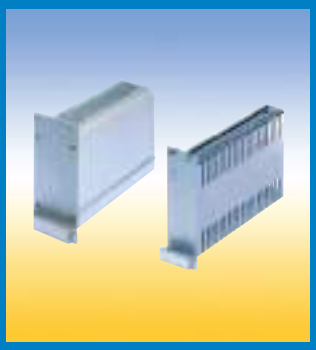
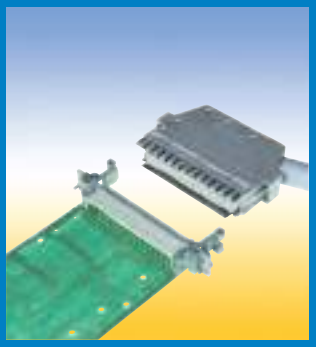
INTERMAS



Modular Assembly Systems



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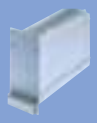

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The ”19-inch-Assembly System“

The so-called 19-inch assembly system consists of a wide range of mechanical and electromechanical components matched to each other in terms of their dimensions and can be regarded as a „mechanical construction kit“ for assembling electronic devices and systems.

The ”19-inch assembly system” was first presented in 1970 at the Hanover Trade Fair by AEG Telefunken (Intermas Modular Assembly Systems). The first application areas of this revolutionary development were industrial electronics followed by power station control engineering and traffic engineering. Today the system is in use worldwide in almost all areas of industrial electronics such as telecommunications, military technology, medical technology, measurement and control technology etc.

The 19 inches originated in the width of equipment front panels in accordance with the USA standard C83-9. In view of the frequent need to combine European and American equipment in a single system the width and the height increments of the 19-inch front panel became the starting point for the DIN 41494 and IEC 60 297-1 standards. Although the 19-inch (482.6 mm) dimension is only used once as the width specification for the front panels of plug-in units and subracks, it has given its name to the modular assembly system. All system dimensions are defined in mm. The correct designation should therefore more correctly be 482.6 mm technology, a term which is also used in DIN 14 494, the German standard for the 19” assembly system.

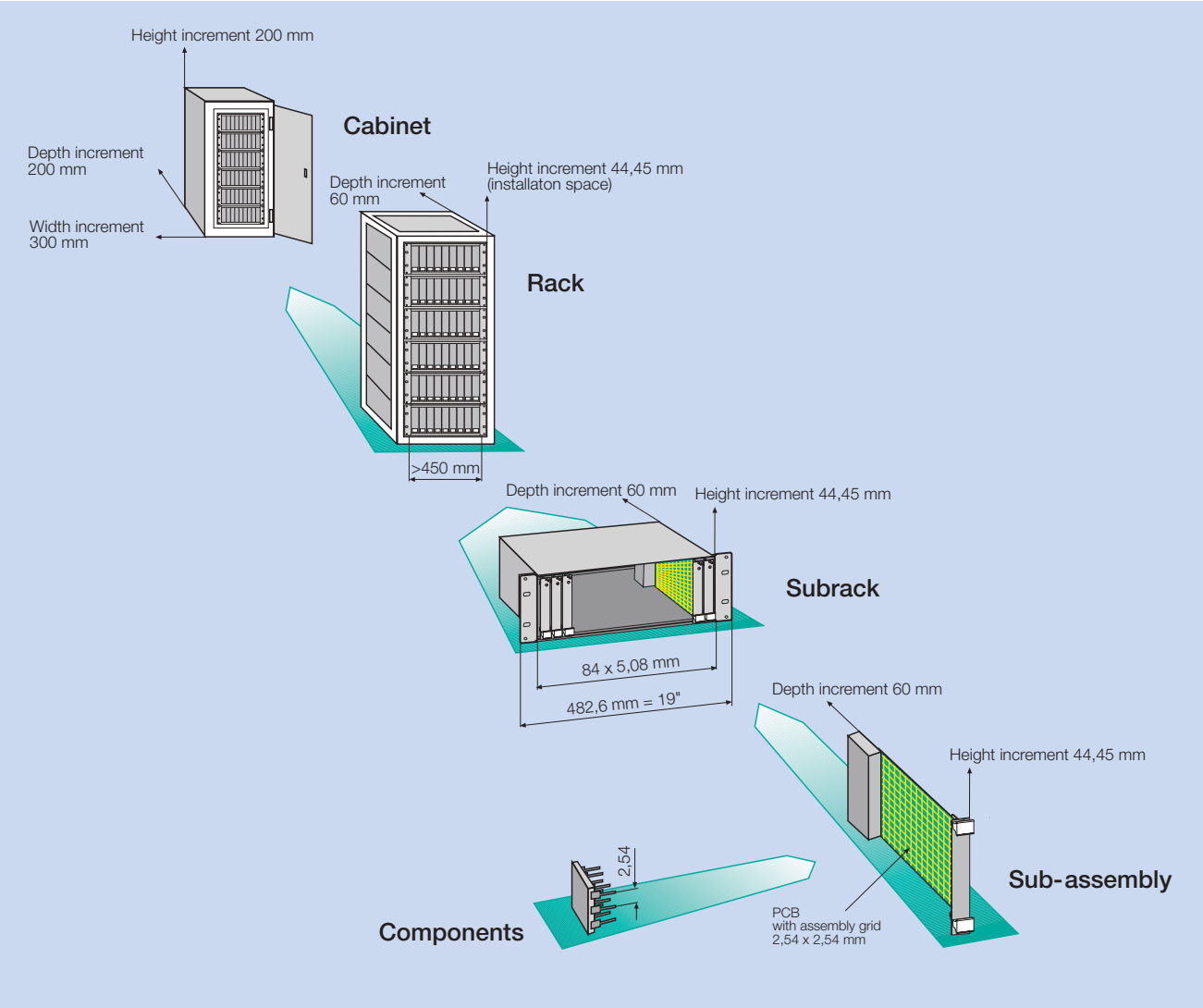
All necessary dimensions were defined in the German DIN 41 494 standard, in IEC Publication 60 297 and in the USA standard ANSI/IEEE 1101.

The aim of the standardization was to make it possible to combine different system components without problems and to ensure compatibility between different devices and modules as the basis for the specialization of individual manufacturers which resulted from global division of labor.

DIN standards and IEC publications

System level	DIN-standards	IEC-publications	DIN-standards	IEC-publications	DIN-standards	IEC-publications
Level 4 Racks	Table Top Housings DIN 41494	IEC 60297-1/2	Racks DIN 41494	IEC 60297-1/2	Cabinets DIN 41494	IEC 60297-1/2
Level 3 19”-Front- and rear pane and subracks	19”-front panel DIN 41494	IEC 60297-3	19”-subracks DIN 41494	IEC 60297-3	19”-rear panel DIN 41494	IEC 60297-3
Level 2 Sub-assembly	PCB DIN 41494	IEC 60297-3	Plug in block DIN 41494	IEC 60297-3	Plug- in unit DIN 41494	IEC 60297-3
Level 1 Components	Sub-assemblys at front panel DIN 41494	IEC 60297-3	Cards DIN 41494	IEC 60297-3	Connectors DIN 41494	IEC 60303-3

(cp.: "The Modular 19"-System“, Hesse, 1991, side 43)



(Cp.: "The Modular 19"-System", Hesse, 1991, side 17)

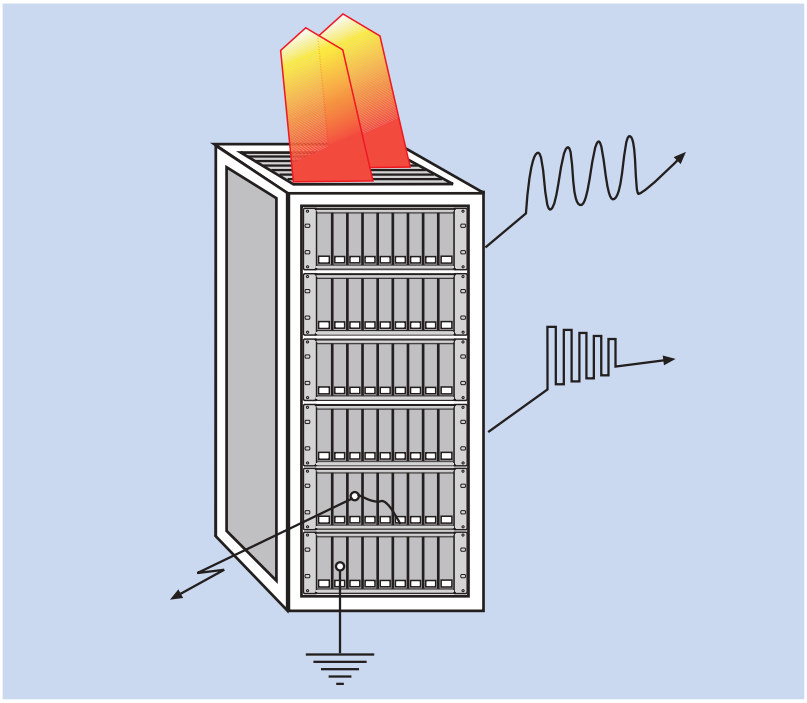
The modular structure

The modular structure of the so-called 19” assembly system allows components of one level to be freely combined with one another without problems and used in assemblies of the next higher level.

In addition to the 19” front panel, the dimensions of the Euroboard (100x160 mm), the component-fitting and wiring grid on the PCB (2.54 mm) and the external dimensions for cabinets formed the initial dimensions for the modular 19” assembly system.

Protection Requirements

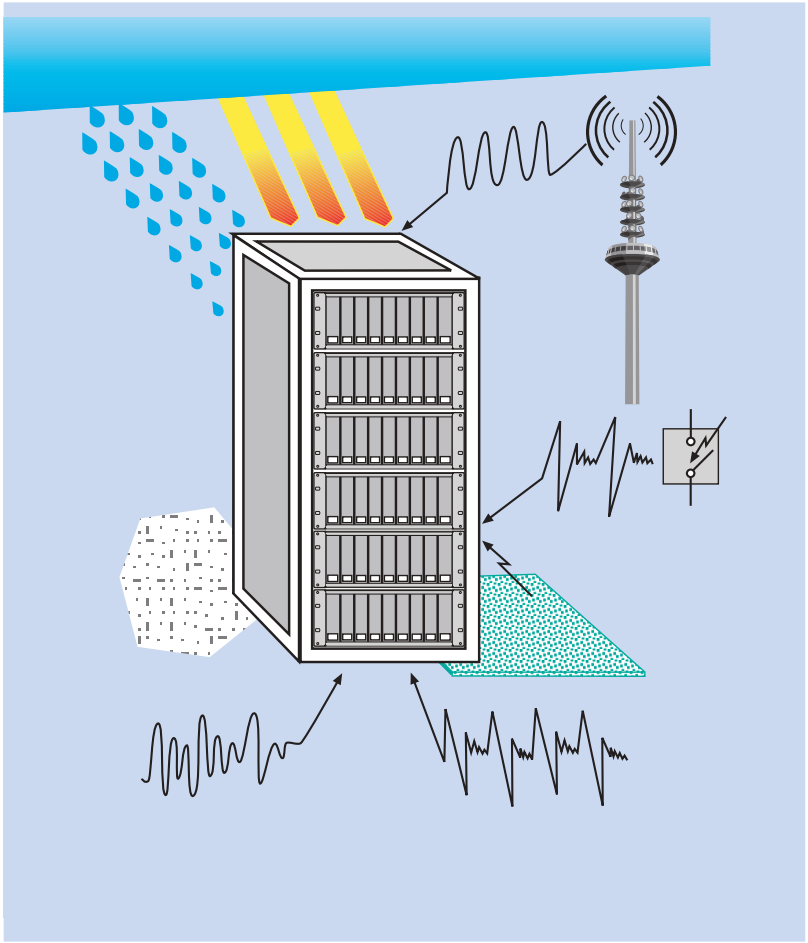
The protection requirements depend on sensitivity of the installed electronics and on the interference levels at the installation location.



(Cp.: "The Modular 19"-System", Hesse, 1991, side 127)

The protection requirements can be divided into:

1. Protection of the surrounding environment against interference, for example RF radiation, emitted by the device or protection against contact with live components.



(Cp.: "The Modular 19"-System", Hesse, 1991, side 127)

2. Protection of the modules against external influences such as mechanical stresses as a result of vibration or shock, or infiltration of foreign bodies and humidity and also highfrequency interference signals.

EMI protection

Electromagnetic interference basically results from three different types of signals:

√ sinusoidal permanent signals of fixed frequency

√ broadband permanent signals (fundamental frequency with harmonics)

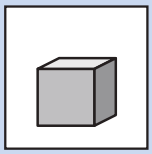
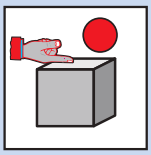
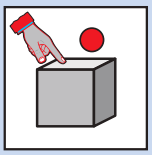
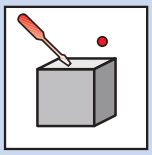
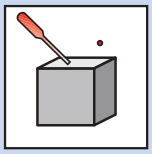
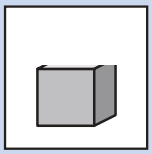
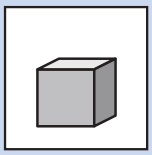
√ transient signals (short period impulse)

In order to adequately counteract such interference factors the paneling elements are conductively connected to one another or bonded to one another using appropriate RFI gaskets.

IP-Protection Classes (IP-Code) IEC 60 529 / EN 60 529

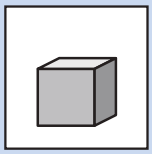
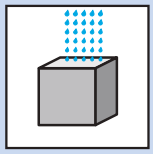
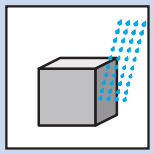
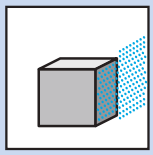
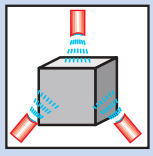
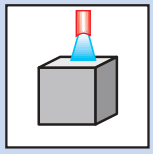
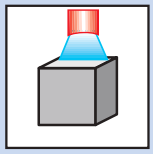
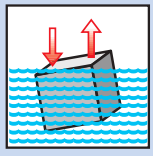
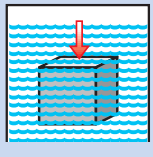
Protection for contact and foreign bodies

IP **1.** Index

0	no special protection	
1	against large area bodies large foreign bodies ø >50 mm (2")	
2	against fingers medium sized foreign bodies ø > 12 mm (0.48")	
3	against tools, wires > 2,5 mm (0.10") small foreign bodies ø > 2,5 mm (0.10")	
4	against tools, wires > 1 mm (0.04") granular foreign bodies ø > 1 mm (0.04")	
5	complete protection dust-protected against dust desposits	
6	complete protection dust-proof	

Water protection

IP **2.** Index

0	no special protection	
1	against water dripping vertically	
2	against water dripping at an angle up to 15° from the vertical	
3	against spray water any direction up to 60° from the vertical	
4	against spray water	
5	against water jets	
6	against strong water jets	
7	against immersion	
8	against submersion	

DIN EN ISO 9001:2015

Our ultimate goal is achieving a competitive advantage through competent advisory services combined with high quality and environmental awareness of our employees.

Quality policy

Quality and competitiveness of Intermas products and services are driven by customer requirements and expectations as well as international market standards. Therefore, every Intermas emlployee is dedicated to fulfill these requirements constantly and entirely.

Customer orientation and customer satisfaction

In order to improve the customer satisfaction consultation services are offered at any stage of the product life cycle. Our management informs customers about technical innovations.
Intermas offers expertise in developing technical solutions through a dialogue with customers. A certified quality management system according to DIN EN ISO 9001 is in place.

System Cabinet *InterRack*

A sophisticated, systematically constructed cabinet system for electrical engineering applications, e.g. as:

√ a universal 19” cabinet
√ a low-voltage cabinet
√ a data and network cabinet

Also excellently suitable for your own designs or special solutions, e.g. as:

√ a training cabinet
√ for patch panels

or in

√ maintenance and control engineering
√ military technology
√ traffic engineering

In short:
This cabinet meets all your requirements and desires.

System Cabinet *InterRack*®

Description

The InterRack system cabinet is made of steel and is easy to assemble using screws. Profiles and paneling elements are galvanized. The customer can choose between two colors of paint finish.
The rack variants and assembly elements provide the capacity for individual configuration.
Protection classes IP 40 and IP 54 are achieved thanks to the use of silicon-free seals.

The cabinet tsands out due to its enormous flexibility of the configuration and extension options.

√ Consistent assembly in the 25-mm-space grid enables appropriate graduation in terms of width, height and depth.

√ Easily incorporated into CAE and CAD-supported development projects.

√ Each level can be used for assembly using only a few system elements.

√ Self-tapping screws allow simple and fast assembly and dismantling and ensure tight and electrically conductive connections.

√ Conducting surfaces and the replaceable system elements ensure excellent EMC characteristics.

Delivery

As a completely assemled and painted cabinet.
Unassembled components on request.

Technical Data

Standards	compliant with DIN 41 488, IEC 60 297-1 and 2, IEC 60917
Width grid	assembly in a 25 mm grid
Depth grid	assembly in a 25 mm grid
Material	loading profiles and corner connectors: aluminum other parts: galvanized steel
Finish	standard: RAL 7032 or as required by the customer
Protection class	compliant with DIN 40050 IP 40 and IP 54 contact protection in accordance with VDE 0160
Utilization category	-25 °C, +70 °C, 75% relative humidity
Protective grounding	all metal parts are electrically bonded to one another following assembly in accordance with VDE 100/12.65, § 6 Nb

Cabinet example

- √ Rack A
- √ Mounting plate
- √ Frontdoor, right opening
- √ Rear panel
- √ Base panel
- √ Top panel closed
- √ Swing handle
- √ 130° hinges
- √ With side panel protection class IP 40

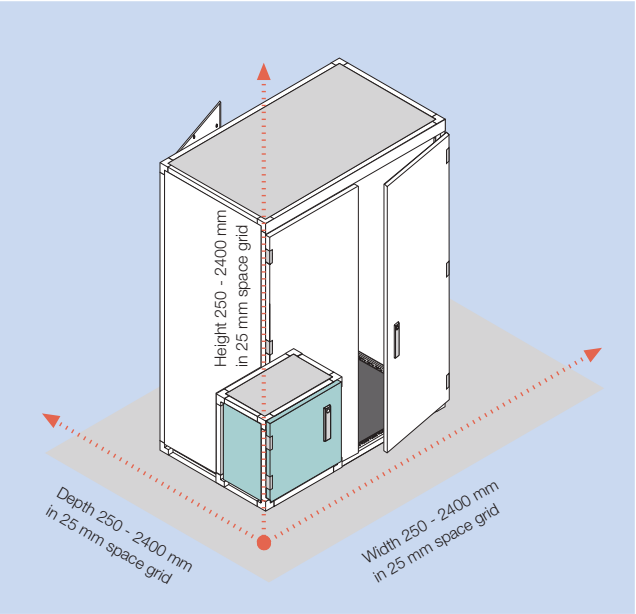
Sealing of the door

Sealing of the paneling parts

Sealing of the system cabinet *InterRack* to protection class IP 54

RFI-shielding of the door of the system cabinet *InterRack*

Configuration



Configuration System Cabinet *InterRack*

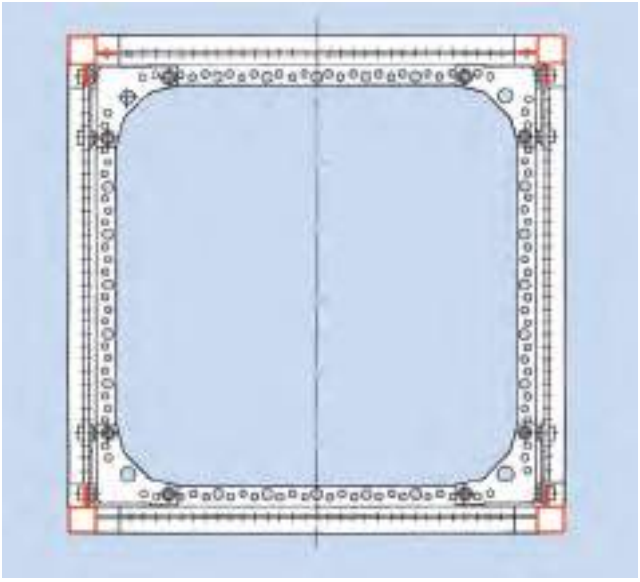
Cabinet	pieces _____			
Rack	❑ version A ❑ version B ❑ version C ❑ version D height: _____ mm width: _____ mm depth: _____ mm			
Color rack **Color paneling parts**	RAL _____ RAL _____			
Side panel	❑	❑ left	❑ right	
	❑ **adding:**	❑ left	❑ right	
Rear panel	❑			
Door opening	❑ front	❑ left	❑ right	
	❑ rear	❑ left	❑ right	
Double door	❑ front	❑ rear		
Hinges	❑ 130 degree	❑ 180 degree		

Door lock	❑ **swing handle** ❑ **key plate**	❑ dummy element ❑ double bit 3 mm ❑ short cylinder keyed alike	❑ square ❑ double bit 5 mm	
Top panel	❑ closed	❑ labyrinth	❑ perforated	❑ raised
Base panel	❑ closed	❑ divided	-	
Mounting plate	❑ galvanized	❑ color RAL _____		
Hinged frame	opening: ❑ left ❑ right ❑ 130 degree ❑ 180 degree			
19" unit support	❑ front	❑ rear		
Protection class	❑ IP _____			
RFI-shielded	❑			
Accessories	❑ **Adaptor** ❑ **Document box** ❑ **U-strut** piece_____	❑ **Logo strip** ❑ **Universal angle** piece_____ ❑ **Lifting eye** (kit with 4 pieces)	❑ **Base**	
Notes	_____ _____ _____ _____			

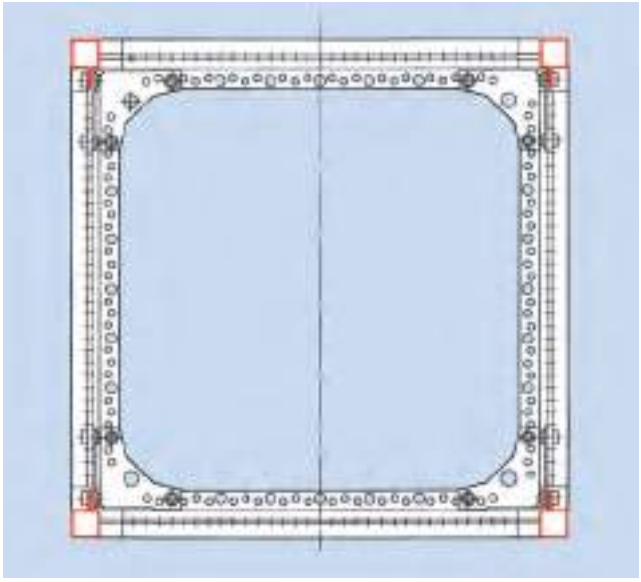
Please ask your local representative for your
individual configuration.
You find your contact person on our homepage:
www.intermas-el.com

Rack construction
The rail profiles are rolled from galvanized sheet steel. This ensures optimal corrosion protection, including the cut edges.
Two versions of rail profiles are available, rail profile W and rail profile V.
Plug-in corner connectors made of die-cast aluminum ensure stable connection in all three axes.
The rail profiles are then screwed to the gusset plate.

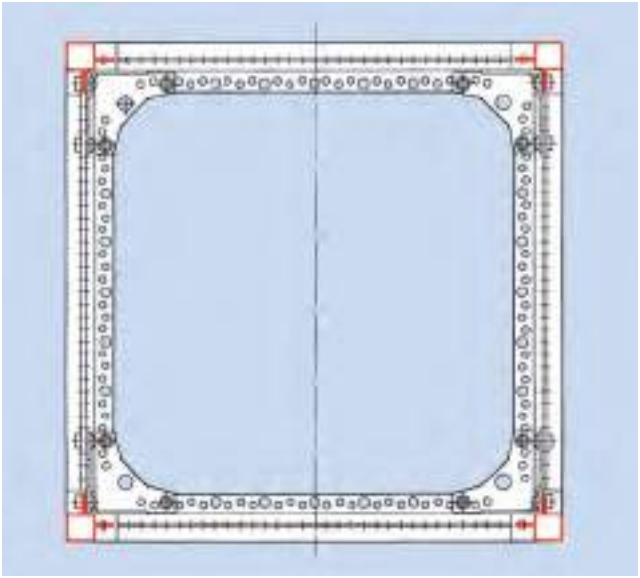
This method of construction allows assembly of any cabinet rack with an edge length of 250 to 2400 mm. Individual switch racks or patch panels can also be constructed just as easily.



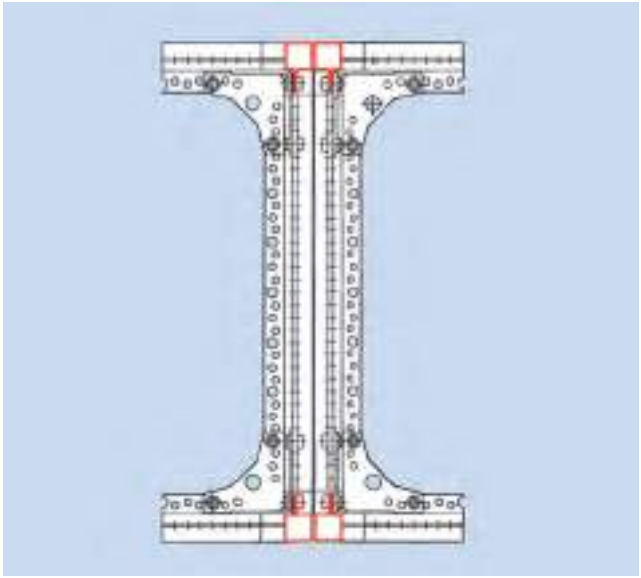
Rack version A
for stand alone cabinets with front door.



Rack version B
for stand alone cabinets with front and rear door.

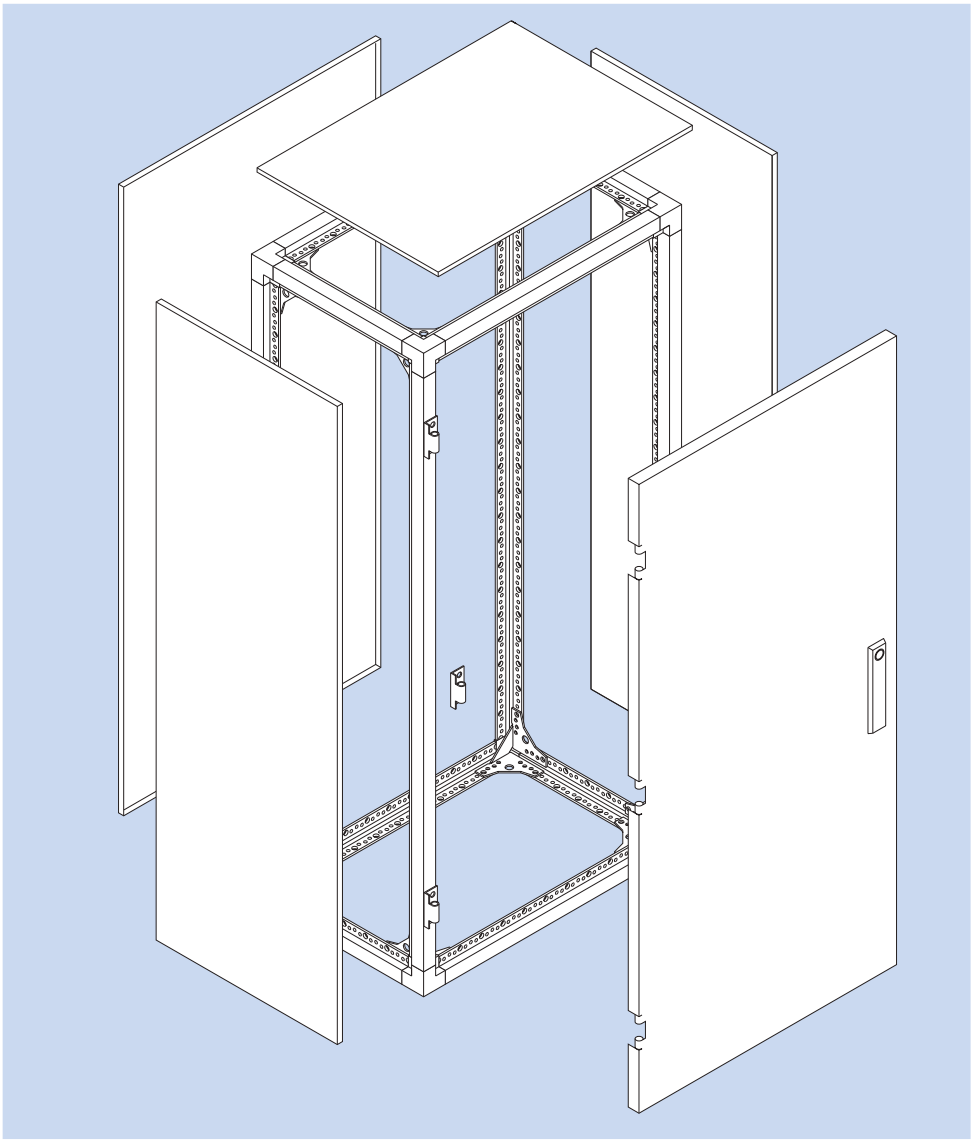


Rack version C
for protected and separated regions, all sides prepared for covering panels.



Rack version D
for frame type switchboards and distribution jumper rings.

System Cabinet *InterRack*®



Ordering details system cabinet

	height [mm]	width [mm]	depth [mm]	1 front door order no. **409.**	1 front door 1 rear door order no. **409.**	double door order no. **409.**
InterRack 1200 x1000 x 400	1200	1000	400	-	-	**166 261**
InterRack 2000 x 600 x 500	2000	600	500	**166 262**	**166 263**	**166 264**
InterRack 2200 x 900 x 600	2200	900	600	**166 265**	-	**166 266**

Delivery

	quantity per kit 1 door	quantity per kit 2 doors	quantity per kit double door
Rack	1	1	1
Door front/rear (130°) Hinges 130°, left opening	1	2	1
Side panels	2	2	2
Rear panel	1	-	1
Top panel closed	1	1	1
Swing handle	1	2	2

This catalog contains stock and standard parts. Other products and sizes on request.

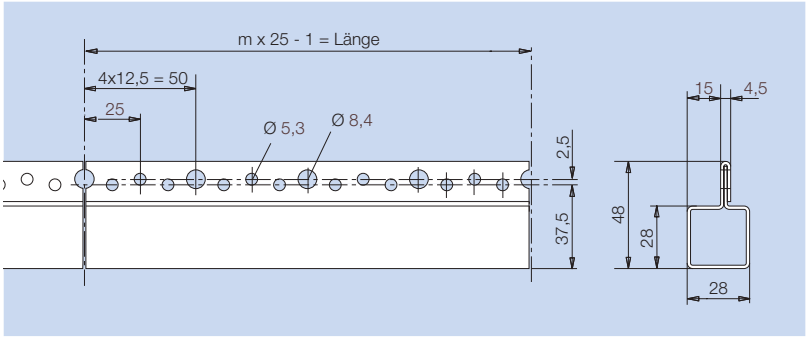
Rail Profiles

The rail profiles are rolled from galvanized sheet steel.
This ensures optimal protection against corrosion including the cut edges. Two Versions of rail profile are available.
Rail profile V
Rail profile W

Material: steel
Finish: galvanized

Finished length for rail profiles

rack-nom. width [mm]	length [mm]	m = number space grid
400	299	12
500	399	16
600	499	20
900	799	32
1000	899	36
1200	1099	44
2000	1899	76
2200	2099	84

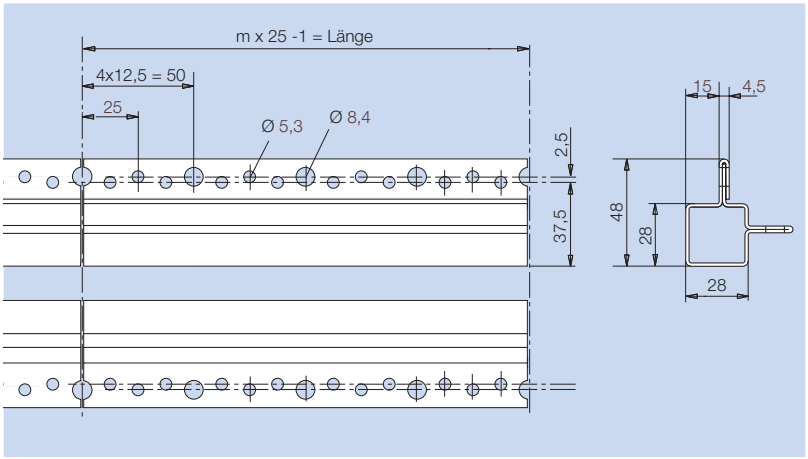


Rail Profile V

For use as height profile and diving profile.

Length: 6360 mm

order no.: **409. 074 056**



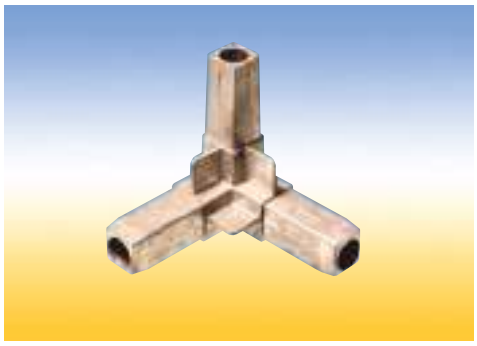
Rail Profile W

For use as height, depth, width profile and dividing profile

Length: 6360 mm

order no.: **409. 074 057**

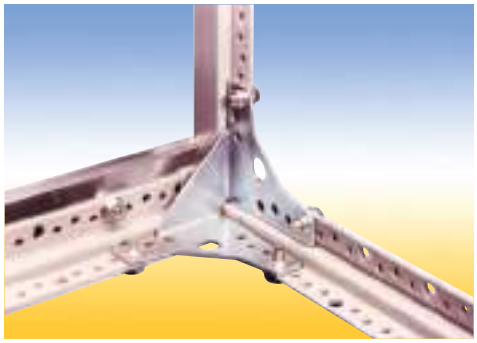
Corner Connector, Gusset Plate A and B, 19”-Unit Support



Corner Connector
For connecting the rear profiles.

Material: aluminum die casting
Finish: untreated

order no.: **409. 050 688**



Gusset Plate A
For fastening the rack corner.

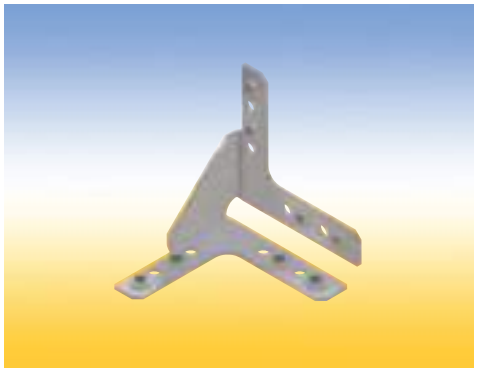
Material: steel
Finish: galvanized, passivated

order no.: **409. 131 354**

Accessories

Cylinder head screw M 8 x 14
(Torx T40) DIN 7500

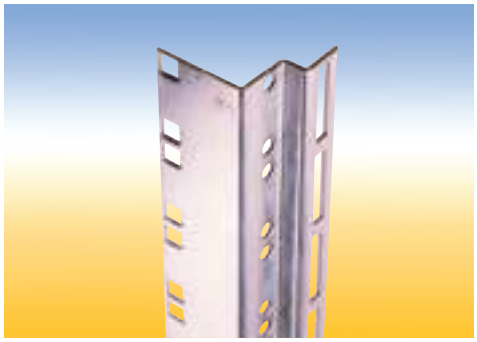
Minimum order quantity: 10 pieces
order no.: **409. 132 778**



Gusset Plate B
For fastening the rack corner.
To get maximum free space for assemblies and for fastening with screws M 8.

Material: steel
Finish: galvanized, passivated

order no.: **409. 167 416**



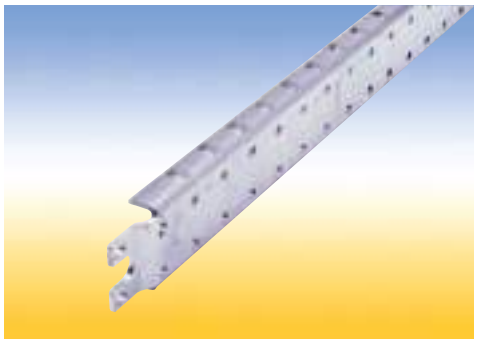
19”-Unit Support
Are mounted vertically, depth variable in 25-mm-space grid.
For mounting of 19”-equipment.

Material: steel
Finish: galvanized, passivated

Ordering details

	for cabinet-height [mm]	length [mm]	order no. **409.**
19”-unit support 2000	2000	1866.45	**078 641**
19”-unit support 2200	2200	2044.70	**078 646**

U-Strut, Universal Angle, Door Hinge 180°



U-Strut

As support for unit support and fixtures in
25-mm-space grid.
2 versions are available:
1. For mounting from outside the cabinet.
2. For mounting from inside the cabinet.
This version is especially suitable for later installations.

Material: steel, 3 mm thick
Finish: galvanized, passivated

Ordering details

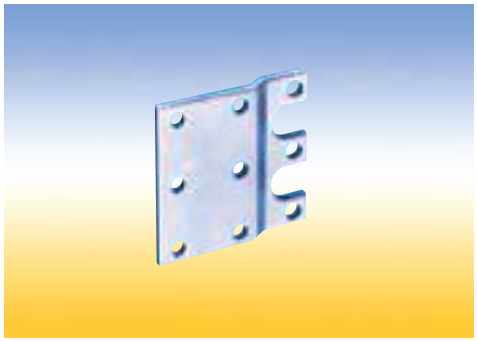
	for cabinet-depth/width [mm]	outside order no. **409.**	inside order no. **409.**
U-Strut 400	400	**049 677**	**132 601**
U-Strut 500	500	**049 679**	**132 603**
U-Strut 600	600	**049 680**	**132 604**
U-Strut 800	800	**049 681**	**132 605**
U-Strut 900	900	**049 682**	**132 606**

Accessories

Hexagon Head Screw M 6 x 12

Minimum order quantity: 10 pieces

order no.: **409. 050 567**



Universal Angle

To fastening of 19”-unit support and accessories.

Material: steel, 3 mm thick
Finish: galvanized, passivated

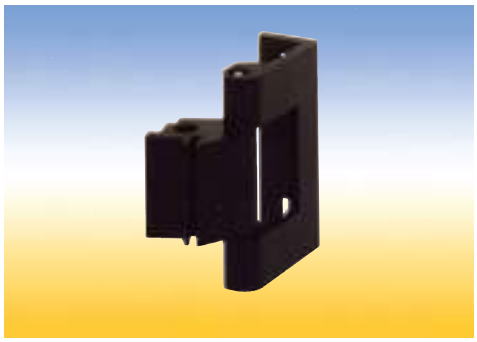
order no.: **409. 132 240**

Accessory

Hexagon Head Screw M 6 x 12

Minimum order quantity: 10 Pieces

order no.: **409. 131 550**



Door Hinge 180°

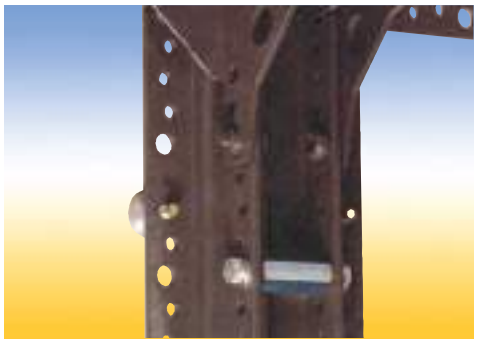
with a 180° opening angle.

Material: aluminum
Finish: black anodized

Delivery:
3 hinges, 3 hinge pins
Mounting parts

order no.: **409. 069 369**

Standard Adaptor, Lifting Eye, Document Box, Custom Logo Strip for Cabinets



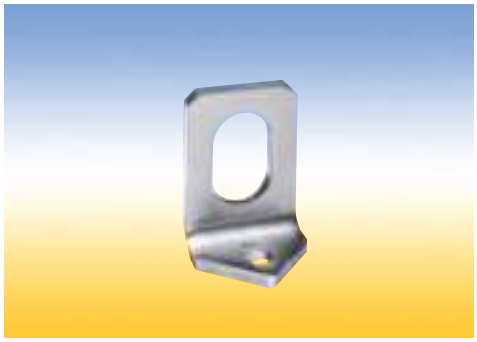
Standard Adaptor Kit

To bolt together additional cabinets.

Material: steel
Finish: galvanized, passivated

Delivery: 8 threaded spacers
Mounting parts

order no.: **409. 132 464**

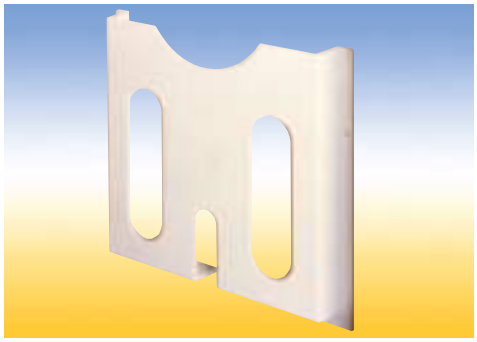


Lifting Eye Kit

Material: steel
Finish: galvanized, passivated

Delivery: 4 lifting eyes
Mounting parts

order no.: **409. 132 735**

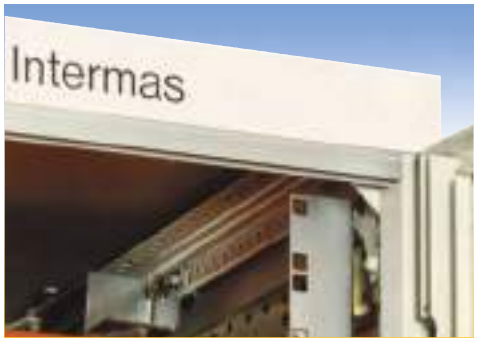


Document Box

DIN A4, upright, self adhesive

Material: Polystyrene, shock resistent
Finish: RAL 9002

order no.: **409. 068 760**



Custom Logo Strip

For the rack above the door.
Self adhesive

Material: aluminum 2 mm thick
Finish: anodized (paintable and printable)

Ordering details

	length [mm]	order no. **409.**
Custom logo strip 600	594	**049 668**
Custom logo strip 900	894	**049 670**
Custom logo strip 1000	994	**069 302**

Housings
Desktop Housings

InterMeZo Housing

- √ Design front
- √ Functional front
- √ Variable in three dimensions
- √ Can be RFI-shielded
- √ Mechanical protection up to IP 54

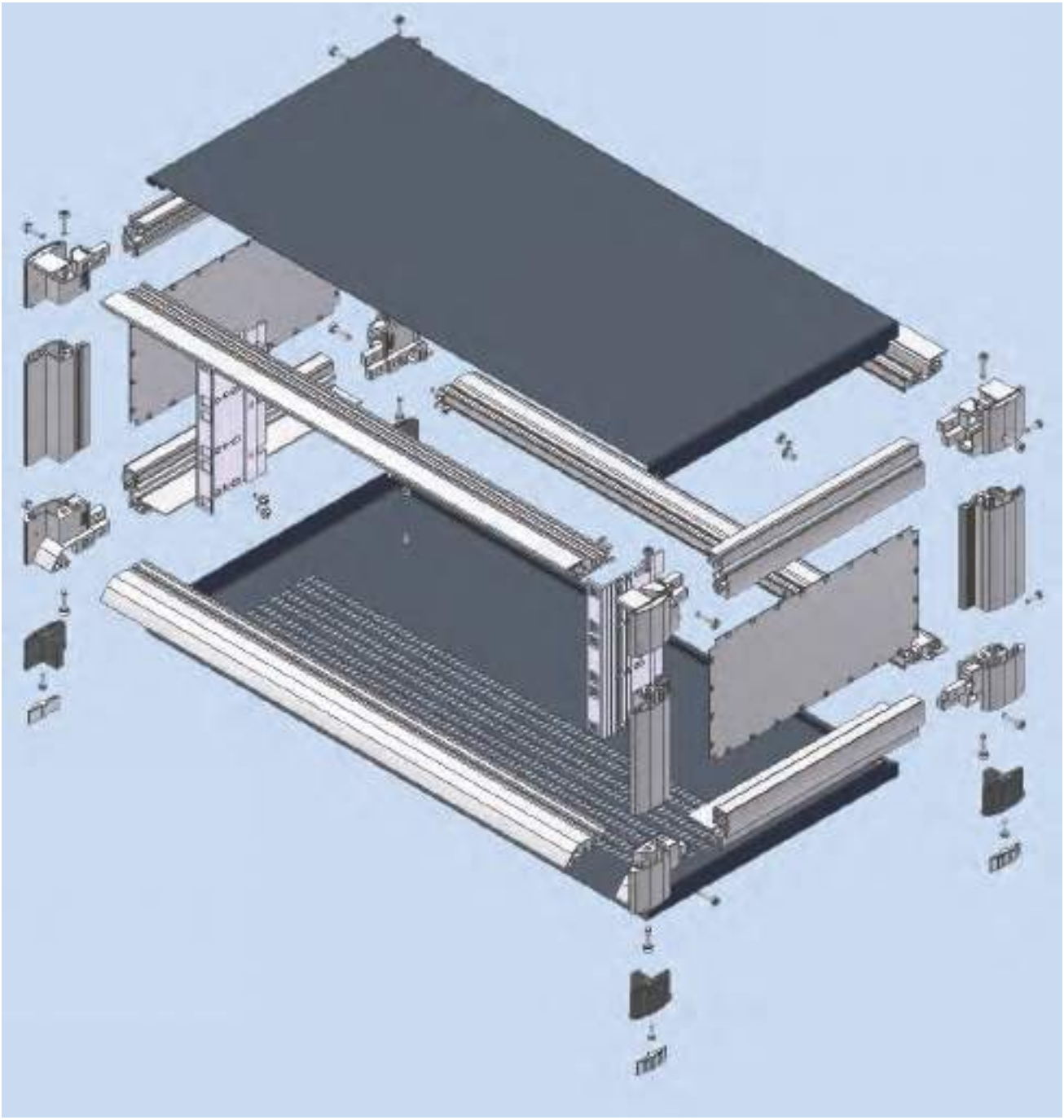
InterCase Desktop Housing

- √ Easy construction
- √ Service friendly
- √ Variable dimensions
- √ Can be RFI-shielded

InterLock Housing

- √ Covering of subracks
- √ Easy mounting without screws

InterMeZo Housing



Requirements
A modern housing exible in its applications, with a modular design, can be RFI-shielded and ventilated, in an attractive design and at a reasonable price: InterMeZo

Construction
1. Housing frame
The InterMeZo housing is based on a framework construction consisting of profiles and corner connectors. This flexible design also enables fast and cost-effective assembly of individual housing sizes.

2. Easy to access
For quick access to the installed electronics the cover plates are pressed into profiled grooves and secured with two screws.

3. RFI shielding
The side walls are pressed into profile grooves; contact elements ensure RFI-shielded bonding.
To achieve effective protection of the housing against dust and water the cover panels, the rear wall and the door can all be fitted with seals.

4. Mechanical sealing
To achieve effective protection of the housing against dust and water the cover panels, the rear wall and the door can all be fitted with seals.

5. Recessed grips
Grips for easy transportation are formed by the recessed mounting of the side walls.

6. Equipment supports
Subracks can be installed variably as the housing depth permits.

7. Chassis panels
The depth profiles are provided with grooves in which chassis panels or similar can be fitted at any depth with the aid of spring nuts.

Summary
The InterMeZo housing from Intermas is a modular and cost-effective housing solution for high-quality industrial electronics in a visually attractive design, developed for the highest possible flexibilty and simplest possible assembly, with expansion capabilities for more demanding needs, compliant with stringent EMI/ESD protection specifications, and with extensice configuration options to fulfil application-specific requirements.

Technical data

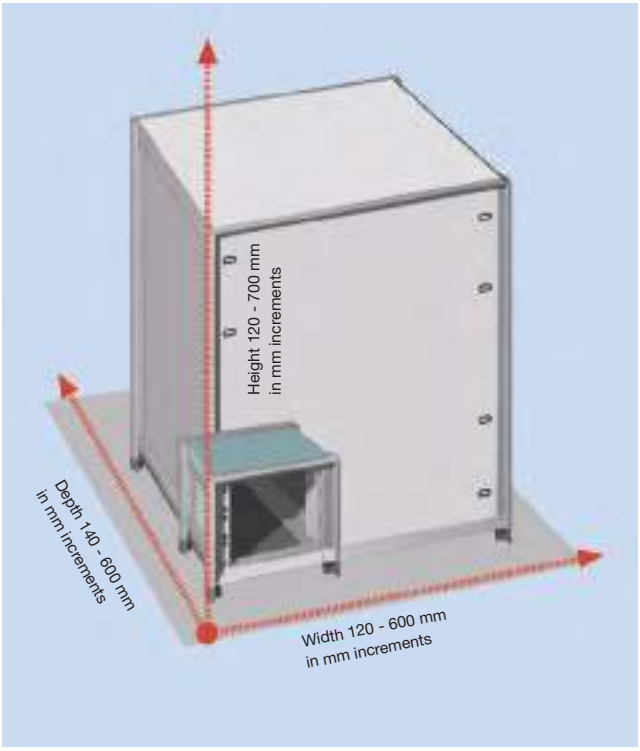
Materials	casing: aluminum profiles corner connectors: die-cast zinc feet: ABS other parts: 0.8 mm galvanized sheet steel
Finish	standard for rear wall and cover panels: painted dark gray (RAL DS 5500) standard for casing and side walls: painted light gray (RAL DS 7000) feet: dark gray

Versions
The *InterMeZo housings* are available to assembly 19”- or metric subracks. Alternatively, any dimensions for variable applications are possible.
For all versions the possibility exists to choose between the following types.

1. Design front
This version has been constructed in terms of a harmonic front design for use with a wide range of applications.

2. Functional front
For higher protection against dust and water as well as EMC shielding.

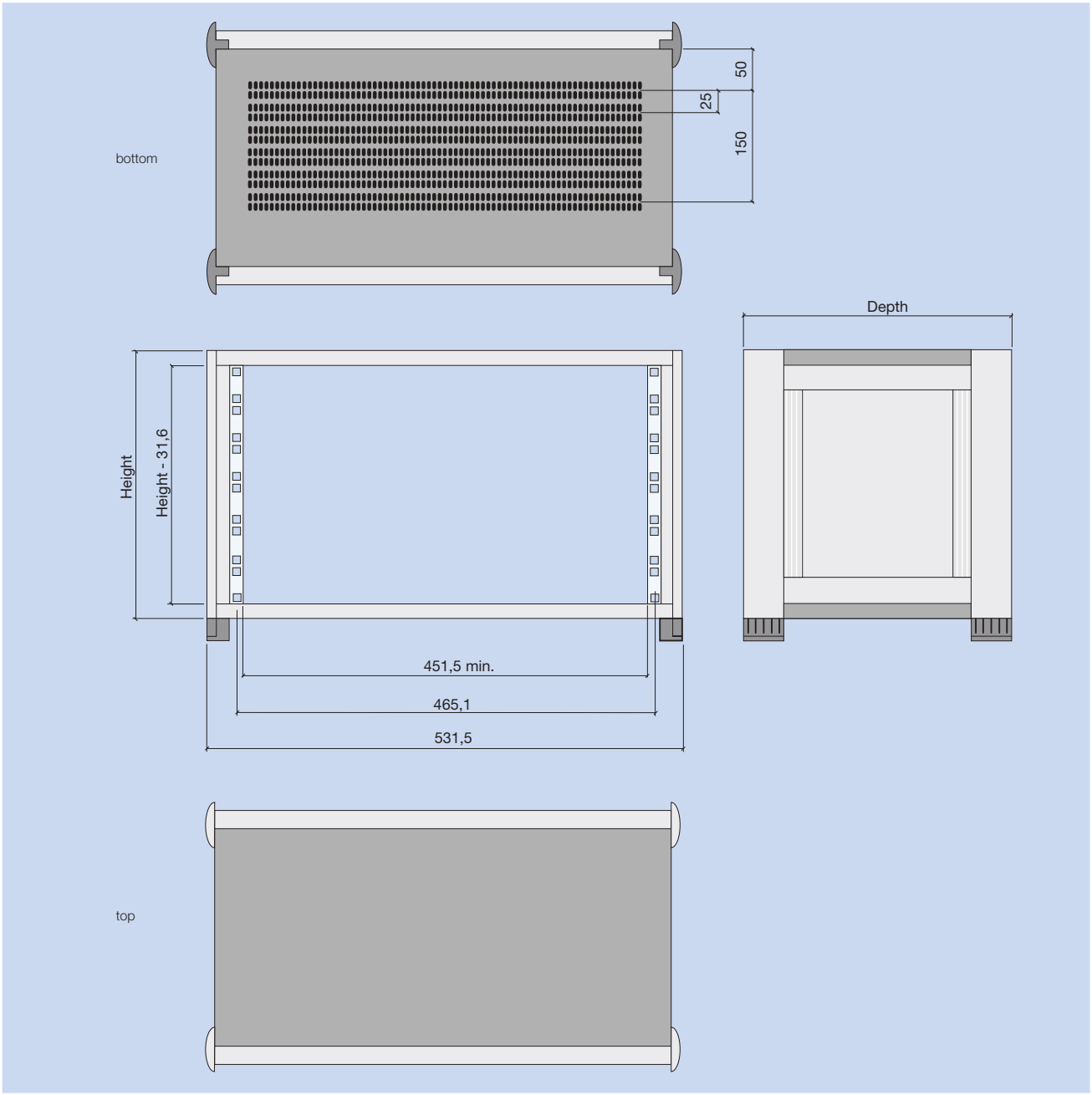
InterMeZo Housing



InterMeZo Housing

Housing	pieces _____
Dimension	height: ❑ 3 U ❑ 6 U width: ❑ 84 HP ❑ 42 HP depth: ❑ 300 mm ❑ 400 mm ❑ 500 mm ❑ other: height: ____ U or _____ mm width: ____ HP or _____ mm depth: _____ mm
Design	❑ design front ❑ front ❑ rear ❑ functional front ❑ front ❑ rear
Color casing, side wall	❑ RAL DS 7000 ❑ RAL_____
Color rear wall, panels	❑ RAL DS 5500 ❑ RAL_____
Louvers in	❑ bottom panel ❑ top panel ❑ rear panel
Front	❑ **Casing door** ❑ **Plexiglass door** ❑ **Front panel** ❑ anodized ❑ RAL _____
19" unit support	❑ front ❑ rear
Protection class	❑ IP _____
RFI-shielding	❑
Accessories	❑ **Rear panel** ❑ **Wheels** ❑ **Carry handles** ❑ **Side bars** ❑ **Subplate** ❑ **Mounting material for subrack and front panels** kit_____ pieces
Notes	_____ _____ _____ _____

Please ask your local representative for your
individual system configuration
You find your contact person on our homepage:
www.intermas-el.com



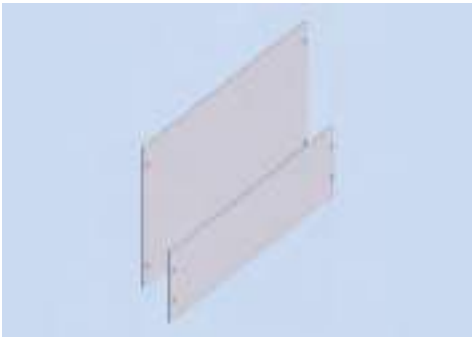
Ordering details for assembled *InterMeZo* housings

nom. height [U]	height [mm]	width [mm]	depth [mm]	*design-front* order no. **409.**	*functional-front* order no. **409.**
3	165.60	531.50	300	**166 208**	-
3	165.60	531.50	400	**166 209**	**166 217**
4	210.05	531.50	400	**166 210**	-
6	298.95	531.50	400	**166 211**	**166 218**
6	298.95	531.50	500	**166 212**	-
7	343.40	531.50	400	**166 213**	-
9	432.30	531.50	400	**166 214**	**166 219**
9	432.30	531.50	500	**166 215**	-
12	565.65	531.50	500	**166 216**	**166 220**

Delivery:
Housing frame with side panels,
top closed,
bottom panel with louvers
4 feet,
2 unit supports

Delivery:
The housing is delivered assembled and painted.

InterMeZo Housing Accessories



19” Front Panels

Material: aluminum 3 mm thick
Finish: anodized

Ordering details for 19” front panels

nom. height [U]	order no. **409.**
3	**086 513**
4	**086 514**
6	**086 516**
7	**086 517**
9	**086 519**
12	**086 522**

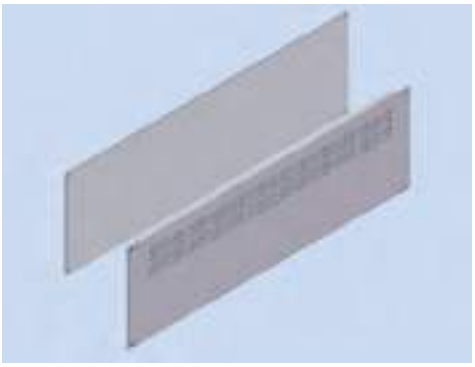
19” Casing Door

Kit consists of:
1 casing door with plexiglass pane
1 lock
2 hinges
Installation hardware

Delivery:
As complete assembled casing door.

Ordering details for 19” casing door

nom. height [U]	order no. **409.**
3	**110 452**
4	**110 453**
6	**110 454**
7	**110 455**
9	**110 456**
12	**110 457**



Rear Panel, closed

Material:
aluminum 2.5 mm thick

Finish:
front side anodized,
rear side conductive

Rear Panel with Louvers

Material:
steel 0.8 mm thick
Finish:
front side RAL DS 5500,
rear side conductive

Ordering details rear panel

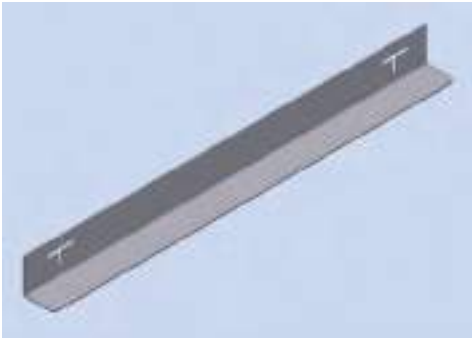
nom. height [U]	closed order no. **409.**	with louvers order no. **409.**
3	**109 984**	**111 556**
4	**109 985**	**111 557**
6	**109 986**	**111 559**
7	**109 987**	**111 560**
9	**109 988**	**111 561**
12	**110 392**	**111 562**

Accessories

Taptite screw M4x10

Minimum order quantity 100 pieces

order-no.: **409. 110 395**



Slide Bars

Kit consists of:
2 slide bars
Installation hardware

Material:
1.5 mm galvanized sheet steel

Finish:
passivated

Ordering details kit

	for housing-depth [mm]	order no. **409.**
slide bar	300	**111 285**
slide bar	400	**111 286**
slide bar	500	**111 287**

RFI-Shielding

Material: stainless steel

Ordering details RFI-shielding-kit for rear/front panel

nom. height [U]	order no. **409.**
3	**110 360**
6	**110 361**
9	**110 366**
12	**110 367**

Ordering details RFI-shielding-kit for cover plates

depth [mm]	order no. **409.**
300	**110 368**
400	**110 370**
500	**110 372**

Unit Support

Kit consists of:
2 unit supports and
Installation hardware

Ordering details for unit support kit

nom. height [U]	order no. **409.**
3	**110 375**
4	**110 376**
6	**110 378**
7	**110 379**
9	**110 381**
12	**110 382**

Mounting material for subracks and front panels in housing

Screw Locking M6
Color: black
Material: POM
Minimum order quantity 10 pieces
order no.: **409. 074 387**

Oval Head Screw
M6 x 16 DIN 7985
steel, nickel plated
Minimum order quantity 10 pieces
order no.: **409. 013 919**

Cage Nut
steel, galvanized
Minimum order quantity 10 pieces
order no.: **409. 131 652**

Castors

Kit consists of:
2 mounting angles
4 castors
Installation hardware

Ordering details for castor kit

	housing-depth [mm]	order no. **409.**
castors 300	300	**112 092**
castors 400	400	**112 093**
castors 500	500	**112 094**

Castors are not retrofit
Please order with housing.

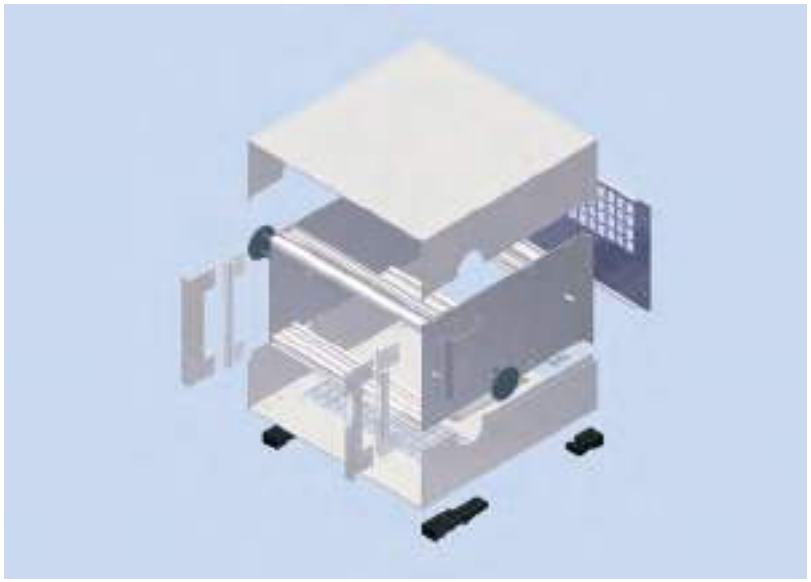
Carry Handles

Kit consists of:
2 handles
Installation hardware

Color: RAL DS 7000

order no.: **409. 112 507**

InterCase Desktop Housing



Description

The special design features of the *InterCase* desktop housing:

√ A desktop housing with a simple design for standardized plug-in units and individual assemblies.

√ The easy to access design allows all covering parts to be removed at any time.

√ The bottom cover and the rear panel are provided with louvers.

√ The side plates include perforations for attaching profile rails at different board depths.

√ The comprehensive range of Intermas subrack accessories allows individual

√ Can be RFI-shielded.

Technical Data

Material	Aluminum feet: plastic
Finish	side plates: blank side panels and rear panel: painted feet: black

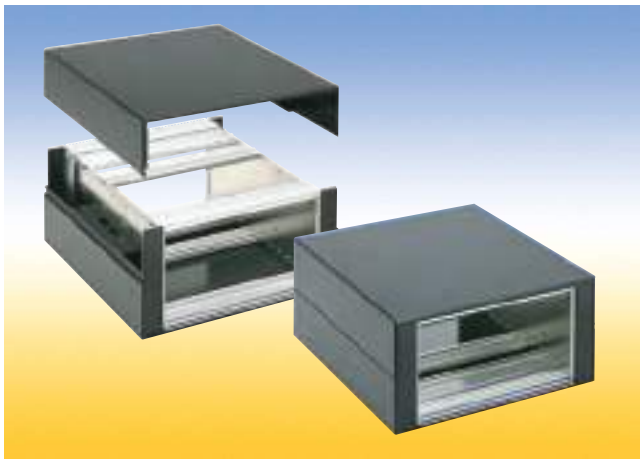
Delivery:

2 top/bottom panels
2 side plates
2 side panels
4 pr ont/rear
1 pr ear middle
(only for 6 U)
1 rear panel
2 covers
2 mounting angles
4 threaded strips
(6 for 6 U)
1 foot kit
(1 carrying handle)
Installation hardware

Ordering details *InterCase* desktop housing

nom. height [U]	width [HP]	nom. depth [mm]	total depth [mm]	order no. **409.**	with carrying handle-order no. **409.**
3	42	160	260	**172 610**	**172 548**
3	42	220	320	**172 620**	**172 621**
3	84	160	260	**172 630**	**172 631**
3	84	220	320	**172 640**	**172 641**
6	84	160	260	**172 650**	**172 651**
6	84	220	320	**172 660**	**172 661**

InterLock Desktop Housing



Material: Polystyrene 6 mm thick
Color: black

Delivery:
The *InterLock* desktop housing is delivered in single parts.

Set consists of:
1 top-shell
1 bottom-shell

Description

The *InterLock* desktop housing has been designed to cover subracks. Also System-Module can be dressed up.

The special design features of the *InterLock* desktop housing:

√ The covering elements are formed from recyclable polystyrene plate-material warmly and the joints are welded together by means of a chlorine carbon solution coldly.

√ Material strength of 4 to 10 mm can be processed according to demand of the device.

√ Easy assembly or disassembly of the case shells. Both case shells are locked by a clamp groove without screws.

√ The case is upgradeable by feet and handles.

√ However, on account of an economic manufacturing technology special dimensions or special colors can be also already realised for small quantities at a reasonable price.

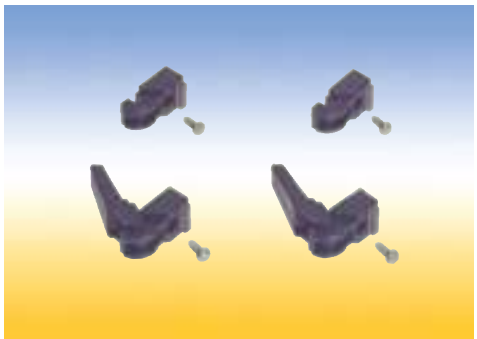
√ Extensive range of accessories is available.

Ordering details kit - *InterLock* desktop housing

nom. height [U]	width [HP]	nom. depth [mm]	order no. **409.**
3	42	220	**168 935**
3	84	220	**168 936**
6	84	220	**168 937**

Ordering details for compatible subrack kits

	nom. height [HE]	width [HP]	PCB depth/ nom. depth [mm]	order no. **409.**
Subrack *FLEXIBLE Fi-alpha* prepared for RFI	3	42	160/220	**133 306**
Subrack *FLEXIBLE Fi-alpha* prepared for RFI	3	84	160/220	**133 307**
Subrack *FLEXIBLE Fi-alpha* prepared for RFI	6	84	160/220	**133 308**



Accessories *InterLock*

Foot kit:
2 feet without tip-up
2 feet with tip-up
4 lens head screws with nut

Material: Ultramid
Color: black

Foot kit

order-no.: **409. 133 305**

Accessories other housings

Foot kit:
2 feet without tip-up
2 feet with tip-up
4 self-tapping screws

Material: Ultramid
Color: black

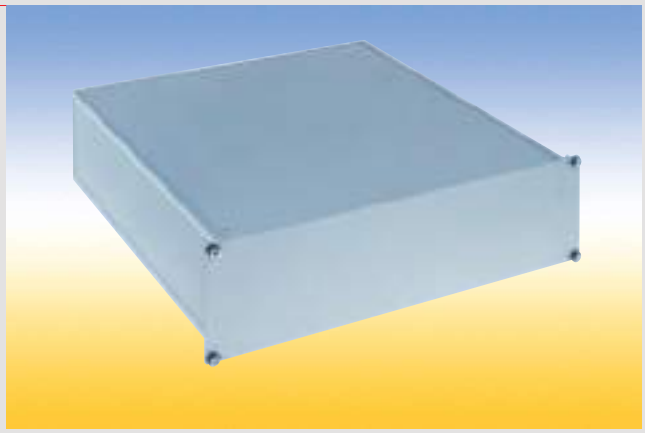
Foot kit

order-no.: **409. 059 640**

Housings for small form factors

DiVar Housing

- √ 19” rack mounted for customized housing
- √ Unrestricted configuration and installation
- √ Cover plates removable

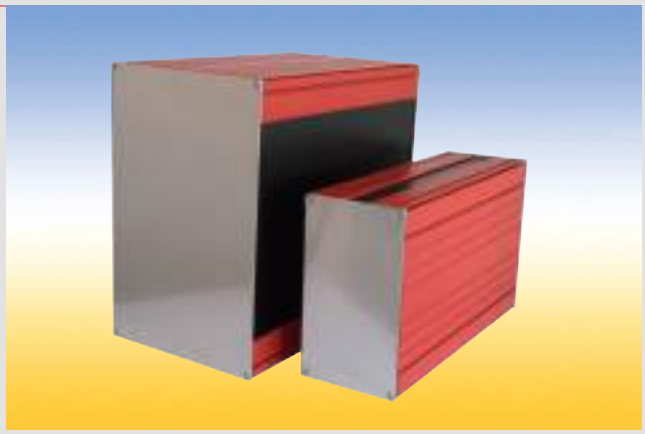


InterShell Housing

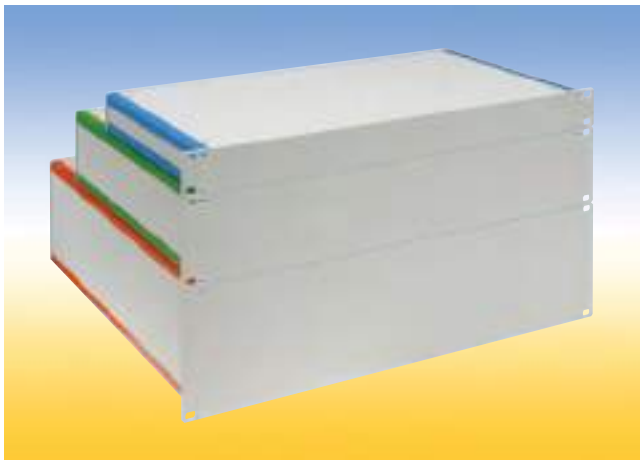
- √ Customized adjustments
- √ Quick and uncomplicated installation
- √ Individual color design

InterShell IP Housing

- √ Custom specific adjustments
- √ Quick and uncomplicated installation
- √ Protection class up to IP 65



DiVar Housing



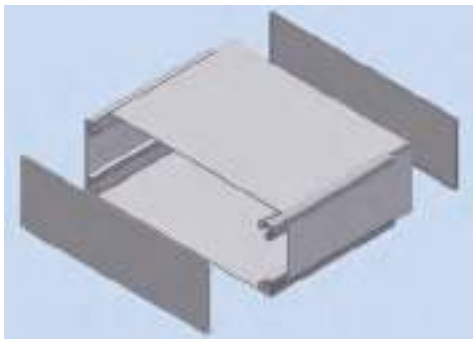
Painting examples of the DiVar housing

Technical Data

Material	aluminum
Finish	profiles: blank cover plates, front panel and side plates: front: anodized, rear: conductive

Delivery

The *DiVar* housing is delivered unassembled as individual parts or as a kit



DiVar housing as individual housing

Description

The special design features of the *DiVar* housing:

√ It consists of profiles into which aluminum, sheet steel, stainless steel or plastic panels with a thickness of 1.5 to 2.5 mm are inserted and, if desired, secured with screws. A wall panel at the rear and a panel at the front are screwed to the profiles.

√ The flexible design allows variable configuration of the housing geometry in all three axes, this allowing adaptation of the housing to customer-specific requirements.

√ Different surfaces can be selected for an individual appearance.

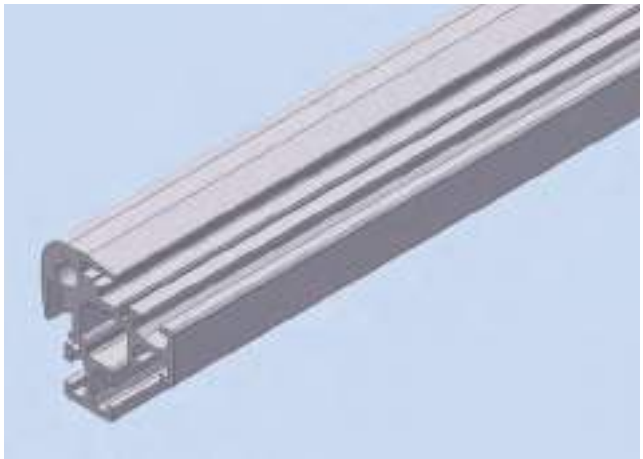
√ The proven RFI contact spring concept ensures optimum RFI shielding.

√ Rails with threaded holes can be pressed into the profile grooves, for example to screw in PCBs or mounting plates.

√ The extensive range of Intermas accessories allows unrestricted configuration and installation of both standardized and non-standard components.

The housing can be supplied in 4 versions:

1. Customized housing
2. 19“ rack mounted
3. Desktop housing with a keyboard area
4. Desktop housing with a continuous slanting surface



Multifunctional Profile *DiVar*

Material: aluminum
Finish: blank

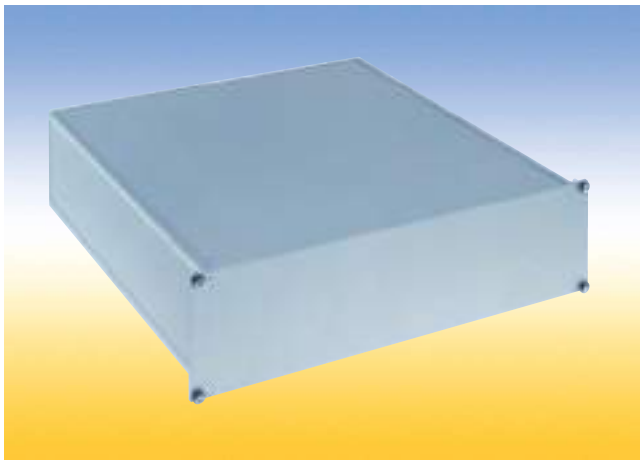
Length: 1000 mm

order no.: **409. 121 808**

Accessories

RFI-spring F3
Length: 399.64 mm

order no.: **409. 111 774**

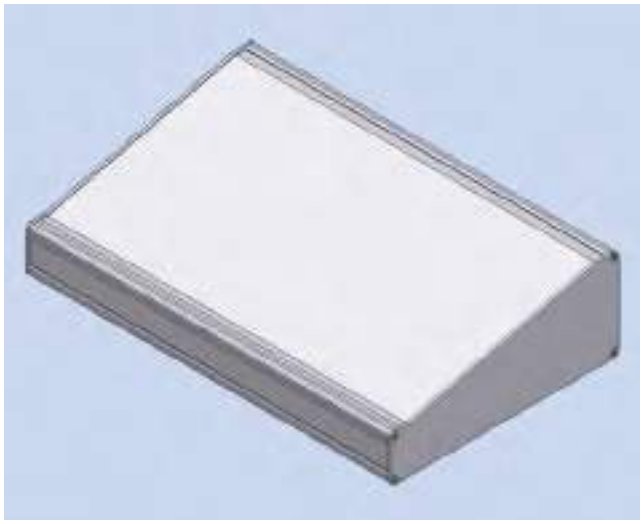


DiVar Housing as rack mounted version

Delivery
4 profiles
4 cover plates
1 19“ front panel
1 rear panel
Assembly hardware

Ordering details
***DiVar* housing as rack mounted version**

nom. height [U]	width [HP]	depth [mm]	order no. **409.**
1	84	250	**122 356**
2	84	350	**122 357**
3	84	450	**122 358**

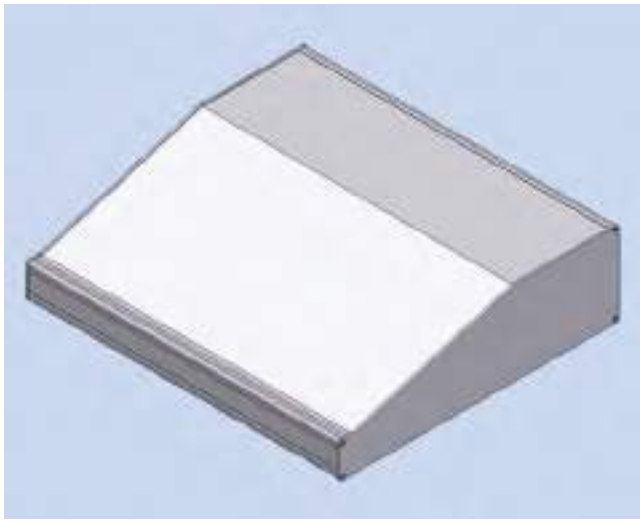


DiVar Desktop Housing

Delivery
4 profiles
4 cover plates
2 side plates
Assembly hardware

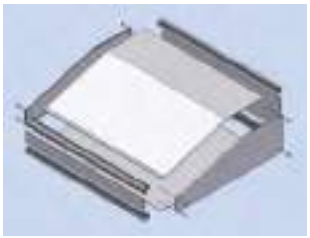
Ordering details
***DiVar* desktop housing**

height [mm]	width [mm]	depth [mm]	order no. **409.**
50/100	400	250	**122 359**



DiVar Desktop Housing with keyboard area

Delivery
4 profiles
4 cover plates
2 side plates
Assembly hardware

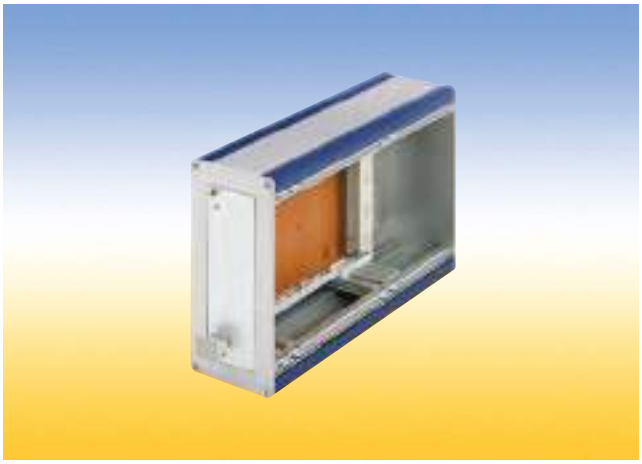


Ordering details
***DiVar* desktop housing with keyboard area**

height [mm]	width [mm]	depth [mm]	order no. **409.**
50/120	450	250/150	**122 360**

DiVar Housing Examples

DiVar housing as covered subrack 3 U - 84 HP - 160 mm depth



DiVar housing as covered cassette 3 U - 8 HP - 160 mm depth

DiVar housing for instrumentation

Please ask your local representative for your
individual configuration.
You find your contact person on our homepage:
www.intermas-el.com

Painting examples of the *InterShell*

Material: Aluminium

Surface : top-shell and bottom-shell
RAL 9006 white aluminum
front panel RAL 9005 - black

Set consists of:
1 top-shell
1 bottom-shell
2 front panels
4 countersunk screw

Delivery:
The *InterShell* housing will be delivered fully assembled and painted.

