TELEREX

ODU®

ODU-MAC® Blue-Line

HDMI

ODU HIGH SPEED DATA TECHNOLOGY

www.odu-connectors.com

ODU-MAC® Blue-Line

FEATURES

- Universal solution: fast, modular and flexible
- Variety of locking options for plastic and metal housings
- > 10,000 mating cycles
- Clip-in assembly / removal of the modules without tools
- Easy replacement of crimp-clip contacts, even when assembled
- Wide range of transmission types
- Ultra-compact connector

APPLICATIONS

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

ATTENTION: All shown connectors and cable assemblies are defined without breaking capacity (COC) according to IEC 61984:2008 (VDE 0627:2009-11).

The majority of ODU-MAC® modules and contacts have been certified according to UL 1977:2022/CSA C22.2 No. 182.3-16:2016 (E file no.: E110586) and tested to MIL / SAE / EIA.

Data transmission protocols
The contact arrangement of an ODU data transmission connector differs from a standard data transmission connector due to the robust ODU specific design. However, the ODU design meets the electrical specifications that are derived from the respective standard data transmission protocol.

Safety instructions / protective conductor connection
A protective conductor termination is mandatorily required if the "limits for **TOUCHABLE PARTS**" described in the respective standards are exceeded and no other protective measures against electric shock have been taken. In any case, before commissioning, a check of the protective connection and all **TOUCHABLE PARTS** must be carried out according to the relevant standards.
When mated, the housing listed in this catalog corresponds to the requirements specified in IEC 61984:2008 with regard to protection against contact in accordance with IEC 60529:1989.
When using mounting housings or comparable device parts without complete IP protection in the cable connection area or when using the connectors without housing, the required contact protection according to IEC 61984:2008 must be provided by the customer (e.g. by suitable installation in the control cabinet with IP degree of protection). The customer must ensure strain relief for the cables / strands on the device part.

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

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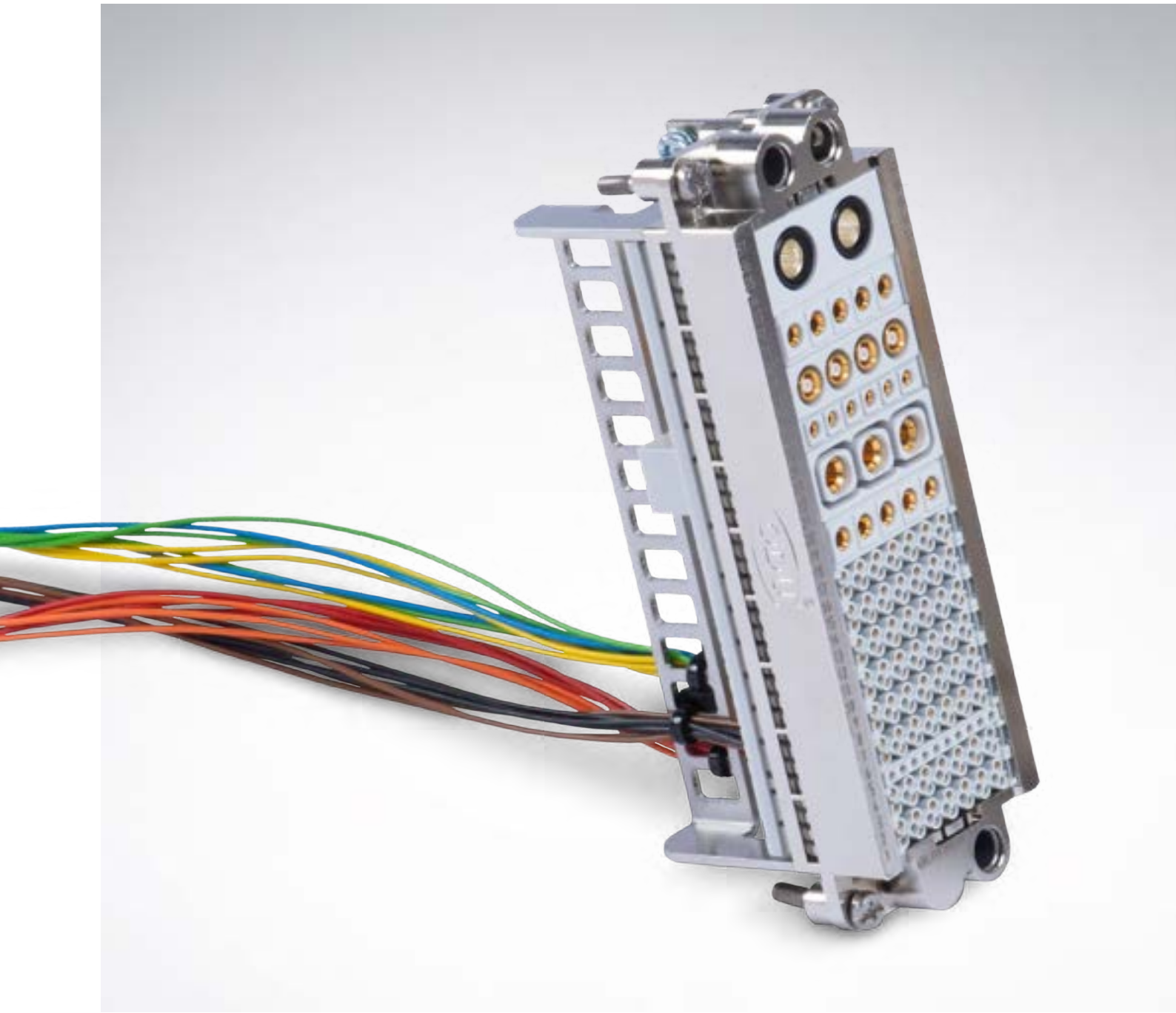
Clickable page numbers

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



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

ODU-MAC®

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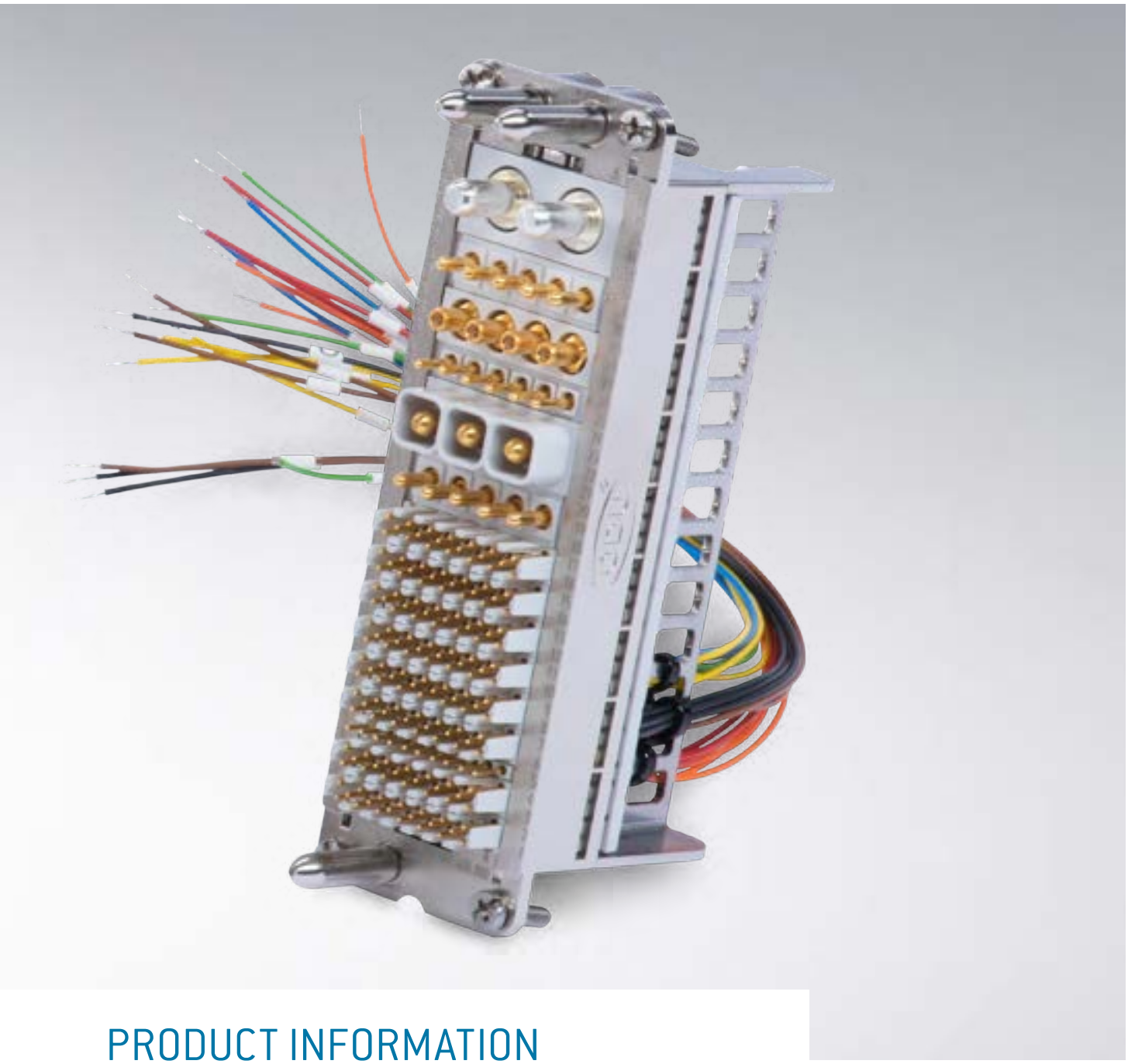

PRODUCT INFORMATION

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THE ODU-MAC® BLUE-LINE – UNIVERSAL SOLUTION

MANUAL MATING

USER-FRIENDLY

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

ROBUST

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

User friendly

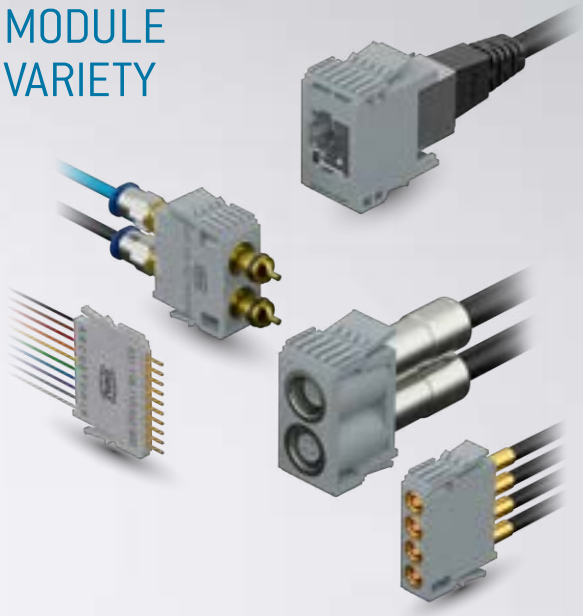
Flexible

High-performance

Robust

AUTOMATIC DOCKING

MODULE VARIETY



FLEXIBLE

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

HIGH-PERFORMANCE

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

A MODULAR ALL-ROUNDER

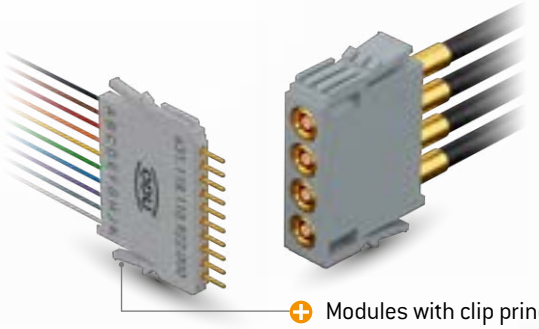
The flexible modular design of the ODU-MAC® Blue-Line enables the combination of different transmission types within one connector.

Whether signal, power, high-current, high-voltage, HF signals (coax), compressed air, fluid, data, or fiber optic are being transmitted – all of the contact inserts can be integrated into the individual connector solution. For signal transmission, there is also a simple contacting option using PCB termination modules. The individual parts are supplied loose.

There are various applications possible: from installation with a stable frame into a rack or panel to the integration in one of the many housing versions.

Frames for 4 housing sizes

Housing made of plastic or aluminum



Modules with clip principle

ODU-MAC® White-Line

Manual connectors for 100,000 mating cycles and more.

ODU-MAC® | ODU DOCK Silver-Line

Connectors for docking systems or automatic docking solutions for robots with 10,000 mating cycles and more.

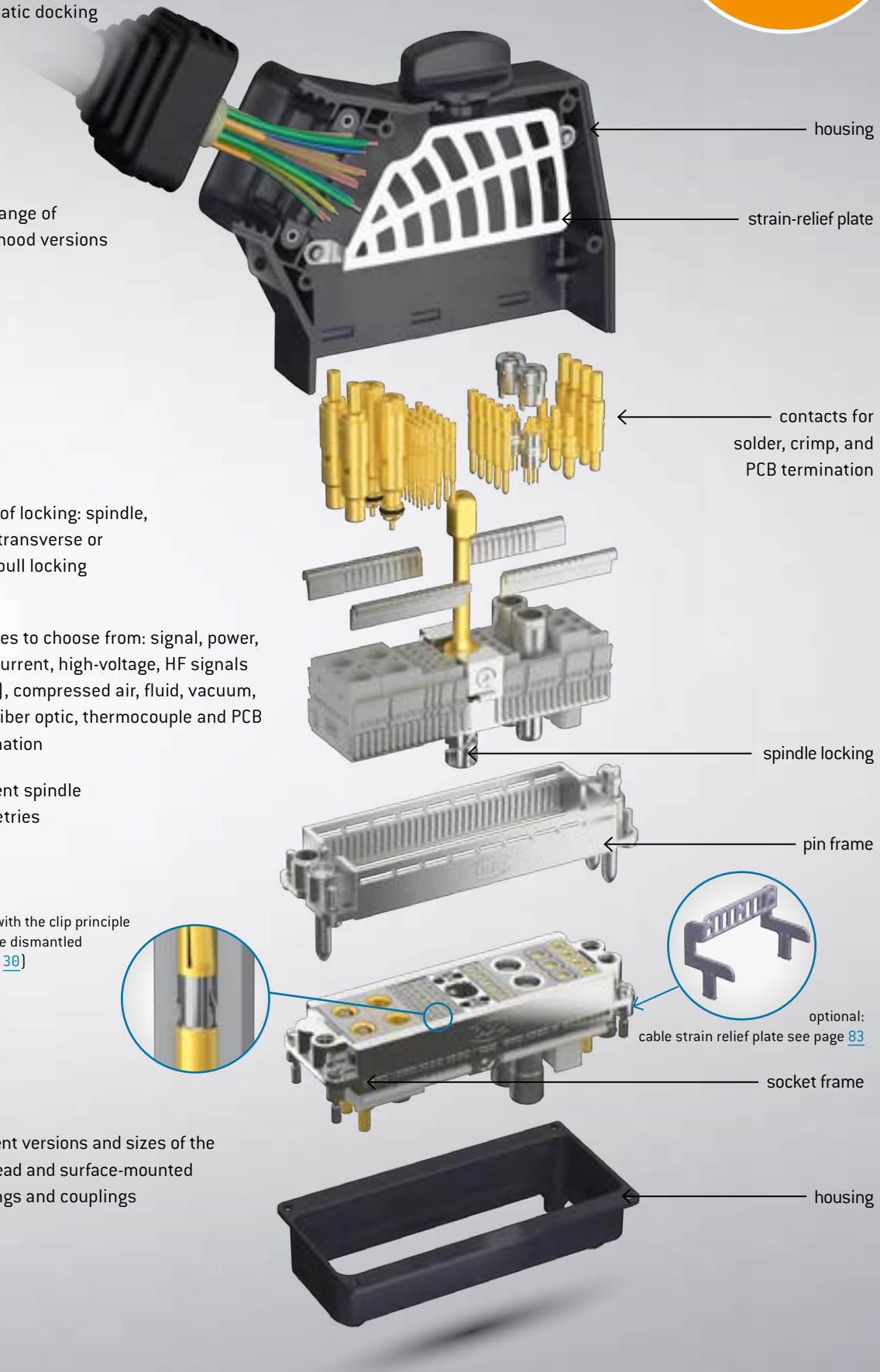
More information: odu-connectors.com/downloads

THE MODULAR SYSTEM AT A GLANCE

10,000
mating cycles
and more

2 possible areas of application:
manual mating or
automatic docking

wide range of
cable hood versions



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

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

3 different spindle
geometries

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

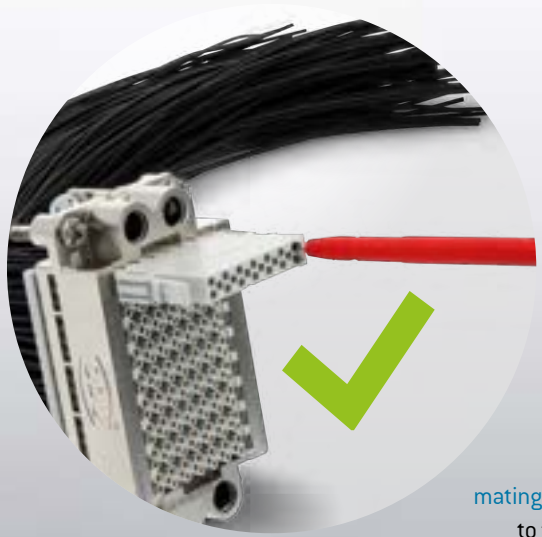
Different versions and sizes of the
bulkhead and surface-mounted
housings and couplings

DOS AND DON'TS

SAFETY

Use correct crimping tools!

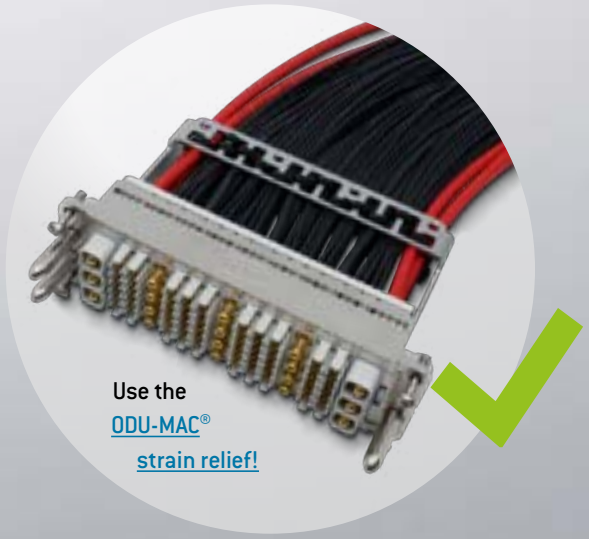
Never insert test probes into the contact sockets!



Use mating part to test!

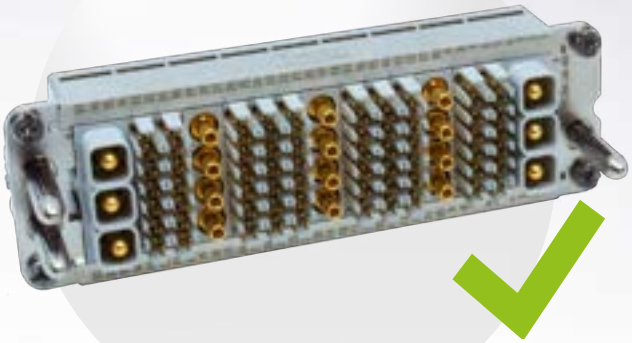
SELECT THE BEST SUITABLE CABLE OUTLET FOR YOUR INDIVIDUAL SOLUTION!

BEST PRACTICE



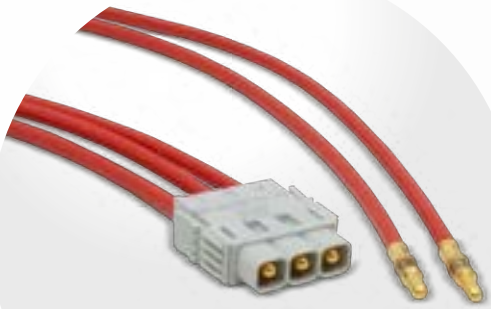
DOS AND DON'TS

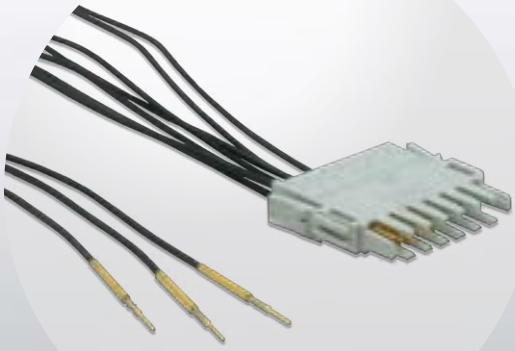
BEST PRACTICE



Balancing is needed to
avoid uneven mating and demating force!

SELECT OUT OF A WIDE RANGE OF PRE-ASSEMBLED MODULES AND CONTACTS



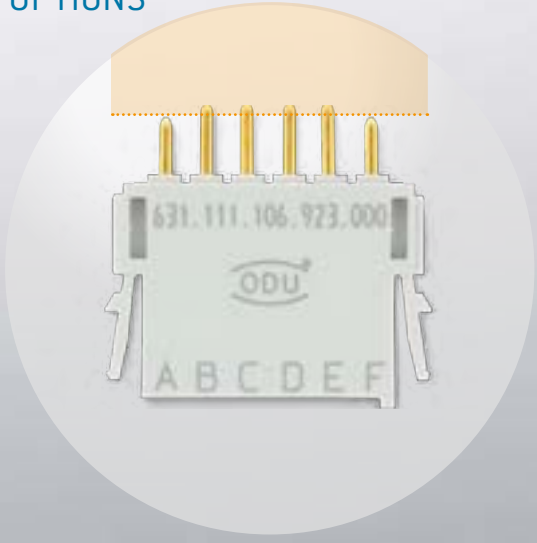


IDEAS

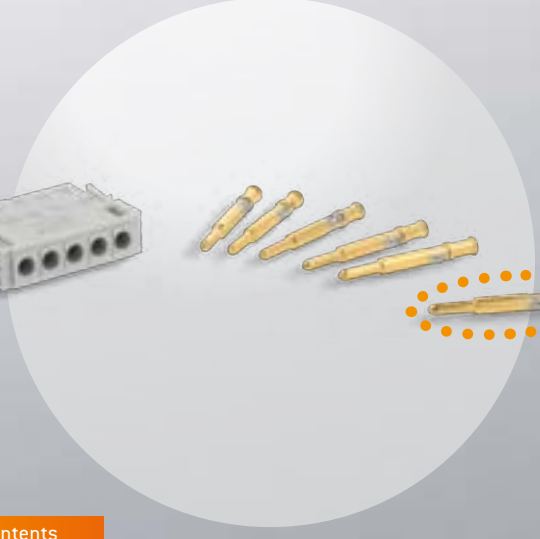
Safety measurement solution!

PARKING POSITION

SEVERAL FIRST MATE, LAST BREAK OPTIONS



ORDER ADDITIONAL SPARE PARTS!



CONFIGURATOR

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

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

CONFIGURE YOUR ODU-MAC® BLUE-LINE HERE:

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

SELECT & REQUEST OFFERS

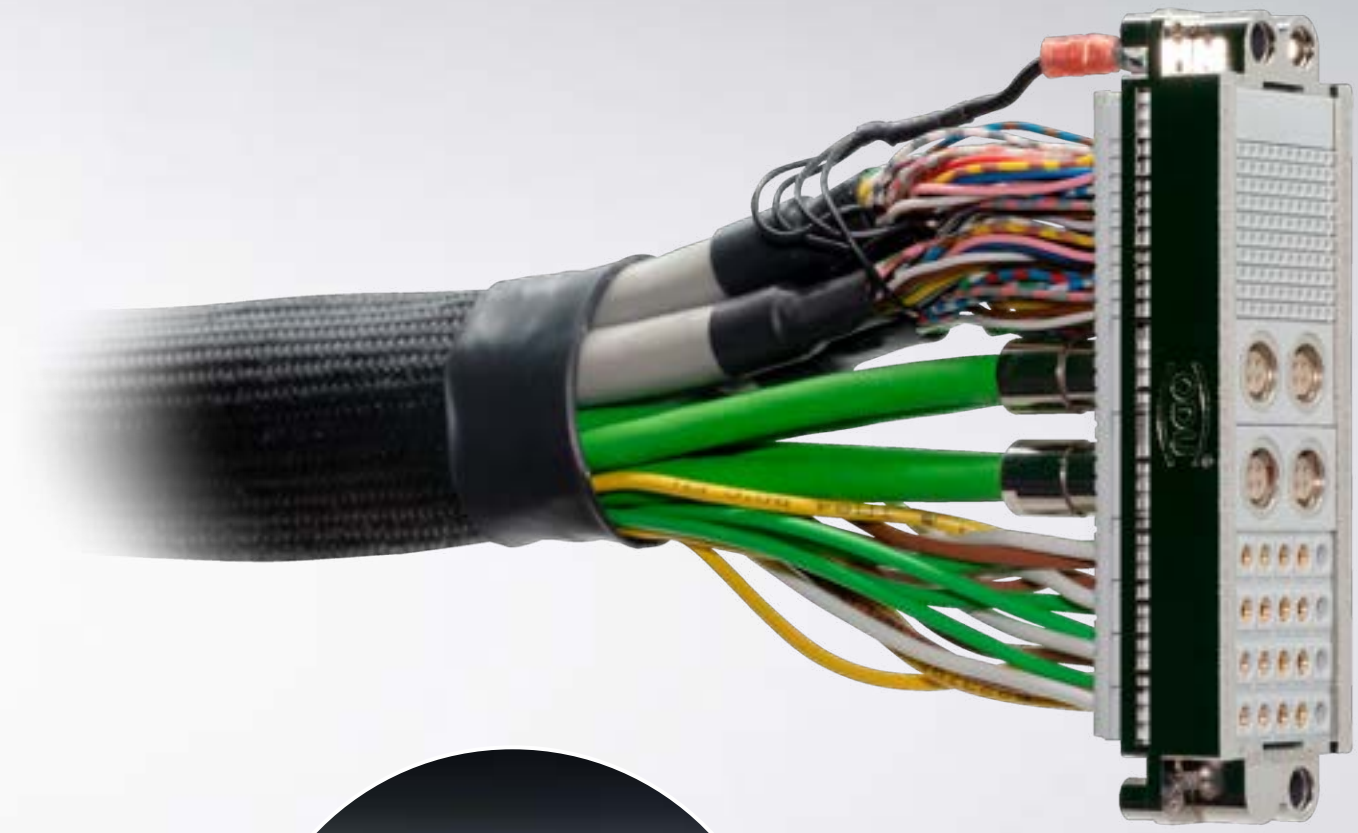
You will receive a drawing and a detailed offer within one working day of submitting your request.

When placing an order, you will receive a complete article number for the connector. The individual parts are supplied loose.

We ask you to enquire directly about customized versions not covered by the standard.

CABLE ASSEMBLY

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



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

THE ODU-MAC® Black-Line
THE MASS INTERCONNECT SOLUTION

with ODU-MAC® Blue-Line modules

More information: odu-interconnect.com

- Easy assembly and removal of contacts
- Constantly low transition resistance
- Flexibility through easy and fast configuration
- Free combination of the different modules
- High packing density

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YOUR HYBRID CONNECTION

MANUAL MATING

4 TYPES OF LOCKING

First, select your locking type by choosing between **spindle, lever, transverse or push-pull locking.**

DIFFERENT CONNECTOR HOUSINGS

Then select the plastic or metal housing best suited to your requirements: **cable hood, cable hood XXL, cable hood wide, RAPID or PUSH-LOCK housing.**

RECEPTACLE SELECTION

Depending on your requirements you choose between **bulkhead mounted housing, surface mounted housing, cable-to-cable hood, PUSH-LOCK receptacles or recessed mounting (RAPID).**

AUTOMATIC DOCKING

4 DOCKING FRAMES TO CHOOSE FROM

Size	Units*
1	12
2	18
3	26
4	37

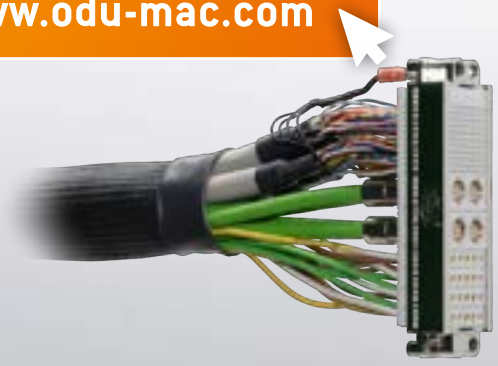
Tolerance compensation radial: +/– 0.6 mm
Tolerance compensation axial: min. 0.1 mm

*1 Unit = 2.4 mm

CABLE ASSEMBLY

Get your connector ready for use **including cable assembly**.

Configure your connector online
www.odu-mac.com



VARIOUS LOCKING OPTIONS

SPINDLE LOCKING

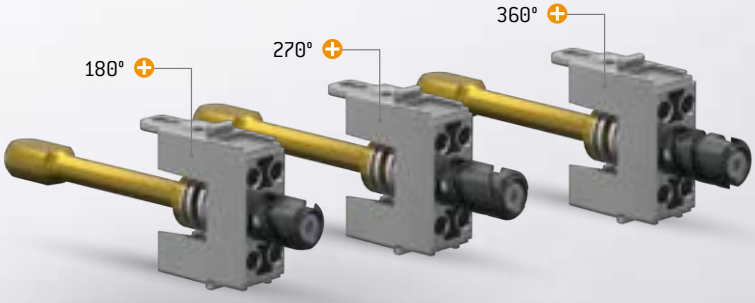
TRANSVERSE LOCKING

LEVER LOCKING

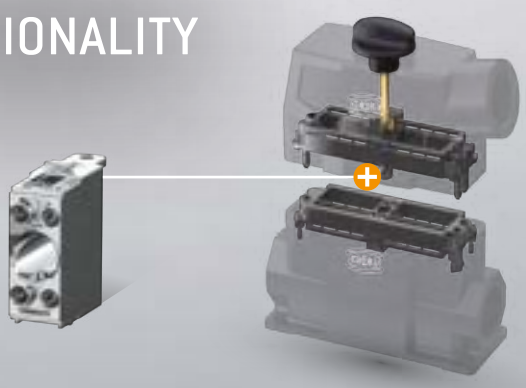
PUSH-PULL LOCKING
(for ODU-MAC® PUSH-LOCK housing)

SPINDLE LOCKING

Quick-action locking system with **10,000 locking cycles**. If required, the simple front replacement set (spindle exchange set) enables a simple adjustment of the spindle geometry. The spindle locking is integrated in a module for installation in ODU-MAC® Blue-Line frames for housings.



FUNCTIONALITY



*1 Unit = 2.4 mm

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HOUSING SELECTION – PLASTIC

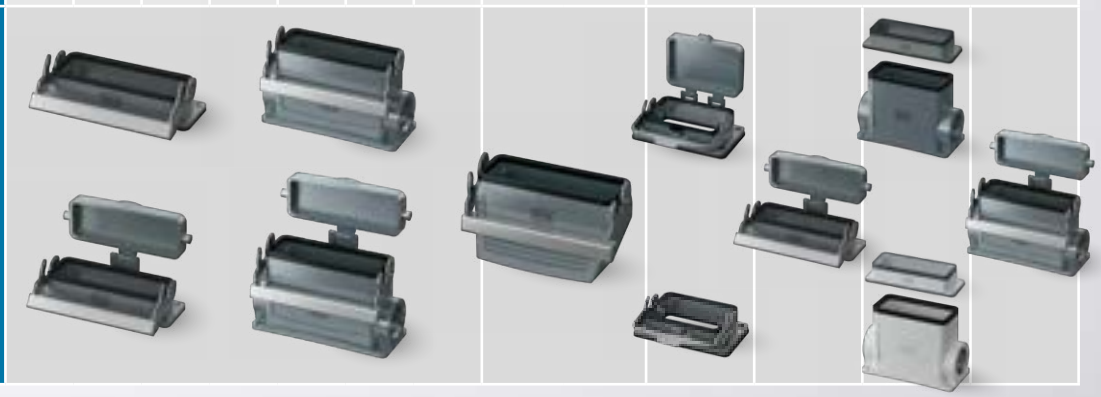
Connector housing		 ODU-MAC® PUSH-LOCK			 ODU-MAC® RAPID				
Locking		Push-Pull	Transverse		Spindle			Spindle	
Size / Type	Units*								
PUSH-LOCK	7	•	–	–	–	–	–	–	–
1	12	–	•	•	–	–	–	–	–
2	18	–	•	•	•	•	•	•	•
3	26	–	•	•	•	•	•		
4	37	–	•	•	•	•	•	•	•
5	54	–	–	–	–	–	–	–	–
6	74	–	–	–	–	–	–	–	–
Protective cover available (for connector & receptacle)		•	•	•	•	•	•	•	•
Receptacle									

*1 Unit = 2.4 mm

ODU-MAC® BLUE-LINE
SPINDLE LOCKING

Additional information on
https://vimeo.com/838690063

HOUSING SELECTION – METAL

Connector housing													
Locking	Lever					Lever		Lever		Spindle			
Size / Type	**Units***												
PUSH-LOCK	7	–	–	–	–	–	–	–	–	–	–	–	–	–
1	12	•	•	•	•	•	–	–	–	–	–	–	–	–
2	18	•	•	•	•	•	–	–	–	–	•	•	•	–
3	26	•	•	•	•	•	–	–	–	–	•	•	•	–
4	37	•	•	•	•	•	•	•	–	–	•	•	•	•
5	54	–	–	–	–	–	–	–	•	•	–	–	–	–
6	74	–	–	–	–	–	–	–	•	•	–	–	–	–
Protective cover available (for connector & receptacle)		•	•	•	•	•	•	•	only receptacle		only Gray			
Receptacle													

*1 Unit = 2.4 mm

ODU-MAC® BLUE-LINE
HOUSING VARIETY

Additional information on
https://vimeo.com/483607961

ODU-MAC® PUSH-LOCK

Very high contact density for small installation space

The compact, sealed ODU-MAC® PUSH-LOCK housing with push-pull locking is based on the ODU-MAC® Blue-Line.

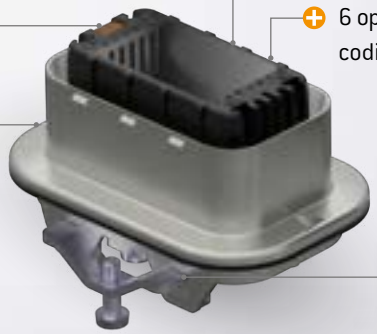
This hybrid connector is extremly user-friendly and allows easy operation with one hand.

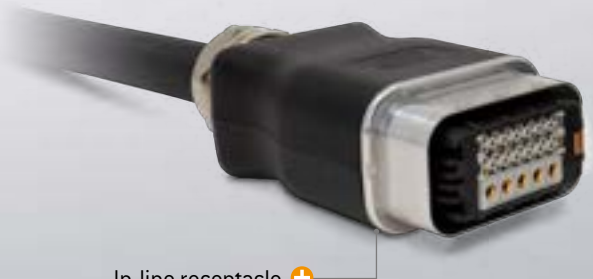
BENEFITS OF THE PUSH-LOCK HOUSING

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

FURTHER INFORMATION FROM PAGE 36


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


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


In-line receptacle

Coming soon

INFORMATION ON PLASTIC HOUSINGS

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

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

Hence manual mating becomes as easy as it is safe.

CHEMICAL RESISTANCE

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

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

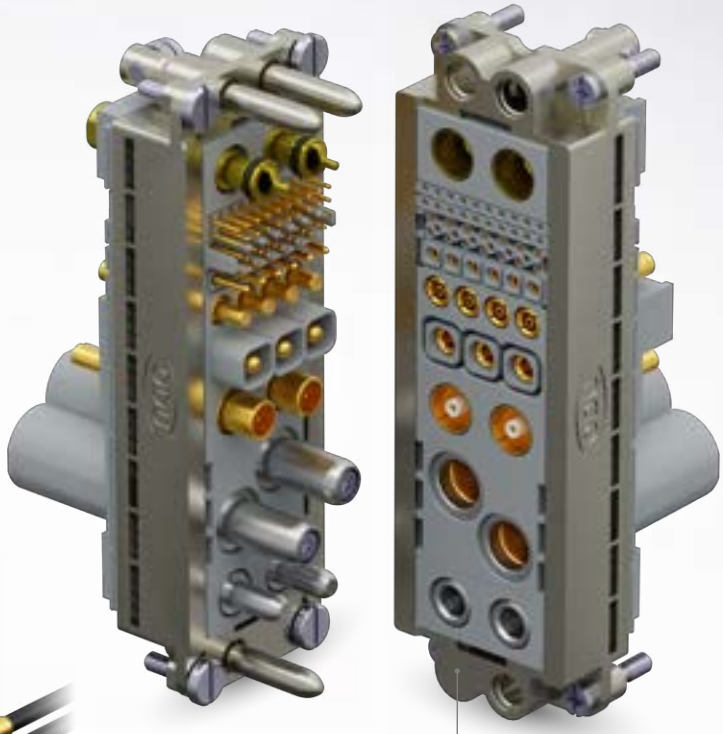
This list gives a non-exhaustive indication of the chemical resistance offered by the plastic housing. Please contact the ODU team if you have any further questions. They will be happy to assist you.

FRAMES FOR AUTOMATIC DOCKING

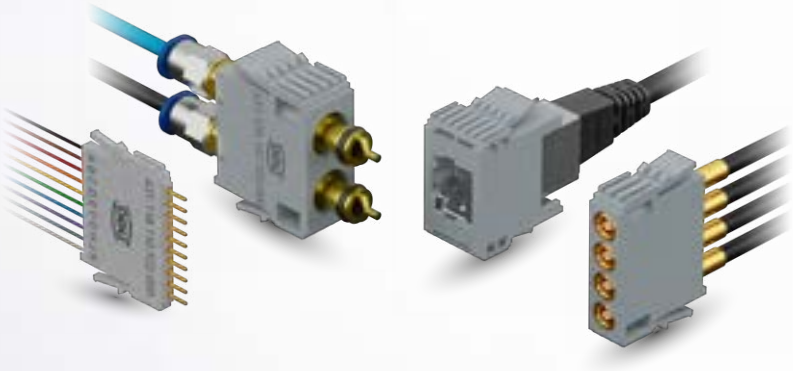
Depending on your application, you can choose between 4 different sizes and equip the frame with modules.

If your requirements for a connector are not covered by the standard products, we also offer customized solutions.

The ODU-MAC® Blue-Line is designed for 12 to 37 grid units (more on request), meaning that 370 contacts can be installed if the 10-contact module with a module width of 2.4 mm (1 unit) is used.



Frame size 4 assembled

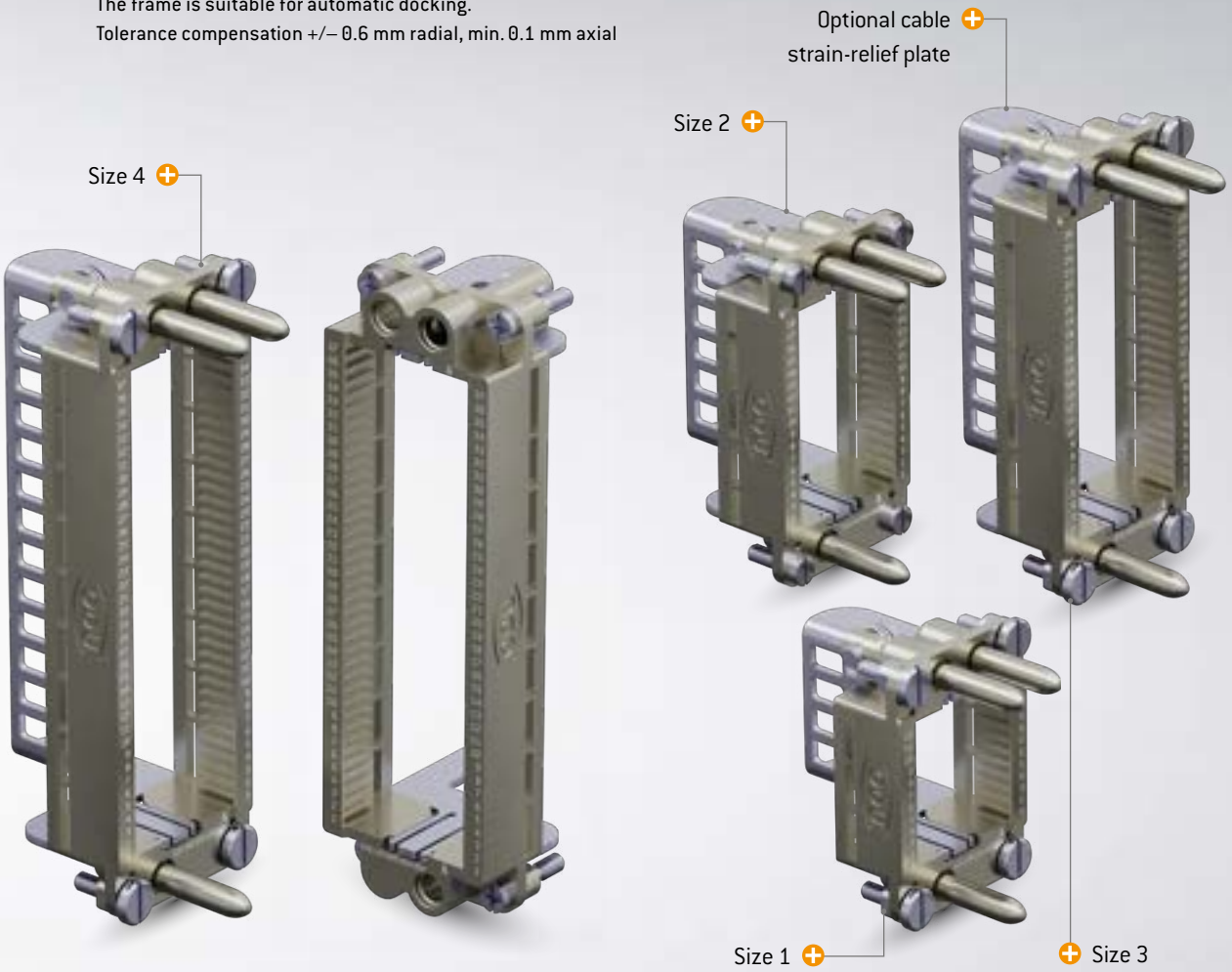


BENEFITS OF THE ODU-MAC® BLUE-LINE FRAMES

- **User-friendly**
  Quick assembly and removal of the modules in the frame without using tools
- **Flexible**
  4 frame sizes (12, 18, 26, 37 units)
- **Maximum contact density** via the 2.4 mm grid (1 unit)
- **High-performance**
  > 10,000 mating cycles
  Up to 370 contacts per connector

PIN FRAMES – FLOATING MOUNTING

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



FURTHER INFORMATION FROM PAGE 80

RELIABLE CONNECTIONS – THE CONTACTS

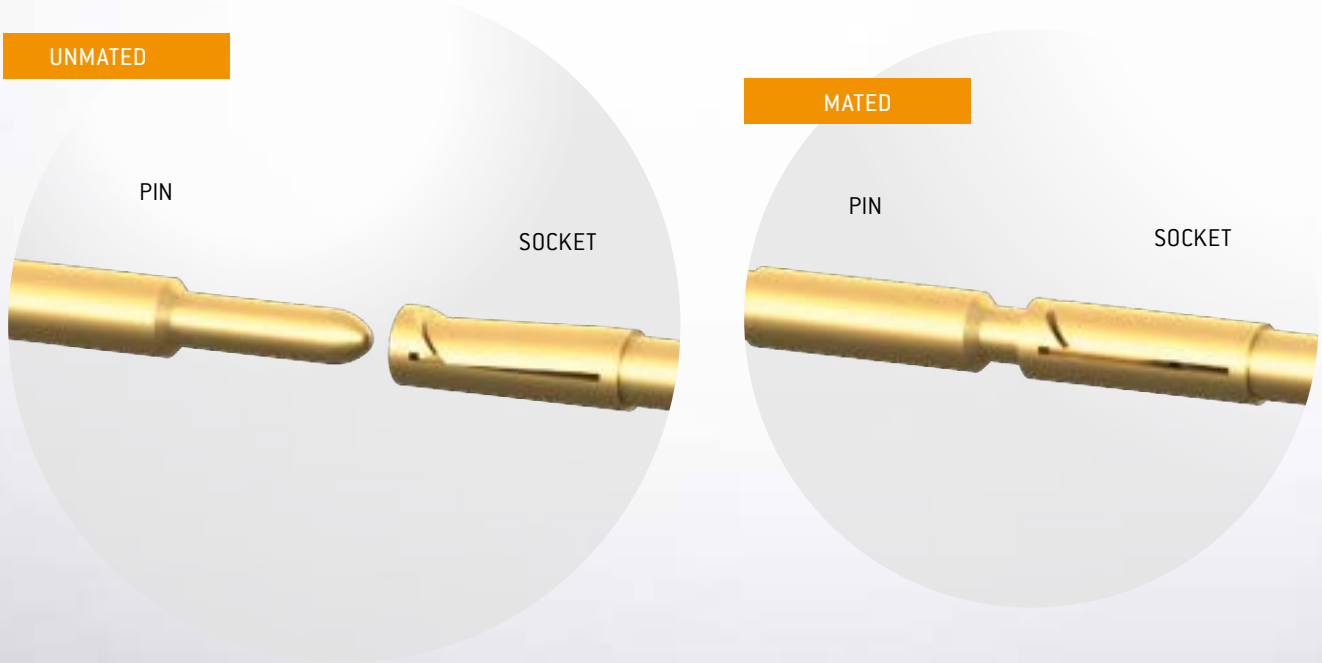
ODU contacts meet the highest quality standards and enable safe and reliable connections. In the turned contact category, we essentially distinguish between lamella and slotted contacts. The socket pieces differ, but the pins are always the same and always solid.

ODU TURNTAC®

Contacts in slotted version

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

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



BENEFITS

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

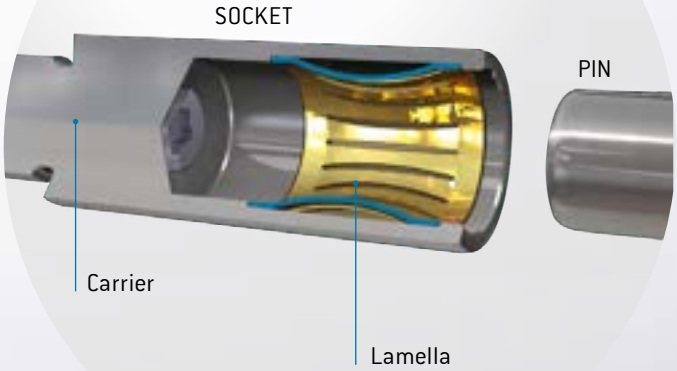
Standard contact principle for:	
Signal /High-voltage contact	∅ 0.7 – 2 mm
Power contact	∅ 3.5 mm
Coax	2 and 4 contacts
Shielded feedthrough	Signal contacts

ODU LAMTAC®

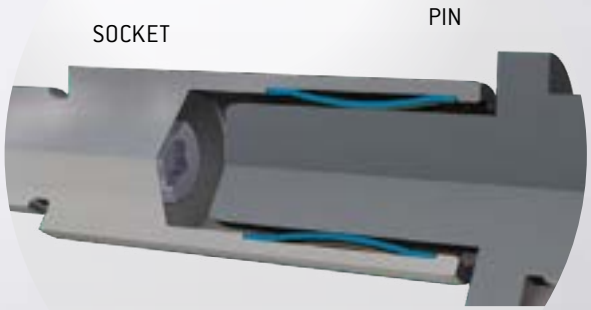
Contacts with lamella technology

The ODU LAMTAC® consists of a turned carrier in which one or several stamped lamella strips are mounted in a fully automated process. The lamella's individual slats make for a multitude of contact points, thereby guaranteeing a high level of contact safety and ease of connecting. The adapted contact force ensures low mating and demating forces, and a long service life with low wear. The mating cycles here are minimum 10,000.

UNMATED



MATED



BENEFITS

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

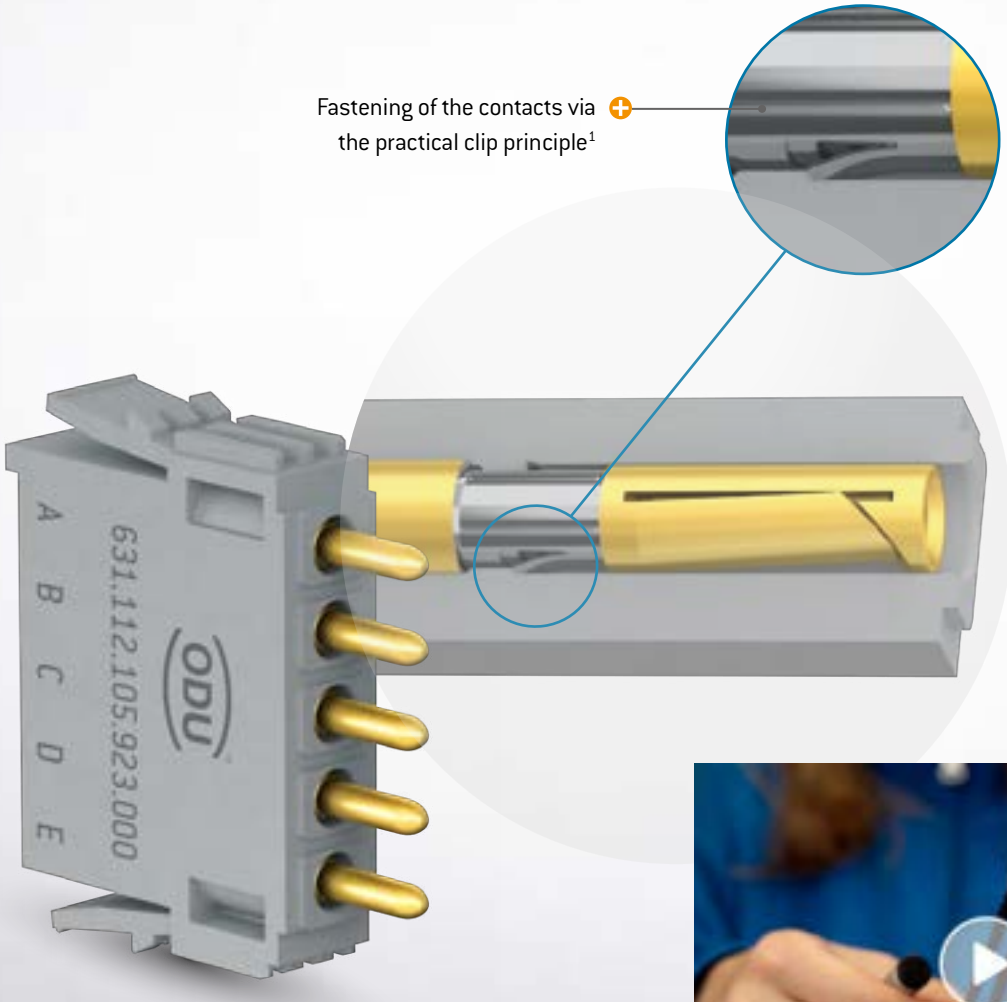
Standard contact principle for:	
Power contact	∅ 5 – 12 mm
Shielded feedthrough	Shielded transmission
PE	∅ 8 mm

CONTACT RETENTION WITH THE CLIP PRINCIPLE (STANDARD)

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

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

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



The majority of modules uses this fastening technology.

