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
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

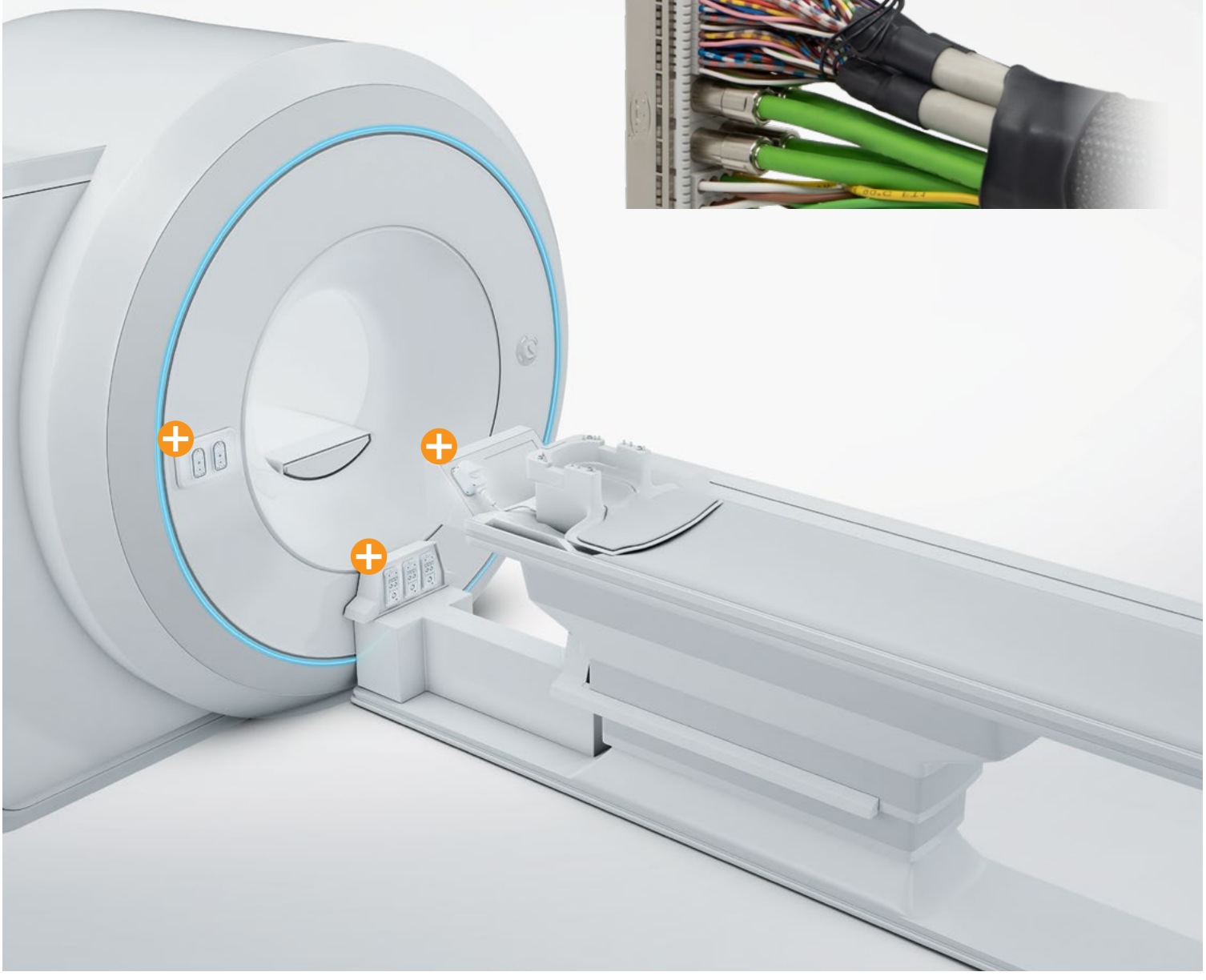
Россия +7(495)268-04-70
Казахстан +7(7172)727-132
Киргизия +996(312)96-26-47

https://odu.nt-rt.ru || oud@nt-rt.ru

ODU-MAC® NON-MAGNETIC

HDMI

ODU HIGH SPEED DATA TECHNOLOGY



ODU-MAC® NON-MAGNETIC

FEATURES

- Non-magnetic
- Rugged version
- > 100,000 mating cycles
- Low contact resistances
- High contact stability and reliability with multiple individual contact points
- High module variety
- Contact density
- Blind mating

APPLICATIONS

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

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

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

All dimensions are in mm. Some figures are for illustrative purposes only.
Subject to change without notice. Errors and omissions excepted.
We reserve the right to change our products and their technical specifications at any time in the interest of technical improvement.
This publication supersedes all prior publications.

This publication is also available as a PDF file that can be downloaded from

A COMPLETE ODU-MAC® PROGRAM CAN BE FOUND IN THIS SERIES:

Silver-Line White-Line Blue-Line

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 data sheet corresponds to the requirements specified in DIN EN 61984:2009 with regard to protection against contact in accordance with DIN EN 60529:1998.

The back of the device must be secured against touching. The customer must ensure strain relief for the cables / stands on the device part.

TABLE OF CONTENTS

Clickable page numbers

ODU-MAC®

Table of Contents

PRODUCT INFORMATION

Table of Contents

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

THE SMART SOLUTION FOR CUTOMIZED CONNECTIONS

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

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

The result is an effective, compact and attractive complete connection that is unrivaled in terms of functionality. Confusion due to an excessive number of connections is a thing of the past – an ODU-MAC® customized to meet your requirements – is the state of the art solution.

The non-magnetic product variety in this catalog is an extension of the current ODU-MAC® product portfolio. ODU has more than 25 years of experience in providing connector solutions for non-magnetic environments up to 11 Tesla. The non-magnetic products in this catalog benefit from all of the product features of ODU-MAC®.

Depending on the customer requirements for the application, the material used for standard products in this catalog may have to change from low magnetic materials that are currently used to fully non-magnetic materials.

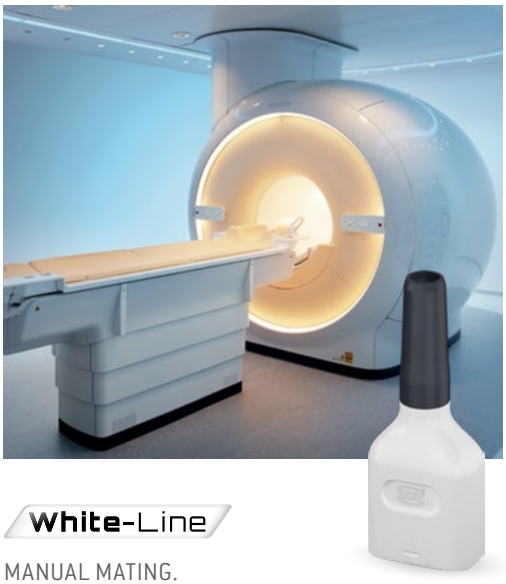
Find out more about custom configurations on the following pages.

THE ODU-MAC® LEAVES NOTHING TO BE DESIRED:

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

Silver-Line

AUTOMATIC DOCKING.



White-Line

MANUAL MATING.

ODU-MAC® ZERO

THE MODULARITY AT A GLANCE:

General ODU-MAC® product range.
Only select parts available in non-magnetic version.

100,000
Mating cycles and more

2 Possible applications:
automatic docking or manual mating

Many cable hood versions available

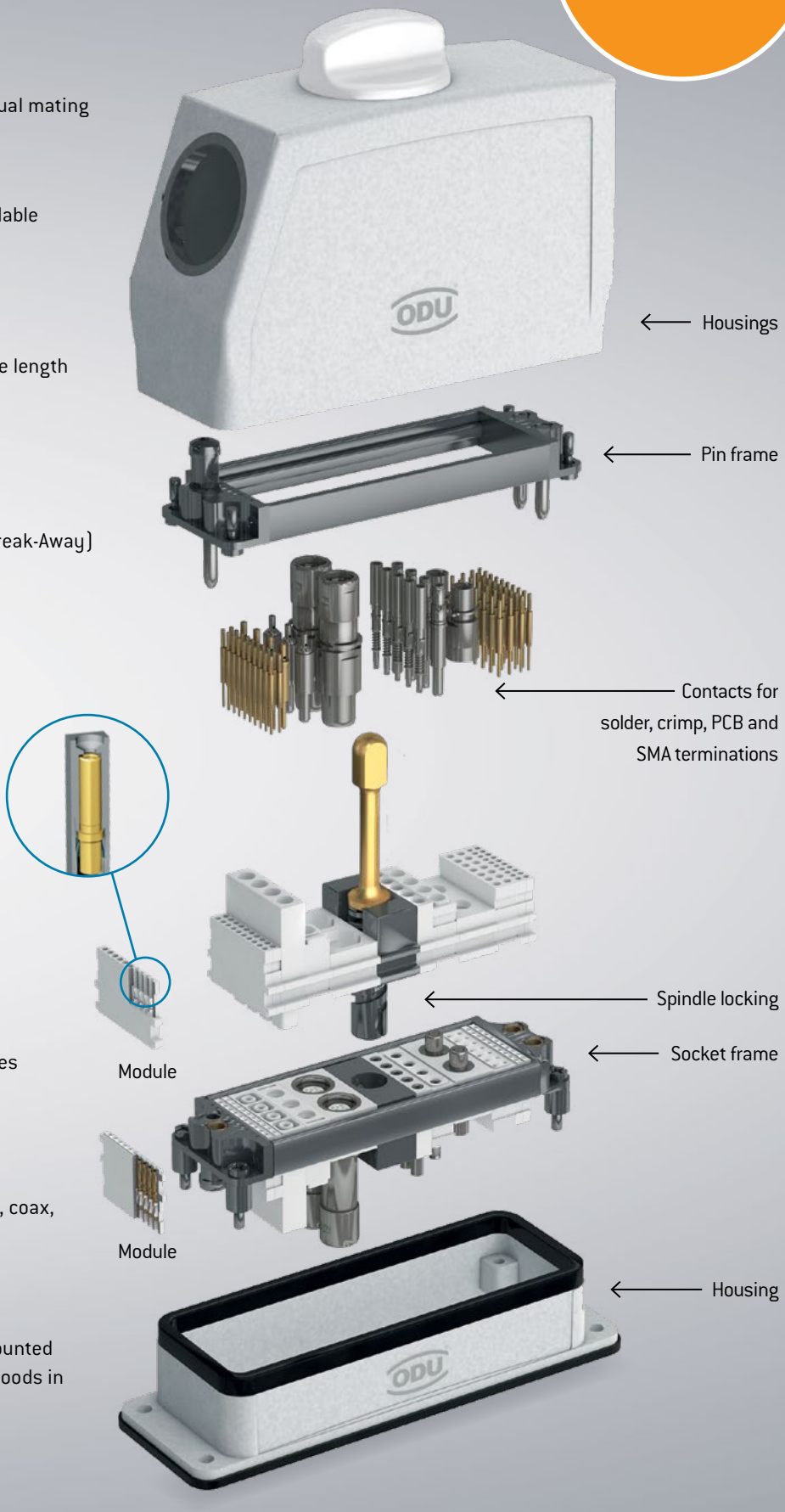
5 Different docking frames
independently configurable length
(see page 10)

2 Locking types: Snap-In (Break-Away)
or spindle locking

2 Different spindle geometries

6 Modules to choose from:
signal, power, high voltage, coax,
and fiber optic

Many variations of bulkhead mounted
and surface mounted housing hoods in
multiple sizes



YOUR WAY TO AN INDIVIDUAL CONNECTION

How to configure your ODU-MAC®.

INDIVIDUAL REQUIREMENTS – INDIVIDUAL CONFIGURATION

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

SELECT & REQUEST OFFERS

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

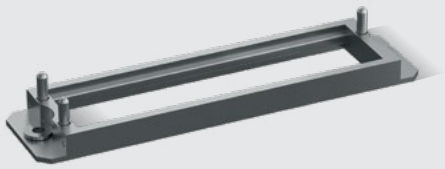
ODU-MAC® Silver-Line

AUTOMATIC DOCKING.

1ST STEP: FRAME SELECTION

Depending upon your requirements, you can choose 5 different frame sizes as a base for automatic docking.

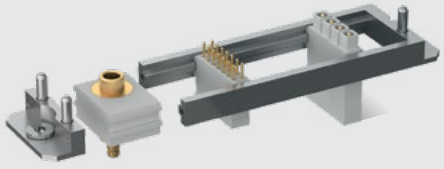
Frames	
ODU-MAC® S (Standard)	ODU-MAC® P+ (Power)
ODU-MAC® M+ (Mini)	ODU-MAC® QCH (Quick Change Head) (connector saver)
ODU-MAC® T (Transverse)	



2ND STEP: MODULE SELECTION

Choose from 17 different modules for transferring signal, power, high voltage, coax, fiber optic and assemble your ODU-MAC® individually.

Modules	
Signal	Coax
Power	Fiber optic
High voltage	Blank modules / spacer modules / coding modules / pin protection module



ODU-MAC® White-Line

1ST STEP: LOCKING

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

Snap-In locking	Spindle locking	Lever locking

2ND STEP: CONNECTOR HOUSING

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

Snap-In locking	Spindle locking	Lever locking
90° Cable exit	Cable hood	Cable hood
45° Cable exit	Cable hood XXL	
0° Cable exit		

3RD STEP: RECEPTACLE SELECTION

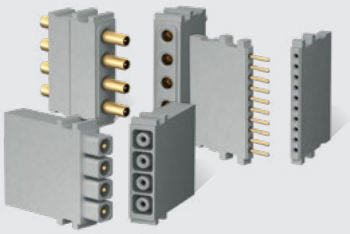
Depending upon the requirements for the receptacle and the selected connector housing, a wide variety of designs is available.

Snap-In locking	Cable hood	Cable hood XXL
Receptacle	Bulkhead mounted housing	Bulkhead mounted housing
In-Line	Surface mounted housing	Surface mounted housing

4TH STEP: MODULE SELECTION

Choose from a wide varity of modules for transferring signal, power, high voltage, coax, fiber optic and assemble your ODU-MAC® individually.

Modules
See page 58



ODU-MAC® Silver-Line
AUTOMATIC DOCKING.

Overview of docking frames.

ODU-MAC® Silver-Line is the best suitable for automatic docking. Choose from a variety of different frames, adjust the length individually and assemble the frame with the modules you need for your requirements.

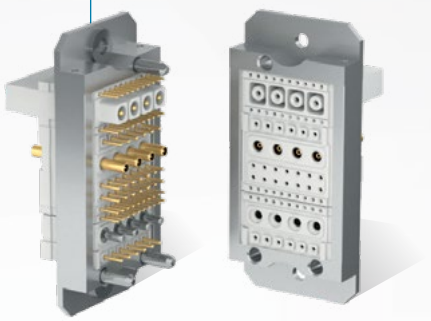
With ODU-MAC® you can always find the perfect solution. And if your requirements for a connection go beyond the standard solutions, we also offer customized special solutions.

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

FURTHER INFORMATION ON PAGE 26.

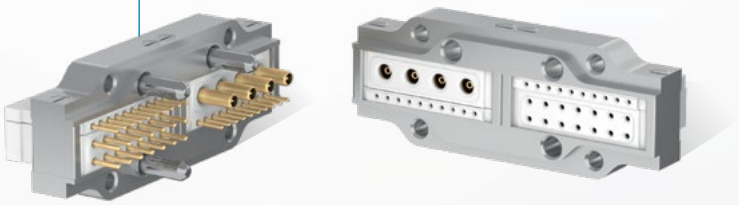
ODU-MAC® S (STANDARD) P. 28

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

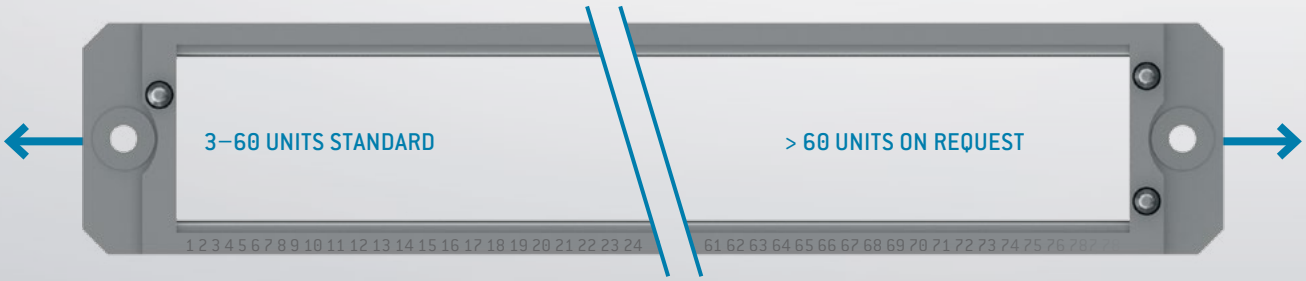


ODU-MAC® T (TRANSVERSE) P. 34

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

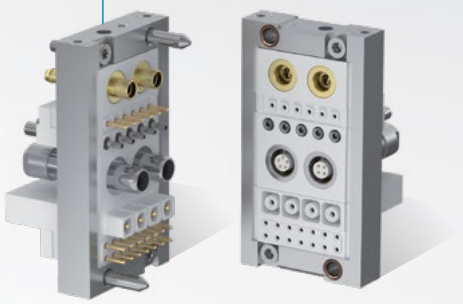


The length of the frames can be ordered individually depending upon the number and combination of required modules.



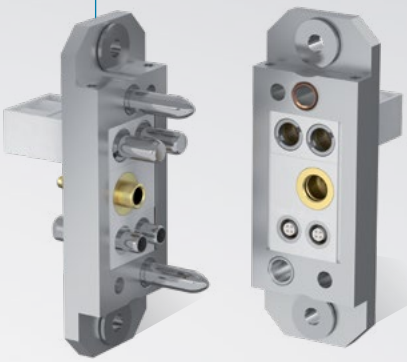
ODU-MAC® M+ (MINI) P. 30

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



ODU-MAC® P+ (POWER) P. 31

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



ODU-MAC® QCH (QUICK CHANGE HEAD) P. 29

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

ODU-MAC® White-Line

MODULARITY AND ERGONOMIC DESIGN FOR THE SMALLEST OF SPACES.

The ODU-MAC® ZERO – Modular Multitasker.

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

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

FURTHER INFORMATION ON PAGE 37.

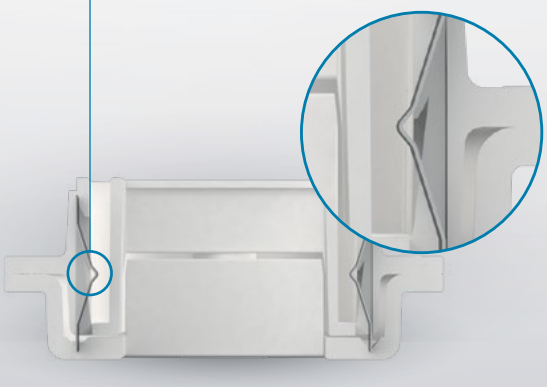
- Housing made of 2 plastic half-shells which also form the frame
- **Bio-compatibility** upon request
- **Coding:** by guiding pins (∅ 4 mm, length 16 mm), housing geometry, coding modules and color-coded cable bend relief varieties
- Suitable for a wide range of ODU-MAC® modules
- Up to **60,000 mating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

HOUSING
PLASTIC HALF-SHELL INCLUDING RAILS FOR MODULAR INSERTS

SNAP-IN LOCKING

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

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



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

Size	Units 2.54 mm	
ZERO	9	

CONNECTOR HOUSING FOR ASSEMBLY

CABLE EXIT 0°
P. 37

CABLE EXIT 90°
P. 37

CABLE EXIT 45°
P. 37

FULLY COMPATIBLE

RECEPTACLE P. 38

For integration in the device.

IN-LINE RECEPTACLE P. 39

For a flying cable-to-cable application.

THE BEST CONNECTIONS FOR MANUAL MATING

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

TWICE AS FAST THANKS TO THE HALF-SHELL PRINCIPLE

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

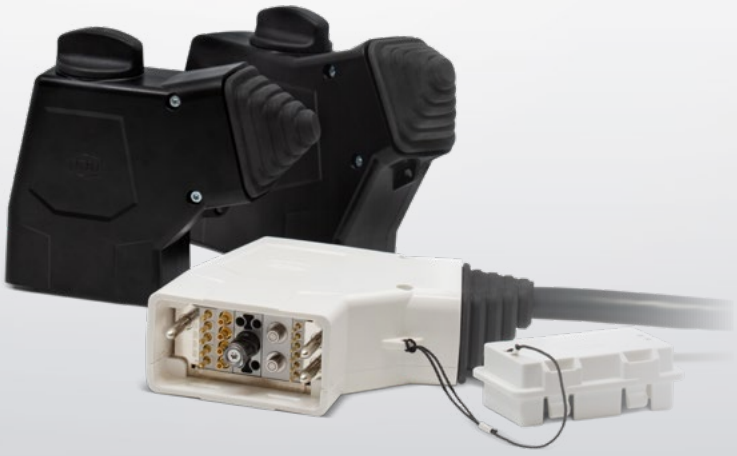
BENEFITS OF THE RAPID HOUSING

- Up to 50% in time savings through easy assembly and maintenance
- **Flexible cable outlet** – can be adapted to cable or tube assemblies as necessary
- **Optional lattice plates** – enable bundling and strain relief of single strands
- **Half-shell principle** – practical structure as well as fitting and assembly of components in the housing
- **New recessed receptacle version**
- Available in size 4 and 2 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

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

Size	Units[1]	
2	16	
4	34	

FURTHER INFORMATION FROM PAGE 50.

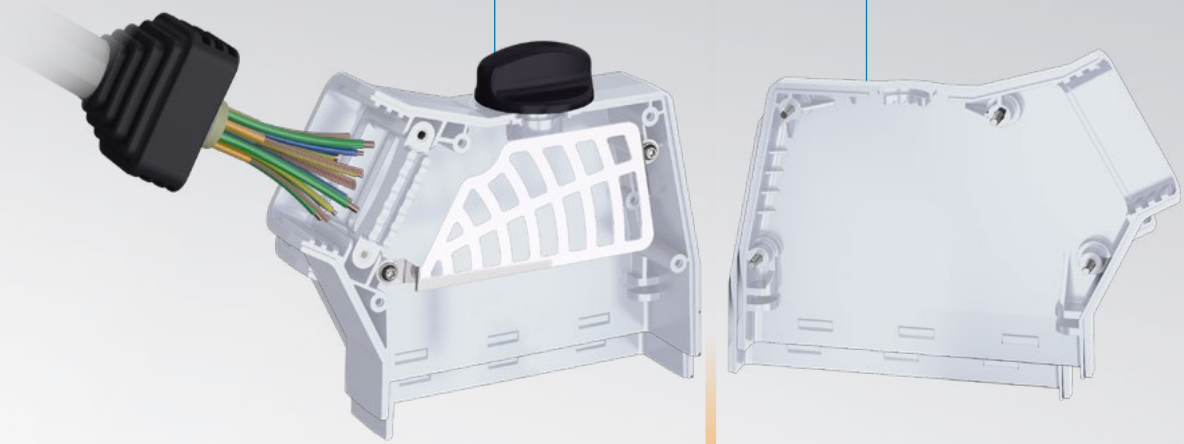


[1] 5 units of space required for spindle

SPINDLE LOCKING, PAGE 44

RAPID PLASTIC HOUSING, PAGE 50

Half-shell principle with individually adjustable side cable outlet



FULLY COMPATIBLE

PLASTIC RAPID RECEPTACLE, PAGE 51

For mounting as a recessed plastic style

RAPID RECEPTACLE, PAGE 51

Direct mounting on the mounting wall

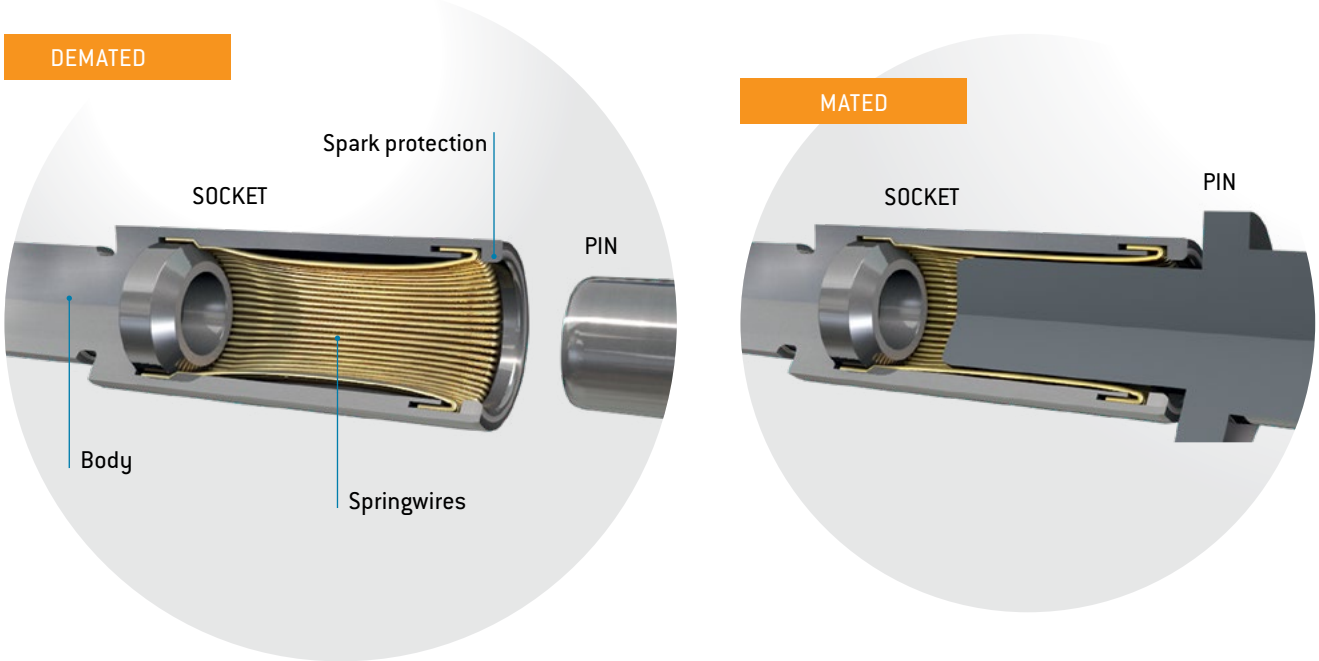
BEST CONNECTIONS – THE CONTACT PRINCIPLE

Electrical Contacts from ODU meet the highest quality standards and ensure secure and reliable connections. Behind this achievement are 80 years of experience in the electrical connector technology.
In addition to the springwire and the lamella technology ODU also offers turned, slotted contact systems and stamping technology for a wide variety of specifications.

ODU SPRINGTAC®

Contacts with springwire technology.

The ODU SPRINGTAC® is the most effective contact system on the market. It offers maximum reliability and an exceptionally long durability. Due to the many independent wire springs, a constant transmission is provided at all times. Even the smallest contact, at 0.76 mm in diameter, contains 15 individual springs. In other words, 15 contact surfaces are present in this tiny contact area.



BENEFITS

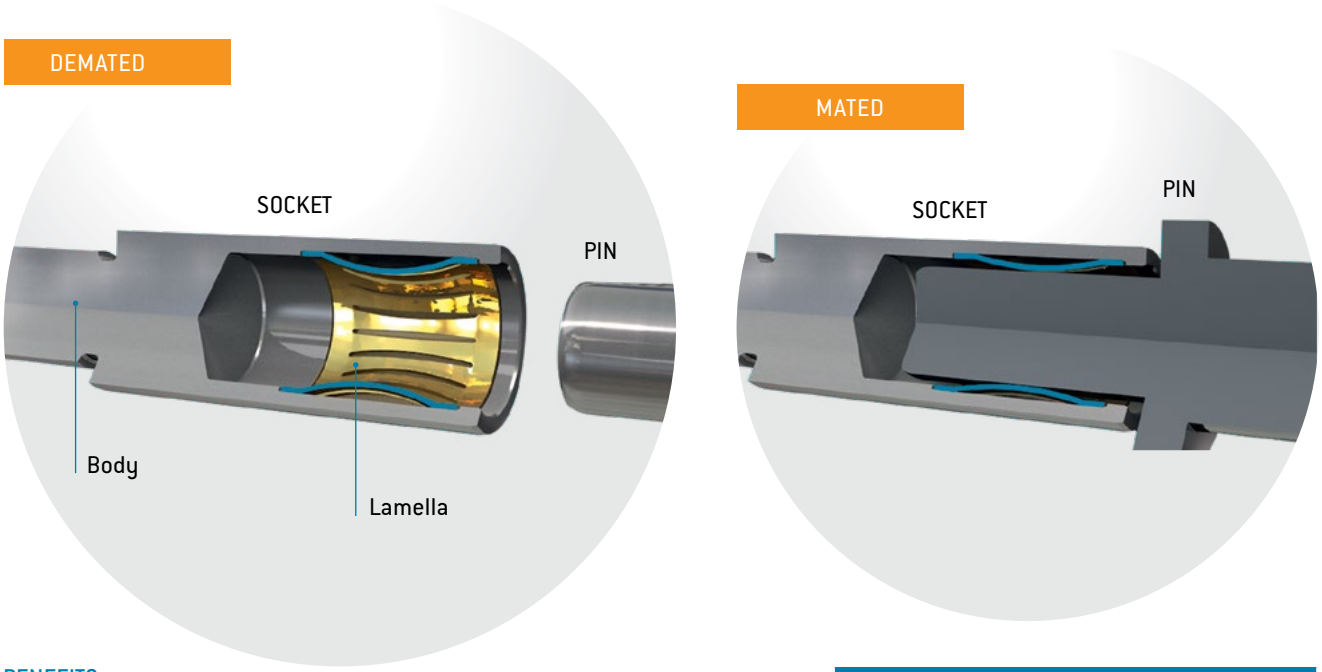
- Outstanding reliability, lifetime and durability with up to 1 million mating cycles (on request)
- Very high contact security
- Low mating and demating forces
- Very high vibration resistance
- Low contact resistance
- High current-carrying capacity

Standard contact principle for:	
Signal	14 to 5 contacts
Power	4 to 3 contacts
High voltage	4 contacts
Coax	2 contacts

ODU LAMTAC®

Contacts with lamella technology.

The ODU LAMTAC® is a high-performance contact system with lamella technology. It possesses high current-carrying capacity and best coax shielding preformance. It consists of a turned carrier containing one or several stamped lamella belts. The lamella's individual slats make for a multitude of contact points, thereby guaranteeing a high level of contact security and ease of connecting.