Description
The aluminium housing *InterShell* allows individual customer requirements in the context of Small Form Factors and has the following characteristics:

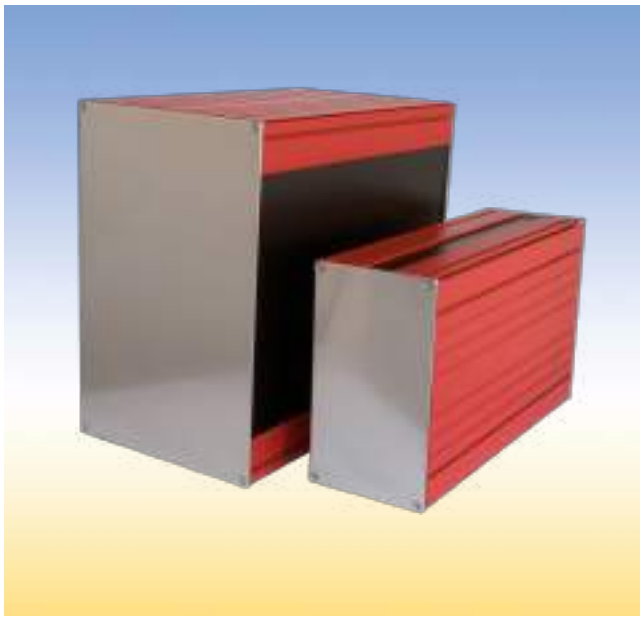
- √ Flexible design in all three axes.
- √ Quick and simple assembly due to its simple setting.
- √ Adapted for packing small electronic units like
  - euroboards in 100 x 160 (mm)
  - customer-specific requirements
  - mITX boards.
- √ Protection classes up to IP 40.
- √ EMC-compatible.
- √ A wide range of surfaces allows individual colour design.
- √ Additional imprints according to customers requirements are available.
- √ Expandable with adhesive mounting feet.

Order details *InterShell* housing

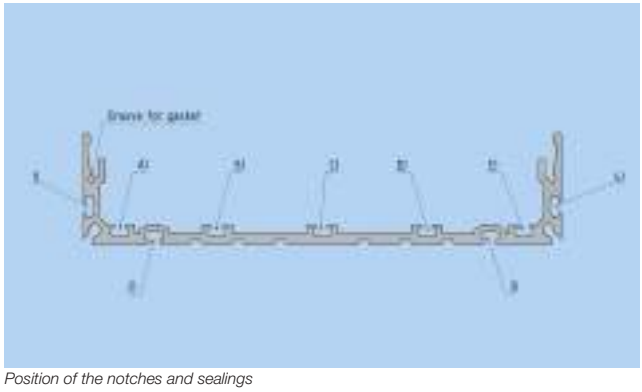
Usage	height [mm]	width [mm]	depth [mm]	order no. **409.**
Euroboard 100 x 160 [mm]	40	106,6	168,2	**138 020**
Universal	60	150	170	**138 021**
mITX board, fastening points included	50	190	190	**138 022**

Accessories	order no. **409.**
housing foot 12,7 x 12,7 x 3,1[mm] PU, black	**137 981**
housing foot 12,7 x 12,7 x 5,8[mm] PU, black	**137 982**

Housing *InterShell IP*



Painting examples of the InterShell IP



Position of the notches and sealings

Delivery :
The housings are delivered unassembled as kits. They are packed - depending on quantity - either as kits or same parts packed together.

Upon request, the housings can also be delivered completely assembled and wired according to your requirements.

Description

The *InterShell IP* - perfect heavy duty housing.
For euroboard cards and customised electronic applications.
Due to its robustness and tightness up to IP65 it is particularly suitable for mobile applications in the outdoor area as well as desk housing for
for measuring and test equipment. It is also possible to use the interior for subrack 3HE 42TE.

The small housing *InterShell IP* stands out due to its particular constructive features:

√ The notches outside of the profile can be used for threaded strips (pos. 1-4) or for fittings like clip-angle or stock mounting.

√ The notches internal the profile (5x, pos. A-E) are used for threaded strips and for additional parts like card guides.

√ Alternative surface treatments, e.g. colorless passivation or varnishing of all visible surfaces are possible.

√ Front panel and rear panel are made of 3mm metal sheed. On request, cut-outs for connectors as well as individual printing are possible.

√ Sidewall, front and back panel are made of bright sea water resistant aluminum. Surface treatments are also possible.

√ Front and rear panel are each fitted with 4 countersunk screws.

√ A sealing (ø2mm) can be inserted between the profile and the plugged-in side panel to protect against extraneous particles and splashed water.

√ The use of high-quality silicone sealings provides an optimal protection against foreign particles and moisture.

√ Optionally, two conductive variants of sealings are available in order to obtain an optimal EMC-shielding

- Silicone filled with particles of nickel-plated graphite
- Fluorosilicone filled with conductive particles of silver-plated aluminum

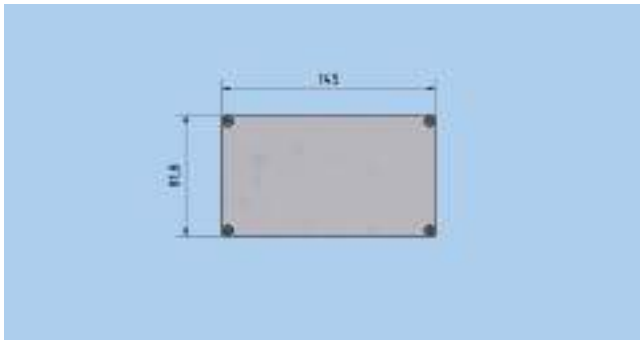
√ Feet-kit is available as an option and can be ordered separately.

Housing *InterShell IP*

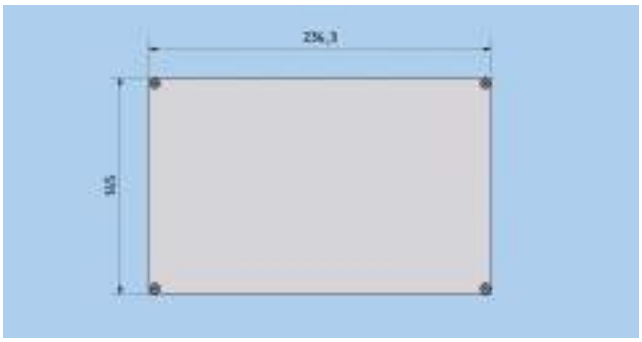
Technical Data

Dimensions	Small housing W 145 mm, H 81,8 mm basic Small housing for subrack 3 U-42 HP, W 234,3 mm, H 145 mm
Usable depth	150, 200, 250 mm (inner dimensions)
Materials	Screws: stainless steel, Assembled and threaded strips: steel or stainless steel profile and side panel: aluminium
Surface	Aluminium parts: blank or colorless passivated Steel parts: galvanized and colourless chromated
Protection class	IP 65 with sealing, otherwise IP43
Temprature range	-35 °C to +80 °C with sealing, otherwise -55 °C to +160 °C
Protective earthing	After assembly all metal parts have an electrically conductive interconnection acc. to VDE 100/12.65, § 6 Nb.

Dimension



Housing InterShell IP basic



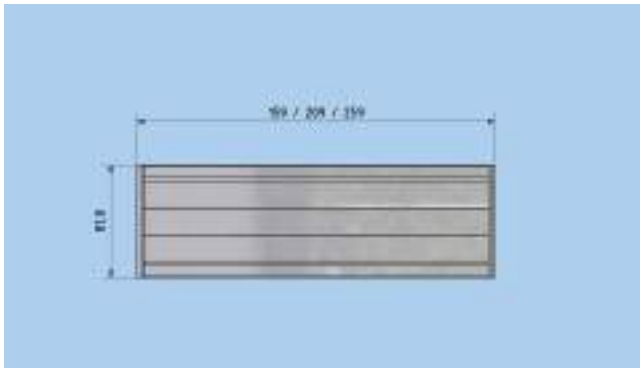
Housing InterShell IP for subrack 3 U 42 HP

Version 1
Housing *InterShell IP* basic

Dimension front panel/rear panel
Width 145 mm
Height 81,8 mm

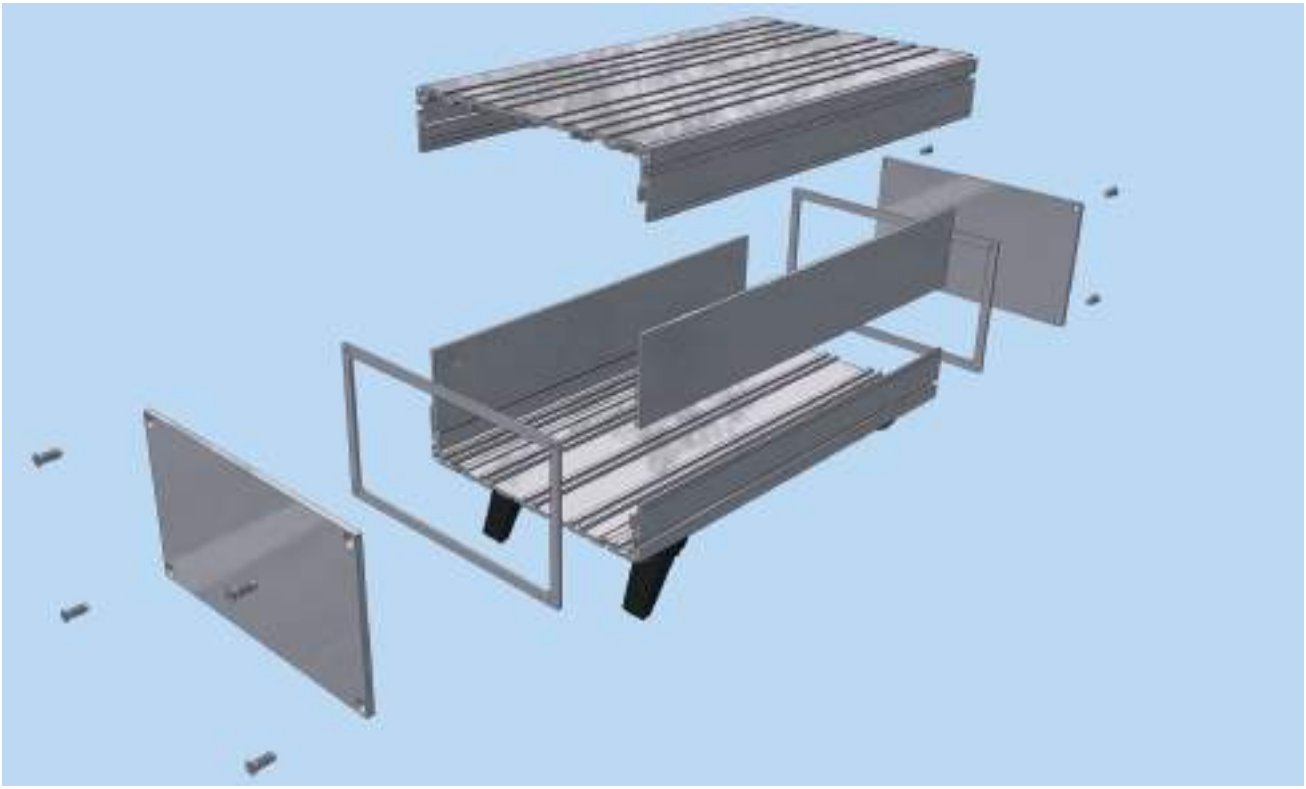
Version 2
Housing *InterShell IP* for subrack 3 U-42 HP

Dimension front panel/rear panel
Width 234,3 mm
Height 145 mm



Housing InterShell IP basic

Housing *InterShell IP*



Version 1
Small housing *InterShell IP* basic

Ordering details

	Order-no. **409.**
Depth dimensions 250 mm	**180 910**
Depth dimensions 200 mm	**180 965**
Depth dimensions 150 mm	**180 967**

Scope of delivery

	pieces per kit 250 mm	pieces per kit 200 mm	pieces per kit 150 mm
Half-shell l = 250 mm	2	-	-
Half-shell l = 200 mm	-	2	-
Half-shell l = 150 mm	-	-	2
Countersunk screw M 4 x 10	8	8	8
Cellular rubber Ø 2 mm	1 m	0,8 m	0,6 m
Side panel l = 250 mm	2	-	-
Side panel l = 200 mm	-	2	
Side panel l = 150 mm	-	-	2
Front panel / back panel	2	2	2
Sealing for housing	2	2	2

Version 2
Housing *InterShell IP* subrack 3 HE-42 TE

Ordering details for kits

	Order-no. **409.**
Depth dimensions 250 mm	**180 911**
Depth dimensions 200 mm	**180 966**
Depth dimensions 150 mm	**180 968**

Scope of delivery

	quantity in kit 250 mm	quantity in kit 200 mm	quantity in kit 150 mm
Half-shell l = 250 mm	2	-	-
Half-shell l = 200 mm	-	2	-
Half-shell l = 150 mm	-	-	2
Countersunk screw M 4 x 10	8	8	8
Cellular rubber Ø 2 mm	1 m	0,8 m	0,6 m
Roof panel/floor panel l = 250 mm	2	-	-
Roof panel/floor panel l = 200 mm	-	2	
Roof panel/floor panel l = 150 mm	-	-	2
Front panel/back panel 3 U 19”	2	2	2
Sealing for housing 3 U 42 HP	2	2	2

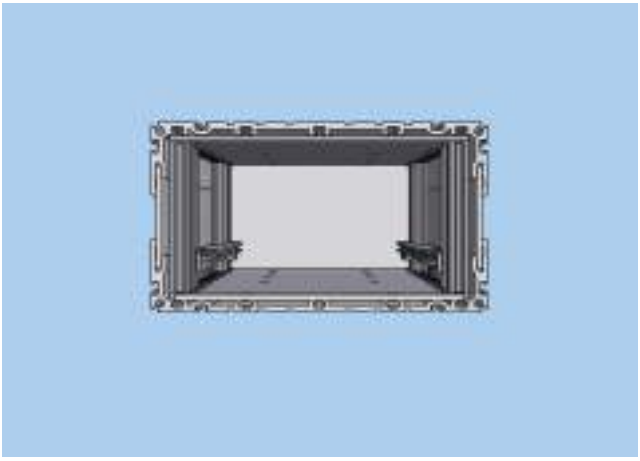
The silicon sealings are included in the basic kit.
Sealings made of conductive material must be ordered separately.

Sealings
Ordering details conductive sealing

	Fluorosilicone filled with conductive particles of silver-plated aluminum. order-no. **409.**	Silicone filled with particles of nickel-plated graphite. order-no. **409.**
Version 1 Housing *InterShell IP* basic	**180 913***	**180 914***
Version 2 Housing *InterShell IP* subrack 3 HE-42 TE	**180 918***	**180 919***

*Remark! Two seals are required per enclosure!

Housing *InterShell IP*
Kit to install 19 inch standard parts

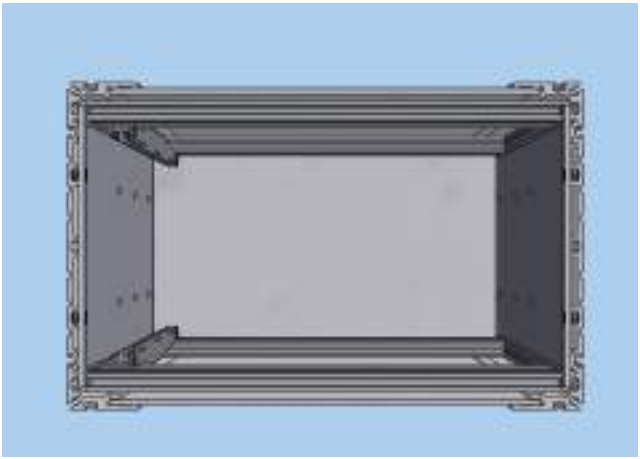


Housing InterShell IP basic

Assembly kit 19 inch standard parts
Housing *InterShell IP*

Scope of delivery

	quantity in kit
side panel 3 U - 220	2
profile rail U 2 13 HP	4
countersunk screw M 4 x 10	8
stop bar	2
threaded strip M 2,5 x 12 HP	4
countersunk screw M 2,5 x 6	4
square nuts M 2,5	4



Housing InterShell IP for subrack 3 U 42 HP

Assembly kit 19 inch standard parts
Housing *InterShell IP for* subrack 3 U-42 HP

Scope of delivery

	quantity in kit
side panel 3 U - 220	2
profile rail U 2 13 HP	4
countersunk screw M 4 x 10	8
stop bar	2
threaded strip M 2,5 x 42 HP	4
countersunk screw M 2,5 x 6	4
square nuts M 2,5	4

Ordering details kits

	order-no. **409.**
Assembly kit 19 inch standard parts basic *InterShell IP*	**180 978**
Assembly kit 19 inch standard parts *InterShell IP for subrack* 3 U-42 HP	**180 979**

Both kits are only suitable for housing depths of 250 mm.

Housing *InterShell IP* Accessories

Housing feet

Foot kit

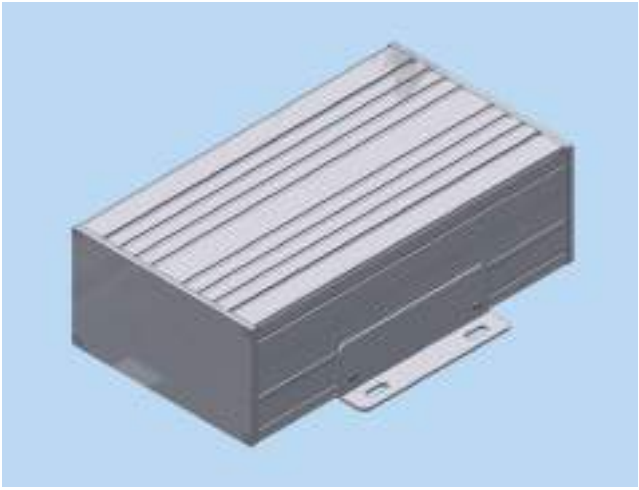
4 Feet without put-up hinge
2 put-up hinge with rubber
4 head screw M 3 x 8
4 washer A 3,2
4 square nut M 3

Material: ultramid
Color: black

Ordering details for kit

	order no. **409.**
Foot kit	**180 982**

Alternative: a kit with 4 adhesive feet is available.



Ground mounting

Version 1: Kit for basic housing

2 mounting angle
4 head screw M 3 x 5
4 square nuts M 3

Version 2: Kit for 3U-42HP

1 mounting angle right 3 U
1 mounting angle left 3 U
4 head screw M 3 x 5
4 square nut M 3

Material: aluminium
Surface: blank

Ordering details for kit

	order no. **409.**
ground mounting	**180 969**
ground mounting 3 U 42 HP	**180 970**

Both kits are suitable for housing depths of 250/200/150 mm

Handle

Scope of delivery

2 countersunk screw M 4 x 12
1 handle 3 U

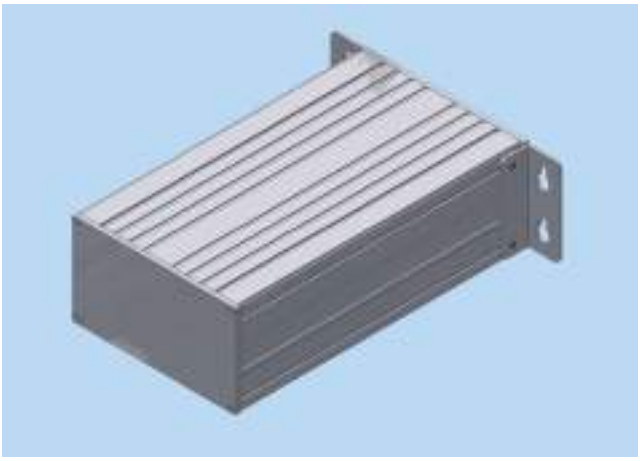
Material: aluminium
Surface: anodized

Ordering details for kit

	order-no. **409.**
handle kit	**180 974**

Kit only for *InterShell IP* basic version available.
Other handles on request.

Housing *InterShell IP* Accessories



Wall mounting

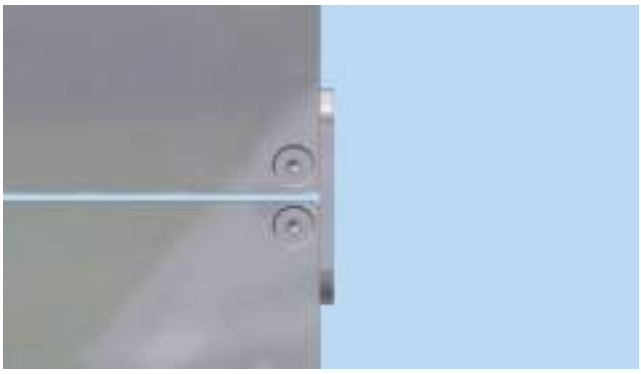
Version 1: Kit for basic housing
1 mounting angle right
1 mounting angle left
4 head screw M 3 x 5
4 square nut M 3

Version 2: Kit for 3 U-42 HP
1 mounting angle right 3 U
1 mounting angle left 3 U
4 head screw M 3 x 4
4 square nut M 3

Material: aluminium
Surface: blank

Ordering details for kit

	order no. 409.
wall mounting kit	**180 972**
wall mounting kit for 3 U 42 HP	**180 973**



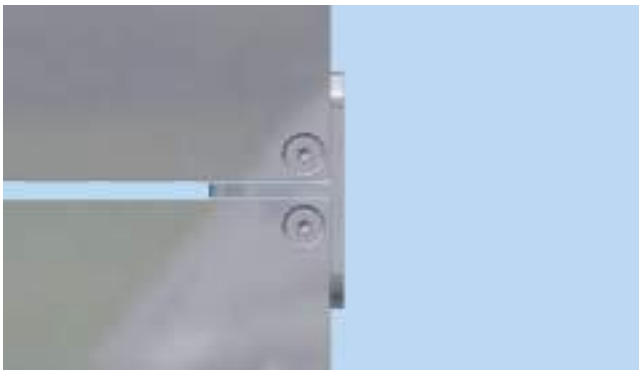
Angle for stacking

Stock mounting and stock mounting heavy version

scope of delivery for kit
2 mounting plate
8 head screw M 3 x 5
8 square nut M 3

scope of delivery for kit heavy version
2 mounting plate heavy version
8 head screw M 3 x 5
8 square nut M 3

Material: aluminium
Surface: blank

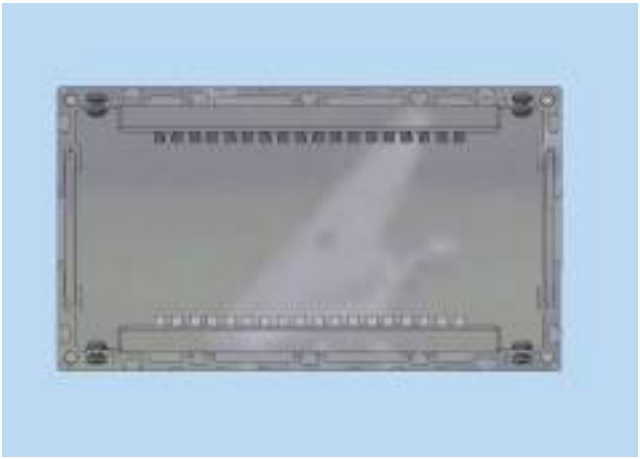


Angle for stacking - heavy version

Ordering details for kit

	order no. 409.
mounting angle	**180 975**
mounting angle heavy	**180 976**

Both kits are suitable for housing depths of 250/200/150 mm
Both kits are only available for InterShell IP basic structure.



Card guide 2 U vertikal

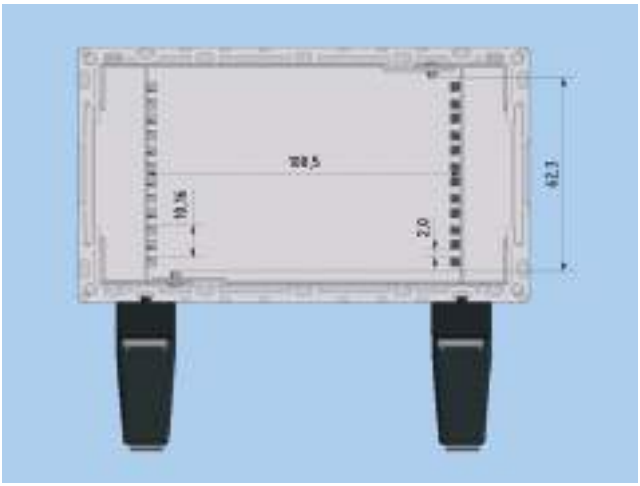
Scope of delivery - depth 250/200 mm
2 card guide vertikal 2 U für depth 250/200 mm
12 head screw M 3 x 4
12 square nut M 3

Scope of delivery - depth 150 mm
2 card guide vertikal 2 U für depth 150 mm
12 head screw M 3 x 4
12 square nut M 3

Material: steel
Surface : galvanised

Ordering details for kit

	order no. **409.**
Kit card guide 2 U 250/200 mm	**180 971**
Kit card guide 2 U 150 mm	**180 981**



card cage (horizontal framing for circuit boards as Euro-card format)

Scope of delivery horizontal
1 card cage komplett
6 head screw M 2,5 x 4
2 threaded strip M 2,5 x 39 TE anreihbar

Material: steel
Surface : galvanized

Ordering details for kit

	order no. **409.**
Kit card cage	**180 977**

Kit only suitable for housing depths of 250 mm.
Kit only available for *InterShell IP* basic construction.

Technical changes and errors reserved.

Intermas Subracks

Subrack *FLEXIBLE*

- √ Simple and fast assembly
- √ All-purpose
- √ RFI shielding can be added later

Subrack *RFI-SHIELDED*

- √ High shielding effectiveness
- √ Individual internal layout
- √ Complies with the latest IEEE standards
- √ For VME / VME64x

Subrack *InterRail*®

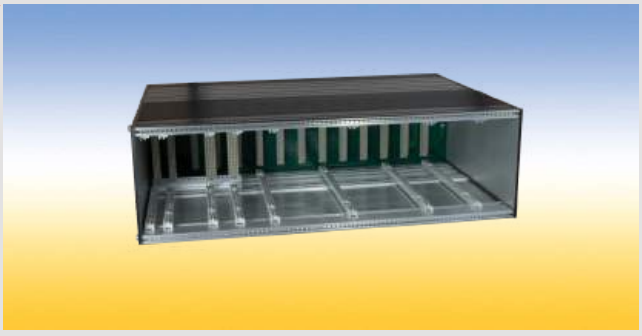
- √ For tough physical demands
- √ Vibration-proof
- √ For use e.g. in railway engineering, traffic engineering, power station engineering

System-Modules CompactPCI

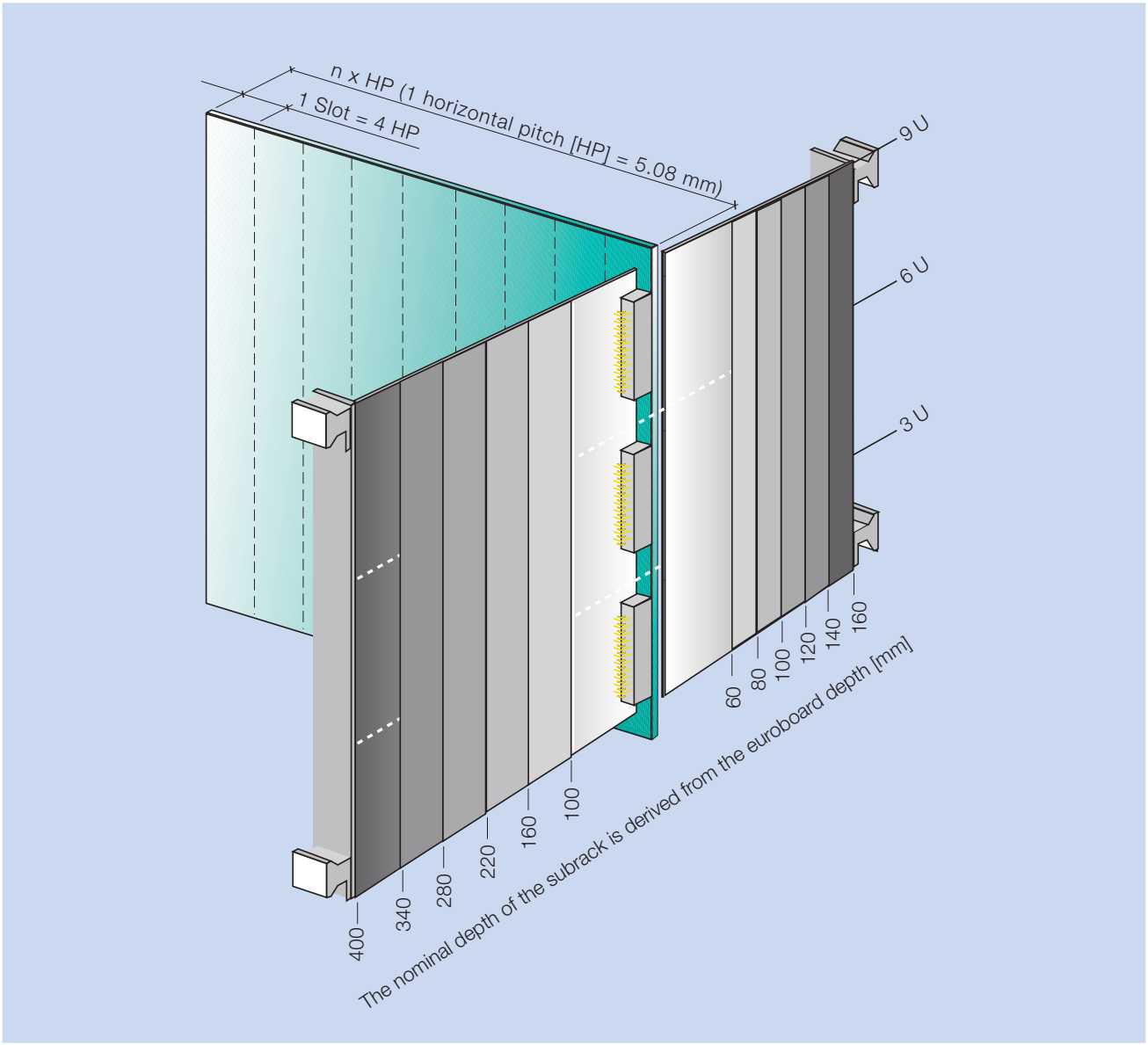
- √ Integrated bus board
- √ Integrated power supply unit
- √ Wired and tested
- √ Optionally with active cooling

Subrack *InterProtect*®

- √ Shock and vibration resistant
- √ Water and dustproof
- √ Optimal HF-tightness



Systematics of the Intermas Subracks



Systematics

The illustration shows the systematics of the height, depth and width pitches of the Intermas-subracks.

The height of the subracks are in Units [U].
1 U is aquivalent to 44.45 mm.

The nominal depth of the subracks is derived from the euroboard depth. Front inserted PCB's are generally specified in 60 mm-steps and for rear stucked PCB's in 20 mm-steps.
For Intermas subracks depths in 10 mm-steps can be realized.

The width pitch is stated in horizontal pitches [HP].
1 HP is aquivalent to 5.08 mm.

Busboards are specified in slots.
1 Slot is aquivalent to 4 HP = 20.32 mm.

Structual Shapes of Subracks

There are three structural shapes, different in the wiring field.

1. Type *alpha*

The rear profiles are suitable for mounting any appropriate wiring carrier, e. g. bus and connector securing devices, used with insulation strips or Z-rails for mounting connectors according to DIN 41 612.

2. Type *beta*

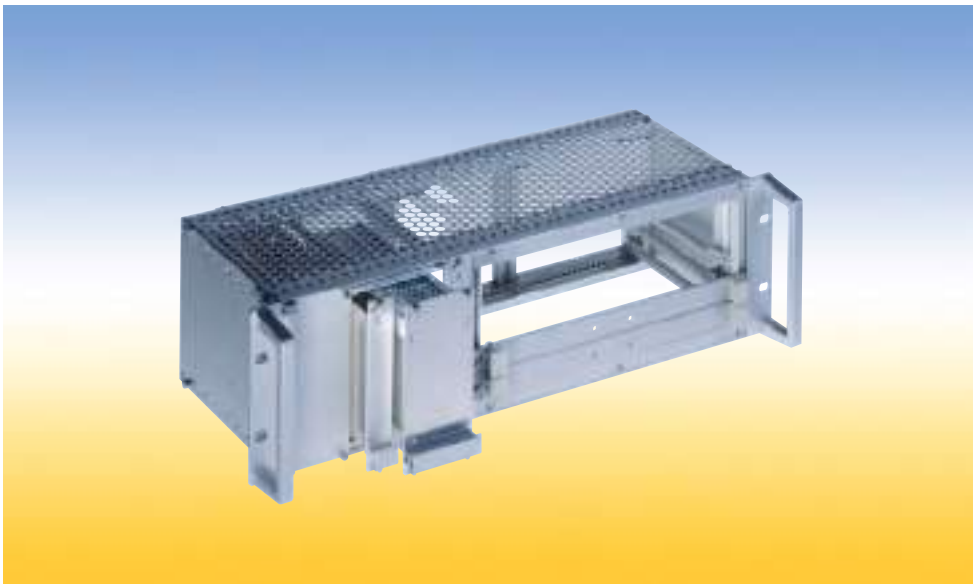
The rear profiles with integral Z-rail are suitable for the direct mounting of connectors to DIN 41 612.

3. Type *delta*

The rear profiles are 2.6 mm deeper than in the type alpha, permitting direct mounting of multilayer backplanes and/or connector securing devices for mounting of DIN-connectors.

Please ask your local representative for your
individual system configuration.
You find your contact person on our homepage:
www.intermas-el.com

Subrack *FLEXIBLE*



Description
The special design features of the subrack *FLEXIBLE*:

√ For mounting of the profile rails the side wall is perforated with a grid of 10 mm to allow installation of modules in depth steps of 10 mm. This results in a flexible amount of free space behind the wiring level or in front of the operating level.

√ The profile rails are connected to the side wall at the front using a special screw which ensures electrical bonding of the parts via a ring cutter under the head.

√ The front and rear profile rails can be interchanged such that the wiring level which is normally at the rear can be implemented at the front of the subrack.

√ The extensive range of accessories allows individual configuration.

√ Fast and simple assembly:
Easy positioning of the profile rails thanks to raised embossing on the side wall.

√ There are 2 versions of this subrack:

1. The *FLEXIBLE Fi* subrack (with an integrated flange)
The combination of the side wall and mounting flange form a single unit. This is the simple and cost-effective version. This standard version can not be shielded.

2. The *FLEXIBLE Fs* subrack (with a separate flange)
The side wall and flange are separate components, so the flange can be screwed to the side panel at the front or the rear.

Advantages:

- Even if the flange is detached and repositioned from the front to the rear the subrack remains a physical unit and is thus also suitable for direct wall mounting.

- This version can be converted to an RFI-shielded subrack with little effort.

Mixed forms
For vertical mounting PCB's of varying heights, divider kits are available.

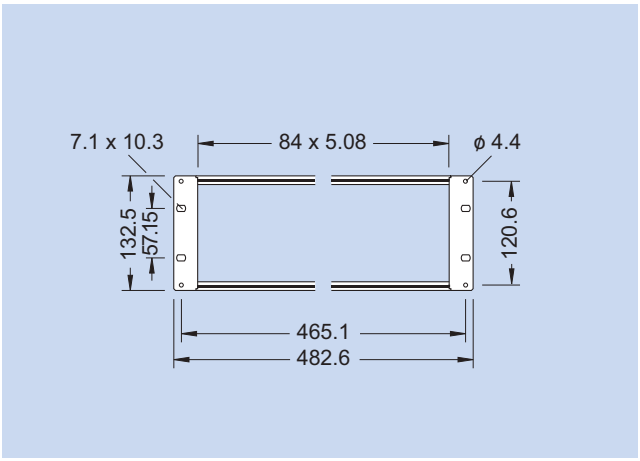
Delivery
Supplied as unassembled kits.
These are either packed as a kit of parts for one unit or as individual components, whereby parts of similar type are packed together.

On request, delivered as assembled and wired subrack according your requirements.

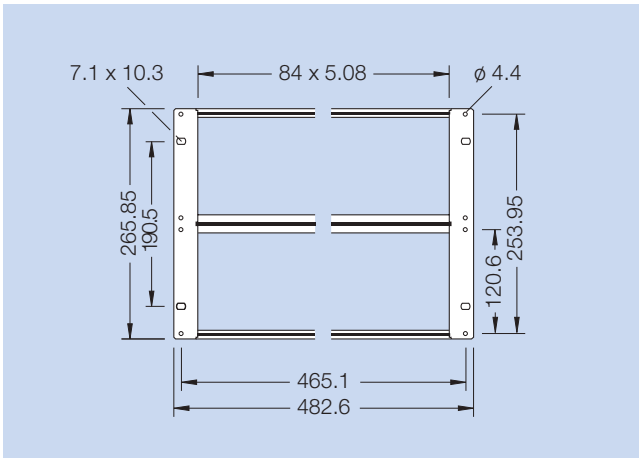
Technical data

Standards	compliant with DIN 41 494 D IEC 60297
width / horizontal pitch	84 usable HP / 5.08 mm
Depth of the inserted board	160, 220, 280 mm (nom. depth)
Depth increment-side panel	10 mm
Connector mounting	M 2.5 in increments of 5.08 mm for DIN 41612, VG 95324 and EC 60603-2 connectors
Materials	screws: steel other parts: aluminum
Finish	screws: galvanized and chromated colorless subrack Fi: anodized; cut areas: blank subrack Fs: passivated
Protection class	DIN 40050 IP 00, IP 20 with cover panels contact protection in accordance with VDE 0160
Utilization category	-25 °C, +70 °C, 75% relative humidity
Protective grounding	all metal parts are electrically bonded to one another following assembly in accordance with VDE 100 D 12.65, § 6 Nb.

Dimensions

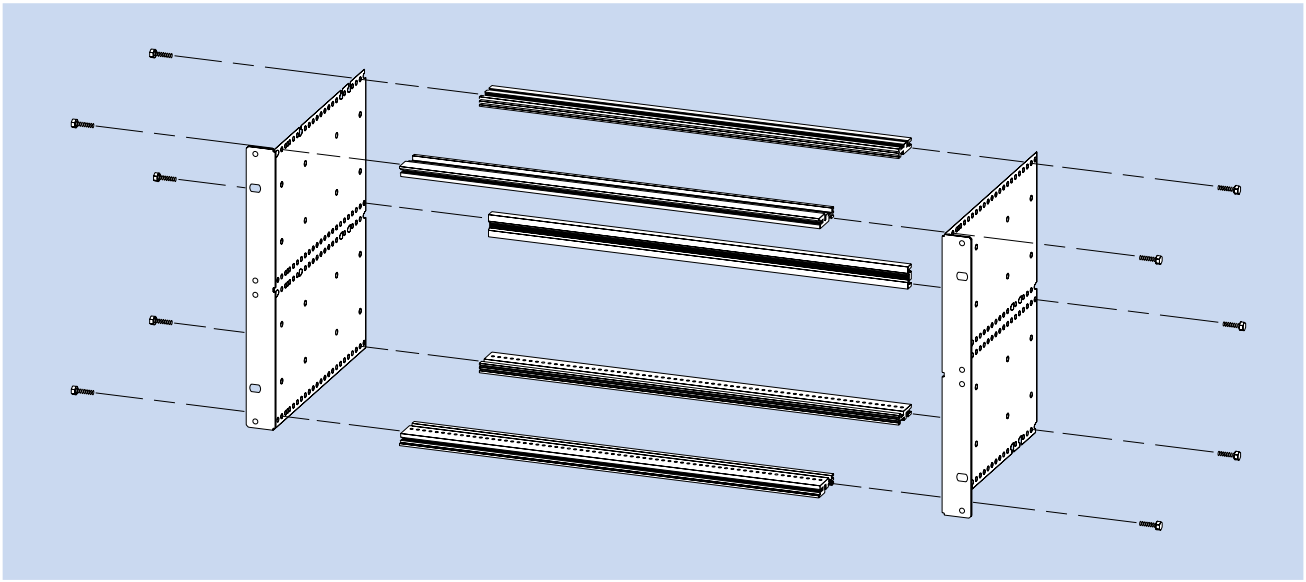


Front of subrack 3 U

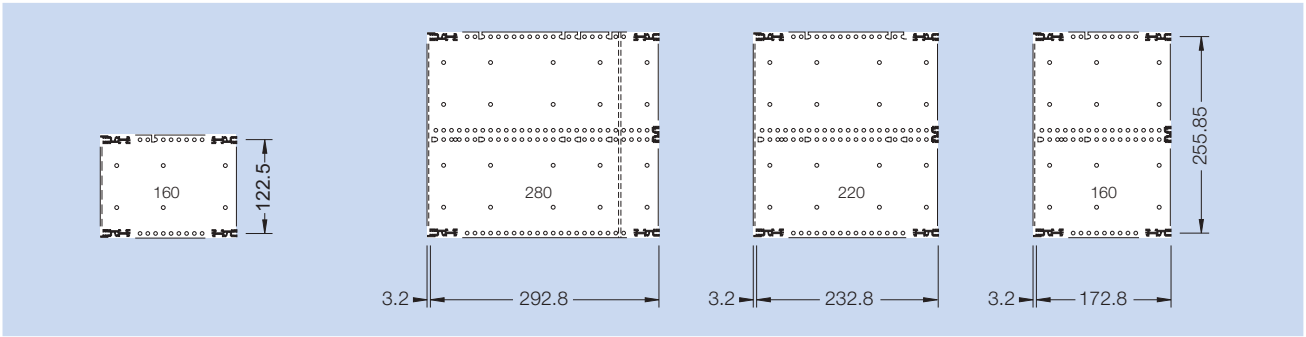


Front of subrack 6 U

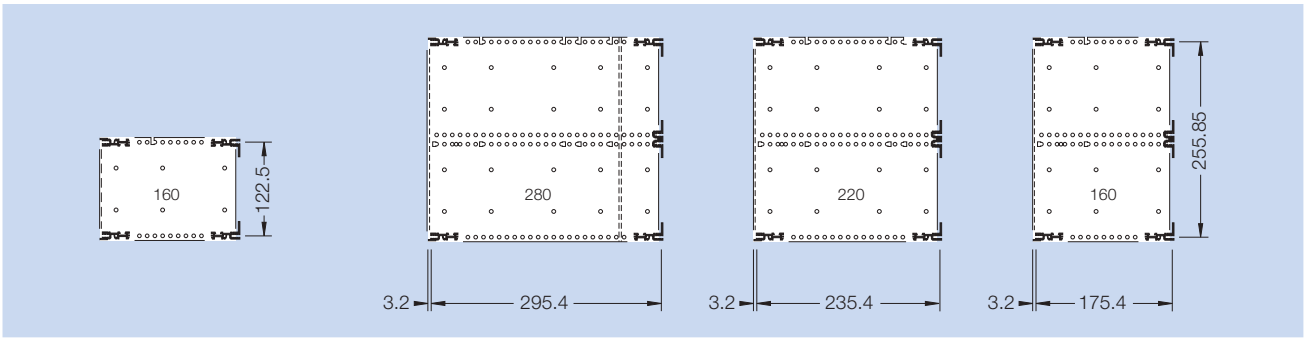
Subrack *FLEXIBLE Fi*



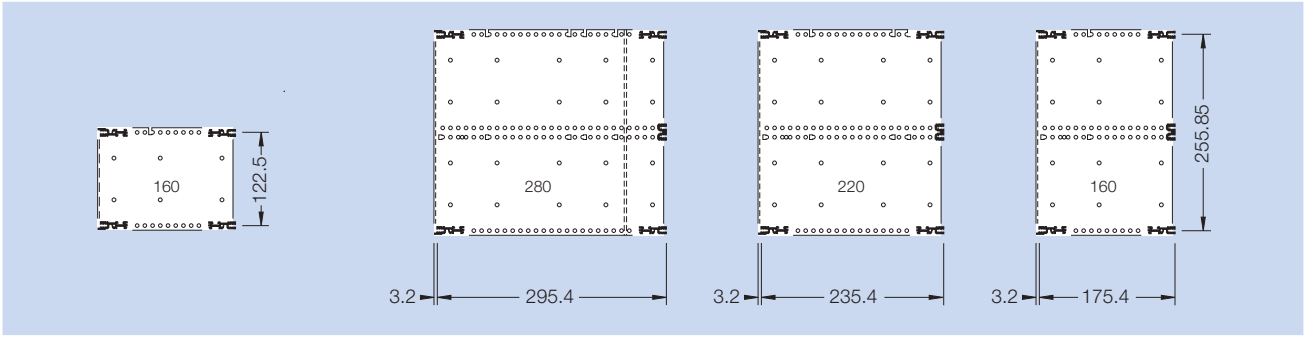
Subrack FLEXIBLE Fi



Depth dimensions type alpha 3 U and 6 U



Depth dimensions type beta 3 U and 6 U



Depth dimensions type delta 3 U and 6 U

This catalog contains stock and standard parts. Other products and sizes on request.

Ordering details for kits

	nom. depth [mm]	type *alpha* order no. **409.**	type *beta* order no. **409.**	type *delta* order no. **409.**
3 U - subrack				
FLEXIBLE Fi - 84-3-160	160	**087 340**	**087 440**	**087 388**
FLEXIBLE Fi - 84-3-220	220	**087 341**	**087 441**	**087 389**
FLEXIBLE Fi - 84-3-280	280	**087 342**	**087 442**	**087 390**
6 U - subrack				
FLEXIBLE Fi - 84-6-160	160	**087 364**	**087 446**	**087 462**
FLEXIBLE Fi - 84-6-220	220	**087 365**	**087 447**	**087 463**
FLEXIBLE Fi - 84-6-280	280	**087 366**	**087 448**	**087 464**

Delivery

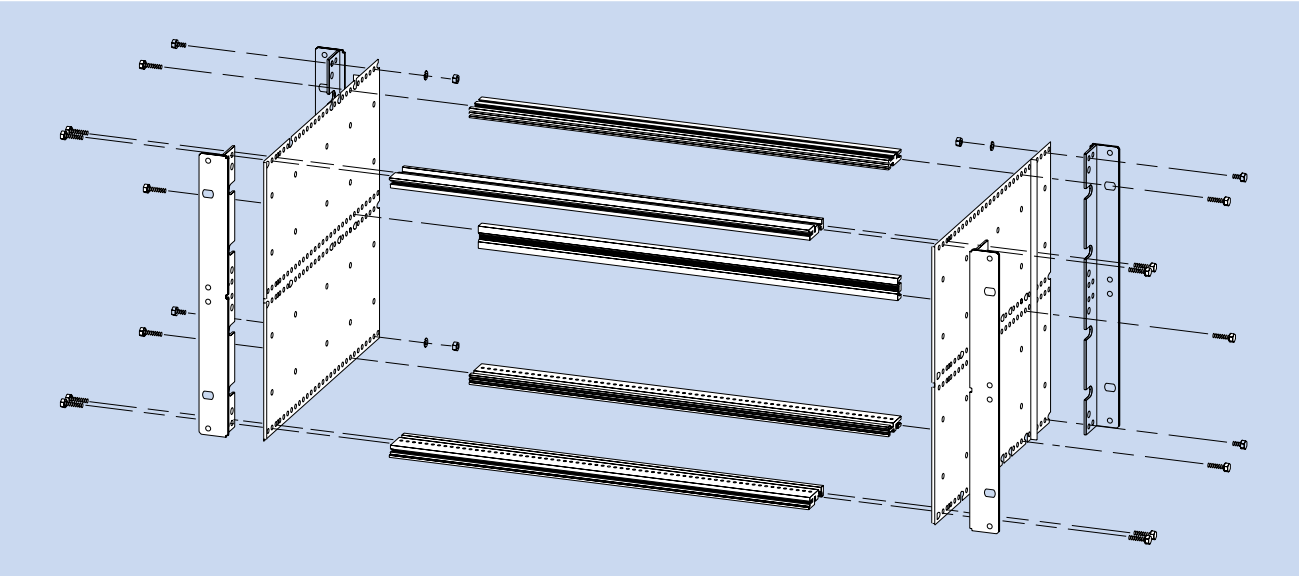
	pieces per kit *alpha* 3 HE	pieces per kit *alpha* 6 HE	pieces per kit *beta* 3 HE	pieces per kit *beta* 6 HE	pieces per kit *delta* 3 HE	pieces per kit *delta* 6 HE
Side panel Fi, anodized	2	2	2	2	2	2
Front pr	2	2	2	2	2	2
Rear pr	2	2	-	-	-	-
Rear pr	-	-	2	2	-	-
Rear pr	-	-	-	-	2	2
Center pr	-	1	-	-	-	-
Center pr	-	-	-	1	-	-
Center pr	-	-	-	-	-	1
Mounting parts kit	1	1	1	1	1	1
Threaded strip	2	2	2	2	2	2

Accessories

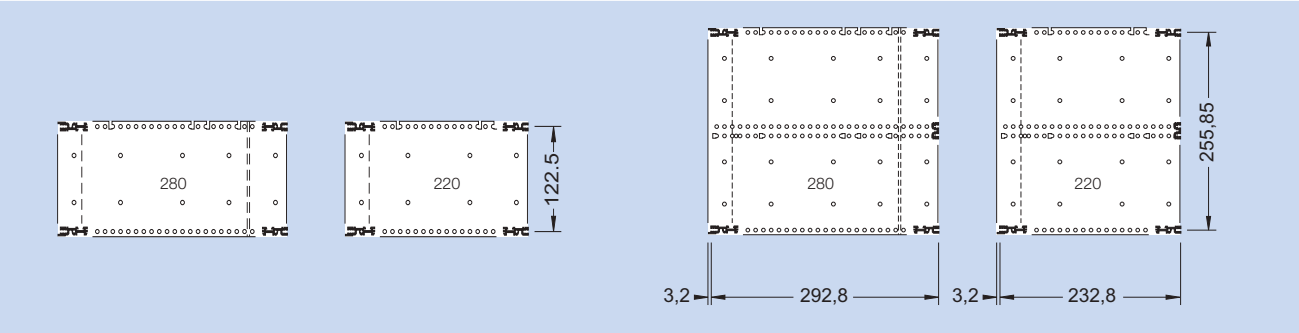
	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
Insulating strip 84 HP	**051 981**
Kits with 2 cover plate ø 8.5 mm and mounting parts	
Cover plates kit slide-in 160	**162 700**
Cover plates kit slide-in 220	**162 701**
Cover plates kit screw-on 160	**162 703**
Cover plates kit screw-on 220	**162 704**
Cover plates kit screw-on 280	**162 705**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

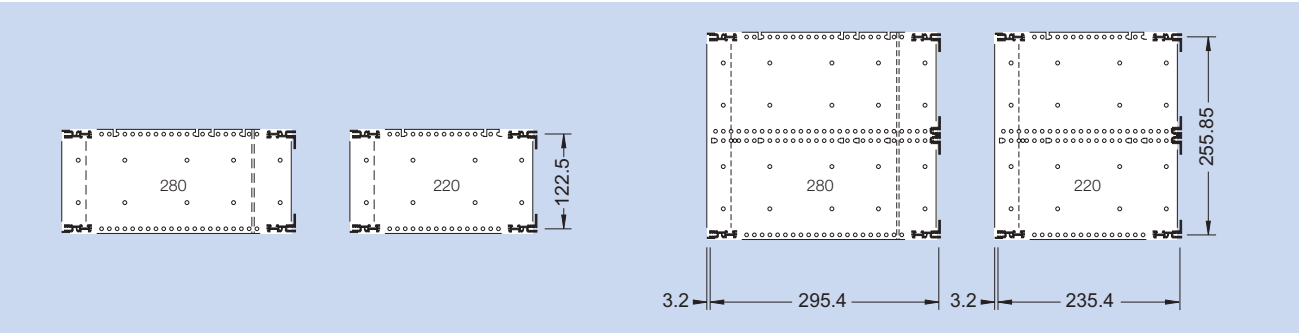
Subrack *FLEXIBLE Fs*



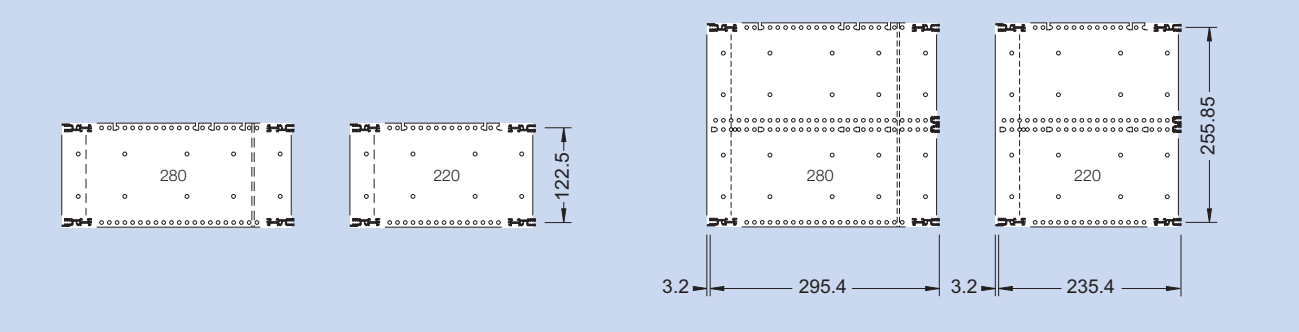
Subrack FLEXIBLE Fs



Depth dimensions Fs type alpha 3 U and 6 U



Depth dimensions Fs type beta 3 U and 6 U



Depth dimensions Fs type delta 3 U and 6 U

Ordering details for kits

	nom. depth [mm]	type *alpha* order no. **409.**	type *beta* order no. **409.**	type *delta* order no. **409.**
3 U - subrack				
FLEXIBLE Fs - 84-3-220	220	**094 700**	**094 704**	**094 708**
FLEXIBLE Fs - 84-3-280	280	**094 701**	**094 705**	**094 709**
6 U - subrack				
FLEXIBLE Fs - 84-6-220	220	**094 702**	**094 706**	**094 710**
FLEXIBLE Fs - 84-6-280	280	**094 703**	**094 707**	**094 711**

Delivery

	pieces per kit *alpha* 3 U	pieces per kit *alpha* 6 U	pieces per kit *beta* 3 U	pieces per kit *beta* 6 U	pieces per kit *delta* 3 U	pieces per kit *delta* 6 U
Side panel Fs, chromated	2	2	2	2	2	2
Flange separated, anodized	2	2	2	2	2	2
Front pr	2	2	2	2	2	2
Rear pr	2	2	-	-	-	-
Rear pr	-	-	2	2	-	-
Rear pr	-	-	-	-	2	2
Center pr	-	1	-	-	-	-
Center pr	-	-	-	1	-	-
Center pr	-	-	-	-	-	1
Mounting parts kit	1	1	1	1	1	1
Threaded strip	2	2	2	2	2	2

Accessories

	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
Insulating strip 84 HP	**051 981**
Kits with 2 cover plates ø 8.5 mm and mounting parts	
Cover plates kit screw-on 220	**162 704**
Cover plates kit screw-on 280	**162 705**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

Subrack *RFI-SHIELDED*

Description
The system dimensions of the *RFI-SHIELDED* subrack are based on those of the *FLEXIBLE* subrack as a logical further development to produce the perfectly shielded subrack. This allows unrestricted use of the extensive and complete range of accessories.

The special design features of the *RFI-SHIELDED* subrack:

√ The refined RFI shielding concept enables high shielding effectiveness.

√ The stable stainless steel contact springs ensure permanent and reliable bonding, even after a large number of plug-in cycles.

√ The perforated RFI cover plates guarantee optimal air flow for improved heat dissipation.

√ The use of high-quality, seawater-resistant aluminum alloys and stainless steel materials removes, for the most part, the need for unnecessary, environmentally harmful surface treatment.

√ There are three versions of this subrack:

1. Subrack RFI-SHIELDED
The standard RFI-shielded version.

2. Subrack *RFI-SHIELDED IEEE*
The front is in accordance with IEEE 1101.10.
The special profile rail is designed for the use of insertion and removal handles (optionally with a hot-swap function) for overcoming high insertion and removal resistance.
The card guides are fitted with mechanical coding systems and special bonding for electrostatic discharge.

3. Subrack *RFI-SHIELDED IEEE / Rear I/O*
The front and the rear are in accordance with IEEE 1101.10/11. This enables insertion and removal of modules with a front panel from both the front and the rear of the subrack.

Mixed forms
For vertical mounting PCB's of varying heights, divider kits are available.

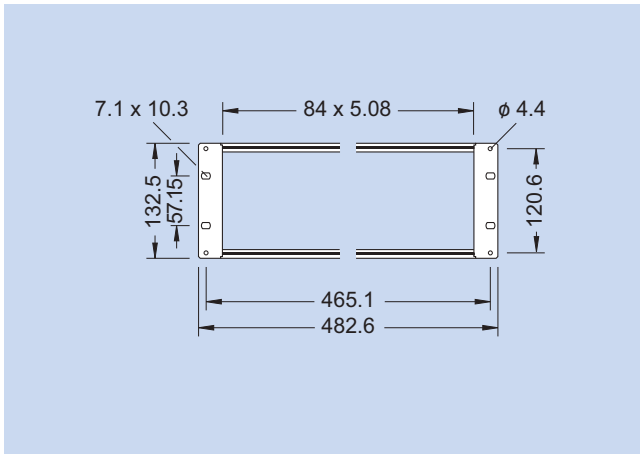
Delivery
Supplied as unassembled kits.
These are either packed as a kit of parts for one unit or as individual components, whereby parts of similar type are packed together.

On request, delivered as assambled and wired subrack according your requirements.

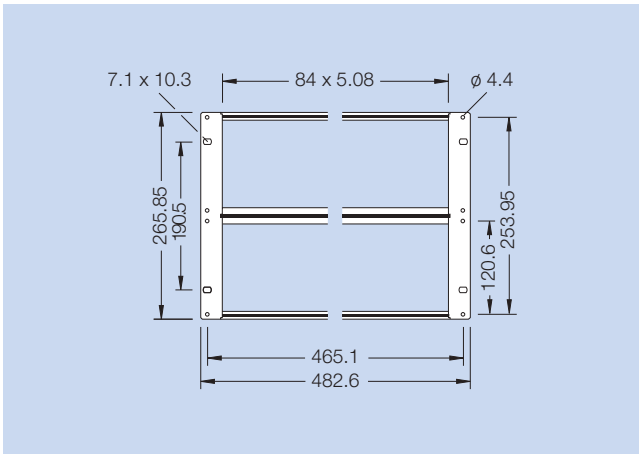
Technical data

Standards	compliant with DIN 41 494 D IEC 60 297-3, IEEE 1101.10
Width / horizontal pitch	84 usable HP / 5.08 mm
Depth of the inserted board	160, 220, 280 mm (nom. depth), 80 mm at the rear
Depth increment-side panel	10 mm
Connector mounting	M 2.5 in increments of 5.08 mm for DIN 41 612, VG 95 324 and EC 60 603-2 connectors
Materials	screws: steel contact springs: stainless steel other parts: aluminum
Finish	screws: galvanized und chromated side panels and cover plates: blank (seawater-resistant) other parts: chromated
Protection class	DIN 40 050 IP 00, IP 20 with cover panels contact protection in accordance with VDE 0160
Utilization category	-25 °C, +70 °C, 75% relative humidity
Protective grounding	all metal parts are electrically bonded to one another following assembly in accordance with VDE 100 D 12.65, § 6 Nb.

Dimensions

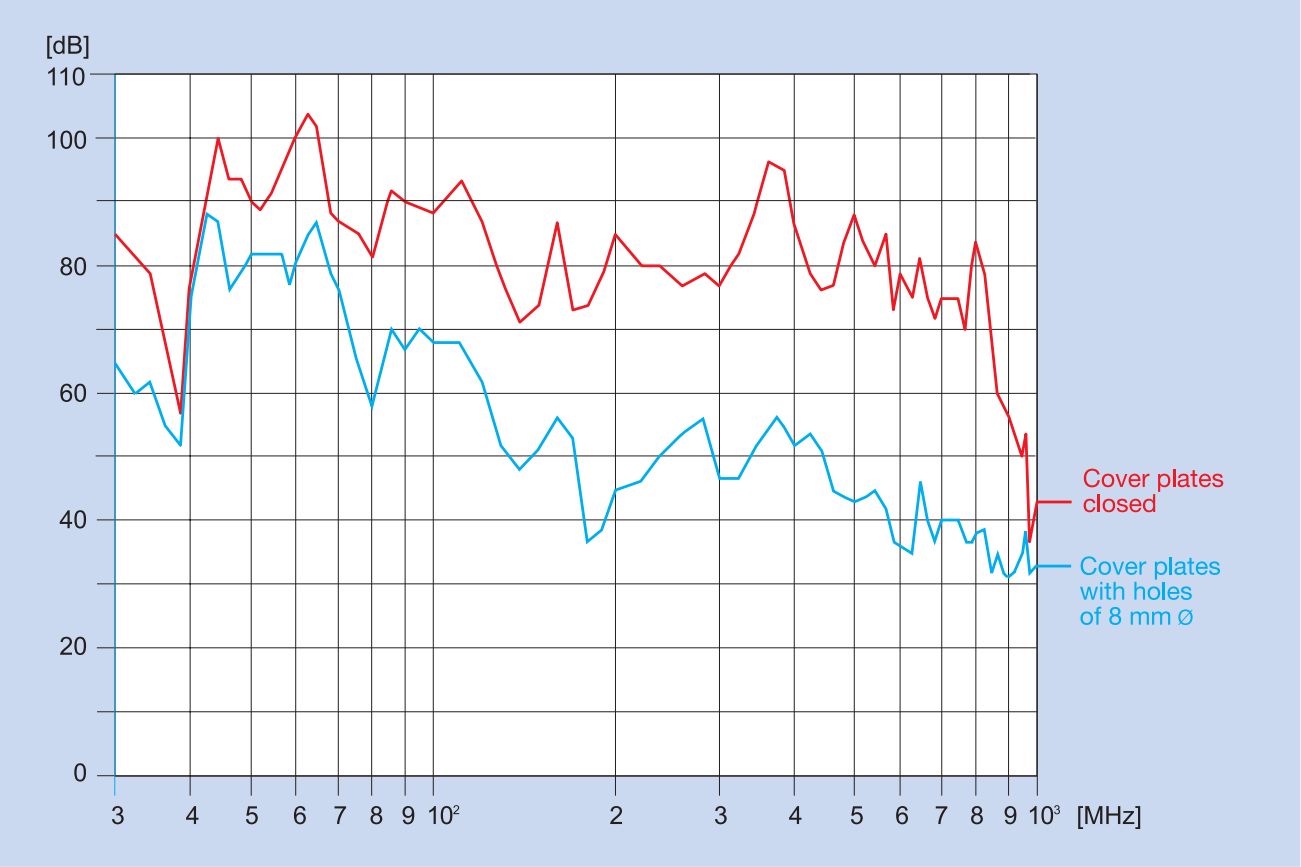


Front of subrack 3 U



Front of subrack 6 U

Measurement Configuration, Tests, Measurement Results



Shielding efficiency as function of grade of perforation of the covers

1. Measurement configuration

The measurement configuration fundamentally complies with the requirements of VG 95 373, Part 15, measurement method KS 04 G.
The subrack stood in the middle of a shielded anechoic chamber. The receiver antenna was in the center of the subrack and the transmitter antenna was mounted at a distance of 1 m from it.
The subrack was positioned such that the perforated cover panel faced the transmitter antenna.
The measurement receiver was located inside the measurement chamber, approximately 2 m from the test object; the measurement transmitter and amplifier were outside the chamber.

2. Tests

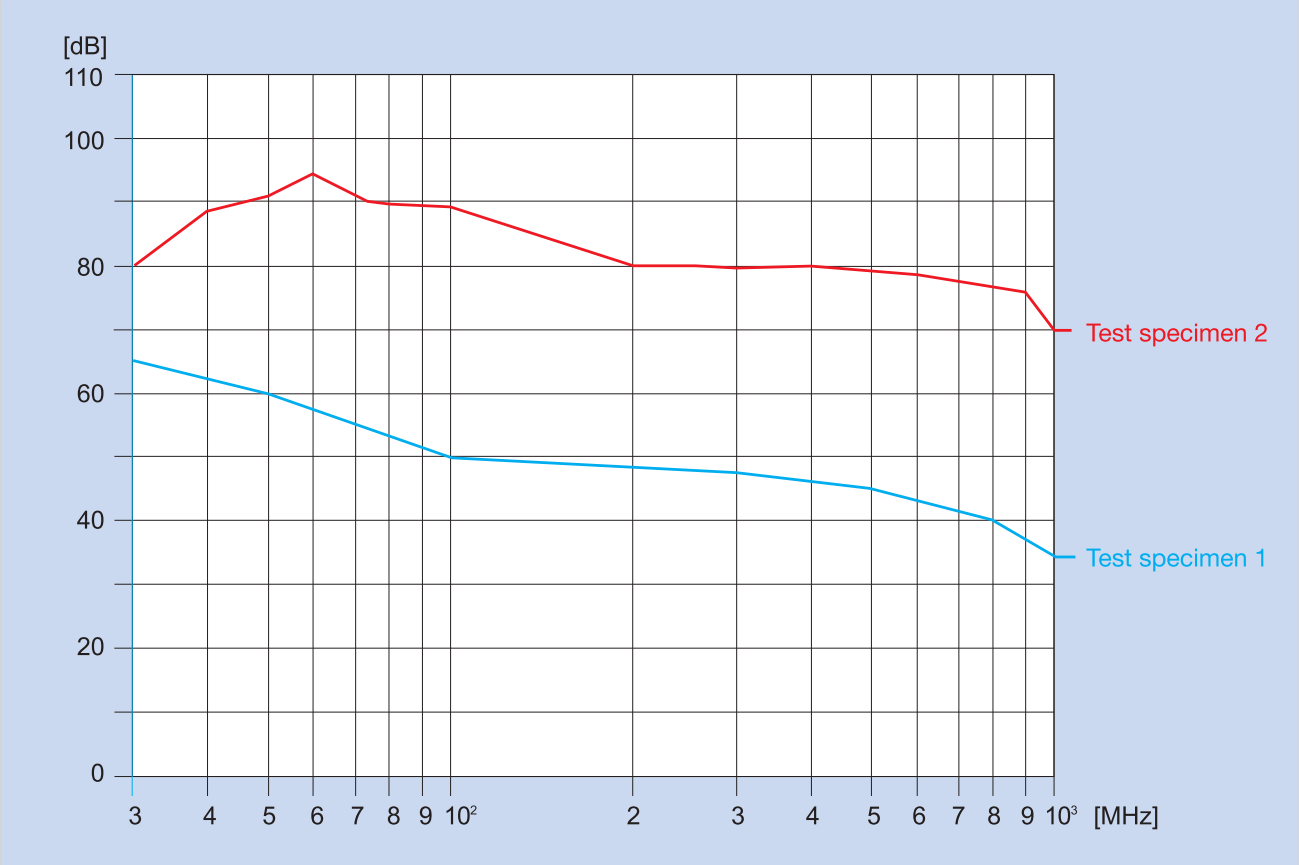
All measurements were performed at a constant transmitter output of -5dBm at 50V. The series of measurement was performed with a free-standing receiver antenna. The next measurements were then performed with the receiver antenna inside the subrack. The shielding effectiveness SE [dB] is the difference between the measurement levels obtained. Two subrack types were tested, one with a perforated cover panel and one with a solid cover panel. Perforation diameters of 3-8 mm essentially lead to the same result: The two related measurement curves can be seen in the diagram above.

Frequenzy steps

Frequenzy range [MHz]	Measurement step [MHz]
30 - 70	2
70 - 100	5
100 - 200	10
200 - 1000	20

3. Measurement results, summary

Compared to the subrack with a perforated cover panel the subrack with a solid cover panel exhibits a significantly higher level of shielding effectiveness, on average 20 dB higher in the lower frequency range (30 - 180 MHz) and on average 40 dB higher in the upper range (180 MHz - 1 GHz).
Above approximately 800 MHz the shielding effectiveness is determined by the distances between the contact points between the subrack and the front panels.
For subracks in accordance with IEEE P 1101.10 this boundary frequency lies at 1.2 to 1.5 GHz depending on the subrack design.



Shielding effectiveness

Shielding effectiveness
The shielding effectiveness of the empty subrack was determined in accordance with VG 95 373, Part 15.

Testing organisation
The measurements were performed in the Siemens Institute for Quality Engineering, Testing and Certification in Munich, Germany.

Test object
Two subracks with a height of 6 U, a width of 84 HP and a depth of 320 mm were tested:

Test specimen 1
Subrack 1 was closed at the top and bottom with perforated cover panels (Ø 4/5 x 4 mm), at the rear with an 85 HP front panel and at the front with twenty-one 4 HP profile front panels.
The elements were bonded to each other via stainless steel RFI gaskets.

Test specimen 2
Subrack 2 was closed at the top and bottom with solid cover panels and at the front and the rear with an 85 HP front panel. The elements were bonded to each other via stainless steel RFI gaskets.

Advice on use
To achieve optimal shielding the subrack must be closed at all sides using RFI gaskets, i.e. it must be fitted at the front and the rear with front panels or sub-assemblies.

Implementation of the Shielding

The RFI-SHIELDED subrack is fitted with stainless steel springs on all sides for defined bonding of all individual elements to each other. The only exceptions are the transitions of the cover plates to the side panel. In this case the bonding is performed using multiple screw connections at short distances from one another. The use of RFI front panels with bonding points at the side and bonding areas in the case of the extruded profile front panel results in a shielded subrack with shielding effectiveness levels as shown in the diagram below.

The details of the technical implementation using stainless steel springs:

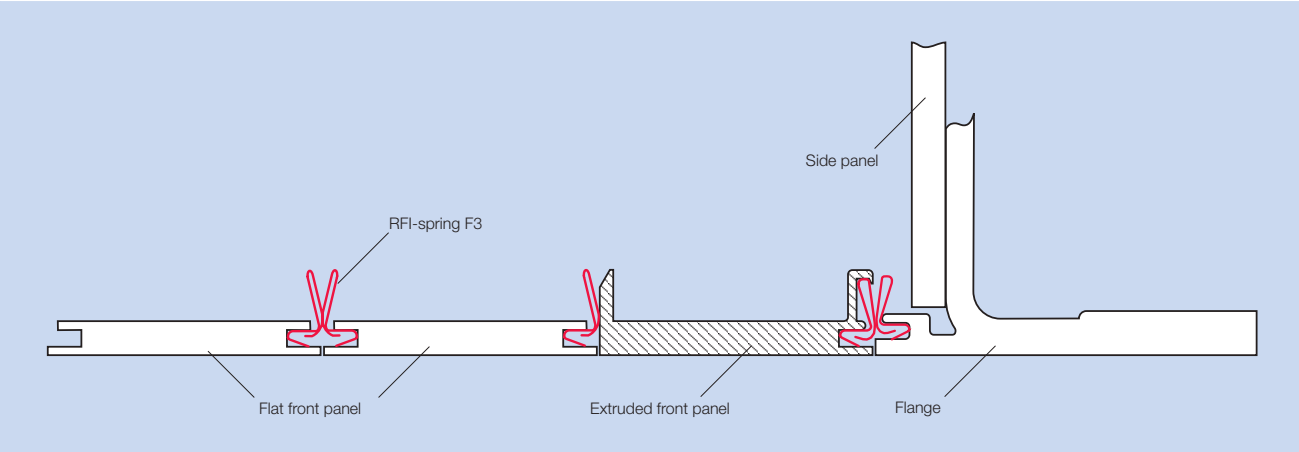
1. Bonding of the cover panel to the profile channel. via the RFI spring A2 which is inserted into the groove of the profile.

2. The RFI spring P2 is snapped onto the profile channel at both the front and the rear and at its front face creates the bonding to the front panels and the rear wall.

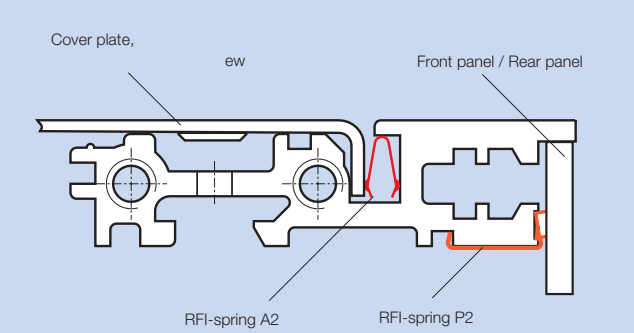
3. The RFI spring F3 is used in the subrack flange. This spring is also used at the sides of the RFI front panels and creates the bonding between the front panels and between the front panel and the flange or side panel.

4. The cover panel is screwed directly to the side panel; springs are thus not necessary here.

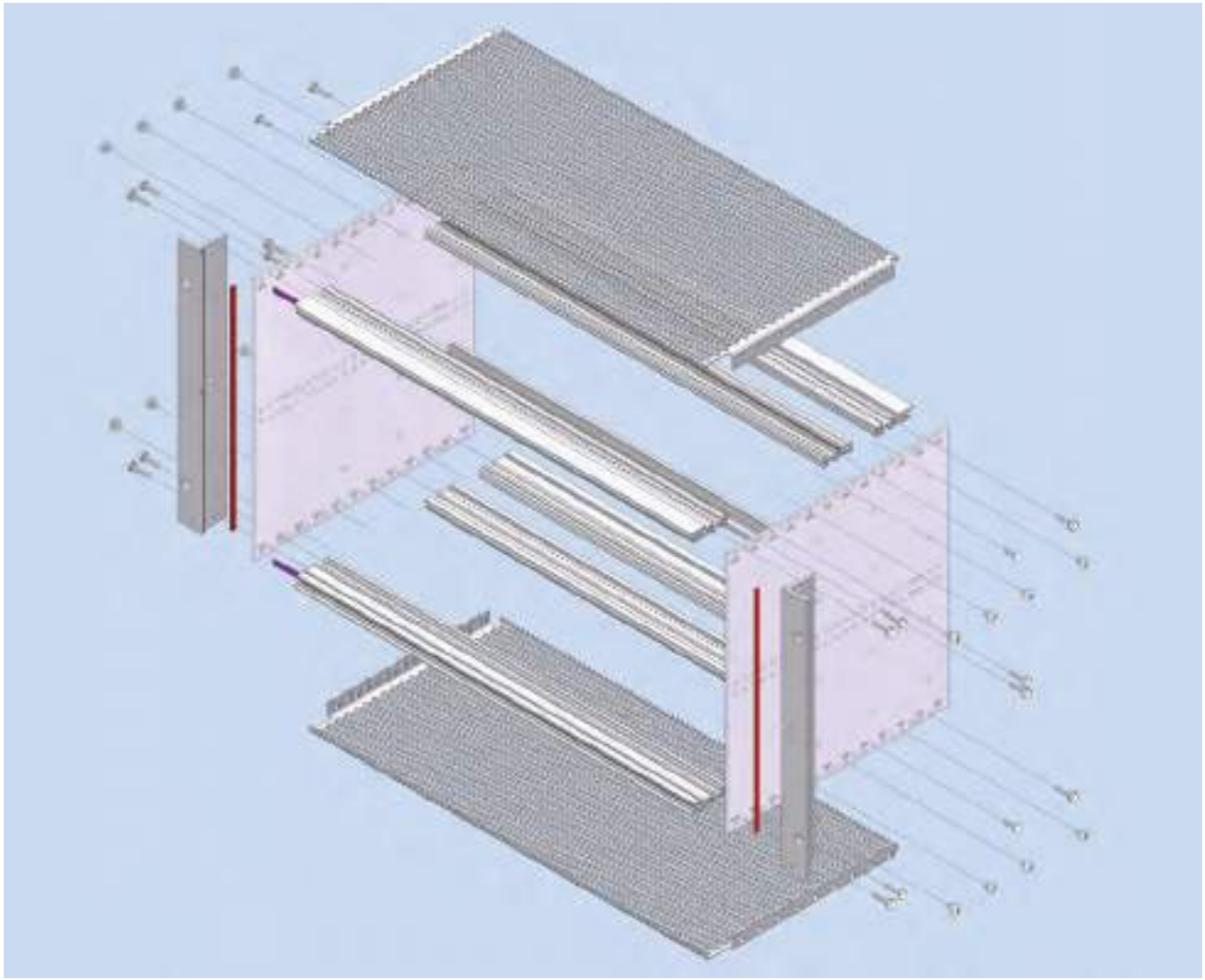
The subrack, its paneling elements and the cover panels are made of high-quality seawater-resistant aluminum alloys.
The spring strips are made of stainless steel.
This well-balanced combination of materials and surface treatment ensures high corrosion and ageing resistance and achievement of the necessary low contact resistance between the individual elements.



