ODU-MAC® Blue-Line

Universal solution

Up to 4,000 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

ODU-MAC® Blue-Line

FEATURES

- Economical, efficient and flexible solution
- Variety of locking options for plastic and metal housings
- > 10,000 mating cycles
- Easy handling: clip-in assembly and removal of the modules in the frame
- Quick removal of contacts
- Wide range of transmission types
- Very high contact density

APPLICATIONS

- Medical
- Test and measurement
- Military, security and communications
- Industrial
- Automotive

All the connectors shown here are connectors without breaking capacity (COC) according to IEC 61984:2008 (VDE 0627:2009-11).

The majority of ODU-MAC® modules and contacts have been certified according to UL 1977:2016/CSA C22.2 no. 182.3 (E file no.: E110586) and tested to MIL/SAE/EIA.

Data transmission protocols

These ODU-specific connectors can transmit common data transmission protocols such as HDMI® 2.0 / 2.1, USB® 1.1, USB® 2.0, USB® 3.2 Gen 1x1, USB® 3.2 Gen 1x2, FireWire®, FlexRay®, Profibus®, DisplayPort® 2.0, but they are not HDMI®, USB®, FireWire®, FlexRay®, Profibus® and DisplayPort® standard connectors.

Safety instructions / protective conductor connection

A protective conductor termination is mandatorily required if the „limits for **TOUCHABLE PARTS**" described in the respective standards are exceeded and no other protective measures against electric shock have been taken. In any case, before commissioning, a check of the protective connection and all **TOUCHABLE PARTS** must be carried out according to the relevant standards.

When mated, the housing listed in this catalog corresponds to the requirements specified in IEC 61984:2008 with regard to protection against contact in accordance with IEC60529:1989.

When using mounting housings or comparable device parts without complete IP protection in the cable connection area or when using the connectors without housing, the required contact protection according to IEC 61984:2008 must be provided by the customer (e.g. by suitable installation in the control cabinet with IP degree of protection). The customer must ensure strain relief for the cables / strands on the device part.

Suitable modules for ODU-MAC® PUSH-LOCK are marked, reversed gender is not possible.

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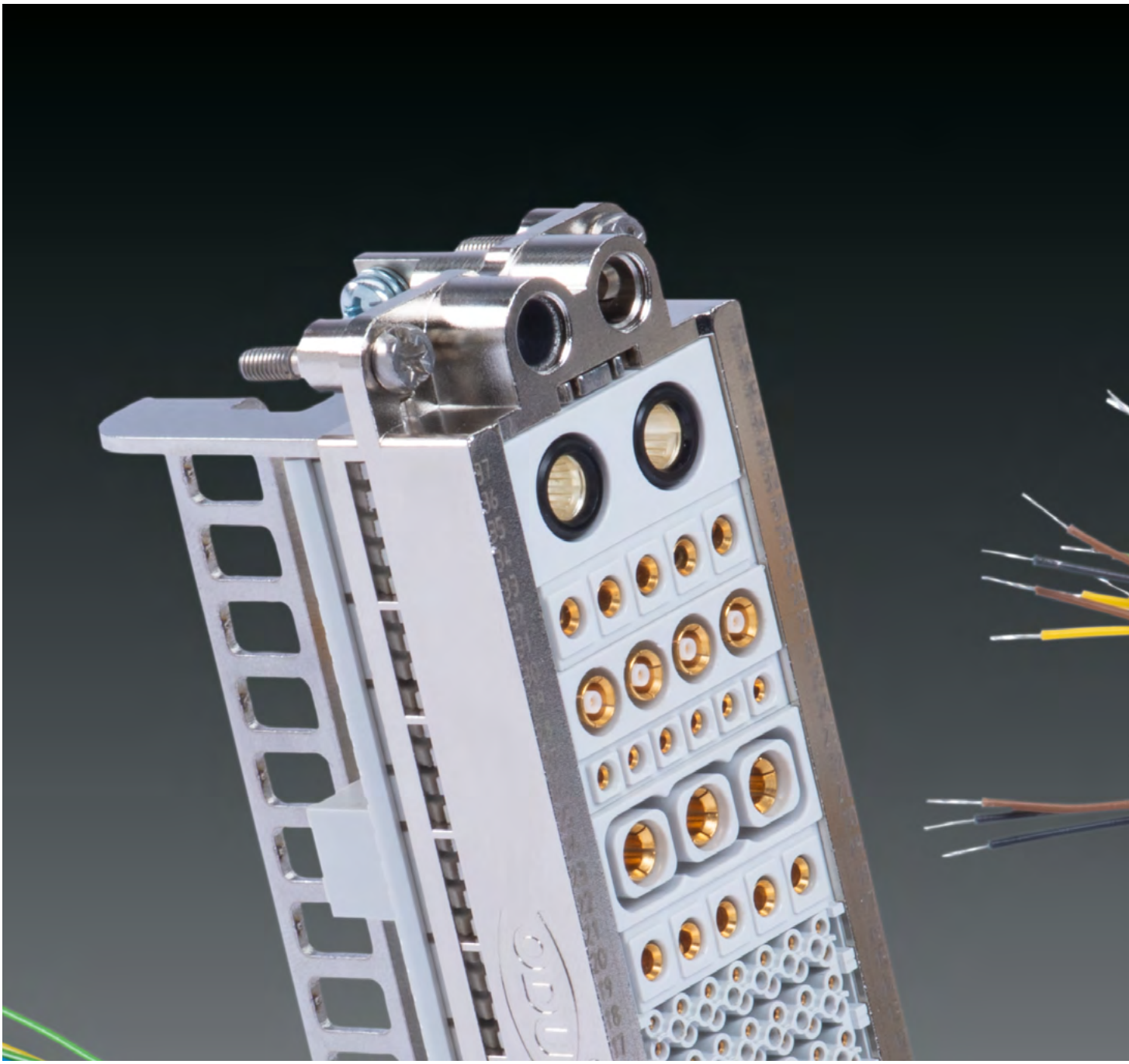

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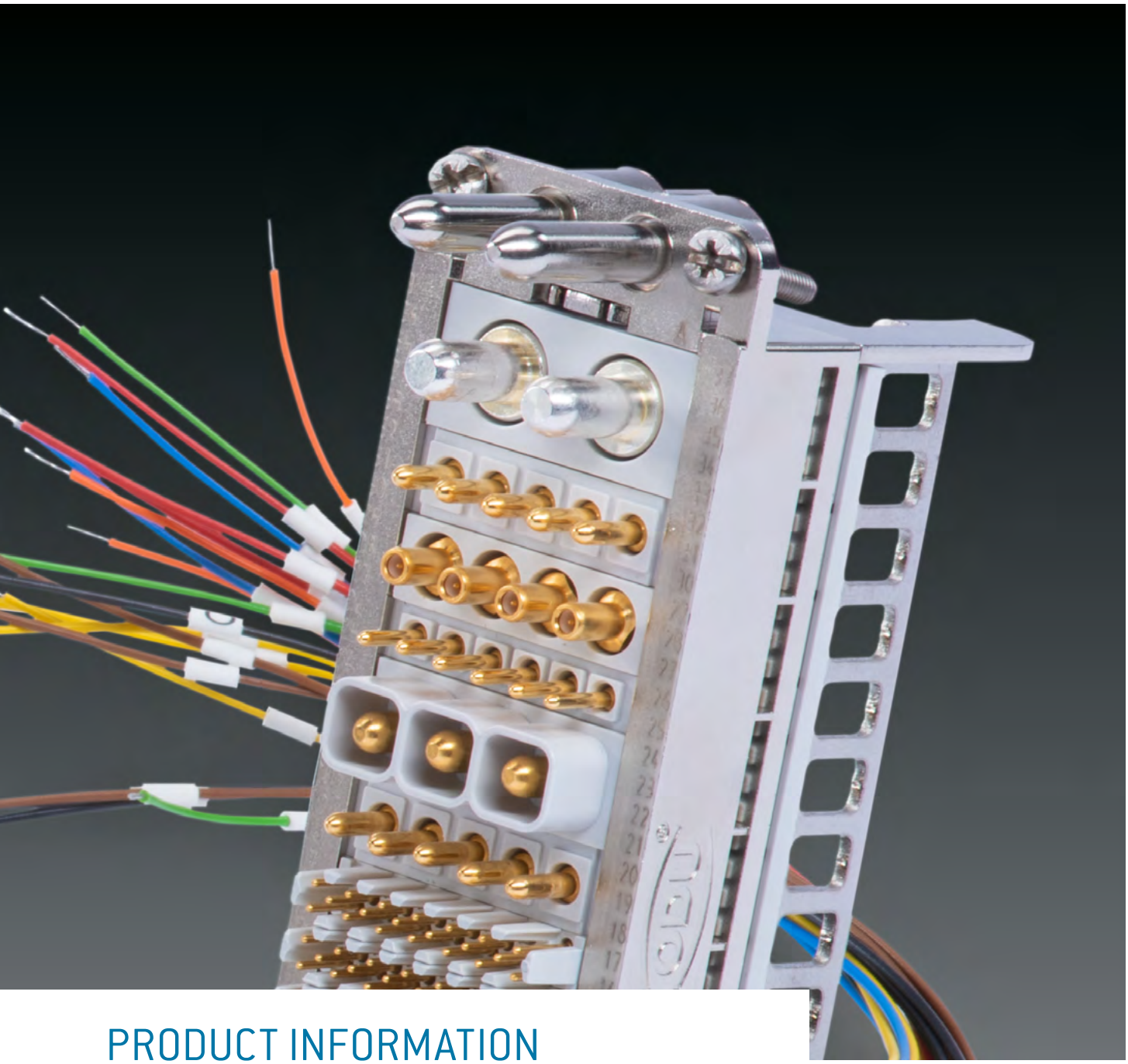

PRODUCT INFORMATION

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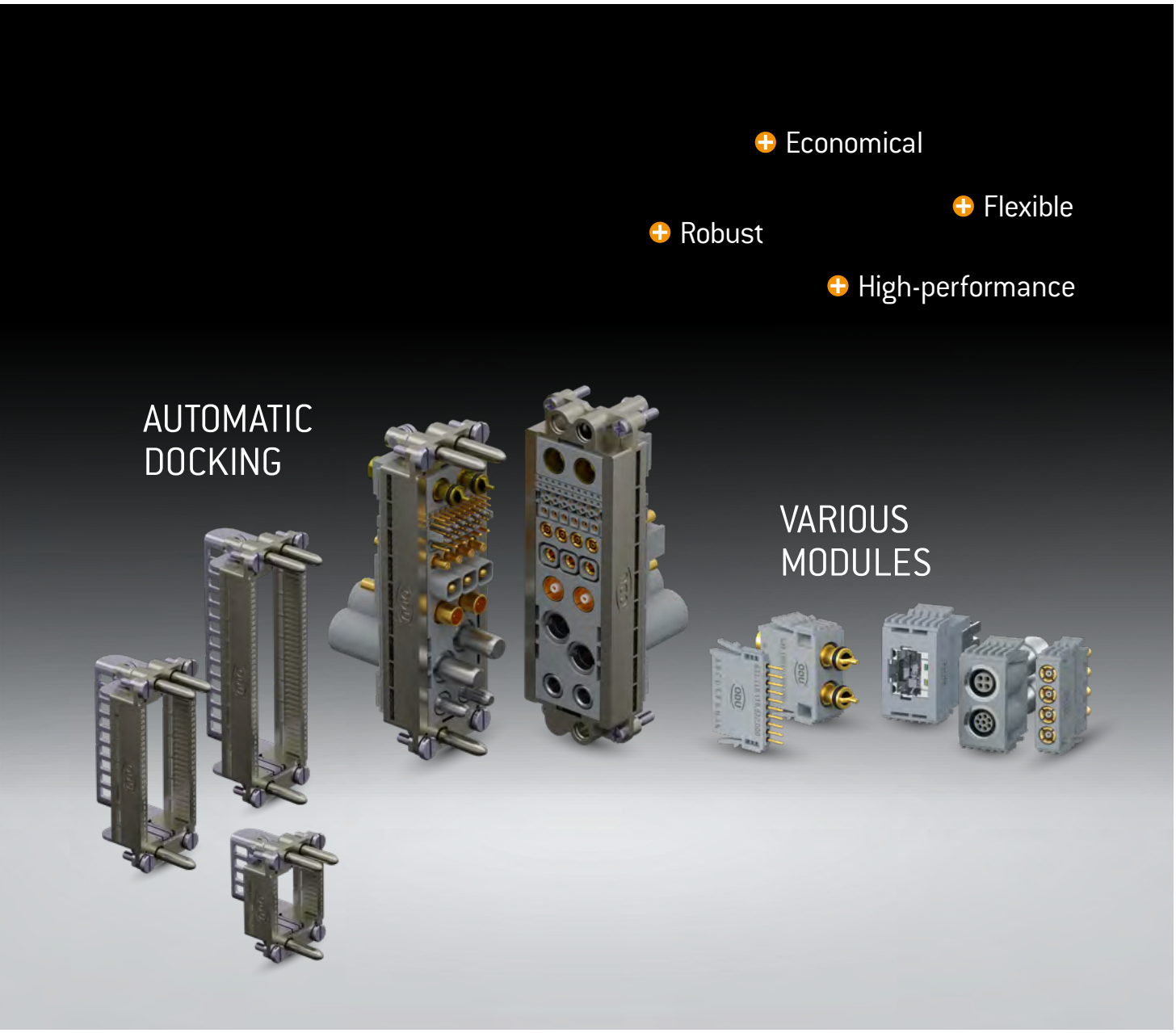
THE ODU-MAC® BLUE-LINE – UNIVERSAL SOLUTION

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 to combine many individual connections in one ODU-MAC® Blue-Line. The proven ODU spindle locking in the ODU-MAC® Blue-Line plastic housing is unique on the market.

This connector system is a modular all-around solution that can be configured for a very small installation space – available in both a plastic and a metal housing. A variety 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. Errors during module assembly are prevented by 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 pin side

ROBUST

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

FLEXIBLE

- 5 frame sizes (7, 12, 18, 26, 37 units)
- Transmission of signals, high-voltage, power, high-current, HF signals (coax), compressed air, fluid, vacuum, data and fiber optic
- Additional option for the transmission of signals: separate PCB termination modules for effective contacting in the termination area
- Very high contact 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)

A MODULAR ALL-ROUNDER

The flexible modular design of the ODU-MAC® Blue-Line enables the combination of different transmission types within one connector. Whether signal, high-voltage, power, high-current, HF signals (coax), compressed air, fluid, vacuum, data or fiber optic are being transmitted – all of the contact inserts can be integrated into the individual connector solution.
For signal transmission, there is also a simple contacting option using PCB termination modules.

Housing made of plastic or aluminum

Frames for 4 housing sizes

Modules with the practical clip principle

THE INTELLIGENT WAY TO AN INDIVIDUAL CONNECTION

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

The result is an effective, compact and attractive complete connection that is unrivalled in terms of functionality. Confusion due to many connections is a thing of the past – an ODU-MAC® customized to meet your requirement is todays's solution.

ODU-MAC® White-Line

Our ODU-MAC® White-Line offers additional options – request our catalog to find out more.

ODU-MAC® Silver-Line ODU DOCK

For automatic docking request our ODU-MAC® Silver-Line catalog to find out more.

THE MODULAR SYSTEM AT A GLANCE

10,000
mating cycles
and more

2 possible areas of application: manual mating or automatic docking

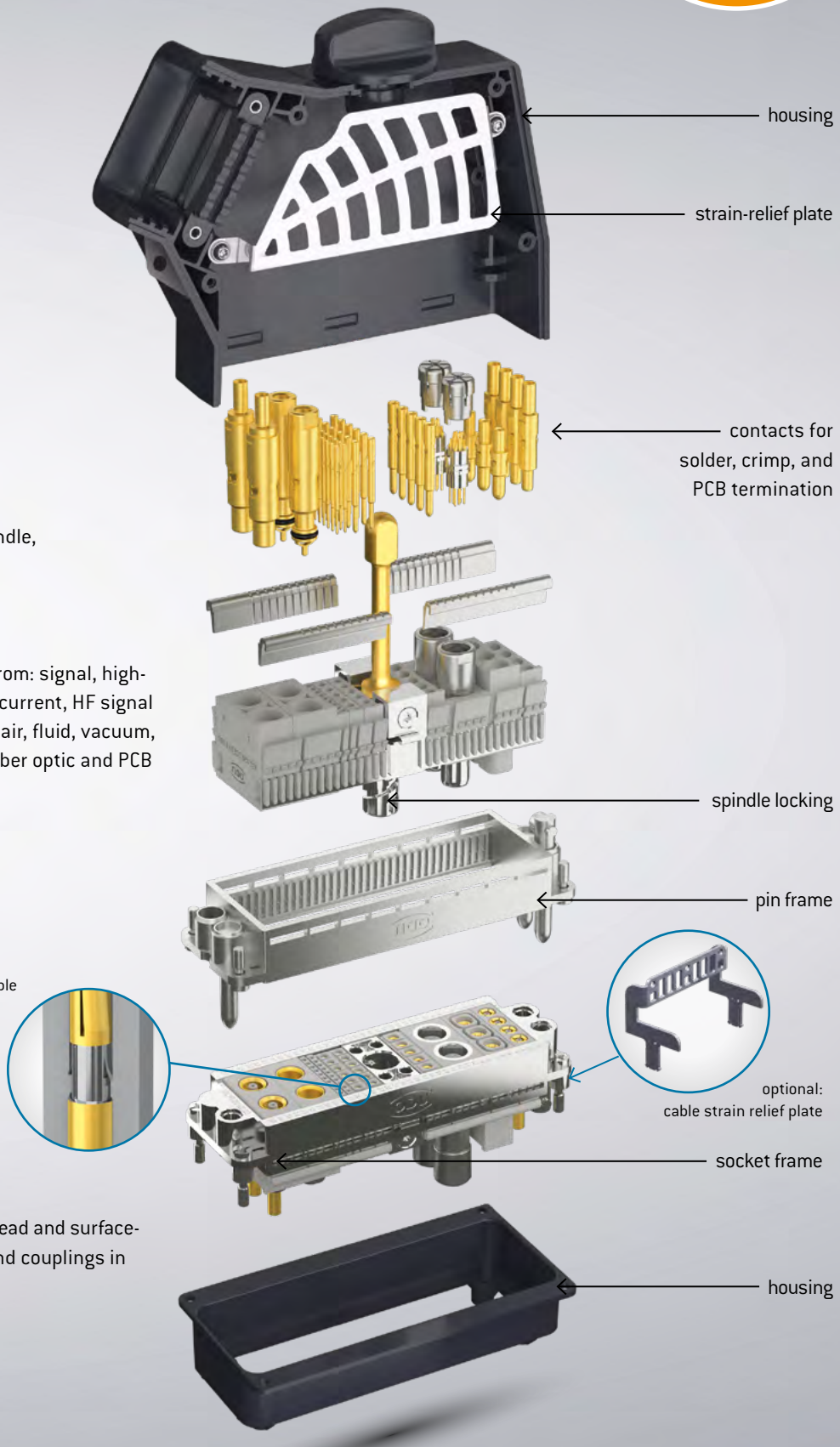
39 cable hood versions

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

32 modules to choose from: signal, high-voltage, power, high-current, HF signal (coax), compressed air, fluid, vacuum, data transmission, fiber optic and PCB termination

3 different spindle geometries

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



Contacts with the clip principle that can be dismantled (see page 30)

PRODUCT FINDER

Individual configuration of your ODU-MAC® Blue-Line connection

With the Product Finder it's possible to configure your connection simply according to your requirements.
The Product Finder guides you through the different choices step by step and offers many continuative information.

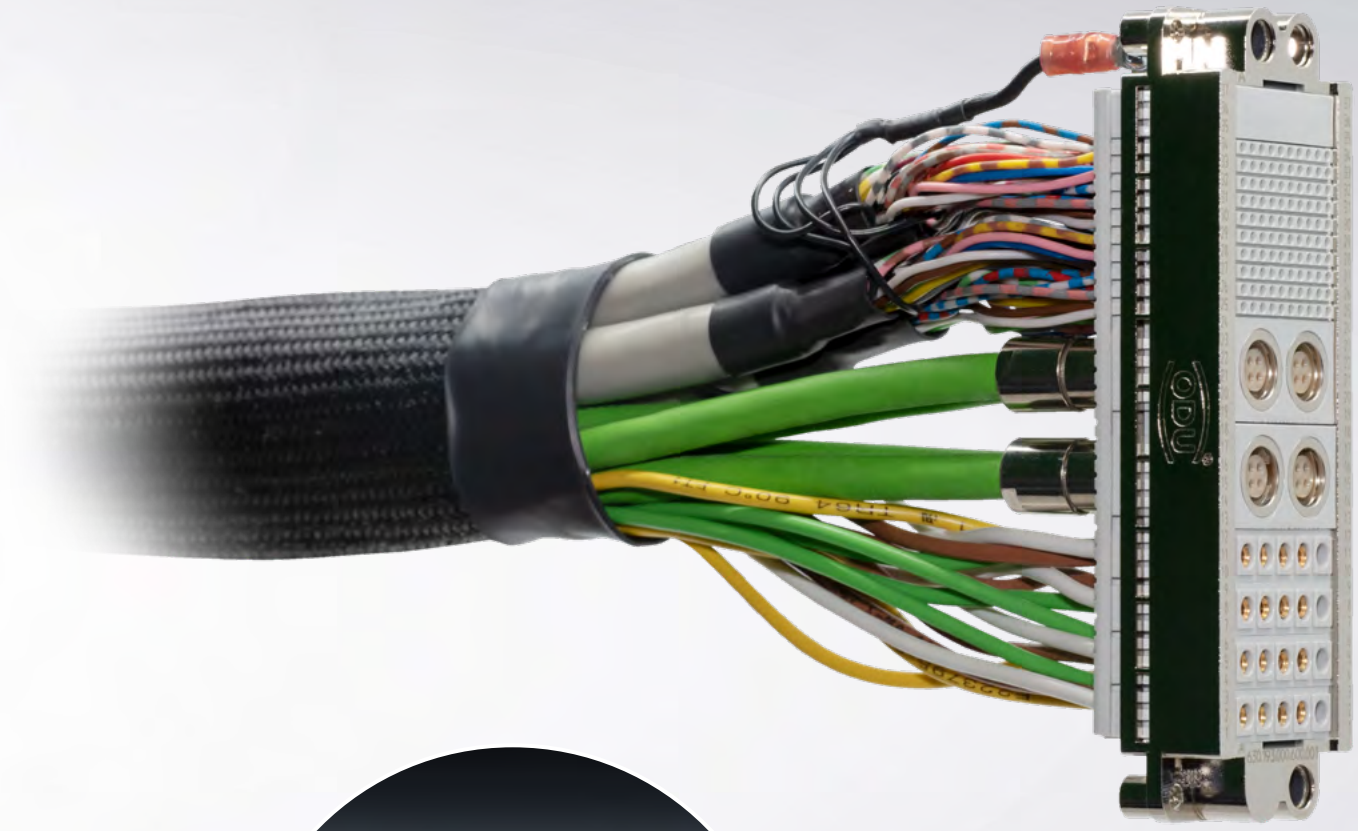
CONFIGURE YOUR ODU-MAC® BLUE-LINE HERE:

SELECT & REQUEST OFFERS

You will receive a drawing and a detailed offer within one working day of submitting your request. When placing an order, you will receive a complete article number for the connector. The individual parts are supplied loose.
We ask you to enquire directly about customized versions not covered by the standard.

CABLE ASSEMBLY

In addition to high quality connectors, ODU also offers complete system solutions including cable assembly. The advantage is that you receive the cable harness in an all-in-one solution from a single source. This greatly minimizes effort and installation time.



- Complete solution from ODU with years of expertise
- State-of-the-art production facilities with 100 % end testing, high-voltage testing and component testing
- Customer-specific labeling
- Prototype, small series and high volume production
- Wide range of standard cables and accessories available

YOUR WAY TO AN INDIVIDUAL CONNECTION

How to configure your ODU-MAC® Blue-Line

FOR AUTOMATIC DOCKING

1ST STEP: FRAME SELECTION

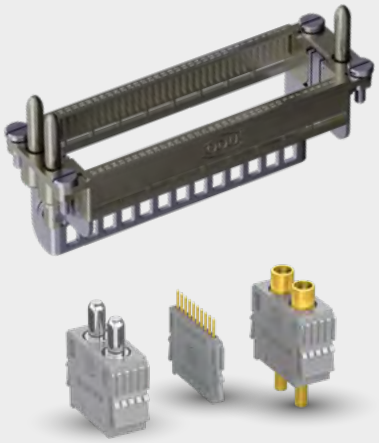
Depending upon your requirements, you can choose between 4 different frame sizes as a base for automatic docking.

2ND STEP: MODULE SELECTION

Choose from 32 different modules for

- Signals:
- High-voltage
- Power
- High-current
- HF signal (coax)
- Compressed air
- Fluid
- Vacuum
- Shielded feedthrough / high-speed connector
- Fiber optic
- PCB termination
- Blank modules

and assemble your ODU-MAC® Blue-Line individually.



WATCH VIDEO vimeo

FOR MANUAL MATING

1ST STEP: LOCKING

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

Spindle locking Metal/plastic housing	Lever locking Metal housing	Transverse locking Plastic housing	Push-pull locking

2ND STEP: CONNECTOR HOUSING SELECTION

Depending upon the locking, choose the housing that suits your requirements. The following housings are available:

Spindle locking	Lever locking	Transverse locking	Push-pull locking
Cable hood Metal/plastic housing	Cable hood Metal housing	Cable hood 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 designs is possible.

Cable hood	Cable hood XXL	Push-pull locking
Bulkhead housing Metal/plastic housing	Bulkhead housing Metal housing	Receptacle
Surface-mounted housing Metal/plastic housing	Surface-mounted housing Metal housing	
Cable-to-cable hood Metal housing		
Recessed-style receptacle		

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 32 different modules for signals, high-voltage, power, high-current, HF signals (coax), compressed air, fluid, vacuum, data transmission, fiber optic or PCB termination and assemble your ODU-MAC® Blue-Line individually.

For details see page 85

ODU-MAC® PUSH-LOCK

Very high contact density for small installation space

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 36


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

MANUAL MATING

Housings with spindle locking at a glance

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

Especially in case of high connection frequency and limited space for locking, the use of precision locking is a preferred option. Depending upon the application scenario, the mechanisms are designed for 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 damage
- **Replaceability** – can be replaced without removing the hood or frame
- **User-friendly** – lower 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 42

[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 50

Connector housing for assembly on the cable

METAL CABLE HOOD WITH SIDE CABLE OUTLET, PAGE 42

Connector housing for assembly on the cable

METAL CABLE HOOD XXL WITH SIDE M50 CABLE OUTLET, PAGE 43

Connector housing with expanded assembly space and side M50 cable outlet

FULLY COMPATIBLE

PLASTIC SURFACE-MOUNTED HOUSING, PAGE 52

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

METAL SURFACE-MOUNTED HOUSING, PAGE 45

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

PLASTIC BULKHEAD HOUSING, PAGE 51

For mounting on your device with spindle locking

METAL BULKHEAD HOUSING, PAGE 44

For mounting on your device with spindle locking

Table of contents

MANUAL MATING

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

QUICK ADJUSTMENT DUE TO HALF-SHELL PRINCIPLE

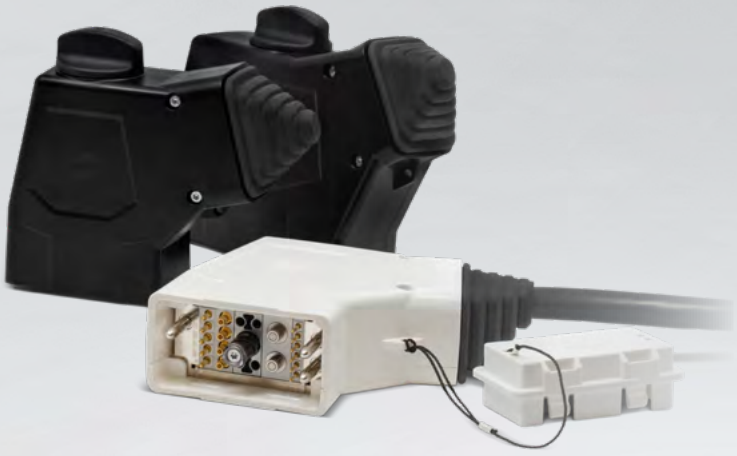
Our new housing meets all major challenges, including high contact density, flush mounting of the receptacle, and easy adaptability when user requirements change quickly. Special protective covers for both housing parts round out the series.

BENEFITS OF THE RAPID HOUSING

- 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 in size 2 and 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]	
2	18	
4	37	

FURTHER INFORMATION FROM PAGE 46

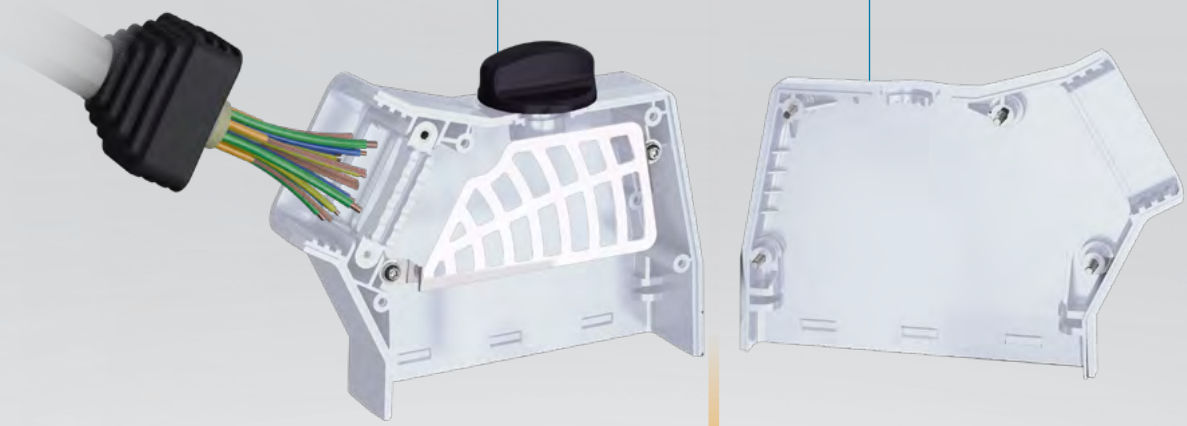


[1] 5 units of space required for spindle

SPINDLE LOCKING, PAGE 46

RAPID PLASTIC HOUSING, PAGE 46

Half-shell principle with individually adjustable side cable outlet



FULLY COMPATIBLE

PLASTIC RAPID RECEPTACLE, PAGE 48

For mounting as a recessed plastic style

RAPID RECEPTACLE, PAGE 47

Direct mounting on the mounting wall

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 50

- 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 53

Connector housing for assembly on the cable

FULLY COMPATIBLE

PLASTIC BULKHEAD HOUSING, PAGE 54

For assembly on your device with transverse locking

PLASTIC SURFACE-MOUNTED HOUSING, PAGE 55

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

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 175301-801:2007-08 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 / module, 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 42

METAL CABLE HOOD WIDE WITH TOP CABLE OUTLET, PAGE 62

Connector housing for double frame assembly

METAL CABLE HOOD WIDE WITH SIDE CABLE OUTLET, PAGE 62

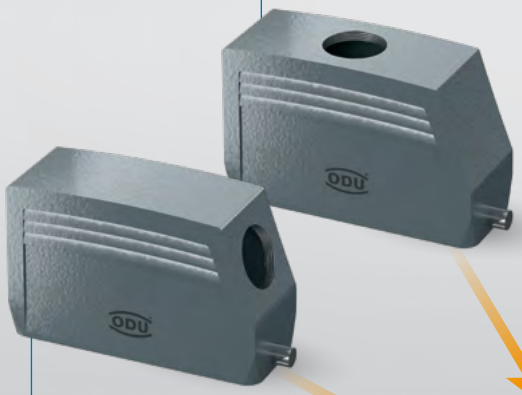
Connector housing for double frame assembly

METAL BULKHEAD HOUSING FOR CABLE HOOD WIDE, PAGE 63

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

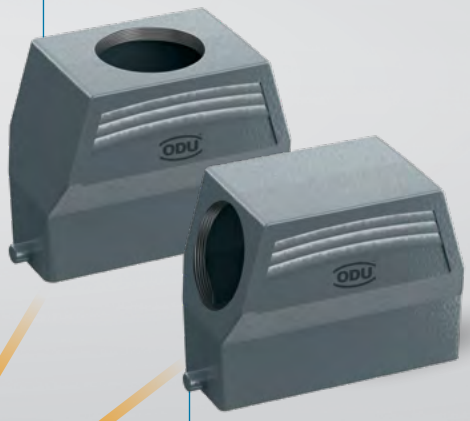
METAL CABLE HOOD WITH TOP CABLE OUTLET, PAGE 63

Connector housing for assembly on the cable



METAL CABLE HOOD XXL WITH TOP M50 CABLE OUTLET, PAGE 59

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



METAL CABLE HOOD WITH SIDE CABLE OUTLET, PAGE 63

Connector housing for assembly on the cable

FULLY COMPATIBLE

METAL CABLE HOOD XXL WITH SIDE M50 CABLE OUTLET, PAGE 59

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

METAL BULKHEAD HOUSING, PAGE 60

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

METAL SURFACE-MOUNTED HOUSING, PAGE 61

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

METAL CABLE-TO-CABLE HOOD, PAGE 64

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

INFORMATION ON PLASTIC HOUSINGS

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.

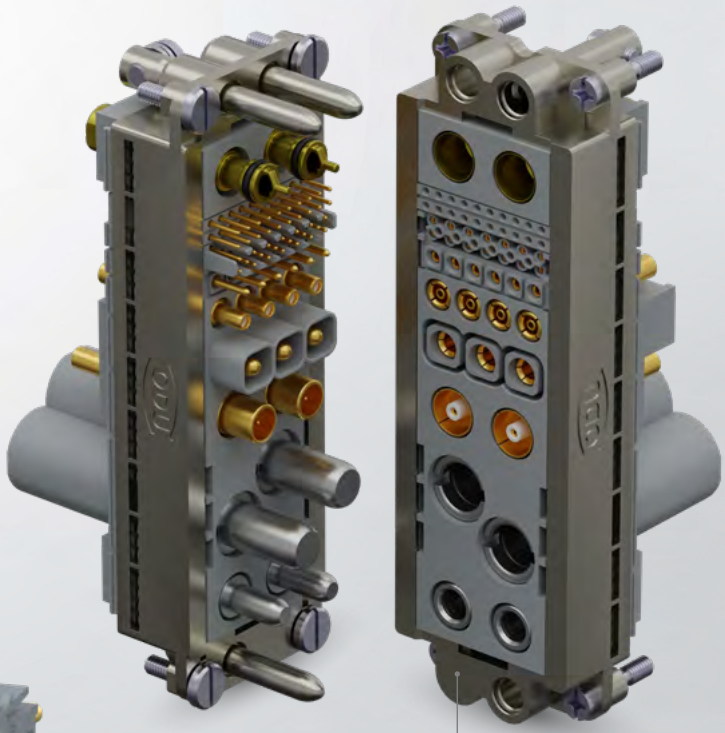
FRAMES FOR AUTOMATIC DOCKING

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 the 10-contact module with a module width of 2.4 mm (1 unit) is used.



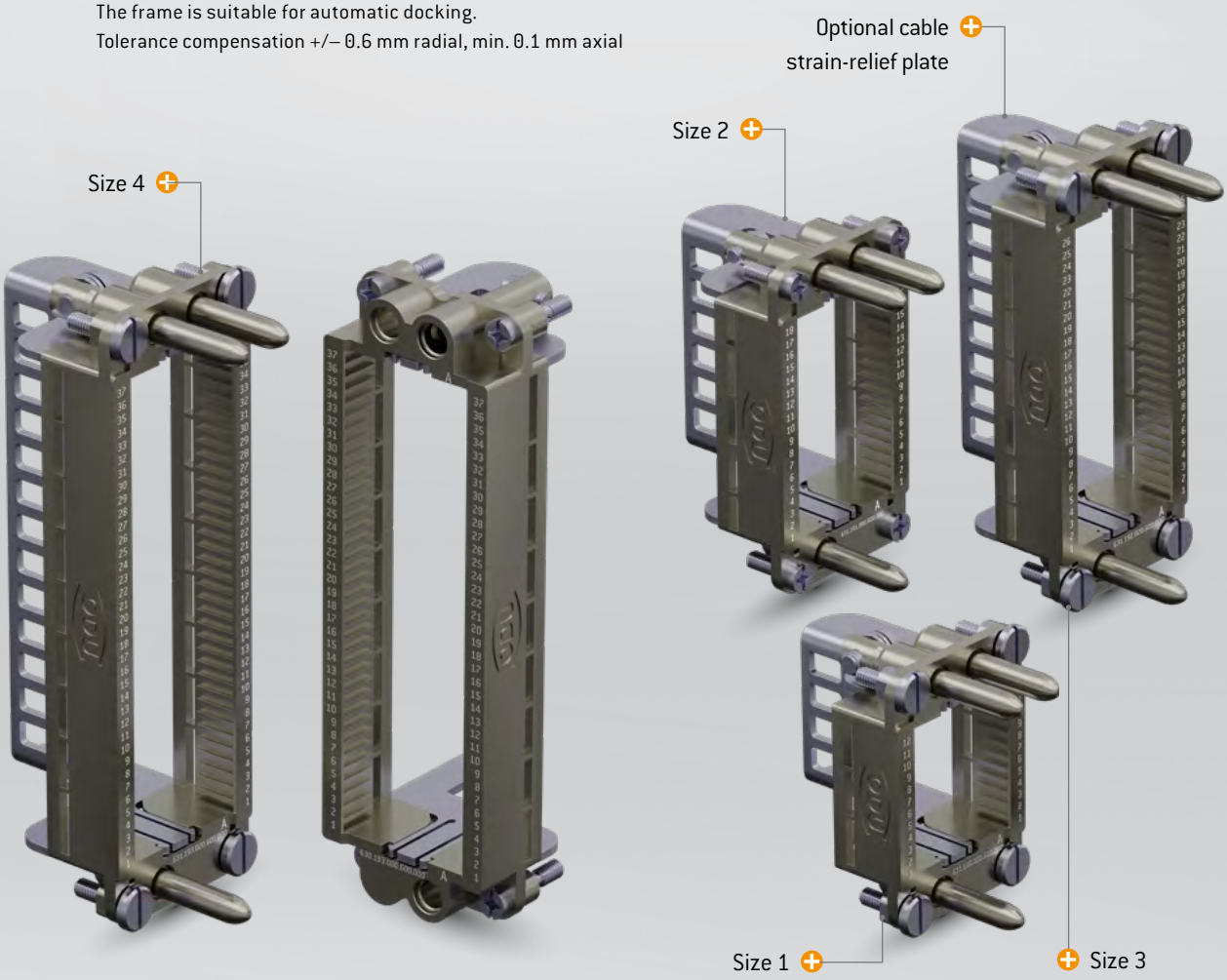
Frame size 4 assembled

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)
  32 different modules: signal, high-voltage, power, high-current, HF signals (coax), compressed air, fluid, vaccum, data transmission, fiber optic or PCB termination
- **Maximum contact 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 80

RELIABLE CONNECTIONS – THE CONTACT PRINCIPLE

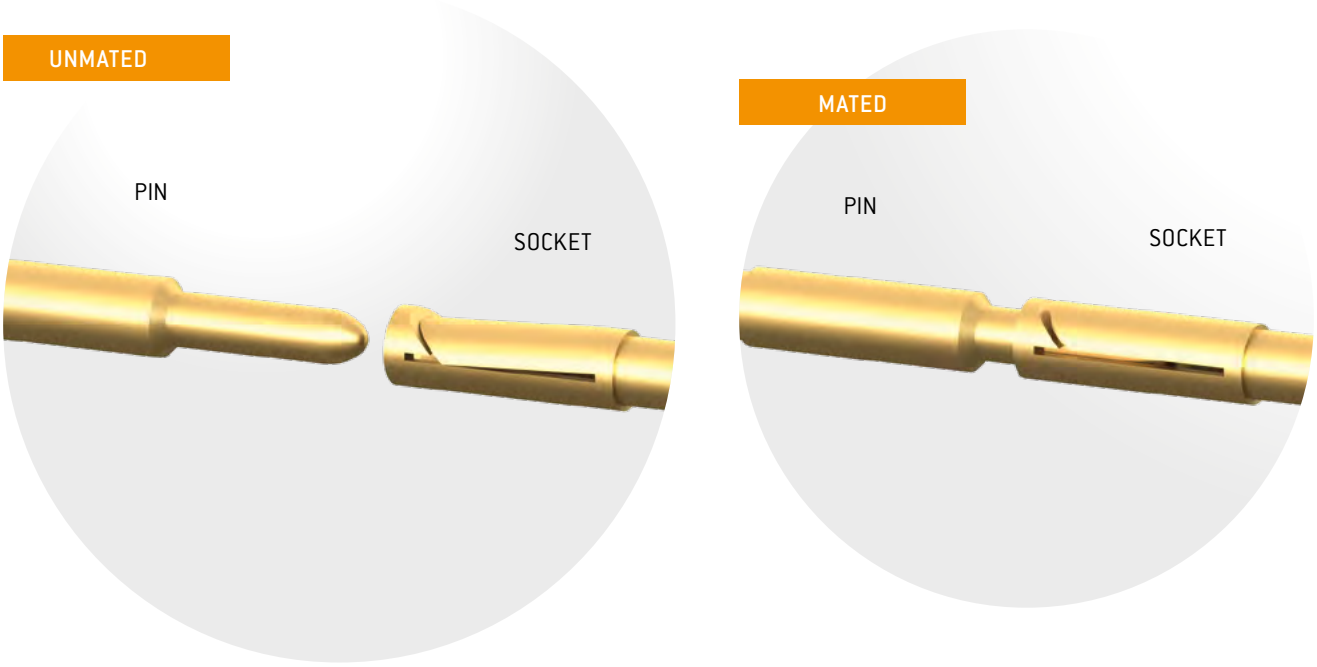
ODU contacts meet the highest quality standards and enable safe and reliable connections. In order to achieve this, ODU relies on high-performance contact technologies. In the turned contact category, we essentially distinguish between lamella and slotted contacts. The socket pieces differ, but the pins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

ODU TURNTAC®

Contacts in slotted version

The universal ODU TURNTAC® contact system combines the very good 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, four, six or more contact areas.



