

#01

PRODUCTS

19" SUBRACKS

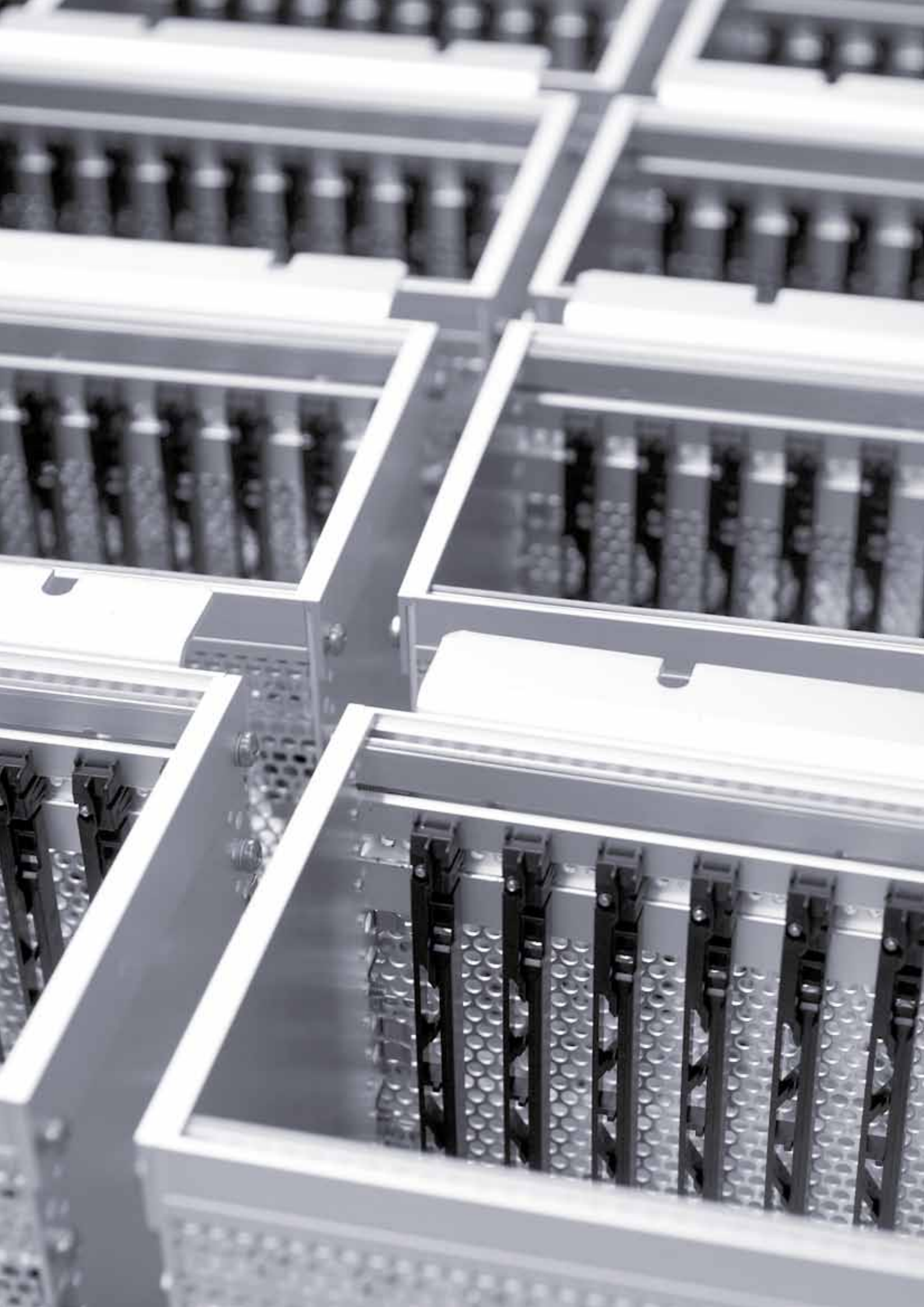
// Future // FutureX // FerroRAIL // Series 75 // Series 76 // Series 77



FerroRAIL

leading.technology

**POLY
RACK**
TECH-GROUP



#01

CONTENTS

19" SUBRACKS

19" Subracks

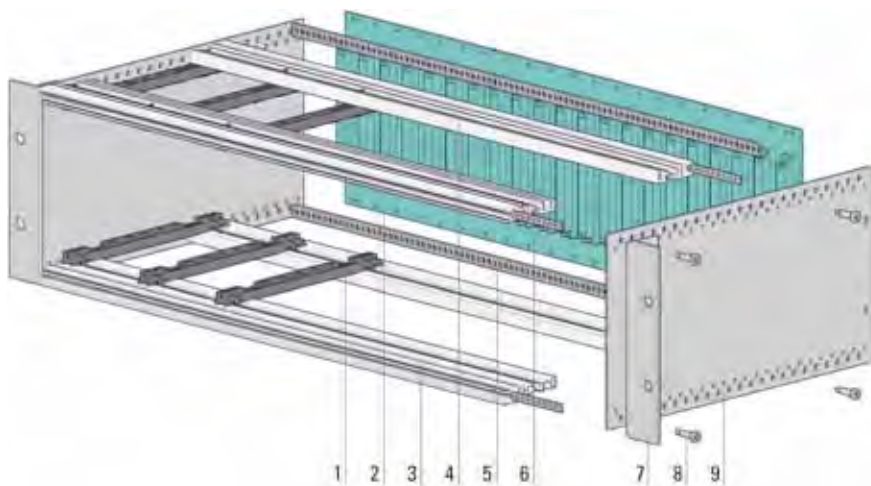
// 01	General information	Page
	Application	SUB 01.2
	Configuration example	SUB 01.2
	Specifications, measurement units and manufacturing tolerances	SUB 01.2
	Manufacturing tolerances	SUB 01.5
	Basic units	SUB 01.6
	Series overview	SUB 01.7
	Custom designs	SUB 01.7
	Individual assembly	SUB 01.7
	Assembly service	SUB 01.7
	Additional products	SUB 01.7
	Hotline	SUB 01.7

// 02	Series	Page
	Future	SUB 01.9
	FutureX	SUB 01.23
	FerroRAIL	SUB 01.35
	Series 75	SUB 01.47
	Series 76	SUB 01.57
	Series 77	SUB 01.65

// 03	Accessories	Page
	Accessories	SUB 01.77
	Split Vertical PCB Mount	SUB 01.102
	Horizontal PCB Mount	SUB 01.103
	Assembly Components	SUB 01.106

// SUB	Appendix	Page
	Glossary	SUB 99.1
	Information on RoHS, REACH and WEEE	SUB 99.8
	Brochure remarks	SUB 99.8

GENERAL INFORMATION



// Application

19" subracks from POLYRACK for mounting plug-in units which typically have single or double Eurocard dimensions. The flexibility of the series enables optimum individual configuration.

// Configuration example

The drawing shows a typical configuration of a 19" subrack (basic unit B).

- 1 Card guide*
- 2 Backplane*
- 3 Front rail (optional for IEEE application)
- 4 Rear rail
- 5 Isolating strip*
- 6 Threaded inserts*
- 7 19" Mounting bracket (version depending on shielding concept)
- 8 Assembly components
- 9 Side plate

All parts which are marked with * are not included in the scope of delivery of the basic unit and must be ordered separately.

// Specifications, measurement units and manufacturing tolerances

Inner and outer dimensions

- IEC 60297-3-101
- IEC 60297-3-102
- IEC 60297-3-103

Height unit U

Unit of measurement for the height in a 19" packaging system
1 U = 44.45 mm

Increment unit HP

Unit of measurement for the width in a 19" packaging system
1 HP = 5.08 mm

Dimensions in order tables

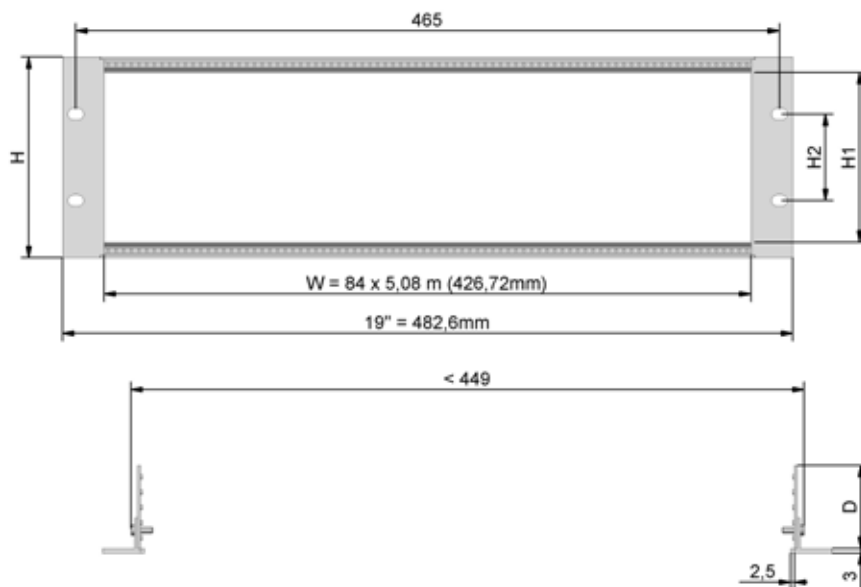
The published dimensions, explicitly U and HP, have to be stipulated in relation to the application.

Height $H = (n(U) \times 44.45 \text{ mm}) - 0.8 \text{ mm}$

Usable width $W > (n(HP) \times 5.08 \text{ mm})$

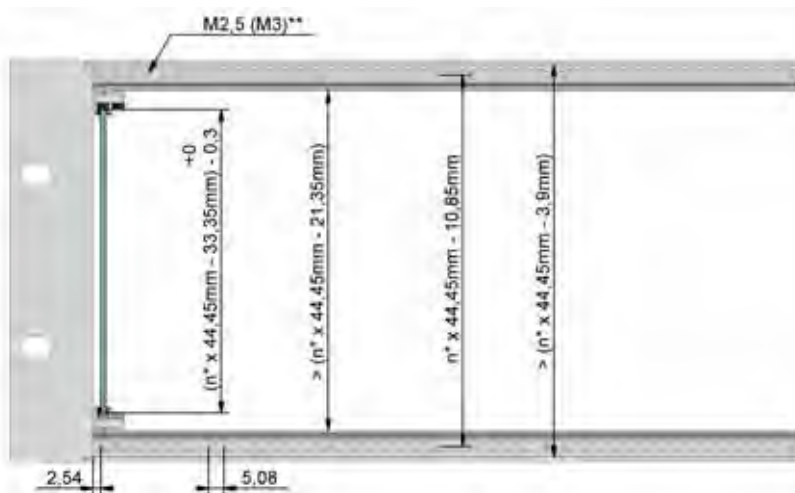
Actual dimension = usable widths $W + 5.08 \text{ mm}$

The depth D (in mm) defines the total depth of the subrack from the supporting surface of the front rail (supporting surface of the 19" mounting bracket) to the rear of the side plate.



Mounting dimensions (mm)

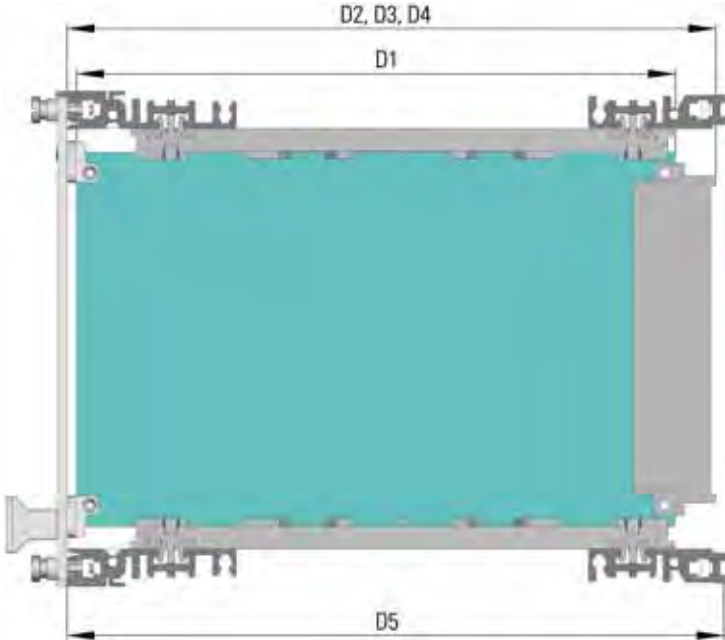
	H	H1	H2
1 U	= 43.6	≤ 23.1	= 31.7
2 U	= 88.1	≤ 67.5	= 76.2
3 U	= 132.5	≤ 112.0	= 57.1
4 U	= 177.0	≤ 156.45	= 101.6
6 U	= 265.9	≤ 245.35	= 190.5



* (U)

** Mounting holes for front panels

//0119" SUBRACKSGENERAL INFORMATION

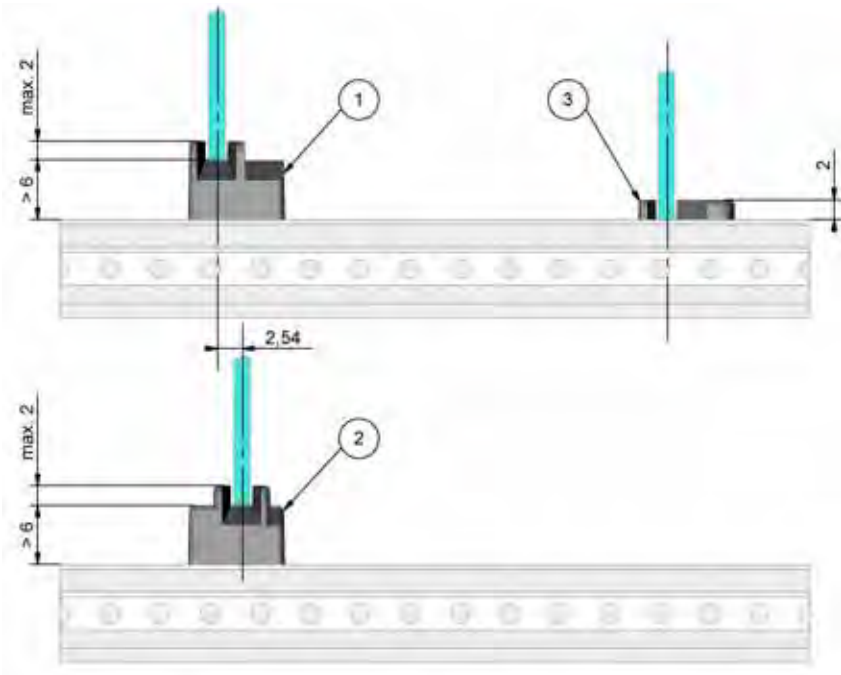


Dimensions for plug-in modules (mm)

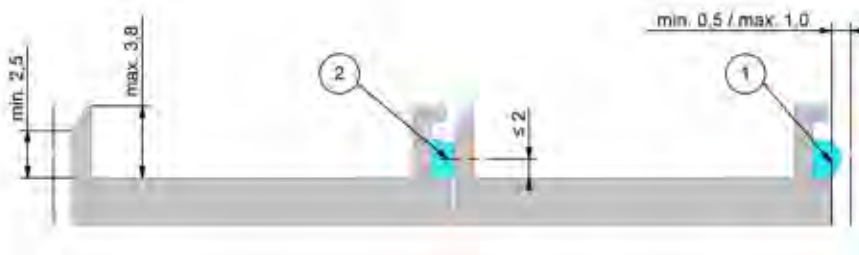
D1*	D2 ± 0.4**	D3 ± 0.4***	D4 ± 0.4****
80.00	89.93	91.93	91.74
100.00	109.93	111.93	111.74
160.00	169.93	171.93	171.74
220.00	229.93	231.93	231.74
280.00	289.93	291.93	291.74

- * Board depth
- ** Plug-in depth for connector IEC 60603-2, Type B, C, D and IEC 61076-4-113
- *** Plug-in depth for connector IEC 60603-2, Type F, G, H
- **** Plug-in depth for connector IEC 61076-4-101

D5 = D1 + 15.5 mm



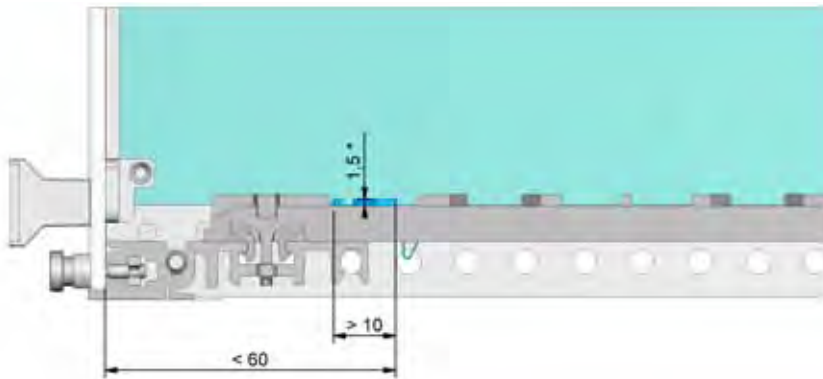
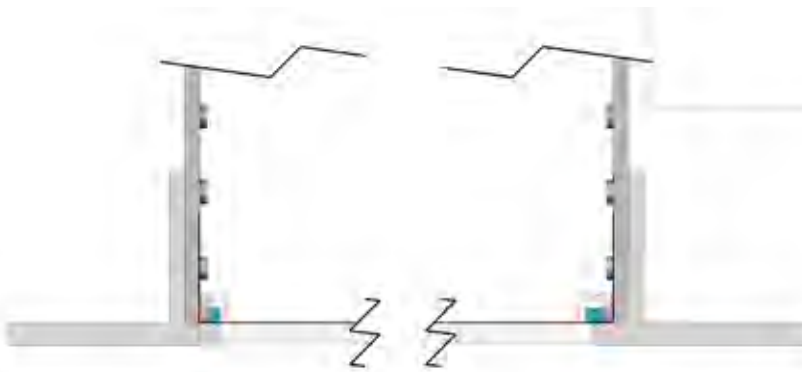
- Card guides – front view
- 1 Card guide standard
 - 2 Card guide 2.54 mm recessed
 - 3 Card guide 4.4 " (111.7 mm)
- Slot width 2 mm or 2.4 mm, respectively



Shielding concept EMC Fabric – front panel
Standards for contact points (contact surface) are specified in IEEE 1101.10.

The diagram shows extracts from the IEEE 1101.10 specification in relation to EMC fabric

- 1 Not compressed EMC Fabric
- 2 Compressed EMC Fabric



ESD contact area

The electrostatic discharge is via a contact clip, which is clipped into the front of the guide rail. To ensure proper functioning, the ESD clip must have contact with the grounded section of the subrack as well as the conductive section of the board.

*ESD contact area

// Manufacturing tolerances

In general, parts tolerances are subject to the POLYRACK factory specifications, with the following exceptions:

Extrusions comply with
DIN EN 12020-1

Punched parts comply with
DIN 6930-1/6930-2 and DIN 6932

GENERAL INFORMATION

// Basic units

There is a choice of four different basic units, depending on the application:



Basic unit B

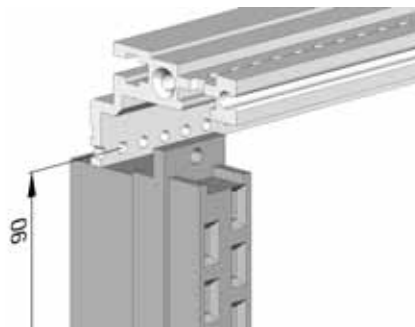
For indirect mounting of backplanes using an isolating strip or for Z-rail

The dimensions for mounting the backplane are calculated as follows:

$$H1 = n \times U - 10.85 \text{ mm}$$

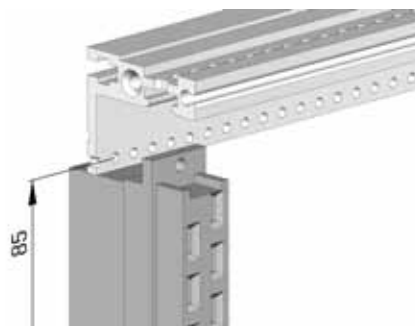
Calculation example for 3 U:

$$H1 = 3 \times 44.45 \text{ mm} - 10.85 \text{ mm} = 122.5 \text{ mm}$$



Basic unit C

With integrated Z-rail for connectors according to IEC 60603-2



Basic unit D

With integrated Z-rail for connectors according to IEC 60603-1



Basic unit E

For direct mounting of backplanes without isolating strips or for perforated rails. Rail width + 3 mm in comparison to basic unit

The dimensions for mounting the backplane are calculated as follows:

$$H1 = n \times U - 10.85 \text{ mm}$$

Calculation example for 3 U:

$$H1 = 3 \times 44.45 \text{ mm} - 10.85 \text{ mm} = 122.5 \text{ mm}$$

// Series overview

Series	Surface Anodized	Alodined	EMC shielding concept	Vibration resistant	Front rail with pitch perforation (IEEE 1101.1/.10)	Features
Future	–	●	●	●	●	Wide variety of applications
FutureX	–	●	●	–	●	Cost-optimized version based on basic Future series
FerroRail	–	●	●	●	●	Specially for French SNCF railway applications
Series 75	●	●	○	–	–	One-piece extruded side plate
Series 76	●	–	–	–	–	For panel mounting
Series 77	●	●	○	–	–	Multiple-piece side plate

○ Without EMC shielding concept, but supporting surfaces (e.g.rails/side plate) are conductive

// Custom designs

Custom designs are available in various different widths, depths and heights. Individual processing to your specifications is also possible.

// Individual assembly

Select appropriate components for customized subracks.

// Assembly service

Upon request we can provide our assembly service.

// Additional products

#01 FRONT PANELS & PLUG-IN MODULES

⇒ Front panels, extractor and static handles, board holders, 19" panels, plug-in modules, cassettes, fan trays

#01 CASES

⇒ 19" desktop cases

#01 SYSTEMSTECHNOLOGY

⇒ Backplanes and fan trays



// Do you have any questions?

We will be happy to help you. Please contact us for further assistance.

HOTLINE Europe
+49.(0)800-POLYRACK (+49.(0)800-76597225)
sales@polyrack.com

HOTLINE North America
+1.401.770.1500
polyrack_us@polyrack.com

19" subracks Future
Basic version with accessories



//02 19" SUBRACKS

Future



Product information

The Future series is designed for different shielding concepts and applications and can be individually configured. The securing of the stable rails with two screws as well as the tox joined version of the side plates allows the use of the subrack in harsh environments (vibration resistance). The positioning of the rails in the 10-mm increments permits dual mounting.

Notes

- “Vibration resistant” version: LES-DB of Deutsche Bahn (German Rail) compliant
- “IEEE” version: Front rail(s) with pitch hole pattern according to IEEE 1101.10



Overview

Basic units	H in U			W in HP	D in mm					Page
	3	4	6		180	244	278	304	364	
- Standard	●	–	●	●	●	●	–	●	●	SUB 01.11
- Vibration resistant	●	–	●	●	–	●	–	●	●	SUB 01.11
- Vibration resistant, EMC spring shielding concept	●	–	●	●	–	●	–	●	●	SUB 01.12
- IEEE, EMC fabric shielding concept	●	●	●	●	●*	●	–	●	●	SUB 01.12
- Rear I/O 160/80, EMC fabric shielding concept	●	–	●	●	–	–	●	–	–	SUB 01.13

* 4 U not available

Single components	Page
Side plates	SUB 01.14
Horizontal rails	SUB 01.15
19" mounting brackets	SUB 01.19
Corner brackets	SUB 01.20

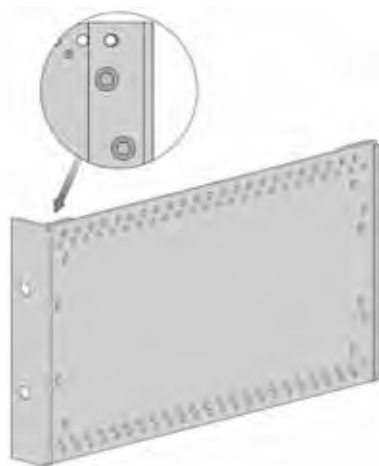
Accessories	Page
Threaded inserts	SUB 01.78
Card guides	Please check series reference SUB 01.79
Board retainers	Please check series reference SUB 01.83
Isolating strips	SUB 01.84
Z-rails	SUB 01.85
Perforated rails	SUB 01.86
Covers	Please check series reference SUB 01.87
Protective hoods	Please check series reference SUB 01.92
Coding blocks and coding pins IEEE	SUB 01.94
EMC/ESD shielding material	Please check concept SUB 01.96
Handles	SUB 01.100
Accessories	Please check series reference SUB 01.106
Split vertical PCB mount	SUB 01.102
Horizontal PCB mount	SUB 01.103

// Basic units

Basic units

The basic units of the Future series differ in their shielding concept and in their vibration resistance.

An IEEE 1101.1/IEEE 1101.10 compatible version is also available as a basic unit. Additional configurations can be created by selecting the appropriate single components.



Features of the basic units

Vibration resistant

Side plate/mounting bracket and corner bracket are tox joined, horizontal rails are secured with two screws on either side.



"EMC spring" shielding concept

Mounting bracket with groove for mounting EMC springs



"EMC fabric" shielding concept

Mounting brackets with bar for mounting self-adhesive EMC fabric D shape

// Basic units



19" subrack Future, standard

Scope of Delivery

Mounting bracket without groove	2 pcs
Side plate	2 pcs
Front rail	2 pcs
Rear rail (B, C or E)	2 pcs
Center rail (only with 6 U)	1 pc
Z-rail (only with 6 U/C)	2 pcs
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Notes

- Mounting brackets without groove, upgrade with shielding material is not possible
- Mounting brackets without handle holes

Ordering table

H	W	Basic unit	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	84 HP	B	23 01 00 20	23 01 00 30	23 01 00 40	23 01 00 50
3 U	84 HP	C	23 01 00 21	23 01 00 31	23 01 00 41	23 01 00 51
3 U	84 HP	E	23 01 00 22	23 01 00 32	23 01 00 42	23 01 00 52
6 U	84 HP	B	23 01 00 26	23 01 00 36	23 01 00 46	23 01 00 56
6 U	84 HP	C	23 01 00 27	23 01 00 37	23 01 00 47	23 01 00 57
6 U	84 HP	E	23 01 00 28	23 01 00 38	23 01 00 48	23 01 00 58



19" subrack Future, vibration resistant

Scope of Delivery

Side plate with mounting bracket and	
Corner bracket, tox joined	2 pcs
Front rail	2 pcs
Rear rail (B, C or E)	2 pcs
Center rail (only with 6 U)	1 pc
Z-rail (only with 6 U/C)	2 pcs
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

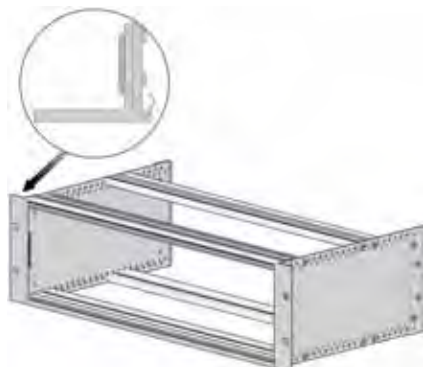
Notes

- Suitable for railway applications according to LES-DB of Deutsche Bahn (German Rail)
- Mounting brackets without groove, upgrade with shielding material is not possible
- Mounting brackets without handle holes

Ordering table

H	W	Basic unit	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	84 HP	B	–	23 03 00 30	23 03 00 40	23 03 00 50
3 U	84 HP	C	–	23 03 00 31	23 03 00 41	23 03 00 51
3 U	84 HP	E	–	23 03 00 32	23 03 00 42	23 03 00 52
6 U	84 HP	B	–	23 03 00 36	23 03 00 46	23 03 00 56
6 U	84 HP	C	–	23 03 00 37	23 03 00 47	23 03 00 57
6 U	84 HP	E	–	23 03 00 38	23 03 00 48	23 03 00 58

// Basic units



19" subrack Future, vibration resistant, EMC spring shielding concept

Scope of Delivery

Side plate with mounting bracket and corner bracket, tox joined

Front rail

Rear rail (B, C or E)

Center rail (only with 6 U)

Z-rail (only with 6 U/C)

Assembly kit

2 pcs

2 pcs

2 pcs

1 pc

2 pcs

1 pc

Delivery Form

In units for self assembly

Notes

- Suitable for railway applications according to LES-DB of Deutsche Bahn (German Rail)
- Mounting brackets with groove for mounting of EMC springs
- EMC springs must be ordered separately
- Mounting brackets without handle holes

Ordering table

H	W	Basic unit	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	84 HP	B	–	23 04 00 30	23 04 00 40	23 04 00 50
3 U	84 HP	C	–	23 04 00 31	23 04 00 41	23 04 00 51
3 U	84 HP	E	–	23 04 00 32	23 04 00 42	23 04 00 52
6 U	84 HP	B	–	23 04 00 36	23 04 00 46	23 04 00 56
6 U	84 HP	C	–	23 04 00 37	23 04 00 47	23 04 00 57
6 U	84 HP	E	–	23 04 00 38	23 04 00 48	23 04 00 58



19" subrack Future IEEE, EMC fabric shielding concept

Scope of Delivery

Mounting bracket with bar

Side plate

Front rail IEEE

Rear rail (B, C or E)

Center rail (only with 6 U)

Z-rail (only with 6 U/C)

Assembly kit

2 pcs

2 pcs

2 pcs

2 pcs

1 pc

2 pcs

1 pc

Delivery Form

In units for self assembly

Notes

- Mounting brackets with bar for mounting of self adhesive EMC fabrics D shape
- EMC fabrics D shape must be ordered separately
- Mounting brackets without handle holes

Ordering table

H	W	Basic unit	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	84 HP	B	23 09 00 20	23 09 00 30	23 09 00 40	23 09 00 50
3 U	84 HP	C	23 09 00 21	23 09 00 31	23 09 00 41	23 09 00 51
3 U	84 HP	E	23 09 00 22	23 09 00 32	23 09 00 42	23 09 00 52
4 U	84 HP	B	–	23 09 00 33	23 09 00 43	23 09 00 53
4 U	84 HP	C	–	23 09 00 34	23 09 00 44	23 09 00 54
4 U	84 HP	E	–	23 09 00 35	23 09 00 45	23 09 00 55
6 U	84 HP	B	23 09 00 26	23 09 00 36	23 09 00 46	23 09 00 56
6 U	84 HP	C	23 09 00 27	23 09 00 37	23 09 00 47	23 09 00 57
6 U	84 HP	E	23 09 00 28	23 09 00 38	23 09 00 48	23 09 00 58



19" subrack Future IEEE, rear I/O 160/80, EMC fabric shielding concept

Scope of Delivery

Mounting bracket with bar
 Corner bracket with bar
 Side plate Rear I/O
 Front rail IEEE
 Rear rail E
 Center rail E (only with 6 U)
 Assembly kit

2 pcs
 2 pcs
 2 pcs
 4 pcs
 2 pcs
 1 pc
 1 pc

Delivery Form

In units for self assembly

Notes

- Mounting brackets and corner brackets with bar for mounting of self adhesive EMC fabrics D shape
- EMC fabrics D shape must be ordered separately
- Board holders for board depth 80 mm must be ordered separately (marked blue)
- Mounting brackets without handle holes

Ordering table

H	W	Basic unit	D = 244 mm	D = 278 mm	D = 304 mm	D = 364 mm
3 U	84 HP	B	–	–	–	–
3 U	84 HP	C	–	–	–	–
3 U	84 HP	E	–	23 19 00 20	–	–
6 U	84 HP	B	–	–	–	–
6 U	84 HP	C	–	–	–	–
6 U	84 HP	E	–	23 19 00 30	–	–

// Single components

Side plates Future

For mounting horizontal rails, mounting brackets, corner brackets and covers.

