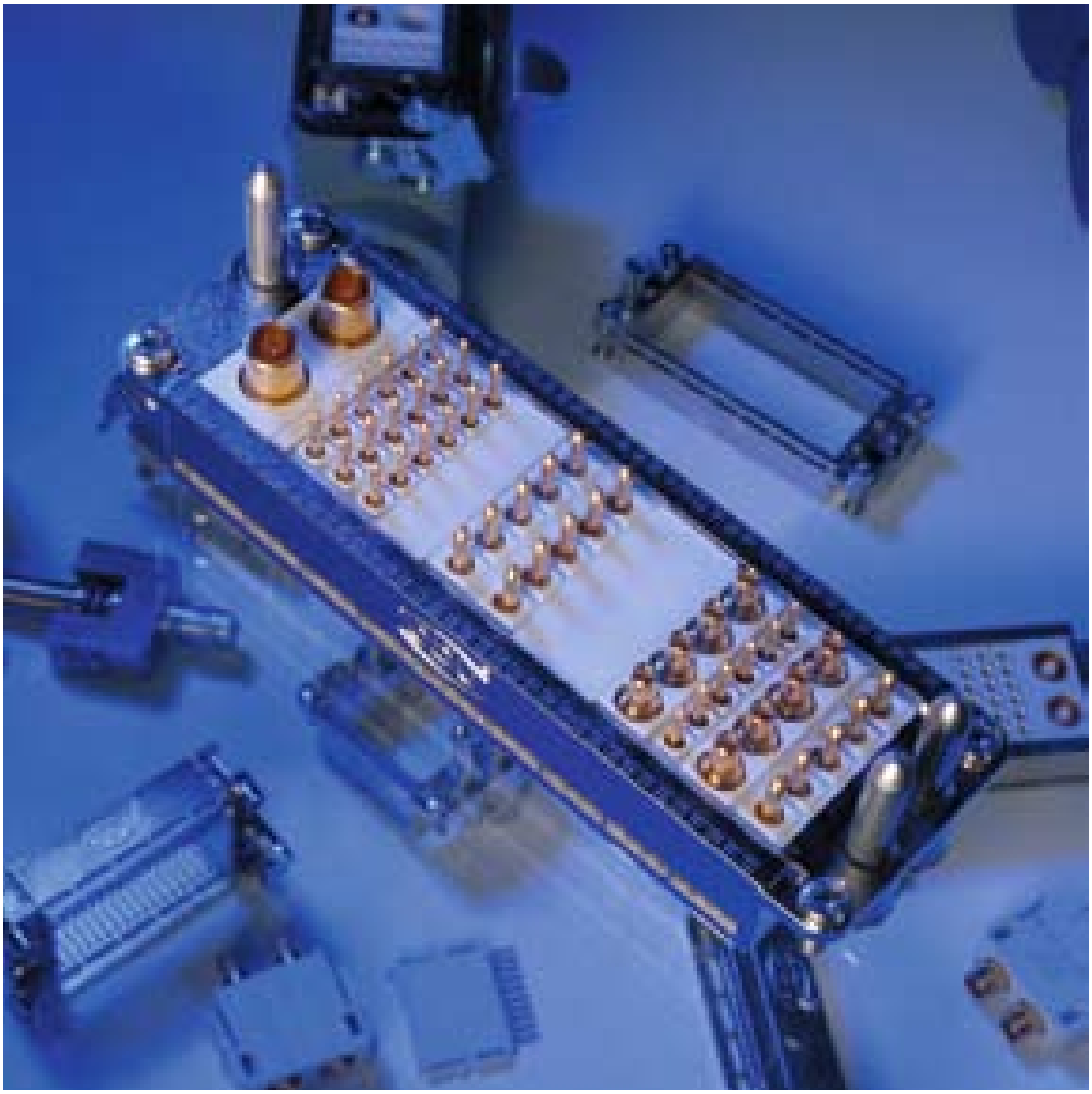

ODU MAC LC

Modular Attachable Connector System

ODU Steckverbindungssysteme GmbH & Co. KG, Pregelstr. 11, 84453 Mühldorf a. Inn, Germany
Phone: +49/86 31/61 56-0, Fax: +49/86 31/61 56-49, e-mail: zentral@odu.de, www.odu.de

ODU Steckverbindungssysteme GmbH & Co. KG, Pregelstr. 11, 84453 Mühldorf a. Inn, Germany, Phone +49/86 31/61 56-0, Fax +49/86 31/61 56-49, www.odu.de

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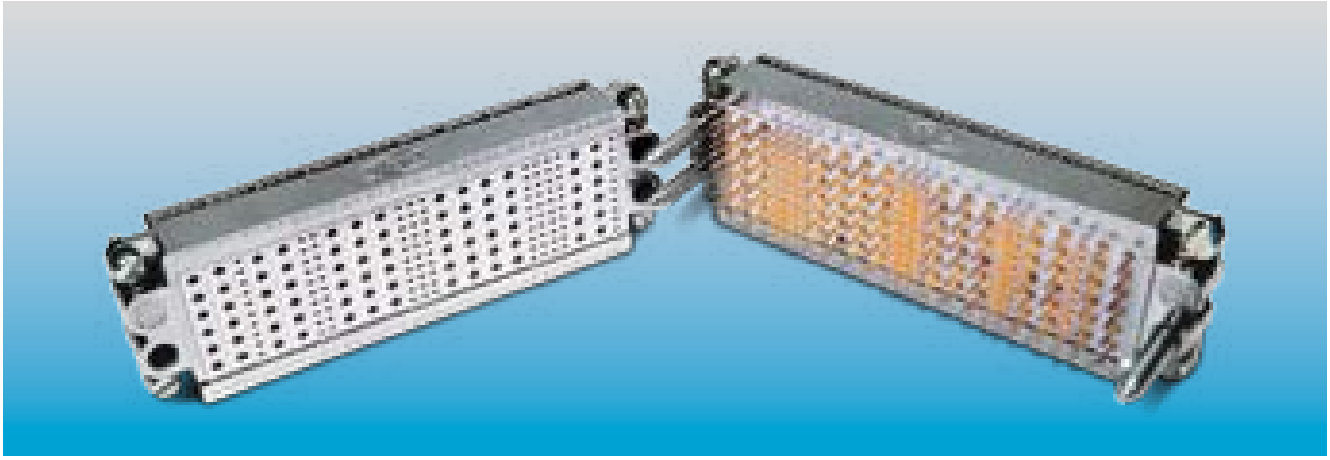
www.odu.de
www.odu-usa.com
www.odu-china.com

All dimensions in mm.
Most of the pictures are illustrations.
All data and specifications subject to change without notice.

ODU MAC LC

Modular Rectangular Connector



ODU MAC LC is a modular rectangular connector comprising a stable frame, various modules and, if needed, a DIN housing.

The various modules can be strung together in any way – customers receive the connector for their specific application.

Thanks to the modular construction, many individual connectors can be combined in one ODU MAC LC.

The ODU MAC LC has been designed particularly for use as a service and interface connector. Example uses of this new connector are found in machine construction, metrology, medical technology, etc.

In machine construction, an internal interface connector is often operated only a few times, and so the ODU MAC LC, with its standard contact technology, is the most economical alternative here.

The ODU MAC LC uses the most economical and proven ODU contact technology with turned/slotted contacts, and it offers up to 5,000 mating cycles. The economic aspect is reinforced by the simple processing of the contacts and modules. The most user-friendly assembly and removal, even when built-in, distinguish the ODU MAC LC as a service connector.

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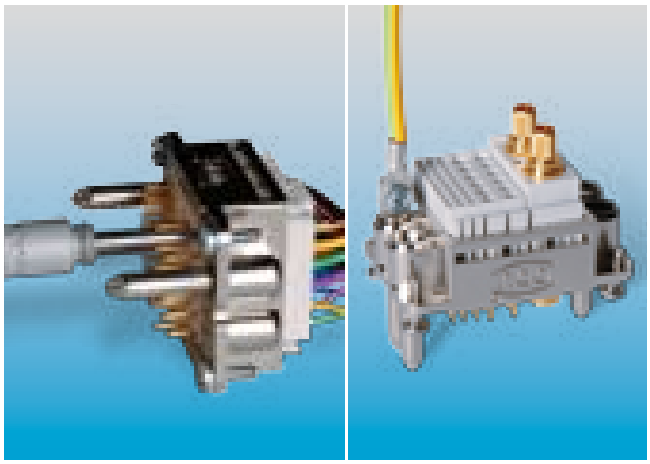
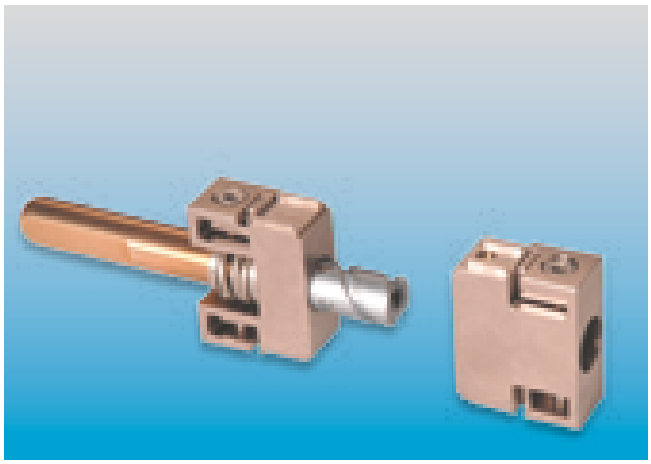


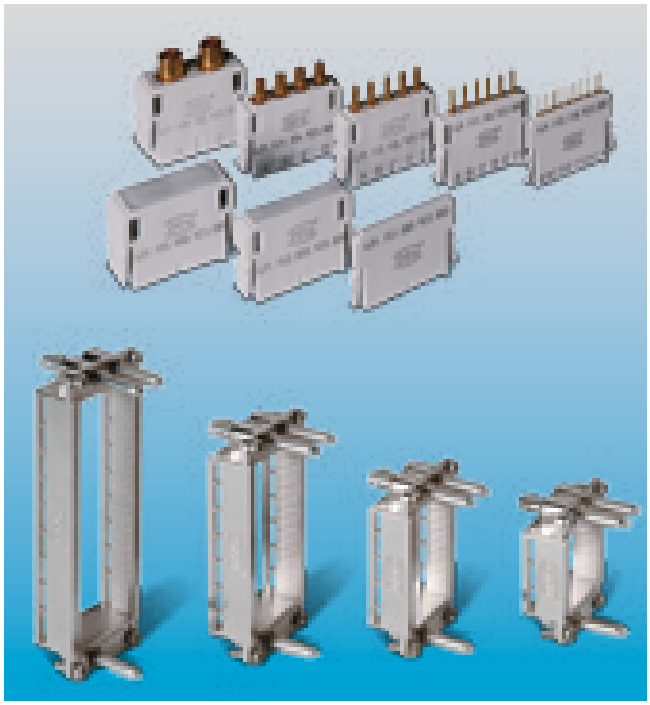


Economical

- easy assembly because of crimp contacts which clip into the insulation body
- quick, tool-less assembly and disassembly of the modules
- disassembly of the contacts from plug side