BENEFITS

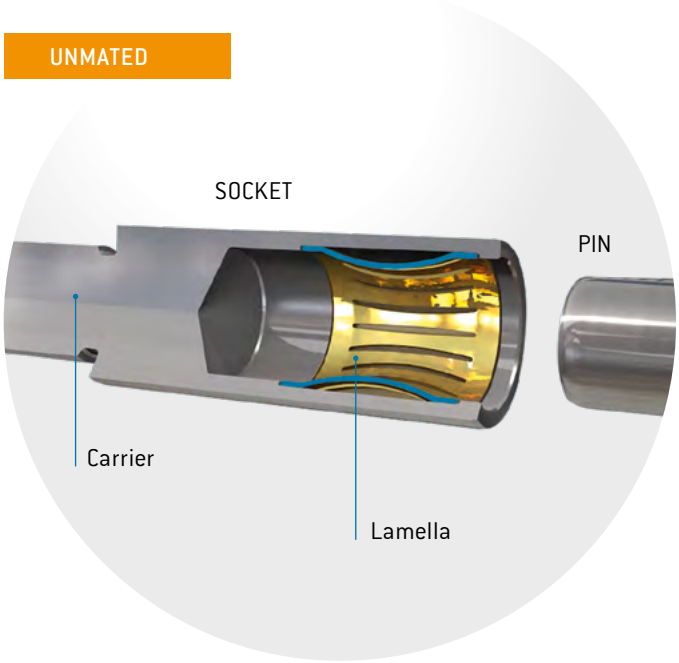
- > 10,000 mating cycles
- Economical solution
- Very small dimensions are possible
- Individual contacts on request

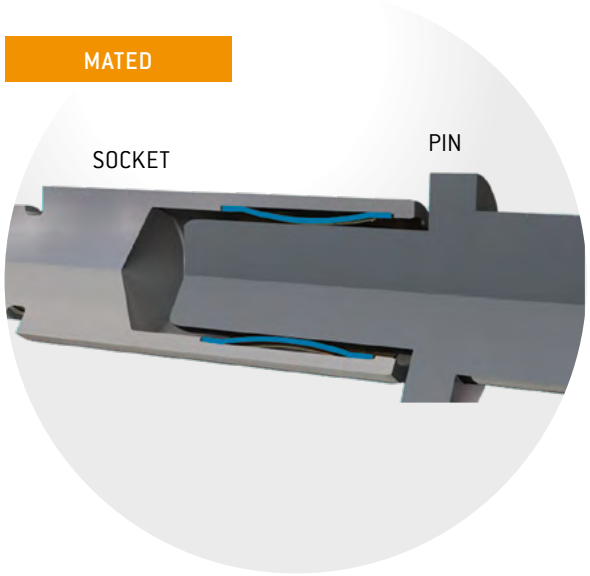
Standard contact principle for:	
Signal /High-voltage contact	∅ 0.7–2 mm
Power contact	∅ 3.5 mm
Coax	2 and 4 contacts
Shielded feedthrough	Signal contacts

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.





BENEFITS

- > 10,000 mating cycles
- High current-carrying 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
PE	∅ 8 mm

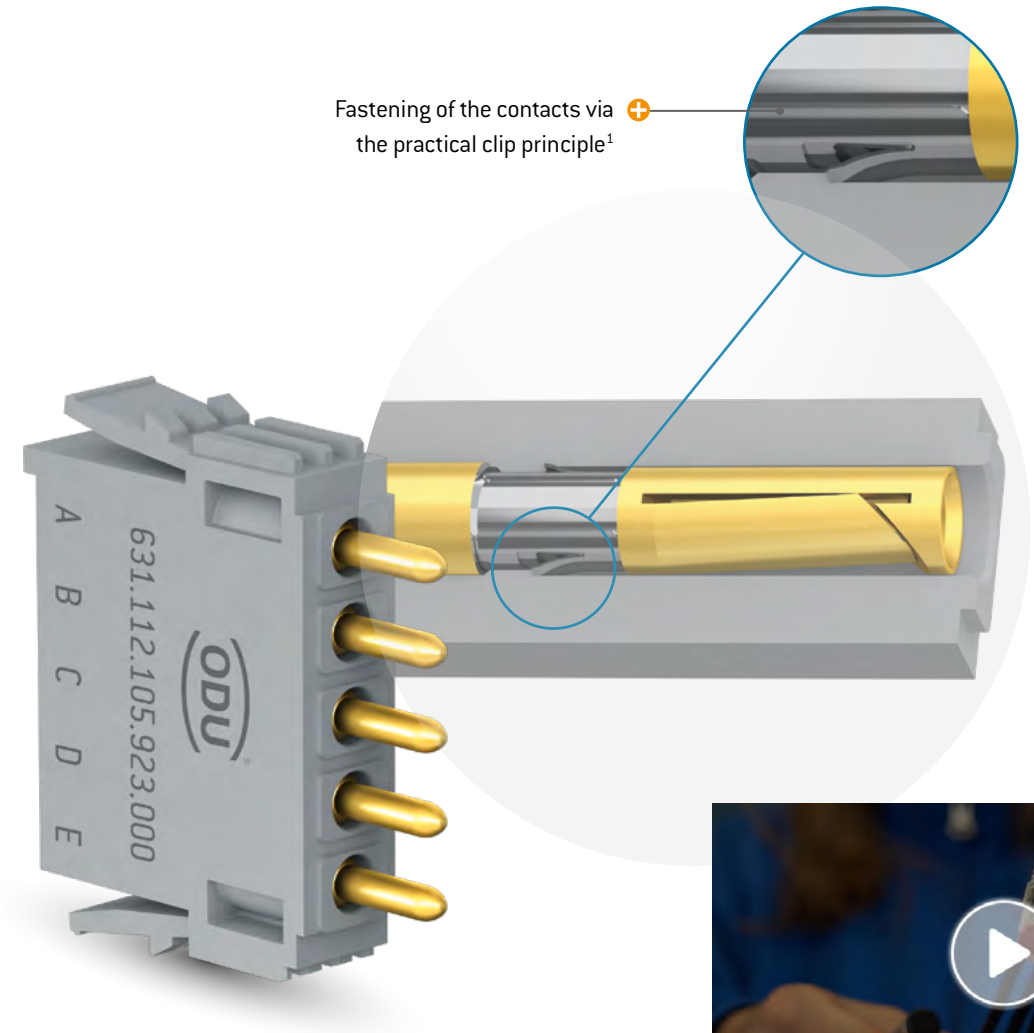
Table of contents

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.



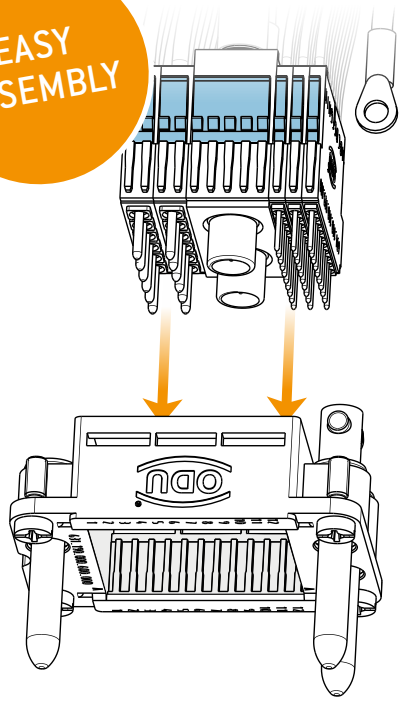
The majority of modules uses this fastening technology.

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

PERFECTLY ASSEMBLED – EASY TO HANDLE

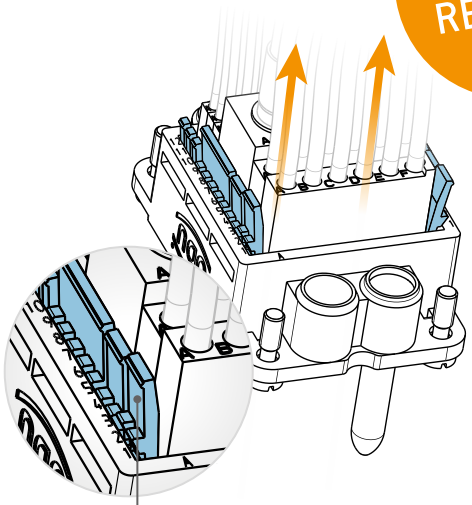
One mechanical and two optical coding functions of the modules simplify the assembly. Modules can be assembled equipped or unequipped (contact assembly is possible at any process step).

EASY ASSEMBLY



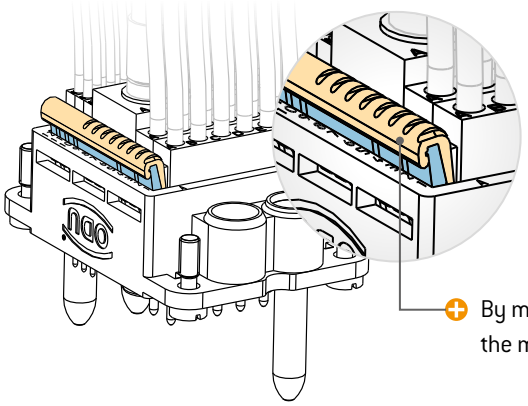
Assembly and fastening of the modules using the clip principle without any tools

SIMPLE REMOVAL



Removal of the modules using the clip principle without any tools

SECURE LOCKING

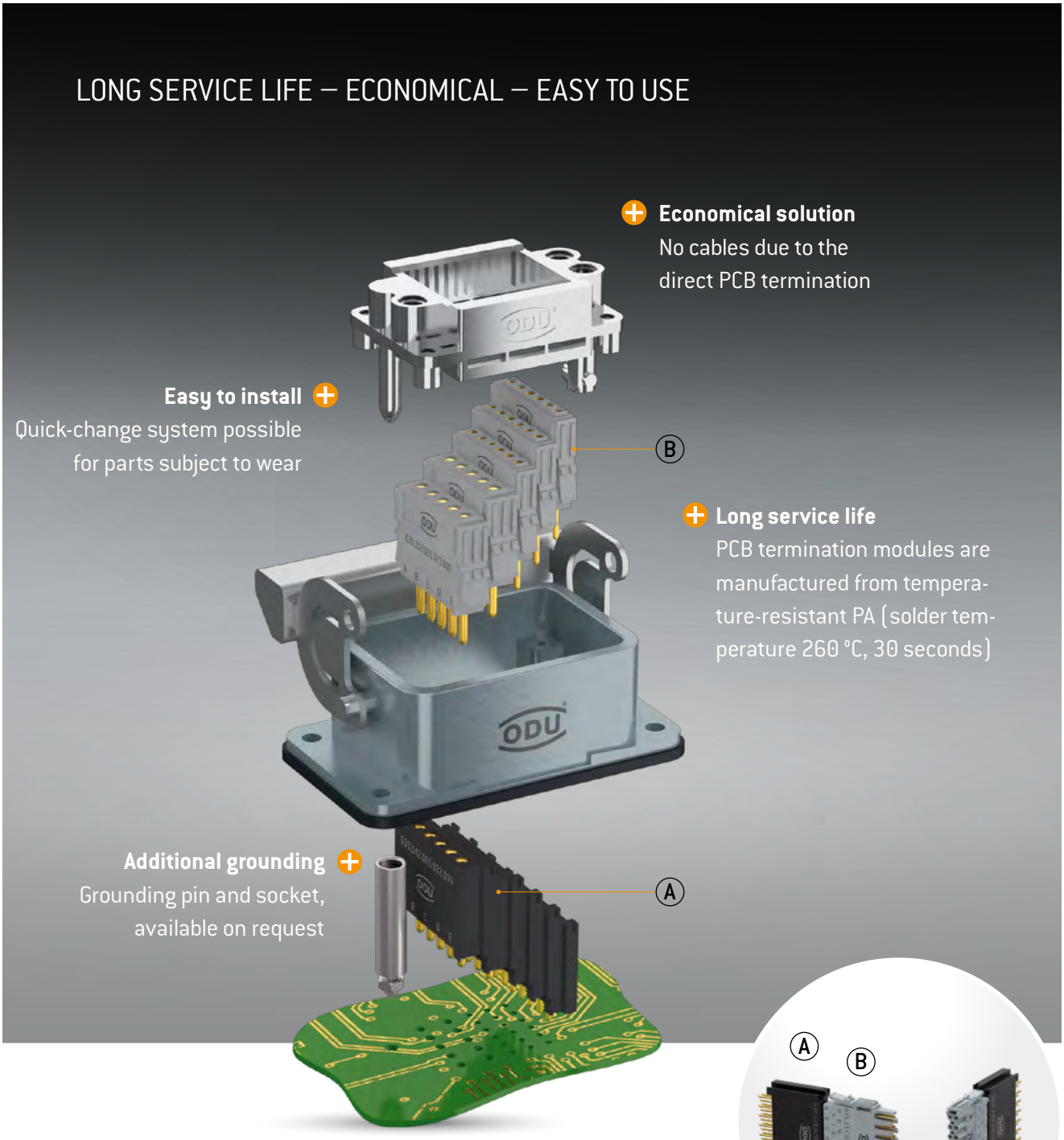


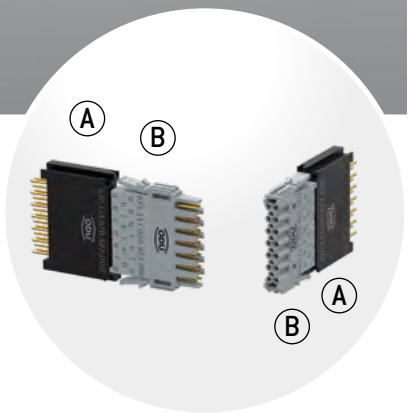
By means of secondary locking, the module is locked correctly

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 VARIOUS 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.

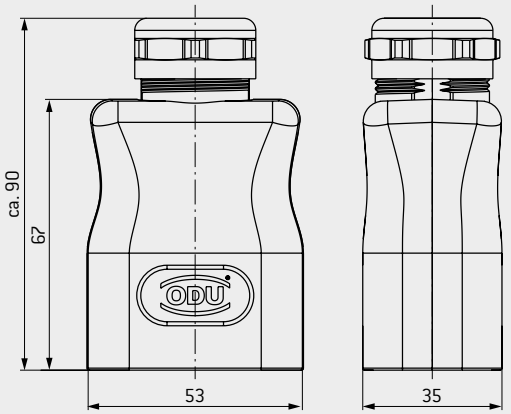
MANUAL MATING

ODU-MAC® PUSH-LOCK

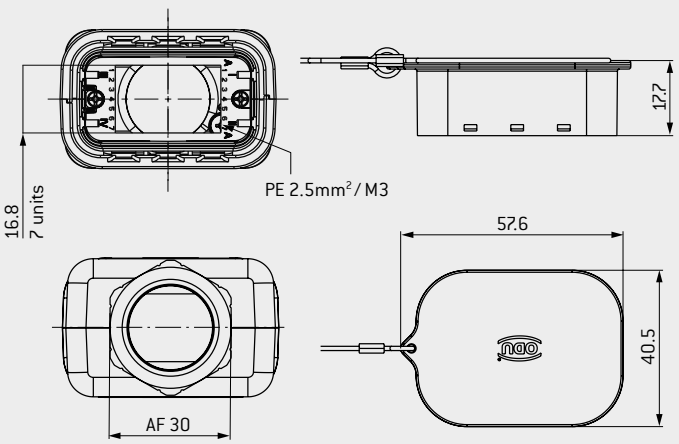
Connector housing for assembly on the cable

PUSH-PULL LOCKING

PLUG



COVER



ODU-MAC® PUSH-LOCK	Part number
Cable hood Black	656.564.012.000.000
Cable hood White	656.564.012.000.001
Connector coding set	656.564.002.010.000
Connector protective cover	656.564.020.000.000

Assembly set for cable-Ø (has to be ordered separately)	Color	Part number
7 to 10.5	Green	921.000.006.999.001
	Gray	921.000.006.999.011
9 to 13	Red	921.000.006.999.002
	Gray	921.000.006.999.012
14 to 18	Blue	921.000.006.999.003
	Gray	921.000.006.999.013
17 to 20.5	Brown	921.000.006.999.004
	Gray	921.000.006.999.014

TECHNICAL DATA

Color of housing	Black (RAL 9005), White (RAL 9003)
Material housing shell	Lexan PC (UL 94)
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
EMC shielding	acc. to IEC 62153-4-3:2013/-4-4:2015
Cable diameter	7–20.5
Coding	6 more mechanical versions as options

SUITABLE MODULES ARE MARKED, REVERSED GENDER IS NOT POSSIBLE.

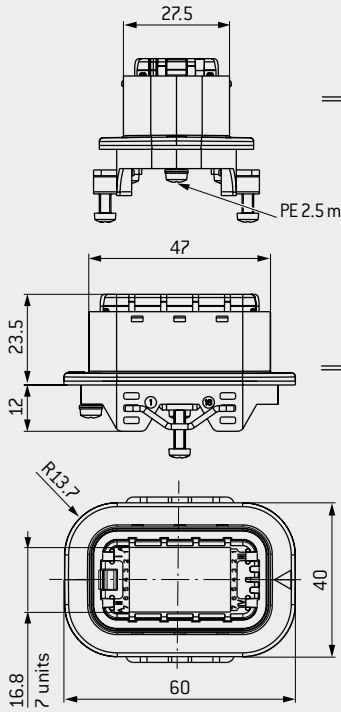
[1] At maximum mating force for all contacts of 40 N [2] The frame is already permanently integrated and consists of seven units. [3] IEC 60529:1989 (VDE 0470-1:2014-09)

ODU-MAC® PUSH-LOCK

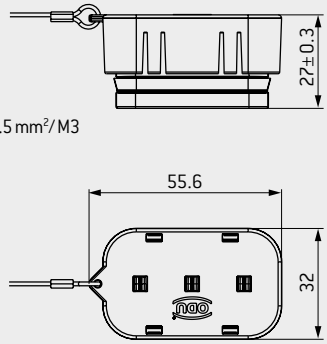
Receptacle for integration in your device

PUSH-PULL LOCKING

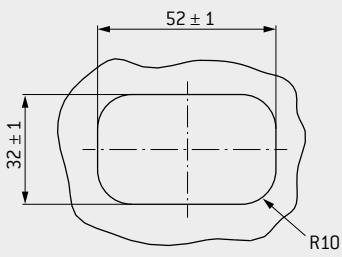
RECEPTACLE



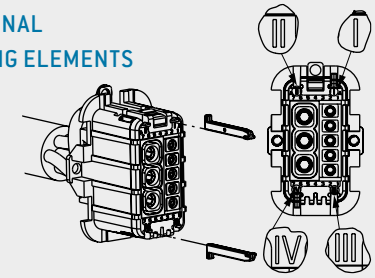
COVER



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 60529:1989 (VDE 0470-1:2014-09)

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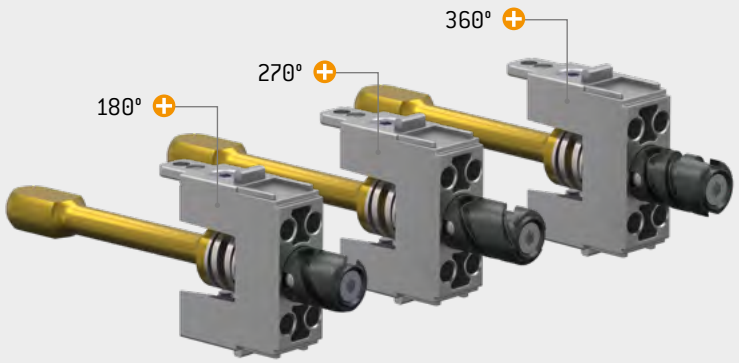
SPINDLE LOCKING (VERSION 1)

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



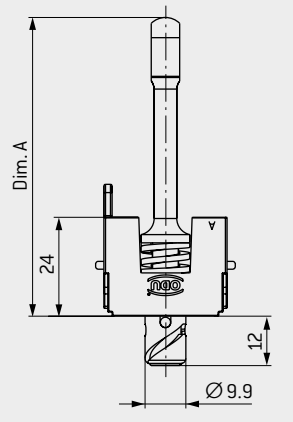
TECHNICAL NOTES

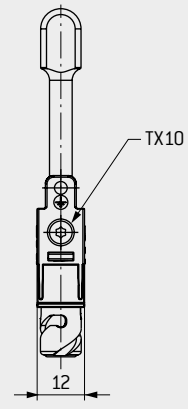
- Min. 10,000 locking cycles
- Space requirement 5 units (5 × 2.4 mm)
- Easy one-hand insertion/connection
- Force benefit by the insertion/connection
- Replaceable spindle screws
- Direct PE contacting (M3 ring cable lug)

Please note the recommended mounting position of the spindle as shown in the table below:

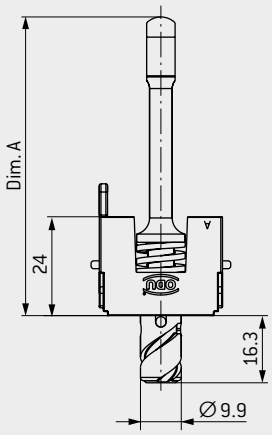
Frame size	Unit range
4	17 - 21
3	11 - 15
2	7 - 11

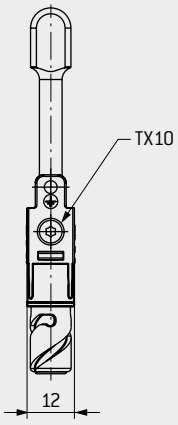
SPINDLE 1 – 12 mm (180°)



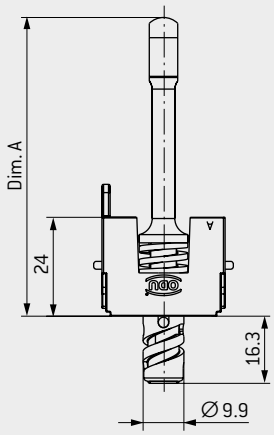


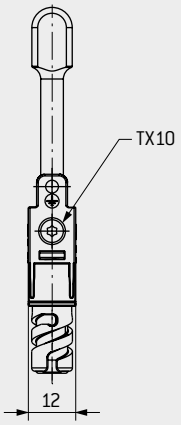
SPINDLE 2 – 16.3 mm (270°)



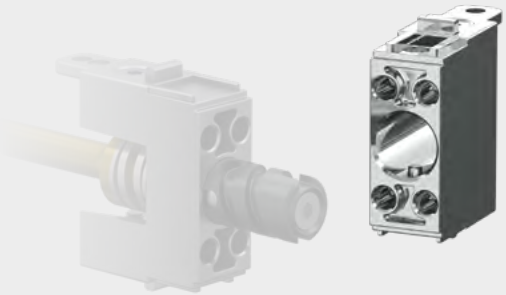


SPINDLE 3 – 16.3 mm (360°)

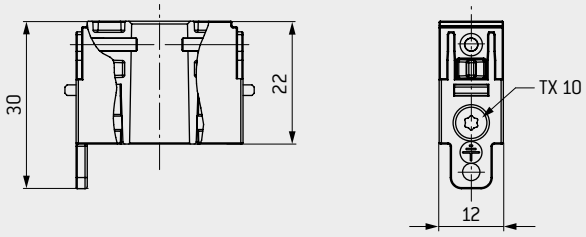




CENTER MODULE SUITABLE FOR SPINDLE 180°, 270° AND 360°



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 / RAPID	634.090.001.304.000	635.093.011.200.000	634.090.001.304.010	635.093.011.200.010	270°	90.5
XXL / RAPID	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.

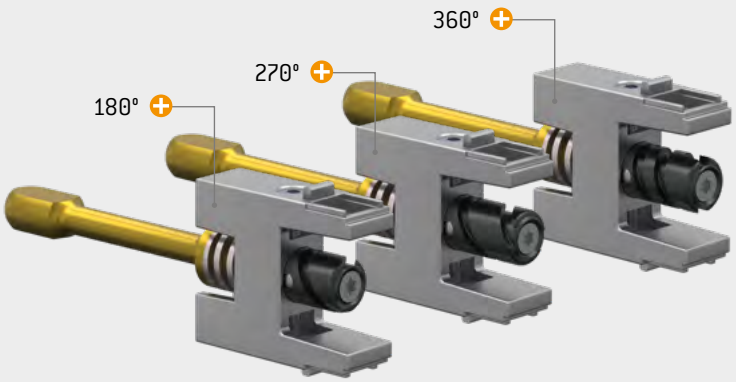
FOR THE REQUIRED ASSEMBLY AIDS, SEE PAGE 160

[1] Coding pins are included in the standard scope of delivery. For an explanation of spindle coding, see from page 74

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)



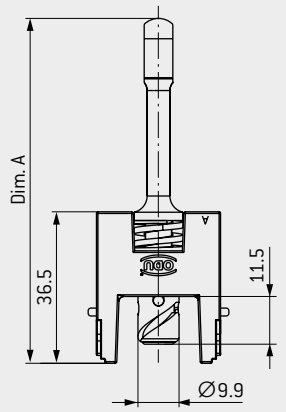
TECHNICAL NOTES

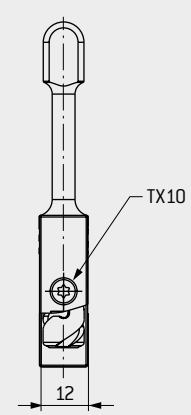
- Min. 10,000 locking cycles
- Space requirement 5 units (5 × 2.4 mm)
- Easy one-hand insertion/connection
- Force benefit by the insertion/connection
- Replaceable spindle screws

Please note the recommended mounting position of the spindle as shown in the table below:

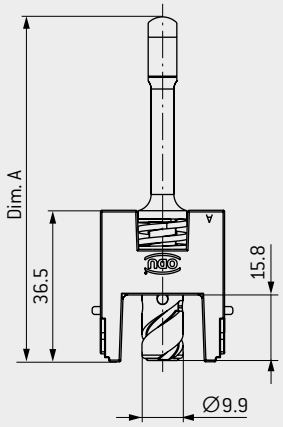
Frame size	Unit range
4	17 - 21
3	11 - 15
2	7 - 11

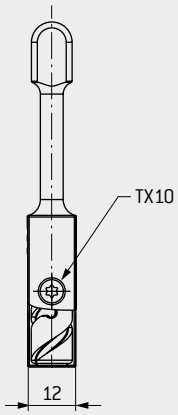
SPINDLE 1 – 11.5 mm (180°)



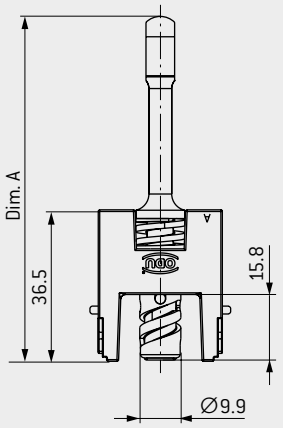


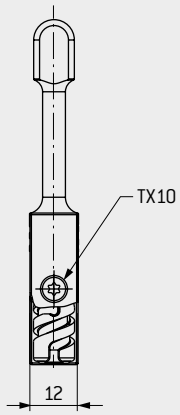
SPINDLE 2 – 15.8 mm (270°)





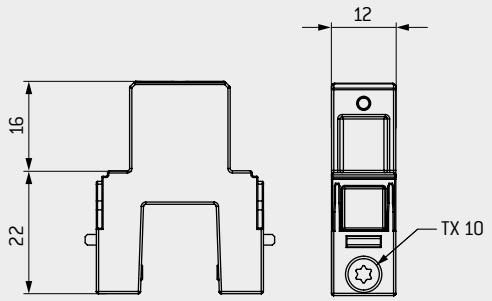
SPINDLE 3 – 15.8 mm (360°)





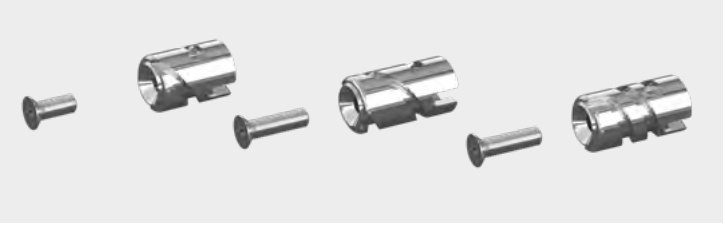
CENTER MODULE SUITABLE FOR SPINDLE 180°, 270°, AND 360°

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 160

METAL CABLE HOOD

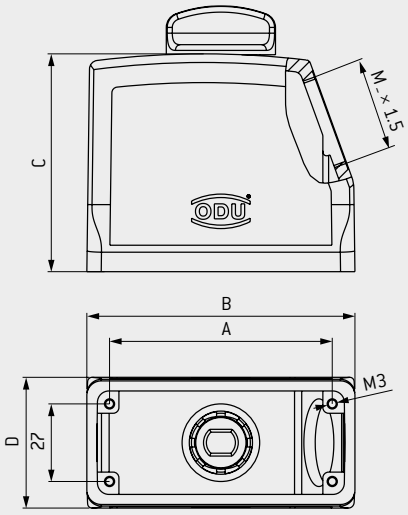
Connector housing for assembly on the cable with side cable outlet

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 67
Number of locking cycles	see page 38
Adapter	for PG clamp see page 68

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 65)
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	M32	
	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
	50	–	613.092.515.653.003	–	77.5	93.3	76	45.5	M40	
	65	613.092.574.644.008	–	–	77.5	93.3	76	45.5	M32	
4	50	613.093.514.644.208	613.093.514.653.203	613.093.514.653.208	104	120	76	45.5	M32	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	

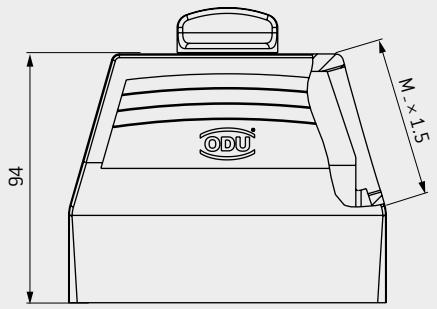
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) and spindle knob used)

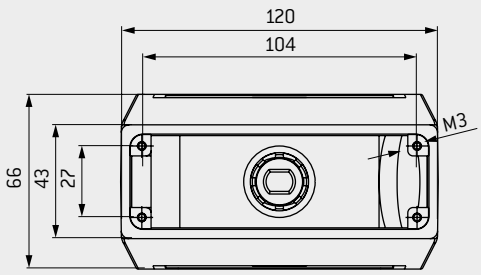
METAL CABLE HOOD XXL

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) 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 67
Number of locking cycles	see page 38

Size	IP	Part number Color of housing gray/spindle knob black	Dim. M Cable outlet	Part number protective cover (see page 65)
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 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) and spindle knob used)

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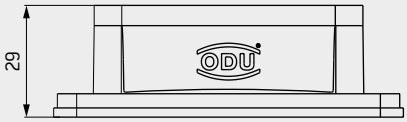
METAL BULKHEAD HOUSING

For mounting on your device

SPINDLE LOCKING

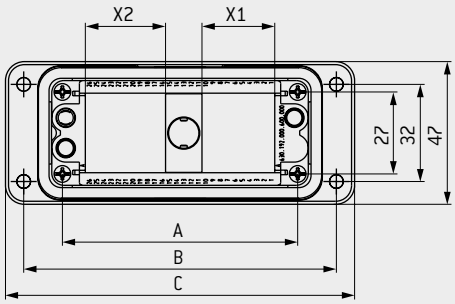
A GRAY MODEL (STANDARD)

B WHITE MODEL



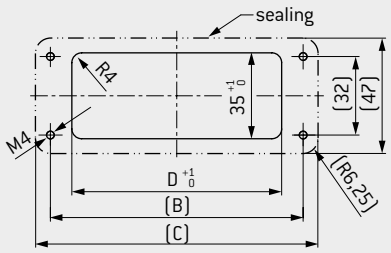
TECHNICAL DATA

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



The frames depicted must be ordered separately, see page 66.

PANEL CUT-OUT



Size	Part number A Color of housing gray	Part number B Color of housing white	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D Panel cut-out mm	X1 Units × 2.4 mm	X2 Units × 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 60529:1989 (VDE 0470-1:2014-09) (depends on the cable hood with spindle locking used)

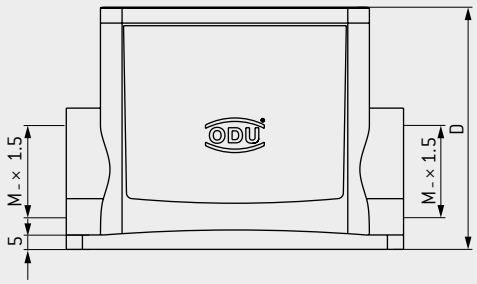
METAL SURFACE-MOUNTED HOUSING

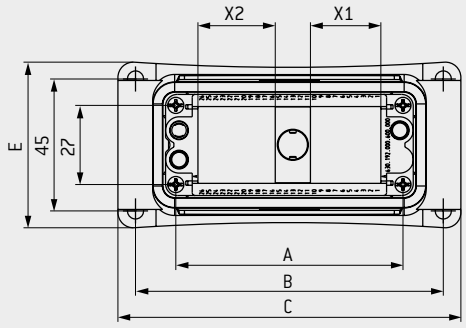
For surface mounting on your device/wall with two side cable outlets

SPINDLE LOCKING

A GRAY MODEL (STANDARD)

B WHITE MODEL





The frames depicted must be ordered separately, see page 66.

