ODU-MAC® White-Line

Compact modular connector system
Up to 6,300 V, 25 bar, 10 Gbit/s, 100,000 mating cycles and 9.0 GHz

MANUAL MATING

ODU-MAC® WHITE-LINE

ODU-MAC® BLUE-LINE

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

www.odu-connectors.com

ODU-MAC® White-Line

FEATURES

- Robust design
- High number of mating cycles (> 100,000)
- Stable low contact resistance
- Vibration resistance
- High level of failure safety and contact security
- Wide variety of transmission modules
- High contact density
- Easy and reliable locking options

APPLICATIONS

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

All shown connectors are according to IEC 60529:1989 (VDE 0627:2009-11); connectors without breaking capacity (COC).

Tested acc. UL 1977:2016 / CSA C22.2 No. 182.3 (E fileno,: E110586). Tested acc. MIL/SAE/EIA. (ODU-USA is registered with the DDTC and able to complete ITAR restricted manufacturing projects.)

Data transmission protocols

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

Safety instructions / protective conductor connection

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

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

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

Non-magnetic

ODU-MAC® ZERO

Issue: 2021-10

TABLE OF CONTENTS

Clickable page numbers

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

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

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 INDIVIDUAL CONNECTIONS

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

Many options are available for a variety of applications in industry or medical technology. For example, installed in the stable frame for rack and panel applications or for automatic docking as well as in a housing version.

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

Find out more about individual configurations on the following pages.

White-Line

MANUAL MATING.

ODU-MAC® ZERO

THE ODU-MAC® LEAVES NOTHING TO BE DESIRED:

- 100,000 mating cycles and more
- Variety of robust housings for special challenges
- Various locking options (snap-in, spindle or lever)
- Many different module options and non-magnetic versions available
- Extremely compact due to high contact density

WATCH VIDEO vimeo

Additional information on vimeo.com/user126476181

ODU-MAC® Blue-Line

Our performance class offers a true alternative – request our ODU-MAC® BLUE-LINE CATALOG !

ODU-MAC® Silver-Line ODU DOCK

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

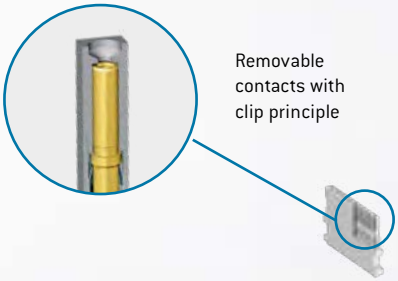
For further information please visit odu-connectors.com/downloads

100,000
Mating cycles and more

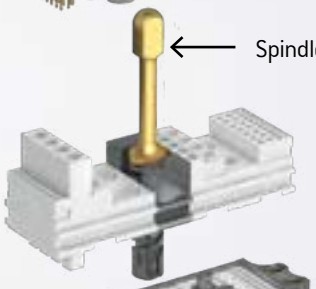
Housing

Pin frame

Contacts for
solder, crimp, PCB
and SMA terminations



Removable
contacts with
clip principle



Spindle locking

Socket frame

Modules

Housing

42 Cable hood versions

4 Locking types:
Snap-in, spindle or
lever locking

5 Different spindle geometries

36 Modules to choose from:
signal, power, high-current,
high-voltage, HF signals (coax),
media such as air or fluid,
high-speed data transmission,
PE and fiber optic

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

OUTSTANDING – FOR EVERY NEED

Take a closer look at the following pages to discover the wide variety of transmission options we offer, such as USB® 2.0[1], USB® 3.2[1], Ethernet, CAT 5, CAT 6_A, HDMI®[1], DisplayPort® 2.0[1], SPE 1000BASE-T1 and FireWire®[1].

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

PRODUCT FINDER

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

With ODU-MAC® Configurator it's possible to configure your connection simply according to your requirements.
The configurator guides you through the different choices step by step and offers many continuative information.

CONFIGURE YOUR ODU-MAC® WHITE-LINE HERE:

www.odu-mac.com takes you directly to the Product Finder, allowing you to configurate your ODU-MAC® immediately.

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 get 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.

CORRECT CONFIGURING – STEP BY STEP

ODU-MAC® White-Line

MANUAL MATING.

1ST STEP: LOCKING

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

Snap-in locking	Spindle locking	Lever locking	Transverse locking
Plastic housing	Metal/plastic housing	Metal housing	Plastic housing

2ND STEP: CONNECTOR HOUSING

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

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

3RD STEP: RECEPTACLE SELECTION

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

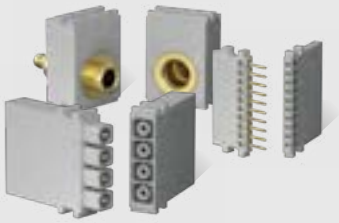
Snap-in locking	Cable hood	Cable hood XXL
Receptacle	Bulkhead mounted housing Metal/plastic housing	Bulkhead mounted housing / Metal housing
In-line Receptacle	Surface mounted housing Metal/plastic housing	Surface mounted housing / Metal housing
	Cable to cable hood Metal housing	
	Recessed-style receptacle	

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

4TH STEP: MODULE SELECTION

Choose from 36 different modules for transferring signal, power, high-current, high-voltage, HF signal (coax), high-speed data transmission, fiber optic and other media such as air or fluid and assemble your ODU-MAC® individually.

Modules
See page 73



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, 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.

FURTHER INFORMATION FROM PAGE 32

- Housing made of 2 plastic half-shells which also form the frame
- Half shell frames allow for easy installation
- **Bio-compatibility** upon request
- **Coding:** Housing geometry, coding modules and color-coded cable bend relief varieties
- Suitable for a wide range of ODU-MAC® modules
- Up to **60,000 mating cycles**
- **3 different cable outlets: straight, 45°, 90°**
- **Simple, safe housing locking** (break-away function/emergency release)

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

Size	Units 2.54 mm	
ZERO	9	

HOUSING
PLASTIC HALF-SHELL INCLUDING RAILS FOR MODULAR INSERTS

SNAP-IN LOCKING

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

- Quick, reliable housing locking thanks to snap fits and sealing strip (frictional locking principle)
- Low mating / demating forces (approx. 10 N for the housing) guarantee quick connection demating (break-away function / emergency release)

CONNECTOR HOUSING FOR ASSEMBLY

CABLE EXIT 90°
PAGE 32

CABLE EXIT 0°
PAGE 32

CABLE EXIT 45°
PAGE 32

FULLY COMPATIBLE

RECEPTACLE, PAGE 33
For integration in the device

IN-LINE RECEPTACLE, PAGE 34
For a flying cable to cable connection

ODU-MAC® White-Line
MANUAL MATING

Overview of housings with spindle locking

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

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

Depending upon the application scenario, the mechanisms are designed for up to 30,000 locking cycles. Easy to mount replacement sets are available for larger numbers of mating cycles (See page 36).

FURTHER INFORMATION FROM PAGE 38

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

Size	Units[1]	
2	16	
3	24	
4	34	

CABLE HOOD XXL[2]:

4	34	

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

PLASTIC CABLE HOOD WITH SIDE CABLE ENTRY, PAGE 46

Connector housing for assembly on the cable

METAL CABLE HOOD WITH SIDE CABLE ENTRY, PAGE 38

Connector housing for assembly on the cable

METAL CABLE HOOD XXL WITH SIDE M50 CABLE ENTRY, PAGE 39

Connector housing with expanded assembly space and side M50 cable entry

FULLY COMPATIBLE

PLASTIC SURFACE MOUNTED HOUSING, PAGE 48

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

METAL SURFACE MOUNTED HOUSING, PAGE 41

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

PLASTIC BULKHEAD MOUNTED HOUSING, PAGE 47

For mounting on device with spindle locking

METAL BULKHEAD MOUNTED HOUSING, PAGE 40

For mounting on device with spindle locking

ODU-MAC® White-Line
MANUAL MATING

Overview of housings with transverse locking

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

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

FURTHER INFORMATION FROM PAGE 49

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

Size	Unit	
1	10	
2	16	
3	24	
4	34	

PLASTIC CABLE HOOD WITH SIDE CABLE ENTRY, PAGE 49

Connector housing for assembly on the cable

FULLY COMPATIBLE

PLASTIC BULKHEAD MOUNTED HOUSING, PAGE 50

For mounting on device with transverse locking

PLASTIC SURFACE MOUNTED HOUSING, PAGE 51

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

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 grid 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

Size	Units[1]	
2	16	
4	34	

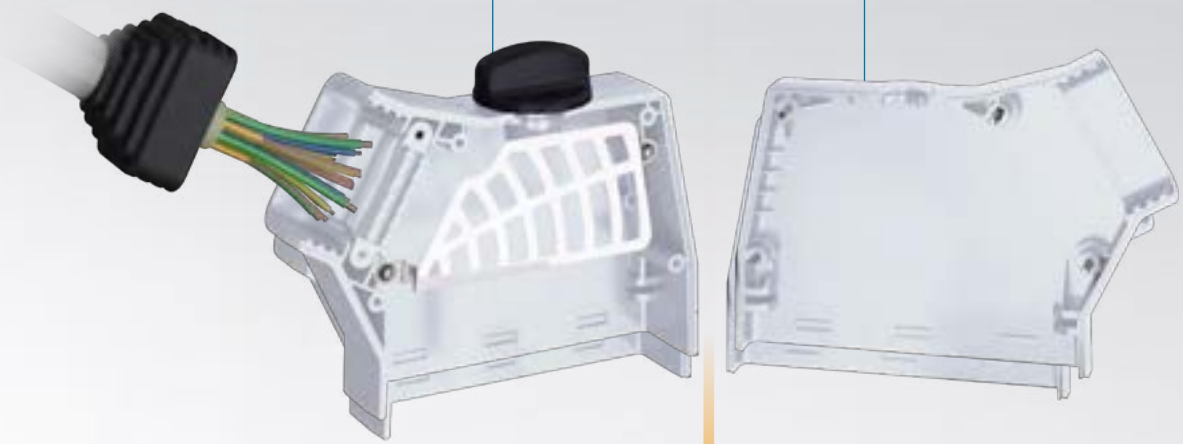
FURTHER INFORMATION FROM PAGE 42

[1] 5 units of space required for spindle

SPINDLE LOCKING, PAGE 36

RAPID PLASTIC HOUSING, PAGE 42

Half-shell principle with individually adjustable side cable outlet



FULLY COMPATIBLE

PLASTIC RAPID RECEPTACLE, PAGE 44

For mounting as a recessed plastic style

RAPID RECEPTACLE, PAGE 43

Direct mounting on the mounting wall

ODU-MAC® White-Line
MANUAL MATING

Overview of housings with lever locking

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

Appropriate frames in various sizes are available for use in the standard DIN EN 175301-801:2007-08 housing with lever. Size 4, for example, can receive up to 34 modules with a module width of 2.54 mm (1 unit), meaning that a total of 34 modules (34 units), or 340 contacts in the case of 10 contacts, can be accommodated. Size 6 of the dual housing can accommodate up to 680 contacts.

FURTHER INFORMATION FROM PAGE 54

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

METAL CABLE HOOD WIDE
WITH TOP CABLE ENTRY, PAGE 58

Connector housing for double frame assembly.

METAL CABLE HOOD WIDE
WITH SIDE CABLE ENTRY, PAGE 58

Connector housing for double frame assembly.

METAL BULKHEAD MOUNTED HOUSING
FOR CABLE HOOD WIDE, PAGE 59

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

METAL CABLE HOOD WITH TOP CABLE ENTRY, PAGE 54

Connector housing for assembly on the cable.

METAL CABLE HOOD XXL WITH TOP M50 CABLE ENTRY, PAGE 55

Connector housing with expanded assembly space.
For assembly on the cable.

METAL CABLE HOOD WITH SIDE CABLE ENTRY, PAGE 54

Connector housing for assembly on the cable.

METAL CABLE HOOD XXL WITH SIDE M50 CABLE ENTRY, PAGE 55

Connector housing with expanded assembly space.
For assembly on the cable.

FULLY COMPATIBLE

METAL BULKHEAD MOUNTED HOUSING, PAGE 56

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

METAL SURFACE MOUNTED HOUSING, PAGE 57

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

METAL CABLE TO CABLE HOOD, PAGE 60

For a flying cable to cable connection with lever locking and top cable entry.

INFORMATION ON PLASTIC HOUSING

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

For the plastic housings of ODU-MAC® the customer can choose between the proven spindle locking technology with more than 30,000 mating cycles which has excellent ergonomic features and the efficient transverse locking. An additional grounding of the plastic housing is unnecessary, due to the antistatic, thermoplastic housing.

Hence manual mating gets as easy as safe.

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

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

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

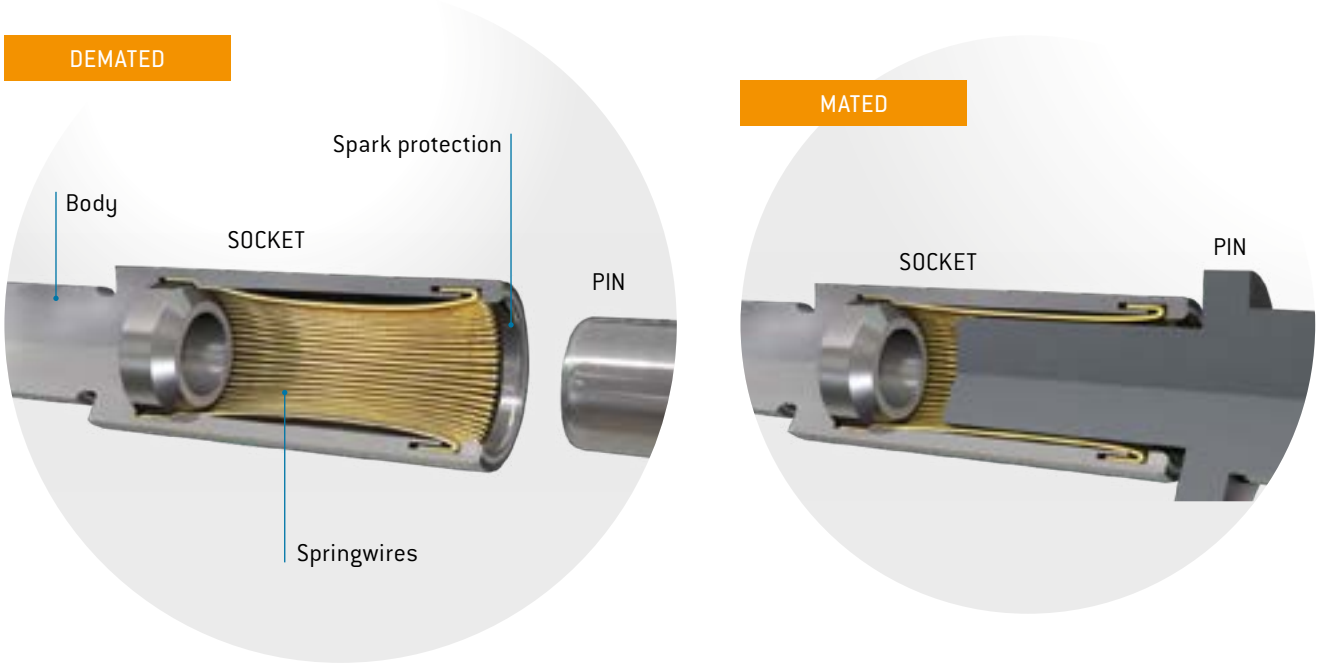
BEST CONNECTIONS – THE CONTACT PRINCIPLE

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

ODU SPRINGTAC®

Contacts with springwire technology

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



ADVANTAGES

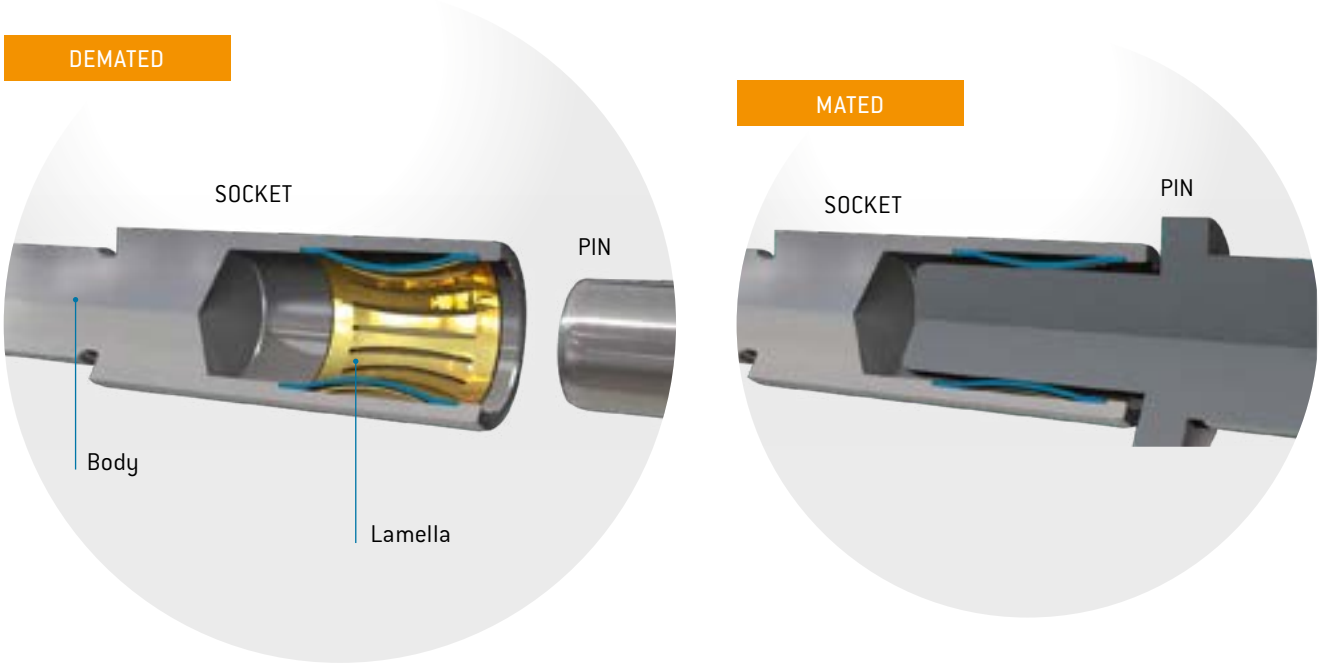
- > 100,000 mating cycles (up to 1 million mating cycles can be achieved)
- High-current-carrying capacity
- Low contact resistances
- Large number of independently flexible contact springs, e.g. 40 springs with a diameter of 5 mm
- Low mating and demating forces
- Extremely secure connection
- High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

Standard contact principle for:	
Signal	14 to 5 contacts
Power	4 to 2 contacts
High-current	2 contacts
High-voltage	4 contacts
RF-signal (coax)	2 contacts
Shielded implementation	8, 5, 4 contacts

ODU LAMTAC®

Contacts with lamella technology

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



ADVANTAGES

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

Standard contact principle for:	
High-current	2 to 1 contact(s)
PE	1 contact
High-voltage	1 contact
RF-signal (coax)	4 contacts
Shielded implementation	Shielded transmission

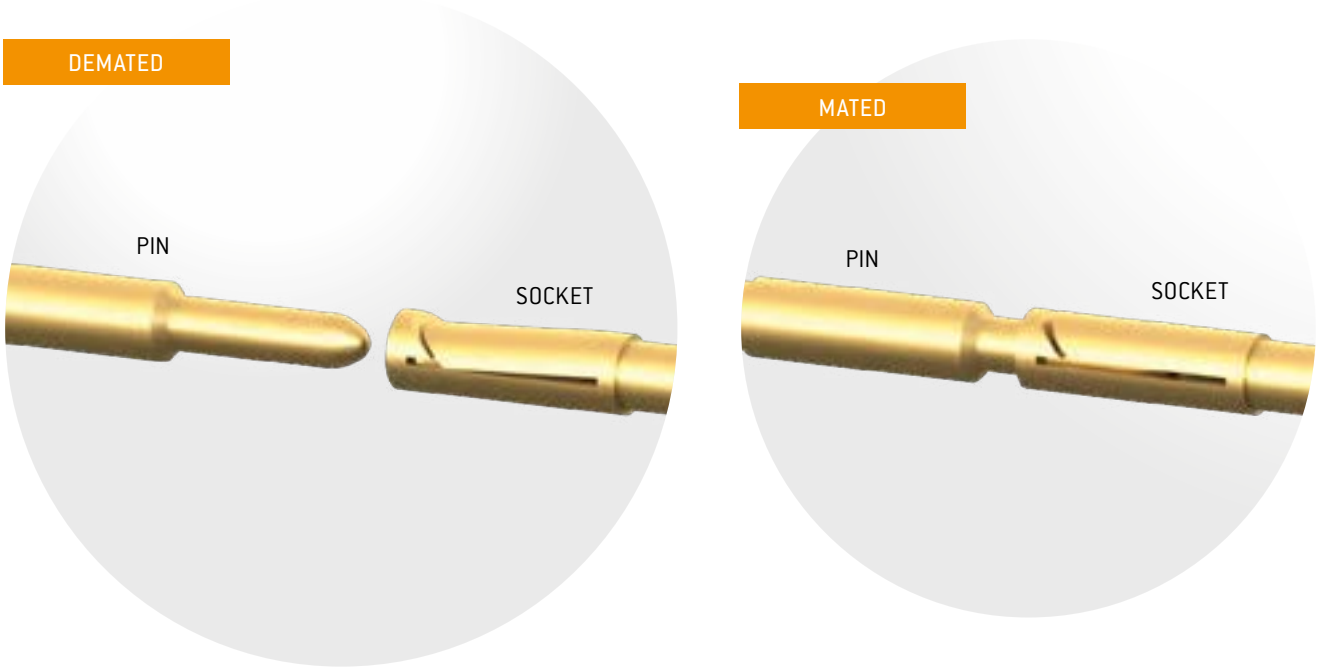
Table of contents

ODU TURNTAC®

Contacts in slotted version.

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

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



ADVANTAGES

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

Standard contact principle for:	
Shielded implementation	Signal contacts

ODU STAMPTAC®

Contacts in stamped version.

Thanks to its economical manufacture, the ODU STAMPTAC® is the most affordable alternative for large numbers of units. Available in various coil sizes for processing with hand crimpers and (semi-) automatic stripper crimpers. This reduces the preparation time enormously. This contact is used in the 10 contacts module (see page 86).

ADVANTAGES

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

Standard contact principle for:	
Signal	10 contacts

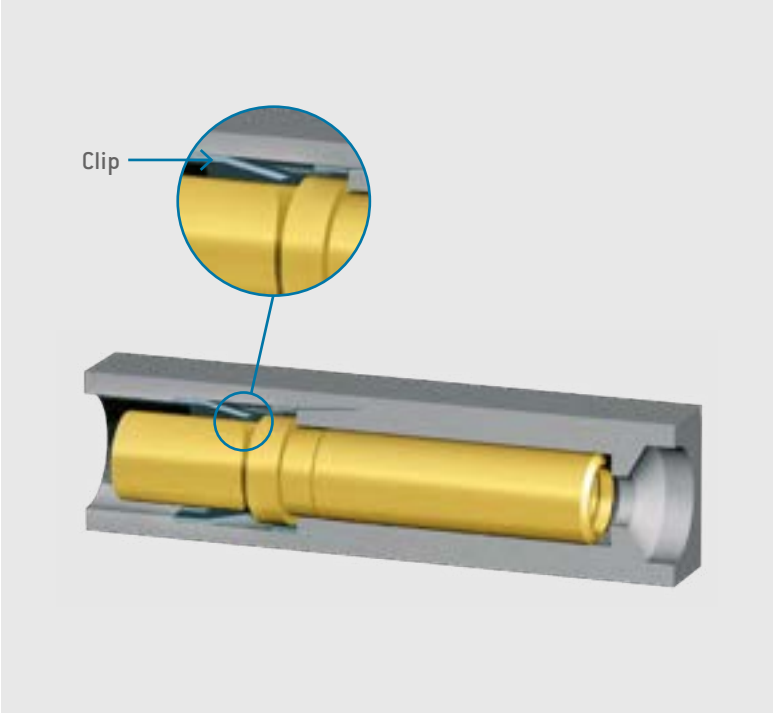
CONTACT RETENTION WITH THE CLIP PRINCIPLE (STANDARD)

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

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

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

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



Most of the modules include this fastening technology.

3 mounting lugs for optimal stability.

FOR YOUR NOTES

APPLICATION SPECIFIC SOLUTIONS

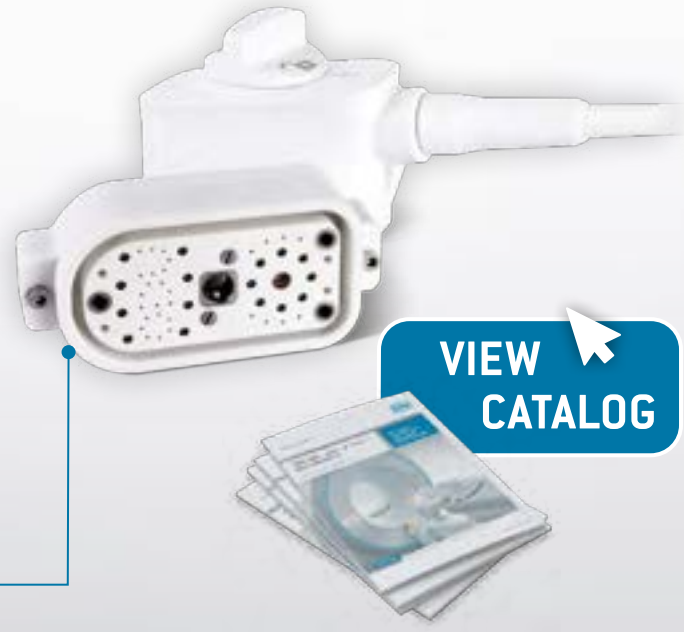
Problem solvers who think outside the box are required when standard solutions find their limits. ODU offers you just this kind of expert: the ones who focus on your specific requirements. For every development order we get, we not only perform a thorough review study, we intensively involve our customers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

MODULAR CONNECTOR WITH SPINDLE LOCKING FOR MRI

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

Advantages

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



For further information please visit odu-connectors.com/downloads

ODU-MAC® NON-MAGNETIC

CUSTOM-SPECIFIC ODU-MAC® CONNECTOR FOR MRI

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 60,000 locking cycles
- Non-magnetic
- 1.3 and 2.8 GHz frequency range
- 50 Ω
- High contact density

ODU-MAC® FOR SPARK WAVE® THERAPY DEVICE

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

Advantages

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

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

ODU-MAC®

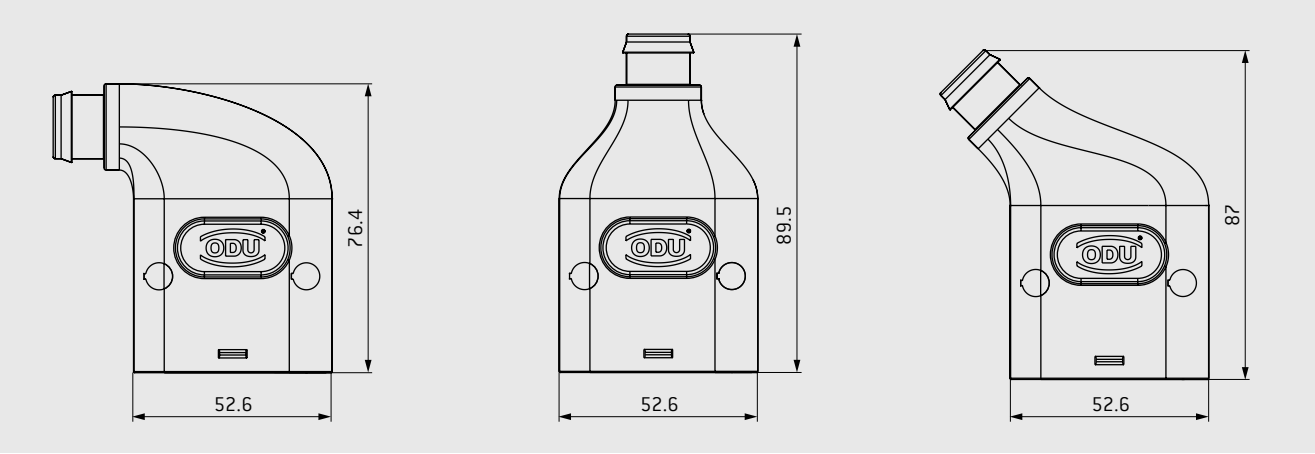
Table of contents

MANUAL MATING

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)



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 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

The cable bend relief must be ordered separately,
see page 35.

SUITABLE MODULES ARE MARKED.

[1] The frame is already permanently integrated and consists of nine units. [2] IEC 60529:1989 (VDE 0470-1:2014-09).

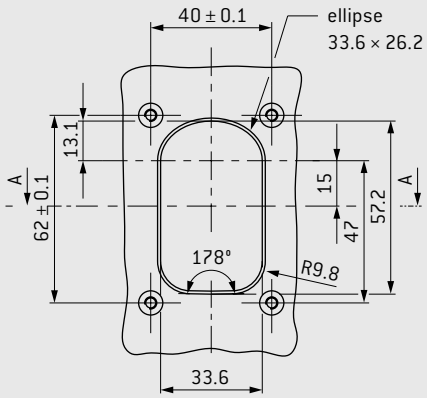
RECEPTACLE

ZERO

For integration in the device

SNAP-IN LOCKING (BREAK-AWAY FUNCTION)

PANEL CUT-OUT

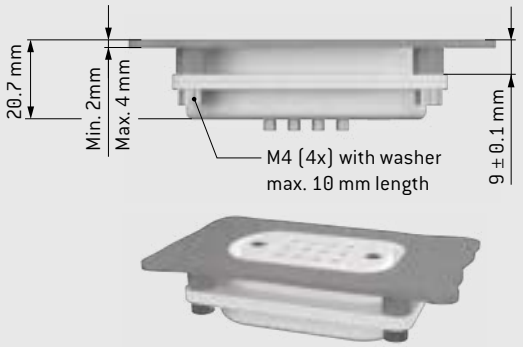


TECHNICAL DATA

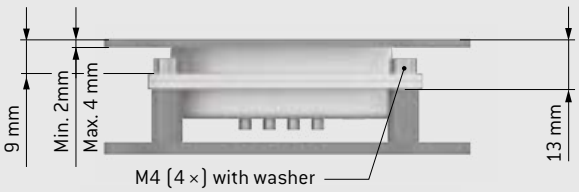
Color of housing	White Black on request
Locking cycles	60,000
Material	PC Lexan (PEI on request)
Protection class[1]	IP54
Operating temperature	–40 °C to +125 °C

Part number	Units[2] 2.54 mm
656.560.001.001.000	9 Units

MOUNTING FROM BELOW



MOUNTING FROM ABOVE



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

[1] IEC 60529:1989 (VDE 0470-1:2014-09). [2] The frame is already permanently integrated and consists of nine units.

Table of contents

IN-LINE RECEPTACLE

ZERO

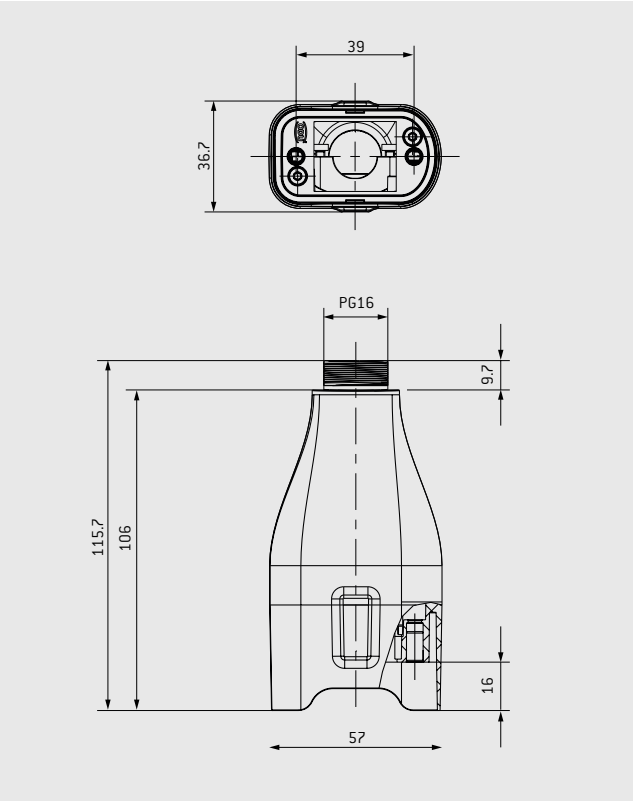
With top cable entry – for a flying cable to cable connection

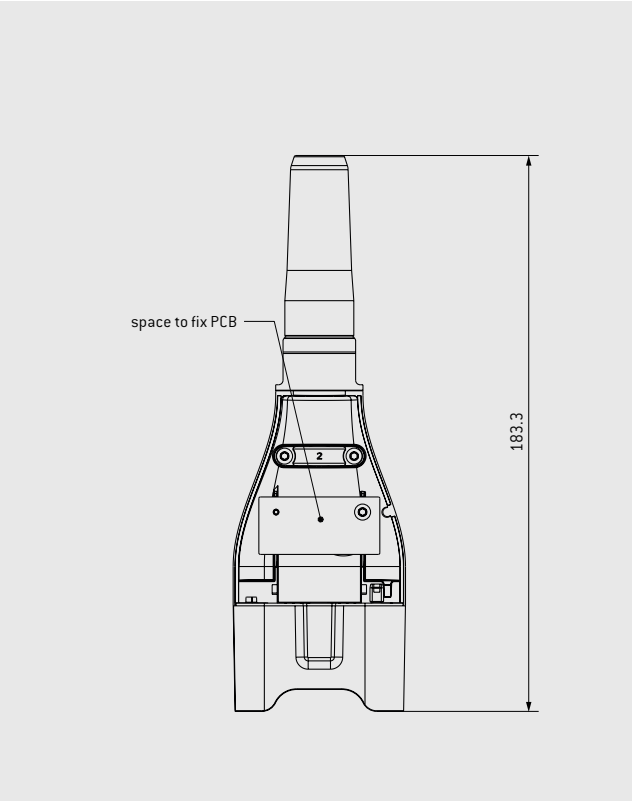
SNAP-IN LOCKING (BREAK-AWAY FUNCTION)

TECHNICAL DATA

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

The cable bend relief must be ordered separately, see page 35.





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 60529:1989 (VDE 0470-1:2014-09). [2] The frame is already permanently integrated and consists of nine units.

SILICONE BEND RELIEFS FOR ODU-MAC® ZERO

TECHNICAL DATA

Material	Silicone
Temperature	–50 °C to +200 °C

DESCRIPTION

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

Part number	Dim. L	Cable jacket (∅ 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	14.5

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

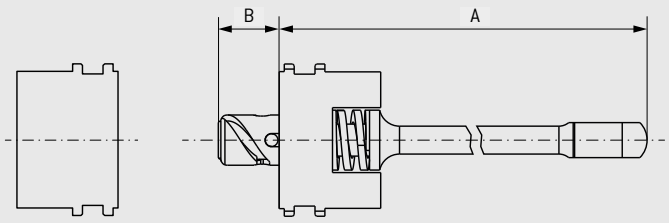
[1] Due to variations in raw materials, colors may differ slightly from RAL numbers. [2] Standard colors with short delivery period.

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



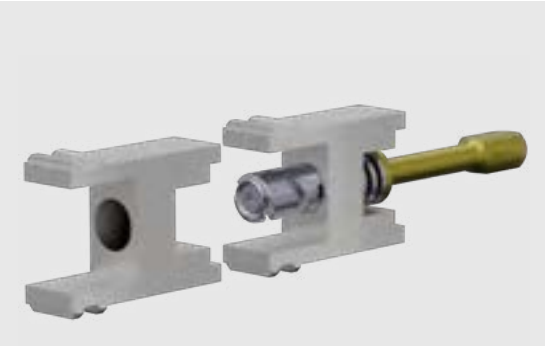
Size	Part number Center module for bulkhead mounted and surface mounted housing	Part number Spindle locking for cable hood	Angle of rotation	Dim. A mm	Dim. B mm
2 (52 mm high)	614.090.001.304.000	615.091.003.200.000	180°	46.5	12
2 (72 mm high)	614.090.001.304.000	615.091.001.200.000	180°	66.5	12
3/4	614.090.001.304.000	615.092.021.200.003	360°	72.5	21.5
4 / XXL / RAPID	614.090.001.304.000	615.093.021.200.003	360°	90.5	21.5

- Max. locking cycles 30,000[1]
- Space requirement 5 units (5 × 2.54 mm)
- Further spindle geometries on request
- Spindle with coding function see page 70

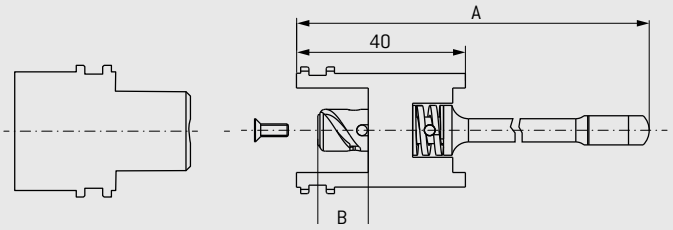
[1] 30,000 cycles depending on mating force of the used modules.

Table of contents

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)	614.090.002.304.000	615.091.004.200.000	180°	63.5	12
2 (72 mm high)	614.090.002.304.000	615.091.002.200.000	180°	83.5	12
3/4	614.090.002.304.000	615.092.022.200.003	360°	89.5	21.5
4/XXL	614.090.002.304.000	615.093.022.200.003	360°	107.5	21.5

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

REPLACEMENT SPINDLE SET FOR VERSION 1 AND 2

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

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

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

CABLE HOOD

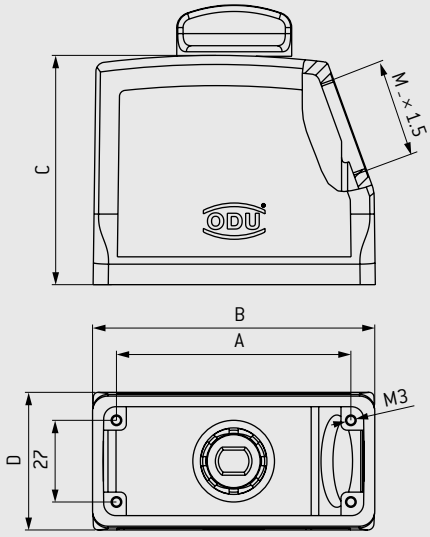
Connector housing for assembly on the cable with side cable entry

SPINDLE LOCKING

A GRAY MODEL (STANDARD)

B WHITE MODEL

C WHITE MODEL WITH BLACK KNOB



TECHNICAL DATA

Color of housing	Gray (standard, similar to RAL 7001) or White (similar RAL 9010)
Material	Aluminium die casting
Protection class[1]	IP50 or IP65
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 63
Number of locking cycles	see page 36
Adapter	for PG clamp see page 64

Size	IP	Part number A Color of housing Gray/ spindle knob Black	Part number B Color of housing White/ spindle knob White	Part number C Color of housing White/ spindle knob Black	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable entry	Part number protective cover Gray (see page 61)
2	50	613.091.513.644.208	613.091.513.653.203	–	57	73	52	43	M25	491.097.613.644.000
		613.091.514.644.208	613.091.514.653.203	613.091.514.653.208	57	73	72	43	M32	
	65	613.091.574.644.008	–	–	57	73	72	43		
3	50	613.092.514.644.208	613.092.514.653.203	613.092.514.653.208	77.5	93.3	76	45.5	M32	492.097.613.644.000
	50	613.092.515.644.008	613.092.515.653.003	–	77.5	93.3	76	45.5	M40	
	65	613.092.574.644.008	–	–	77.5	93.3	76	45.5	M32	
4	50	613.093.514.644.208	613.093.514.653.203	613.093.514.653.208	104	120	76	45.5	M32	493.097.613.644.000
		On request	On request	613.093.515.653.008	104	120	76	45.5	M40	
	65	613.093.574.644.008	–	–	104	120	76	45.5	M32	
		613.093.575.644.008	–	–	104	120	76	45.5	M40	

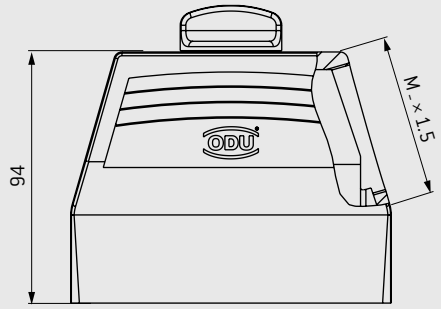
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (Depends on the cable clamp(s) and spindle type used).