Robust

- centering, guiding and grounding with pin-socket-guiding
- different housings with spindle- and lever locking available



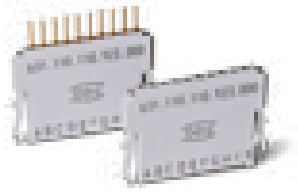
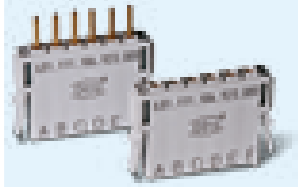
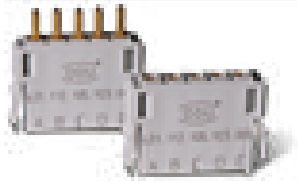
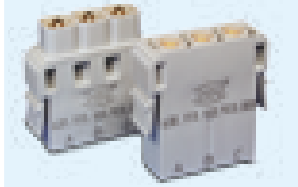
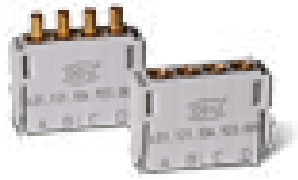
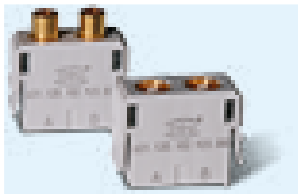
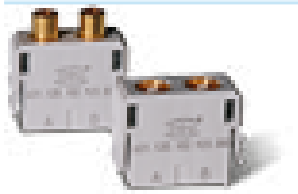
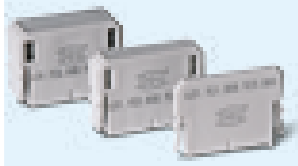
Flexible

- 4 frame sizes (12, 18, 26, 37 units)
- range of contact inserts for signals, power and high frequency are available

Powerful

- ≥ 5,000 mating cycles
- up to 370 contacts in one connector
- proven ODU contact technology (turned, slotted contacts)

Overview Modules

Module	Positions	Units (Width)	Current Information		Page
	10-pos.	1 Unit (2.4 mm)	Reference voltage:[1)] Rated surge voltage: [1)] Degree of pollution: [1)] Rated current: [2)]	250 V 2,500 V 2 7 A	7
	6-pos.	2 Units (4.8 mm)	Reference voltage: [1)] Rated surge voltage: [1)] Degree of pollution: [1)] Rated current: [2)]	400 V 2,500 V 2 15 A	8
	5-pos.	3 Units (7.2 mm)	Reference voltage: [1)] Rated surge voltage: [1)] Degree of pollution: [1)] Rated current: [2)]	630 V 2,500 V 2 23 A	9
	3-pos.	4 Units (9.6 mm)	Reference voltage: [1)] Rated surge voltage: [1)] Degree of pollution: [1)] Rated current: [2)]	2,500 V 10,000 V 2 35 A	10
	4-pos. 50 Ω KOAX	3 Units (7.2 mm)	Frequency range:	3.3 GHz	11
	2-pos. 50 Ω KOAX	5 Units (12.0 mm)	Frequency range:	1.8 GHz	12
	2-pos. 75 Ω KOAX	5 Units (12.0 mm)	Frequency range:	2.2 GHz	13
	Spacer Modules	1 Unit (2.4 mm) 3 Units (7.2 mm) 5 Units (12 mm)			14

[1)] acc. to VDE 0298 – Part 2
[2)] per single contact with biggest cross-section

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Module 10-position

1 Unit = 2.4 mm

Technical Information

Contact diameter	0.7 mm
Operating temperature	– 40° C to +125° C
Total mating force (average)	8 N
Total demating force (average)	6 N
Mating cycles	≥ 5,000
Current and resistance	see table

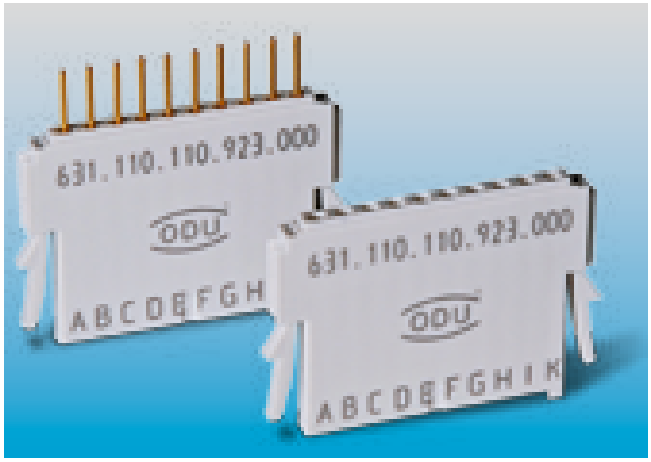
Voltage Information

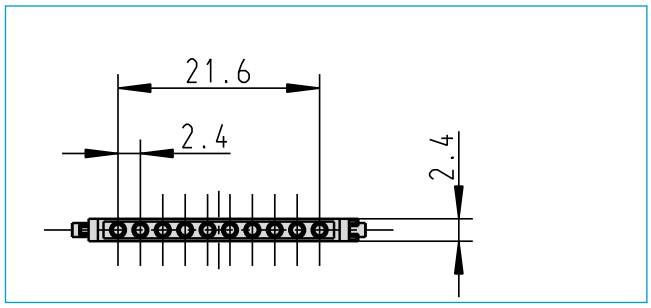
acc. IEC 60664 – 1

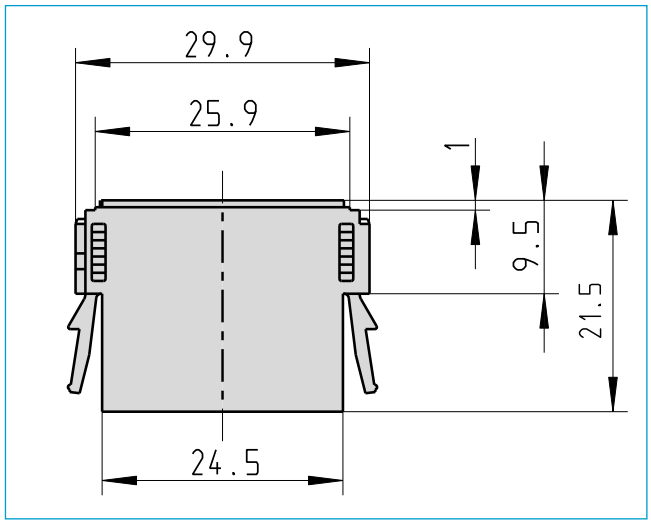
Reference voltage	250 V	50 V
Rated surge voltage	2,500 V	2,500 V
Degree of pollution	2	3

Materials

Insulation body	PBT unreinforced V0 acc. UL-94
Contact	Cu-Alloy gold plated







Tools

Crimp tong	080 000 051 100 000
Positioner	080 000 051 101 000
Removal tool	087 7CC 070 002 000

	Part Number	Wire cross-section (mm²)	Termination AWG	max. Current (A)	Contact Resistance average (mΩ)
Insulation body	631 110 110 923 000				
Pin contact	185 423 000 270 000	0.15 – 0.38	22/26	7.0	3.5
Pin contact short	185 431 000 270 000	0.15 – 0.38	22/26	7.0	3.5
Socket contact	175 581 000 270 000	0.15 – 0.38	22/26	7.0	3.5

Module 6-positions

2 Units = 4.8 mm

Technical Information

Contact diameter	1.3 mm
Operating temperature	–40°C to +125°C
Total mating force (average)	8.4 N
Total demating force (average)	7.2 N
Mating cycles	≥ 5,000
Current and resistance	see table

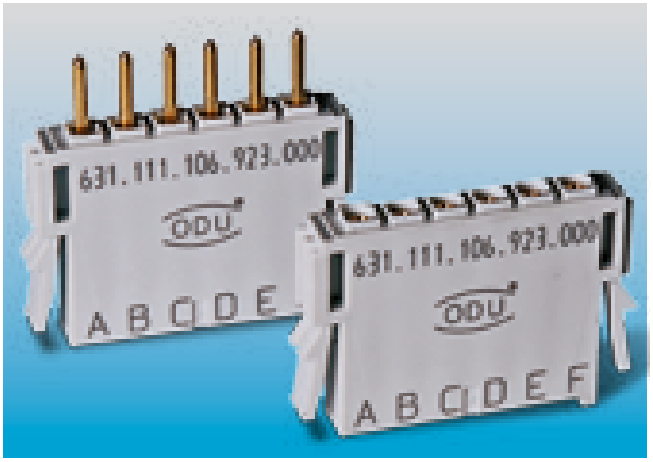
Voltage Information

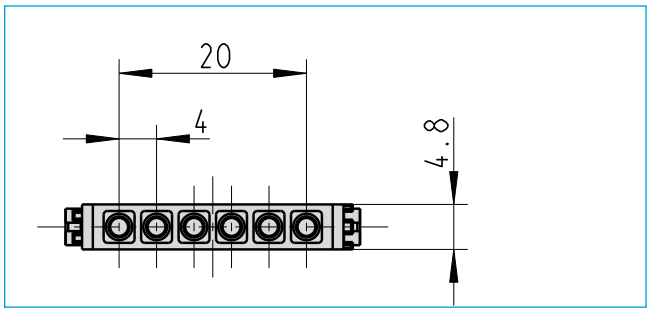
acc. IEC 60664 – 1

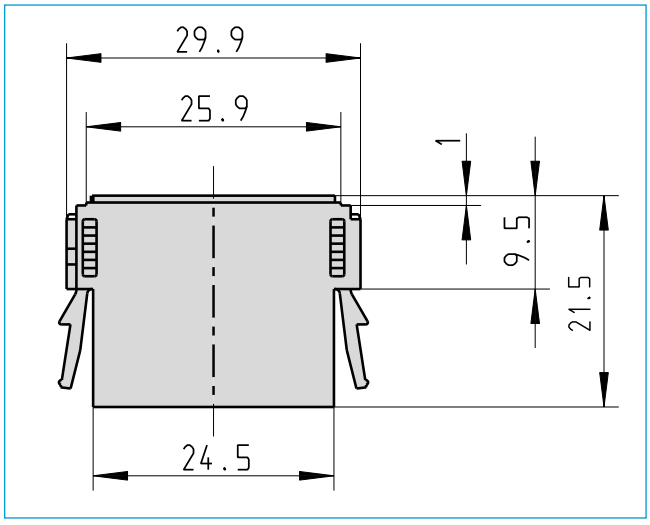
Reference voltage	400 V	160 V
Rated surge voltage	2,500 V	2,500 V
Degree of pollution	2	3