BENEFITS

- > 10,000 mating cycles
- High vibration resistance
- Low contact resistance
- Automated lamella assembly
- High contact security

Standard contact principle for:	
Coax	4 contacts

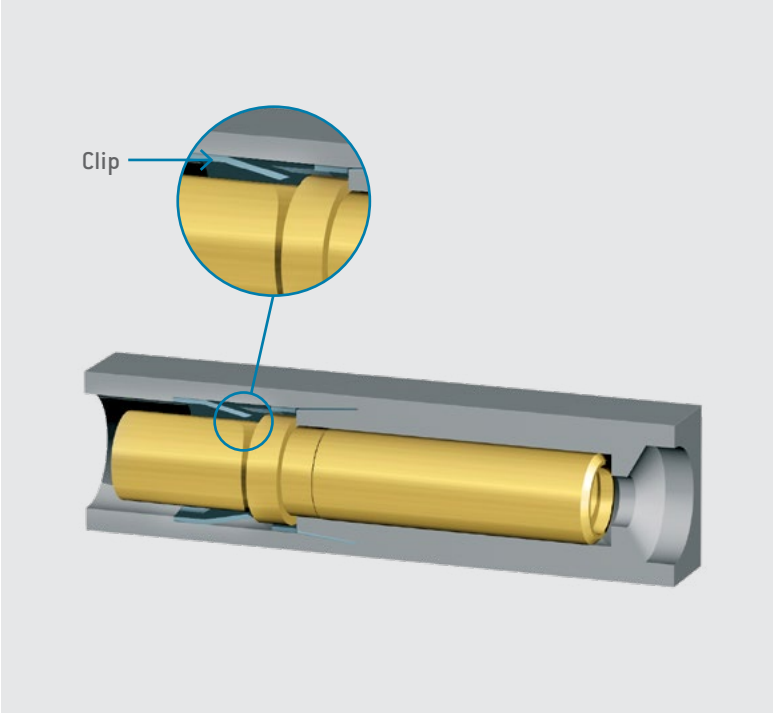
CONTACT RETENTION WITH THE CLIP PRINCIPLE (STANDARD)

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

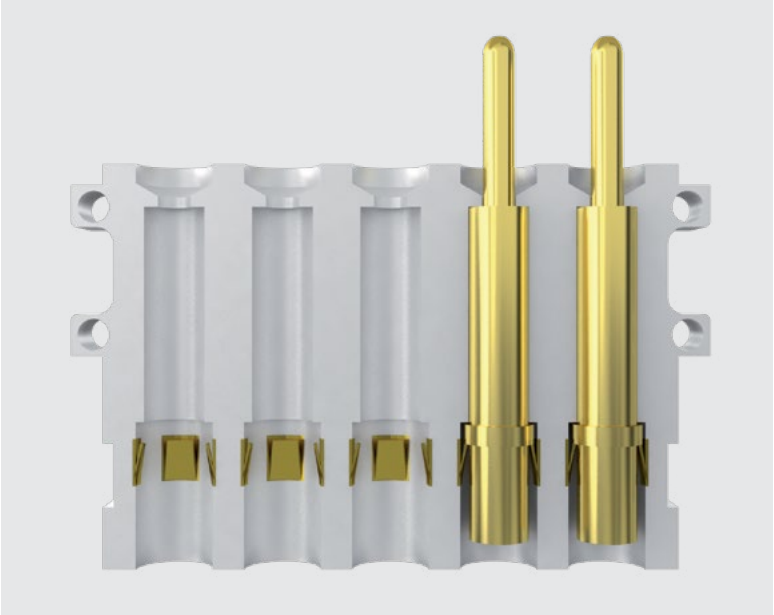
The contacts can be easily removed again at any time with a removal tool.

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

Not all modules are equipped with the clip principle, but removal is possible.



Most of the modules include this fastening technology.



3 mounting lugs for optimal stability.

Table of Contents

APPLICATION SPECIFIC SOLUTIONS

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

MONOBLOC INSULATOR

Used for customized housings that capitalizes on the the advantages of standard ODU-MAC® contacts.

Advantages

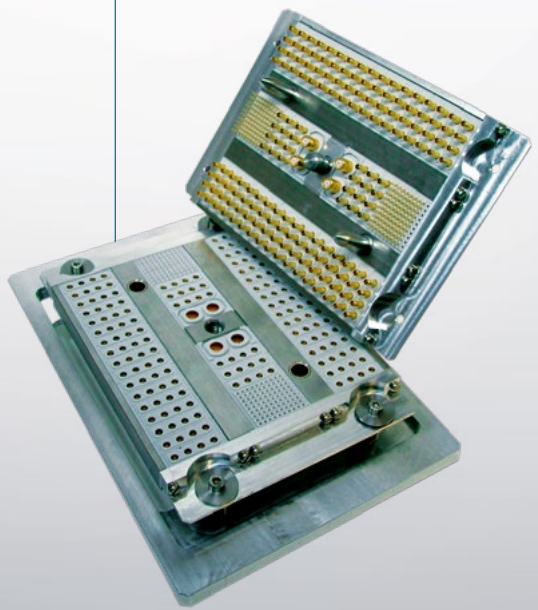
- Non-magnetic version

COMPLETE DOCKING UNIT

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

Advantages

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



MANUAL MATING

Well-known manufacturers worldwide trust in the ODU-MAC® system as a reliable connector between the various patient coils and the MRI device. In addition to increased ease of operation, the connector is also available in a version with non-magnetic materials.

Advantages

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

MANUAL MATING

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

Advantages

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

ODU-MAC® FOR SPARK WAVE® THERAPY DEVICE

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

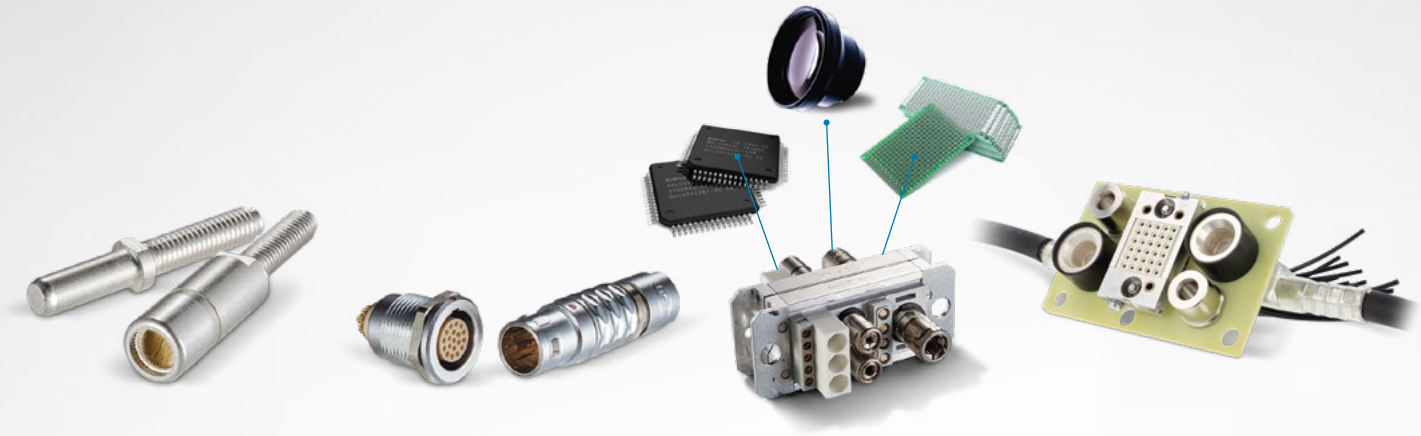
Advantages

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

CABLE ASSEMBLY INTEGRATED SOLUTIONS

ODU offers a comprehensive solution of services and capabilities as part of the cable assembly solutions available for the market.

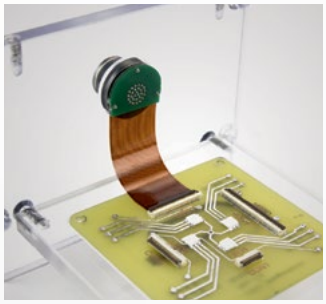
CORE CONTACT TECHNOLOGY



ELECTRICAL CONTACTS → COMPLETE CONNECTOR SYSTEM → INTELLIGENT CONNECTORS → **SYSTEM SOLUTION**

CABLE ASSEMBLY






CABLE ASSEMBLY CAPABILITIES

- Custom turnkey solutions
- Rapid prototyping & product development
- Thermoplastic injection molding design & fabrication
- Bonding & laser etching
- Private labeling
- Factory direct
- ITAR regulated facility

PRODUCT ASSEMBLY TECHNOLOGIES AND SERVICES

- One stop shop
- Solder, crimp and PCB terminations
- Overmolding with TPE, TPU and PVC
- Customizable overmolding turn-key solutions
- EMC-compatible assembly
- 100 % final inspection
- Custom specific testing options available

MRI CABLE ASSEMBLY SOLUTIONS

- MR balun tuning
- Cost reduction implementing our semi-automated coax assembly process (S2S)
- Single / 4 / 8 /16 / 32 channel cable assembly
- Our technical team works with our customers from design to production
- Excellent imaging quality
- Small, medium and large batches available

ODU-MAC®

Table of Contents

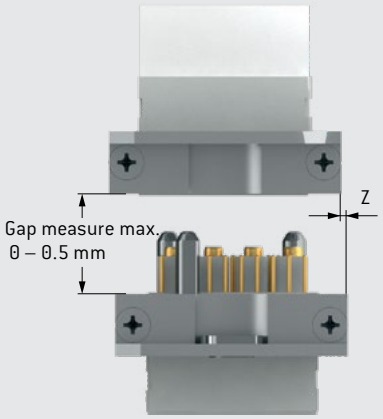
AUTOMATIC DOCKING

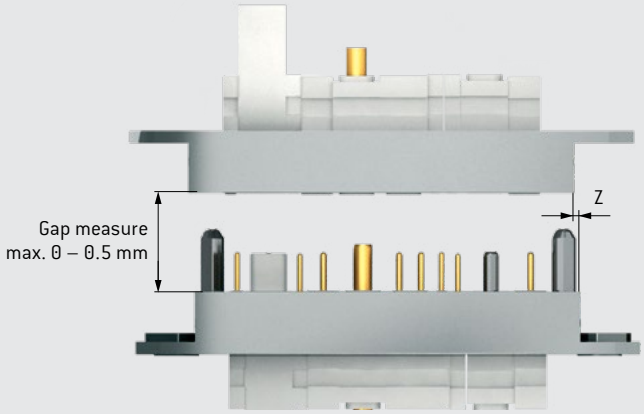
SYSTEM REQUIREMENTS AND TOLERANCES

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

Clean and smooth docking is secured by special guiding pins that are designed for the forces which guide the connector. Please pay attention to the mechanical requirements as illustrated below.

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



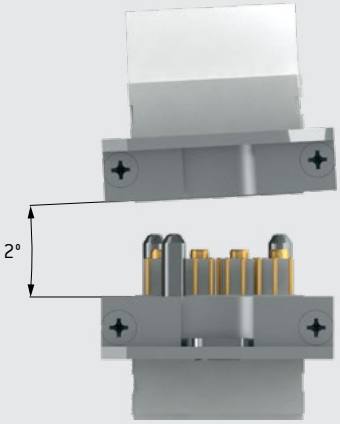


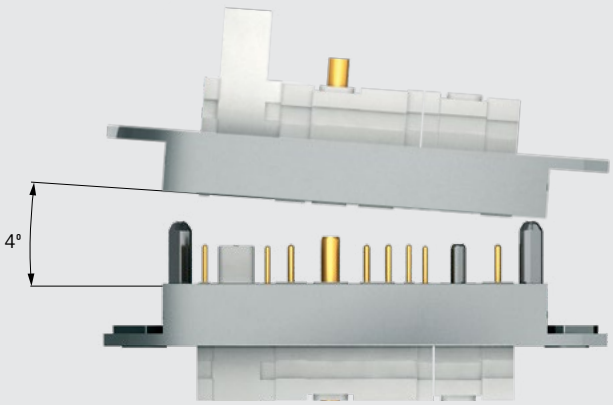
Frame	Tolerance z
S	+/– 0.6 mm
M+	+/– 0.6 mm
T	On request

Frame	Tolerance z
P+	+/– 2.5 mm
QCH	+/– 0.6 mm

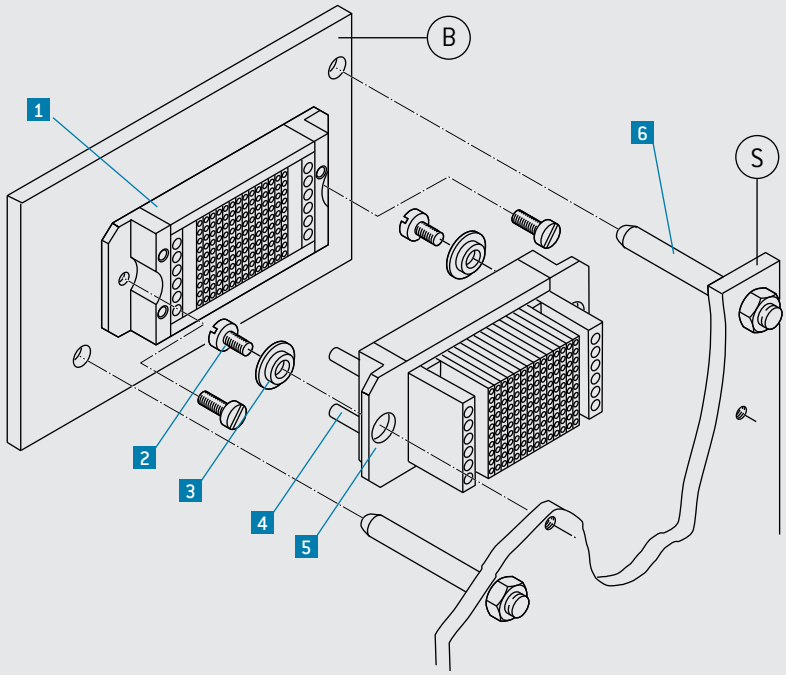
The maximum permissible gap between socket and pin pieces is 0.5 mm as a standard. Extension with long contact pins is possible.

MAXIMUM PERMISSIBLE ANGLE DEVIATION WHEN MATING





EXAMPLE OF AN S FRAME SYSTEM



Strain relief for cables / braids must be provided by the customer.

1. ODU-MAC® socket piece (fixed) (screwed without play wall B)
2. Fastening screw
3. Centering bushing for tolerance compensation of an S frame: Axial play: 0.2 mm Radial play: +/– 0.6 mm
4. Pins for self-centering of ODU-MAC®
5. ODU-MAC® pin piece (floating) (with play via centering socket; screwed onto wall S)
6. Guiding pin forwalls B and S (customer performance)

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

NOTE: AUTOMATIC DOCKING SYSTEMS

- The pin piece of the ODU-MAC® S has to be fixed with the accompanying centering sockets and has mounted floating
- The guiding system of the ODU-MAC® requires additional guiding hardware for the system
- The max. allowed gap between socket and pin pieces is 0.5 mm as standard.
  Extension with long contact pins is possible.
- An alignment system (e.g. guide rails, etc.) is necessary to achieve high mating cycles.
  The max. allowed alignment error is, less than +/– 0.6 mm radially in the example of the ODU-MAC® S-frame.
- Strain relief for the cables / braids must be provided by the customer.

FAILURE TO OBSERVE THESE SPECIFICATIONS MAY RESULT IN DAMAGE.

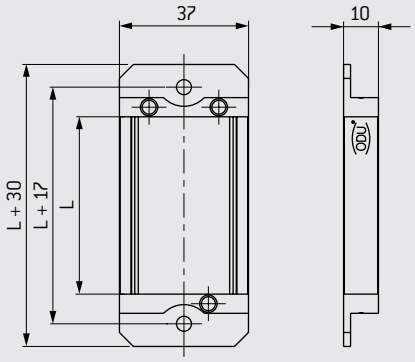
ODU-MAC® S (STANDARD)

Standard solutions for docking applications.

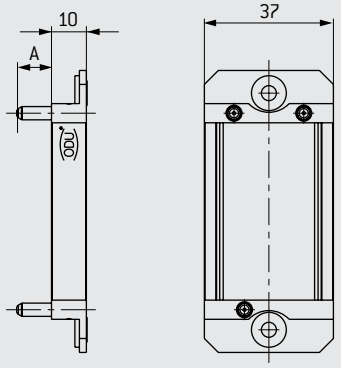
TECHNICAL DATA

- Tolerance compensation:
  Axial play: 0.2 mm
  Radial play: +/– 0.6 mm
- Floating supported (pin side)
- ≥ 100,000 mating cycles

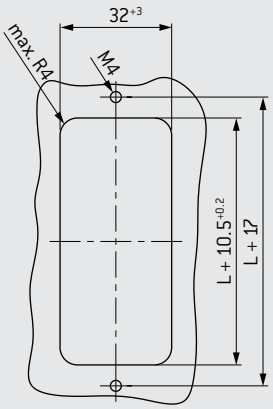
SOCKET FRAME WITH GUIDING HOLE



PIN FRAME WITH GUIDING PIN



PANEL CUT-OUT



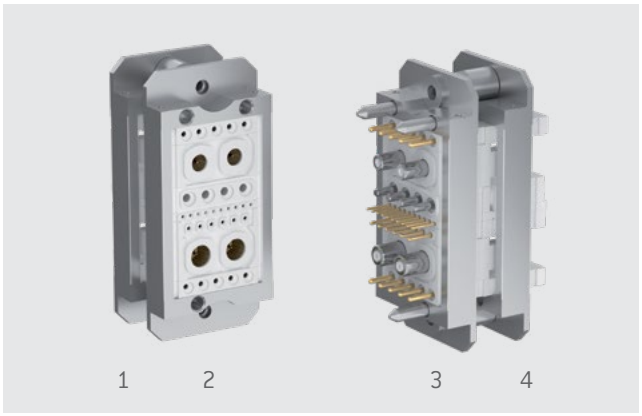
Description	Part number	Dim. A	Note
Pin frame	611.020.0__.400.000	10	
Socket frame	610.020.0__.400.000		
Pin frame	611.021.0__.400.000	12.5	
Socket frame	610.020.0__.400.000		
Pin frame	611.025.0__.400.000	21	Model for spindle locking
Socket frame	610.020.0__.400.000		
Pin frame	611.050.0__.400.000	10	With labelling
Socket frame	610.050.0__.400.000		

L = Number of units × 2.54
__ = Select number of desired units
(3 to 40, ≥ 41 on request)

Table of Contents

ODU-MAC® QCH (QUICK CHANGE HEAD)

For highest requirements towards mating cycles (connector saver), low maintenance downtime and expense



TECHNICAL DATA (S FRAME)

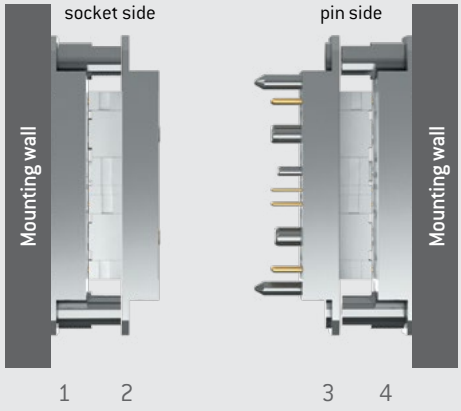
- Tolerance compensation:
  Axial play: 0.2 mm
  Radial play: +/– 0.6 mm
- Floating supported (pin side)
- Unlimited mating cycles (≥ 100,000 per interchange part)
- Minimized maintenance effort thanks to interchangeable parts

Available on request.
Technical specifications have to be clarified in detail.

Non-magnetic version available on request.

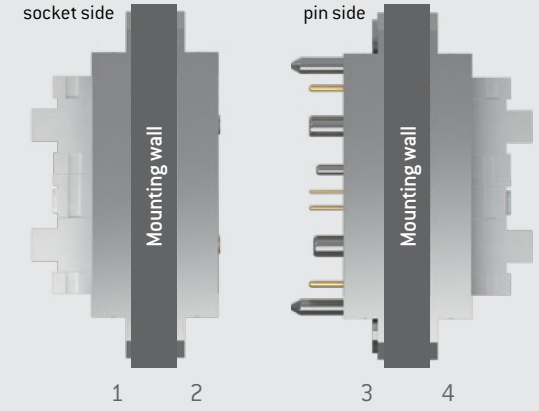
The ODU-MAC® QCH allows fulfilling the highest requirements towards mating cycles. The system consists of four parts – two base parts plus two interchange parts. Assembly of one base and interchange part build one unit for socket and pin side, respectively. The mounting wall can either be rear (requires distance piece for base parts) or central.

REAR MOUNTING WALL



Description	Part number
Part 1: Base part incl. distance piece	610.026.0 __.600.000
Part 2: Interchange part (socket)	610.020.0 __.600.000
Part 3: Interchange part (pin)	611.021.0 __.600.000
Part 4: Base part incl. distance piece	610.026.0 __.600.000
Distance piece as a spare part	610.026.201.304.000

CENTRAL MOUNTING WALL – MAX. THICKNESS 10 mm



Description	Part number
Part 1: Base part	610.027.0 __.600.000
Part 2: Interchange part (socket)	610.020.0__.600.000
Part 3: Interchange part (pin)	611.021.0__.600.000
Part 4: Base part	611.027.0__.600.000

In the event of maintenance or repair, only the interchange parts need to be replaced, while the base parts with the cable harness remain assembled. Therefore, the ODU-MAC® QCH enables operation with a competitive advantage:

- Cost efficient
- Extremely low maintenance effort
- Time saving
- Extended lifespan

OTHER COMPATIBLE FRAMES FOR ODU-MAC® QCH (ON REQUEST)

- ODU-MAC® P+ (see page 31)

INTERCHANGE PARTS CAN BE ORDERED FULLY ASSEMBLED

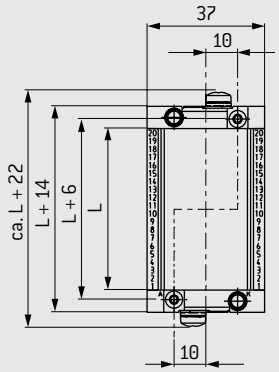
ODU-MAC® M+ (MINI)

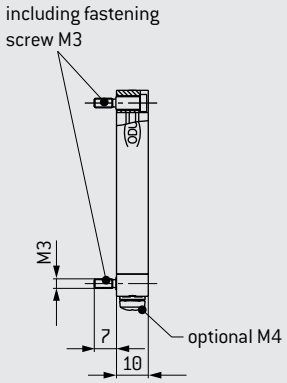
Compact design with minimal space requirements and optional PE transmission.

TECHNICAL DATA

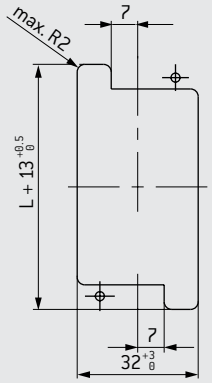
- Tolerance compensation:
  Axial play: 0.4 mm
  Radial play: +/– 0.6 mm
- Floating supported (pin and socket side)
- ≥ 100,000 mating cycles
- Optional PE transmission see page 32

SOCKET FRAME WITH GUIDING BUSHES

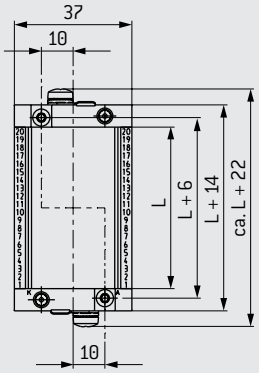


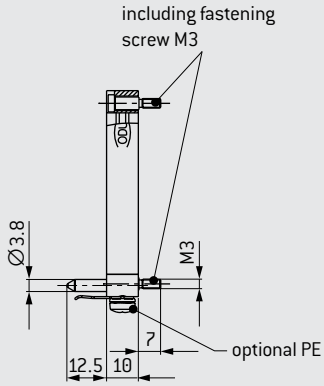


PANEL CUT-OUT

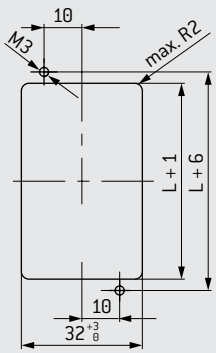


PIN FRAME WITH GUIDING PIN





PANEL CUT-OUT



Description	Part number
Pin frame	611.716.0__.400.000
Socket frame	610.716.0__.400.000

L = Number of units × 2.54
__ = Select register number of desired units
(3 to 40, ≥ 41 on request)

Table of Contents

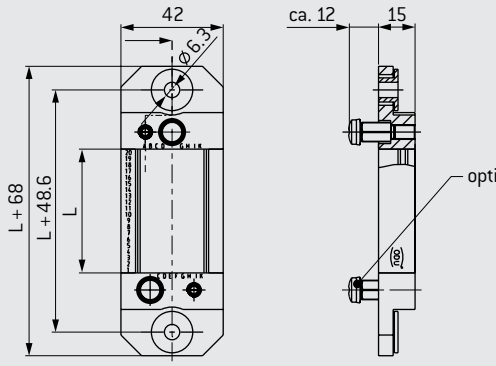
ODU-MAC® P+ (POWER)

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

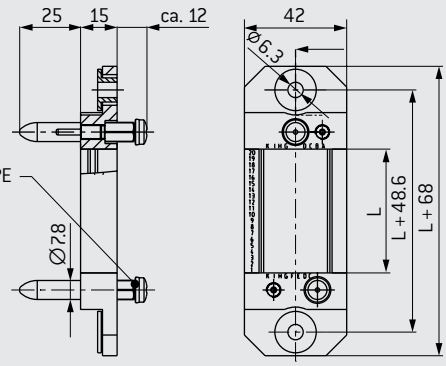
TECHNICAL DATA

- Tolerance compensation:
  Axial play: 1 mm
  Radial play: +/– 2.5 mm
- Floating supported (pin and socket side)
- Recommended for modules with contact diameter > 5 mm or frame length > 40 units (depending on configuration)
- ≥ 100,000 mating cycles
- Optional PE transmission see page 33

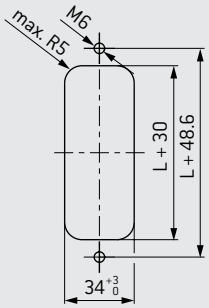
SOCKET FRAME WITH GUIDING BUSHES



PIN FRAME WITH GUIDING PIN



PANEL CUT-OUT



Description	Part number
Pin frame	611.730.0 __.400.000
Socket frame	610.730.0 __.400.000

L = Number of units × 2.54
__ = Select number of desired units
(5 to 60 in steps of 5, ≥ 61 on request)

PE TRANSMISSION FOR ODU-MAC® M+ (MINI)

GROUNDING KIT FOR M+ SOCKET FRAME

GROUNDING KIT MOUNTED

TECHNICAL DATA

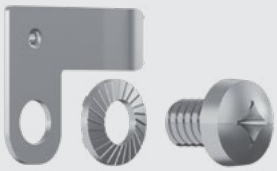
- Tolerance compensation:
  Axial play: 0.4 mm
  Radial play: +/– 0.6 mm
- Minimum 100,000 mating cycles
- Double-sided version
- Surface: nickel-plated

Non-magnetic version available upon request.

Part number	Connection threads
190.270.001.000.000	M4

Max. 6 mm² lug connection for PE transmission

GROUNDING KIT FOR M+ PIN FRAME



GROUNDING KIT MOUNTED

TECHNICAL DATA

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

Non-magnetic version available upon request.

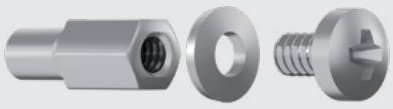
Part number	Connection threads
190.270.002.000.000	M4

Max. 6 mm² lug connection for PE transmission

CONTACT RESISTANCE COMPLIANT WITH < 0,1 Ω STANDARD

PE TRANSMISSION FOR ODU-MAC® P+ (POWER)

GROUNDING KIT FOR P+ SOCKET FRAME



TECHNICAL DATA

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

Non-magnetic version available upon request.

Part number	Connection threads
174.100.100.201.100	M5

Max. 10 mm² lug connection for PE transmission

GROUNDING KIT MOUNTED

GROUNDING KIT FOR P+ PIN FRAME

TECHNICAL DATA

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

Non-magnetic version available upon request.

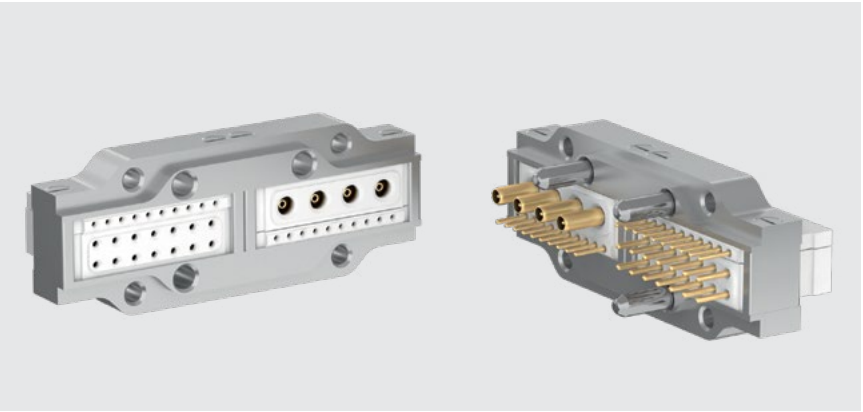
Part number	Connection threads
180.100.000.301.100	M5

Max. 10 mm² lug connection for PE transmission

CONTACT RESISTANCE COMPLIANT WITH < 0,1 Ω STANDARD

ODU-MAC® T (TRANSVERSE)

Transverse frame, for low installation height requirements.

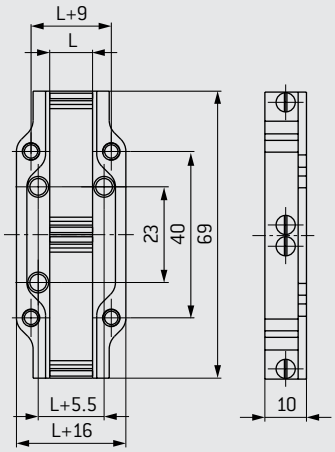


TECHNICAL DATA

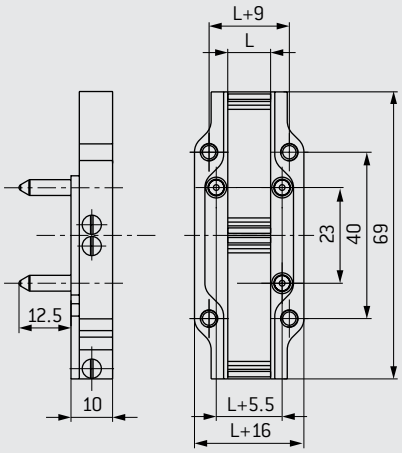
- Installation even in housing solution

Available on request.
Technical specifications have to be clarified in detail.

SOCKET FRAME WITH GUIDING HOLE



PIN FRAME WITH GUIDING PIN



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

PANEL CUT-OUT

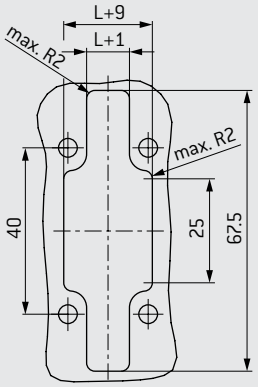


Table of Contents

MANUAL MATING

ODU-MAC®

ODU-MAC® ZERO

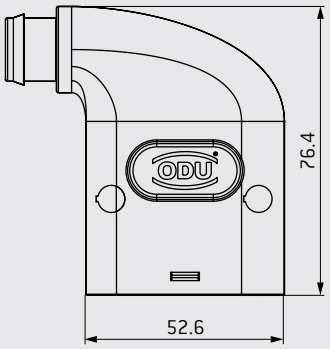
Connector housing for mounting on the cable with different cable entries.
ODU-MAC® rail for installing the insulator is already integrated in the housing.