Dimples on the side plates ease assembly and prevent unwanted torsion of the rails.

Side plate Future

Depending on the choice of mounting brackets, for configuration of standard Future 19" subracks, EMC spring shielding concept or EMC fabric shielding concept.

Material

Aluminum, 2 mm, alodined

Scope of Delivery

Side plate 1 pc

Delivery Form

In units for self assembly

Note

– Horizontal rail mountable in 10-mm increment

Ordering table

H	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	23 10 01 79	23 10 01 70	23 10 01 73	23 10 01 76
4 U	–	23 10 01 71	23 10 01 74	23 10 01 77
6 U	23 10 01 80	23 10 01 72	23 10 01 75	23 10 01 78

Side plate Future, tox joined for EMC spring shielding concept

For configurations according to EN 50155 (shock and vibration resistant)

Scope of Delivery

Side plate, mounting bracket and corner bracket, tox joined 1 pc

Material

Side plate aluminum, 2 mm, alodined
Mounting brackets and corner bracket (3/2 mm) with groove for EMC spring shielding concept, aluminum extrusion, alodined

Delivery Form

In units for self assembly

Notes

- Horizontal rails mountable in 10-mm increment
- Horizontal rails must be secured with two screws on each side
- EMC springs must be ordered separately

Ordering table

H	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	–	23 10 01 90	23 10 01 93	23 10 01 96
6 U	–	23 10 01 92	23 10 01 95	23 10 01 98

Side plate Future IEEE, rear I/O, euroboard 160/80 mm

For configuration of 19" subracks Future according to IEEE 1101.1/IEEE 1101.10 with Rear I/O (160/80 mm)

Scope of Delivery

Side plate 1 pc

Delivery Form

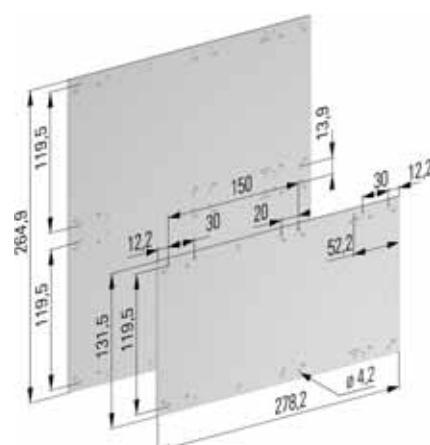
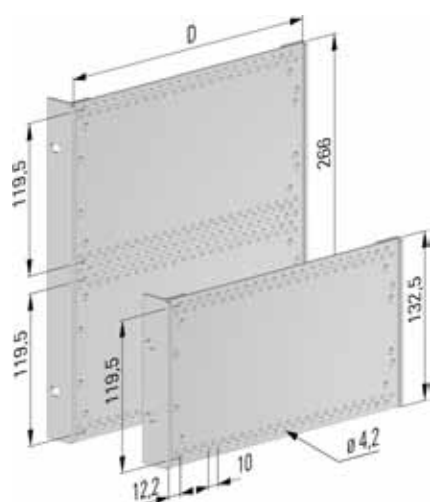
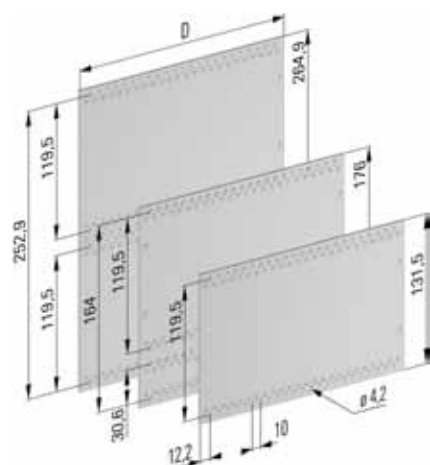
In units for self assembly

Note

– Horizontal rails can be fixed with two screws

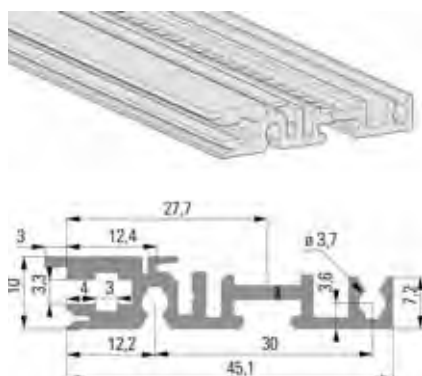
Ordering table

H	D = 244 mm	D = 278 mm	D = 304 mm	D = 364 mm
3 U	–	23 10 01 97	–	–
6 U	–	23 10 01 99	–	–



Front, rear and center rails Future

There are two extruded channels for self forming M4 screws to mount the rails to the side plates. Front and rear rails include incremented holes for mounting of guide rails. Center rails do not include incremented holes and are only used for mounting of backplanes, either directly or indirectly, or Z-rails and perforated rails. The center rails are used in 6 U subracks.



Front rail standard

For mounting plug-in units or front panels

Material
Aluminum extrusion, alodined

Scope of Delivery

Front rail standard 1 PU (10 pcs)

Delivery Form

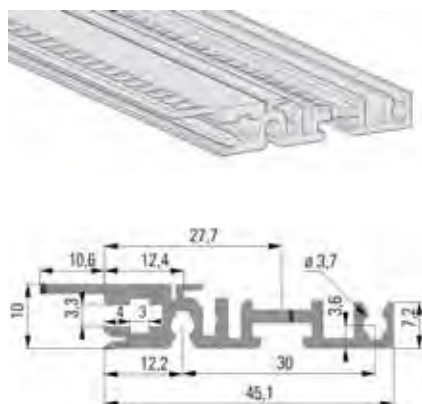
In units for self assembly

Note

– Horizontal rails are secured with two screws

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 00
84 HP	–	23 10 02 02



Front rail IEEE

For mounting plug-in units according to IEEE 1101.1/IEEE 1101.10

Material
Aluminum extrusion, alodined

Scope of Delivery

Front rail IEEE 1 PU (10 pcs)

Delivery Form

In units for self assembly

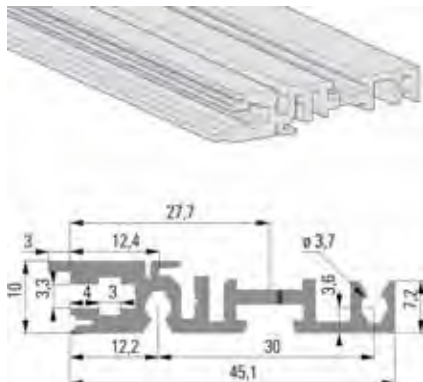
Notes

– Horizontal rails are secured with two screws
– Corners notched

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 06
84 HP	–	23 10 02 08

// Single components



Front rail double-spaced

For double spaced configuration

Material

Aluminum extrusion, alodined

Scope of Delivery

Front rail double-spaced 1 PU (10 pcs)

Delivery Form

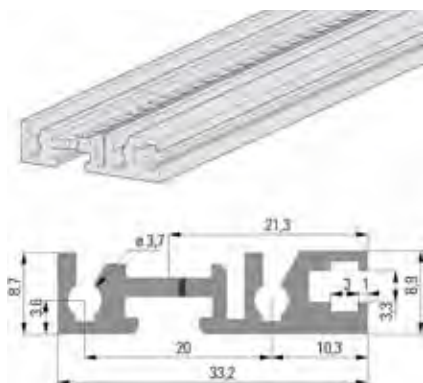
In units for self assembly

Notes

- Horizontal rails are secured with two screws
- Corners notched

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 12
84 HP	–	23 10 02 14



Rear rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit B 1 PU (10 pcs)

Delivery Form

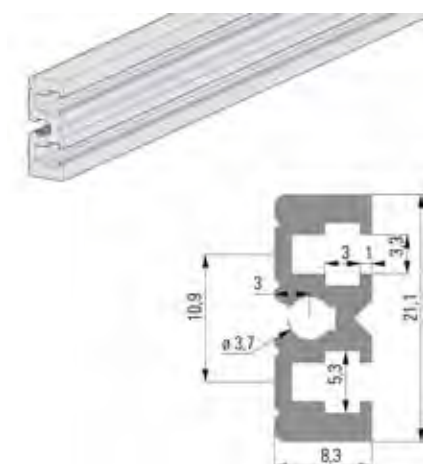
In units for self assembly

Note

- Horizontal rails are secured with two screws

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 27
84 HP	–	23 10 02 29



Center rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Center rail basic unit B 1 PU (10 pcs)

Delivery Form

In units for self assembly

Note

- Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 15
84 HP	–	23 10 02 17

// Single components



Rear rail basic unit C

With integrated connector fixation according to IEC 60603-2

Material
Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit C 1 PU (5 pcs)

Delivery Form

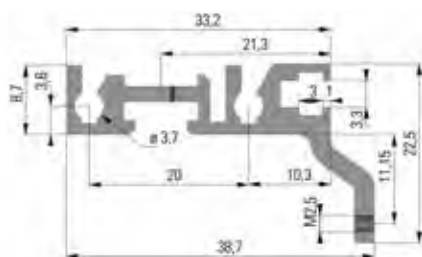
In units for self assembly

Note

– Horizontal rails are secured with two screws

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 18
84 HP	–	23 10 02 20



Rear rail basic unit E

For direct mounting of backplane or perforated rail

Material
Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit E 1 PU (10 pcs)

Delivery Form

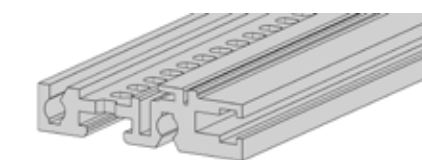
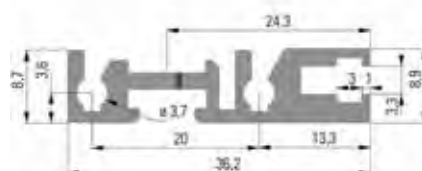
In units for self assembly

Note

– Horizontal rails are secured with two screws

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 21
84 HP	–	23 10 02 23



Rear rail basic unit E for cover plate

For direct mounting of backplane or perforated rail

Material
Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit E 1 PU (10 pcs)

Delivery Form

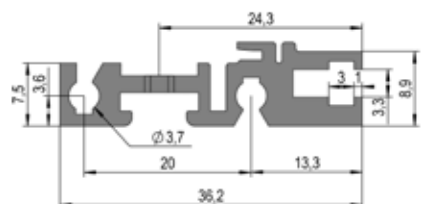
In units for self assembly

Notes

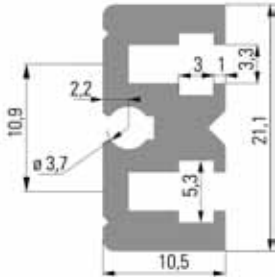
- Horizontal rails are secured with two screws on each side
- Only for Eurocards 220 mm
- Required for applications with cover plate

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 30
84 HP	–	23 10 02 32



// Single components



Center rail basic unit E

For direct mounting of backplane or perforated rail

Material
Aluminum extrusion, alodined

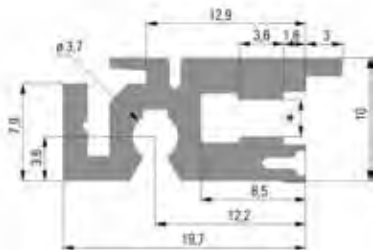
Scope of Delivery
Center rail basic unit E 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 24
84 HP	–	23 10 02 26



Dual rear rail

*With integrated thread channel M3

Material
Aluminum extrusion, alodined

Scope of Delivery
Dual rear rail 1 PU (10 pcs)

Delivery Form
In units for self assembly

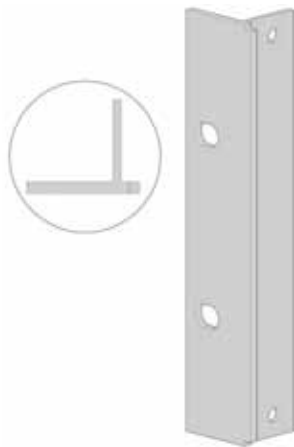
Notes
– Horizontal rails are secured with one screw
– Required for applications with dual cover plate
– Maximum torque 0.75 Nm (6.6 lbs)

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 09
84 HP	–	23 10 02 11

19" mounting brackets Future

Mounted to the front of the subrack, the brackets enable installation of the subrack in a 19" case or cabinet. Includes recess for front rail



19" mounting brackets Future, standard

Without groove, upgrade with shielding material not possible.
Either with or without handle holes

Material
Aluminum extrusion, alodined

Scope of Delivery
Mounting brackets without groove 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– Handles must be ordered separately

Ordering table

H	Without handle holes	With handle holes
3 U	80 41 10 03	80 41 10 04
4 U	–	–
6 U	80 41 10 08	80 41 10 07



19" mounting brackets Future with groove for EMC spring shielding concept

With groove for mounting EMC springs

Material
Aluminum extrusion, alodined

Scope of Delivery
Mounting bracket with groove 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– EMC springs must be ordered separately

Ordering table

H	Without handle holes	With handle holes
3 U	23 10 01 60	–
4 U	23 10 01 61	–
6 U	23 10 01 62	–



19" mounting brackets Future with bar for EMC fabric shielding concept

With bar for mounting self adhesive EMC fabric D shape

Material
Aluminum extrusion, alodined

Scope of Delivery
Mounting bracket with bar 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– EMC fabrics D shape must be ordered separately

Ordering table

H	Without handle holes	With handle holes
3 U	23 11 01 60	–
4 U	–	–
6 U	23 11 01 61	–

// Single components

Corner brackets Future

For facing the rear of the subrack. Includes recess for front rail.

The total depth of the subrack expands by 3 mm with the corner brackets assembled.



Corner bracket Future, standard

Without groove, upgrade with shielding material not possible.

Material
Aluminum extrusion, alodined

Scope of Delivery
Corner bracket without groove 1 PU (10 pcs)

Delivery Form
In units for self assembly

Ordering table

H	Variant without groove
3 U	80 41 10 20
4 U	–
6 U	80 41 10 21



Corner bracket Future with groove for EMC spring shielding concept

With groove for mounting EMC springs

Material
Aluminum extrusion, alodined

Scope of Delivery
Corner bracket with groove 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– EMC springs must be ordered separately

Ordering table

H	Variant with groove
3 U	23 10 01 65
4 U	23 10 01 66
6 U	23 10 01 67



Corner bracket Future with bar for EMC fabric shielding concept

With bar for mounting self-adhesive EMC fabric D shape

Material
Aluminum extrusion, alodined

Scope of Delivery
Corner bracket with bar 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– EMC fabrics D shape must be ordered separately

Ordering table

H	Variant with bar
3 U	23 11 01 65
4 U	–
6 U	23 11 01 67

19" subrack Future
Basic and modified version



19" subrack FutureX
Basic version



//02 19" SUBRACKS

FutureX



Product information

The FutureX series is a cost-optimized product that is designed for lower mechanical stress. This cost reduction is due to the use of rails with a lighter construction.

Thanks to the different shielding concepts for the 19" subracks, the shielding can be configured individually. In the side plates there are holes for insert nuts to enable accessories (e.g. mounting plate) to be attached. The horizontal rails can be mounted in 10-mm increments, which permits dual mounting.

Note

- "IEEE" version: front rail(s) with pitch hole pattern according to IEEE 1101.10

Overview

Basic units	H in U		W in HP	D in mm				Page
	3	6		180	244	304	364	
- Standard	●	●	●	●*	●	●	●	SUB 01.25
- EMC spring shielding concept	●	●	●	●*	●	●	●	SUB 01.25
- EMC fabric shielding concept	●	●	●	●*	●	●	●	SUB 01.26
- IEEE, EMC fabric shielding concept	●	●	●	●*	●	●	●	SUB 01.26

* Dual mounting not possible

Single components	Page
Side plates	SUB 01.27
Horizontal rails	SUB 01.28
Mounting brackets	SUB 01.31
Corner brackets	SUB 01.32

Accessories	Page
Threaded inserts	SUB 01.78
Card guides	Please check series reference
Board retainers	Please check series reference
Isolating strips	SUB 01.84
Z-rails	SUB 01.85
Perforated rails	SUB 01.86
Covers	Please check series reference
Protective hoods	Please check series reference
Coding blocks and coding pin IEEE	SUB 01.94
EMC/ESD shielding material	Please check concept
Handles	SUB 01.100
Assembly components	Please check series reference
Split vertical PCB mount	SUB 01.102
Horizontal PCB mount	SUB 01.103

// Basic units

Basic units

The basic units of the FutureX series differ mainly in the shielding concept. An IEEE 1101.1/ IEEE 1101.10 compatible version is also available as a basic unit. Additional configurations can be created by selecting the appropriate single components.

Features of the basic units



"EMC spring" shielding concept

Mounting bracket with groove for mounting EMC springs



"EMC fabric" shielding concept

Mounting brackets with bar for mounting self adhesive EMC fabric D shape

19" subrack FutureX, standard



Scope of Delivery

Mounting brackets without groove	2 pcs
Side plate	2 pcs
Front rail	2 pcs
Rear rail (B or E)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

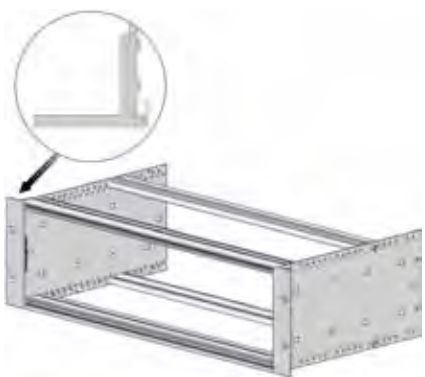
Components in units for self assembly

Notes

- Mounting brackets without groove, upgrade with shielding material is not possible
- Mounting brackets without handle holes

Ordering table

H	W	Basic unit	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	84 HP	B	23 13 00 20	23 13 00 30	23 13 00 40	23 13 00 50
3 U	84 HP	E	23 13 00 21	23 13 00 31	23 13 00 41	23 13 00 51
6 U	84 HP	B	23 13 00 22	23 13 00 32	23 13 00 42	23 13 00 52
6 U	84 HP	E	23 13 00 23	23 13 00 33	23 13 00 43	23 13 00 53



19" subrack FutureX, EMC spring shielding concept

Scope of Delivery

Mounting bracket with groove	2 pcs
Side plate	2 pcs
Front rail	2 pcs
Rear rail (B or E)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Notes

- Mounting brackets with groove for mounting of EMC springs
- EMC springs must be ordered separately
- Mounting brackets without handle holes

Ordering table

H	W	Basic unit	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	84 HP	B	23 14 00 20	23 14 00 30	23 14 00 40	23 14 00 50
3 U	84 HP	E	23 14 00 21	23 14 00 31	23 14 00 41	23 14 00 51
6 U	84 HP	B	23 14 00 22	23 14 00 32	23 14 00 42	23 14 00 52
6 U	84 HP	E	23 14 00 23	23 14 00 33	23 14 00 43	23 14 00 53

// Basic units



19" subrack FutureX, EMC fabric shielding concept

Scope of Delivery

Mounting bracket with bar	2 pcs
Side plate	2 pcs
Front rail	2 pcs
Rear rail (B or E)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

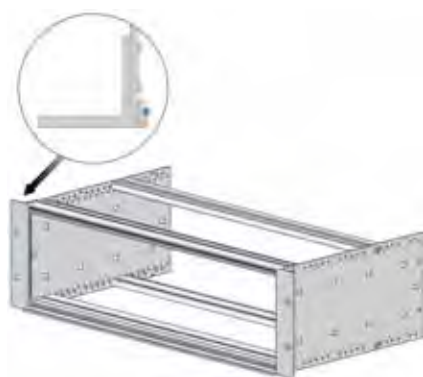
Components in units for self assembly

Notes

- Mounting bracket with bar for mounting self adhesive EMC fabric D shape
- EMC fabrics D shape must be ordered separately
- Mounting brackets without handle holes

Ordering table

H	W	Basic unit	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	84 HP	B	23 11 00 20	23 11 00 30	23 11 00 40	23 11 00 50
3 U	84 HP	E	23 11 00 22	23 11 00 32	23 11 00 42	23 11 00 52
6 U	84 HP	B	23 11 00 26	23 11 00 36	23 11 00 46	23 11 00 56
6 U	84 HP	E	23 11 00 28	23 11 00 38	23 11 00 48	23 11 00 58



19" subrack FutureX IEEE, EMC fabric shielding concept

Scope of Delivery

Mounting bracket with bar	2 pcs
Side plate	2 pcs
Front rail IEEE	2 pcs
Rear rail (B or E)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Notes

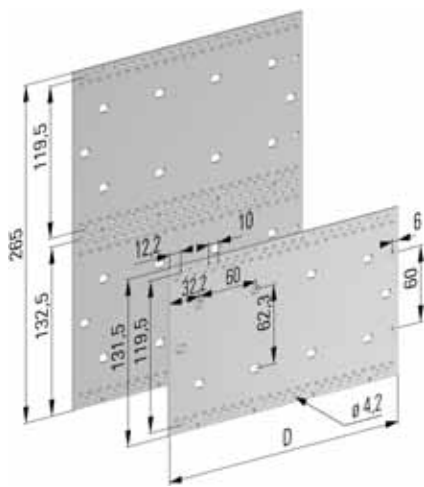
- Mounting bracket with bar for mounting self adhesive EMC fabric D shape
- EMC fabrics D shape must be ordered separately
- Mounting brackets without handle holes

Ordering table

H	W	Basic unit	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	84 HP	B	23 18 00 20	23 18 00 30	23 18 00 40	23 18 00 50
3 U	84 HP	E	23 18 00 21	23 18 00 31	23 18 00 41	23 18 00 51
6 U	84 HP	B	23 18 00 22	23 18 00 32	23 18 00 42	23 18 00 52
6 U	84 HP	E	23 18 00 23	23 18 00 33	23 18 00 43	23 18 00 53

Side plates FutureX

For mounting horizontal rails, mounting brackets, corner brackets and covers.
Dimples on the side plates ease assembly and prevent unwanted torsion of the rails.



Side plate FutureX

Material
Aluminum, 2 mm, alodined

Scope of Delivery
Side plate

1 pc

Delivery Form
In units for self assembly

Notes
– Horizontal rails mountable in 10-mm increment
– Insert nuts must be ordered separately

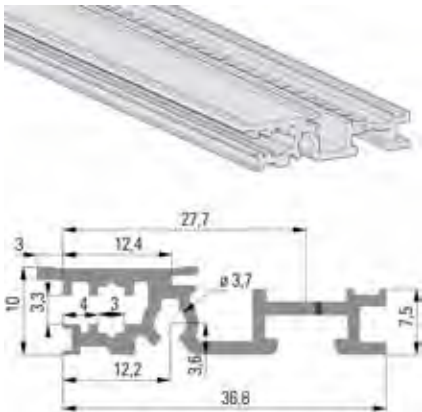
Ordering table

H	D = 180 mm	D = 244 mm	D = 304 mm	D = 364 mm
3 U	23 11 02 34	23 11 02 35	23 11 02 36	23 11 02 37
6 U	23 11 02 38	23 11 02 39	23 11 02 40	23 11 02 41

// Single components

Front, rear and center rails FutureX

There are extruded channels for self-forming M4 screws to mount the rails to the side plates. Front and rear rails include incremented holes for mounting guide rails. Center rails do not have incremented holes and are only used for direct or indirect mounting of backplanes, Z-rails and perforated rails in 6 U subracks.