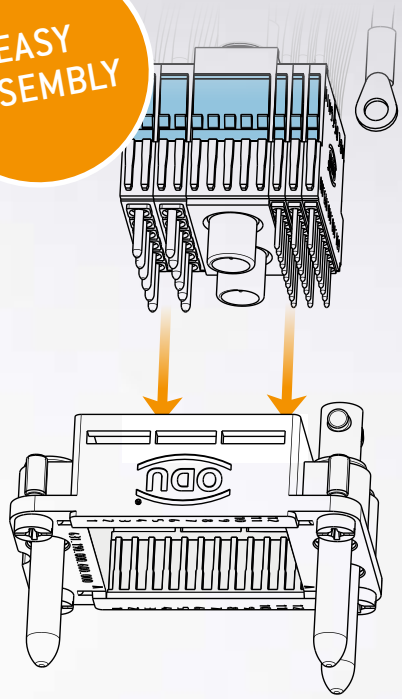
Additional information on
https://vimeo.com/587872695

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

PERFECTLY ASSEMBLED – EASY TO HANDLE

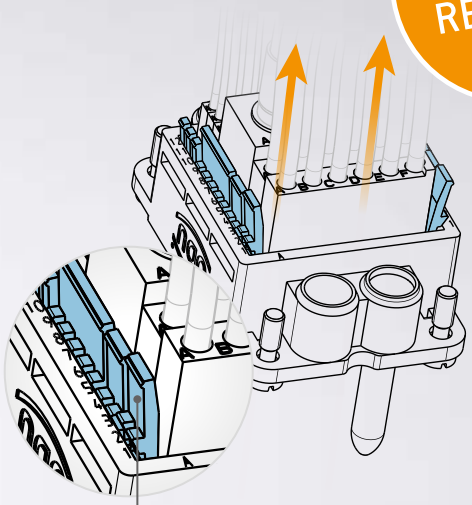
One mechanical and two optical coding functions of the modules simplify the assembly. Modules can be assembled equipped or unequipped (contact assembly is possible at any process step).

EASY ASSEMBLY



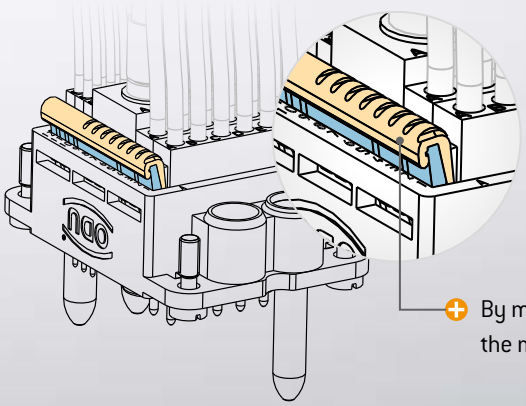
Assembly and fastening of the modules using the clip principle without any tools

SIMPLE REMOVAL



Removal of the modules using the clip principle without any tools

SECURE LOCKING

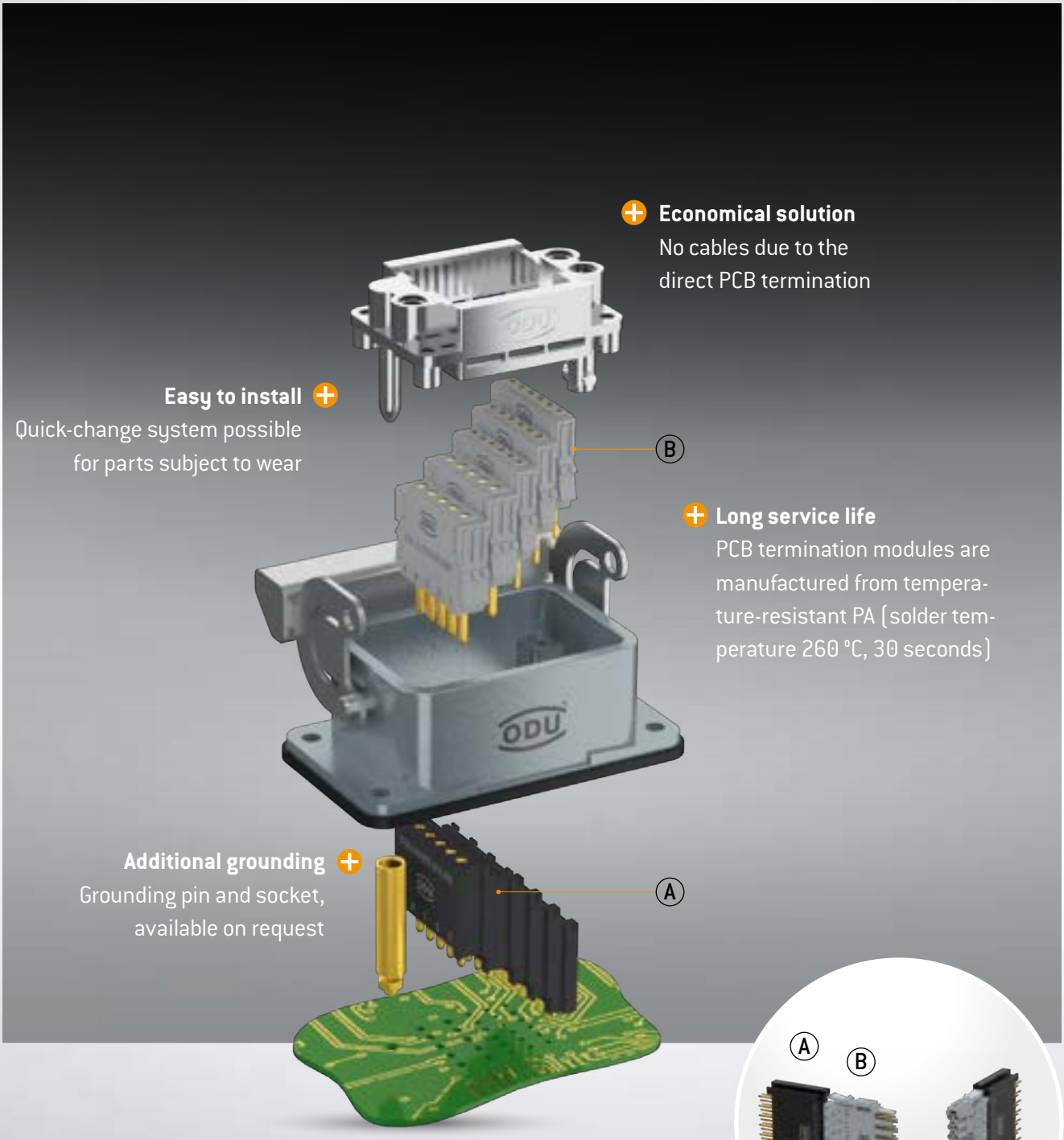


By means of secondary locking, the module is locked correctly

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

PCB TERMINATION MODULES

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



THE BENEFITS OF THE PCB TERMINATION ASSEMBLY

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

THE ODU-MAC® BLUE-LINE – FOR VARIOUS APPLICATIONS

AUTONOMOUS DISINFECTION ROBOT

The ODU-MAC® Blue-Line guarantees a secure self-centering connection between the cleaning body and the vehicle.

X-RAY MACHINES

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

MEASURING AND TESTING TECHNOLOGY

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

AUTOMOTIVE TESTING

The connection between a battery testing system and electrical cars is made with ODU-MAC® Blue-Line connectors including high-voltage modules.

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

ODU-MAC®

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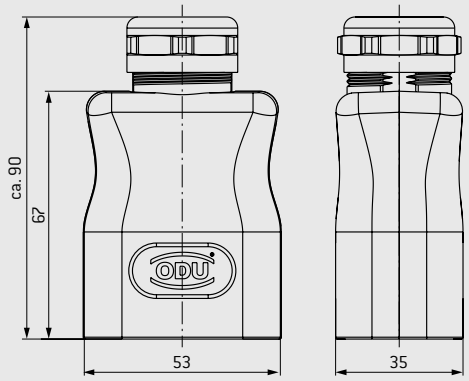
MANUAL MATING

ODU-MAC® PUSH-LOCK

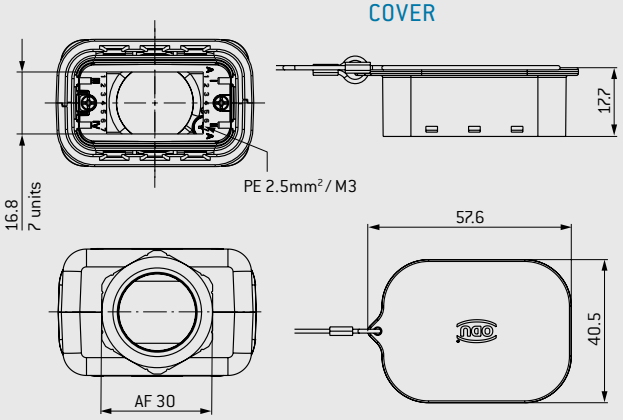
Connector housing for assembly on the cable

PUSH-PULL LOCKING

PLUG



COVER



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

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

TECHNICAL DATA

Color of housing	Black (RAL 9005), White (RAL 9003)
Material housing shell	Lexan PC (UL 94)
Material protective cover	Lexan PC
Number of locking cycles[1]	5,000
Units[2]	7
International Protection class[3]	IP67
Operating temperature	–40 °C to +125 °C
EMC shielding	acc. to IEC 62153-4-3:2013/-4-4:2015
Cable diameter	7 – 20.5
Coding	6 more mechanical versions as options

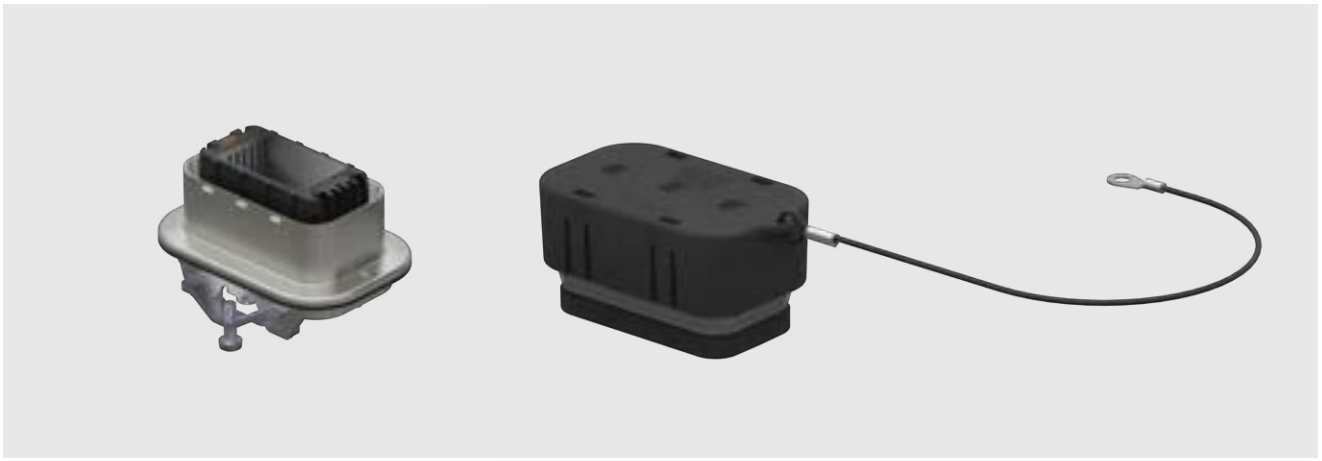
SUITABLE MODULES ARE MARKED, REVERSED GENDER IS NOT POSSIBLE.

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

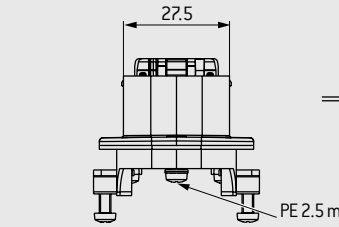
ODU-MAC® PUSH-LOCK

Receptacle for integration in your device

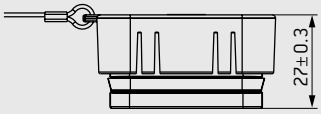
PUSH-PULL LOCKING

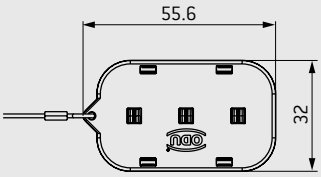


RECEPTACLE

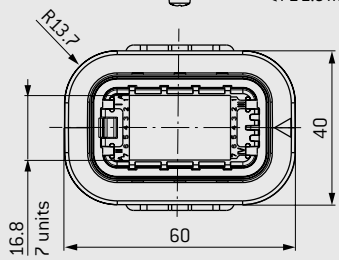


COVER

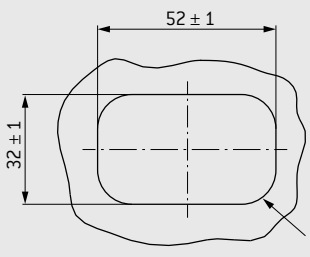




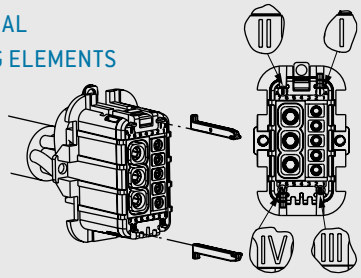
POSSIBLE SHEET THICKNESS



PANEL CUT-OUT



OPTIONAL CODING ELEMENTS



TECHNICAL DATA

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

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

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

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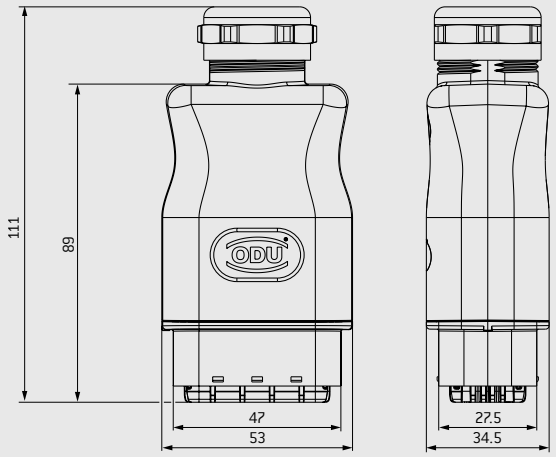
ODU-MAC® PUSH-LOCK

Coming soon

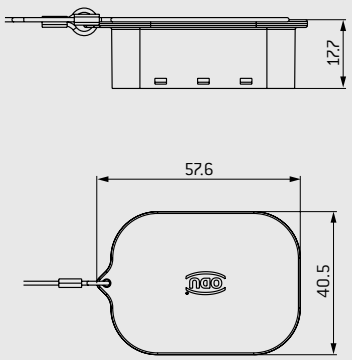
In-Line receptacle for cable to cable assembly
Connector housing for assembly on the cable

PUSH-PULL LOCKING

PLUG



COVER



ODU-MAC® PUSH-LOCK	Part number
In-Line receptacle Black	656.564.003.000.001
In-Line receptacle White	on demand
In-Line receptacle coding set	656.564.001.010.000
In-Line receptacle protective cover	656.564.010.000.000

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

TECHNICAL DATA

Color of housing	Black (RAL 9005), White (RAL 9003)
Material housing shell	Lexan PC (UL 94)
Material protective cover	Lexan PC
Number of locking cycles[1]	5,000
Units[2]	5
International Protection class[3]	IP67
Operating temperature	–40 °C to +125 °C
EMC shielding	acc. to IEC 62153-4-3:2013/-4-4:2015
Cable diameter	7 – 20.5
Coding	6 more mechanical versions as options

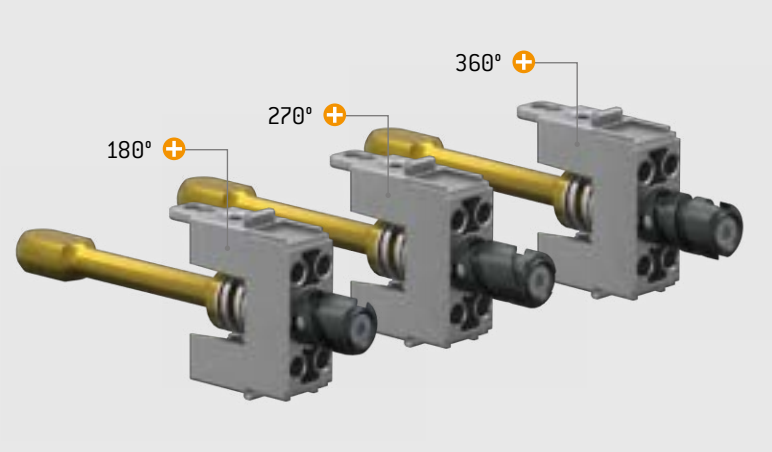
SUITABLE MODULES ARE MARKED, REVERSED GENDER IS NOT POSSIBLE.

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

SPINDLE LOCKING (VERSION 1)

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

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



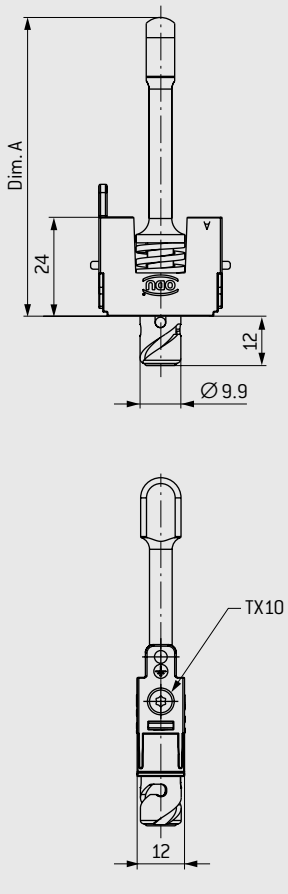
TECHNICAL NOTES

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

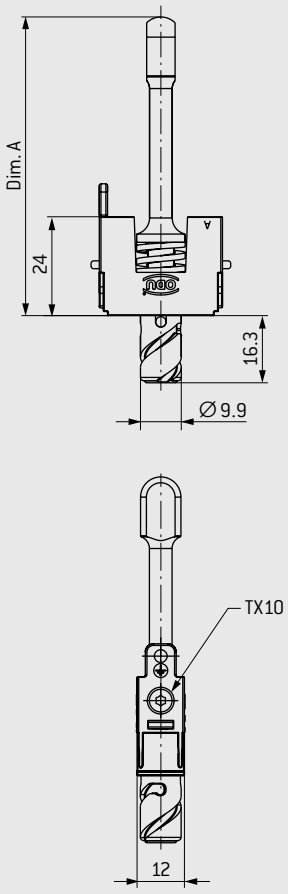
Please note the recommended mounting position of the spindle as shown in the table below:

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

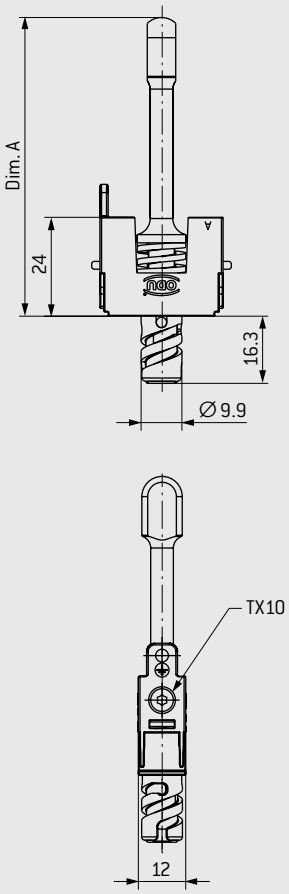
SPINDLE 1 – 12 mm (180°)



SPINDLE 2 – 16.3 mm (270°)



SPINDLE 3 – 16.3 mm (360°)



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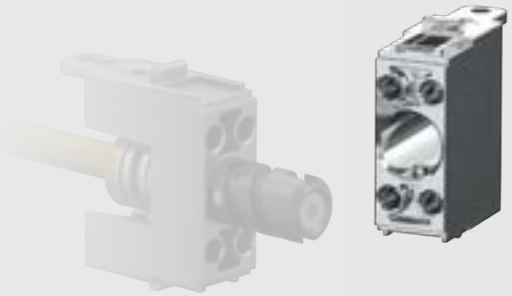
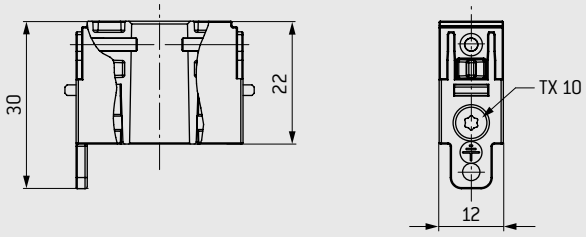
CENTER MODULE SUITABLE FOR SPINDLE 180°, 270° AND 360°

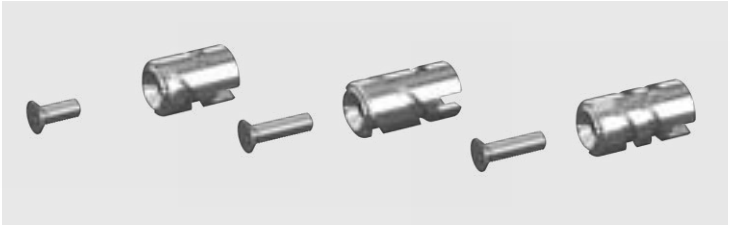


CENTER MODULE FOR SPINDLE LOCKING



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

REPLACEMENT SPINDLE SETS 180°, 270° AND 360°



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

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

FOR THE REQUIRED ASSEMBLY AIDS, SEE PAGE 172

[1] Coding pins are included in the standard scope of delivery. For an explanation of spindle coding, see from page 72

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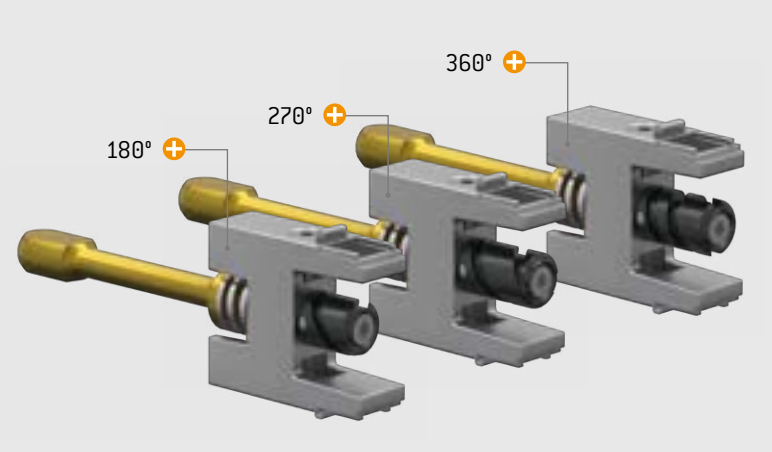
SPINDLE LOCKING (VERSION 2)

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

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



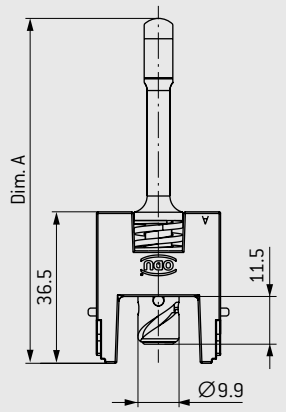
TECHNICAL NOTES

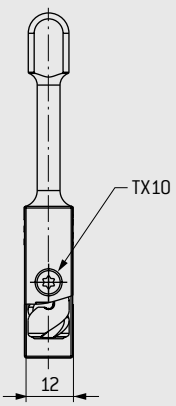
- Min. 10,000 locking cycles
- Space requirement 5 units (5 × 2.4 mm)
- Easy one-hand insertion / connection
- Force benefit by the insertion / connection
- Replaceable spindle screws

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

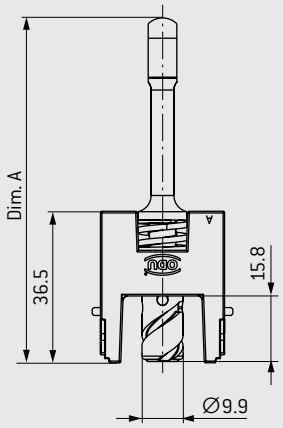
Frame size	Unit range
4	17 – 21
3	11 – 15
2	7 – 11

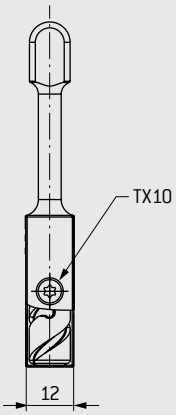
SPINDLE 1 – 11.5 mm (180°)



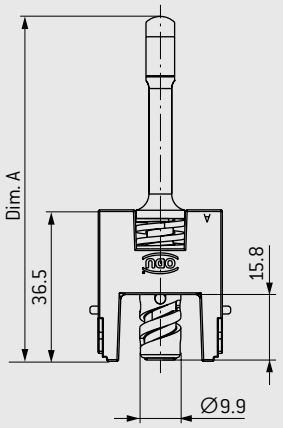


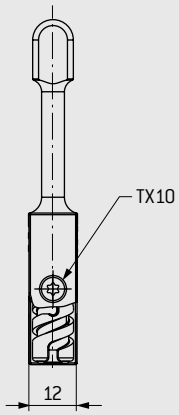
SPINDLE 2 – 15.8 mm (270°)





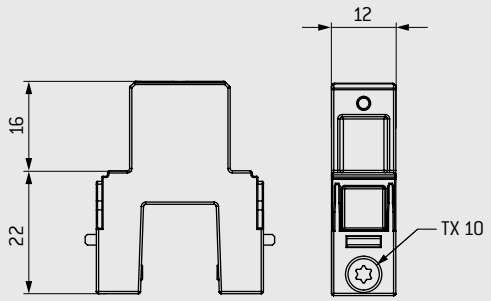
SPINDLE 3 – 15.8 mm (360°)





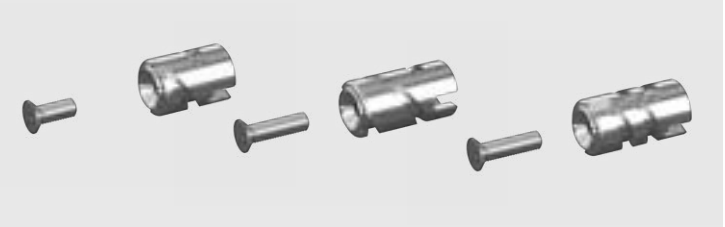
CENTER MODULE SUITABLE FOR SPINDLE 180°, 270°, AND 360°

CENTER MODULE FOR SPINDLE LOCKING



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

REPLACEMENT SPINDLE SETS 180°, 270° AND 360°



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

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

FOR THE REQUIRED ASSEMBLY AIDS, SEE PAGE 172

METAL CABLE HOOD

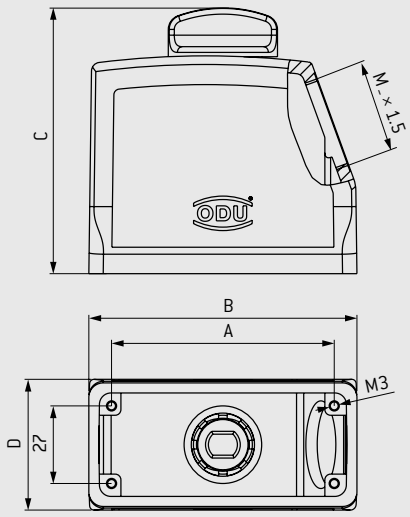
Connector housing for assembly on the cable with side cable outlet

SPINDLE LOCKING

A GRAY MODEL (STANDARD)

B WHITE MODEL

C WHITE MODEL WITH BLACK KNOB



TECHNICAL DATA

Color of housing	Gray (standard, similar to RAL 7001) or White (similar to RAL 9010)
Material	Aluminum die casting
International Protection class[1]	IP50 or IP65
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 69
Number of locking cycles	see from page 40
Adapter	for PG clamp see page 70

Size	IP	Part number A Color of housing gray spindle knob black	Part number B Color of housing white spindle knob white	Part number C Color of housing white spindle knob black	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable outlet	Part number Protective cover gray (see page 67)
2	50	613.091.513.644.208	613.091.513.653.203	–	57	73	52	43	M25	491.097.613.644.001
		613.091.514.644.208	613.091.514.653.203	613.091.514.653.208	57	73	90	43	M32	
	65	613.091.574.644.008	–	–	57	73	90	43		
3	50	613.092.514.644.208	613.092.514.653.203	613.092.514.653.208	77.5	93.3	93	45.5	M32	492.097.613.644.001
	50	613.092.515.644.008	613.092.515.653.003	–	77.5	93.3	94	45.5	M40	
	65	613.092.574.644.008	–	–	77.5	93.3	94	45.5	M32	
4	50	613.093.514.644.208	613.093.514.653.203	613.093.514.653.208	104	120	93	45.5	M32	493.097.613.644.001
		On request	On request	613.093.515.653.008	104	120	94	45.5	M40	
	65	613.093.574.644.008	–	–	104	120	94	45.5	M32	
		613.093.575.644.008	–	–	104	120	94	45.5	M40	

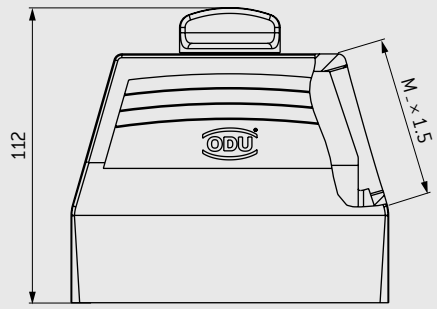
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable clamp(s) and spindle knob used)

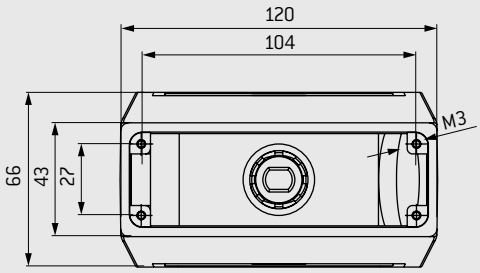
METAL CABLE HOOD XXL

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

SPINDLE LOCKING

A GRAY MODEL





TECHNICAL DATA

Color of housing	Gray (similar to RAL 7001) White on request
Material	Aluminum die casting
International	
Protection class[1]	IP50 or IP65
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 69
Number of locking cycles	see from page 40

Size	IP	Part number Color of housing gray/spindle knob black	Dim. M Cable outlet	Part number protective cover (see page 67)
4	50	613.093.516.644. 208	M50	493.097.613.644.001
4	65	613.093.576.644.008	M50	493.097.613.644.001

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

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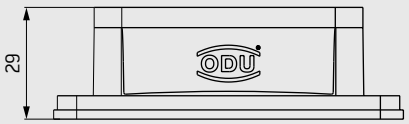
METAL BULKHEAD HOUSING

For mounting on your device

SPINDLE LOCKING

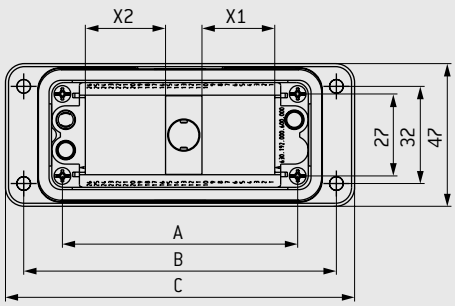
A GRAY MODEL (STANDARD)

B WHITE MODEL



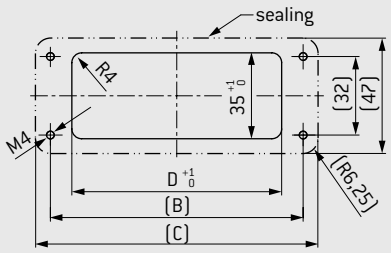
TECHNICAL DATA

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



The frames depicted must be ordered separately, see page 68.

PANEL CUT-OUT



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

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

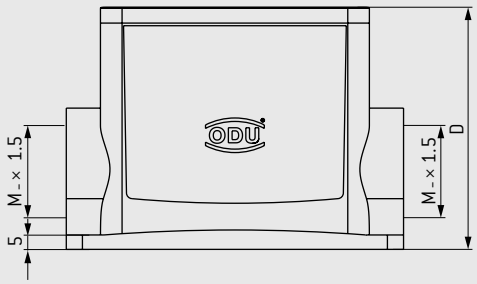
METAL SURFACE-MOUNTED HOUSING

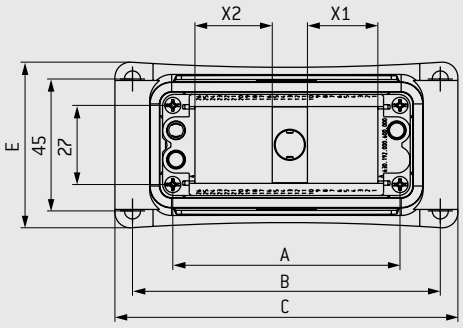
For surface mounting on your device / wall with two side cable outlets

SPINDLE LOCKING

A GRAY MODEL (STANDARD)

B WHITE MODEL





The frames depicted must be ordered separately, see page 68.

TECHNICAL DATA

Color of housing	Gray (standard, similar to RAL 7001) White on request
Material	Aluminum die casting
International	
Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85 °C (continuous)
Sealing	NBR; sealing material, FKM on request (to extend the temperature range)
Cable clamp	see page 69
Adapter	for PG clamp see page 70

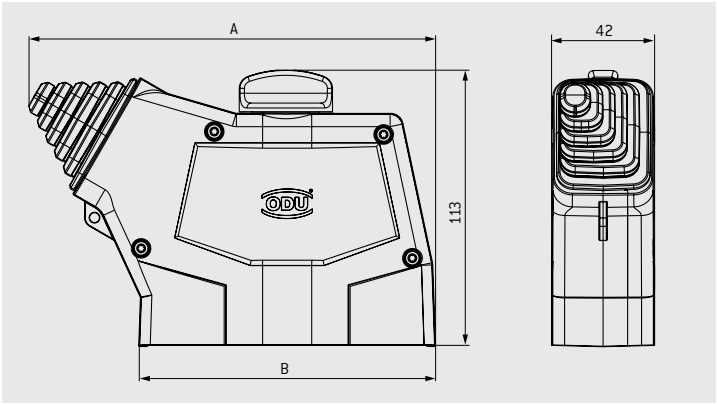
Size	Part number A Color of housing gray	Part number B Color of housing white	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	X1 Units × 2.4 mm	X2 Units × 2.4 mm	Dim. M Cable outlet
2	612.091.025.644.102	612.091.025.653.102	57	82	92.5	74	55.5	6	7	M32
3	612.092.025.644.102	612.092.025.653.102	77.5	105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

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

ODU-MAC® RAPID PLASTIC HOUSING

Half-shell principle with individually adjustable side cable outlet

SPINDLE LOCKING



TECHNICAL DATA

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

Size	Part number	Description	Color of housing	Cable outlet ⌀	Part number protective cover	Dim. A mm	Dim.B mm
2	656.561.012.003.000	RAPID housing	White	Max. 26 × 37 mm	656.561.012.023.000	139.0	75.1
2	656.561.012.008.000	RAPID housing	Black		656.561.012.018.000		
4	656.563.012.003.000	RAPID housing	White		656.563.012.023.000	165.7	121.0
4	656.563.012.008.000	RAPID housing	Black		656.563.012.018.000		
2 / 4	635.093.011.200.000	Spindle locking 270° without coding					
2 / 4	635.093.011.200.010	Spindle locking 270° with coding					
2 / 4	635.093.011.200.003	Spindle locking 360° without coding					
2 / 4	635.093.011.200.013	Spindle locking 360° with coding					
2	631.191.000.600.001	Housing frame, pin side					
4	631.193.000.600.001	Housing frame, pin side					

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

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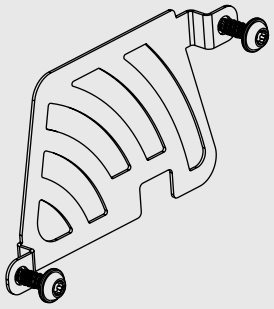
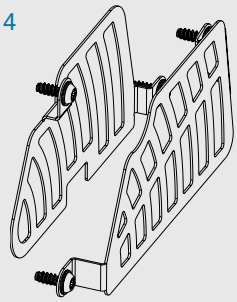
STRAIN RELIEF SET

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

SIZE 2



SIZE 4



TECHNICAL DATA

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

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

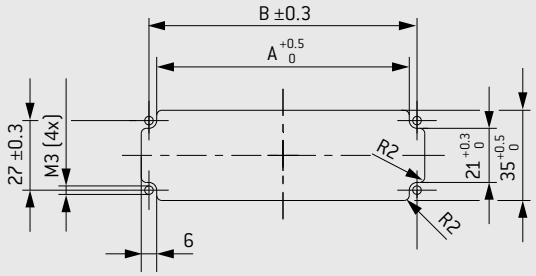
ODU-MAC® RAPID RECEPTACLE

For mounting on your device

SPINDLE LOCKING

DIRECT ASSEMBLY OF THE SOCKET FRAME
ON ASSEMBLY WALL

PANEL CUT-OUT



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

ODU-MAC® RAPID RECEPTACLE

For mounting as a recessed plastic version

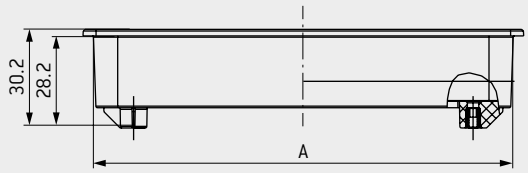
SPINDLE LOCKING

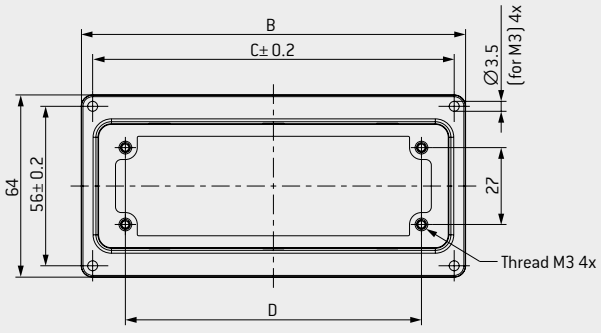
RECESSED ASSEMBLY
OF THE SOCKET FRAME
IN ASSEMBLY WALL

Also available **in White**

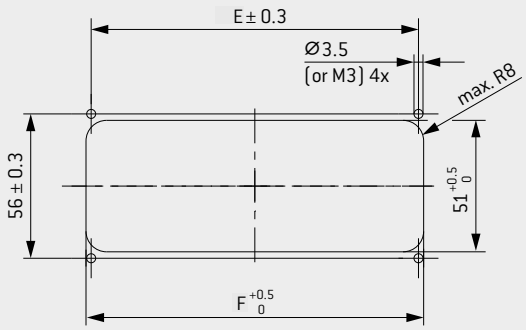
TECHNICAL DATA

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





PANEL CUT-OUT



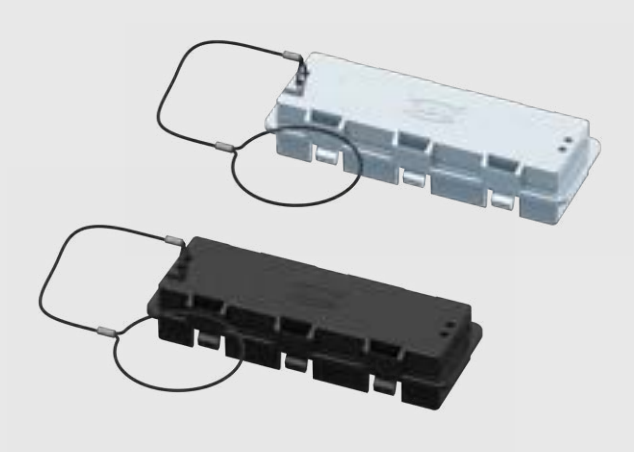
Size	Part number	Description	Color of housing	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. E mm	Dim. F mm
2	656.561.001.003.000	Receptacle	White	82.4	88	80	57	80	84
2	656.561.001.008.000	Receptacle	Black	82.4	88	80	57	80	84
4	656.563.001.003.000	Receptacle	White	129.4	134.9	127.2	104	127	131
4	656.563.001.008.000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

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

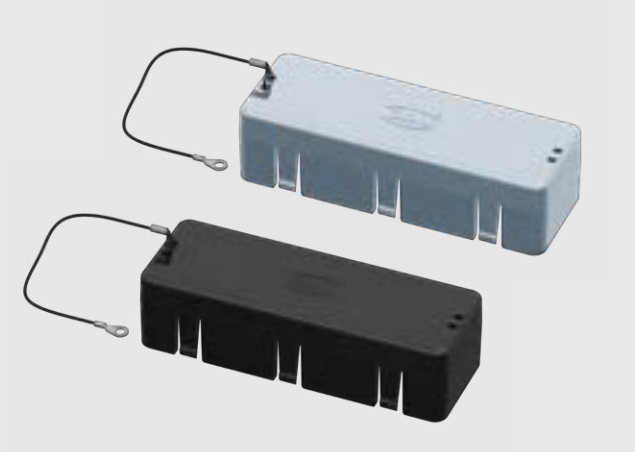
PLASTIC PROTECTIVE COVER

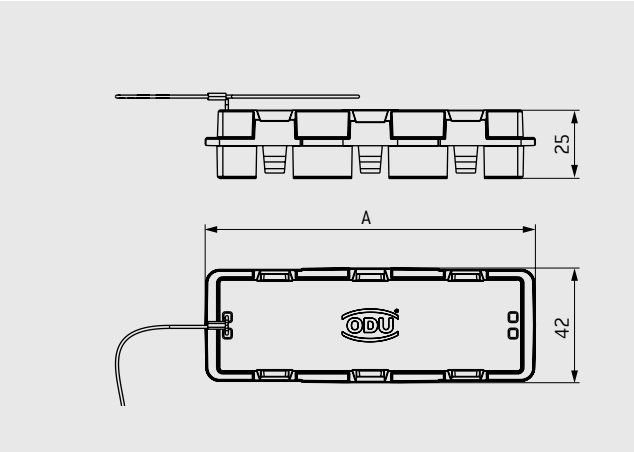
For ODU-MAC® RAPID housing and recessed version receptacle

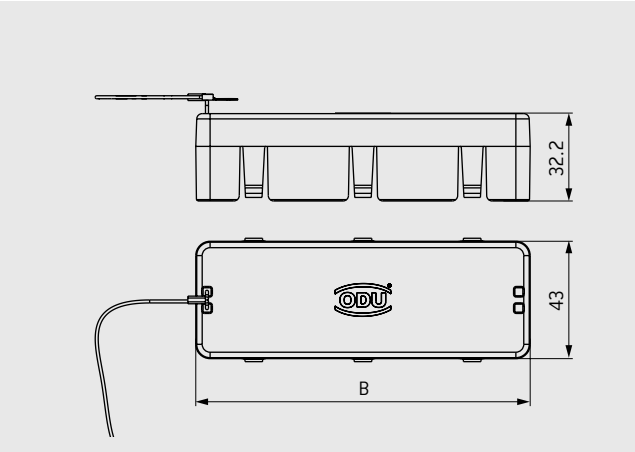
HOUSING



RECESSED-STYLE RECEPTACLE







TECHNICAL DATA

Color of housing	Black (RAL 9005), White (RAL 9003)
Material	Plastic Lexan PC, UL 94-V0
Operating temperature	–40 °C to +125 °C
Protection class[1]	IP2X

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

[1] DIN EN 60529:2014-09

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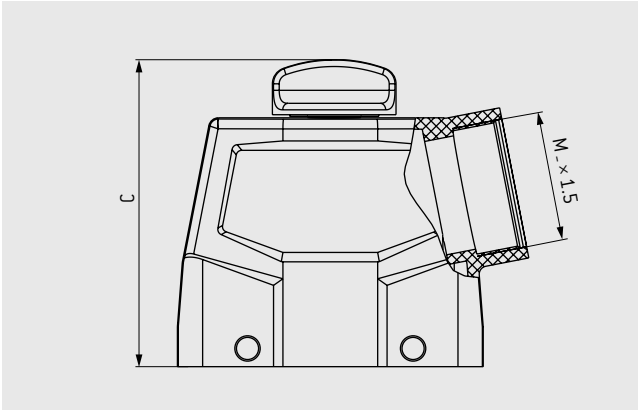
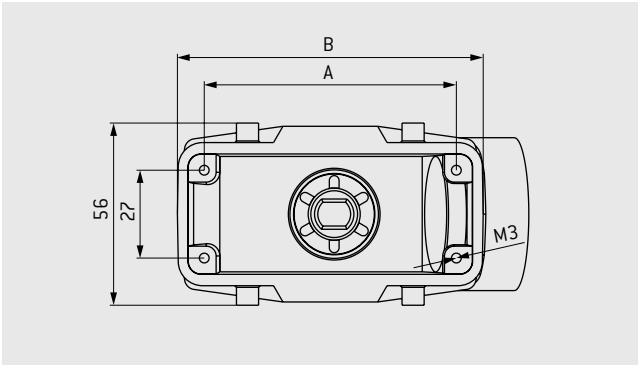
PLASTIC CABLE HOOD

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

SPINDLE LOCKING





TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
International Protection class[1]	IP50 IP65 on request
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 69
Number of locking cycles	see from page 40

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. M Cable outlet	Part number protective cover (see page 59)
2	613.091.514.908.308	57	74	90	M32	491.097.613.908.001
3	613.092.514.908.308	77.5	94	94	M40	492.097.613.908.001
4	613.093.514.908.308	104	121	94	M40	493.097.613.908.001

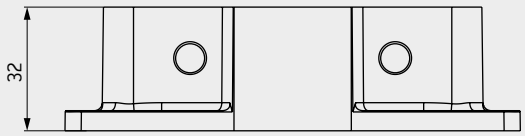
FOR A REDUCTION FROM M40 TO M32, SEE PAGE 69

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

PLASTIC BULKHEAD HOUSING

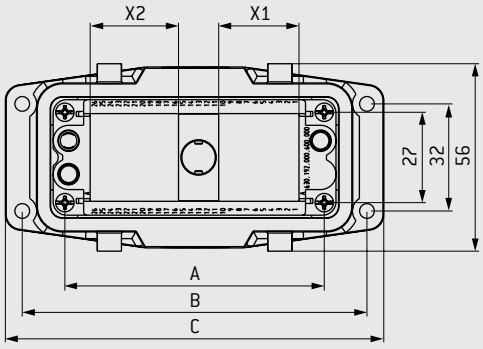
For mounting on your device with spindle locking

SPINDLE LOCKING



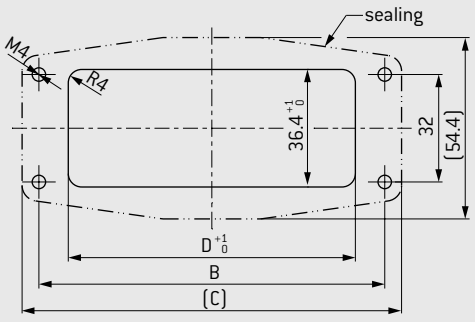
TECHNICAL DATA

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



The frames depicted must be ordered separately, see page 68.

PANEL CUT-OUT



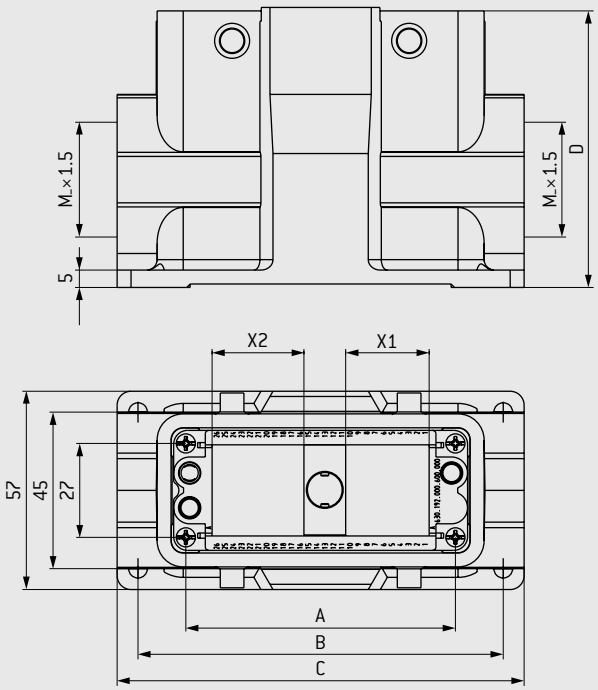
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D Panel cut-out mm	X1 Units × 2.4 mm	X2 Units × 2.4 mm	Part number protective cover (see page 58)
2	612.091.010.908.000	57	83	93	67	6	7	491.097.612.908.001
3	612.092.010.908.000	77.5	103	114	87	10	11	492.097.612.908.001
4	612.093.010.908.000	104	130	140	114	16	16	493.097.612.908.001

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

PLASTIC SURFACE-MOUNTED HOUSING

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

SPINDLE LOCKING



The frames depicted must be ordered separately, see page 68.

TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
International	
Protection class[1]	IP50 / IP65
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material
Cable clamp	see page 69

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	X1 Units × 2.4 mm	X2 Units × 2.4 mm	Dim. M Cable outlet	Part number protective cover (see page 58)
2	612.091.020.908.000	57	82	94	82	6	7	M32	491.097.612.908.001
3	612.092.020.908.000	77.5	105	117	82	10	11	M40	492.097.612.908.001
4	612.093.020.908.000	104	132	144	82	16	16	M40	493.097.612.908.001

FOR A REDUCTION FROM M40 TO M32, SEE PAGE 69

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

PLASTIC CABLE HOOD

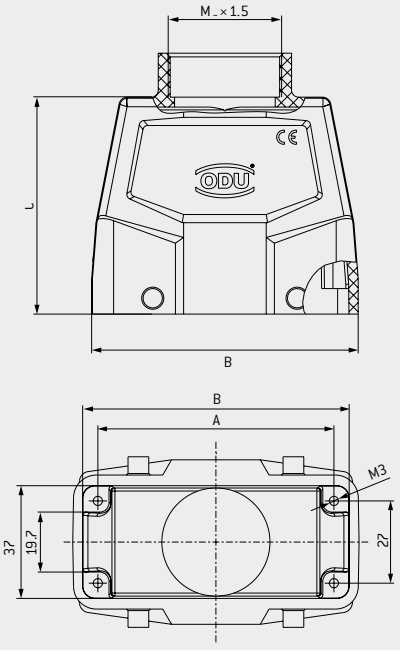
Plastic cable hood for assembly on the cable with side cable outlet

TRANSVERSE LOCKING

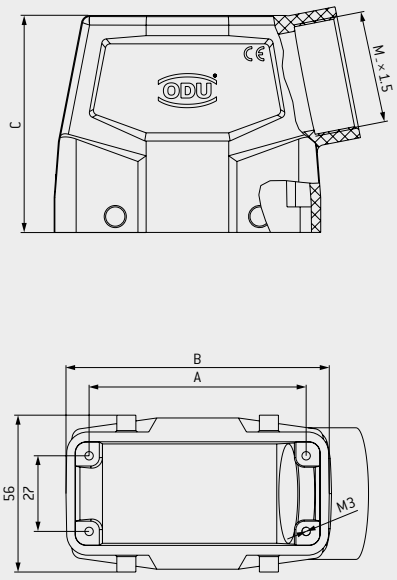
A TOP CABLE OUTLET

B SIDE CABLE OUTLET

A TOP CABLE OUTLET



B SIDE CABLE OUTLET



TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
International Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 69
Number of locking cycles	5,000

Size	Part number with side cable outlet	Part number with top cable outlet	Dim. A mm	Dim. B mm	Dim. C mm	Dim. M Cable outlet	Part number protective cover (see page 59)
1	490.420.650.908.000	490.220.650.908.000	44	61	72.5	M32	490.097.613.908.001
2	491.420.650.908.000	491.220.650.908.000	57	74	72.5	M32	491.097.613.908.001
3	492.420.650.908.000	492.220.650.908.000	77.5	94	76.5	M40	492.097.613.908.001
4	493.420.650.908.000	493.220.650.908.000	104	121	76.5	M40	493.097.613.908.001

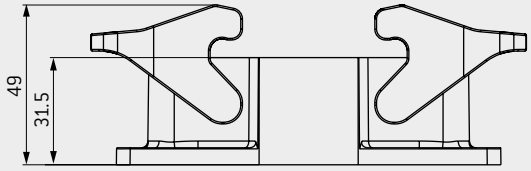
FOR A REDUCTION FROM M40 TO M32 AND FROM M32 TO M25, SEE PAGE 69

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

PLASTIC BULKHEAD HOUSING

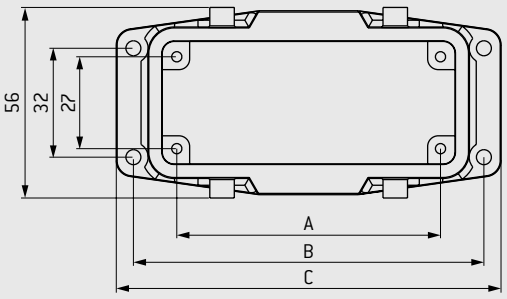
For assembly on your device with transverse locking

TRANSVERSE LOCKING

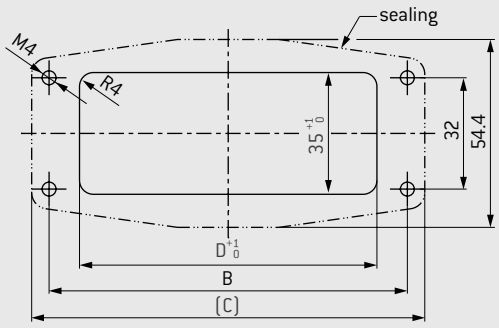


TECHNICAL DATA

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



PANEL CUT-OUT



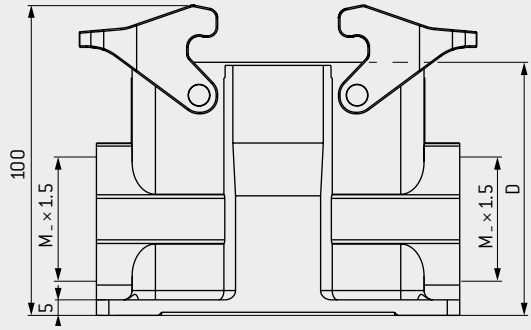
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D Panel cut-out mm	Part number protective cover (see page 58)
1	490.120.600.908.000	44	70	80	53	490.097.612.908.000
2	491.120.600.908.000	57	83	93.2	66	491.097.612.908.000
3	492.120.600.908.000	77.5	103	113	86	492.097.612.908.000
4	493.120.600.908.000	104	130	140	113	493.097.612.908.000

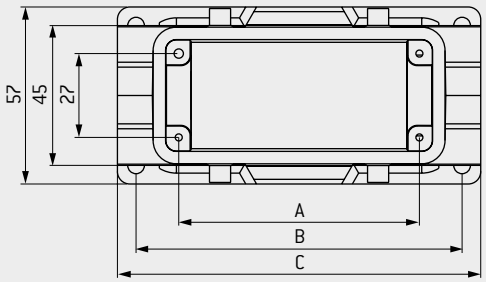
[1] IEC 60529:1989 (VDE 0470-1:2014-09) (depends on the cable hood used)

PLASTIC SURFACE-MOUNTED HOUSING

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

TRANSVERSE LOCKING





TECHNICAL DATA

Color of housing	Black (RAL 9005)
Material	Plastic PA6 GF, UL 94-V0
International	
Protection class[1]	IP65
Operating temperature	–40 °C to +125 °C
Sealing	NBR; sealing material
Cable clamp	see page 69

Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable outlet	Part number protective cover (see page 58)
1	490.120.650.908.000	44	70	82	74.7	M32	490.097.612.908.000
2	491.120.650.908.000	57	82	94	81.5	M32	491.097.612.908.000
3	492.120.650.908.000	77.5	105	117	81.5	M40	492.097.612.908.000
4	493.120.650.908.000	104	132	144	81.5	M40	493.097.612.908.000

FOR A REDUCTION FROM M40 TO M32 AND FROM M32 TO M25, SEE PAGE 69

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

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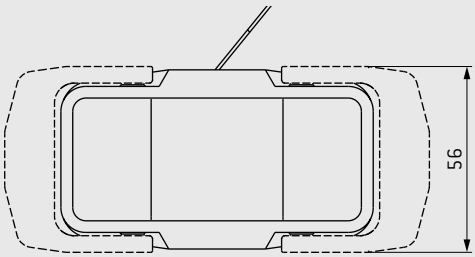
PLASTIC PROTECTIVE COVER

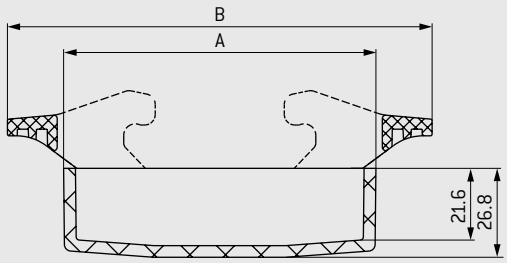
For bulkhead and surface-mounted housing with lanyard

SPINDLE LOCKING **A**

TRANSVERSE LOCKING **B**

SPINDLE AND TRANSVERSE LOCKING





Dotted line and dimension B only applies to spindle locking

TECHNICAL DATA

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

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

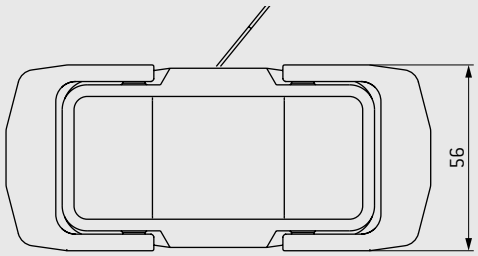
[1] IEC 60529:1989 (VDE 0470-1:2014-09)

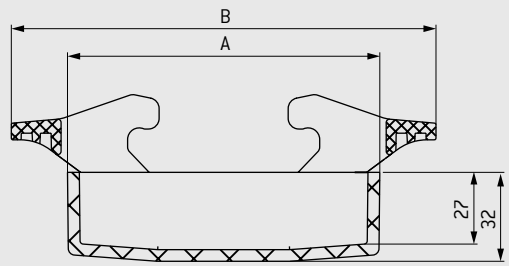
PLASTIC PROTECTIVE COVER

For cable hood with lanyard

SPINDLE AND TRANSVERSE LOCKING

SPINDLE AND TRANSVERSE LOCKING





TECHNICAL DATA

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

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

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

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METAL CABLE HOOD

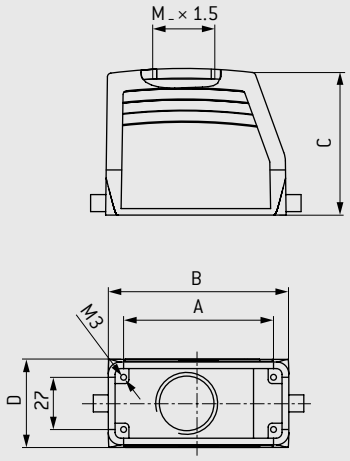
Connector housing for assembly on the cable with top and side cable outlet

LEVER LOCKING

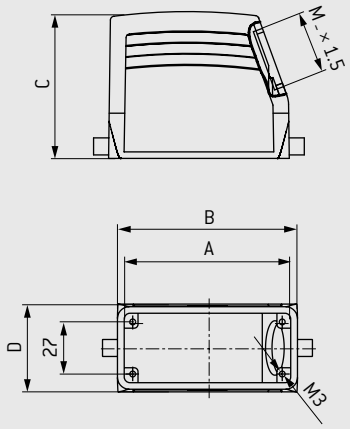
A TOP CABLE OUTLET

B SIDE CABLE OUTLET

A TOP CABLE OUTLET



B SIDE CABLE OUTLET



TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminum die casting
International Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 69
Adapter	for PG clamp see page 70

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

Size	Part number A Top cable outlet	Part number B Side cable outlet	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable outlet	Part number protective cover (see from page 50)
1	490.214.450.644.102	490.414.450.644.102	44	60	52	43	M25	490.097.500.644.000
	490.215.450.644.102	490.415.450.644.102			72		M32	
2	491.214.450.644.102	491.414.450.644.102	57	73	52	43	M25	491.097.212.644.000
	491.215.450.644.102	491.415.450.644.102			72		M32	
3	492.215.450.644.102	492.415.450.644.102	77.5	93.5	76	45.5	M32	492.097.214.644.000
	492.216.550.644.000	–	104	120	76	45.5	M40	
4	493.215.450.644.102	493.415.450.644.102	104	120	76	45.5	M32	493.097.214.644.000
	493.217.550.644.000	493.417.550.644.000					M40	

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

METAL CABLE HOOD XXL

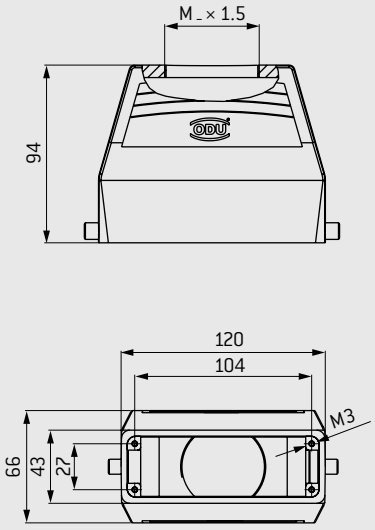
Connector housing for assembly on the cable with expanded assembly space and side and top M50 cable outlet

LEVER LOCKING

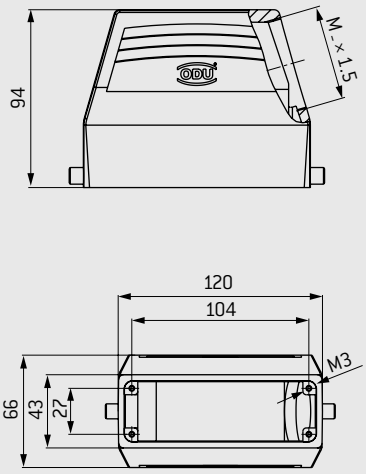
A TOP CABLE OUTLET

B SIDE CABLE OUTLET

A TOP CABLE OUTLET



B SIDE CABLE OUTLET



TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminum die casting
International Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C
Cable clamp	see page 69

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

Size	Part number A Top cable outlet	Part number B Side cable outlet	Dim. M Cable outlet	Part number protective cover (see from page 50)
4	493.218.550.644.000	493.419.550.644.000	M50	493.097.214.644.000

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

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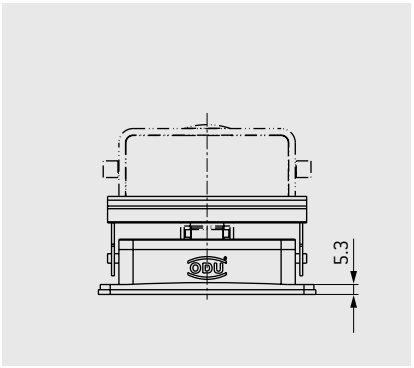
METAL BULKHEAD HOUSING

For mounting on your device

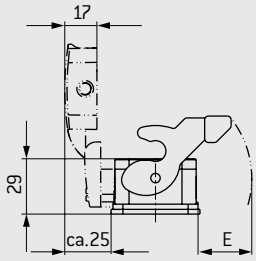
LEVER LOCKING

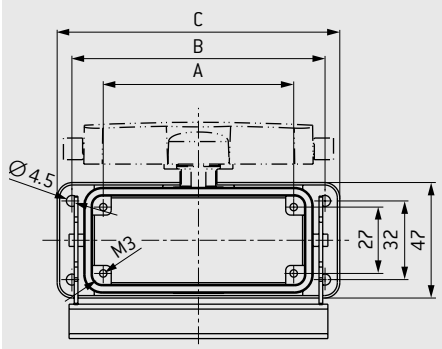
A WITHOUT COVER

B WITH COVER

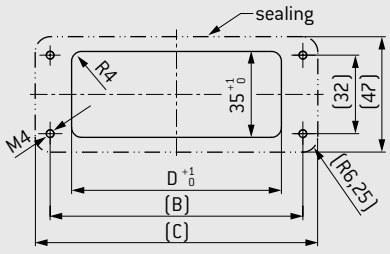


Lever locking (just an example)





PANEL CUT-OUT



TECHNICAL DATA

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

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

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

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

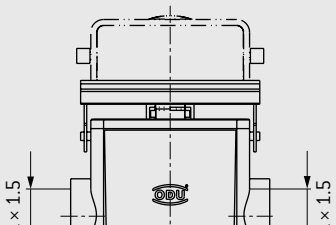
METAL SURFACE-MOUNTED HOUSING

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

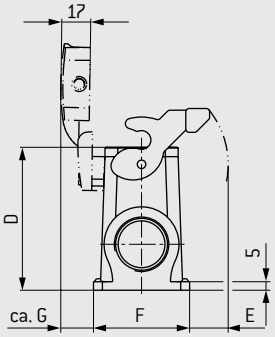
LEVER LOCKING

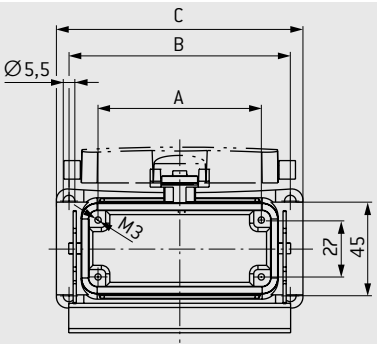
A WITHOUT COVER

B WITH COVER



Lever locking (just an example)





TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminum die casting
International Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85 °C (continuous)
Sealing	NBR; sealing material FKM on request (to extend the temperature range)
Adapter	for PG clamp see page 70

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

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

M40 CABLE OUTLET AVAILABLE ON REQUEST

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

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METAL CABLE HOOD WIDE

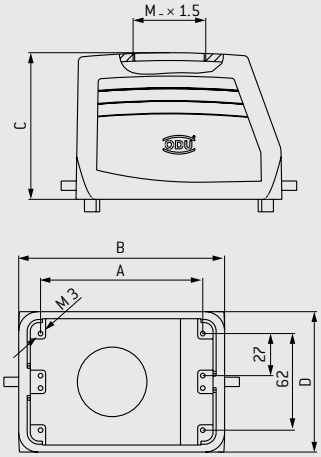
With top and side cable outlet for double frame assembly

LEVER LOCKING

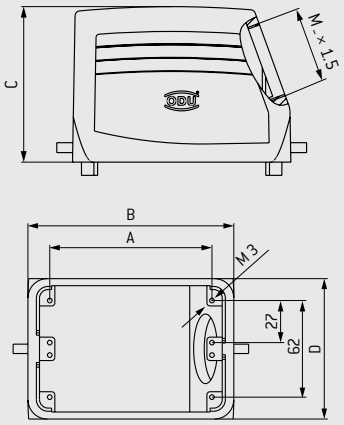
A TOP CABLE OUTLET

B SIDE CABLE OUTLET

A TOP CABLE OUTLET



B SIDE CABLE OUTLET



TECHNICAL DATA

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminum die casting
International Protection class[1]	IP65 in mated condition
Operating temperature	without housing sealing: –40 °C to +125 °C
Cable clamp	see page 69

Housing suitable for two standard frames size 3 or 4.

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

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

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

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

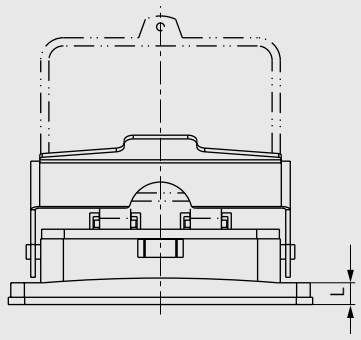
METAL BULKHEAD HOUSING FOR CABLE HOOD WIDE

For mounting on your device

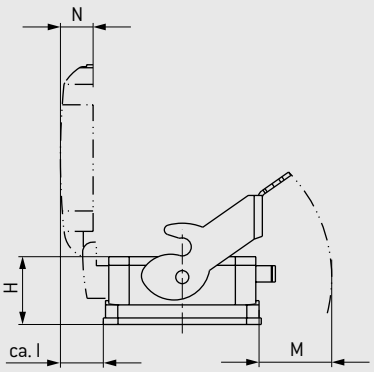
LEVER LOCKING

A WITHOUT COVER

B WITH COVER



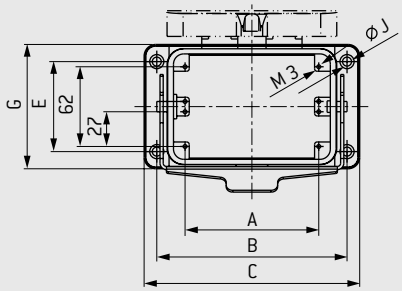
Lever locking (just an example)



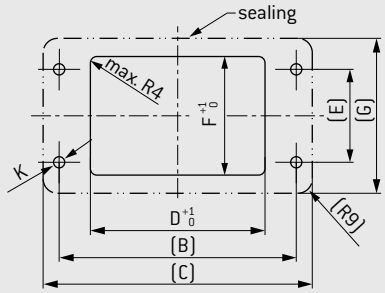
TECHNICAL DATA

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

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



PANEL CUT-OUT



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

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

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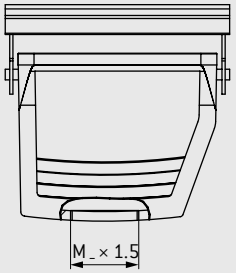
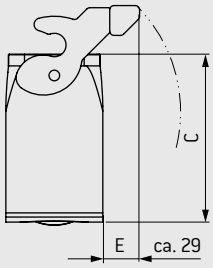
METAL CABLE-TO-CABLE HOOD

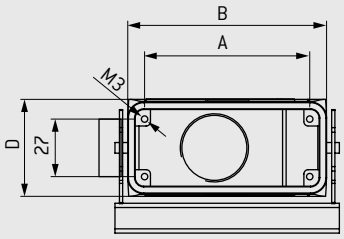
With top cable outlet for a flying cable-to-cable connection

LEVER LOCKING



Lever locking (just an example)





TECHNICAL DATA

To build a cable-to-cable connection.
Suitable for use with cable hoods (page 44).

Color of housing	Gray (standard similar to RAL 7001)
Material	Aluminum die casting
International Protection class[1]	IP65 in mated condition
Operating temperature	–40 °C to +125 °C (short duration) –40 °C to +85 °C (continuous)
Sealing	NBR; sealing material FKM on request (to extend the temperature range)
Cable clamp	see page 69
Adapter	for PG clamp see page 70

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

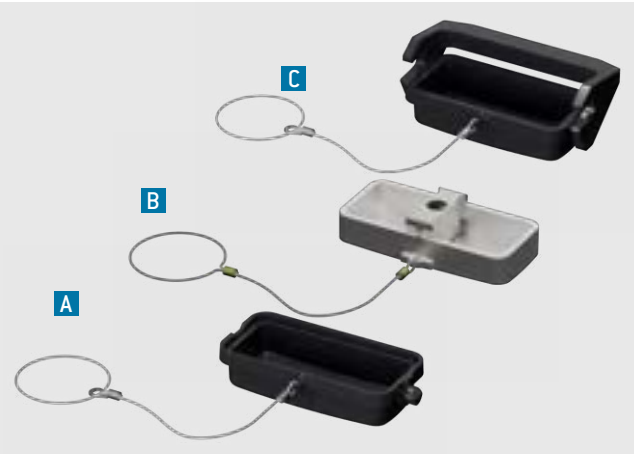
Size	Part number	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm	Dim. M Cable outlet	Part number Protective cover (see from page 50)
1	490.331.450.644.102	44	60	75	43	M32	490.097.500.644.001
2	491.331.450.644.102	57	73	75	43		491.097.133.644.000
3	492.331.450.644.102	77.5	93.3	79	45.5		492.097.133.644.000
4	493.331.450.644.102	104	120	79	45.5		493.097.133.644.000

M40 CABLE OUTLET AVAILABLE ON REQUEST

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

PROTECTIVE COVERS

For metal housing



TECHNICAL DATA

Color	Gray (standard, similar to RAL 7001)

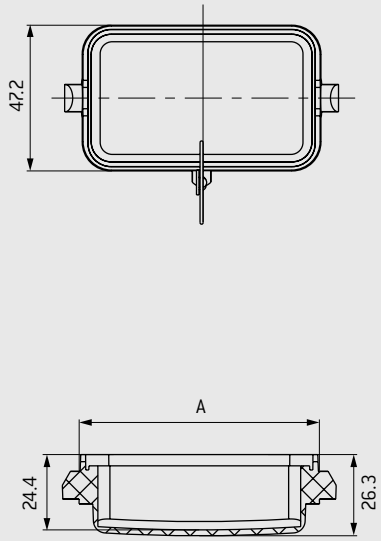
International Protection class IP65 in locked condition

Protective cover with locking latch (C)
Protective cover with bolt and lanyard (A)

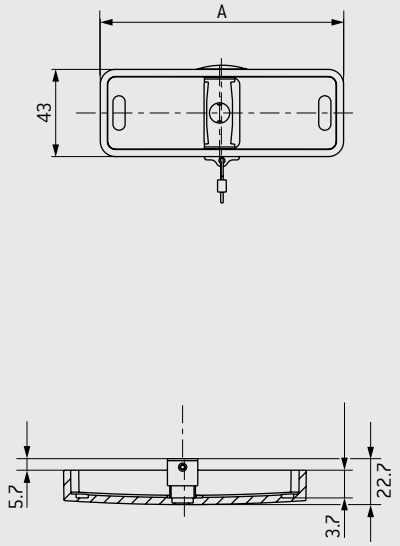
International Protection class IP42 in locked condition

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

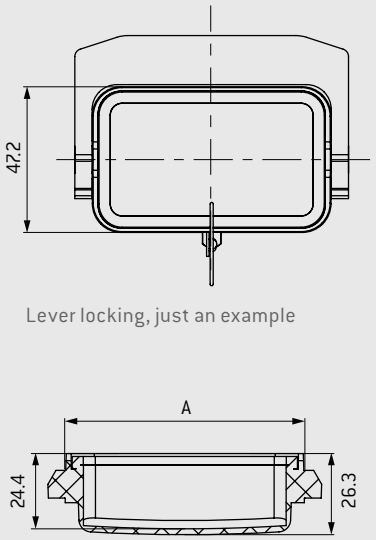
A FOR CABLE TO CABLE HOODS



B FOR CABLE HOOD AND CABLE HOOD XXL FOR SPINDLE LOCKING



C FOR CABLE HOOD AND CABLE HOOD XXL WITH LEVER LOCKING



Lever locking, just an example

Size	IP65 Type A Protective cover with bolt and lanyard	IP42 Type B[1] Protective cover for spindle locking with lanyard and center module	IP65 Type C Protective cover with locking latch	Dim. A mm
1	490.097.700.921.001	–	490.097.700.921.002	60
2	491.097.700.921.001	491.097.613.644.001	491.097.700.921.002	73
3	492.097.700.921.001	492.097.613.644.001	492.097.700.921.002	93.5
4/XXL	493.097.700.921.001	493.097.613.644.001	493.097.700.921.002	120

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

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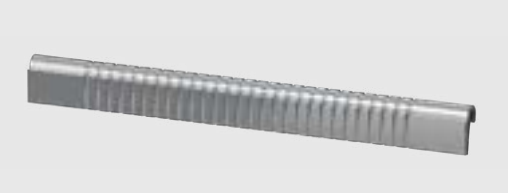
ODU-MAC® BLUE-LINE FRAME FOR HOUSING

With grounding for housing

TECHNICAL DATA

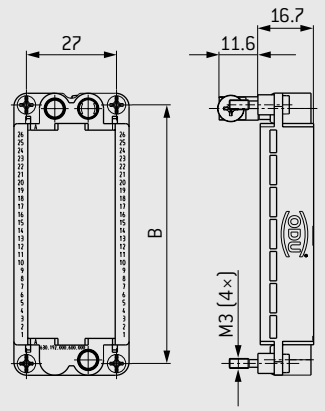
- Material: nickel-plated zinc die casting
- 1 unit = 2.4 mm

Included in the scope of delivery: secondary locking part
For use and assembly, see page 31



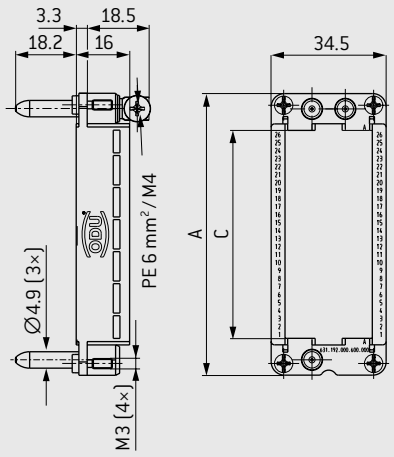
For optional strain relief
see page 83

SOCKET FRAME WITH GUIDE BUSHING



Sockets in bulkhead and surface-mounted housing or cable-to-cable hood. Pins in the cable hood. Modules are not mounted, contacts are supplied loose. See the options for coding from page 72

PIN FRAME WITH GUIDING PIN



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

Size	Part number Socket frame	Part number Pin frame	Max. units 2.4 mm[1]	Dim. A mm	Dim. B mm	Dim. C mm
1	630.190.000.600.000	631.190.000.600.000	12	51	44	12 × 2.4 = 28.8
2	630.191.000.600.000	631.191.000.600.000	18	64	57	18 × 2.4 = 43.2
3	630.192.000.600.000	631.192.000.600.000	26	84.5	77.5	26 × 2.4 = 62.4
4	630.193.000.600.000	631.193.000.600.000	37	111	104	37 × 2.4 = 88.8
RAPID						
2	630.191.000.600.000	631.191.000.600.001	18	64	57	18 × 2.4 = 43.2
4	630.193.000.600.000	631.193.000.600.001	37	111	104	37 × 2.4 = 88.8
FRAMES FOR CABLE HOOD WIDE						
5	2 × part number size 3	2 × part number size 3	2 x 26	84.5	77.5	26 × 2.4 = 62.4
6	2 × part number size 4	2 x part number size 4	2 x 37	111	104	37 × 2.4 = 88.8

[1] If the configuration doesn't fill the frame completely, please use blank modules (see page 157).
Please note that when equipping size 5 and 6 housings two frames are required.

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CABLE CLAMP AND REDUCING RING

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

TECHNICAL DATA

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

EMC and metal clamps available on request

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

REDUCING RING FOR PLASTIC HOUSING

TECHNICAL DATA

Color	Black (RAL 9005)
Material	Plastic PA6 GF20, UL 94-V0
International Protection class	IP65
Temperature range	–40 °C to 125 °C
Sealing	NBR; sealing material
Tightening torque	4 ± 0.5 Nm

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

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

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ADAPTER RING, BLIND PLUG, AND LOCKNUT

ADAPTER RING FOR CABLE CLAMP WITH PG THREAD

TECHNICAL DATA

Material Nickel-plated brass

Part number	Outside thread	Inside thread
921.000.006.000.254	M25 × 1.5	PG 21
921.000.006.000.255	M32 × 1.5	PG 29
921.000.006.000.267	M32 × 1.5	M40 × 1.5

BLIND PLUG FOR SURFACE-MOUNTED HOUSING

TECHNICAL DATA

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

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

LOCKNUT FOR CABLE CLAMP

TECHNICAL DATA

Material Nickel-plated brass

Part number	Thread
931.000.003.000.112	M32 × 1.5
931.000.003.000.113	M40 × 1.5

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

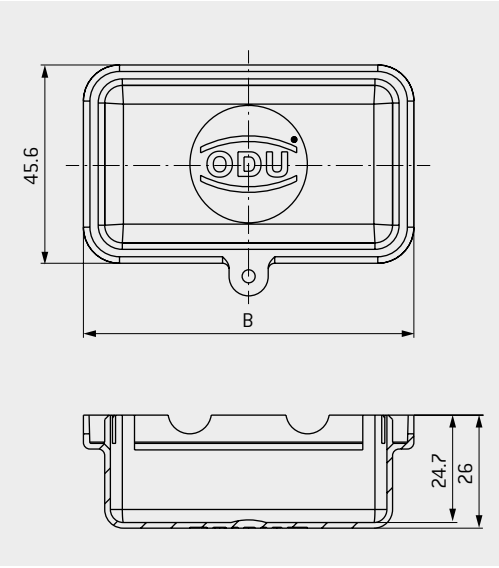
PROTECTIVE TRANSPORT COVER AND SECONDARY LOCKING PART

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

TECHNICAL DATA

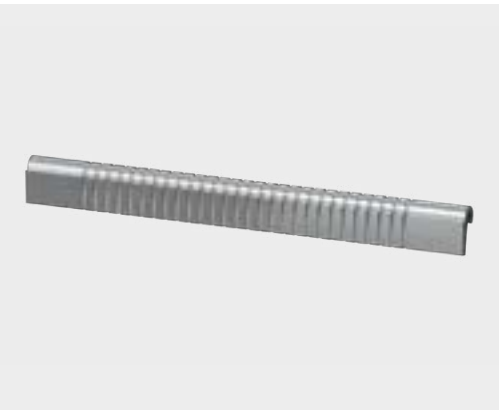
Material	Plastic PP
Color	Black (similar to RAL 9002)

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



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

SECONDARY LOCKING FOR MODULES



TECHNICAL DATA

Material	Thermoplastic, glass-fiber reinforced

Part number – only if a replacement is required1
631.000.001.923.000

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

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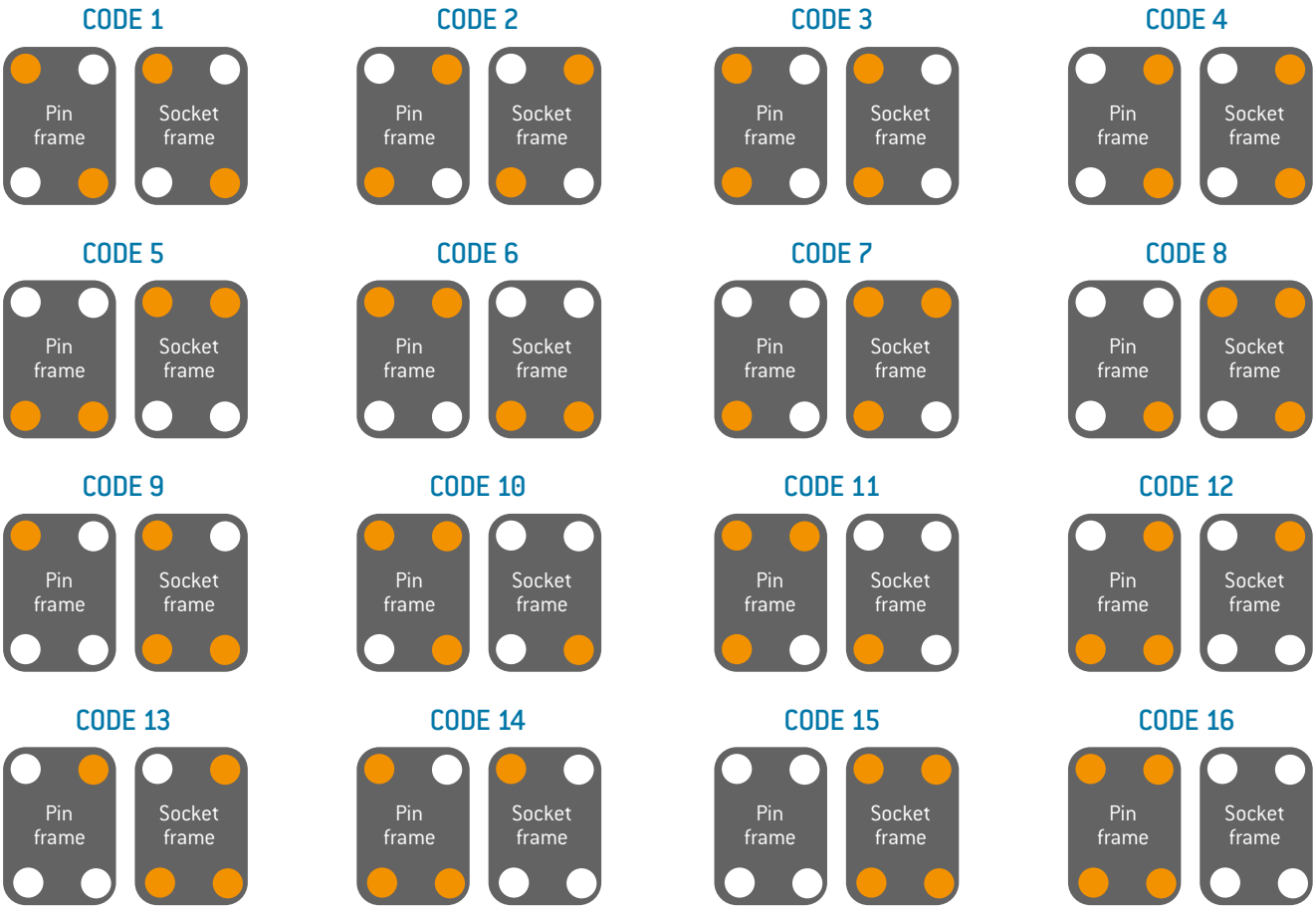
CODING OPTIONS FOR HOUSINGS WITH LEVER LOCKING

To prevent mismating

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

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

CODING OPTIONS



● = Coding pin

○ = Coding socket

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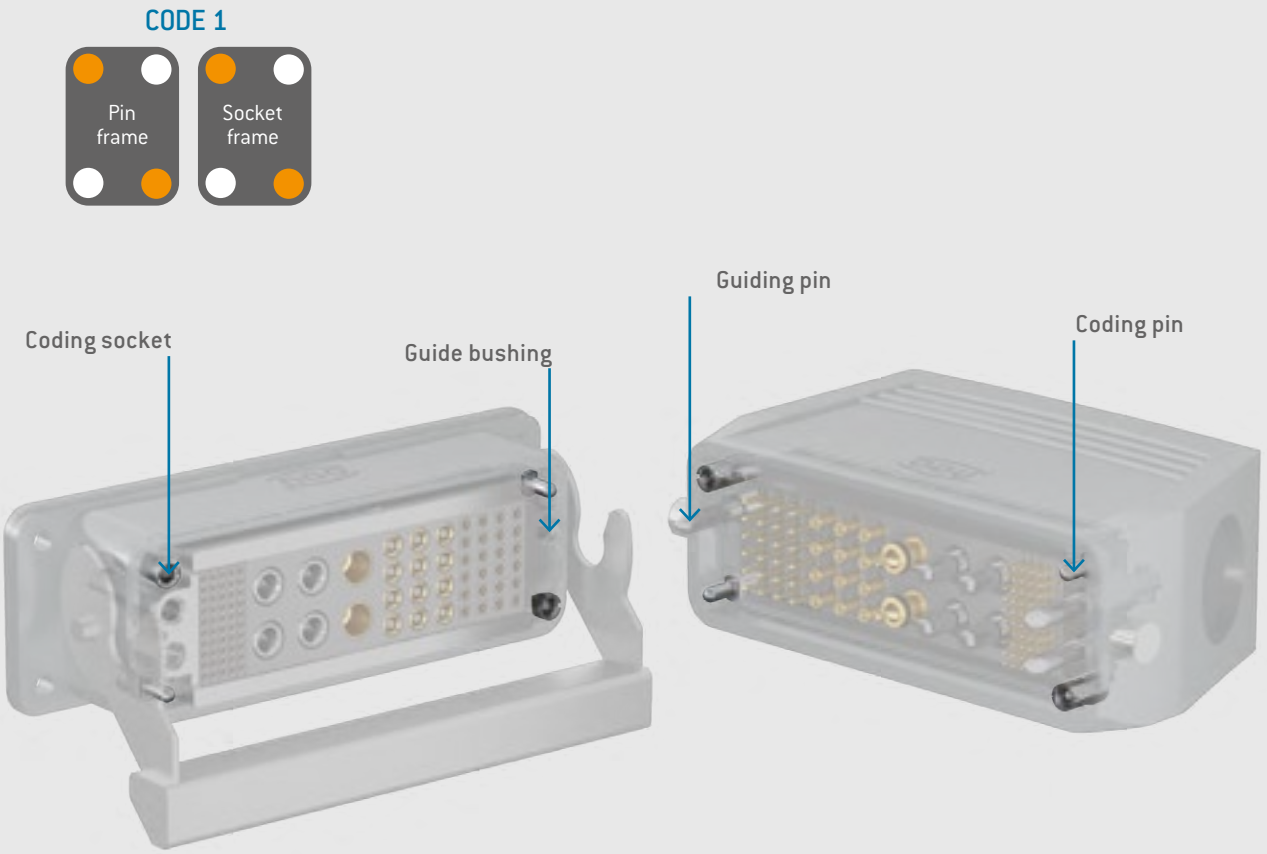
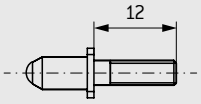
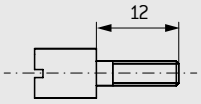
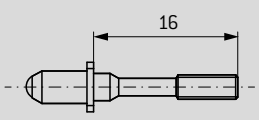
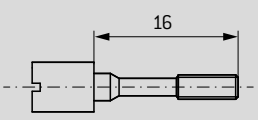
CODING EXAMPLE



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

PART NUMBER BASIC TOOL, TORQUE WRENCH/1.2 Nm: 598.054.002.000.000
PART NUMBER TOOL INSERT FOR ASSEMBLY OF CODING PIN: 598.054.203.000.000
PART NUMBER TOOL INSERT FOR ASSEMBLY OF CODING SOCKET: 598.054.110.000.000 OR 598.054.113.000.000

For an overview of all tools, see from page 169

CODING OPTIONS FOR HOUSINGS WITH SPINDLE LOCKING

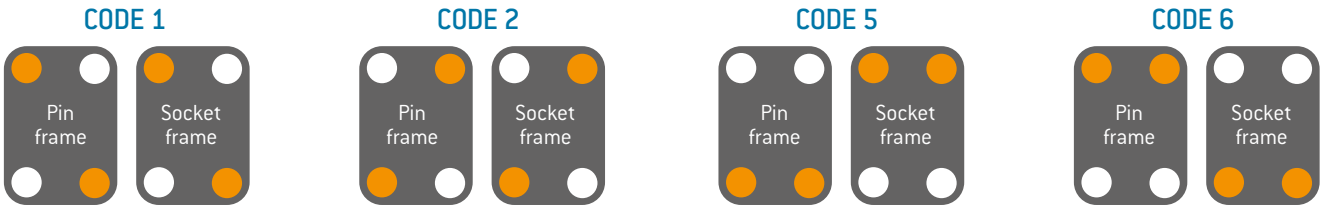
To prevent mismating

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

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

Alternatively, or if additional coding options are required, ODU offers an innovative option with the coded spindle from page 76.

CODING OPTIONS



= Coding pin

= Coding socket

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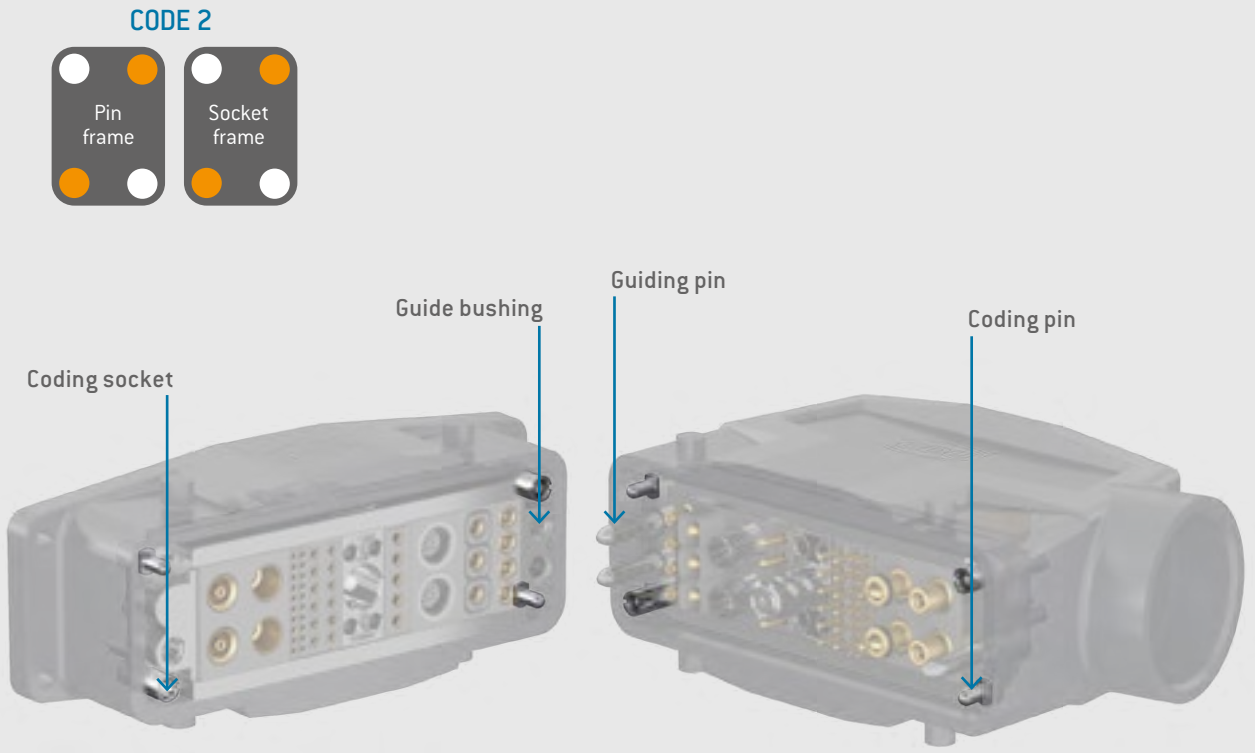
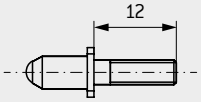
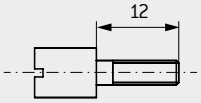
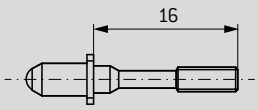
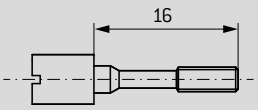
CODING EXAMPLE



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

PART NUMBER BASIC TOOL, TORQUE WRENCH/1.2 Nm: 598.054.002.000.000
PART NUMBER TOOL INSERT FOR ASSEMBLY OF CODING PIN: 598.054.203.000.000
PART NUMBER TOOL INSERT FOR ASSEMBLY OF CODING SOCKET: 598.054.113.000.000

For an overview of all tools, see from page 169

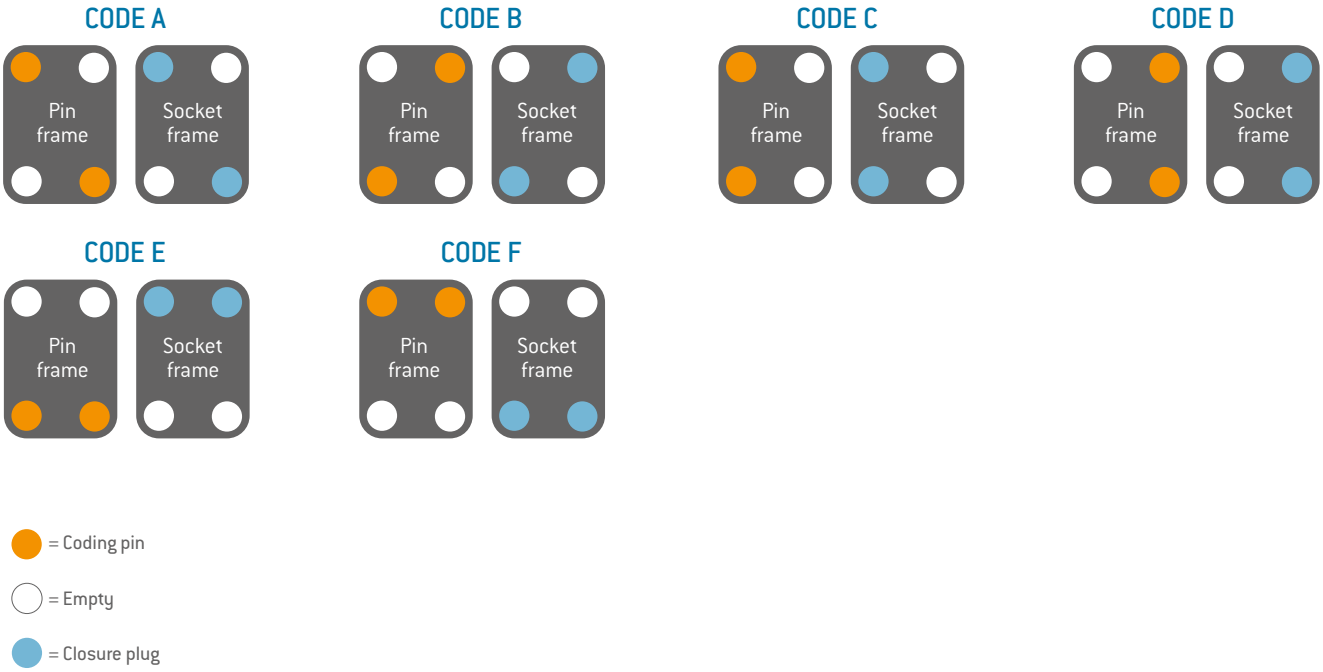
CODING OPTIONS FOR CODED SPINDLES

To prevent mismating

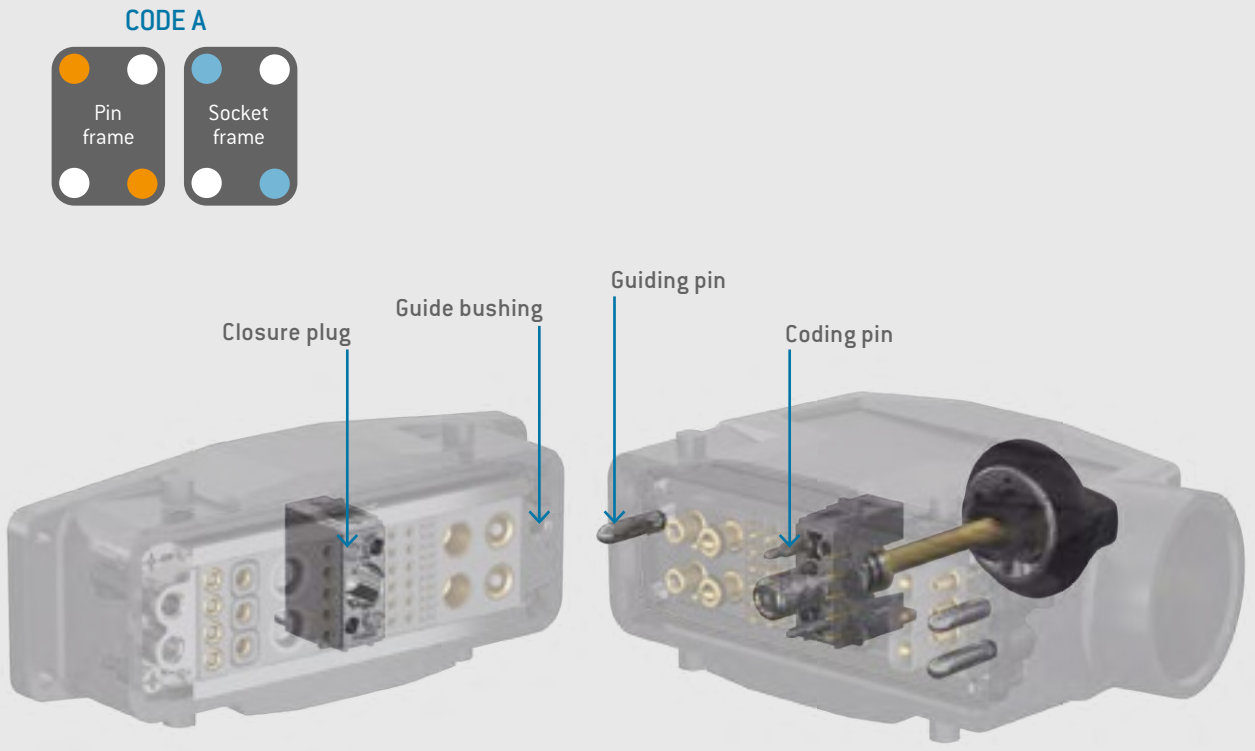
In order to prevent mismating, it is in some cases useful to provide the connection systems with a coding.