TECHNICAL DATA

Color of housing	Gray (standard, similar to RAL 7001) White on request
Material	aluminum die casting
International	
Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85 °C (continuous)
Sealing	NBR; sealing material, FKM on request (to extend the temperature range)
Cable clamp	see page 67
Adapter	for PG clamp see page 68

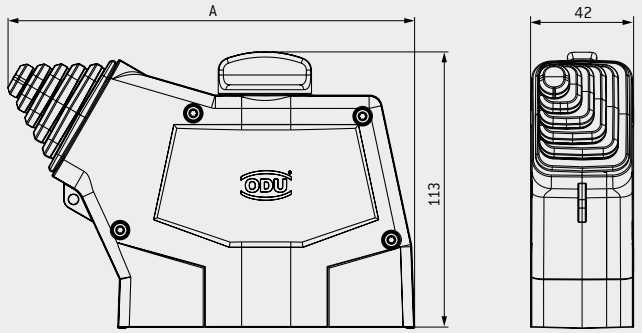
Size	Part number A Color of housing gray	Part number B Color of housing white	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	X1 Units × 2.4 mm	X2 Units × 2.4 mm	Dim. M Cable outlet
2	612.091.025.644.102	612.091.025.653.102	57	82	92.5	74	55.5	6	7	M32
3	612.092.025.644.102	612.092.025.653.102	77.5	105	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 60529:1989 (VDE 0470-1:2014-09) (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



TECHNICAL DATA

Color of housing	Black (RAL 9005), White (RAL 9003)
Material	Plastic Lexan PC, UL 94-V0
International Protection class[1]	IP4X
Operating temperature	–40 °C to +125 °C
Grommet	Silicone (RAL 7035), UL 94-V0
Number of locking cycles	see page 38
Coding	Spindle coding (6 options) see page 72

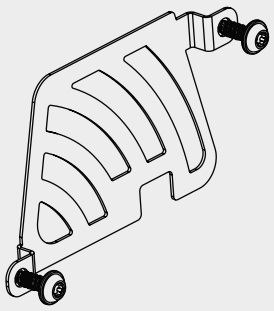
Size	Part number	Description	Color of housing	Cable outlet □	Part number protective cover	Dim. A mm
2	656.561.012.003.000	RAPID housing	White	Max. 26 × 37 mm	656.561.012.023.000	139
2	656.561.012.008.000	RAPID housing	Black		656.561.012.018.000	
4	656.563.012.003.000	RAPID housing	White		656.563.012.023.000	165.7
4	656.563.012.008.000	RAPID housing	Black		656.563.012.018.000	
2 / 4	635.093.011.200.000	Spindle locking 270° without coding				
2 / 4	635.093.011.200.010	Spindle locking 270° with coding				
2 / 4	635.093.011.200.003	Spindle locking 360° without coding				
2 / 4	635.093.011.200.013	Spindle locking 360° with coding				
2	631.191.000.600.001	Housing frame, pin side				
4	631.193.000.600.001	Housing frame, pin side				

[1] IEC 60529:1989 (VDE 0470-1:2014-09)

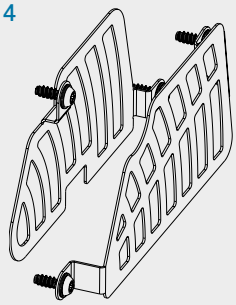
STRAIN RELIEF SET

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

SIZE 2



SIZE 4



TECHNICAL DATA

Material	Stainless steel
Operating temperature	–40 °C to +125 °C

Size	Part number	Included accessories
2	656.561.002.050.000	1 × strain-relief plate including fastening screws 2 × S3 × 13.5 TX10
4	656.563.002.050.000	2 x strain-relief plate including fastening screws 4 x S3 x 13.5 TX10

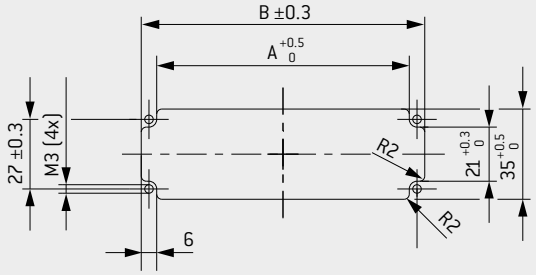
ODU-MAC® RAPID RECEPTACLE

For mounting on your device

SPINDLE LOCKING

DIRECT ASSEMBLY OF THE SOCKET FRAME ON ASSEMBLY WALL

PANEL CUT-OUT



Size	Part number	Description	Dim. A mm	Dim. B mm
2	630.191.000.600.000	Frame	51	57
4	630.193.000.600.000	Frame	98	104
2 / 4	634.090.001.304.000	Center module without coding		
2 / 4	634.090.001.304.010	Center module with coding		

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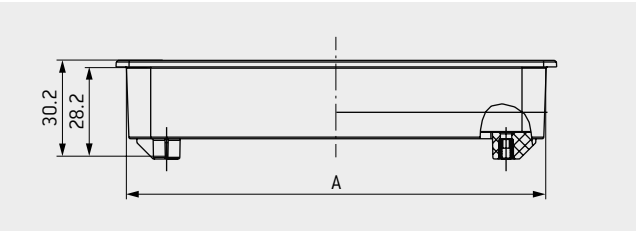
ODU-MAC® RAPID RECEPTACLE

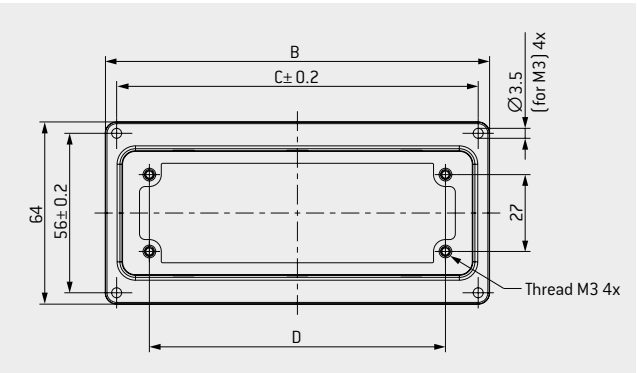
For mounting as a recessed plastic version

SPINDLE LOCKING

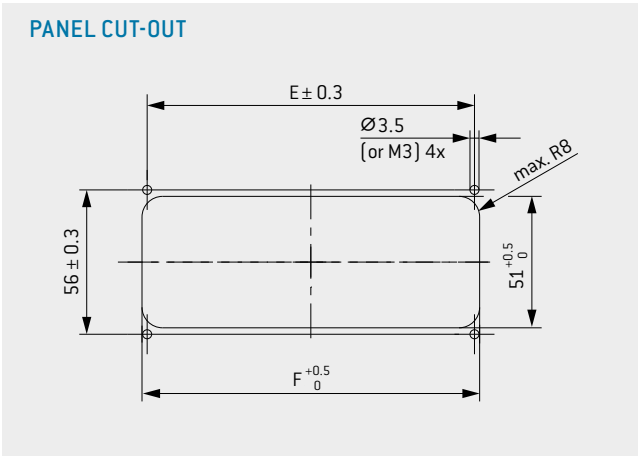
TECHNICAL DATA

Color of housing (recessed style)	Black (RAL 9005), White (RAL 9003)
Material	Plastic Lexan PC, UL 94-V0
Operating temperature International	–40 °C to +125 °C
Protection class[1]	IP4X





PANEL CUT-OUT



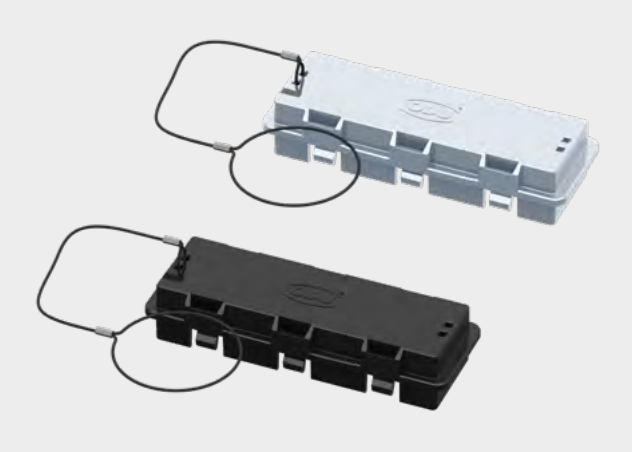
Size	Part number	Description	Color of housing	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	Dim. F mm
2	656.561.001.003.000	Receptacle	White	82.4	88	80	57	80	84
2	656.561.001.008.000	Receptacle	Black	82.4	88	80	57	80	84
4	656.563.001.003.000	Receptacle	White	129.4	134.9	127.2	104	127	131
4	656.563.001.008.000	Receptacle	Black	129.4	134.9	127.2	104	127	131
2	630.191.000.600.000	Frame							
4	630.193.000.600.000	Frame							
2 / 4	634.090.001.304.000	Center module without coding							
2 / 4	634.090.001.304.010	Center module with coding							

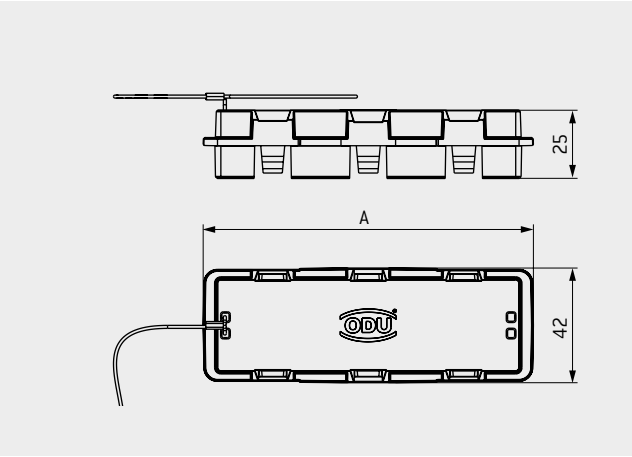
[1] IEC 60529:1989 (VDE 0470-1:2014-09)

PLASTIC PROTECTIVE COVER

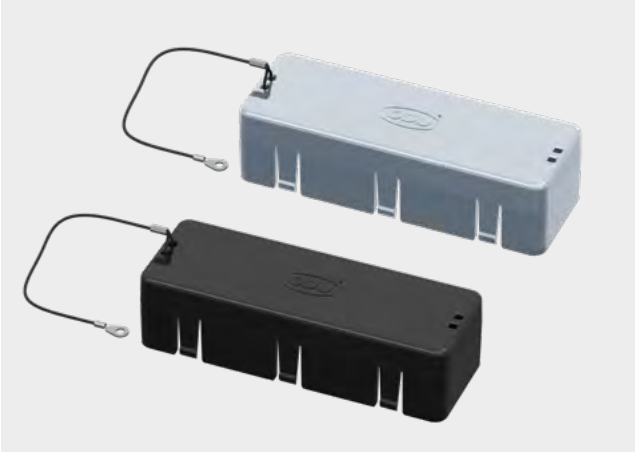
For ODU-MAC® RAPID housing and recessed version receptacle

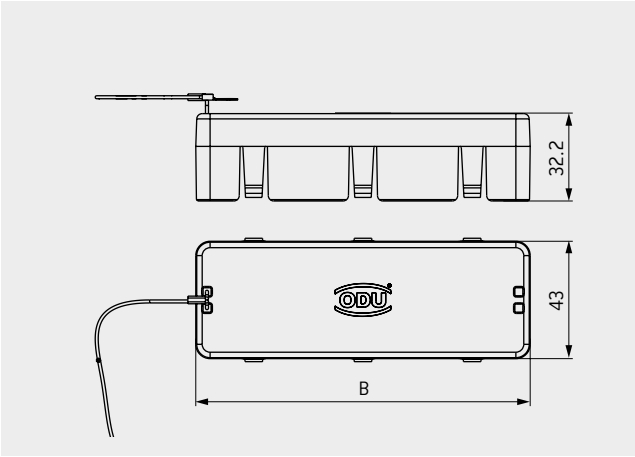
HOUSING





RECESSED-STYLE RECEPTACLE





TECHNICAL DATA

Color of housing	Black (RAL 9005), White (RAL 9003)
Material	Plastic Lexan PC, UL 94-V0
Operating temperature	–40 °C to +125 °C

Size	Color	Part number protective cover for housing	Part number protective cover for recessed version receptacle	Lanyard length housing mm	Lanyard length recessed version receptacle mm	Dim. A mm	Dim. B mm
2	White	656.561.012.023.000	656.561.011.023.000	300	150	74	75.5
2	Black	656.561.012.018.000	656.561.011.018.000				
4	White	656.563.012.023.000	656.563.011.023.000			121	122.5
4	Black	656.563.012.018.000	656.563.011.018.000				

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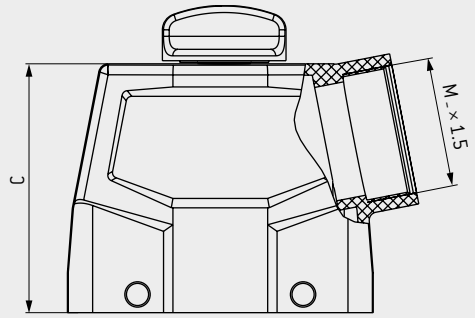
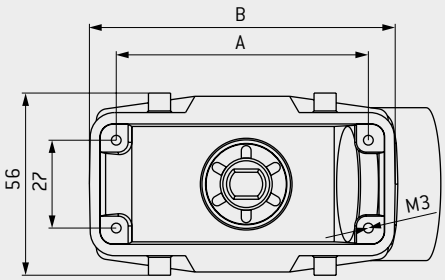
PLASTIC CABLE HOOD

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 IP65 on request
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 67
Number of locking cycles	see from page 38

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. M Cable outlet	Part number protective cover (see page 57)
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

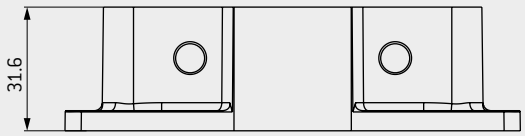
FOR A REDUCTION FROM M40 TO M32, SEE PAGE 67

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) and spindle knob used)

PLASTIC BULKHEAD HOUSING

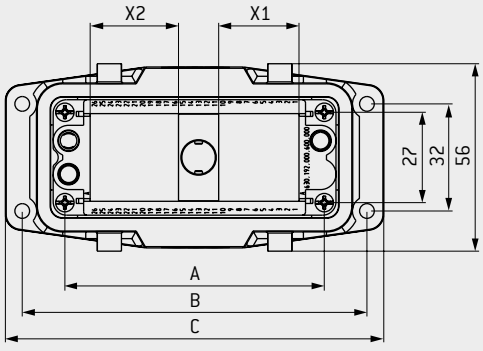
For mounting on your device with spindle locking

SPINDLE LOCKING



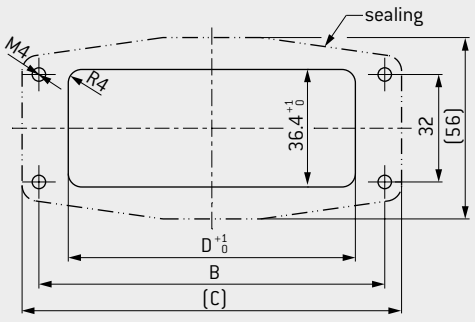
TECHNICAL DATA

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



The frames depicted must be ordered separately, see page 66.

PANEL CUT-OUT



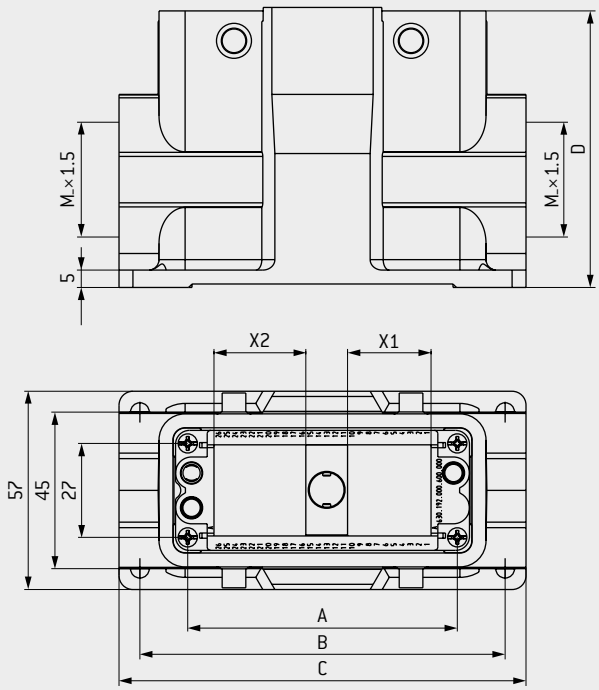
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D Panel cut-out mm	X1 Units × 2.4 mm	X2 Units × 2.4 mm	Part number protective cover (see page 56)
2	612.091.010.908.000	57	83	93	67	6	7	491.097.612.908.001
3	612.092.010.908.000	77.5	103	114	87	10	11	492.097.612.908.001
4	612.093.010.908.000	104	130	140	114	16	16	493.097.612.908.001

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable hood with spindle locking used)

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 66.

TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
International Protection class[1]	IP50 IP65 on request
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material
Cable clamp	see page 67

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 56)
2	612.091.020.908.000	57	82	94	82	6	7	M32	491.097.612.908.001
3	612.092.020.908.000	77.5	105	117	82	10	11	M40	492.097.612.908.001
4	612.093.020.908.000	104	132	144	82	16	16	M40	493.097.612.908.001

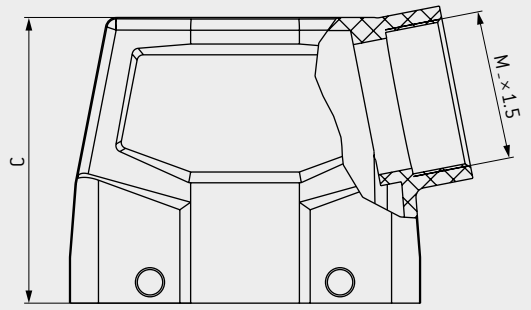
FOR A REDUCTION FROM M40 TO M32, SEE PAGE 67

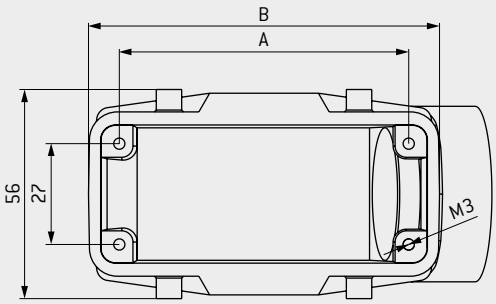
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) and cable hood with spindle locking used)

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 67
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 57)
1	490.420.650.908.000	44	61	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

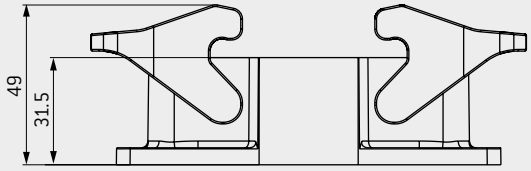
FOR A REDUCTION FROM M40 TO M32 AND FROM M32 TO M25, SEE PAGE 67

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) used)

PLASTIC BULKHEAD HOUSING

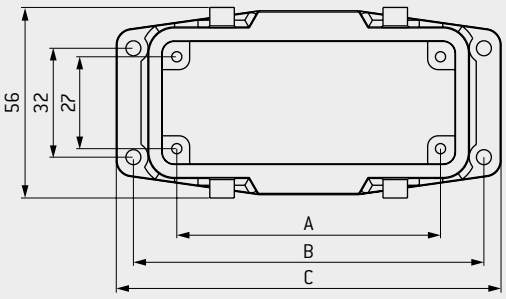
For assembly on your device with transverse locking

TRANSVERSE LOCKING

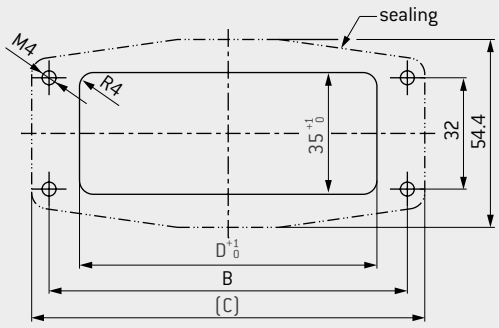


TECHNICAL DATA

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



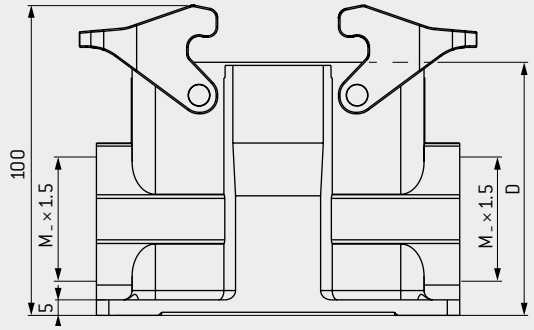
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D Panel cut-out mm	Part number protective cover (see page 56)
1	490.120.600.908.000	44	70	80	53	490.097.612.908.000
2	491.120.600.908.000	57	83	93.2	66	491.097.612.908.000
3	492.120.600.908.000	77.5	103	113	86	492.097.612.908.000
4	493.120.600.908.000	104	130	140	113	493.097.612.908.000

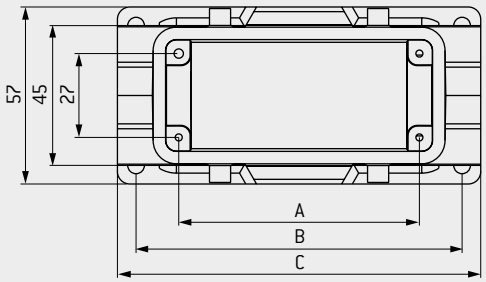
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable hood used)

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 67

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 56)
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 67

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) and cable hood used)

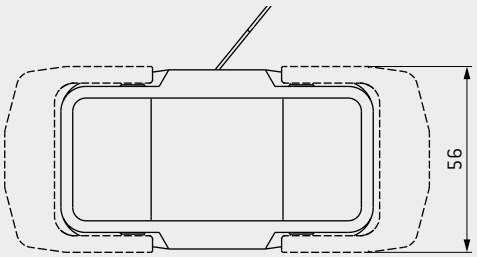
PLASTIC PROTECTIVE COVER

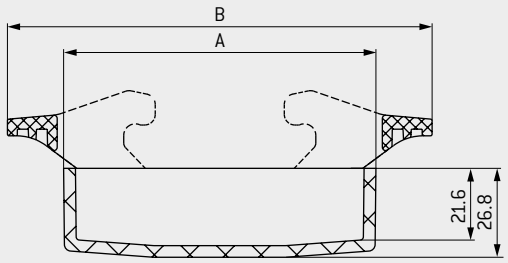
For bulkhead and surface-mounted housing with lanyard

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 Protective cover for spindle locking	Part number B Protective cover for transverse locking	Dim. A mm	Dim. B 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

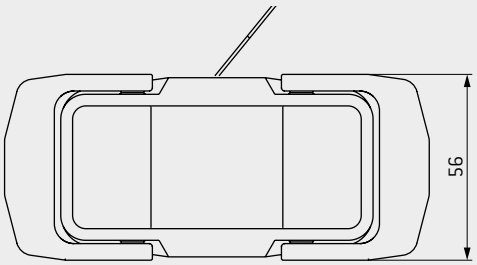
[1] IEC 60529:1989 (VDE 0470-1:2014-09)

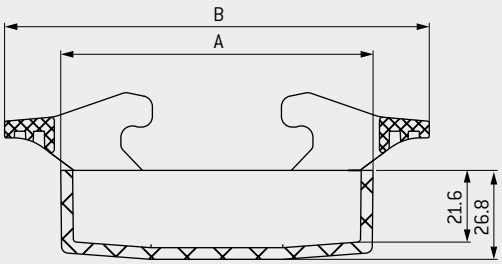
PLASTIC PROTECTIVE COVER

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 60529:1989 (VDE 0470-1:2014-09)

METAL CABLE HOOD

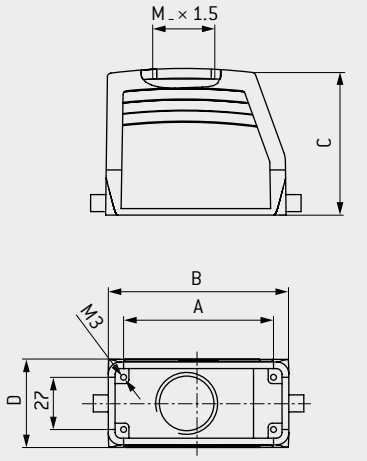
Connector housing for assembly on the cable with top and side cable outlet

LEVER LOCKING

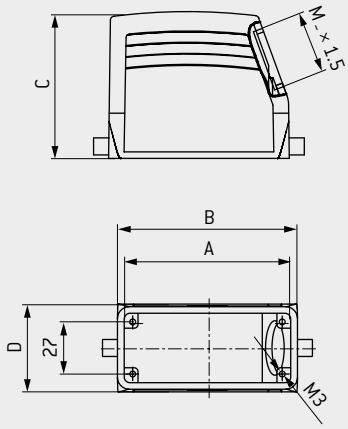
A TOP CABLE OUTLET

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 67
Adapter	for PG clamp see page 68

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 Top cable outlet	Part number B Side cable outlet	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable outlet	Part number protective cover (see page 65)
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
	492.216.550.644.000	–	104	120	76	45.5	M40	
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 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) used)

METAL CABLE HOOD XXL

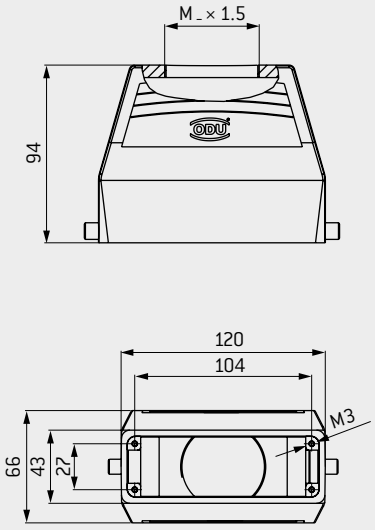
Connector housing for assembly on the cable with expanded assembly space and side and top M50 cable outlet

LEVER LOCKING

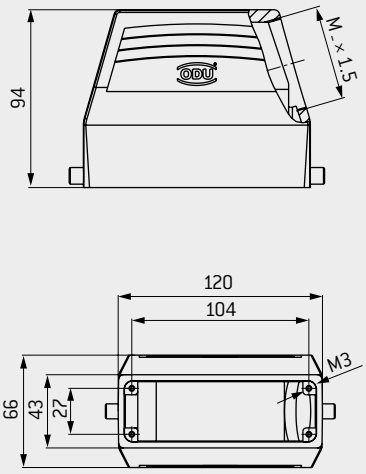
A TOP CABLE OUTLET

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 67

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 Top cable outlet	Part number B Side cable outlet	Dim. M Cable outlet	Part number protective cover (see page 65)
4	493.218.550.644.000	493.419.550.644.000	M50	493.097.214.644.000

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) used)

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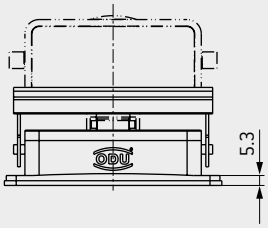
METAL BULKHEAD HOUSING

For mounting on your device

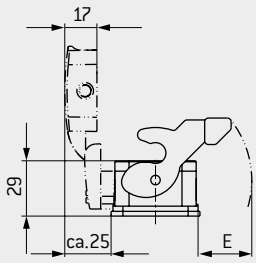
LEVER LOCKING

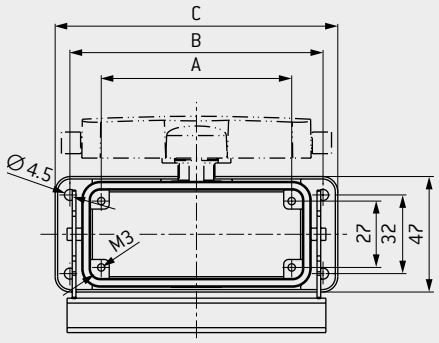
A WITHOUT COVER

B WITH COVER

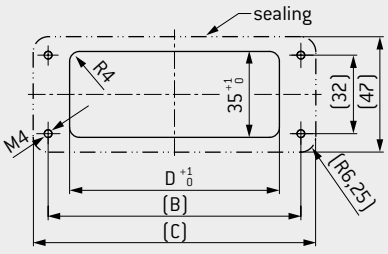


Lever locking (just an example)





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

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable hood used)

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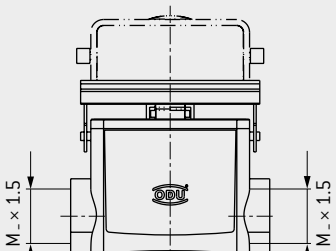
METAL SURFACE-MOUNTED HOUSING

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

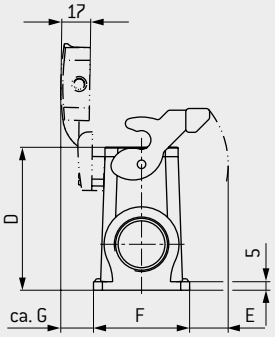
LEVER LOCKING

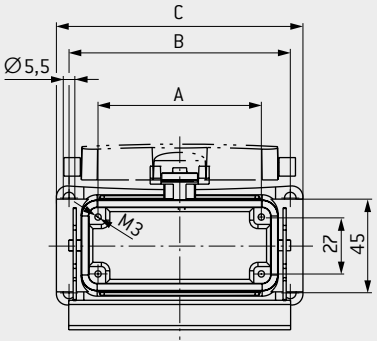
A WITHOUT COVER

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) –40 °C to +85 °C (continuous)
Sealing	NBR; sealing material FKM on request (to extend the temperature range)
Adapter	for PG clamp see page 68

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 Without protective cover	Part number B With protective cover	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	Dim. F mm	Dim. G mm	Dim. M Cable 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 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) and cable hood used)

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METAL CABLE HOOD WIDE

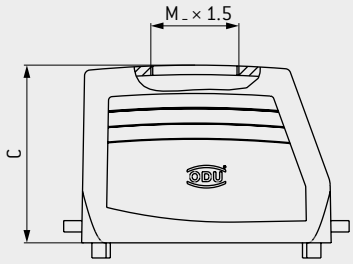
With top and side cable outlet for double frame assembly

LEVER LOCKING

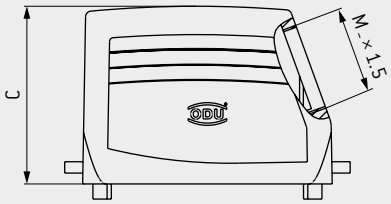
A TOP CABLE OUTLET

B SIDE CABLE OUTLET

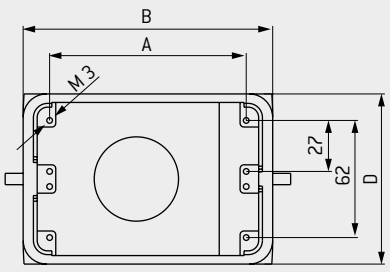
A TOP CABLE OUTLET



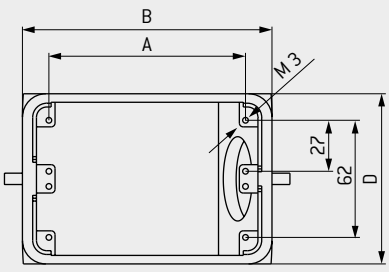
B SIDE CABLE OUTLET



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 67

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.

Size	Part number A Top cable outlet	Part number B Side cable outlet	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M 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 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) used)

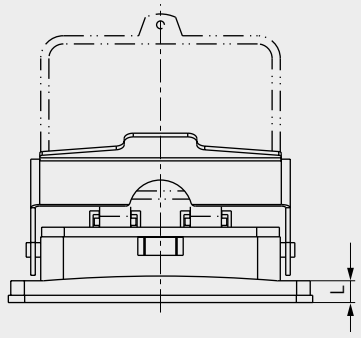
METAL BULKHEAD HOUSING FOR CABLE HOOD WIDE

For mounting on your device

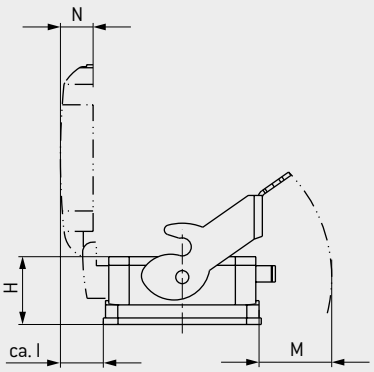
LEVER LOCKING

A WITHOUT COVER

B WITH COVER



Lever locking (just an example)

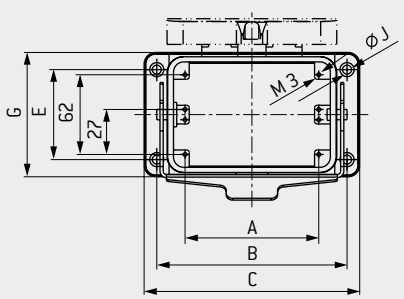


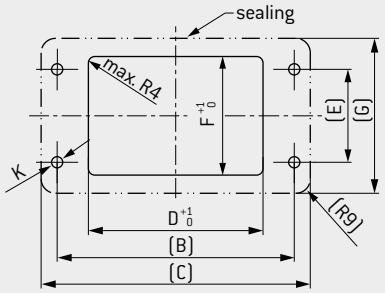
TECHNICAL DATA

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

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable hood wide used)

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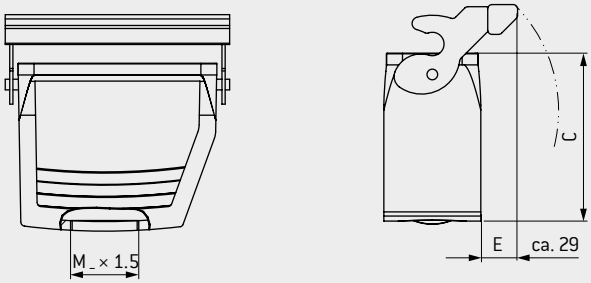
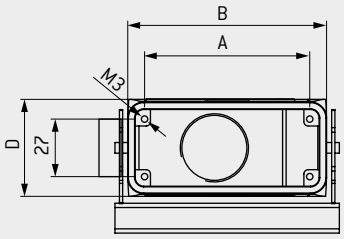
METAL CABLE-TO-CABLE HOOD

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 58).

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) –40 °C to +85 °C (continuous)
Sealing	NBR; sealing material FKM on request (to extend the temperature range)
Cable clamp	see page 67
Adapter	for PG clamp see page 68

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

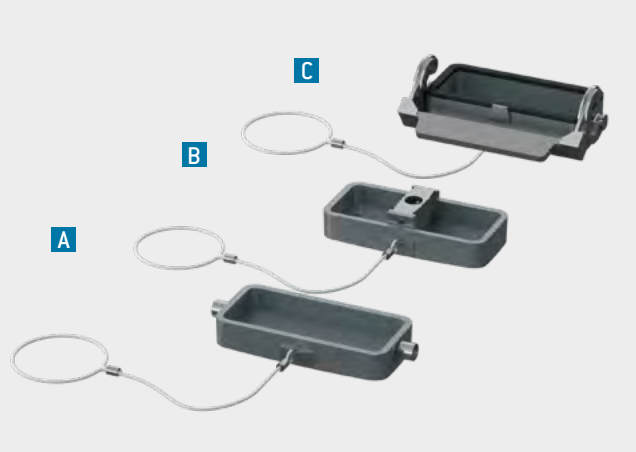
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable outlet	Part number Protective cover (see page 65)
1	490.331.450.644.102	44	60	75	43	M32	490.097.500.644.001
2	491.331.450.644.102	57	73	75	43		491.097.133.644.000
3	492.331.450.644.102	77.5	93.3	79	45.5		492.097.133.644.000
4	493.331.450.644.102	104	120	79	45.5		493.097.133.644.000

M40 CABLE OUTLET AVAILABLE ON REQUEST

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) used)

METAL PROTECTIVE COVER

For metal housing



TECHNICAL DATA

Color	Gray (standard, similar to RAL 7001)

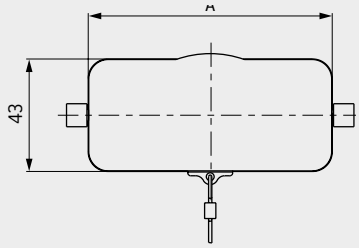
International Protection class IP65 in locked condition
Metal protective cover with locking latch (C)
Metal protective cover with bolt and lanyard (A)

International Protection class IP42 in locked condition

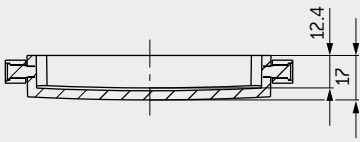
Metal protective cover	with center module for spindle locking and lanyard (B)
Material	aluminum die casting (body)
Temperature range	–40 °C to +125 °C
Sealing	NBR; sealing material

A METAL PROTECTIVE COVER

for bulkhead or surface-mounted housing and cable-to-cable hood

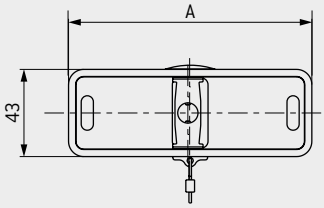


A VIEW WITHOUT LANYARD

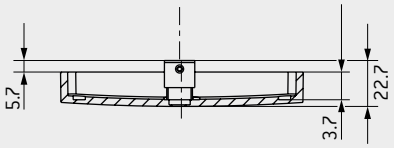


B METAL PROTECTIVE COVER

for cable hood and cable hood XXL for spindle locking

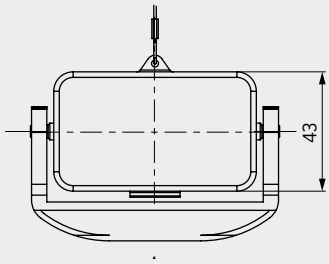


B VIEW WITHOUT LANYARD



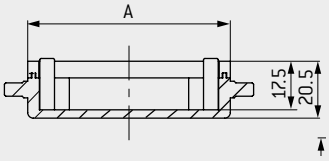
C METAL PROTECTIVE COVER

for cable hood and cable hood XXL with lever locking



Lever locking, just an example

C VIEW WITHOUT LOCKING LATCH



Size	IP65 Part number A Metal protective cover with bolt and lanyard	IP42 Part number B[1] Metal protective cover for spindle locking with lanyard and center module	IP65 Part number C Metal protective cover with locking latch	Dim. A mm
1	490.097.500.644.001	–	490.097.500.644.000	60
2	491.097.133.644.000	491.097.613.644.001	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

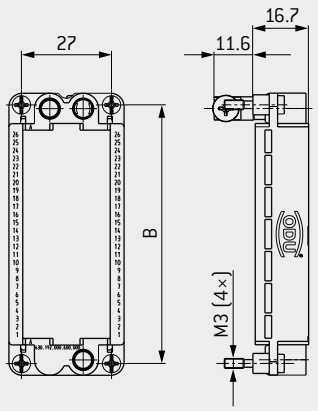
TECHNICAL DATA

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

Included in the scope of delivery: secondary locking part

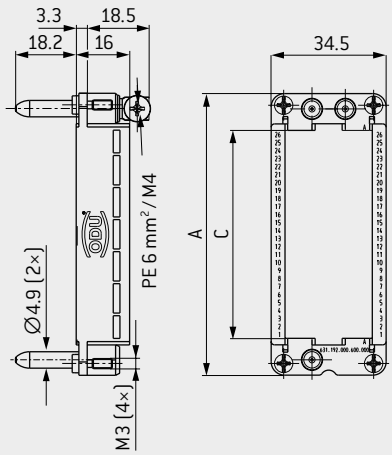
For use and assembly, see page 31

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 70.

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 Socket frame	Part number Pin frame	Max. units 2.4 mm[1]	Dim. A mm	Dim. B mm	Dim. C 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						
2	630.191.000.600.000	631.191.000.600.001	18	64	57	18 × 2.4 = 43.2
4	630.193.000.600.000	631.193.000.600.001	37	111	104	37 × 2.4 = 88.8
FRAMES FOR CABLE HOOD WIDE						
5	2 × part number size 3	2 × part number size 3	2 x 26	84.5	77.5	26 × 2.4 = 62.4
6	2 × part number size 4	2 x part number size 4	2 x 37	111	104	37 × 2.4 = 88.8

[1] If the configuration doesn't fill the frame completely, please use blank modules (see page 152).
Please note that when equipping size 5 and 6 housings two frames are required.

CABLE CLAMP AND REDUCING RING

CABLE CLAMP[1] FOR HOUSINGS ACCORDING TO IEC 62444:2010 (VDE 0619:2014-05)

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-Ø mm Min.	Cable-Ø mm Max.
027.825.060.130.007	M25 × 1.5	Gray (RAL 7001)	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	Light Gray (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 (RAL 9005)	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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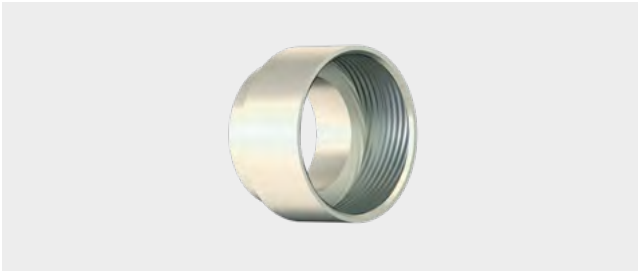
ADAPTER RING, BLIND PLUG, AND LOCKNUT

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

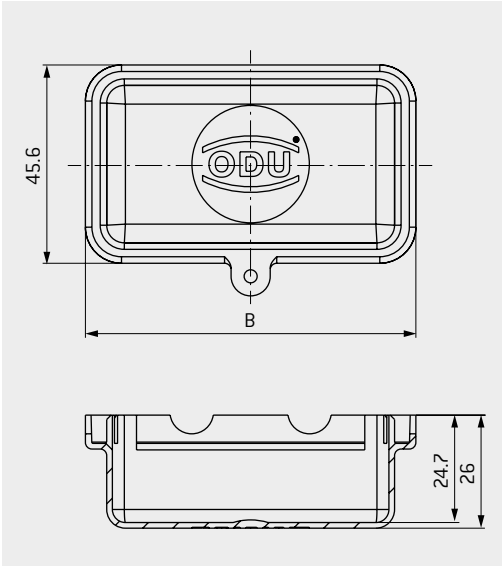
PROTECTIVE TRANSPORT COVER AND SECONDARY LOCKING PART

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

TECHNICAL DATA

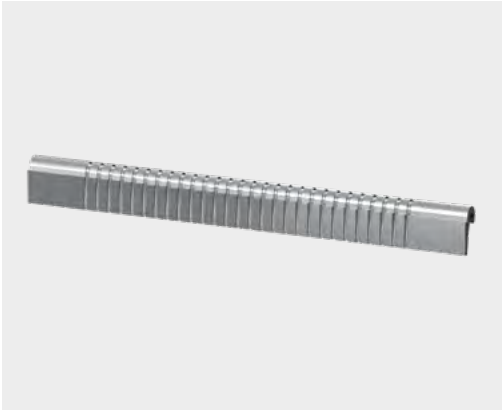
Material	plastic PP
Color	Black (similar to RAL 9002)

Size	Dim. B mm	Part number With holding rope	Part number 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



Please note: protective transport covers do not fit in case of using the coding option for housings.

