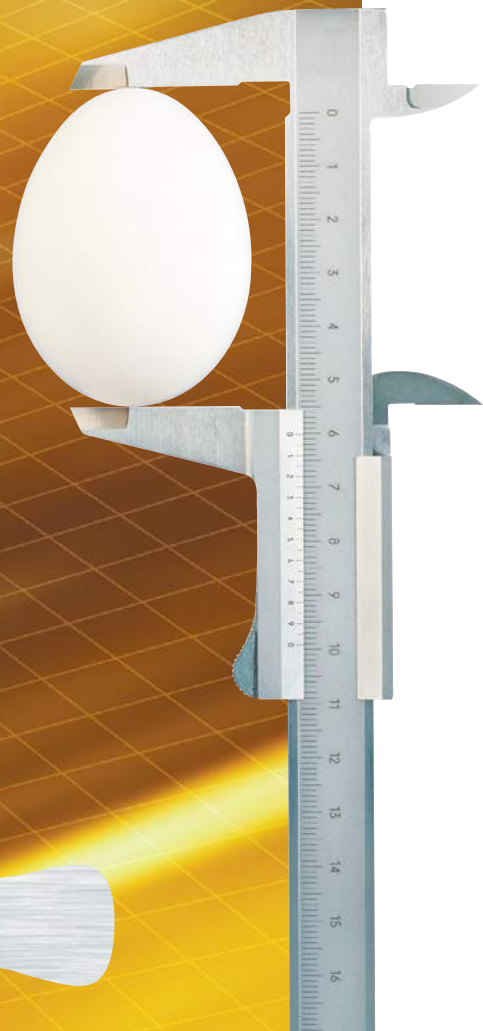




# Technical Information

## Technical Information

- Overview of standards ..... 196
- 19" modular system ..... 197
- IP degrees of protection ..... 204
- Flammability of plastics ..... 205
- Protective earthing ..... 206
- Certification ..... 207
- Approbations ..... 207
- Terminology ..... 208
- Abbreviations ..... 209
- Index ..... 210
- Standard colours ..... 213
- General terms and conditions ..... 214
- apra worldwide ..... 216