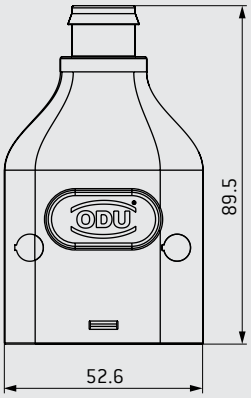
SNAP-IN LOCKING (BREAK-AWAY FUNCTION)

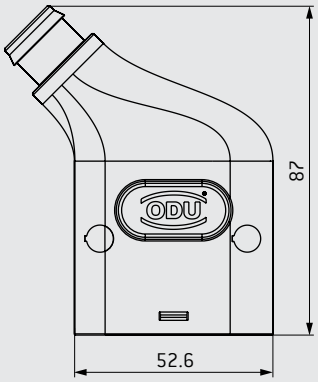
90° CABLE EXIT

0° CABLE EXIT

45° CABLE EXIT







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

TECHNICAL DATA

Color of housing	White Black / Gray on request
Locking cycles	60,000
Material	PC Lexan (PEI on request)
Protection class[2]	IP54
Operating temperature	–40 °C to +125 °C
Cable-∅	8 to 14.5 mm
Protective cover	On request

The cable bend relief must be ordered separately
see page 61

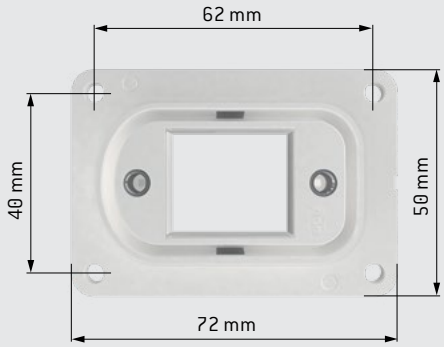
SUITABLE MODULES ARE MARKED

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

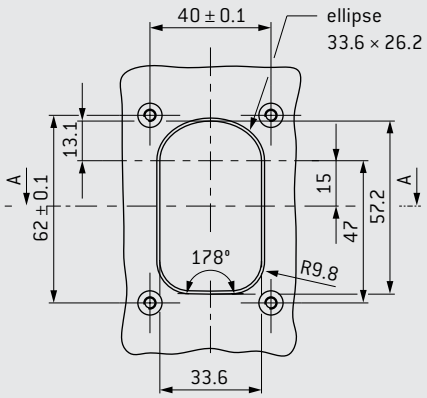
RECEPTACLE

For integration in the device

SNAP-IN LOCKING (BREAK-AWAY FUNCTION)



PANEL CUT-OUT

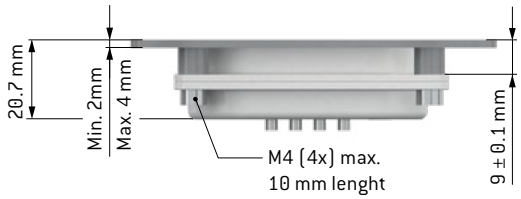


TECHNICAL DATA

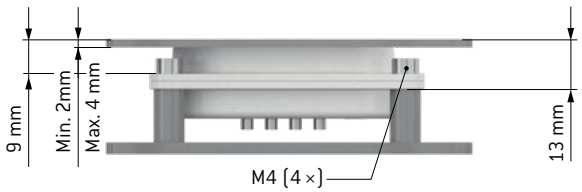
Color of housing	White Black / Gray on request
Locking cycles	60,000
Material	PC Lexan (PEI on request)
Protection class[1]	IP54
Operating temperature	–40 °C to +125 °C
Protective cover	On request

Part number	Units[2] 2.54 mm
656.560.001.001.000	9 Units

MOUNTING FROM BELOW



MOUNTING FROM ABOVE



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

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

INLINE-RECEPTACLE

ZERO

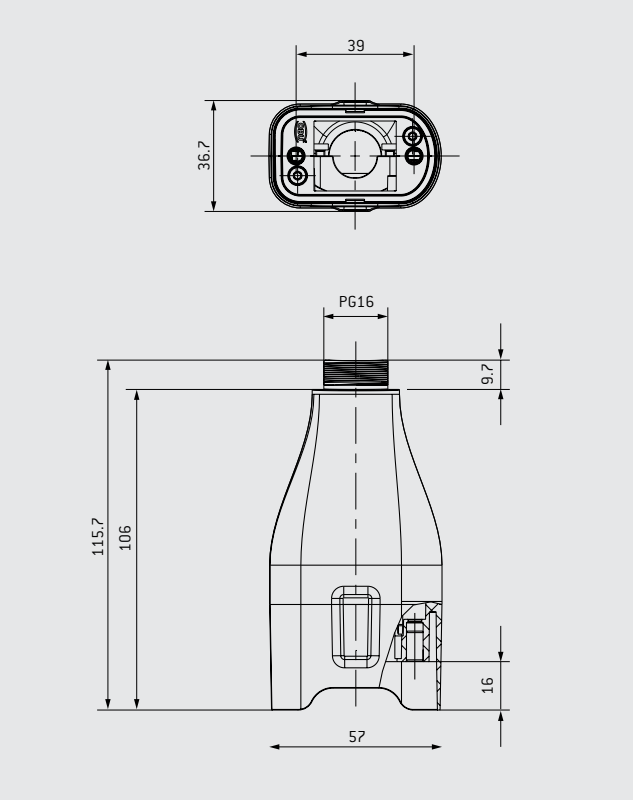
With top cable entry – for a flying cable to cable connection

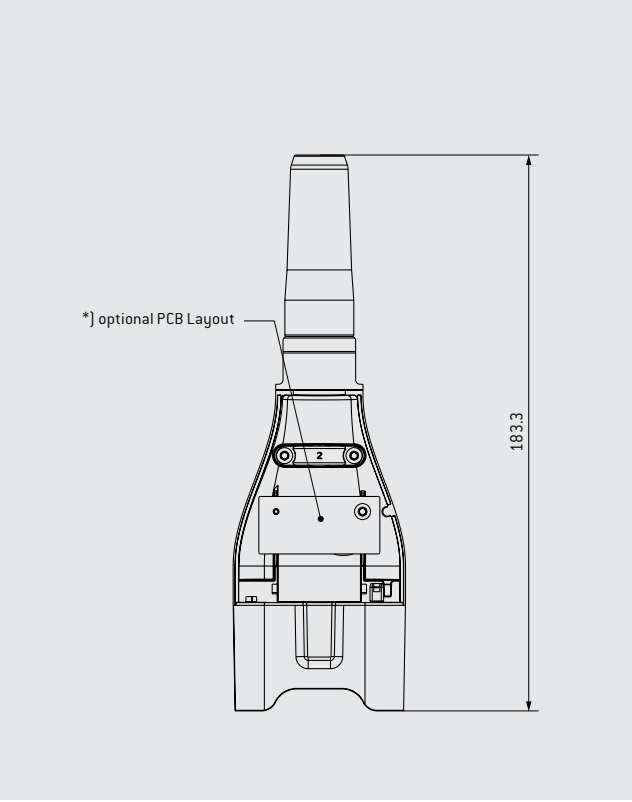
SNAP-IN LOCKING (BREAK-AWAY FUNCTION)

TECHNICAL DATA

Color of housing	White Black / Gray on request
Locking cycles	60,000
Material	PC Lexan (PEI on request)
Protection class[1]	IP54
Operating temperature	–40 °C to +125 °C
Protective cover	On request

The cable bend relief must be ordered separately
see page 61.





Part number	Units[2] 2.54 mm
656.560.003.001.000	9 Units

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

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

Table of Contents

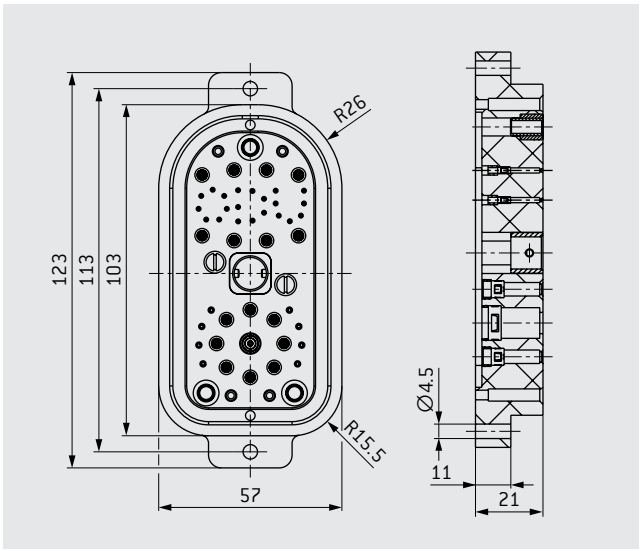
ODU MEDI-FLEX WITH CUSTOMIZABLE INSERT

Plug and receptacle connector housing and insulator
Connector housing and insulation body for cable-to-panel connections with customizable insulation body.

SPINDLE LOCKING

TECHNICAL NOTES

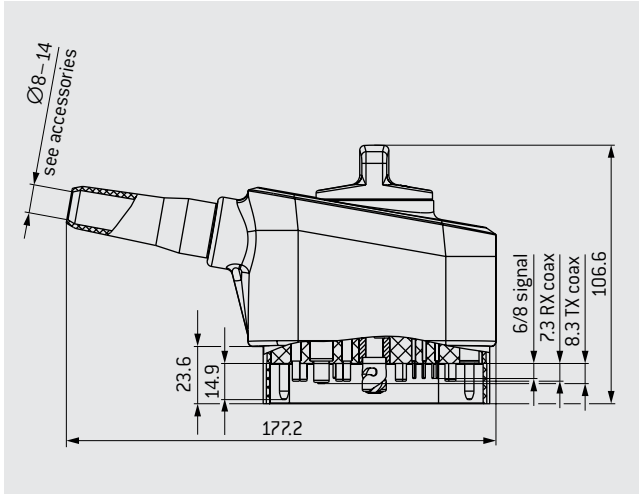
- Plastic housing with customizable mono-block insulation
- Iconography on knob to indicate secure locking



TECHNICAL DATA

Color of housing	White
Insulation material	according (UL 94 V0)
Housing material	PC Lexan 925A (UL 94 V-2)
Protection class[1]	IP54
Operating temperature	–40 °C to 125 °C
Cable-Ø	8 to 14 mm
Locking system	180° Spindle locking (up to 30 K mating cycles, with replaceable tip)

The cable bend relief must be ordered separately see page 61.
Part number will be determined based on desired configuration.



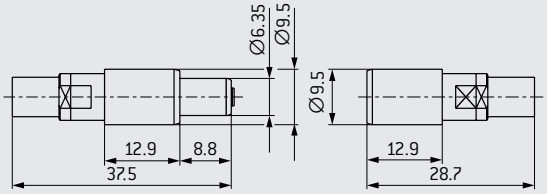
[1] IEC 60529:2013 (VDE 0470-1:2014).

Table of Contents

CONTACTS SUITABLE FOR ODU MEDI-FLEX

COAX-VERSIONS

TX COAX 50 Ω



TECHNICAL DATA – TX COAX 50 Ω

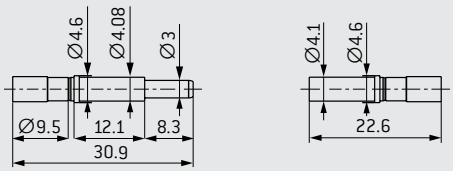
Frequency range	0–2.8 GHz
Mating force	6.95 N
Demating force	4.95 N
Rated voltage	850 V
Test voltage	2,600 V

Voltage information acc. to MIL[2]

Insulation resistance	> 100 GΩ
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 100,000

All technical information see module description p. 88-89.

RX COAX 50 Ω



TECHNICAL DATA – RX COAX 50 Ω

Frequency range	0–1.3 GHz
Mating force	4.45 N
Demating force	3.8 N
Rated voltage	350 V
Test voltage	1,050 V

Voltage information acc. to MIL[2]

Insulation resistance	> 100 GΩ
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 60,000

All technical information see module description p. 86-87.

SIGNAL

TECHNICAL NOTES

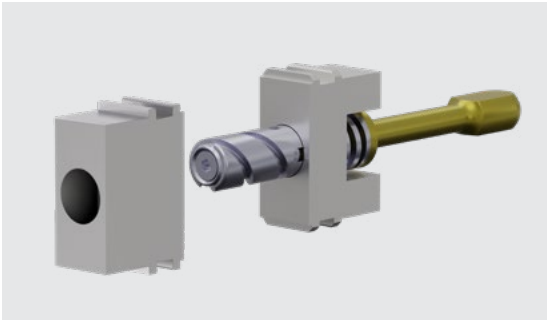
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- All technical information see module description.
- Crimp information see page 111.

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ	More information see page
CONTACT Ø 0.76								
Pin contact short	182.958.000.370.000	0.38	22	7.5	6	11	3.8	68–69
Pin contact long	182.959.000.370.000							
Socket contact	172.958.700.257.000							
Pin contact short	182.965.000.370.000	0.25 – 0.08	24/28	6	5	9	3.8	
Pin contact long	182.966.000.370.000							
Socket contact	172.965.700.257.000							
CONTACT Ø 1.02								
Pin contact short	182.956.000.370.000	0.50 – 0.38	20/22	9	8	13.5	2.1	70-71
Pin contact long	182.957.000.370.000							
Socket contact	172.956.700.257.000							
Pin contact short	182.944.000.370.000	0.25 – 0.08	24/28	6	6	9	2.1	
Pin contact long	182.945.000.370.000							
Socket contact	172.944.700.257.000							
CONTACT Ø 1.5								
Pin contact short	182.960.000.370.000	1.5	14	18	14.5	27	0.95	66–67
Pin contact long	182.961.000.370.000							
Socket contact	172.960.700.257.000							
Pin contact short	180.545.000.370.000	1 – 0.75	18	16	13	22.5	0.95	
Pin contact long	180.575.000.370.000							
Socket contact	170.545.700.257.000							
Pin contact short	180.541.000.370.000	0.5/0.38	20/22	10	8	15	0.95	
Pin contact long	180.571.000.370.000							
Socket contact	170.541.700.257.000							
CONTACT Ø 2.41								
Pin contact short	182.962.000.370.000	2.5		24	19	33.5	0.45	73–74
Pin contact long	182.963.000.370.000							
Socket contact	172.962.700.257.000							
Pin contact short	182.608.000.370.001	0.5 – 0.38	20/22	10.5	8	15.5	0.55	
Pin contact long	182.605.000.370.001							
Socket contact	172.605.700.257.000							

SPINDLE LOCKING

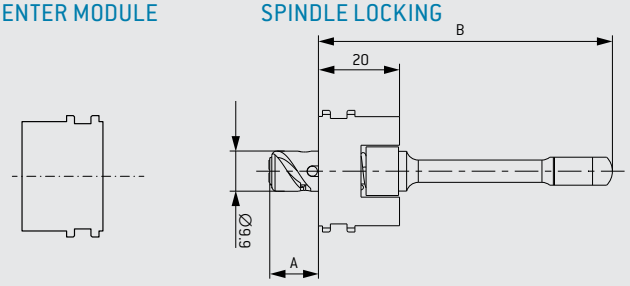
Module for installation in ODU-MAC® frames for housings. Quick-action locking system with 30,000 locking cycles. Simple replacement of the front (spindle exchange set) enables further mating cycles of the complete system.

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



CENTER MODULE

SPINDLE LOCKING

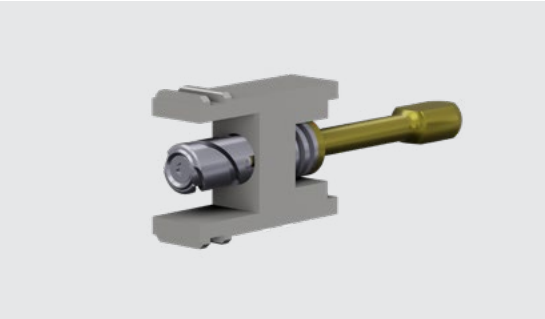


Size	Part number Center module for bulkhead mounted and surface mounted housing	Part number Spindle locking for cable hood	Angle of rotation	Dim. A mm	Dim. B mm
2 (52 mm high)	614.090.001.338.001	615.091.003.900.001	180°	12	46.5
2 (72 mm high)		615.091.001.900.001	180°	12	66.5
3/4		615.092.011.900.001	360°	16.3	72.5

- Max. locking cycles 30,000[1]
- Space requirement 5 units (5 × 2.54 mm)
- Further spindle geometries on request
- Can account for 80 lbf (9 Nm) of mating forces

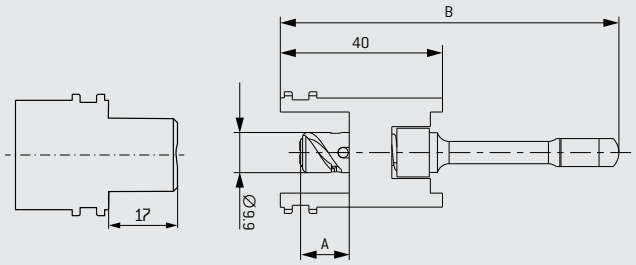
[1] 30,000 cycles depending on mating force of the used modules.

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



CENTER MODULE

SPINDLE LOCKING



Size	Part number Center module for bulkhead mounted and surface mounted housing	Part number Spindle locking for cable hood	Angle of rotation	Dim. A mm	Dim. B mm
2 (52 mm high)	614.090.002.338.001	615.091.004.900.001	180°	12	63.5
2 (72 mm high)		615.091.002.900.001	180°	12	83.5
3/4		615.092.012.900.001	360°	16.3	89.5

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

REPLACEMENT SPINDLE SET FOR VERSION 1 AND 2

Part number spindle exchange set	Angle of rotation	Dim. A mm
615.090.104.249.010	180°	12
615.090.104.249.012	360°	16.3

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

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

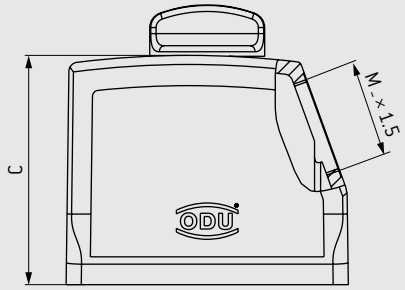
CABLE HOOD

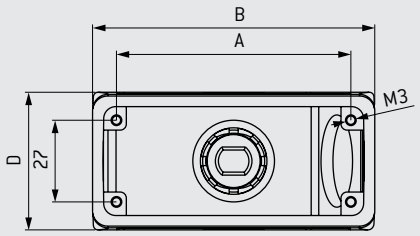
Connector housing for assembly on the cable with side cable entry

SPINDLE LOCKING

B WHITE MODEL

C WHITE MODEL WITH BLACK KNOB





TECHNICAL DATA

Color of housing	White (similar RAL 9010)
Material	Aluminium die casting
Protection class[1]	IP50
	IP65 on request
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 56
Number of locking cycles	see page 44

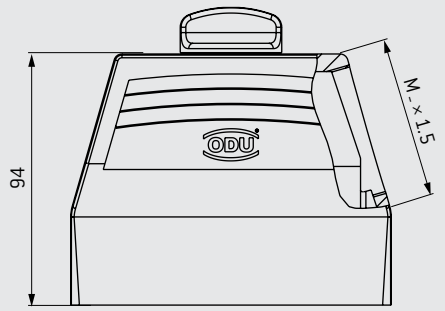
Size	Part number B Color of housing White / spindle knob White	Part number C Color of housing White / spindle knob Black	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable entry	Part number protective cover gray (see page 57)
2	613.091.513.453.203	–	57	73	52	43	M25	On request
	613.091.514.453.203	613.091.514.453.208	57	73	72	43	M32	
3	613.092.514.453.203	613.092.514.453.208	77.5	93.3	76	45.5	M32	On request
4	613.093.514.453.203	613.093.514.453.208	104	120	76	45.5	M32	On request
	On request	613.093.515.453.008	104	120	76	45.5	M40	On request

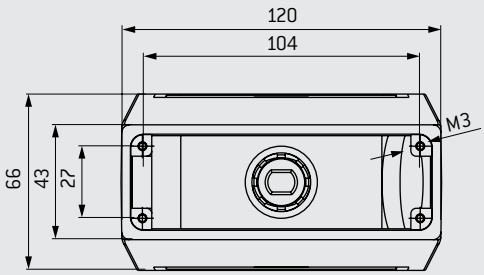
[1] IEC 60529:2013 (VDE 0470-1:2014) (Depends on the cable clamp(s) and spindle type used).

CABLE HOOD XXL

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

SPINDLE LOCKING





TECHNICAL DATA

Color of housing	Gray, White on request
Material	Aluminium die casting
Protection class[1]	IP50 IP65 on request
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 56
Number of locking cycles	see page 45

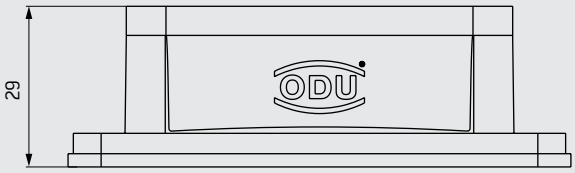
Size	Part number Color of housing Gray / spindle knob Black	Dim. M Cable entry	Part number protective cover (see page 61)
4	613.093.516.444. 208	M50	On request

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

BULKHEAD MOUNTED HOUSING

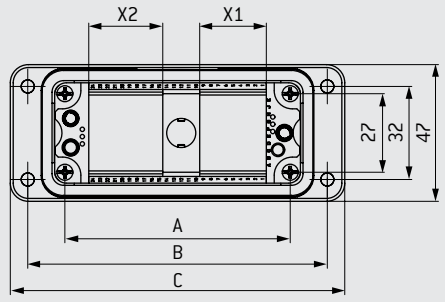
For mounting on the device

SPINDLE LOCKING



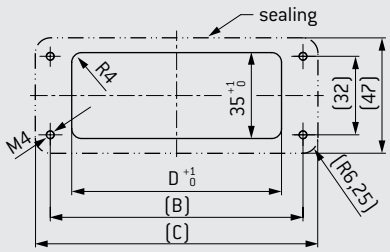
TECHNICAL DATA

Color of housing	White (similar to RAL 9010), Gray on request
Material	Aluminium die casting
Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85 °C (operating)
Sealing	NBR; sealing material FKM on request (higher temperature range)



The frames depicted must be ordered separately, see page 55.

PANEL CUT-OUT



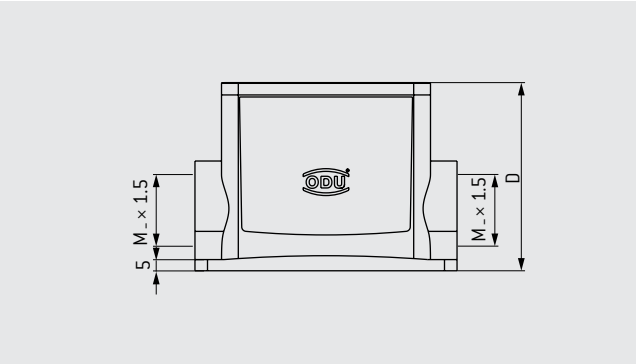
Size	Part number Color of housing white	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D Panel cut-out mm	X1 Units 2.54 mm	X2 Units 2.54 mm
2	612.091.010.453.000	57	83	95	65.2	5	6
3	612.092.010.453.000	77.5	103	115	85.5	9	10
4	612.093.010.453.000	104	130	143	112.2	14	15

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

SURFACE MOUNTED HOUSING

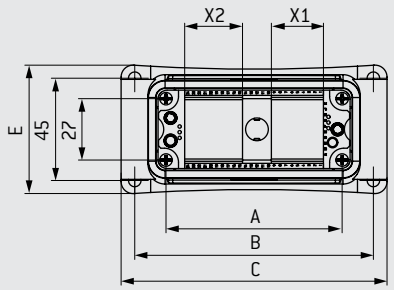
For surface mounting on your device / wall with two side cable entries

SPINDLE LOCKING



TECHNICAL DATA

Color of housing	Gray (standard, similar 7001) White on request (similar to RAL 9010)
Material	Aluminium die casting
Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85 °C (operating)
Sealing	NBR; sealing material FKM on request (higher temperature range)
Cable clamp	See page 60



The frames depicted must be ordered separately, see page 55.

Size	Part number Color of housing white	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	X1 Units 2.54 mm	X2 Units 2.54 mm	Dim. M Cable entry
2	612.091.025.453.102	57	82	92.5	74	55.5	5	6	M32
3	612.092.025.453.102	77.5	105	117	84	56.5	9	10	M32
4	612.093.025.453.102	104	132	144	84	57.5	14	15	M32

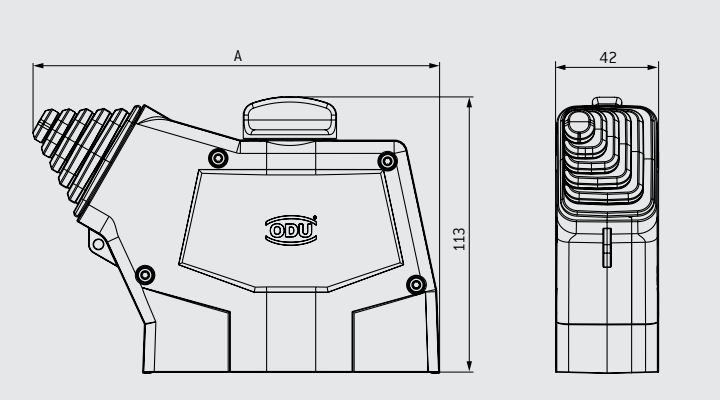
[1] IEC 60529:2013 (VDE 0470-1:2014) (Depends on the cable clamp(s) and spindle type used).

ODU-MAC® RAPID PLASTIC HOUSING

Half-shell principle with individually adjustable side cable outlet

SPINDLE LOCKING

UP TO 50 % TIME SAVINGS



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 from page 44
Coding	Spindle coding (6 options) on request

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

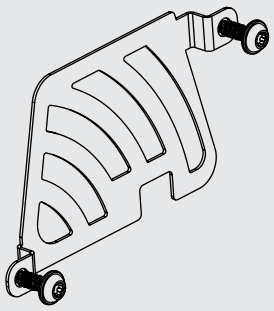
Size	Part number	Description	Color of housing	Cable outlet □	Part number protective cover	Dim. A mm
2	656.561.012.003.000	RAPID housing	White	Max. 26 × 37 mm	656.561.012.023.000	139
2	656.561.012.008.000	RAPID housing	Black		656.561.012.018.000	
4	656.563.012.003.000	RAPID housing	White		656.563.012.023.000	165.7
4	656.563.012.008.000	RAPID housing	Black		656.563.012.018.000	
2 / 4	615.093.021.200.003	Spindle locking without coding				
2	611.191.004.600.000	Housing frame, pin side				
4	611.193.004.600.000	Housing frame, pin side				

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

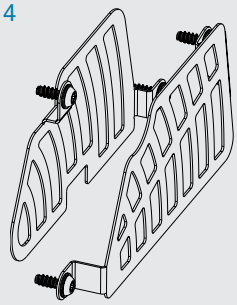
STRAIN RELIEF SET

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

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

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

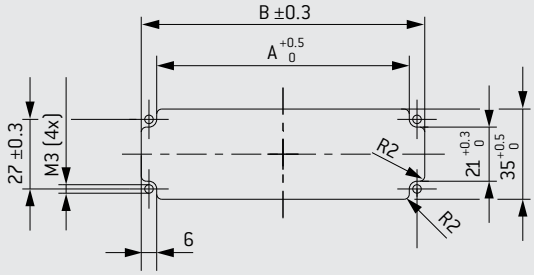
For mounting on your device

SPINDLE LOCKING

DIRECT ASSEMBLY OF THE SOCKET FRAME
ON ASSEMBLY WALL

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

PANEL CUT-OUT



Size	Part number	Description	Dim. A mm	Dim. B mm
2	610.191.000.600.000	Frame	51	57
4	610.193.000.600.000	Frame	98	104
2 / 4	614.090.001.304.000	Center module without coding		

Table of Contents

ODU-MAC® RAPID RECEPTACLE

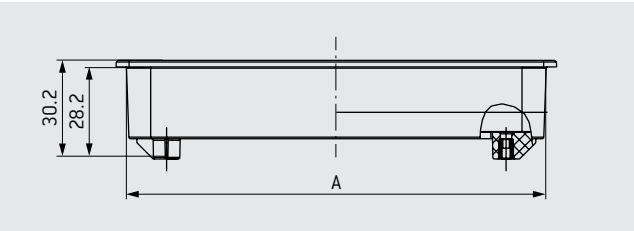
For mounting as a recessed plastic version

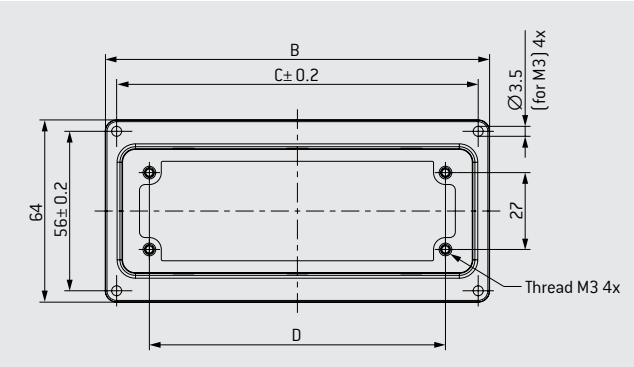
SPINDLE LOCKING

TECHNICAL DATA

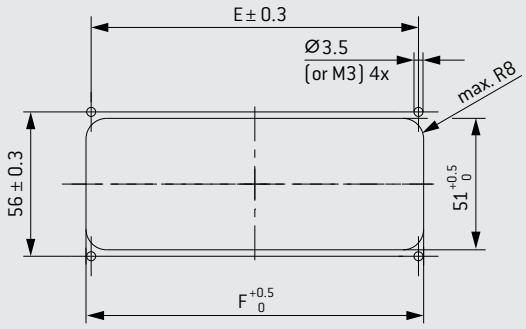
Color of housing (recessed style)	Black (RAL 9005), White (RAL 9003)
Material	Plastic Lexan PC, UL 94-V0
Operating temperature	–40 °C to +125 °C
International Protection class[1]	IP4X

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.





