FAST MOVING TECHNOLOGY

Connectors for battery packs CombiTac CT-HE

Railwayline | Industrial connectors

EN

System description

The connectors described in this document meet the specific requirements of the railway industry and are particularly suited for the use in railway rolling stock. These connectors are based on the components of our modular connector system CombiTac.

The following configurations feature the connections dedicated for battery packs:
The connectors can be combined with Ø 12 mm power contacts and Ø 1.6 mm signal contacts, i.e. electrical connection and monitoring of battery packs.
When both contact types are combined, the signal contacts on page 9 have an interlock function (“first break/last mate”)

Characteristics

- Special configurations are based on the modular connector system CombiTac, preassembled and tested
- Configuration can have modules with or without signal contacts
- Small cables for signal contacts can be secured by attaching them with cable ties on the plastic walls
- Misalignment correction in a blind connection (max. 3° and ±1 mm)
- Fully compliant with railways fire and smoke industry norm EN 45545-2
- Power contacts equipped with touch protection safety IP2X
- Several power contacts available for a wide range of cable cross sections available
- Insulation voltage according to coordination industry norm EN 50124-1 used in railway applications

Optional modules

Additional modules of the product range CombiTac can complete the configurations presented in this document. In this case, a configuration is necessary, do not hesitate to contact us if needed.

Required tools

For the required tools please refer to MA091.

MA

Assembly instructions MA091

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Technical data

General data, configurations	
Max. permissible mounting angular misalignment during mating	3°
Max. permissible mounting offset	± 1 mm
Degree of protection (unmated)	IP2X (up to 1000 V)
Rated insulation voltage (U_{Nm}) Power contacts Ø 12 mm Signal contacts Ø 1.6 mm	see Table page 10
Surge voltage (U_{Ni}) power contacts Ø 12 mm signal contacts Ø 1.6 mm	U_{Ni} at PD1/PD2/PD3: 8 kV 12 kV
Carrier material	PA
Power contacts material	Cu (Ag)
Signal contacts material	CuZn (Au)
Screws	Stainless steel
End piece	Zamak
Supporting rail	Aluminium

Technical data, contacts	
Nominal Ø, Power contacts	12 mm
Nominal Ø, Signal contacts	1.6 mm
Operating temperature	-40 °C/+120 °C
Mating cycles	10'000

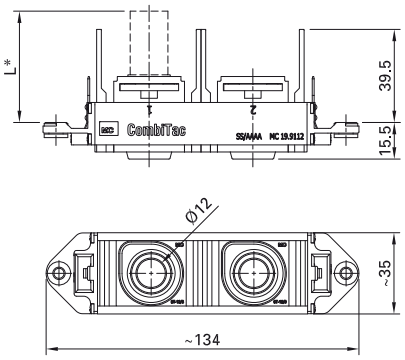
Norms	
Railway applications – Rolling stock – Electrical connectors, requirements and test methods	EN 50467
Railway rolling stock – Electrical connectors – Generalities.	NF F 61030
Connectors – Safety requirements and tests	EN 61984
Connectors for electronic equipment – Tests and measurements – Part 5-2: Current-carrying capacity tests; Test 5b: Current-temperature derating	EN 60512-5
Railway applications – Insulation coordination – Part 1: basic requirements – Cleareances and creepage distances for all electrical and electronic equipment	EN 50124-1
Railway applications – Fire protection on railway vehicles. Part 2: Requirements for fire behaviour of materials and components	EN 45545-2
Rolling stock – Fire behaviour – Materials choosing	NF F 16101
Railway rolling stock – Fire behaviour – Materials choosing, application for electric equipments.	NF F 16102
Railway applications – Rolling stock equipment – Shock and vibration tests	EN 61373

CombiTac combinations

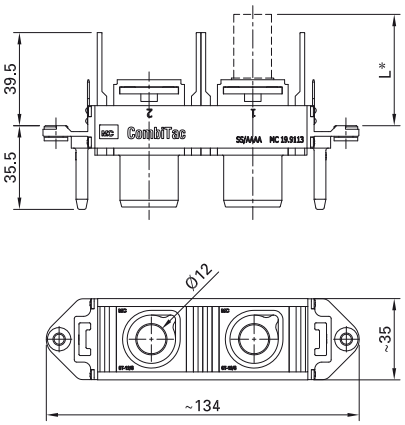
CombiTac CT-HE...2-12

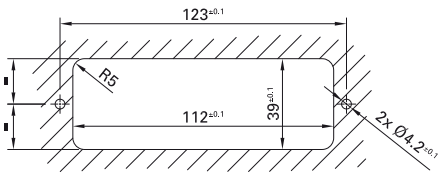
Assembled, without contacts
for 2 × Ø 12 mm Power Contacts

