimping and PCB termination
- Optional selectable Push-Pull locking or screw locking technology ensuring a secure connection at all times as well as easy to release Break-Away function
- 2 up to 55 contacts
- IP50 to IP69
- Autoclavable for medical applications
- Hybrid inserts for combined transmission
- Including cable assembly – complete solution



### MODULAR CONNECTORS

- Application-specific hybrid interface
- For manual mating and automatic docking
- The highest packing density
- Flexible modular construction
- Multitude of data transmission modules
- For the transmission of signals, power, high current, high voltage, HF signals (coax), media, high-speed data and fiber optics
- Variety of locking options available
- Extremely durable – even under extreme conditions
- Mating cycles scalable as required from 10,000 to over 100,000 (1 million)
- Including cable assembly – complete solution



A PERFECT ALLIANCE.

# VERSATILE CONNECTOR SOLUTIONS

## FOR A WIDE RANGE OF APPLICATIONS



### HEAVY DUTY CONNECTORS

- Extremely durable even under extreme / harsh environments
- High vibration resistance
- Up to 400 A (higher currents upon request)

### PRINTED CIRCUIT BOARDS CONNECTORS



- Maximum flexibility in application designs
- High resilience and outstanding quality
- Including cable assembly – complete solution



### APPLICATION AND CUSTOMER-SPECIFIC SOLUTIONS

- Contacts, connectors and cable 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
- Short development and production paths



### CABLE ASSEMBLY

- Complete systems from a single source based on years of expertise
- State-of-the-art production facilities with 100 % end testing
- Cleanroom production
- Overmolding in silicone, hot-melt and high-pressure procedures
- Customer-specific labeling
- Prototype, small series and high volume production
- Rapid prototyping




# MORE THAN
## A CONNECTION

Our Know-How for your success

### HIGH PERFORMANCE CONNECTOR TECHNOLOGY FOR DEMANDING KEY MARKETS

Customers rely on ODU technology wherever first-class, high-performance connector solutions are required. All our skills go into our products to ensure your success.

In addition to the top quality, reliable stability and maximum flexibility our products also stand for dynamics, reliability, safety, precision, efficiency and sustainability.

**ODU – A PERFECT ALLIANCE.**

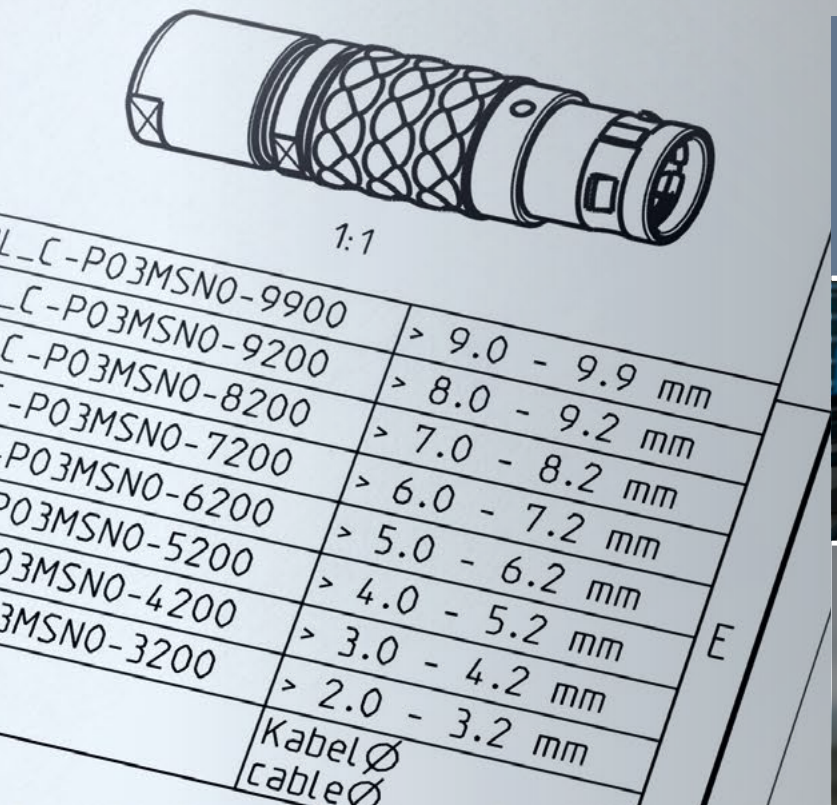
### CONNECTIONS THAT LIVE UP TO ANY REQUIREMENT

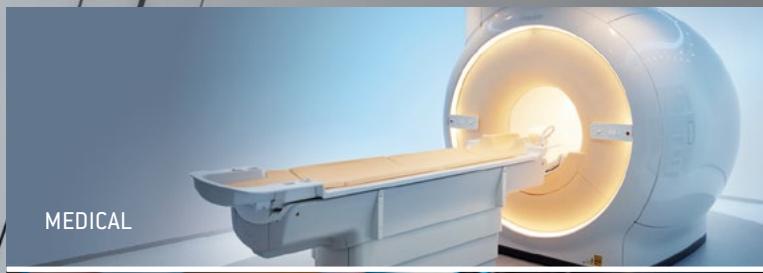
Contacts, connectors and integrated cable assembly solutions meeting the most demanding technical market requirements – ODU's connector solutions and value-added services are characterized by their exclusive focus on meeting the customer's needs.

- Precise implementation of application-specific requirements regarding design, functionality, cost and exclusivity
- Modified connector solutions derived from standard products
- One-to-one local expertise and fair, friendly consulting
- Short development and production paths

A PERFECT ALLIANCE.

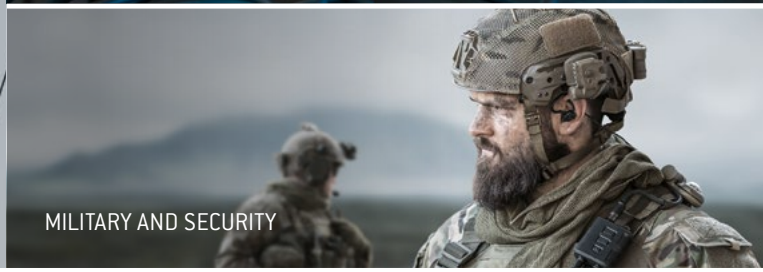
# CROSS-INDUSTRY KNOW-HOW

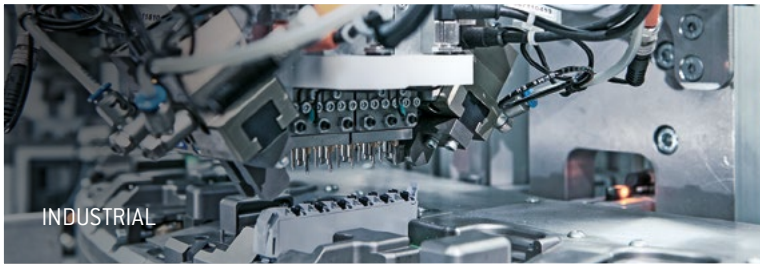










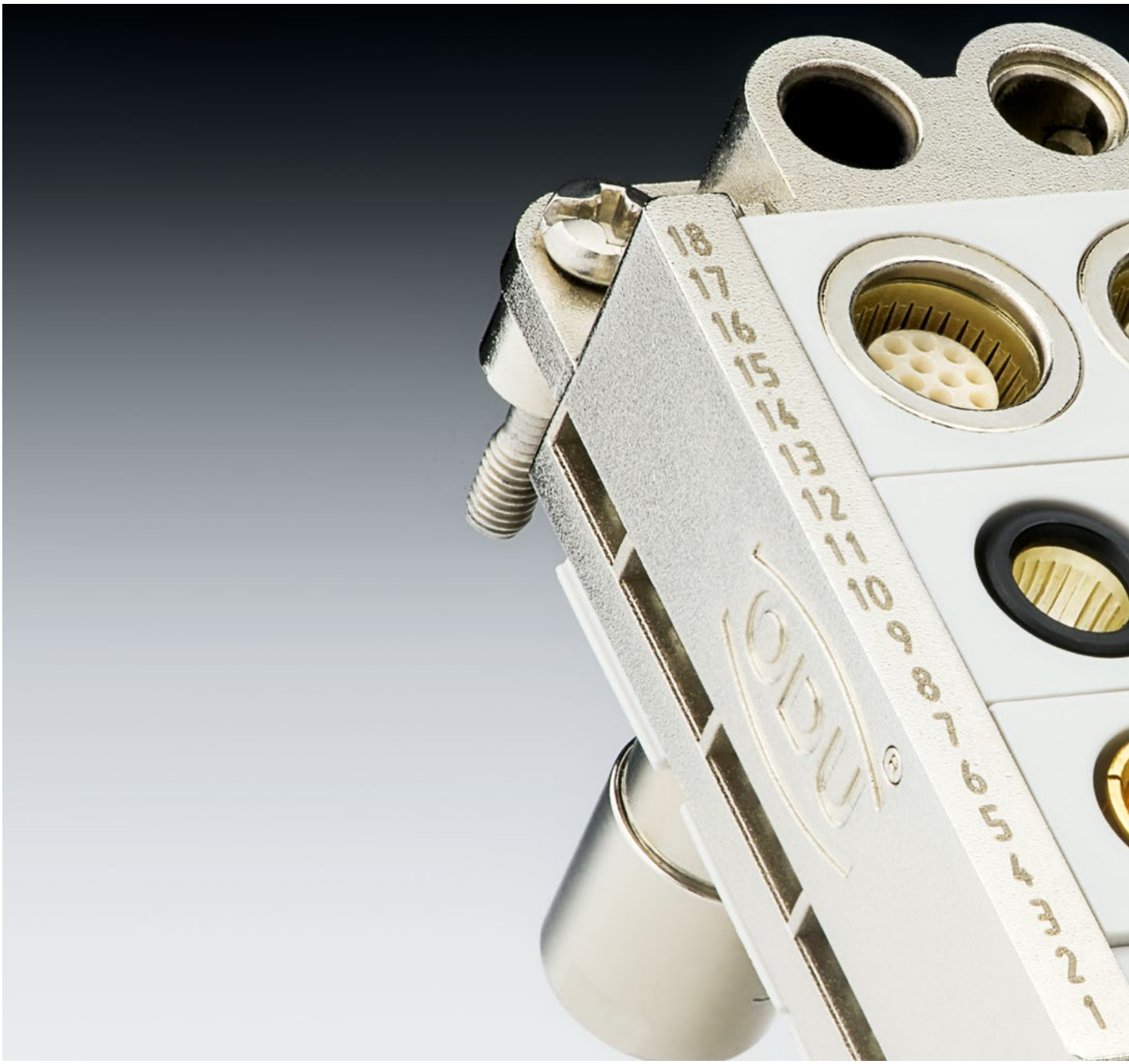





## DEVELOPMENT OF CUSTOM SOLUTIONS

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 impressive, custom-fit final end products.




## EASILY CONFIGURE THE ODU-MAC® BLUE-LINE ONLINE AT: WWW.ODU-MAC.COM/EN/

ODU-MAC®



# PRODUCT INFORMATION


The ODU-MAC® Blue-Line – a new performance class ..... 12

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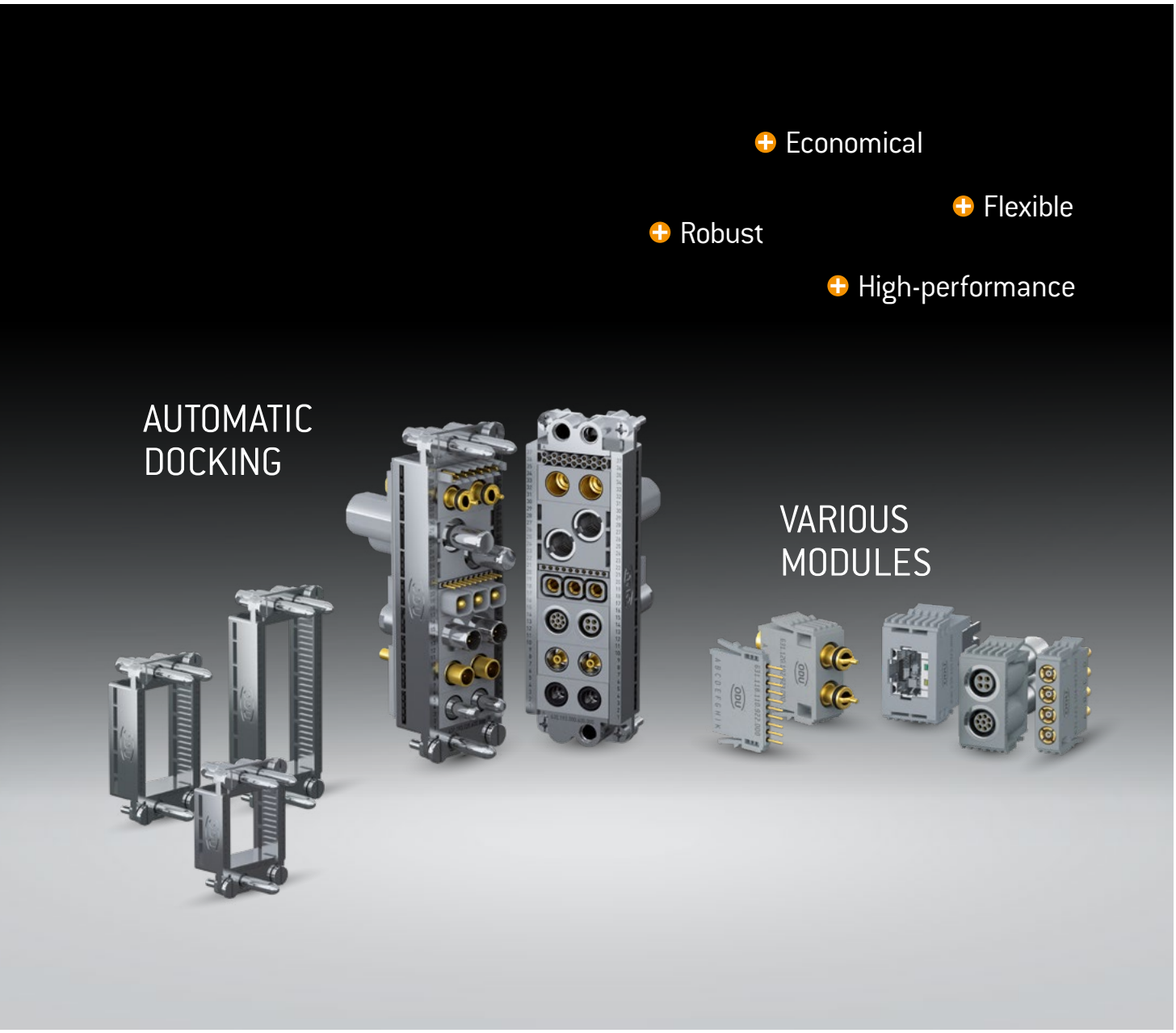
# THE ODU-MAC® BLUE-LINE – A NEW PERFORMANCE CLASS

## MANUAL MATING




The ODU-MAC® Blue-Line is a convenient, hybrid manual-connector solution comprising a stable frame, various modules, and a housing. Its modular design enables it to combine many individual connections in one ODU-MAC® Blue-Line. The proven ODU spindle locking in the new standard plastic housing provides the ODU-MAC® Blue-Line with a truly unique selling point on the market.

The economical connector system is a modular all-around solution that can be configured for the smallest installation space – available in both a plastic and a metal housing. A multitude of data transmission modules allow for a broad area of application as a service and interface connector, such as in mechanical engineering, in measurement and testing, as well as in medical technology. The simple, exceptionally user-friendly assembly and removal of the crimp-clip contacts, even if they have already been assembled, distinguish the ODU-MAC® Blue-Line as well; any module installation errors are prevented via one mechanical and two optical coding functions. The cost-effective and proven ODU contact technology – turned and slotted contacts – with at least 10,000 mating cycles, as well as the simple processing of the contacts and modules, underscores the economical nature of the system.




## ECONOMICAL

- Easy assembly using crimp contacts, which are clipped into the insulators
- Quick assembly and removal of the modules in the frame without using tools
- Removal of the contacts from the mating side

## ROBUST

- Centering, guiding, and grounding via guiding sockets and pins
- Numerous housing versions in metal and plastic available with spindle or lever locking

## FLEXIBLE

- 5 frame sizes (7, 12, 18, 26, 37 units)
- Transmission of signals, power, high current, coax, compressed air, fluid, data, and fiber optics
- Additional option for the transmission of signals: separate PCB termination modules for effective contacting in the termination area
- Maximum packing density via the 2.4 mm grid (1 unit)

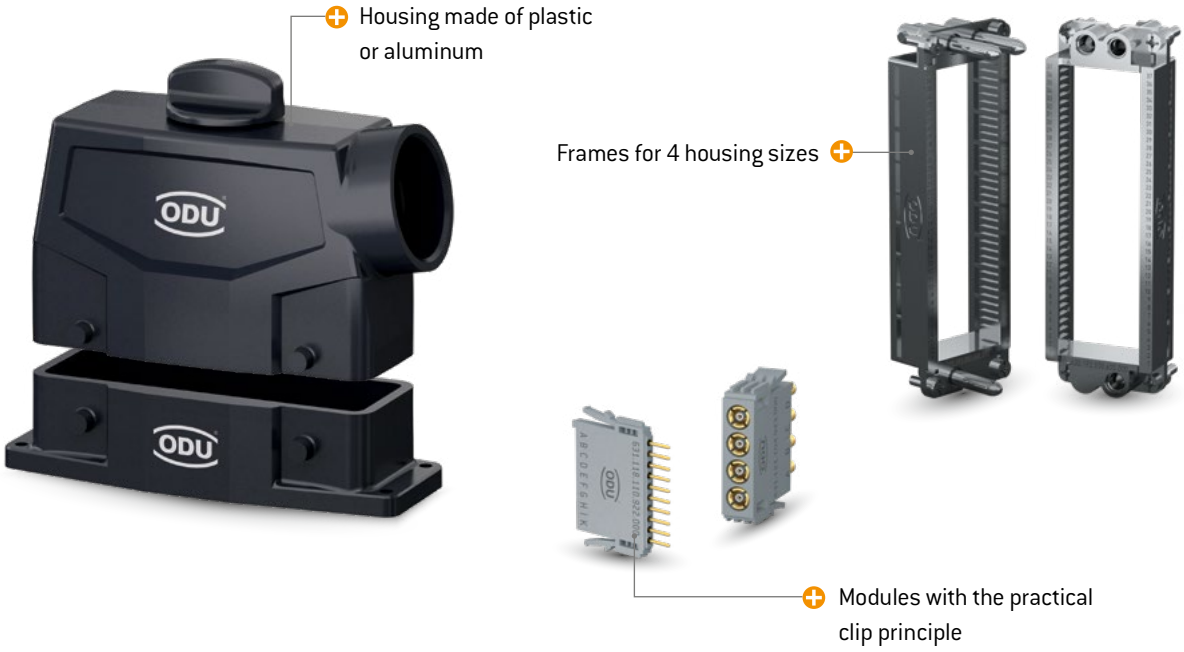
## HIGH-PERFORMANCE

- > 10,000 mating cycles
- Up to 370 contacts per single-row connector
- Proven ODU contact technology (turned/slotted contacts and contacts with lamella technology)

Table of contents

# A MODULAR ALL-ROUNDER

The flexible modular design of the ODU-MAC® Blue-Line enables the combination of the most varied types of transmission within a connector. Whether signal, power, high current, coax, compressed air, fluid, data or fiber optics are being transmitted – all of the contact inserts can be selected from the modular system and integrated into the individual connector solution. For signal transmission, there is also a simple contacting option using PCB termination modules. The mating options are equally versatile.




## THE INTELLIGENT WAY TO AN INDIVIDUAL CONNECTION

There are many possibilities available here for the most varied applications: for example, installed in a stable frame for rack-and-panel applications or in one of the many housing versions.

This results in an effective, compact, and attractive overall connection that cannot be beaten in terms of functionality. The confusion caused by many connections is a thing of the past – an ODU-MAC® Blue-Line customized to meet your requirements is today's solution.

**Learn more about custom configurations on the following pages or at: www.odu-mac.com/en/**

## ODU-MAC® Silver-Line / White-Line

**Our ODU-MAC® Silver-Line and White-Line offer a more comprehensive portfolio – request our catalog to find out more.**

## YouTube

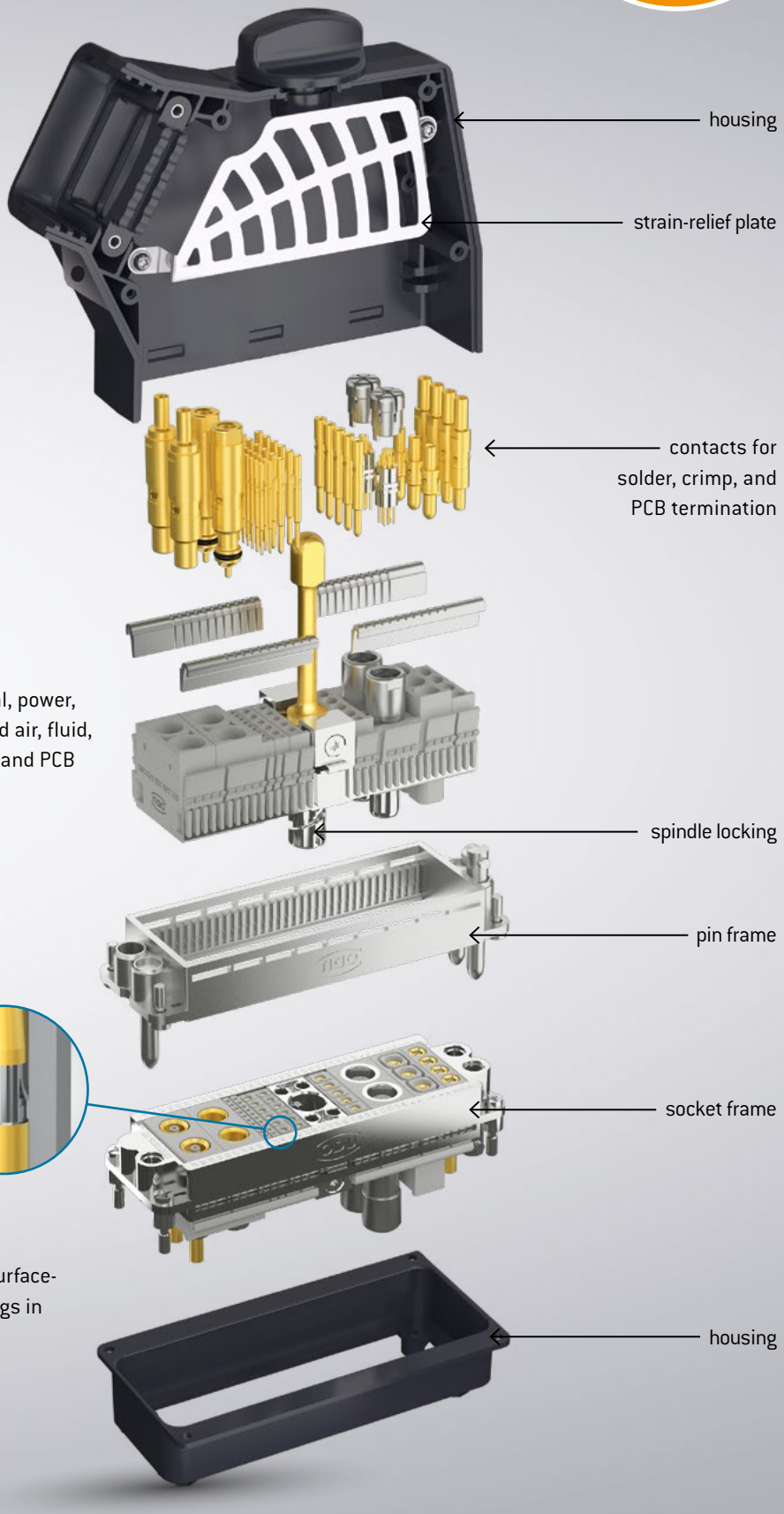
**FIND OUT MORE IN THE VIDEOS AT www.youtube.com/ODUSteckverbinder**

# THE MODULAR SYSTEM AT A GLANCE:

**10,000**
mating cycles
and more

**2** possible areas of application: manual mating or automatic docking

**39** cable hood versions




**4** types of locking: spindle, lever, transverse or push-pull locking

**28** modules to choose from: signal, power, high current, coax, compressed air, fluid, data transmission, fiber optic, and PCB termination

**3** different spindle geometries

Contacts with the clip principle that can be dismantled
(see page 36)

**14** versions of the bulkhead and surface-mounted housings and couplings in various sizes

# ODU-MAC® BLUE-LINE WEB CONFIGURATOR

**The individual configuration of your ODU-MAC® Blue-Line connector**

The ODU-MAC® Blue-Line Web Configurator offers you the possibility of conveniently configuring your connector online according to your requirements. The Configurator guides you step by step through the various selection options and offers much additional information. There are 3 ways to access the ODU-MAC® Blue-Line 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® Blue-Line.




You access the Configurator via the **Modular Connectors** product category.

## 2. ACCESS: DIRECTLY THROUGH WWW.ODU-MAC.COM/EN/




www.odu-mac.com/en/ takes you directly to the configuration interface, allowing you to start assembling your ODU-MAC® Blue-Line immediately.

## 3. ACCESS: THROUGH WWW.ODU-CONNECTORS.COM/BLUE-LINE/




Click the “Configurator” button on the www.odu-connectors.com/blue-line/ landing page to go to the Web Configurator.

# YOUR WAY TO AN INDIVIDUAL CONNECTION

**How to configure your ODU-MAC® Blue-Line.**

### INDIVIDUAL REQUIREMENTS – INDIVIDUAL CONFIGURATION

With ODU-MAC® Blue-Line, we offer a modular connector system configured to your exact requirements. This means that you always receive the appropriate hybrid connection for a perfect interface.

### SELECT & REQUEST OFFERS

You will receive a drawing and a detailed offer within one working day of submitting your request. The frames, modules, and contacts are delivered individually and can be easily assembled (clipped in) on site.
**We ask you to enquire directly about customized versions not covered by the standard product.**

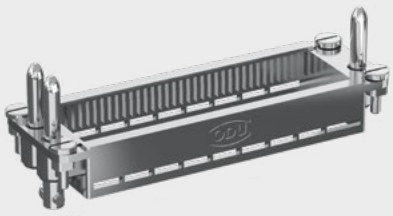


**For information on configuring your connector, please refer to our website: www.odu-mac.com/en/**

## FOR AUTOMATIC DOCKING

### 1ST STEP: FRAME SELECTION

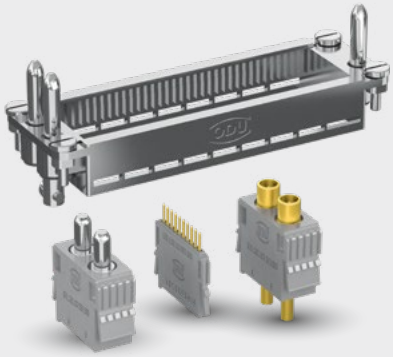
Depending upon your requirements, you can choose 4 different frame sizes as a base for automatic docking.



### 2ND STEP: MODULE SELECTION

Choose from 28 different modules for signals, power, high current, coax, compressed air, fluid, data transmission, fiber optics or PCB termination and assemble your ODU-MAC® Blue-Line individually.

| Modules | |
|---|---|
| Signal | Shielded feedthrough/ high-speed connector |
| Power | Fiber optic |
| High current | PCB termination |
| Coax | Blank modules |
| Compressed air and fluid | |



# FOR MANUAL MATING

## 1ST STEP: LOCKING

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

| Spindle locking<br>Metal/plastic housing | Lever locking<br>Metal housing | Transverse locking<br>Plastic housing | Push-pull locking |
|---|---|---|---|



## 2ND STEP: CONNECTOR HOUSING SELECTION

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

| Spindle locking | Lever locking | Transverse locking | Push-pull locking |
|---|---|---|---|
| Cable hood<br>Metal/plastic housing | Cable hood<br>Metal housing | Cable hood<br>Plastic housing | Cabel hood |
| Cable hood XXL | Cable hood XXL | | |
| | Cable hood wide | | |



## 3RD STEP: RECEPTACLE SELECTION

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

| Cable hood | Cable hood XXL | Push-pull locking |
|---|---|---|
| Bulkhead housing<br>Metal/plastic housing | Bulkhead housing<br>Metal housing | Receptacle |
| Surface-mounted housing<br>Metal/plastic housing | Surface-mounted housing<br>Metal housing | |
| Cable-to-cable hood<br>Metal housing | | |



The cable hood wide is only compatible with the cable hood wide version of bulkhead and surface-mounted housings.

## 4TH STEP: MODULE SELECTION

Choose from 28 different modules for signals, power, high current, coax HF signals, compressed air, fluid, data transmission, fiber optics or PCB termination and assemble your ODU-MAC® Blue-Line individually.

| Modules |
|---|
| See page 90 |



# ODU-MAC® PUSH-LOCK

## Maximum packing density in the smallest installation space

We offer a compact, sealed housing with push-pull locking based on the ODU-MAC® Blue-Line. In terms of ergonomics, modularity, and user-friendliness, it is in no way inferior to its “big brother” with spindle locking. Seven units can be custom-fitted with hybrid connector configurations offering International Protection class IP67.

### With push-pull locking

The compact, sealed ODU-MAC® PUSH-LOCK housing with push-pull locking is based on the ODU-MAC® Blue-Line. Seven units can be custom-fitted with hybrid connector configurations offering International Protection class IP67. The ergonomic one-handed operation, modular design, and user friendliness of the PUSH-LOCK housing are what set it apart. A total of six optional coding functions and the tried-and-tested push-pull locking principle ensure mating is reliable and secure. This modular rectangular connector benefits from the decades of experience obtained through ODU push-pull circular connectors.

### BENEFITS OF THE PUSH-LOCK HOUSING

- Easy and secure **push-pull locking**
- **7 units**
- **Modules:** signal, power, HF signals (coax), compressed air, fluid coupling, data transmission
- > **5,000** mating cycles
- **IP67**
- **M25** cable outlet
- **Protective cover**

FURTHER INFORMATION FROM PAGE 42.

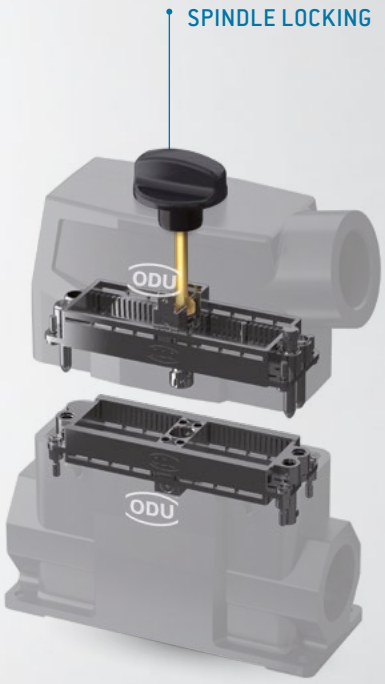



M25 cable outlet
Ergonomic
one-handed operation
Push-pull
locking
> 5,000 mating cycles
International Protection
class IP67 (mated)


PE termination
Can be fitted with
7 units
**Hybrid connector:**
signal, power,
HF signals (coax),
compressed air,
fluid coupling,
data transmission
6 optional additional
coding functions
Hidden
mounting solution

# THE BEST CONNECTIONS FOR MANUAL MATING

**Housings with spindle locking at a glance.**




In the case of spindle locking of the ODU-MAC® Blue-Line, 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 more than 10,000 locking cycles.

## BENEFITS OF SPINDLE LOCKING

- **Low profile** – requires less space for operation than lever locking
- **Easy to use** – one-handed operation
- **Ergonomic design** – elegant spindle knob
- **Tested reliability** – developed for high numbers of locking cycles
- **Fully enclosed** – internal mechanism protects against injury
- **Replaceability** – can be replaced without removing the hood or frame
- **User-friendly** – little force required for operation
- **Precision** – materials, design, and tolerances help to prolong the service life of the complete system

| Size | Units[1] | |
|---|---|---|
| 2 | 18 | |
| 3 | 26 | |
| 4 | 37 | |

**CABLE HOOD XXL[2]:**

| | | |
|---|---|---|
| 4 | 37 | |

FURTHER INFORMATION FROM PAGE 48.

[1] 5 units of space required for spindle [2] Cable hood XXL only possible in metal version

## PLASTIC CABLE HOOD WITH SIDE CABLE OUTLET, PAGE 56

Connector housing for assembly on the cable



## METAL CABLE HOOD WITH SIDE CABLE OUTLET, PAGE 48

Connector housing for assembly on the cable



## METAL CABLE HOOD XXL WITH SIDE M50 CABLE OUTLET, PAGE 49

Connector housing with expanded assembly space and side M50 cable outlet



FULLY COMPATIBLE



## PLASTIC SURFACE-MOUNTED HOUSING, PAGE 58

For surface mounting on your device/ wall with spindle locking and two side cable outlets



## METAL SURFACE-MOUNTED HOUSING, PAGE 51

For surface mounting on your device/wall with spindle locking and two side cable outlets



## PLASTIC BULKHEAD HOUSING, PAGE 57

For mounting on your device with spindle locking



## METAL BULKHEAD HOUSING, PAGE 50

For mounting on your device with spindle locking

# THE BEST CONNECTIONS FOR MANUAL MATING

## ODU-MAC® RAPID housings with spindle locking at a glance

### TWICE AS FAST THANKS TO THE HALF-SHELL PRINCIPLE

Our new housing meets all major challenges, including high contact density, flush mounting of the receptacle, and easy adaptability when user requirements change quickly. Special protective covers for both housing parts round out the series.

### BENEFITS OF THE RAPID HOUSING

- Up to 50% in time savings through easy assembly and maintenance
- **Flexible cable outlet** – can be adapted to cable or tube assemblies as necessary
- **Optional lattice plates** – enable bundling and strain relief of single strands
- **Half-shell principle** – practical structure as well as fitting and assembly of components in the housing
- **New recessed receptacle version**
- Available for ODU-MAC® White-Line and Blue-Line in size 4 with the proven ODU spindle locking system
- Coding enabled through the guiding pins on the frame; six further coding functions are optional via the spindle module

| Size | Units[1] | |
|---|---|---|
| 4 | 37 |  |

FURTHER INFORMATION FROM PAGE 52.

[1] 5 units of space required for spindle

SPINDLE LOCKING, PAGE 52

RAPID PLASTIC HOUSING, PAGE 52

Half-shell principle with individually adjustable side cable outlet



FULLY COMPATIBLE





PLASTIC RAPID RECEPTACLE, PAGE 53

For mounting as a recessed plastic style

RAPID RECEPTACLE, PAGE 53

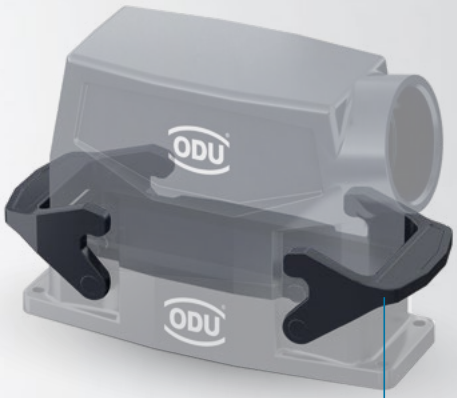
Direct mounting on the mounting wall

# THE BEST CONNECTIONS FOR MANUAL MATING

**Housings with transverse locking at a glance.**

The efficient and robust plastic housings with transverse locking are available in size 1 to 4 with IP65 as standard.

A space-saving locking type for two-handed safety operation with over 5,000 possible mating cycles, which complements our multi-faceted housing range. It makes manual mating as easy as it is safe.




TRANSVERSE LOCKING

FURTHER INFORMATION FROM PAGE 59.

- Locking latch **can be changed easily**
- Light and robust housing model
- **Space-saving locking,** stackable sidewise
- Two-handed safety operation
- Protection class **IP65**
- > **5,000 locking cycles**

| Size | Units | |
|---|---|---|
| 1 | 12 |  |
| 2 | 18 |  |
| 3 | 26 |  |
| 4 | 37 |  |

PLASTIC CABLE HOOD
WITH SIDE CABLE OUTLET, PAGE 59

Connector housing for assembly on the cable




FULLY
COMPATIBLE




PLASTIC BULKHEAD
HOUSING, PAGE 60

For assembly on your device
with transverse locking



PLASTIC SURFACE-MOUNTED HOUSING,
PAGE 61

For surface mounting on your device/wall
with transverse locking and two side cable outlets

# THE BEST CONNECTIONS FOR MANUAL MATING

**Housings with lever locking at a glance.**

ODU-MAC® Blue-Line with lever locking offers a wide variety of combination possibilities for manual mating. With the exception of the cable hood wide, 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 37 modules with a module width of 2.4 mm (1 unit), meaning that a total of 37 modules (37 units), or 370 contacts in the case of 10 contacts, can be accommodated. Size 6 of the cable hood wide can even accommodate up to 740 contacts.

| Size | Units | |
|---|---|---|
| 1 | 12 |  |
| 2 | 18 |  |
| 3 | 26 |  |
| 4 | 37 |  |
| **CABLE HOOD XXL:** | | |
| 4 | 37 |  |
| **CABLE HOOD WIDE:** | | |
| 5 | 52 |  |
| 6 | 74 |  |

FURTHER INFORMATION FROM PAGE 64.



**METAL CABLE HOOD WIDE WITH TOP CABLE OUTLET, PAGE 68**

Connector housing for double frame assembly

**METAL CABLE HOOD WIDE WITH SIDE CABLE OUTLET, PAGE 68**

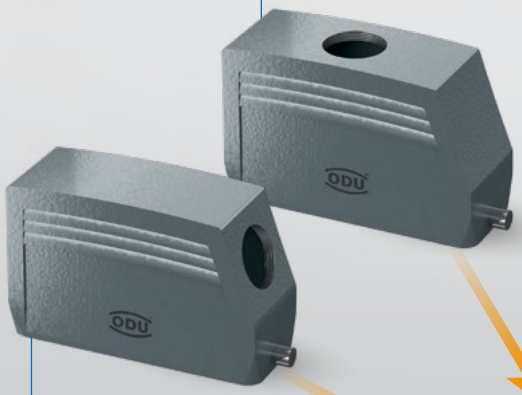
Connector housing for double frame assembly

**METAL BULKHEAD HOUSING FOR CABLE HOOD WIDE, PAGE 69**

For mounting on your device with lever locking (with and without cover)

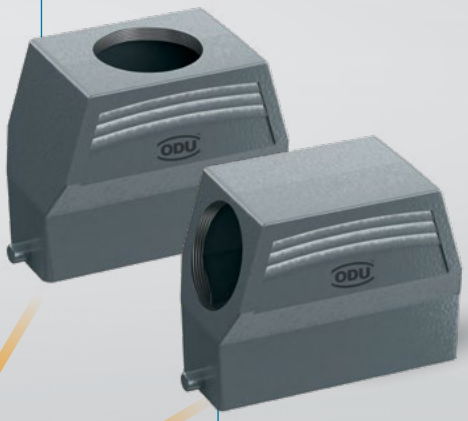
## METAL CABLE HOOD WITH TOP CABLE OUTLET, PAGE 64

Connector housing for assembly on the cable



## METAL CABLE HOOD XXL WITH TOP M50 CABLE OUTLET, PAGE 65

Connector housing with expanded assembly space, for assembly on the cable



## METAL CABLE HOOD WITH SIDE CABLE OUTLET, PAGE 64

Connector housing for assembly on the cable

FULLY COMPATIBLE

## METAL CABLE HOOD XXL WITH SIDE M50 CABLE OUTLET, PAGE 65

Connector housing with expanded assembly space, for assembly on the cable



## METAL BULKHEAD HOUSING, PAGE 66

For mounting on your device with lever locking (with and without cover)



## METAL SURFACE-MOUNTED HOUSING, PAGE 67

For surface mounting on your device/wall with two side cable outlets (with and without cover)



## METAL CABLE-TO-CABLE HOOD, PAGE 70

For a flying cable-to-cable connection with lever locking and top cable outlet

# INFORMATION ON THE PLASTIC HOUSING

Plastic housings are 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.

The plastic housings of ODU-MAC® Blue-Line either use the proven ODU spindle locking technology with a minimum of 10,000 locking cycles, which has excellent ergonomic features, or the customer can choose the efficient transverse locking version instead. An additional grounding of the plastic housing is unnecessary, due to the antistatic, thermoplastic housing.

**Hence manual mating becomes as easy as it is safe.**



# CHEMICAL RESISTANCE

| 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 sulfate, 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 sulfide | 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 | • | |
| Petroleum | • | |
| Potassium carbonate | • | |
| Potassium chloride | • | |
| Potassium iodide | • | |
| Potassium nitrate | • | |
| Potassium sulfate | • | |
| 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 sulfate | • | |
| Sodium sulphide | • | |
| Sodium thiosulfate | • | |
| Solution for developing photos | • | |
| Stearic acid | • | |
| Stearic acids | • | |
| Sulfur | • | |
| Sulfur dioxide | | • |
| Tallow | • | |
| Tar | • | |
| Tartaric acid | • | |
| Transformer oil | • | |
| Urea, diluted | • | |
| Urine | • | |
| Vegetable oil | • | |
| Water | • | |

This list gives a non-exhaustive indication of the chemical resistance offered by the plastic housing. Please contact the ODU team if you have any further questions. They will be happy to assist you.

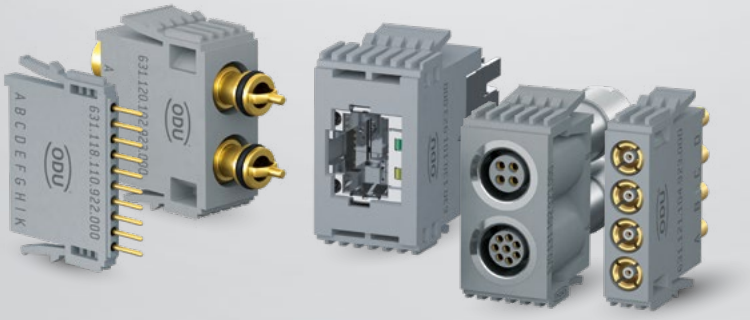
# FRAMES FOR AUTOMATIC DOCKING

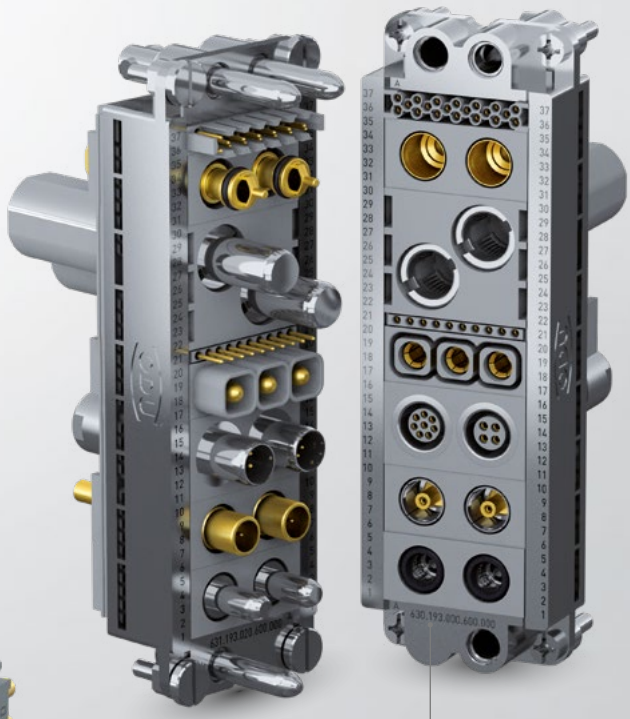
## Docking frames at a glance

Depending on your requirements, you can choose between 4 different sizes and fit the frame with modules.

There is always a perfect solution with the ODU-MAC® Blue-Line. If your requirements for a connector are not covered by the standard solutions, we also offer special customer-specific solutions.

The ODU-MAC® Blue-Line is designed for 12 to 37 grid units (more on request), meaning that 370 contacts can be installed if the10-contact module with a module width of 2.4 mm (1 unit) is used.





Frame size 4 assembled

### BENEFITS OF THE ODU-MAC® BLUE-LINE FRAMES

- **Economical**
  Quick assembly and removal of the modules in the frame without using tools
- **Flexible**
  4 frame sizes (12, 18, 26, 37 units)
  28 different modules: signal, power, high current, coax, compressed air, fluid, data transmission, fiber optic or PCB termination
- **Maximum packing density** via the 2.4 mm grid (1 unit)
- **High-performance**
  > 10,000 mating cycles
  Up to 370 contacts per connector

## PIN FRAMES – FLOATING MOUNTING

The frame is suitable for automatic docking.
Tolerance compensation +/– 0.6 mm radial, min. 0.1 mm axial




FURTHER INFORMATION FROM PAGE 72.

# BEST CONNECTIONS – THE CONTACT PRINCIPLE

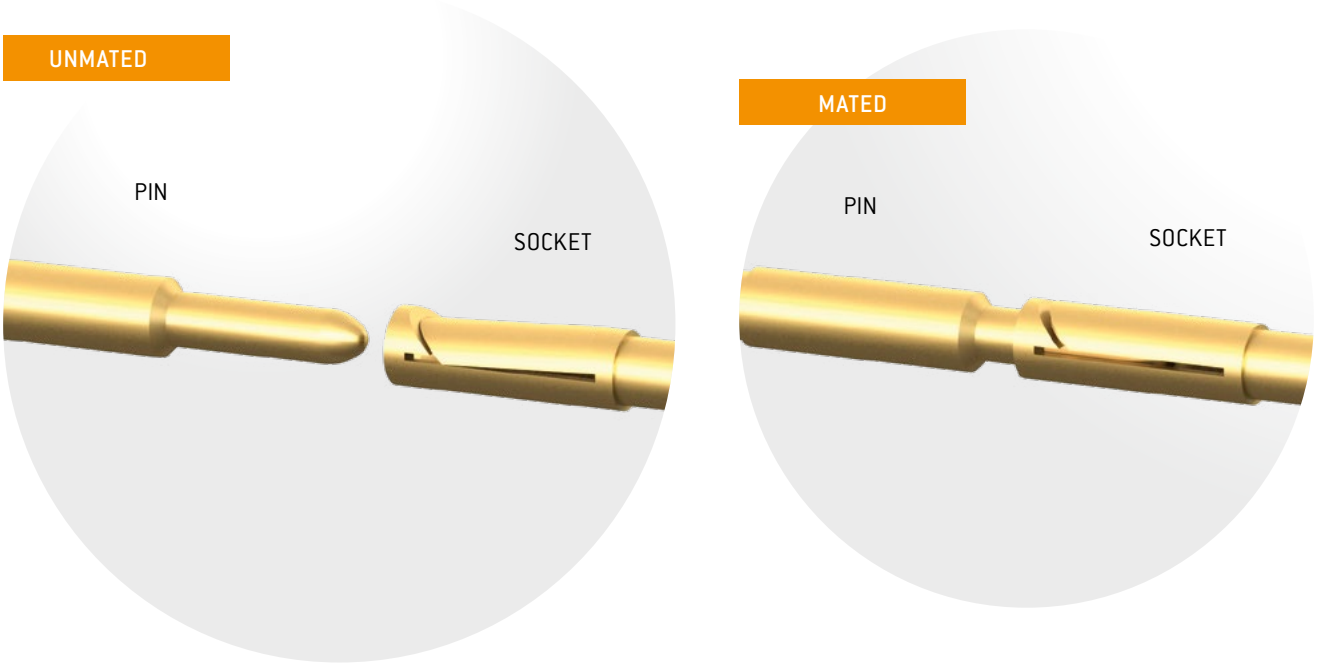
ODU contacts meet the highest quality standards and enable safe and reliable connections. In order to achieve this, ODU relies on high-performance contact technologies. In the turned contact category, we essentially distinguish between lamella and slotted contacts. The socket pieces differ, but the pins are always the same and always solid.

## ODU TURNTAC®

**Contacts in slotted version.**

The universal ODU TURNTAC® contact system combines the very best contact properties and high quality with economical prices. By means of 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 version of the slotted contact, the connector system offers two or four contact areas.




