

Shell housings and accessories

Page

Summary of shell housings and accessories **20.02**

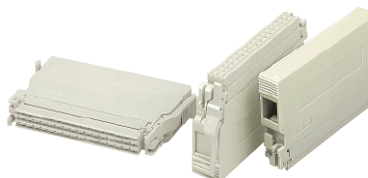
Shell housing C **20.04**



Shell housing 2C, 3C **20.08**

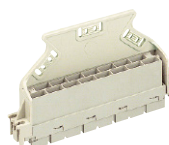
Shell housing A **20.10**

Shell housing B **20.12**



Shell housing D 15 **20.16**

Open hood G **20.19**



Junction element O **20.19**

Shell housings D 20/2 and D 20/4 **20.20**

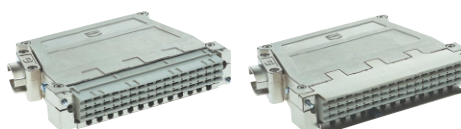


EMC housing **20.26**

Shell housings D 20/2 and D 20/4 metallised. **20.27**



Shell housings D 20 metal **20.30**



Electronic connectors in Heavy Duty Housings **20.33**

Summary shell housings and accessories



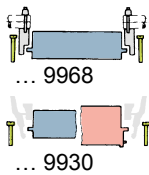
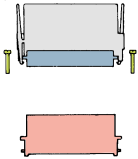
Appropriate connectors in shell housings	Types B, C, D, E, har-bus® 64	Types 2C, 3C	Type F	Types F, H, MH	Types E, F, H, MH
Check list: How to order shell housings and accessories. The Part number is stated.					
Shell housings	C 09 02 064 0501 09 02 064 0502 09 03 096 0501 09 05 048 0501	2C, 3C 09 23 048 0501 09 25 030 0501	A 09 06 048 0501 09 06 048 0402	B 09 06 048 0503 09 06 048 0504 09 06 048 0505	G 09 06 000 9957
Cable insert	09 02 000 9910 09 02 000 9911			09 06 000 9914 09 06 000 9915	
Insert for LED				09 06 000 9917	
Locking lever Order 2 pieces, in some cases each with different Part Nos. for left and right hand	09 02 000 9902 09 02 000 9903	Supplied with the shell housing	Supplied with the shell housing	09 06 000 9913 09 06 000 9919	
Locking screws Order 2 sets for fixing elements with male connectors	09 02 000 9909 M 2.5 x 16 M 2.5	09 02 000 9909 M 2.5 x 16 M 2.5	M 2.5 x 12 M 2.5	09 06 000 9926 M 2.5 x 20 M 2.5	Supplied with the shell housing
for interface connectors I	09 02 000 9909 M 2.5 x 16 M 2.5		M 2.5 x 22 Supplied with the interface connector I	09 06 000 9955 M 2.5 x 26	Supplied with the shell housing
Fixing brackets for 19" racks for male connectors	C 	C 	A 	B 	B
Multiple left fixing	09 02 000 9919	09 02 000 9919	09 06 000 9901	09 06 000 9907 09 06 000 9966 09 06 000 9908 09 06 000 9967	09 06 000 9907 09 06 000 9966 09 06 000 9908 09 06 000 9967
Multiple right fixing	09 02 000 9920	09 02 000 9920	09 06 000 9902		
Single left fixing	09 02 000 9921	09 02 000 9921	09 06 000 9905	09 06 000 9909 09 06 001 9934 09 06 000 9910 09 06 001 9935	09 06 000 9909 09 06 001 9934 09 06 000 9910 09 06 001 9935
Single right fixing	09 02 000 9922	09 02 000 9922	09 06 000 9906		
for female connectors				B 	
Multiple left fixing				09 06 000 9933 09 06 000 9933	
Multiple right fixing					
Fixing brackets for angled male connectors on pcb	C 	C 			
left	09 02 000 9926	09 02 000 9926			
right	09 02 000 9927	09 02 000 9927			
Fixing brackets for inverse male connectors on pcb	R 	R 			
R 1	09 02 000 9953	09 02 000 9953			
R 32	09 02 000 9954	09 02 000 9954			
Distance fixing brackets for piggyback connectors					
Type D top	09 04 000 9907				09 04 000 9907
Type E bottom	09 04 000 9906				09 04 000 9906
Type F top	09 06 000 9936				09 06 000 9936
Type F bottom	09 06 000 9937				09 06 000 9937
Protection strip for 20 mm shell housing				09 06 000 9929	
Protection and fixing strip for 20 mm shell housing				09 06 001 9909	

Female connectors Male connectors

Detailed system description see chapter 00

Summary shell housings and accessories



Appropriate connectors in shell housings	Types F, H, MH	Types F, H, MH	Types F, H, MH	Types F, H, MH	Types F, H, MH
Check list: How to order shell housings and accessories. The Part number is stated.					
Shell housings	O 09 06 000 9968 09 06 000 9930° ° order 2 pieces	D 15 09 06 048 0515	D 20 09 06 048 0521 09 06 048 0522	D 20 metallised 09 06 948 0521 09 06 948 0522	D 20 metal 09 06 848 0550 09 06 848 0551
Cable insert			09 06 000 9988 09 06 000 9989	09 06 900 9988	
Insert for LED			09 06 000 9986 09 06 000 9987	09 06 900 9986 09 06 900 9987	
Locking lever Order 2 pieces, in some cases each with different Part Nos. for left and right hand		Supplied with the shell housing			
Locking screws Order 2 sets for fixing elements with male connectors for interface connectors I	09 06 000 9926 M 2.5 x 20 M 2.5	09 06 000 9926 M 2.5 x 16 M 2.5	Supplied with the shell housing	Supplied with the shell housing	Supplied with the shell housing
Shroud for screw fixing with interface connector I	—	—	09 06 001 9964	09 06 001 9964	—
Fixing brackets for 19" racks for male connectors Multiple fixing	B 	B 	B 	B 	B 
left	09 06 000 9907 09 06 000 9966	09 06 000 9907 09 06 000 9966	09 06 000 9907 09 06 000 9966 09 06 000 9995 09 06 000 9997	09 06 900 9907 09 06 900 9966 09 06 900 9995 09 06 900 9997	09 06 900 9997
right	09 06 000 9908 09 06 000 9967	09 06 000 9908 09 06 000 9967	09 06 000 9908 09 06 000 9967 09 06 000 9996 09 06 000 9998	09 06 900 9908 09 06 900 9967 09 06 900 9996	09 06 900 9996
Single fixing	left 09 06 000 9909 09 06 001 9934	left 09 06 000 9909 09 06 001 9934	left 09 06 000 9909 09 06 001 9934	left 09 06 900 9909 09 06 901 9934	left 09 06 800 9943 09 06 901 9924
right	right 09 06 000 9910 09 06 001 9935	right 09 06 000 9910 09 06 001 9935	right 09 06 000 9910 09 06 001 9935	right 09 06 900 9910 09 06 901 9935	right 09 06 800 9944 09 06 901 9925
for female connectors	B 	B 			
Multiple fixing	only ... 9930 09 06 000 9933 09 06 000 9933	09 06 000 9933 09 06 000 9933			
Protection and fixing strip for 20 mm shell housing			09 06 001 9909	09 06 901 9909	

Shell housings

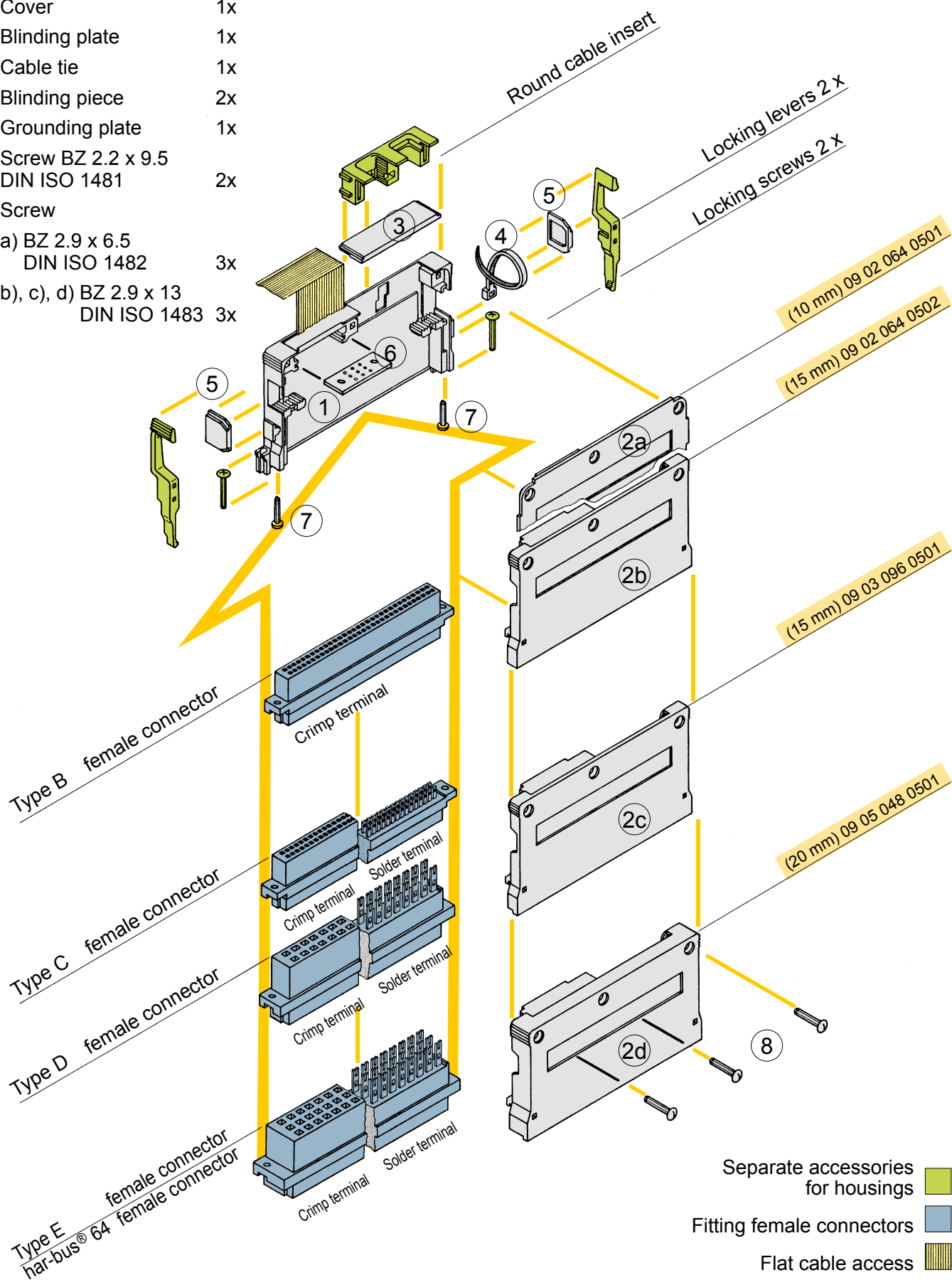
Female connectors Male connectors

Detailed system description see chapter 00

Shell housing C for types B, C, D, E and har-bus® 64



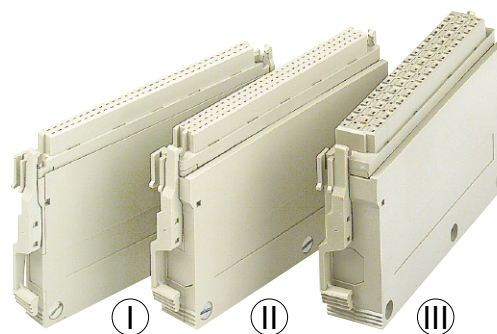
- | | |
|--|----|
| ① Shell | 1x |
| ② Cover | 1x |
| ③ Blinding plate | 1x |
| ④ Cable tie | 1x |
| ⑤ Blinding piece | 2x |
| ⑥ Grounding plate | 1x |
| ⑦ Screw BZ 2.2 x 9.5
DIN ISO 1481 | 2x |
| ⑧ Screw | |
| a) BZ 2.9 x 6.5
DIN ISO 1482 | 3x |
| b), c), d) BZ 2.9 x 13
DIN ISO 1483 | 3x |