PANEL CUT-OUT



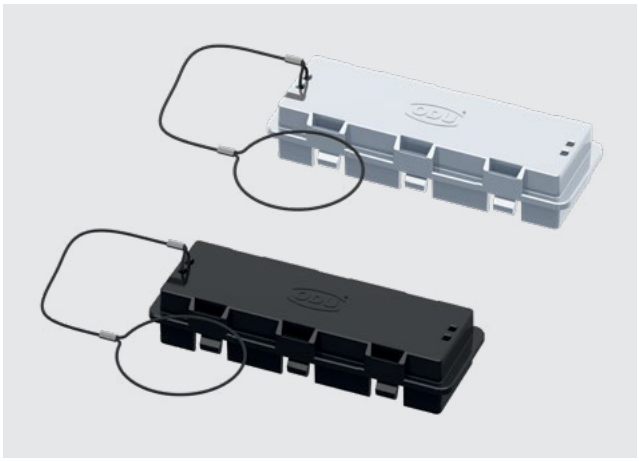
Size	Part number	Description	Color of housing	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	Dim. F mm
2	656.561.001.003.000	Receptacle	White	82.4	88	80	57	80	84
2	656.561.001.008.000	Receptacle	Black	82.4	88	80	57	80	84
4	656.563.001.003.000	Receptacle	White	129.4	134.9	127.2	104	127	131
4	656.563.001.008.000	Receptacle	Black	129.4	134.9	127.2	104	127	131
2	610.191.000.600.000	Frame							
4	610.193.000.600.000	Frame							
2 / 4	614.090.001.304.000	Center module without coding							

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

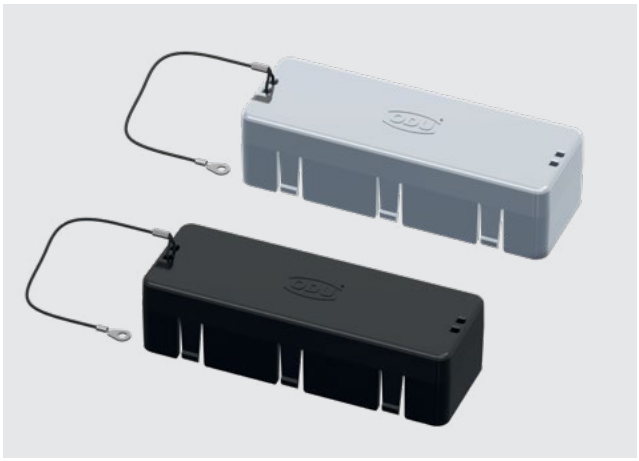
PLASTIC PROTECTIVE COVER

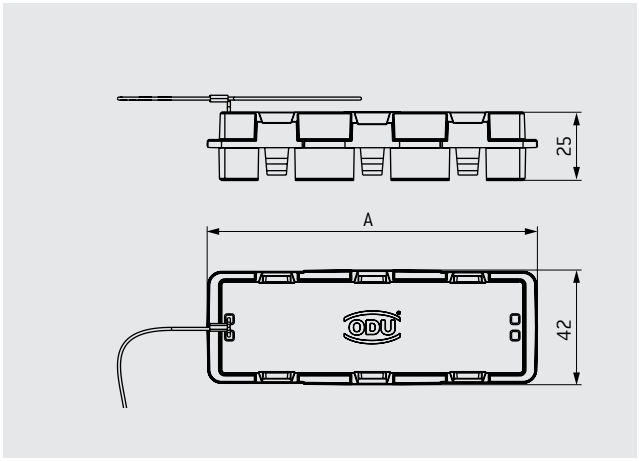
For ODU-MAC® RAPID housing and recessed version receptacle

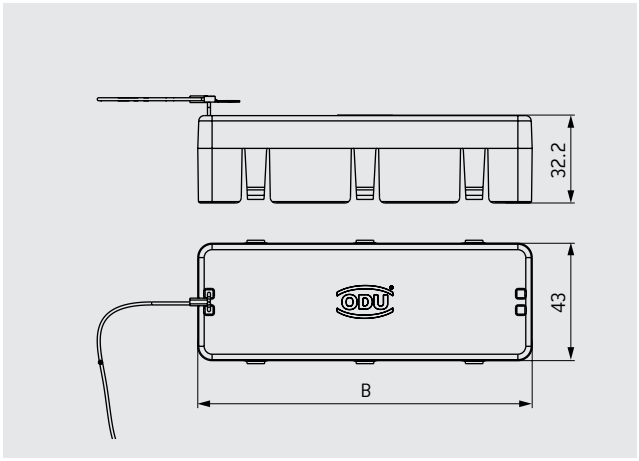
HOUSING



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

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

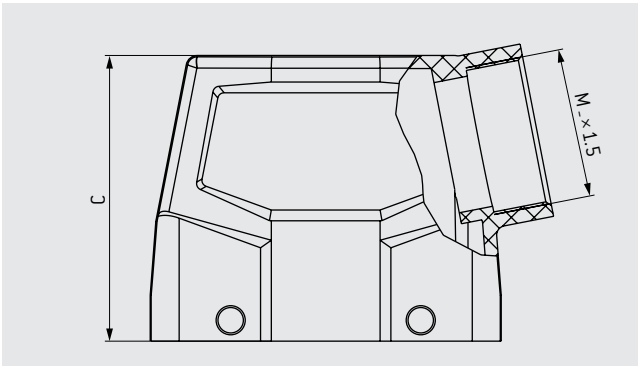
Size	Color	Part number protective cover for housing	Part number protective cover for recessed version receptacle	Lanyard length housing mm	Lanyard length recessed version receptacle mm	Dim. A mm	Dim. B mm
2	White	656.561.012.023.000	656.561.011.023.000	300	150	74	75.5
2	Black	656.561.012.018.000	656.561.011.018.000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

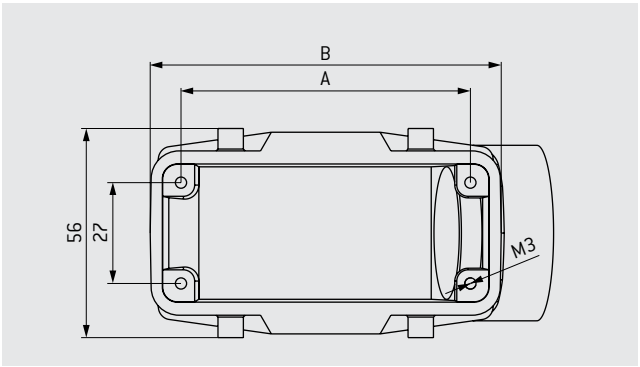
Table of Contents

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 60
Number of locking cycles	5,000

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. M Cable outlet	Part number protective cover (see page 53)
1	490.420.650.908.000	44	54	72.5	M32	490.097.613.908.001
2	491.420.650.908.000	57	74	72.5	M32	491.097.613.908.001
3	492.420.650.908.000	77.5	94	76.5	M40	492.097.613.908.001
4	493.420.650.908.000	104	121	76.5	M40	493.097.613.908.001

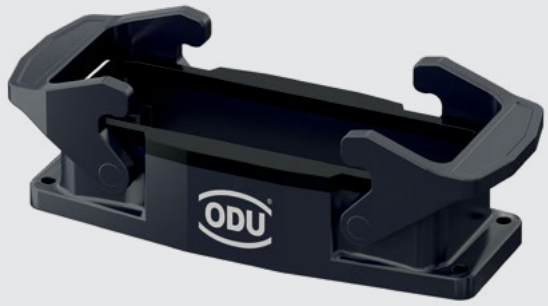
FOR A REDUCTION FROM M40 TO M32 AND FROM M32 TO M25, SEE PAGE 56

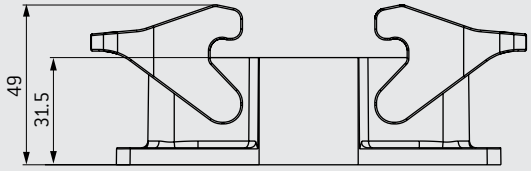
[1] IEC 60529:2013 (VDE 0470-1:2014) (depends on the cable clamp(s) used)

PLASTIC BULKHEAD HOUSING

For assembly on your device with transverse locking

TRANSVERSE LOCKING

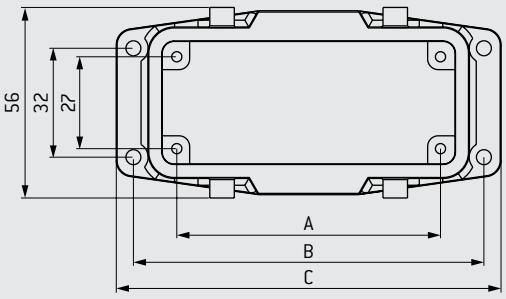




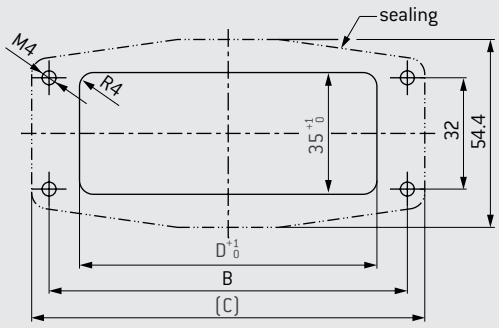
TECHNICAL DATA

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

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.



PANEL CUT-OUT



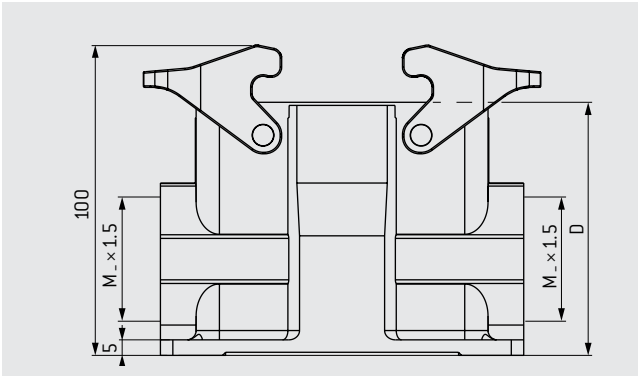
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D Panel cut-out mm	Part number protective cover (see page 53)
1	490.120.600.908.000	44	70	80	53	490.097.612.908.000
2	491.120.600.908.000	57	83	93.2	66	491.097.612.908.000
3	492.120.600.908.000	77.5	103	113	86	492.097.612.908.000
4	493.120.600.908.000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

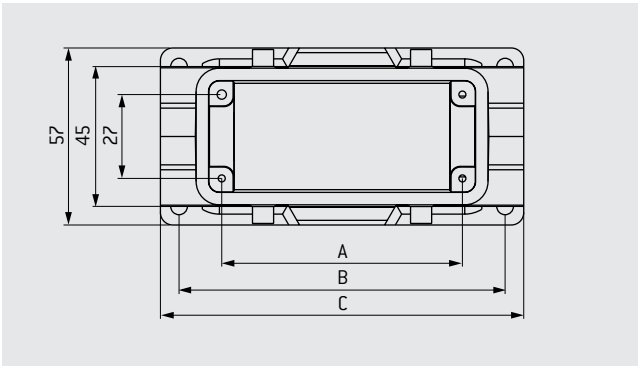
[1] IEC 60529:2013 (VDE 0470-1:2014) (depends on the cable hood used)

PLASTIC SURFACE-MOUNTED HOUSING

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

TRANSVERSE LOCKING





TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
International Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material
Cable clamp	see page 60

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

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 53)
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 60

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

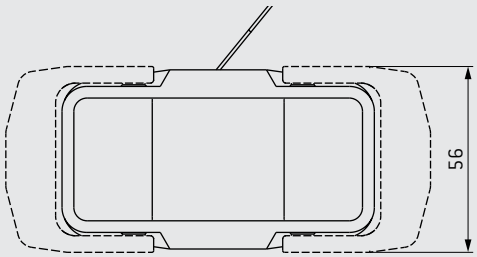
PLASTIC PROTECTIVE COVER

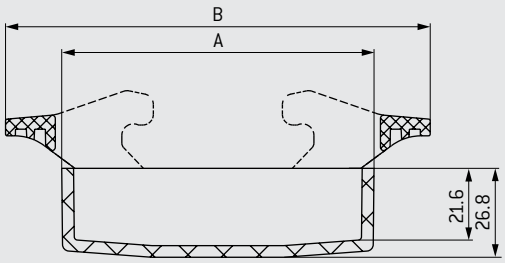
For bulkhead and surface-mounted housing with lanyard

SPINDLE LOCKING A

TRANSVERSE LOCKING B

SPINDLE AND TRANSVERSE LOCKING





Dotted line and dimension B only applies to spindle locking

TECHNICAL DATA

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

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

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

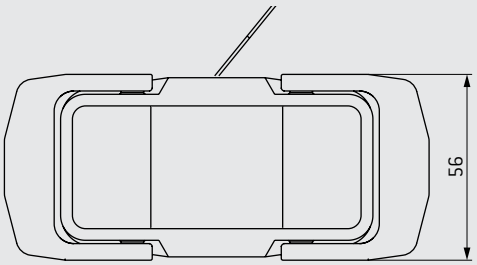
[1] IEC 60529:2013 (VDE 0470-1:2014)

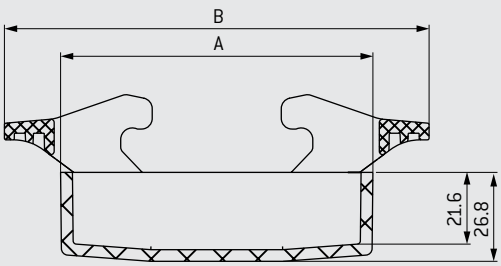
PLASTIC PROTECTIVE COVER

For cable hood with lanyard

SPINDLE AND TRANSVERSE LOCKING

SPINDLE AND TRANSVERSE LOCKING





TECHNICAL DATA

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

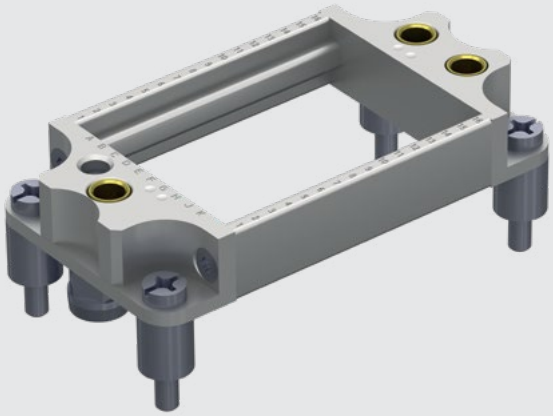
Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

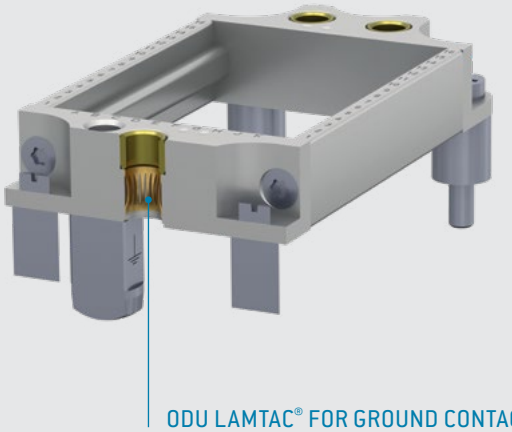
Size	Part number Protective cover for spindle locking	Part number Protective cover for transverse locking	Dim. A mm	Dim. B mm
1	–	490.097.613.908.001	61	95
2	491.097.613.908.001	491.097.613.908.001	74	108
3	492.097.613.908.001	492.097.613.908.001	94	128
4	493.097.613.908.001	493.097.613.908.001	121	155

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

ODU-MAC® FRAME FOR HOUSING

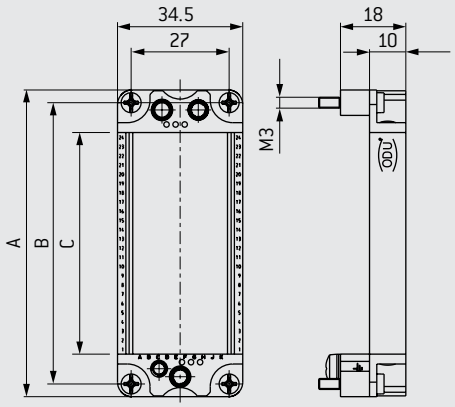
With grounded housing (The frame is not required for the ODU-MAC® ZERO.)





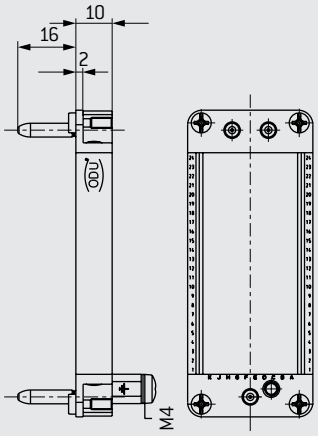
ODU LAMTAC® FOR GROUND CONTACT
with a maximum of 6 mm² termination

SOCKET FRAME WITH GUIDING BUSHES



Sockets in bulkhead mounted housing, cable to cable hood or surface mounted housing. Pins in cable hood. Modules are mounted, contacts are not fixed enclosed.

PIN FRAME WITH GUIDING PIN



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

Size	Part number Socket frame	Part number Pin frame	Max. units 2.54 mm[1]	Dim. A mm	Dim. B mm	Dim. C mm
ZERO	No frame required.	No frame required.	9	–	–	–
1	610.190.000.400.000	611.190.000.400.000	10	51	44	25.5
2	610.191.000.400.000	611.191.000.400.000	16	64	57	40.8
3	610.192.000.400.000	611.192.000.400.000	24	84.5	77.5	61.1
4/XXL	610.193.000.400.000	611.193.000.400.000	34	111	104	86.5

[1] If the configuration doesn't fill the frame completely, please use blank modules (see page 104).

Table of Contents

CABLE CLAMP AND BLIND GROMMET

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

TECHNICAL DATA

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

EMC clamp on request.

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

BLIND GROMMET FOR SURFACE MOUNTED HOUSING

TECHNICAL DATA

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

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

[1] Cable clamp not included in the scope of delivery of the housings.

SILICONE BEND RELIEFS FOR ODU-MAC® ZERO AND MEDI-FLEX

TECHNICAL DATA

Material	Silicone
Temperature	–50 °C to +200 °C
Colors	White, gray, or black Red, yellow, green, blue (on request)

DESCRIPTION

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

Magnetism: Depending on the application, the MRI (permeability and imaging) field must be checked by the customer.

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

Color code	Color	RAL no.[1] (similar)
203	White[2]	9010
207	Gray[2]	7005
208	Black[2]	9005

REDUCING RING FOR PLASTIC HOUSING

TECHNICAL DATA

Color	Black (RAL 9005)
Material	plastic PA6 GF20, UL 94-V0
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] Due to variations in raw materials, colors may differ slightly from RAL numbers.[2] Standard colors with short delivery period

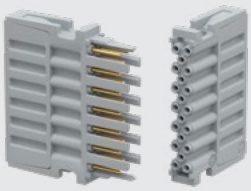
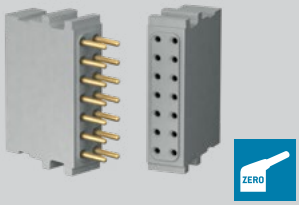
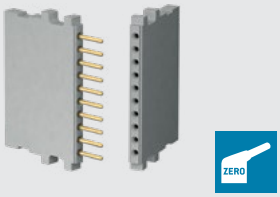
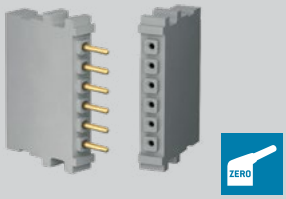
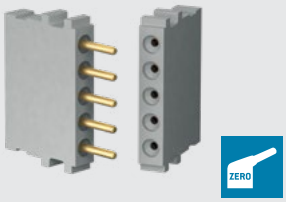
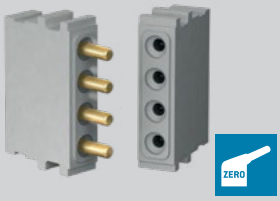
ODU-MAC®

Table of Contents

MODULES

OVERVIEW

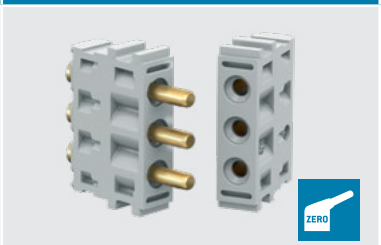
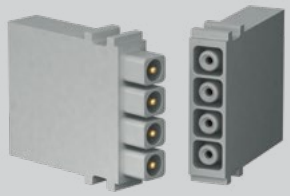
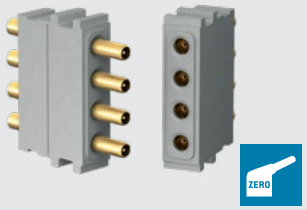
This icon marks compatibility with ODU-MAC® ZERO; note the space requirements

	Modules	Description	Units / width	Features		Page
Signal		20 contacts for turned contacts Contact Ø: 0.76 mm	2 Units 5.08 mm	High contact density Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	250 V 1,500 V 11 A for 0.76 mm² 2 ≥ 100,000	68
		14 contacts for turned contacts Contact Ø: 1.02 mm	3 Units 7.62 mm	High contact density Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	320 V 2,500 V 13.5 A for 0.5 mm² 2 ≥ 100,000	70
		10 contacts for turned contacts Contact Ø: 0.76 mm	1 Unit 2.54 mm	Highest contact density Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	250 V 1,500 V 11 A for 0.38 mm² 2 ≥ 100,000	72
		6 contacts for turned contacts Contact Ø: 1.02 mm	2 Units 5.08 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	400 V 3,000 V 13.5 A for 0.5 mm² 2 ≥ 100,000	74
		5 contacts for turned contacts Contact Ø: 1.5 mm	2 Units 5.08 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	500 V 2,500 V 27 A for 1.5 mm² 2 ≥ 100,000	76
Power		4 contacts for turned contacts Contact Ø: 2.41 mm	3 Units 7.62 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	500 V 3,000 V 33.5 A for 2.5 mm² 2 ≥ 100,000	78

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008) for degree of pollution 2. [2] Definition max. continuous current see page 129.

OVERVIEW OF ALL MODULES

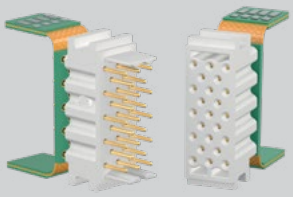
This icon marks compatibility with ODU-MAC® ZERO; note the space requirements

	Modules	Description	Units / width	Features	Page
Power		3 contacts for turned contacts Contact Ø: 3 mm	3 Units 7.62 mm	Operating voltage[1] 500 V Rated impulse voltage[1] 3,000 V Max. continuous current[2] 28 A for 1.5 mm² Degree of pollution[1] 2 Mating cycles ≥ 100,000	80
		3 contacts for turned contacts Contact Ø: 3 mm	4 Units 10.16 mm	High voltage Operating voltage[1] 2,500 V Rated impulse voltage[1] 10,000 V Max. continuous current[2] 28 A for 1.5 mm² Degree of pollution[1] 2 Mating cycles ≥ 100,000	82
High voltage		4 contacts for turned contacts Contact Ø: 1.5 mm	3 Units 7.62 mm	High contact density high voltage Operating voltage[1] 2,500 V Rated impulse voltage[1] 10,000 V Max. continuous current[2] 27 A for 1.5 mm² Degree of pollution[1] 2 Mating cycles ≥ 100,000	84
Coax		4 contacts for 50 Ω coax contacts	3 Units 7.62 mm	High contact density Frequency range 0–1.3 GHz Mating cycles ≥ 60,000	86
		2 contacts for 50 Ω coax contacts	5 Units 12.7 mm	High voltage Frequency range 0–2.8 GHz Mating cycles ≥ 100,000	88

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008). [2] Definition max. continuous current see page 129. [3] Contact with springwire technology. [4] Contact with lamella technology.

OVERVIEW

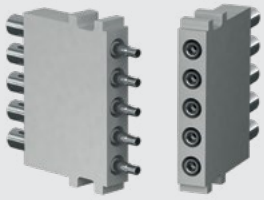
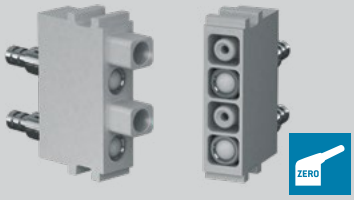
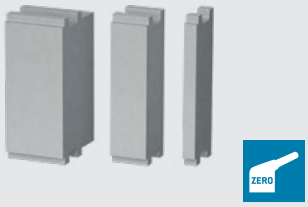
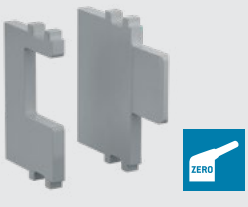
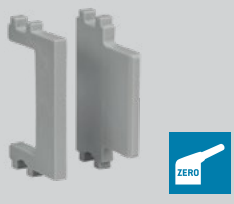
This icon marks compatibility with ODU-MAC® ZERO; note the space requirements

	Modules	Description	Units / width	Features		Page
Coax		10 contacts for 50 Ω common shield	3 Units 7.62 mm	Frequency range Mating cycles	0–1.3 GHz ≥ 40,000	90
		8 contacts for 50 Ω common shield	3 Units 7.62 mm	Frequency range Mating cycles	0–1.3 GHz ≥ 40,000	92
		6 contacts for 50 Ω common shield	3 Units 7.62 mm	Frequency range Mating cycles	0–1.3 GHz ≥ 40,000	94
		8-channel module (coax option)	4 Units 10.16 mm	Easy to assemble Frequency range Mating cycles	 0–350 MHz ≥ 100,000	96
		MINI-COAX		Frequency range Mating cycles	0–1.15 GHz ≥ 5,000	98

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008) for degree of pollution 2. [2] Definition max. continuous current see page 129.

OVERVIEW

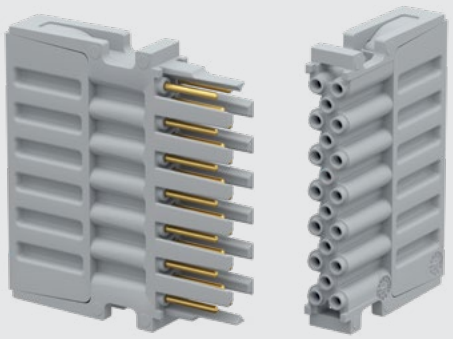
This icon marks compatibility with ODU-MAC® ZERO; note the space requirements

	Modules	Description	Units / width	Features	Page
Fiber optic		5 contacts for fiber optic contacts for plastic fiber (POF) Non-magnetic on request.	2 Units 5.08 mm	High contact density Insertion loss typical 1.5 dB for 670 nm Mating cycles ≥ 40,000	100
		2 contacts for fiber optic contacts for plastic fiber (POF)	3 Units 7.62 mm	Insertion loss < 4.0 dB with polished fiber Mating cycles infinite	102
Blank modules / spacer modules / coding modules / pin protection modules		Blank modules	1 Unit 2.54 mm 3 Units 7.62 mm 5 Units 12.7 mm	Used to fill incomplete frames.	104
		Spacer module	1 Unit 2.54 mm 2 Units 5.08 mm 3 Units 7.62 mm 5 Units 12.7 mm	Not equipped, enable the pluggability despite different contact equipment in the pin piece. For information on the individual spacer modules please look at the corresponding modules.	105
		Coding modules	1 Unit 2.54 mm	Arranged between the modules to create keyed guiding system.	106
		Pin protection modules	1 Unit 2.54 mm	Used to protect the pins in conjunction with small pin diameters.	107

MODULE 20 CONTACTS

Pin protection against mechanical damage

SIGNAL



2
Units

Contact diameter: 0.76 mm
Mating cycles: ≥ 100,000
Current-carrying capacity[1]: 11 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- Crimp information see page 111.
- Module can't be used in ODU-MAC® ZERO.

REMOVAL TOOL I (ANGLED)

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

REMOVAL TOOL II

Removal of the still unassembled contact (without cable, which may have to be cut off)
PART NUMBER: 087.611.001.001.000

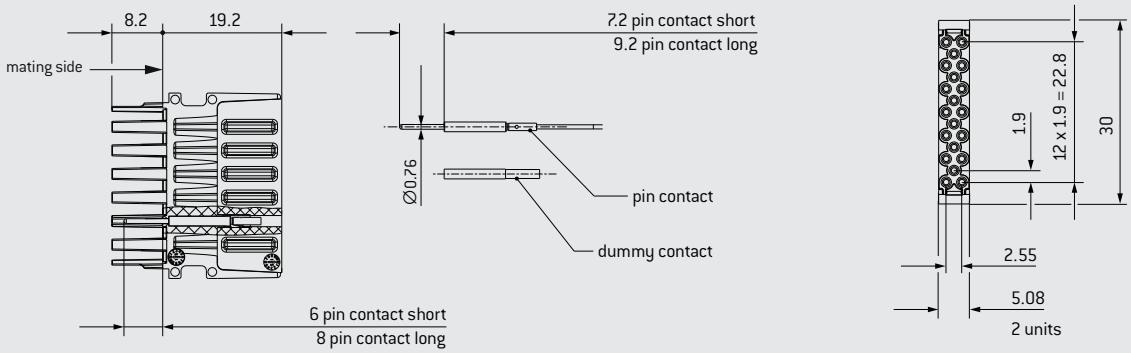
For an overview of all tools please see page 117.

TECHNICAL DATA

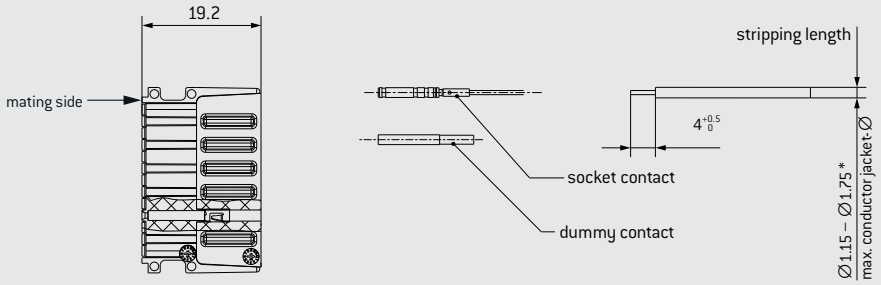
Voltage information[2]		
Operating voltage	250 V	50 V
Rated impulse voltage	1,500 V	1,500 V
Degree of pollution	2	3
Voltage information acc. to MIL[3]		
Operating voltage	500 V	
Test voltage	1,500 V	
Mechanical data		
Total mating force (average)	27 N / Module	
Total sliding force (average)	19.6 N / Module	
Contact diameter	0.76 mm	
Operating temperature	–40 °C to +125 °C	
Mating cycles	≥ 100,000	
Materials		
Insulator	Thermoplastic fiber glass reinforced acc. to UL 94	
Contact body	Cu alloy	
Contact spring	CuBe alloy	
Contact plating	Au over Ni	

[1] Definition max. continuous current see page 129. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 123. [3] See page 127.

INSULATOR PIN

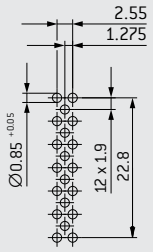


INSULATOR SOCKET



*= ∅ 1.15 with removal too – ≤ ∅ 1.75 without removal tool

PCB LAYOUT



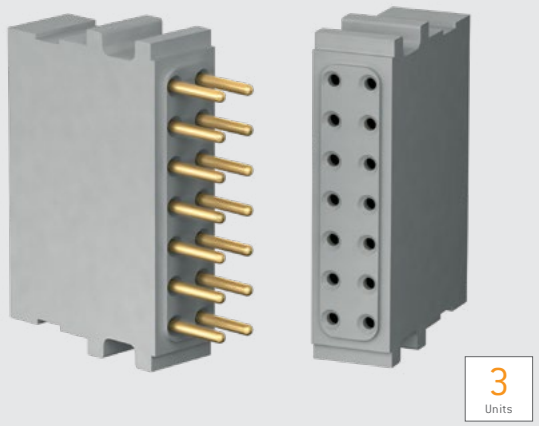
Module 20 contacts	Part number
Insulator	610.178.120.922.000
Insulator pin	611.178.120.922.000
Dummy contact	021.341.123.923.000

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact short	182.958.000.370.000	0.38	22	7.5	4	11	3.8
Pin contact long	182.959.000.370.000						
Socket contact	172.958.700.257.000						
Pin contact short	182.965.000.370.000	0.25 – 0.08	24 – 28	6	3.5	9	3.8
Pin contact long	182.966.000.370.000						
Buchsenkontakt	172.965.700.257.000						
Pin contact short	182.850.000.370.000		PCB termination ∅ 0.76 mm	7.5	4	11	3.8
Pin contact long	182.851.000.370.000						
Socket contact	Upon Request						

[1] Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K.
[2] Definition max. continuous current see page 129

MODULES 14 CONTACTS

SIGNAL



Contact diameter: 1.02 mm
Mating cycles: ≥ 100,000
Current-carrying capacity[1]: 13.5 A

REMOVAL TOOL I (ANGLED)

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

REMOVAL TOOL II

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

For an overview of all tools please see from page 117.

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 111.

TECHNICAL DATA

Voltage information[2]

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

Voltage information acc. to MIL[3]

Operating voltage	950 V
Test voltage	2,850 V

Mechanical data

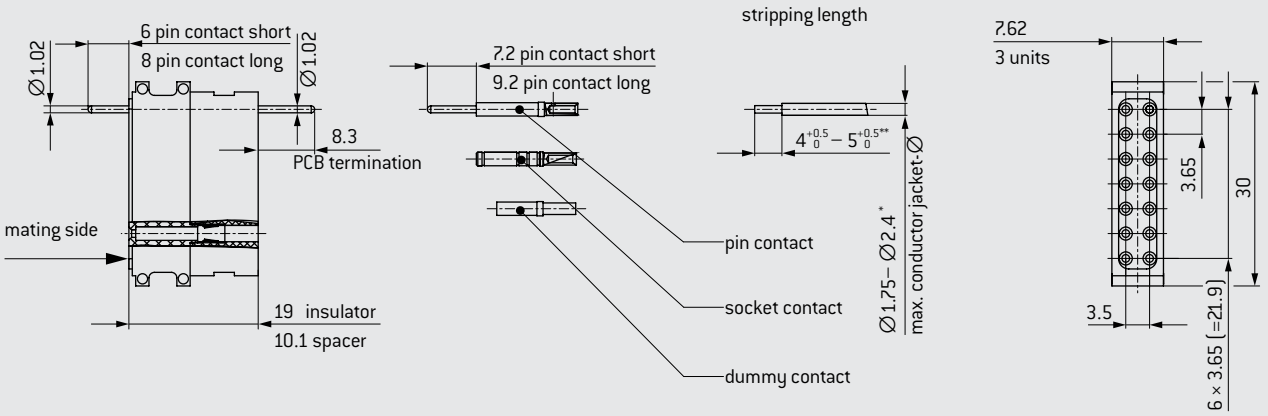
Total mating force (average)	18.9 N / Module
Total sliding force (average)	13.7 N / Module
Contact diameter	1.02 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 100,000

Materials

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

[1] Definition max. continuous current see page 129. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 123. [3] See page 127.