### BENEFITS

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

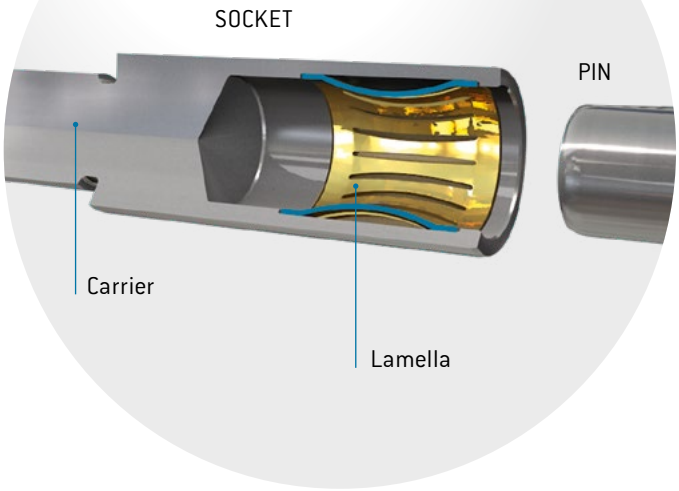
| Standard contact principle for: | |
|---|---|
| Signal contact | ∅ 0.7–2 mm |
| Power contact | ∅ 3.5 mm |
| Coax | 2 and 4 contacts |
| Shielded feedthrough | Signal contacts |

# ODU LAMTAC®

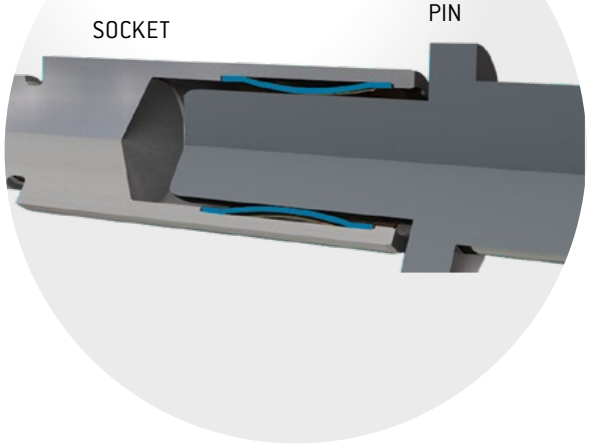
**Contacts with lamella technology.**

The ODU LAMTAC® consists of a turned carrier in which one or several stamped lamella strips are mounted in a fully automated process. The lamella's individual slats make for a multitude of contact points, thereby guaranteeing a high level of contact safety and ease of connecting. 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.

UNMATED




MATED




## BENEFITS

- > 10,000 mating cycles
- High current-carrying capacity – surge current capacity
- Low contact resistances
- Low mating and demating forces
- High vibration and shock resistance
- Individual contacts on request

| Standard contact principle for: | |
|---|---|
| Power contact | ∅ 5 – 12 mm |
| Shielded feedthrough | Shielded transmission |

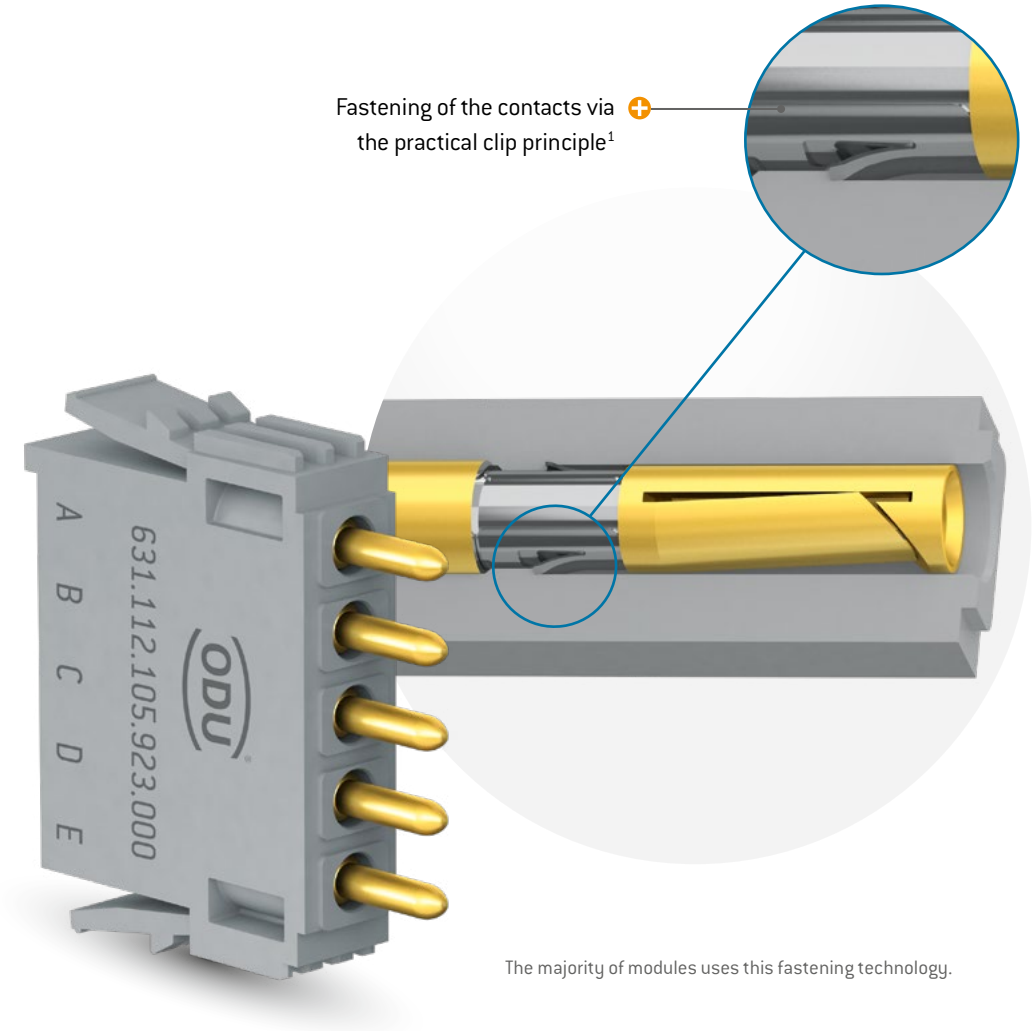
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# CONTACT RETENTION WITH THE CLIP PRINCIPLE (STANDARD)

The graphic below shows how the contact is fixed in the insulator. The contact is pushed from the termination side (rear insertion) into the insulator and locked in by a metal clip (barbed hook) snapping in the insulator. The contacts can be easily removed again from the front at any time with a removal tool.

Compared with permanent connections, crimp technology allows for the 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 always possible.



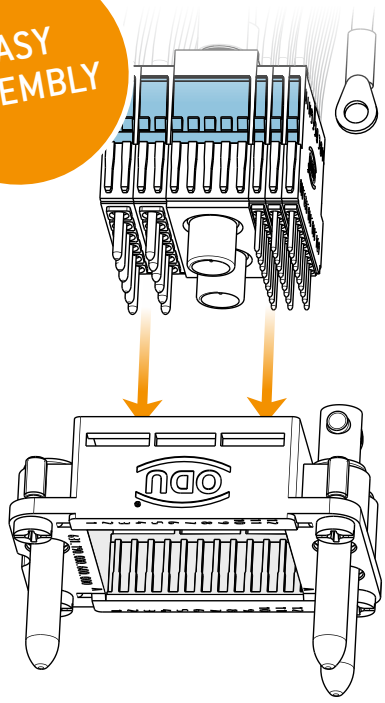

The majority of modules uses this fastening technology.

[1] After clipping a new contact in three times, the module must be renewed.

# PERFECTLY ASSEMBLED – EASY TO HANDLE

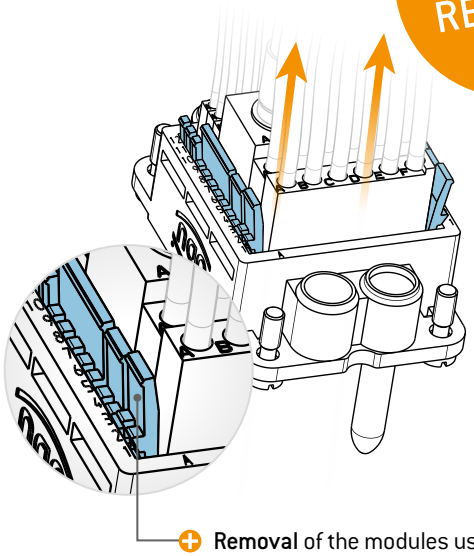
One mechanical and two optical coding functions of the modules simplify the assembly. Modules can be assembled equipped or unequipped (contact assembly is possible at any process step).

EASY ASSEMBLY



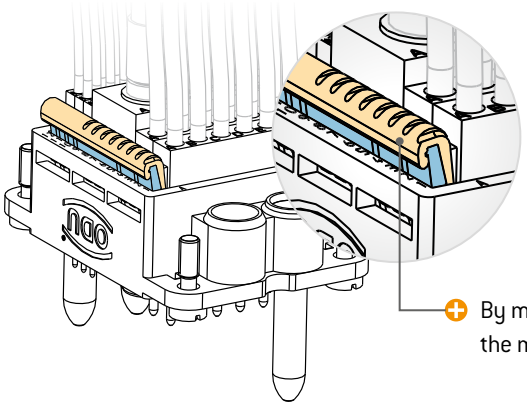
**Assembly** and fastening of the modules using the clip principle without any tools

SIMPLE REMOVAL



**Removal** of the modules using the clip principle without any tools

SECURE LOCKING

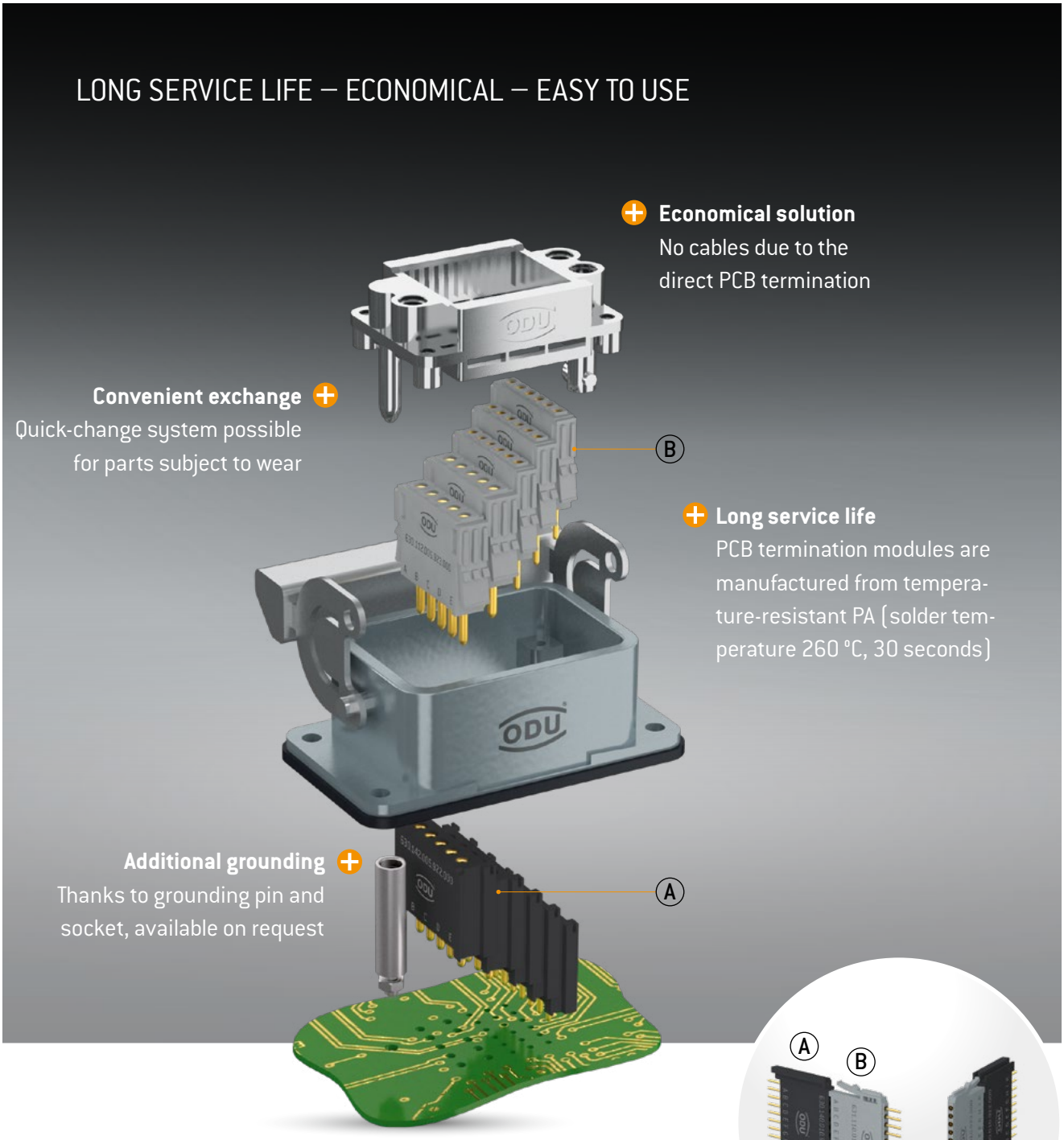


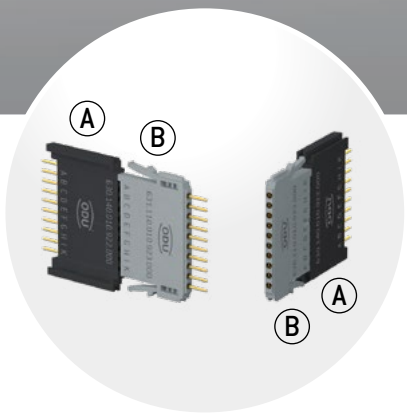
By means of secondary locking, the module is locked correctly

Please refer to the ODU-MAC® Blue-Line assembly instructions for detailed information. Further information is available in the download area of our website.

# PCB TERMINATION MODULES

**Easy-to-use termination technology for signal modules via PCB contacting**




## THE BENEFITS OF THE PCB TERMINATION ASSEMBLY

The PCB termination modules Ⓐ[1] are permanently mounted on the board and are connected via an interface to the module Ⓑ that is plugged into the frame. If a module needs to be replaced, then only the module Ⓑ installed in the frame must be replaced. Module Ⓐ that is mounted on the PCB is not affected by this. An effective installation or quick-change function, as the case may be, is thereby achieved.

[1] After clipping a new contact in three times, the module must be renewed.

# THE ODU-MAC® BLUE-LINE – FOR THE MOST VARIED APPLICATIONS

## MAIN APPLICATION AREAS FOR THE ODU-MAC® BLUE-LINE

- Test and measurement
- Medical
- Industrial
- Special machine construction

### ODU-MAC® BLUE-LINE FOR X-RAY MACHINES

The modular ODU-MAC® connector acts as an interface between a mobile X-ray machine and a monitor cart. It transmits high current, data, and signals.



### ODU-MAC® BLUE-LINE FOR AUTOMOTIVE TESTING

The ODU-MAC® Blue-Line in a housing with spindle locking provides a reliable interface between the test device and the measured-data receiver.



### ODU-MAC® BLUE-LINE FOR MEASURING AND TESTING TECHNOLOGY

ODU-MAC® Blue-Line customized power and signal transmission solution for a HIL testing system.






## EASILY CONFIGURE THE ODU-MAC® BLUE-LINE ONLINE AT: WWW.ODU-MAC.COM/EN/

ODU-MAC®

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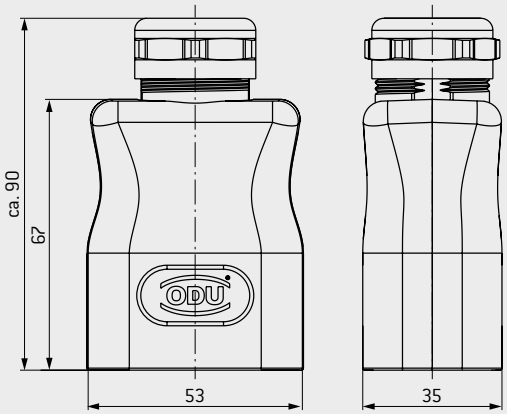
# ODU-MAC® PUSH-LOCK

## Connector housing for assembly on the cable

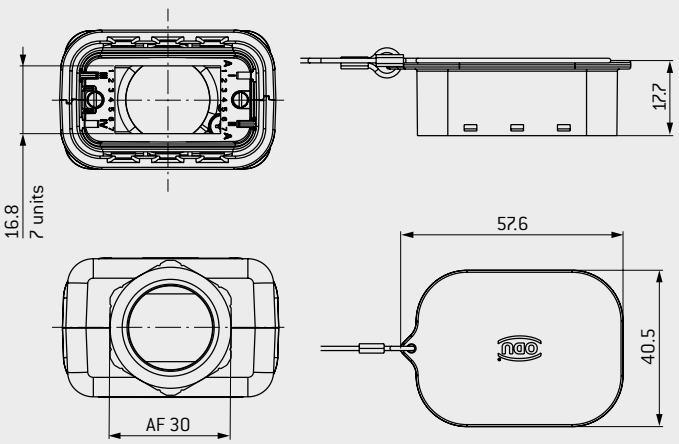
**PUSH-PULL LOCKING**



### PLUG




### COVER




| ODU-MAC® PUSH-LOCK | Part number |
|---|---|
| Cable hood | 656.564.012.000.000 |
| Connector coding set | 656.564.002.010.000 |
| Connector protective cover | 656.564.020.000.000 |

| Assembly set for cable-∅ (has to be ordered separately) | Color | Part number |
|---|---|---|
| 7 to 10.5 | Green | 921.000.006.999.001 |
| 9 to 13 | Red | 921.000.006.999.002 |
| 14 to 18 | Blue | 921.000.006.999.003 |
| 17 to 20.5 | Brown | 921.000.006.999.004 |

### TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005), White on request |
| Material housing shell | Lexan PC |
| Material protective cover | Lexan PC |
| Number of locking cycles[1] | 5,000 |
| Units[2] | 7 |
| International Protection class[3] | IP67 |
| Operating temperature | –40 °C to +125 °C |
| Cable diameter | 7–20.5 |
| Coding | 6 more mechanical versions as options |

SUITABLE MODULES ARE MARKED.

[1] At maximum mating force for all contacts of 40 N. [2] The frame is already permanently integrated and consists of seven units. [3] IEC 60529:2013 (VDE 0470-1:2014)

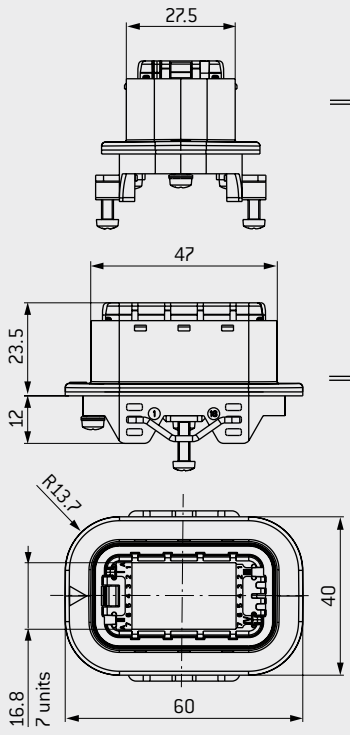
# ODU-MAC® PUSH-LOCK

Receptacle for integration in your device

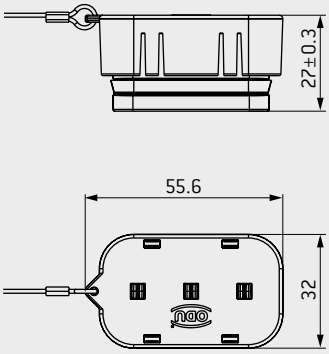
PUSH-PULL LOCKING



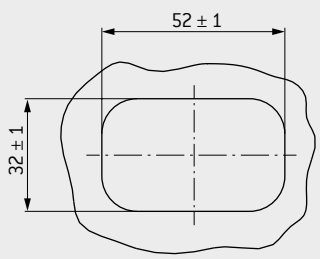
## RECEPTACLE



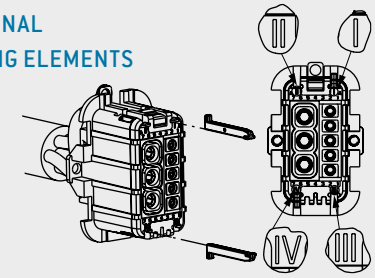

## COVER




## PANEL CUT-OUT




## OPTIONAL CODING ELEMENTS




## TECHNICAL DATA

| | |
|---|---|
| Material receptacle | Zn alloy, nickel-plated |
| Material protective cover | Lexan PC |
| Number of locking cycles[1] | 5,000 |
| Units[2] | 7 |
| International Protection class[3] | IP67 |
| Operating temperature | –40 °C to +125 °C |

| ODU-MAC® PUSH-LOCK | Part number |
|---|---|
| Receptacle | 656.564.001.000.000 |
| Receptacle coding set | 656.564.001.010.000 |
| Receptacle protective cover | 656.564.010.000.000 |

| Receptacle coding | |
|---|---|
| Coding A | I + IV |
| Coding B | II + III |
| Coding C | I + II |
| Coding D | III +IV |
| Coding E | I + III |
| Coding F | II + IV |

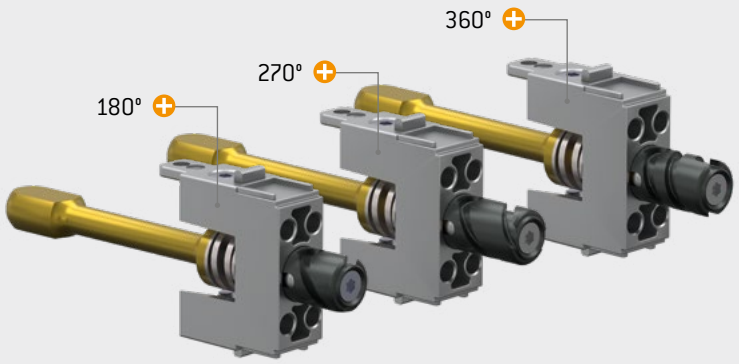
[1] At maximum mating force for all contacts at 40 N. [2] The frame is already permanently integrated and consists of seven units. [3] IEC 60529:2013 (VDE 0470-1:2014)

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# SPINDLE LOCKING (VERSION 1)

Module for installation in ODU-MAC® Blue-Line frame for housing. Quick-action locking system with over 10,000 locking cycles. Easy replacement of the front (replacement spindle set) enables a simple adjustment of the spindle geometry.

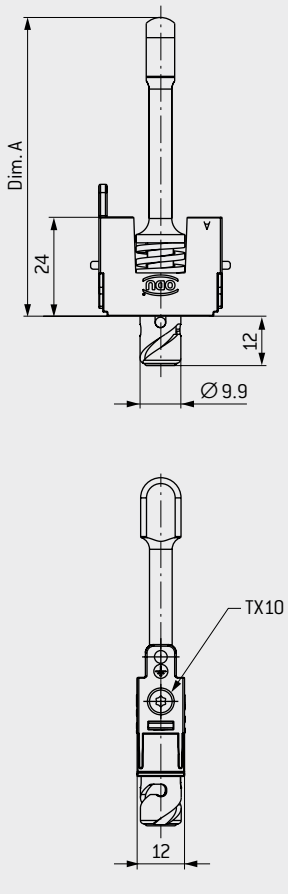
## VERSION 1: FOR SOCKETS IN BULKHEAD OR SURFACE-MOUNTED HOUSING AND PINS IN CABLE HOOD



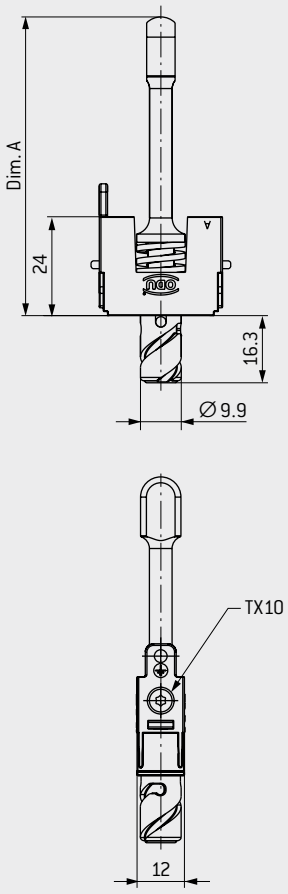

### TECHNICAL NOTES

- Min. 10,000 locking cycles
- Space requirement 5 units (5 × 2.4 mm)
- Easy one-hand insertion/connection
- Force benefit by the insertion/connection
- Replaceable spindle screws
- Direct PE contacting (fast-on)

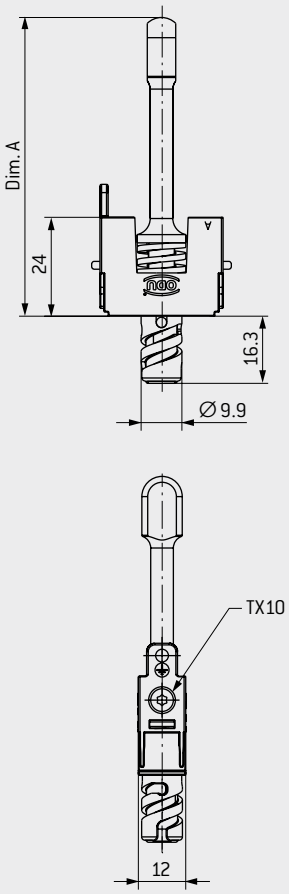
### SPINDLE 1 – 12 mm (180°)



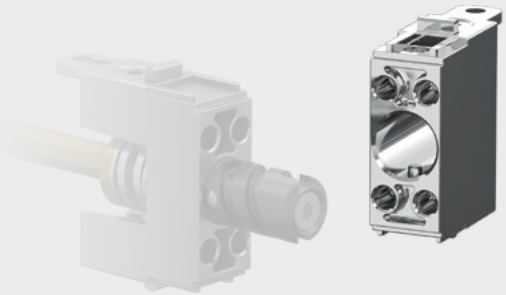

### SPINDLE 2 – 16.3 mm (270°)



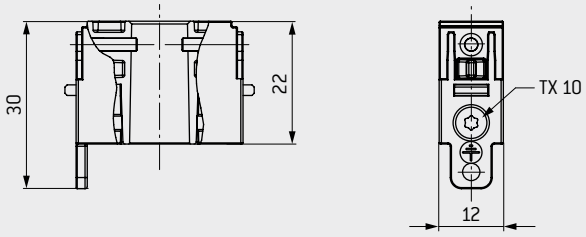

### SPINDLE 3 – 16.3 mm (360°)



## CENTER MODULE SUITABLE FOR SPINDLE 180°, 270°, AND 360°

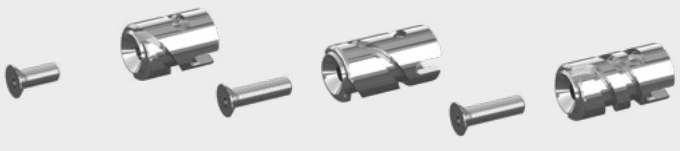


## CENTER MODULE FOR SPINDLE LOCKING




| Size | Part number WITHOUT CODING | | Part number WITH CODING[1] | | Angle of rotation | Dim. A |
|---|---|---|---|---|---|---|
| | Center module for bulkhead and surface-mounted housing and cable-to-cable hood | Spindle locking for cable hood | Center module for bulkhead and surface-mounted housing and cable-to-cable hood | Spindle locking for cable hood | | mm |
| 2 (52 mm high) | 634.090.001.304.000 | 635.091.003.200.000 | 634.090.001.304.010 | 635.091.003.200.010 | 180° | 46.5 |
| 2 (72 mm high) | 634.090.001.304.000 | 635.091.001.200.000 | 634.090.001.304.010 | 635.091.001.200.010 | 180° | 66.5 |
| 3/4 | 634.090.001.304.000 | 635.092.011.200.000 | 634.090.001.304.010 | 635.092.011.200.010 | 270° | 72.5 |
| 3/4 | 634.090.001.304.000 | 635.092.011.200.003 | 634.090.001.304.010 | 635.092.011.200.013 | 360° | 72.5 |
| XXL | 634.090.001.304.000 | 635.093.011.200.000 | 634.090.001.304.010 | 635.093.011.200.010 | 270° | 90.5 |
| XXL | 634.090.001.304.000 | 635.093.011.200.003 | 634.090.001.304.010 | 635.093.011.200.013 | 360° | 90.5 |

## REPLACEMENT SPINDLE SETS 180°, 270°, AND 360°



| Part number replacement spindle set | Angle of rotation | Dimension mm |
|---|---|---|
| 615.090.104.249.000 | 180° | 12 |
| 615.090.104.249.004 | 270° | 16.3 |
| 615.090.104.249.005 | 360° | 16.3 |

Depending on the application, a simple adjustment of the spindle geometry is possible using the replacement spindle set.

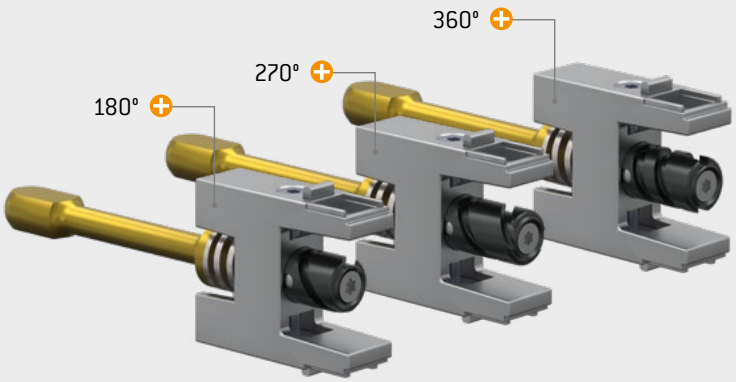
FOR THE REQUIRED ASSEMBLY AIDS, SEE PAGE 158

[1] Coding pins are included in the standard scope of delivery. For an explanation of spindle coding, see from page 80

# SPINDLE LOCKING (VERSION 2)

Module for installation in ODU-MAC® Blue-Line frame for housing. Quick-action locking system with over 10,000 locking cycles. Easy replacement of the front (replacement spindle set) enables a simple adjustment of the spindle geometry.

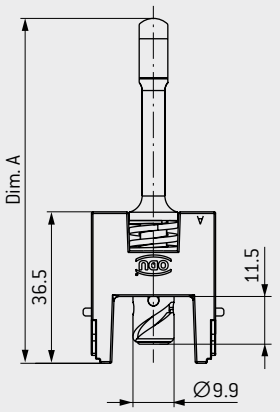
## VERSION 2: FOR PINS IN BULKHEAD OR SURFACE-MOUNTED HOUSING AND SOCKETS IN CABLE HOOD (REVERSED GENDER)

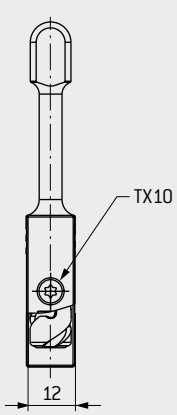



### TECHNICAL NOTES

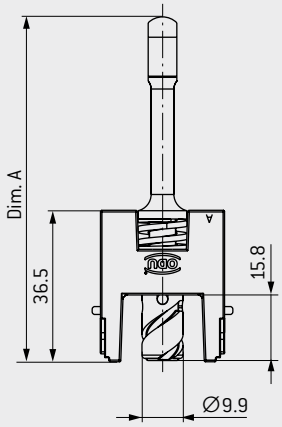
- Min. 10,000 locking cycles
- Space requirement 5 units (5 × 2.4 mm)
- Easy one-hand insertion/connection
- Force benefit by the insertion/connection
- Replaceable spindle screws

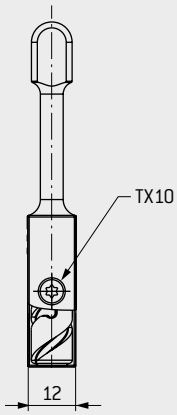
### SPINDLE 1 – 11.5 mm (180°)



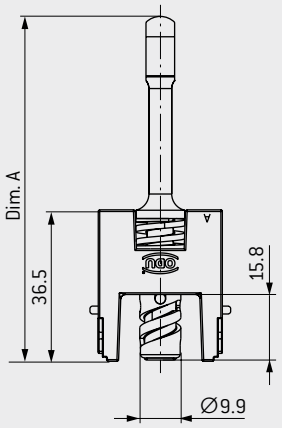



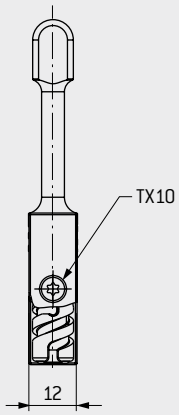

### SPINDLE 2 – 15.8 mm (270°)




### SPINDLE 3 – 15.8 mm (360°)

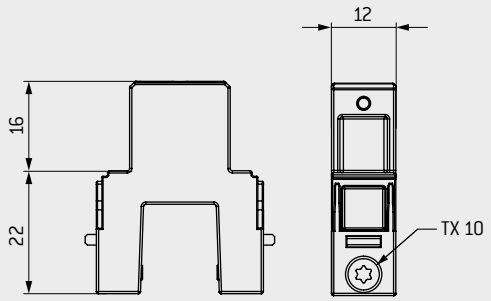


## CENTER MODULE SUITABLE FOR SPINDLE 180°, 270°, AND 360°

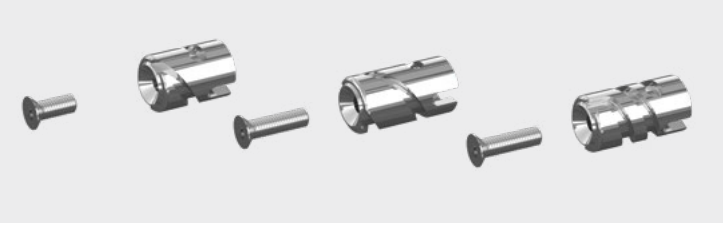


## CENTER MODULE FOR SPINDLE LOCKING




| Size | Part number WITHOUT CODING | | Angle of rotation | Dim. A |
|---|---|---|---|---|
| | Center module for bulkhead and surface-mounted housing and cable-to-cable hood | Spindle locking for cable hood | | mm |
| 2 (52 mm high) | 634.090.002.304.000 | 635.091.004.200.000 | 180° | 63.5 |
| 2 (72 mm high) | 634.090.002.304.000 | 635.091.002.200.000 | 180° | 83 |
| 3/4 | 634.090.002.304.000 | 635.092.012.200.000 | 270° | 89.1 |
| 3/4 | 634.090.002.304.000 | 635.092.012.200.003 | 360° | 89.1 |
| XXL | 634.090.002.304.000 | 635.093.012.200.000 | 270° | 107.1 |
| XXL | 634.090.002.304.000 | 635.093.012.200.003 | 360° | 107.1 |

## REPLACEMENT SPINDLE SETS 180°, 270°, AND 360°



| Part number replacement spindle set | Angle of rotation | Dimension mm |
|---|---|---|
| 615.090.104.249.000 | 180° | 12 |
| 615.090.104.249.004 | 270° | 16.3 |
| 615.090.104.249.005 | 360° | 16.3 |

Depending on the application, a simple adjustment of the spindle geometry is possible using the replacement spindle set.

FOR THE REQUIRED ASSEMBLY AIDS, SEE PAGE 158.

# METAL CABLE HOOD

Connector housing for assembly on the cable with side cable outlet

SPINDLE LOCKING



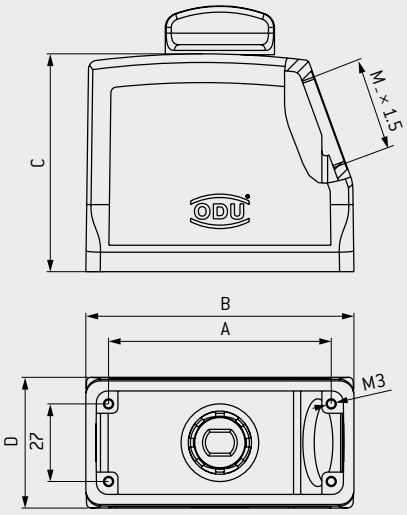
A GRAY MODEL (STANDARD)



B WHITE MODEL



C WHITE MODEL WITH BLACK KNOB




## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Gray (standard, similar to RAL 7001) or White (similar to RAL 9010) |
| Material | aluminum die casting |
| International Protection class[1] | IP50 or IP65 |
| Operating temperature | –40 °C to +125 °C |
| Cable clamp | see page 73 |
| Number of locking cycles | see page 44 |
| Adapter | for PG clamp see page 74 |

| Size | IP | 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 outlet | Part number Protective cover gray (see page 71) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 50 | 613.091.513.644.208 | 613.091.513.653.203 | – | 57 | 73 | 52 | 43 | M25 | 491.097.613.644.001 |
| | | 613.091.514.644.208 | 613.091.514.653.203 | 613.091.514.653.208 | 57 | 73 | 72 | 43 | | |
| | 65 | 613.091.574.644.008 | – | – | 57 | 73 | 72 | 43 | | |
| 3 | 50 | 613.092.514.644.208 | 613.092.514.653.203 | 613.092.514.653.208 | 77.5 | 93.3 | 76 | 45.5 | M32 | 492.097.613.644.001 |
| | 65 | 613.092.574.644.008 | – | – | 77.5 | 93.3 | 76 | 45.5 | | |
| 4 | 50 | 613.093.514.644.208 | 613.093.514.653.203 | 613.093.514.653.208 | 104 | 120 | 76 | 45.5 | | 493.097.613.644.001 |
| | | On request | On request | 613.093.515.653.008 | 104 | 120 | 76 | 45.5 | M40 | |
| | 65 | 613.093.574.644.008 | – | – | 104 | 120 | 76 | 45.5 | M32 | |
| | | 613.093.575.644.008 | – | – | 104 | 120 | 76 | 45.5 | M40 | |

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

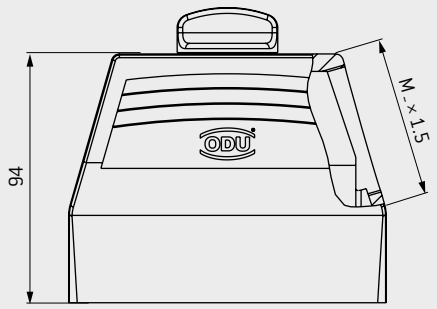
# METAL CABLE HOOD XXL

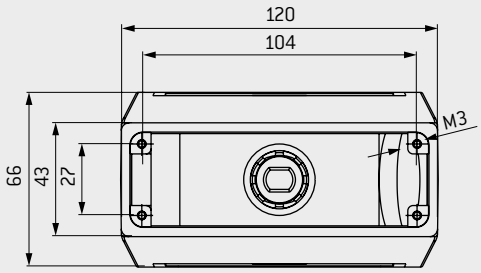
Connector housing for assembly on the cable with expanded assembly space and side M50 cable outlet

SPINDLE LOCKING




A GRAY MODEL




## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Gray (similar to RAL 7001)<br>White on request |
| Material | aluminum die casting |
| International | |
| Protection class[1] | IP50 or IP65 |
| Operating temperature | –40 °C to +125 °C |
| Cable clamp | see page 73 |
| Number of locking cycles | see page 44 |

| Size | IP | Part number<br>Color of housing gray/spindle knob black | Dim. M<br>Cable outlet | Part number protective cover<br>(see page 71) |
|---|---|---|---|---|
| 4 | 50 | 613.093.516.644. 208 | M50 | 493.097.613.644.001 |
| 4 | 65 | 613.093.576.644.008 | M50 | 493.097.613.644.001 |

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

# METAL BULKHEAD HOUSING

## For mounting on your device

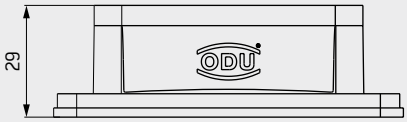
**SPINDLE LOCKING**



**A** GRAY MODEL (STANDARD)

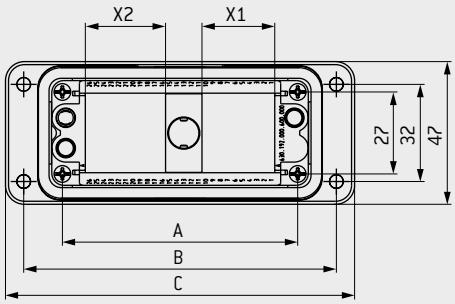


**B** WHITE MODEL



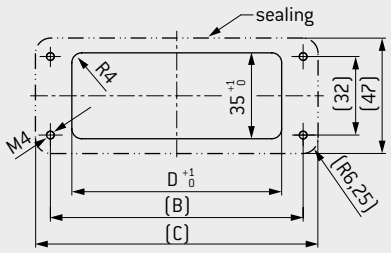

### TECHNICAL DATA

| | |
|---|---|
| Color of housing | Gray (standard, similar to RAL 7001)<br>or White (similar to RAL 9010) |
| Material | aluminum die casting |
| International Protection class[1] | IP65 |
| Operating temperature | –40 °C to +125 °C (short duration)<br>–40 °C to +85 °C (continuous) |
| Sealing | NBR; sealing material, FKM on request<br>(to extend the temperature range) |




The frames depicted must be ordered separately, see page 72.

### PANEL CUT-OUT




| Size | Part number A<br>Color of housing gray | Part number B<br>Color of housing white | Dim. A<br>mm | Dim. B<br>mm | Dim. C<br>mm | Dim. D<br>Panel cut-out<br>mm | X1<br>Units<br>× 2.4 mm | X2<br>Units<br>× 2.4 mm |
|---|---|---|---|---|---|---|---|---|
| 2 | 612.091.010.644.000 | 612.091.010.653.000 | 57 | 83 | 95 | 65.2 | 6 | 7 |
| 3 | 612.092.010.644.000 | 612.092.010.653.000 | 77.5 | 103 | 115 | 85.5 | 10 | 11 |
| 4 | 612.093.010.644.000 | 612.093.010.653.000 | 104 | 130 | 143 | 112.2 | 16 | 16 |

[1] IEC 60529:2013 (VDE 0470-1:2014) (depends on the cable hood with spindle locking used)

# METAL SURFACE-MOUNTED HOUSING

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

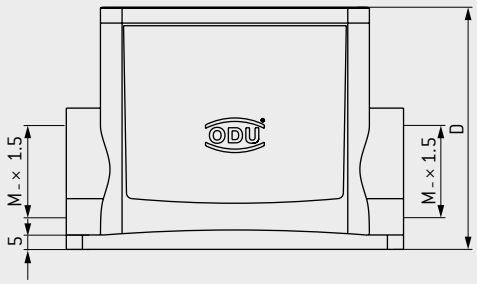
SPINDLE LOCKING

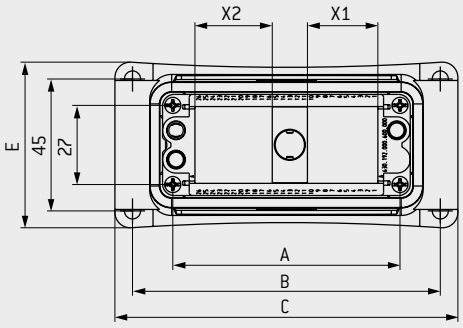


A GRAY MODEL (STANDARD)



B WHITE MODEL




The frames depicted must be ordered separately, see page 72.

## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Gray (standard, similar to RAL 7001)<br>White on request |
| Material | aluminum die casting |
| International | |
| Protection class[1] | IP65 |
| Operating temperature | –40 °C to +125 °C (short duration)<br>–40 °C to +85 °C (continuous) |
| Sealing | NBR; sealing material, FKM on request<br>(to extend the temperature range) |
| Cable clamp | see page 73 |
| Adapter | for PG clamp see page 74 |

| Size | Part number A<br>Color of housing gray | Part number B<br>Color of housing white | Dim. A<br>mm | Dim. B<br>mm | Dim. C<br>mm | Dim. D<br>mm | Dim. E<br>mm | X1<br>Units × 2.4 mm | X2<br>Units × 2.4 mm | Dim. M<br>Cable outlet |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 612.091.025.644.102 | 612.091.025.653.102 | 57 | 82 | 92.5 | 74 | 55.5 | 6 | 7 | M32 |
| 3 | 612.092.025.644.102 | 612.092.025.653.102 | 77.5 | 105 | 117 | 84 | 56.5 | 10 | 11 | M32 |
| 4 | 612.093.025.644.102 | 612.093.025.653.102 | 104 | 132 | 144 | 84 | 57.5 | 16 | 16 | M32 |
| | 612.093.026.644.000 | – | | | | | | | | M40 |

[1] IEC 60529:2013 (VDE 0470-1:2014) (depends on the cable clamp(s) and cable hood with spindle locking used)

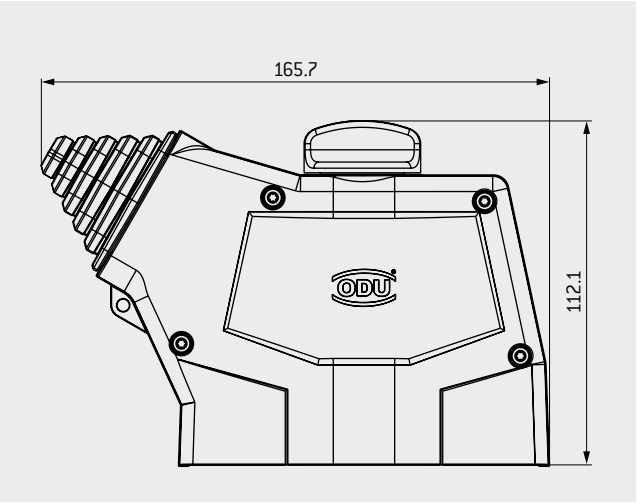
# ODU-MAC® RAPID PLASTIC HOUSING

Half-shell principle with individually adjustable side cable outlet

SPINDLE LOCKING

50% TIME SAVINGS






## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005),<br>White on request |
| Material<br>International | plastic Lexan PC, UL 94-V0 |
| Protection class | IP4X |
| Operating temperature | –40 °C to +125 °C |
| Grommet | silicone (RAL 7035), UL 94-V0 |
| Number of locking cycles | see from page 44 |
| Coding | spindle coding from page 80<br>(6 options) |

| Size | Part number | Description | Cable outlet ⌀ | Part number protective cover (see page 54) |
|---|---|---|---|---|
| 4 | 656.563.012.008.000 | RAPID housing | Max. 32 × 42 mm | 656.563.012.018.000 |
| 4 | 635.093.011.200.000 | Spindle locking 270° without coding | | |
| 4 | 635.093.011.200.003 | Spindle locking 360° without coding | | |
| 4 | 635.093.011.200.010 | Spindle locking 270° with coding | | |
| 4 | 635.093.011.200.013 | Spindle locking 360° with coding | | |
| RAPID | 631.193.000.600.001 | Housing frame, pin side | | |

# ODU-MAC® RAPID RECEPTACLE VERSIONS

For mounting on your device or as a recessed plastic style

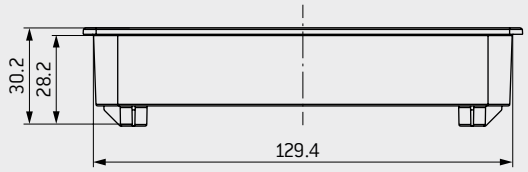
SPINDLE LOCKING



**A** RECESSED ASSEMBLY OF THE SOCKET FRAME IN ASSEMBLY WALL



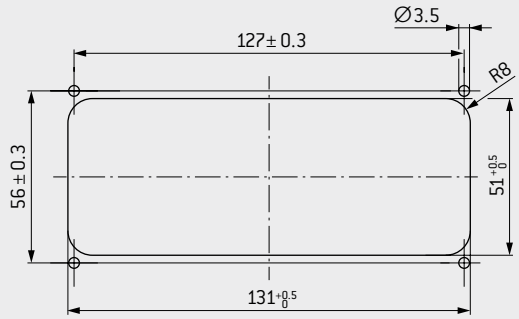
**B** DIRECT ASSEMBLY OF THE SOCKET FRAME ON ASSEMBLY WALL



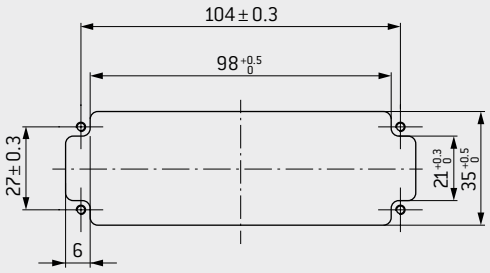

## TECHNICAL DATA

| | |
|---|---|
| Color of housing (recessed style) | Black (RAL 9005), White on request |
| Material International | plastic Lexan PC, UL 94-V0 |
| Protection class | IP4X |
| Operating temperature | –40 °C to +125 °C |

## PANEL CUT-OUT A: RECESSED STYLE




## PANEL CUT-OUT B: DIRECT ASSEMBLY

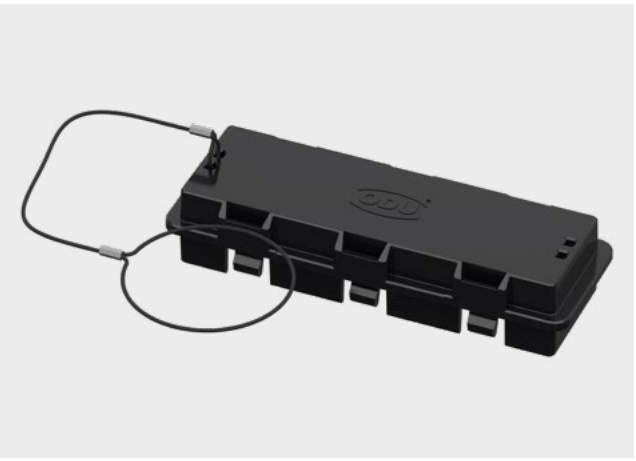



| Size | Part number | Description | Part number protective cover (see page 54) |
|---|---|---|---|
| 4 | 656.563.001.008.000 | Recessed-style receptacle, version A | 656.563.011.018.000 |
| 4 | 630.193.000.600.000 | Housing frame, socket side (both versions) | |
| 4 | 634.090.001.304.000 | Center module for spindle without coding | |
| 4 | 634.090.001.304.010 | Center module for spindle with coding | |

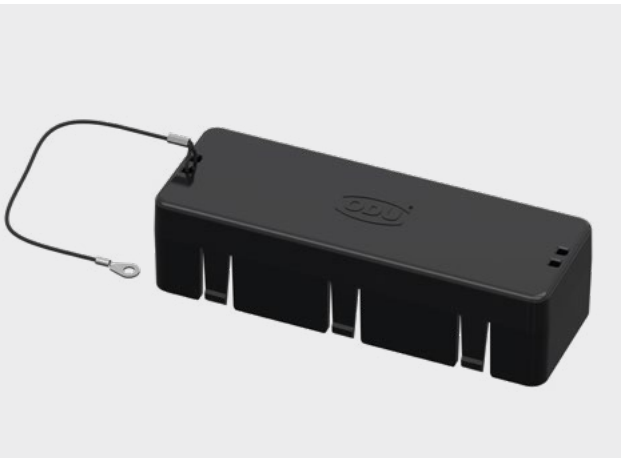
# PLASTIC PROTECTIVE COVER

For ODU-MAC® RAPID housing and recessed-style receptacle

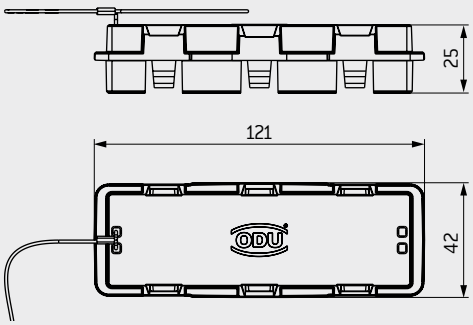
HOUSING A



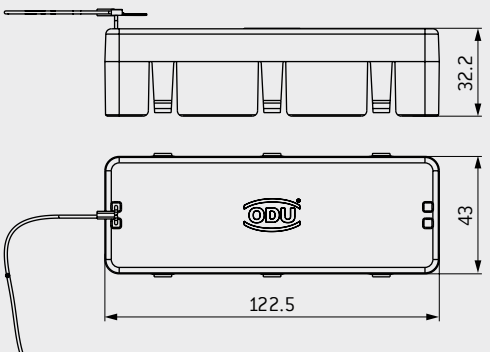
RECESSED-STYLE RECEPTACLE B



A




B



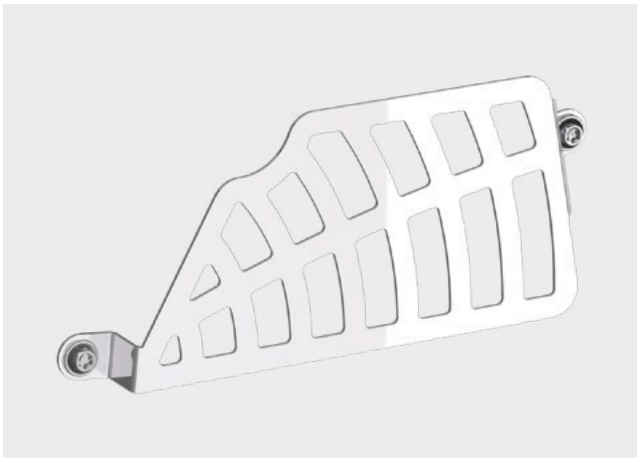

## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005), White on request |
| Material | plastic Lexan PC, UL 94-V0 |
| International Protection class | IP4X |
| Operating temperature | –40 °C to +125 °C |

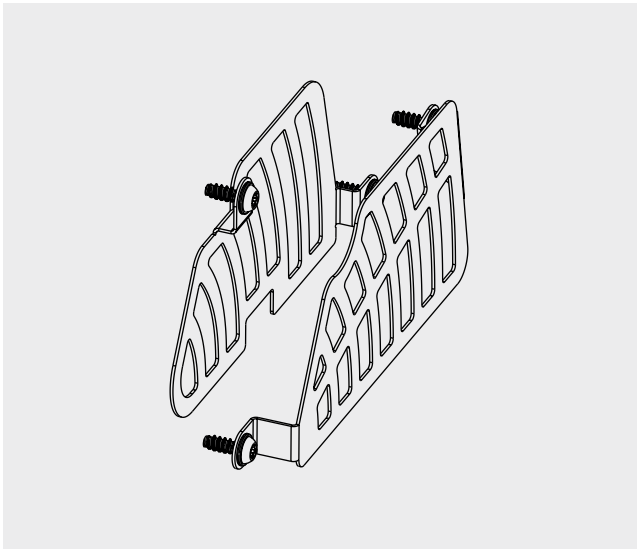
| Size | Part number A protective cover for housing | Part number B protective cover for recessed-style receptacle | Lanyard length A mm | Lanyard length B mm |
|---|---|---|---|---|
| 4 | 656.563.012.018.000 | 656.563.011.018.000 | 300 | 150 |

# STRAIN-RELIEF SET

**For ODU-MAC® RAPID housing, the option for bundling and additional strain relief of single strands**



Optional lattice plates for strand bundling can also be retrofitted.