Front rail standard

For mounting plug-in units or front panels

Material
Aluminum extrusion, alodined

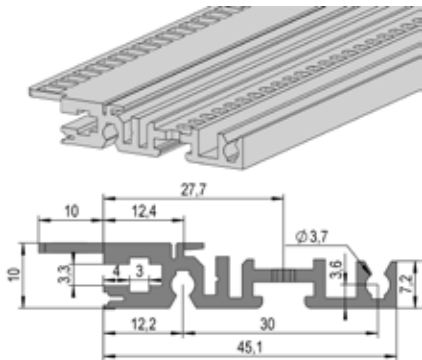
Scope of Delivery
Front rail standard 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	23 11 02 00
84 HP	–	23 11 02 02



Front rail IEEE

For configuration of plug-in units according to IEEE 1101.1/1101.10

Material
Aluminum extrusion, alodined

Scope of Delivery
Front rail IEEE 1 PU (10 pcs)

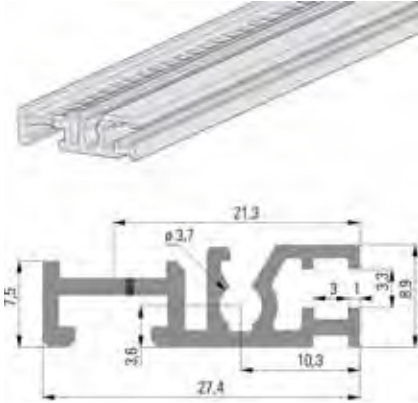
Delivery Form
In units for self assembly

Notes
– Horizontal rails are secured with 2 screws
– Corners notched

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 06
84 HP	–	23 10 02 08

// Single components



Rear rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit B 1 PU (10 pcs)

Delivery Form

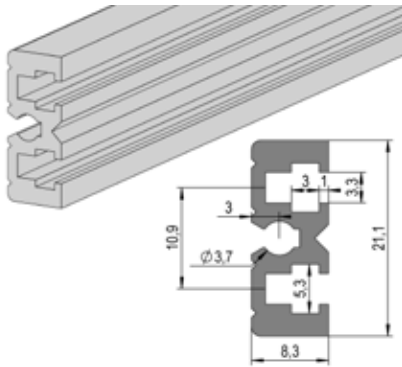
In units for self assembly

Note

– Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	23 11 02 27
84 HP	–	23 11 02 29



Center rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Center rail basic unit B 1 PU (10 pcs)

Delivery Form

In units for self assembly

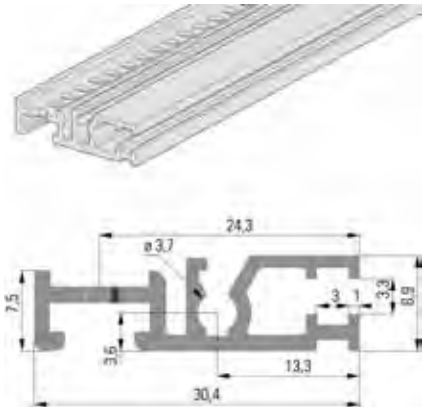
Note

– Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 15
84 HP	–	23 10 02 17

// Single components



Rear rail basic unit E

For direct mounting of backplane or perforated rail

Material
Aluminum extrusion, alodined

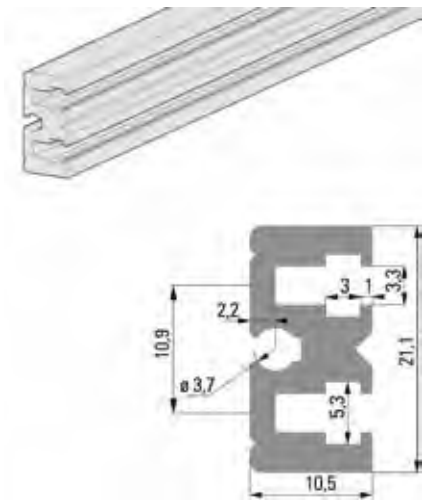
Scope of Delivery
Rear rail basic unit E 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	23 11 02 21
84 HP	–	23 11 02 23



Center rail basic unit E

For direct mounting of backplane or perforated rail

Material
Aluminum extrusion, alodined

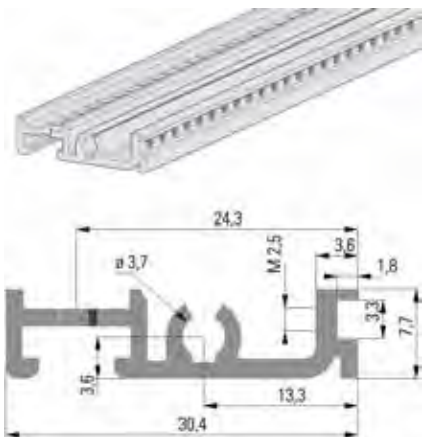
Scope of Delivery
Center rail basic unit E 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	23 10 02 24
84 HP	–	23 10 02 26



Rear rail basic unit E with integrated thread M2.5

For direct mounting of backplane or perforated rail without using threaded inserts

Material
Aluminum extrusion, alodined

Scope of Delivery
Rear rail basic unit E 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	23 11 02 31
84 HP	–	23 11 02 30

19" mounting brackets FutureX

Mounted on the front of the subrack, the bracket installation of the subrack in a 19" case or cabinet. Includes recess for front rail.



19" mounting brackets FutureX, standard

Without groove, upgrade with shielding material not possible.
Either with or without handle holes

Material
Aluminum extrusion, alodined

Scope of Delivery
Mounting bracket without groove 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– Handles must be ordered separately

Ordering table

H	Without handle holes	With handle holes
3 U	80 41 10 03	80 41 10 04
4 U	–	–
6 U	80 41 10 08	80 41 10 07



19" mounting bracket FutureX with groove for EMC spring shielding concept

With groove for mounting EMC springs

Material
Aluminum extrusion, alodined

Scope of Delivery
Mounting bracket with groove 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– EMS springs must be ordered separately

Ordering table

H	Without handle holes	With handle holes
3 U	23 10 01 60	–
4 U	23 10 01 61	–
6 U	23 10 01 62	–



19" mounting bracket FutureX with bar for EMC fabric shielding concept

With bar for mounting self adhesive EMC fabric D shape

Material
Aluminum extrusion, alodined

Scope of Delivery
Mounting bracket with bar 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– EMC fabrics D shape must be ordered separately

Ordering table

H	Without handle holes	With handle holes
3 U	23 11 01 60	–
4 U	–	–
6 U	23 11 01 61	–

// Single components

19" corner brackets FutureX

For facing the rear of the subrack. Includes recess for front rail.

When corner brackets are mounted, the overall depth of the subrack is extended by 3 mm.



Corner bracket FutureX, standard

Without groove, upgrade with shielding material not possible.

Material
Aluminum extrusion, alodined

Scope of Delivery
Corner bracket without groove 1 PU (10 pcs)

Delivery Form
In units for self assembly

Ordering table

H	Variant without groove
3 U	80 41 10 20
4 U	–
6 U	80 41 10 21



Corner bracket FutureX with groove for EMC spring shielding concept

With groove for mounting EMC springs

Material
Aluminum extrusion, alodined

Scope of Delivery
Corner bracket with groove 1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
EMC springs must be ordered separately

Ordering table

H	Variant with groove
3 U	23 10 01 65
4 U	23 10 01 66
6 U	23 10 01 67



Corner bracket FutureX with bar for EMC fabric shielding concept

With bar for mounting self adhesive EMC fabric D shape

Material
Aluminum extrusion, alodined

Scope of Delivery
Corner bracket with bar 1 PU (10 pcs)

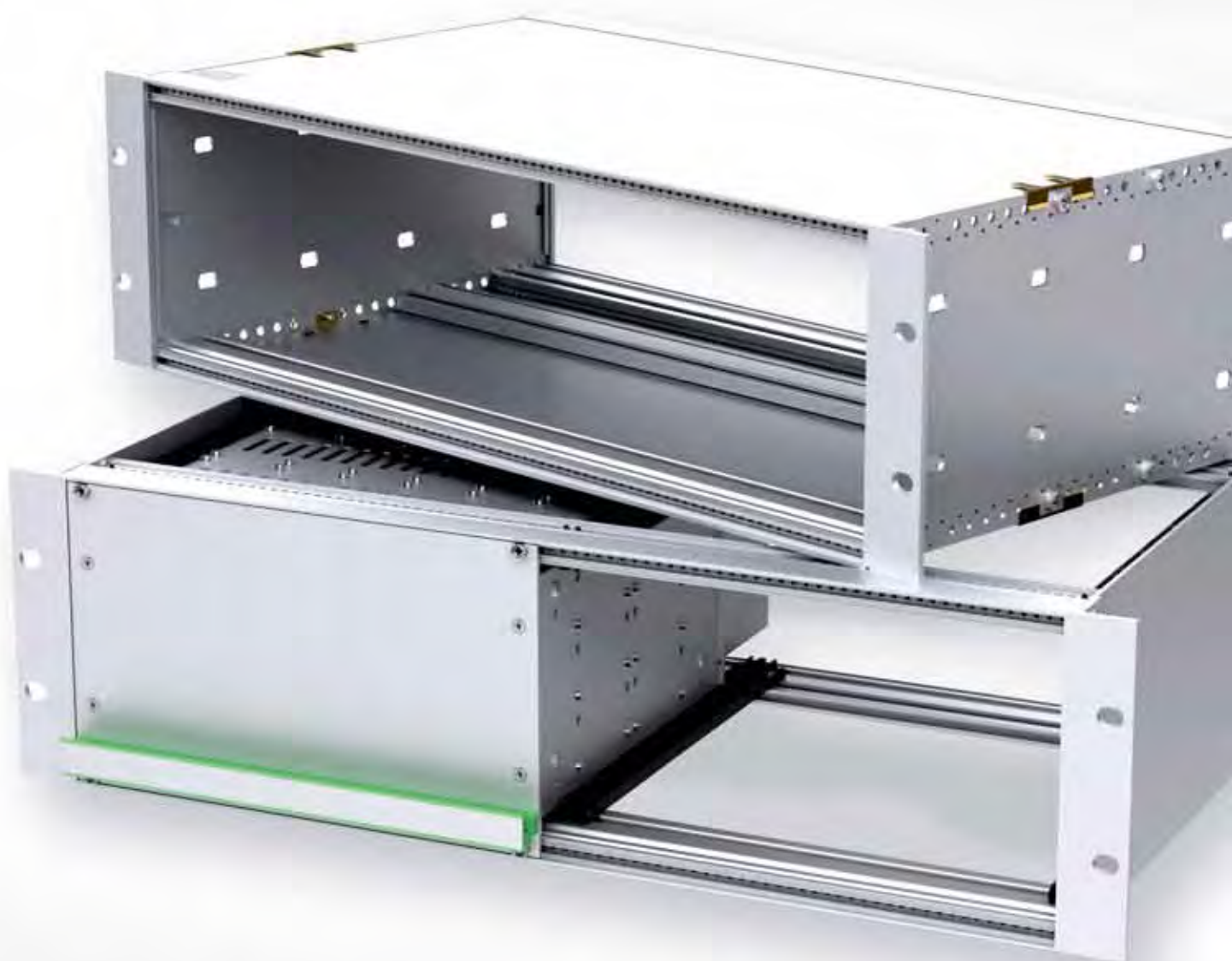
Delivery Form
In units for self assembly

Note
EMC fabrics D shape must be ordered separately

Ordering table

H	Variant with bar
3 U	23 11 01 65
4 U	–
6 U	23 11 01 67

19" subrack FutureX
Basic and modified version



19" subrack FerroRAIL
Basic version



//02 19" SUBRACKS

FerroRAIL



Product information

The 19" subrack series FerroRAIL was developed specially for French SNCF railway applications. Based on the Future series, which complies with the LES-DB of the German Railway Deutsche Bahn, the specific requirements for fulfillment of the French standards have been implemented.

Notes

- For French SNCF railway applications in accordance with the following standards:
NF EN 61373, NF F 67-012, NF F 60-002, NF F 61-005, NF F 16-101/102 class F1, I2
- "IEEE" version: Front rails with pitch hole pattern according to IEEE 1101.10
- 1 T = 4 HP (20.32 mm)



Overview

Basic units	H in U		W in HP (T)		D in mm		Page
	3	6	36 (9 T)	84 (21 T)	235.5	320	
- Standard, with side plate extrusion and mounting frame	•	•	•	•	–	•	SUB 01.38
- IEEE, with side plate extrusion and mounting frame	•	•	•	•	–	•	SUB 01.39
- IEEE, shortened version, without side plate extrusion, without mounting frame	•	•	•	•	•	–	SUB 01.39

Single components	Page
Side plates	SUB 01.40
Horizontal rails	SUB 01.41
Mounting frame	SUB 01.44

Accessories	Page
Threaded inserts	SUB 01.78
Card guides	Please check series reference SUB 01.79
Board retainers	Please check series reference SUB 01.83
Perforated rails	SUB 01.86
Covers	Please check series reference SUB 01.87
Coding blocks and coding pin IEEE	SUB 01.94
Coding block FerroRAIL	SUB 01.95
EMC/ESD shielding material	Please check concept SUB 01.96
Handles	SUB 01.100
Assembly components	Please check series reference SUB 01.106

//02 19" SUBRACKS

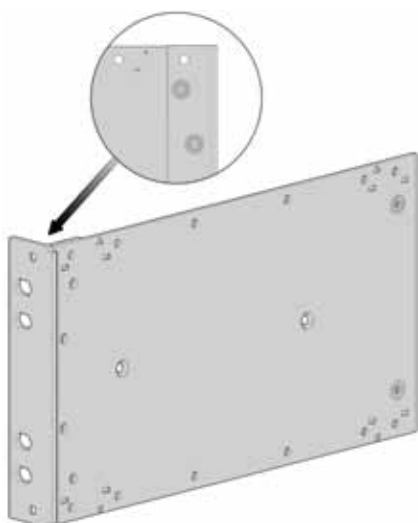
FerroRAIL

// Basic units

Basic units

The basic units of the FerroRAIL series are available as standard and IEEE versions. The standard versions are vibration-resistant and are equipped with side plate extrusions and a mounting frame.

All IEEE basic units are shielded with EMC springs and are available either with side plate extrusions and mounting frame or in a shortened version. Further configurations can be created by individual combination of components.



Features of the basic units

Vibration resistant

Side plate/mounting brackets and corner brackets are tox-joined, horizontal rails are secured with two screws on each side.

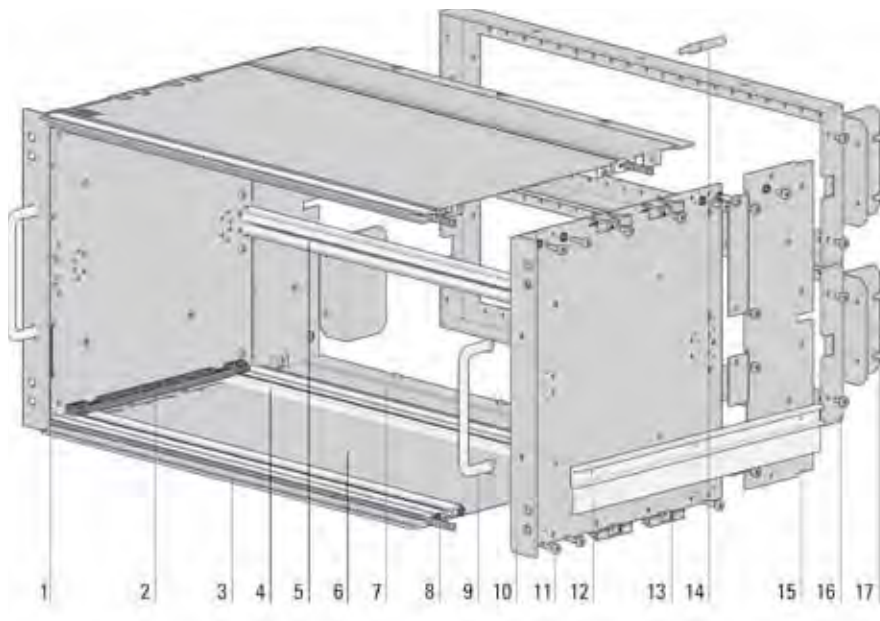


"EMC spring" shielding concept

Mounting brackets with groove for mounting EMC springs

Example of configuration

The diagram shows a typical configuration of a 19" subrack FerroRAIL 6 U.



- 1 EMC spring
- 2 Card guide*
- 3 Front rail (IEEE version as option)
- 4 Rear rail E
- 5 Center rail E (only with 6 U)
- 6 Front cover plate
- 7 Rear cover plate
- 8 Threaded inserts*
- 9 Handle
- 10 Side plate with mounting brackets, tox-joined
- 11 Assembly components
- 12 Guiding extrusion, external
- 13 Cover EMC spring
- 14 Coding block*
- 15 Side plate extrusion
- 16 Mounting frame (6 U = 2 pcs)
- 17 Distance bracket for mounting frame

The parts marked with * are not included in the standard scope of delivery of a basic unit.

//0219" SUBRACKS

FerroRAIL

// Basic units



19" subrack FerroRAIL, standard, with side plate extrusions and mounting frame

Scope of Delivery

Side plate with mounting bracket, tox-joined	2 pcs
Front rail	2 pcs
Rear rail	2 pcs
Center rail (only with 6 U)	1 pc
Handle	2 pcs
Front cover plate	2 pcs
Rear cover plate	2 pcs
Guiding extrusion external	2 pcs
Side plate extrusion	2 pcs
Mounting frame (6 U = 2 pcs)	1 pc
Distance bracket (6 U = 4 pcs)	2 pcs
Assembly kit	1 pc

Delivery Form

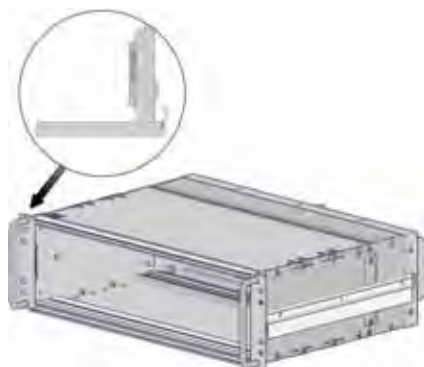
Components in units for self assembly

Notes

- Coding blocks must be ordered separately
- Additional rear rails are required for configurations with EK 160 mm boards

Ordering table

H	W	Basic unit	D = 320 mm
3 U	36 HP (9 T)	E	25 10 03 36
3 U	84 HP (21 T)	E	25 10 03 84
6 U	36 HP (9 T)	E	25 10 06 36
6 U	84 HP (21 T)	E	25 10 06 84



19" subrack FerroRAIL, IEEE, with side plate extrusions and mounting frame, EMC spring shielding concept

Scope of Delivery

Side plate with mounting bracket, tox-joined	2 pcs
Front rail IEEE	2 pcs
Rear rail	2 pcs
Center rail (only with 6 U)	1 pc
Handle	2 pcs
Front cover plate	2 pcs
Rear cover plate	2 pcs
Guiding extrusion external	2 pcs
Side plate extrusion	2 pcs
Mounting frame (6 U = 2 pcs)	1 pc
Distance bracket (6 U = 4 pcs)	2 pcs
Cover EMC spring	8 pcs
Assembly kit	1 pc

Delivery Form

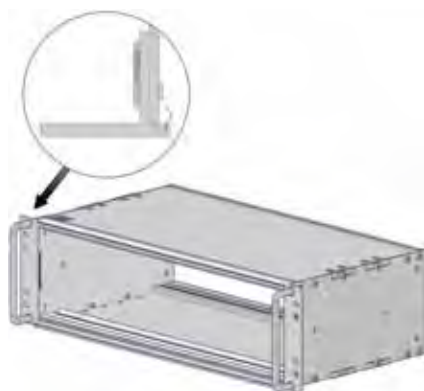
Components in units for self assembly

Notes

- Mounting brackets with groove for mounting EMC springs
- Coding bolts and EMC springs must be ordered separately
- Additional rear rails are required for configurations with EK160 mm boards

Ordering table

H	W	Basic unit	D = 320 mm
3 U	36 HP (9 T)	E	25 10 13 36
3 U	84 HP (21 T)	E	25 10 13 84
6 U	36 HP (9 T)	E	25 10 16 36
6 U	84 HP (21 T)	E	25 10 16 84



19" subrack FerroRAIL, IEEE, shortened version, EMC spring shielding concept – without side plate extrusions, without mounting frame

Scope of Delivery

Side plate with mounting bracket, tox-joined	2 pcs
Front rail IEEE	2 pcs
Rear rail	2 pcs
Center rail (only with 6 U)	1 pc
Handle	2 pcs
Front cover plate	2 pcs
Cover EMC spring	8 pcs
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Notes

- Mounting brackets with groove for mounting EMC springs
- EMC springs must be ordered separately
- Additional rear rails are required for configurations with EK 160 mm boards

Ordering table

H	W	Basic unit	D = 235.5 mm
3 U	36 HP (9 T)	E	25 10 23 36
3 U	84 HP (21 T)	E	25 10 23 84
6 U	36 HP (9 T)	E	25 10 26 36
6 U	84 HP (21 T)	E	25 10 26 84

Side plate FerroRAIL, tox-joined, for EMC spring shielding concept

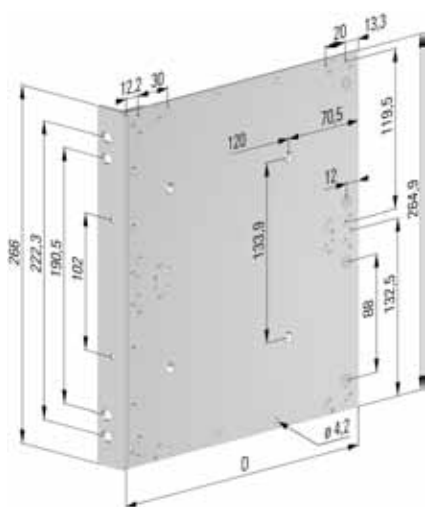
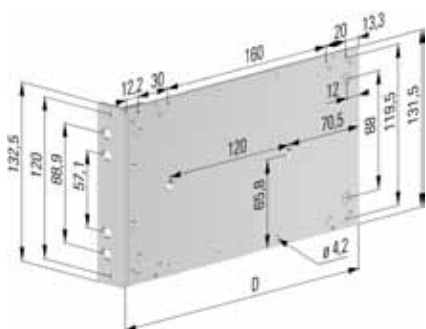
Side plate aluminum, 2 mm, alodined. Mounting bracket (3/2 mm) with groove for spring shielding concept, aluminum extrusion, alodined

Side plate, mounting bracket,
tox-joined

In units for self assembly

- Horizontal rails mountable in 10-mm increments
- Horizontal rails must be secured with two screws
- EMC springs must be ordered separately
- With handle holes

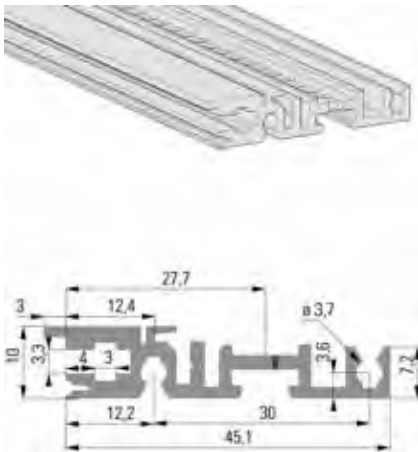
H	D = 235.5 mm
3 U	25 11 10 03
6 U	25 11 10 06



Front, rear and center rails FerroRAIL

There are extruded channels for self-forming M4 screws to mount the rails to the side plates. Front and rear rails include incremented holes for mounting guide rails.

Center rails do not have incremented holes and are used only for direct or indirect mounting of backplanes, Z-rails and perforated rails in 6 U sub racks.



Front rail, standard

For mounting plug-in units or front panels

Material
Aluminum extrusion, alodined

Scope of Delivery

Front rail 1 PU (10 pcs)

Delivery Form

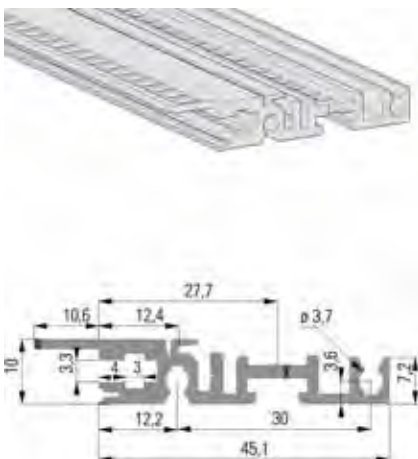
Components in units for self assembly

Note

– Horizontal rails are secured with two screws on each side

Ordering table

W	Anodized	Alodined
36 HP (9 T)	–	23 10 02 03
84 HP (21 T)	–	23 10 02 02



Front rail IEEE

For mounting plug-in units according to IEEE 1101.1/1101.10

Material
Aluminum extrusion, alodined

Scope of Delivery

Front rail IEEE 1 PU (10 pcs)

Delivery Form

Components in units for self assembly

Note

– Horizontal rails are secured with two screws on each side
– Corners notched

Ordering table

W	Anodized	Alodined
36 HP (9 T)	–	23 10 02 05
84 HP (21 T)	–	23 10 02 08

//02 19" SUBRACKS

FerroRAIL

// Single components



Rear rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit B 1 PU (10 pcs)

Delivery Form

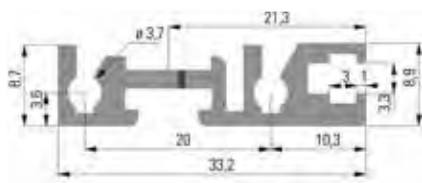
Components in units for self assembly

Notes

- Horizontal rails are secured with two screws on each side
- Only for euroboards 160 mm, cover plate not pluggable

Ordering table

W	Anodized	Alodined
36 HP (9 T)	–	23 10 02 36
84 HP (21 T)	–	23 10 02 29



Center rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Center rail basic unit B 1 PU (10 pcs)

Delivery Form

Components in units for self assembly

Note

- Horizontal rails are secured with one screw on each side

Ordering table

W	Anodized	Alodined
36 HP (9 T)	–	23 10 02 34
84 HP (21 T)	–	23 10 02 17



Rear rail basic unit E

For direct mounting of backplane or perforated rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit E 1 PU (10 pcs)

Delivery Form

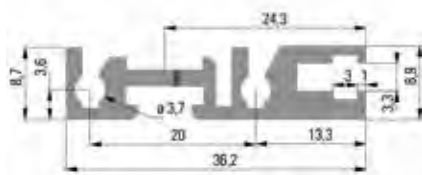
Components in units for self assembly

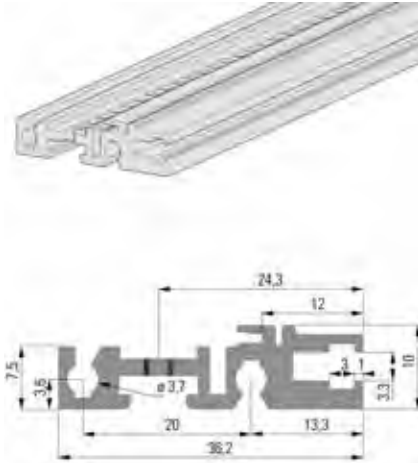
Notes

- Horizontal rails are secured with two screws on each side
- Only for euroboards 160 mm, cover plate not pluggable

Ordering table

W	Anodized	Alodined
36 HP (9 T)	–	23 10 02 31
84 HP (21 T)	–	23 10 02 23





Rear rail basic unit E for cover plate

For direct mounting of backplane or perforated rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit E 1 PU (10 pcs)

Delivery Form

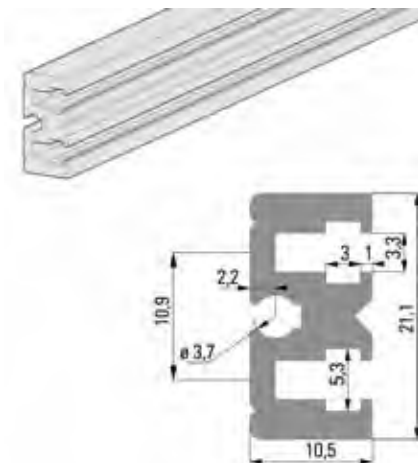
Components in units for self assembly

Notes

- Horizontal rails are secured with two screws on each side
- Only for euroboards 220 mm
- Required for applications with cover plate

Ordering table

W	Anodized	Alodined
36 HP (9 T)	–	23 10 02 33
84 HP (21 T)	–	23 10 02 32



Center rail basic unit E

For direct mounting of backplane or perforated rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Center rail basic unit E 1 PU (10 pcs)

Delivery Form

Components in units for self assembly

Note

- Horizontal rails are fixed with one screw on each side

Ordering table

W	Anodized	Alodined
36 HP (9 T)	–	23 10 02 35
84 HP (21 T)	–	23 10 02 26

//0219" SUBRACKS

FerroRAIL

// Single components



Mounting frame FerroRAIL

For mounting connectors and coding bolts

Material
Aluminum, alodined

Scope of Delivery	
Side plate extrusion	2 pcs
Mounting frame (6 U = 2 pcs)	1 pc
Rear cover plate	2 pcs
Distance bracket (6 U = 4 pcs)	2 pcs
Guiding extrusion, external	2 pcs
Assembly kit	1 pc

Delivery Form
Components in units for self assembly

Ordering table

H	W = 36 HP(9 T)	W = 84 HP(21 T)
3 U	25 12 13 36	25 12 13 84
6 U	25 12 16 36	25 12 16 84

19" subrack FerroRAIL,
Standard, 3 U and 6 U, with card guides/backplane



19" subracks Series 75

Customized application with fans

Basic version, 3 U, with card guides/covers



//02 19" SUBRACKS Series 75



Product information

The subrack Series 75 is a cost-effective and easy-to-assemble alternative, using one-piece extruded side plates with integrated 19" mounting brackets. It is used for mounting single and double Eurocards. The horizontal rails can be mounted in 30-mm increments.

Overview

Basic units	H in U		W in HP	D in mm			Page
	3	6		172.5	210	240	
- Standard without handle holes	●	●	●	●	●	●	SUB 01.49
- Standard with handle holes	●	●	●	●	●	●	SUB 01.49
- EMC without handle holes	●	●	●	●	●	●	SUB 01.50
- EMC with handle holes	●	●	●	●	●	●	SUB 01.50

Single components	Page
Extruded side plate	SUB 01.51
Horizontal rails	SUB 01.52

Accessories	Page
Threaded inserts	SUB 01.78
Card guides	Please check series reference SUB 01.79
Board retainers	Please check series reference SUB 01.83
Isolating strips	SUB 01.84
Z-rails	SUB 01.85
Perforated rails	SUB 01.86
Covers	Please check series reference SUB 01.87
Protective hoods	Please check series reference SUB 01.92
EMC/ESD shielding material	Please check concept SUB 01.96
Identification strips	SUB 01.99
Handles	SUB 01.100
Wall mounting brackets	SUB 01.101
Assembly components	Please check series reference SUB 01.106
Split vertical PCB mount	SUB 01.102
Horizontal PCB mount	SUB 01.103

//02 19" SUBRACKS Series 75

// Basic units

Basic units

The 19" subrack Series 75 is available as standard and EMC versions, either with or without handle holes. The extruded side plates and horizontal rails in the standard basic units are made of anodized aluminum, cutting edges raw. All parts in the EMC versions are clear alodined. Further configurations can be created by individual combination of the appropriate components.

