

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89

Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
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Ноябрьск (3496)41-32-12
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Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47

Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35

Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
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Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
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Киргизия +996(312)96-26-47

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

ODU-MAC[®] Silver-Line

ODU DOCK Silver-Line

Compact modular connector system

up to 6,300 V, 25 bar, 10 Gbit/s, 100,000 mating cycles and 9.0 GHz

AUTOMATIC DOCKING



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

ODU-MAC[®] WHITE-LINE

ODU-MAC[®] BLUE-LINE

ODU-MAC[®] Silver-Line

AND ODU DOCK Silver-Line

FEATURES

- Robust design
- High number of mating cycles (> 100,000)
- Stable low contact resistance
- Vibration resistance
- High reliability
- Wide variety of transmission modules
- Compact solution possibilities
- Maximum packing density
- Blind mating

APPLICATIONS

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



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

The majority of ODU-MAC[®] modules and contacts have been certified according to UL 1977/CSA C 22.2 no. 182.3 (E file no.: E110586) and tested to MIL/SAE/EIA.

All dimensions are in mm.

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

Issue: 2019-07

Data transmission protocols

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



Non-magnetic



ODU DOCK

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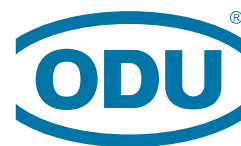
Clickable page
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A PERFECT ALLIANCE.

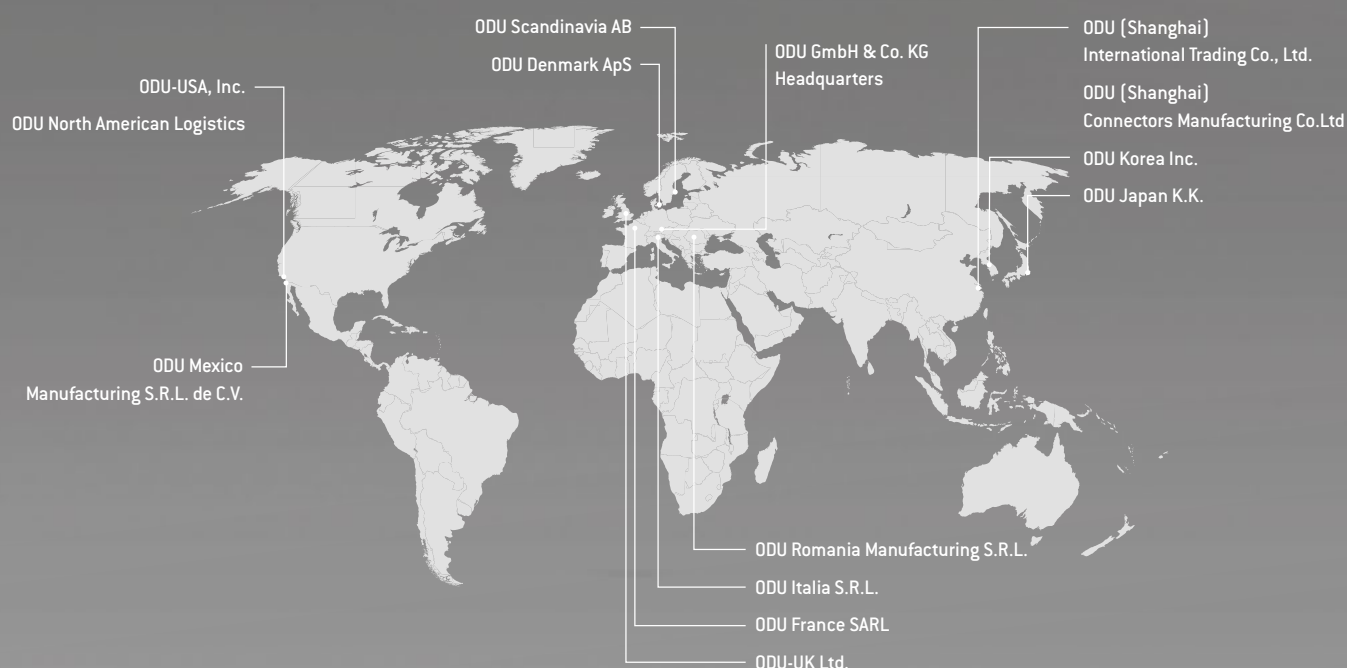
Creating connections, building alliances, collaborating into the future: Whether two technical components come together to form a unit or people come together to strive for great results – the key is to aspire to achieve superb results. This goal drives our work. **Perfect connections that inspire and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





A PERFECT ALLIANCE.

” WORLDWIDE CUSTOMER PROXIMITY



ODU GROUP OVERVIEW

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

As of February 2019

CERTIFICATES & APPROVALS

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

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

INGENIOUS IDEAS PERFECT SOLUTIONS

Product portfolio of ODU



ELECTRICAL CONTACTS

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



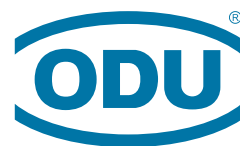
CIRCULAR CONNECTORS

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



MODULAR CONNECTORS

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



A PERFECT ALLIANCE.

” VERSATILE CONNECTOR SOLUTIONS

FOR A WIDE RANGE OF APPLICATIONS



HEAVY DUTY CONNECTORS

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

PRINTED CIRCUIT BOARDS CONNECTORS



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



APPLICATION AND CUSTOMER-SPECIFIC SOLUTIONS

- Contacts, connectors and cable assemblies for the highest technical requirements as well as special applications
- First-class implementation expertise
- High level of vertical manufacturing – all competences and key technologies under one roof
- Expert advice based on mutual partnership
- Short development and production paths



CABLE ASSEMBLY

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

MORE THAN A CONNECTION

Our Know-How for your success



HIGH PERFORMANCE CONNECTOR TECHNOLOGY FOR DEMANDING KEY MARKETS

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

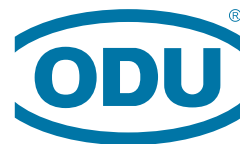
In addition to the top quality, reliable stability and maximum flexibility our products also stand for dynamics, reliability, safety, precision, efficiency and sustainability.

ODU – A PERFECT ALLIANCE.

CONNECTIONS THAT LIVE UP TO ANY REQUIREMENT

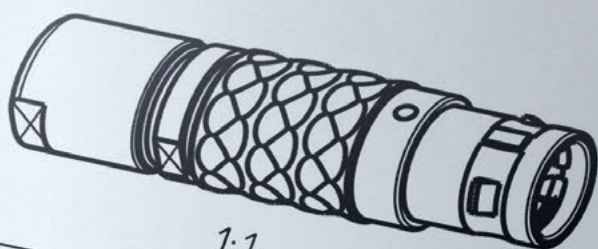
Contacts, connectors and integrated cable assembly solutions meeting the most demanding technical market requirements – ODU's connector solutions and value-added services are characterized by their exclusive focus on meeting the customer's needs.

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



A PERFECT ALLIANCE.

” CROSS-INDUSTRY KNOW-HOW



L_C-P03MSNO-9900	> 9.0 - 9.9 mm
L_C-P03MSNO-9200	> 8.0 - 9.2 mm
L_C-P03MSNO-8200	> 7.0 - 8.2 mm
L_C-P03MSNO-7200	> 6.0 - 7.2 mm
L_C-P03MSNO-6200	> 5.0 - 6.2 mm
L_C-P03MSNO-5200	> 4.0 - 5.2 mm
L_C-P03MSNO-4200	> 3.0 - 4.2 mm
L_C-P03MSNO-3200	> 2.0 - 3.2 mm
Kabel Ø cable Ø	

DEVELOPMENT OF CUSTOM SOLUTIONS

Demands that can't be pigeon-holed call for creative specialists who think outside the box. ODU offers the type of expertise that focuses solely on the specific requirements of our customers.

For every development order we get, we not only perform a thorough check to make sure it's feasible, we intensively incorporate our customers in the ongoing design process. This guarantees impressive, custom-fit final end products.

MEDICAL

TEST AND MEASUREMENT

MILITARY AND SECURITY

INDUSTRIAL

ENERGY

EMOBILITY



ODU-MAC®



PRODUCT INFORMATION

ODU-MAC®

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

THE INTELLIGENT WAY TO A CONSOLIDATED CONNECTION

The ODU-MAC®'s flexible, modular design enables multiple connection types to be combined within single contacts. Whether signal, power, high current, high voltage, RF-signal (coax), high-speed data transmission, fiber optic and other media such as air or fluid – all types can be selected from the module and integrated into the consolidated connector solution. The connection options are just as versatile.

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

The result is an effective, compact and attractive complete connection that cannot be beaten in terms of functionality. Confusion due to an excessive number of connections is a thing of the past – an ODU-MAC® customized to meet your requirements is today's solution.

The ODU-MAC® is available in two basic versions. You can choose either a flexible and adjustable aluminum frame for automatic docking or the ODU-MAC® White-Line (see the [separate catalog](#) for further information).

Find out more about custom configurations on the following pages.



THE ODU-MAC® SILVER-LINE LEAVES NOTHING TO BE DESIRED:

- 100,000 mating cycles and more
- Versions in the docking frame for automatic docking
- Many different module options available
- Extremely compact due to the high contact density



ODU-MAC® **Blue-Line**

Our new performance class for manual mating or automatic docking offers a true alternative – request our ODU-MAC® Blue-Line catalog to find out more.

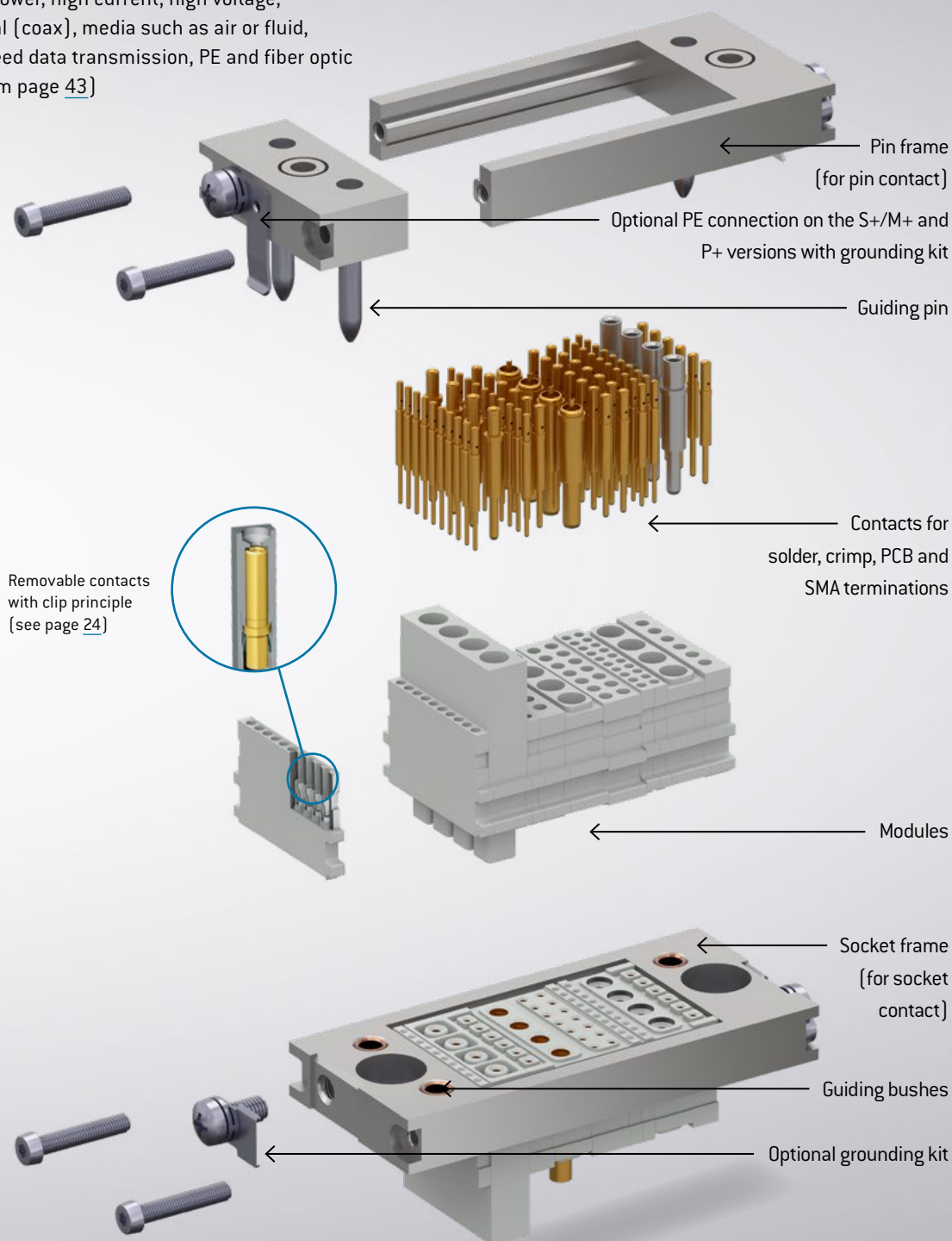
THE MODULARITY AT A GLANCE:

100,000

Mating cycles and more

7 Various docking frames available in customizable lengths (see page 18)

36 Modules to choose from:
signal, power, high current, high voltage,
RF-signal (coax), media such as air or fluid,
high-speed data transmission, PE and fiber optic
(see from page 43)



YOUR WAY TO A CONSOLIDATED CONNECTION

How to configure your ODU-MAC®.

INDIVIDUAL REQUIREMENTS – CONSOLIDATED CONFIGURATION

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

SELECT & REQUEST OFFERS

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



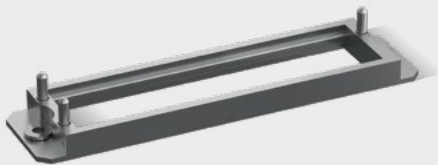
ODU-MAC® **Silver-Line**

AUTOMATIC DOCKING.

1ST STEP: FRAME SELECTION

Depending upon your requirements, you can choose 7 different frame types as a base for automatic docking.

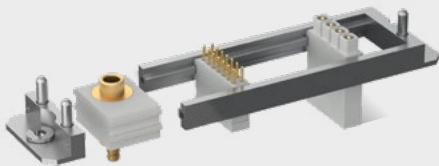
Frames	
ODU-MAC® S (Standard)	ODU-MAC® T (Transverse)
ODU-MAC® L (Large)	ODU-MAC® P+ (Power)
ODU-MAC® S+ (Special)	ODU-MAC® QCH (Quick Change Head)
ODU-MAC® M+ (Mini)	



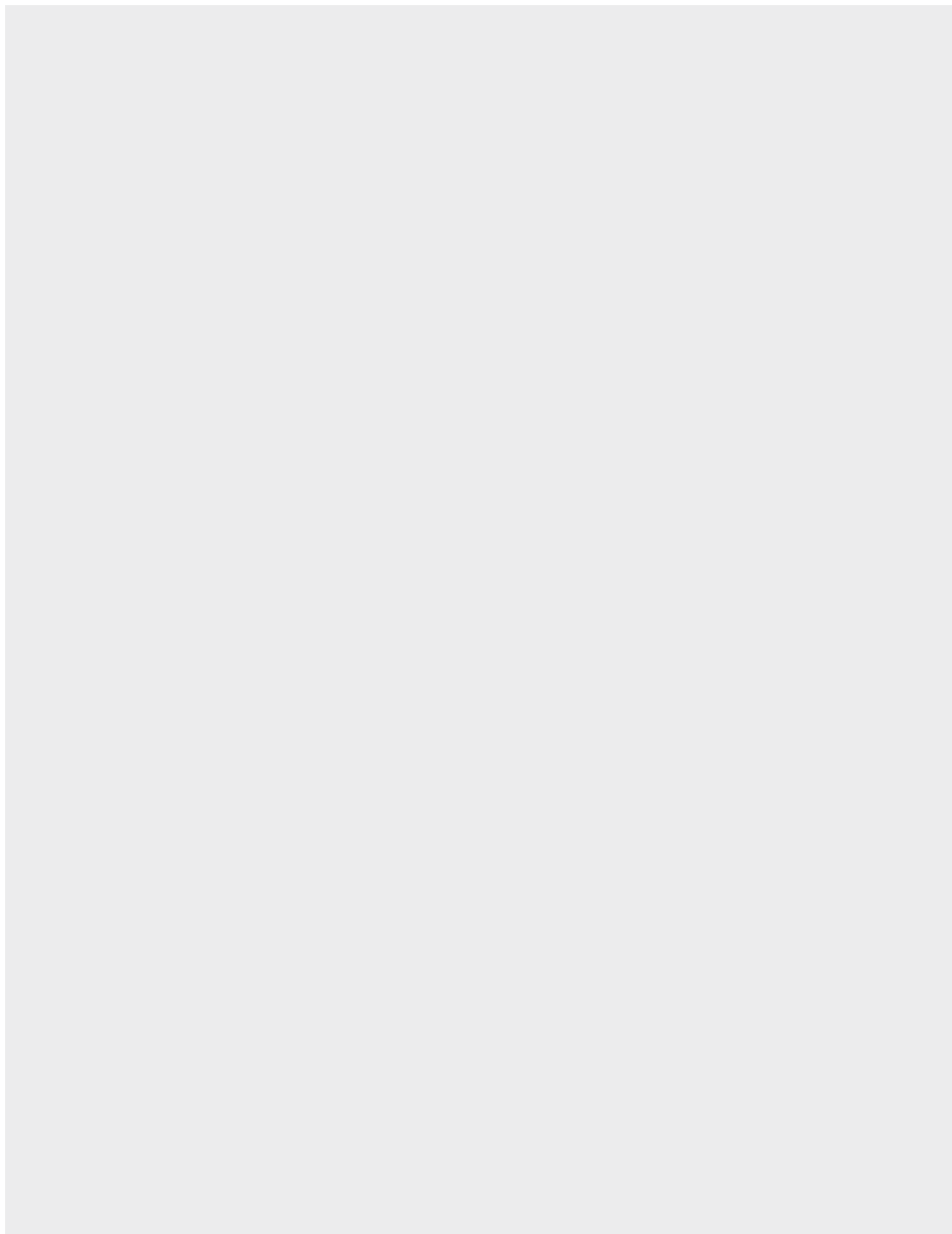
2ND STEP: MODULE SELECTION

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

Modules	
Signal	Compressed air and fluid model
Power	Fiber optic
High current, PE module	Shielded implementation / high-speed connector
High voltage	Blank modules / spacer modules / coding modules / pin protection modules
RF-signal (coax)	



FOR YOUR NOTES



ODU-MAC[®] **Silver-Line** AUTOMATIC DOCKING.

Overview of docking frames

ODU-MAC[®] in the docking frame is used only for automatic docking. Choose from a variety of different frames, adjust the length individually and assemble the frame with the modules you need for your requirements.

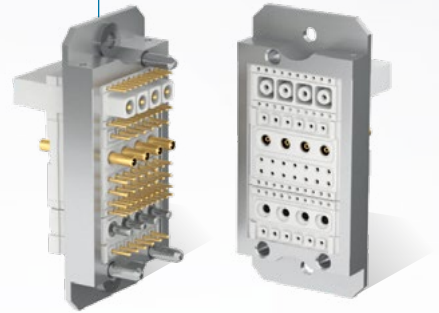
With ODU-MAC[®] you can always find the perfect solution. And should your requirements for a connection go beyond the standard solutions, we also offer customized special solutions.

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

FURTHER INFORMATION FROM PAGE 27.

ODU-MAC[®] S (STANDARD) S. 30

Standard solution for docking tasks
Tolerance compensation: ± 0.6 mm

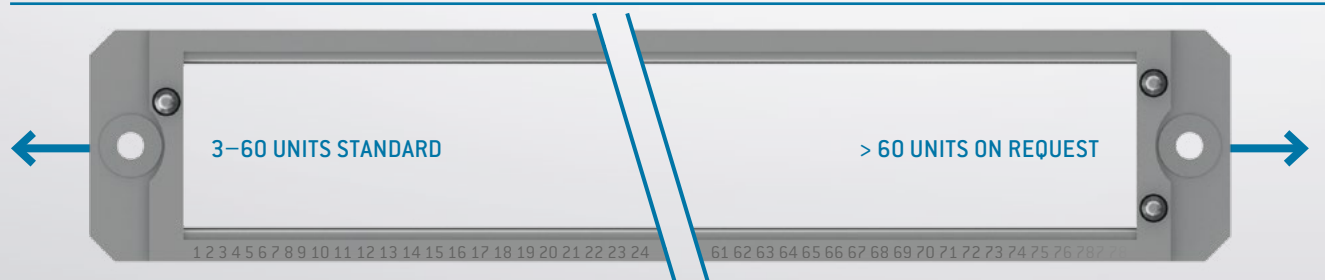


ODU-MAC[®] P+ (POWER) S. 36

The frame for the highest requirements thanks to reinforced frame design
Tolerance compensation: ± 2.5 mm



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



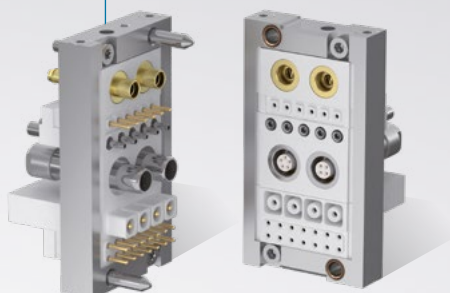
ODU-MAC® S+ (SPECIAL) S. 32

The new standard for docking tasks
Tolerance compensation: ± 1.2 mm



ODU-MAC® M+ (MINI) S. 34

Compact size with the smallest space requirement
Tolerance compensation: ± 0.6 mm



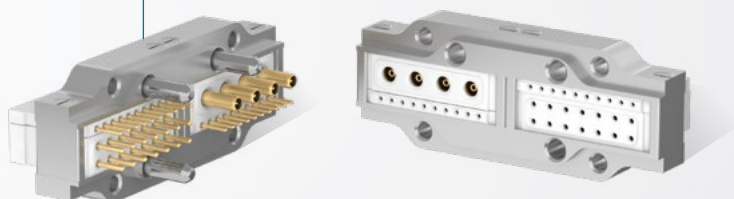
ODU-MAC® L (LARGE) S. 31

Frame with higher tolerance compensation and reinforced guiding bushes, as well as extended guiding pins
Tolerance compensation: ± 1.2 mm



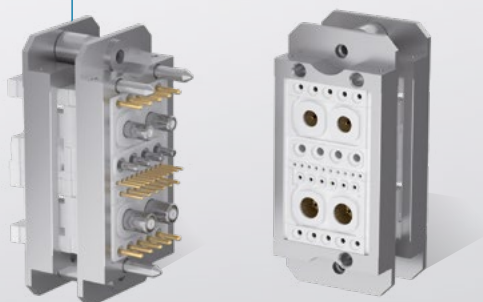
ODU-MAC® T (TRANSVERSE) S. 38

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



ODU-MAC® QCH (QUICK CHANGE HEAD) S. 39

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

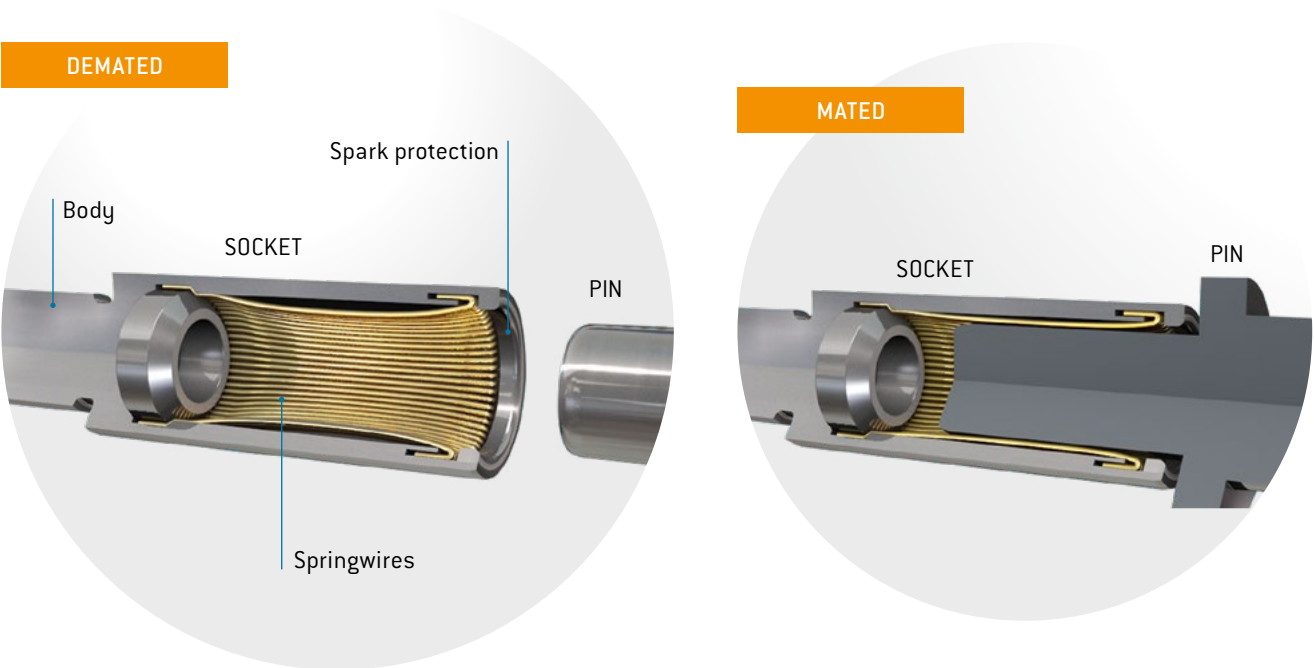


BEST CONNECTIONS – THE CONTACT PRINCIPLE

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

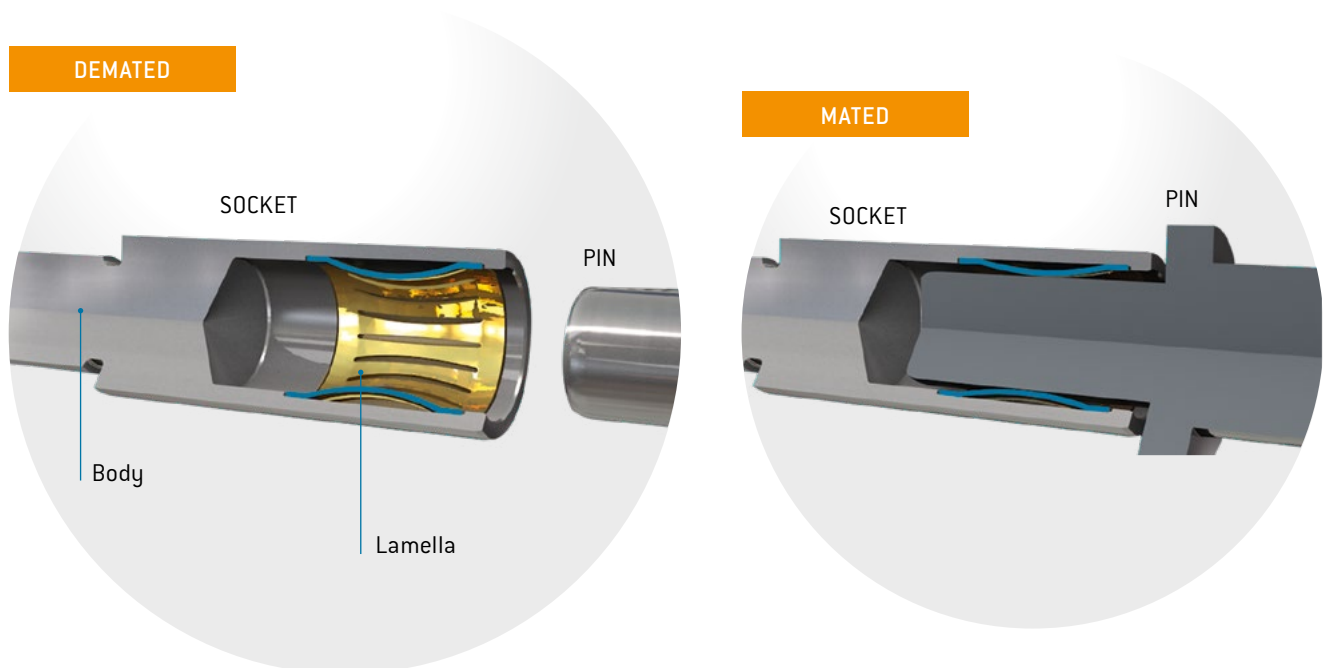
- Greater than 100,000 mating cycles (up to 1 million mating cycles can be achieved)
- High current-carrying capacity – surge current capacity
- Low contact resistances
- Large number of independently flexible contact springs, e.g. 40 springs with a diameter of 5 mm
- Low mating and demating forces
-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

Standard contact principle for:	
Signal	14 to 5 contacts
Power	4 to 2 contacts
High current	2 contacts
High voltage	4 contacts
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 – surge current 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:

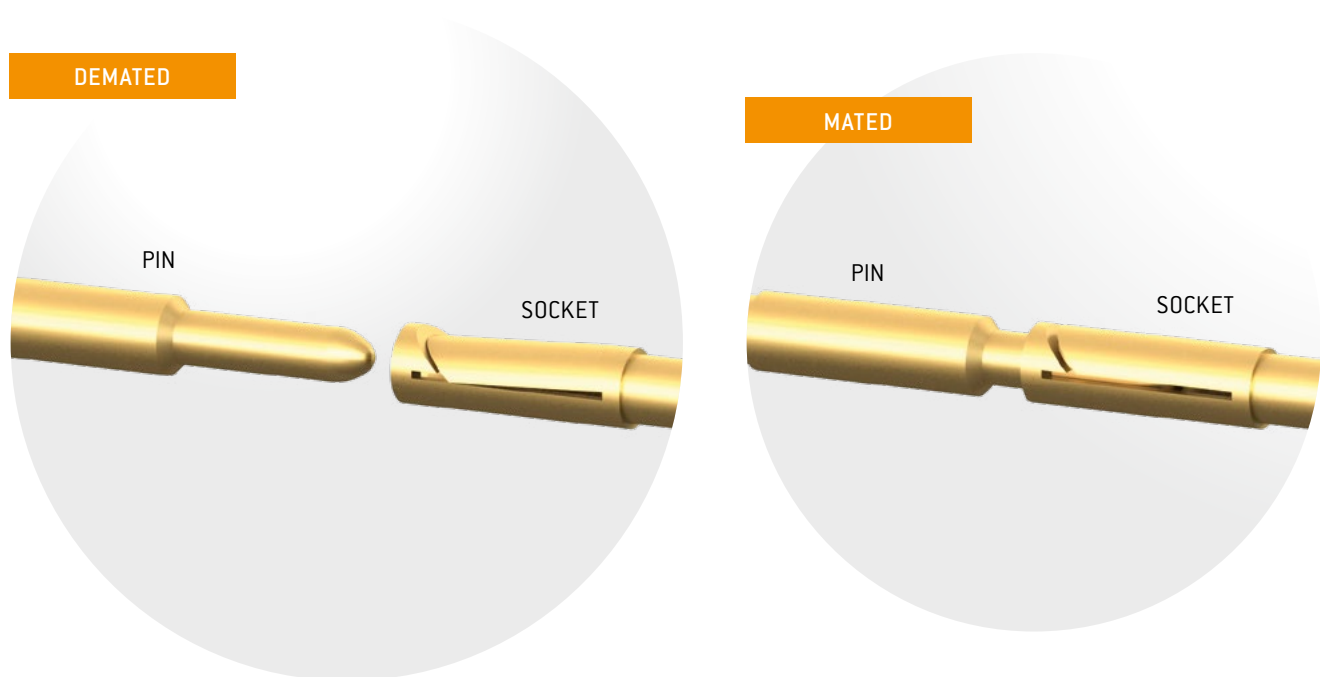
High current	2 to 1 contact(s)
PE	1 contact
High voltage	1 contact
RF-signal (coax)	4 contacts
Shielded implementation	Shielded transmission

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

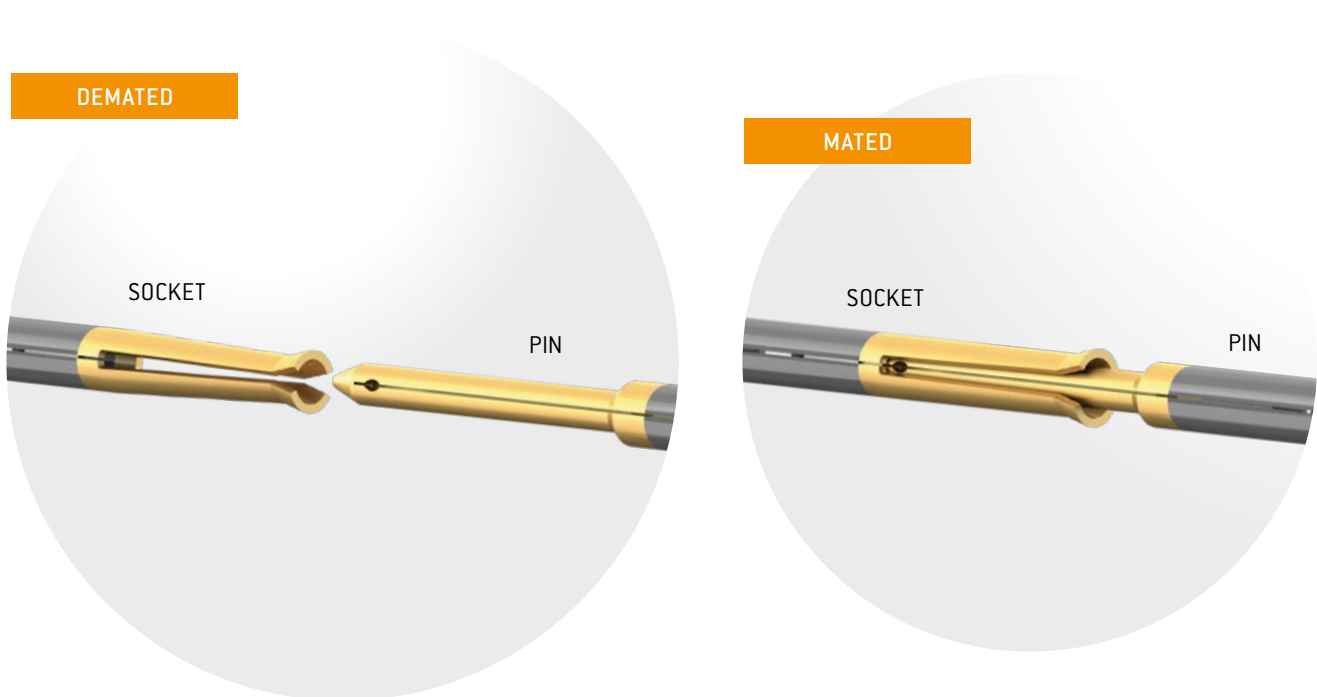
Signal contacts

ODU STAMPTAC®

Contacts in stamped model

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 [54/55](#)).



ADVANTAGES

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

Standard contact principle for:

Signal	10 contacts
--------	-------------

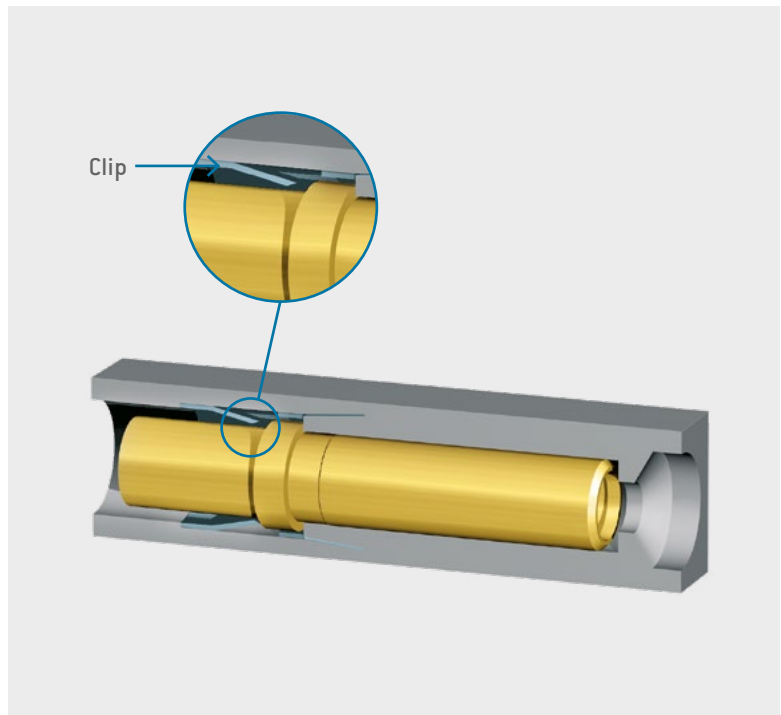
CONTACT RETENTION WITH THE CLIP PRINCIPLE (STANDARD)

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

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

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

Not all modules are equipped with the clip principle, but removal is possible. The 10-position stamped contact does not have a removable contact system.



Most of the modules include this fastening technology.



3 mounting tabs for optimal stability

APPLICATION SPECIFIC SOLUTIONS

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

FOR INDUSTRIAL



FOR MEDICAL



Please also refer to our ODU-MAC®
Non-Magnetic catalog.

MONOBLOC INSULATOR

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

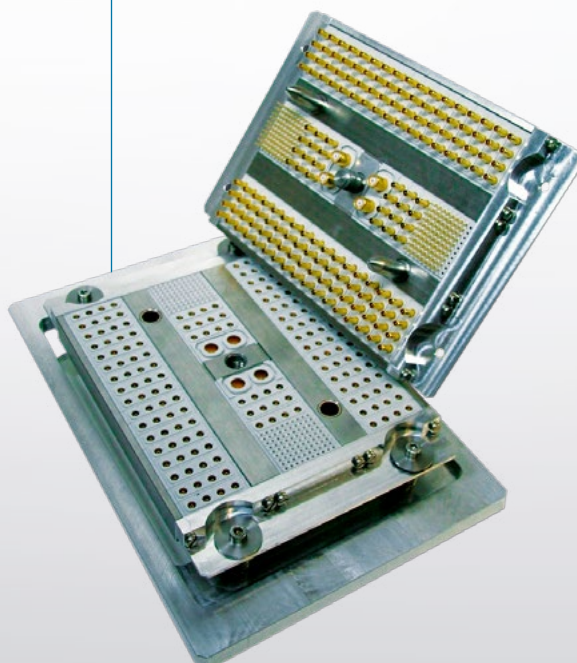


COMPLETE DOCKING UNIT

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

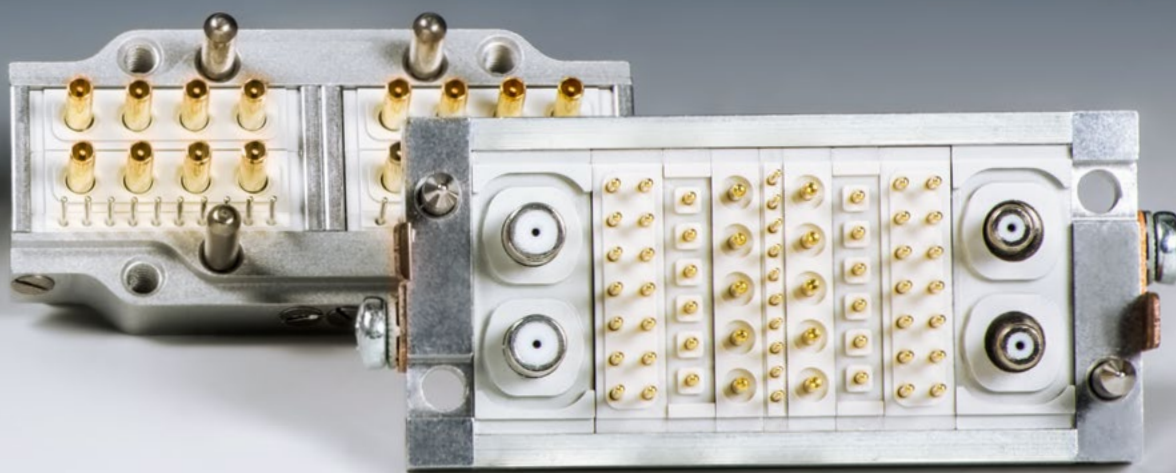
Advantages

- Special floating support with tolerance compensation ± 3 mm





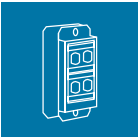
ODU-MAC®



ODU-MAC® – AUTOMATIC DOCKING.

System requirements and tolerances	28
ODU-MAC® S (Standard)	30
ODU-MAC® L (Large)	31
ODU-MAC® S+ (Special)	32
ODU-MAC® M+ (Mini)	34
ODU-MAC® P+ (Power)	36
ODU-MAC® T (Transverse)	38
ODU-MAC® QCH (Quick Change Head)	39
ODU-MAC® Silver-Line strain relief housing	40

SYSTEM REQUIREMENTS AND TOLERANCES



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

Clean and smooth docking is secured by special guiding pins that are designed for the forces which guide the connector. Please note the mechanical requirements behind the design.

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

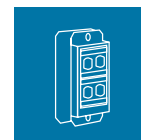
Frame	Tolerance
	z
S	+/- 0.6 mm
L/S+	+/- 1.2 mm
M+	+/- 0.6 mm

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

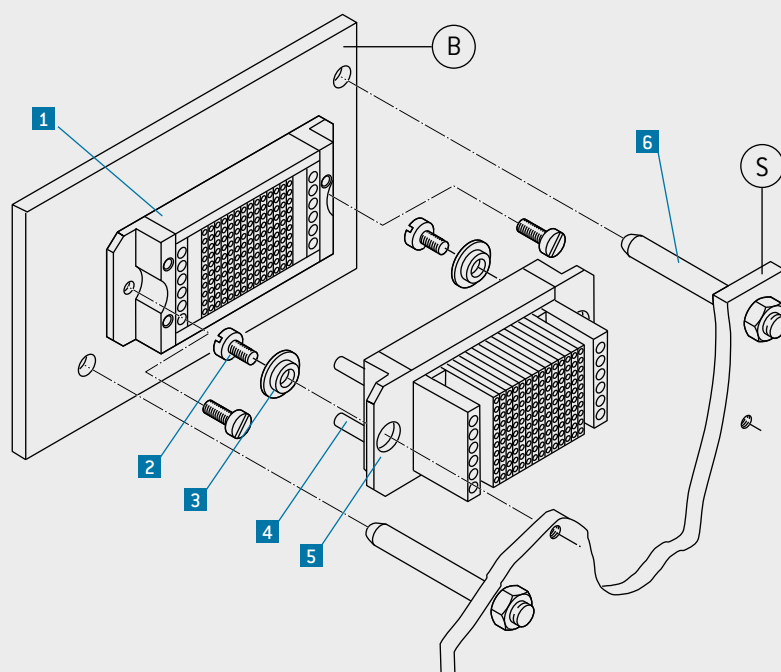
The maximum permissible gap between socket and pin pieces is 0.5 mm as a standard. Extension with long contact pins is possible.

MAXIMUM PERMISSIBLE ANGLE DEVIATION WHEN MATING

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



EXAMPLE OF AN S FRAME SYSTEM (MECHANICAL REQUIREMENTS)



Strain relief for cables/braids must be provided by the customer. Draw your attention to our strain relief housing page [40](#).

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

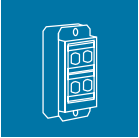
The values for the connected condition (pin S in B) result from the axial play of the centering sockets.

NOTE: AUTOMATIC DOCKING SYSTEMS

- The pin piece of the ODU-MAC® S is to be fixed with the accompanying centering sockets and has mounted floating.
- The guiding system of the ODU-MAC® requires additional guiding hardware for the system.
- The maximum permissible gap between socket and pin pieces is 0.5 mm as standard. Extension with long contact pins is possible.
- An alignment system (e.g. guide rails, etc.) is necessary to achieve high mating cycles. The max. permissible alignment error is, for example, with the ODU-MAC® S frame, less than ± 0.6 mm radial.
- Strain relief for the cables/braids must be provided by the customer or use our strain relief housing see page [40](#).

FAILURE TO OBSERVE THESE SPECIFICATIONS MAY RESULT IN DAMAGE.