INSULATOR PIN AND SOCKET



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

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

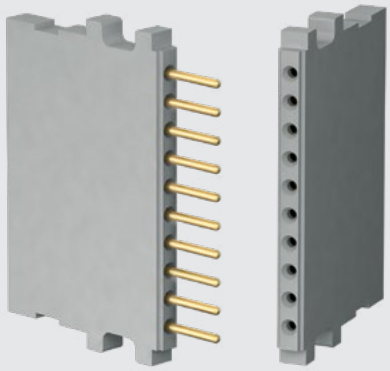
** $4^{+0.5}_{0}$: AWG 24 – 28; 0.25 – 0.08 mm²
$5^{+0.5}_{0}$: AWG 20 – 22; 0.5 – 0.38 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	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	182.956.000.370.000	0.5 – 0.38	20 – 22	9	7	13.5	2.1
Pin contact long	182.957.000.370.000						
Socket contact	172.956.700.257.000						
Pin contact short	182.944.000.370.000	0.25 – 0.08	24 – 28	6	5	9	2.1
Pin contact long	182.945.000.370.000						
Socket contact	172.944.700.257.000						
Pin contact short	182.818.000.370.000		PCB termination Ø 1.02 mm	9	7	13.5	2.1
Pin contact long	182.819.000.370.000						
Socket contact	172.818.700.257.000						

[1] Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K. [2] Definition max. continuous current see page 129.

MODULE 10 CONTACTS FOR TURNED CONTACTS

SIGNAL



1 Unit

Contact diameter: 0.76 mm
Mating cycles: ≥ 100,000
Current-carrying capacity[1]: 11 A

REMOVAL TOOL I (ANGLED)

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

REMOVAL TOOL II

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

For an overview of all tools please see from page 117.

TECHNICAL NOTES

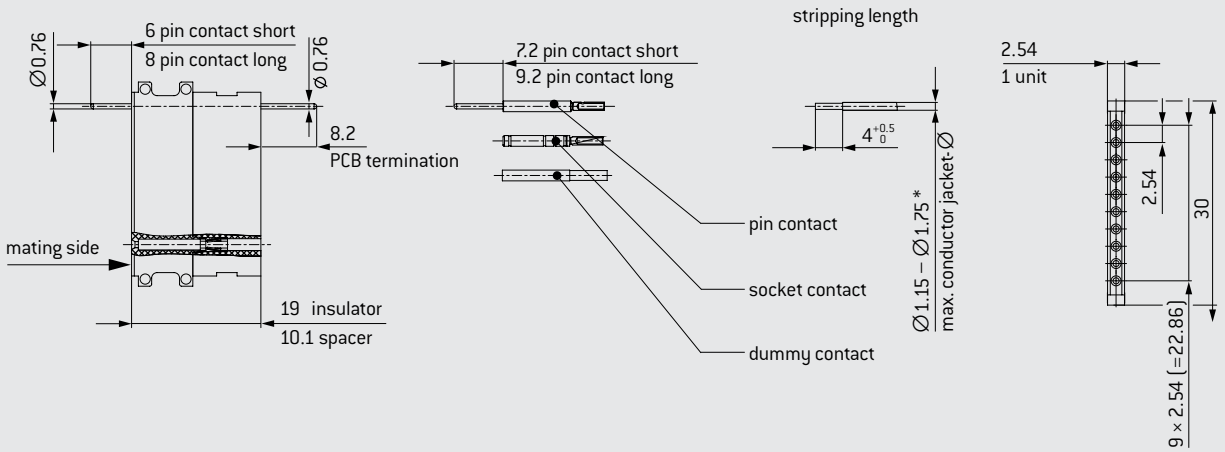
- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- The 10 contacts modules with turned contacts are not compatible with stamped contacts or modules.
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 111.

TECHNICAL DATA

Voltage information[2]		
Operating voltage	250 V	32 V
Rated impulse voltage	1,500 V	1,500 V
Degree of pollution	2	3
Voltage information acc. to MIL[3]		
Operating voltage	500 V	
Test voltage	1,500 V	
Mechanical data		
Total mating force (average)	13.5 N / Module	
Total sliding force (average)	9.8 N / Module	
Contact diameter	0.76 mm	
Operating temperature	–40 °C to +125 °C	
Mating cycles	≥ 100,000	
Materials		
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94	
Contact body	Cu alloy	
Contact spring	CuBe alloy	
Contact processing	Au over NiP	

[1] Definition max. continuous current see page 129. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 123. [3] See page 127.

INSULATOR PIN AND SOCKET



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

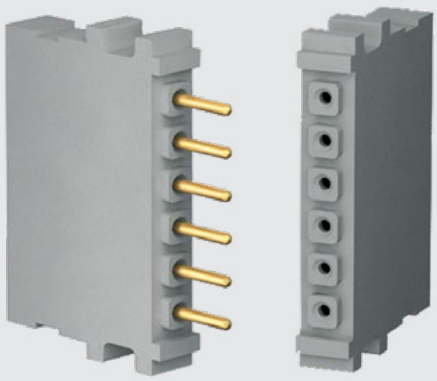
Module 10 contacts	Part number
Insulator	611.122.110.923.000
Spacer	611.122.111.923.000
Dummy contact	021.341.123.923.000

Description	Part number	Conductor cross-section mm²	Termination AWG	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	182.958.000.370.000	0.38	22	7.5	6	11	3.8
Pin contact long	182.959.000.370.000						
Socket contact	172.958.700.257.000						
Pin contact short	182.965.000.370.000	0.25 – 0.08	24 – 28	7.5	5	9	3.8
Pin contact long	182.966.000.370.000						
Socket contact	172.965.700.257.000						
Pin contact short	182.850.000.370.000		PCB termination Ø 0.76 mm	4	6	11	3.8
Pin contact long	182.851.000.370.000						
Socket contact	172.889.700.257.000						

[1] Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K. [2] Definition max. continuous current see page 129.

MODULE 6 CONTACTS

SIGNAL



2
Units

Contact diameter: 1.02 mm
Mating cycles: ≥ 100,000
Current-carrying capacity[1]: 13.5 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 111.

TECHNICAL DATA

Voltage information[2]

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

Voltage information acc. to MIL[3]

Operating voltage	850 V
Test voltage	2,550 V

Mechanical data

Total mating force (average)	8.1 N / Module
Total sliding force (average)	5.9 N / Module
Contact diameter	1.02 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 100,000

Materials

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

REMOVAL TOOL I (ANGLED)

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

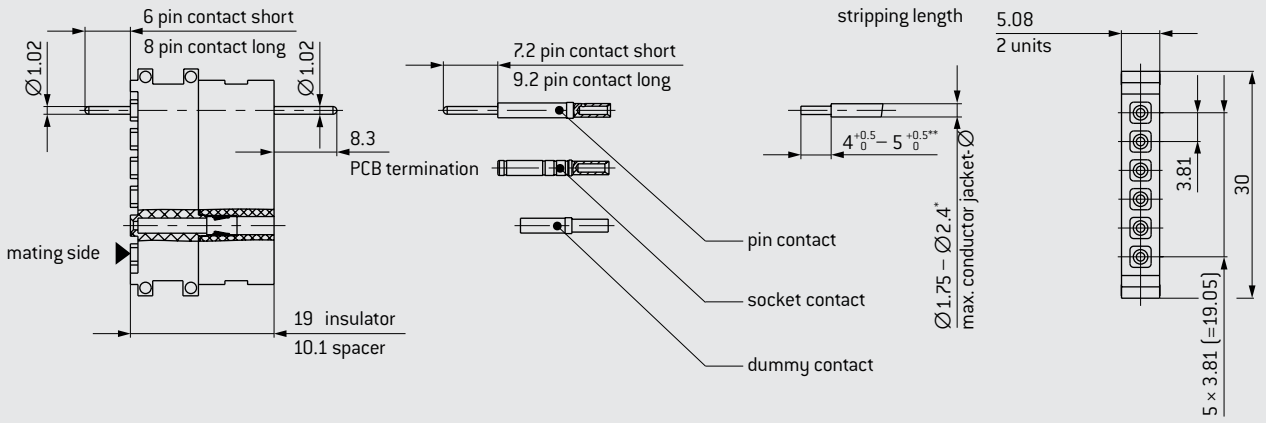
REMOVAL TOOL II

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

For an overview of all tools please see from page 117.

[1] Definition max. continuous current see page 129. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 123. [3] See page 127.

INSULATOR PIN AND SOCKET



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

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

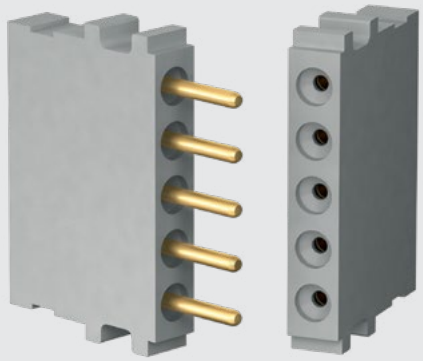
** $4^{+0.5}_{0}$: AWG 24 – 28; 0.25 – 0.08 mm²
$5^{+0.5}_{0}$: AWG 20 – 22; 0.5 – 0.38 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact short	182.956.000.370.000	0.5 – 0.38	20 – 22	9	8	13.5	2.1
Pin contact long	182.957.000.370.000						
Socket contact	172.956.700.257.000						
Pin contact short	182.944.000.370.000	0.25 – 0.08	24 – 28	6	6	9	2.1
Pin contact long	182.945.000.370.000						
Socket contact	172.944.700.257.000						
Pin contact short	182.818.000.370.000		PCB termination Ø 1.02 mm	9	8	13.5	2.1
Pin contact long	182.819.000.370.000						
Socket contact	172.818.700.257.000						

[1] Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K. [2] Definition max. continuous current see page 129.

MODULE 5 CONTACTS

SIGNAL



2 Units

Contact diameter: 1.5 mm
Mating cycles: ≥ 100,000
Current-carrying capacity[1]: 27 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 111.

TECHNICAL DATA

Voltage information[2]

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

Voltage information acc. to MIL[3]

Operating voltage	750 V
Test voltage	2,250 V

Mechanical data

Total mating force (average)	15 N / Module
Total sliding force (average)	11.3 N / Module
Contact diameter	1.5 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 100,000

Materials

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy
Contact spring	CuSn alloy
Contact finish	
Contact body	Au over NiP
Contact springs	Au

REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL I (ANGLED)

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

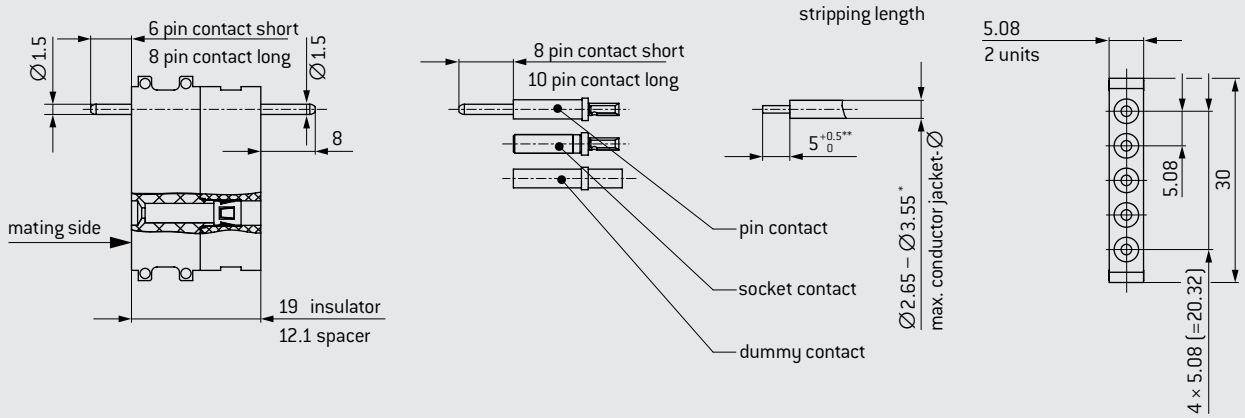
REMOVAL TOOL II

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

For an overview of all tools please see from page 117.

[1] Definition max. continuous current see page 131. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 125. [3] See page 127.

INSULATOR PIN AND SOCKET



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

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

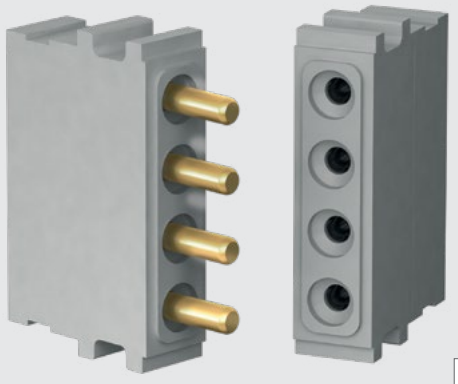
** $5^{+0.5}_{0}$: AWG 20 – 22; 0.5 – 0.38 mm²
AWG 14 – 18; 0.75 – 1.5 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact short	182.960.000.370.000	1.5	14	18	14.5	27	0.95
Pin contact long	182.961.000.370.000						
Socket contact	172.960.700.257.000						
Pin contact short	180.545.000.370.000	1	18	16	13	22.5	0.95
Pin contact long	180.575.000.370.000						
Socket contact	170.545.700.257.000						
Pin contact short	180.541.000.370.000	0.5 – 0.38	20 – 22	10	8	15	0.95
Pin contact long	180.571.000.370.000						
Socket contact	170.541.700.257.000						
Pin contact short	182.802.000.370.000	0.25 – 0.08	24 – 28	6	6	9	0.95
Pin contact long	182.803.000.370.000						
Socket contact	172.802.700.257.000						

[1] Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K. [2] Definition max. continuous current see page 129.

MODULE 4 CONTACTS

POWER



3
Units

Contact diameter: 2.41 mm
Mating cycles: ≥ 100,000
Current-carrying capacity[1]: 33.5 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- Crimp information see page 111.

TECHNICAL DATA

Voltage information[2]

Operating voltage	500 V	200 V
Rated impulse voltage	3,000 V	3,000 V
Degree of pollution	2	3

Voltage information acc. to MIL[3]

Operating voltage	1,100 V
Test voltage	3,300 V

Mechanical data

Total mating force (average)	13 N / Module
Total sliding force (average)	12 N / Module
Contact diameter	2.41 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 100,000

Materials

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

REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL I (ANGLED)

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

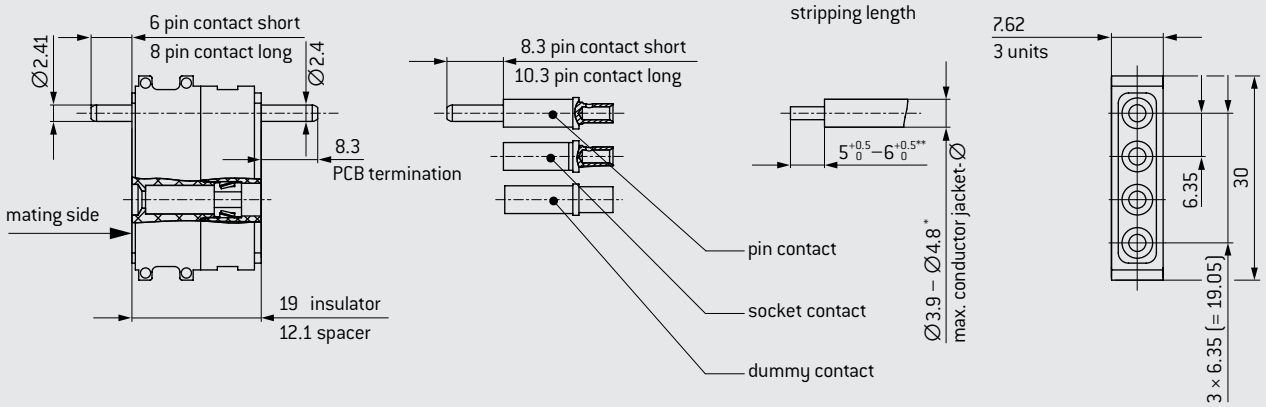
REMOVAL TOOL II

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

For an overview of all tools please see from page 117.

[1] Definition max. continuous current see page 129. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 123. [3] See page 127.

INSULATOR PIN AND SOCKET



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

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

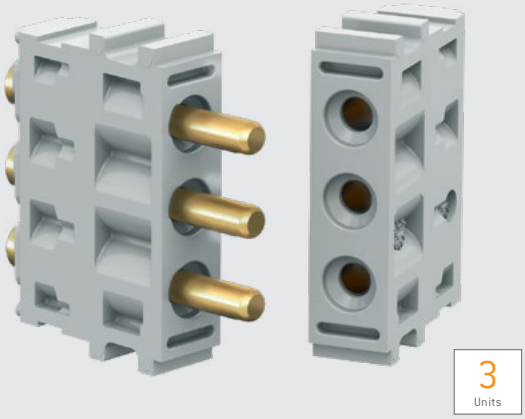
** $5^{+0.5}_{0}$: AWG 20 – 22; 0.38 – 0.5 mm²
$6^{+0.5}_{0}$: AWG 12; 2.5 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact short	182.962.000.370.000	2.5		24	19	33.5	0.45
Pin contact long	182.963.000.370.000						
Socket contact	172.962.700.257.000						
Pin contact short	182.608.000.370.001	0.5 – 0.38	20 – 22	10.5	8	15.5	0.55
Pin contact long	182.605.000.370.001						
Socket contact	172.605.700.257.000						
Socket contact	On request		PCB termination				

[1] Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K. [2] Definition max. continuous current see page 129.

MODULE 3 CONTACTS

POWER



REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL I (ANGLED)

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

REMOVAL TOOL II

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

For an overview of all tools please see from page 117.

Contact diameter: 3 mm
Mating cycles: ≥ 100,000
Termination cross-section: from 0.75 to 1.5 mm²

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- Crimp information see page 111.

TECHNICAL DATA

Voltage information[1]

Operating voltage	500 V	200 V
Rated impulse voltage	3,000 V	3,000 V
Degree of pollution	2	3

Voltage information acc. to MIL[2]

Operating voltage	1,200 V
Test voltage	3,600 V

Mechanical data

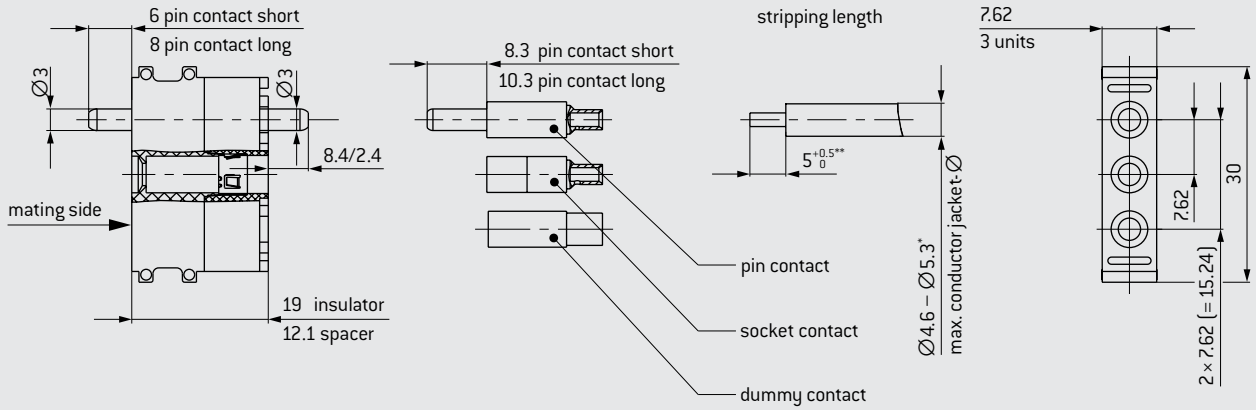
Total mating force (average)	13.5 N / Module
Total sliding force (average)	10.4 N / Module
Contact diameter	3 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 100,000

Materials

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

[1] IEC 60664-1:2007 (VDE 0110-1:2008) see page 123. [2] See page 127.

INSULATOR PIN AND SOCKET



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

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

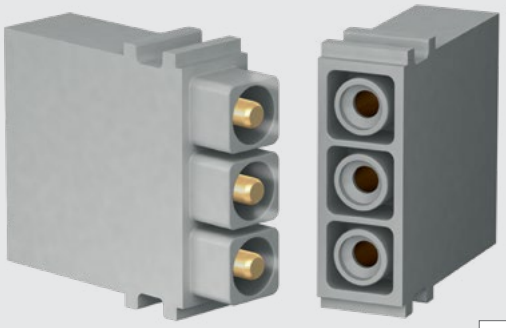
** $5^{+0.5}_{0}$: AWG 14 – 18 / 0.75 – 1.5 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact short	182.582.000.370.000	1.5	14	19	16	28	0.3
Pin contact long	On request						
Socket contact	172.582.700.257.000						
Pin contact short	On request	1 – 0.75	18	16.5	14	24.5	0.3
Pin contact long	182.585.000.370.000						
Socket contact	172.584.700.257.000						

[1] Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K. [2] Definition max. continuous current see page 129.

MODULE 3 CONTACTS

POWER



4
Units

REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL II

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

For an overview of all tools please see from page 117.

Contact diameter: 3 mm
Mating cycles: ≥ 100,000
Current-carrying capacity[1]: 28 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- Crimp information see page 111.

TECHNICAL DATA

Voltage information[2]

Operating voltage	2,400 V	950 V
Rated impulse voltage	9,000 V	9,000 V
Degree of pollution	2	3

Voltage information acc. to MIL[3]

Operating voltage	1,850 V
Test voltage	5,600 V

Mechanical data

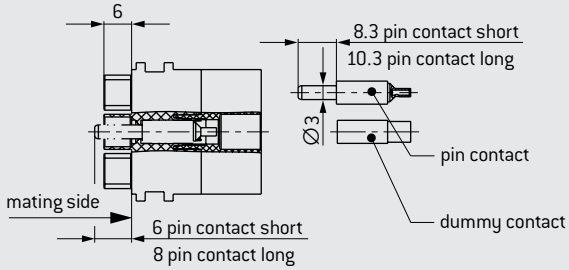
Total mating force (average)	13.5 N / Module
Total sliding force (average)	10.4 N / Module
Contact diameter	3 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 100,000

Materials

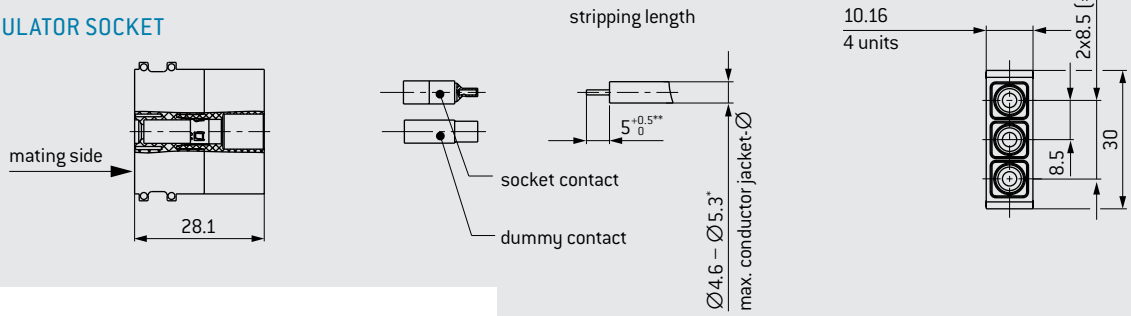
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy
Contact spring	CuSn alloy
Contact finish	Au over NiP

[1] Definition max. continuous current see page 129. [2] IEC 60664-1:2007 (VDE 0110-1:2008) see page 123. [3] See page 127.

INSULATOR PIN



INSULATOR SOCKET



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

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

** $5^{+0.5}_{0}$: AWG 14 – 18 / 0.75 – 1.5 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact short	182.582.000.370.000	1.5	14	19	16	28	0.3
Pin contact long	On request						
Socket contact	172.582.700.257.000						
Pin contact short	On request	1 – 0.75	18	16.5	14	24.5	0.3
Pin contact long	182.585.000.370.000						
Socket contact	172.584.700.257.000						

[1] Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K. [2] Definition max. continuous current see page 129.

MODULE 4 CONTACTS

HIGH VOLTAGE

REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL II

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

For an overview of all tools please see from page 117.

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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 123).
- Crimp information see page 111.

TECHNICAL DATA

Voltage information[1]

Operating voltage	2,500 V	1,000 V
Rated impulse voltage	10,000 V	10,000 V
Degree of pollution	2	3

Voltage information acc. to MIL[2]

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

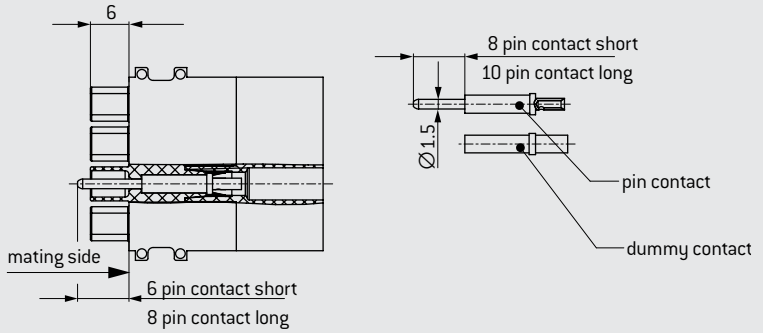
Mechanical data	
Total mating force (average)	12 N / Module
Total sliding force (average)	9.2 N / Module
Contact diameter	1.5 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 100,000

Materials

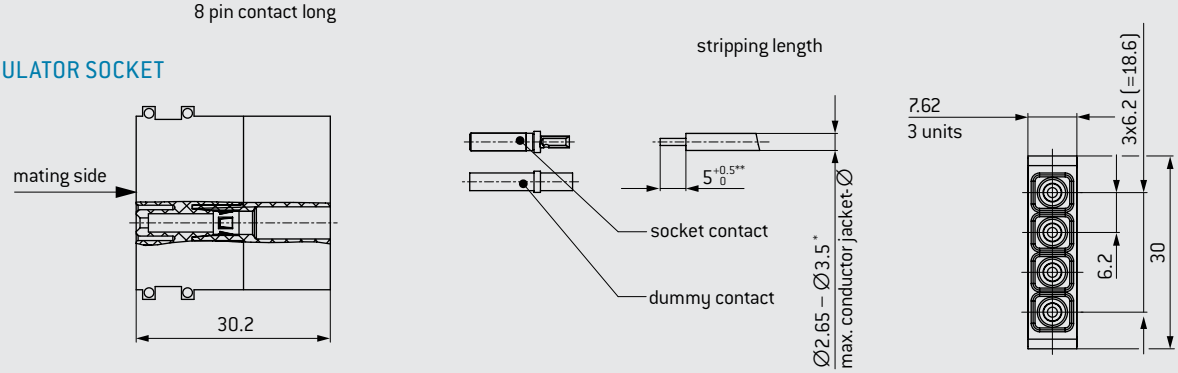
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy
Contact spring	CuSn alloy
Contact finish	
Contact body	Au over NiP
Contact spring	Au

[1] IEC 60664-1:2007 (VDE 0110-1:2008) see page 123. [2] See page 127.

INSULATOR PIN



INSULATOR SOCKET



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

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

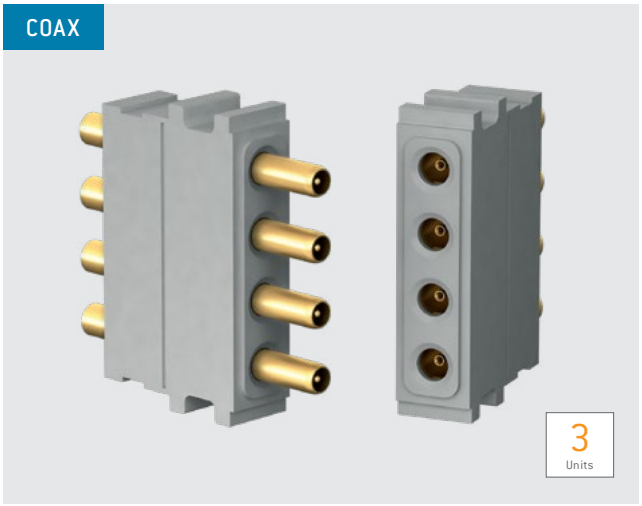
** $5^{+0.5}_{0}$: AWG 20 – 22; 0.5 – 0.38 mm²
AWG 14 – 18; 0.75 – 1.5 mm²

Description	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact short	182.960.000.370.000	1.5	14	18	14.5	27	0.95
Pin contact long	182.961.000.370.000						
Socket contact	172.960.700.257.000						
Pin contact short	180.545.000.370.000	1 – 0.75	18	16	13	22.5	0.95
Pin contact long	180.575.000.370.000						
Socket contact	170.545.700.257.000						
Pin contact short	180.541.000.370.000	0.5 – 0.38	20 – 22	10	8	15	0.95
Pin contact long	180.571.000.370.000						
Socket contact	170.541.700.257.000						
Pin contact short	182.802.000.370.000	0.25 – 0.08	24 – 28	6	6	9	0.95
Pin contact long	182.803.000.370.000						
Socket contact	172.802.700.257.000						

[1] Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K. [2] Definition max. continuous current see page 129.

MODULE 4 CONTACTS FOR 50 Ω

COAX



Mating cycles: ≥ 60,000
Frequency range[1]: 0–1.3 GHz

TECHNICAL NOTES

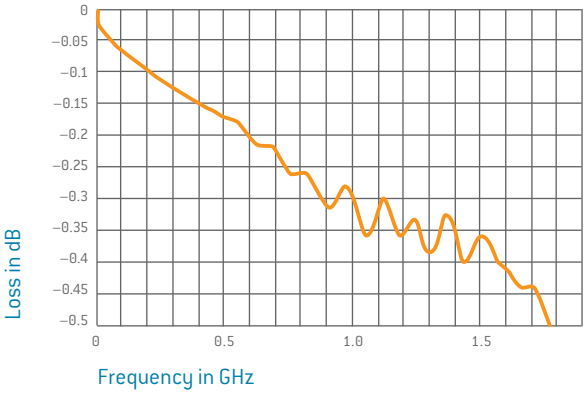
- Crimp information see page 111.