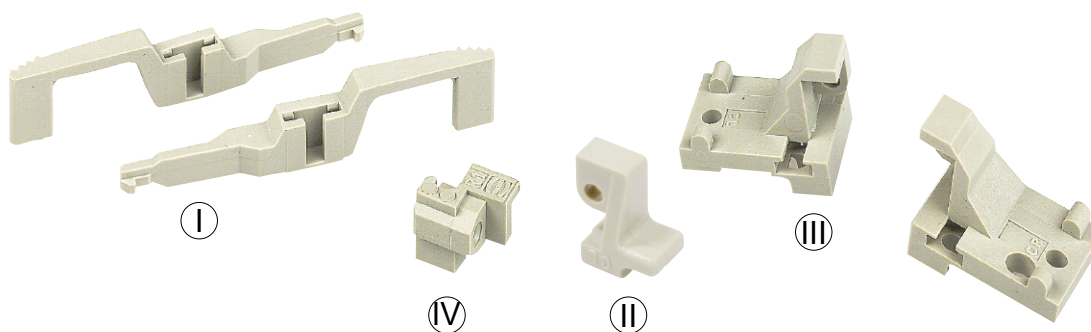
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04

Moulding material: thermoplastic resin, glass-fibre filled, UL 94-V0

Shell housing C for types B, C, D, E and har-bus® 64

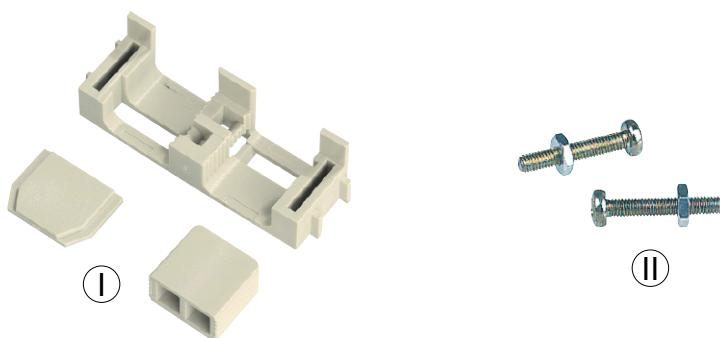


Identification	Part number	Drawing	Dimensions in mm
Shell housing C for female connectors type B I	10 mm 09 02 064 0501		
Shell housing C for female connectors types C, D II	15 mm 09 02 064 0502		
Shell housing C for female connectors type E, har-bus® 64 III	20 mm 09 05 048 0501		
1) Possible access for flat cable (18 x Ø 1.27). Remove the blanking piece.			



Accessories

Identification	Part number	Drawing	Dimensions in mm
Locking lever for shell housing C I	left 09 02 000 9902 right 09 02 000 9903		
Fixing brackets C for male connectors for 19" racks according to DIN EN 60 297, part 3-101 Multiple fixing II	left 09 02 000 9919 right 09 02 000 9920		
Single fixing III	left 09 02 000 9921 right 09 02 000 9922		
Fixing brackets R for inverse male connectors on pcb's IV Screw DIN ISO 7049 M 2.2 x 9.5	R 1 09 02 000 9953 R 32 09 02 000 9954 09 06 001 9974		See application example 4, chapter 01

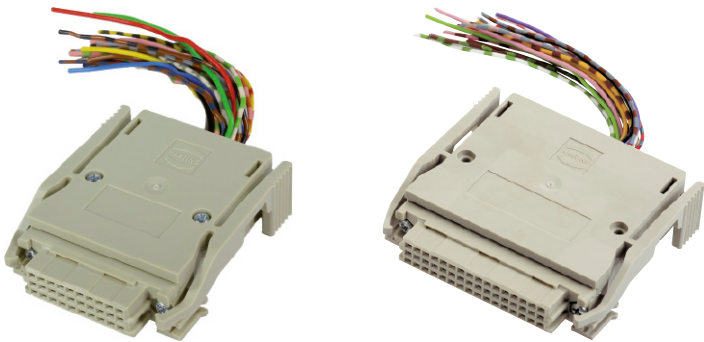


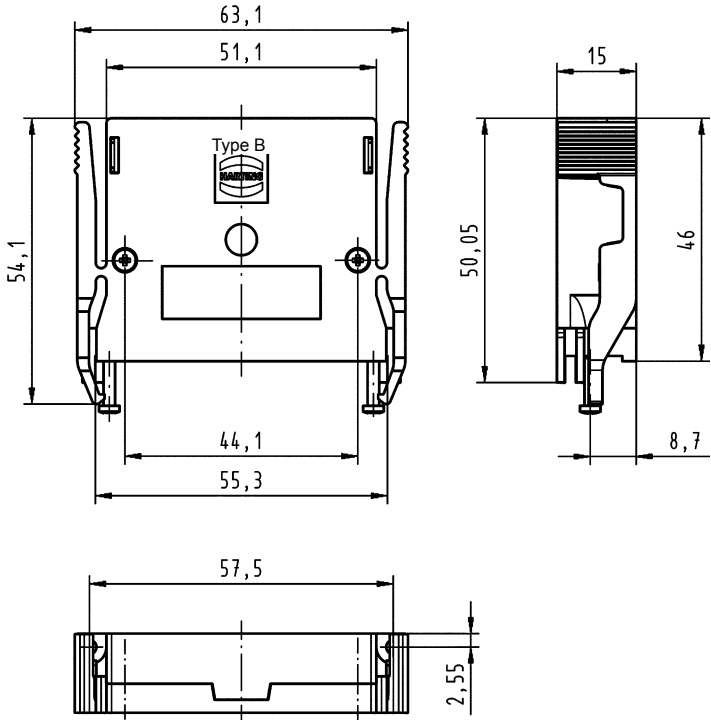
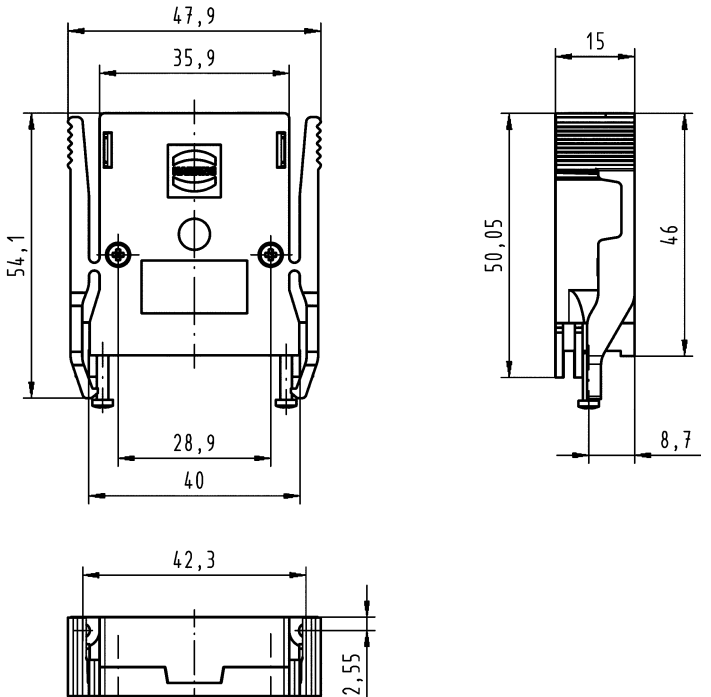
Accessories

Identification	Part number	Drawing	Dimensions in mm
Fixing brackets C for angled male connectors on pcb without fixing possibility in 19" racks	left 09 02 000 9926 ^{f)} right 09 02 000 9927 ^{f)}		
Round cable insert 2 x ø 6.5 for shell housing C 09 02 064 0501 Supplied with: Round cable insert 1x Blinding piece A 1x Blinding piece B 1x Cable tie 1x	09 02 000 9910 ^{f)}		
Round cable insert 2 x ø 11.5 ① for shell housings C 09 02 064 0502 09 03 096 0501 09 05 048 0501 Supplied with: Round cable insert 1x Blinding piece A 1x Blinding piece B 1x Cable tie 1x	09 02 000 9911 ^{f)}		
Locking screws ②	09 02 000 9909 ¹⁾		

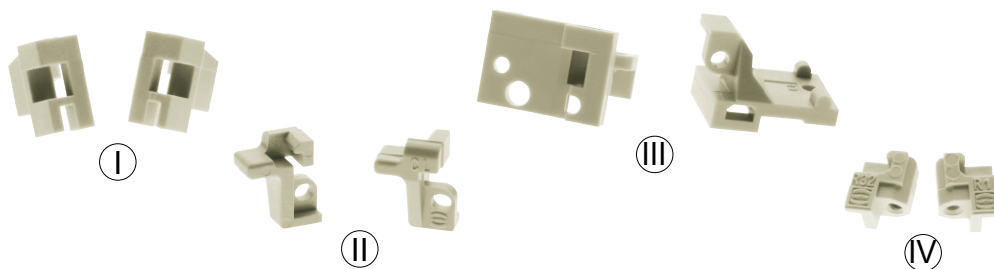
¹⁾ Order 2 pieces for one shell housing

^{f)} Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2

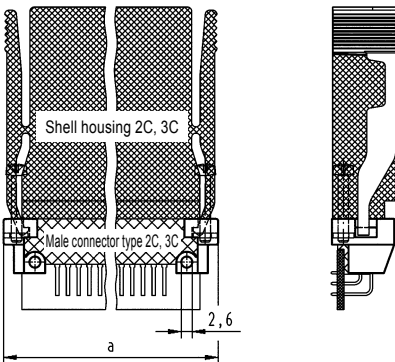
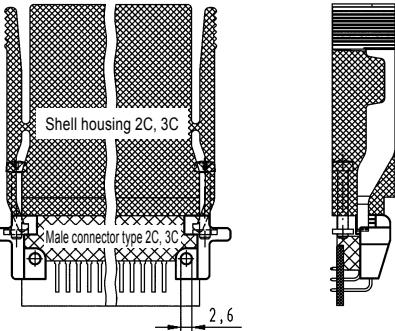
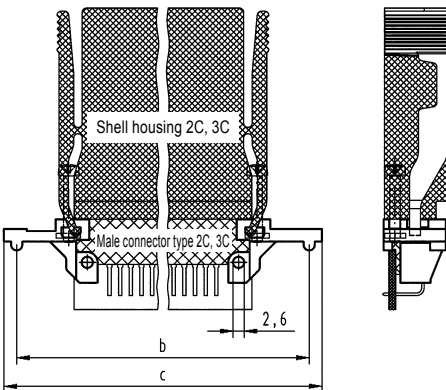
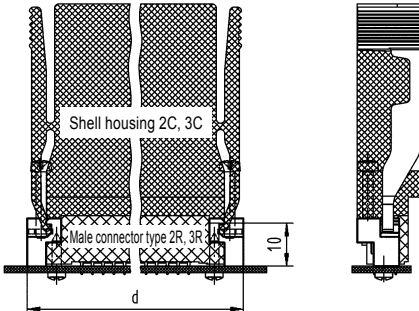


Identification	Part number	Drawing	Dimensions in mm
Shell housing 2C for female connectors type 2C Supplied with: Shell 1x Cover with 2 locking levers 1x Cable tie 1x Screw 2.2 x 9.5 4x (09 06 001 9974)	09 23 048 0501		
Shell housing 3C for female connectors type 3C Supplied with: Shell 1x Cover with 2 locking levers 1x Cable tie 1x Screw 2.2 x 9.5 4x (09 06 001 9974)	09 25 030 0501		