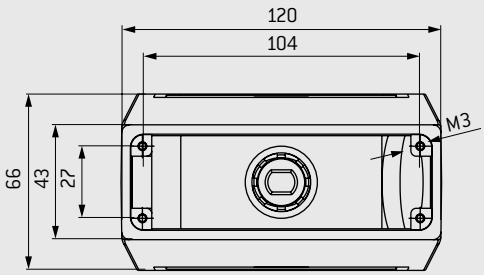
CABLE HOOD XXL

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

SPINDLE LOCKING

A GRAY MODEL





TECHNICAL DATA

Color of housing	Gray (similar to RAL 7001) White on request
Material	Aluminium die casting
Protection class[1]	IP50 or IP65
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 63
Number of locking cycles	see page 36

Size	IP	Part number Color of housing Gray / spindle knob Black	Dim. M Cable entry	Part number protective cover (see page 63)
4	50	613.093.516.644. 208	M50	493.097.613.644.000
4	65	613.093.576.644.008	M50	493.097.613.644.000

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

Table of contents

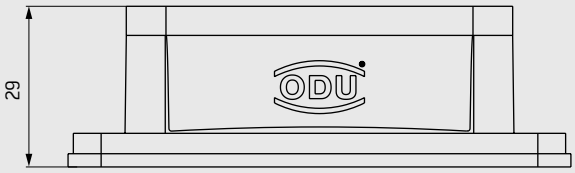
BULKHEAD MOUNTED HOUSING

For mounting on the device.

SPINDLE LOCKING

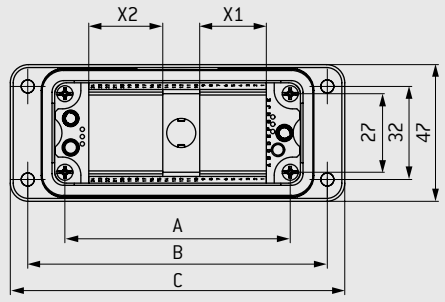
A GRAY MODEL (STANDARD)

B WHITE MODEL



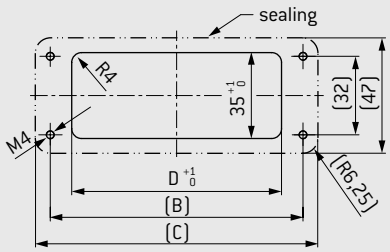
TECHNICAL DATA

Color of housing	Gray (standard, similar to RAL 7001) or White (similar to RAL 9010)
Material	Aluminium die casting
Protection class[1]	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 62.

PANEL CUT-OUT



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

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (Depends on the spindle type used).

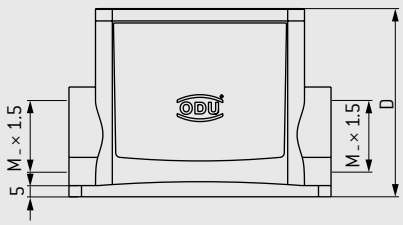
SURFACE MOUNTED HOUSING

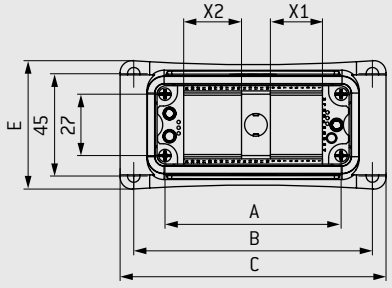
For surface mounting on your device / wall with two side cable entries.

SPINDLE LOCKING

A GRAY MODEL (STANDARD)

B WHITE MODEL





The frames depicted must be ordered separately, see page 62.

TECHNICAL DATA

Color of housing	Gray (standard, similar to ral 7001) White 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)
Cable clamp	See page 63
Adapter	for PG clamp See page 64

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

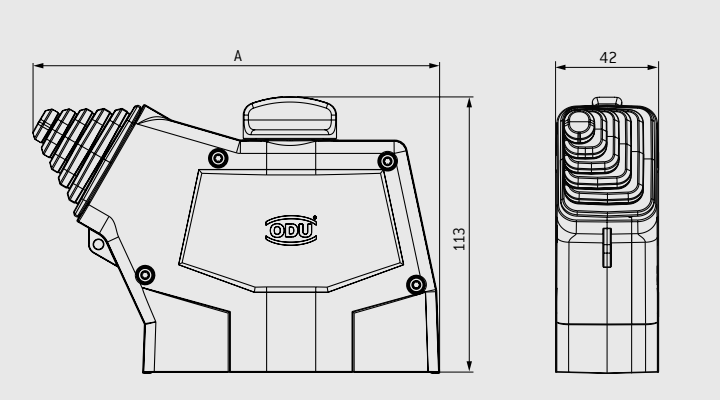
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (Depends on the cable clamp(s) and spindle type used).

ODU-MAC® RAPID

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
Number of locking cycles	See from page 36
Coding	Spindle coding (6 options) see page 68

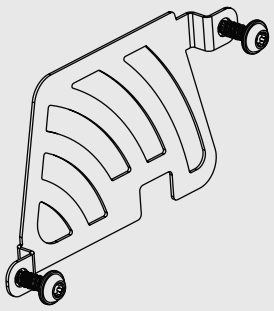
Size	Part number	Description	Color of housing	Cable outlet ⌀	Part number protective cover	Dim. A mm
2	656.561.012.003.000	RAPID housing	White	Max. 26 × 37 mm	656.561.012.023.000	139
2	656.561.012.008.000	RAPID housing	Black		656.561.012.018.000	
4	656.563.012.003.000	RAPID housing	White		656.563.012.023.000	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 / 4	615.093.021.200.013	Spindle locking with coding				
2	611.191.004.600.000	Housing frame, pin side				
4	611.193.004.600.000	Housing frame, pin side				

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

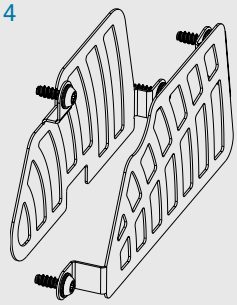
STRAIN RELIEF SET

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

SIZE 2



SIZE 4



TECHNICAL DATA

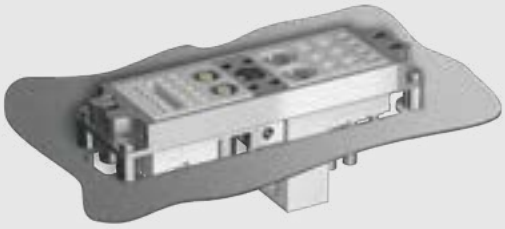
Material	Stainless steel
Operating temperature	–40 °C to +125 °C

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

ODU-MAC® RAPID RECEPTACLE

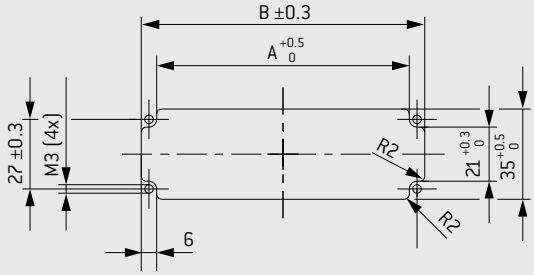
For mounting on your device

SPINDLE LOCKING



DIRECT ASSEMBLY OF THE SOCKET FRAME ON ASSEMBLY WALL

PANEL CUT-OUT



Size	Part number	Description	Dim. A mm	Dim. B mm
2	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		
2 / 4	614.090.001.304.010	Center module with coding		

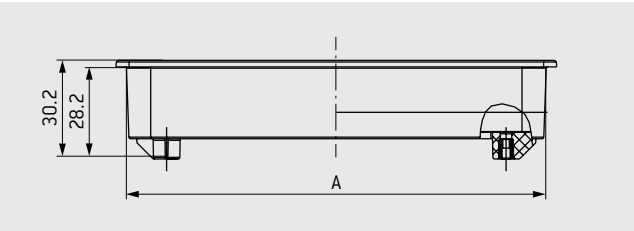
ODU-MAC® RAPID RECEPTACLE

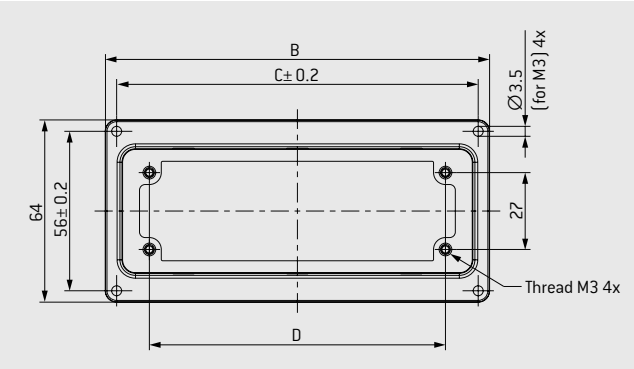
For mounting as a recessed plastic version

SPINDLE LOCKING

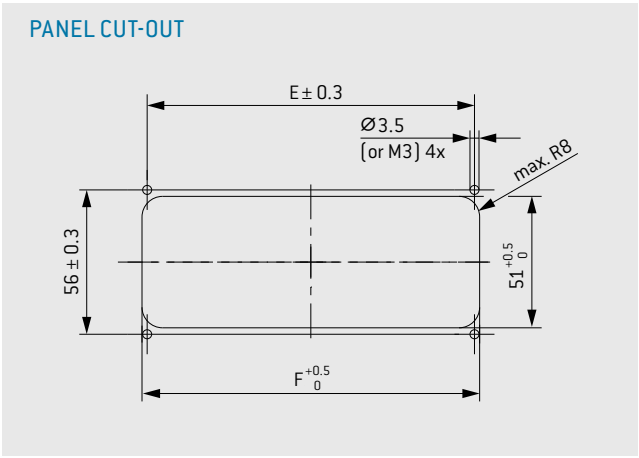
TECHNICAL DATA

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





PANEL CUT-OUT



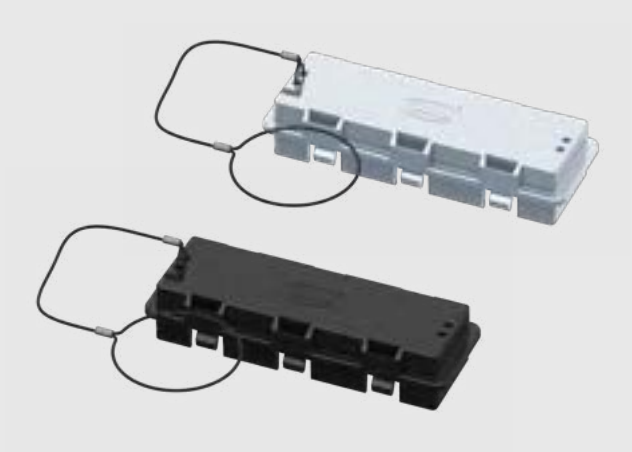
Size	Part number	Description	Color of housing	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	Dim. F mm
2	656.561.001.003.000	Receptacle	White	82.4	88	80	57	80	84
2	656.561.001.008.000	Receptacle	Black	82.4	88	80	57	80	84
4	656.563.001.003.000	Receptacle	White	129.4	134.9	127.2	104	127	131
4	656.563.001.008.000	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							
2 / 4	614.090.001.304.010	Center module with coding							

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

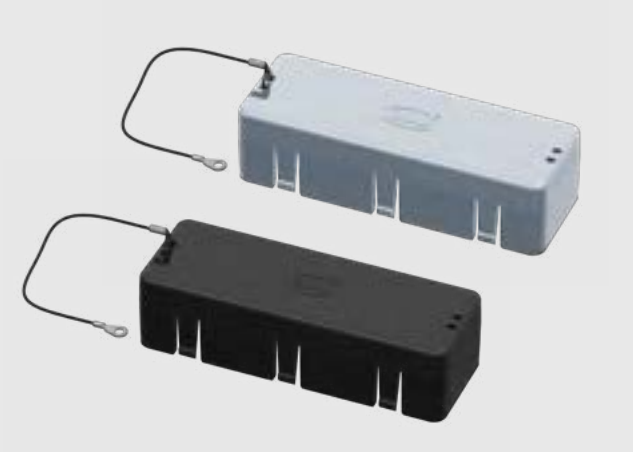
PROTECTIVE COVER

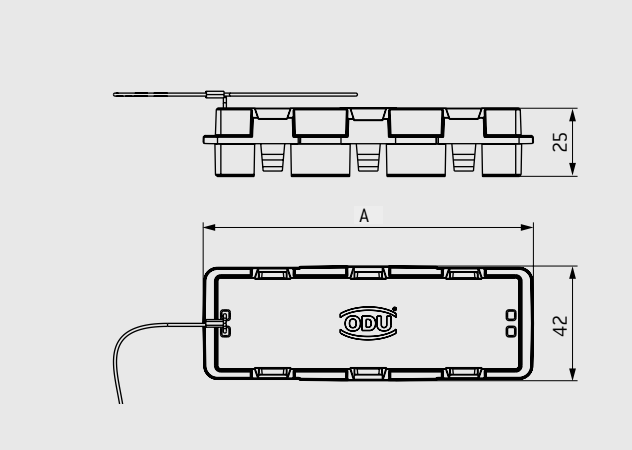
For ODU-MAC® RAPID housing and recessed version receptacle

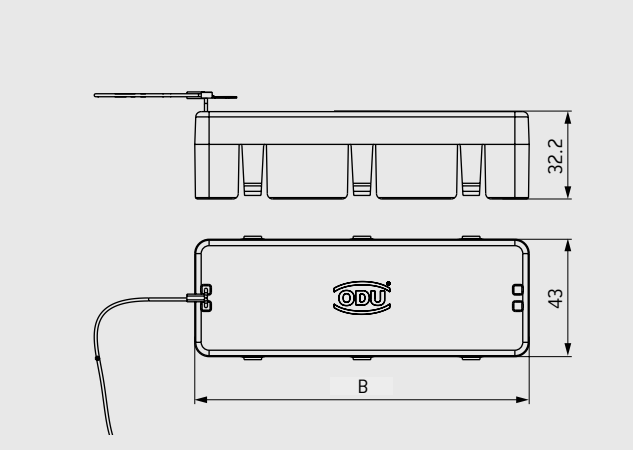
HOUSING



RECESSED-STYLE RECEPTACLE







TECHNICAL DATA

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

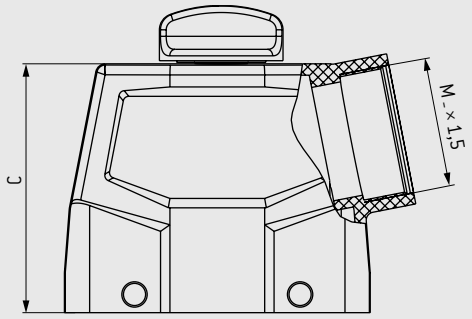
Size	Color	Part number protective cover for housing	Part number protective cover for recessed version receptacle	Lanyard length housing mm	Lanyard length recessed version receptacle mm	Dim. A mm	Dim. B mm
2	White	656.561.012.023.000	656.561.011.023.000	300	150	74	75.5
2	Black	656.561.012.018.000	656.561.011.018.000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

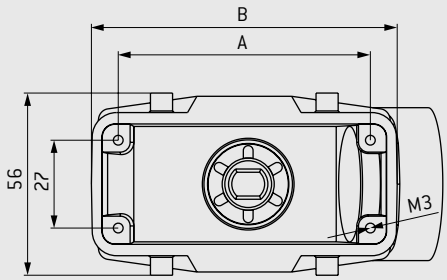
Table of contents

CABLE HOOD

Plastic cable hood for assembly on cable and side cable entry

SPINDLE LOCKING





TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
Protection class[1]	IP50
	IP65 on request
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 63
Number of locking cycles	see page 36

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. M cable entry	Part number protective cover (see page 53)
2	613.091.514.908.308	57	74	72.5	M32	491.097.613.908.001
3	613.092.514.908.308	77.5	94	76.5	M40	492.097.613.908.001
4	613.093.514.908.308	104	121	76.5	M40	493.097.613.908.001

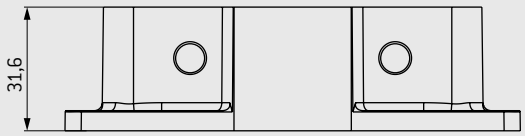
FOR A REDUCTION FROM M40 TO M32, SEE PAGE 63.

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

BULKHEAD MOUNTED HOUSING

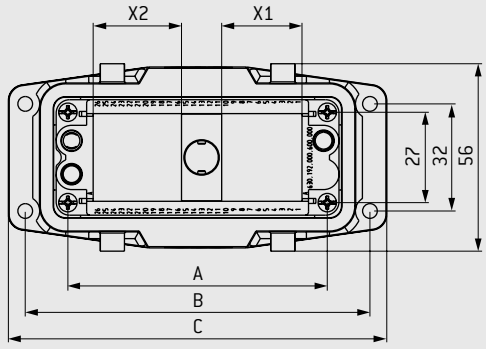
For assembly of your device with spindle locking

SPINDLE LOCKING



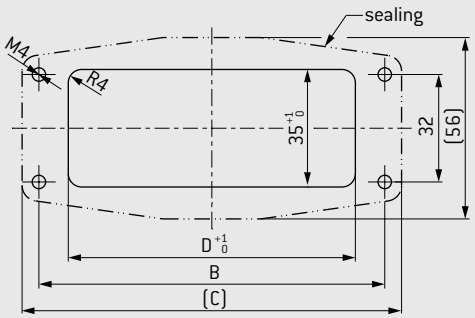
TECHNICAL DATA

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



The frames depicted must be ordered separately, see page 62.

PANEL CUT-OUT



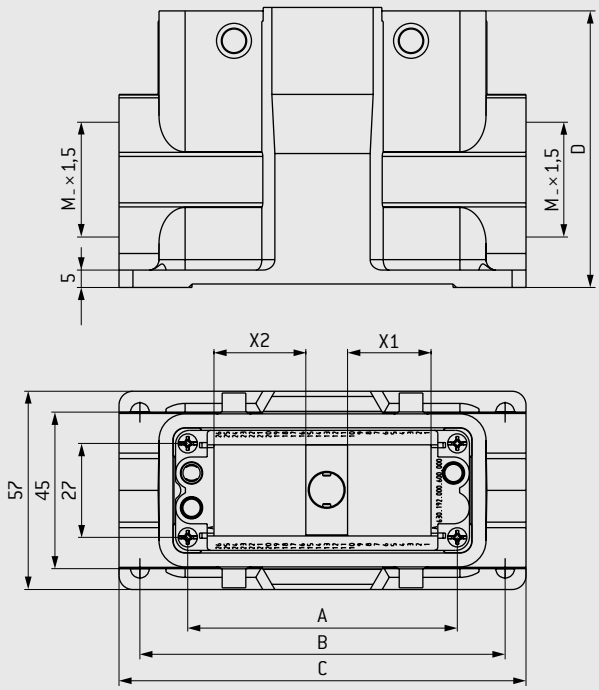
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D panel cut-out mm	X1 Units 2.54 mm	X2 Units 2.54 mm	Part number protective cover (see page 52)
2	612.091.010.908.000	57	83	93	67	5	6	491.097.612.908.001
3	612.092.010.908.000	77.5	103	114	87	9	10	492.097.612.908.001
4	612.093.010.908.000	104	130	140	114	14	15	493.097.612.908.001

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (Depends on the spindle type used).

SURFACE MOUNTED HOUSING

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

SPINDLE LOCKING



The frames depicted must be ordered separately, see page 62.

TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
Protection class[1]	IP50 / IP65
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material
Cable clamp	see page 63

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	X1 Units 2.54 mm	X2 Units 2.54 mm	Dim. M Cable entry	Part number protective cover (see page 52)
2	612.091.020.908.000	57	82	94	81.5	5	6	M32	491.097.612.908.001
3	612.092.020.908.000	77.5	105	117	81.5	9	10	M40	492.097.612.908.001
4	612.093.020.908.000	104	132	144	81.5	14	15	M40	493.097.612.908.001

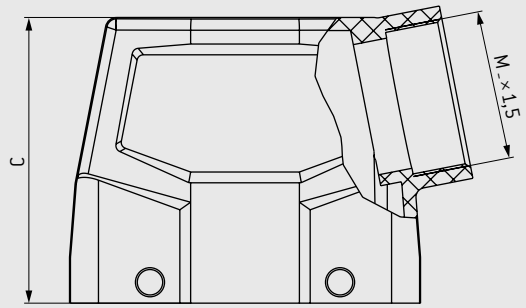
FOR A REDUCTION FROM M40 TO M32, SEE PAGE 63.

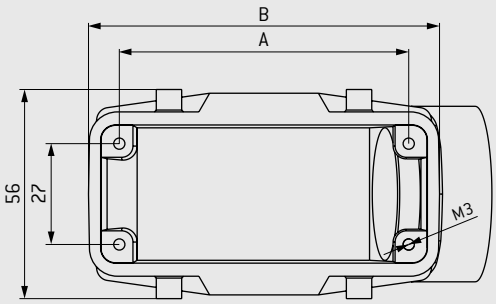
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (Depends on the cable clamp(s) and spindle type used).

CABLE HOOD

Plastic cable hood for assembly on cable and side cable entry

TRANSVERSE LOCKING





TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 63
Number of locking cycles	5,000

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. M Cable entry	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

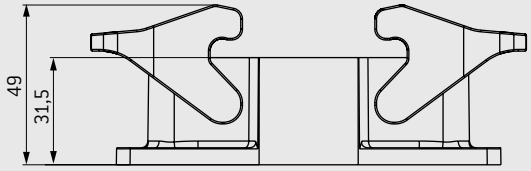
FOR A REDUCTION FROM M40 TO M32 AND FROM M32 TO M25, SEE PAGE 63.

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

BULKHEAD MOUNTED HOUSING

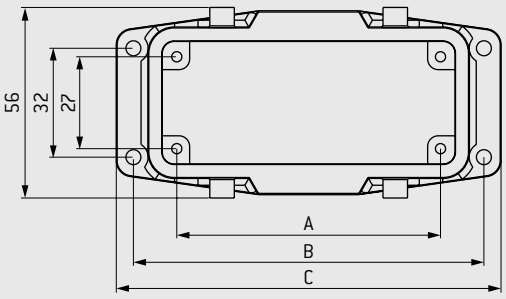
For assembly of your device with transverse locking

TRANSVERSE LOCKING

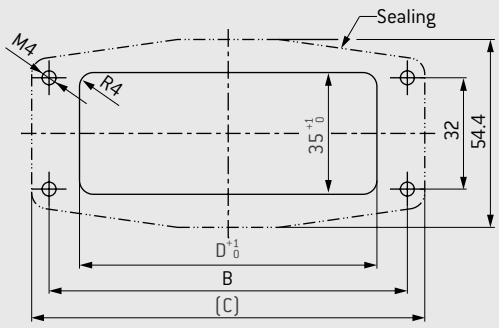


TECHNICAL DATA

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



PANEL CUT-OUT



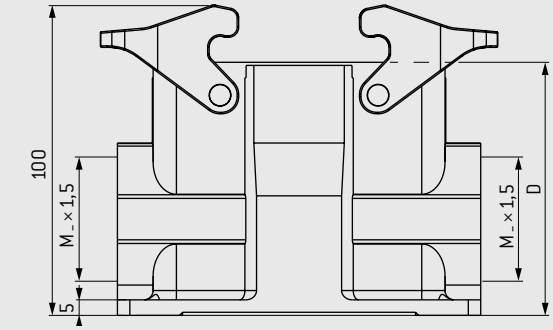
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D panel cut-out mm	Part number protective cover (see page 52)
1	490.120.600.908.000	44	70	80	53	490.097.612.908.000
2	491.120.600.908.000	57	83	93.2	66	491.097.612.908.000
3	492.120.600.908.000	77.5	103	113	86	492.097.612.908.000
4	493.120.600.908.000	104	130	140	113	493.097.612.908.000

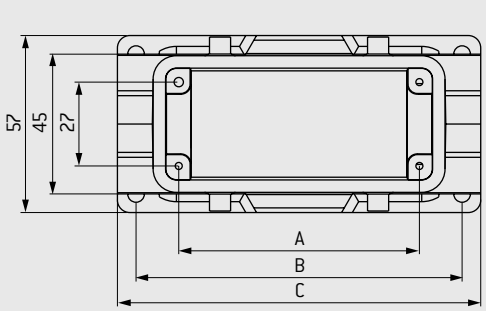
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (Depends on the cable hood used)

SURFACE MOUNTED HOUSING

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

TRANSVERSE LOCKING





TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material
Cable clamp	see page 63

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable entry	Part number protective cover (see page 52)
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 63.

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (Depends on the cable glamp and cable hood used).

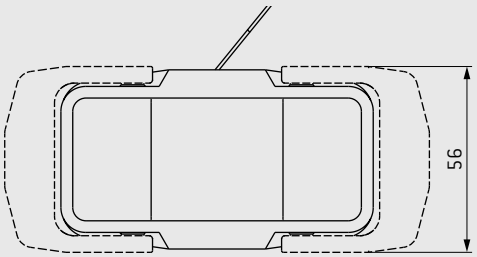
PROTECTIVE COVER

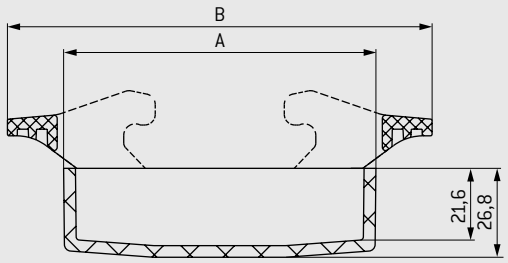
For bulkhead and surface mounted housing with lanyard

SPINDLE LOCKING A

TRANSVERSE LOCKING B

SPINDLE AND TRANSVERSE LOCKING





Dotted line and dim. B only applies for the spindle locking types.

TECHNICAL DATA

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

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

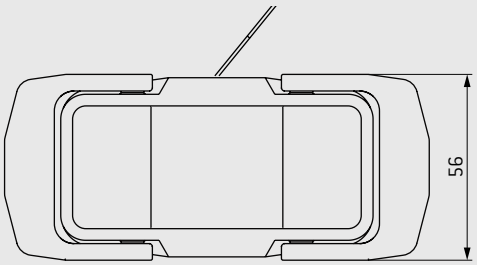
[1] IEC 60529:1989 (VDE 0470-1:2014-09)

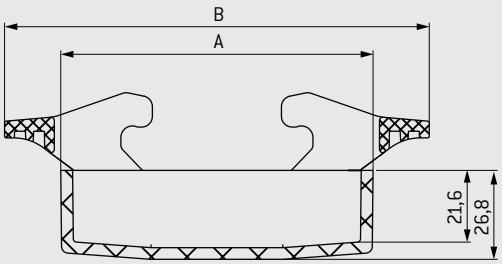
PROTECTIVE COVER

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
Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material
Locking	via the transverse lever locking included in the delivery

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

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

CABLE HOOD

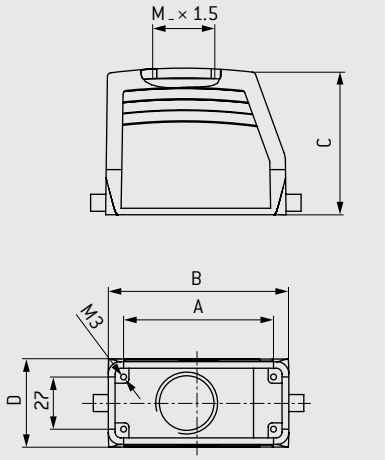
Connector housing for assembly on the cable – with straight and side cable entry

LEVER LOCKING

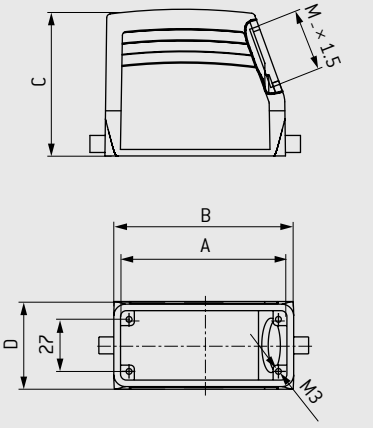
A TOP CABLE ENTRY

B SIDE CABLE ENTRY

A TOP CABLE ENTRY



B SIDE CABLE ENTRY



TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 63
Adapter	for PG clamp see page 64

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

Size	Part number A Top cable entry	Part number B Side cable entry	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable entry	Part number protective cover (see page 61)
1	490.214.450.644.102	490.414.450.644.102	44	60	52	43	M25	490.097.500.644.000
	490.215.450.644.102	490.415.450.644.102			72		M32	
2	491.214.450.644.102	491.414.450.644.102	57	73	52	43	M25	491.097.212.644.000
	491.215.450.644.102	491.415.450.644.102			72		M32	
3	492.215.450.644.102	492.415.450.644.102	77.5	93.5	76	45.5	M32	492.097.214.644.000
	492.216.550.644.000	–					M40	
4	493.215.450.644.102	493.415.450.644.102	104	120	76	45.5	M32	493.097.214.644.000
	493.217.550.644.000	493.417.550.644.000					M40	

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

CABLE HOOD XXL

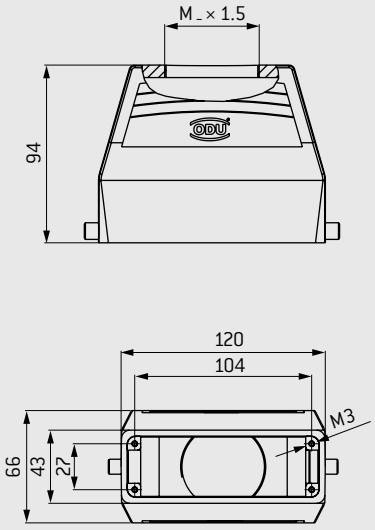
Connector housing for assembly on the cable – with expanded assembly space as well as side and top M50 cable entry

LEVER LOCKING

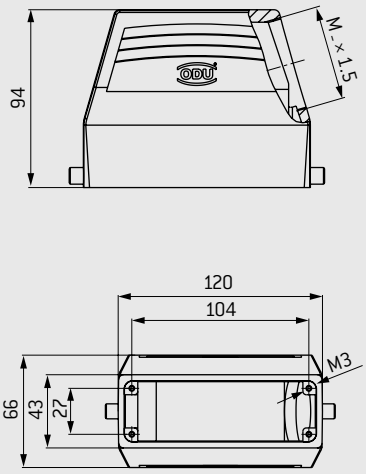
A TOP CABLE ENTRY

B SIDE CABLE ENTRY

A TOP CABLE ENTRY



B SIDE CABLE ENTRY



TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 63

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

Size	Part number A Top cable entry	Part number B Side cable entry	Dim. M Cable entry	Part number protective cover (see page 61)
4	493.218.550.644.000	493.419.550.644.000	M50	493.097.214.644.000

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

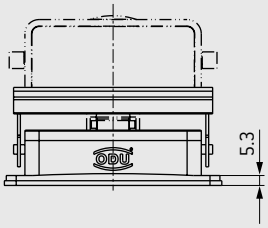
BULKHEAD MOUNTED HOUSING

For mounting on the device

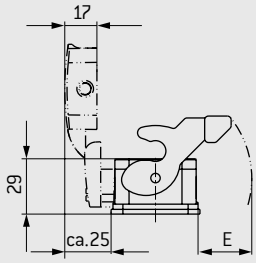
LEVER LOCKING

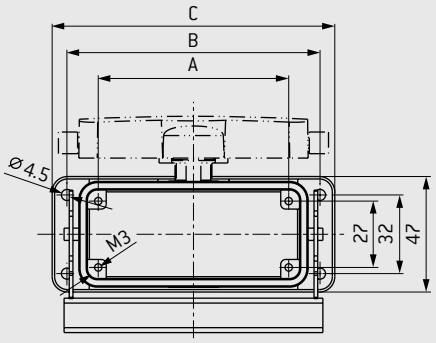
A WITHOUT COVER

B WITH COVER

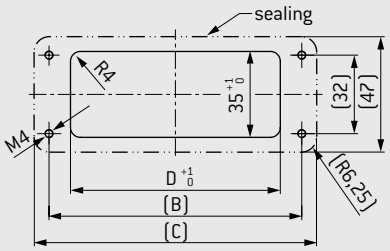


Lever locking (just an example)





PANEL CUT-OUT



TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85°C (operating)
Sealing	NBR; sealing material FKM on request (higher temperature range)

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

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

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

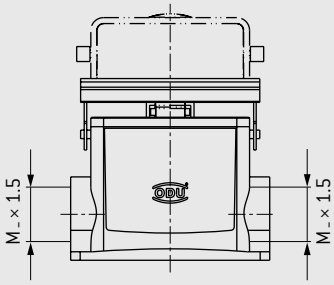
SURFACE MOUNTED HOUSING

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

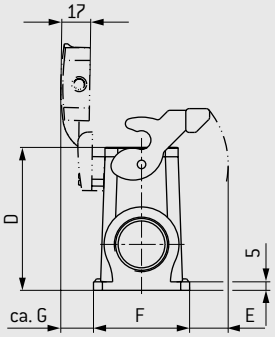
LEVER LOCKING

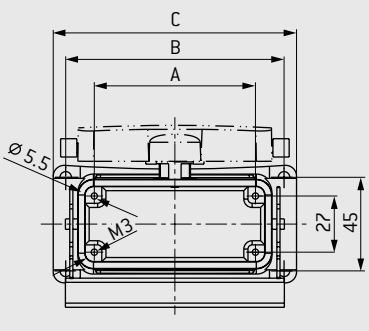
A WITHOUT COVER

B WITH COVER



Lever locking (just an example)





TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85 °C (operating)
Sealing	NBR; sealing material FKM on request (higher temperature range)
Adapter	for PG clamp see page 64

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

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

M40 CABLE ENTRY AVAILABLE UPON REQUEST.

[1] IEC 60529:1989 (VDE 0470-1:2014-09) (Depends on the base and hood cable clamps used).

Table of contents

CABLE HOOD WIDE

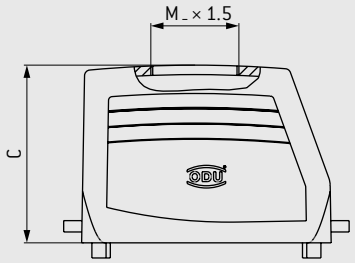
With straight and side cable entry for double contact arrangement on the frame

LEVER LOCKING

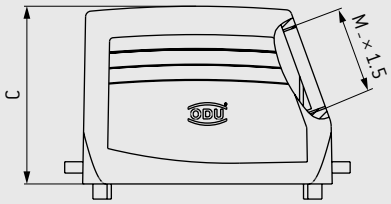
A TOP CABLE ENTRY

B SIDE CABLE ENTRY

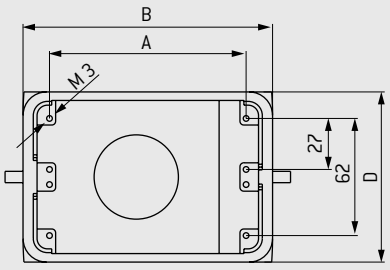
A TOP CABLE ENTRY



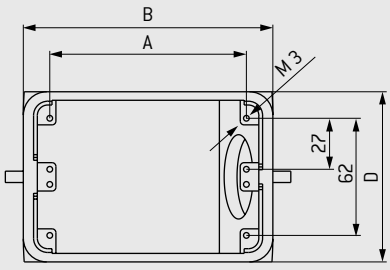
B SIDE CABLE ENTRY



A TOP CABLE ENTRY



B SIDE CABLE ENTRY



TECHNICAL DATA

Color of housing	Gray (standard, similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP65 in mated condition
Operating temperature	without housing sealing: –40 °C to +125 °C
Cable clamp	see page 63

Housing suitable for two standard frames size 3 or 4.

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

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

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

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

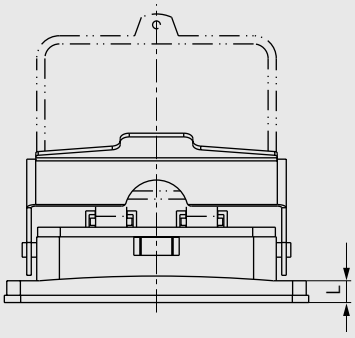
BULKHEAD MOUNTED HOUSING FOR CABLE HOOD WIDE

For mounting on the device

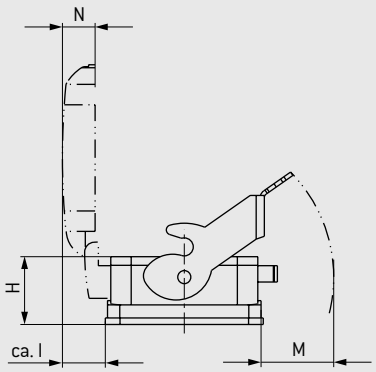
LEVER LOCKING

A WITHOUT COVER

B WITH COVER



Lever locking (just an example)

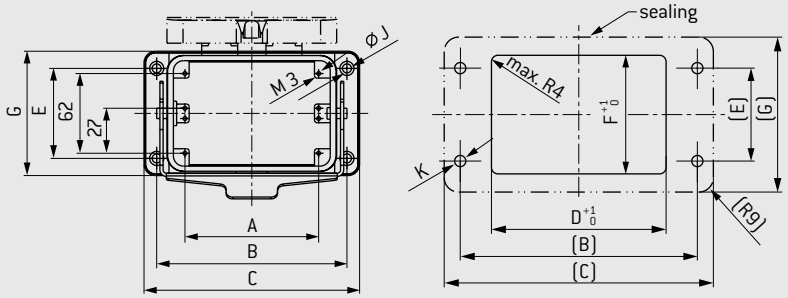


TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85 °C (operating)
Sealing	NBR; sealing material FKM on request (higher temperature range)

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

PANEL CUT-OUT



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

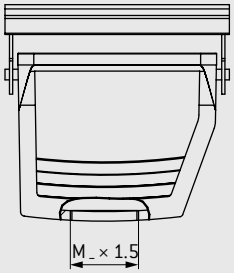
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (Depends on the hood cable clamp(s) used).

Table of contents

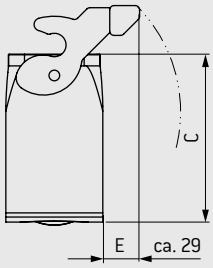
CABLE TO CABLE HOOD

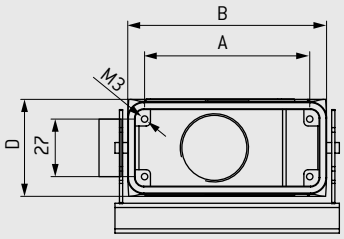
With top cable entry – for a flying cable to cable connection

LEVER LOCKING



Lever locking (just an example)





TECHNICAL DATA

To build a cable to cable connection. Suitable for use with cable hoods (page 54).