TECHNICAL DATA

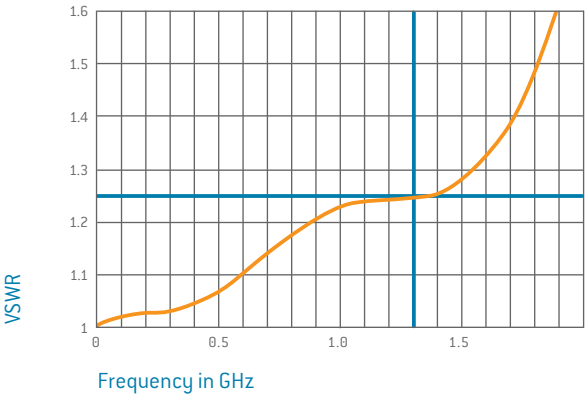
Frequency range[1]	0–1.3 GHz[1]
Insulation resistance	> 100 GΩ
Voltage information acc. to MIL[2]	
Operating voltage	350 V
Test voltage	1,050 V
Mechanical data	
Total mating force (average)	17.8 N / Module
Total sliding force (average)	15.3 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 60,000
Materials	
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body / insulator	Cu alloy / PTFE
Contact spring	CuSn / CuBe alloy
Contact finish	Au over NiP

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss



Voltage standing-wave ratio VSWR



REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL I (ANGLED)

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

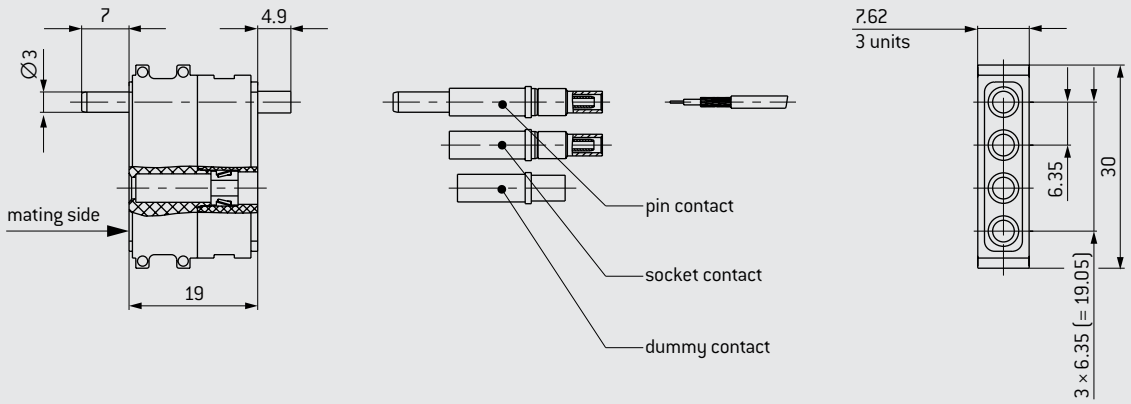
REMOVAL TOOL II

Removal of the not assembled contact (with cable – wire may have removed).
PART NUMBER: 087.611.001.001.000

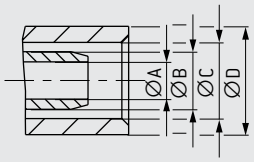
For an overview of all tools please see from page 117.

[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 127.

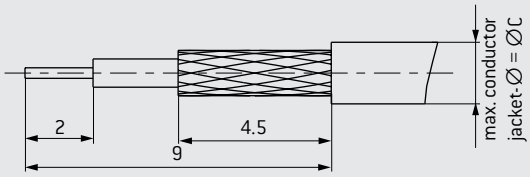
INSULATOR FOR PIN AND SOCKET



CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 4 contacts	Part number
Insulator	611.149.104.923.000

Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable[1]	A	B	C	D	Part number crimp inserts
Pin contact	122.120.001.270.000	50	1.3	RG 178/RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Pin contact	122.120.003.270.000		0.8	RG 174 / RG 188 / RG 316 (75 Ω: RG 179, RG 187)	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.120.011.270.000		0.85	G 02232 (H+S)[2]	1.75	2.7	3.5	4.3	082.000.039.103.000
Socket contact	122.120.002.270.000	50	1.3	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Socket contact	122.120.004.270.000		0.8	RG 174 / RG 188 / RG 316 (75 Ω: RG 179, RG 187)	1.75	2.7	3.2	3.8	082.000.039.102.000
Socket contact	122.120.012.270.000		0.85	G 02232 (H+S)[2]	1.75	2.7	3.5	4.3	082.000.039.103.000
Crimping tool for shielding sleeve	080.000.039.000.000								

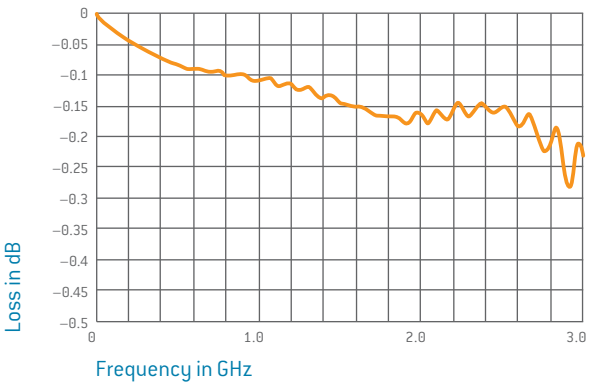
[1] Special lines and alternative models on request. [2] Removal tool II is not possible due to the conductor diameter.

MODULE 2 CONTACTS FOR 50 Ω AND HIGH VOLTAGE

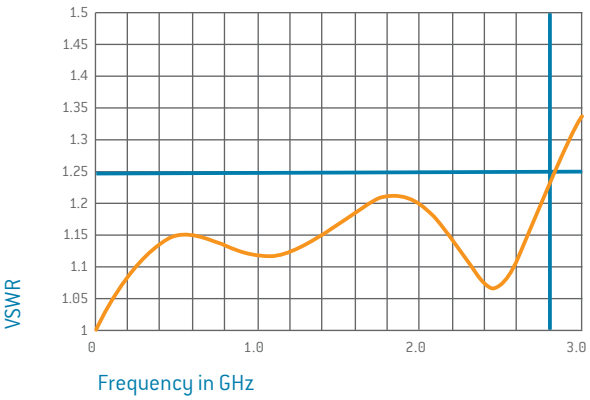
COAX

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss



Voltage standing-wave ratio VSWR



Mating cycles: ≥ 100,000
Frequency range[1]: 0–2.8 GHz

TECHNICAL NOTES

- Crimp information see page 111.

TECHNICAL DATA

Voltage information

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

Voltage information acc. to MIL[2]

Operating voltage	850 V
Test voltage	2,600 V

Mechanical data

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

Materials

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

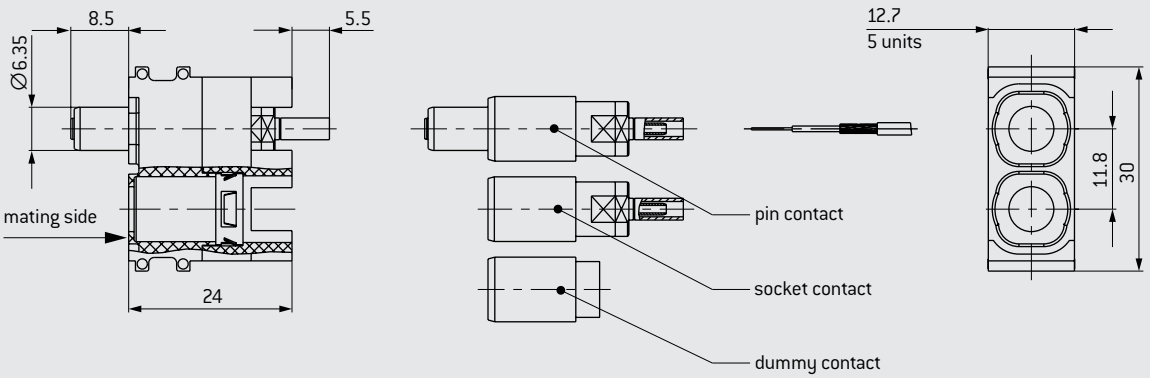
REMOVAL TOOL

PART NUMBER: 087.170.391.000.000

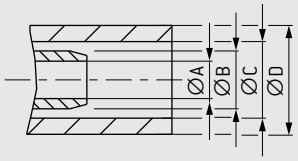
For an overview of all tools please see from page 117.

[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 127.

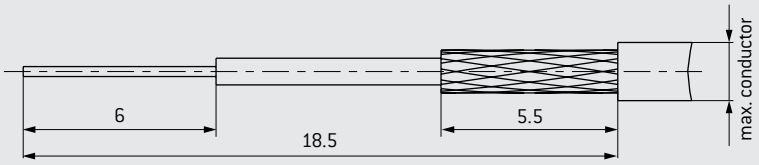
INSULATOR FOR PIN AND SOCKET



CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 2 contacts	Part number
Insulator	611.155.102.923.000
Dummy contact	021.341.179.923.000

Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable[1]	A	B	C	D	Part number crimp inserts
Pin contact	122.126.001.270.000	50	0.3	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Pin contact	122.126.003.270.000		2.0	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.126.013.270.000		2.8	RG 223 / RG 142	3.15	4.5	5.9	6.75	082.000.039.108.000
Pin contact	122.126.007.270.000		2.6	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
Socket contact	122.126.002.270.000	50	0.3	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Socket contact	122.126.004.270.000		2.0	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Socket contact	122.126.014.270.000		2.8	RG 223 / RG 142	3.15	4.5	5.9	6.75	082.000.039.108.000
Socket contact	122.126.008.270.000		2.6	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
Crimping tool for shielding sleeve	080.000.039.000.000								

[1] Special lines on request.

MODULE 10 CONTACTS FOR 50 Ω COMMON SHIELD

COAX

Mating cycles: ≥ 40,000
Frequency range[1]: 0–1.3 GHz

TECHNICAL NOTES

- Crimp information see page 111.

TECHNICAL DATA

Frequency range[1]	0–1.3 GHz
Insulation resistance	> 500 GΩ

Voltage information acc. to MIL[2]

Rated voltage	175 V
Test voltage	525 V

Mechanical data

Mating force (average)	8.4 N / Module
Demating force (average)	8.4 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 40,000

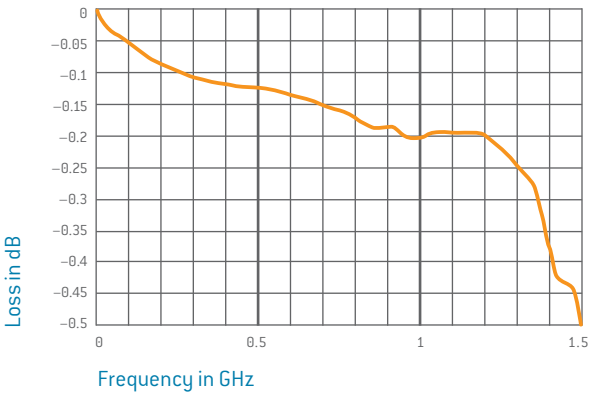
Materials

Carrier	CuZn alloy
Carrier finish	NiP
Contact	CuSn alloy
Contact finish	Au over NiP

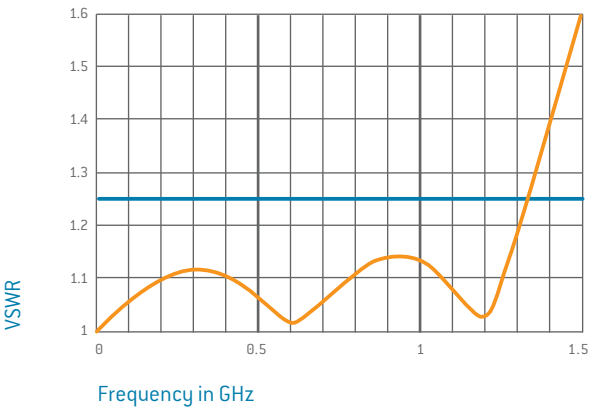
Contacts are press-fit into insulation body during manufacturing, so they cannot be removed.
Connector assembly instructions available on request.
Number 010.010.000.000.092

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss

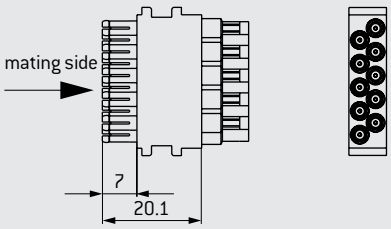


Voltage standing-wave ratio VSWR

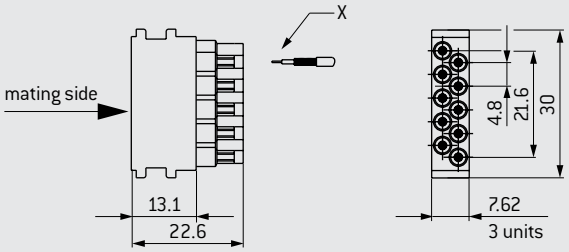


[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 127.

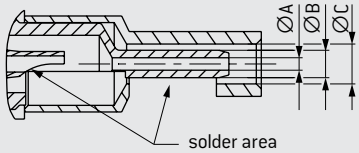
INSULATOR FOR PIN



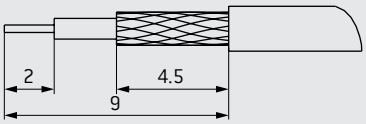
INSULATOR FOR SOCKET



CABLE TERMINATION / DETAIL X



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable	A	B	C
Socket configuration	610.168.010.270.000	50	–	Micro Coax	0.5	1.1	1.6
Pin configuration	611.168.010.270.000		–				
Socket configuration	610.168.010.270.001		1.3	RG 178 / RG 196	1.1	1.7	2.25
Pin configuration	611.168.010.270.001		1.3				

MODULE 8 CONTACTS FOR 50 Ω COMMON SHIELD

COAX

Mating cycles: ≥ 40,000
Frequency range[1]: 0–1.3 GHz

TECHNICAL NOTES

- Crimp information see page 111.

TECHNICAL DATA

Frequency range[1]	0–1.3 GHz
Insulation resistance	> 500 GΩ

Voltage information acc. to MIL[2]

Rated voltage	175 V
Test voltage	525 V

Mechanical data

Mating force (average)	6.7 N / Module
Demating force (average)	6.7 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 40,000

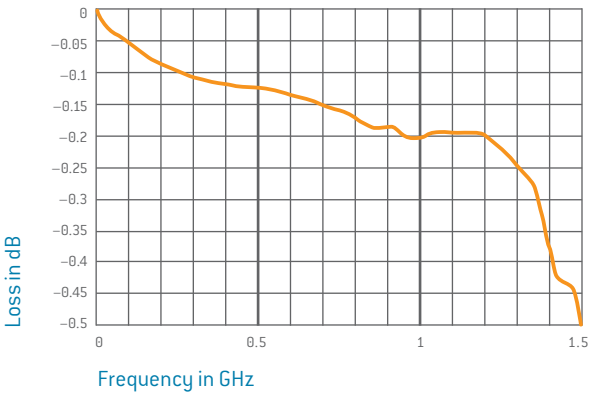
Materials

Carrier	CuZn alloy
Carrier finish	NiP
Contact	CuSn alloy
Contact finish	Au over NiP

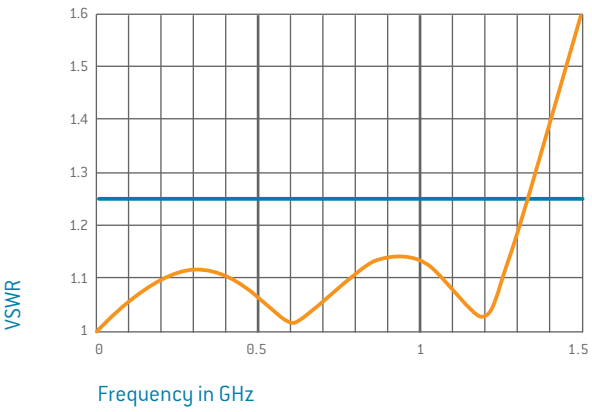
Contacts are press-fit into insulation body during manufacturing, so they cannot be removed.
Connector assembly instructions available on request.
Number 010.010.000.000.092

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss

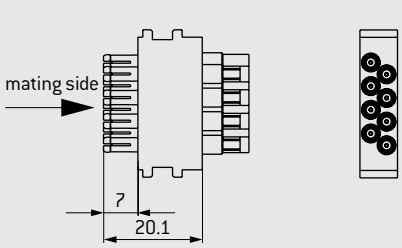


Voltage standing-wave ratio VSWR

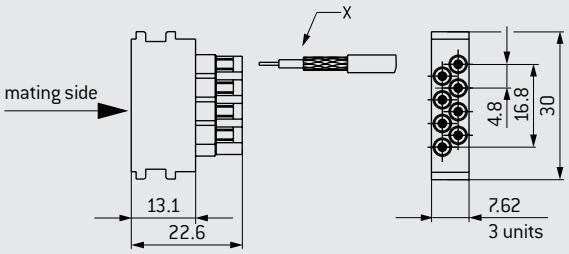


[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 127.

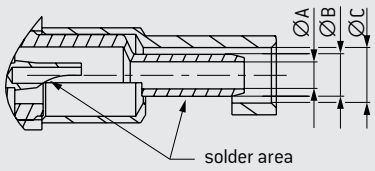
INSULATOR FOR PIN



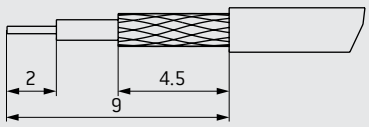
INSULATOR FOR SOCKET



CABLE TERMINATION / DETAIL X



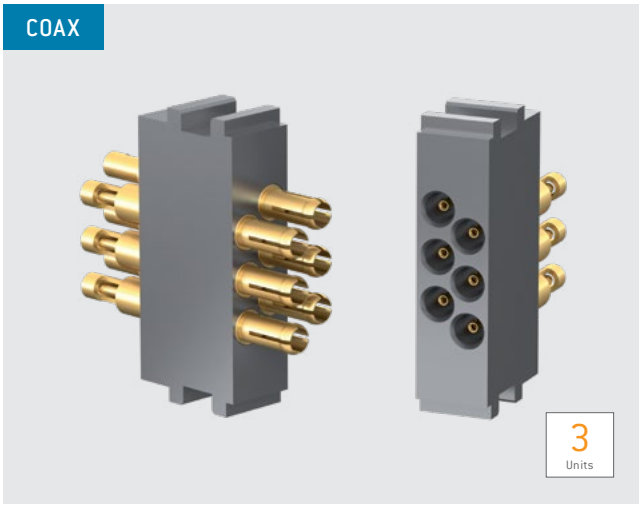
RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable	A	B	C
Socket configuration	610.168.008.270.001	50	1.3	RG 178 / RG 196	1.1	1.7	2.25
Pin configuration	611.168.008.270.001		1.3				

MODULE 6 CONTACTS FOR 50 Ω COMMON SHIELD

COAX



Mating cycles: ≥ 40,000
Frequency range[1]: 0–1.3 GHz

TECHNICAL NOTES

- Crimp information see page 111.

TECHNICAL DATA

Frequency range[1]	0–1.3 GHz
Insulation resistance	> 500 GΩ

Voltage information acc. to MIL[2]

Rated voltage	175 V
Test voltage	525 V

Mechanical data

Mating force (average)	5.1 N / Module
Demating force (average)	5.1 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 40,000

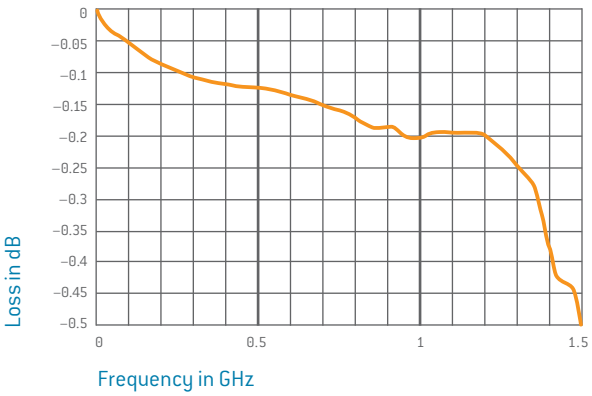
Materials

Carrier	CuZn alloy
Carrier finish	NiP
Contact	CuSn alloy
Contact finish	Au over NiP

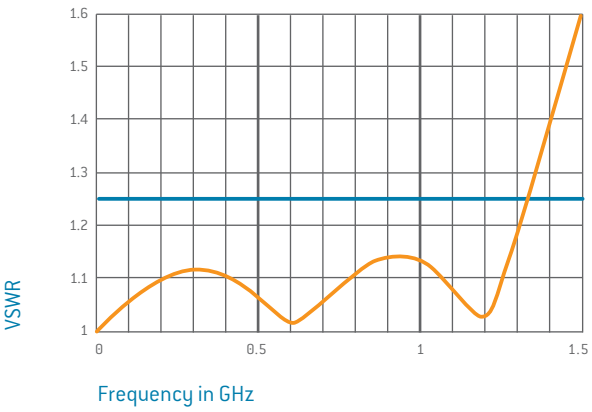
Contacts are press-fit into insulation body during manufacturing, so they cannot be removed.
Connector assembly instructions available on request.
Number 010.010.000.000.092

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss

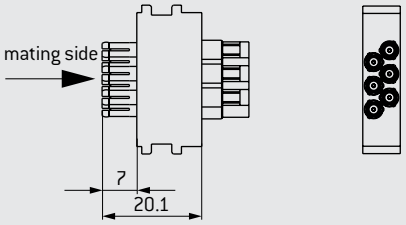


Voltage standing-wave ratio VSWR

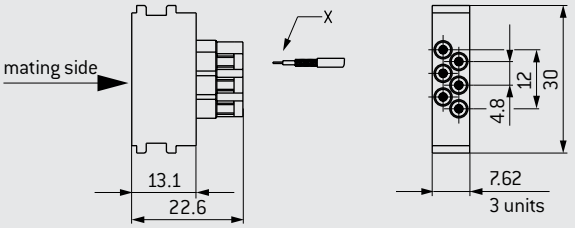


[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 127.

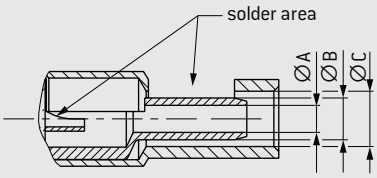
INSULATOR FOR PIN



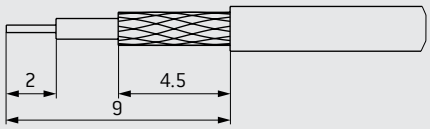
INSULATOR FOR SOCKET



CABLE TERMINATION / DETAIL X



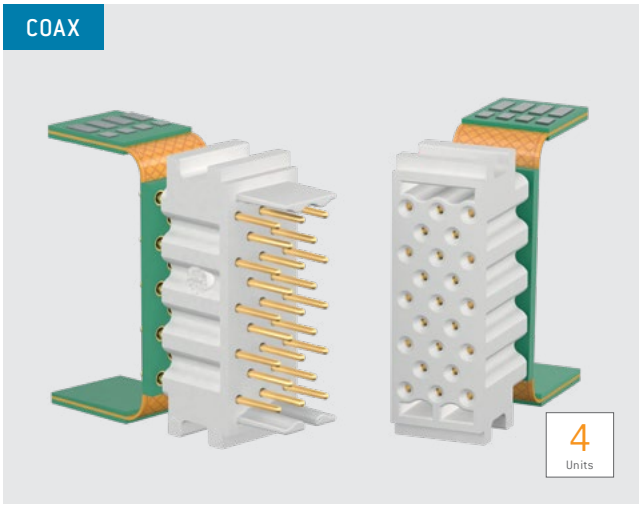
RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable	A	B	C
Socket configuration	610.168.006.270.000	50	–	Micro Coax	0.5	1.1	1.6
Pin configuration	611.168.006.270.000		–				
Socket configuration	610.168.006.270.001		1.3	RG 178 / RG 196	1.1	1.7	2.25
Pin configuration	611.168.006.270.001		1.3				
Socket configuration	610.168.006.270.002		0.8	RG 316	1.75	2.7	3.2
Pin configuration	611.168.006.270.002		0.8				

8 CHANNEL MODULE (COAX OPTION) 50 Ω

COAX



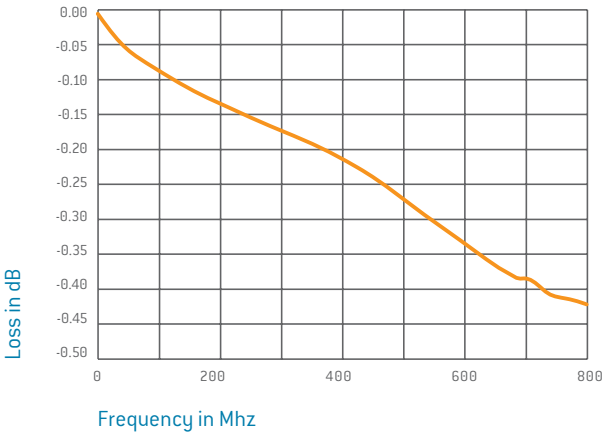
Mating cycles: ≥ 100,000
Frequency range[1]: 0–490 MHz

TECHNICAL DATA

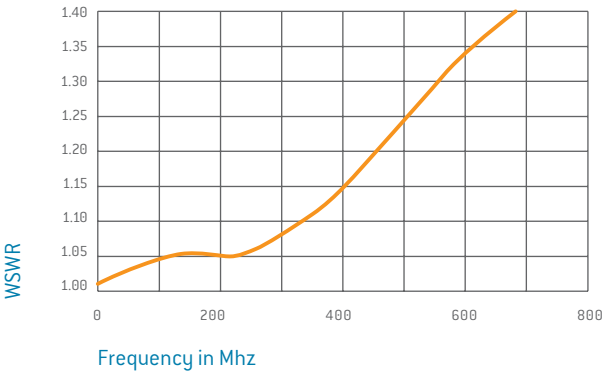
Frequency range[1]	0–490 MHz	
Insulation resistance	> 0.5 GΩ	
Voltage information[2]		
Operating voltage	160 V	32 V
Rated impulse voltage	2,000 V	2,000 V
Degree of pollution	2	3
Voltage information acc. MIL[3]		
Rated voltage	475 V	
Test voltage	1,425 V	
Mechanical data		
Mating force (average)	29.9 N / Module	
Demating force (average)	20.7 N / Module	
Contact diameter	0.76 mm	
Operating temperature	–40 °C to +100 °C	
Mating cycles	≥ 100,000	
Materials		
Insulator	LCP	
Contact body	Cu alloy	
Contact spring	CuBe alloy	
Contact	Au over NiP	

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss

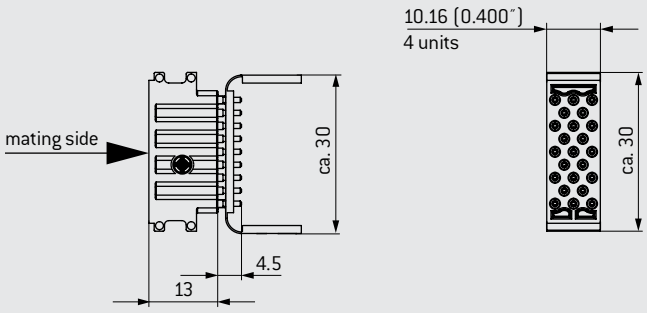


Voltage standing-wave ratio VSWR

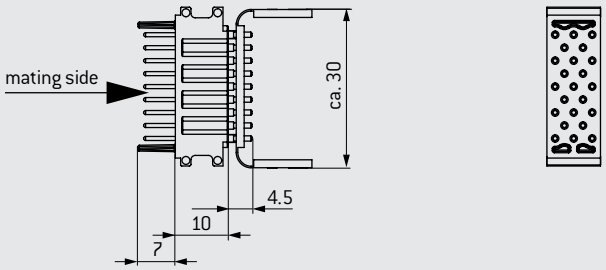


[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length.
[2] IEC 60664-1:2007 (VDE 0110-1: 2008) see page 123
[3] See from page 127

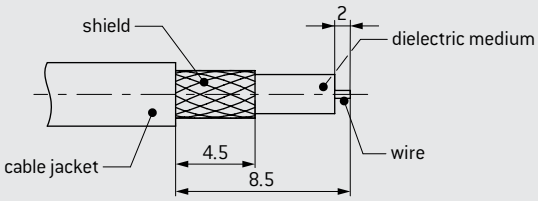
INSULATOR FOR SOCKET



INSULATOR FOR PIN

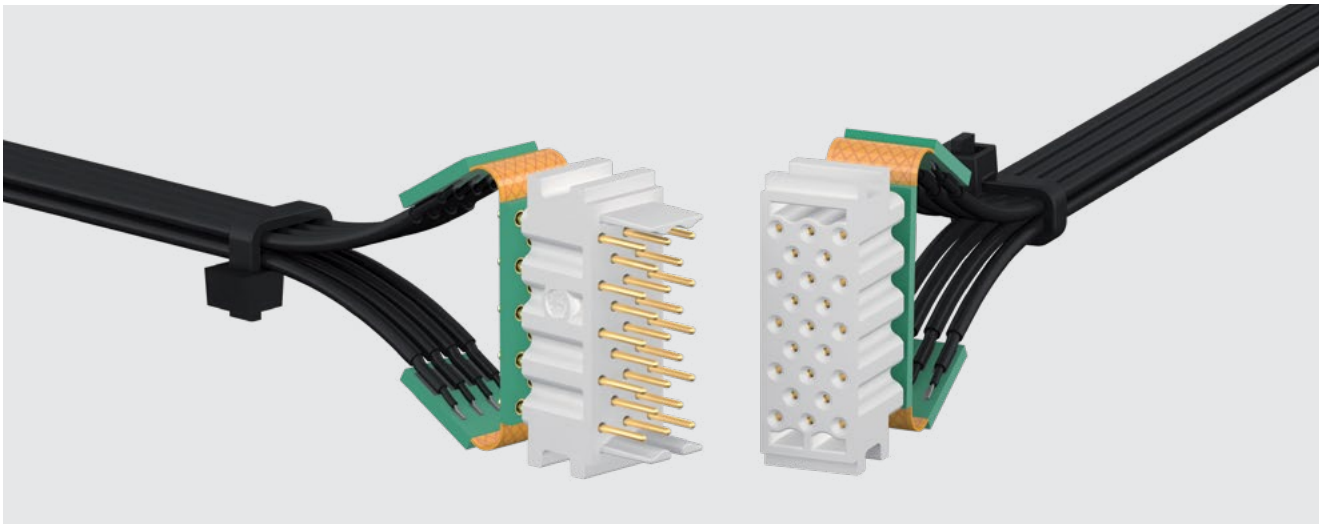


RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Inner conductor and outer conductor soldered

Description	Part number	Characteristic impedance Ω	Frequency range MHz	Cable
8-position pin insulator with contacts and PCB terminated	611.175.008.935.000	50	490	Micro-coax, recommend RG 178
8-position socket insulator with contacts and PCB terminated	610.175.008.935.000	50	490	Micro-coax, recommend RG 178



MINI-COAX CONTACT 50 Ω

The Mini-Coax Contact is designed to be implemented into custom insulation body solutions, where there low cycle requirements, but high contact density and small space requirements.