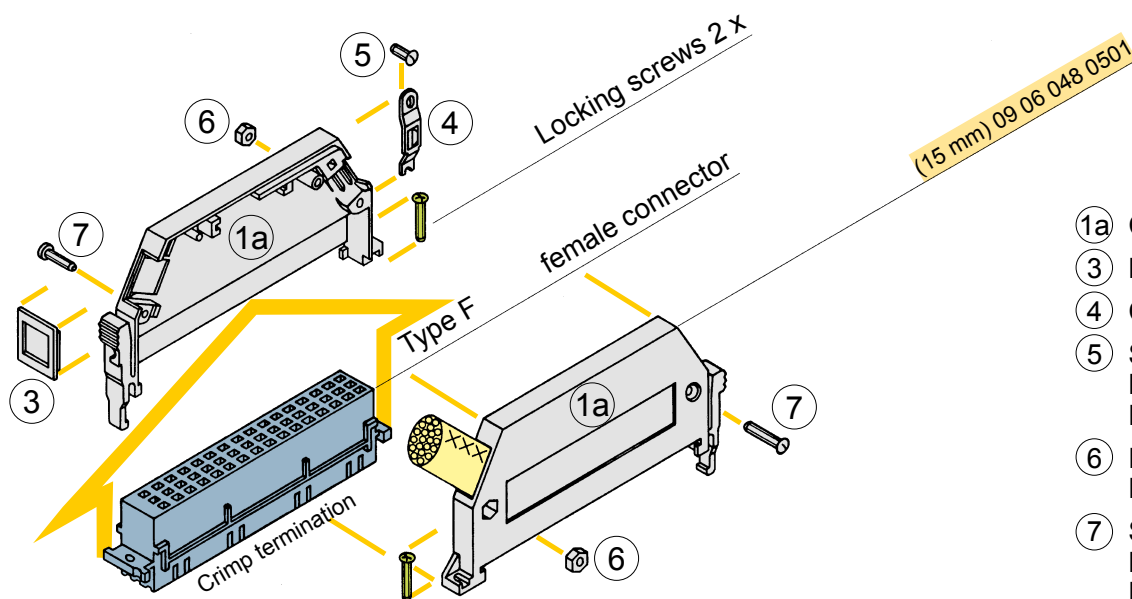
Shell housings



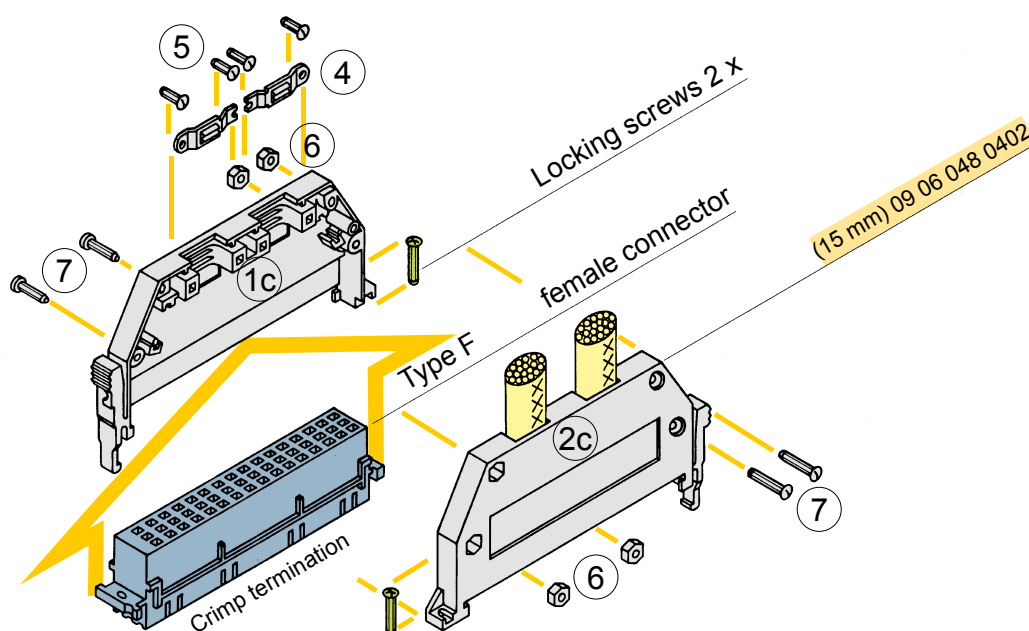
Accessories

Identification	Part number	Drawing	Dimensions in mm									
Fixing brackets C for angled male connectors on pcb without fixing possibility in 19" racks I	left 09 02 000 9926 right 09 02 000 9927		<table><tr><td></td><td>a</td></tr><tr><td>2C</td><td>63.7</td></tr><tr><td>3C</td><td>48.4</td></tr></table>		a	2C	63.7	3C	48.4			
	a											
2C	63.7											
3C	48.4											
Fixing brackets C for male connectors for 19" racks according to DIN EN 60 297, part 3-101 Multiple fixing II	left 09 02 000 9919 right 09 02 000 9920											
Single fixing III	left 09 02 000 9921 right 09 02 000 9922		<table><tr><td></td><td>b</td><td>c</td></tr><tr><td>2C</td><td>82.3</td><td>88.4</td></tr><tr><td>3C</td><td>67.1</td><td>73.2</td></tr></table>		b	c	2C	82.3	88.4	3C	67.1	73.2
	b	c										
2C	82.3	88.4										
3C	67.1	73.2										
Fixing brackets R for inverse male connectors on pcb's IV Screw DIN ISO 7049 M2.2 x 9.5	R 1 09 02 000 9953 R 32 09 02 000 9954 09 06 001 9974		<table><tr><td></td><td>d</td></tr><tr><td>2C</td><td>64.1</td></tr><tr><td>3C</td><td>48.9</td></tr></table>		d	2C	64.1	3C	48.9			
	d											
2C	64.1											
3C	48.9											

Shell housing A for type F



- ①a Casing shell 2x
- ③ Blinding piece 1x
- ④ Cable clamp 1x
- ⑤ Screw
BZ 2.9 x 9.5
DIN ISO 1481 1x
- ⑥ Hexagonal nut M3
DIN EN ISO 4032 2x
- ⑦ Screw
M3 x 12
DIN EN ISO 1207 2x



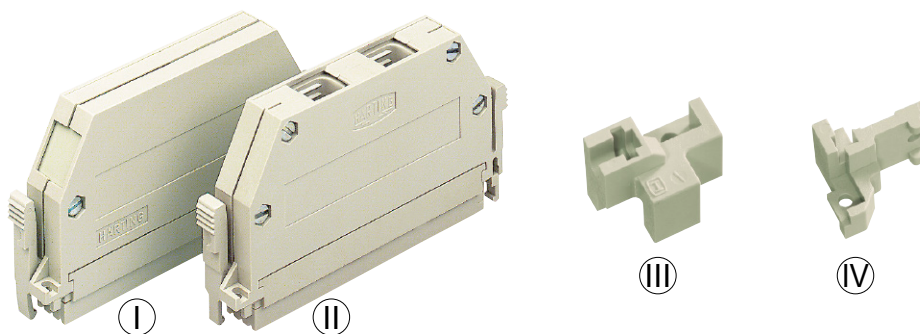
- ①c Shell 1x
- ②c Cover 1x
- ④ Cable clamp 2x
- ⑤ Screw
BZ 2.9 x 9.5
DIN ISO 1481 4x
- ⑥ Hexagonal nut M3
DIN EN ISO 4032 4x
- ⑦ Screw
M3 x 12
DIN EN ISO 1207 4x

Shell
housings

- Separate accessories for housings
- Fitting female connectors
- Cable access
- Housing parts supplied

20
10 Moulding material: thermoplastic resin, glass-fibre filled, UL 94-V0

Shell housing A for type F



Identification	Part number	Drawing	Dimensions in mm
Shell housing A Side entry I	15 mm 09 06 048 0501 ^{f)}		
	15 mm 09 06 048 0402 ^{f)}		
Cable clamp incl. screw	09 06 001 9986	1 x ④ + 2 x ⑤ on page 20.10	
Fixing brackets A for male connectors for 19" racks according to DIN EN 60 297, part 3-101 Multiple fixing III	left 09 06 000 9901 ^{f)} right 09 06 000 9902 ^{f)}	 left right	
	left 09 06 000 9905 ^{f)} right 09 06 000 9906 ^{f)}	 left right	

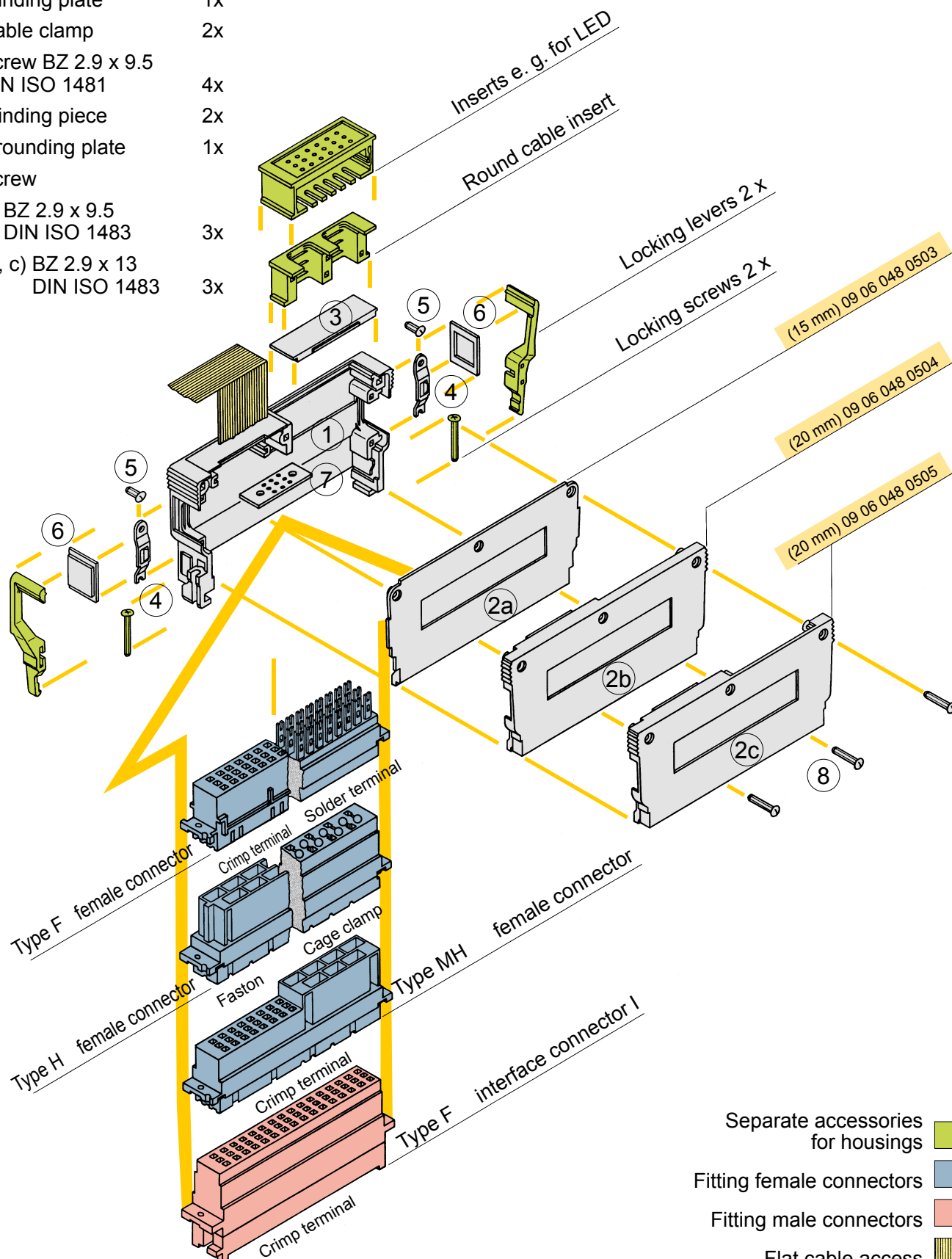
1) nut and screw not supplied with bracket

^{f)} Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2

Shell housing B for types F, H and MH



- | | |
|--------------------------------------|----|
| ① Shell | 1x |
| ② Cover | 1x |
| ③ Blinding plate | 1x |
| ④ Cable clamp | 2x |
| ⑤ Screw BZ 2.9 x 9.5
DIN ISO 1481 | 4x |
| ⑥ Blinding piece | 2x |
| ⑦ Grounding plate | 1x |
| ⑧ Screw | |
| a) BZ 2.9 x 9.5
DIN ISO 1483 | 3x |
| b), c) BZ 2.9 x 13
DIN ISO 1483 | 3x |