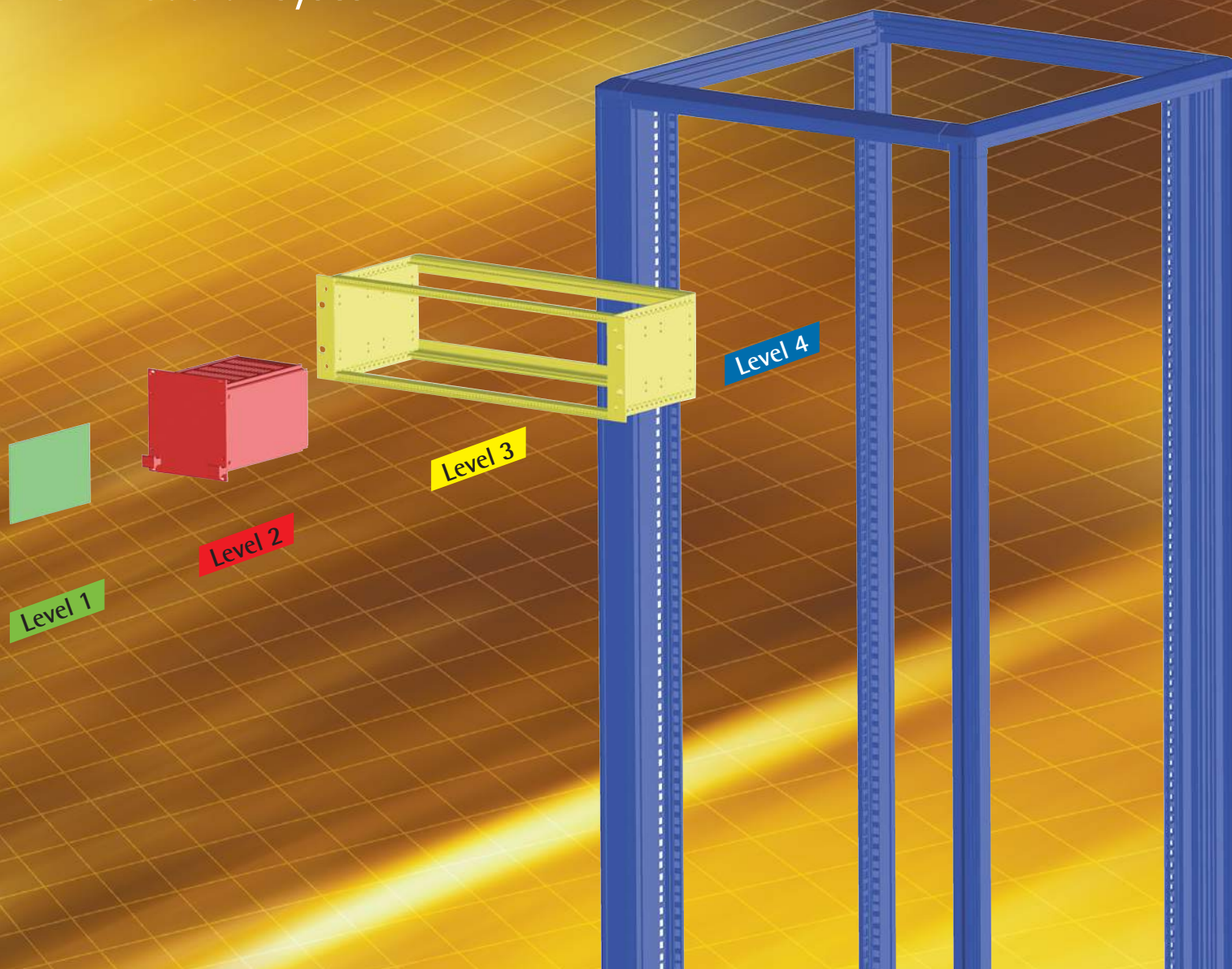
... the perfect shell for valuable electronics



## Overview of standards

Standard	Description
DIN 41494	Mechanical structures of the 482,6 mm (19") series
DIN 43356	Dimensions of metric construction, Multimodul 25mm
DIN 43700	Outer dimensions of panel instruments cases and dimensions of cut-outs in the control panels
DIN 43834	Fastening for measuring and control instruments for panel mounting; fastening component; fastening holes in the instrument
DIN 43835	Fastening for indicating instruments; fastening component, cone-rivets at the case, mounting arrangement
DIN 46008	Flat contact surfaces for earthing screws; rated voltage below 52 kV
DIN EN 50155	Railway uses of electrical equipment on rail vehicles
DIN EN 55022	Limit values and measuring procedures for interference from information technology equipment
DIN EN 60917-2	Interface co-ordination dimensions for metric construction
DIN EN 60917-2-2	Interface co-ordination dimensions for metric construction: dimensions for modules, plug-in units, rear panels, front panels and plug-in modules
DIN EN 60950	Safety of information technology equipment
DIN VDE 0100 Part 410	Protection against electric shock
DIN VDE 0100 Part 540	Earth conductor, earthing
DIN EN 50081-1/-2	Electromagnetic compatibility (EMC) - Generic emission standard Part 1: Residential, commercial and light industry Part 2: industrial environment
DIN EN 50082-1/-2	Electromagnetic interference, basic standard interference Part 1: residential, commercial and light industry Part 2: industrial environment
DIN EN 50091-1/-2	Uninterruptible powersystems (UPS); General and safety requirements Part 2: EMC-Requirements
IEC 60297-3-100	Dimensions of mechanical structures of the 482,6 mm (19") series: basic dimensions of front panels, subracks, chassis, racks and cabinets
IEC 60297-3-101	Dimensions of mechanical structures of the 482,6 mm (19") series: subracks and modules
IEC 60297-3-102	Dimensions of mechanical structures of the 482,6 mm (19") series: injector / extractor handle
IEC 60297-3-103	Dimensions of mechanical structures of the 482,6 mm (19") series: coding and alignment pin
DIN EN 60529	Degrees of protection: protection against shock, foreign objects and water for electrical equipment
IEC 60603-2	Connectors for frequencies below 3 MHz for use with printed boards - part 2: detail specification for two-part connectors with assessed quality, for printed boards, for basic grid of 2,54 mm
IEC 61554	Panel mounted equipment - Electrical measuring instruments - Dimensions for panel mounting
IEC 61643-1	Low-voltage surge protective devices Part 1: surge protective devices connected to low-voltage power systems
IEC 62040-3	Uninterruptible powersystems (UPS) Part 3: method of specifying the performance and test requirements
IEEE 587	Guide for Surge Voltages in Low-Voltage AC Power Circuits
IEEE 1101.10	Additional mechanical specifications for microcomputers using IEEE 1101.1-1991 equipment practice
IEEE 1101.11	Mechanical rear plug-in units specifications for microcomputers using IEEE 1101.1 and IEEE 1101.10 equipment practice
UL 94	Combustibility and flammability of plastics UL94 HB: horizontal burning test UL94 V-2, UL94 V-1, UL94 V-0: vertical burning test
VG 95373 Part 15	Directives on shielding attenuation measurements