CT-HEB2-12



CT-HES2-12





Order No.	Type	Description
19.9112	CT-HEB2-12	Female configuration
19.9113	CT-HES2-12	Male configuration

* See table page 8

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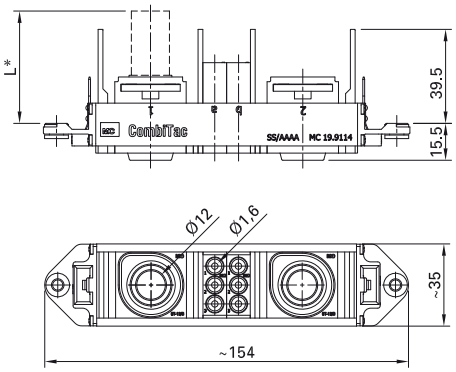
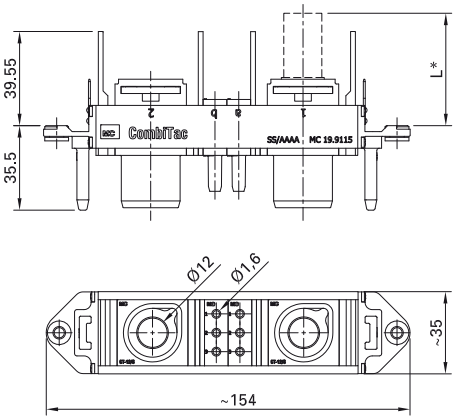
CombiTac CT-HE...2-12+6-1,6

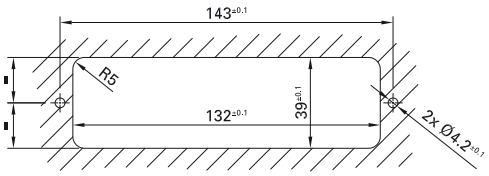
Assembled, without contacts
for 2 × Ø 12 mm Power Contacts
6 × Ø 1.6 mm Signal Contacts

CT-HEB2-12+6-1,6



CT-HES2-12+6-1,6





Order No.	Type	Description
19.9114	CT-HEB2-12+6-1,6	Female configuration
19.9115	CT-HES2-12+6-1,6	Male configuration

* See table page 8

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Assembly instructions MA091

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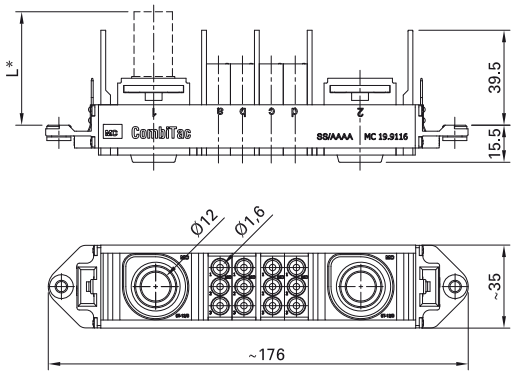
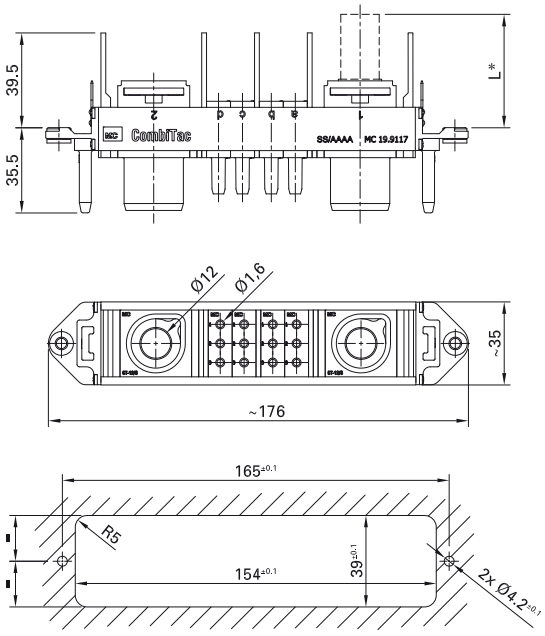
CombiTac CT-HE...2-12+12-1,6