Materials

Insulation body	PBT unreinforced V0 acc. UL-94
Contact	Cu-Alloy gold plated







Tools

Crimp tong	080 000 051 100 000
Positioner	080 000 051 101 000
Removal tool	087 7CC 130 004 000

	Part Number	Wire cross-section (mm²)	Termination AWG	Max. Current (A)	Contact Resistance average (mΩ)
Insulation body	631 111 106 923 000				
Pin contact	185 424 000 270 000	0.5 – 1.0	18 / 20	15.0	1.8
Pin contact short	185 432 000 270 000	0.5 – 1.0	18 / 20	15.0	1.8
Socket contact	175 535 000 270 000	0.5 – 1.0	18 / 20	15.0	1.8

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Module 5-positions

3 Units = 7.2 mm

Technical Information

Contact diameter	2 mm
Operating temperature	–40°C to +125°C
Total mating force (average)	15 N
Total demating force (average)	11.5 N
Mating cycles	≥ 5,000
Current and resistance	see table

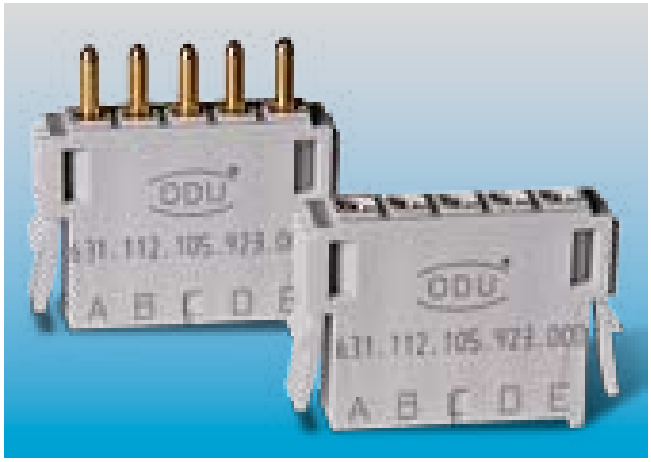
Voltage Information

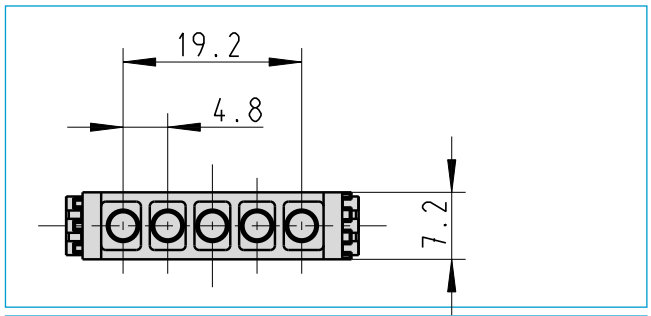
acc. IEC 60664 – 1

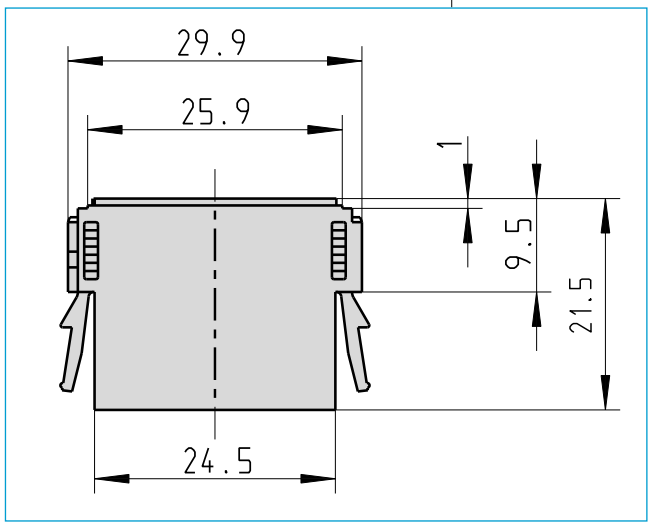
Reference voltage	630 V	250 V
Rated surge voltage	2,500 V	2,500 V
Degree of pollution	2	3

Materials

Insulation body	PBT unreinforced V0 acc. UL-94
Contact	Cu-Alloy gold plated







Tools

Crimp tong	080 000 051 100 000
Positioner	080 000 051 101 000
Removal tool	087 7CC 200 003 000

	Part Number	Wire cross-section (mm²)	Termination AWG	Max. Current (A)	Contact Resistance average (mΩ)
Insulation body	631 112 105 923 000				
Pin contact	185 440 000 270 000	1.5–2.5	14 / 16	23.0	1.0
Pin contact short	185 441 000 270 000	1.5–2.5	14 / 16	23.0	1.0
Socket contact	175 570 000 270 000	1.5–2.5	14 / 16	23.0	1.0

Power Module 3-positions

4 Units = 9.6 mm

Technical Information

Contact diameter	3.5 mm
Operating temperature	–40°C to +125°C
Total mating force (average)	12 N
Total demating force (average)	10 N
Mating cycles	≥ 5,000
Current and resistance	see table

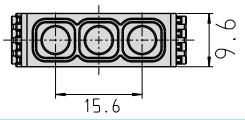
Voltage Information

acc. IEC 60664 – 1

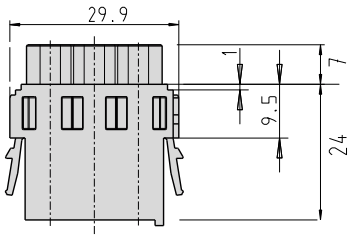
Reference voltage	2,500 V	1,000 V
Rated surge voltage	10,000 V	8,000 V
Degree of pollution	2	3

Materials

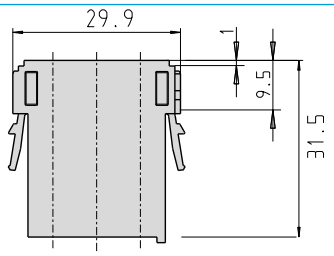
Insulation body	PBT unreinforced V0 acc. UL-94
Contact	Cu-Alloy gold plated



Pin part



Socket part



Tools

Crimp tong	080 000 057 100 000
Positioner	080 000 057 101 000
Removal tool	087 7CC 350 001 000

	Part Number	Wire cross-section (mm²)	Termination AWG	Max. Current (A)	Contact Resistance average (mΩ)
Insulation body Socket	630 113 103 923 000				
Insulation body Pin	631 113 103 923 000				
Pin contact 2.5	185 462 000 270 000	1.5–2.5	14/16	26	0.4
Pin contact 2.5 short	185 463 000 270 000	1.5–2.5	14/16	26	0.4
Pin contact 4	185 460 000 270 000	4	12	30	0.4
Pin contact 4 short	185 461 000 270 000	4	12	30	0.4
Pin contact 6	185 442 000 270 000	6	10	35	0.4
Pin contact 6 short	185 443 000 270 000	6	10	35	0.4
Socket contact 2.5	177 060 000 270 000	1.5–2.5	14/16	26	0.4
Socket contact 4	177 059 000 270 000	4	12	30	0.4
Socket contact 6	177 058 000 270 000	6	10	35	0.4

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Module 4-positions for, COAX Contacts 50 Ω

3 Units = 7.2 mm

Technical Information

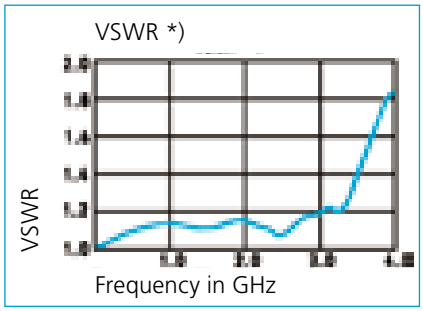
Frequency range	3.3 GHz
Cable impedance	> 100 GΩ
Operating temperature	–40°C to +125°C
Total mating force (average)	7.2N
Total demating force (average)	6.8N
Mating cycles	≥ 5,000

Voltage Information acc. MIL

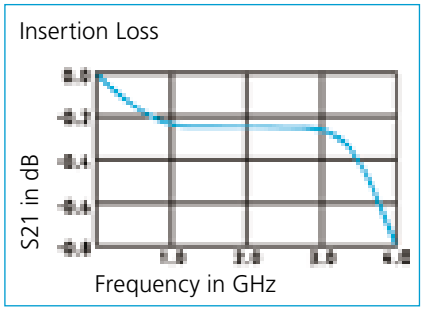
Reference voltage	525 V
Test voltage	1,575 V

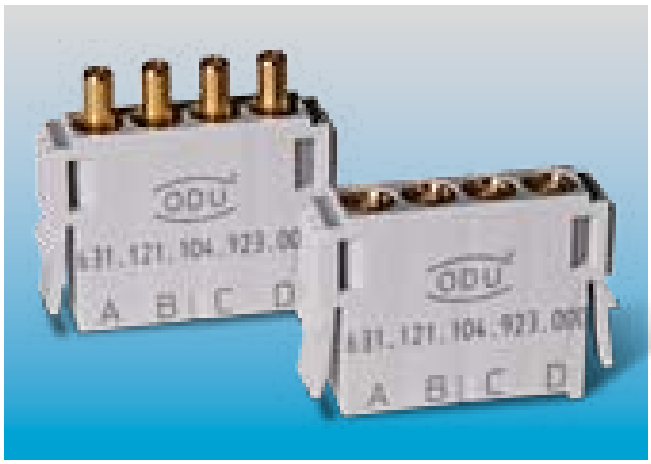
Materials

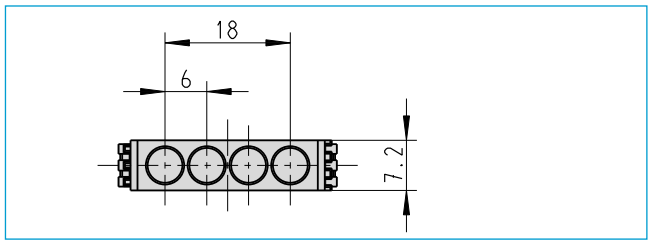
Insulation body	PBT unreinforced PTFE
Contact	Cu-Alloy gold plated