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminium die casting
Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85 °C (operating)
Sealing	NBR; sealing material FKM on request (higher temperature range)
Cable clamp	see page 63
Adapter	for PG clamp see page 64

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

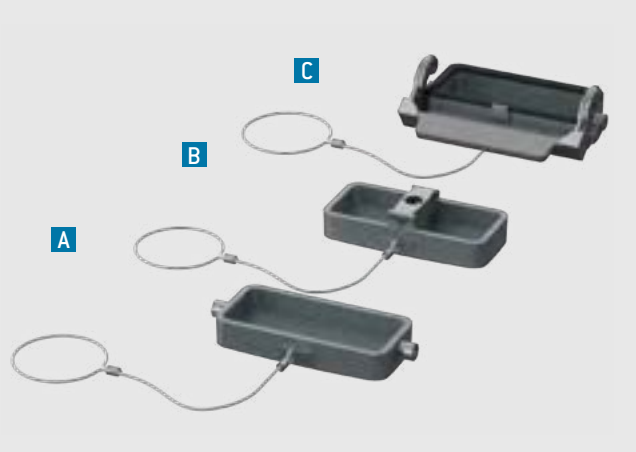
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable entry	Part number Protective cover (see page 61))
1	490.331.450.644.102	44	60	75	43	M32	490.097.500.644.001
2	491.331.450.644.102	57	73	75	43		491.097.133.644.000
3	492.331.450.644.102	77.5	93.3	79	45.5		492.097.133.644.000
4	493.331.450.644.102	104	120	79	45.5		493.097.133.644.000

M40 CABLE ENTRY AVAILABLE UPON REQUEST.

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

PROTECTIVE COVER

For metal housing



TECHNICAL DATA

Color	Gray (standard, similar to RAL 7001)

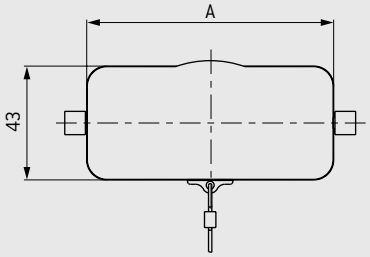
Protection class IP65 in locked condition
Metal protective cover with locking latch (C)
Metal protective cover with bolt and lanyard (A)

Protection class IP42 in locked condition

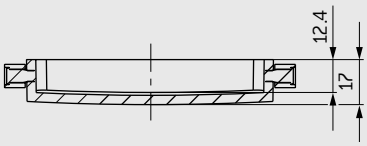
Metal protective cover	with middle section for spindle locking with lanyard (B)
Material	Aluminium die casting (body)
Temperature range	–40 °C to +125 °C
Sealing	NBR; sealing material

A METAL PROTECTIVE COVER

for bulkhead mounted, surface mounted housing and cable-to-cable-hoods

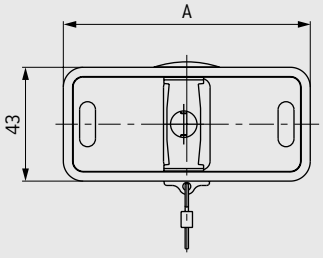


A VIEW WITHOUT LANYARD

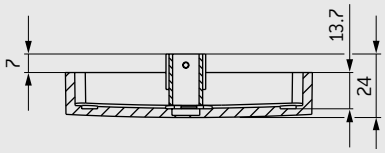


B METAL PROTECTIVE COVER

for cable hood and cable hood XXL for spindle locking

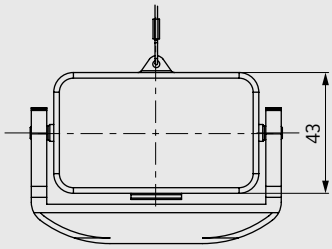


B VIEW WITHOUT LANYARD



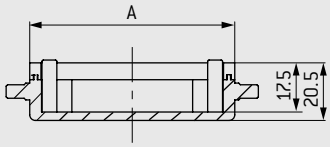
C METAL PROTECTIVE COVER

for cable hood and cable hood XXL for lever locking



Lever locking just an example.

C VIEW WITHOUT LOCKING LATCH



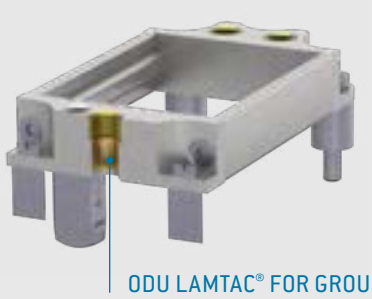
Size	IP65 Part number A Metal protective cover with bolt and lanyard	IP42 Part number B[1] Metal protective cover for spindle locking with lanyard and middle section	IP65 Part number C Metal protective cover with locking latch	Dim. A mm
1	490.097.500.644.001	–	490.097.500.644.000	60
2	491.097.133.644.000	491.097.613.644.000	491.097.212.644.000	73
3	492.097.133.644.000	492.097.613.644.000	492.097.214.644.000	93.5
4/XXL	493.097.133.644.000	493.097.613.644.000	493.097.214.644.000	120

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

Table of contents

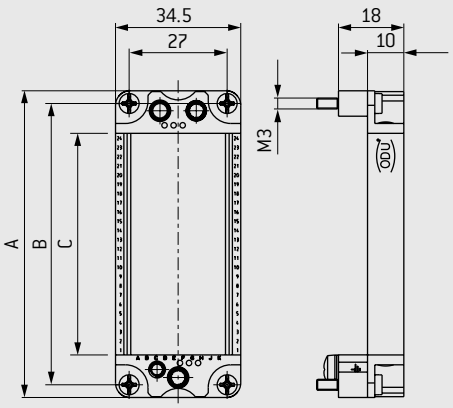
ODU-MAC® FRAME FOR HOUSING

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



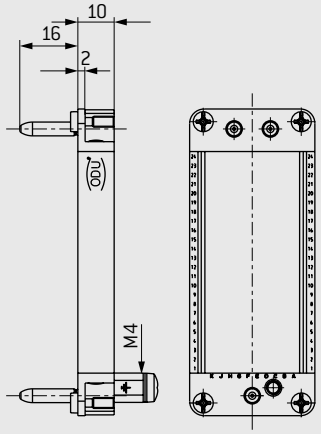
ODU LAMTAC® FOR GROUND CONTACT
with a maximum of 6 mm² termination

SOCKET FRAME WITH GUIDING BUSHES



Sockets in bulkhead mounted housing recessed-style, cable to cable hood or surface mounted housing. Pins in cable hood. Modules are mounted, contacts are not fixed enclosed. Coding possibilities see page 66.

PIN FRAME WITH GUIDING PIN



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

Size	Part number Socket frame	Part number Pin frame	Max. units 2.54 mm[1]	Dim. A mm	Dim. B mm	Dim. C mm
ZERO	No frame required.	No frame required.	9	–	–	–
1	610.190.000.600.000	611.190.000.600.000	10	51	44	25.5
2	610.191.000.600.000	611.191.000.600.000	16	64	57	40.8
3	610.192.000.600.000	611.192.000.600.000	24	84.5	77.5	61.1
4/XXL	610.193.000.600.000	611.193.000.600.000	34	111	104	86.5
RAPID						
2	610.191.000.600.000	611.191.004.600.000	16	64	57	40.8
4	610.193.000.600.000	611.193.004.600.000	34	111	104	86.5
FRAMES FOR CABLE HOOD WIDE						
5	2 × part number size 3	2 × part number size 3	2 × 24	84.5	77.5	61.1
6	2 × part number size 4	2 x part number size 4	2 × 34	111	104	86.5

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

[1] If the configuration doesn't fill the frame completely, please use blank modules (see page 152).

CABLE CLAMP AND REDUCING RING

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

TECHNICAL DATA

Material Body	PA
Sealing	NBR; sealing material
Protection class	IP68 to 5 bar
Temperature range	–40 °C to +100 °C

EMC clamp on request.

Part number	Thread	Color	Width across flats	Tightening torque Nm	Cable diameter mm min.	Cable diameter mm max.
027.825.060.130.007	M25 × 1.5	Silver Gray (RAL 7001)	30	8	6	13
027.825.090.170.007					9	17
027.832.070.150.007	M32 × 1.5		36	10	7	15
027.832.110.210.007					11	21
027.840.190.280.007	M40 × 1.5		46	13	19	28
027.850.270.350.007	M50 × 1.5		55	15	27	35
027.825.060.130.003	M25 × 1.5	Light Gray (RAL 7035)	30	8	6	13
027.825.090.170.003					9	17
027.832.070.150.003	M32 × 1.5		36	10	7	15
027.832.110.210.003					11	21
027.840.190.280.003	M40 × 1.5		46	13	19	28
027.832.070.150.008	M32 × 1.5	Black (RAL 9005)	36	10	7	15
027.832.110.210.008					11	21
027.840.190.280.008	M40 × 1.5		46	13	19	28

REDUCING RING FOR PLASTIC HOUSING

TECHNICAL DATA

Color	Black (RAL 9005)
Material	Plastic PA6 GF20, UL 94-V0
Protection class	IP65
Temperature range	–40 °C to +125 °C
Sealing	NBR; sealing material

Part number	External thread	Internal thread
921.000.006.000.360	M32 × 1.5	M25 × 1.5
921.000.006.000.356	M40 × 1.5	M32 × 1.5

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

ADAPTER RING, BLIND GROMMET

ADAPTER RING FOR CABLE CLAMPS WITH PG THREAD

TECHNICAL DATA

Material Nickel-plated brass

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

BLIND GROMMET FOR SURFACE MOUNTED HOUSING

TECHNICAL DATA

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

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

PROTECTIVE TRANSPORT COVER FOR METAL HOUSINGS

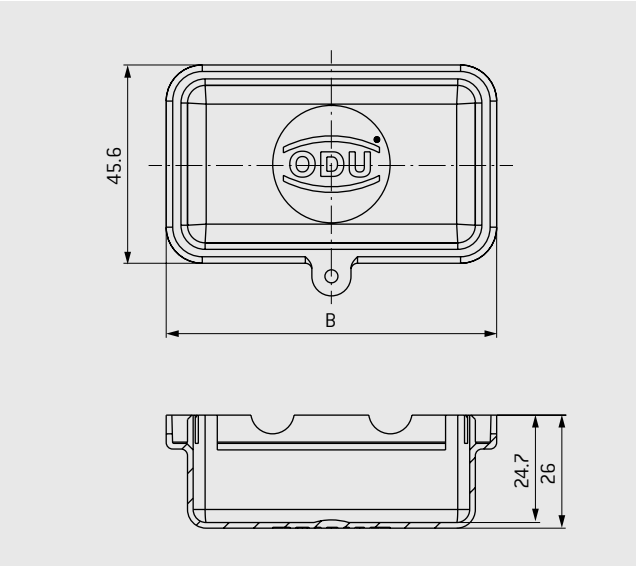
For protecting the assembled cable hood during transport

TECHNICAL DATA

Material	Plastic
Color	Black (similar to RAL 9002)

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

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



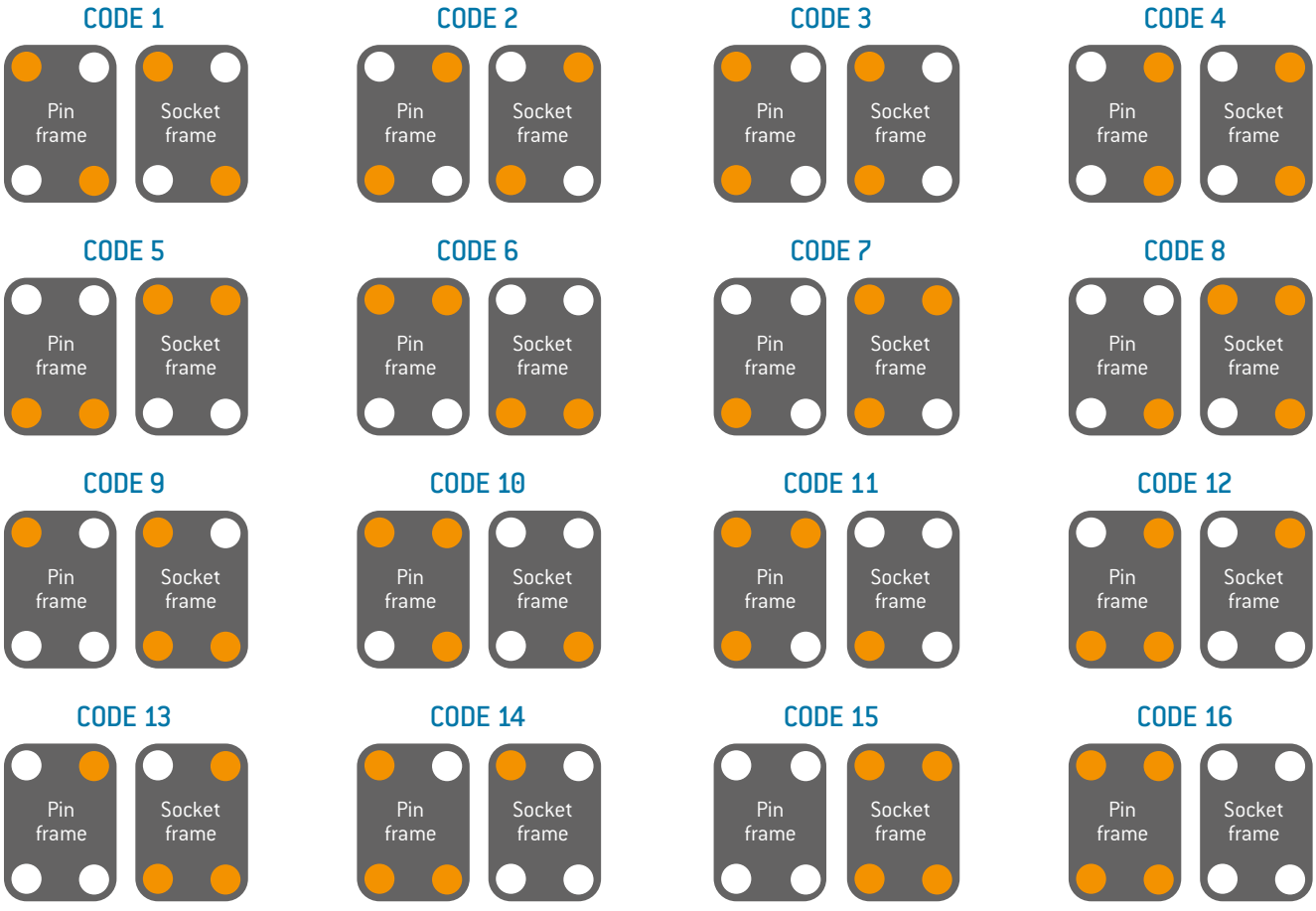
CODING POSSIBILITES FOR HOUSINGS WITH LEVER LOCKING

To prevent mismating

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

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

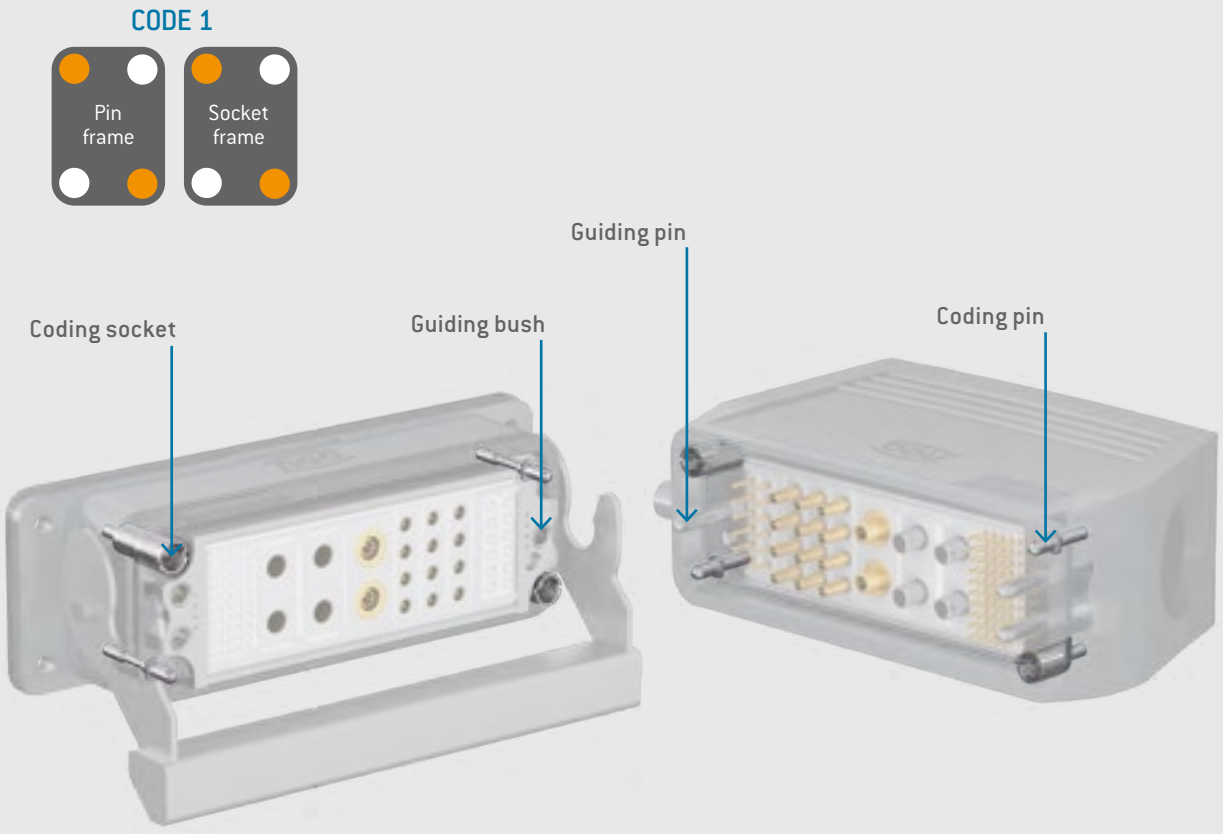
CODING OPTIONS

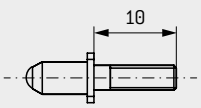
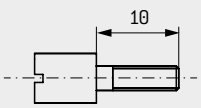
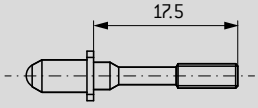
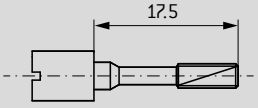


● = Coding pin

○ = Coding socket

CODING EXAMPLE



Frame	Part number matching the frame no.	Coding	
		Part number pin	Part number socket
Pin	611.19X.000.600.000	611.090.303.902.000 	610.090.304.902.000 
Socket	610.19X.000.600.000	611.090.304.902.000 	610.090.303.902.000 

PART NUMBER BASIC TOOL, SCREWDRIVER / 1.2 Nm: 598.054.002.000.000
PART NUMBER TOOL INSERT FOR CODING PIN: 598.054.203.000.000
PART NUMBER TOOL INSERT FOR CODING SOCKET: 598.054.110.000.000

An overview of all tools is on page 164.

CODING POSSIBILITES FOR HOUSINGS WITH SPINDLE LOCKING

To prevent mismating

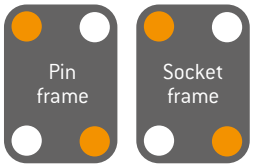
In order to prevent mismating, it is in some cases useful to provide the connection systems with a coding system.

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

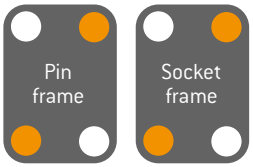
Alternatively, if additional coding options are required, ODU offers an innovative option with the coded spindle, see page 70.

CODING OPTIONS

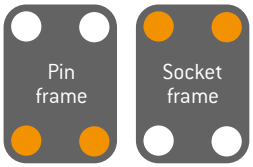
CODE 1



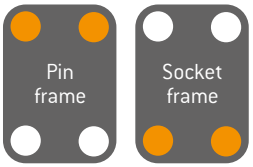
CODE 2



CODE 5



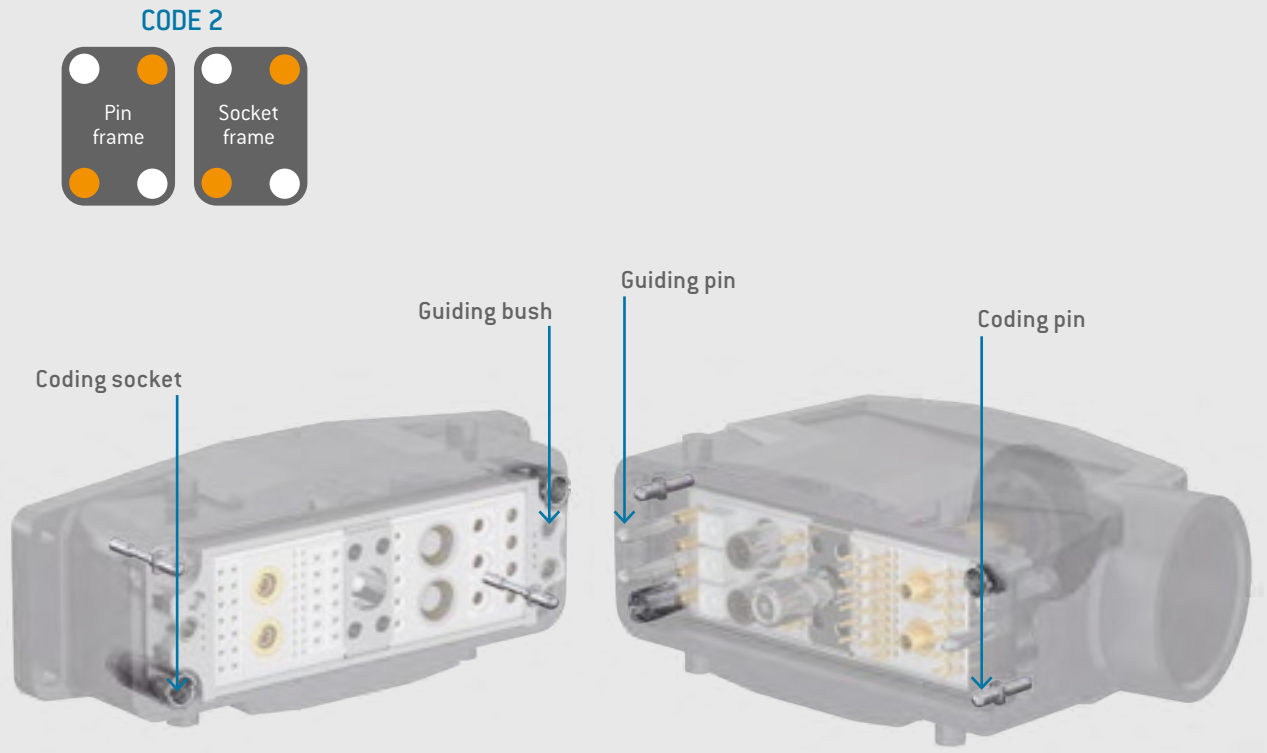
CODE 6

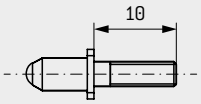
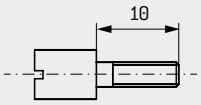
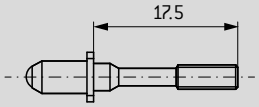
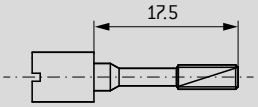


= Coding pin

= Coding socket

CODING EXAMPLE



Frame	Part number matching the frame no.	Coding	
		Part number pin	Part number socket
Pin	611.19X.000.600.000	611.090.303.902.000 	610.090.304.902.000 
Socket	610.19X.000.600.000	611.090.304.902.000 	610.090.303.902.000 

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

An overview of all tools is on page 164.

CODING OPTIONS FOR CODED SPINDLE

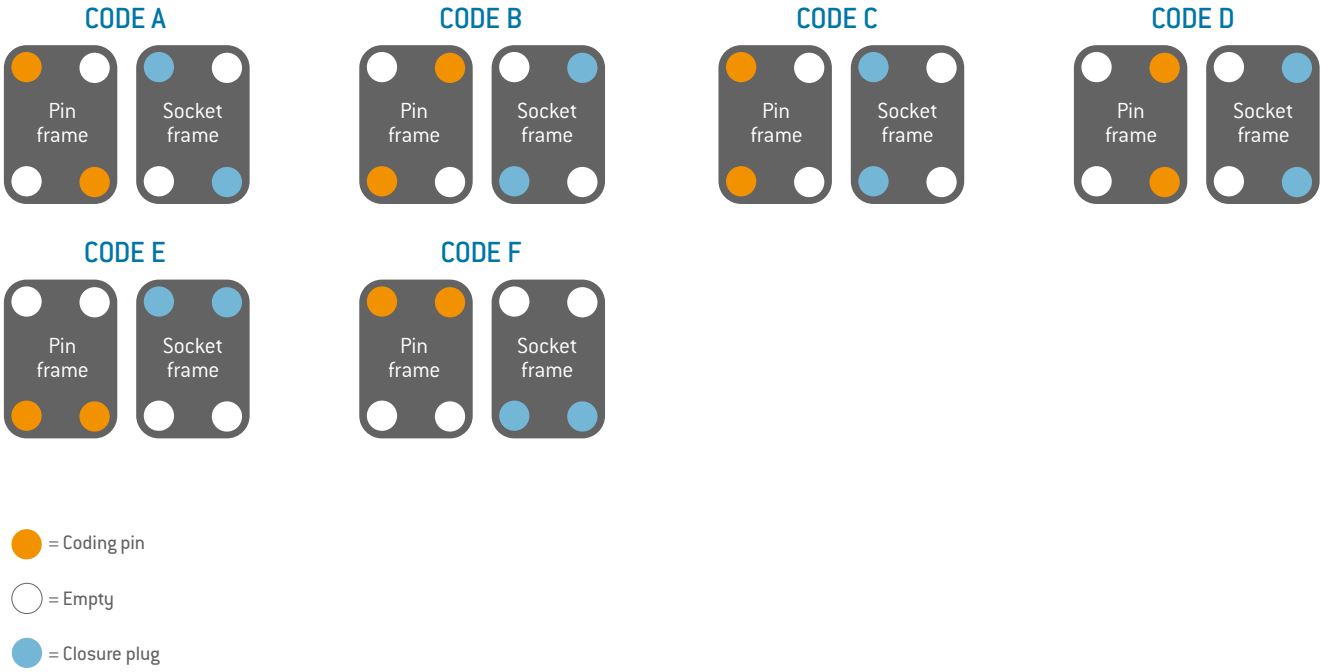
To prevent mismating

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

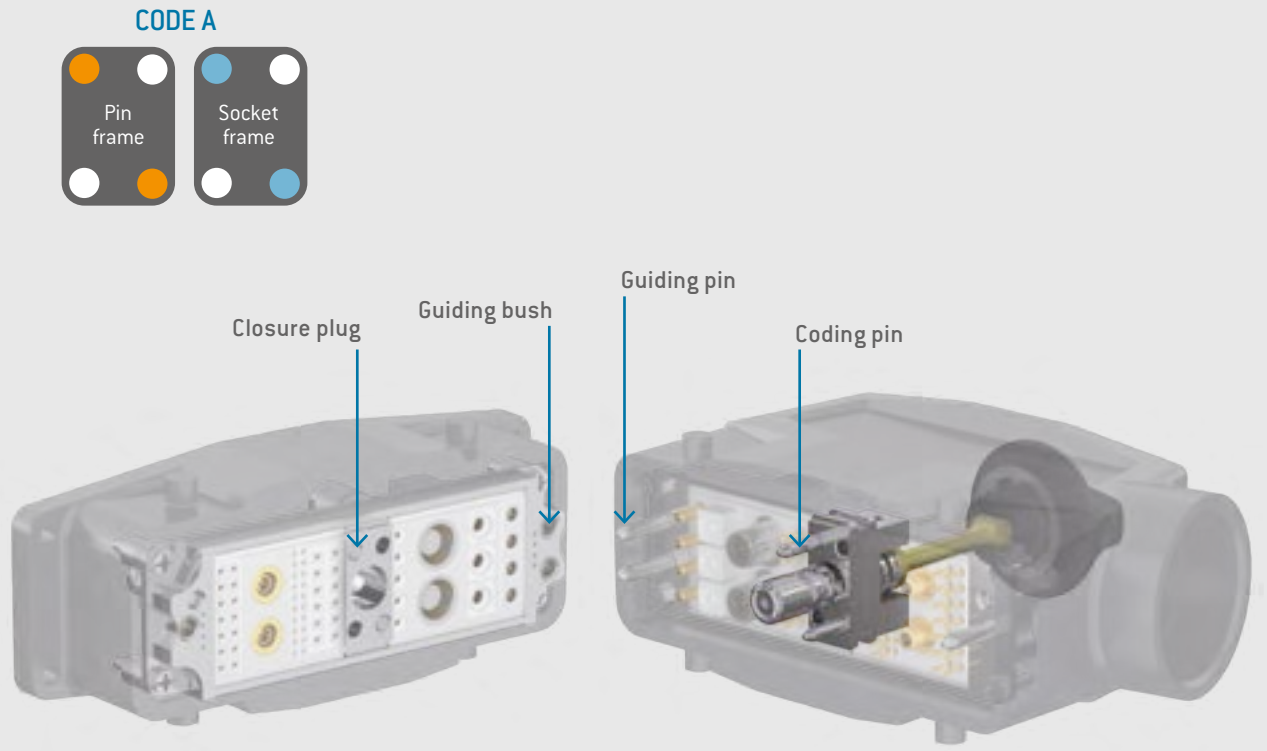
For this purpose, ODU has developed innovative coding to provide housing variation that is directly integrated into the spindle of the ODU-MAC®. ODU provides up to six different coding options with the installation of 2 coding pins in the spindle locking and 2 closure plugs in the center module. If several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

Reversed gender version on request only.

CODING OPTIONS



CODING EXAMPLE



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

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

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

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

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

An overview of all tools is on page 164.

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

ODU-MAC®

Table of contents

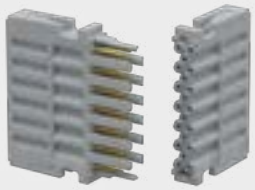
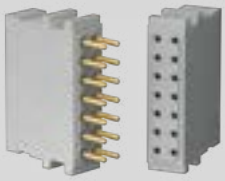
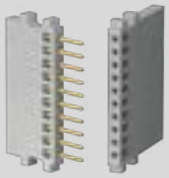
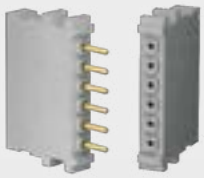
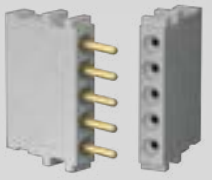
MODULES

Table of contents

OVERVIEW OF ALL MODULES

Non-magnetic

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

	Modules	Description	Units / width	Features		Page
Signal		20 contacts Contact-Ø: 0.76 mm	2 Unit 5.08 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles Highest contact density	250 V 1,500 V 11 A for 0.38 mm² 2 minimum 100,000	80
		14 contacts Contact-Ø: 1.02 mm	3 Units 7.62 mm	Operating voltage[1] Rated impulse voltage1 Max. continuous current[2] Degree of pollution[1] Mating cycles	320 V 2,500 V 13.5 A for 0.5 mm² 2 minimum 100,000	82
		10 contacts Contact-Ø: 0.76 mm	1 Unit 2.54 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles	250 V 1,500 V 11 A for 0.38 mm² 2 minimum 100,000	84
		10 contacts for stamped contacts Contact-Ø: 0.7 mm	1 Unit 2.54 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles Economical solution	32 V 1,500 V 6 A for 0.38 mm² 2 minimum 5,000	86
		6 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 minimum 100,000	88
		5 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 minimum 100,000	90
Power		4 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 41 A for AWG 12 2 minimum 100,000	92

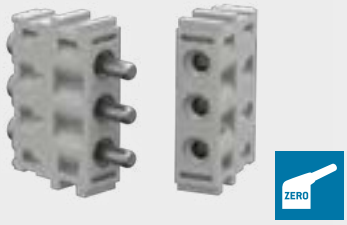
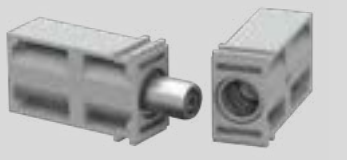
[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008-01) for degree of pollution 2. [2] Definition max. continuous current see page 177.

Table of contents

OVERVIEW OF ALL MODULES

Non-magnetic

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

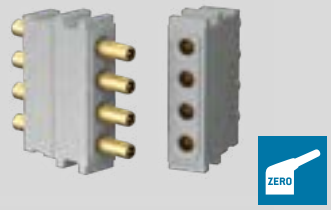
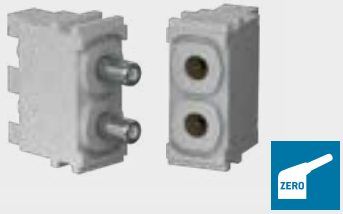
	Modules	Description	Units / width	Features	Page
Power		3 contacts Contact-Ø: 3 mm	3 Units 7.62 mm	Operating voltage[1] 500 V Rated impulse voltage[1] 3,000 V Max. continuous current[2] 58 A for 6 mm² Degree of pollution[1] 2 Mating cycles minimum 100,000	94
		3 contacts Contact-Ø: 3 mm	4 Units 10.16 mm	Operating voltage[1] 2,500 V Rated impulse voltage[1] 10,000 V Max. continuous current[2] 58 A for 6 mm² Degree of pollution[1] 2 Mating cycles minimum 100,000 High-voltage	96
		2 contacts Contact-Ø: 5 mm	5 Units 12.7 mm	Operating voltage[1] 1,000 V Rated impulse voltage[1] 4,000 V Max. continuous current[2] 119 A for 16 mm² Degree of pollution[1] 2 Mating cycles minimum 100,000	98
High-current		2 contacts with ODU SPRINGTAC® [3] Contact-Ø: 8 mm	6 Units 15.24 mm	Operating voltage[1] 500 V Rated impulse voltage[1] 3,000 V Max. continuous current[2] 142 A for 25 mm² Degree of pollution[1] 2 Mating cycles minimum 100,000	100
		2 contacts with ODU LAMTAC® [4] Contact-Ø: 8 mm	6 Units 15.24 mm	Operating voltage[1] 500 V Rated impulse voltage[1] 3,000 V Max. continuous current[2] 154 A for 25 mm² Degree of pollution[1] 2 Mating cycles minimum 10,000	102
		1 contact with ODU LAMTAC® [4] Contact-Ø: 10 mm or Contact-Ø: 12 mm	7 Units 17.78 mm for both versions	Model 10 mm / 12 mm Operating voltage[1] 500 V / 400 V Rated impulse voltage[1] 4,000 V / 3,000 V Max. continuous current[2] 180 A for 35 mm² / 225 A for 50 mm² Degree of pollution[1] 2 / 2 Mating cycles min. 10,000 / min. 10,000 Highest current	104

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008-01) for degree of pollution 2. [2] Definition max. continuous current see page 177. [3] Contact with springwire technology. [4] Contact with lamella technology.

OVERVIEW OF ALL MODULES

Non-magnetic

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

	Modules	Description	Units /width	Features		Page
PE		1 contact with ODU LAMTAC®[3] Contact-Ø: 10 mm	5 Units 12.7 mm	Mating cycles Conductor cross-section	minimum 10,000 10 / 16 / 25 mm²	106
High-voltage		4 contacts Contact-Ø: 1.5 mm	3 Units 7.62 mm	Operating voltage[1] Rated impulse voltage[1] Max. continuous current[2] Degree of pollution[1] Mating cycles ⊕ High contact density, high-voltage	2,500 V 10,000 V 27 A for 1.5 mm² 2 minimum 100,000	108
		1 contact Contact-Ø: 2 mm	8 Units 20.32 mm	Operating voltage[1] Rated impulse voltage[1] Degree of pollution[1] Mating cycles ⊕ High-voltage	6,300 V 20,000 V 2 minimum 10,000	110
RF-signal (coax)		4 contacts for 50 Ω RF-signal (coax) contacts	3 Units 7.62 mm	Frequency range Mating cycles ⊕ High contact density	0 to 1.3 GHz minimum 60,000	112
		2 contacts for 50 Ω RF-signal (coax) contacts SMA termination	5 Units 12.7 mm	Frequency range Mating cycles ⊕ 9.0 GHz	0 to 9.0 GHz minimum 100,000	114
		2 contacts for 50 Ω RF-signal (coax) contacts	5 Units 12.7 mm	Frequency range Mating cycles	0 to 2.4 GHz minimum 100,000	116

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008-01) for degree of pollution 2. [2] Definition max. continuous current see page 177.
[3] Contact with lamella technology

OVERVIEW OF ALL MODULES

Non-magnetic

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

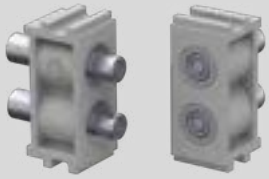
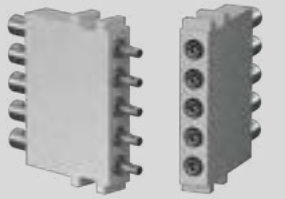
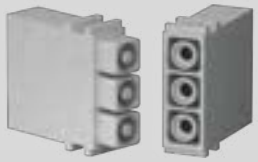
	Modules	Description	Units / width	Features		Page
RF-signal (coax)		2 contacts for 50 Ω RF-signal (coax) contacts	5 Units 12.7 mm	Frequency range Mating cycles + High voltage	0 to 2.8 GHz minimum 100,000	118
		2 contacts for 75 Ω RF-signal (coax) contacts	5 Units 12.7 mm	Frequency range Mating cycles	0 to 3.0 GHz minimum 100,000	120
Compressed air and fluid modules		2 contacts for compressed air valves	5 Units 12.7 mm	Tube diameter Mating cycles + 20 bar	M5 or max. 4 mm minimum 100,000	122
		2 contacts for compressed air valves	16 Units 40.64 mm	Tube diameter Inner diameter tube Mating cycles + 12 bar	max. 6 mm max. 6 mm minimum 100,000	124
		1 contact for compressed air valve	8 Units 20.32 mm	Tube diameter Inner diameter tube Mating cycles + 12 bar	max. 6 mm max. 6 mm minimum 100,000	126
		2 contacts for fluid coupling plug	5 Units 12.7 mm	Tube diameter Mating cycles + 16 bar	M5 internal thread minimum 100,000	128

Table of contents

OVERVIEW OF ALL MODULES

Non-magnetic

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

	Modules	Description	Units/width	Features	Page
Compressed air and fluid modules		1 contact for fluid coupling plug	9 Units 22.86 mm	Inner diameter tube G1/4 Mating cycles minimum 100,000 + 25 bar	132
Fiber optic		5 contacts for fiber optic POF	2 Units 5.08 mm	Insertion loss typical 1.5 dB for 670 nm Mating cycles minimum 40,000 + High contact density	136
		2 contacts for fiber optic POF	5 Units 12.7 mm	Insertion loss typical 1.5 dB for 670 nm Mating cycles minimum 100,000	138
		3 contacts for fiber optic GOF	4 Units 10.16 mm	Insertion loss typical 1 dB for 670 nm Mating cycles minimum 100,000	140
Shielded implementation / high-speed connector		2 to 10 contacts for inserts size 0	5 Units 12.7 mm	Mating cycles minimum 10,000 Suitable for all common bus systems USB® 1.1[1], USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire®[1], Ethernet, CAT 5, SPE 1000BASE-T1	144
		2 to 14 contacts for inserts size 1	6 Units 15.24 mm	Suitable for all common bus systems USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire®[1], Ethernet, CAT 5, SPE 1000BASE-T1 + Mating cycles with ODU TURNTAC® min. 10,000 + Mating cycles with ODU SPRINGTAC® min. 60,000	146

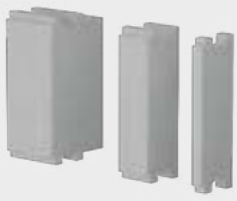
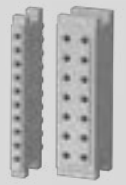
[1] Concerning data transmission protocols please note page 2.