## TECHNICAL DATA

| | |
|---|---|
| Material | stainless steel |
| Operating temperature | –40 °C to +125 °C |

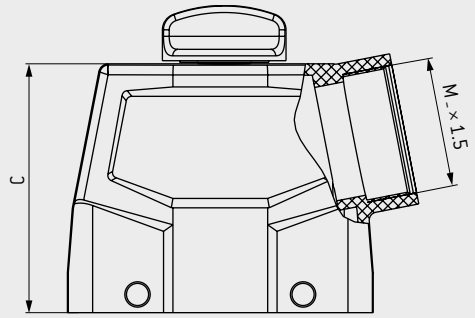
| Size | Part number | Included accessories |
|---|---|---|
| 4 | 656.563.002.050.000 | 2 × strain-relief plate including fastening screws<br>4 × S3 × 13.5 TX10 |

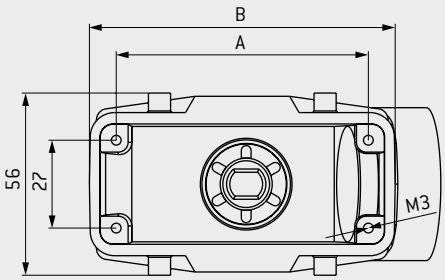
# PLASTIC CABLE HOOD

Plastic cable hood for assembly on the cable with side cable outlet

SPINDLE LOCKING




## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005) |
| Material | plastic PA6 GF, UL 94-V0 |
| International Protection class[1] | IP50<br>IP65 on request |
| Operating temperature | –40 °C to +125 °C |
| Cable clamp | see page 73 |
| Number of locking cycles | see from page 44 |

| Size | Part number | Dim. A mm | Dim. B mm | Dim. C mm | Dim. M Cable outlet | Part number protective cover (see page 63) |
|---|---|---|---|---|---|---|
| 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 |

FOR A REDUCTION FROM M40 TO M32, SEE PAGE 73

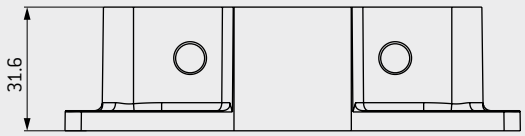
[1] IEC 60529:2013 (VDE 0470-1:2014) (depends on the cable clamp(s) and spindle knob used)

# PLASTIC BULKHEAD HOUSING

For mounting on your device with spindle locking

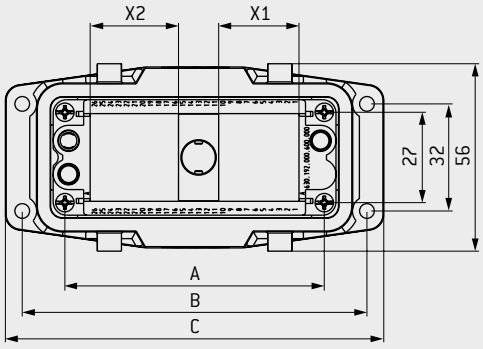
SPINDLE LOCKING



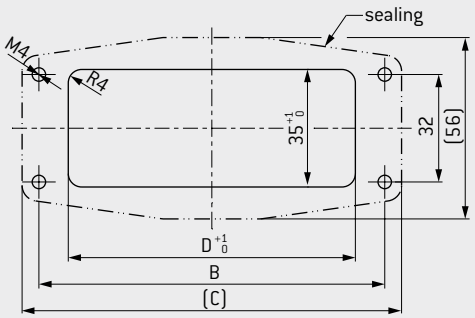

## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005) |
| Material | plastic PA6 GF, UL 94-V0 |
| International Protection class[1] | IP50<br>IP65 on request |
| Operating temperature | –40 °C to +125 °C |
| Sealing | NBR; sealing material |




The frames depicted must be ordered separately, see page 72.

## PANEL CUT-OUT




| Size | Part number | Dim. A mm | Dim. B mm | Dim. C mm | Dim. D Panel cut-out mm | X1 Units × 2.4 mm | X2 Units × 2.4 mm | Part number protective cover (see page 62) |
|---|---|---|---|---|---|---|---|---|
| 2 | 612.091.010.908.000 | 57 | 83 | 93 | 67 | 6 | 7 | 491.097.612.908.001 |
| 3 | 612.092.010.908.000 | 77.5 | 103 | 114 | 87 | 10 | 11 | 492.097.612.908.001 |
| 4 | 612.093.010.908.000 | 104 | 130 | 140 | 114 | 16 | 16 | 493.097.612.908.001 |

[1] IEC 60529:2013 (VDE 0470-1:2014) (depends on the cable hood with spindle locking used)

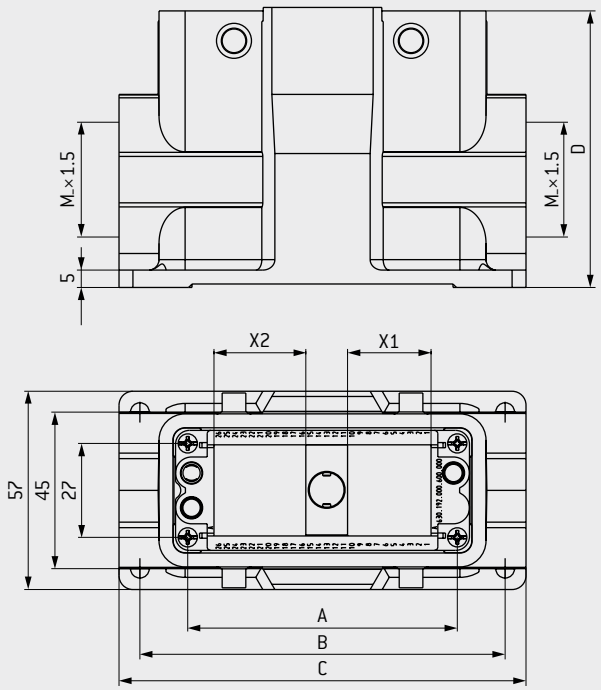
Table of contents

# PLASTIC SURFACE-MOUNTED HOUSING

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

SPINDLE LOCKING




The frames depicted must be ordered separately, see page 72.

## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005) |
| Material | Plastic PA6 GF, UL 94-V0 |
| International Protection class[1] | IP50<br>IP65 on request |
| Operating temperature | –40 °C to +125 °C |
| Sealing | NBR; sealing material |
| Cable clamp | see page 73 |

| Size | Part number | Dim. A mm | Dim. B mm | Dim. C mm | Dim. D mm | X1 Units × 2.4 mm | X2 Units × 2.4 mm | Dim. M Cable outlet | Part number protective cover (see page 62) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 612.091.020.908.000 | 57 | 82 | 94 | 81.5 | 6 | 7 | M32 | 491.097.612.908.001 |
| 3 | 612.092.020.908.000 | 77.5 | 105 | 117 | 81.5 | 10 | 11 | M40 | 492.097.612.908.001 |
| 4 | 612.093.020.908.000 | 104 | 132 | 144 | 81.5 | 16 | 16 | M40 | 493.097.612.908.001 |

FOR A REDUCTION FROM M40 TO M32, SEE PAGE 73

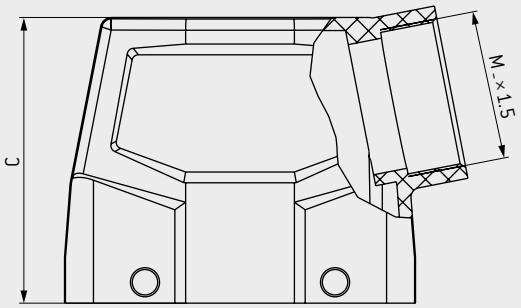
[1] IEC 60529:2013 (VDE 0470-1:2014) (depends on the cable clamp(s) and cable hood with spindle locking used)

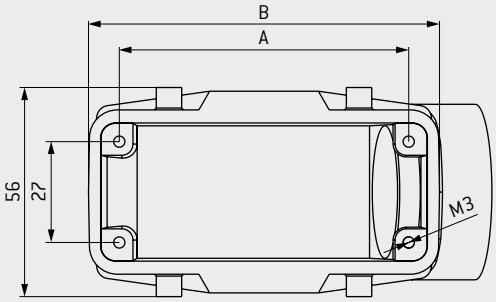
# PLASTIC CABLE HOOD

Plastic cable hood for assembly on the cable with side cable outlet

TRANSVERSE LOCKING




## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005) |
| Material | plastic PA6 GF, UL 94-V0 |
| International Protection class[1] | IP65 |
| Operating temperature | –40 °C to +125 °C |
| Cable clamp | see page 73 |
| Number of locking cycles | 5,000 |

| Size | Part number | Dim. A mm | Dim. B mm | Dim. C mm | Dim. M Cable outlet | Part number protective cover (see page 63) |
|---|---|---|---|---|---|---|
| 1 | 490.420.650.908.000 | 44 | 54 | 72.5 | M32 | 490.097.613.908.001 |
| 2 | 491.420.650.908.000 | 57 | 74 | 72.5 | M32 | 491.097.613.908.001 |
| 3 | 492.420.650.908.000 | 77.5 | 94 | 76.5 | M40 | 492.097.613.908.001 |
| 4 | 493.420.650.908.000 | 104 | 121 | 76.5 | M40 | 493.097.613.908.001 |

FOR A REDUCTION FROM M40 TO M32 AND FROM M32 TO M25, SEE PAGE 73

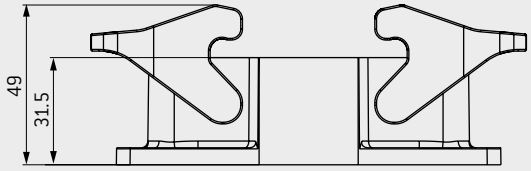
[1] IEC 60529:2013 (VDE 0470-1:2014) (depends on the cable clamp(s) used)

# PLASTIC BULKHEAD HOUSING

For assembly on your device with transverse locking

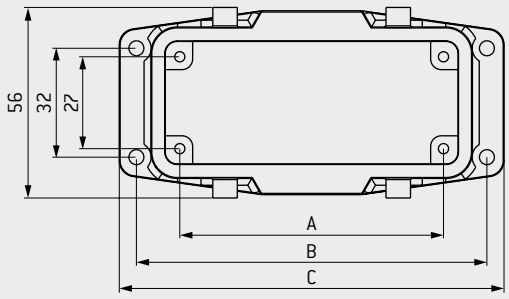
TRANSVERSE LOCKING



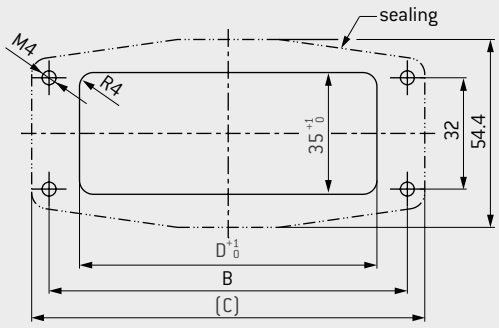




## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005) |
| Material | plastic PA6 GF, UL 94-V0 |
| International | |
| Protection class[1] | IP65 |
| Operating temperature | –40 °C to +125 °C |
| Sealing | NBR; sealing material |




## PANEL CUT-OUT




| Size | Part number | Dim. A mm | Dim. B mm | Dim. C mm | Dim. D Panel cut-out mm | Part number protective cover (see page 62) |
|---|---|---|---|---|---|---|
| 1 | 490.120.600.908.000 | 44 | 70 | 80 | 53 | 490.097.612.908.000 |
| 2 | 491.120.600.908.000 | 57 | 83 | 93.2 | 66 | 491.097.612.908.000 |
| 3 | 492.120.600.908.000 | 77.5 | 103 | 113 | 86 | 492.097.612.908.000 |
| 4 | 493.120.600.908.000 | 104 | 130 | 140 | 113 | 493.097.612.908.000 |

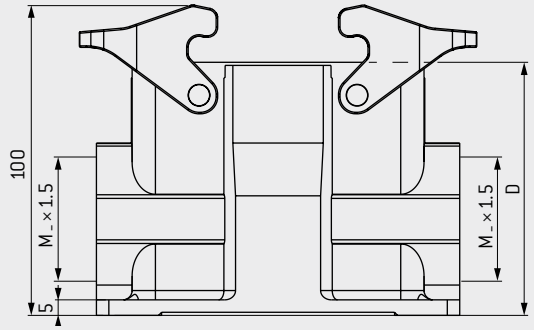
[1] IEC 60529:2013 (VDE 0470-1:2014) (depends on the cable hood used)

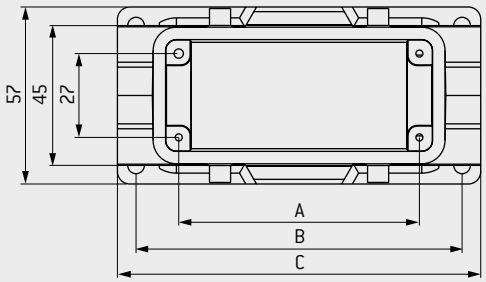
# PLASTIC SURFACE-MOUNTED HOUSING

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

TRANSVERSE LOCKING






## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005) |
| Material | plastic PA6 GF, UL 94-V0 |
| International Protection class[1] | IP65 |
| Operating temperature | –40 °C to +125 °C |
| Sealing | NBR; sealing material |
| Cable clamp | see page 73 |

| Size | Part number | Dim. A mm | Dim. B mm | Dim. C mm | Dim. D mm | Dim. M Cable outlet | Part number protective cover (see page 62) |
|---|---|---|---|---|---|---|---|
| 1 | 490.120.650.908.000 | 44 | 70 | 82 | 74.7 | M32 | 490.097.612.908.000 |
| 2 | 491.120.650.908.000 | 57 | 82 | 94 | 81.5 | M32 | 491.097.612.908.000 |
| 3 | 492.120.650.908.000 | 77.5 | 105 | 117 | 81.5 | M40 | 492.097.612.908.000 |
| 4 | 493.120.650.908.000 | 104 | 132 | 144 | 81.5 | M40 | 493.097.612.908.000 |

FOR A REDUCTION FROM M40 TO M32 AND FROM M32 TO M25, SEE PAGE 73

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

# PLASTIC PROTECTIVE COVER

For bulkhead and surface-mounted housing with lanyard

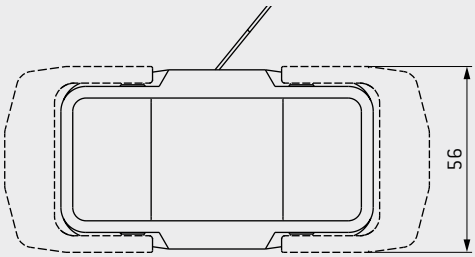
**SPINDLE LOCKING** **A**

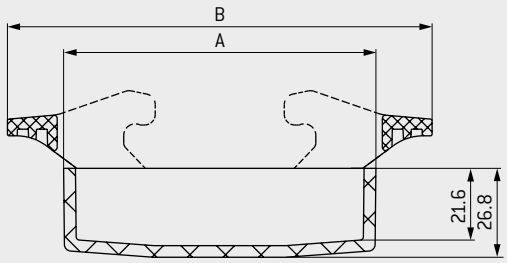


**TRANSVERSE LOCKING** **B**



## SPINDLE AND TRANSVERSE LOCKING




Dotted line and dimension B only applies to spindle locking

## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005) |
| Material | plastic PA6 GF, UL 94-V0 |
| International Protection class[1] | IP65 |
| Operating temperature | –40 °C to +125 °C |

| Size | Part number A<br>Protective cover for spindle locking | Part number B<br>Protective cover for transverse locking | Dim. A<br>mm | Dim. B<br>mm |
|---|---|---|---|---|
| 1 | – | 490.097.612.908.000 | 61 | 95 |
| 2 | 491.097.612.908.001 | 491.097.612.908.000 | 74 | 108 |
| 3 | 492.097.612.908.001 | 492.097.612.908.000 | 94 | 128 |
| 4 | 493.097.612.908.001 | 493.097.612.908.000 | 121 | 155 |

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

# PLASTIC PROTECTIVE COVER

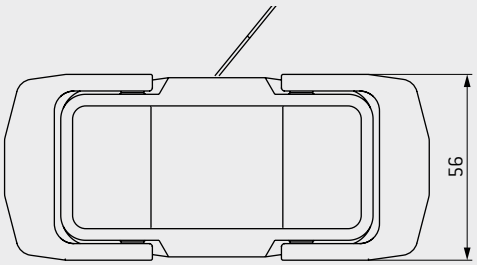


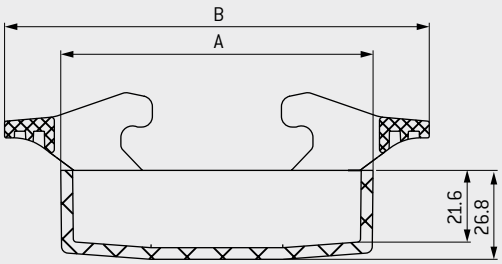
For cable hood with lanyard

## SPINDLE AND TRANSVERSE LOCKING



## SPINDLE AND TRANSVERSE LOCKING




### TECHNICAL DATA

| | |
|---|---|
| Color of housing | Black (RAL 9005) |
| Material | plastic PA6 GF, UL 94-V0 |
| International | |
| Protection class[1] | IP65 |
| Operating temperature | –40 °C to +125 °C |
| Sealing | NBR; sealing material |
| Locking | via the transverse locking included in the delivery |

| Size | Part number Protective cover for spindle locking | Part number Protective cover for transverse locking | Dim. A mm | Dim. B mm |
|---|---|---|---|---|
| 1 | – | 490.097.613.908.001 | 61 | 95 |
| 2 | 491.097.613.908.001 | 491.097.613.908.001 | 74 | 108 |
| 3 | 492.097.613.908.001 | 492.097.613.908.001 | 94 | 128 |
| 4 | 493.097.613.908.001 | 493.097.613.908.001 | 121 | 155 |

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

# METAL CABLE HOOD

**Connector housing for assembly on the cable with top and side cable outlet**

**LEVER LOCKING**

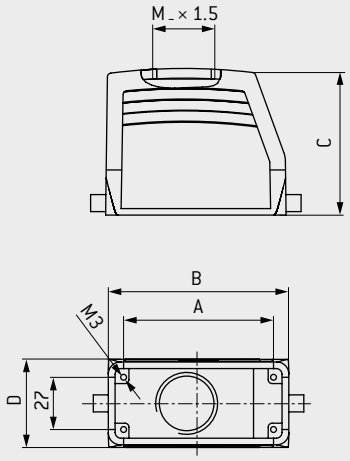


**A** TOP CABLE OUTLET

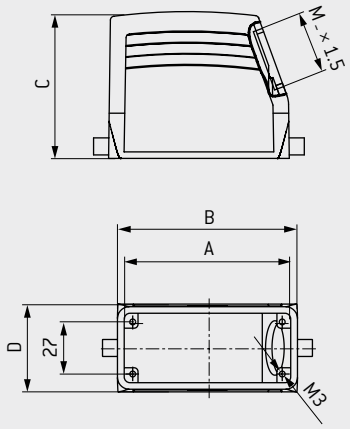


**B** SIDE CABLE OUTLET

## A TOP CABLE OUTLET




## B SIDE CABLE OUTLET




## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Gray (standard similar to RAL 7001) |
| Material | aluminum die casting |
| International Protection class[1] | IP65 in mated condition |
| Operating temperature | –40 °C to +125 °C |
| Cable clamp | see page 73 |
| Adapter | for PG clamp see page 74 |

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

| Size | Part number A<br>Top cable outlet | Part number B<br>Side cable outlet | Dim. A<br>mm | Dim. B<br>mm | Dim. C<br>mm | Dim. D<br>mm | Dim. M<br>Cable outlet | Part number protective cover<br>(see page 71) |
|---|---|---|---|---|---|---|---|---|
| 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)

# METAL CABLE HOOD XXL

Connector housing for assembly on the cable with expanded assembly space and side and top M50 cable outlet

LEVER LOCKING

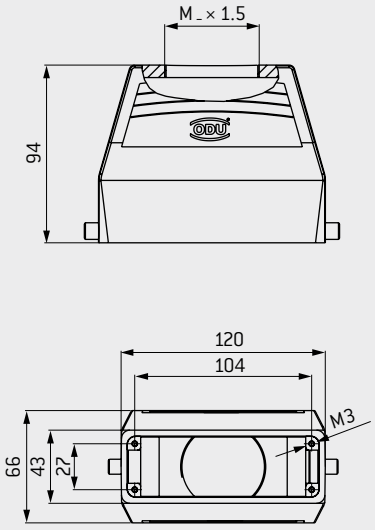


A TOP CABLE OUTLET

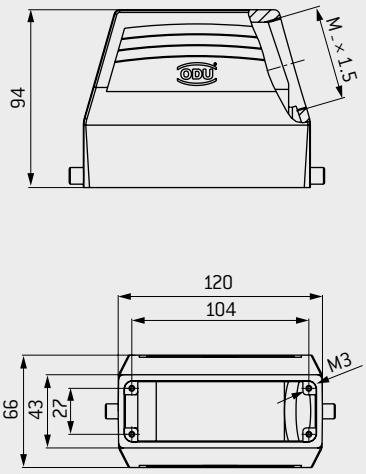


B SIDE CABLE OUTLET

## A TOP CABLE OUTLET




## B SIDE CABLE OUTLET




## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Gray (standard similar to RAL 7001) |
| Material | Aluminum die casting |
| International Protection class[1] | IP65 in mated condition |
| Operating temperature | –40 °C to +125 °C |
| Cable clamp | see page 73 |

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

| Size | Part number A<br>Top cable outlet | Part number B<br>Side cable outlet | Dim. M<br>Cable outlet | Part number protective cover<br>(see page 71) |
|---|---|---|---|---|
| 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)

# METAL BULKHEAD HOUSING

## For mounting on your device

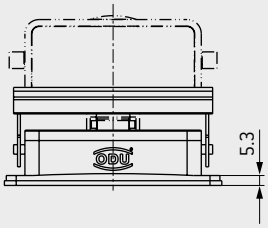
**LEVER LOCKING**



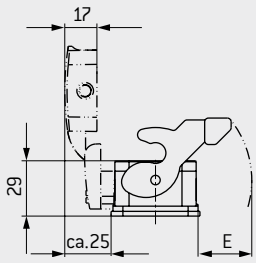
**A** WITHOUT COVER

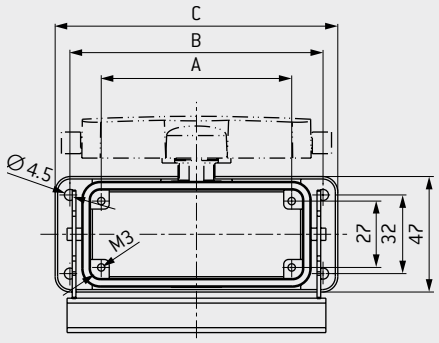


**B** WITH COVER

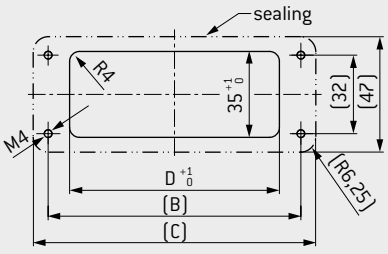



Lever locking (just an example)




### PANEL CUT-OUT




### TECHNICAL DATA

| | |
|---|---|
| Color of housing | Gray (standard similar to RAL 7001) |
| Material | Aluminum die casting |
| International Protection class[1] | IP65 in mated condition |
| Operating temperature | –40 °C to +125 °C (short duration)<br>–40 °C to +85 °C (continuous) |
| Sealing | NBR; sealing material FKM on request (to extend the temperature range) |

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

| Size | Part number A<br>Without protective cover | Part number B<br>With protective cover | Dim. A<br>mm | Dim. B<br>mm | Dim. C<br>mm | Dim. D<br>Panel cut-out<br>mm | Dim. E<br>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 cable hood used)

# METAL SURFACE-MOUNTED HOUSING

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

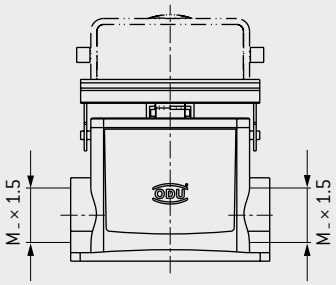
LEVER LOCKING



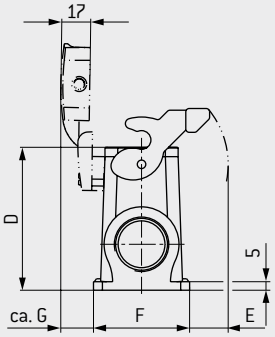
A WITHOUT COVER

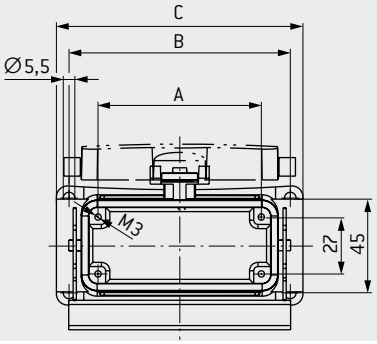


B WITH COVER




Lever locking (just an example)




## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Gray (standard similar to RAL 7001) |
| Material | aluminum die casting |
| International Protection class[1] | IP65 in mated condition |
| Operating temperature | –40 °C to +125 °C (short duration)<br>–40 °C to +85 °C (continuous) |
| Sealing | NBR; sealing material FKM on request (to extend the temperature range) |
| Adapter | for PG clamp see page 74 |

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

| Size | Part number A<br>Without protective cover | Part number B<br>With protective cover | Dim. A<br>mm | Dim. B<br>mm | Dim. C<br>mm | Dim. D<br>mm | Dim. E<br>mm | Dim. F<br>mm | Dim. G<br>mm | Dim. M<br>Cable outlet |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 OUTLET AVAILABLE ON REQUEST

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

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# METAL CABLE HOOD WIDE

**With top and side cable outlet for double frame assembly**

**LEVER LOCKING**

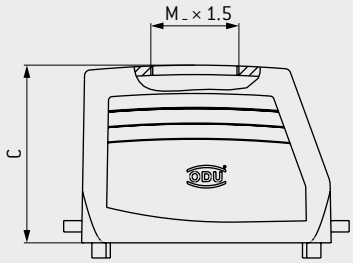


**A** TOP CABLE OUTLET

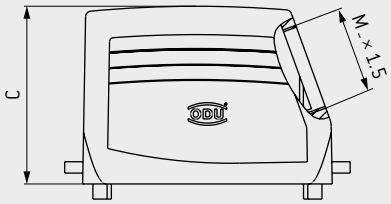


**B** SIDE CABLE OUTLET

## A TOP CABLE OUTLET




## B SIDE CABLE OUTLET




## TECHNICAL DATA

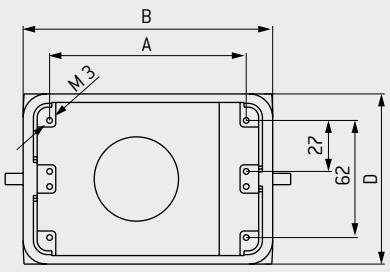
| | |
|---|---|
| Color of housing | Gray (standard similar to RAL 7001) |
| Material | aluminum die casting |
| International Protection class[1] | IP65 in mated condition |
| Operating temperature | without housing sealing: –40 °C to +125 °C |
| Cable clamp | see page 73 |

Housing suitable for two standard frames size 3 or 4.

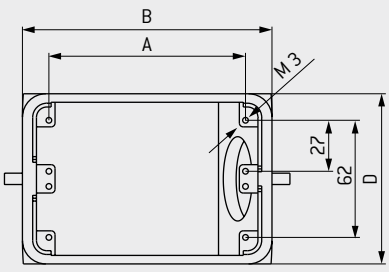
2 × size 3 = size 5
2 × size 4 = size 6

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

## A TOP CABLE OUTLET




## B SIDE CABLE OUTLET




| Size | Part number A<br>Top cable outlet | Part number B<br>Side cable outlet | Dim. A<br>mm | Dim. B<br>mm | Dim. C<br>mm | Dim. D<br>mm | Dim. M<br>Cable outlet |
|---|---|---|---|---|---|---|---|
| 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)

# METAL BULKHEAD HOUSING FOR CABLE HOOD WIDE

For mounting on your device

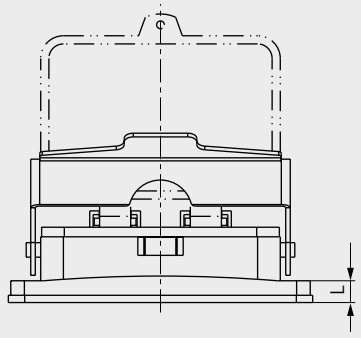
LEVER LOCKING



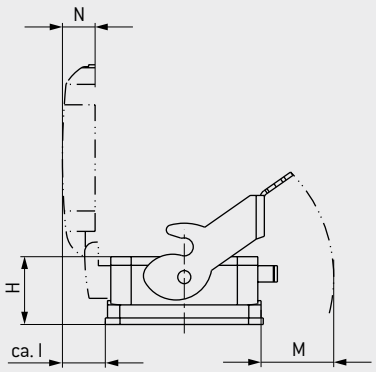
A WITHOUT COVER



B WITH COVER



Lever locking (just an example)

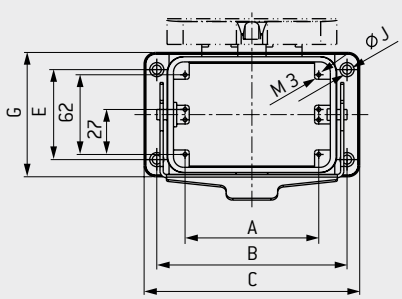


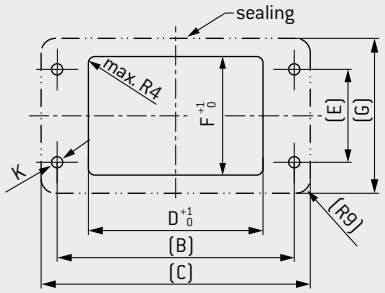

## TECHNICAL DATA

| | |
|---|---|
| Color of housing | Gray (standard similar to RAL 7001) |
| Material | aluminum die casting |
| International Protection class[1] | IP65 in mated condition |
| Operating temperature | –40 °C to +125 °C (short duration)<br>–40 °C to +85 °C (continuous) |
| Sealing | NBR; sealing material FKM on request (to extend the temperature range) |

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

## PANEL CUT-OUT




| Size | Part number A<br>Without protective cover | Part number B<br>With protective cover | Dim. A<br>mm | Dim. B<br>mm | Dim. C<br>mm | Dim. D<br>mm | Dim. E<br>mm | Dim. F<br>mm | Dim. G<br>mm | Dim. H<br>mm | Dim. I<br>mm | Dim. J<br>mm | Dim. K<br>mm | Dim. L<br>mm | Dim. M<br>mm | Dim. N<br>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 cable hood wide used)

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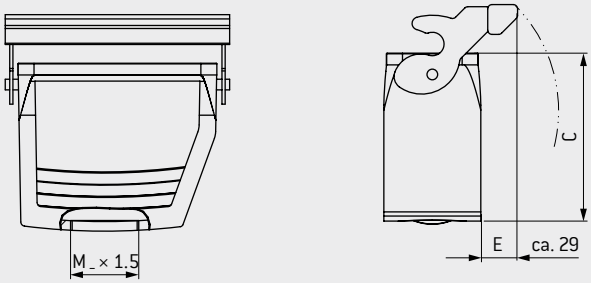
# METAL CABLE-TO-CABLE HOOD

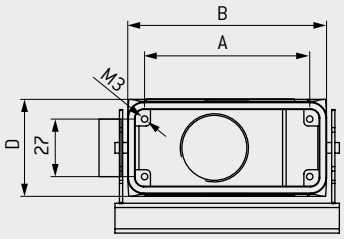
**With top cable outlet for a flying cable-to-cable connection**

**LEVER LOCKING**




Lever locking (just an example)




## TECHNICAL DATA

To build a cable-to-cable connection.
Suitable for use with cable hoods (page 64).

| | |
|---|---|
| Color of housing | Gray (standard similar to RAL 7001) |
| Material | aluminum die casting |
| International Protection class[1] | IP65 in mated condition |
| Operating temperature | –40 °C to +125 °C (short duration)<br>–40 °C to +85 °C (continuous) |
| Sealing | NBR; sealing material FKM on request (to extend the temperature range) |
| Cable clamp | see page 73 |
| Adapter | for PG clamp see page 74 |

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

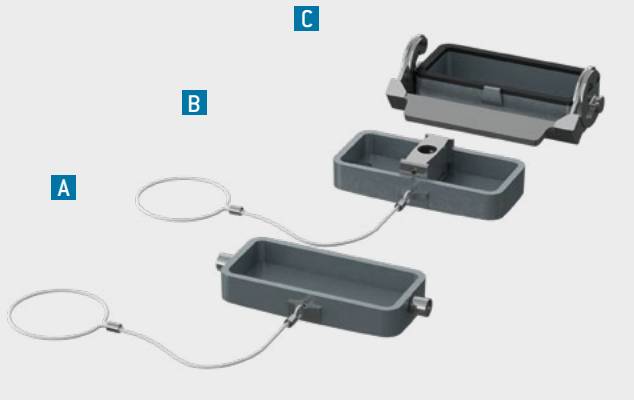
| Size | Part number | Dim. A mm | Dim. B mm | Dim. C mm | Dim. D mm | Dim. M Cable outlet | Part number Protective cover (see page 71) |
|---|---|---|---|---|---|---|---|
| 1 | 490.331.450.644.102 | 44 | 60 | 75 | 43 | M32 | 490.097.500.644.001 |
| 2 | 491.331.450.644.102 | 57 | 73 | 75 | 43 | | 491.097.133.644.000 |
| 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 OUTLET AVAILABLE ON REQUEST

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

# METAL PROTECTIVE COVER

## For metal housing




### TECHNICAL DATA

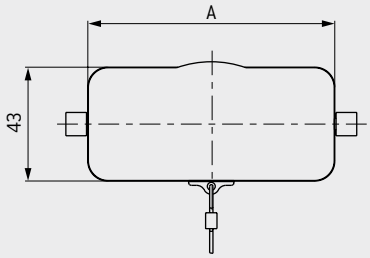
| | |
|---|---|
| Color | Gray (standard, similar to RAL 7001) |

**International Protection class IP65 in locked condition**
Metal protective cover with locking latch (C)
Metal protective cover with bolt and lanyard (A)

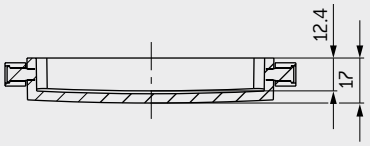
**International Protection class IP54 in locked condition**

| | |
|---|---|
| Metal protective cover | with center module for spindle locking and lanyard (B) |
| Material | aluminum die casting (body) |
| Temperature range | –40 °C to +125 °C |
| Sealing | NBR; sealing material |

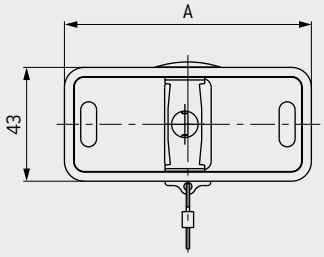
### A METAL PROTECTIVE COVER
for bulkhead or surface-mounted housing and cable-to-cable hood



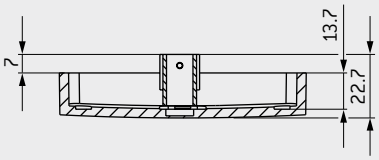

### A VIEW WITHOUT LANYARD



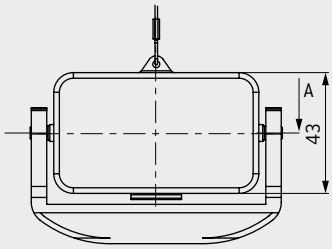

### B METAL PROTECTIVE COVER
for cable hood and cable hood XXL for spindle locking




### B VIEW WITHOUT LANYARD

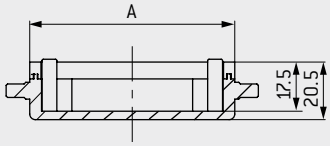



### C METAL PROTECTIVE COVER
for cable hood and cable hood XXL with lever locking




Lever locking, just an example

### C VIEW WITHOUT LOCKING LATCH




| Size | IP65<br>Part number A<br>Metal protective cover with bolt and lanyard | IP50<br>Part number B[1]<br>Metal protective cover for spindle locking with lanyard and center module | IP65<br>Part number C<br>Metal protective cover with locking latch | Dim. A<br>mm |
|---|---|---|---|---|
| 1 | 490.097.500.644.001 | – | 490.097.500.644.000 | 60 |
| 2 | 491.097.133.644.000 | 491.097.613.644.001 | 491.097.212.644.000 | 73 |
| 3 | 492.097.133.644.000 | 492.097.613.644.001 | 492.097.214.644.000 | 93.5 |
| 4/XXL | 493.097.133.644.000 | 493.097.613.644.001 | 493.097.214.644.000 | 120 |

[1] This cover cannot be used in conjunction with a coded spindle.

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# ODU-MAC® BLUE-LINE FRAME FOR HOUSING

## With grounding for housing



### TECHNICAL DATA

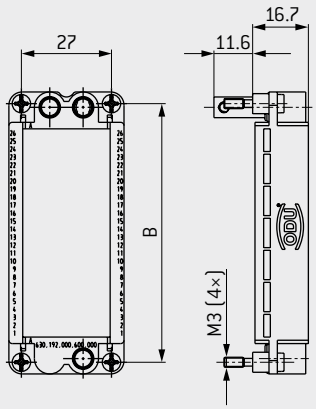
- Material: nickel-plated zinc die casting
- 1 unit = 2.4 mm

### Included in the scope of delivery: secondary locking part

For use and assembly, see page 37

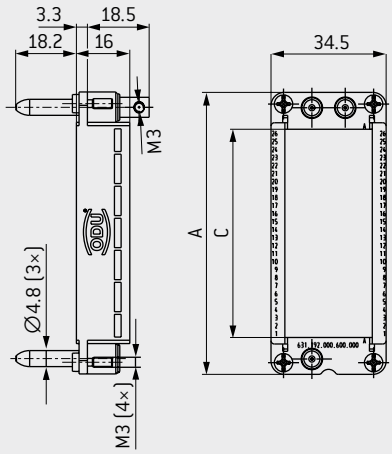


### SOCKET FRAME WITH GUIDE BUSHING




Sockets in bulkhead and surface-mounted housing or cable-to-cable hood. Pins in the cable hood. Modules are not mounted, contacts are supplied loose. See the options for coding from page 76.

### PIN FRAME WITH GUIDING PIN




For the height of the contact pins, the same dimensions as described for the respective modules apply.

| Size | Part number<br>Socket frame | Part number<br>Pin frame | Max. units<br>× 2.4 mm[1] | Dim. A<br>mm | Dim. B<br>mm | Dim. C<br>mm |
|---|---|---|---|---|---|---|
| 1 | 630.190.000.600.000 | 631.190.000.600.000 | 12 | 51 | 44 | 12 × 2.4 = 28.8 |
| 2 | 630.191.000.600.000 | 631.191.000.600.000 | 18 | 64 | 57 | 18 × 2.4 = 43.2 |
| 3 | 630.192.000.600.000 | 631.192.000.600.000 | 26 | 84.5 | 77.5 | 26 × 2.4 = 62.4 |
| 4 | 630.193.000.600.000 | 631.193.000.600.000 | 37 | 111 | 104 | 37 × 2.4 = 88.8 |
| RAPID | 630.193.000.600.000 | 630.193.000.600.001 | 37 | 111 | 104 | 37 × 2.4 = 88.8 |

Please note that when equipping a cable hood wide, the frames must be ordered in duplicate.

[1] If the configuration doesn't fill the frame completely, please use blank modules (see page 150)

# CABLE CLAMP AND REDUCING RING

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



### TECHNICAL DATA

| | |
|---|---|
| Material for body | PA |
| Sealing | NBR; sealing material |
| International Protection class | IP68 to 5 bar |
| Temperature range | –40 °C to +100 °C |

EMC and metal clamps available on request

| Part number | Thread | Color | Width across flats | Tightening torque Nm | Cable-∅ mm Min. | Cable-∅ 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 (RAL 7035) | 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 | M32 × 1.5 | | | | 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, UL 94-V0 |
| International Protection class | IP65 |
| Temperature range | –40 °C to 125 °C |
| Sealing | NBR; sealing material |
| Tightening torque | 4 ± 0.5 Nm |

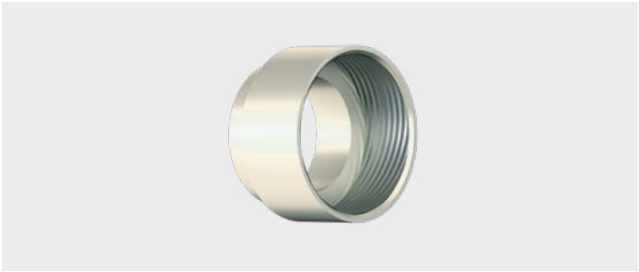
| Part number | Outside thread | Inside thread |
|---|---|---|
| 921.000.006.000.360 | M32 × 1.5 | M25 × 1.5 |
| 921.000.006.000.356 | M40 × 1.5 | M32 × 1.5 |

[1] Cable clamp not included in the scope of delivery, but O-ring is supplied with the housing.

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# ADAPTER RING, BLIND PLUG, AND LOCKNUT

## ADAPTER RING FOR CABLE CLAMP WITH PG THREAD



### TECHNICAL DATA

Material nickel-plated brass

| Part number | Outside thread | Inside 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 PLUG FOR SURFACE-MOUNTED HOUSING



### TECHNICAL DATA

Color Gray
Material PA glass-fiber reinforced
International 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

# PROTECTIVE TRANSPORT COVER AND SECONDARY LOCKING PART



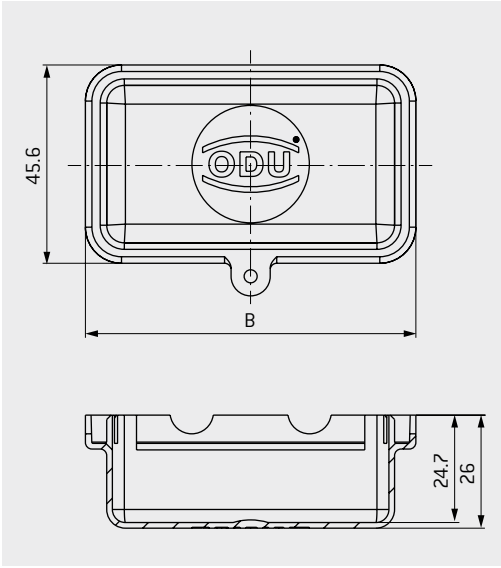
## PROTECTIVE TRANSPORT COVER FOR METAL HOUSING – for protecting the assembled cable hood during transport



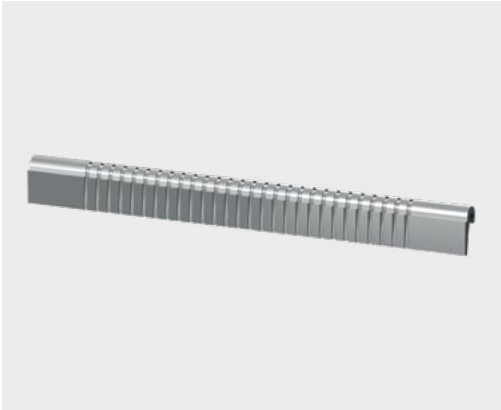
### TECHNICAL DATA

| | |
|---|---|
| Material | plastic PP |
| Color | Black (similar to RAL 9002) |

| Size | Dim. B<br>mm | Part number<br>With holding rope | Part number<br>Without holding rope |
|---|---|---|---|
| 1 | 63 | 490.097.900.924.000 | 490.097.900.924.101 |
| 2 | 76 | 491.097.900.924.000 | 491.097.900.924.101 |
| 3 | 96.5 | 492.097.900.924.000 | 492.097.900.924.101 |
| 4/XXL | 123 | 493.097.900.924.000 | 493.097.900.924.101 |




## SECONDARY LOCKING FOR MODULES



### TECHNICAL DATA

| | |
|---|---|
| Material | thermoplastic, glass-fiber reinforced |

| Part number – only if a replacement is required[1] |
|---|
| 631.000.001.923.000 |

[1] The secondary locking part is included in the standard scope of delivery.