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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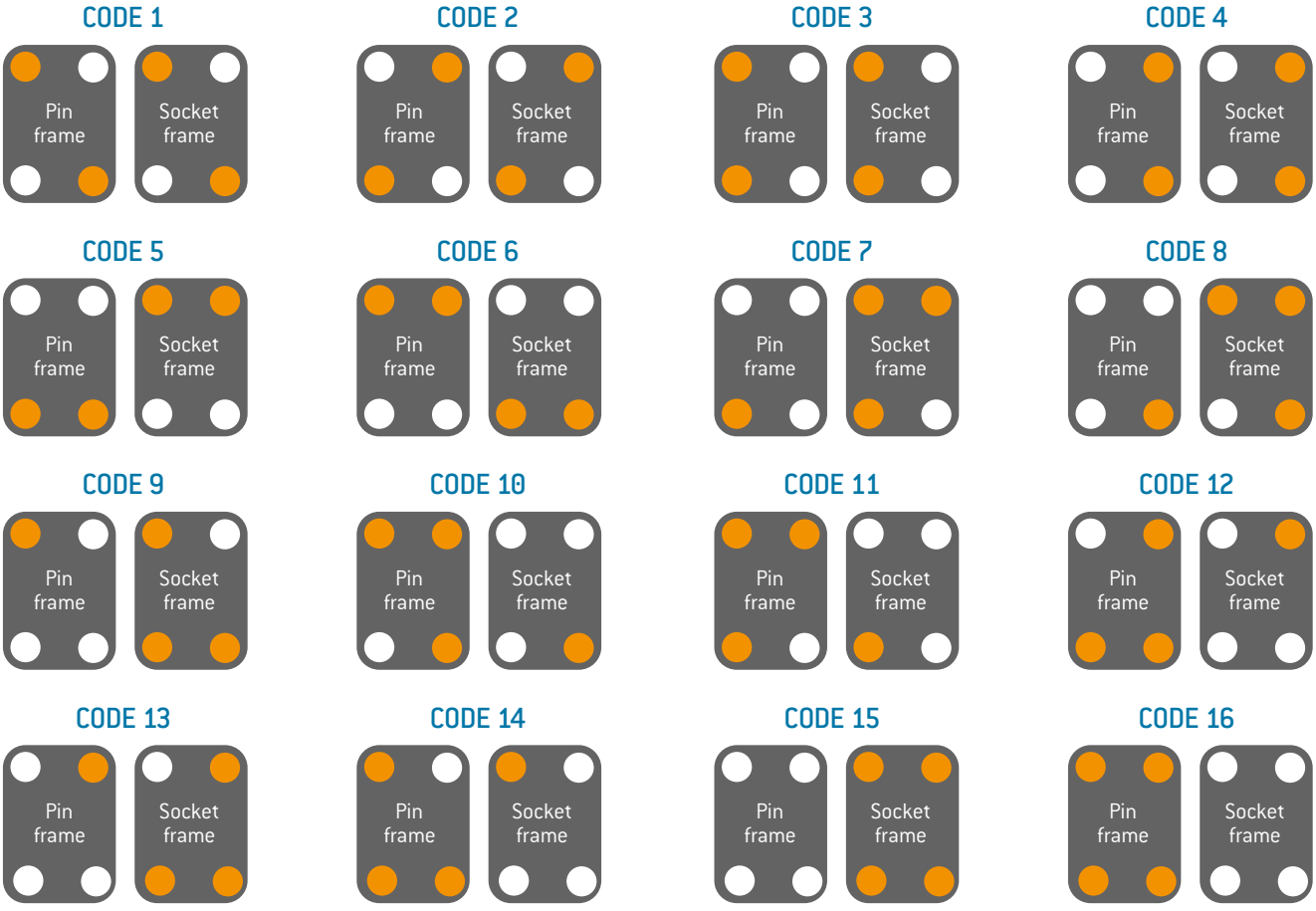
CODING OPTIONS FOR HOUSINGS WITH LEVER LOCKING

To prevent mismating

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

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

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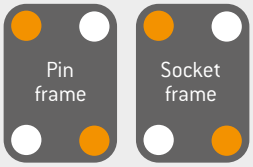
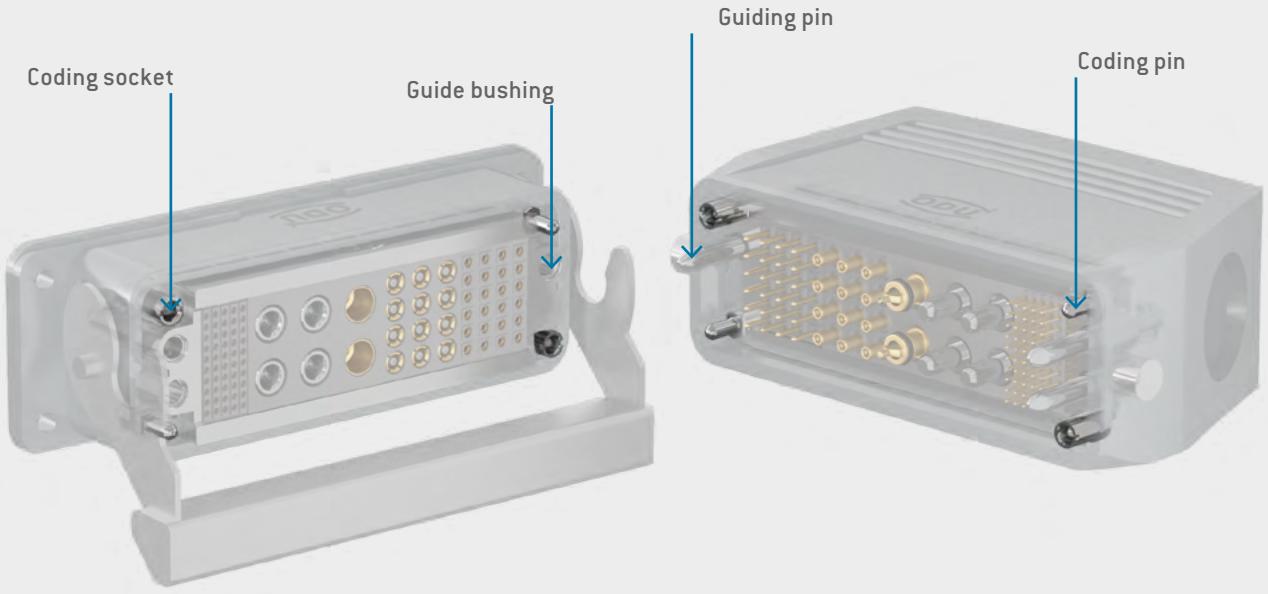
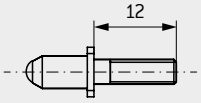
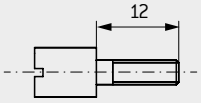
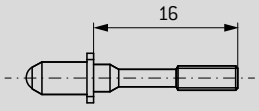
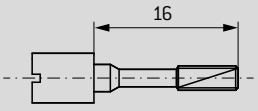
CODING EXAMPLE

CODE 1





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 OR 598.054.113.000.000

For an overview of all tools, see from page 155.

CODING OPTIONS FOR HOUSINGS WITH SPINDLE LOCKING

To prevent mismating

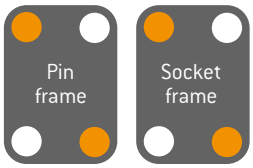
In order to prevent mismating, it is in some cases useful to provide the connection systems with a coding.

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.

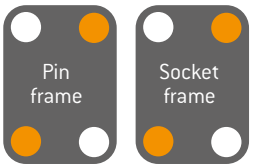
Alternatively, or if additional coding options are required, ODU offers an innovative option with the coded spindle on pages 74 and 75.

CODING OPTIONS

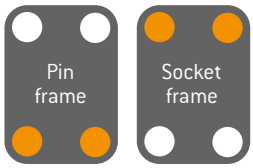
CODE 1



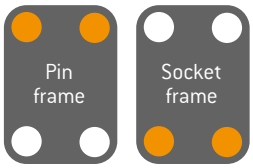
CODE 2



CODE 5



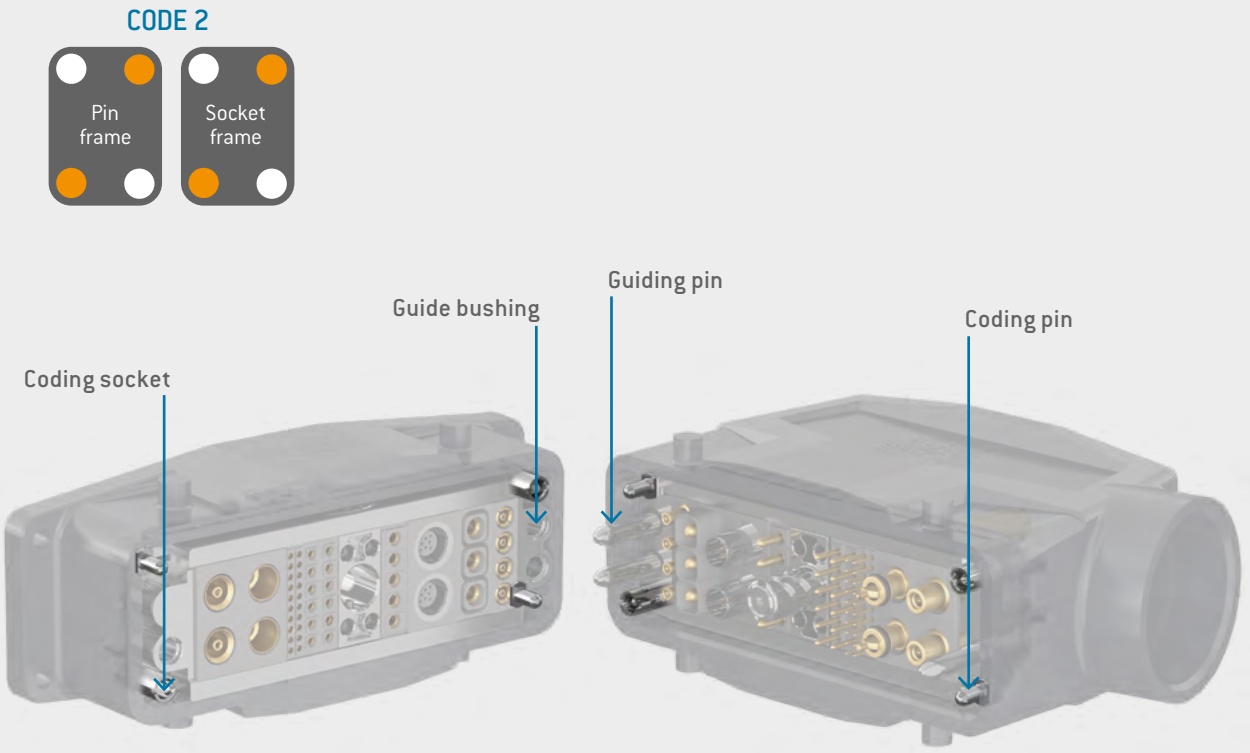
CODE 6

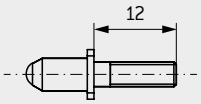
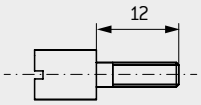
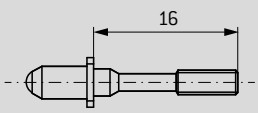
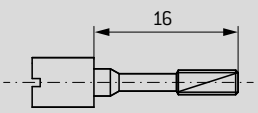


= Coding pin

= 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: 598.054.113.000.000

For an overview of all tools, see from page 155.

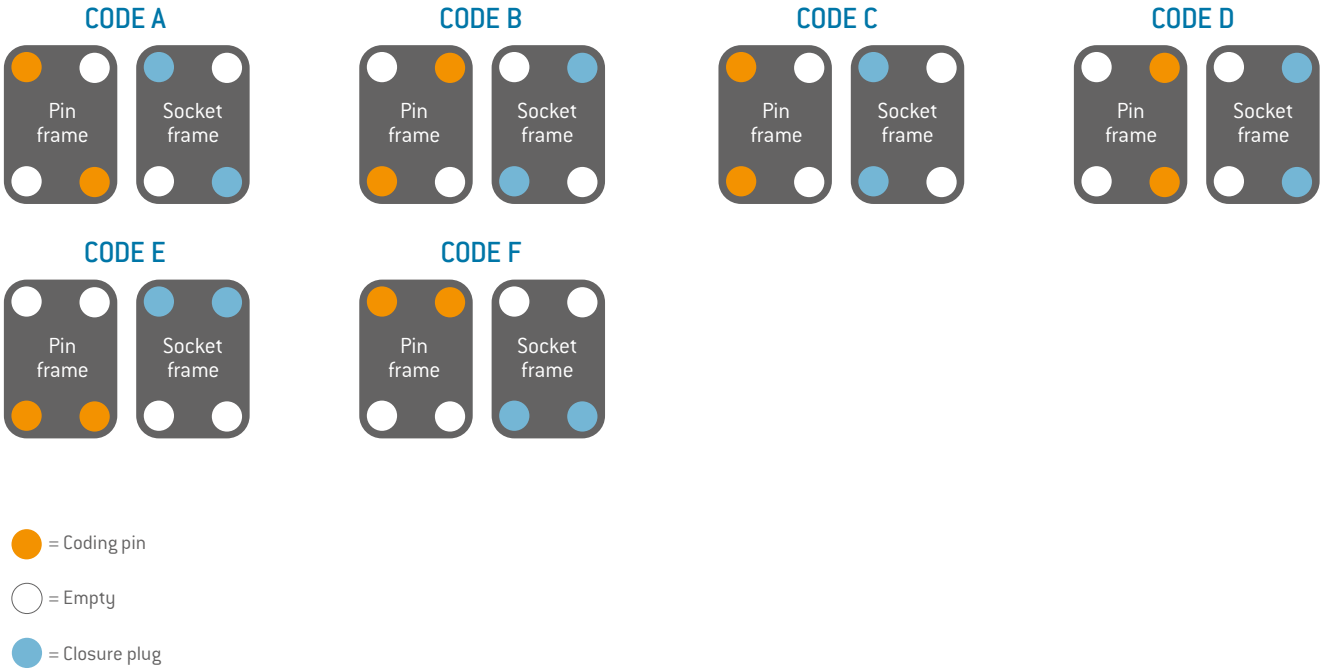
CODING OPTIONS FOR CODED SPINDLES

To prevent mismating

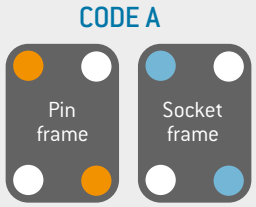
In order to prevent mismating, it is in some cases useful to provide the connection systems with a coding.

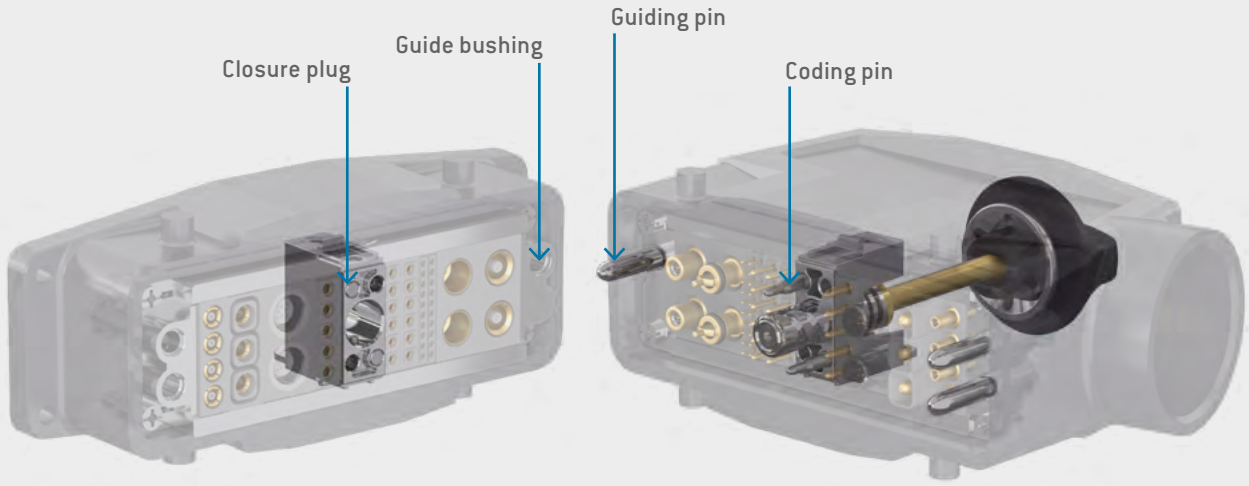
For this purpose, ODU has developed innovative coding that is directly integrated into the spindle for the ODU-MAC® Blue-Line housing versions. ODU provides up to 6 different coding options by installing 2 coding pins in the spindle locking and 2 closure plugs in the center module. If several adjacent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

For an overview of all tools, see from page 155.

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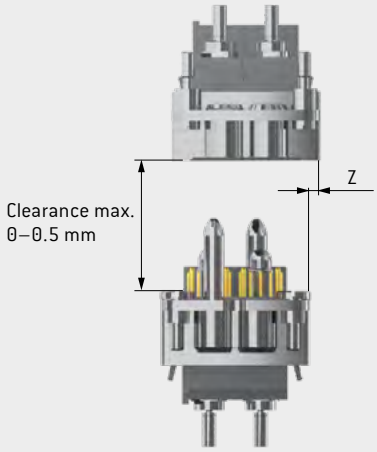
AUTOMATIC DOCKING

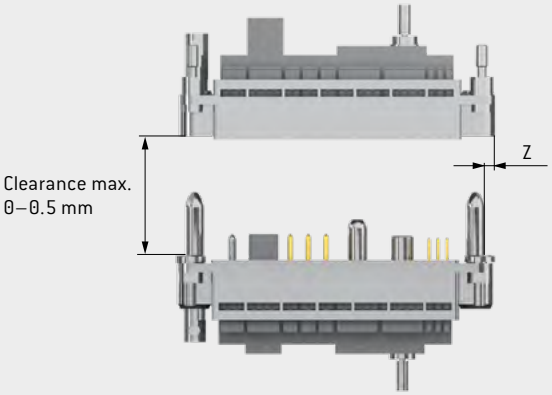
REQUIREMENTS OF THE COMPLETE SYSTEM

High mating cycles and high-speed data 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)

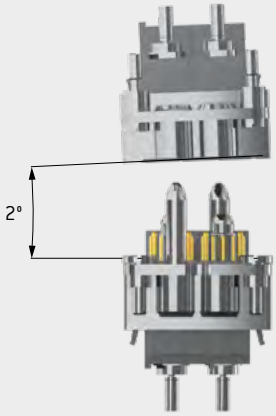


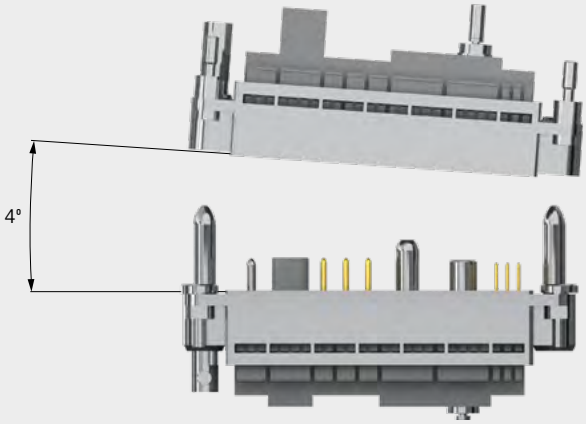


Frame	Tolerance z
Docking frame	+/– 0.6 mm

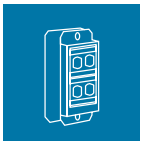
The maximum permissible gap between socket and pin pieces is 0.5 mm as standard. Extension with long contact pins is possible.

MAXIMUM PERMISSIBLE ANGLE DEVIATION WHEN MATING



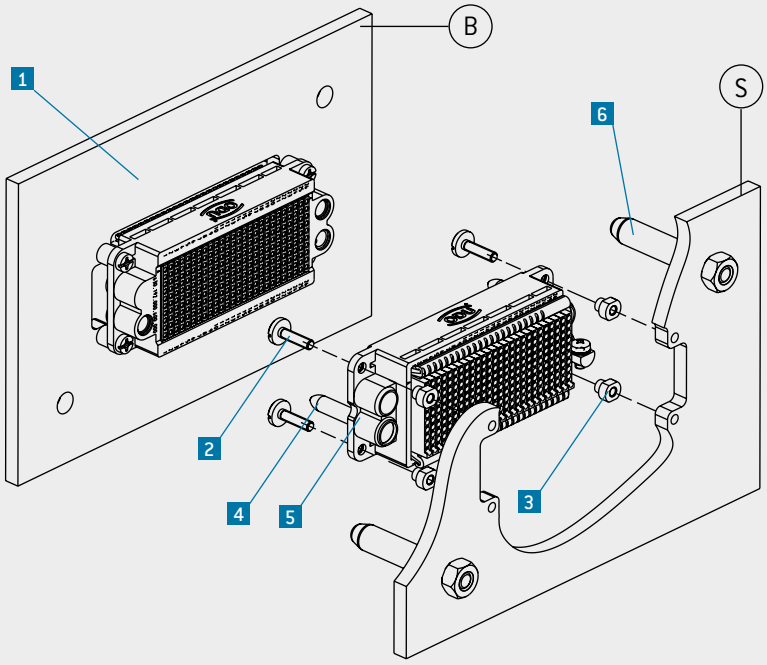


OUR TEAM IS HAPPY TO ANSWER ANY QUERIES YOU MAY HAVE.



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 plate (see page 81) or / and our strain-relief housing (see page 82).

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 Radial play: +/– 0.6 mm
4. Pins for self-centering of ODU-MAC® Blue-Line
5. ODU-MAC® Blue-Line pin piece (floating) (with play via centering bushing; screwed tight to wall S)
6. 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, please use our strain relief plate (see page 81) or /and our strain-relief housing (see page 82).

FAILURE TO OBSERVE THESE SPECIFICATIONS MAY RESULT IN DAMAGE.

ODU-MAC® BLUE-LINE DOCKING FRAME

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

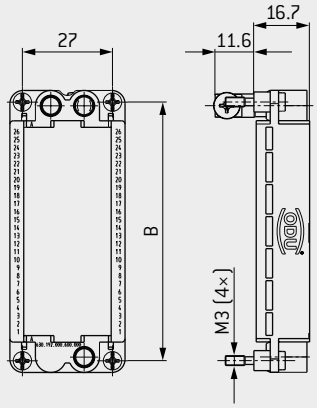
TECHNICAL DATA

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

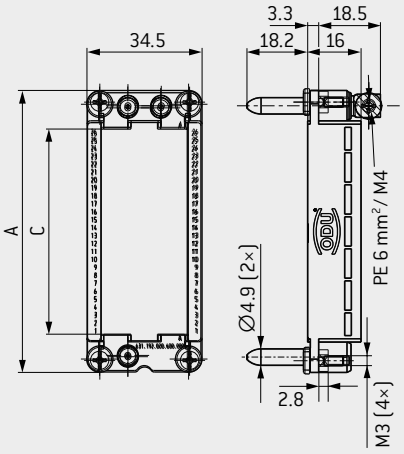
Included in the scope of delivery: secondary locking part

For use and assembly, see page 31

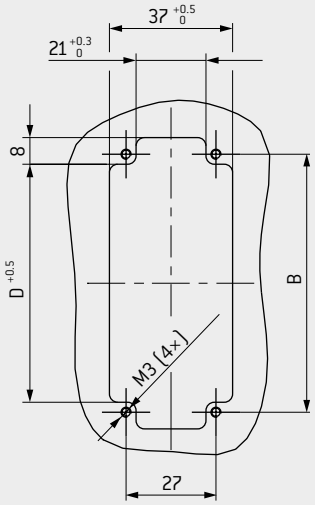
SOCKET FRAME WITH GUIDE BUSHING



PIN FRAME WITH GUIDING PIN



PANEL CUT-OUT



Modules are not mounted, contacts are supplied loose.

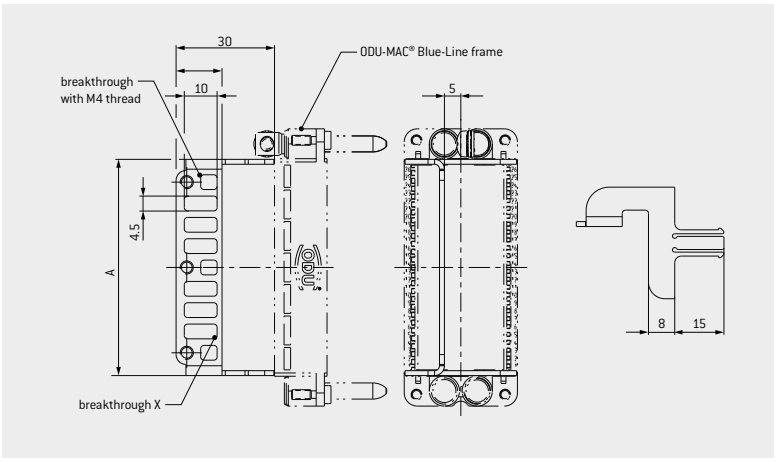
For the height of the contact pins, the same dimensions as described for the respective modules apply.

Size	Part number Socket frame	Part number Pin frame	Max. units × 2.4 mm[1]	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D 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 152).

ODU-MAC® BLUE-LINE STRAIN-RELIEF PLATE

For ODU-MAC® Blue-Line frames, the option for bundling and additional strain relief of single strands



TECHNICAL DATA

Material stainless steel

The plate can be used for both the pin and the socket side.

Size	Part number	Dim. A mm	Number of breakthrough X
1	631.000.002.902.190	32.3	2
2	631.000.002.902.191	46.7	4
3	631.000.002.902.192	65.9	6
4	631.000.002.902.193	92.3	9

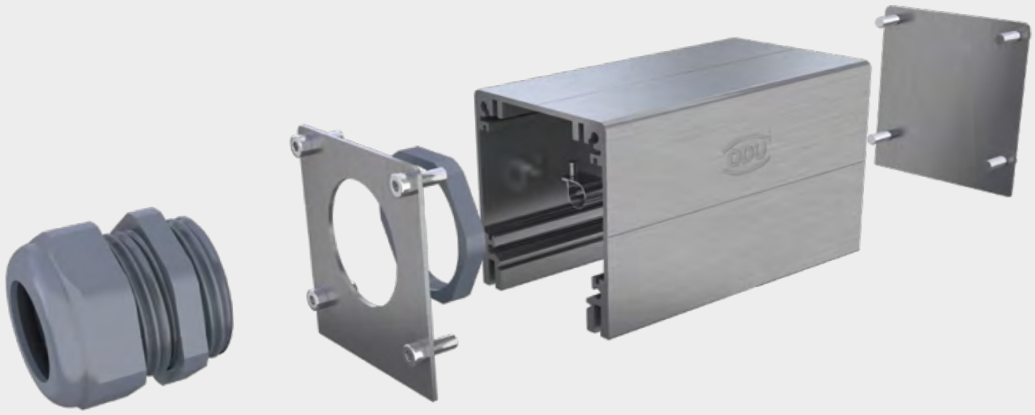
NOTE: AUTOMATIC DOCKING SYSTEMS

- If the strain relief is used, the voltage specifications of the single modules may be reduced. A check is necessary.
- With regard to the bending radius of the cables in conjunction with different housings, the use of the plate always has to be considered specifically, as there is a very large variety of variants possible.
- Doesn`t work with the following housings:
  - Metal housing with spindle locking
  - Metal housing with lever locking and side cable outlet
  - ODU-MAC® PUSH-LOCK and ODU-MAC® RAPID Housing

Modul	The respective strain relief plate can be used for the following modules:								
	Signal	PE		Power	High-current	Coax	High-speed	Fiber optic	
	all	1 pos. 16 mm²	1 pos. 10 mm²	3 pos.	2 pos. 5 mm	4 pos. for 50 Ω	RJ 45	POF	GOF
pin side	•	•	•	•	•	•	•	•	•
socket side	•	•	•	–	•	•	–	•	•

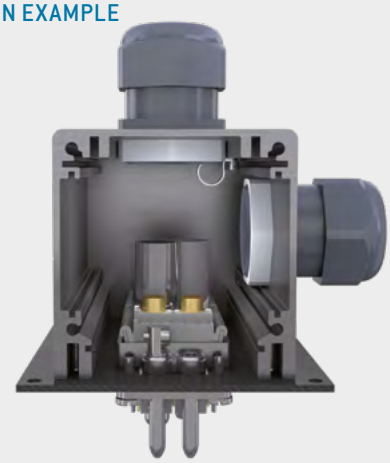
ODU-MAC® BLUE-LINE STRAIN-RELIEF HOUSING

Accessories for docking solutions

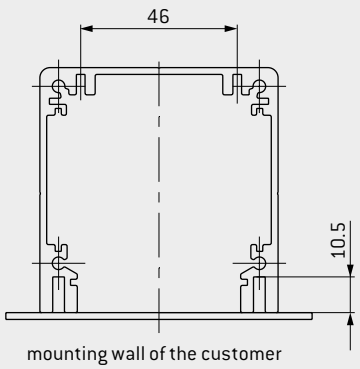


Graphic shows optional cable clamp, it is not automatically included in the scope of delivery.

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 67
- Locknut for cable clamp, see page 68

FEATURES

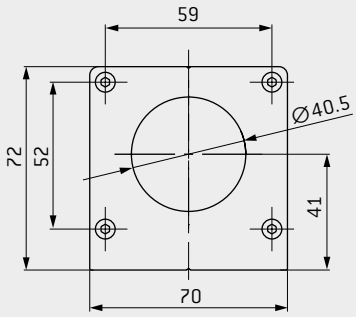
- Robust and compact
- Protection of the termination area
- Individual strain-relief variations, cable outlets as well as grounding connections
- Suitable for all ODU-MAC® docking frames (additional lengths available on request)
- Optional fixing of the PCBs and components in the protected interior
- 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

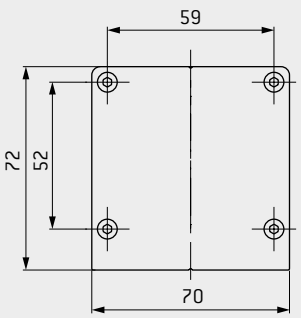
ODU-MAC® BLUE-LINE STRAIN-RELIEF HOUSING

Accessories for docking solutions

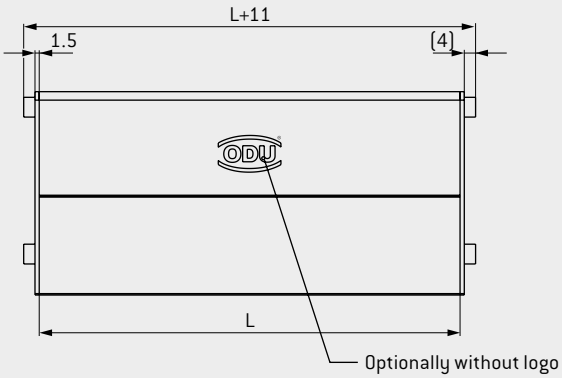
COVER WITH HOLE



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 2 × cover without hole	Part number 1 × cover with /1 × cover without hole	Part number 2 × cover with hole	Frame size	Dim. L 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

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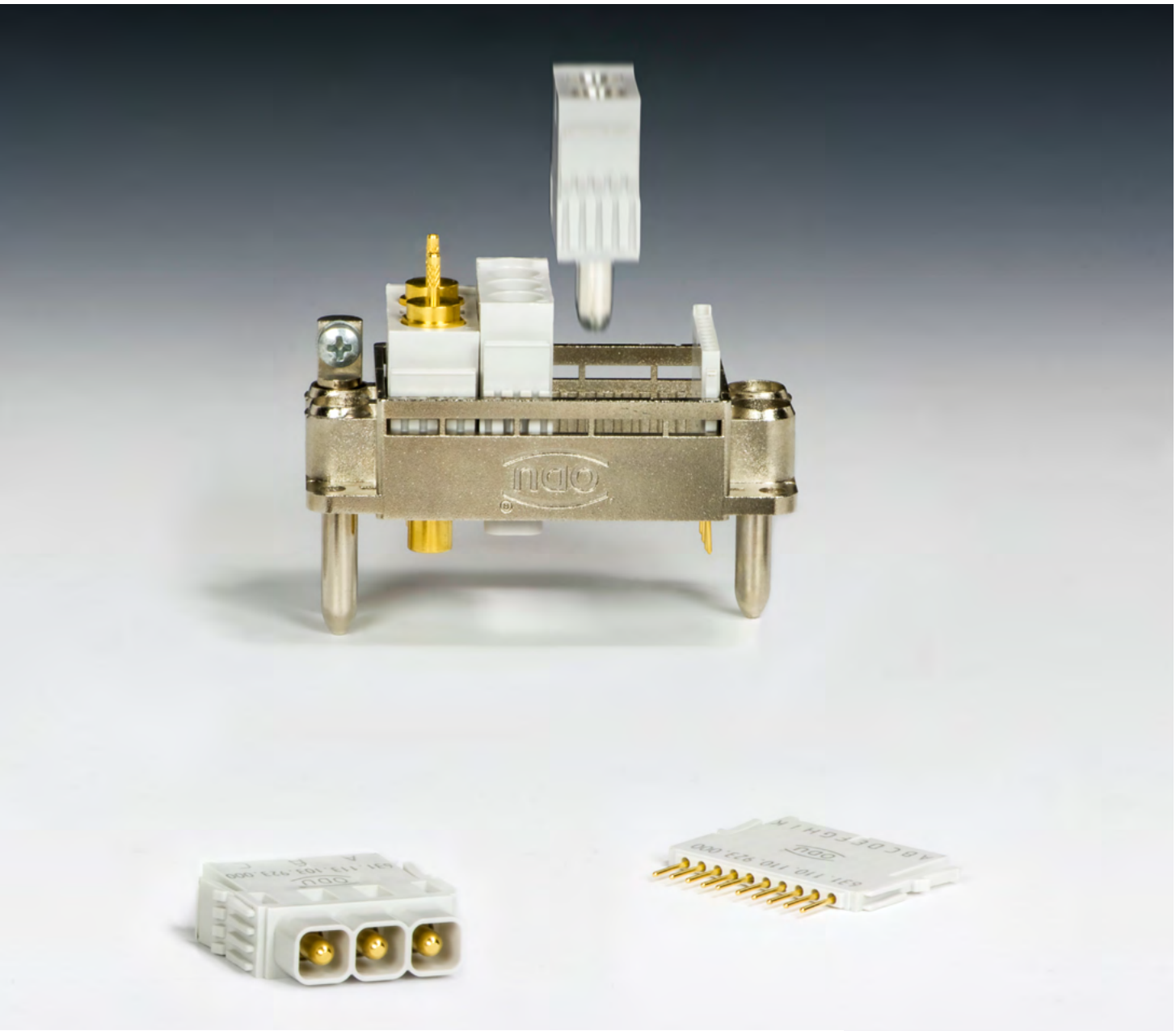
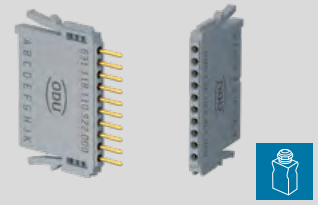
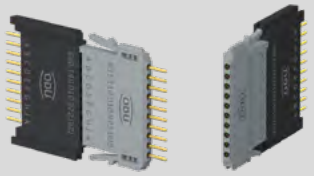


MODULES

Table of contents

OVERVIEW OF ALL MODULES

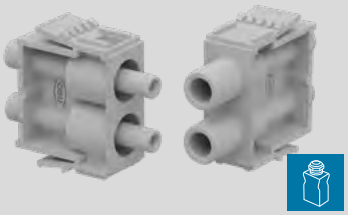
Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

	Modules	Description	Units / width	Features	Page
Signal		20 contacts Contact-Ø: 0.7 mm	2 Units 4.8 mm	Operating voltage[1] 200 V Rated surge voltage[1] 2,000 V Max. continuous current[2] 11 A for 0.14 mm² Pollution degree[1] 2 Mating cycles min. 10,000 Maximum contact density and pin protection	92
		10 contacts Contact-Ø: 0.7 mm	1 Unit 2.4 mm	Operating voltage[1] 320 V Rated surge voltage[1] 2,500 V Max. continuous current[2] 11 A for 0.14 mm² Pollution degree[1] 2 Mating cycles min. 10,000 Maximum contact density	94
		6 contacts Contact-Ø: 1.3 mm	2 Units 4.8 mm	Operating voltage[1] 400 V Rated surge voltage[1] 3,000 V Max. continuous current[2] 19.5 A for 1 mm² Pollution degree[1] 2 Mating cycles min. 10,000	96
		5 contacts Contact-Ø: 2 mm	3 Units 7.2 mm	Operating voltage[1] 630 V Rated surge voltage[1] 3,000 V Max. continuous current[2] 33 A for 2.5 mm² Pollution degree[1] 2 Mating cycles min. 10,000	98
PCB termination modules		20 contacts Contact-Ø: 0.7 mm	2 Units 4.8 mm	Operating voltage[1] 200 V Rated surge voltage[1] 2,000 V Max. continuous current[2] 7 A Pollution degree[1] 2 Mating cycles min. 10,000 Maximum contact density and pin protection	100
		10 contacts Contact-Ø: 0.7 mm	1 Unit 2.4 mm	Operating voltage[1] 320 V Rated surge voltage[1] 2,500 V Max. continuous current[2] 7 A Pollution degree[1] 2 Mating cycles min. 10,000 Maximum contact density	102

[1] According to IEC 60664-1:2007 (VDE 0110-1:2008-01) for pollution degree 2 [2] For a definition of max. continuous current, see page 174

OVERVIEW OF ALL MODULES

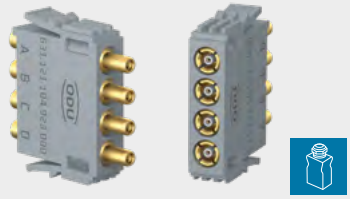
Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

	Modules	Description	Units / width	Features		Page
PCB termination modules		6 contacts Contact-Ø: 1.3 mm	2 Units 4.8 mm	Operating voltage[1] Rated surge voltage[1] Max. continuous current[2] Pollution degree[1] Mating cycles	400 V 3,000 V 13 A 2 min. 10,000	104
		5 contacts Contact-Ø: 2 mm	3 Units 7.2 mm	Operating voltage[1] Rated surge voltage[1] Max. continuous current[2] Pollution degree[1] Mating cycles	550 V 3,000 V 25 A 2 min. 10,000	106
PE module		1 contact with ODU LAMTAC® Contact-Ø: 8 mm	5 Units 12 mm	Mating cycles Conduct cross-section	min. 10,000 10 / 16 / 25 mm²	108
High-voltage		2 contacts Contact-Ø: 1.3 mm	5 Units 12 mm	Operating voltage[1] Rated surge voltage[1] Pollution degree[1] Mating cycles High-voltage	4,000 V 12,000 V 2 min. 10,000	110
Power		3 contacts Contact-Ø: 3.5 mm	4 Units 9.6 mm	Operating voltage[1] Rated surge voltage[1] Max. continuous current[2] Pollution degree[1] Mating cycles High-voltage	2,500 V 10,000 V 58 A for 6 mm² 2 min. 10,000	112
High-current		2 contacts for turned contacts with ODU LAMTAC®[3] Contact-Ø: 5 mm	5 Units 12 mm	Operating voltage[1] Rated surge voltage[1] Max. continuous current[2] Pollution degree[1] Mating cycles	400 V 4,000 V 108 A for 16 mm² 2 min. 10,000	114