COAX

Mating cycles: ≥ 5,000
Frequency range[1]: 0–1.7 GHz

TECHNICAL DATA

Frequency range[1]	0–1.7 GHz
Insulation resistance	> 100 GΩ

Voltage information

Rated voltage	250 V
Rated test voltage	750 V

Mechanical data

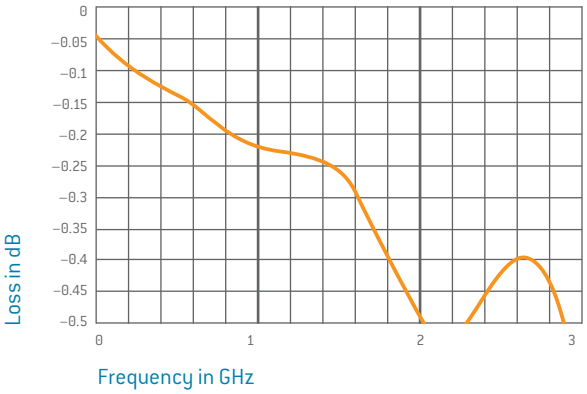
Total Mating force (average)	1.6 N / Contact
Total sliding force (average)	1.4 N / Contact
Operating temperature	–40 °C to +125 °C
Mating cycles	≥ 5,000

Materials

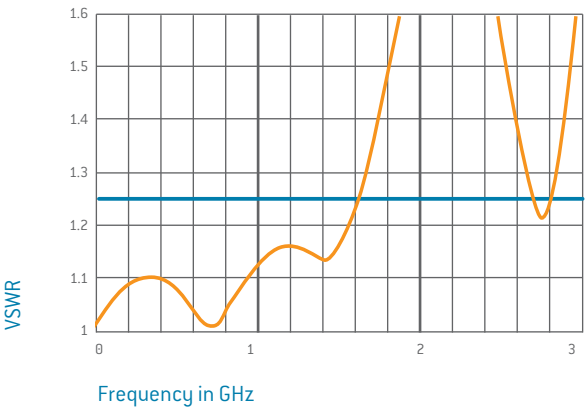
Contact	CuSn alloy
Contact finish	Au over NiP

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

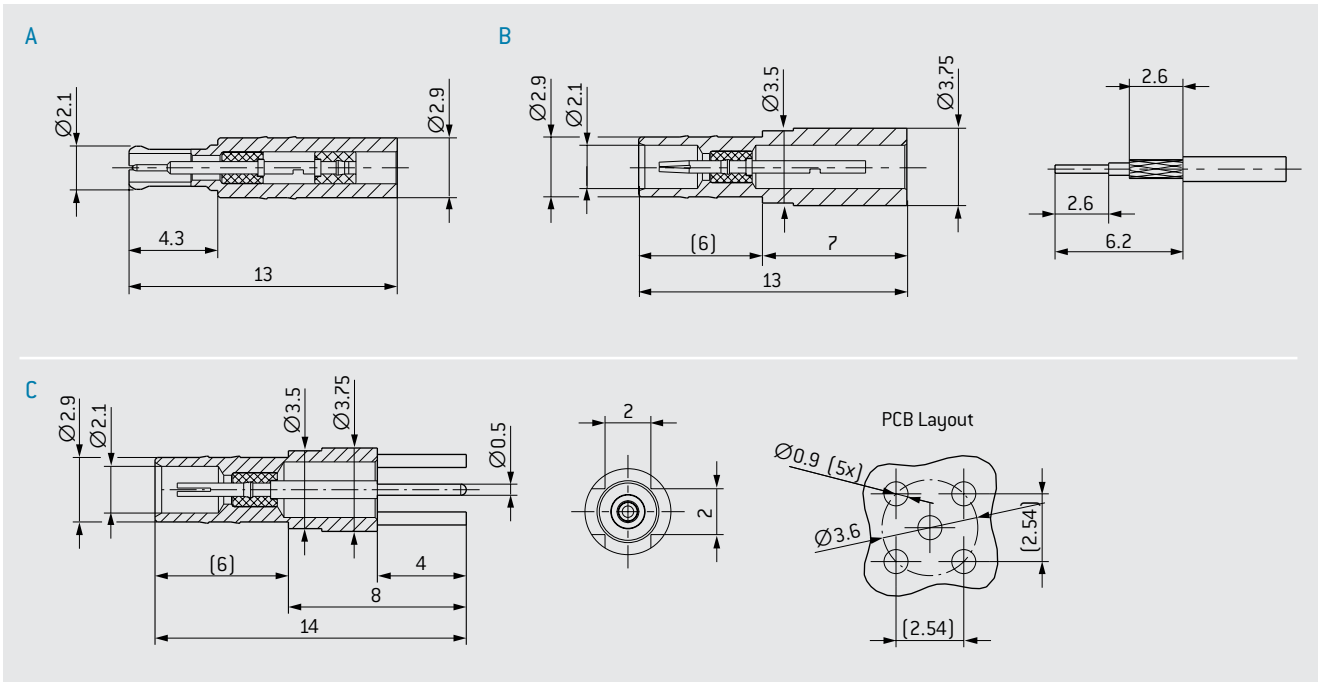
Insertion loss



Voltage standing-wave ratio VSWR



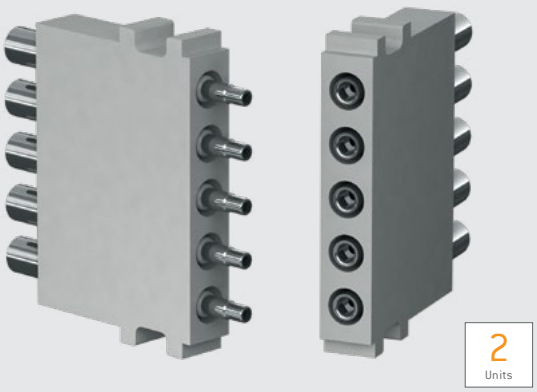
[1] Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 × 5 cm conductor length. [2] See from page 127.



Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable
Pin contact to cable (A)	122.141.013.270.000	50	1.7	RG178, RG 196
Socket contact to cable (B)	122.141.014.270.000	50	1.7	RG178, RG 196
Pin contact to cable (A)	122.141.013.270.000	50	1.55	Micro-coax
Socket contact to cable (B)	122.141.014.270.000	50	1.55	Micro-coax
Socket contact to PCB (C)	122.142.002.270.000	50	–	–
mounting fixture	085.122.141.000.010	–	–	–

MODULE 5 CONTACTS FOR PLASTIC FIBER POF

FIBER OPTIC



REMOVAL TOOL II

Removal from front, cutting-off not necessary.

PART NUMBER: 087.611.001.002.000

For an overview of all tools please see from page 117.

Ferrule
Mating cycles: ≥ 40,000
Non-magnetic on request

TECHNICAL NOTES

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

TECHNICAL DATA

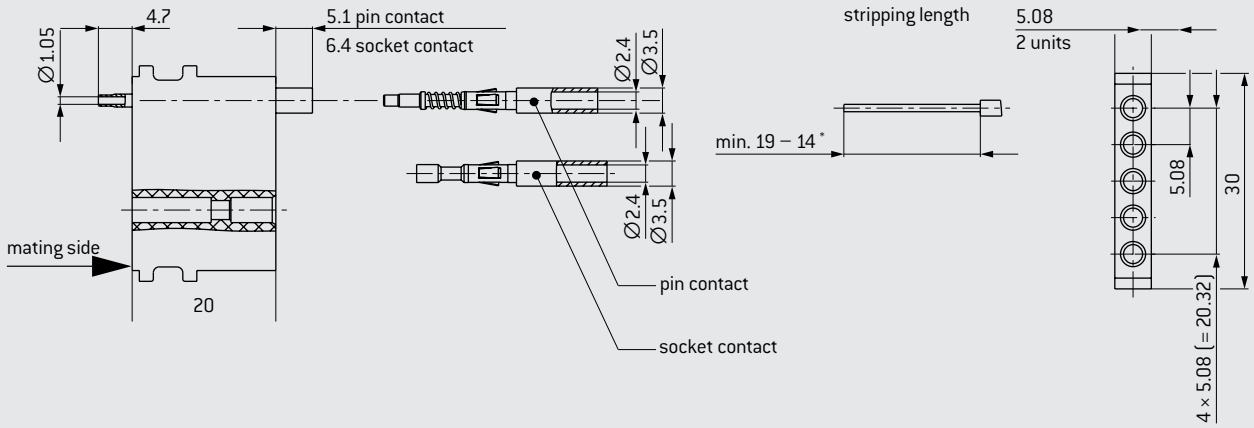
Mechanical data

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

Materials

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

INSULATOR PIN AND SOCKET



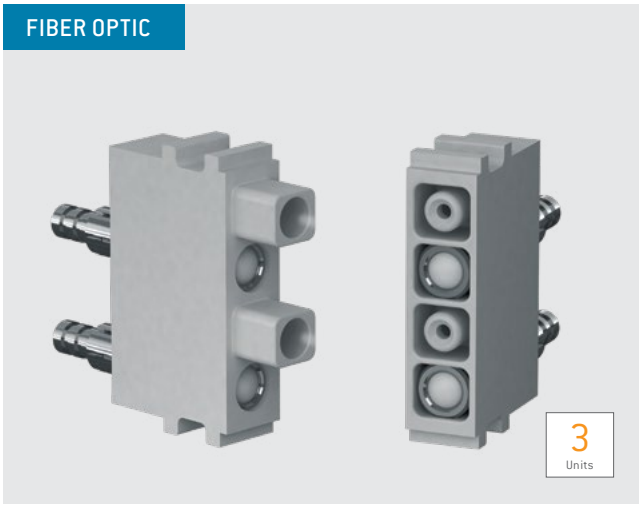
* min. 19 pin contact – min. 14 socket contact

Module 5 contacts	Part number
Insulator	611.163.105.923.000

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

MODULE 2 CONTACTS FOR PLASTIC OPTICAL FIBER (POF)

FIBER OPTIC



Lense with HFBR-Ferrule
Mating cycles: infinite

TECHNICAL DATA

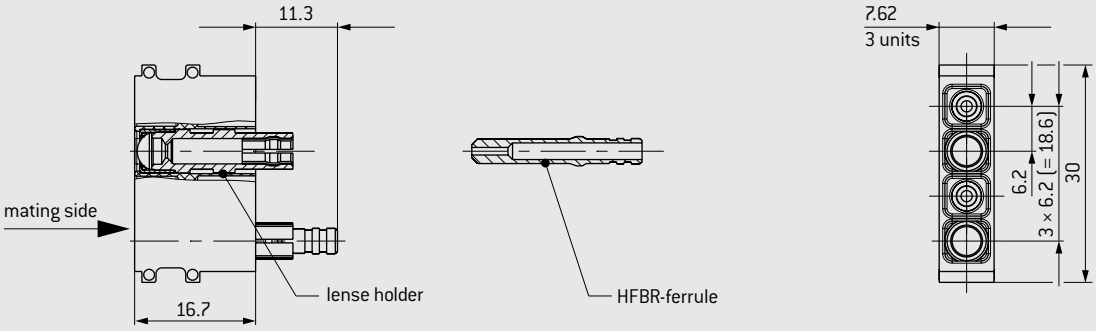
Mechanical data

POF (Polymer Optical Fiber)	1 mm
Outer diameter	2.2 mm–2.3 mm
Fiber fastening	Crimp
Attenuation	< 4 dB with with polished fiber
Beam expansion	> 3 mm
Insertion loss	
Typical	1.5 dB at 670 nm
During life-time	< 2 dB at 670 nm
Total mating force (average)	< 0 N
Operating temperature (depending on fiber)	
Standard fiber	–40 °C to +85 °C
High temperature fiber	–40 °C to +115 °C
Mating cycles	Infinite

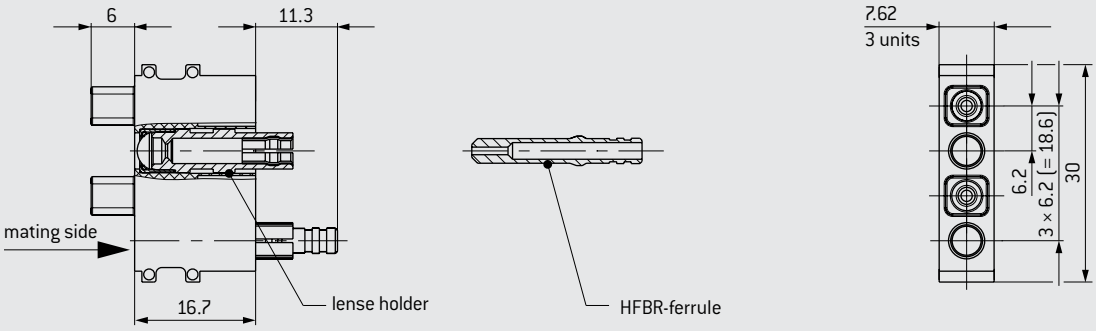
Materials

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Fiber optic contact	Cu alloy
Type of fiber	Plastic fiber 980/1,000 (POF)

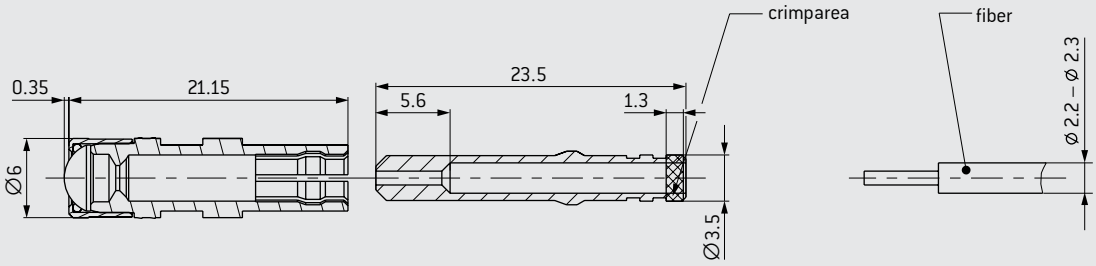
INSULATOR SOCKET



INSULATOR PIN



FIBER OPTIC CONTACT INCL. LENS AND HFBR-FERRULE

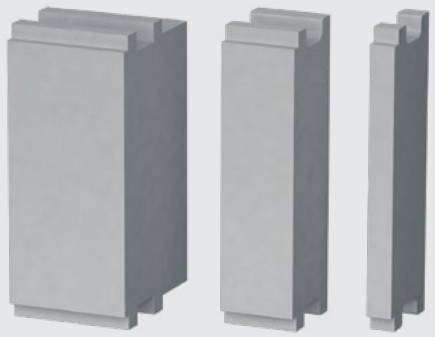


Description	Part number
2-Position pin side insulator with contacts	611.174.102.923.000
2-Position socket side insulator with contacts	610.174.102.923.000
Assembling set for fiber optic (consists of:)	080.000.052.000.000
Cutting tool	080.000.052.100.000
Reserve cutter	080.000.052.101.000
Crimp tool	080.000.052.200.000
Removal tool (ferrule)	087.656.509.010.000
POF-polisher	598.503.003.001.000

Table of Contents

BLANK MODULES

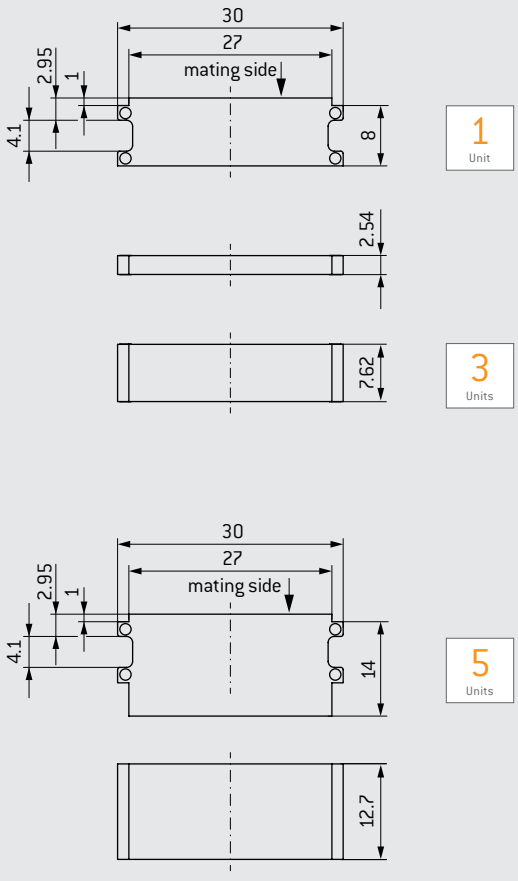
BLANK MODULES



These blank modules are used to fill in spaces not occupied by contact modules. It is important to completely fill each frame with the maximum allowable modules to prevent sliding of the modules and ensure proper mating.

TECHNICAL DATA

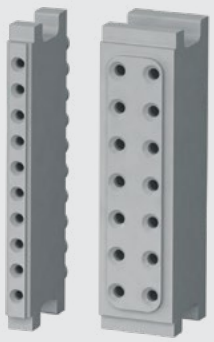
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94



Units	Part number
1	611.122.113.923.000
3	611.130.113.923.000
5	611.128.113.923.000

SPACER MODULES

SPACER MODULES



Cannot be equipped with contacts. Spacer modules are found on the same page as their respective contact module counterparts (e.g. the 14-pos spacer module is found on the same page as the 14-pos contact module).

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

TECHNICAL DATA

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94

CODING MODULES

CODING MODULES

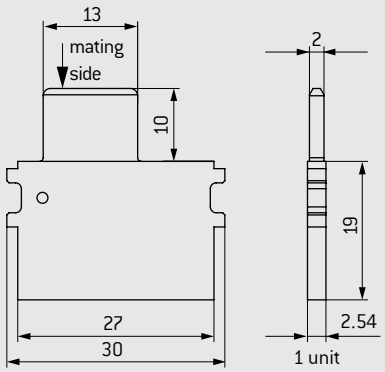
1
Unit

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

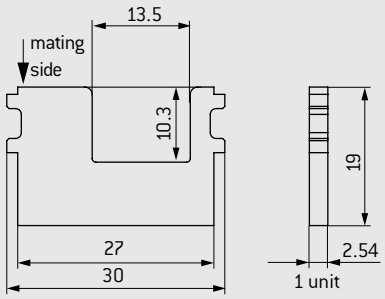
TECHNICAL DATA

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94

PIN



SOCKET



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

PIN PROTECTION MODULES

PIN PROTECTION MODULES

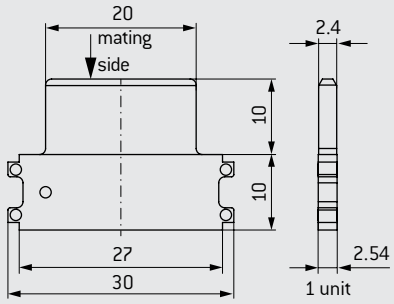
1
Unit

Pin protection modules help shield smaller pin sizes, such as the 0.76 mm and the 1.02 mm diameter pins, from collision. These small plastic inserts in the frame alongside contact modules and act as a wall that extends past the pins.

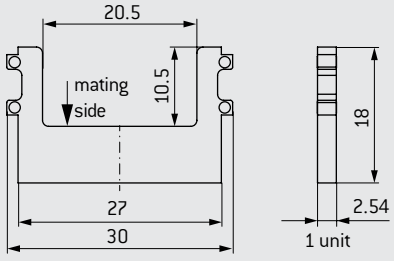
TECHNICAL DATA

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94

PIN

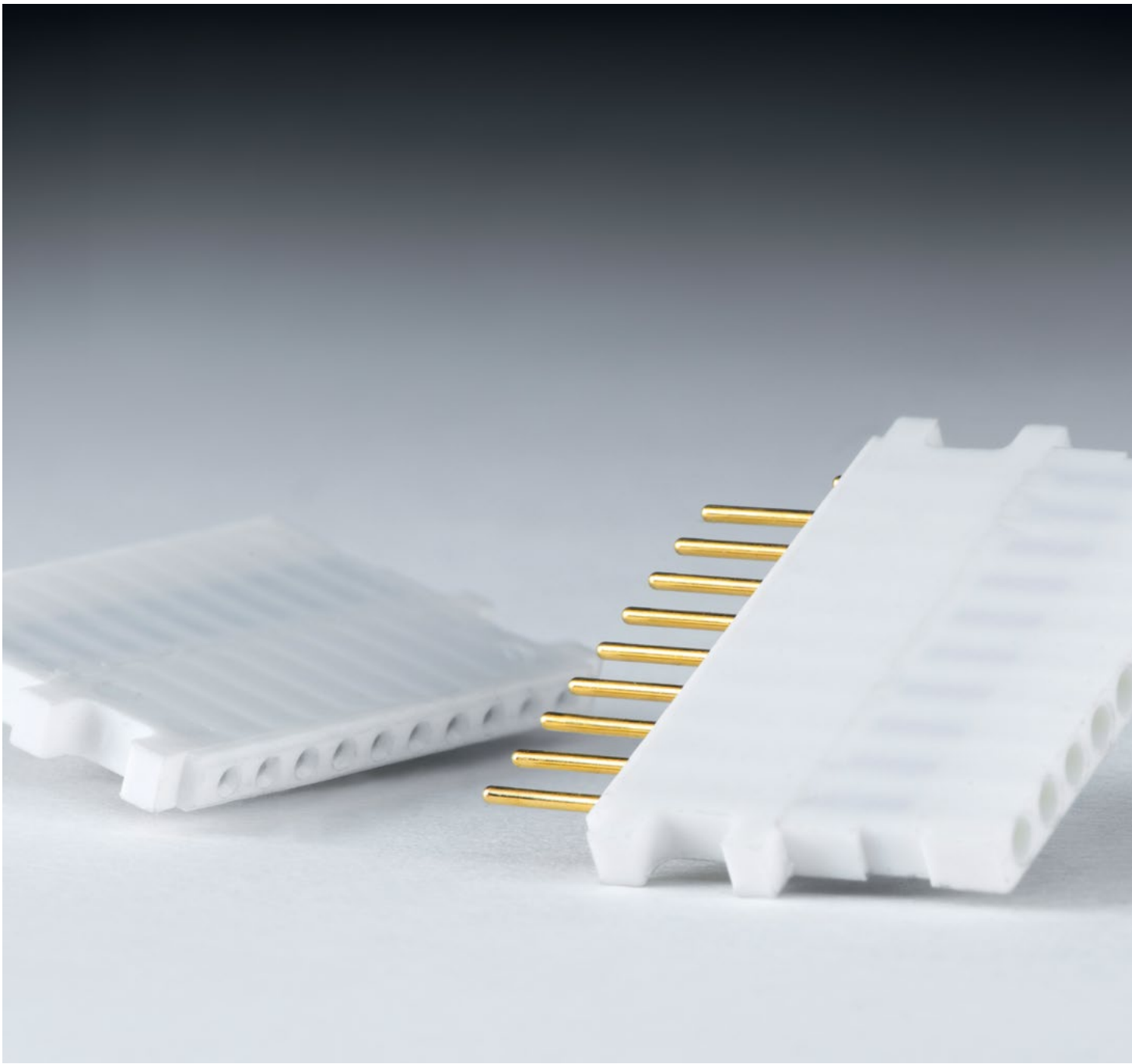


SOCKET



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

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



ODU-MAC®

Table of Contents

TOOLS

TERMINATION TECHNOLOGY

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

- Crimp
- Solder
- PCB

CRIMP TERMINATION

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

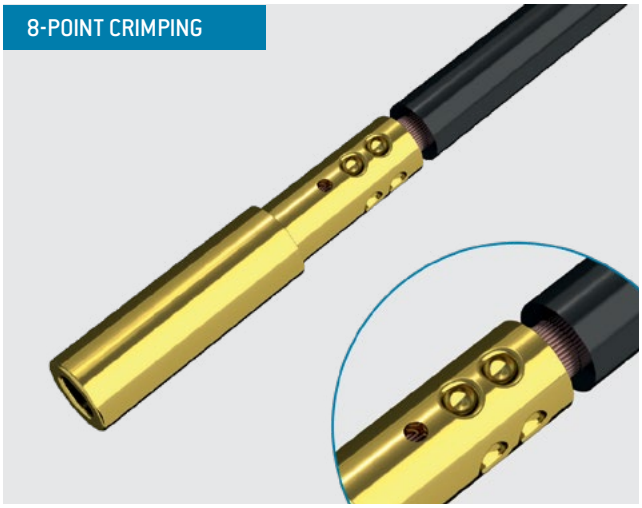
Through crimping, the conductor and contact materials in the compressed areas become so dense as to create a connection which is nearly gas-tight, and with a tensile strength befitting the conductor material.

Crimping can be carried out on the tiniest of diameters as well as in larger diameters. For small diameters (0.8 – 2.5 mm²), eight-point crimp tools are used; six-point crimp tools are used for larger dimensions. The corner measurement of the crimping is never larger than the original diameter. The cable insulation is not damaged in the process and can be directly attached to the connector end.

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

HEXAGONAL CRIMPING

8-POINT CRIMPING



CRIMPING TOOLS

For further crimp information please refer to the table on page 114.
All tools are magnetic, by default.

8-POINT CRIMPING TOOL FOR CONDUCTOR CONNECTIONS FROM 0.08 TO 1.0 mm²

With user-friendly digital display.
PART NUMBER: 080.000.051.000.000

POSITIONER FOR CONTACT DIAMETER FROM 0.76 TO 3 mm
PART NUMBER: 080.000.051.101.000
Has to be ordered separately.

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

With user-friendly digital display.
PART NUMBER: 080.000.057.000.000

POSITIONER FOR CONTACT DIAMETER FROM 1.5 TO 3 mm
PART NUMBER: 080.000.057.101.000
Has to be ordered separately.

HEXAGONAL CRIMPING TOOL FOR CROSS-SECTIONS (AWG 12), 4 TO 6.0 mm²

With blocking system.
PART NUMBER: 080.000.062.000.000

MECHANICAL HEXAGONAL HAND CRIMPING TOOL FROM 10 TO 50 mm²

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

CRIMPING JAWS FOR CONTACT DIAMETER
FROM 5 TO 12 mm SEE PAGE 115
Has to be ordered separately.

CRIMPING TOOLS

For further crimp information please refer to the table on page 114.
All tools are magnetic, by default.

HEXAGONAL CRIMPING TOOL FOR COAX CONTACTS

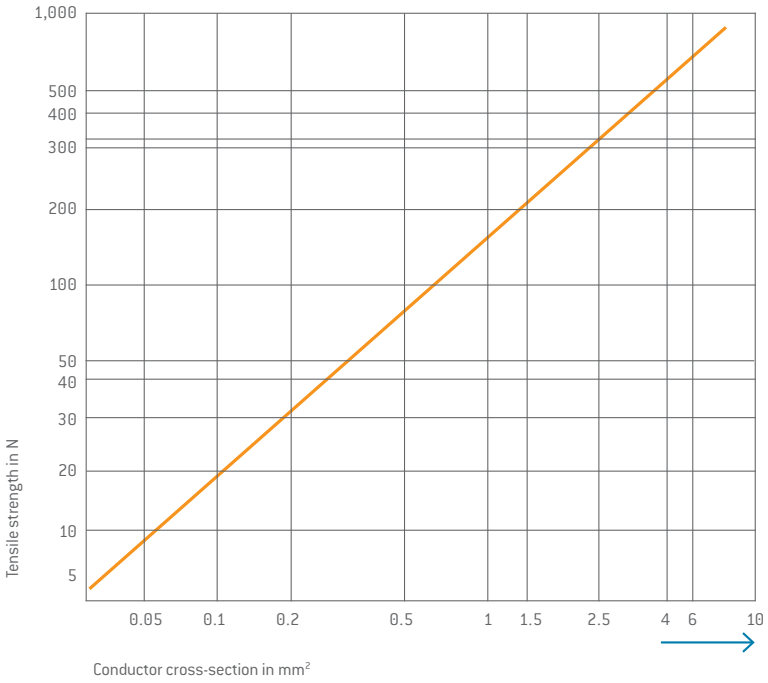
With blocking system.
PART NUMBER PLIER: 080.000.039.000.000

CRIMPING JAWS PLEASE SEE PAGE 114
Has to be ordered separately.

CRIMP CONNECTIONS

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

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



NOTE

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

TESTING ELECTRICAL CONTINUITY FOLLOWING ASSEMBLY / TESTING OF WIRING:

One of the most important functional features is the observance of the specified mating and sliding forces. All socket contacts in fully automatic systems supplied by ODU are therefore tested for 100 % observance of these values in the context of process monitoring. This takes place with the correctly chosen testing systems without damage to the socket. However, ODU points out that incorrectly chosen test systems (e.g. test pin)

CRIMP INFORMATION

Contact diameter	Termination cross-section[1]		Stripping length	8-pt-crimping tool 080.000.051.000.000 without positioner	8-pt-crimping tool 080.000.057.000.000 without positioner	Crimping tool for coax 080.000.039.000.000	Hexagonal crimping tool 080.000.062.000.000
				Positioner 080.000.051.101.000	Positioner 080.000.057.101.000		
mm	AWG	mm²	mm	position / adjustment dim.	position / adjustment dim.	Crimping jaws	
0.76	24–28	0.25–0.08	4+0.5	1/0.67			
1.02				2/0.67			
1.5				3/0.67			
0.7	26–28		3+0.5				
0.7	22–24						
0.76	22	0.38	4+0.5	1/0.67			
1.02	20–22	0.5–0.38	5+0.5	2/0.92			
1.5				3/0.92			
2.41				4/0.92			
3				5/0.92			
1.5	18	1–0.75	5+0.5	3/1.12			
2.41				4/1.12			
3				5/1.12			
1.5	16		5+0.5	3/1.42	10/1.42²		
1.5		1.5	5+0.5	3/1.32	10/1.42²		
2.41				4/1.32	9/1.42²		
3				5/1.32	6/1.42²		
1.5	14		5+0.5	3/1.42	10/1.42²		
2.41				4/1.42	9/1.42²		
3				5/1.42	6/1.42²		
2.41		2.5	6+0.5		9/1.67²		
3					6/1.67²		
2.41	12(7–20)		6+0.5		9/2.12²		Profile no. 2
2.41	12(19–26)		6+0.5		9/1.92²		Profile no. 2
3		4	6+0.5		6/2.12²		Profile no. 3
5							
3	10	6	7+0.5		8/2.22²		Profile no. 3
5		10	10+0.5				
5		16	10+0.5				
8		16	10+0.5				
8		25	18+0.5				
10							
12							
10		35	18+0.5				
12							
12		50	18+0.5				
RG 178 / RG 196			(9 / 4.5 / 18.5) See module description			082.000.039.101.000	
RG 174 / RG 188 / RG 316 / RG 179 / RG 187						082.000.039.102.000	
G 02232 D (RG174D)						082.000.039.103.000	
RG 58 / G 03233 (H&S)						082.000.039.106.000	
RG 223						082.000.039.108.000	
RG 59						082.000.039.109.000	

Table of Contents

CRIMP INFORMATION

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

[1] The listed cross section correspond to a finely stranded conductor design according to IEC 60228:2005 (VDE 0295:2005) class 5 or a finely stranded conductor design (7- / 19-stranded) according to AWG ASTM B258:2018. [2] Recommended by ODU as a standard tool and setting.

ASSEMBLY AIDS

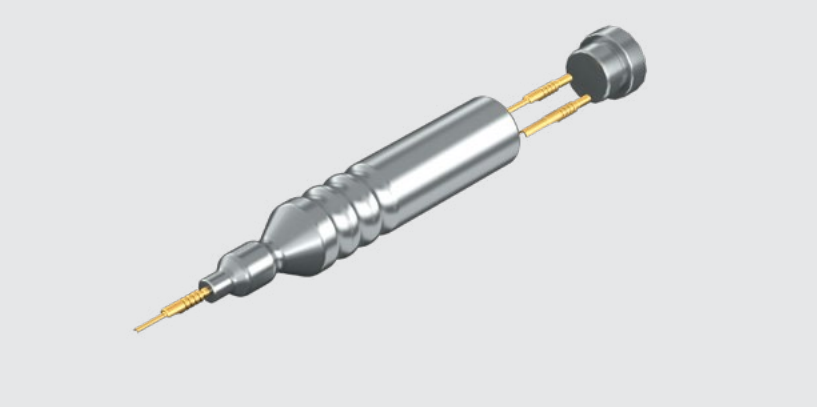
All tools are magnetic, by default.

Description	For use in	Part number	Nm	Recommended tightening torque
Torque wrench With cross handle. fixed. automatic release (for inner hexagonal bits with C6.3- or E6.3-shaft). Bit has to be ordered separately.		598.054.001.000.000	0.9	
		598.054.002.000.000	1.2	
		598.054.003.000.000	3	
		598.054.004.000.000	1.5	
		598.054.005.000.000	0.6	
		598.054.006.000.000	2.2	
		598.054.007.000.000	4.2	
Bit slot 3.5 (0.5 – 50)	Screwing of the rails in the T frame	598.054.108.000.000		0.9 Nm +/– 0.2 Nm
Bit slot 5.5 (0.8 – 50)	Mounting screw on frames in a housing	598.054.101.000.000		0.6 Nm +/– 0.1 Nm
Bit Phillips cross slot size 1	Grounding screw on frames in a housing and M+ frame	598.054.106.000.000		1.2 Nm +/– 0.2 Nm
Bit Phillips cross slot size 1	Grounding plug socket for P+ frame[1]	598.054.106.000.000		1.5 Nm +/– 0.2 Nm
Bit Phillips cross slot size 1	Grounding pin for P+ frame[2]	598.054.106.000.000		3.0 Nm +/– 0.3 Nm
SW 8	Mounting of grounding socket P+ frame	598.054.111.000.000		2.2 Nm +/– 0.3 Nm
SW 8	Mounting of grounding pin P+ frame	598.054.111.000.000		4.2 Nm +/– 0.5 Nm
Bit slot 3.5 (0.5 – 50)	Rails on frames in a housing	598.054.108.000.000		0.9 Nm +/– 0.2 Nm
Bit slot 5.5 (0.8 – 50)	Screwing of the rails in the S, M+ frame and replacement spindle	598.054.101.000.000		0.9 Nm +/– 0.2 Nm
Bit Torx TX 10	Mounting of ODU-MAC® ZERO housing	598.054.104.000.000		0.6 Nm +/– 0.1 Nm
Bit Torx TX 20	Screwing of the rails in the P+ frame	598.054.105.000.000		1.5 Nm +/– 0.2 Nm
Distance spacer / QCH	S frame for quick change head and rear mounting panel	598.054.204.000.000		1.2 Nm +/– 0.2 Nm

[1] Grounding screw for P+ socket frame. [2] Grounding screw for P+ pin frame.