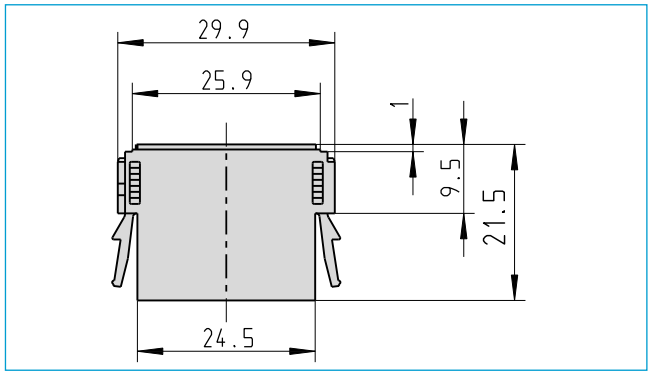


*) voltage standig wave ratio









Tools

Crimp tong – external conductor	080 000 039 000 000
Crimp tong – internal conductor	080 000 051 100 000
Positioner	080 000 051 102 000
Removal tool	087 7CC 310 001 000

	Part Number	Cable impedance (Ω)	Cable	Crimp insert
Insulation body Socket	631 121 104 923 000			
Pin contact	122 133 001 270 000	50	RG 178, RG 196	082 000 039 101 000
Pin contact	122 133 003 270 000	50	RG 174, RG 188, RG 316	082 000 039 102 000
Socket contact	122 133 002 270 000	50	RG 178, RG 196	082 000 039 101 000
Socket contact	122 133 004 270 000	50	RG 174, RG 188, RG 316	082 000 039 102 000

Module 2-positions for COAX Contacts, 50 Ω

5 Units = 12 mm

Technical Information

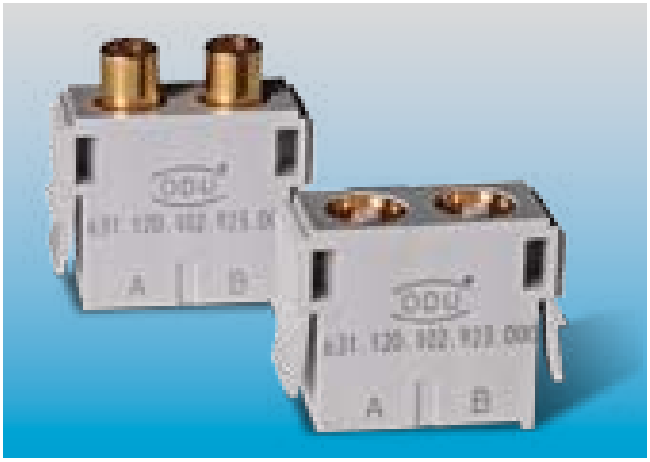
Frequency range	1.8 GHz
Cable impedance	50 Ω
Insulation resistance	> 100 GΩ
Operating temperature	– 40° C to + 125° C
Total mating force (average)	3.6 N
Total demating force (average)	3.2 N
Mating cycles	≥ 5,000

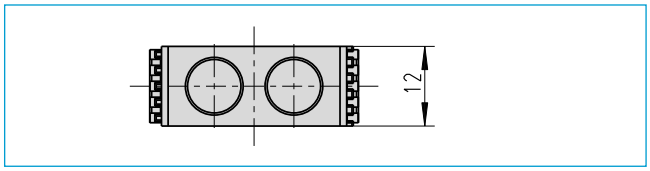
Voltage Information acc. MIL

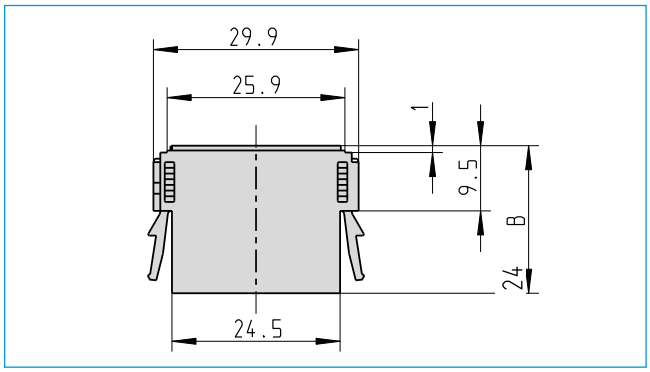
Reference voltage	800 V
Test voltage	2,400 V

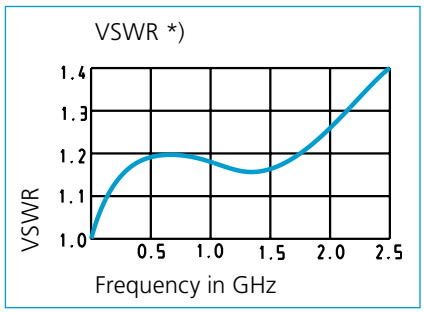
Materials

Insulation body	PBT unreinforced PTFE
Contact	Cu-Alloy gold plated

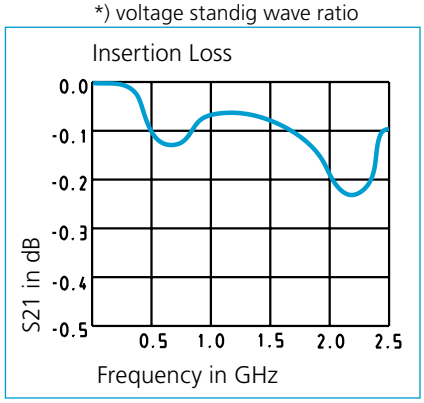








*) voltage standig wave ratio



Tools

Crimp tong – external conductor	080 000 039 000 000
Crimp tong – internal conductor	080 000 051 100 000
Positioner	080 000 051 102 000
Removal tool	087 7CC 690 001 000

	Part Number	Cable impedance (Ω)	Cable	Crimp insert
Insulation body	631.120.102.923.000			
Pin contact	122.132.001.270.000	50 Ω	RG178, RG196	082.000.039.101.000
Pin contact	122.132.003.270.000	50 Ω	RG174, RG188, RG316	082.000.039.102.000
Pin contact	122.132.007.270.000	50 Ω	RG58	082.000.039.106.000
Pin contact	122.132.009.270.000	50 Ω	RG223	082.000.039.106.000
Socket contact	122.132.002.270.000	50 Ω	RG178, RG196	082.000.039.101.000
Socket contact	122.132.004.270.000	50 Ω	RG174, RG188, RG316	082.000.039.102.000
Socket contact	122.132.008.270.000	50 Ω	RG58	082.000.039.106.000
Socket contact	122.132.010.270.000	50 Ω	RG223	082.000.039.106.000

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Module 2-positions for COAX Contacts, 75 Ω

5 Units = 12 mm

Technical Information

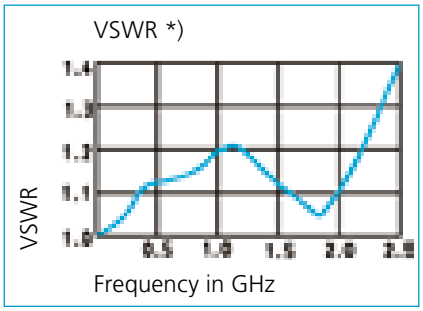
Frequency range	2.2 GHz
Cable impedance	75 Ω
Insulation resistance	> 100 GΩ
Operating temperature	– 40 °C to +125 °C
Total mating force (average)	3.6 N
Total demating force (average)	3.2 N
Mating cycles	≥ 5,000

Voltage Information acc. MIL

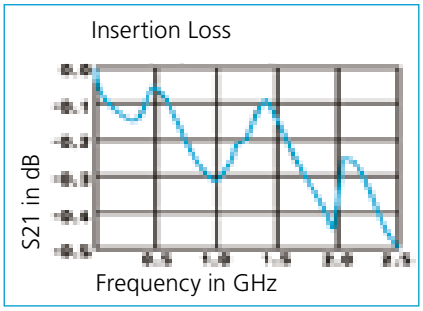
Reference voltage	930 V
Test voltage	2,790 V

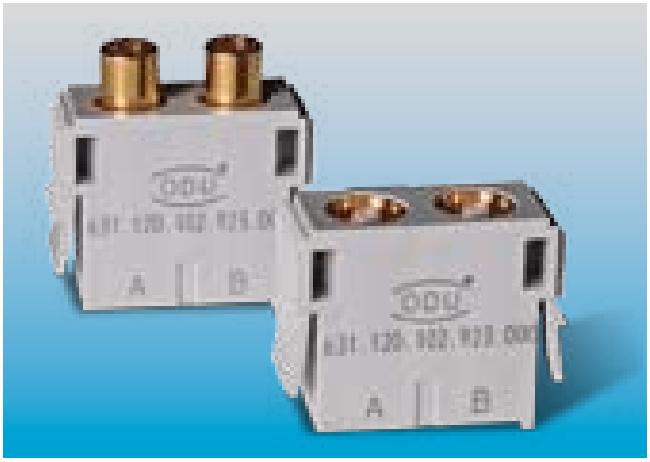
Materials

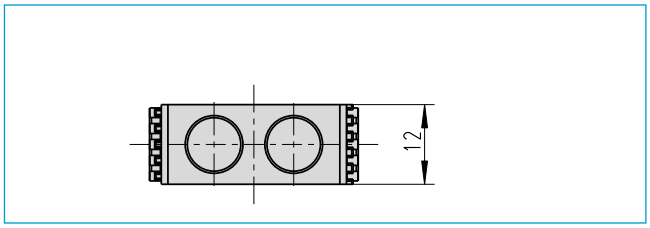
Insulation body	PBT unreinforced PTFE
Contact	Cu-Alloy gold plated