## The 4 levels of the 19" modular system



- |                |                                                                |
|----------------|----------------------------------------------------------------|
| <b>Level 1</b> | components, elements (front panels, plug-in connectors, PCB's) |
| <b>Level 2</b> | modules (connecting plates, sub-units, cassettes)              |
| <b>Level 3</b> | subracks, plug-in units                                        |
| <b>Level 4</b> | enclosures (19" enclosures, consoles, racks, cabinets)         |





19" components	Standards	apra-norm solutions
<b>LEVEL 4</b>  19" cabinets 19" racks 19" enclosures	IEC 60297-3-100 IEC 60297-3-100 IEC 60297-3-100	
<b>LEVEL 3</b>  19" front panels 19" subracks 19" plug-in units	IEC 60297-3-101 IEC 60297-3-102 IEC 60297-3-103 IEEE 1101.1 IEEE 1101.10 IEEE 1101.11	
<b>LEVEL 2</b>  Sub-units Cassettes	IEC 60297-3-101 IEC 60297-3-102 IEC 60297-3-103 IEEE 1101.1 IEEE 1101.10 IEEE 1101.11	
<b>LEVEL 1</b>  Front panels Plug-in connectors PCB's	IEC 60297-3-101 IEC 60297-3-102 IEC 60297-3-103 DIN 41494/8 IEC 60603-2 IEC 60097	