Sealing of the vertical splices between the front panels and between front panel und flange



Bonding with RFI-springs

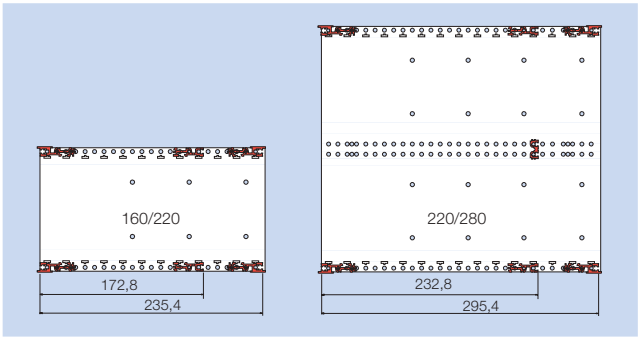


Assembling example

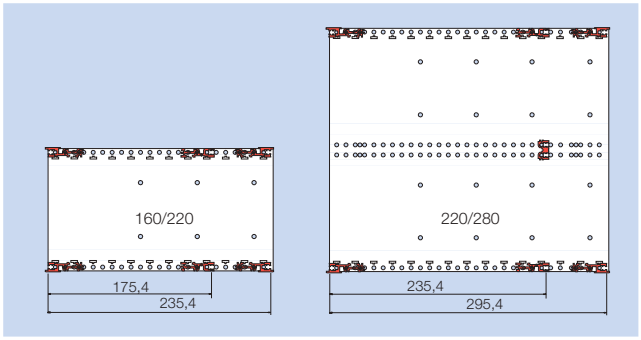
Delivery example

	pieces 6 U
Side panel	2
Flange	2
RFI-spring F3 (flange/front panel)	2
Threaded strip (front only)	2
Cover plates punched holes Ø 4 / 5.2x4 mm	2
RFI-spring A2 (cover plate/profile)	4
Mounting parts	1
Front profile	2
Rear profile	2
Inside profile	2
Center profile	1

Subrack *RFI-SHIELDED*



Depth dimensions type alpha 3 U and 6 U



Depth dimensions type delta 3 U and 6 U

Ordering details for kits

	PCB depth/ nom. depth [mm]	type *alpha* order no. **409.**	type *delta* order no. **409.**
3 U - subrack			
RFI-SHIELDED - 84-3-220	160/220	**162 708**	**162 710**
RFI-SHIELDED - 84-3-280	220/280	**162 709**	**162 711**
6 U - subrack			
RFI-SHIELDED - 84-6-220	160/220	**162 712**	**162 714**
RFI-SHIELDED - 84-6-280	220/280	**162 713**	**162 715**

Delivery

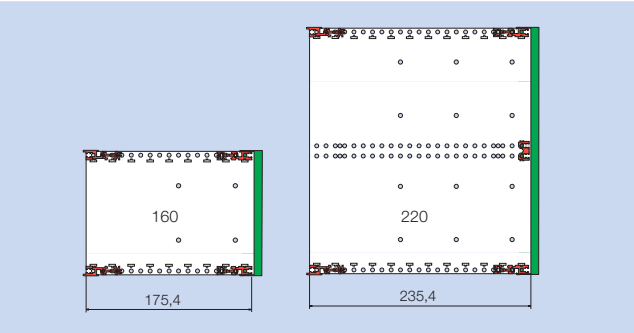
	pieces per kit *alpha* 3 U	pieces per kit *alpha* 6 U	pieces per kit *delta* 3 U	pieces per kit *delta* 6 U
Side panel	2	2	2	2
Flange	2	2	2	2
RFI-spring F3 (flange/front panel)	2	2	2	2
Threaded strip (front only) For your custom subrack please order threaded strips separately.	2	2	2	2
Cover plate punched holes Ø 4 / 5.2 x 4 mm	2	2	2	2
RFI-spring A2 (cover plate/profile)	4	4	4	4
Mounting parts kit	1	1	1	1
Front profile/rear V12-RFI-85	4	4	4	4
Inside profile-HE1-85	2	2	-	-
Center profile-ME1-85	-	1	-	-
Inside profile-HE2-85	-	-	2	2
Center profile-ME2-85	-	-	-	1

Accessories

	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
Insulating strip 84 HP	**051 981**
RFI-spring P2 - 84 (profile/front panel)	**106 547**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

Subrack *RFI-SHIELDED* with Rear Cover



Depth dimensions type delta 3 U and 6 U

Ordering details for kits

	PCB depth [mm]	type *delta* order no. **409.**
3 U - subrack		
RFI-SHIELDED - 84-3-160	160	**162 716**
RFI-SHIELDED - 84-3-220	220	**162 717**
6 U - subrack		
RFI-SHIELDED - 84-6-160	160	**162 718**
RFI-SHIELDED - 84-6-220	220	**162 719**

Delivery

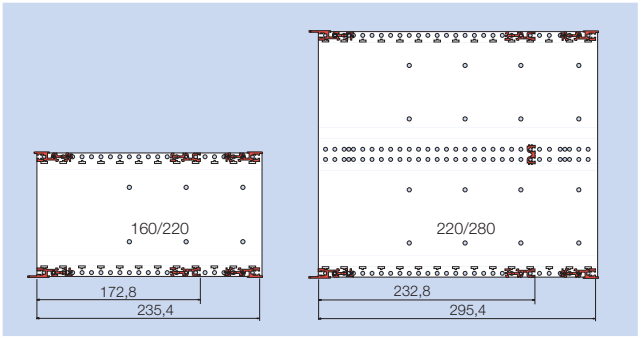
	pieces per kit *delta* 3 U	pieces per kit *delta* 6 U
Side panel	2	2
Flange	2	2
Cover	1	1
RFI-spring F3 (flange/front panel)	2	2
Threaded strip (front only) For your custom subrack please order threaded strips separately.	2	2
Cover plates punched holes Ø 4 / 5.2 x 4 mm	2	2
RFI-spring A2 (cover plate/profile)	4	4
Mounting parts kit	1	1
Front profile V12-RFI-85	2	2
Rear profile H22-RFI-85 for scew on cover	2	2
Center profile ME2-85	-	1

Accessories

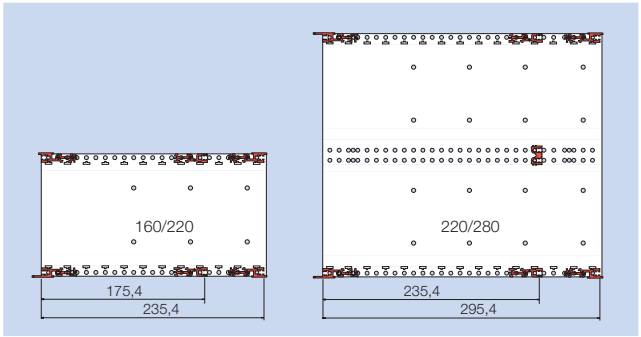
	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
Insulating strip 84 HP	**051 981**
RFI-spring P2 - 84 (profile/front panel)	**106 547**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

Subrack *RFI-SHIELDED IEEE*



Depth dimensions IEEE type alpha 3 U and 6 U



Depth dimensions IEEE type delta 3 U and 6 U

Ordering details for kits

	PCB depth/ nom. depth [mm]	type *alpha* order no. **409.**	type *delta* order no. **409.**
3 U - subrack			
RFI-SHIELDED - IEEE - 84-3-220	160/220	**162 720**	**162 722**
RFI-SHIELDED - IEEE - 84-3-280	220/280	**162 721**	**162 723**
6 U - subrack			
RFI-SHIELDED - IEEE - 84-6-220	160/220	**162 724**	**162 726**
RFI-SHIELDED - IEEE - 84-6-280	220/280	**162 725**	**162 727**

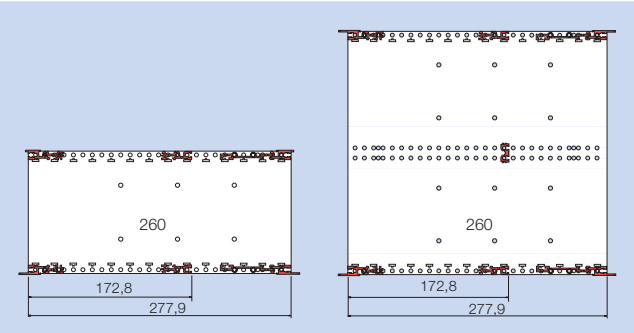
Delivery

	pieces per kit *alpha* 3 U	pieces per kit *alpha* 6 U	pieces per kit *delta* 3 U	pieces per kit *delta* 6 U
Side panel	2	2	2	2
Flange	2	2	2	2
RFI-spring F3 (flange/front panel)	2	2	2	2
Threaded strip (front only) For your custom subrack please order threaded strips separately.	2	2	2	2
Cover plates punched holes ⌀ 4 / 5.2 x 4mm	2	2	2	2
RFI-spring A2 (cover plate/profile)	4	4	4	4
Mounting parts kit	1	1	1	1
Front profile/rear V12-IEEE-85	1	2	1	2
Front profile/rear V12-RFI-85	3	2	3	2
Inside profile-HE1-85	2	2	-	-
Center profile inside ME1-85	-	1	-	-
Inside profile-HE2-85	-	-	2	2
Center profile inside ME2-85	-	-	-	1

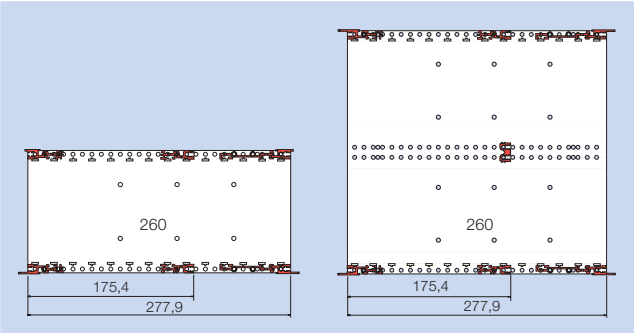
Accessories

	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
Insulating strip 84 HP	**051 981**
RFI-spring P2 - 84 (profile/front panel)	**106 547**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.



Depth dimensions Rear I/O type alpha 3 U and 6 U



Depth dimensions Rear I/O type delta 3 U and 6 U

Ordering details for kits

	nom. depth [mm]	type *alpha* order no. **409.**	type *delta* order no. **409.**
3 U - subrack			
RFI-SHIELDED Rear I/O-84-3-160+80	260	**162 728**	**162 729**
6 U - subrack			
RFI-SHIELDED Rear I/O-84-6-160+80	260	**116 484**	**161 034**

Delivery

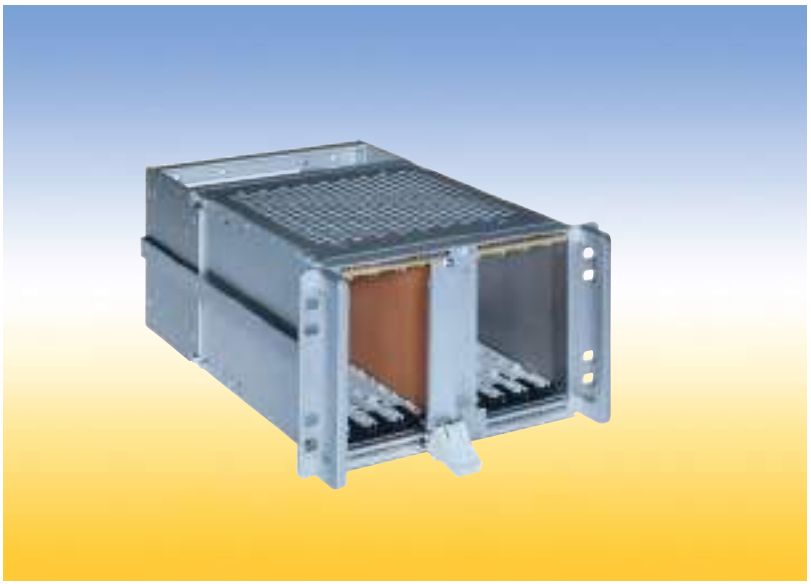
	pieces per kit *alpha* 3 U	pieces per kit *alpha* 6 U	pieces per kit *delta* 3 U	pieces per kit *delta* 6 U
Side panel	2	2	2	2
Flange	2	2	2	2
RFI-spring F3 (flange/front panel)	2	2	2	2
Threaded strip (front only) For your custom subrack please order threaded strips separately.	2	2	2	2
Cover plates punched holes ⌀ 4 / 5.2 x 4mm	2	2	2	2
RFI-spring A2 (cover plate/profile)	4	4	4	4
Mounting parts kit	1	1	1	1
Front profile V12-IEEE-85	1	2	1	2
Front profile V12-RFI-85	1	-	1	-
Rear profile-V1HUCK-IEEE-85	1	2	1	2
Rear profile-V1HUCK-85	1	-	1	-
Inside profile-HE1-85	2	2	-	-
Inside profile-HE2-85	-	-	2	2
Support profile for card guide	2	2	2	2

Accessories

	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
Insulating strip 84 HP	**051 981**
RFI-spring P2 - 84 (profile/front panel)	**106 547**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

Subrack *InterRail*®



Description
The system dimensions of the InterRail subrack are based on those of the *FLEXIBLE Fi* as a logical further development to produce a subrack for heavy-duty use. This allows unrestricted use of the extensive range of accessories.

The special design features of the InterRail subrack:

√ Profile rails with a high section modulus guarantee resistance to vibrations.

√ The refined RFI-shielding concept enables high shielding effectiveness (see the RFI-SHIELDED chapter).

√ There are four versions of this subrack:

1. Subrack *InterRail*
Shielding is not possible for the unsealed version.

2. Subrack *InterRail RFI*
The RFI-shielded version.

3. Subrack *InterRail RFI - IEEE*
The front is in accordance with IEEE 1101.10.
The special profile rail is designed for the use of insertion and removal handles (optionally with a hot-swap function) for overcoming high insertion and removal resistance. The card guides are fitted with mechanical coding systems and special bonding for electrostatic discharge.

4. Subrack *InterRail SNCF*
The special subrack with the certification from the French Railways.

Mixed forms
For vertical mounting PCB's of varying heights, divider kits are available.

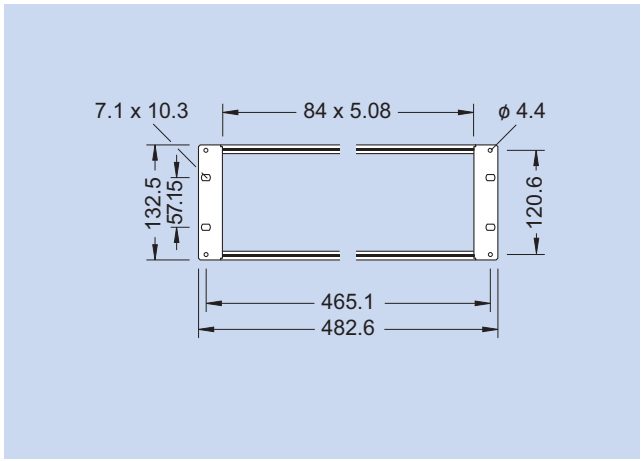
Delivery
Supplied as unassembled kits.
These are either packed as a kit of parts for one unit or as individual components, whereby parts of similar type are packed together.

On request, delivered as assembled and wired subrack according your requirements.

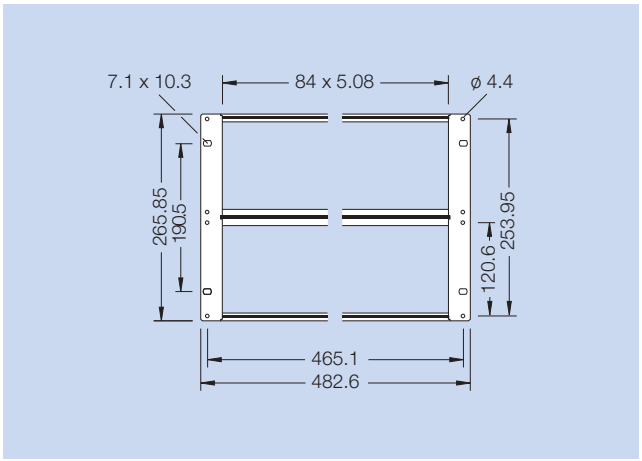
Technical data

Standards	IEC 60297, DIN 41494, IEEE 1101.10, DIN EN 50155 NF F 60-002, NF F 61-012, NF F 67-012
Width / horizontal pitch	84 usable HP / 5.08 mm (36 HP at SNCF)
Depth of the inserted board	160, 220, 280 mm (nom. depth)
Connector mounting	M 2.5 in increments of 5.08 mm for connectors, DIN 41 612, VG 95 324 and EC 60603-2
Materials	screws: steel contact springs: stainless steel or tin-plated other parts: aluminum
Finish	screws: galvanized und chromated other parts: chromated
Protection class	DIN 40 050 IP 20 (with cover plates) contact protection in accordance to VDE 0160
Utilization category	-25 °C, +70 °C, 75% relative humidity
Protective grounding	all metal parts are electrically bonded to one another following assembly in accordance with VDE 100 D 12.65, § 6 Nb.

Dimensions



Front of subrack 3 U



Front of subrack 6 U

Subrack *InterRail*®
Tests in accordance with SNCF NF standards and DIN EN 50155

- **Testing in accordance with DIN EN 50 155**

The tests are passed if no damage or malfunctions are determined.
The tests are performed from 5 to 150 Hz with the assigned accelerations and amplitudes.

- **Tests in accordance with SNCF NF standards**

The tests are passed if the maximum resonance sharpness of ca. 10 g is not exceeded in any axis.

Certification
Based on development and manufacture certified in accordance with DIN ISO 9001 this SNCF-tested subrack complies with the SNCF standards
NF F 60-002 (testing standard),
NF F 61-005 (dimensions standard),
NF F 67-012 (test boards)
and DIN EN 50 155.
In addition to being certified for railway applications the InterRail subrack is also approved for use with the French National Railways.

Test specimen
Subrack with dimensions H = 6 U, W = 84 HP,
D = 220 mm

Test sequence
The following tests were performed in the 3 axes X, Y and Z on the subrack with the PCB configuration listed below:
a) Determination of the critical resonance frequency
b) An endurance test at the resonance frequency The vibration excitation was performed between 7 and 70 Hz at a constant acceleration of 1 g in 12 cycles each lasting 10 minutes.
In total the subrack was vibrated for eight hours, 2 hours each with the following alternating board configuration:

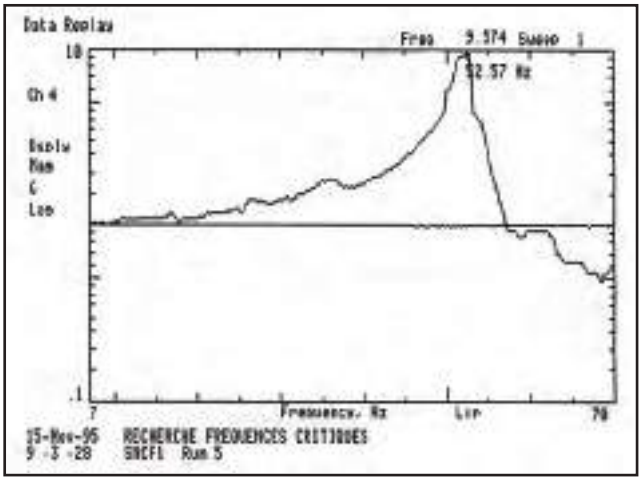
1. In the X-axis
   21 x 420 g boards
2. In the Z-axis
   21 x 420 g boards
3. In the Y-axis
   21 x 240 g boards
4. In the Z-axis
   4 x 420 g boards plus a 6.22 kg cassette installed in the center.

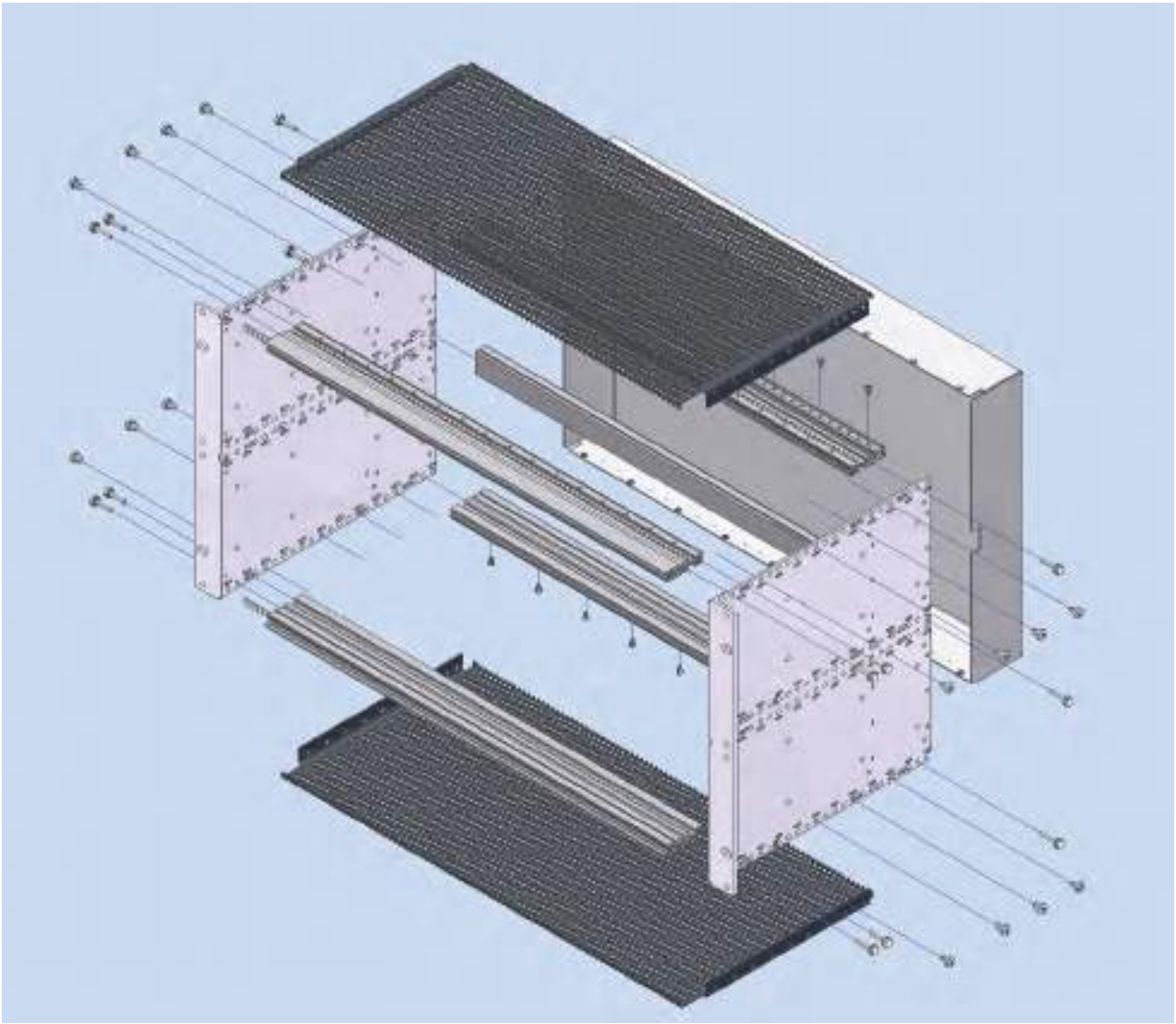
Measurement results with non-stiffened boards
Excerpt from the results of the measurements in the Y-axis, measurement on the front profile rail:
Maximum resonance sharpness 10.8 g at 52.5 Hz.
Measurement at the rear on the side panel extension:
Maximum resonance sharpness 9.6 g at 52.5Hz (see the measurement curve).

Measurement results with stiffened boards
These measurements are not demanded by the testing standard but were nonetheless also performed.
Excerpt from the results of the measurement in the Y-axis, measured on the front profile rail:
Maximum resonance sharpness 7.6 g at 47.1 Hz.

Measurement at the rear on the side panel extension:
Maximum resonance sharpness 6.5 g at 47.1 Hz.

Test result
Following vibration for a total of 8 hours the test specimen showed no signs of damage.

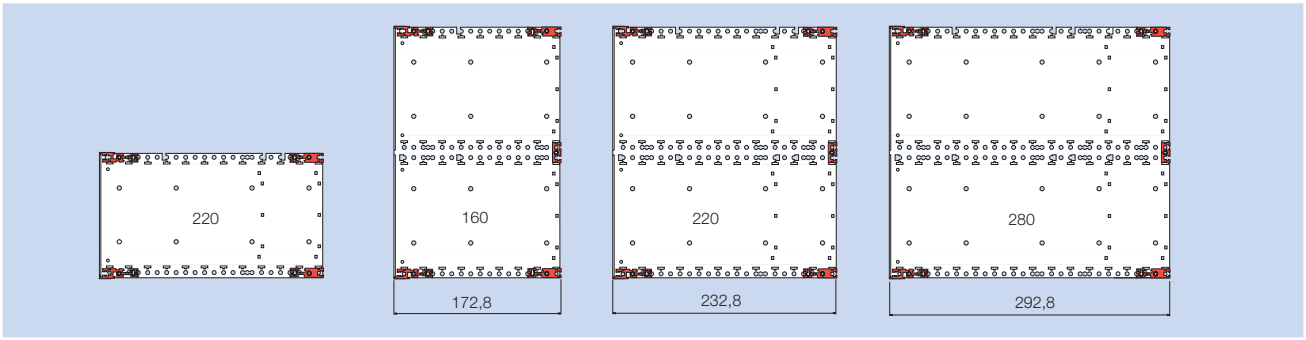




Delivery example

	pieces 6 U
Side panel	2
Cover	1
Threaded strip (front only)	2
Cover plates punched holes Ø 4 / 5.2x4 mm	2
RFI-spring A2 (cover plate/profile)	4
Mounting parts	1
Front profile	2
Rear profile	2
Inside profile	2
Center profile	1

Subrack *InterRail*®



Depth dimensions type alpha 3 U and 6 U

Ordering details for kits

	nom. depth [mm]	type *alpha* order no. **409.**
3 U - subrack		
InterRail - 84-3-160	160	**162 610**
InterRail - 84-3-220	220	**162 611**
InterRail - 84-3-280	280	**162 612**
6 U - subrack		
InterRail - 84-6-160	160	**162 613**
InterRail - 84-6-220	220	**162 614**

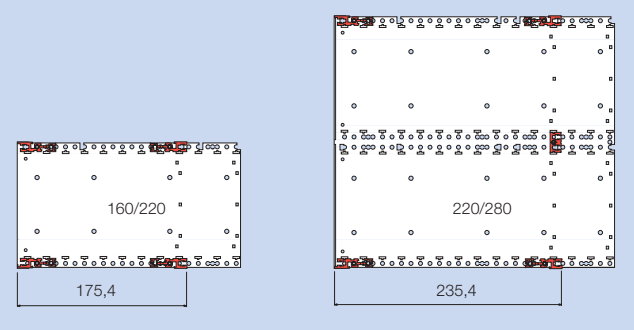
Delivery

	pieces per kit *alpha* 3 U	pieces per kit *alpha* 6 U
Side panel	2	2
Threaded strip (front only) For your custom subrack please order threaded strips separately.	2	2
Mounting parts kit	1	1
Front profile V12S-RFI-85	2	2
Rear profile H12S-85	2	2
Center profile M1S-85	-	1

Accessories

	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
Insulating strip 84 HP	**051 981**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.



Depth dimensions type delta 3 U and 6 U

Ordering details for kits

	PCB depth/ nom. depth [mm]	type *delta* order no. **409.**
3 U - subrack		
InterRail RFI-84-3-220	160/220	**162 730**
InterRail RFI-84-3-280	220/280	**162 731**
6 U - subrack		
InterRail RFI - 84-6-220	160/220	**162 732**
InterRail RFI - 84-6-280	220/280	**162 733**

Delivery

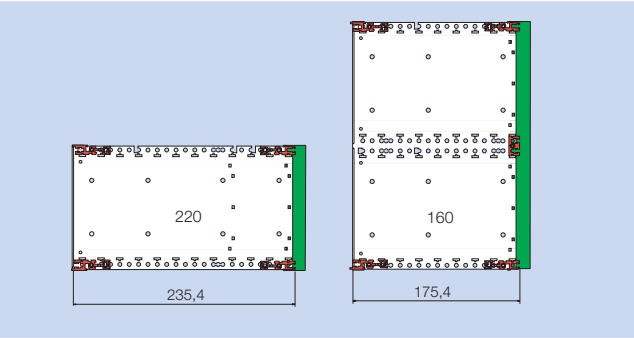
	pieces per kit *delta* 3 U	pieces per kit *delta* 6 U
	2	2
Threaded strip (front only) For your custom subrack please order threaded strips separately.	2	2
Cover plates punched holes ⌀ 4 / 5.2 x 4mm	2	2
RFI-spring A2 (cover plate/profile)	4	4
Mounting parts kit	1	1
Front profile V12S-RFi-85	2	2
Rear profile H22S-RFI-85	2	2
Center profile M2S-85	-	1

Accessories

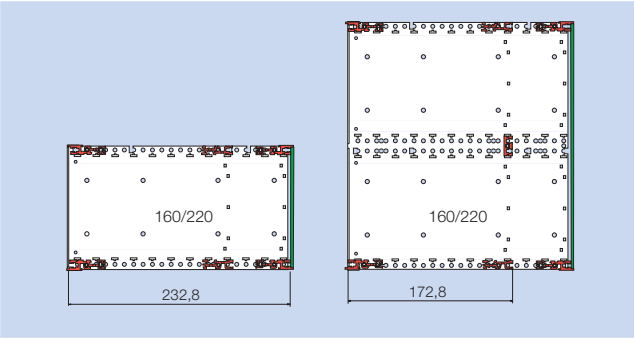
	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
RFI-spring P2 - 84 (profile/front panel)	**106 547**
Shielding kit F1 3 U (side panel/front panel)	**093 605**
Shielding kit F1 6 U (side panel/front panel)	**093 606**
Shielding kit 3 U (side panel/backplane)	**108 274**
Shielding kit 6 U (side panel/backplane)	**108 275**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

Subrack *InterRail® RFI*
with Rear Cover or for Front Panel in the Rear



Depth dimensions type delta 3 U and 6 U with cover



Depth dimensions type alpha 3 U and 6 U for front panel

Ordering details for kits

	nom. depth [mm]	type *delta* with cover order no. **409.**	f. front panel PCB depth/ nom. depth [mm]	type *alpha* f. front panel order no. **409.**
3 U - subrack				
InterRail RFI 84-3-160	160	**162 734**	-	**-**
InterRail RFI 84-3-220	220	**162 735**	160/220	**162 738**
6 U - subrack				
InterRail RFI 84-6-160	160	**162 736**	-	**-**
InterRail RFI 84-6-220	220	**162 737**	160/220	**162 739**

Delivery

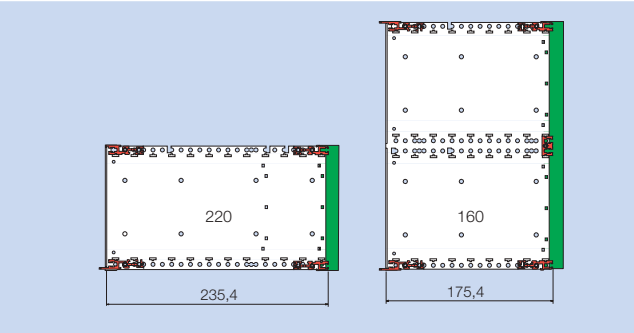
	pieces per kit *alpha* 3 U	pieces per kit *alpha* 6 U	pieces per kit *delta* 3 U	pieces per kit *delta* 6 U
	2	2	2	2
Threaded strip (front only) For your custom subrack please order threaded strips separately.	2	2	2	2
Cover plates punched holes ⌀ 4 / 5.2 x 4mm	2	2	2	2
RFI-spring A2 (cover plate/pr	4	4	4	4
Mounting parts kit	1	1	1	1
Cover	1	1	-	-
Front profile/rear V12S-85	2	2	4	4
Rear profile H22RFI-85 screw on cover	2	2	-	-
Center profile M2S-85	-	1	-	-
Rear profile H12S-85	-	-	2	2
Center profile M1S-85	-	-	-	1

Accessories

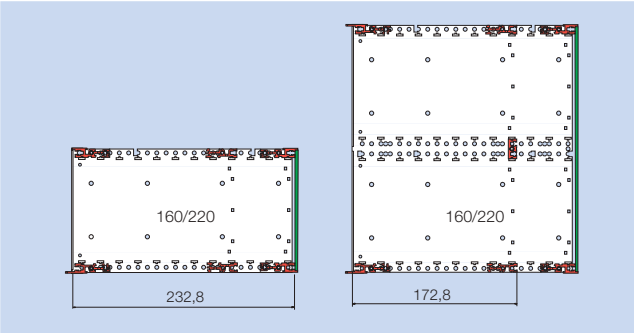
	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
Insulating strip 84 HP	**051 981**
RFI-spring P2 - 84 (profile/front panel)	**106 547**
Shielding kit F1 3 U (side panel/front panel)	**093 605**
Shielding kit F1 6 U (side panel/front panel)	**093 606**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

This catalog contains stock and standard parts. Other products and sizes on request.



Depth dimensions IEEE type delta 3 U and 6 U with cover



Depth dimensions IEEE type alpha 3 U and 6 U for front panel

Ordering details for kits

	nom. depth [mm]	type *delta* with cover order no. **409.**	f. front panel PCB depth/ nom. depth [mm]	type *alpha* f. front panel order no. **409.**
3 U - subrack				
InterRail RFI 84-3-160	160	**162 740**	-	**-**
InterRail RFI 84-3-220	220	**162 741**	160/220	**162 744**
6 U - subrack				
InterRail RFI 84-6-160	160	**162 742**	-	**-**
InterRail RFI 84-6-220	220	**162 743**	160/220	**162 745**

Delivery

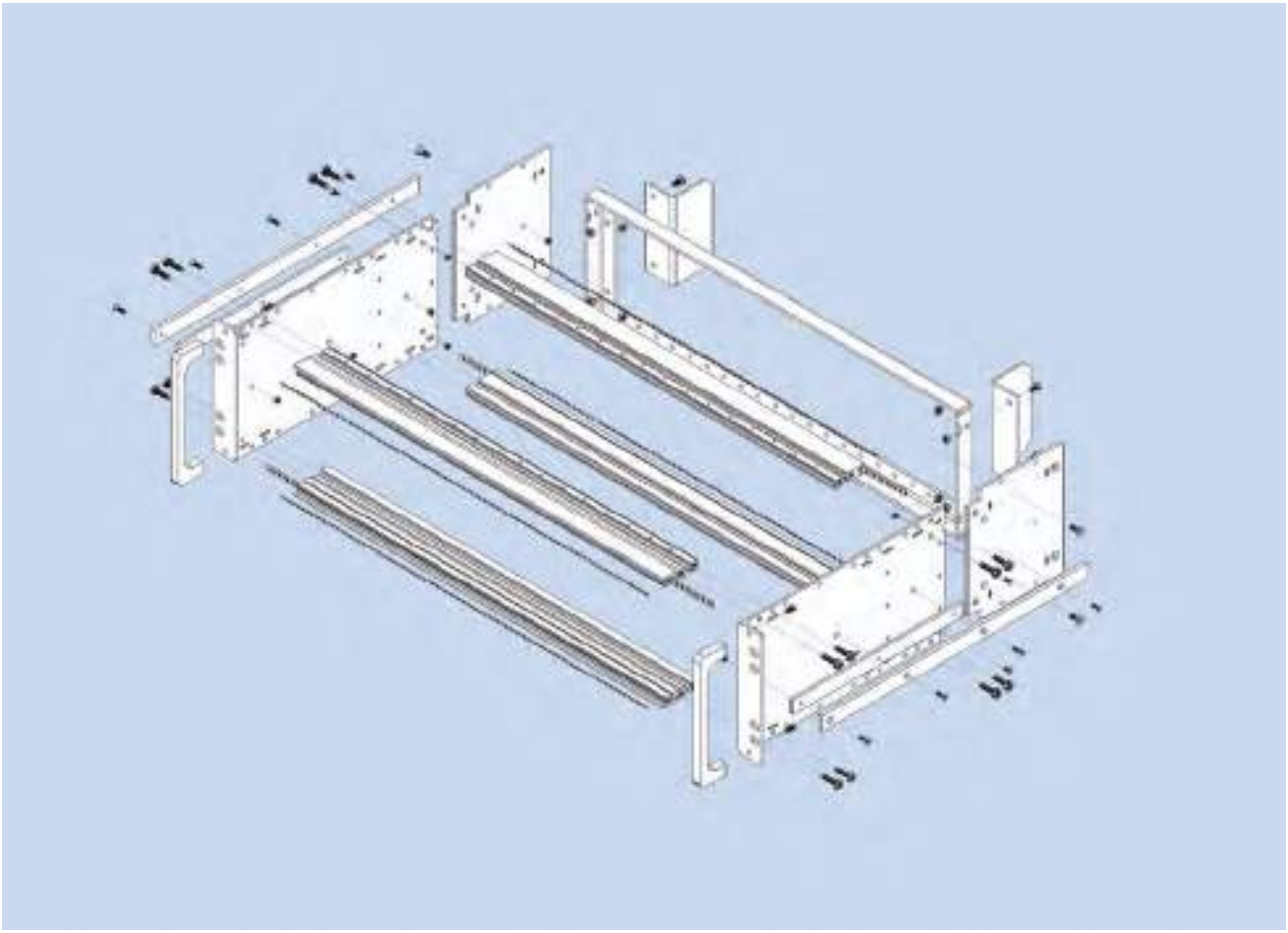
	pieces per kit *with cover* 3 U	pieces per kit *with cover* 6 U	pieces per kit *f. front panel* 3 U	pieces per kit *f. front panel* 6 U
	2	2	2	2
Threaded strip (front only) For your custom subrack please order threaded strips separately.	2	2	2	2
Cover plates punched holes ⌀ 4 / 5.2 x 4mm	2	2	2	2
RFI-spring A2 (cover plate/profile)	4	4	4	4
Mounting parts kit	1	1	1	1
Cover	1	1	-	-
Front profile V12-IEEE-85	1	2	1	2
Front profile/rear V12S-85	1	-	3	2
Rear profile H22-RFI f. Cover 85	2	2	-	-
Center profile M2S-85	-	1	-	-
Inside profile H12S-85	-	-	2	2
Center profile inside M1S-85	-	-	-	1

Accessories

	order no. **409.**
Threaded strip 84 x M 2.5	**091 255**
Insulating strip 84 HP	**051 981**
RFI-spring P2 - 84 (profile/front panel)	**106 547**
Shielding kit F1 3 U (side panel/front panel)	**093 605**
Shielding kit F1 6 U (side panel/front panel)	**093 606**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

Subrack *InterRail*® - *SNCF*



Delivery

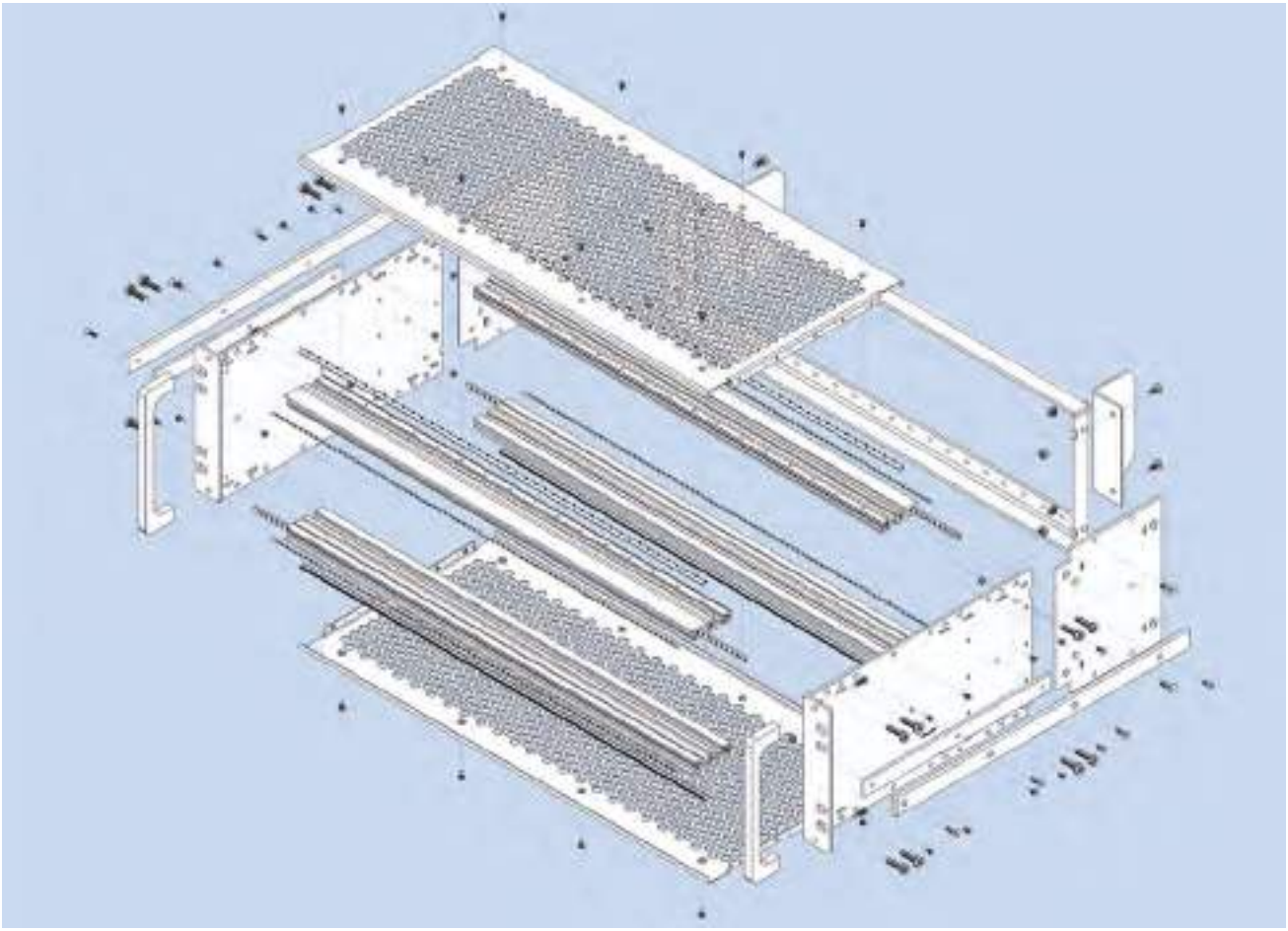
	pieces per kit *alpha* 3 U	pieces per kit *alpha* 6 U
	2	2
Side panel extender	2	2
Wiring frame	1	2
Wiring protection angle	2	4
Guide bar short	2	2
Guide bar long	2	2
Front profile V12S	2	2
Rear profile H12S	2	2
Center profile M1S	-	1
Handle	2	2
Label strip	4	4
Mounting parts kit	1	1
Threaded strip	4	6

Ordering details for kits

	nom. width/ nom. depth [mm]	type *alpha* order no. **409.**
3 U - subrack		
InterRail SNCF-36-3-220	36 - 220	**108 251**
InterRail SNCF-84-3-220	84 - 220	**108 250**
6 U - subrack		
InterRail SNCF-36-6-220	36 - 220	**107 716**
InterRail SNCF-84-6-220	84 - 220	**102 822**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

Subrack *InterRail*® - *SNCF RFI*



Delivery

	pieces per kit *delta* 3 U	pieces per kit *delta* 6 U
	2	2
Side panel extender	2	2
Wiring frame	1	2
Wiring protection angle	2	4
Guide bar short	2	2
Guide bar long	2	2
Front profile V12S	2	2
Rear profile H22S	2	2
Center profile M2S	-	1
Cover plates with punched holes ⌀ 8 mm	2	2
RFI-springn A2 (cover plates/profile)	4	4
Handle	2	2
Label strip	4	4
Mounting parts kit	1	1
Threaded strip	4	6

Ordering details for kits

	nom. width/ nom. depth [mm]	type *delta* order no. **409.**
3 U - subrack		
InterRail SNCF RFI-36-3-220	36 - 220	**108 255**
InterRail SNCF RFI-84-3-220	84 - 220	**108 254**
6 U - subrack		
InterRail SNCF RFI-36-6-220	36 - 220	**108 253**
InterRail SNCF RFI-84-6-220	84 - 220	**108 252**

Accessories

	order no. **409.**
Card guide VIB 1.6-220 without nut	**058 944**
Screw M 3.2 x 12 for card guide SNCF	**102 432**
RFI-spring P2 - 84 (pr ont panel)	**106 547**
Shielding kit F1 3 U (side panel/front panel)	**093 605**
Shielding kit F1 6 U (side panel/front panel)	**093 606**

Further details and possibilities of other applications are in the chapter Subrack-Accessories.

System-Module CompactPCI

Description
The special design features of the CompactPCI system modules:

√ The refined RFI-shielding concept enables high shielding effectiveness (see the RFI-SHIELDED chapter).

√ The construction offers additional space for drives and hard disks.

√ They are fitted with an ATX 300 W power supply unit with a wide-range input and PFC.

√ CPCI backplane in accordance with specification 2.0 Rev. 3.0, with or without rear I/O

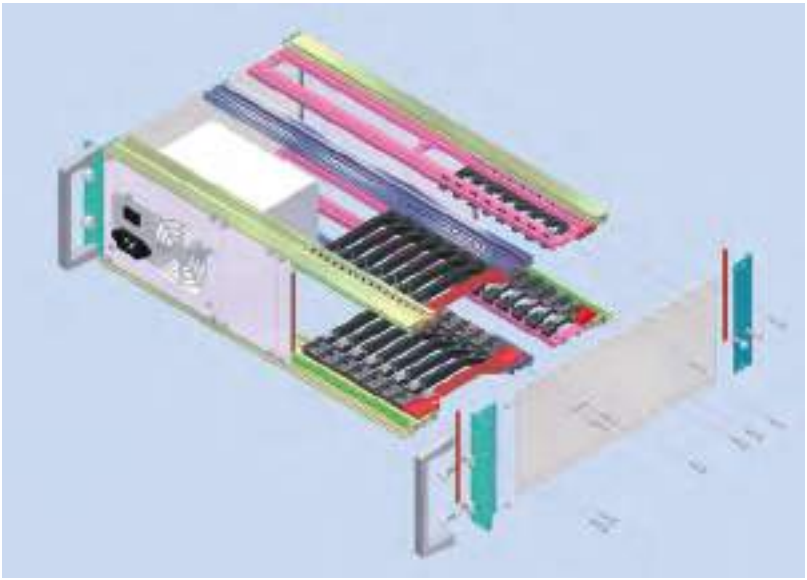
√ Convection or active ventilation

Delivery
The subrack is delivered assembled.

Other systems on request.

Technical data

Standards	compliant with DIN 41 494, IEC 60297-3, IEEE 1101.10 IEC 61 076-4-101, CPCI Specification 2.0, Revision 3.0
Width / horizontal pitch	84 usable HP/ 5.08 mm
Depth of the inserted board	160 mm at the front, 80 mm at the rear
Depth increment side panel	10 mm
Materials	screws: steel contact springs: stainless steel card guide: plastic other parts: aluminum
Finish	screws: galvanized und chromated side panels and cover plates: blank (seawater resistance) other parts: chromated
Protection class	DIN 40 050 IP 20 (with cover plates) contact protection in accordance with VDE 0160
Utilization category	-25 °C, +70 °C, 75% relative humidity
Protective grounding	all metal parts are electrically bonded to one another following assembly in accordance with VDE 100 D 12.65, § 6 Nb.



Consists of:

1 Subrack *RFI-SHIELDED CPCI / REAR I/O* 84 HP,
260 mm nom. depth
(160 mm at the front, 80 mm at the rear)
1 Backplane 8 Slot, 3 U, 32 Bit, system slot right
1 ATX 300W power supply unit with a wide-range input
and PFC, with assembled front panel.
1 Blind front panel 16 HP at the front.
1 Blind front panel 4 HP at the front.
1 Blind front panel 48 HP at the rear.
1 Blind front panel 8 HP at the rear.
1 Pair of card guides red 160 mm (CPU)
including IEEE-coding and ESD-spring in the bottom card guide.
1 Pair of card guides red 80 mm (CPU)
including IEEE-coding and
7 Pair of card guides black 160 mm (CPU)
including IEEE-coding and ESD-spring in the bottom card guide.
7 Pair of card guides black 80 mm (CPU)
including IEEE-coding and ESD-spring in the bottom card guide.

System-Module CompactPCI-3 U-Rear I/O and 6 U-Rear I/O

System-Module CompactPCI-3 U-Rear I/O

order no.: **409. 122 295**

Consists of:

1 Subrack *RFI-SHIELDED CPCI / REAR I/O*
84 HP, 260 mm nom. depth
(160 mm at the front, 80 mm at the rear)
1 Backplane 8 Slot, 3 U, 32 Bit, system slot right
1 ATX 300W power supply unit with a wide-range input and PFC, with assembled front panel.
1 Blind front panel 16 HP at the front.
1 Blind front panel 4 HP at the front.
1 Blind front panel 48 HP at the rear.
1 Blind front panel 8 HP at the rear.
1 Pair of card guides red 160 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
1 Pair of card guides red 160 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
7 Pair of card guides black 160 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
7 Pair of card guides black 80 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.

System-Module CompactPCI-6 U-Rear I/O

order no.: **409. 122 297**

Consists of:

1 Subrack *RFI-SHIELDED CPCI / REAR I/O*
84 HP, 260 mm nom. depth
(160 mm at the front, 80 mm at the rear)
1 Backplane 8 Slot, 6 U, 64 Bit, system slot right
1 ATX 300W power supply unit with a wide-range input and PFC, with assembled front panel.
(optional front panel for a drive over the power supply).
1 Blind front panel 16 HP at the front.
1 Blind front panel 4 HP at the front.
1 Blind front panel 48 HP at the rear.
1 Blind front panel 8 HP at the rear.
1 Pair of card guides red 160 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
1 Pair of card guides red 80 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
7 Pair of card guides black 160 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
7 Pair of card guides black 80 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.

System-Module CompactPCI - 6+3 U-Rear I/O and 4 U-Rear I/O

System-Module CompactPCI-6+1U-Rear I/O

order no.: **409. 122 301**

Consists of:

1 subrack *RFI-SHIELDED CPCI / REAR I/O*
84 HP, 260 mm nom. depth
(160 mm at the front, 80 mm at the rear)
1 Backplane 8 Slot, 6 U, 64 Bit, system slot right
1 ATX 300W power supply unit with a wide-range input and PFC, with assembled front panel.
(optional front panel for a drive over the power supply).
1 Blind front panel 16 HP at the front.
1 Blind front panel 4 HP at the front.
1 Blind front panel 48 HP at the rear.
1 Blind front panel 8 HP at the rear.
1 Fan drawer with integrated fan.
1 Pair of card guides red 160 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
1 Pair of card guides red 80 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
7 Pair of card guides black 160 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
7 Pair of card guides black 80 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.

System-Module CompactPCI-4 U-Rear I/O

order no.: **409. 122 300**

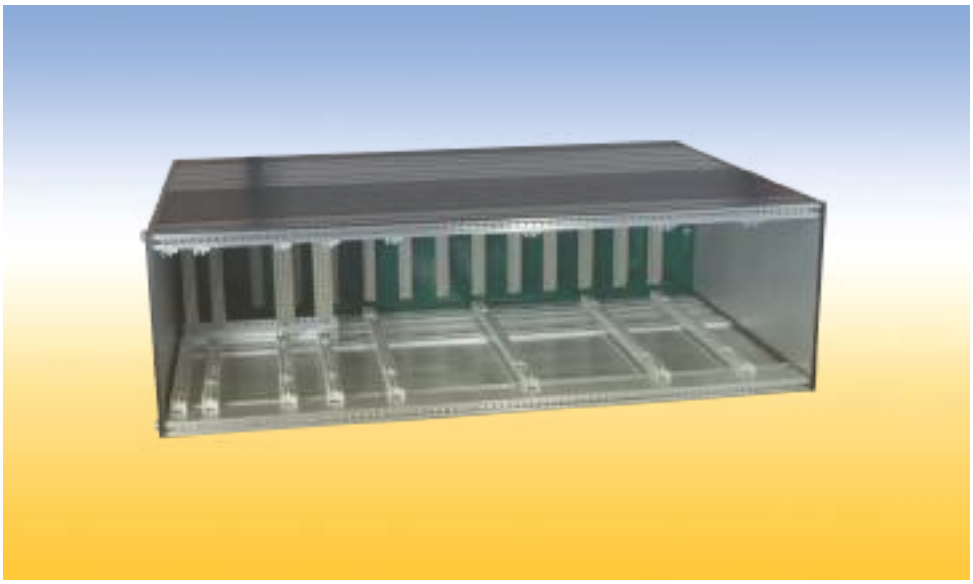
Consists of:

1 subrack *RFI-SHIELDED CPCI / REAR I/O*
84 HP, 260 mm nom. depth
(160 mm at the front, 80 mm at the rear)
for horizontal embedded 6 U PCB's
1 Backplane 4 Slot, 6 U, 64 Bit, system slot right
(1 Slot free e. g. for hard disk or driver)
2 Front panels 6 U - 4 HP (1 at the front, 1 at the rear)
1 ATX 300 W power supply unit with a wide-range input and PFC, with integrated 32 HP Front panel at the front.
1 Fan
1 Pair of card guides red 160 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
1 Pair of card guides red 80 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
4 Pair of card guides black 160 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.
4 Pair of card guides black 80 mm (CPU) including IEEE-coding and ESD-spring in the bottom card guide.

System-Module

❑ **Housing** ❑ **Subrack**	pieces _____ pieces _____
Dimensions	**height:** ❑ 3 U ❑ 6 U ❑ other _____ U **width:** ❑ 84 HP ❑ 42 HP ❑ other _____ HP **depth:** ❑ 260 mm ❑ other _____ mm
Backplane	❑ **CPU** number of slots _____ ❑ **J1 VME** number of slots _____ ❑ **J1/J2 Monilithic VME** number of slots _____ ❑ **VME64x** number of slots _____ Rear I/O: ❑ 80 mm ❑ other _____ mm ❑ **CPCI** number of slots _____ System slot: ❑ right ❑ left Width system slot: ❑ 4 HP ❑ 8 HP Rear I/O : ❑ 80 mm ❑ other _____ mm
Mounting position PCB	❑ horizontal ❑ vertical
Depth of the PCB	❑ 160 mm ❑ other_____ mm
Power supply / PSU	❑ AC / DC ❑ DC / DC ❑ ATX ❑ 300 Watt ❑ 400 Watt ❑ 19“ ❑ 300 Watt ❑ 400 Watt ❑ other Watt _____ ❑ active ventilation of the system
Accessories	❑ Harddisc ❑ CD-ROM ❑ Keypad
Notes	_____ _____ _____ _____

Please ask your local representative for your
individual system-module-configuration.
You find your contact person on our homepage:
www.intermas-el.com



Description
Special design features of the subrack InterProtect®:

√ Upper and lower cover are made of a solid extruded aluminium profile. The surface is passivated

√ Profiles have 11 screwing points on each side in order to fix the side panels.

√ Profiles are equipped with channels to insert mounting or threaded strips. These strips are designated to fix frontpanel, rear wall, card guides and connectors resp. backplanes.

√ Connector and backplane sections can be realized with nominal depth of 160, 180, 220 und 240 mm.

√ Card guides with a nominal depth of 160 and 220 mm, optionally snap-in or screwable can be used.

√ The side walls, front panel and rear wall are made of seawater resistant aluminium. They have a material thickness of 4 mm and are passivated.

√ Front panel and rear wall are each fixed with 28 (42HP) resp. 52 (84HP) screws on the 3U subrack, and with 36 (42HP) resp. 60 (84HP) screws on the 6U subrack.

√ The usage of high-quality sealing materials guarantees an optimal protection against dirt, dust and the intrusion of water.

√ An optimal shielding is achieved by the usage of conductive sealings.

√ Sealings are made of silicone resp. the conductible variant of silicone, filled with particles of nickel-plated graphite. Upon request it is also possible to use sealings made of fluorine silicone or of conductible par-ticles of silver-plated aluminum.

Delivery form:
Supplied as unassembled kits.
These are either packed as a kit of parts for one unit or as individual components, whereby parts of similar type are packed together.

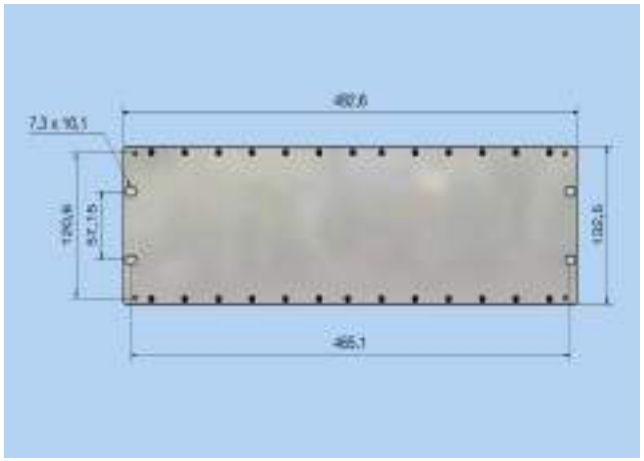
On request, delivered as assembled and wired subrack according your requirements.

Subrack *InterProtect*®

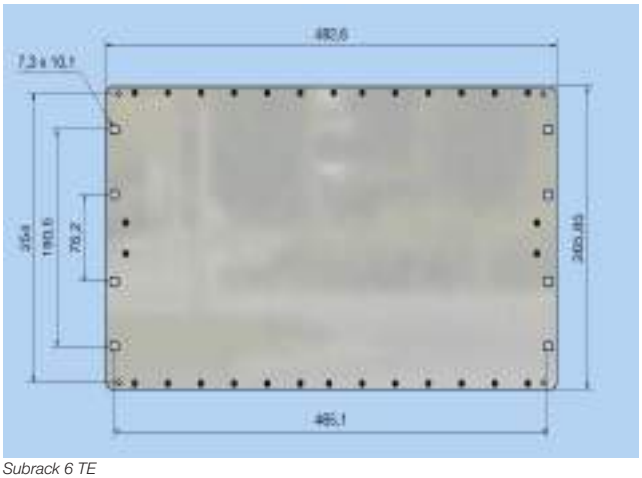
Technical Data

Dimension	Acc. to DIN 41 494/ IEC 60 297
Width / horizontal pitch	84 / 42 usable HP / 5,08
Depth of backplane	160, 180, 220, 240 mm (Nominal depth)
Attachment of plug-in connector	M 2,5 as grid of 5,08 mm for plug-in connectors acc. to DIN 41 612, VG 95 324, IEC 60 603-2
Materials	screws: stainless steel, assembly and threaded strips: steel or stainless steel, other parts: aluminium
Surfaces	aluminium parts: passivated, steel parts zink-cromated and passivated
Protection class	acc. to DIN EN 60529, IP66
Temperature range	-55 to +160 °C
Protective earthing	After assembly all metal parts have an electrically conductive interconnection acc. to VDE 100/12.65, § 6 Nb

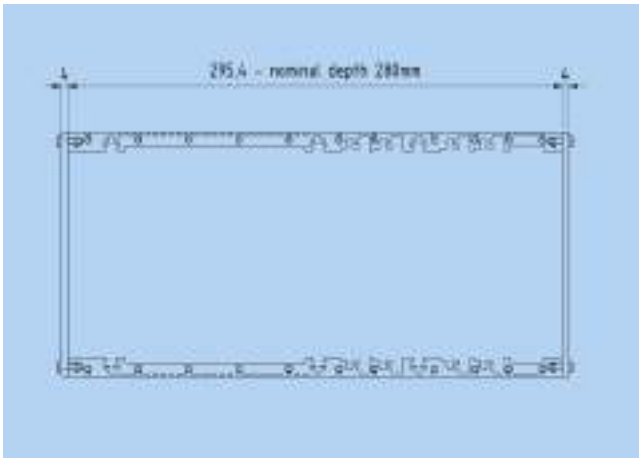
Dimension



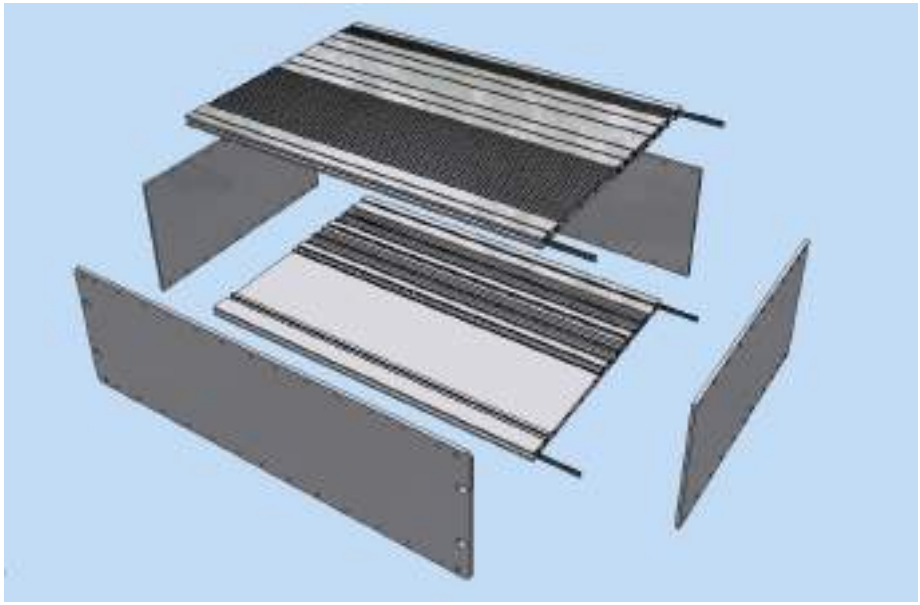
Subrack 3 TE



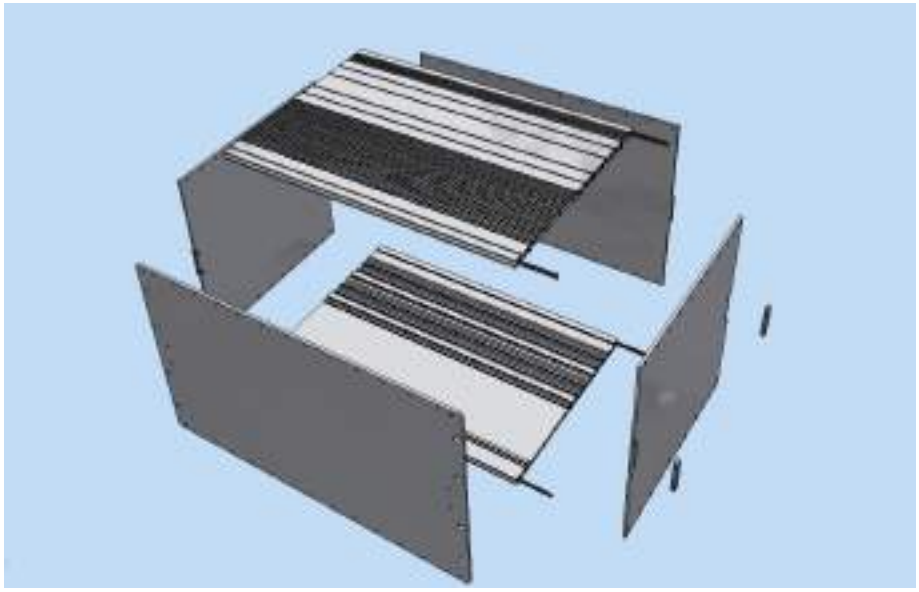
Subrack 6 TE



Depth dimensions of subrack



Subrack 3U



Subrack 6 U

Ordering details for kits

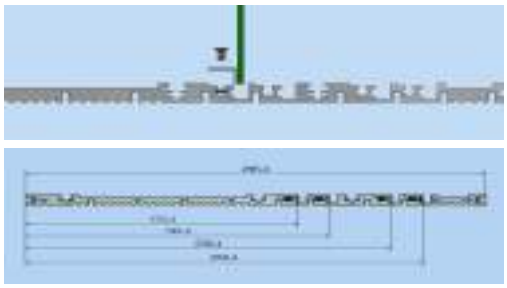
	nom. depth [mm]	order no. **409.**
3 U - subrack		
42-3-280	280	**138 802**
84-3-280	280	**138 803**
6 U - subrack		
42-6-280	280	**138 821**
84-6-280	280	**138 822**

Subrack *InterProtect*®

Delivery

	pieces per kit 3U-42HP	pieces per kit 3U-84HP	pieces per kit 6U-42HP	pieces per kit 6U-84HP
Subrack profile 280	2	2	2	2
Side panel 280	2	2	2	2
Front panel	1	1	1	1
Rear panel	1	1	1	1
Threaded strip	4	4	4	4
Pan-head screw M3x12	28	52	36	60
Pan-head screw M4x16	44	44	44	44
Connector 6U	-	-	4	4
Countersunk scew M3x6	-	-	8	8

Sealings are not included. They must be ordered in accordance to your application and requirements.
Further details and possibilities of other applications can be found in the chapter Subrack-Accessories

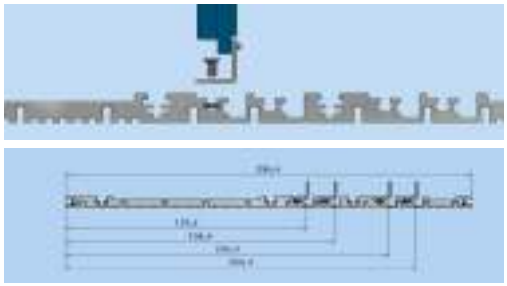


Kit for backplane fixing bar
Material: aluminium
Finish: passivated (TCP)

Scope of delivery:
2 backplane fixing bars
2 treaded strips
Fixing screws

Ordering details for kits

	order no. 409.
Backplane-fixing bars 42HP	**138 976**
Backplane-fixing bars 84HP	**138 977**



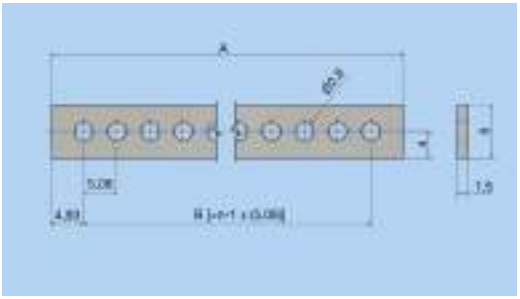
Kit for pin assignment

Material: aluminium
Finish: passivated (TCP)

Scope of delivery:
2 connector fixing
2 treaded strips
Fixing screws

Ordering details for kits

	order no. 409.
connector fixing 42HP	**138 978**
connector fixing 84HP	**138 979**



Mounting strip for snap-in card guide

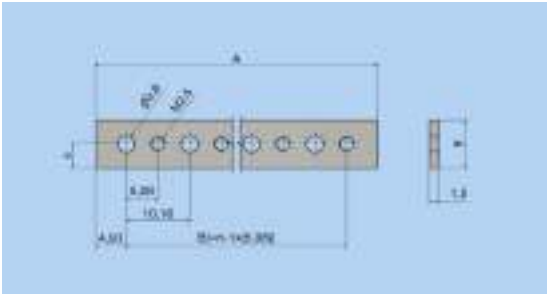
Material: steel or stainless steel
Finish: electrogalvanized, passivated resp. stainless steel blank

Every card guide section requires 4 assembly strips.

Ordering details for kits snap-in

n = number of holes	A [mm].	B [mm]	steel order no. **409.**	stainless steel order no. **409.**
42	218,14	202,28	**138 811**	**138 872**
84	431,50	421,64	**138 812**	**138 873**

Other lengths on request.



Mounting strip for screwable card guide

Material: steel or stainless steel
Finish: electrogalvanized, passivated resp. stainless steel blank

Every card guide section requires 4 assembly strips.

Ordering details for kits screwable

n = number of holes	A [mm].	B [mm]	steel order no. **409.**	stainless steel order no. **409.**
42	218,14	202,28	**138 870**	**138 874**
84	431,50	421,64	**138 871**	**138 875**

Other lengths on request.

Subrack *InterProtect*® Sealing

Ordering details for kits

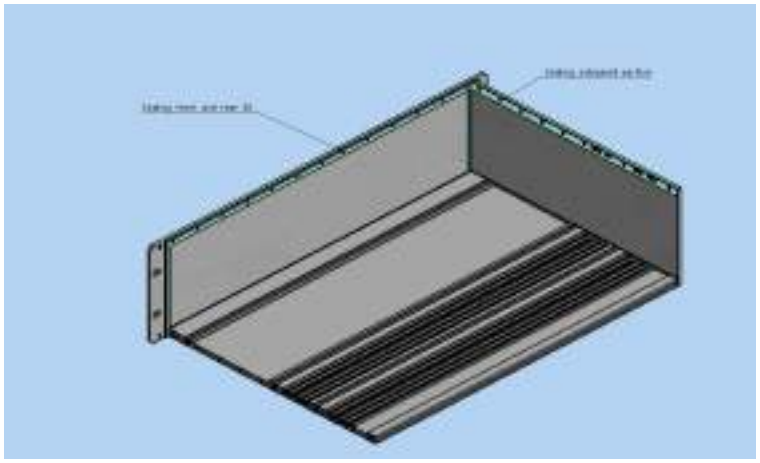
Sealing kit	*Sealing kit* IP * order no. **409.**	*Sealing kit* IP/EMV ** order no. **409.**
3U-42HP	**138 905**	**138 906**
3U-84HP	**138 908**	**138 909**
6U-42HP	**138 911**	**138 912**
6U-84HP	**138 914**	**138 915**

* Sealings are made of silicone / ** Sealings are made of silicone filled with particles of nickel-plated graphite.

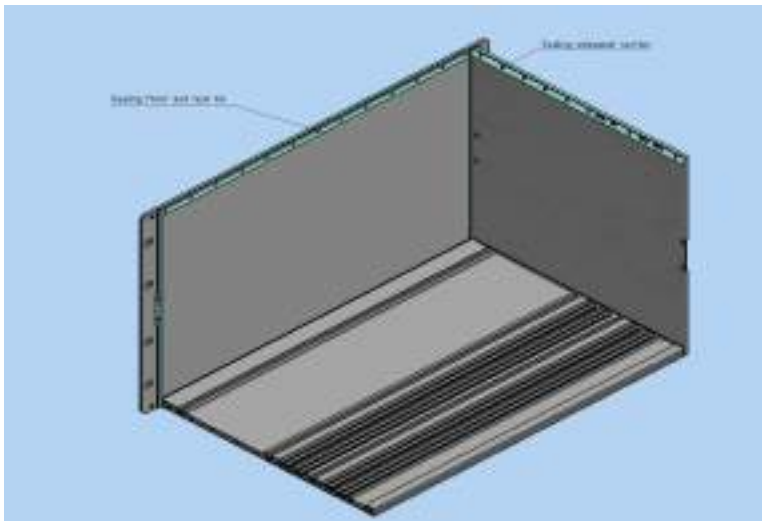
Scope of dedelivery:

2 Sealing right and left
2 Sealing left and right
2 Sealing F/R

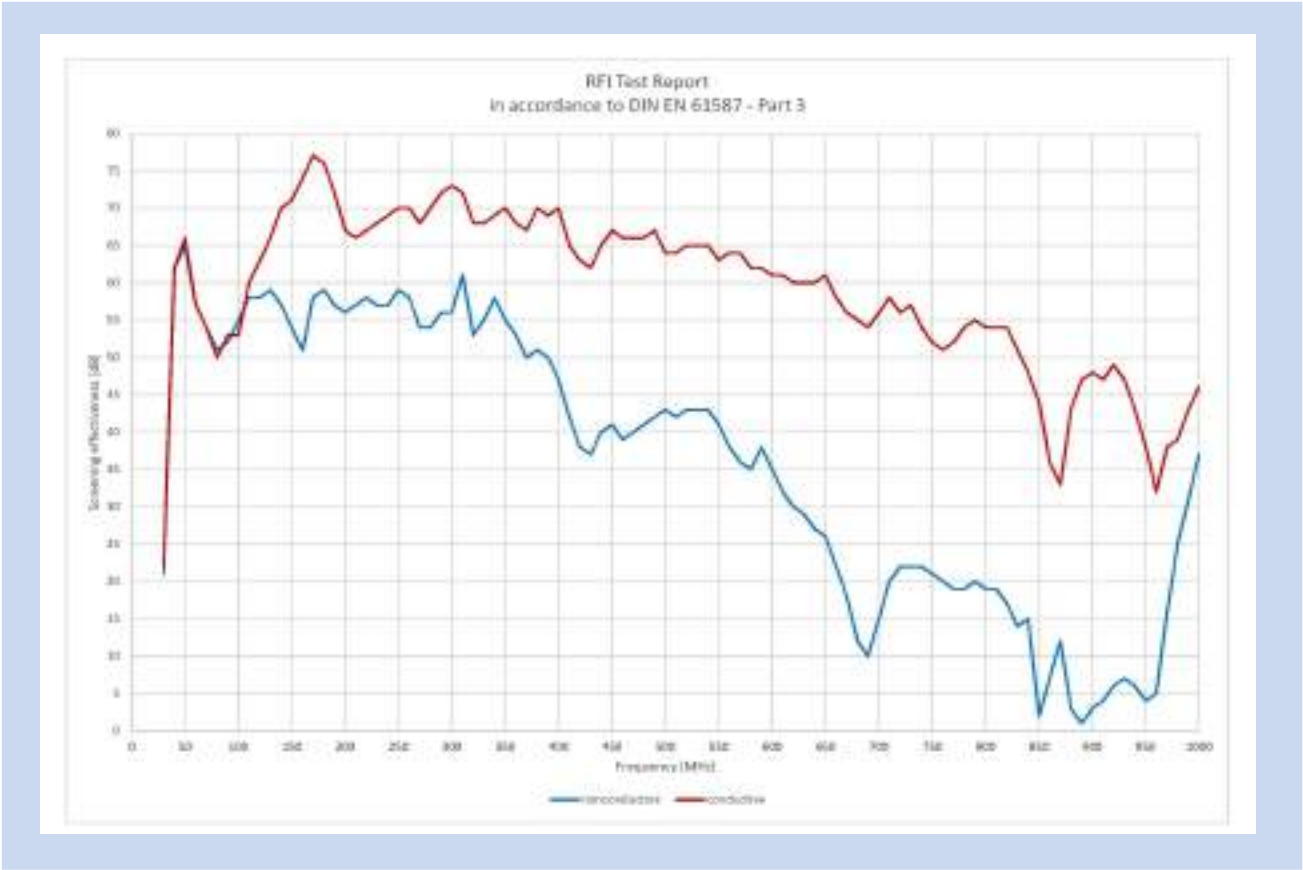
Realisation of the shielding



Subrack 3U



Subrack 6U



Shielding efficienc depends on the material of the used sealing material.

Shielding effectiveness:
The shielding effectiveness of the empty subrack was determined in accordance with DIN EN 61 587-Part 3.

Testing institute:
The measurements were performed at *hummel electronic* in Fellbach, Germany.

Test specimen 1
This subrack was equipped with sealings made of silicone, filled with particles of nickel-plated graphite.

Test specimen 2
This subrack was equipped with sealings made of silicone.