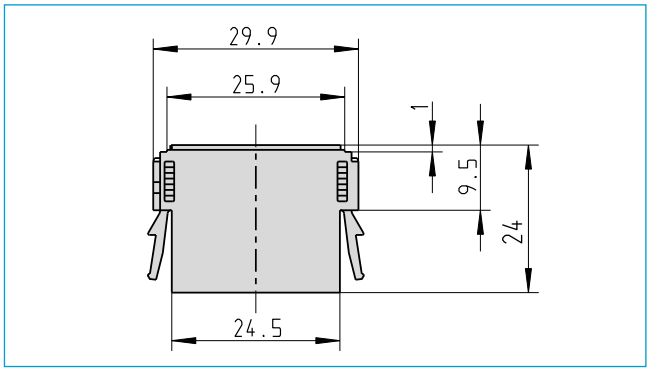


*) voltage standig wave ratio









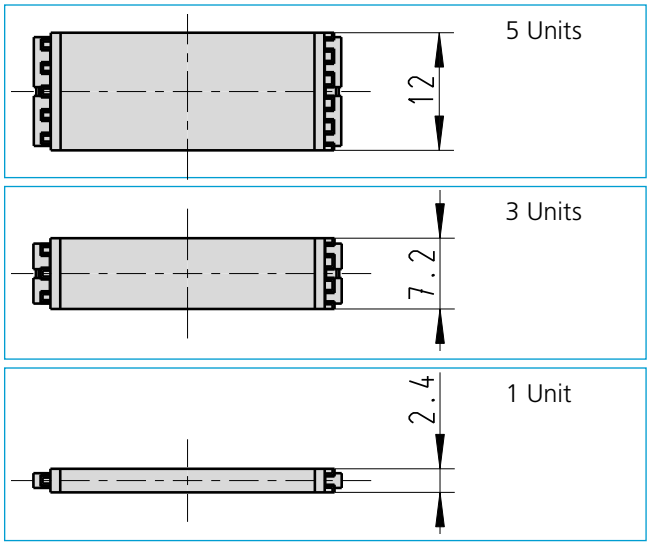
Tools

Crimp tong – external conductor	080 000 039 000 000
Crimp tong – internal conductor	080 000 051 100 000
Positioner	080 000 051 102 000
Removal tool	087 7CC 690 001 000

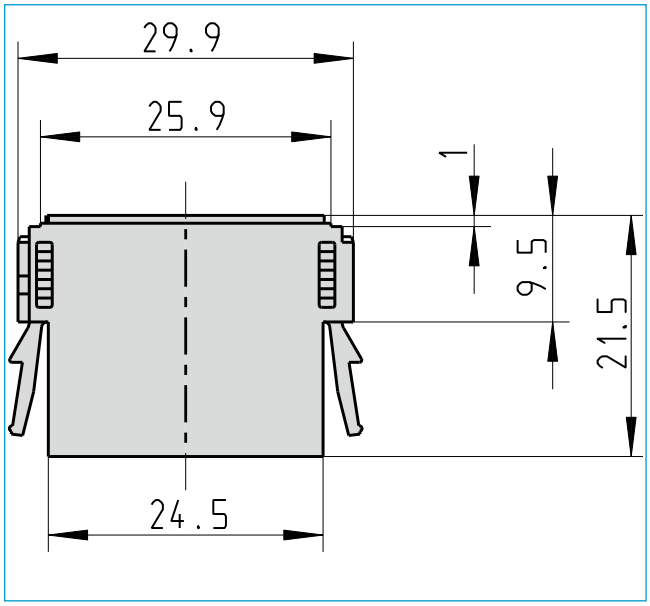
	Part Number	Cable impedance (Ω)	Cable	Crimp insert
Insulation body	631 120 102 923 000			
Pin contact	122 131 003 270 000	75	RG 179, RG 187	082 000 039 102 000
Pin contact	122 131 009 270 000	75	RG 59	082 000 039 109 000
Socket contact	122 131 004 270 000	75	RG 179, RG 187	082 000 039 102 000
Socket contact	122 131 010 270 000	75	RG 59	082 000 039 109 000

Spacer Modules

- for filling up not completely assembled frames
- all frames must be filled up completely with insulation bodies or spacer modules



	Part Number
Spacer Module 1 Unit	631 151 000 923 000
Spacer Module 3 Units	631 153 000 923 000
Spacer Module 5 Units	631 155 000 923 000



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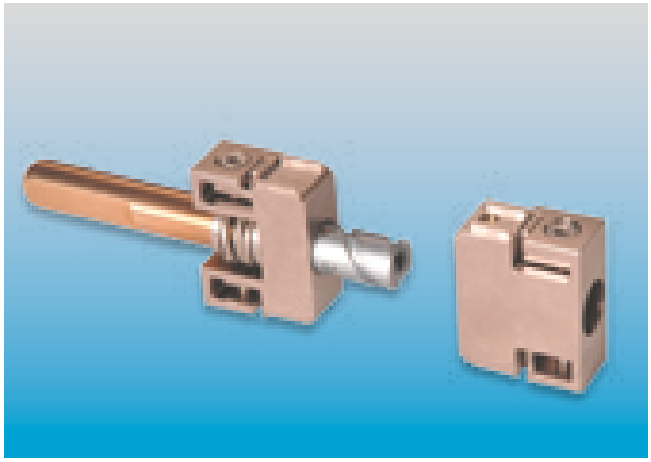
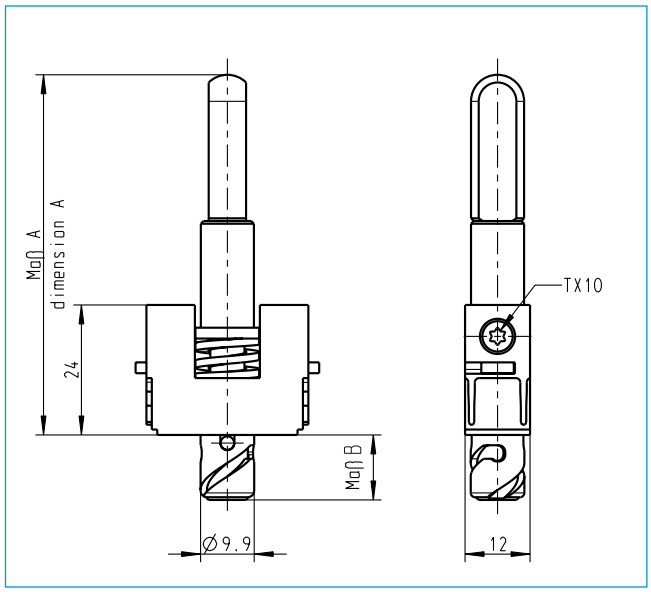
Locking Spindle

5 Units = 12 mm

- simple to use with one hand
- force benefit by the insertion/connection
- hangeable spindle screw

Mating cycles ≥ 5,000



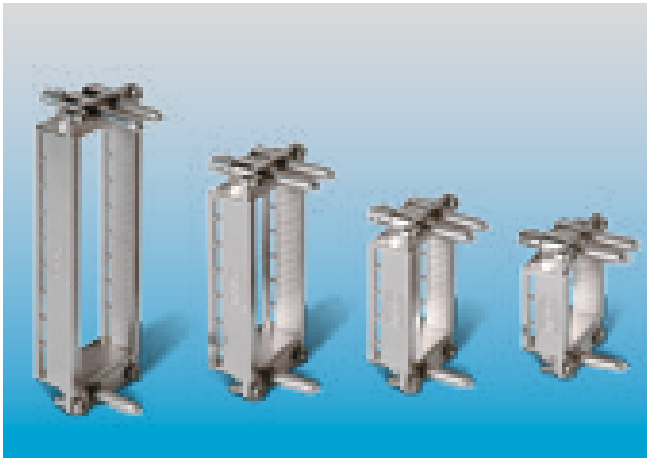


	Part Number	For size	Angle of tilt	A	B
Locking Spindle [1]	635 091 003 200 000	2 (50 mm high)[3]	180°	46.5	12.0
Locking Spindle [1]	635 091 001 200 000	2 (70 mm high)[3]	180°	66.5	12.0
Locking Spindle [1]	635 092 021 200 003	3/4	360°	72.5	21.5
Center Module [2]	634 090 001 904 000	2/3/4	–	–	–

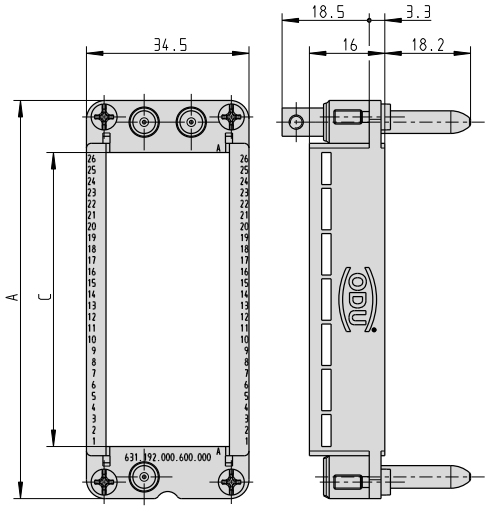
[1] for use in pin frame
[2] for use in socket frame
[3] see page 18, dim. A

Frames

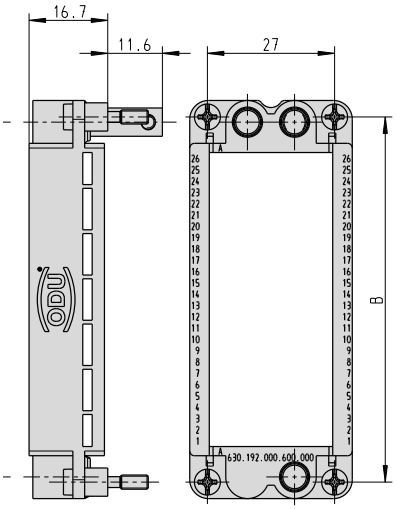
Zinc diecasting = nickel-plated
1 Unit = 2.4 mm



Pin-Frame



Socket-Frame



Size	Part Number	Description	Units	A	B	C
1	630 190 000 600 000 631 190 000 600 000	Socket Frame Pin Frame	12	51.0	44.0	12 × 2.4 = 28.8
2	630 191 000 600 000 631 191 000 600 000	Socket Frame Pin Frame	18	64.0	57.0	18 × 2.4 = 43.2
3	630 192 000 600 000 631 192 000 600 000	Socket Frame Pin Frame	26	84.5	77.5	26 × 2.4 = 62.4
4	630 193 000 600 000 631 193 000 600 000	Socket Frame Pin Frame	37	111.0	104.0	37 × 2.4 = 88.8

Torque value of frame screws: 1.25 Nm

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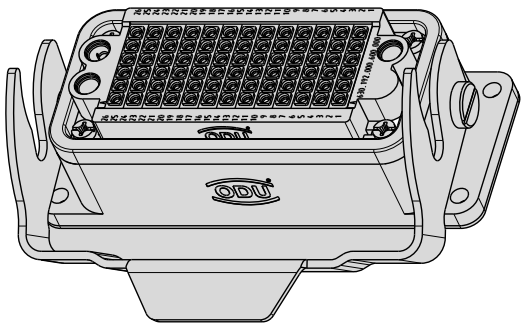
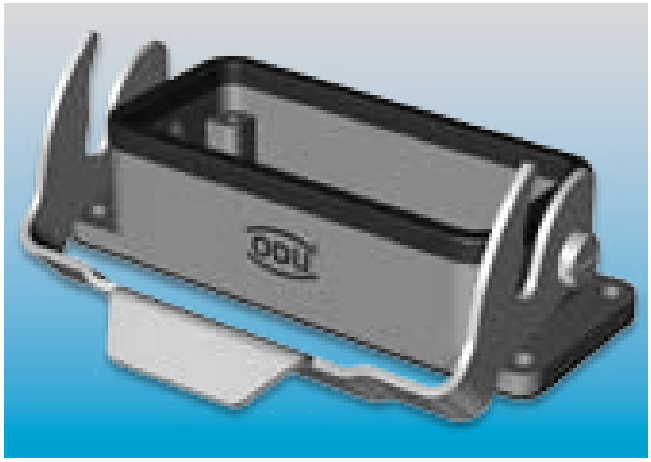
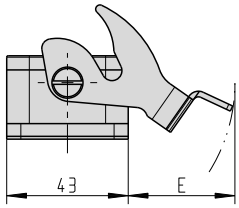
Panel-Mount Bases including lever locking