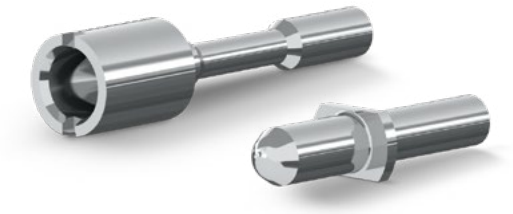
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# CODING OPTIONS FOR HOUSINGS WITH LEVER LOCKING

## 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 housing of the ODU-MAC® Blue-Line. 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.



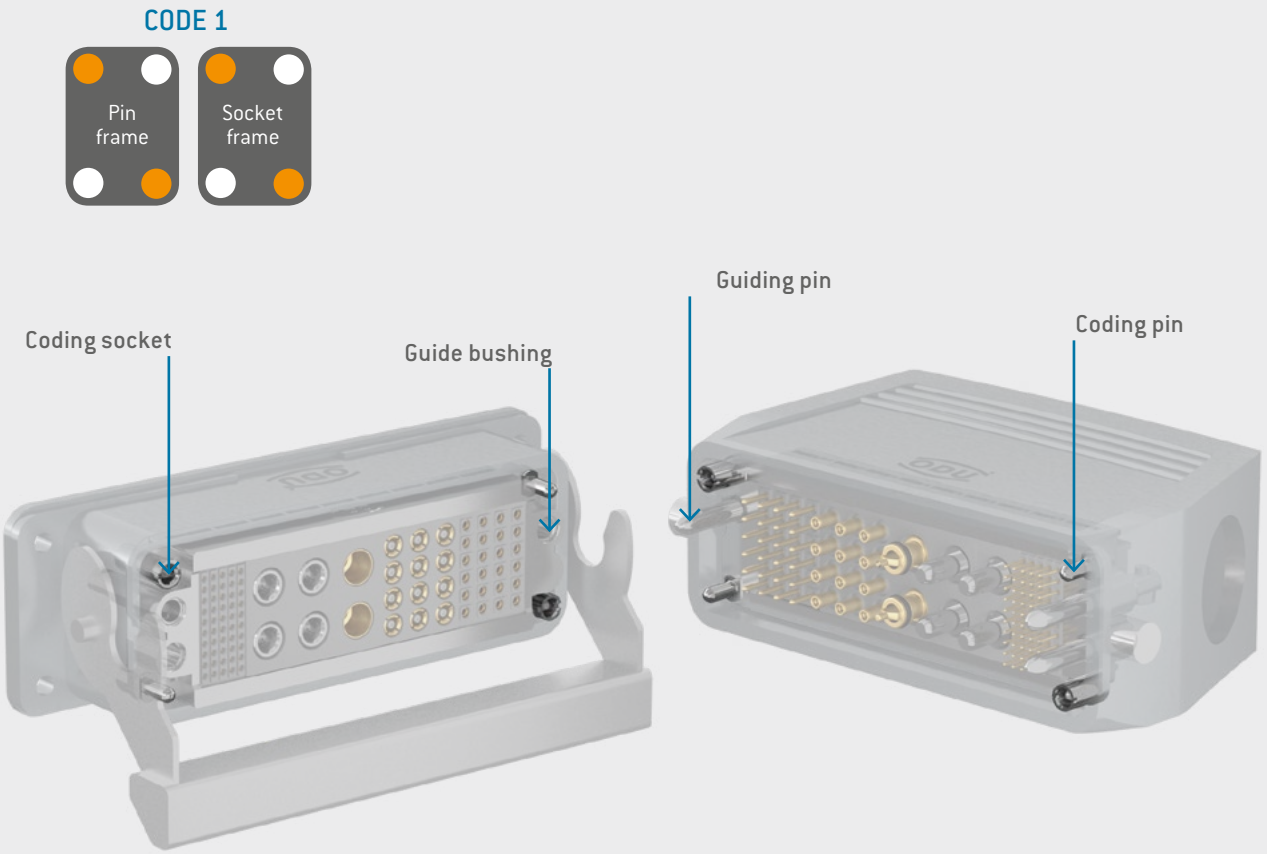
## CODING OPTIONS

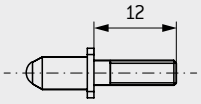
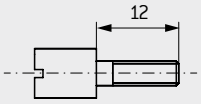
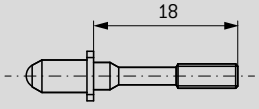
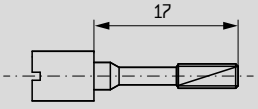



● = Coding pin

○ = Coding socket

## CODING EXAMPLE




| Frame | Part number matching the frame no. | Coding | |
|---|---|---|---|
| | | Part number pin | Part number socket |
| Pin | 631.19X.000.600.000 | 631.090.301.700.000   | 630.090.302.700.000   |
| Socket | 630.19X.000.600.000 | 631.090.302.700.000   | 630.090.301.700.000   |

PART NUMBER BASIC TOOL, TORQUE WRENCH/1.2 Nm: 598.054.002.000.000
PART NUMBER TOOL INSERT FOR ASSEMBLY OF CODING PIN: 598.054.203.000.000
PART NUMBER TOOL INSERT FOR ASSEMBLY OF CODING SOCKET: 598.054.110.000.000

An overview of all tools, see from page 153.

# CODING OPTIONS FOR HOUSINGS WITH SPINDLE LOCKING

## To prevent mismating

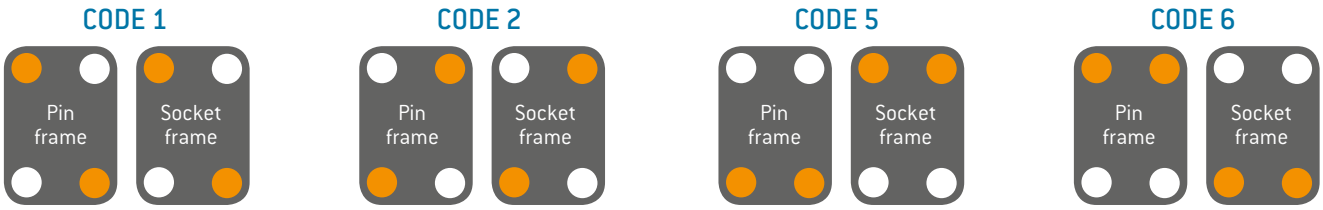
In order to prevent mismating, it is in some cases useful to provide the connection systems with a coding system.

Instead of cylinder screws, coding pins and coding sockets can be used in the housing of the ODU-MAC® Blue-Line. 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, or if additional coding options are required, ODU offers an innovative option with the coded spindle on pages 80 and 81.

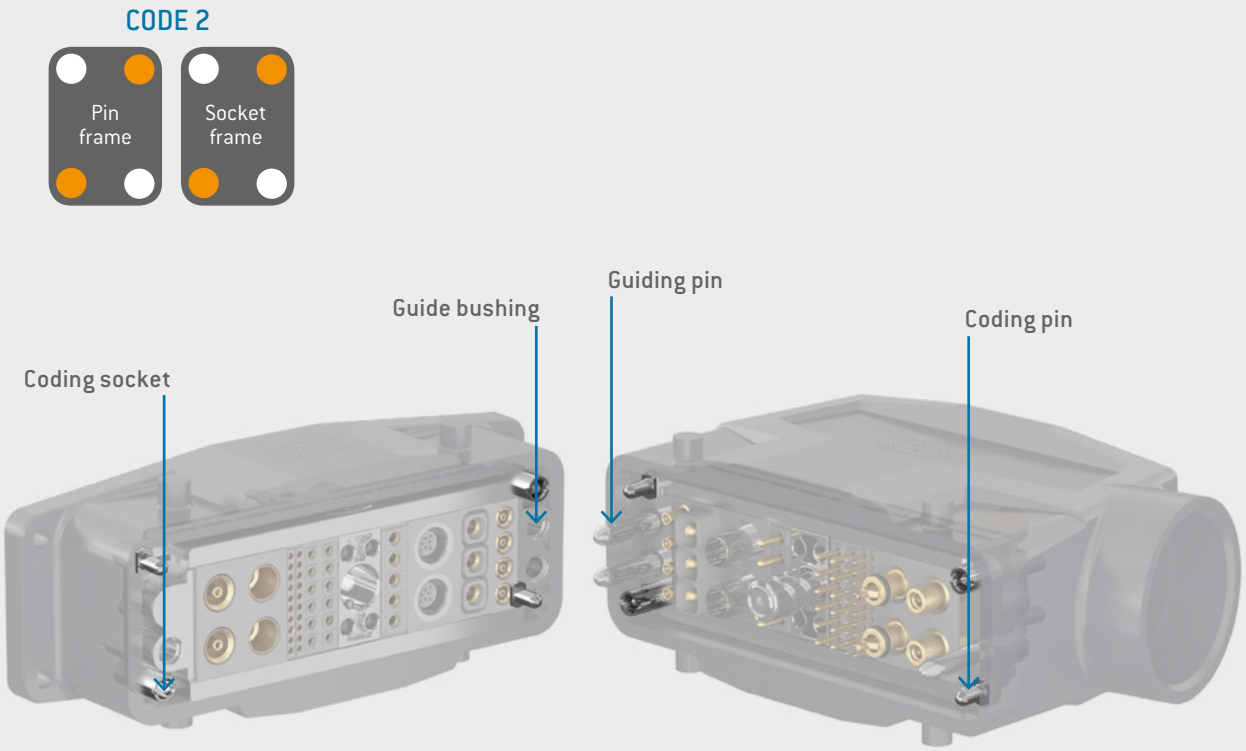
## CODING OPTIONS

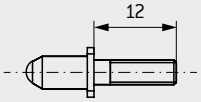
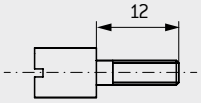
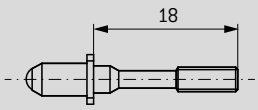
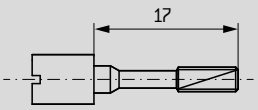



= Coding pin

= Coding socket

## CODING EXAMPLE




| Frame | Part number matching the frame no. | Coding | |
|---|---|---|---|
| | | Part number pin | Part number socket |
| Pin | 631.19X.000.600.000 | 631.090.301.700.000   | 630.090.302.700.000   |
| Socket | 630.19X.000.600.000 | 631.090.302.700.000   | 630.090.301.700.000   |

PART NUMBER BASIC TOOL, TORQUE WRENCH/1.2 Nm: 598.054.002.000.000
PART NUMBER TOOL INSERT FOR ASSEMBLY OF CODING PIN: 598.054.203.000.000
PART NUMBER TOOL INSERT FOR ASSEMBLY OF CODING SOCKET: 598.054.110.000.000

An overview of all tools, see from page 153.

# CODING OPTIONS FOR CODED SPINDLES

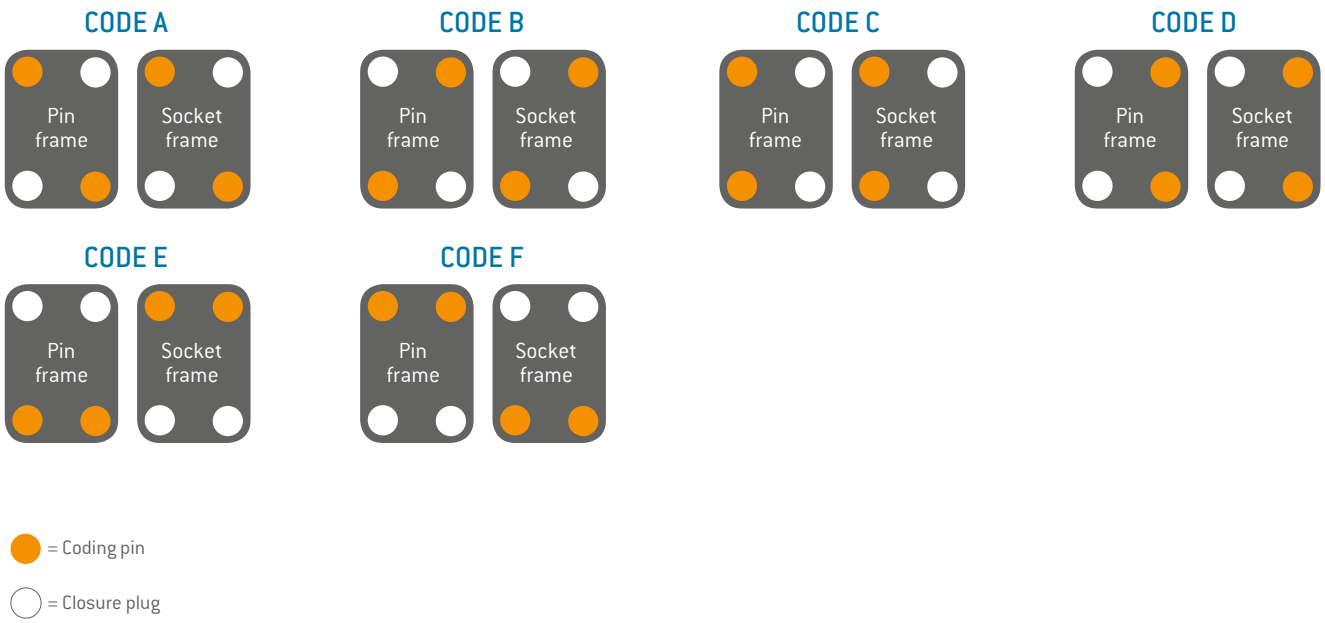
## To prevent mismating

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

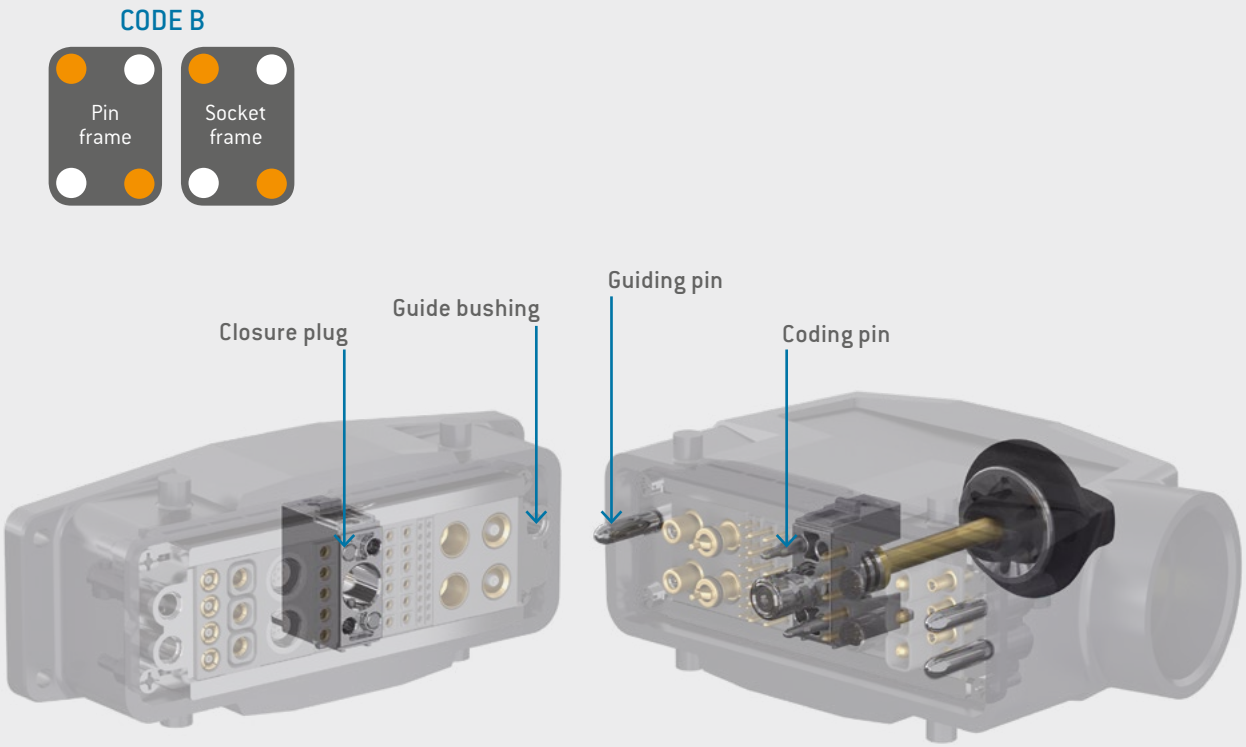
For this purpose, ODU has developed innovative coding that is directly integrated into the spindle for the ODU-MAC® Blue-Line housing versions. ODU provides up to 6 different coding options by installing 2 coding pins in the spindle locking and 2 closure plugs in the center module. If several adjacent connectors are used, this can prevent mismating.



## CODING OPTIONS



## CODING EXAMPLE




| Size | WITH CODING[1] | | Angle of rotation |
|---|---|---|---|
| | Part number Center module for spindle for bulkhead and surface-mounted housing and cable-to-cable hood | Part number Spindle locking for cable hood | |
| 2 (52 mm high) | 634.090.001.304.010 | 635.091.003.200.010 | 180° |
| 2 (72 mm high) | 634.090.001.304.010 | 635.091.001.200.010 | 180° |
| 3/4 | 634.090.001.304.010 | 635.092.011.200.010 | 270° |
| 3/4 | 634.090.001.304.010 | 635.092.011.200.013 | 360° |
| XXL/RAPID | 634.090.001.304.010 | 635.093.011.200.010 | 270° |
| XXL/RAPID | 634.090.001.304.010 | 635.093.011.200.013 | 360° |

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

| ONLY IF A REPLACEMENT IS REQUIRED[2] | |
|---|---|
| Part number Coding pin | Part number Closure plug |
|  |  |
| 635.090.105.902.000 | 634.090.106.902.000 |

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

TORQUE WRENCH/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, see from page 153.



## EASILY CONFIGURE THE ODU-MAC® BLUE-LINE ONLINE AT: WWW.ODU-MAC.COM/EN/

ODU-MAC®

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# AUTOMATIC DOCKING

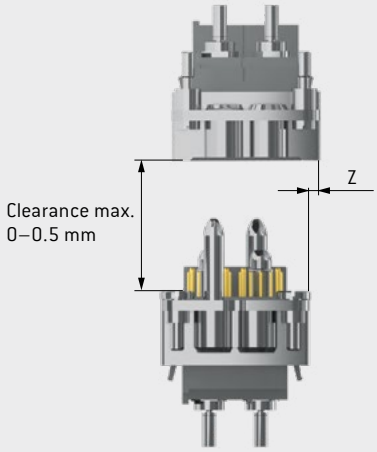
Requirements of the complete system ..... 84
ODU-MAC® Blue-Line docking frame ..... 86
ODU-MAC® Blue-Line strain-relief housing ..... 87

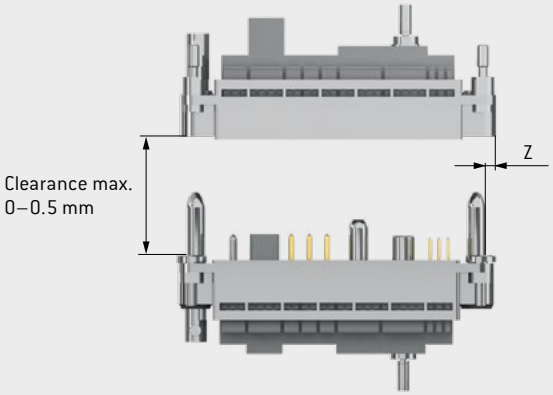
# REQUIREMENTS OF THE COMPLETE SYSTEM

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)

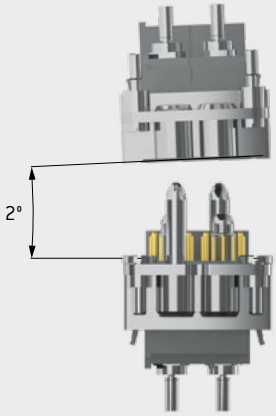


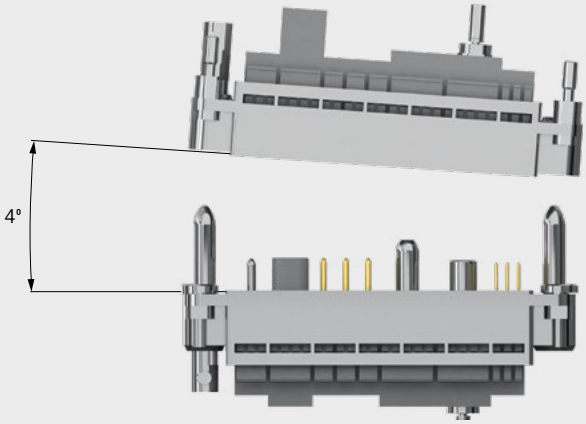




| Frame | Tolerance z |
|---|---|
| Docking frame | +/– 0.6 mm |

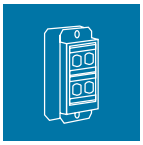
The maximum permissible gap between socket and pin pieces is 0.5 mm as standard. Extension with long contact pins is possible.

## MAXIMUM PERMISSIBLE ANGLE DEVIATION WHEN MATING



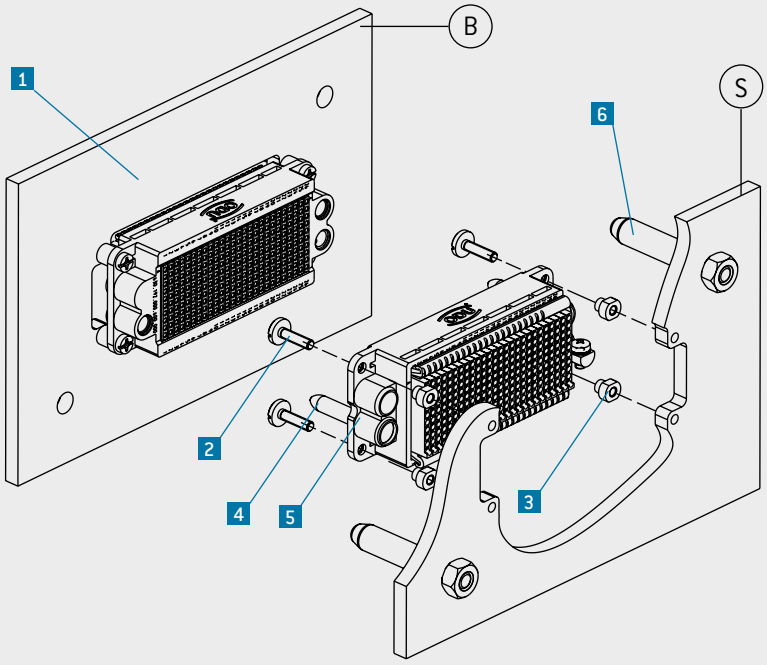




OUR TEAM IS HAPPY TO ANSWER ANY QUERIES YOU MAY HAVE.



YOU REQUIRE GREATER VARIETY? A MORE COMPREHENSIVE OFFER IS PROVIDED BY OUR ODU-MAC® SILVER-LINE – THE SPECIALIST FOR AUTOMATIC DOCKING SOLUTIONS.

## ALIGNMENT SYSTEM (MECHANICAL NECESSITY)




**Strain relief for the cables/strands must be provided by the customer. Please see our strain-relief housing page 87.**

1 ODU-MAC® Blue-Line socket piece (fixed) (screwed tight without play to wall B)
2 Fastening screw
3 Tolerance compensation:
Axial play: 0.1 mm
4 Radial play: +/– 0.6 mm
5 Pins for self-centering of ODU-MAC® Blue-Line
6 ODU-MAC® Blue-Line pin piece (floating) (with play via centering bushing; screwed tight to wall S)
Pin for guiding from wall B to S (to be done by customer)

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

### NOTE: AUTOMATIC DOCKING SYSTEMS

- The pin piece of the ODU-MAC® Blue-Line is to be fixed with the centering bushings supplied and so that the frame can float.
- The guiding system of the ODU-MAC® Blue-Line provides no guiding hardware for the overall plug-in.
- 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) must be provided through the plug-in unit. The maximum permissible alignment error is, for example, less than +/- 0.6 mm radial for the ODU-MAC® Blue-Line docking frame.
- Strain relief for the cables/strands must be provided by the customer, or use our strain-relief housing, see page 87.

FAILURE TO OBSERVE THESE SPECIFICATIONS MAY RESULT IN DAMAGE.

# ODU-MAC® BLUE-LINE DOCKING FRAME

## Standard solution for docking applications (such as rack & panel)



### TECHNICAL DATA

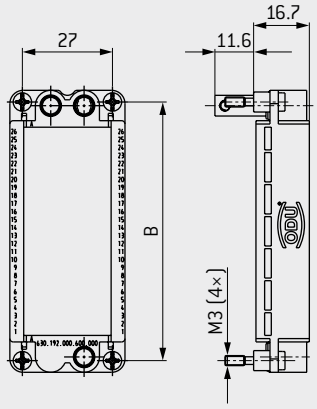
- Tolerance compensation:
  Axial play: min. 0.1 mm
  Radial play: +/– 0.6 mm
- Pin piece (floating)

### Included in the scope of delivery: secondary locking part

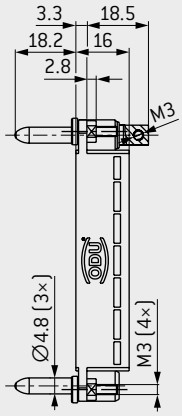
For use and assembly, see page 37

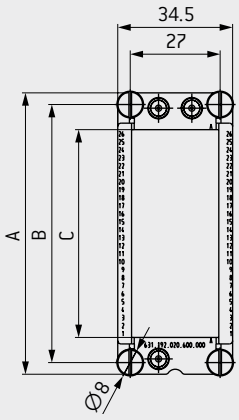


### SOCKET FRAME WITH GUIDE BUSHING

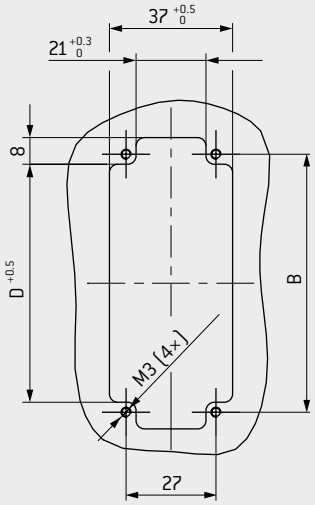



### PIN FRAME WITH GUIDING PIN




### PANEL CUT-OUT




Modules are not mounted, contacts are supplied loose.

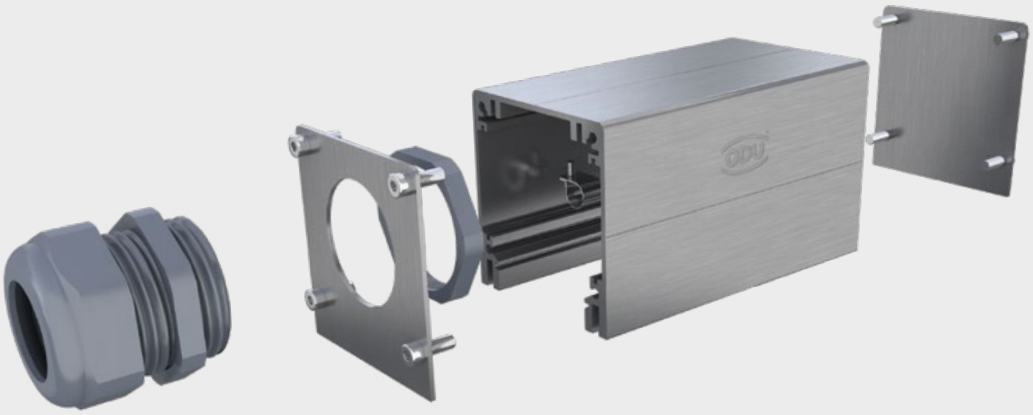
For the height of the contact pins, the same dimensions as described for the respective modules apply.

| Size | Part number<br>Socket frame | Part number<br>Pin frame | Max. units<br>× 2.4 mm[1] | Dim. A<br>mm | Dim. B<br>mm | Dim. C<br>mm | Dim. D<br>mm |
|---|---|---|---|---|---|---|---|
| 1 | 630.190.000.600.000 | 631.190.020.600.000 | 12 | 51 | 44 | 12 × 2.4 = 28.8 | 38 |
| 2 | 630.191.000.600.000 | 631.191.020.600.000 | 18 | 64 | 57 | 18 × 2.4 = 43.2 | 51 |
| 3 | 630.192.000.600.000 | 631.192.020.600.000 | 26 | 84.5 | 77.5 | 26 × 2.4 = 62.4 | 71.5 |
| 4 | 630.193.000.600.000 | 631.193.020.600.000 | 37 | 111 | 104 | 37 × 2.4 = 88.8 | 98 |

[1] If the configuration doesn't fill the frame completely, please use blank modules (see page 150).

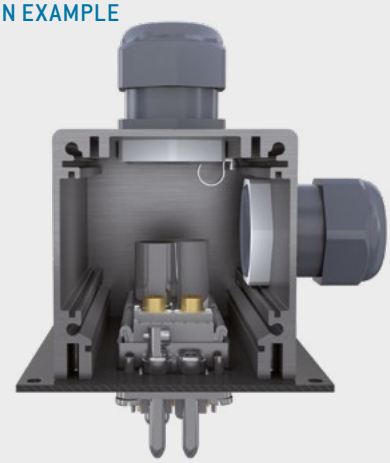
# ODU-MAC® BLUE-LINE STRAIN-RELIEF HOUSING

## Accessories for docking solutions

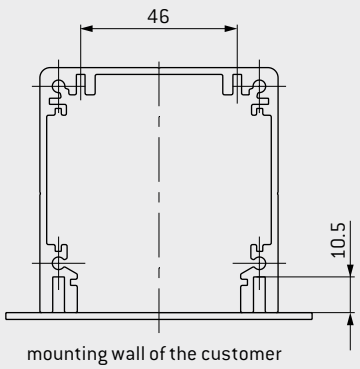


Graphic shows optional cable clamp, it is not automatically included in the scope of delivery.

### APPLICATION EXAMPLE



Graphic shows optional cable clamp, it is not automatically included in the scope of delivery. Additional M32 cable clamps can be attached by the customer.




### TECHNICAL DATA

- Material: aluminum
- Operating temperature: –40 °C to +125 °C
- International Protection class[1] can be adjusted individually
- Cable clamps, see page 73
- Locknut for cable clamp, see page 74

### FEATURES

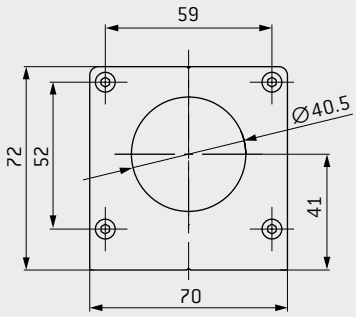
- Resistant and compact
- Protection of the termination area
- Individual strain-relief variations, cable outlets as well as grounding connections
- Suitable for all ODU-MAC® docking frames (additional lengths available on request)
- Optional fixing of the PCBs and components in the protected interior
- ODU logo included as standard; customer logo can also be delivered on request

[1] A higher International Protection class is possible for additional sealing of the housing

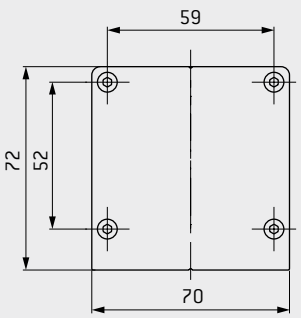
# ODU-MAC® BLUE-LINE STRAIN-RELIEF HOUSING

## Accessories for docking solutions

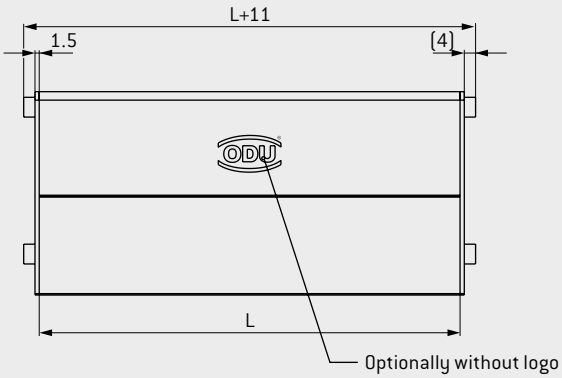
### COVER WITH HOLE




### COVER WITHOUT HOLE




### HOUSING SET INCLUDING COVER

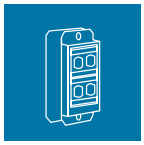



For fastening on an existing mounting wall of the customer

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

| Part number<br>2 × cover without hole | Part number<br>1 × cover with /1 × cover without hole | Part number<br>2 × cover with hole | Frame size | Dim. L<br>mm |
|---|---|---|---|---|
| 616.010.100.600.000 | 616.010.114.600.000 | 616.010.144.600.000 | 1–3 | 97 |
| 616.020.100.600.000 | 616.020.114.600.000 | 616.020.144.600.000 | 4 | 123 |

# FOR YOUR NOTES

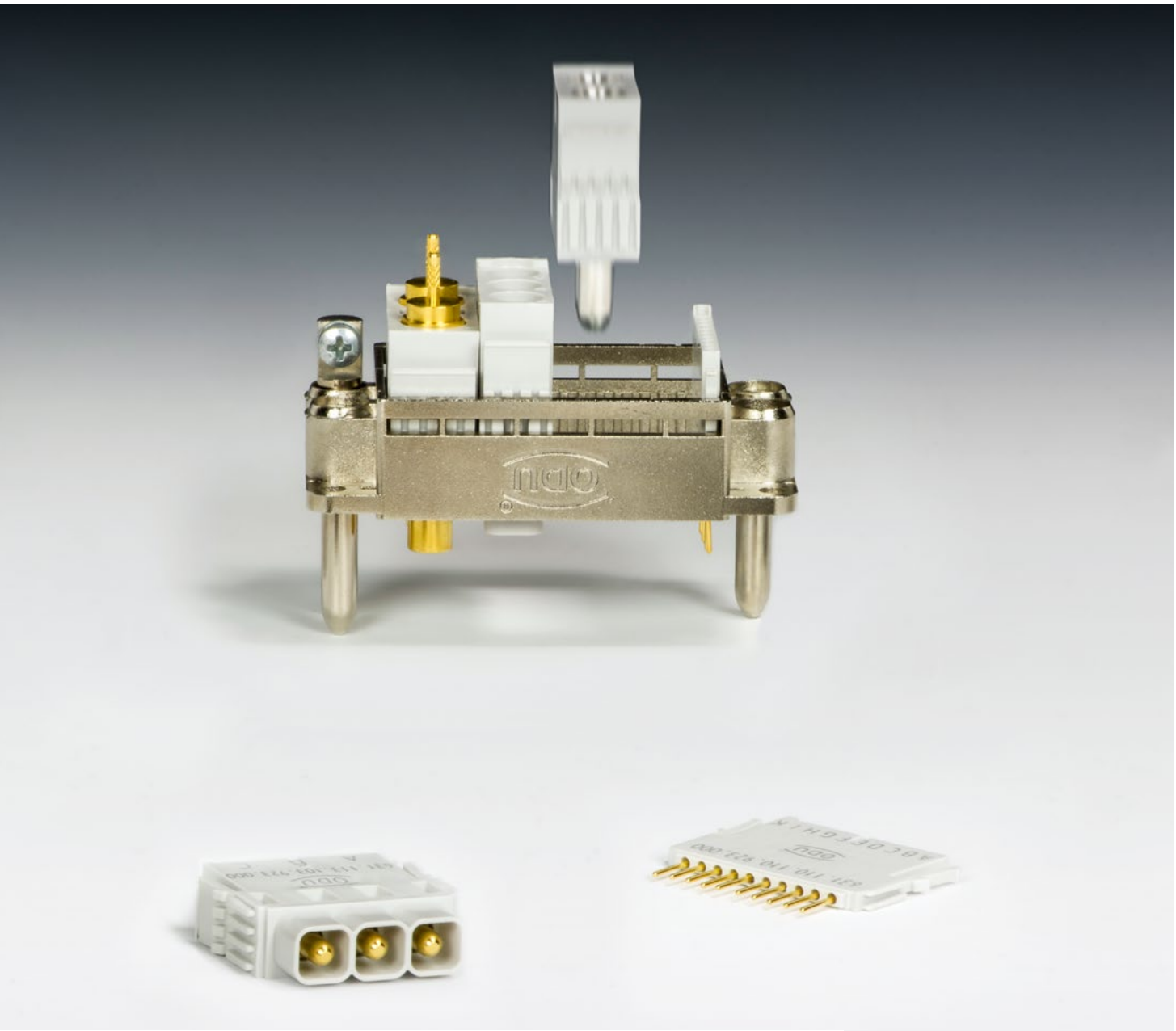




## EASILY CONFIGURE THE ODU-MAC® BLUE-LINE ONLINE AT: WWW.ODU-MAC.COM/EN/

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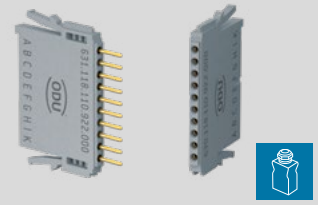
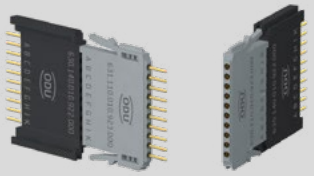
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Fiber optic ..... 148

Blank modules ..... 150

# OVERVIEW OF ALL MODULES

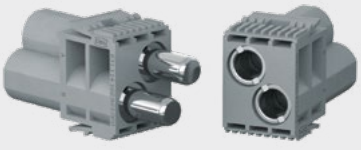
Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

| | Modules | Description | Units/width | Features | Page |
|---|---|---|---|---|---|
| Signal |  | 20 contacts<br>Contact-∅:<br>0.7 mm | 2 Units<br>4.8 mm | Maximum packing density and pin protection<br>Operating voltage[1] 250 V<br>Rated surge voltage[1] 2,000 V<br>Max. continuous current[2] 11 A for 0.38 mm²<br>Pollution degree[1] 2<br>Mating cycles min. 10,000 | 98 |
| |  | 10 contacts<br>Contact-∅:<br>0.7 mm | 1 Unit<br>2.4 mm | Maximum packing density<br>Operating voltage[1] 320 V<br>Rated surge voltage[1] 2,500 V<br>Max. continuous current[2] 11 A for 0.38 mm²<br>Pollution degree[1] 2<br>Mating cycles min. 10,000 | 100 |
| |  | 6 contacts<br>Contact-∅:<br>1.3 mm | 2 Units<br>4.8 mm | Operating voltage[1] 400 V<br>Rated surge voltage[1] 2,500 V<br>Max. continuous current[2] 19.5 A for 1 mm²<br>Pollution degree[1] 2<br>Mating cycles min. 10,000 | 102 |
| |  | 5 contacts<br>Contact-∅:<br>2 mm | 3 Units<br>7.2 mm | Operating voltage[1] 630 V<br>Rated surge voltage[1] 3,000 V<br>Max. continuous current[2] 33 A for 2.5 mm²<br>Pollution degree[1] 2<br>Mating cycles min. 10,000 | 104 |
| PCB termination modules |  | 20 contacts<br>Contact-∅:<br>0.7 mm | 2 Units<br>4.8 mm | Operating voltage[1] 250 V<br>Rated surge voltage[1] 2,500 V<br>Max. continuous current[2] 7 A<br>Pollution degree[1] 2<br>Mating cycles min. 10,000 | 106 |
| |  | 10 contacts<br>Contact-∅:<br>0.7 mm | 1 Unit<br>2.4 mm | Maximum packing density<br>Operating voltage[1] 320 V<br>Rated surge voltage[1] 2,500 V<br>Max. continuous current[2] 7 A<br>Pollution degree[1] 2<br>Mating cycles min. 10,000 | 108 |

[1] According to IEC 60664-1:2007 (VDE 0110-1:2008) for pollution degree 2 [2] For a definition of max. continuous current, see page 172

# OVERVIEW OF ALL MODULES

Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

| | Modules | Description | Units/width | Features | | Page |
|---|---|---|---|---|---|---|
| PCB termination modules |  | 6 contacts<br>Contact-∅:<br>1.3 mm | 2 Units<br>4.8 mm | Operating voltage[1]<br>Rated surge voltage[1]<br>Max. continuous current[2]<br>Pollution degree[1]<br>Mating cycles | 400 V<br>2,500 V<br>13 A<br>2<br>min. 10,000 | 110 |
| |  | 5 contacts<br>Contact-∅:<br>2 mm | 3 Units<br>7.2 mm | Operating voltage[1]<br>Rated surge voltage[1]<br>Max. continuous current[2]<br>Pollution degree[1]<br>Mating cycles | 630 V<br>2,500 V<br>25 A<br>2<br>min. 10,000 | 112 |
| Power |  | 3 contacts<br>Contact-∅:<br>3.5 mm | 4 Units<br>9.6 mm | High voltage<br>Operating voltage[1]<br>Rated surge voltage[1]<br>Max. continuous current[2]<br>Pollution degree[1]<br>Mating cycles | <br>2,500 V<br>10,000 V<br>58 A for 6 mm²<br>2<br>min. 10,000 | 114 |
| High current |  | 2 contacts for turned contacts with ODU LAMTAC®[3]<br>Contact-∅:<br>5 mm | 5 Units<br>12 mm | Operating voltage[1]<br>Rated surge voltage[1]<br>Max. continuous current[2]<br>Pollution degree[1]<br>Mating cycles | 400 V<br>4,000 V<br>108 A for 16 mm²<br>2<br>min. 10,000 | 116 |
| |  | 2 contacts for turned contacts with ODU LAMTAC®[3]<br>Contact-∅:<br>8 mm | 9 Units<br>21.6 mm | Maximum current<br>Operating voltage[1]<br>Rated surge voltage[1]<br>Max. continuous current[2]<br>Pollution degree[1]<br>Mating cycles | <br>400 V<br>3,000 V<br>150 A for 25 mm²<br>2<br>min. 10,000 | 118 |
| |  | 1 contact for turned contacts with ODU LAMTAC®[3]<br>Contact-∅:<br>12 mm | 8 Units<br>19.2 mm | Operating voltage[1]<br>Rated surge voltage[1]<br>Max. continuous current[2]<br>Pollution degree[1]<br>Mating cycles | 2,500 V<br>10,000 V<br>225 A for 50 mm²<br>2<br>min. 10,000 | 120 |

[1] According to IEC 60664-1:2007 (VDE 0110-1:2008) for pollution degree 2 [2] For a definition of max. continuous current, see page 172
[3] Contact with lamella technology

# OVERVIEW OF ALL MODULES

Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

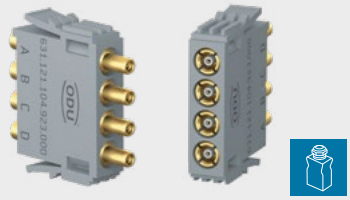
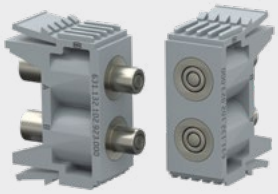
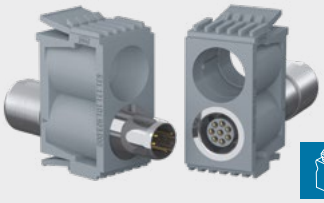
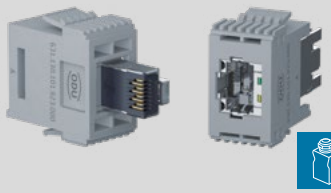
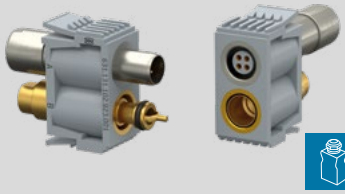
| | Modules | Description | Units/width | Features | Page |
|---|---|---|---|---|---|
| Coax |  | 4 contacts for 50 Ω coax contacts | 3 Units<br>7.2 mm | High packing density<br>Frequency range 0–2.8 GHz<br>Mating cycles min. 10,000 | 122 |
| |  | 2 contacts for 50 Ω coax contacts | 5 Units<br>12 mm | Frequency range 0–4 GHz<br>Mating cycles min. 10,000 | 124 |
| |  | 2 contacts for 50 Ω coax contacts SMA termination | 5 Units<br>12 mm | Frequency range 0–12 GHz<br>Mating cycles min. 10,000 | 126 |
| |  | 2 contacts for 75 Ω coax contacts | 5 Units<br>12 mm | Frequency range 0–2.7 GHz<br>Mating cycles min. 10,000 | 128 |
| Compressed air and fluid coupling |  | 2 contacts | 5 Units<br>12 mm | 12 bar<br>Tube-∅ inner-∅: max. 4 mm<br>outer-∅ Push-in: max. 6 mm<br>Mating cycles min. 10,000 | 130 |
| |  | 2 contacts | 5 Units<br>12 mm | 10 bar<br>Tube-∅ M5 to max. 4 mm<br>Mating cycles min. 10,000 | 132 |



Table of contents

# OVERVIEW OF ALL MODULES

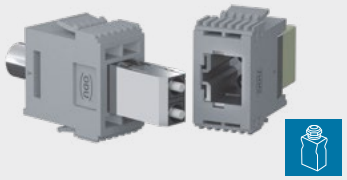
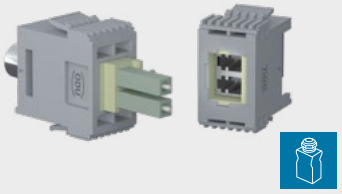
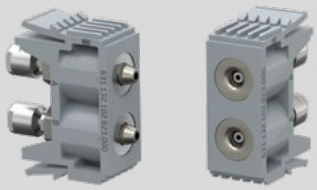
Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

| | Modules | Description | Units/width | Features | Page |
|---|---|---|---|---|---|
| Compressed air and fluid coupling |  | 2 contacts | 5 Units<br>12 mm | 10 bar<br>Tube-∅ M5 inside thread<br>Mating cycles min. 10,000 | 134 |
| Shielded feedthrough/ high-speed connector |  | 2 contacts | 6 Units<br>14.4 mm | Mating cycles min. 10,000<br>Suitable for all common bus systems<br>CAT 5[1], USB® 2.0[1] | 138 |
| |  | 1 contact | 6 Units<br>14.4 mm | Mating cycles min. 10,000<br>Suitable for all common bus systems<br>CAT 5[1], USB® 2.0[1] | 140 |
| |  | 1 contact<br>RJ45 insert | 7 Units<br>16.8 mm | Mating cycles min. 5,000<br>10 gigabit Ethernet[1] according to IEEE 802.3 an-2006<br>CAT 5[1], CAT $6_A$[1] according to ANSI/TIA IEIA-568-32-10 | 142 |
| Combination module |  | 2 contacts<br>High-speed & coax | 6 Units<br>14.4 mm | Mating cycles min. 10,000<br>Coax 50 Ω/4 GHz or 75 Ω/2.2 GHz<br>Selected inserts are suitable and qualified for data rates up to 5 Gbit/s. Suitable for USB® 2.0[1], USB® 3.1 Gen1[1], FireWire®[1], Ethernet[1] | 144 |
| |  | 2 contacts<br>High-speed & compressed air | 6 Units<br>14.4 mm | Mating cycles min. 10,000<br>Compressed air 12 bar<br>Selected inserts are suitable and qualified for data rates up to 5 Gbit/s. Suitable for USB® 2.0[1], USB® 3.1 Gen1[1], FireWire®[1], Ethernet[1] | 146 |

[1] Concerning data transmission protocols, please note page 2.

# OVERVIEW OF ALL MODULES

Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

| | Modules | Description | Units/width | Features | Page |
|---|---|---|---|---|---|
| Fiber optic (on request) |  | 2 contacts for SC insert | 7 Units<br>16.8 mm | Single mode (SM)<br>Multi mode (MM)<br>Mating cycles min. 5,000 | 148 |
| |  | 2 contacts for LC insert | 7 Units<br>16.8 mm | | |
| |  | 2 contacts for fiber-optic contact for plastic fiber (POF) | 5 Units<br>12 mm | Mating cycles min. 10,000<br>Insertion loss typical 1.5 dB for 670 nm | 149 |
| Blank modules |  | Blank modules | 1<br>2.4 mm<br>3<br>7.2 mm<br>5<br>12 mm | Used to fill incomplete frames. | 150 |

# FOR YOUR NOTES



# MODULE 20 CONTACTS

Pin protection against mechanical damage

SIGNAL




## REMOVAL TOOL



Removal of the assembled contact from the mating side
PART NUMBER: 087.7CC.070.005.000

For an overview of all tools, please see from page 153.