*Vitaro*<sup>®</sup>

ZENITH<sup>2.0</sup>



Computer plug-in unit **EVO2.0**

Front panels 200/205



Cassette 248

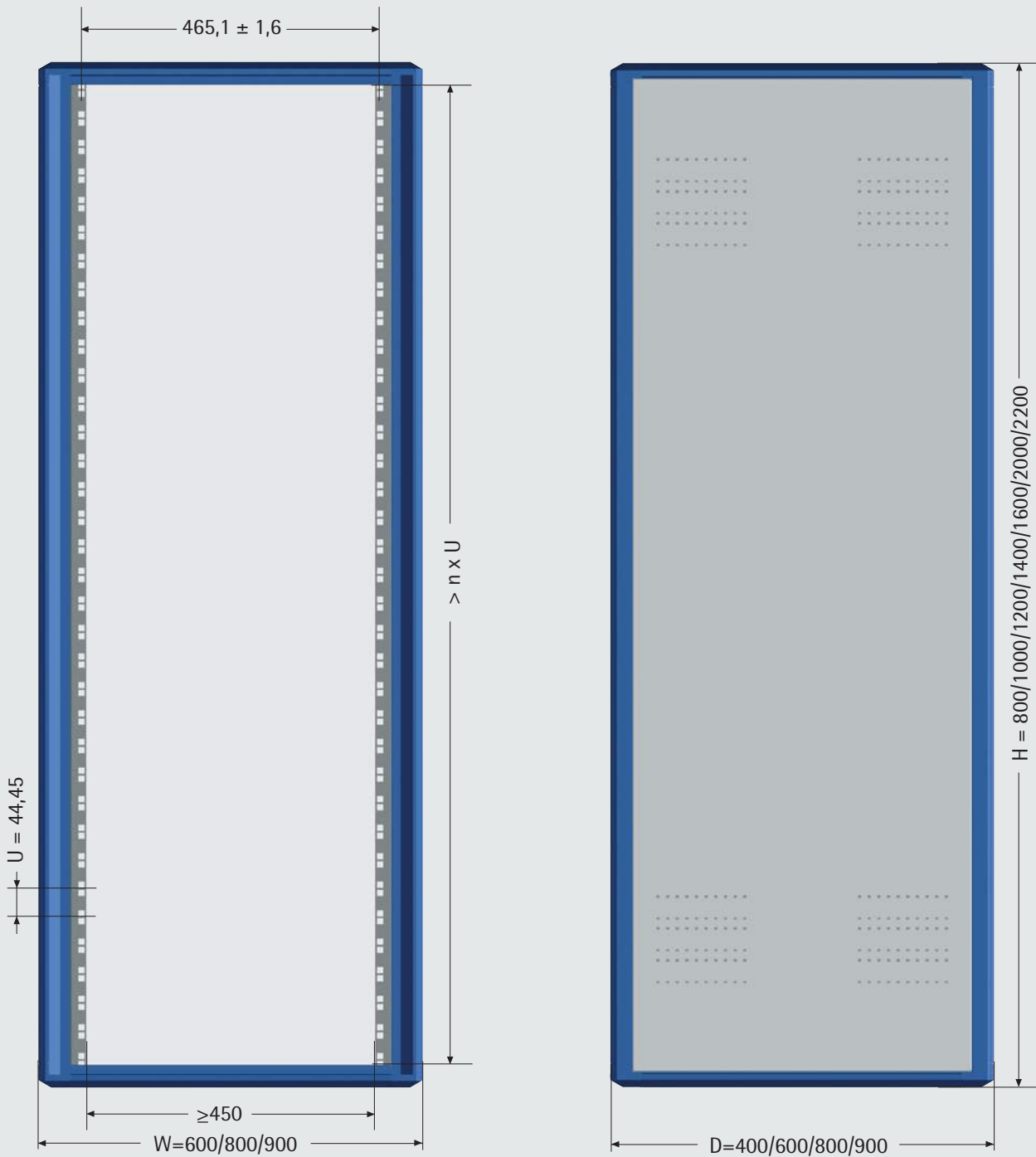


Front panels 244





Level 4: 19" cabinets, 19" racks, 19" enclosures



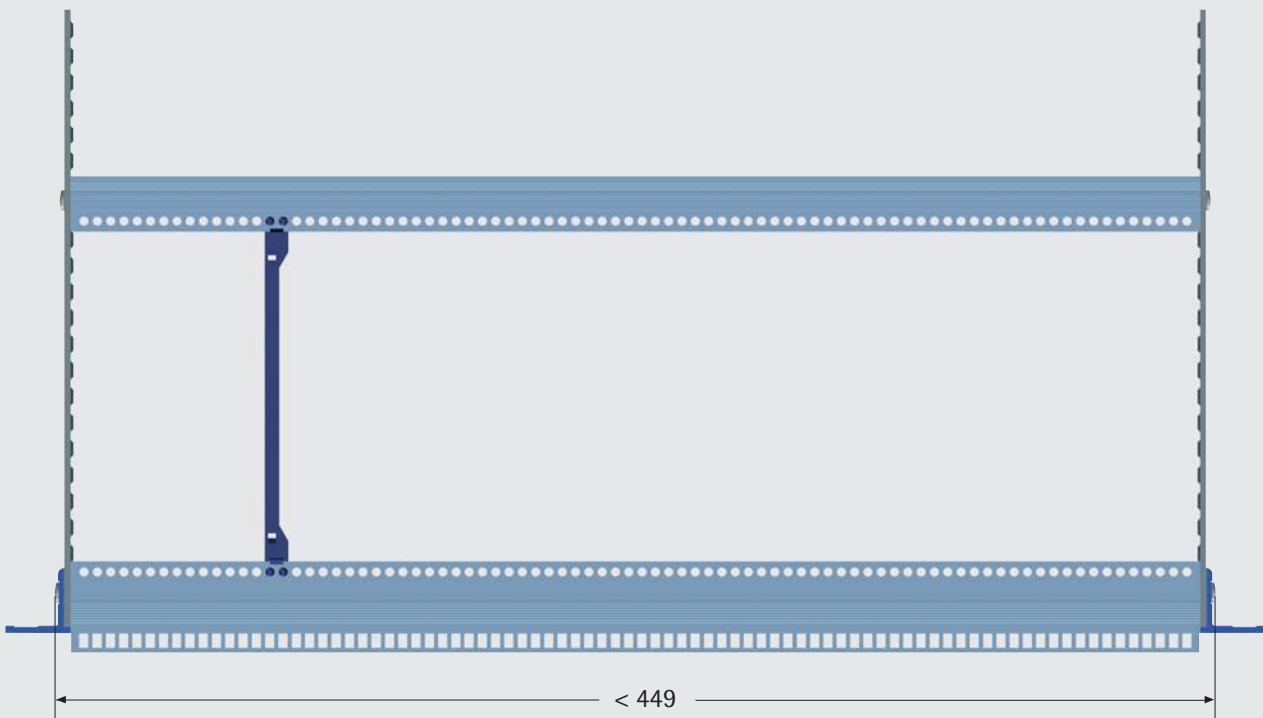
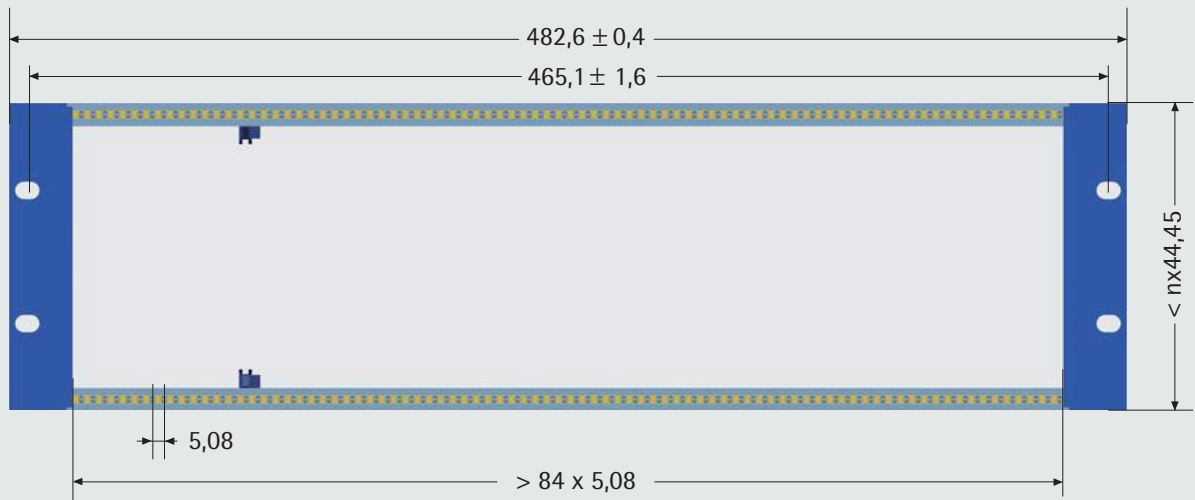
Cabinet system	Height H mm	Installation height $n \times U$	Width W mm	Depth D mm
aprack	600, 800, 1000, 1200, 1600, 1800, 2000	11, 16, 20, 25, 34, 38, 43	600, 800	600, 800

The measures H/W/D in drawing and chart are nominal sizes corresponding to the division. The installation dimensions are marginally smaller.