ODU-MAC® S (STANDARD)



Standard solutions for docking applications

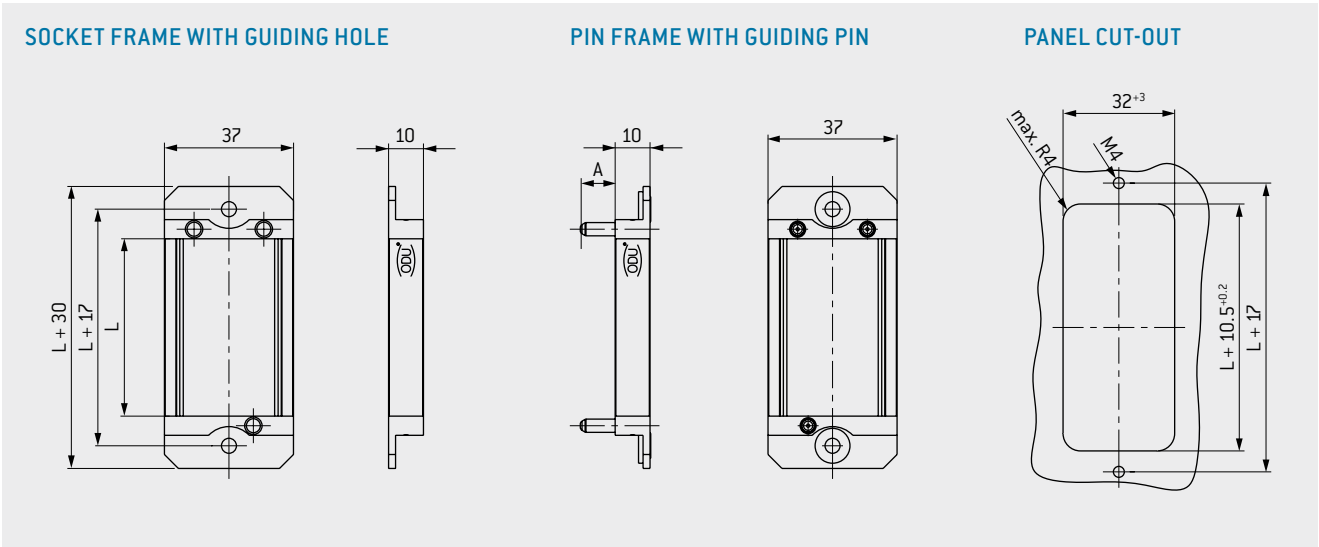


TECHNICAL DATA

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



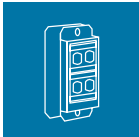
Non-magnetic version available upon request



Description	Part number	Dim. A	Note
Pin frame	611.020.0___.600.000	10	
Socket frame	610.020.0___.600.000		
Pin frame	611.021.0___.600.000	12.5	
Socket frame	610.020.0___.600.000		
Pin frame	611.025.0___.600.000	21	Model with long guiding pins
Socket frame	610.020.0___.600.000		
Pin frame	611.050.0___.600.000	10	With labeling
Socket frame	610.050.0___.600.000		

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

ODU-MAC® L (LARGE)



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

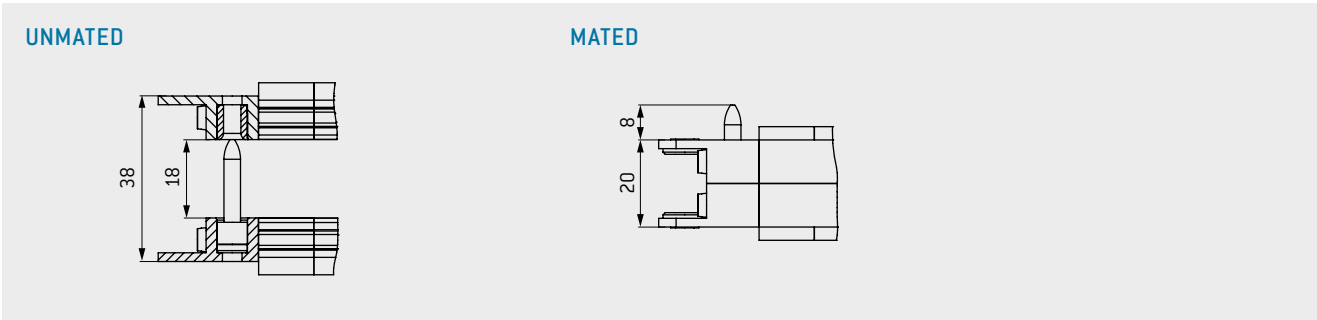
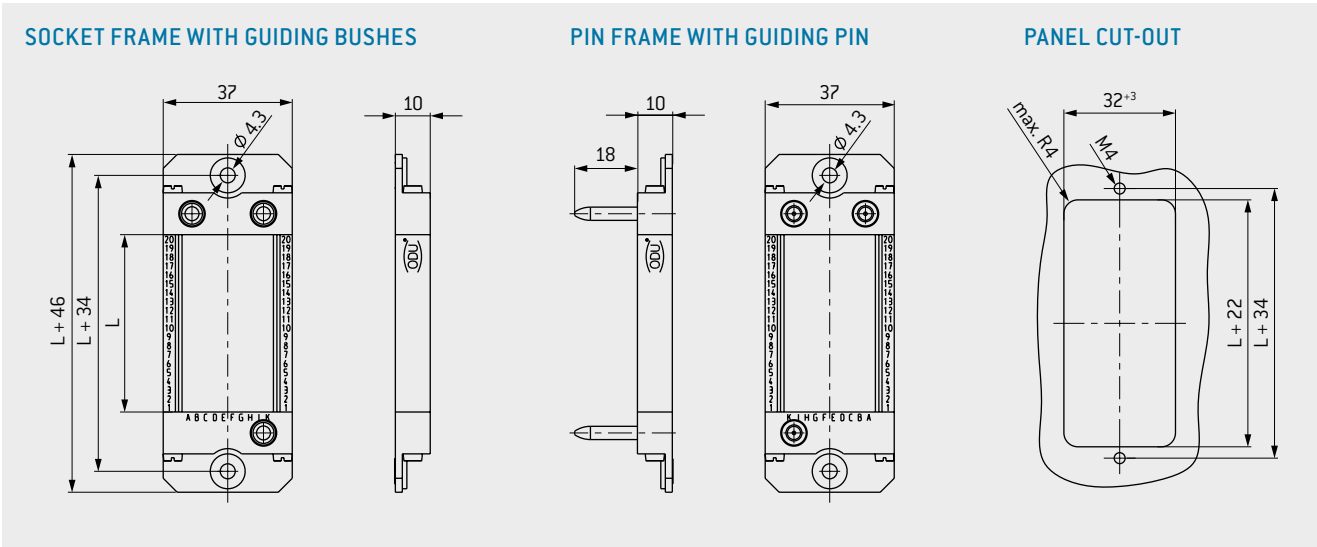


TECHNICAL DATA

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



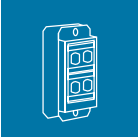
Non-magnetic version available upon request



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

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

ODU-MAC® S+ (SPECIAL)



The new standard for docking tasks with optional PE transmission

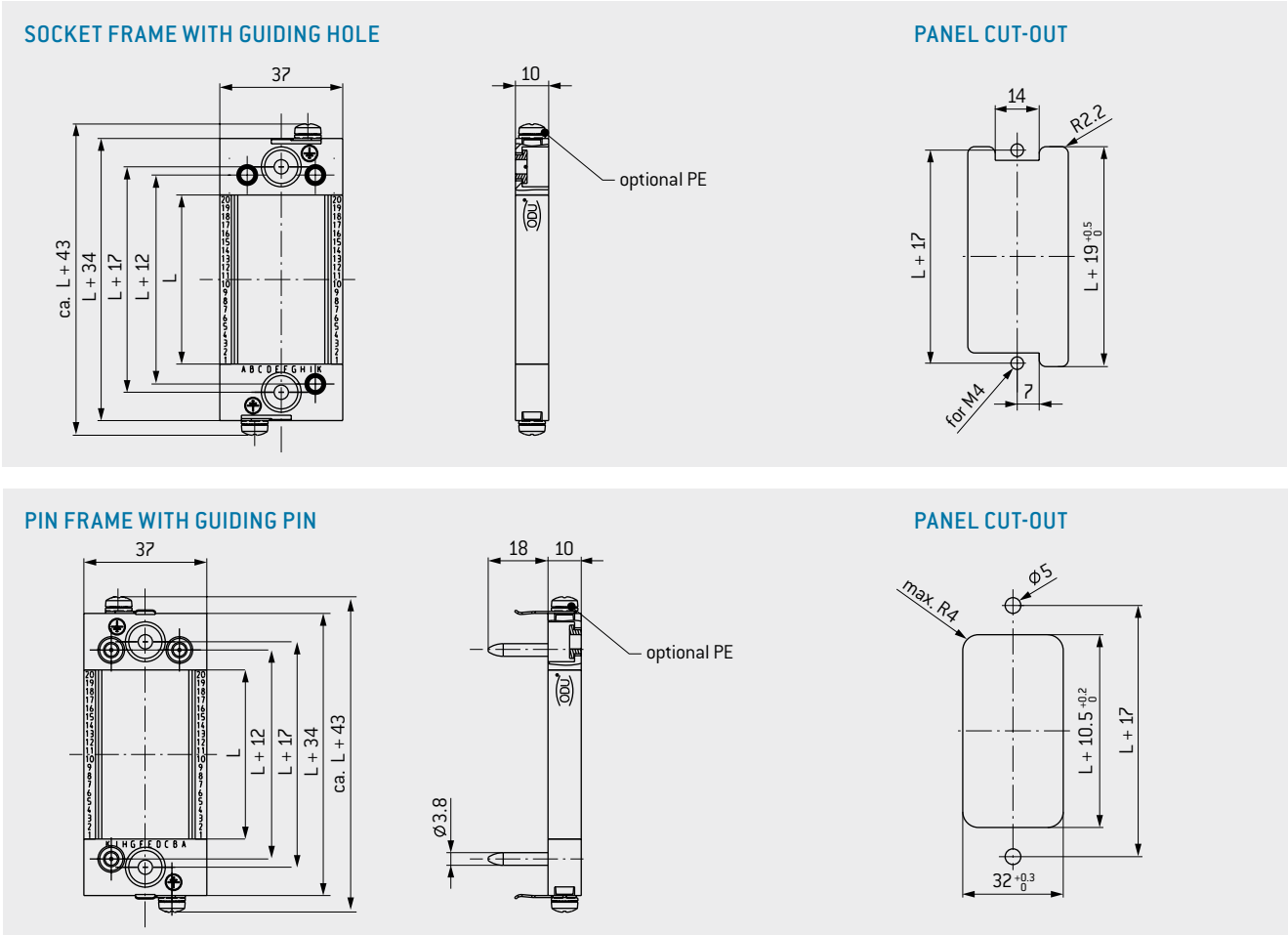


TECHNICAL DATA

- Tolerance compensation:
Axial play: 0.4 mm
Radial play: ± 1.2 mm
- Double-sided floating supported
- Minimum 100,000 mating cycles
- Optional PE transmission see page 33



Non-magnetic version available upon request

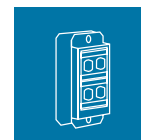


Description	Part number
Pin frame	611.750.0__600.000
Socket frame	610.750.0__600.000

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

NOT COMPATIBLE WITH ODU-MAC® S FRAME

PE TRANSMISSION FOR ODU-MAC® S+ (SPECIAL)



GROUNDING KIT FOR S+ SOCKET FRAME



TECHNICAL DATA

- Tolerance compensation:
Axial play: 0.4 mm
Radial play: ± 1.2 mm
- Minimum 100,000 mating cycles
- Double-sided version (redundant)
- Surface: nickel-plated



Non-magnetic version available upon request

GROUNDING KIT MOUNTED



Part number	Connection threads
190.270.001.000.000	M4

Max. 6 mm² lug connection for PE transmission

GROUNDING KIT FOR S+ PIN FRAME



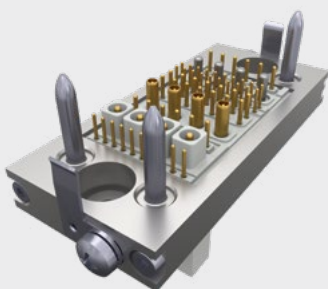
TECHNICAL DATA

- Tolerance compensation:
Axial play: 0.4 mm
Radial play: ± 1.2 mm
- Minimum 100,000 mating cycles
- Double-sided version (redundant)
- Surface: nickel-plated



Non-magnetic version available upon request

GROUNDING KIT MOUNTED



Part number	Connection threads
190.270.002.000.000	M4

Max. 6 mm² lug connection for PE transmission

CONTACT RESISTANCE COMPLIANT WITH $< 0.1 \Omega$ STANDARD

ODU-MAC® M+ (MINI)



Compact design with minimal space requirements and optional PE transmission

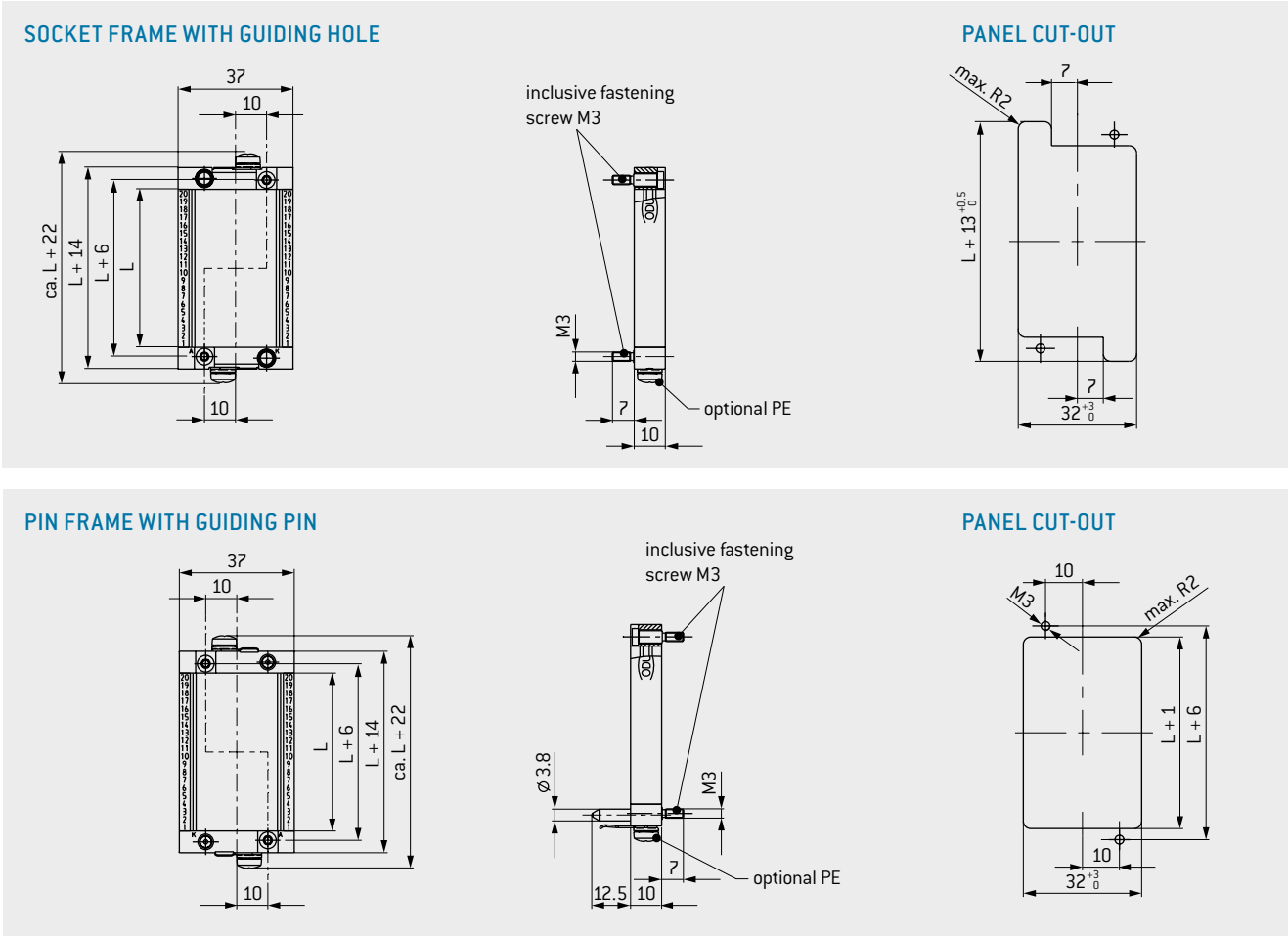


TECHNICAL DATA

- Tolerance compensation:
Axial play: 0.4 mm
Radial play: ± 0.6 mm
- Double-sided floating supported
- Minimum 100,000 mating cycles
- Optional PE transmission see page [35](#)



Non-magnetic version available upon request

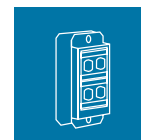


Description	Part number
Pin frame	611.716.0__600.000
Socket frame	610.716.0__600.000

L = Number of units $\times$ 2.54
-- = Here please register number of desired units
(03 to 60, above 61 on request)

NOT COMPATIBLE WITH ODU-MAC® M FRAME

PE TRANSMISSION FOR ODU-MAC® M+(MINI)



GROUNDING KIT FOR M+ SOCKET FRAME



TECHNICAL DATA

- Tolerance compensation:
Axial play: 0.4 mm
Radial play: ± 0.6 mm
- Minimum 100,000 mating cycles
- Double-sided version (redundant)
- Surface: nickel-plated



Non-magnetic version available upon request

GROUNDING KIT MOUNTED



Part number	Connection threads
190.270.001.000.000	M4

Max. 6 mm² lug connection for PE transmission

GROUNDING KIT FOR M+ PIN FRAME



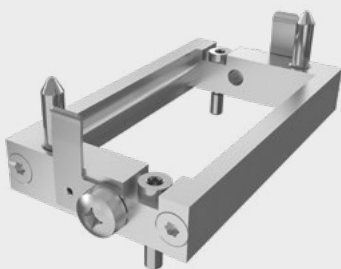
TECHNICAL DATA

- Tolerance compensation:
Axial play: 0.4 mm
Radial play: ± 0.6 mm
- Minimum 100,000 mating cycles
- Double-sided version (redundant)
- Surface: nickel-plated



Non-magnetic on request.

GROUNDING KIT MOUNTED

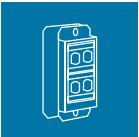


Part number	Connection threads
190.270.002.000.000	M4

Max. 6 mm² lug connection for PE transmission

CONTACT RESISTANCE COMPLIANT WITH $< 0.1 \Omega$ STANDARD

ODU-MAC® P+ (POWER)



The frame for highest requirements by a reinforced frame design,
high tolerance compensation ± 2.5 mm

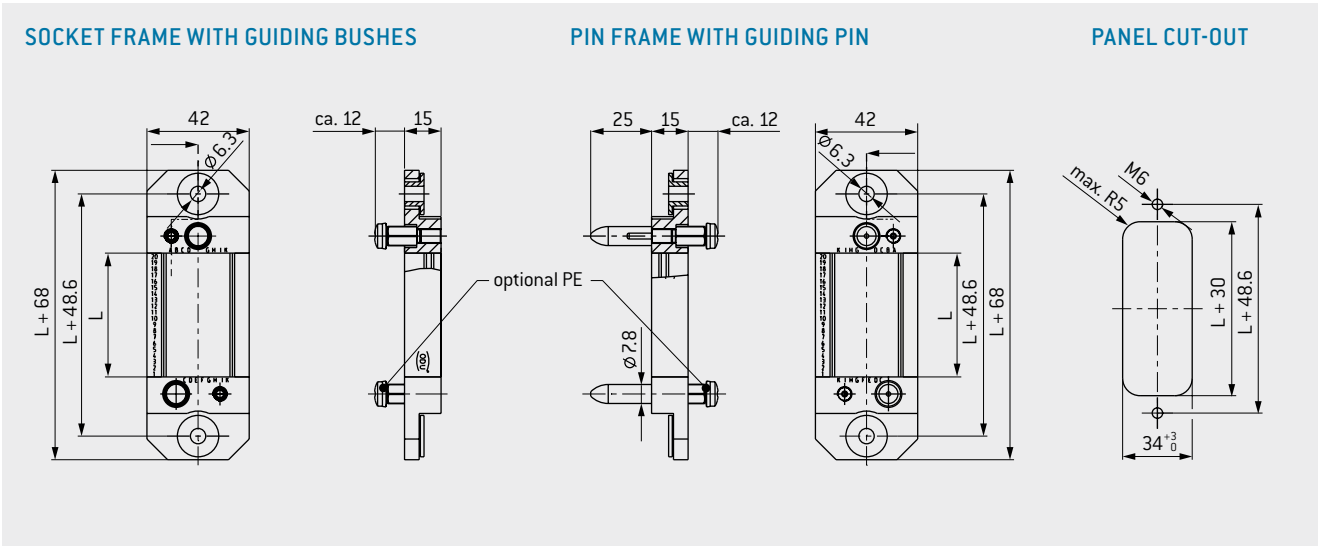


TECHNICAL DATA

- Tolerance compensation:
Axial play: 1 mm
Radial play: ± 2.5 mm
- Double-sided floating supported
- Advisable for modules
with contact diameter > 5 mm
and frame length > 40 units (depending on configuration)
- Contact diameter > 8 mm: this frame has to be used
- Minimum 100,000 mating cycles
- Optional PE transmission see page [37](#)



Non-magnetic version available upon request

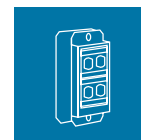


Description	Part number
Pin frame	611.730.0 __.600.000
Socket frame	610.730.0 __.600.000

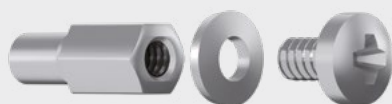
L = Number of units $\times 2.54$
__ = Here please register number of desired units
(05 to 60 in steps of 5, above 61 on request)

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

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



GROUNDING KIT FOR P+ SOCKET FRAME



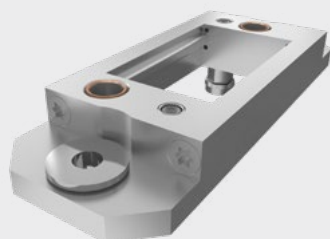
TECHNICAL DATA

- Tolerance compensation:
Axial play: 1 mm
Radial play: ± 2.5 mm
- Minimum 100,000 mating cycles
- Double-sided version (redundant)
- Surface: Ag



Non-magnetic version available upon request

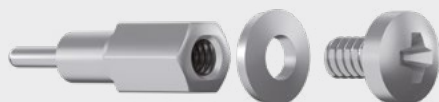
GROUNDING KIT MOUNTED



Part number	Connection threads
174.100.100.201.100	M5

Max. 10 mm² lug connection for PE transmission

GROUNDING KIT FOR P+ PIN FRAME



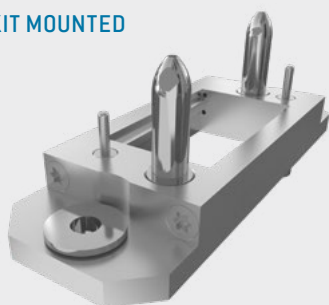
TECHNICAL DATA

- Tolerance compensation:
Axial play: 1 mm
Radial play: ± 2.5 mm
- Minimum 100,000 mating cycles
- Double-sided version (redundant)
- Surface: Ag



Non-magnetic version available upon request

GROUNDING KIT MOUNTED

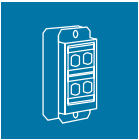


Part number	Connection threads
180.100.000.301.100	M5

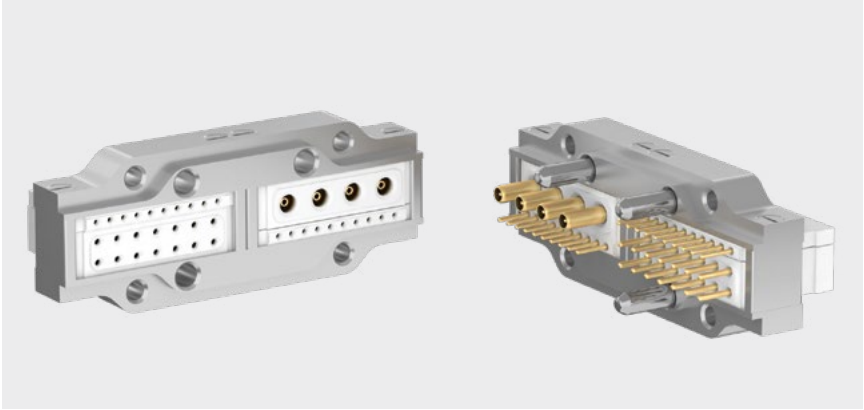
Max. 10 mm² lug connection for PE transmission

CONTACT RESISTANCE COMPLIANT WITH $< 0.1 \Omega$ STANDARD

ODU-MAC® T (TRANSVERSE)



Transverse frame, for when a low installation height is required



TECHNICAL DATA

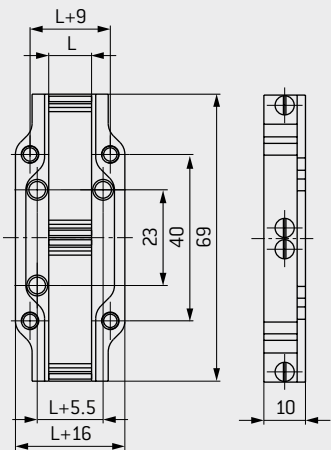
- Installation even in housing solution

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

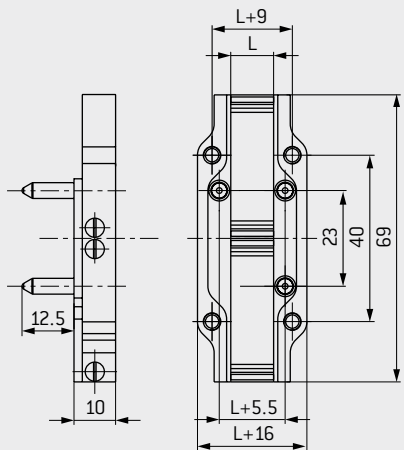


Standard non-magnetic

SOCKET FRAME WITH GUIDING HOLE

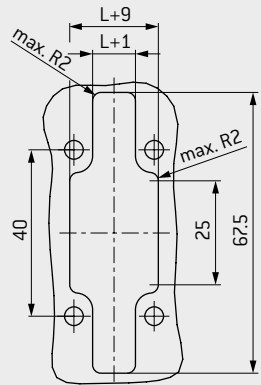


PIN FRAME WITH GUIDING PIN



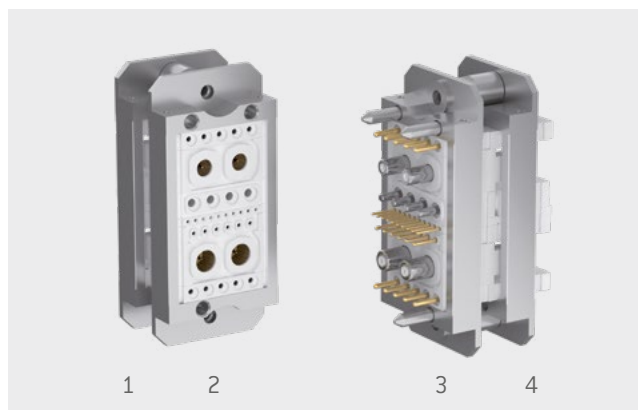
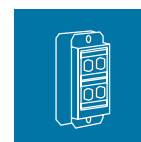
Part number Pin frame	Part number Socket frame	Dim. L mm	Units
611.055.029.303.600	610.055.029.103.600	7.62	3 × 2
611.055.029.304.600	610.055.029.104.600	10.16	4 × 2
611.055.029.305.600	610.055.029.105.600	12.7	5 × 2
611.055.029.306.600	610.055.029.106.600	15.24	6 × 2
611.055.029.307.600	610.055.029.107.600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

PANEL CUT-OUT



ODU-MAC® QCH (QUICK CHANGE HEAD)

Frames for the highest mating cycle requirements (connector saver), with an extremely low maintenance downtime and expense, thanks to easily replaceable exchange components



TECHNICAL DATA

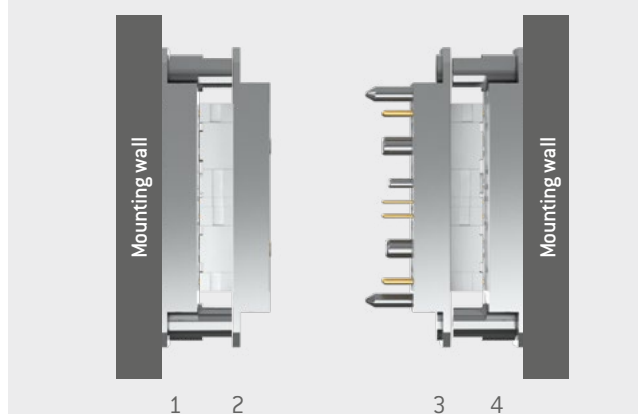
- Tolerance compensation:
Axial play: 0.2 mm
Radial play: +/- 0.6 mm
- Pin piece floating supported
- Unlimited number of mating cycles (min. 100,000 mating cycles)
- Replacement of the interchangeable parts without assembly effort

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

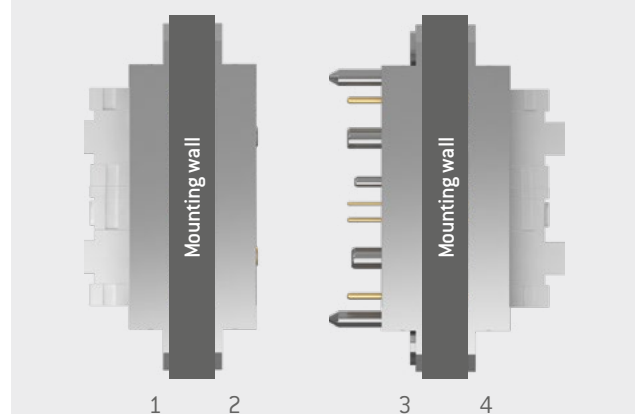


Non-magnetic version available upon request

MOUNTING WALL BACK



MOUNTING WALL CENTRAL – FOR WALL THICKNESS 10 mm



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

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

The quick change head (connector saver) consists of 4 frames. Pin and socket frames are disconnected or connected when disconnecting or connecting between the second and third frame.

Pieces 1 and 2 or 3 and 4 always remain together.

In the event of damage or wear to the contacts, both replacement parts 2 and 3 are disconnected from pieces 1 and 4 and can be quickly and easily replaced with the new replacement parts without time spent on assembly. The connection is ready to use again within a matter of seconds.

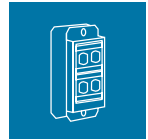
FRAMES FOR THE QUICK CHANGE HEAD SYSTEM

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

MODULES AND CONTACTS FOR THE QUICK CHANGE HEAD SYSTEM

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

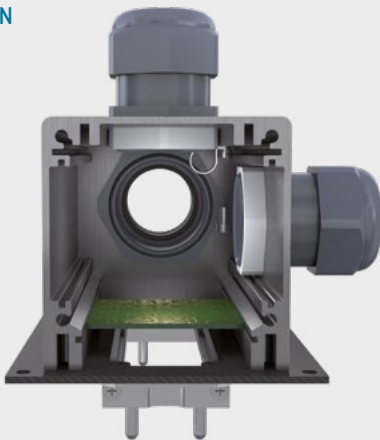
ODU-MAC® SILVER-LINE STRAIN RELIEF HOUSING



The accessories for docking solutions



APPLICATION EXAMPLE

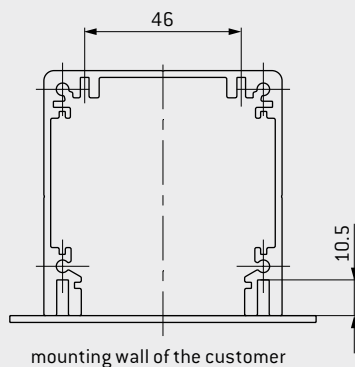


TECHNICAL DATA

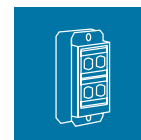
- Material: aluminum
- Operating temperature: -40 °C to $+125\text{ °C}$
- Protection class¹ can be adjusted individually
- Cable clamps, see page [186](#)
- Locknut for cable clamp see page [186](#)

CHARACTERISTICS

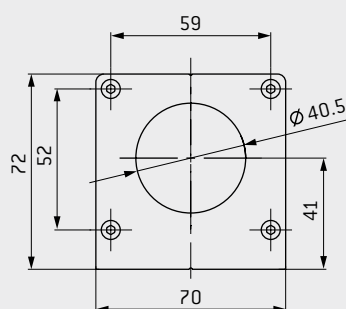
- Resistant and compact
- Protection of the termination area
- Individual strain-relief variations, cable entries as well as grounding connections
- Suitable for all ODU-MAC® docking frames
- 6 standard lengths, compatible with all ODU-MAC® docking frame varieties (further lengths available on request)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



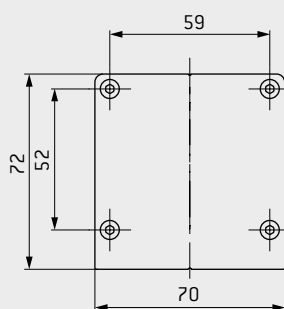
¹ A higher protection class is possible for additional sealing of the housing.



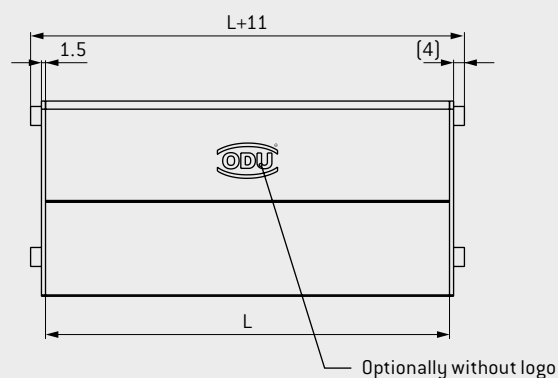
COVER WITH HOLE



COVER WITHOUT HOLE



HOUSING SET INCLUDING COVER



For mounting on an existing mounting wall of the customer.

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

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



ODU-MAC®

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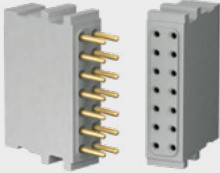
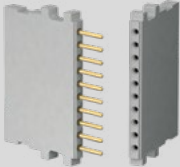
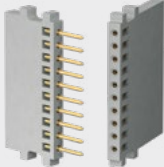
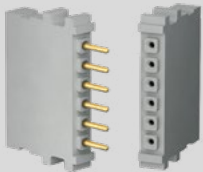
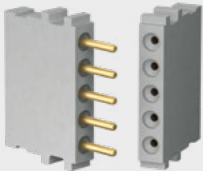
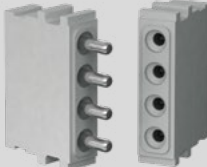
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PE	74
High voltage	76
RF-signal (coax)	80
Compressed air and fluid modules	90
Fiber optic	104
Shielded implementation/high-speed connector	110
Blank modules/spacer modules/coding modules/pin protection modules	118

OVERVIEW OF ALL MODULES



Modules marked with this symbol can be used in the ODU Dock; note the space requirements.

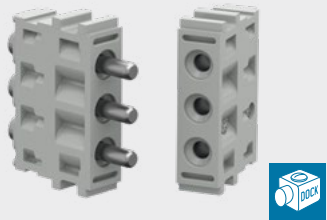
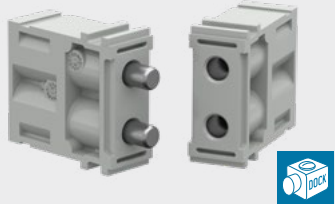
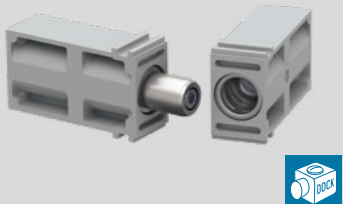
	Modules	Description	Units /width	Features	Page
Signal	 	14 contacts for turned contacts Contact Ø: 1.02 mm	 7.62 mm	High contact density Operating voltage ¹ 320 V Rated impulse voltage ¹ 2,500 V Max. continuous current ² 13.5 A for 0.5 mm ² Degree of pollution ¹ 2 Mating cycles minimum 100,000	50
	 	10 contacts for turned contacts Contact Ø: 0.76 mm	 2.54 mm	Highest contact density Operating voltage ¹ 250 V Rated impulse voltage ¹ 1,500 V Max. continuous current ² 11 A for 0.38 mm ² Degree of pollution ¹ 2 Mating cycles minimum 100,000	52
	 	10 contacts for stamped contacts Contact Ø: 0.7 mm	 2.54 mm	Economical solution Operating voltage ¹ 32 V Rated impulse voltage ¹ 1,500 V Max. continuous current ² 6 A for 0.38 mm ² Degree of pollution ¹ 2 Mating cycles minimum 5,000	54
	 	6 contacts for turned contacts Contact Ø: 1.02 mm	 5.08 mm	Operating voltage ¹ 400 V Rated impulse voltage ¹ 3,000 V Max. continuous current ² 13.5 A for 0.5 mm ² Degree of pollution ¹ 2 Mating cycles minimum 100,000	56
	 	5 contacts for turned contacts Contact Ø: 1.5 mm	 5.08 mm	Operating voltage ¹ 500 V Rated impulse voltage ¹ 2,500 V Max. continuous current ² 27 A for 1.5 mm ² Degree of pollution ¹ 2 Mating cycles minimum 100,000	58
Power	 	4 contacts for turned contacts Contact Ø: 2.41 mm	 7.62 mm	Operating voltage ¹ 500 V Rated impulse voltage ¹ 3,000 V Max. continuous current ² 41 A for AWG 12 Degree of pollution ¹ 2 Mating cycles minimum 100,000	60

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008) for degree of pollution 2. ² Definition max. continuous current see page [197](#)

OVERVIEW OF ALL MODULES



Modules marked with this symbol can be used in the ODU Dock; note the space requirements.

	Modules	Description	Units /width	Features	Page
Power		3 contacts for turned contacts Contact Ø: 3 mm	 7.62 mm	Operating voltage ¹ 500 V Rated impulse voltage ¹ 3,000 V Max. continuous current ² 58 A for 6 mm ² Degree of pollution ¹ 2 Mating cycles minimum 100,000	62
		3 contacts for turned contacts Contact Ø: 3 mm	 10.16 mm	High voltage Operating voltage ¹ 2,500 V Rated impulse voltage ¹ 10,000 V Max. continuous current ² 58 A for 6 mm ² Degree of pollution ¹ 2 Mating cycles minimum 100,000	64
		2 contacts for turned contacts Contact Ø: 5 mm	 12.7 mm	Operating voltage ¹ 1,000 V Rated impulse voltage ¹ 4,000 V Max. continuous current ² 119 A for 16 mm ² Degree of pollution ¹ 2 Mating cycles minimum 100,000	66
High current		2 contacts for turned contacts with ODU SPRINGTAC ³ Contact Ø: 8 mm	 15.24 mm	Operating voltage ¹ 500 V Rated impulse voltage ¹ 3,000 V Max. continuous current ² 142 A for 25 mm ² Degree of pollution ¹ 2 Mating cycles minimum 100,000	68
		2 contacts for turned contacts with ODU LAMTAC ⁴ Contact Ø: 8 mm	 15.24 mm	Operating voltage ¹ 500 V Rated impulse voltage ¹ 3,000 V Max. continuous current ² 154 A for 25 mm ² Degree of pollution ¹ 2 Mating cycles minimum 10,000	70
		1 contact for turned contacts with ODU LAMTAC ⁴ Contact Ø: 10 mm or Contact Ø: 12 mm	 17.78 mm for both versions	Highest current 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 ² 179 A 225 A for 35 mm ² for 50 mm ² Degree of pollution ¹ 2 2 Mating cycles min. 10,000 min. 10,000	72

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008) ² Definition max. continuous current see page 197 ³ Contact with springwire technology

⁴ Contact with lamella technology

OVERVIEW OF ALL MODULES



Modules marked with this symbol can be used in the ODU Dock; note the space requirements.

	Modules	Description	Units /width	Features	Page
PE		1 contact for turned contacts with ODU LAMTAC ^{®3} Contact Ø: 10 mm	 12.7 mm	Mating cycles Conductor cross-section minimum 10,000 10/16/25 mm ²	74
High voltage		4 contacts for turned contacts Contact Ø: 1.5 mm	 7.62 mm	High contact density high voltage Operating voltage ¹ 2,500 V Rated impulse voltage ¹ 10,000 V Max. continuous current ² 27 A for 1.5 mm ² Degree of pollution ¹ 2 Mating cycles minimum 100,000	76
		1 contact Contact Ø: 2 mm	 20.32 mm	High voltage Operating voltage ¹ 6,300 V Rated impulse voltage ¹ 20,000 V Degree of pollution ¹ 2 Mating cycles minimum 10,000	78
RF-signal (coax)		4 contacts for 50 Ω RF-signal (coax) contacts	 7.62 mm	High contact density Frequency range 0 to 1.3 GHz Mating cycles minimum 60,000 	80
		2 contacts for 50 Ω RF-signal (coax) contacts SMA termination	 12.7 mm	9.0 GHz Frequency range 0 to 9.0 GHz Mating cycles minimum 100,000	82
		2 contacts for 50 Ω RF-signal (coax) contacts	 12.7 mm	Frequency range 0 to 2.4 GHz Mating cycles minimum 100,000	84

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008) for degree of pollution 2. ² Definition max. continuous current see page [197](#) ³ Contact with lamella technology

OVERVIEW OF ALL MODULES



Modules marked with this symbol can be used in the ODU Dock; note the space requirements.

	Modules	Description	Units /width	Features	Page
RF-signal (coax)		2 contacts for 50 Ω RF-signal (coax) contacts	5 Units 12.7 mm	High voltage Frequency range Mating cycles 0 to 2.8 GHz minimum 100,000	86
		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	88
Compressed air and fluid modules		2 contacts for compressed air valves	5 Units 12.7 mm	20 bar Tube diameter Mating cycles M5 or max. 4 mm minimum 100,000	90
		2 contacts for compressed air valves	16 Units 40.64 mm	12 bar Tube diameter Inner diameter tube Mating cycles max. 6 mm max. 6 mm minimum 100,000	92
		1 contact for compressed air valve	8 Units 20.32 mm	12 bar Tube diameter Inner diameter tube Mating cycles max. 6 mm max. 6 mm minimum 100,000	94
		2 contacts for fluid coupling plug	5 Units 12.7 mm	10 bar Tube diameter Mating cycles M5 internal thread minimum 100,000	96

OVERVIEW OF ALL MODULES



Modules marked with this symbol can be used in the ODU Dock; note the space requirements.

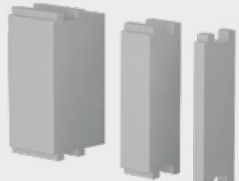
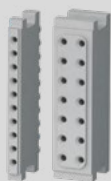
	Modules	Description	Units/width	Features		Page
Compressed air and fluid modules		1 contacts for fluid coupling plug	9 Units 22.86 mm	25 bar	G1/4 minimum 100,000	100
				Inner diameter tube		
Fiber optic		5 contacts for fiber optic contacts for plastic fiber (POF)	2 Units 5.08 mm	High contact density	1.5 dB for 670 nm minimum 40,000	104
		2 contacts for fiber optic contacts for plastic fiber (POF)	5 Units 12.7 mm	Mating cycles	minimum 100,000	106
		3 contacts for fiber optic contacts for fiber glass (GOF)	4 Units 10.16 mm	Insertion loss typical	1.5 dB for 670 nm	108
Shielded implementation/high-speed connector		2 to 10 contacts for inserts size 0	5 Units 12.7 mm	Mating cycles	minimum 10,000	110
		2 to 14 contacts for inserts size 1	6 Units 15.24 mm	Suitable for all common bus systems USB® 1.1 ¹ , USB® 2.0 ¹ , USB® 3.1 Gen1 ¹ , FireWire® ¹ , Ethernet ¹ , CAT 5 ¹	minimum 10,000 minimum 60,000	112

¹ Concerning data transmission protocols please note page 2.

OVERVIEW OF ALL MODULES

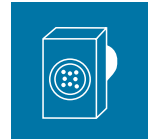


Modules marked with this symbol can be used in the ODU Dock; note the space requirements.

	Modules	Description	Units/width	Features	Page
Shielded implementation/high-speed connector	 	4 to 16 contacts for inserts size 2	 17.78 mm	Mating cycles with springwire minimum 10,000 minimum 60,000 Suitable for all common bus systems HDMI ¹ , Ethernet ¹ , CAT 5 ¹ , CAT 6 ¹	114
	 	10 to 30 contacts for inserts size 3	 20.32 mm	Mating cycles minimum 10,000 Suitable for all common bus systems Ethernet ¹	116
Blank modules/spacer modules/coding modules/pin protection modules	 	Blank modules	  2.54 mm 7.62 mm  12.7 mm	Used to fill incomplete frames.	118
	 	Spacer module	  2.54 mm 5.08 mm   7.62 mm 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.	119
	 	Coding modules	 2.54 mm	Arranged between the modules to create keyed guiding system.	120
	 	Pin protection modules	 2.54 mm	Used to protect the pins in conjunction with small pin diameters.	121

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

MODULES 14 CONTACTS



SIGNAL



Contact diameter: 1.02 mm
Mating cycles: minimum 100,000
Current-carrying capacity¹: 13.5 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 [see page 197].
- Contacts and insulators up to 200 °C on request
- Crimp information see page 174

TECHNICAL DATA

Voltage information²

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

Voltage information acc. to MIL³

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 plating	Au over Ni

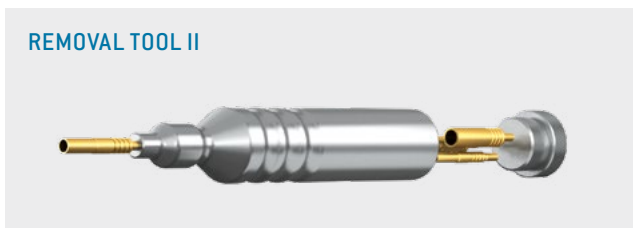
REMOVAL TOOL I (ANGLED)



Removal of the already assembled contact (incl. cable)

PART NUMBER: 087.170.362.000.000

REMOVAL TOOL II



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

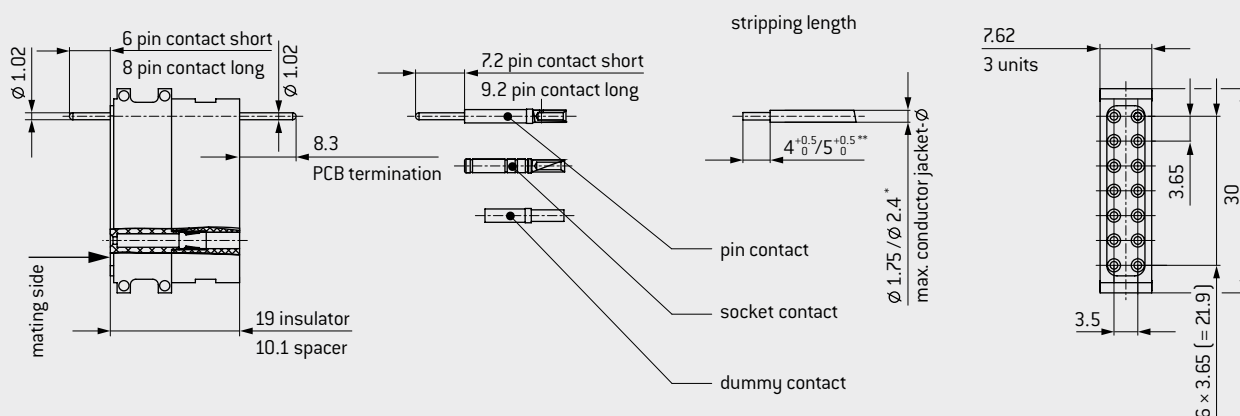
PART NUMBER: 087.611.001.001.000

For an overview of all tools please see from page 183.

¹ Definition max. continuous current see page 197 ² IEC 60664-1:2007 [VDE 0110-1:2008] see page 191 ³ See page 194



INSULATOR PIN AND SOCKET



* $\leq \varnothing 1.75$ removal possible / $\leq \varnothing 2.4$ removal not possible

** $4^{+0.5}_{-0.5}$: AWG 24–28; 0.25–0.08 mm²

$5^{+0.5}_{-0.5}$: AWG 20–22; 0.5–0.38 mm²

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

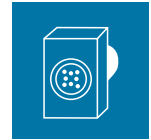
Description	Part number	Conductor cross-section mm ²	Termination AWG/mm	Nominal current ²		Max. continuous current ³ Single contact A	Contact resistance mΩ
				Single contact A	Module fully equipped A		
Pin contact short ¹	180.362.000.307.000	0.5–0.38	20–22	9	7	13.5	2.1
Pin contact long ¹	180.382.000.307.000						
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 $\varnothing 1.02$ mm	9	7	13.5	2.1
Pin contact long ¹	180.819.000.307.000						
Socket contact	170.818.700.207.000						



¹ Non-magnetic version on request ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K

³ Definition max. continuous current see page 197

MODULE 10 CONTACTS FOR TURNED CONTACTS



SIGNAL



Contact diameter: 0.76 mm
Mating cycles: minimum 100,000
Current-carrying capacity¹: 11 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 197).
- 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 174

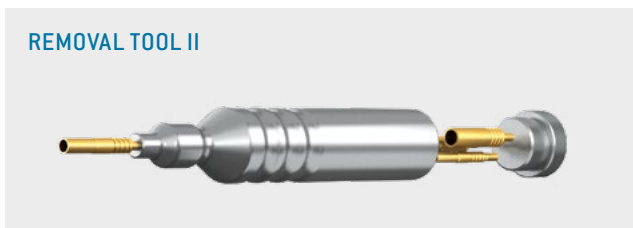
REMOVAL TOOL I (ANGLED)



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 183.

TECHNICAL DATA

Voltage information²

Operating voltage	250 V	32 V
Rated impulse voltage	1,500 V	1,500 V
Degree of pollution	2	3

Voltage information acc. to MIL³

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, max. 75 °C
Mating cycles	minimum 100,000

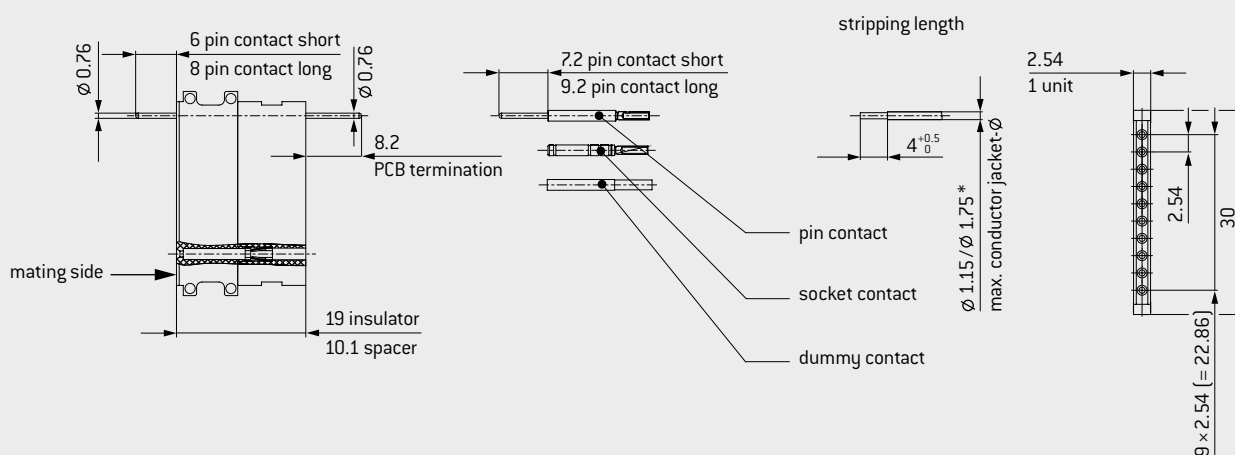
Materials

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

¹ Definition max. continuous current see page 197 ² IEC 60664-1:2007 (VDE 0110-1:2008) see page 191 ³ See page 194



INSULATOR PIN AND SOCKET



* $\leq \phi 1.15$ removal possible / $\leq \phi 1.75$ removal not possible

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

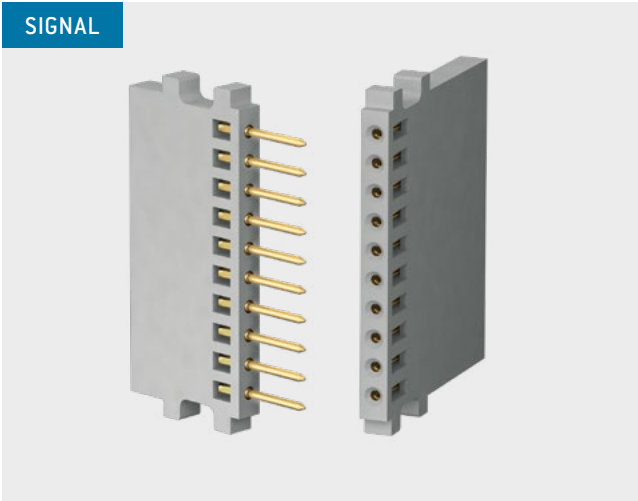
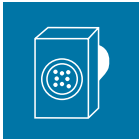
Description	Part number	Conductor cross-section mm ²	Termination AWG/mm	Nominal current ²		Max. continuous current ³ Single contact A	Contact resistance mΩ
				Single contact A	Module fully equipped A		
Pin contact short ¹	180.361.000.307.000	0.38	22	7.5	6	11	3.8
Pin contact long ¹	180.381.000.307.000						
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 $\phi 0.76$ mm	7.5	6	11	3.8
Pin contact long ¹	180.851.000.307.000						
Socket contact ¹	170.850.700.207.000						



¹ Non-magnetic version on request ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K

³ Definition max. continuous current see page 197

MODULE 10 CONTACTS FOR STAMPED CONTACTS



Contact diameter: 0.7 mm
Mating cycles: mind. 5,000
Current-carrying capacity¹: 6 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 197).
- The 10 contacts modules with turned contacts are not compatible with stamped contacts or modules.
- Contacts are not removable.
- Crimp information see page 174

TECHNICAL DATA

Voltage information^{2,4}

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^{3,4}

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

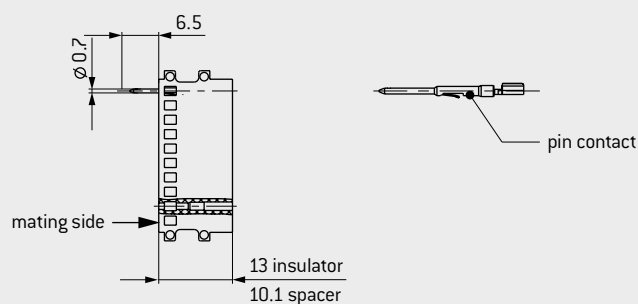
Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Contact	CuSn6 alloy
Contact plating	
in termination area	Sn over Ni
in contact area	Au over Ni

¹ Definition max. continuous current see page 197 ² IEC 60664-1:2007 (VDE 0110-1:2008) see page 191 ³ See page 194

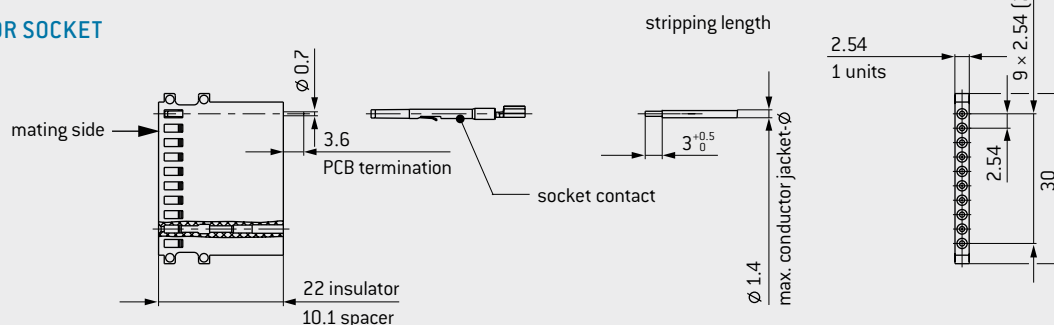
⁴ Voltage data does not apply when mounting metal components (e.g., spindle). Blank module required here



INSULATOR PIN



INSULATOR SOCKET



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

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

Packaging unit for crimp model (per reel)

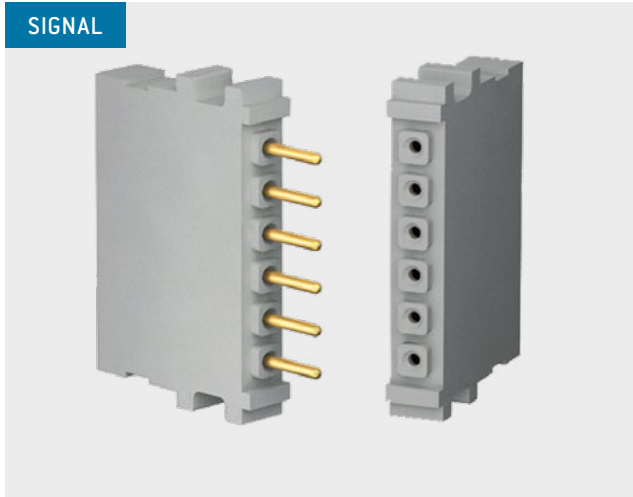
Quantity	500	900	5,000	10,000	20,000
Code number	51	52	54	55	50

¹ Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K ² Definition max. continuous current see page 197

MODULE 6 CONTACTS



SIGNAL



Contact diameter: 1.02 mm
Mating cycles: minimum 100,000
Current-carrying capacity¹: 13.5 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page [197](#)).
- Contacts and insulators up to 200 °C on request
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information²

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

Voltage information acc. to MIL³

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 plating	Au over Ni

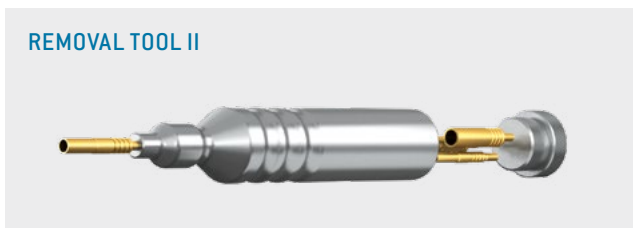
REMOVAL TOOL I (ANGLED)



Removal of the already assembled contact (incl. cable)

PART NUMBER: 087.170.362.000.000

REMOVAL TOOL II



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

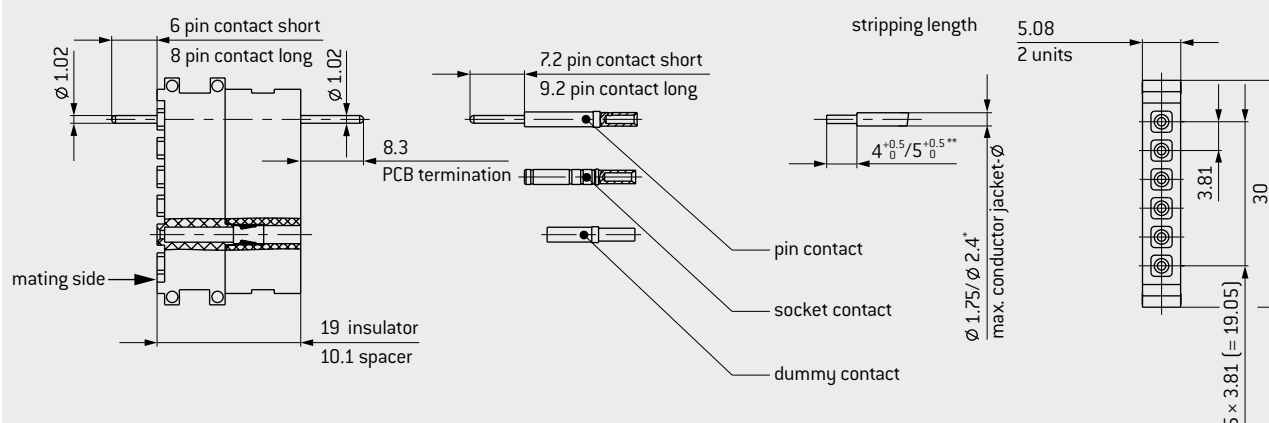
PART NUMBER: 087.611.001.001.000

For an overview of all tools please see from page [183](#).