**Contact diameter: 0.7 mm**
**Mating cycles: min. 10,000**
**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 172).
- For crimp information, see from page 154

## TECHNICAL DATA

### Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]

| | | |
|---|---|---|
| Operating voltage | 250 V | 80 V |
| Rated surge voltage | 2,000 V | 2,000 V |
| Clearance distance | 1.0 mm | 1.0 mm |
| Creepage distance | 1.0 mm | 1.0 mm |
| Pollution degree | 2 | 3 |

### Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 200 V | 10 V |
| Test voltage | 1,076 V AC | 1,076 V AC |
| Pollution degree | 2 | 3 |

### Voltage data according to MIL[4]

| | |
|---|---|
| Operating voltage | 475 V |
| Test voltage | 1,425 V |

### Mechanical data

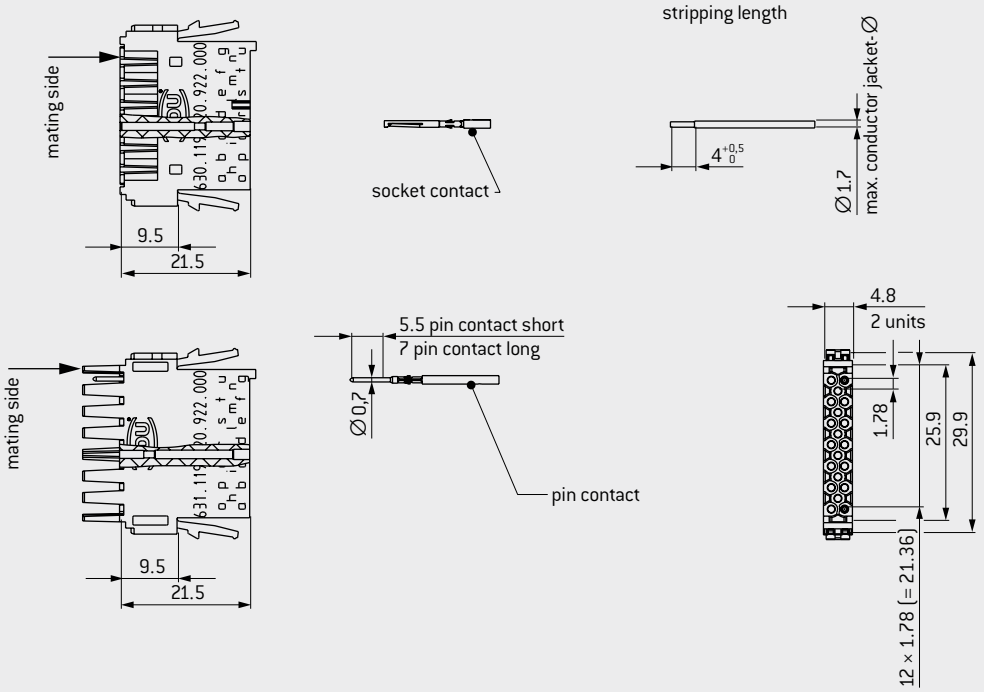
| | |
|---|---|
| Total mating force (average) | 16 N/module |
| Total sliding force (average) | 12 N/module |
| Contact diameter | 0.7 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

### Materials

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact | Cu alloy |
| Contact finishing | gold-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

## INSULATOR PIN AND SOCKET




| Module 20 contacts | Part number |
|---|---|
| Insulator socket | 630.119.120.922.000 |
| Insulator pin | 631.119.120.922.000 |

| Description | Part number | Conductor cross-section mm² | Termination AWG/mm | 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 short | 185.710.000.270.000 | 0.08–0.38 | 22–28 | 7 | 5.5 | 11 | 3.5 |
| Pin contact long | 185.711.000.270.000 | | | | | | |
| Socket contact | 175.581.000.270.000 | | | | | | |

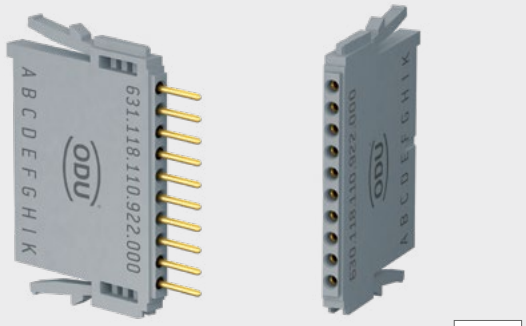
### PCB CONTACTS AVAILABLE ON REQUEST

For suitable PCB termination modules, please see page 106.

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172

# MODULE 10 CONTACTS

SIGNAL




## REMOVAL TOOL



Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.070.005.000**

For an overview of all tools, please see from page 153.

**Contact diameter: 0.7 mm**
**Mating cycles: min. 10,000**
**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 172).
- For crimp information, see from page 154

## TECHNICAL DATA

### Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]

| | | |
|---|---|---|
| Operating voltage | 320 V | 125 V |
| Rated surge voltage | 2,500 V | 2,500 V |
| Clearance distance | 1.4 mm | 1.4 mm |
| Creepage distance | 1.6 mm | 1.6 mm |
| Pollution degree | 2 | 3 |

### Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 320 V | 63 V |
| Test voltage | 1,320 V AC | 1,320 V AC |
| Pollution degree | 2 | 3 |

### Voltage data according to MIL[4]

| | |
|---|---|
| Operating voltage | 475 V |
| Test voltage | 1,425 V |

### Mechanical data

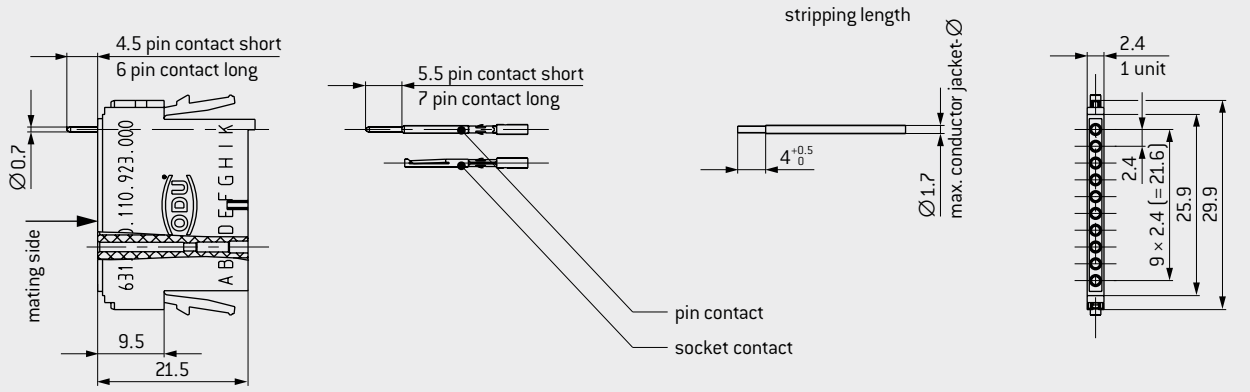
| | |
|---|---|
| Total mating force (average) | 8 N/module |
| Total sliding force (average) | 6 N/module |
| Contact diameter | 0.7 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

### Materials

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact | Cu alloy |
| Contact finishing | gold-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

## INSULATOR PIN AND SOCKET




| Module 10 contacts | Part number |
|---|---|
| Insulator socket | 630.118.110.922.000 |
| Insulator pin | 631.118.110.922.000 |

| Description | Part number | Conductor cross-section mm² | Termination AWG/mm | 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 short | 185.710.000.270.000 | 0.08–0.38 | 22–28 | 7 | 5.5 | 11 | 3.5 |
| Pin contact long | 185.711.000.270.000 | | | | | | |
| Socket contact | 175.581.000.270.000 | | | | | | |

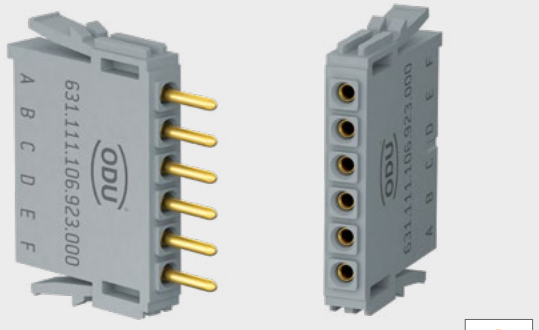
### PCB CONTACTS AVAILABLE ON REQUEST

For suitable PCB termination modules, please see page 108.

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172

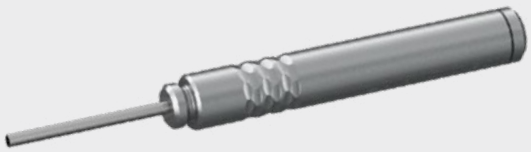
# MODULE 6 CONTACTS

SIGNAL




2
Units

REMOVAL TOOL



Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.130.004.000**

For an overview of all tools, please see from page 153.

**Contact diameter: 1.3 mm**
**Mating cycles: min. 10,000**
**Current-carrying capacity[1]: 19.5 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 172).
- For crimp information, see from page 154

## TECHNICAL DATA

### Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]

| | | |
|---|---|---|
| Operating voltage | 400 V | 160 V |
| Rated surge voltage | 2,500 V | 2,500 V |
| Clearance distance | 2.1 mm | 2.1 mm |
| Creepage distance | 2.5 mm | 2.5 mm |
| Pollution degree | 2 | 3 |

### Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 500 V | 200 V |
| Test voltage | 1,730 V AC | 1,730 V AC |
| Pollution degree | 2 | 3 |

### Voltage data according to MIL[4]

| | |
|---|---|
| Operating voltage | 775 V |
| Test voltage | 2,325 V |

### Mechanical data

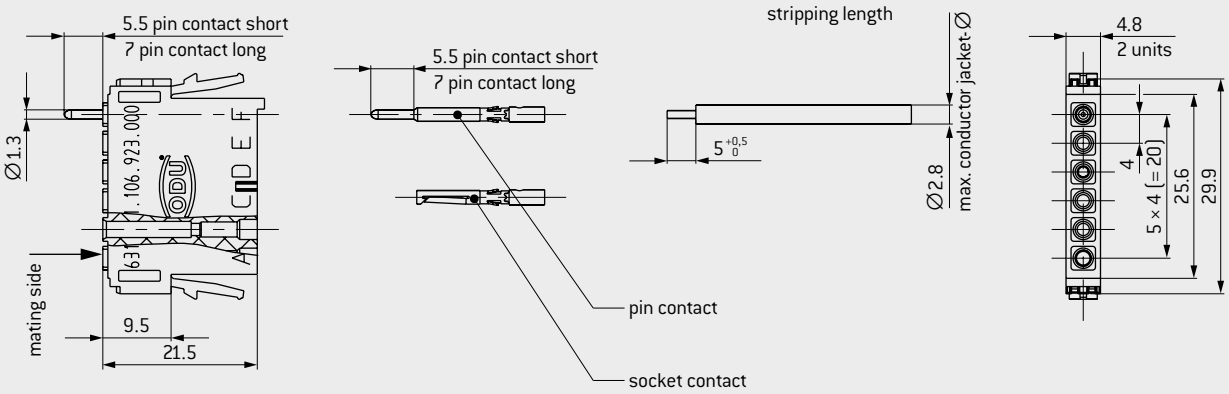
| | |
|---|---|
| Total mating force (average) | 8.4 N/module |
| Total sliding force (average) | 7.2 N/module |
| Contact diameter | 1.3 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

### Materials

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact | Cu alloy |
| Contact finishing | gold-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

## INSULATOR PIN AND SOCKET




| Module 6 contacts | Part number |
|---|---|
| Insulator | 631.111.106.923.000 |

| Description | Part number | Conductor cross-section mm² | Termination AWG/mm | 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 short | 185.432.000.270.000 | 0.5–1 | 18–20 | 12.5 | 11.5 | 19.5 | 1.8 |
| Pin contact long | 185.424.000.270.000 | | | | | | |
| Socket contact | 175.535.000.270.000 | | | | | | |
| Pin contact short | 185.714.000.270.000 | 0.08–0.38 | 22–28 | 9.5 | 7 | 12 | 1.8 |
| Pin contact long | 185.713.000.270.000 | | | | | | |
| Socket contact | 175.442.000.270.000 | | | | | | |

### PCB CONTACTS AVAILABLE ON REQUEST

For suitable PCB termination modules, please see page 110.

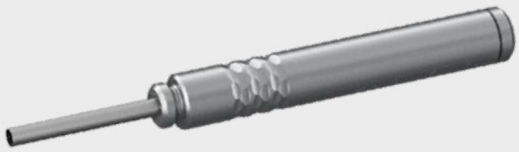
[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172

# MODULE 5 CONTACTS

SIGNAL




## REMOVAL TOOL



Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.200.003.000**

For an overview of all tools, please see from page 153.

**Contact diameter: 2 mm**
**Mating cycles: min. 10,000**
**Current-carrying capacity[1]: 33 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 172).
- For crimp information, see from page 154

## TECHNICAL DATA

### Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]

| | | |
|---|---|---|
| Operating voltage | 630 V | 250 V |
| Rated surge voltage | 3,000 V | 3,000 V |
| Clearance distance | 2.5 mm | 2.5 mm |
| Creepage distance | 3.4 mm | 3.4 mm |
| Pollution degree | 2 | 3 |

### Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 672 V | 267 V |
| Test voltage | 1,959 V AC | 1,959 V AC |
| Pollution degree | 2 | 3 |

### Voltage data according to MIL[4]

| | |
|---|---|
| Operating voltage | 1,025 V |
| Test voltage | 3,075 V |

### Mechanical data

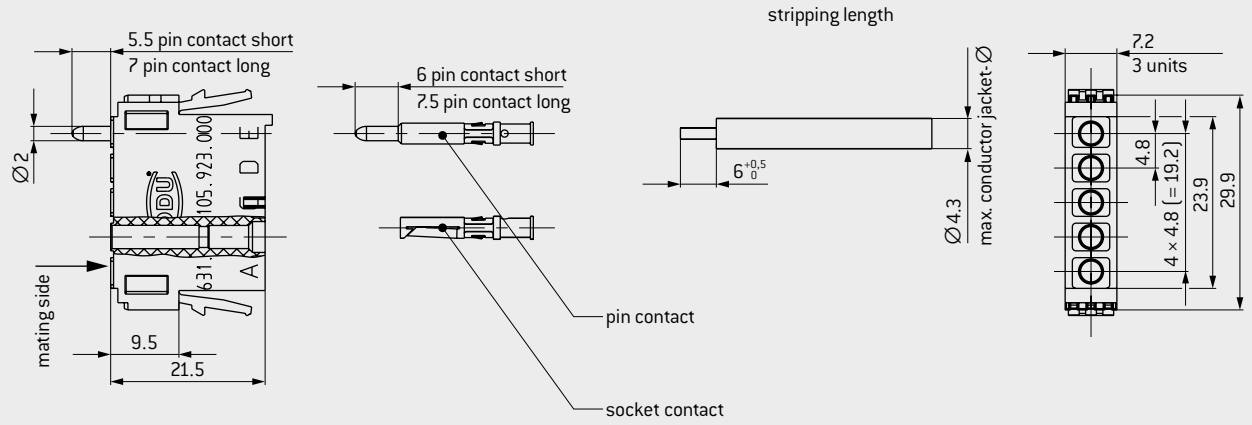
| | |
|---|---|
| Total mating force (average) | 13.5 N/module |
| Total sliding force (average) | 9 N/module |
| Contact diameter | 2 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

### Materials

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact | Cu alloy |
| Contact finishing | gold-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

## INSULATOR PIN AND SOCKET




| Module 5 contacts | Part number |
|---|---|
| Insulator | 631.112.105.923.000 |

| Description | Part number | Conductor cross-section mm² | Termination AWG/mm | 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 short | 185.437.000.270.000 | 1–1.5 | 16/18 | 18 | 15 | 27 | 1 |
| Pin contact long | 185.436.000.270.000 | | | | | | |
| Socket contact | 175.567.000.270.000 | | | | | | |
| Pin contact short | 185.441.000.270.000 | 2.5 | 14 | 24 | 19 | 33 | 1 |
| Pin contact long | 185.440.000.270.000 | | | | | | |
| Socket contact | 175.570.000.270.000 | | | | | | |

## PCB CONTACTS AVAILABLE ON REQUEST

For suitable PCB termination modules, please see page 112.

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172

# MODULE 20 CONTACTS

**For effective PCB contacting with quick-change function**

## PCB TERMINATION



2 Units

## COMPATIBLE WITH MODULE 20 CONTACTS ON PAGE 98

### NOTE

- Frame for the transfer of grounding to the board and corresponding grounding socket on request
- Explanations of the structure on page 38.

**Contact diameter: 0.7 mm**
**Mating cycles: min. 10,000**
**Current-carrying capacity[1]: 7 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 175).
- Solder temperature for PCB termination module (black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules

### TECHNICAL DATA

**Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]**

| | | |
|---|---|---|
| Operating voltage | 250 V | 50 V |
| Rated surge voltage | 2,500 V | 2,500 V |
| Clearance distance | 1.0 mm | 1.0 mm |
| Creepage distance | 1.0 mm | 1.0 mm |
| Pollution degree | 2 | 3 |

**Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]**

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 200 V | 10 V |
| Test voltage | 1,076 V AC | 1,076 V AC |
| Pollution degree | 2 | 3 |

**Voltage data according to MIL[4]**

| | |
|---|---|
| Operating voltage | 475 V |
| Test voltage | 1,425 V |

**Mechanical data**

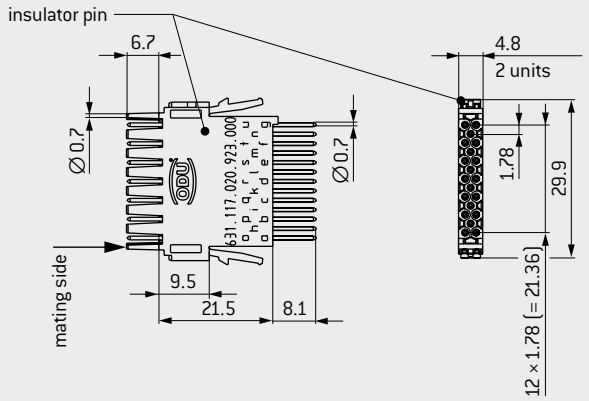
| | |
|---|---|
| Total mating force (average) | 16 N/module |
| Total sliding force (average) | 12 N/module |
| Contact diameter | 0.7 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

**Materials**

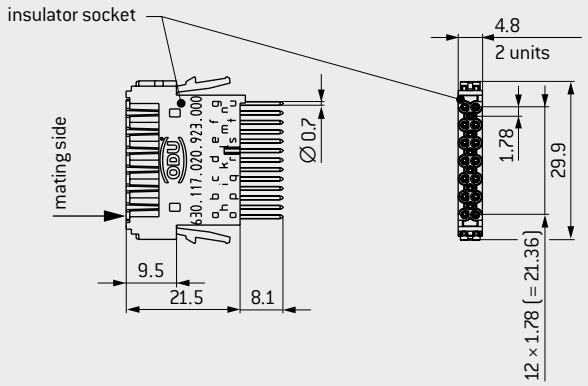
| | |
|---|---|
| Insulator pin/socket frame | thermoplastic acc. to UL 94 (Gray) |
| Insulator PCB | thermoplastic acc. to UL 94 (Black) |
| Contact body | Cu alloy |
| Contact finishing | gold-plated |

[1] For a definition of max. continuous current, see page 172 [2] See page 165 [3] See page 168 [4] See page 169

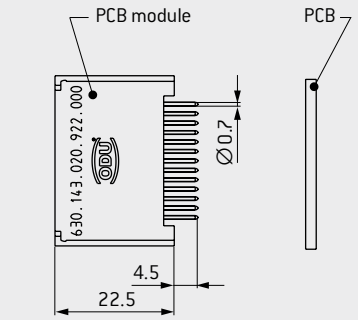
## INSULATOR PIN

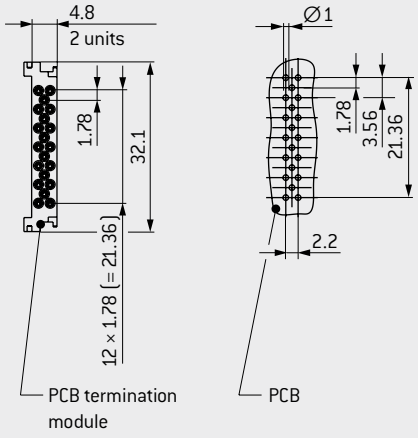



## INSULATOR SOCKET




## PCB TERMINATION MODULE




| Description | Part number | Nominal current[1] A | Max. continuous current[2] A | Contact resistance[3] mΩ |
|---|---|---|---|---|
| Insulator socket incl. contacts | 630.117.020.923.000 | 4.5 | ? | ? |
| Insulator pin incl. contacts | 631.117.020.923.000 | 4.5 | ? | ? |
| Insulator PCB incl. injected contacts[4] | 630.143.020.922.000 | 4.5 | ? | ? |

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172
[3] Due to the double transfer between the modules and the PCB termination modules, the contact resistance is twice as high as with a normal signal module.
[4] PCB contacts are injected in the insulator, so cannot be removed

Table of contents

# MODULE 10 CONTACTS

**For effective PCB contacting with quick-change function**

## PCB TERMINATION





1 Unit

## COMPATIBLE WITH MODULE 10 CONTACTS ON PAGE 100

### NOTE

- Frame for the transfer of grounding to the board and corresponding grounding socket on request
- Explanations of the structure on page 38.

**Contact diameter: 0.7 mm**
**Mating cycles: min. 10,000**
**Current-carrying capacity[1]: 7 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 175).
- Solder temperature for PCB termination module (black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules

### TECHNICAL DATA

**Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]**

| | | |
|---|---|---|
| Operating voltage | 320 V | 80 V |
| Rated surge voltage | 2,500 V | 2,500 V |
| Clearance distance | 1.4 mm | 1.4 mm |
| Creepage distance | 1.6 mm | 1.6 mm |
| Pollution degree | 2 | 3 |

**Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]**

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 320 V | 63 V |
| Test voltage | 1,320 V AC | 1,320 V AC |
| Pollution degree | 2 | 3 |

**Voltage data according to MIL[4]**

| | |
|---|---|
| Operating voltage | 475 V |
| Test voltage | 1,425 V |

**Mechanical data**

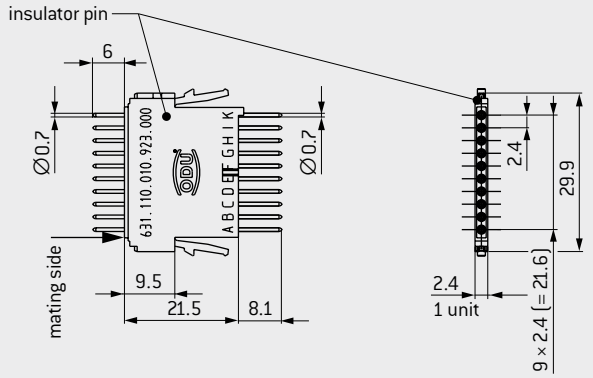
| | |
|---|---|
| Total mating force (average) | 8 N/module |
| Total sliding force (average) | 6 N/module |
| Contact diameter | 0.7 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

**Materials**

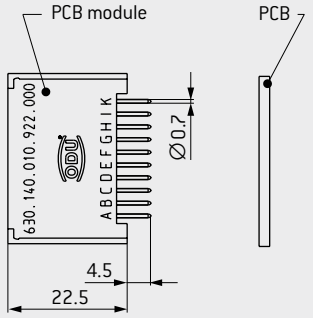
| | |
|---|---|
| Insulator pin/socket frame | thermoplastic acc. to UL 94 (Gray) |
| Insulator PCB | thermoplastic acc. to UL 94 (Black) |
| Contact body | Cu alloy |
| Contact finishing | gold-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

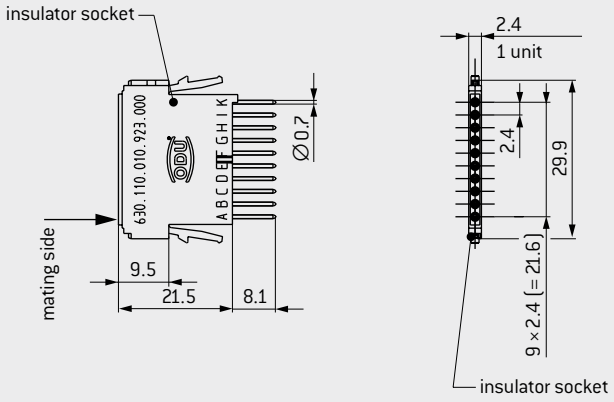
## INSULATOR PIN

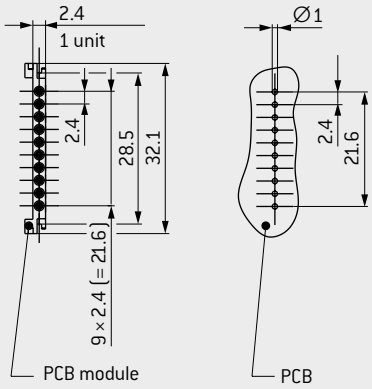



## PCB TERMINATION MODULE




## INSULATOR SOCKET




| Description | Part number | Nominal current[1] A | Max. continuous current[2] A | Contact resistance[3] mΩ |
|---|---|---|---|---|
| Insulator socket incl. contacts | 630.110.010.923.000 | 4.5 | ? | ? |
| Insulator pin incl. contacts | 631.110.010.923.000 | 4.5 | ? | ? |
| Insulator PCB incl. injected contacts[4] | 630.140.010.922.000 | 4.5 | ? | ? |

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172
[3] Due to the double transfer between the modules and the PCB termination modules, the contact resistance is twice as high as with a normal signal module.
[4] PCB contacts are injected in the insulator, so cannot be removed

Table of contents

# MODULE 6 CONTACTS

**For effective PCB contacting with quick-change function**

## PCB TERMINATION



2 Units

## COMPATIBLE WITH MODULE 6 CONTACTS ON PAGE 102

### NOTE

- Frame for the transfer of grounding to the board and corresponding grounding socket on request
- Explanations of the structure on page 38.

**Contact diameter: 1.3 mm**
**Mating cycles: min. 10,000**
**Current-carrying capacity[1]: 13 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 175).
- Solder temperature for PCB termination module (black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules

### TECHNICAL DATA

**Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]**

| | | |
|---|---|---|
| Operating voltage | 400 V | 160 V |
| Rated surge voltage | 2,500 V | 2,500 V |
| Clearance distance | 2.1 mm | 2.1 mm |
| Creepage distance | 2.5 mm | 2.5 mm |
| Pollution degree | 2 | 3 |

**Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]**

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 500 V | 200 V |
| Test voltage | 1,730 V AC | 1,730 V AC |
| Pollution degree | 2 | 3 |

**Voltage data according to MIL[4]**

| | |
|---|---|
| Operating voltage | 775 V |
| Test voltage | 2,325 V |

**Mechanical data**

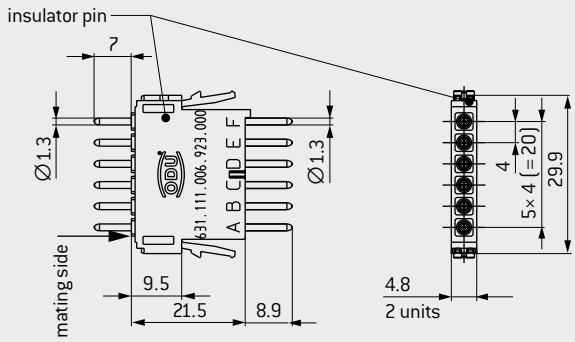
| | |
|---|---|
| Total mating force (average) | 8.4 N/module |
| Total sliding force (average) | 7.2 N/module |
| Contact diameter | 1.3 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

**Materials**

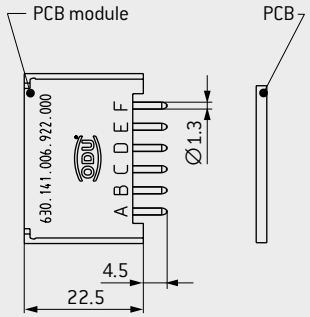
| | |
|---|---|
| Insulator pin/socket frame | thermoplastic acc. to UL 94 (Gray) |
| Insulator PCB | thermoplastic acc. to UL 94 (Black) |
| Contact body | Cu alloy |
| Contact finishing | gold-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165. [3] See page 168 [4] See page 169

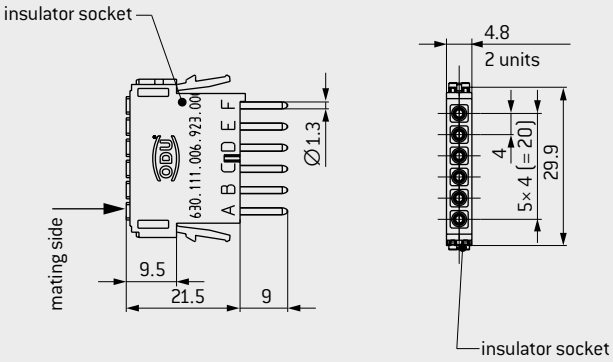
## INSULATOR PIN

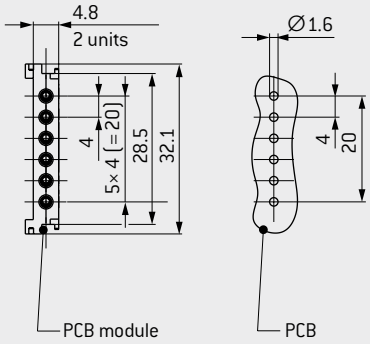



## PCB TERMINATION MODULE




## INSULATOR SOCKET




| Description | Part number | Nominal current [1] A | Max. continuous current [2] A | Contact resistance [3] mΩ |
|---|---|---|---|---|
| Insulator socket incl. contacts | 630.111.006.923.000 | 8 | 13 | 3.6 |
| Insulator pin incl. contacts | 631.111.006.923.000 | 8 | 13 | 3.6 |
| Insulator PCB incl. injected contacts [4] | 630.141.006.922.000 | 8 | 13 | 3.6 |

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172
[3] Due to the double transfer between the modules and the PCB termination modules, the contact resistance is twice as high as with a normal signal module.
[4] PCB contacts are injected in the insulator, so cannot be removed

# MODULE 5 CONTACTS

**For effective PCB contacting with quick-change function**

## PCB TERMINATION



3
Units

## COMPATIBLE WITH MODULE 5 CONTACTS ON PAGE 104

### NOTE

- Frame for the transfer of grounding to the board and corresponding grounding socket on request
- Explanations of the structure on page 38.

**Contact diameter: 2 mm**
**Mating cycles: min. 10,000**
**Current-carrying capacity[1]: 25 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 175).
- Solder temperature for PCB termination module (black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules

### TECHNICAL DATA

**Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]**

| | | |
|---|---|---|
| Operating voltage | 630 V | 250 V |
| Rated surge voltage | 3,000 V | 3,000 V |
| Clearance distance | 2.5 mm | 2.5 mm |
| Creepage distance | 3.4 mm | 3.4 mm |
| Pollution degree | 2 | 3 |

**Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]**

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 672 V | 267 V |
| Test voltage | 1,959 V AC | 1,959 V AC |
| Pollution degree | 2 | 3 |

**Voltage data according to MIL[4]**

| | |
|---|---|
| Operating voltage | 1,025 V |
| Test voltage | 3,075 V |

**Mechanical data**

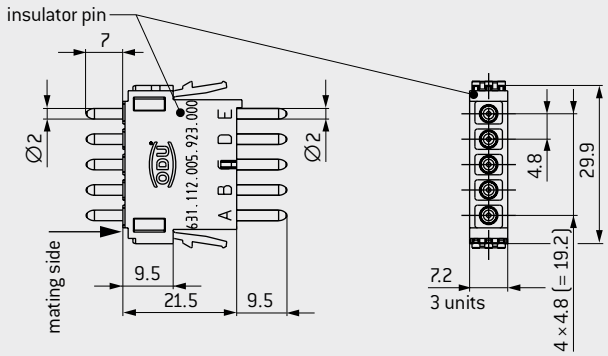
| | |
|---|---|
| Total mating force (average) | 13.5 N/module |
| Total sliding force (average) | 9 N/module |
| Contact diameter | 2 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

**Materials**

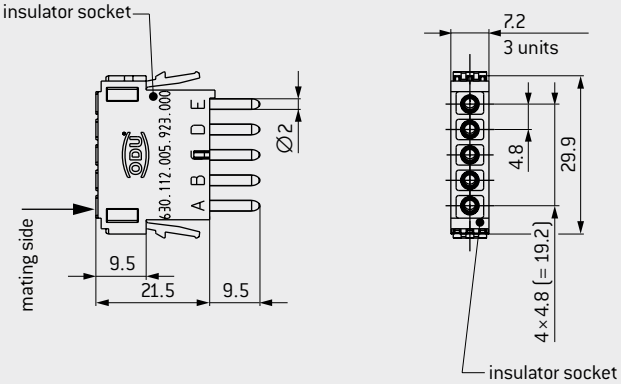
| | |
|---|---|
| Insulator pin/socket frame | thermoplastic acc. to UL 94 (Gray) |
| Insulator PCB | thermoplastic acc. to UL 94 (Black) |
| Contact body | Cu alloy |
| Contact finishing | gold-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

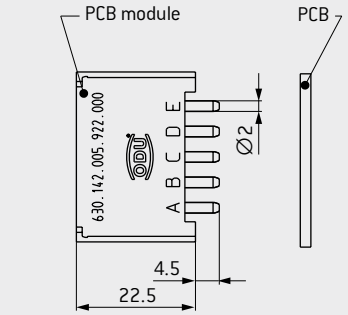
## INSULATOR PIN

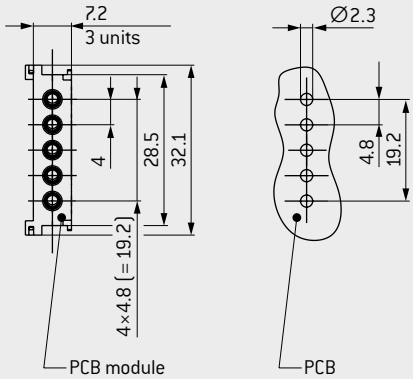



## INSULATOR SOCKET




## PCB TERMINATION MODULE




| Description | Part number | Nominal current [1] A | Max. continuous current [2] A | Contact resistance [3] mΩ |
|---|---|---|---|---|
| Insulator socket incl. contacts | 630.112.005.923.000 | 16 | 25 | 2 |
| Insulator pin incl. contacts | 631.112.005.923.000 | 16 | 25 | 2 |
| Insulator PCB incl. injected contacts [4] | 630.142.005.922.000 | 16 | 25 | 2 |

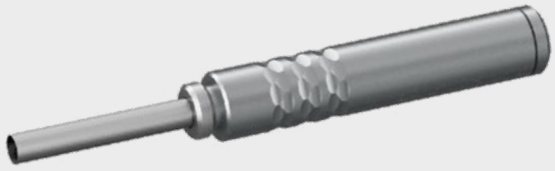
[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172
[3] Due to the double transfer between the modules and the PCB termination modules, the contact resistance is twice as high as with a normal signal module.
[4] PCB contacts are injected in the insulator, so cannot be removed

# MODULE 3 CONTACTS

POWER




## REMOVAL TOOL



Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.350.001.000**

For an overview of all tools, please see from page 153.

**Contact diameter: 3.5 mm**
**Mating cycles: min. 10,000**
**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 172).
- For crimp information, see from page 154

## TECHNICAL DATA

### Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]

| | | |
|---|---|---|
| Operating voltage | 2,500 V | 1,000 V |
| Rated surge voltage | 10 KV | 8 KV |
| Clearance distance | 16.3 mm | 16.3 mm |
| Creepage distance | 16.3 mm | 16.3 mm |
| Pollution degree | 2 | 3 |

### Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 3,260 V | 1,276 V |
| Test voltage | 7,514 V AC | 7,514 V AC |
| Pollution degree | 2 | 3 |

### Voltage data according to MIL[4]

| | |
|---|---|
| Operating voltage | 3,750 V |
| Test voltage | 11,250 V |

### Mechanical data

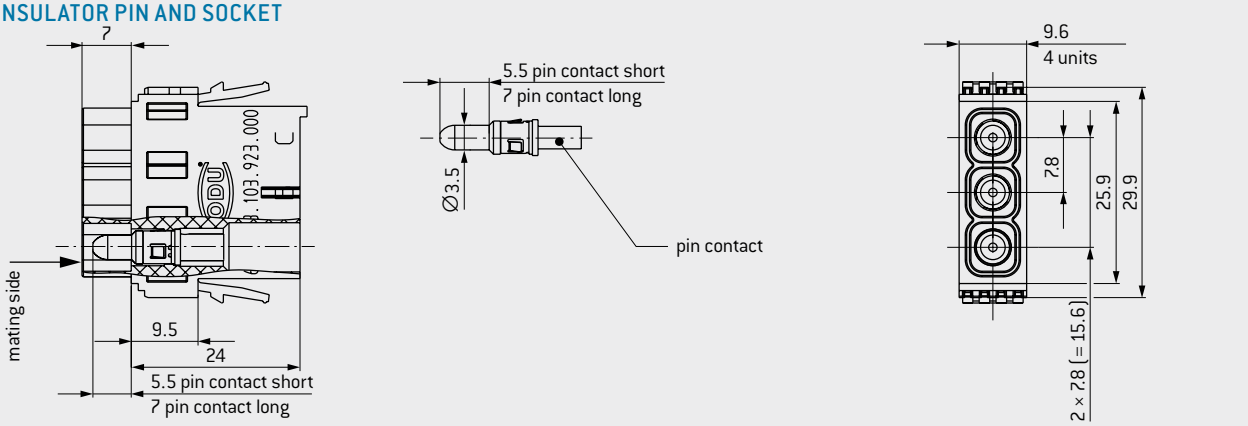
| | |
|---|---|
| Total mating force (average) | 12 N/module |
| Total sliding force (average) | 10 N/module |
| Contact diameter | 3.5 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

### Materials

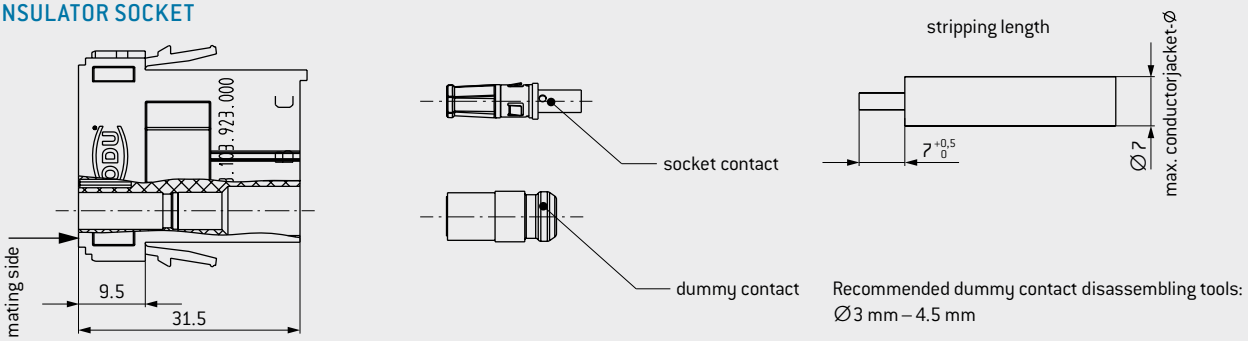
| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact | Cu alloy |
| Contact finishing | gold-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

## INSULATOR PIN AND SOCKET




## INSULATOR SOCKET




Recommended dummy contact disassembling tools:
Ø3 mm – 4.5 mm

| Module 3 contacts | Part number |
|---|---|
| Insulator socket | 630.113.103.923.000 |
| Insulator pin | 631.113.103.923.000 |
| Dummy contact | 021.341.201.946.000 |

| Description | Part number | Conductor cross-section mm² | Termination AWG/mm | 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 short | 185.463.000.270.000 | 2.5 | 14 | 25 | 21 | 37 | 0.4 |
| Pin contact long | 185.462.000.270.000 | | | | | | |
| Socket contact | 177.060.000.270.000 | | | | | | |
| Pin contact short | 185.461.000.270.000 | 4 | 12 | 39 | 30 | 58 | 0.4 |
| Pin contact long | 185.460.000.270.000 | | | | | | |
| Socket contact | 177.059.000.270.000 | | | | | | |
| Pin contact short | 185.443.000.270.000 | 6 | 10 | 39 | 30 | 58 | 0.4 |
| Pin contact long | 185.442.000.270.000 | | | | | | |
| Socket contact | 177.058.000.270.000 | | | | | | |

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172

# MODULE 2 CONTACTS

**ODU LAMTAC® (contact with lamella technology)**

HIGH CURRENT




REMOVAL TOOL



Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.680.001.000**

For an overview of all tools, please see from page 153.

**Contact diameter: 5 mm**
**Mating cycles: min. 10,000**
**Current-carrying capacity[1]: 108 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 172).
- For crimp information, see from page 154

## TECHNICAL DATA

### Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]

| | | |
|---|---|---|
| Operating voltage | 400 V | 160 V |
| Rated surge voltage | 4 KV | 3 KV |
| Clearance distance | 3.1 mm | 3.1 mm |
| Creepage distance | 3.1 mm | 3.1 mm |
| Pollution degree | 2 | 3 |

### Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 611 V | 485 V |
| Test voltage | 2,251 V AC | 2,251 V AC |
| Pollution degree | 2 | 3 |

### Voltage data according to MIL[4]

| | |
|---|---|
| Operating voltage | 975 V |
| Test voltage | 2,925 V |

### Mechanical data

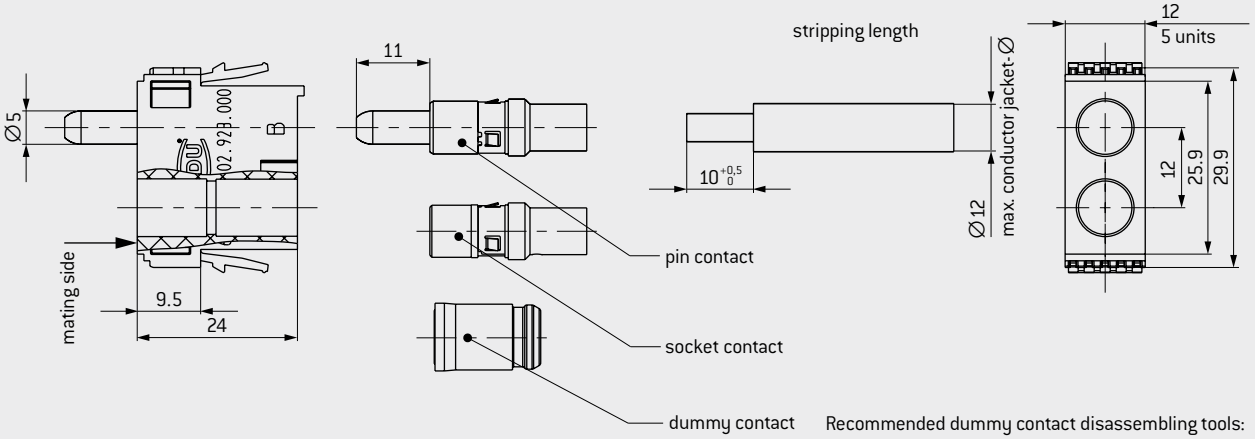
| | |
|---|---|
| Total mating force (average) | 34 N/module |
| Total sliding force (average) | 28 N/module |
| Contact diameter | 5 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

### Materials

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact body | Cu alloy |
| Contact lamella | CuBe alloy |
| Contact finishing | silver-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

## INSULATOR PIN AND SOCKET

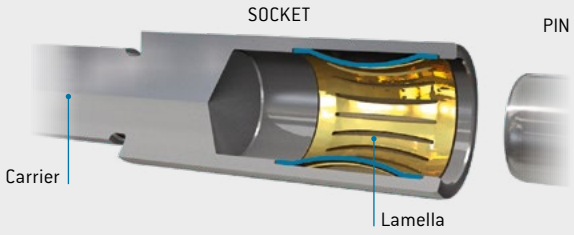



Recommended dummy contact disassembling tools:
Ø 5 mm – 7 mm

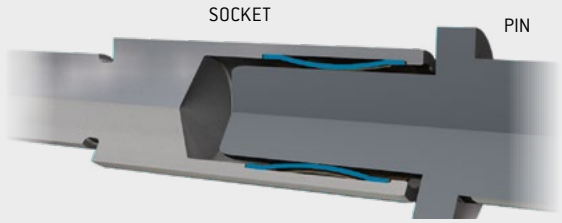
For use in a housing, check the necessary space requirements

## ODU LAMTAC® (CONTACT WITH LAMELLA TECHNOLOGY)

### UNMATED




### MATED




| Module 2 contacts | Part number |
|---|---|
| Insulator | 631.120.102.923.000 |
| Dummy contact | 021.341.202.946.000 |

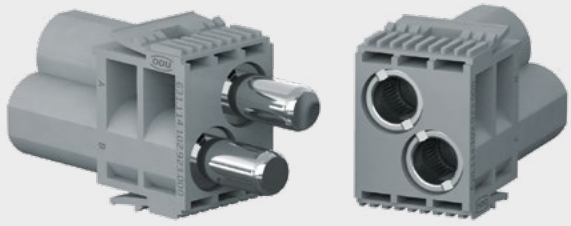
| Description | Part number | Conductor cross-section mm² | Nominal current[1] Single contact A | Nominal current[1] Module fully equipped A | Max. continuous current[2] Single contact A | Contact resistance mΩ |
|---|---|---|---|---|---|---|
| Pin contact | 185.484.000.201.000 | 10 | 56 | 56 | 90 | 0.2 |
| Socket contact | 178.879.100.201.000 | | | | | |
| Pin contact | 185.485.000.201.000 | 16 | 68 | 68 | 108 | 0.2 |
| Socket contact | 178.880.100.201.000 | | | | | |

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172

# MODULE 2 CONTACTS

**ODU LAMTAC® (contact with lamella technology)**

HIGH CURRENT



9 Units

## REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts.



Tightening torque 2.7 Nm ± 0.1 Nm

**PART NUMBER: 087.611.002.001.000**

For an overview of all tools, please see from page 153.

**Contact diameter: 8 mm**
**Mating cycles: min. 10,000**
**Current-carrying capacity[1]: 150 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 172).
- For crimp information, see from page 154

## TECHNICAL DATA

### Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]

| | | |
|---|---|---|
| Operating voltage | 400 V | 160 V |
| Rated surge voltage | 3 KV | 3 KV |
| Clearance distance | 2.3 mm | 2.3 mm |
| Creepage distance | 2.4 mm | 2.4 mm |
| Pollution degree | 2 | 3 |

### Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 537 V | 428 V |
| Test voltage | 1,844 V AC | 1,844 V AC |
| Pollution degree | 2 | 3 |

### Voltage data according to MIL[4]

| | |
|---|---|
| Operating voltage | 700 V |
| Test voltage | 2,100 V |

### Mechanical data

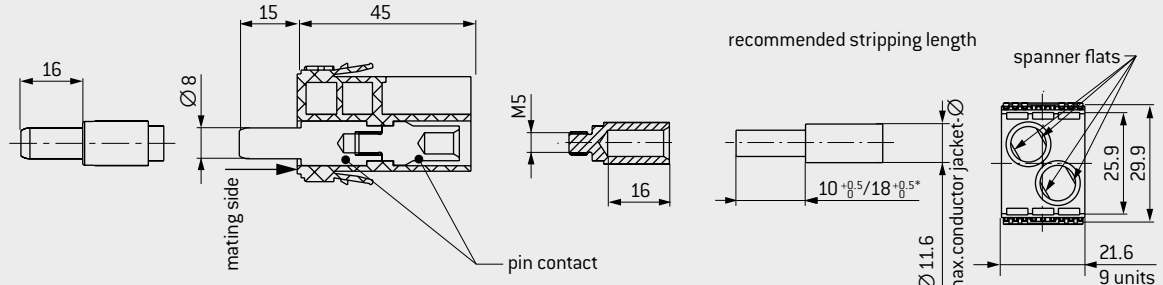
| | |
|---|---|
| Total mating force (average) | 60 N/module |
| Total sliding force (average) | 45 N/module |
| Contact diameter | 8 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

### Materials

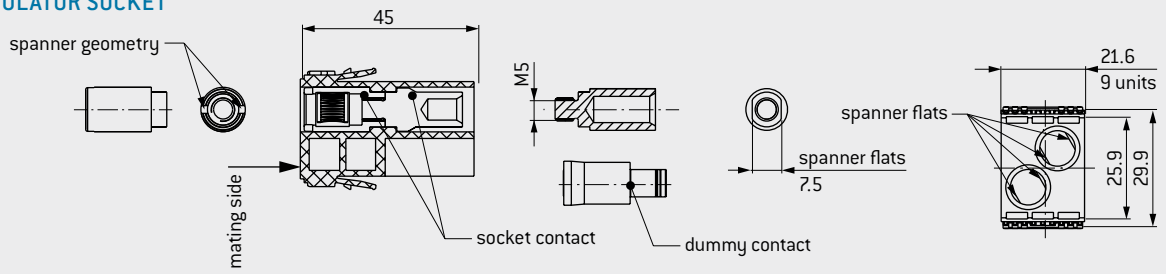
| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact body | Cu alloy |
| Contact lamella | CuBe alloy |
| Contact finishing | silver-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

## INSULATOR PIN




## INSULATOR SOCKET



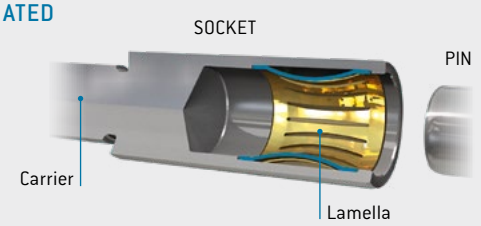

For use in a housing, check the necessary space requirements

* 10 +0.5 0 : 16 mm²
18 +0.5 0 : 25 mm²

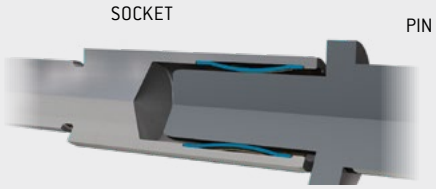
Recommended dummy contact disassembling tools:
Ø 5 mm – 7 mm

## ODU LAMTAC® (CONTACT WITH LAMELLA TECHNOLOGY)

### UNMATED




### MATED




| Module 2 contacts | Part number |
|---|---|
| Insulator socket | 630.114.102.923.000 |
| Insulator pin | 631.114.102.923.000 |
| Dummy contact | 021.341.203.946.000 |

| Description | Part number | Conductor cross-section mm² | 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 | 181.875.100.200.000 | 16 | 76 | 75 | 123 | 0.2 |
| Socket contact | 178.875.100.201.000 | | | | | |
| Pin contact | 181.874.100.200.000 | 25 | 103 | 100 | 150 | 0.2 |
| Socket contact | 178.874.100.201.000 | | | | | |

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172

# MODULE 1 CONTACT

**ODU LAMTAC® (contact with lamella technology)**

HIGH CURRENT



8 Units

## REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts.



Tightening torque 2.2 Nm ± 0.2 Nm

**PART NUMBER: 598.054.006.000.000**

Torx bit TX20

**PART NUMBER: 598.054.105.000.00**

For an overview of all tools, please see from page 153.