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

CODING OPTIONS



CODING EXAMPLE



Size	With coding[1]		Angle of rotation	Only if a replacement is required[2]	
	Part number Center module for spindle for bulkhead and surface-mounted housing and cable-to-cable hood	Part number Spindle locking for cable hood		Part number Coding pin	Part number Closure plug
2 (52 mm high)	634.090.001.304.010	635.091.003.200.010	180°		
2 (72 mm high)		635.091.001.200.010	180°		
3/4		635.092.011.200.010	270°		
3/4		635.092.011.200.013	360°		
XXL/RAPID		635.093.011.200.010	270°		
XXL/RAPID		635.093.011.200.013	360°	635.090.105.902.000	634.090.106.902.000

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

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

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

For an overview of all tools, see from page 169

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

ODU-MAC®

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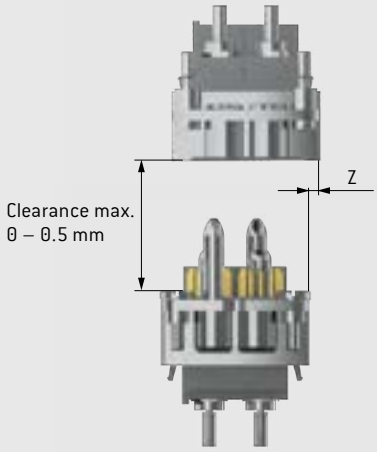
AUTOMATIC DOCKING

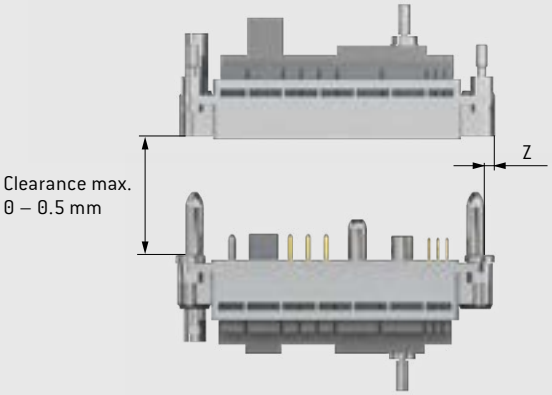
REQUIREMENTS OF THE COMPLETE SYSTEM

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

Clean and smooth docking is secured by special guiding pins that are designed for the forces which guide the connector. Please also note the mechanical necessities as described on page 81.

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

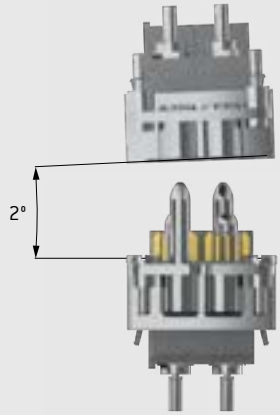


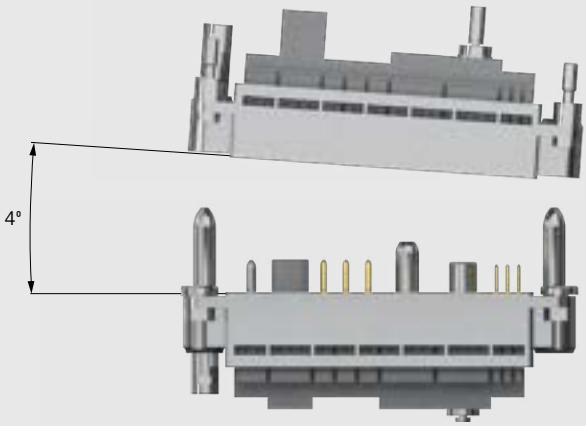


Frame	Tolerance Z
Docking frame	+/– 0.6 mm

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

MAXIMUM PERMISSIBLE ANGLE DEVIATION WHEN MATING

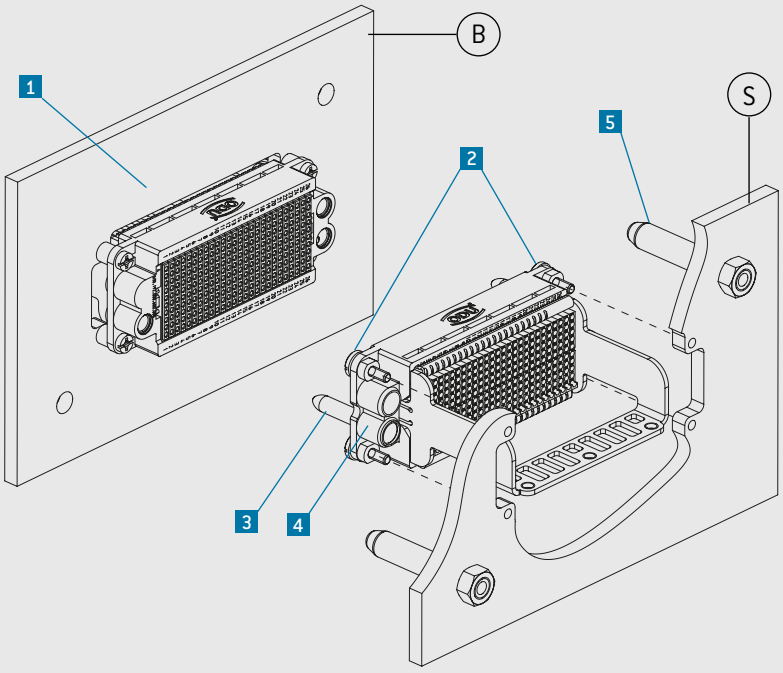




OUR TEAM IS HAPPY TO ANSWER ANY QUERIES YOU MAY HAVE.

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

ALIGNMENT SYSTEM (MECHANICAL NECESSITY)



Strain relief for the cables/strands must be provided by the customer. Please see our strain-relief plate (see page 83 or / and our strain-relief housing (see page 84).

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

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

NOTE: AUTOMATIC DOCKING SYSTEMS

- The pin piece of the ODU-MAC® Blue-Line is to be fixed with the centering bushings supplied and so that the frame can float.
- The guiding system of the ODU-MAC® Blue-Line provides no guiding hardware for the overall plug-in.
- The maximum permissible gap between socket and pin pieces is 0.5 mm as standard. Extension with long contact pins is possible.
- An alignment system (e.g., guide rails) must be provided through the plug-in unit. The maximum permissible alignment error is, for example, less than +/– 0.6 mm radial for the ODU-MAC® Blue-Line docking frame.
- Strain relief for the cables / strands must be provided by the customer, please use our strain relief plate (see page 83) or /and our strain-relief housing (see page 84).

FAILURE TO OBSERVE THESE SPECIFICATIONS MAY RESULT IN DAMAGE.

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ODU-MAC® BLUE-LINE DOCKING FRAME

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

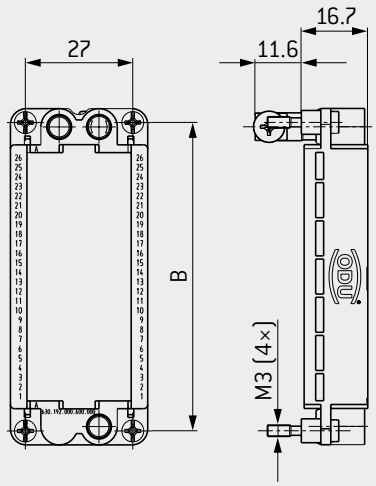
TECHNICAL DATA

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

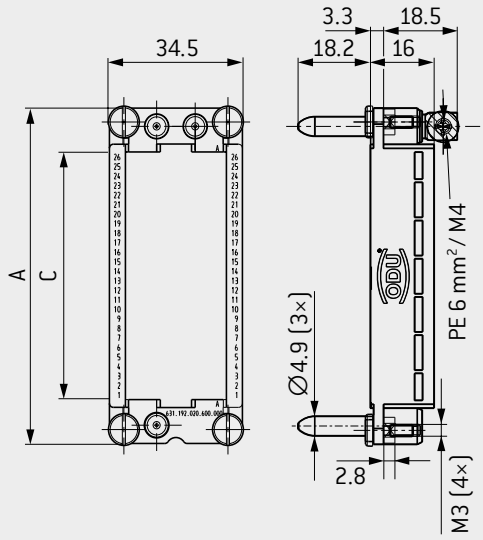
Included in the scope of delivery: secondary locking part

For use and assembly, see page 31

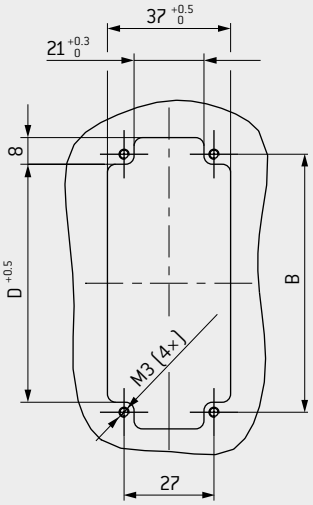
SOCKET FRAME WITH GUIDE BUSHING



PIN FRAME WITH GUIDING PIN



PANEL CUT-OUT



Modules are not mounted, contacts are supplied loose.

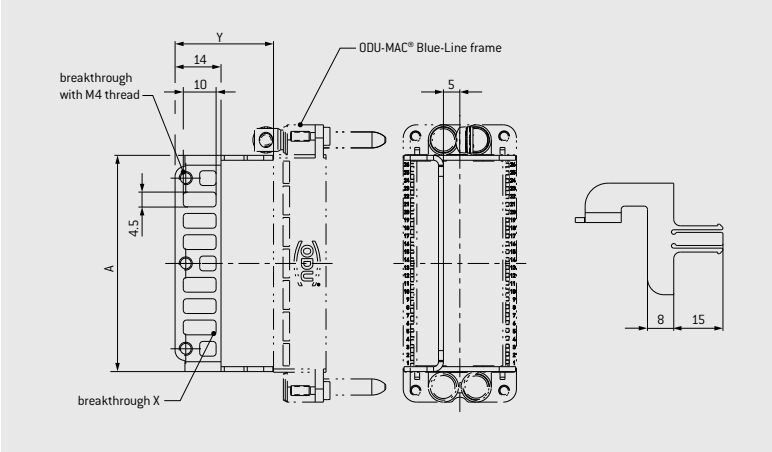
For the height of the contact pins, the same dimensions as described for the respective modules apply.

Size	Part number Socket frame	Part number Pin frame	Max. units × 2.4 mm1	Dim. A mm	Dim. B mm	Dim. C mm	Dim. D mm
1	630.190.000.600.000	631.190.020.600.000	12	51	44	12 × 2.4 = 28.8	38
2	630.191.000.600.000	631.191.020.600.000	18	64	57	18 × 2.4 = 43.2	51
3	630.192.000.600.000	631.192.020.600.000	26	84.5	77.5	26 × 2.4 = 62.4	71.5
4	630.193.000.600.000	631.193.020.600.000	37	111	104	37 × 2.4 = 88.8	98

[1] If the configuration doesn't fill the frame completely, please use blank modules (see page 157).

ODU-MAC® BLUE-LINE STRAIN-RELIEF PLATE

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



TECHNICAL DATA

Material Stainless steel

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

Size	Version	Part number	Dim. A mm	Number of breakthrough X	Length Y
1	Short	631.000.002.902.190	32.3	2	30
	Long	631.000.001.902.190			44
2	Short	631.000.002.902.191	46.7	4	30
	Long	631.000.001.902.191			44
3	Short	631.000.002.902.192	65.9	6	30
	Long	631.000.001.902.192			44
4	Short	631.000.002.902.193	92.3	9	30
	Long	631.000.001.902.193			44

NOTE

- If the strain relief is used, the voltage specifications of the single modules may be reduced. A check is necessary.
- With regard to the bending radius of the cables in conjunction with different housings, the use of the plate always has to be considered specifically, as there is a very large variety of variants possible.
- Doesn't work with the following housings:
  - Metal housing with spindle locking
  - Metal housing with lever locking and side cable outlet
  - ODU-MAC® PUSH-LOCK and ODU-MAC® RAPID Housing
- Long versions are working only for a very limited selection of housings.

Modul	The respective strain relief plate can be used for the following modules:										
	Signal	PE		Power	High-current	High voltage		Coax	High-speed	Fiber optic	
	all	1 pos. 16 mm²	1 pos. 10 mm²	3 pos.	2 pos. 5 mm	2 pos.	6 pos.	4 pos. for 50 Ω	RJ 45	POF	GOF
pin side short	•	•	•	•	•	–	–	•	•	•	•
socket side short				–					–		–
pin side long				•		•	•		•		•
socket side long											

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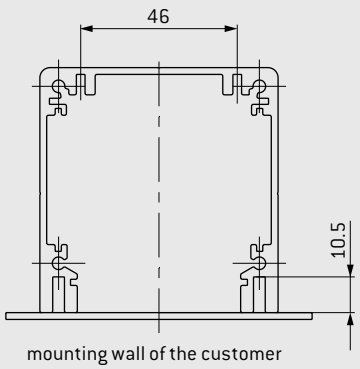
ODU-MAC® BLUE-LINE STRAIN-RELIEF HOUSING

Accessories for docking solutions

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

APPLICATION EXAMPLE

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



TECHNICAL DATA

- Material: Aluminum
- Operating temperature: –40 °C to +125 °C
- International Protection class[1] can be adjusted individually
- Cable clamps, see page 69
- Locknut for cable clamp, see page 70

FEATURES

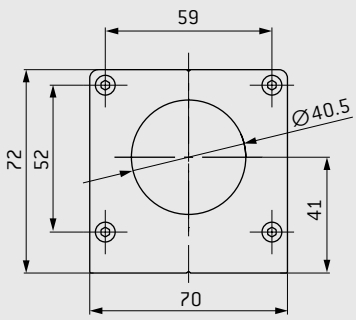
- Robust and compact
- Protection of the termination area
- Individual strain-relief variations, cable outlets as well as grounding connections
- Suitable for all ODU-MAC® docking frames (additional lengths available on request)
- Optional fixing of the PCBs and components in the protected interior
-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

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

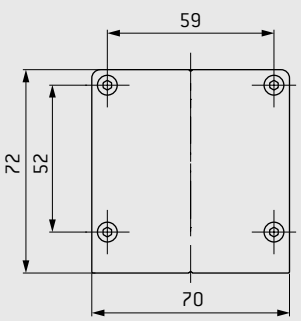
ODU-MAC® BLUE-LINE STRAIN-RELIEF HOUSING

Accessories for docking solutions

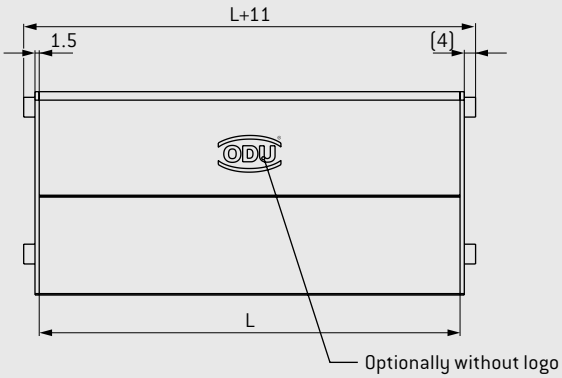
COVER WITH HOLE



COVER WITHOUT HOLE



HOUSING SET INCLUDING COVER



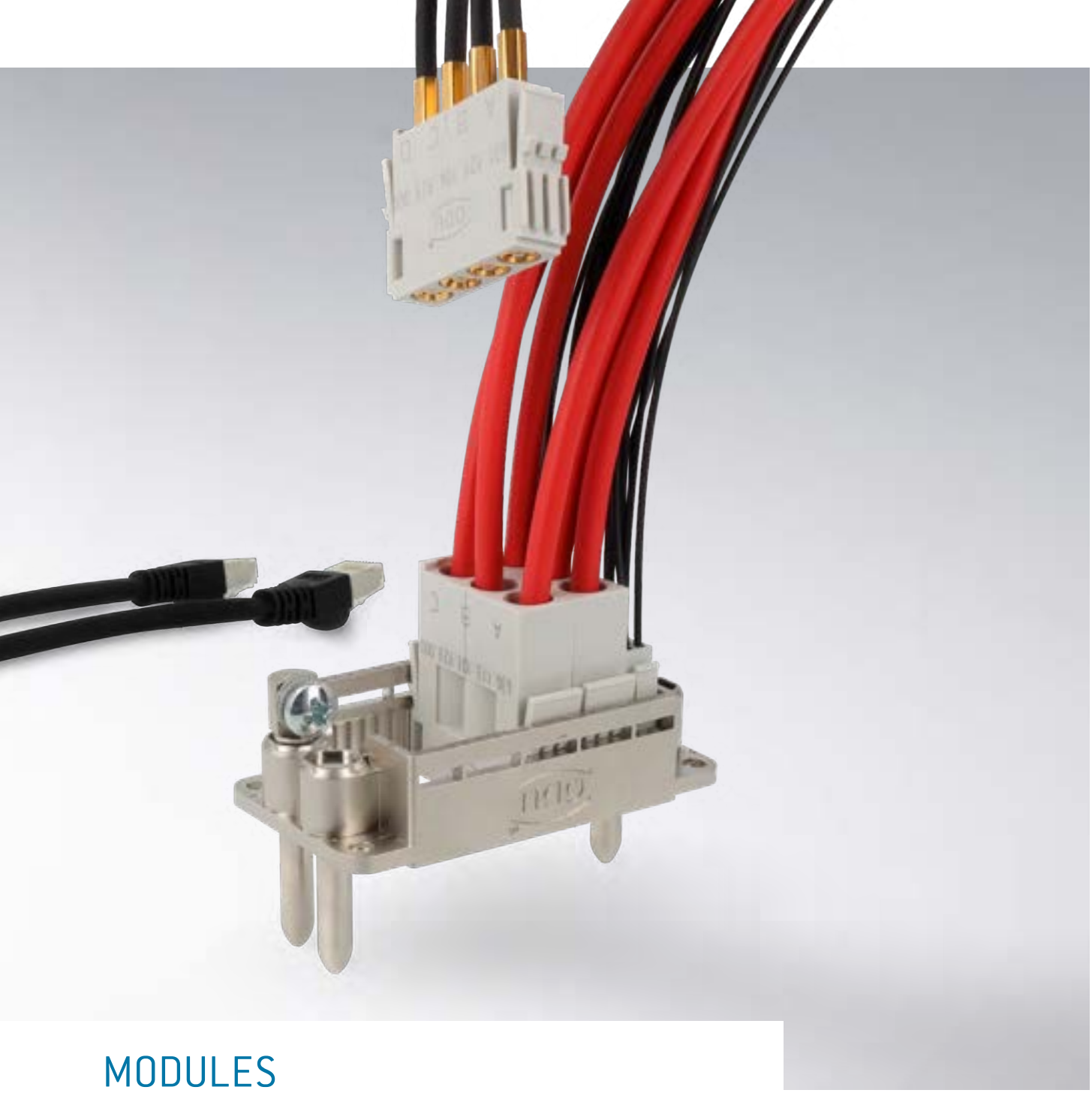
For fastening on an existing mounting wall of the customer.

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

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

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

ODU-MAC®



MODULES

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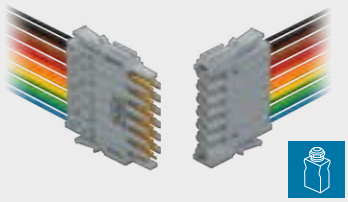
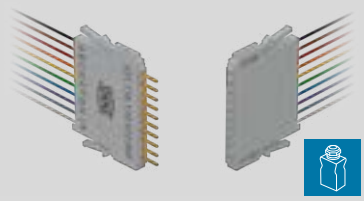
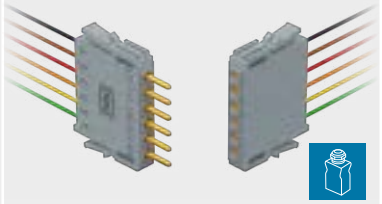
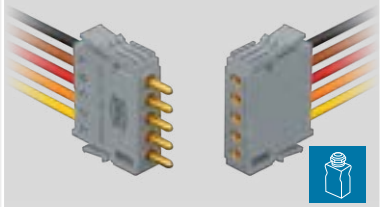
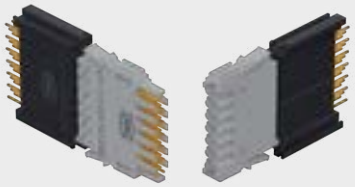
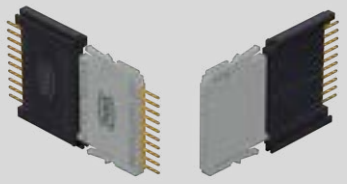
OVERVIEW OF ALL MODULES

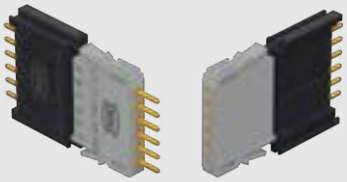
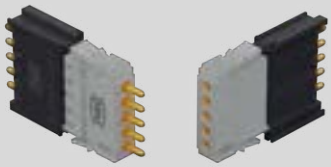
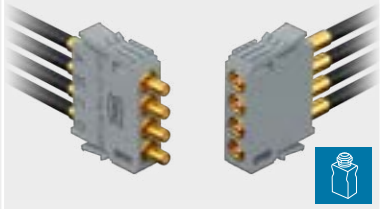
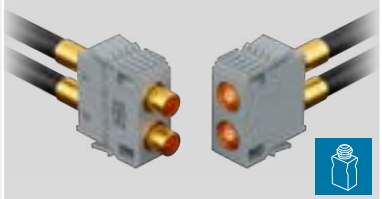
Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

	Modules	Description	Units / width	Features (refer to module level only)	Page
Signal		20 contacts Contact-Ø: 0.7 mm	2 Units 4.8 mm	Operating voltage[1] 200 V Rated surge voltage[1] 2,000 V Max. continuous current[2] 11 A for 0.38 mm² Pollution degree[1] 2 Mating cycles min. 10,000 Maximum contact density and pin protection	94
		10 contacts Contact-Ø: 0.7 mm	1 Unit 2.4 mm	Operating voltage[1] 320 V Rated surge voltage[1] 2,500 V Max. continuous current[2] 11 A for 0.38 mm² Pollution degree[1] 2 Mating cycles min. 10,000 Maximum contact density	96
		6 contacts Contact-Ø: 1.3 mm	2 Units 4.8 mm	Operating voltage[1] 400 V Rated surge voltage[1] 3,000 V Max. continuous current[2] 19.5 A for 1 mm² Pollution degree[1] 2 Mating cycles min. 10,000	98
		5 contacts Contact-Ø: 2 mm	3 Units 7.2 mm	Operating voltage[1] 630 V Rated surge voltage[1] 3,000 V Max. continuous current[2] 33 A for 2.5 mm² Pollution degree[1] 2 Mating cycles min. 10,000	100
PCB termination		20 contacts Contact-Ø: 0.7 mm	2 Units 4.8 mm	Operating voltage[1] 200 V Rated surge voltage[1] 2,000 V Max. continuous current[2] 7 A Pollution degree[1] 2 Mating cycles min. 10,000 Maximum contact density and pin protection	102
		10 contacts Contact-Ø: 0.7 mm	1 Unit 2.4 mm	Operating voltage[1] 320 V Rated surge voltage[1] 2,500 V Max. continuous current[2] 7 A Pollution degree[1] 2 Mating cycles min. 10,000 Maximum contact density	103

[1] According to IEC 60664-1:2020 (VDE 0110-1:2022-07) for pollution degree 2 [2] For a definition of max. continuous current, see page 186

OVERVIEW OF ALL MODULES

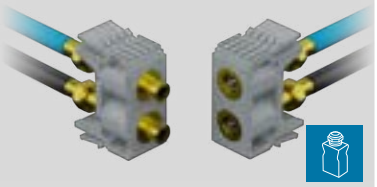
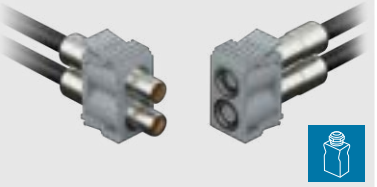
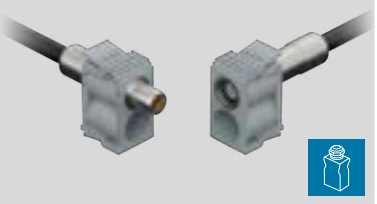
Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

	Modules	Description	Units / width	Features (refer to module level only)	Page
PCB termination		6 contacts Contact-Ø: 1.3 mm	2 Units 4.8 mm	Operating voltage[1] 400 V Rated surge voltage[1] 3,000 V Max. continuous current[2] 13 A Pollution degree[1] 2 Mating cycles min. 10,000	104
		5 contacts Contact-Ø: 2 mm	3 Units 7.2 mm	Operating voltage[1] 550 V Rated surge voltage[1] 3,000 V Max. continuous current[2] 25 A Pollution degree[1] 2 Mating cycles min. 10,000	105
Coax		4 contacts for 50 Ω coax contacts	3 Units 7.2 mm	Frequency range 0 – 2.8 GHz Mating cycles min. 10,000 High contact density	106
		2 contacts for 50 Ω coax contacts	5 Units 12 mm	Frequency range 0 – 4 GHz Mating cycles min. 10,000	108
		2 contacts for 50 Ω coax contacts SMA termination	5 Units 12 mm	Frequency range 0 – 12 GHz Mating cycles min. 10,000 12 GHz	110
		2 contacts for 75 Ω coax contacts	5 Units 12 mm	Frequency range 0 – 2.6 GHz Mating cycles min. 10,000	112

[1] According to IEC 60664-1:2020 (VDE 0110-1:2022-07) for pollution degree 2 [2] For a definition of max. continuous current, see page 186

OVERVIEW OF ALL MODULES

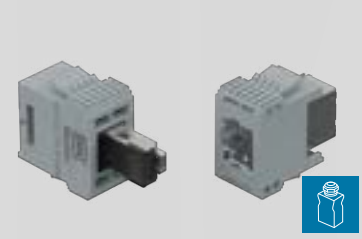
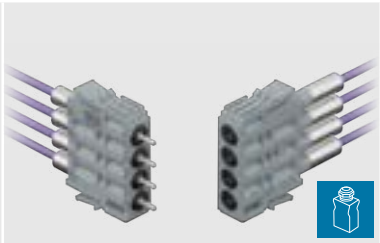
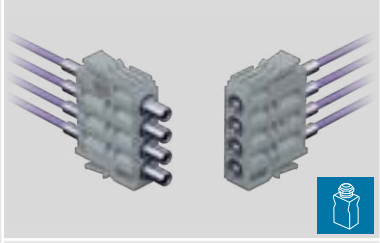
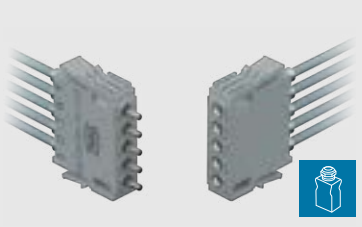
Modules marked with this symbol can be used in the PUSH-LOCK; note the space requirements.

	Modules	Description	Units / width	Features (refer to module level only)	Page
Compressed air / fluid / vacuum coupling		2 contacts	5 Units 12 mm	Tube-∅ inner-∅: max. 4 mm outer-∅ Push-in: max. 6 mm Mating cycles min. 10,000 + 12 bar	114
		2 contacts	5 Units 12 mm	Tube-∅ M5 max. 4 mm Mating cycles min. 10,000 + 10 bar	116
		2 contacts	5 Units 12 mm	Tube-∅ M5 inside thread Mating cycles min. 10,000 + 10 bar	118
		1 contact	12 Units 28.8 mm	Tube inner-∅ 16 mm Mating cycles min. 10,000 + –0.8 bar	120
Shielded feedthrough / high-speed connector		2 to 14 contacts for 2 insert size 1	6 Units 14.4 mm	Mating cycles min. 10,000 Suitable for all common bus systems CAT 5, USB® 2.0, USB® 3.2 Gen 1x1, FireWire®, Ethernet, SPE 10G BASE-T1[1]	122
		2 to 14 contacts for 1 insert size 1	6 Units 14.4 mm	Mating cycles min. 10,000 Suitable for all common bus systems CAT 5, USB® 2.0, USB® 3.2 Gen 1x1, FireWire®, Ethernet, SPE 10G BASE-T1[1]	122

[1] Single Pair Ethernet according to IEC 63171-6:2020(IEEE 802.3ch)

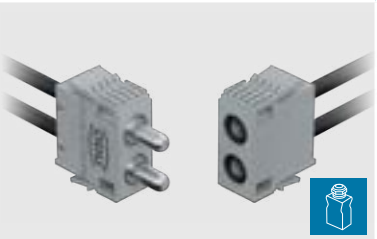
OVERVIEW OF ALL MODULES

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

	Modules	Description	Units / width	Features (refer to module level only)	Page
Shielded feedthrough / high-speed connector		3 to 22 contacts for 1 insert size 2	7 Units 16.8 mm	Mating cycles min. 10,000 Suitable for all common bus systems HDMI® up to 48 Gbit/s, DisplayPort® up to 40 Gbit/s, USB® up to 10 Gbit/s	126
		RJ45 insert	7 Units 16.8 mm	Mating cycles min. 5,000 10 gigabit Ethernet[1] according to IEEE 802.3 an CAT 6 according to ANSI/TIA/EIA-568-C.2 CAT 6_A according to ANSI/TIA-568.2-D	130
Fiber optic (on request)		4 contacts for fiber optic only pre-assembled Physical Contact	3 Units 7.2 mm	Mating cycles min. 1,000 max. Insertion loss 0.5 dB Single mode 9 / 125 µm Multi mode 50 / 125 µm	132
		4 contacts for fiber optic only pre-assembled Expanded Beam	3 Units 7.2 mm	Mating cycles min. 10,000 Max. Insertion loss 1.5 dB Multi mode 50 / 125 µm	134
		5 contacts for fiber optic POF	3 Units 7.2 mm	Mating cycles min. 10,000 Insertion loss typical 1,5 dB for 660 nm	136

OVERVIEW OF ALL MODULES

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

	Modules	Description	Units / width	Features (refer to module level only)	Page
High-current		2 contacts for turned contacts with ODU LAMTAC®[2] Contact-Ø: 5 mm	5 Units 12 mm	Operating voltage[1] 400 V Rated surge voltage[1] 4,000 V Max. continuous current[2] 108 A for 16 mm² Pollution degree[1] 2 Mating cycles min. 10,000	138
		2 contacts for turned contacts with ODU LAMTAC®[2] Contact-Ø: 8 mm	9 Units 21.6 mm	Operating voltage[1] 400 V Rated surge voltage[1] 3,000 V Max. continuous current[2] 154 A for 25 mm² Pollution degree[1] 2 Mating cycles min. 10,000	140
		1 contact for turned contacts with ODU LAMTAC®[2] Contact-Ø: 12 mm	8 Units 19.2 mm	Operating voltage[1] 2,500 V Rated surge voltage[1] 10,000 V Max. continuous current[2] 225 A for 50 mm² Pollution degree[1] 2 Mating cycles min. 10,000 High-voltage	142
		3 contacts Contact-Ø: 3.5 mm	4 Units 9.6 mm	Operating voltage[1] 2,500 V Rated surge voltage[1] 10,000 V Max. continuous current[2] 58 A for 6 mm² Pollution degree[1] 2 Mating cycles min. 10,000 High-voltage	144
PE		1 contact with ODU LAMTAC®[2] Contact-Ø: 8 mm	5 Units 12 mm	Mating cycles min. 10,000 Conduct cross-section 10 / 16 / 25 mm²	146

[1] Single Pair Ethernet according to IEC 63171-6:2020(IEEE 802.3ch) [2] Contact with lamella technology

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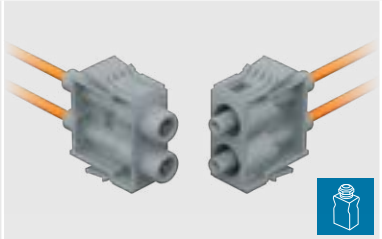
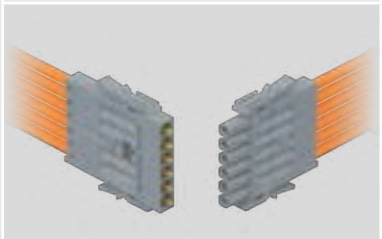
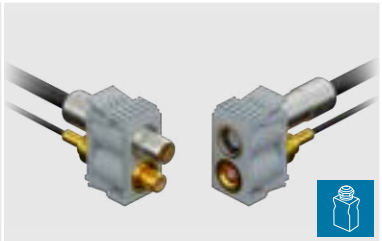
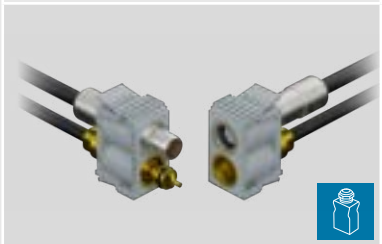
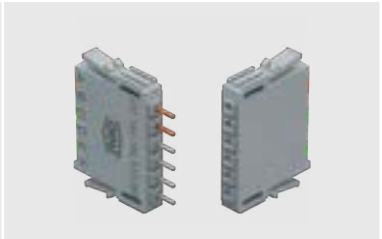
OVERVIEW OF ALL MODULES

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

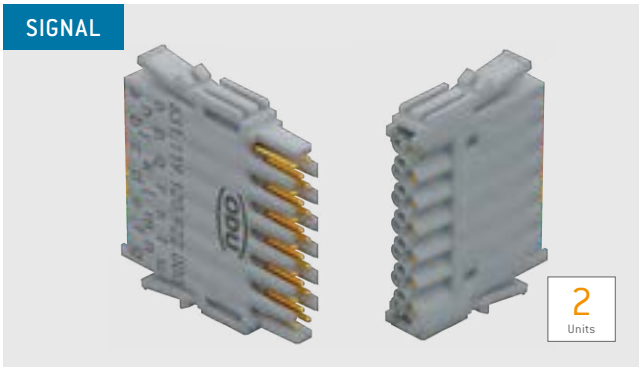
	Modules	Description	Units / width	Features (refer to module level only)	Page
High-voltage		2 contacts Contact-Ø: 1.3 mm	5 Units 12 mm	Operating voltage[1] 4,000 V Rated surge voltage[1] 12,000 V Pollution degree[1] 2 Mating cycles min. 10,000	148
		6 contacts Contact-Ø: 1.3 mm	2 Units 4.8 mm	Operating voltage[1] 1,500 V Rated surge voltage[1] 6,000 V Pollution degree[1] 2 Mating cycles min. 10,000	150
Combination		2 contacts High-speed & coax	6 Units 14.4 mm	Mating cycles min. 10,000 Coax 50 Ω/4 GHz or 75 Ω/2.2 GHz Selected inserts are suitable and qualified for data rates up to 5 Gbit/s. Suitable for CAT 5, USB® 2.0, USB® 3.2 Gen 1x1, FireWire®, Ethernet, SPE 10G BASE-T1[2]	152
		2 contacts High-speed & compressed air	6 Units 14.4 mm	Mating cycles min. 10,000 Compressed air 12 bar Selected inserts are suitable and qualified for data rates up to 5 Gbit/s. Suitable for CAT 5, USB® 2.0, USB® 3.2 Gen 1x1, FireWire®, Ethernet, SPE 10G BASE-T1[2]	152
Thermocoupling		6 contacts Contact-Ø: 1.0 mm	2 Units 4.8 mm	Thermocouple type K & T, others on request Mating cycles min. 5,000	156
Blank modules		Blank modules	1 2.4 mm 3 7.2 mm 5 12 mm	Used to fill incomplete frames.	157

[1] According to IEC 60664-1:2020 (VDE 0110-1:2022-07) for pollution degree 2 [2] Single Pair Ethernet according to IEC 63171-6:2020 (IEEE 802.3ch)

MODULE 20 CONTACTS

Pin protection against mechanical damage

SIGNAL



Contact diameter: 0.7 mm
Mating cycles: min. 10,000
Current-carrying capacity[1]: 11 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 188).
- For crimp information, see from page 168

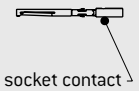
Materials	
Insulator	thermoplastic acc. to UL 94
Contact	Cu alloy
Contact finishing	gold-plated

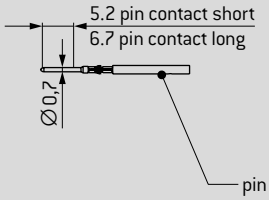
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2,3]		
Operating voltage	200 V	10 V
Pollution degree	2	3
Rated surge voltage[3]	2,000 V	
Clearance distance	1.0 mm	
Creepage distance	1.0 mm	
Voltage data according to MIL[4]		
Operating voltage	475 V	
Test voltage	1,425 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[6]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	200 V	10 V
Pollution degree	2	3
Test voltage	1,076 V AC	

Part number insulator	
Socket insulator 630.119.120.922.000	Pin insulator 631.119.120.922.000

Contact	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[5] Single contact A	Nominal current[5] Module fully equipped A	Max. continuous current[4] Single contact A	Contact resistance mΩ
Pin short	185.710.000.270.000	0.14 – 0.38	22 – 26	7.0	5.5	11.0	3.5
Pin long	185.711.000.270.000						
Socket	175.581.000.270.000						
Pin short	185.B26.000.270.000	0.05 – 0.14	26 – 30	6.5	3.2	10.0	3.5
Pin long	185.B27.000.270.000						
Socket	175.C09.000.270.000						
Contact removal tool	087.7CC.070.005.000						

PCB termination available on request, for suitable modules, please see page 102.





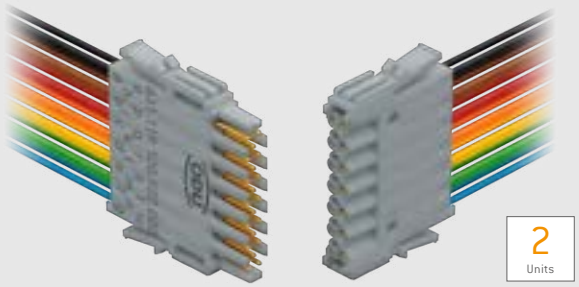
Product Finder

Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] This voltage specification is according to IEC 60664-1:2020 (VDE 0110-1:2022-07) only valid for equipment with a maximum expected rated surge voltage of 2,000 V, which is not directly connected to the low-voltage grid. [4] See page 185 [5] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [6] See page 182.

CABLE ASSEMBLY – MODULE 20 CONTACTS

SIGNAL

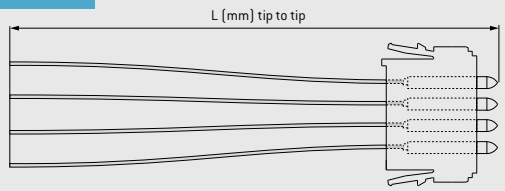


Technical data wires 0.34 mm² / AWG 22, see page 163	
Conductor	TPC – tin plated copper acc. to EN 13602
Insulation	UL-PVC semi rigid (UL-Style 1061 / 10002)
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	1,500 V / AC (UL-Style 1061/10002)
Operating voltage	300 V (UL-Style 1061/10002)

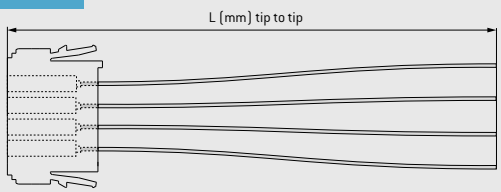
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



0	1
0	2
0	3
0	4
0	5
0	6
0	7
0	8
0	9
1	0

1	1
1	2
1	3
1	4
1	5
1	6
1	7
1	8
1	9
2	0

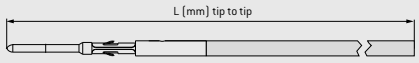
Number of conductors 1 – 20 acc. to IC color code per row, bundling with Black heatshrink tube, ending 100 mm before the cut labeled per row (a–g, h–n, o–u). Wires are terminated in alphabetical order.

L 0300 – 5000 mm

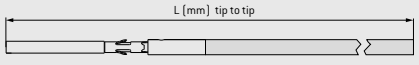
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		A	B	2	0	0			A	0	Z	Z	0	0				

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



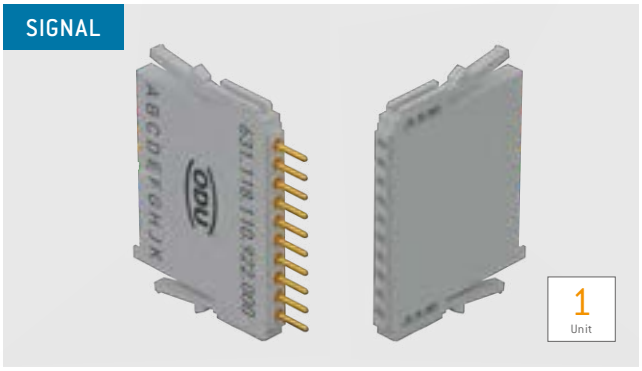
Contact	Part number	Black	Brown	Red	Orange	Yellow	Green	Blue	Violet	Gray	White	Green-Yellow
Pin short	185.710.000.270.000	TZ	TY	TX	TW	TV	TU	TT	TS	TR	TQ	TP
Pin long	185.711.000.270.000	TO	TN	TM	TL	TK	TJ	TI	TH	TG	TF	TE
Socket	175.581.000.270.000	TD	TC	TB	TA	T9	T8	T7	T6	T5	T4	T3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	C	A	2	2	0	1	A	0			0	0				

L 0300 – 5000 mm

MODULE 10 CONTACTS

SIGNAL



Contact diameter: 0.7 mm
Mating cycles: min. 10,000
Current-carrying capacity[1]: 11 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 188).
- For crimp information, see from page 168

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

Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	320 V	63 V
Pollution degree	2	3
Rated surge voltage	2,500 V	
Clearance distance	1.4 mm	
Creepage distance	1.6 mm	

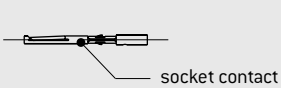
Voltage data according to MIL[4]	
Operating voltage	475 V
Test voltage	1,425 V

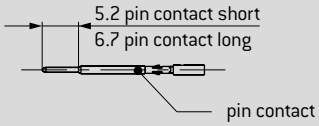
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	320 V	63 V
Pollution degree	2	3
Test voltage	1,320 V AC	

Part number insulator	
Socket insulator 630.118.110.922.000	Pin insulator 631.118.110.922.000

Contact	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[5] Single contact A	Nominal current[5] Module fully equipped A	Max. continuous current[1] Single contact A	Contact resistance mΩ
Pin short	185.710.000.270.000	0.14 – 0.38	22 – 26	7.0	5.5	11.0	3.5
Pin long	185.711.000.270.000						
Socket	175.581.000.270.000						
Pin short	185.B26.000.270.000	0.05 – 0.14	26 – 30	6.5	5.0	10.0	3.5
Pin long	185.B27.000.270.000						
Socket	175.C09.000.270.000						
Contact removal tool	087.7CC.070.005.000						

PCB termination available on request, for suitable modules, please see page 103.





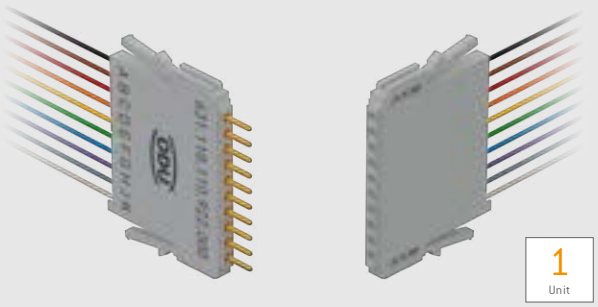
Product Finder

Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185
[5] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K

CABLE ASSEMBLY – MODULE 10 CONTACTS

SIGNAL



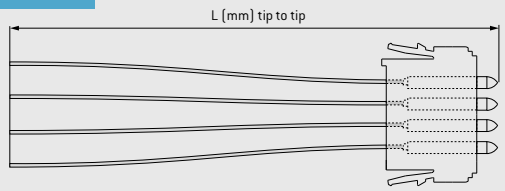
1 Unit

Technical data wires 0.34 mm² / AWG 22, see page 163	
Conductor	TPC – tin plated copper acc. to EN 13602
Insulation	UL-PVC semi rigid (UL-Style 1061 / 10002)
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	1,500 V / AC (UL-Style 1061/10002)
Operating voltage	300 V (UL-Style 1061/10002)

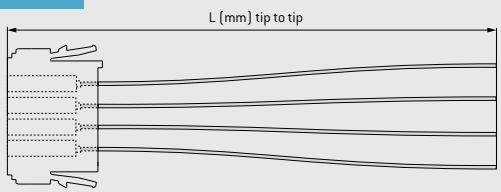
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



0	1
0	2
0	3
0	4
0	5
0	6
0	7
0	8
0	9
1	0

Number of conductors 1 – 10 acc. to IC color code. Wires are terminated in alphabetical order.

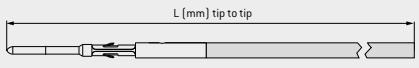
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		A	A	2	0	0			A	0	Z	Y	0	0				

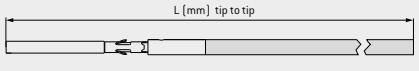
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



Contact	Part number	Black	Brown	Red	Orange	Yellow	Green	Blue	Violet	Gray	White	Green-Yellow
Pin short	185.710.000.270.000	TZ	TY	TX	TW	TV	TU	TT	TS	TR	TQ	TP
Pin long	185.711.000.270.000	TO	TN	TM	TL	TK	TJ	TI	TH	TG	TF	TE
Socket	175.581.000.270.000	TD	TC	TB	TA	T9	T8	T7	T6	T5	T4	T3

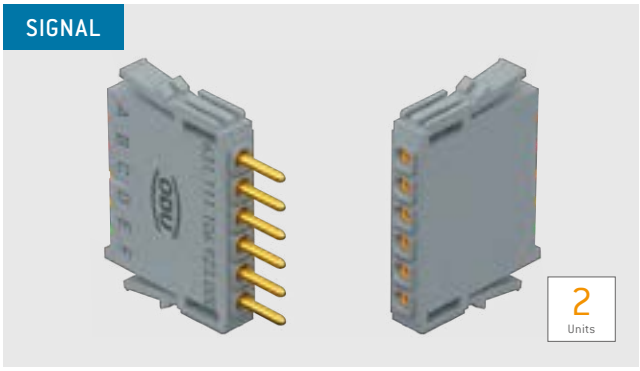
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	C	A	2	2	0	1	A	0			0	0				

L 0300 – 5000 mm

Schematic illustration

MODULE 6 CONTACTS

SIGNAL



Contact diameter: 1.3 mm
Mating cycles: min. 10,000
Current-carrying capacity[1]: 19.5 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 188).
- For crimp information, see from page 168

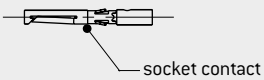
Materials	
Insulator	thermoplastic acc. to UL 94
Contact	Cu alloy
Contact finishing	Gold-plated

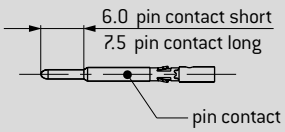
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	400 V	160 V
Pollution degree	2	3
Rated surge voltage	3,000 V	
Clearance distance	2.1 mm	
Creepage distance	2.5 mm	
Voltage data according to MIL[4]		
Operating voltage	775 V	
Test voltage	2,325 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	500 V	200 V
Pollution degree	2	3
Test voltage	1,730 V AC	

Part number insulator
Socket & Pin 631.111.106.923.000

Contact	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[5] Single contact A	Nominal current[5] Module fully equipped A	Max. continuous current[1] Single contact A	Contact resistance mΩ
Pin short	185.432.000.270.000	0.50 – 1.00	18 – 20	12.5	11.5	19.5	1.8
Pin long	185.424.000.270.000						
Socket	175.535.000.270.000						
Pin short	185.714.000.270.000	0.14 – 0.38	22 – 26	9.5	7.0	14.0	1.8
Pin long	185.713.000.270.000						
Socket	175.A42.000.270.000						
Contact removal tool	087.7CC.130.004.000						

PCB termination available on request, for suitable modules, please see page 104.