Subrack configuration *InterProtect*®

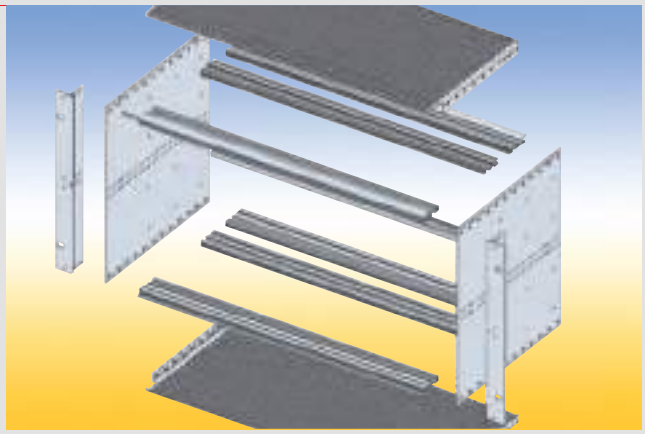
Configuration module

❑ **Subrack**	piece _____
Dimensions	**height:** ❑ 3 U ❑ 6 U ❑ other _____ U **width:** ❑ 84 HP ❑ 42 HP ❑ other _____ HP **depth:** ❑ 280 mm
Backplane	❑ **CPU** number of slots _____ ❑ **J1 VME** number of slots _____ ❑ **J1/J2 Monolithic VME** number of slots _____ ❑ **VME64x** number of slots _____ ❑ **CPCI** number of slots _____ Systemslot: ❑ right ❑ left width Systemslot: ❑ 4 HP ❑ 8 HP
Depth of PCB:	❑ 160 mm ❑ 180 mm ❑ 220 mm ❑ 240 mm
Accessories:	❑ Backplane-mounting bracket ❑ Connector fixing ❑ Installation strip: card strip snap-in ❑ Installation strip: card strip screwable ❑ Sealing: ❑ Silicone ❑ Silicone with particles of nickel-plated graphite
Notes	_____ _____ _____ _____

Subrack Accessories

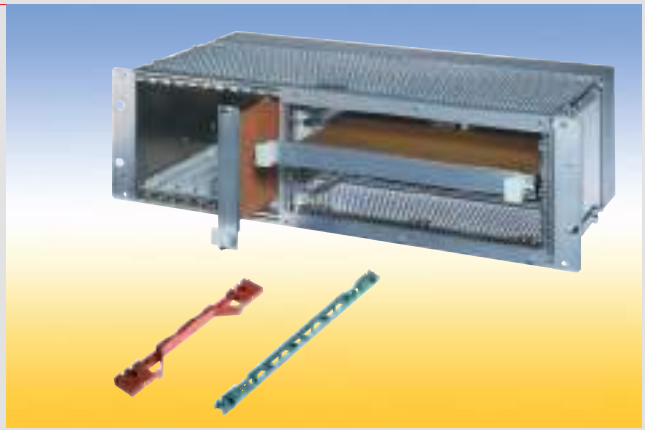
Single Parts

- √ Side Panels
- √ Flanges
- √ Closing Profiles
- √ Handle
- √ Side Panel Extender
- √ Side Panel Connector
- √ Horizontal Rails
- √ Cover Plates
- √ Rear Covers



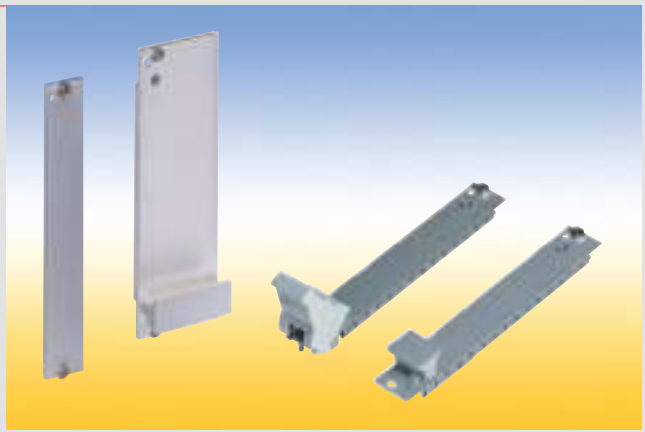
Configurations

- √ Subrack Divider
- √ Partition Wall
- √ Labelling Rail, Locking Rail, Label Strip
- √ Threaded Strips
- √ Z-Rail A, Mounting Rail B
- √ Card Guide and Accessories

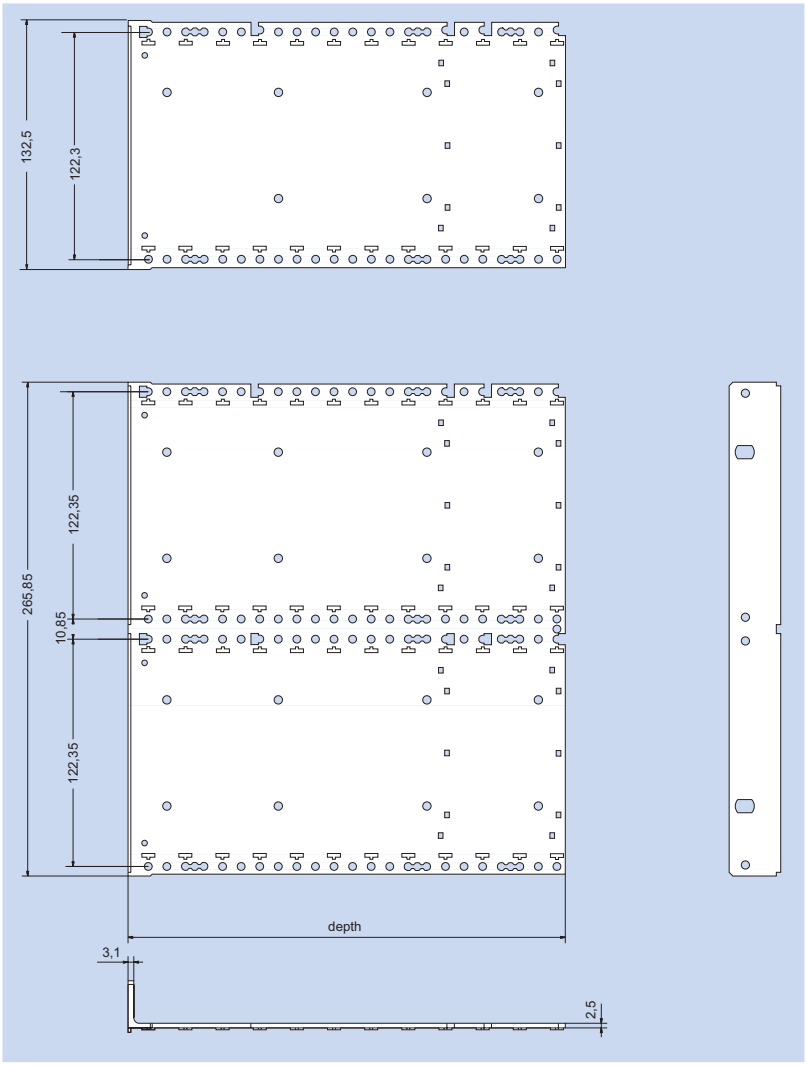


Front Panels and Handles

- √ Blind Front Panels
- √ Front Panels with Handle
- √ Front Panels with Ejector Handle
- √ Front Panels with IEEE-Handle
- √ Plastic Front Panels



Side Panel Fi



for subrack *FLEXIBLE Fi* and *InterRail* (not for *InterRail SNCF*)

Side Panel Fi (flange integrated)
The side panel and the flange are extruded in one piece.

Material: aluminum, extruded
Finish: colorless anodized or passivated

Ordering details

	nom. height [U]	nom. depth [mm]	depth [mm]	anodized order no. **409.**	chromated order no. **409.**
Side panel Fi - 3 - 160	3	160	175.4	**085 001**	**110 248**
Side panel Fi - 3 - 220	3	220	235.4	**085 002**	**110 234**
Side panel Fi - 3 - 280	3	280	295.4	**085 003**	**110 249**
Side panel Fi - 6 - 160	6	160	175.4	**085 095**	**110 201**
Side panel Fi - 6 - 220	6	220	235.4	**085 096**	**110 238**
Side panel Fi - 6 - 280	6	280	295.4	**085 097**	**110 202**

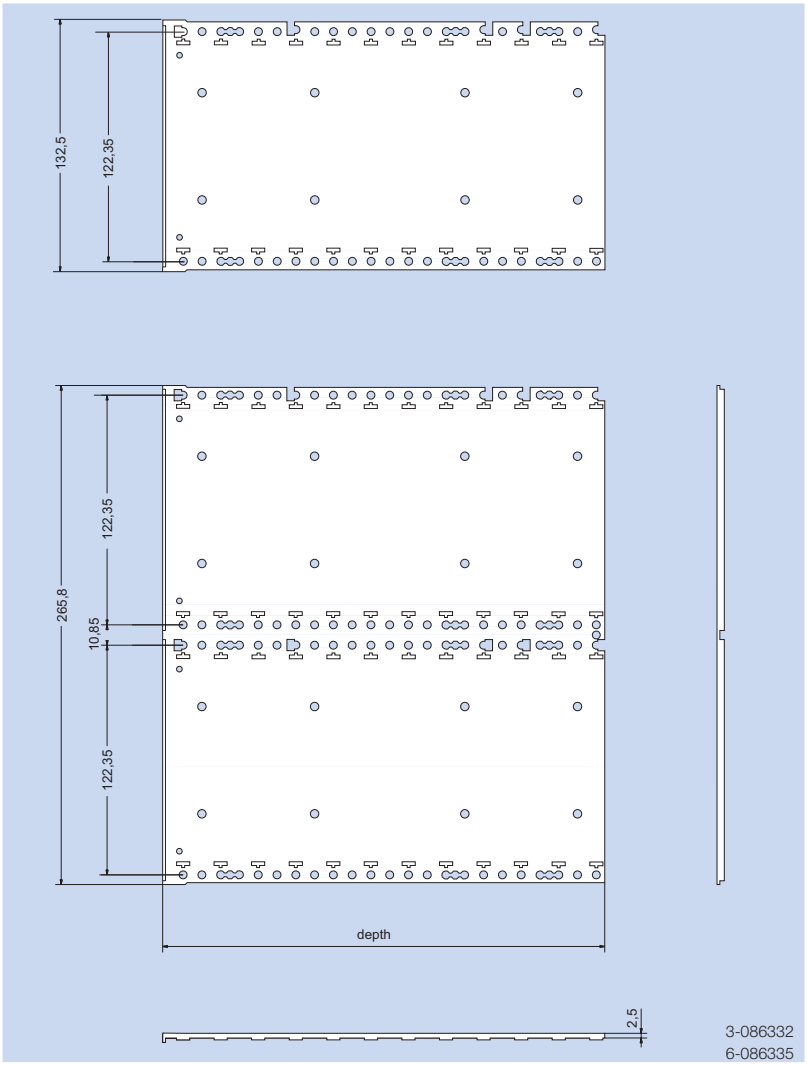
Accessories

Hexagonal cupped point head screw M 4 x 16, Torx T 20
For assembly of the side panel to the horizontal rails.

Minimumm order quantity 100 pieces
order no.: **409. 052 156**

Self tapping hexagonal cupped point head screw M 4 x 16, Torx T 20
For assembly of the side panel to the horizontal rails for subrack InterRail.

Minimumm order quantity 100 pieces
order no.: **409. 078 693**



for subrack *FLEXIBLE Fs*

Side Panel Fs (flange seperate)

Material: aluminum, extruded
Finish: passivated

Ordering details

	nom. height [U]	nom. depth [mm]	depth [mm]	order no. **409.**
Side panel Fs - 3 - 160	3	160	174.2	**106 750**
Side panel Fs - 3 - 220	3	220	234.2	**086 333**
Side panel Fs - 3 - 280	3	280	294.2	**086 334**
Side panel Fs - 6 - 160	6	160	174.2	**097 286**
Side panel Fs - 6 - 220	6	220	234.2	**086 336**
Side panel Fs - 6 - 280	6	280	294.2	**086 337**

Accessories

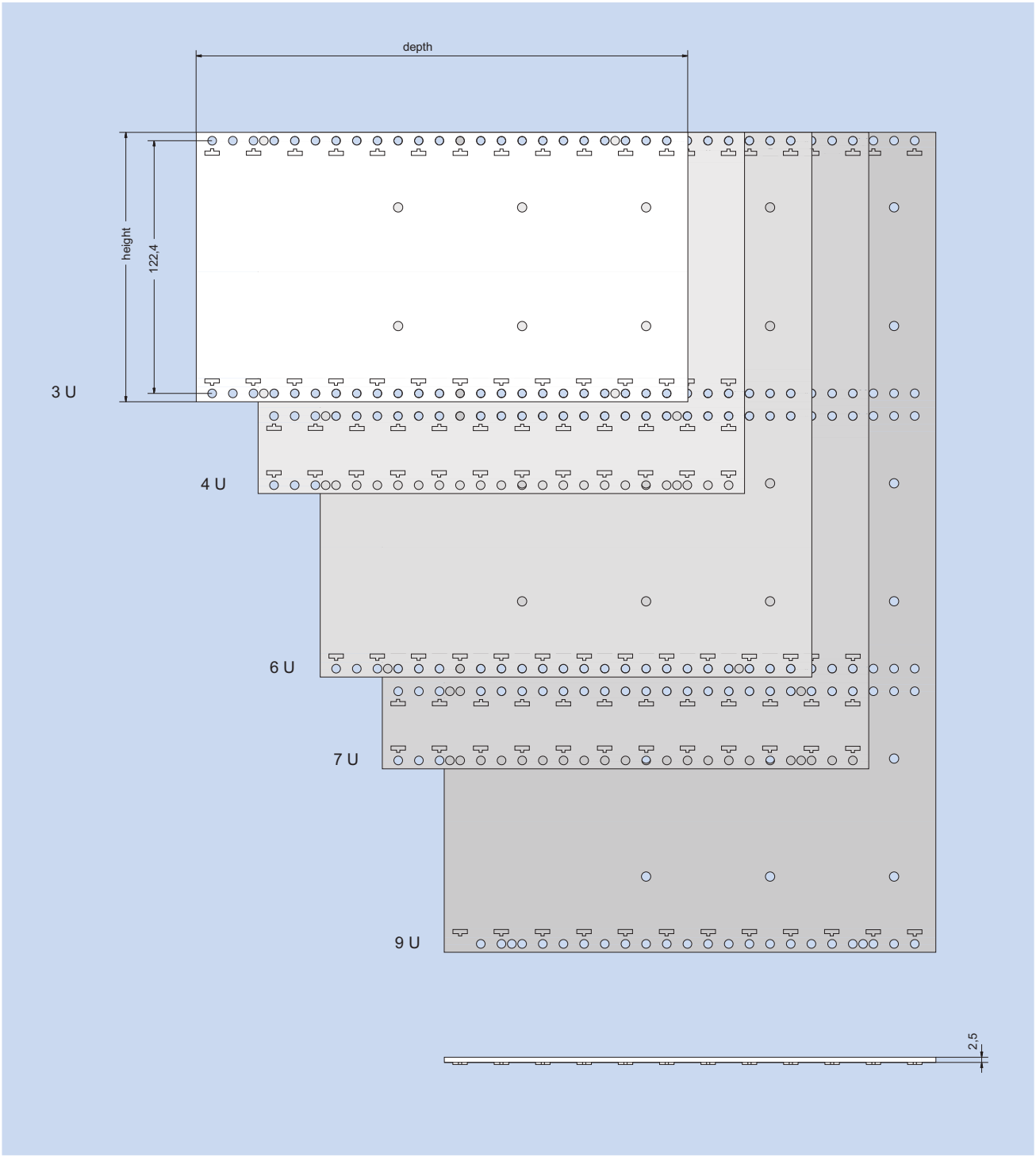
Hexagonal cupped point head screw M 4 x 16, Torx T 20

For assembly of the side panel to the horizontal rails.

Minimumm order quantity 100 pieces

order no.: **409. 052 156**

Side Panel RFI without Flange



for subrack *RFI-SHIELDED*

Side Panel RFI without flange

Material: aluminum, 2.5 mm thick
Finish: blank, seawater resistant

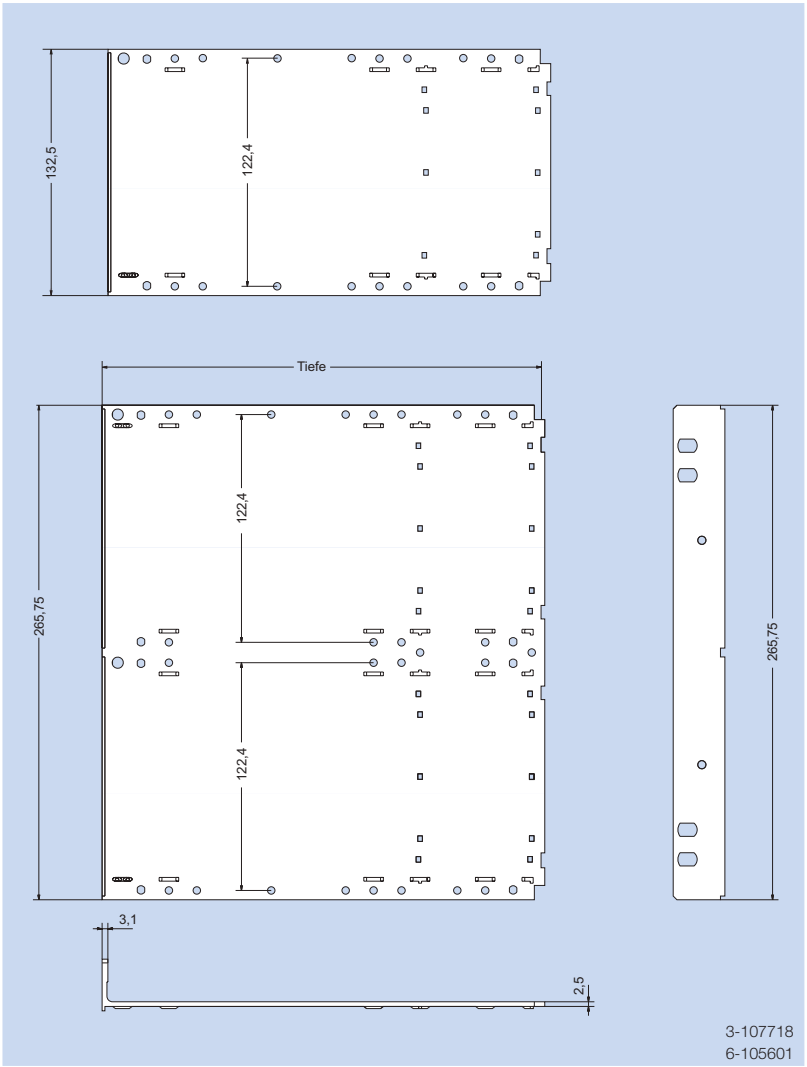
Ordering details

	nom. height [U]	height [mm]	nom. depth [mm]	depth [mm]	order no. **409.**
Side panel RFI - 3 - 160	3	130.50	160	177.9	**114 240**
Side panel RFI - 3 - 220	3	130.50	220	237.9	**114 241**
Side panel RFI - 3 - 240	3	130.50	240	257.9	**161 173**
Side panel RFI - 3 - 260	3	130.50	260	277.9	**161 174**
Side panel RFI - 3 - 280	3	130.50	280	297.9	**114 242**
Side panel RFI - 3 - 340	3	130.50	340	357.9	**114 243**
Side panel RFI - 4 - 280	4	174.95	280	297.9	**112 872**
Side panel RFI - 4 - 460	4	174.95	460	477.9	**112 876**
Side panel RFI - 6 - 160	6	263.85	160	177.9	**114 758**
Side panel RFI - 6 - 220	6	263.85	220	237.9	**114 759**
Side panel RFI - 6 - 240	6	263.85	240	257.9	**161 188**
Side panel RFI - 6 - 260	6	263.85	260	277.9	**161 189**
Side panel RFI - 6 - 280	6	263.85	280	297.9	**114 760**
Side panel RFI - 6 - 340	6	263.85	340	357.9	**114 762**
Side panel RFI - 6 - 460	6	263.85	460	477.9	**114 766**
Side panel RFI - 7 - 240	7	308.30	240	257.9	**161 193**
Side panel RFI - 9 - 220	9	397.20	220	237.9	**161 155**
Side panel RFI - 9 - 280	9	397.20	280	297.9	**161 156**
Side panel RFI - 9 - 340	9	397.20	340	357.9	**161 157**
Side panel RFI - 9 - 460	9	397.20	460	477.9	**161 160**

Accessories

	order no. **409.**
For assembly of the side panel to the pr Minimumm order quantity 100 pieces	
Hexagon cupped point head screw M 4 x 16 Torx T 20	**052 156**
For assembly of the middle pro led rail by using an outside xed cover plate. Minimum order quantity 10 pieces	
Hexagon head scr	**026 068**

Side Panel *InterRail® SNCF*



for subrack *InterRail SNCF*

Side Panel *InterRail SNCF*

Material: aluminum, extruded
Finish: passivated

Ordering details

	nom. height [U]	nom. depth [mm]	depth [mm]	order no. **409.**
Side panel *InterRail - SNCF* - 3 - 220	3	220	237.9	**107 719**
Side panel *InterRail - SNCF* - 6 - 220	6	220	237.9	**105 602**

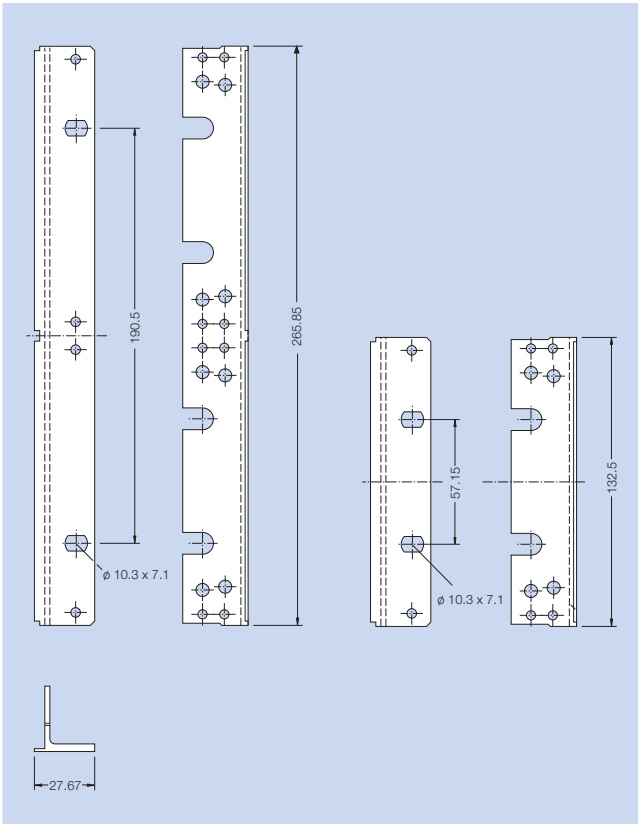
Accessories

Self tapping hexagonal cupped point head screw M 4 x 16, Torx T 20

For assembly of the side panel to the horizontal rails.

Minimumm order quantity 100 pieces

order no.: **409. 087 639**



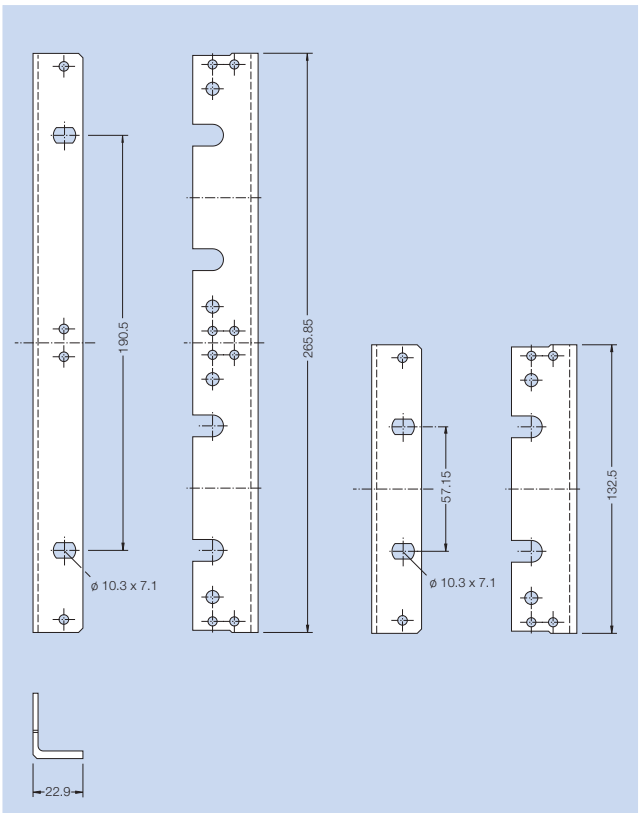
for subrack *FLEXIBLE Fs*

Flange F
The flange can be mounted to the side panel by means of the mounting screws for the horizontal rails.

Material: aluminum, extruded
Finish: anodized

Ordering details

	order no. **409.**
Flange F - 3 U	**086 787**
Flange F - 6 U	**086 791**



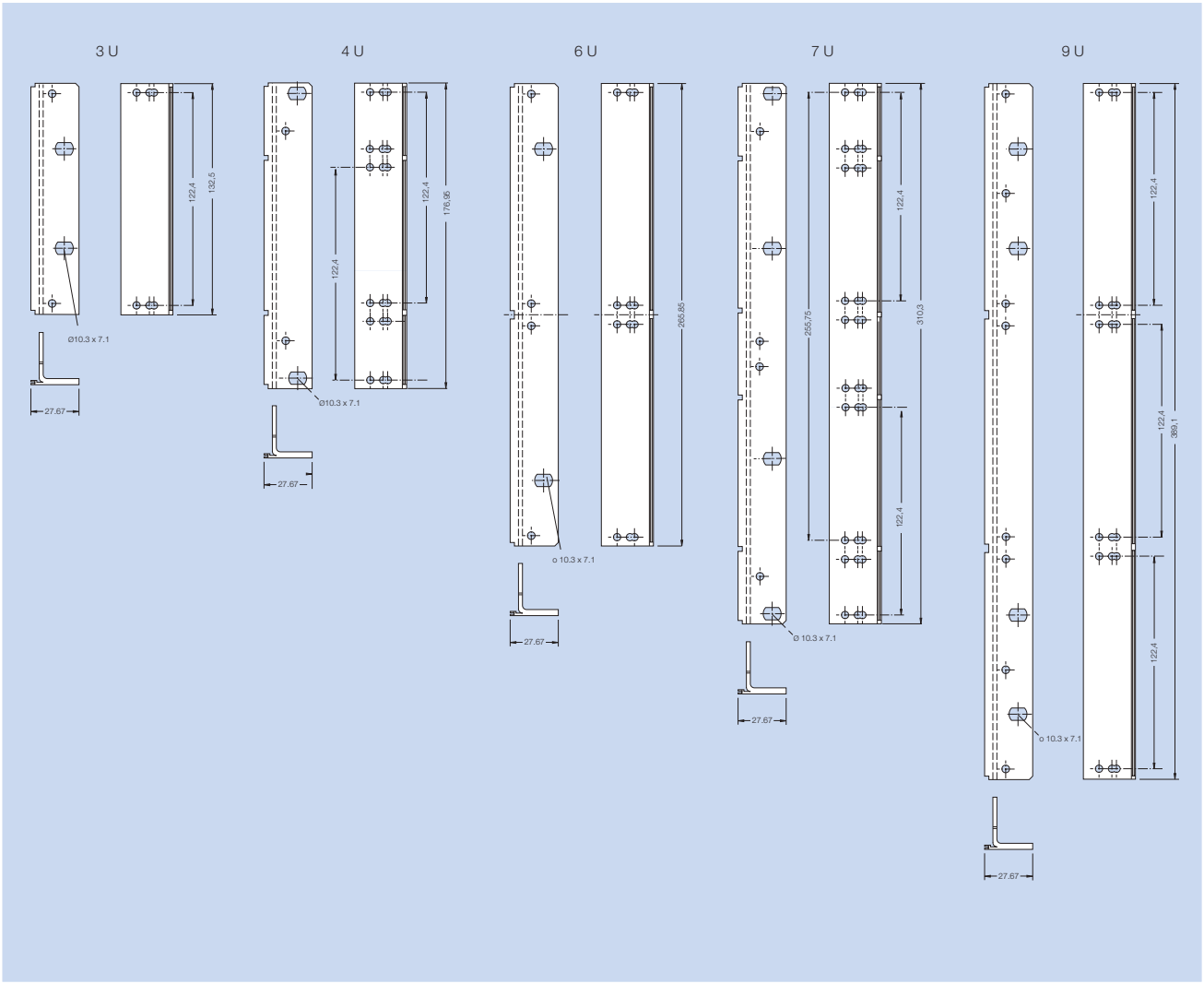
Flange without Nose
This flange can be mounted at various depth on the side panel grid.

Material: aluminum, extruded
Finish: anodized

Ordering details

	order no. **409.**
Flange without nose - 3 U	**087 802**
Flange without nose - 6 U	**087 824**

Flange RFI



for subrack *RFI-SHIELDED*

Flange RFI
The flange can be mounted to the side panel by means of the mounting screws for the horizontal rails.
With slits in the side edges for insertion of RFI springs.

Material: aluminum, extruded
Finish: passivated

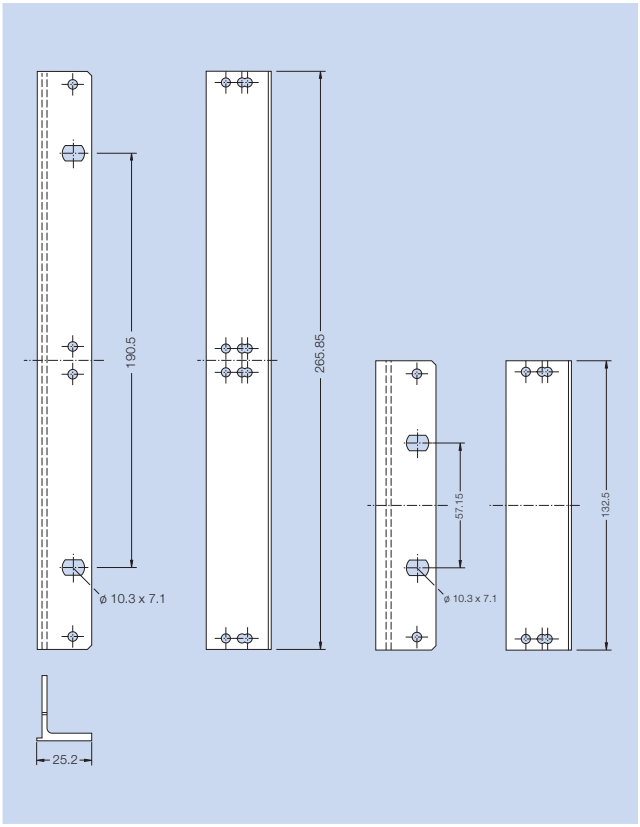
Ordering details

	nom. height [U]	order no. **409.**
Flange RFI - 3	3	**112 202**
Flange RFI - 4	4	**114 612**
Flange RFI - 6	6	**112 205**
Flange RFI - 7	7	**114 618**
Flange RFI - 9	9	**112 234**

Accessories

	order no. **409.**
RFI-spring F3 - 2 U	**112 386**
RFI-spring F3 - 3 U	**111 636**
RFI-spring F3 - 4 U	**112 387**
RFI-spring F3 - 6 U	**111 637**

Flange RFI - FP,
Flange for Wall Mounting



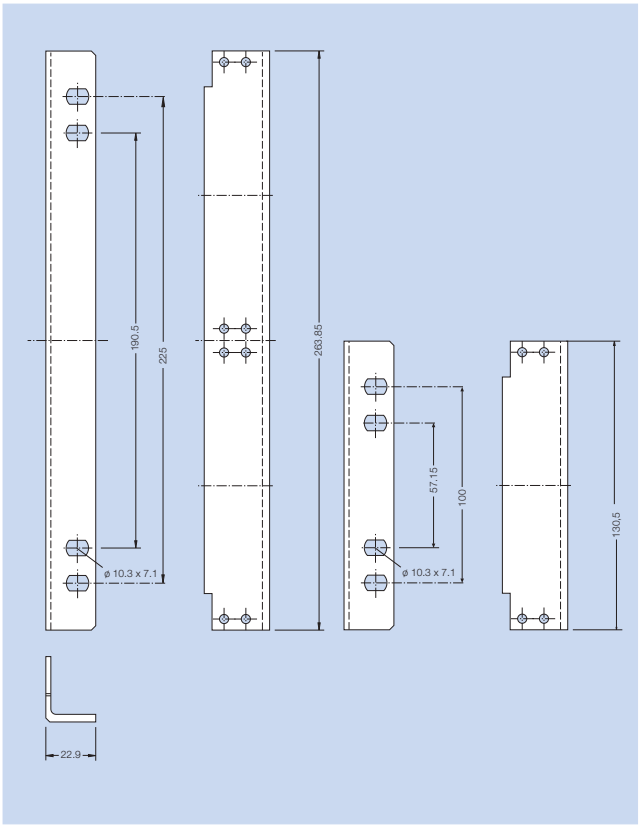
Flange RFI - FP

This flange is suitable for mounting of a continous front panel of 85 HP and a hinged front panel of 85 HP in a subrack. The flange will be mounted to the side panel by means of the mounting screws for the horizontal rails.

Material: aluminum, extruded
Finish: passivated

Ordering details

	order no. **409.**
Flange RFI - FP - 3 U	**114 708**
Flange RFI - FP - 6 U	**114 715**



Flange for Wall Mounting

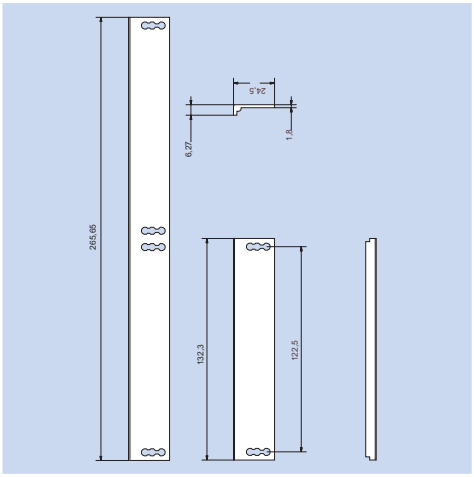
For mounting of a subrack on a wall.

Material: aluminum
Finish: blank, seawater resistant

Ordering details

	order no. **409.**
Flange for wall mounting - 3 U	**161 110**
Flange for wall mounting - 6 U	**161 113**

Closing Profiles F and RFI -F3
Handle



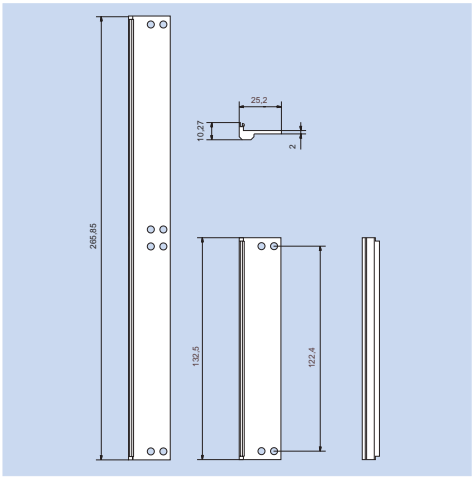
Closing Profile F

For covering the slit between front panel and side panel.
The closing profile will be mounted to the side panel by means of the mounting screws for the horizontal rails.

Material: aluminum, extruded
Finish: anodized

Ordering details

	order no. 409.
Closing profile F - 3 U	**085 695**
Closing profile F - 6 U	**085 696**



Closing Profile RFI -F3

For covering the slit between front panel and side panel.
The closing profile will be mounted to the side panel by means of the mounting screws for the horizontal rails.
With slits for insertion of RFI-springs.

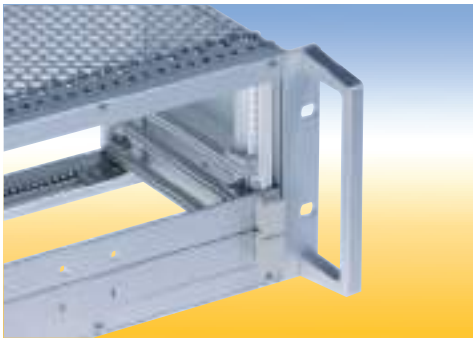
Material: aluminum, extruded
Finish: passivated

Ordering details

	order no. 409.
Closing profile RFI - F3 - 3 U	**122 131**
Closing profile RFI - F3 - 6 U	**118 374**

Accessories

	order no. 409.
RFI-spring F3 - 3 U	**111 636**
RFI-spring F3 - 6 U	**111 637**



Handle

Material: aluminum
Finish: anodized

Ordering details

	order no. 409.
Handle -3 U	**040 419**
Handle -6 U	**040 420**

Accessories
Counter sunk screw M4 x 10, Torx
Minimumm order quantity 100 pieces
order no.: **409. 105 789**

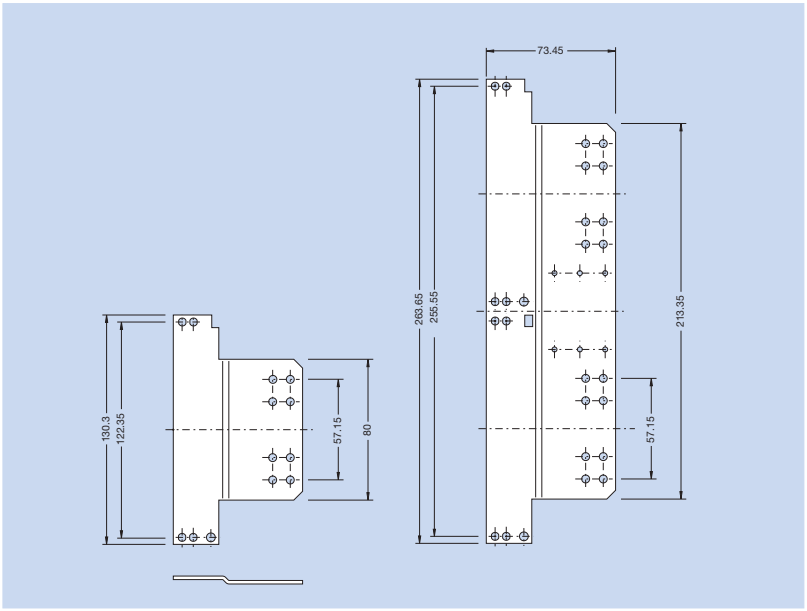
Mounting parts for fastening a subrack into a housing

Screw retrainer M6
Color: black
Material: POM
Minimum order quantity 10 pieces
order no.: **409. 074 387**

Oval head screw
M6 x 16 DIN 7985
steel, nickel plated
Minimum order quantity 10 pieces
order no.: **409. 013 919**

This catalog contains stock and standard parts. Other products and sizes on request.

Side Panel Extender, Side Panel Connector



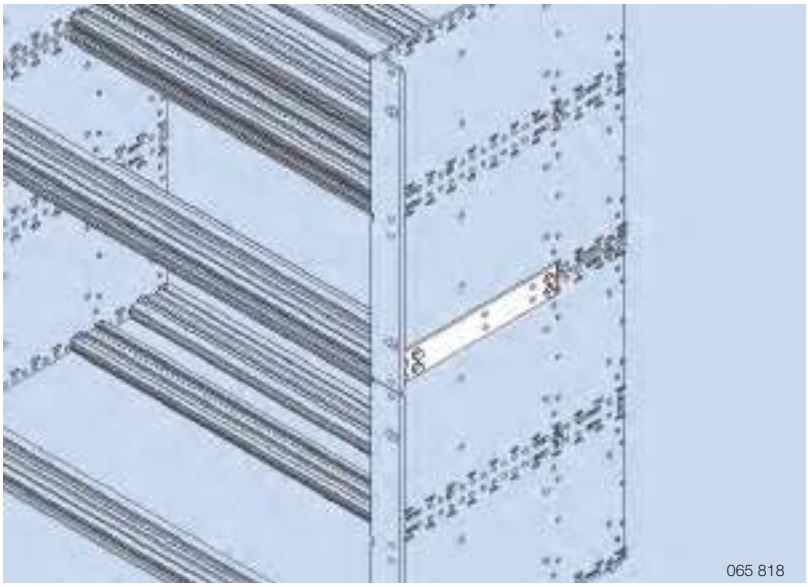
Side Panel Extender

Elongate a side panel about 60 mm to obtain a larger cabling space.
The side panel extender is mounted to the side panel by means of the mounting screws for the horizontal rails.

Material: aluminum, 2 mm thick
Finish: passivated

Ordering details

	order no. **409.**
Side panel extender 3 U	**087 820**
Side panel extender 6 U	**087 821**



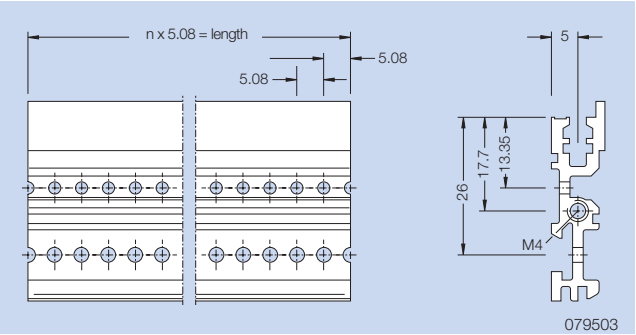
Side Panel Connector

Join two subracks, one above the other. The side panel connector is mounted to the side panels by means of the mounting screws for the horizontal rails. (nom. depth 160 mm).

Material: aluminum, 2 mm thick
Finish: blank

order no.: **409. 065 819**

Horizontal Rails



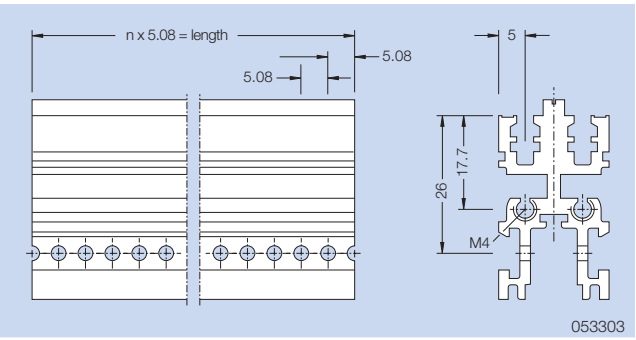
for subrack *FLEXIBLE Fi*

Front Profile VE1
(also rear profile by using a front panel on the rear).

Material: aluminum
Finish: anodized

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Front pr	21	106.68	**079 521**
Front pr	43	218.44	**079 543**
Front pr	85	431.80	**079 585**



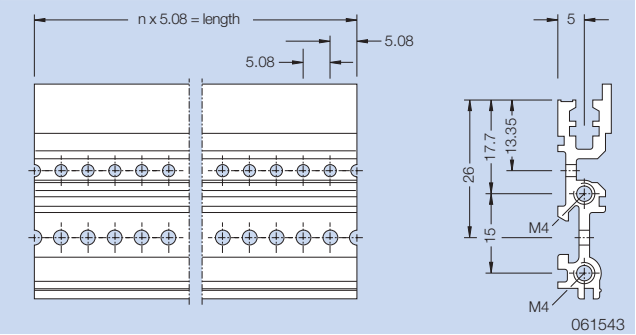
for subrack *FLEXIBLE, RFI-SHIELDED* and *InterRail*

Front Profile 2xVE1
For partition e.g. 6 U subracks into two fields of 3 U.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Front pr	21	106.68	**053 321**
Front pr	29	147.32	**053 329**
Front pr	43	218.44	**053 343**
Front pr	85	431.80	**053 385**



for subrack *FLEXIBLE*

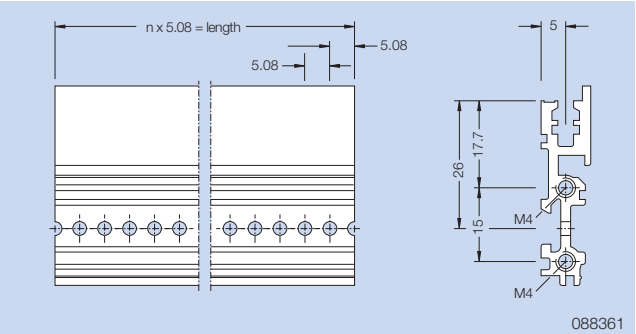
Front Pr
With 2 tapped holes.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Front pr	43	218.44	**062 043**
Front pr	85	431.80	**062 085**

This catalog contains stock and standard parts. Other products and sizes on request.



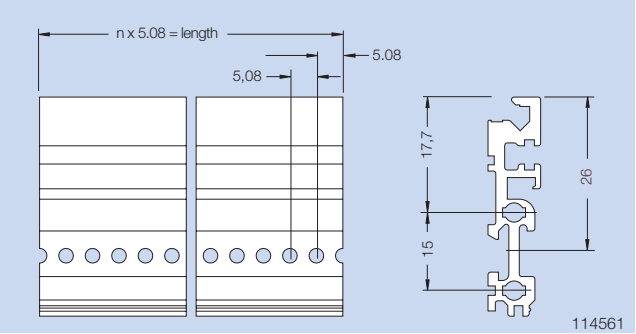
for subrack *RFI-SHIELDED*

Front Profile V12-RFI
(also rear profile by using a front panel on the rear).
With retainer for RFI-spring A2

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Front pr	43	218.44	**090 799**
Front pr	85	431.80	**088 365**



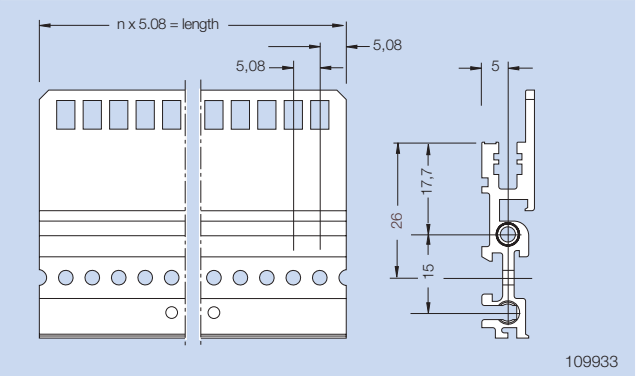
for subrack *RFI-SHIELDED*

Front Profile V12-SFP-RFI
For adapting a plug in front panel.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Front pr	85	431.80	**114 562**



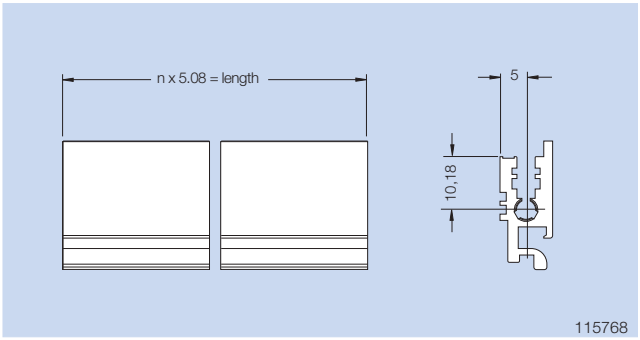
for subrack *RFI-SHIELDED* and *InterRail*

Front Profile V12-IEEE
With grid holes for IEEE handle.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Front pr	43	218.44	**111 182**
Front pr	85	431.80	**109 934**



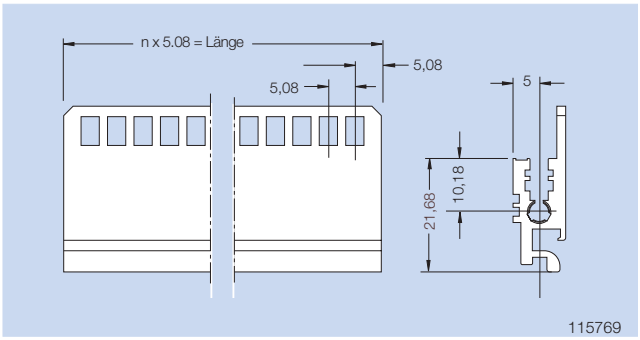
for subrack *InterRail*

Front Profile V1-HUCK
For subrack Rear I/O.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Front profile V1-HUCK	43	218.44	**116 588**
Front profile V1-HUCK	85	431.80	**115 823**



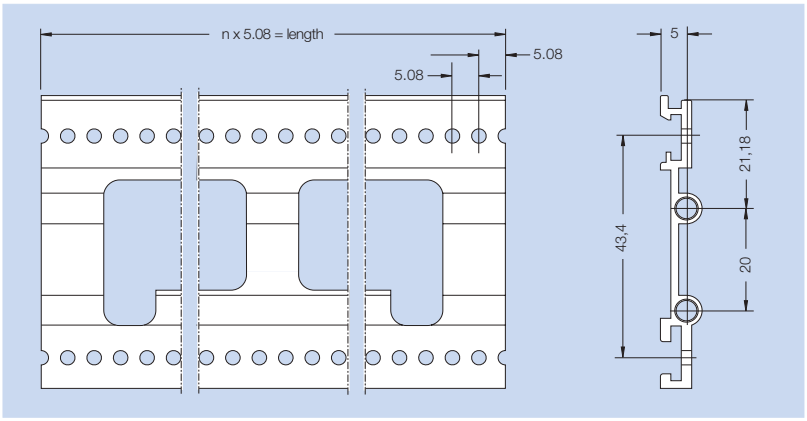
for subrack *RFI-SHIELDED* and *InterRail*

Front Profile V1-HUCK-IEEE
For subrack Rear I/O subrack. With grid holes for IEEE handle. Strengthened version.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Front profile V1-HUCK-IEEE	43	218.44	**116 507**
Front profile V1-HUCK-IEEE	85	431.80	**115 824**



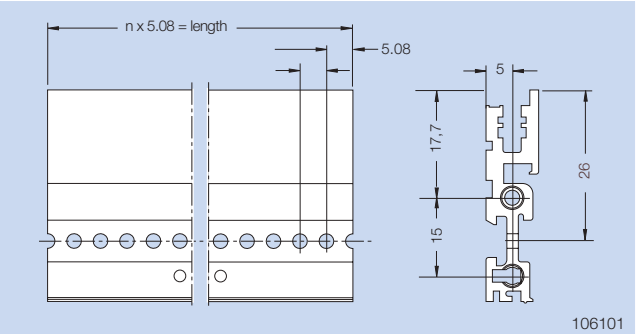
for subrack *RFI-SHIELDED* and *InterRail*

Support Profile
For insertion of card guides in subrack Rear I/O.

Material: aluminum
Finish: blank

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Support profile	43	218.44	**122 421**
Support profile	85	431.80	**115 771**



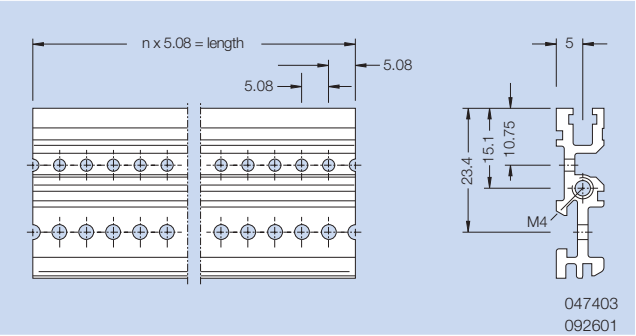
for subrack *RFI-SHIELDED* and *InterRail*

Front Profile V12-S-RFI
(also rear profile by using a front panel on the rear).
Strengthened version.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Front profile V12-S-RFI	37	187.96	**106 102**
Front profile V12-S-RFI	43	218.44	**116 586**
Front profile V12-S-RFI	85	431.80	**106 103**

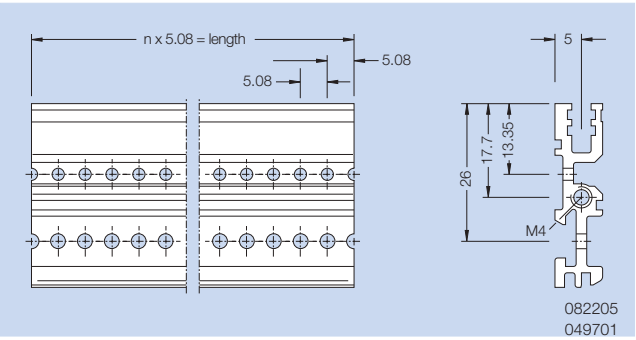


for subrack *FLEXIBLE* and *RFI-SHIELDED*

Rear Profile HE1
(type *alpha*).
Material: aluminum
Finish: anodized or passivated

Ordering details

	nom. width [HP]	length [mm]	anodized order no. **409.**	chromated order no. **409.**
Rear profile HE1	21	106.68	**047 421**	**161 245**
Rear profile HE1	43	218.44	**047 443**	**104 994**
Rear profile HE1	85	431.80	**047 485**	**092 602**



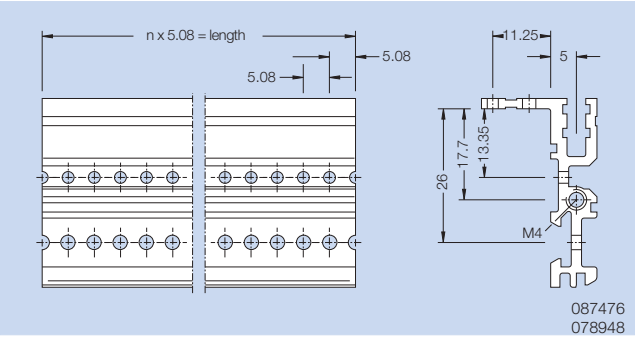
for subrack *FLEXIBLE* and *RFI-SHIELDED*

Rear Profile HE2
(type *delta*).
Material: aluminum
Finish: anodized or passivated

Ordering details

	nom. width [HP]	length [mm]	anodized order no. **409.**	chromated order no. **409.**
Rear profile HE2	21	106.68	**049 721**	**082 121**
Rear profile HE2	43	218.44	**049 743**	**082 143**
Rear profile HE2	85	431.80	**049 785**	**082 185**

Horizontal Rails



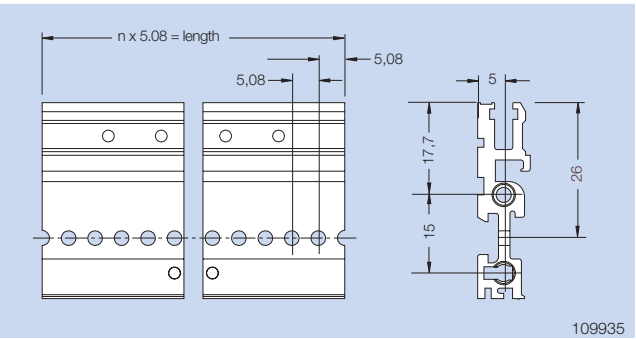
for subrack *FLEXIBLE*

Rear Profile HZE
(type *beta*) with integrated connector attachment.

Material: aluminum
Finish: anodized or passivated

Ordering details

	nom. width [HP]	length [mm]	anodized order no. **409.**	chromated order no. **409.**
Rear profile HZE	21	106.68	**047 221**	**108 061**
Rear profile HZE	43	218.44	**047 243**	**104 030**
Rear profile HZE	85	431.80	**047 285**	**087 475**



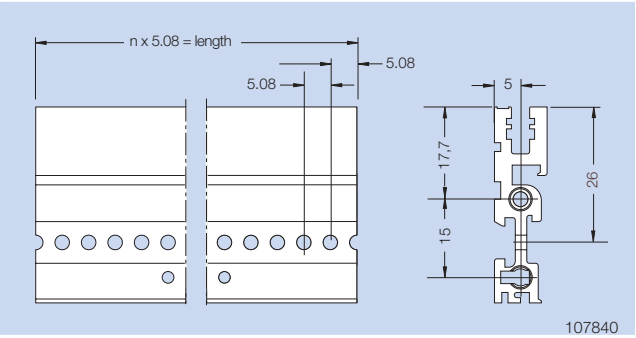
for subrack *RFI-SHIELDED* and *InterRail*

Rear Profile H22-RFI for scew on rear cover
(type *delta*) For use with a rear cover.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Rear profile H22-RFI for screw on rear cover	43	218.44	**109 937**
Rear profile H22-RFI for screw on rear cover	85	431.80	**108 246**



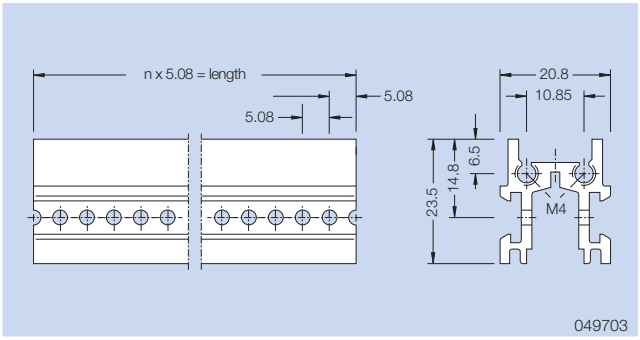
for subrack *InterRail*

Rear Profile H22-S-RFI
(type *delta*). Strengthened version.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Rear profile H22-S-RFI	37	187,95	**107 721**
Rear profile H22-S-RFI	43	218.44	**107 841**
Rear profile H22-S-RFI	85	431.80	**107 842**



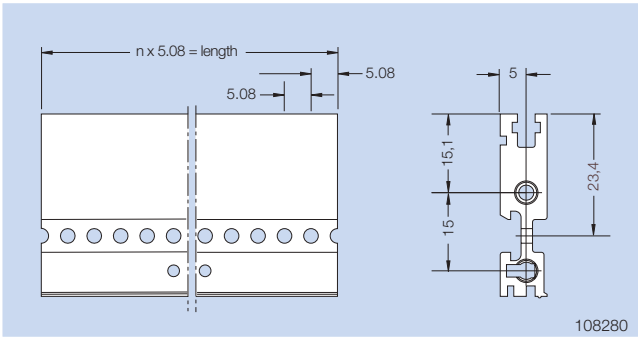
for subrack *FLEXIBLE* and *RFI-SHIELDED*

Rear Profile 2xHK
For partition, e.g. 6 U subracks into two fields of 3 U.

Material: aluminum
Finish: anodized

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Rear profile 2xHK	21	106.68	**050 121**
Rear profile 2xHK	29	147,32	**050 129**
Rear profile 2xHK	43	218.44	**050 143**
Rear profile 2xHK	85	431.80	**050 185**



for subrack *InterRail*

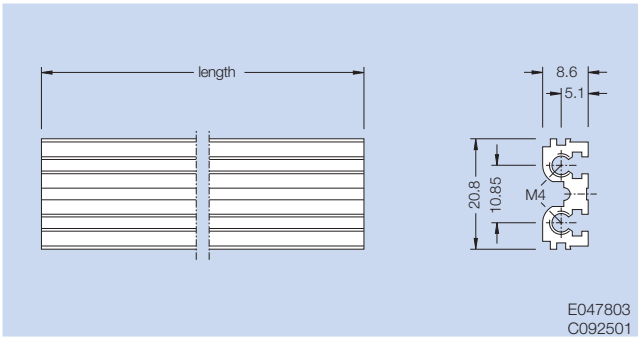
Rear Profile H12-S
(type *alpha*) Strengthened version.

Material: aluminum

Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Rear profile H12-S	37	187.96	**108 987**
Rear profile H12-S	43	218.44	**121 519**
Rear profile H12-S	85	431.80	**108 988**



for subrack *FLEXIBLE* and *RFI-SHIELDED*

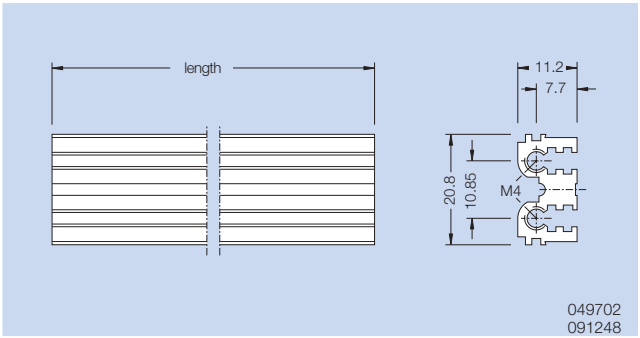
Center Profile ME1
(type alpha) Mounted in the rear of a 6 U subrack .

Material: aluminum
Finish: anodized or passivated

Ordering details

	nom. width [HP]	length [mm]	anodized order no. **409.**	chromated order no. **409.**
Center profile ME1	21	106.68	**047 821**	**161 059**
Center profile ME1	43	218.44	**047 843**	**115 042**
Center profile ME1	85	431.80	**047 885**	**092 502**

Horizontal Rails



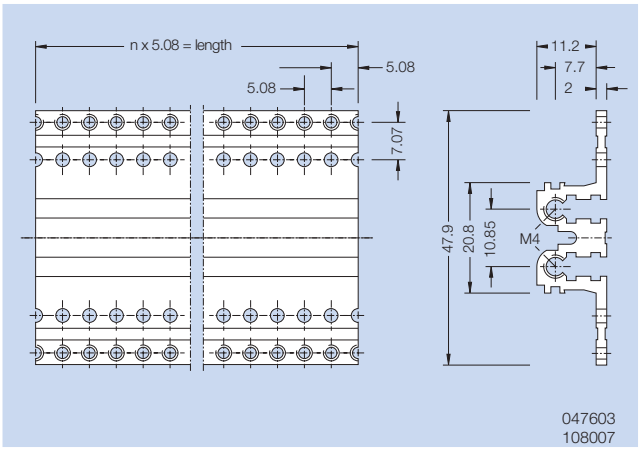
for subrack *FLEXIBLE* and *RFI-SHIELDED*

Center Profile ME2
(type delta) Mounted in the rear of a 6 U subrack.

Material: aluminum
Finish: anodized or passivated

Ordering details

	nom. width [HP]	length [mm]	anodized order no. **409.**	chromated order no. **409.**
Center profile ME2	21	106.68	**049 921**	**115 701**
Center profile ME2	43	218.44	**049 943**	**111 199**
Center profile ME2	85	431.80	**049 985**	**093 548**



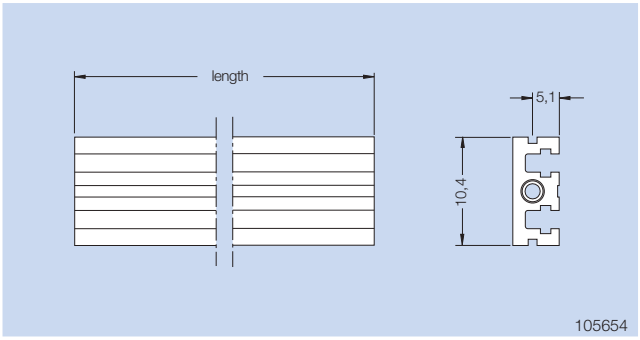
for subrack *FLEXIBLE* and *RFI-SHIELDED*

Center Profile MZE
(type beta) Mounted in the rear of a 6 U subrack, with integrated connector attachment.

Material: aluminum
Finish: anodized or passivated

Ordering details

	nom. width [HP]	length [mm]	anodized order no. **409.**	chromated order no. **409.**
Center profile MZE	21	106.68	**047 621**	**122 377**
Center profile MZE	43	218.44	**047 643**	**122 378**
Center profile MZE	85	431.80	**047 685**	**108 008**



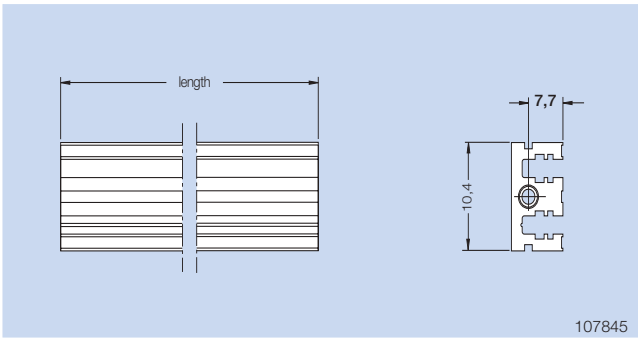
for subrack *InterRail*

Center Profile M1-S
(type alpha) Mounted in the rear of a 6 U subrack.
Strengthened version.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Center profile M1-S	37	187.96	**105 655**
Center profile M1-S	43	218.44	**122 379**
Center profile M1-S	85	431.80	**105 656**



for subrack *InterRail*

Center Profile M2-S
(type delta) Mounted in the rear of a 6 U subrack.
Strengthened version.

Material: aluminum
Finish: passivated

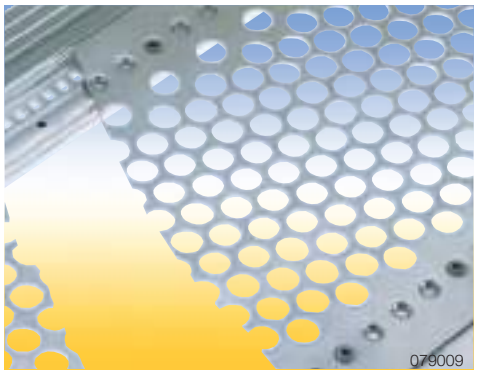
Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Center profile M2-S	37	187.96	**107 722**
Center profile M2-S	43	218.44	**107 846**
Center profile M2-S	85	431.80	**107 847**

Accessories

	order no. **409.**
For contact between pr ont panel	
RFI-spring P2 - 42 HP	**106 546**
RFI-spring P2 - 84 HP	**106 547**
For contact between pr	
RFI-spring A2 - 42 HP	**090 800**
RFI-spring A2 - 84 HP	**085 011**

Cover Plates



Accessories

Self tapping counter sunk scrrew M 2.5x10

Minimumm order quantity 100 pieces

order no.: **409. 105 790**

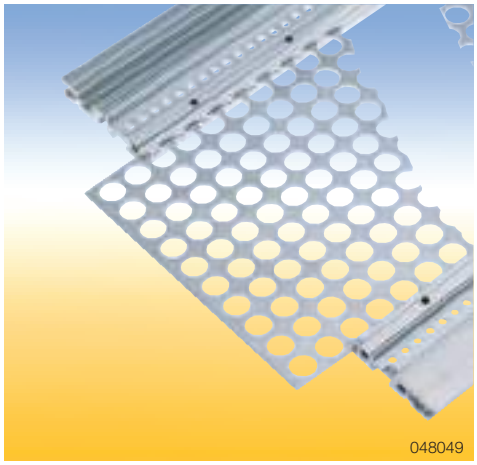
for subrack *FLEXIBLE*

Cover Plate F, screw on
Hole diameter 8.0 mm.
The cover plate is mounted on the horizontal rails with self tapping countersunk screws at special holes

Material: aluminum, 1 mm thick
Finish: blank, seawater resistant

Ordering details

	nom. width [HP]	nom. depth [mm]	order no. **409.**
Cover plate F, screw on	84	160	**079 184**
Cover plate F, screw on	84	220	**079 284**
Cover plate F, screw on	84	280	**079 384**



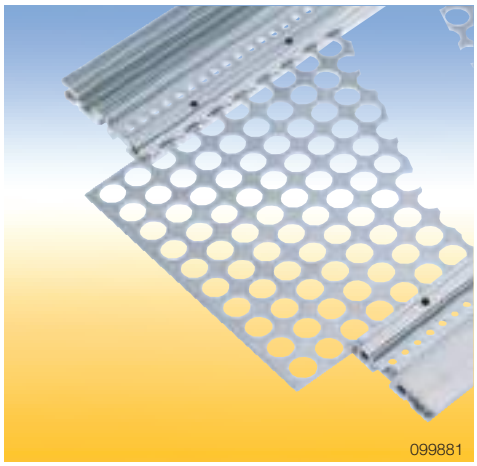
for subrack *FLEXIBLE Fi*

Cover Plate Fi, slide-in
Hole diameter 8.5 mm
The cover plate slides in special slots in the profiles.

Material: aluminum, 1.5 mm thick
Finish: blank, seawater resistant

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Cover plate Fi, slide-in	84	160	**048 684**
Cover plate Fi, slide-in	84	220	**048 784**



for subrack *FLEXIBLE Fs*

Cover Plate Fs, slide-in
Hole diameter 8.5 mm.
The cover plate slides in special slots in the profiles.

Material: aluminum, 1.5 mm thick
Finish: blank, seawater resistant

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
Cover plate Fs, slide-in	84	160	**099 883**

for subrack *RFI-SHIELDED* and *InterRail*

Cover Plate, inside

Hole diameter 4 / 5.2 x 4 mm. The cover plate is mounted with self tapping counter sunk screws on the inside of the side panels. Additionally the cover plate is secured to the horizontal rails by clips.

Material: aluminum, 1 mm thick
Finish: passivated, seawater resistant

Ordering details

	nom. width [HP]	nom. depth [mm]	order no. **409.**
Cover plate, inside	84	160	**115 270**
Cover plate, inside	84	220	**116 603**

	nom. width [HP]	PCB depth/ nom. depth [mm]	order no. **409.**
Cover plate, inside	84	160 / 220	**121 329**
Cover plate, inside	84	160 / 280	**122 549**
Cover plate, inside	84	220 / 280	**122 550**

Accessories

	order no. **409.**
For assembling the cover plate to the side panel. Minimum order quantity 100 pieces	
Self tapping counter sunk screw M 2.5 x 6	**067 624**
For assembling the cover plate to the horizontal rails. Minimum order quantity 10 pieces	
Clip	**115 224**

for subrack *RFI-SHIELDED*

Cover Plate, outside

Hole diameter 4 / 5.2 x 4 mm. The cover plate will be mounted with self tapping counter sunk screws outside of the side panels. Additionally the cover plate is secured to the horizontal rails by clips.

Material: aluminum, 1 mm thick
Finish: blank, seawater resistant

Ordering details

	nom. width [HP]	nom. depth [mm]	order no. **409.**
Cover plate, outside	84	240	**161 104**
Cover plate, outside	84	260	**161 105**
Cover plate, outside	84	340	**115 540**
Cover plate, outside	84	460	**115 542**

Accessories

	order no. **409.**
For assembling the cover plate to the side panel. Minimum order quantity 100 pieces	
Self tapping counter sunk screw M 4.7 x 6.5	**111 184**
For assembling the cover plate to the horizontal rails. Minimum order quantity 10 pieces	
Clip	**115 224**

Cover Plates, Rear Cover

for subrack *InterRail*

Cover Plate *InterRail*
Hole diameter 8.0 mm.
The cover plate is mounted with self tapping counter sunk screws at the side panels and at the horizontal rails.

Material: aluminum, 1 mm thick
Finish: blank, seawater resistant

Ordering details

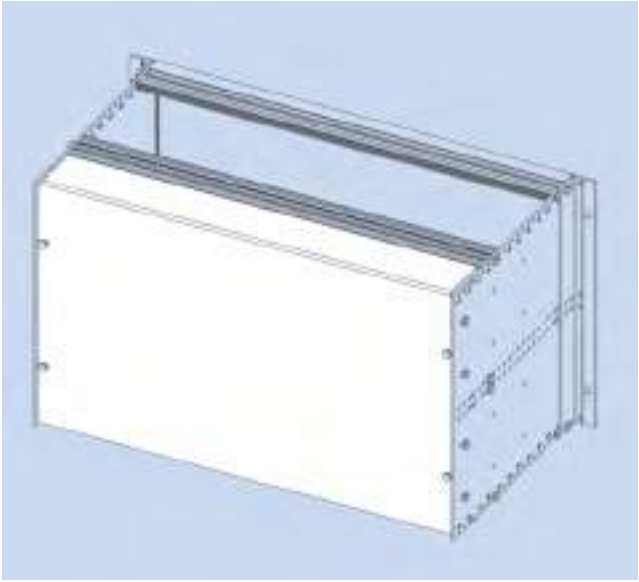
	nom. width [HP]	nom. depth [mm]	order no. **409.**
Cover plate *InterRail*	84	160	**107 906**
Cover plate *InterRail*	84	220	**107 905**
Cover plate *InterRail*	36	220	**107 723**

Accessories

Self tapping counter sunk screw M 2.5 x 6

Minimumm order quantity 100 pieces

order no.: **409. 067 624**



for subrack *FLEXIBLE*

Rear Cover F 84 HP

Technische Daten

Material	Rear cover: Holding angle:	aluminum: steel
Finish	Rear cover: Holding angle:	passivated galvanized, passivated

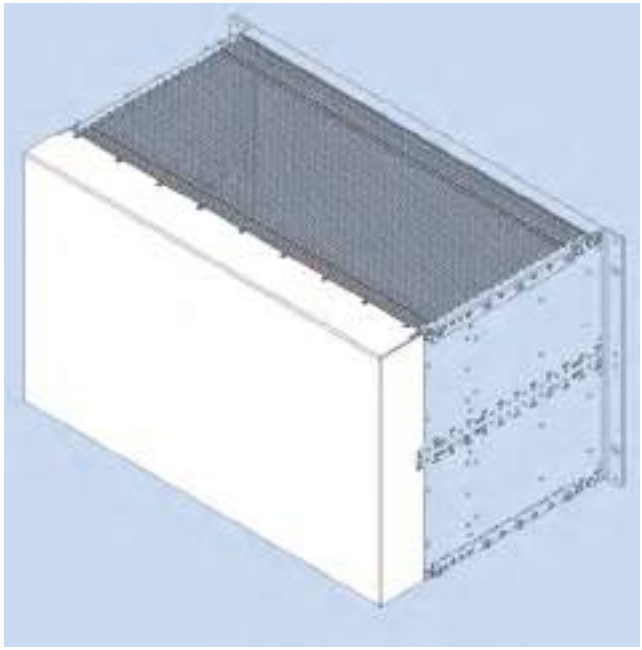
Delivery:
Unassembled as single parts or as kit.

Ordering details

	nom. height [U]	height [mm]	order no. **409.**
Rear cover F	3	125.0	**088 190**
Rear cover F	6	258.5	**089 244**

Delivery kit rear cover F 84 HP

	3 U Stück	6 U Stück
Rear cover 84 HP	1	1
Holding angle	2	4
Mounting parts	1	1



Rear Cover RFI 84 HP

Protective wiring rear cover for RFI shielded enclosure.

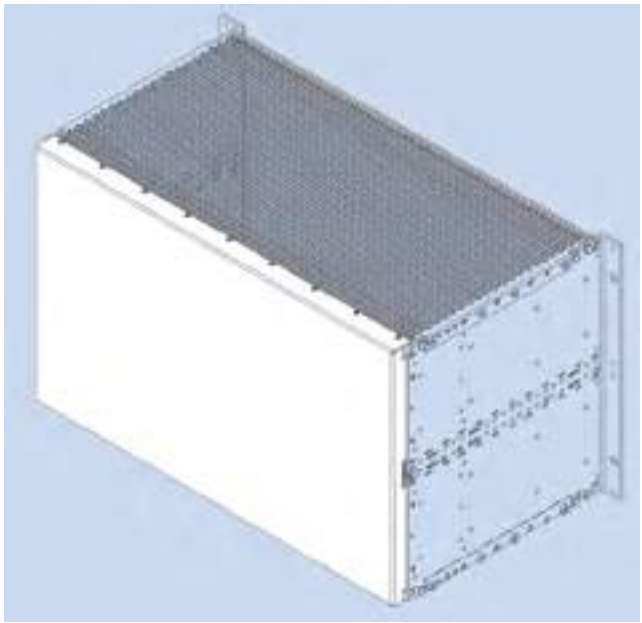
Material: aluminum, 1 mm thick
Finish: passivated

Delivery:
Unassembled as single parts or as kit.

Delivery:
1 rear cover 84 HP
2 RFI-spring U2 (4 for 6 U)
Mounting parts

Ordering details kit rear cover RFI 84 HP

	nom. height [U]	height [mm]	order no. **409.**
Rear Cover RFI	3	125.0	**115 898**
Rear Cover RFI	6	258.5	**115 899**



Rear Cover RFI 84 HP, inside

Protective wiring rear cover for RFI shielded enclosure.

Material: aluminum, 1 mm thick
Finish: passivated

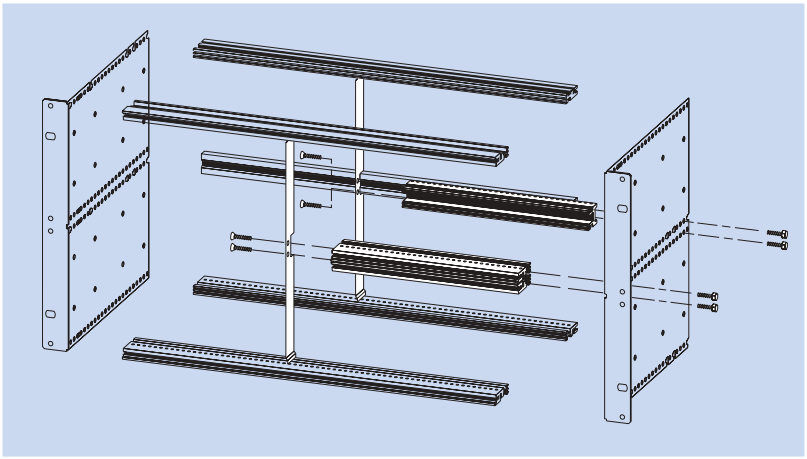
Ordering details rear cover RFI 84 HP, inside

	nom. height [U]	height [mm]	order no. **409.**
Rear Cover RFI	3	133.15	**108 875**
Rear Cover RFI	6	266.5	**108 876**

Accessories

	order no. **409.**
For assembling the rear cover to the pr	der quantity 100 pieces
Counter sunk screw M 2.5 x 6	**067 624**
For assembling the rear cover to the side panel. Minimumm order quantity 100 pieces	
Self tapping Taptite screw M 2.5 x 6	**082 239**

Subrack Divider



Assembly:
The short horizontal rails are assembled to the side panel. The dividing strip is inserted into the horizontal rail groove, fixed with a rotating motion and mounted on the short horizontal rails.

Positioning note:
For optimum use of available space in the subrack, PCB's of 6 U should be mounted left, and the 3 U on the right. In this case the dividing strip requires only 1 HP, otherwise 2 HP for the necessary air and leakage paths.

for subrack *FLEXIBLE* and *RFI-SHIELDED*

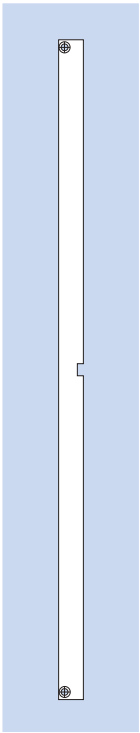
Subrack Divider Kit
2 x 3 U - 42 HP and 6 U - 40 HP
The divider separates a 6 U subrack into a field for 6 U PCB's and 2 fields of 3 U.

Finish: passivated

Delivery:
1 double front profile
2xVE1-43 HP chromated
1 double rear profile
2xHK-43 HP anodized
2 divider strips
Mounting parts

order no.: **409. 082 063**

Single Parts



Blind Front Panel for Subrack Divider
For covering of the divider strip. Optional with RFI-springs for a RFI shielded front.