**Contact diameter: 12 mm**
**Mating cycles: min. 10,000**
**Current-carrying capacity[1]: 225 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 172).
- For crimp information, see from page 154

## TECHNICAL DATA

### Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]

| | | |
|---|---|---|
| Operating voltage | 2,500 V | 1,000 V |
| Rated surge voltage | 10 KV | 10 KV |
| Clearance distance | 13.5 mm | 13.5 mm |
| Creepage distance | 13.5 mm | 13.5 mm |
| Pollution degree | 2 | 3 |

### Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[3]

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 2,700 V | 1,071 V |
| Test voltage | 6,388 V AC | 6,388 V AC |
| Pollution degree | 2 | 3 |

### Voltage data according to MIL[4]

| | |
|---|---|
| Operating voltage | 850 V |
| Test voltage | 2,550 V |

### Mechanical data

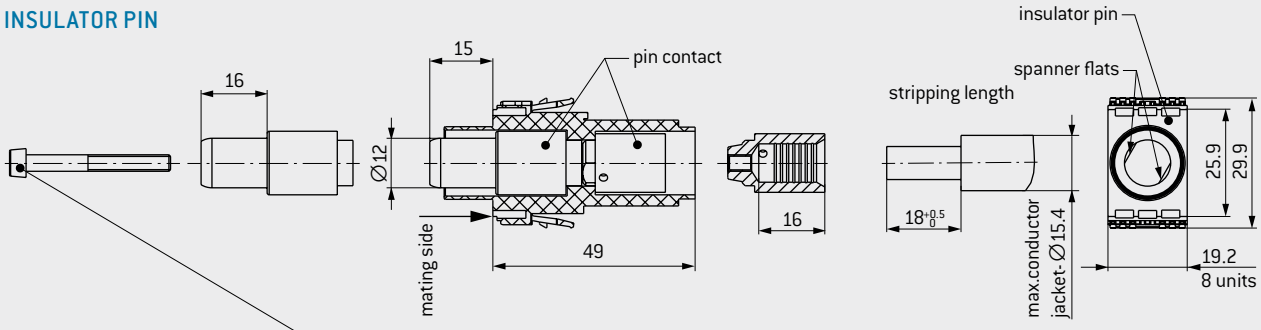
| | |
|---|---|
| Total mating force (average) | 45 N/module |
| Total sliding force (average) | 30 N/module |
| Contact diameter | 12 mm |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

### Materials

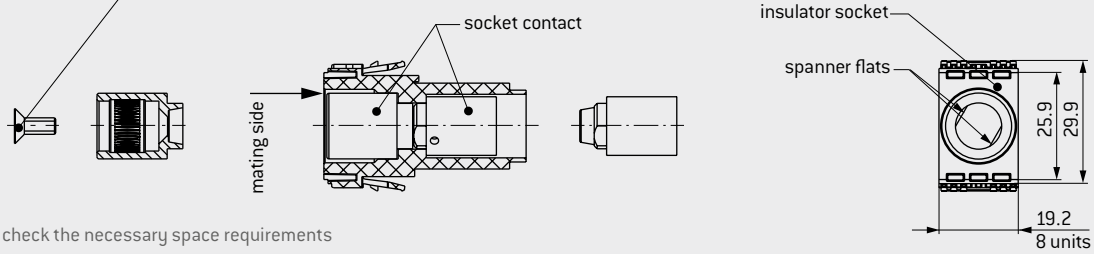
| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact body | Cu alloy |
| Contact lamella | CuBe alloy |
| Contact finishing | silver-plated |

[1] For a definition of max. continuous current, see page 172 [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 168 [4] See page 169

## INSULATOR PIN



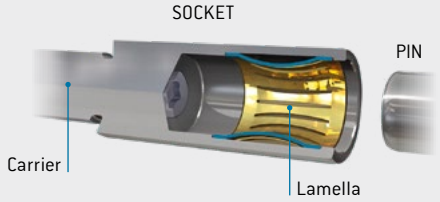

## INSULATOR SOCKET



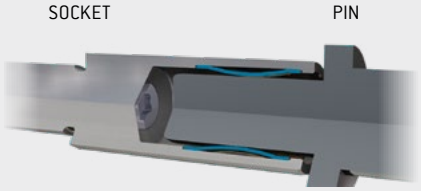

For use in a housing, check the necessary space requirements

## ODU LAMTAC® (CONTACT WITH LAMELLA TECHNOLOGY)

### UNMATED




### MATED



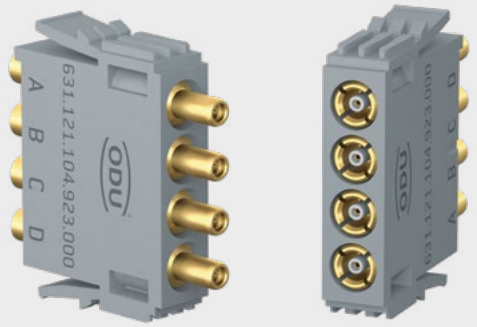

| Module 1 contact | Part number |
|---|---|
| Insulator socket | 630.115.101.923.000 |
| Insulator pin | 631.115.101.923.000 |

| Description | Part number | Conductor crosssection mm² | Nominal current[1] Single contact A | Max. continuous current[2] Single contact A | Contact resistance mΩ |
|---|---|---|---|---|---|
| Pin contact | 181.944.100.200.001 | 25 | 115 | 167 | 0.1 |
| Socket contact | 178.948.100.201.001 | | | | |
| Pin contact | 181.945.100.200.001 | 35 | 135 | 195 | 0.1 |
| Socket contact | 178.953.100.201.001 | | | | |
| Pin contact | 181.943.100.200.001 | 50 | 155 | 225 | 0.1 |
| Socket contact | 178.943.100.201.001 | | | | |

[1] Determined according to IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003) at increased temperature 45 K [2] For a definition of max. continuous current, see page 172

# MODULE 4 CONTACTS FOR 50 Ω

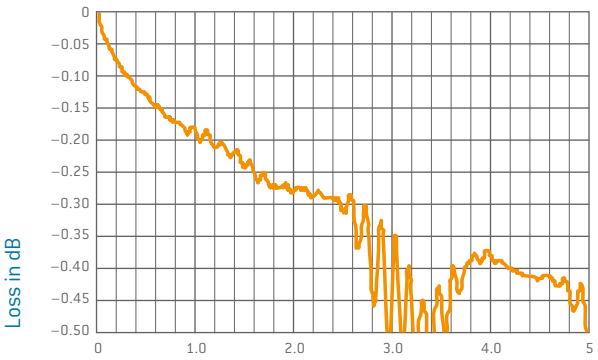
COAX



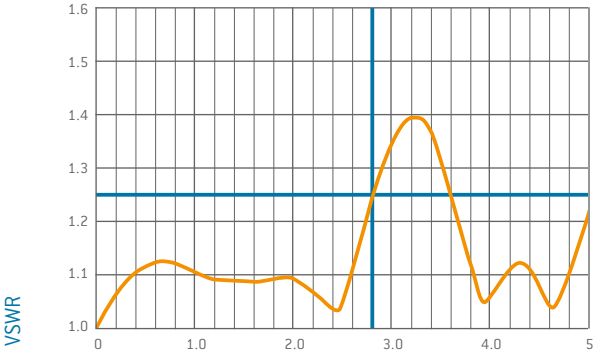

3 Units

## HIGH-FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

**Insertion loss**




**Voltage standing-wave ratio VSWR**




Mating cycles: min. 10,000
Frequency range[1]: 0–2.8 GHz

### TECHNICAL NOTES

- For crimp information, see from page 154

### TECHNICAL DATA

**Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]**

| | | |
|---|---|---|
| Frequency range[1] | 0–2.8 GHz | |
| Insulation resistance | > 100 GΩ | |
| Clearance distance | 1.5 mm | 1.5 mm |
| Creepage distance | 1.5 mm | 1.5 mm |
| Pollution degree | 2 | 3 |

**Voltage data according to MIL[3]**

| | |
|---|---|
| Operating voltage | 525 V |
| Test voltage | 1,575 V |

**Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[4]**

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 300 V | 50 V |
| Test voltage | 1,383 V AC | 1,383 V AC |
| Pollution degree | 2 | 3 |

**Mechanical data**

| | |
|---|---|
| Total mating force (average) | 10.6 N/module |
| Total sliding force (average) | 7.6 N/module |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

**Materials**

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact/insulator | Cu alloy/PTFE |
| Contact finishing | gold-plated |

### REMOVAL TOOL

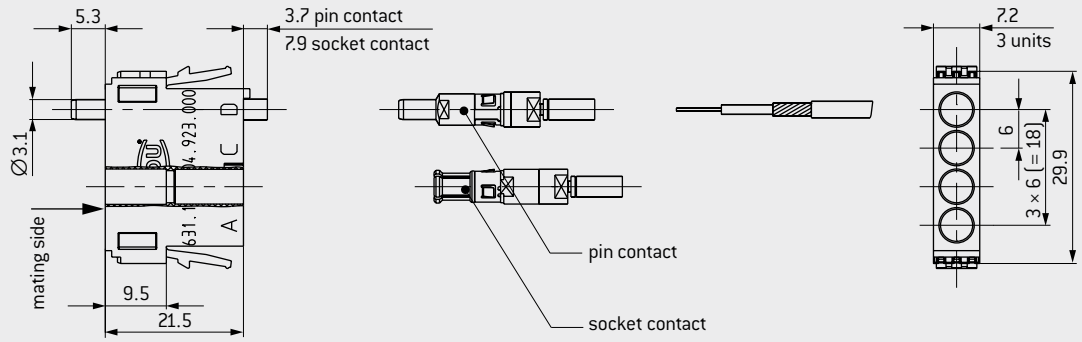


Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.310.001.000**

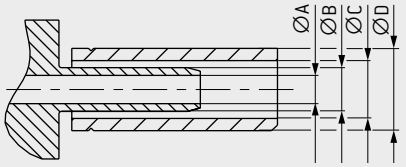
For an overview of all tools, please see from page 153.

[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 169 [4] See page 168

## INSULATOR FOR PIN AND SOCKET

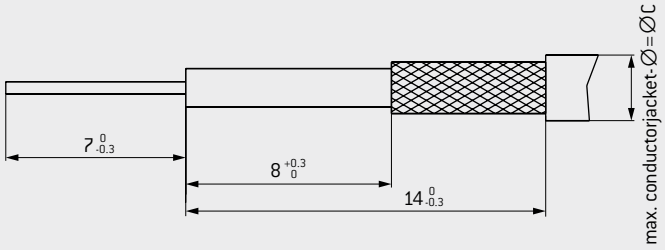



## CABLE TERMINATION




Inner conductor crimped, outer conductor crimped

## RECOMMENDED CABLE CONSTRUCTION/STRIPPING LENGTH




| Module 4 contacts | Part number |
|---|---|
| Insulator | 631.121.104.923.000 |

| Description | Part number | Characteristic impedance Ω | Frequency range GHz | Cable[1] | A | B | C | D | Part number Crimp dies |
|---|---|---|---|---|---|---|---|---|---|
| Pin contact | 122.133.003.270.000 | 50 | 0.5 | RG 178, RG 196 | 1.1 | 1.7 | 2.25 | 3.2 | 082.000.039.101.000 |
| Pin contact | 122.133.001.270.000 | | 2.8 | RG 174, RG 188, RG 316 | 1.75 | 2.7 | 3.2 | 3.8 | 082.000.039.102.000 |
| Socket contact | 122.133.004.270.000 | 50 | 0.5 | RG 178, RG 196 | 1.1 | 1.7 | 2.25 | 3.2 | 082.000.039.101.000 |
| Socket contact | 122.133.002.270.000 | | 2.8 | RG 174, RG 188, RG 316 | 1.75 | 2.7 | 3.2 | 3.8 | 082.000.039.102.000 |

[1] Special lines and alternative models on request

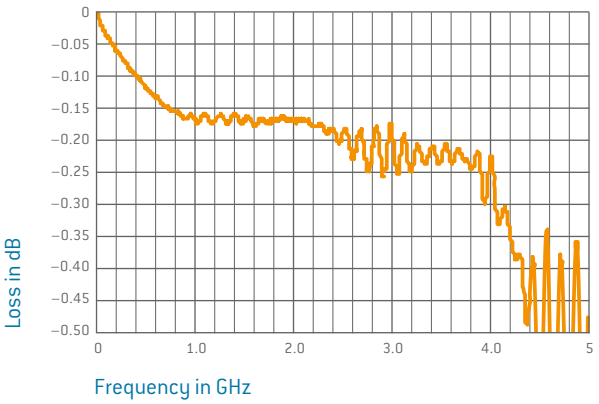
# MODULE 2 CONTACTS FOR 50 Ω

COAX

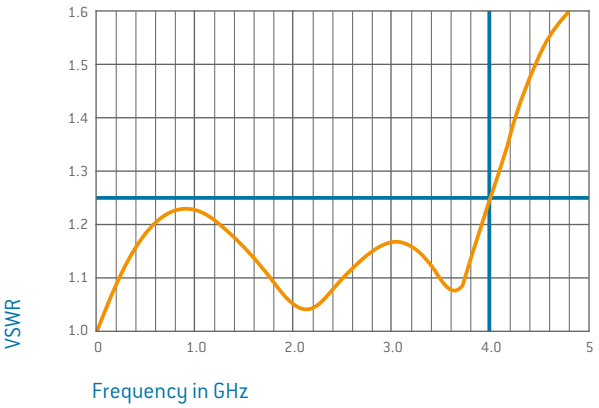



## HIGH-FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

**Insertion loss**




**Voltage standing-wave ratio VSWR**




**Mating cycles: min. 10,000**
**Frequency range[1]: 0–4 GHz**

### TECHNICAL NOTES

- For crimp information, see from page 154

### TECHNICAL DATA

**Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]**

| | | |
|---|---|---|
| Frequency range[1] | 0–4 GHz | |
| Insulation resistance | > 100 GΩ | |
| Clearance distance | 2.2 mm | 2.2 mm |
| Creepage distance | 3.1 mm | 3.1 mm |
| Pollution degree | 2 | 3 |

**Voltage data according to MIL[3]**

| | |
|---|---|
| Operating voltage | 800 V |
| Test voltage | 2,400 V |

**Voltage data according to standard DIN EN 61010-1:2010[4]**

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 612 V | 243 V |
| Test voltage | 1,788 V AC | 1,788 V AC |
| Pollution degree | 2 | 3 |

**Mechanical data**

| | |
|---|---|
| Total mating force (average) | 8.1 N/module |
| Total sliding force (average) | 5.8 N/module |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

**Materials**

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact/insulator | Cu alloy/PTFE |
| Contact finishing | gold-plated |

### REMOVAL TOOL

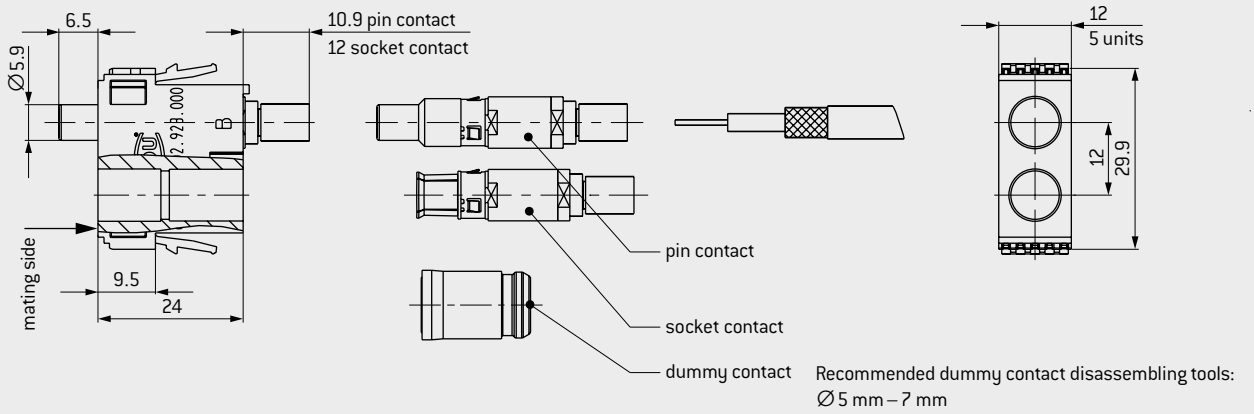


Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.690.001.000**

For an overview of all tools, please see from page 153.

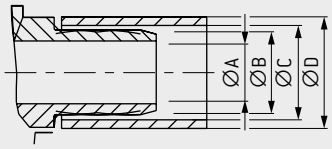
[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See page 169 [4] See page 168

## INSULATOR FOR PIN AND SOCKET



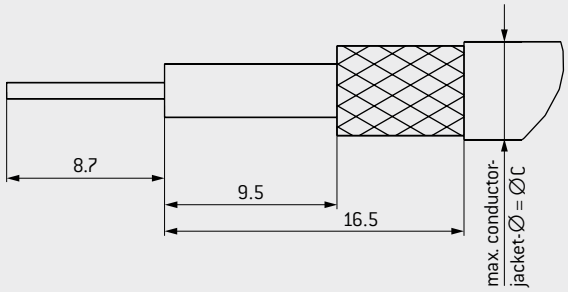

Recommended dummy contact disassembling tools:
Ø 5 mm – 7 mm

## CABLE TERMINATION




Inner conductor crimped, outer conductor crimped

## RECOMMENDED CABLE CONSTRUCTION/STRIPPING LENGTH




| Module 2 contacts | Part number |
|---|---|
| Insulator | 631.120.102.923.000 |
| Dummy contact | 021.341.202.946.000 |

| Description | Part number | Characteristic impedance Ω | Frequency range GHz | Cable[1] | A | B | C | D | Part number Crimp dies |
|---|---|---|---|---|---|---|---|---|---|
| Pin contact | 122.132.001.270.000 | 50 | 0.2 | RG 178, RG 196 | 1.1 | 1.7 | 2.25 | 3.2 | 082.000.039.101.000 |
| Pin contact | 122.132.003.270.000 | | 0.4 | RG 174, RG 188, RG 316 | 1.75 | 2.7 | 3.2 | 3.8 | 082.000.039.102.000 |
| Pin contact | 122.132.007.270.000 | | 3.5 | RG 58 | 3.15 | 4.5 | 5.2 | 6.15 | 082.000.039.106.000 |
| Pin contact | 122.132.013.270.000 | | 4 | RG 223 | 3.15 | 4.5 | 5.9 | 6.75 | 082.000.039.108.000 |
| Socket contact | 122.132.002.270.000 | 50 | 0.2 | RG 178, RG 196 | 1.1 | 1.7 | 2.25 | 3.2 | 082.000.039.101.000 |
| Socket contact | 122.132.004.270.000 | | 0.4 | RG 174, RG 188, RG 316 | 1.75 | 2.7 | 3.2 | 3.8 | 082.000.039.102.000 |
| Socket contact | 122.132.008.270.000 | | 3.5 | RG 58 | 3.15 | 4.5 | 5.2 | 6.15 | 082.000.039.106.000 |
| Socket contact | 122.132.014.270.000 | | 4 | RG 223 | 3.15 | 4.5 | 5.9 | 6.75 | 082.000.039.108.000 |

[1] Special lines and alternative models on request

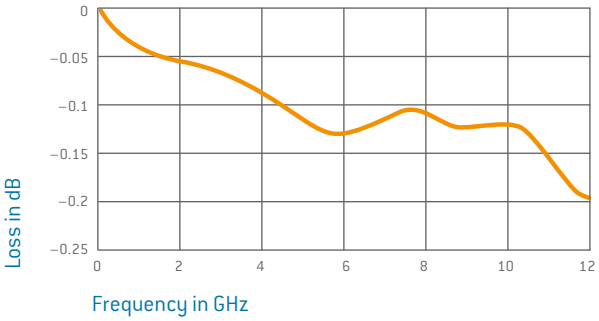
# MODULE 2 CONTACTS FOR 50 Ω WITH SMA TERMINATION

COAX

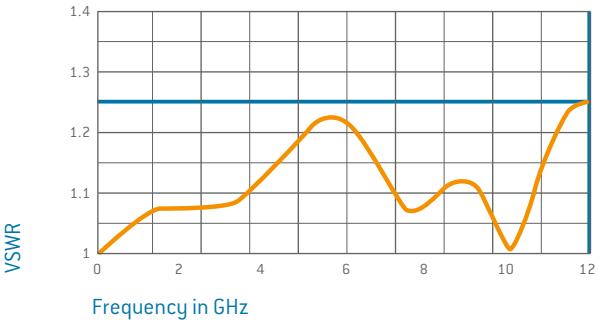



## HIGH-FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

**Insertion loss**




**Voltage standing-wave ratio VSWR**




Mating cycles: min. 10,000
Frequency range[1]: 0–12 GHz[2]

### TECHNICAL DATA

**Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[3]**

| | | |
|---|---|---|
| Frequency range[1] | 0–12 GHz[2] | |
| Insulation resistance | > 100 GΩ | |
| Clearance distance | 1.6 mm | 1.6 mm |
| Creepage distance | 1.6 mm | 1.6 mm |
| Pollution degree | 2 | 3 |

**Voltage data according to MIL[4]**

| | |
|---|---|
| Operating voltage | 565 V |
| Test voltage | 1,700 V |

**Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[5]**

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 320 V | 63 V |
| Test voltage | 1,444 V AC | 1,444 V AC |
| Pollution degree | 2 | 3 |

**Mechanical data**

| | |
|---|---|
| Total mating force (average) | 8.1 N/module |
| Total sliding force (average) | 5.8 N/module |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

**Materials**

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact/insulator | Cu alloy/PTFE |
| Contact finishing | gold-plated |

### REMOVAL TOOL

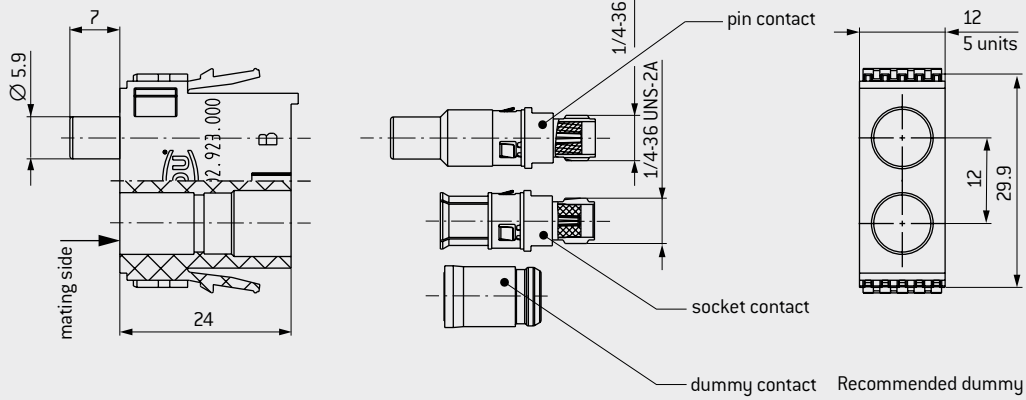


Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.690.001.000**

For an overview of all tools, please see from page 153.

[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] Frequency range 0–16 GHz, if gap between pin and socket frame is < 0.2 mm and particular coax cables are used. Example: docking application
[3] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [4] See page 169 [5] See from page 168

## INSULATOR FOR PIN AND SOCKET



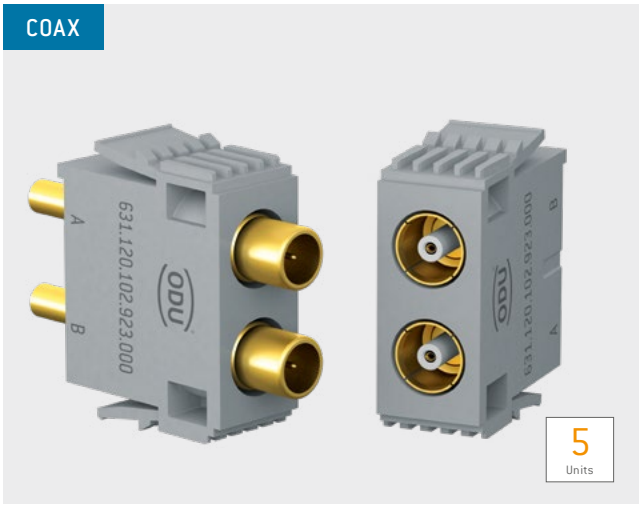

| Module 2 contacts | Part number |
|---|---|
| Insulator | 631.122.102.923.000 |
| Dummy contact | 021.341.202.946.000 |

| Description | Part number | Characteristic impedance<br>Ω | Frequency range<br>GHz |
|---|---|---|---|
| Pin contact | 122.143.001.270.000 | 50 | 12[1] |
| Socket contact | 122.143.002.270.000 | | 12[1] |

[1] Frequency range 0–16 GHz, if gap between pin and socket frame is < 0.2 mm and particular coax cables are used. Example: docking application

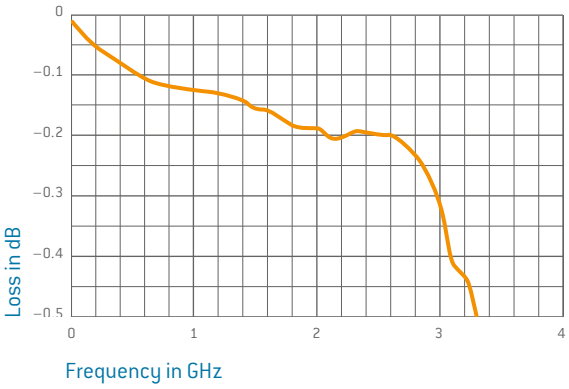
# MODULE 2 CONTACTS FOR 75 Ω

COAX

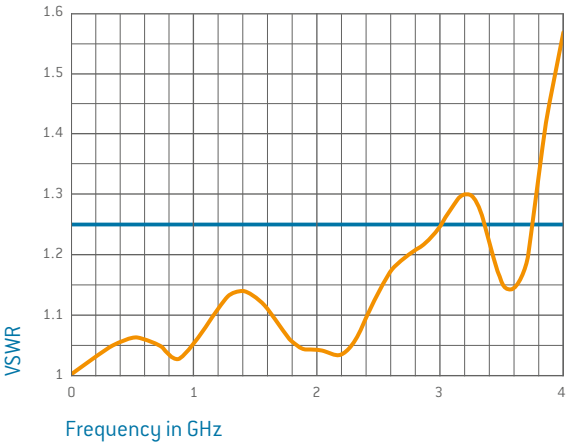



## HIGH-FREQUENCY CHARACTERISTICS FOR 75 Ω COAX CONTACTS[1]

**Insertion loss**




**Voltage standing-wave ratio VSWR**




Mating cycles: min. 10,000
Frequency range[1]: 0–2.7 GHz

### TECHNICAL NOTES

- For crimp information, see from page 154

### TECHNICAL DATA

**Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008)[2]**

| | | |
|---|---|---|
| Frequency range[1] | 0–2.7 GHz | |
| Insulation resistance | > 100 GΩ | |
| Clearance distance | 1.1 mm | 1.1 mm |
| Creepage distance | 1.1 mm | 1.1 mm |
| Pollution degree | 2 | 3 |

**Voltage data according to MIL[3]**

| | |
|---|---|
| Operating voltage | 930 V |
| Test voltage | 2,790 V |

**Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2010)[4]**

| | | |
|---|---|---|
| Supply voltage from grid supply circuit (CAT.2) | 150 V < $U_{rms}$ ≤ 300 V | |
| Operating voltage | 220 V | 16 V |
| Test voltage | 1,138 V AC | 1,138 V AC |
| Pollution degree | 2 | 3 |

**Mechanical data**

| | |
|---|---|
| Total mating force (average) | 8.1 N/module |
| Total sliding force (average) | 5.8 N/module |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |

**Materials**

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Contact/insulator | Cu alloy/PTFE |
| Contact finishing | gold-plated |

### REMOVAL TOOL

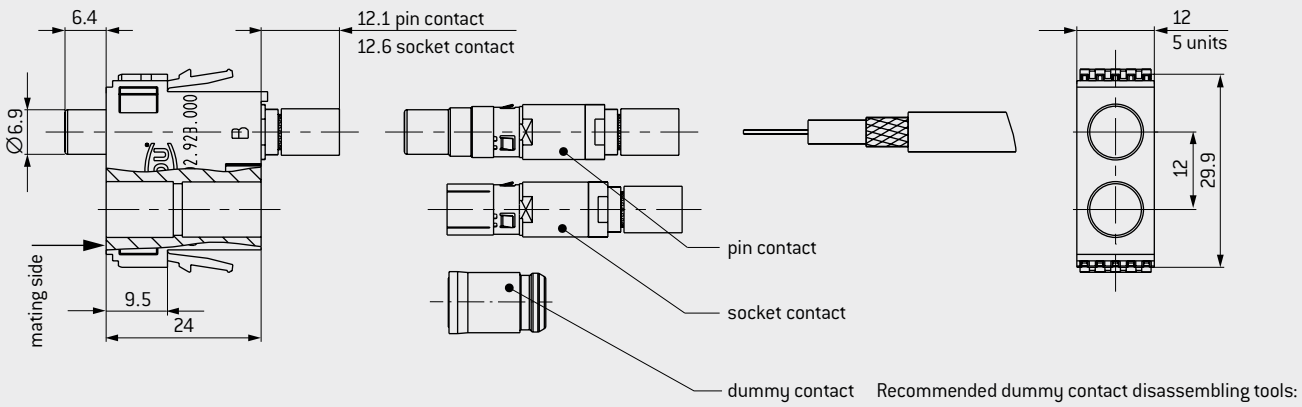


Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.690.001.000**

For an overview of all tools, please see from page 153.

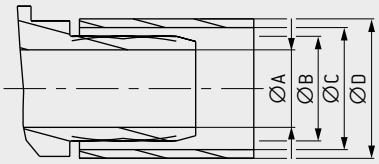
[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 165 [3] See from page 169 [4] See page 168

## INSULATOR FOR PIN AND SOCKET



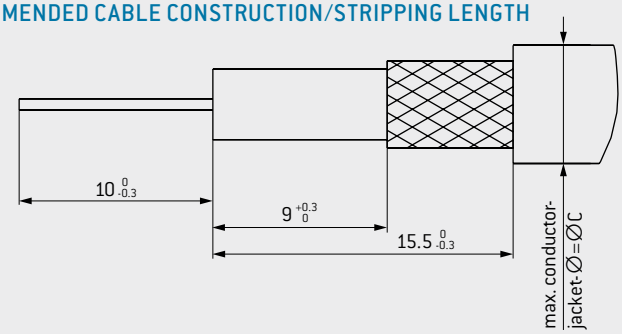

Recommended dummy contact disassembling tools:
Ø5 mm – 7 mm

## CABLE TERMINATION




Inner conductor crimped, outer conductor crimped

## RECOMMENDED CABLE CONSTRUCTION/STRIPPING LENGTH




| Module 2 contacts | Part number |
|---|---|
| Insulator | 631.120.102.923.000 |
| Dummy contact | 021.341.202.946.000 |

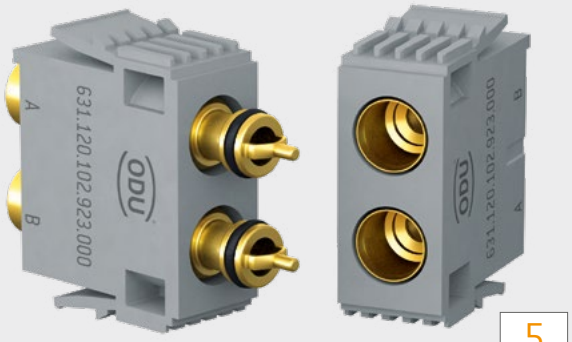
| Description | Part number | Characteristic impedance Ω | Frequency range GHz | Cable[1] | A | B | C | D | Part number Crimp dies |
|---|---|---|---|---|---|---|---|---|---|
| Pin contact | 122.131.003.270.000 | 75 | 1.2 | RG 179, RG 187 | 1.75 | 2.7 | 3.2 | 3.8 | 082.000.039.102.001 |
| Pin contact | 122.131.009.270.000 | | 2.7 | RG 59 | 4 | 5.4 | 6.3 | 7.2 | 082.000.039.109.000 |
| Socket contact | 122.131.004.270.000 | 75 | 1.2 | RG 179, RG 187 | 1.75 | 2.7 | 3.2 | 3.8 | 082.000.039.102.001 |
| Socket contact | 122.131.010.270.000 | | 2.7 | RG 59 | 4 | 5.4 | 6.3 | 7.2 | 082.000.039.109.000 |

[1] Special lines and alternative models on request

# MODULE 2 CONTACTS FOR PNEUMATIC VALVES

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

## COMPRESSED AIR




## REMOVAL TOOL



Removal of the assembled contact from the mating side
**PART NUMBER: 087.7CC.680.001.000**

For an overview of all tools, please see from page 153.

**Operating pressure[1]: 12 bar**
**Mating cycles[2]: minimum 10,000**
**Tube termination: M5**

## TECHNICAL NOTES

- The function dictates that contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Vacuum modules and further termination types on request
- No $O_2$ model[3]

## TECHNICAL DATA

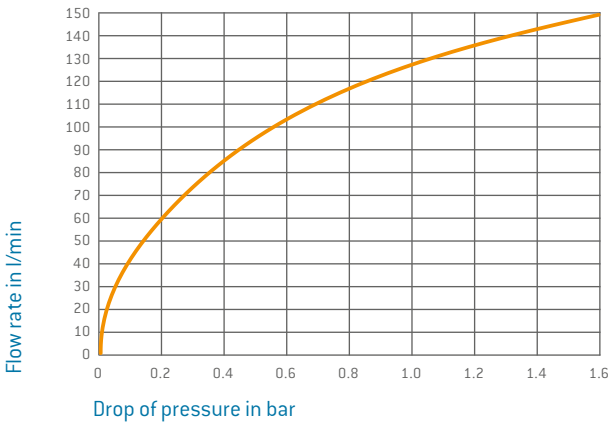
### Mechanical data

| | |
|---|---|
| Permissible max. operating pressure | 12 bar |
| Operating force | 10.4 N/module |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles | min. 10,000 |
| Tube termination | M5 inside thread for commercially available Push-in terminations |

### Materials

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |
| Valve body | Cu alloy, blank |
| Sealing | NBR; sealing material |

## FLOW RATE DIAGRAM

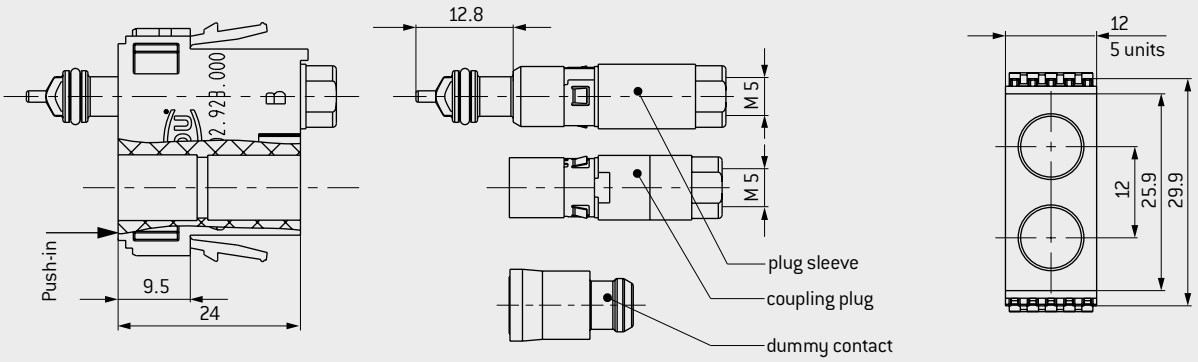



The flow rate diagram refers to the locking version with a maximum gap between socket and pin piece of ≤ 0.5 mm. If the clearance is modified, the drop of pressure increases.

[1] Burst pressure min. 40 bar [2] The stated mating cycles are possible if regular maintenance intervals are observed [3] Not suitable for mixtures with over 25% oxygen content or explosive gases.

## INSULATOR PIN AND SOCKET

TERMINATION ACCESSORIES, SEE PAGE 136




Recommended dummy contact disassembling tools:
∅3 mm – 4.5 mm

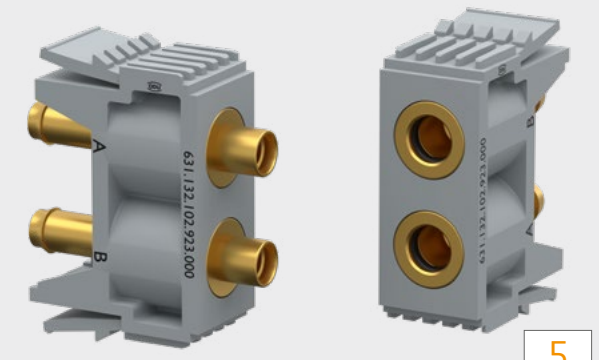
| Module 2 contacts | Part number |
|---|---|
| Insulator | 631.120.102.923.000 |
| Dummy contact | 021.341.202.946.000 |

| Description | Part number | Termination |
|---|---|---|
| Plug sleeve (non shut-off) | 196.035.001.300.000 | M5 |
| Coupling (non shut-off) | 196.035.003.300.000 | |
| Coupling (shut-off) | 196.035.002.300.000 | |

# MODULE 2 CONTACTS FOR PNEUMATIC VALVES

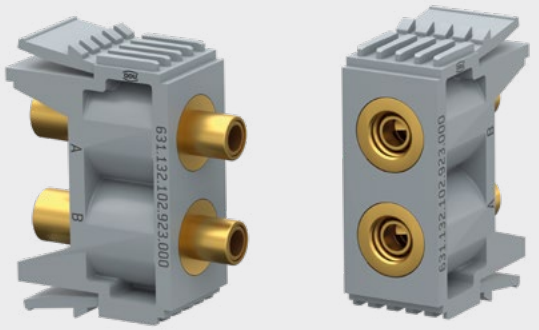
Inner-∅ of tube max. 4 mm, Push-in-∅ max. 6 mm.

COMPRESSED AIR




Non shut-off version

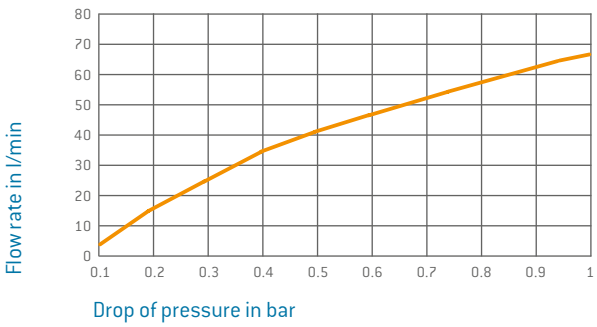
5 Units




Shut-off version

5 Units

## 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.

**Operating pressure: 10 bar**
**Mating cycles[1]: min. 10,000**
**Tube termination: M5 or max. 4 mm**

## TECHNICAL NOTES

- The function dictates that contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Vacuum modules and further termination types on request
- No $O_2$ model[2]

## TECHNICAL DATA

### Mechanical data

| | |
|---|---|
| Permissible max. operating pressure | 10 bar |
| Operating force | |
| Non shut-off | 27 N/module |
| One-sided shut-off | 28 N/module |
| Two-sided shut-off | 29 N/module |
| Total sliding force (average) | |
| Non shut-off | 12.6 N/module |
| One-sided shut-off | 12.6 N/module |
| Two-sided shut-off | 9.2 N/module |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles[1] | min. 10,000 |
| Tube termination | M5 inside thread for commercially available Push-in terminations |

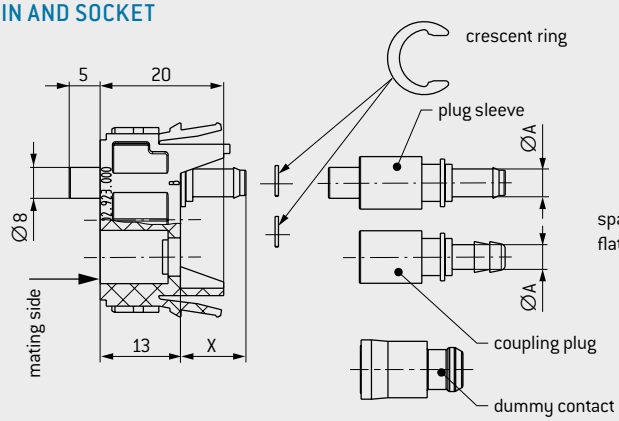
### Materials

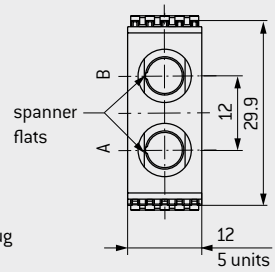
| | |
|---|---|
| Insulator | thermoplastic glass-fiber reinforced acc. to UL 94 |
| Valve body | Cu alloy, blank |
| Sealing | NBR; sealing material/FKM |

[1] The stated mating cycles are possible if regular maintenance intervals are observed [2] Not suitable for mixtures with over 25% oxygen content or explosive gases

## INSULATOR PIN AND SOCKET

TERMINATION ACCESSORIES, SEE PAGE 136




Recommended dummy contact disassembling tools:
Ø3 mm – 4.5 mm

| Module 2 contacts | Part number |
|---|---|
| Insulator | 631.132.102.923.000 |
| Dummy contact | 021.341.205.946.000 |

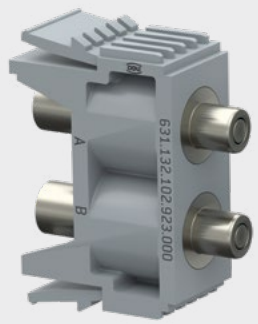
| Description | Part number | Dim. A mm | Dim. X mm | Termination types see page 136 I | II |
|---|---|---|---|---|---|
| Plug sleeve (non shut-off) | 196.023.001.300.000 | 3 | 8.5 | x | |
| Plug sleeve (non shut-off) | 196.024.001.300.000 | 4 | 10.5 | x | |
| Coupling (non shut-off) | 196.023.003.300.000 | 3 | 8.5 | x | |
| Coupling (non shut-off) | 196.024.003.300.000 | 4 | 10.5 | x | |
| Plug sleeve (shut-off)[1,2] | 196.025.014.300.000 | M5 | – | | x |
| Coupling (shut-off) | 196.023.002.300.000 | 3 | 8.5 | x | |
| Coupling (shut-off) | 196.024.002.300.000 | 4 | 10.5 | x | |
| Coupling (shut-off)[2] | 196.025.012.300.000 | M5 | – | | x |

[1] Only pluggable on coupling 196.025.012.300.000 [2] Sealing material: FKM

# MODULE 2 CONTACTS FOR FLUID COUPLING

Suitable for conducting air, water, and other fluids

## FLUID COUPLING



Two-sided shut-off

5 Units

**Operating pressure: 10 bar low-leakage model**
**Mating cycles[1]: min. 10,000**
**Tube termination: M5**

### TECHNICAL NOTES

- The function dictates that 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 permitted.
- No $O_2$ model[2]

### TECHNICAL DATA

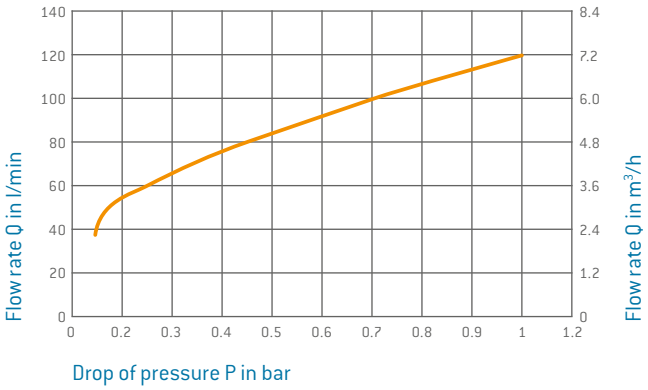
#### Mechanical data

| | |
|---|---|
| Permissible max. operating pressure | 10 bar |
| Tube termination | M5 inside thread for commercially available Push-in terminations |
| Operating force | 48 N/module |
| Operating temperature | –40 °C to +125 °C |
| Mating cycles[1] | min. 10,000 |

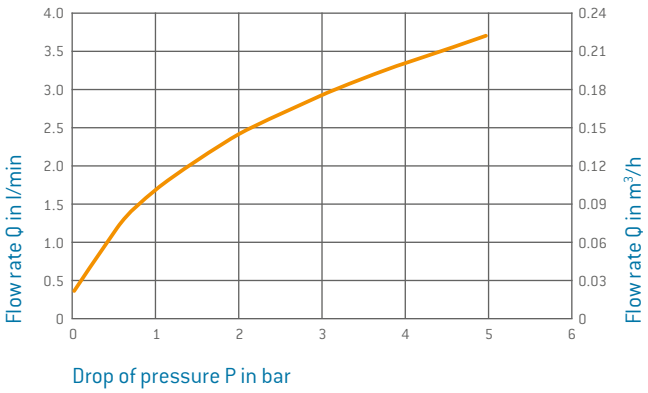
#### Materials

| | |
|---|---|
| Insulator | thermoplastic glass-fiber reinforced acc. to UL 94 |
| Fluid coupling | Cu alloy/nickel-plated |
| Sealing | sealing material/FKM |

### FLOW RATE DIAGRAM AIR




### FLOW RATE DIAGRAM WATER

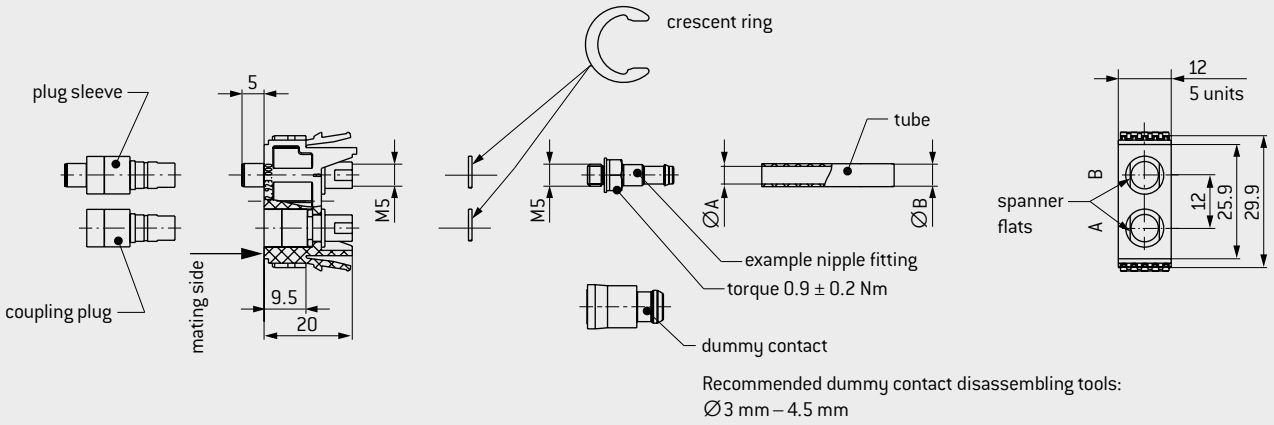



The flow rate diagram refers to the locking version with a maximum gap between socket and pin piece of ≤ 0.5 mm.
If the clearance is modified, the drop of pressure increases.