[1] According to IEC 60664-1:2007 (VDE 0110-1:2008-01) for pollution degree 2 [2] For a definition of max. continuous current, see page 174
[3] Contact with lamella technology

OVERVIEW OF ALL MODULES

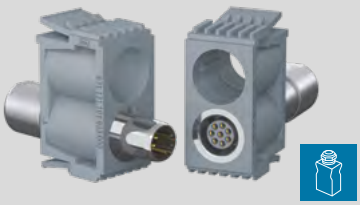
Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

	Modules	Description	Units / width	Features	Page
High-current		2 contacts for turned contacts with ODU LAMTAC®[3] Contact-Ø: 8 mm	9 Units 21.6 mm	Operating voltage[1] 400 V Rated surge voltage[1] 3,000 V Max. continuous current[2] 154 A for 25 mm² Pollution degree[1] 2 Mating cycles min. 10,000	116
		1 contact for turned contacts with ODU LAMTAC®[3] Contact-Ø: 12 mm	8 Units 19.2 mm	Operating voltage[1] 2,500 V Rated surge voltage[1] 10,000 V Max. continuous current[2] 225 A for 50 mm² Pollution degree[1] 2 Mating cycles min. 10,000 Maximum current	118
Coax		4 contacts for 50 Ω coax contacts	3 Units 7.2 mm	Frequency range 0–2.8 GHz Mating cycles min. 10,000 High contact density	120
		2 contacts for 50 Ω coax contacts	5 Units 12 mm	Frequency range 0–4 GHz Mating cycles min. 10,000	122
		2 contacts for 50 Ω coax contacts SMA termination	5 Units 12 mm	Frequency range 0–12 GHz Mating cycles min. 10,000 12 GHz	124
		2 contacts for 75 Ω coax contacts	5 Units 12 mm	Frequency range 0–2.7 GHz Mating cycles min. 10,000	126

[1] According to IEC 60664-1:2007 (VDE 0110-1:2008-01) for pollution degree 2 [2] For a definition of max. continuous current, see page 174
[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
Compressed air / fluid / vacuum coupling		2 contacts	5 Units 12 mm	Tube-∅ inner-∅: max. 4 mm outer-∅ Push-in: max. 6 mm Mating cycles min. 10,000 + 12 bar	128
		2 contacts	5 Units 12 mm	Tube-∅ M5 max. 4 mm Mating cycles min. 10,000 + 10 bar	130
		2 contacts	5 Units 12 mm	Tube-∅ M5 inside thread Mating cycles min. 10,000 + 10 bar	132
		1 contact	12 Units 28.8 mm	Tube inner-∅ 16 mm Mating cycles min. 10,000 + –0.8 bar	136
Shielded feedthrough / high-speed connector		2 to 14 contacts for 2 insert size 1	6 Units 14.4 mm	Mating cycles min. 10,000 Suitable for all common bus systems CAT 5, USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire®[1], Ethernet, SPE 1000BASE-T1[2]	138
		2 to 14 contacts for 1 insert size 1	6 Units 14.4 mm	Mating cycles min. 10,000 Suitable for all common bus systems CAT 5, USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire®[1], Ethernet, SPE 1000BASE-T1[2]	140

[1] Concerning data transmission protocols, please note page 2. [2] Single Pair Ethernet according to IEC 63171-6:2020(IEEE 802.3bp)

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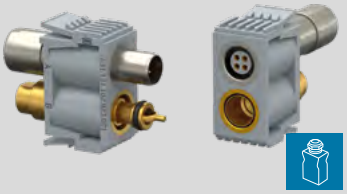
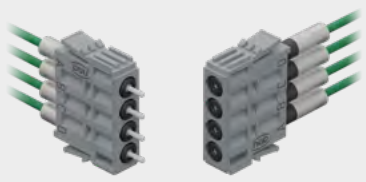
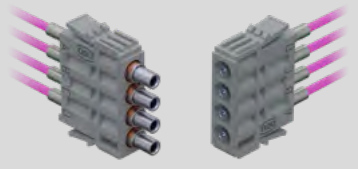
OVERVIEW OF ALL MODULES

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

	Modules	Description	Units / width	Features	Page
Shielded feedthrough / high-speed connector		3 to 22 contacts for 1 insert size 2	7 Units 16.8 mm	Mating cycles min. 10,000 Suitable for all common bus systems CAT 5,CAT 6_A, USB® 3.2 Gen 1x2[1], Ethernet, HDMI®[1] 2.0/2.1, DisplayPort®[1] 2.0	142
		1 contact RJ45 insert	7 Units 16.8 mm	Mating cycles min. 5,000 10 gigabit Ethernet[1] according to IEEE 802.3 an CAT 6 according to ANSI/TIA/EIA-568-C.2 CAT 6_A according to ANSI/TIA-568.2-D	144
Combination module		2 contacts High-speed & coax	6 Units 14.4 mm	Mating cycles min. 10,000 Coax 50 Ω/4 GHz or 75 Ω/2.2 GHz Selected inserts are suitable and qualified for data rates up to 5 Gbit/s. Suitable for CAT 5, USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire®[1], Ethernet, SPE 1000BASE-T1[2]	146
		2 contacts High-speed & compressed air	6 Units 14.4 mm	Mating cycles min. 10,000 Compressed air 12 bar Selected inserts are suitable and qualified for data rates up to 5 Gbit/s. Suitable for CAT 5, USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire®[1], Ethernet, SPE 1000BASE-T1[2]	148
Fiber optic (on request)		4 contacts for fiber optic only pre-assembled Physical Contact	3 Units 7.2 mm	Mating cycles min. 1,000 max. Insertion loss 0.5 dB Single mode 9 / 125 µm Multi mode 50 / 125 µm	on requetst
		4 contacts for fiber optic only pre-assembled Expanded Beam	3 Units 7.2 mm	Mating cycles min. 100,000 Max. Insertion loss 1.5 dB Multi mode 50 / 125 µm	on requetst

[1] Concerning data transmission protocols, please note page 2. [2] Single Pair Ethernet according to IEC 63171-6:2020(IEEE 802.3bp)

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		5 contacts for fiber optic POF	3 Units 7.2 mm	Mating cycles min. 10,000 Insertion loss typical 1,5 dB for 670 nm	150
Blank modules		Blank modules	1 2.4 mm 3 7.2 mm 5 12 mm	Used to fill incomplete frames.	152

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 155.

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 0298-4:2013-06 (see page 174).
- For crimp information, see from page 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[2]

Operating voltage	200 V	10 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 0411-1:2020-03)[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

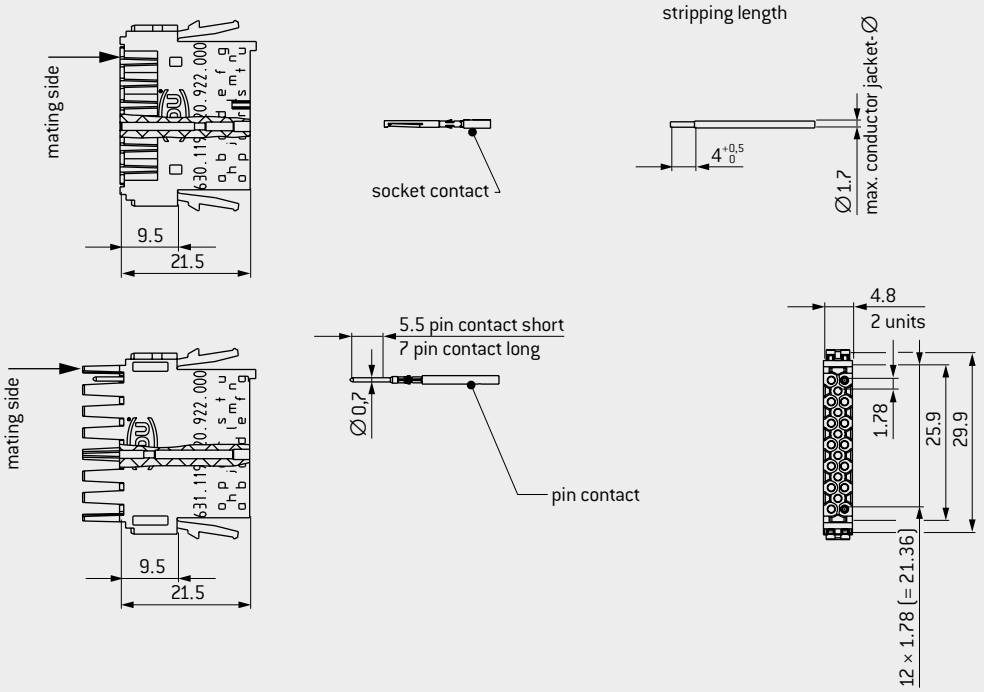
Total mating force (average)	16 N/module
Total sliding force (average)	12 N/module
Contact diameter	0.7 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

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

[1] For a definition of max. continuous current, see page 174 [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167 [3] This voltage specification is according to IEC 60664-1:2007 (VDE 0110-1:2008-01) only valid for equipment with a maximum expected rated surge voltage of 2,000 V, which is not directly connected to the low-voltage grid. See page 170 [4] See page 171

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	0.14–0.38	22–26	7	3.5	11	3.5
Pin contact long	185.711.000.270.000						
Socket contact	175.581.000.270.000						
Pin contact short	185.B26.000.270.000	0.05–0.14	26–30	6.5	3	10	3.5
Pin contact long	185.B27.000.270.000						
Socket contact	175.C09.000.270.000						

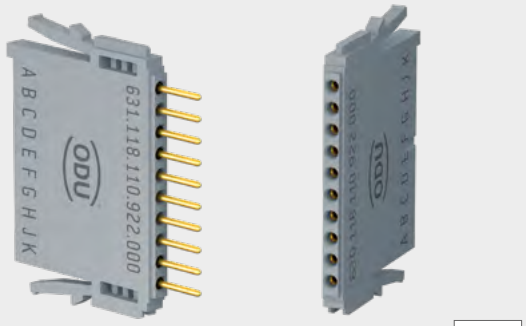
PCB TERMINATION AVAILABLE ON REQUEST

For suitable PCB termination modules, please see page 100.

[1] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [2] For a definition of max. continuous current, see page 174

MODULE 10 CONTACTS

SIGNAL



1 Unit

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 155.

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 0298-4:2013-06 (see page 177).
- For crimp information, see from page 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[2]

Operating voltage	320 V	63 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 0411-1:2020-03)[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

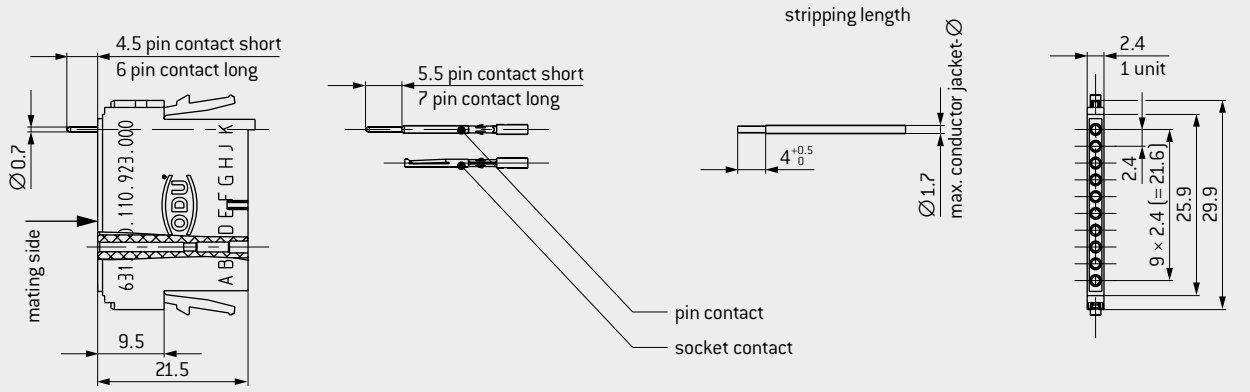
Total mating force (average)	8 N/module
Total sliding force (average)	6 N/module
Contact diameter	0.7 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

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

[1] For a definition of max. continuous current, see page 174 [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167 [3] See page 170 [4] See page 171

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	0.14–0.38	22–26	7	5.5	11	3.5
Pin contact long	185.711.000.270.000						
Socket contact	175.581.000.270.000						
Pin contact short	185.B26.000.270.000	0.05–0.14	26–30	6.5	5	10	3.5
Pin contact long	185.B27.000.270.000						
Socket contact	175.C09.000.270.000						

PCB TERMINATION AVAILABLE ON REQUEST

For suitable PCB termination modules, please see page 102.

[1] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [2] For a definition of max. continuous current, see page 174

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 155.

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 0298-4:2013-06 (see page 177).
- For crimp information, see from page 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[2]

Operating voltage	400 V	160 V
Rated surge voltage	3,000 V	3,000 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 0411-1:2020-03)[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

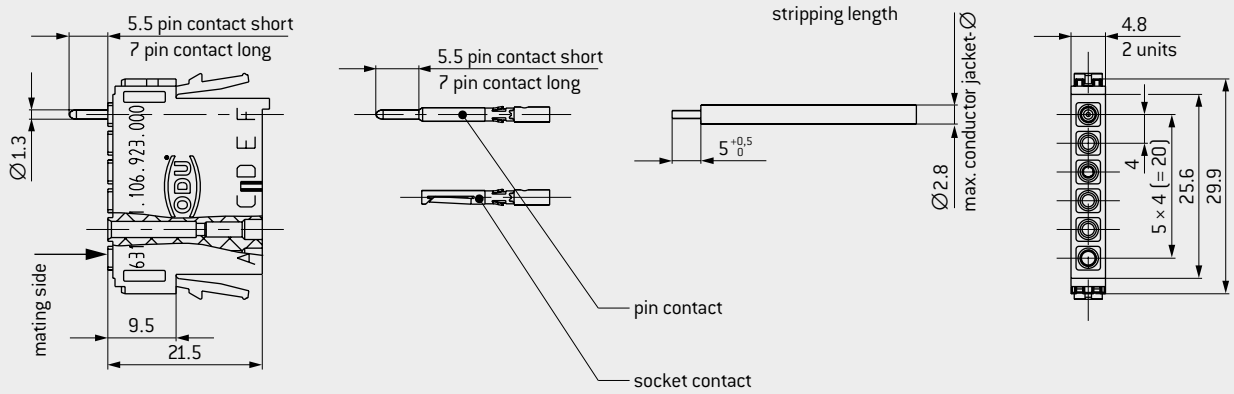
Total mating force (average)	8.4 N/module
Total sliding force (average)	7.2 N/module
Contact diameter	1.3 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

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

[1] For a definition of max. continuous current, see page 174 [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167 [3] See page 170 [4] See page 171

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	0.14–0.38	22–26	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 104.

[1] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [2] For a definition of max. continuous current, see page 174

MODULE 5 CONTACTS

SIGNAL

3
Units

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 155.

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 0298-4:2013-06 (see page 177).
- For crimp information, see from page 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[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 0411-1:2020-03)[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

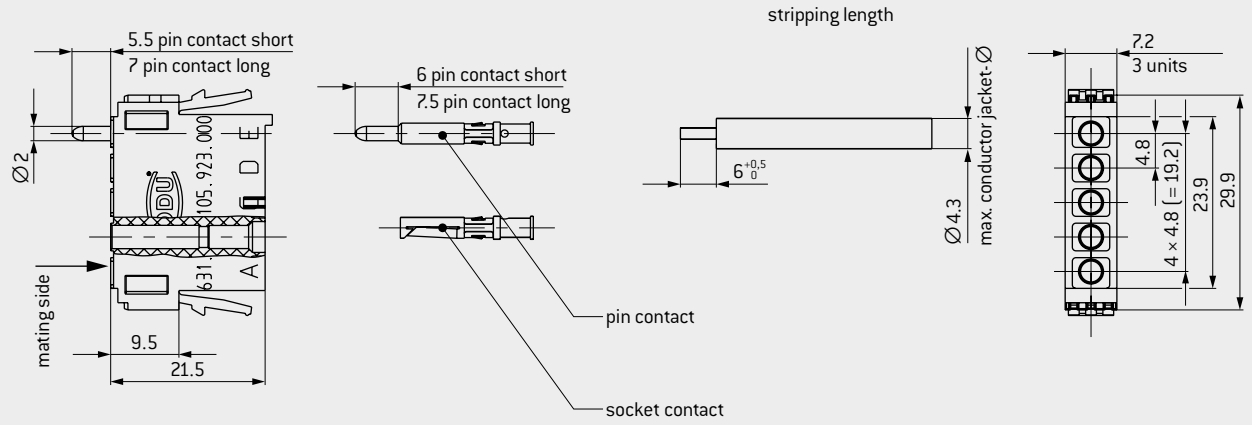
Total mating force (average)	13.5 N/module
Total sliding force (average)	9 N/module
Contact diameter	2 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

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

[1] For a definition of max. continuous current, see page 174 [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167 [3] See page 170 [4] See page 171

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

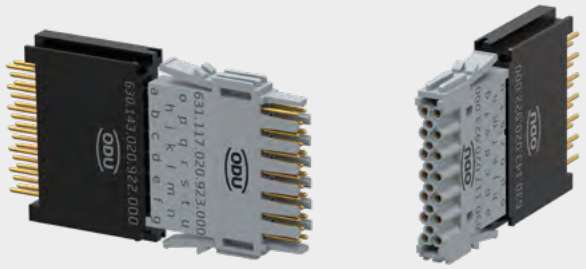
For suitable PCB termination modules, please see page 106.

[1] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [2] For a definition of max. continuous current, see page 174

MODULE 20 CONTACTS

For effective PCB contacting with quick-change function

PCB TERMINATION



2
Units

COMPATIBLE WITH MODULE 20 CONTACTS ON PAGE 92

NOTE

- Frame for the transfer of grounding to the board and corresponding grounding socket on request
- Explanations of the structure on page 32.

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 0298-4:2013-06 (see page 177).
- Solder temperature for PCB termination module (Black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules, more modules on request acc. configuration

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[2]

Operating voltage	200 V	10 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 0411-1:2020-03)[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

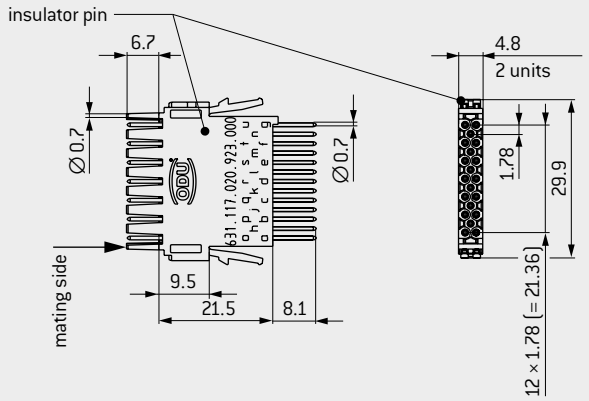
Total mating force (average)	16 N/module
Total sliding force (average)	12 N/module
Contact diameter	0.7 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

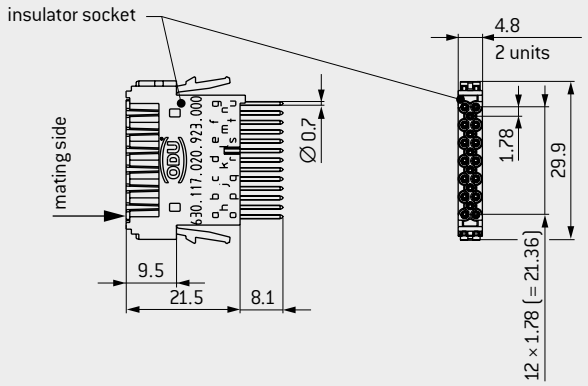
Insulator pin/socket frame	thermoplastic acc. to UL 94 (Gray)
Insulator PCB	thermoplastic acc. to UL 94 (Black)
Contact body	Cu alloy
Contact finishing	gold-plated

[1] For a definition of max. continuous current, see page 174
[2] See page167. This voltage specification is according to IEC 60664-1:2007 (VDE 0110-1:2008-01) only valid for equipment with a maximum expected rated surge voltage of 2.000 V, which is not directly connected to the low-voltage grid.
[3] See page 170 [4] See page 171

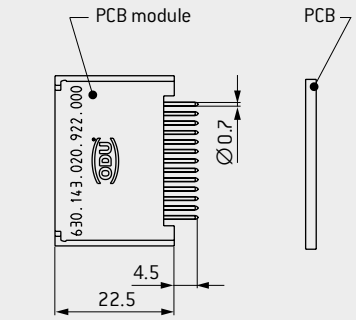
INSULATOR PIN

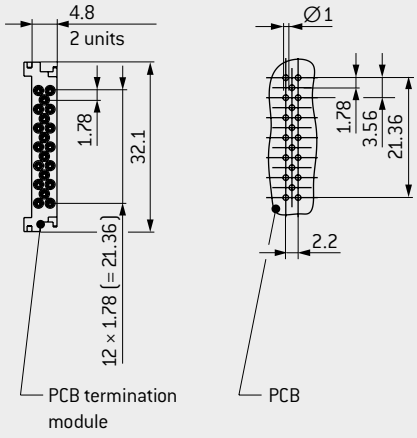


INSULATOR SOCKET



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 at increased temperature 45 K
[2] For a definition of max. continuous current, see page 174
[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, can be conditionally removed. See page 32

MODULE 10 CONTACTS

For effective PCB contacting with quick-change function

PCB TERMINATION

1 Unit

Contact diameter: 0.7 mm
Mating cycles: min. 10,000
Current-carrying capacity[1]: 7 A

COMPATIBLE WITH MODULE 10 CONTACTS ON PAGE 94

NOTE

- Frame for the transfer of grounding to the board and corresponding grounding socket on request
- Explanations of the structure on page 32.

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 0298-4:2013-06 (see page 177).
- Solder temperature for PCB termination module (Black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules, more modules on request acc. configuration

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[2]

Operating voltage	320 V	63 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 0411-1:2020-03)[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

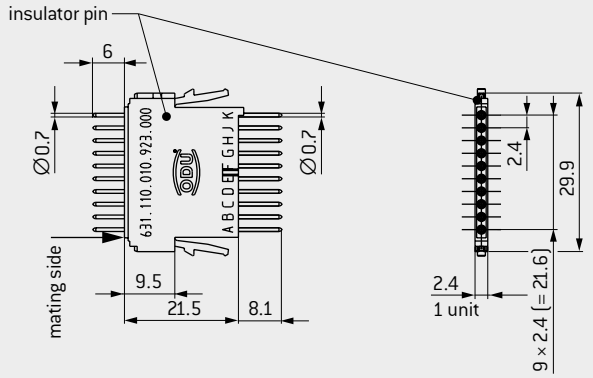
Total mating force (average)	8 N/module
Total sliding force (average)	6 N/module
Contact diameter	0.7 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

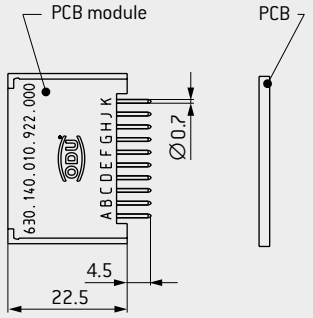
Insulator pin/socket frame	thermoplastic acc. to UL 94 (Gray)
Insulator PCB	thermoplastic acc. to UL 94 (Black)
Contact body	Cu alloy
Contact finishing	gold-plated

[1] For a definition of max. continuous current, see page 174 [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167 [3] See page 170 [4] See page 171

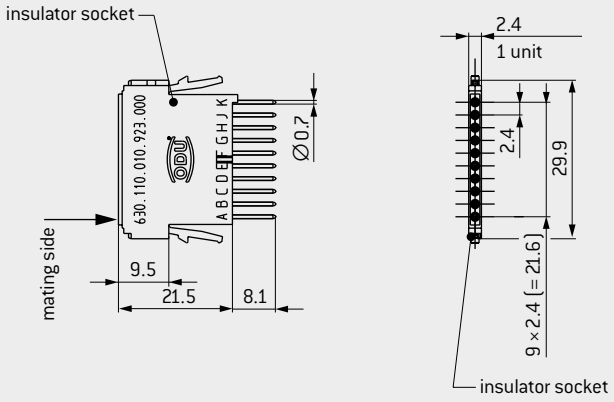
INSULATOR PIN

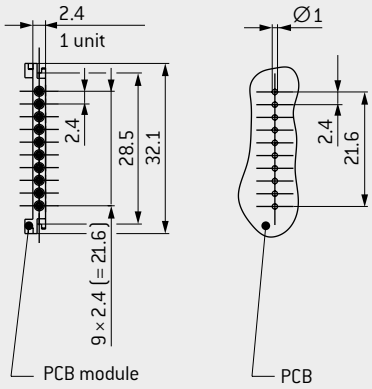


PCB TERMINATION MODULE



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 at increased temperature 45 K [2] For a definition of max. continuous current, see page 174
[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, can be conditionally removed. See page 32

MODULE 6 CONTACTS

For effective PCB contacting with quick-change function

PCB TERMINATION

2
Units

COMPATIBLE WITH MODULE 6 CONTACTS ON PAGE 96

NOTE

- Frame for the transfer of grounding to the board and corresponding grounding socket on request
- Explanations of the structure on page 32.

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 0298-4:2013-06 (see page 177).
- Solder temperature for PCB termination module (black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules, more modules on request acc. configuration

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[2]

Operating voltage	400 V	160 V
Rated surge voltage	3,000 V	3,000 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 0411-1:2020-03)[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

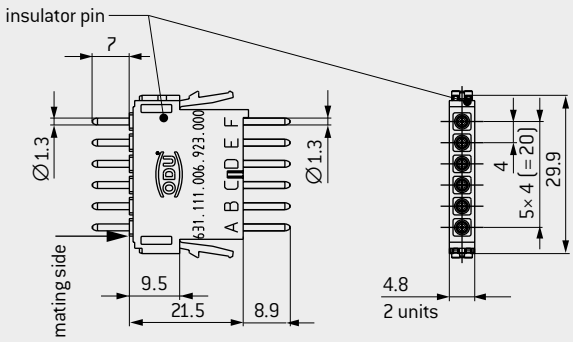
Total mating force (average)	8.4 N/module
Total sliding force (average)	7.2 N/module
Contact diameter	1.3 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

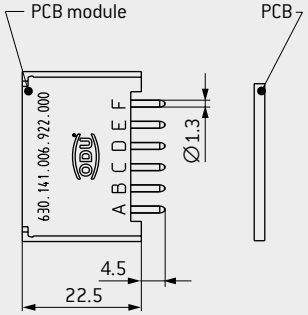
Insulator pin/socket frame	thermoplastic acc. to UL 94 (Gray)
Insulator PCB	thermoplastic acc. to UL 94 (Black)
Contact body	Cu alloy
Contact finishing	gold-plated

[1] For a definition of max. continuous current, see page 174 [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167. [3] See page 170 [4] See page 171

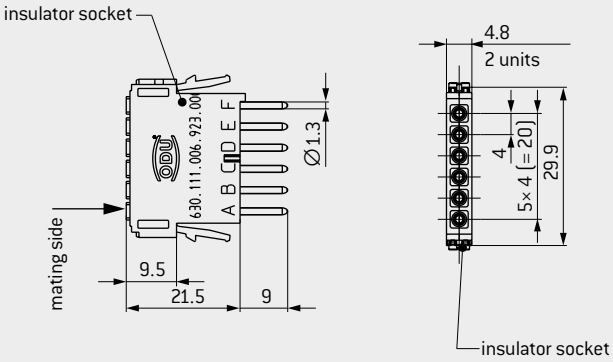
INSULATOR PIN

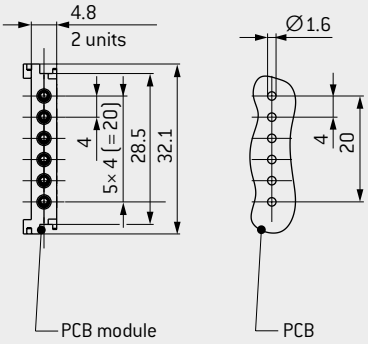


PCB TERMINATION MODULE



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 at increased temperature 45 K [2] For a definition of max. continuous current, see page 174
[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, can be conditionally removed. See page 32

MODULE 5 CONTACTS

For effective PCB contacting with quick-change function

PCB TERMINATION

3
Units

COMPATIBLE WITH MODULE 5 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 32.

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 0298-4:2013-06 (see page 177).
- Solder temperature for PCB termination module (black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules, more modules on request acc. configuration

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[2]

Operating voltage	550 V	220 V
Rated surge voltage	3,000 V	3,000 V
Clearance distance	2.5 mm	2.5 mm
Creepage distance	2.8 mm	2.8 mm
Pollution degree	2	3

Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]

Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms} ≤ 300 V	
Operating voltage	555 V	221 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

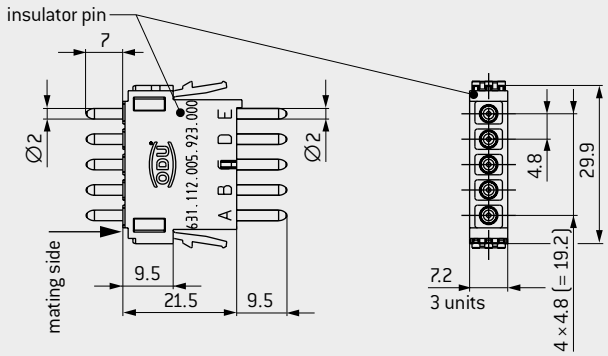
Total mating force (average)	13.5 N/module
Total sliding force (average)	9 N/module
Contact diameter	2 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

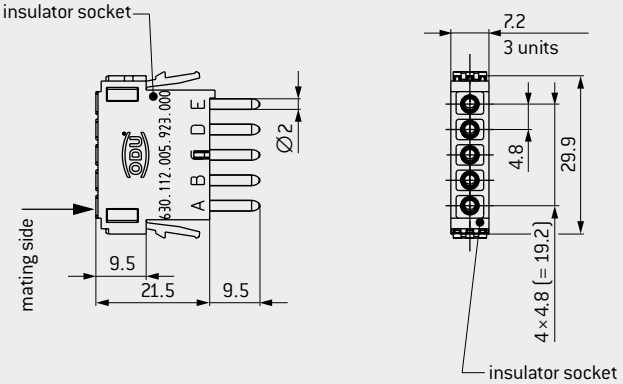
Insulator pin/socket frame	thermoplastic acc. to UL 94 (Gray)
Insulator PCB	thermoplastic acc. to UL 94 (Black)
Contact body	Cu alloy
Contact finishing	gold-plated

[1] For a definition of max. continuous current, see page 174 [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167 [3] See page 170 [4] See page 171

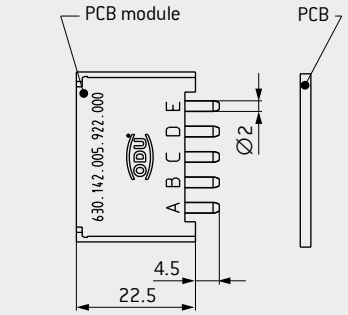
INSULATOR PIN

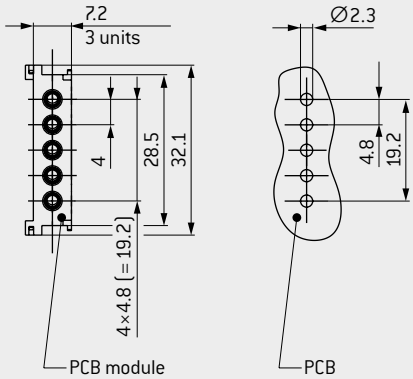


INSULATOR SOCKET



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 at increased temperature 45 K [2] For a definition of max. continuous current, see page 174
[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, can be conditionally removed. See page 32

MODULE 1 CONTACT

Flexible protective grounding for all conductive housings and docking frame versions

PE MODULE

5 Units

REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts

Torque wrench for PE module and contact
PART NUMBER: 598.054.002.000.000
Locking torque: 1.2 Nm ± 0.2 Nm

Bit Torx TX10 for PE module and contact
PART NUMBER: 598.054.104.000.000

For an overview of all tools, please see from page 155.

Contact diameter: 8 mm
Mating cycles[1]: min. 10,000
Conductor cross-section: 10 / 16 / 25 mm²

TECHNICAL NOTES

- The module can be freely positioned in any frame and allows contacting to the frame and conductive housing.
- Novel torx cone connection for optimized power transmission
- For crimp information, see from page 156

TECHNICAL DATA

Mechanical data

Total mating force (average)	30 N / Module
Total sliding force (average)	22.5 N / Module
Contact diameter	8 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 10,000

Materials

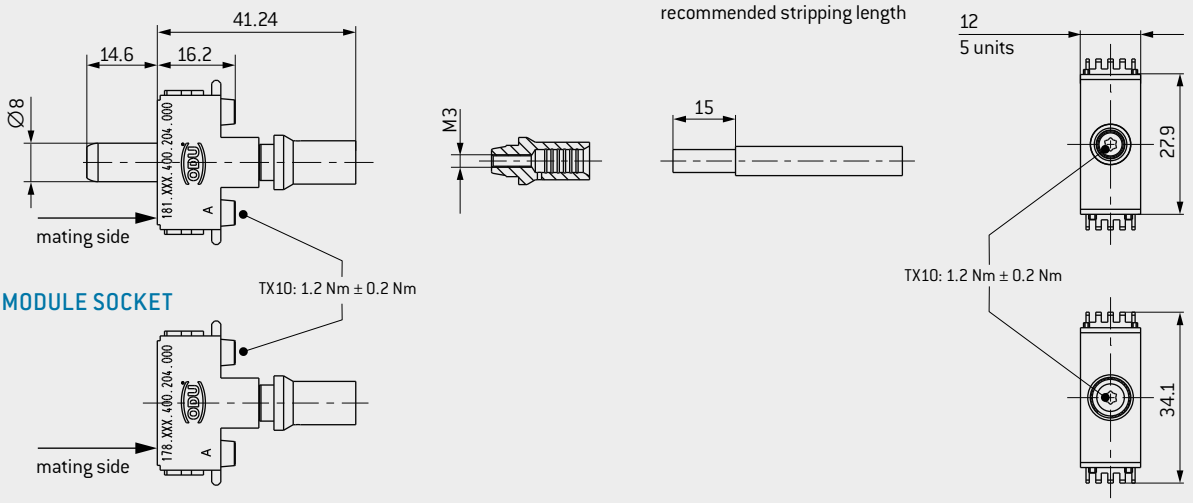
Contact body	Cu alloy
Contact lamella	CuBe alloy
Contact plating	Ni

The cross-section of a PE conductor must be designed in accordance with DIN EN 61984:2009-11 depending on the largest live conductor. The cross-section can be reduced from 25 mm². This relationship is explained via the following table:

Nominal cross-section of the current-carrying conductor mm²	Minimum cross-section of the protective conductor in accordance with DIN EN 61984:2009-11 mm²
10	10
16 / 25 / 35	16
50	25

[1] Higher mating cycles are possible simply by replacing the module (including pin/socket from the rear). The termination area remains unaffected, because of two-part contact.

PE MODULE PIN

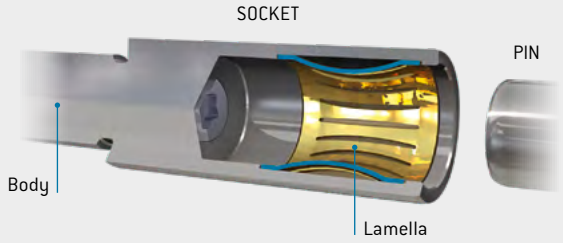


PE MODULE SOCKET

ODU LAMTAC® (CONTACTS WITH LAMELLA TECHNOLOGY)

In comparison to the ODU SPRINGTAC® contact, ODU LAMTAC® offers a lower number of contact surfaces. One or more of the stamped lamellas are mounted in a machined body. The contact resistance of 0.1 Ω required by the standard is easily achieved.

DEMATED



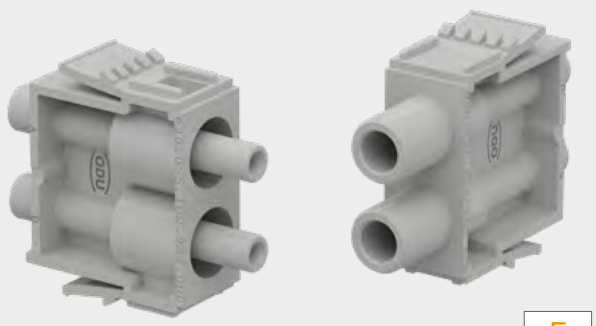
MATED

Description	Part number	Conductor cross-section[1] mm²	Nominal current[2] Single contact A	Impulse current kA	Contact resistance Ω
PE module/Pin	181.869.400.204.000	25	125	> 20	< 0.1
PE module/Socket	178.869.400.204.000				
PE module/Pin	181.866.400.204.000	16	90	> 20	< 0.1
PE module/Socket	178.866.400.204.000				
PE module/Pin	181.872.400.204.000	10	65	> 20	< 0.1
PE module/Socket	178.872.400.204.000				
Conductor cross-section 35 / 50 mm²	On request				

[1] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class5).
[2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.

MODULE 2 CONTACTS

HIGH-VOLTAGE



5
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 155.

Contact diameter: 1.3 mm
Mating cycles: min. 10,000
Operating voltage: 4.000 V

TECHNICAL NOTES

- The current load information is valid for single contacts.
  For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- For crimp information, see from page 156
- Pin frame with extended guiding pins is neccessary.