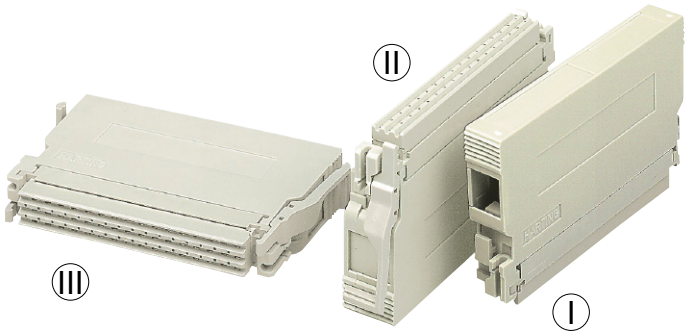


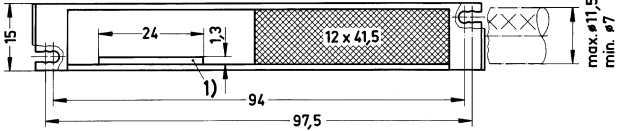
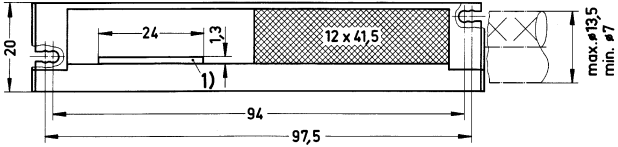
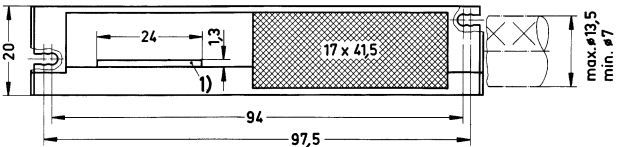
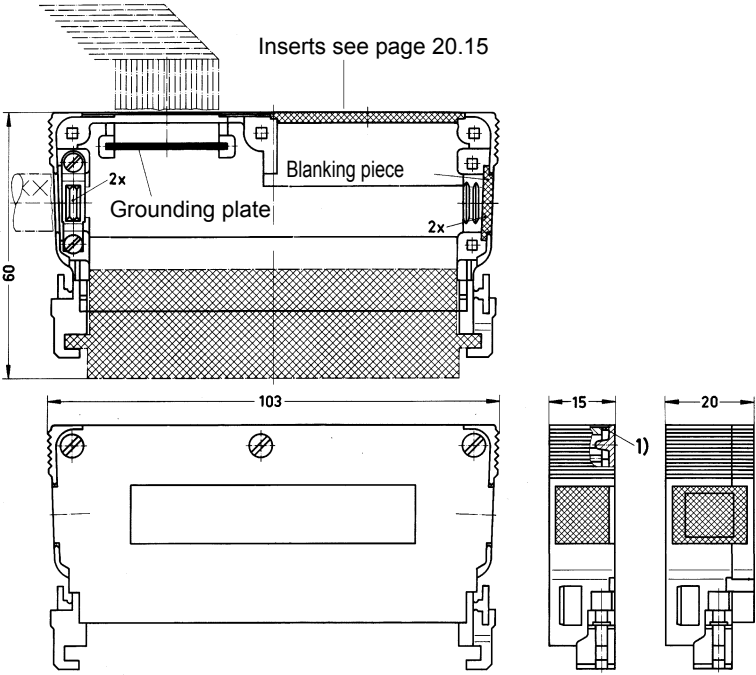
Shell
housings

20

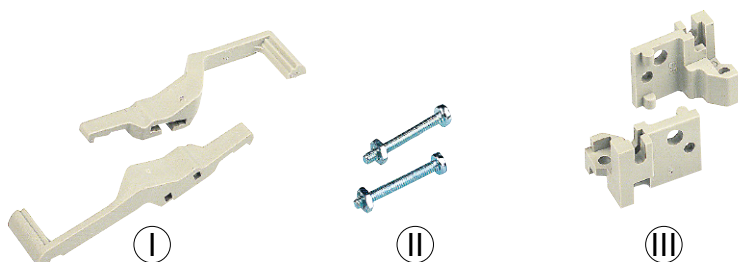
12 Moulding material: thermoplastic resin, glass-fibre filled, UL 94-V0

- Separate accessories for housings
- Fitting female connectors
- Fitting male connectors
- Flat cable access
- Housing parts supplied



Identification	Part number	Drawing	Dimensions in mm
Shell housing B	I 15 mm 09 06 048 0503		
	II 20 mm 09 06 048 0504		
	III 20 mm 09 06 048 0505		
		Inserts see page 20.15 	
		1) Possible access for flat cable (18 x 1.27). Remove the blanking piece	

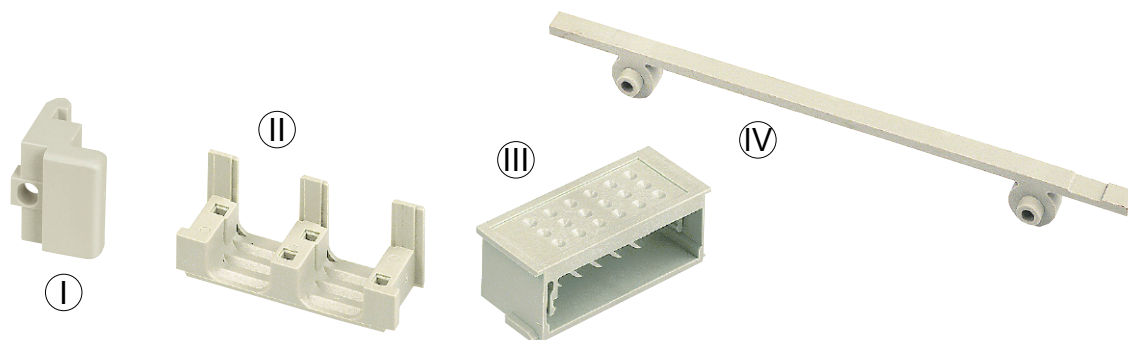
Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2



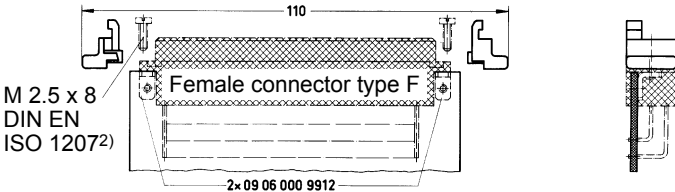
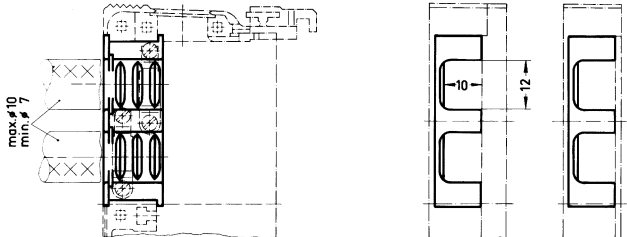
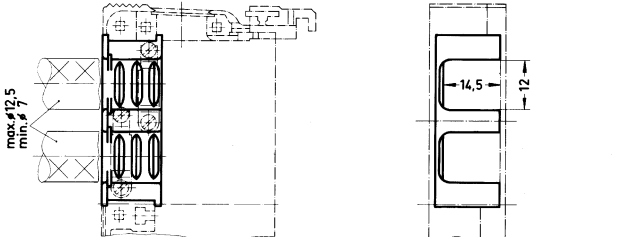
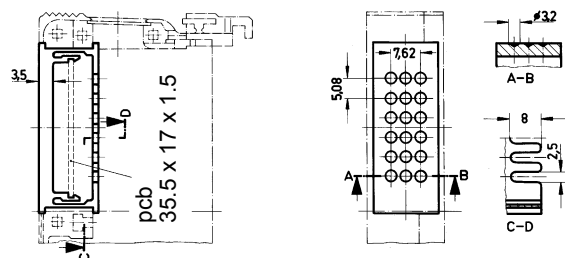
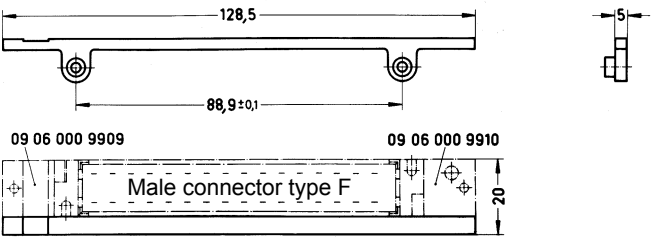
Accessories

Identification	Part number	Drawing	Dimensions in mm
Locking lever for shell housing B 09 06 048 0503 I	09 06 000 9913 ¹⁾ f)		
09 06 048 0504 09 06 048 0505 1) Order 2 pieces for one shell housing	left 09 06 000 9913 ^{f)} right 09 06 000 9919 ^{f)}		
Locking screws II	09 06 000 9926 ¹⁾		
Fixing brackets B for male connectors for 19" racks according to DIN EN 60 297, part 3-101 Multiple fixing without nut with nut M 2.5 DIN 562	left 09 06 000 9907 ^{f)} right 09 06 000 9908 ^{f)} left 09 06 000 9966 ^{f)} right 09 06 000 9967 ^{f)}		
Single fixing without nut III	left 09 06 000 9909 ^{f)} right 09 06 000 9910 ^{f)} left 09 06 001 9934 right 09 06 001 9935		

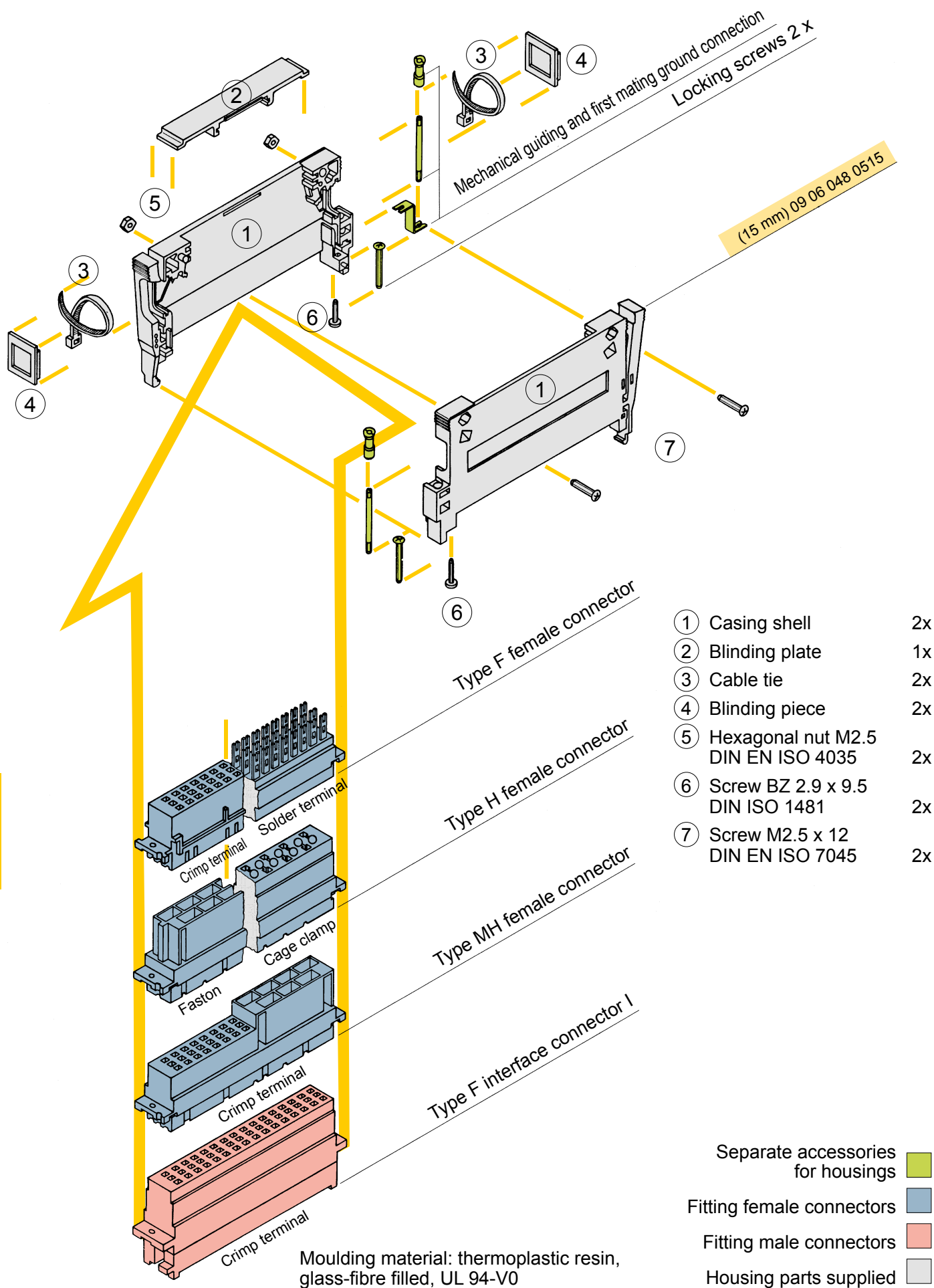
^{f)} Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2



Accessories

Identification	Part number	Drawing	Dimensions in mm
Fixing brackets B for female connectors for 19" racks according to DIN EN 60 297, part 3-101 Multiple fixing  1) Order 2 pieces for one female connector	09 06 000 9933 ¹⁾	 2) nut and screw not supplied with fixing brackets	
Round cable insert 2 x $\varnothing 10$ for shell housings B 09 06 048 0503 09 06 048 0504 Supplied with: Round cable insert 1x Blinding piece 1x	09 06 000 9914		
Round cable insert 2 x $\varnothing 12.5$  for shell housing B 09 06 048 0505 Supplied with: Round cable insert 1x Blinding piece 1x	09 06 000 9915		
Insert for LED  for shell housing B 09 06 048 0505	09 06 000 9917		
Protection strip  Used with shell housings type B for front side access 09 06 048 0504 09 06 048 0505	09 06 000 9929		