Table of contents

OVERVIEW OF ALL MODULES

Non-magnetic

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

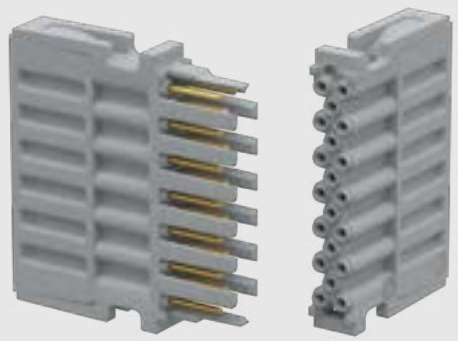
	Modules	Description	Units /width	Features	Page
Shielded implementation / high-speed connector		4 to 16 contacts for inserts size 2	7 Units 17.78 mm	Suitable for all common bus systems USB® 3.2 Gen 1x2[1], Ethernet, CAT 5, CAT 6_A, HDMI®[1], DisplayPort®[1]2.0, SPE 1000BASE-T1 ⊕ Mating cycles with ODU TURNTAC® min. 10,000 ⊕ Mating cycles with ODU SPRINGTAC® min. 60,000	148
		10 to 30 contacts for inserts size 3	8 Units 20.32 mm	Mating cycles minimum 10,000 Suitable for all common bus systems Ethernet	150
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.	152
		Spacer module	1 Unit 2.54 mm 2 Units 5.08 mm 3 Units 7.62 mm 5 Units 12.7 mm	Not equipped with retaining clips. The populated pin modules on mating connectors can still be inserted into these spacers without interference. For information on the individual spacer modules please look at the corresponding modules.	153
		Coding modules	1 Unit 2.54 mm	Arranged between the modules to create keyed guiding system.	154
		Pin protection modules	1 Unit 2.54 mm	Used to protect the pins in conjunction with small pin diameters.	155

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

MODULE 20 CONTACTS

Pin protection against mechanical damage

SIGNAL



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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Crimp information see page 158.
- 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

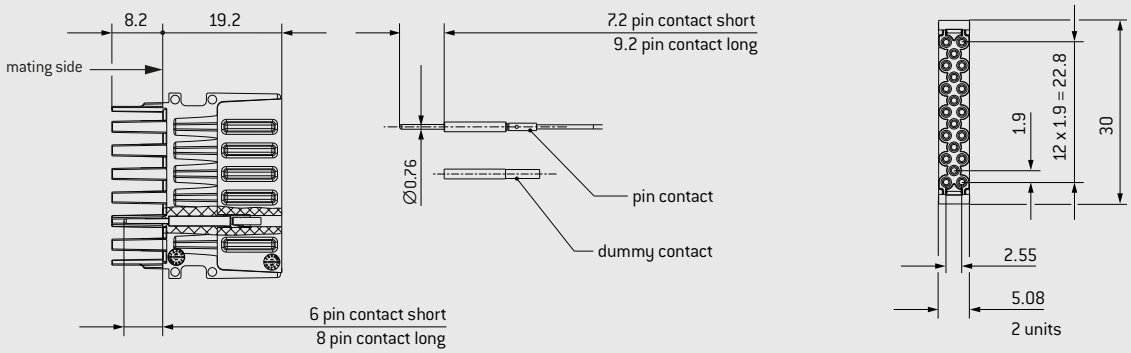
For an overview of all tools please see from page 164.

TECHNICAL DATA

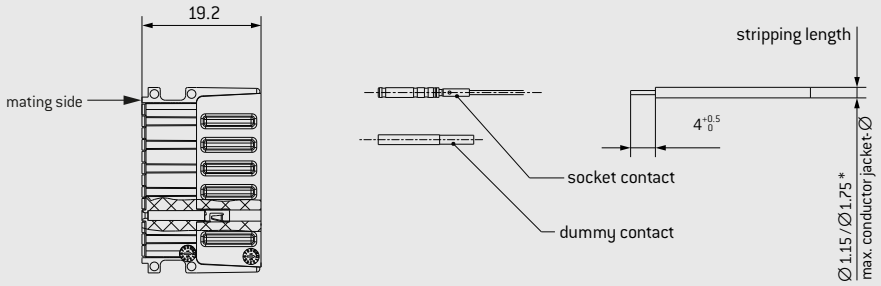
Voltage information[2]		
Operating voltage	250 V	50 V
Rated impulse voltage	1,500 V	1,500 V
Degree of pollution	2	3
Voltage information acc. to MIL[3]		
Operating voltage	500 V	
Test voltage	1,500 V	
Mechanical data		
Total mating force (average)	27 N / Module	
Total sliding force (average)	19.6 N / Module	
Contact diameter	0.76 mm	
Operating temperature	–40 °C to +125 °C	
Mating cycles	minimum 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 177. [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [3] See page 174.

INSULATOR PIN

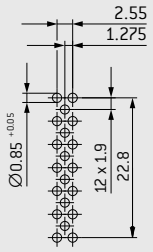


INSULATOR SOCKET



*= Ø 1.15 with removal tool / ≤ Ø 1.75 without removal tool

PCB LAYOUT



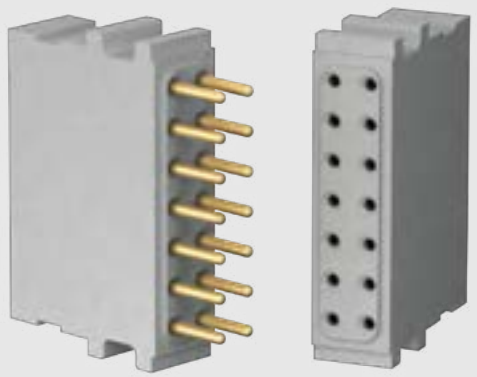
Module 20 contacts	Part number
Insulator	610.178.120.922.000
Insulator pin	611.178.120.922.000
Dummy contact	021.341.123.300.000

Description	Part number	Conductor cross-section mm²	Termination AWG/mm	Nominal current² Single contact A	Nominal current² Module fully equipped A	Max. continuous current³ Single contact A	Contact resistance mΩ
Pin contact short¹	180.361.000.307.000	0.38	22	7.5	4	11	3.8
Pin contact long¹	180.381.000.307.000						
Socket contact¹	170.361.700.207.000						
Pin contact short¹	180.540.000.307.000	0.25 – 0.08	24 – 28	6	3.5	9	3.8
Pin contact long¹	180.570.000.307.000						
Buchsenkontakt¹	170.540.700.207.000						
Pin contact short¹	180.850.000.307.000		PCB termination Ø 0.76 mm	7.5	4	11	3.8
Pin contact long¹	180.851.000.307.000						
Socket contact¹	170.850.700.207.000						

¹ Non-magnetic version on request ² Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
³ Definition max. continuous current see page 177.

MODULES 14 CONTACTS

SIGNAL



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 164.

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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 158.

TECHNICAL DATA

Voltage information[2]

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

Voltage information acc. to MIL[3]

Operating voltage	950 V
Test voltage	2,850 V

Mechanical data

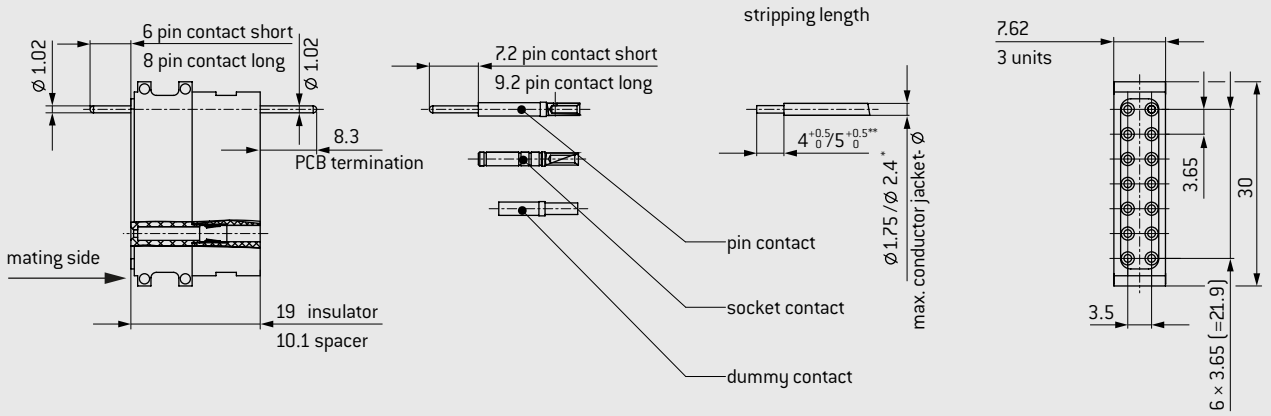
Total mating force (average)	18.9 N / Module
Total sliding force (average)	13.7 N / Module
Contact diameter	1.02 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

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

[1] Definition max. continuous current see page 177. [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [3] See page 174.

INSULATOR PIN AND SOCKET



Module 14 contacts	Part number
Insulator	611.130.114.923.000
Spacer	611.130.111.923.000
Dummy contact	021.341.124.300.000

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

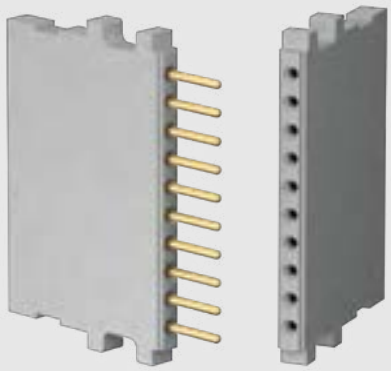
** $4^{+0.5}_{0}$: AWG 24 – 28; 0.25 – 0.08 mm²
$5^{+0.5}_{0}$: AWG 20 – 22; 0.5 – 0.38 mm²

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

[1] Non-magnetic version on request. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

MODULE 10 CONTACTS

SIGNAL



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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- 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 158.

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

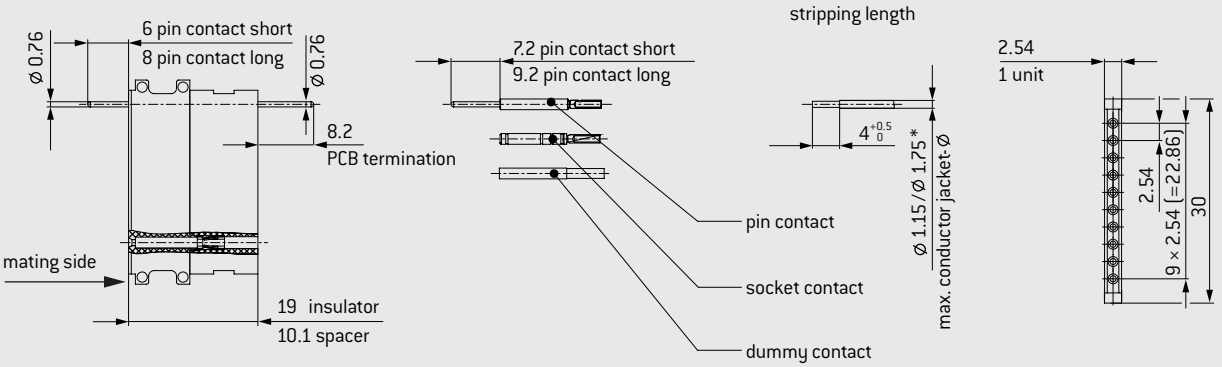
For an overview of all tools please see from page 165.

TECHNICAL DATA

Voltage information[2]		
Operating voltage	250 V	32 V
Rated impulse voltage	1,500 V	1,500 V
Degree of pollution	2	3
Voltage information acc. to MIL[3]		
Operating voltage	500 V	
Test voltage	1,500 V	
Mechanical data		
Total mating force (average)	13.5 N / Module	
Total sliding force (average)	9.8 N / Module	
Contact diameter	0.76 mm	
Operating temperature	–40 °C to +125 °C acc. to UL 1977, Second edition, max. 75 °C	
Mating cycles	minimum 100,000	
Materials		
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94	
Contact body	Cu alloy	
Contact spring	CuBe alloy	
Contact processing	Au over Ni	

[1] Definition max. continuous current see page 177. [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [3] See page 174.

INSULATOR PIN AND SOCKET



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

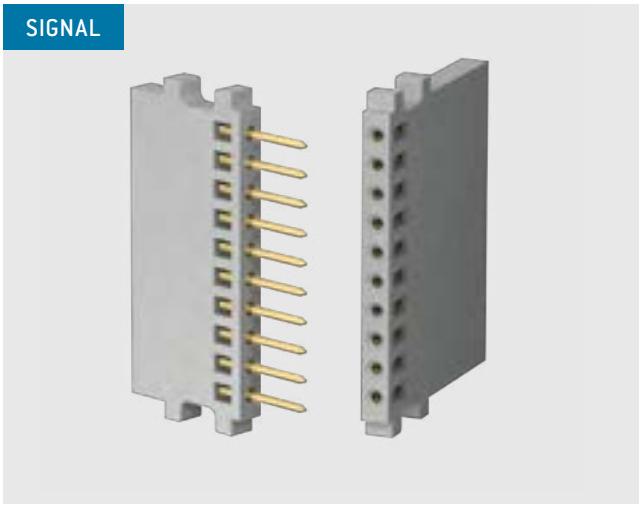
Module 10 contacts	Part number
Insulator	611.122.110.923.000
Spacer	611.122.111.923.000
Dummy contact	021.341.123.300.000

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

[1] Non-magnetic version on request. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

MODULE 10 CONTACTS FOR STAMPED CONTACTS

SIGNAL



Contact diameter: 0.7 mm
Mating cycles: minimum 5,000
Current-carrying capacity[1]: 6 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- The 10 contacts modules with turned contacts are not compatible with stamped contacts or modules.
- Contacts are not removable.
- Crimp information see page 158.

TECHNICAL DATA

Voltage information[2]

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

Voltage information acc. to MIL[3]

Operating voltage	450 V
Test voltage	1,350 V

Mechanical data

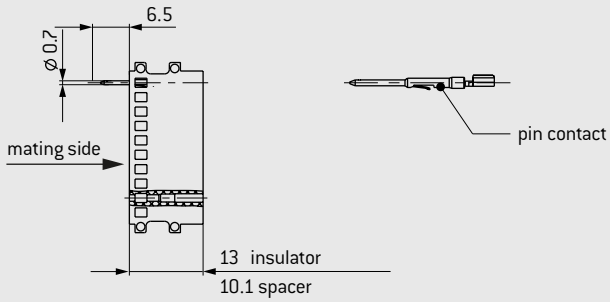
Total mating force (average)	5 N / Module
Total sliding force (average)	4.8 N / Module
Contact diameter	0.7 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 5,000

Materials

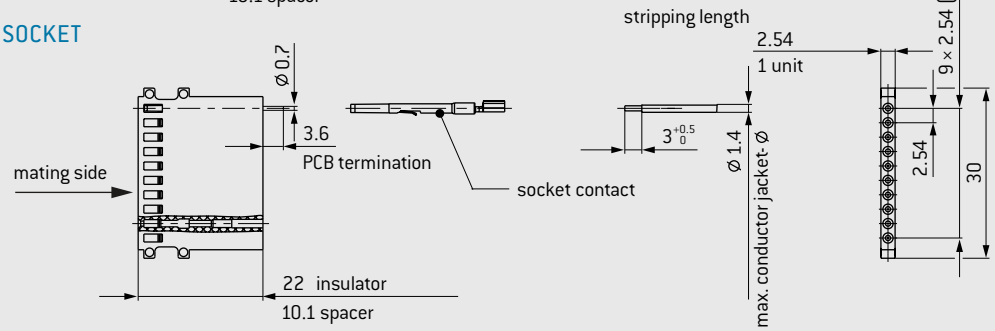
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact	CuSn6 alloy
Contact finish	
in termination area	Sn over Ni
in contact area	Au over Ni

[1] Definition max. continuous current see page 177. [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [3] See page 174.

INSULATOR PIN



INSULATOR SOCKET



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

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

Packaging unit for crimp model (per reel)

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

[1] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K. [2] Definition max. continuous current see page 177.

MODULE 6 CONTACTS

SIGNAL

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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 158.

TECHNICAL DATA

Voltage information[2]

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

Voltage information acc. to MIL[3]

Operating voltage	850 V
Test voltage	2,550 V

Mechanical data

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

Materials

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

REMOVAL TOOL I (ANGLED)

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

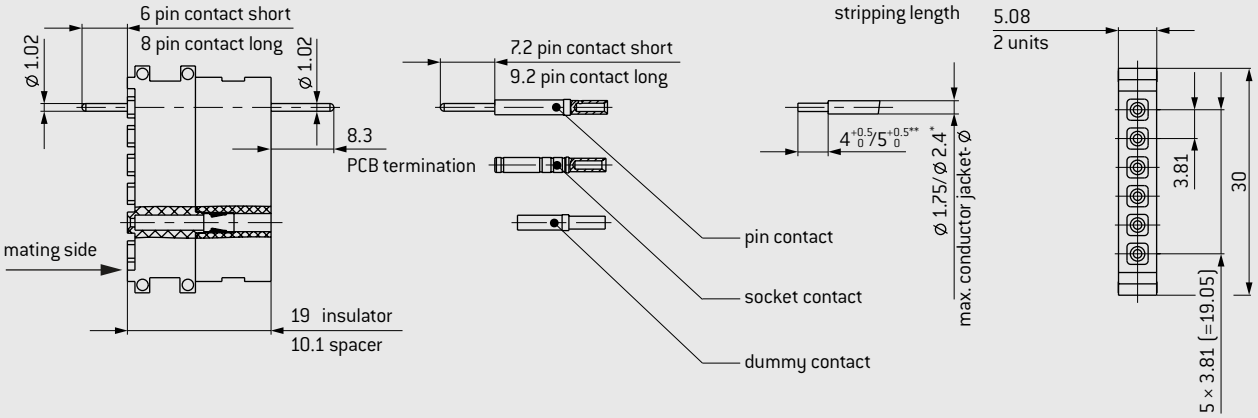
REMOVAL TOOL II

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

For an overview of all tools please see from page 164.

[1] Definition max. continuous current see page 177. [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [3] See page 174.

INSULATOR PIN AND SOCKET



Module 6 contacts	Part number
Insulator	611.123.106.923.000
Spacer	611.123.111.923.000
Dummy contact	021.341.124.300.000

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

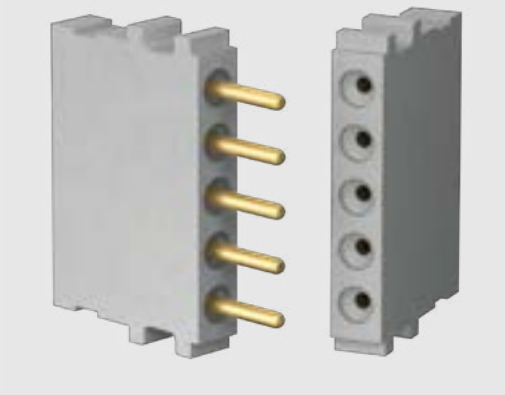
** $4^{+0.5}_{0}$: AWG 24 – 28; 0.25 – 0.08 mm²
$5^{+0.5}_{0}$: AWG 20 – 22; 0.5 – 0.38 mm²

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

[1] Non-magnetic version on request. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

MODULE 5 CONTACTS

SIGNAL



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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Contacts and insulators up to 200 °C on request.
- Crimp information see page 158.

TECHNICAL DATA

Voltage information[2]

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

Voltage information acc. to MIL[3]

Operating voltage	750 V
Test voltage	2,250 V

Mechanical data

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

Materials

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

REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL I (ANGLED)

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

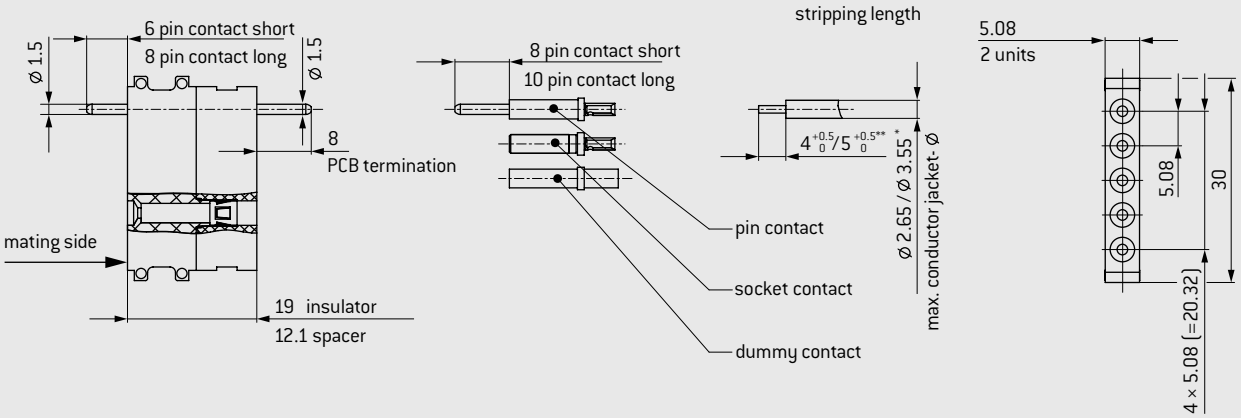
REMOVAL TOOL II

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

For an overview of all tools please see from page 164.

[1] Definition max. continuous current see page 177. [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [3] See page 174.

INSULATOR PIN AND SOCKET



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

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

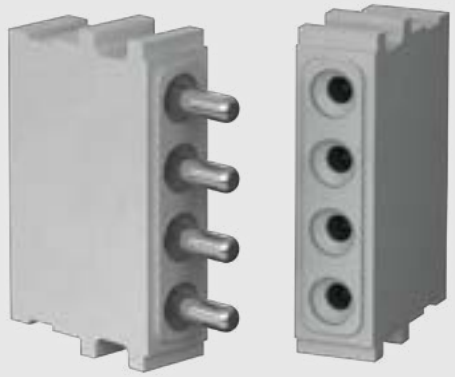
** $4^{+0.5}_{0}$: AWG 24 – 28; 0.25 – 0.08 mm²
$5^{+0.5}_{0}$: AWG 20 – 22; 0.5 – 0.38 mm²
AWG 14 – 18; 0.75 – 1.5 mm²

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

[1] Non-magnetic version on request. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

MODULE 4 CONTACTS

POWER



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 164.

Contact diameter: 2.41 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 41 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Crimp information see page 158.

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

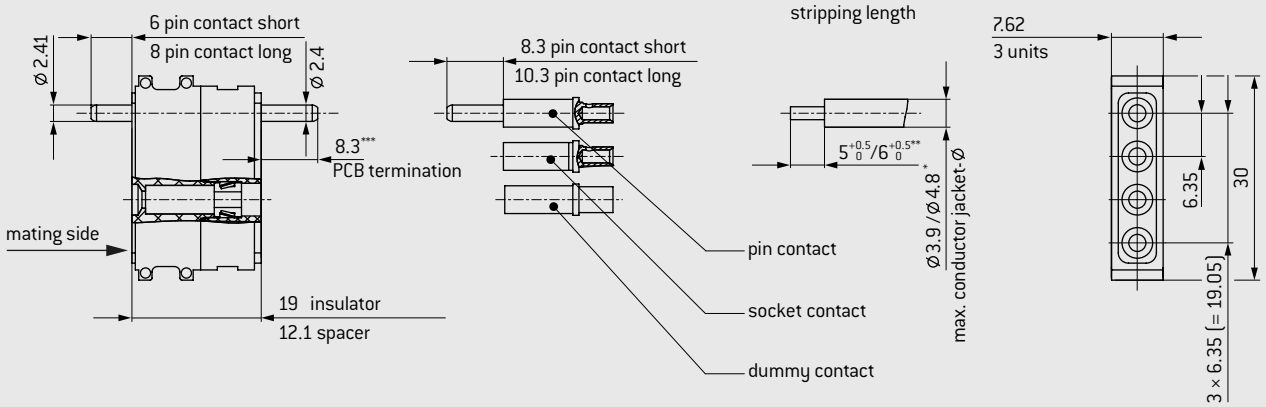
Total mating force (average)	13.8 N / Module
Total sliding force (average)	12 N / Module
Contact diameter	2.41 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

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

[1] Definition max. continuous current see page 177. [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [3] See page 174..

INSULATOR PIN AND SOCKET



Module 4 contacts	Part number
Insulator	611.126.104.923.000
Spacer	611.126.111.923.000
Dummy contact	021.300.127.300.000

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

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

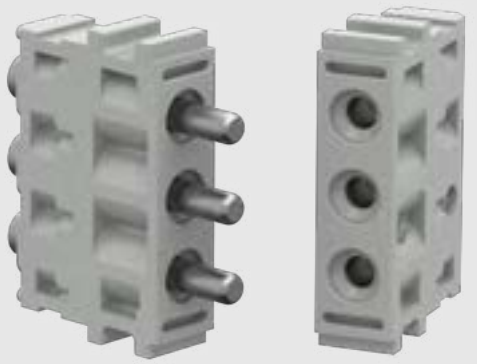
*** PCB termination / crimp termination at 6 mm², protection against contact in the termination area recommended, e. g. heat-shrink tubing.

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

[1] Non-magnetic version on request. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

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 164.

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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Crimp information see page 158.

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

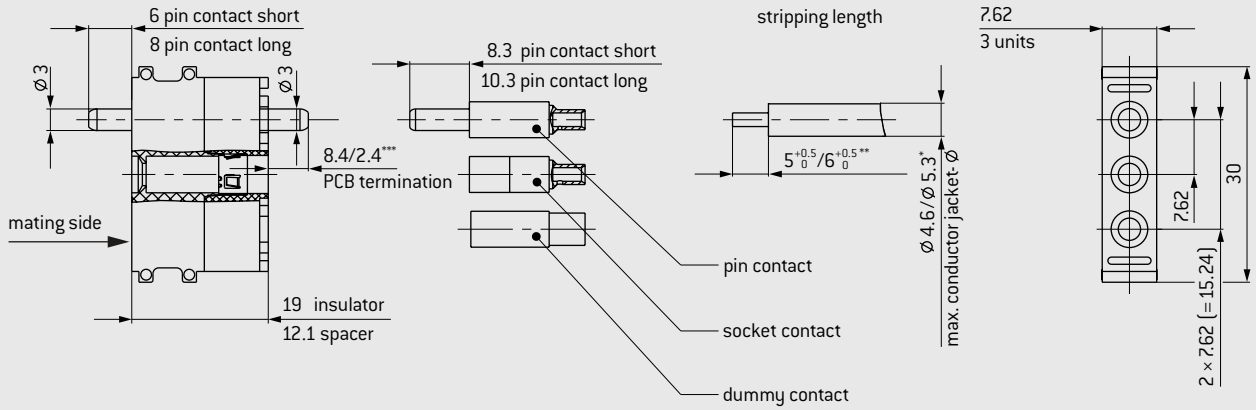
Total mating force (average)	13.5 N / Module
Total sliding force (average)	10.4 N / Module
Contact diameter	3 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

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

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

INSULATOR PIN AND SOCKET



Module 3 contacts	Part number
Insulator	611.127.103.923.000
Spacer	611.127.111.923.000
Dummy contact	021.341.128.300.000

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

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

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

Description	Part number	Conductor cross-section mm²	Termination AWG/mm	Nominal current² Single contact A	Nominal current² Module fully equipped A	Max. continuous current³ Single contact A	Contact resistance mΩ
Pin contact short	182.980.000.301.000	6		39	30	58	0.3
Pin contact long	182.981.000.301.000						
Socket contact	172.978.100.201.000						
Pin contact short	180.366.000.301.000	4		39	30	58	0.3
Pin contact long	180.386.000.301.000						
Socket contact	172.366.100.201.000						
Pin contact short	180.546.000.301.000	2.5		25	21	37	0.3
Pin contact long	180.576.000.301.000						
Socket contact	170.546.100.201.000						
Pin contact short[1]	182.582.000.301.000	1.5	14	19	16	28	0.3
Pin contact long	182.583.000.301.000						
Socket contact[1]	172.582.100.201.000						
Pin contact short	182.584.000.301.000	1 – 0.75	18	16.5	14	24.5	0.3
Pin contact long[1]	182.585.000.301.000						
Socket contact[1]	172.584.100.201.000						
Pin contact short	182.586.000.301.000	0.5 – 0.38	20 – 22	11.5	9.5	17	0.4
Pin contact long	182.587.000.301.000						
Socket contact	172.586.100.201.000						
Pin contact short	182.571.000.301.000		PCB termination Ø 3.0 mm	39	30	58	0.3
Pin contact long	182.572.000.301.000						
Socket contact	172.843.100.201.000						

[1] Non-magnetic version on request. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

MODULE 3 CONTACTS

POWER

REMOVAL TOOL I (STRAIGHT)

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

REMOVAL TOOL II

Removal of 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 from page 164.

Contact diameter: 3 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 58 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Crimp information see page 158.

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	1,875 V V
Test voltage	5,625 V

Mechanical data

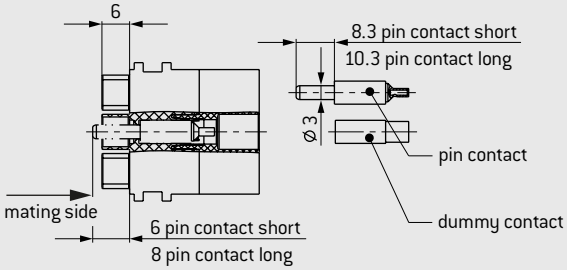
Total mating force (average)	13.5 N / Module
Total sliding force (average)	9.8 N / Module
Contact diameter	3 mm
Operating temperature	–40 °C to +125 °C acc. to UL 1977, Second Edition, max. 75 °C
Mating cycles	minimum 100,000

Materials

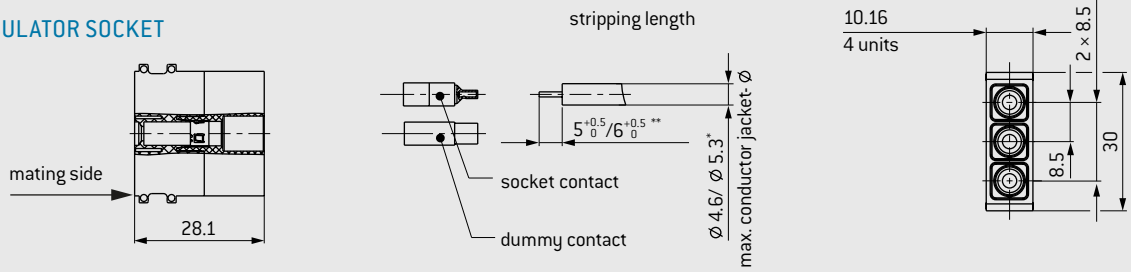
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy
Contact spring	CuSn alloy
Contact finish	Ag

[1] Definition max. continuous current see page 177. [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [3] See page 174.

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	021.341.128.300.000

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

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

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

[1] Non-magnetic version on request. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

Table of contents

MODULE 2 CONTACTS

POWER

REMOVAL TOOL

Removal of the already assembled contact (incl. cable)
PART NUMBER: 087.170.391.000.000

For an overview of all tools please see from page page 164.

Contact diameter: 5 mm
Mating cycles: minimum 100,000
Current-carrying capacity[1]: 119 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Contacts and insulators up to 200 °C on request
- Crimp information see page 158.

TECHNICAL DATA

Voltage information[2]

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

Voltage information acc. to MIL[3]

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

Mechanical data

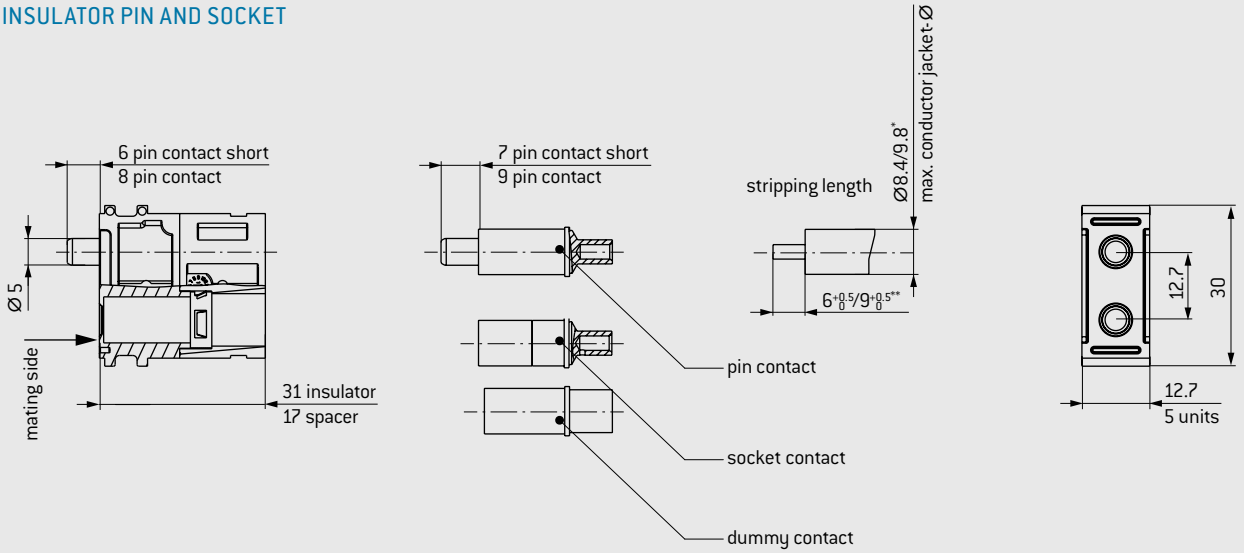
Total mating force (average)	21 N / Module
Total sliding force (average)	15 N / Module
Contact diameter	5 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

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

[1] Definition max. continuous current see page 177. [2] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171 [3] See page 174.

INSULATOR PIN AND SOCKET



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

* ≤ Ø 8.4 removal possible /≤ Ø 9.8 Demontage nicht möglich

** $6^{+0.5}_{0}$: 4 mm²
$9^{+0.5}_{0}$: 10 / 16 mm²

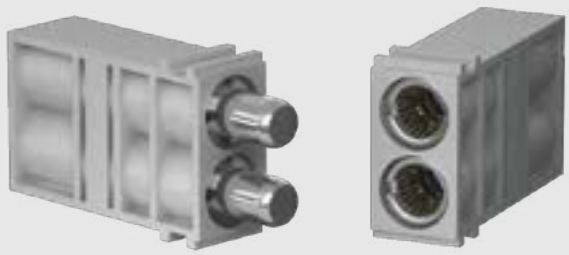
Description	Part number	Conductor cross-section mm²	Nominal current[1] Single contact A	Nominal current[1] Module fully equipped A	Max. continuous current[2] Single contact A	Contact resistance mΩ
Pin contact short	182.891.000.301.000	16	80	70	119	0.21
Pin contact long	182.892.000.301.000					
Socket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

[1] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K [2] Definition max. continuous current see page 177.

MODULE 2 CONTACTS

ODU SPRINGTAC® (contacts with springwire technology)

HIGH-CURRENT



Contact diameter: 8 mm
Mating cycles[1]: minimum 100,000
Current-carrying capacity[2]: 142 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Crimp information see page 158.

TECHNICAL DATA

Voltage information[3]

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

Voltage information acc. to MIL[4]

Operating voltage	700 V
Test voltage	2,100 V

Mechanical data

Total mating force (average)	54 N / Module
Total sliding force (average)	39 N / Module
Contact diameter	8 mm
Operating temperature	–40 °C to +125 °C
Mating cycles[1]	minimum 100,000

Materials

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

REQUIRED ASSEMBLY TOOL

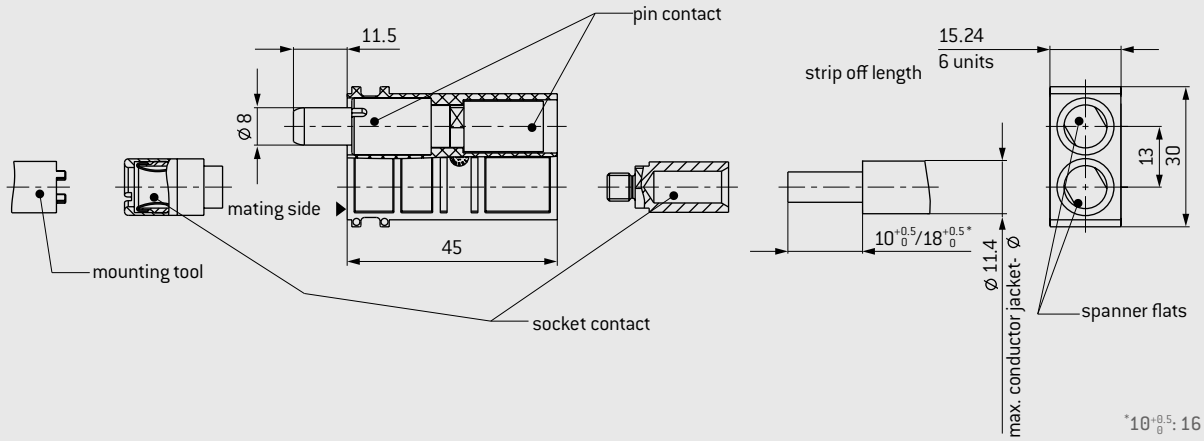
For screwing and releasing the contacts.

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

For an overview of all tools please see from page 165.

[1] Higher mating cycles by easy exchange of the wear parts (pin/socket from front) possible. The termination area remains unaffected, because of two-part contact.
[2] Definition max. continuous current see page 177. [3] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [4] See page 174.

INSULATOR PIN AND SOCKET



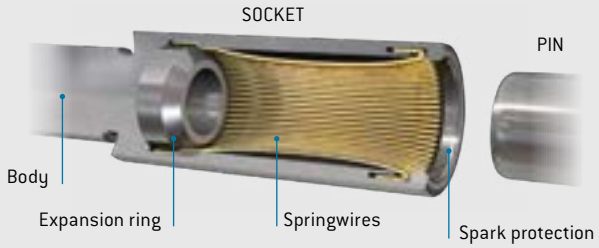
In application with a housing please check the cable space requirement.

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

ODU SPRINGTAC® (CONTACTS WITH SPRINGWIRE TECHNOLOGY)

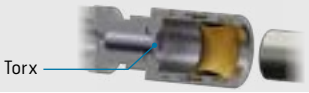
ODU SPRINGTAC® offers a large number of contact surfaces. The wires are mounted individually and connected with a lathe-turned body. The springwires contact and flex independently from one another (see also page 22).