Features of the basic units

One piece extruded side plate



**19" subrack Series 75, standard, without handle holes****Scope of Delivery**

Extruded side plate	2 pcs
Front rail	2 pcs
Rear rail (B or C)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Ordering table

H	W	Basic unit	D = 172.5 mm	D = 210 mm	D = 240 mm
3 U	84 HP	B	75 30 10 00	75 31 10 00	75 00 00 02
3 U	84 HP	C	75 30 20 00	75 31 20 00	75 00 00 03
6 U	84 HP	B	75 60 10 00	75 61 10 00	75 00 00 31
6 U	84 HP	C	75 60 20 00	75 61 20 00	75 00 00 32

**19" subrack Series 75, standard, with handle holes****Scope of Delivery**

Extruded side plate	2 pcs
Front rail	2 pcs
Rear rail (B or C)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Note

– Handles must be ordered separately

Ordering table

H	W	Basic unit	D = 172.5 mm	D = 210 mm	D = 240 mm
3 U	84 HP	B	75 30 11 00	75 31 11 00	75 00 00 06
3 U	84 HP	C	75 30 21 00	75 31 21 00	75 00 00 07
6 U	84 HP	B	75 60 11 00	75 61 11 00	75 00 00 35
6 U	84 HP	C	75 60 21 00	75 61 21 00	75 00 00 36

//02 19" SUBRACKS

Series 75

// Basic units



19" subrack Series 75, standard, EMC, without handle holes

Scope of Delivery

Extruded side plate	2 pcs
Front rail	2 pcs
Rear rail (B, C or E)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Note

– All components alodined

Ordering table

H	W	Basic unit	D = 172.5 mm	D = 210 mm	D = 240 mm
3 U	84 HP	B	75 30 10 10	75 31 10 10	75 00 01 02
3 U	84 HP	C	75 30 20 10	75 31 20 10	75 00 01 03
3 U	84 HP	E	75 30 40 10	75 31 40 10	75 00 01 05
6 U	84 HP	B	75 60 10 10	75 61 10 10	75 00 01 31
6 U	84 HP	C	75 60 20 10	75 61 20 10	75 00 01 32
6 U	84 HP	E	75 60 40 10	75 61 40 10	75 00 01 34



19" subrack Series 75, EMC, with handle holes

Scope of Delivery

Extruded side plate	2 pcs
Front rail	2 pcs
Rear rail (B, C or E)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Notes

– All components alodined
– Handles must be ordered separately

Ordering table

H	W	Basic unit	D = 172.5 mm	D = 210 mm	D = 240 mm
3 U	84 HP	B	75 30 11 10	75 31 11 10	75 00 01 06
3 U	84 HP	C	75 30 21 10	75 31 21 10	75 00 01 07
3 U	84 HP	E	75 30 41 10	75 31 41 10	75 00 01 09
6 U	84 HP	B	75 60 11 10	75 61 11 10	75 00 01 35
6 U	84 HP	C	75 60 21 10	75 61 21 10	75 00 01 36
6 U	84 HP	E	75 60 41 10	75 61 41 10	75 00 01 38

Extruded side plates Series 75

For mounting horizontal rails and covers. Dimples on the extruded side plates ease assembly and prevent unwanted torsion of the rails.



Extruded side plates Series 75, without handle holes

Material

Aluminum extrusion 2/2.5 mm, choice of anodized/cutting edges raw or alodined (EMC)

Scope of Delivery

Extruded side plate

1 pc

Delivery Form

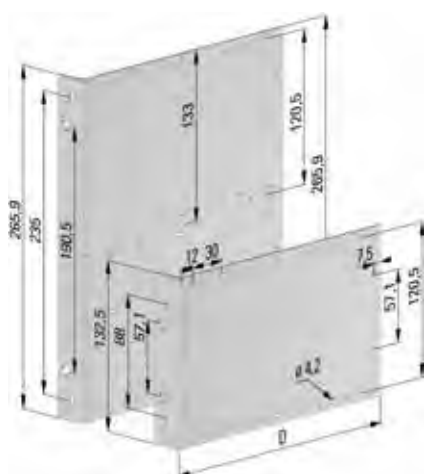
In units for self assembly

Notes

- Horizontal rails mountable in 30-mm increment
- With notches for mixed assemblies

Ordering table

H	Variant	D = 112 mm	D = 172.5 mm	D = 210 mm	D = 240 mm
3 U	Anodized	75 41 10 10	79 75 31 00	79 75 32 00	75 41 10 01
6 U	Anodized	75 41 10 11	79 75 61 00	79 75 62 00	75 41 10 02
3 U	Alodined	–	79 75 31 01	79 75 32 01	75 41 10 03
6 U	Alodined	–	79 75 61 01	79 75 62 01	75 41 10 04



Extruded side plates Series 75, with handle holes

Material

Aluminum extrusion 2/2.5 mm, choice of anodized/cutting edges raw or alodined (EMC)

Scope of Delivery

Extruded side plate with handle holes

1 pc

Delivery Form

In units for self assembly

Notes

- Horizontal rails mountable in 30-mm increment
- With notches for mixed assemblies

Ordering table

H	Variant	D = 112 mm	D = 172.5 mm	D = 210 mm	D = 240 mm
3 U	Anodized	75 41 10 30	79 75 33 00	79 75 34 00	75 41 10 40
6 U	Anodized	75 41 10 31	79 75 63 00	79 75 64 00	75 41 10 41
3 U	Alodined	–	79 75 33 01	79 75 34 01	75 41 10 42
6 U	Alodined	–	79 75 63 01	79 75 64 01	75 41 10 43

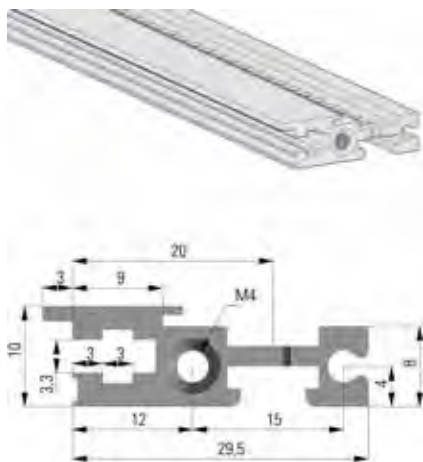
19" SUBRACKS

```
// Single components
```

Front, rear and center rail Series 75

There are threads for M4 screws for mounting on the side plates.

Front and rear rails include incremented holes for mounting guide rails. Center rails do not have incremented holes and are only used for direct or indirect mounting of backplanes, Z-rails and perforated rails in 6 U sub racks.



Front rail standard

For mounting plug-in units or front panels

Material

Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery

Front rail	1 PU (10 pcs)
Rail (L = 2700 mm)	1 pc

Delivery Form

In units for self assembly

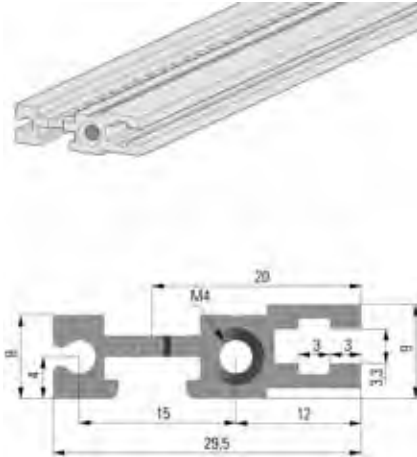
Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 01 02 00	90 01 42 00
63 HP	90 01 03 00	90 01 43 00
84 HP	90 01 01 00	90 01 41 00
2700 mm	90 01 00 00	–

// Single components



Rear rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery

Rear rail basic unit B 1 PU (10 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

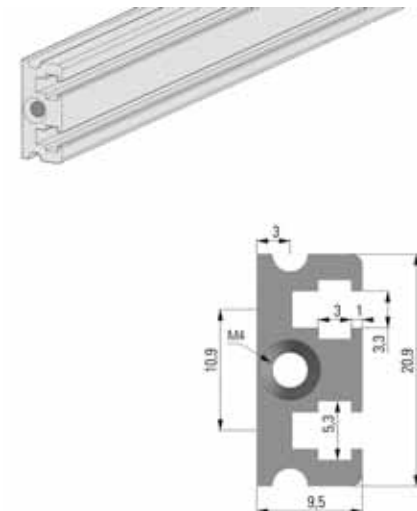
In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremental holes, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 07 02 00	90 07 42 00
63 HP	90 07 03 00	90 07 43 00
84 HP	90 07 01 00	90 07 41 00
2700 mm	90 07 00 00	–



Center rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery

Center rail basic unit B 1 PU (10 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

In units for self assembly

Notes

- Horizontal rails can be fixed with one screw.
- Rail (2700 mm) with incremented holes, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 19 02 00	90 19 42 00
63 HP	90 19 03 00	90 19 43 00
84 HP	90 19 01 00	90 19 41 00
2700 mm	90 19 00 00	–

//0219" SUBRACKS

Series 75

// Single components



Rear rail basic unit C

With integrated connector fixation according to IEC 60603-2

Material

Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery

Rear rail basic unit C1 PU (5 pcs)
Rail (L = 2700 mm)1 pc

Delivery Form

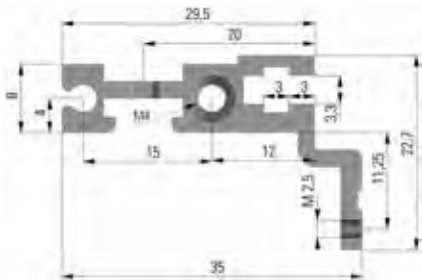
In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes, integrated threads M2.5, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 08 02 00	90 08 42 00
63 HP	90 08 03 00	90 08 43 00
84 HP	90 08 01 00	90 08 41 00
2700 mm	90 08 00 00	–



Center rail basic unit C

With integrated connector fixation according to IEC 60603-2

Material

Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery

Center rail basic unit C1 PU (10 pcs)
Rail (L = 2700 mm)1 pc

Delivery Form

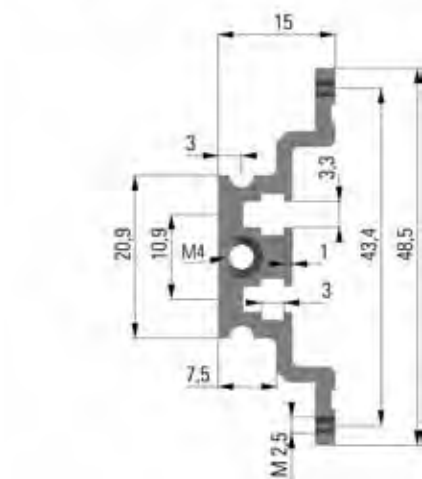
In units for self assembly

Notes

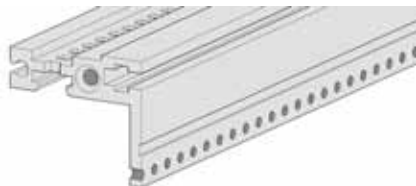
- Horizontal rails are secured with one screw
- Rail with integrated threads M2.5, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 22 02 00	90 22 42 00
63 HP	90 22 03 00	90 22 43 00
84 HP	90 22 01 00	90 22 41 00
2700 mm	90 22 00 00	–



// Single components



Rear rail basic unit D

With integrated connector fixation according to IEC 60603-1

Material

Aluminum extrusion, anodized/cutting edges raw

Scope of Delivery

Rear rail basic unit D 1 PU (5 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

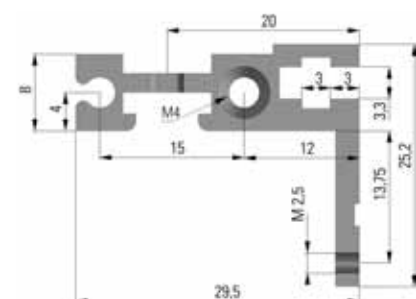
In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes, integrated threads M2.5, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 09 02 00	–
63 HP	90 09 03 00	–
84 HP	90 09 01 00	–
2700 mm	90 09 00 00	–



Rear rail basic unit E

For direct mounting of backplane or perforated rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit E 1 PU (10 pcs)

Delivery Form

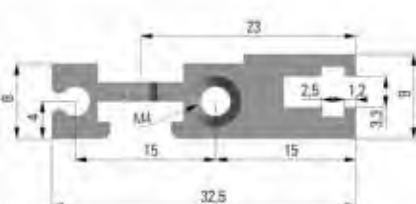
In units for self assembly

Note

- Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	90 41 11 02
63 HP	–	90 41 11 01
84 HP	–	90 41 11 00



Center rail basic unit E

For direct mounting of backplane or perforated rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Center rail basic unit E 1 PU (10 pcs)

Delivery Form

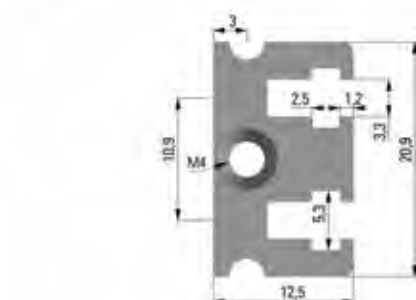
In units for self assembly

Note

- Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	90 41 11 12
63 HP	–	90 41 11 11
84 HP	–	90 41 11 10



19" subrack Series 76
Basic version with accessories



//02

19" SUBRACKS

Series 76



Product information

The subrack Series 76 is particularly suitable for panel mounted applications. Thanks to the use of a single-piece panel front rail its appearance is particularly appealing. Horizontal rails can be mounted in 30-mm increments.

Overview

Basic units	H in U 3	W in HP 84	D in mm 172.5	210	240	Page
- Standard	•	•	•	•	•	SUB 01.59

Single components	Page
Extruded side plates	SUB 01.60
Horizontal rails	SUB 01.61

Accessories	Page
Threaded inserts	SUB 01.78
Card guides	Please check series reference SUB 01.79
Board retainers	Please check series reference SUB 01.83
Isolating strips	SUB 01.84
Z-rails	SUB 01.85
Covers	Please check series reference SUB 01.87
Protective hoods	Please check series reference SUB 01.92
Identification strips	SUB 01.99
Assembly components	Please check series reference SUB 01.106

//0219" SUBRACKS

Series 76

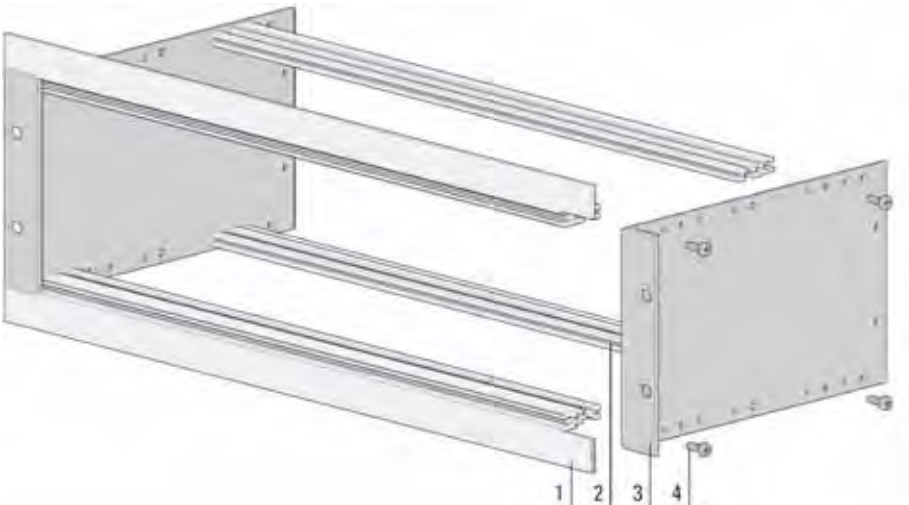
// Basic units

Basic units

Series 76 basic units are made in anodized aluminum (cutting edges raw).

Features of the basic units

Horizontal front rail

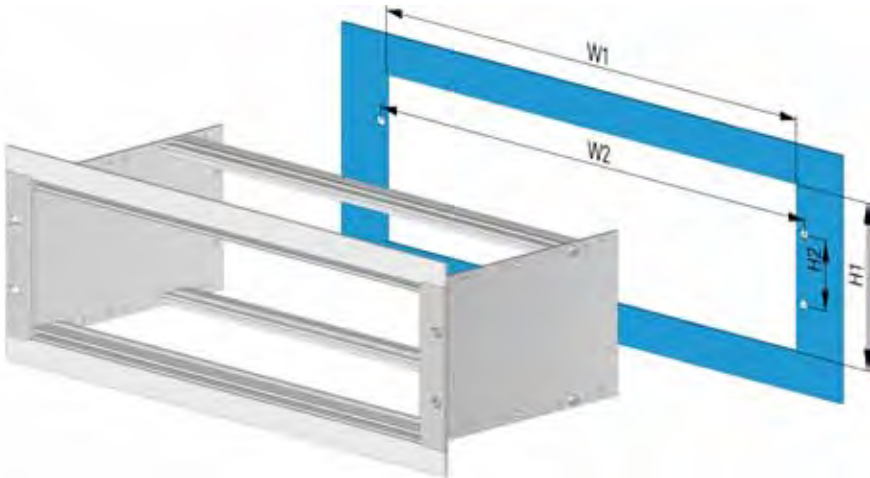


- 1 Panel front rail
- 2 Rear rail
- 3 Extruded side plate
- 4 Assembly components

Panel cut-out

Mounting dimensions (mm)

Height	3 U
Width	84 HP
H1	135.0 mm
H2	57.1 mm
W1	451.0 mm
W2	465.0 mm



// Basic units



19" subrack Series 76, standard

Scope of Delivery

Extruded side plate	2 pcs
Panel front rail	2 pcs
Rear rail (B or C)	2 pcs
Assembly kit	1 pc

Delivery Form

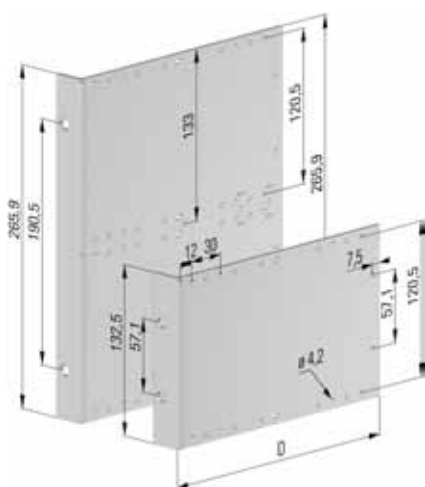
Components in units for self assembly

Ordering table

H	W	Basic unit	D = 172.5 mm	D = 210 mm	D = 240 mm
3 U	84 HP	B	87 30 10 00	87 31 10 00	87 00 00 02
3 U	84 HP	C	87 30 20 00	87 31 20 00	87 00 00 03

Extruded side plates Series 76

For mounting extrusions and covers. Dimples on the side plates ease assembly and prevent unwanted torsion of the rails.



Extruded side plate Series 76, without handle holes

Material
Aluminum extrusion 2/2.5 mm, anodized/cutting
edges raw

Extruded side plate

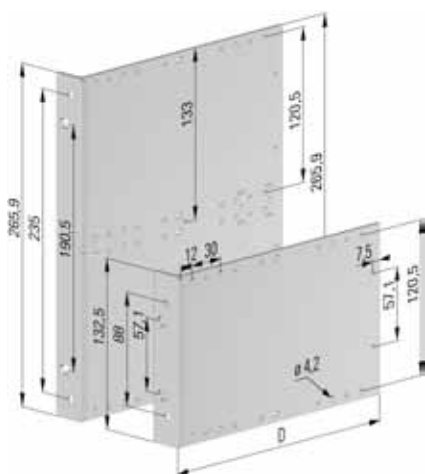
1 pc

In units for self assembly

- Horizontal rails mountable in 30-mm increment
- With notches for mixed assemblies

Ordering table

H	Variant	D = 112 mm	D = 172.5 mm	D = 210 mm	D = 240 mm
3 U	Anodized	75 41 10 10	79 75 31 00	79 75 32 00	75 41 10 01
6 U	Anodized	75 41 10 11	79 75 61 00	79 75 62 00	75 41 10 02
3 U	Alodined	—	—	—	—
6 U	Alodined	—	—	—	—



Extruded side plate Series 76, with handle holes

Material
Aluminum extrusion 2/2.5 mm, anodized/cutting
edges raw

Extruded side plate with handle holes

1 pc

In units for self assembly

- Horizontal rails mountable in 30-mm increments
- With notches for mixed assemblies
- Handles must be ordered separately

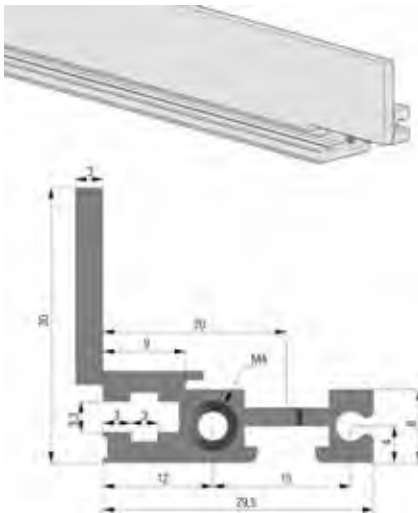
Ordering table

H	Variant	D = 112 mm	D = 172.5 mm	D = 210 mm	D = 240 mm
3 U	Anodized	75 41 10 30	79 75 33 00	79 75 34 00	75 41 10 40
6 U	Anodized	75 41 10 31	79 75 63 00	79 75 64 00	75 41 10 41
3 U	Alodined	—	—	—	—
6 U	Alodined	—	—	—	—

Front, rear and center rail Series 76

There are threads for M4 screws for mounting on the side plates.
Front and rear rails include incremented holes for mounting guide rails. Center rails do not have

incremented holes and are only used for direct or indirect mounting of backplanes, Z-rails and perforated rails in 6 U sub racks.



Front rail for mounting in control panels

For mounting plug-in units or front panels

Material
Aluminum extrusion, anodized/cutting edges raw

Scope of Delivery

Front rail for panel mounting 1 PU (5 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

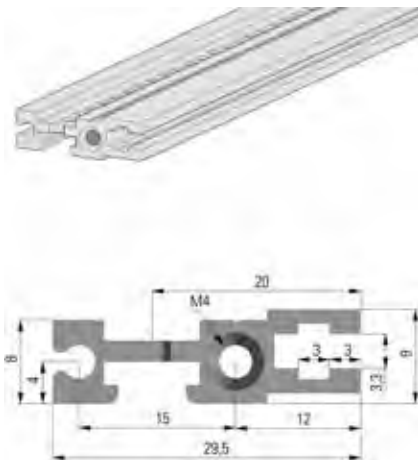
In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes, without M4 threads, without notch

Ordering table

W	Anodized	Alodined
42 HP	90 21 02 00	–
63 HP	90 21 03 00	–
84 HP	90 21 01 00	–
2700 mm	90 21 00 00	–



Rear rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material
Aluminum extrusion, anodized/cutting edges raw

Scope of Delivery

Rear rail basic unit B 1 PU (10 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes, without M4 threads

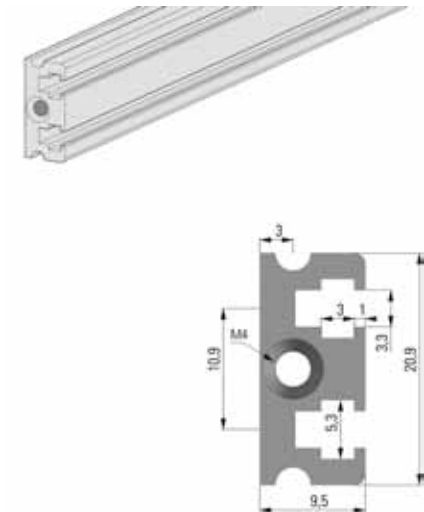
Ordering table

W	Anodized	Alodined
42 HP	90 07 02 00	–
63 HP	90 07 03 00	–
84 HP	90 07 01 00	–
2700 mm	90 07 00 00	–

//0219" SUBRACKS

Series 76

// Single components



Center rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material
Aluminum extrusion, anodized/cutting edges raw

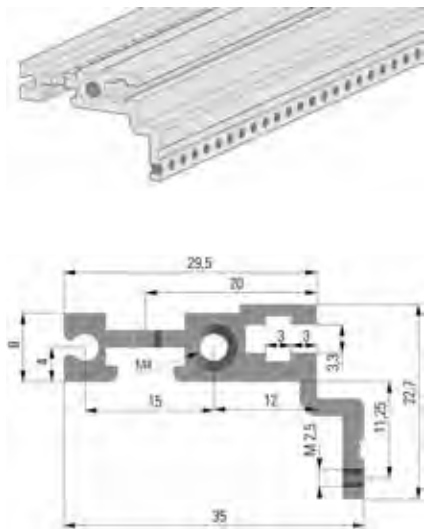
Scope of Delivery
Center rail basic unit B 1 PU (10 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form
In units for self assembly

Notes
– Horizontal rails are secured with one screw
– Rail with incremented holes, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 19 02 00	–
63 HP	90 19 03 00	–
84 HP	90 19 01 00	–
2700 mm	90 19 00 00	–



Rear rail basic unit C

With integrated connector fixation according to IEC 60603-2

Material
Aluminum extrusion, anodized/cutting edges raw

Scope of Delivery
Rear rail basic unit C 1 PU (5 pcs)
Rail (L = 2700 mm) 1 pc

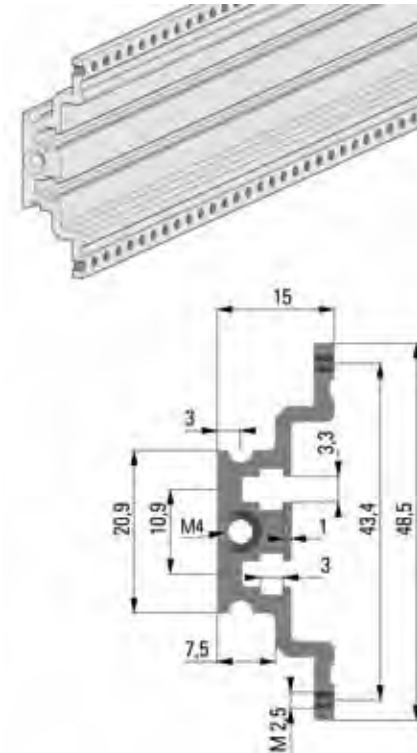
Delivery Form
In units for self assembly

Notes
– Horizontal rails are secured with one screw
– Rail with incremented holes, integrated threads M2.5, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 08 02 00	–
63 HP	90 08 03 00	–
84 HP	90 08 01 00	–
2700 mm	90 08 00 00	–

// Single components



Center rail basic unit C

With integrated connector fixation according to IEC 60603-2

Material

Aluminum extrusion, anodized/cutting edges raw

Scope of Delivery

Center rail basic unit C 1 PU (10 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

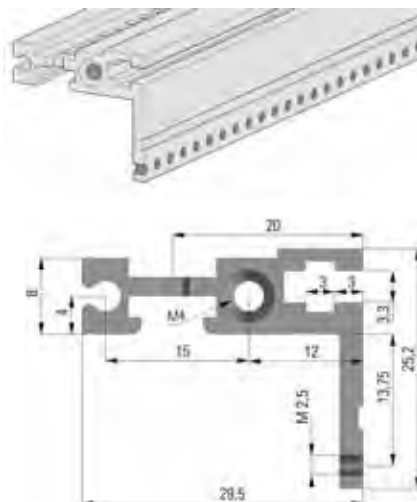
In units for self assembly

Notes

- Horizontal rails are secured with one screw.
- Rail (2700 mm) with integrated threads M2.5, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 22 02 00	–
63 HP	90 22 03 00	–
84 HP	90 22 01 00	–
2700 mm	90 22 00 00	–



Rear rail basic unit D

With integrated connector fixation according to IEC 60603-1

Material

Aluminum extrusion, anodized/cutting edges raw

Scope of Delivery

Rear rail basic unit D 1 PU (5 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes and integrated threads M2.5, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 09 02 00	–
63 HP	90 09 03 00	–
84 HP	90 09 01 00	–
2700 mm	90 09 00 00	–

19" subrack Series 77
Basic and modified version



//02 19" SUBRACKS Series 77



Product information

The subrack Series 77 is furnished with two-piece side plates, which makes it particularly suitable for individual processing and customized dimensions. Hem-bend side plates allow mounting in cases and cabinets on slide rails. The horizontal rails can be mounted in 30-mm increments.