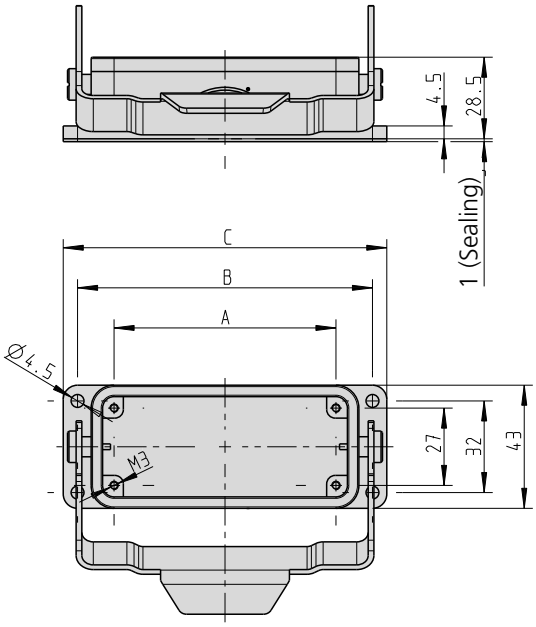
Standard Colour of housing: grey
IP 65 in mated condition
with and without protection cover* available

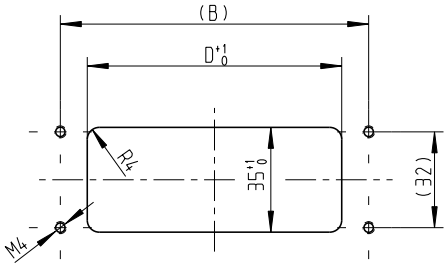






Example of lever locking





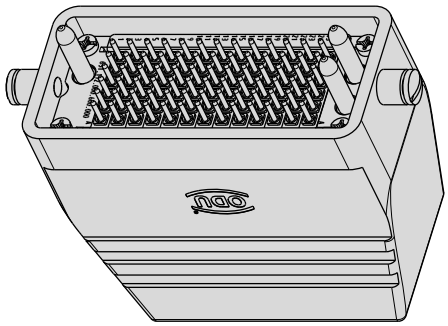
Panel Cut-Out

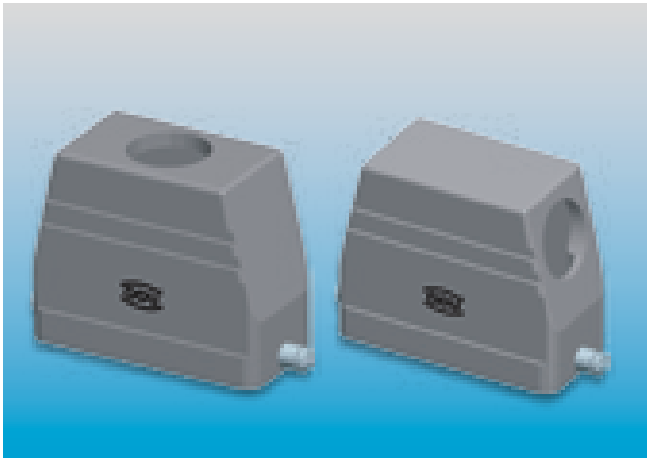
Size	Part Number Panel-mounted Base	Dimension A	Dimension B	Dimension C	Panel Cut-Out Dimension D	Dimension E
1	490 130 400 644 000	44.0	70	80	48	~ 25
2	491 130 400 644 000	57.0	83	93	65	~ 35
3	492 130 400 644 000	77.5	103	113	82	~ 35
4	493 130 400 644 000	104.0	130	140	110	~ 35

* Protection cover and Box-Mounted Base on request

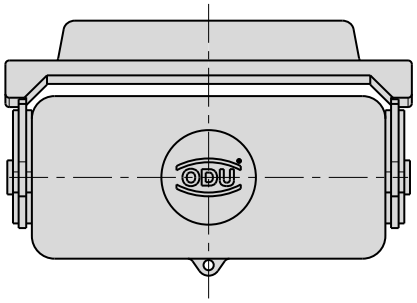
Cable Hood with straight or right angled exit

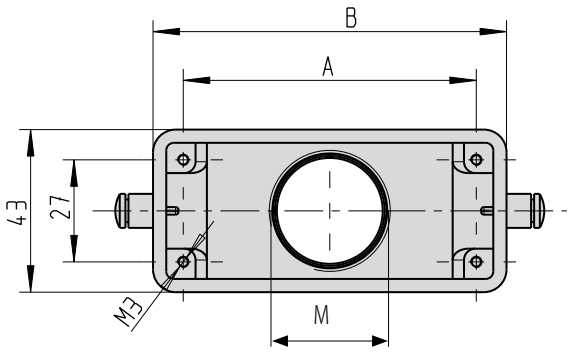
for lever locking
IP 65 in mated condition

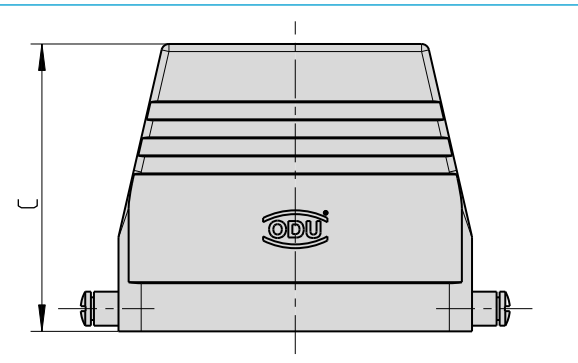




Protection Cover







Size	Part Number right angled exit	Part Number straight exit	Dim. A	Dim. B	Dim. C	Cable exit M	Protection cover
1	490 414 450 644 102 490 415 450 644 102	490 214 450 644 102 490 215 450 644 102	44.0	60.0	48 70	M 25 × 1.5 M 32 × 1.5	490 097 212 644 000
2	491 414 450 644 102 491 415 450 644 102	491 214 450 644 102 491 215 450 644 102	57.0	73.0	50 70	M 25 × 1.5 M 32 × 1.5	491 097 212 644 000
3	492 415 450 644 102	492 215 450 644 102	77.5	93.5	76	M 32 × 1.5	492 097 214 644 000
4	493 415 450 644 102	493 215 450 644 102	104.0	120.0	78	M 32 × 1.5	493 097 214 644 000

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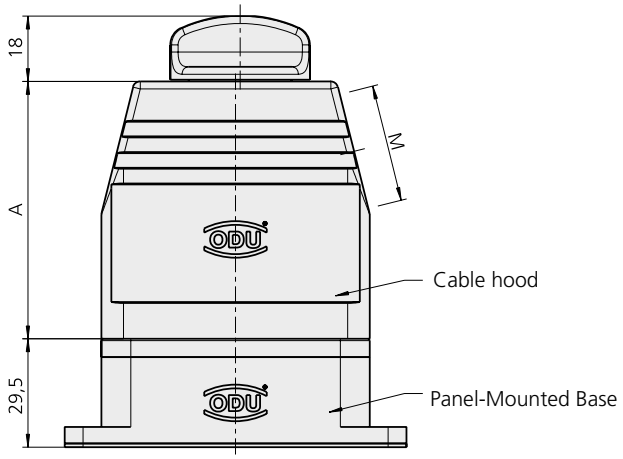
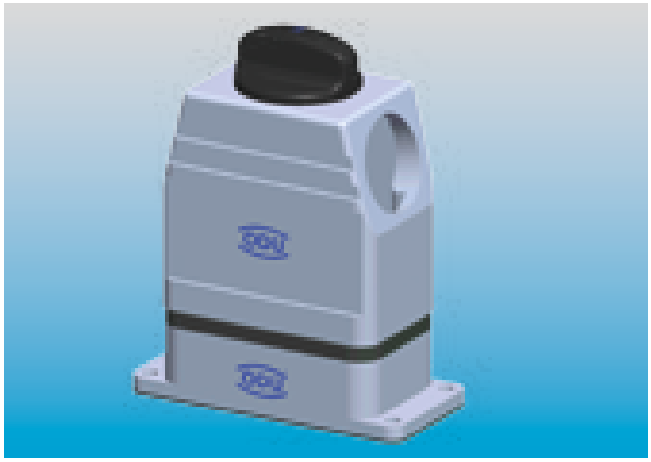
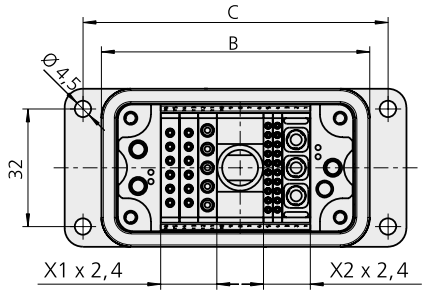
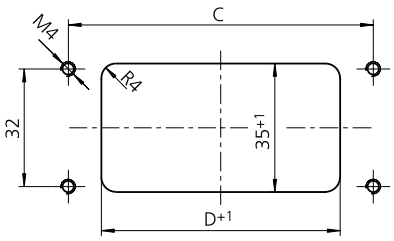
ODU MAC DIN-Housing

with Spindle locking









Panel Cut-Out

Colour of housing: white

Size	Part Number Cable hood	Part Number Panel-mounted Base	Dim. A	Dim. B	Dim. C	Panel Cut-Out Dim. D	X1	X2	Cable exit M	Spindle-head
2	613 091 513 653 203	612 091 010 653 000	50	73.0	83	60	6	5	M 25 x 1.5	
2	613 091 514 653 203	612 091 010 653 000	70	73.0	83	60	6	5	M 32 x 1.5	white
3	613 092 514 653 203	612 092 010 653 000	76	93.5	103	82	10	9	M 32 x 1.5	
4	613 093 514 653 203	612 093 010 653 000	78	120.0	130	108	15	14	M 32 x 1.5	

Colour of housing: grey

Size	Part Number Cable hood	Part Number Panel-mounted Base	Dim. A	Dim. B	Dim. C	Panel Cut-Out Dim. D	X1	X2	Cable exit M	Spindle-head
2	613 091 513 644 208	612 091 010 644 000	50	73.0	83	60	6	5	M 25 x 1.5	
2	613 091 514 644 208	612 091 010 644 000	70	73.0	83	60	6	5	M 32 x 1.5	black
3	613 092 514 644 208	612 092 010 644 000	76	93.5	103	82	10	9	M 32 x 1.5	
4	613 093 514 644 208	612 093 010 644 000	78	120.0	130	108	15	14	M 32 x 1.5	

Material: Aluminium-Diecast

Box-Mounted Base on request!