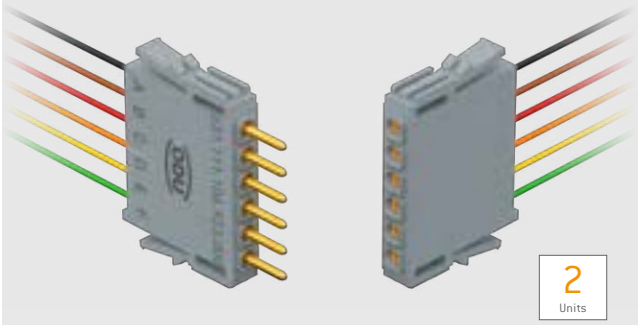


Product Finder Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185
[5] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K

CABLE ASSEMBLY – MODULE 6 CONTACTS

SIGNAL

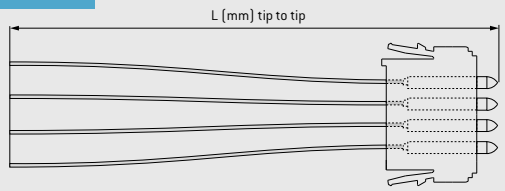


Technical Data wires 1.0 mm² / AWG 18, see page. 163	
Conductor	TPC – tin plated copper acc. to EN 13602
Insulation	UL-PVC +105 °C (UL-Style 1007/1569)
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	3,000 V/AC (UL-Style 1007 / 1569)
Operating voltage	300 V (UL-Style 1007/1569)

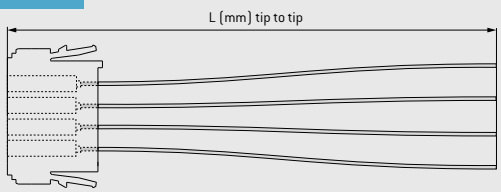
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



0	1
0	2
0	3
0	4
0	5
0	6

Number of conductors 1 – 6 acc. to IC color code. Wires are terminated in alphabetical order.

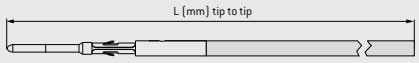
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		A	B	2	0	0			A	0	Z	X	0	0				

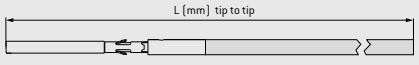
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



Contact	Part number	Black	Brown	Red	Orange	Yellow	Green	Blue	Violet	Gray	White	Green-Yellow
Pin short	185.432.000.270.000	T2	T1	T0	SZ	SY	SX	SW	SV	SU	ST	SS
Pin long	185.424.000.270.000	SR	SQ	SP	SO	SN	SM	SL	SK	SJ	SI	SH
Socket	175.535.000.270.000	SG	SF	SE	SD	SC	SB	SA	S9	S8	S7	S6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	G	A	1	8	0	1	A	0			0	0				

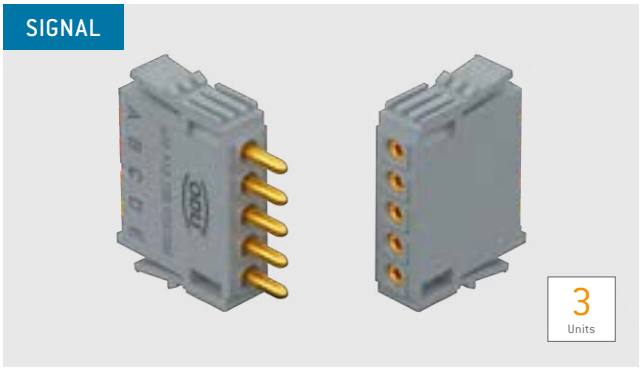
L 0300 – 5000 mm

Schematic illustration

Table of contents

MODULE 5 CONTACTS

SIGNAL



Contact diameter: 2 mm
Mating cycles: min. 10,000
Current-carrying capacity[1]: 33 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 188).
- For crimp information, see from page 168

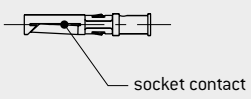
Materials	
Insulator	thermoplastic acc. to UL 94
Contact	Cu alloy
Contact finishing	Gold-plated

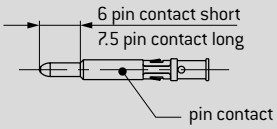
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	630 V	250 V
Pollution degree	2	3
Rated surge voltage	3,000 V	
Clearance distance	2.5 mm	
Creepage distance	3.4 mm	
Voltage data according to MIL[4]		
Operating voltage	1,025 V	
Test voltage	3,075 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	672 V	267 V
Pollution degree	2	3
Test voltage	1,959 V AC	

Part number insulator
Socket & Pin 631.112.105.923.000

Contact	Part number	Conductor cross-section mm²	Termination AWG	Nominal current[5] Single contact A	Nominal current[5] Module fully equipped A	Max. continuous current[1] Single contact A	Contact resistance mΩ
Pin short	185.437.000.270.000	1.00–1.50	16–18	18.0	15.0	27.0	1.0
Pin long	185.436.000.270.000						
Socket	175.567.000.270.000						
Pin short	185.441.000.270.000	2.50	14	24.0	19.0	33.0	1.0
Pin long	185.440.000.270.000						
Socket	175.570.000.270.000						
Contact removal tool	087.7CC.200.003.000						

PCB termination available on request, for suitable modules, please see page 105.



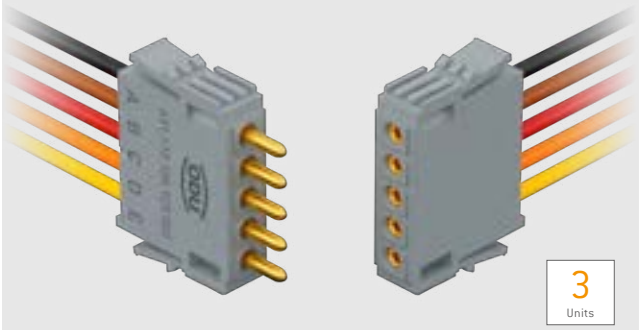


Product Finder Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185
[5] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K

CABLE ASSEMBLY – MODULE 5 CONTACTS

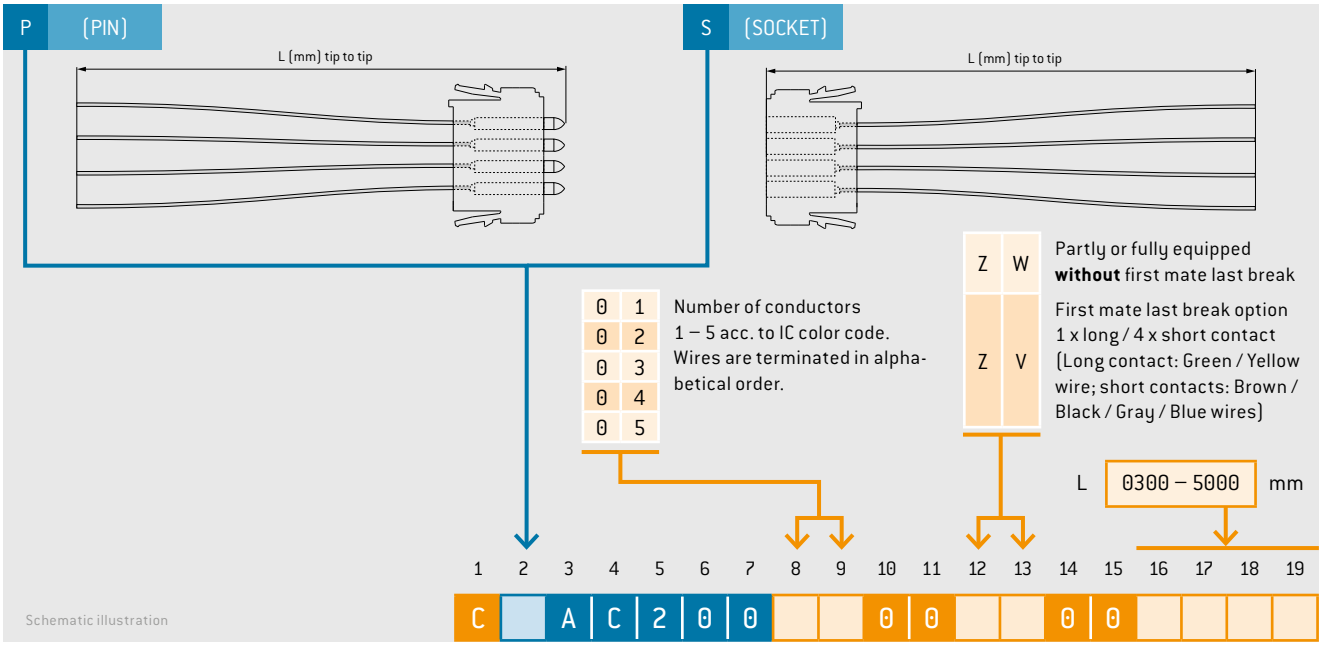
SIGNAL



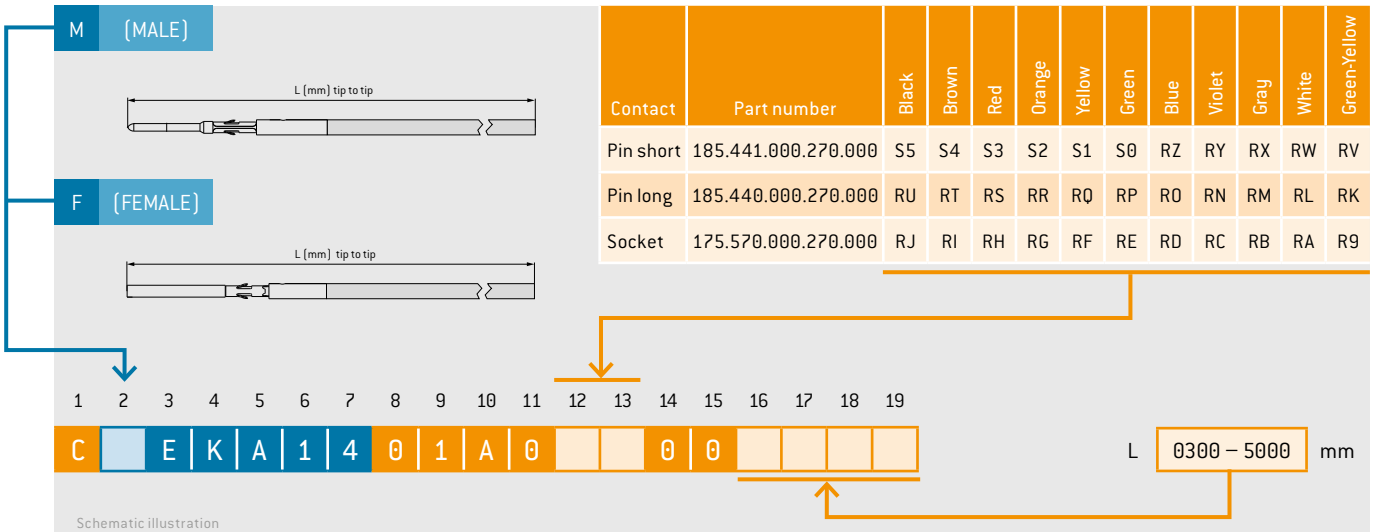
Technical data wires 2.50 mm² / AWG 14, see page 163	
Conductor	TPC – tin plated copper acc. to EN 13602
Insulation	UL-PVC +105 °C (UL-Style 1569)
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	3,000 V/AC (UL-Style 1569)
Operating voltage	300 V (UL-Style 11569)

The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES



PRE-ASSEMBLED CONTACTS



Contact	Part number	Black	Brown	Red	Orange	Yellow	Green	Blue	Violet	Gray	White	Green-Yellow
Pin short	185.441.000.270.000	S5	S4	S3	S2	S1	S0	RZ	RY	RX	RW	RV
Pin long	185.440.000.270.000	RU	RT	RS	RR	RQ	RP	RO	RN	RM	RL	RK
Socket	175.570.000.270.000	RJ	RI	RH	RG	RF	RE	RD	RC	RB	RA	R9

MODULE 20 CONTACTS

PCB TERMINATION

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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 188).
- Solder temperature for PCB termination module (Black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules, more modules on request acc. configuration

Materials	
Insulator pin / socket-frame	Thermoplastic acc. to UL 94 (Gray)
Insulator PCB	Thermoplastic acc. to UL 94 (Black)
Contact	Cu alloy
Contact finishing	Gold-plated

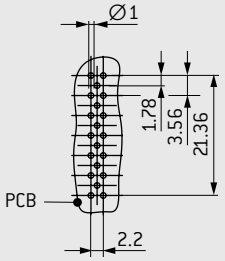
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	200 V	10 V
Pollution degree	2	3
Rated surge voltage[3]	2,000 V	
Clearance distance	1.0 mm	
Creepage distance	1.0 mm	
Voltage data according to MIL[4]		
Operating voltage	450 V	
Test voltage	1,400 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	200 V	10 V
Pollution degree	2	3
Test voltage	1,076 V AC	

Compatible with module 20 contacts on page 94

NOTE

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

PCB TERMINATION MODULE



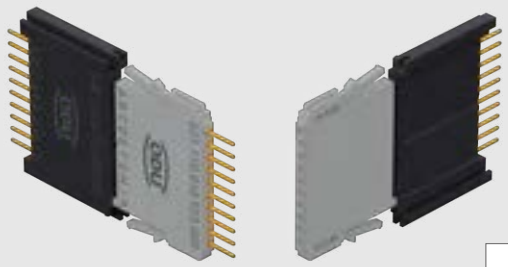
Description	Part number	Nominal current[5] A	Max. continuous current[1] A	Contact resistance[6] mΩ
Insulator socket incl. contacts	630.117.020.923.000	4.5	7	7
Insulator pin incl. contacts	631.117.020.923.000	4.5	7	7
Insulator PCB incl. injected contacts[4]	630.143.020.922.000	4.5	7	7

Product Finder Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] See page 179. This voltage specification is according to IEC 60664-1:2020 (VDE 0110-1:2022-07) only valid for equipment with a maximum expected rated surge voltage of 2,000 V, which is not directly connected to the low-voltage grid. [3] See page 182 [4] See page 185 [5] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [6] Due to the double transfer between the modules and the PCB termination modules, the contact resistance is twice as high as with a normal signal module. [7] PCB contacts are injected in the insulator, can be conditionally removed. See page 32

MODULE 10 CONTACTS

PCB TERMINATION



1 Unit

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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 186).
- Solder temperature for PCB termination module (Black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules, more modules on request acc. configuration

Materials	
Insulator pin/socket-frame	Thermoplastic acc. to UL 94 (Gray)
Insulator PCB	Thermoplastic acc. to UL 94 (Black)
Contact	Cu alloy
Contact finishing	Gold-plated

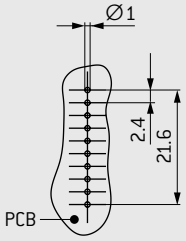
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	320 V	63 V
Pollution degree	2	3
Rated surge voltage	2,500 V	
Clearance distance	1.4 mm	
Creepage distance	1.6 mm	
Voltage data according to MIL[4]		
Operating voltage	450 V	
Test voltage	1,400 V	
Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	320 V	63 V
Pollution degree	2	3
Test voltage	1,320 V AC	

Compatible with module 10 contacts on page 96

NOTE

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

PCB TERMINATION MODULE



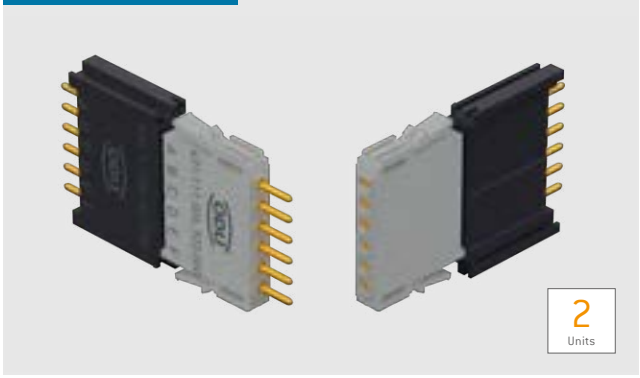
Description	Part number	Nominal current[5] A	Max. continuous current[1] A	Contact resistance[6] mΩ
Insulator socket incl. contacts	630.110.010.923.000	4.5	7	7
Insulator pin incl. contacts	631.110.010.923.000	4.5	7	7
Insulator PCB incl. injected contacts[7]	630.140.010.922.000	4.5	7	7

Product Finder Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] See page 179 [3] See page 182 [4] See page 185 [5] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [6] Due to the double transfer between the modules and the PCB termination modules, the contact resistance is twice as high as with a normal signal module. [7] PCB contacts are injected in the insulator, can be conditionally removed. See page 32

MODULE 6 CONTACTS

PCB TERMINATION



Contact diameter: 1.3 mm
Mating cycles: min. 10,000
Current-carrying capacity[1]: 13 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 186).
- Solder temperature for PCB termination module (black PA) 260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules, more modules on request acc. configuration

Materials	
Insulator pin/socket-frame	Thermoplastic acc. to UL 94 (Gray)
Insulator PCB	Thermoplastic acc. to UL 94 (Black)
Contact	Cu alloy
Contact finishing	Gold-plated

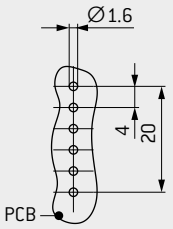
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	400 V	160 V
Pollution degree	2	3
Rated surge voltage	3,000 V	
Clearance distance	2.1 mm	
Creepage distance	2.5 mm	
Voltage data according to MIL[4]		
Operating voltage	350 V	
Test voltage	1,100 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	500 V	200 V
Pollution degree	2	3
Test voltage	1,730 V AC	

Compatible with module 6 contacts on page 98

NOTE

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

PCB TERMINATION MODULE



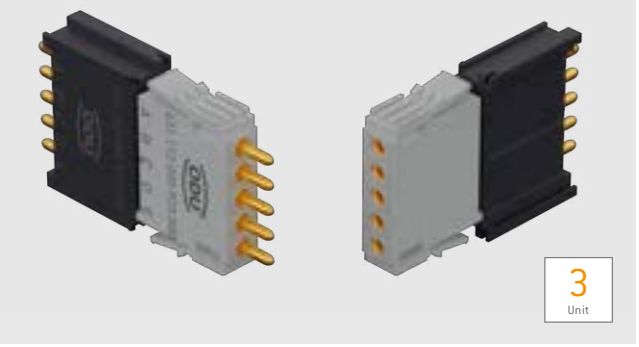
Description	Part number	Nominal current[5] A	Max. continuous current[1] A	Contact resistance[6] mΩ
Insulator socket incl. contacts	630.111.006.923.000	8	13	3.6
Insulator pin incl. contacts	631.111.006.923.000	8	13	3.6
Insulator PCB incl. injected contacts[7]	630.141.006.922.000	8	13	3.6

Product Finder Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] See page 179 [3] See page 182 [4] See page 185 [5] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [6] Due to the double transfer between the modules and the PCB termination modules, the contact resistance is twice as high as with a normal signal module. [7] PCB contacts are injected in the insulator, can be conditionally removed. See page 32

MODULE 5 CONTACTS

PCB TERMINATION



Contact diameter: 2 mm
Mating cycles: min. 10,000
Current-carrying capacity[1]: 25 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 186).
- Solder temperature for PCB termination module (black PA) +260 °C for 30 seconds
- Maximum adjacent arrangement of 10 modules, more modules on request acc. configuration

Materials	
Insulator pin/socket-frame	Thermoplastic acc. to UL 94 (Gray)
Insulator PCB	Thermoplastic acc. to UL 94 (Black)
Contact	Cu alloy
Contact finishing	Gold-plated

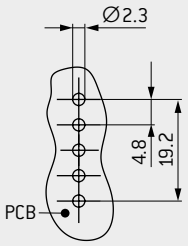
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	550 V	220 V
Pollution degree	2	3
Rated surge voltage	3,000 V	
Clearance distance	2.5 mm	
Creepage distance	2.8 mm	
Voltage data according to MIL[4]		
Operating voltage	700 V	
Test voltage	2,200 V	
Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	555 V	221 V
Pollution degree	2	3
Test voltage	1,959 V AC	

Compatible with module 5 contacts on page 100

NOTE

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

PCB TERMINATION MODULE



Description	Part number	Nominal current[5] A	Max. continuous current[1] A	Contact resistance[6] mΩ
Insulator socket incl. contacts	630.112.005.923.000	16	25	2
Insulator pin incl. contacts	631.112.005.923.000	16	25	2
Insulator PCB incl. injected contacts[7]	630.142.005.922.000	16	25	2

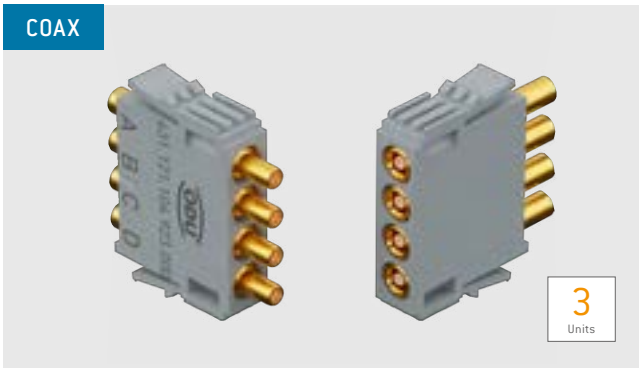
Product Finder

Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] See page 179 [3] See page 182 [4] See page 185 [5] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K [6] Due to the double transfer between the modules and the PCB termination modules, the contact resistance is twice as high as with a normal signal module. [7] PCB contacts are injected in the insulator, can be conditionally removed. See page 32

MODULE 4 CONTACTS FOR 50 Ω

COAX



Mating cycles: min. 10,000
Frequency range[5]: 0 – 2.8 GHz

TECHNICAL NOTES

- For crimp information, see from page 168

Product Finder | Assembly instruction

Materials	
Insulator	Thermoplastic acc. to UL 94
Contact / insulator	Cu alloy / PTFE
Contact finishing	Gold-plated

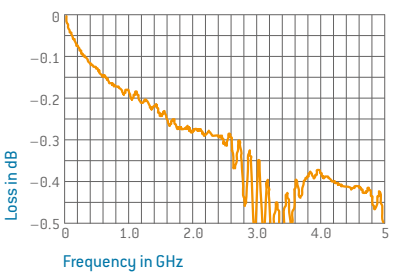
Technical data	
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]	
Operating voltage	160 V
Pollution degree	2
Rated surge voltage	1,500 V
Frequency range[5]	0 – 2.8 GHz
Insulation resistance	> 100 GΩ
Clearance distance[6]	0.8 mm
Creepage distance[6]	0.8 mm
Voltage data according to MIL[4]	
Operating voltage	525 V
Test voltage	1,575 V
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]	
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms} ≤ 300 V
Operating voltage	160 V
Pollution degree	2
Test voltage	984 V AC

Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable[5]	Part number outer conductor crimp dies for crimping tool 080.000.039.000.000
Pin contact	122.133.003.270.000	50	2.8	RG 174, RG 188, RG 316	082.000.039.102.001
	122.133.001.270.000		0.5	RG 178 RG 196	082.000.039.101.000
Socket contact	122.133.004.270.000	50	2.8	RG 174, RG 188, RG 316	082.000.039.102.001
	122.133.002.270.000		0.5	RG 178, RG 196	082.000.039.101.000
Crimping tool inner conductor	080.000.051.000.000				
Positioner inner conductor	080.000.051.102.000				
Removal tool	087.7CC.310.001.000				

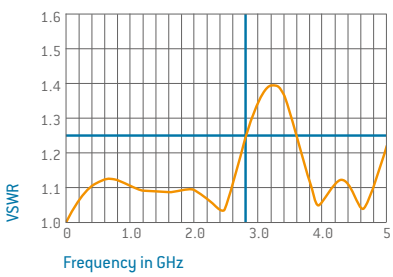
Module 4 contacts	Part number
Insulator	631.121.104.923.000

HIGH-FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[5]

Insertion loss



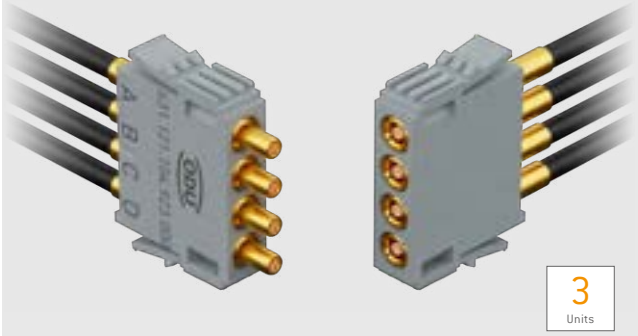
Voltage standing-wave ratio VSWR



[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185 [5] Special lines and alternative models on request [6] Clearance and creepage distance between inner conductor and outer conductor

CABLE ASSEMBLY – MODULE 4 CONTACTS FOR 50 Ω

COAX



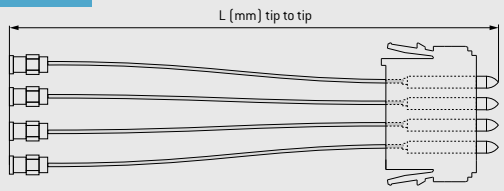
3 Units

For cable specification, see page 163

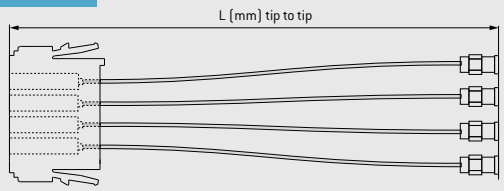
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Second side connector	Coax cable				
	RG178	RG196	RG174	RG188	RG316
SMA	YZ	YX	YV	YT	YR
BNC	YY	YW	YU	YS	YQ

0	1
0	2
0	3
0	4

Number of conductors 1 – 4, labeled with Black heatshrink tube on the end of the second side connector. Wires are terminated in alphabetical order.

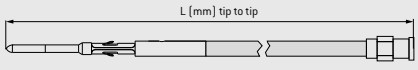
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		F	C	2	0	0			A	0			0	0				

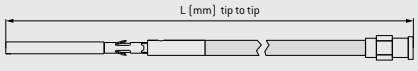
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



Please enter RG type in position 5 – 7

		Second side connector	Coax cable					
			178	196	174	188	316	RG type
Pin	122.133.001.270.000	SMA	0D	0C	–	–	–	
		BNC	0B	0A	–	–	–	
	122.133.003.270.000	SMA	–	–	09	08	07	
		BNC	–	–	06	05	04	
Socket	122.133.002.270.000	SMA	03	02	–	–	–	
		BNC	01	00	–	–	–	
	122.133.004.270.000	SMA	–	–	NZ	NY	NX	
		BNC	–	–	NW	NV	NU	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		C	A				0	1	A	C			0	0				

L 0300 – 5000 mm

Schematic illustration

Table of contents

MODULE 2 CONTACTS FOR 50 Ω

COAX

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

TECHNICAL NOTES

- For crimp information, see from page 168

Product Finder

Assembly instruction

Materials	
Insulator	Thermoplastic acc. to UL 94
Contact / insulator	Cu alloy / PTFE
Contact finishing	Gold-plated

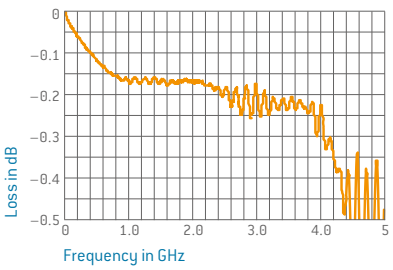
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	630 V	250 V
Pollution degree	2	3
Rated surge voltage	4,000 V	
Frequency range[1]	0 – 4 GHz	
Insulation resistance	> 100 GΩ	
Clearance distance[6]	3.4 mm	
Creepage distance[6]	3.4 mm	
Voltage data according to MIL[4]		
Operating voltage	800 V	
Test voltage	2,400 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	672 V	267 V
Pollution degree	2	3
Test voltage	2,394 V AC	

Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable[1]	Outer conductor crimp dies for crimping tool 080.000.039.000.000
Pin contact	122.132.001.270.000	50	0.2	RG 178, RG 196	082.000.039.101.000
	122.132.003.270.000		0.4	RG 174, RG 188, RG 316	082.000.039.102.001
	122.132.007.270.000		3.5	RG 58	082.000.039.106.000
	122.132.013.270.000		4	RG223, RG142	082.000.039.108.000
Socket contact	122.132.002.270.000	50	0.2	RG 178, RG 196	082.000.039.101.000
	122.132.004.270.000		0.4	RG 174, RG 188, RG 316	082.000.039.102.001
	122.132.008.270.000		3.5	RG 58	082.000.039.106.000
	122.132.014.270.000		4	RG 178, RG 196	082.000.039.108.000
Crimping tool for inner conductor	080.000.051.000.000				
Positioner for inner conductor	080.000.051.102.000				
Removal tool	087.7CC.690.001.000				

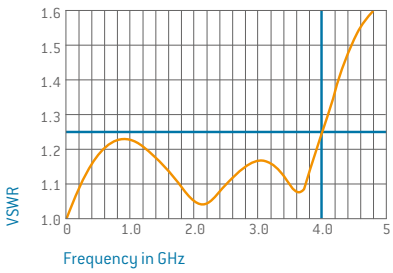
Module 2 contacts	Part number
Insulator	631.120.102.923.000
Dummy contact	021.341.202.946.000

HIGH-FREQUENCY CHARACTERISTICS FOR 50 Ω COAX CONTACTS[5]

Insertion loss



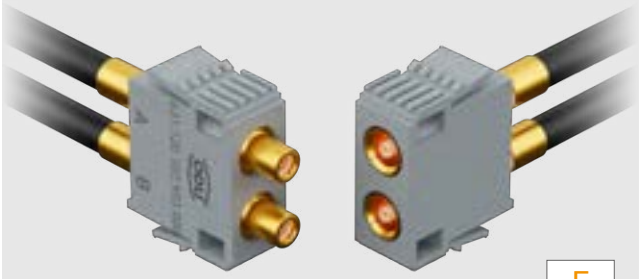
Voltage standing-wave ratio VSWR



[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185 [5] Special lines and alternative models on request [6] Clearance and creepage distance between inner conductor and outer conductor

CABLE ASSEMBLY – MODULE 2 CONTACTS FOR 50 Ω

COAX



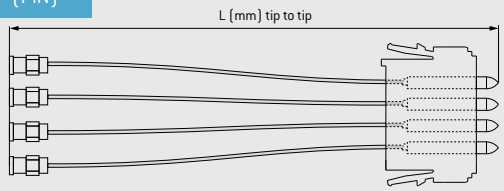
5 Units

For cable specification, see page 163

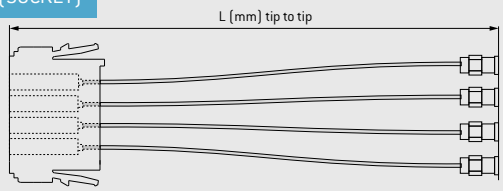
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Second side connector	Coax cable						
	RG178	RG196	RG174	RG188	RG316	RG58	RG223
SMA	YP	YN	YL	YJ	YH	YF	YD
BNC	YO	YM	YK	YI	YG	YE	YC

0	1
0	2

Number of conductors 1 – 2, labeled with Black heatshrink tube on the end of the second side connector.
Wires are terminated in alpha-betical order.

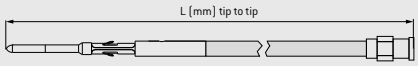
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		F	E	2	0	0			A	0			0	0				

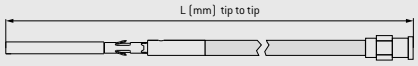
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



Please enter RG type in position 5 – 7

		2nd side connector	Coax cable 178	196	174	188	316	058	223	RG type
Pin	122.132.001.270.000	SMA	NT	NS	–	–	–	–	–	
		BNC	NR	NQ	–	–	–	–	–	
	122.132.003.270.000	SMA	–	–	NP	NO	NN	–	–	
		BNC	–	–	NM	NL	NK	–	–	
	122.132.007.270.000	SMA	–	–	–	–	–	NJ	–	
		BNC	–	–	–	–	–	NI	–	
	122.132.013.270.000	SMA	–	–	–	–	–	–	NH	
		BNC	–	–	–	–	–	–	NG	
Socket	122.132.002.270.000	SMA	NF	NE	–	–	–	–	–	
		BNC	ND	NC	–	–	–	–	–	
	122.132.004.270.000	SMA	–	–	NB	NA	N9	–	–	
		BNC	–	–	N8	N7	N6	–	–	
	122.132.008.270.000	SMA	–	–	–	–	–	N5	–	
		BNC	–	–	–	–	–	N4	–	
	122.132.014.270.000	SMA	–	–	–	–	–	–	N3	
		BNC	–	–	–	–	–	–	N2	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		C	A				0	1	A	C			0	0				

L 0300 – 5000 mm

Schematic illustration

Table of contents

MODULE 2 CONTACTS FOR 50 Ω WITH SMA TERMINATION

COAX

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

TECHNICAL NOTES

- For crimp information, see from page 168

Product Finder | Assembly instruction

Materials	
Insulator	Thermoplastic acc. to UL 94
Contact / insulator	Cu alloy / PTFE
Contact finishing	Gold-plated

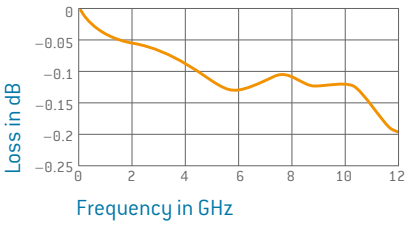
Module 2 contacts	Part number
Insulator	631.122.102.923.000
Dummy contact	021.341.202.946.000

Description	Part number	Characteristic impedance Ω	Frequency range GHz
Pin contact	122.143.001.270.000	50	12[2]
Socket contact	122.143.002.270.000		12[2]
Removal tool	087.7CC.690.001.000		

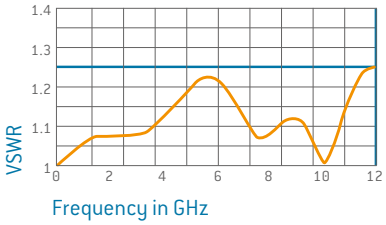
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[3]		
Operating voltage	320 V	63 V
Pollution degree	2	3
Rated surge voltage	2,500 V	
Frequency range[1]	0 – 12 GHz[2]	
Insulation resistance	> 100 GΩ	
Clearance distance[6]	1.6 mm	
Creepage distance[6]	1.6 mm	
Voltage data according to MIL[4]		
Operating voltage	565 V	
Test voltage	1,700 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[5]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	320 V	63 V
Pollution degree	2	3
Test voltage	1,444 V AC	

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

Insertion loss



Voltage standing-wave ratio VSWR



[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] Frequency range 0 – 16 GHz, if gap between pin and socket frame is < 0.2 mm and particular coax cables are used. Example: docking application
[3] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [4] See page 185 [5] See from page 182 [6] Clearance and Creepage distance between inner conductor and outer conductor

Table of contents

MODULE 2 CONTACTS FOR 75 Ω

COAX

Mating cycles: min. 10,000
Frequency range[1]: 0 – 2.6 GHz

TECHNICAL NOTES

- For crimp information, see from page 168

Product Finder | Assembly instruction

Materials	
Insulator	Thermoplastic acc. to UL 94
Contact / insulator	Cu alloy / PTFE
Contact finishing	Gold-plated

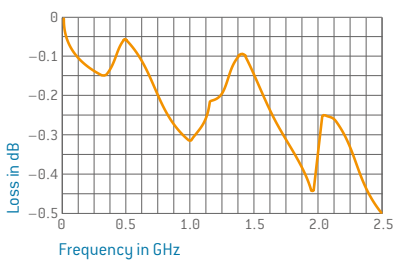
Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	500 V	200 V
Pollution degree	2	3
Rated surge voltage	4,000 V	
Frequency range[1]	0 – 2.6 GHz	
Insulation resistance	> 100 GΩ	
Clearance distance[6]	3.1 mm	
Creepage distance[6]	3.1 mm	
Voltage data according to MIL[4]		
Operating voltage	930 V	
Test voltage	2,790 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	612 V	243 V
Pollution degree	2	3
Test voltage	2,251 V AC	

Description	Part number	Characteristic impedance Ω	Frequency range GHz	Cable[5]	Outer conductor crimp dies for crimping tool 080.000.039.000.000
Pin contact	122.131.003.270.000	75	2.1	RG 179, RG 187 ST2081 (6G-SDI)	082.000.039.102.001
	122.131.009.270.000		2.6	RG59/U (Belden) ST2082 (12G-SDI)	082.000.039.109.000
Socket contact	122.131.004.270.000	75	2.1	RG 179, RG 187 ST2081 (6G-SDI)	082.000.039.102.001
	122.131.010.270.000		2.6	RG59/U (Belden) ST2081 (6G-SDI)	082.000.039.109.000
Crimping tool inner conductor	080.000.051.000.000				
Positioner inner conductor	080.000.051.102.000				
Removal tool	087.7CC.690.001.000				

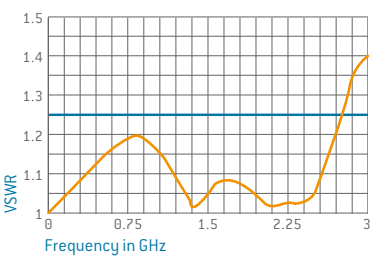
Module 2 contacts	Part number
Insulator	631.120.102.923.000
Dummy contact	021.341.202.946.000

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

Insertion loss



Voltage standing-wave ratio VSWR



[1] Loss levels depend on used conductor type at a VSWR of 1.25. More are available on request. Each test was performed with a conductor length of 2 × 5 cm.
[2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See from page 182 [4] See page 185 [5] Special lines and alternative models on request [6] Clearance and Creepage distance between inner conductor and outer conductor

CABLE ASSEMBLY – MODULE 2 CONTACTS FOR 75 Ω

COAX

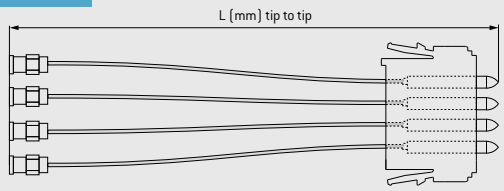
5
Units

For cable specification, see page 163

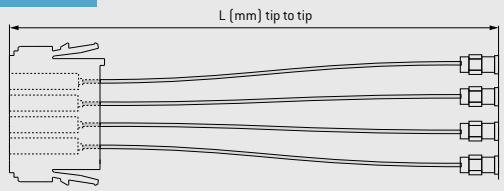
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Second side connector	Coax cable		
	RG179	RG187	RG59
BNC	YB	YA	Y9

0	1
0	2

Number of conductors 1 – 2, labeled with Black heatshrink tube on the end of the second side connector.
Wires are terminated in alpha-betical order.

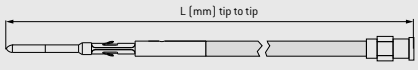
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		F	E	2	0	0			A	0			0	0				

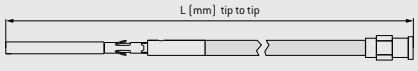
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



Please enter RG type in position 5 – 7

		Second side connector	Coax cable			
			179	187	059	RG type
Pin	122.131.003.270.000	BNC	N1	N0	–	
	122.131.009.270.000	BNC	–	–	MZ	
Socket	122.131.004.270.000	BNC	MY	MX	–	
	122.131.010.270.000	BNC	–	–	MW	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		C	B				0	1	A	C			0	0				

L 0300 – 5000 mm

Schematic illustration

Table of contents

MODULE 2 CONTACTS FOR PNEUMATIC VALVES

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

COMPRESSED AIR

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

TECHNICAL NOTES

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

Materials	
Insulator	Thermoplastic acc. to UL 94
Valve body	Cu alloy / blank
Dummy contact	NBR; sealing material

Technical data	
Mechanical data	
Permissible max. operating pressure	12 bar
Operating force	10.4 N / module

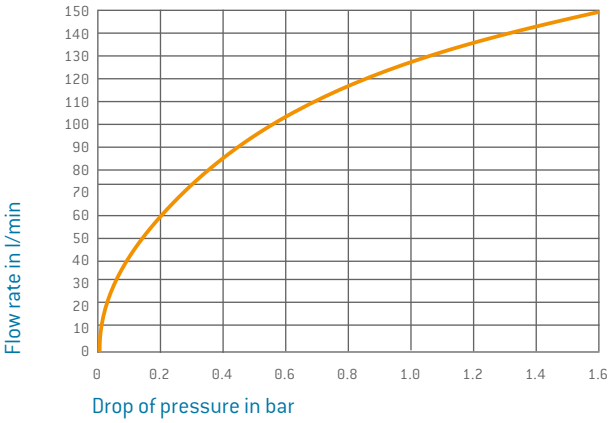
Module 2 contacts	Part number
Insulator	631.120.102.923.000
Dummy contact	021.341.202.946.000

Description	Part number	Termination
Plug sleeve (non shut-off)	196.035.001.300.000	M5
Coupling (non shut-off)	196.035.003.300.000	
Coupling (shut-off)	196.035.002.300.000	
Removal tool	087.7CC.680.001.000	

Product Finder

Assembly instruction

FLOW RATE DIAGRAM



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

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

CABLE ASSEMBLY – MODULE 2 CONTACTS

COMPRESSED AIR

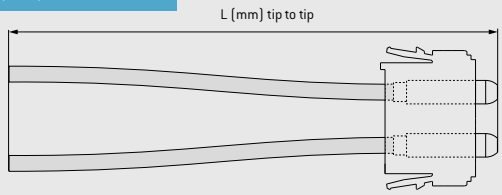
5 Units

Technical data	
Hose type	Polyamide Blue
Dimension (mm) Outer-Ø / Inner-Ø	6.00 / 2.50
Hose type	Polyurethane Black
Dimension (mm) Outer-Ø / Inner-Ø	6.00 / 4.00
Operating temperature	Polyamide Blue −30 °C to +90 °C
	Polyurethane Black −35 °C to +60 °C

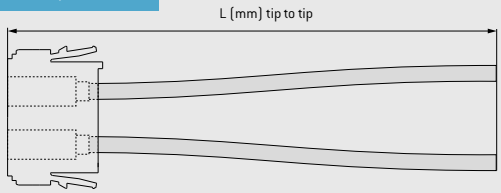
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN) Non-shut-off



S (SOCKET) Shut-off



0 1	Number of conductors 1 – 2, assembled with push-fitting and tube with 6 mm outer diameter, straigth cut on the second side marked with Black heat shrink tube, ending 50 mm before the straight cut. Wires are terminated in alphabetical order.
0 2	

Hose type	Push-in fitting	Push-in fitting L-connection
Polyamid Blue	XZ	XX
Polyurethane Black	XY	XW

L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		V	E	2	0	0			A	0			0	0				

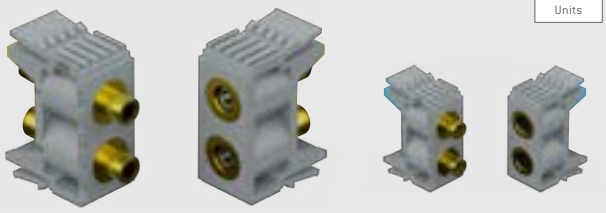
Schematic illustration

MODULE 2 CONTACTS FOR PNEUMATIC VALVES

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

COMPRESSED AIR

5 Units



Shut-off version | Non shut-off version

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

TECHNICAL NOTES

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

Materials	
Insulator	Thermoplastic acc. to UL 94
Valve body	Cu alloy / blank
Dummy contact	NBR; sealing material / FKM

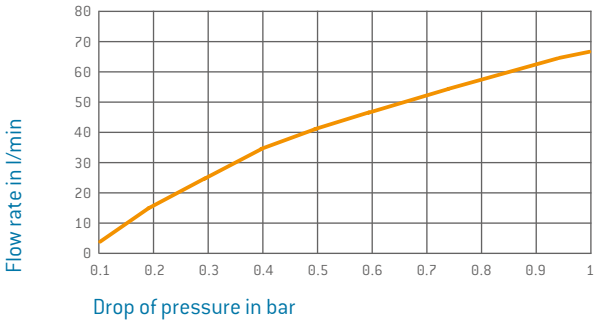
Technical data	
Mechanical data	
Permissible max. operating pressure	10 bar
Relative operating pressure	–0.8 bar[6]
Operating force	
Non shut-off	27 N
One-sided shut-off	28 N
Two- sided shut-off	29 N

Module 2 contacts	Part number
Insulator	631.132.102.923.000
Dummy contact	021.341.205.946.000

Description	Part number	Termination diameter	Termination types see page 168	
			I	II
Plug sleeve (non shut-off)	196.023.001.300.000	3	●	–
Plug sleeve (non shut-off)	196.024.001.300.000	4	●	–
Coupling (non shut-off)	196.023.003.300.000	3	●	–
Coupling (non shut-off)	196.024.003.300.000	4	●	–
Plug sleeve (shut-off)[4,5]	196.025.014.300.000	M5	–	●
Coupling (shut-off)	196.023.002.300.000	3	●	–
Coupling (shut-off)	196.024.002.300.000	4	●	–
Coupling (shut-off)[2]	196.025.012.300.000	M5	–	●

Product Finder | Assembly instruction

FLOW RATE DIAGRAM

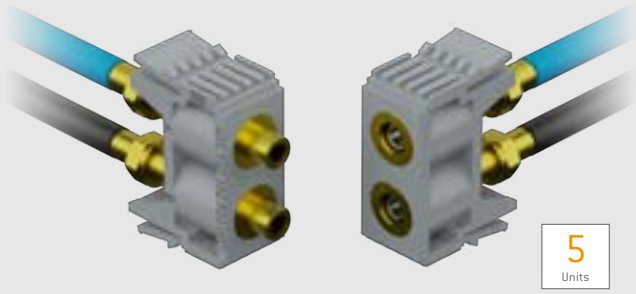


The flow rate diagram refers to the locking version with a maximum gap between socket and pin piece of ≤ 0.5 mm. If the clearance is modified, the drop of pressure increases.