Overview

Basic units	H in U			W in HP	D in mm			Page
	3	6	9		172.5	210	270	
- Standard without handle holes	●	●	○	●	●	●	●	SUB 01.67
- Standard with handle holes	●	●	○	●	●	●	●	SUB 01.67
- EMC without handle holes	●	●	○	●	●	●	●	SUB 01.68
- EMC with handle holes	●	●	○	●	●	●	●	SUB 01.68

○ Only available as single components

Single components	Page
Side plates	SUB 01.69
Horizontal rails	SUB 01.70
Mounting brackets	SUB 01.74

Accessories	Page
Threaded inserts	SUB 01.78
Card guides	Please check series reference SUB 01.79
Board retainers	Please check series reference SUB 01.83
Isolating strips	SUB 01.84
Z-rails	SUB 01.85
Perforated rails	SUB 01.86
Covers	Please check series reference SUB 01.87
Protective hoods	Please check series reference SUB 01.92
EMC/ESD shielding material	Please check concept SUB 01.96
Identification strips	SUB 01.99
Handles	SUB 01.100
Wall mounting brackets	SUB 01.101
Assembly components	Please check series reference SUB 01.106
Split vertical PCB mount	SUB 01.102
Horizontal PCB mount	SUB 01.103

//02 19" SUBRACKS

Series 77

// Basic units

Basic units

The 19" subracks Series 77 are available as standard and EMC versions, with or without handle holes. The extruded side plates, mounting brackets and horizontal rails in the standard basic unit are made of anodized aluminum, cutting edges raw. All parts in the EMC versions are clear anodized.

Further configurations as well as configurations in 9 U height can be created by individual combination of the appropriate components.

Features of the basic units

Side plate with separate mounting bracket



// Basic units



19" subrack Series 77, standard, without handle holes

Scope of Delivery

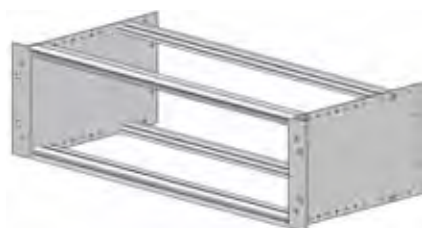
Side plate	2 pcs
Mounting bracket	2 pcs
Front rail	2 pcs
Rear rail (B or C)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Ordering table

H	W	Basic unit	D = 172.5 mm	D = 210 mm	D = 270 mm
3 U	84 HP	B	77 30 10 00	77 31 10 00	77 32 10 00
3 U	84 HP	C	77 30 20 00	77 31 20 00	77 32 20 00
4 U	84 HP	B	77 40 10 00	77 41 10 00	77 42 10 00
4 U	84 HP	C	–	–	–
6 U	84 HP	B	77 60 10 00	77 61 10 00	77 62 10 00
6 U	84 HP	C	77 60 20 00	77 61 20 00	77 62 20 00



19" subrack Series 77, standard, with handle holes

Scope of Delivery

Side plate	2 pcs
Mounting bracket	2 pcs
Front rail	2 pcs
Rear rail (B or C)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Note

– Handles must be ordered separately

Ordering table

H	W	Basic unit	D = 172.5 mm	D = 210 mm	D = 270 mm
3 U	84 HP	B	77 30 11 00	77 31 11 00	77 32 11 00
3 U	84 HP	C	77 30 21 00	77 31 21 00	77 32 21 00
4 U	84 HP	B	77 40 11 00	77 41 11 00	77 42 11 00
4 U	84 HP	C	–	–	–
6 U	84 HP	B	77 60 11 00	77 61 11 00	77 62 11 00
6 U	84 HP	C	77 60 21 00	77 61 21 00	77 62 21 00

//02 19" SUBRACKS

Series 77

// Basic units



19" subrack Series 77, EMC, without handle holes

Scope of Delivery

Side plate	2 pcs
Mounting bracket	2 pcs
Front rail	2 pcs
Rear rail (B, C or E)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

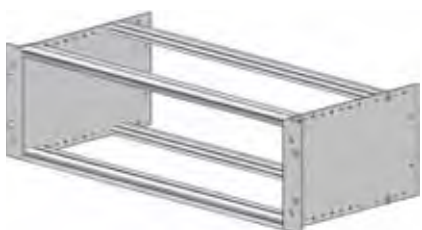
Components in units for self assembly

Note

– All components alodined

Ordering table

H	W	Basic unit	D = 172.5 mm	D = 210 mm	D = 270 mm
3 U	84 HP	B	77 30 10 10	77 31 10 10	77 32 10 10
3 U	84 HP	C	77 30 20 10	77 31 20 10	77 32 20 10
3 U	84 HP	E	77 30 40 10	77 31 40 10	77 32 40 10
4 U	84 HP	B	77 40 10 10	77 41 10 10	77 42 10 10
4 U	84 HP	C	–	–	–
4 U	84 HP	E	77 40 40 10	77 41 40 10	77 42 40 10
6 U	84 HP	B	77 60 10 10	77 61 10 10	77 62 10 10
6 U	84 HP	C	77 60 20 10	77 61 20 10	77 62 20 10
6 U	84 HP	E	77 60 40 10	77 61 40 10	77 62 40 10



19" subrack Series 77, EMC, with handle holes

Scope of Delivery

Side plate	2 pcs
Mounting bracket	2 pcs
Front rail	2 pcs
Rear rail (B, C or E)	2 pcs
Center rail (only with 6 U)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Notes

– All components alodined
– Handles must be ordered separately

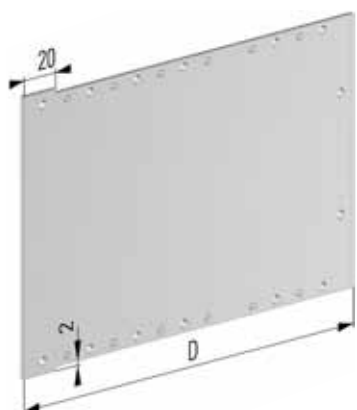
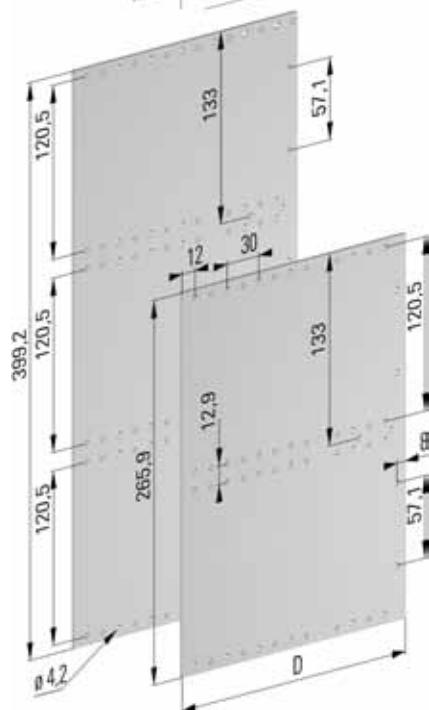
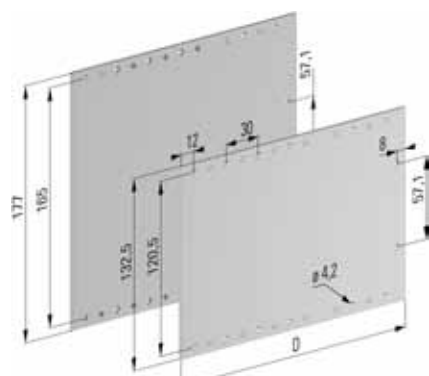
Ordering table

H	W	Basic unit	D = 172.5 mm	D = 210 mm	D = 270 mm
3 U	84 HP	B	77 30 11 10	77 31 11 10	77 32 11 10
3 U	84 HP	C	77 30 21 10	77 31 21 10	77 32 21 10
3 U	84 HP	E	77 30 41 10	77 31 41 10	77 32 41 10
4 U	84 HP	B	77 40 11 10	77 41 11 10	77 42 11 10
4 U	84 HP	C	–	–	–
4 U	84 HP	E	77 40 41 10	77 41 41 10	77 42 41 10
6 U	84 HP	B	77 60 11 10	77 61 11 10	77 62 11 10
6 U	84 HP	C	77 60 21 10	77 61 21 10	77 62 21 10
6 U	84 HP	E	77 60 41 10	77 61 41 10	77 62 41 10

Side plates Series 77

For mounting horizontal rails, mounting brackets and covers. Dimples on the side plates ease

assembly and prevent unwanted torsion of the rails.

**Side plate Series 77****Material**

Aluminum 2 mm, choice of anodized/cutting edges raw or alodined (EMC)

Scope of Delivery

Side plate

1 pc

Delivery Form

In units for self assembly

Note

– Horizontal rails mountable in 30-mm increments

Ordering table

H	Variant	D = 172.5 mm	D = 210 mm	D = 270 mm
3 U	Anodized	79 77 31 00	79 77 32 00	79 77 33 00
4 U	Anodized	79 77 41 00	79 77 42 00	79 77 43 00
6 U	Anodized	79 77 61 00	79 77 62 00	79 77 63 00
9 U	Anodized	79 77 91 00	79 77 92 00	79 77 93 00
3 U	Alodined	79 77 34 00	79 77 35 00	79 77 36 00
4 U	Alodined	79 77 44 00	79 77 45 00	79 77 46 00
6 U	Alodined	79 77 64 00	79 77 65 00	79 77 66 00
9 U	Alodined	79 77 94 00	79 77 95 00	79 77 96 00

Hem bend side plate Series 77

Enables mounting on slide rails in cases or cabinets

Scope of Delivery

Hem bend side plate

1 pc

Material

Aluminum 2 mm, anodized/cutting edges raw

Delivery Form

In units for self assembly

Note

– Horizontal rails mountable in 30-mm increments

Ordering table

H	Variant	D = 172.5 mm	D = 210 mm	D = 270 mm
3 U	Anodized	77 41 20 01	77 41 20 05	77 41 20 09
4 U	Anodized	77 41 20 02	77 41 20 06	77 41 20 10
6 U	Anodized	77 41 20 03	77 41 20 07	77 41 20 11
9 U	Anodized	77 41 20 04	77 41 20 08	77 41 20 12

//0219" SUBRACKS

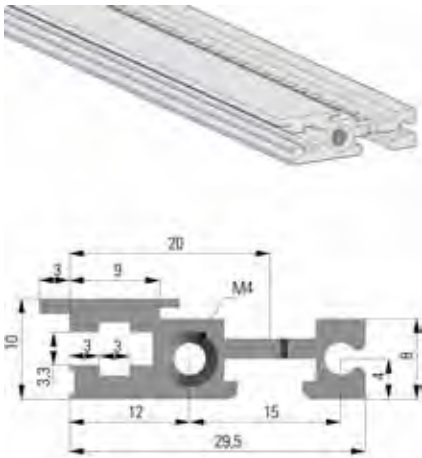
Series 77

// Single components

Front, rear and center rails Series 77

There are threads for M4 screws for mounting on the side plates.

Front and rear rails include incremented holes for mounting guide rails. Center rails do not have incremented holes and are used only for direct or indirect mounting of backplanes, Z-rails and perforated rails in 6 U subracks.



Front rail standard

For mounting plug-in units or front panels

Material
Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery
Front rail 1 PU (10 pcs)
Rail (L = 2700 mm) 1 pc

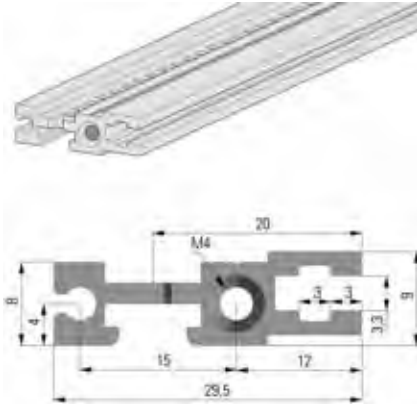
Delivery Form
In units for self assembly

Notes
– Horizontal rails are secured with one screw
– Rail with incremented holes, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 01 02 00	90 01 42 00
63 HP	90 01 03 00	90 01 43 00
84 HP	90 01 01 00	90 01 41 00
2700 mm	90 01 00 00	–

// Single components



Rear rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery

Rear rail basic unit B 1 PU (10 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

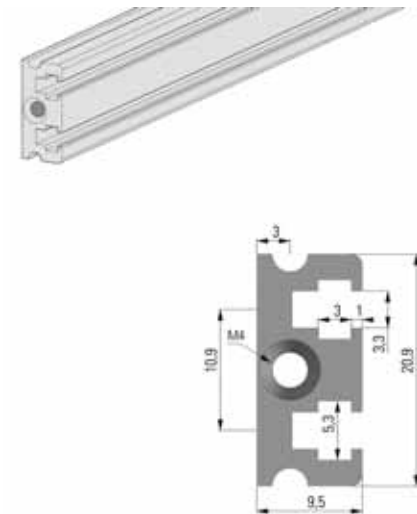
In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 07 02 00	90 07 42 00
63 HP	90 07 03 00	90 07 43 00
84 HP	90 07 01 00	90 07 41 00
2700 mm	90 07 00 00	–



Center rail basic unit B

For mounting backplane (indirectly) or Z-rail

Material

Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery

Center rail basic unit B 1 PU (10 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 19 02 00	90 19 42 00
63 HP	90 19 03 00	90 19 43 00
84 HP	90 19 01 00	90 19 41 00
2700 mm	90 19 00 00	–

//02 19" SUBRACKS

Series 77

// Single components



Rear rail basic unit C

With integrated connector fixation according to IEC 60603-2

Material

Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery

Rear rail basic unit C 1 PU (5 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

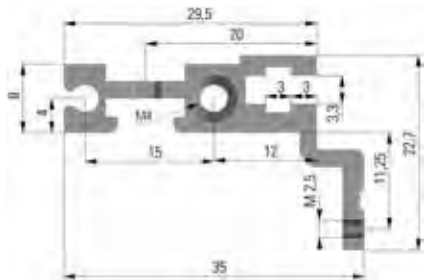
In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes, integrated threads M2.5, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 08 02 00	90 08 42 00
63 HP	90 08 03 00	90 08 43 00
84 HP	90 08 01 00	90 08 41 00
2700 mm	90 08 00 00	–



Center rail basic unit C

With integrated connector fixation according to IEC 60603-2

Material

Aluminum extrusion, choice of anodized/cutting edges raw or alodined

Scope of Delivery

Center rail basic unit C 1 PU (10 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

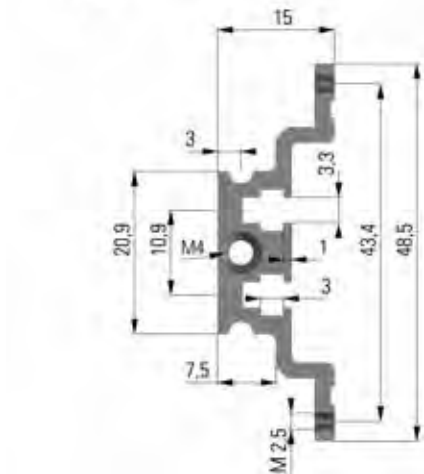
In units for self assembly

Notes

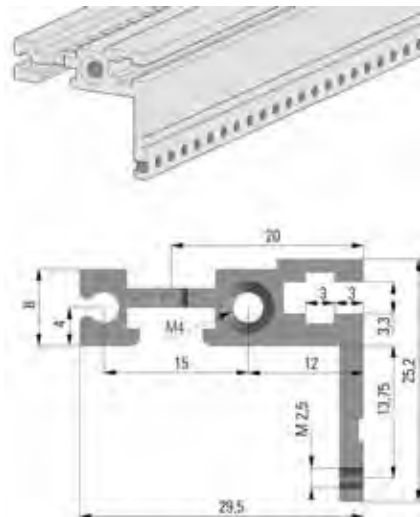
- Horizontal rails are secured with one screw
- Rail with integrated threads M2.5, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 22 02 00	90 22 42 00
63 HP	90 22 03 00	90 22 43 00
84 HP	90 22 01 00	90 22 41 00
2700 mm	90 22 00 00	–



// Single components



Rear rail basic unit D

With integrated connector fixation according to IEC 60603-1

Material

Aluminum extrusion, anodized/cutting edges raw

Scope of Delivery

Rear rail basic unit D 1 PU (5 pcs)
Rail (L = 2700 mm) 1 pc

Delivery Form

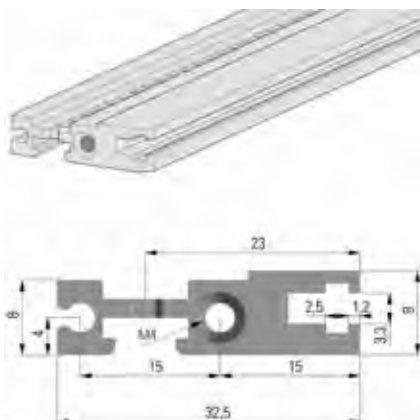
In units for self assembly

Notes

- Horizontal rails are secured with one screw
- Rail with incremented holes, integrated threads M2.5, without M4 threads

Ordering table

W	Anodized	Alodined
42 HP	90 09 02 00	–
63 HP	90 09 03 00	–
84 HP	90 09 01 00	–
2700 mm	90 09 00 00	–



Rear rail basic unit E

For direct mounting of backplane or perforated rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Rear rail basic unit E 1 PU (10 pcs)

Delivery Form

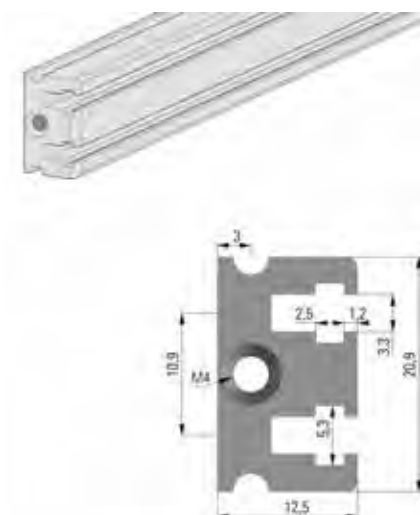
In units for self assembly

Note

- Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	90 41 11 02
63 HP	–	90 41 11 01
84 HP	–	90 41 11 00



Center rail basic unit E

For direct mounting of backplane or perforated rail

Material

Aluminum extrusion, alodined

Scope of Delivery

Center rail basic unit E 1 PU (10 pcs)

Delivery Form

In units for self assembly

Note

- Horizontal rails are secured with one screw

Ordering table

W	Anodized	Alodined
42 HP	–	90 41 11 12
63 HP	–	90 41 11 11
84 HP	–	90 41 11 10

//02 19" SUBRACKS

Series 77

// Single components

19" mounting crackets Series 77

Mounted on the front of the subrack, the brackets enable installation of the subrack in 19" cases or cabinets. Include recess for front rail.



19" mounting brackets Series 77, without handle holes

Material Aluminum extrusion, choice of anodized, RAL 7032 smooth finish or alodined	Scope of Delivery Mounting brackets without handle holes		1 PU (10 pcs)
	Delivery Form In units for self assembly		
	Note – 19" mounting brackets 6 U and 9 U with notches for mixed assemblies		

Ordering table

H	Anodized	RAL 7032	Alodined
3 U	90 03 31 00	90 03 33 00	90 03 35 00
4 U	90 03 41 00	–	90 03 45 00
6 U	90 03 61 00	90 03 63 00	90 03 65 00
9 U	90 03 91 00	–	90 03 95 00



19" mounting brackets Series 77, with handle holes

Material Aluminum extrusion, choice of anodized, RAL 7032 smooth finish or alodined	Scope of Delivery Mounting brackets with handle holes		1 PU (10 pcs)
	Delivery Form In units for self assembly		
	Notes – Handles must be ordered separately – 19" mounting brackets 6 U and 9 U with notches for mixed assemblies		

Ordering table

H	Anodized	RAL 7032	Alodined
3 U	90 03 32 00	90 03 34 00	90 03 36 00
4 U	90 03 42 00	–	90 03 46 00
6 U	90 03 62 00	90 03 64 00	90 03 66 00
9 U	90 03 92 00	–	90 03 96 00



19" subracks
Diverse accessories



//03 19" SUBRACKS ACCESSORIES

// Content

// 03	Accessories	Page
	Threaded inserts	SUB 01.78
	Card guides	SUB 01.79
	Card guide EK 80 mm – Future	SUB 01.80
	Board holder Rear I/O EK 80 mm – Future	SUB 01.80
	Card guide – Future/FutureX	SUB 01.80
	Card guide AI-Rail – Future/FutureX	SUB 01.81
	Card guide EK 280 mm – FutureX	SUB 01.81
	Card guide 4,4" – FutureX/Series 75/76/77	SUB 01.81
	Card guide 1/2 HP/IEEE – FerroRAIL	SUB 01.81
	Card guide – FerroRAIL	SUB 01.82
	Card guide – Series 75/76/77	SUB 01.82
	Card grid – Series 75/76/77	SUB 01.82
	Card guide, 3-piece	SUB 01.82
	Board retainers, Board extractor, PB locking rails	SUB 01.83
	Isolating strips	SUB 01.84
	Z-rails for basic unit B	SUB 01.85
	Perforated rails for basic unit E	SUB 01.86
	Cover plates	SUB 01.87
	Cover plate – Future	SUB 01.88
	Cover plate dual – Future	SUB 01.88
	Cover plate dual II – Future	SUB 01.89
	Cover plate – FutureX	SUB 01.89
	Cover plate – FerroRAIL	SUB 01.90
	Cover plate – Series 75/76/77	SUB 01.91
	Cover plate EMC – Series 75/77	SUB 01.91
	Protective hoods	SUB 01.92
	Protective hood – Future/FutureX	SUB 01.93
	Protective hood – Series 75/76/77	SUB 01.93
	Protective hood EMC – Series 75/77	SUB 01.93
	Coding elements	SUB 01.94
	Mounting block for coding pins – Future/FerroRAIL	SUB 01.94
	Coding pins IEEE – Future/FerroRAIL	SUB 01.94
	Coding bolt – FerroRAIL	SUB 01.95
	EMC/ESD shielding material	SUB 01.96
	Shielding material EMC spring – Future/FutureX/FerroRAIL	SUB 01.96
	Shielding material EMC fabric – Future/FutureX	SUB 01.96
	EMC contact clip cover plate – Future/FutureX/FerroRAIL	SUB 01.97
	Contact screw M2.5 for front panel grounding	SUB 01.97
	ESD spring for card guide	SUB 01.98
	ESD spring alignment pin	SUB 01.98
	Identification strips	SUB 01.99
	Handles	SUB 01.100
	Handle – Future/FutureX/Series 75/76/77	SUB 01.100
	Handle – FerroRAIL	SUB 01.100
	Wall mounting brackets	SUB 01.101
	Assembly components	SUB 01.106
	Split vertical PCB mount	SUB 01.102
	Horizontal PCB mount	SUB 01.103

//0319" SUBRACKS

ACCESSORIES

//Threaded inserts

Threaded inserts

For mounting plug-in modules and backplanes to horizontal rails.

Threaded inserts

Material
Steel 5 x 2 mm, white zinc plated

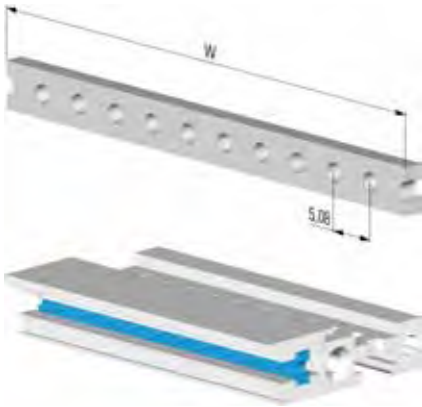
Scope of Delivery
Threaded insert1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– Choice of M2.5 or M3 thread

Ordering table

W	Thread M2.5	Thread M3
20 HP	79 32 18 00	79 33 18 00
42 HP	79 32 14 00	79 33 14 00
63 HP	79 32 16 00	79 33 16 00
84 HP	79 32 17 00	79 33 17 00



// Card guides



Card guides

For mounting Eurosize boards in the card cage of the subrack. They are clipped into the incremented holes of the rails and are used at the same time for positioning.

– 3-piece card guides are available for individual board depths.

Notes

- Groove width 2 mm for board thickness 1.6 mm
NEW: Groove width 2.4 mm for board thickness 2.0 mm
- Fire protection classification
ABS: UL 94 V0
PC: NF F 16-101/102 class F1, I2
PBT: UL 94 V0
PPO: UL 94 V0

Overview

Board depth	Groove width	Version	Material	Color	Future	FutureX	FerroRAIL	Series 75/76/77	Order no.	Page
EK 80*mm	2.0 mm	Standard	PPO	Black	●				23 10 04 42	SUB 01 .80
EK 100 mm	2.0 mm	Standard	PPO	Black				●	79 31 40 00	SUB 01 .82
EK 160 mm	2.0 mm	Standard	PPO	Black	●	●			23 10 04 29	SUB 01 .80
	2.0 mm	Standard	PPO	Grey	●	●			23 10 04 34	SUB 01 .80
	2.0 mm	Standard	PPO	Black				●	79 31 00 00	SUB 01 .82
	2.0 mm	Heavy-duty version	PPO	Black	●	●			23 10 04 02	SUB 01 .80
	2.0 mm	Heavy-duty version	PPO	Black				●	79 31 04 00	SUB 01 .82
	2.0 mm	Heavy-duty version	PC	Grey			●****		23 10 04 04	SUB 01 .82
NEW	2.4 mm	Heavy-duty version	PPO	Black	●	●			23 10 04 43	SUB 01 .80
	2.0 mm	1/2 HP/IEEE	PC	Green			●		23 10 04 38	SUB 01 .81
		Card grid 7-fold								
	2.0 mm	Standard	PPO	Black				●	79 31 91 00	SUB 01 .82
		4.4" **								
	2.0 mm	Standard	PPO	Black		●			79 31 05 00	SUB 01 .81
	2.0 mm	Standard	PPO	Black		●			79 31 03 00	SUB 01 .81
EK 220 mm	2.0 mm	Heavy-duty version	PPO	Black	●	●			23 10 04 03	SUB 01 .80
	2.0 mm	Heavy-duty version	PPO	Black				●	79 31 12 00	SUB 01 .82
	2.0 mm	Heavy-duty version	PC	Grey			●****		23 10 04 05	SUB 01 .82
	2.0 mm	Heavy-duty version	AL	Natural	●	●	●		23 10 04 40	SUB 01 .81
		4.4" **								
	2.0 mm	Standard	PPO	Black		●			79 31 06 00	SUB 01 .81
EK 280 mm	2.0 mm	Heavy-duty version	PPO	Black		●			23 10 04 37	SUB 01 .81
	2.0 mm	Heavy-duty version	AL	Natural	●	●	●		23 10 04 41	SUB 01 .81
EK flexible		Card Guide, 3-piece								
	2.0 mm	End pieces (1 pair)	PPO	Black	●	●	●	●	79 31 62 00	SUB 01 .82
	2.0 mm	Rail (L = 2750 mm)***	AL	Natur	●	●	●	●	90 16 00 00	SUB 01 .82
	2.0 mm	Rail (L = 2750 mm)****	ABS	Black	●	●	●	●	90 42 40 01	SUB 01 .82

* Typically used in Rear I/O applications

** For board sizes 111.7 mm x 160 mm or 111.7 mm x 220 mm

*** Rail length adapted to board depth (for Series 75/76/77 = EK - 49 mm; for Series Future/FutureX/FerroRAIL = EK - 58 mm) on request

**** Required for French SNCF railway applications

//03 19" SUBRACKS

ACCESSORIES

// Card guides

Card guide EK 80 mm – Future

For board depth 80 mm or for Rear I/O applications according to IEEE 1101.1/IEEE 1101.10

Material
PPO

Scope of Delivery

Card guide,
1 set (top/bottom) 1 PU (50 pcs)

Delivery Form

In units for self assembly

Notes

- Can in addition be secured with screws
- Mounting of EMC springs possible
- Board holder for Rear I/O applications required (see below)

Ordering table

Card depth	Groove width	Color	Standard	Heavy duty version
80 mm	2.0 mm	Black	23 10 04 42	–

Board holder Rear I/O EK 80 mm – Future

Board depth 80 mm for Rear I/O applications according to IEEE 1101.1/IEEE 1101.10

The Board holder is available in 2 versions:

- Type 1 card guides are clipped in (suitable for heavy modules)
- Type 2 card guides are suspended (enhances air flow)

Material
Aluminum 1.5 mm, raw

Scope of Delivery

Board holder 1 pc

Delivery Form

In units for self assembly

Notes

- Only for EB 80 mm card guide
- Can only be used in connection with side plate Future IEEE, Rear I/O application
- Card guides can be mounted in 4 HP increments
- Assembly components are included in assembly kit 19" subrack Future IEEE, Rear I/O

Ordering table

Card depth	Groove width	W	Type 1	Type 2
80 mm	2.0 mm	84 HP	23 10 02 81	23 10 02 82

Card guide – Future/FutureX

Material
PPO

Scope of Delivery

Card guide 1 PU (50 pcs)

Delivery Form

In units for self assembly

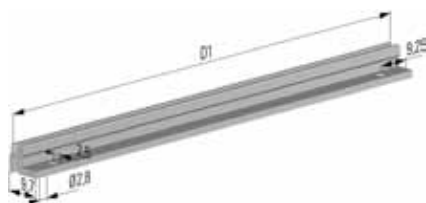
Notes

- Can in addition be secured with screws
- Mounting of EMC springs possible

Ordering table

Card depth	Groove width	Color	Standard	Heavy duty version
160 mm	2.0 mm	Black	23 10 04 29	23 10 04 02
160 mm	2.0 mm	Grey	23 10 04 34	–
160 mm	2.4 mm	Black	–	23 10 04 43
220 mm	2.0 mm	Black	–	23 10 04 03

// Card guides



Card guide AI-Rail – Future/FutureX

Material
Aluminum rail ALMgSi 0.5 raw

Scope of Delivery
Card guide rail 1 PU (50 pcs)

Note
– Can only be secured with screws

Delivery Form
In units for self assembly

Ordering table

Card depth	Groove width	D1	Standard	Heavy duty version
220 mm	2.0 mm	202 mm	–	23 10 04 40
280 mm	2.0 mm	262 mm	–	23 10 04 41



Card guide EK 280 mm – FutureX

Material
PPO

Scope of Delivery
Card guide 1 PU (50 pcs)

Note
– Can only be clipped into position

Delivery Form
In units for self assembly

Ordering table

Card depth	Groove width	Color	Standard	Heavy duty version
280 mm	2.0 mm	Black	–	23 10 04 37



Card guide 4.4" – FutureX/Series 75/76/77

For board height 4.4" (111.7 mm)

Scope of Delivery
Card guide 1 PU (50 pcs)

Material
PPO

Delivery Form
In units for self assembly

Note
– Can only be clipped into position

Ordering Table

Card depth	Groove width	Series	Color	Standard	Heavy duty version
160 mm	2.0 mm	FutureX	Black	79 31 05 00	–
220 mm	2.0 mm	FutureX	Black	79 31 06 00	–
160 mm	2.0 mm	Series 75/76/77	Black	79 31 03 00	–



Card guide 1/2 HP/IEEE – FerroRAIL

For mounting in 1/2 HP offset according to IEEE 1101.1/IEEE 1101.10 applications.
For mounting Compact PCI power supplies and SMD plug-in modules.