[1] The stated mating cycles are possible if regular maintenance intervals are observed [2] Not suitable for mixtures with over 25% oxygen content or explosive gases

## INSULATOR PIN AND SOCKET

TERMINATION ACCESSORIES, SEE PAGE 136




Recommended dummy contact disassembling tools:
Ø3 mm – 4.5 mm

| Module 2 contacts | Part number |
|---|---|
| Insulator | 631.132.102.923.000 |
| Dummy contact | 021.341.205.946.000 |

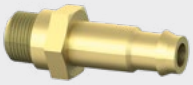
| Description | Part number | Termination |
|---|---|---|
| Plug sleeve (shut-off) | 196.025.015.338.000 | M5 |
| Coupling (shut-off) | 196.025.016.338.000 | M5 |

# M5 TERMINATION ACCESSORIES

COMPRESSED AIR

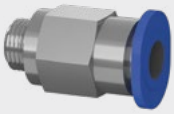
### TERMINATION TYPE I

Plug nipple



### TERMINATION TYPE II PUSH-IN

Push-in fitting



L connection



### TECHNICAL NOTES

- Tightening torque 0.9 ± 0.2 Nm

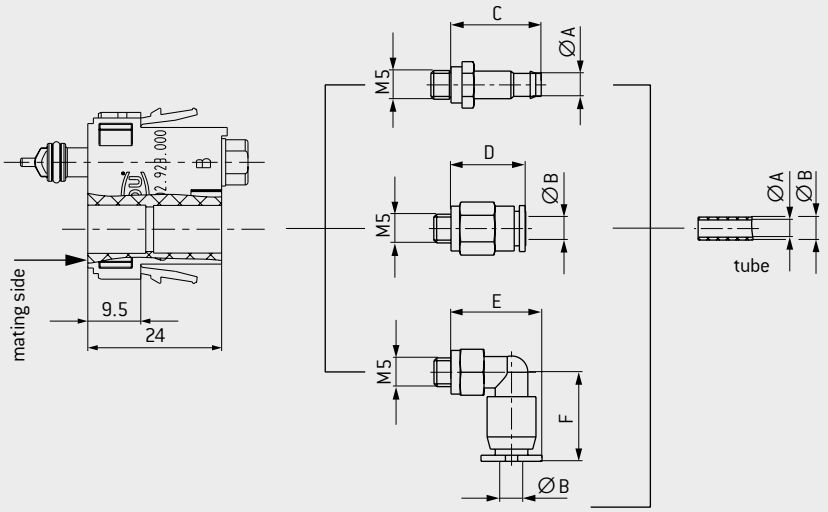
### TECHNICAL DATA

**Mechanical data**

| | |
|---|---|
| Permissible operating pressure (static) | 0.95–14 bar |
| Operating temperature for Push-in | –10 °C to +80 °C |
| Thread termination | M5 |

| Description | Part number | Dim. A Inner-∅ of tube mm | Dim. B Outer-∅ of tube mm | Dim. C mm | Dim. D mm | Dim. E mm | Dim. F mm |
|---|---|---|---|---|---|---|---|
| | | | | incl. sealing washer | | | |
| Plug nipple | 945.000.001.000.123 | 2 | | 10.2 | | | |
| Plug nipple | 945.000.001.000.136 | 3 | | 14.2 | | | |
| Plug nipple | 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 |

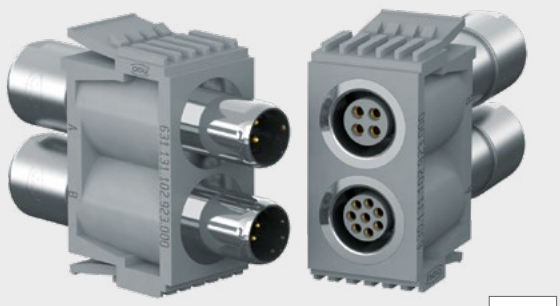
## TERMINATION DIMENSIONS ACCESSORIES PNEUMATIC VALVES



# MODULE FOR MULTI-POSITION SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR

Size 1 (e.g., for use in bus systems), 2 feedthroughs

## SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR



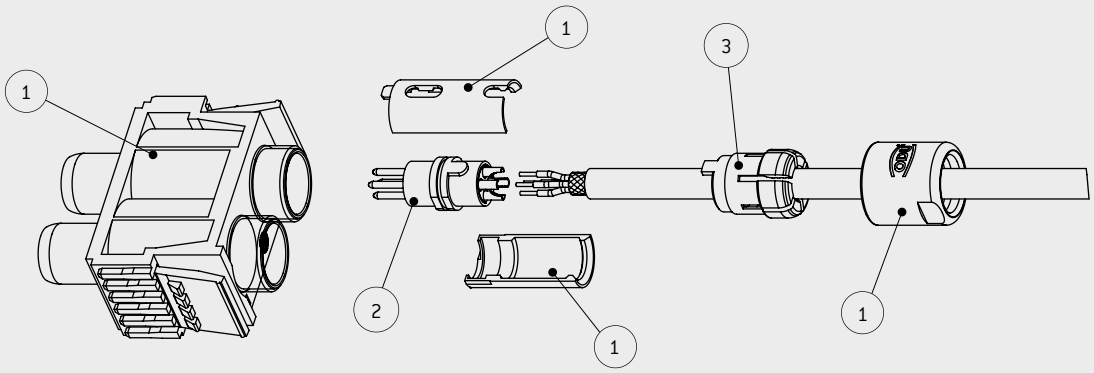
6 Units

Mating cycles: min. 10,000
CAT 5[1], USB® 2.0[1]
2 to 14 contacts

### TECHNICAL NOTES

- The inserts listed here for shielded feedthroughs/ high-speed connectors are ideal for all common bus systems with transfer rates up to 10.0 MHz, e.g., Profibus®[1], RS485, FlexRay®[1], CAN-Bus[1], and RS232.
- Selected inserts are suitable and qualified for data rates up to 1 Gbit/s, e.g., Gigabit-Ethernet[1], Fast-Ethernet[1], IEEE 1394, USB® 2.0[1], FireWire® S400[1] (on request).

## HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



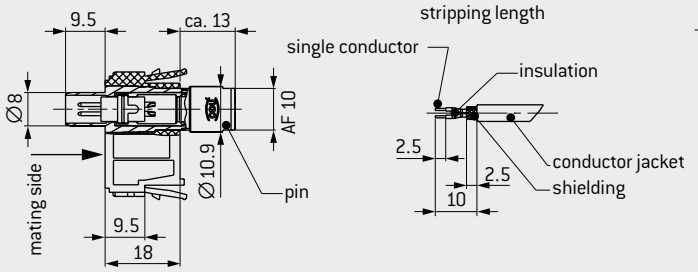

| Order | Base parts | Part number |
|---|---|---|
| 1 | Insulator socket incl. socket housing | 630.131.102.923.000 |
| 1 | Insulator pin incl. connector housing | 631.131.102.923.000 |
| 2 | Insert cpl. solder contacts[2] | See next page |
| 3 | Assembly set | See table on the right |

### ASSEMBLY SET

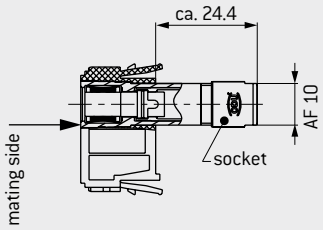
| Cable-∅ mm | Part number |
|---|---|
| 1.5 to 2.1 | 751.020.188.304.022 |
| 2 to 3.2 | 751.020.188.304.032 |
| 3 to 4.2 | 751.020.188.304.042 |
| 4 to 5.2 | 751.020.188.304.052 |
| 5 to 6.2 | 751.020.188.304.062 |
| 6 to 7.2 | 751.020.188.304.072 |
| 7 to 7.7 | 751.020.188.304.077 |

[1] Concerning data transmission protocols, please note page 2. [2] Insert for crimp contacts on request

## INSULATOR PIN

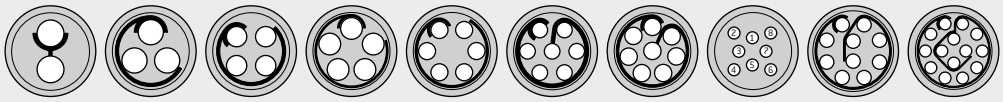



## INSULATOR SOCKET




For use in a housing, check the necessary space requirements

## CONTACT ARRANGEMENTS



2 contacts | 3 contacts | 4 contacts CAT 5[1] USB® 2.0[1] | 5 contacts | 6 contacts | 7 contacts | 8 contacts | 8 contacts CAT 5[1] | 10 contacts USB® 3.1 Gen1[1] | 14 contacts

| Number of contacts | Contact-Ø mm | Termination cross-section AWG | Rated voltage[2] V | Rated surge voltage[2] kV | Pollution degree[2] | Nominal voltage[3] V AC | Model | Category[4] | Insert cpl.[5] part number | Total mating force N | Total sliding force N |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **INSERT WITH ODU TURNTAC® (MATING CYCLES MIN. 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[1] | 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[1] | 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[1] | 701.841.724.408.D00 | 13 | 10 |
| | | | | | | | 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 | | |
| 10 | 6 × 0.3<br>4 × 0.5 | 28<br>24 | 10 | 1.2 | 2 | 100 | Pin | USB® 3.1 Gen1[1] | 701.831.724.410.D00 | 16 | 12 |
| | | | | | | | Socket | | 701.731.724.410.D00 | | |
| 14 | 0.5 | 28 | 25 | 1.5 | 2 | 300 | Pin | | 701.841.724.014.400 | 15 | 12 |
| | | | | | | | Socket | | 701.741.724.014.200 | | |

If required, selected inserts with 60,000 mating cycles (ODU SPRINGTAC®) available on request

[1] Concerning data transmission protocols, please note page 2. [2] According to IEC 60664-1:2007 (VDE 0110-1:2008), see page 165
[3] According to EIA-364-20F:2009 [4] Classification according to ISO/IEC 11801:2017-1 [5] Insert for crimp version on request

# MODULE FOR MULTI-POSITION SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR

Size 1 (e.g., for use in bus systems), 1 feedthrough

## SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR

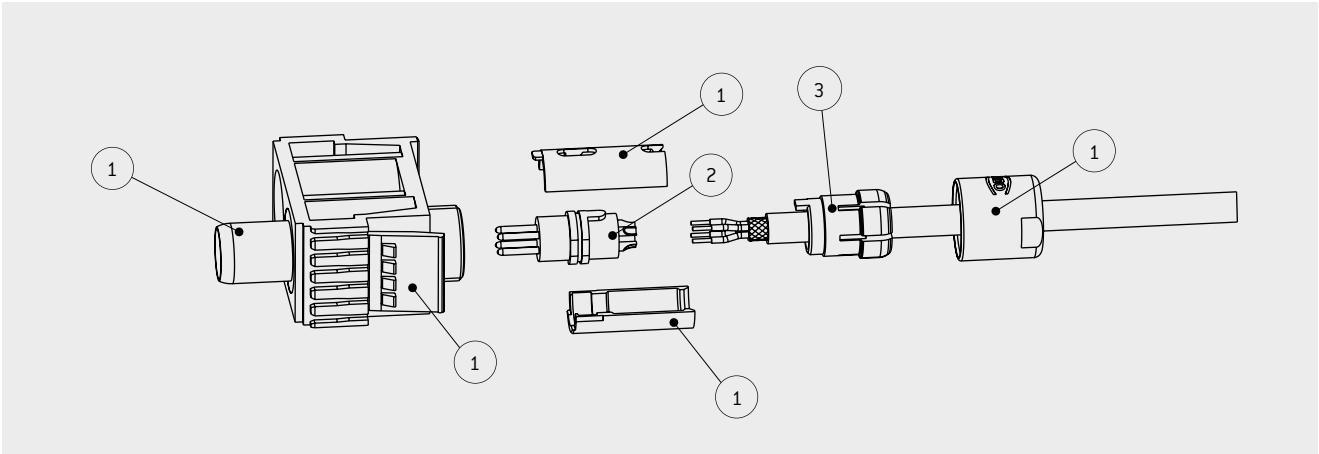



Mating cycles: min. 10,000
CAT 5[1], USB® 2.0[1]
2 to 14 contacts

### TECHNICAL NOTES

- The inserts listed here for shielded feedthroughs/high-speed connectors are ideal for all common bus systems with transfer rates up to 10.0 MHz, e.g., Profibus®[1], RS485, FlexRay®[1], CAN-Bus[1], and RS232.
- Selected inserts are suitable and qualified for data rates up to 1 Gbit/s, e.g., Gigabit-Ethernet[1], Fast-Ethernet[1], IEEE 1394, USB® 2.0[1], FireWire® S400[1] (on request).

## HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



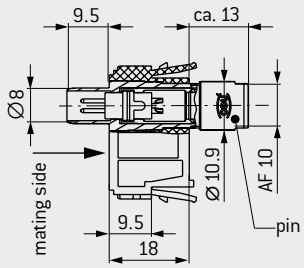

| Order | Base parts | Part number |
|---|---|---|
| 1 | Insulator socket<br>incl. socket housing | 630.131.101.923.000 |
| 1 | Insulator pin<br>incl. connector housing | 631.131.101.923.000 |
| 2 | Insert cpl. solder contacts[2] | See next page |
| 3 | Assembly set | See table on the right |
| | Dummy contact | 021.341.204.946.000 |

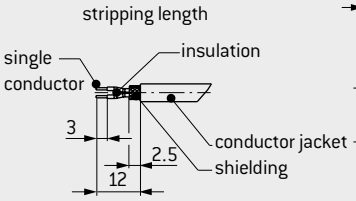
### ASSEMBLY SET

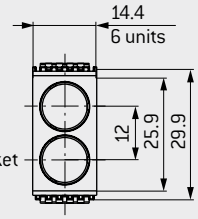
| Cable-∅<br>mm | Part number |
|---|---|
| 1.5 to 2.1 | 751.020.188.304.022 |
| 2 to 3.2 | 751.020.188.304.032 |
| 3 to 4.2 | 751.020.188.304.042 |
| 4 to 5.2 | 751.020.188.304.052 |
| 5 to 6.2 | 751.020.188.304.062 |
| 6 to 7.2 | 751.020.188.304.072 |
| 7 to 7.7 | 751.020.188.304.077 |

[1] Concerning data transmission protocols, please note page 2. [2] Insert for crimp contacts on request

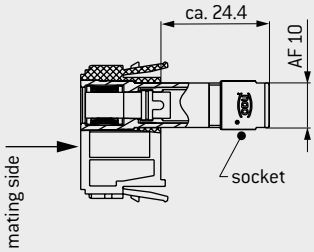
## INSULATOR PIN



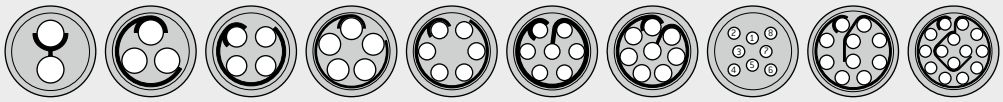




## INSULATOR SOCKET




For use in a housing, check the necessary space requirements

## CONTACT ARRANGEMENTS



2 contacts | 3 contacts | 4 contacts CAT 5[1] USB® 2.0[1] | 5 contacts | 6 contacts | 7 contacts | 8 contacts | 8 contacts CAT 5[1] | 10 contacts USB® 3.1 Gen1[1] | 14 contacts

| Number of contacts | Contact-Ø mm | Termination cross-section AWG | Rated voltage[2] V | Rated surge voltage[2] kV | Pollution degree[2] | Nominal voltage[3] V AC | Model | Category[4] | Insert cpl.[5] part number | Total mating force N | Total sliding force N |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **INSERT WITH ODU TURNTAC® (MATING CYCLES MIN. 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[1] | 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[1] | 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[1] | 701.841.724.408.D00 | 13 | 10 |
| | | | | | | | 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 | | |
| 10 | 6 × 0.3<br>4 × 0.5 | 28<br>24 | 10 | 1.2 | 2 | 100 | Pin | USB® 3.1 Gen1[1] | 701.831.724.410.D00 | 16 | 12 |
| | | | | | | | Socket | | 701.731.724.410.D00 | | |
| 14 | 0.5 | 28 | 25 | 1.5 | 2 | 300 | Pin | | 701.841.724.014.400 | 15 | 12 |
| | | | | | | | Socket | | 701.741.724.014.200 | | |

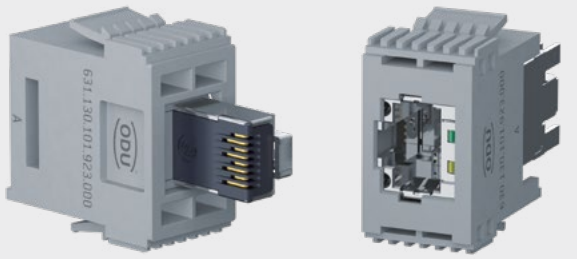
If required, selected inserts with 60,000 mating cycles (ODU SPRINGTAC®) available on request

[1] Concerning data transmission protocols, please note page 2. [2] According to IEC 60664-1:2007 (VDE 0110-1:2008), see page 165
[3] According to EIA-364-20F:2009 [4] Classification according to ISO/IEC 11801:2017-1 [5] Insert for crimp version on request

# MODULE FOR INDUSTRIAL ETHERNET[1] RJ45 / 10 GBIT/S

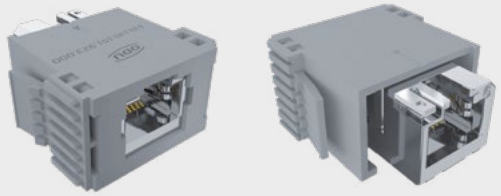
STEADYTEC® Technology

## HIGH-SPEED CONNECTOR

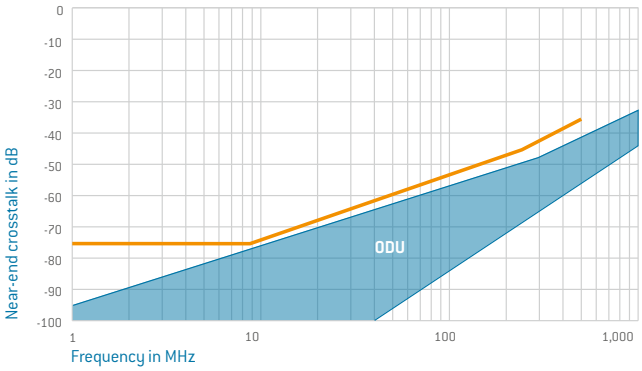


7 Units

## COUPLING FOR RJ45 CONNECTION ON THE SOCKET SIDE



## NEXT




## Mating cycles: min. 5,000
## TIAA/TIAB/Profinet®[1]/CAT 5[1]/CAT $6_A$[1]
## 8 contacts

### TECHNICAL NOTES

- Data transmission
- This module is suitable for transmitting data according to CAT $6_A$[1] TIA/EIA-568-B.2-10 ISO/IEC 11801:2007. Suitable for the transmission of 10 Gbit/s according to IEEE 802.3.
- 8-way RJ45 field connector and RJ45 connector insert CAT $6_A$[1] (assembly w/o special tools) for stranded and solid wire cables
- Improved vibration and shock resistance by, for example, using 4 springs at the shrouds in the RJ45 socket of the RJ45 module CAT $6_A$[1] and RJ45 coupling CAT $6_A$[1]
- Multi-port capable

### TECHNICAL DATA

| | |
|---|---|
| Contact resistance | < 20 mΩ |
| Insulation resistance | > 500 MΩ |
| Mating cycles | min. 5,000 |

**Dielectric strength**

| | |
|---|---|
| Contact – contact | > 1,000 V, DC |
| Contact – shield | > 1,500 V, DC |
| Current-carrying capacity | 1 A |

**Transfer impedance**

| | |
|---|---|
| at 1 MHz | < 100 mΩ |
| at 10 MHz | < 200 mΩ |
| at 80 MHz | < 1,600 mΩ |

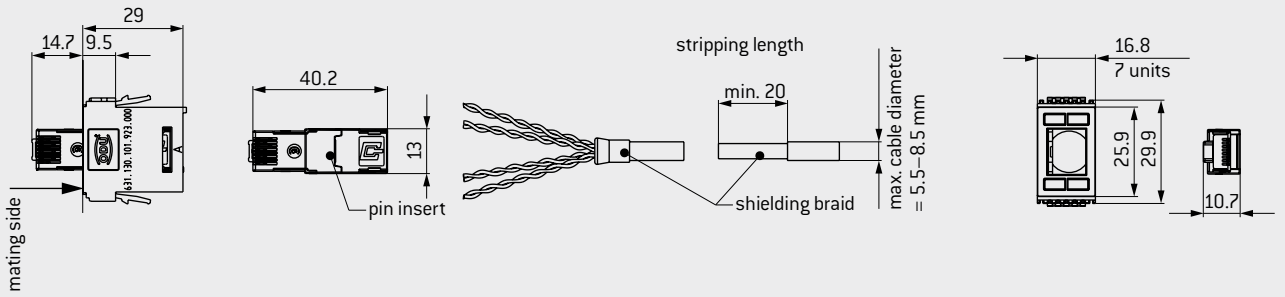
**Materials**

| | |
|---|---|
| Surface | Sn |

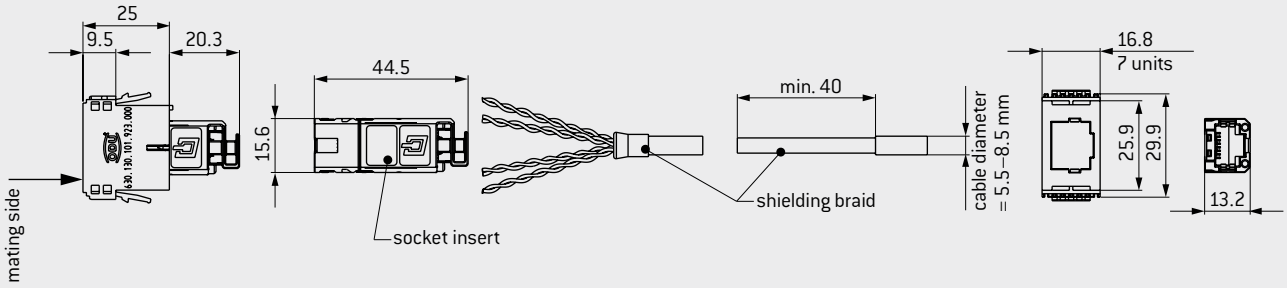
**Temperature range** –40 °C to +70 °C

[1] Concerning data transmission protocols, please note page 2.

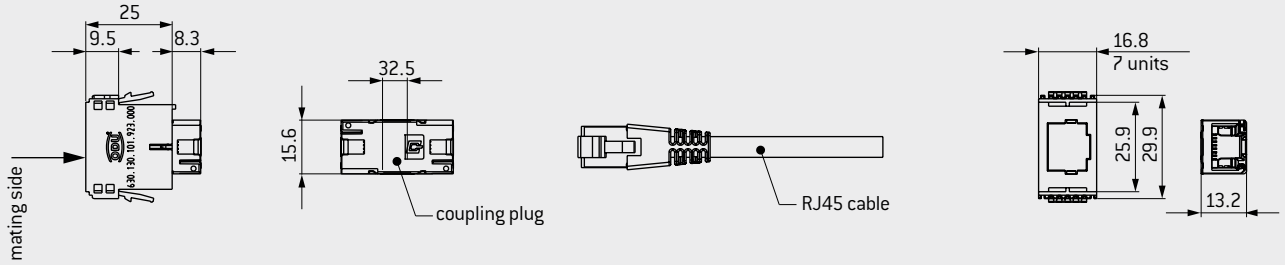
## INSULATOR PIN




## INSULATOR SOCKET




## COUPLING




Module protection of the Ethernet[1] insert not ensured by means of guiding pins alone.
For use in a housing, check the necessary space requirements

| Multi-position module | Part number |
|---|---|
| Insulator socket | 630.130.101.923.000 |
| Insulator pin | 631.130.101.923.000 |

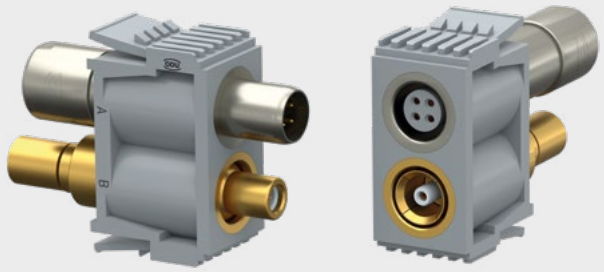
| Description | Part number | Category | Termination<br>AWG / mm |
|---|---|---|---|
| Coupling for RJ45 | 923.000.005.000.145 | | RJ45, 8 contacts |
| Socket insert | 923.000.005.000.146 | TIA A | 22–26 |
| Socket insert | 923.000.005.000.147 | TIA B | 22–26 |
| Socket insert | 923.000.005.000.148 | Profinet®[1] | 22–26 |
| Connector insert | 923.000.005.000.149 | TIAA / TIAB / Profinet®[1] | 22–26 |

[1] Concerning data transmission protocols, please note page 2.

# COMBINATION MODULE FOR HIGH-SPEED AND COAX 50 Ω/75 Ω

Size 1

## COMBINATION MODULE



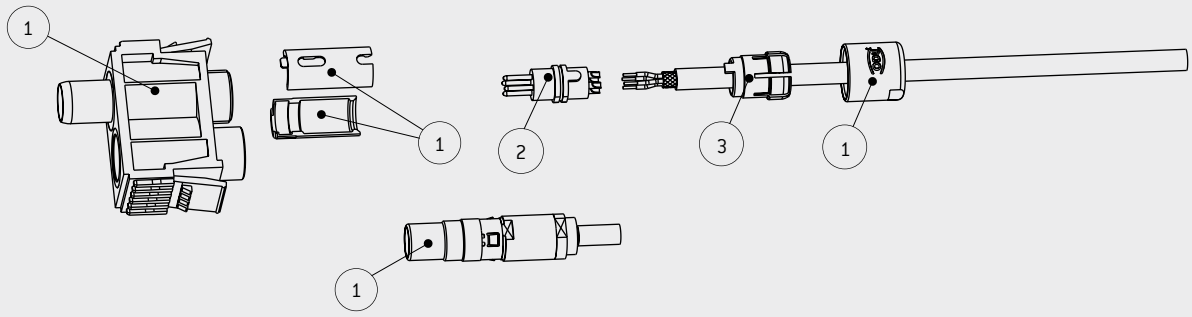
6 Units

Mating cycles: min. 10,000
Frequency range: 0–4 GHz
USB® 2.0[1], USB® 3.1 Gen1[1], FireWire®[1], Ethernet[1]

### TECHNICAL NOTES

- Note for high-speed module, see page 138–141
- For crimp information for coax modules, see from page 154

## HOW TO CONFIGURE YOUR COMBINATION MODULE



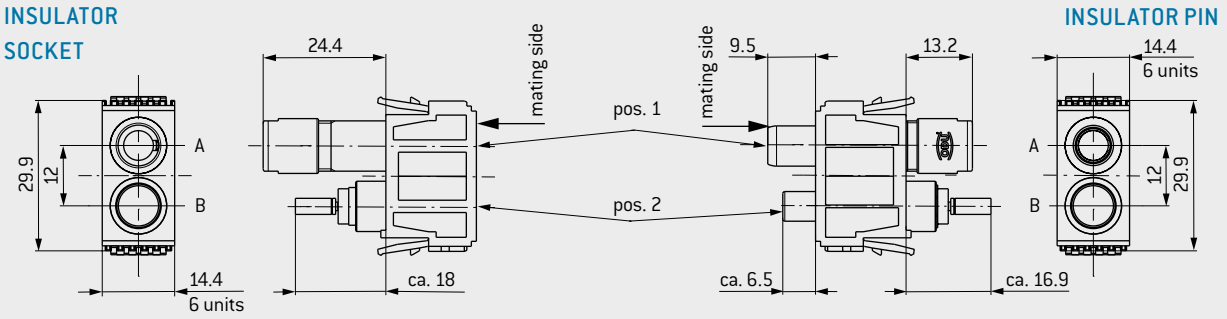

| Order | Base parts | Part number |
|---|---|---|
| 1 | Insulator incl. housing and coax contact 50 Ω/75 Ω | See next page |
| 2 | Insert for shielded feedthrough cpl. solder contacts[2] | See page 138–141 |
| 3 | Assembly set | See table on the right |

### 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 |

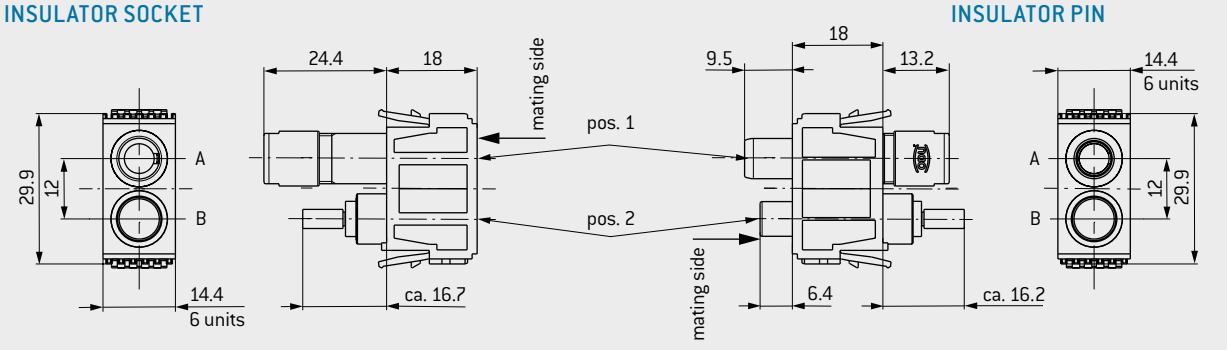
[1] Concerning data transmission protocols, please note page 2. [2] Insert for crimp contacts on request

## COAX 50 Ω




| Description | Part number | Characteristic impedance Ω | Frequency range GHz | Cable[1] | Cable termination[2] A | B | C | D | Part number Crimp dies |
|---|---|---|---|---|---|---|---|---|---|
| Socket side | 630.131.102.923.321 | 50 | 0.2 | RG 179, RG 196 | 1.1 | 1.7 | 2.25 | 3.2 | 082.000.039.101.000 |
| Pin side | 631.131.102.923.321 | | | | | | | | |
| Socket side | 630.131.102.923.322 | 50 | 0.4 | RG 174, RG 188, RG 316 | 1.75 | 2.7 | 3.2 | 3.8 | 082.000.039.102.000 |
| Pin side | 631.131.102.923.322 | | | | | | | | |
| Socket side | 630.131.102.923.323 | 50 | 3.5 | RG 58 | 3.15 | 4.5 | 5.2 | 6.15 | 082.000.039.106.000 |
| Pin side | 631.131.102.923.323 | | | | | | | | |
| Socket side | 630.131.102.923.325 | 50 | 4 | RG 223 | 3.15 | 4.5 | 5.9 | 6.75 | 082.000.039.108.000 |
| Pin side | 631.131.102.923.325 | | | | | | | | |

## COAX 75 Ω



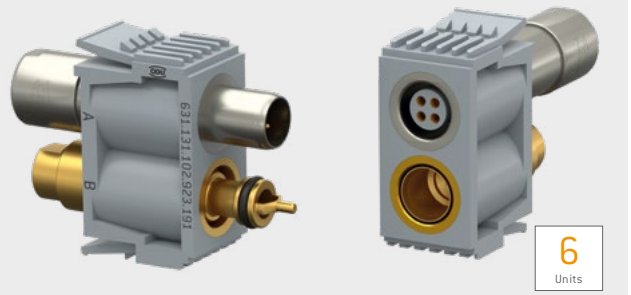

| Description | Part number | Characteristic impedance Ω | Frequency range GHz | Cable[1] | Cable termination[3] A | B | C | D | Part number Crimp dies |
|---|---|---|---|---|---|---|---|---|---|
| Socket side | 630.131.102.923.311 | 75 | 1.2 | RG 179, RG 187 | 1.75 | 2.7 | 3.2 | 3.8 | 082.000.039.102.001 |
| Pin contact | 631.131.102.923.311 | | | | | | | | |
| Socket contact | 630.131.102.923.312 | 75 | 2.7 | RG 59 | 4 | 5.4 | 6.3 | 7.2 | 082.000.039.109.000 |
| Pin contact | 631.131.102.923.312 | | | | | | | | |

[1]Special line on request [2]See page 125 [3]See page 129

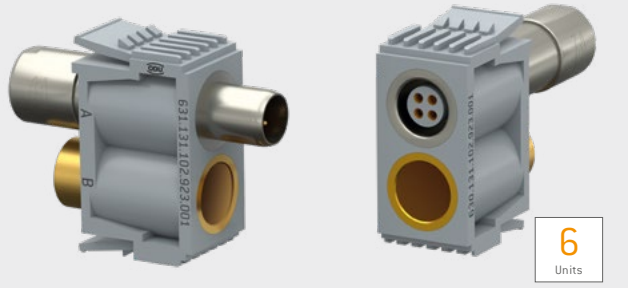
# COMBINATION MODULE FOR HIGH-SPEED AND COMPRESSED AIR/EASILY INTERCHANGEABLE

Size 1

## COMBINATION MODULE FOR HIGH-SPEED AND COMPRESSED AIR




## COMBINATION MODULE CAN BE EASILY INTERCHANGEABLE




**Mating cycles[1]: min. 10,000**
**USB® 2.0[2], USB® 3.1 Gen1[2], FireWire®[2], Ethernet[2]**
**12 bar or 0–4 GHz**

### TECHNICAL NOTES

- Note for high-speed module, see page 138–141

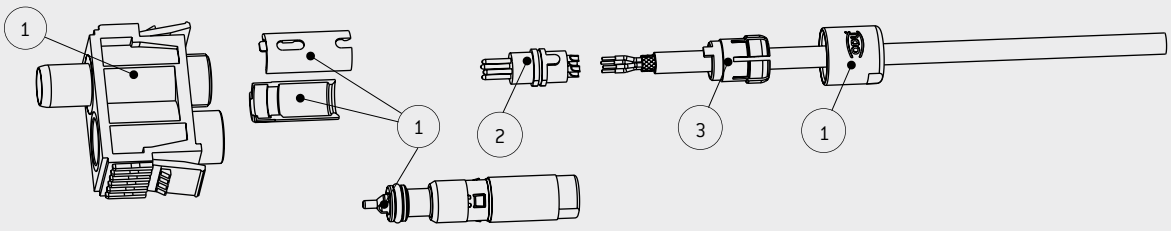
### COMBINATION MODULE FOR HIGH-SPEED AND COMPRESSED AIR

- The function dictates that contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Vacuum modules and further termination types on request
- No $O_2$ model[3]
- Termination accessories, see page 136

### COMBINATION MODULE CAN BE EASILY INTERCHANGEABLE

- Can be retrofitted with 50 Ω coax contact, see page 124–125
- Can be retrofitted with 75 Ω coax contact, see page 128–129
- Can be retrofitted with compressed air, see page 130–131

## HOW TO CONFIGURE YOUR COMBINATION MODULE FOR HIGH-SPEED AND COMPRESSED AIR




| Order | Base parts | Part number |
|---|---|---|
| 1 | Insulator incl. housing and compressed air/easily interchangeable | See next page |
| 2 | Insert for shielded feedthrough cpl. solder contacts[4] | See page 138–141 |
| 3 | Assembly set | See table on the right |

### ASSEMBLY SET

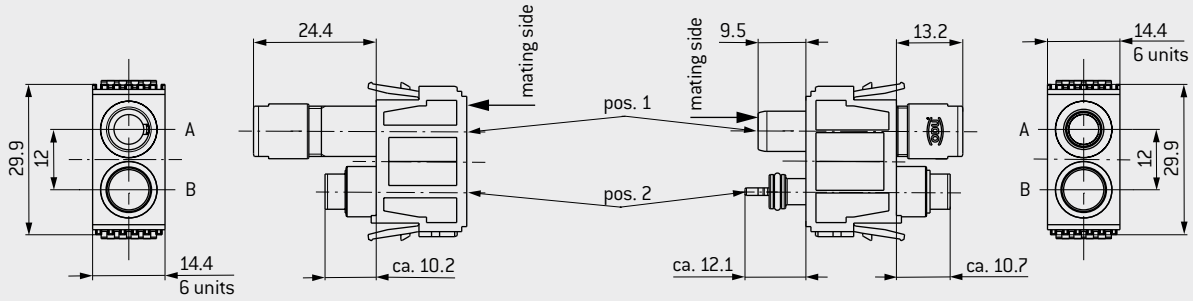
| Cable-∅ mm | Part number |
|---|---|
| 1.5 to 2.1 | 751.020.188.304.022 |
| 2 to 3.2 | 751.020.188.304.032 |
| 3 to 4.2 | 751.020.188.304.042 |
| 4 to 5.2 | 751.020.188.304.052 |
| 5 to 6.2 | 751.020.188.304.062 |
| 6 to 7.2 | 751.020.188.304.072 |
| 7 to 7.7 | 751.020.188.304.077 |

[1] The stated mating cycles for compressed air module are possible via regualr maintaince intervals [2] Concerning data transmission protocols, please note page 2.
[3] Not suitable for mixtures with over 25% oxygen content or explosive gases. [4] Insert for crimp contacts on request

## COMBINATION MODULE FOR HIGH-SPEED AND COMPRESSED AIR

### INSULATOR SOCKET

### INSULATOR PIN

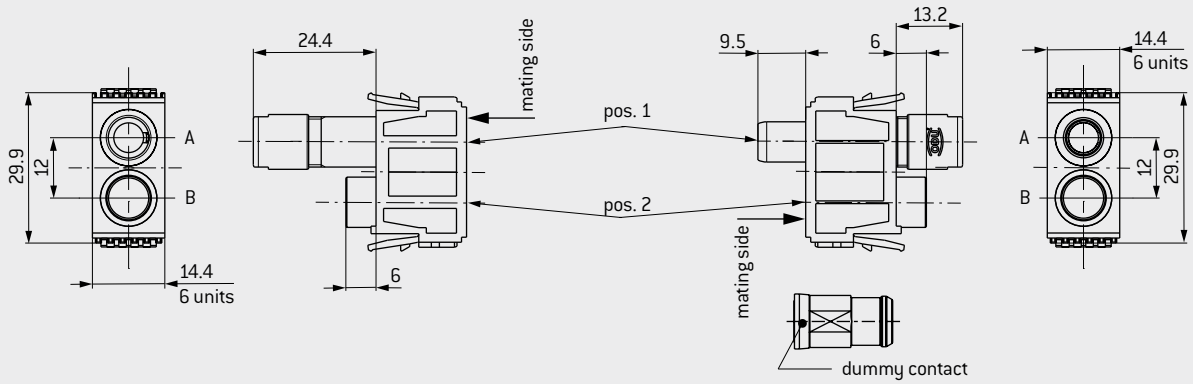



| Description | Part number | Termination |
|---|---|---|
| Socket side (non shut-off) | 630.131.102.923.191 | M5 |
| Pin side (non shut-off) | 631.131.102.923.191 | |
| Socket side (shut-off) | 630.131.102.923.192 | |

## COMBINATION MODULE CAN BE EASILY INTERCHANGEABLE

### INSULATOR SOCKET

### INSULATOR PIN




Recommended dummy contact disassembling tools:
∅5 mm – 7 mm

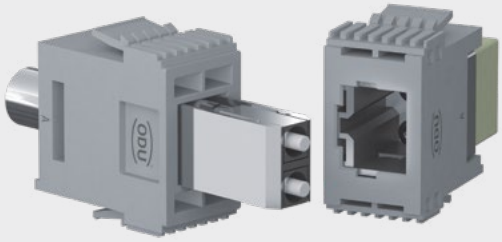
| Description | Part number |
|---|---|
| Socket side | 630.131.102.923.001 |
| Pin side | 631.131.102.923.001 |
| Dummy contact | 021.341.204.946.000 |

# MODULE 2 CONTACTS FOR GLASS-FIBER CONTACTS GOF

On request

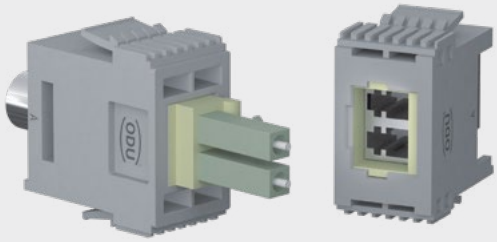
FIBER OPTIC

## INSERT SC



7 Units

## INSERT LC



7 Units

## Ferrule
## Single mode (SM)/multi mode (MM)
## Mating cycles[1]: min. 10,000

### TECHNICAL NOTES

- The function dictates that contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Please note that the polished surface of the contact must not be touched. When in an unmated condition, the contact must also be protected from dust and dirt.

### TECHNICAL DATA

| | |
|---|---|
| Mating cycles[1] | min. 10,000 |

### INSERTS SC

| | |
|---|---|
| Ferrule | zirconia<br>SM: 125.5 µm + 1 µm<br>MM: 127 µm + 4 µm |
| **Optical features** | |
| Insertion loss | SM: max. 0.5 dB<br>MM: max. 0.4 dB |
| Return loss | SM: min. 40 dB<br>MM: min. 30 dB |
| Temperature range | –40 °C to +70 °C |
| Cable outer diameter | 5 mm to 8 mm |

### INSERTS LC

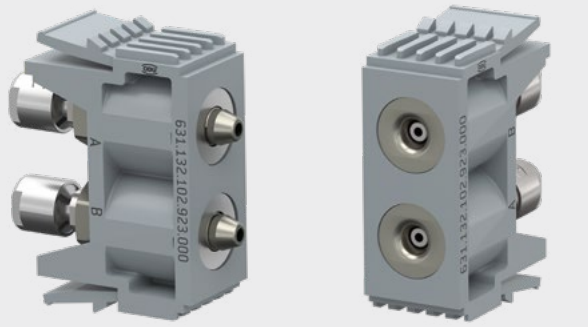
| | |
|---|---|
| Ferrule | zirconia<br>SM: 125.5 µm + 1 µm<br>MM: 127 µm +4 µm |
| **Optical features** | |
| Insertion loss | SM: max. 0.5 dB<br>MM: max. 0.4 dB |
| Return loss | SM: min. 40 dB<br>MM: min. 30 dB |
| Temperature range | –40 °C to + 70 °C |
| Cable outer diameter | 5 mm to 8 mm |

[1] The stated mating cycles are possible if regular maintenance intervals are observed

# MODULE 2 CONTACTS FOR PLASTIC FIBER POF/MOST

On request

FIBER OPTIC




5 Units

## Ferrule
## Mating cycles: min. 10,000
## Type of plastic fiber: POF/MOST

### TECHNICAL NOTES

- The function dictates that contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.

### 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 |
| Over entire service life | < 2 dB at 670 Nm |
| Total mating force (average) | 16.0 N |
| Operating temperature (depending on fiber) | |
| Standard fiber | –40 °C to +85 °C |
| High-temperature fiber | –40 °C to +115 °C |
| Mating cycles | min. 10,000 |

#### Materials

| | |
|---|---|
| Insulator | thermoplastic acc. to UL94<br>glass-fiber reinforced<br>acc. to UL 94 |
| Fiber-optic contact | Cu alloy |
| Type of fiber | plastic fiber<br>980/1.000 (POF)<br>or 980/1.550 (MOST) |

# BLANK MODULES

## BLANK MODULES



Used to fill incomplete frames.
The frames must be fully equipped with insulators or blank modules.

### TECHNICAL DATA

| | |
|---|---|
| Insulator | thermoplastic acc. to UL 94 |



1 Unit
2.4 mm



3 Units
7.2 mm



5 Units
12 mm

| Units | Part number |
|---|---|
| 1 | 631.151.000.923.000 |
| 3 | 631.153.000.923.000 |
| 5 | 631.155.000.923.000 |

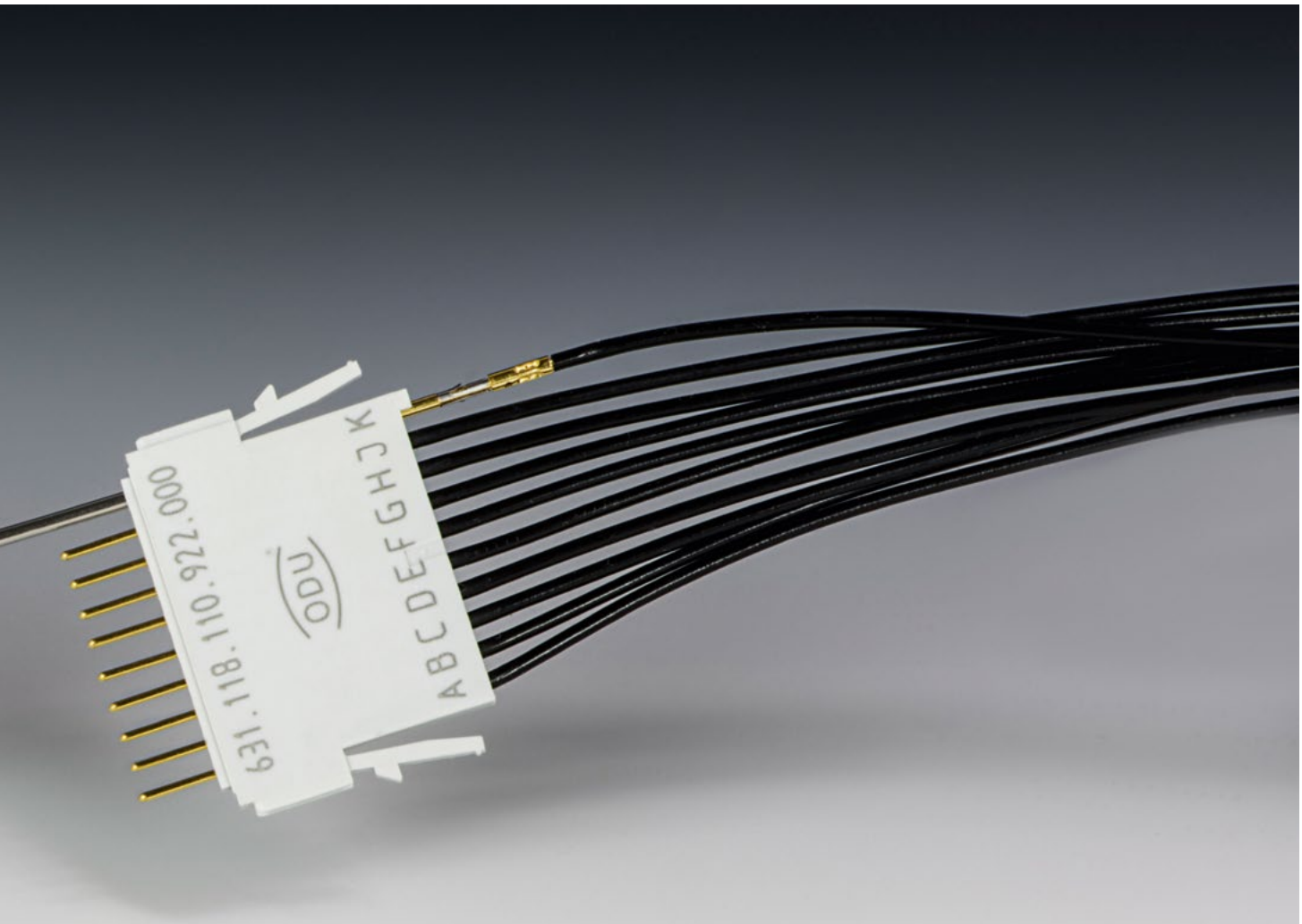
# FOR YOUR NOTES






# ODU-MAC®

Table of contents




# TOOLS

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Crimping tools ..... 155
Tensile strength diagram for crimp terminations ..... 156
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# TERMINATION TECHNOLOGY

ODU offers three different termination technologies for the single contacts:

- Crimp
- Solder
- PCB

## CRIMP TERMINATION

The contact processing for the production of connecting cables via crimping creates a secure, durable, and corrosion-free contact. 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-proof, and with a tensile strength befitting the conductor material.