Material: aluminum
Finish: passivated
Dimensions: 2 HP x 6 U

order no.: **409. 116 319**

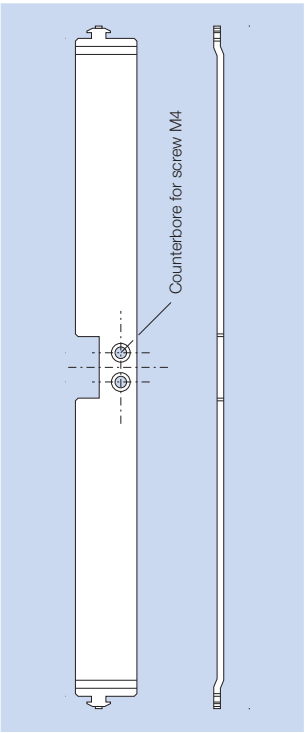
Accessories

	order no. 409.
RFI-spring F3 - 3U	**111 112**
RFI-spring F3 - 6U	**111 116**

Needed 1 x 6 U and 2 x 3 U RFI-springs

For assembly of the front panel to the horizontal rail
Minimum order quantity 100 pieces

Oval head screw M 2.5 x 11.3	**101 917**



Divider Strip

Material: aluminum chromated
Dimensions: 6 U

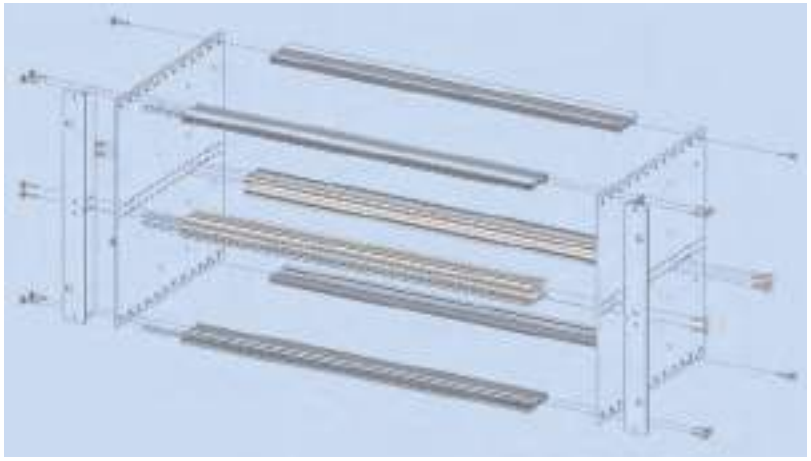
order no.: **409. 078 942**

Accessories
Counter sunk screw M 4 x 16
For assembly of the divider strip to the horizontal rail:

Minimum order quantity 100 pieces

order no.: **409. 107 342**

Subrack Divider, Horizontal Mounting Frame



for subrack *FLEXIBLE* and *RFI-SHIELDED*

Subrack Divider Kit 2 x 3 U - 84 HP
For partitioning a 6 U subrack in 2x3U.

Delivery:
1 double front profile
2xVE1 - 85HP colorless chromated 1 double rear profile
2xHK - 85HP anodized
Mounting parts

order no.: **409. 166 270**

Horizontal Mounting Frame
20 HP for horizontal mounting of 6U PCB‘s in 3U subracks.
The horizontal mounting frame needs 52 HP in the width.
For 84 HP subracks are available
Placed right:
52 HP for horizontal mounting frame,
32 HP for 3 U-PCB‘s
Placed left:
52 HP for horizontal mounting frame,
1 HP for air and leakage paths,
31 HP for 3 U-PCB‘s.

Ordering details for horizontal mounting frame kits

		nom. depth [mm]	type *alpha* order no. **409.**	type *beta* order no. **409.**	type *delta* order no. **409**
6 U	anodized	user-	**069 047**	**064 947**	**064 687**
6 U RFI	chromated	160	**161 161**	-	**161 165**
6 U RFI	chromated	220	**161 162**	-	**161 166**

Accessories
Threaded strip 20 x M 2.5

order no.: **409. 072 533**

Partition Wall, Separating Wall Wall and Door Installation Pr

Partition Wall

For partitioning of a subrack part.
The partition wall 6 U can also be used as a RFI shielded subrack divider in 6 U and 2x3 U parts.

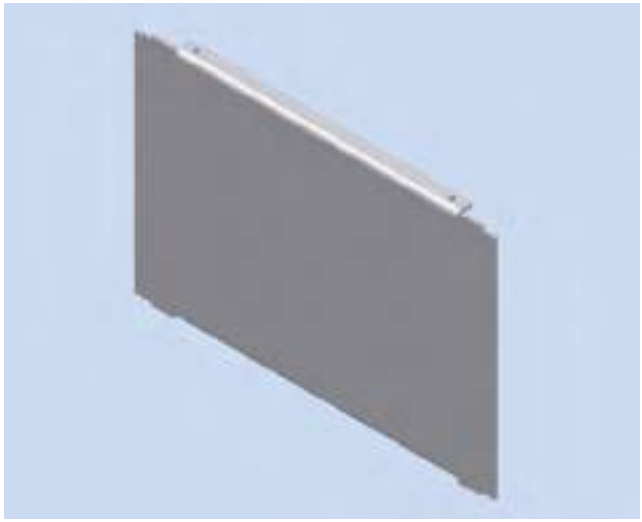
Delivery:
1 partition wall
1 front panel 2 HP
Mounting parts

Accessories

	3 U order no. **409.**	6 U order no. **409.**
Shielding kit	**116 416**	**116 418**
consists of:	pieces	pieces
RFI-spring F3 - 3 U	2	2
RFI-spring F3 - 6 U	-	1
RFI-spring M - P1	1	2
Clamping plate	1	2
Mounting parts	1	1

Ordering details kit

	nom. depth 160 mm order no. **409.**	nom. depth 220 mm order no. **409.**
Partition wall 3 U	**116 333**	**116 334**
Partition wall 6 U	**116 335**	**116 336**



Separating Wall

Material: aluminum
Finish: blank

Delivery: 1 separating wall
Mounting parts

Ordering details kit

	nom. depth 160 mm order no. **409.**	nom. depth 220 mm order no. **409.**
Separating wall 3 U	**122 648**	**122 649**
Separating wall 6 U	**122 650**	**122 651**

for subrack *FLEXIBLE Fs*, *RFI-SHIELDED* and *InterRail*

Wall and Door Installation Profile Kit

For mounting subracks in a door, switch panel etc.
The installation profiles are mounted to the side panel by means of the mounting screws to the horizontal rails.

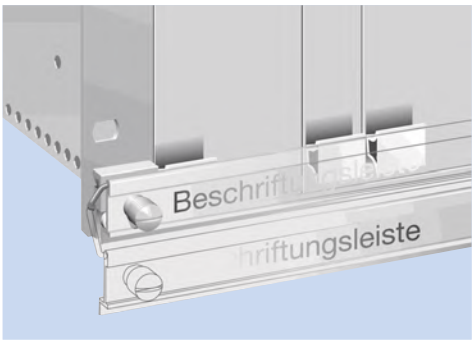
Material: aluminum
Finish: anodized

Delivery:
2 wall installation profiles

Ordering details kit

	order no. **409.**
Wall installation pro le 42 HP	**108 045**
Wall installation pro le 84 HP	**108 012**

Labelling Rail, Locking Rail
Label Strip



for subrack *FLEXIBLE Fs, RFI-SHIELDED, InterRail*

Labelling Rail 84 HP

This hinged labelling rail is mounted on the subrack flanges. Normally, it is placed in front of the front panels. For ejecting a PCB, the rail is turned down.

order no.: **409. 121 941**

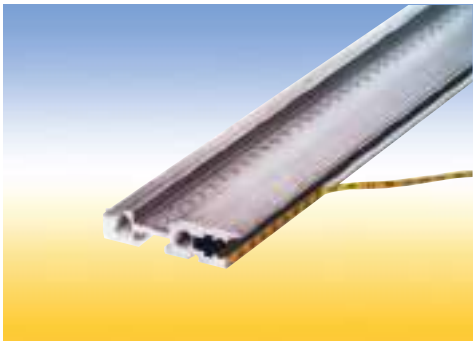
Delivery:
1 labelling rail
2 mounting flanges
2 hinge brackets
Mounting parts

Locking Rail 84 HP

For locking of PCB's without front panels.
The locking rail is mounted at the horizontal rail in front of the PCB's.
A labeling strip can be insert into a groove.

order no.: **409. 120 790**

Delivery:
1 locking rail
1 rubber
Mounting parts



Label Strip

Self adhesive. For identifying PCB slots in the subrack. The PCB slot number can be read through the hole in the front panel.

Note:
The label strip cannot be read while using the RFI spring P2.

Material: PC/PE-foil
Color: yellow/black

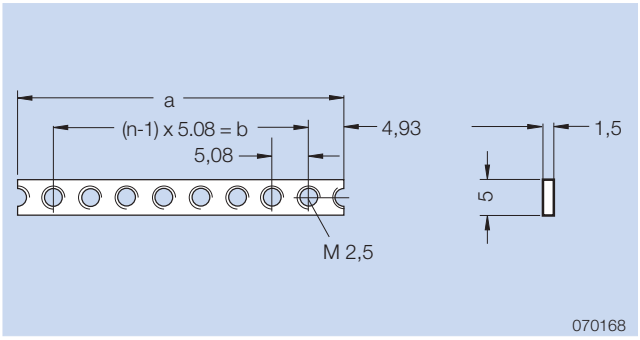
Delivery

Minimum purchase: 18 pieces on a papersheet.

Ordering details kit

	order no. 409.
Label strip 01 - 84	**024 738**
Label strip 84 - 01	**024 740**

Threaded Strips



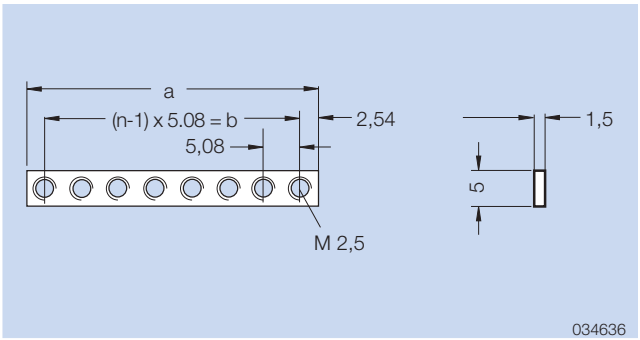
Threaded Strip M 2.5

For attaching the front panels and assembly parts at the wiring field.

Material: steel
Finish: galvanized, chromated

Ordering details threaded strip M 2.5

n = number of threads	a [mm]	b [mm]	order no. **409.**
20	106.38	96.52	**131 688**
21	111.46	101.60	**130 883**
28	147.02	137.16	**131 701**
32	167.34	157.48	**131 548**
36	187.66	177.80	**103 777**
42	218.14	207.28	**100 843**
84	431.50	421.64	**091 255**



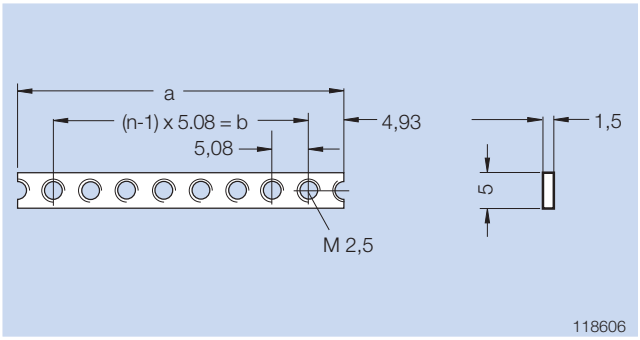
Threaded Strip M 2.5 addable

This threaded strip could be added to other strips and the space between the holes always adds up 5.08 mm.

Material: steel
Finish: galvanized, chromated

Ordering details threaded strip M 2.5 addable

n = number of threads	a [mm]	b [mm]	order no. **409.**
10	50.80	45.72	**131 836**
20	101.60	96.52	**131 845**
28	142.24	137.16	**106 751**
42	213.36	207.28	**131 813**
84	426.72	421.64	**131 478**



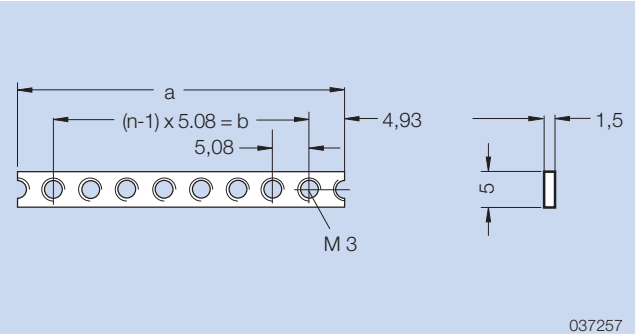
Threaded Strip M 2.5 - stainless steel

For attaching the front panels and assembly parts at the wiring field
This threaded strip is for nonmagnetic applications.

Material: stainless steel
Finish: blank

Ordering details threaded strip M 2.5 - stainless steel

n = number of threads	a [mm]	b [mm]	order no. **409.**
84	431.50	421.64	**118 608**

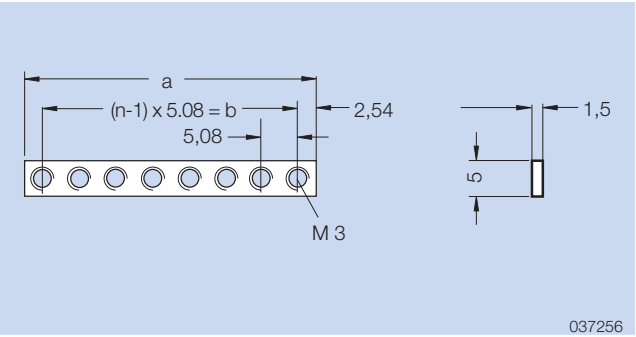


Threaded Strip M 3

Material: steel
Finish: galvanized, chromated

Ordering details threaded strip M 3

n = number of threads	a [mm]	b [mm]	order no. **409.**
84	431.50	421.64	**130 890**



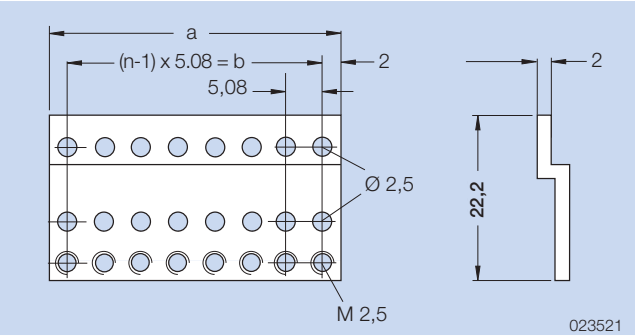
Threaded Strip M 3 addable

Material: steel
Finish: galvanized, chromated

Ordering details threaded strip M 3 addable

n = number of threads	a [mm]	b [mm]	order no. **409.**
84	426.72	421.64	**132 038**

Z-Rail A,
Mounting Rail B



Z-Rail A tapped M 2.5

For mounting connectors in accordance to IEC 60603/ DIN 41 612 in subracks type *alpha*.
Mounted on the rear profile.

Material: aluminum
Finish: passivated

Ordering details Z-rail A tapped M 2.5

n [HP]	a [mm]	b [mm]	Order no. **409.**
22	110.68	106.68	**024 361**
42	212.28	208.28	**024 380**
84	426.44	421.64	**026 586**

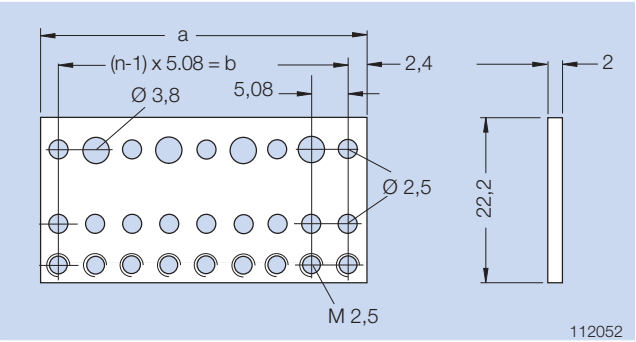
Accessories

Mounting parts for assembling the Z-rail A:

for 84 HP Z-rail, 5 places suggested.

Minimum order quantity 100 pieces

	order no. **409.**
Oval head screw M 2.5 x 8 ISO 7045	**094 602**
Washer 2.7	**013 911**
Fitting bolt M 2.5 x 6.5 (for connectors)	**032 708**



Mounting Rail B tapped M 2.5

For mounting connectors in accordance to IEC 60603/ DIN 41 612.

For mounting at the rear profile on subracks *type alpha* with insulating strip and insulating bushings.

For mounting at the rear profile on subracks *type delta.*

Material: aluminum
Finish: blank

Ordering details mounting rail B tapped M 2.5

n [HP]	a [mm]	b [mm]	order no. **409.**
42	212.28	208.28	**112 054**
84	426.44	421.64	**112 055**

Accessories

Mounting parts for assembling the mounting rail B:

for 84 HP Z-rail, 5 places suggested.

Minimum order quantity 100 pieces

	order no. **409.**
Washer 2.7	**013 911**
Fitting bolt M 2.5 x 6.5 (for connectors)	**032 708**
for type alpha	
Oval head screw M 2.5 x 12 ISO 7045	**094 604**
for type delta	
Oval head screw M 2.5 x 8 ISO 7045	**094 602**

Insulating Strip

For insulated mounting of wiring supports, e. g. of the mounting rail B.
Mounted between horizontal rail and wiring support.

Technical data

Material	PPO / PC
Continous temperature	– 40 °C up to + 105 °C
Fire protection class	UL 94 V–1
Color	gray

Ordering details

	length [HP]	order no. **409.**
Insulating strip-40	40	**061 541**
Insulating strip-84	84	**051 981**

Insulating Bushing 2.6

For use together with mounting rail B and insulating strip.

Technical data

Material	PC
Continous temperature	– 40 °C up to + 115 °C
Fire protection class	UL 94 V–0
Color	transparent

order no.: **409. 018 055**

Card Guide ECONOMY

for subrack *FLEXIBLE*

Card Guide ECONOMY

An inexpensive snap-in card guide that can also be secured to the horizontal rails with self tapping screws.

Technical data

Material	PC
Color	gray
Continous temperature	– 40 °C up to + 115 °C
Fire protection class	UL 94 V–0

Ordering details

	nom. length [mm]	PCB thickness [mm]	order no. **409.**
Card guide ECONOMY	160	1.6	**108 173**
Card guide ECONOMY	220	1.6	**047 601**

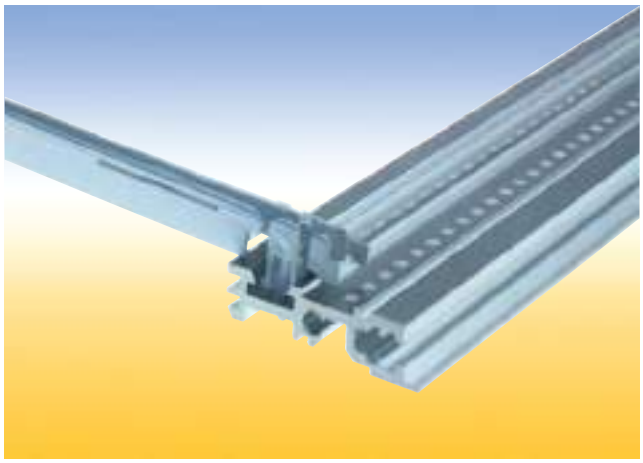
Accessories

Self tapping oval head screw M 2.5 x 5

For assembling the card guides to the horizontal rails

Minimum order quantity 100 pieces

order no.: **409. 039 691**



Card Guide UNIVERSAL
This is an all-purpose card guide with provision for a spring to contact front panels.

Technical data

Material	PC
Color	gray
Continous temperature	– 40 °C up to + 115 °C
Fire protection class	UL 94 V–0

Ordering details

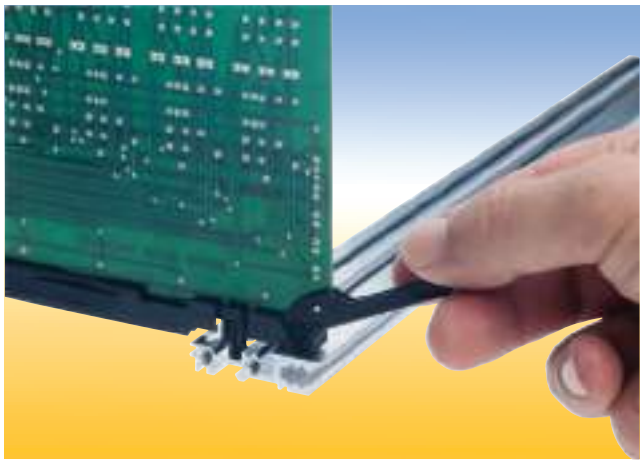
	nom. length [mm]	PCB thickness [mm]	order no. **409.**
Card guide UNIVERSAL	160	1.6 - 2.0	**061 468**
Card guide UNIVERSAL	220	1.6 - 2.0	**061 469**
Card guide UNIVERSAL	280	1.6 - 2.0	**061 526**

Accessories

Grounding contact for front panels

order no.: **409. 058 102**

Card Guide
with integrated push and pull assist

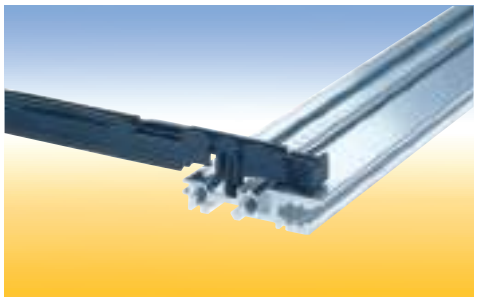


Card Guide with integrated push and pull assist
This special card guide with an integral small lever aids in the handling of PCB's with high pin plug in connectors.
The lever is supported by the walls of a special guide chamber when the board is pulled out or pushed in.
It is suitable for a spring to contact a track near the PCB edge.
This card guides are snap-in and can be secured with screws.

Delivery:
1 card guide top
1 card guide buttom

Technical data

Material	card guide: PBT lever: PPO grooved pin: steel, blank
Color	black
Continous temperature	– 40 °C up to + 130 °C
Fire protection class	UL 94 V–0



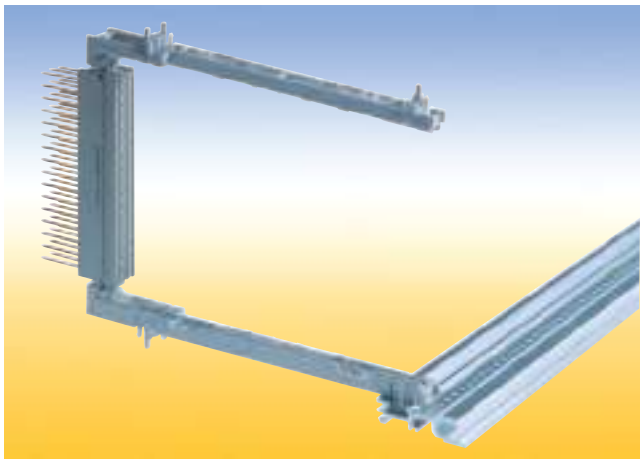
Ordering details kit
card guide with integrated push and pull assist

	nom. length [mm]	PCB thickness [mm]	order no. **409.**
Card guide 160	160	1.6	**112 453**
Card guide 220	220	1.6	**112 454**
Lever with grooved pin	-	1.6	**111 157**

For a card guide kit needed 2 levers

Accessories

	Order no. **409.**
PCB track contact PROFIL	**103 358**
For assembling the card guides to the horizontal rails. Minimum order quantity 100 pieces	
Oval head screw M 2.5 x 12	**094 604**
Hexagonal nut M 2.5	**013 938**
Washer 2.7	**013 911**



Card Guide CONN
For easy screwless snap-on mounting of connectors accordance to IEC 60603/ DIN 41 612.
With a provision for a spring to contact front panels and for contacting a track near the PCB edge.
This snap-in card guides can als be secured with screws.

Delivery:
1 card guide CONN top
1 card guide CONN bottom

Technical data

Material	nom. length 160: PC nom. length 220: PBT
Color	gray
Continous temperature	Lexan: – 40 °C up to + 115 °C PBT: – 40 °C up to + 130 °C
Fire protection class	UL 94 V–0

Ordering details kit card guide CONN

	nom. length [mm]	PCB thickness [mm]	order no. **409.**
Card guide CONN	160	1.6	**083 091**
Card guide CONN	220	1.6 - 2.4	**116 200**

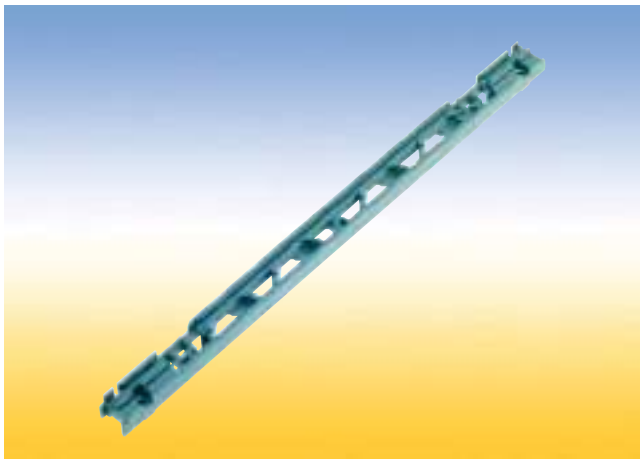
Accessories

	order no. **409.**
Grounding contact for front panels	**058 102**
PCB track contact PROFIL	**103 358**

For assembling the card guides to the horizontal rails. Minimum order quantity 100 pieces

Oval head screw M 2.5 x 12	**094 604**
Hexagonal nut M 2.5	**013 938**
Washer 2.7	**013 911**

Card Guide VIB



Card Guide VIB
Lattice construction for heavy mechanical loads.
With a provision for a spring to contact front panels and for contacting a track near the PCB edge.
This card guides can be snapped in and/or secured with screws.

Two versions:
1. With pressed-in nut M 2.5
for assembly to the horizontal rail with oval head screws M 2.5 x 12

2. Without a nut, but one can be added in the existing hexagonal molding.

Technical data

Material	PC
Color	nom. length 80 mm: black nom. length 100 mm: black others: gray
Continous temperature	– 40 °C up to + 115 °C
Fire protection class	UL 94 V–0

Ordering details card guide VIB

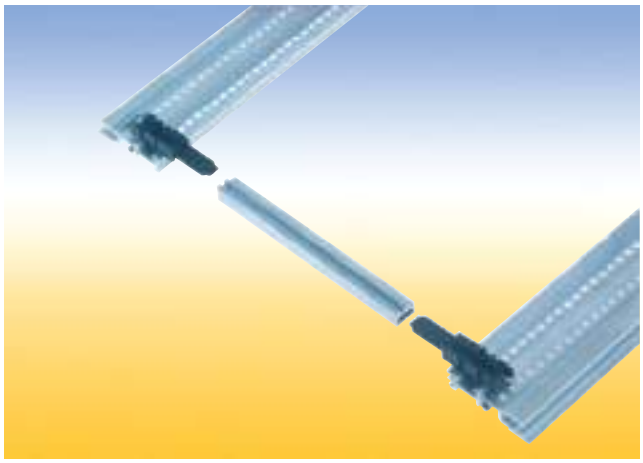
	nom. length [mm]	PCB thickness [mm]	snap-in	secured with screws	order no. **409.**
bottom	80	1.6 - 2.4	yes	-	**115 171**
top	80	1.6 - 2.4	yes	-	**115 236**
with nut M 2.5	100	1.6	yes	yes	**108 157**
without nut	100	1.6	yes	yes	**108 101**
with nut M 2.5	160	1.6	-	yes	**059 632**
without nut	160	1.6	yes	yes	**109 058**
without nut	160	2.0	yes	yes	**069 774**
without nut	160	2.4	yes	yes	**080 068**
without nut	180	1.6	yes	yes	**085 010**
with nut M 2.5	220	1.6	-	yes	**059 634**
without nut	220	1.6	yes	yes	**108 120**
without nut	220	2.4	yes	yes	**101 276**
with nut M 2.5	280	1.6	-	yes	**059 636**

Accessories

	order no. **409.**
Grounding contact for front panels	**058 102**
PCB track contact PROFIL	**103 358**

For assembling the card guides to the horizontal rails. Minimum order quantity 100 pieces

Oval head screw M 2.5 x 12	**094 604**
Hexagonal nut M 2.5	**013 938**
Washer 2.7	**013 911**



Card Guide VARIO
This is a length variable card guide constructed from 3 pieces. The center piece can be cut to any length. With a provision for a spring to contact front panels. These snap-in end pieces can also be secured with screws.

Two versions:
1. With pressed-in nut M 2.5
for assembly to the horizontal rail with oval head screws M 2.5 x 12

2. Without a nut, but one can be added in the existing hexagonal molding.

Technical data

Material	end pieces: PPO center piece: aluminum or PPO
Color	end pieces: black center piece: black, silver
Continous temperature	– 40 °C up to + 105 °C
Fire protection class	UL 94 V–1

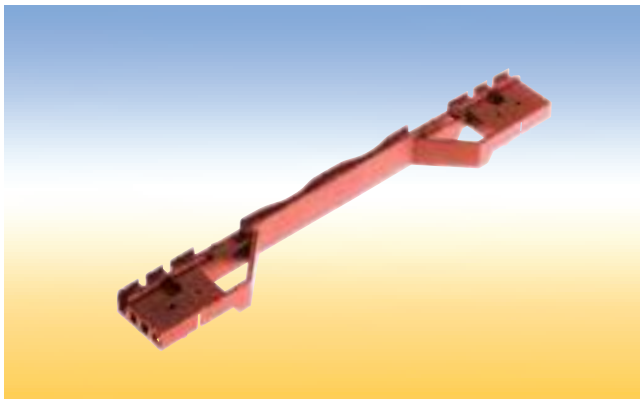
Ordering details card guide VARIO

	length [mm]	PCB thickness [mm]	order no. **409.**
Pair of end pieces			
with nut M 2.5	-	1.6	**061 086**
without nut	-	1.6	**061 051**
with nut M 2.5	-	2.4	**061 088**
without nut	-	2.4	**061 052**
center piece			
plastic	1000	1.6	**061 061**
aluminum	1000	1.6	**061 059**
plastic	1000	2.4	**061 062**
aluminum	1000	2.4	**061 060**

Accessories

	order no. **409.**
Grounding contact for front panels	**058 102**
For assembling the card guides to the horizontal rails. Minimum order quantity 100 pieces	
Oval head screw M 2.5 x 12	**094 604**
Hexagonal nut M 2.5	**013 938**
Washer 2.7	**013 911**

Card Guide IEEE and Card Guide IEEE with 1/2 HP lateral offset



Card Guide IEEE

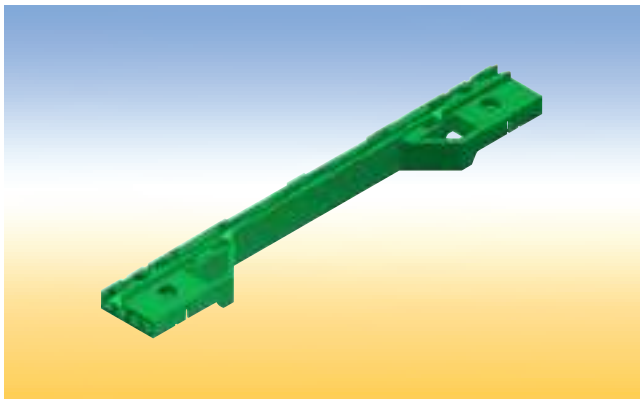
This card guide is in accordance to specification IEEE 1101.10.
The required coding of the IEEE is integrated in the card guide head.
With provision for the IEEE contact spring for grounding of the alignment-pins of the PCB's front panel. Also with a provision for contacting a track near the PCB edge.
This snap-in card guides can be secured with screws.

Technical data

Material	PBT
Color	black or red
Continous temperature	– 40 °C up to + 115 °C
Fire protection class	UL 94 V–0

Ordering details for card guide IEEE

color	nom. length [mm]	PCB thickness [mm]	order no. **409.**
black	160	1.6 - 2.4	**113 400**
black	220	1.6 - 2.4	**131 973**
red	160	1.6 - 2.4	**116 440**



Card Guide IEEE with 1/2 HP lateral offset

This card guide is also in accordance to specification IEEE 1101.10.
For CompactPCI-power supplies and for Plug-in units fitted with SMD.
With provision for the IEEE contact spring for grounding of the alignment-pins of the PCB's front panel.
Also with a provision for contacting a track near the PCB edge.
This card guide is secured with screws.

Technical data

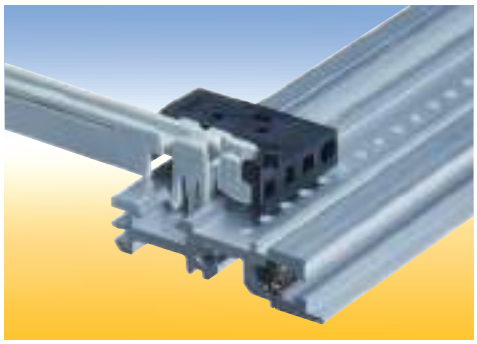
Material	PBT
Color	green
Continous temperature	– 40 °C up to + 115 °C
Fire protection class	UL 94 V–0

Ordering details for card guide IEEE with 1/2 HP lateral offset

color	nom. length [mm]	PCB thickness [mm]	order no. **409.**
green	160	1.6 - 2.4	**130 889**

Accessories for Card Guide IEEE

	order no. **409.**
contact spring IEEE	**113 450**
coding pin IEEE gray	**113 713**
coding pin IEEE red	**116 442**
PCB track contact PROFIL	**103 358**
For assembling the card guides to the horizontal rails. Minimum order quantity 100 pieces	
Lens head screw M 2.5 x 12	**094 604**
Hexagonal nut M 2.5	**013 938**
Washer 2.7	**013 911**



for card guide UNIVERSAL, CONN, VIB and VARIO

Coding Head IEEE

Snapped on the head of standard card guides to comply to the requirements of the specification IEEE 1101.10

Functions:

1. Holding the IEEE contact spring for grounding the alignment pins of the front panel.
2. Adapting the IEEE coding pin.
3. Guiding the 1.6 to 2.4 mm thick PCB.

Technical data

Material	PC
Color	black, red
Fire protection class	UL 94 V–0

Ordering details kit

	order no. 409.
coding head IEEE - black	**113 905**
coding head IEEE - red	**116 441**

Delivery:
1 coding head IEEE top
1 coding head IEEE bottom

Contact Spring IEEE

Snapped into the IEEE card guide or IEEE coding head to ground the alignment pin of the front panel.

Material: tin-bronze

order no.: **409. 113 450**

Coding Pin IEEE

Snapped into the IEEE card guide or IEEE coding head.

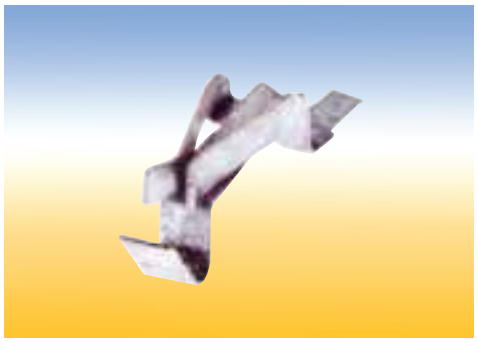
Technical data

Material	PC
Fire protection class	UL 94 V–0

Ordering details

	order no. 409.
coding pin IEEE - gray	**113 713**
coding pin IEEE - red	**116 442**

Accessories for Card Guides



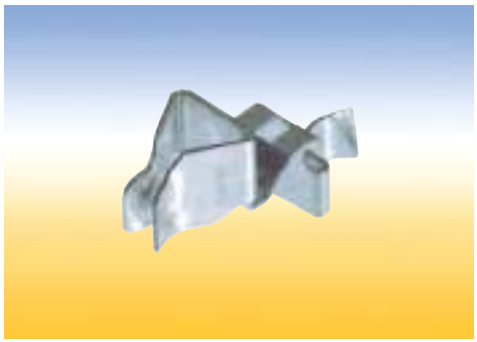
PCB Track Contact PROFIL

Snapped into a card guide, connecting a PCB's edge to the horizontal rail of a subrack.

Technical data

Material	tin-bronze
Finish	tin-plated
Fire protection class	UL 94 V–0

order no.: **409. 103 358**



Grounding Contact for Front Panels

For premating grounding. In connection with front connector with male contact.

Material: tin-bronze
tin-plated

order no.: **409. 058 102**

Accessories

Front connector with male contact

	order no. **409.**
top	**107 728**
bottom	**107 727**

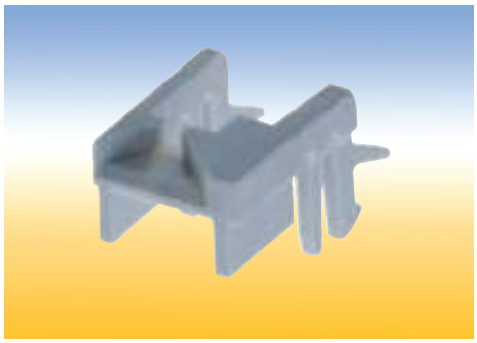
Cover for Ventilation Openings

Snapping into the horizontal rails. Covers the ventilation openings between card guides.

Material: plastic
Fire protection class: UL 94 V-0

Ordering details

	nom. length [mm]	order no. **409.**
Front connector with male contact 4 HP	160	**106 530**
Front connector with male contact 4 HP	220	**106 531**



PCB Lead-In

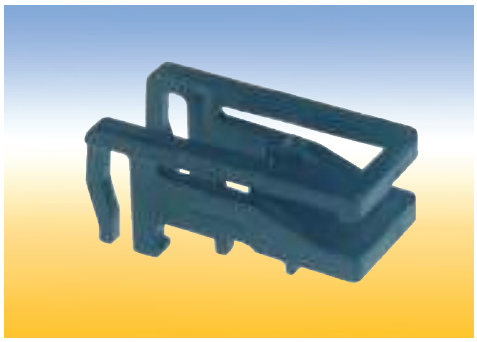
For easy lead-in of the PCB into the card guide.

Technical data

Material	PC, 10% fiber glass reinforced
Color	gray, similar RAL 7044
Fire protection class	UL 94 V–0

Delivery:
1 PCB lead-in top
1 PCB lead-in bottom

order no.: **409. 092 785**



PCB Locking Spring, plastic

Secures PCB without front panels.

Technical data

Material	PC
Color	black
Fire protection class	UL 94 V–0

order no.: **409. 052 720**

PCB Locking Device Kit

Secures PCB's without front panels. Used for easy locking and ejecting of PCB's

Technical data

Material	handle: PBT pin: steel
Color	black
Fire protection class	UL 94 V–0

Delivery

Kit, unassembled

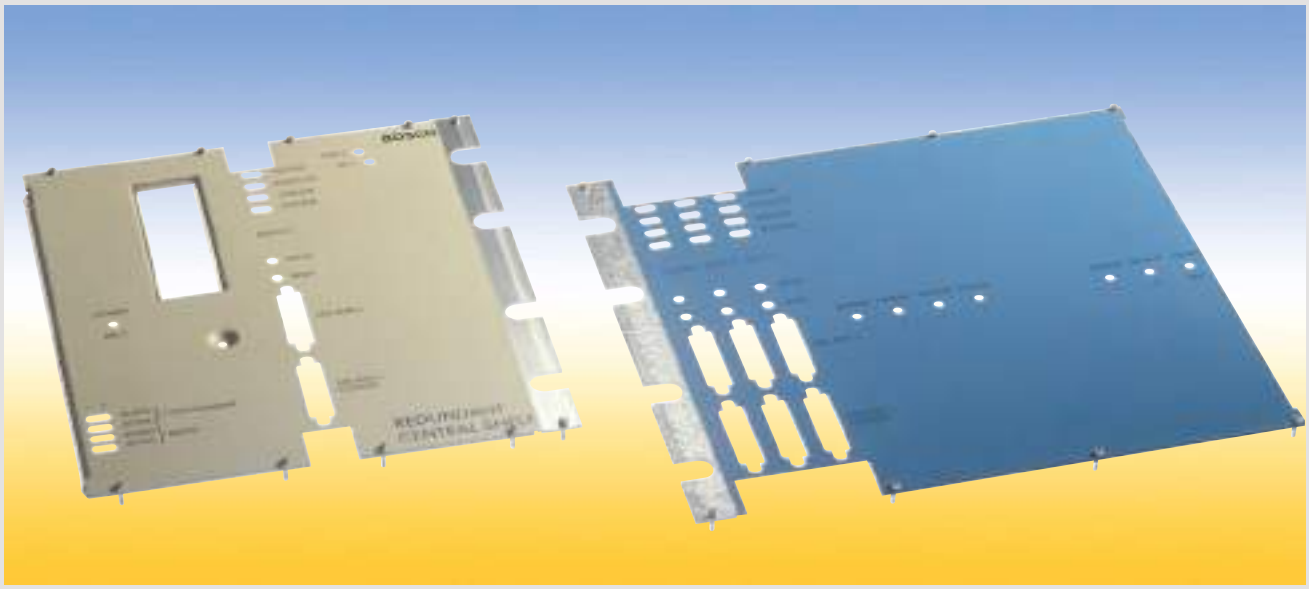
Delivery:

2 handles
2 pins
2 PCB locking springs

Ordering details kit

	order no. **409.**
PCB locking device 1.6	**068 698**
PCB locking device 2.4	**102 297**

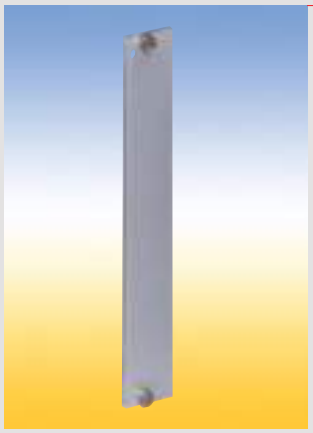
Front Panels



In addition to the wide range of standard front panels we also provide on request individual customer specific front panels with punching, surface finish and silk screening.
Textured or smooth painted in all revelant RAL-colors, abrasion-resistant silk-screen printing as well as color coordinated engraving give your front panel an individual appearance.

Please ask your local representative for your
individual front panel design.
You find your contact person on our homepage:
www.intermas-el.com

Front Panels and Handles

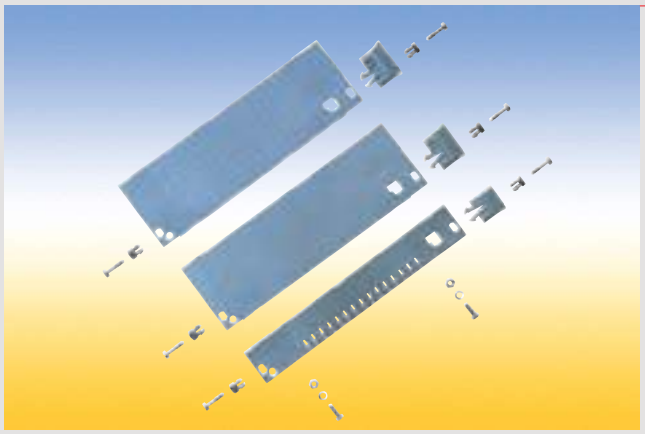


√ Blind Front Panels

√ Front Panels with Handle
√ Handles

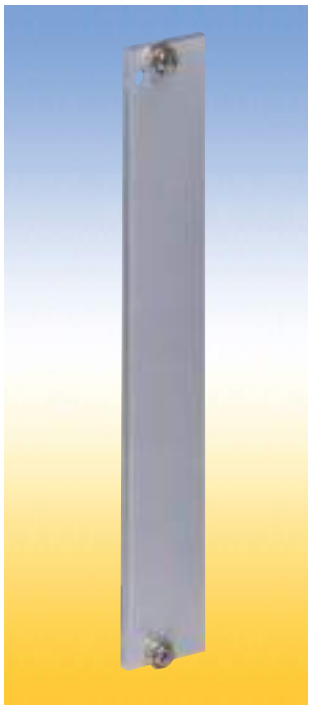
√ Front Panels with Ejector Handle
√ Ejector Handles

√ Front Panels with IEEE Handle
√ IEEE-Handles



√ Plastic Front Panels

Blind Front Panels



Blind Front Panels
For covering empty sections or to carry various components in subracks.

Four versions are available:

1. Flat front panel blank
The front side is covered with a removable transparent foil.

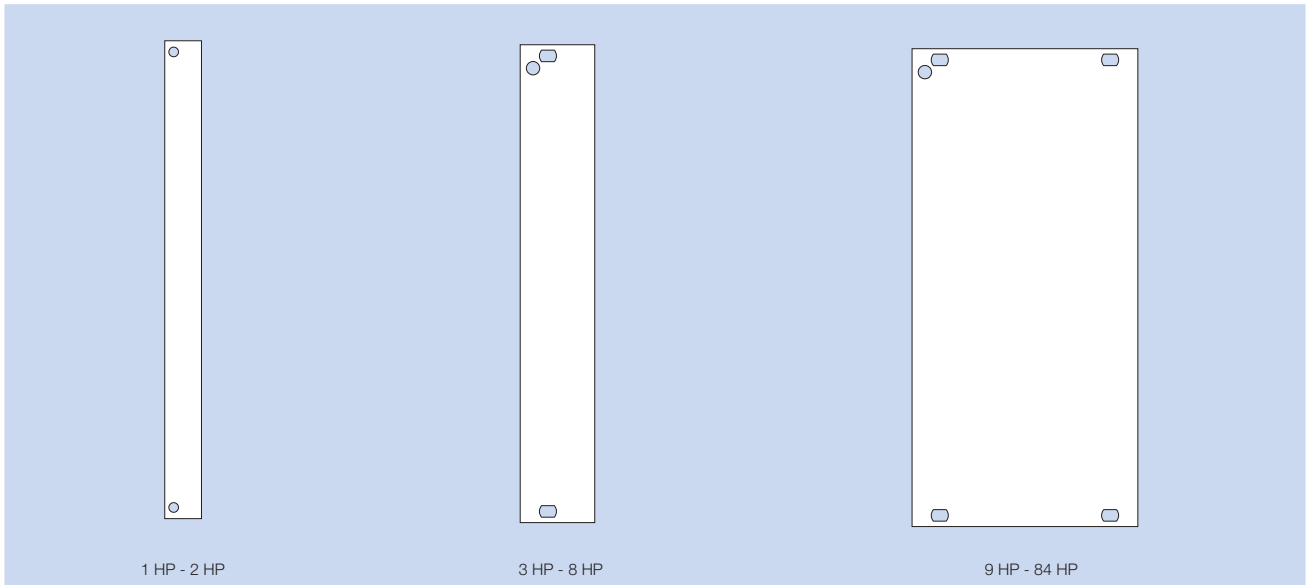
2. Flat front panel anodized
Front anodized, rear conductive.

3. Flat front panel RFI
Front anodized, rear conductive, with slits in the side edges for insertion of RFI springs.

4. Extruded front panel RFI
Made of extruded aluminum alloy, with slits in the side edges for insertion of RFI springs for contact.
Surface finish is passivated.

Material
Flat front panel: aluminum 2.5 mm thick
Extruded front panel: aluminum

Delivery
Front panels are delivered unassembled as single parts or as a kit.



Ordering details blind front panels (flat front panel)

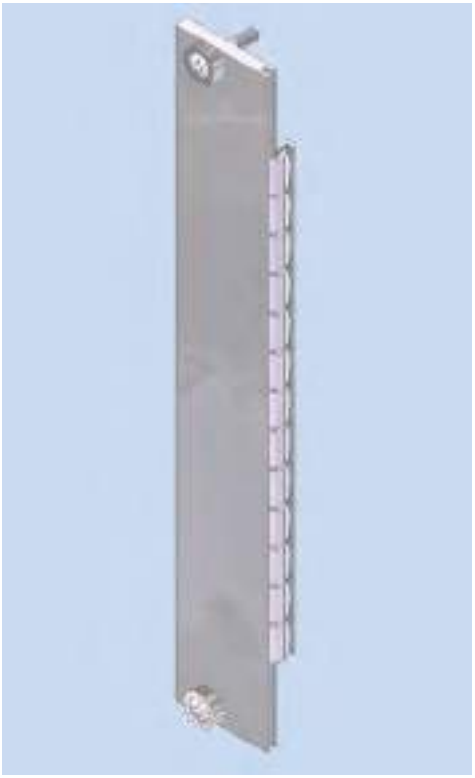
	nom. width [HP]	3 U blank order no. **409.**	3 U anodized/ conductive order no. **409.**	6 U blank order no. **409.**	6 U anodized/ conductive order no. **409.**
Blind front panel	1	**097 201**	-	**097 601**	-
Blind front panel	2	**097 202**	-	**097 602**	-
Blind front panel	3	**097 203**	-	**097 603**	-
Blind front panel	4	**097 204**	**097 404**	**097 604**	**097 804**
Blind front panel	5	**097 205**	-	**097 605**	-
Blind front panel	6	**097 206**	**097 406**	**097 606**	**097 806**
Blind front panel	7	**097 207**	-	**097 607**	-
Blind front panel	8	**097 208**	**097 408**	**097 608**	**097 808**
Blind front panel	10	**097 210**	-	**097 610**	-
Blind front panel	12	**097 212**	**097 412**	**097 612**	**097 812**
Blind front panel	14	**097 214**	**097 414**	**097 614**	**097 814**
Blind front panel	21	**097 221**	**097 421**	**097 621**	**097 821**
Blind front panel	28	**097 228**	**097 428**	**097 628**	**097 828**
Blind front panel	42	**097 242**	**097 442**	**097 642**	**097 842**
Blind front panel	84	**097 284**	**097 484**	**097 684**	**097 884**

Accessories

Minimum order quantity 100 pieces

	pieces for 1-2 HP	pieces for 3-8 HP	pieces for 9-85 HP	order no. **409.**
Screw retainer M2.5 gray	-	2	4	**100 539**
Screw retainer M2.5 black	-	2	4	**100 538**
Cross-head screw M 2.5 x 11.3	2	2	4	**101 917**

Blind Front Panels RFI



Ordering details kit - blind front panel RFI

nom. width [HP]	3 U extruded order no. **409.**	3 U order no. **409.**	6 U extruded order no. **409.**	6 U order no. **409.**
1	**114 453**	-	**114 464**	-
2	**114 454**	-	**114 465**	-
3	**114 455**	-	**114 466**	-
4	**114 361**	**113 583**	**114 387**	-
5	**114 362**	-	**114 388**	-
6	**114 363**	**113 586**	**114 389**	-
7	**114 365**	-	**114 390**	-
8	**114 366**	-	**114 391**	-
9	**114 367**	-	**114 392**	-
10	**114 368**	-	**114 393**	-
12	-	**113 589**	-	**113 608**
14	-	**113 590**	-	**113 609**
21	-	**113 592**	-	**113 611**
28	-	**113 593**	-	**113 612**
42	-	**113 594**	-	**113 613**
43	-	**114 487**	-	-
84	-	**113 595**	-	**113 614**
85	-	**113 596**	-	-

Finish: flat front panel: front side anodized, rear side conductive
extruded front panel: passivated

Delivery kit - blind front panel RFI:

	pieces for 1-2 HP	pieces for 3-8 HP	pieces for 9-43 HP	pieces for 44-85 HP
Front panel	1	1	1	1
	1 / 2	1 / 2	1 / 2	1 / 2
Grounding bushing M2.5	-	2	4	6
Mounting parts-kit	1	1	1	1

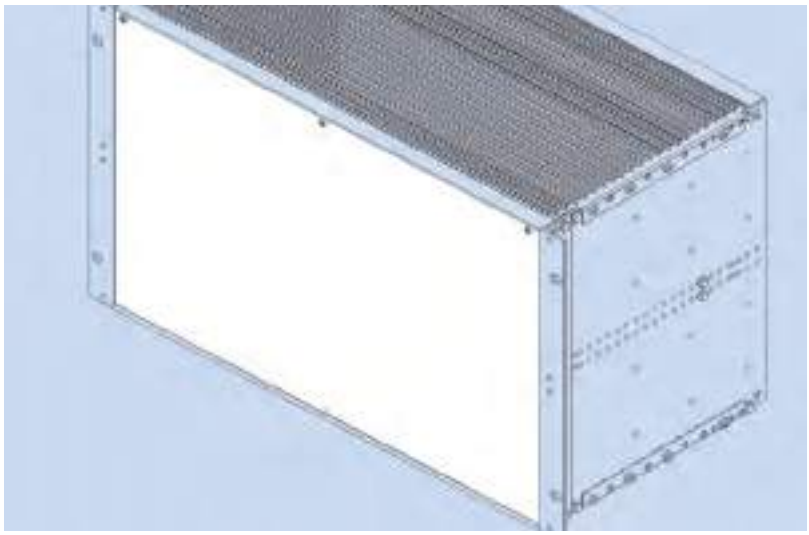
Accessories

Roller cutter to assemble the RFI spring F3

order no.: **409. 118 433**

Ordering details single part blind front panel RFI

nom. width [HP]	3 U extruded order no. **409.**	3 U order no. **409.**	6 U extruded order no. **409.**	6 U order no. **409.**
1	**114 458**	-	**114 469**	-
2	**114 459**	-	**114 470**	-
3	**113 027**	-	**114 476**	-
4	**111 608**	**112 252**	**111 618**	-
5	**113 028**	-	**114 384**	-
6	**111 609**	**112 258**	**111 619**	-
7	**111 610**	-	**111 620**	-
8	**111 611**	-	**111 621**	-
9	**113 029**	-	**114 385**	-
10	**113 030**	-	**114 386**	-
12	-	**112 551**	-	**112 611**
14	-	**112 557**	-	**112 617**
21	-	**112 578**	-	**112 638**
28	-	**112 821**	-	**112 943**
42	-	**112 581**	-	**112 641**
43	-	**114 082**	-	-
84	-	**113 598**	-	**113 617**
85	-	**113 599**	-	-



Plug-in Front Panel 85 HP

The front panel bottom edge is inserted in the groove of a specially profiled rail. With slits in the side edges for insertion of RFI springs.
To be used in combination with below mentioned flanges only.

Finish:
front side anodized, rear side conductive

Delivery:
1 front panel
3 grounding bushing M 2.5
3 cross-head screw M 2.5 x 11.3

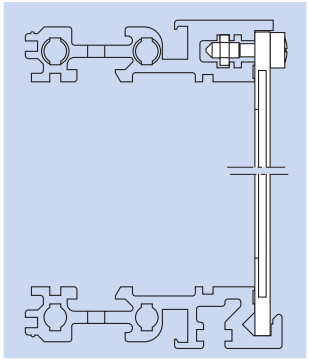
Ordering details for kit

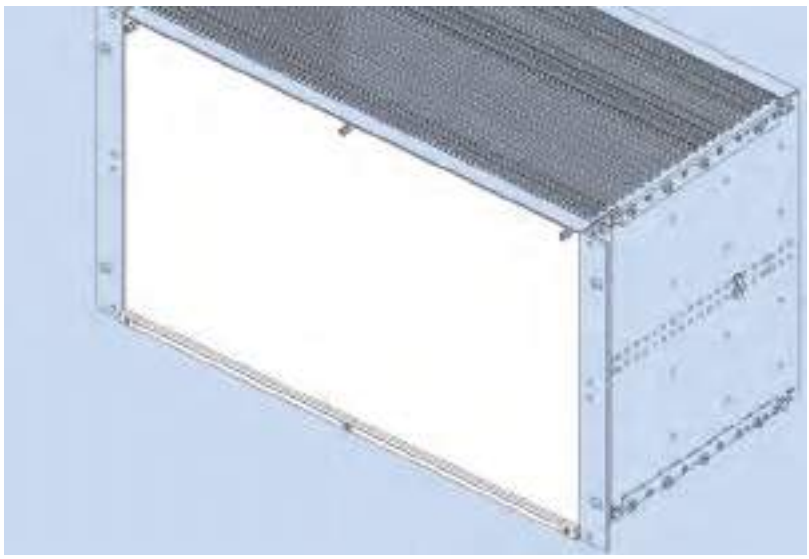
	order no. 409.
Plug-in front panel 3 U	**113 948**
Plug-in front panel 6 U	**113 950**

Accessories

	order no. 409.
Pr rail VE12SFP-RFI-85	**114 562**
Flange RFI - FP - 3 U	**114 708**
Flange RFI - FP - 6 U	**114 715**
RFI spring F3 - 3 U	**111 112**
RFI spring F3 - 6 U	**111 116**

For one front panel 2 RFI springs are needed.





Hinged Front Panel 85 HP

With slits in the side edges for insertion of RFI springs. The hinge is screwed to the prprofiled rail of the subrack. An 84 HP threaded strip is needed.
To be used in combination with below mentioned flanges only.

Finish:
front side anodized, rear side conductive

Delivery:
1 front panel
1 hinge
3 grounding bushings
Mounting parts

Delivery: as unassembled kit.
Assembled kits on request.

Ordering details for kit

	order no. 409.
Hinged front panel 3 U	**113 705**
Hinged front panel 6 U	**113 706**

Accessories

	order no. 409.
Threaded strip 84 HP	**078 428**
Flange RFI - FP - 3 U	**114 708**
Flange RFI - FP - 6 U	**114 715**
RFI spring F3 - 3 U	**111 112**
RFI spring F3 - 6 U	**111 116**

For one front panel 2 RFI springs are needed.

Front Panels with Handle

Front Panels with Handle
For assembly on a PCB.
Handle and front connector are screwed on the front panel.
The plain front panel is easy to modify.

Four versions are available:

1. Flat front panel blank
The front side is covered with a removable transparent foil.

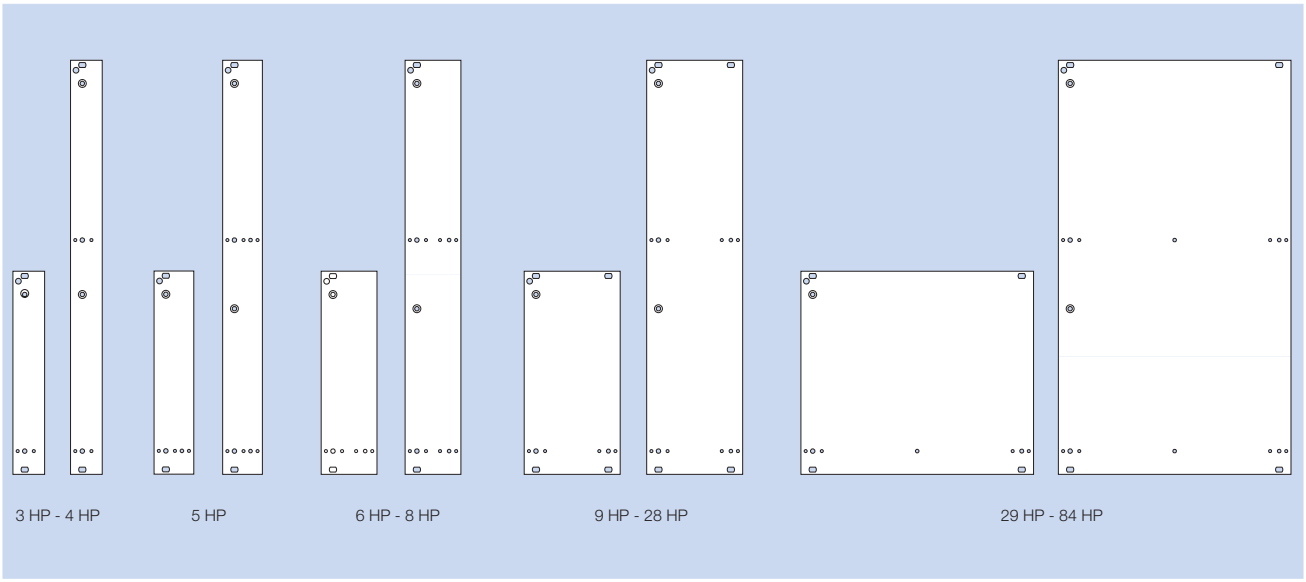
2. Flat front panel anodized
Front anodized, rear conductive.

3. Flat front panel RFI
Front anodized, rear conductive.
With slits in the side edges for insertion of RFI springs.

4. Extruded front panel RFI
Made of extruded aluminum alloy, with slits in the side edges for insertion of RFI springs for contact.
Surface finish is passivated.

Material
Flat front panel: aluminum 2.5 mm thick
Extruded front panel: aluminum

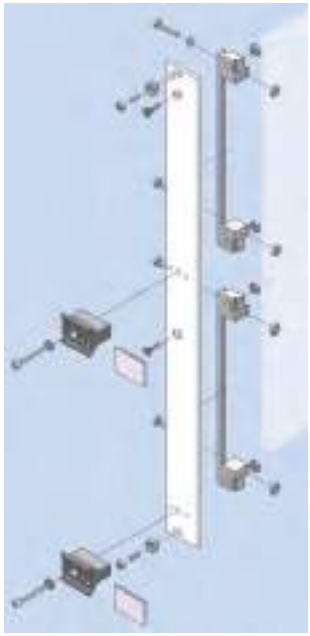
Delivery
Front panels are delivered unassembled as single parts or as a kit.



Hole pattern of the front panels

Ordering details kit - front panel with handle (flat front panels)

nom. width [HP]	3 U anodized/ conductive order no. **409.**	6 U anodized/ conductive order no. **409.**
4	**107 518**	**122 624**
6	**122 622**	**122 625**
8	**107 520**	**122 626**
10	**107 521**	**122 627**
12	**107 522**	**122 628**



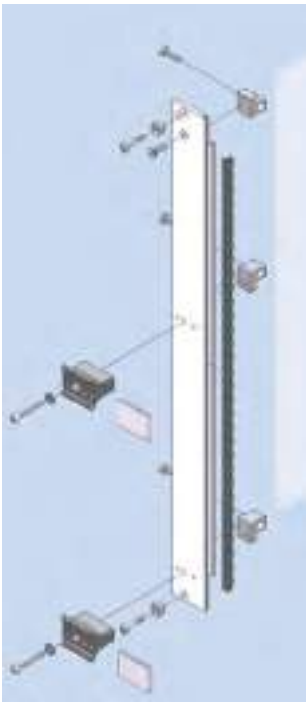
Delivery kit - front panel with handle

	3 U pieces for 3-8 HP	3 U pieces for 9-12 HP	6 U pieces for 3-8 HP	6 U pieces for 9-12 HP
Front panel	1	1	1	1
Handle gray	1	1	2	2
Ident-plate aluminum	1	1	2	2
Front connector FEE	1	1	2	2
Screw retainer M 2.5	2	4	2	4
Mounting parts	1	1	1	1

Ordering details - single part front panel for handle (flat front panel)

nom. width [HP]	3 U blank order no. **409.**	3 U anodized/ conductive order no. **409.**	6 U blank order no. **409.**	6 U anodized/ conductive order no. **409.**
3	**096 403**	-	**096 703**	-
4	**096 404**	**096 604**	**096 704**	**096 904**
5	**096 405**	**096 605**	**096 705**	**096 905**
6	**096 406**	**096 606**	**096 706**	**096 906**
7	**096 407**	-	**096 707**	-
8	**096 408**	**096 608**	**096 708**	**096 908**
10	**096 410**	**096 610**	**096 710**	**096 910**
12	**096 412**	**096 612**	**096 712**	**096 912**
16	**096 416**	-	**096 716**	-
21	**096 421**	-	**096 721**	-

Front Panels RFI with Handle



Ordering details kit - front panel RFI with handle

nom. width [HP]	3 U extruded order no. **409.**	3 U order no. **409.**	6 U extruded order no. **409.**	6 U order no. **409.**
3	**114 537**	-	**114 541**	-
4	**114 377**	-	**114 404**	-
5	**114 378**	-	**114 405**	-
6	**114 379**	-	**114 406**	-
7	**114 380**	-	**114 407**	-
8	**114 381**	-	**114 408**	-
10	**114 383**	-	**114 410**	-
12	-	**113 685**	-	**113 693**

Finish:

Flat front panel: front side anodized, rear side conductive
Extruded front panel: passivated

Delivery kit - front panel RFI with handle

	3 U pieces for 3-8 HP	3 U pieces for 9-12 HP	6 U pieces for 3-8 HP	6 U pieces for 9-12 HP
Front panel	1	1	1	1
Handle gray	1	1	2	2
Ident-plate aluminum	1	1	2	2
Front connector metal	2	2	3	3
Grounding bushing M 2.5	2	4	2	4
Mounting parts	1	1	1	1

Accessories

	order no. **409.**
For one flat front panel 2 RFI-springs are needed.	
RFI spring F3 - 3 U	**111 112**
RFI spring F3 - 6 U	**111 116**
For assemble the RFI spring F3	
Roller cutter	**118 433**

Ordering details single part front panel RFI for handle

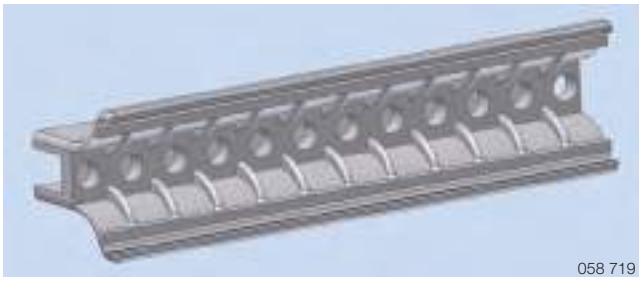
nom. width [HP]	3 U extruded order no. **409.**	3 U order no. **409.**	6 U extruded order no. **409.**	6 U order no. **409.**
3	**114 538**	-	**114 540**	-
4	**114 370**	**113 711**	**114 396**	-
5	**114 371**	-	**114 397**	-
6	**114 372**	**113 723**	**114 399**	-
7	**114 373**	-	**114 400**	-
8	**114 374**	**113 725**	**114 401**	-
10	**114 376**	-	**114 403**	-
12	-	**113 729**	-	**113 762**

Handle FP

Assembled with M 2.5 screws and with 1 additional self tapping screw from 6 HP. The handle is held against torsion by means of two nipples.

Technical data

Material	Polycarbonate, 10% fiber-glass reinforced
Color	gray RAL 7032, black
Continous temperature	– 40 °C to + 100 °C
Fire protection class	UL 94 V–0



058 719

Ordering details handle FP

width [HP]	length [mm]	gray order no. **409.**	black order no. **409.**
3	13.80	**102 115**	**041 657**
4	18.88	**102 114**	**100 667**
5	23.96	**103 005**	**103 205**
6	29.04	**103 006**	**103 206**
7	34.12	**103 007**	**103 207**
8	39.20	**103 008**	**103 208**

Ordering details handle strip FP

width [HP]	length [mm]	gray order no. **409.**	black order no. **409.**
10	49.36	**103 810**	**058 910**
12	59.52	**103 812**	**058 912**
16	79.84	**103 816**	**058 916**
21	105.24	**103 821**	**058 921**
42	211.92	**103 842**	**058 942**

Accessories handles:

Minimum order quantity each 100 pieces

	order no. **409.**
Pan head screw M 2.5 x 16	**094 605**
Washer 2.7	**013 911**
Hexagonal nut M 2.5 DIN 439	**013 938**
Self tapping screw M 2.5 x 10	**040 401**

Ident Plate

for handle FP.
The ident plate is markable and printable, snapped in after mounting the handle to the front panel.

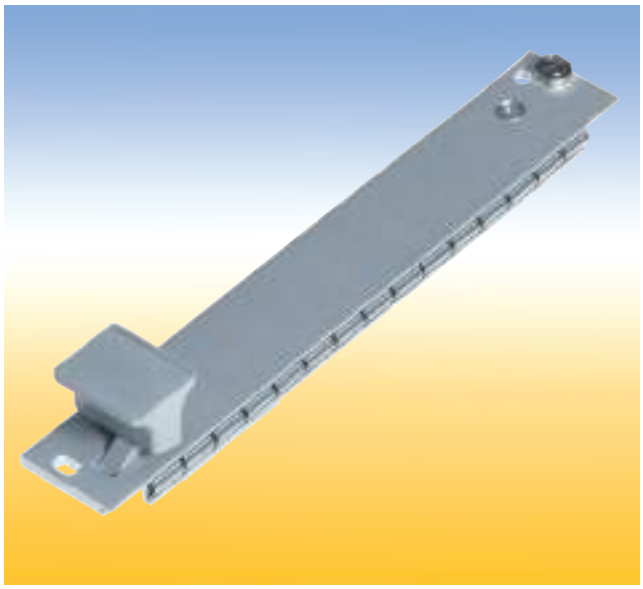
Technical data

Material	aluminum or Polycarbonate, crystal clear
Finish	Alu: silver silk-anodized
Continous temperature	PC: – 40 °C to + 115 °C
Fire protection class	PC: UL 94 V–2

Ordering details ident-plate

width [HP]	length [mm]	aluminum order no. **409.**	crystal clear order no. **409.**
3	13.80	**017 929**	**089 238**
4	18.88	**017 956**	**089 240**
5	23.96	**022 791**	-
6	29.04	**022 792**	-
7	34.12	**022 793**	-
8	39.20	**022 794**	-
10	49.36	**022 796**	-
12	59.52	**022 798**	-
16	79.84	**022 802**	-
21	105,24	**022 807**	-
42	211.92	**040 652**	-

Front Panels with Ejector Handle



Front Panels with Ejector Handle
For easy release of PCB's with high pin connections. The ejector handle is extends through the front panel and is screwed together with the bearing bushing at the front connector.

Four versions are available:

1. Flat front panel blank.
The front side is covered with a removable transparent foil.

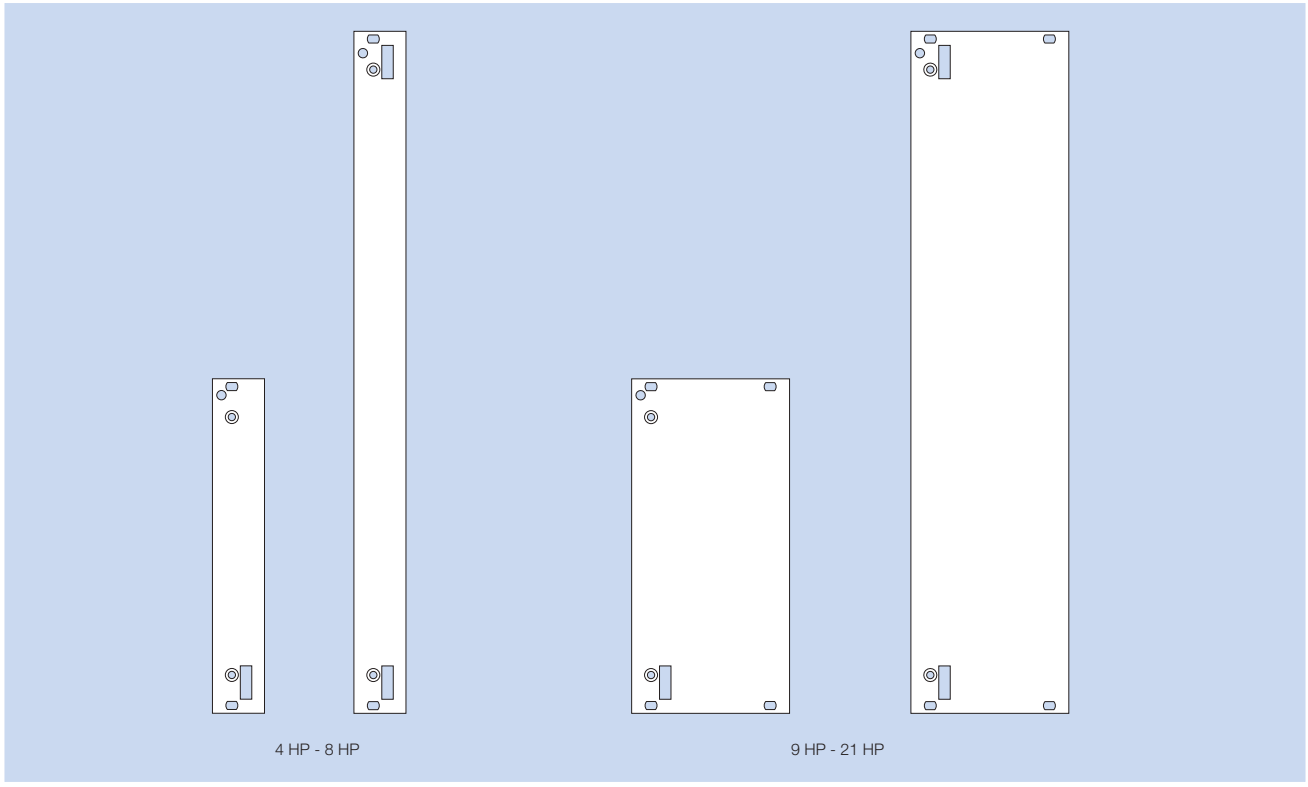
2. Flat front panel anodized.
Front anodized, rear conductive.

3. Flat front panel RFI
Front anodized, rear conductive. With slits in the side edges for insertion of RFI springs.

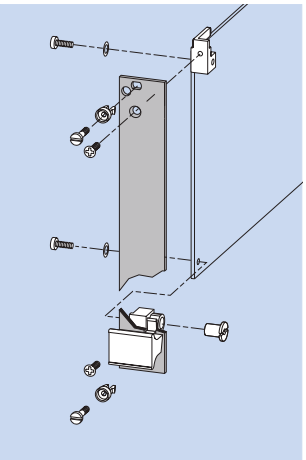
4. Extruded front panel RFI
Made of extruded aluminum alloy, with slits in the side edges for insertion of RFI springs for contact. Surface finish is passivated.

Material
Flat front panel: aluminum 2.5 mm thick
Extruded front panel: aluminum

Delivery
Front panels are delivered unassembled as single parts or as a kit.

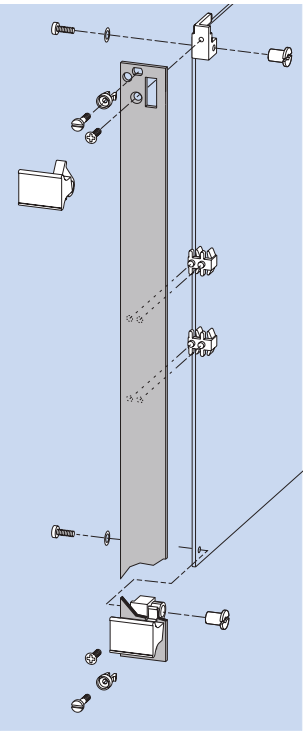


Hole pattern of the front panels



Ordering details kit - front panel with ejector handle (flat front panels)

nom. width [HP]	3 U blank order no. **409.**	3 U anodized/ conductive order no. **409.**	6 U blank order no. **409.**	6 U anodized/ conductive order no. **409.**
4	**168 913**	**168 919**	**122 639**	**122 645**
5	**168 914**	-	**122 640**	-
6	**168 915**	-	**122 641**	-
8	**168 916**	**168 920**	**122 642**	**122 646**
10	**168 917**	-	**122 643**	-
12	**168 918**	**168 921**	**122 644**	**122 647**



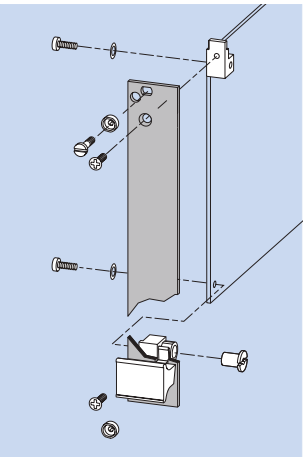
Delivery kit - front panel with ejector handle

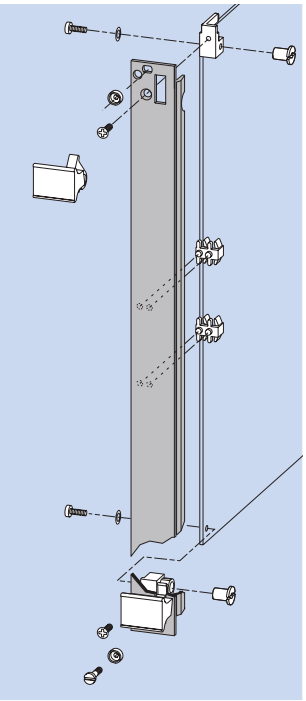
	3 U pieces for 4-8 HP	3 U pieces for 9-12 HP	6 U pieces for 4-8 HP	6 U pieces for 9-12 HP
Front panel	1	1	1	1
Ejector handle top, gray	-	-	1	1
Ejector handle bottom, gray	1	1	1	1
Bearing bushing	1	1	2	2
Front connector metal	2	2	2	2
Front panel support plug-in	-	-	2	2
Screw retainer M 2.5	2	4	2	4
Mounting parts	1	1	1	1

Ordering details single part front panel for ejector handle (flat front panels)

nom. width [HP]	3 U blank order no. **409.**	3 U anodized/ conductive order no. **409.**	6 U for support pluged-in blank order no. **409.**	6 U for support pluged-in anodized/ conductive order no. **409.**	6 U for support screwed blank order no. **409.**	6 U for support screwed anodized/ conductive order no. **409.**
4	**168 900**	**168 908**	**102 404**	**102 344**	**102 454**	**102 384**
5	**168 901**	-	**102 405**	-	-	-
6	**168 902**	-	**102 406**	-	-	-
8	**168 903**	**168 909**	**102 408**	**102 348**	**102 458**	**102 388**
10	**168 904**	-	**102 410**	-	-	-
12	**168 905**	**168 910**	**102 412**	**102 352**	**102 462**	**102 392**
16	**168 906**	**168 911**	**102 416**	**102 356**	-	-
21	**168 907**	**168 912**	**102 421**	**102 361**	-	-

Front Panels RFI with Ejector Handle





Ordering details - kit front panel RFI with ejector handle

nom. width [HP]	3 U extruded order no. **409.**	3 U order no. **409.**	6 U extruded order no. **409.**	6 U order no. **409.**
4	**113 655**	**113 620**	**113 662**	-
5	**113 656**	-	**113 663**	-
6	**113 657**	**113 622**	**113 665**	-
7	**113 658**	-	**113 667**	-
8	**113 659**	-	**113 668**	-
9	**113 660**	-	**113 669**	-
10	**113 661**	-	**113 670**	-
12	-	**113 626**	-	**113 640**

Finish:

Flat front panel: front side anodized, rear side conductive
Extruded front panel: passivated

Delivery kit - front panel RFI with ejector handle

	3 U pieces for 4-8 HP	3 U pieces for 9-12 HP	6 U pieces for 4-8 HP	6 U pieces for 9-12 HP
Front panel	1	1	1	1
ejector handle top, gray	-	-	1	1
ejector handle bottom, gray	1	1	1	1
Bearing bushing	1	1	2	2
Front connector metal	2	2	2	2
Front panel support plug-in	-	-	2	2
Grounding bushing M 2.5	2	4	2	4
Mounting parts	1	1	1	1

Accessories

	order no. **409.**
For one flat front panel 2 RFI-springs are needed.	
RFI spring F3 - 3 U	**111 112**
RFI spring F3 - 6 U	**111 116**
For assemble the RFI spring F3	
Roller cutter	**118 433**

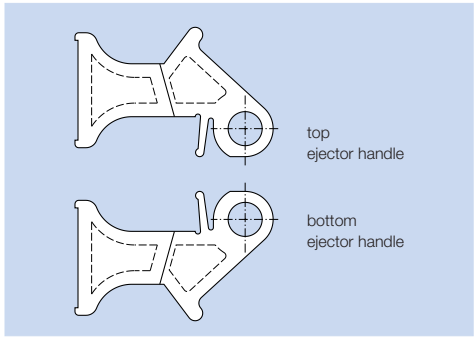
Ordering details single part front panel RFI for ejector handle

nom. width [HP]	3 U extruded order no. **409.**	3 U order no. **409.**	6 U extruded order no. **409.**	6 U order no. **409.**
4	**111 847**	**112 644**	**111 613**	-
5	**113 170**	-	**113 147**	-
6	**111 604**	**112 650**	**111 614**	-
7	**111 605**	-	**111 615**	-
8	**111 606**	-	**111 616**	-
9	**113 171**	-	**113 148**	-
10	**113 172**	-	**113 149**	-
12	-	**112 668**	-	**112 725**

Ejector Handle
The ejector handle extends through the front panel and is screwed together with the bearing bushing at the front connector.