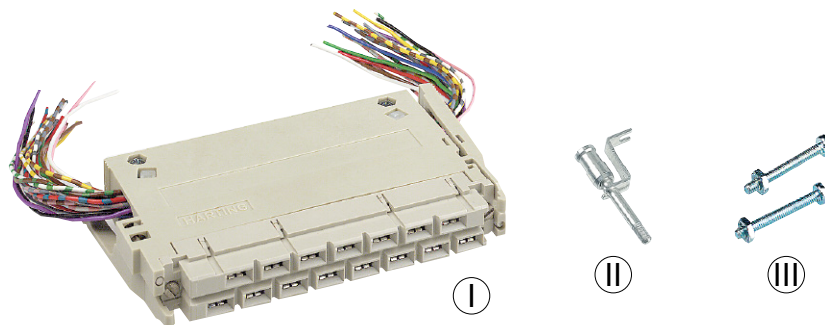
Shell housing D 15 for types F, H and MH



Shell housings

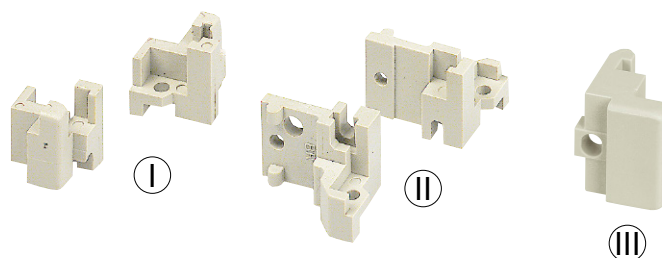
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Shell housing D 15 for types F, H and MH



Identification	Part number	Drawing	Dimensions in mm
Shell housing D 15 I	15 mm 09 06 048 0515 ¹⁾		
Mechanical guiding and first mating ground connection II	09 06 000 9961		
Locking screws III 1) Order 2 pieces for one shell housing	09 06 000 9926 ¹⁾		

¹⁾ Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2



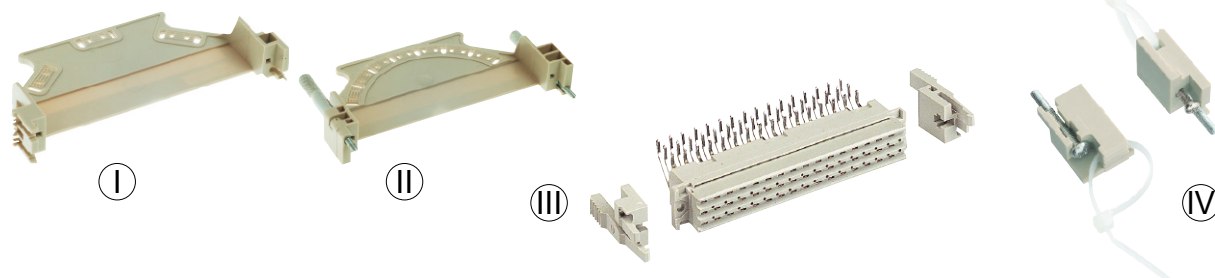
Accessories

Identification	Part number	Drawing	Dimensions in mm
Fixing brackets B for male connectors for 19" racks according to DIN EN 60 297, part 3-101 Multiple fixing without nut I with nut M 2.5 DIN 562	left 09 06 000 9907 right 09 06 000 9908 left 09 06 000 9966 right 09 06 000 9967		
Single fixing without nut II with nut M 2.5 DIN 562	left 09 06 000 9909 right 09 06 000 9910 left 09 06 001 9934 right 09 06 001 9935		
Fixing brackets B for female connectors for 19" racks according to DIN EN 60 297, part 3-101 Multiple fixing III	09 06 000 9933 ¹⁾		

¹⁾ Order 2 pieces for one female connector

²⁾ nut and screw not supplied with fixing brackets

Open hood G, junction element O, locking lever



Identification	Part number	Drawing	Dimensions in mm
Open hood G I for types E, F, H and MH, for applications A B C Supplied with: Open hood 1x Locking screw 2x (09 06 000 9958) Cable tie 1x Screw 2x	09 06 000 9957	2 x ST 2.2 x 9.5 F-Z; E1U; ISO 7049	
Open hood G II for types E, F, H and MH, for application C Supplied with: Open hood 1x Pre-assembled, undetachable locking screw 2x Cable tie 1x Screw 2x	09 06 001 9939		
Junction element O for type F IV Supplied with: Junction element 2x Cable tie 2x Screw 2x Screw M2.5 x 20 2x	09 06 000 9968	2 x ST 2.2 x 9.5 F-Z; E1U; ISO 7049	
Locking lever for type F, H and MH III ¹⁾ Order 2 pieces for one female connector	09 06 000 9930¹⁾ 09 06 000 9911¹⁾	²⁾ nut and screw not supplied with locking levers	

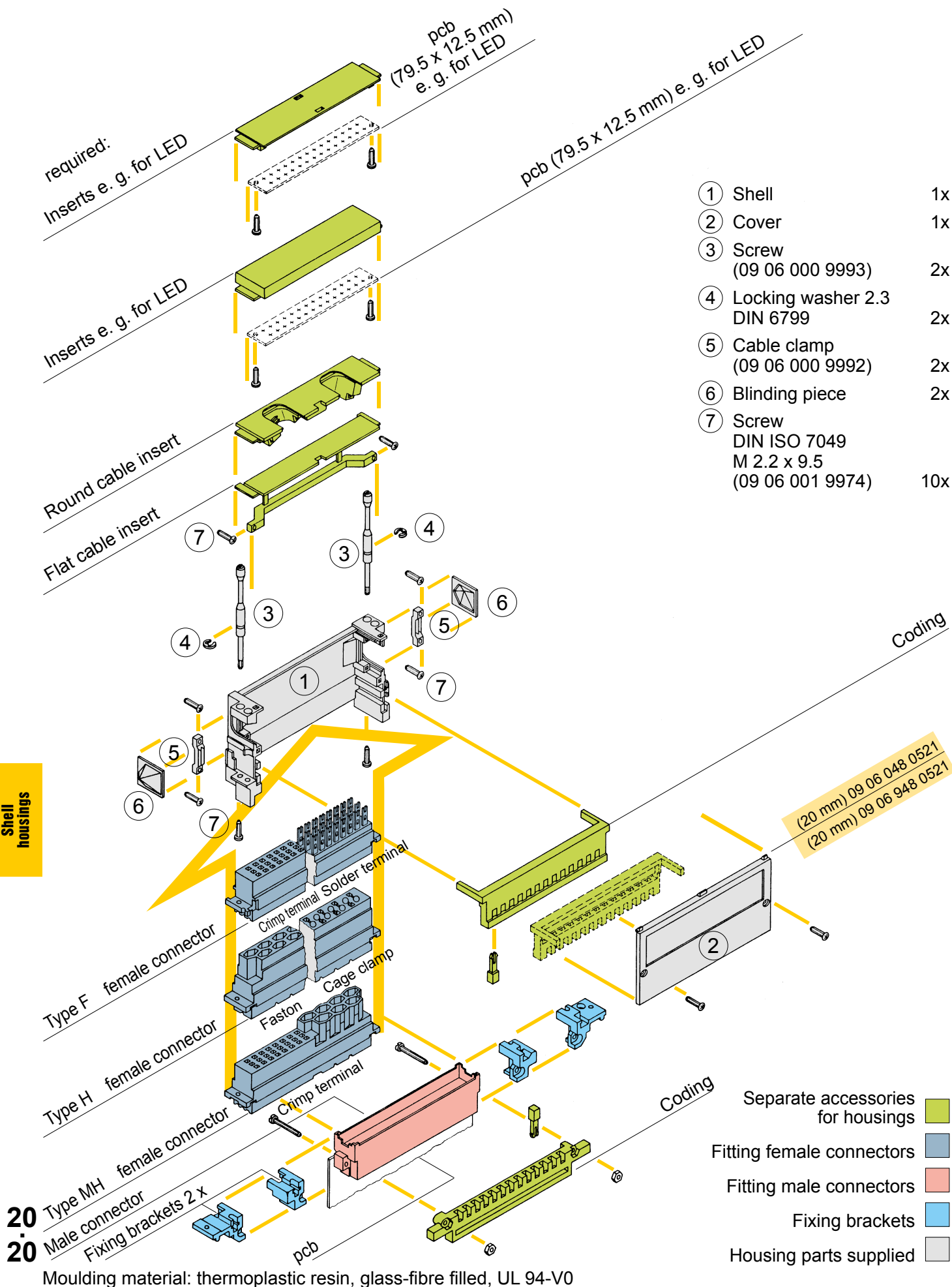
Shell housings

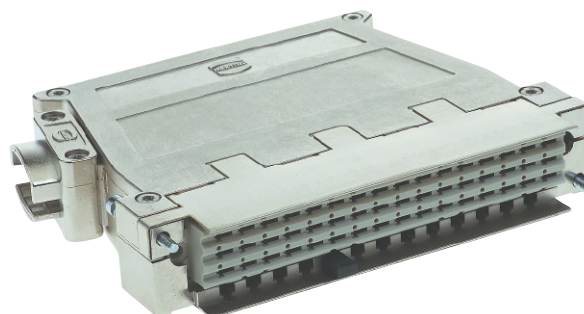
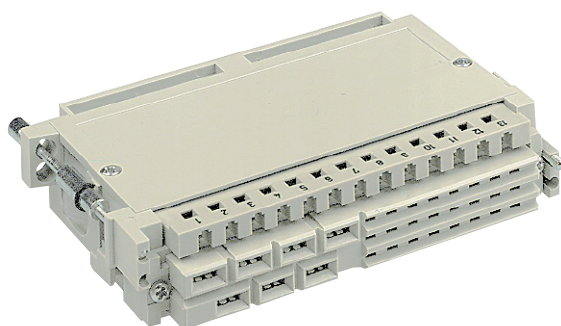
20
19

Shell housing D 20/2 for types F, H and MH



Shell housings





Fitting female connectors

Part-No.	Type	D 20/2	D 20/4	D 20 metal	D 20 metal HF
09 06 2__ 823	F with open solder lugs	X		X	X
09 06 2__ 853	F with closed solder lugs	X		X	X
09 06 248 3201	F moulding for crimp contacts	X	X	X	X
09 06 215 2871	H for faston	X		X	X
09 06 015 2813	H with cage clamps	X		X	X
09 06 231 2881	MH moulding for crimp contacts	X		X	X

Order example:

32 = 32 contacts
48 = 48 contacts

09 06 2__ 853



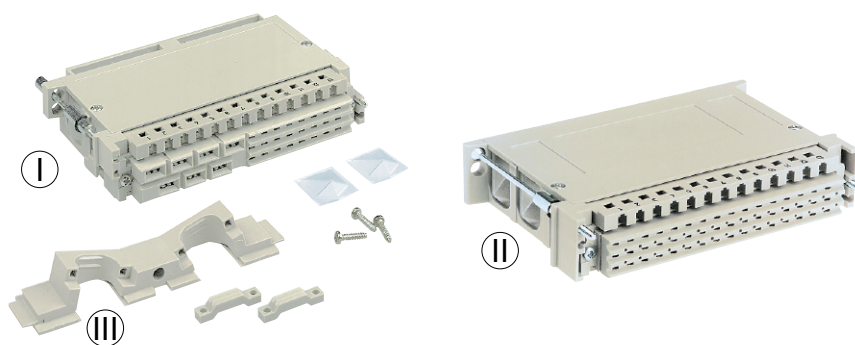
7 = performance level 3
6 = performance level 2
2 = performance level 1

Technical characteristics

	D 20/2	D 20/2 metallised ¹⁾	D 20/4	D 20/4 metallised ¹⁾	D 20 metal	D 20 metal HF
Part number	09 06 048 0521	09 06 948 0521	09 06 048 0522	09 06 948 0522	09 06 848 0550	09 06 848 0551
Material	Polycarbonate	Polycarbonate	Polycarbonate	Polycarbonate	Zinc alloy	Zinc alloy
Surface	none	nickel/copper	none	nickel/copper	nickel-plated	nickel-plated
Weight [g]	36	44	43	52	182	188
Cable entries	side (2 x), top (2 x)	side (2 x), top (2 x)	side (4 x)	side (4 x)	side (2 x), top (2 x)	side (2 x), top (2 x)
Protection	IP20	IP20	IP20	IP20	IP20	IP20