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[1]

Operating voltage[3]	4,000 V	1,600 V
Rated surge voltage	12 kV	12 kV
Clearance distance	15.5 mm	15.5 mm
Creepage distance	20.6 mm	20.6 mm
Pollution degree	2	3

Test of the partial discharge voltage (PDV) acc. to IEC 60664-1: 2007 (VDE 0110-1:2008-01)[1]

PDV inception voltage	3,000 V
PDV extinction voltage	2,500 V

Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2020-03)[2]

Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms} ≤ 300 V	
Operating voltage[3]	4,000 V	1,600 V
Test voltage	7,198 V AC	7,198 V AC
Pollution degree	2	3

Mechanical data

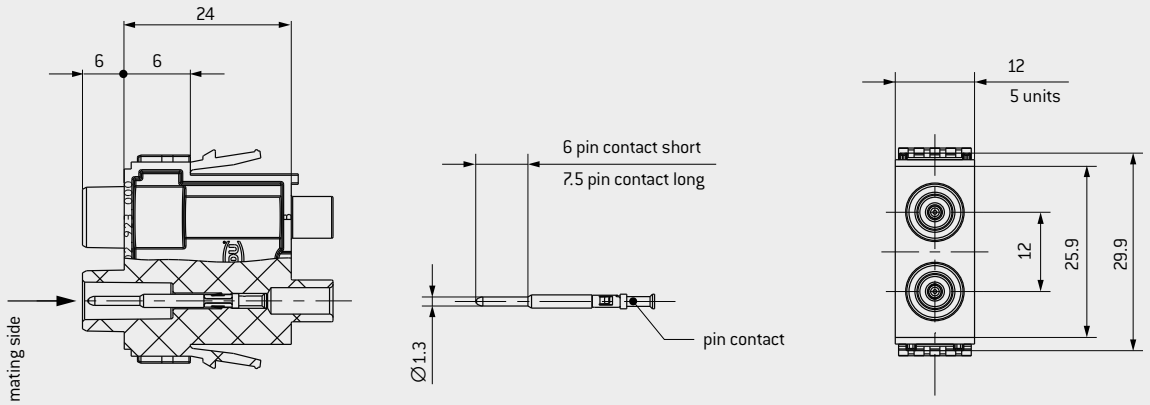
Total mating force (average)	2.8 N/module
Total sliding force (average)	2.4 N/module
Contact diameter	1.3 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

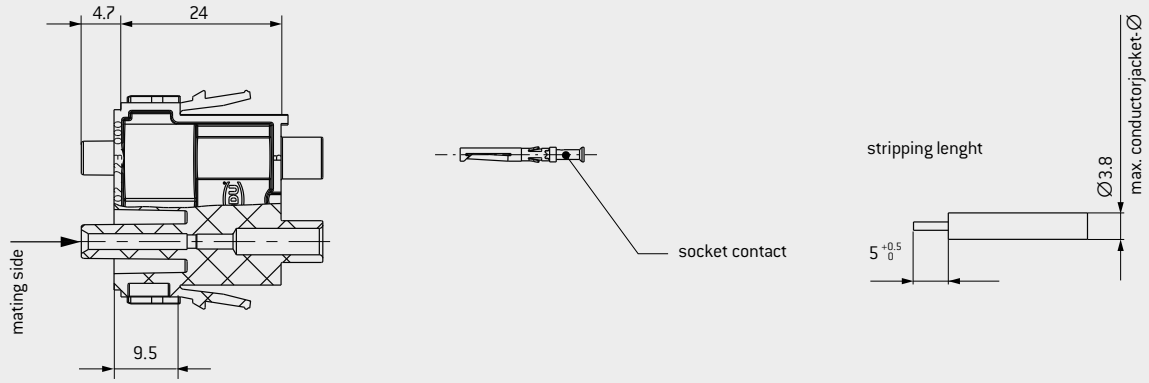
Insulator	thermoplastic acc. to UL 94
Contact	Cu alloy
Contact finishing	gold-plated

[1] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167
[2] See page 170
[3] Version with increased operating voltage possible on request

INSULATOR PIN



INSULATOR SOCKET



Module 2 contacts	Part number
Insulator socket	630.160.102.923.000
Insulator pin[3]	631.160.102.923.000

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	0.14–0.38	22–26	9.5	7	12	1.8
Pin contact long	185.713.000.270.000						
Socket contact	175.A42.000.270.000						

[1] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K
[2] For a definition of max. continuous current, see page 174
[3] Pin frame with extended guiding pins is neccessary.

MODULE 3 CONTACTS

POWER

4
Units

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 155.

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 0298-4:2013-06 (see page 177).
- For crimp information, see from page 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[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 0411-1:2020-03)[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

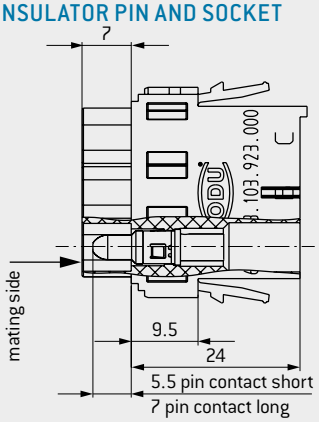
Total mating force (average)	12 N/module
Total sliding force (average)	10 N/module
Contact diameter	3.5 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

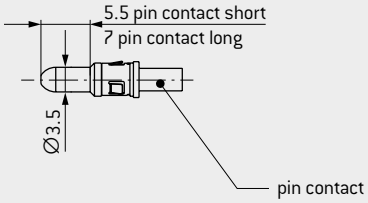
Materials

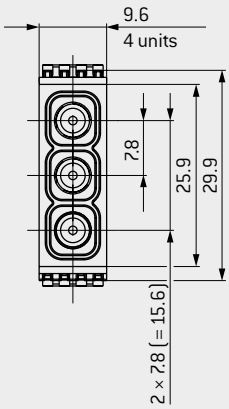
Insulator	thermoplastic acc. to UL 94
Contact	Cu alloy
Contact finishing	gold-plated

[1] For a definition of max. continuous current, see page 174 [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167 [3] See page 170 [4] See page 171

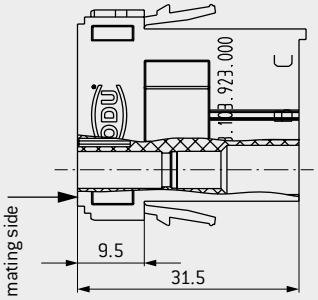
INSULATOR PIN AND SOCKET

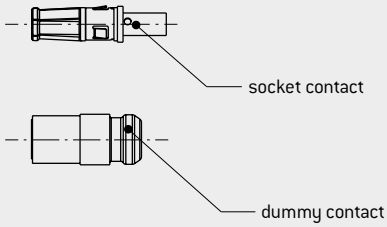


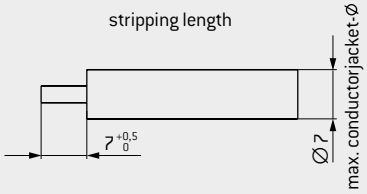




INSULATOR SOCKET







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						

FOR PUSH-LOCK ONLY WITH MAX. 2,5 MM² POSSIBLE, IF PE GROUDING IS NEEDED

[1] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [2] For a definition of max. continuous current, see page 174

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 155.

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 0298-4:2013-06 (see page 177).
- For crimp information, see from page 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[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 0411-1:2020-03)[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

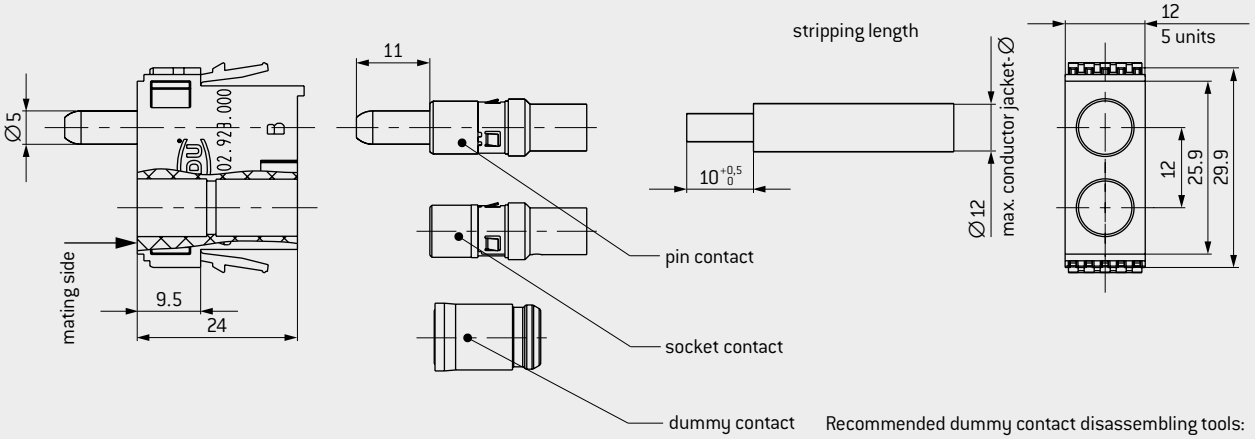
Total mating force (average)	34 N/module
Total sliding force (average)	28 N/module
Contact diameter	5 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

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 174
[2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167
[3] See page 170 [4] See page 171

INSULATOR PIN AND SOCKET

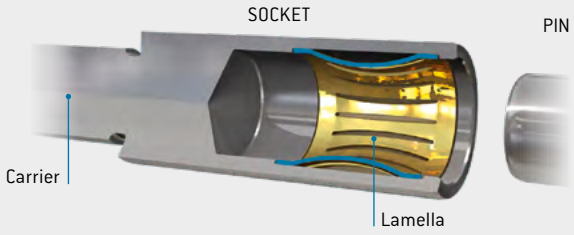


Recommended dummy contact disassembling tools:
Ø 5 mm – 7 mm

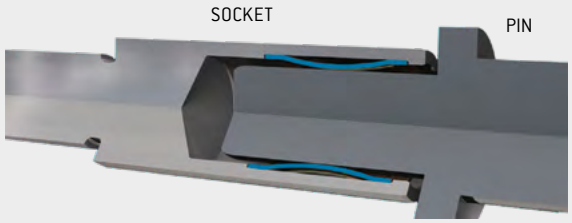
For use in a housing, check the necessary space requirements

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[1] mm²	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact	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] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5),
[2] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K
[3] For a definition of max. continuous current, see page 174

MODULE 2 CONTACTS

ODU LAMTAC® (contact with lamella technology)

HIGH-CURRENT

9 Units

REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts.

PART NUMBER: 598.054.004.000.000
Tightening torque 1.5 Nm ± 0.2 Nm

Torx bit TX10
PART NUMBER: 598.054.104.000.000
Tightening torque 1.5 Nm ± 0.2 Nm

For an overview of all tools, please see from page 155.

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 0298-4:2013-06 (see page 177).
- For crimp information, see from page 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[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 0411-1:2020-03)[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

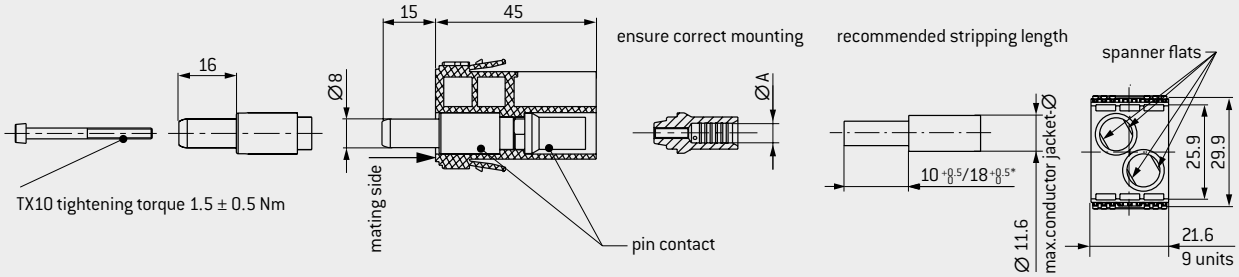
Total mating force (average)	60 N/module
Total sliding force (average)	45 N/module
Contact diameter	8 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

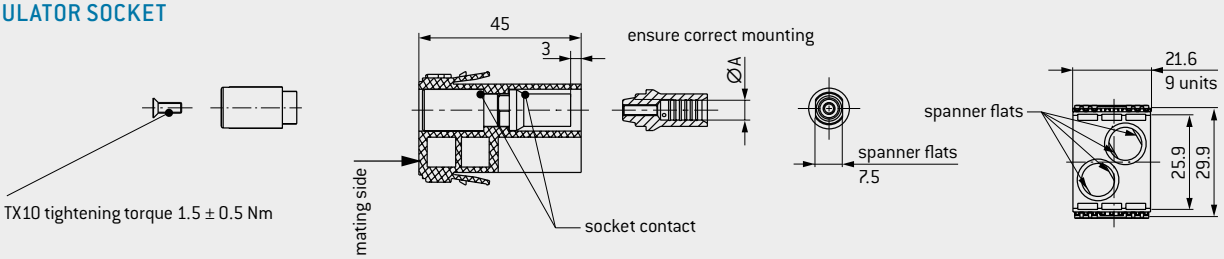
Insulator	thermoplastic acc. to UL 94
Contact body	Cu alloy
Contact lamella	CuBe alloy
Contact finishing	silver-plated

[1] For a definition of max. continuous current, see page 174
[2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167
[3] See page 170 [4] See page 171

INSULATOR PIN



INSULATOR SOCKET

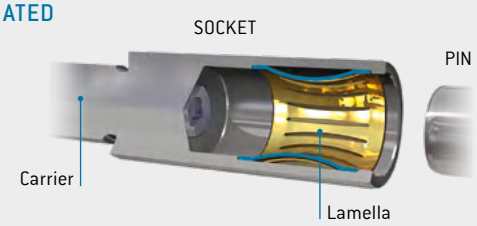


For use in a housing, check the necessary space requirements

* $10^{+0.5}_{0}$: 16 mm²
$18^{+0.5}_{0}$: 25 mm²

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[1] mm²	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact	181.875.100.200.001	16	90	85	133	0.2
Socket contact	178.875.100.201.001					
Pin contact	181.874.100.200.001	25	105	100	154	0.2
Socket contact	178.874.100.201.001					

[1] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5) [2] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [3] For a definition of max. continuous current, see page 174

MODULE 1 CONTACT

ODU LAMTAC® (contact with lamella technology)

HIGH-CURRENT

8 Units

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 0298-4:2013-06 (see page 177).
- For crimp information, see from page 156

REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts.

PART NUMBER: 598.054.006.000.000
Tightening torque 2.2 Nm ± 0.2 Nm

Torx bit TX20
PART NUMBER: 598.054.105.000.000
Tightening torque 2.2 Nm ± 0.2 Nm

For an overview of all tools, please see from page 155.

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[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 0411-1:2020-03)[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

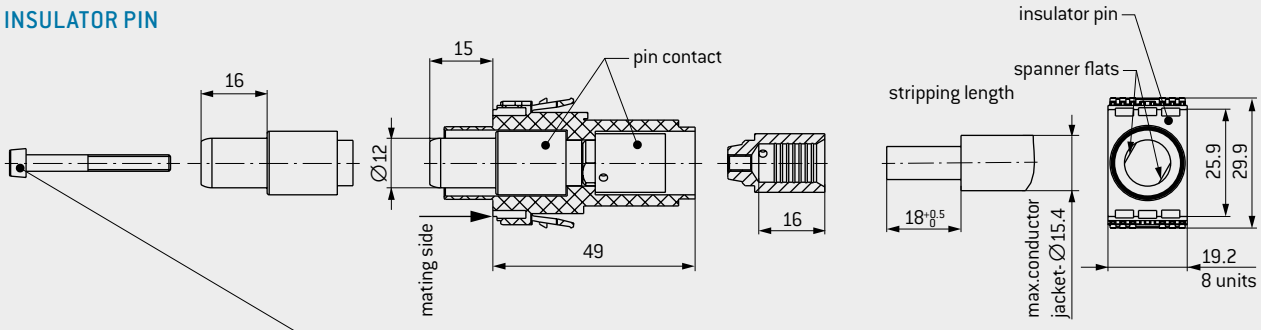
Total mating force (average)	45 N/module
Total sliding force (average)	30 N/module
Contact diameter	12 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	min. 10,000

Materials

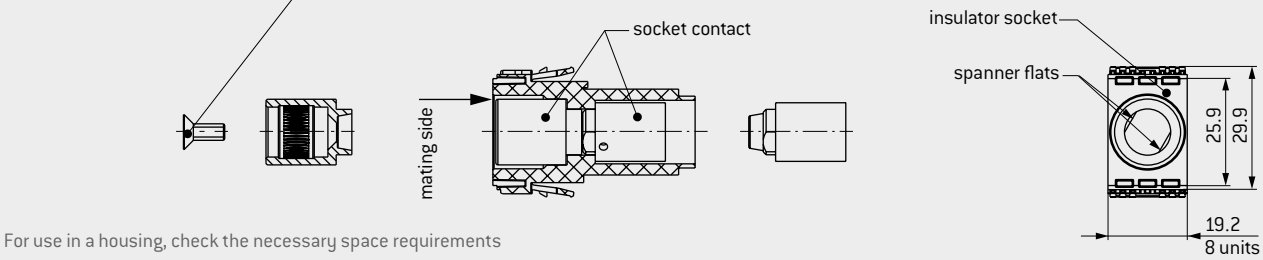
Insulator	thermoplastic acc. to UL 94
Contact body	Cu alloy
Contact lamella	CuBe alloy
Contact finishing	silver-plated

[1] For a definition of max. continuous current, see page 174
[2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167
[3] See page 170 [4] See page 171

INSULATOR PIN



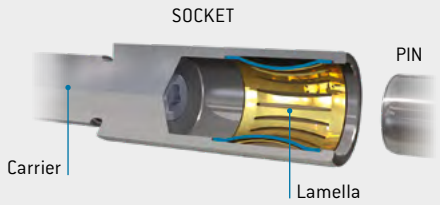
INSULATOR SOCKET



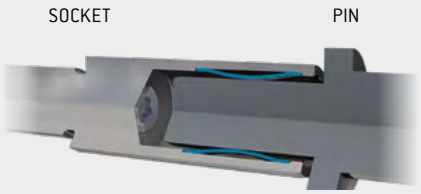
For use in a housing, check the necessary space requirements

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[1] mm²	Nominal current[2] Single contact A	Max. continuous current[3] 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] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5) [2] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [3] For a definition of max. continuous current, see page 174

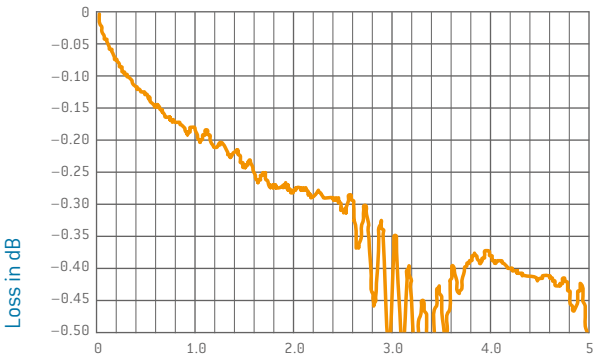
MODULE 4 CONTACTS FOR 50 Ω

COAX

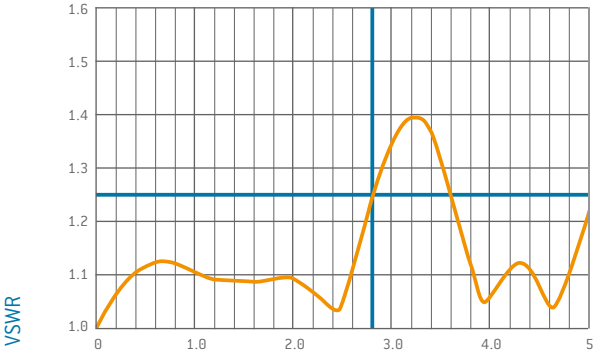
3 Units

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 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[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 0411-1:2020-03)[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

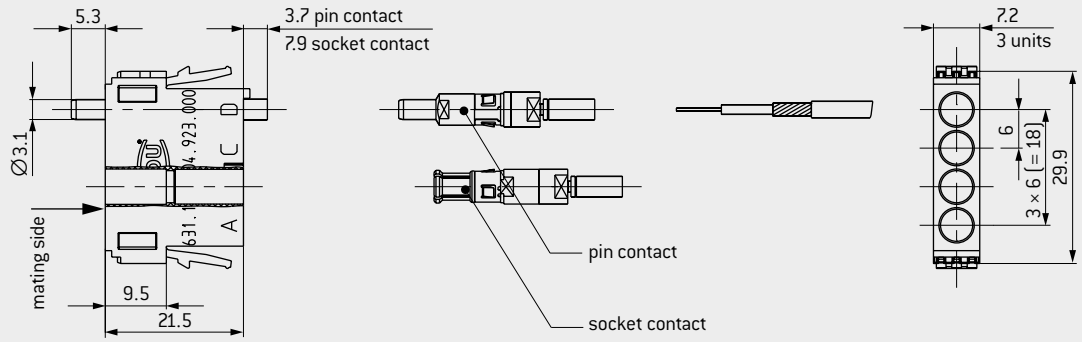
REMOVAL TOOL

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

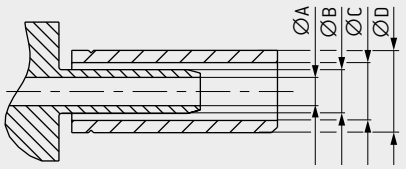
For an overview of all tools, please see from page 155.

[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 0110-1:2008-01) see page 167 [3] See page 171 [4] See page 170

INSULATOR FOR PIN AND SOCKET

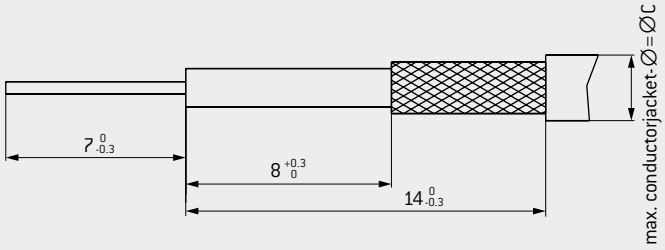


CABLE TERMINATION



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 outer conductor crimp dies for crimping tool 080.000.039.000.000
Pin contact	122.133.003.270.000	50	2.8	RG 174, RG 188, RG 316	1.75	2.7	3.2	3.8	082.000.039.102.001
	122.133.001.270.000		0.5	RG 178 RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Socket contact	122.133.004.270.000	50	2.8	RG 174, RG 188, RG 316	1.75	2.7	3.2	3.8	082.000.039.102.001
	122.133.002.270.000		0.5	RG 178 RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Crimping tool for inner conductor	080.000.051.000.000								
Positioner for inner conductor	080.000.051.102.000								

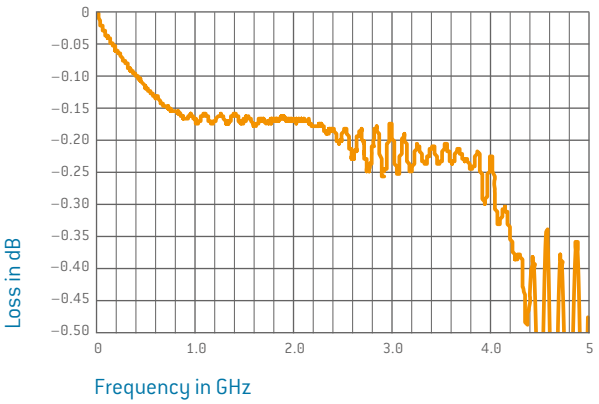
[1] Special lines and alternative models on request

MODULE 2 CONTACTS FOR 50 Ω

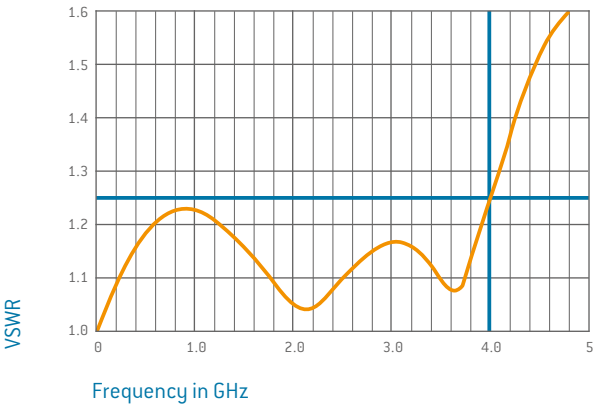
COAX

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 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[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 IEC 61010-1:2010 (VDE0411-1:2020-03)[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

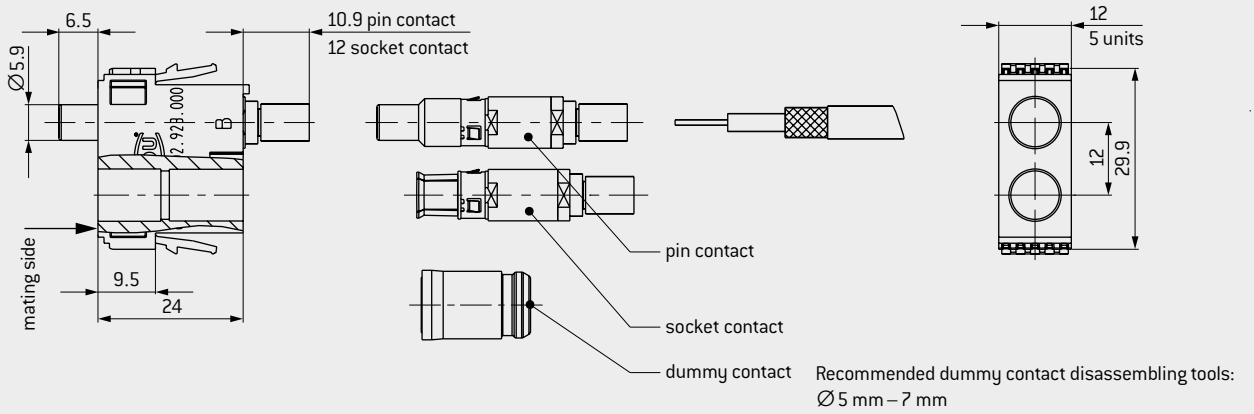
REMOVAL TOOL

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 155.

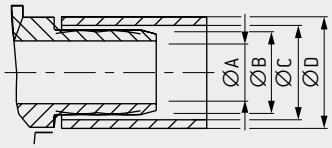
[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167 [3] See page 171 [4] See page 170

INSULATOR FOR PIN AND SOCKET



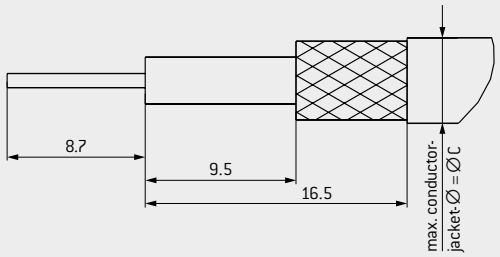
Recommended dummy contact disassembling tools:
Ø 5 mm – 7 mm

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	Outer conductor crimp dies for crimping tool 080.000.039.000.000
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
	122.132.003.270.000		0.4	RG 174, RG 188, RG 316	1.75	2.7	3.2	3.8	082.000.039.102.001
	122.132.007.270.000		3.5	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
	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
	122.132.004.270.000		0.4	RG 174, RG 188, RG 316	1.75	2.7	3.2	3.8	082.000.039.102.001
	122.132.008.270.000		3.5	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
	122.132.014.270.000		4	RG 223	3.15	4.5	5.9	6.75	082.000.039.108.000
Crimping tool for inner conductor	080.000.051.000.000								
Positioner for inner conductor	080.000.051.102.000								

[1] Special lines and alternative models on request

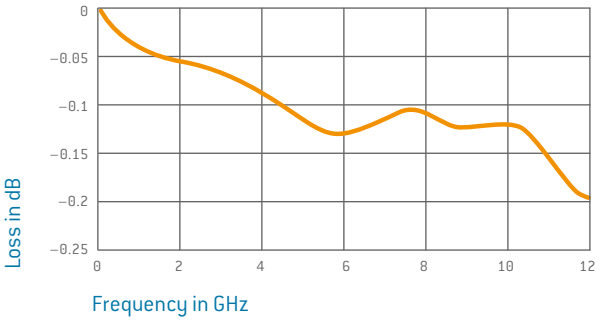
MODULE 2 CONTACTS FOR 50 Ω WITH SMA TERMINATION

COAX

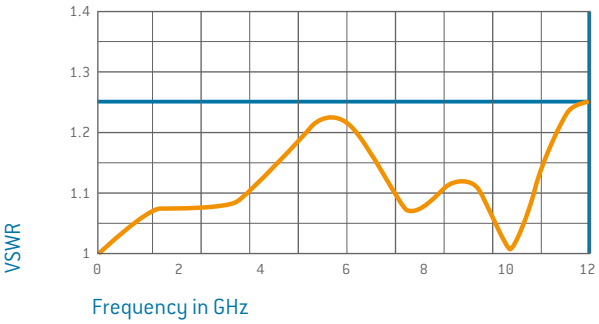
Mating cycles: min. 10,000
Frequency range[1]: 0–12 GHz[2]

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

Insertion loss



Voltage standing-wave ratio VSWR



TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[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 0411-1:2020-03)[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

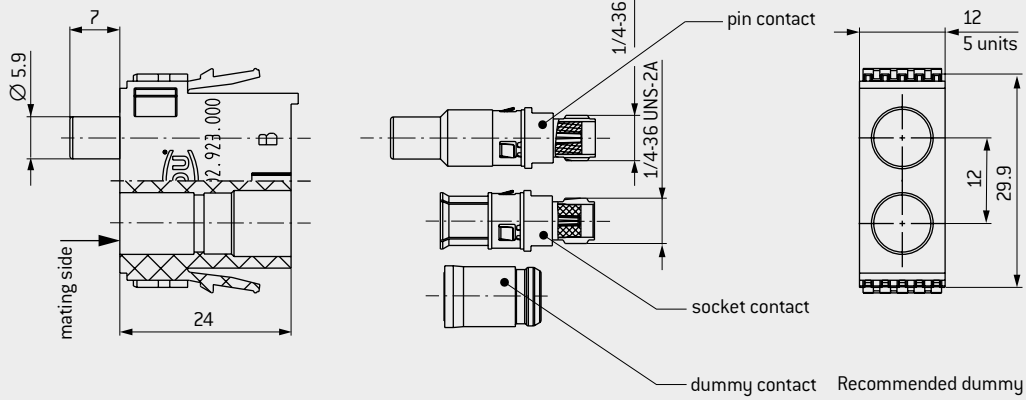
REMOVAL TOOL

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 155.

[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 0110-1:2008-01) see page 167 [4] See page 171 [5] See from page 170

INSULATOR FOR PIN AND SOCKET



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

Module 2 contacts	Part number
Insulator	631.122.102.923.000
Dummy contact	021.341.202.946.000

Description	Part number	Characteristic impedance Ω	Frequency range GHz
Pin contact	122.143.001.270.000	50	12[1]
Socket contact	122.143.002.270.000		12[1]

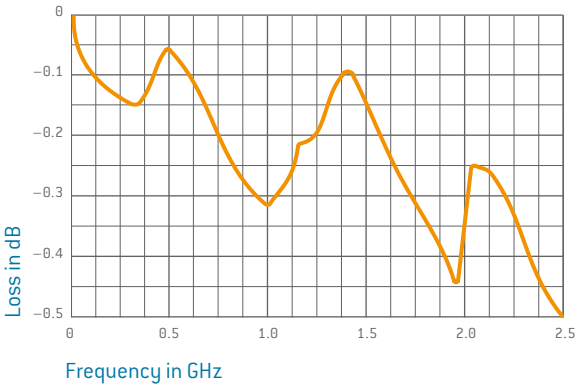
[1] Frequency range 0–16 GHz, if gap between pin and socket frame is < 0.2 mm and particular coax cables are used. Example: docking application

MODULE 2 CONTACTS FOR 75 Ω

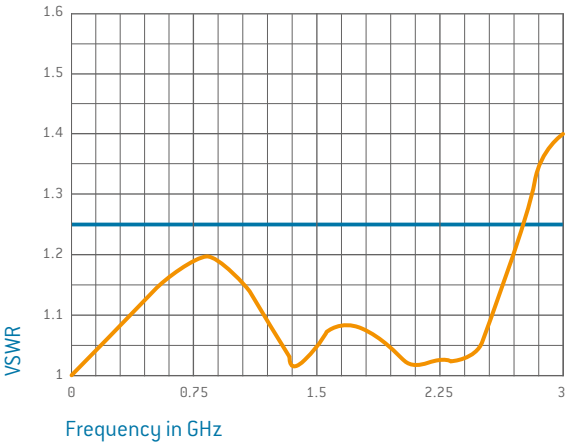
COAX

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 156

TECHNICAL DATA

Voltage data according to IEC 60664-1:2007 (VDE 0110-1:2008-01)[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 0411-1:2020-03)[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

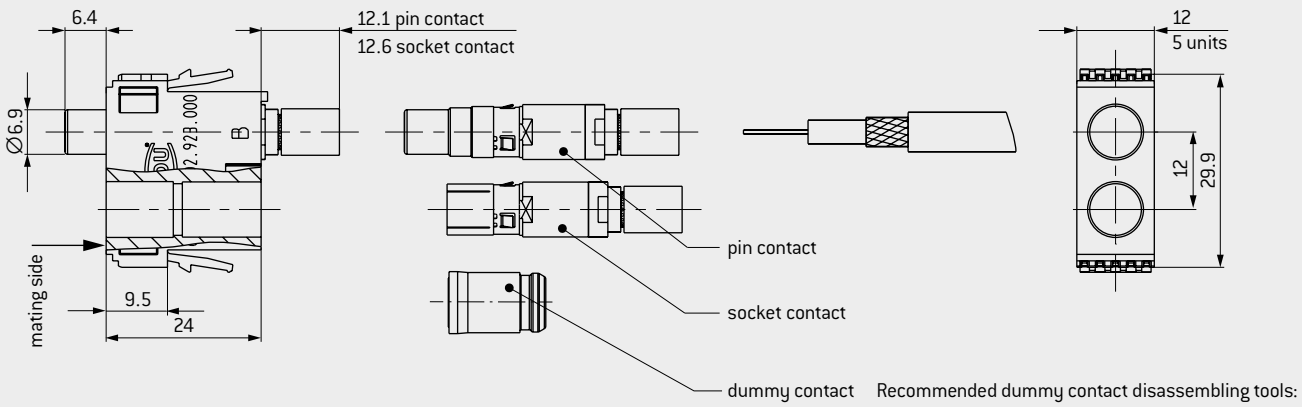
REMOVAL TOOL

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 155.

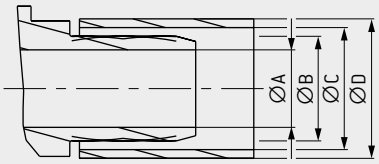
[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 167 [3] See from page 171 [4] See page 170

INSULATOR FOR PIN AND SOCKET



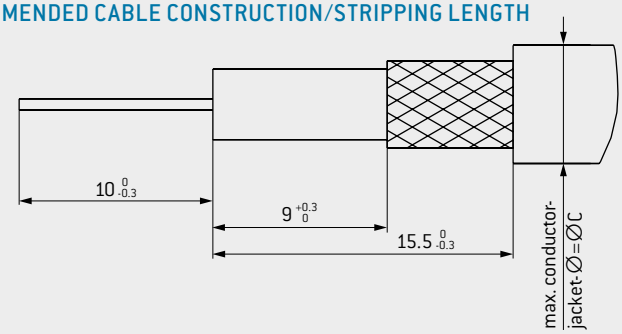
Recommended dummy contact disassembling tools:
Ø5 mm – 7 mm

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	Outer conductor crimp dies for crimping tool 080.000.039.000.000
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
	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
	122.131.010.270.000		2.7	RG 59	4	5.4	6.3	7.2	082.000.039.109.000
Crimping tool for inner conductor	080.000.051.000.000								
Positioner for inner conductor	080.000.051.102.000								

[1] Special lines and alternative models on request

MODULE 2 CONTACTS FOR PNEUMATIC VALVES

Inner-Ø of tube max. 4 mm, Push-in-Ø 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 155.

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

TECHNICAL NOTES

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

TECHNICAL DATA

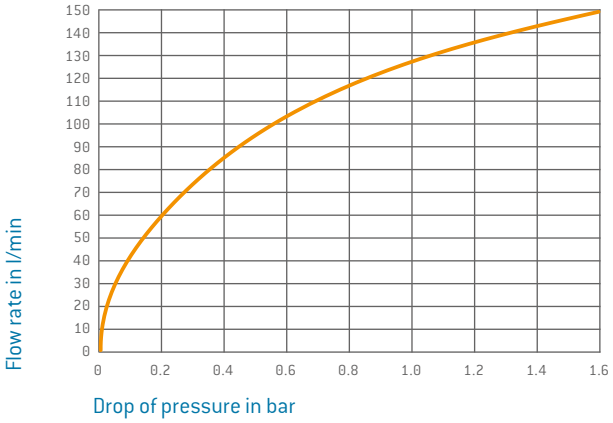
Mechanical data

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

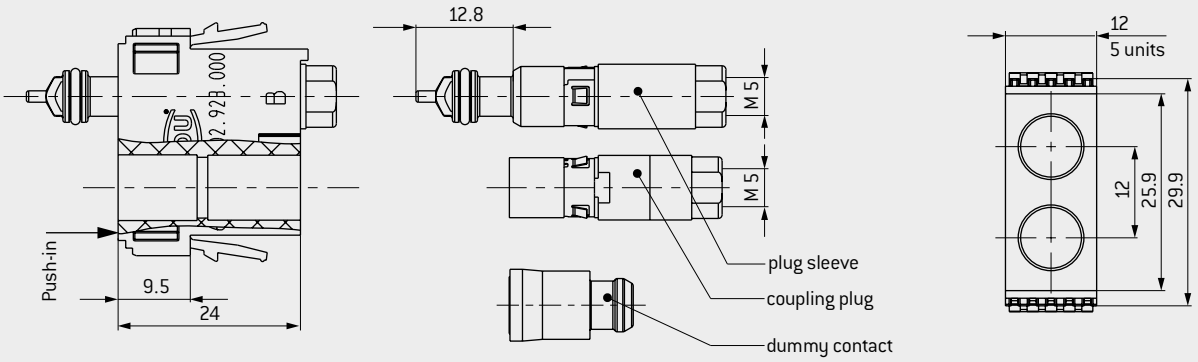


The flow rate diagram refers to the locking version with a maximum gap between socket and pin piece of ≤ 0.5 mm. If the clearance is modified, the drop of pressure increases.

[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 134



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

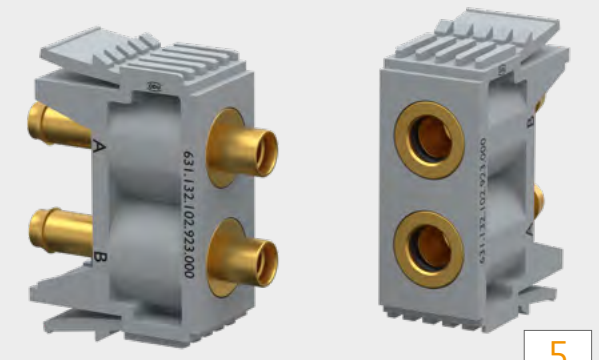
Module 2 contacts	Part number
Insulator	631.120.102.923.000
Dummy contact	021.341.202.946.000

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

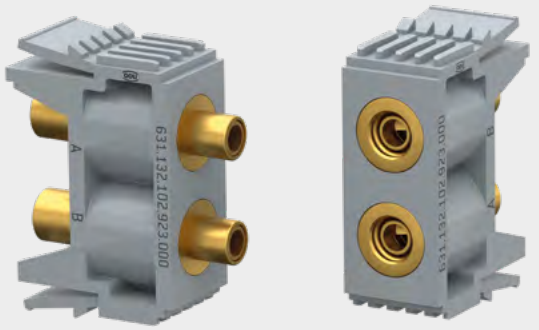
Inner-Ø of tube max. 4 mm, Push-in-Ø max. 6 mm.