¹ Definition max. continuous current see page [197](#) ² IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ³ See page [194](#)



INSULATOR PIN AND SOCKET



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

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

** 4^{+0.5/-0}, AWG 24–28; 0.25–0.08 mm²

5^{+0.5/-0}, AWG 20–22; 0.5–0.38 mm²

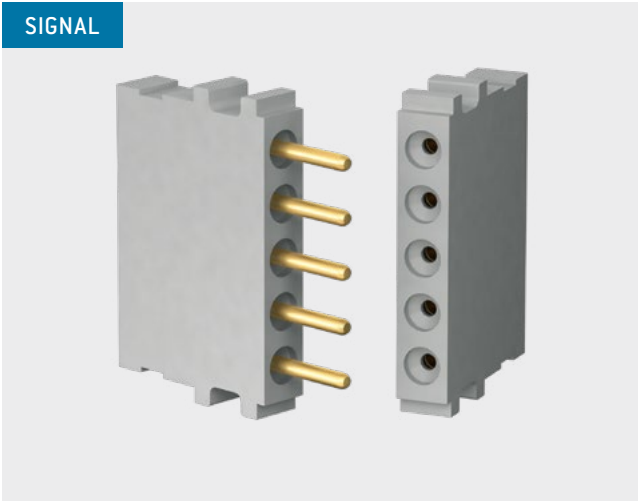
Description	Part number	Conductor cross-section mm ²	Termination AWG/mm	Nominal current ²		Max. continuous current ³ Single contact A	Contact resistance mΩ
				Single contact A	Module fully equipped A		
Pin contact short ¹	180.362.000.307.000	0.5–0.38	20–22	9	8	13.5	2.1
Pin contact long ¹	180.382.000.307.000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



¹ Non-magnetic version on request ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K

³ Definition max. continuous current see page 197

MODULE 5 CONTACTS



Contact diameter: 1.5 mm
Mating cycles: minimum 100,000
Current-carrying capacity¹: 27 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page [197](#)).
- Contacts and insulators up to 200 °C on request
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information²

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

Voltage information acc. to MIL³

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

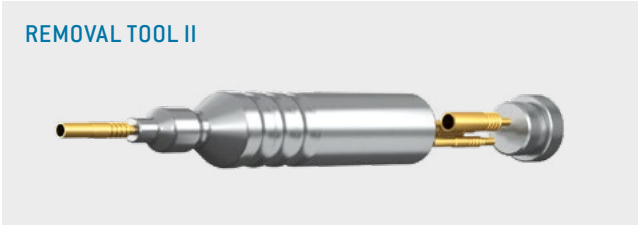
Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact spring	CuSn alloy
Contact plating	
Contact body	Au over Ni
Contact springs	Ag



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



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



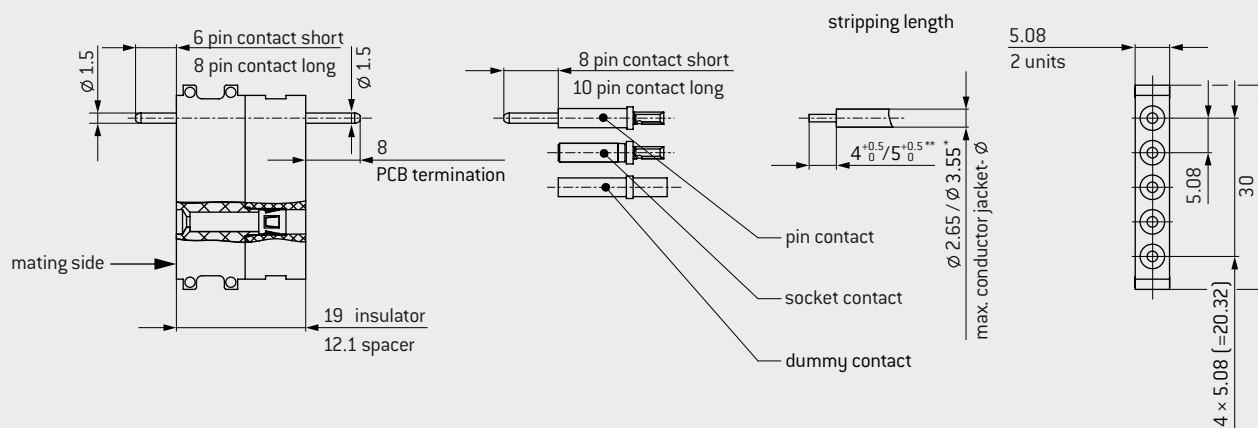
Removal of the still unassembled contact (without cable, which may have to be cut off)
PART NUMBER: 087.611.001.001.000

For an overview of all tools please see from page [183](#).

¹ Definition max. continuous current see page [197](#) ² IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ³ See page [194](#)



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

* $\leq \varnothing 2.65$ removal possible / $\leq \varnothing 3.55$ removal not possible

** $4^{+0.5}_{-0.5}$: AWG 24–28; 0.25–0.08 mm²

$5^{+0.5}_{-0.5}$: AWG 20–22; 0.5–0.38 mm²

AWG 14–18; 0.75–1.5 mm²

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



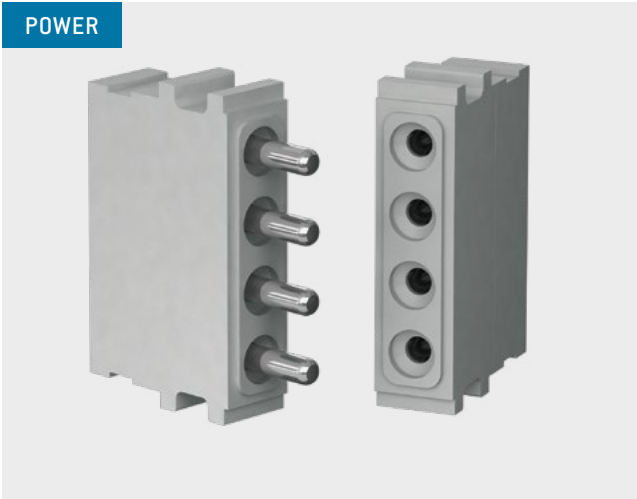
¹ Non-magnetic version on request ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K

³ Definition max. continuous current see page 197

MODULE 4 CONTACTS



POWER



Contact diameter: 2.41 mm
Mating cycles: minimum 100,000
Current-carrying capacity¹: 41 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 [see page [197](#)].
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information²

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

Voltage information acc. to MIL³

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

Mechanical data

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

Materials

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

REMOVAL TOOL I (STRAIGHT)



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

REMOVAL TOOL I (ANGLED)



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

REMOVAL TOOL II



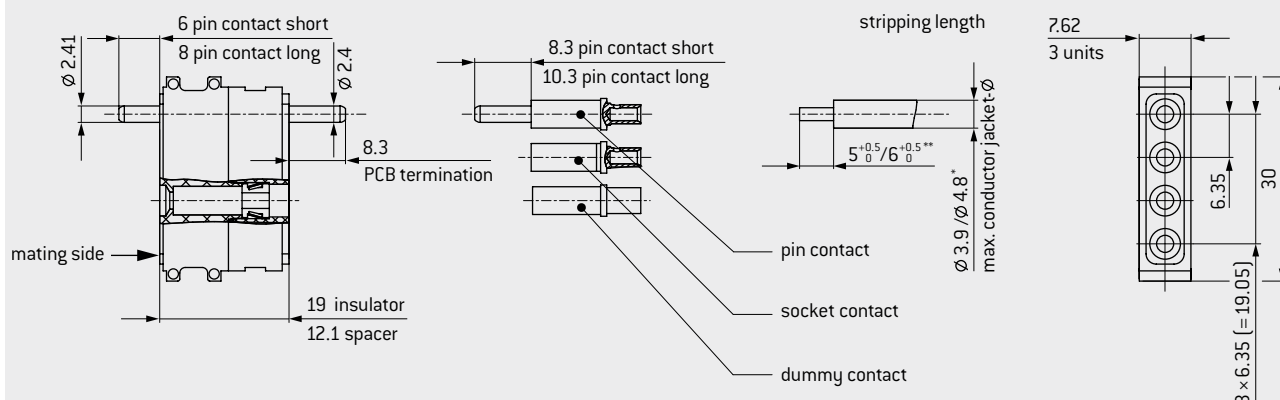
Removal of the still unassembled contact (without cable, which may have to be cut off)
PART NUMBER: 087.611.001.001.000

For an overview of all tools please see from page [183](#).

¹ Definition max. continuous current see page [197](#) ² IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ³ See page [194](#)



INSULATOR PIN AND SOCKET



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

* $\leq \varnothing 3.9$ removal possible / $\leq \varnothing 4.8$ removal not possible

** $5^{+0.5}_{-0.5}$; AWG 14 – 22; 0.38 – 1.5 mm²

$6^{+0.5}_{-0.5}$; 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.

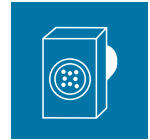
Description	Part number	Conductor cross-section mm ²	Termination AWG/mm	Nominal current ²		Max. continuous current ³ Single contact A	Contact resistance mΩ
				Single contact A	Module fully equipped A		
Pin contact short	180.365.000.301.000	2.5	12	28	25	41	0.45
Pin contact long	180.385.000.301.000		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



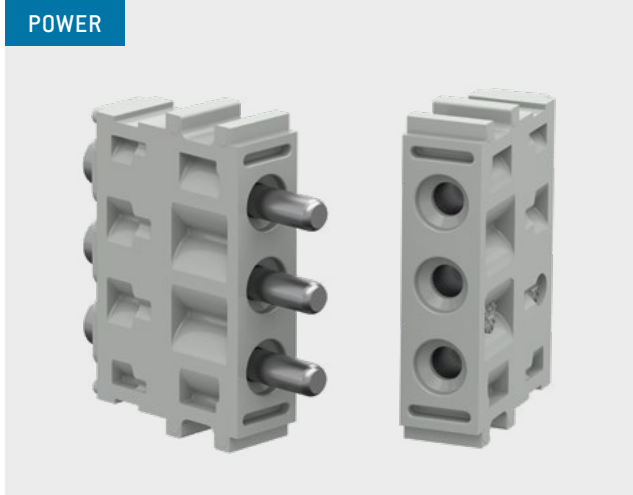
¹ Non-magnetic version on request ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K

³ Definition max. continuous current see page 197

MODULE 3 CONTACTS



POWER



Contact diameter: 3 mm

Mating cycles: minimum 100,000

Termination cross-section: from 0.38 to 6 mm²

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page [197](#)).
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information¹

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

Voltage information acc. to MIL²

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

Mechanical data

Total mating force (average)	13.5 N / Module
Total sliding force (average)	9.8 N / Module
Contact diameter	3 mm
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

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

REMOVAL TOOL I (STRAIGHT)



Removal of the already assembled contact (incl. cable)

PART NUMBER: 087.170.136.000.000

REMOVAL TOOL I (ANGLED)



Removal of the already assembled contact (incl. cable)

PART NUMBER: 087.170.366.000.000

REMOVAL TOOL II



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

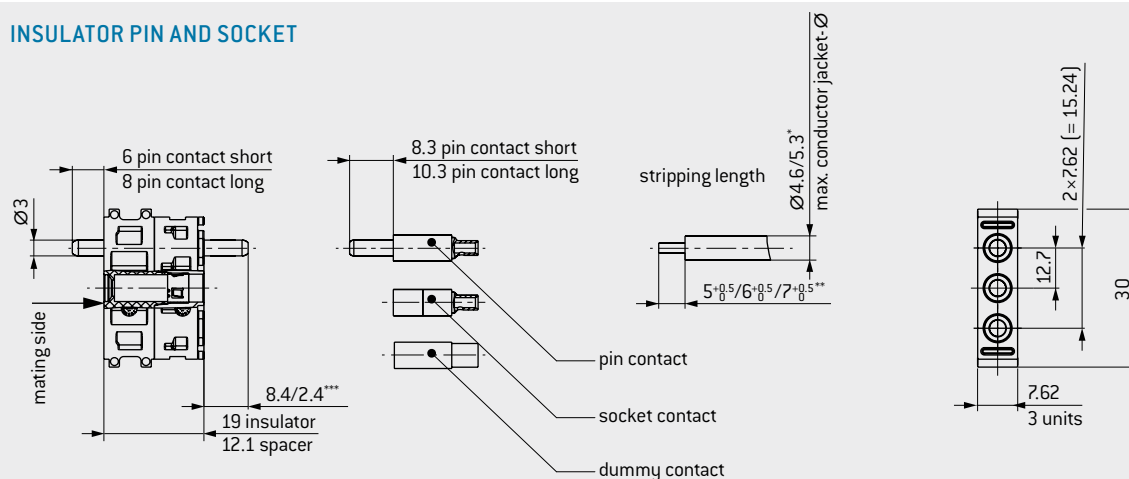
PART NUMBER: 087.611.001.001.000

For an overview of all tools please see from page [183](#).

¹ IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ² See page [194](#)



INSULATOR PIN AND SOCKET



* $\leq \varnothing 4.6$ removal possible / $\leq \varnothing 5.3$ removal not possible

** $5^{+0.5}_0$: AWG 14–22; 0.38–4 mm²

$6^{+0.5}_0$: 2.5–4 mm²

$7^{+0.5}_0$: 6 mm²

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

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

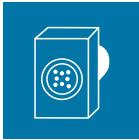
Description	Part number	Conductor cross-section mm ²	Termination AWG/mm	Nominal current ²		Max. continuous current ³ Single contact A	Contact resistance mΩ
				Single contact A	Module fully equipped A		
Pin contact short	182.980.000.301.000	6		39	30	58	0.3
Pin contact long	182.981.000.301.000						
Socket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



¹ Non-magnetic version on request ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K

³ Definition max. continuous current see page 197

MODULE 3 CONTACTS



POWER



Contact diameter: 3 mm
Mating cycles: minimum 100,000
Current-carrying capacity¹: 58 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page [197](#)).
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information²

Operating voltage	2,500 V	1,000 V
Rated impulse voltage	10,000 V	8,000 V
Degree of pollution	2	3

Voltage information acc. to MIL³

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

Mechanical data

Total mating force (average)	13.5 N / Module
Total sliding force (average)	9.8 N / Module
Contact diameter	3 mm
Operating temperature	–40 °C to +125 °C acc. to UL 1977, 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 plating	Ag

REMOVAL TOOL I (STRAIGHT)



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

REMOVAL TOOL II



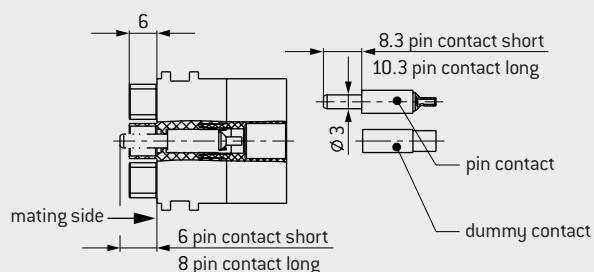
Removal of the still unassembled contact (without cable, which may have to be cut off)
PART NUMBER: 087.611.001.001.000

For an overview of all tools please see from page [183](#).

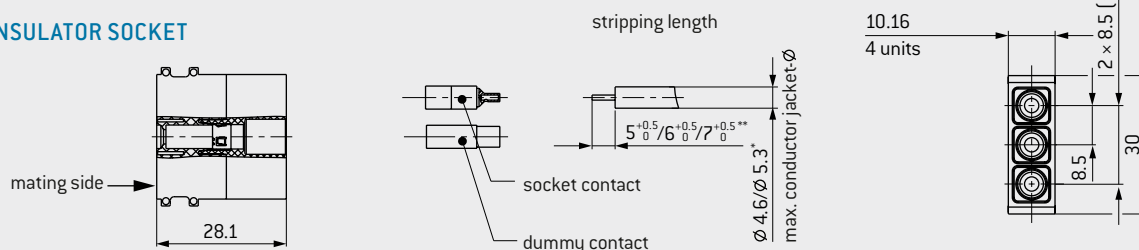
¹ Definition max. continuous current see page [197](#) ² IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ³ See page [194](#)



INSULATOR PIN



INSULATOR SOCKET



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

* $\leq \varnothing 4.6$ removal possible / $\leq \varnothing 5.3$ removal not possible

** $5^{+0.5}_0$: AWG 14–22; 0.38–4 mm²

$6^{+0.5}_0$: 2.5–4 mm²

$7^{+0.5}_0$: 6 mm²

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



¹ Non-magnetic version on request ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K

³ Definition max. continuous current see page 197

MODULE 2 CONTACTS



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 [183](#).

Contact diameter: 5 mm
Mating cycles: minimum 100,000
Current-carrying capacity¹: 119 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page [197](#)).
- When automatic docking due to the high mating forces and the high cable cross sections we recommend the assembly in the ODU-MAC® P+ (Power) frame (see page [36](#)).
- Contacts and insulators up to 200 °C on request
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information²

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 MIL³

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

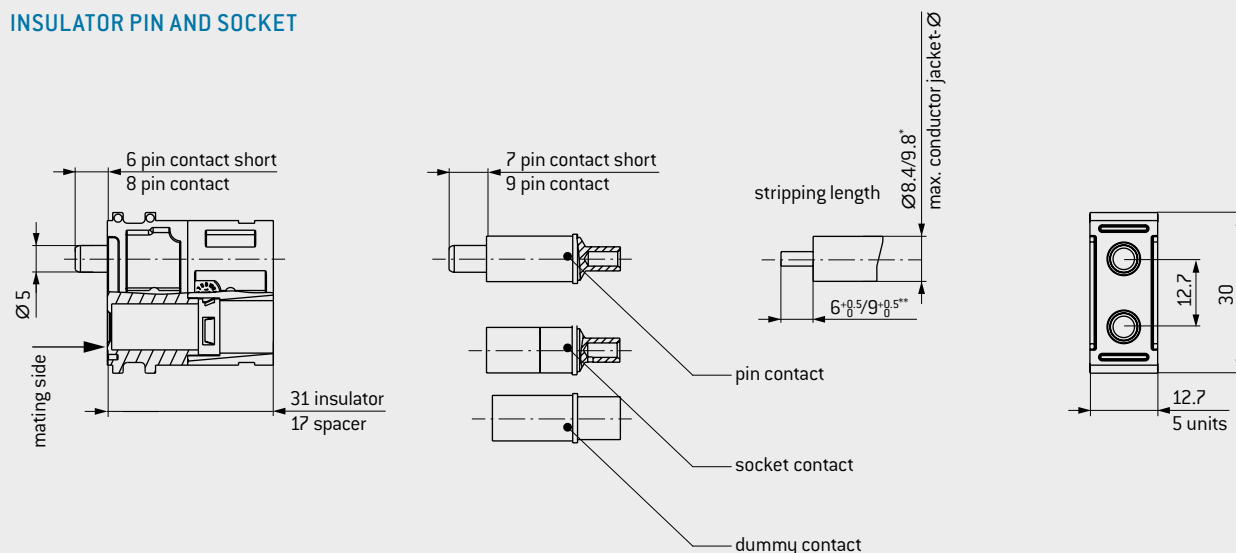
Materials

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 [197](#) ² IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ³ See page [194](#)



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

* $\leq \varnothing 8.4$ removal possible / $\leq \varnothing 9.8$ Demontage nicht möglich

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

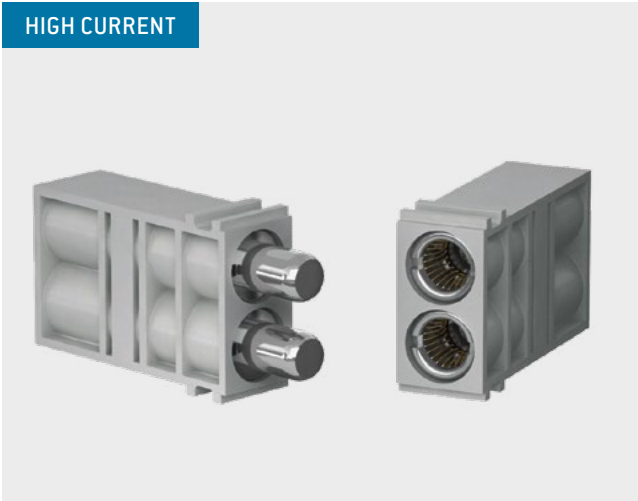
Description	Part number	Conductor cross-section mm ²	Nominal current ¹		Max. continuous current ² Single contact A	Contact resistance mΩ
			Single contact A	Module fully equipped A		
Pin contact short	182.891.000.301.000	16	80	70	119	0.21
Pin contact long	182.892.000.301.000					
Socket contact	172.891.100.201.000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

¹ Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K ² Definition max. continuous current see page 197

MODULE 2 CONTACTS



ODU SPRINGTAC® (contacts with springwire technology)



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 [183](#).

Contact diameter: 8 mm
Mating cycles¹: minimum 100,000
Current-carrying capacity²: 142 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page [197](#)).
- When automatic docking due to the high mating forces and the high cable cross sections we recommend the assembly in the ODU-MAC® P+ [Power] frame (see page [36](#)).
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information³

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

Voltage information acc. to MIL⁴

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

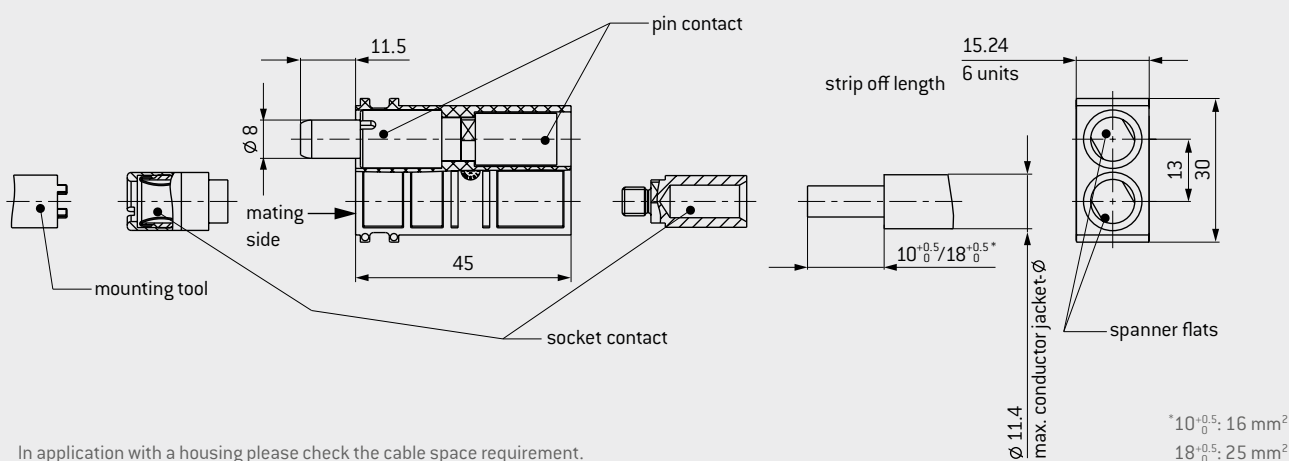
Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact spring	CuSn alloy
Contact plating	Ag

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 [197](#) ³ IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ⁴ See page [194](#)

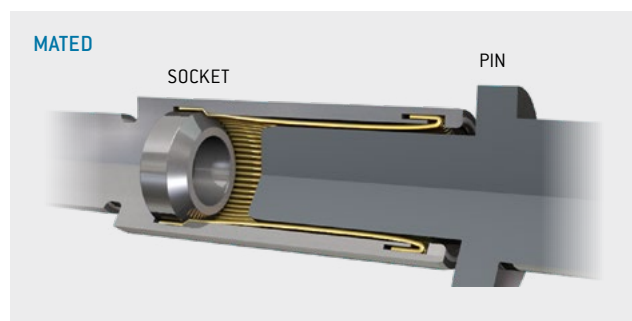
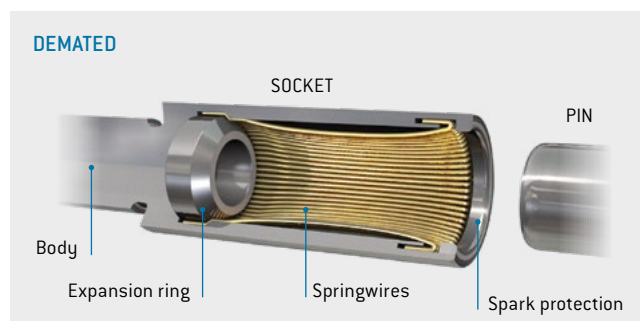


INSULATOR PIN AND SOCKET



ODU SPRINGTAC® (CONTACTS WITH SPRINGWIRE TECHNOLOGY)

ODU SPRINGTAC® offers a large number of contact surfaces. The wires are mounted individually and connected with a machined body. The springwires contact and flex independently from one another (see also page 20).



Module 2 contacts	Part number
Insulator	611.173.102.923.000

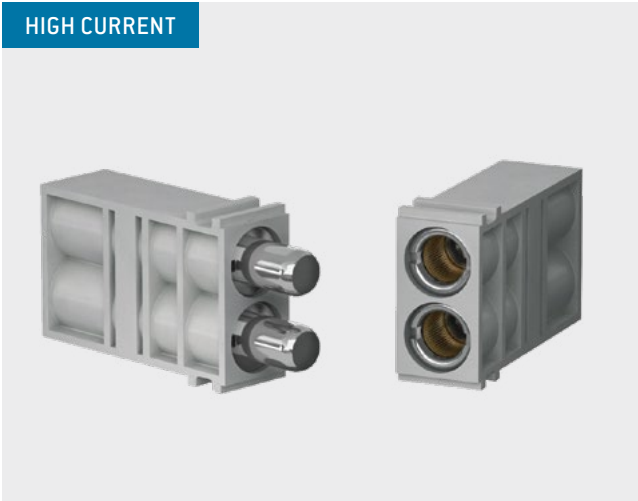
Description	Part number	Conductor cross-section ¹ mm²	Nominal current ²		Max. continuous current ³ Single contact A	Contact resistance mΩ
			Single contact A	Module fully equipped A		
Pin contact	181.873.100.200.000	25	100	95	142	0.2
Socket contact	170.045.100.201.000					
Pin contact	181.872.100.200.000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

¹ Extra fine wire acc. to IEC 60228:2004 [VDE 0295:2005; class 5], class 5 ² Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K ³ Definition max. continuous current see page 197.

MODULE 2 CONTACTS



ODU LAMTAC® (contacts with lamella technology)



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 [183](#).

Contact diameter: 8 mm
Mating cycles¹: minimum 10,000
Current-carrying capacity²: 154 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page [197](#)).
- When automatic docking due to the high mating forces and the high cable cross sections we recommend the assembly in the ODU-MAC® P+ [Power] frame (see page [36](#)).
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information³

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

Voltage information acc. to MIL⁴

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

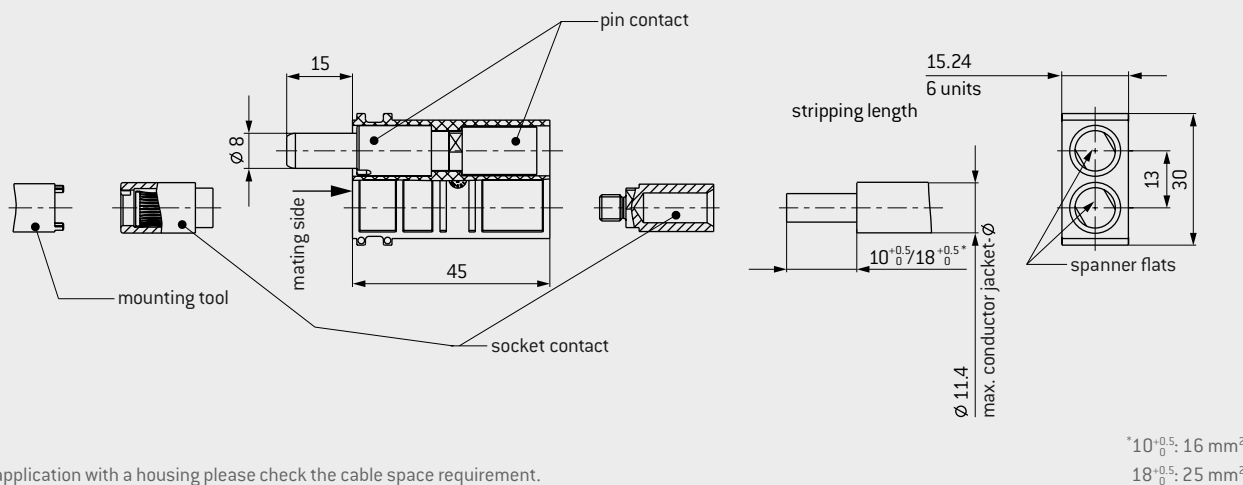
Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact lamella	CuBe alloy
Contact plating	Ag

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 [197](#) ³ IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ⁴ See page [194](#)

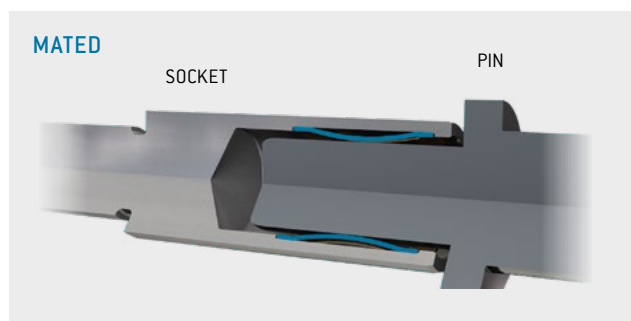
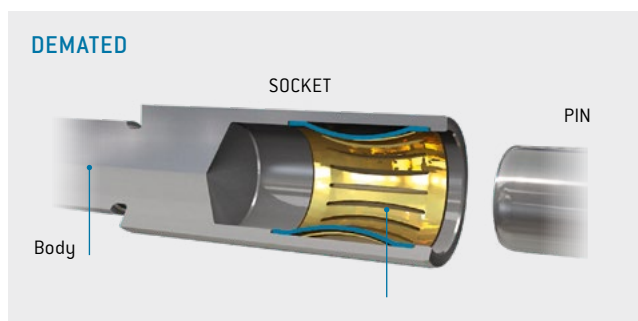


INSULATOR PIN AND SOCKET



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 (see also page 21).



Module 2 contacts	Part number
Insulator	611.161.102.923.000

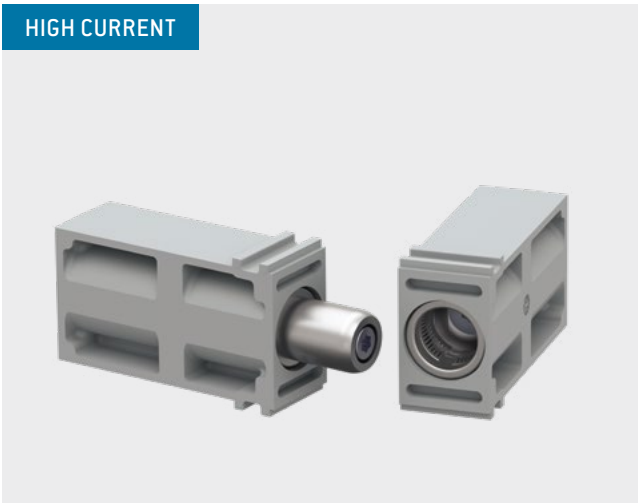
Description	Part number	Conductor cross-section ¹ mm ²	Nominal current ²		Max. continuous current ³ Single contact A	Contact resistance mΩ
			Single contact A	Module fully equipped A		
Pin contact	181.874.100.200.000	25	105	100	154	0.2
Socket contact	178.874.100.201.000					
Pin contact	181.875.100.200.000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

¹ Extra fine wire acc. to IEC 60228:2004 (VDE 0295:2005; class 5), class 5 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K ³ Definition max. continuous current see page 197

MODULE 1 CONTACT



ODU LAMTAC® (contacts with lamella technology)



Torque wrench
PART NUMBER: 598.054.006.000.000
Locking torque: 2.2 Nm

Bit Torx TX20
PART NUMBER: 598.054.105.000.000
For an overview of all tools please see from page [183](#).

Contact diameter: 10 mm or 12 mm
Mating cycles¹: minimum 10,000
Current-carrying capacity²: 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 (see page [197](#)).
- When automatic docking due to the high mating forces and the high cable cross sections we recommend the assembly in the ODU-MAC® P+ [Power] frame (see page [36](#)).
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information³

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

Voltage information acc. to MIL⁴

Operating voltage	
Ø 10 mm	2,000 V
Ø 12 mm	1,500 V
Test voltage	
Ø 10 mm	6,000 V
Ø 12 mm	4,500 V

Mechanical data

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

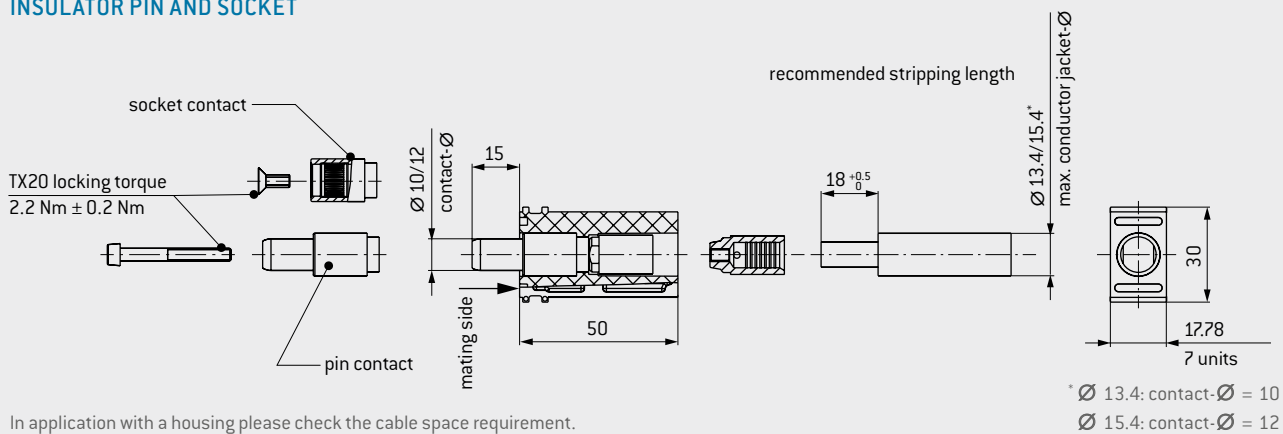
Materials

Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact lamella	CuBe alloy
Contact plating	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 [197](#) ³ IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ⁴ See page [194](#)

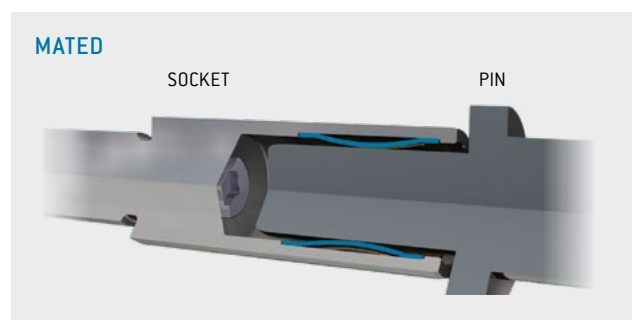
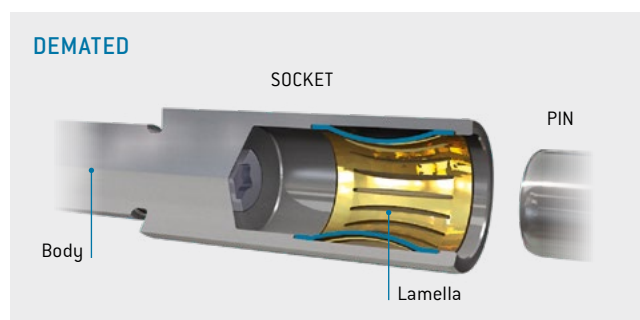


INSULATOR PIN AND SOCKET



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 (see also page 21).



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

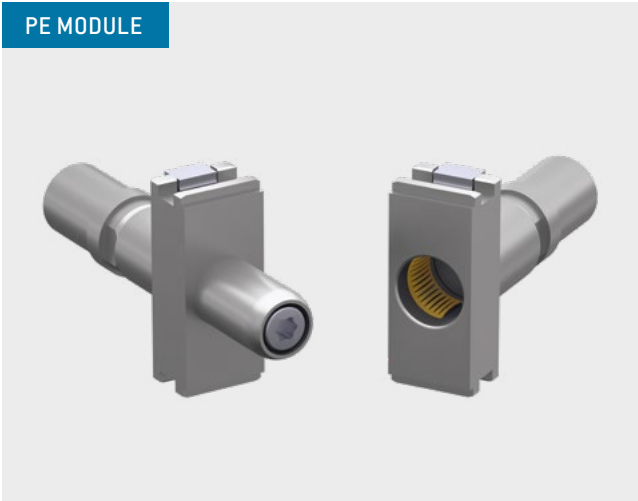
Description	Part number	Conductor cross-section ¹ mm ²	Nominal current ² Single contact A	Max. continuous current ³ Single contact A	Contact resistance mΩ
Pin contact-Ø 10 mm	181.878.100.200.001	35	125	180	0.15
Socket contact-Ø 10 mm	178.878.100.201.001				
Pin contact-Ø 10 mm	181.946.100.200.001	25	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; class 5], class 5 ² Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K ³ Definition max. continuous current see page 197

PE MODULE 1 CONTACT



Flexible protective grounding for all conductive housings and docking frame versions



Contact diameter: 10 mm
Mating cycles¹: 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.
- When automatic docking due to the high mating forces and the high cable cross sections we recommend the assembly in the ODU-MAC® P+ (Power) frame (see page 36).
- Novel torx cone connection for optimized power transmission
- Crimp information see page 174



REQUIRED ASSEMBLY TOOL
For screwing and releasing the contacts

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

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

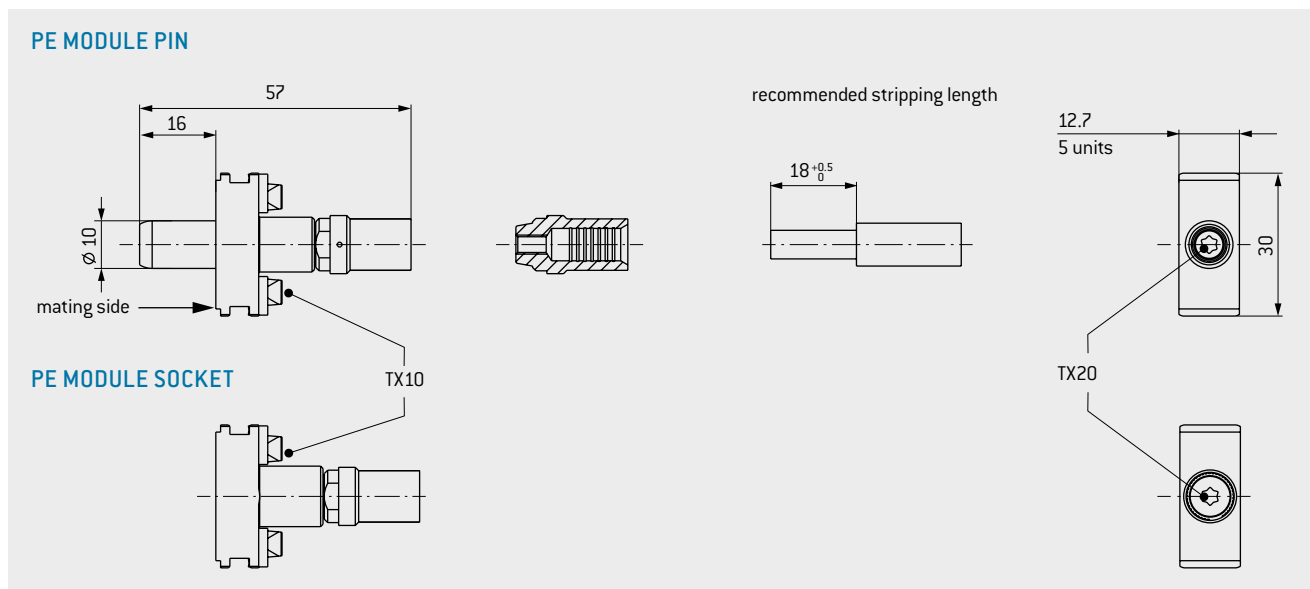
Bit torx TX 10 for PE module
PART NUMBER: 598.054.104.000.000

For an overview of all tools please see from page 183.

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

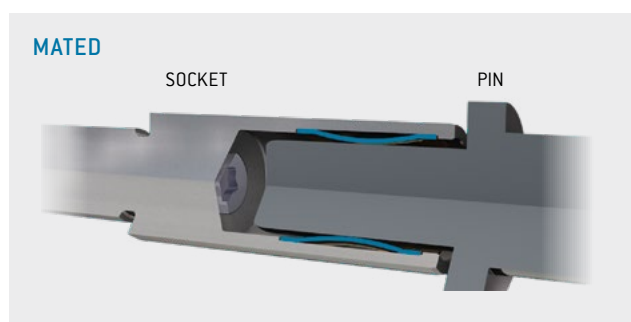
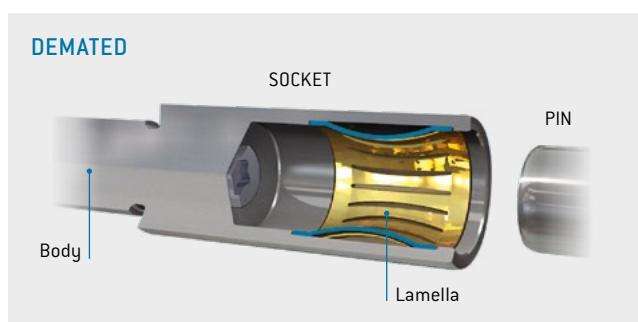
Nominal cross-section of the current-carrying conductor mm ²	Minimum cross-section of the protective conductor in accordance with DIN EN 61984:2009 mm ²
10	10
16, 25, 35	16
50	25

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.



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 0.1Ω required by the standard is easily achieved.



Description	Part number	Conductor cross-section ¹ mm ²	Nominal current ² Single contact A	Impulse voltage kV	Contact resistance mΩ
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 mm ²	On request				

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

² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) 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 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 [183](#).

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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page [197](#)).
- Crimp information see page [174](#)

TECHNICAL DATA

Voltage information¹

Operating voltage	2,500 V	1,000 V
Rated impulse voltage	10,000 V	8,000 V
Degree of pollution	2	3

Voltage information acc. to MIL²

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

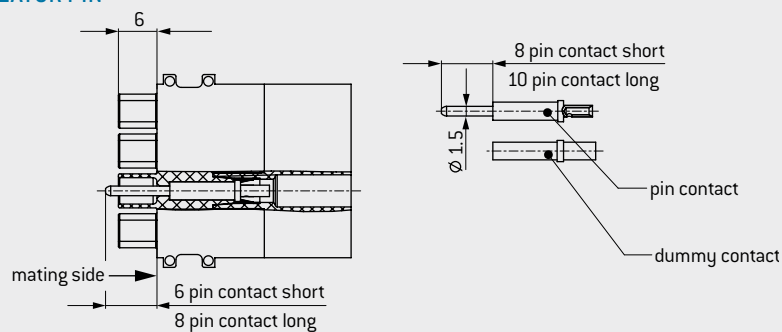
Materials

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

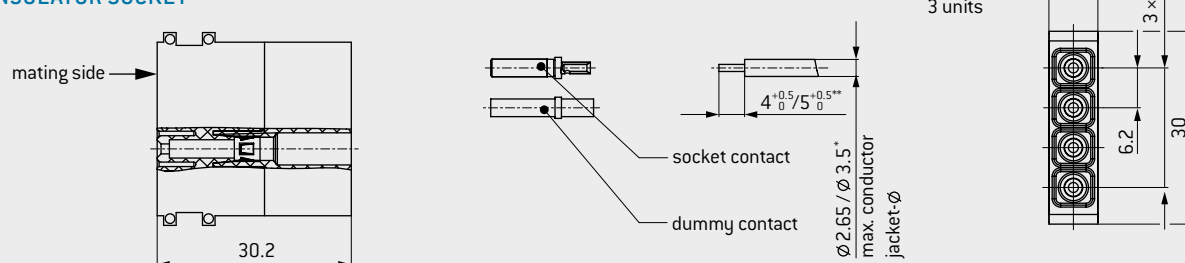
¹ IEC 60664-1:2007 (VDE 0110-1:2008) see page [191](#) ² See page [194](#)



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

* $\leq \varnothing 2.65$ removal possible / $\leq \varnothing 3.5$ 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

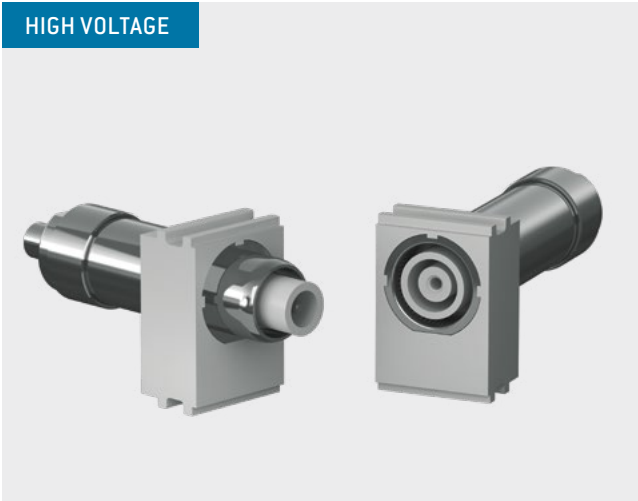
Description	Part number	Conductor cross-section	Termination	Nominal current ²		Max. continuous current ³	Contact resistance
		mm ²	AWG	Single contact A	Module fully equipped A	Single contact A	mΩ
Pin contact short ¹	180.363.000.307.000	1.5	14	18	14.5	27	0.95
Pin contact long ¹	180.383.000.307.000			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



¹ Non-magnetic version on request ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K

³ Definition max. continuous current see page 197

MODULE 1 CONTACT



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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2013 (see page 197).
- Center contact soldered
- Outer contact crimped
- Recommended cable construction see page 79

TECHNICAL DATA

Voltage information¹

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

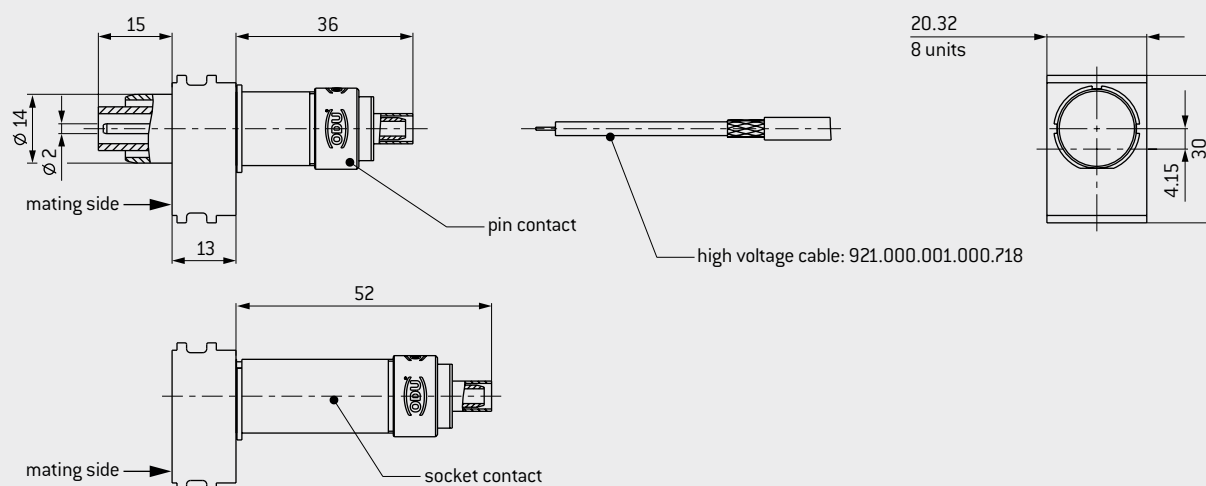
Materials

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

¹IEC 60664-1:2007 (VDE 0110-1:2008) see page 191

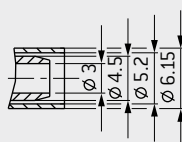


INSULATOR FOR PIN AND SOCKET

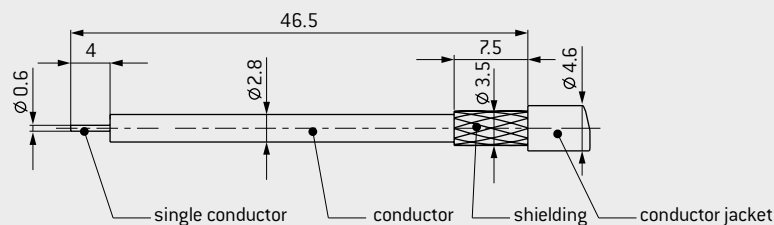


In application with a housing please check the cable space requirement.