¹⁾ upper temperature limit is +105 °C

Shell housing D 20 for types F, H and MH

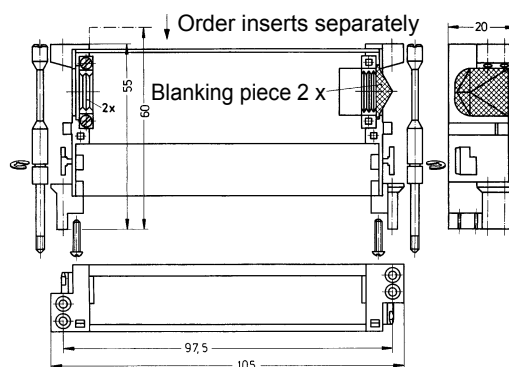


Identification	Part number	Drawing	Dimensions in mm
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Shell housing
D 20/2
Two side
cable entries

I

20 mm
09 06 048 0521

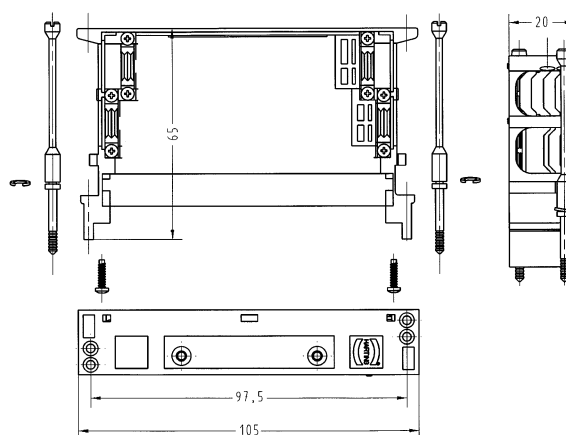


Shell housing
D 20/4
Four side
cable entries

II

Supplied with:
Shell 1x
Cover 1x
Locking screw 2x
(09 06 000 9920)
Locking washer 2.3 2x
Screw BZ 2.2x9.5 12x
Blinding piece 3x
Cable clamp 2x

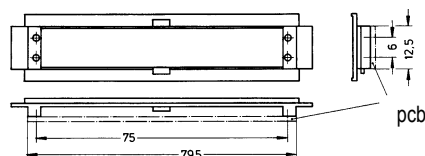
20 mm
09 06 048 0522



Inserts e. g. for LED*

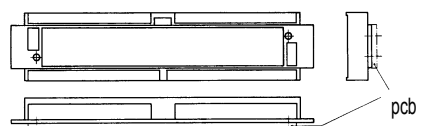
for 55 mm height

09 06 000 9986



for 60 mm height

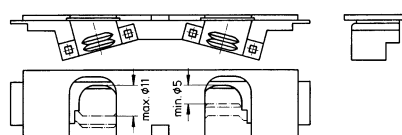
09 06 000 9987



Round cable insert*
2 x Ø 11

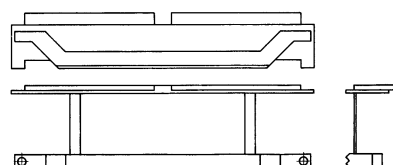
III

09 06 000 9988

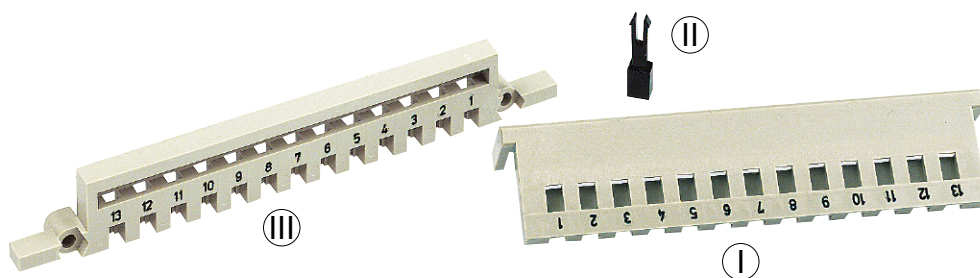


Flat cable insert*

09 06 000 9989



* Fits D 20/2
Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2



Coding

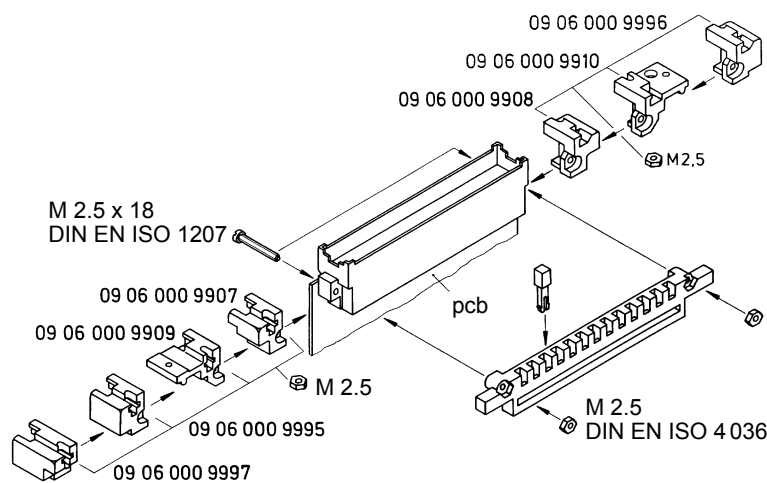
Identification	Part number	Drawing	Dimensions in mm
Code comb for shell housing³⁾ (can also be used as a blanking cover) (I)	09 06 000 9984 ^{f)}		
Coding pin³⁾ (II) 1) Order 13 pieces per code comb	09 06 001 9905 ¹⁾	Order 13 pieces per code comb	
Code comb for male connectors³⁾ (III) short version for a full metal locking lever with nut M2.5	09 06 000 9985 ^{f)} 09 06 001 9985 ^{f)} 09 06 001 9995 ^{f)}		
Mounting possibilities for the code comb in the shell housing D 20/2		2) Use the lower slot when coding the male connector with fixing brackets Mounting example A max. cable entry $\varnothing$ 14 mm to the top, see page 20.25 Mounting example B max. cable entry $\varnothing$ 14 mm to the bottom, see page 20.25	

³⁾ Fits D 20/2 and D 20/4

^{f)} Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2

Identification Part number Drawing Dimensions in mm

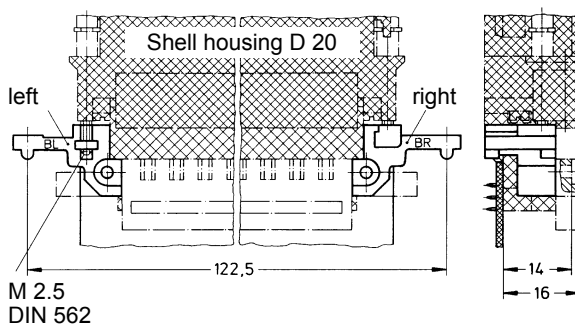
Mounting possibilities
for code comb
at the male connector
with fixing brackets



Fixing brackets B
for male connectors*
for 19" racks according
to DIN EN 60 297,
part 3-101
Single fixing*
without nut

left
09 06 000 9909
right
09 06 000 9910

left
09 06 001 9934
right
09 06 001 9935



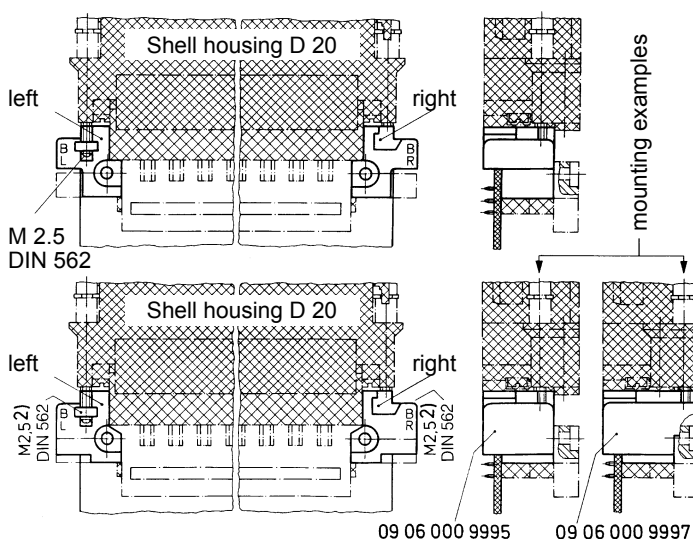
Multiple fixing*
without coding
at the fixing bracket
without nut

left
09 06 000 9907
right
09 06 000 9908

left
09 06 000 9966
right
09 06 000 9967

left
09 06 000 9995
09 06 000 9997

right
09 06 000 9996
09 06 000 9998



without coding
at the fixing bracket
with nut
M 2.5 DIN 562

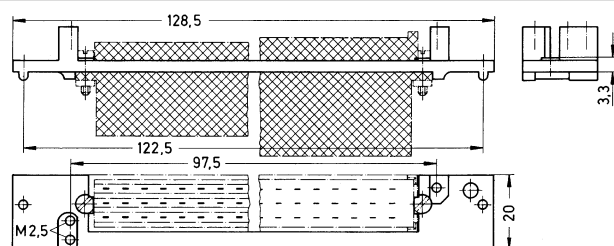
with coding
at fixing bracket¹⁾
with nut
M 2.5 15 mm
DIN 562 20 mm

15 mm
20 mm

²⁾ supplied with fixing

Protection and fixing
strip* for 20 mm
shell housing
Single fixing
fits female connectors
and I element crimp

09 06 001 9909



20
24

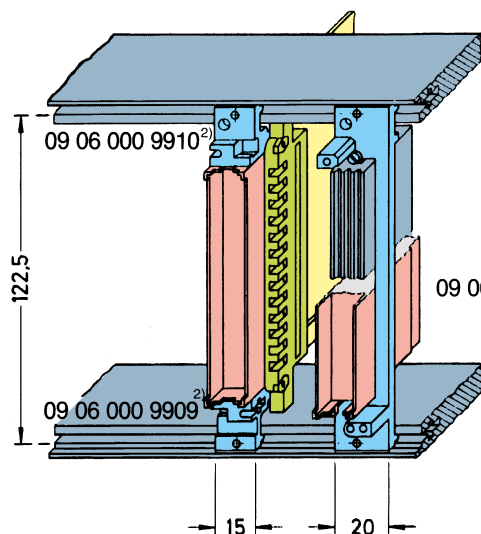
* Fits D 20/2 and D 20/4

¹⁾ Specific coding between the fixing bracket and the pcb guiding rail.
The guiding rail and corresponding coding pins are not scope of delivery

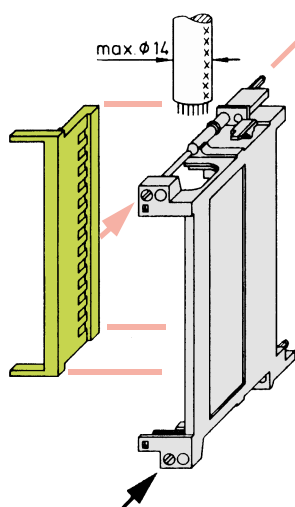
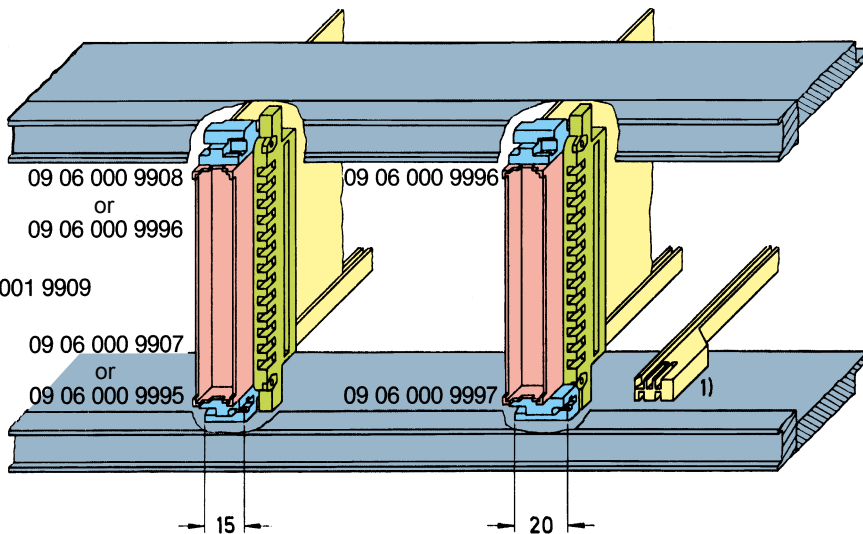
Mounting examples