DEMATED



MATED

Module 2 contacts	Part number
Insulator	611.173.102.923.000



TORX-CONE DESIGN WITH NEW PART NUMBERS WILL FOLLOW 2021 / 22

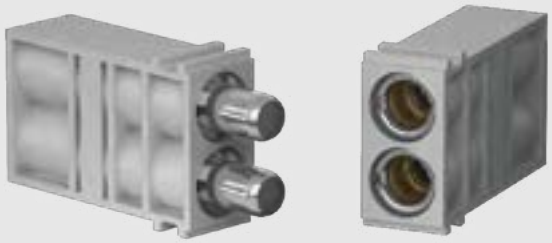
Description	Part number	Conductor cross-section[1] mm²	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact	181.873.100.200.000	25	100	95	142	0.2
Socket contact	170.045.100.201.000					
Pin contact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

[1] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5), class 5. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

MODULE 2 CONTACTS

ODU LAMTAC® (contacts with lamella technology)

HIGH-CURRENT



Contact diameter: 8 mm
Mating cycles[1]: minimum 10,000
Current-carrying capacity[2]: 154 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Crimp information see page 158.

REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts.

PART NUMBER: 087.611.002.001.000

Locking torque: 2.7 Nm ± 0.1 Nm

For an overview of all tools please see from page 164.

TECHNICAL DATA

Voltage information[3]

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

Voltage information acc. to MIL[4]

Operating voltage	900 V
Test voltage	2,700 V

Mechanical data

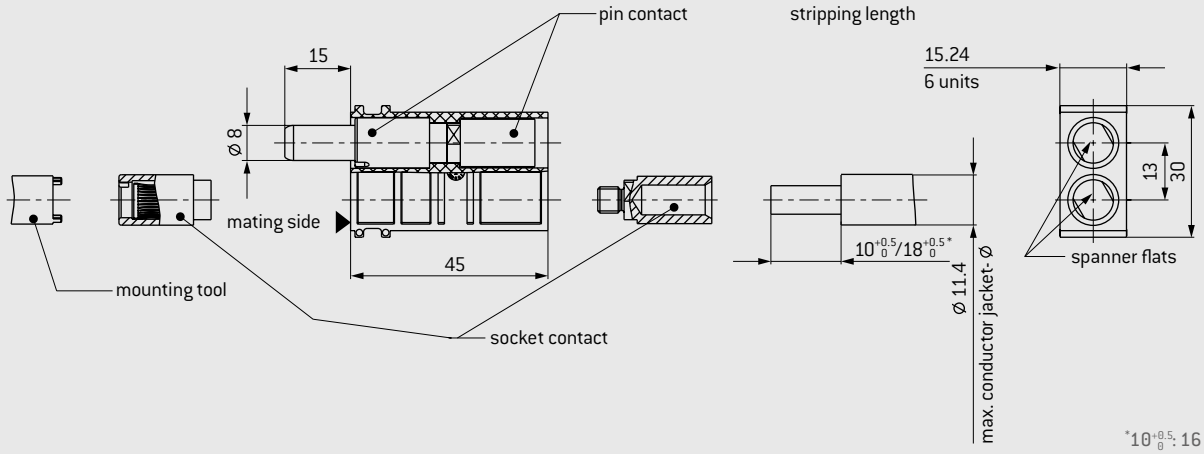
Total mating force (average)	60 N / Module
Total sliding force (average)	45 N / Module
Contact diameter	8 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 10,000

Materials

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

[1] Higher mating cycles by easy exchange of the wear parts (pin/socket from front) possible. The termination area remains unaffected, because of two-part contact.
[2] Definition max. continuous current see page 177. [3] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [4] See page 174.

INSULATOR PIN AND SOCKET



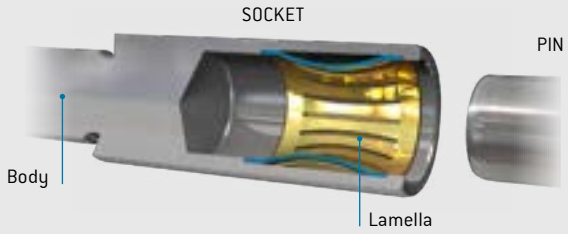
In application with a housing please check the cable space requirement.

*10+0.5 0: 16 mm²
18+0.5 0: 25 mm²

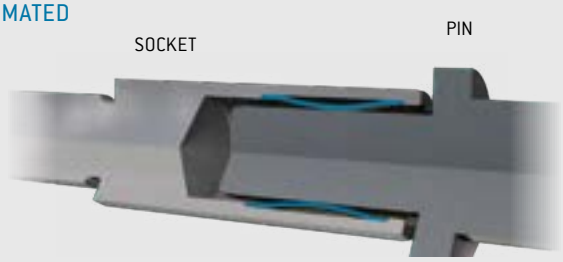
ODU LAMTAC® (CONTACTS WITH LAMELLA TECHNOLOGY)

In comparison to the ODU SPRINGTAC® contact, ODU LAMTAC® offers a lower number of contact surfaces. One or more of the stamped lamellas are mounted in a lathe-turned body (see also page 23).

DEMATED



MATED



Module 2 contacts	Part number
Insulator	611.161.102.923.000

TORX-CONE DESIGN WITH NEW PART NUMBERS WILL FOLLOW 2021 / 22

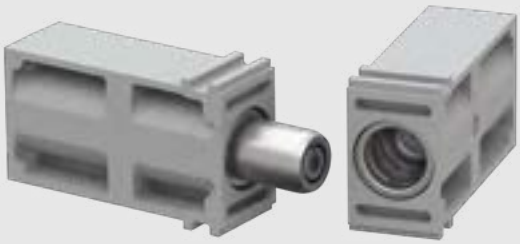
Description	Part number	Conductor cross-section[1] mm²	Nominal current[2] Single contact A	Nominal current[2] Module fully equipped A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact	181.874.100.200.000	25	105	100	154	0.2
Socket contact	178.874.100.201.000					
Pin contact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

[1] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5), class 5. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

MODULE 1 CONTACT

ODU LAMTAC® (Contacts with lamella technology)

HIGH CURRENT



Contact diameter: 10 mm or 12 mm
Mating cycles[1]: minimum 10,000
Current-carrying capacity[2]: max. 225 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Crimp information see page 158.

TECHNICAL DATA

Voltage information[3]

Operating voltage		
∅ 10 mm	500 V	200 V
∅ 12 mm	400 V	160 V
Rated impulse voltage		
∅ 10 mm	4,000 V	4,000 V
∅ 12 mm	3,000 V	3,000 V
Degree of pollution		
∅ 10 mm and ∅ 12 mm	2	3

Voltage information acc. to MIL[4]

Operating voltage	
∅ 10 mm	2.000 V
∅ 12 mm	1,500 V
Test voltage	
∅ 10 mm	6,000 V
∅ 12 mm	4,500 V

Mechanical data

Total mating force (average)	
∅ 10 mm	33 N / Module
∅ 12 mm	45 N / Module
Total sliding force (average)	
∅ 10 mm	24 N / Module
∅ 12 mm	30 N / Module
Contact diameter	10 mm or 12 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 10,000

Materials

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

REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts

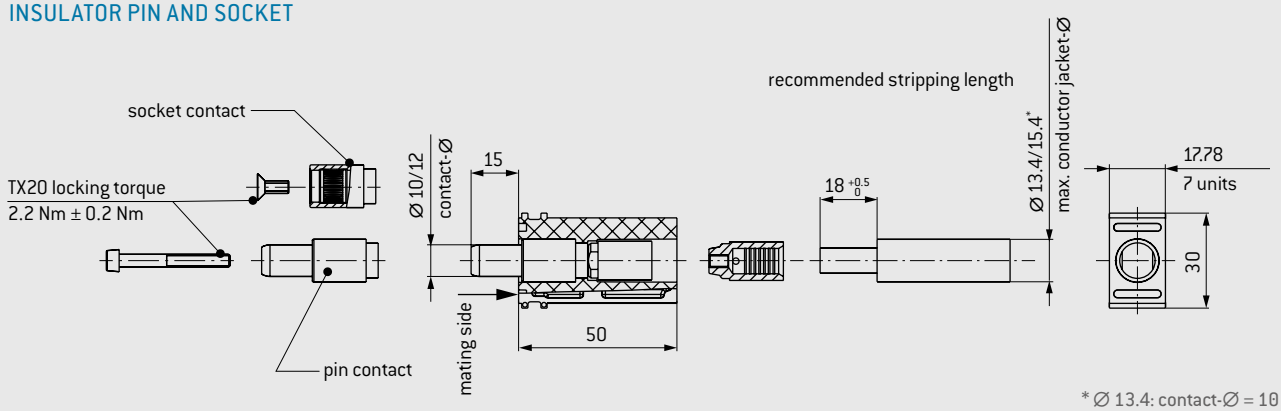
Torque wrench
PART NUMBER: 598.054.006.000.000

Bit Torx TX20
PART NUMBER: 598.054.105.000.000
Locking torque: 2.2 Nm ± 0.2 Nm

For an overview of all tools please see from page 164.

[1] Higher mating cycles by easy exchange of the wear parts (pin/socket from front) possible. The termination area remains unaffected, because of two-part contact.
[2] Definition max. continuous current see page 177. [3] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171. [4] See page 174.

INSULATOR PIN AND SOCKET



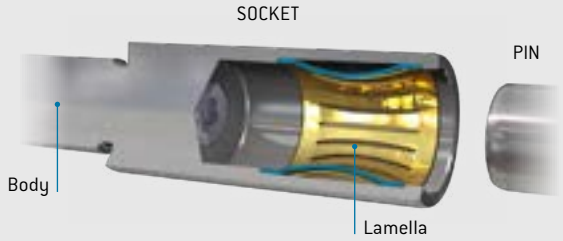
In application with a housing please check the cable space requirement.

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

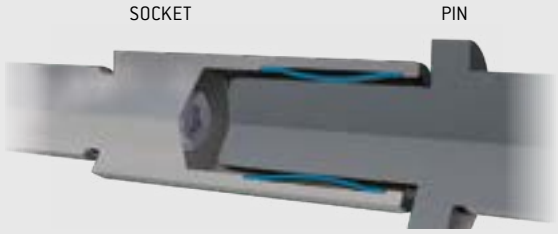
ODU LAMTAC® (CONTACTS WITH LAMELLA TECHNOLOGY)

In comparison to the ODU SPRINGTAC® contact, ODU LAMTAC® offers a lower number of contact surfaces. One or more of the stamped lamellas are mounted in a machined body (see also page 23).

DEMATED



MATED



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

Description	Part number	Conductor cross-section[1] mm²	Nominal current[2] Single contact A	Max. continuous current[3] Single contact A	Contact resistance mΩ
Pin contact-Ø 10 mm	181.878.100.200.001	35	125	180	0.15
Socket contact-Ø 10 mm	178.878.100.201.001				
Pin contact-Ø 10 mm	181.946.100.200.001	25	110	160	0.15
Socket contact-Ø 10 mm	178.954.100.201.001				
Pin contact-Ø 12 mm	181.943.100.200.001	50	155	225	0.1
Socket contact-Ø 12 mm	178.943.100.201.001				
Pin contact-Ø 12 mm	181.945.100.200.001	35	135	195	0.1
Socket contact-Ø 12 mm	178.953.100.201.001				
Pin contact-Ø 12 mm	181.944.100.200.001	25	115	167	0.1
Socket contact-Ø 12 mm	178.948.100.201.001				

[1] Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5), class 5 [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K
[3] Definition max. continuous current see page 177.

PE MODULE 1 CONTACT

Flexible protective grounding for all conductive housings and docking frame versions

PE

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

TECHNICAL NOTES

- The module can be freely positioned in any frame and allows contacting to the frame and conductive housing.
- Novel torx cone connection for optimized power transmission
- Crimp information see page 158.

TECHNICAL DATA

Mechanical data

Total mating force (average)	33 N / Module
Total sliding force (average)	24 N / Module
Contact diameter	10 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 10,000

Materials

Contact body	Cu alloy
Contact lamella	CuBe alloy
Contact plating	Ag

REQUIRED ASSEMBLY TOOL

For screwing and releasing the contacts

Torque wrench for PE contact
PART NUMBER: 598.054.003.000.000

Torque wrench for PE module
PART NUMBER: 598.054.002.000.000

Bit torx TX 20 for PE contact
PART NUMBER: 598.054.105.000.000
Locking torque: 3 Nm ± 0.5 Nm

Bit torx TX 10 for PE module
PART NUMBER: 598.054.104.000.000
Locking torque: 1.2 Nm ± 0.2 Nm

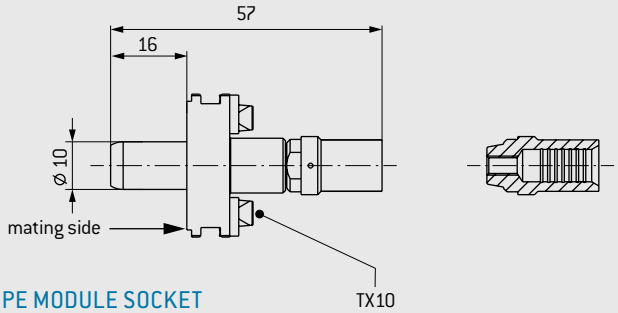
For an overview of all tools please see from page 164.

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

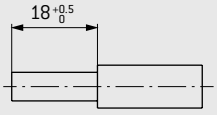
Nominal cross-section of the current-carrying conductor mm²	Minimum cross-section of the protective conductor in accordance with DIN EN 61984:2009-11 mm²
10	10
16, 25, 35	16
50	25

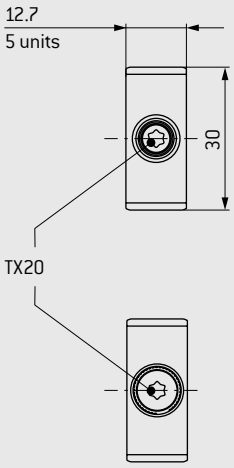
[1] Higher mating cycles are possible simply by replacing the module (including pin/socket from the rear). The termination area remains unaffected, because of two-part contact.

PE MODULE PIN

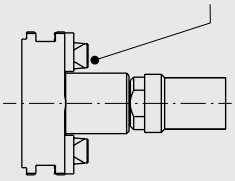


recommended stripping length





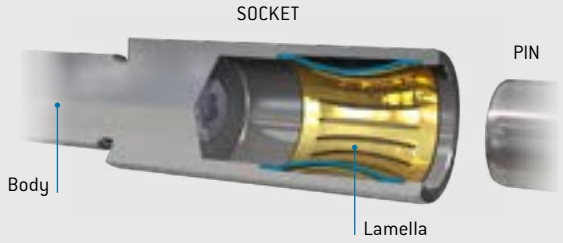
PE MODULE SOCKET



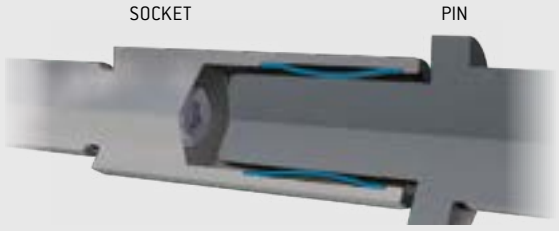
ODU LAMTAC® (CONTACTS WITH LAMELLA TECHNOLOGY)

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

DEMATED



MATED



Description	Part number	Conductor cross-section[1] mm²	Nominal current[2] Single contact A	Impulse current kA	Contact resistance Ω
PE module/Pin	181.886.100.200.000	25	125	>20	0.1
PE module/Socket	178.886.100.201.000				
PE module/Pin	181.885.100.200.000	16	90	>20	0.1
PE module/Socket	178.885.100.201.000				
PE module/Pin	181.884.100.200.000	10	65	>20	0.1
PE module/Socket	178.884.100.201.000				
Conductor cross-section 35/50 mm²	On request				

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

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 164.

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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Crimp information see page 158.

TECHNICAL DATA

Voltage information[1]		
Operating voltage	2,500 V	1,000 V
Rated impulse current	10,000 V	8,000 V
Degree of pollution	2	3

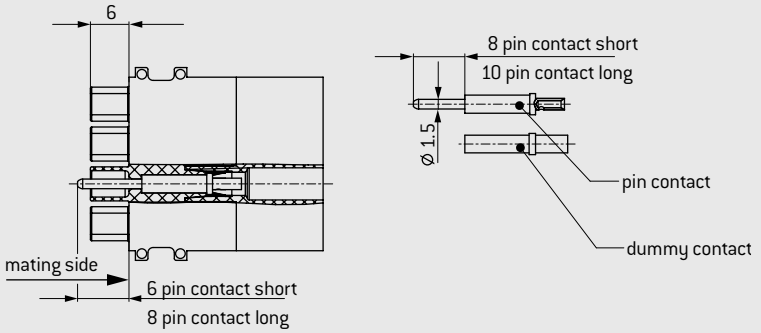
Voltage information acc. to MIL[2]	
Operating voltage	2,500 V
Test voltage	7,500 V

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

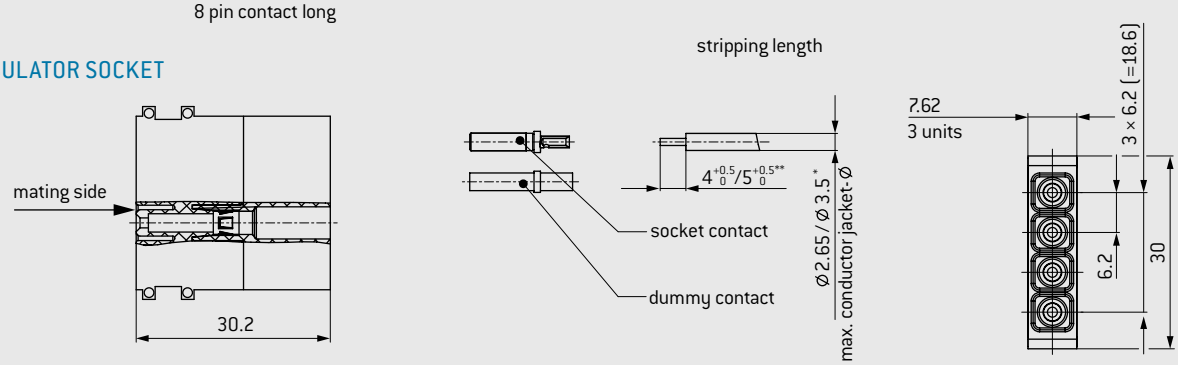
Materials	
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy
Contact spring	CuSn alloy
Contact finish	
Contact body	Au over Ni
Contact spring	Ag

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

INSULATOR PIN



INSULATOR SOCKET



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

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

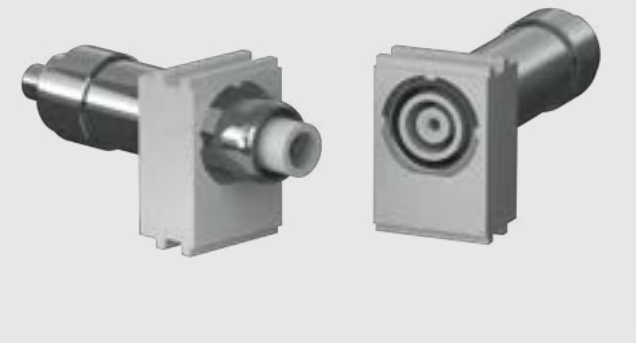
** $4^{+0.5}_{0}$: AWG 24 – 28; 0.25 – 0.08 mm²
$5^{+0.5}_{0}$: AWG 20 – 22; 0.5 – 0.38 mm²
AWG 14 – 18; 0.75 – 1.5 mm²

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

[1] Non-magnetic version on request. [2] Determined acc. to IEC 60512-5-1:2002 at a temperature increase of 45 K.
[3] Definition max. continuous current see page 177.

MODULE 1 CONTACT

HIGH-VOLTAGE



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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013-06 (see page 177).
- Center contact soldered
- Outer contact crimped
- Recommended cable construction see page 111 .

TECHNICAL DATA

Voltage information[1]

Operating voltage	6,300 V	2,500 V
Rated impulse voltage	20,000 V	20,000 V
Degree of pollution	2	3
Clearance distance	> 32 mm	
Creepage distance	> 32 mm	

Test of the partial discharge voltage (PDV) acc. to VDE

PDV inception voltage	6,000 V
PDV extinction voltage	5,700 V

Mechanical data

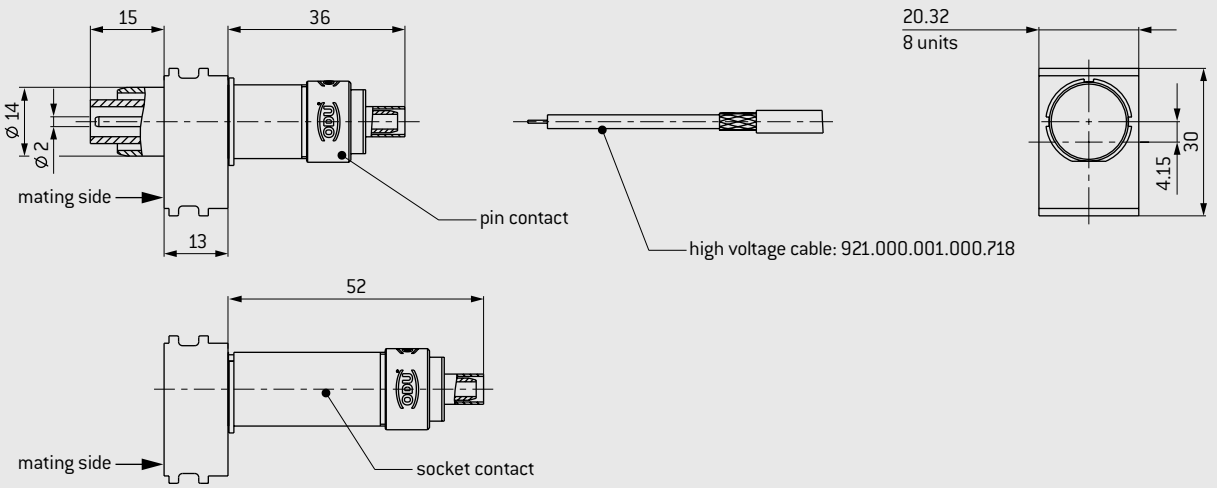
Total mating force (average)	17 N / Module
Total sliding force (average)	15 N / Module
Contact diameter	2 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 10,000

Materials

Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Contact body / insulator	Cu alloy / PTFE
Contact spring	CuBe alloy
Contact finish	
Outer contact	gal. Ni
Center contact	gal. Ag

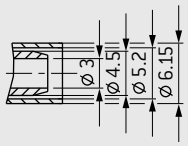
[1] IEC 60664-1:2007 (VDE 0110-1:2008-01) see page 171

INSULATOR FOR PIN AND SOCKET

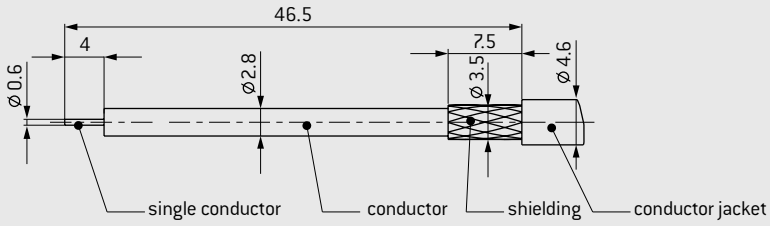


In application with a housing please check the cable space requirement.

CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 1 contact	Part number
Insulator	611.171.101.923.000

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

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

MODULE 4 CONTACTS FOR 50 Ω

COAX

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

TECHNICAL NOTES

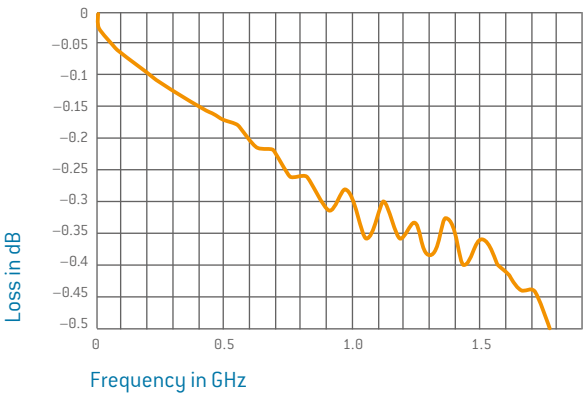
- Crimp information see page 158.

TECHNICAL DATA

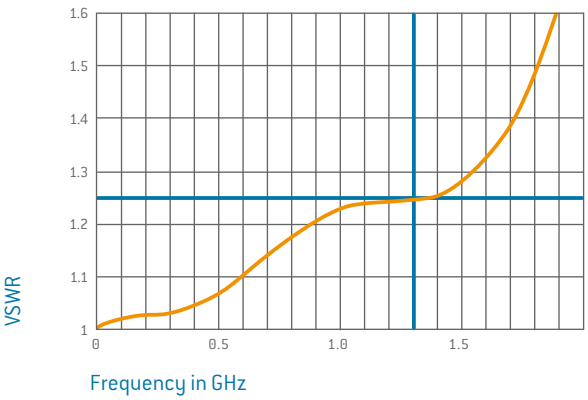
Frequency range[1]	0–1.3 GHz[1]
Insulation resistance	> 100 GΩ
Voltage information acc. to MIL[2]	
Operating voltage	350 V
Test voltage	1,050 V
Mechanical data	
Total mating force (average)	17.8 N / Module
Total sliding force (average)	15.3 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles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

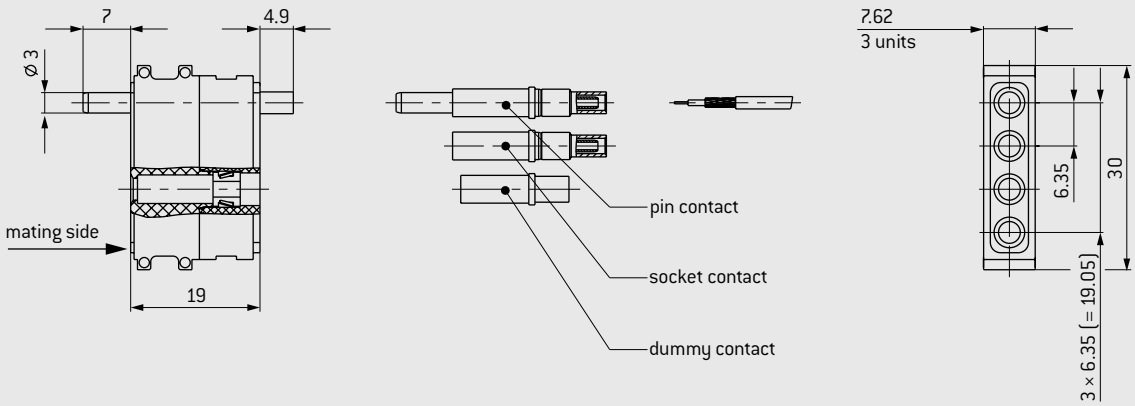
REMOVAL TOOL II

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

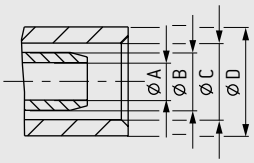
For an overview of all tools please see from page 164.

[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 174.

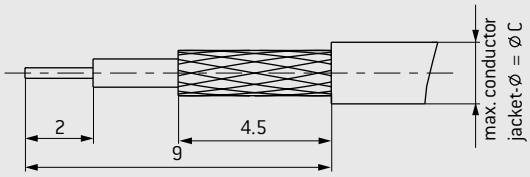
INSULATOR FOR PIN AND SOCKET



CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



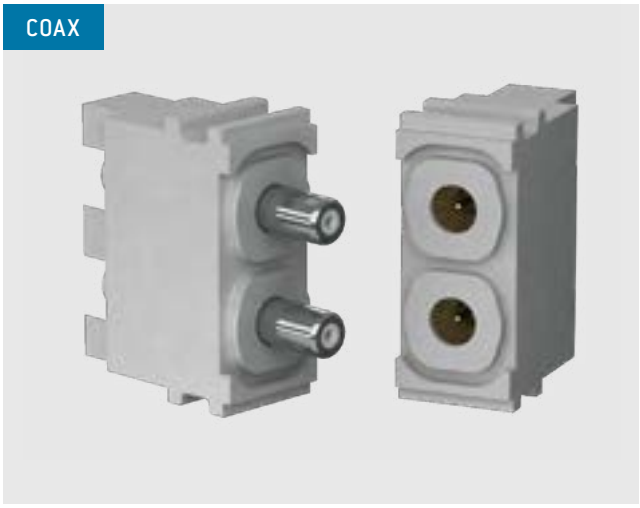
Module 4 contacts	Part number
Insulator	611.149.104.923.000
Dummy contact	021.341.127.300.000

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 D (RG174D)[2] K 02252 D (RG316D)	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 D (RG174D)[2] K 02252 D (RG316D)	1.75	2.7	3.5	4.3	082.000.039.103.000
Crimping tool for shielding sleeve	080.000.039.000.000								

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

MODULE 2 CONTACTS FOR 50 Ω WITH SMA TERMINATION

COAX



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

TECHNICAL NOTES

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

Voltage information acc. to MIL[2]

Operating voltage	350 V
Test voltage	1,050 V

Mechanical data

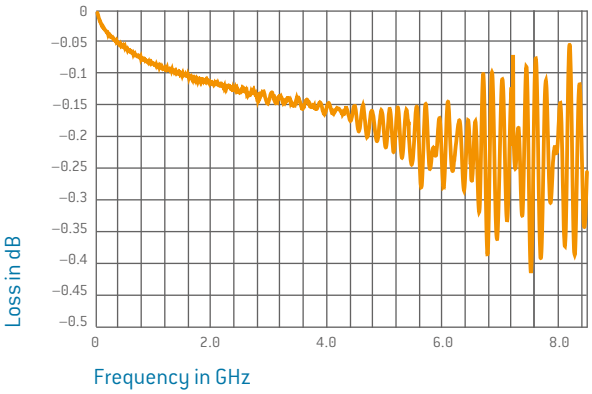
Total mating force (average)	11.9 N / Module
Total sliding force (average)	8.5 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

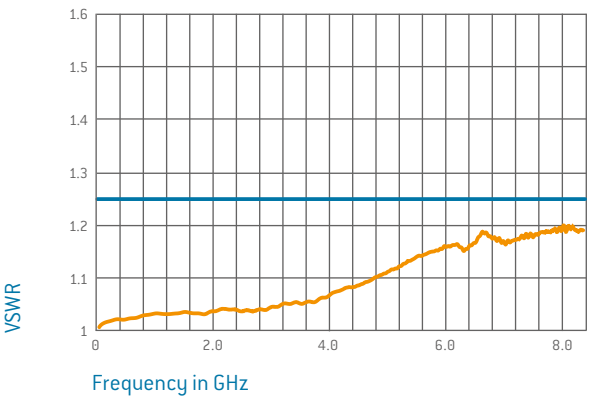
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body / insulator	Cu alloy / PTFE
Contact spring	CuSn / CuBe alloy
Contact finish	
Center contact	Au over Ni
Outer contact	Ni

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss



Voltage standing-wave ratio VSWR



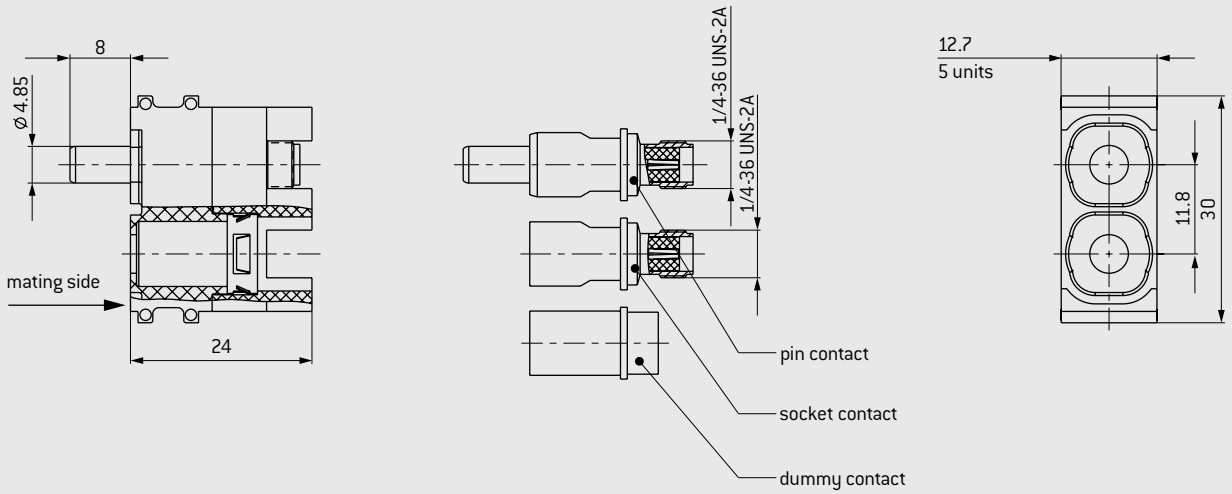
REMOVAL TOOL

PART NUMBER: 087.122.349.000.000

For an overview of all tools please see from page 164.

[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 174.

INSULATOR PIN AND SOCKET



Module 2 contacts	Part number
Insulator	611.152.102.923.000
Dummy contact	021.341.177.300.000

Description	Part number	Charac-teristic impedance Ω	Frequency range GHz
Pin contact	122.349.001.207.000	50	9.0
Socket contact	122.349.002.207.000		

MODULE 2 CONTACTS FOR 50 Ω

COAX

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

TECHNICAL NOTES

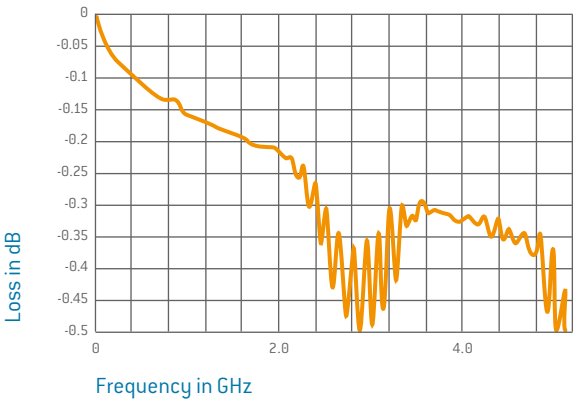
- Crimp information see page 158.

TECHNICAL DATA

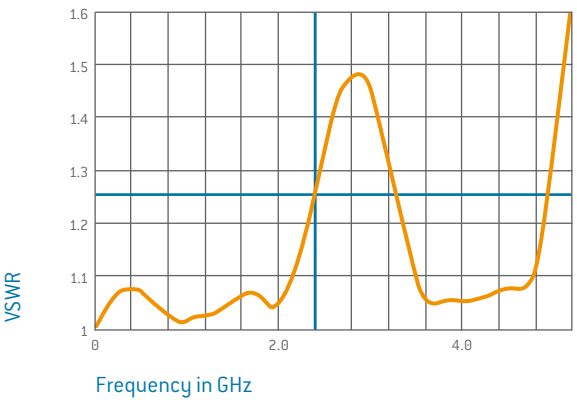
Frequency range[1]	0–2.4 GHz
Insulation resistance	> 100 GΩ
Voltage information acc. to MIL[2]	
Operating voltage	400 V
Test voltage	1,200 V
Mechanical data	
Total mating force (average)	11.9 N / Module
Total sliding force (average)	8.5 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000
Materials	
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy / PTFE
Contact spring	CuSn- / CuBe alloy
Contact finish	
Center contact	Au over Ni
Outer contact	Ni

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss



Voltage standing-wave ratio VSWR



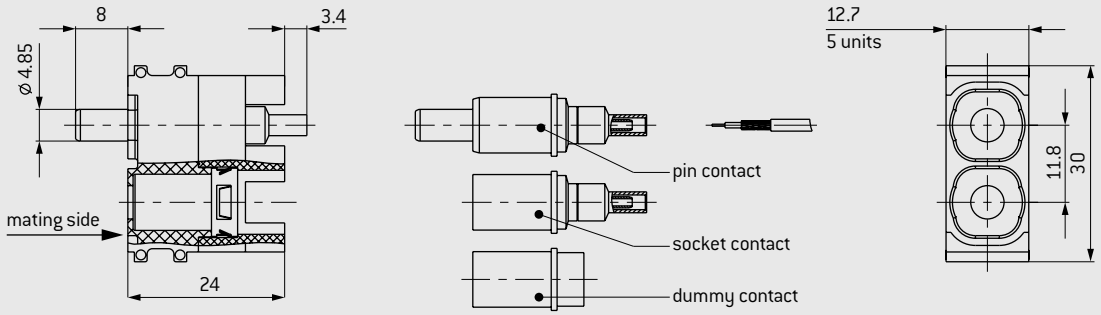
REMOVAL TOOL

PART NUMBER: 087.170.391.000.000

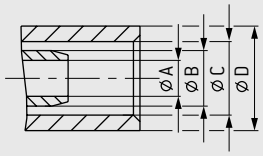
For an overview of all tools please see from page 164.

[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 174.

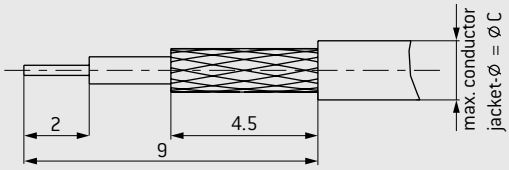
INSULATOR FOR PIN AND SOCKET



CABLE TERMINATION



RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 2 contacts	Part number
Insulator	611.152.102.923.000
Dummy contact	021.341.177.300.000

Description	Part number	Charac-teristic impedance Ω	Fre-quency range GHz	Cable[1]	A	B	C	D	Part number crimp inserts
Pin contact	122.346.001.207.000	50	1.25	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Pin contact	122.346.003.207.000		2.1	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.346.007.207.000		2.4	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
Pin contact	122.346.009.207.000			RG 223	3.15	4.5	5.5	6.15	082.000.039.108.000
Pin contact	122.346.011.207.000		2.1	G 02232 D (RG174D) K 02252 D (RG316D)	1.75	2.7	3.5	4.3	082.000.039.103.000
Socket contact	122.346.002.207.000	50	1.25	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Socket contact	122.346.004.207.000		2.1	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Socket contact	122.346.008.207.000		2.4	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
Socket contact	122.346.010.207.000			RG 223	3.15	4.5	5.5	6.15	082.000.039.108.000
Socket contact	122.346.012.207.000		2.1	G 02232 D (RG174D) K 02252 D (RG316D)	1.75	2.7	3.5	4.3	082.000.039.103.000
Crimping tool for shielding sleeve	080.000.039.000.000								

[1] Special lines on request.

MODULE 2 CONTACTS FOR 50 Ω AND HIGH-VOLTAGE

COAX

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

TECHNICAL NOTES

- Crimp information see page 158.