Scope of Delivery
Card guide 1 PU (50 pcs)

Material
PC

Delivery Form
In units for self assembly

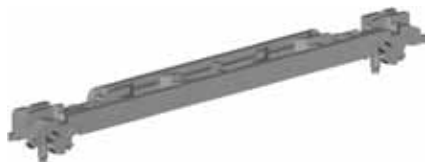
Notes
– Can in addition be secured with screws
– Mounting of EMC springs possible

Ordering table

Card depth	Groove width	Color	Standard	Heavy duty version
160 mm	2.0 mm	Green	23 10 04 38	–

//03 19" SUBRACKS ACCESSORIES

// Card guides



Card guide – FerroRAIL

Material
PC

Scope of Delivery
Card guide

1 PU (50 pcs)

Note
– Can in addition be secured with screws
– Mounting of EMC springs possible

Delivery Form
In units for self assembly

Ordering table

Card depth	Groove width	Color	Standard	Heavy duty version
160 mm	2.0 mm	Grey	–	23 10 04 04
220 mm	2.0 mm	Grey	–	23 10 04 05



Card guide – Series 75/76/77

Material
PPO

Delivery Form
In units for self assembly

Scope of Delivery
Card guide

1 PU (50 pcs)

Notes
– Screw-on heavy-duty version
– Mounting of EMC springs only possible with heavy-duty version

Ordering table

Card depth	Groove width	Color	Standard	Heavy duty version
100 mm	2.0 mm	Black	79 31 40 00	–
160 mm	2.0 mm	Black	79 31 00 00	79 31 04 00
220 mm	2.0 mm	Black	–	79 31 12 00



Card grid – Series 75/76/77

Card grid, 7-fold in 4-HP increments

Delivery Form
In units for self assembly

Material
PPO

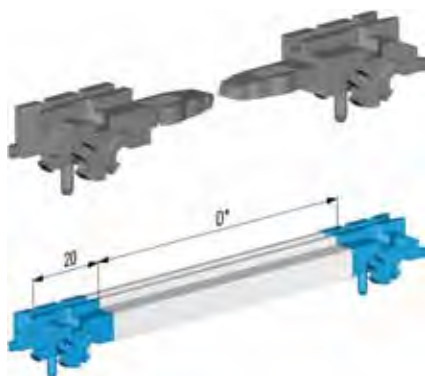
Note
– Can only be clipped into position

Scope of Delivery
Card grid

1 PU (25 pcs)

Ordering table

Card depth	Groove width	Color	Standard	Heavy duty version
160 mm	2.0 mm	Black	79 31 91 00	–



Card guide, 3-piece

3-piece card guide for individual board depth

Delivery Form
In units for self assembly

Material / Scope of Delivery
See ordering table

Notes
– End pieces can in addition be secured with screws
– Not possible to mount EMC springs

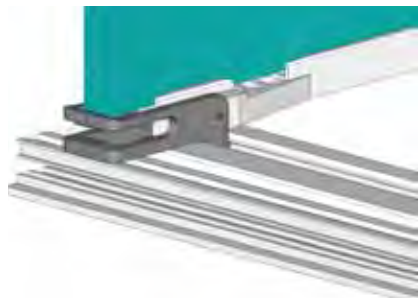
Ordering table

Version	Groove width	Material	Color	Scope of Delivery	Order no.
End pieces (pair)	2.0 mm	PPO	Black	1 PU (50 pair)	79 31 62 00
Card guide rail	2.0 mm	Aluminum	Anodized	2750 mm	90 16 00 00
Card guide rail	2.0 mm	ABS	Black	2750 mm	90 42 40 01

Rail length D* adapted to board depth (for Series 75/76/77 = EK - 49 mm) on request

Rail length D* adapted to board depth (for Series Future/FutureX/FerroRAIL = EK - 58 mm) on request

// Board retainers



Board retainers

Board retainers are used to secure the boards in the subrack, typically in applications without front panel.

Note

- Fire protection classification
PC: NF F 16-101/102 class F1, I2
PPO: UL 94 V0



Board extractor

Used singly

Material
PC

Scope of Delivery

Board extractor 1 pc
Cylindrical pin 1 pc

Delivery Form

In units for self assembly

Notes

- Mounting either bottom or top board extractor
- Board extractor and board retainers can be used in combination

Ordering table

Order no.
79 3115100



Board retainer

Can be used singly

Material
See ordering table

Scope of Delivery

Board retainer 1 PU (50 pcs)

Delivery Form

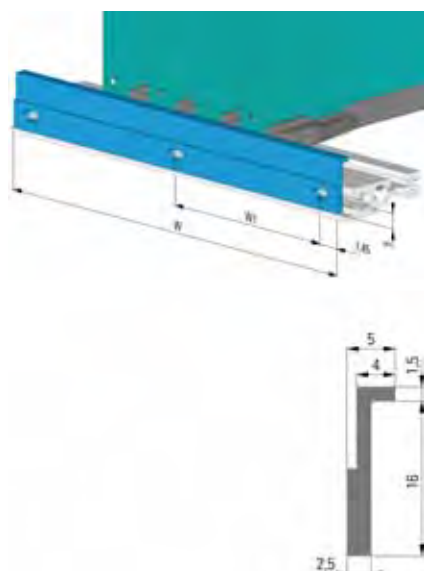
In units for self assembly

Note

- The material PC is required for French SNCF railway applications

Ordering table

Series	Color	Material	Order no.
Series 75/76/77	Black	PPO	79 31 53 00
Future/FutureX	Black	PPO	79 31 70 00
FerroRAIL	Grey	PC	79 31 70 01



PB locking rail

Enables interlocking of all assembled plug-in boards

Material

Aluminum extrusion, anodized/cutting edges raw

Scope of Delivery

PB locking rail 1 pc
Assembly kit Type A 1 pc
Rail (L = 2700 mm) 1 pc

Delivery Form

In units for self assembly

Notes

- Can be mounted on all 19" subracks
- Sleeve hole (W1 = 215.8 mm) only at 84 HP

Ordering table

W	Order no.
42 HP	90 11 11 00
63 HP	90 11 13 00
84 HP	90 11 12 00
2700 mm	90 11 10 00

//0319" SUBRACKS

ACCESSORIES

// Isolating strips, mounting clips for isolating strips

Isolating strips

Enable isolated mounting of the backplane to the rear rail B and set the standard insert depth. Mounting clips secure the isolating strips.

Isolating strips

Material
ABS

Scope of Delivery
Isolating strip1 PU (10 pcs)

Delivery Form
In units for self assembly

Note
– Fire protection classification UL 94 V0

Ordering table

W	Color	Order no.
20 HP	Grey	79 38 04 00
42 HP	Grey	79 38 01 00
63 HP	Grey	79 38 03 00
84 HP	Grey	79 38 02 00

Mounting clips for isolating strips

For positioning and securing the isolating strips and threaded inserts.

Scope of Delivery
Mounting clip1 PU (100 pcs)

Material
ABS

Delivery Form
In units for self assembly

Note
– Fire protection classification UL 94 V0

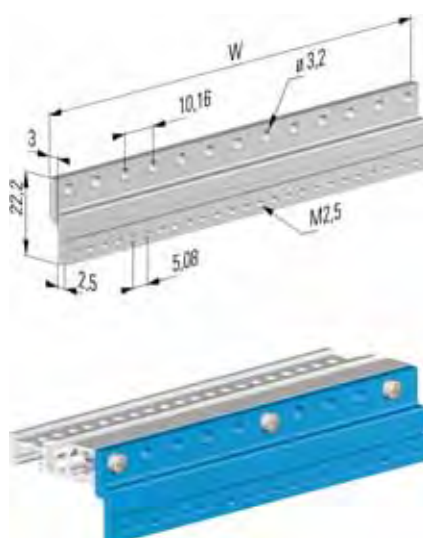
Ordering table

Color	Order no.
Grey	79 51 50 00

// Z-rails

Z-rails

For mounting connectors according to IEC 60603-2 or IEC 60603-1 to rear rail B.



Z-rails for basic unit B – IEC 60603-2

Material

Aluminum rail, choice of anodized/cutting edges raw or alodined

Delivery Form

In units for self assembly

Scope of Delivery

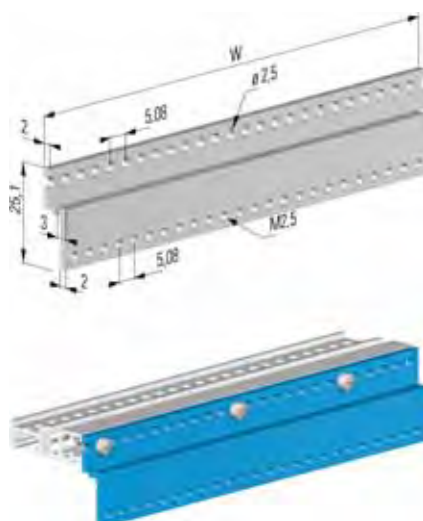
Z-rail 1 PU (10 pcs)
Assembly kit M3 1 PU (10 pcs)

Notes

- Assembly can also be performed with threaded inserts M2.5/M3
- DIN 7985 M2.5 x 8 screws must be ordered separately

Ordering table

W	Length	Anodized	Alodined
20 HP	104.7 mm	90 41 11 62	–
42 HP	216.5 mm	90 41 11 50	90 41 11 56
63 HP	323.1 mm	90 41 11 51	90 41 11 57
84 HP	429.8 mm	90 41 11 52	90 41 11 58



Z-rails for basic unit B – IEC 60603-1

Material

Aluminum rail, choice of anodized/cutting edges raw or alodined

Delivery Form

In units for self assembly

Scope of Delivery

Z-rail 1 PU (10 pcs)
Assembly kit M3 1 PU (10 pcs)

Notes

- Assembly can also be performed with threaded inserts M2.5/M3
- DIN 7985 M2.5 x 8 screws must be ordered separately

Ordering table

W	Length	Anodized	Alodined
20 HP	104.7 mm	90 41 11 63	–
42 HP	216.5 mm	90 41 11 53	90 41 11 59
63 HP	323.1 mm	90 41 11 54	90 41 11 60
84 HP	429.8 mm	90 41 11 55	90 41 11 61

//0319" SUBRACKS

ACCESSORIES

// Perforated rails

Perforated rails

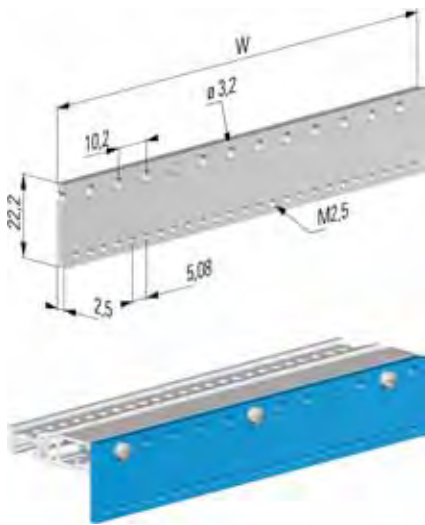
For mounting connectors according to IEC 60603-2 to rear rail E

Perforated rails for basic unit E – IEC 60603-2

Material Aluminum 2.5 mm, alodined		Delivery Form In units for self assembly1 PU (10 pcs)	
Scope of Delivery Perforated rail1 PU (10 pcs) Assembly kit M31 PU (10 pcs)		Notes – Assembly can also be performed with threaded inserts M2.5/M3 – DIN 7985 M2.5 x 8 screws must be ordered separately	

Ordering table

W	Length	Anodized	Alodined
20 HP	104.7 mm	–	23 11 02 48
42 HP	216.5 mm	–	23 11 02 32
63 HP	323.1 mm	–	23 11 02 47
84 HP	429.8 mm	–	23 11 02 33



// Cover plates



Cover plates

Cover plates mechanically protect the built-in components and/or protect against electromagnetic interference. The perforation in the cover plates ensures adequate ventilation of the electronics.

Overview

Series	W	Board depth (EK)	Depth (D)	Surface	Note	Order no.	Page
Future	42 HP	160 mm	Min. 244 mm	Alodined	Covers the card cage	23 10 02 40	SUB 01 .88
	42 HP	220 mm	Min. 304 mm	Alodined	Covers the card cage	23 10 02 42	SUB 01 .88
	42 HP	160 mm	244 mm	Alodined	Complete coverage of depth (D)	23 10 02 44	SUB 01 .88
	42 HP	160 or 220 mm	304 mm	Alodined	Complete coverage of depth (D)	23 10 02 46	SUB 01 .88
	42 HP	160 or 220 mm	364 mm	Alodined	Complete coverage of depth (D)	23 10 02 48	SUB 01 .88
	84 HP	160 mm	Min. 244 mm	Alodined	Covers the card cage	23 10 02 41	SUB 01 .88
	84 HP	220 mm	Min. 304 mm	Alodined	Covers the card cage	23 10 02 43	SUB 01 .88
	84 HP	160 mm	244 mm	Alodined	Complete coverage of depth (D)	23 10 02 45	SUB 01 .88
	84 HP	160 or 220 mm	304 mm	Alodined	Complete coverage of depth (D)	23 10 02 47	SUB 01 .88
	84 HP	160 or 220 mm	364 mm	Alodined	Complete coverage of depth (D)	23 10 02 49	SUB 01 .88
	84 HP	160/80 mm Rear I/O	278 mm	Alodined	Complete coverage of depth (D)	23 10 02 80	SUB 01 .89
FutureX	42 HP	160 mm	Min. 244 mm	Alodined	Covers the card cage	23 10 02 72	SUB 01 .89
	42 HP	220 mm	Min. 304 mm	Alodined	Covers the card cage	23 10 02 74	SUB 01 .89
	84 HP	160 mm	Min. 244 mm	Alodined	Covers the card cage	23 10 02 73	SUB 01 .89
	84 HP	220 mm	Min. 304 mm	Alodined	Covers the card cage	23 10 02 75	SUB 01 .89
FerroRAIL	36 HP	220 mm	235.5 or 320 mm	Alodined	Covers the card cage	25 10 00 02	SUB 01 .90
	84 HP	220 mm	235.5 or 320 mm	Alodined	Covers the card cage	25 10 00 03	SUB 01 .90
Series 75/76/77	42 HP	160 mm	Min. 172.5 mm	Anodized*	Covers the card cage	79 15 06 00	SUB 01 .91
	42 HP	220 mm	Min. 240 mm	Anodized*	Covers the card cage	79 15 16 00	SUB 01 .91
	63 HP	160 mm	Min. 172.5 mm	Anodized*	Covers the card cage	79 15 04 00	SUB 01 .91
	63 HP	220 mm	Min. 240 mm	Anodized*	Covers the card cage	79 15 14 00	SUB 01 .91
	84 HP	160 mm	Min. 172.5 mm	Raw	Covers the card cage	79 15 01 00	SUB 01 .91
	84 HP	220 mm	Min. 240 mm	Raw	Covers the card cage	79 15 11 00	SUB 01 .91
	84 HP	160 mm	Min. 172.5 mm	Anodized*	Covers the card cage	79 15 02 00	SUB 01 .91
	84 HP	220 mm	Min. 240 mm	Anodized*	Covers the card cage	79 15 12 00	SUB 01 .91
	84 HP	160 mm	Min. 172.5 mm	Alodined	Covers the card cage	78 01 20 50	SUB 01 .91
	84 HP	220 mm	Min. 240 mm	Alodined	Covers the card cage	78 01 20 51	SUB 01 .91

* Cutting edges raw

//0319" SUBRACKS

ACCESSORIES

// Cover plates

Cover plate – Future

- For covering the card cage
- Mounting and shielding with self-clipping contact clips
- Vibration resistance can be enhanced by additionally screwing the contact clips to the side plate
- Perforation Rv4-5, air through put 58%

$W1 = W + 4\text{ mm}$

Material
Aluminum 1 mm, alodined

Scope of Delivery
Cover plate 1 pc

Delivery Form
In units for self assembly

Note
– Contact clips for cover plate must be ordered separately

Ordering table

W	Card depth = 160 mm D1 = 119 mm	Card depth = 220 mm D1 = 179 mm
42 HP	23 10 02 40	23 10 02 42
84 HP	23 10 02 41	23 10 02 43

Cover plate dual – Future

- For covering the entire depth (D)
- Mounting and shielding with self-clipping contact clips
- Vibration resistance can be enhanced by additionally screwing the contact clips to the side plate
- Perforation Rv4-5, air through put 58%

$W1 = W + 4\text{ mm}$

Material
Aluminum 1 mm, alodined

Scope of Delivery
Cover plate 1 pc

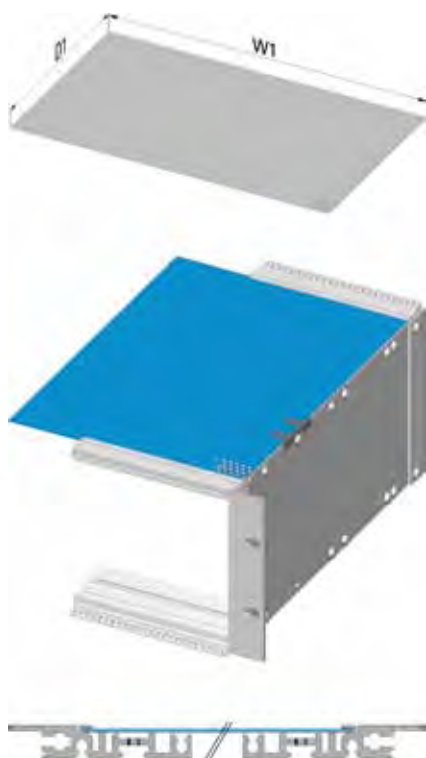
Delivery Form
In units for self assembly

Notes
– Can only be used in combination with rear rail with integrated thread groove
– Contact clips for cover plate must be ordered separately

Ordering table

W	D = 244 mm D1 = D - 39.7 mm	D = 304 mm D1 = D - 39.7 mm	D = 364 mm D1 = D - 39.7 mm
42 HP	23 10 02 44	23 10 02 46	23 10 02 48
84 HP	23 10 02 45	23 10 02 47	23 10 02 49

// Cover plates



Cover plate dual II – Future

- For covering the entire depth (D)
- Covers slide into the grooves of the horizontal front rails
- Mounting and shielding with self-clipping contact clips
- Vibration resistance can be enhanced by additionally screwing the contact clips to the side plate
- Perforation Rv4-5, air through put 58%

$$W1 = W + 4 \text{ mm}$$

Material

Aluminum 1 mm, alodined

Scope of Delivery

Cover plate

1 pc

Delivery Form

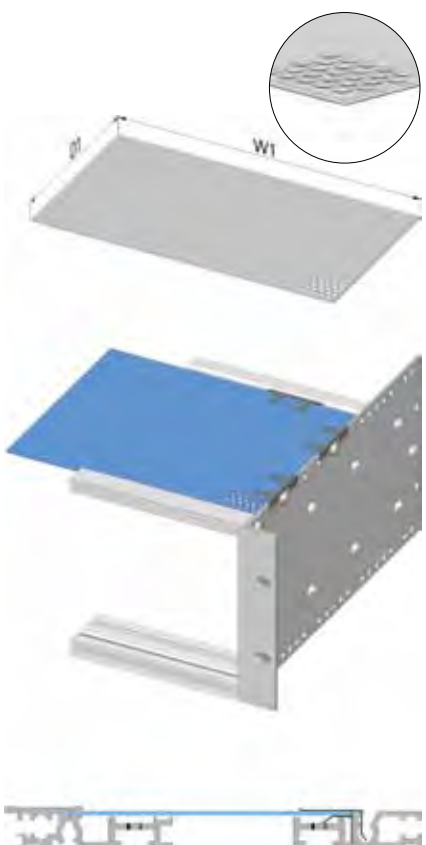
In units for self assembly

Notes

- Depicted side view shows application with IEEE rails (Rear I/O 160/80)
- Contact clips for cover plate must be ordered separately

Ordering table

W	D = 244 mm	D = 278 mm D1 = 252.9 mm (Rear I/O 160/80)	D = 304 mm	D = 364 mm
84 HP	23 10 02 91	23 10 02 80	23 10 02 90	23 10 02 83



Cover plate – FutureX

- For covering the card cage
- Mounting and shielding with self-clipping contact clips
- Vibration resistance can be enhanced by additionally screwing the contact clips to the side plate
- Perforation Rv4-5, air through put 58%

$$W1 = W + 4 \text{ mm}$$

Material

Aluminum 1 mm, alodined

Scope of Delivery

Cover plate

1 pc

Delivery Form

In units for self assembly

Note

- Contact clips for cover plate must be ordered separately

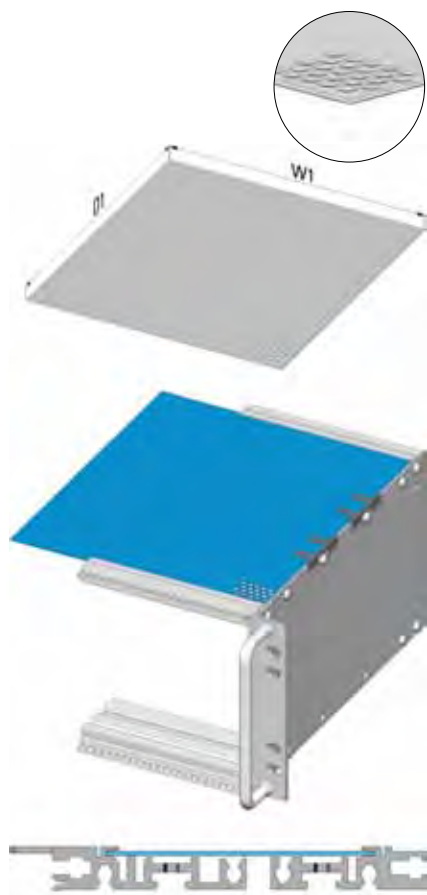
Ordering table

W	Card depth = 160 mm D1 = 146.3 mm	Card depth = 220 mm D1 = 206.3 mm
42 HP	23 10 02 72	23 10 02 74
84 HP	23 10 02 73	23 10 02 75

//0319" SUBRACKS

ACCESSORIES

// Cover plates



Cover plate – FerroRAIL

- For covering the card cage
- Covers slide into the grooves of the horizontal front/rear rails
- Screwed to the side plate with self-clipping contact clips
- Perforation Rv4-5, air through put 58%

$W1 = W + 4\text{ mm}$

Material

Aluminum 1 mm, alodined

Scope of Delivery

Cover plate 1 pc

Delivery Form

In units for self assembly

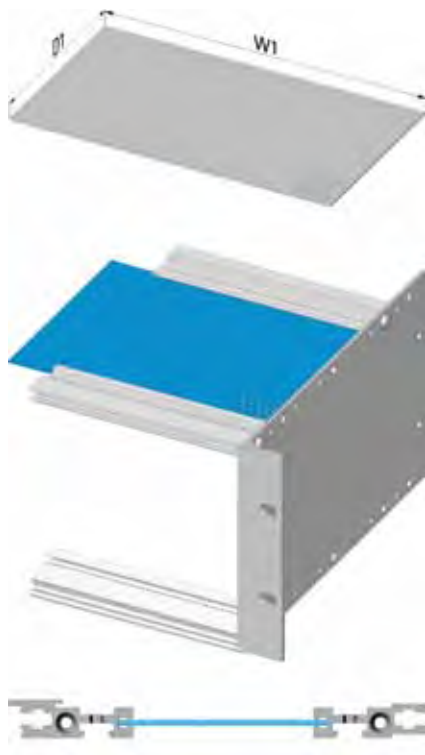
Notes

- Can only be used in combination with rear rail E for cover plate
- Contact clips for cover plate must be ordered separately

Ordering table

W	Card depth = 220 mm
36 HP (9 T)	25 10 00 02
84 HP (21 T)	25 10 00 03

// Cover plates



Cover plate – Series 75/76/77

- For covering the card cage
- Covers slide into the grooves of the horizontal front/rear rails
- Perforation Rv3,2-5, air through put 38.5%

$$W1 = W + 3 \text{ mm}$$

Material

Aluminum 1.5 mm, choice of raw or anodized

Scope of Delivery

Cover plate

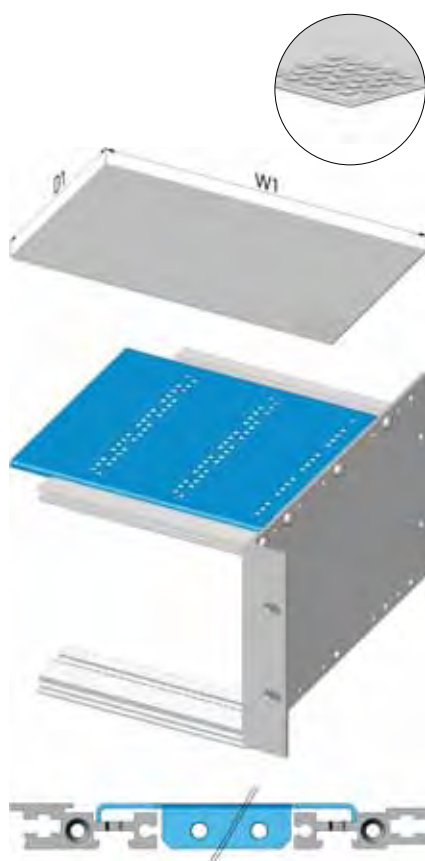
1 pc

Delivery Form

In units for self assembly

Ordering table

W	Card depth = 160 mm D1 = 121.6 mm		Card depth = 220 mm D1 = 181.6 mm	
	Raw	Anodized	Raw	Anodized
42 HP	–	79 15 06 00	–	79 15 16 00
63 HP	–	79 15 04 00	–	79 15 14 00
84 HP	79 15 01 00	79 15 02 00	79 15 11 00	79 15 12 00



Cover plates EMC – Series 75/77

- For covering the card cage
- Mounting by screwing to the side plates
- Perforation Rv4-6, air through put 40%

$$W1 = W + 3 \text{ mm}$$

Material

Aluminum 1 mm, alodined

Scope of Delivery

Cover plate

1 pc

Assembly kit

1 pc

Delivery Form

In units for self assembly

Ordering table

W	Card depth = 160 mm D1 = 140.6 mm		Card depth = 220 mm D1 = 200.6 mm	
	Raw	Anodized	Raw	Anodized
84 HP	78 01 20 50	78 01 20 51	78 01 20 50	78 01 20 51

//0319" SUBRACKS

ACCESSORIES

// Protective hoods



Protective hoods

Protective hoods are used for mechanical protection of the rear-side electronics and protect against eletromagnetic interference.