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 / mm ²	Nominal current A	Contact resistance average mΩ
Pin contact	122.138.001.201.000	082.000.039.106.000	22 / 24	3.5	0.4
Socket contact	122.138.002.201.000				
High voltage line ¹	921.000.001.000.718		0.25		
Crimping tool for shielding sleeve	080.000.039.000.000				

¹ Partial discharge test carried out with recommended cable construction.

MODULE 4 CONTACTS FOR 50 Ω



RF-SIGNAL (COAX)



Mating cycles: minimum 60,000



Non-magnetic

Frequency range¹: 0–1.3 GHz

TECHNICAL NOTES

- Crimp information see page [174](#)

TECHNICAL DATA

Frequency range ¹	0–1.3 GHz
Insulation resistance	> 100 G Ω

Voltage information acc. to MIL²

Operating voltage	350 V
Test voltage	1,050 V

Mechanical data

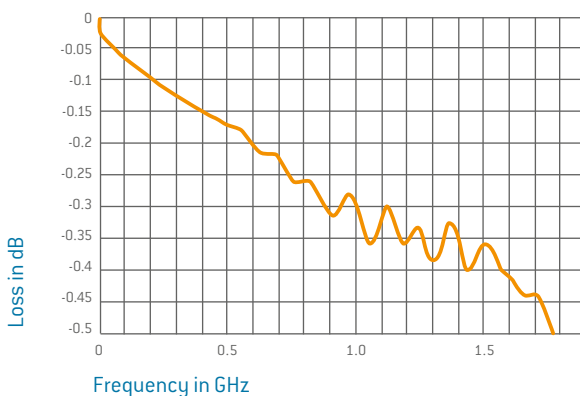
Total mating force (average)	17.8 N / Module
Total sliding force (average)	15.3 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 60,000

Materials

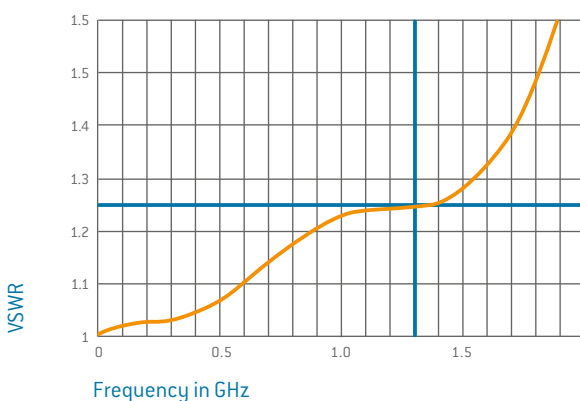
Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Contact body / Insulator	Cu alloy / PTFE
Contact spring	CuSn / CuBe alloy
Contact plating	Au over CuSnZn

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS¹

Transmission lost



Voltage standing-wave ratio VSWR



¹ Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 x 5 cm conductor length.

² See from page [194](#)

REMOVAL TOOL I (STRAIGHT)



Removal of the already assembled contact (incl. cable)

PART NUMBER: 087.170.139.000.000

REMOVAL TOOL I (ANGLED)



Removal of the already assembled contact (incl. cable)

PART NUMBER: 087.170.365.000.000

REMOVAL TOOL II



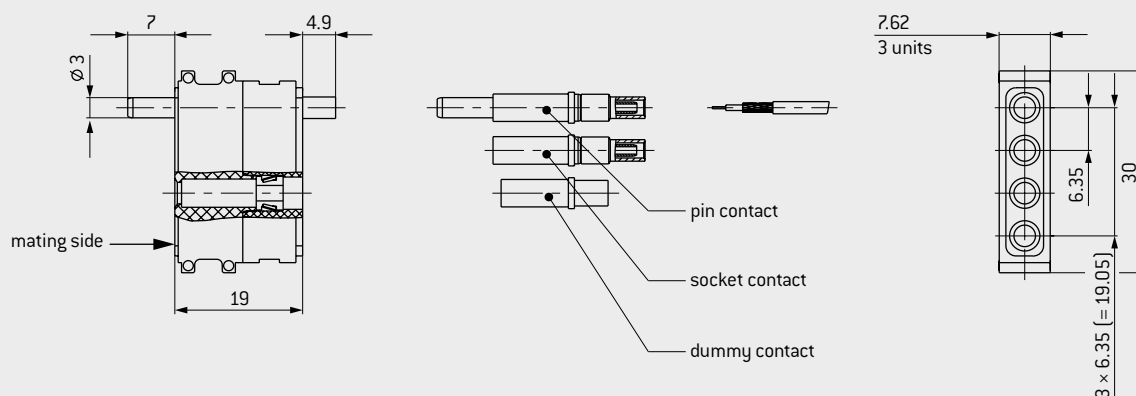
Removal of the still unassembled contact (without cable, which may have to be cut off)

PART NUMBER: 087.611.001.001.000

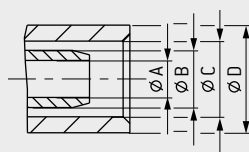
For an overview of all tools please see from page [183](#).



INSULATOR FOR PIN AND SOCKET

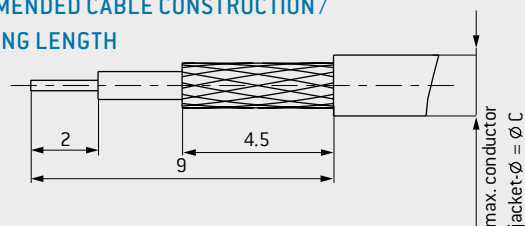


CABLE TERMINATION



Center contact: soldered, outer contact: crimped

RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 4 contacts	Part number
Insulator	611.149.104.923.000
Dummy contact	021.341.127.923.000

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

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

MODULE 2 CONTACTS FOR 50 Ω WITH SMA TERMINATION



RF-SIGNAL (COAX)



Mating cycles: minimum 100,000
Frequency range¹: 0–9.0 GHz

TECHNICAL DATA

Frequency range¹ 0–9.0 GHz
Insulation resistance > 100 G Ω

Voltage information acc. to MIL²

Operating voltage 350 V
Test voltage 1,050 V

Mechanical data

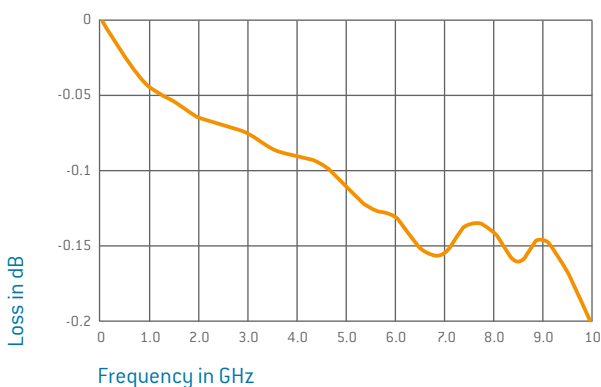
Total mating force (average) 11.9 N / Module
Total sliding force (average) 8.5 N / Module
Operating temperature –40 °C to +125 °C
Mating cycles minimum 100,000

Materials

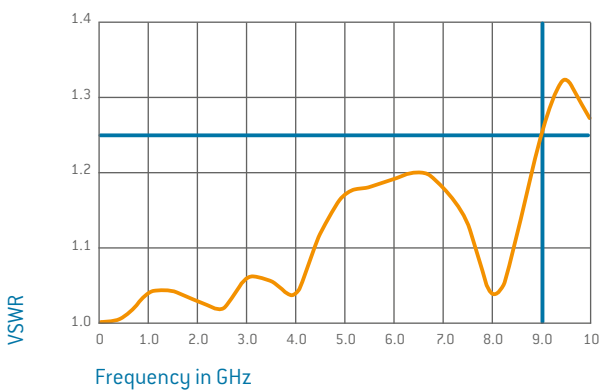
Insulator Thermoplastic fiber glass reinforced acc. to UL 94
Contact body / Insulator Cu alloy / PTFE
Contact spring CuSn / CuBe alloy
Contact finish
Center contact Au over Ni
Outer contact Ni

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS¹

Transmission lost



Voltage standing-wave ratio VSWR



REMOVAL TOOL



PART NUMBER: 087.122.349.000.000

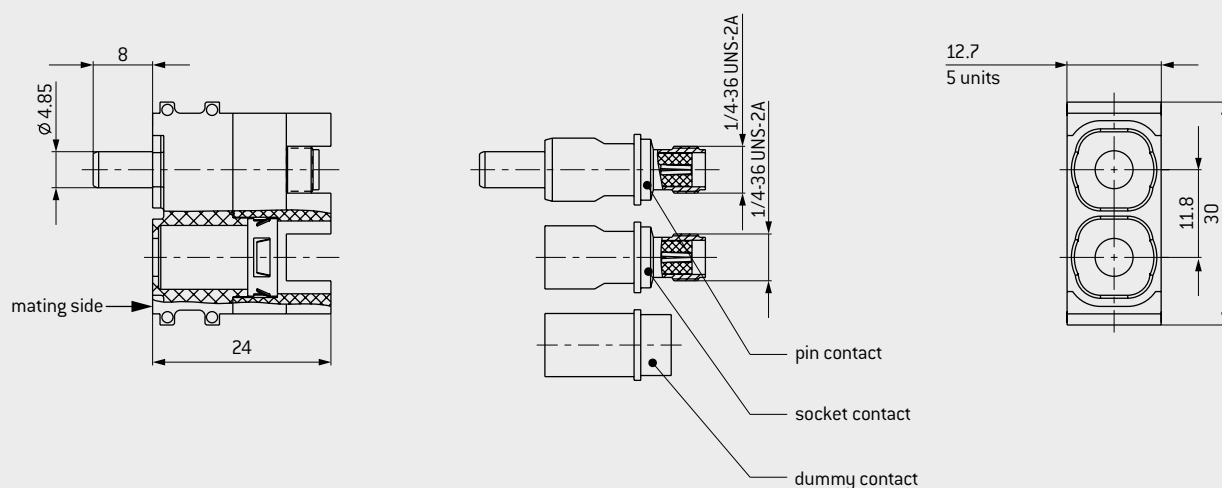
For an overview of all tools please see from page [183](#).

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 [194](#)



INSULATOR PIN AND SOCKET



Module 2 contacts	Part number
Insulator	611.152.102.923.000
Dummy contact	021.341.177.300.000

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

MODULE 2 CONTACTS FOR 50 Ω



RF-SIGNAL (COAX)



Mating cycles: minimum 100,000
Frequency range¹: 0–2.4 GHz

TECHNICAL NOTES

- Crimp information see page [174](#)

TECHNICAL DATA

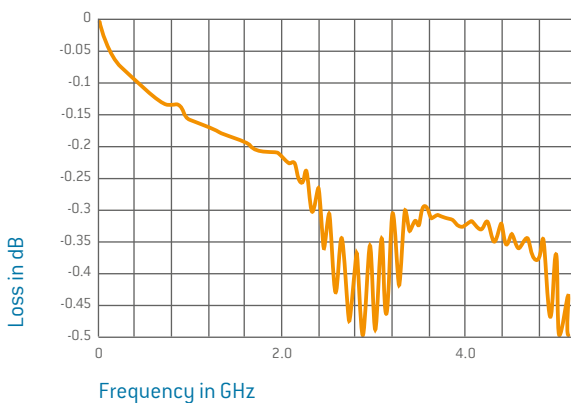
Frequency range ¹	0–2.4 GHz
Insulation resistance	> 100 G Ω

Voltage information acc. to MIL²

Operating voltage	400 V
Test voltage	1,200 V

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS¹

Transmission lost



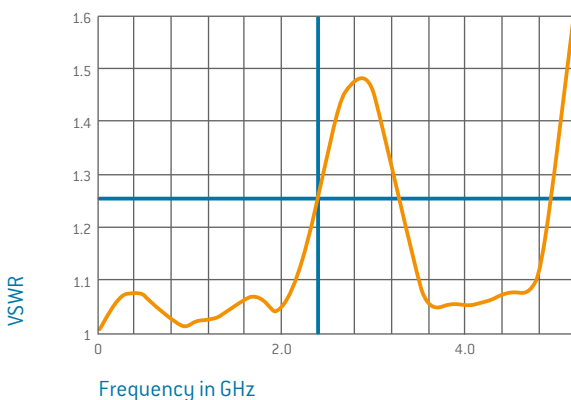
Mechanical data

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

Voltage standing-wave ratio VSWR



REMOVAL TOOL



PART NUMBER: 087.170.391.000.000

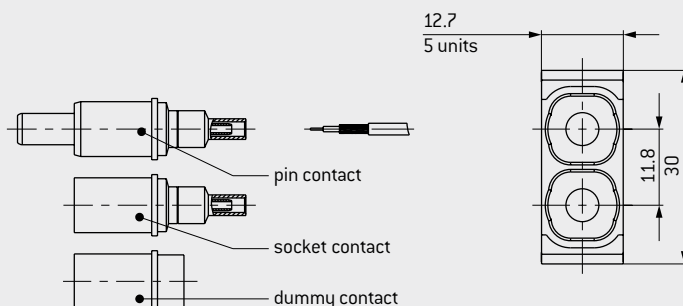
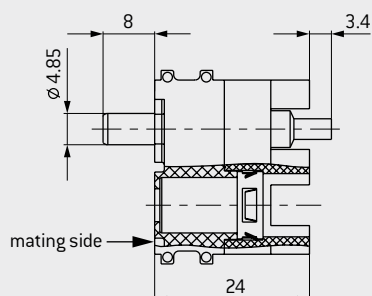
For an overview of all tools please see from page [183](#).

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.

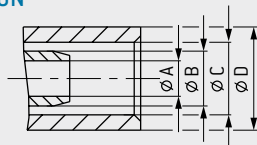
² See from page [194](#)



INSULATOR FOR PIN AND SOCKET

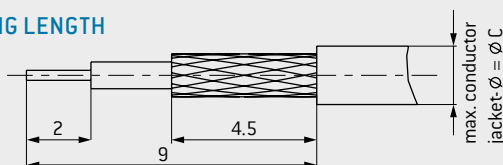


CABLE TERMINATION



Center contact: soldered, outer contact: crimped

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	Characteristic impedance Ω	Frequency range GHz	Cable ¹	A	B	C	D	Part number crimp inserts
Pin contact	122.346.001.207.000	50	1.25	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Pin contact	122.346.003.207.000		2.1	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.346.005.207.000			RG 122 [2YCY 0.4/2.5-75 Ω]	2.75	3.7	4.2	5	082.000.039.104.000
Pin contact	122.346.007.207.000		2.4	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
Pin contact	122.346.009.207.000			RG 223	3.15	4.5	5.5	6.15	082.000.039.108.000
Pin contact	122.346.011.207.000		2.1	G 02232 D (H+S) RG 316 D	1.75	2.7	3.5	4.3	082.000.039.103.000
Socket contact	122.346.002.207.000	50	1.25	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Socket contact	122.346.004.207.000		2.1	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Socket contact	122.346.006.207.000			RG 122 [2YCY 0.4/2.5-75 Ω]	2.75	3.7	4.2	5	082.000.039.104.000
Socket contact	122.346.008.207.000		2.4	RG 58	3.15	4.5	5.2	6.15	082.000.039.106.000
Socket contact	122.346.010.207.000			RG 223	3.15	4.5	5.5	6.15	082.000.039.108.000
Socket contact	122.346.012.207.000		2.1	G 02232 D (H+S) RG 316 D	1.75	2.7	3.5	4.3	082.000.039.103.000
Crimping tool for shielding sleeve	080.000.039.000.000								

¹ Special lines on request

MODULE 2 CONTACTS FOR 50 Ω AND HIGH VOLTAGE



RF-SIGNAL (COAX)



Mating cycles: minimum 100,000



Non-magnetic

Frequency range¹: 0–2.8 GHz

TECHNICAL NOTES

- Crimp information see page [174](#).

TECHNICAL DATA

Frequency range ¹	0–2.8 GHz
Insulation resistance	> 100 G Ω

Voltage information acc. to MIL²

Operating voltage	850 V
Test voltage	2,600 V

Mechanical data

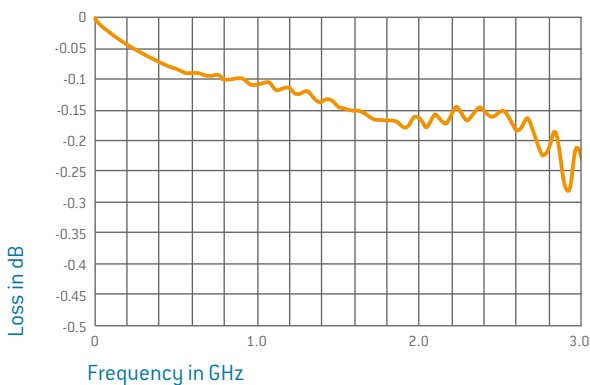
Total mating force (average)	13.9 N / Module
Total sliding force (average)	9.9 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

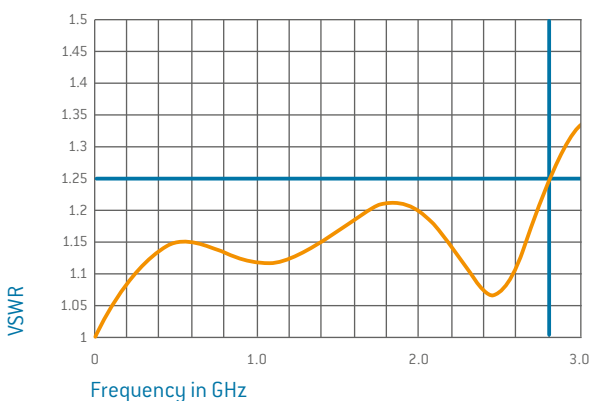
Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Contact body	Cu alloy / PTFE
Contact spring	CuSn / CuBe alloy
Contact plating	Au over CuSnZn

HIGH FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS¹

Transmission lost



Voltage standing-wave ratio VSWR



REMOVAL TOOL



PART NUMBER: 087.170.391.000.000

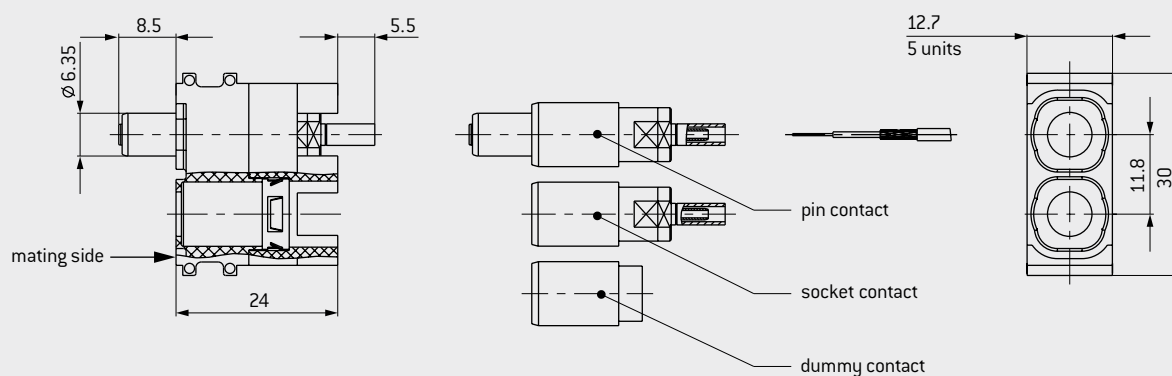
For an overview of all tools please see from page [183](#).

¹ Loss levels depend on used conductor type at a VSWR of 1.25. Further are available on request. Tested with per 2 x 5 cm conductor length.

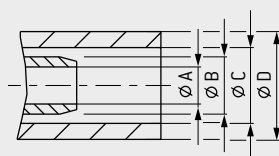
² See from page [194](#)



INSULATOR FOR PIN AND SOCKET

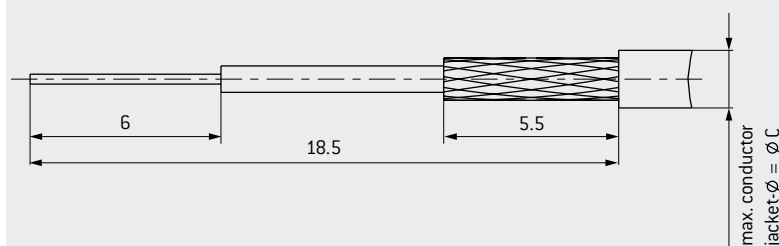


CABLE TERMINATION



Center contact: soldered, outer contact: crimped

RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 2 contacts	Part number
Insulator	611.155.102.923.000
Dummy contact	021.341.179.923.000

Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable ¹	A	B	C	D	Part number crimp inserts
Pin contact	122.126.001.270.000	50	0.3	RG 178 / RG 196	1.1	1.7	2.25	3.2	082.000.039.101.000
Pin contact	122.126.003.270.000		2.0	RG 174 / RG 188 / RG 316	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.126.013.270.000		2.8	RG 223	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	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



RF-SIGNAL (COAX)



Mating cycles: minimum 100,000
Frequency range¹: 0–3.0 GHz

TECHNICAL NOTES

- Crimp information see page [174](#)

TECHNICAL DATA

Frequency range ¹	0–3.0 GHz
Insulation resistance	> 100 G Ω

Voltage information acc. to MIL²

Operating voltage	475 V
Test voltage	1,425 V

Mechanical data

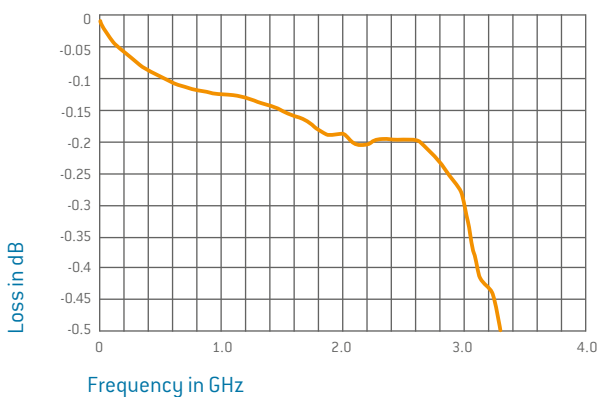
Total mating force (average)	13.3 N / Module
Total sliding force (average)	9.5 N / Module
Operating temperature	–40 °C to +125 °C
Mating cycles	minimum 100,000

Materials

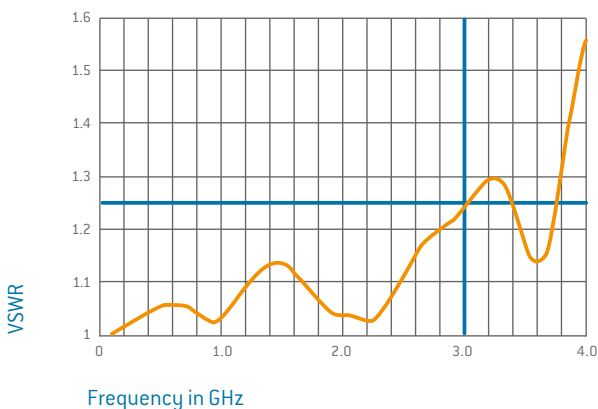
Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
Contact body	Cu alloy/PTFE
Contact spring	CuSn / CuBe alloy
Contact plating	
Center contact	Au over Ni
Outer contact	Ni

HIGH FREQUENCY CHARACTERISTICS FOR 75 Ω COAX CONTACTS¹

Transmission loss



Voltage standing-wave ratio VSWR



REMOVAL TOOL



PART NUMBER: 087.170.391.000.000

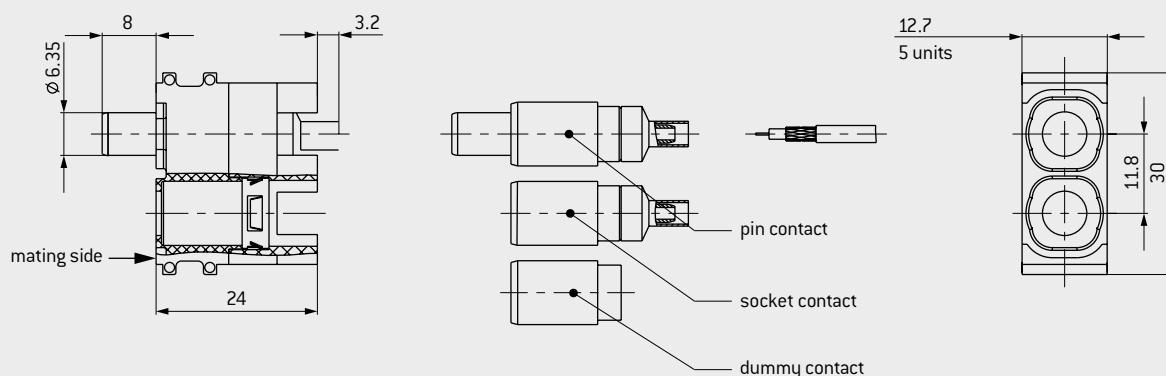
For an overview of all tools please see from page [183](#).

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.

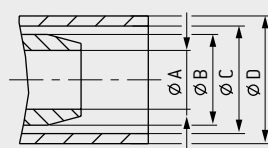
² See from page [194](#)



INSULATOR FOR PIN AND SOCKET

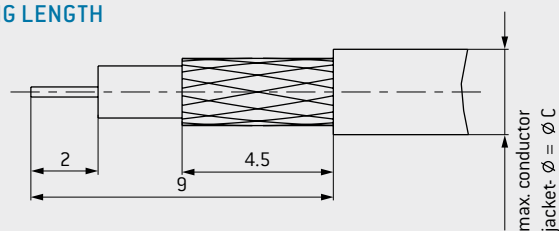


CABLE TERMINATION



Center contact: soldered, outer contact: crimped

RECOMMENDED CABLE CONSTRUCTION / STRIPPING LENGTH



Module 2 contacts	Part number
Insulator	611.155.102.923.000
Dummy contact	021.341.179.923.000

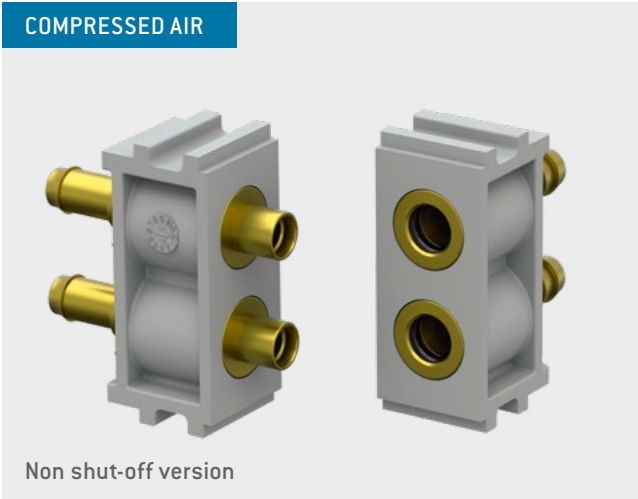
Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable ¹	A	B	C	D	Part number crimp inserts
Pin contact	122.348.003.207.000	75	3.0	RG 179 / RG 187	1.75	2.7	3.2	3.8	082.000.039.102.000
Pin contact	122.348.007.207.000		0.55	G 03233 (H+S)	3.15	4.5	5.2	6.15	082.000.039.106.000
Pin contact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

¹ Special lines on request

MODULE 2 CONTACTS FOR COMPRESSED AIR VALVES



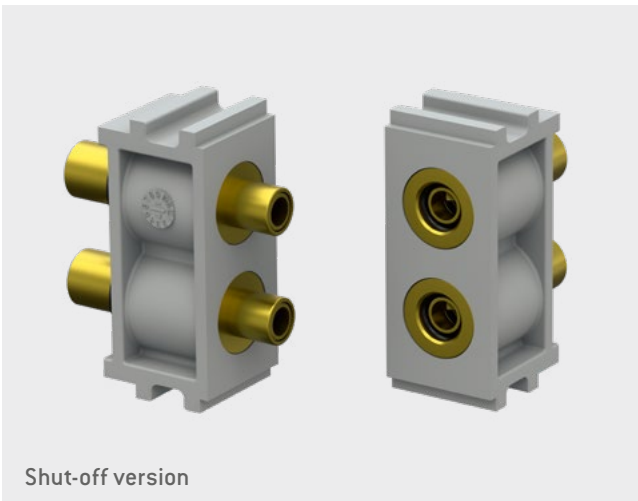
Inner diameter of tube max. 4 mm, Push-in diameter max. 6 mm.



Operating pressure: 20 bar
Mating cycles¹: minimum 100,000
Inner diameter tube: M5 or max. 4 mm

TECHNICAL NOTES

- The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Vacuum model and further termination types on request
- No O₂ model²



TECHNICAL DATA

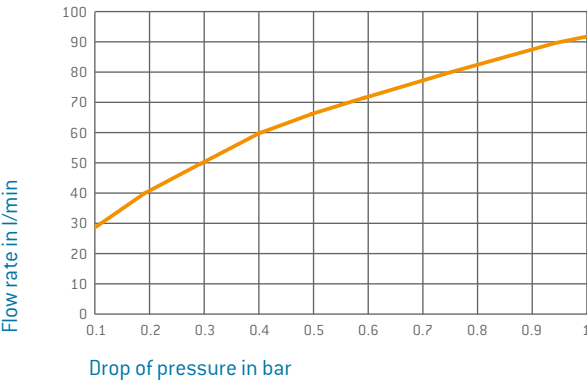
Mechanical data

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

Materials

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

FLOW RATE DIAGRAM



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

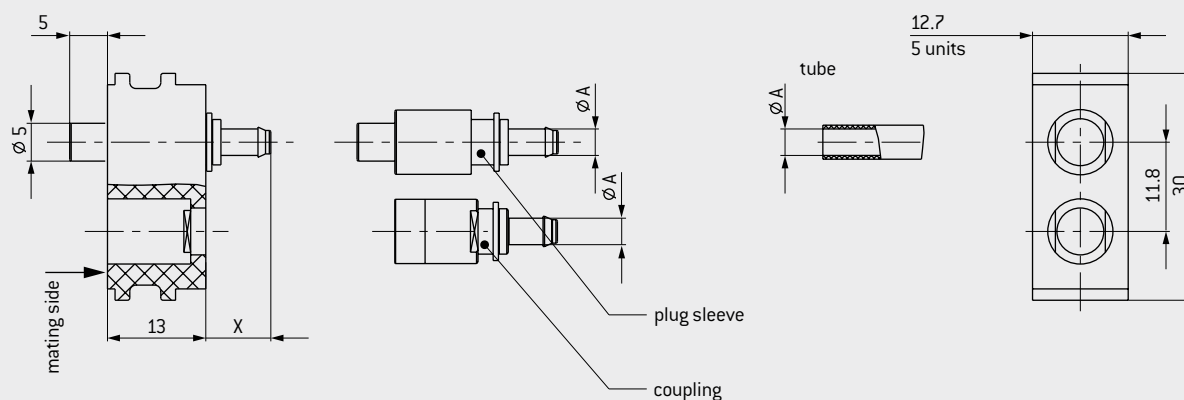
¹ Specified mating cycles possible with regular service intervals

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 98	
				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



Operating pressure: 12 bar
Mating cycles¹: minimum 100,000
Inner diameter tube: max. 6 mm

TECHNICAL NOTES

- The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Vacuum model and further termination types on request
- No O₂ model²

TECHNICAL DATA

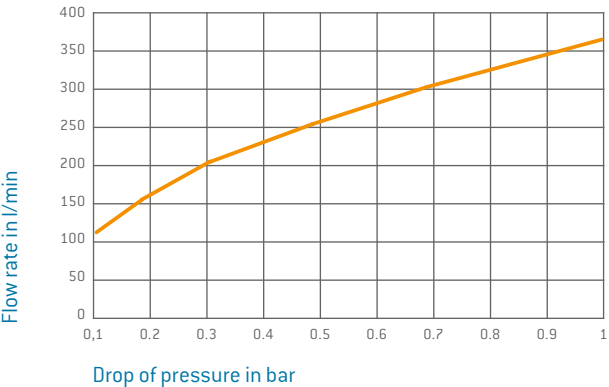
Mechanical data

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

Materials

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

FLOW RATE DIAGRAM



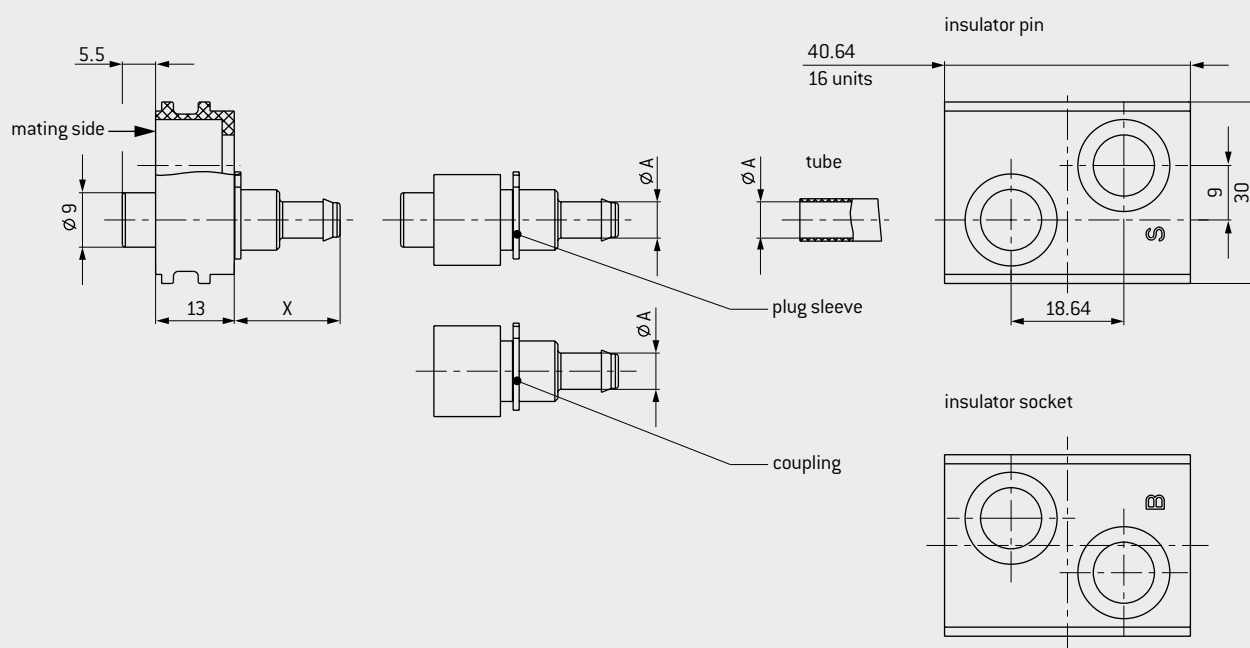
The flow diagram refers to the blocking variant with a maximum gap between socket and pin piece of ≤ 0.5 mm. The pressure reduction increases in the event of a changed gap measurement.

¹ Specified mating cycles possible with regular service intervals

² Not suitable for mixtures containing more than 25 % oxygen content or 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 CONTACTS FOR COMPRESSED AIR VALVES



Inner diameter of tube max. 6 mm



Operating pressure: 12 bar
Mating cycles¹: minimum 100,000
Inner diameter tube: max. 6 mm

TECHNICAL NOTES

- The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- Vacuum model and further termination types on request.
- No O₂ model²

TECHNICAL DATA

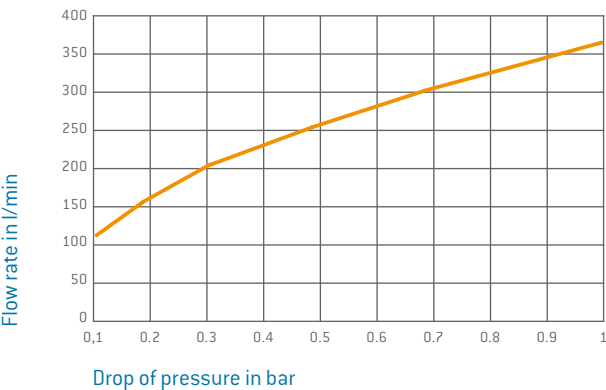
Mechanical data

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

Materials

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

FLOW RATE DIAGRAM



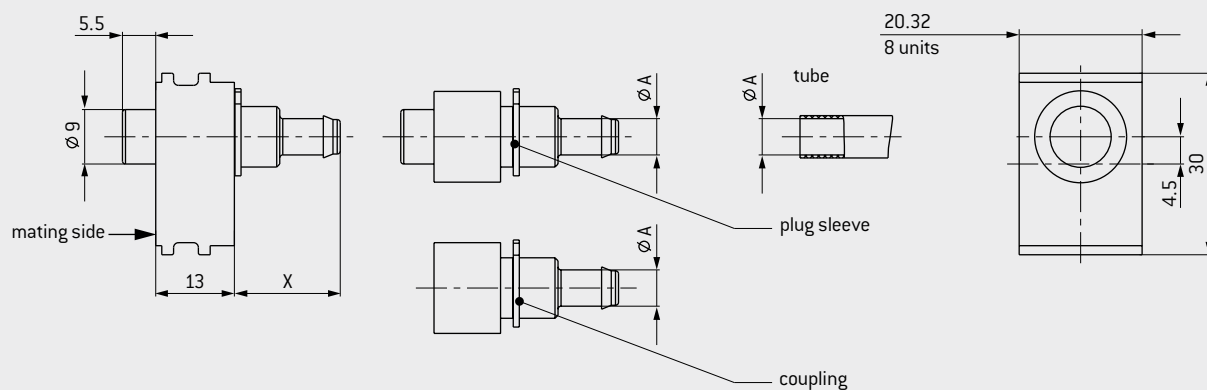
The flow diagram refers to the blocking variant with a maximum gap between socket and pin piece of ≤ 0.5 mm. The pressure reduction increases in the event of a changed gap measurement.

¹ Specified mating cycles possible with regular service intervals

² Not suitable for mixtures containing more than 25 % oxygen content or explosive gases



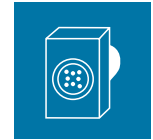
INSULATOR PIN AND SOCKET



Module 1 contacts	Part number
Insulator	611.142.101.923.000

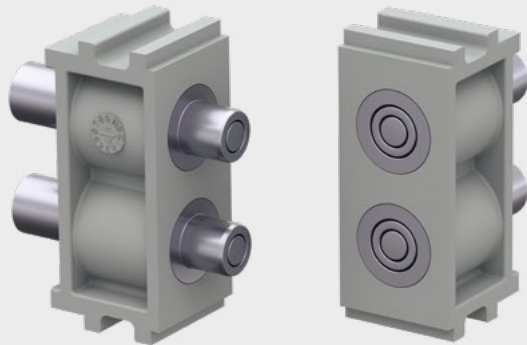
Description	Part number	Dim. A mm	Dim. X mm
Plug sleeve (non shut-off)	196.001.001.300.000	4	15
Plug sleeve (non shut-off)	196.002.001.300.000	6	17.5
Coupling plug (non shut-off)	196.001.003.300.000	4	15
Coupling plug (non shut-off)	196.002.003.300.000	6	17.5
Coupling plug (shut-off)	196.001.002.300.000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

MODULE 2 CONTACTS



Suitable for conducting air, water and other fluids

FLUID MODEL



Two-sided shut-off

Operating pressure: 16 bar low-leakage model
Mating cycles¹: minimum 100,000
Inner diameter tube: M5

TECHNICAL NOTES

- The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- The use of flammable or explosive liquids or gases is not allowed.
- No O₂ model²

TECHNICAL DATA

Mechanical data

Valid max. operating pressure
Tube termination

16 bar
M5 internal thread for
commercially available
Push-in connections

Total mating force (average)
Total sliding force (average)
Operating temperature
Mating cycles¹

64 N / Module
0 N / Module
-40 °C to +125 °C
minimum 100,000

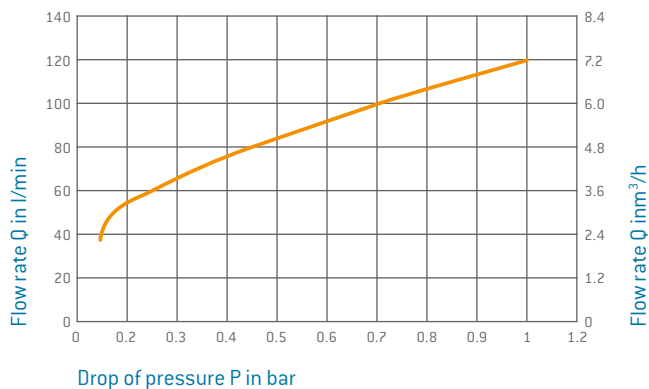
Materials

Insulator

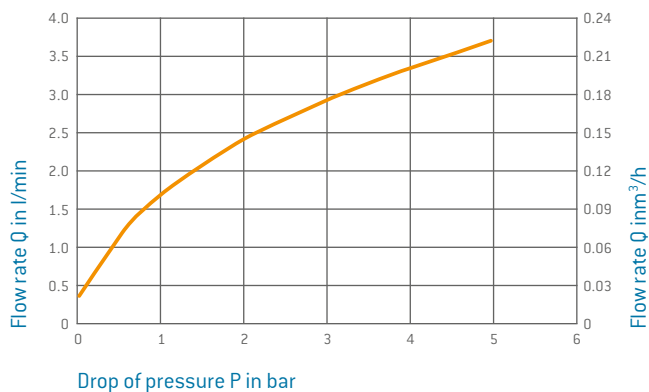
Thermoplastic
fiber glass reinforced
acc. to UL 94
Stainless steel
NBR

Fluid model
Sealing

FLOW RATE DIAGRAM AIR



FLOW RATE DIAGRAM WATER



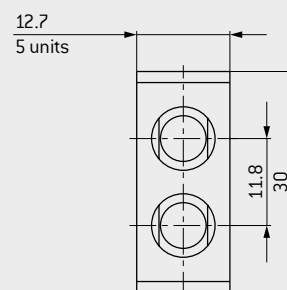
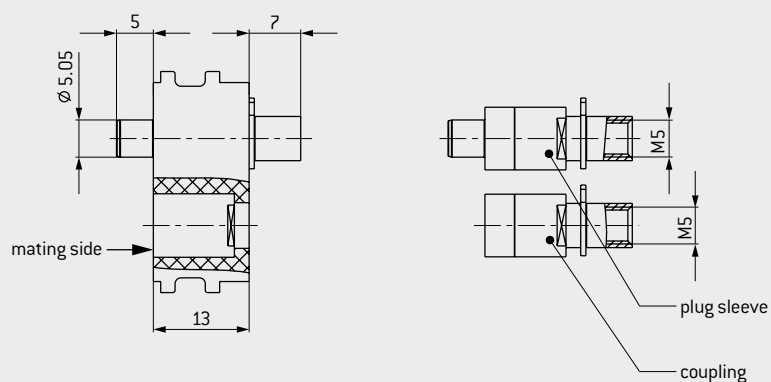
The flow diagram refers to the blocking variant with a maximum gap between socket and pin piece of ≤ 0.5 mm. The pressure reduction increases in the event of a changed gap measurement.

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 [98](#)

Module 2 contacts	Part number
Insulator	611.141.102.923.000

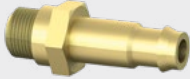
Description	Part number	Termination mm
Plug sleeve (pin piece)	196.025.015.902.001	M5
Coupling plug (socket piece)	196.025.016.902.001	M5

ACCESSORIES M5

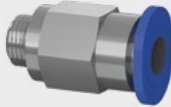


COMPRESSED AIR AND FLUID MODEL

TERMINATION TYPE I
Nipple fitting



TERMINATION TYPE II PUSH-IN
Push-in fitting



L connection



TECHNICAL NOTES

- Tightening torque 1.5 Nm

TECHNICAL DATA

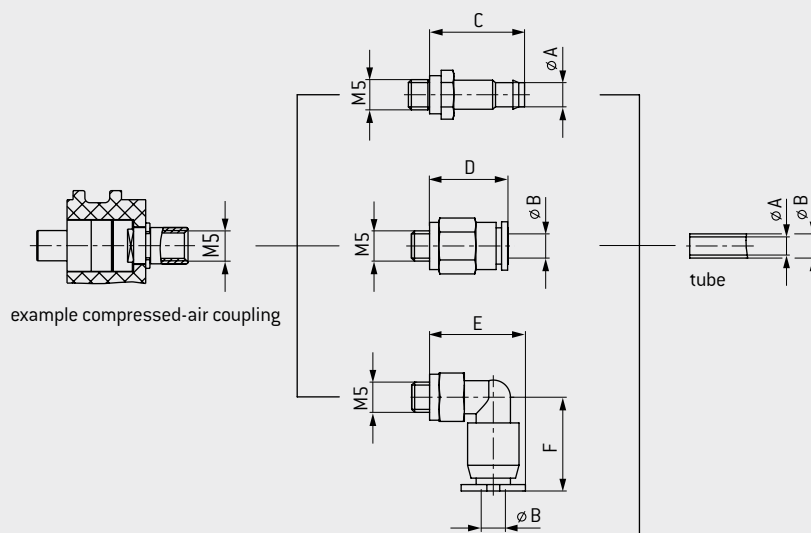
Mechanical data

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

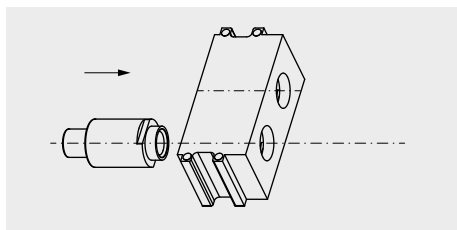
Description	Part number	Dim. A	Dim. B	Dim. C	Dim. D	Dim. E	Dim. F
		Inner diameter of tube mm	Outer diameter of tube mm	incl. sealing washer			mm
Nipple fitting	945.000.001.000.123	2		10.2			
Nipple fitting	945.000.001.000.136	3		14.2			
Nipple fitting	945.000.001.000.137	4		15.8			
Push-in fitting	945.000.001.000.138		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



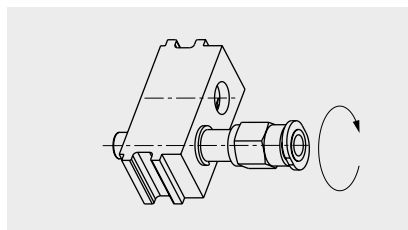
TERMINATION DIMENSIONS, FOR ACCESSORIES USED WITH FLUID COUPLING AND RETAINER RING.



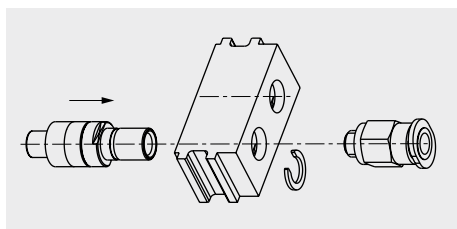
ASSEMBLY OF THE MODEL (DEPENDING ON MODEL)



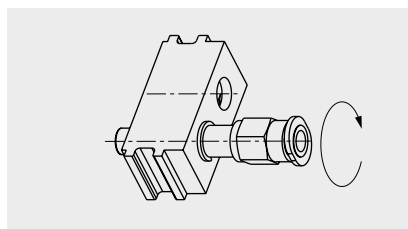
1. Insert model in insulator.



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

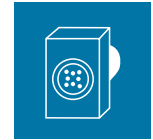


1. Insert model in insulator
and assemble retaining ring.



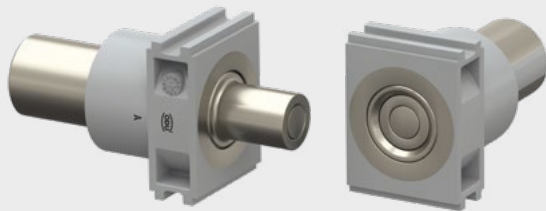
2. Screw termination accessories in model.
Tightening torque 1.5 Nm.

MODULE 1 CONTACTS



Suitable for conducting air, water, and other fluids [e.g., coolants]

FLUID MODEL



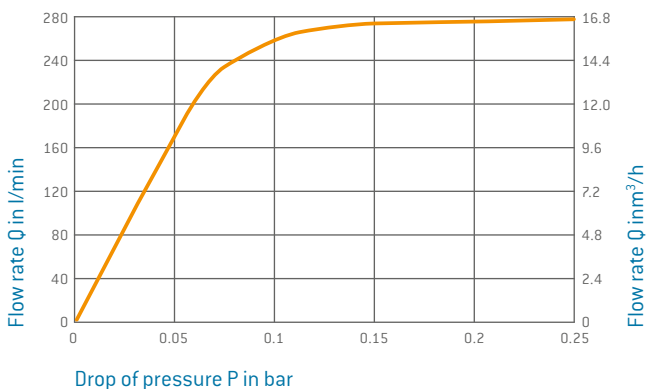
Two-sided shut-off

Operating pressure: 25 bar low-leakage model
Mating cycles¹: minimum 100,000
Inner diameter tube: G1/4

TECHNICAL NOTES

- The contacts are pre-stressed in the mated state. The frame must maintain this pre-stress with a holding device.
- The use of flammable or explosive liquids or gases is not permitted.
- No O₂ model²
- Module cannot be used with docking solutions with M+ or T frames. For S frames we recommend extended guiding pins, and the P+ frame for high pin count.

FLOW RATE DIAGRAM AIR



TECHNICAL DATA

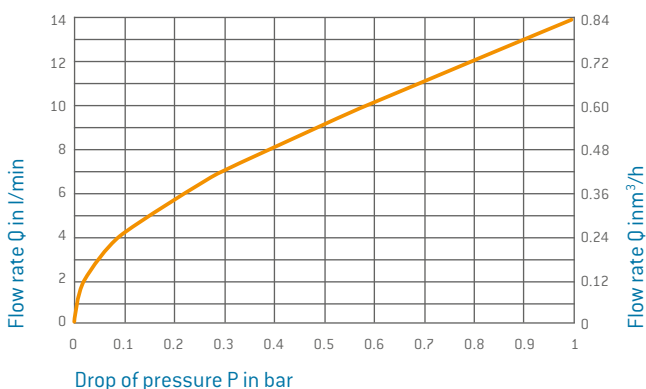
Mechanical data

Valid max. operating pressure	–0.95 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 WATER



REMOVAL TOOL



Removal of the fully assembled coupling (including cable).