TECHNICAL DATA

Voltage information

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

Voltage information acc. to MIL[2]

Operating voltage	850 V
Test voltage	2,600 V

Mechanical data

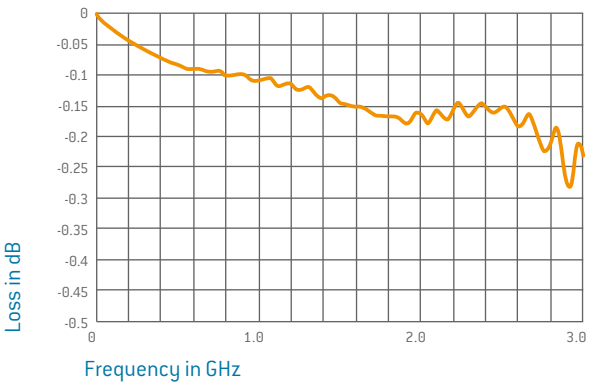
Total mating force (average)	13.9 N / Module
Total sliding force (average)	9.9 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

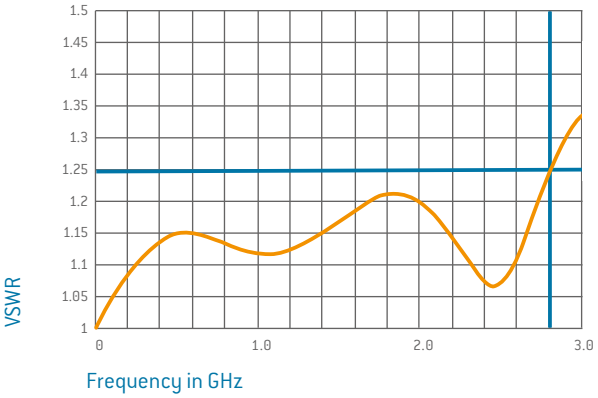
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy / PTFE
Contact spring	CuSn / CuBe alloy
Contact finish	Au over NiP

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[1]

Insertion loss



Voltage standing-wave ratio VSWR



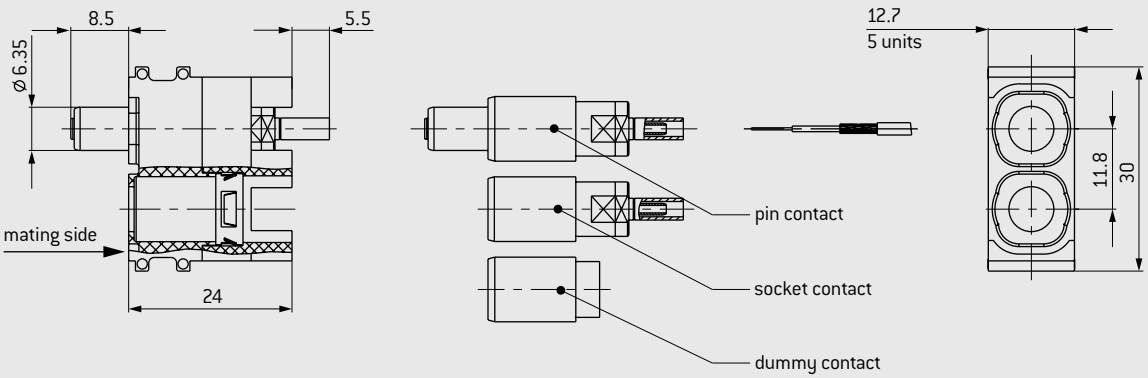
REMOVAL TOOL

PART NUMBER: 087.170.391.000.000

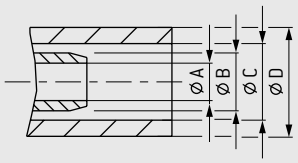
For an overview of all tools please see from page 164.

[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 174.

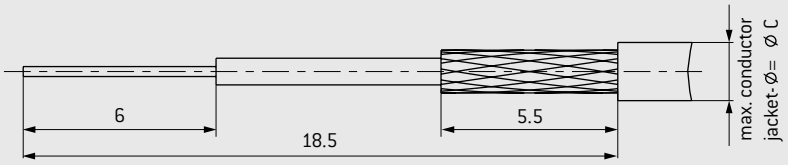
INSULATOR FOR PIN AND SOCKET



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	Charac-teristic impedance Ω	Fre-quency 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 2 CONTACTS FOR 75 Ω

COAX

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

TECHNICAL NOTES

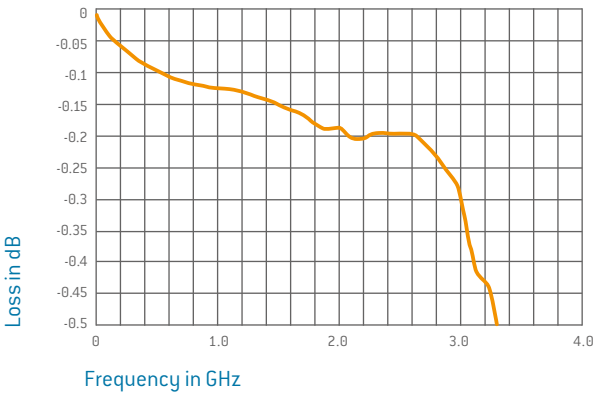
- Crimp information see page 158.

TECHNICAL DATA

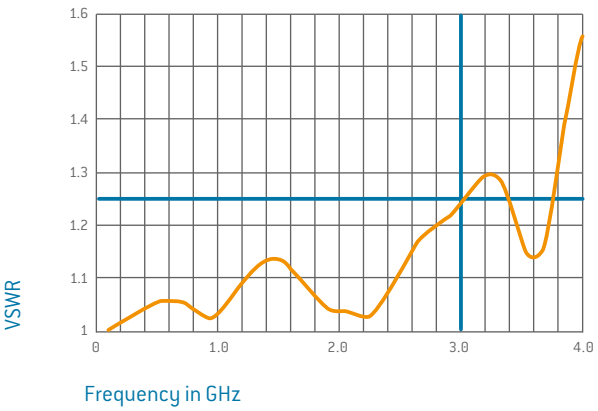
Frequency range[1]	0–3.0 GHz
Insulation resistance	> 100 GΩ
Voltage information acc. to MIL[2]	
Operating voltage	475 V
Test voltage	1,425 V
Mechanical data	
Total mating force (average)	13.3 N / Module
Total sliding force (average)	9.5 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000
Materials	
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94
Contact body	Cu alloy/PTFE
Contact spring	CuSn / CuBe alloy
Contact finish	
Center contact	Au over Ni
Outer contact	Ni

HIGH FREQUENCY CHARACTERISTICS FOR 75 Ω COAX CONTACTS[1]

Insertion loss



Voltage standing-wave ratio VSWR



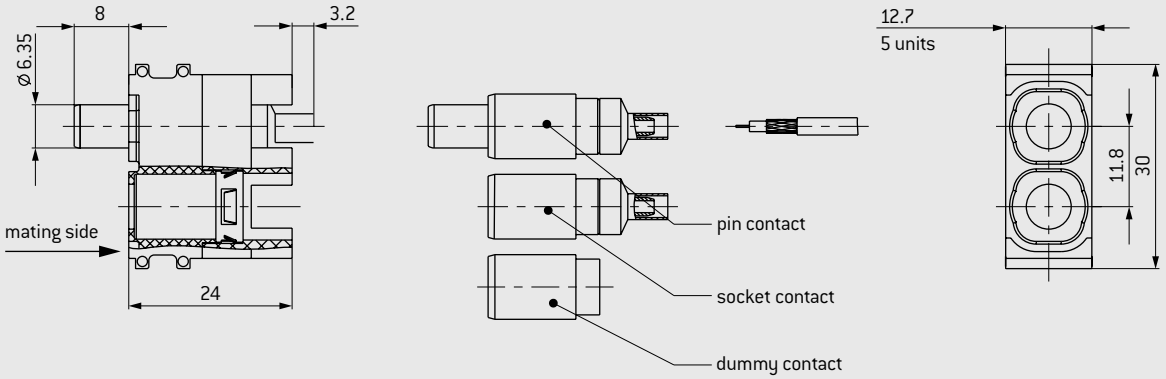
REMOVAL TOOL

PART NUMBER: 087.170.391.000.000

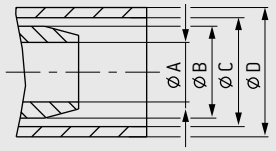
For an overview of all tools please see from page 164.

[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 174.

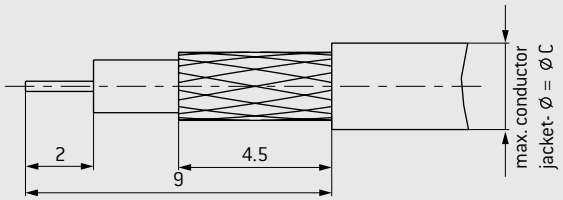
INSULATOR FOR PIN AND SOCKET



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

[1] Special lines on request.

MODULE 2 CONTACTS FOR COMPRESSED AIR VALVES

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

COMPRESSED AIR

Non shut-off version

Shut-off version

Operating pressure: 20 bar
Mating cycles[1]: minimum 100,000
Inner diameter tube: M5 or max. 4 mm

TECHNICAL NOTES

- The contacts are spring loaded in the mated state. The frame must maintain this spring load with a holding device.
- Further termination types on request
- No O_2 model[2]

TECHNICAL DATA

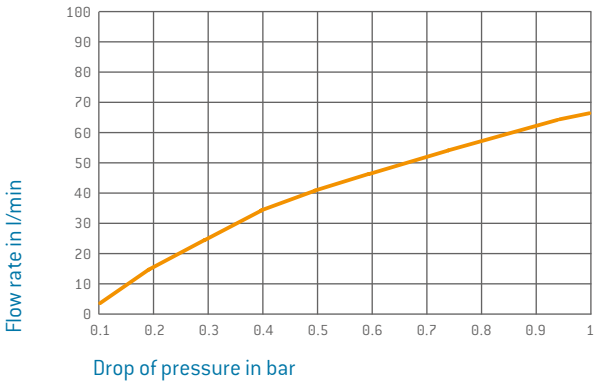
Mechanical data

Valid max. operating pressure	–0.8 to 20 bar
Total mating force (average)	
non shut-off	27 N / Module
one side shut-off	28 N / Module
both side shut-off	29 N / Module
Total sliding force (average)	
non shut-off	12.6 N / Module
one side shut-off	12.6 N / Module
both side shut-off	9.2 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles[1]	minimum 100,000
Tube termination	M5 internal thread for commercially available Push-in connections

Materials

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

FLOW RATE DIAGRAM

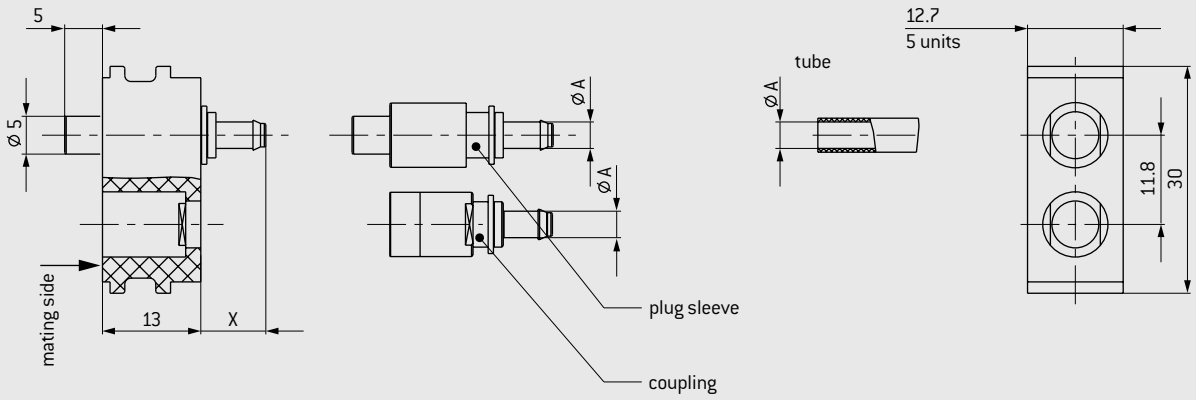


The flow rate diagram refers to the locking version with a maximum gap between socket and pin piece of ≤ 0.5 mm. If the clearance is modified, the drop of pressure increases.

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

INSULATOR PIN AND SOCKET

ACCESSORIES SEE PAGE 98



Module 2 contacts	Part number
Insulator	611.141.102.923.000

Description	Part number	Dim. A mm	Dim. X mm	Termination types see page 158 I	II
Plug sleeve (non shut-off)	196.023.001.300.000	3	8.5	x	
Plug sleeve (non shut-off)	196.024.001.300.000	4	10.5	x	
Plug sleeve (non shut-off)	196.025.001.300.000	M5	–		x
Coupling plug (non shut-off)	196.023.003.300.000	3	8.5	x	
Coupling plug (non shut-off)	196.024.003.300.000	4	10.5	x	
Coupling plug (non shut-off)	196.025.003.300.000	M5	–		x
Plug sleeve (shut-off)[1,2]	196.025.014.300.000	M5	–		x
Coupling plug (shut-off)	196.023.002.300.000	3	8.5	x	
Coupling plug (shut-off)	196.024.002.300.000	4	10.5	x	
Coupling plug (shut-off)[2]	196.025.012.300.000	M5	–		x

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

MODULE 2 CONTACTS FOR COMPRESSED AIR VALVES

Inner diameter of tube max. 6 mm

COMPRESSED AIR

Non shut-off version

One side shut-off version

Operating pressure: 12 bar
Mating cycles[1]: minimum 100,000
Inner diameter tube: max. 6 mm

TECHNICAL NOTES

- The contacts are spring loaded in the mated state. The frame must maintain this spring load with a holding device.
- Further termination types on request.
- No O_2 model[2]

TECHNICAL DATA

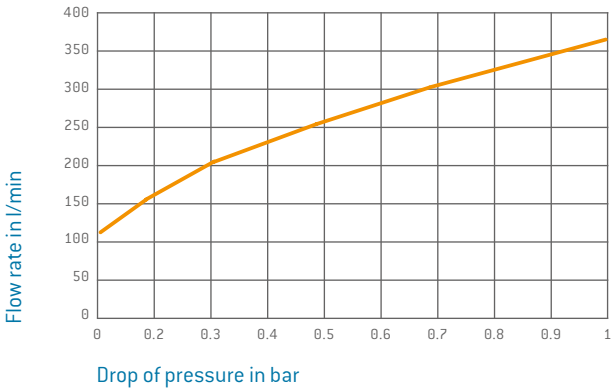
Mechanical data

Valid max. operating pressure	–0.8 to 12 bar
Total mating force (average)	
non shut-off	10.8 N / Module
one side shut-off	12.8 N / Module
Total sliding force (average)	
non shut-off	6.8 N / Module
one side shut-off	6.8 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles[1]	minimum 100,000

Materials

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

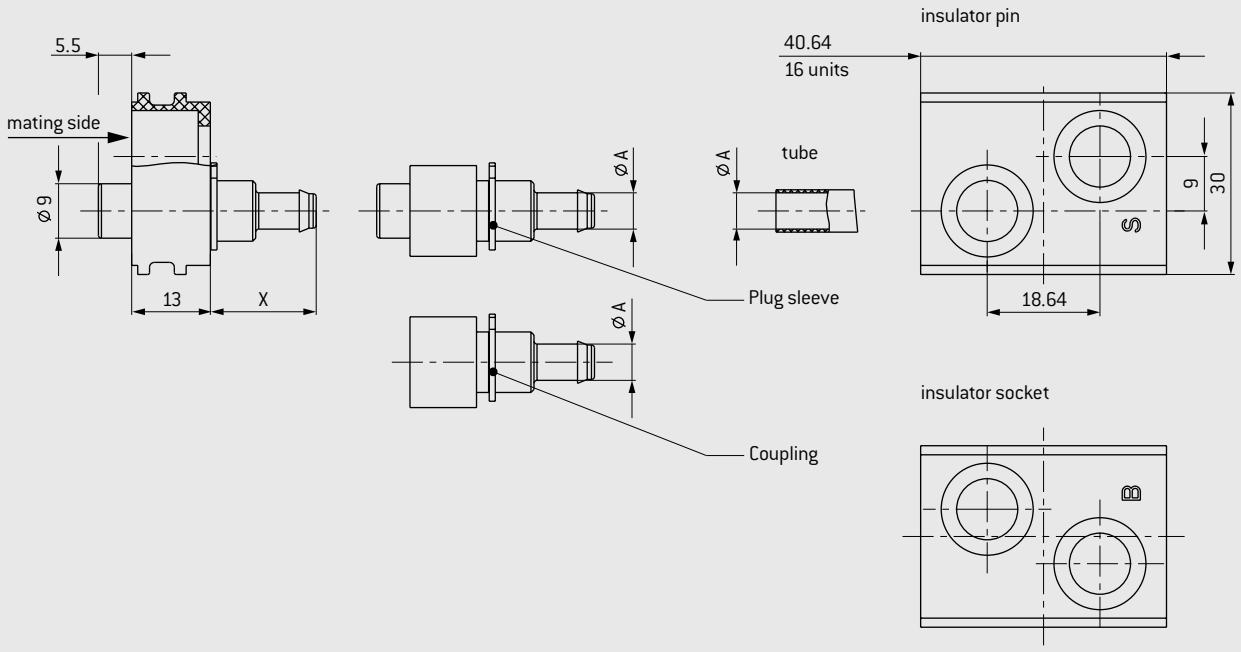
FLOW RATE DIAGRAM



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

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

INSULATOR PIN AND SOCKET



Module 2 contacts	Part number
Insulator socket	610.140.102.923.000
Insulator pin	611.140.102.923.000

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

MODULE 1 CONTACT FOR COMPRESSED AIR VALVES

Inner diameter of tube max. 6 mm

COMPRESSED AIR

Non shut-off version

Shut-off version

Operating pressure: 12 bar
Mating cycles[1]: minimum 100,000
Inner diameter tube: max. 6 mm

TECHNICAL NOTES

- The contacts are spring loaded in the mated state. The frame must maintain this spring load with a holding device.
- Further termination types on request.
- No O_2 model[2]

TECHNICAL DATA

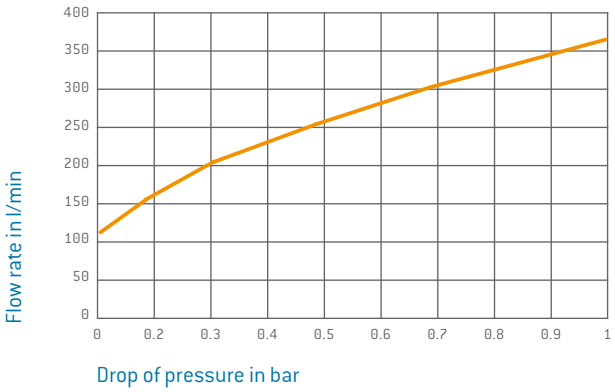
Mechanical data

Valid max. operating pressure	–0.8 to 12 bar
Total mating force (average)	
non shut-off	5.4 N / Module
one side shut-off	6.4 N / Module
Total sliding force (average)	
non shut-off	3.4 N / Module
one side shut-off	3.4 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles[1]	minimum 100,000

Materials

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

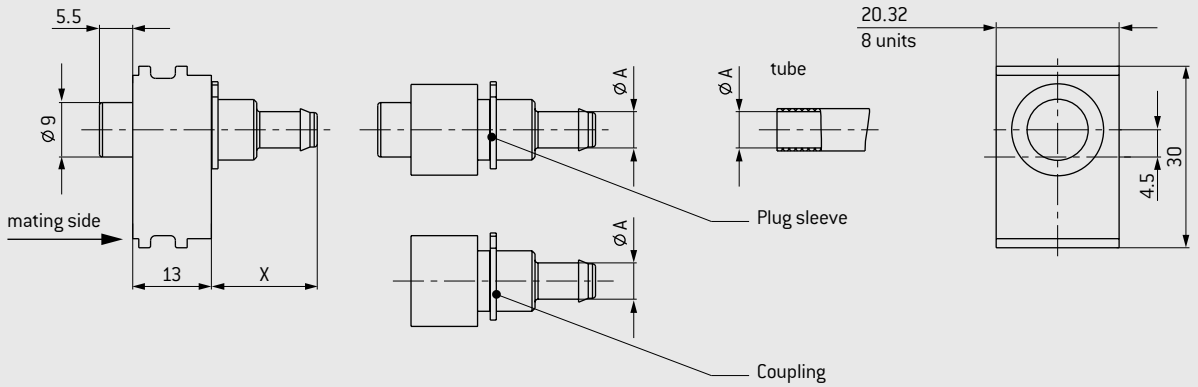
FLOW RATE DIAGRAM



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

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

INSULATOR PIN AND SOCKET



Module 1 contact	Part number
Insulator	611.142.101.923.000

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

MODULE 2 CONTACTS

Suitable for conducting air, water and other fluids

FLUID

Two-sided shut-off

Operating pressure: 16 bar low-leakage model
Mating cycles[1]: minimum 100,000
Inner diameter tube: M5

TECHNICAL NOTES

- The contacts are spring loaded in the mated state. The frame must maintain this spring load with a holding device.
- The use of flammable or explosive liquids or gases is not allowed.
- No O_2 model[2]

TECHNICAL DATA

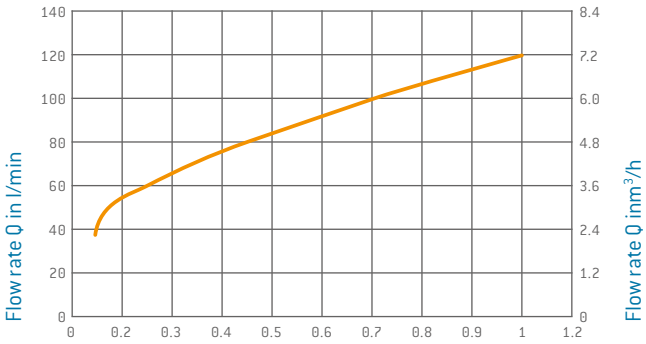
Mechanical data

Valid max. operating pressure	16 bar
Tube termination	M5 internal thread for commercially available Push-in connections
Total mating force (average)	64 N / Module
Total sliding force (average)	0 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles[1]	minimum 100,000

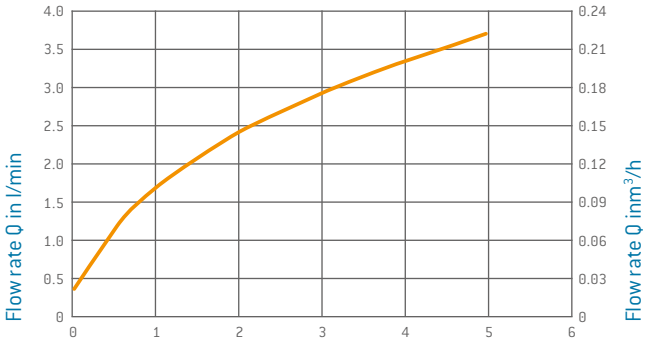
Materials

Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Fluid model	Stainless steel
Sealing	NBR

FLOW RATE DIAGRAM AIR



FLOW RATE DIAGRAM WATER

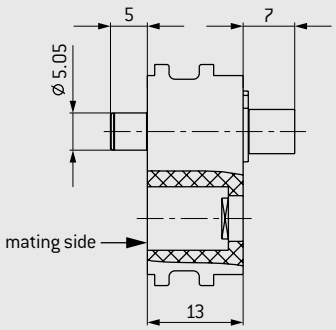


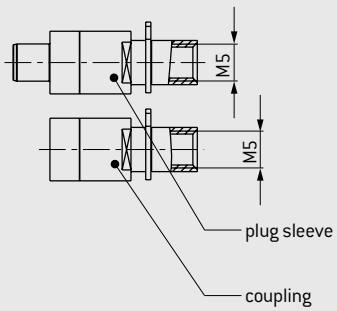
The flow diagram refers to the blocking variant with a maximum gap between socket and pin piece of ≤ 0.5 mm. The pressure reduction increases in the event of a changed gap measurement.

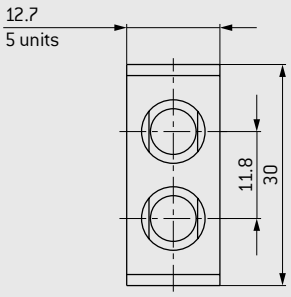
[1] Specified mating cycles possible with regular service intervals
[2] Not suitable for mixtures containing more than 25 % oxygen content or explosive gases

INSULATOR PIN AND SOCKET

ACCESSORIES SEE PAGE 130







Module 2 contacts	Part number
Insulator	611.141.102.923.000

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

ACCESSORIES

COMPRESSED AIR AND FLUID MODEL

TERMINATION TYPE I

Nipple fitting

TERMINATION TYPE II PUSH-IN

Push-in fitting

L connection

TECHNICAL NOTES

- Tightening torque 1.5 Nm

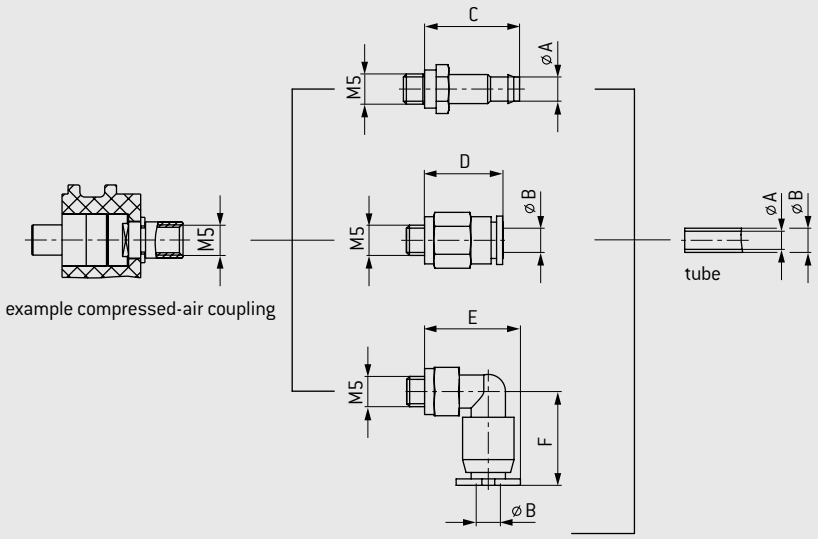
TECHNICAL DATA

Mechanical data

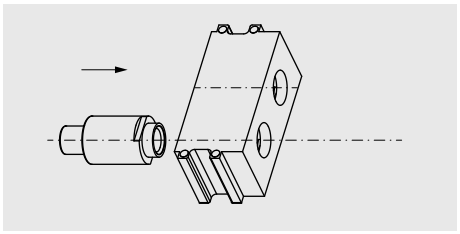
Valid operating pressure (static)	0.95 to 14 bar
Operating temperature	–10 °C to +80 °C
Thread termination	M5

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

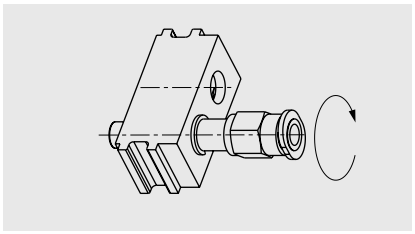
TERMINATION DIMENSIONS, FOR ACCESSORIES USED WITH FLUID COUPLING AND RETAINER RING.



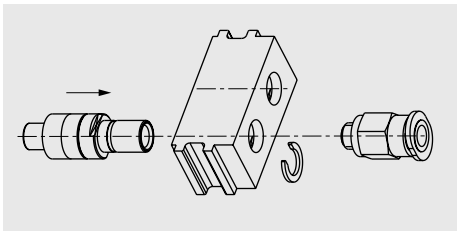
ASSEMBLY OF THE MODEL (DEPENDING ON MODEL)



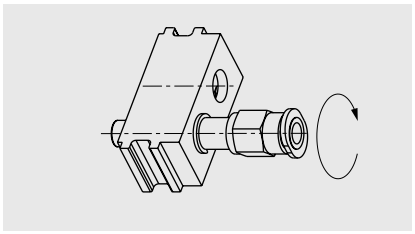
1. Insert model in insulator.



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



1. Insert model in insulator
   and assemble retaining ring.



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

MODULE 1 CONTACTS

Suitable for conducting air, water, and other fluids (e.g., coolants)

FLUID

Two-sided shut-off

Operating pressure: 25 bar low-leakage model
Mating cycles[1]: minimum 100,000
Inner diameter tube: G1/4

TECHNICAL NOTES

- The contacts are spring loaded in the mated state. The frame must maintain this spring load with a holding device.
- The use of flammable or explosive liquids or gases is not permitted.
- No O_2 model[2]

TECHNICAL DATA

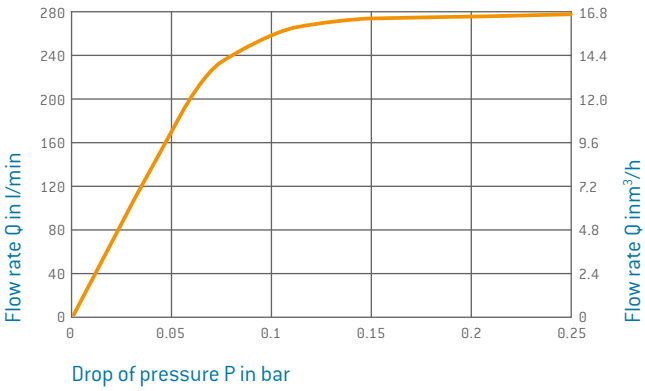
Mechanical data

Valid max. operating pressure	–0.8 to 25 bar
Tube termination	G1/4 inner thread for standard Push-in connections
Total mating force (average)	60 N / Module
Total sliding force (average)	0 N / Module
Operating temperature	–15 °C to +90 °C
Mating cycles[1]	minimum 100,000

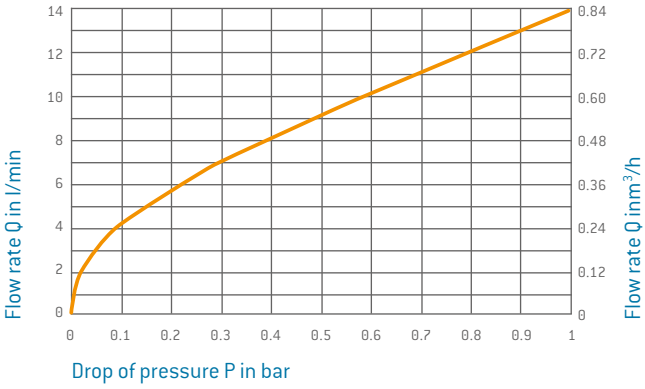
Materials

Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Fluid model	Cu alloy, nickel-plated
Sealing	NBR

FLOW RATE DIAGRAM AIR



FLOW RATE DIAGRAM WATER



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

REMOVAL TOOL

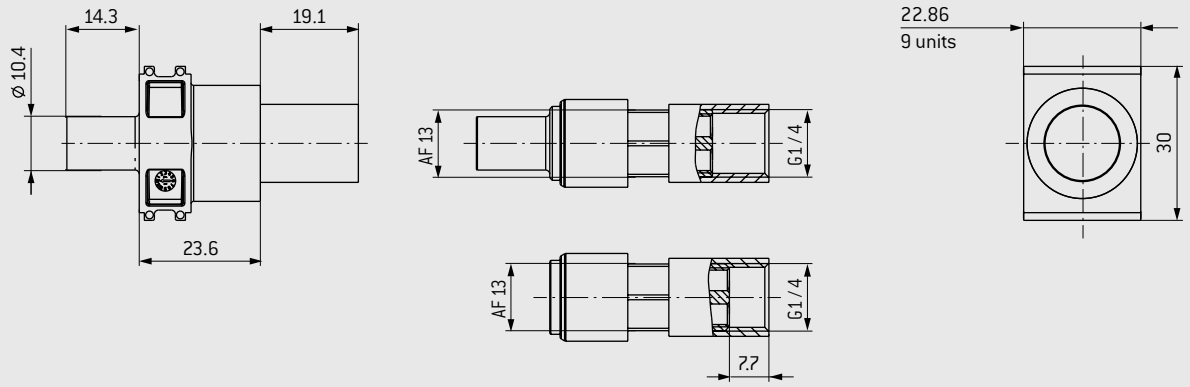
Removal of the fully assembled coupling (including cable).

PART NUMBER: 087.196.050.000.000

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

INSULATOR PIN AND SOCKET

ACCESSORIES SEE PAGE 134



For use in a strain relief housing, the space requirements must be checked.

Module 1 contacts	Part number
Insulator	611.177.101.923.000

Description	Part number	Termination	Outer diameter of tube
Plug sleeve (shut-off)	196.050.001.380.000	G1 / 4	see termination accessories on p. 134
Coupling plug (shut-off)	196.050.002.380.000	G1 / 4	

ACCESSORIES G 1 / 4

FLUID G1/4

TERMINATION TYPE PUSH-IN

Push-in fitting

L connection

TECHNICAL NOTES

- Tightening torque 7.5 Nm

TECHNICAL DATA

Mechanical data

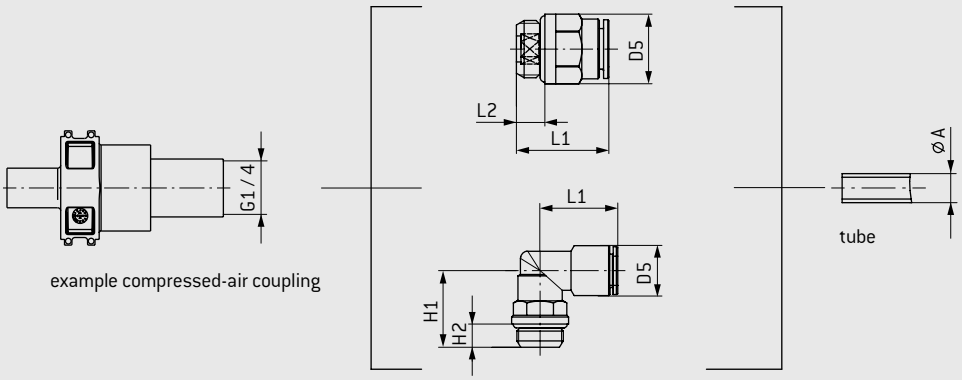
Valid operating pressure (static)	–0.95 to 16 bar
Operating temperature	–20 °C to +70 °C
Thread termination	G1 / 4

Description	Part number	Dim. A Outer diameter of tube mm	D5 Ø mm	L1 mm	L2 mm	Weight g
ODU-MAC® Push-in fitting G1 / 4	945.000.001.000.322	6	16	19.5	6.5	12.7
	945.000.001.000.323	8	16	21.5	6.5	13.6
	945.000.001.000.324	10	16	27.5	6.5	17.4
	945.000.001.000.325	12	16	28.5	6.5	26.2

Description	Part number	Dim. A Outer diameter of tube mm	D5 Ø mm	L1 mm	H1 mm	H2 mm	Weight g
ODU-MAC® L connection Push-in Push-in G1 / 4[1]	945.000.001.000.318	6	12	22	21.5	6.5	21.8
	945.000.001.000.319	8	14	22.5	21.5	6.5	25.3
	945.000.001.000.320	10	16	26	22	6.5	34
	945.000.001.000.321	12	19	28.5	25.5	6.5	58.5

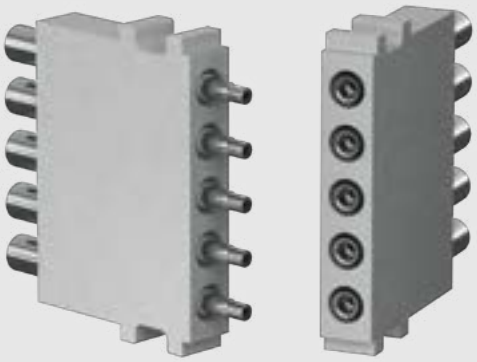
[1] For use in a strain relief housing, the space requirements must be checked.

TERMINATION DIMENSIONS FOR ACCESSORIES USED WITH FLUID COUPLING



MODULE 5 CONTACTS FOR FIBER OPTIC POF

FIBER OPTIC



Metal guided ferrule
Mating cycles: minimum 40,000
Non-magnetic on request

TECHNICAL NOTES

- Conditional with the function, the contacts are spring loaded in the mated state. This spring load must be maintained by the frame via a holding device.

TECHNICAL DATA

Mechanical data

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

Materials

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

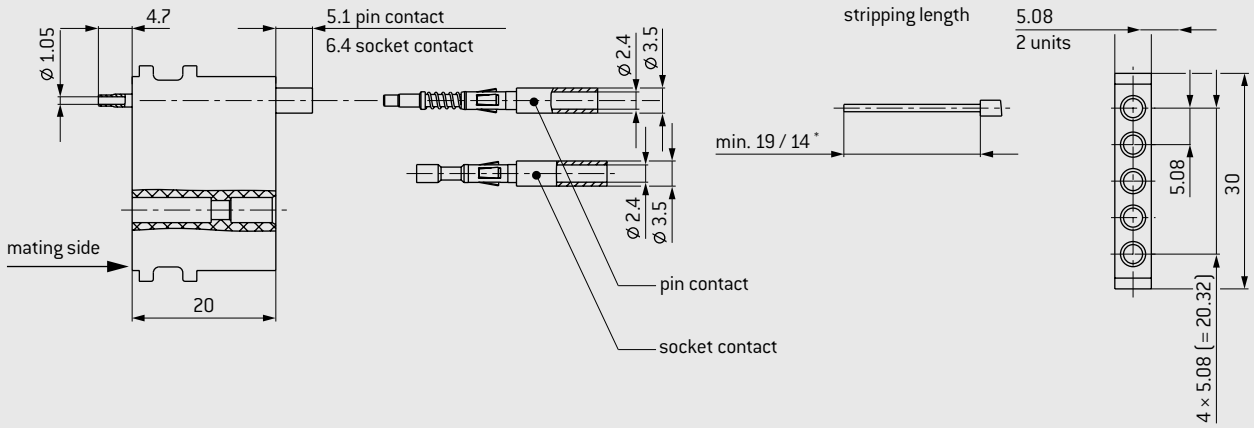
REMOVAL TOOL II

Removal from front, cutting-off not necessary.

PART NUMBER: 087.611.001.002.000

For an overview of all tools please see from page 164.

INSULATOR PIN AND SOCKET



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

Module 5 contacts	Part number
Insulator	611.163.105.923.000

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

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

MODULE 2 CONTACTS FOR FIBER OPTIC POF

FIBER OPTIC

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

TECHNICAL NOTES

- Conditional with the function, the contacts are spring loaded in the mated state. This spring load must be maintained by the frame via a holding device.
- Lens connector on request

TECHNICAL DATA

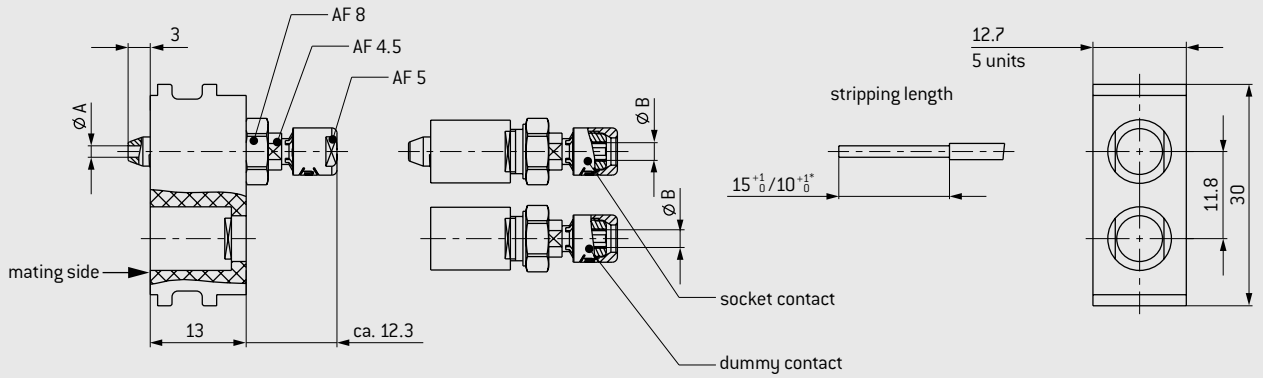
Mechanical data

POF (Polymer Optical Fiber)	1 mm
Outer diameter	2.2 mm–2.3 mm
Fiber fastening	Clamping
Insertion loss	
Typical	1.5 dB at 670 nm
During life-time	< 2 dB at 670 nm
Total mating force (average)	16 N
Operating temperature (depending on fiber)	
Standard fiber	–40 °C to +85 °C
High temperature fiber	–40 °C to +115 °C
Mating cycles	minimum 100,000

Materials

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

INSULATOR PIN AND SOCKET



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

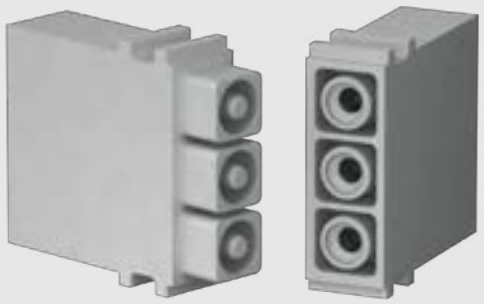
Module 2 contacts	Part number
Insulator	611.141.102.923.000

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

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

MODULE 3 CONTACTS FOR FIBER OPTIC GOF

FIBER OPTIC



Ceramic Ferrule
Single-mode / multi-mode
Mating cycles[1]: minimum 100,000

TECHNICAL NOTES

- The contacts are spring loaded in the mated state. The frame must maintain this spring load a holding device.
- Lens connector on request.