COMPRESSED AIR



Non shut-off version

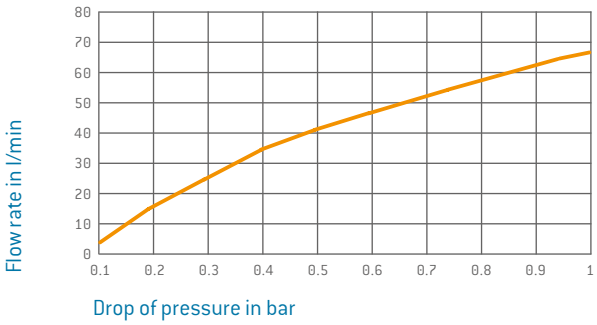
5 Units



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 spring-loaded in the mated state. The frame must maintain this spring load 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

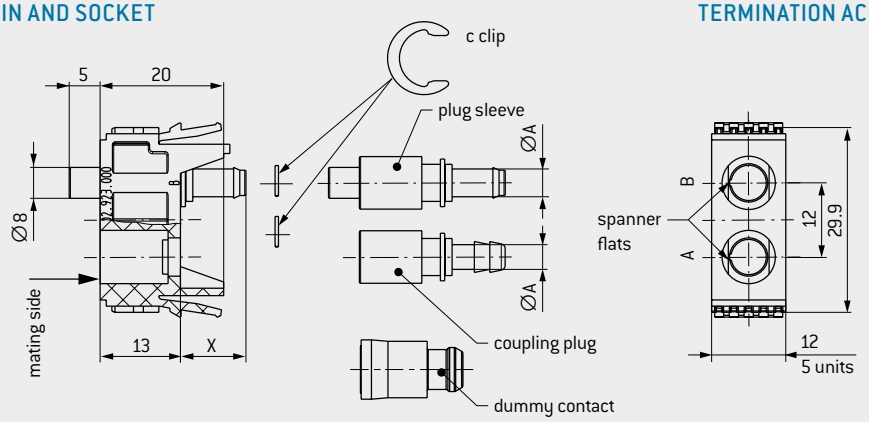
Materials

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 134



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

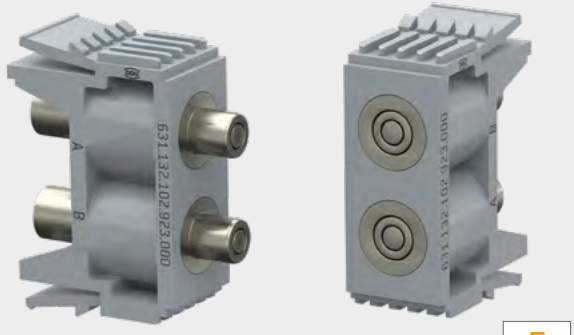
Description	Part number	Dim. A mm	Dim. X mm	Termination types see page 136 I	II
Plug sleeve (non shut-off)	196.023.001.300.000	3	8.5	x	
Plug sleeve (non shut-off)	196.024.001.300.000	4	10.5	x	
Coupling (non shut-off)	196.023.003.300.000	3	8.5	x	
Coupling (non shut-off)	196.024.003.300.000	4	10.5	x	
Plug 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 spring loaded in the mated state. The frame must maintain this spring load with a holding device.
- The use of flammable or explosive liquids or gases is not permitted.
- No O_2 model[2]

TECHNICAL DATA

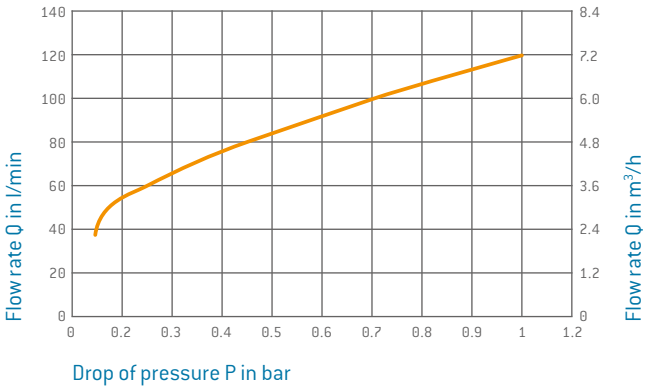
Mechanical data

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

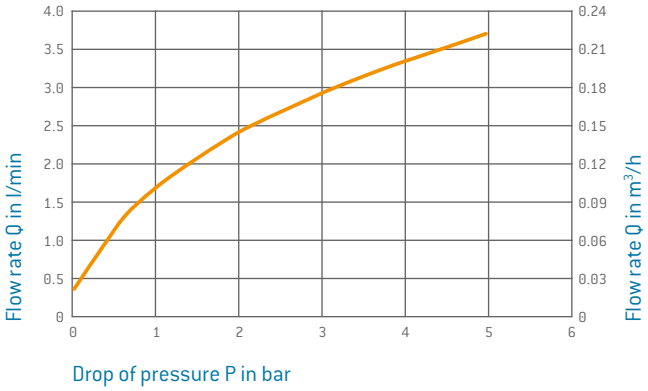
Materials

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

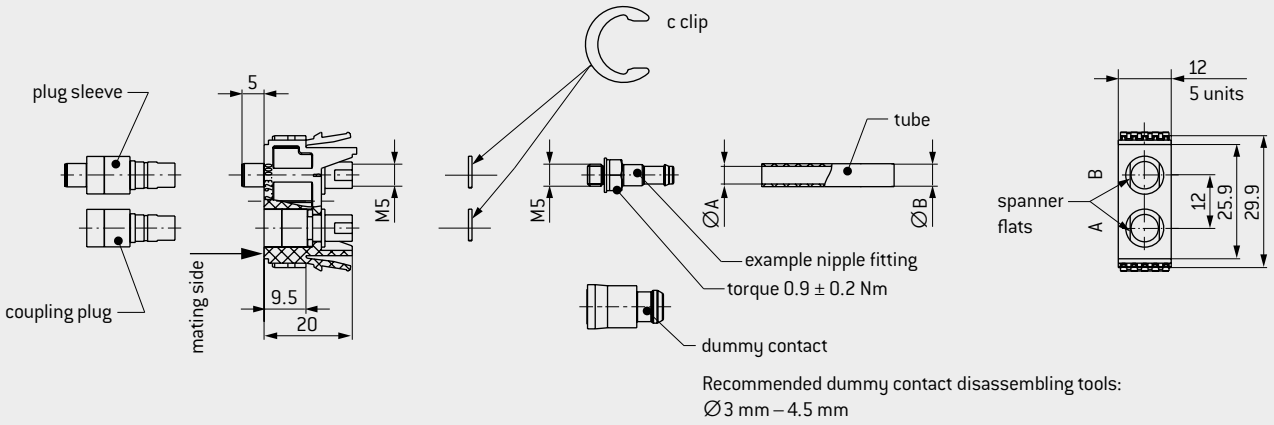


The flow rate diagram refers to the locking version with a maximum gap between socket and pin piece of ≤ 0.5 mm.
If the clearance is modified, the drop of pressure increases.

[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 134



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 AND FLUID MODULE

TERMINATION TYPE I

Plug nipple

TERMINATION TYPE II PUSH-IN

Push-in fitting

L connection

TECHNICAL NOTES

- Tightening torque 0.9 ± 0.2 Nm

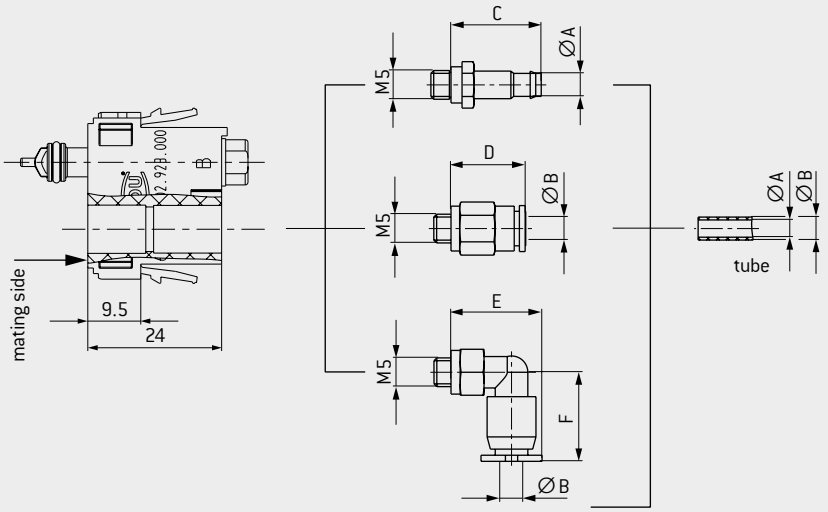
TECHNICAL DATA

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-Ø of tube mm	Dim. B Outer-Ø 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

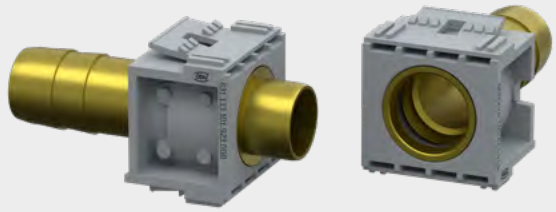
TERMINATION DIMENSIONS ACCESSORIES PNEUMATIC VALVES



MODULE 1 CONTACT FOR VACUUM

Inner-∅ of tube 16 mm, vacuum –0.8 bar

VACUUM



12
Units

Max. low pressure: –0.8 bar
Mating cycles[1]: min. 10,000
Tube connection: max. ∅ 16 mm

TECHNICAL NOTES

- No O_2 model[2]

TECHNICAL DATA

Mechanical data

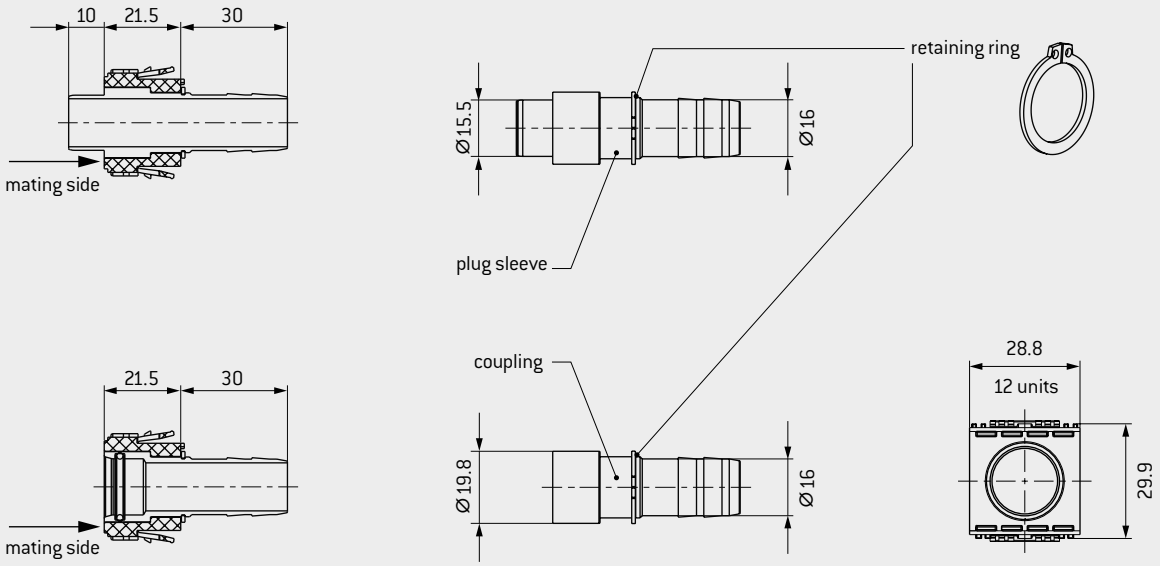
Max. low pressure	–0.8 bar (–0.8 x 10^5 Pa)
Max. pressure drop in 5 s	50 x 10^{-5} bar (50 Pa)
Operating force	5.2 N per module
Total sliding force	3.0 N per module
Operating temperature	–40 °C to +125 °C
Mating cycles[1]	min. 10,000

Materials

Insulator	PBT (reinforced thermoplastic glass fiber) acc. to UL 94
Coupling	Cu alloy
Plug sleeve	Cu alloy
Sealing	VMQ

[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



For use in a housing, check the neccessary space requirements.

Module 1 contact	Part number
Insulator	631.133.101.923.000

Description	Part number	Inner-Ø of tube in mm
Plug sleeve	196.052.001.300.000	16
Coupling	196.052.002.300.000	

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

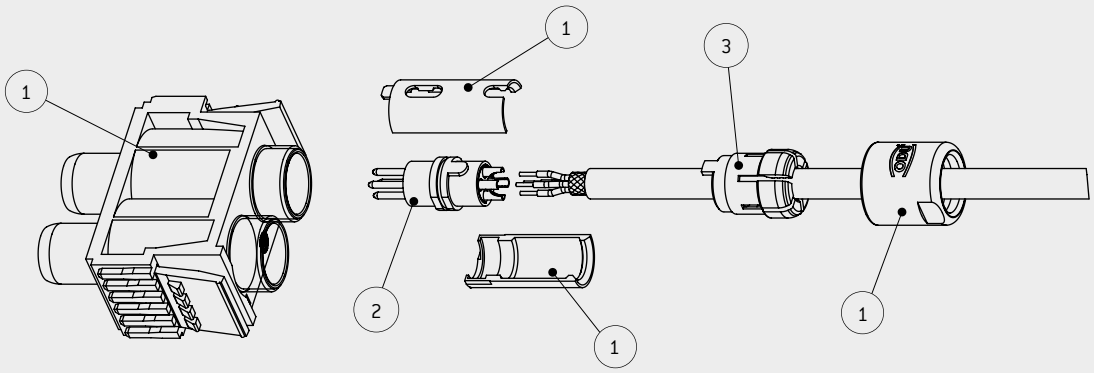
6 Units

Mating cycles: min. 10,000
CAT 5, USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire®[1], Ethernet, SPE
2 to 14 contacts

TECHNICAL NOTES

- The inserts listed here for shielded feedthroughs/ high-speed connectors are ideal for all common bus systems, e.g., Profibus®[1], RS485, FlexRay®[1], CAN-Bus, and RS232.
- Selected inserts are suitable and qualified for data rates up to 5 Gbit/s, e.g., Gigabit-Ethernet, Fast-Ethernet, IEEE 1394, USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire® S400[1] (on request), SPE 1000BASE-T1[3].

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



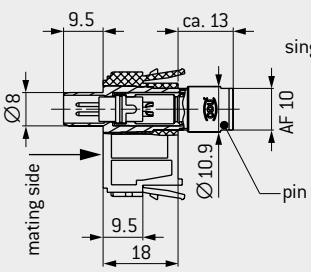
Order	Base parts	Part number
1	Insulator socket incl. socket housing	630.131.102.923.000
1	Insulator pin incl. connector housing	631.131.102.923.000
2	Insert cpl. solder contacts[2]	See next page
3	Assembly set	See table on the right

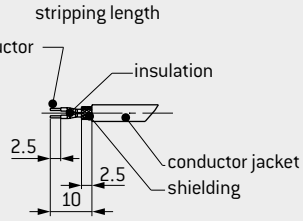
ASSEMBLY SET

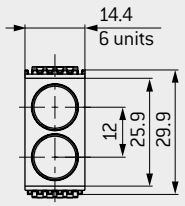
Cable-Ø mm	Part number
1.5 to 2.1	751.020.188.304.022
2 to 3.2	751.020.188.304.032
3 to 4.2	751.020.188.304.042
4 to 5.2	751.020.188.304.052
5 to 6.2	751.020.188.304.062
6 to 7.2	751.020.188.304.072
7 to 7.7	751.020.188.304.077

[1] Concerning data transmission protocols, please note page 2. [2] Insert for crimp contacts on request [3] Single Pair Ethernet according to IEC 63171-6:2019 (IEEE 802.3bp) contacts on request

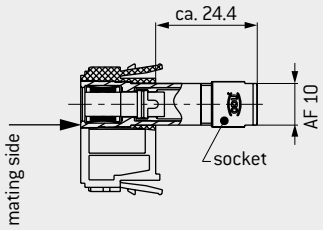
INSULATOR PIN





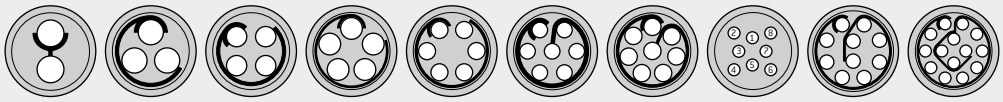


INSULATOR SOCKET



For use in a housing, check the necessary space requirements

CONTACT ARRANGEMENTS



2 contacts SPE 1000 BASE-T1 | 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® 3.2 Gen 1x1[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	2	550	Pin		701.844.724.002.200	8.6	7.1
							Socket		701.744.724.002.200		
2	0.7	22	32	1.5	2	300	Pin	SPE 1000 BASE-T1	701.848.724.002.D00	6.1	5.1
							Socket		701.748.724.002.D00		
3	1.3	20	32	1.5	2	500	Pin		701.844.724.003.200	10.4	8.7
							Socket		701.744.724.003.200		
4	0.9	22	40	2	2	500	Pin	CAT 5 up to 100 Mbit/s	701.849.724.004.200	8.3	6.9
							Socket		701.749.724.004.200		
4	0.9	22	40	2	2	500	Pin	USB® 2.0[1]	701.849.724.004.D00	8.3	6.9
							Socket		701.749.724.004.D00		
5	0.9	22	32	1.5	2	450	Pin		701.849.724.005.200	9.1	7.6
							Socket		701.749.724.005.200		
6	0.7	22	32	1.5	2	400	Pin		701.848.724.406.200	8.3	7.0
							Socket		701.748.724.406.200		
7	0.7	22	32	1.5	2	400	Pin		701.848.724.407.200	8.9	7.4
							Socket		701.748.724.407.200		
8	0.7	22	10	1.2	2	333	Pin		701.848.724.408.200	9.5	7.9
							Socket		701.748.724.408.200		
8	0.5	26	32	1.5	2	333	Pin	CAT 5 up to 1 Gbit/s	701.841.724.408.D00	9.3	7.8
							Socket		701.741.724.408.D00		
10	0.5	28	25	1.5	2	333	Pin		701.841.724.010.400	10.4	8.7
							Socket		701.741.724.010.200		
10	6 × 0.3 4 × 0.5	28 24	7.5	1.2	2	100	Pin	USB® 3.2 Gen 1x1[1]	701.831.724.410.D00	12.6	10.5
							Socket		701.731.724.410.D00		
14	0.5	28	25	1.5	2	300	Pin		701.841.724.014.400	15.7	13.1
							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 0110-1:2008-01), see page 167
[3] According to EIA-364-20F:2019 [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

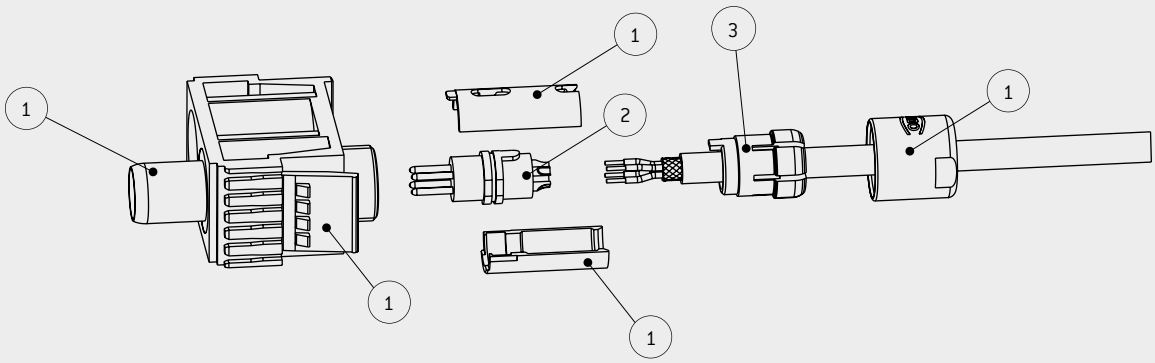
SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR

Mating cycles: min. 10,000
CAT 5, USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire®[1], Ethernet, SPE
2 to 14 contacts

TECHNICAL NOTES

- The inserts listed here for shielded feedthroughs/high-speed connectors are ideal for all common bus systems, e.g., Profibus®[1], RS485, FlexRay®[1], CAN-Bus, and RS232.
- Selected inserts are suitable and qualified for data rates up to 5 Gbit/s, e.g., Gigabit-Ethernet, Fast-Ethernet, IEEE 1394, USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire® S400[1] (on request), SPE 1000BASE-T1[3].

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



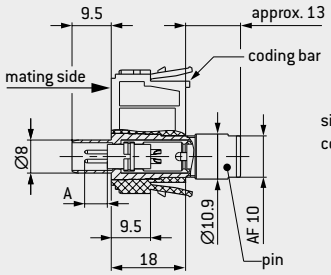
Order	Base parts	Part number
1	Insulator socket incl. socket housing	630.131.101.923.000
1	Insulator pin incl. connector housing	631.131.101.923.000
2	Insert cpl. solder contacts[2]	See next page
3	Assembly set	See table on the right
	Dummy contact	021.341.204.946.000

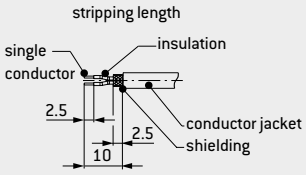
ASSEMBLY SET

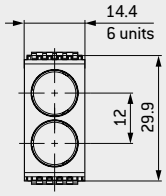
Cable-∅ mm	Part number
1.5 to 2.1	751.020.188.304.022
2 to 3.2	751.020.188.304.032
3 to 4.2	751.020.188.304.042
4 to 5.2	751.020.188.304.052
5 to 6.2	751.020.188.304.062
6 to 7.2	751.020.188.304.072
7 to 7.7	751.020.188.304.077

[1] Concerning data transmission protocols, please note page 2. [2] Insert for crimp contacts on request [3] Single Pair Ethernet according to IEC 63171-6:2019 (IEEE 802.3bp) contacts on request

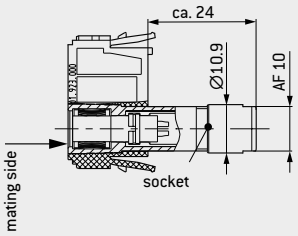
INSULATOR PIN





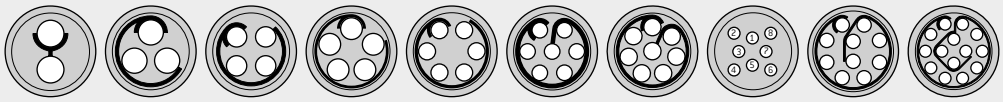


INSULATOR SOCKET



For use in a housing, check the necessary space requirements

CONTACT ARRANGEMENTS



2 contacts SPE 1000 BASE-T1 | 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® 3.2 Gen 1x1[1] | 14 contacts

INSERT WITH ODU TURNTAC® (MATING CYCLES MIN. 10,000)

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
2	1.3	20	32	2	2	550	Pin		701.844.724.002.200	8.6	7.1
							Socket		701.744.724.002.200		
2	0.7	22	32	1.5	2	300	Pin	SPE 1000 BASE-T1	701.848.724.002.D00	6.1	5.1
							Socket		701.748.724.002.D00		
3	1.3	20	32	1.5	2	500	Pin		701.844.724.003.200	10.4	8.7
							Socket		701.744.724.003.200		
4	0.9	22	40	2	2	500	Pin	CAT 5 up to 100 Mbit/s	701.849.724.004.200	8.3	6.9
							Socket		701.749.724.004.200		
4	0.9	22	40	2	2	500	Pin	USB® 2.0[1]	701.849.724.004.D00	8.3	6.9
							Socket		701.749.724.004.D00		
5	0.9	22	32	1.5	2	450	Pin		701.849.724.005.200	9.1	7.6
							Socket		701.749.724.005.200		
6	0.7	22	32	1.5	2	400	Pin		701.848.724.406.200	8.3	7.0
							Socket		701.748.724.406.200		
7	0.7	22	32	1.5	2	400	Pin		701.848.724.407.200	8.9	7.4
							Socket		701.748.724.407.200		
8	0.7	22	10	1.2	2	333	Pin		701.848.724.408.200	9.5	7.9
							Socket		701.748.724.408.200		
8	0.5	26	32	1.5	2	333	Pin	CAT 5 up to 1 Gbit/s	701.841.724.408.D00	9.3	7.8
							Socket		701.741.724.408.D00		
10	0.5	28	25	1.5	2	333	Pin		701.841.724.010.400	10.4	8.7
							Socket		701.741.724.010.200		
10	6 x 0.3	28	7.5	1.2	2	100	Pin	USB® 3.2 Gen 1x1[1]	701.831.724.410.D00	12.6	10.5
	4 x 0.5	24					Socket		701.731.724.410.D00		
14	0.5	28	25	1.5	2	300	Pin		701.841.724.014.400	15.7	13.1
							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 0110-1:2008-01), see page 167
[3] According to EIA-364-20F:2019 [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 2 (e.g., for use in bus systems), 1 feedthrough

SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR

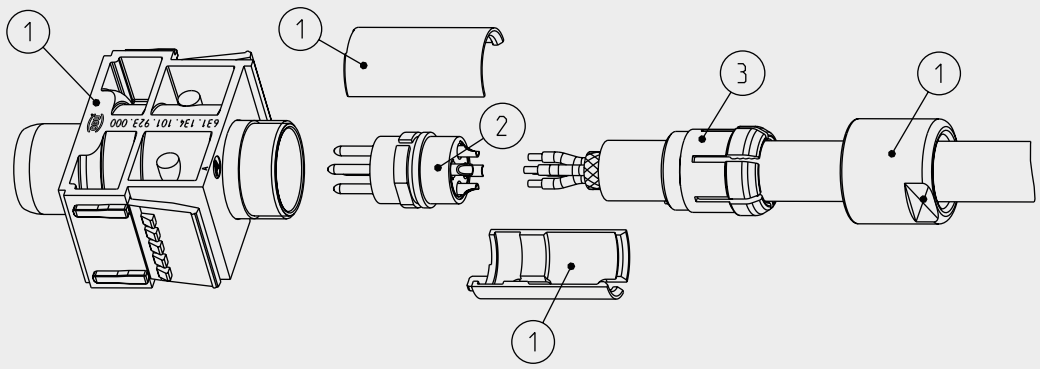
7 Units

Mating cycles: min. 10,000
CAT 5, CAT 6_A, USB® 3.2 Gen 1x2[1], HDMI® 2.0 / 2.1[1], DisplayPort® 2.0[1]
3 to 22 contacts

TECHNICAL NOTES

- The inserts listed here for shielded feedthroughs/high-speed connectors are ideal for all common bus systems with transfer rates, e.g., Profibus®[1], RS485, FlexRay®[1], CAN-Bus, and RS232.
- Selected inserts are suitable and qualified for data rates up to 10 Gbit/s, e.g., 10 Gigabit-Ethernet, DisplayPort® 2.0[1], Fast-Ethernet, IEEE 1394, USB® 3.2 Gen 1x2[1], HDMI® 2.0 / 2.1[1].

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



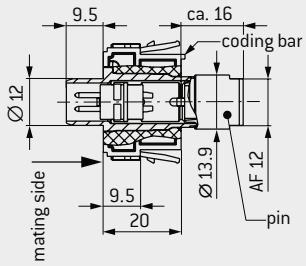
Order	Base parts	Part number
1	Insulator socket incl. socket housing	630.134.101.923.000
1	Insulator pin incl. connector housing	631.134.101.923.000
2	Insert cpl. solder contacts[2]	See next page
3	Assembly set	See table on the right

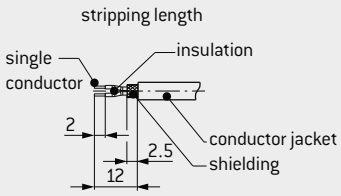
ASSEMBLY SET

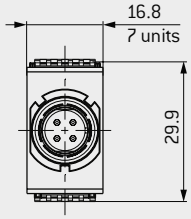
Cable-Ø mm	Part number
2 to 3.2	752.020.188.304.032
3 to 4.2	752.020.188.304.042
4 to 5.2	752.020.188.304.052
5 to 6.2	752.020.188.304.062
6 to 7.2	752.020.188.304.072
7 to 8.2	752.020.188.304.082
8 to 9.2	752.020.188.304.092
9 to 9.9	752.020.188.304.099

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

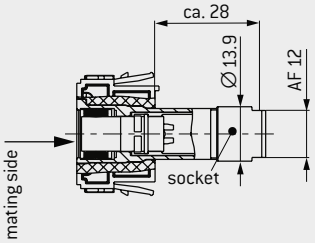
INSULATOR PIN







INSULATOR SOCKET



For use in a housing, check the necessary space requirements

CONTACT ARRANGEMENTS

3 contacts | 4 contacts CAT 5 | 6 contacts | 7 contacts | 8 contacts CAT 5, CAT 6_A | 12 contacts | 14 contacts | 16 contacts HDMI® 2.0 | 19 contacts | 22 contacts USB® 3.2 Gen 1x2[5], DisplayPort® 2.0[5], HDMI® 2.1[5]

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)											
3	1.6	18	50	2.5	3	800	Pin		702.851.724.003.200	13.9	11.6
			160		2		Socket		702.751.724.003.200		
4	1.3	20	40	2.5	3	650	Pin	CAT 5 up to 100 Mbit / s	702.844.724.004.200	13.1	10.9
			160		2		Socket		702.744.724.004.200		
6	1.3	20	32	2	3	600	Pin		702.844.724.006.200	16.2	13.5
			80		2		Socket		702.744.724.006.200		
		18	32	1.5	2	366	Pin		702.844.724.406.200	16.2	13.5
							Socket		702.744.724.406.200		
7	1.3	20	32	2	3	600	Pin		702.844.724.007.200	17.8	14.8
			80	2	2		Socket		702.744.724.007.200		
		18	32	1.5	2	366	Pin		702.844.724.407.200	17.8	14.8
							Socket		702.744.724.407.200		
8	0.9	22	20	2	3	500	Pin	CAT 6_A	702.849.724.008.D00	16.2	13.5
			50		2		Socket		702.749.724.008.D00		
12	0.7	26	10	2	3	450	Pin		702.848.724.012.200	16.1	13.4
			32		2		Socket		702.748.724.012.200		
14	0.7	26	32	1.5	2	400	Pin		702.848.724.014.200	17.6	14.7
							Socket		702.748.724.014.200		
16	0.5	26	10	1.5	3	250	Pin	HDMI[1] 2.0	702.841.724.416.D00	19.1	15.9
			32		2		Socket		702.741.724.416.D00		
19	0.7	26	32	1.5	2	333	Pin		702.848.724.019.200	21.4	17.9
							Socket		702.748.724.019.200		
22	0.5	22 / 28	16	2	3	200	pin	USB® 3.2 Gen 1x2[1], DisplayPort® 2.0[1], HDMI® 2.0 / 2.1[1]	702.841.724.022.D00	23.7	19.8
			40		2		socket		702.741.724.022.D00		
INSERT WITH ODU SPRINGTAC® (MATING CYCLES MIN. 60,000)											
8	0.76	22	16	2	3	550	pin	CAT 5	702.842.724.008.D00	23.5	19.6
			40		2		socket		702.742.724.008.D00		

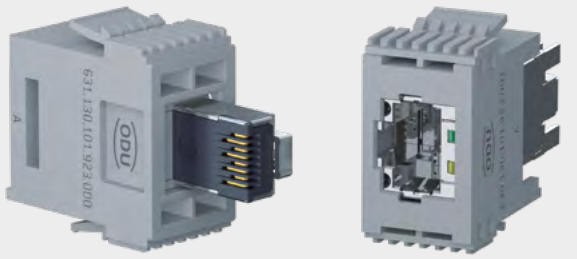
[1] Concerning data transmission protocols, please note page 2. [2] According to IEC 60664-1:2007 (VDE 0110-1:2008-01), see page 167
[3] According to EIA-364-20F:2009 [4] Classification according to ISO/IEC 11801-1:2017-11 [5] Insert for crimp version on request

Table of contents

MODULE FOR INDUSTRIAL ETHERNET RJ45 / 10 GBIT/S

STEADYTEC® Technology

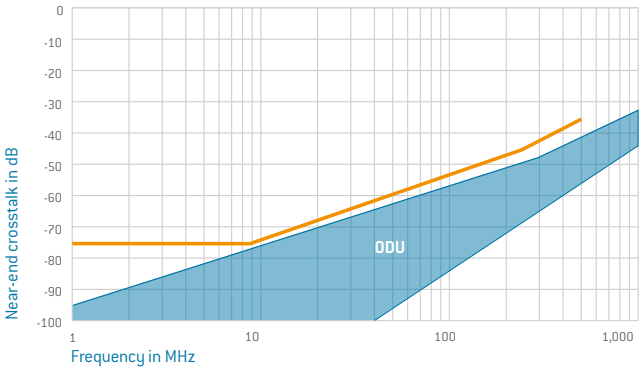
HIGH-SPEED CONNECTOR



7 Units

COUPLING FOR RJ45 CONNECTION ON THE SOCKET SIDE

NEXT



Mating cycles: min. 5,000
CAT 6, CAT 6$_A$
8 contacts

TECHNICAL NOTES

- Data transmission
- This module is suitable for transmitting data of CAT 6 according to ANSI/TIA/EIA-568-C.2 and CAT 6$_A$ according to ANSI/TIA-568.2-D. Suitable for the transmission of 10 Gbit/s according to IEEE 802.3an.
- 8-way RJ45 field connector and RJ45 connector insert CAT 6$_A$ (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$_A$ and RJ45 coupling CAT 6$_A$
- 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

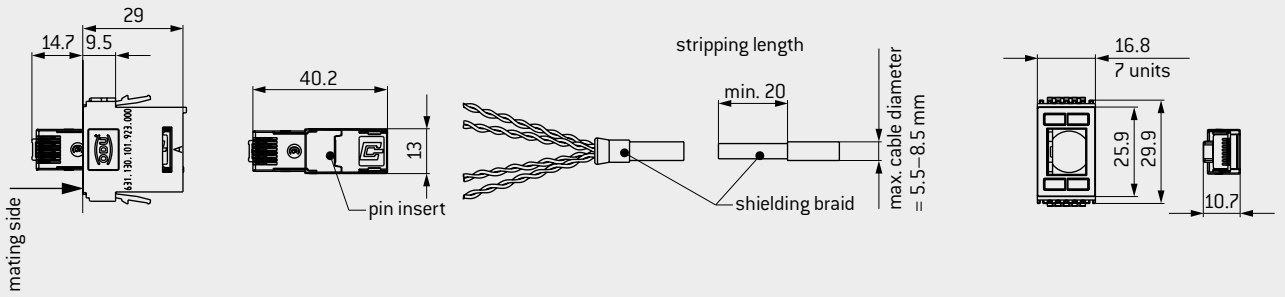
Materials

Surface	Sn

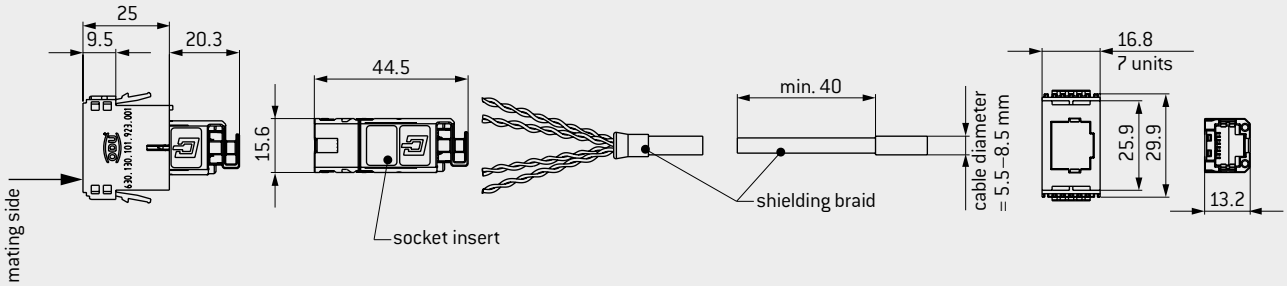
Temperature range –40 °C to +70 °C

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

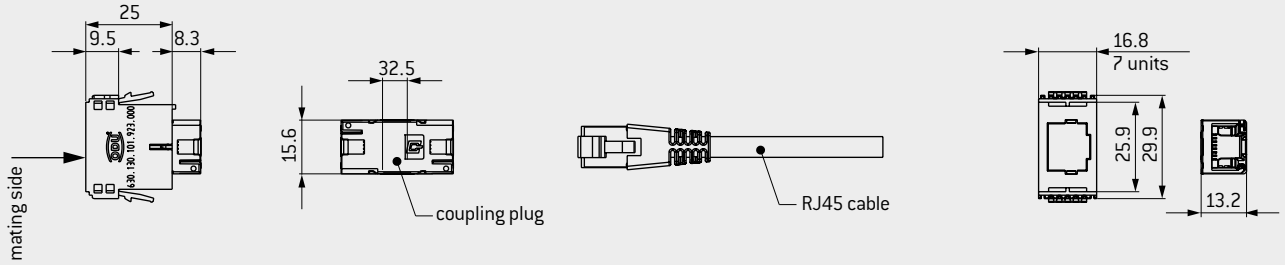
INSULATOR PIN



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	630.130.101.923.001
Insulator pin	631.130.101.923.000

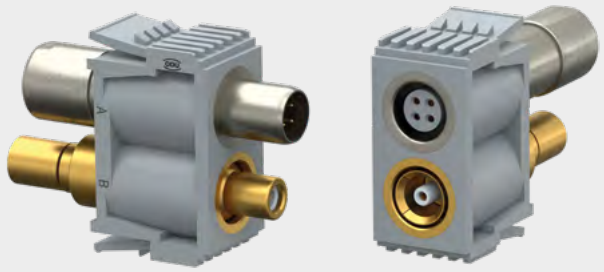
Description	Part number	Category	Termination AWG / mm
Coupling for RJ45	923.000.005.000.145		RJ45, 8 contacts
Socket insert	923.000.005.000.146	TIA A	22–26
Socket insert	923.000.005.000.147	TIA B	22–26
Socket insert	923.000.005.000.148	Profinet®[1]	22–26
Connector insert	923.000.005.000.149	TIAA / TIAB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



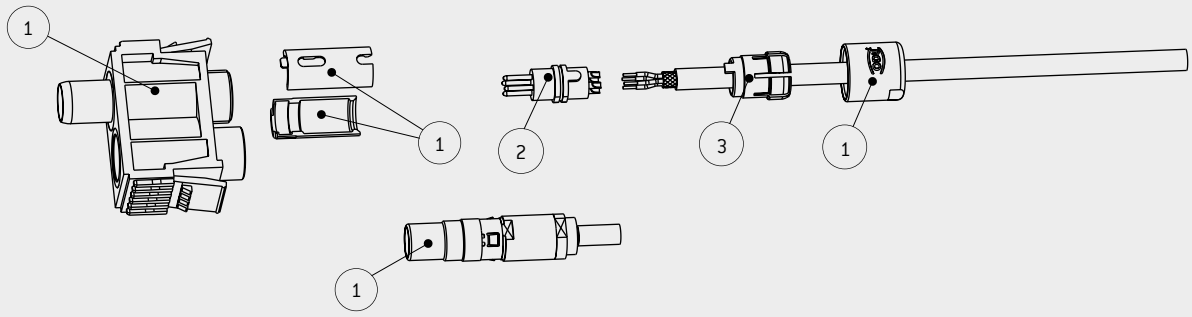
6 Units

Mating cycles: min. 10,000
Frequency range: 0–4 GHz
CAT 5, USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire®[1], Ethernet, SPE

TECHNICAL NOTES

- Note for high-speed module, see pages 138-141
- For crimp information for coax modules, see from page 156

HOW TO CONFIGURE YOUR COMBINATION MODULE



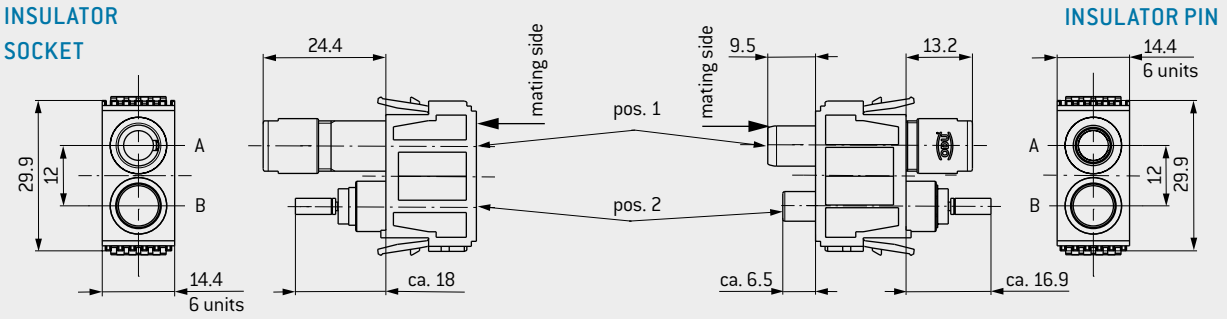
Order	Base parts	Part number
1	Insulator incl. housing and coax contact 50 Ω/75 Ω	See next page
2	Insert for shielded feedthrough cpl. solder contacts[2]	See page 138-141
3	Assembly set	See table on the right