ASSEMBLY AIDS

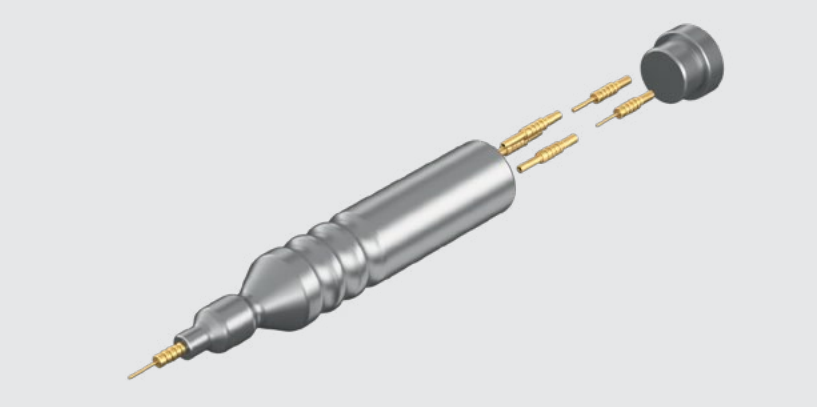
All tools are magnetic, by default.



INSERTION TOOL Ø 0.76–1.5 mm

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

PART NUMBER: 085.611.001.001.000



EXTRACTION TOOL Ø 0.76–1.5 mm

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

PART NUMBER: 087.611.005.001.000

Contact Ø	Assembly aid insertion tool	Assembly aid extraction tool
0.76	085.611.001.001.000	087.611.005.001.000
1.02	085.611.001.001.000	087.611.005.001.000
1.5	085 .611.001.001.000	087.611.005.001.000

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

REMOVAL OF CONTACTS

All tools are magnetic, by default.

REMOVAL TOOL I

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

REMOVAL TOOL II

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

REMOVAL IS ONLY POSSIBLE WITH ODU TOOLS.

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

[1] In use with high voltage module, 4 contacts, (see page 84) the angled version cannot be used.
[2] With cable (H+S) G02232 only removal tool I is usable.

SERVICE KIT FOR ODU SPRINGTAC® AND ODU LAMTAC® CONTACTS

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

ODU has put together a Service Kit for this purpose, so that lubrication can be carried out directly on site. A cleaning brush and a special cleaning cloth, as well as precise instructions, 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

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 repre- sents no impairment of the electrical properties.

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

ODU-MAC®

Table of Contents

TECHNICAL INFORMATION

INTERNATIONAL PROTECTION CLASSES

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

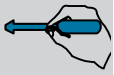
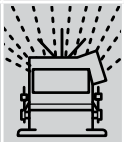
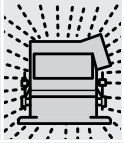
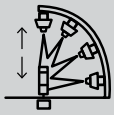
Code letters (International Protection)	First code number (Degrees of protection against access to hazardous parts respectively against solid foreign objects)			Second code number (Degrees of protection against water)			
IP	6			5			
Code number	Protection against access to hazardous parts / Protection 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 Ø ≥ 50 mm	1	Protection against dripping water		Protection against vertically falling waterdrops
2	Protection against medium-sized foreign objects		Protection against contact with the fingers / Protection against solid foreign objects Ø ≥ 12.5 mm	2	Protection against dripping water (tilted)		Protection against falling water-drops when tilted (any angle up to 15° from the vertical)
3	Protection against small foreign objects		Protection against contact with tools / Protection against solid foreign objects Ø ≥ 2.5 mm	3	Protection against spray water		Protection against spray water (any angle up to 60° from the vertical)
4	Protection against granular foreign objects		Protection against contact with a wire / Protection against solid foreign objects Ø ≥ 1.0 mm	4	Protection against splashing water		Protection against splashing water from all directions
5	Dustproof		Protection against contact with a wire / Protection against uncontrolled ingress of dust	5	Protection against water jet		Protection against water jet from all directions
6	Dustproof		Protection against contact with a wire / Complete protection against ingress of dust	6	Protection against power-ful water jet		Protection against powerful water jet from all directions
				7	Protection against the effects of temporary immersion in water		Protection against ingress of harmful quantities of water by temporary submersion into water
				8	Protection against the effects of continuous immersion in water		Protection against ingress of harmful quantities of water by continuous submersion into water
				9	Protection against high pressure and high water jet temperatures		Protection against water from all directions by high pressure and high temperatures

Table of Contents

EXPLANATIONS AND DETAILS OF SAFETY REQUIREMENTS, TESTS, AND VOLTAGE DATA

GENERAL

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

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

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

All of the voltage data listed in this catalog refers to the use of insulators, which have been installed according to assembly regulations 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).

The most important influence variables and the electrical parameters harmonized with these will be explained in more detail in the following. We would be happy to assist you with any further questions. The texts and tables given here are excerpts from the indicated standards. As a rule, product committees lay down application-specific safety requirements for various fields of use; these requirements also regulate the insulation coordination and inspection of connectors.

In such cases, the "product standards" take precedence and must be observed instead of the "basic safety standards" stated here. However, since this catalog and the technical data sheets cannot take all product standards into consideration, we have restricted ourselves to the following standard in terms of voltage data:

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

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

The permissible 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.
- If not noted otherwise, all voltage is in rms value.
- **Overvoltage category III** is used, along with the TT and TN system types, to dimension the rated impulse voltage.
- Condition A is always used for the inhomogeneous field when dimensioning the clearance distances used.
- The inspections prescribed for solid insulation and for clearance distances (if necessary) are conducted as alternating voltage inspections according to Table F.5.
- The clearance and creepage distances are determined on the bases specified in this standard.

OPERATING VOLTAGE / RATED VOLTAGE / NOMINAL VOLTAGE

The **max. operating voltage** (= rated voltage) is the value of a voltage that is specified by the manufacturer for a component, device, or item of equipment according to various applicable standards, and to which the operating and performance features relate. Some standards use the term "rated voltage" or "working voltage" instead of "operating voltage". In these explanations, the term "nominal voltage" is used for the value of the issued voltage indicated by the power supply company (PSC) or by the manufacturer of the voltage source for classification of the overvoltage category. Equipment may have more than one value or one range for rated voltage (see Table F.4 in IEC 60664-1:2007 (VDE 0110-1:2008)).

RATED IMPULSE VOLTAGE

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

Depending upon the indicated degree of pollution, the rated surge voltage depends upon the clearance distance between the individual contacts. The rated surge voltage may be influenced significantly by the usage of blank modules and varied positioning of the contacts in the insulators, (see table F.2 in IEC 60664-1:2007 (VDE 0110-1:2008)).

According to this standard, the minimum clearance distances for equipment not connected directly to the low voltage mains should be measured according to the possible permanent voltages, the temporary overvoltages, or periodic peak voltages (see Table F.7 in IEC 60664-1:2007 (VDE 0110-1:2008)).

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

DEGREE OF POLLUTION

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

In the case of a connector with a degree of protection of minimum IP54 IEC 60529:2013 (VDE 0470-1:2014), the insulating parts may be measured enclosed according to the standard for a low degree of pollution. This also applies for mated connectors for which enclosure is ensured by the connector housing and which are only disconnected for testing and maintenance purposes.

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

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

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

Degree of pollution 4
Permanent conductivity is present, caused by conductive dust, rain or moisture. For example, devices in the open air or outdoor facilities and construction machinery.
Operating voltage (VDE: Rated voltage): Value of a voltage that is specified by the manufacturer for a component, device or operating medium and relates to the operating and performance features.

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

CLEARANCE DISTANCE

The shortest distance in the air between two conductive parts.

CREEPAGE DISTANCE

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

TEST VOLTAGE

The dielectric strength of the connector is confirmed according to the standard corresponding to the indicated rated surge voltage by applying the test voltage according to table F.5 over a defined time range.

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

Rated impulse voltage û kV	Test impulse voltage at sea level û kV	Test impulse voltage at 200 m elevation û kV	Test impulse voltage at 500 m elevation û kV
0.33	0.357	0.355	0.350
0.5	0.541	0.537	0.531
0.8	0.934	0.920	0.899
1.5	1.751	1.725	1.685
2.5	2.920	2.874	2.808
4	4.923	4.874	4.675
6	7.385	7.236	7.013
8	9.847	9.648	9.350
12	14.770	14.471	14.025

CONVERSIONS / AWG (AMERICAN WIRE GAUGE)

Circular wire					
AWG	Diameter		Cross-section	Weight	Max. resistance
	Inch	mm	mm^2	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 cross-section of the wire changes by 26% from one gauge number to the next. The AWG numbers decrease as the wire diameter increases, while the AWG numbers increase as the wire diameter decreases. This only applies to solid wire.

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

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

Accordingly, strands with the same AWG number but different numbers of wires differ in cross-section. For instance, an AWG 20 strand of 7 AWG 28 wires has a cross-section of 0.563 mm^2, while an AWG 20 strand of 19 AWG 32 wires has a cross-section of 0.616 mm^2.

Source: ASTM

VOLTAGE DATA ACC. 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 voltage 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”.

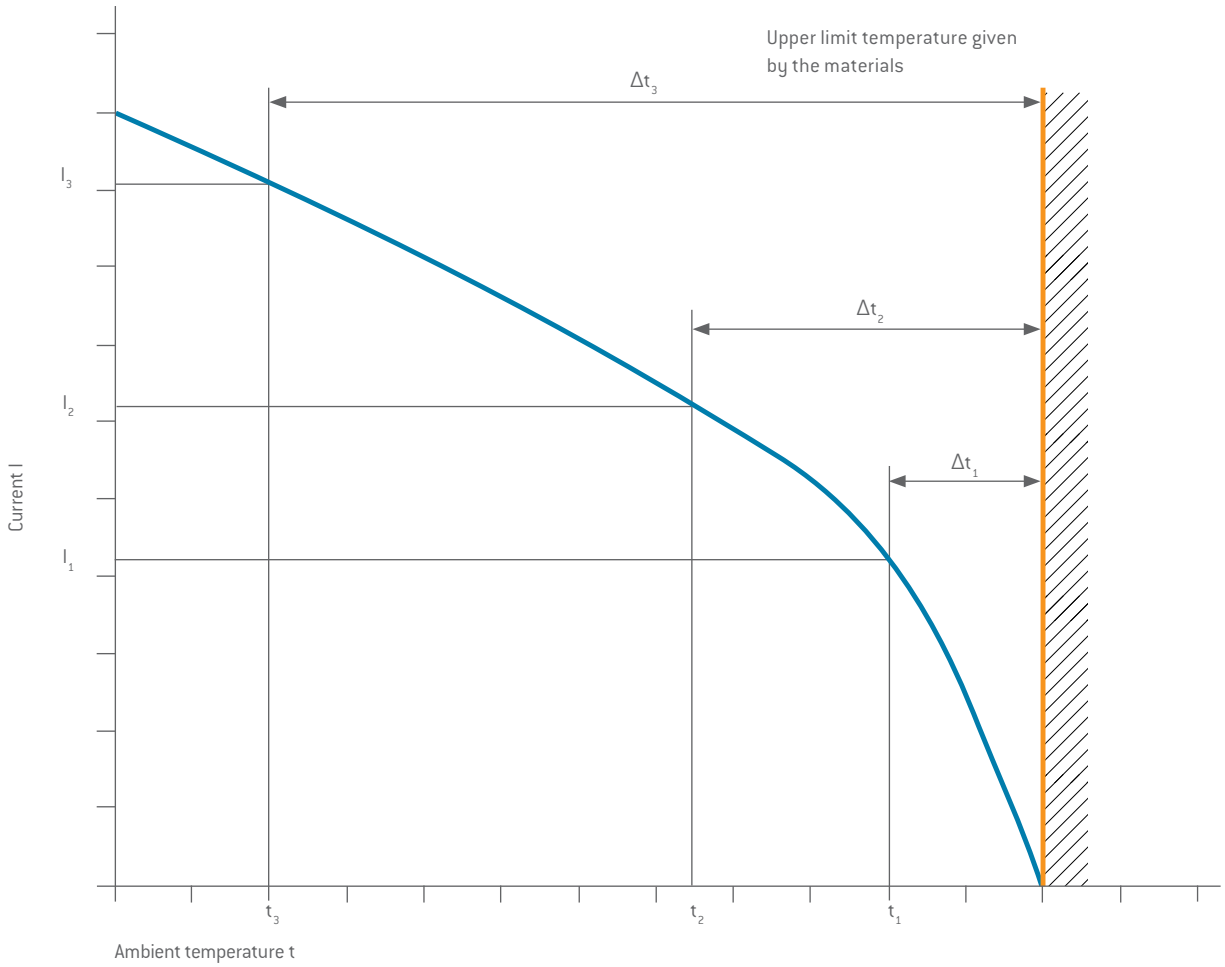
Test voltage: Dielectric withstanding voltage × 0.75
Operating voltage: Dielectric withstanding voltage × 0.75 × 0.33

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.

BASE FOR CURRENT-CARRYING CAPACITY

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

STRUCTURE OF THE BASE CURRENT-CARRYING CAPACITY CURVE



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

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

The relationship between current, the resulting temperature increase, conditioned by the dissipation loss at the contact resistance, and the ambient temperature is represented in a curve. The curve is plotted in a linear coordinate system with current "I" as Y-axis and temperature "t" as X-axis. The upper limiting temperature forms the limit of the diagram.

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

CURRENT LOAD

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

RATED CURRENT (NOMINAL CURRENT)

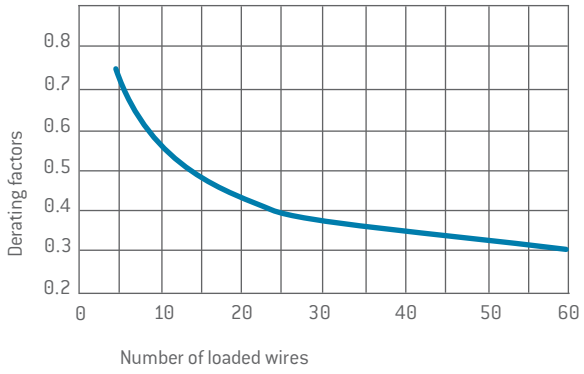
The metrologically determined current which is permitted to flow continuously through all contacts at the same time and will increase the contact temperature by 45 Kelvin. The amperage is determined according to the derating measurement method (DIN EN 60512-5-2:2003) and derived from the derating curve.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

MAX. CONTINUOUS CURRENT

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

DERATING FACTORS

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



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

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

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

NOTE

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

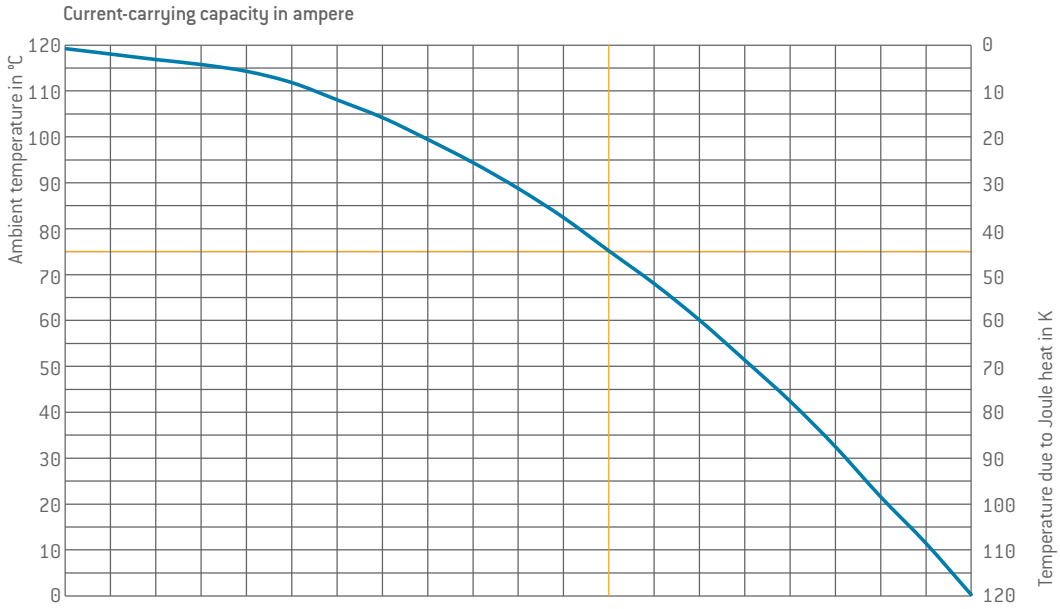
CURRENT-CARRYING CAPACITY DIAGRAM

FOR SINGLE CONTACTS

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

Upper limit temperature: +120 °C.

Termination with nominal cross-section.



Contact	Contact Ø	Termination cross-section mm²	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
ODU SPRINGTAC®	0.76	0.25	0		1		2		3		4		5		6		7		8		9		10
		0.38	0	I	1.5	I	2.5	I	3.5	I	5	I	6	I	7.5	I	8.5	I	9.5	I	11	I	12
	1.02	0.25	0		1		2		3		4		5		6		7		8		9		10
		0.5	0	I	1.5	I	3	I	4.5	I	6	I	7.5	I	9	I	10.5	I	12	I	13.5	I	14.5
	1.5	0.25	0		1		2		3		4		5		6		7		8		9		10
		0.5	0	I	1.5	I	3.5	I	5	I	6.5	I	8	I	10	I	11.5	I	13	I	15	I	16.5
		1	0		2.5		5		7.5		10		12.5		15		17.5		19.5		22.5		24.5
		AWG 16	0	I	3	I	6	I	9	I	12	I	15	I	18	I	21	I	24	I	27	I	29.5
		1.5	0		3		6		9		12		15		18		21		24		27		29.5
	2.41	0.5	0	I	1.5	I	3.5	I	5	I	7	I	8.5	I	10.5	I	12	I	13.5	I	15.5	I	17.5
		1	0		2.5		5.5		8		10.5		13		16		18.5		21		23.5		26
		1.5	0	I	3	I	6	I	9	I	12	I	15	I	18	I	21	I	24	I	27	I	30
		2.5	0		4		8		12		16		20		24		27.5		31.5		35.5		39
		AWG 12	0	I	4.5	I	9	I	13.5	I	18.5	I	23	I	28	I	32	I	36.5	I	41	I	45
	3	0.5	0		2		4		5.5		7.5		9.5		11.5		13		15		17		18.5
		1	0	I	2.5	I	5.5	I	8	I	11	I	13.5	I	16.5	I	19	I	21.5	I	24.5	I	27
		1.5	0		3		6		9		12		15.5		19		22		25		28		31
		2.5	0	I	4	I	8	I	12	I	16	I	20	I	25	I	29	I	33	I	37	I	41
		4	0		6		13		19		25		32		39		45		51		58		64
		6	0	I	6	I	13	I	19	I	25	I	32	I	39	I	45	I	51	I	58	I	64

Nominal current — Max. continuous current

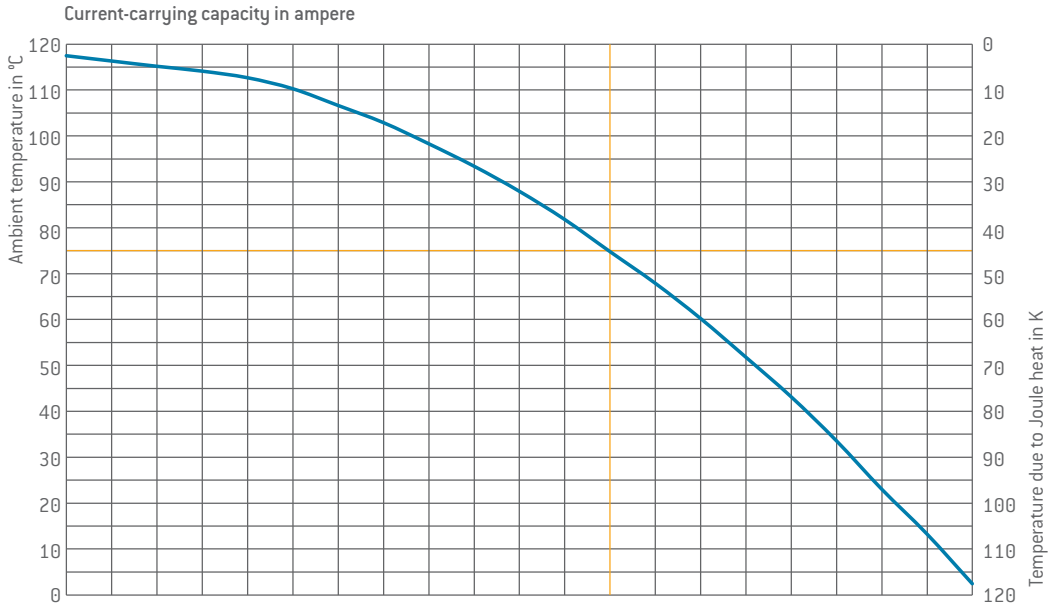
CURRENT-CARRYING CAPACITY DIAGRAM

FOR FULLY EQUIPPED MODULES

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

The values of the 4 contact high voltage module (page 84) correspond to the values of the 5 contacts signal module (page 76).

The values of the 3 contacts power module (page 82) correspond to the values of the 3 contacts power module (page 80).



Contact	Module	Contact Ø	Termination cross-section mm²	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
ODU SPRINGTAC®	10 contacts	0.76	0.25	0		1		2		3		3.5		4		5		6		7		8		8.5
			0.38	0	I	1	I	2	I	3	I	4	I	5	I	6	I	7	I	8	I	9	I	10
	6 contacts	1.02	0.25	0		1		2		3		4		5		6		7		8		9		10
			0.5	0	I	1.5	I	3	I	4.5	I	6	I	7	I	8	I	9.5	I	11	I	12.5	I	14
	14 contacts	1.02	0.25	0		1		2		3		3.5		4.5		5		6		7		8		9
			0.5	0	I	1.5	I	2.5	I	4	I	5	I	6	I	7	I	8.5	I	9.5	I	11	I	12
	5 contacts	1.5	0.25	0		1		2		3		4		5		6		7		8		9		10
			0.5	0	I	1.5	I	2.5	I	4	I	5	I	6.5	I	8	I	9	I	10.5	I	11.5	I	13
			1	0		2		4.5		6.5		9		11		13		15		17.5		20		22
			AWG 16	0	I	2.5	I	5	I	7.5	I	10	I	12.5	I	14.5	I	17.5	I	20		22.5	I	25
			1.5	0		2.5		5		7.5		10		12.5		14.5		17.5		20		22.5		25
	4 contacts	2.41	0.5	0	I	1.5	I	3	I	4	I	5.5	I	7	I	8	I	9.5	I	11	I	12.5	I	14
			1	0		2.5		5		7		9		11		13		15.5		18		20.5		23
			1.5	0	I	2.5	I	5	I	7.5	I	10	I	12.5	I	15	I	18	I	21	I	24	I	27
			2.5	0		3.5		7		10		13		16		19		22.5		26		29.5		33
			AWG 12	0	I	4	I	8	I	12.5	I	16.5	I	20.5	I	25	I	29	I	33	I	37	I	41
	3 contacts	3	0.5	0		2		3.5		5		6.5		8		9.5		10.5		12		13		14.5
			1	0	I	2.5	I	5	I	7	I	9.5	I	12	I	14	I	16.5	I	19	I	21.5	I	24
			1.5	0		2.5		5.5		8		11		13.5		16		19		21.5		24.5		27
			2.5	0	I	3.5	I	7	I	10.5	I	14	I	17.5	I	21	I	25	I	29	I	33	I	37
			4	0		5		10		15		20		25		30		35.5		41		46.5		52
			6	0	I	5	I	10	I	15	I	20	I	25	I	30	I	35.5	I	41	I	46.5	I	52

Nominal current — Max. continuous current

LINE CURRENT LOAD

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

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

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

[1] VDE 0891-1:1990.

TECHNICAL TERMS

AMBIENT TEMPERATURE

Temperature of the air or other medium in which a connector or a corresponding cable assembly is intended to be used.

AWG

American Wire Gauge – see page 126

BASE CURVE

See page 128

CHEMICAL RESISTANCE

Chemical resistance is the ability of a material to protect itself against chemical attack or solvent reaction. In contrast to corrosion, there is no material removal, which is particularly typical for plastics and elastomers.
Adhesives, cleaning agents or other chemicals are often used on our products within the scope of general deployment and further handling. Contact with unsuitable chemicals may have an adverse effect on the mechanical and electrical properties of the insulation and housing materials. The connector specifications may no longer be sustainable. Please observe our handling suggestions and technical instructions as given in this catalog or corresponding assembly instructions as well as the special information for the plastic housings.

CLEARANCE DISTANCE

The shortest distance by air between two conductive parts (according to IEC 60664-01:2007). The insulation coordination is explained in detail from page 123.

CONNECTORS

An element which enables electrical conductors to be connected and is intended to create and/or separate connections with a suitable counterpart (according to IEC 61984:2008 (VDE 0627:2009-11)). If not otherwise specified, these are connectors without breaking capacity (COC).

CONNECTOR WITH BREAKING CAPACITY (COC)

Connector that may be mated or unmated during intended use, live or under load (according to IEC 61984:2008 (VDE 0627:2009-11)).

CONNECTOR WITHOUT BREAKING CAPACITY (COC)

Connector which is not deemed to be engagend or disengaged in normal use when live under load (according to IEC 61984:2008 (VDE 0627:2009-11)).

CONTACT RESISTANCE

The contact resistance is the contact resistance at the contact zone of a electrical contact pair. The contact resistance is significantly lower than the total resistance (refer to total resistance). The specifications are average values.

CORES

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

CREEPAGE DISTANCES

The shortest distance between two conductive parts along the surface of a solid insulation material (according to IEC 60664-01:2007). 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 123.

CRIMP BARREL

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

CRIMP CONNECTION (CRIMP TERMINATION)

The permanent, non-detachable and solder-free mounting of a contact to a conductor via deforming or shaping under pressure to make a good electrical and mechanical connection. Executed with crimping tool, press or automatic crimping machine (see page 111).

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.

TECHNICAL TERMS

CURRENT-CARRYING CAPACITY (NOMINAL CURRENT AND MAXIMUM CONTINUOUS CURRENT)

The value is derived from an adequately dimensioned connection cable in accordance with IEC 60228:2004 (VDE 0295:2005; class 5), so that a significant temperature increase is not incurred. The indicated temperature increase takes place through the contact. The specifications are average values.

DEGREE OF POLLUTION

Numerical value indicating the expected pollution of the micro-environment. The pollution levels 1-4 were defined. (Pollution: any deposit of solid, liquid or gaseous foreign matter that may reduce the electrical strength or surface resistance of the insulation; micro-environment: immediate vacinity of the insulation, which in particular influences the dimensioning of the creepage distances). See IEC 60664-1:2007 (VDE 0110-1:2008))

The insulation coordination is explained in detail from page 124

DELIVERY FORM

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

DERATING CURVE

See page 128

DERATING FACTOR

According to VDE 0298-4:2013, with connectors and cables over 5 contacts, the heating is greater than it is with individual contacts. For that reason, the aforementioned standard is calculated with a derating factor. See page 129

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

See page 128

INSERTION AND WITHDRAWAL FORCE

The force required to fully insert or withdraw pluggable elements without the influence of a coupling or locking device.

INSULATOR

Part of a connector that separates conductive parts with different potential, usually identical to the contact carrier.

KEYING (MECHANICAL)

Geometry detail that prevents interchangeability of otherwise identical connectors.This is useful when two or more identical connectors are attached to the same device.

LUBRICATION

All standard contacts are lubricated at the factory. We recommend using the ODU Electrical Contacts Service kit. See page 119)

MATERIALS (STANDARD DESIGN)

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

MATING CYCLES

A mating cycle consists of one insertion and withdrawal action of both connector parts with each other. The given values are only valid under the following conditions: clean environment, adequate radial alignment, flawless counter contact pins.

MAX. CONTINUOUS CURRENT

The metrologically determined amperage at room temperature (approx. 20 °C) which increases the contact temperature to the limit temperature. The values specified in the catalog apply to either individual contacts or completely assembled inserts / modules, as indicated. Refer to page 128 for the derating curve, if a different ambient temperature is valid.

NOMINAL CURRENT

See rated current.

NOMINAL SINGLE CONTACT CURRENT LOAD

The current-carrying capacity which each individual contact can be loaded with on its own (see from page 129).

TECHNICAL TERMS

NOMINAL VOLTAGE

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

NON-MAGNETIC DEFINITION

ODU modules, plastic housing and frames are 100% tested with a permeability μr < 1.0005. Metal housing on request.

OPERATING TEMPERATURE FOR ODU-MAC®

Permissable temperature range between the uppermost and lowermost limits. This includes contact heating through current-carrying capacity.

OPERATING VOLTAGE

The operating voltage is the voltage supply at the device. The operating voltage may not be higher than the rated voltage of the connector.

PRINTED CIRCUIT BOARD (PCB)

A PCB is a carrier for electronic components. It serves the purposes of mechanical mounting and electrical connection.

PCB TERMINATION

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

RATED CURRENT (NOMINAL CURRENT)

The values specified in the catalog apply to individual contacts or to completely assembled inserts / modules, depending on the specification. See page 129

RATED VOLTAGE

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

REDUCTION FACTOR

Based on VDE 0298-4:2013-06, connectors and cables with more than 5 contacts have a higher heating rate compared to individual contacts. For this reason, the aforementioned standard is calculated with a reduction.

SLIDING FORCE

Please refer to Insertion and Withdrawal force.

The higher value of the insertion force is caused by the “attachment peak”. Subsequently, only the pure sliding force has an effect. In the case of lamella contacts, the data refers to contacts in the lubricated state (status at delivery) and after approx. 30 mating cycles. The forces are/may be higher in new condition (lubricated). In the case of springwire contacts, the data refers to contacts in new condition. The data represents average values with a potential fluctuation of ± 50 %.

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 which are thereby overcome ease handling significantly. For relubrication, we recommend the ODU Electrical Contacts Service Kit.

STRANDED WIRE

The stranded wire is an electrical conductor consisting of thin individual wires and is therefore easy to bend.

TERMINATION CROSS-SECTION

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; Class 5), borderline conductor structures require a separate review.

TERMINATION TECHNOLOGIES

Methods for connecting the leads to the electro-mechanical element, such as solder-free connections pursuant to IEC 60352 (DIN EN 60352): crimp, screw connection etc. or soldering connection (see page 110).

TEST VOLTAGE

The test voltage which a connector or a corresponding cable assembly can withstand under defined conditions without dielectric breakdown or flashover.

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

See protection types on page 122

TOTAL RESISTANCE

Total resistance value measured from terminal to terminal (e.g. without crimp resistance). The specifications are average values.

UPPERMOST LIMIT TEMPERATURE

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

WIRE

Solid conductor

GENERAL NOTE

The connectors and cable assemblies listed in this catalog are generally designed as connectors without breaking capacity unless otherwise stated. The rated voltage specification given on the respective data sheet must be respected. Suitable precautionary measures must be taken to ensure that people do not come into contact with live conductors during installation and operation. All entries in this catalog were thoroughly reviewed before printing. ODU reserves the right to make changes based on the current status of knowledge without prior notice and 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
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

Россия +7(495)268-04-70
Казахстан +7(7172)727-132
Киргизия +996(312)96-26-47

https://odu.nt-rt.ru || oud@nt-rt.ru