[1] The stated mating cycles are possible if regular maintenance intervals are observed [2] Not suitable for mixtures with over 25% oxygen content or explosive gases
[3] In mated condition or in the case of shut-off variants in unmated condition also [4] Only pluggable on coupling 196.025.012.300.000 [5] Sealing material: FKM
[6] Pressure specification as relative value (absolute value: 0.2 bar)

CABLE ASSEMBLY – MODULE 2 CONTACTS

COMPRESSED AIR



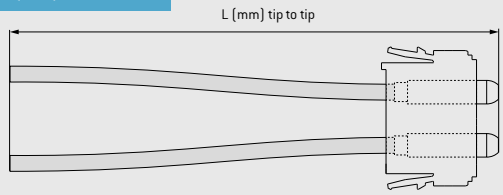
5 Units

Technical data	
Hose type	Polyamide Blue
Dimension (mm) Outer-Ø / Inner-Ø	8.00 / 4.00
Hose type	Polyurethane Black
Dimension (mm) Outer-Ø / Inner-Ø	6.00 / 4.00
Operating temperature	Polyamide Blue −30 °C to +90 °C
	Polyurethane Black −35 °C to +60 °C

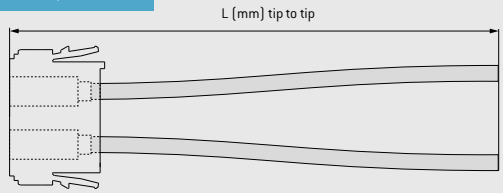
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN) Shut-off



S (SOCKET) Shut-off



	Plug nipple
Hose type	945.000.001.000.137
Polyamid Blue	XV
Polyurethane Black	XU

0 1	Number of conductors 1 – 2, assembled with nipple-fitting and tube with 4 mm inner diameter, marked with Black heatshrink tube, ending 50 mm before the straight cut. Wires are terminated in alphabetical order.
0 2	

L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		V	E	2	0	0			A	0			0	0				

Schematic illustration

MODULE 2 CONTACTS FOR FLUID COUPLING

Suitable for conducting air, water, and other fluids

FLUID COUPLING

Two-sided shut-off

5 Units

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

TECHNICAL NOTES

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

Materials	
Insulator	Thermoplastic acc. to UL 94
Fluid coupling	Cu alloy / nickel-plated
Sealing	Sealing material / FKM

Technical data	
Mechanical data	
Permissible max. operating pressure	10 bar
Relative operating pressure	–0.8 bar[4]
Operating force	48 N / module
Tube termination	M5 inside thread for commercially available Push-in terminations

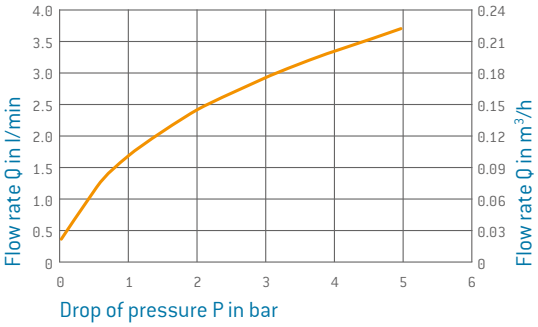
Module 2 contacts	Part number
Insulator	631.132.102.923.000
Dummy contact	021.341.205.946.000

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

Product Finder

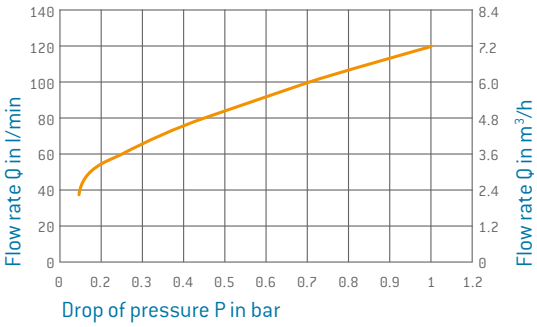
Assembly instruction

FLOW RATE DIAGRAM WATER



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

FLOW RATE DIAGRAM AIR



[1] The stated mating cycles are possible if regular maintenance intervals are observed [2] Not suitable for mixtures with over 25% oxygen content or explosive gases
[3] In unmated condition also [4] Pressure specification as relative value (absolute value: 0,2 bar)

CABLE ASSEMBLY – MODULE 2 CONTACTS

FLUID COUPLING

Two-sided shut-off

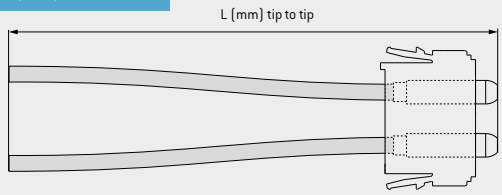
5 Units

Technical data	
Lubricants	Material: Polyamide Blue
Dimension (mm) Outer-Ø / Inner-Ø	6.00 / 2.50
Dimension (mm) Outer-Ø / Inner-Ø	8.00 / 4.00
Compressed air & water	Material: Polyurethane Black
Dimension (mm) Outer-Ø / Inner-Ø	6.00 / 4.00

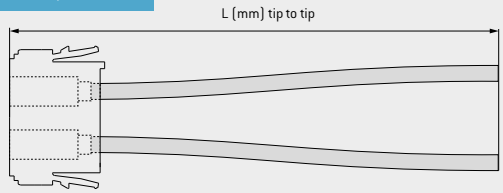
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN) Shut-off



S (SOCKET) Shut-off



0 1	Number of conductors 1 – 2, assembled with push-fitting and tube with 6 mm outer diameter, marked with Black heatshrink tube, ending 50 mm before the straight cut.
0 2	

Hose type	Push-in fitting	Push-in fitting L-connection
	945.000.001.000.140	945.00.001.000.143
Polyamid Blue	XT	XR
Polyurethane Black	XS	XQ

L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		U	E	2	0	0			A	0			0	0				

Schematic illustration

MODULE 1 CONTACT FOR VACUUM

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

VACUUM

12 Units

Relative operating pressure: –0.8 bar[4]
Mating cycles[1]: min. 10,000
Tube connection: max. ∅ 16 mm

TECHNICAL NOTES

- No O_2 model[2]

Product Finder Assembly instruction

Materials	
Insulator	Thermoplastic
Coupling / Plug sleeve	Cu alloy
Sealing	VMQ

Technical data	
Mechanical data	
Operating pressure	–0.8 bar (–0.8 x 10^5 Pa)
Max. pressure drop in 5 s	50 x 10^{-5} bar (50 Pa)
Operating force	5.2 N / module
Permissible max. operating pressure	8.5 bar

Module 1 contact	Part number
Insulator	631.133.101.923.000

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

[1] The stated mating cycles are possible if regular maintenance intervals are observed.
[2] Not suitable for mixtures with over 25 % oxygen content or explosive gases. [4] Pressure specification as relative value (absolute value: 0,2 bar)

M5 TERMINATION ACCESSORIES

COMPRESSED AIR AND FLUID MODULE

TERMINATION TYPE I

Plug nipple

TERMINATION TYPE II PUSH-IN

Push-in fitting

L connection

TECHNICAL NOTES

- Tightening torque 0.9 ± 0.2 Nm

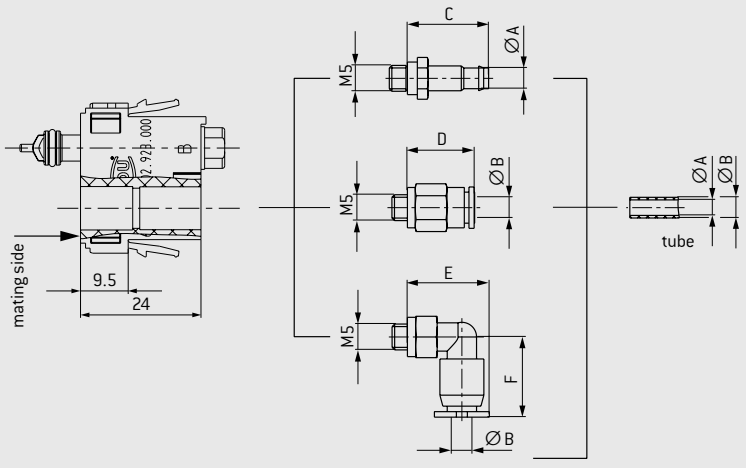
TECHNICAL DATA

Mechanical data

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

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

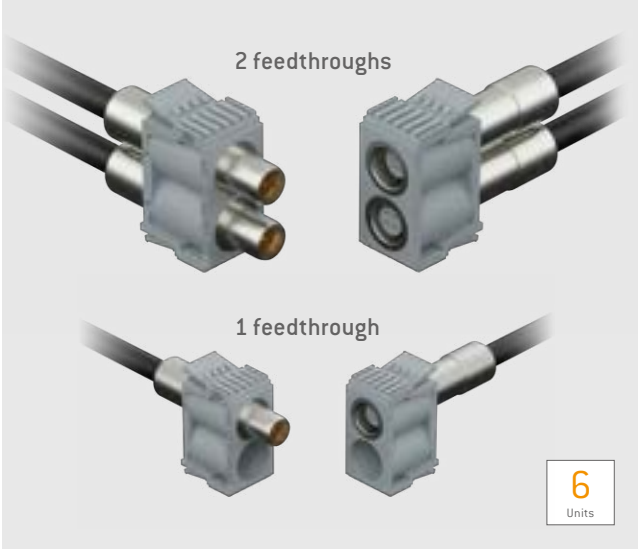
TERMINATION DIMENSIONS ACCESSORIES PNEUMATIC VALVES



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

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

SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR



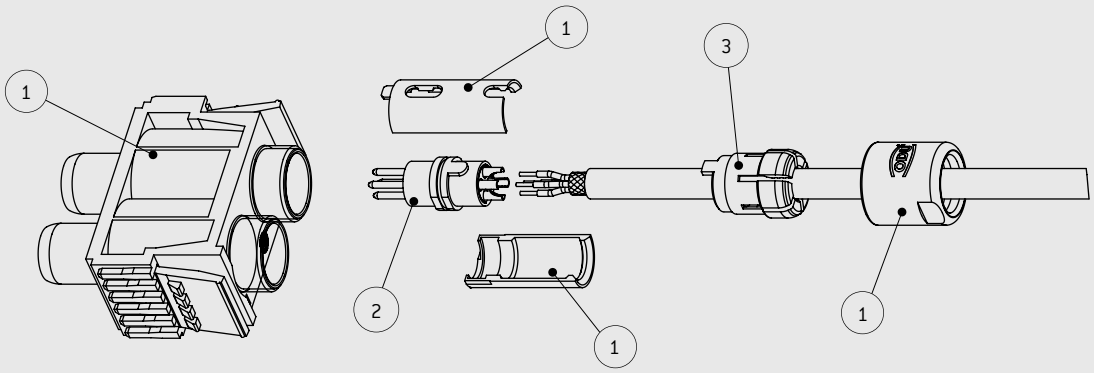
Mating cycles: min. 10,000
CAT 5, USB® 2.0, USB® 3.2 Gen 1x1, FireWire®, Ethernet, SPE
2 to 14 contacts

TECHNICAL NOTES

- The inserts listed here for shielded feedthroughs/ high-speed connectors are ideal for all common bus systems, e.g., Profibus®, RS485, FlexRay®, CAN-Bus, and RS232.
- Selected inserts are suitable and qualified for data rates up to 5 Gbit/s, e.g., Gigabit-Ethernet, Fast-Ethernet, IEEE 1394, USB® 2.0, USB® 3.2 Gen 1x1, FireWire® S400 (on request), SPE 10G BASE-T1.

Product Finder | Assembly instruction

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



Order	Base parts	Part number
1	Insulator socket incl. 1 socket housing	630.131.101.923.000
1	Insulator pin incl. 1 connector housing	631.131.101.923.000
1	Insulator socket incl. 2 socket housings	630.131.102.923.000
1	Insulator pin incl. 2 connector housings	631.131.102.923.000
2	Insert cpl. solder contacts[1]	See next page
3	Assembly set	See table on the right

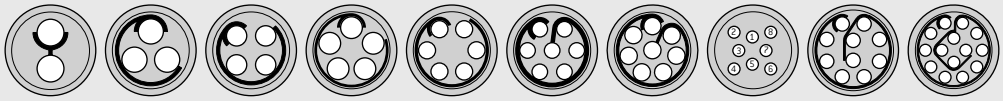
ASSEMBLY SET

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

[1]Insert for crimp contacts on request [2] Single Pair Ethernet according to IEC 63171-6:2019 (IEEE 802.3bp) contacts on request

VIEW PIN INSULATION BODY

CONTACT ARRANGEMENTS



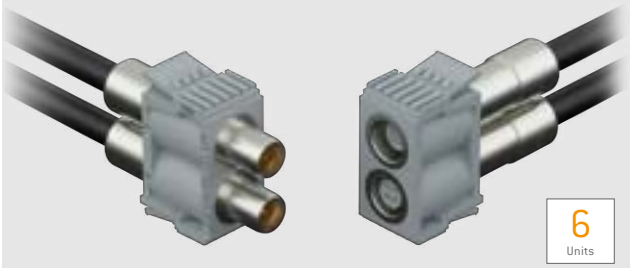
2 contacts SPE 10G BASE-T1 | 3 contacts | 4 contacts CAT 5 USB® 2.0 | 5 contacts | 6 contacts | 7 contacts | 8 contacts | 8 contacts CAT 5 | 10 contacts USB® 3.2 Gen 1x1 | 14 contacts

Number of contacts	Contact-Ø mm	Termination cross-section AWG	Rated voltage[1] V	Rated surge voltage[1] kV	Pollution degree[1]	Nominal voltage[2] V AC	Model	Cate-gory[3]	Insert cpl.[4] part number	Total mating force N	Total sliding force N
INSERT WITH ODU TURNTAC® (MATING CYCLES MIN. 10,000)											
2	1.3	20	32	2	2	550	Pin	–	701.844.724.002.200	8.6	7.1
							Socket		701.744.724.002.200		
2	0.7	22	32	1.5	2	300	Pin	SPE 10G BASE-T1	701.848.724.002.D00	6.1	5.1
							Socket		701.748.724.002.D00		
3	1.3	20	32	1.5	2	500	Pin	–	701.844.724.003.200	10.4	8.7
							Socket		701.744.724.003.200		
4	0.9	22	40	2	2	500	Pin	CAT 5 up to 100 Mbit/s	701.849.724.004.200	8.3	6.9
							Socket		701.749.724.004.200		
4	0.9	22	40	2	2	500	Pin	USB® 2.0	701.849.724.004.D00	8.3	6.9
							Socket		701.749.724.004.D00		
5	0.9	22	32	1.5	2	450	Pin	–	701.849.724.005.200	9.1	7.6
							Socket		701.749.724.005.200		
6	0.7	22	32	1.5	2	400	Pin	–	701.848.724.406.200	8.3	7.0
							Socket		701.748.724.406.200		
7	0.7	22	32	1.5	2	400	Pin	–	701.848.724.407.200	8.9	7.4
							Socket		701.748.724.407.200		
8	0.7	22	10	1.2	2	333	Pin	–	701.848.724.408.200	9.5	7.9
							Socket		701.748.724.408.200		
8	0.5	26	32	1.5	2	333	Pin	CAT 5 up to 1 Gbit/s	701.841.724.408.D00	9.3	7.8
							Socket		701.741.724.408.D00		
10	0.5	28	25	1.5	2	333	Pin	–	701.841.724.010.400	10.4	8.7
							Socket		701.741.724.010.200		
10	6 × 0.3 4 × 0.5	28 24	7.5	1.2	2	100	Pin	USB® 3.2 Gen 1x1	701.831.724.410.D00	12.6	10.5
							Socket		701.731.724.410.D00		
14	0.5	28	25	1.5	2	300	Pin	–	701.841.724.014.400	15.7	13.1
							Socket		701.741.724.014.200		

[1] According to IEC 60664-1:2020 (VDE 0110-1:2022-07), see page 179 [2] According to EIA-364-20F:2019 [3] Classification according to ISO/IEC 11801:2017:2017-1
[4] Insert for crimp version on request

CABLE ASSEMBLY – SHIELDED FEEDTHROUGH FOR DATA PROTOCOLS

SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR

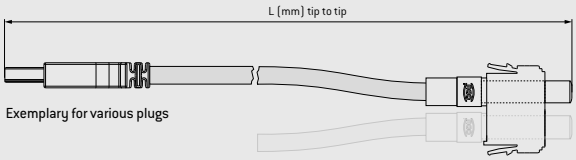


For cable specification see 158 / 161 / 163

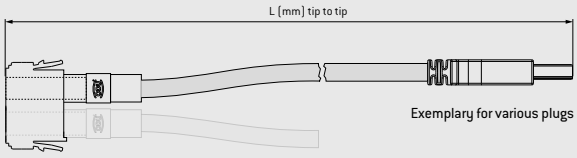
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Schematic illustration

Data protocol		Assembly		Second side connector			Length	
SPE®	S	single side	0 1	IEC 63171:2021 plug-2	WR	L	0300 – 5000	mm
		double side	0 2					
Ethernet 1 Gbit/s	R	single side	0 1	RJ45 plug	WZ		0300 – 5000	
		double side	0 2					
USB®2.0	Q	single side	0 1	Type A plug	WX		0300 – 3000	
		double side	0 2					
USB®3.2 Gen 1x1		single side	0 1		WW		0300 – 2000	
		double side	0 2					

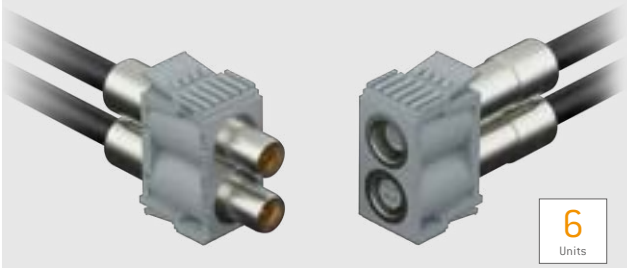
Please note:
Channel Length of the data protocols should not be exceeded.
USB® 2.0: 4.00 m
USB® 3.2 Gen 1x1: 2.00 m

Cable assemblies with data protocols are only available with second side connector because we test for correctness before shippment.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C			F	2	0	0			K	0			0	0				

CABLE ASSEMBLY – SHIELDED FEEDTHROUGH WITH SIGNAL CABLES

SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR

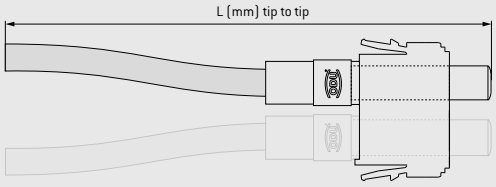


For cable specification, see page 164

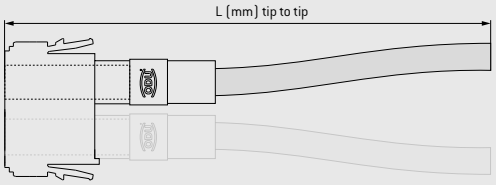
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Schematic illustration

Conductors	Assembly			PVC	PUR
2	single side	0	1	KZ	KQ
	double side	0	2		
3	single side	0	1	KY	KP
	double side	0	2		
4	single side	0	1	KX	KO
	double side	0	2		
5	single side	0	1	KW	KN
	double side	0	2		
6	single side	0	1	KV	KM
	double side	0	2		
7	single side	0	1	KU	KL
	double side	0	2		
8	single side	0	1	KT	KK
	double side	0	2		
10	single side	0	1	KS	KJ
	double side	0	2		
14	single side	0	1	KR	KI
	double side	0	2		

Wiring in accordance to:
IC-Code for PVC cables (see page 185)
DIN 47100 for PUR cables (see page 182)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
C		T	F	2	0	0			K	0			0	0					L 0300 – 5000 mm

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

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

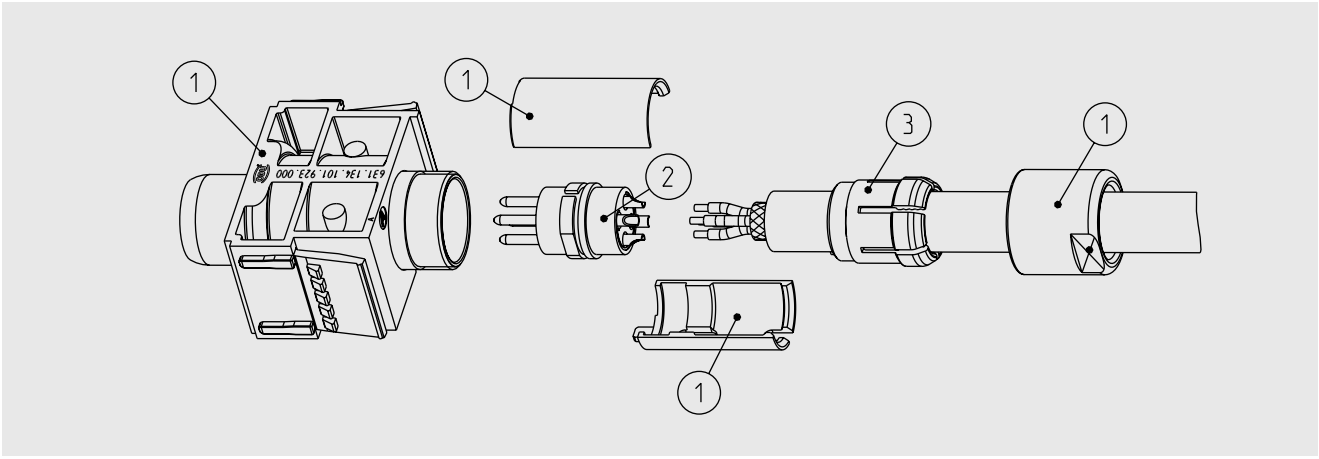
SHIELDED FEEDTHROUGH/HIGH-SPEED CONNECTOR

Mating cycles: min. 10,000
HDMI® up to 48 Gbit/s
DisplayPort® up to 40 Gbit/s
USB® up to 10 Gbit/s
3 to 22 contacts

TECHNICAL NOTES

- The inserts listed here for shielded feedthroughs/high-speed connectors are ideal for all common bus systems with transfer rates, e.g., Profibus®, RS485, FlexRay®, CAN-Bus, and RS232.
- Selected inserts are suitable and qualified for data rates up to 10 Gbit/s, e.g. HDMI® up to 48 Gbit/s, DisplayPort® up to 40 Gbit/s, USB®up to 10 Gbit/s

HOW TO CONFIGURE YOUR HIGH-SPEED CONNECTOR



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

Product Finder

Assembly instruction

ASSEMBLY SET

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

[1] Insert for crimp contacts on request

CONTACT ARRANGEMENTS

3 contacts | 4 contacts CAT 5 | 6 contacts | 7 contacts | 8 contacts CAT 5, CAT 6_A | 12 contacts | 14 contacts | 16 contacts HDMI® 2.0 | 19 contacts | 22 contacts HDMI® up to 48 Gbit/s DisplayPort® up to 40 Gbit/s USB® up to 10 Gbit/s

Number of contacts	Contact-Ø mm	Termination cross-section AWG	Rated voltage[1] V	Rated surge voltage[1] kV	Pollution degree[1]	Nominal voltage[2] V AC	Model	Category[3]	Insert cpl.[4] part number	Total mating force N	Total sliding force N
INSERT WITH ODU TURNTAC® (MATING CYCLES MIN. 10,000)											
3	1.6	18	–	2.5	–	800	Pin	–	702.851.724.003.200	13.9	11.6
			125		2		Socket		702.751.724.003.200		
4	1.3	20	–	2.5	–	650	Pin	CAT 5 up to 100 Mbit / s	702.844.724.004.200	13.1	10.9
			160		2		Socket		702.744.724.004.200		
6	1.3	20	–	2	–	600	Pin	–	702.844.724.006.200	16.2	13.5
			80		2		Socket		702.744.724.006.200		
		18	32	1.5	2	366	Pin		702.844.724.406.200	16.2	13.5
							Socket		702.744.724.406.200		
7	1.3	20	–	2	–	600	Pin	–	702.844.724.007.200	17.8	14.8
			80	2	2		Socket		702.744.724.007.200		
		18	32	1.5	2	366	Pin		702.844.724.407.200	17.8	14.8
							Socket		702.744.724.407.200		
8	0.9	22	–	2	–	500	Pin	CAT 6_A	702.849.724.008.D00	16.2	13.5
			40		2		Socket		702.749.724.008.D00		
12	0.7	26	–	2	–	450	Pin	–	702.848.724.012.200	16.1	13.4
			32		2		Socket		702.748.724.012.200		
14	0.7	26	32	1.5	2	400	Pin	–	702.848.724.014.200	17.6	14.7
							Socket		702.748.724.014.200		
16	0.5	26	–	1.5	–	250	Pin	HDMI 2.0	702.841.724.416.D00	19.1	15.9
			32		2		Socket		702.741.724.416.D00		
19	0.7	26	32	1.5	2	333	Pin	–	702.848.724.019.200	21.4	17.9
							Socket		702.748.724.019.200		
22	0.5	22 / 28	–	1.2	–	200	pin	HDMI® up to 48 Gbit/s DisplayPort® up to 40 Gbit/s USB® up to 10 Gbit/s	702.841.724.022.D00	23.7	19.8
			6.3		2		socket		702.741.724.022.D00		
INSERT WITH ODU SPRINGTAC® (MATING CYCLES MIN. 10,000)											
8	0.76	22	–	2	–	550	pin	CAT 5	702.842.724.008.D00	23.5	19.6
			40		2		socket		702.742.724.008.D00		

[1] According to IEC 60664-1:2020 (VDE 0110-1:2022-07), see page 179 [2] According to EIA-364-20F:2009 [3] Classification according to ISO/IEC 11801:2017-1:2017-11
[4] Insert for crimp version on request

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CABLE ASSEMBLY FOR – SHIELDED FEEDTHROUGH FOR DATA PROTOCOLS

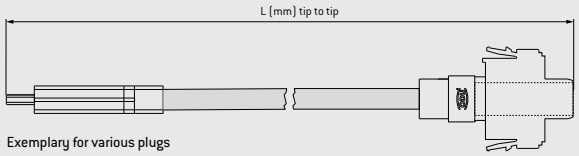
SHIELDED FEEDTHROUGH / HIGH-SPEED CONNECTOR

For cable see 159 / 160 / 161

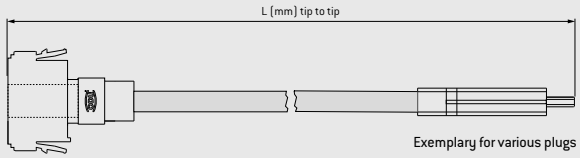
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Schematic illustration

Data protocol		Second side connector		Length		
Ethernet® 10 Gbit/s	R	RJ45 plug	WZ	L	0300 – 5000	mm
USB® 3.2 Gen 1x2	Q	Type C plug	WV		0300 – 1000	
HDMI® 2.0	P	HDMI® Type A plug	WU		0300 – 2900	
HDMI® 2.1	P	HDMI® Type A plug	WT		0300 – 2900	
DisplayPort® 2.0	O	DisplayPort® plug	WS		0300 – 4800	

Please note:
Channel length of the data protocols should not be exceeded.

USB® 3.2 Gen 1x2:	2.00 m
HDMI® 2.0 / 2.1:	5.00 m
DISPLAYPORT® 2.0:	5.00 m

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C			G	2	0	0	0	1	K	0			0	0				

Cable assemblies with data protocols are only available with second side connector because we test for correctness before shippment.

CABLE ASSEMBLY – SHIELDED FEEDTHROUGH WITH SIGNAL CABLES

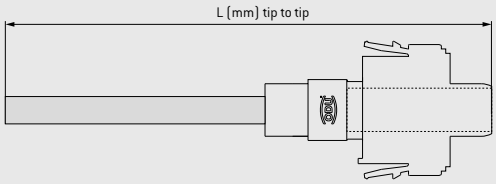
SHIELDED FEEDTHROUGH / HIGH-SPEED CONNECTOR

For cable specification , see page 164

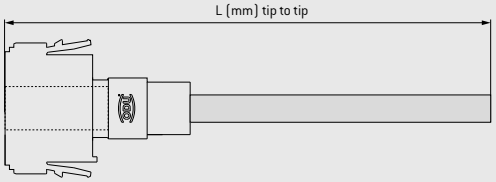
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Schematic illustration

Conductors	PVC	PUR
3	KI	KB
4	KH	KA
6	KG	K9
7	KF	K8
12	KE	K7
14	KD	K6
19	KC	K5

Wiring in accordance to:
IC-Code for PVC cables (see page 183)
DIN 47100 for PUR cables (see page 182)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		T	G	2	0	0	0	1	K	0			0	0				

L 0300 – 5000 mm

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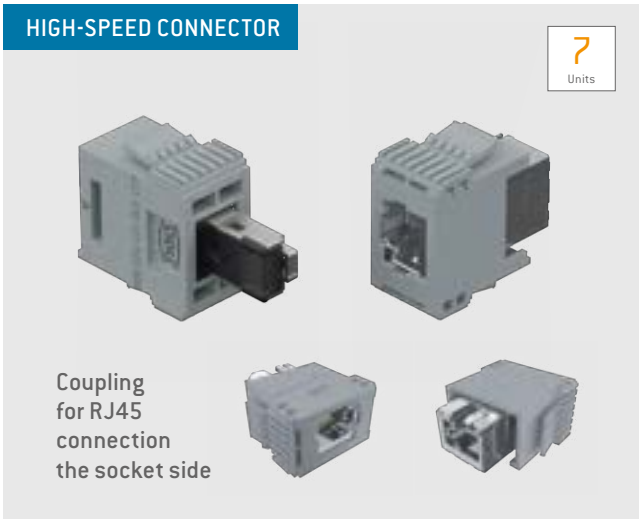
MODULE FOR INDUSTRIAL ETHERNET® RJ45 / 10 GBIT/S

STEADYTEC® Technology

HIGH-SPEED CONNECTOR



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

TECHNICAL NOTES

- Data transmission
- This module is suitable for transmitting data of CAT 6 according to ANSI/TIA/EIA-568-C.2 and CAT 6$_A$ according to ANSI/TIA-568.2-D. Suitable for the transmission of 10 Gbit/s according to IEEE 802.3an.
- 8-way RJ45 field connector and RJ45 connector insert CAT 6$_A$ (assembly w/o special tools) for stranded and solid wire cables
- Improved vibration and shock resistance by, for example, using 4 springs at the shrouds in the RJ45 socket of the RJ45 module CAT 6$_A$ and RJ45 coupling CAT 6$_A$
- Multi-port capable

Materials	
Surface	Sn

Technical data	
Contact resistance	< 20 mΩ
Insulation resistance	> 500 MΩ
Mating cycles	min. 5,000
Temperature range	–40 °C to +70 °C

Dielectric strength

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

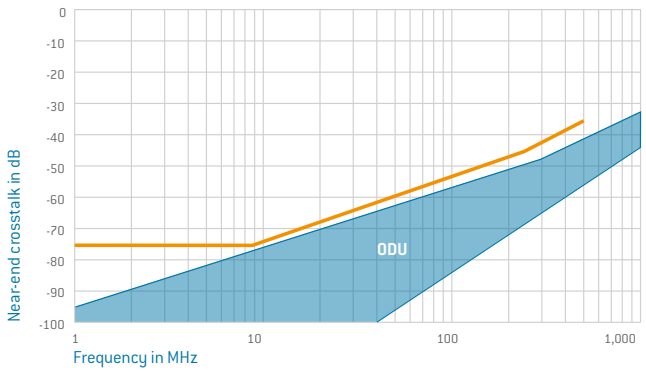
Transfer impedance

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

Multi-position module	Part number
Insulator pin	631.130.101.923.000
Insulator socket	630.130.101.923.001

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

NEXT



Product Finder

Assembly instruction

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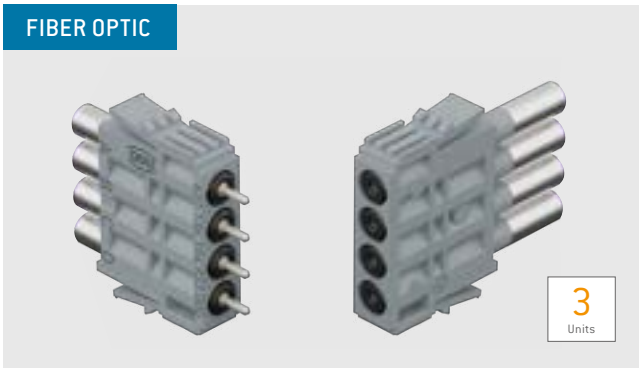
MODULE 4 CONTACTS FOR FIBER OPTIC GOF

FIBER OPTIC



Physical contact
Mating cycles: min. 1,000
Polish: PC / APC

TECHNICAL NOTES

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

Product Finder

Assembly instruction

Materials	
Insulator	Thermoplastic acc. to UL 94 Glass-fiber reinforced acc. to UL 94
Fiber optic contact	PARA, stainless steel, Cu alloy, ceramic
Type of fiber GOF Singlemode Multimode	 9 / 125 µm 50 / 125 µm

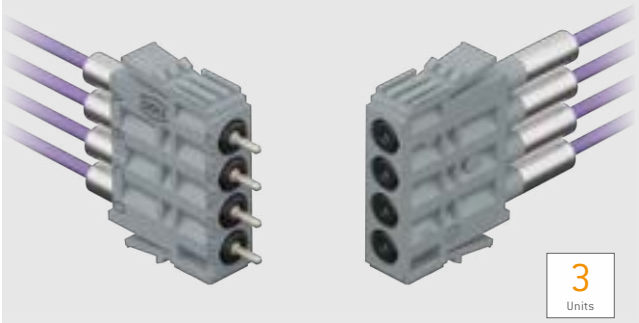
Description	Part number
Insulator pin	631.136.104.923.000
Insulator socket	630.136.104.923.000
Removal tool	087.7CC.125.001.000

Contacts only available as pre-assembled solution. See next page!

Technical data	
Mechanical data	
Max. insertion loss	0.5 dB
Temperature range	–40 °C to +85 °C

CABLE ASSEMBLY — MODULE 4 CONTACTS

FIBER OPTIC

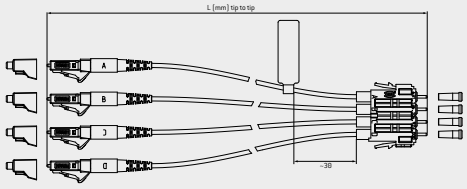


Technical data	
Fiber type	Multimode / singlemode
Fiber material	Quartz glass fiber
Primary coating	Acrylate
Jacket	Indoor: FRNC
Operating temperature	–25 up to +70 °C

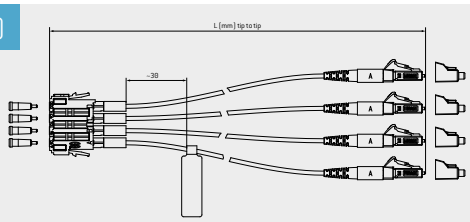
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Mode	Type and polish of Fiber Optic interface connector (2nd side)		
Multi	LC/PC	Z	Z
Single	LC/PC	Z	Y
Single	LC/APC	Z	X
Multi	SC/PC	Z	W
Single	SC/PC	Z	V
Single	SC/APC	Z	U
Multi	ST/PC	Z	T
Single	ST/PC	Z	S
Single	ST/APC	Z	R
Multi	FC/PC	Z	Q
Single	FC/PC	Z	P
Single	FC/APC	Z	O
Multi	E2000/PC	Z	N
Single	E2000/PC	Z	M
Single	E2000/APC	Z	L

0	1
0	2
0	3
0	4

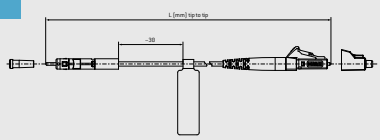
Number of terminated Fiber Optic channels and Fiber Optic plugs 1 – 4

L 000700 – 999999 mm

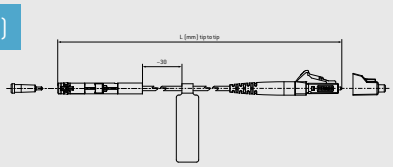
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
F		G	C	2	0	0			A	0								

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



5	0	0	Multimode
0	9	0	Singlemode

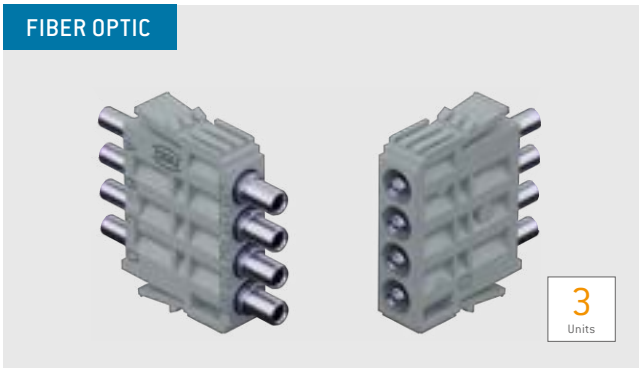
Mode	Type and polish of Fiber Optic interface connector (2nd side)		
Multi	LC/PC	Z	Z
Single	LC/PC	Z	Y
Single	LC/APC	Z	X
Multi	SC/PC	Z	W
Single	SC/PC	Z	V
Single	SC/APC	Z	U
Multi	ST/PC	Z	T
Single	ST/PC	Z	S
Single	ST/APC	Z	R
Multi	FC/PC	Z	Q
Single	FC/PC	Z	P
Single	FC/APC	Z	O
Multi	E2000/PC	Z	N
Single	E2000/PC	Z	M
Single	E2000/APC	Z	L

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
F		0	P				0	1	G	P								

L 000700 – 999999 mm

MODULE 4 CONTACTS FOR FIBER OPTIC GOF

FIBER OPTIC



Expanded Beam
Mating cycles: min. 10,000

TECHNICAL NOTES

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

Product Finder

Assembly instruction

Materials	
Insulator	Thermoplastic acc. to UL 94
Fiber optic contact	Cu alloy, stainless steel, ceramic
Type of fiber GOF Multimode	50 / 125 µm

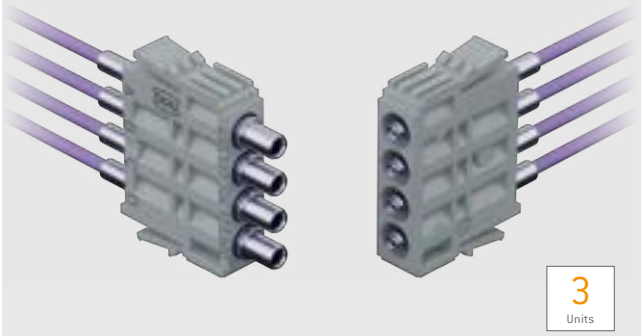
Description	Part number
Insulator pin (suitable for female contacts)	631.137.104.923.000
Insulator socket (suitable for male contacts)	630.137.104.923.000
Removal tool	087.7CC.125.001.000

Contacts only available as pre-assembled solution. See next page!

Technical data	
Mechanical data	
Insert loss Return loss	≤ 1.5 dB ≥ 32.0 dB (MM)
Operating temperature (depending on fiber)	–40 °C to +85 °C

CABLE ASSEMBLY — MODULE 4 CONTACTS

FIBER OPTIC



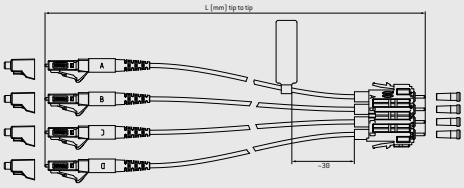
3 Units

Technical data	
Fiber type	Multimode / singlemode
Fiber material	Quartz glass fiber
Primary coating	Acrylate
Jacket	Indoor: FRNC
Operating temperature	–25 up to +70 °C

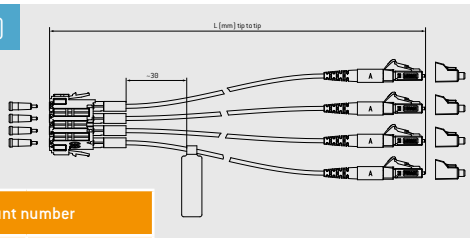
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



0 1
0 2
0 3
0 4

Number of terminated Fiber Optic channels and Fiber Optic plugs 1 – 4

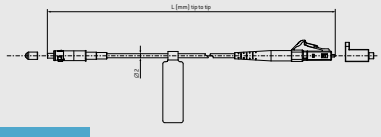
Pos. 12 – 13	Count number	
	Mode	Type and polish of Fiber Optic interface connector (2nd side)
ZK	Multi	LC/PC
ZJ	Multi	SC/PC
ZI	Multi	ST/PC
ZH	Multi	FC/PC
ZG	Multi	E2000/PC

L 000700 – 999999 mm

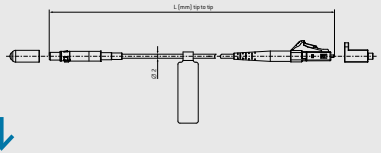
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
F		G	C	2	0	0			A	0								

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



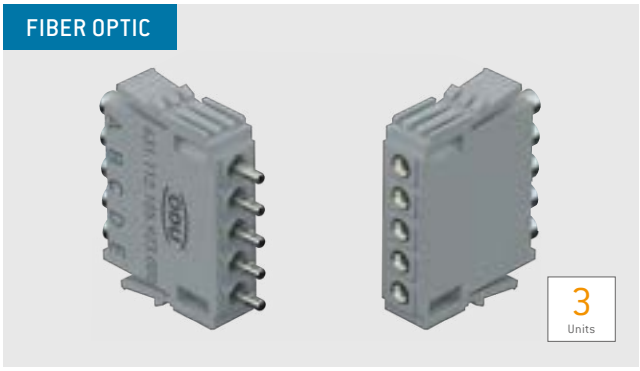
Pos. 12 - 13	Count number	
	Mode	Type and polish of Fiber Optic interface connector (2nd side)
ZK	Multi	LC/PC
ZJ	Multi	SC/PC
ZI	Multi	ST/PC
ZH	Multi	FC/PC
ZG	Multi	E2000/PC

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
F		0	E	5	0	0	0	1	G	P								

L 000700 – 999999 mm

MODULE 5 CONTACTS FOR FIBER OPTIC POF

FIBER OPTIC



Polymere Optical Fiber
Mating cycles: min. 10,000

TECHNICAL NOTES

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

Product Finder

Assembly instruction

Materials	
Insulator	Thermoplastic acc. to UL 94
Fiber optic contact	Cu alloy, stainless steel
Type of fiber POF	980 / 1,000 µm

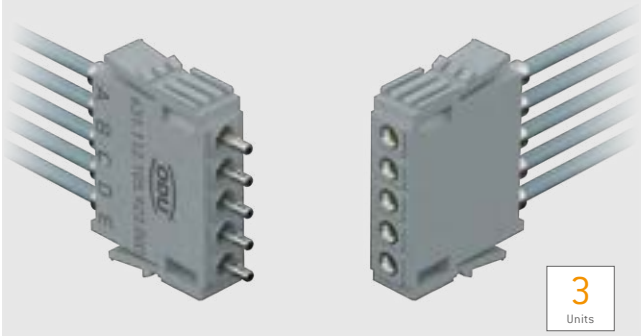
Technical data	
Mechanical data	
POF	1 mm
Outer diameter cable	2.2 – 2.3 mm
Insertion loss (typical)	≤ 1.5 dB
Total mating force (average)	<17.5 N per module
Operating temperature (depending on fiber)	
Standard fiber	–40 °C to +85 °C
Mating cycles	min. 10,000

Technical data	Part number
Insulator	631.112.105.923.000

Description	Part number
Pin contact 980 / 1,000 µm	196.503.002.204.000
Socket contact 980 / 1,000 µm	196.503.001.204.000
Processing set (Multi-purpose and crimping tool)	080.000.048.000.000
Cutting / stripping universal pliers	080.000.048.100.000
Crimping tool	080.000.048.200.000
Removal tool	087.7CC.200.003.000

CABLE ASSEMBLY MODULE 5 CONTACTS

FIBER OPTIC

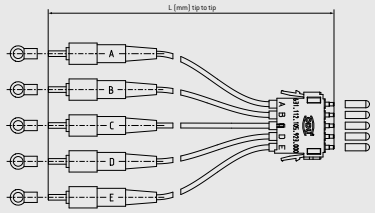


Technical data	
Fiber type	Multimode
Fiber material	PMMA core and fluoropolymer cladding
Jacket	Indoor: PVC
Operating temperature	–40 up to +80 °C (up to +85 °C at max. 1,000 h operating time)

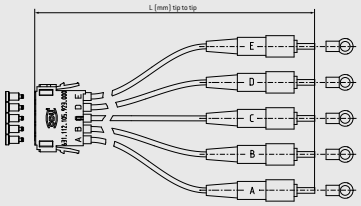
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



	Number of terminated Fiber Optic channeLs and Fiber Optic plugs 1 – 5
0 1	
0 2	
0 3	
0 4	
0 5	

		Mode	Type and polish of Fiber Optic interface connector (2nd side)
Z	Z	Multimode	ST / PC
Z	E	Multimode	FSMA / PC

L 000700 – 999999 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
F		G	C	2	0	0			A	0								

PRE-ASSEMBLED CONTACTS

M (MALE)

F (FEMALE)

		Mode	Type and polish of Fiber Optic interface connector (2nd side)
Z	E	Multimode	ST / PC
Z	F	Multimode	FSMA / PC

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		0	P	9	8	0	0	1	G	P								

L 000700 – 999999 mm

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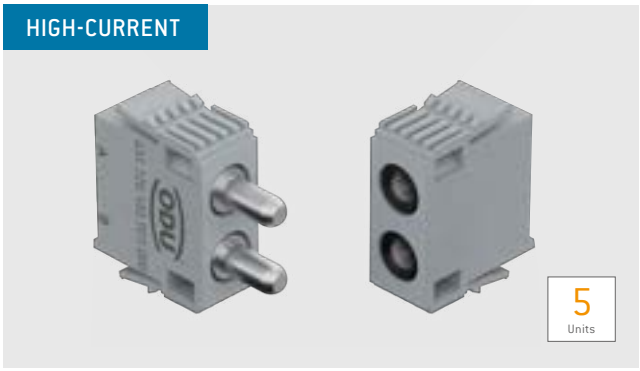
MODULE 2 CONTACTS

ODU LAMTAC® (contact with lamella technology)

HIGH-CURRENT



Contact diameter: 5 mm
Mating cycles: min. 10,000
Current-carrying capacity[1]: 108 A

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 186).
- For crimp information, see from page 168

Materials	
Insulator	Thermoplastic acc. to UL 94
Contact body	Cu alloy
Contact lamella	CuBe alloy
Contact finishing	Silver-plated

Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	400 V	160 V
Pollution degree	2	3
Rated surge voltage	4,000 V	3,000 V
Clearance distance	3.1 mm	
Creepage distance	3.1 mm	

Voltage data according to MIL[4]	
Operating voltage	975 V
Test voltage	2,925 V

Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	611 V	485 V
Pollution degree	2	3
Test voltage	2,251 V AC	

Module 2 contacts	Part number
Insulator	631.120.102.923.000
Dummy contact	021.341.202.946.000

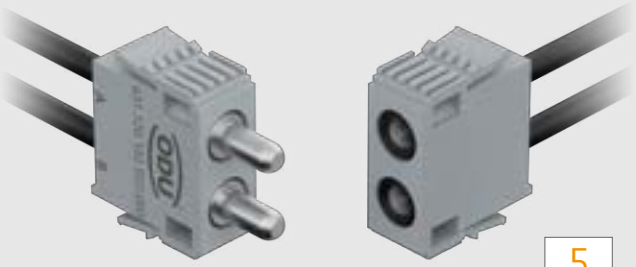
Description	Part number	Conductor cross-section[5] mm²	Nominal current[6]		Max. continuous current[1]	Contact resistance mΩ
			Single contact A	Module fully equipped A	Single contact A	
Pin contact	185.484.000.201.000	10	56	56	90	0.2
Socket contact	178.879.100.201.000					
Pin contact	185.485.000.201.000	16	68	68	108	0.2
Socket contact	178.880.100.201.000					
Removal tool	087.7CC.680.001.000					

Product Finder Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185
[5] Fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5 [6] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K

CABLE ASSEMBLY – MODULE 2 CONTACTS

HIGH-CURRENT



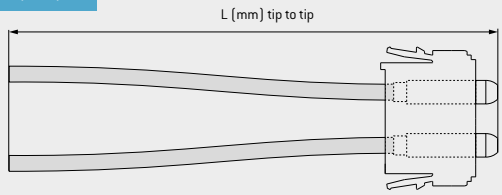
5 Units

Technical data wires 10 / 16 mm² / AWG 8 / 6, see page 163	
Conductor	TPC – tin plated copper acc. to DIN EN 13602:2013-09
Insulation	UL-PVC +105 °C (UL-Style 1015)
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	2,000 V/AC (UL-Style 1015)
Operating voltage	600 V (UL-Style 1015)

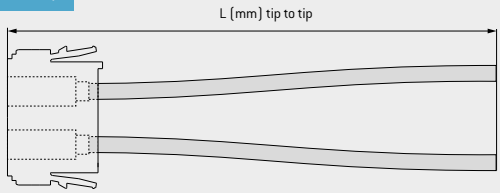
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Standard	10 mm²	Black wire, inkjet marked (A and B)	ZP
	16 mm²		ZQ
DC-Power	10 mm²	Black and Red wire	ZR
	16 mm²		ZS

0 1	Number of conductors. Wires are terminated in alphabetical order.
0 2	

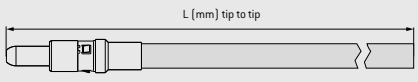
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		C	E	2	0	0			A	0			0	0				

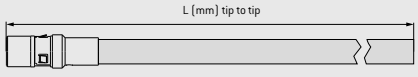
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



08 Single wire PVC 10 mm² / AWG 8 , csee page 163

		Black and Red	Brown	Blue	Green-Yellow
Pin	185.484.000.201.000	PT	PS	PR	PQ
Socket	178.879.100.201.000	PP	PQ	PN	PM

06 Single wire PVC 16 mm² / AWG 6 , see page 163

		Black and Red	Brown	Blue	Green-Yellow
Socket	185.485.000.201.000	PL	PK	PJ	PI
Pin long	178.880.100.201.000	PH	PQ	PF	PE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	N	A			0	1	A	0			0	0				

L 0300 – 5000 mm

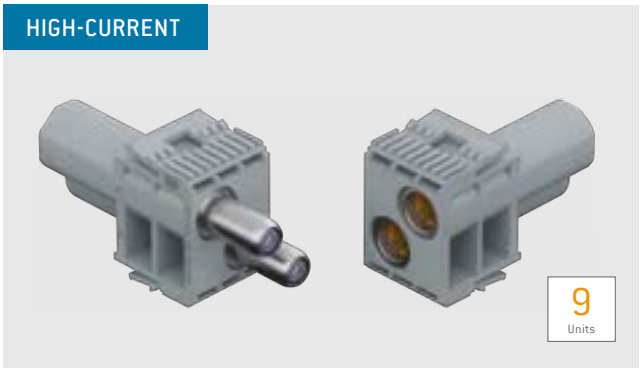
Schematic illustration

Table of contents

MODULE 2 CONTACTS

ODU LAMTAC® (contact with lamella technology)

HIGH-CURRENT



Contact diameter: 8 mm
Mating cycles: min. 10,000
Current-carrying capacity[1]: 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 0298-4:2023-06 (see page 186).
- For crimp information, see from page 168

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

Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	400 V	160 V
Pollution degree	2	3
Rated surge voltage	3,000 V	
Clearance distance	2.3 mm	
Creepage distance	2.4 mm	
Voltage data according to MIL[4]		
Operating voltage	700 V	
Test voltage	2,100 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	537 V	428 V
Pollution degree	2	3
Test voltage	1,844 V AC	

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

Description	Part number	Conductor cross-section[5] mm²	Nominal current[6]		Max. continuous current[1]	Contact resistance mΩ
			Single contact A	Module fully equipped A	Single contact A	
Pin contact	181.875.100.200.001	16	90	85	133	0.2
Socket contact	178.875.100.201.001					
Pin contact	181.874.100.200.001	25	105	100	154	0.2
Socket contact	178.874.100.201.001					
Assembly tool	598.054.004.000.000					
Torx bit TX10 Assembly tool	598.054.104.000.000					

Product Finder Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185 [5] Fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5) [6] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K

CABLE ASSEMBLY – MODULE 2 CONTACTS

HIGH-CURRENT

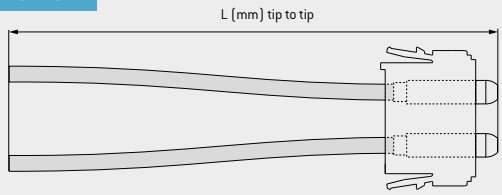
9 Units

Technical data wires 16 / 25 mm² / AWG 6 / 4 , see page 163	
Conductor	TPC – tin plated copper acc. to DIN EN 13602:2013-09
Insulation	UL-PVC +105 °C (UL-Style 1015)
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	2,000 V/AC (UL-Style 1015)
Operating voltage	600 V (UL-Style 1015)

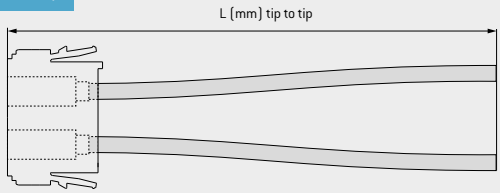
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Number of conductors

0	1	16 mm²	Black wire, inkjet marked (A and B)	Z0
0	2			
0	1	25 mm²		ZN
0	2			

Wires are terminated in alphabetical order.