ASSEMBLY SET

Cable-Ø 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

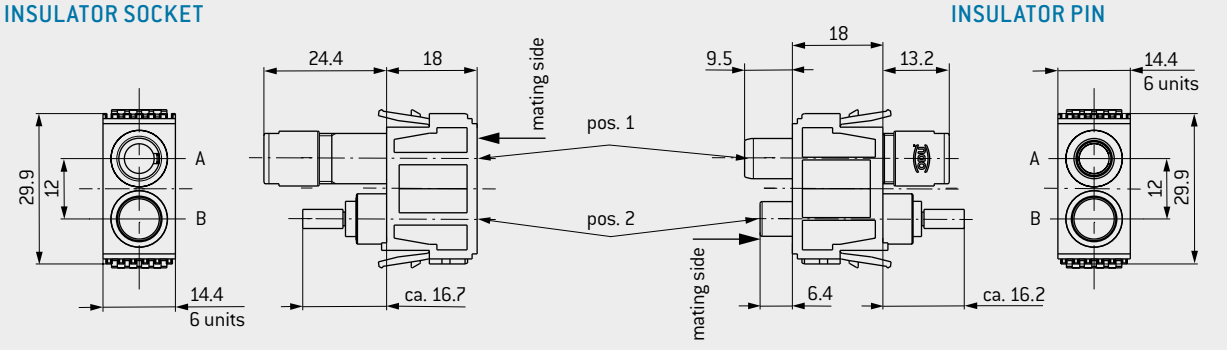
[1] Concerning data transmission protocols, please note page 2. [2] Insert for crimp contacts on request

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 178, 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	082.000.039.102.001
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



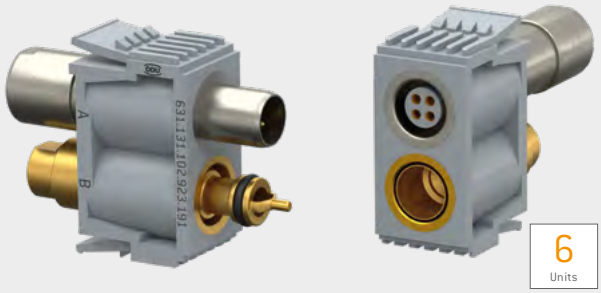
Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable[1]	Cable termination[3] A	B	C	D	Part number Crimp dies
Socket side	630.131.102.923.311	75	1.2	RG 179, RG 187	1.75	2.7	3.2	3.8	082.000.039.102.001
Pin contact	631.131.102.923.311								
Socket contact	630.131.102.923.312	75	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 122 [3]See page 126

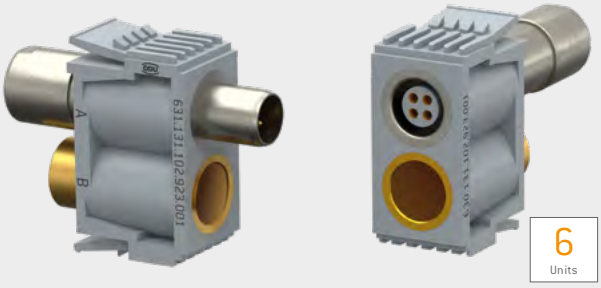
COMBINATION MODULE FOR HIGH-SPEED AND COMPRESSED AIR/EASILY INTERCHANGEABLE

Size 1

COMBINATION MODULE FOR HIGH-SPEED AND COMPRESSED AIR



COMBINATION MODULE CAN BE EASILY INTERCHANGEABLE



Mating cycles[1]: min. 10,000
CAT 5, USB® 2.0[2], USB® 3.2 Gen 1x1[2], FireWire®[2], Ethernet, SPE
12 bar or 0–4 GHz

TECHNICAL NOTES

- Note for high-speed module, see pages 138-141

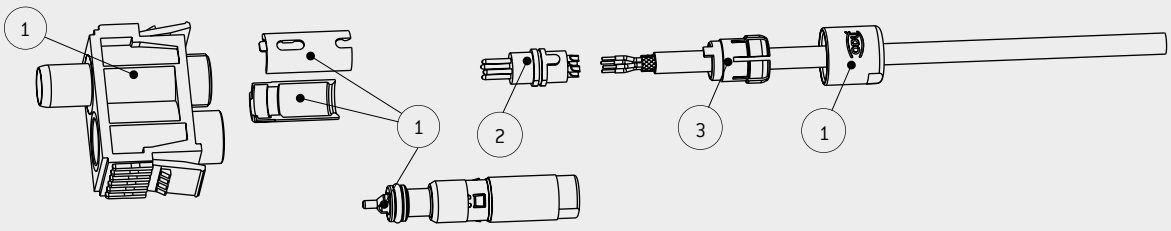
COMBINATION MODULE FOR HIGH-SPEED AND COMPRESSED AIR

- The function dictates that contacts are spring loaded in the mated state. The frame must maintain this spring load with a holding device.
- Vacuum modules and further termination types on request
- No O_2 model[3]
- Termination accessories, see page 134

COMBINATION MODULE CAN BE EASILY INTERCHANGEABLE

- Can be retrofitted with 50 Ω coax contact, see pages 122-123
- Can be retrofitted with 75 Ω coax contact, see pages 126-127
- Can be retrofitted with compressed air, see pages 128-129

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 pages 138-141
3	Assembly set	See table on the right

ASSEMBLY SET

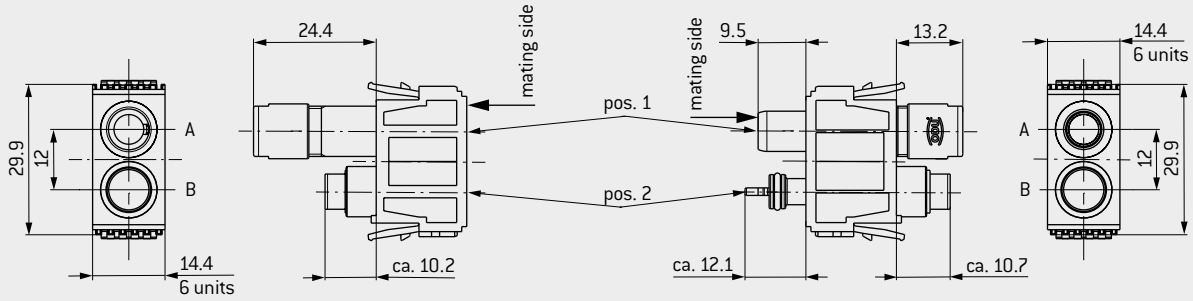
Cable-Ø mm	Part number
1.5 to 2.1	751.020.188.304.022
2 to 3.2	751.020.188.304.032
3 to 4.2	751.020.188.304.042
4 to 5.2	751.020.188.304.052
5 to 6.2	751.020.188.304.062
6 to 7.2	751.020.188.304.072
7 to 7.7	751.020.188.304.077

[1] The stated mating cycles for compressed air module are possible via regualr maintaince intervals [2] [1]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

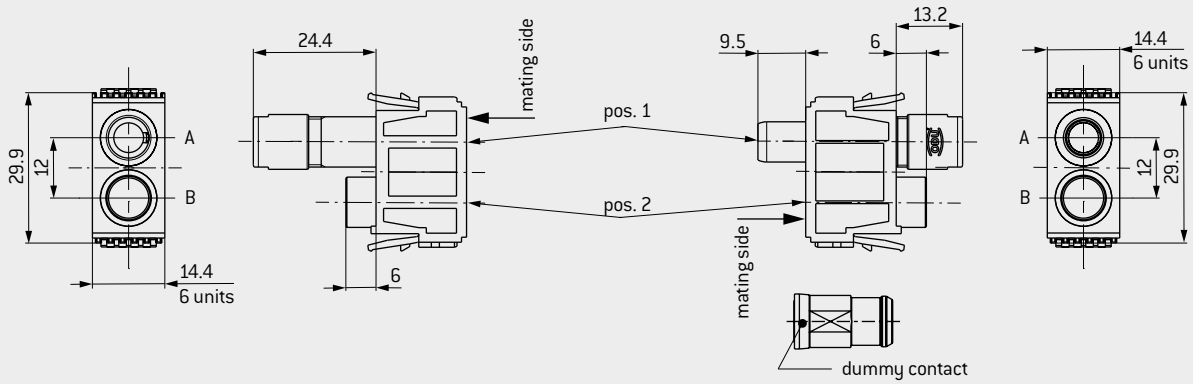


Description	Part number	Termination
Socket side (non shut-off)	630.131.102.923.191	M5
Pin side (non shut-off)	631.131.102.923.191	
Socket side (shut-off)	630.131.102.923.192	

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 5 CONTACTS FOR FIBER OPTIC POF

FIBER OPTIC

3
Units

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 155.

Ferrule
Mating cycles: min. 10,000
Type of fiber optic: POF

TECHNICAL NOTES

- The function dictates that contacts are spring loaded in the mated state. The frame must maintain this spring load with a holding device.

TECHNICAL DATA

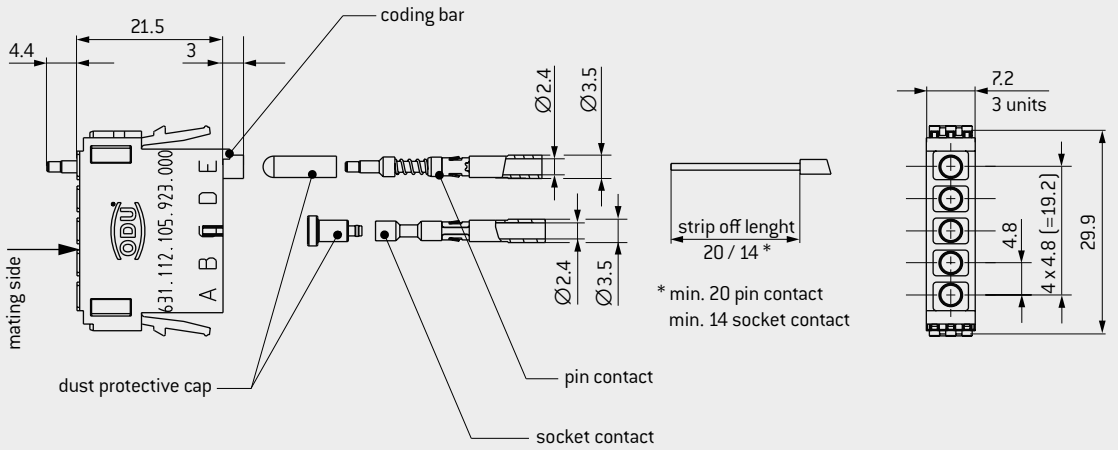
Mechanical data

POF	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)	17.5 N per module
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 glass-fiber reinforced acc. to UL 94
Fiber optic contact	Cu alloy
Type of fiber	POF 980 / 1.000 µm

INSULATOR PIN AND SOCKET



Module 5 contacs	Part number
Insulator	631.112.105.923.000

Description	Part number
Socket contact 980 / 1,000 µm	196.503.001.204.000
Pin contact 980 / 1,000 µm	196.503.002.204.000
Processing set (Multi-purpose and crimping tool)	080.000.048.000.000
Cutting / stripping universal pliers	080.000.048.100.000
Crimping tool	080.000.048.200.000

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

Table of contents

TOOLS

TERMINATION TECHNOLOGY

ODU offers three different termination technologies for the single contacts:

- Crimp
- Solder
- PCB

CRIMP TERMINATION

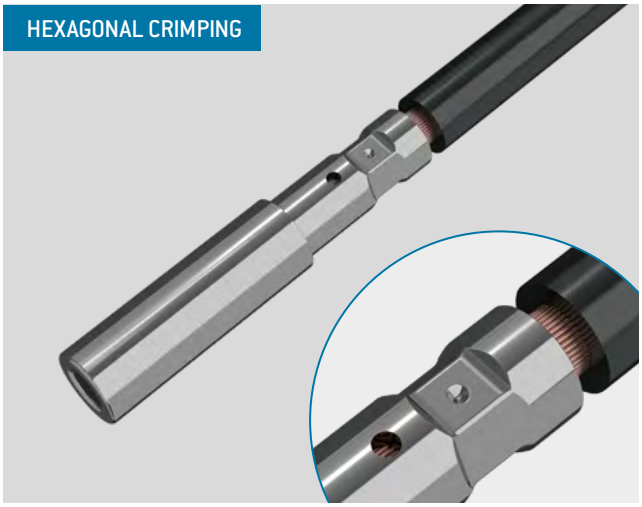
The contact processing for the production of connecting cables via crimping creates a secure, durable, and corrosion-free contact. For most people, crimping is easy and quick to carry out.

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.

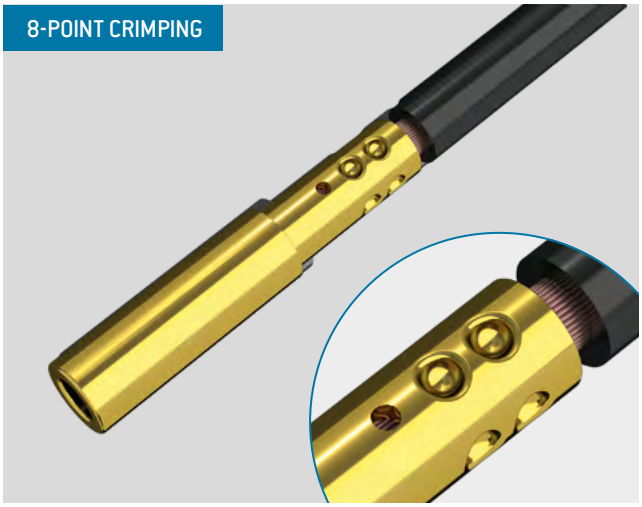
Crimping can be carried out on the tiniest of crosssections as well as on larger crosssections. For small crosssections (0.14–2.5 mm²), 8-point crimping tools are used; hexagonal crimping tools are used for larger crosssections. The corner measurement of the crimping is never larger than the original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

CRIMPING TOOLS

For further crimp information, please refer to the table on page 159.

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 159.
Has to be ordered separately

HEXAGONAL CRIMPING TOOL FOR COAX CONTACTS

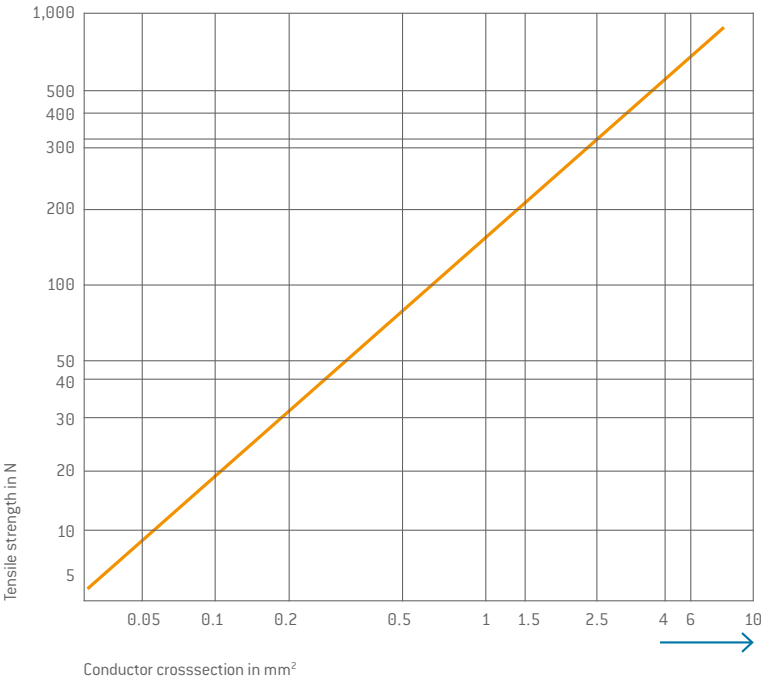
With blocking system
PART NUMBER PLIER: 080.000.039.000.000

CRIMPING JAWS SEE PAGE 159.
Has to be ordered separately

TENSILE STRENGTH FOR CRIMP TERMINATIONS

IEC 60352-2:2006 (DIN EN 60352-2:2014-04)

Tensile strength diagram of a crimp termination depending on the conductor crosssection IEC 60352-2:2006 (DIN EN 60352-2:2014-04).
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

CRIMP INFORMATION

Contact -Ø	Termination crosssection		Strip-ping length	8-point crimping tool 080.000.051.000.000 without positioner	8-point crimping tool 080.000.057.000.000 without positioner	Hexagonal crimping tool 080.000.062.000.000	Hexagonal crimping tool 080.000.064.000.000	Hexagonal crimping tool 080.000.039.000.000
				Positioner 080.000.051.101.000	Positioner 080.000.057.101.000			
mm	AWG 7 wire 19 wire	mm² Class 5	mm	Position/adjusting dimension	Position/adjusting dimension		Crimping jaws	Crimping jaws
0.7	30	0.05	$4^{+0.5}$	9/0.45				
	28	0.08	$4^{+0.5}$	9/0.55				
	26		$4^{+0.5}$	9/0.55				
		0.14						
1.3	28	0.08	$4^{+0.5}$	10/0.60				
	26		$4^{+0.5}$	10/0.62				
	24		$4^{+0.5}$	10/0.62				
	22		$4^{+0.5}$	10/0.62				
		0.14	$4^{+0.5}$	10/0.62				
		0.25	$4^{+0.5}$	10/0.62				
		0.38	$4^{+0.5}$	10/0.62				
	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], [2]/1.67			
	12					Profile no. 3		
	10					Profile no. 3		
		2.5			[1], [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	
12		25	$18^{+0.5}$				080.000.064.125.000	
		35					080.000.064.135.000	
		50					080.000.064.150.000	

COAX CRIMP INFORMATION

		Positioner for inner conductor 080.000.051.102.000				Crimp dies for outer conductor
		Position/adjusting dimension				
RG 178 / RG 196	See module description	2/0.67[3] 1/0.57[4]				082.000.039.101.000
RG 174 / RG 179 / RG 187/ RG 188 / RG 316		2/0.67[3] 1/0.57[4]				082.000.039.102.001
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		598.054.004.000.000	1.5	
Torque wrench		598.054.006.000.000	2.2	
Torque wrench		598.054.003.000.000	3	
Bit slot 8 (1.2 / 50)	Coding socket (DIN frame)	598.054.110.000.000		1.2 Nm +/– 0.2 Nm
Bit combination profile size 2	Coding socket (DIN frame)	598.054.113.000.000		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
Bit slot 5.5 (0.8 / 50)	Fastening screw on pin frames, floating mounted	598.054.101.000.000		1.2 Nm +/– 0.2 Nm
Phillips bit cross slot size 2	Oval-head screw of grounding pin on frame	598.054.115.000.000		1.2 Nm +/– 0.2 Nm
Phillips PH1 Bit	PUSH-LOCK assembly	598.054.114.000.000		0.6 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 10	Screws for PE module	598.054.104.000.000		1.2 Nm +/– 0.2 Nm
Torx bit TX 10	Screw for power contact 8 mm contact-Ø	598.054.104.000.000		1.2 Nm +/– 0.2 Nm
Torx bit TX 20	Screw for power contact 12 mm contact-Ø	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

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-Ø 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

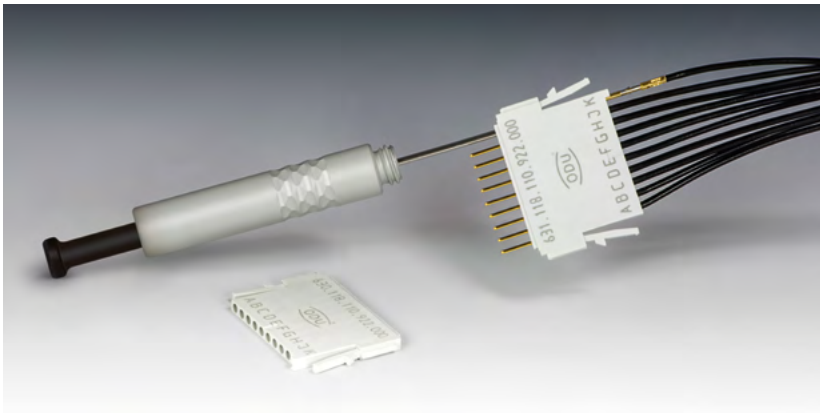
REMOVAL TOOL FOR COAX AND COMPRESSED-AIR CONTACTS

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 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, help to ensure 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

To reorder individual tubes of the lubricant:

ORDER NUMBER: 50270079

For technical properties of the service kit, please refer to our website: **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 %

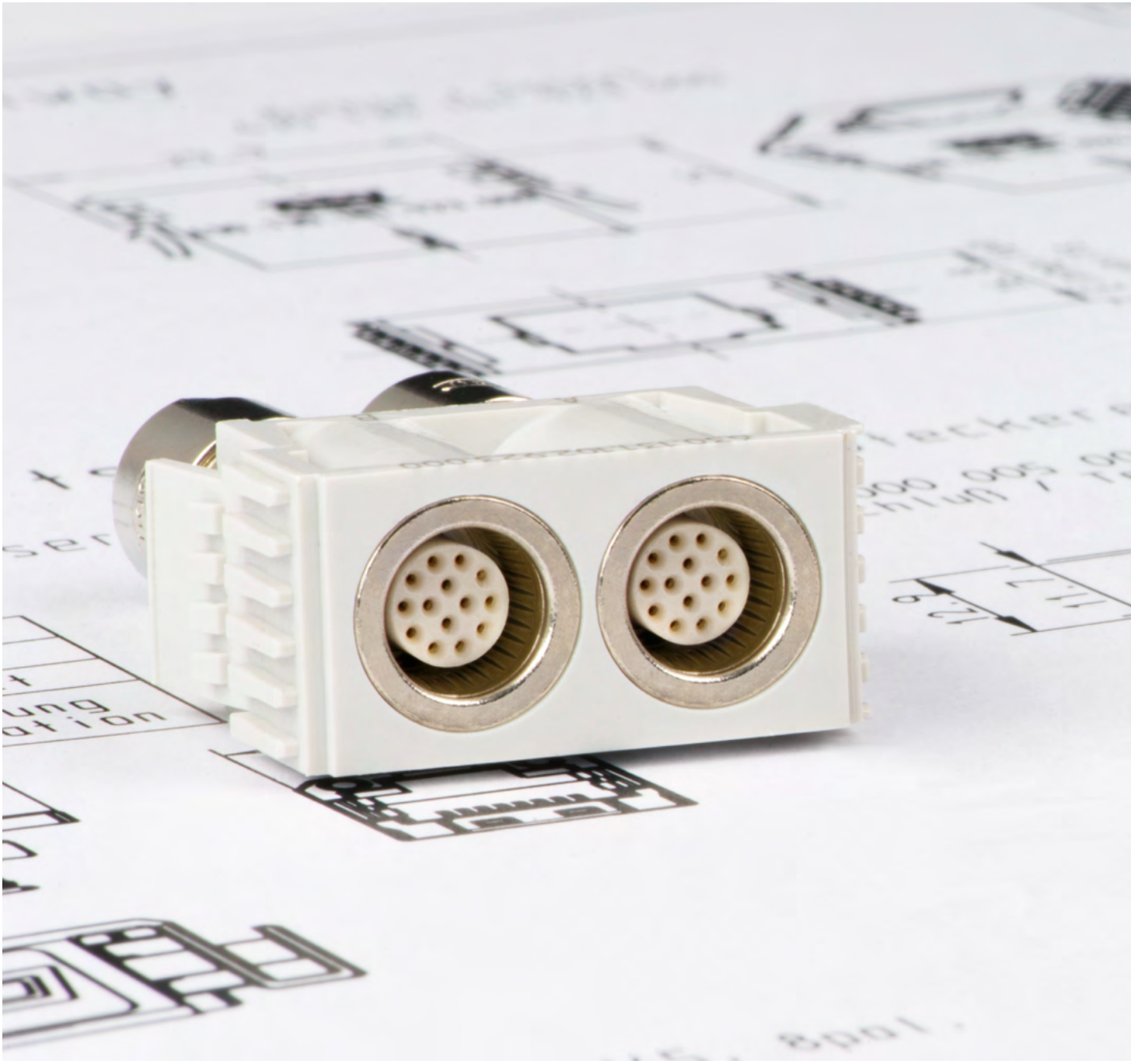
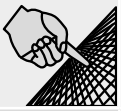
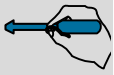
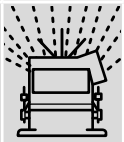
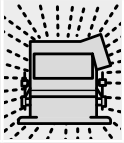
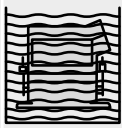
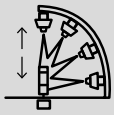


Table of contents

TECHNICAL INFORMATION

INTERNATIONAL PROTECTION CLASSES

According to IEC 60529:1989 (VDE 0470-1:2014-09)

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

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: 2009-11) "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 0627:2009-11).

All of the voltage data listed in this catalog refers to the use of insulators, which have been installed according to assembly regulations for the ODU-MAC® Portfolio. 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 0110-1:2008-01).

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 0110-1:2008-01) "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 overvoltages and the rated voltages 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 prescribed tests for solid insulation and for the airways (if necessary) shall be carried out in accordance to the tables F.1 and F.5 as an alternating voltage test.
- 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 0110-1:2008-01))

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 0110-1:2008-01)).

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 0110-1:2008-01)).

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 60529:1989 (VDE 0470-1:2014-09), 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 0110-1:2008-01): 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 û kV	Test surge voltage at sea level û kV	Test surge voltage at 200 m elevation û kV	Test surge voltage at 500 m elevation û kV
0.33	0.357	0.355	0.350
0.5	0.541	0.537	0.531
0.8	0.934	0.920	0.899
1.5	1.751	1.725	1.685
2.5	2.920	2.874	2.808
4	4.923	4.874	4.675
6	7.385	7.236	7.013
8	9.847	9.648	9.350
12	14.770	14.471	14.025

IEC 61010-1:2010 (VDE 0411-1:2020-03)

"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 0110-1:2008-01):

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} = 30 V (Upeak = 42.4 V)
- Direct voltage (DC): U = 60 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 IEC 61010-1:2010 (VDE0411-1:2020-03) 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, smaler-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.

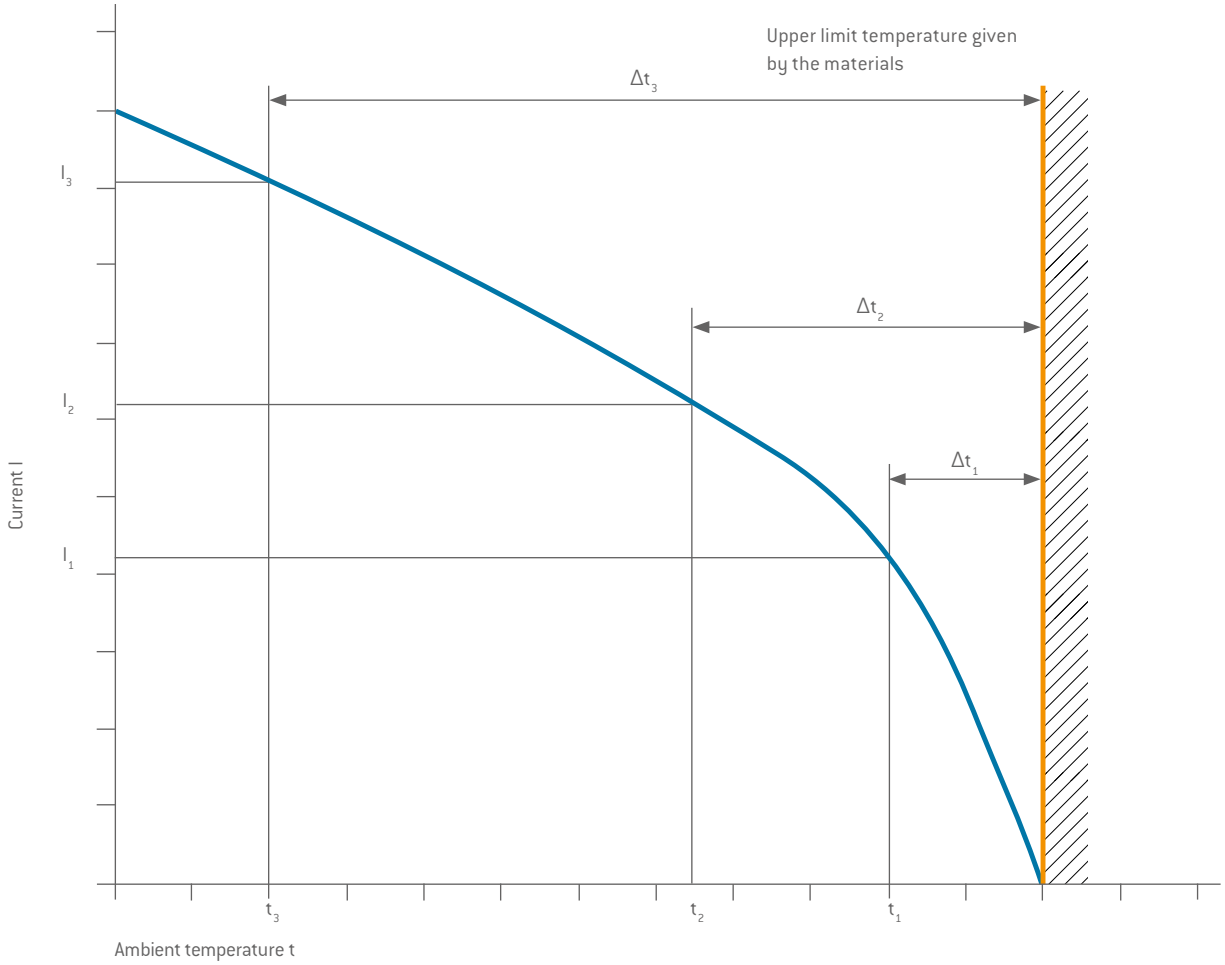
Accordingly, strands with the same AWG number but different numbers of wires differ in cross-section. For instance, an AWG 20 strand of 7 AWG 28 wires has a crosssection of 0.563 mm², while an AWG 20 strand of 19 AWG 32 wires has a cross-section of 0.616 mm².

Source: ASTM

BASIC PRINCIPLES OF CURRENT-CARRYING CAPACITY

Derating measurement method IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003-01)

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 0276-1000:1995-06)

RATED CURRENT (NOMINAL CURRENT)

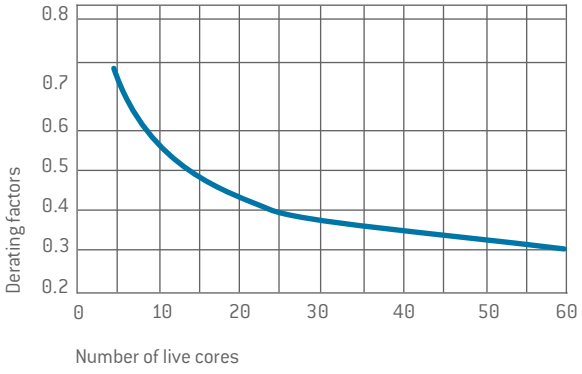
The metrologically determined current which is permitted to flow continuously through all contacts at the same time and will increase the contact temperature by 45 Kelvin.
The amperage is determined according to the derating measurement method (DIN EN 60512-5-2:2003-01) and derived from the derating 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 0298-4:2013-06 are applied. The derating factor assumes relevance as of 5 live cores or count the nominal current of the fully equipped modules. Dependend on the application and the cable-management.



Number of live cores or fully equipped module	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.

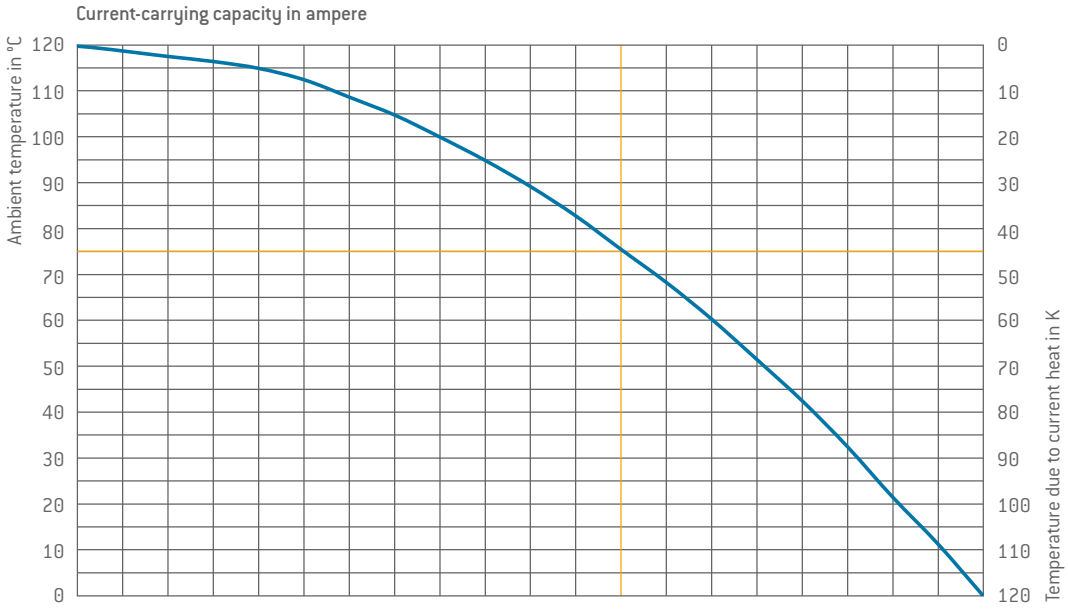
CURRENT-CARRYING CAPACITY DIAGRAM

FOR SINGLE CONTACTS

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

Upper limit temperature: +120 °C

Termination with nominal crosssection



Contact	Contact-Ø	Termination crosssection mm²	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	14	I	28	I	44	I	59	I	74	I	90	I	97	I	118	I	133	I	148
		25	0		17		34		51		68		85		105		119		136		154		170
	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	225	I	249

Nominal current

Max. continuous current

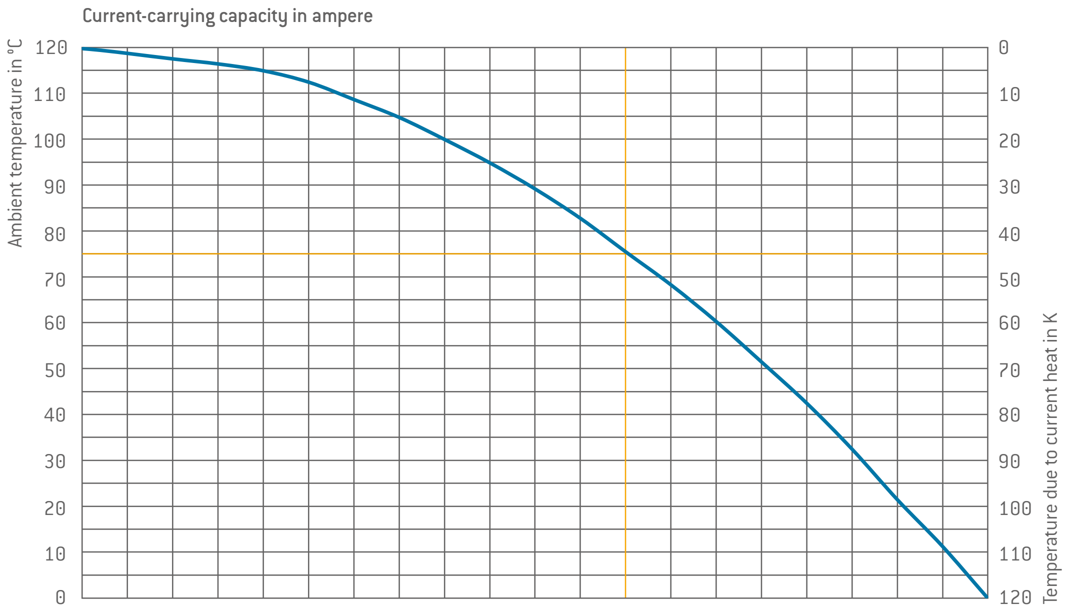
CURRENT-CARRYING CAPACITY DIAGRAM

FOR FULLY EQUIPPED MODULES

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

Upper limit temperature: +120 °C

Termination with nominal crosssection



Contact	Contact-Ø	Termination crosssection mm²											
ODU TURNTAC®	0.7	0.38	0	1	2	3	4	5	5.5	6.5	7.5	8.5	9.5
		PCB	0	1	1.5	2.5	3	4	4.5	5.5	6	7	7.5
	1.3	0.38	0	1	2	3.5	4.5	5.5	7	8	9	10.5	11.5
		1	0	1.5	3.5	5.5	7.5	9.5	11.5	14	16.5	19	20.5
		PCB	0	1.5	2.5	4	5	6.5	8	9.5	11	12.5	14
	2	1.5	0	2.5	5	7.5	10	12.5	15	17.5	20	22	24
		2.5	0	3	6	9	12	15	19	22	25	28	31
		PCB	0	3	5.5	8	11	13.5	16	19	22	25	27.5
	3.5	2.5	0	3.5	7	10.5	14	17.5	21	24	27.5	31	34.5
		4	0	5	10	15	20	25	30	34	39	44	49
		6	0	5	10	15	20	25	30	34	39	44	49
ODU LAMTAC®	5	10	0	9	18	27	37	46	56	65	74	83	92
		16	0	11	22	33	45	56	68	79	90	101	112
	8	16	0	14	28	43	57	72	85	101	115	129	143
		25	0	17	33	50	66	83	100	117	133	150	167

Nominal current | Max. continuous current

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 PVC, PE, PUR, TPE heat-resistant	Multi-wire highly flexible lines For hand-held devices, core/sheath cold-resistant, PVC-insulated		Multi-wire movable lines PVC, PE, PUR, TPE standard program 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 0298-4:2013-06 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 0891-1:1990-05

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 172

BASE CURVE IEC 60512-5-2:2002

See page 173

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 167.

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 70).

CONNECTOR

Also known as connectors without contact rating (COC) (IEC 61984:2008 (VDE 0627:2009-11)). 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 167.

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 156).

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 0295:2005-09; 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 173

DERATING FACTOR

According to VDE 0298-4:2013-06, 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 174).

TECHNICAL TERMS

DERATING MEASUREMENT METHOD IEC 60512-5-2:2002

See page 173

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 SPRINGTAC® and ODU LAMTAC® contacts for subsequent lubrication (see page 163).

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

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 175).

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 176). 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 167.

RATED CURRENT (NOMINAL CURRENT)

See from page 174

RATED VOLTAGE

According to IEC 60512-5-2:2002 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

Ergonomic locking of the housings with an easy-to-operate precsision locking spindle. This spindle enables easy closing and opening of the housings with a single turning movement. The mating and sliding forces overcome in this way ease handling significantly. For relubrication, we recommend the service kit (page 163).

TERMINATION CROSSSECTION

The specified cross-sections correspond to a “fine-wire” conductor structure (7/19 wire) according to AWG (ASTM B258-14) or to a “fine-wire” conductor structure pursuant to IEC 60228:2005 (VDE 0295:2005-09; Class 5), the upper and lower limit margins specified within this standard require a separate test.

TERMINATION TECHNOLOGIES

Methods for connecting the lines to the electro-mechanical element, such as solder-free connections according to IEC 60352-2:2006 (60352-2:2014-04): crimp termination, screw connection, etc., or soldering connection (see from page 156).

TEST VOLTAGE

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

TIGHTNESS IEC 60529:1989 (VDE 0470-1:2014-09)

See International Protection classes on page 166

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.

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
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