Dimensions in mm

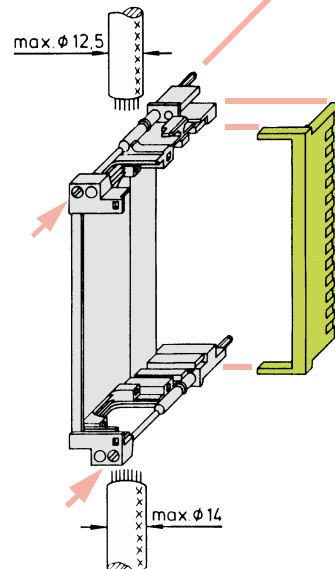
Single fixing



Multiple fixing



Mounting example A²⁾
max. cable entry to the top



Mounting example B
max. cable entry to the bottom

Separate accessories for housings

Fitting female connectors

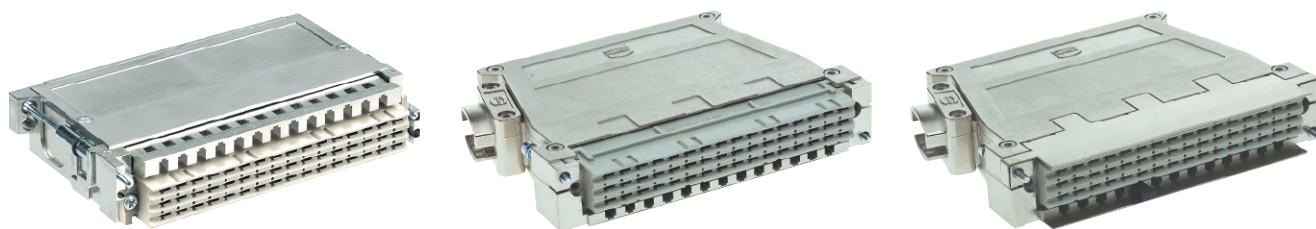
Fitting male connectors

Fixing brackets

Housing parts supplied

¹⁾ Specific coding between the fixing bracket and the pcb guiding rail

²⁾ Max. cable entry (ϕ 14 mm) from the bottom with fixing brackets 09 06 901 9924/...9925 possible. See page 20.32.



EMC with HARTING connectors

HARTING offers metallised D 20 housings and full metal housings for EMC connectors according to IEC 60603-2. Its strong EMI characteristics and metallised fixing elements offers optimal shielding and grounding.

The connection of the cable braid to different types of connector housings, as well as the influence of the connector itself on EMC characteristics of an instrument application, were analysed in regard to **the shielding effectiveness against electromagnetic radiation**. The shielded signal data lines of a railway application were carried via two eurocard pcb's installed into a 19"-rack. The fixing of the cable braid was realised with different HARTING D 20 housings.

The application including the connectors was then exposed to RF signals, transient bursts and electrostatic discharges.

The standard plastic housings showed minimal EMC performance. The EMC performance of metallised and full metal housings showed significant improvements.

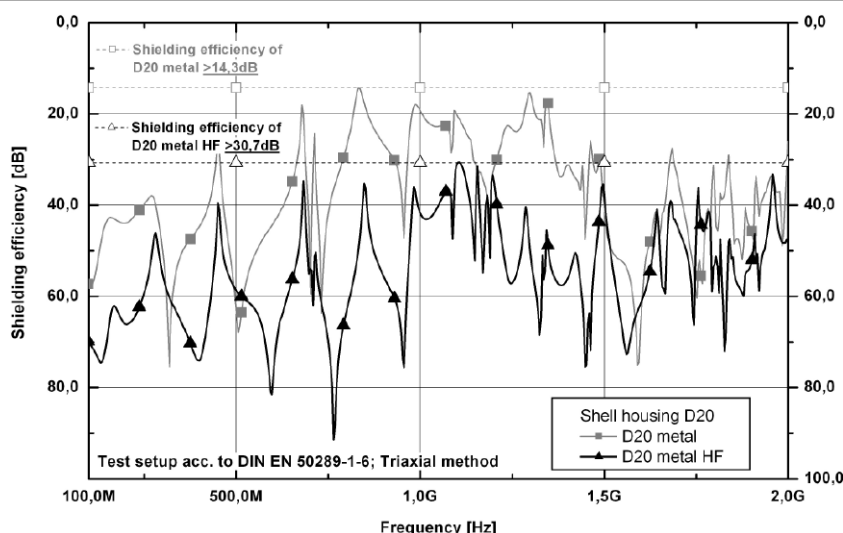
One advantage of metallised housings is their reduced weight (40 grams compared to 180 grams of a full metal housing). Therefore, minimal interference is applied to the pcb in applications where strong vibration is occurring. The HARTING housings are comparatively light through the use of metallised plastic.

The main advantages of a full metal housing are improved cable braid fixing, easy mounting and robustness.

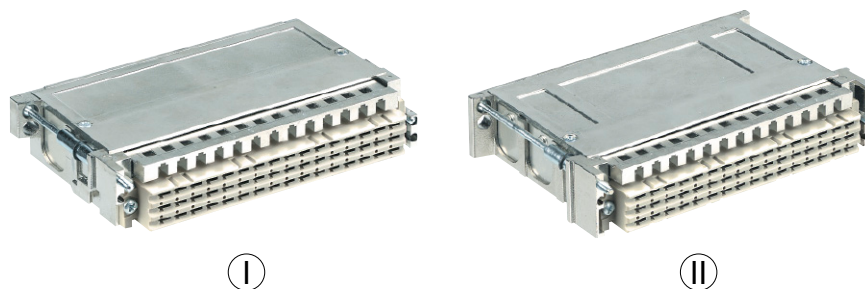
In general, one should keep in mind that an unshielded cable entry leads to loss of the shielding against electromagnetic interference.

"A high-resistance interruption of the cable shield (e.g. by using "pigtailed" via twisted stranded wires of the cable shield) may affect the EMC performance and therefore cause unacceptable effects to the electromagnetic environment."

These housings are applied in electronic installations of the railway vehicles of the GERMAN RAILWAY. They are also recommended for stationary installations of the GERMAN RAILWAY (see norm BN 74016, part 1 of December 1989).

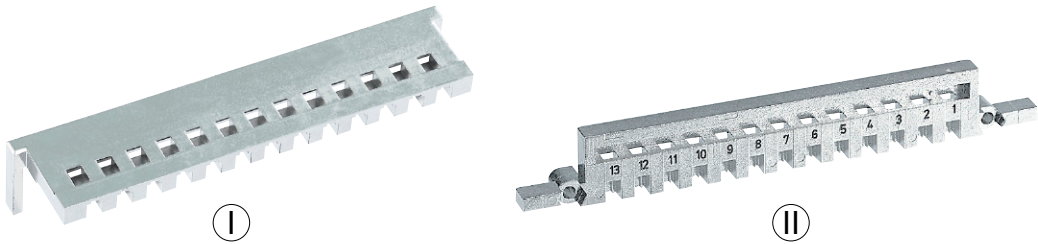


Shell housing D 20 metallised for types F, H and MH



Identification	Part number	Drawing	Dimensions in mm
Shell housing D 20/2 metallised with two side cable entries I Supplied with: see page 20.20	20 mm 09 06 948 0521	Order inserts separately	
Shell housing D 20/4 metallised with four side cable entries II Supplied with: Shell 1x Cover 1x Locking screw 2x (09 06 000 9920) Locking washer 2.3 2x Screw BZ 2.2x7.5 12x Blinding piece 3x Cable clamp 2x	20 mm 09 06 948 0522		
Metallised insert e. g. for LED* for 55 mm height	09 06 900 9986		
for 60 mm height	09 06 900 9987		
Metallised round cable insert* 2 x Ø 11	09 06 900 9988		

* Fits D 20/2 metallised
Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2



Coding

Identification	Part number	Drawing	Dimensions in mm
Metallised code comb for shell housing³⁾ (can also be used as blanking cover) I	09 06 900 9984 ^{f)}		
Code pin³⁾ 1) Order 13 pieces per code comb	09 06 001 9905 ¹⁾		Order 13 pieces per code comb
Metallised code comb for male connector³⁾ II short version for a full metal locking lever	09 06 900 9985 ^{f)} 09 06 901 9985 ^{f)}		
Mounting possibilities for the code comb in shell housing D 20/2 metallised			2) Use the lower slot when coding the male connector with fixing brackets Mounting example A max. cable entry $\varnothing$ 14 mm to the top, see page 20.25 Mounting example B max. cable entry $\varnothing$ 14 mm to the bottom, see page 20.25

Shell housings

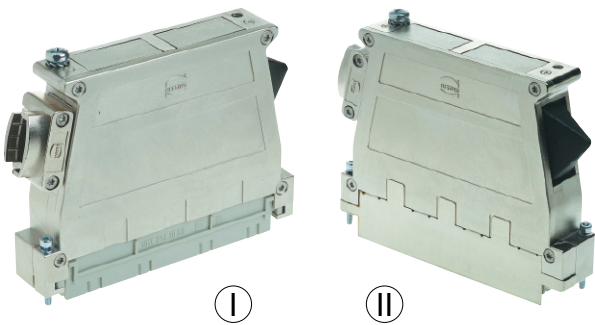
³⁾ Fits D 20/2 and D 20/4 metallised
^{f)} Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2

Identification	Part number	Drawing	Dimensions in mm
Mounting possibilities for coding at the male connector with fixing brackets		09 06 900 9996 09 06 900 9910 09 06 900 9908 M 2.5 M 2.5 x 18 DIN EN ISO 1207 09 06 900 9907 09 06 900 9909 M 2.5 09 06 900 9995 09 06 900 9997 pcb M 2.5 DIN EN ISO 4036	
Fixing brackets B metallised for male connectors* for 19" racks according to DIN EN 60 297, part 3-101 Single fixing* without nut with nut M 2.5 DIN EN ISO 4036	left 09 06 900 9909 right 09 06 900 9910 left 09 06 901 9934 right 09 06 901 9935	Shell housing D 20 left right 122,5 14 16 M 2.5 DIN EN ISO 4036	
Multiple fixing* without coding at fixing bracket without nut without coding at fixing bracket with nut M 2.5 DIN 562 with coding at fixing bracket ¹⁾ with nut M 2.5 DIN 562	left 09 06 900 9907 right 09 06 900 9908 left 09 06 900 9966 right 09 06 900 9967 left 15 mm 09 06 900 9995 20 mm 09 06 900 9997 right 15 mm 09 06 900 9996	Shell housing D 20 left right 128,5 122,5 97,5 20 M 2.5 DIN 562 09 06 900 9995 09 06 900 9997 mounting examples 2) supplied with fixing	
Protection and fixing* strip for 20 mm shell housing Single fixing fits female connectors and I element crimp	09 06 901 9909	128,5 122,5 97,5 20 M 2.5	

* Fits D 20/2 and D 20/4 metallised

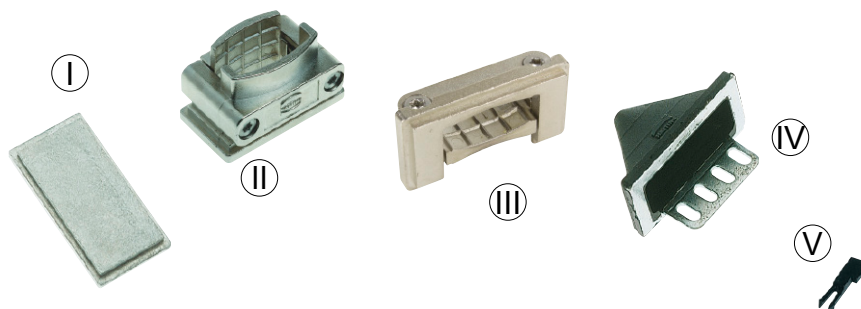
¹⁾ Specific coding between the fixing bracket and pcb guiding rail