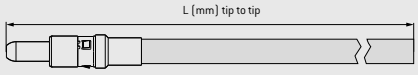
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		C	I	2	0	0			A	0			0	0				

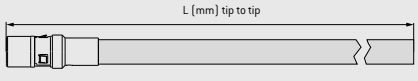
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



06 Single wire PVC 16 mm² / AWG 6 , see page 163

		Black	Brown	Blue	Green-Yellow
Pin	181.875.100.200.000	PD	PC	PB	PA
Socket	178.875.100.201.000	P9	P8	P7	P6

04 Single wire PVC 25 mm² / AWG 4 , see page 163

		Black	Brown	Blue	Green-Yellow
Pin	181.874.100.200.000	P5	P4	P3	P2
Socket	178.874.100.201.000	P1	P0	0Z	0Y

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	0	A			0	1	A	0			0	0				

L 0300 – 5000 mm

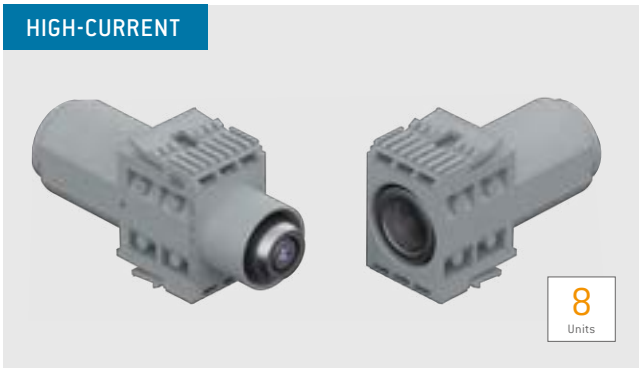
Schematic illustration

Table of contents

MODULE 1 CONTACT

ODU LAMTAC® (contact with lamella technology)

HIGH-CURRENT



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

TECHNICAL NOTES

- The current load information is valid for single contacts or fully equipped modules. For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 186).
- For crimp information, see from page 168

Materials	
Insulator	Thermoplastic acc. to UL 94
Contact body	Cu alloy
Contact lamella	CuBe alloy
Contact finishing	Silver-plated

Technical data

Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[6]

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

Voltage data according to MIL[4]

Operating voltage	850 V
Test voltage	2,550 V

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

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

Module 1 contact	Part number
Insulator socket	630.115.101.923.000
Insulator pin	631.115.101.923.000

Description	Part number	Conductor cross-section[5] mm²	Nominal current[6] Single contact A	Max. continuous current[1] Single contact A	Contact resistance mΩ
Pin contact	on request	10	71	106	0.1
Socket contact					
Pin contact		16	96	144	
Socket contact					
Pin contact	181.944.100.200.001	25	115	167	
Socket contact	178.948.100.201.001				
Pin contact	181.945.100.200.001	35	135	195	
Socket contact	178.953.100.201.001				
Pin contact	181.943.100.200.001	50	155	225	
Socket contact	178.943.100.201.001				
Assembly tool	598.054.006.000.000				
Torx bit TX20 Assembly tool	598.054.105.000.000				

Product Finder

Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185
[5] Fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5) [6] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K

CABLE ASSEMBLY – MODULE 1 CONTACT

HIGH-CURRENT

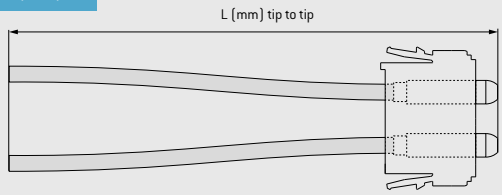
8 Units

Technical data wires 25 / 35 / 50 mm² / AWG 4 / 2 / 1, see page 163	
Conductor	TPC – tin plated copper acc. to DIN EN 13602:2013-09
Insulation	UL-PVC +105 °C (UL-Style 1015 /1569)
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	2000 V/AC for 25 mm² / AWG4 2500 V/AC for 35 / 50mm² / AWG2 / 1 (UL-Style 1015)
Operating voltage	600 V (UL-Style 1015)

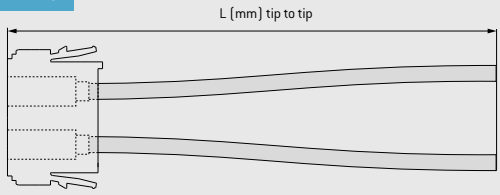
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



25 mm²	Black wire, without marking	ZM
35 mm²		ZL
50 mm²		ZK

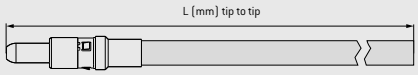
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		C	H	2	0	0	0	1	A	0			0	0				

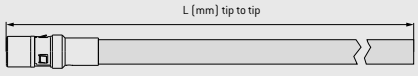
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



04	Single wire PVC 25 mm² / AWG 4, see page 163				
		Black	Brown	Blue	Green-Yellow
Pin	181.944.100.200.001	0X	0W	0V	0U
Socket	178.948.100.201.001	0T	0S	0R	0Q

02	Single wire PVC 35 mm² / AWG 2, see page 163				
		Black	Brown	Blue	Green-Yellow
Pin	181.945.100.200.001	0P	0O	0N	0M
Socket	178.953.100.201.001	0L	0K	0J	0I

01	Single wire PVC 50 mm² / AWG 1, see page 163				
		Black	Brown	Blue	Green-Yellow
Pin	181.943.100.200.001	0H	–	–	0G
Socket	178.943.100.201.001	0F	–	–	0E

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	Q	A			0	1	A	0			0	0				

L 0300 – 5000 mm

Schematic illustration

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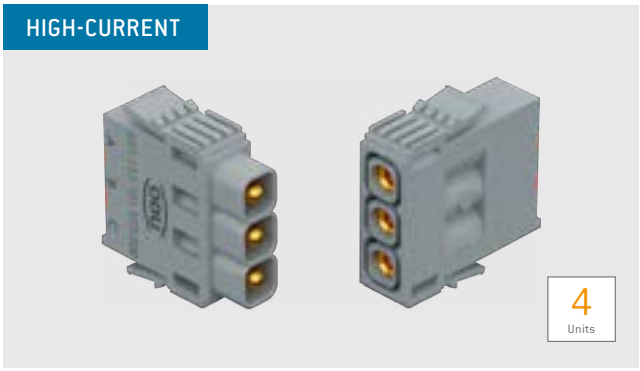
MODULE 3 CONTACTS

HIGH-CURRENT



Contact diameter: 3.5 mm
Mating cycles: min. 10,000
Current-carrying capacity[6]: 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 0298-4:2023-06 (see page 186).
- For crimp information, see from page 168

Materials	
Insulator	Thermoplastic acc. to UL 94
Contact / insulator	Cu alloy
Contact finishing	Gold-plated

Technical data		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	2,500 V	1,000 V
Pollution degree	2	3
Rated surge voltage	10,000 V	
Clearance distance	16.3 mm	
Creepage distance	16.3 mm	
Voltage data according to MIL[4]		
Operating voltage	3,750 V	
Test voltage	11,250 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	3,260 V	1,276 V
Pollution degree	2	3
Test voltage	7,514 V AC	

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

Description	Part number	Conductor cross-section[5] mm²	Termination AWG	Nominal current[6] Single contact A	Nominal current[6] Module fully equipped A	Max. continuous current[1] Single contact A	Contact resistance mΩ
Pin contact short	185.463.000.270.000	2.5	14	25	21	37	0.4
Pin contact long	185.462.000.270.000						
Socket contact	177.060.000.270.000						
Pin contact short	185.461.000.270.000	4	12	39	30	58	0.4
Pin contact long	185.460.000.270.000						
Socket contact	177.059.000.270.000						
Pin contact short	185.443.000.270.000	6	10	39	30	58	0.4
Pin contact long	185.442.000.270.000						
Socket contact	177.058.000.270.000						
Removal tool	087.7CC.350.001.000						

For Push-Lock only with max. 2,5 mm² possible, if PE grounding is needed.

Product Finder Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185
[5] Fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5) [6] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K

CABLE ASSEMBLY – MODULE 3 CONTACTS

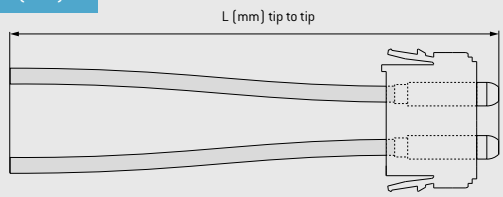
HIGH-CURRENT

Technical data wires 2,5 / 6mm² / AWG10 / 14, see page 163	
Conductor	TPC – tin plated copper acc. to DIN EN 13602:2013-09
Insulation	UL-PVC +105 °C (UL-Style 1015 / 1569)
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	2000 V/AC for 6 mm²/ AWG10 (UL-Style 1015) 3000 V/AC for 2.5 mm² / AWG14 (UL-Style 1569)
Operating voltage	600 V for 6 mm² / AWG10 (UL-Style 1015) 300 V for 2.5 mm² / AWG14 (UL-Style 1569)

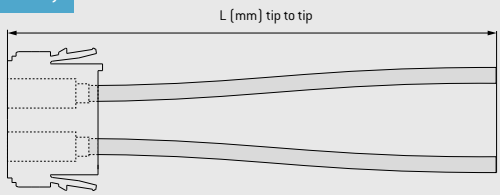
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



0	1	Number of conductors 1 – 3, acc. to IC color code. Cross section 6.0 mm² / AWG 10.	ZU
0	2		
0	3		
0	3	Mixed configuration 2 x short pin, (Black, Blue), 1x long pin (Green-Yellow) Cross section 2.5 mm² / AWG 14	ZT

Wires are terminated in alphabetical order.

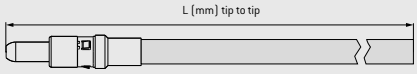
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		B	D	2	0	0			A	0			0	0				

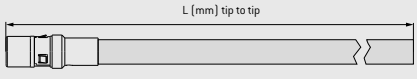
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



10 Single wire PVC 6 mm² / AWG 10 , see page 163

		Black	Brown	Blue	Gray	White	Green-Yellow
Pin short	185.443.000.270.000	R8	R7	R6	R5	R4	R3
Pin long	185.442.000.270.000	R2	R1	R0	QZ	QY	QX
Socket	177.058.000.270.000	QW	QV	QU	QT	QS	QR

14 Single wire PVC 2.5 mm² / AWG 14 , see page 163

		Black	Brown	Red	Orange	Yellow	Green	Blue	Violet	Gray	White	Green-Yellow
Pin short	185.463.000.270.000	QQ	QP	QO	QN	QM	QL	QK	QJ	QI	QH	QG
Pin long	185.462.000.270.000	QF	QE	QD	QC	QB	QA	Q9	Q8	Q7	Q6	Q5
Socket	177.060.000.270.000	Q4	Q3	Q2	Q1	Q0	PZ	PY	PX	PW	PV	PU

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	M	A			0	1	A	0			0	0				

L 0300 – 5000 mm

Schematic illustration

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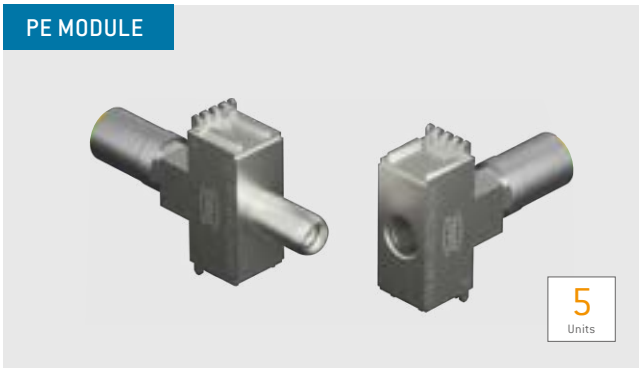
MODULE 1 CONTACT

Flexible protective grounding for all conductive housings and docking frame versions

PE MODULE



Contact diameter: 8 mm
Mating cycles[1]: min. 10,000
Conductor cross-section: 10/16/25/35 mm²

TECHNICAL NOTES

- The module can be freely positioned in any frame and allows contacting to the frame and conductive housing.
- Novel torx cone connection for optimized power transmission
- For crimp information, see from page 168

Description	Part number	Conductor cross-section[1] mm²	Nominal current[2] Single contact A	Impulse current kA	Contact resistance Ω
PE module/Pin	181.870.400.204.000	35	135	>20	< 0.1
PE module/Socket	178.870.400.204.000				
PE module/Pin	181.869.400.204.000	25	125	>20	< 0.1
PE module/Socket	178.869.400.204.000				
PE module/Pin	181.866.400.204.000	16	90	>20	< 0.1
PE module/Socket	178.866.400.204.000				
PE module/Pin	181.872.400.204.000	10	65	>20	< 0.1
PE module/Socket	178.872.400.204.000				
Assembly tool	598.054.002.000.000				
Bit torx TX 10 assembly tool	598.054.104.000.000				

Product Finder Assembly instruction

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

CABLE ASSEMBLY – MODULE 1 CONTACT

PE MODULE

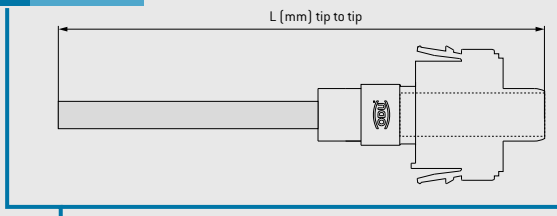
5
Units

Technical data wires, see page 163	
Conductor	TPC – tin plated copper acc. to DIN EN 13602:2013-09
Insulation	UL-PVC +105 °C (UL-Style 1015)
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	2,000 V/AC (UL-Style 1015)
Operating voltage	600 V (UL-Style 1015)

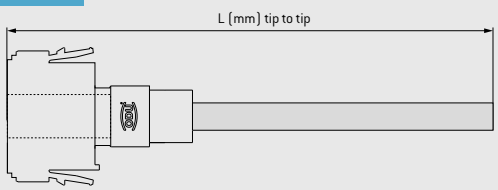
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Cross section	Color	
10 mm²	Green / Yellow	ZJ
16 mm²		ZI
25 mm²		ZH
35 mm²		ZG

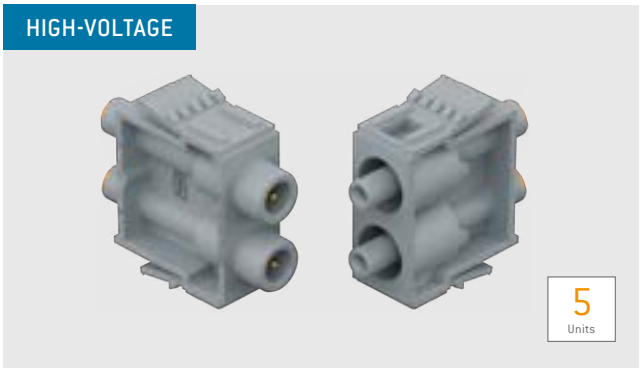
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		D	E	2	0	0	0	1	A	0			0	0				

Schematic illustration

MODULE 2 CONTACTS

HIGH-VOLTAGE



Contact diameter: 1.3 mm
Mating cycles: min. 10,000
Operating voltage: 4,000 V

TECHNICAL NOTES

- The current load information is valid for single contacts.
  For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 188).
- For crimp information, see from page 168

MATERIALS	
Insulator	Thermoplastic acc. to UL 94
Contact / insulator	Cu alloy
Contact finishing	Gold-plated

TECHNICAL DATA		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	4,000 V	1,600 V
Pollution degree	2	3
Rated surge voltage	12,000 V	
Clearance distance	15.5 mm	
Creepage distance	20.6 mm	
Voltage data according to MIL[4]		
Operating voltage	3,300 V	
Test voltage	9,900 V	
Voltage data according to IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	4,000 V	1,600 V
Pollution degree	2	3
Test voltage	7,198 V AC	

Module 2 contacts	Part number
Insulator socket	630.160.102.923.000
Insulator pin	631.160.102.923.000

Description	Part number	Conductor cross-section[5] mm²	Termination AWG	Nominal current[6] Single contact A	Nominal current[6] Module fully equipped A	Max. continuous current[1] Single contact A	Contact resistance mΩ
Pin contact short	185.432.000.270.000	0.5 – 1.00	18 – 20	12.5	11.5	19.5	1.8
Pin contact long	185.424.000.270.000						
Socket contact	175.535.000.270.000						
Pin contact short	185.714.000.270.000	0.14 – 0.38	22 – 26	9.5	7	12	1.8
Pin contact long	185.713.000.270.000						
Socket contact	175.A42.000.270.000						
Removal tool	087.7CC.130.004.000						

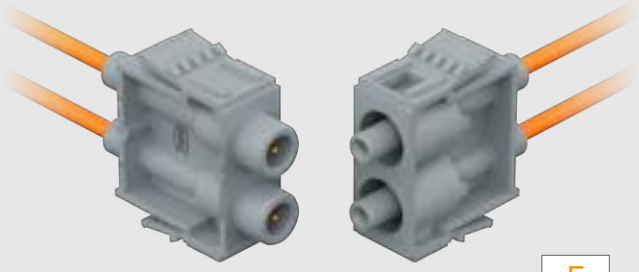
Product Finder

Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185 [5] Fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5) [6] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K

CABLE ASSEMBLY – MODULE 2 CONTACTS

HIGH-VOLTAGE



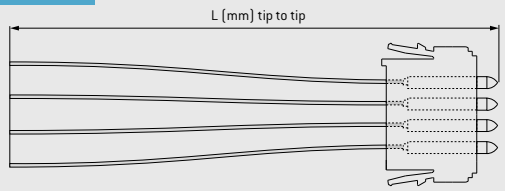
5 Units

Technical data wires 1.00 mm² / AWG 18, see page 165	
Conductor	SPC – silver plated copper
Insulation	Fp-FEP
Temperature range	–40 up to +200 °C
Test voltage	13,100 V / AC
Operating voltage	5,800 V

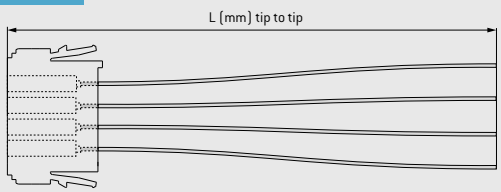
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



0	1
0	2

Number of conductors 1 – 2
Wire color Orange, inkjet marked (A and B).
Wires are terminated in alphabetical order.

Wires are terminated in alphabetical order.

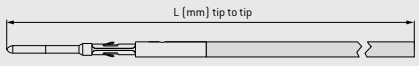
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	E	2	0	0			A	0	Z	F	0	0				

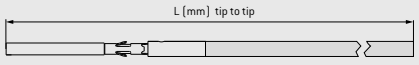
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



Single wire Fp – FEP 1.00 mm² / AWG 18 , see page 165		
		Orange
Pin	185.432.000.270.000	ML
Socket	175.535.000.270.000	MK

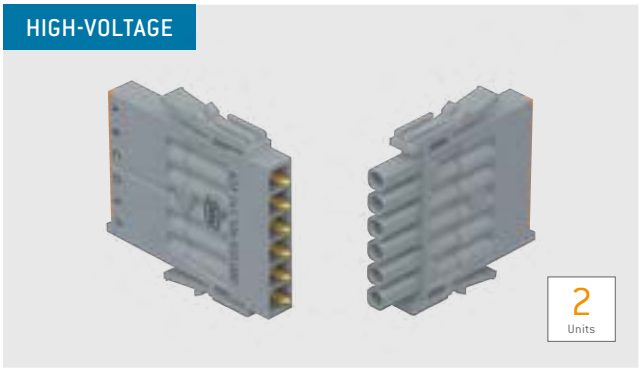
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	H	A	1	8	0	1	A	0			0	0				

L 0300 – 5000 mm

Schematic illustration

MODULE 6 CONTACTS

HIGH-VOLTAGE



Contact diameter: 1.3 mm
Mating cycles: min. 10,000
Operating voltage: 1,500 V

TECHNICAL NOTES

- The current load information is valid for single contacts.
  For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 188).
- For crimp information, see from page 168

MATERIALS	
Insulator	Thermoplastic acc. to UL 94
Contact / insulator	Cu alloy
Contact finishing	Gold-plated

TECHNICAL DATA		
Voltage data according to IEC 60664-1:2020 (VDE 0110-1:2022-07)[2]		
Operating voltage	1,500 V	600 V
Pollution degree	2	3
Rated surge voltage	6,000 V	
Clearance distance	7.8 mm	
Creepage distance	7.8 mm	

Voltage data according to MIL[4]	
Operating voltage	2,000 V
Test voltage	6,000 V

Voltage data according to standard IEC 61010-1:2010 (VDE 0411-1:2020-03)[3]		
Supply voltage from grid supply circuit (CAT.2)	150 V < U_{rms}	≤ 300 V
Operating voltage	1,500 V	600 V
Pollution degree	2	3
Test voltage	2,602 V AC	

Module 2 contacts	Part number
Insulator socket	630.161.106.922.000
Insulator pin[3]	631.161.106.922.000

Description	Part number	Conductor cross-section[5] mm²	Termination AWG	Nominal current[6] Single contact A	Nominal current[6] Module fully equipped A	Max. continuous current[1] Single contact A	Contact resistance Ω
Pin contact short	185.432.000.270.000	0.5 – 1.00	18 – 20	12.5	11.5	19.5	1.8
Pin contact long	185.424.000.270.000						
Socket contact	175.535.000.270.000						
Pin contact short	185.714.000.270.000	0.14 – 0.38	22 – 26	9.5	7.0	12.0	1.8
Pin contact long	185.713.000.270.000						
Socket contact	175.A42.000.270.000						
Removal tool	087.7CC.130.004.000						

Touch protection on the socket side: 2.8 mm distance to the test finger (according to UL 1977:2022 and DIN EN 61010-1:2020)

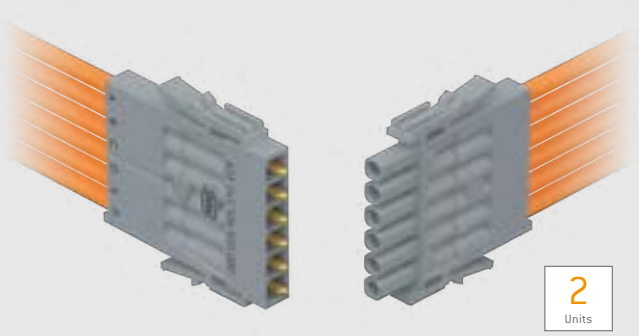
Product Finder

Assembly instruction

[1] For a definition of max. continuous current, see page 188 [2] IEC 60664-1:2020 (VDE 0110-1:2022-07) see page 179 [3] See page 182 [4] See page 185 [5] Fine wire acc. to IEC 60228:2004 (VDE 0295:2005-09; class 5) [6] Determined according to IEC 60512-5-2:2002 at increased temperature 45 K

CABLE ASSEMBLY – MODULE 6 CONTACTS

HIGH-VOLTAGE

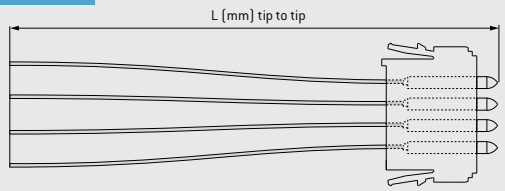


Technical data wires 1.00 mm² / AWG 18, see page 165	
Conductor	TPC – tin plated copper
Insulation	PVC
Temperature range in motion	–10 up to +105 °C
Temperature range at rest	–30 up to +105 °C
Test voltage	5,000 V / AC
Operating voltage	1,500 V

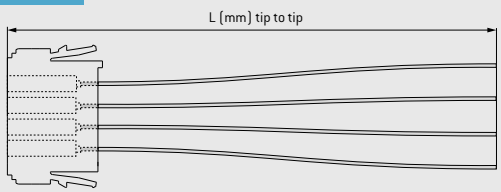
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



0	1
0	2
0	3
0	4
0	5
0	6

Number of conductors 1 – 6
Wire color Orange,
inkjet marked (A to F).
Wires are terminated in
alphabetical order.

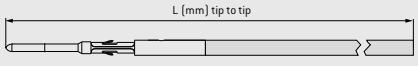
L 0300 – 5000 mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	B	2	0	0			A	0	Z	E	0	0				

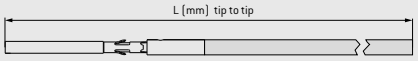
Schematic illustration

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



Single wire Fp – FEP 1.00 mm² / AWG 18 , see page 165

		Orange
Pin	185.424.000.270.000	MJ
Socket	175.535.000.270.000	MI

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		E	H	A	1	8	0	1	A	0			0	0				

L 0300 – 5000 mm

Schematic illustration

COMBINATION MODULE FOR HIGH-SPEED DATA TECHNOLOGY AND COMPRESSED AIR

Size 1

COMBINATION MODULE

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

TECHNICAL NOTES

- Note for high-speed module, see pages 122 – 130

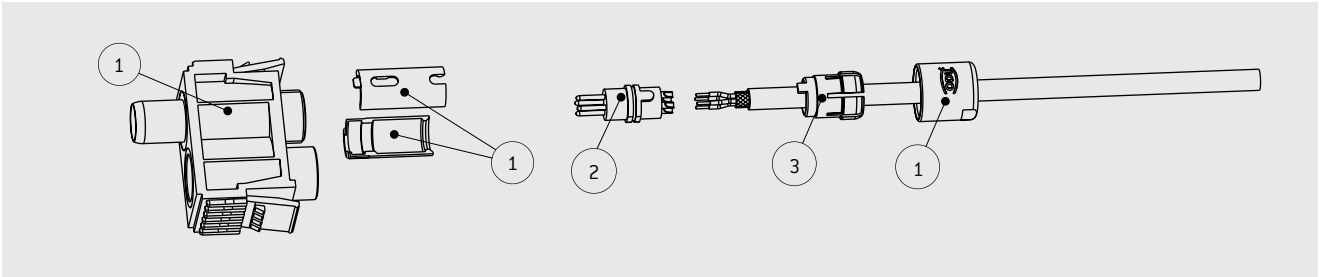
COMBINATION MODULE FOR HIGH-SPEED AND COMPRESSED AIR

- The function dictates that contacts are spring loaded in the mated state. The frame must maintain this spring load with a holding device.
- Vacuum modules and further termination types on request
- No O_2 model[2]
- Termination accessories, see page 121

COMBINATION MODULE CAN BE EASILY INTERCHANGEABLE

- Can be retrofitted with 50 Ω coax contact, see pages 108 – 109
- Can be retrofitted with 75 Ω coax contact, see pages 112 – 113
- Can be retrofitted with compressed air, see pages 114 – 115

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



Order	Base parts	Part number
1	Insulator incl. housing	See next page
2	Insert for shielded feedthrough cpl. solder contacts[3]	See pages 122 – 130
3	Assembly set	See table on the right

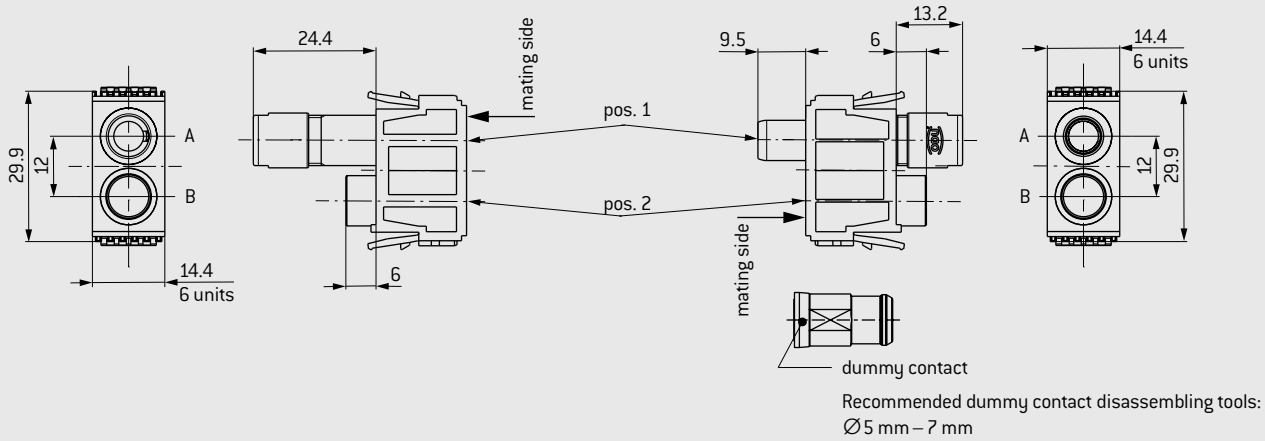
ASSEMBLY SET

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

[1] The stated mating cycles for compressed air module are possible via regular maintaince intervals [2] Not suitable for mixtures with over 25% oxygen content or explosive gases. [3] Insert for crimp contacts on request

INSULATOR SOCKET

INSULATOR PIN



Recommended dummy contact disassembling tools:
Ø5 mm – 7 mm

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

For useable 50 Ω coax contacs see page 108
For useable 75 Ω coac contacs see page 112
For useable compressed air contacts see page 114

Product Finder Assembly instruction

CABLE ASSEMBLY – COMBINATION MODULE FOR HIGH-SPEED DATA TECHNOLOGY AND COMPRESSED AIR

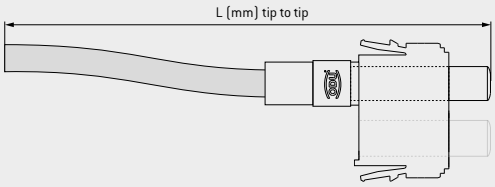
COMBINATION MODULE

For cable specification please see page 158 / 161

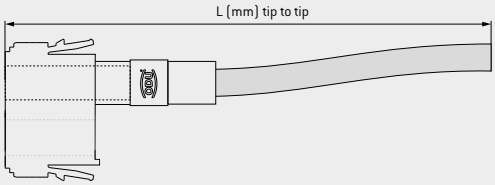
The combined technical specification of the cable harness is determined by the inferior individual technical values of the modules and raw cable.

PRE-ASSEMBLED MODULES

P (PIN)



S (SOCKET)



Number of conductors	PUR	PVC
2	UZ	UJ
3	UY	UI
4	UX	UH
5	UV	UG
6	UU	UF
7	UT	UE
8	US	UD
10	U0	UB
14	UK	U9

Data protocol	Second side connector		
	RJ 45 plug	USB® 2.0	USB® A plug
CAT® 5e up to 1Gbit	UQ	–	–
USB® 2.0	–	UW	–
USB® 3.2 Gen 1x1	–	–	UM

Cable harness is only with shielded feed-through. Compressed air or coax harness need to be ordered separately. See next page!

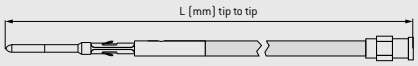
Wiring in accordance to:
IC-Code for PVC cables (see page 183)
DIN 47100 for PUR cables (see page 182)

L 0300 – 5000 mm

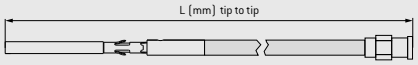
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C		W	F	2	0	0	0	1	K	0			0	0				

PRE-ASSEMBLED CONTACTS

M (MALE)



F (FEMALE)



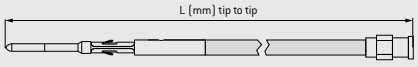
			2nd side connector	Single contact 50 Ω, Coax cable						
				178	196	174	188	316	058	223	RG type
Pin	122.132.001.270.000	SMA		NT	NS	–	–	–	–	–
		BNC		NR	NQ	–	–	–	–	–
	122.132.003.270.000	SMA		–	–	NP	NO	NN	–	–
		BNC		–	–	NM	NL	NK	–	–
	122.132.007.270.000	SMA		–	–	–	–	–	NJ	–
		BNC		–	–	–	–	–	NI	–
	122.132.013.270.000	SMA		–	–	–	–	–	–	NH
		BNC		–	–	–	–	–	–	NG
Socket	122.132.002.270.000	SMA		NF	NE	–	–	–	–	–
		BNC		ND	NC	–	–	–	–	–
	122.132.004.270.000	SMA		–	–	NB	NA	N9	–	–
		BNC		–	–	N8	N7	N6	–	–
	122.132.008.270.000	SMA		–	–	–	–	–	N5	–
		BNC		–	–	–	–	–	N4	–
	122.132.014.270.000	SMA		–	–	–	–	–	–	N3
		BNC		–	–	–	–	–	–	N2

Please enter RG type in position 5 – 7

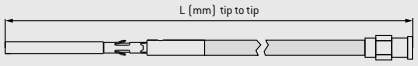
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			
C		C	A				0	1	A	C			0	0					L	0300 – 5000	mm

Schematic illustration

M (MALE)



F (FEMALE)



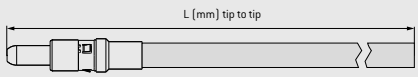
			Second side connector	Single contact 75 Ω, Coax cable			
				179	187	059	RG type
Pin	122.131.003.270.000	BNC		N1	N0	–	
	122.131.009.270.000	BNC		–	–	MZ	
Socket	122.131.004.270.000	BNC		MY	MX	–	
	122.131.010.270.000	BNC		–	–	MW	

Please enter RG type in position 5 – 7

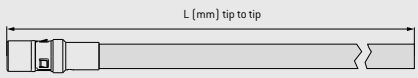
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			
C		C	B				0	1	A	C			0	0					L	0300 – 5000	mm

Schematic illustration

M (MALE)



F (FEMALE)



	Pneumatic valves and fluid couplings	
	Push-in fitting	Push-in fitting L-connection
Hose type	945.000.001.000.140	945.00.001.000.143
Polyamid Blue	MV	MT
Polyurethane Black	MU	MS

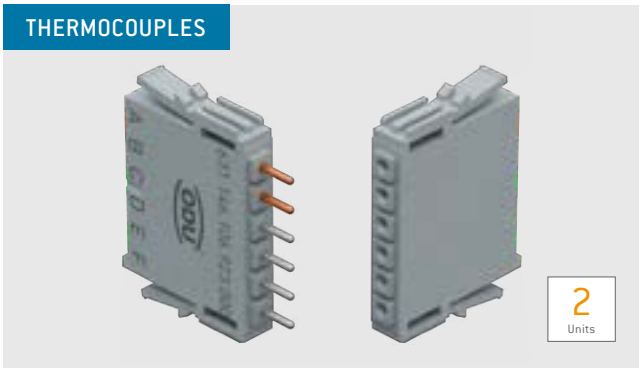
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			
C		M	A	0	6	0	0	1	T	0			0	0					L	0300 – 5000	mm

Schematic illustration

Table of contents

MODULE 6 CONTACTS FOR 3 THERMOCOUPLES

THERMOCOUPLES



Contact diameter: 1.0 mm
Mating cycles: min. 5,000
Thermocouple types: Type K and Type T

TECHNICAL NOTES

- The current load information is valid for single contacts.
  For use in connector systems, the load should be reduced according to VDE 0298-4:2023-06 (see page 188).
- For crimp information, see from page 168

MATERIALS	
Insulator	Thermoplastic acc. to UL 94
Contact type K	Ni-Cr (+) / Ni (–)
Contact type T	Cu (+) / Cu-Ni (–)

TECHNICAL DATA	
Typical temp. range (Type K)	–200° C to 1,250° C
Typical temp. range (Type T)	–250° C to 350° C

Module 2 contacts	Part number
Insulator socket	630.146.106.923.000
Insulator pin	631.146.106.923.000

Description	Type	Part number	Conductor cross-section mm²	Termination AWG	Farbcode Contact	Farbcode ANSI[1]	Farbcode IEC
Pin contact Ni-Cr (+)	K Temperature range: –200 °C to 1,250 °C	186.050.000.905.000	0.22 – 0.5	20 – 24	Green	Yellow	Green
Pin contact Ni (–)		186.051.000.905.000			White	Red	White
Socket contact Ni-Cr (+)		176.050.000.905.000			Green	Yellow	Green
Socket contact Ni (–)		176.051.000.905.000			White	Red	White
Pin contact Cu (+)	T Temperature range: –250 °C to 350 °C	186.052.000.905.000	0.22 – 0.5	20 – 24	Red	Blue	Brown
Pin contact Cu-Ni (-)		186.053.000.905.000			Yellow	Red	White
Socket contact Cu (+)		176.052.000.905.000			Red	Blue	Brown
Socket contact Cu-Ni (-)		176.053.000.905.000			Yellow	Red	White
Insert & removal tool		087.170.999.000.000					

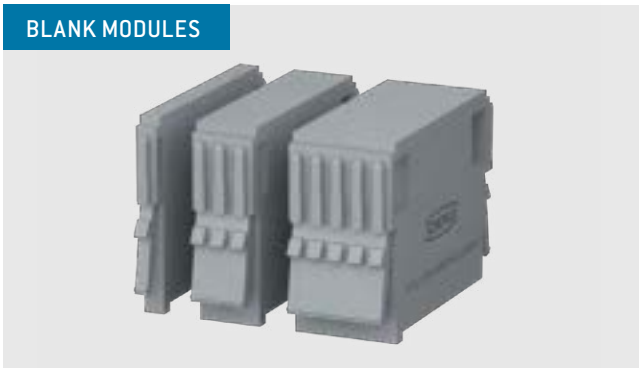
Product Finder

Assembly instruction

[1] Acc. to EN 60584-1:2013

BLANK MODULES

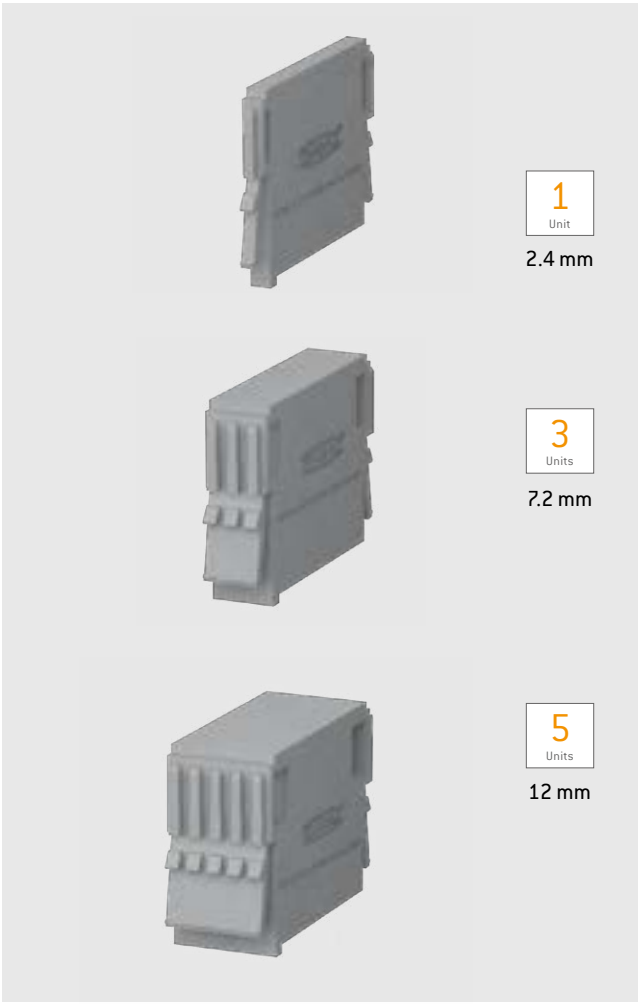
BLANK MODULES



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

TECHNICAL DATA

Insulator	thermoplastic acc. to UL 94



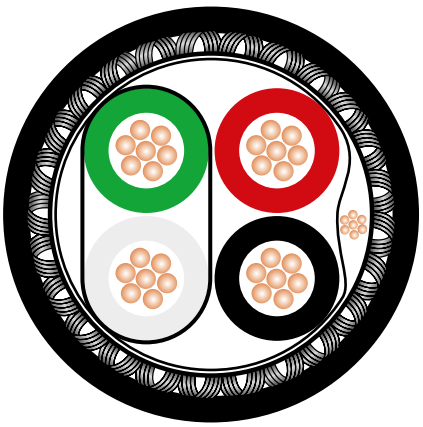
Units	Part number
1	631.151.000.923.000
3	631.153.000.923.000
5	631.155.000.923.000

Product Finder

Assembly instruction

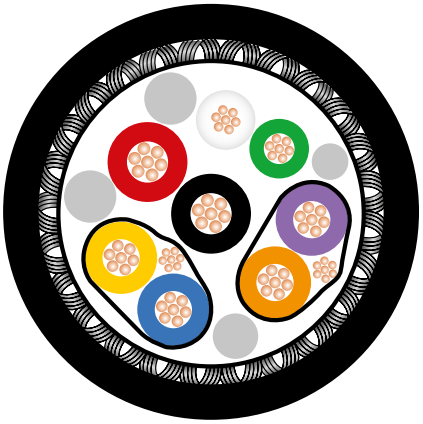
CABLE SPECIFICATIONS
TECHNICAL DATA

DATA CABLE USB® 2.0 – PRE-ASSEMBLED TYPE A



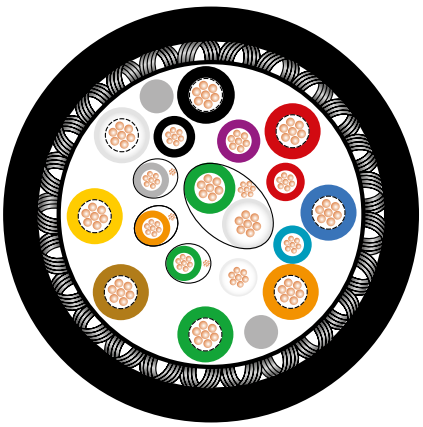
TECHNICAL DATA	USB® 2.0
Conductor	Stranded copper wire
Composition	1 x 2 x AWG 28 2 x AWG 24
Temperature range	–15 up to +80 °C
Test voltage	100 V
Jacket / Color	PVC ∅ 4.5 mm / Black
Configuration	 USB® 2.0 Type A Plug

DATA CABLE USB® 3.2 GEN 1x1 – PRE-ASSEMBLED TYPE A



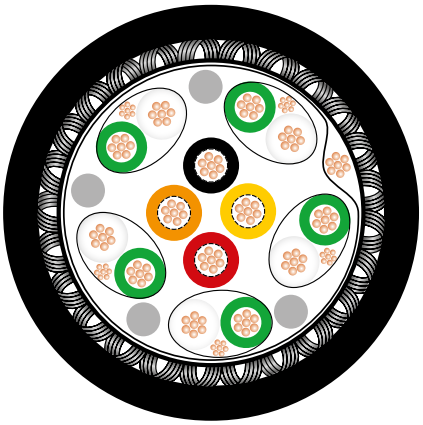
TECHNICAL DATA	USB® 3.2 GEN 1X1
Conductor	Stranded copper wire
Composition	2 x 2 x AWG 28 1 x 2 x AWG 28 2 x AWG 24
Temperature range	–15 up to +80 °C
Test voltage	300 V
Jacket / Color	PVC ∅ 5.5 mm / Black
UL-Style	20276
Configuration	 USB® 3.2 Gen 1x1 Type A

DATA CABLE USB® 3.2 GEN 2x2 – PRE-ASSEMBLED TYPE C



TECHNICAL DATA	USB® 3.2 GEN 2X2
Conductor	Stranded copper wire
Composition	8 x AWG 30 / Coaxial 1 x 2 x AWG 30 2 x AWG 28 3 x AWG 30 3 x AWG 30 / Foil shield
Temperature range	–20 up to +85 °C
Temperature range in motion	±0 to +50 °C
Test voltage	300 V
Jacket / Color	TPE ∅ 4.9 mm / Black
UL-Style	758
Configuration	 USB® 3.2. Gen 2x2 Type C plug

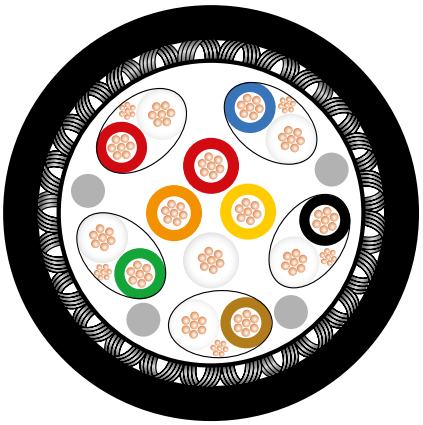
DATA CABLE DISPLAYPORT® 2.0 – PRE-ASSEMBLED



TECHNICAL DATA	DISPLAYPORT® 2.0
Conductor	Stranded copper wire
Composition	5 x 2 x AWG30 4 x AWG30
Temperature range	–20 up to +80 °C
Test voltage	300 V
Jacket / Color	PVC ∅ 6.2 / 6.8 / 7.0 mm Black
UL-Style	20276
Configuration	 DisplayPort® plug

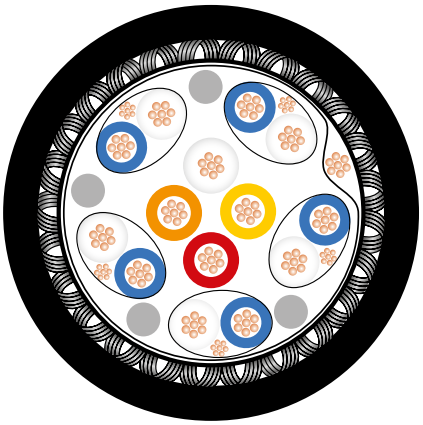
CABLE SPECIFICATIONS
TECHNICAL DATA

DATA CABLE HDMI® 2.0 – PRE-ASSEMBLED



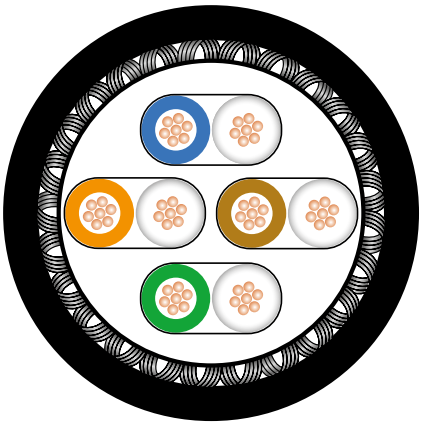
TECHNICAL DATA	HDMI® 2.0
Conductor	Stranded copper wire
Composition	5 x 2 x AWG30 4 x AWG30
Temperature range	–20 up to +80 °C
Test voltage	300 V
Jacket / Color	PVC Ø 7.3 mm / Black
UL-Style	20276
Configuration	 HDMI® 2.0 Type A plug

DATA CABLE HDMI® 2.1 – PRE-ASSEMBLED



TECHNICAL DATA	HDMI® 2.1
Conductor	Stranded copper wire
Composition	Length 1 m / 2 m: 5 x 2 x AWG30 4 x AWG30 Length 3 m: 5 x 2 x AWG30 4 x AWG28
Temperature range	–20 up to +80 °C
Test voltage	300 V
Jacket / Color	PVC Ø 6.3 / 7.3 mm / Black
UL-Style	20276
Configuration	 HDMI® 2.1 Type A plug

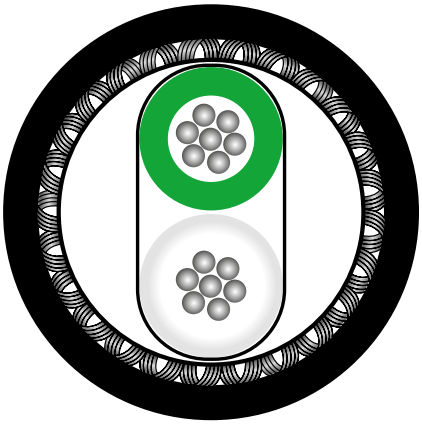
DATA CABLE ETHERNET – PRE-ASSEMBLED



TECHNICAL DATA	ETHERNET
Conductor	Bare copper wire, ∅ 0.46 mm AWG 27 / 7
UL listed	E244889
Insulation	PE ∅ 1.02 mm (core)
Jacket / Color	LSZH (jacket) / PVC (bend relief) / Black
Shielding	Tinned copper braid
Particle intrusion	IP2X
Water / submerge	IPX0
Ambient temperature	–40 °C to +75 °C
Halogen-free	IEC 60754-2
Flame retardant	IEC 60332-1; UL 444 CM
Transmission characteristics	Suitable for 10 Gigabit Ethernet Category 6A: ISO/IEC 11801; DIN EN 50173-1 Class EA: ISO/IEC 11801; DIN EN 50173-1 Category 6A: ANSI/TIA/EIA-568-C.2
Configuration	RJ45 plug

CABLE SPECIFICATIONS
TECHNICAL DATA

DATA CABLES SINGLE PAIR ETHERNET – PRE-ASSEMBLED



TECHNICAL DATA	SINGLE PAIR ETHERNET
Conductor	Tinned copper wire
Composition	1 x 2 x AWG 22
Insulation	PE ∅ 1.65 mm
Stranding	2 cores stranded to a pair
Shielding	Tinned copper
Jacket / Color	PVC / Black ∅ 5.1 mm
Temperature range	–20 up to +80 °C
Configuration	 DIN IEC 63171-2:2022-10 plug

COAXIAL CABLES

TECHNICAL DATA

Conductor	See table
Insulation	See table
Jacket / Color	PVC / Black FEP-6Y / Transparent PFA-51Y / White
Shielding	Copper spiral shield
Temperature range in motion	See table
Temperature range at rest	See table

WITHOUT UL APPROVAL

RG-Type	Z	Temperature range (motion/rest)	Conductor	Dimensions in mm		Insulation Jacket
				Outer-Ø	Core-Ø	
RG58	50 Ω	–40 °C / +80 °C (r)	tin-plated copper	4.95 ± 0.12	2.95	PVC
RG59	75 Ω	–20 °C / +70 °C (r)	steel-copper – conductor blank	6.15 ± 0.20	3.70 ± 0.10	PVC
RG174	50 Ω	–10 °C / +70 °C (m)	steel-copper – conductor blank	2.80 ± 0.13	1.50 ± 0.08	PVC
RG178	50 Ω	–55 °C / +200 °C (m)	steel-copper – silver-plated conductor	1.80 ± 0.10	0.84 ± 0.05	FEP-6Y
RG179	75 Ω	–55 °C / +200 °C (m)	steel-copper – silver-plated conductor	2.54 ± 0.10	1.60 ± 0.05	FEP-6Y
RG187	75 Ω	–55 °C / +200 °C (m)	steel-copper – silver-plated conductor	2.54 ± 0.15	1.60 ± 0.10	PFA-51Y
RG188	50 Ω	–55 °C / +200 °C (m)	steel-copper – silver-plated conductor	2.59 ± 0.10	1.52 ± 0.05	PFA-51Y
RG196	50 Ω	–55 °C / +200 °C (r)	steel-copper – silver-plated conductor	1.94	0.84	PTFE-5Y
RG223	50 Ω	–30 °C / +70 °C (m)	silver-plated copper acc. to EN13602	5.40 ± 0.20	2.95 ± 0.10	PVC
RG316	50 Ω	–55 °C / +200 °C (m)	steel-copper – silver-plated conductor	2.50 ± 0.10	1.52 ± 0.05	FEP-6Y

SINGLE WIRES PVC
UL-Style 1061 / 10002 | UL-Style 1007 / 1569 | UL-Style 1015

TECHNICAL DATA

Conductor	TPC – tin plated copper acc. to DIN EN 13602:2013-09
Insulation	UL-PVC semi rigid (UL-Style 1061 / 10002 UL-PVC 105 °C (UL-Style 1007 / 1569 & 1015)
Temperature range in motion	–10 up to +105°C (UL-Style 10002/1569/1015) –10 up to +80°C (UL-Style 1007) –30 up to +80°C (UL-Style 1061)
Temperature range at rest	–30 up to +105°C (UL-Style 10002/1569/1015) –30 up to +80°C (UL-Style 1007 /1061)
Test voltage	1,500 V/AC (UL-Style 1061 / 10002) 3,000 V/AC (UL-Style 1007 / 1569) 6,000 V/AC (UL-Style 1015)
Operating voltage	300 V (UL-Style 1061 / 10002 & 1007 / 1569) 600 V (UL-Style 1015)

CABLE SPECIFICATIONS
TECHNICAL DATA

MULTI-CONDUCTOR CABLES PVC
SCREENED UL / CUL – LIYCY STYLE 2464 / 2517-10002

TECHNICAL DATA

Conductor	TPC – tin plated copper acc. to DIN EN 13602:2013-09
Insulation	UL-PVC semi rigid
Jacket / Color	PVC / Black
Shielding	Copper braid tinned
Temperature range in motion	–10 up to +80 °C (style 2464) –10 up to +105 °C (style 2517)
Temperature range at rest	–30 up to +80 °C (style 2464) –30 up to +105 °C (style 2517)
Test voltage	1,500 V / AC
Operating voltage UL	300 V
Wire colors	acc. to IC-Code

MULTI-CONDUCTOR CABLES PUR
SHIELDED-UL / CUL – STYLE 20233 / 10042

TECHNICAL DATA

Conductor	Bare copper acc. to DIN EN 13602:2013-09
Insulation	TPE (12Y) thermoplastic compound
Jacket / Color	PUR – (11Y), UL-AWM758 / Black
Temperature range in motion	–40 up to +80 °C
Temperature range at rest	–50 up to +80 °C
Test voltage	1,500 V / AC
Operating voltage UL	300 V
Wire colors	acc. to DIN 47100

HIGH-VOLTAGE SINGLE WIRE

TECHNICAL DATA

Conductor	SPC – silver plated copper
Insulation	Fp-FEP
Jacket / Color	Orange ∅ 2.45 mm
Temperature range	–40 up to +200 °C
Test voltage	13,100 V / AC
Operating voltage UL	5,800 V

CROSS SECTION 1.00 mm² / AWG 18

Composition: 19 x 0.120 mm

HIGH-VOLTAGE SINGLE WIRE

TECHNICAL DATA

Conductor	TPC – tin plated copper
Insulation	PVC
Color	Orange ∅ 2.90 mm
Temperature range	–10 up to +105 °C
Test voltage	5,000 V / AC
Operating voltage UL	1,500 V

CROSS SECTION 1.00 mm² / AWG 18

Composition: 19 x 0.254 mm

ODU-MAC®

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TOOLS

TERMINATION TECHNOLOGY

ODU offers three different termination technologies for the single contacts:

- Crimp
- Solder
- PCB

CRIMP TERMINATION

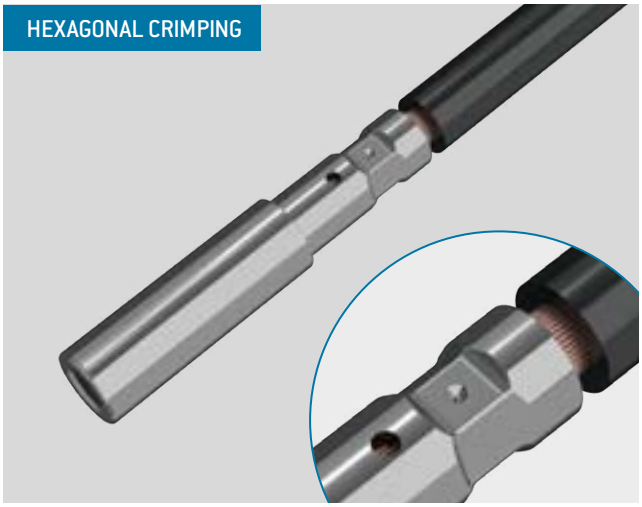
The contact processing for the production of connecting cables via crimping creates a secure, durable, and corrosion-free contact. For most people, crimping is easy and quick to carry out.