TECHNICAL DATA

Mechanical data

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

Materials

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

REMOVAL TOOL I (STRAIGHT)

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

PART NUMBER: 087.170.136.000.000

REMOVAL TOOL II

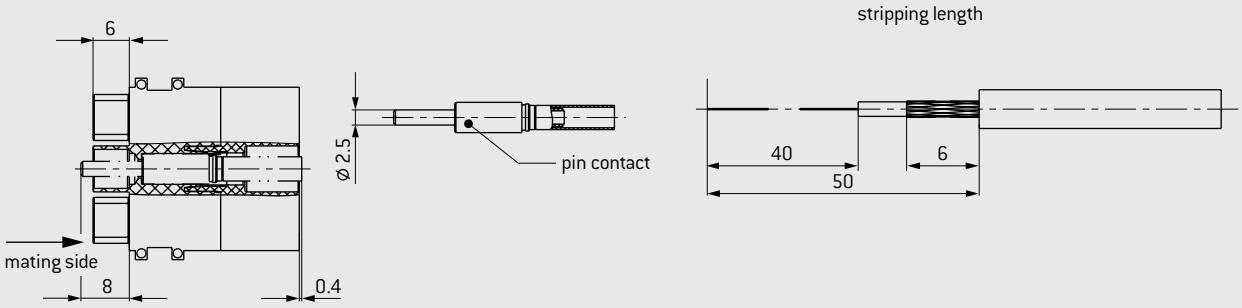
Removal of unassembled contacts, or contacts from which the cable has been removed.

PART NUMBER: 087.611.001.001.000

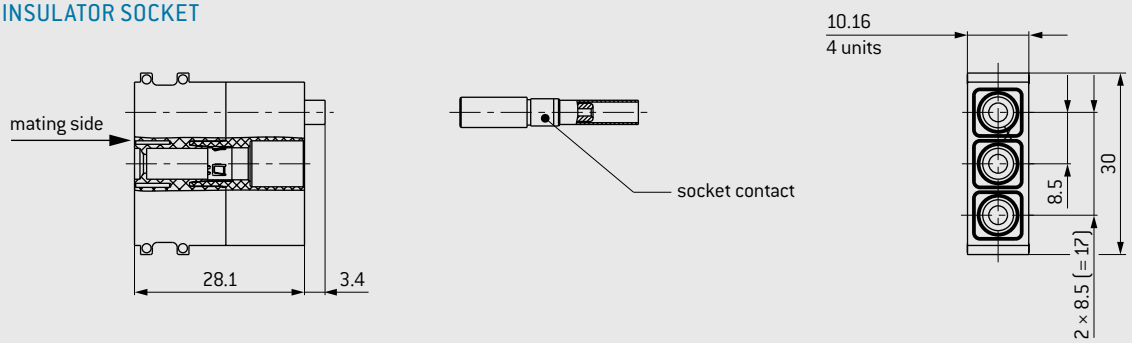
For an overview of all tools please see page 164.

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

INSULATOR PIN



INSULATOR SOCKET



Module 3 contacts	Part number
Insulator pin piece	611.162.103.923.000
Insulator socket piece	610.162.103.923.000

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

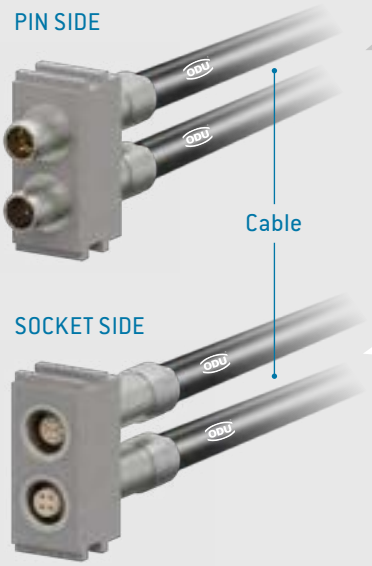
For assembly instructions please refer to our website: www.odu-connectors.com/downloads

PREASSEMBLED MODULE FOR MULTI-POSITION FEEDTHROUGH / HIGH-SPEED CONNECTOR

PREASSEMBLED MODULE:

- The inserts listed here for shielded feedthroughs / high-speed connectors are optimally suitable for transfer of Ethernet, USB® 2.0[1], USB® 3.2 and HDMI®[1].
- We offer the preassembled module with individually defined cable length, so that you do not need to assemble the cable by yourselves. We are glad to advice you the best solution.

SIZE 0 / FEEDTHROUGH / HIGH-SPEED CONNECTOR



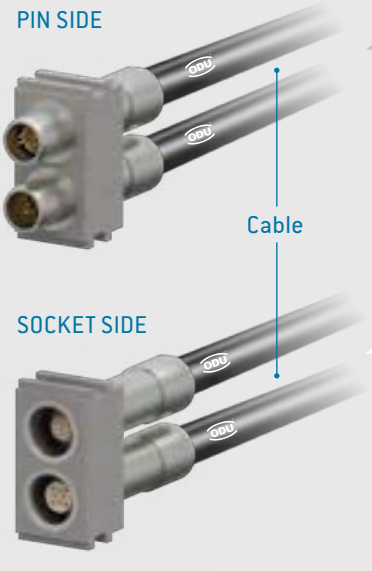
Type & configuration	Data transmission protocols
Connector A	USB® 2.0[1] (cable length 0.2 – 4.0 m)
Micro-connector B	
Receptacle A	
Connector A	USB® 3.2 Gen 1x1[1] (cable length 0.2 – 4.0 m)
Micro-connector B	
Receptacle A	

Category[2]	No. of contacts (insert)
USB® 2.0[1]	4
USB® 3.2 Gen 1x1[1]	10

CONTACT US!
sales@odu.de
+498631 6156-0

[1] For data transmission protocols please see page 2.
[2] Classification acc. to ISO/IEC 11801(1-6):2017-11

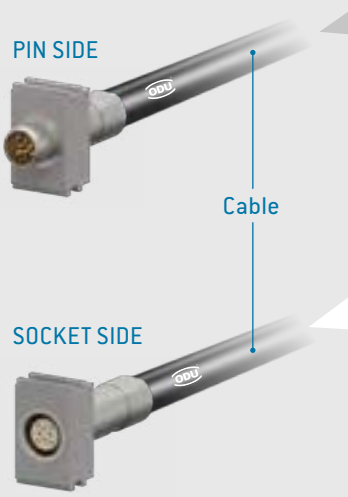
SIZE 1 / FEEDTHROUGH / HIGH-SPEED CONNECTOR



Type & configuration	Data transmission protocols
RJ45	Ethernet (cable length 0.2 – 100.0 m)
Connector A Micro-connector B Receptacle A	USB® 3.2 Gen 1x1[1] (cable length 0.2 – 1.8 m)

Category[2]	No. of contacts (insert)
Ethernet	8
USB® 3.2 Gen 1x1[1]	10

SIZE 2 / FEEDTHROUGH / HIGH-SPEED CONNECTOR



Type & configuration	Data transmission protocols
RJ45	Ethernet (cable length 0.2 – 100.0 m)
Connector A Receptacle A	HDMI®[1] 2.0 or 2.1®[1] (cable length 0.2 – 3.0 m)
Connector C	USB® 3.2 Gen 1x2[1] (cable length 0.2 – 1.8 m)

Category[2]	No. of contacts (insert)
Ethernet	4 or 8
HDMI®[1]	16 or 22
USB® 3.2 Gen 1x2[1]	22
DisplayPort® 2.0[1]	22

[1] For data transmission protocols please see page 2.
[2] Classification acc. to SO/IEC 11801(1-6):2017-11

MODULE FOR MULTI-POSITION, SHIELDED FEED-THROUGH / HIGH-SPEED CONNECTOR

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

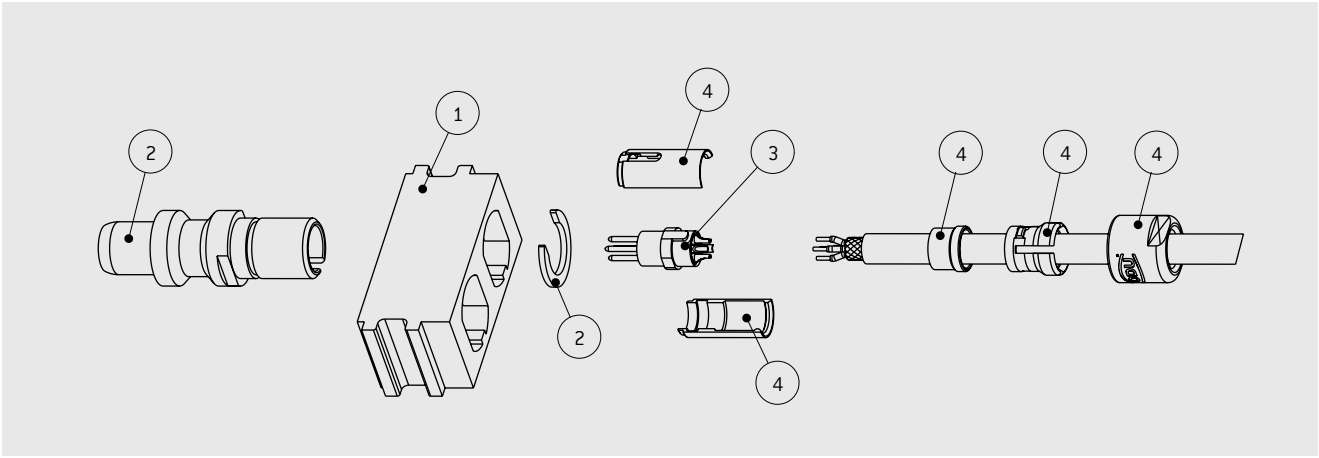
SHIELDED FEED-THROUGH / HIGH-SPEED CONNECTOR

Mating cycles: minimum 10,000
USB® 2.0[1], USB® 3.2 Gen 1x1[1], CAT 5
2 to 10 contacts

TECHNICAL NOTES

- The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems. For example, Profibus®[1], USB® 1.1[1], RS485, FlexRay®[1], CAN-Bus and RS232.
- Selected inserts are suitable and qualified for data rates up to 5 GBits/s. For example, Fast-Ethernet[1], USB® 2.0[1], USB® 3.2 Gen 1x1[1], FireWire® S400[1] (on request), IEEE 1394, SPE 1000BASE-T1[4].

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



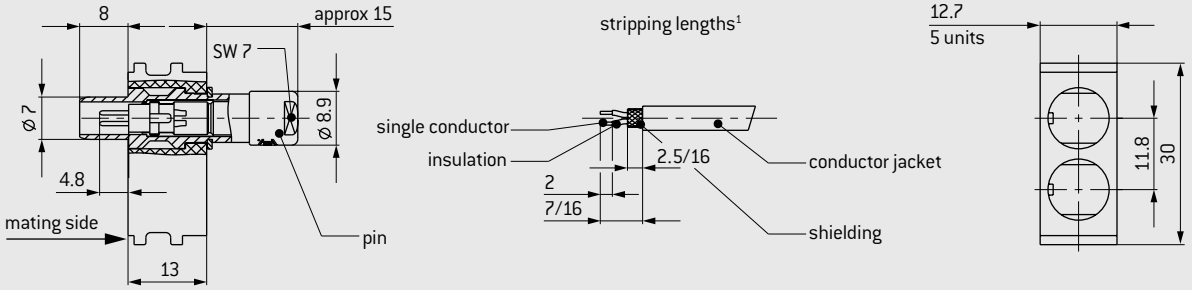
Order	Base parts	Part number
1	Insulator	611.148.102.923.000
2	Socket housing complete	653.001.001.304.000
2	Plug housing complete	653.001.002.304.000
	Dummy contact	021.341.182.300.000
3	Insert complete solder contacts[2]	see next page
4	Assembly set	see table on the right

ASSEMBLY SET

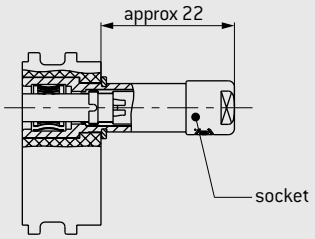
Cable ∅ mm	Part number
1.5 to 2	653.001.001.304.020
2 to 2.5	653.001.001.304.025
2.5 to 3	653.001.001.304.030
3 to 3.5	653.001.001.304.035
3.5 to 4	653.001.001.304.040
4 to 4.5	653.001.001.304.045
4.5 to 5	653.001.001.304.050
5 to 6.1	653.001.001.304.061[3]

[1] Concerning data transmission protocols please note page 2. [2] Available with crimp contact upon request.
[3] It's possible that the cable collet cannot be covered completely over the cable. [4] Single Pair Ethernet according to IEC 63171-6:2019(IEEE 802.3bp)

INSULATOR PIN



INSULATOR SOCKET



In application with a housing please check the space requirement.

CONTACT ARRANGEMENTS

2 contacts | 3 contacts | 4 contacts CAT 5[2], USB® 2.0[2] | 5 contacts | 6 contacts | 7 contacts | 9 contacts | 10 contacts USB® 3.2 Gen1x1

Number of contacts	Contact diameter mm	Termination cross-section AWG	Rated voltage[3] V	Rated impulse voltage[3] kV	Degree of pollution[3]	Nominal voltage[4] V AC	Model	Category[5]	Insert complete[6] Part number	Total mating force N	Total sliding force N
INSERT WITH ODU TURNTAC® (MATING CYCLES MINIMUM 10,000)											
2	0.7	22	32	1.5	2	300	Pin	SPE 1000 BASE-T1	700.848.72M.002.D00	5.7	4.8
							Socket		700.748.72M.002.D00		
2	0.9	22	32	2	2	500	Pin		700.849.724.002.200	6.2	5.2
							Socket		700.749.724.002.200		
3	0.9	22	32	1.5	2	400	Pin		700.849.724.003.200	7.1	5.9
							Socket		700.749.724.003.200		
4	0.7	26	32	1.5	2	300	Pin	CAT 5	700.848.724.004.200	6.8	5.7
							Socket		700.748.724.004.200		
4	0.7	22	32	1.5	2	300	Pin	USB® 2.0[2]	700.848.724.404.221	6.8	5.7
							Socket		700.748.724.404.200		
5	0.7	26	25	1.5	2	366	Pin		700.848.724.005.200	7.4	6.2
							Socket		700.748.724.005.200		
6	0.5	28	32	1.5	2	300	Pin		700.841.724.006.200	7.9	6.6
							Socket		700.741.724.006.200		
7	0.5	28	32	1.5	2	300	Pin		700.841.724.007.200	8.4	7.0
							Socket		700.741.724.007.200		
9	0.5	28	10	1.2	2	200	Pin		700.841.724.009.200	9.5	7.9
							Socket		700.741.724.009.200		
10	0.5	28	7.5	1.2	2	200	Pin		700.841.724.010.221	10.1	8.4
							Socket		700.741.724.010.221		
10	6 × 0.3 4 × 0.5	28 24	7.5	1.2	2	100	Pin	USB® 3.2 Gen 1x1[2]	700.831.724.410.D00	10.1	8.4
							Socket		700.731.724.410.D00		

[1] You will find the required lengths in the relevant assembly instructions. [2] Concerning data transmission protocols please note page 2. [3] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008-01), see page 171 [4] Acc. to EIA-364-20F:2019 [5] Classification acc. to ISO/IEC 11801-1:2017-1 [6] Several inserts in crimp model on request

MODULE FOR MULTI-POSITION, SHIELDED FEED-THROUGH / HIGH-SPEED CONNECTOR

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

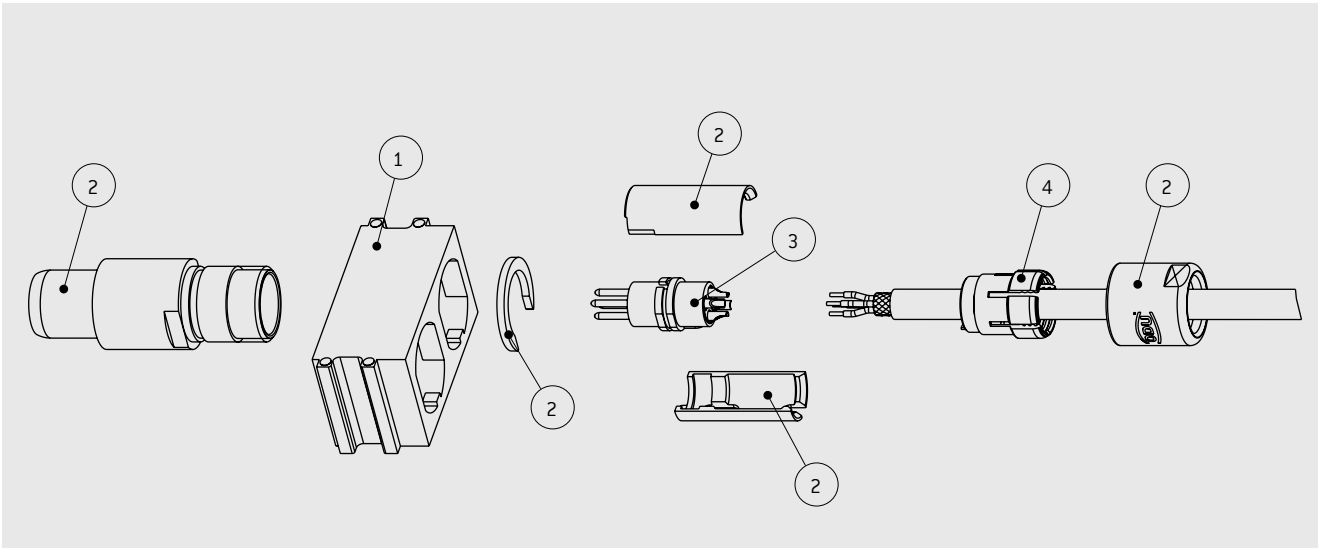
SHIELDED FEED-THROUGH / HIGH-SPEED CONNECTOR

Mating cycles: minimum 10,000 / 60,000
USB® 2.0[1], USB® 3.2 Gen 1x1[1], CAT 5
2 to 14 contacts

TECHNICAL NOTES

- The inserts listed here for shielded implementations/high-speed connectors are optimally suitable for all common bus systems. For example, Profibus®[1], RS485, FlexRay®[1], CAN-Bus and RS232.
- Selected inserts are suitable and qualified for data rates up to 5 Gbit/s. For example, Gigabit-Ethernet, Fast-Ethernet, IEEE 1394, USB® 2.0[1], FireWire® S400[1] (on request), SPE 1000BASE-T1[4].

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



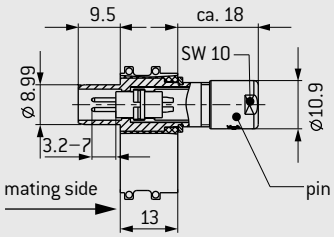
Order	Base parts	Part number
1	Insulator	611.167.102.923.000
2	Socket housing complete	653.002.001.304.000
2	Plug housing complete	653.002.002.304.000
	Dummy contact	021.341.186.300.000
3	Insert complete solder contacts[2]	see next page
4	Assembly set	see table on the right

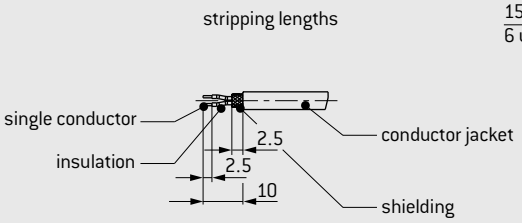
ASSEMBLY SET

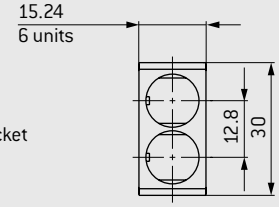
Cable Ø mm	Part number
1.5 to 2.1	751.020.188.304.022
2 to 3.2	751.020.188.304.032
3 to 4.2	751.020.188.304.042
4 to 5.2	751.020.188.304.052
5 to 6.2	751.020.188.304.062
6 to 7.2	751.020.188.304.072
7 to 7.7	751.020.188.304.077[3]

[1] Concerning data transmission protocols please note page 2. [2] Available with crimp contact upon request.
[3] It's possible that the cable collet cannot be covered completely over the cable. [4] Single Pair Ethernet according to IEC 63171-6(IEEE 802.3bp)

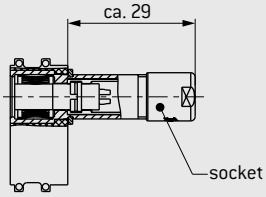
INSULATOR PIN







INSULATOR SOCKET



In application with a housing please check the space requirement.

CONTACT ARRANGEMENTS

2 contacts | 3 contacts | 4 contacts CAT 5, USB® 2.0[5] | 5 contacts | 6 contacts | 7 contacts | 8 contacts | 8 contacts CAT 5 | 10 contacts USB® 3.2 Gen 1x1[5] | 14 contacts

Number of contacts	Contact diameter mm	Termination cross-section AWG	Rated voltage[1] V	Rated impulse voltage[1] kV	Degree of pollution[1]	Nominal voltage[2] V AC	Model	Category[3]	Insert complete[4] Part number	Total mating force N	Total sliding force N
INSERT WITH ODU TURNTAC® (MATING CYCLES MINIMUM 10,000)											
2	1.3	20	32	2	2	550	Pin		701.844.724.002.200	8.6	7.1
							Socket		701.744.724.002.200		
2	0.7	22	32	1.5	2	300	Pin	SPE 1000 BASE-T1	701.848.724.002.D00	6.1	5.1
							Socket		701.748.724.002.D00		
3	1.3	20	32	1.5	2	500	Pin		701.844.724.003.200	10.4	8.7
							Socket		701.744.724.003.200		
4	0.9	22	40	2	2	500	Pin	CAT 5 up to 100 Mbit/s	701.849.724.004.200	8.3	6.9
							Socket		701.749.724.004.200		
4	0.9	22	40	2	2	500	Pin	USB® 2.0[5]	701.849.724.004.D00	8.3	6.9
							Socket		701.749.724.004.D00		
5	0.9	22	32	1.5	2	450	Pin		701.849.724.005.200	9.1	7.6
							Socket		701.749.724.005.200		
6	0.7	22	32	1.5	2	400	Pin		701.848.724.406.200	8.3	7
							Socket		701.748.724.406.200		
7	0.7	22	32	1.5	2	400	Pin		701.848.724.407.200	8.9	7.4
							Socket		701.748.724.407.200		
8	0.7	22	10	1.2	2	333	Pin		701.848.724.408.200	9.5	7.9
							Socket		701.748.724.408.200		
8	0.5	26	32	1.5	2	333	Pin	CAT 5 up to 1 Gbit/s	701.841.724.408.D00	9.3	7.8
							Socket		701.741.724.408.D00		
10	0.5	28	25	1.5	2	333	Pin		701.841.724.010.400	10.4	8.7
							Socket		701.741.724.010.200		
10	6 x 0.3 4 x 0.5	28 24	7.5	1.2	2	100	Pin	USB® 3.2 Gen 1x1[5]	701.831.724.410.D00	12.6	10.5
							Socket		701.731.724.410.D00		
14	0.5	28	25	1.5	2	300	Pin		701.841.724.014.400	15.7	13.1
							Socket		701.741.724.014.200		
INSERT WITH ODU SPRINGTAC® (MATING CYCLES MINIMUM 60,000)											
4	0.76	22	63	2	2	450	Pin	CAT 5 up to 100 Mbit/s	701.842.724.004.700	9.6	8
							Socket		701.742.724.004.700		
5	0.76	22	32	1.5	2	400	Pin		701.842.724.005.700	10.8	9
							Socket		701.742.724.005.700		

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008-01), see page 171. [2] Acc. to EIA-364-20F:2019. [3] Classification acc. to ISO/IEC 11801-1:2017-1. [4] Several inserts in crimp model on request. [5] Concerning data transmission protocols please note page 2.

MODULE FOR MULTI-POSITION, SHIELDED FEED-THROUGH / HIGH-SPEED CONNECTOR

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

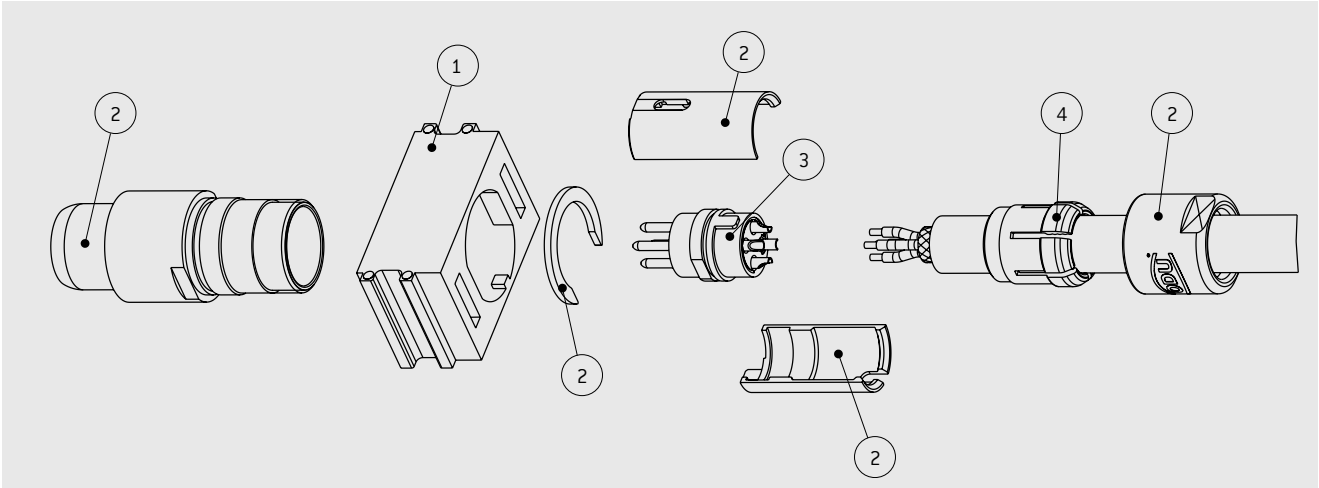
SHIELDED FEED-THROUGH / HIGH-SPEED CONNECTOR

Mating cycles: minimum 10,000 / 60,000
CAT 5, CAT 6_A, HDMI®[1] 2.0 / 2.1,
USB® 3.2 Gen 1x2[1], DisplayPort 2.0
3 to 22 contacts

TECHNICAL NOTES

- The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems. For example, Profibus®[1], RS485, FlexRay®[1], CAN-Bus[1] and RS232.
- Selected inserts are suitable and qualified for data rates up to 20 GBit/s. E. g. 10 Gigabit-Ethernet, Gigabit-Ethernet, Fast-Ethernet[1], IEEE 1394, HDMI®[1], USB® 3.2 Gen 1x2[1], DisplayPort 2.0.

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



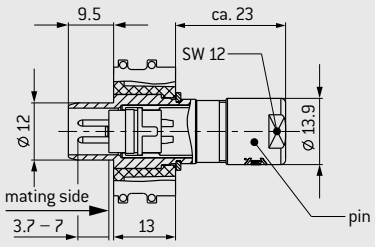
Order	Base parts	Part number
1	Insulator	611.170.101.923.000
2	Socket housing complete	653.003.001.304.000
2	Plug housing complete	653.003.002.304.000
3	Insert complete solder contacts[2]	see next page
4	Assembly set	see table on the right

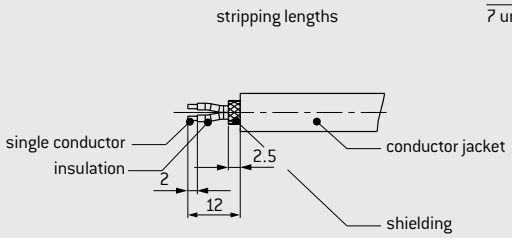
ASSEMBLY SET

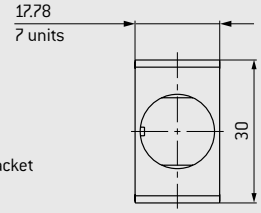
Cable ∅ mm	Part number
2 to 3.2	752.020.188.304.032
3 to 4.2	752.020.188.304.042
4 to 5.2	752.020.188.304.052
5 to 6.2	752.020.188.304.062
6 to 7.2	752.020.188.304.072
7 to 8.2	752.020.188.304.082
8 to 9.2	752.020.188.304.092
9 to 9.9	752.020.188.304.099

[1] Concerning data transmission protocols please note page 2. [2] Available with crimp contact upon request.

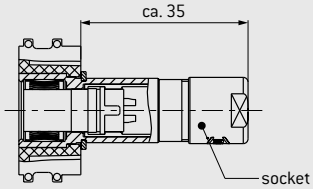
INSULATOR PIN





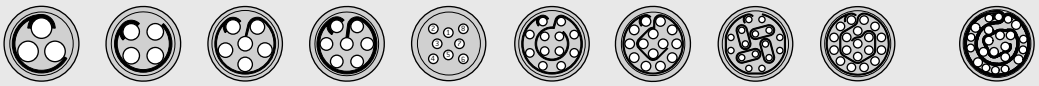


INSULATOR SOCKET



In application with a housing please check the space requirement.

CONTACT ARRANGEMENTS



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

Number of contacts	Contact diameter mm	Termination cross-section AWG	Rated voltage[1] V	Rated impulse voltage[1] kV	Degree of pollution[1]	Nominal voltage[2] V AC	Model	Category[3]	Insert complete[4] Part number	Total mating force N	Total sliding force N
INSERT WITH ODU TURNTAC® (MATING CYCLES MINIMUM 10,000)											
3	1.6	18	50	2.5	3	800	Pin		702.851.724.003.200	13.9	11.6
			160		2		Socket		702.751.724.003.200		
4	1.3	20	40	2.5	3	650	Pin	CAT 5 up to 100 Mbit/s	702.844.724.004.200	13.1	10.9
			160		2		Socket		702.744.724.004.200		
6	1.3	20	32	2	3	600	Pin		702.844.724.006.200	16.2	13.5
			80				Socket		702.744.724.006.200		
		18	32	1.5	2	366	Pin		702.844.724.406.200		
							Socket		702.744.724.406.200		
7	1.3	20	32	2	3	600	Pin		702.844.724.007.200	17.8	14.8
			80	2	2		Socket		702.744.724.007.200		
		18	32	1.5	2	366	Pin		702.844.724.407.200		
							Socket		702.744.724.407.200		
8	0.9	22	20	2	3	500	Pin	CAT 6_A	702.849.724.008.D00	16.2	13.5
			50		2		Socket		702.749.724.008.D00		
12	0.7	26	10	2	3	450	Pin		702.848.724.012.200	16.1	13.4
			32		2		Socket		702.748.724.012.200		
14	0.7	26	32	1.5	2	400	Pin		702.848.724.014.200	17.6	14.7
							Socket		702.748.724.014.200		
16	0.5	26	10	1.5	3	250	Pin	HDMI 2.0®[5]	702.841.724.416.D00	19.1	15.9
			32		2		Socket		702.741.724.416.D00		
19	0.7	26	32	1.5	2	333	Pin		702.848.724.019.200	21.4	17.9
							Socket		702.748.724.019.200		
22	0.5	22 / 28	16	2	3	200	Pin	USB®[5] 3.2 Gen 1x2 DisplayPort 2.0 HDMI®[5] 2.1	702.841.724.022.D00	23.7	19.8
			40		2		Socket		702.741.724.022.D00		
INSERT WITH ODU SPRINGTAC® (MATING CYCLES MINIMUM 60,000)											
8	0.76	22	16	2	3	550	Pin	CAT 5	702.842.724.008.D00	23.5	19.6
			40		2		Socket		702.742.724.008.D00		

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008-01), see page 171. [2] Acc. to EIA-364-20F:2019. [3] Classification acc. to ISO/IEC 11801-1:2017-1. [4] Several inserts in crimp model on request. [5] Concerning data transmission protocols please note page 2.

MODULE FOR MULTI-POSITION, SHIELDED FEED-THROUGH / HIGH-SPEED CONNECTOR

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

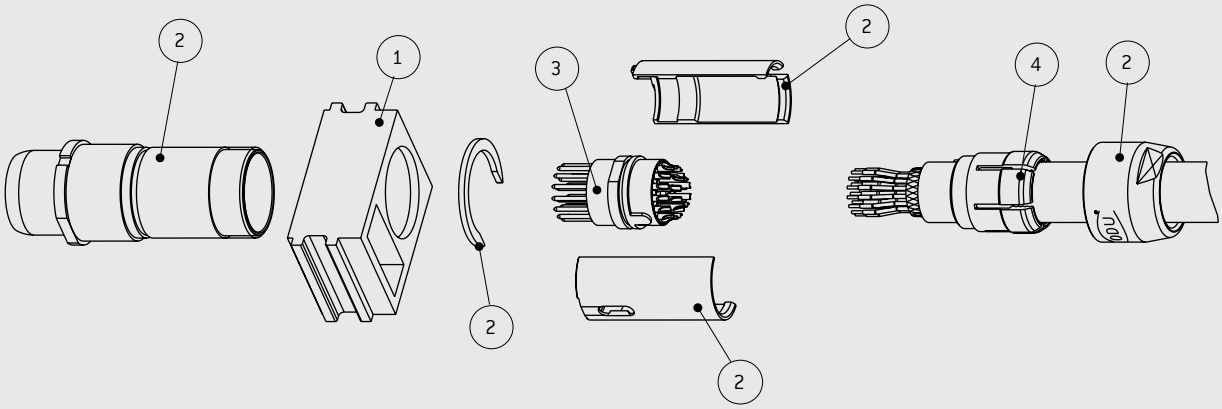
SHIELDED FEED-THROUGH / HIGH-SPEED CONNECTOR

Mating cycles: minimum 10,000
4 to 30 contacts

TECHNICAL NOTES

- The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems. For example, Profibus®[1], RS485, FlexRay®[1], CAN-Bus[1] and RS232.
- Selected inserts can be qualified for data rates.

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



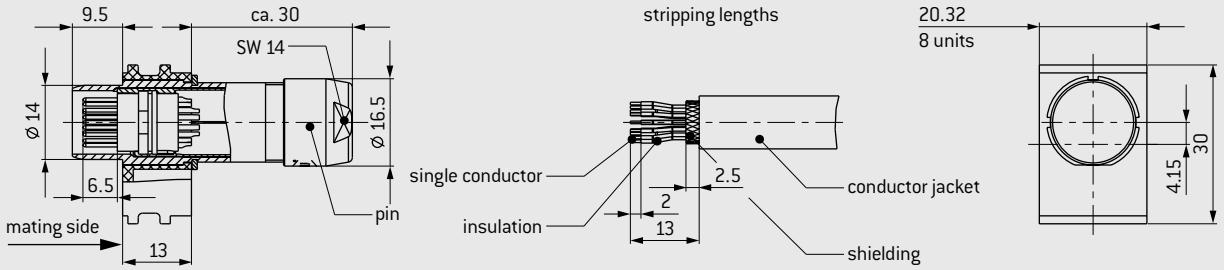
Order	Base parts	Part number
1	Insulator	611.171.101.923.000
2	Socket housing complete	653.004.001.304.000
2	Plug housing complete	653.004.002.304.000
3	Insert complete solder contacts[2]	see next page
4	Assembly set	see table on the right

ASSEMBLY SET

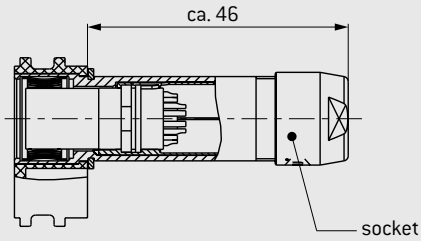
Cable ∅ mm	Part number
3 to 4.2	753.020.188.304.042
4 to 5.2	753.020.188.304.052
5 to 6.2	753.020.188.304.062
6 to 7.2	753.020.188.304.072
7 to 8.2	753.020.188.304.082
8 to 9.2	753.020.188.304.092
9 to 10.2	753.020.188.304.102
10 to 11.2	753.020.188.304.112
11 to 11.9	753.020.188.304.119

[1] Concerning data transmission protocols please note page 2. [2] Available with crimp contact upon request.

INSULATOR PIN

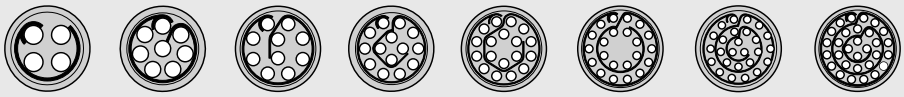


INSULATOR SOCKET



In application with a housing please check the space requirement.

CONTACT ARRANGEMENTS



4 contacts | 8 contacts | 10 contacts | 14 contacts | 18 contacts | 22 contacts | 26 contacts | 30 contacts

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

Number of contacts	Contact diameter mm	Termination cross-section AWG	Rated voltage[1] V	Rated impulse voltage[1] kV	Degree of pollution[1]	Nominal voltage[2] V AC	Model	Category[3]	Insert complete[4] Part number	Total mating force N	Total sliding force N
4	2	14	32	2	3	550	Pin		703.802.724.004.200	17.4	14.5
			100		2		Socket		703.702.724.004.200		
8	1.3	18	16	2	3	450	Pin		703.844.724.408.200	20.5	17.1
			32		2		Socket		703.744.724.408.200		
10	1.3	20	20	2	3	450	Pin		703.844.724.010.200	23.6	19.7
			50		2		Socket		703.744.724.010.200		
14	0.9	22	16	2	3	450	Pin		703.849.724.018.200	24.3	20.3
			16		2		Socket		703.749.724.014.200		
18	0.9	22	10	2	3	450	Pin		703.849.724.018.200	29.0	24.2
			32		2		Socket		703.749.724.018.200		
22	0.7	22	32	1.5	2	333	Pin		703.848.724.422.200	24.9	20.8
							Socket		703.748.724.422.200		
26	0.7	22	25	1.5	2	300	Pin		703.848.724.426.200	28	23.3
							Socket		703.748.724.426.200		
		26	32			333	Pin		703.848.724.026.200		
							Socket		703.748.724.026.200		
30	0.7	22	10	1.2	2	300	Pin		703.848.724.430.200	31.1	25.9
							Socket		703.748.724.430.200		

[1] Acc. to IEC 60664-1:2007 (VDE 0110-1:2008-01), see page 171. [2] Acc. to EIA-364-20F:2019. [3] Classification acc. to ISO/IEC 11801-1:2017-1. [4] Several inserts in crimp model on request.