PART NUMBER: 087.196.050.000.000

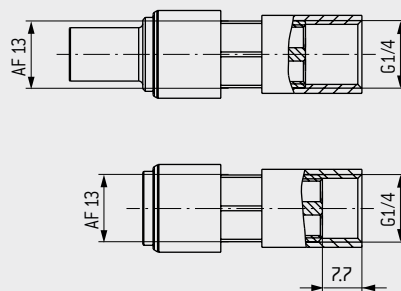
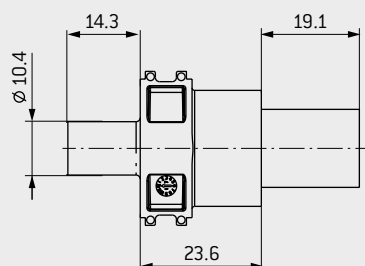
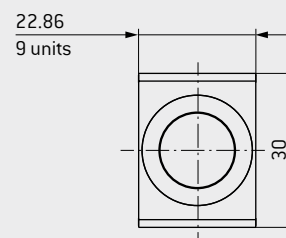
The flow diagram refers to the blocking variant with a maximum gap between socket and pin piece of ≤ 0.5 mm. The pressure reduction increases in the event of a changed gap measurement.

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 [102](#)

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. 102
Coupling plug (shut-off)	196.050.002.380.000	G1/4	

ACCESSORIES G1/4



FLUID MODEL 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

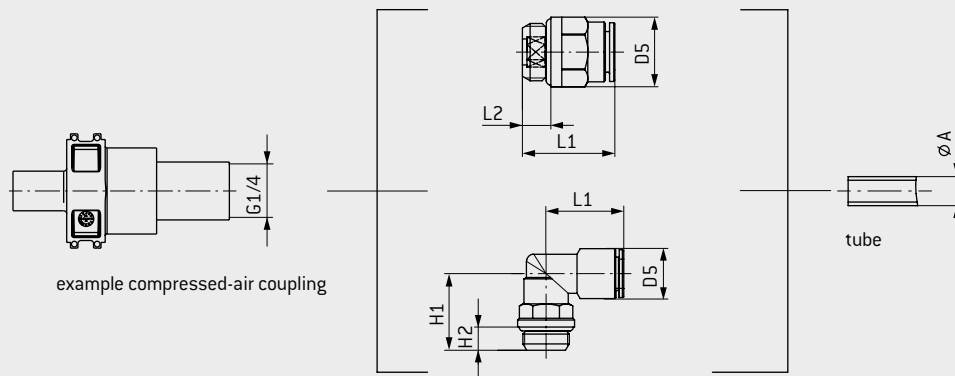
Description	Part number	Dim. A Outer diameter of tube mm	D5 Ø mm	L1 mm	L2 mm	Weight g
ODU-MAC® Push-in fitting G1/4	945.000.001.000.322	6	16	19.5	6.5	12.7
	945.000.001.000.323	8	16	21.5	6.5	13.6
	945.000.001.000.324	10	16	27.5	6.5	17.4
	945.000.001.000.325	12	16	28.5	6.5	26.2

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

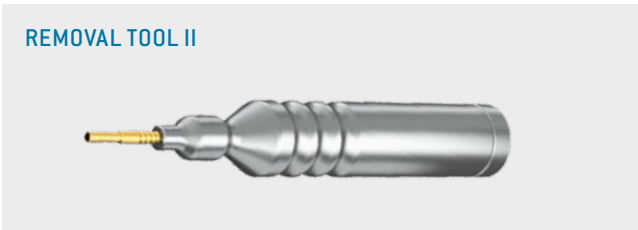
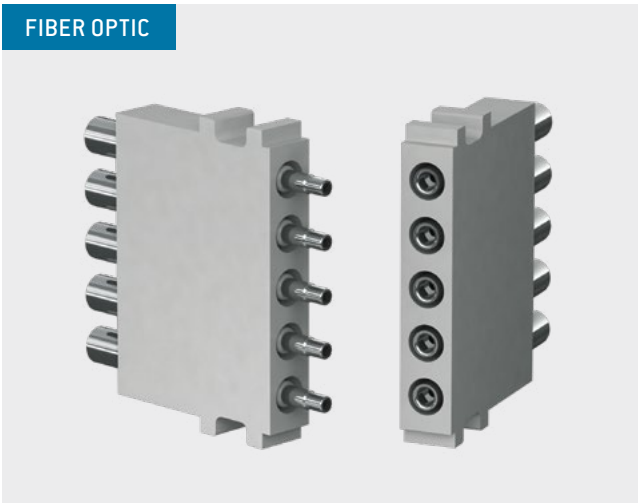
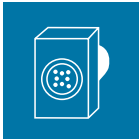
¹ For use in a strain relief housing, the space requirements must be checked.



TERMINATION DIMENSIONS FOR ACCESSORIES USED WITH FLUID COUPLING



MODULE 5 CONTACTS FOR PLASTIC FIBER POF



Removal from front, cutting-off not necessary

PART NUMBER: 087.611.001.002.000

For an overview of all tools please see from page [183](#).

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

TECHNICAL NOTES

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

TECHNICAL DATA

Mechanical data

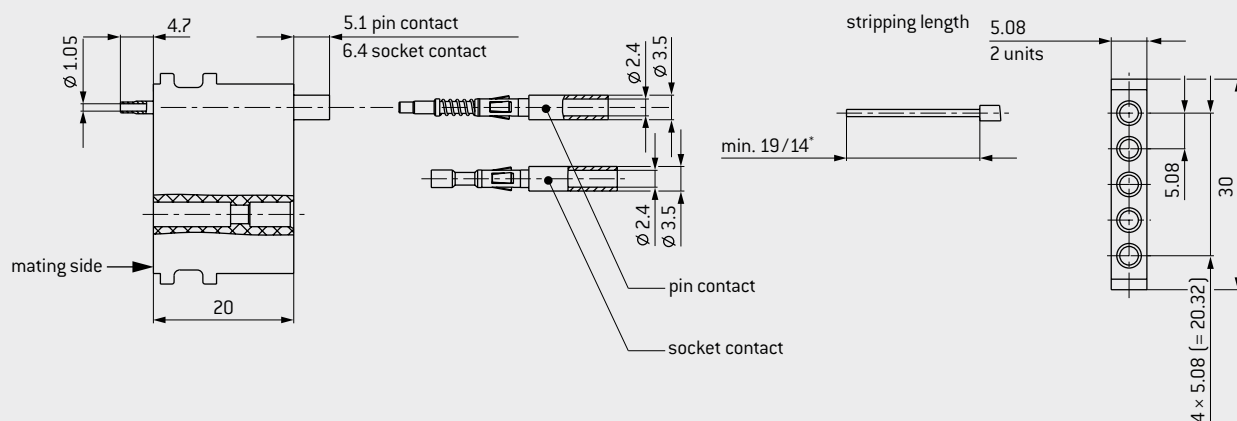
POF (Polymer Optical Fiber)	1 mm
Outer diameter	2.2 mm–2.3 mm
Fiber fastening	Crimp
Insertion loss	
Typical	1.5 dB at 670 nm
During life-time	< 2 dB at 670 nm
Total mating force (average)	< 17.5 N
Operating temperature (depending on fiber)	
Standard fiber	–40 °C to +85 °C
High temperature fiber	–40 °C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

Materials

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



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 μ m	196.503.001.901.000
Pin contact 980 / 1,000 μ m	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

MODULE 2 CONTACTS FOR PLASTIC FIBER POF/MOST



Ferrule
Mating cycles: minimum 100,000
Type of plastic fiber: POF/MOST

TECHNICAL NOTES

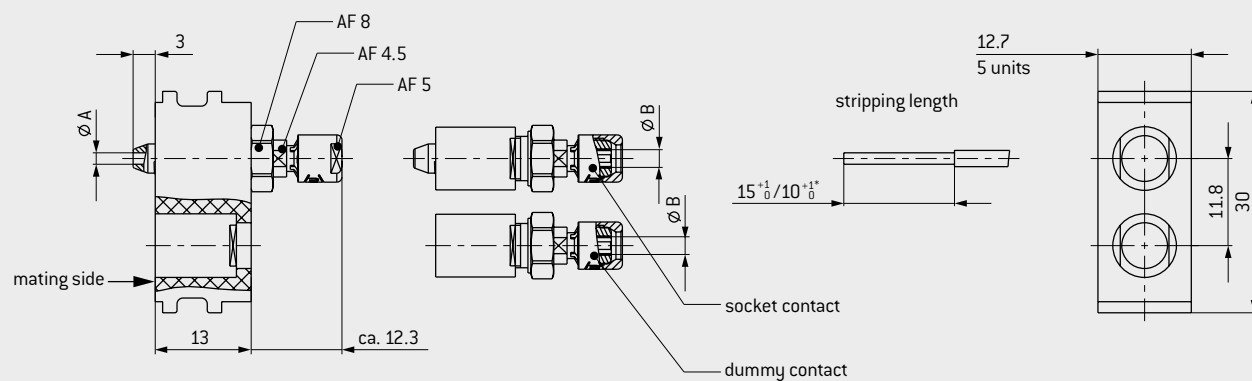
- Conditional with the function, the contacts are pre-stressed in the mated state. This pre-stressing must be maintained by the frame via a holding device.
- Lens connector on request

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}_{-1} pin contact / 10^{+1}_{-1} socket contact

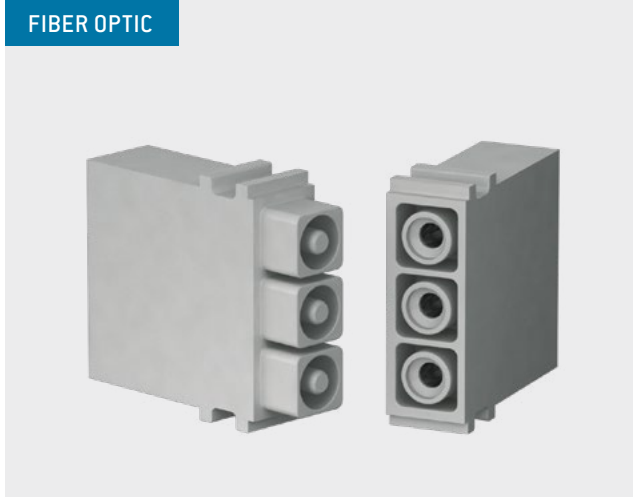
Module 2 contacts	Part number
Insulator	611.141.102.923.000

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		

MODULE 3 CONTACTS FOR FIBER GLASS GOF



FIBER OPTIC



REMOVAL TOOL I (STRAIGHT)



Removal of the already assembled contact (incl. cable)

PART NUMBER: 087.170.136.000.000

REMOVAL TOOL II



Removal of 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 [183](#).

Ceramic Ferrule
Single-mode / multi-mode
Mating cycles¹: minimum 100,000

TECHNICAL NOTES

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

TECHNICAL DATA

Mechanical data

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

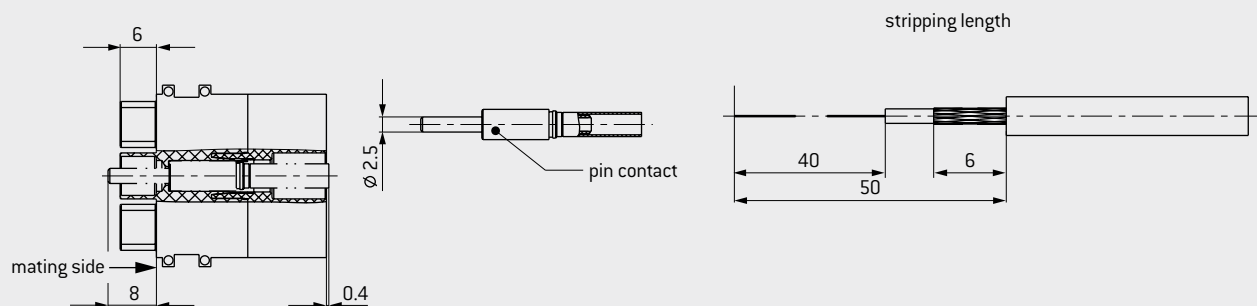
Materials

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

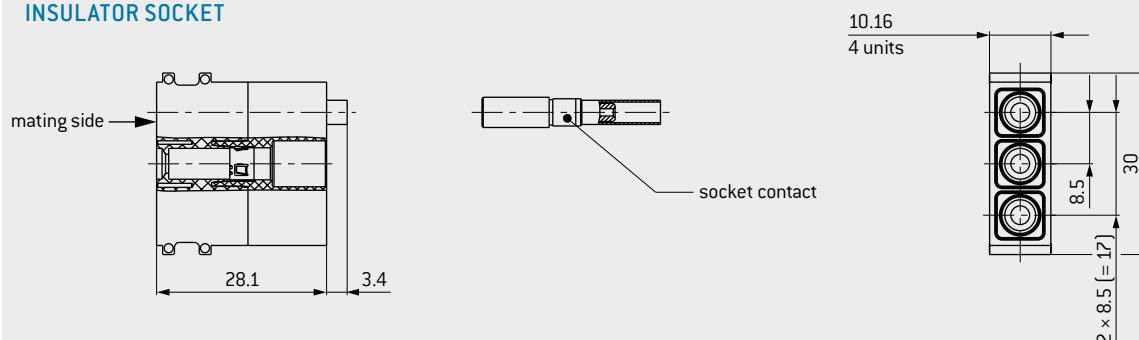
¹ Specified mating cycles possible with regular service intervals ² Fiber assembly (glue and polish) on request



INSULATOR PIN



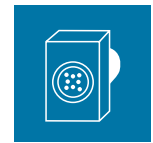
INSULATOR SOCKET



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	LWL-Faser
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		

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



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

SHIELDED IMPLEMENTATION/HIGH-SPEED CONNECTOR

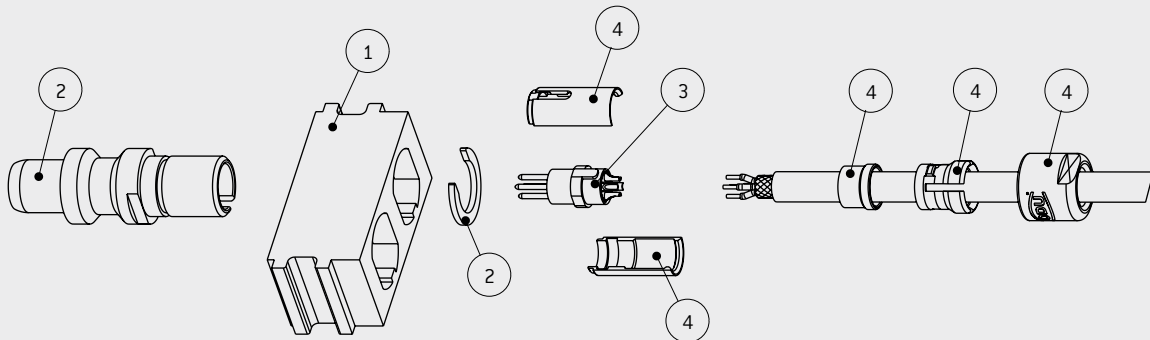


Mating cycles: minimum 10,000
USB® 2.0¹, USB® 3.1 Gen1¹, CAT 5¹
2 to 10 contacts

TECHNICAL DATA

- The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems with transfer rates up to 10 MHz. For example, Profibus®¹, USB® 1.1¹, RS485, FlexRay®¹, CAN-Bus¹ and RS232.
- Selected inserts are suitable and qualified for data rates up to 5 GBits/s. For example, Fast-Ethernet¹, USB® 2.0¹, USB® 3.1 Gen1¹, FireWire® S400¹ (on request), IEEE 1394

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



ASSEMBLY SET

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

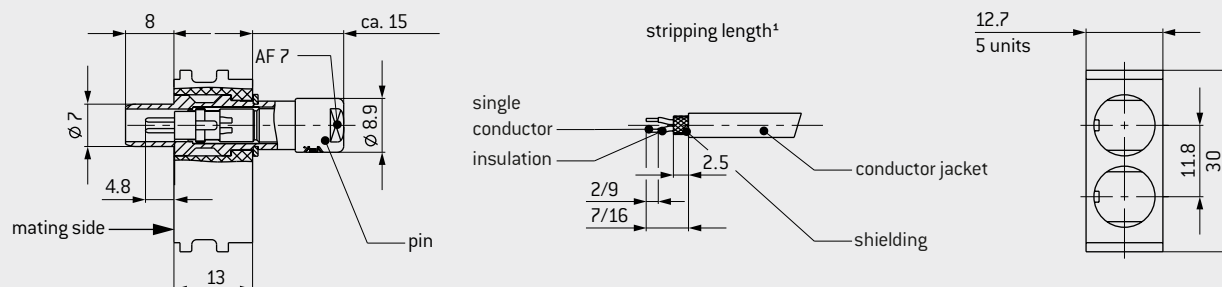
Cable-Ø mm	Part number
1.5 to 2	653.001.001.304.020
2 to 2.5	653.001.001.304.025
2.5 to 3	653.001.001.304.030
3 to 3.5	653.001.001.304.035
3.5 to 4	653.001.001.304.040
4 to 4.5	653.001.001.304.045
4.5 to 5	653.001.001.304.050
5 to 6.1	653.001.001.304.061 ³

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

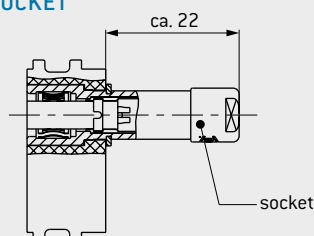
³ It's possible that the cable collet cannot be covered completely over the cable.



INSULATOR PIN



INSULATOR SOCKET



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

CONTACT ARRANGEMENTS



2 contacts



3 contacts



4 contacts
T 5², USB[®] 2.0²



5 contacts



6 contacts



7 contacts



9 contacts



10 contacts
USB® 3.1 Gen1²

Number of contacts	Contact diameter	Termination cross-section	Rated voltage ³	Rated impulse voltage ³	Degree of pollution ³	Nominal voltage ⁴	Model	Category ⁵	Insert complete ⁶ Part number	Total mating force	Total sliding force
	mm	AWG	V	kV		V AC				N	N

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

2	0.9	22	10 32	2 2	3 2	500	Pin Socket		700.849.724.002.200 700.749.724.002.200	6.2	5.2
3	0.9	22	32	1.5	2	400	Pin Socket		700.849.724.003.200 700.749.724.003.200	7.1	5.9
4	0.7	26	32	1.5	2	300	Pin Socket	CAT 5 ²	700.848.724.004.200 700.748.724.004.200	6.8	5.7
4	0.7	22	32	1.5	2	300	Pin Socket	USB® 2.0 ²	700.848.724.404.221 700.748.724.404.200	6.8	5.7
5	0.7	26	32	1.5	2	366	Pin Socket		700.848.724.005.200 700.748.724.005.200	7.4	6.2
6	0.5	28	32	1.5	2	300	Pin Socket		700.841.724.006.200 700.741.724.006.200	7.9	6.6
7	0.5	28	32	1.5	2	300	Pin Socket		700.841.724.007.200 700.741.724.007.200	8.4	7
9	0.5	28	10	1.2	2	200	Pin Socket		700.841.724.009.200 700.741.724.009.200	9.5	7.9
10	0.5	28	10	1.2	2	200	Pin Socket		700.841.724.010.221 700.741.724.010.221	10.1	8.4
10	6 × 0.3 4 × 0.5	28 24	10	1.2	2	100	Pin Socket	USB® 3.1 Gen1 ²	700.831.724.410.D00 700.731.724.410.D00	10.1	8.4

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), see page 191 ⁴ Acc. to EIA-364-20F:2019 ⁵ Classification acc. to ISO/IEC 11801:2017-1 ⁶ Several inserts in crimp model on request

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



Size 1 [e.g. insert in bus systems]

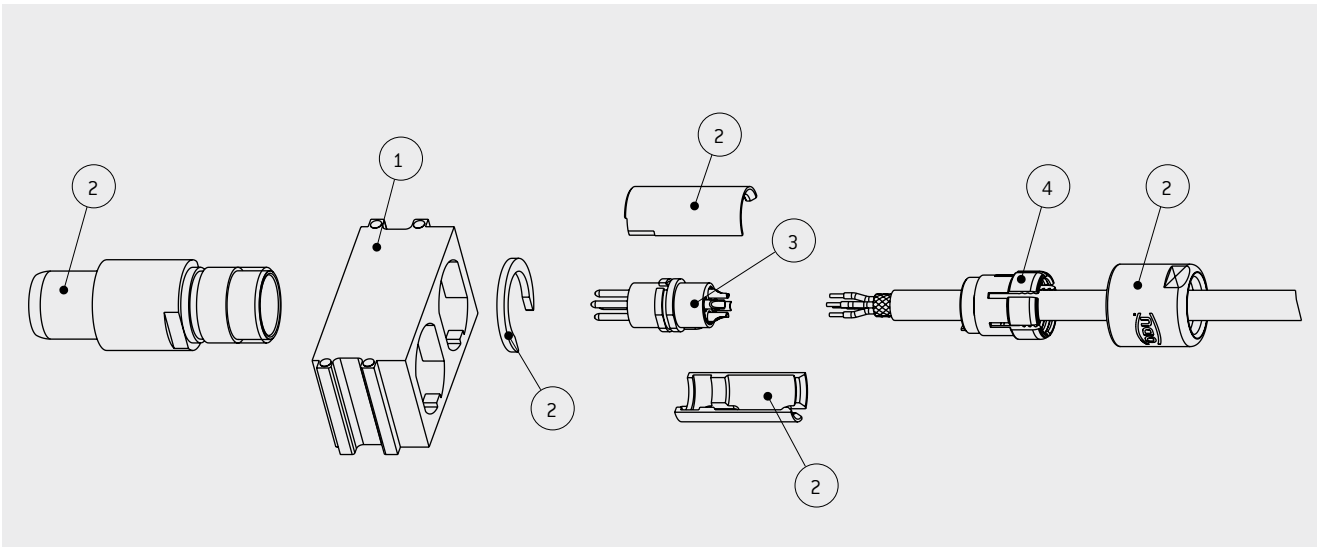


Mating cycles: minimum 10,000 / 60,000
USB® 2.0¹, CAT 5¹
2 to 14 contacts

TECHNICAL DATA

- The inserts listed here for shielded implementations/high-speed connectors are optimally suitable for all common bus systems with transfer rates up to 10 MHz. For example, Profibus®¹, RS485, FlexRay®¹, CAN-Bus¹ and RS232.
- Selected inserts are suitable and qualified for data rates up to 1 Gbit/s. For example, Gigabit-Ethernet¹, USB® 2.0¹, Fast-Ethernet¹, IEEE 1394, FireWire® S400¹ [on request]

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



ASSEMBLY SET

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

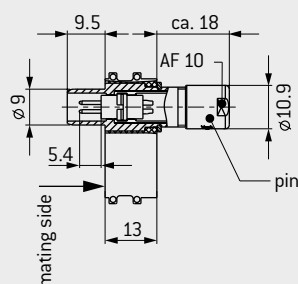
Cable-Ø mm	Part number
1.5 to 2.1	751.020.188.304.022
2 to 3.2	751.020.188.304.032
3 to 4.2	751.020.188.304.042
4 to 5.2	751.020.188.304.052
5 to 6.2	751.020.188.304.062
6 to 7.2	751.020.188.304.072
7 to 7.7	751.020.188.304.077 ³

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.



INSULATOR PIN



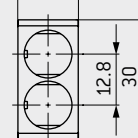
stripping length

single
conductor

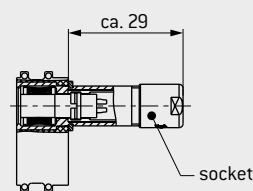
insulation

conductor jacket

shielding

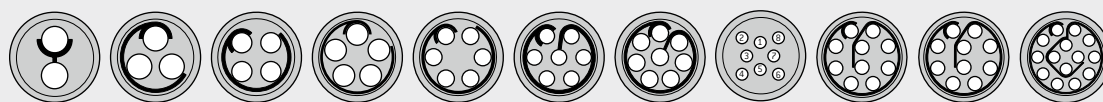
15.24
6 units

INSULATOR SOCKET



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

CONTACT ARRANGEMENTS



2-contacts

3-contacts

4-contacts

5-contacts

6-contacts

7-contacts

8-contacts

8-contacts

10-contacts

10-contacts

14-contacts

CAT 5⁵, USB[®] 2.0⁵CAT 5⁵USB 3.1 Gen1⁵

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	Catego-ry ³	Insert complete ⁴ Part number	Total mating force N	Total sliding force N
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INSERT WITH ODU TURNTAC[®] (MATING CYCLES MINIMUM 10,000)

2	1.3	20	32	2	3	550	Pin		701.844.724.002.200	8.6	7.1
			80				Socket		701.744.724.002.200		
3	1.3	20	16	2	3	500	Pin		701.844.724.003.200	10.4	8.7
			40				Socket		701.744.724.003.200		
4	0.9	22	10	2	3	500	Pin	CAT 5 ⁵	701.849.724.004.200	8.3	6.9
			32				Socket		701.749.724.004.200		
4	0.9	22	10	2	3	500	Pin	USB [®] 2.0 ⁵	701.849.724.004.000	8.3	6.9
			32				Socket		701.749.724.004.000		
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	32	1.5	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 ⁵	701.841.724.408.000	9.3	7.8
							Socket		701.741.724.408.000		
10	0.5	28	25	1.5	2	333	Pin		701.841.724.010.400	10.4	8.7
							Socket		701.741.724.010.200		
10	6 × 0.3 4 × 0.5	28 24	10	1.2	2	100	Pin	USB [®] 3.1 Gen1 ⁵	701.831.724.410.000	12.6	10.5
							Socket		701.731.724.410.000		
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	25	2	3	450	Pin	CAT 5 ⁵	701.842.724.004.700	9.6	9
			63				Socket		701.742.724.004.700		
5	0.76	22	25	1.5	3	400	Pin		701.842.724.005.700	10.8	18
			63				Socket		701.742.724.005.700		

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Acc. to EIA-364-20F:2019 ³ Classification acc. to ISO/IEC 11801:2017-1⁴ Several inserts in crimp model on request ⁵ Concerning data transmission protocols please note page 2.

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



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

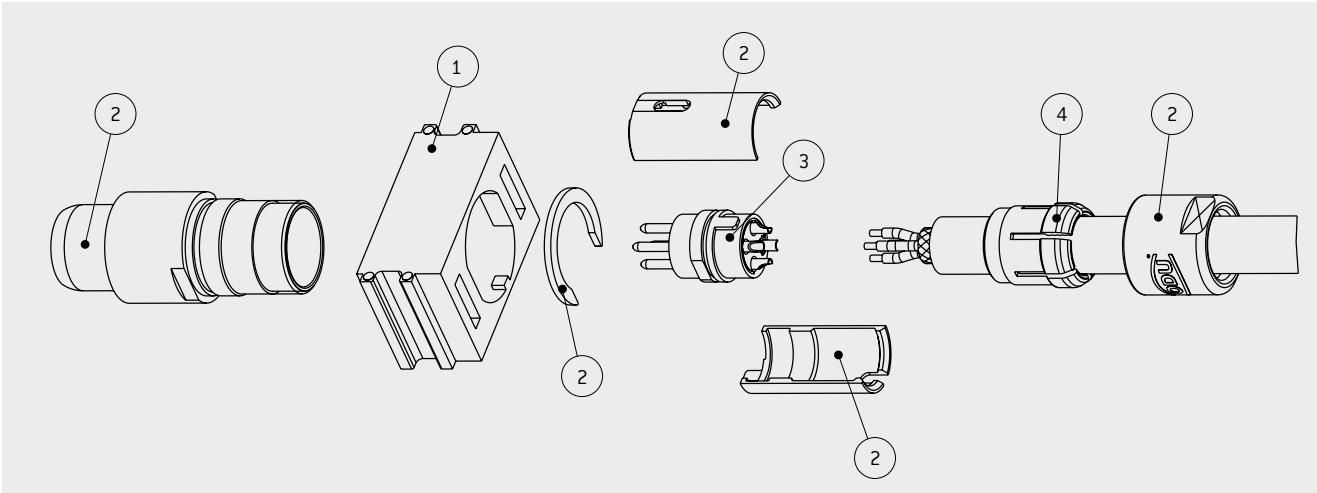


Mating cycles: minimum 10,000 / 60,000
CAT 5¹, CAT 6A¹, HDMI^{®1}
4, 8 and 16 contacts

TECHNICAL DATA

- The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems with transfer rates up to 10 MHz.
For example, Profibus^{®1}, RS485, FlexRay^{®1}, CAN-Bus¹ and RS232.
- Selected inserts are suitable and qualified for data rates up to 10 GBit/s. E.g. 10 Gigabit-Ethernet¹, Gigabit-Ethernet¹, Fast-Ethernet¹, IEEE 1394, HDMI^{®1}.

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



ASSEMBLY SET

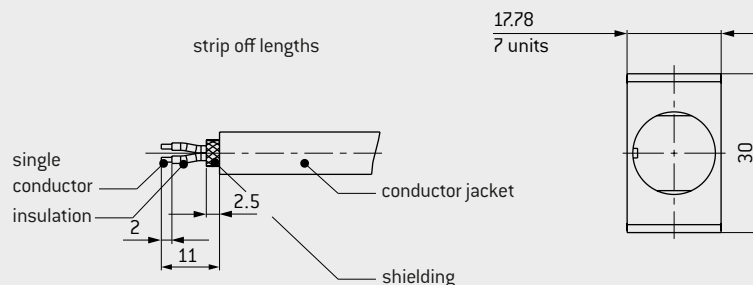
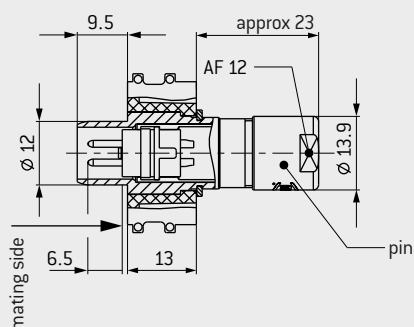
Order	Base parts	Part number
1	Insulator	611.170.101.923.000
2	Socket housing complete	653.003.001.304.000
2	Connector housing complete	653.003.002.304.000
3	Insert complete solder contacts ²	See next page
4	Assembly set	See table on the right

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

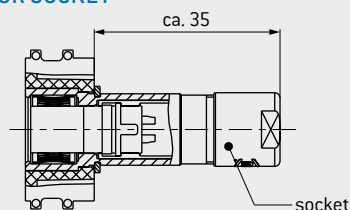
¹ Concerning data transmission protocols please note page 2. ² Available with crimp contact upon request



INSULATOR PIN



INSULATOR SOCKET



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

CONTACT ARRANGEMENTS



4 contacts
CAT 5⁵



8 contacts
CAT 5⁵
CAT 6_A⁵



16 contacts
HDMI® 2.0⁵

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	Catego-ry ³	Insert complete ⁴ Part number	Total mat-ing force N	Total sliding force N
--------------------	---------------------	-------------------------------	------------------------------	---------------------------------------	----------------------------------	-----------------------------------	-------	------------------------	--	-----------------------	-----------------------

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

4	1.3	20	40	2.5	3	650	Pin	CAT 5 ⁵	702.844.724.004.200	13.1	10.9
			160				Socket		702.744.724.004.200		
8	0.9	22	20	2	3	500	Pin	CAT 6 _A ⁵	702.849.724.008.000	16.2	13.5
			50				Socket		702.749.724.008.000		
16	0.5	26	10	1.5	3	250	Pin	HDMI® 2.0 ⁵	702.841.724.416.000	19.1	15.9
			32				Socket		702.741.724.416.000		

INSERT WITH ODU SPRINGTAC® (MATING CYCLES MINIMUM 60,000)

8	0.76	22	16	2	3	550	Pin	CAT 5 ⁵	702.842.724.008.000	23.5	19.6
			40				Socket		702.742.724.008.000		

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Acc. to EIA-364-20F:2019 ³ Classification acc. to ISO/IEC 11801:2017-1

⁴ Several inserts in crimp model on request ⁵ Concerning data transmission protocols please note page 2.

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



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

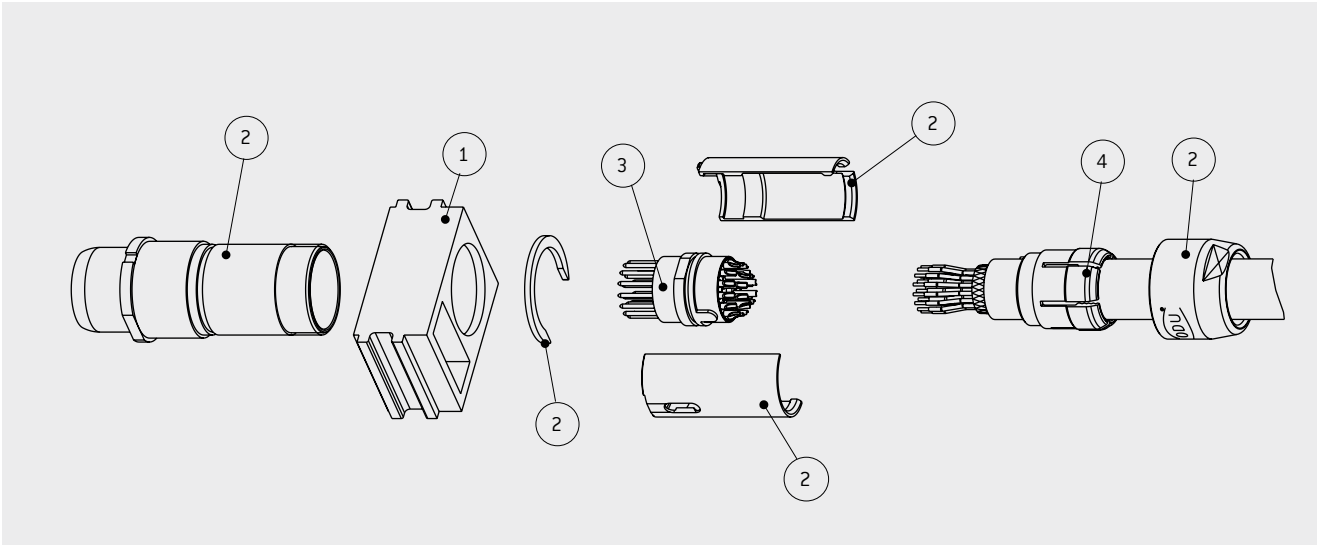


Mating cycles: minimum 10,000
10 to 30 contacts

TECHNICAL DATA

- The inserts listed here for shielded implementations / high-speed connectors are optimally suitable for all common bus systems with transfer rates to 10 MHz.
For example, Profibus[®], RS485, FlexRay[®], CAN-Bus¹ and RS232.
- Selected inserts can be qualified for data rates.

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



ASSEMBLY SET

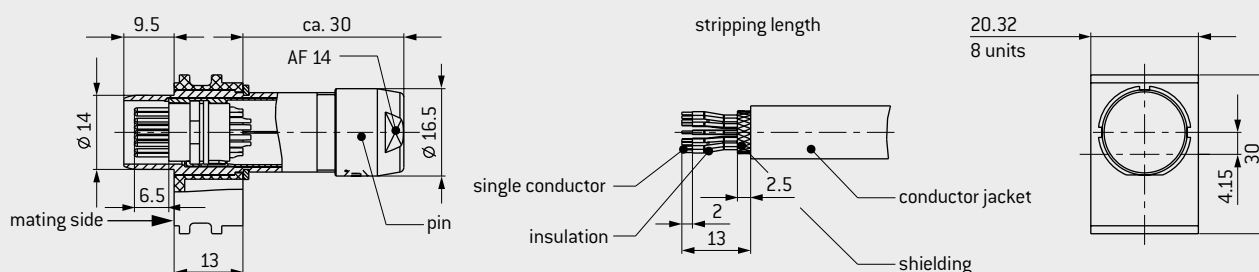
Order	Base parts	Part number
1	Insulator	611.171.101.923.000
2	Socket housing complete	653.004.001.304.000
2	Connector housing complete	653.004.002.304.000
3	Insert complete solder contacts ¹	See next page
4	Assembly set	See table on the right

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

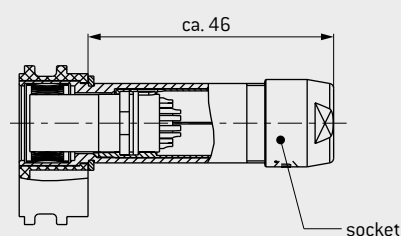
¹ Concerning data transmission protocols please note page 2. ² Available with crimp contact upon request



INSULATOR PIN



INSULATOR SOCKET



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

CONTACT ARRANGEMENTS



10 contacts



18 contacts



22 contacts



30 contacts

Number of contacts	Contact diameter mm	Termination cross-section AWG	Rated voltage ¹ V	Rated impulse voltage ¹ kV	Degree of pollution ¹	Nominal voltage ² V AC	Model	Catego-ry ³	Insert complete ⁴ Part number	Total mat-ing force N	Total sliding force N
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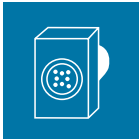
INSERT WITH ODU TURNTAC® (MATING CYCLES MINIMUM 10,000)

10	1.3	20	20	2	3	450	Pin		703.844.724.010.200	23.6	19.7
			50	2	2		Socket		703.744.724.010.200		
18	0.9	22	10	2	3	450	Pin		703.849.724.018.200	29	24.2
			32	2	2		Socket		703.749.724.018.200		
22	0.7	26	32	1.5	2	366	Pin		703.848.724.022.200	24.9	20.8
							Socket		703.748.724.022.200		
30	0.7	26	32	1.5	2	300	Pin		703.848.724.030.200	31.1	25.9
							Socket		703.748.724.030.200		

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Acc. to EIA-364-20F:2019 ³ Classification acc. to ISO/IEC 11801:2017-1

⁴ Several inserts in crimp model on request

BLANK MODULES

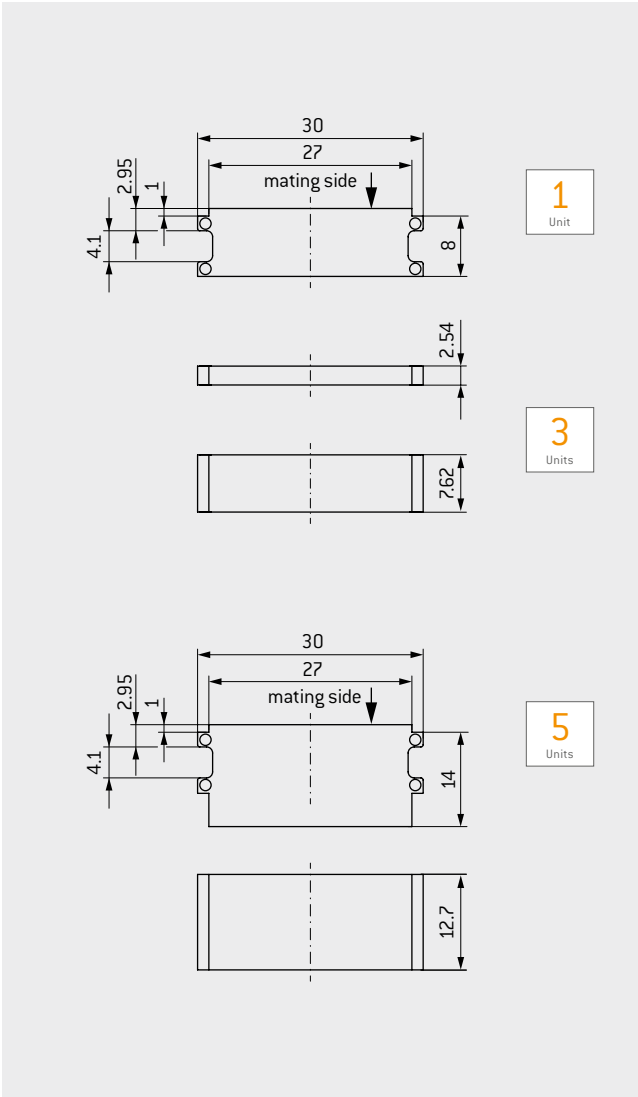


To be used to fill any gaps, in incomplete frames:
The frame has to be fully mounted with insulators,
spacers or blank modules.

TECHNICAL DATA

Insulator

Thermoplastic
fiber glass reinforced
acc. to UL 94



Units	Part number
1	611.122.113.923.000
3	611.130.113.923.000
5	611.128.113.923.000

SPACER-MODULES



SPACER-MODULES



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

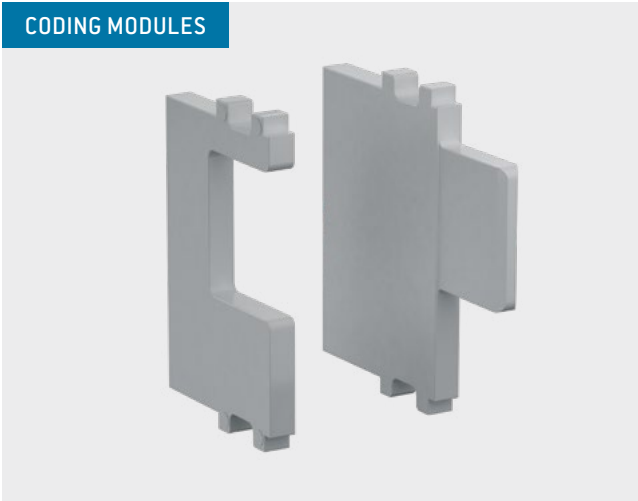
TECHNICAL DATA

Insulator

Thermoplastic
fiber glass reinforced
acc. to UL 94

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

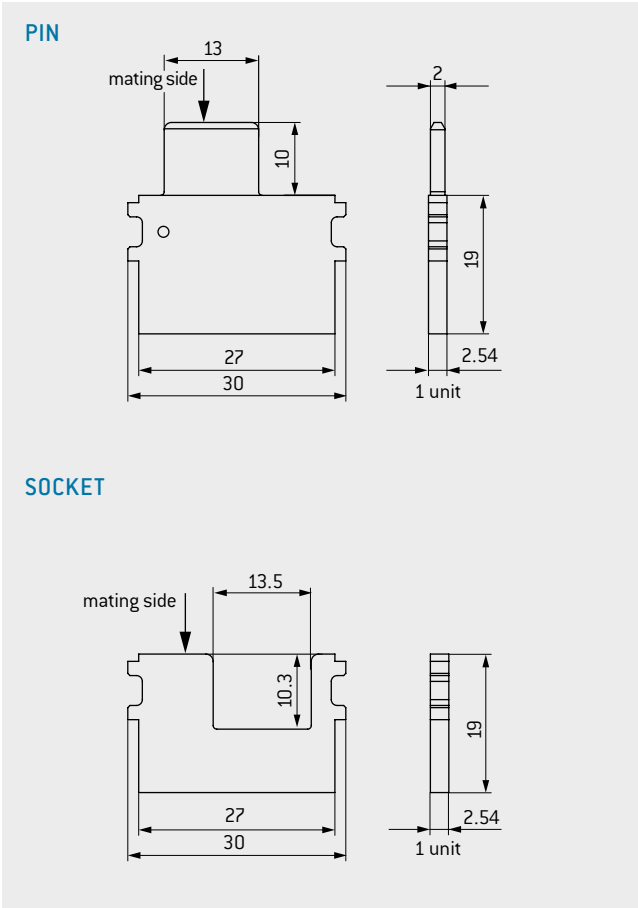
CODING MODULES



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

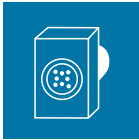
TECHNICAL DATA

Insulator	Thermoplastic fiber glass reinforced acc. to UL 94
-----------	--



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

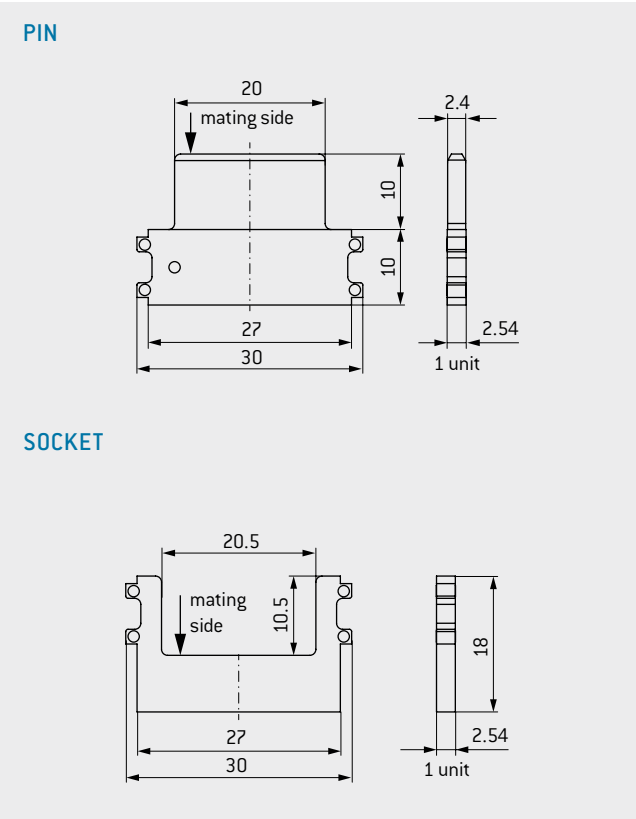
PIN PROTECTION MODULES



For connections with small pin diameters, these modules serve as protection for the pins. Especially in the case of small contact diameters ($\varnothing$ 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
-----------	--



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 DOCK



PRODUCT INFORMATION ODU DOCK

For automatic docking and robot systems	124
Main fields of application	126
Best connections – the contact principle	128
Housing versions for ODU DOCK	130
Inserts with Quick Change Head (QCH)	131
Your way to an individual connection	132
ODU DOCK product overview	134

ODU DOCK **Silver-Line**

FOR AUTOMATIC DOCKING AND ROBOT SYSTEMS

Connectors for Docking and Robot Systems are connectors that have restricted guidance and that can be inserted automatically. The force can be applied manually, electrically or pneumatically. Connectors for Docking and Robot Systems are connectors with a simple design and a huge variety of contact inserts. Often a large number of mating cycles are called for. The docking system stands or falls on the guide and the contact system that are selected.

From simple standard connectors for Docking and Robot Systems to the complex docking unit (z. B. IP65 and EMC protection) – ODU is able to provide practically any solution you could imagine.

THE BENEFITS OF ODU DOCK:

- Easy assembly from the rear
- Simple handling and usability
- Straight and angled cable outlet
- Robust aluminum or plastic housing available in **three sizes**
- 2+PE to 36+PE inserts for transmission of signal, power, current, data and media
- **High density** with small contact diameter
- Standard contacts with crimp termination; solder termination on request
- Proven ODU SPRINGTAC® contacts: min. **100,000 mating cycles**
- ODU DOCK Quick Change Head meets the requirement for up to **10 million mating cycles**



ODU DOCK AT A GLANCE:

3

Available docking plate thicknesses: 10 mm, 14 mm, 20 mm

2

Contact surfaces

32

Modules to choose from:
Signal, power, high current, high voltage, RF-signal (coax), media such as air or fluid, high-speed data transmission or fiber optic (see from page 44)

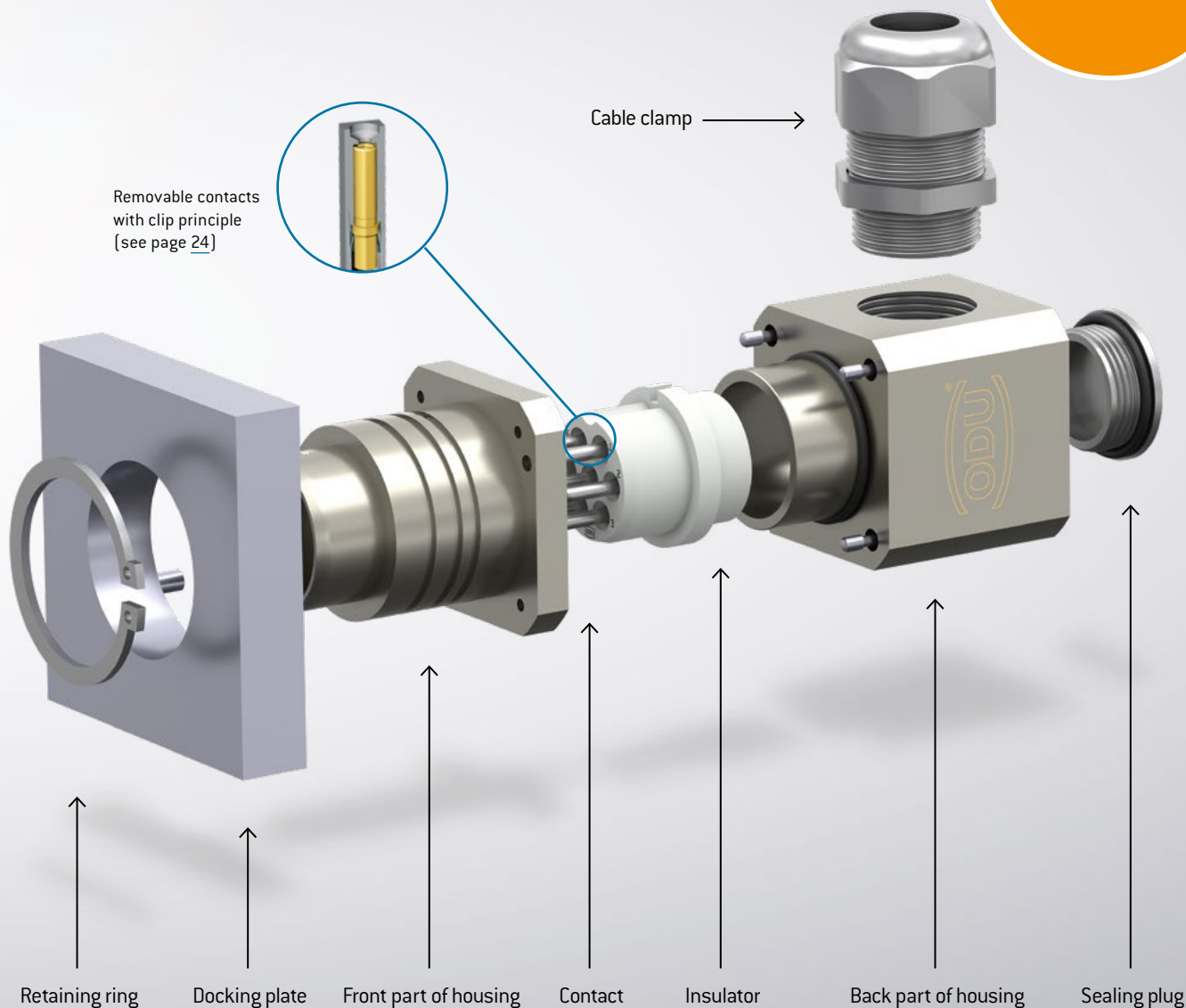
2

Housing versions: Plastic or aluminum nickel-plated

15

Versions with different numbers of poles for signal, power, and hybrid transmission

100,000
Mating cycles and more



ODU DOCK **Silver-Line** FOR AUTOMATIC DOCKING AND ROBOT SYSTEMS

MAIN FIELDS OF APPLICATION

Whether industrial robots, test systems, switchgear, or tool change systems – all these applications rely on dependable automatic docking and call for an extremely robust connection system with a high level of contact safety. The ODU DOCK Silver-Line has been designed for all these interfaces. ODU SPRINGTAC® technology guarantees vastly more than 100,000 mating cycles at a constant contact resistance and contact quality. The robust housing design meets the requirements of a harsh industrial environment.