Technical data

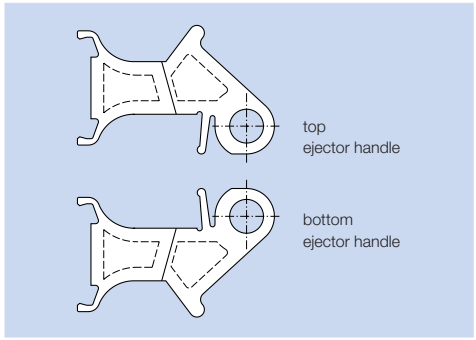
Material	Polycarbonate, 10% fiber-glass reinforced
Color	gray, black
Continous temperature	– 40 °C to + 100 °C
Fire protection class	UL 94 V–0



Ordering details ejector handle 4 HP

version	gray order no. 409.	black order no. 409.
top	**101 923**	**094 458**
bottom	**101 924**	**094 459**

Mounting parts see front connectors



Ejector handle 4 HP
Front side open, for assembly with an ident-plate.

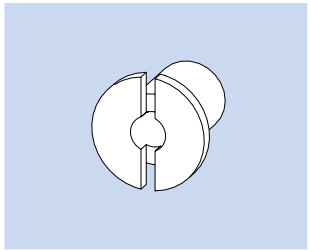
Ordering details ejector handle 4 HP

version	gray order no. 409.	black order no. 409.
top	**102 117**	**101 843**
bottom	**102 118**	**101 844**

Mounting parts see front connectors

Ident-plate 4 HP
The ident-plate is markable and printable. Snapped in after mounting the handle at the front panel.
Material: aluminum
Finish: silver silk-matt anodized

order no.: **409. 017 956**

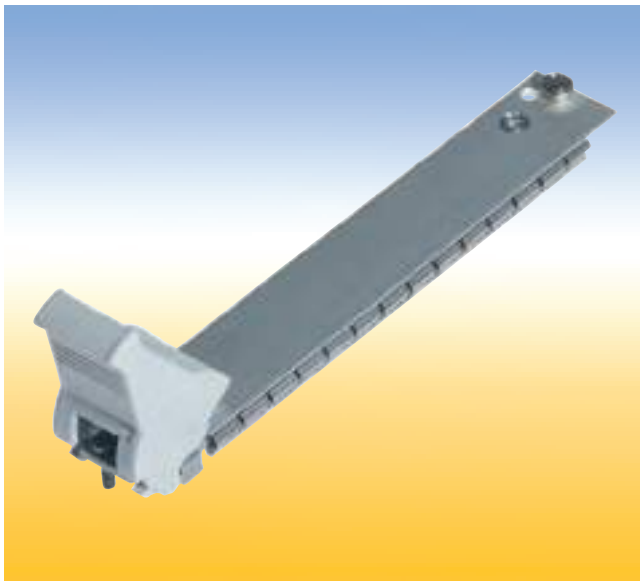


Bearing Bushing 4
for handle 4 HP

Material: steel, galvanized
Finish: passivated

order no.: **409. 065 888**

Front Panels RFI with IEEE Handle



Front Panels with IEEE Handle

For easy pull of PCB's with high density connectors in accorordance to specification IEEE 1101.10.
The assembled handle kit is stuck in the milled space of the front panel and is secured with a clamped spring. Afterwards the PCB are screwed on the inter-grated front connector.

Two versions with IEEE handle are available:

1. Flat front panel RFI
Front anodized, rear conductive. With slits in the side edges for insertion of RFI springs.

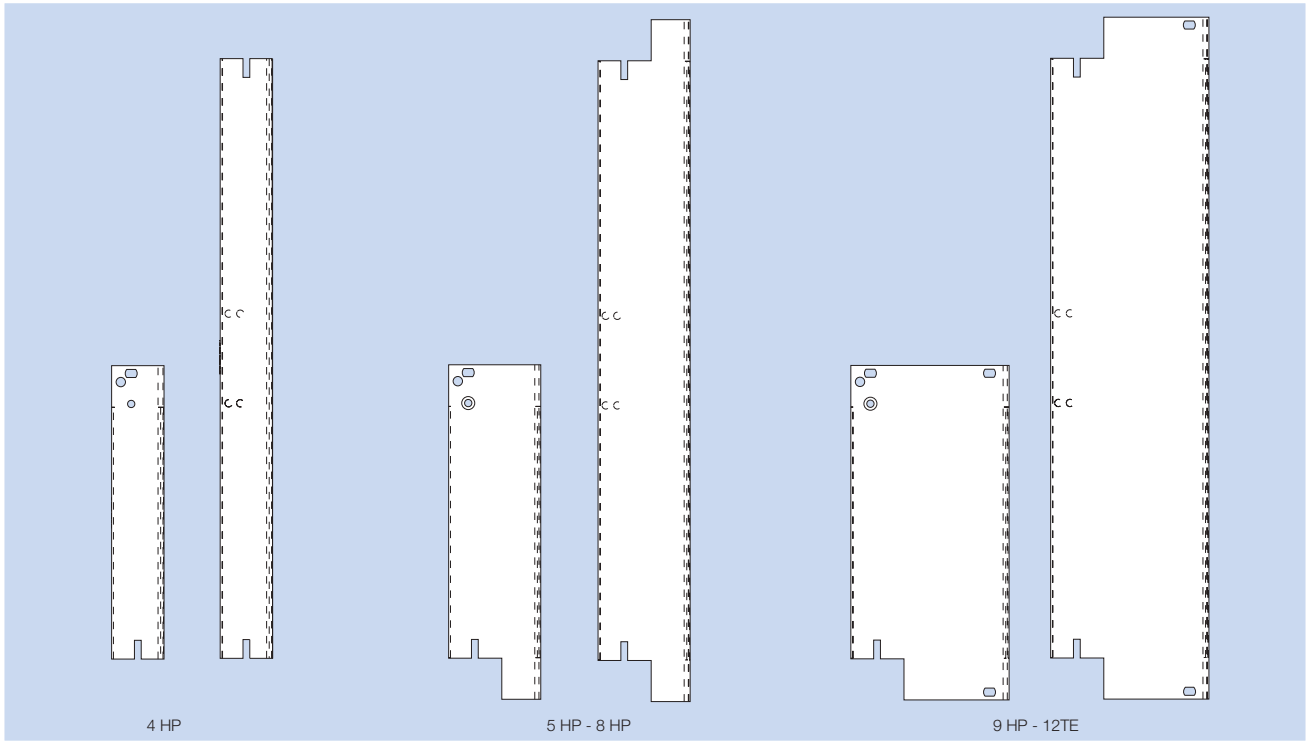
2. Extruded front panel RFI
Made of extruded aluminum alloy, with slits in the side edges for insertion of RFI springs or for contacting. Surface finish is passivated.

Delivery

Front panels are delivered with the assambled IEEE handle as single parts or as a kit.

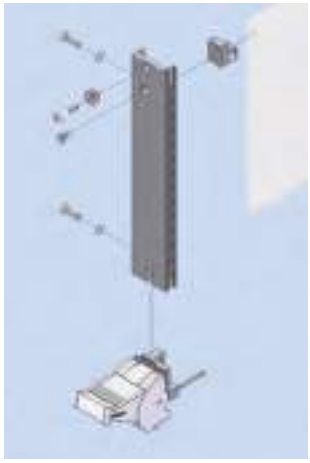
Technical data

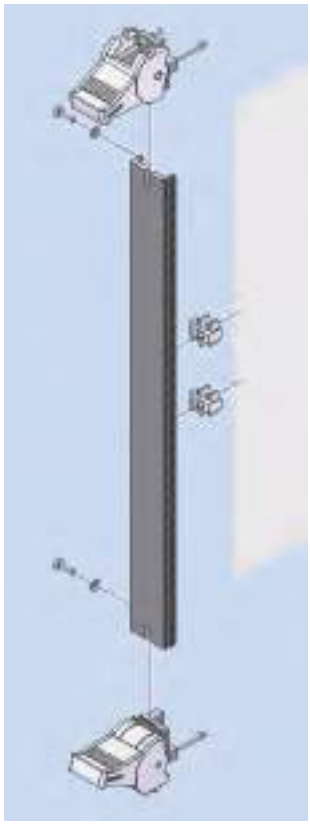
Material	Front panel: aluminum Handle: Polycarbonate
Finish	Front panel: *flat:* front side anodized, rear side conductive *extruded:* passivated
Color	handle: RAL 7035 or black
Continous temperature	– 40 °C to + 100 °C
Fire protection class	UL 94 V–0



Hole pattern of the front panels

Front Panels RFI with IEEE Handle gray without hot-swap





Ordering details kit - front panel RFI with IEEE-handle, gray, without hot-swap

nom. width [HP]	3 U extruded order no. **409.**	3 U order no. **409.**	6 U extruded order no. **409.**	6 U order no. **409.**
4	**113 671**	**113 641**	**113 674**	-
6	**113 672**	-	**113 675**	-
8	**113 673**	-	**113 676**	-
10	**114 463**	-	**114 475**	-
12	-	**113 647**	-	**113 654**

Delivery kit front panel RFI with IEEE-Handle without hot-swap

	3 U pieces for 4-8 HP	3 U pieces for 9-12 HP	6 U pieces for 4-8 HP	6 U pieces for 9-12 HP
Front panel	1	1	1	1
IEEE-handle top gray	-	-	1	1
IEEE-handle bottom gray	1	1	1	1
Front connector metal	1	1	-	-
Front panel support plug-in	-	-	2	2
Grounding bushing M 2.5	1	3	-	2
Mounting parts	1	1	1	1

Accessories

	order no. **409.**
For one flat front panel 2 RFI-springs are needed.	
RFI spring F3 - 3 U	**111 112**
RFI spring F3 - 6 U	**111 116**
For assemble the RFI spring F3	
Roller cutter	**118 433**

Ordering details single part front panel RFI for IEEE handle

nom. width [HP]	3 U extruded order no. **409.**	3 U order no. **409.**	6 U extruded order no. **409.**	6 U order no. **409.**
4	**112 152**	**113 079**	**112 154**	-
5	**112 408**	-	**112 400**	-
6	**112 409**	**112 778**	**112 401**	-
7	**112 410**	-	**112 402**	-
8	**112 411**	-	**112 403**	-
9	**112 412**	-	**112 404**	-
10	**112 413**	-	**112 405**	-
12	-	**112 790**	-	**112 773**

IEEE Handle 4 HP without hot-swap

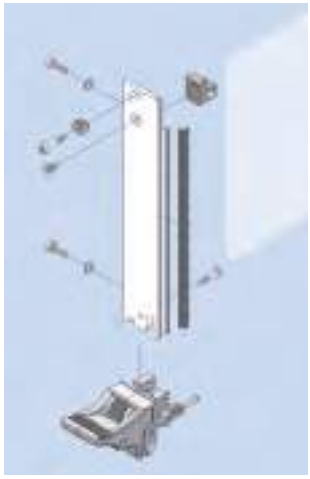
Color: gray, RAL 7035

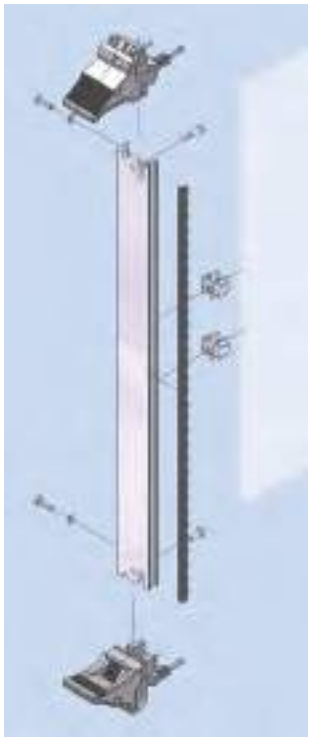
Delivery:
Assembled handle with mounting parts.

Ordering details

	order no. **409.**
IEEE handle 4HP bottom	**114 413**
IEEE handle 4HP top	**114 415**

Front Panels RFI with IEEE Handle black with hot-swap





Ordering details kit - extruded front panel RFI with IEEE handle, black, hot-swap in the bottom handle

nom. width [HP]	3 U order no. **409.**	6 U order no. **409.**
4	**122 607**	**122 610**
6	**122 608**	**122 611**
8	**122 609**	**122 612**

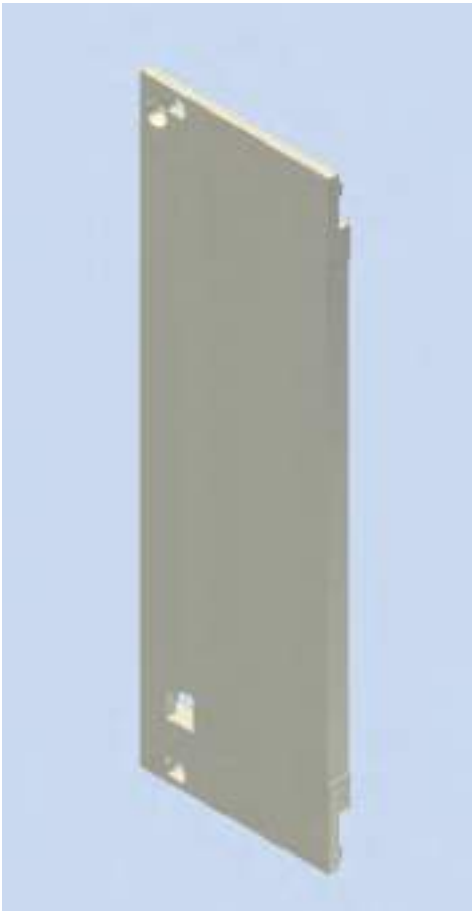
Delivery kit

	3 U pieces for 4-8 HP	6 U pieces for 4-8 HP
Front panel	1	1
IEEE handle top black	-	1
IEEE handle bottom black	1	1
Micro switch	1	1
Front connector metal	1	-
Front panel support plug-in	-	2
Grounding bushing M 2.5	1	-
Mounting parts	1	1

Accessories

	order no. **409.**
For one flat front panel 2 RFI-springs are needed.	
RFI spring F3 - 3 U	**111 112**
RFI spring F3 - 6 U	**111 116**
For assemble the RFI spring F3	
Roller cutter	**118 433**

Plastic Front Panel, Snap-in Handle



Plastic Front Panels

On the rear side of the 2 mm thick front panel is an integrated front connector for attaching 1.6 mm thickness 3 U PCBs.
The handle snappes in into the front panel, therefore the front panel can be modified easily.

Delivery

As single part

Technical data

Material	Polycarbonate, 10% fiber-glass reinforced
Color	RAL 7032, pearl gray or black
Continous temperature	– 40 °C to + 115 °C
Fire protection class	UL 94 V–0

Ordering details plastic front panel

nom. width [HP]	3 U pearl gray order no. **409.**	3 U black order no. **409.**
3	**035 004**	**-**
4	**-**	**-**
8	**035 665**	**040 387**

Accessories

Minimum order quantity 100 pieces

	order no. **409.**
Screw retainer 2 - M 2.5, gray	**085 689**
Cross-head screw M 2.5 x 10. 8	**056 135**

Snap-in Handle

For use with 2 mm thick front panels of plastic. The handle snappes in into the front panel.
Front panels aluminum on request

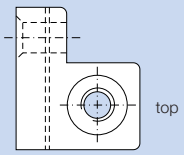
Technical data

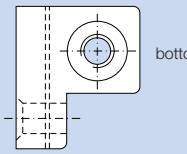
Material	Polycarbonate, 10% fiber-glass reinforced
Color	RAL 7032, pearl gray or black
Continous temperature	– 40 °C to + 105 °C
Fire protection class	UL 94 V–0

Ordering details snap-in handle

nom. width [HP]	RAL 7032 order no. **409.**	pearl gray order no. **409.**	black order no. **409.**
3	**043 035**	**035 528**	**040 385**
4	**043 036**	**035 529**	**040 386**

Front Connector





Front Connector

Material: zinc die-cast
Finish: untreated

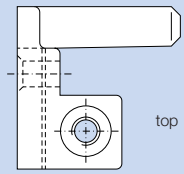
Ordering details

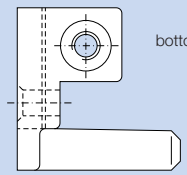
	order no. 409.
Front connector top	099 731
Front connector bottom	099 730

Accessories

Counter sunk screw M 2.5 x 6
self tapping
Minimum order quantity 100 pieces

order no.: **409. 067 624**





Front Connector with Male Contact

For premating front panel grounding.

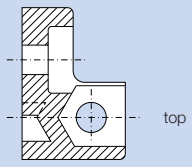
Material: zinc die-cast
Finish: tin-plated

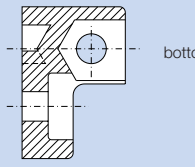
Ordering details

	order no. 409.
Front connector top	107 728
Front connector bottom	107 727

Accessories

	order no. 409.
Front panel grounding contact	058 102
Minimum order quantity 100 pieces	
Self tapping counter sunk screw M 2.5 x 6	067 624





Plastic Front Connector

Technical data

Material	Polycarbonate, 10% fiber-glass reinforced
Color	gray
Continous temperature	– 40 °C to + 100 °C
Fire protection class	UL 94 V–0

Ordering details

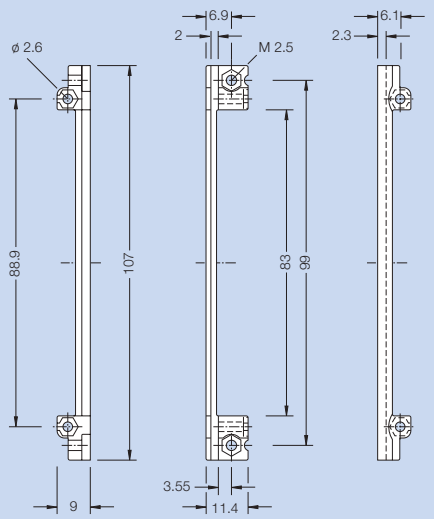
	order no. 409.
Front connector top	065 883
Front connector bottom	065 882

Accessories

Minimum order quantity 100 pieces

	order no. 409.
Hexagonal nut M 2.5	013 938
Counter sunk screw M 2.5 x 6	067 624

Front Connector FEE, Front Panel Support



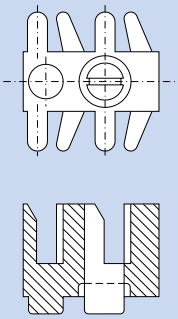
Front Connector FEE

With inserted nut M 2.5 for fastening to the front panel.
Also for use with front mounted Elements (FEE).

Technical data

Material	Polycarbonate, 10% fiber-glass reinforced nut: steel, galvanized and chromated
Color	gray
Continous temperature	– 40 °C to + 115 °C
Fire protection class	UL 94 V–0

order no.: **409. 024 830**



Front Panel Support

For PCB's with a height over 3 U used with two-piece front connector.
Prevents deflection of the front panel when inserting the PCB.

Technical data

Material	Polycarbonate, 10% fiber-glass reinforced
Color	gray
Continous temperature	– 40 °C to + 100 °C
Fire protection class	UL 94 V–0

order no.: **409. 092 786**

Screw Retainer, Grounding Bushing, Quick Lock E

Screw retainer, Grounding bushing and Screw

Screw Retainer 2.5 - M 2.5

For 2.5 mm thick front panels, for pluging in the screw

Technical data

Material	POM
Color	gray or black
Continous temperature	– 40 °C to + 100 °C

Ordering details

Minimum order quantity 100 pieces

	Color	order no. **409.**
Screw retainer 2.5 - M 2.5	gray	**100 539**
Screw retainer 2.5 - M 2.5	black	**100 538**

Grounding Bushing M 2.5

Pressed into the front panel. Secures the screw M 2.5 and provides electrical bounding between the screw and front panel and subrack; even when the front panel is anodized.

Material: brass, nickel plated

Minimum order quantity 10 pieces

order no.: **409. 082 594**

Screw M 2.5 x 11.3

for 2.5 mm thick front panels

Material: knurled head screw: steel, nickel plated
others: stainless steel

Ordering details

Minimum order quantity 100 pieces

	head form	order no. **409.**
Pan head screw	sloted	**100 540**
Oval head screw	cross slot	**101 917**
Knurled head screw	knurled	**101 918**

Quick Lock E

for 2.5 mm thick front panels.
Slot head.

Minimum order quantity 10 pieces

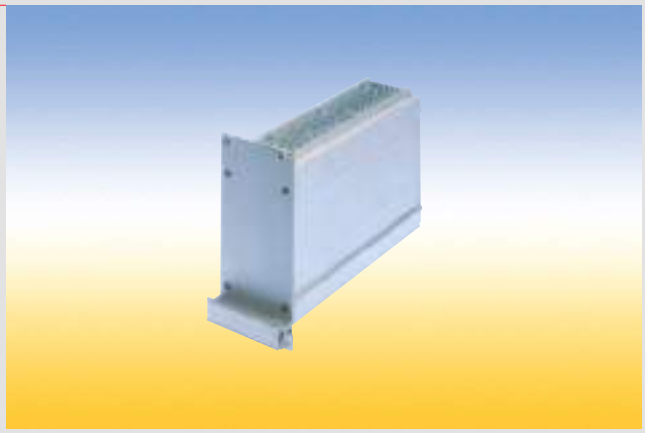
order no.: **409. 097 957**

Technical data

Material	sleeve: POM bolt: steel, galvanized
Color	gray
Continous temperature	– 40 °C to + 100 °C

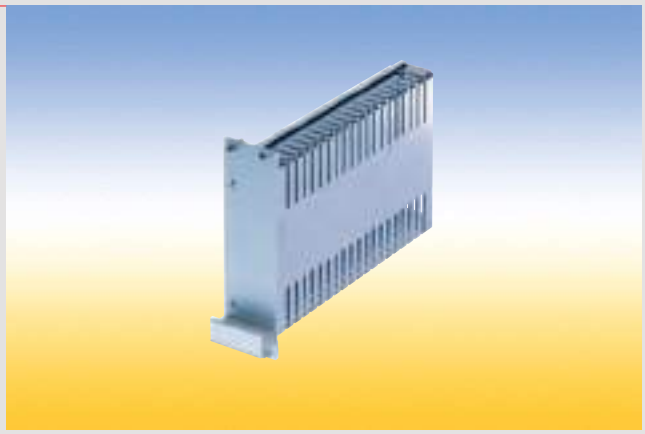
Cassettes

Cassette with Extruded Side Walls

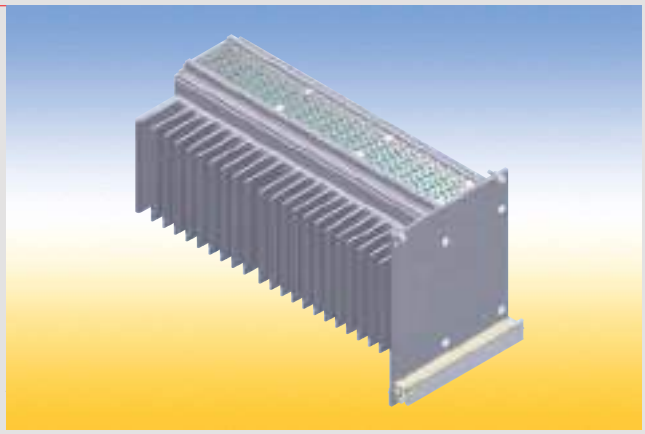


Cassette with four Depth Profiles

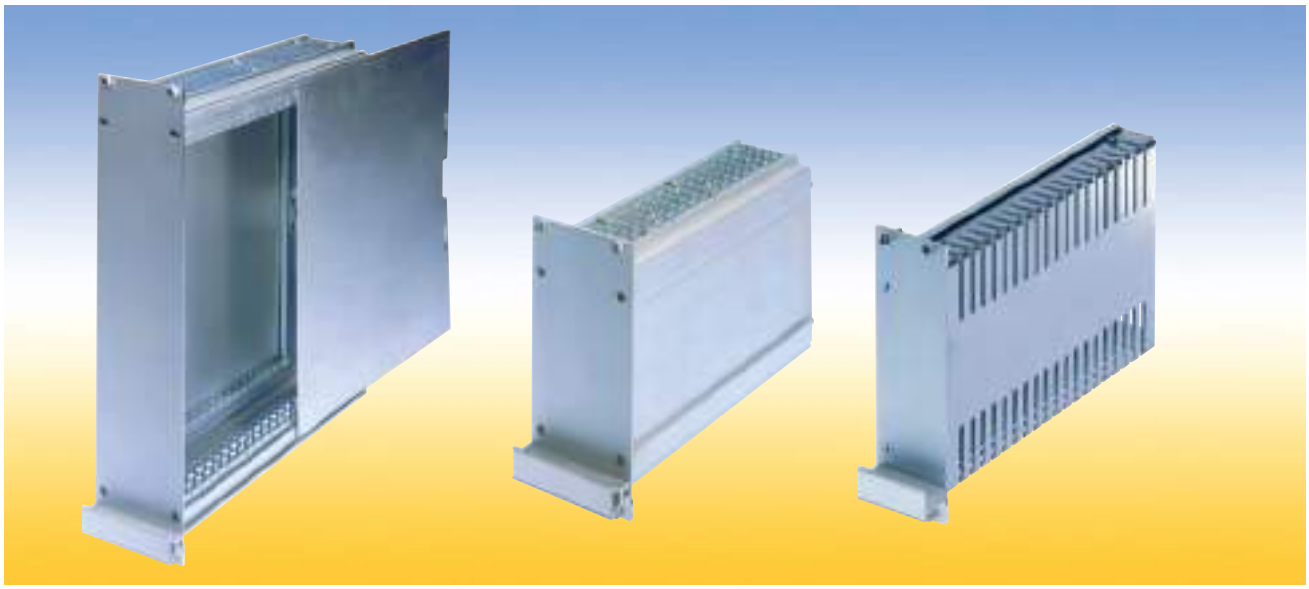
Cassette with Cover Hood



Cassette with Heat Sink



Cassettes



Description
The cassette has two functions:
It can be inserted into a subrack just like a PCB and it can accommodate plug-in boards.

Three cassette versions are available:

1. A cassette with extruded side walls
Extruded side walls in combination with a front panel and a rear panel make up the basic cassette which is then fitted with top and bottom plates.

2. A cassette with four depth profiles
Four identical depth profiles in combination with a front panel and a rear panel make up the basic cassette which is then fitted with top and bottom plates.
Two side service apertures are created which make the interior of the cassette easily accessible for inspection purposes. These apertures can be closed off using slide-in panels.

3. Cassette with cover hood
This version consists of a extruded side wall at the left to which the protective cover with an integrated rear wall is attached. The rear has a 4 HP aperture for installing an IEC 60 603-2 type B, C, D or F connector.

The special design features of the cassettes:
√ The side edges of the front panel are slit for insertion of RFI gaskets which harmonically blend into the front panel grid and which require no additional space.
√ The cassettes fit into all IEC 60 297 subracks.

√ The cassette is fitted in the subrack using PCB guide mounts. For the right side of the cassette the guide mount is installed rotated by 180°.

√ Suitable for accommodating Euroboards (3U, 6U) in accordance with IEC 60 297.
√ The side walls and depth profiels have guide channels for insertion of 3U or 6U boards; only installation at the left is standardized.
√ Additional guide mounts can be snapped into the top and bottom cover panels to accommodate internal boards.
√ When used in a subrack the distance between the cassette and the PCB to the right of it is 2.47 mm.

Rear panel:
Three different rear panels are available:

1. Cassette „RG“ (rear panel closed):
This cassette is particularly suitable for any installation.

2. Cassette „RT“ (rear panel with partial aperture):
The rear panel has a 4HP aperture for installation of a connector.

3. Cassette „RV“ (rear panel with full aperture):
The rear panel has an aperture across its full width and is perforated for installation of connectors.

Dimensions
The cassette design is based on the following grid:
Horizontal pitch 5.08 mm
Height pitch 44.45 mm
Depth pitch 10.00 mm

Technical data

Standards	IEC 60 297, Part 3
Material	„RV“ rear panel, top and bottom panels: sheet steel mounting parts: steel handles: plastic other parts: aluminum
Finish	side panel, covers, „RV“ rear panel: untreated front panel: front anodized, rear and edges untreated other parts: passivated
Protection class	IP 30
Utilization category	-25 °C to 70 °C, =< 75 % relative humidity, condensation possible
Electrical requirements	all parts are electrically bonded to one another following assembly in accordance with VDE 100 § 8 Nb.

RFI shielding of Cassettes.

The Cassettes are manufactured from electrically conductive materials and screwed together.
The RFI shielding can be further enhanced by increasing the number of screws used in vulnerable areas to obtain a superior RFI seal:

1. Top and bottom plates / front panels
Additional mounting blocks can be used between the top and bottom covers and the front plate.
The top and bottom covers are pierced every 5.08 mm and by drilling extra holes in the front plane, additional contact points can be made.

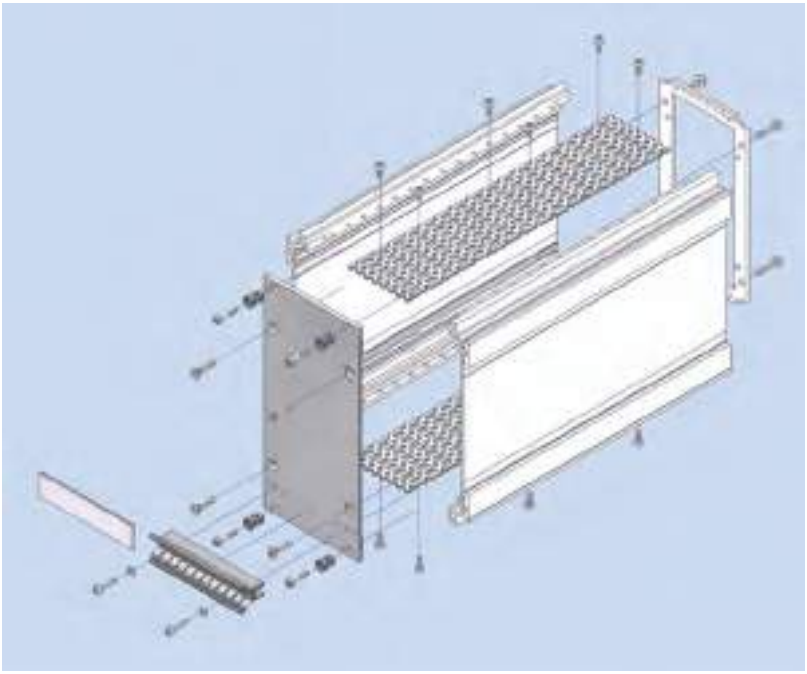
2. Top and bottom plates / rear panels
Additional mounting blocks can be used between the top and bottom plates and the rear panels.
The top and bottom plates are pierced every 5.08 mm and by drilling extra holes in the rear panel types “R” and “RT“, additional contact points can be made. Rear panel type “RV” are pre-punched at 5.08 mm as standard and require no further modification.

3. 6 U Side wall / front panel
Two additional screws can be used in the front panel (one each side) to gain extra contact points to the side extrusion. Both the front panel and the extrusion require additional drilling.

Intermas Cassettes have excellent RFI Shielding properties as standard.
But should you wish to enhance the RFI shielding, then please contact one of our specialists for further assistance.

Please ask your local representative for your
personal assistance.
You find your contact person on our homepage:
www.intermas-el.com

Cassette with Extruded Side Walls



Cassette with Extruded Side Walls
The cassette kits includes following rear panels:
1. Rear panel closed (RG)
2. Rear panel with partical aperture (RT)
3. Rear panel with full aperture (RV).

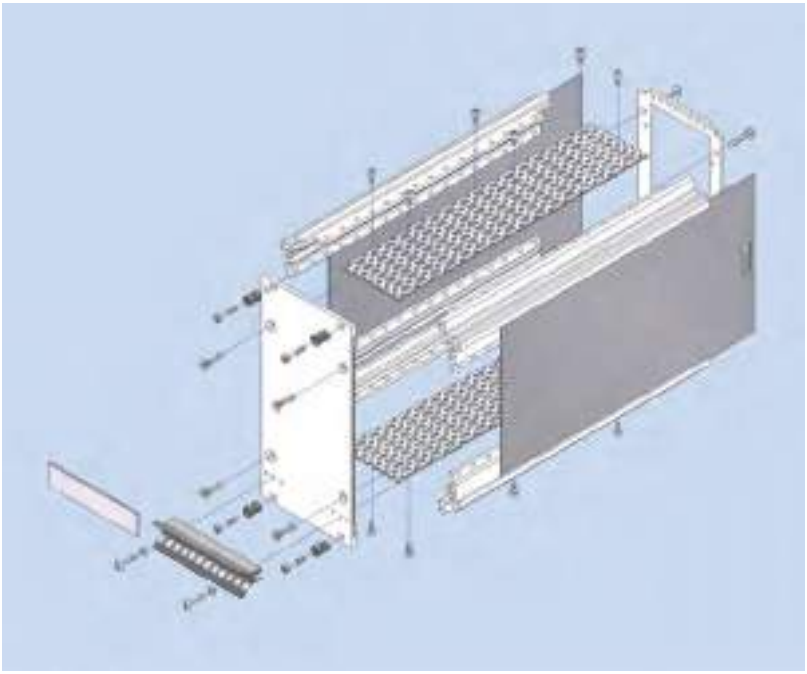
Kit constists of:
2 extruded side walls
1 rear panel
2 top/bottom plate
1 front panel, with slits in the side edges for insertion of RFI gaskets
1 handle
1 aluminum ident-plate
Mounting parts

Delivery
The cassette is delivered unassembled as individual parts or as a kit.

Ordering details kit cassette with extruded side walls

	nom. height [U]	nom. width [HP]	nom. depth **160 mm** order no. **409.**	nom. depth **220 mm** order no. **409.**
RT	3	08	**165 617**	**165 625**
RG	3	10	**165 602**	**165 610**
RG	3	12	**165 603**	**165 611**
RG	3	14	**165 604**	**165 612**
RG	3	21	**165 605**	**165 613**
RG	3	28	**165 606**	**165 614**
RG	3	42	**165 607**	**165 615**
RV	3	10	**165 634**	**165 642**
RV	3	12	**165 635**	**165 643**
RV	3	14	**165 636**	**165 644**
RV	3	21	**165 637**	**165 645**
RV	3	28	**165 638**	**165 646**
RV	3	42	**165 639**	**165 647**

Cassette with four Depth Profiles



Cassette with four Depth Profiles
The cassette kits includes following rear panels:
1. Rear panel closed (RG)
2. Rear panel with partical aperture (RT)
3. Rear panel with full aperture (RV).

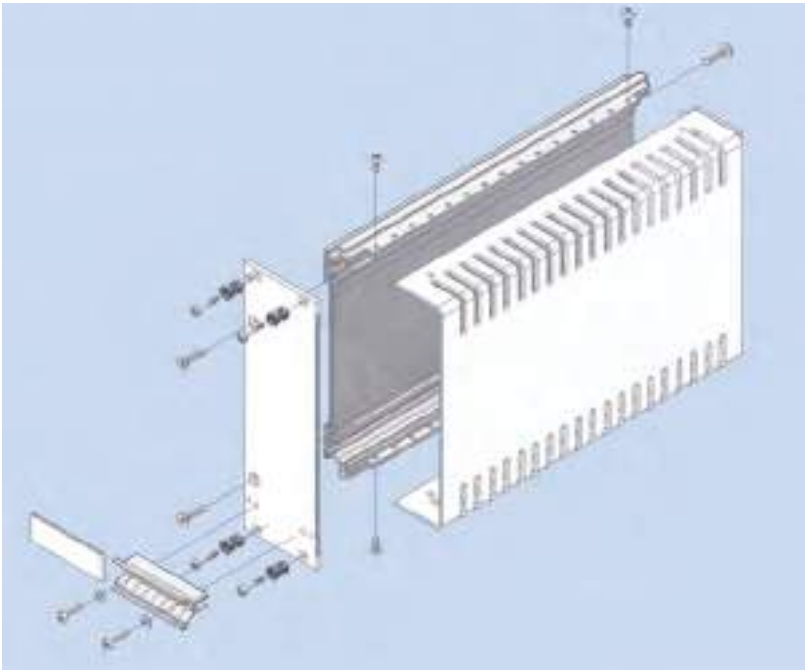
Kit constists of:
4 depth profiles
2 struts
2 side plates
1 rear panel 3 U / 2 rear panels 6 U
2 top/bottom plate
1 front panel, with slits in the side edges for insertion of RFI gaskets
1 handle
1 aluminum ident-plate
Mounting parts

Delivery
The cassette is delivered unassembled as individual parts or as a kit.

Ordering details kit cassette with four depth profiles

	nom. height [U]	nom. width [HP]	nom. depth **160 mm** order no. **409.**	nom. depth **220 mm** order no. **409.**
RT	3	08	**165 713**	**165 721**
RG	3	10	**165 698**	**165 706**
RG	3	12	**165 699**	**165 707**
RG	3	14	**165 700**	**165 708**
RG	3	21	**165 701**	**165 709**
RG	3	28	**165 702**	**165 710**
RG	3	42	**165 703**	**165 711**
RV	3	10	**165 730**	**165 738**
RV	3	12	**165 731**	**165 739**
RV	3	14	**165 732**	**165 740**
RV	3	21	**165 733**	**165 741**
RV	3	28	**165 734**	**165 742**
RV	3	42	**165 735**	**165 743**
RT	6	08	**165 873**	**165 881**
RG	6	10	**165 842**	**165 850**
RG	6	12	**165 843**	**165 851**
RG	6	14	**165 844**	**165 852**
RG	6	21	**165 845**	**165 853**
RG	6	28	**165 846**	**165 854**
RG	6	42	**165 847**	**165 855**
RV	6	10	**165 858**	**165 866**
RV	6	12	**165 859**	**165 867**
RV	6	14	**165 860**	**165 868**
RV	6	21	**165 861**	**165 869**
RV	6	28	**165 862**	**165 870**
RV	6	42	**165 863**	**165 871**

Cassette with Cover Hood



Cassette with Cover Hood

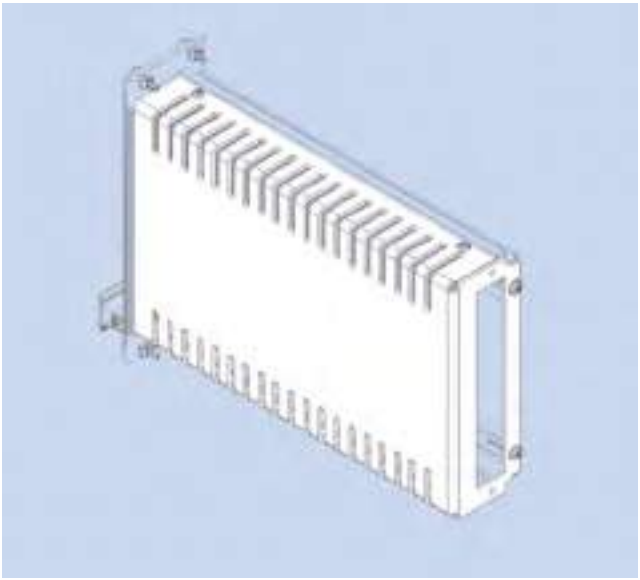
Kit constists of:
1 extruded side wall
1 cover hood
1 front panel, with slits in the side edges for insertion of RFI gaskets
1 handle
1 aluminum ident-plate
Mounting parts

Delivery
The cassette is delivered unassembled as individual parts or as a kit.

Ordering details kit cassette with cover hood

nom. height [U]	nom. width [HP]	nom. depth **160 mm** order no. **409.**	nom. depth **220 mm** order no. **409.**
3	6	**166 112**	**166 116**
3	7	**166 113**	**166 117**
3	8	**166 114**	**166 118**

Individual parts of the cassettes

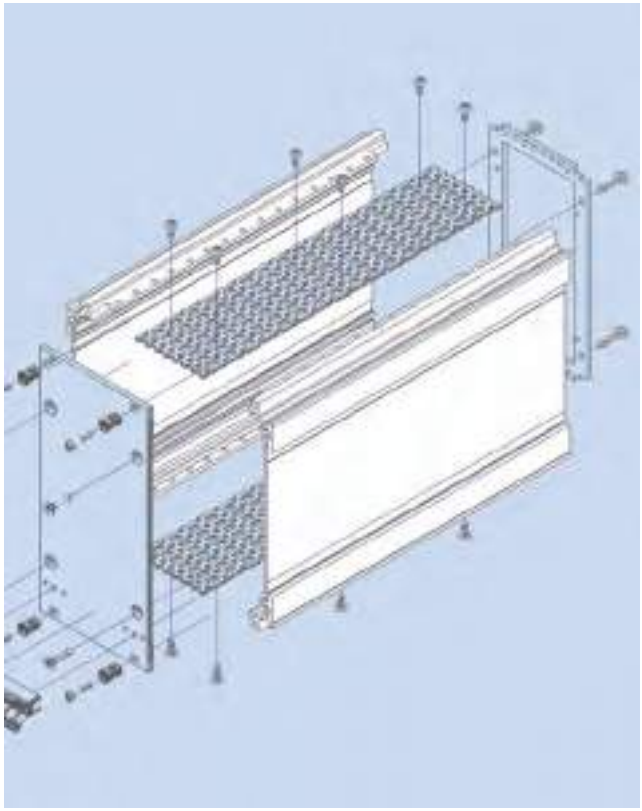


Cover Hood

Material: aluminum
Finish: blank

Ordering details cover hood

nom. height [U]	nom. width [HP]	nom. depth **160 mm** order no. **409.**	nom. depth **220 mm** order no. **409.**
3	6	**165 896**	**166 100**
3	7	**165 897**	**166 101**
3	8	**165 898**	**166 102**

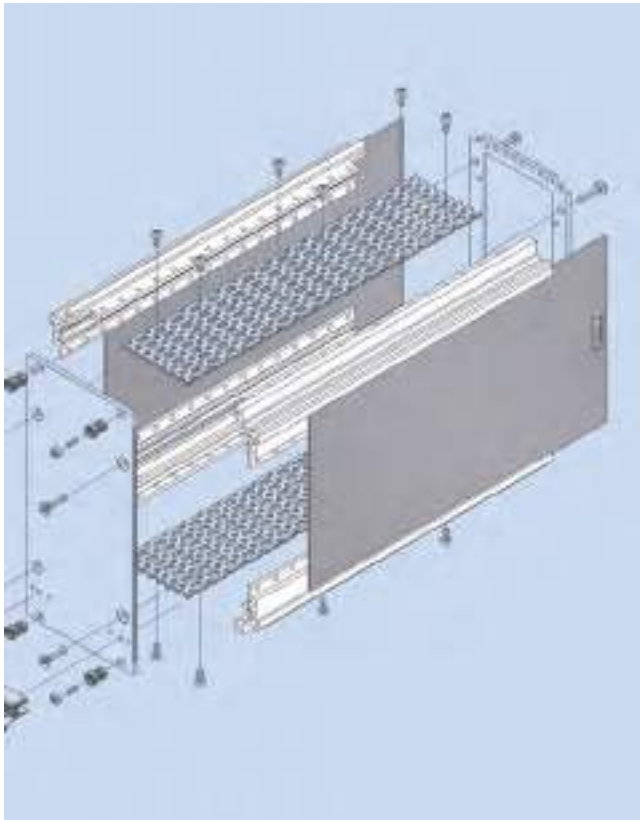


Extruded Side Wall

Material: aluminum
Finish: passivated

Ordering details extruded side walls

nom. depth [mm]	3 U order no. **409.**
160	**079 202**
220	**079 203**



Depth Profiles

Material: aluminum
Finish: passivated

Ordering details depth profiles

nom. depth [mm]	order no. **409.**
160	**039 603**
220	**039 604**

Side Plates

Material: aluminum
Finish: blank

Ordering details side plates

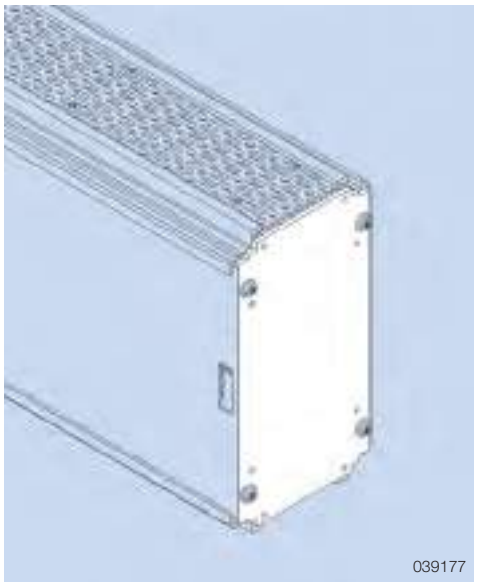
nom. depth [mm]	3 U order no. **409.**	6 U order no. **409.**
160	**039 542**	**039 546**
220	**039 543**	**039 547**

Strut 6 U

Material: aluminum
Finish: passivated

order no.: **409. 039 540**

Individual Parts of the Cassettes



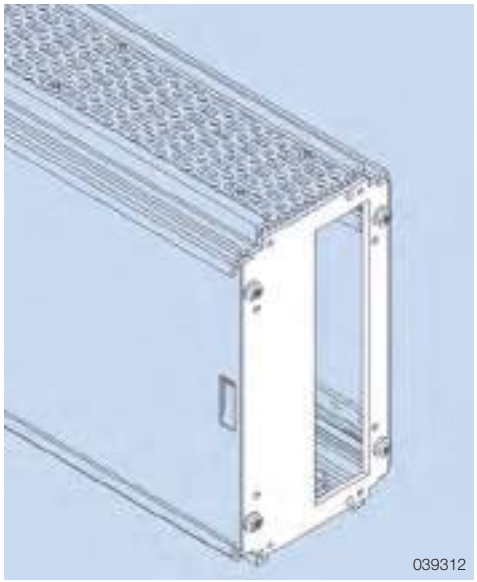
Rear Panel RG

3 U panel wall closed. 6 U cassettes require two 3 U rear panels.

Material: aluminum
Finish: blank

Ordering details rear panel RG

nom. width [HP]	order no. **409.**
8	-
10	**166 237**
12	**166 238**
14	**166 239**
21	**166 240**
28	**166 241**
42	**166 242**



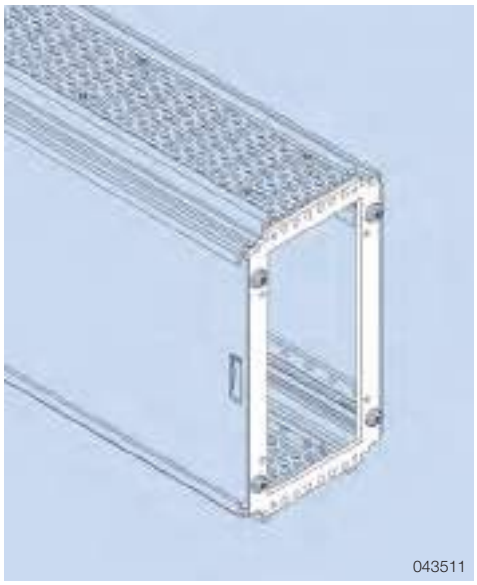
Rear Panel RT

3 U rear panel with partical aperture. 6 U cassettes require two 3 U rear panels.

Material: aluminum
Finish: blank

Ordering details rear panel RT

nom. width [HP]	order no. **409.**
8	**166 243**
10	-
12	-
14	-
21	-
28	-
42	-



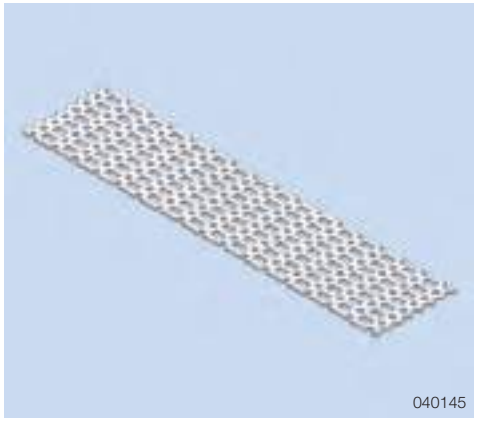
Rear Panel RV

3 U Rear panel with full aperture. 6 U cassettes require two 3 U rear panels.

Material: steel
Finish: galvanized und passivated

Ordering details rear panel RV

nom. width [HP]	order no. **409.**
8	-
10	**043 514**
12	**043 516**
14	**043 518**
21	**043 525**
28	**043 532**
42	**043 546**

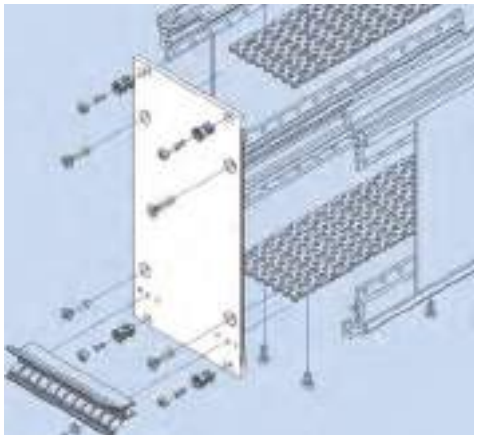


Top/Bottom Plate

Material: steel
Finish: galvanized and passivated

Ordering details top/bottom plate

nom. width [HP]	nom. depth **160 mm** order no. **409.**	nom. depth **220 mm** order no. **409.**
8	**038 687**	**038 763**
10	**038 689**	**038 765**
12	**038 691**	**038 767**
14	**038 693**	**038 769**
21	**038 700**	**038 776**
28	**038 707**	**038 783**
42	**038 721**	**038 797**



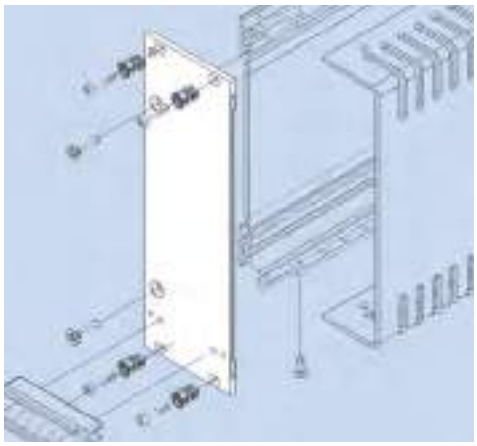
Front Panel

For cassette with extruded side panel or depth profiles.

Material: aluminum
Finish: front anodized, rear and edges blank

Ordering details front panel for cassette

nom. width [HP]	**3 U** order no. **409.**	**6 U** order no. **409.**
8	**115 005**	**119 024**
10	**115 007**	**119 026**
12	**115 009**	**119 028**
14	**115 011**	**119 030**
21	**115 018**	**119 037**
28	**115 025**	**119 044**
42	**115 039**	**119 058**



Front Panel

For cassette with cover hood.

Material: aluminum
Finish: front anodized, rear and edges blank

Ordering details front panel for cassette cover hood

nom. width [HP]	**3 U** order no. **409.**
6	**122 380**
7	**120 282**
8	**120 283**

Individual Parts of the Cassettes

Handle FP for Front Panels

Assembled with M 2.5 screws and with 1 additional self tapping screw from 6 HP. The handle is held against torsion by means of two nipples.

Technical data

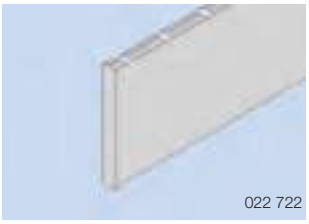
Material	Polycarbonate, colored 10% fiber-glass reinforced
Color	gray RAL 7032, black
Continous temperature	– 40 °C to + 100 °C)
Fire protection class	UL 94 V–0

Ordering details handle FP

width [HP]	length [mm]	gray order no. **409.**	black order no. **409.**
6	29.04	**103 006**	**103 206**
7	34.12	**103 007**	**103 207**
8	39.20	**103 008**	**103 208**

Ordering details handle strip FP

width [HP]	length [mm]	gray order no. **409.**	black order no. **409.**
10	49.36	**103 810**	**058 910**
12	59.52	**103 812**	**058 912**
14	69.68	**103 814**	**058 914**
21	105.24	**103 821**	**058 921**
28	150.80	**103 828**	**058 928**
42	211.92	**103 842**	**058 942**



Ident-Plate

for handle FP.
The ident-plate is markable and printable, snapped in after mounting the handle to the front panel.

Material: aluminum
Finish: anodized

Ordering details ident-plate

width [HP]	length [mm]	order no. **409.**
6	29.04	**022 792**
7	34.12	**022 793**
8	39.20	**022 794**
10	49.36	**022 796**
12	59.52	**022 798**
14	69.86	**022 800**
21	105.24	**022 807**
28	150.80	**022 814**
42	211.92	**040 652**

Mounting parts of the cassette

Minimum order quantity each 100 pieces

	order no. **409.**
To assemble the strut and the top/bottom plates to the pr	
Oval head screw M 2.5 x 5	**039 691**
To assemble the rear plate to the pr	
Oval head screw M 3 x 12	**108 963**
Spring washer A 3	**040 969**
To assemble the front panel to the pr	
Counter sunk screw M 3 x 12	**108 962**
To assemble the cassette into the subrack	
Screw retainer 2.5, gray	**100 539**
Screw M 2.5 x 11.3	**101 917**

Mounting parts for handles:

Minimum order quantity each 100 pieces

	order no. **409.**
Washer 2.7	**013 911**
Self tapping screw M 2.5 x 10	**040 401**

This catalog contains stock and standard parts. Other products and sizes on request.

Accessories
Pan head screw M2,2 x 6,5
Minimum order quantity 100 pieces

order no.: 409. 022 672

Card Guide for Cassette

This card guide is snap-in and screw-on type.

Technical data

Material	Noryl
Color	RAL 7035
Continous temperature	– 40 °C to + 115 °C
Fire protection class	UL 94 V–0

Ordering details

	nom. length [mm]	PCB thickness [mm]	order no. **409.**
Card guide for cassette	100	1.6	**041 012**
Card guide for cassette	160	1.6	**041 008**

PCB Retainer

To secure PCB's inside the cassette.
Assembled together with the card guide.

Technical data

Material	Noryl
Color	RAL 7035
Continous temperature	– 40 °C to + 115 °C
Fire protection class	UL 94 V–0

order no.: **409. 043 488**

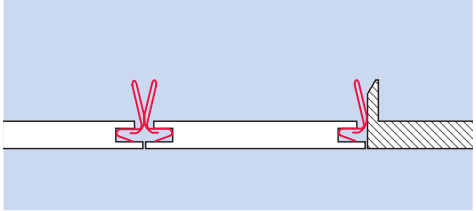
Male Connector Assembly Kit

To assemble male connectors of type B, C, D, E, F, G, or H reg. DIN EN 60603 in rear panels.

Material: steel
Finish: galvanized und passivated

Delivery: 1 male connector bracket top
1 male connector bracket bottom
Mounting parts

order no.: **409. 046 098**



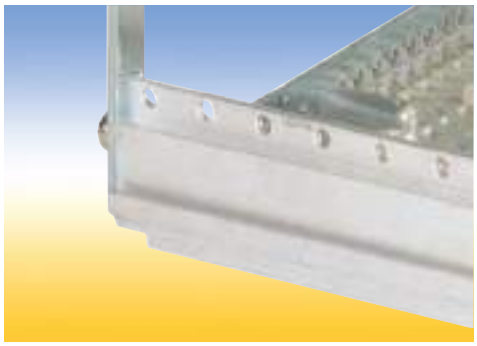
RFI-Spring F3

The RFI-contact spring for inserting into the side edges of the front panel.

Ordering details

	order no. **409.**
ont panel 2 RFI-springs are needed.	
RFI spring F3 - 3 U	**111 112**
RFI spring F3 - 6 U	**111 116**
For assemble the RFI spring F3	
Roller cutter	**118 433**

Accessories for Cassettes



Mounting Block

To connect top/bottom plate with rear panel.
The mounting block can also be used to enhance RFI shielding in conjunction with blank rear panel RG. The rear panel can be additionally drilled for extra contact points.

order no.: **409. 044 090**

Backplane Holder

To assemble backplanes on top/bottom plate.

order no.: **409. 119 013**

Accessories

Minimum order quantity each 100 pieces

	order no. 409.
To assemble the rear plate and the backplane holder at the top/bottom plates	
Oval head screw M 2.5 x 6	**046 999**
To assemble the backplane or the rear panel at the mounting block or backplane holder	
Oval head screw Taptite M 2.5 x 10	**040 401**
Spring washer 2.7	**013 911**

Cassette Angle

To assembly a free wiring level inside of the cassette.
Mounted on the top/bottom plate.

Material: steel
Finish: galvanized and passivated

Ordering details cassette angle

length [mm]	for cassette nom. width [HP]	order no. 409.
9.18	8	**039 851**
19.34	10	**039 853**
29.50	12	**039 855**
39.66	14	**039 857**
75.22	21	**039 864**
110.78	28	**039 954**
181.90	42	**039 968**

Accessories

Minimum order quantity each 100 pieces

	order no. 409.
To assemble the casssette angle at the top/bottom plates	
Oval head screw M 2.5 x 5	**039 691**
To assemble the connectors at the cassette angle	
Tapered screw M 2.5 x 6.5	**032 708**

Shell

To cover the open space between the top and bottom rear panels for 6-U-cassette. The shell is assembled at the strut.

Material: aluminum
Finish: passivated

Ordering details

	nom. width [HP]	order no. **409.**
Shell 08	8	**040 348**
Shell 10	10	**040 350**
Shell 12	12	**040 352**
Shell 14	14	**040 354**
Shell 21	21	**040 361**
Shell 28	28	**040 368**
Shell 42	42	**040 382**

Accessories

Oval head screw M 3 x 12
Minimum order quantity 100 pieces
order no.: **409. 108 963**

Screw retainer, grounding bushing and screw

Screw retainer 2.5 - M 2.5

To 2.5 mm thickness front panels, for pushing in the screw

Technical data

Material	POM
Color	gray or black
Continous temperature	– 40 °C to + 100 °C

Ordering details

Minimum order quantity 100 pieces

	Color	order no. **409.**
Screw retainer 2.5 - M 2.5	gray	**100 539**
Screw retainer 2.5 - M 2.5	black	**100 538**

Grounding Bushing M 2.5

To press in to the front panel in order to get electrical bounding to the cassette even when the front panel is anodized.

Material: brass, nickel plated

Minimum order quantity 10 pieces
order no.: **409. 082 594**

Screw M 2.5 x 11.3

for 2.5 mm thick Front panels

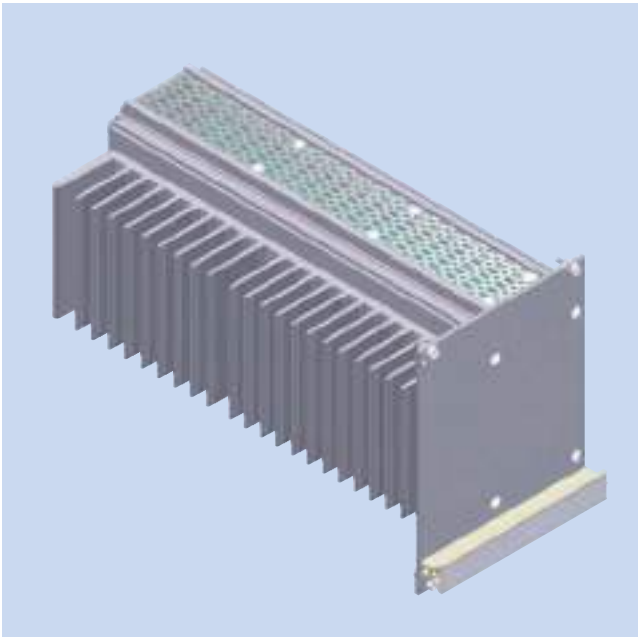
Material: Knurled head screw: steel nickel plated
Others: stainless steel

Ordering details

Minimum order quantity 100 pieces

	head form	order no. **409.**
Pan head screw	sloted	**100 540**
Oval head screw	cross slot	**101 917**
Knurled head screw	knurled	**101 918**

Cassette with Heat Sink



Cassette with Heat Sink

This cassette is designed for passive cooling of electronic sub assemblies and systems. The thermal power loss which is generated in the 19“ cassette is dissipated by a heat sink which also serves as sidewall. The heat sink is covered by an asymmetric front panel. Euroboards are being fitted into card guides which can be snapped in every possible position in the cassette. A wide range of accessories, for example rear cover, handle and handle strip in different colors and types are available. The front panel can be fitted with RFI springs to realize RFI shielding of the front of the subrack. Optionally the complete cassette can be RFI shielded.

Delivery

4 depth profiles
1 side plates
1 heat sink, aluminum blank
1 rear panel 3 U
2 top/bottom plate
1 front panel, with slits in the side edges for insertion of RFI gaskets
1 handle
1 aluminum ident-plate
Mounting parts

Delivery

The cassette is delivered unassembled as individual parts or as a kit.

Ordering details cassette with heat sink

height [U]	depth [mm]	cassette + heat sink-width [HP]	order no. **409.**
3	160	12 + 8	**168 938**
3	160	28 + 8	**168 939**
3	220	12 + 8	**168 940**
3	220	28 + 8	**168 941**

Accessories

	order no. **409.**
For one flat front panel 2 RFI-springs are needed.	
RFI spring F3 - 3U	**111 112**
For assemble the RFI spring F3	
Roller cutter	**118 433**

Electronic Systems

Customer specific electronic systems

- √ Electronic products according to your requirements
- √ Consulting service and development for mechanics, electronics and wiring
- √ Professional electronic integration and wiring
- √ Certifications (CE, UL, shock, vibration, etc.) on request

Customer specific electronic systems

System consulting
√ Project planning combining your specifications and our know-how

Development
√ Mechanics, customer specific electronics, prototype construction
√ Consider environmental conditions like shock, vibration, temperature and RF-signals

Production
Metal processing, surface refinement, assembly

Elektronics and wiring
√ ESD compliant electronic assembly and wiring

Quality assurance
√ Electrical safety tests, component test, system test, Burn-In

Application examples

High speed data acquisition system

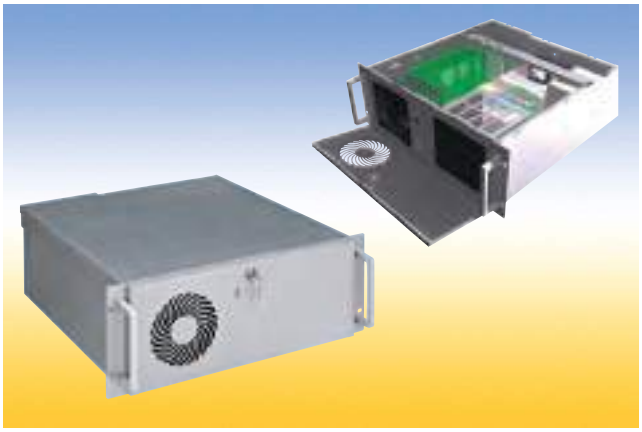
- Customer specific design with PCI slots at front side
- High EMI requirements because of high frequency clocking
- Optimized cooling for high-quality components

Control system with touch operation

- 2,5 U height and only 6 cm depth
- High performance in a small housing
- Development of a cooling concept
- Reliable touch operation

Highly available Industrial PC

- Lockable front door to prevent unauthorized access
- System with shock and vibration dampers
- High reliability by using RAID and redundant power supply



Please ask your local representative for your
individual system configuration.
You find your contact person on our homepage:
www.intermas-el.com

AC/DC converters

- √ PK MONOVOLT
- √ PK BIVOLT
- √ PK TRIVOLT
- √ VP 40
- √ VP 50

AC/DC converters with active PFC

- √ VP 80
- √ VP 150

AC/DC converters economy

- √ EC MONOVOLT
- √ EC TRIVOLT

DC/DC converters

- √ GK TRIVOLT

Power Supplies PK-Series MONOVOLT

MONOVOLT AC/DC-converters
30 to 120 Watt switched mode AC/DC plug-in power supplies with one output in 3 U Eurocassettes for use in 19" subracks to IEC 60297-3.

- √ Compact rugged design in stable aluminum cassette
- √ High regulation accuracy
- √ Remote On/Off and Powerfail signal
- √ SENSE-operation and Overvoltage protection (OVP)
- √ PK 60-R for redundant operation
- √ Convection cooling
- √ CE marked for compliance to EMC and Low Voltage Directives
- √ Safety according to EN 60950, UL, cUL
- √ VERO standardised pinning
- √ 24 months warranty

Ordering details Power Supplies Monovolt AC/DC-converter

	nom. height/ nom. width [U] / [HP]	for nom. depth [mm]	single output [W]	output [V]/ [A]	without powerfail order no. **116.**
PK 30	3 / 8	>160	30	5V/6A	**010016D***
PK 60	3 / 8	>160	60	5V/12A	**010063D***
PK 60	3 / 8	>160	60	12V/5A	**010064A***
PK 60	3 / 8	>160	60	24V/2,5A	**010066F***
PK 120	3 / 14	>160	120	12V/10A	**010070J**
PK 120	3 / 14	>160	120	24V/5A	**010072C**

For applications according EN 61000-3-2, we recommend the VP-Series.

Power Supplies

Accessories

	order no.
Reduced height front panel for PK 30	**148-011002D**
Reduced height front panel for PK 60	**148-010021E**
Reduced height front panel for PK 120	**148-010019G**
Male connector with coding strip H15 DIN 41612	**017-010115K**
Minimum order quantity 1 pack (10 pieces)	
Coding strip	**017-010064F**

Technical input data

Input voltage (switchable)	115 / 230VAC
Input frequency	47-63Hz
Inrush surge current limit	by NTC
Input voltage spike limit	by VDR
Hold-up time	>20 msec (at nominal values)
	typ. > 80%
Safety: CE marking according to low voltage directive 73/23/EEG	
Safety according to	EN 60950, UL 1950
EMC: CE marking according EMC directive 89/336/EEG	
EMI conducted & radiated emission	EN 55022/B (0.15-30MHz; 30-1000MHz)
EMI immunity	EN 50082-2
Operating temperature / Storage temperature	0 °C...+70 °C / -25 °C...+85 °C
Relative humidity	max. 95% without condensation
Case material / finish	clear anodised aluminum cassette with cooling cutouts

Technical data: output voltage

	PK 30 V1	PK 60 V1	PK 60 V1	PK 60 V1	PK 120 V1	PK 120 V1
Single output	30 W	60 W	60 W	60 W	120 W	120 W
Output voltage	5V	5V	12V	24V	12V	24V
Adjustment range	4.85-5.5V	4.5-5.5V	11-13V	22-26V	10.8-13.2V	21.6-26.4V
Output nominal current	6A	12A	5A	2,5A	10A	5A
Ripple at full load	<40mV$_{PP}$	<40mV$_{PP}$	<40mV$_{PP}$	<40mV$_{PP}$	<40mV$_{PP}$	<40mV$_{PP}$
Line regulation (100% I_{OUT})	<0.2%	<0.3%	<0.2%	<0.2%	<0.2%	<0.2%
Load regulation static (10...90%I_{OUT})	<0.2%	<0.2%	<0.2%	<0.2%	<0.2%	<0.2%
Response time (10...90%I_{OUT})	<1ms	<0.8ms	<0.5ms	<0.5ms	<0.5ms	<0.5ms
Output current limit	>6.5A	>12.5A	>5.3A	>2.7A	>11A	>5.5A
Short circuit protection	continously, automatic restart					
Overvoltage protection (OVP)	6-6.7V	5.5-6.0V adjustable	13.2-15V adjustable	26.4-30V adjustable	12-16.5V adjustable	27-29V adjustable
Powerfail signal (at full load >6ms)	—	V1<4.8V	—	V1<23V	>11.5V	>23.0V
Temperatur	0.02%/°C	0.02%/°C	0.02%/°C	0.02%/°C	0.02%/°C	0.02%/°C
Output regulation with sense	0.5V max.	0.5V max.	0.5V max.	0.5V max.	0.5V max.	0.5V max.
Derating	1 W/°C above 55°C	1.6 W/°C above 45°C	1.6 W/°C above 45°C	1.6 W/°C above 45°C	2.4 W/°C above 55°C	2.4 W/°C above 55°C

Power Supplies PK-Series BIVOLT

PK-Series BIVOLT AC/DC-converters
30 to 60 Watt switched mode AC/DC plug-in power supplies with two outputs in 3 U/8 HP Eurocassettes for use in 19" subracks to IEC 60297-3.

- √ High regulation accuracy
- √ All voltages individually adjustable
- √ Compact rugged design in stable aluminum cassette
- √ EN 60950, UL, and cUL approvals
- √ CE marked for compliance to EMC and Low Voltage Directives
- √ Overvoltage protection (OVP)
- √ No-load and short circuit proof
- √ Coded H15 connector
- √ VERO standardised pinning
- √ 24 months warranty

Ordering details Power Supplies AC/DC-converter

	nom. height/ nom. width [U] / [HP]	for nom. depth [mm]	single output [W]	output [V]/ [A]	order no. **116.**
BIVOLT PK 60 A	3 / 8	>160	60	±12-15V/2A	**010022A***

For applications according EN 61000-3-2, we recommend the VP-Series.

Accessories

	order no.
Reduced height front panel for PK 60	**148-010011J**
Male connector with coding strip H15 DIN 41612	**017-010115K**
Minimum order quantity 1 pack (10 pieces)	
Coding strip	**017-010064F**

Technical input data

Input voltage (switchable)	94-253VAC
Input frequency	47-63Hz
Inrush surge current limit	by NTC
Input voltage spike limit	by VDR
Hold-up time	>20 msec (at nominal values)
	typ. > 80%
Safety: CE marking according to low voltage directive 73/23/EEG	
Safety according to	EN 60950, UL 1950
EMC: CE marking according EMC directive 89/336/EEG	
EMI conducted & radiated emission	EN 55022/B (0.15-30MHz; 30-1000MHz)
EMI immunity	EN 50082-2
Operating temperature / Storage temperature	0 °C...+70 °C / -25 °C...+85 °C
Relative humidity	max. 95% without condensation
Case material / finish	clear anodised aluminum cassette with cooling cutouts

Technical data: output voltage

	PK 60 A V1, V2
Dual output	60 W
Output voltage	±12-15V
Adjustment range	±12-15V
Output nominal current	2A, 2A
Ripple at full load	<20mV$_{pp}$
Line regulation (100% I_{OUT})	<0.2%
Load regulation static (10...90%I_{OUT})	<0.5%
Response time (10...90%I_{OUT})	<1ms
Output current limit	>2.2A
Short circuit protection	continously, automatic restart
Overvoltage pr	±16.5-19V
Powerfail-Signal (at full load>6ms)	>4.8V
Temperatur	0.02%/°C
Derating	1.6 W/°C above 55°C

Power Supplies PK-Series TRIVOLT

TRIVOLT AC/DC-converter
60 to 120 Watt switched mode AC/DC plug-in power supplies with three outputs in 3 U Eurocassettes for use in 19” subracks to IEC 60297-3.

- √ 3 high stability outputs, all adjustable
- √ Safety approvals to UL, cUL and EN 60950
- √ CE marked for compliance to EMC and Low Voltage Directives
- √ SENSE-operation (5V output)
- √ Overvoltage protection (OVP)
- √ Powerfail signal optional
- √ No-load and short circuit proof
- √ Coded H15 connector
- √ VERO standardised pinning
- √ 24 months warranty

Ordering details Power Supplies TRIVOLT AC/DC-converter

	nom. height/ nom. width [U] / [HP]	for nom. depth [mm]	single output [W]	outputs V1	V2	V3	order no. **116.**
TRIVOLT PK 60 A	3 / 8	160	60	5V/6A	+12-15V/1A	-12-15V/1A	**010018J** [1]
TRIVOLT PK 60 B	3 / 8	160	60	5V/6A	+12-15V/2A	-12-15V/0.5A	**010101G** [1]
TRIVOLT PK 120	3 / 14	160	120	5V/12A	+12-15V/2A	-12-15V/2A	**010046C** [2]
TRIVOLT PK1 20 PF	3 / 14	160	120	5V/12A	+12-15V/2A	-12-15V/2A	**010078G** [2][3]

[1]
[2]
[3] incl.Powerfail signal

For applications according EN 61000-3-2, we recommend the VP-Series.

Accessories

	order no.
Reduced height front panel for PK 60	**148-010000K**
Reduced height front panel for PK 120	**148-010020H**
Male connector with coding strip H15 DIN 41612	**017-010115K**
Minimum order quantity 1 pack (10 pieces)	
Coding strip	**017-010064F**

Technical input data

Input voltage (switchable)	94-253VAC
Input frequency	47-63Hz
Inrush surge current limit	by NTC
Input voltage spike limit	by VDR
Hold-up time	>20 msec (at nominal values)
	typ. >75%
Safety: CE marking according to low voltage directive 73/23/EEG	
Safety according to	EN 60950, UL 1950
EMC: CE marking according EMC directive 89/336/EEG	
EMI conducted & radiated emission	EN 55022/B (0.15-30MHz; 30-1000MHz)
EMI immunity	EN 50082-2
Operating temperature / Storage temperature	0 °C...+70 °C / -25 °C...+85 °C
Relative humidity	max. 95% without condensation
Case material / finish	clear anodised aluminum cassette with cooling cutouts

Technical data: output voltage

	PK 60 A			PK 60 B			PK 120 / PK 120 PF		
	V1	V2	V3	V1	V2	V3	V1	V2	V3
Triple-output	60 W			60 W			120 W		
Output voltage	5V	+12V	-12V	5V	+12V	-12V	5V	+12V	-12V
Adjustment range	4.5-5.5V	+12-15V	-12-15V	4.5-5.5V	+12-15V	-12-15V	4.5-5.5V	+12-15V	-12-15V
Output nominal current	6A	1A	1A	6A	2A	0.5A	12A	2A	2A
Ripple at full load	<40mV$_{PP}$	<3mV$_{PP}$	<3mV$_{PP}$	<40mV$_{PP}$	<3mV$_{PP}$	<3mV$_{PP}$	<40mV$_{PP}$	<20mV$_{PP}$	<20mV$_{PP}$
Line regulation (100% I_{OUT})	<0.2%	<0.02%	<0.02%	<0.2%	<0.02%	<0.02%	<0.2%	<0.02%	<0.02%
Load regulation static (10...90%I_{OUT})	<0.2%	<0.2%	<0.2%	<0.5%	<0.5%	<0.5%	<0.2%	<0.2%	<0.2%
Response time (10...90%I_{OUT})	<1ms	<10µs	<10µs	<1ms	<10µs	<10µs	<0.2ms	<0.5ms	<0.5ms
Output current limit	>6.5A	>1.1A	>1.1A	>6.5A	>2.1A	>0.6A	>12.5A	>2.2A	>2.2A
Short circuit protection	continously, automatic restart								
Overvoltage protection (OVP)	6.0-6.7V	-	-	6.0-6.7V	-	-	+5.5-6.0V adjustable	+16.5-19V fix	-16.5-19V fix
Powerfail signal (at full load >6ms)	<4.8V	-	-	<4.8V	-	-	>4.8V	-	-
Temperatur	0.02%/°C			0.02%/°C			0.02%/°C		
Output regulation with sense	0.5V max.	-	-	0.5V max.	-	-	0.5V max.	-	-
Derating	1.6 W/°C above 55°C			1.6 W/°C above 55°C			4 W/°C above 55°C		

Power Supplies VP-Series, 40 and 50
1 - 3 Outputs

With modern switch mode technology VP 40 achieves

AC/DC-converter
40 or 50 Watt switched mode AC/DC plug-in power supplies in 3 U/4 HP Eurocassettes for use in 19” subracks to IEC 60297-3.