Assembled, without contacts
for 2 × Ø 12 mm Power Contacts
12 × Ø 1.6 mm Signal Contacts

CT-HEB2-12+12-1,6



CT-HES2-12+12-1,6



Order No.	Type	Description
19.9116	CT-HEB2-12+12-1,6	Female configuration
19.9117	CT-HES2-12+12-1,6	Male configuration

* See table page 8

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Assembly instructions MA091

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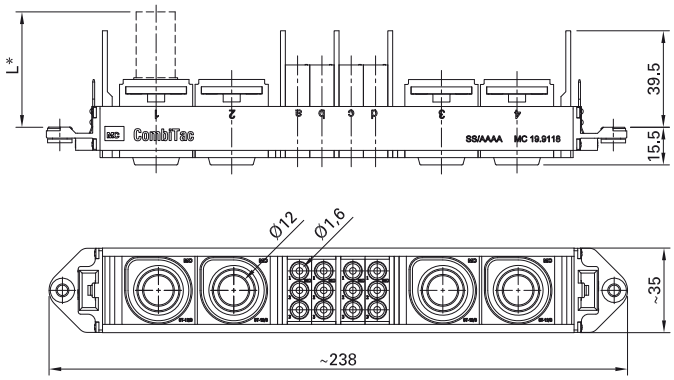
CombiTac CT-HE...4-12+12-1,6

Assembled, without contacts

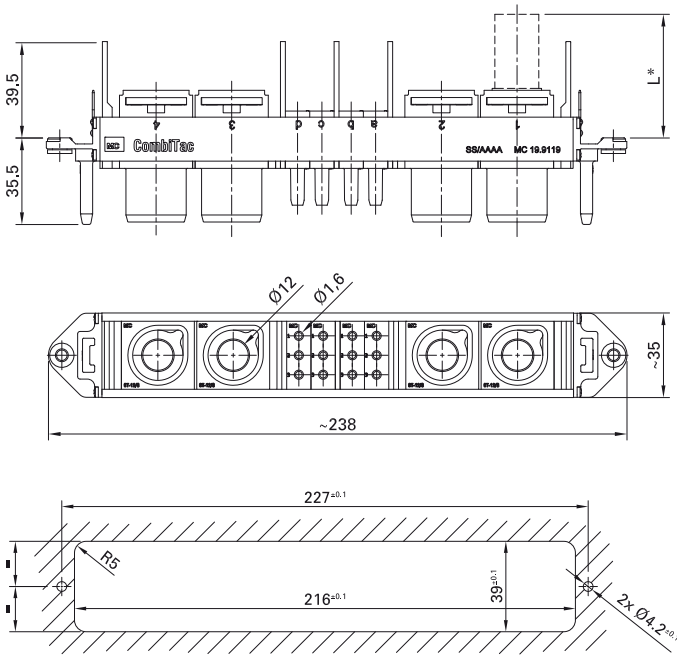
for 4 × Ø 12 mm Power Contacts
12 × Ø 1.6 mm Signal Contacts

Same polarity of power contacts (pole 1 and 2 as well as pole 3 and 4 resp.)

CT-HEB4-12+12-1,6



CT-HES4-12+12-1,6



Order No.	Type	Description
19.9118	CT-HEB4-12+12-1,6	Female configuration
19.9119	CT-HES4-12+12-1,6	Male configuration

* See table page 8

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Assembly instructions MA091

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Contacts

Ø 12 mm Contacts

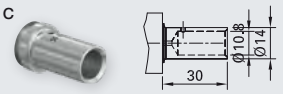
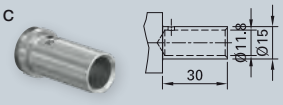
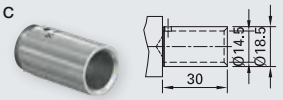
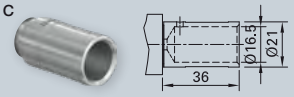
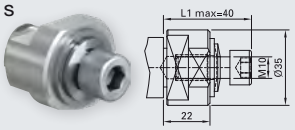
For power contact carriers CT-HE... shown on page 4 to 7. Sockets fitted with MULTILAM.