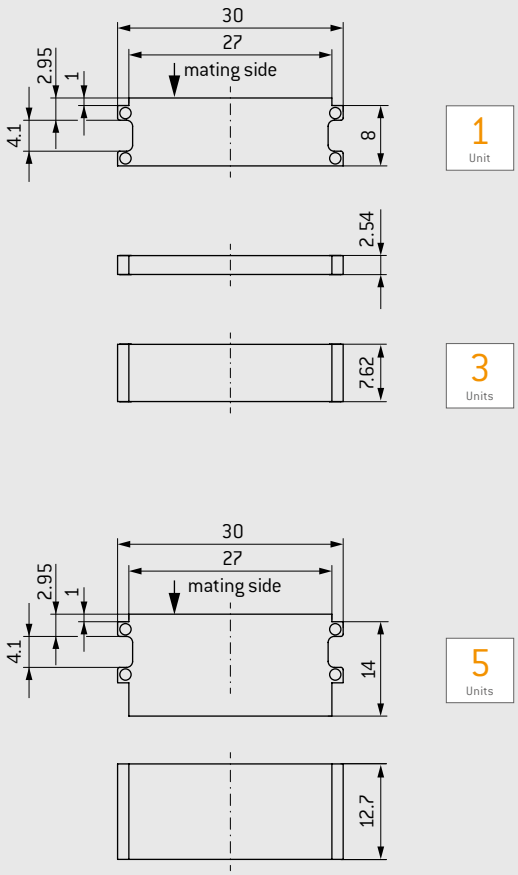
BLANK MODULES

BLANK MODULES

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

TECHNICAL DATA

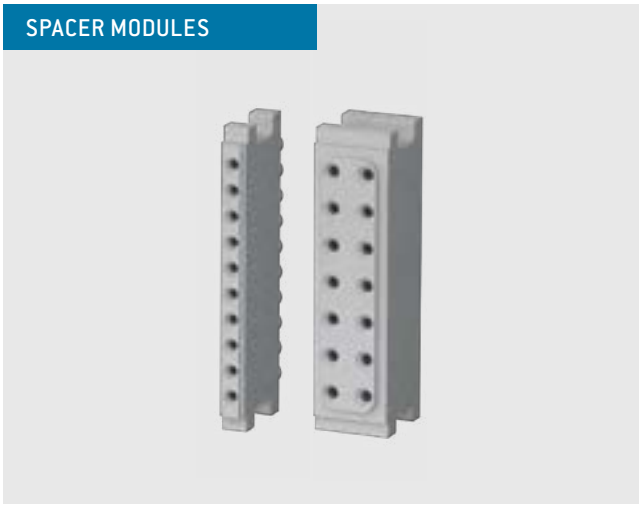
Insulator	Thermoplastic fiber glass reinforced acc. to UL-94



Units	Part number
1	611.122.113.923.000
3	611.130.113.923.000
5	611.128.113.923.000

SPACER MODULES

SPACER MODULES



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

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

TECHNICAL DATA

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94

CODING MODULES

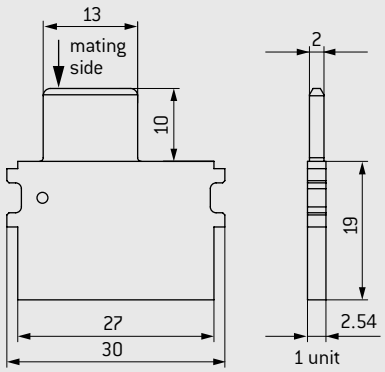
CODING MODULES

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

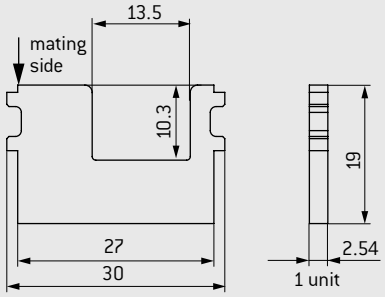
TECHNICAL DATA

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94

PIN



SOCKET



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

PIN PROTECTION MODULES

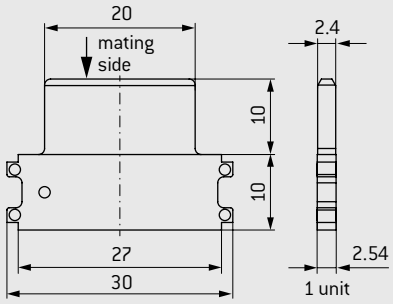
PIN PROTECTION MODULES

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

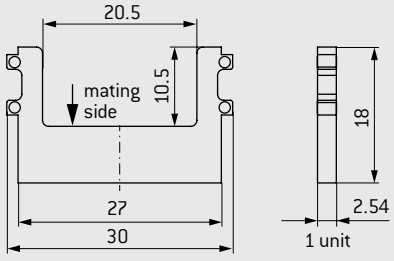
TECHNICAL DATA

Insulator	Thermoplastic fiber glass reinforced acc. to UL-94

PIN



SOCKET



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

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

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.

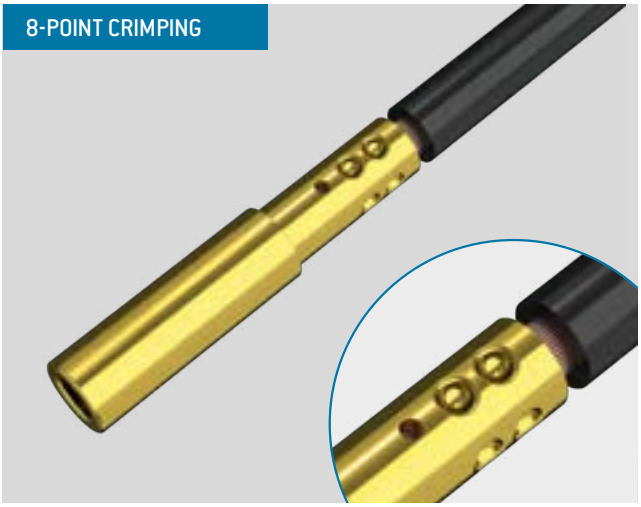
Through crimping, the conductor and contact materials in the compressed areas become so dense as to create a connection which is nearly gas-tight, and with a tensile strength befitting the conductor material.

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

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

HEXAGONAL CRIMPING

8-POINT CRIMPING



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

CRIMPING TOOLS

For further crimp information please refer to the table from page 162.

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

With user-friendly digital display.
PART NUMBER: 080.000.051.000.000

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

8-POINT CRIMPING TOOL FOR CONDUCTOR CONNECTIONS FROM 1.5 TO 6 mm²

With user-friendly digital display.
PART NUMBER: 080.000.057.000.000

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

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

With blocking system.
PART NUMBER: 080.000.062.000.000

MECHANICAL HEXAGONAL HAND CRIMPING TOOL FROM 10 TO 50 mm²

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

CRIMPING JAWS FOR CONTACT DIAMETER FROM 5 TO 12 mm SEE PAGE 163
Has to be ordered separately.

CRIMPING TOOLS

For further crimp information please refer to the table on page 162.

HEXAGONAL CRIMPING TOOL FOR COAX CONTACTS

With blocking system.
PART NUMBER PLIER: 080.000.039.000.000

CRIMPING JAWS PLEASE SEE PAGE 162
Has to be ordered separately.

HAND CRIMPING TOOL FOR SINGLE CRIMP CONTACTS (STAMPED CONTACTS)

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

HAND CRIMPERS WITH ROLL FOR SPOOL GOODS (STAMPED CONTACTS)

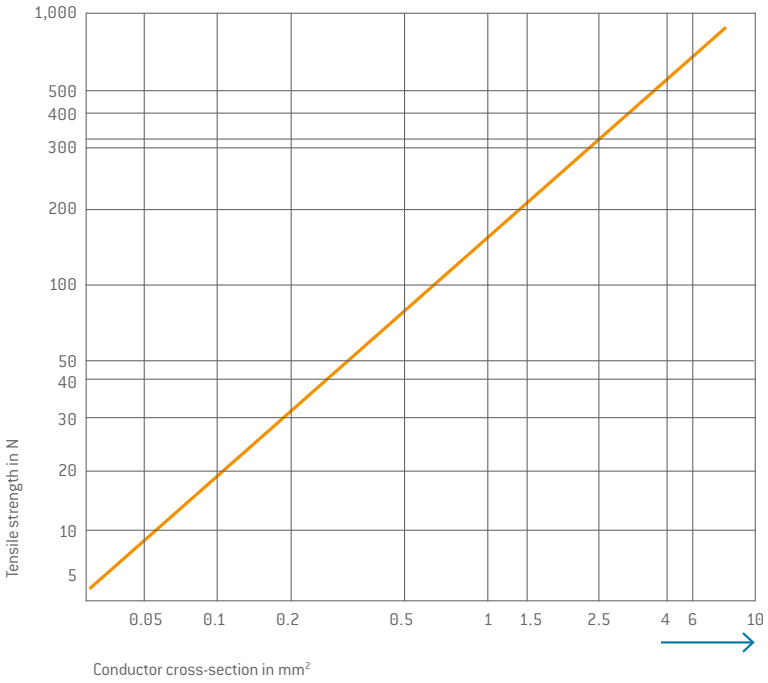
PART NUMBER: 080.000.041.000.000
Contacts are supplied on the reel and are automatically isolated. The feed occurs by hand operation.

- Suitable for coil size: 115 mm.
  Therefore 500/900 contacts can be processed.
- Processing with automatic stripper crimper possible,
  further information on request.

CRIMP CONNECTIONS

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

Tensile strength diagram of a crimp termination depending upon the conductor cross-section IEC 60352-2:2006 (DIN EN 60352-2:2014). **Example:** A 2.5 mm² conductor must achieve a minimum tensile strength of approx. 320 N.



NOTE

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

TESTING ELECTRICAL CONTINUITY FOLLOWING ASSEMBLY / TESTING OF WIRING:

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

We recommend using suitable test adapters here.

CRIMP INFORMATION

Contact diameter	Termination cross-section[1]		Stripping length	8-pt crimping tool 080.000.051.000.000 without positioner Positioner 080.000.051.101.000	8-pt crimping tool 080.000.057.000.000 without positioner Positioner 080.000.057.101.000	Crimping tool for coax 080.000.039.000.000	Hexagonal crimping tool 080.000.062.000.000
mm	AWG	mm²	mm	position / adjustment dim.	position / adjustment dim.	Crimping jaws	
0.76	24–28	0.25–0.08	$4^{+0.5}$	1/0.67			
1.02				2/0.67			
1.5				3/0.67			
0.7	26–28		$3^{+0.5}$				
0.7	22–24						
0.76	22	0.38	$4^{+0.5}$	1/0.67			
1.02	20–22	0.5–0.38	$5^{+0.5}$	2/0.92			
1.5				3/0.92			
2.41				4/0.92			
3				5/0.92			
1.5	18	1–0.75	$5^{+0.5}$	3/1.12			
2.41				4/1.12			
3				5/1.12			
1.5	16		$5^{+0.5}$	3/1.42	10/1.42[2]		
1.5		1.5	$5^{+0.5}$	3/1.32	10/1.42[2]		
2.41				4/1.32	9/1.42[2]		
3				5/1.32	6/1.42[2]		
1.5	14		$5^{+0.5}$	3/1.42	10/1.42[2]		
2.41				4/1.42	9/1.42[2]		
3				5/1.42	6/1.42[2]		
2.41		2.5	$6^{+0.5}$		9/1.67[2]		
3					6/1.67[2]		
2.41	12(7–20)		$6^{+0.5}$		9/2.12[2]		Profile no.2
2.41	12(19–26)		$6^{+0.5}$		9/1.92[2]		Profile no.2
3		4	$6^{+0.5}$		6/2.12[2]		Profile no.3
5							
3	10	6	$7^{+0.5}$		8/2.22[2]		Profile no.3
5		10	$9^{+0.5}$				
5		16	$9^{+0.5}$				
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) K 02252 D (RG316D)						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	Pressbacken		Spool goods
0.76	24 – 28	0.25 – 0.08	$4^{+0.5}$			
1.02						
1.5						
0.7	26 – 28		$3^{+0.5}$		080.000.040.000.000	080.000.041.000.000
0.7	22 – 24				080.000.040.000.000	080.000.041.000.000
0.76	22	0.38	$4^{+0.5}$			
1.02	20 – 22	0.5 – 0.38	$5^{+0.5}$			
1.5						
2.41						
3						
1.5	18	1 – 0.75	$5^{+0.5}$			
2.41						
3						
1.5	16		$5^{+0.5}$			
1.5		1.5	$5^{+0.5}$			
2.41						
3						
1.5	14		$5^{+0.5}$			
2.41						
3						
2.41		2.5	$6^{+0.5}$			
3						
2.41	12 (7 – 20)		$6^{+0.5}$			
2.41	12 (19 – 26)		$6^{+0.5}$			
3		4	$6^{+0.5}$			
5						
3	10	6	$7^{+0.5}$			
5		10	$9^{+0.5}$	080.000.064.110.000		
5		16	$9^{+0.5}$	080.000.064.101.000		
8		16	$10^{+0.5}$	080.000.064.116.000		
8		25	$18^{+0.5}$	080.000.064.125.000		
10						
12						
10		35	$18^{+0.5}$	080.000.064.135.000		
12						
12		50	$18^{+0.5}$	080.000.064.150.000		

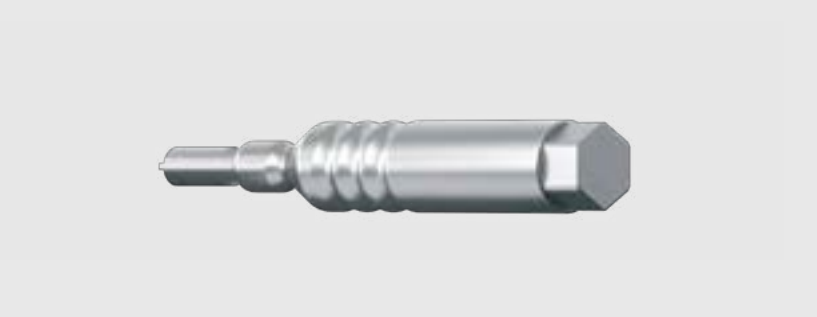
[1] The listed cross section correspond to a finely stranded conductor design according to IEC 60228:2004 (VDE 0295:2005-09) class 5 or a finely stranded conductor design (7/19-stranded) according to AWG ASTM B258-14. [2] Recommended by ODU as a standard tool and setting.

Table of contents

ASSEMBLY AID

Description	Usage for	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	
		598.054.011.000.000	3.5	
Bit slot 2.5 (0.4/70)	Mounting of spindle coding	598.054.109.000.000		0.9 Nm +/– 0.2 Nm
Bit slot 8 (1.2/50)	Mounting of frame coding (coded socket)	598.054.110.000.000		1.2 Nm +/– 0.2 Nm
Special bit	Coding pin for frames in a housing	598.054.203.000.000		1.2 Nm +/– 0.2 Nm
Bit combi slot size 1	Mounting screw on frames in a housing	598.054.102.000.000		1.2 Nm +/– 0.2 Nm
Bit Torx TX 8	Rails on frames in a housing	598.054.103.000.000		0.9 Nm +/– 0.2 Nm
Bit Torx TX 10	Spare spindle knob and PE-module	598.054.104.000.000		1.2 Nm +/– 0.2 Nm
Bit Torx TX 10	Mounting of ODU-MAC ZERO housing	598.054.104.000.000		0.6 Nm +/– 0.1 Nm
Bit Torx TX 20	1 contact PE-module	598.054.105.000.000		3.0 Nm +/– 0.5 Nm
Bit Torx TX 20	1 contact high-current module 10 and 12 mm contact diameter	598.054.105.000.000		2.2 Nm +/– 0.2 Nm
Bit for coding pin	Mounting of coding pins	598.054.203.000.000		1.2 Nm +/– 0.2 Nm
Receiving of back nut	Mounting, shielded implementation size 0	598.055.002.000.000		0.6 Nm +/– 0.1 Nm
Receiving of back nut	Mounting, shielded implementation size 1	598.055.001.000.000		1.0 Nm +/– 0.2 Nm
Receiving of back nut	Mounting, shielded implementation size 2	598.055.003.000.000		2.0 Nm +/– 0.2 Nm
Receiving of back nut	Mounting, shielded implementation size 3	598.055.004.000.000		3.5 Nm +/– 0.3 Nm

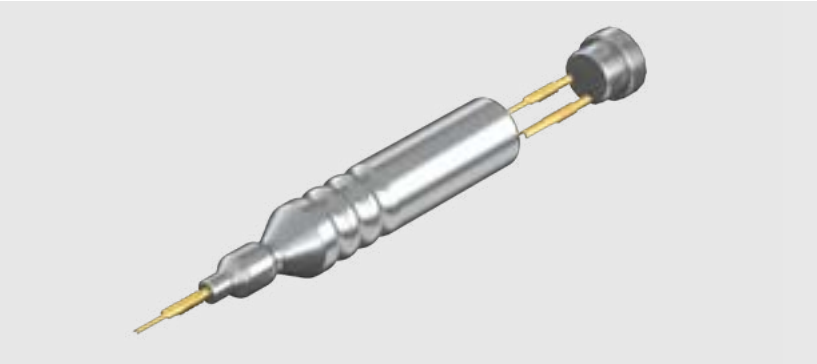
ASSEMBLY AID



ASSEMBLY TOOL HIGH-CURRENT

Necessary assembly tool for screwing and releasing of the contacts.

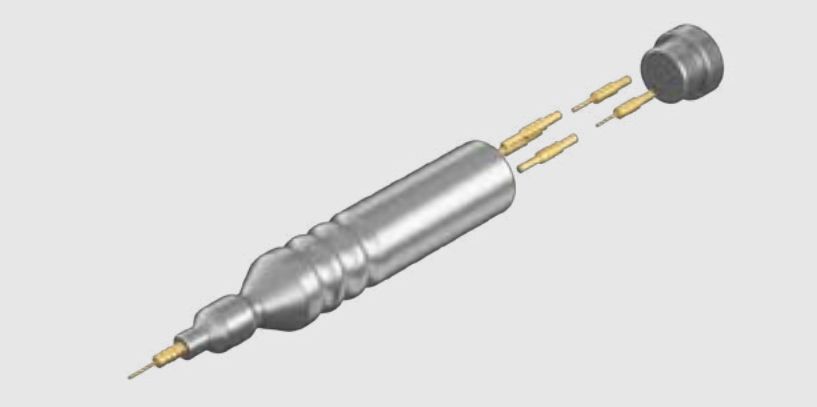
PART NUMBER: 087.611.002.001.000



INSERTION TOOL ∅ 0.76–1.5 mm

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

PART NUMBER: 085.611.001.001.000



EXTRACTION TOOL ∅ 0.76–1.5 mm

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

PART NUMBER: 087.611.005.001.000

Contact ∅	Assembly tool high-current	Assembly aid insertion tool	Assembly aid extraction tool
0.76		085.611.001.001.000	087.611.005.001.000
1.02		085.611.001.001.000	087.611.005.001.000
1.5		085 .611.001.001.000	087.611.005.001.000
8	087.611.002.001.000		

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

Table of contents

REMOVAL OF CONTACTS

REMOVAL TOOL I

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

REMOVAL TOOL II

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

REMOVAL ONLY POSSIBLE WITH ODU TOOLS.

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

[1] In use with high-voltage module, 4 contacts, (see page 108) the angled version cannot be used.
[2] With cable (H+S) G02232 only removal tool I is usable.

SERVICE KIT FOR ALL ELECTRICAL CONTACTS

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

ODU has put together a Service Kit for this purpose, so that lubrication can be carried out directly on site. A cleaning brush and a special cleaning cloth, as well as precise instructions, help to ensure optimal care of the contacts. In the absence of other specifications, the Service Kit can be used for all ODU contacts and connections.
PART NUMBER: 170.000.000.000.100

To reorder individual tubes of the lubricant:
ORDER NUMBER: 50270079

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

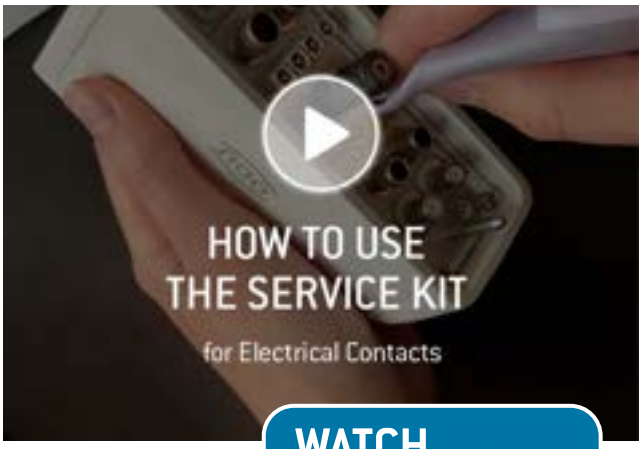
CLEANING INFORMATION

Service manual 003.170.000.000.000

FURTHER INFORMATION

Never submerge the connector in liquid. The connector may only be put back into operation again when it has been assured that it is completely dry.
Ensure that contact pins are not bent or otherwise damaged. The connector must no longer be used if damage or other signs of wear are detected. Clean with maximum 2.5 bar compressed air to avoid contact damage. A slight blackening of the contact points may occur over the course of the service life and represents no impairment of the electrical properties.

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



vimeo.com/560732341

ODU-MAC®

Table of contents

TECHNICAL INFORMATION

INTERNATIONAL PROTECTION CLASSES

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

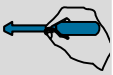
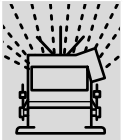
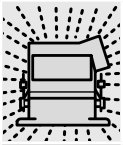
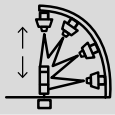
Code letters (International Protection) IP	First code number (Degrees of protection against access to hazardous parts respectively against solid foreign objects) 6			Second code number (Degrees of protection against water) 5			
Code number	Protection against access to hazardous parts / Protection against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

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 0627:2009-11) "Connectors – Safety requirements and tests" has been used to dimension and determine the values provided.

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

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

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

The clearance and creepage distances are determined on the bases specified in IEC 60664-1:2007 (VDE 0110-1:2008-01).

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

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

IEC 60664-1:2007 (VDE 0110-1:2008-01) "INSULATION COORDINATION FOR EQUIPMENT WITHIN LOW-VOLTAGE SYSTEMS"

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

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

The following general specifications have been defined for dimensioning:

- **Isolation** between electrical circuits (functional insulation between the contacts) or between an electrical circuit and local ground (contact with grounded frame) has been dimensioned as **basic insulation**. If **"double insulation"** or **"reinforced insulation"** is required, the voltage data provided may no longer apply; insulating clearances may need to be extended.
- 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 0110-1:2008-01)).

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 0110-1:2008-01)).

According to this standard, the minimum clearance distances for equipment not connected directly to the low voltage mains should be measured according to the possible permanent voltages, the temporary overvoltages, or periodic peak voltages (see Table F.7 in IEC 60664-1:2007 (VDE 0110-1:2008-01)).

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

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 60529:1989 (VDE 0470-1:2014-09), 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 0110-1:2008-01): table F.5 – test voltages for testing clearance distances at different altitudes (the voltage levels are valid only to verify the clearance distances).

Rated 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

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.

CONVERSIONS / AWG (AMERICAN WIRE GAUGE)

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

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

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

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

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

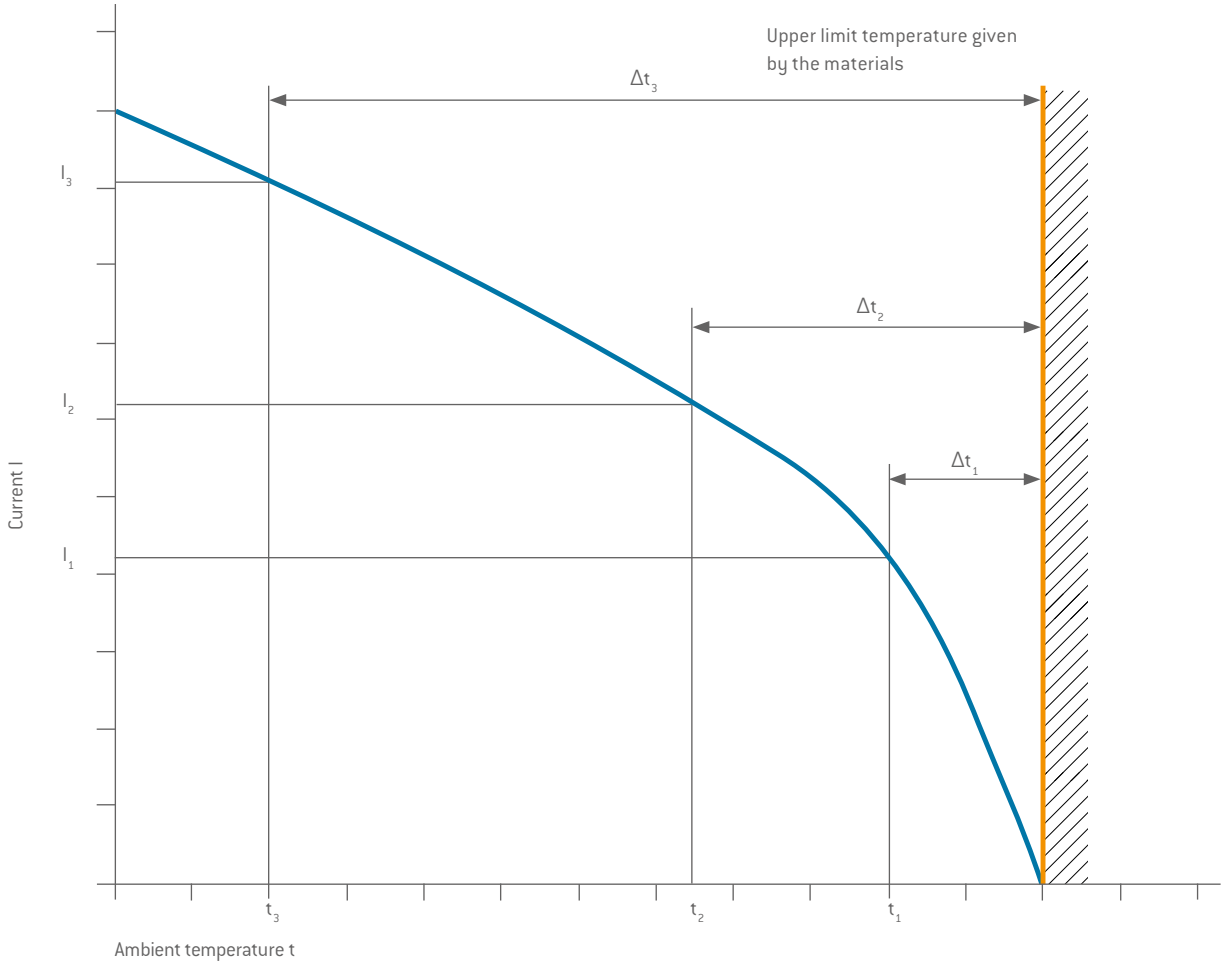
Source: ASTM

Table of contents

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



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 ($0.8 \times I_n$) also makes allowance for factors such as manufacturing tolerances and uncertainties in temperature measurement or the measuring arrangement.

CURRENT LOAD

In dependence on VDE 0276-1000:1995-06

RATED CURRENT (NOMINAL CURRENT)

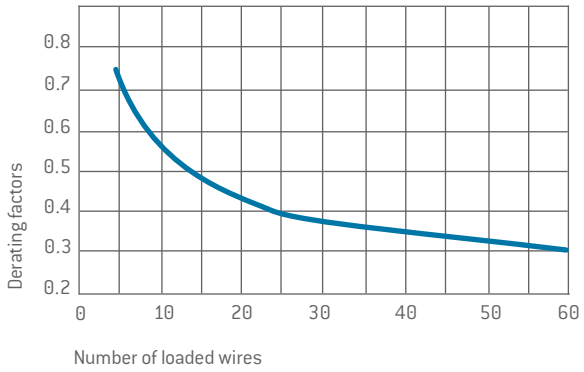
The metrologically determined current which is permitted to flow continuously through all contacts at the same time and will increase the contact temperature by 45 Kelvin. The amperage is determined according to the derating measurement method IEC 60512-5-2:2002 and derived from the derating curve. The values specified in the catalog apply to either individual contacts or completely assembled inserts/
modules, as indicated.

MAX. CONTINUOUS CURRENT

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

DERATING FACTORS

In the case of multi-position connectors and cables, heating is greater than with individual contacts. It is therefore calculated with a derating factor.
There are no direct regulations for connectors in this context. The derating factors for multi-core cables pursuant to VDE 0298-4:2013-06 are applied. The derating factor assumes relevance as of 5 live wires or count the nominal current of the fully equipped modules. Depending on application and cable-management.



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

Load and derating factors
Multi-core plastic cable with conductor 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.

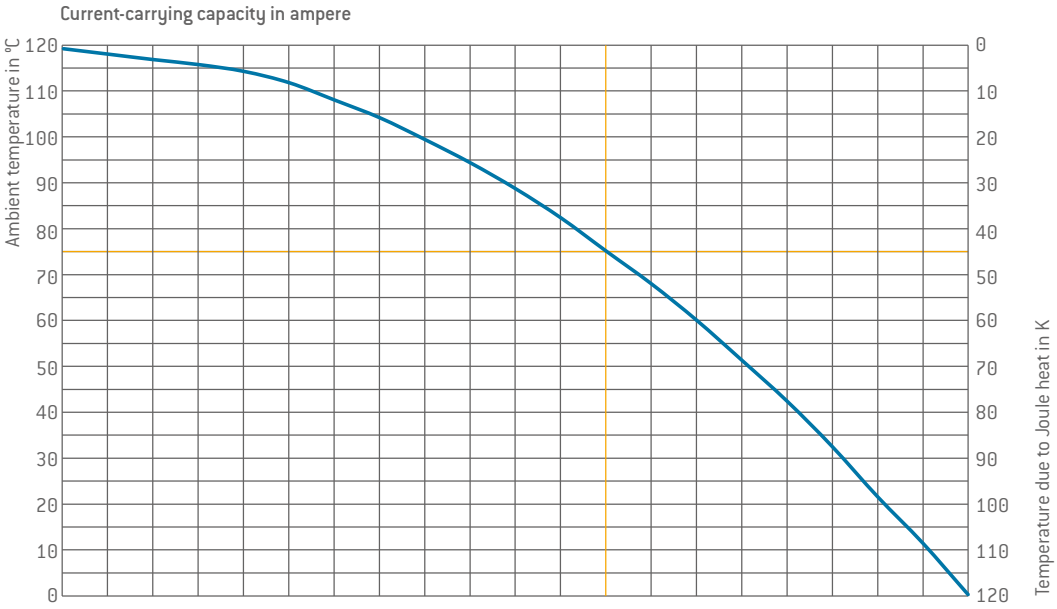
CURRENT-CARRYING CAPACITY DIAGRAM

FOR SINGLE CONTACTS

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

Upper limit temperature: +120 °C.

Termination with nominal cross-section.



Contact	Contact ∅	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
	5	4	0		6		13		19		25		32		39		45		51		58		64
		10	0	I	11	I	21	I	32	I	42	I	53	I	65	I	75	I	85	I	97	I	106
		16	0		13		26		39		52		65		80		93		106		119		130
	8	16	0	I	12.5	I	25	I	37	I	49	I	62	I	75	I	87	I	99	I	111	I	123
		25	0		18		36		52		68		84		100		114		128		142		155
ODU LAMTAC®	8	16	0	I	15	I	29	I	44	I	59	I	74	I	90	I	104	I	118	I	133	I	147
		25	0		17		34		52		69		87		105		121		137		154		171
	10	25	0	I	18	I	36	I	54	I	72	I	90	I	110	I	127	I	144	I	163	I	180
		35	0		20		39		59		79		99		120		139		158		179		196
	12	25	0	I	19	I	38	I	57	I	75	I	95	I	115	I	133	I	152	I	172	I	188
		35	0		22		44		66		89		111		135		156		178		200		220
		50	0	I	24	I	48	I	72	I	96	I	120	I	145	I	170	I	195	I	220	I	240

Nominal current — Max. continuous current

Table of contents

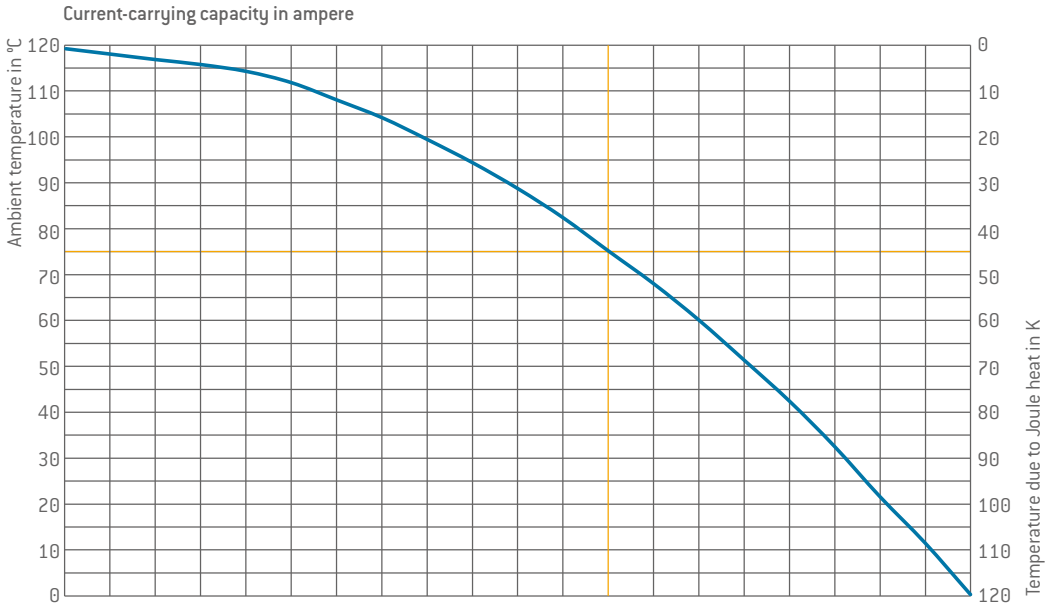
CURRENT-CARRYING CAPACITY DIAGRAM

FOR FULLY EQUIPPED MODULES

Measurement made in acc. with IEC 60512-5-2:2002 (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 108) correspond to the values of the 5 contacts signal module (page 90).

The values of the 3 contacts power module (page 96) correspond to the values of the 3 contacts power module (page 94).



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
	2 contacts	5	4	0		5.5		11		17		22.5		28		34		39.5		45		50.5		56
			10	0	I	9.5	I	19	I	28	I	37.5	I	47	I	56.5	I	66	I	75	I	84.5	I	94
			16	0		11.5		23		34.5		46		58		70		81		92		103		114
	2 contacts	8	16	0	I	11.5	I	23	I	34	I	46	I	58	I	70	I	81	I	92	I	103	I	114
			25	0		16		32		48		64		79		95		109		124		138		152
ODU LAMTAC®	2 contacts	8	16	0	I	14	I	28	I	42	I	55.5	I	70	I	85	I	98	I	111	I	126	I	139
			25	0		16		33		49		65		82		100		116		132		149		164

Nominal current — Max. continuous current

Table of contents

LINE CURRENT LOAD

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

Laying procedure	Exposed in air	or on surfaces		
	Single-wire lines PVC, PE, PUR, TPE heat resistant	Multi-wire highly flexible lines for hand-held devices, wire/sheath cold-resistant, PVC insulated		Multi-wire movable lines PVC, PE, PUR, TPE standard program harmonised series
Number of loaded wires	1	2	3	4
Nominal cross-section copper conductor in mm²	Current load in A			
0.14[1]	3			2
0.25[1]	5			4
0.34[1]	8			6
0.5[1]	12	3	3	9
0.75	15	6	6	12
1	19	10	10	15
1.5	24	16	16	18
2.5	32	25	20	26
4	42	32	25	34
6	54	40		44
10	73	63		61
16	98			82
25	129			108
35	158			135
50	198			168
Current load acc. to:	VDE 0298-4:2013-06 table 11			

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

[1] DIN VDE 0891-1:1990-05

TECHNICAL TERMS

AMBIENT TEMPERATURE

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

AWG

American Wire Gauge – see page 175

BASE CURVE

See page 176

CHEMICAL RESISTANCE

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

CLEARANCE DISTANCE

The shortest distance in the air between two conductive parts. The insulation coordination is explained in detail from page 173.

CONNECTORS

Also known as connectors without contact rating (COC): (IEC 61984:2008 (VDE 0627:2009-11)). An element which enables electrical conductors to be connected and is intended to create and/or separate connections with a suitable counterpart.

CONTACT RESISTANCE

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

CORES

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

CREEPAGE DISTANCES

The shortest distance between two conductive parts along the surface of a solid insulation material. This factors in all elevations and recesses in the insulator, as long as defined minimum dimensions are on hand. The insulation coordination is explained in detail from page 173.

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 161).

CRIMP TERMINATION

Termination technology, see crimp connection.

CRIMPING AREA

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

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

The data relates to adequately dimensioned connection cable in accordance with IEC 60228:2004 (VDE 0295:2005-09; class 5), so that no significant temperature increase here. The indicated temperature increase takes place through the contact. The specifications are average values.

DEGREE OF POLLUTION

The insulation coordination is explained in detail from page 172.

DELIVERY FORM

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

DERATING CURVE

See page 176

DERATING FACTOR

According to VDE 0298-4:2013-06, 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 177

TECHNICAL TERMS

DERATING MEASUREMENT METHOD IEC 60512-5-2:2002

See page 176

INSULATOR

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

MATERIALS (STANDARD DESIGN)

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

MATING AND SLIDING FORCE (UNMATING FORCE)

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

MATING CYCLES

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

MAX. CONTINUOUS CURRENT

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

NOMINAL CURRENT IEC 60512-5-2:2002

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 178).

NOMINAL VOLTAGE

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

OPERATING TEMPERATURE FOR ODU-MAC®

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

OPERATING VOLTAGE

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”.

PCB TERMINATION

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

RATED CURRENT (NOMINAL CURRENT)

See page 177

RATED VOLTAGE

According to IEC 60664-1:2007 standard “Value of a voltage which is specified by the manufacturer for a component, device or operating medium and relates to the operating and performance features.”

SOLDER CONNECTION (SOLDER TERMINATION)

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

TECHNICAL TERMS

SOLDER TERMINATION

Termination technology, see solder connection.

SPINDLE LOCKING

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

TERMINATION CROSS-SECTION

The specified cross-sections correspond to a 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), the upper and lower limit margins specified within this standard require a separate test.

TERMINATION TECHNOLOGIES

Methods for connecting the leads to the electro-mechanical element, such as solder-free connections pursuant to IEC60352-2:2006: crimp, screw connection etc. or soldering connection (see page 161).

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

See protection types on page 170

UPPERMOST LIMIT TEMPERATURE

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

WIRE

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

GENERAL NOTE

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

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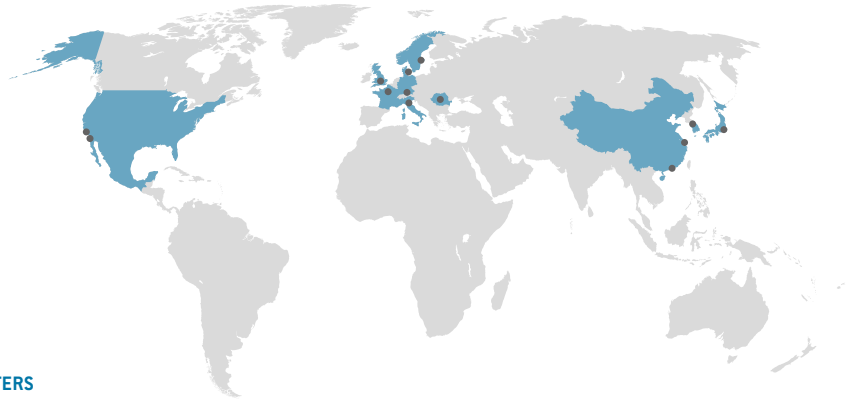

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