- √ Wide input range 94-253VAC
- √ High efficiency from 75% to 84%
- √ CE marking according EMI and LV directive
- √ Safety according to EN 60950, UL, cUL
- √ Optional: EMI front panel, no front panel
- √ VERO standard pinning, suits to PK 60
- √ SENSE-operation
- √ Convection cooling
- √ 24 months warranty

Ordering details Power Supplies AC/DC-converter

	nom.height/ nom. width [U] / [HP]	for nom. depth [mm]	output [W]	outputs	with front plate order no. **116.**
VP 40-3 A	3 / 4	>160	40	5V/4A; +12…15V/0.6A; -12...-15V/0.6A	**040311E***
VP 40-3 B	3 / 4	>160	40	+12...15V/1.4A; +12...15V/0.6A; -12...-15V/0.6A	**040312B***
VP 40-3 C	3 / 4	>160	40	24V/0.8A; +12...15V/0.6A; -12...-15V/0.6A	**040313K***
VP 50-1	3 / 4	>160	50	5V/10A	**040151K***
VP 50-1	3 / 4	>160	50	12V/4.2A...15V/3.3A	**040152G***
VP 50-1	3 / 4	>160	50	24V/2.1A	**040153D***

Accessories

	order no.
Male connector with coding strip H15 DIN 41612	**017-010115K**
Minimum order quantity 1 pack (10 pieces)	
Coding strip	**017-010064F**

Technical input data

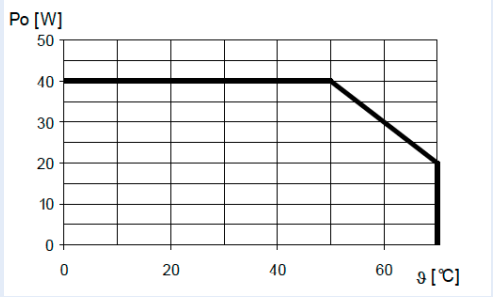
Input voltage	115 / 230VAC
Input frequency	47-63Hz
Inrush surge current limit	by NTC resistor
Input voltage spike limit	by VDR resistor
Hold-up time	≥60 ms at 230V / ≥10 ms at 115V ≥30 ms at 230V / ≥30 ms at 115V
Powerfactor correction PFC	>0,6
Efficiency	up to 75% / up to 85%
Safety: CE marking according to low voltage directive 2006/95/EG	
Safety according to	EN 60950-1
EMC: CE marking according EMC directive 2004/108/EG	EN 61000-6-3 (2007) EN 61000-6-2 (2006)
EMI conducted & radiated emission	EN 55022/B (0,15-30MHz; 30-1000MHz)
EMI immunity	EN 50082-2
Operating temperature / Storage temperature	0 °C...+70 °C / -25 °C...+85 °C
Relative humidity	max. 95%, not condensing
Dimensions (L x W x H) mm	162 x 20 x 100 mm, with front plate 128 mm

Technical data: output voltage

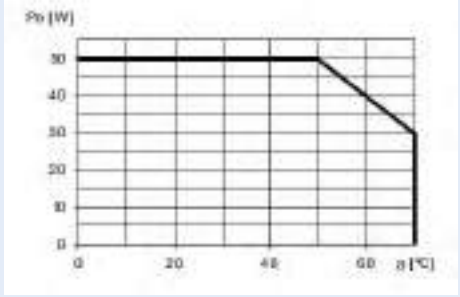
	VP 40-3 A			VP 40-3 B / C			VP 50-1		
	V1	V2	V3	V1B / C	V2B / C	V3B / C	V1	V1	V1
Output	40 W			40 W			50 W		
Output voltage	+5V	+12V	-12V	+12V	+12V	-12V	5V	12V	24V
Adjustment range	+5V	+12V...+15V	-12V...-15V	+12V...+15V / 24V	+12V...+15V	-12V...-15V	5V	12V...15V	24V
Output nominal current [1]	4A	0.6A	0.6A	1.4A / 0.8A	0.6A	0.6A	10A	4.2A...3.3A	2.1A
Ripple at full load	≤20mVss	≤5mVss	≤5mVss	≤20mVss	≤5mVss	≤5mVss	≤20mVss	≤40mVss	≤20mVss
Line regulation (100% I_{OUT})	≤0.1%	≤0.02%	≤0.02%	≤0.1%	≤0.02%	≤0.02%	≤0.1%	≤0.1%	≤0.1%
Load regulation static (10...90%I_{OUT})	≤0.1%	≤0.4 [2]	≤0.4 [2]	≤0.1%	≤0.4 [2]	≤0.4 [2]	≤0.1%	≤0.1 [2]	≤0.1 [2]
Response time (10...90%I_{OUT})	≤0.4ms	≤20µs	≤20µs	≤0.4ms	≤20µs	≤20µs	≤0.4ms	≤0.4ms	≤0.4ms
Output current limit	>4.2A	>0.8A	>0.8A	>1.5A / 0.85A	>0.8A	>0.8A	>10A	3.6A...5.5A	>2.1A
Short circuit protection	yes			yes			yes		
Overvoltage protection (OVP)	5.85V...6.25V			16.5V...18V /26.4V...31V	—	—	5.85V...6.25V	16.5V...18V	16.5...31V
Powerfail signal (at full load >6ms)	≥5ms bevor V1<4.8V			optional	optional	optional	optional	optional	optional
Output regulation with sense	0.5V max.			0.5V max.	—	—	0.5V max.	0.5V max.	0.5V max.
Derating	2.5% / °C, from 50 °C				see derating curv				

[1] maximum total output power: 40 / 50 Watt, see derating

[2] I_{OUT} V1 min. 1A



Derating curve VP 40



Derating curve VP 50

Power Supplies VP-Series, 80 and 150
1 - 3 Outputs

AC/DC-converter with PFC

80 or 150 Watt switched mode AC/DC plug-in power supplies in 3 U/8 HP respectively 12 HP Eurocassettes for use in 19" subracks to IEC 60297-3.

- √ Active Powerfactor Correction PFC
- √ Wide input range 94-253VAC
- √ High efficiency from 83% up to 87%
- √ Power share between outputs
- √ N+1 redundant types on request
- √ CE marking acc. EMI and LV directive
- √ Safety according to EN 60950, UL, cUL
- √ VERO standard pinning, VP 80 suits to PK 60 and VP 150 suits to PK 120
- √ 24 months warranty

With the new VP 80 / 150 series and efficiency from 83% up to 87% is achieved while power density is increased over its predecessors by more than 30%. Without the need for external heatsinking, the 80 W or 150 W out-put power can be achieved with natural convection cooling. A wide range of multi O/P units is further extended through power share technology, allowing maximum flexibility in the way power is delivered across the voltage rails, for smaller and more economical solutions. The range is enhanced with „Type R" versions, designed for N+1 redundant applications or battery back-up systems.

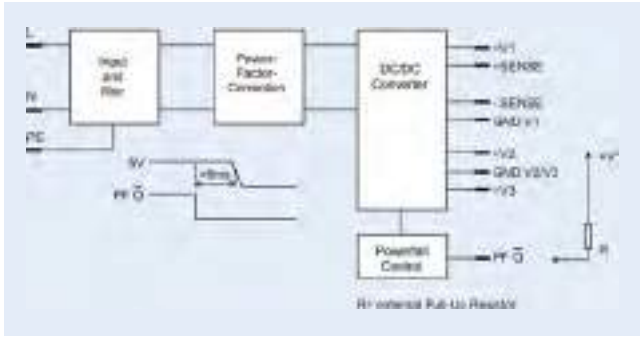
Ordering details Power Supplies AC/DC-converter

	nom.height/ nom. width [U] / [HP]	for nom. depth [mm]	output [W]	outputs	order no. **116.**
VP 80-1	3 / 8	>120	80	24V/3.3A	**020018B** [1]
VP 80-3 C	3 / 8	>120	80	5V/12A; +12V/4A; -12V/1A	**020026D** [1]
VP 150-3	3 / 12	>120	150	5V/20A; +12V...15V/4A; -12...15V/2A	**031530B** [2]

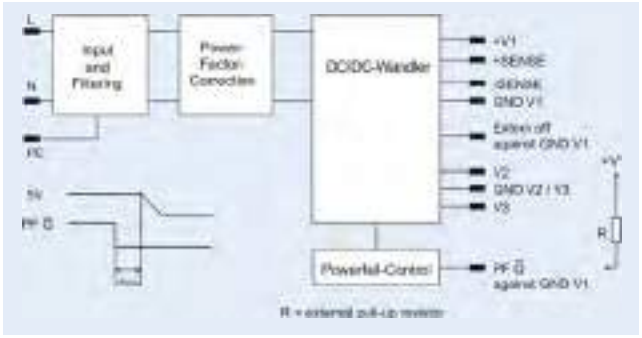
[1] [2] safety to EN 60950, UL, cUL

Accessories

	order no.
Male connector with coding strip H15 DIN 41612	**017-010115K**
Minimum order quantity 1 pack (10 pieces)	
Coding strip	**017-010064F**



Schematic diagram VP 80



Schematic diagram VP 150

Technical input data

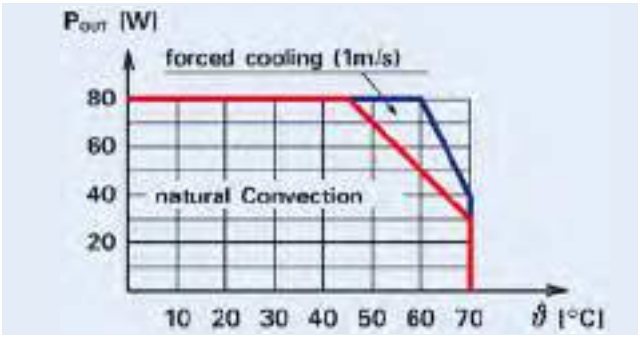
Input voltage	94-253VAC
Input frequency	47-63Hz
Inrush surge current limit	<27A (NTC)
Input voltage spike limit	by VDR
Hold-up time	>20 msec (at nominal values)
Powerfactor correction PFC	>0,95 / >0,98
Efficiency	up to 83% / typ. >81%
Safety: CE marking according to low voltage directive 73/23/EEG	
Safety according to	EN 60950
EMC: CE marking according EMC directive 89/336/EEG	
EMI conducted & radiated emission	EN 55022/B (0.15-30MHz; 30-1000MHz)
EMI immunity	EN 50082-2
Operating temperature / Storage temperature	0 °C...+70 °C / -40 °C...+85 °C
Relative humidity	max. 90% without condensation
Dimensions (L x W x H) mm	VP 80 162 x 32, 9 x100 mm / VP 150 162x60, 6x110 mm
Weight:	650 g / 1100 g

Technical data: output voltage

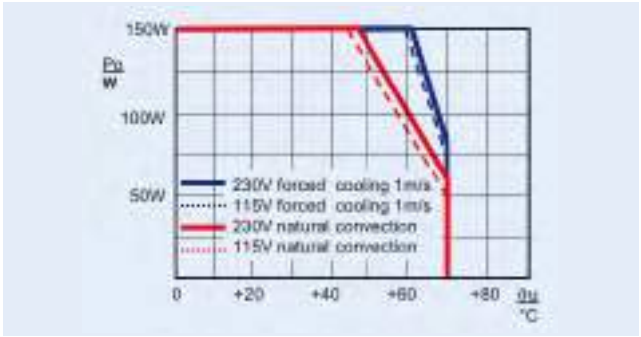
	VP 80-1	VP 80-3 C			VP 150-3		
	V1	V1	V2	V3	V1	V2	V3
Output	80 W	80 W			150 W		
Output voltage	24V	+5V	+12V	-12V	+5V	+12-15V	-12-15V
Adjustment range	22-26V	4.8-5.5V	fix	fix	4.8...5.5V	+11.8-15.2V	-11.8-15.2V
Output nominal current [1]	3,3A	12A	4A	1A	20A [1]	4A [1]	2A [1]
Ripple at full load	<40mV$_{PP}$	<40mV$_{PP}$	<40mV$_{PP}$	<10mV$_{PP}$	<40mV$_{PP}$	<20mV$_{PP}$	<20mV$_{PP}$
Line regulation (100% I_{OUT})	<0.1%	<0.2%	<0.2%	<0.2%	<0.2%	<0.2%	<0.2%
Load regulation static (10...90%I_{OUT})	<0.1%	<0.5%	<±4 [2]	<1.5% [2]	<0,5%	<0,2%	<0,2%
Response time (10...90%I_{OUT})	<0.1ms	<1ms	<1ms	<1ms	<1ms	<1ms	<1ms
Output current limit	>3.35A	>12.1A	>4.1A	>1.01A	>20.5A	>5A	>2.7A
Short circuit protection	yes, electronic, automatic restart						
Overvoltage protection (OVP)	27-32V	6.0-6.7V	—	—	6.0-6.5V fix	+16-18V fix	-16-18V fix
Powerfail signal (at full load >6ms)	V1<23V	<V1-4.8V	—	—	<V1-4.8V	—	—
Output regulation with sense	0.5V max.	0.5V max.	—	—	0.5V max.	—	—
Derating	2 W/°C over 45°C at natural convection; 4 W/°C over 60°C at enhanced cooling				see derating curve		

[1] maximum total output power: 80 Watt or 150 Watt, see derating curve

[2] I_{OUT} V1 min. 1A



Derating curve VP 80



Derating curve VP 150

Power Supplies EC-Series MONOVOLT

MONOVOLT AC/DC-converter
50 Watt switched mode AC/DC plug-in power supplies with one output in 3 U/8 HP steelcassettes for use in 19" subracks to IEC 60297-3.

- √ Reduced cost power supply on 100 x 160 mm Eurocard
- √ Steel cover
- √ Wide input range
- √ Overvoltage protection (OVP)
- √ No load and short circuit proof
- √ Powerfail signal
- √ Coded H15 connector
- √ VERO standardised pinning
- √ Separate frontpanel kit with handle
- √ 24 months warranty

Ordering details Power Supplies Monovolt AC/DC-converter

	nom. height/ nom. width [U] / [HP]	for nom. depth [mm]	single output [W]	output [V]/ [A]	order no. **116.**
EC 50	3 / 8	>160	50	24V/2.2A	**010194F***

Accessories

	order no.
Front panel with handle: EC50	**148-011001G**
Male connector with coding strip H15 DIN 41612	**017-010115K**
Minimum order quantity 1 pack (10 pieces)	
Coding strip	**017-010064F**

Technical input data

Input voltage AC/DC	93-253VAC wide input
Input frequency	47-63Hz
Inrush surge current limit	by NTC
Input voltage spike limit	by VDR
Hold-up time	>20 msec (at nominal values)
Efficiency	typ. 68-75%
Safety: CE marking according to low voltage directive 73/23/EEG	
Safety according to	EN 60950, UL 1950, EN41003
EMC: CE marking according EMC directive 89/336/EEG	
EMI conducted & radiated emission	EN 55022/B (0.15-30MHz; 30-1000MHz)
EMI immunity	EN 50082-2
Operating temperature / Storage temperature	0 °C...+70 °C / -25 °C...+85 °C
Relative humidity	max. 95% without condensation
Case material / finish	ventilated steel cassette with cooling cutouts

Technical data: output voltage

	EC 50 V1
Single-output	50 W
Output voltage	24V
Adjustment range	21.6-26.8V
Output nominal current	2.2A
Ripple at full load	<40mV$_{pp}$
Line regulation (100% I_{OUT})	<0.2%
Load regulation static (10...90%I_{OUT})	<1%
Response time (10...90%I_{OUT})	<1ms
Output current limit	>2.4A
Short circuit protection	continous, automatic restart
Overvoltage protection (OVP)	27-32V
Derating	1.2 W/°C over 45°C

TRIVOLT AC/DC-converter

50 Watt switched mode AC/DC plug-in power supplies with three output in 3 U steelcassettes for use in 19" subracks to IEC 60297-3.

- √ Economy priced alternative of PK series
- √ Steel cover
- √ Safety according to EN 60950
- √ Overvoltage protection (OVP)
- √ No load and short circuit proof
- √ Powerfail signal
- √ Coded H15 connector
- √ VERO standardized pinning
- √ Separate frontpanel kit with handle
- √ 24 months warranty

Ordering details Power Supplies Monovolt AC/DC-converter

	nom.height/ nom. width [U] / [HP]	for nom. depth [mm]	output [W]	outputs V1	outputs V2	outputs V3	order no. **116.**
EC 50 C	3 / 8	>160	50	5V/5A	+15V/0.8A	-15V/0.8A	**010186D***

*EN 60950 certified

Accessories

	order no.
Front panel with handle: EC50	**148-011001G**
Male connector with coding strip H15 DIN 41612	**017-010115K**
Minimum order quantity 1 pack (10 pieces)	
Coding strip	**017-010064F**

Technical input data

Input voltage AC/DC	93-253VAC wide input
Input frequency	47-63Hz
Inrush surge current limit	by NTC
Input voltage spike limit	by VDR
Hold-up time	>20 msec (at nominal values)
Efficiency	typ. 70%
Safety: CE marking according to low voltage directive 73/23/EEG	
Safety according to	EN 60950, UL 1950,
EMC: CE marking according EMC directive 89/336/EEG	
EMI conducted & radiated emission	EN 55022/B (0.15-30MHz; 30-1000MHz)
EMI immunity	EN 50082-2
Operating temperature / Storage temperature	0 °C...+70 °C / -25 °C...+85 °C
Relative humidity	max. 95% without condensation
Case material / finish	ventilated steel cassette with cooling cutouts

Technical data: output voltage

	EC 50 V1	EC 50 V2	EC 50 V3
Triple output	50 W		
Output voltage	5V	+15V	-15V
Adjustment range	4.5-5.5V	fix	fix
Output nominal current	5A	0.8A	0.8A
Ripple at full load	<40mV$_{PP}$	<10mV$_{PP}$ [1]	<10mV$_{PP}$ [1]
Line regulation (100% I_{OUT})	<0.2%	<0.2%	<0.2%
Load regulation static (10...90%I_{OUT})	<1%	<0.5%	<0.5%
Response time (10...90%I_{OUT})	<1ms	<1ms	<1ms
Output current limit	>6A(>9A [2])	>1.1A	>1.1A
Short circuit protection	yes, electronic, automatic restart		
Overvoltage protection (OVP)	6.0-6.7V	—	—
Powerfail-Signal (at full load>6ms)	V1<4.8V	—	—
Temperatur	0,05%/°C		
Derating	1.5 W/°C above 45°C		

[1] V2/V3 linear post regulated

[2] at single load

Power Supplies GK-Series TRIVOLT

TRIVOLT DC/DC-converter

60 to 120 Watt switched mode DC/DC plug-in converter with three outputs in 3 U Eurocassettes for use in 19" subracks IEC 60297-3.

- √ Compact rugged design in stable aluminum cassette
- √ DC input range 2:1 ratio
- √ High regulation accuracy
- √ Separate adjust of all outputs
- √ SENSE-operation and Overvoltage protection (OVP)
- √ Convection cooling
- √ CE marked for compliance to EMC and Low Voltage Directives
- √ VERO standardised pinning
- √ 24 months warranty

Ordering details Power Supplies TRIVOLT AC/DC-converter

	nom. height/ nom. width [U] / [HP]	for nom. depth [mm]	output [W]	outputs V1	outputs V2	outputs V3	order no. **116.**
GK 120-2	3 / 14	>160	120	5V/12A	+12-15V/2A	-12-15V/2A	**010175L**

Accessories

	order no.
Reduced height front panel GK 120	**148-010020H**
Male connector with coding strip H15 DIN 41612	**017-010115K**
Minimum order quantity 1 pack (10 pieces)	
Coding strip	**017-010064F**

Technical input data

Input voltage	24VDC (18-36)
Inrush surge current limit	line impedance dependant
Input voltage spike limit	by Thyristor-Crowbar
Hold-up time	>3 msec (at nominal values)
Efficiency	typ. >70-75%
Safety: CE marking according to low voltage directive 73/23/EEG	
Safety according to	EN 60950, UL 1950,
EMC: CE marking according EMC directive 89/336/EEG	
EMI conducted & radiated emission	EN 55022/B (0.15-30MHz; 30-1000MHz)
EMI immunity	EN 50082-2
Operating temperature / Storage temperature	0 °C...+70 °C / -25 °C...+85 °C
Relative humidity	max. 95% without condensation
Cae material / finish	Clear anodised aluminum cassette with cooling cutouts

Technical data: output voltage

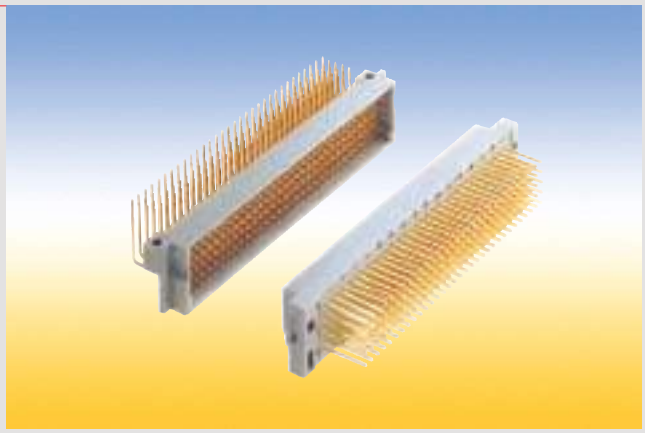
	GK 120-2 V1	GK 120-2 V2	GK 120-2 V3
Triple output	120 W		
Output voltage	5V	+12-15V	-12-15V
Adjustment range	4.5-5.5V	+12-15V	-12-15V
Output nominal current	12A	2A	2A
Ripple at full load	<40mV$_{PP}$	<20mV$_{PP}$	<20mV$_{PP}$
Line regulation (100% I_{OUT})	<0.2%	<0.2%	<0.2%
Load regulation static (10...90%I_{OUT})	<0.2%	<0.2%	<0.2%
Response time (10...90%I_{OUT})	<0.2ms	<0.5ms	<0.5ms
Output current limit	>12.5A	>2.2A	>2.2A
Short circuit protection	continously, automatic restart		
Overvoltage protection (OVP)	5.5-6.0V	—	—
Output regulation with sense	0.5V max.	—	—
Temperatur	0,05%/°C		
Derating	4 W/°C above 55°C		

Power Supplies

This catalog contains stock and standard parts. Other products and sizes on request.

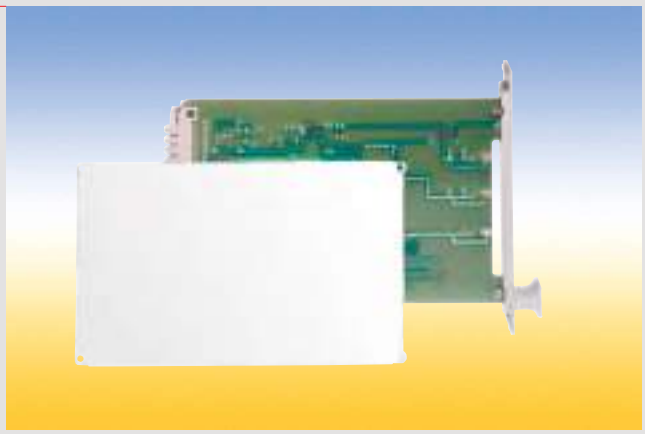
Connectors and Accessories

- √ In accordance with IEC 60 603-2 / DIN 41 612
- √ Designs supplementing the standards



Cover for Euroboards

- √ Self-extinguishing in accordance with UL 94-V0
- √ For use with or without a coding strip

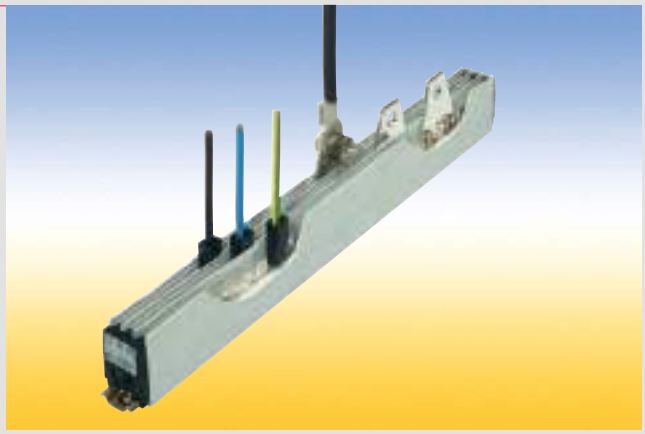


Interface Housings for IEC 60 603-2 / DIN 41 612 Connectors

- √ Plastic version
- √ Metal version
- √ Shielding concept
- √ Also for railway applications in accordance with BN 74 016

SE Bus Bars

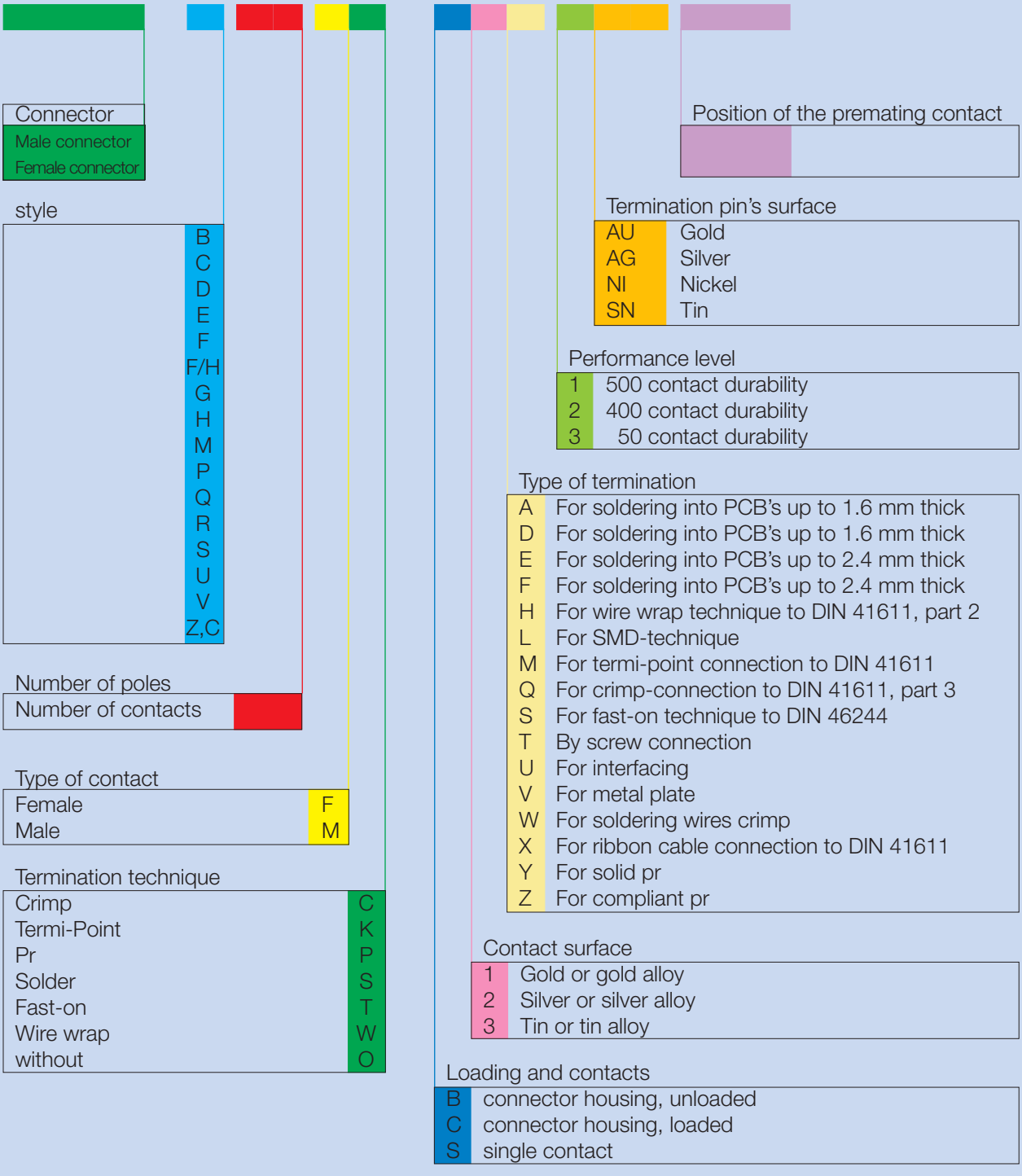
- √ High current capacity up to 120 A
- √ Two connection types
- √ 2 or 3-pole



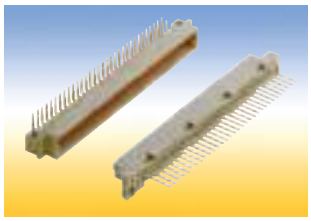
Coding key for IEC 60 603-2 / DIN 41 612 connectors
Since this catalog not only contains DIN 41612 connectors but also connectors which supplement the standard, the coding key has been extended accordingly.

Ordering example

Female connector C 064 M S - C 1 A - 1 A U - A 01



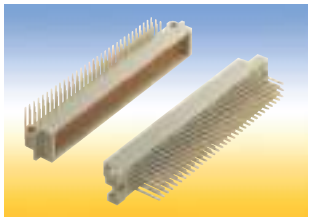
This catalog contains stock and standard parts. Other products and sizes on request.



Connectors style B

Ordering details

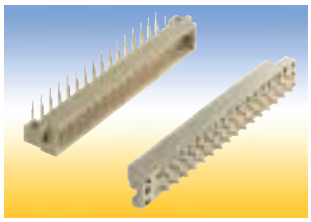
	no.poles: assignment:	064 ab 1...32
	terminations [mm]	order no. **409.**
Male connector B		
MS - C1A - 2 SN	0.6 x 0.6 x 2.9	**043 586**
Female connector B		
FS - C1D - 2 SN	0.25 x 0.7 x 2.5	**105 380**



Connectors style C

Ordering details

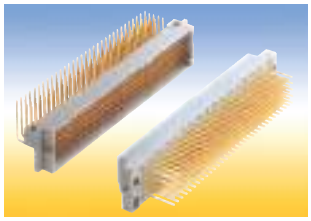
	no.poles: assignment:	032 ac 2...32	064 ac 1...32	096 abc 1...32
	terminations [mm]	order no. **409.**	order no. **409.**	order no. **409.**
Male connector C				
MS - C1A - 2 SN	0.6 x 0.6 x 2.9	**043 598**	**043 606**	**043 610**
Female connector C				
FS - C1E - 2 SN	0.25 x 0.7 x 4	-	**068 108**	**068 089**
FW - C1H - 2 SN	0.6 x 0.6 x 13	**045 891**	**045 894**	**045 897**



Connectors style D

Ordering details

	no.poles: assignment:	032 ac 2...32
	terminations [mm]	order no. **409.**
Male connector D		
MS - C1A - 2 SN	0.6 x 0.6 x 2.9	**043 622**
Female connector D		
FW - C1H - 2 SN	1 x 1 x 20	**070 323**
FC - B	f. male 0.6 x 0.6	**031 022**
FC - B	f. male 0.6 x 1/1.5	**031 031**

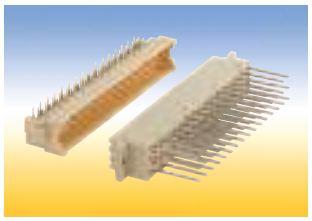


Connectors style E

Ordering details

	no.poles: assignment:	048 row separation 5,08 ace 2...32	048 row separation 2.54 ace 2...32
	terminations [mm]	order no. **409.**	order no. **409.**
Male connector E			
MS - C1A - 2 SN	0.6 x 0.6 x 2.9	**045 210**	**045 235**
Female connector E			
FW - C1H - 2 SN	1 x 1 x 20	**070 425**	-
FW - C1H - 2 SN	0.6 x 0.6 x 13	-	-
FC - B	f. male 1 x 1	**031 030**	-
FC - B	f. male 0.6x1/1.5	**031 021**	-

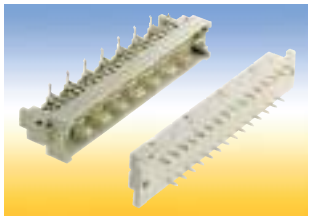
Connectors Styles F, H and R



Connectors style F

Ordering details

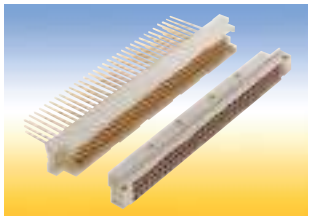
	no.poles: assignment:	032 zb 2...32	048 zbd 2...32
	terminations [mm]	order no. **409.**	order no. **409.**
Male connector F			
MS - C1A - 2 SN	0.6 x 0.6 x 2.9	**022 622**	**041 660**
Female connector F			
FW - C1E - 2 SN	1 x 1 x 4.5	**070 969**	**024 567**
FW - C1H - 2 SN	1 x 1 x 22	**042 219**	**042 218**
FC - B	f. male 0.6x1/1.5	**-**	**031 015**



Connectors style H

Ordering details

	no.poles: assignment:	011 b 2.5,8...32	015 dz 4...32
	terminations [mm]	order no. **409.**	order no. **409.**
Male connector H			
MS -C2A - 1 AG z32 at 3.5 mm premating	1.2 x 0.8 x 3.5	**098 989**	**-**
MS - C2A - 1 SN z32 at 1.5 mm premating	1.2 x 0.8 x 2.9	-	**101 385**
MT - C2S - 1 AG b32 at 3.5 mm premating	6.3 x 0.8 x 8	**098 986**	-
MT - C2S - 1 AG z32 at 1.5 mm premating	6.3 x 0.8 x 8	-	**094 628**
Female connector H			
FT - C2S - 1 AG	6.3 x 0.8 x 8	**098 991**	-
FT - C2S - 2 AG	6.3 x 0.8 x 8	-	**071 015**

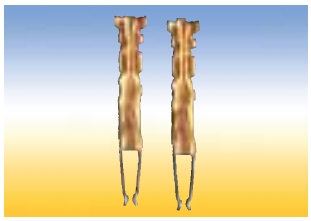


Connectors style R

Ordering details

	no.poles: assignment:	032 ac 2...32	064 ac 1...32	096 abc 1...32
	terminations [mm]	order no. **409.**	order no. **409.**	order no. **409.**
Male connector R				
C1E - 2 SN	0.6 x 0.6 x 4	**077 051**	**077 055**	**077 058**
C1H - 2 SN	0.6 x 0.6 x 13	**077 045**	**074 202**	**077 048**
Female connector R				
C1A - 2 SN	0.6 x 0.6 x 6	**077 038**	**074 203**	**077 042**

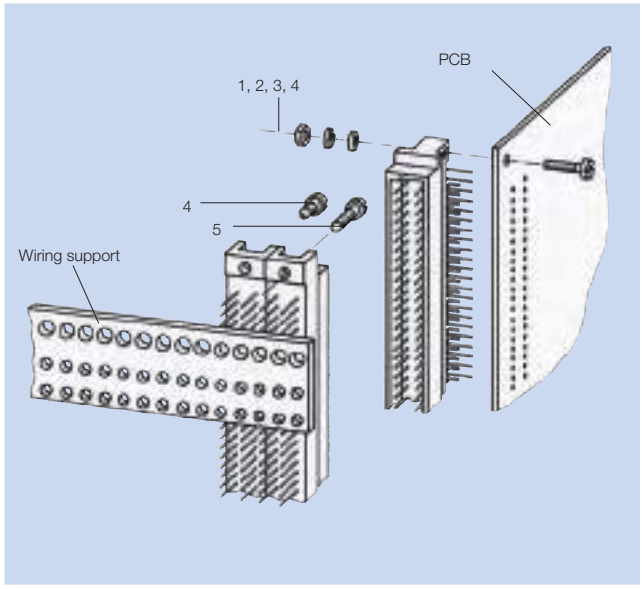
This catalog contains stock and standard parts. Other products and sizes on request.



Crimp-Snap-In-Contacts for Connectors style C, D, E, and F, Pliers and Unlocking Tool

Ordering details

	for connector style	conductor cross section [AWG]	order no. **409.**	**Pliers** order no. **409.**
Crimp-snap-in-male MC - S1Q - 2 NI	F	16 - 18	**077 112**	**035 630**
MC - S1Q - 2 NI	F	20 - 24	**077 111**	**035 630**
Crimp-snap-in-female for male contact 0.6x1/0.6x1.5				
FC - S1Q - 1 SN	D, E, F	16 - 18	**031 019**	**035 630**
FC - S1Q - 1 SN	D, E, F	20 - 26	**031 018**	**035 630**
FC - S1Q - 1 SN	D, E, F	26 - 28	**031 020**	**031 120**
Crimp-snap-in-female for male contact 1 x 1				
MC - S3Q - 3 SN	D, E, F	16 - 18	**031 024**	**035 630**
MC - S3Q - 3 SN	D, E, F	20 - 26	**031 023**	**035 630**
unlocking tool			**031 123**	-



Mounting of Connectors

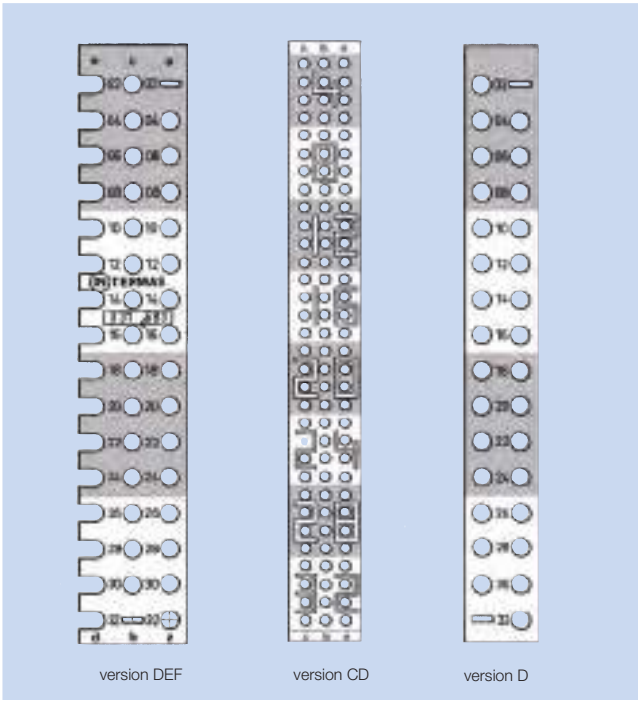
Connectors in accordance to DIN 41612 can be mounted with commercial DIN screws.
Using tapered screw, the connectors can be mounted in correct position without any adjustment or alignment.

Ordering details

Minimum order quantity each 100 pieces

	position	order no. **409.**
Hexagonal nut M 2.5 DIN439	1	**013 938**
Spring washer 2.5 DIN 127	2	**013 910**
Washer 2.7 DIN 433	3	**018 028**
Pan head screw M 2.5x12 DIN 84	4	**013 904**
Tapered screw M 2.5 x 6.5	5	**032 708**
Tapered screw M 2.5 x 9	5	**070 476**

Accessories for Connectors



Marking Strips

IEC 60603-2 / DIN 41612 provides labeling for connectors on their wiring side.
Marking strips, made of thin plastic foil (Astralon), ensure the perfect designation of pin positions.

1. Type *DEF*
for connectors styles D, E and F with pin cross section 1,0 x 1,0 and 0.8 x 1.6 and 0.8 x 2.4 mm
and for connectors with the type of termination V.

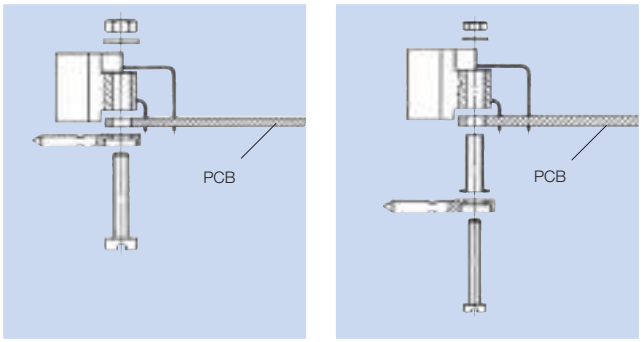
order no.: **409. 031 583**

2. Type *CD*
for connectors styles C and D with pin cross section 0.6 x 0.6 u.1,0 x 1,0 mm
and for connectors with the type of termination V.

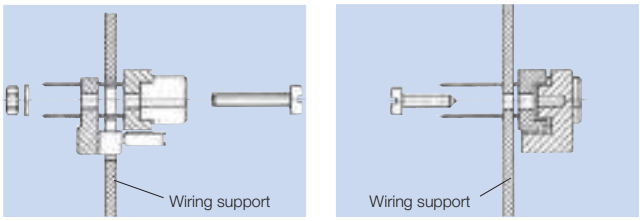
order no.: **409. 022 714**

3. Typ *D*
for connectors style D

order no.: **409. 044 214**



Coding strip M, mounted together with the male connector



Coding strip F, mounted together with the female connector

Coding Strips

The coding strip is designed for attachment to connectors in accordance with IEC 60603-2 / DIN 41612 and is to be mounted together with the connector to the PCB. Also the mating coding part is mounted together with the connector to the wiring support. Each coding strip has 16 coding teeth, that can be broken off as necessary

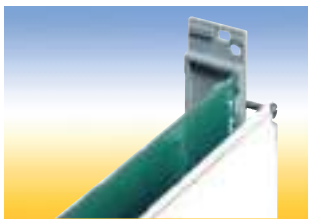
Ordering details

	order no. 409.
Coding strip M [1]	**033 188**
Coding strip F [1]	**033 189**
Coding strip F-plate [1] [2]	**070 617**
Coding strip F-plate 2 [1] [3]	**064 740**

1) one functional unit comprises 1 coding strip M and one coding strip F
2) for attaching with self tapping screws
3) attaching at through hole

Description

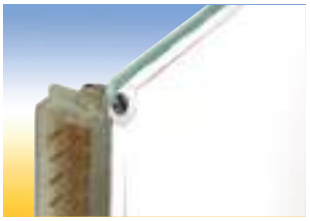
This PCB cover protect the soldered side against dirt and contact. Two versions are available:
A standard PCB cover and a PCB cover for use with a coding strip.
The coding strip PCB cover can be used in connection with a coding strip on the connector.



Mounting of PCB cover standard at the front panel

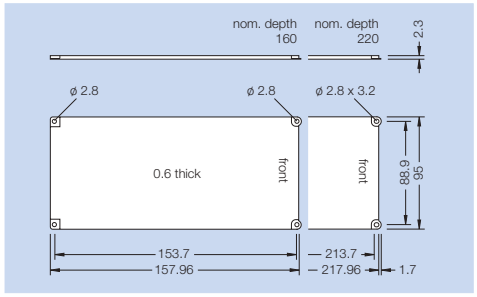
Technical data

Material	PBT (Polyester)
Continous temperature	-40 °C to <+60 °C
Fire protection class	UL 94 V-0 at 0.8 mm
Color	white

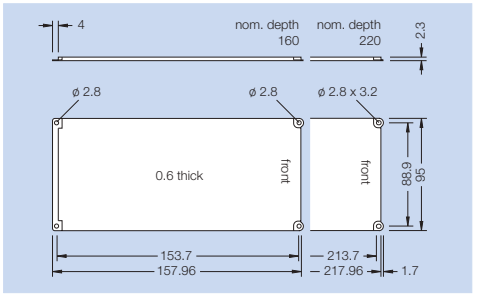


Mounting of PCB cover standard at side of the connector

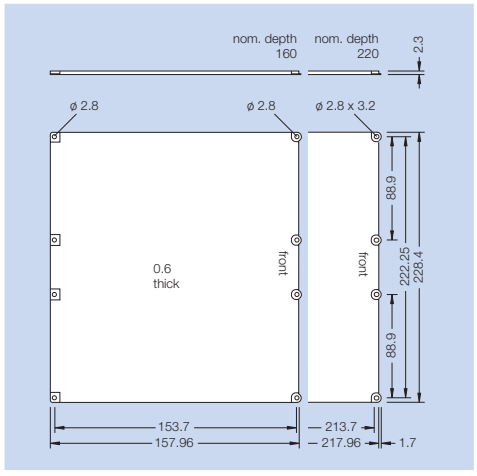
Mounting of PCB cover for coding strip jammed under the recess of the coding strip



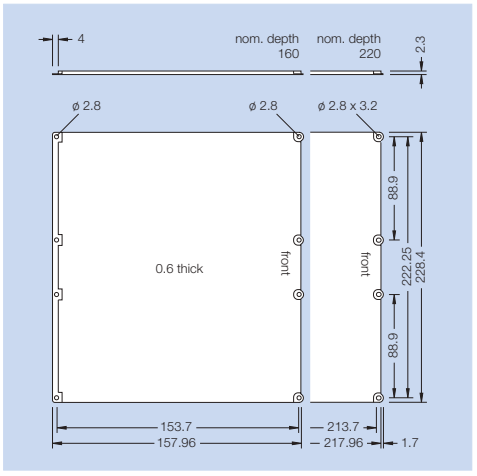
PCB cover standard 3U



PCB cover for coding strip 3U



PCB cover standard 6U



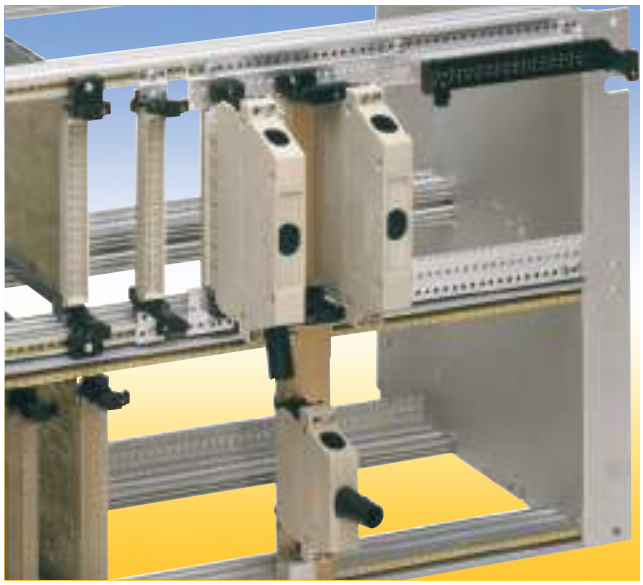
PCB cover for coding strip 6U

Ordering details

	PCB height [mm]	standard order no. **409.**	coding strip order no. **409.**
Cover for Euroboards			
3-160	100	**100 652**	**100 650**
3-220	100	**100 662**	**100 660**
6-160	233.35	**102 110**	**102 109**
6-220	233.35	**102 113**	**102 112**

Metallized PCB cover on request.

Plastic Interface Housings



Description

This compact and insulating interface housing is designed to accommodate DIN 41 612 / IEC 60 603-2 connectors. It is physically clamped into position between guide elements. The interface housings have the following advantages:

√ Accommodation of either female or male connectors of any type of connection technology.
√ Protects the connector during insertion and operation.
√ Lifting screws ease insertion and removal.
√ Three cable feed apertures.
√ Strain relief.
√ Allows installation of display and operating elements.
√ Codable.

Metallized plastic interface housing for RFI-shielding available.

Technical data

Dimensions	IEC 60297 / DIN 41494
Material	interface housing: PC, pebble gray guide components: PC, black
Fire characteristics:	UL 94 V-1
Utilization category:	-25 °C, 100 °C, 90% relative humidity

Delivery kit interface housing

	pieces per kit *style B*	pieces per kit *style C, E, F1, F*	pieces per kit *style C1, F2*
Interface housing shells	2	2	2
Cover strip	1	-	-
Cable clamp	2	2	-
Blind plug	2	2	-
Strain relief kit	1	1	-
Mounting parts	1	1	1

Delivery

Interface housings:
As a kit of unassembled components, without guide components.

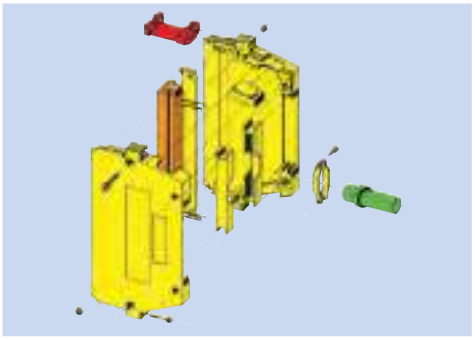
Guide components:
As an assembled kit.

Delivery kit guide elements

	pieces per kit
Guide element top	1
Guide element bottom	1
Mounting parts	1

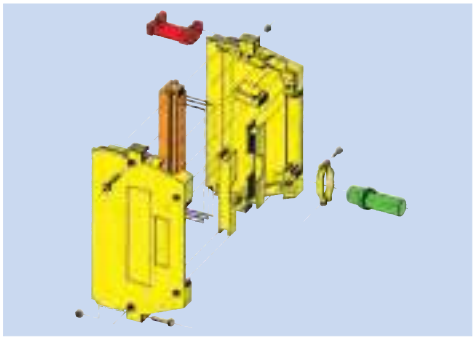
Color code:
yellow: interface housing
orange: male connector
blue: female connector
red: guide components
green: accessories

Ordering details for interface housing kits (yellow: interface housing kit)



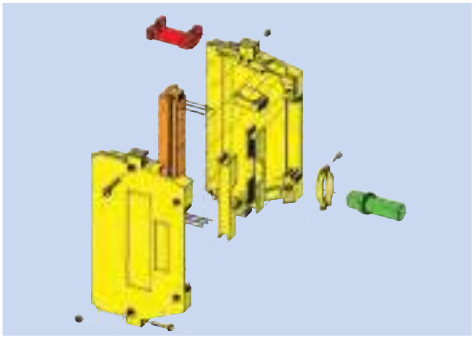
Interface Housing B

order no.: **409. 077 516**



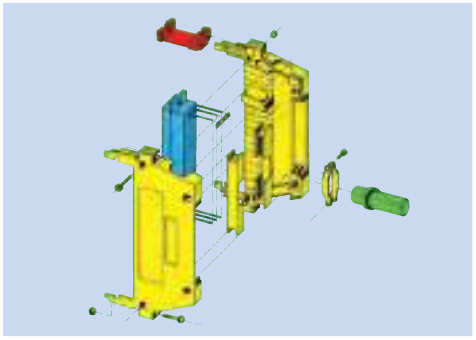
Interface Housing C

order no.: **409. 031 124**



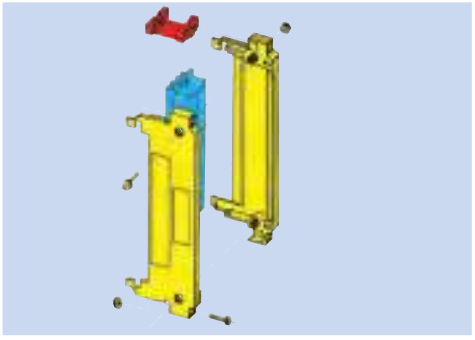
Interface Housing E

order no.: **409. 031 125**



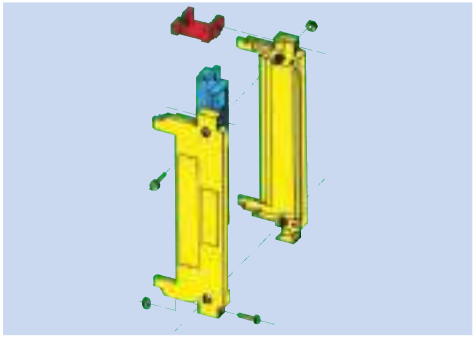
Interface Housing F

order no.: **409. 070 620**



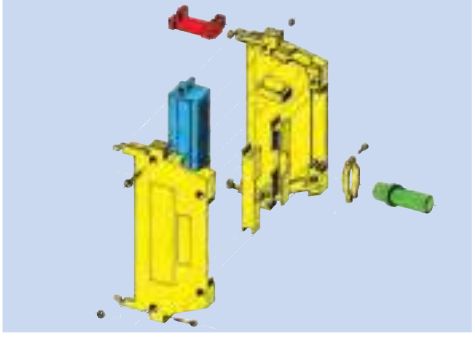
Interface Housing F2
for termination technique with ribbon cable

order no.: **409. 073 659**



Interface Housing C1
for termination technique with ribbon cable

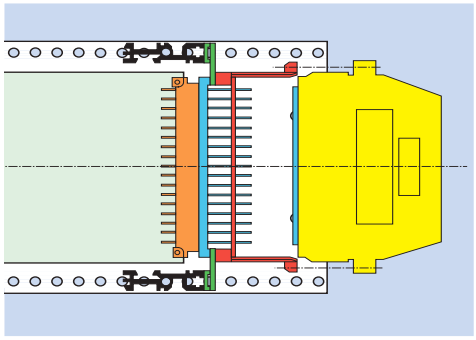
order no.: **409. 070 621**



Interface Housing F1
for crimp-snap-in termination technique

order no.: **409. 071 876**

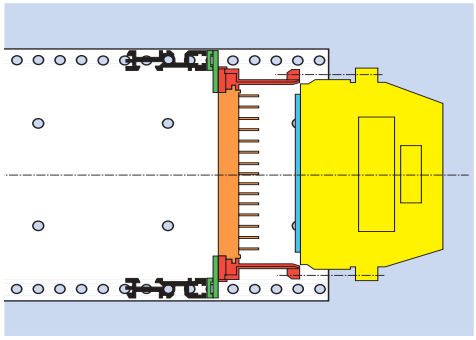
Plastic Guide Components



Application
For interface housings with female connector, to attach on the connecting pins of a female connector subrack.

Ordering details for kits

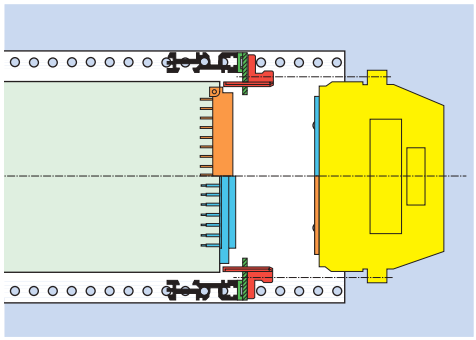
	length spacer	for interface housings	order no. **409.**
Guide component C-Huk 13	6	C, C1	**032 563**
Guide component C-Huk 17	9	C, C1	**032 564**
Guide component D-Huk 20	11	D	**032 565**
Guide component D-Huk 26	17.5	D	**032 566**
Guide component E-Huk 20	11	E	**032 567**
Guide component E-Huk 26	17.5	E	**032 568**
Guide component F-Huk 22	22	E	**032 569**



Application
For interface housings with female connector, to attach on the connecting pins of a *U-element* rack.

Ordering details for kits

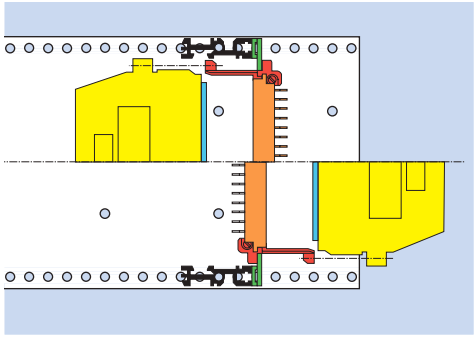
	for interface housings	order no. **409.**
Guide component U-element	F, F1, F2	**035 207**



Application
For interface housings with female or male connector, for mating directly to the PCB (LP) connector subrack.

Ordering details for kits

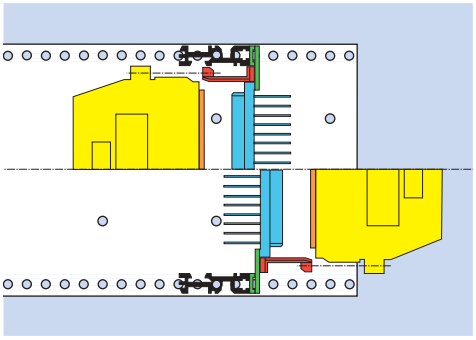
	for interface housings and connectors	order no. **409.**
Guide component CDFHR-LP	C, C1, D, M, F, F1, F2, H, R	**032 553**
Guide component E-LP	E	**032 554**



Application
For interface housings with female connector, for mating with a male connector, who is installed on the *connector attachment* (SB).

Ordering details for kits

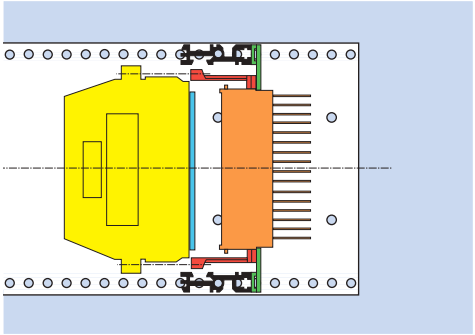
	for interface housings and connectors	order no. **409.**
Guide component CDR-M-SB/FP	B, Q, C, C1, R, D, M	**032 520**
Guide component E-M-SB/FP	E	**032 551**
Guide component F-M-SB/FP	F, F1, F2, U, H	**032 575**



Application
For interface housings with male connector, for mating with a male connector, that is installed on the *connector attachment* (SB).

Ordering details for kits

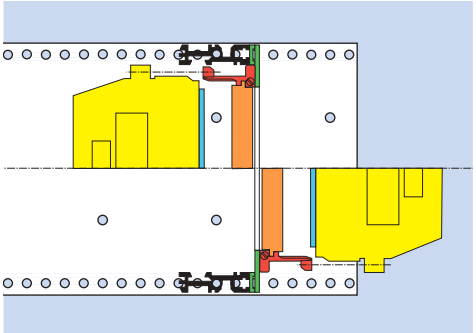
	for interface housings and connectors	order no. **409.**
Guide component CDHR-F-SB	C, C1, R, D, M, H, B, Q	**032 555**
Guide component E-M-F-SB	M	**032 556**



Application
For interface housings with female connector, for mating with an *I-element*. Installation in the wiring field of the subrack.

Ordering details for kits

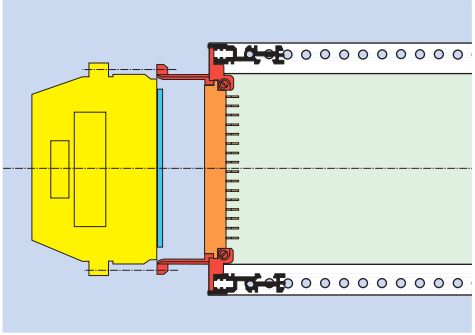
	for interface housings and connectors	order no. **409.**
Guide component I-unit	F, F1, F2	**035 206**



Application
For interface housings with female connector, for mating with a male connector, on *Backplane* (BP).

Ordering details for kits

	order no. **409.**
Guide component CDHR-M-BP	**072 620**
Guide component E-M-BP	**072 619**



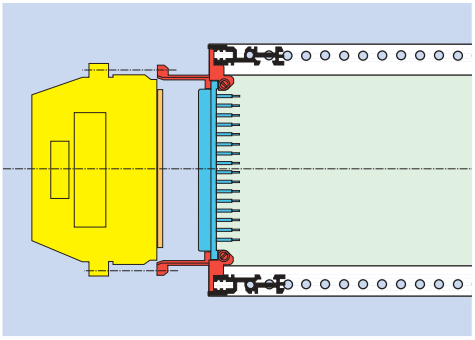
Application
For interface housings with female connector, for mating with a male connector, serves as a handle *(GL)*, mounted on the service side of the subracks.

Ordering details for kits

	for interface housings and connectors	order no. **409.**
Guide component CDR-M-GL	B, C, C1, R, Q, D, M	**032 518**
Guide component E-M-GL	E	**032 549**
Guide component F-M-GL	F, F1, F2, U, H	**032 574**

Color code:
yellow: interface housing
orange: male connector
blue: female connector
red: guide components
green: accessories

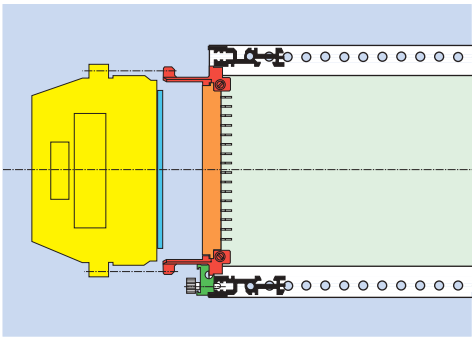
Plastic Guide Components



Application
For interface housings with male connector, for mating with a female connector, serves as a handle *(GL)*, mounted on the service side of the subracks.

Ordering details for kits

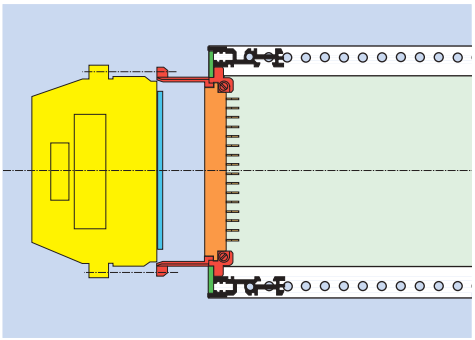
	for interface housings and connectors	order no. **409.**
Guide component CDHR-F-GL	B, Q, C, C1, R, D, M	**032 519**
Guide component E-F-GL	E	**032 550**



Application
For interface housings with female connector, for mating with a male connector, serves as a handle *(GL)*
the subrack.

Ordering details for kits

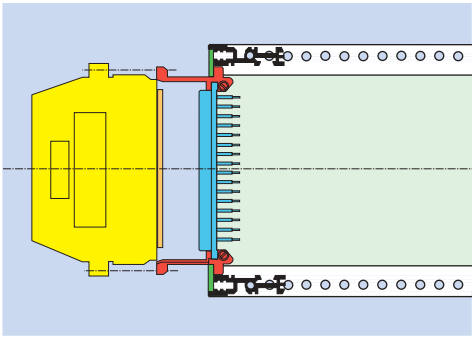
	for interface housings and connectors	order no. **409.**
Guide component F-M-GL	F, H15, U	**035 316**



Application
For interface housings with female connector, for mating with a male connector, that is mounted on a *front panel (FP)*.

Ordering details for kits

	for interface housings and connectors	order no. **409.**
Guide component CDR-M-SB/FP	B, Q, C, C1, R, D, M	**032 520**
Guide component E-M-SB/FP	E	**032 551**
Guide component F-M-SB/FP	F, F1, F2, H, U	**032 575**



Application
For interface housings with male connector, for mating with a female connector, that is mounted on a *front panel (FP)*.

Ordering details for kits

	for interface housings and connectors	order no. **409.**
Guide component CDFHR-FP	B, C, C1, D, M, H11, Q, R	**032 523**
Guide component E-FP	E	**032 552**

Color code:
yellow: interface housing
orange: male connector
blue: female connector
red: guide components
green: accessories

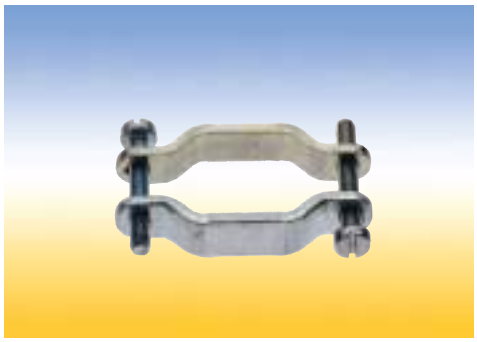
Accessories for Plastic Interface Housings

Cable Sleeve

Material: black rubber

for housing styles C, F, B
order no.: **409. 032 766**

for housing style E
order no.: **409. 032 767**

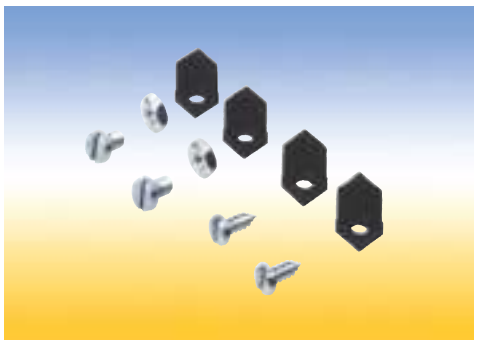


Cable Clamp Kit
consists of:
2 brackets and mounting parts

Material: metal

for housing styles C,D, F, H
order no.: **409. 034 532**

for housing style E
order no.: **409. 034 533**



Coding Kit
with 16 possibilities
consists of:
4 coding elements and mounting parts

Material: plastic

order no.: **409. 069 755**

Coding Kit
with 32 possibilities
consists of:
4 coding elements and mounting parts

Material: metal

order no.: **409. 034 724**

Metal Interface Housings

Description

The metal interface housing was developed on the basis of the plastic interface housing design as a totally metal housing with metal guide elements for heavy-duty use. It has the following advantages:

√ Suitable for all 19" front panels in accordance with IEC 60 297-3 and IEEE fronts in accordance with P1101.10.
√ For shielding between the interface housing and the front panel, in the E and F1 style RFI shielding panels can be added at the transfer side
√ Coding already integrated or can be added, depending on the style
√ Three cable feed apertures
√ For cable diameters up to 17 mm
√ For heavy-duty applications such as railway engineering, power station engineering etc.

Technical data

Dimensions	IEC 60297 / DIN 41494
Material	housing shells: die-cast zinc guide components: die-cast zinc or metallized plastic other parts: stainless steel, steel, brass
Finish:	housing shells: drum-polished or galvanized and chromated or or nickel plated other parts: galvanized, nickel-plated

Delivery kit interface housings metal

	pieces per kit standard	pieces per kit shielded
Interface housing shells	2	2
Cable clamps	1	1
Blind plug	2	2
Shielding plate	-	1
RFI-spring	-	1
Mounting parts	1	1

Delivery kit guide element

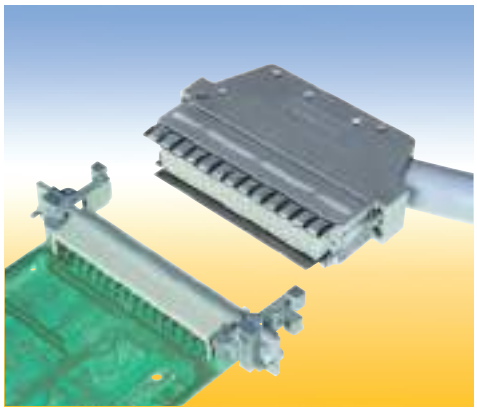
	pieces per kit
Guide component top	1
Guide component bottom	1
Mounting parts	1

Delivery

Interface housings:
As a kit of unassembled components, without guide components.

Guide components:
As an assembled kit.

This catalog contains stock and standard parts. Other products and sizes on request.



Metal interface housings metal RFI

Metal Interface Housings RFI E

For connectors styles E 48 and E 160.

Ordering details for kits

	width [HP]	drum-polished order no. **409.**	galvanized+ chromated order no. **409.**
Metal interface housings			
RFI E-standard	4	**113 860**	**113 824**
RFI E-shielded	4	-	**113 849**

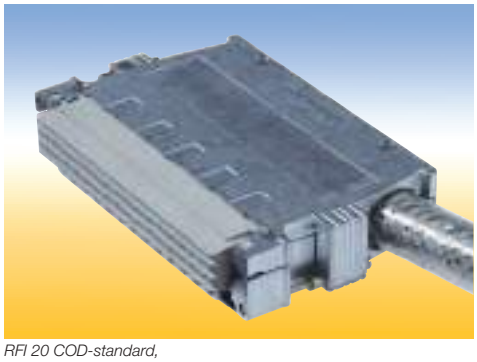
Metal Interface Housings RFI F1

For connector styles F 48, C96, H11, H15, and F24/H7.

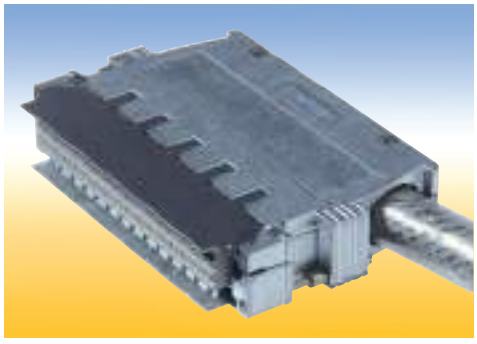
Ordering details for kits

	width [HP]	drum-polished order no. **409.**	galvanized+ chromated order no. **409.**
Metal interface housings			
RFI F1-standard	3	**113 838**	**111 775**
RFI F1-standard	4	**113 840**	**111 245**
RFI F1-shielded	4	-	**113 841**

Nickel plated metal interface housings RFI F1 on request.



RFI 20 COD-standard,
codable with marketables coding elements



RFI 20 COD-shielded, codable

Metal Interface Housings RFI 20 COD

With integrated coding,
for connector styles F 48, H15 and F24/H7

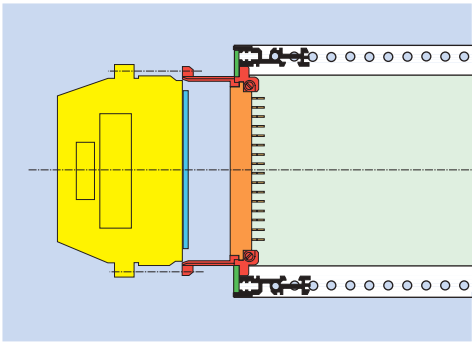
The Metal interface housings RFI 20 - standard are *not* supplied with RFI springs.

Ordering details for kits

	width [HP]	drum-polished order no. **409.**	galvanized+ chromated order no. **409.**
Metal interface housings			
HF20COD-standard	4	**166 286**	**166 287**
HF20COD-shielded	4	-	**166 288**

Nickel plated metal interface housings RFI 20 COD - standard on request.

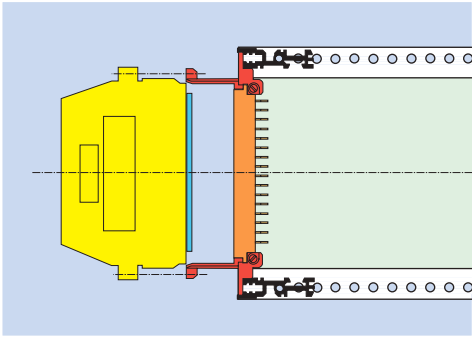
Metallized Guide Components



Application
Guide component F for mounting of a 3 HP metal interface housing in any position of the mounting area.

Ordering details for kits

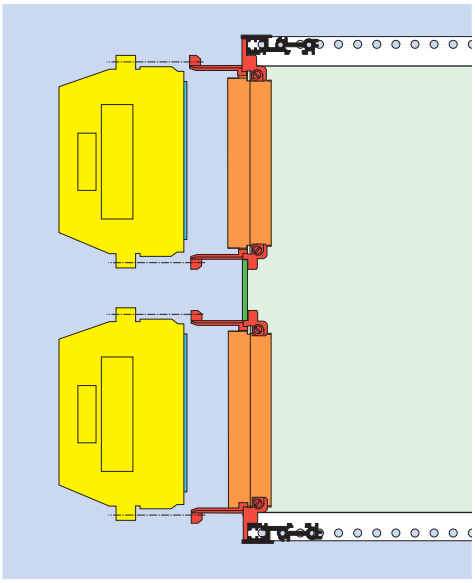
	for metal interface housing RFI	order no. **409.**
Guide component F metal-lized	F1- 3 HP	**114 122**



Application
Guide component F with integrated front panel for mounting of a 3 HP metal interface housing RFI in a 3 U subrack..

Ordering details for kits

	for metal interface housing RFI	order no. **409.**
Guide component F metal-lized	F1- 3 HP	**114 121**

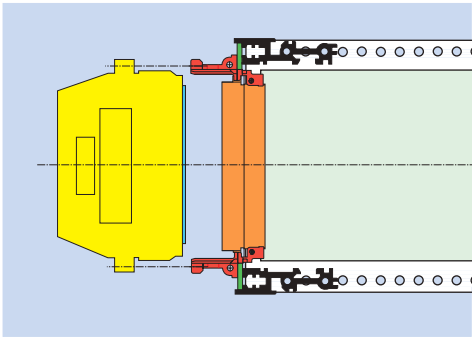


Application
Guide component F for mounting of a 3 HP metal interface housing RFI in the upper or lower area of 6 U subracks.gers.

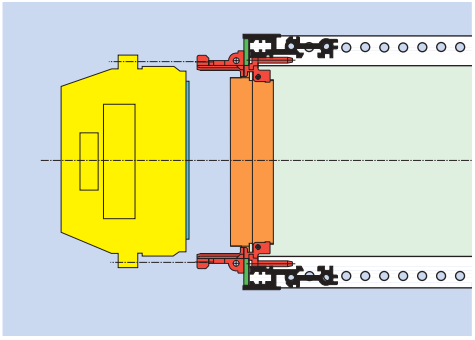
Ordering details

	for metal interface housing RFI	order no. **409.**
Guide component F metal-lized	top - F1- 3 HP	**114 119**
Guide component F metal-lized	bottom - F1- 3 HP	**114 120**

Color code:
yellow: interface housing
orange: male connector
blue: female connector
red: guide components
green: accessories



without coding



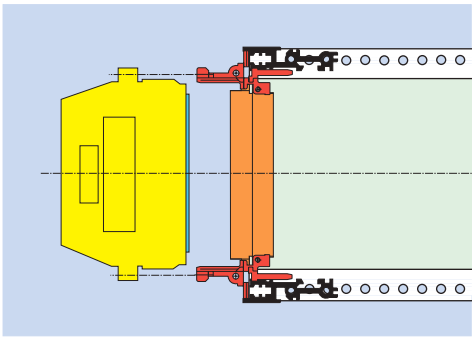
with coding

Application

Guide component F/E for mounting of a 4 HP metal interface housing RFI in any position of the mounting area.

Ordering details for kits

	for metal interface housing RFI	order no. **409.**
Guide component F/E metal	E, F1- 4 HP	**114 933**
Guide component F/E metal with coding	E, F1- 4 HP	**114 007**

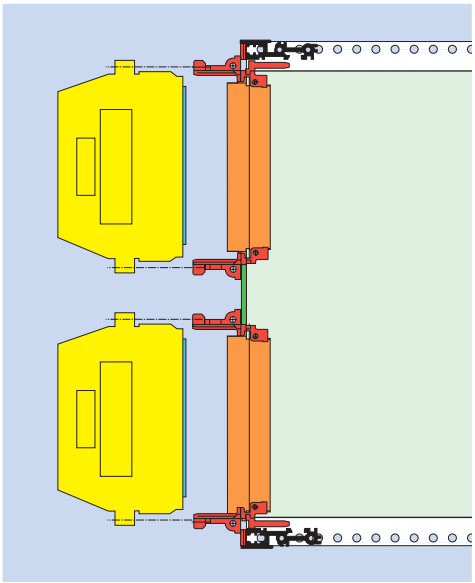


Application

Guide component F/E with integrated front panel for mounting of a 4 HP metal interface housing RFI in a 3 U subrack.

Ordering details for kits

	for metal interface housing RFI	order no. **409.**
Guide component F/E metal	F1- 4 HP	**113 826**



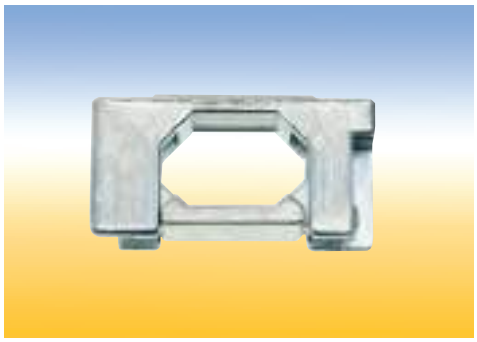
Application

Guide component F/E for mounting of a 4 HP metal interface housing RFI in the upper or lower area of 6 U subracks.