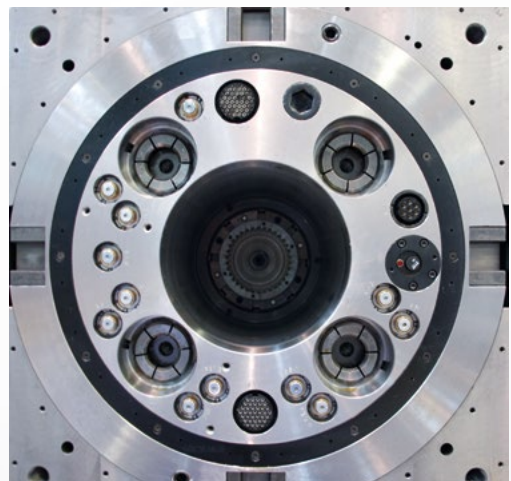
ODU-MAC® modules open up a world of transmission possibilities, from signals and power to HF signals (coax), media such as air and fluids, data, and light waves.

THE ODU DOCK SILVER-LINE IS PRINCIPALLY FOUND IN THE FOLLOWING APPLICATIONS:

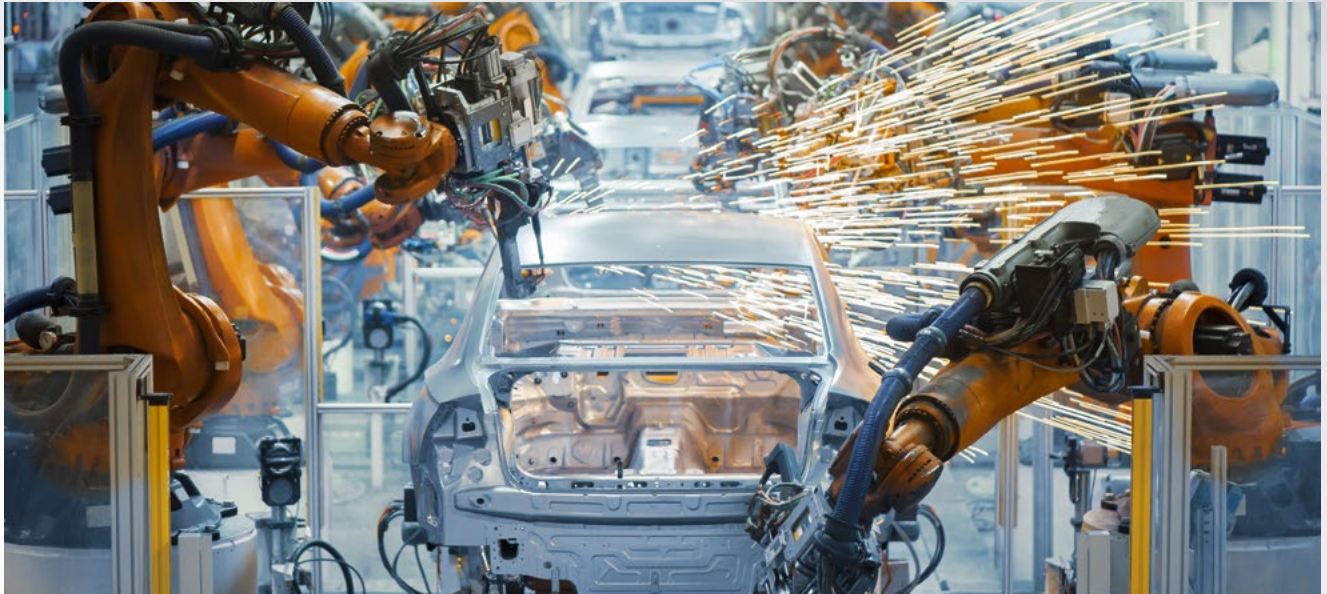
- Tool change systems
- Test equipment
- Industrial robot systems
- Automation systems in production lines



ODU DOCK FOR INDUSTRIAL APPLICATIONS



ODU DOCK FOR MILLING AND GRINDING MACHINES
[Source: Waldrich Siegen Werkzeugmaschinen GmbH]



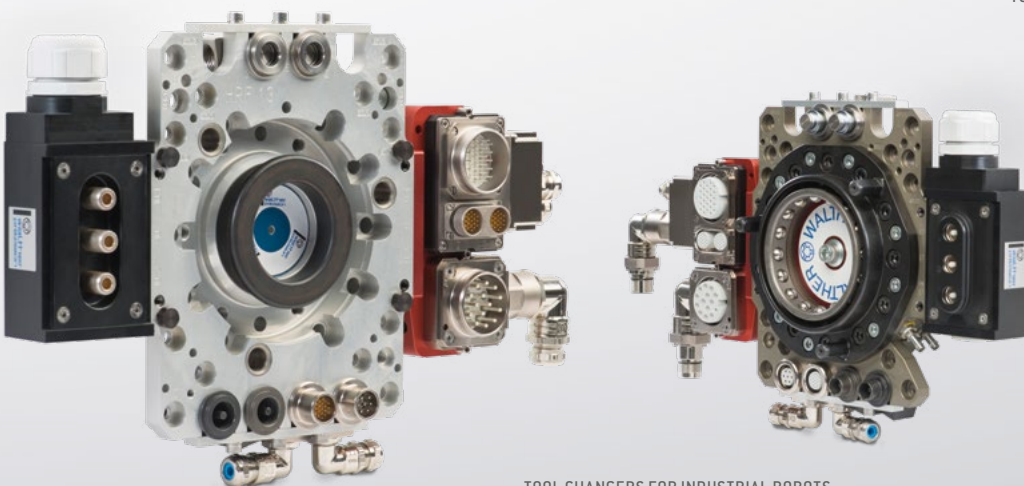
ODU DOCK FOR WELDING HEADS

IN USE

Today's industrial manufacturing and production processes would be unthinkable without docking and robot systems. Industrial robots, tool change and depot systems, cable connections and test equipment are just a few examples of the applications for these systems. ODU docking systems are built into combined quick coupling systems (electrical/pneumatic) where they enable the greatest possible flexibility.



TOOL CHANGERS FOR INDUSTRIAL ROBOTS



TOOL CHANGERS FOR INDUSTRIAL ROBOTS

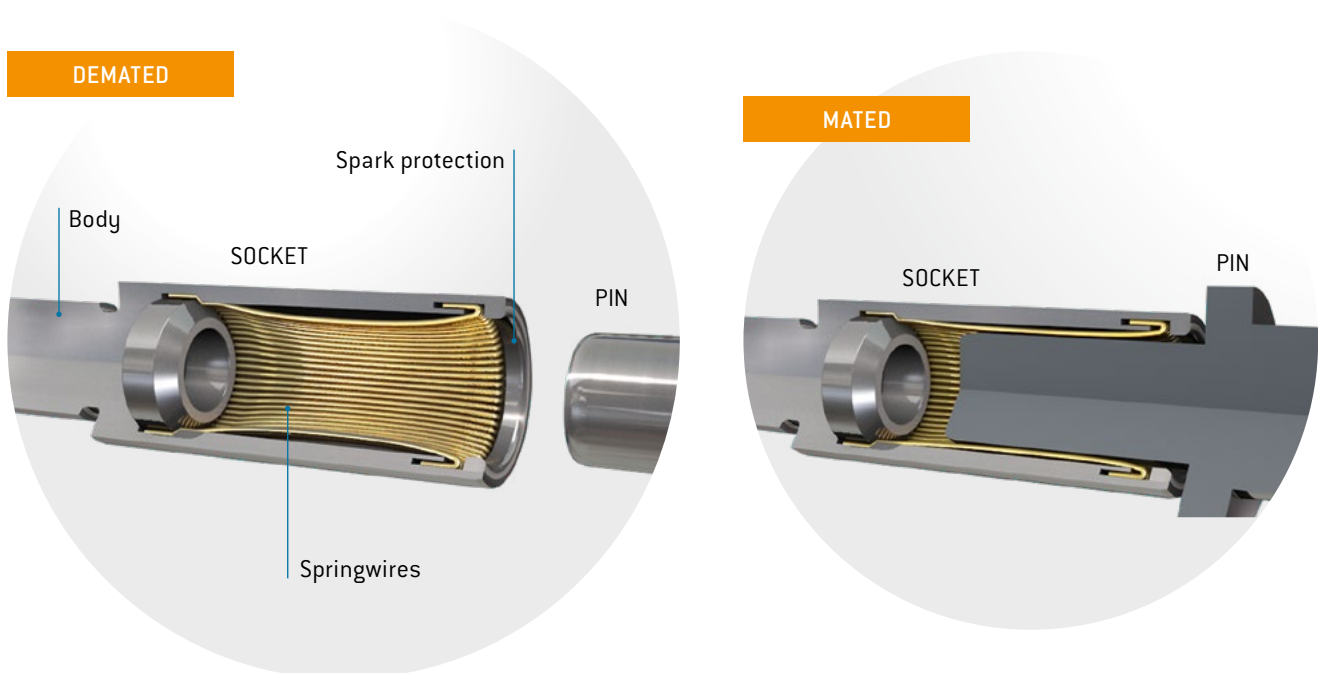
BEST CONNECTIONS – THE CONTACT PRINCIPLE

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

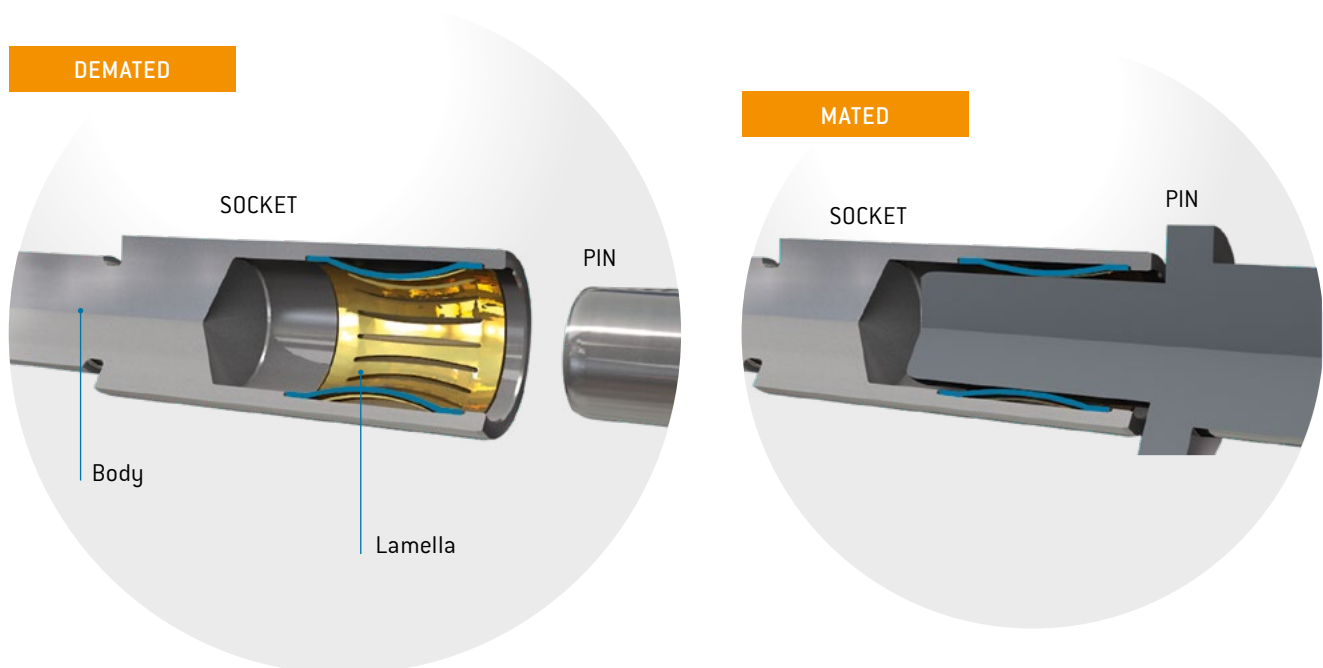
- Greater than 100,000 mating cycles (up to 1 million mating cycles can be achieved)
- High current-carrying capacity – surge current capacity
- Low contact resistances
- Large number of independently flexible contact springs, e.g. 40 springs with a diameter of 5 mm
- Low mating and demating forces
-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

Standard contact principle for:	
Signal	36+PE to 6+PE
Power	2+PE to 36+PE
High current	2+PE to 6+PE
Hybrid	2+PE+9 and 3+PE+4
High voltage	4 contacts
RF-signal (coax)	2 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 – surge current 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:

ODU DOCK Quick Change Head base parts¹

¹ Quick Change Head base parts for size 1, 18+PE feature ODU TURNTAC® contacts.

HOUSING VERSIONS FOR ODU DOCK

Robust housing available in two materials and three sizes

You can choose from two housing versions: a nickel-plated aluminum housing and a plastic housing. The housing can also offer IP65 and EMC protection as optional extras. The robust design meets all the requirements of industrial applications. The socket and pin housings each consist of two parts (front part and back part), which are screwed together. The inserts are located in the front part, while the rear housing protects the termination side and is home to strain relief devices such as cable clamps.

For the cable clamps needed for strain relief or EMC protection, see page [186](#), where you can choose cable clamps made from either plastic or metal. All housings are suitable for three plate thicknesses and the required spacer and retaining rings are included in the scope of supply, along with a dummy contact.

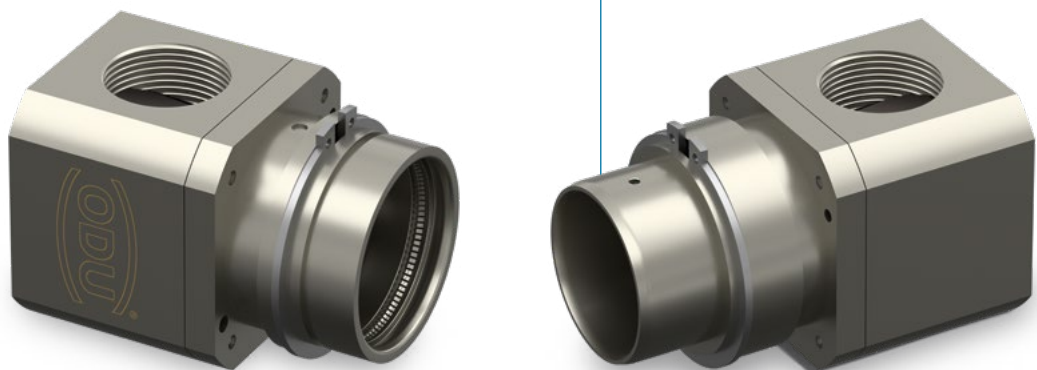
PLASTIC HOUSING

Material: POM, black



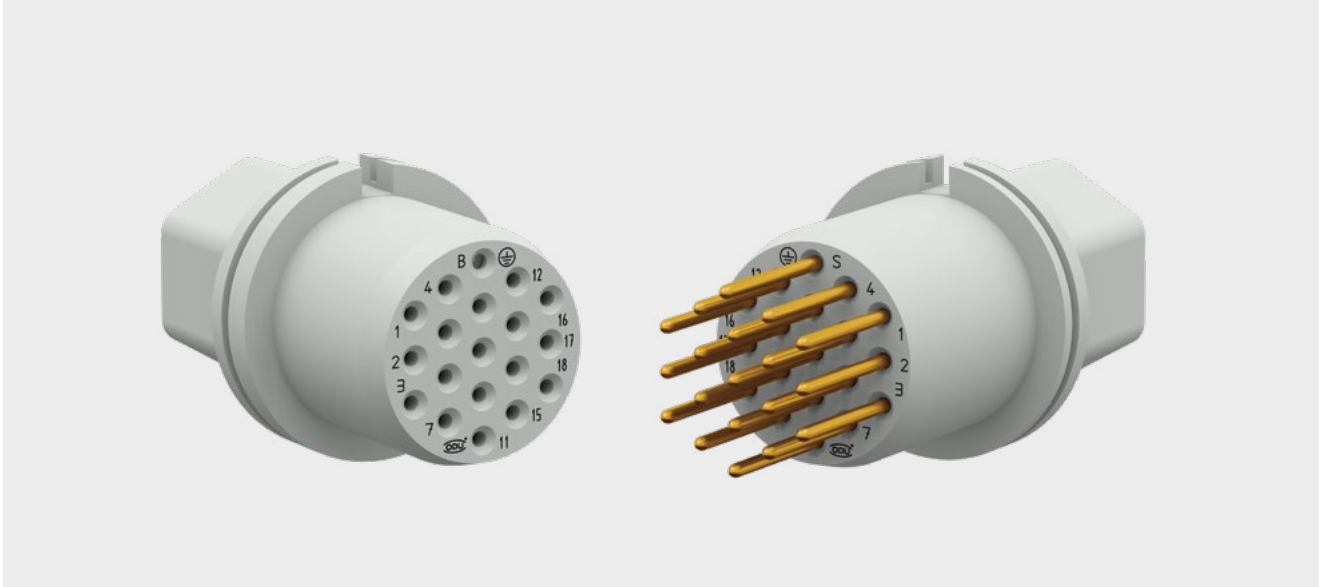
ALUMINUM HOUSING, NICKEL-PLATED

Material: aluminum, nickel-plated
Available with or without EMC protection



INSERTS WITH QUICK CHANGE HEAD (QCH)

For an extremely high number of mating cycles



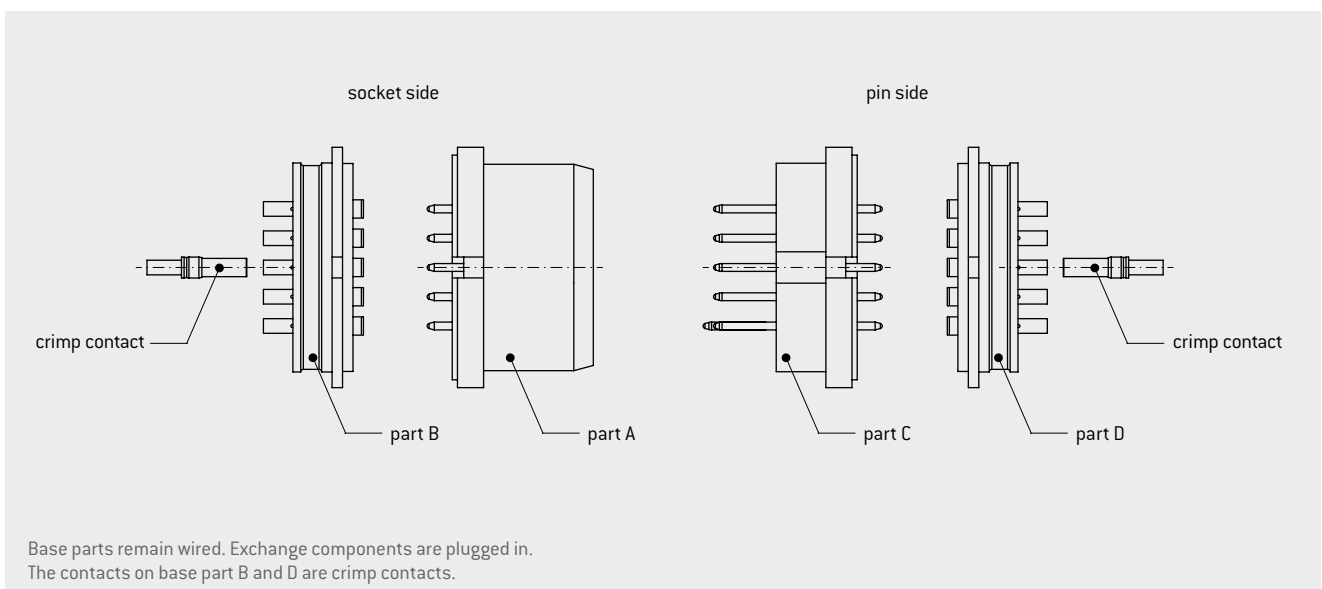
The ODU SPRINGTAC® contacts offer contact stability for up to 100,000 mating cycles. The ODU DOCK Quick Change Head is suitable for applications that require even more mating cycles.

MATERIAL

Insulator	PBT-GF (UL 94)
Contacts	Cu alloy

PRINCIPLE BEHIND THE QUICK CHANGE HEAD

The connection system consists of an interchangeable front part (connector piece) and a terminal piece. When the contacts suffer from wear, the front part is exchanged in a very short time without it being necessary to separate the connections that are made with the contacts of the terminal piece.



YOUR WAY TO A CONSOLIDATED CONNECTION

How to configure your ODU DOCK.

INDIVIDUAL REQUIREMENTS – CONSOLIDATED CONFIGURATION

ODU DOCK is always the right choice for all your signal, hybrid, bus signal, power, high-current, media and data transmission needs. You can configure them to precisely fit your requirements, so as to obtain the perfect interface.

CONFIGURATION IS CHILD’S PLAY

A complete ODU DOCK product consists of a housing, insulator, contacts, and dummy contact (where necessary). You can select exactly which components you need step by step. **We ask you to enquire directly about customized versions not covered by the standard.**



ODU DOCK **Silver-Line**

1ST STEP: HOUSING

Depending upon your requirements, you can choose from two different housing versions for automatic docking.

Housing		
Material	Aluminum, nickel-plated EMC protection available	Plastic (POM)



2ND STEP: SELECTION OF STANDARD INSERT

The 15 standard inserts are suitable for transmitting, signals, high current and power. Each insert consists of an insulator and contacts. You can order dummy contacts if required, but they do not have to be used everywhere in the insulator.

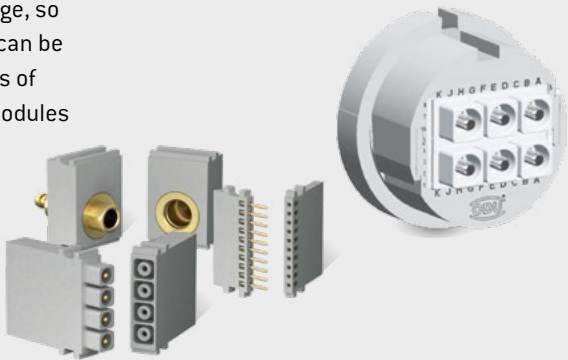
Insert	
Insulator	3 sizes, 2+PE to 36+PE
Pin contact	Silver-plated (gold-plated on request)
Socket contact	With ODU SPRINGTAC® and ODU LAMTAC®
Ground contact	Depending on contact arrangements
Dummy contact	May be needed, depending on requirements



OPTIONAL STEP: SELECTION OF ODU-MAC® MODULES

The ODU-MAC® adapter increases the modular options available for size 3. You can choose from 32 modules from the ODU-MAC® range, so bus signals, data, light waves, and media such as air and fluids can be transmitted. You can configure modules to meet the exact needs of your application for up to eight units. The part numbers of the modules can be found from page 50.

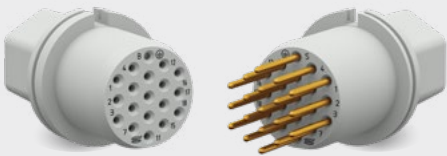
The possible modules are marked: 



ODU-MAC® adapter	
Insulator pin	1 × 209.611.000.000.000
Insulator socket	1 × 209.610.000.000.000

OPTIONAL STEP: SELECTION OF QUICK CHANGE HEAD

Our unique Quick Change Head technology significantly reduces the amount of time that needs to be spent on servicing. Exchange components can be replaced really easily (while the base parts remain cabled), so the number of mating cycles can be vastly increased in no time at all. You can find out more about this on page 131.



Quick Change Head		
Pin side	Terminal piece	Connector piece
Socket side	Terminal piece	Connector piece

3RD STEP: SELECTION OF CABLE CLAMPS

We offer you cable clamps with or without EMC protection for the purpose of strain relief. You can choose from two different materials. See page 186.

Cable clamp		
Material	Metal (available with EMC protection)	Plastic



ODU DOCK PRODUCT OVERVIEW

CONTACTS				
Conductor cross-section		Contact diameter	Material surface	Max. nominal current
mm ²	AWG	mm		A
0.08 – 0.25	24 – 28	Ø 0.76	Au	6
0.38	22	Ø 0.76	Au	7.5
0.38 – 0.5	20 – 22	Ø 1.02	Au	9
		Ø 1.5	Ag	10
1		Ø 1.02	Au	12
		Ø 2	Ag	15
1.5		Ø 1.5	Ag	18
		Ø 2	Ag	18
		Ø 3	Ag	19
		Ø 5	Ag	19
2.5		Ø 3	Ag	25
		Ø 6	Ag	25
4		Ø 3	Ag	35
		Ø 5	Ag	39
6		Ø 6	Ag	46
		Ø 5	Ag	46
10		Ø 5	Ag	65
16		Ø 6	Ag	80

Please take note of the derating charts on page 196 when selecting conductor cross-sections.
Other methods of contact processing are possible on request.

¹ Solder termination on request

	SIZE 1					SIZE 2				SIZE 3					
	250 V	200 V	320 V	250 V	80 V	800 V	320 V	320 V	160 V	800 V	500 V	630 V	630 V	200 V	320 V
	2+PE ¹	6+PE ¹	2+PE+9	18+PE	31	3+PE+4	4+PE ¹	6+PE ¹	15+PE ¹	2+PE	4+PE ¹	6+PE ¹	13+PE ¹	26+PE ¹	36+PE ¹
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from page [137](#)

from page [149](#)

from page [159](#)

¹ Solder termination on request



ODU DOCK



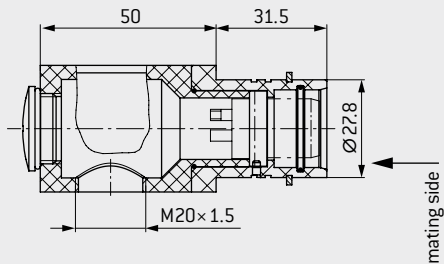
ODU DOCK SIZE 1

Housing	138
Pin and socket inserts	140
Quick Change Head	145

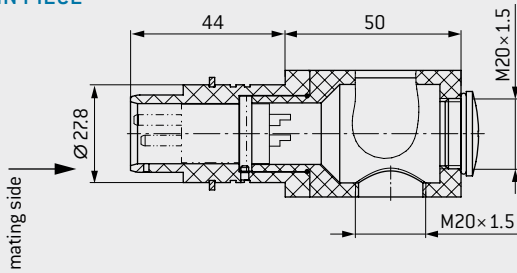
PLASTIC HOUSING



SOCKET PIECE



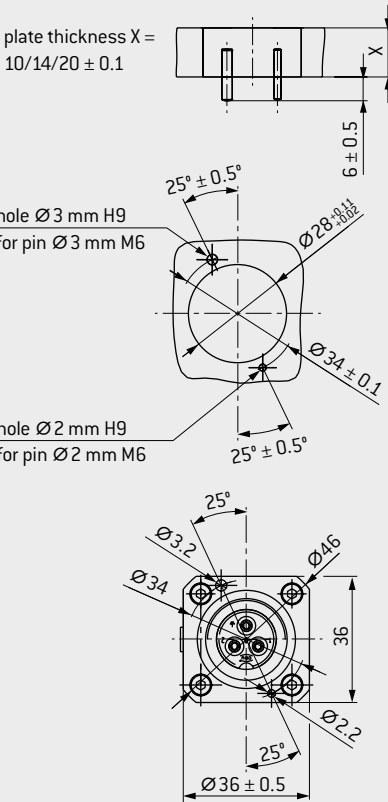
PIN PIECE



TECHNICAL DATA

Material	POM, black
Protection class ¹	IP65 (in mated condition)
Operating temperature	-40 °C to +100 °C
Cable exit	straight and right-angled

VIEW MATING SIDE



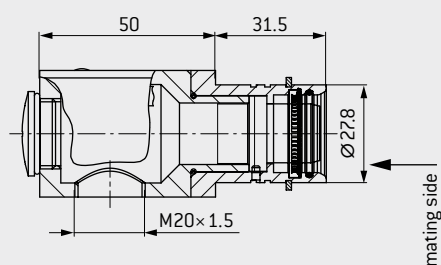
Description	Part number	IP40	IP65
Socket piece	656.164.011.000.000		•
Pin piece	656.164.012.000.000		•

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

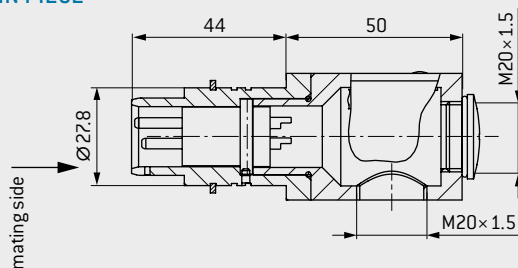
ALUMINUM HOUSING, NICKEL-PLATED



SOCKET PIECE



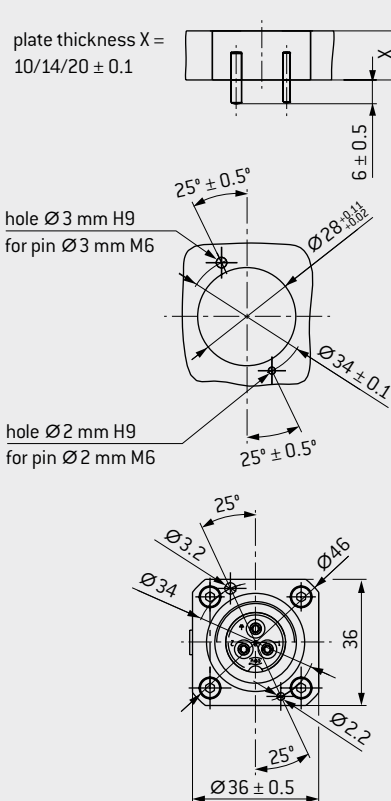
PIN PIECE



TECHNICAL DATA

Material	Aluminum, nickel-plated
Protection class ¹	IP65 (while mated, depending on version)
Operating temperature	-40 °C to +100 °C
Cable exit	straight and right-angled
EMC protection	optional

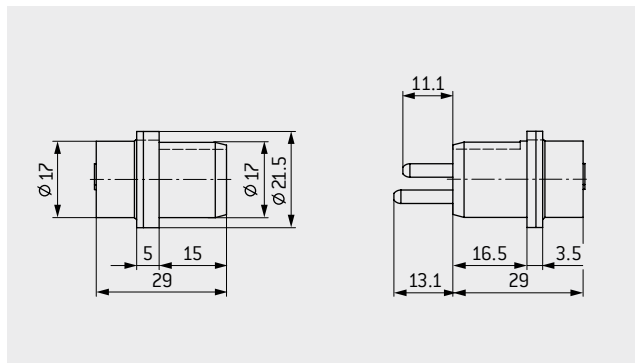
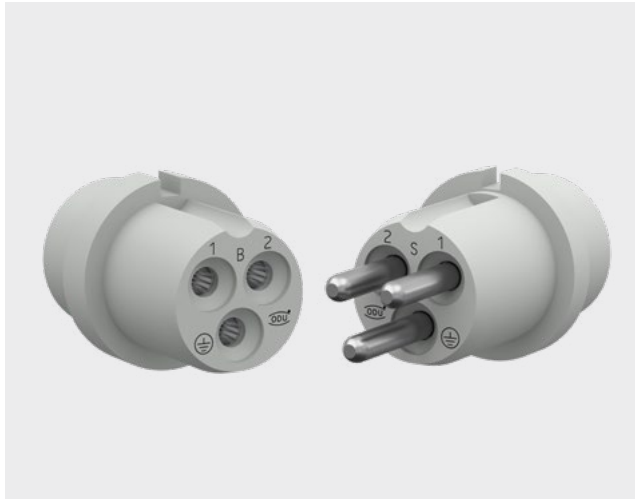
VIEW MATING SIDE



Description	Part number	IP40	IP65	EMC protection
Socket piece	656.164.021.000.000		•	•
	656.164.023.000.000	•		
	656.164.024.000.000	•		•
	656.164.025.000.000		•	
Pin piece	656.164.022.000.000	•	•	•

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

CONTACT INSERT 2+PE



Contact diameter: 3 mm
Conductor cross-section: 2.5/1.5 mm²

TECHNICAL DATA

Voltage information¹

	Plastic		Metal	
Operating voltage	630 V	250 V	500 V	200 V
Rated impulse voltage	4,000 V	4,000 V	3,000 V	3,000 V
Degree of pollution	2	3	2	3

Mechanical data

Total mating force (average)	34 N
Total sliding force (average)	21 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Crimping tools from page 175

Assembly and removal tools from page 184

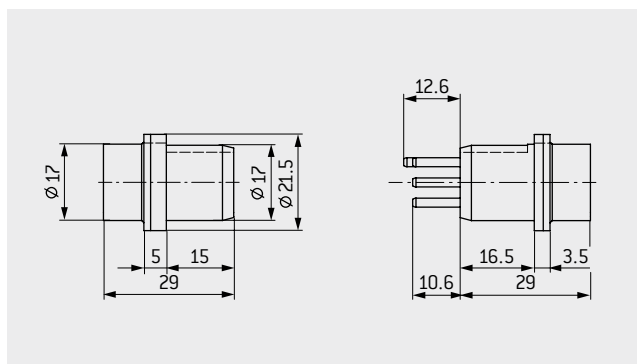
Description	Part number
Insulator socket	207.703.004.003.000
Insulator pin	207.803.004.003.000
Dummy contact	021.341.136.304.000

Description	Part number	Contact diameter	Conductor cross-section		Nominal current ² Single contact	Contact resistance
		mm	mm ²	AWG	A	mΩ
Socket contact	170.382.000.201.000	3	2.5		25	1
Pin contact	180.334.000.301.000					
Earthing pin contact	180.335.000.301.000					
Socket contact	170.499.100.201.000	3	1.5		19	1
Pin contact	180.374.000.301.000					
Earthing pin contact	180.375.000.301.000					

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

CONTACT INSERT

6+PE



Contact diameter: 2 mm
Conductor cross-section: 1/1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	500 V 200 V	500 V 160 V
Rated impulse voltage	3,000 V 3,000 V	3,000 V 3,000 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	53 N
Total sliding force (average)	27 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Crimping tools from page 175

Assembly and removal tools from page 184

Description	Part number
Insulator socket	207.702.004.007.000
Insulator pin	207.802.004.007.000
Dummy contact	021.341.135.924.000

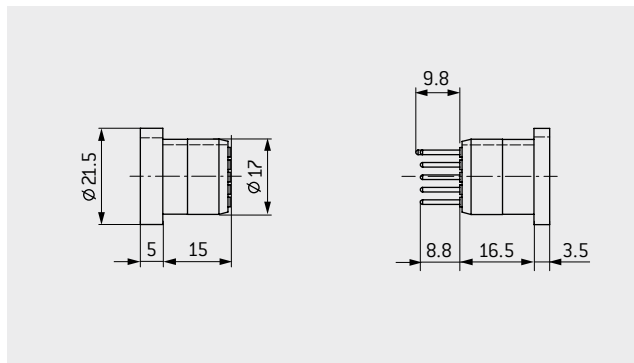
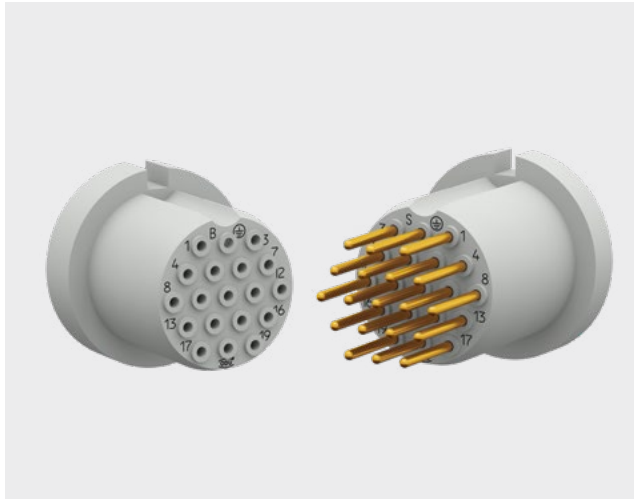
Description	Part number	Contact diameter	Conductor cross-section	Nominal current ² Single contact	Contact resistance
		mm	mm ² AWG	A	mΩ
Socket contact	170.381.000.201.000	2	1.5	18	1.5
Pin contact	180.332.000.301.000				
Earthing pin contact	180.333.000.301.000				
Socket contact	170.827.100.201.000	2	1	15	1.5
Pin contact	180.827.000.301.000				
Earthing pin contact	180.828.000.301.000				

CONDUCTOR CROSS-SECTION 2.5 mm² IS AVAILABLE ON REQUEST.

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

CONTACT INSERT

18+PE



Contact diameter: 1.02 mm
Conductor cross-section: 0.38–0.5 mm²

TECHNICAL DATA

Voltage information¹

	Plastic		Metal	
Operating voltage	630 V	250 V	400 V	160 V
Rated impulse voltage	3,000 V	3,000 V	2,500 V	2,500 V
Degree of pollution	2	3	2	3

Mechanical data

Total mating force (average)	27 N
Total sliding force (average)	19 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

Insulator	PBT fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact springs	CuBe alloy
Contact plating	Au

No extra earth contact necessary. Earthing is provided via the insulator geometry.

Crimping tools from page [175](#)

Assembly and removal tools from page [184](#)

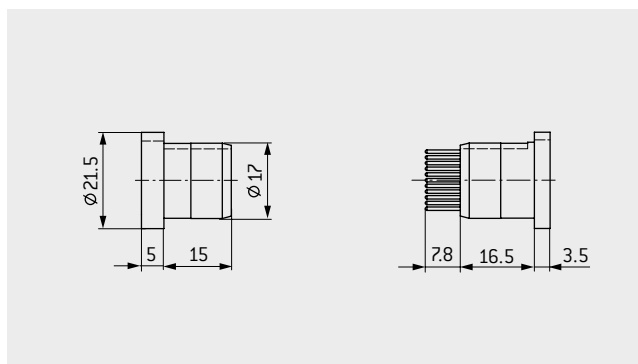
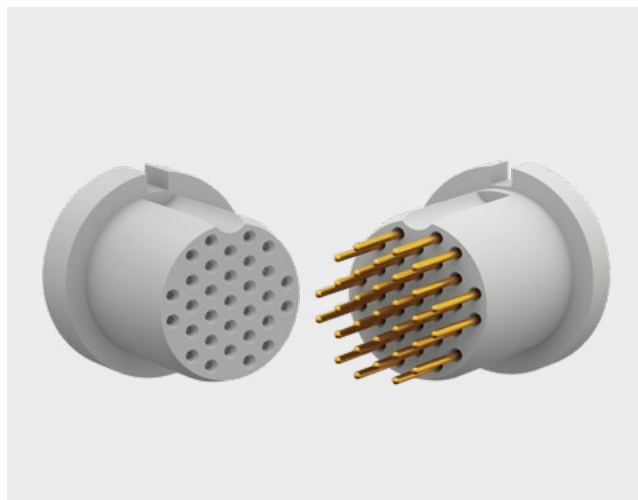
Description	Part number
Insulator socket	207.701.001.019.000
Insulator pin	207.801.001.019.000
Dummy contact	021.341.124.300.000

Description	Part number	Contact diameter	Conductor cross-section		Nominal current ² Single contact	Contact resistance
		mm	mm ²	AWG	A	mΩ
Socket contact	170.362.700.207.000	1.02	0.38–0.5	20–22	9	2
Pin contact	182.970.000.307.000					
Socket contact	172.368.700.207.000	1.02	1		12	2
Pin contact	182.972.000.307.000					

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page [191](#) ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

CONTACT INSERT

31 CONTACTS



Contact diameter: 0.76 mm
Conductor cross-section: 0.38/0.08–0.25 mm²

TECHNICAL DATA

Voltage information¹

	Plastic		Metal	
Operating voltage	320 V	80 V	250 V	50 V
Rated impulse voltage	2,500 V	2,500 V	2,000 V	2,000 V
Degree of pollution	2	3	2	3

Mechanical data

Total mating force (average)	44 N
Total sliding force (average)	31 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

Insulator	PBT fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact springs	CuBe alloy
Contact plating	Au

Without grounding contact, crimping tools from page [175](#)

Assembly and removal tools from page [184](#)

Description	Part number
Insulator socket	207.742.001.031.000
Insulator pin	207.842.001.031.000
Dummy contact	021.341.123.923.000

Description	Part number	Contact diameter mm	Conductor cross-section		Nominal current ² Single contact A	Contact resistance mΩ
			mm ²	AWG		
Socket contact	170.361.700.207.000	0.76	0.38	20	7.5	3.5
Pin contact	180.381.000.307.000					
Socket contact	170.540.700.207.000	0.76	0.08–0.25	24–28	6	3.5
Pin contact	180.570.000.307.000					

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page [191](#) ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

CONTACT INSERT

2+PE+9



Contact diameter: 1.5/1.02 mm
Conductor cross-section: 1.5/0.38–0.5 mm²

TECHNICAL DATA

Voltage information¹

for contact diameter 1,5

Material housing	Plastic		Metal	
Operating voltage	800 V	320 V	630 V	250 V
Rated impulse voltage	4,000 V	4,000 V	3,000 V	3,000 V
Degree of pollution	2	3	2	3

for contact diameter 1,02

Material housing	Plastic		Metal	
Rated voltage	630 V	250 V	400 V	160 V
Rated impulse voltage	3,000 V	3,000 V	2,500 V	2,500 V
Degree of pollution	2	3	2	3

Mechanical data

Total mating force (average)	22 N
Total sliding force (average)	16 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

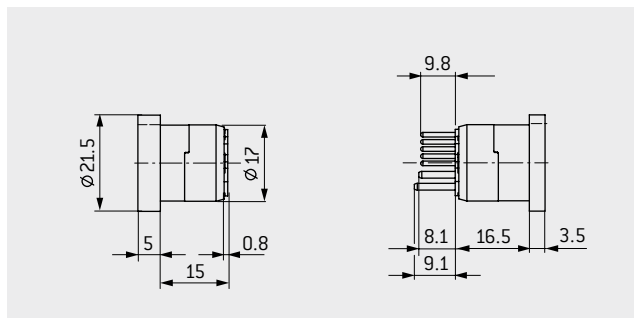
Materials

Insulator	PBT fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact springs	Cu alloy
Contact plating	Ag 1.5 mm /Au 1.02 mm

No extra earth contact necessary. Earthing is provided via the insulator geometry.

Crimping tools from page 175

Assembly and removal tools from page 184



Description	Part number
Insulator socket	207.700.001.012.000
Insulator pin	207.800.001.012.000
Dummy contact (Ø 1.5 mm)	021.341.125.923.000
Dummy contact (Ø 1.02 mm)	021.341.124.300.000

Description	Part number	Contact diameter	Conductor cross-section		Nominal current ² Single contact	Contact resistance
		mm	mm ²	AWG	A	mΩ
Socket contact (10, 11, E)	170.363.100.201.001	1.5	1.5		18	1.5
Pin contact (10, 11, E)	180.383.000.301.000					
Socket contact (1 to 9)	170.362.700.207.000	1.02	0.38–0.5	20–22	9	2
Pin contact (1 to 9)	180.382.000.307.000					

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

QUICK CHANGE HEAD

6+PE



Contact diameter: 2 mm

Conductor cross-section: 0.5–1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	160 V 32 V	160 V 32 V
Rated impulse voltage	2,500 V 2,500 V	2,500 V 2,500 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	55 N
Total sliding force (average)	29 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

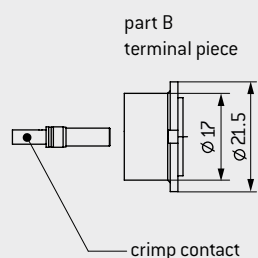
Materials

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

Crimping tools from page 182

Assembly and removal tools from page 184

SOCKET SIDE

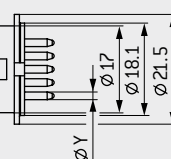


PIN SIDE

part A
connector piece

part C
connector piece

part D
terminal piece



Terminal pieces stay wired. Connector pieces are exchanged in the Docking System. Contacts at the terminal piece B and D are respectively crimp contacts.

Description	Part number	Contact diameter Ø X	Contact diameter Ø Y	Conductor cross-section	Nominal current ² single contact	Contact resistance
		mm	mm	mm ² AWG	A	mΩ
Socket insert A	252.087.001.007.000	2	1.5	0.5–1.5 20–22	16	6
Pin insert C	252.088.001.007.000				16	
Socket insert B	252.089.011.007.000	2	1.5	0.5–1.5 20–22	16	
Socket insert D	252.089.012.007.000				16	

¹ Acc. to IEC 60664-1:2007 [VDE 0110-1:2008], see page 191 ² Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

QUICK CHANGE HEAD

18+PE



Contact diameter: 1 mm
Conductor cross-section: 0.5–1 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	400 V 160 V	400 V 160 V
Rated impulse voltage	3,000 V 3,000 V	2,500 V 2,500 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	65 N
Total sliding force (average)	50 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

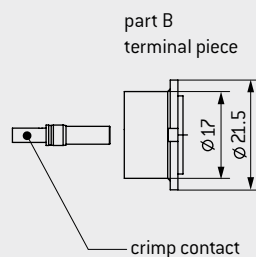
Materials

Insulator	PBT fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact springs	CuSn alloy
Contact plating	Au

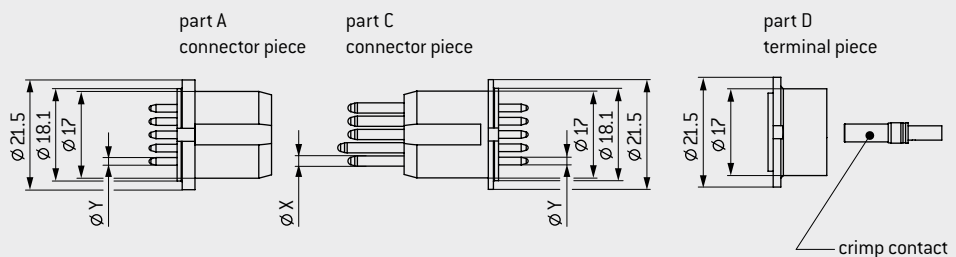
Crimping tools from page 182

Assembly and removal tools from page 184

SOCKET SIDE



PIN SIDE



Terminal pieces stay wired. Connector pieces are exchanged in the Docking System. Contacts at the terminal piece B and D are respectively crimp contacts.