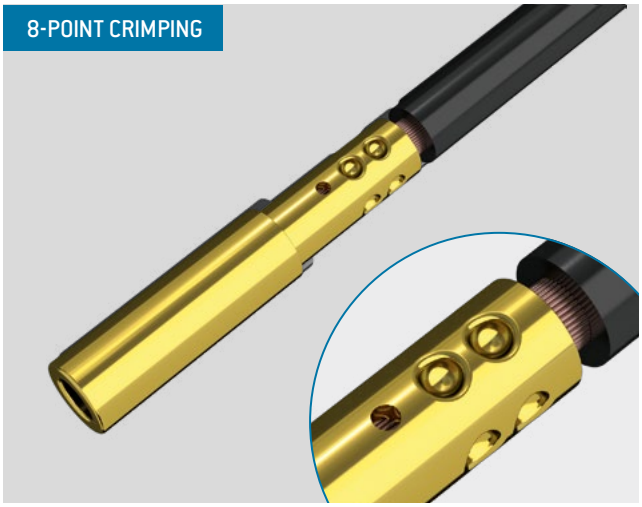
Crimping can be carried out on the tiniest of crosssections as well as on larger crosssections. For small crosssections (0.14–2.5 mm²), 8-point crimping tools are used; hexagonal crimping tools are used for larger crosssections. The corner measurement of the crimping is never larger than the original 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 cable cross-section, 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 157.

## 8-POINT CRIMPING TOOL FOR CONDUCTOR CONNECTIONS FROM 0.08 TO 1 mm²



With user-friendly digital display
PART NUMBER: 080.000.051.000.000

POSITIONER FOR CONTACT DIAMETER FROM 0.7 TO 2 mm
PART NUMBER: 080.000.051.101.000
Has to be ordered separately

## 8-POINT CRIMPING TOOL FOR CONDUCTOR CONNECTIONS FROM 1.5 TO 2.5 mm²



With user-friendly digital display
PART NUMBER: 080.000.057.000.000

POSITIONER FOR CONTACT DIAMETER FROM 2 TO 3.5 mm
PART NUMBER: 080.000.057.101.000
Has to be ordered separately

## HEXAGONAL CRIMPING TOOL FOR CROSSSECTIONS (AWG 12) FROM 4 TO 6 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 dies.

CRIMPING JAWS FOR CONTACT DIAMETER FROM 5 TO 8 mm SEE PAGE 157.
Has to be ordered separately

## HEXAGONAL CRIMPING TOOL FOR COAX CONTACTS



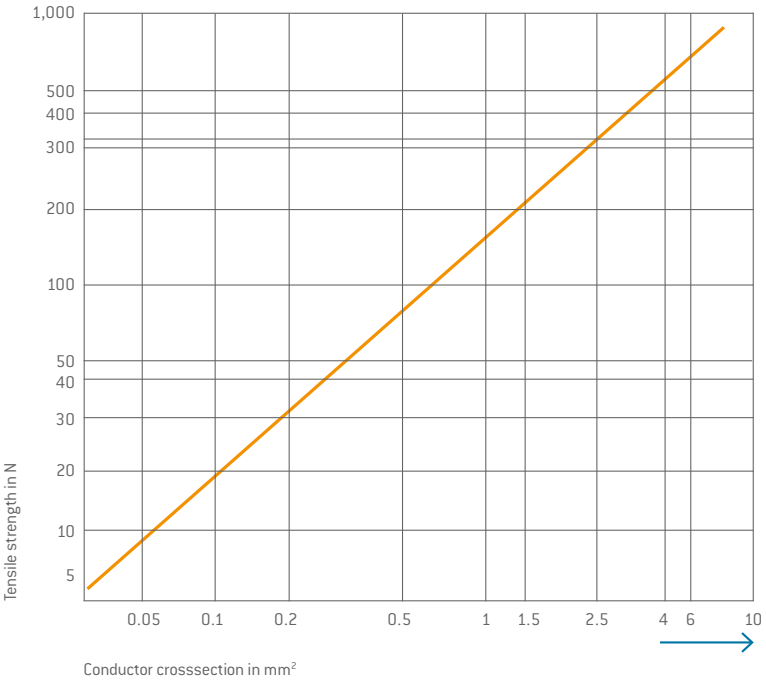
With blocking system
PART NUMBER PLIER: 080.000.039.000.000

CRIMPING JAWS SEE PAGE 157.
Has to be ordered separately

# TENSILE STRENGTH FOR CRIMP TERMINATIONS

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

Tensile strength diagram of a crimp termination depending on the conductor crosssection 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.



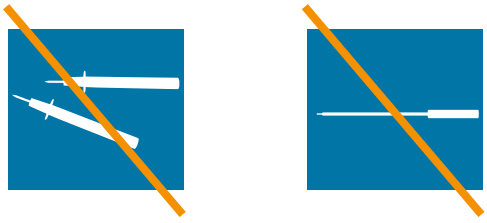

### NOTE

Internal standards and guidelines are used for crosssections (> 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 testing systems (e.g., test pin) or processing methods (e.g., test speed) following assembly 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 -Ø mm | Termination crosssection AWG 7 wire 19 wire | Termination crosssection mm² Class 5 | Strip-ping length mm | 8-point crimping tool 080.000.051.000.000 without positioner<br>Positioner 080.000.051.101.000<br>Position/adjusting dimension | 8-point crimping tool 080.000.057.000.000 without positioner<br>Positioner 080.000.057.101.000<br>Position/adjusting dimension | Hexagonal crimping tool 080.000.062.000.000 | Hexagonal crimping tool 080.000.064.000.000<br>Crimping jaws | Hexagonal crimping tool 080.000.039.000.000<br>Crimping jaws |
|---|---|---|---|---|---|---|---|---|
| 0.7 | 28 | 0.08 | 4$^{+0.5}$ | 0.60 / 9 | | | | |
| | 26 | | | 9 / 0.62 | | | | |
| | 24 | | | | | | | |
| | 22 | | | | | | | |
| | | 0.14 | | | | | | |
| | | 0.25 | | | | | | |
| | | 0.38 | | | | | | |
| 1.3 | 20 | | 5$^{+0.5}$ | 10 / 0.92 | | | | |
| | 18 | | | | | | | |
| | | 0.5 | | | | | | |
| | | 0.75 | | | | | | |
| | | 1 | | 10 / 1.02 | | | | |
| 2 | 18 | | 6$^{+0.5}$ | 11 / 1.22 | | | | |
| | 16 | | | 11 / 1.27 | | | | |
| | 14 | | | | 3 / 1.67 | | | |
| | | 1 | | 11 / 1.22 | | | | |
| | | 1.5 | | | 3 / 1.27 | | | |
| | | 2.5 | | | 3 / 1.67 | | | |
| 3.5 | 14 | | 7$^{+0.5}$ | | 1[1], 2[2] / 1.67 | | | |
| | 12 | | | | | Profile no. 3 | | |
| | 10 | | | | | Profile no. 3 | | |
| | | 2.5 | | | 1[1], 2[2] / 1.67 | | | |
| | | 4 | | | | Profile no. 3 | | |
| | | 6 | | | | Profile no. 3 | | |
| 5 | | 10 | 10$^{+0.5}$ | | | | 080.000.064.110.000 | |
| | | 16 | | | | | 080.000.064.101.000 | |
| 8 | | 16 | 10$^{+0.5}$ | | | | 080.000.064.116.000 | |
| | | 25 | 18$^{+0.5}$ | | | | 080.000.064.125.000 | |

## COAX CRIMP INFORMATION

| | | Positioner 080.000.051.102.000<br>Position/adjusting dimension | | | | |
|---|---|---|---|---|---|---|
| RG 178 / RG 196 | See module description | 2/0.67[3]<br>1/0.57[4] | | | | 082.000.039.101.000 |
| RG 174 / RG 179 / RG 187 / RG 188 / RG 316 | | 2/0.67[3]<br>1/0.57[4] | | | | 082.000.039.102.000 |
| RG 58 | | 2/0.92[3] | | | | 082.000.039.106.000 |
| RG 223 | | 2/0.67 | | | | 082.000.039.108.000 |
| RG 59 | | 2/0.67[3] | | | | 082.000.039.109.000 |

[1] Pin [2] Socket [3] For contacts 122.131… & 122.132… [4] For contacts 122.133…

# ASSEMBLY AIDS



## 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.

| Description | Usage for | Part number | Nm | Recommended tightening torque |
|---|---|---|---|---|
| Torque wrench | | 598.054.001.000.000 | 0.9 | |
| Torque wrench | | 598.054.002.000.000 | 1.2 | |
| Torque wrench | | 598.054.006.000.000 | 2.2 | |
| Torque wrench | | 598.054.003.000.000 | 3 | |
| Bit combination slot size 2 | Coding socket (DIN frame) | 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 combination slot size 1 | Fastening screw on frames in a housing | 598.054.102.000.000 | | 1.2 Nm +/– 0.2 Nm |
| Phillips bit cross slot size 1 | Oval-head screw of grounding pin on frame | 598.054.106.000.000 | | 1.2 Nm +/– 0.2 Nm |
| Torx bit TX 10 | Screws of the securing bracket in the spindle locking and spare spindle knob | 598.054.104.000.000 | | 1.2 Nm +/– 0.2 Nm |
| Torx bit TX 20 | Screw for power contact 12 mm contact diameter | 598.054.105.000.000 | | 2.2 Nm +/– 0.2 Nm |
| Assembly tool back nut size 1 | Back nut for shielded feedthrough size 1 | 598.055.001.000.000 | | 0.9 Nm +/– 0.2 Nm |
| Bit for coded spindle, slot 3 × 0.5 mm | Assembly of the spindle coding | 598.054.109.000.000 | | 0.9 Nm +/– 0.2 Nm |

# REMOVAL TOOLS



### ASSEMBLY TOOL HIGH CURRENT CONTACT DIAMETER 8 mm

Required assembly tool for screwing and releasing the contacts, tightening torque: 2.7 Nm +/– 0.1 Nm

**PART NUMBER: 087.611.002.001.000**



### REMOVAL TOOL FOR CONTACTS DIAMETER 0.7 mm

The contact is removed from the front, in the case of already assembled contacts, the cable does not have to be disconnected.

**PART NUMBER: 087.7CC.070.005.000**



### REMOVAL TOOL FOR CONTACTS DIAMETER 1.3 TO 5 mm

The contact is removed from the front, in the case of already assembled contacts, the cable does **not** have to be disconnected.

| Contact-∅ mm | Part number |
|---|---|
| 1.3 | 087.7CC.130.004.000 |
| 2 | 087.7CC.200.003.000 |
| 3.5 | 087.7CC.350.001.000 |
| 5 | 087.7CC.680.001.000 |



### REMOVAL TOOL FOR COAX AND COMPRESSED-AIR CONTACTS

The contact is removed from the front, in the case of already assembled contacts, the cable does **not** have to be disconnected.

| Contact | Part number |
|---|---|
| Coax 4 contacts | 087.7CC.310.001.000 |
| Coax 2 contacts | 087.7CC.690.001.000 |
| Compressed air | 087.7CC.680.001.000 |

## REMOVAL AND ASSEMBLY OF CONTACTS IS ONLY POSSIBLE WITH ODU TOOLS

# REMOVAL OF CONTACTS



## REMOVAL OF THE ASSEMBLED CONTACT

Use the conductor to push the contact to be removed to the front from behind, in order to make unlocking easier. The removal tool is pushed from the front over the contact and into the insulator until there is an audible click. By lightly pulling on the cable, the contact can be pulled from the rear of the insulator. The ODU-MAC® Blue-Line has the advantage that the contacts can also be clipped out of the module in an assembled condition without separation of the assembly.

## REMOVAL OF CONTACTS IS ONLY POSSIBLE WITH ODU TOOLS

# SERVICE KIT 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 minimized and the mating and demating 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 service kit for this purpose, so that lubrication can be carried out directly on site. A cleaning brush and a special cleaning cloth, as well as precise instructions, allow for optimal care of the contacts. In the absence of other specifications, the service kit can be used for all ODU contacts and connections.

## PART NUMBER: 170.000.000.000.100

For technical properties of the service kit, please refer to our website: www.odu-connectors.com/downloads

## CLEANING INFORMATION

Service manual 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 must no longer be used if 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%



# ODU-MAC®

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# TECHNICAL INFORMATION


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# INTERNATIONAL PROTECTION CLASSES

## According to IEC 60529:2013 (VDE 0470-1:2014)

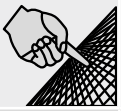
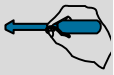
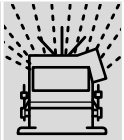
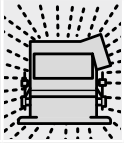
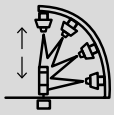
| Code letters (International Protection) | First code number (degrees of protection against access to hazardous parts or against solid foreign objects) | | | Second code number (degrees of protection against water) | | | |
|---|---|---|---|---|---|---|---|
| IP | 6 | | | 5 | | | |
| Code number | Protection 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 **diameter** ≥ 50 mm | 1 | Protection against dripping water |  | Protection against vertically falling water drops |
| 2 | Protection against medium-sized foreign objects |  | Protection against contact with the fingers/protection against solid foreign objects **diameter** ≥ 12.5 mm | 2 | Protection against water dripping at an angle |  | Protection against water drops falling at an angle (any angle up to 15° either side of the vertical) |
| 3 | Protection against small foreign objects |  | Protection against contact with tools/protection against solid foreign objects **diameter** ≥ 2.5 mm | 3 | Protection against spray water |  | Protection against spray water (any angle up to 60° either side of the vertical) |
| 4 | Protection against granular foreign objects |  | Protection against contact with a wire/protection against solid foreign objects **diameter** ≥ 1 mm | 4 | Protection against splashing water |  | Protection against splashing water from any direction |
| 5 | Dustproof |  | Protection against contact with a wire/protection against uncontrolled ingress of dust | 5 | Protection against water jet |  | Protection against water jet from any direction |
| 6 | Dustproof |  | Protection against contact with a wire/complete protection against ingress of dust | 6 | Protection against powerful water jet |  | Protection against powerful water jet from any direction |
| | | | | 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 water jet featuring high temperatures |  | Protection against water from all directions characterized by high pressure and high temperatures |



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# EXPLANATIONS AND DETAILS OF SAFETY REQUIREMENTS, INSPECTIONS, AND VOLTAGE DATA

## GENERAL

All the technical information listed in this catalog and the data sheets has been determined by drawing on various standards. Unless otherwise stated, standard IEC 61984:2008 (VDE 0627: 2009) "Connectors – Safety requirements and tests" has been used to dimension and determine the values provided.

This international standard applies to connectors (with rated voltages of 50 V to 1,000 V alternating and direct, and rated currents of up to 125 A per contact) which either have no type specification or which have a type specification whose safety requirements refer to this standard. The standard can be used as a guide for connectors with rated voltages up to 50 V. In cases such as this, IEC 60664-1:2007 must be consulted when dimensioning the clearance and creepage distances. This standard can also serve as a guide for connectors with rated currents higher than 125 A per contact.

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

All of the voltage data listed in this catalog refers to the use of insulators, which have been installed according to assembly regulations in the ODU-MAC® frame for housings or in the ODU-MAC® docking frame. Customer-specific attachments, which could reduce the clearance and creepage distances, have not been taken into account here.

The clearance and creepage distances are determined on the bases specified in IEC 60664-1:2007 (VDE 0110-1:2008).

The most important influence variables and the electrical parameters harmonized with these will be explained in more detail in the following. We would be happy to assist you with any further questions. The texts and tables given here are excerpts from the indicated standards. As a rule, product committees lay down application-specific safety requirements for various fields of use; these requirements also regulate the insulation coordination and inspection of connectors. In such cases, the "product standards" take precedence and must be observed instead of the "basic safety standards" stated here. However, since this catalog and the technical data sheets cannot take all product standards into consideration, we have restricted ourselves to the following standard in terms of voltage data:

## IEC 60664-1:2007 (VDE 0110-1:2008) "INSULATION COORDINATION FOR EQUIPMENT WITHIN LOW-VOLTAGE SYSTEMS"

This is what is known as a **basic safety standard**, which regulates the minimum requirements for dimensioning clearance and creepage distances, as well as their inspection. The standard applies to equipment used up to an altitude of 2,000 m above sea level and with a rated alternating voltage of up to 1,000 V and a nominal frequency of up to 30 KHz or a rated direct voltage of up to 1,500 V. It applies in those cases where corresponding product standards do not define any values for clearance and creepage distances, nor lay down any requirements for solid insulation, or where no product standards are even available.

The permissible overvoltage and the rated voltage may be significantly influenced by the use of blank modules and varying positioning of the contacts in the insulators.

**The following general specifications have been defined for dimensioning:**

- **Isolation** between electrical circuits (functional insulation between the contacts) or between an electrical circuit and local ground (contact with grounded frame) has been dimensioned as **basic insulation**. If "**double insulation**" or "**reinforced insulation**" is required, the voltage data provided may no longer apply; insulating clearances may need to be extended.
- Unless otherwise stated, all voltages are given as rms voltage values.
- **Overvoltage category III** is used, along with the TT and TN system types, to dimension the rated surge voltage.
- Condition A is always used for the inhomogeneous field when dimensioning the clearance distances used.
- The inspections prescribed for solid insulation and for clearance distances (if necessary) are conducted as alternating voltage inspections according to Table F.5.
- The clearance and creepage distances are determined on the bases specified in this standard.

## OPERATING VOLTAGE/RATED VOLTAGE/ NOMINAL VOLTAGE

The **max. operating voltage** (= rated voltage) is the value of a voltage that is specified by the manufacturer for a component, device, or item of equipment according to various applicable standards, and to which the operating and performance

features relate. Some standards use the term “rated voltage” or “working voltage” instead of “operating voltage”. 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.

Equipment 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)).

## RATED SURGE VOLTAGE

Value of an impulse withstand voltage that is indicated by the manufacturer for equipment or a part thereof, 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 pollution degree, the rated surge voltage depends upon the clearance distance between the individual contacts (see Table F.2 in IEC 60664-1:2007 (VDE 0110-1:2008)).

According to this standard, the minimum clearance distances for equipment 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)).

If a “periodic peak voltage” is present for a long time over the service life (more than approximately 60 minutes), this is not an overvoltage as regards insulation dimensioning under the terms of the standard, but must be considered a continuous voltage instead. In such cases, the “periodic peak voltage” must be used as the operating voltage.

## POLLUTION DEGREE

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 pollution degree according to the criteria listed below must be selected for the equipment.

In the case of a connector with a degree of protection of minimum IP54 IEC 60529:2013 (VDE 0470-1:2014), the insulating parts may be measured enclosed according to the standard for a low pollution degree. 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.

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

**Pollution degree 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.

**Pollution degree 3**
(= Standard, if no specific pollution degree is indicated)
Conductive pollution occurs or dry, non-conductive pollution that becomes conductive because of condensation must be expected. For example, devices in industrial, commercial, and agricultural operations, unheated storage areas and workshops.

**Pollution degree 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 item of equipment and relates to the operating and performance features.

Depending upon the indicated pollution degree, the rated voltage is dependent upon the insulating material group of the connector and the respective creepage distances between the individual contacts.

## 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 pollution degree applied.

## TEST VOLTAGES

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 surge voltage<br>û kV | Test surge voltage at sea level<br>û kV | Test surge voltage at 200 m elevation<br>û kV | Test surge voltage at 500 m elevation<br>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 | 9.350 |
| 12 | 14.770 | 14.471 | 14.025 |

# IEC 61010-1:2010 (VDE 0411-1:2010)



**“Safety requirements for electrical equipment for measurement, control, and laboratory use”**

This is what is known as a type specification or product standard, which is universally applicable to all devices belonging to the application area covered by this standard. For particular types of device, these requirements are supplemented or modified by the specific requirements contained in one or more special additional parts of the standard (Part 2), which must be read in conjunction with the requirements contained in Part 1.

Devices belonging to the application area:

- Electrical test and measurement instruments:
  devices that test, measure, display or record electrical and/or physical variables (also applies to test instruments integrated in production processes)
- Electrical open and closed-loop control devices for industrial process control: devices that set one or more output variables to specific values
- Electrical laboratory equipment: devices that measure, display, monitor or analyze substances (may also be used outside of the laboratory)

Devices excluded from the application area:

- IEC 60065 (Audio, video and similar electronic apparatus)
- IEC 60204 (Electrical equipment of machines)
- IEC 60601 (Medical electrical equipment)

**This standard defines some special cases, unlike IEC 60664-1:2007 (VDE 0110-1:2008):**

Limit values for accessible parts (Section 6.3[1]):

The voltages listed below are classed as dangerous and active, if certain currents (0.5 mA AC; 2.0 mA DC) are exceeded at the same time:

- Alternating voltage (AC): $U_{rms}$ = 33 V (Upeak = 46.7 V)
- Direct voltage (DC): U = 70 V
- Wet environment $U_{rms}$ = 16 V AC ($U_{peak}$ = 22.6 V); U = 35 V DC

A general distinction is made between the supply circuit (primary circuit) and the secondary circuit, which have different values for the clearance and creepage distances.

A partial discharge test is not compulsory at voltages > 700 V here either, it is merely recommended.

[1] See corresponding section in the DIN EN 61010-1:2010 (VDE 0411-1) safety standard

# VOLTAGE DATA ACCORDING TO “MIL”

## EIA-364-20F:2019

### “Withstanding Voltage – Test Procedure for Electrical Connectors, Sockets and Coaxial Contacts”

The withstanding voltage values stated in this catalog were determined according to the method described in EIA-364-20F:2019 “Withstanding Voltage – Test Procedure for Electrical Connectors, Sockets and Coaxial Contacts”. The inserts were tested while mated, and the test current was applied to the pin insert.

75% of the calculated dielectric withstanding voltage is used as the test voltage for further calculations. The operating voltage is 1/3 of this value.

This standard refers to IEC 60512-4-1:2003 “Connectors for electronic equipment – Tests and measurements – Part 4-1: Voltage stress tests – Test 4a: Voltage proof”.

**Test voltage: dielectric withstanding voltage** × 0.75
**Operating voltage: dielectric withstanding voltage** × 0.75 × 0.33

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

# CONVERSIONS/AWG (AMERICAN WIRE GAUGE)

| Circular wire | | | | | |
|---|---|---|---|---|---|
| AWG | Diameter | | Cross-section | Weight | Max. resistance |
| | Inch | mm | mm² | kg/km | Ω/km |
| 4/0 [259/21] | 0.6010 | 15.300 | 107.0 | 997.00 | 0.17 |
| 3/0 [259/22] | 0.5360 | 13.600 | 85.0 | 793.00 | 0.22 |
| 2/0 [259/23] | 0.4770 | 12.100 | 67.4 | 628.00 | 0.27 |
| 1/0 [259/24] | 0.4240 | 10.800 | 53.5 | 497.00 | 0.34 |
| 1 [259/25] | 0.3780 | 9.600 | 42.2 | 395.00 | 0.43 |
| 2 [259/26] | 0.3350 | 8.500 | 33.6 | 312.00 | 0.55 |
| 4 [133/25] | 0.2660 | 6.800 | 21.1 | 195.00 | 0.87 |
| 6 [133/27] | 0.2100 | 5.300 | 13.3 | 122.00 | 1.38 |
| 8 [133/29] | 0.1670 | 4.200 | 8.37 | 76.80 | 2.18 |
| 10 [1] | 0.1019 | 2.590 | 5.26 | 46.77 | 3.45 |
| 10 [37/26] | 0.1150 | 2.921 | 4.74 | 42.10 | 4.13 |
| 12 [1] | 0.0808 | 2.050 | 3.31 | 29.41 | 5.45 |
| 12 [19/25] | 0.0930 | 2.362 | 3.08 | 27.36 | 5.94 |
| 12 [37/28] | 0.0910 | 2.311 | 2.97 | 26.45 | 6.36 |
| 14 [1] | 0.0641 | 1.630 | 2.08 | 18.51 | 8.79 |
| 14 [19/27] | 0.0730 | 1.854 | 1.94 | 17.23 | 9.94 |
| 16 [1] | 0.0508 | 1.290 | 1.31 | 11.625 | 13.94 |
| 16 [19/29] | 0.0590 | 1.499 | 1.23 | 10.928 | 15.70 |
| 18 [1] | 0.0403 | 1.020 | 0.823 | 7.316 | 22.18 |
| 20 [1] | 0.0320 | 0.813 | 0.519 | 4.613 | 35.10 |
| 20 [7/28] | 0.0390 | 0.991 | 0.563 | 5.003 | 34.10 |
| 20 [19/32] | 0.0420 | 1.067 | 0.616 | 5.473 | 32.00 |
| 22 [1] | 0.0253 | 0.643 | 0.324 | 2.883 | 57.70 |
| 22 [19/34] | 0.0330 | 0.838 | 0.382 | 3.395 | 51.80 |
| 24 [1] | 0.0201 | 0.511 | 0.205 | 1.820 | 91.20 |
| 24 [7/32] | 0.0250 | 0.635 | 0.227 | 2.016 | 86.00 |
| 24 [19/36] | 0.0270 | 0.686 | 0.241 | 2.145 | 83.30 |
| 26 [1] | 0.0159 | 0.404 | 0.128 | 1.139 | 147.00 |
| 26 [7/34] | 0.0200 | 0.508 | 0.141 | 1.251 | 140.00 |
| 26 [19/38] | 0.0220 | 0.559 | 0.154 | 1.370 | 131.00 |
| 28 [1] | 0.0126 | 0.320 | 0.0804 | 0.715 | 231.00 |
| 28 [7/36] | 0.0160 | 0.406 | 0.0889 | 0.790 | 224.00 |
| 28 [19/40] | 0.0170 | 0.432 | 0.0925 | 0.823 | 207.00 |
| 30 [1] | 0.0100 | 0.254 | 0.0507 | 0.450 | 374.00 |
| 30 [7/38] | 0.0130 | 0.330 | 0.0568 | 0.505 | 354.00 |
| 32 [1] | 0.0080 | 0.203 | 0.0324 | 0.288 | 561.00 |
| 32 [7/40] | 0.0110 | 0.279 | 0.0341 | 0.303 | 597.10 |
| 34 [1] | 0.0063 | 0.160 | 0.0201 | 0.179 | 951.00 |
| 34 [7/42] | 0.0070 | 0.180 | 0.0222 | 0.197 | 1,491.00 |
| 36 [1] | 0.0050 | 0.127 | 0.0127 | 0.1126 | 1,519.00 |
| 36 [7/44] | 0.0060 | 0.150 | 0.0142 | 0.1263 | 1,322.00 |

The American Wire Gauge (AWG) is based on the principle that the crosssection 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 crosssection to that of the stranded wire. In this case, the crosssection of the stranded wire refers to the sum of the copper crosssections of the individual wires.

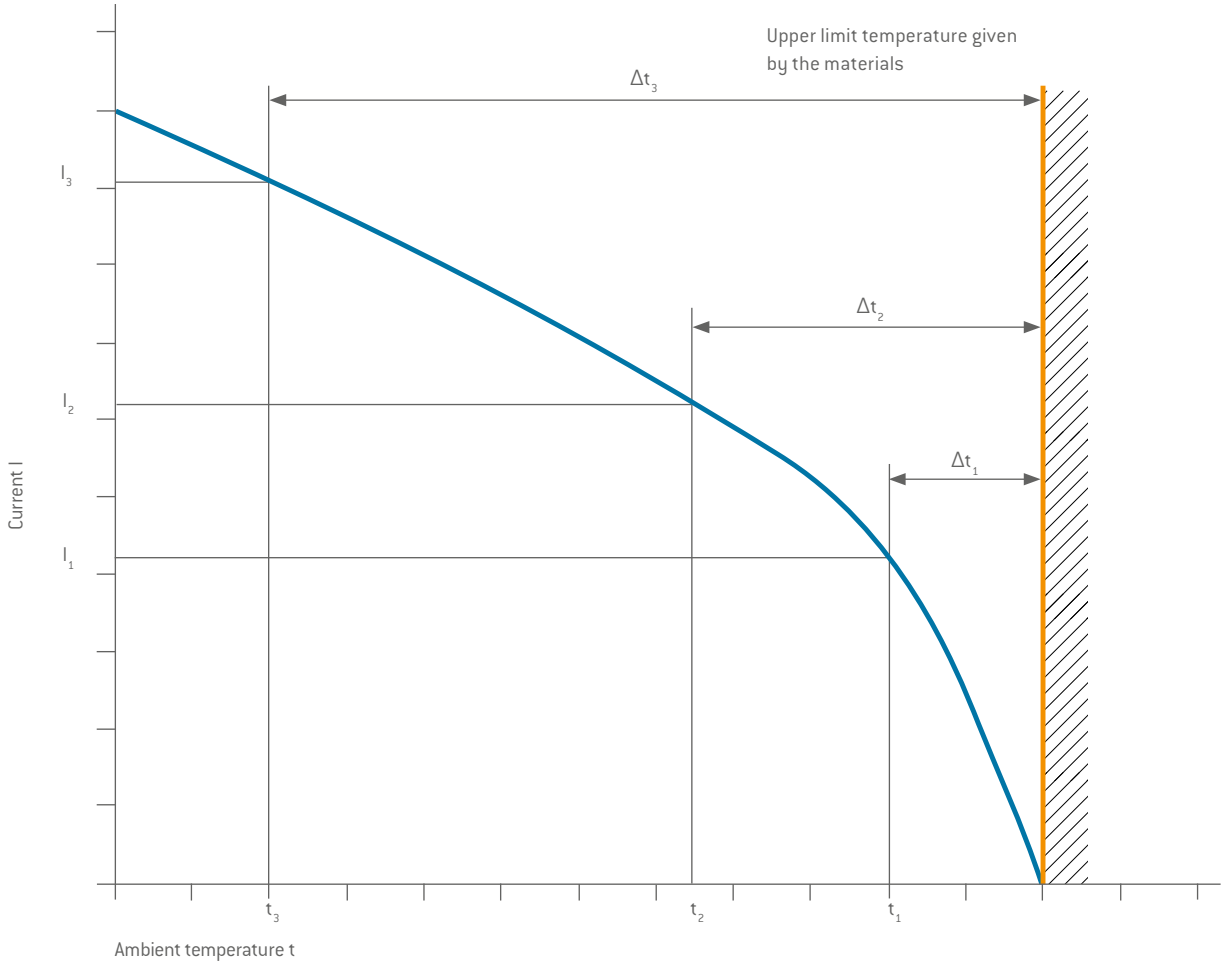
Accordingly, strands with the same AWG number but different numbers of wires differ in crosssection. For instance, an AWG 20 strand of 7 AWG 28 wires has a crosssection of 0.563 mm², while an AWG 20 strand of 19 AWG 32 wires has a crosssection of 0.616 mm².

Source: ASTM

# BASIC PRINCIPLES OF CURRENT-CARRYING CAPACITY

**Derating measurement method IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003)**

## STRUCTURE OF THE BASE CURRENT-CARRYING CAPACITY CURVE




The current-carrying capacity of a connector is determined by measurement. It is determined taking self-heating by current heat and the ambient temperature into account, and is limited by the thermal properties of the contact materials used. Their upper limit temperature must 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 limit temperature forms the limit of the diagram.

Over three measurements, the temperature rise due to current 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 ($0.8 \times I_n$) 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)

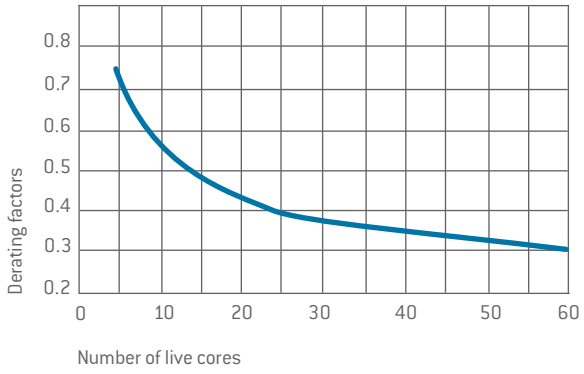
The metrologically determined current which is permitted to flow continuously through all contacts at the same time and will increase the contact temperature by 45 Kelvin.
The amperage is determined according to the derating measurement method (DIN EN 60512-5-2:2003) and derived from the derating curve.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

## DERATING FACTORS

In the case of multi-position connectors and cables, the heating is greater than it is with single 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 cores.




| Number of live cores | 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 crosssection of 1.5 to 10 mm² when installed in the open air

**Example:**
VA cable with 24 cores is used (24 contacts). The nominal crosssection of a core 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 cores. A 6 mm² Cu line (contact diameter 3.0 mm) can be used according to current-carrying capacity with 39 ampere.
The 24 contacts connector 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.

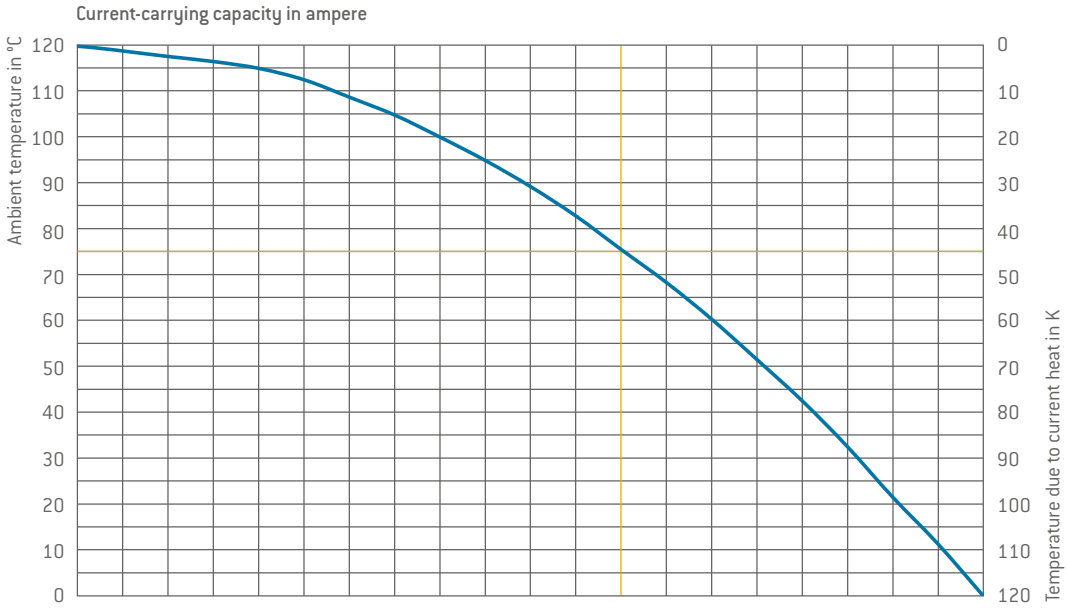
# CURRENT-CARRYING CAPACITY DIAGRAM

## FOR SINGLE CONTACTS

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

Upper limit temperature: +120 °C

Termination with nominal crosssection




| Contact | Contact-∅ | Termination crosssection mm² | I | I | I | I | I | I | I | I | I | I | I | I | I | I | I | I | I | I | I | I | I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ODU TURNTAC® | 0.7 | 0.38 | 0 | I | 1 | I | 2.5 | I | 3.5 | I | 5 | I | 6 | I | 7 | I | 8.5 | I | 9.5 | I | 11 | I | 12 |
| | 1.3 | 0.38 | 0 | | 1.5 | | 3 | | 4.5 | | 6 | | 7.5 | | 9 | | 11 | | 12.5 | | 14 | | 15.5 |
| | | 1 | 0 | I | 2 | I | 4 | I | 6.5 | I | 8.5 | I | 10.5 | I | 12.5 | I | 15 | I | 17 | I | 19.5 | I | 21.5 |
| | 2 | 1.5 | 0 | | 3 | | 6 | | 9 | | 12 | | 15 | | 18 | | 21 | | 24 | | 27 | | 30 |
| | | 2.5 | 0 | I | 4 | I | 8 | I | 12 | I | 16 | I | 20 | I | 24 | I | 27 | I | 30 | I | 33 | I | 37 |
| | 3.5 | 2.5 | 0 | | 4 | | 8 | | 12.5 | | 16.5 | | 20.5 | | 25 | | 29 | | 33 | | 37 | | 41 |
| | | 4 | 0 | I | 6.5 | I | 13 | I | 19.5 | I | 26 | I | 32.5 | I | 39 | I | 45 | I | 51.5 | I | 58 | I | 64 |
| | | 6 | 0 | | 6.5 | | 13 | | 19.5 | | 26 | | 32.5 | | 39 | | 45 | | 51.5 | | 58 | | 64 |
| ODU LAMTAC® | 5 | 10 | 0 | I | 10 | I | 20 | I | 29 | I | 38 | I | 47 | I | 56 | I | 67 | I | 78 | I | 90 | I | 99 |
| | | 16 | 0 | | 11 | | 22 | | 33 | | 44 | | 56 | | 68 | | 81 | | 94 | | 108 | | 119 |
| | 8 | 16 | 0 | I | 12 | I | 24 | I | 37 | I | 50 | I | 63 | I | 76 | I | 92 | I | 108 | I | 123 | I | 135 |
| | | 25 | 0 | | 16 | | 33 | | 50 | | 67 | | 85 | | 103 | | 118 | | 135 | | 150 | | 165 |
| | 12 | 25 | 0 | I | 19 | I | 38 | I | 56.5 | I | 75.5 | I | 94.5 | I | 115 | I | 132 | I | 151 | I | 172 | I | 189 |
| | | 35 | 0 | | 22 | | 44 | | 66 | | 88.5 | | 110.5 | | 135 | | 155 | | 177 | | 201 | | 221 |
| | | 50 | 0 | I | 25 | I | 51 | I | 76 | I | 101.5 | I | 127 | I | 155 | I | 178 | I | 203 | I | 231 | I | 254 |

Nominal current

Max. continuous current

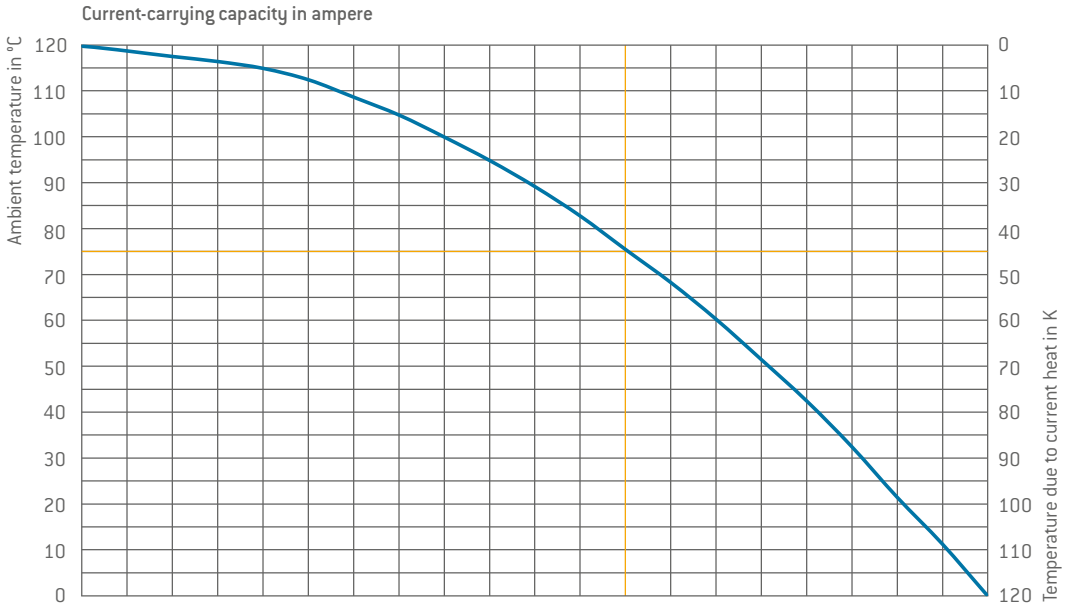
# CURRENT-CARRYING CAPACITY DIAGRAM

## FOR FULLY EQUIPPED MODULES

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

Upper limit temperature: +120 °C

Termination with nominal crosssection




| Contact | Contact-∅ | Termination crosssection mm² | I | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ODU TURNTAC® | 0.7 | 0.38 | 0 | I | 1 | I | 2 | I | 3 | I | 4 | I | 5 | I | 5.5 | I | 6.5 | I | 7.5 | I | 8.5 | I | 9.5 |
| | | PCB | 0 | | 1 | | 1.5 | | 2.5 | | 3 | | 4 | | 4.5 | | 5.5 | | 6 | | 7 | | 7.5 |
| | 1.3 | 0.38 | 0 | I | 1 | I | 2 | I | 3.5 | I | 4.5 | I | 5.5 | I | 7 | I | 8 | I | 9 | I | 10.5 | I | 11.5 |
| | | 1 | 0 | | 1.5 | | 3.5 | | 5.5 | | 7.5 | | 9.5 | | 11.5 | | 14 | | 16.5 | | 19 | | 20.5 |
| | | PCB | 0 | I | 1.5 | I | 2.5 | I | 4 | I | 5 | I | 6.5 | I | 8 | I | 9.5 | I | 11 | I | 12.5 | I | 14 |
| | 2 | 1.5 | 0 | | 2.5 | | 5 | | 7.5 | | 10 | | 12.5 | | 15 | | 17.5 | | 20 | | 22 | | 24 |
| | | 2.5 | 0 | I | 3 | I | 6 | I | 9 | I | 12 | I | 15 | I | 19 | I | 22 | I | 25 | I | 28 | I | 31 |
| | | PCB | 0 | | 3 | | 5.5 | | 8 | | 11 | | 13.5 | | 16 | | 19 | | 22 | | 25 | | 27.5 |
| | 3.5 | 2.5 | 0 | I | 3.5 | I | 7 | I | 10.5 | I | 14 | I | 17.5 | I | 21 | I | 24 | I | 27.5 | I | 31 | I | 34.5 |
| | | 4 | 0 | | 5 | | 10 | | 15 | | 20 | | 25 | | 30 | | 34 | | 39 | | 44 | | 49 |
| | | 6 | 0 | I | 5 | I | 10 | I | 15 | I | 20 | I | 25 | I | 30 | I | 34 | I | 39 | I | 44 | I | 49 |
| ODU LAMTAC® | 5 | 10 | 0 | | 9 | | 18 | | 27 | | 37 | | 46 | | 56 | | 65 | | 74 | | 83 | | 92 |
| | | 16 | 0 | I | 11 | I | 22 | I | 33 | I | 45 | I | 56 | I | 68 | I | 79 | I | 90 | I | 101 | I | 112 |
| | 8 | 16 | 0 | | 13 | | 25 | | 38 | | 50 | | 63 | | 75 | | 88 | | 100 | | 113 | | 125 |
| | | 25 | 0 | I | 17 | I | 34 | I | 50 | I | 66 | I | 83 | I | 100 | I | 116 | I | 132 | I | 149 | I | 166 |
| | | | | | | | | | | | | | | | Nominal current | | | | Max. continuous current | | | | |



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# NOMINAL CURRENT LOAD OF LINES

The current-carrying capacity of the individual conductors is frequently lower than that of the single 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<br>PVC, PE, PUR, TPE<br>heat-resistant | Multi-wire highly flexible lines<br>For hand-held devices, core/sheath<br>cold-resistant, PVC-insulated | | Multi-wire movable lines<br>PVC, PE, PUR, TPE<br>standard program<br>harmonized series |
| Number of live cores | 1 | 2 | 3 | 4 |
| Nominal crosssection copper conductor in mm² | Nominal 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 |
| Nominal current load acc. to: | VDE 0298-4:2013 Table 11 | | | |

Nominal current load of lines with a nominal voltage of up to 1,000 V and of heat-resistant lines.
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

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# TECHNICAL TERMS

## AMBIENT TEMPERATURE

Temperature of the air or other medium in which a piece of equipment is intended to be used.

## AWG

American Wire Gauge see page 170

## BASE CURVE IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003)

See page 171

## CHEMICAL RESISTANCE

Many secondary processing procedures use glues, 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. Please observe our processing suggestions and technical notes in this catalog as well as the special information for the plastic housings.

## CLEARANCE DISTANCE

The shortest distance in the air between two conductive parts. The insulation coordination is explained in detail from page 165.

## CODING (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 from page 76).

## CONNECTOR

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.

## CORE

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

## CREEPAGE DISTANCE

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 165.

## CRIMP BARREL

A conductor barrel which can accommodate one or more conductors and be crimped by a crimping tool.

## CRIMP TERMINATION

Termination technology, see crimp connection

## CRIMP CONNECTION

The permanent, non-detachable, and solder-free mounting of a contact to a conductor via shaping the crimp barrel around the conductor to make a good electrical and mechanical connection. Executed with crimping tool, press or automatic crimping machine (see page 154).

## 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 cables according to IEC 60228:2004 (VDE 0295:2005; Class 5), so that no significant temperature increase occurs here.

The indicated temperature increase takes place through the contact. The specifications are average values.

## DELIVERY FORM

The delivery of the connector is carried out in the form of individual parts.

## DERATING CURVE

See page 171

## DERATING FACTOR

According to VDE 0298-4:2013, with connectors and cables with over 5 contacts, the heating is greater than it is with single contacts. For that reason, the aforementioned standard is calculated with a derating factor (see page 172).

# TECHNICAL TERMS



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

See page 171

### INSULATOR

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

### LUBRICATION

All standard contacts are lubricated at the factory. We recommend the service kit for ODU SPRINTAC® and ODU LAMTAC® contacts for subsequent lubrication (see page 161).

### MATERIALS (STANDARD DESIGN)

Pins and carriers 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.

### MATING AND SLIDING FORCE (DEMATING 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. The data refers to contacts in a lubricated condition (status at delivery) and after approx. 30 mating cycles. The forces are/may be higher in new condition (lubricated). 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 insertion and withdrawal action. 10,000 mating cycles are the standard value for ODU TURNTAC® and ODU LAMTAC® 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 single 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 continuously on its own (see from page 171).

### NOMINAL VOLTAGE

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

### OPERATING TEMPERATURE

See upper limit temperature (see page 178). Single modules may differ from the indicated temperature values. Here you find the technical information on the appropriate pages.

### OPERATING VOLTAGE

The nominal voltage of the power source for which the connector is being used. The operating voltage must not be higher than the nominal voltage of the connector.

### PCB

A.k.a. “printed circuit board”. A PCB is a carrier for electronic components. It serves the purposes of mechanical mounting and electrical connection.

### PCB TERMINATION

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

### POLLUTION DEGREE

The insulation coordination is explained in detail from page 165.

### RATED CURRENT (NOMINAL CURRENT)

See from page 172

### 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 item of equipment and relates to the operating and performance features”.

# TECHNICAL TERMS



### SOLDER CONNECTION (SOLDER TERMINATION)

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

### SOLDER TERMINATION

Termination technology, see solder connection

### SPINDLE LOCKING

Locking of two halves of a connector pair by one or more screws, which are generally fluted or have a toggle for easier activation.

### TERMINATION CROSSSECTION

The specified crosssections correspond to a “fine-wire” conductor structure according 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 lines to the electro-mechanical element, such as solder-free connections according to IEC 60352-2:2013 (DIN EN 60352-2:2014): crimp termination, screw connection, etc., or soldering connection (see from page 154).

### TEST VOLTAGE

The voltage which a conductor can withstand under defined conditions without dielectric breakdown or flashover.

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

See International Protection classes on page 164

### UPPER LIMIT TEMPERATURE

The highest permissible temperature at which the connector may still be operated. It includes contact heating through current-carrying capacity. In the case of standard contacts (ODU TURNTAC®), this amounts to +120 °C.

### WIRE

Wires (solid conductors) are available with an insulating 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 precautions must be taken to ensure people do not come into contact with live conductors during installation and operation.

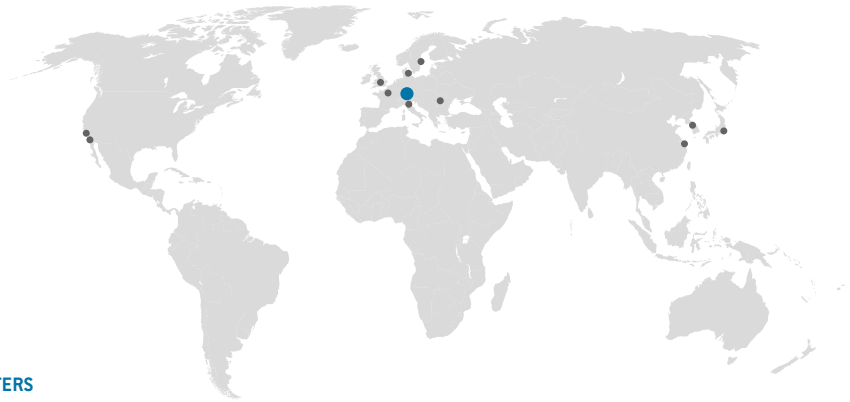
All entries in this catalog were thoroughly reviewed before printing. ODU reserves the right to make changes based on the current state of knowledge without prior notice without being obliged to provide replacement deliveries or refinements of older designs.

# FOR YOUR NOTES



A PERFECT ALLIANCE.

# ODU GROUP WORLDWIDE



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www.odu-connectors.com/contact

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| | |
|---|---|
| **Germany** | Otto Dunkel GmbH |
| **China** | ODU (Shanghai) Connectors Manufacturing Co.Ltd |
| **Mexico** | ODU Mexico Manufacturing S.R.L. de C.V. |
| **Romania** | ODU Romania Manufacturing S.R.L. |
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