Type of termination:

- Crimp termination (C) for Cu cable (class 5 and 6)
- Screw termination (S) using an M10 inside thread by means of a cable lug for Cu cable (class 5 and 6)

CTR-B...12/...

CTR-S...12/...

Order No.	Type	Socket	Pin	Plating	Conductor cross section	Rated current[1]	Max. depth[2]	Type of termination
					mm^2	A	L (mm)	
19.1007 **19.1006**	CTR-BP12/50 IP2X AG CTR-SP12/50 IP2X AG	×	×	Ag	50	250	46	C 
19.1009 **19.1008**	CTR-BP12/70 IP2X AG CTR-SP12/70 IP2X AG	×	×	Ag	70	300	50	C 
19.1011 **19.1010**	CTR-BP12/95 IP2X AG CTR-SP12/95 IP2X AG	×	×	Ag	95	360	50	C 
19.1013 **19.1012**	CTR-BP12/120 IP2X AG CTR-SP12/120 IP2X AG	×	×	Ag	120	400	56	C 
19.1015 **19.1014**	CTR-B12/M10 CTR-S12/M10	×	×	Ag	50 70 95 120	250 300 360 430	61	S 

[1] Heating dT = 50 °K, see Derating-Diagram, page 11
[2] See drawings on pages 4 to 7

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Assembly instructions MA091

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Ø 1.6 mm Contacts

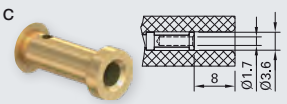
For signal contact carriers CT-HE... from pages 4 to 7. Socket fitted with MULTILAM.
Allows the Interlock function (“first break/last mate”), when combined with power contacts.

For a “first mate/last break” function, leading pin contacts are available on request.

Type of termination:
Crimp termination (C) for Cu conductors

BP-C1,6/0,5-1,5 AU

SP-C1,6/0,5-1,5 AU

Order No.	Type	Socket	Pin	Plating	Conductor cross section	Rated current	Type of termination
					mm²	A	
19.6777 **19.6778**	BP-C1,6/0,5-1,5 AU SP-C1,6/0,5-1,5 AU	×	×	Au	0.5 – 1.5	16	C 

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Assembly instructions MA091

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Rated insulation voltage

Rated insulation voltage (U_{Nm}) depending on pollution degrees and overvoltage categories (acc. EN 50124-1):

Contact carrier Ø 12 mm

Overvoltage category	Pollution degree 1	Pollution degree 2	Pollution degree 3
Surge voltage U_{Ni}	8 kV	8 kV	8 kV
OV 1	2300 V	1800 V	700 V
OV 2	1600 V	1600 V	700 V
OV 3	1200 V	1200 V	700 V
OV 4	900 V	900 V	700 V

Contact carrier Ø 1.6 mm

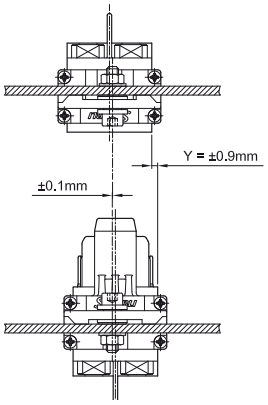
Overvoltage category	Pollution degree 1	Pollution degree 2	Pollution degree 3
Surge voltage U_{Ni}	12 kV	12 kV	12 kV
OV 1	3700 V	2800 V	1100 V
OV 2	3000 V	2800 V	1100 V
OV 3	2300 V	2300 V	1100 V
OV 4	1200 V	1200 V	1100 V

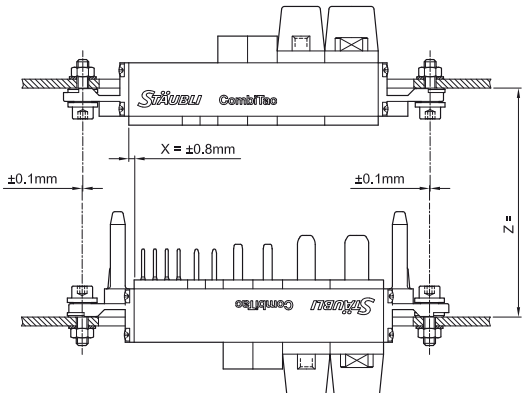
The EN 50124-1 standard names four overvoltage categories (OV) and four degrees of pollution (PD) that describe the environmental conditions to which the component is subjected, in this case the contact carrier:

- **Overvoltage category 1 (OV1):** Very low overvoltages, for use in environments with overvoltage protection (internal and external): no direct contact with overhead contact line; operation in vehicles or buildings; integration in equipment or connectors.
- **Overvoltage category 2 (OV2):** as OV1, but with higher requirements with regard to safety, reliability and/or overvoltage conditions.
- **Overvoltage category 3 (OV3):** as OV4, but with lower requirements with regard to safety, reliability and/or overvoltage conditions.
- **Overvoltage category 4 (OV4):** No protection against overvoltage (internal/external), for example in the event of direct contact with the overhead contact line or hazards arising from lightning strikes or power surges.
- **Pollution degree 1 (PD1):** Either no pollution or dry non-conductive pollution which has no effects.
- **Pollution degree 2 (PD2):** Non-conductive pollution occurs; temporarily conductive pollution possible due to light condensation.
- **Pollution degree 3 (PD3):** Slightly conductive pollution due to enduring condensation; occurs in industrial environments or on construction sites (harsh environments).

Panel mounted

1. Max. permissible mounting offset



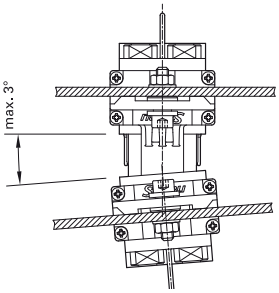


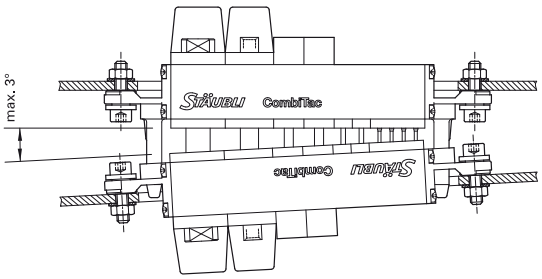
Distance Z in mated condition

Z = 25 $mm^{0/+1}$ (with 1.6 mm contacts)

Z = 25 $mm^{0/+2}$ (without 1.6 mm contacts)

2. Max. permissible mounting angular misalignment during mating

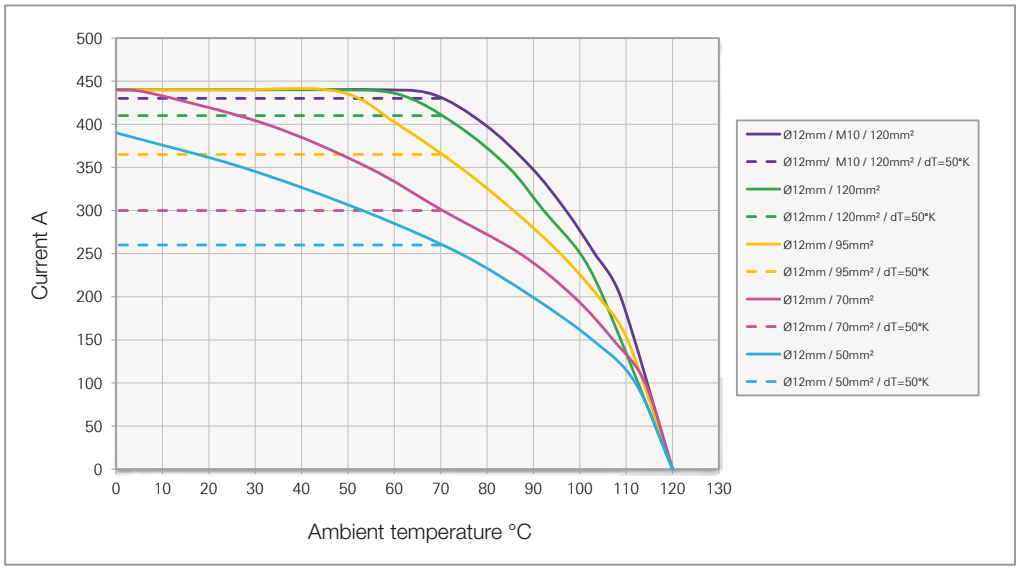




Derating diagram

For a 2 x Ø 12 mm power contacts configuration.

Limiting current curve according to EN 60512-5-2 (2002)



[1] Heating dT = 50 °K

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