Description	Part number	Contact diameter Ø X	Contact diameter Ø Y	Conductor cross-section		Nominal current ² Single contact	Contact resistance
		mm	mm	mm ²	AWG	A	mΩ
Socket insert A	252.087.001.019.000	1	0.9			12	9
Pin insert C	252.088.001.019.000						
Socket insert B	252.089.011.019.000	1	0.9	0.5–1		12	
Socket insert D	252.089.012.019.000						

¹ Acc. to IEC 60664-1:2007 [VDE 0110-1:2008], see page 191 ² Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

FOR YOUR NOTES



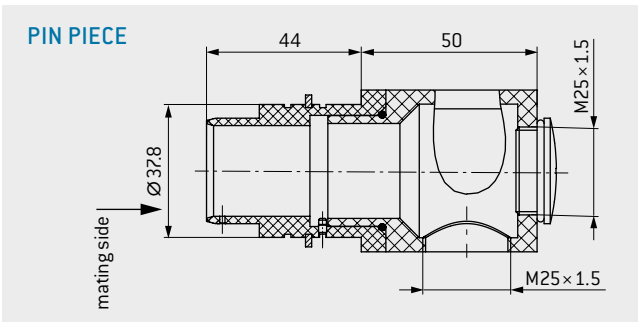
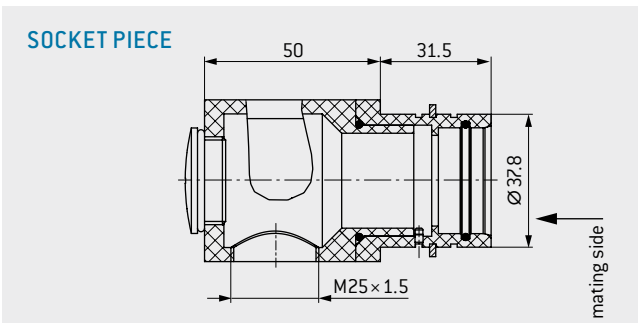
ODU DOCK



ODU DOCK SIZE 2

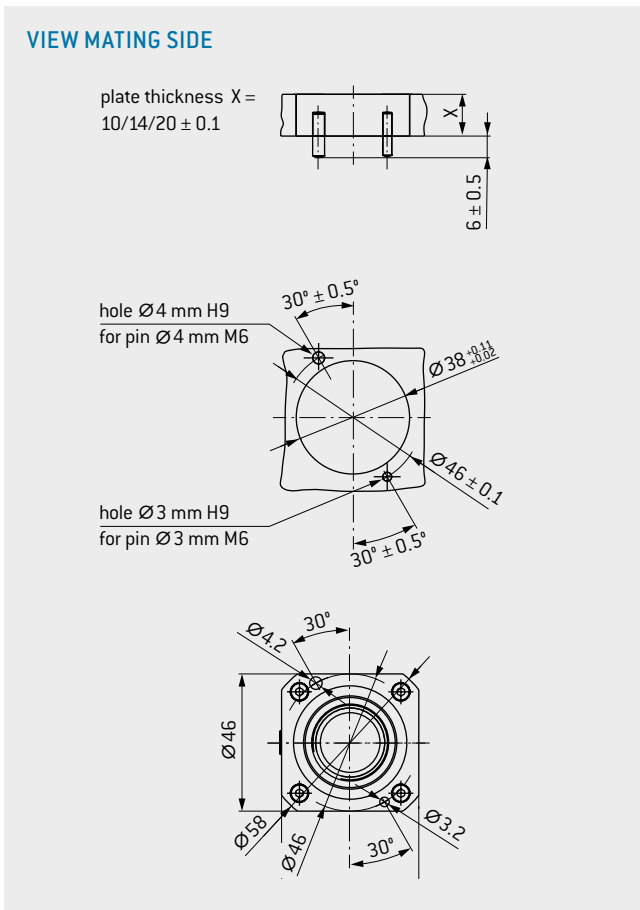
Housing	150
Pin and socket inserts	152
Quick Change Head	156

PLASTIC HOUSING



TECHNICAL DATA

Material	POM, black
Protection class ¹	IP65 (in mated condition)
Operating temperature	–40 °C to +100 °C
Cable exit	straight and right-angled



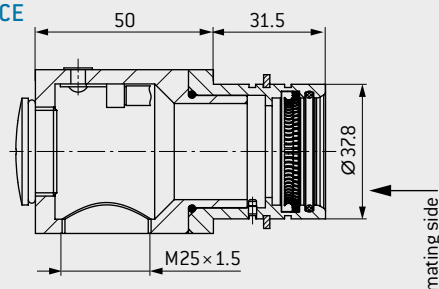
Description	Part number	IP40	IP65
Socket piece	656.162.011.000.000		•
Pin piece	656.162.012.000.000		•

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

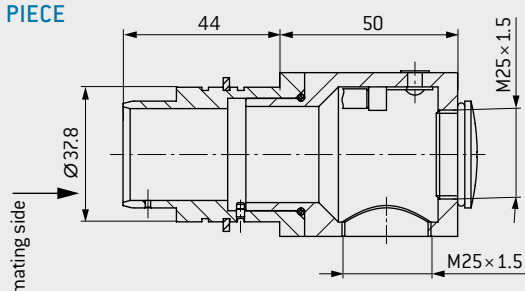
ALUMINUM HOUSING, NICKEL-PLATED



SOCKET PIECE



PIN PIECE

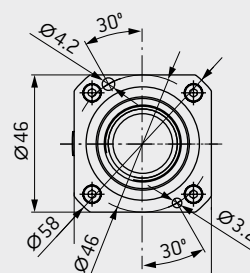
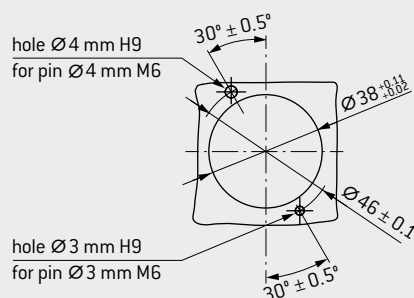
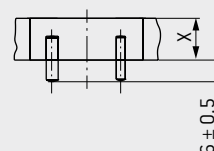


TECHNICAL DATA

Material	Aluminum, nickel-plated
Protection class ¹	IP65 (while mated, depending on version)
Operating temperature	–40 °C to +100 °C
Cable exit	straight and right-angled
EMC protection	optional

VIEW MATING SIDE

plate thickness $X =$
10/14/20 ± 0.1

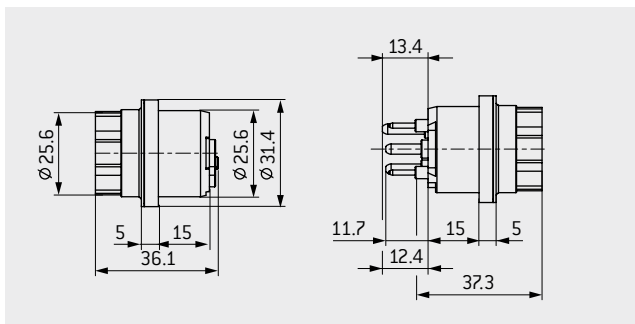
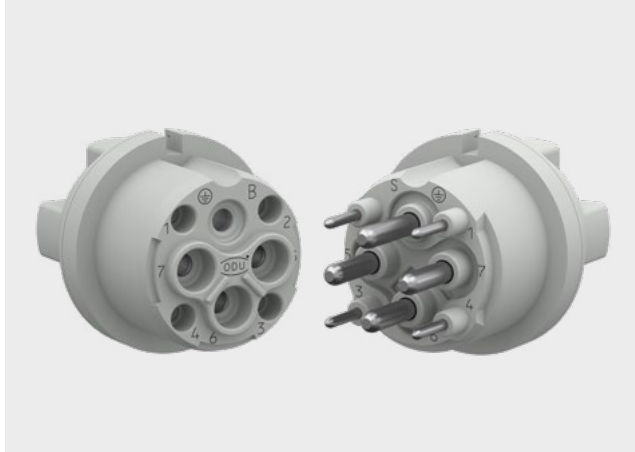


Description	Part number	IP40	IP65	EMC protection
Socket piece	656.162.021.000.000		•	•
	656.162.023.000.000	•		
	656.162.024.000.000	•		•
	656.162.025.000.000		•	
Pin piece	656.162.022.000.000	•	•	•

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

CONTACT INSERT

3+PE+4



Description	Part number
Insulator socket	208.700.001.008.000
Insulator pin	208.800.001.008.000
Dummy contact socket/pin (Ø 3 mm)	021.341.136.924.000
Dummy contact socket (Ø 1.5 mm)	021.341.131.923.000
Dummy contact socket (Ø 1.5 mm)	021.341.132.923.000

Contact diameter: 3/1.5 mm
Conductor cross-section: 4/2.5/1.5 mm²

TECHNICAL DATA

Voltage information¹ for contact diameter 3

Material housing	Plastic	Metal
Operating voltage	1,600 V 800 V	1,600 V 800 V
Rated impulse voltage	8,000 V 8,000 V	6,000 V 6,000 V
Degree of pollution	2 3	2 3

for contact diameter 1.5

Material housing	Plastic	Metal
Rated voltage	1,600 V 800 V	630 V 250 V
Rated impulse voltage	8,000 V 8,000 V	4,000 V 4,000 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	57 N
Total sliding force (average)	36 N
Operating temperature	-40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

No extra earth contact necessary. Earthing is provided via the insulator geometry.

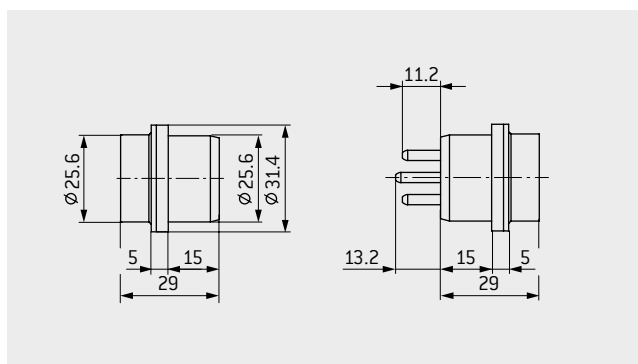
Crimping tools from page [175](#)

Assembly and removal tools from page [184](#)

Description	Part number	Contact diameter	Conductor cross-section	Nominal current ² Single contact	Contact resistance
		mm	mm ² AWG	A	mΩ
Socket contact	172.085.100.201.000	3	4	35	1
Pin contact	182.085.000.301.000				
Socket contact	170.382.000.201.000	3	2.5	25	1
Pin contact	180.335.000.301.000				
Socket contact	170.499.100.201.000	3	1.5	19	1
Pin contact	180.375.000.301.000				
Socket contact	170.363.100.201.001	1.5	1.5	18	1.5
Pin contact	181.135.000.301.000				

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page [191](#) ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

CONTACT INSERT 4+PE



Contact diameter: 3 mm
Conductor cross-section: 2.5/1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	800 V 320 V	800 V 320 V
Rated impulse voltage	4,000 V 4,000 V	4,000 V 4,000 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	57 N
Total sliding force (average)	34 N
Operating temperature	-40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Crimping tools from page 175

Assembly and removal tools from page 184

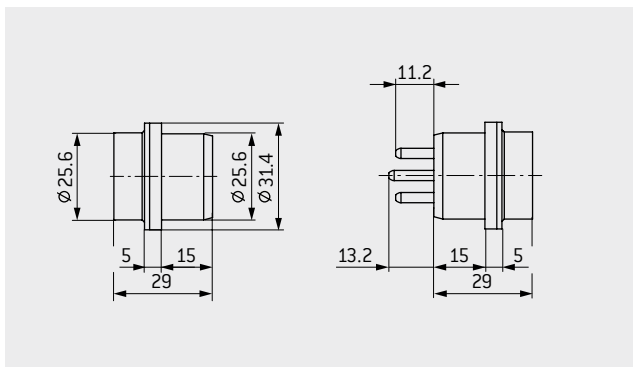
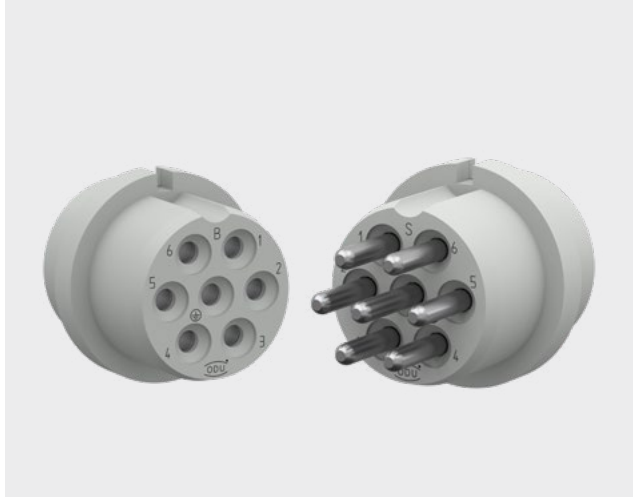
Description	Part number
Insulator socket	208.703.004.005.000
Insulator pin	208.803.004.005.000
Dummy contact	021.341.136.304.000

Description	Part number	Contact diameter	Conductor cross-section	Nominal current ² Single contact	Contact resistance
		mm	mm ² AWG	A	mΩ
Socket contact	170.382.000.201.000	3	2.5	25	1
Pin contact	180.334.000.301.000				
Earthing pin contact	180.335.000.301.000				
Socket contact	170.499.100.201.000	3	1.5	19	1
Pin contact	180.374.000.301.000				
Earthing pin contact	180.375.000.301.000				

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

CONTACT INSERT

6+PE



Contact diameter: 3 mm
Conductor cross-section: 2.5/1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	800 V 320 V	800 V 320 V
Rated impulse voltage	4,000 V 4,000 V	4,000 V 4,000 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	79 N
Total sliding force (average)	48 N
Operating temperature	-40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Without grounding contact, crimping tools from page [175](#)

Assembly and removal tools from page [184](#)

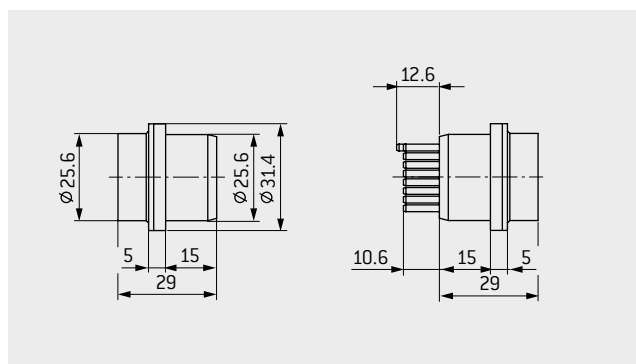
Description	Part number
Insulator socket	208.703.004.007.000
Insulator pin	208.803.004.007.000
Dummy contact	021.341.136.304.000

Description	Part number	Contact diameter	Conductor cross-section	Nominal current ² Single contact	Contact resistance
		mm	mm ² AWG	A	mΩ
Socket contact	170.382.000.201.000	3	2.5	25	1
Pin contact	180.334.000.301.000				
Earthing pin contact	180.335.000.301.000				
Socket contact	170.499.100.201.000	3	1.5	19	1
Pin contact	180.374.000.301.000				
Earthing pin contact	180.375.000.301.000				

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page [191](#) ²Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

CONTACT INSERT

15+PE



Contact diameter: 2 mm
Conductor cross-section: 1/1.5 mm²

TECHNICAL DATA

Voltage information¹

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

Mechanical data

Total mating force (average)	120 N
Total sliding force (average)	60 N
Operating temperature	-40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Crimping tools from page 175

Assembly and removal tools from page 184

Description	Part number
Insulator socket	208.702.004.016.000
Insulator pin	208.802.004.016.000
Dummy contact	021.341.135.924.000

Description	Part number	Contact diameter	Conductor cross-section		Nominal current ² Single contact	Contact resistance
		mm	mm ²	AWG	A	mΩ
Socket contact	170.381.000.201.000	2	1.5		18	1.5
Pin contact	180.332.000.301.000					
Earthing pin contact	180.333.000.301.000					
Socket contact	170.827.100.201.000	2	1		15	1.5
Pin contact	180.827.000.301.000					
Earthing pin contact	180.828.000.301.000					

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

QUICK CHANGE HEAD

6+PE



Contact diameter: 3 mm

Conductor cross-section: 0.5–1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	400 V 250 V	400 V 250 V
Rated impulse voltage	4,000 V 4,000 V	4,000 V 4,000 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	82 N
Total sliding force (average)	50 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

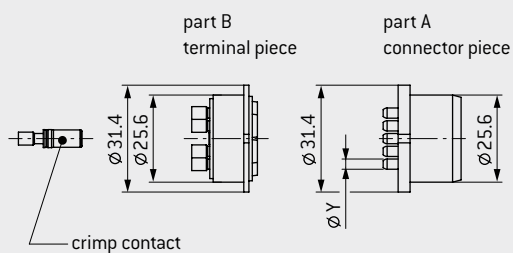
Materials

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

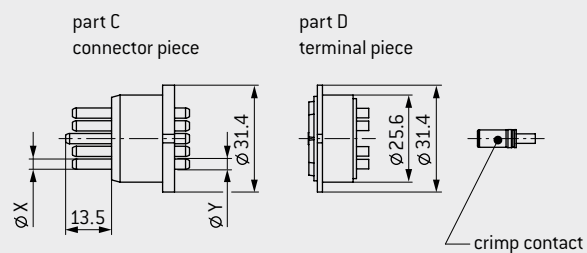
Crimping tools from page [182](#)

Assembly and removal tools from page [184](#)

SOCKET SIDE



PIN SIDE



Terminal pieces stay wired. Connector pieces are exchanged in the Docking System. Contacts at the terminal piece B and D are respectively crimp contacts.

Description	Part number	Contact diameter Ø X	Contact diameter Ø Y	Conductor cross-section	Nominal current ² Single contact	Contact resistance
		mm	mm	mm ² AWG	A	mΩ
Socket insert A	252.080.001.007.000	3	3		18	2.5
Pin insert C	252.081.001.007.000					
Socket insert B	252.082.011.107.150	3	3	0.5–1.5	18	
Socket insert D	252.082.012.107.150					

¹ Acc. to IEC 60664-1:2007 [VDE 0110-1:2008], see page [191](#) ²Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

QUICK CHANGE HEAD

15+PE



Contact diameter: 2 mm

Conductor cross-section: 0.5–1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic		Metal	
Operating voltage	160 V	32 V	160 V	32 V
Rated impulse voltage	2,500 V	2,500 V	2,500 V	2,500 V
Degree of pollution	2	3	2	3

Mechanical data

Total mating force (average)	126 N
Total sliding force (average)	66 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

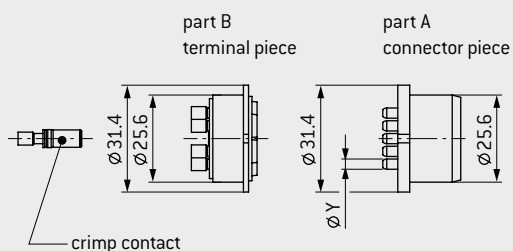
Materials

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

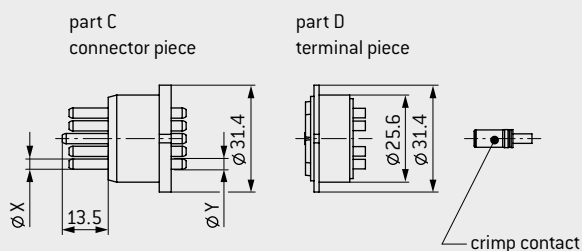
Crimping tools from page [182](#)

Assembly and removal tools from page [184](#)

SOCKET SIDE



PIN SIDE



Terminal pieces stay wired. Connector pieces are exchanged in the Docking System. Contacts at the terminal piece B and D are respectively crimp contacts.

Description	Part number	Contact diameter Ø X	Contact diameter Ø Y	Conductor cross-section	Nominal current ² Single contact	Contact resistance
		mm	mm	mm ² AWG	A	mΩ
Socket insert A	252.080.001.016.000	2	1.5	0.5–1.5	16	6
Pin insert C	252.081.001.016.000					
Socket insert B	252.082.011.016.000					
Socket insert D	252.082.012.016.000					

¹ Acc. to IEC 60664-1:2007 [VDE 0110-1:2008], see page [191](#) ² Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K. When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).



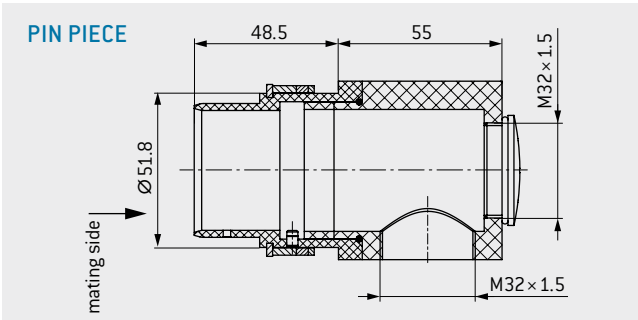
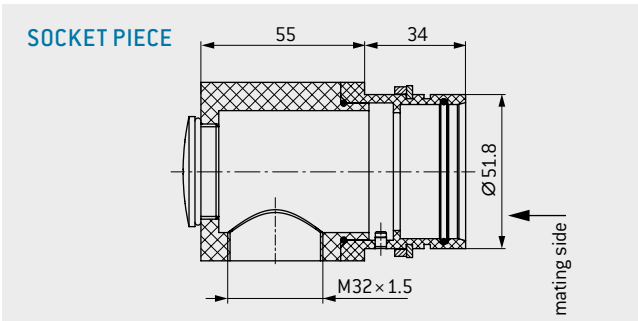
ODU DOCK



ODU DOCK SIZE 3

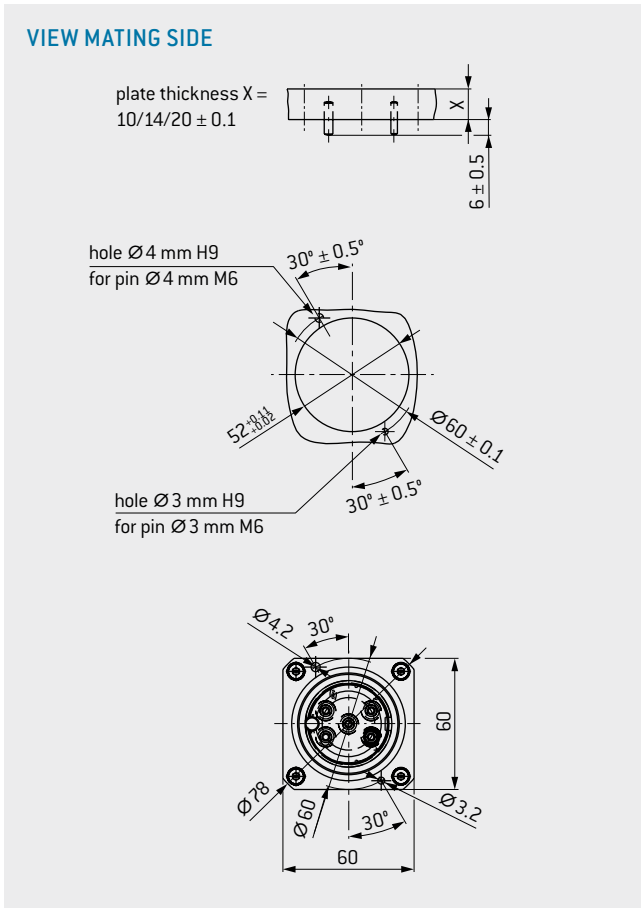
Housing	160
Pin and socket inserts	162
Quick Change Head	168
Flexible application with ODU-MAC® modules	171

PLASTIC HOUSING



TECHNICAL DATA

Material	POM, black
Protection class ¹	IP65 (in mated condition)
Operating temperature	–40 °C to +100 °C
Cable exit	straight and right-angled



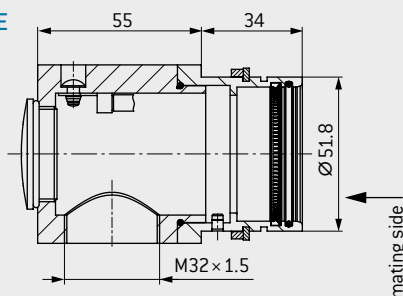
Description	Part number	IP40	IP65
Socket piece	656.163.011.000.000		•
Pin piece	656.163.012.000.000		•

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

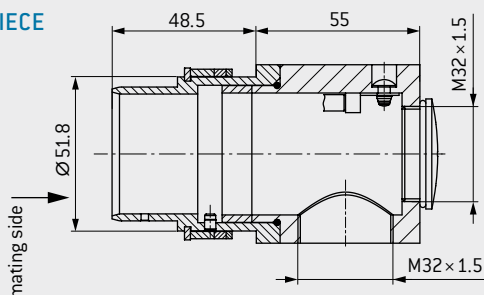
ALUMINUM HOUSING, NICKEL-PLATED



SOCKET PIECE



PIN PIECE

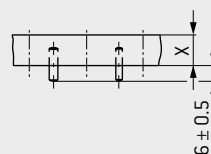


TECHNICAL DATA

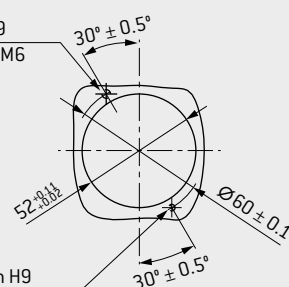
Material	Aluminum, nickel-plated
Protection class ¹	IP65 (while mated, depending on version)
Operating temperature	–40 °C to +100 °C
Cable exit	straight and right-angled
EMC protection	optional

VIEW MATING SIDE

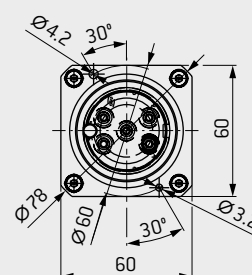
plate thickness X =
10/14/20 ± 0.1



hole Ø4 mm H9
for pin Ø4 mm M6



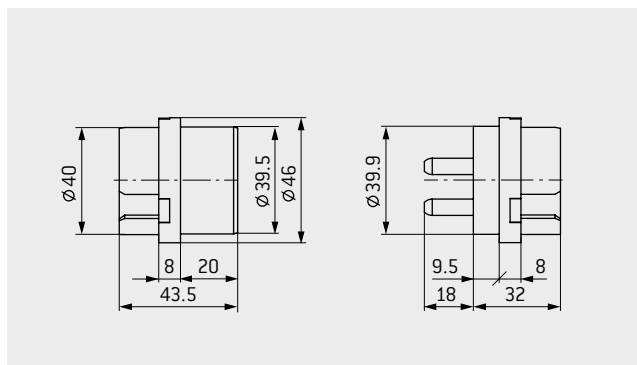
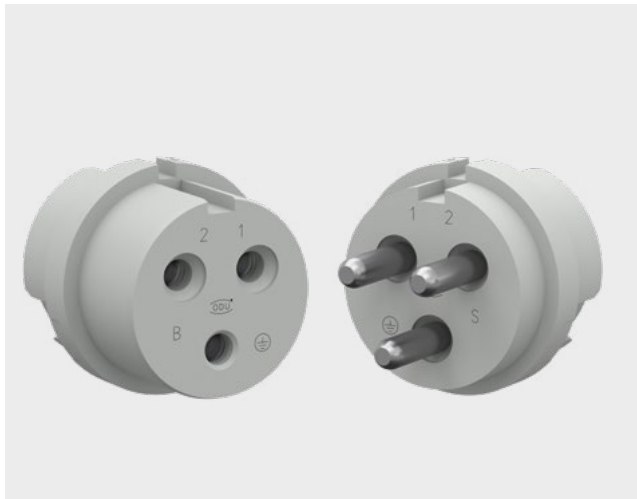
hole Ø3 mm H9
for pin Ø3 mm M6



Description	Part number	IP40	IP65	EMC protection
Socket piece	656.163.021.000.000		•	•
	656.163.023.000.000	•		
	656.163.024.000.000	•		•
	656.163.025.000.000		•	
Pin piece	656.163.022.000.000	•	•	•

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

CONTACT INSERT 2+PE



Contact diameter: 6 mm

Conductor cross-section: 16/6/2.5 mm²

TECHNICAL DATA

Voltage information¹

	Plastic		Metal	
Material housing	1,600 V	800 V	1,000 V	400 V
Operating voltage	6,000 V	6,000 V	5,000 V	5,000 V
Rated impulse voltage	2	3	2	3
Degree of pollution				

Mechanical data

Total mating force (average)	54 N
Total sliding force (average)	32 N
Operating temperature	-40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Insulator without holding clip – contacts are inserted from the side.

Crimping tools from page [175](#)

Assembly and removal tools from page [184](#)

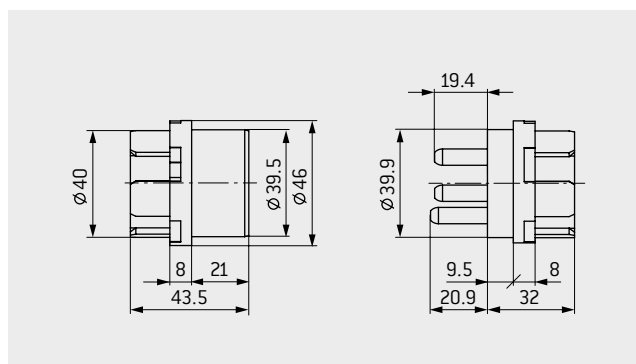
Description	Part number
Insulator socket	209.706.004.003.000
Insulator pin	209.806.004.003.000

Description	Part number	Contact diameter	Conductor cross-section		Nominal current ² Single contact	Contact resistance
			mm ²	AWG	A	mΩ
Socket contact	172.929.100.201.000	6	16		80	0.5
Pin contact	181.146.000.301.000					
Earthing socket contact	172.930.100.201.000					
Socket contact	172.927.100.201.000	6	6		46	0.5
Pin contact	181.144.000.301.000					
Earthing socket contact	172.928.100.201.000					
Socket contact	172.925.100.201.000	6	2.5		25	1
Pin contact	181.142.000.301.000					
Earthing socket contact	172.926.100.201.000					

¹ Acc. to IEC 60664-1:2007 [VDE 0110-1:2008], see page [191](#) ² Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

CONTACT INSERT

4+PE



Description	Part number
Insulator socket	209.706.004.005.000
Insulator pin	209.806.004.005.000

Contact diameter: 6 mm
Conductor cross-section: 16 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	1,250 V 500 V	1,000 V 400 V
Rated impulse voltage	6,000 V 6,000 V	5,000 V 5,000 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	90 N
Total sliding force (average)	53 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

No extra earth contact necessary. Earthing is provided via the insulator geometry. Insulator without holding clip – contacts are inserted from the side.

Crimping tools from page [175](#)

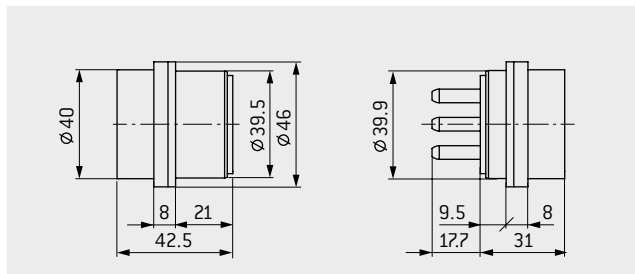
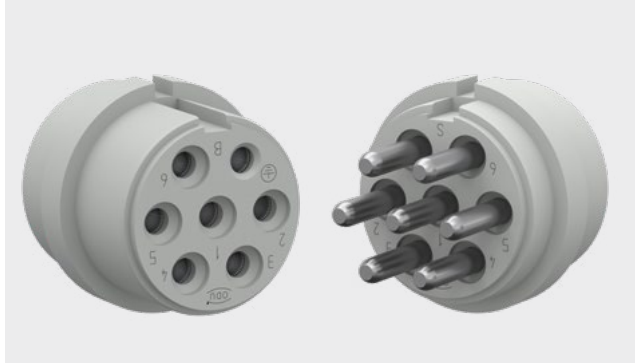
Assembly and removal tools from page [184](#)

Description	Part number	Contact diameter	Conductor cross-section	Nominal current ² Single contact	Contact resistance
		mm	mm ² AWG	A	mΩ
Socket contact	172.650.100.201.000	6	16	80	0.5
Pin contact	182.504.000.301.000				

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page [191](#) ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

CONTACT INSERT

6+PE



Description	Part number
Insulator socket	209.705.004.007.000
Insulator pin	209.805.004.007.000
Dummy contact (socket)	021.341.141.924.000
Dummy contact (pin)	021.341.142.924.000

Contact diameter: 5 mm

Conductor cross-section: 10/6/4/1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	1,600 V 630 V	1,600 V 630 V
Rated impulse voltage	6,000 V 6,000 V	6,000 V 6,000 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	158 N
Total sliding force (average)	126 N
Operating temperature	-40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Crimping tools from page 175

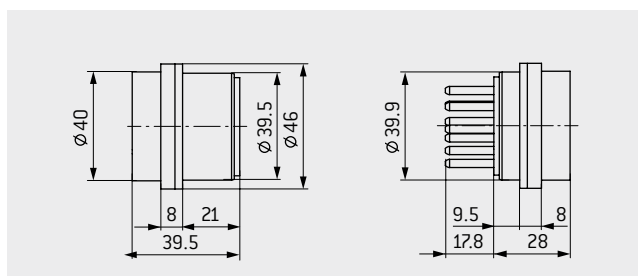
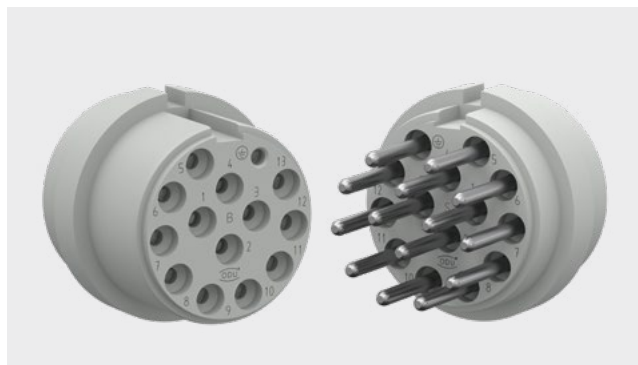
Assembly and removal tools from page 184

Description	Part number	Contact diameter mm	Conductor cross-section		Nominal current ² Single contact A	Contact resistance mΩ
			mm ²	AWG		
Socket contact	170.633.100.201.000	5	10		65	0.5
Pin contact	180.633.000.301.000					
Earthing socket contact	170.634.100.201.000					
Socket contact	170.452.100.201.000	5	6		46	1
Pin contact	180.452.000.301.000					
Earthing socket contact	170.453.100.201.000					
Socket contact	172.931.100.201.000	5	4		39	1
Pin contact	181.140.000.301.000					
Earthing socket contact	172.932.100.201.000					
Socket contact	170.492.100.201.000	5	1.5		19	1
Pin contact	180.492.000.301.000					
Earthing socket contact	170.493.100.201.000					

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

CONTACT INSERT

13+PE



Description	Part number
Insulator socket	209.703.004.014.000
Insulator pin	209.803.004.014.000
Dummy contact (socket)	021.341.137.300.000
Dummy contact (pin)	021.341.138.300.000

Contact diameter: 3 mm
Conductor cross-section: 4/2.5/1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	1,600 V 630 V	1,600 V 630 V
Rated impulse voltage	5,000 V 5,000 V	5,000 V 5,000 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	158 N
Total sliding force (average)	95 N
Operating temperature	-40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Crimping tools from page 175

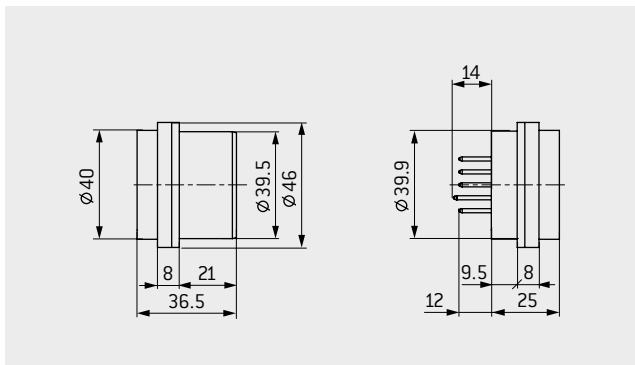
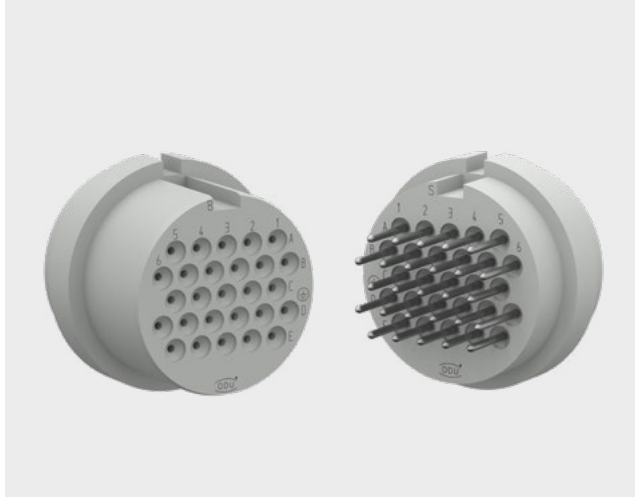
Assembly and removal tools from page 184

Description	Part number	Contact diameter	Conductor cross-section	Nominal current ² Single contact	Contact resistance
		mm	mm ² AWG	A	mΩ
Socket contact	172.160.100.201.000	3	4	35	1
Pin contact	181.160.000.301.000				
Earthing socket contact	172.161.100.201.000				
Socket contact	172.918.100.201.000	3	2.5	25	1
Pin contact	181.138.000.301.000				
Earthing socket contact	172.919.100.201.000				
Socket contact	172.916.100.201.000	3	1.5	19	1
Pin contact	181.136.000.301.000				
Earthing socket contact	172.917.100.201.000				

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

CONTACT INSERT

26+PE



Description	Part number
Insulator socket	209.745.004.027.000
Insulator pin	209.845.004.027.000
Dummy contact (socket)	021.341.131.923.000
Dummy contact (pin)	021.341.132.923.000

Contact diameter: 1.5 mm

Conductor cross-section: 1.5/0.38–0.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic		Metal	
Operating voltage	800 V	320 V	800 V	320 V
Rated impulse voltage	4,000 V	4,000 V	4,000 V	4,000 V
Degree of pollution	2	3	2	3

Mechanical data

Total mating force (average)	162 N
Total sliding force (average)	102 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Crimping tools from page 175

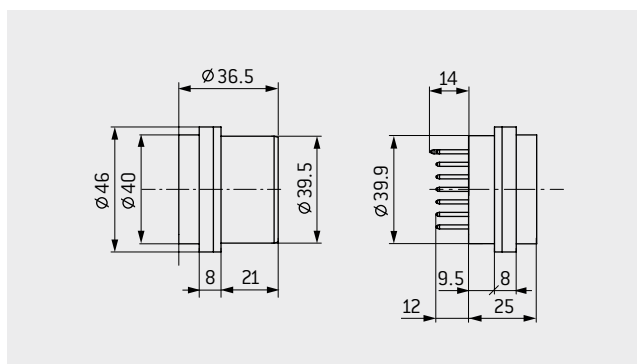
Assembly and removal tools from page 184

Description	Part number	Contact diameter	Conductor cross-section		Nominal current ² Single contact	Contact resistance
		mm	mm ²	AWG	A	mΩ
Socket contact	170.370.000.201.000	1.5	1.5	22	18	2
Pin contact	181.134.000.301.000					
Earthing pin contact	181.135.000.301.000					
Socket contact	172.912.100.201.000	1.5	0.38–0.5		10	2.5
Pin contact	181.132.000.301.000					
Earthing pin contact	181.133.000.301.000					

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

CONTACT INSERT

36+PE



Contact diameter: 1.5 mm
Conductor cross-section: 1.5/0.38–0.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	800 V 320 V	800 V 320 V
Rated impulse voltage	4,000 V 4,000 V	4,000 V 4,000 V
Degree of pollution	2 3	2 3

Mechanical data

Total mating force (average)	222 N
Total sliding force (average)	139 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Crimping tools from page 175

Assembly and removal tools from page 184

Description	Part number
Insulator socket	209.745.004.037.000
Insulator pin	209.845.004.037.000
Dummy contact (socket)	021.341.131.923.000
Dummy contact (pin)	021.341.132.923.000

Description	Part number	Contact diameter	Conductor cross-section	Nominal current ² single contact	Contact resistance
		mm	mm ² AWG	A	mΩ
Socket contact	170.370.000.201.000	1.5	1.5 22	18	2
Pin contact	181.134.000.301.000				
Earthing pin contact	181.135.000.301.000				
Socket contact	172.912.100.201.000	1.5	0.38–0.5	10	2.5
Pin contact	181.132.000.301.000				
Earthing pin contact	181.133.000.301.000				

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page 191 ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page 197.

QUICK CHANGE HEAD 26+PE



Contact diameter: 1.5 mm
Conductor cross-section: 0.5–1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic		Metal	
Operating voltage	200 V	63 V	200 V	63 V
Rated impulse voltage	3,000 V	3,000 V	3,000 V	3,000 V
Degree of pollution	2	3	2	3

Mechanical data

Total mating force (average)	173 N
Total sliding force (average)	112 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

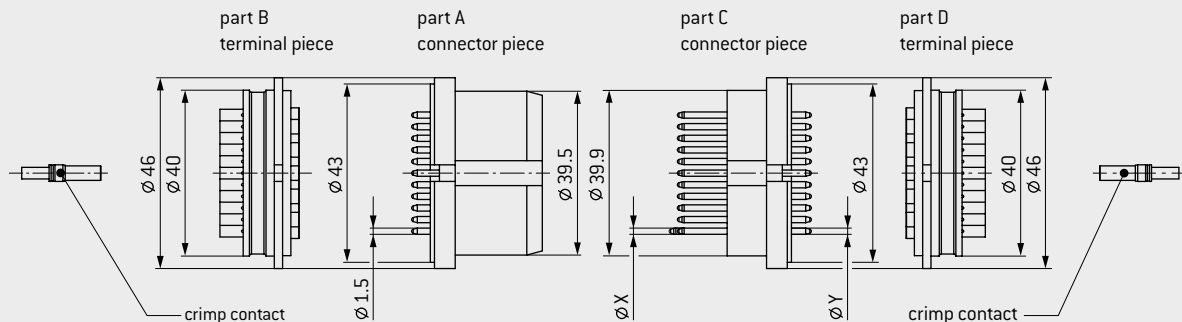
Insulator	PBT fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact springs	CuSn alloy
Contact plating	Ag

Crimping tools from page [182](#)

Assembly and removal tools from page [184](#)

SOCKET SIDE

PIN SIDE



Terminal pieces stay wired. Connector pieces are exchanged in the Docking System. Contacts at the terminal piece B and D are respectively crimp contacts.

Description	Part number	Contact diameter Ø X	Contact diameter Ø Y	Conductor cross-section	Nominal current ² Single contact	Contact resistance
		mm	mm	mm ² AWG	A	mΩ
Socket insert A	252.058.002.027.000	1.5	1.5	0.5–1.5	16	?
Pin insert C	252.059.002.027.000					
Socket insert B	252.061.012.027.000					
Socket insert D	252.061.013.027.000					

¹ Acc. to IEC 60664-1:2007 (VDE 0110-1:2008), see page [191](#) ² Determined acc. to IEC 60512-5-1:2002 (DIN EN 60512-5-1:2003) at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

QUICK CHANGE HEAD

36+PE



Contact diameter: 1.5 mm
Conductor cross-section: 0.5–1.5 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic		Metal	
Operating voltage	160 V	40 V	160 V	40 V
Rated impulse voltage	2,500 V	2,500 V	2,500 V	2,500 V
Degree of pollution	2	3	2	3

Mechanical data

Total mating force (average)	237 N
Total sliding force (average)	153 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

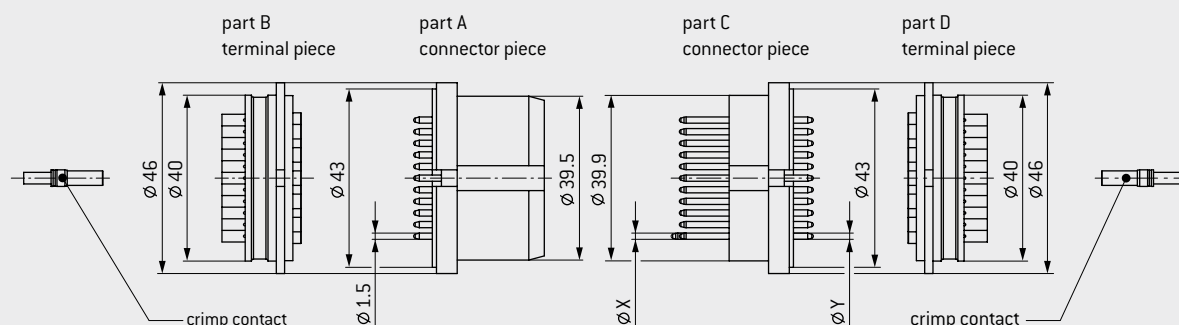
Insulator	PBT fiber glass reinforced acc. to UL 94
Contact body	Cu alloy
Contact springs	CuSn alloy
Contact plating	Ag

Crimping tools from page [182](#)

Assembly and removal tools from page [184](#)

SOCKET SIDE

PIN SIDE



Terminal pieces stay wired. Connector pieces are exchanged in the Docking System. Contacts at the terminal piece B and D are respectively crimp contacts.

Description	Part number	Contact diameter Ø X	Contact diameter Ø Y	Conductor cross-section		Nominal current ² Single contact	Contact resistance
		mm	mm	mm ²	AWG	A	mΩ
Socket insert A	252.058.001.037.000	1.5	1.5			16	7
Pin insert C	252.059.002.037.000						
Socket insert B	252.061.011.037.000	1.5	1.5	0.5–1.5		16	
Socket insert D	252.061.012.037.000						

¹ Acc. to IEC 60664-1:2007 [VDE 0110-1:2008], see page [191](#) ² Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

QUICK CHANGE HEAD

13+PE



Contact diameter: 3 mm
Conductor cross-section: 2.5–4 mm²

TECHNICAL DATA

Voltage information¹

Material housing	Plastic	Metal
Operating voltage	630 V	630 V
Rated impulse voltage	5,000 V	4,000 V
Degree of pollution	3	3

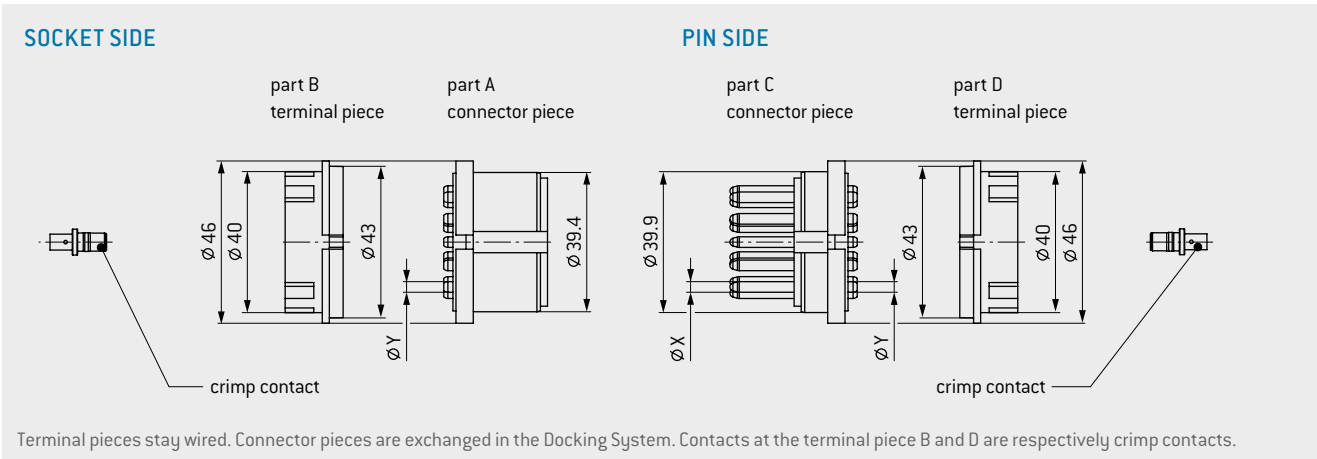
Mechanical data

Total mating force (average)	163 N
Total sliding force (average)	100 N
Operating temperature	–40 °C to +120 °C
Mating cycles	minimum 100,000

Materials

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

Crimping tools from page [182](#)
Assembly and removal tools from page [184](#)

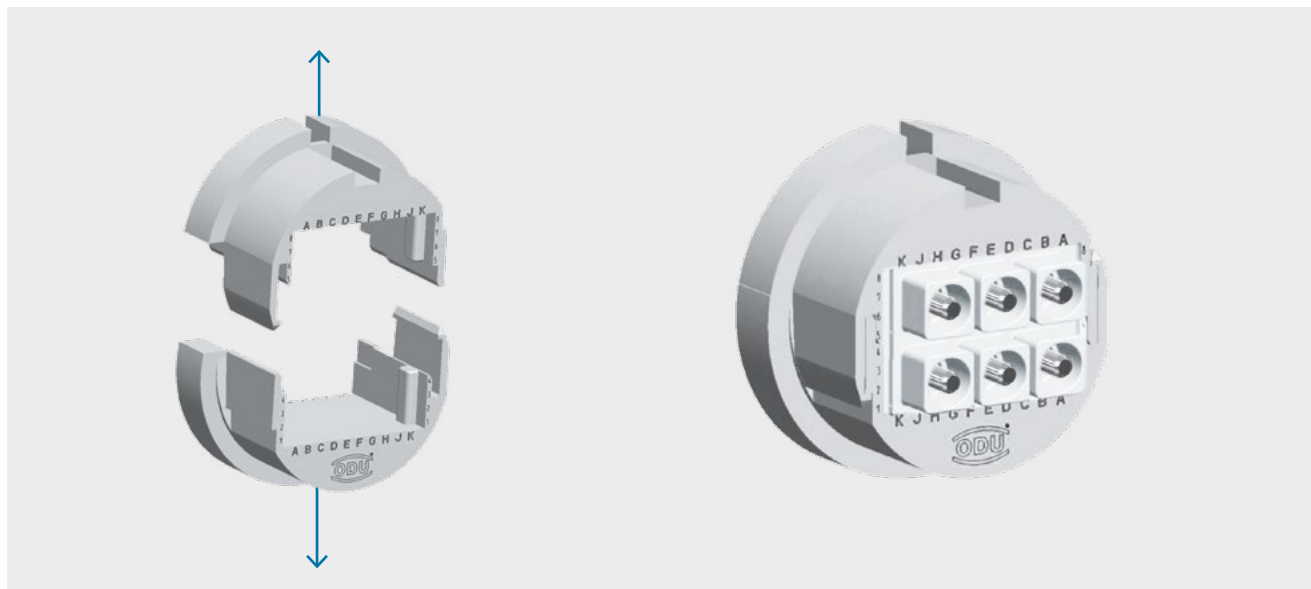


Description	Part number	Contact diameter Ø X	Contact diameter Ø Y	Conductor cross-section		Nominal current ² single contact	Contact resistance
		mm	mm	mm ²	AWG	A	mΩ
Socket insert A	252.058.002.014.000	3	3			30	3.5
Pin insert C	252.059.002.014.000						
Socket insert B	252.061.003.014.000	3	3	2.5–4		30	
Socket insert D	252.061.004.014.000						

¹ Acc. to IEC 60664-1:2007 [VDE 0110-1:2008], see page [191](#) ² Determined acc. to IEC 60512-5-1:2002 [DIN EN 60512-5-1:2003] at a temperature increase of 45 K: When determining the current-carrying capacity for a fully equipped insert, take the reduction factor into account, see page [197](#).

FLEXIBLE CIRCULAR CONNECTORS WITH ODU-MAC® MODULES

Suitable for rugged housing ODU DOCK Silver-Line size 3



Modular circular connectors from the existing portfolio can be easily configured with the flexible ODU-MAC® inserts. The flexible insulators (half shells) are compatible with ODU DOCK Silver-Line size 3 housings and can be easily installed in them. The result is a modular circular connector with a very robust housing.

The flexible use provides space for ODU-MAC® modules with 8 units. Thanks to the divided insulator, installation of ODU-MAC® modules is possible without a large expenditure of time. The modules are easily inserted into the insulator. Following the completed contact arrangement, the two halves are clipped together and integrated into the respective housing.

Due to the combination of two proven ODU products you can arrange the inserts individually:

- Combination of ODU DOCK housings with integrated modules from the ODU-MAC® program
- Space for 8 units (1 unit = 2.54 mm)
- Material insulator: PBT

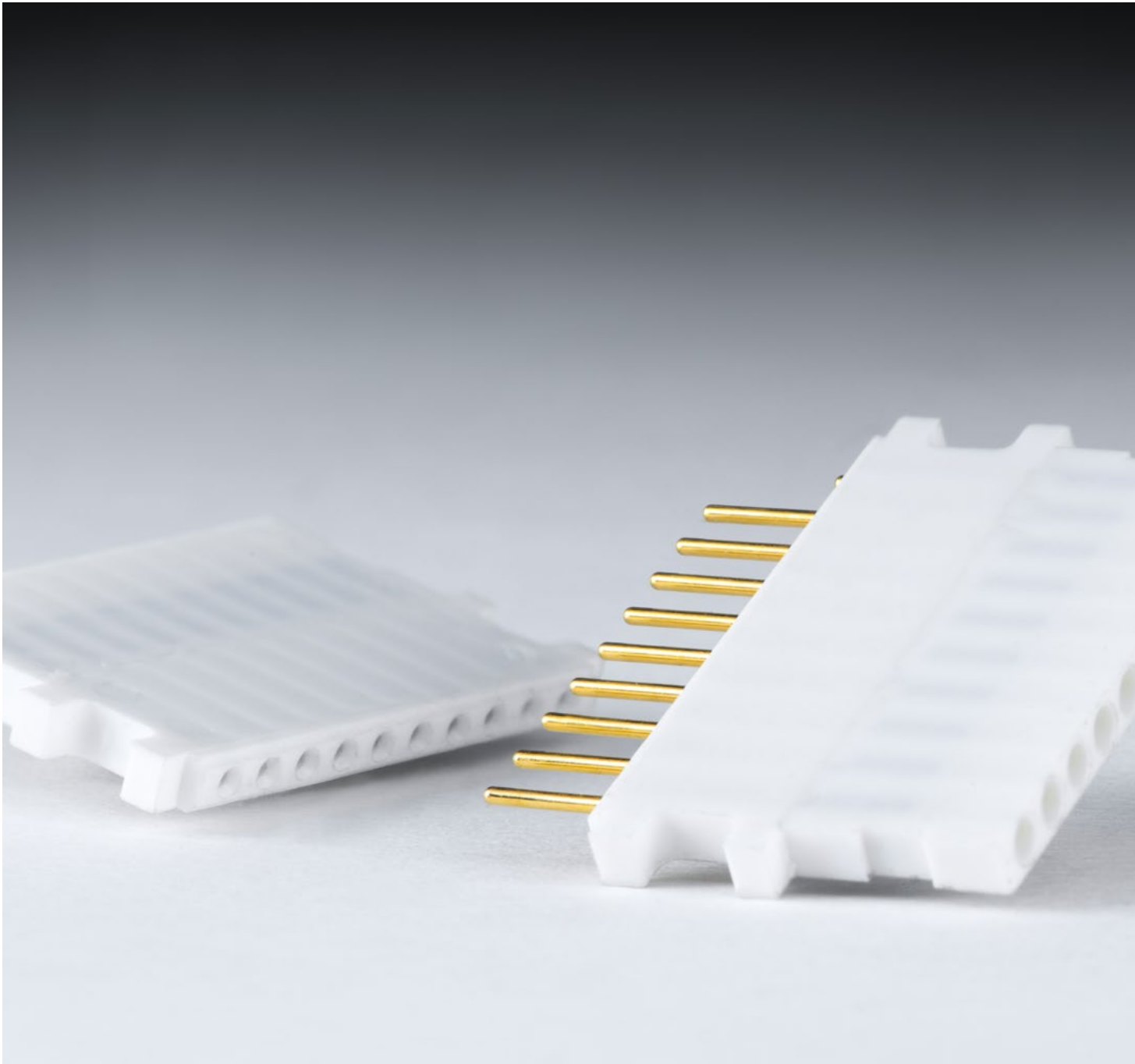
Description	Part number	Part number
	Insulator socket	Insulator pin
Insulator half-shells	209.610.000.000.000	209.611.000.000.000

NOTE

- Recommendation: use first make/last break contacts from Ø 1.02 mm
- Assembly instruction available on our [website](#)

FURTHER INFORMATION ON ODU-MAC® MODULES FROM PAGE 44. NOTE ALSO THE ODU DOCK ICON





ODU-MAC®



TOOLS AND ACCESSORIES

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Crimp information	178
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Removal of contacts	185
Cable clamps and locknuts	186
Service kit for ODU SPRINGTAC® and ODU LAMTAC® contacts	187

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.