Railway classification NFF 16-101,
Smoke index: F1, Flammability class: I2



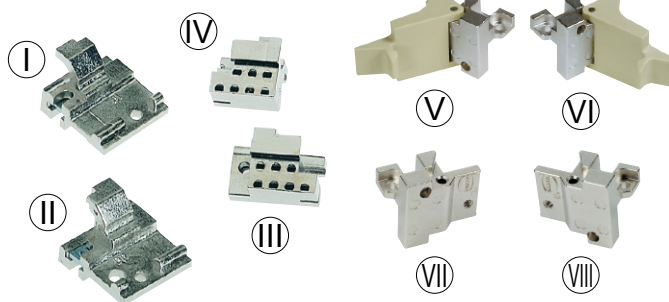
Identification	Part number	Drawing	Dimensions in mm
Shell housing D 20 metal I Supplied with: Shell with coding 1x Cover 1x Locking screw (hexagonal) M2.5 x 23 (09 06 800 9953) 2x Screw (torx) M2.5 x 10 (09 06 800 9960) 4x Earth screw M4 x 8 (09 06 800 9958) 2x	09 06 848 0550		
Shell housing D 20 metal HF with nickel-plated surface II Supplied with: Shell with coding and HF-sealing spring 1x Cover with shielding plate 1x Locking screw (hexagonal) M2.5 x 23 (09 06 800 9953) 2x Screw (torx) M2.5 x 10 (09 06 800 9960) 4x Earth screw M4 x 8 (09 06 800 9958) 2x	09 06 848 0551		

Shell housing D 20 metal for types F, H and MH



Identification	Part number	Drawing	Dimensions in mm
Blinding piece ⓐ	09 06 800 9951		
Cable clamp wide ⓑ	09 06 800 9955		
small ⓒ	09 06 800 9962		
Cable grommet with strain relief ⓓ	09 06 800 9950		
Crimp flange insert Cable clamp cable-Ø appr. 5- 7 mm cable-Ø appr. 7-10 mm cable-Ø appr. 10-12 mm Blanking piece for hoods Code pin ⓔ	09 06 800 9952 61 03 000 0141 61 03 000 0044 61 03 000 0143 61 03 000 0042 09 06 001 9905	 	
Hexagon ball-head screw driver	09 99 000 0003		

Shell housing D 20 metal HF for types F, H and MH



Identification	Part number	Drawing	Dimensions in mm
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Fixing brackets B metallised for male connectors

for 19" racks according to DIN EN 60 297, part 3-101

Single fixing

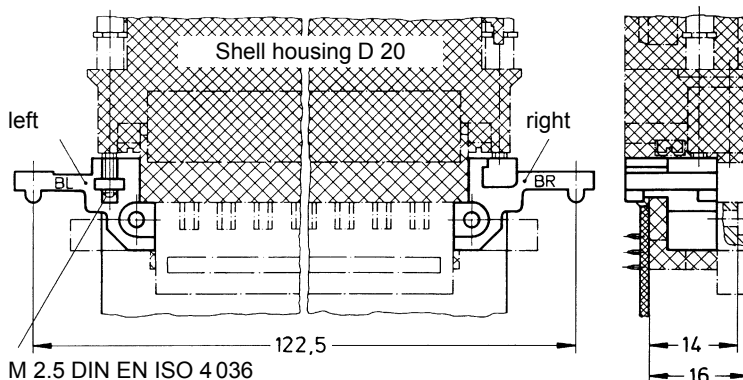
with nut
M 2.5

DIN EN ISO 4 036

Ⓘ

Ⓜ

left 20 mm 09 06 901 9924 ^{f)}
right 20 mm 09 06 901 9925 ^{f)}



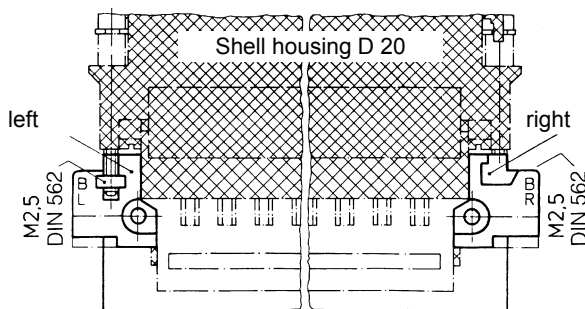
Multiple fixing

with coding
at fixing bracket
with nut
M 2.5 DIN 562

ⓂⓂ

ⓂⓂ

left 20 mm 09 06 900 9997 ^{f)}
right 15 mm 09 06 900 9996 ^{f)}



Fixing brackets B metal for male connectors

for 19" racks according to DIN EN 60 297, part 3-101

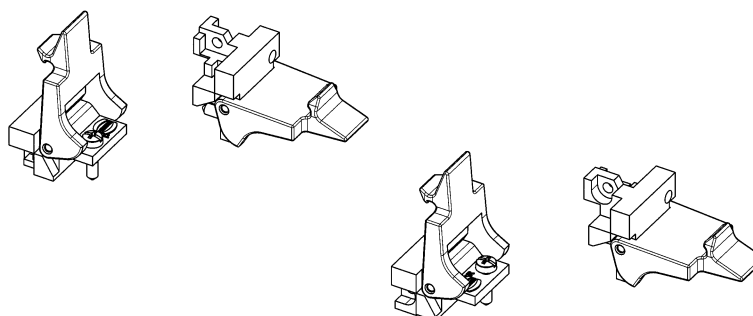
Single fixing

with ejector
handle

Ⓜ

Ⓜ

left 09 06 800 9946
right 09 06 800 9948



without ejector
handle

ⓂⓂ

ⓂⓂ

left 09 06 800 9966
right 09 06 800 9968

^{f)} Railway classification NFF 16-101, Smoke index: F1, Flammability class: I2

For applications where robust, high density, splash-proof connectors are required, e.g. in the automated control and industrial processing systems, HARTING have combined the proven reliability of DIN 41 612 connectors with standard Han® 24 B heavy duty hoods and housings, to bring forward a connector system with up to 96 ways and various contact plating thicknesses to suit the individual requirements.

Advantages

- The combination enhances design flexibility, as it permits an identical wiring interface between the standard 19" racking systems and the peripheral equipment.
- Simplified stock-holding, identical operating tools.

Inserts

Female	2 x 48 way type F female connectors with crimp contact elements see chapter 03
Male	2 x 48 way type F interface connectors I with crimp contact elements see chapter 03

Hoods and housings

see catalogue "Heavy Duty Han® Connectors"

chapter 30
size 24 B

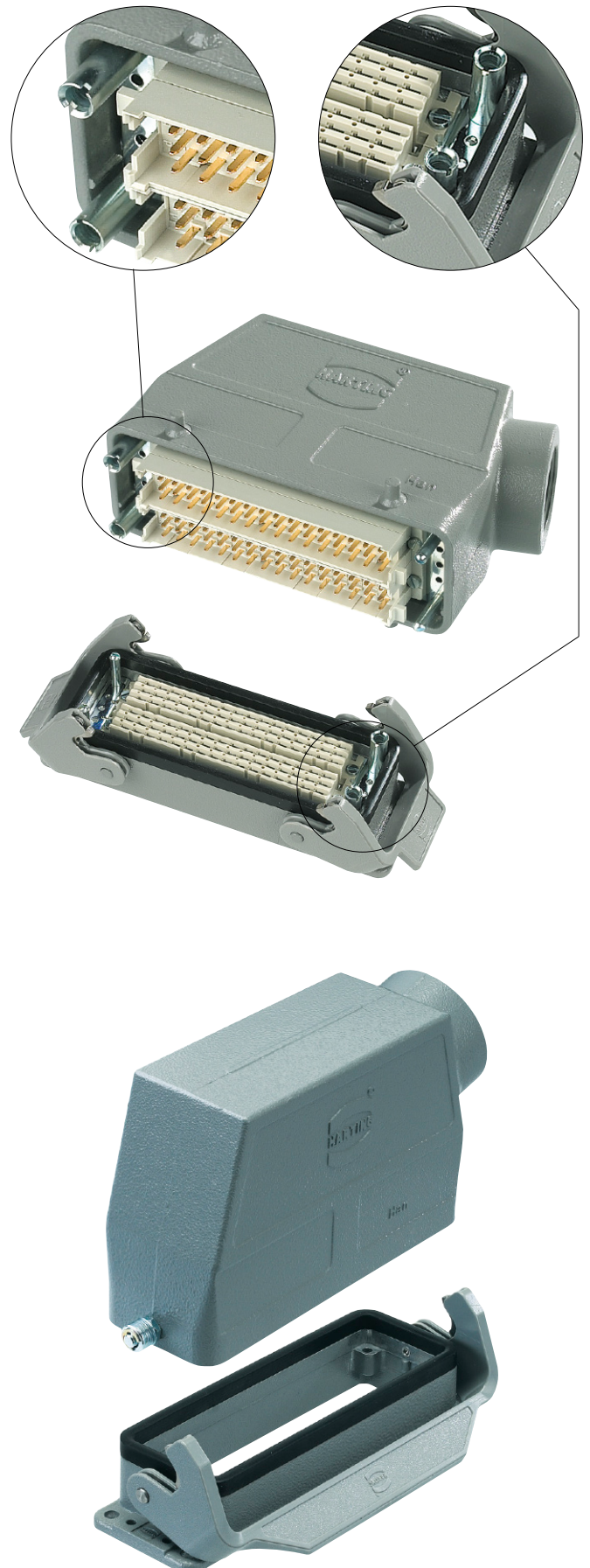
Degree of protection for hoods and housings: IP65

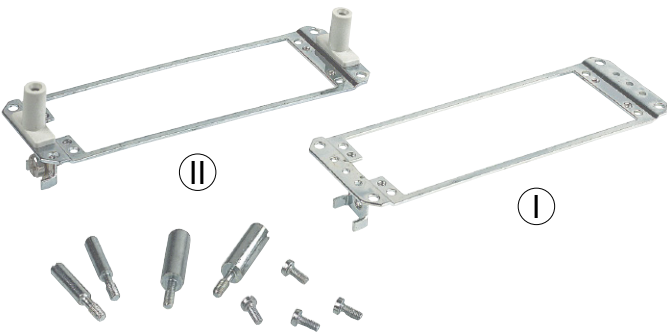
Retaining frames

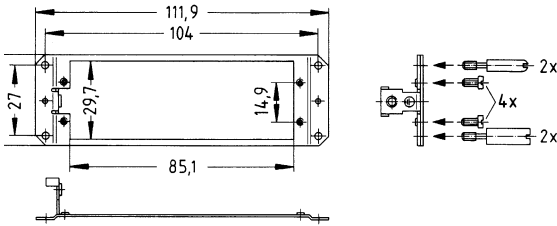
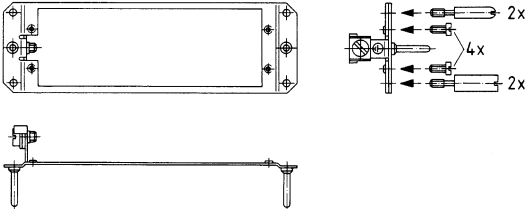
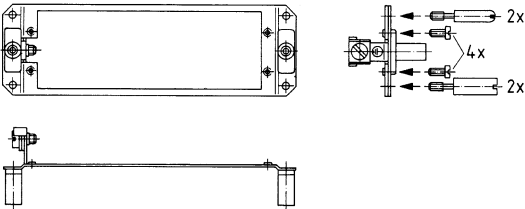
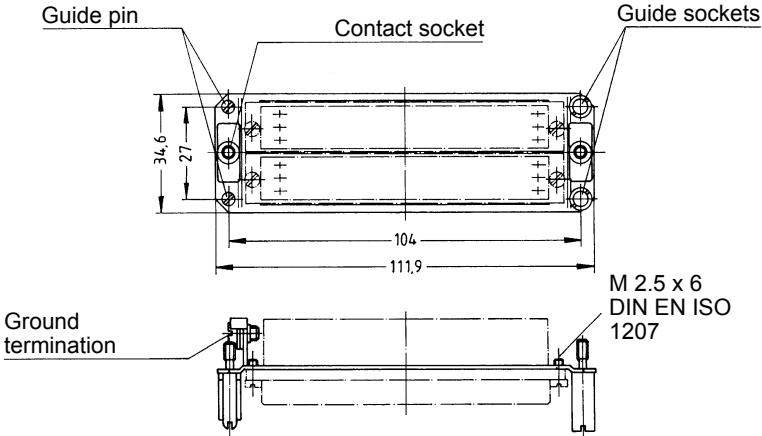
For fixing the inserts into the housing.

Alternative versions with pre-mating contacts and ground termination.

If the working voltages are in excess of 42 V (50 V) it is essential to use retaining frames which have pre-mating ground contacts.





Identification	Part number	Drawing	Dimensions in mm
Retaining frame without contact elements I	09 06 001 9904		
Retaining frame with 2 contact pins and ground termination	09 06 001 9902		
Retaining frame with 2 contact sockets and ground termination II	09 06 001 9903		
		Each retaining frame is supplied with 4 fixing screws for mounting the inserts and with 2 guide pins and sockets that provide mechanical protection for the contacts during mating and disconnection. These can also be used as a coding system to prevent cross plugging of adjacent connectors.	
Mounting example		Connectors in the retaining frame with contact sockets 	

Shell housings