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

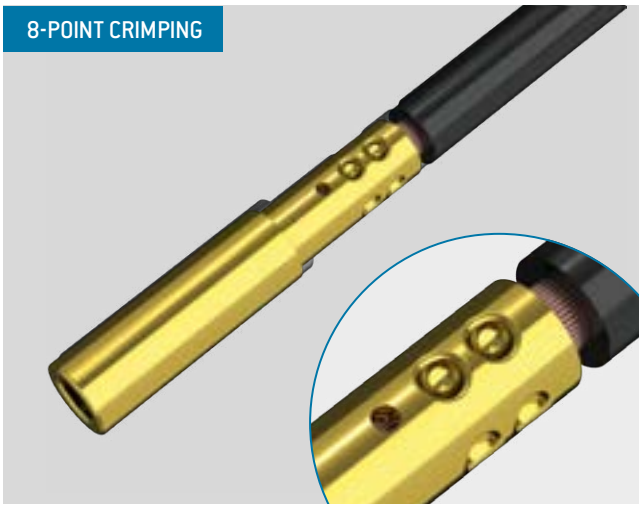
Crimping can be carried out on the tiniest of crosssections as well as on larger crosssections. For small crosssections (0.14–2.5 mm²), 8-point crimping tools are used; hexagonal crimping tools are used for larger crosssections. The corner measurement of the crimping is never larger than the original diameter. The cable insulation is not damaged in the process and can be directly attached to the connector end.

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

HEXAGONAL CRIMPING



8-POINT CRIMPING



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

CRIMPING TOOLS

For further crimp information, please refer to the table on page 171.

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

With user-friendly digital display
PART NUMBER: 080.000.051.000.000

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

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

With user-friendly digital display
PART NUMBER: 080.000.057.000.000

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

HEXAGONAL CRIMPING TOOL FOR CROSSSECTIONS (AWG 12) FROM 4 TO 6 mm²

With blocking system
PART NUMBER: 080.000.062.000.000

MECHANICAL HEXAGONAL HAND CRIMPING TOOL FROM 10 TO 50 mm²

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

CRIMPING JAWS FOR CONTACT DIAMETER FROM 5 TO 8 mm SEE PAGE 171.
Has to be ordered separately

HEXAGONAL CRIMPING TOOL FOR COAX CONTACTS

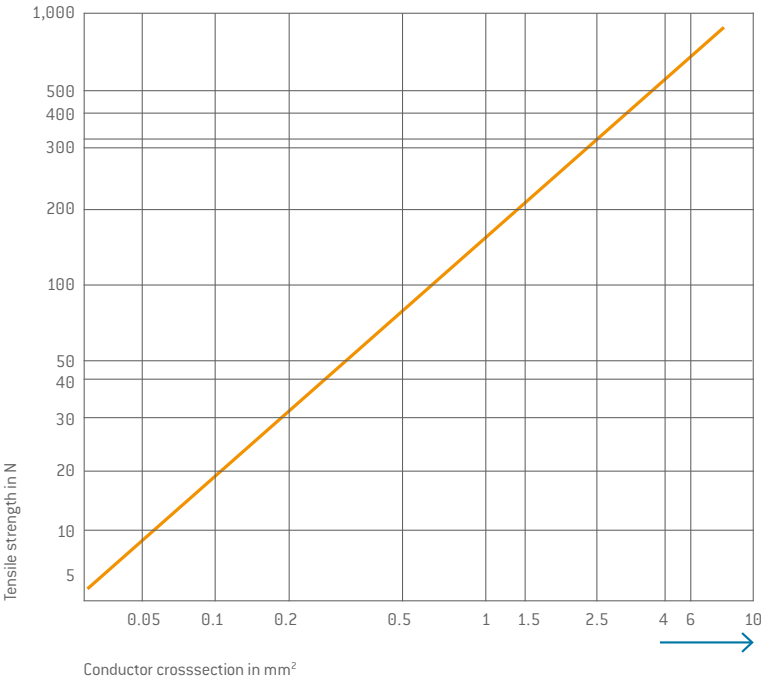
With blocking system
PART NUMBER PLIER: 080.000.039.000.000

CRIMPING JAWS SEE PAGE 171.
Has to be ordered separately

TENSILE STRENGTH FOR CRIMP TERMINATIONS

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

Tensile strength diagram of a crimp termination depending on the conductor crosssection IEC 60352-2:2006 (DIN EN 60352-2:2014-04).
Example: A 2.5 mm² conductor must achieve a minimum tensile strength of approx. 320 N.



NOTE

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

TESTING ELECTRICAL CONTINUITY FOLLOWING ASSEMBLY/TESTING OF WIRING:

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

We recommend using suitable test adapters here.

CRIMP INFORMATION

Contact -Ø	Termination cross-section[5]		8-point crimping tool 080.000.051.000.000 without positioner	8-point crimping tool 080.000.057.000.000 without positioner	Hexagonal crimping tool 080.000.062.000.000	Hexagonal crimping tool 080.000.064.000.000	Hexagonal crimping tool 080.000.039.000.000
			Positioner 080.000.051.101.000	Positioner 080.000.057.101.000			
mm	AWG 7 wire 19 wire	mm² Class 5	Position/adjusting dimension	Position/adjusting dimension		Crimping jaws	Crimping jaws
0.7	30	–	9/0.45	–	–	–	–
	28	–	9/0.55	–	–	–	–
	26	–	9/0.62	–	–	–	–
	24	–		–	–	–	–
	22	–		–	–	–	–
	–	0.05	9/0.45	–	–	–	–
	–	0.08	9/0.55	–	–	–	–
	–	0.14	9/0.62	–	–	–	–
	–	0.38		–	–	–	–
1.3	26		10/0.62	–	–	–	–
	24		10/0.62	–	–	–	–
	22		10/0.62	–	–	–	–
		0.14	10/0.62	–	–	–	–
		0.25	10/0.62	–	–	–	–
		0.38	10/0.62	–	–	–	–
	20		10/0.92	–	–	–	–
	18			–	–	–	–
		0.5		–	–	–	–
		0.75		–	–	–	–
		1	10/1.02	–	–	–	–
2	18	–	11/1.22	–	–	–	–
	16	–	11/1.27	–	–	–	–
	14	–	–	3/1.67	–	–	–
	–	1	11/1.22	–	–	–	–
	–	1.5	–	3/1.27	–	–	–
	–	2.5	–	3/1.67	–	–	–
3.5	14	–	–	1[1], 2[2]/1.67		–	–
	12	–	–	–	Profile no. 3	–	–
	10	–	–	–	Profile no. 3	–	–
	–	2.5	–	1[1], 2[2]/1.67		–	–
	–	4	–	–	Profile no. 3	–	–
	–	6	–	–	Profile no. 3	–	–
5	–	10	–	–	–	080.000.064.110.000	–
	–	16	–	–	–	080.000.064.101.000	–
8	–	16	–	–	–	080.000.064.116.000	–
	–	25	–	–	–	080.000.064.125.000	–
12	–	25	–	–	–	080.000.064.125.000	–
	–	35	–	–	–	080.000.064.135.000	–
	–	50	–	–	–	080.000.064.150.000	–

COAX CRIMP INFORMATION

	Positioner for inner conductor 080.000.051.102.000 Position/adjusting dimension	Crimp dies for outer conductor
RG 178 / RG 196	2/0.67[3] 1/0.57[4]	082.000.039.101.000
RG 174 / RG 179 / RG 187/ RG 188 / RG 316	2/0.67[3] 1/0.57[4]	082.000.039.102.001
RG 58	2/0.92[3]	082.000.039.106.000
RG 223	2/0.92[3]	082.000.039.108.000
RG 59	2/0.67[3]	082.000.039.109.000

CRIMP INFORMATION FOR THERMOCONTACT

Crimp tool 080.000.071.000.000

[1] Pin [2] Socket [3] For contacts 122.131… & 122.132… [4] For contacts 122.133… [5] The listed cross-section correspond to a finely stranded conductor design according to IEC 60228:2004 (VDE 0295:2005-09) class 5 or a finely stranded conductor design (7 / 19 stranded) according to AWG ASTM B258-14

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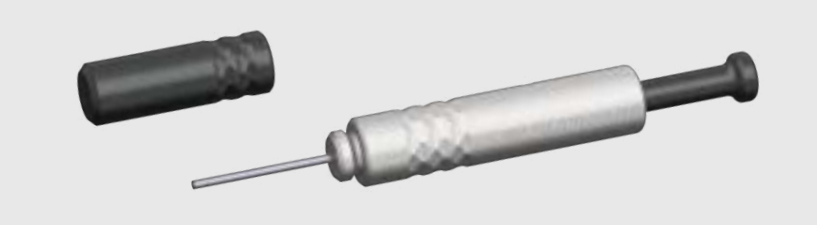
ASSEMBLY AIDS

TORQUE WRENCH

With cross handle, fixed, automatic release (for inner hexagonal bits with C6.3 or E6.3 shaft).
Bit has to be ordered separately.

Description	Usage for	Part number	Nm	Recommended tightening torque
Torque wrench		598.054.001.000.000	0.9	–
Torque wrench		598.054.002.000.000	1.2	–
Torque wrench		598.054.004.000.000	1.5	–
Torque wrench		598.054.006.000.000	2.2	–
Torque wrench		598.054.003.000.000	3	–
Bit slot 8 (1.2 / 50)	Coding socket (DIN frame)	598.054.110.000.000	–	1.2 Nm +/– 0.2 Nm
Bit combination profile size 2	Coding socket (DIN frame)	598.054.113.000.000	–	1.2 Nm +/– 0.2 Nm
Special bit	Coding pin for frames in a housing	598.054.203.000.000	–	1.2 Nm +/– 0.2 Nm
Bit combination slot size 1	Fastening screw on frames in a housing	598.054.102.000.000	–	1.2 Nm +/– 0.2 Nm
Bit slot 5.5 (0.8 / 50)	Fastening screw on pin frames, floating mounted	598.054.101.000.000	–	1.2 Nm +/– 0.2 Nm
Phillips bit cross slot size 2	Oval-head screw of grounding pin on frame	598.054.115.000.000	–	1.2 Nm +/– 0.2 Nm
Phillips PH1 Bit	PUSH-LOCK assembly	598.054.114.000.000	–	0.6 Nm +/– 0.2 Nm
Torx bit TX 10	Screws of the securing bracket in the spindle locking and spare spindle knob	598.054.104.000.000	–	1.2 Nm +/– 0.2 Nm
Torx bit TX 10	Screws for PE module	598.054.104.000.000	–	1.2 Nm +/– 0.2 Nm
Torx bit TX 10	Screw for power contact 8 mm contact-∅	598.054.104.000.000	–	1.5 Nm +/– 0.5 Nm
Torx bit TX 20	Screw for power contact 12 mm contact-∅	598.054.105.000.000	–	2.2 Nm +/– 0.2 Nm
Assembly tool back nut size 1	Back nut for shielded feedthrough size 1	598.055.001.000.000	–	0.9 Nm +/– 0.2 Nm
Assembly tool back nut size 2	Back nut for shielded feedthrough size 2	598.055.003.000.000	–	2.0 Nm +/– 0.4 Nm
Bit for coded spindle, slot 3 × 0.5 mm	Assembly of the spindle coding	598.054.109.000.000	–	0.9 Nm +/– 0.2 Nm
Assembly tool back nut coax 50Ω	Back nut for coax 50 Ω (4 pole module)	598.055.005.000.000	–	–
Assembly tool back nut coax 75Ω	Back nut for coax 75 Ω	598.055.006.000.000	–	–
Insertion tool (0.7 / 1.3 mm)	Insertion tool for mounting the 0,7mm and 1,3mm contacts	085.7CC.000.000.000	–	–

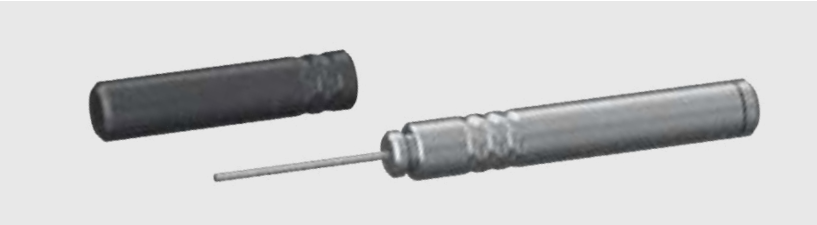
REMOVAL TOOLS



REMOVAL TOOL FOR CONTACTS DIAMETER 0.7 mm

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

PART NUMBER: 087.7CC.070.005.000



REMOVAL TOOL FOR CONTACTS DIAMETER 1.3 TO 5 mm

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

Contact-Ø mm	Part number
1.3	087.7CC.130.004.000
2.0	087.7CC.200.003.000
3.5	087.7CC.350.001.000
5.0	087.7CC.680.001.000

REMOVAL TOOL FOR COAX AND COMPRESSED-AIR CONTACTS

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

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

INSERTION / REMOVAL TOOLS FOR ODU-MAC® BLUE-LINE CONTACTS

Description	Usage for	Part number
Insertion tool (0.7 / 1.3 mm)	Insertion tool for mounting the 0,7mm and 1,3mm contacts	085.7CC.000.000.000
Insert and removal tool (1.0 mm)	Insert and removal tool for thermocontacts	087.170.999.000.000

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

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REMOVAL OF CONTACTS

REMOVAL OF THE ASSEMBLED CONTACT

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

REMOVAL OF CONTACTS IS ONLY POSSIBLE WITH ODU TOOLS

SERVICE KIT FOR ODU CONTACTS

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

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

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

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

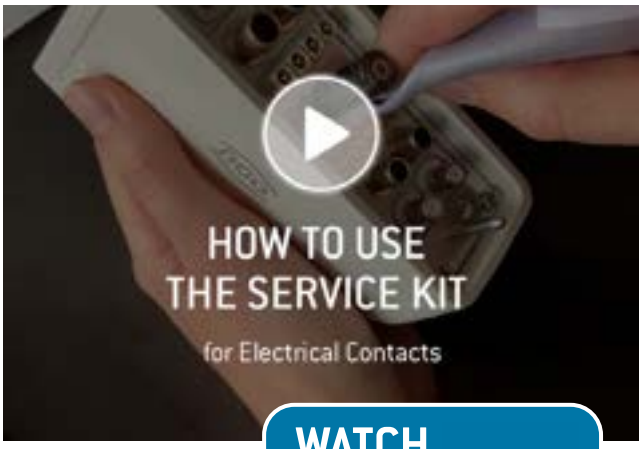
CLEANING INFORMATION

Service manual 003.170.000.000.000

FURTHER INFORMATION

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

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



Additional information on
https://vimeo.com/560732341

ODU-MAC®

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TECHNICAL INFORMATION

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INTERNATIONAL PROTECTION CLASSES

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

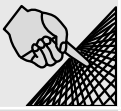
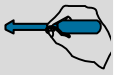
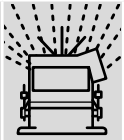
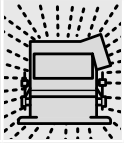
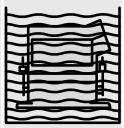
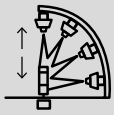
Code letters (International Protection)	First code number (degrees of protection against access to hazardous parts or against solid foreign objects)			Second code number (degrees of protection against water)			
IP	6			5			
Code number	Protection against access to hazardous parts/ protection against ingress of solid foreign objects			Code number	Protection against harmful effects due to the ingress of water		
0	No protection		No protection against contact/no protection against solid foreign objects	0	No protection against water		No protection against water
1	Protection against large foreign objects		Protection against contact with the back of the hand/protection against solid foreign objects **diameter** ≥ 50 mm	1	Protection against dripping water		Protection against vertically falling water drops
2	Protection against medium-sized foreign objects		Protection against contact with the fingers/protection against solid foreign objects **diameter** ≥ 12.5 mm	2	Protection against water dripping at an angle		Protection against water drops falling at an angle (any angle up to 15° either side of the vertical)
3	Protection against small foreign objects		Protection against contact with tools/protection against solid foreign objects **diameter** ≥ 2.5 mm	3	Protection against spray water		Protection against spray water (any angle up to 60° either side of the vertical)
4	Protection against granular foreign objects		Protection against contact with a wire/protection against solid foreign objects **diameter** ≥ 1 mm	4	Protection against splashing water		Protection against splashing water from any direction
5	Dustproof		Protection against contact with a wire/protection against uncontrolled ingress of dust	5	Protection against water jet		Protection against water jet from any direction
6	Dustproof		Protection against contact with a wire/complete protection against ingress of dust	6	Protection against powerful water jet		Protection against powerful water jet from any direction
				7	Protection against the effects of temporary immersion in water		Protection against ingress of harmful quantities of water by temporary submersion into water
				8	Protection against the effects of continuous immersion in water		Protection against ingress of harmful quantities of water by continuous submersion into water
				9	Protection against high-pressure water jet featuring high temperatures		Protection against water from all directions characterized by high pressure and high temperatures

Table of contents

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

GENERAL

All the technical information listed in this catalog and the data sheets has been determined by drawing on various standards. Unless otherwise stated, standard IEC 61984:2008 (VDE 0627: 2009-11) "Connectors – Safety requirements and tests" has been used to dimension and determine the values provided.

This international standard applies to connectors (with rated voltages of 50 V to 1,000 V alternating and direct, and rated currents of up to 125 A per contact) which either have no type specification or which have a type specification whose safety requirements refer to this standard. The standard can be used as a guide for connectors with rated voltages up to 50 V. In cases such as this, IEC 60664-1:2020 (VDE 0110-1:2022-07) must be consulted when dimensioning the clearance and creepage distances. This standard can also serve as a guide for connectors with rated currents higher than 125 A per contact.

All shown connectors and cable assemblies are defined without breaking capacity (COC) according to IEC 61984:2008 (VDE 0627:2009-11).

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

The clearance and creepage distances are determined on the bases specified in IEC 60664-1:2020 (VDE 0110-1:2022-07).

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 60664-1:2020 (VDE 0110-1:2022-07) "INSULATION COORDINATION FOR EQUIPMENT WITHIN LOW-VOLTAGE SYSTEMS"

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

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

The following general specifications have been defined for dimensioning:

- **Insulation** between electrical circuits (functional insulation between the contacts) or between an electrical circuit and local ground (contact with grounded frame) has been dimensioned as **basic insulation**. If "**double insulation**" or "**reinforced insulation**" is required, the voltage data provided may no longer apply; insulating clearances may need to be extended.
- Unless otherwise stated, all voltages are given as rms voltage values.
- **Overvoltage category III** is used, along with the TT and TN system types, to dimension the rated surge voltage.
- Condition A is always used for the inhomogeneous field when dimensioning the clearance distances.
- The prescribed tests for solid insulation and for the airways (if necessary) shall be carried out in accordance to the tables shown in annex F.
- 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.5 in IEC 60664-1:2020 (VDE 0110-1:2022-07))

RATED SURGE VOLTAGE

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

Depending upon the indicated pollution degree, the rated surge voltage depends upon the clearance distance between the individual contacts (see Table F.2 in IEC 60664-1:2020 (VDE 0110-1:2022-07)).

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.8 in IEC 60664-1:2020 (VDE 0110-1:2022-07)).

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

POLLUTION DEGREE

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

In the case of a connector with a degree of protection of minimum IP54 IEC 60529:1989 (VDE 0470-1:2014-09), the insulating parts may be measured enclosed according to the standard for a low pollution degree. This also applies for mated connectors for which enclosure is ensured by the connector housing and which are only disconnected for testing and maintenance purposes.

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

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

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

Pollution degree 4
Permanent conductivity is present, caused by conductive dust, rain or moisture. For example, devices in the open air or outdoor facilities and construction machinery.

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

CLEARANCE DISTANCE

The shortest distance in the air between two conductive parts.

CREEPAGE DISTANCE

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

TEST VOLTAGES

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

IEC 60664-1:2020 (VDE 0110-1:2022-07): Table F.6 – test voltages for testing clearance distances at different altitudes (the voltage levels are valid only to verify the clearance distances)

Rated surge voltage û kV	Test surge voltage at sea level û kV	Test surge voltage at 200 m elevation û kV	Test surge voltage at 500 m elevation û kV
0.33	0.357	0.355	0.350
0.5	0.541	0.537	0.531
0.8	0.934	0.920	0.899
1.5	1.751	1.725	1.685
2.5	2.920	2.874	2.808
4	4.923	4.874	4.675
6	7.385	7.236	7.013
8	9.847	9.648	9.350
12	14.770	14.471	14.025
15	18.464	18.091	17.533

COLOR CODE ACC. TO DIN 47100

CORED WITHOUT COLOR REPETITION

Core	Core Color	Code
1	White	ws
2	Brown	br
3	Green	gn
4	Yellow	ge
5	Gray	gr
6	Pink	rs
7	Blue	bl
8	Red	rt
9	Black	sw
10	Violet	vio
11	Gray-Pink	grrs
12	Red-Blue	rtbl
13	White-Green	wsgn
14	Brown-Green	brgn
15	White-Yellow	wsge
16	Yellow-Brown	gebr
17	White-Gray	wsgr
18	Gray-Brown	grbr
19	White-Pink	wsrs
20	Pink-Brown	rsbr
21	White-Blue	wsbl
22	Brown-Blue	brbl
23	White-Red	wsrt
24	Brown-Red	brrt
25	White-Black	wssw
26	Brown-Black	brsw
27	Gray-Green	grgn
28	Yellow-Gray	gegr
29	Pink-Green	rsgn
30	Yellow-Pink	gers
31	Green-Blue	gnbl

Core	Core Color	Code
32	Yellow-Blue	gebl
33	Green-Red	gnrt
34	Yellow-Red	gert
35	Green-Black	gnsw
36	Yellow-Black	gesw
37	Gray-Blue	grbl
38	Pink-Blue	gsbl
39	Gray-Red	grrt
40	Pink-Red	rsrt
41	Gray-Black	grsw
42	Pink-Black	rssw
43	Blue-Black	blsw
44	Red-Black	rtsw
45	White-Brown-Black	wsbrsw
46	Yellow-Green-Black	gegnsw
47	Gray-Pink-Black	grrssw
48	Blue-Red-Black	blrtsw
49	White-Green-Black	wsgnsw
50	Green-Brown-Black	gnbrsw
51	White-Yellow-Black	wsgesw
52	Yellow-Brown-Black	gebrsw
53	White-Gray-Black	wsgrsw
54	Gray-Brown-Black	grbrsw
55	White-Pink-Black	wsrssw
56	Pink-Brown-Black	rsbrsw
57	White-Blue-Black	wsblsw
58	Brown-Blue-Black	brblsw
59	White-Red-Black	wsrtsw
60	Brown-Red-Black	brrtsw
61	Black-White	swws

- The cores are counted starting in the outer layer and continuing through all layers in the same direction.
- The first color is the base color
- The 2nd and 3rd color is applied in the form of abrasion-resistant color rings.
- For 2 and 3-colored cores, the characters of the color code are lined up directly next to each other
- For cables with color repetition, the color code starts again with White(1) from the 45th core onwards.
- For paired cores, always the two colors named in sequence are stranded.
- The color code is repeated from the 23rd and 45th pair onwards.

INTERNATIONAL COLOR CODE / IC - CODE

FOR UL / CSA CONTROL CABLES

Core	Core Color
1	Black
2	Brown
3	Red
4	Orange
5	Yellow
6	Green
7	Blue
8	Violet
9	Gray
10	White
11	White-Black
12	White-Brown
13	White-Red
14	White-Orange
15	White-Yellow
16	White-Green
17	White-Blue
18	White-Violet
19	White-Gray
20	Brown-Black
21	Brown-Red
22	Brown-Orange
23	Brown-Yellow
24	Brown-Green
25	Brown-Blue
26	Brown-Violet
27	Brown-Gray
28	Brown-White
29	Green-Black
30	Green-Brown

Core	Core Color
31	Green-Red
32	Green-Orange
33	Green-Blue
34	Green-Violet
35	Green-Gray
36	Green-White
37	Yellow-Black
38	Yellow-Brown
39	Yellow-Red
40	Yellow-Orange
41	Yellow-Blue
42	Yellow-Violet
43	Yellow-Gray
44	Yellow-White
45	Gray-Black
46	Gray-Brown
47	Gray-Red
48	Gray-Orange
49	Gray-Yellow
50	Gray-Green
51	Gray-Blue
52	Gray-Violet
53	Gray-White
54	Orange-Black
55	Orange-Brown
56	Orange-Red
57	Orange-Yellow
58	Orange-Green
59	Orange-Blue
60	Orange-Violet

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

"Safety requirements for electrical equipment for measurement, control, and laboratory use"

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

Devices belonging to the application area:

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

Devices excluded from the application area:

- IEC 60065:2014 (Audio, video and similar electronic apparatus)
- IEC 60204:2016 (Electrical equipment of machines)
- IEC 60601:2005 (Medical electrical equipment)

This standard defines some special cases, unlike IEC 60664-1:2020 (VDE 0110-1:2022-07):

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

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

- Alternating voltage (AC): U_{rms} = 30 V (U_{peak} = 42.4 V)
- Direct voltage (DC): U = 60 V
- Wet environment U_{rms} = 16 V AC (U_{peak} = 22.6 V); U = 35 V DC

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

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

[1] See corresponding section in the IEC 61010-1:2010 (VDE0411-1:2020-03) safety standard

VOLTAGE DATA ACCORDING TO “MIL”

EIA-364-20F:2019

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

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

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

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

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

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

CONVERSIONS / AWG (AMERICAN WIRE GAUGE)

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

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

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

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

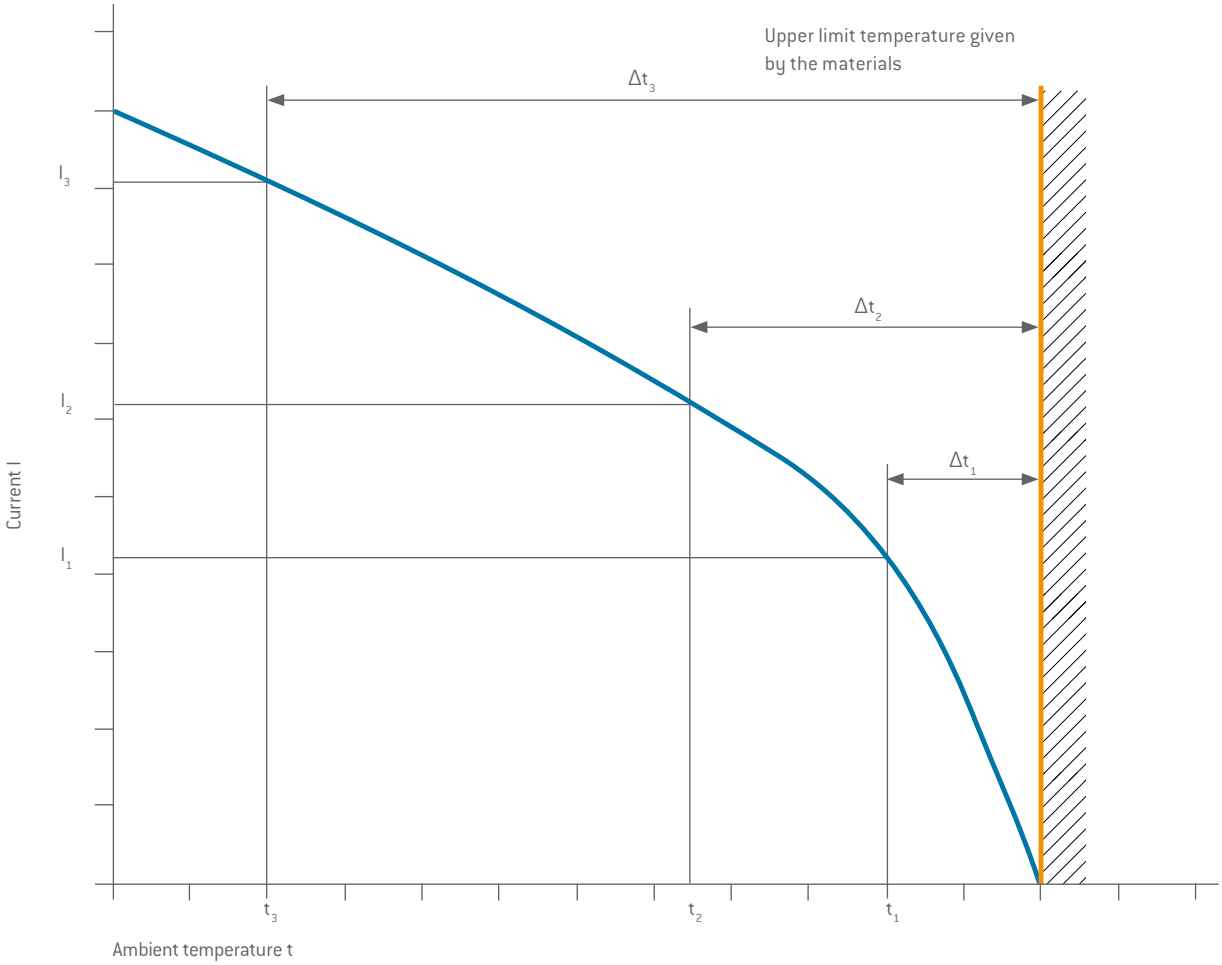
Accordingly, strands with the same AWG number but different numbers of wires differ in cross-section. For instance, an AWG 20 strand of 7 AWG 28 wires has a crosssection of 0.563 mm², while an AWG 20 strand of 19 AWG 32 wires has a cross-section of 0.616 mm².

Source: ASTM

BASIC PRINCIPLES OF CURRENT-CARRYING CAPACITY

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

STRUCTURE OF THE BASE CURRENT-CARRYING CAPACITY CURVE



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

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

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

CURRENT LOAD

(In dependence on VDE 0276-1000:1995-06)

RATED CURRENT (NOMINAL CURRENT)

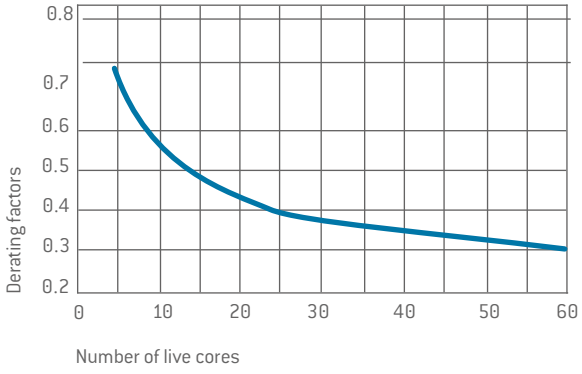
The metrologically determined current which is permitted to flow continuously through all contacts at the same time and will increase the contact temperature by 45 Kelvin.
The amperage is determined according to the derating measurement method (DIN EN 60512-5-2:2003-01) and derived from the derating curve. The values specified in the catalog apply to either single contacts or completely assembled inserts/ modules, as indicated.

MAX. CONTINUOUS CURRENT

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

DERATING FACTORS

In the case of multi-position connectors and cables, the heating is greater than it is with single contacts. It is therefore calculated with a derating factor.
There are no direct regulations for connectors in this context. The derating factors for multi-core cables pursuant to VDE 0298-4:2023-06 are applied. The derating factor assumes relevance as of 5 live cores or count the nominal current of the fully equipped modules. Dependend on the application and the cable-management.



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

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

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

NOTE

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

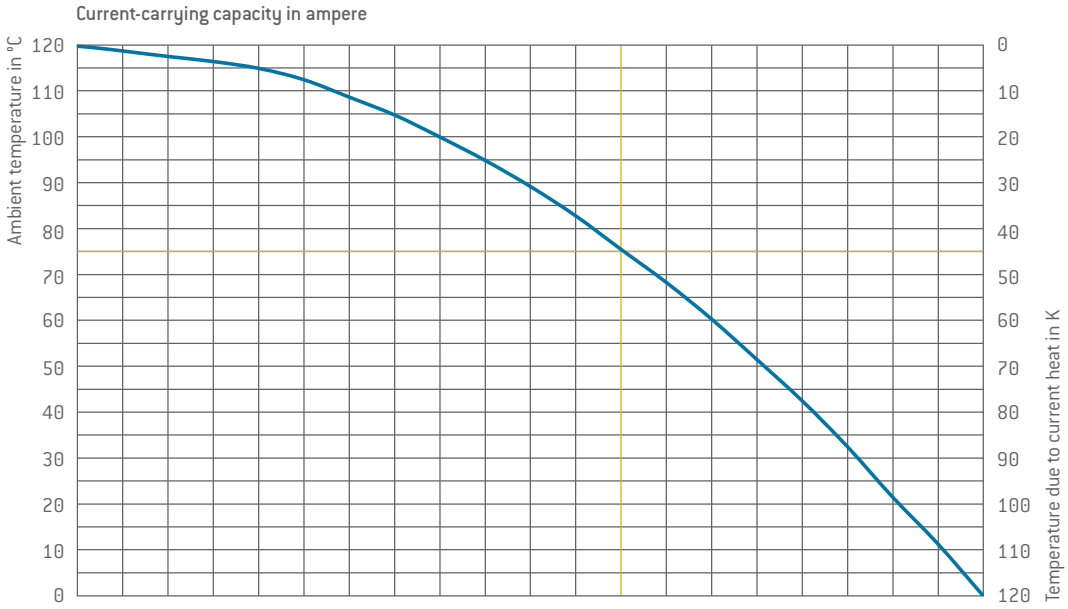
CURRENT-CARRYING CAPACITY DIAGRAM

FOR SINGLE CONTACTS

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

Upper limit temperature: +120 °C

Termination with nominal crosssection



Contact	Contact-Ø	Termination crosssection mm²	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
ODU TURNTAC®	0.7	0.14	0	I	1,1	I	2,1	I	3,2	I	4,3	I	5,4	I	6,5	I	7,6	I	8,7	I	9,8	I	10,9
		0.38	0	I	1	I	2.5	I	3.5	I	5	I	6	I	7	I	8.5	I	9.5	I	11	I	12
	1.3	0.38	0		1.5		3		4.5		6		7.5		9		11		12.5		14		15.5
		1	0	I	2	I	4	I	6.5	I	8.5	I	10.5	I	12.5	I	15	I	17	I	19.5	I	21.5
	2	1.5	0		3		6		9		12		15		18		21		24		27		30
		2.5	0	I	4	I	8	I	12	I	16	I	20	I	24	I	27	I	30	I	33	I	37
	3.5	2.5	0		4		8		12.5		16.5		20.5		25		29		33		37		41
		4	0	I	6.5	I	13	I	19.5	I	26	I	32.5	I	39	I	45	I	51.5	I	58	I	64
		6	0		6.5		13		19.5		26		32.5		39		45		51.5		58		64
ODU LAMTAC®	5	10	0	I	10	I	20	I	29	I	38	I	47	I	56	I	67	I	78	I	90	I	99
		16	0		11		22		33		44		56		68		81		94		108		119
	8	16	0	I	14	I	28	I	44	I	59	I	74	I	90	I	97	I	118	I	133	I	148
		25	0		17		34		51		68		85		105		119		136		154		170
	12	10	0		12		23.5		35.5		47		59		71		83		94.5		106		118
		16	0		16		32		48		64		80		96		112		128		144		160
		25	0		19		38		57		76		95		115		133		150		167		186
		35	0	I	22	I	44	I	66	I	88	I	111	I	135	I	156	I	176	I	195	I	217
		50	0		25		51		76		101		127		155		179		204		225		250

Nominal current

Max. continuous current

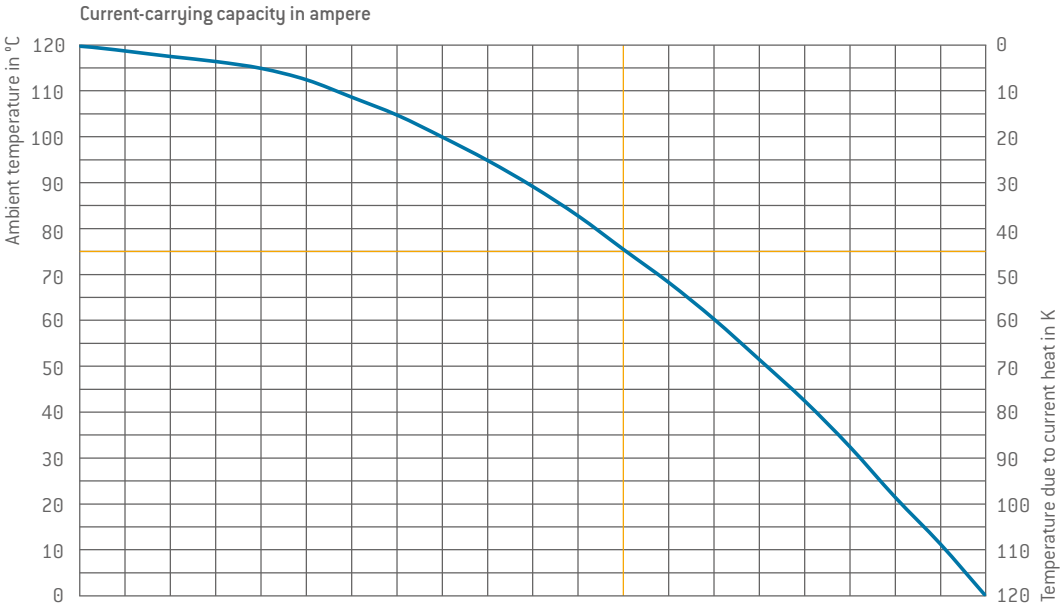
CURRENT-CARRYING CAPACITY DIAGRAM

FOR FULLY EQUIPPED MODULES

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

Upper limit temperature: +120 °C

Termination with nominal crosssection



Contact	Contact-Ø	Termination crosssection mm²	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
ODU TURNTAC®	0.7	0.14 (10 pos.)	0	I	0.8	I	1.6	I	2.4	I	3.3	I	4.1	I	4.9	I	5.7	I	6.6	I	7.4	I	8.2
		0.14 (20 pos.)	0	I	0.5	I	1	I	1.6	I	2.1	I	2.6	I	3.2	I	3.7	I	4.2	I	4.7	I	5.2
		0.38 (10 pos.)	0		1		2		3		4		5		5.5		6.5		7.5		8.5		9.5
		0.38 (20 pos.)	0		1		2		3		4		5		5.5		6.5		7.5		8.5		9.5
		PCB	0		1		1.5		2.5		3		4		4.5		5.5		6		7		7.5
	1.3	0.38	0	I	1	I	2	I	3.5	I	4.5	I	5.5	I	7	I	8	I	9	I	10.5	I	11.5
		1	0		1.5		3.5		5.5		7.5		9.5		11.5		14		16.5		19		20.5
		PCB	0	I	1.5	I	2.5	I	4	I	5	I	6.5	I	8	I	9.5	I	11	I	12.5	I	14
	2	1.5	0		2.5		5		7.5		10		12.5		15		17.5		20		22		24
		2.5	0	I	3	I	6	I	9	I	12	I	15	I	19	I	22	I	25	I	28	I	31
		PCB	0		3		5.5		8		11		13.5		16		19		22		25		27.5
	3.5	2.5	0	I	3.5	I	7	I	10.5	I	14	I	17.5	I	21	I	24	I	27.5	I	31	I	34.5
		4	0		5		10		15		20		25		30		34		39		44		49
		6	0	I	5	I	10	I	15	I	20	I	25	I	30	I	34	I	39	I	44	I	49
ODU LAMTAC®	5	10	0		9		18		27		37		46		56		65		74		83		92
		16	0	I	11	I	22	I	33	I	45	I	56	I	68	I	79	I	90	I	101	I	112
	8	16	0		14		28		43		57		72		85		101		115		129		143
		25	0	I	17	I	33	I	50	I	66	I	83	I	100	I	117	I	133	I	150	I	167
															Nominal current						Max. continuous current		

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NOMINAL CURRENT LOAD OF LINES

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

Laying procedure	Exposed in air	Or on surfaces		
	Single-wire lines PVC, PE, PUR, TPE heat-resistant	Multi-wire highly flexible lines For hand-held devices, core / sheath cold-resistant, PVC-insulated		Multi-wire movable lines PVC, PE, PUR, TPE standard program harmonized series
Number of live cores	1	2	3	4
Nominal crosssection copper conductor in mm^2	Nominal current load in A			
0.14[1]	3			2
0.25[1]	5			4
0.34[1]	8			6
0.5[1]	12	3	3	9
0.75	15	6	6	12
1	19	10	10	15
1.5	24	16	16	18
2.5	32	25	20	26
4	42	32	25	34
6	54	40		44
10	73	63		61
16	98			82
25	129			108
35	158			135
50	198			168
Nominal current load acc. to:	VDE 0298-4:2023-06 Table 11			

Nominal current load of lines with a nominal voltage of up to 1,000 V and of heat-resistant lines.
The specification of data does not release one from the need to conduct the test. The original standards remain authoritative for all of the listed technical specifications.

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

TECHNICAL TERMS

AMBIENT TEMPERATURE

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

AWG

American Wire Gauge see page 186

BASE CURVE

See page 187

CHEMICAL RESISTANCE

Chemical resistance is the ability of a material to protect itself against chemical attack or solvent reaction. In contrast to corrosion, there is no material removal, which is particularly typical for plastics and elastomers.

Adhesives, cleaning agents or other chemicals are often used on our products within the scope of general deployment and further handling. Contact with unsuitable chemicals may have an adverse effect on the mechanical and electrical properties of the insulation and housing materials. The connector specifications may no longer be sustainable. Please observe our handling suggestions and technical instructions as given in this catalog or corresponding assembly instructions as well as the special information for the plastic housings.

CLEARANCE DISTANCE

The shortest distance by air between two conductive parts (according to IEC 60664-1:2020 (VDE 0110-1:2022-07). The insulation coordination is explained in detail from page 179.

CODING (MECHANICAL)

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

CONNECTOR WITH BREAKING CAPACITY (CBC)

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

CONNECTOR WITHOUT BREAKING CAPACITY (COC)

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

CONNECTORS

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

CONTACT RESISTANCE

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

CORES

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

CREEPAGE DISTANCE

The shortest distance between two conductive parts along the surface of a solid insulation material (according to IEC 60664-1:2020 (VDE 0110-1:2022-07). 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 179.

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 168).

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 value is derived from an adequately dimensioned connection cable in accordance with IEC 60228:2004

TECHNICAL TERMS

(VDE 0295:2005-09; class 5), so that a significant temperature increase is not incurred. The indicated temperature increase takes place through the contact. The specifications are average values.

DELIVERY FORM

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

DERATING CURVE

See page 188

DERATING MEASUREMENT METHOD IN ACCORDANCE WITH IEC 60512-5-2:2002 (DIN EN 60512-5-2:2003-01)

See page 189

INSERTION AND WITHDRAWAL FORCE

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

INSULATOR

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

LUBRICATION

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

MATING CYCLES

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

MAX. CONTINUOUS CURRENT

The metrologically determined amperage at room temperature (approx. 20° C) which increases the contact temperature to the limit temperature. The values specified in the catalog apply to either individual contacts or completely assembled inserts / modules, as indicated. Refer to page 188 for the derating curve, if a different ambient temperature is valid.

NOMINAL CURRENT

See Rated Current.

NOMINAL SINGLE-CONTACT CURRENT LOAD

The current-carrying capacity which each individual contact can be loaded with on its own (see page 188.)

NOMINAL VOLTAGE

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

OPERATING TEMPERATURE

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

OPERATING VOLTAGE

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

PCB TERMINATION

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

POLLUTION DEGREE

Numerical value indicating the expected pollution of the micro-environment. The pollution levels 1-4 were defined. (Pollution: any deposit of solid, liquid or gaseous foreign matter that may reduce the electrical strength or surface resistance of the insulation; micro-environment: immediate vacinity of the insulation, which in particular influences the dimensioning of the creepage distances). See IEC 60664-1:2020 (VDE 0110-1:2022-07)) See from page 179.

PRINTED CIRCUIT BOARD (PCB)

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

RATED CURRENT (NOMINAL CURRENT)

The values specified in the catalog apply to individual contacts or to completely assembled inserts / modules, depending on the specification. See page 188

TECHNICAL TERMS

RATED VOLTAGE

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

REDUCTION FACTOR

Based on VDE 0298-4:2023-06, connectors and cables with more than 5 contacts have a higher heating rate compared to individual contacts. For this reason, the aforementioned standard is calculated with a reduction. See page 187

SLIDING FORCE

Please refer to Insertion and Withdrawal force.

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

SOLDER CONNECTION (SOLDER TERMINATION)

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

SPINDLE LOCKING

Ergonomic locking of the housings with an easy-to-operate precsision locking spindle. This spindle enables easy closing and opening of the housings with a single turning movement. The mating and sliding forces which are thereby overcome ease handling significantly. For relubrication, we recommend the ODU Electrical Contacts Service Kit.

STRANDED WIRE

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

TERMINATION CROSSSECTION

The specified cross-sections correspond to a a “fine-wire” conductor structure (7/19 wire) according to AWG (ASTM B258-14) or to a “fine-wire” conductor structure pursuant to IEC 60228:2004 (VDE 0295:2005-09; Class 5), borderline conductor structures require a separate review.

TERMINATION TECHNOLOGIES

Methods for connecting the leads to the electro-mechanical element, such as solder-free connections pursuant to IEC 60352-4:2020 (DIN EN 60352-2:2014-04): crimp, screw connection etc. or soldering connection (see from page 168).

TEST VOLTAGE

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

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

See protection types on page 178

TOTAL RESISTANCE

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

WIRE

Solid conductor

GENERAL NOTE

The connectors and cable assemblies listed in this catalog are generally designed as connectors without breaking capacity unless otherwise stated. The rated voltage specification given on the respective data sheet must be respected. Suitable precautionary measures must be taken to ensure that people do not come into contact with live conductors during installation and operation. All entries in this catalog were thoroughly reviewed before printing. ODU reserves the right to make changes based on the current status of knowledge without prior notice and without being obliged to provide replacement deliveries or refinements of older designs..

ODU-MAC BLUE-LINE® / C / 0724 / EN

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