CRIMPING TOOLS



For further crimp information please refer to the tables from page [178](#).

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 mm²



With crimp dies

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 [179](#).

Has to be ordered separately

HEXAGONAL CRIMPING TOOL FOR COAX-CONTACTS



With crimp dies

PART NUMBER ZANGE: 080.000.039.000.000

CRIMPING JAWS PLEASE SEE PAGE [178](#).

Has to be ordered separately

CRIMPING TOOLS



For further crimp information please refer to the tables from page [178](#).

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.

HYDRAULIC CRIMPING TOOL



With crimp dies

PART NUMBER ZANGE: 080.000.026.000.000

For cross-sections of 10 mm² and 16 mm²

With safety valve, which opens automatically if the pressure required for full compression is reached.

CRIMPING JAWS PLEASE SEE PAGE [181](#)

Has to be ordered separately

8-POINT CRIMPING TOOL FOR CROSS-SECTIONS FROM 0.38 TO 2.5 mm²



With crimp dies

PART NUMBER: 080.000.038.000.000

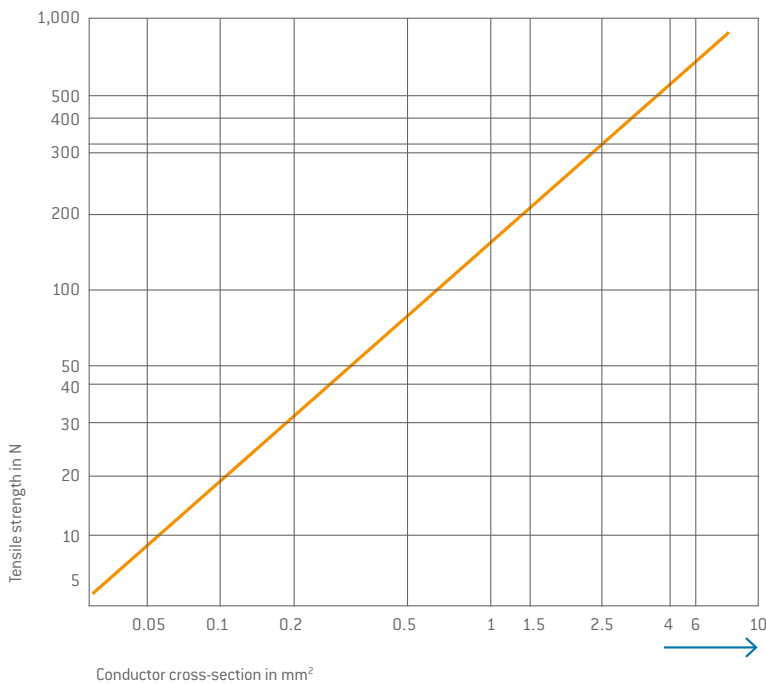
Single contacts are positioned manually in the pliers and get crimped.

TENSILE STRENGTH FOR CRIMP TERMINATIONS



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

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



NOTE

Internal standards and guidelines are used for cross-sections ($> 10 \text{ mm}^2$), as these are not clearly defined in the international standard.

TESTING ELECTRICAL CONTINUITY FOLLOWING ASSEMBLY / TESTING OF WIRING:

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



CRIMP INFORMATION

ODU-MAC® **Silver-Line**



Contact diameter	Termination cross-section ¹		Stripping length	8-pt-crimping tool 080.000.051.000.000 without positioner	8-pt-crimping tool 080.000.057.000.000 without positioner	Crimping tool for coax 080.000.039.000.000	Hexagonal crimping tool 080.000.062.000.000	
	mm	AWG		mm ²	mm	Positioner 080.000.051.101.000 position / adjustment dim.	Positioner 080.000.057.101.000 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	10 ^{+0.5}					
5		16	10 ^{+0.5}					
8		16	10 ^{+0.5}					
8		25	18 ^{+0.5}					
10								
12								
10		35	18 ^{+0.5}					
12								
12		50	18 ^{+0.5}					
RG 178/RG 196			[9/4.5/18.5] See module description			082.000.039.101.000		
RG 174/RG 188/RG 316/RG 179/RG 187						082.000.039.102.000		
G 02232 D/K 02252 D						082.000.039.103.000		
RG 122/2YCY 0.4/2.5						082.000.039.104.000		
RG 58/G 03233 (H&S)						082.000.039.106.000		
RG 223						082.000.039.108.000		
RG 59						082.000.039.109.000		

CRIMP INFORMATION

ODU-MAC® **Silver-Line**



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	mm ²	mm	Crimping jaws		Spool goods
0.76	24 – 28	0.25 – 0.08	4 ^{+0.5}			
1.02						
1.5						
0.7	26 – 28		3 ^{+0.5}		080.000.040.000.000	080.000.041.000.000
0.7	22 – 24				080.000.040.000.000	080.000.041.000.000
0.76	22	0.38	4 ^{+0.5}			
1.02	20 – 22	0.5 – 0.38	5 ^{+0.5}			
1.5						
2.41						
3						
1.5	18	1 – 0.75	5 ^{+0.5}			
2.41						
3						
1.5	16		5 ^{+0.5}			
1.5		1.5	5 ^{+0.5}			
2.41						
3						
1.5	14		5 ^{+0.5}			
2.41						
3						
2.41		2.5	6 ^{+0.5}			
3						
2.41	12(7 – 20)		6 ^{+0.5}			
2.41	12(19 – 26)		6 ^{+0.5}			
3	10	4	6 ^{+0.5}			
5						
3						
5		10	10 ^{+0.5}	080.000.064.110.000		
5		16	10 ^{+0.5}	080.000.064.101.000		
8		16	10 ^{+0.5}	080.000.064.116.000		
8		25	18 ^{+0.5}	080.000.064.125.000		
10						
12						
10		35	18 ^{+0.5}	080.000.064.135.000		
12						
12		50	18 ^{+0.5}	080.000.064.150.000		

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

CRIMP INFORMATION

ODU DOCK **Silver-Line** SIZE 1



Contact diameter mm	Termination cross-section ¹		Stripping length mm	8-pt-crimping tool 080.000.051.000.000 without positioner	Hexagonal crimping tool 080.000.062.000.000
	AWG	mm ²		Positioner 080.000.051.103.000 position / adjustment dim. Y	Profile no. / Check gauge X
0.76	24–28	0.25–0.08	4 ^{+0.5}	1 / 0.67	
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	
2			6 ^{+0.5}	4 / 0.92	
1.02		1	5 ^{+0.5}	2 / 1.12	
2			7 ^{+0.5}	4 / 1.12	
1.5		1.5	5 ^{+0.5}	3 / 1.42 ²	1 / 2.15 ± 0.05
2			7 ^{+0.5}	4 / 1.42 ²	
3			8 ^{+0.5}	5 / 1.42 ²	
2		2.5	7 ^{+0.5}	4 / 1.62	
3			9 ^{+0.5}	5 / 1.62 ²	2 / 2.8 ± 0.05

ODU DOCK **Silver-Line** SIZE 2

Contact diameter mm	Termination cross-section ¹		Stripping length mm	8-pt-crimping tool 080.000.051.000.000 without positioner	Hexagonal crimping tool 080.000.062.000.000
	AWG	mm ²		Positioner 080.000.051.103.000 position / adjustment dim. Y	Profile no. / Check gauge X
2		1	7 ^{+0.5}	4 / 1.12	
1.5 (socket)		1.5	5 ^{+0.5}	3 / 1.42 ²	1 / 2.15 ± 0.05
1.5 (pin)			8 ^{+0.5}	6 / 1.42 ²	
2			7 ^{+0.5}	4 / 1.42 ²	
3			8 ^{+0.5}	5 / 1.42 ²	
3		2.5	9 ^{+0.5}	5 / 1.62 ²	2 / 2.8 ± 0.05
3		4	9 ^{+0.5}		3 / 3.5 ± 0.05

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

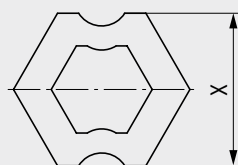
CRIMP INFORMATION

ODU DOCK **Silver-Line** SIZE 3

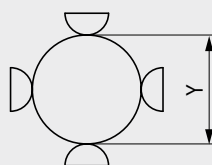


Contact diameter mm	Termination cross-section ¹		Stripping length mm	8-pt-crimping tool 080.000.051.000.000 without positioner Positioner 080.000.051.104.000 position [socket/PE-socket/ pin] / adjustment dim. Y	Hexagonal crimping tool 080.000.062.000.000 Profile no.	Hexagonal crimping tool 080.000.026.000.000 Crimping jaws/Check gauge X
	AWG	mm ²				
1.5	24–28	0.25–0.08	8 ^{+0.5}	{1/–/2} / 0.67		
1.5		0.61–0.38	8 ^{+0.5}	{1/–/2} / 0.92		
1.5		1.5	8 ^{+0.5}	{1/–/2} / 1.42 ²	1	
3				{3/8/5} / 1.42 ²		
5						
3		2.5	9 ^{+0.5}	{3/8/5} / 1.62 ²	2	
6			10 ^{+0.5}			
3		4	10 ^{+0.5}		3	
5						
5		6	10 ^{+0.5}		4	
6						
5		10	11 ^{+0.5}			080.000.026.110.000 / 5.4 ± 0.05
6		16	13 ^{+0.5}			080.000.026.116.000 / 6.5 ± 0.05

CHECK GAUGE (CONTACT)



ADJUSTMENT DIMENSION (TOOL)



FOR ALL SIZES

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

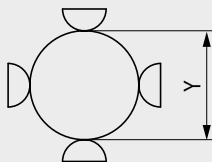
CRIMP INFORMATION

ODU DOCK **Silver-Line** QCH SIZE 1/2/3



Contact diameter mm	Termination cross-section ¹		Stripping length mm	8-pt-crimping tool 080.000.051.000.000 without positioner		8-pt-crimping tool 080.000.038.000.000 without positioner	8-pt-crimping tool 080.000.057.000.000 without positioner
	AWG	mm ²		Positioner 080.000.051.105.000 Position / adjustment dim. Y	Positioner 080.000.051.103.000 Position / adjustment dim. Y	Positioner 080.000.038.200.000 Position	Positioner 080.000.057.101.000 Position / adjustment dim. Y
1.5	24–28	0.25–0.08	7 ^{+0.6}		4/0.67		
0.9	22–26	0.38–0.15	4 ^{+0.5}	4/0.67			
1.5	20	0.5	7 ^{+0.6}		4/1.07 ²	4	
3			7 ^{+0.6}			4	
1.5		0.5	7 ^{+0.6}		4/1.02 ²	4	
0.9	18–20	1–0.5	4 ^{+0.5}	4/1.12			
1.5		0.75	7 ^{+0.6}		4/1.12 ²	5	
3			5 ^{+0.5}			5	
1.5	18	1	7 ^{+0.6}		4/1.12 ²	5	
3			5 ^{+0.5}			5	
1.5		1.5	7 ^{+0.6}		4/1.22 ²	6	
3	14		5 ^{+0.5}			6	
1.5	14				4/1.37 ²	6	
3	Insert size 3	2.5	6 ^{+0.5}				6/1.8
3		4	6 ^{+0.5}				6/2.12

ADJUSTMENT DIMENSION (TOOL)



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

ASSEMBLY AID

ODU-MAC® Silver-Line

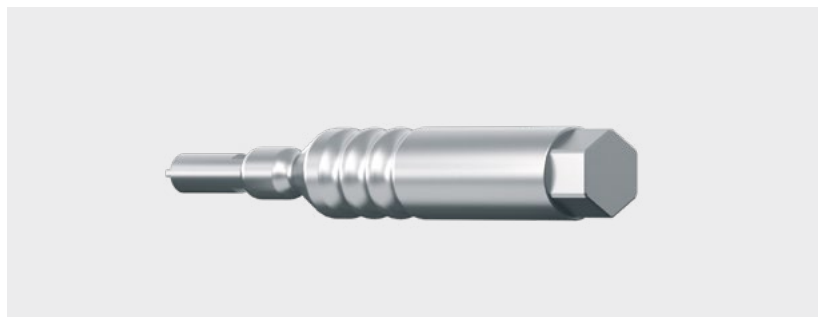


Description	Usage for	Part number	Nm	Recommended tightening torque
Torque wrench With cross handle, fixed, automatic release (for inner hexagonal bits with C6.3- or E6.3-shaft). Bit has to be ordered separately.		598.054.001.000.000	0.9	
		598.054.002.000.000	1.2	
		598.054.003.000.000	3	
		598.054.004.000.000	1.5	
		598.054.005.000.000	0.6	
		598.054.006.000.000	2.2	
		598.054.007.000.000	4.2	
Bit slot 2.5 [0.4/70]	Mounting of spindle coding	598.054.109.000.000		0.9 Nm +/- 0.2 Nm
Bit slot 3.5 [0.5/50]	Screwing of the rails in the T frame	598.054.108.000.000		0.9 Nm +/- 0.2 Nm
Bit slot 5.5 [0.8/50]	Screwing of the rails in the L frame	598.054.101.000.000		1.2 Nm +/- 0.2 Nm
Bit slot 8 [1.2/50]	Mounting of frame coding (coded socket)	598.054.110.000.000		1.2 Nm +/- 0.2 Nm
Special bit	Coding pin for frames in a housing	598.054.203.000.000		1.2 Nm +/- 0.2 Nm
Bit combi slot size 1	Mounting screw on frames in a housing	598.054.102.000.000		1.2 Nm +/- 0.2 Nm
Bit Phillips cross slot size 1	Grounding screw on frames in a housing and M+/S+ frame	598.054.106.000.000		1.2 Nm +/- 0.2 Nm
Bit Phillips cross slot size 1	Grounding plug socket for P+ frame	598.054.106.000.000		1.5 Nm +/- 0.2 Nm
Bit Phillips cross slot size 1	Grounding pin for P+ frame	598.054.106.000.000		3.0 Nm +/- 0.3 Nm
AF 8	Mounting of grounding socket P+ frame	598.054.111.000.000		2.2 Nm +/- 0.3 Nm
AF 8	Mounting of grounding pin P+ frame	598.054.111.000.000		4.2 Nm +/- 0.5 Nm
Bit Torx TX 8	Rails on frames in a housing	598.054.103.000.000		0.9 Nm +/- 0.2 Nm
Bit Torx TX 10	Screwing of the rails in the S and M+/S+ frame and spare spindle knob and PE module	598.054.104.000.000		1.2 Nm +/- 0.2 Nm
Bit Torx TX 20	Screwing of the rails in the P+ frame/contact PE module	598.054.105.000.000		3.0 Nm +/- 0.3 Nm
Bit Torx TX 20	High-current contacts	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
Distance spacer/QCH	S frame for quick-change head and rear mounting panel	598.054.204.000.000		1.2 Nm +/- 0.2 Nm
Receiving of back nut	Mounting, shielded implementation size 0	598.055.002.000.000		0.6 Nm +/- 0.1 Nm
Receiving of back nut	Mounting, shielded implementation size 0 for cable diameters from 5.5 to 6.5 mm	598.055.001.000.00	1	
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

ODU-MAC® AND ODU DOCK

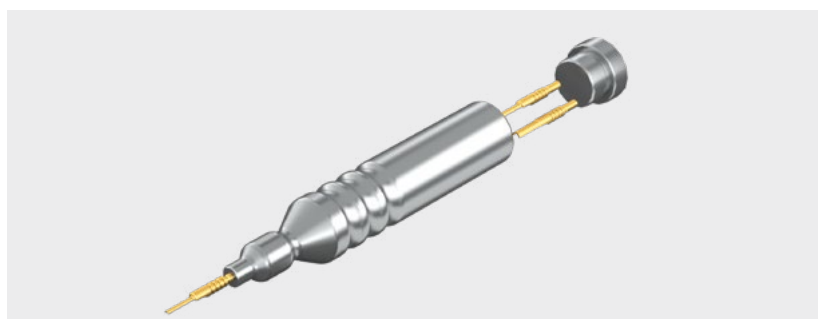
Silver-Line



ASSEMBLY TOOL HIGH CURRENT

Necessary assembly tool for screwing and releasing of the contacts.

PART NUMBER: 087.611.008.001.000



INSERTION TOOL Ø 0.76–1.5 mm

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

PART NUMBER: 085.611.001.001.000



Contact Ø	Assembly tool high current	Assembly aid insertion tool	Assembly aid ODU DOCK Quick Change Head
0.76		085.611.001.001.000	
1.02		085.611.001.001.000	
1.5		085.611.001.001.000	085.170.323.000.000
2			085.170.323.000.000
3			085.178.069.000.000
3/size 3 14 contacts			085.178.070.000.000
8	087.611.002.001.000		
12/10	598.054.105.000.000 598.054.006.000.000		

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

REMOVAL OF CONTACTS

ODU-MAC® AND ODU DOCK

Silver-Line



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 the still unassembled contact (without cable, which may have to be cut off). The removal tool is pressed from behind into the insulator until a quiet click is heard. The contact can be removed from the insulator by lightly pushing it with the extraction tools.

REMOVAL ONLY POSSIBLE WITH ODU TOOLS

Contact Ø	Removal tool I straight	Removal tool I angled	Removal tool II	Removal tool	Removal tool ODU DOCK Quick Change Head
					
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		087.170.323.000.000
2		087.170.364.000.000			087.170.323.000.000
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		087.178.057.000.000
5				087.170.391.000.000	
Coax 50 Ω 4 contacts	087.170.139.000.000	087.170.365.000.000	087.611.001.001.000 ²		
Coax 50 Ω 2 contacts				087.170.391.000.000	
Coax 50 Ω 2 contacts SMA				087.122.349.000.000	
Coax 75 Ω 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		
Fiber optic 1 contact				087.196.050.000.000	

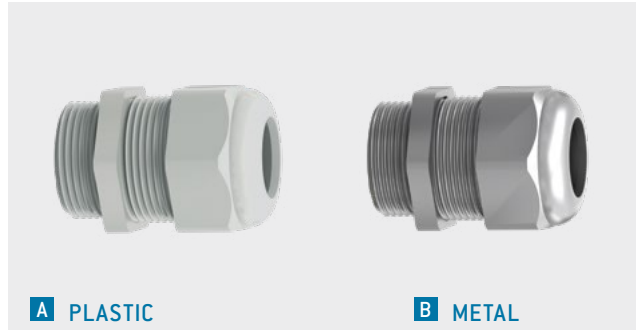
¹ In use with high voltage module, 4 contacts, (see page 76) the angled version cannot be used.

² With cable (H+S) G02232 only removal tool I is usable

CABLE CLAMP AND LOCKNUT



CABLE CLAMP¹ FOR STRAIN RELIEF HOUSING ACCORDING TO IEC 62444:2010 (VDE 0619:2014)



TECHNICAL DATA TYP A

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

TECHNICAL DATA TYP B

Material Body	Nickel-plated Brass
Sealing	NBR; sealing material
Protection class	IP68 to 10 bar
Temperature range	−40 °C to +100 °C

Part number	Thread	Product	Material	Color	Width across flats	Cable diameter mm	
						min.	max.
027.820.070.130.007	M20 × 1.5	ODU DOCK size 1	Plastic	Gray	25	7	13
028.620.070.125.000	M20 × 1.5	ODU DOCK size 1	Metal	Brass	25	7	12.5
027.825.060.130.007	M25 × 1.5	ODU DOCK size 2	Plastic	Gray	30	6	13
027.825.090.170.007	M25 × 1.5	ODU DOCK size 2	Plastic	Gray	30	9	17
028.625.070.125.000	M25 × 1.5	ODU DOCK size 2	Metal	Brass	30	7	12.5
028.625.090.165.000	M25 × 1.5	ODU DOCK size 2	Metal	Brass	30	9	16.5
027.832.070.150.007	M32 × 1.5	ODU DOCK size 3/ Strain relief housing	Plastic	Gray	36	7	15
027.832.110.210.007	M32 × 1.5	ODU DOCK size 3/ Strain relief housing	Plastic	Gray	36	11	21
028.632.090.165.000	M32 × 1.5	ODU DOCK size 3	Metal	Brass	36	9	16.5
028.632.110.210.000	M32 × 1.5	ODU DOCK size 3	Metal	Brass	36	11	21
027.832.070.150.003	M32 × 1.5	Strain relief housing	Plastic	White	36	7	15
027.832.110.210.003	M32 × 1.5	Strain relief housing	Plastic	White	36	11	21
027.832.070.150.008	M32 × 1.5	Strain relief housing	Plastic	Black	36	7	15
027.832.110.210.008	M32 × 1.5	Strain relief housing	Plastic	Black	36	11	21
027.840.190.280.003	M40 × 1.5	Strain relief housing	Plastic	White	46	19	28
027.840.190.280.008	M40 × 1.5	Strain relief housing	Plastic	Black	46	19	28

LOCKNUT FOR CABLE CLAMP



TECHNICAL DATA

Material	Nickel-plated Brass
----------	---------------------

Part number	Thread
931.000.003.000.112	M32 × 1.5
931.000.003.000.113	M40 × 1.5

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

¹ Delivery doesn't contain cable clamp.

SERVICE KIT FOR ODU SPRINGTAC® AND ODU LAMTAC® CONTACTS



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

ODU has put together a service kit to this purpose, so that lubrication can be carried out directly on location. A cleaning brush and a special cleaning cloth, as well as precise instructions allow optimal care of the contacts. In the absence of other specifications, the service kit can be used for all ODU contacts and connections.

PART NUMBER: 170.000.000.000.100

For technical properties of the service kit please refer

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 may no longer be used when damage or other signs of wear are detected. Clean with maximum 2.5 bar compressed air to avoid contact damage. A slight blackening of the contact points may occur over the course of the service life and represents no impairment of the electrical properties.

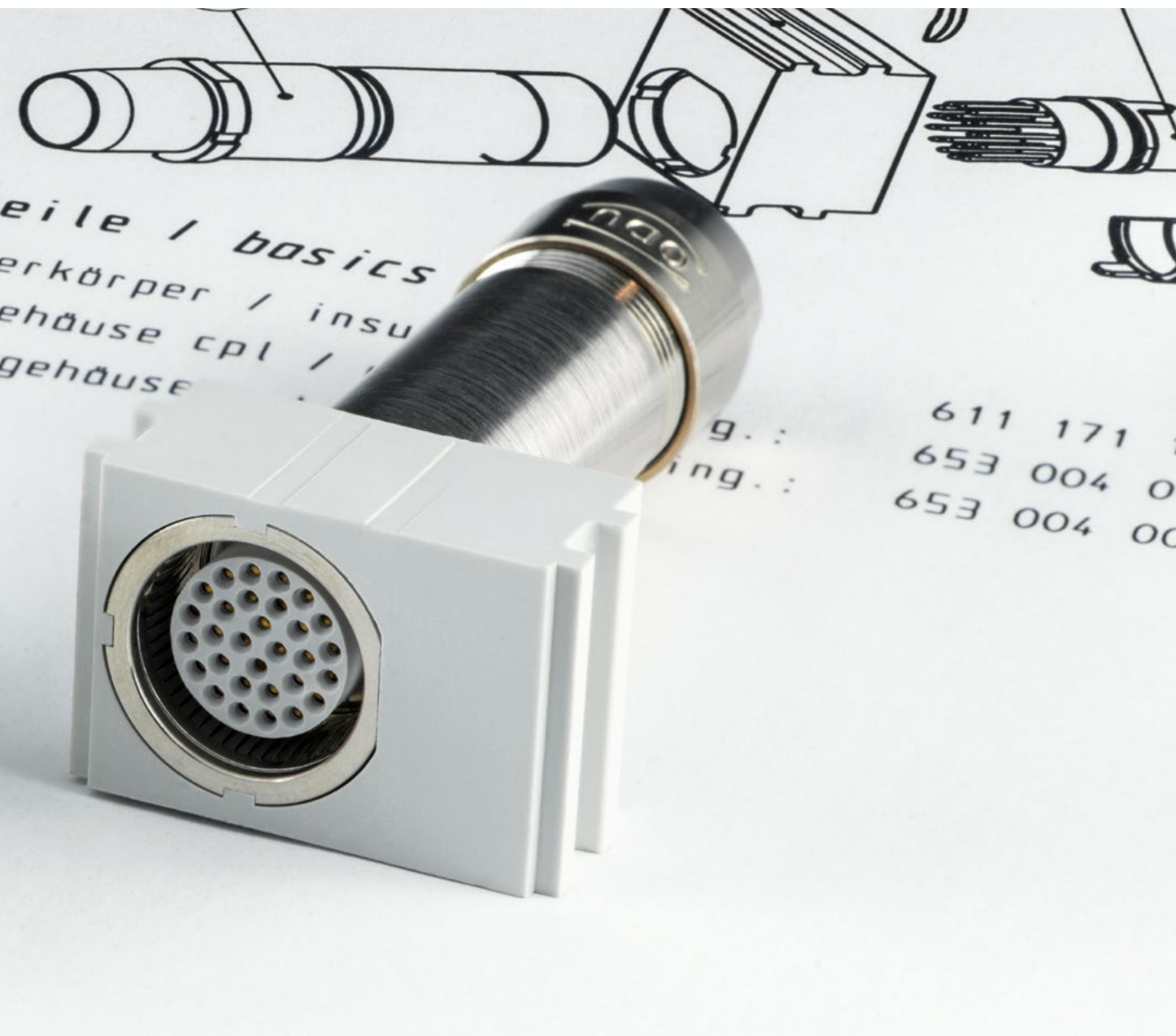
Recommended cleaning agent

Soap: liquid soaps on sodium bicarbonate or potassium base.

Alcohol: ethanol 70 %, isopropyl alcohol 70 %.



ODU-MAC®



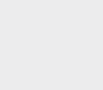
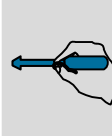
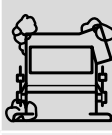
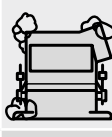
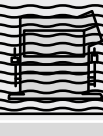
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INTERNATIONAL PROTECTION CLASSES



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

Code letters (International Protection)		First code number (Degrees of protection against access to hazardous parts respectively against solid foreign objects)		Second code number (Degrees of protection against water)			
IP		6		5			
Code number	Protection against access to hazardous parts / Protection against ingress of solid foreign objects		Code number	Protection against harmful effects due to the ingress of water			
0	No protection		No protection against contact / No protection against solid foreign objects	0	No protection against water		No protection against water
1	Protection against large foreign objects		Protection against contact with the back of the hand / Protection against solid foreign objects Ø ≥ 50 mm	1	Protection against dripping water		Protection against vertically falling waterdrops
2	Protection against medium-sized foreign objects		Protection against contact with the fingers / Protection against solid foreign objects Ø ≥ 12.5 mm	2	Protection against dripping water (tilted)		Protection against falling waterdrops 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 powerful 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

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



GENERAL

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

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

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

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

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

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

In such cases, the "product standards" take precedence and must be observed instead of the "basic safety standards" stated here. However, since this catalog and the technical data

sheets cannot take all product standards into consideration, we have restricted ourselves to the following standard in terms of voltage data:

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

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

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

The following general specifications have been defined for dimensioning:

- **Isolation** between electrical circuits (functional insulation between the contacts) or between an electrical circuit and local ground (contact with grounded frame) has been dimensioned as **basic insulation**. If "**double insulation**" or "**reinforced insulation**" is required, the voltage data provided may no longer apply; insulating clearances may need to be extended.
- If not noted otherwise, all voltage is in rms value.
- **Overvoltage category III** is used, along with the TT and TN system types, to dimension the rated impulse voltage.
- Condition A is always used for the inhomogeneous field when dimensioning the clearance distances used.
- The inspections prescribed for solid insulation and for clearance distances (if necessary) are conducted as alternating voltage inspections according to Table F.5.
- The clearance and creepage distances are determined on the bases specified in this standard.



OPERATING VOLTAGE/RATED VOLTAGE/NOMINAL VOLTAGE

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

RATED IMPULSE VOLTAGE

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

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

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

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

DEGREE OF POLLUTION

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

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

Degree of pollution 1

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

Degree of pollution 2

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

Degree of pollution 3

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

Degree of pollution 4

Permanent conductivity is present, caused by conductive dust, rain or moisture. For example, devices in the open air or outdoor facilities and construction machinery.

Operating voltage (VDE: Rated voltage): Value of a voltage that is specified by the manufacturer for a component, device or operating medium and relates to the operating and performance features.

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



CLEARANCE DISTANCE

The shortest distance in the air between two conductive parts.

CREEPAGE DISTANCE

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

TEST VOLTAGE

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

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

Rated impulse voltage U _i kV	Test impulse voltage at sea level U _i kV	Test impulse voltage at 200 m elevation U _i kV	Test impulse voltage at 500 m elevation U _i 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 $\times 0.75$

Operating voltage: Dielectric withstanding voltage $\times 0.75 \times 0.33$

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 mm ²	Weight kg/km	Max. resistance Ω/km
	Inch	mm			
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.

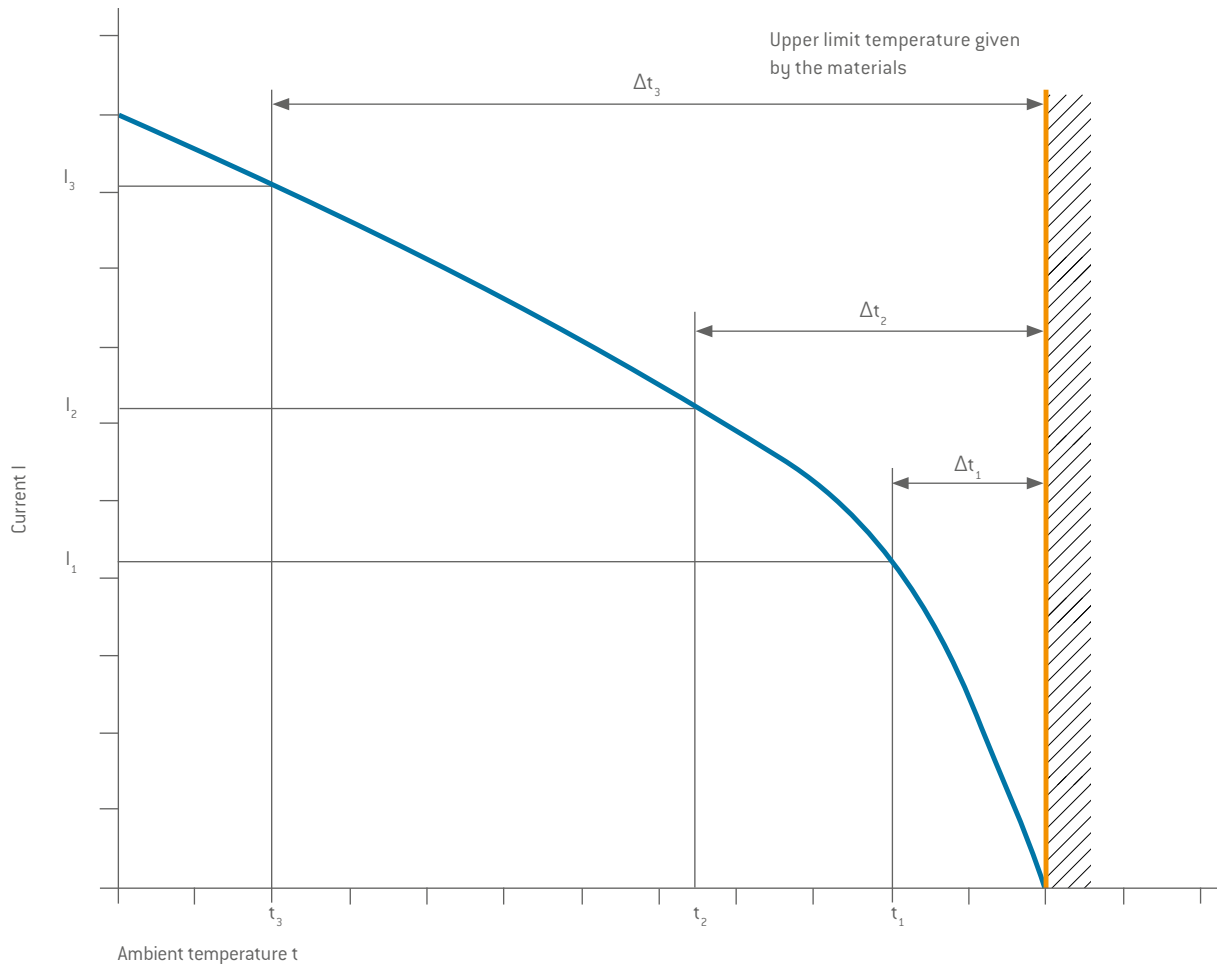
Source: ASTM

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

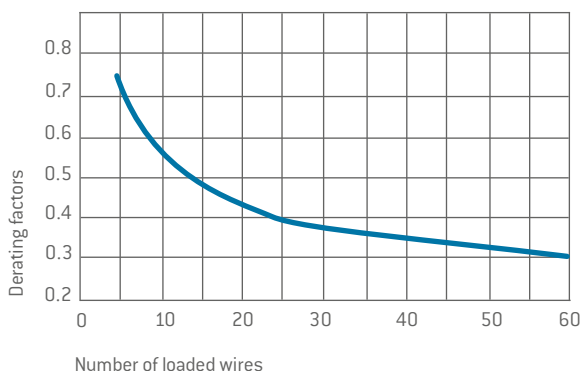
RATED CURRENT (NOMINAL CURRENT)

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 (DIN EN 60512-5-2:2003) and derived from the derating curve. The values specified in the catalog apply to either individual contacts or completely assembled inserts/modules, as indicated.

DERATING FACTORS

In the case of multi-position connectors and cables, heating is greater than with individual contacts. It is therefore calculated with a derating factor.

There are no direct regulations for connectors in this context. The derating factors for multi-core cables pursuant to VDE 0298-4:2013 are applied. The derating factor assumes relevance as of 5 live wires.



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).

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.

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

Load and derating factors

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

NOTE

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

CURRENT-CARRYING CAPACITY DIAGRAM

ODU-MAC® Silver-Line

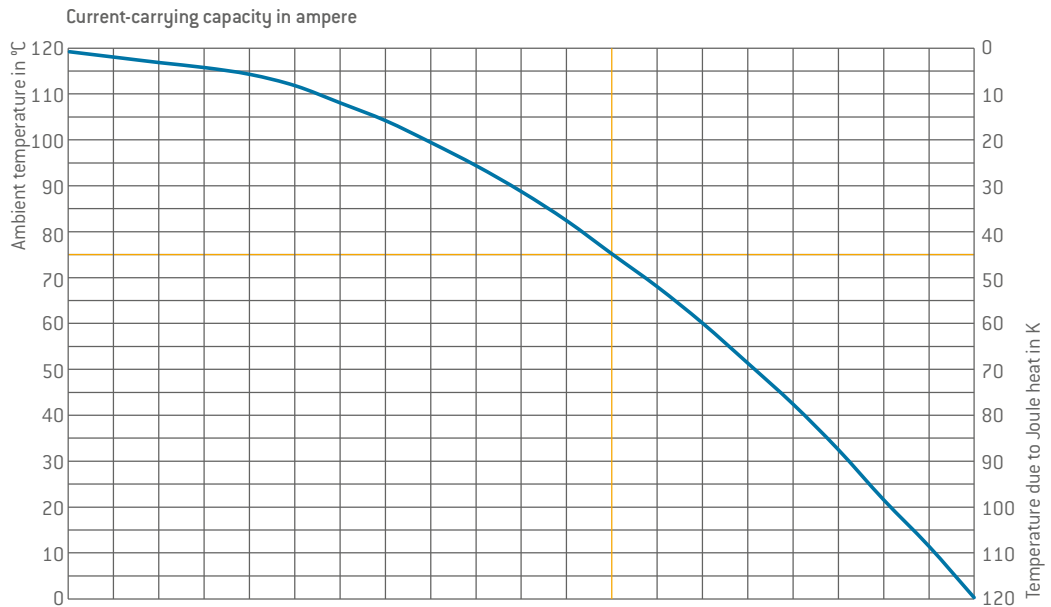


FOR SINGLE CONTACTS

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

Upper limit temperature:
+120 °C

Termination with
nominal cross-section



Contact	Contact Ø mm	Termination cross-section mm²																
ODU SPRINGTAC®	0.76	0.25	0	1	2	3	4	5	6	7	8	9	10					
		0.38	0	1.5	2.5	3.5	5	6	7.5	8.5	9.5	11	12					
	1.02	0.25	0	1	2	3	4	5	6	7	8	9	10					
		0.5	0	1.5	3	4.5	6	7.5	9	10.5	12	13.5	14.5					
	1.5	0.25	0	1	2	3	4	5	6	7	8	9	10					
		0.5	0	1.5	3.5	5	6.5	8	10	11.5	13	15	16.5					
		1	0	2.5	5	7.5	10	12.5	15	17.5	19.5	22.5	24.5					
		AWG 16	0	3	6	9	12	15	18	21	24	27	29.5					
		1.5	0	3	6	9	12	15	18	21	24	27	29.5					
	2.41	0.5	0	1.5	3.5	5	7	8.5	10.5	12	13.5	15.5	17					
		1	0	2.5	5.5	8	10.5	13	16	18.5	21	23.5	26					
		1.5	0	3	6	9	12	15	18	21	24	27	30					
		2.5	0	4	8	12	16	20	24	27.5	31.5	35.5	39					
		AWG 12	0	4.5	9	13.5	18.5	23	28	32	36.5	41	45					
	3	0.5	0	2	4	5.5	7.5	9.5	11.5	13	15	17	18.5					
		1	0	2.5	5.5	8	11	13.5	16.5	19	21.5	24.5	27					
		1.5	0	3	6	9	12	15.5	19	22	25	28	31					
		2.5	0	4	8	12	16	20	25	29	33	37	41					
		4	0	6	13	19	25	32	39	45	51	58	64					
		6	0	6	13	19	25	32	39	45	51	58	64					
	5	4	0	6	13	19	25	32	39	45	51	58	64					
		10	0	11	21	32	42	53	65	75	85	97	106					
		16	0	13	26	39	52	65	80	93	106	119	130					
	8	16	0	12.5	25	37	49	62	75	87	99	111	123					
		25	0	18	36	52	68	84	100	114	128	142	155					
ODU LAMTAC®	8	16	0	15	29	44	59	74	90	104	118	133	147					
		25	0	17	34	52	69	87	105	121	137	154	171					
	10	25	0	18	36	54	72	90	110	126	144	164	180					
		35	0	20.5	41	61.5	82	102.5	125	143.5	164	187	205					
	12	25	0	19	38	56.5	75.5	94.5	115	132	151	172	189					
		35	0	22	44	66	88.5	110.5	135	155	178	203	221					
		50	0	25	51	76	101.5	127	155	178	203	231	254					

Nominal current

Max. continuous current

CURRENT-CARRYING CAPACITY DIAGRAM

ODU-MAC® Silver-Line

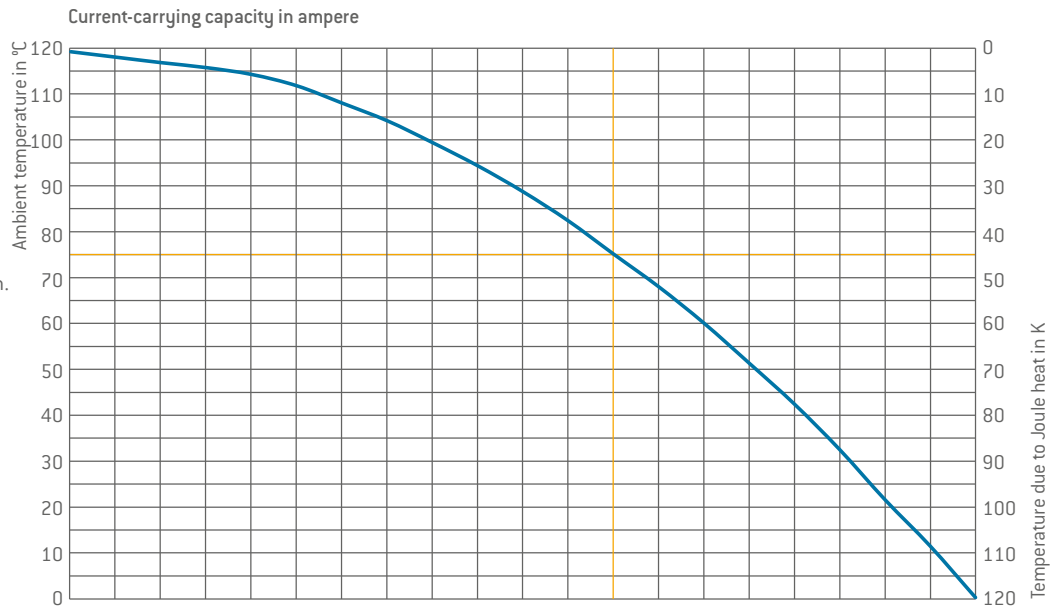


FOR FULLY EQUIPPED MODULES

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

The values of the 4 contact high voltage module (page 76) correspond to the values of the 5 contacts signal module (page 58).

The values of the 3 contacts power module (page 64) correspond to the values of the 3 contacts power module (page 62).



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

Nominal current

Max. continuous current

CURRENT-CARRYING CAPACITY DIAGRAM

ODU DOCK **Silver-Line**

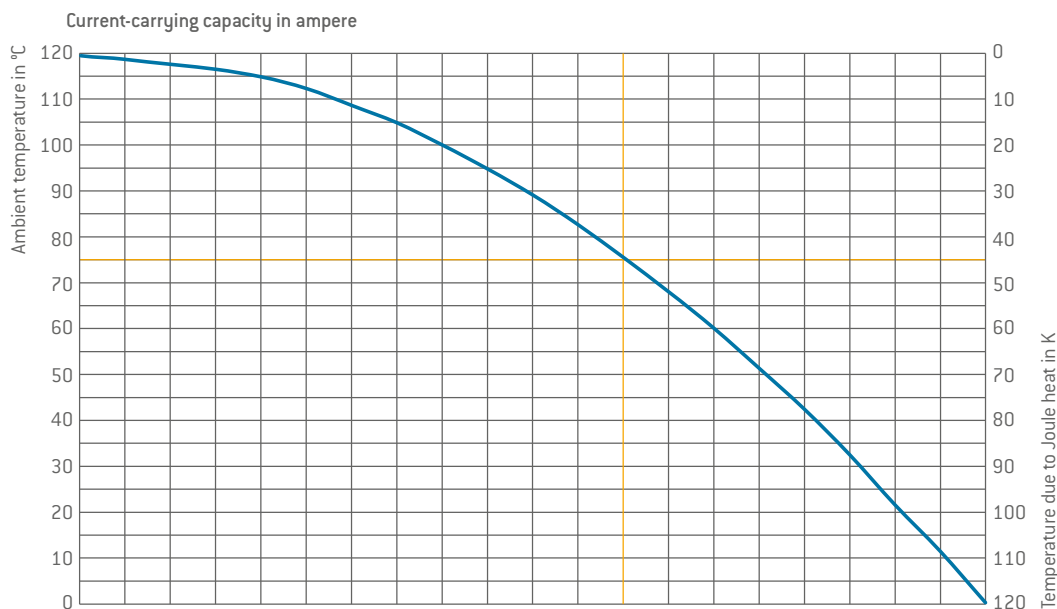


FOR FULLY EQUIPPED INSERTS

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

Upper limit temperature: +120 °C

Termination with nominal cross-section



Size	In- serts	Contact Ø mm	Termination cross-section mm ²															
1	31 con- tacts	0.76	0.38	0	0.4	0.9	1.4	1.9	2.4	2.8	3.3	3.8	4.2	4.6				
1	19 con- tacts	1	0.5	0	0.6	1.3	1.9	2.5	3.1	3.8	4.4	5	5.7	6.3				
1/QCH	19 con- tacts	1	1	0	0.9	1.8	2.8	3.8	4.8	5.8	6.7	7.6	8.6	9.5				
1	12 con- tacts	1.02	0.5	0	0.8	1.6	2.3	3	3.7	4.4	5.1	5.8	6.6	7.4				
1	12 con- tacts	1.5	1.5	0	1.2	2.4	3.7	4.9	6.1	7.3	8.5	9.8	11	12.3				
1	7 con- tacts	2	1.5	0	1.9	3.8	5.8	7.8	9.8	11.8	13.8	15.7	17.6	19.5				
1	3 con- tacts	3	2.5	0	3.4	6.8	10.1	13.4	16.7	20	23.3	26.6	29.8	33.1				
2	16 con- tacts	2	1.5	0	1.7	3.4	5	6.6	8.3	10	11.6	13.2	14.9	16.5				
2	7 con- tacts	3	2.5	0	3.1	6.2	9.3	12.4	15.5	18.6	21.7	24.8	27.8	30.8				
3	37 con- tacts	1.5	1.5	0	2.2	4.4	6.6	8.8	11	13.2	15.3	17.5	19.7	21.8				
3	14 con- tacts	3	4	0	3.4	6.8	10.2	13.7	17.2	20.6	24	27.4	30.8	34.3				
3/QCH	14 con- tacts	3	4	0	3.8	7.9	11.4	15.2	19	22.8	26.6	30.4	34.1	37.8				
3	7 con- tacts	5	10	0	7.1	14.1	21.2	28.3	35.4	42.5	49.5	56.5	63.5	70.5				
3	5 con- tacts	6	16	0	10.9	21.8	32.7	43.6	54.4	65.2	75.9	86.6	97.3	108				

Nominal current

Max. continuous current

LINE CURRENT LOAD



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

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

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

¹ DIN VDE 0891-1:1990

TECHNICAL TERMS



AMBIENT TEMPERATURE

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

AWG

American Wire Gauge – see page [195](#)

BASE CURVE

See page [196](#)

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 [191](#).

CONNECTORS

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

CONTACT RESISTANCE

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

CORES

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

CREEPAGE DISTANCES

The shortest distance between two conductive parts along the surface of a solid insulation material. This factors in all elevations and recesses in the insulator, as long as defined minimum dimensions are on hand. The insulation coordination is explained in detail from page [191](#).

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 [175](#)).

CRIMP TERMINATION

Termination technology, see crimp connection.

CRIMPING AREA

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

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

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

DEGREE OF POLLUTION

The insulation coordination is explained in detail from page [191](#).

DELIVERY FORM

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

DERATING CURVE

See page [196](#)

DERATING FACTOR

According to VDE 0298-4:2013, with connectors and cables over 5 contacts, the heating is greater than it is with individual contacts. For that reason, the aforementioned standard is calculated with a derating factor. See page [197](#)

TECHNICAL TERMS



DERATING MEASUREMENT METHOD

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

See page [196](#)

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 $\pm 50\%$.

MATING CYCLES

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

MAX. CONTINUOUS CURRENT

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

NOMINAL CURRENT

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

See rated current.

NOMINAL SINGLE CONTACT CURRENT LOAD

The current-carrying capacity which each individual contact can be loaded with on its own (see from page [196](#)).

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 [204](#)).

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 [197](#)

RATED VOLTAGE

According to IEC 60664-1:2007 (DIN EN 60664-1:2008) 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 "fine-wire" conductor structure pursuant to IEC 60228:2004 (VDE 0295:2005; Class 5) or a "fine-wire" conductor structure (7/19 wire) according to AWG ASTM B258:2018.

TERMINATION TECHNOLOGIES

Methods for connecting the leads to the electro-mechanical element, such as solder-free connections pursuant to IEC 60352 (DIN EN 60352): crimp, screw connection etc. or soldering connection (see page [174](#)).

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

See protection types on page [190](#)

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.

Алматы (7273)495-231	Иваново (4932)77-34-06	Магнитогорск (3519)55-03-13	Ростов-на-Дону (863)308-18-15	Тольятти (8482)63-91-07
Ангарск (3955)60-70-56	Ижевск (3412)26-03-58	Москва (495)268-04-70	Рязань (4912)46-61-64	Томск (3822)98-41-53
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Владикавказ (8672)28-90-48	Кострома (4942)77-07-48	Орел (4862)44-53-42	Сочи (862)225-72-31	Челябинск (351)202-03-61
Владимир (4922)49-43-18	Краснодар (861)203-40-90	Оренбург (3532)37-68-04	Ставрополь (8652)20-65-13	Череповец (8202)49-02-64
Волгоград (844)278-03-48	Красноярск (391)204-63-61	Пенза (8412)22-31-16	Сургут (3462)77-98-35	Чита (3022)38-34-83
Вологда (8172)26-41-59	Курск (4712)77-13-04	Петрозаводск (8142)55-98-37	Сыктывкар (8212)25-95-17	Якутск (4112)23-90-97
Воронеж (473)204-51-73	Курган (3522)50-90-47	Псков (8112)59-10-37	Тамбов (4752)50-40-97	Ярославль (4852)69-52-93
Екатеринбург (343)384-55-89	Липецк (4742)52-20-81	Пермь (342)205-81-47	Тверь (4822)63-31-35	

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