Ordering details for kits

	for metal interface housing RFI	order no. **409.**
Guide component F/E metal	top - F1- 4 HP	**113 830**
Guide component F/E metal	bottom - F1- 4 HP	**113 828**

Accessories for Metal Interface Housings RFI E and F

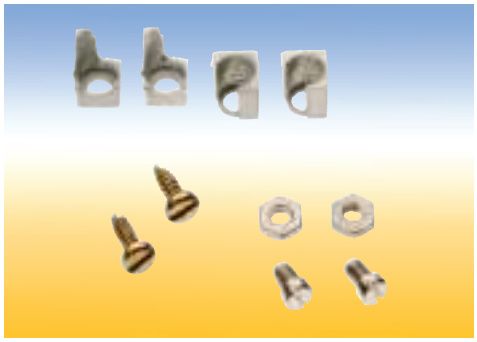


Cable Clamp Kit
consists of:
2 brackets and mounting parts

Material: zink die-cast
Finish : galvanized

Ordering details for kits

	order no. **409.**
Cable clamp 3 HP	**113 788**
Cable clamp 4 HP	**112 279**

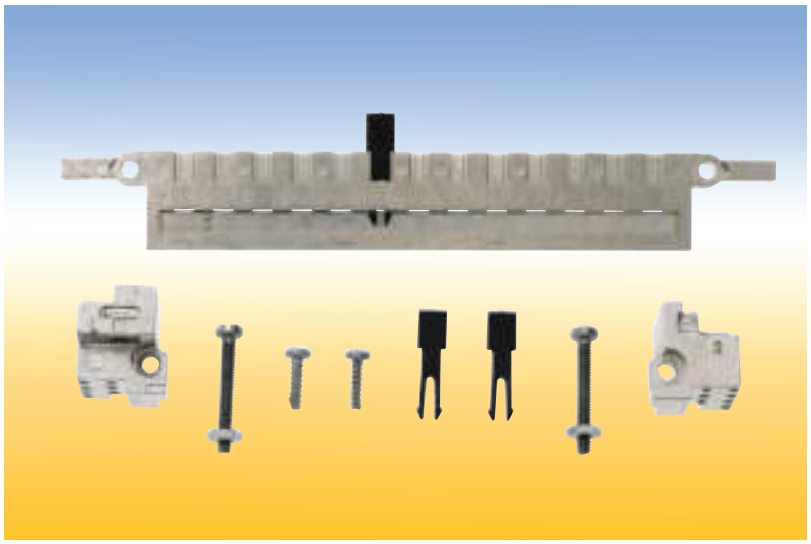


Coding Kit
with 32 possibilities
consists of:
4 coding elements and mounting parts

Material: metal

order no.: **409. 034 724**

Accessories for Metal Interface Housings RFI 20 COD



Retaining Parts Kit
for mounting in subrack

Material: plastic
Finish: metallized

order no.: **409. 114 983**

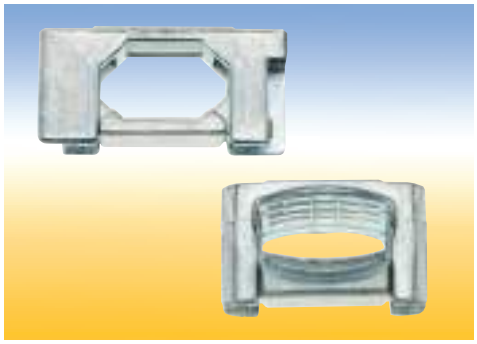
Coding Strip RFI 20
for the male connector

Material: plastic
Finish: metallized

order no.: **409. 114 985**

Coding Pin RFI 20
Material: plastic

Packing unit: 100 pieces
order no.: **409. 115 095**



Cable Clamp Kit
4 HP - RFI 20
consists of:
2 brackets and mounting parts

Material: zinc die-cast
Finish: metallized

Ordering details for kits

	order no. 409.
Cable clamp smal	**114 982**
Cable clamp wide	**117 108**

Insulated Bus Bar

Two connection versions are available:

1. Connection version A:
Alternating terminal lugs for A 6.3 x 0.3 flat push-on connectors and screw attachment.

Description

Insulated bus bar kit for the power supply in housings and cabinets.

The features of the bus bars:
√ High current capacity up to 120 A.
√ Safe against accidental hand contact up to 500 V in accordance with VDE 0106.
√ The protective profile makes the bus bar safe against accidental finger contact up to 220 V in accordance with VDE 0470.
√ Deliverable in any desired length.
√ With a width of 25 mm, 3-pole use is possible.
√ Insulating materials in accordance with the stipulations of VDE 0606.

2. Connection version B:
Alternating terminal lugs for A 6.3 x 0.3 flat push-on connectors and double terminal lugs for A 2.8 x 0.8 flat push-on connectors or one A 6.3 x 0.8 flat push-on connector. Intermediate lengths can be produced by simply sawing.

Technical data

Number of poles	2- or 3-pole
Connection version A	A 6.3 x 0.8 DIN 46244/connection Ø 4.2 mm
Connection version B	A 6.3 x 0.8 / 2 x A 2.8 x 0.8 DIN 46244
Utilization category	-25 °C, +70°C, no condensation
Phase current	120 A at an ambient temperature of 20 °C; 80 A at 55 °C; 70 A at 70 °C
Max. operating voltage	500 V
Insulation class	group C in accordance with DIN/VDE 0110
Test voltage	3.1 kV
Amp capacity at 20°C	25 A per pin connection A 6.3 x 0.8
Material	bus bar: SE-Cu F37, hot-dip tinned insulating body: PP end cap: PC, black mounting parts: steel, galvanized, passivated
Fire protection class	insulating UL 94 V-0

Delivery

assembled

Kit consists of:

Rails
1 Plastic body
2 End caps
Mounting parts

Accessories

	order no. **409.**
Mounting parts 401 (2 position points)	**065 430**
Mounting parts from 1600 mm (4 position points)	**059 270**
Connection lug 100 A	**057 680**

Ordering details for kits

	nom. length [mm]	for cabinet height	A 2poles order no. **409.**	A 3poles order no. **409.**	B 2poles order no. **409.**	B 3poles order no. **409.**
Bus bar 100 A-	401	-	-	**061 443**	-	**080 695**
Bus bar 100 A-	1600	1800	**062 093**	**058 447**	-	**080 939**
Bus bar 100 A-	1800	2000	**062 094**	**058 449**	**080 696**	**080 941**
Bus bar 100 A-	2000	2200	**062 095**	**058 451**	**080 697**	**080 943**

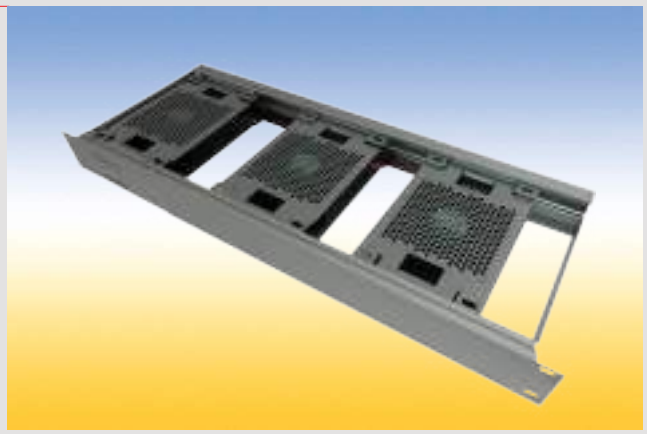
This catalog contains stock and standard parts. Other products and sizes on request.

Accessories

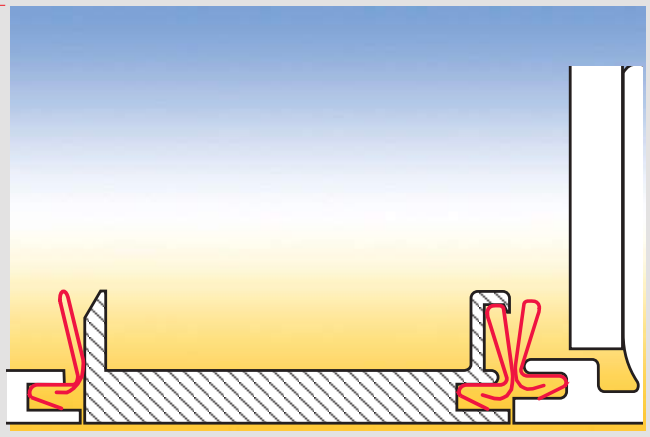
19” Cross-Flow Fan

19” Fan Unit 1 U

CoolSpot



RFI Springs



19” Cross-Flow Fan

19” Cross-Flow Fan

For cooling of 160 mm deep modules.

Fan for cooling of 220 mm deep modules on request.

Delivery:
Cross-flow fan
Filter mat
Support grille for filter mat

Technical data

Power plant	current: squirrel-cage motor direct current: non commutator DC motor
Ambient temperature	current: -25 to +65 °C direct current: -25 to +55 °C
Bearings	groved ball bearing
Life Expectancy	20.000 h
Protection class	IP 10 accordance to DIN 40050
Filter mat	Viledon PSB 145-S
Electrical connection	terminal strip on the back
Material	ventilator housing: steel side panel, flange, support grille, front grille: plastic
Finish	housing: galvanized and chromated

Ordering details 19” Cross-Flow Fan

	nom. depth [mm]	voltage [V]	frequency [Hz]	airflow [m^3/h]	order no. **409.**
for mounting into a cabinet					
EQR -160 KS	160	AC 230	50/60	260	**091 833**
GQR - 160 KS 24 VG	160	DC 24	-	260	**091 844**
for mounting into a housing					
EQR - 160 KG	160	AC 230	50/60	235	**091 834**

Accessories

	order no. **409.**
Protection grille	**091 836**
Plastic motor protection hood	**091 835**
per pack 10 pieces	
Filter mat for EQR and GQR	**026 519**
Filter mat for EQR -160 KG	**026 520**

This catalog contains stock and standard parts. Other products and sizes on request.

19” Fan Unit 1 U

For cooling of modules in cabinets or housings.

Delivery:
1 front panel
1 housing with grille
3 fans
1 power connector
1 strain-relief

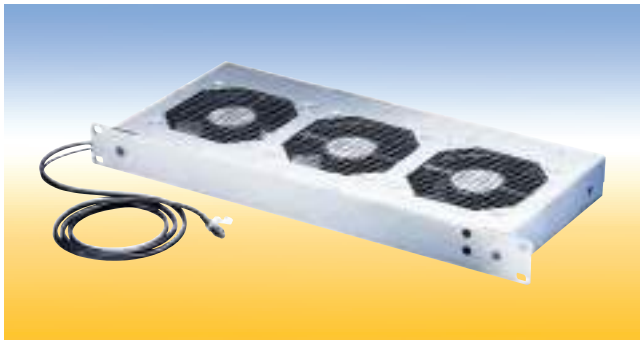
Fan unit with 6 fans and other voltages on request.

Technical data

Ambient temperature	max. 70 °C
Max. static pressure	73 - 88 Pa
Noise level	56.5 - 60.2 dB (A)
Power consumption	45 / 42 W
Materials	front panel: 3 mm aluminum anodized, housing: 1 mm steel, al-zinc

Ordering details

	depth [mm]	voltage [V]	frequency [Hz]	airflow [m³/h]	order no. **409.**
Fan unit 1U	193	AC 230	50/60	440-520	**166 274**



19” Fan Unit 1 U with speed monitoring and control

For cooling of modules in cabinets or housings.

Delivery:
1 front panel
1 housing with grille
3 fans
1 connection cable, cable length 2.5 m, open end
1 temperature sensor external, NTC resistor, cable length 1.5 m

Technical data

Ambient temperature	max. 65 °C
Max. static pressure	70 Pa
Noise level	63.5 dB (A)
Power consumption	15.9 W
Materials	front panel: 3 mm aluminum anodized, housing: 1 mm steel, al-zinc

Technical Data, Control & Monitoring

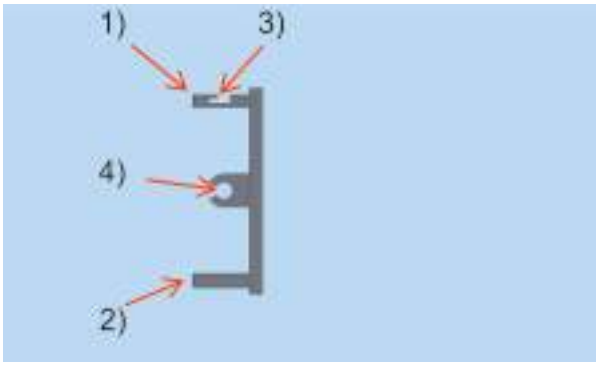
Switching control range	20 - 40 °C to 30 - 50 °C
Sensor connection	rear connector for temperature sensor
Signal for	speed < 20 % of the nom. speed; switch-on delay < 4 s, signal delay < 1 s
Signaling	display via LEDs floating contact switching capacity 20 W switching voltage max. 100 V

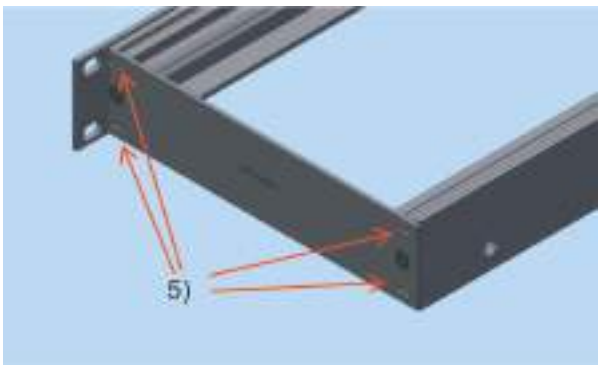
Ordering details

	depth [mm]	voltage [V]	airflow [m³/h]	order no. **409.**
Fan unit 1 U with speed monitoring and control	193	DC 24	467	**166 276**

CoolSpot - 19'' 1 U Fan Tray with infinitely variable Fan Modules

CoolSpot is a 19‘‘ 1U fan tray with the possibility to vary the number and position of fans according to the current heat load. It is designed for an economical but highly effective and precise cooling of electronic components within 19‘‘ cabinets and housings. Cooling air is directly supplied at the hot spots due to the infinitely variable positioning of the fans.

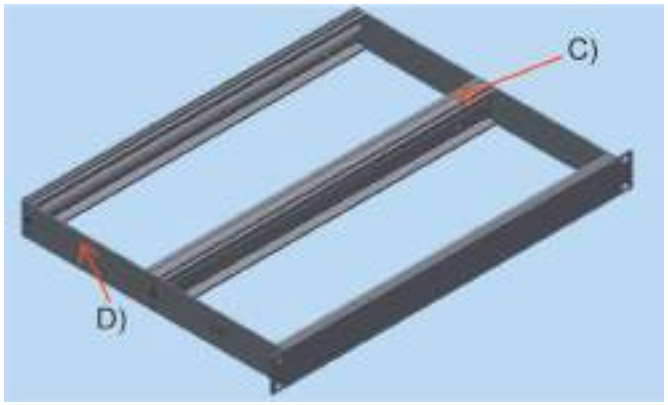


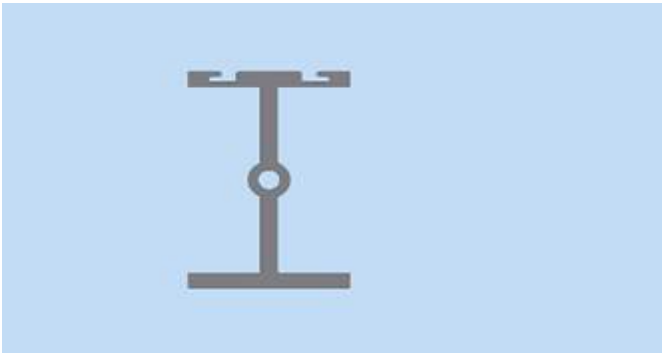


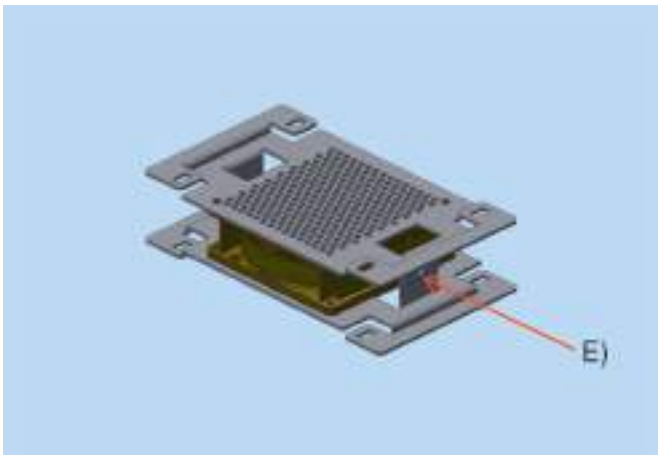
Specification CoolSpot basic frame
The CoolSpot fan tray is characterized by the following constructive features:

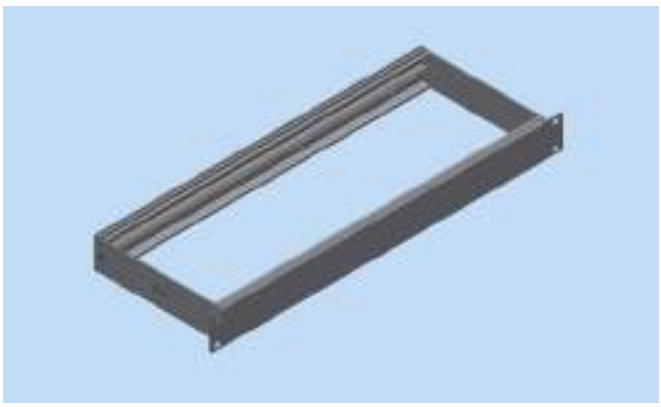
- √ The fan tray's basic frame consists of a front panel, two side stripes and an end profile.
- √ The side stripes are made of colorless pre-anodized aluminum. The cutting edges, which are a result of processing, are blank. Front panel and end profile are also colorlessly anodized.
- √ Front panel A as well as end profile B are manufactured from the same source profile in order to keep the construction as cost-effective as possible. The cutting edges are blank due to the necessary machining.
- √ There are two wings (pos. 1 & 2) on the profiles' inside to enable a linear guidance of the fan modules.
- √ The upper wing has a groove (pos. 3) to include retaining clips. These retaining clips secure the fan modules against unintended shifting.
- √ There is a srew channel in the centre (pos. 4) which enables the assembly of thread-forming screws to the side strips.
- √ Each side strip has four stamped nubs (pos. 5). These guarantee a sufficient protection against twisting during the basic frame's assembly, even though the entire basic frame is put together installation-friendly with only four srcews.

CoolSpot - 19'' 1 U Fan Tray with infinitely variable Fan Modules









Specification CoolSpot extension kit
An extension kit is available as the CoolSpot basic frame only allows an installation of a maximum of four fan modules in a single-row arrangement.

- √ The extension kit uses the already existing basic frame's front panel and end profile and adds an intermediate profile C.
- √ The basic frame's both side panels are replaced by longer side panels D.
- √ These reconstruction measures enable the installation of a maximum of eight fan modules in a two-row arrangement.

Specification CoolSpot fan module

- √ The CoolSpot fan module is characterized by its easy assembly.
- √ The fan module either consists of a fan in the standard measures of 92x92x25 mm and two mounting plates or of a fan in the standard measures of 120x120x32 mm and the corresponding mounting plates.
- √ Each of both mounting plates has two pins. These pins are used for positioning the fan and act as protection against twisting when assembling the fan module.
- √ Both mounting plates are connected with two thread-forming screws E. Thus the fan is clamped between both mounting plates. There is no additional screw connection necessary for the fan itself.
- √ Any desired fan up until a height of 32 mm can be inserted by exchanging the mounting plates.
- √ Every fan module's construction kit contains four retaining clips in order to secure the fan modules against unintended shifting within the fan tray.
- √ We use either SEPA oder EBM-Papst fans in our fan trays to satisfy all demands regarding long service life and cost-benefit ratio. Other fan types can be delivered on request.

CoolSpot - 19'' 1 U Fan Tray with infinitely variable Fan Modules

Specification CoolSpot wiring kit

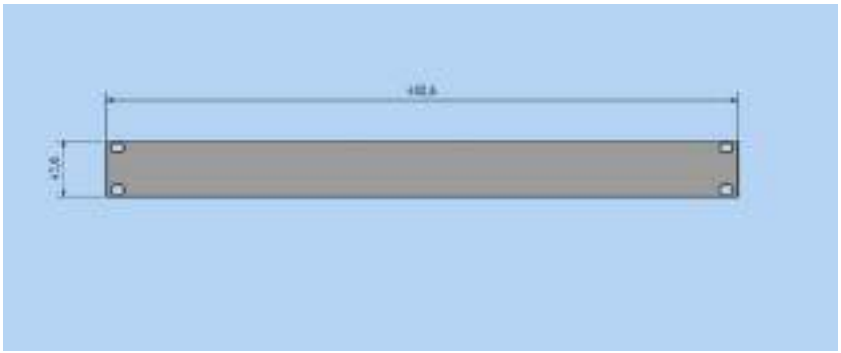
√ By default the wiring kit contains a 2-pole Phoenix plug for the fan tray's power connector.
√ Different connectors can be ordered optionally.
√ Small parts such as cable holders, cable ties, cable glands etc. are also part of the wiring kit.

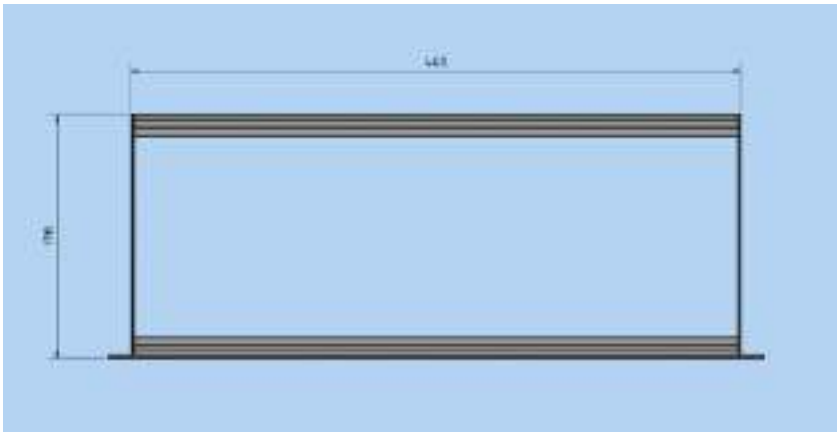
Technical data

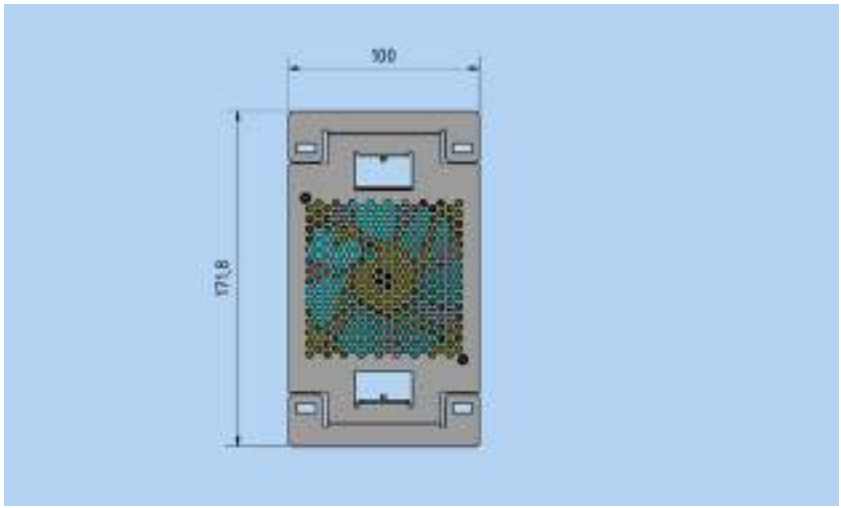
Dimensions of front panel	Width: 19“ (482,6 mm) Heigth: 1 U (43,6 mm)
Housing depth basic frame	single row 92 fan size: 178 mm single row 120 fan size: 205 mm
Housing depth incl. assembled extension kit	two-rowed 92 fan size: 353,2 mm two-rowed 120 fan size: 407,2 mm
Materials	Screws: steel, galvanized with user-friendly torx drive Retaining clips: stainless steel Mounting plates: galvanized steel sheet All other parts: aluminum
Surfaces	Aluminum parts anodized natural Steelparts galvanized and passivated
Rated voltage	12 VDC (other voltages on request)
Rated output	dependent upon fan module
Protection class	IP20
Operating temperature	-10°C … +70°C
Storage temperature	-40°C … +70°C
Level above mean sea level	until 2000 m
volume flow	dependent upon fan module

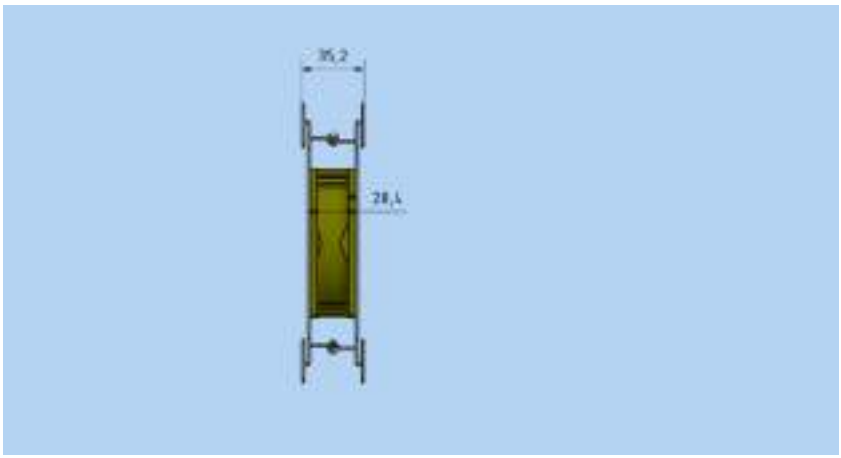
CoolSpot - 19'' 1 U Fan Tray with infinitely variable Fan Modules

Dimensions









CoolSpot - 19'' 1 U Fan Tray with infinitely variable Fan Modules

Ordering details assembly kit

CoolSpot basic frame	order no. **409.**
92 fan size	**208 590**
120 fan size	**146 533**

Delivery basic frame

1 front panel
2 side stripes
1 end profile
4 countersunk screws Taptite M4x16 Torx

Ordering details assembly kit

CoolSpot extension kit	order no. **409.**
92 fan size	**208 380**
120 fan size	**146 534**

Delivery extension kit

1 intermediate profile
2 side stripes long
2 countersunk screws Taptite M4x16 Torx

Ordering details assembly kit

	order no. **409.**
CoolSpot wiring kit	**208 591**

Delivery wiring kit

1 cable gland
1,5 m 2-wire cable flexible
3 mini cable holder
3 cable ties
2 ferrules
1 Phoenix Combicon connector, 2-pole, grid 5,08 mm
0,1 m heat-shrink tubing
2 connecting clamps

Ordering details assembly kit

CoolSpot fan module 92 fan size	order no. **409.**
with SEPA fan	**208 592**
with EBM-Papst fan	**146 537**

CoolSpot fan module 120 fan size	order no. **409.**
with SEPA fan	**146 538**
with EBM-Papst fan	**146 539**

Delivery fan module 92

2 mounting plates
1 fan 92x92x25 mm
2 oval-head screws Taptite M2,5x5 Torx
4 retaining clips

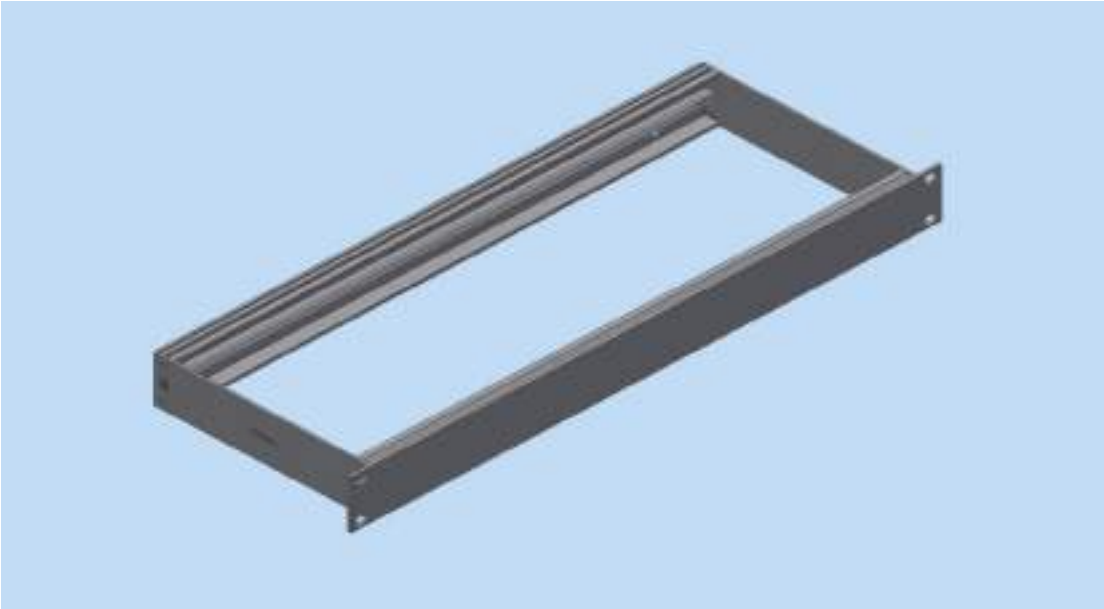
Delivery fan module 120

2 mounting plates
1 fan 92x92x25 mm
2 oval-head screws Taptite M2,5x5 Torx
4 retaining clips

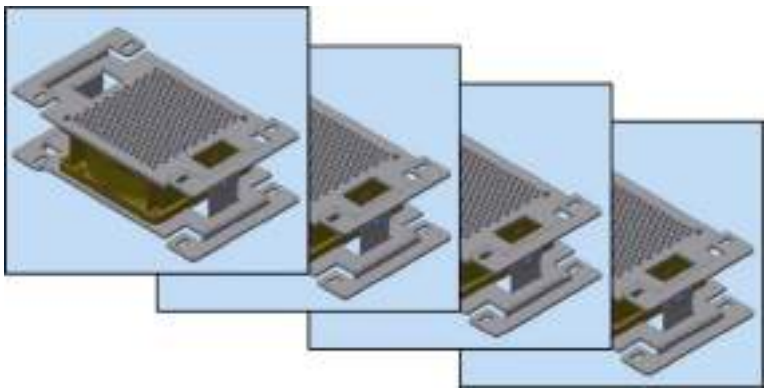
CoolSpot - 19'' 1 U Fan Tray with infinitely variable Fan Modules

Configuration example

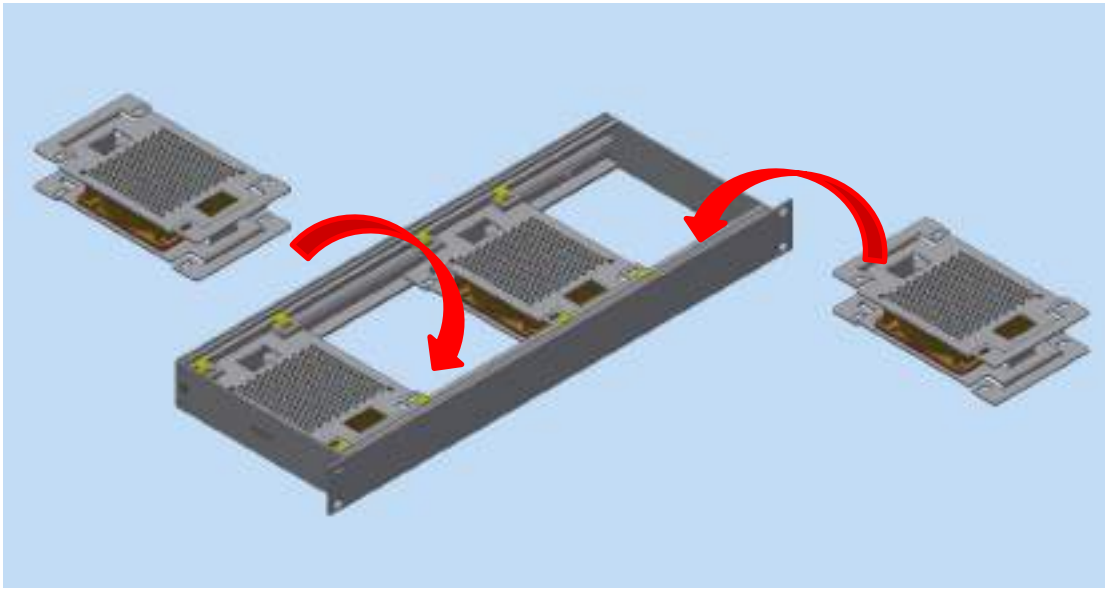
Step 1: Selection of required CoolSpot basic frame.
In this example:simple basic frame 409. 208 590 for a fan size of 92 mm.



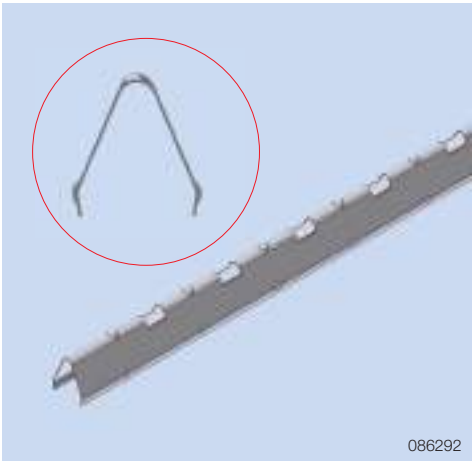
Step 2: Selection of required CoolSpot fan module in desired quantity (maximum of 4).
In this example: fan module 409. 208 592 with SEPA fan in size 92 mm.

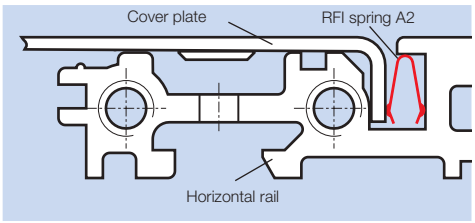


The configurated fan of choice can also be delivered as an assembled version.



RFI Spring A2 and F3





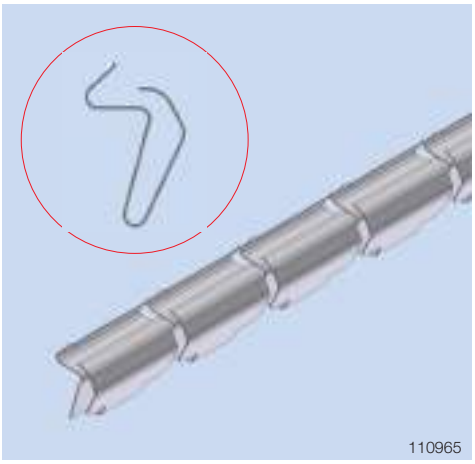
RFI Spring A2

Shielding between the cover plates and the subrack. The spring is snapped into the profile channel at the horizontal rail.
It can be cut in 10 mm lengths.

Material: stainless steel, 0.1 mm thick

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
RFI spring A2	36	182	**107 724**
RFI spring A2	42	217	**090 800**
RFI spring A2	84	427	**085 011**



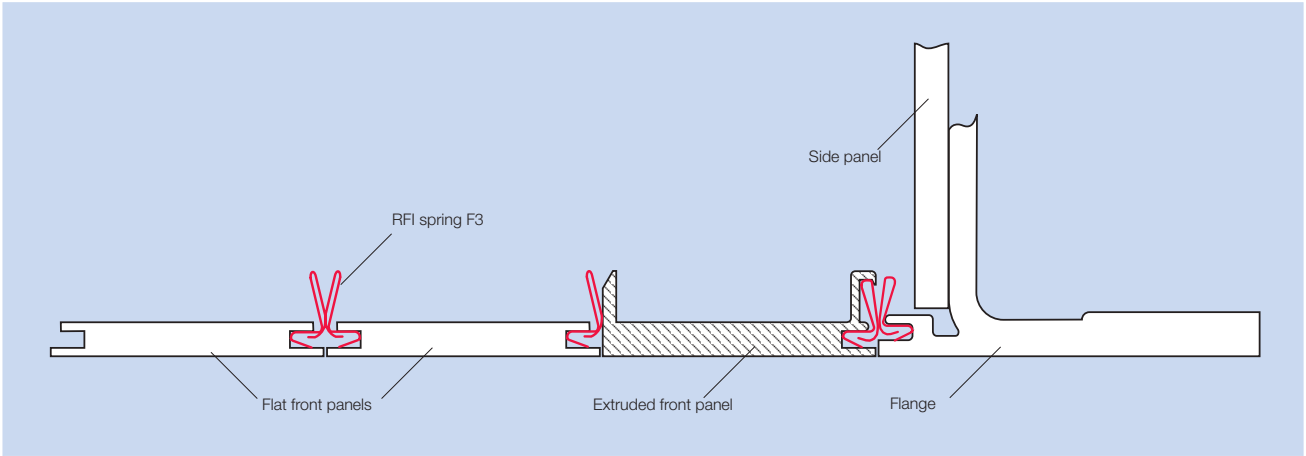
RFI Spring F3

Shielding between the front panels and between front panel and flange as well as shielding the cover plates of the *DiVar* housing.
It can be cut in 7.41 mm lengths.

Material: stainless steel, 0.08 mm thick

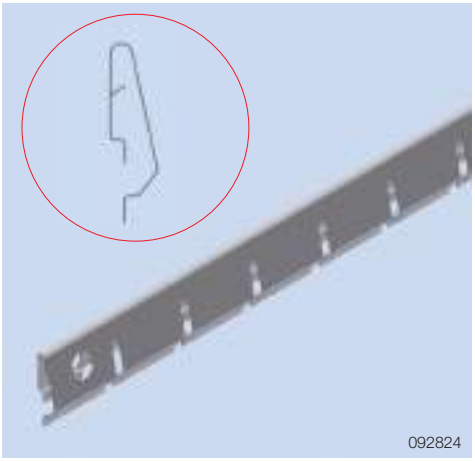
Ordering details

	nom. height [U]	height [mm]	order no. **409.**
RFI spring F3-2	2	51.37	**112 386**
RFI spring F3-3-IEEE	3	95.83	**111 112**
RFI spring F3-3	3	110.65	**111 636**
RFI spring F3-4	4	155.11	**112 387**
RFI spring F3-6-IEEE	6	229.21	**111 116**
RFI spring F3-6	6	244.03	**111 637**



Shielding between the front panel and between front panel and flange

RFI Spring F1, Contact Profile and RFI Spring P2



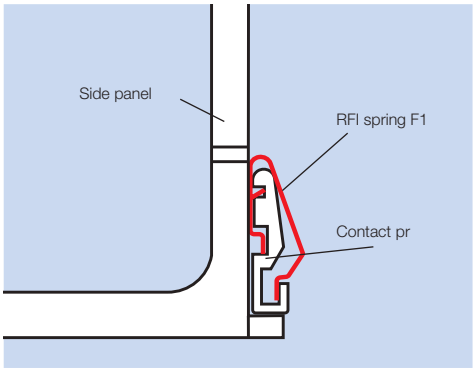
RFI Spring F1

Shielding between the front panel and side panel with the contact profile of the *InterRail* subrack.

Material: CuSn 0.1 mm thick

Ordering details

	nom. height [U]	height [mm]	order no. **409.**
RFI spring F1-3	3	106.9	**093 400**
RFI spring F1-6	6	240.25	**093 401**



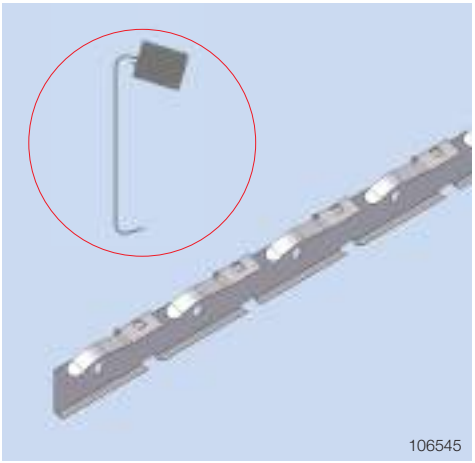
Contact Pr

Shielding between front panel and side panel with the RFI spring F1 of the *InterRail* subrack.

Material: aluminum
Finish: passivated

Ordering details

	nom. height [U]	height [mm]	order no. **409.**
Contact pr -3	3	107.5	**092 923**
Contact pr -6	6	240.85	**092 924**



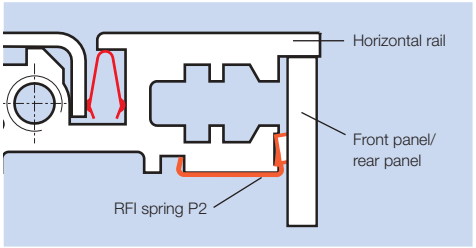
RFI Spring P2

Shielding front panels and rear panel to the horizontal rail.
The spring is snapped into the pr
It can be cut in 15.24 mm lengths.

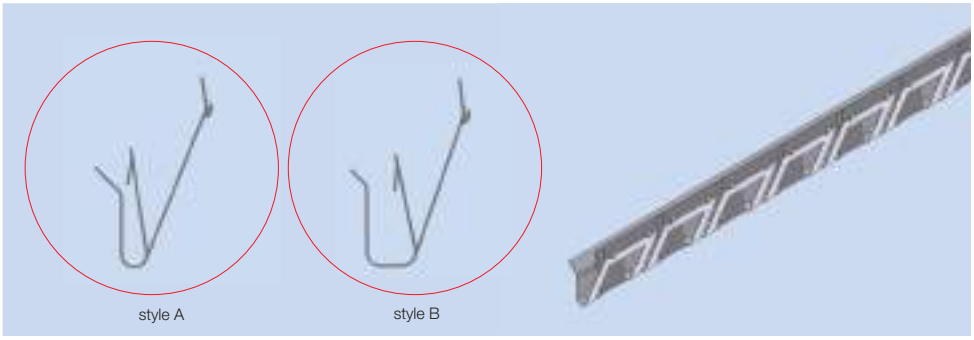
Material: stainless steel, 0.08 mm thick

Ordering details

	nom. width [HP]	length [mm]	order no. **409.**
RFI spring P2	42	212.36	**106 546**
RFI spring P2	84	425.72	**106 547**



RFI Spring U1 and U2

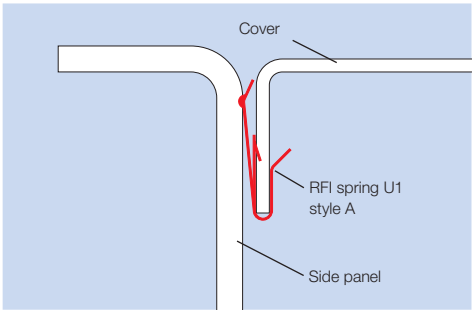


RFI Spring U1
Multiple applications. Shielding subracks, housings and cabinets with 1 mm - 2.5 mm sheet thickness.
The spring can be cut in 10 mm lengths.

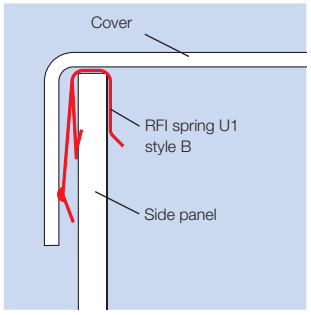
Material:
stainless steel, 0.1 mm thick

Ordering details

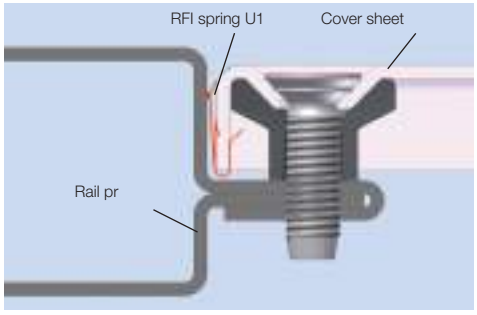
	style	sheet thick-ness [mm]	length [mm]	order no. **409.**
RFI spring U1-1,0-230	A	1.0	229	**114 840**
RFI spring U1-1,5-400	A	1.5	399	**101 830**
RFI spring U1-2,0-270	B	2.0	269	**107 323**



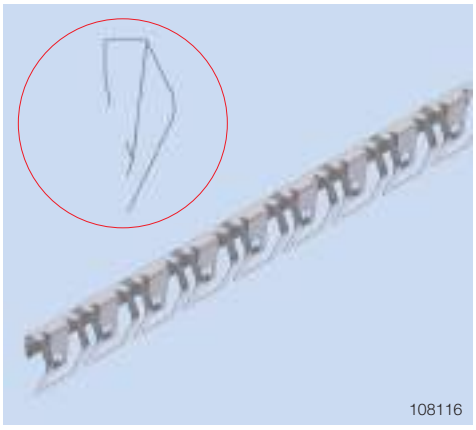
Subrack example of use



Subrack example of use



System cabinet example of use

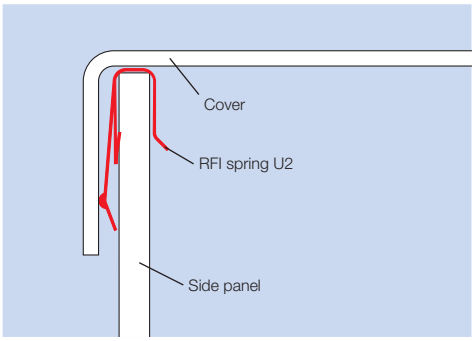


RFI Spring U2
Multiple applications. Shielding subracks, housings and cabinets with 2.5 mm sheet thickness.
The spring can be cut in 10 mm lengths.

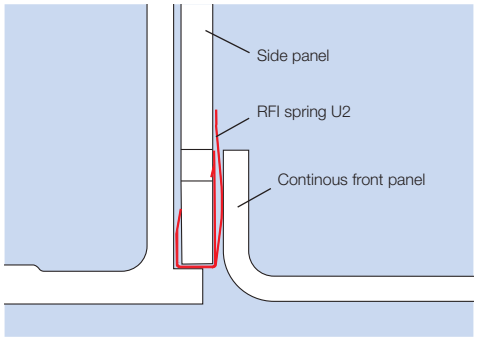
Material: stainless steel, 0.08 mm thick

Ordering details

	sheet thick-ness [mm]	length [mm]	order no. **409.**
RFI spring U2	2.5	98.79	**108 107**
RFI spring U2	2.5	232.14	**108 108**
RFI spring U2	2.5	632.19	**109 537**

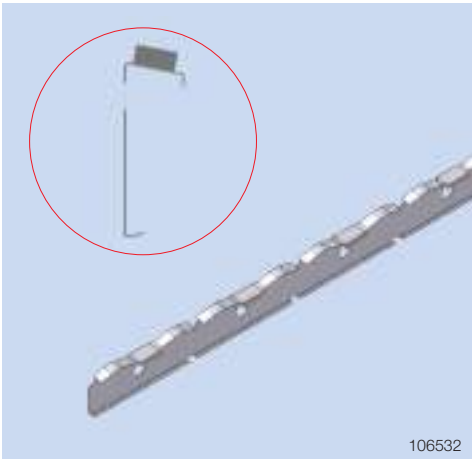


Subrack example of use



Subrack example of use

RFI Spring M-P2, G-A2, G-P2 and RFI Fabric Gasket



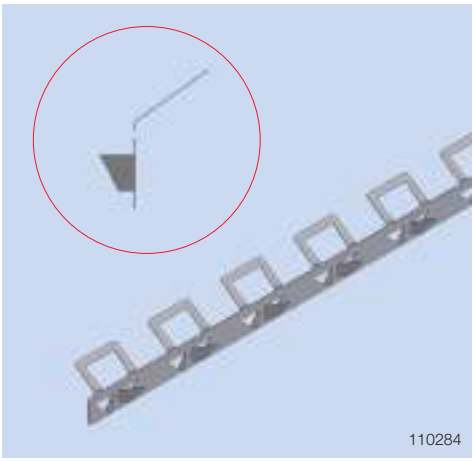
RFI Spring M-P2
Shielding between side panel and backplane with a mounting strip.
The spring can be cut in 25 mm lengths.

Material: stainless steel, 0.08 mm thick
Dimensions: 85 x 5 mm
Length: 424 mm

order no.: **409. 106 533**

Accessories

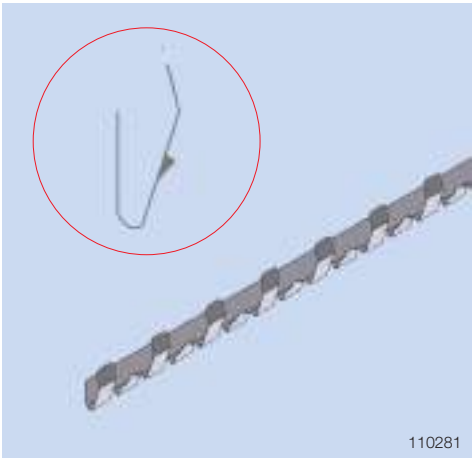
Mounting strip
order no.: **409. 111 691**



RFI Spring G-A2
Shielding between the profiles and the cover plates of the *InterMeZo* housing.
The spring can be cut in 25 mm lengths.

Material: stainless steel, 0.15 mm thick
Length: 469 mm

order no.: **409. 110 960**



RFI Spring G-P2
Shielding between the door/rear panel and the profile of the *InterMeZo* housing.
The spring can be cut in 14.815 mm lengths.

Material: stainless steel, 0.15 mm thick
Length: 471.83 mm

order no.: **409. 111 534**

RFI Fabric Gasket, self-adhesive
Shielding between the door/rear panel and the profile of the housing.

Material: polyurethane foam core covered with copper-nickel (CuNi) metal fabric
Dimensions: height 9.5 x width 6.4 x length 1000 mm
Fire protection class: UL 94 V-0

order no.: **409. 175 397**

List of Order-Numbers
409.

Order no. **409.**	
013	
013 904	7.5
013 910	7.5
013 911	3.72, 3.76
	3.77, 3.78
	3.79, 3.80
	3.93, 4.10
	4.12
013 919	3.52, 2.7
013 938	3.76, 3.78
	3.79, 3.80
	3.93, 3.102
	7.5
017	
017 929	3.93
017 956	3.93
017 956	3.97
018	
018 028	7.5
018 055	3.73
022	
022 622	7.4
022 672	4.11
022 714	7.6
022 791	3.93
022 792	3.93, 4.10
022 793	3.93, 4.10
022 794	3.93, 4.10
022 796	3.93, 4.10
022 798	3.93, 4.10
022 800	4.10
022 802	3.93
022 807	3.93, 4.10
022 814	4.10
024	
024 361	3.72
024 380	3.72
024 567	7.4
024 738	3.69
024 740	3.69
024 830	3.103
026	
026 068	3.47
026 519	8.2
026 520	8.2
026 586	3.72

Order no. **409.**	
031	
031 015	7.4
031 018	7.5
031 019	7.5
031 020	7.5
031 021	7.3
031 022	7.3
031 023	7.5
031 024	7.5
031 030	7.3
031 031	7.3
031 120	7.5
031 123	7.5
031 124	7.9
031 125	7.9
031 583	7.6
032	
032 518	7.11
032 519	7.12
032 520	7.10, 7.12
032 523	7.12
032 549	7.11
032 550	7.12
032 551	7.10, 7.12
032 552	7.12
032 553	7.10
032 554	7.10
032 555	7.11
032 556	7.11
032 563	7.10
032 564	7.10
032 565	7.10
032 566	7.10
032 567	7.10
032 568	7.10
032 569	7.10
032 574	7.11
032 575	7.10, 7.12
032 708	3.72, 4.12
	7.5
032 766	7.13
032 767	7.13
033	
033 188	7.6
033 189	7.6
034	
034 532	7.13
034 533	7.13
034 724	7.13, 7.18

Order no. **409.**	
035	
035 004	3.101
035 206	7.11
035 207	7.10
035 316	7.12
035 528	3.101
035 529	3.101
035 630	7.5
035 665	3.101
038	
038 687	4.9
038 689	4.9
038 691	4.9
038 693	4.9
038 700	4.9
038 707	4.9
038 721	4.9
038 763	4.9
038 765	4.9
038 767	4.9
038 769	4.9
038 776	4.9
038 783	4.9
038 797	4.9
039	
039 540	4.7
039 542	4.7
039 543	4.7
039 546	4.7
039 547	4.7
039 603	4.7
039 604	4.7
039 691	3.74, 3.77
	4.10, 4.12
039 851	4.12
039 853	4.12
039 855	4.12
039 857	4.12
039 864	4.12
039 954	4.12
039 968	4.12
040	
040 348	4.13
040 350	4.13
040 352	4.13
040 354	4.13
040 361	4.13
040 368	4.13
040 382	4.13
040 385	3.101

Order no. **409.**	
040 386	3.101
040 387	3.101
040 401	3.93, 4.10
	4.12
040 419	3.52
040 420	3.52
040 652	3.93
040 969	4.10
041	
041 008	4.11
041 012	4.11
041 657	3.93
041 660	7.4
042	
042 218	7.4
042 219	7.4
043	
043 035	3.101
043 036	3.101
043 488	4.11
043 514	4.8
043 516	4.8
043 518	4.8
043 525	4.8
043 532	4.8
043 546	4.8
043 586	7.3
043 598	7.3
043 606	7.3
043 610	7.3
043 622	7.3
044	
044 090	4.12
044 214	7.6
045	
045 210	7.3
045 235	7.3
045 891	7.3
045 894	7.3
045 897	7.3
046	
046 098	4.11
046 999	4.12
047	
047 221	3.58
047 243	3.58

List of Order-Numbers
409.

Order no. **409.**	
047 285	3.58
047 421	3.57
047 443	3.57
047 485	3.57
047 601	3.74
047 621	3.60
047 643	3.60
047 685	3.60
047 821	3.59
047 843	3.59
047 885	3.59
048	
048 684	3.62
048 784	3.62
049	
049 668	1.10
049 670	1.10
049 677	1.9
049 679	1.9
049 680	1.9
049 681	1.9
049 682	1.9
049 721	3.57
049 743	3.57
049 785	3.57
049 921	3.60
049 943	3.60
049 985	3.60
050	
050 121	3.67
050 129	3.67
050 143	3.67
050 185	3.67
050 567	1.9
050 688	1.8
051	
051 981	3.7, 3.9
	3.16, 3.17
	3.18, 3.19
	3.24, 3.26
	3.27, 3.73
052	
052 156	3.44, 3.45
	3.47
052 720	3.83
053	
053 321	3.54

Order no. **409.**	
053 329	3.54
053 343	3.54
053 385	3.54
056	
056 135	3.101
057	
057 680	7.20
058	
058 102	3.75, 3.77
	3.78, 3.79
	3.82, 3.102
058 447	7.20
058 449	7.20
058 451	7.20
058 910	3.93
058 910	4.10
058 912	3.93, 4.10
058 914	4.10
058 916	3.93
058 921	3.93, 4.10
058 928	4.10
058 942	3.93, 4.10
058 944	3.29
059	
059 270	7.20
059 632	3.78
059 634	3.78
059 636	3.78
059 640	2.9
061	
061 051	3.79
061 052	3.79
061 059	3.79
061 060	3.79
061 061	3.79
061 062	3.79
061 086	3.79
061 088	3.79
061 443	7.20
061 468	3.75
061 469	3.75
061 526	3.75
061 541	3.73
062	
062 043	3.54
062 085	3.54
062 093	7.20

Order no. **409.**	
062 094	7.20
062 095	7.20
064	
064 687	3.67
064 740	7.6
064 947	3.67
065	
065 430	7.20
065 819	3.53
065 882	3.102
065 883	3.102
065 888	3.97
067	
067 624	3.63, 3.64
	3.65, 3.102
068	
068 089	7.3
068 108	7.3
068 698	3.83
068 760	1.10
069	
069 047	3.67
069 302	1.10
069 369	1.9
069 755	7.13
069 774	3.78
070	
070 323	7.3
070 425	7.3
070 476	7.5
070 617	7.6
070 620	7.9
070 621	7.9
070 969	7.4
071	
071 015	7.4
071 876	7.9
072	
072 533	3.67
072 619	7.11
072 620	7.11
073	
073 659	7.9

Order no. **409.**	
074	
074 056	1.7
074 057	1.7
074 202	7.4
074 203	7.4
074 387	2.7, 3.52
077	
077 038	7.4
077 042	7.4
077 045	7.4
077 048	7.4
077 051	7.4
077 055	7.4
077 058	7.4
077 111	7.5
077 112	7.5
077 516	7.9
078	
078 428	3.89
078 641	1.8
078 646	1.8
078 693	3.44
078 942	3.66
079	
079 184	3.62
079 202	4.7
079 203	4.7
079 284	3.62
079 384	3.62
079 521	3.54
079 543	3.54
079 585	3.54
080	
080 068	3.78
080 695	7.20
080 696	7.20
080 697	7.20
080 939	7.20
080 941	7.20
080 943	7.20
081	
081 039	1.10
082	
082 063	3.66
082 121	3.57
082 143	3.57
082 185	3.57

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409.

Order no. **409.**	
082 239	3.65
082 594	3.104, 4.13
083	
083 091	3.77
085	
085 001	3.44
085 002	3.44
085 003	3.44
085 010	3.78
085 011	3.61, 8.10
085 095	3.44
085 096	3.44
085 097	3.44
085 689	3.101
085 695	3.52
085 696	3.52
086	
086 333	3.45
086 334	3.45
086 336	3.45
086 337	3.45
086 513	2.6
086 514	2.6
086 516	2.6
086 517	2.6
086 519	2.6
086 522	2.6
086 787	3.49
086 791	3.49
087	
087 340	3.7
087 341	3.7
087 342	3.7
087 364	3.7
087 365	3.7
087 366	3.7
087 388	3.7
087 389	3.7
087 390	3.7
087 440	3.7
087 441	3.7
087 442	3.7
087 446	3.7
087 447	3.7
087 448	3.7
087 462	3.7
087 463	3.7
087 464	3.7
087 475	3.58

Order no. **409.**	
087 639	3.48
087 802	3.49
087 820	3.53
087 821	3.53
087 824	3.49
088	
088 190	3.64
088 365	3.55
089	
089 238	3.93
089 240	3.93
089 244	3.64
090	
090 799	3.55
090 800	3.61, 8.10
091	
091 255	3.7, 3.9
	3.16, 3.17
	3.18, 3.19
	3.24, 3.25
	3.26, 3.27
091 833	8.2
091 834	8.2
091 835	8.2
091 836	8.2
092	
092 502	3.59
092 602	3.57
092 785	3.82
092 786	3.103
092 923	8.11
092 924	8.11
093	
093 400	8.11
093 401	8.11
093 548	3.60
093 605	3.25, 3.26
	3.27, 3.29
093 606	3.25, 3.26
	3.27, 3.29
094	
094 458	3.97
094 459	3.97
094 464	3.101
094 602	3.72

Order no. **409.**	
094 604	3.72, 3.76
	3.77, 3.78
	3.79, 3.80
094 605	3.93
094 628	7.4
094 700	3.9
094 701	3.9
094 702	3.9
094 703	3.9
094 704	3.9
094 705	3.9
094 706	3.9
094 707	3.9
094 708	3.9
094 709	3.9
094 710	3.9
094 711	3.9
096	
096 403	3.91
096 404	3.91
096 405	3.91
096 406	3.91
096 407	3.91
096 408	3.91
096 410	3.91
096 412	3.91
096 416	3.91
096 421	3.91
096 604	3.91
096 605	3.91
096 606	3.91
096 608	3.91
096 610	3.91
096 612	3.91
096 703	3.91
096 704	3.91
096 705	3.91
096 706	3.91
096 707	3.91
096 708	3.91
096 710	3.91
096 712	3.91
096 716	3.91
096 721	3.91
096 904	3.91
096 905	3.91
096 906	3.91
096 908	3.91
096 910	3.91
096 912	3.91

Order no. **409.**	
097	
097 201	3.87
097 202	3.87
097 203	3.87
097 204	3.87
097 205	3.87
097 206	3.87
097 207	3.87
097 208	3.87
097 210	3.87
097 212	3.87
097 214	3.87
097 221	3.87
097 228	3.87
097 242	3.87
097 284	3.87
097 286	3.45
097 404	3.87
097 406	3.87
097 408	3.87
097 412	3.87
097 414	3.87
097 421	3.87
097 428	3.87
097 442	3.87
097 484	3.87
097 601	3.87
097 602	3.87
097 603	3.87
097 604	3.87
097 605	3.87
097 606	3.87
097 607	3.87
097 608	3.87
097 610	3.87
097 612	3.87
097 614	3.87
097 621	3.87
097 628	3.87
097 642	3.87
097 684	3.87
097 804	3.87
097 806	3.87
097 808	3.87
097 812	3.87
097 814	3.87
097 821	3.87
097 828	3.87
097 842	3.87
097 884	3.87
097 957	3.104

Order no. **409.**	
098	
098 986	7.4
098 989	7.4
098 991	7.4
099	
099 730	3.102
099 731	3.102
099 883	3.102
100	
100 538	3.87, 3.104
	4.13
100 539	3.87, 3.104
	4.13
100 540	3.104, 4.13
100 650	7.7
100 652	7.7
100 660	7.7
100 662	7.7
100 667	3.93
100 843	3.80
101	
101 276	3.78
101 385	7.4
101 830	8.10
101 843	3.97
101 844	3.97
101 917	3.104, 4.13
101 918	3.104, 4.13
101 923	3.97
101 276	3.78
101 385	7.4
101 830	8.12
101 843	3.97
101 844	3.97
101 917	3.66, 3.87
	3.104, 4.10
	4.13
101 918	3.104, 4.13
101 923	3.97
101 924	3.97
102	
102 109	7.7
102 110	7.7
102 112	7.7
102 113	7.7
102 114	3.93
102 115	3.93
102 117	3.93
102 118	3.93

Order no. **409.**	
102 297	3.83
102 344	3.95
102 348	3.95
102 352	3.95
102 356	3.95
102 361	3.95
102 384	3.95
102 388	3.95
102 392	3.95
102 404	3.95
102 405	3.95
102 406	3.95
102 408	3.95
102 410	3.95
102 412	3.95
102 416	3.95
102 421	3.95
102 432	3.29
102 454	3.95
102 458	3.95
102 462	3.95
102 822	3.28
103	
103 005	3.93
103 006	3.93, 4.10
103 007	3.93, 4.10
103 008	3.93, 4.10
103 205	3.93
103 206	3.93, 4.10
103 207	3.93, 4.10
103 208	3.93, 4.10
103 358	3.76, 3.77
	3.78, 3.80
	3.82
103 777	3.70
103 810	3.93, 4.10
103 812	3.93, 4.10
103 814	4.10
103 816	3.93
103 821	3.93, 4.10
103 828	4.10
103 842	3.93, 4.10
104	
104 030	3.58
104 994	3.57
105	
105 380	7.3
105 602	3.48

Order no. **409.**	
105 655	3.61
105 656	3.61
105 789	3.52
105 790	3.62
106	
106 102	3.57
106 103	3.57
106 530	3.82
106 531	3.82
106 533	8.13
106 546	3.61, 8.11
106 547	3.16, 3.17
	3.18, 3.19
	3.25, 3.26
	3.27, 3.29
	3.61, 8.11
106 750	3.45
106 751	3.70
107	
107 323	8.12
107 342	3.66
107 518	3.91
107 520	3.91
107 521	3.91
107 522	3.91
107 716	3.28
107 719	3.48
107 721	3.58
107 722	3.61
107 723	3.64
107 724	8.10
107 727	3.102
107 728	3.102
107 841	3.58
107 842	3.58
107 846	3.61
107 847	3.61
107 905	3.64
107 906	3.64
108	
108 008	3.60
108 012	3.68
108 045	3.68
108 061	3.58
108 101	3.78
108 107	8.12
108 108	8.12
108 120	3.78
108 157	3.78
108 173	3.74

Order no. **409.**	
108 246	3.58
108 250	3.28
108 251	3.28
108 252	3.29
108 253	3.29
108 254	3.29
108 255	3.29
108 274	3.25
108 275	3.25
108 875	3.65
108 876	3.65
108 962	4.10
108 963	4.10, 4.13
108 987	3.59
108 988	3.59
109	
109 058	3.78
109 537	8.12
109 934	3.55
109 937	3.58
109 984	2.6
109 985	2.6
109 986	2.6
109 987	2.6
109 988	2.6
110	
110 201	3.44
110 202	3.44
110 234	3.44
110 238	3.44
110 248	3.44
110 249	3.44
110 360	2.7
110 361	2.7
110 366	2.7
110 367	2.7
110 368	2.7
110 370	2.7
110 372	2.7
110 375	2.7
110 376	2.7
110 378	2.7
110 379	2.7
110 381	2.7
110 382	2.7
110 392	2.6
110 395	2.6
110 452	2.6
110 453	2.6
110 454	2.6
110 455	2.6

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409.

Order no. **409.**	
110 456	2.6
110 457	2.6
110 960	8.13
111	
111 112	3.66, 3.89
	3.92, 3.96
	3.99, 3.100
	4.11, 4.14
	8.10
111 116	3.66, 3.89
	3.92, 3.90
	3.99, 3.100
	4.11, 8.10
111 157	3.76
111 182	3.55
111 184	3.73
111 199	3.60
111 245	7.15
111 285	2.6
111 286	2.6
111 287	2.6
111 534	8.13
111 556	2.6
111 557	2.6
111 559	2.6
111 560	2.6
111 561	2.6
111 562	2.6
111 604	3.96
111 605	3.96
111 606	3.96
111 608	3.88
111 609	3.88
111 610	3.88
111 611	3.88
111 613	3.96
111 614	3.96
111 615	3.96
111 616	3.96
111 618	3.88
111 619	3.88
111 620	3.88
111 621	3.88
111 636	3.50, 3.52
	8.10
111 637	3.50, 3.52
	8.10
111 691	8.13
111 774	2.9
111 775	7.15
111 847	3.96

Order no. **409.**	
112	
112 054	3.72
112 055	3.72
112 092	2.7
112 093	2.7
112 094	2.7
112 152	3.99
112 154	3.99
112 202	3.50
112 205	3.50
112 234	3.50
112 252	3.88
112 258	3.88
112 279	7.18
112 386	3.50, 8.10
112 387	3.50, 8.10
112 400	3.99
112 401	3.99
112 402	3.99
112 403	3.99
112 404	3.99
112 405	3.99
112 408	3.99
112 409	3.99
112 410	3.99
112 411	3.99
112 412	3.99
112 413	3.99
112 453	3.76
112 454	3.76
112 507	2.7
112 551	3.88
112 557	3.88
112 578	3.88
112 581	3.88
112 611	3.88
112 617	3.88
112 638	3.88
112 641	3.88
112 644	3.96
112 650	3.96
112 668	3.96
112 725	3.96
112 773	3.99
112 778	3.99
112 790	3.99
112 821	3.88
112 872	3.47
112 876	3.47
112 943	3.88
113	
113 027	3.88

Order no. **409.**	
113 028	3.88
113 029	3.88
113 030	3.88
113 079	3.99
113 147	3.96
113 148	3.96
113 149	3.96
113 170	3.96
113 171	3.96
113 172	3.96
113 400	3.80
113 450	3.80, 3.81
113 583	3.88
113 586	3.88
113 589	3.88
113 590	3.88
113 592	3.88
113 593	3.88
113 594	3.88
113 595	3.88
113 596	3.88
113 598	3.88
113 599	3.88
113 608	3.88
113 609	3.88
113 611	3.88
113 612	3.88
113 613	3.88
113 614	3.88
113 617	3.88
113 620	3.96
113 622	3.96
113 626	3.96
113 640	3.96
113 641	3.99
113 647	3.99
113 654	3.99
113 655	3.96
113 656	3.96
113 657	3.96
113 658	3.96
113 659	3.96
113 660	3.96
113 661	3.96
113 662	3.96
113 663	3.96
113 665	3.96
113 667	3.96
113 668	3.96
113 669	3.96
113 670	3.96
113 671	3.99
113 672	3.99

Order no. **409.**	
113 673	3.99
113 674	3.99
113 675	3.99
113 676	3.99
113 685	3.92
113 693	3.92
113 705	3.89
113 706	3.89
113 711	3.92
113 713	3.80, 3.81
113 723	3.92
113 725	3.92
113 729	3.92
113 762	3.92
113 788	7.18
113 824	7.15
113 826	7.17
113 828	7.17
113 830	7.17
113 838	7.15
113 840	7.15
113 841	7.15
113 849	7.15
113 860	7.15
113 905	3.81
113 948	3.89
113 950	3.89
114	
114 007	7.17
114 082	3.88
114 119	7.16
114 120	7.16
114 121	7.16
114 122	7.16
114 240	3.47
114 241	3.47
114 242	3.47
114 243	3.47
114 361	3.88
114 362	3.88
114 363	3.88
114 365	3.88
114 366	3.88
114 367	3.88
114 368	3.88
114 370	3.92
114 371	3.92
114 372	3.92
114 373	3.92
114 374	3.92
114 376	3.92
114 377	3.92

Order no. **409.**	
114 378	3.92
114 379	3.92
114 380	3.92
114 381	3.92
114 383	3.92
114 384	3.88
114 385	3.88
114 386	3.88
114 387	3.88
114 388	3.88
114 389	3.88
114 390	3.88
114 391	3.88
114 392	3.88
114 393	3.88
114 396	3.92
114 397	3.92
114 399	3.92
114 400	3.92
114 401	3.92
114 403	3.92
114 404	3.92
114 405	3.92
114 406	3.92
114 407	3.92
114 408	3.92
114 410	3.92
114 413	3.99
114 415	3.99
114 453	3.88
114 454	3.88
114 455	3.88
114 458	3.88
114 459	3.88
114 463	3.99
114 464	3.88
114 465	3.88
114 466	3.88
114 469	3.88
114 470	3.88
114 475	3.99
114 476	3.88
114 487	3.88
114 537	3.92
114 538	3.92
114 540	3.92
114 541	3.92
114 562	3.55, 3.89
114 612	3.50
114 618	3.50
114 708	3.51, 3.89
114 715	3.51, 3.89
114 758	3.47

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114 759	3.47
114 760	3.47
114 762	3.47
114 766	3.47
114 840	8.12
114 933	7.17
114 982	7.19
114 983	7.19
114 985	7.19
115	
115 005	4.9
115 007	4.9
115 009	4.9
115 011	4.9
115 018	4.9
115 025	4.9
115 039	4.9
115 042	3.59
115 095	7.19
115 171	3.78
115 224	3.63
115 236	3.78
115 270	3.63
115 540	3.63
115 542	3.63
115 701	3.60
115 771	3.56
115 823	3.56
115 824	3.56
115 898	3.65
115 899	3.65
116	
116 200	3.77
116 319	3.66
116 333	3.68
116 334	3.68
116 335	3.68
116 336	3.68
116 416	3.68
116 418	3.68
116 440	3.80
116 441	3.81
116 442	3.80, 3.81
116 484	3.19
116 507	3.56
116 586	3.57
116 588	3.56
116 603	3.63
117	
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118 433	3.88, 3.92
	3.96, 3.99
	3.100, 4.11
	4.14
118 608	3.70
119	
119 013	4.12
119 024	4.9
119 026	4.9
119 028	4.9
119 030	4.9
119 037	4.9
119 044	4.9
119 058	4.9
120	
120 282	4.9
120 283	4.9
120 790	3.69
121	
121 329	3.63
121 519	3.59
121 808	2.10
121 941	3.69
122	
122 131	3.52
122 295	3.32
122 297	3.32
122 300	3.33
122 301	3.33
122 356	2.10
122 357	2.10
122 358	2.10
122 359	2.10
122 360	2.10
122 377	3.60
122 378	3.60
122 379	3.61
122 380	4.9
122 421	3.56
122 549	3.63
122 550	3.63
122 607	3.100
122 608	3.100
122 609	3.100
122 610	3.100
122 611	3.100
122 612	3.100

Order no. **409.**	
122 622	3.91
122 624	3.91
122 625	3.91
122 626	3.91
122 627	3.91
122 628	3.91
122 639	3.95
122 640	3.95
122 641	3.95
122 642	3.95
122 643	3.95
122 644	3.95
122 645	3.95
122 646	3.95
122 647	3.95
122 648	3.68
122 649	3.68
122 650	3.68
122 651	3.68
130	
130 883	3.70
130 889	3.80
130 890	3.70
131	
131 354	1.8
131 478	3.70
131 548	3.70
131 550	1.9
131 652	2.7
131 688	3.70
131 701	3.70
131 813	3.70
131 836	3.70
131 845	3.70
131 973	3.80
132	
132 038	3.70
132 240	1.9
132 464	1.10
132 601	1.9
132 603	1.9
132 604	1.9
132 605	1.9
132 606	1.9
132 735	1.10
132 778	1.8

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133 306	2.9
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137	
137 981	2.13
137 982	2.13
138	
138 020	2.13
138 021	2.13
138 022	2.13
138 802	3.45
138 803	3.45
138 811	3.47
138 812	3.47
138 821	3.45
138 822	3.45
138 870	3.47
138 871	3.47
138 872	3.47
138 873	3.47
138 874	3.47
138 875	3.47
138 905	3.48
138 906	3.48
138 908	3.48
138 909	3.48
138 911	3.48
138 912	3.48
138 914	3.48
138 915	3.48
138 976	3.46
138 977	3.46
138 978	3.46
138 979	3.46
146	
146 533	8.8
146 534	8.8
146 537	8.8
146 538	8.8
146 539	8.8

Order no. **409.**	
161	
161 034	3.19
161 059	3.59
161 104	3.63
161 105	3.63
161 110	3.51
161 113	3.51
161 155	3.47
161 156	3.47
161 157	3.47
161 160	3.47
161 161	3.67
161 162	3.67
161 165	3.67
161 166	3.67
161 173	3.47
161 174	3.47
161 188	3.47
161 189	3.47
161 193	3.47
161 245	3.57
162	
162 610	3.24
162 611	3.24
162 612	3.24
162 613	3.24
162 614	3.24
162 700	3.7
162 701	3.7
162 703	3.7
162 704	3.7, 3.9
162 705	3.7, 3.9
162 708	3.16
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162 710	3.16

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162 711	3.16
162 712	3.16
162 713	3.16
162 714	3.16
162 715	3.16
162 716	3.17
162 717	3.17
162 718	3.17
162 719	3.17
162 720	3.18
162 721	3.18
162 722	3.18
162 723	3.18
162 724	3.18
162 725	3.18
162 726	3.18
162 727	3.18
162 728	3.19
162 729	3.19
162 730	3.25
162 731	3.25
162 732	3.25
162 733	3.25
162 734	3.26
162 735	3.26
162 736	3.26
162 737	3.26
162 738	3.26
162 739	3.26
162 740	3.27
162 741	3.27
162 742	3.27
162 743	3.27
162 744	3.27
162 745	3.27
165	
165 602	4.4
165 603	4.4
165 604	4.4
165 605	4.4
165 606	4.4
165 607	4.4
165 610	4.4
165 611	4.4
165 612	4.4
165 613	4.4
165 614	4.4
165 615	4.4
165 617	4.4
165 625	4.4
165 634	4.4
165 635	4.4

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165 636	4.4
165 637	4.4
165 638	4.4
165 639	4.4
165 642	4.4
165 643	4.4
165 644	4.4
165 645	4.4
165 646	4.4
165 647	4.4
165 698	4.5
165 699	4.5
165 700	4.5
165 701	4.5
165 702	4.5
165 703	4.5
165 706	4.5
165 707	4.5
165 708	4.5
165 709	4.5
165 710	4.5
165 711	4.5
165 713	4.5
165 721	4.5
165 730	4.5
165 731	4.5
165 732	4.5
165 733	4.5
165 734	4.5
165 735	4.5
165 738	4.5
165 739	4.5
165 740	4.5
165 741	4.5
165 742	4.5
165 743	4.5
165 842	4.5
165 843	4.5
165 844	4.5
165 845	4.5
165 846	4.5
165 847	4.5
165 850	4.5
165 851	4.5
165 852	4.5
165 853	4.5
165 854	4.5
165 855	4.5
165 858	4.5
165 859	4.5
165 860	4.5
165 861	4.5
165 862	4.5

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165 866	4.5
165 867	4.5
165 868	4.5
165 869	4.5
165 870	4.5
165 871	4.5
165 873	4.5
165 881	4.5
165 896	4.6
165 897	4.6
165 898	4.6
166	
166 100	4.6
166 101	4.6
166 102	4.6
166 112	4.6
166 113	4.6
166 114	4.6
166 116	4.6
166 117	4.6
166 118	4.6
166 208	2.5
166 209	2.5
166 210	2.5
166 211	2.5
166 212	2.5
166 213	2.5
166 214	2.5
166 215	2.5
166 216	2.5
166 217	2.5
166 218	2.5
166 219	2.5
166 220	2.5
166 237	4.8
166 238	4.8
166 239	4.8
166 240	4.8
166 241	4.8
166 242	4.8
166 243	4.8
166 261	1.6
166 262	1.6
166 263	1.6
166 264	1.6
166 265	1.6
166 266	1.6
166 270	3.67
166 274	8.3
166 275	8.3
166 276	8.3

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166 286	7.15
166 287	7.15
166 288	7.15
167	
167 416	1.8
168	
168 900	3.95
168 901	3.95
168 902	3.95
168 903	3.95
168 904	3.95
168 905	3.95
168 906	3.95
168 907	3.95
168 908	3.95
168 909	3.95
168 910	3.95
168 911	3.95
168 912	3.95
168 913	3.95
168 914	3.95
168 915	3.95
168 916	3.95
168 917	3.95
168 918	3.95
168 919	3.95
168 920	3.95
168 921	3.95
168 935	2.9
168 936	2.9
168 937	2.9
168 938	4.14
168 939	4.14
168 940	4.14
168 941	4.14
172	
172 548	2.8
172 610	2.8
172 620	2.8
172 621	2.8
172 630	2.8
172 631	2.8
172 640	2.8
172 641	2.8
172 650	2.8
172 651	2.8
172 660	2.8
172 661	2.8

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175	
175 397	8.13
180	
180 910	2.16
180 911	2.17
180 913	2.17
180 914	2.17
180 918	2.17
180 919	2.17
180 965	2.16
180 966	2.17
180 967	2.16
180 968	2.17
180 969	2.19
180 970	2.19
180 971	2.21
180 972	2.20
180 973	2.20
180 974	2.19
180 975	2.20
180 976	2.20
180 977	2.21
180 978	2.18
180 979	2.18
180 981	2.21
180 982	2.19
208	
208 380	8.8
208 590	8.8
208 591	8.8
208 592	8.8

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116-031530B	6.10
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116-040312B	6.8
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