Overview

Series	H	W	Board depth (EK)	Depth (D)	Surface	Note	Order No.	Page
Future/FutureX	3 U	42 HP	160 mm	244 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 60	SUB 01 .93
	3 U	42 HP	220 mm	304 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 60	SUB 01 .93
	3 U	84 HP	160 mm	244 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 61	SUB 01 .93
	3 U	84 HP	220 mm	244 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 67	SUB 01 .93
	3 U	84 HP	220 mm	304 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 61	SUB 01 .93
	4 U	84 HP	160 mm	244 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 63	SUB 01 .93
	4 U	84 HP	220 mm	244 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 69	SUB 01 .93
	4 U	84 HP	220 mm	304 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 63	SUB 01 .93
	6 U	84 HP	160 mm	244 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 65	SUB 01 .93
	6 U	84 HP	220 mm	244 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 71	SUB 01 .93
	6 U	84 HP	220 mm	304 mm	Alodined	Mechanical protection and shielding (EMC)	23 10 02 65	SUB 01 .93
Series 75/76/77	3 U	84 HP	–	Min. 210 mm	Raw	Mechanical protection	79 16 01 00	SUB 01 .93
	3 U	84 HP	–	Min. 210 mm	Anodized*	Mechanical protection	79 16 02 00	SUB 01 .93
	3 U	84 HP	–	Min. 210 mm	Alodined	Mechanical protection and shielding (EMC)	78 01 20 60	SUB 01 .93
	6 U	84 HP	–	Min. 210 mm	Raw	Mechanical protection	79 01 23 28	SUB 01 .93
	6 U	84 HP	–	Min. 210 mm	Anodized*	Mechanical protection	79 01 23 29	SUB 01 .93
	6 U	84 HP	–	Min. 210 mm	Alodined	Mechanical protection and shielding (EMC)	78 01 20 61	SUB 01 .93

*Cutting edges raw

// Protective hoods



Protective hood – Future/FutureX

Self-clipping contact clips are used for mounting and shielding. To enhance the vibration resistance the contact clips can additionally be screwed to the side plate.

Material

Aluminum 1 mm, alodined

Scope of Delivery

Protective hood

1 pc

Delivery Form

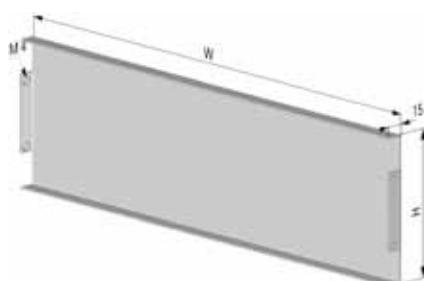
In units for self assembly

Note

– Contact clips for cover plates must be ordered separately

Ordering table

H	W	Card depth = 160 mm SUB depth D = 244 mm D1 = 102.5 mm	Card depth = 220 mm SUB depth D = 244 mm D1 = 42.5mm	Card depth = 220 mm SUB depth D = 304 mm D1 = 102.5
3 U	42 HP	23 10 02 60	–	23 10 02 60
3 U	84 HP	23 10 02 61	23 10 02 67	23 10 02 61
4 U	42 HP	–	–	–
4 U	84 HP	23 10 02 63	23 10 02 69	23 10 02 63
6 U	42 HP	–	–	–
6 U	84 HP	23 10 02 65	23 10 02 71	23 10 02 65



Protective hood – Series 75/76/77

Can be used with side plate depth of at least 210 mm

Material

Aluminum 1.5 mm, choice of raw or anodized/
cutting edges raw

Scope of Delivery

Protective hood

1 pc

Assembly kit

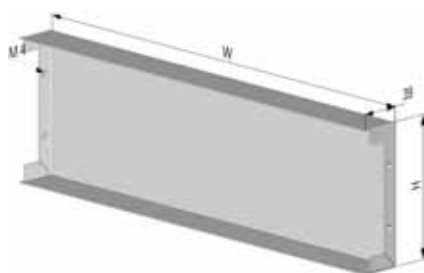
1 pc

Delivery Form

In units for self assembly

Ordering table

H	W	Raw	Anodized
3 U	84 HP	79 16 01 00	79 16 02 00
6 U	84 HP	79 01 23 28	79 01 23 29



Protective hood EMC – Series 75/77

For use with side plate depth of at least 210 mm

Material

Aluminum 1.5 mm, alodined

Scope of Delivery

Protective hood

1 pc

Assembly kit

1 pc

Delivery Form

In units for self assembly

Ordering table

H	W	Alodined
3 U	84 HP	78 01 20 60
6 U	84 HP	78 01 20 61

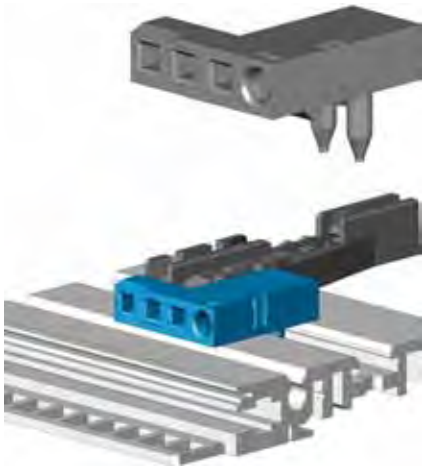
//0319" SUBRACKS

ACCESSORIES

// Coding elements

Coding elements

Coding elements are used for labeling slots or subracks in order to prevent mistakes and hence protect the electronics.



Mounting block for coding pins – Future/FerroRAIL

For mounting coding pins used in IEEE applications and, in conjunction with the EMC spring, to provide contact of the board to the horizontal front rail.

Material
See ordering table

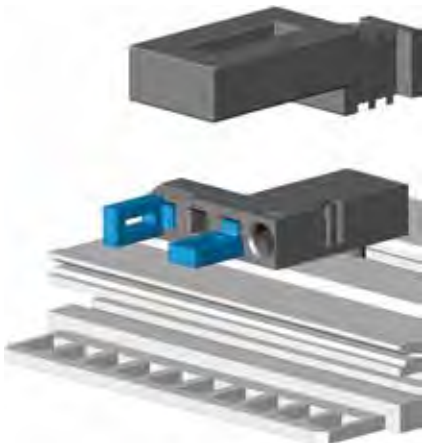
Scope of Delivery
Coding block1 PU (50 pcs)

Delivery Form
In units for self assembly

Notes
– Is mounted in the horizontal front rail in front of the card guide
– Can be used in 4 HP increments
– EMC spring can be mounted
– Fire protection classification
PC: NF F 16-101/102 class F1, I2
PPO: UL 94 V0

Ordering table

Position	Color	Material	Order no.
Top	Black	PPO	23 10 01 50
Top	Red	PPO	23 10 04 35
Top	Grey	PC	23 10 04 06
Top	Green	PC	23 10 04 08
Bottom	Black	PPO	23 10 01 51
Bottom	Red	PPO	23 10 04 36
Bottom	Grey	PC	23 10 04 07
Bottom	Green	PC	23 10 04 09



Coding pins IEEE – Future/FerroRAIL

Coding pins are mounted to the coding block to prevent mistakes in plugging the slots.

Material
PA

Scope of Delivery
Coding pin IEEE1 PU (50 pcs)

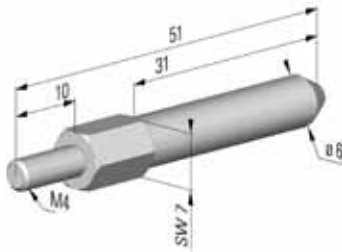
Delivery Form
In units for self assembly

Notes
– Can be turned in 4 positions
– Fire protection classification
PA: UL 94 V0

Ordering table

Color	Order no.
Red	23 10 01 57

// Coding elements



Coding bolt – FerroRAIL

Are mounted on the rear of the wiring frame to prevent mix-up of the subbracks.

Material
Stainless steel 1.4104

Scope of Delivery
Coding bolt

1 PU (10 pcs)

Delivery Form
In units for self assembly

Ordering table

Order no.
25 10 00 01

//0319" SUBRACKS

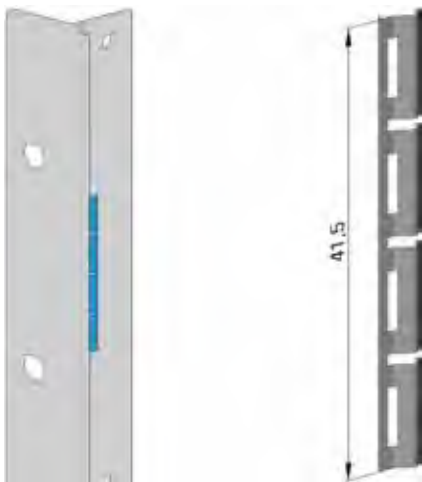
ACCESSORIES

// EMC/ESD shielding material

EMC/ESD shielding material

To ensure that the electronic products function satisfactorily in an electromagnetic environment, i.e. that the electromagnetic compatibility (EMC) of the products is guaranteed, additional shielding material may be required, depending on the electronics and the ambient conditions. EMC springs/fabrics are used to make contact with mechanical components and thus provide

shielding for the plug-in units and electronics against high-frequency radiation. ESD springs/screws are used for the discharge of static electricity. ("ESD" abbreviation for "Electrostatic Discharge")



Shielding material EMC spring – Future/FutureX/FerroRAIL

Is mounted in the groove of the mounting bracket, corner bracket or front panel with a special assembly tool. Can be mounted left or right.

Material
Spring steel 0.3 mm

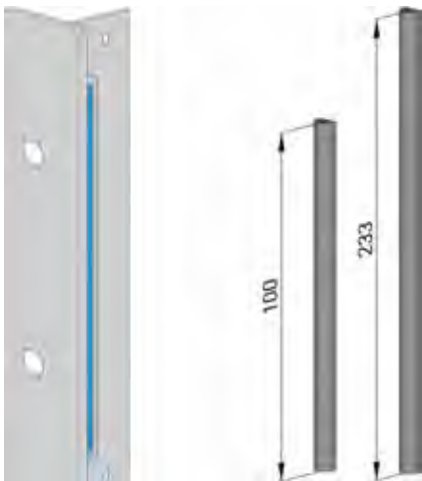
Scope of Delivery
EMC spring 1 PU (50 pcs)
Assembly tool (optional) 1 pc

Delivery Form
In units for self assembly

Note
– The number of springs can be determined individually, depending on the degree of shielding required

Ordering table

Version	Order no.
EMC spring	23 10 04 24
Assembly tool	23 10 04 28



Shielding material EMC fabric – Future/FutureX

The self-adhesive EMC fabric D shape can be used on mounting brackets, corner brackets or front panels. It can be positioned left or right.

Material
Fabric Foam 1.5 x 2 mm, CuNi plated

Scope of Delivery
EMC fabric 1 PU (10 pcs)
By the meter (L = 1000 mm) 1 pc

Delivery Form
In units for self assembly

Notes
– One-sided self-adhesive (peel-off film)
– Temperature resistance: -40°C up to +100°C
– Fire protection classification: UL 94V0

Ordering table

H	Order no.
3 U	23 10 04 30
6 U	23 10 04 31
By the meter (1000 mm)	23 10 04 32

// EMC/ESD shielding material



EMC contact clip for cover plate – Future/FutureX/FerroRAIL

For self-clipping mounting of cover plates and protective hoods.
The more clips are used, the better the subrack shielding properties.

Material

Spring steel 0.3 mm

Scope of Delivery

EMC contact clip

1 PU (50 pcs)

Delivery Form

In units for self assembly

Note

– To enhance vibration resistance use also pan head screw DIN 7985 M4 x 8 A2



Ordering table

Order no.
23 10 01 55



Contact screw M2.5 for front panel grounding

The contact screw mounted into the threaded insert provides electrical contact between the anodized front panel and the horizontal front rail.

Material

Silver steel 1.2210, hardened

Scope of Delivery

Contact screw

1 PU (100 pcs)

Delivery Form

In units for self assembly



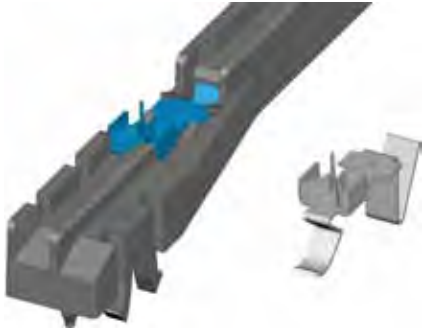
Ordering table

Order no.
79 51 50 49

//0319" SUBRACKS

ACCESSORIES

// EMC/ESD shielding material



ESD spring for card guide

Mounted in the card guides it allows an electrostatic discharge of the board to the subrack.

Material
Tin bronze, tin-plated

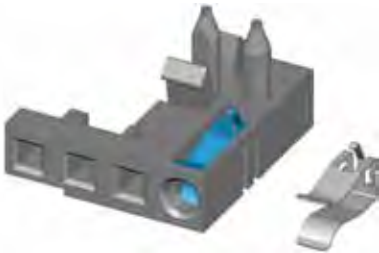
Scope of Delivery
ESD spring 1 PU (50 pcs)

Delivery Form
In units for self assembly

Note
– Only for card guides with mounting groove for ESD spring

Ordering table

Order no.
79 41 71 02



ESD spring alignment pin

The ESD spring alignment pin is mounted into the coding block and enables electrostatic discharge of the board via the IEEE extractor handle with ESD pin.

Material
Tin bronze, pewtered

Scope of Delivery
ESD spring 1 PU (50 pcs)

Delivery Form
In units for self assembly

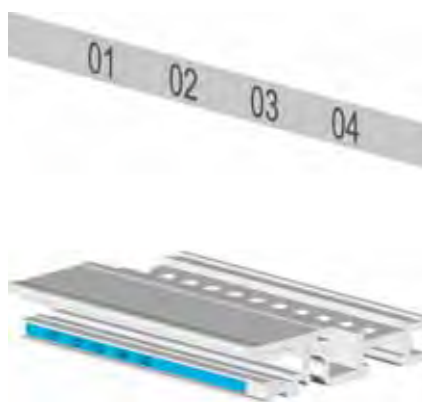
Note
– Only for IEEE extractor handle with ESD pin

Ordering table

Order no.
23 10 01 52

Identification strips

Identification strips are used for labeling the slots. The slot position is viewable through a hole in the front panel.



Identification strips

Mounted (self adhesive) in the groove of the horizontal rail

Material

Polycarbonate 0.25 mm, silk screened

Scope of Delivery

Identification strips

1 PU (10 pcs)

Delivery Form

In units for self assembly

Notes

- One-sided self-adhesive (peel-off film)
- Cannot be used in horizontal front rails of the series Future or FerroRAIL
- Slot increment: 1 slot = 4 HP

Ordering table

84 HP	Imprint	Order no.
Front side	1 - 84 HP (HP increment)	79 37 00 00
Rear side	84 - 1 HP (HP increment)	79 37 10 00
Front side	1 - 21 (slot increment)	79 37 04 21
Rear side	21 - 1 (slot increment)	79 37 14 21

//0319" SUBRACKS

ACCESSORIES

// Handles

Handles

Enable better handling of heavy subracks



Handle – Future/FutureX, Series 75/76/77

Suitable for 19" subracks

Material
Aluminum extrusion, anodized

Scope of Delivery
Handle
Assembly kit

1 pc
1 pc

Delivery Form
In units for self assembly

Ordering table

H	H1	H2	D1	Order no.
2 U	55.0 mm	69.0 mm	40 mm	79 36 00 00
3 U	88.0 mm	102.0 mm	40 mm	79 36 01 00
–	120.0 mm	134.0 mm	40 mm	79 36 03 00
4 U	133.5 mm	147.5 mm	40 mm	79 36 05 00
5 U	180.0 mm	194.0 mm	40 mm	79 36 04 00
6/9 U	235.0 mm	249.0 mm	40 mm	79 36 02 00



Handle – FerroRAIL

Suitable for 19" subracks of the FerroRAIL series

Material
Steel, chrome plated, glossy

Scope of Delivery
Handle
Assembly kit

1 pc
1 pc

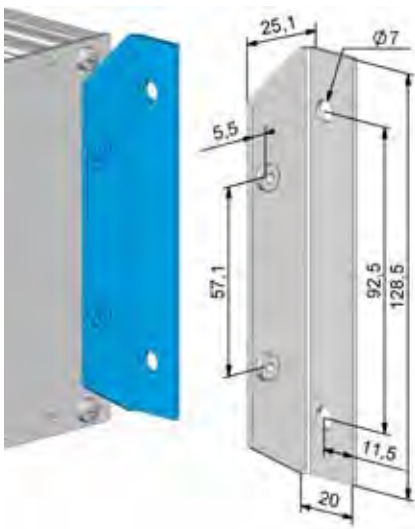
Delivery Form
In units for self assembly

Ordering table

H	H1	H2	D1	Order no.
3 U / 6 U	120 mm	131 mm	33 mm	25 10 00 04

Wall mounting brackets

For wall mounting of 19" subracks Series 75 and 77



Bracket 3 U for wall mounting – Series 75/77

For rear mounting on 19" subracks

Material

Aluminum 2 mm, anodized/cutting edges raw

Scope of Delivery

Mounting bracket

1 pc

Assembly kit

1 pc

Delivery Form

In units for self assembly

Notes

- 2 brackets required for 3 U subrack
- 4 brackets required for 6 U subrack
- Please mount corner brackets on front

Ordering table

H	Order no.
3 U	79 34 00 00

SPLIT VERTICAL PCB MOUNT

// Split vertical PCB mount

Conversion kit for mixed assemblies
1 x 6 U/2 x 3 U

Product information

If both single (3 U) and double (6 U) Eurocards are to be used, the card cage must be adjusted accordingly.

Together with you we develop the best possible technical and cost-effective solution. Please do not hesitate to contact us. We will be happy to assist you.

Calculation and planning example

Usable width $W = 84$ HP

In 3 U section:

Usable width $W1$

In 6 U section:

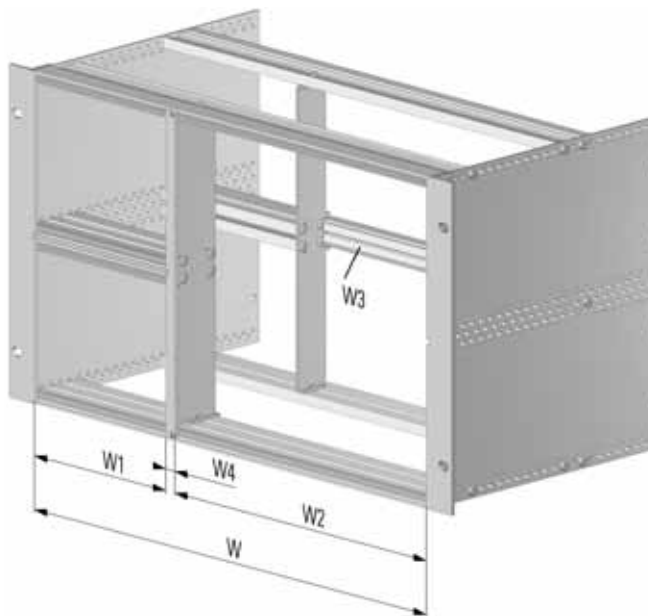
Usable width $W2$

Horizontal rail length $W3 = W - W1 \times 5.08 - 2.5$ mm

$W4 = 2$ HP

Note

- Individual assemblies upon request.
Please use planning example above as a guideline.



HORIZONTAL PCB MOUNT

// Conversion kit for horizontal PCB mount

Conversion kit for horizontal PCB mount

Product information

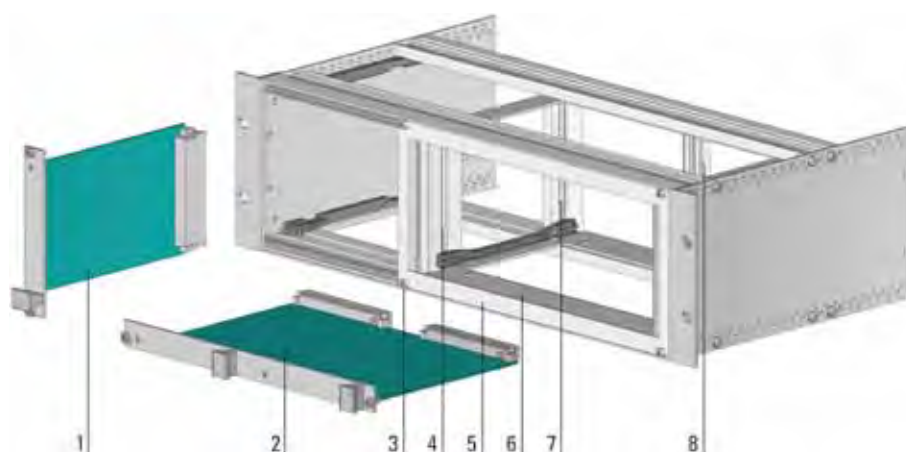
For horizontal PCB mounting of double Eurocards in 3 U subracks or cases.

Specifications

Mounting dimensions according to IEC 60297-3-101

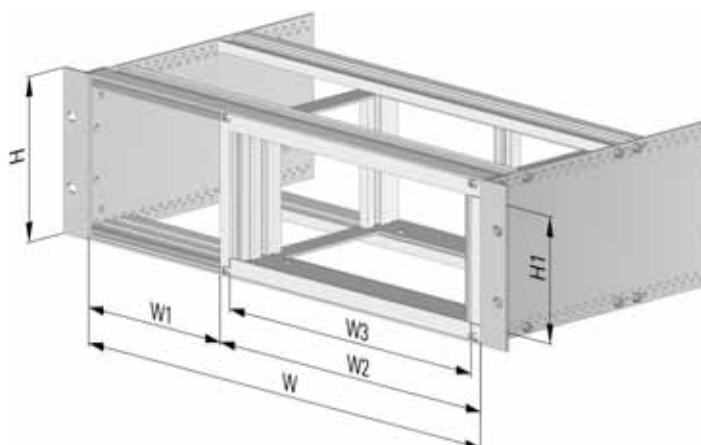
Configuration example

The diagram shows a typical horizontal PCB mount configuration of a 19" subrack.



- 1 Single euroboard
- 2 Double euroboard
- 3 Assembly kit
- 4 Front rail
- 5 Front bezel*
- 6 Frame top/bottom
- 7 Rear rail
- 8 Center rail

The parts marked * are not included in the standard scope of delivery of a basic unit.

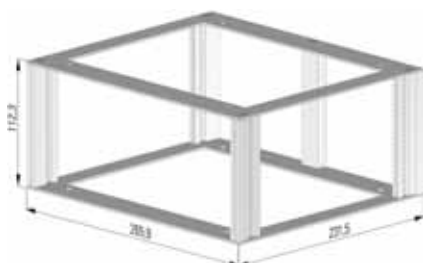


Mounting dimensions

H	3 U
H1	20 HP = 101.6 mm
W	84 HP
W1	28 HP
W2	56 HP = 284.1 mm
W3	6 U = 262.7 mm

HORIZONTAL PCB MOUNT

// Conversion kit for horizontal PCB mount



Conversion kit for horizontal PCB mount – Series 75/76/77

Scope of Delivery

Frame top/bottom	2 pcs
Front rail	2 pcs
Rear rail (B/C)	2 pcs
Center rail (B/C)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Notes

- No EMC-version
- Front bezels must be ordered separately (see below)

Material

Aluminum anodized/cutting edges raw

Ordering table

H	Basic unit	Card depth = 160 mm	Card depth = 220 mm
3 U	B	87 36 10 00	87 37 10 00
3 U	C	87 36 20 00	87 37 20 00



Front bezel 3 U/56 HP – Series 75/76/77

For covering the horizontal PCB mount

Material

Aluminum 2.5 mm, anodized/cutting edges raw

Scope of Delivery

Front bezel	1 pc
Assembly kit Type A (knurled screw and plastic sleeve)	1 pc

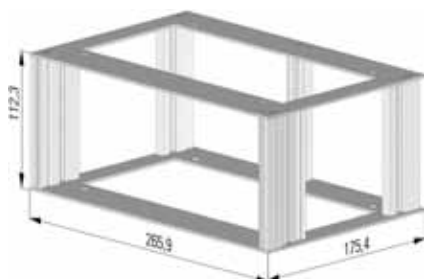
Delivery Form

Components in units for self assembly

Ordering table

H	W2	Order no.
3 U	56 HP	79 24 03 00

// Conversion Kit for Horizontal PCB Mount



Conversion kit for horizontal PCB mount, EMC – Series Future/FutureX

Scope of Delivery

Frame top/bottom	2 pcs
Front rail	2 pcs
Rear rail (B/E)	2 pcs
Center rail (B/E)	1 pc
Assembly kit	1 pc

Delivery Form

Components in units for self assembly

Notes

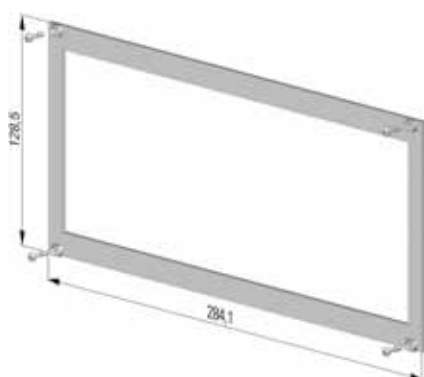
- EMC version
- Front bezels must be ordered separately (see below)

Material

Aluminum, alodined

Ordering table

H	Basic unit	Card depth = 160 mm	Card depth = 220 mm
3 U	B	23 10 04 50	–
3 U	E	23 10 04 51	–



Front bezel 3 U/56 HP, EMC – Series Future/FutureX

For covering the horizontal PCB mount

Material

Aluminum 2.5 mm, front side anodized/rear alodined

Scope of Delivery

Front bezel	1 pc
Assembly kit Type A (knurled screw)	1 pc

Delivery Form

Components in units for self assembly

Notes

- Metal sleeve press-fitted
- Shielded version upon request











Ordering table

H	W2	Order no.
3 U	56 HP	23 10 04 52











//03 19" SUBRACKS ACCESSORIES

// Assembly components

Ordering Table

Usage	Picture	Description	Version Material	Norm	Future/FerroRAIL	FutureX	Series 75 / 76 / 77	Order no.	PU
Mounting of horizontal rails		Cylinder head screw with Torx T20, self-locking	M4 x 20 mm Steel nickle-plated	ISO 7049		●		79 91 02 01	1 PU (100 pcs)
		Cylinder head screw with low head	M4 x 12 mm Steel zinc-plated	DIN 7984			●	79 91 02 00	1 PU (100 pcs)
		Posidrive pan head screw, self-locking	M4 x 12 mm Steel nickle-plated	Similar to DIN 7985			●	79 91 01 00	1 PU (100 pcs)
Individual mounting to side plate		Insert nut	M4 Stainless steel			●		79 91 41 00	1 PU (10 pcs)
Mounting of subrack to 19" rack		Pan head screw with Torx T30	M6 x 16 mm Stainless steel	ISO 14583	●	●	●	79 91 85 00	1 PU (100 pcs)
		Posidrive pan head screw	M6 x 16 mm Steel nickle-plated	DIN 7985	●	●	●	79 91 23 00	1 PU (100 pcs)
		Plastic washer	d = 6.8 mm PP black		●	●	●	79 91 30 00	1 PU (100 pcs)
		Cage nut	M6 Steel zinc-plated		●	●	●	79 91 31 00	1 PU (100 pcs)
Mounting of card guide		Countersunk screw with Phillips head	2.5 x 6 mm Steel zinc-plated	WN 1413	●	●	●	79 51 50 48	1 PU (100 pcs)
		Posidrive pan head screw	M2.5 x 12 mm Steel nickle-plated	DIN 7985	●	●	●	79 91 13 00	1 PU (100 pcs)

Ordering Table

Usage	Picture	Description	Version Material	Norm	Future/FerroRAIL	FutureX	Series 75 / 76 / 77	Order no.	PU
Mounting of Z-rails, perforated rails		Posidrive pan head screw	M2.5 x 8 mm Steel nickle-plated	DIN 7985	●	●	●	79 91 08 00	1 PU (100 pcs)
Mounting of backplane to rear rail E		Posidrive pan head screw	M2.5 x 8 mm Steel nickle-plated	DIN 7985	●	●	●	23 10 03 26	1 PU (100 pcs)
Mounting of backplane to rear rail E		Posidrive pan head screw	M2.5 x 8 mm zinc-plated	DIN 7985	●	●	●	79 91 87 00	1 PU (100 pcs)
Mounting of backplane to rear rail B, with isolating strip		Posidrive pan head screw	M2.5 x 12 mm Steel nickle-plated	DIN 7985	●	●	●	79 91 13 00	1 PU (100 pcs)
Mounting of backplane to rear rail B, with isolating strip		Posidrive pan head screw	M2.5 x 12 mm zinc-plated	DIN 7985	●	●	●	79 91 88 00	1 PU (100 pcs)
Mounting of card guide, for screwing directly		Posidrive pan head screw	KA3.0x12 mm Steel zinc-plated	PT®	●	●	●	79 51 50 47	1 PU (100 pcs)
Mounting of PCB and card guide		Hexagon nut	M2.5 Steel nickle-plated	DIN 934	●	●	●	79 91 07 00	1 PU (100 pcs)
Mounting of cover plate		Pan head screw with Torx T20, self-locking	M4 x 6 mm Stainless steel	similar to DIN 7985	●	●		23 10 03 30	1 PU (100 pcs)
Mounting of cover plate and protective hoods		Posidrive pan head screw, self-locking	M4 x 6 mm Steel nickle-plated	DIN 7985			●*	79 91 21 00	1 PU (100 pcs)
Mounting of horizontal rails		Cylinder head screw with Torx T20, self-locking	M4 x 20 mm Steel nickle-plated	ISO 7049		●		79 91 02 01	1 PU (100 pcs)