Cable gland: see next page!

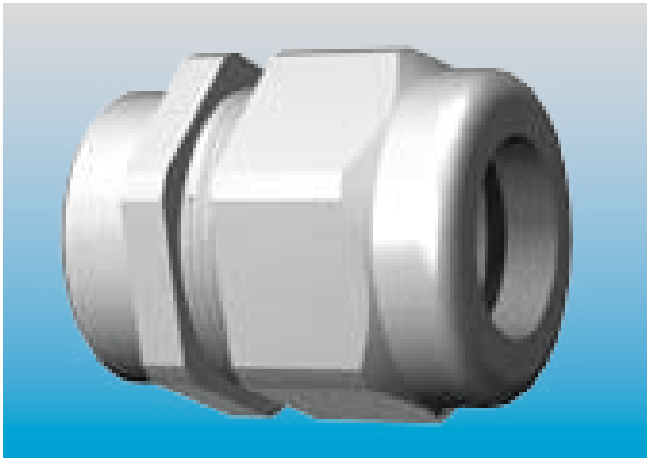
Cable Gland for DIN housing

(acc. EN 50262)

Temperature area: –40°C to +100°C
Protection class: IP68 to 5 bar
Material: PA grey, NBR

Cable-Ø	Part Number M 25 x 1.5	wrench size
6.0 –13.0	027 825 060 130 007	30
9.0 –17.0	027 825 090 170 007	30

Cable-Ø	Part Number M 32 x 1.5	wrench size
7.0 –15.0	027 832 070 150 007	36
11.0 –21.0	027 832 110 210 007	36

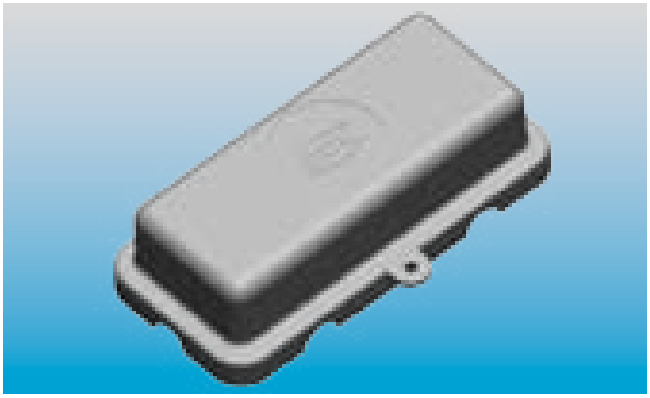


Torque specifications: M 25: 8 Nm
M 32: 10 Nm

Cover (Transport cover)

Material: PP black

Size	Part Number with holding rope	Part Number without holding rope
1	490 097 900 924 000	490 097 900 924 101
2	491 097 900 924 000	491 097 900 924 101
3	492 097 900 924 000	492 097 900 924 101
4	493 097 900 924 000	493 097 900 924 101



Adapter Cable exit

(metrical to PG)

Cable exit M	with adapter cable exit PG	Part Number
M 25 x 1.5	PG 21	921 000 006 000 254
M 32 x 1.5	PG 29	921 000 006 000 255

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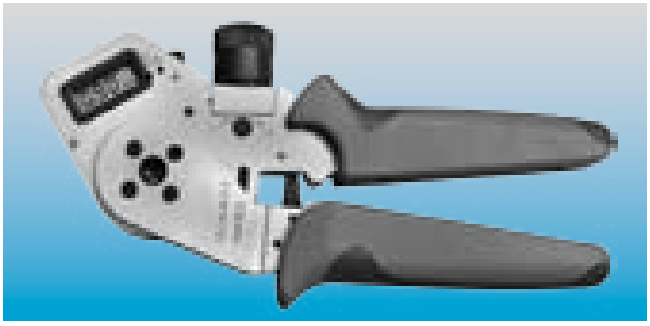
Crimp tools and Contact preparation

Crimping creates an easy, reliable, corrosion-free, and long-term connection between conductor and contact. It requires little skill and can be performed by non-experts.

Crimping causes cold-flow of the conductor and contact material, creating a gas-tight connection between contact and conductor. A stiffening of the conductor at the connection, as it is possible with soldering, cannot occur.
Crimping can be performed on very small or very large conductor cross-sections.

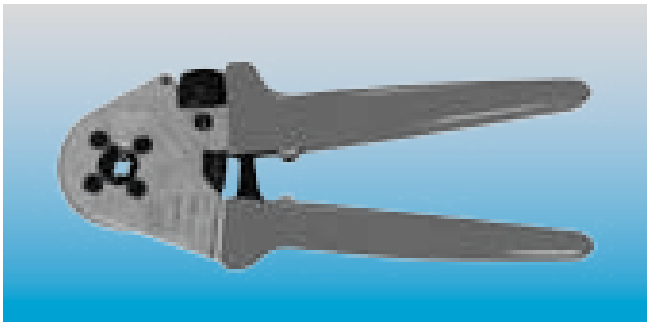
8-Crimp Tool
for cross-section 0.08 – 2.50 mm²
with user-friendly digital display

Part Number: 080 000 051 000 000



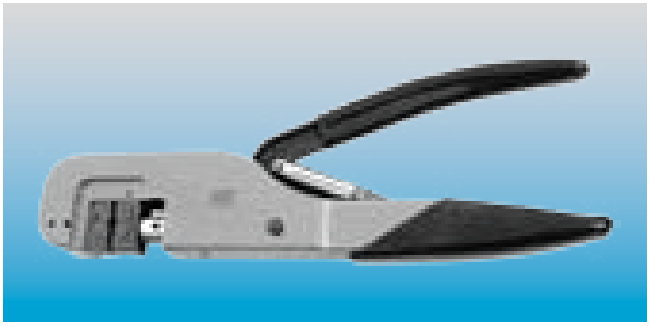
8-Crimp Tool
for cross-section 1.50 – 6.00 mm²

Part Number: 080 000 057 000 000



Hexagonal Crimp Tool
for coax contact, with locking system (ratchet)

Part Number: 080 000 039 000 000



Coax-Cable	Crimp dies
RG 178, RG 196	082 000 039 101 000
RG 174, RG 188, RG 316, RG 179, RG 187	082 000 039 102 000
RG 59	082 000 039 109 000

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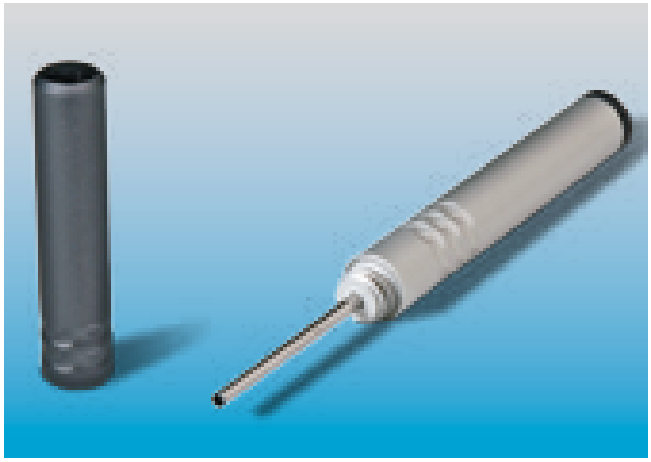
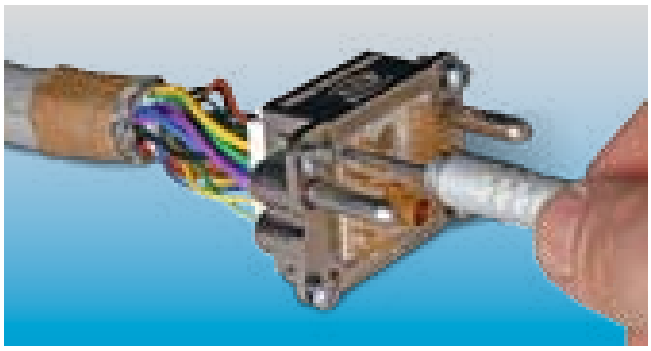
Removal Tools

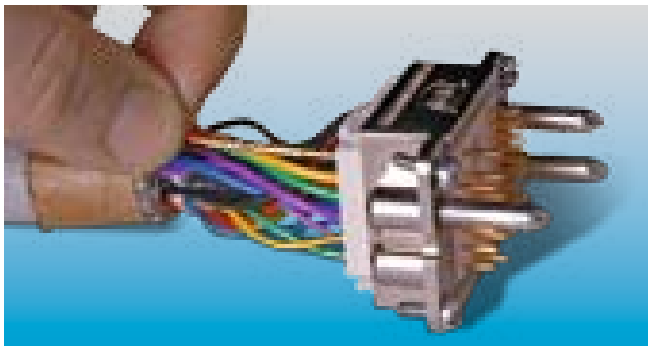
Removal of the contact from the front. Cable of assembled contacts must **not** be cut off.

Contact Ø	Part Number
0.7 mm	087 7CC 070 002 000
1.3 mm	087 7CC 130 004 000
2.0 mm	087 7CC 200 003 000
3.5 mm	087 7CC 350 001 000



Removal of the contacts
Press the removal tool from the front into the insulation body till a quiet “click” is heard. Pulling on the cable removes the contact from the insulation body.