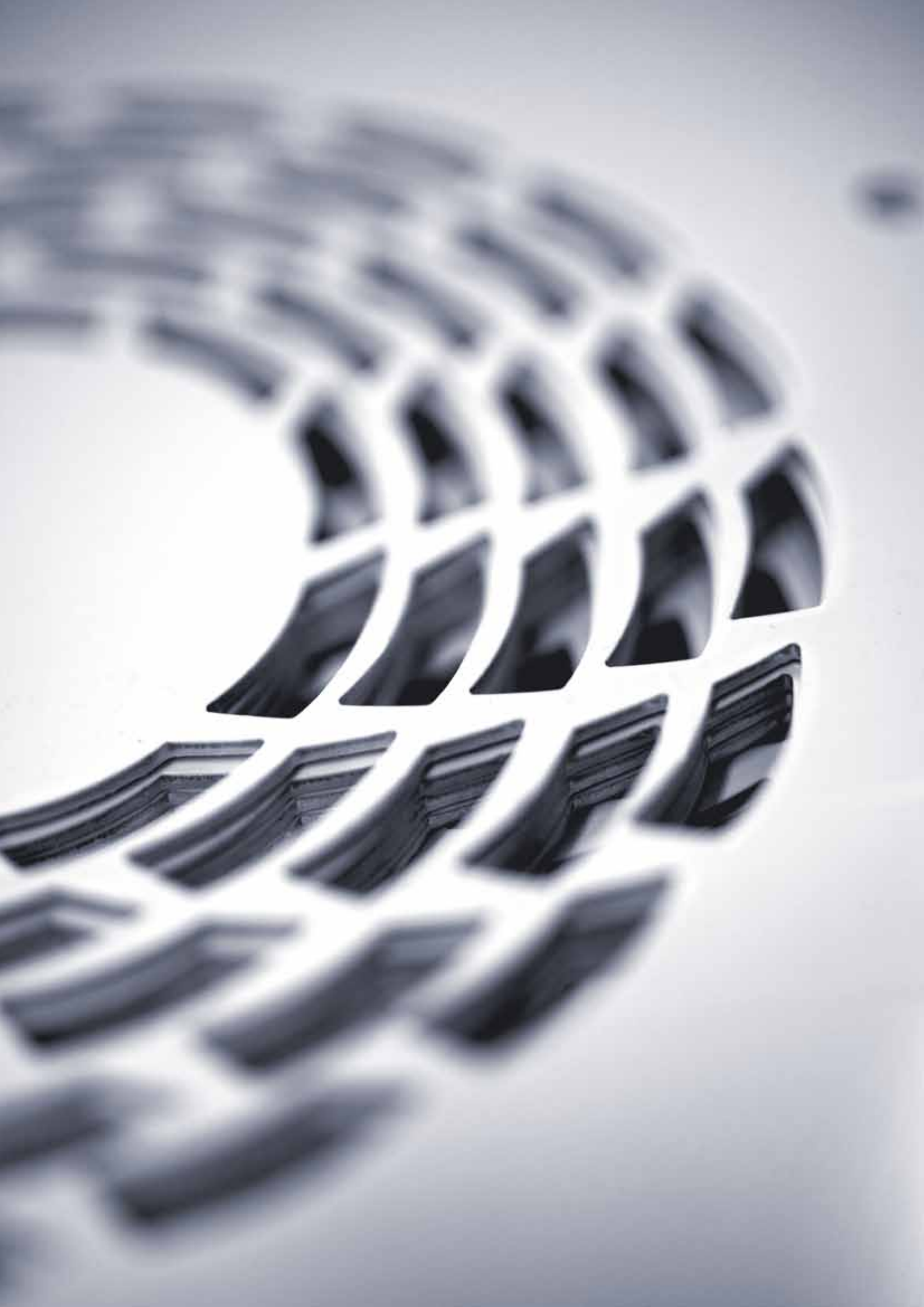
* Not for Series 76

19" SUBRACKS

```
// Assembly components
```

Ordering Table

[illegible]





//SUB Appendix

// Glossary A - DIN

A

ABS

Acrylonitrile butadiene styrene (ABS) is in its raw form a colorless to gray plastic material; it has a high surface hardness and is therefore suitable for scratch-resistant and semi-gloss surfaces. It features good impact and oil resistance. ABS is used for automotive and electronic parts as well as cases for electronic devices.

AC

"Alternating Current" (AC): electric current which periodically reverses direction.

ADC

Automatic (mechanical or electronic) daisy chaining see also Daisy Chain/Daisy Chaining and EADC

ANSI

The "American National Standards Institute" (ANSI) is the American organization responsible for standardization (equivalent of the German DIN), which defined e.g. the codification of character sets for computers.

ASA-PC

The plastic blends made of acrylonitrile styrene acrylate (ASA) and polycarbonate (PC) have high thermal stability, good chemical resistance and excellent resistance to weather, aging and yellowing. (Trade marks i.e. Luran® S, Terblend S)

AT

"Advanced Technology" (AT) stands for a particular generation of circuit boards for personal computers. AT-class computers are characterized by the 80286 processor from the Intel Corporation or by the 16-bit ISA bus extension. For this reason the ISA-bus is also referred to as the AT-bus.

ATX

ATX refers to a main board layout specification that was defined by Intel. ATX boards are characterized by short cables to the hard drive which allows for high transfer rates, better ventilation of the CPU and the possibility to start the computer automatically.

B

Bridge

A bridge interconnects two independent bus architectures and coordinates the communication in both directions. A bridge can be designed as a plug-in card or as a piggyback module. For special applications the components that are required can be implemented on the backplane. The bridge can for example provide for a CompactPCI system with more than 8 slots or be used to interconnect different bus architectures.

C

CE

The CE mark (Conformité Européenne, meaning "European conformity") identifies conformity of a product with respect to product safety according to EU law. By applying the CE mark the manufacturer confirms that the product complies with the effective European Union regulations.

CompactPCI

"Compact Peripheral Component Interconnect Bus" (CompactPCI) is a registered trademark of the PCI Industrial Computer Manufacturers Group (PICMG). CompactPCI systems are standardized microcomputers. The main advantage of CompactPCI lies in its hot-swap capabilities.

CompactPCI PlusIO

Extension of the existing parallel data transmission of the CompactPCI busses according to PICMG 2.0R3.0 to include serial connection (USB, PCExpress, Ethernet, etc.). Enables the use of both data transmission approaches as a hybrid solution and opens the transfer to solely serial. The mechanics is based on the known IEEE 1101.10 standard.

D

Daisy Chain

A daisy chain is a number of hardware components that are connected in series. The first component is connected directly to the computer, and all other components are linked to each other in a chain.

Daisy Chaining

The connected components in a daisy chain can be allocated different priorities for the exchange of data, which is meant to prevent conflicts and malfunctions. Daisy chaining on a circuit board can be done either mechanically or electronically.

DC

"Direct Current" (DC): current with just one polarity

Differential Pair

Describes the pairwise coupling technology of serial data lines which work with a very high transmission rate. Routing, as well as the length and coaxial geometry are the determining parameters, enabling speeds >5Gbits. For this, special high-speed simulation tools are used during PCB design.

DIN

Abbreviation for "Deutsches Institut für Normung" (German Institute for Standardization): comparable to the American ANSI.

DIN 41494 (replaced by: IEC 60297)

DIN 41494 is the basic specification for the 19" construction system. It is separated into different parts and defines the dimensions for the individual assemblies.

DIN 41612 (replaced by: IEC 60603-2)

DIN 41612 is the basic standard for printed circuit connectors. It defines the design and assembly characteristics for connectors

DIN 41617 (replaced by: IEC 60603-1)

DIN 41617 is the basic standard for printed circuit connectors. It defines the design and assembly characteristics for connectors.

DIN 6930-1

Specification for technical terms of delivery for punched parts made of steel.

DIN 6930-2

This specification defines the general tolerances for punched parts made of steel.

DIN 6932

This specification defines the design rules for punched parts made of steel.

DIN EN 12020-1

Specification for technical terms of delivery for extruded precision profiles made of aluminum or aluminum alloys.

DIN EN 12020-2

Specification for max/min dimensions and shape tolerances for extruded precision profiles made of aluminum or aluminum alloys.

Double Eurocard

The double Eurocard is a circuit board according to IEC 297-1. The card measures 233.35 mm x 160 mm. The term "double Eurocard" means that two cards can be inserted into the space one above the other.

E

EADC

"Electronic Automatic Daisy Chaining" (EADC) is for example used in VME64x and replaces the mechanical switch connector.

EMC

Electromagnetic Compatibility (EMC) is the ability of an electrical device to function properly in its electromagnetic environment, without negatively influencing this environment, which also includes other devices.

The specifications for electromagnetic compatibility are primarily based on three European norms.

The generic standard EN 50081 covers both emitted interference and interference immunity in residential, commercial and light industrial environments. The EN 55022 norm defines the

limits and measurement procedures for RFI of IT equipment.

EN

The European Norms (EN) are rules which have been ratified by one of the three European standardization committees: the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) or the European Telecommunications Standards Institute (ETSI).

EN 55022

This specification defines standards for information technology equipment and essentially covers the topics of radio interference and defines limits and measuring procedures.

EN 60950

This specification defines the safety of equipment for information technology.

ESD

Means both "Electrostatic Discharge" and "Electrostatic Sensitive Devices" (ESD).

"Electrostatic Discharge" is the process of charge equalization between solid, liquid or gaseous media that have different electrostatic charges. The charge equalization is usually accompanied by a spark or other sign of discharge.

ETSI

Members of the "European Telecommunications Standards Institute" (ETSI) include parts of the EU administration, European manufacturers and research institutes.

ETSI standards are referred to as ETS (European Telecommunication Standards).

Eurocard

The Eurocard is a circuit board according to IEC 297-1. The card measures 100 mm x 160 mm.

F

Fabric

Name for the switch-slot in networking bus topologies.

G

H

H.110

Extension of bus systems with a bus topology as required for telecommunication applications. This means e.g. providing special signal lines for the external connection of telephone installations (high-voltage test > 1.5 kV), as well as guaranteeing the supply of an operating voltage of 48 V.

Heat pipe

Metal pipe for dissipation of power loss on an electronic component (e.g. CPU). Inside the pipe there is (hermetically sealed) a vaporizable medium which improves dissipation of thermal energy. The pipe can be formed with a tool. The internal structures are also partially designed as capillary systems to improve the cooling effect. The heat pipe is used for convectional and conductive cooling in passively cooled assemblies.

Heat sink

Heat sink take over the heat dissipation in the environment by enlarging the surface of a component with power loss.

HF

High frequency (HF) is the designation for frequencies that are higher than audible sound waves (low frequency).

The frequency band from 3 to 30 MHz is also known as high frequency.

Hot swap

This refers to the exchange of computer components while the computer is running.

There are three defined stages:

1. Basic hot swap: the component that is going to be exchanged has to be deactivated beforehand or the computer configuration has to be changed first.
2. Full hot swap: software installed in the component that is to be exchanged or in another component takes care of activation or deactivation.
3. High availability model: a separate hot swap controller takes over the control centrally. This enables failed boards to be deactivated automatically and therefore prevents the computer from crashing.

HP

Abbreviation for "Horizontal Pitch" or standard width measurement which defines the width for plug-in modules in 19" construction system. One HP equals 5.08 mm.

I

IEC

Abbreviation for "International Electrotechnical Commission". The IEC is an international standards organization which is comprised of all national electrical engineering committees. It develops and adopts electrotechnical standards on a global level.

IEC 60297 (previously DIN 41494)

This is the generic specification for 19" technology. It is subdivided into 4 sections and defines the dimensions of the individual assemblies IEC 60297 defines in different sub-documents the mechanical structure of PCB's, subracks and cabinets of 19" construction. These specifications define the mechanical structure in terms of height, width and depth. Although the structure

was defined on the basis of 19" the dimensions of the boards, subracks and frames are given in metric. The dimension 19" equals 482.6 mm.

IEC 60297-1

The specification 60297-1 defines front panel and rack dimensions. The dimensions given are linked to the following specification which defines the detailed dimensions of the 19" cabinets.

IEC 60297-2

This sub-document defines cabinet dimensions, incremented pitches for the subracks, covers, doors and bearing elements.

IEC 60297-3-101

Describes the dimensions for modular subracks and the plug-in boards.

IEC 60297-3-102

Supplements the previous sub-document 3-101 with mechanical fixtures for extracting and inserting boards.

IEC 60297-3-103

Specifies coding elements, guiding pins and guide rails.

IEC 60603-1 (previously DIN 41617)

This is the basic specification for PCB connectors. It defines the the design and assembly characteristics for connectors.

IEC 60603-2 (previously DIN 41612)

This is the basic specification for PCB connectors. It defines the the design and assembly characteristics for connectors.

IEC 821

The IEC 821 defines the specification for the VMEbus.

IEEE

The "Institute of Electrical and Electronics Engineers" (IEEE) is a non-profit organization which encourages and standardizes technical developments.

IEEE 1101.10

Standard which defines additional mechanical specifications for microcomputer systems. This specification applies to all microcomputer applications that have to conform to the 19" standard.

IEEE 1014

Defines the specification for the VMEbus.

IN-Board termination

The termination is positioned between the first and second and the last and next-to-last slots on the backplane. This has the advantage of not affecting the outer dimensions of the backplane due to the termination.

//SUB Appendix

// Glossary IP - P

IP

"International Protection" (IP). IP protection classes define the protection of electrical devices against contact, foreign bodies or moisture. Cases and covers must be designed so as to meet the IP protection class requirements. The IP Protection Class is defined by an identification number.

The definitions and explanation for the IP identification numbers are given in the specifications DIN VDE 0470 Part 1, EN60529 and IEC 529.

In detail:

First digit	Protection against contact	Protection against foreign objects
0	Not protected	Not protected
1	Large body parts (back of hand)	Foreign objects $\varnothing > 50 \text{ mm}$
2	Fingers	Foreign objects $\varnothing > 12 \text{ mm}$
3	Tools and wires $\varnothing > 2.5 \text{ mm}$	Foreign objects $\varnothing > 2.5 \text{ mm}$
4	Tools and wires $\varnothing > 1.0 \text{ mm}$	Granular foreign objects $\varnothing > 1.0 \text{ mm}$
5	Complete protection against contact	Dust protected
6	Complete protection against contact	Dust tight
Second digit	Protection against water	
0	Not protected	
1	Dripping water (vertically falling drops)	
2	Dripping water (falling at an angle of up to 15°)	
3	Spraying water (max. 60°)	
4	Splashing water	
5	Water jets	
6	Powerful water jets	
7	Immersion up to 1 m	
8	Immersion beyond 1 m	

ISA

"Industry Standard Architecture" (ISA) refers to a bus that was developed by IBM and is still used today on almost all main boards for reasons of compatibility.

ISO

"International Organization for Standardization" (ISO) is an international board composed of representatives from all standards organizations.

J

JTAG

"Joint Test Action Group" (JTAG) defines an interface to test systems that enables a system test even for installed and complex electronic assemblies. Before the system is put into operation, a boundary scan of the individual assemblies and functions can be performed. In addition, the electronic assemblies can be programmed and also debugged.

K

L

LVDS

"Low Voltage Differential Signal" (LVDS), typical triggering mode for TFT displays.

M

MDC

Manual Daisy Chaining (MDC) with jumpers for VMEbus.

MPS

Based on a Microcomputer Packaging System (MPS), industrial microcomputers are built for VMEbus, VME, VME64x, CompactPCI and Industrial PC applications mainly in the industrial environment.

N

NEMA

The "National Electrical Manufacturers Association" (NEMA) is a federation of the electronics industry in North America. The NEMA controls a variety of standards in relation to the electronics industry such as the National Electrical Code.

Node

Name for the end-point slot of a network bus topology.

O

ON-Board-Termination

The termination is positioned before the first and after the last slot on the backplane, which increases the outer dimensions of the backplane by approximately 2 HP on both the right and left sides.

Open Frame

This term is used in connection with power supply units. So-called "open-frame power supplies" do not have a cover, which means that the electronic components in the power supply are easily accessible.

P

PA

Polyamides (PA) usually refer to synthetic and technically usable thermoplastics. Most of the technically significant polyamides are partially crystalline thermoplastic polymers and feature high mechanical strength, stiffness and durability. They also provide good chemical resistance and processibility.

PBT

Polybutylene terephthalate (PBT) is used e.g. for cases in the electrical and electronics industries and for connector housings. (Trade marks e.g. Ultradur, Crastin)

PC

In its transparent form polycarbonate (PC) is used for making light conductors. (Trade marks e.g. Lexan, Makrolon)

PC-ABS

Polycarbonate+ABS blends (PC+ABS) combine the advantages of PC and ABS – both materials are used in the electronic packaging industry. The impact resistance and heat resistance, the high-grade semi-gloss and scratch-resistant surface, and the high stiffness and durability should be particularly emphasized. A typical application is casings for electronic devices.

PCI

"Peripheral Component Interconnect" (PCI) defines a standardized bus structure for interfacing between peripherals and the chipset of a CPU, as well as being the basis for several other bus standards, like Compact-PCI and PCI-Express. It is used for normal PCs and also for industrial computer-based solutions.

PE

Polyethylene (PE) is a thermoplastic which is produced by polymerization of ethylene. Polyethylene is mainly used for making cable insulation and e.g. for shrink-wrap film.

PFC

The power factor defines the relationship between active power and apparent power for an electrical appliance. The higher the power factor for any given appliance, the higher its effectiveness. The power factor correction (PFC) serves to increase the effectiveness of an electrical appliance. This is achieved by the reduction of heat loss, reduction of high frequency EMC interference as well as by improvement of the mains voltage distribution process.

PICMG

The "PCI Industrial Computer Manufacturers Group" (PICMG) is a consortium of more than 600 companies that work in close cooperation to develop specifications for high-end telecommunications and industrial computer applications. The PICMG specifications include the Compact-PCI for Eurocard formats.

PMMA

Polymethyl methacrylate (PMMA), also known as acrylic glass or Plexiglas, is a synthetic, glass-like thermoplastic. PMMA is generally used in display applications.

P0

The P0 is an additional I/O connection that can be freely allocated and is used in VME64x backplanes. It is positioned between the J1 and J2 levels. A PCI Bus or network bus can be connected to the P0. (See also VME64x specification ANSI/VITA 1.1-1994 thru 1.1-1997)

POM

Thanks to its high stiffness, low friction and excellent dimensional and thermal stability, polyoxymethylene (POM), also known as polyacetal, is used as a technical plastic typically for high-precision parts. (Trade marks e.g. Hostaform, Delrin)

PP

Polypropylene (PP), also known as polypropene, is a thermoplastic that is closely related to HD-PE. It is used e.g. for making injection molded parts, fiber, thermoformed parts and semi-finished parts.

PPE or PPO

Polyphenyl ether (PPE), formerly polyphenylene oxide (PPO), is rarely used in its pure form. It is typically blended with polystyrene, impact-resistant styrene-butadiene copolymer or polyamide. The material is used for making formed parts in the electronics, household and automotive industries, where high heat resistance, dimensional stability and accurate dimensions play an important role. (Trade mark e.g. Noryl)

PS

Polystyrene (PS) is a transparent, amorphous or semi-crystalline thermoplastic. Polystyrene is used as thermoplastically processible material or as foamed material (expanded polystyrene). Well known trade marks for foamed polystyrene are Styropor and Styrodur. The material provides good isolation and is used in electronics for making switches, inductors and cases. (High Impact Polystyrene, HIPS)

PSB

"Packet Switching Bus" (PSB) defines the extension of the CompactPCI as PSB2.16 or the VME64x as VITA31 and describes the bus topology for extension with a network bus on backplane level.

PT® screw

Thread-forming or self-tapping screw for plastics (especially thermoplasts), used e.g. for card guides.

PU

Abbreviation for packaging unit.

PWM

"Pulse Width Modulation" (PWM), typical triggering mode for speed-controlled fans.

Q

R

REACH

"Registration, Evaluation, Authorisation and Restriction of Chemicals" is an EU regulation on chemicals and their safe use.

//SUB Appendix

// Glossary REAR I/O - UPS

Rear I/O

The term Rear I/O has to do with bus circuit boards. Rear I/O are pins on the rear of bus circuit boards which can be freely allocated so that the user can connect his expansion cards as needed.

Redundancy

This describes the availability of backup for a system-relevant assembly and its function. This guarantees that in the event of a failure the function will be taken over by the redundant assembly. Especially in the case of power supplies, two equivalent power supplies are generally intelligently connected in parallel so that a failed assembly can be exchanged during operation using hot swap technology. Indication of these functions is generally handled via the standard interfaces.

RoHS

"Restriction of Hazardous Substances Directive" (RoHS) is the EU directive 2002/95/EG on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

RPM

"Revolutions per minute" (RPM), typical rotational speed signal for fans.

S

Shore

Shore hardness, named after Albert Shore, is a material parameter for elastomers and plastics and is defined in the specifications DIN 53505 and DIN 7868. To determine the hardness according to Shore the resistance of a material is measured as follows: a defined sample piece penetrates a material at a defined elastic force. The test results range from 0 to 100, whereby 0 represents the lowest and 100 the highest hardness. The hardness in Shore A is softer than that in Shore D, whereby there is an overlap between these two hardness scales. Example: 90 Shore A equals approximately 35 Shore D.

SMB

"System Management Bus" (SMB) is the bus structure used for bus systems for independent communication of system monitoring information. It is often based on a serial I²C bus and uses the IPMI protocol.

SMD

"Surface-mount device". These are electronic components that do not have connection wires but instead are mounted directly on the surface of an electronic circuit board and attached with solder.

SMT

"Surface-mount devices"(SMD), such as resistors, capacitors, unlike "wired components" using "through-hole technology" (THT), do not have connection wires but instead are moun-

ted directly on to the surface of the PCB via soldered connection pins. This is called "surface-mount technology" (SMT).

T

Termination

Termination is a defined cable termination on a bus circuit board.

Touchscreen

Computer user interface (normally a specially coated glass plate) by means of which a technical device, usually a computer, can be directly controlled by touching specific program items. Mainly resistive or capacitive solutions are used for interaction with the screen. The controller needed for position analysis is connected to the main board via a standard interface (USB, serial, PS/2). Special drivers are needed amongst other for calibration.

TPE

Thermoplastic elastomers (TPE) are materials which can be processed thermoplastically and have properties that resemble those of rubber. TPE can be formed easily as they go through the plastic state during processing. They can be manufactured in hardnesses ranging from 5 Shore A up to 70 Shore D. Typical applications in the electronics industry are for parts such as IP seals or EMC shielding material.

U

U

Abbreviation for "Unit" (U) or standard height measurement. This defines the vertical height for plug-in modules in the 19" construction system.

1 U equals 44.45 mm

UL

"Underwriters Laboratory" (UL) is an independent organization which conducts safety tests and product certifications.

UL94

The UL94 standard "Tests for Flammability of Plastic Materials for Parts in Devices and Applications" from the Underwriters Laboratory (UL) describes a procedure to evaluate and classify the flammability of plastics.

UPS

"Uninterruptible power supply" (UPS): typically a parallel DC power supply via an additional rechargeable battery to back up the main power supply for a limited amount of time. Emergency operation is generally indicated via an additional interface, which can also be used for analysis (e.g. shut-down of the system).

V

VDE

Abbreviation for "VDE Verband der Elektrotechnik, Elektronik und Informationstechnik e.V." (Association for Electrical, Electronic & Information Technologies), based in Frankfurt am Main, Germany

VITA

Abbreviation for "VMEbus International Trading Association" (non-profit organization): Association of manufacturers and users of VMEbus products that has the goal of promoting and spreading VMEbus.

VME64x

Extension of the VMEbus to 64 bit technology. The extensions that are defined by IEEE 1101.10. (such as hot swap) are also integrated. The P0 connector provides the possibility for further bus extensions.

VMEbus

The VMEbus is a microcomputer bus system for real-time use. The VMEbus was originally designed by a consortium led by Motorola. Today the VMEbus is defined by the Standard IEEE 1014.

W

WEEE

WEEE is the abbreviation for "Waste Electrical and Electronic Equipment". This EU directive regulates the collection and recycling of electronic equipment. It also includes recycling rates for manufacturers.

WN

Abbreviation for "Werksnorm", POLYRACK's factory specifications

X

Y

Z

//SUB Appendix

// Information on RoHS, REACH, WEEE

// RoHS

POLYRACK TECH-GROUP products correspond to the requirements of European Directive 2002/95/EC (RoHS) unless we have been given instructions to the contrary. The corresponding status for each product is given in our business documents as appropriate.

// REACH

POLYRACK TECH-GROUP and its companies POLYRACK Electronic-Aufbausysteme GmbH, RAPP Kunststofftechnik GmbH and RAPP Oberflächenbearbeitung GmbH are primarily downstreamed users. The measures taken by our enterprises conform with those of the other market participants in the supply chain. Products of the POLYRACK TECH-GROUP comply as of today's status of knowledge to the requirements of REACH regulation EG 1907/2006.

// WEEE

POLYRACK TECH-GROUP is not a manufacturer in accordance with the European Directive 2002/96/EC (WEEE) and is therefore essentially released from this directive. Responsibility for fulfilling the required recycling quotas lies solely with the manufacturer of the end product.

// Brochure Remarks

We reserve the right to make technical changes in the course of ongoing development and improvement of our product ranges with respect to the information provided in our publications. Compensation cannot be claimed because of changes, omissions or printing errors.

// POLYRACK TECH-GROUP

// Contact information

// POLYRACK TECH-GROUP

POLYRACK TECH-GROUP Holding GmbH & Co. KG

Steinbeisstraße 4
75334 Straubenhardt
Germany
Phone +49.(0)7082.7919.0
Fax +49.(0)7082.7919.330
info@polyrack.com
www.polyrack.com



// Companies of the TECH-GROUP

POLYRACK Electronic-Aufbausysteme GmbH

Steinbeisstraße 4
75334 Straubenhardt
Germany
Phone +49.(0)7082.7919.0
Fax +49.(0)7082.7919.330

RAPP Kunststofftechnik GmbH

Heinrich-Hertz-Straße 25
75334 Straubenhardt
Germany
Phone +49.(0)7082.7919.703
Fax +49.(0)7082.7919.630

RAPP Oberflächenbearbeitung GmbH

Forlenweg 12
75334 Straubenhardt
Germany
Phone +49.(0)7082.7919.651
Fax +49.(0)7082.7919.660

Metalle in Form Geräteteile GmbH

Ottostraße 10
76227 Karlsruhe
Germany
Phone +49(0)721.94496.0
www.metalle-in-form.com

// Foreign subsidiaries

Switzerland

POLYRACK AG

Seefeldstraße 283
8008 Zürich
Switzerland
Phone +41(0)71.6951455
polyrack_ch@polyrack.com

USA/Canada

POLYRACK North America Corp.

1600 Highland Corporate Drive
Cumberland, RI 02864
USA
Phone +1.401.770.1500
Fax +1.401.770.1550
polyrack_us@polyrack.com

Asia/China

POLYRACK Science & Technology Co., Ltd.

7th floor, Building No. 11
Langkou Industrial Park
DaLang Street,
Longhua New District
Shenzhen 518054
China
Phone +86.755.8202.8946
Fax +86.755.8202.8949
polyrack_asia@polyrack.com

Benelux, Belgium

POLYRACK Benelux S.P.R.L.

Rue Georges Cosse, 6
5380 Fernelmont
Belgium
Phone +32.81.411.500
polyrack_benelux@polyrack.com

You will find the closest sales representative or distribution partner
responsible for your area at: www.polyrack.com

#01 PRODUCTS

19" SUBRACKS

\\ Future \\ FutureX \\ FerroRAL \\ Series 75 \\ Series 76 \\ Series 77

POLYRACK TECH-GROUP

Steinbeisstraße 4
75334 Straubenhardt
Germany
www.polyrack.com

HOTLINE

+49.(0)800 - POLYRACK
(+49.(0)800.76597225)
sales@polyrack.com



Visit us online!