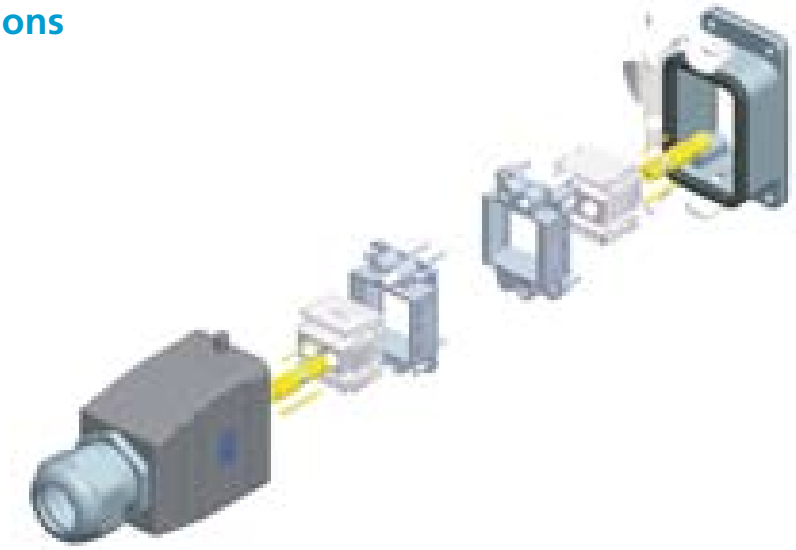




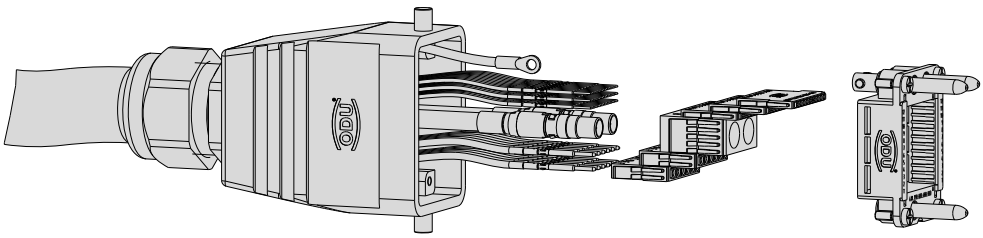
Removal tools for COAX contacts

Contact Ø	Part Number	see page
3.1 mm	087 7CC 310 001 000	11
6.9 mm	087 7CC 690 001 000	12/13

Assembly Instructions

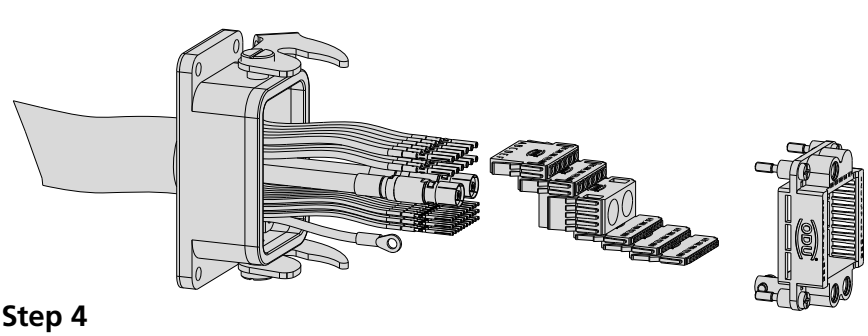


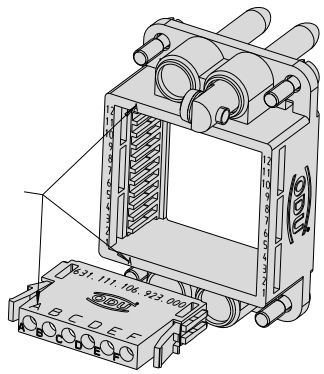
Step 1
Slide cable through
housing / cable gland /
mounting operture



Step 2
Strip cable and wire.
Fit wire into the contact barrel and crimp.

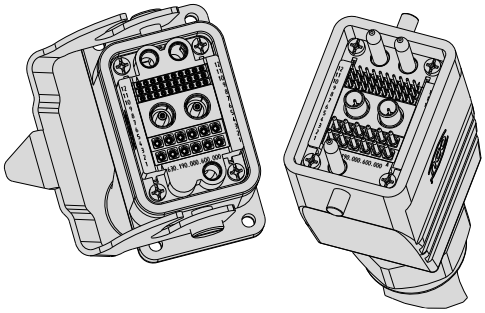
Step 3
Insert contacts into insulator according to the numbering.





Step 4
Put assembled insulators into frame,
observe (A to A) the coding and
clamp PE/Shield onto frame.

Step 5
Mount complete assembled frame in housing,
observe locking torque of max. 1.25 Nm.
Fix cable on strain relief.



Step 6
Visual inspection / mating test.
Frames always have to be filled up
with insulators or spacers.

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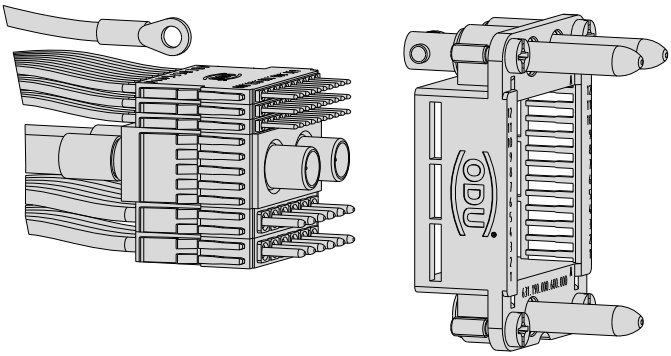
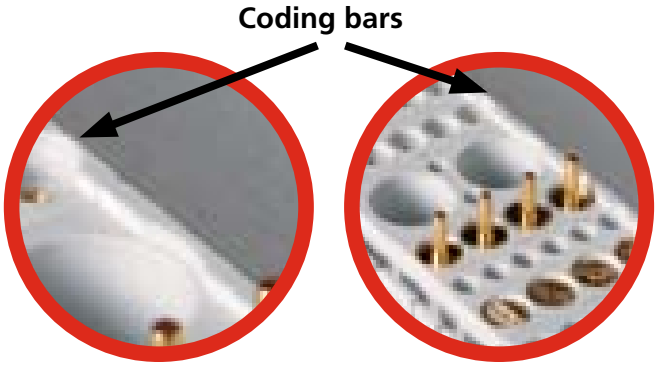
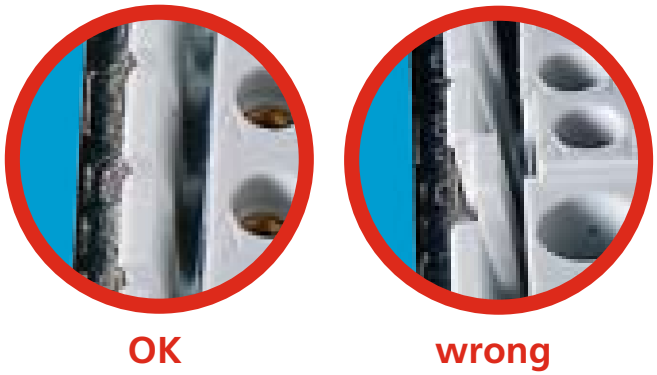
For easier insertion of the populated insulators in the frame, locate them in the correct position before inserting.



All **coding bars** should be in one line.

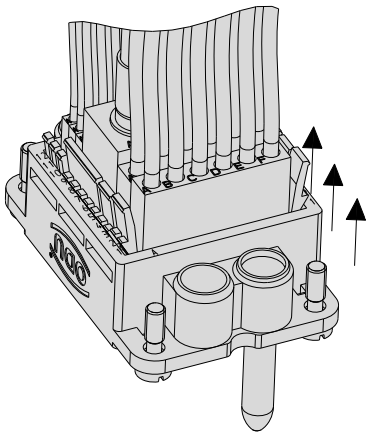


See that all insulators were snapped in correctly. All snap fits should be in line.



For disassembling of insulators, always disassemble several insulators. Don´t pull on the cable.

For the disassembly of the insulators, it is advisable to begin at the edge of the frame.



Technical Information

Electrical Data

Current load (nominal and max. continuous):
Data is based on contacts terminated to correct size of conductors. No additional contact temperature rise occurs due to incorrect conductors or cables. All measured contact temperature rise is due to contact resistance, only.

Nominal current:
The current which causes a 45°C temperature rise (for example: for 23° C to 68° C).

Derating factor

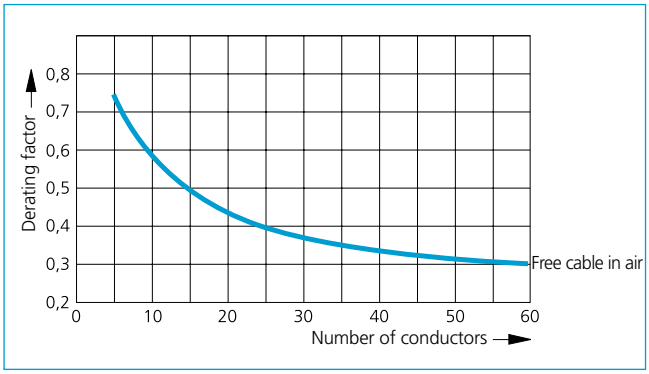
Current load values given in the connector and contact specifications in previous sections are single contact current loads.

With multi-position connectors and cables, the temperature increase is higher than with single contacts. It is therefore necessary to apply a derating factor to calculate the maximum current load per contact in multi-pole connectors. There is no precise specification for connectors. In practice, one uses the derating factor form DIN 57 298 Part 2 and VDE 0298 Part 2 for multi-conductor cables (Ref. DIN 41 640, Part 3).

Load Derating Factor for plastic jacketed cable in air from 1.5 mm² - 10 mm².

Number of Conductors	In Air
5	0.75
7	0.65
10	0.55
14	0.50
19	0.45
24	0.40
40	0.35
61	0.30

Load Derating Factor
plastic jacketed cable in air form 1.5 – 10 mm² in air



Example:
The cable has 24 conductors with a cross-section of 6 mm² each. From the diagram, the derating factor is determined as 0.4.

A single copper conductor with 6 mm² cross-section can carry a load of 44 A. Therefore, a cable with 24 conductors, each having a 6 mm² cross-section, can carry a maximum 17.6 A per conductor (44 A x 0.4 = 17.6 A).

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ODU globally

ODU Steckverbindungssysteme
GmbH & Co. KG
Otto Dunkel GmbH
Pregelstraße 11
84453 Mühldorf a. Inn
Germany
Phone: +49/8631/6156-0
Fax: +49/8631/6156-49
E-Mail: zentral@odu.de
Internet: www.odu.de

ODU France
Phone: +33/1/3935-4690
E-Mail: jean-nicolas.vikelas@odu.fr

ODU Scandinavia
Phone: +46/176/18261
E-Mail peter.biloch@odu.se

ODU UK
Phone: +44/1509-266-433
E-Mail: sales@odu-uk.co.uk

ODU USA
Phone: +1/805/4840540
E-Mail: sales@odu-usa.com

ODU Shanghai Trading
Phone: +86/21/58347828-106
E-Mail: oduchina@odu.com.cn

ODU's headquarters and factory are located in Mühldorf at the River Inn, approximately 50 miles east of Munich, at the foothills of the Bavarian Alps.

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