Level 3: 19" front panels, 19" plug-in units, 19" subracks



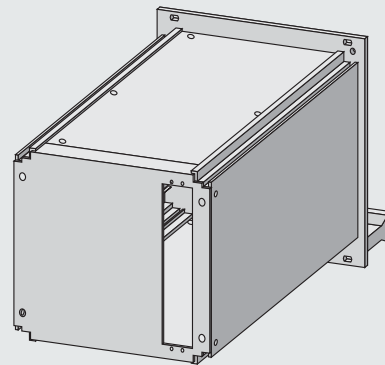
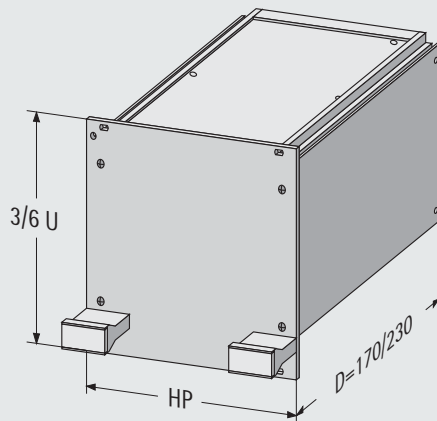


## Level 2: Plug-in modules

### Sub-units

Insertable component for electrical equipment for example (building blocks), that cannot be mounted to a connecting plate; with or without plug-in connector.

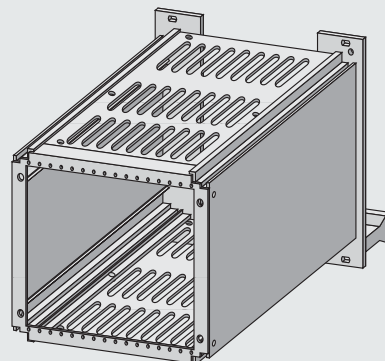
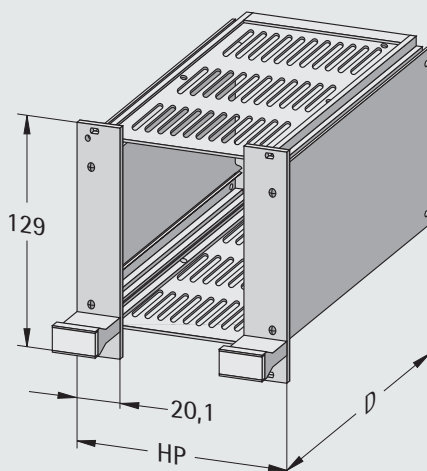
Standardised outer dimensions, freely configurable inner dimensions



### Cassettes

Insertable component for several connecting plates, for example; with or without plug-in connector

Standardised outer dimensions





Level 1: Front panels, plug-in connectors, PCB's

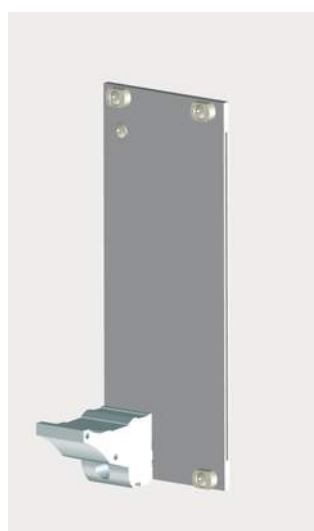
Front panels 3 U



Front panel Type A



Front panel Type C with handle



Front panel IEEE with injector/extractor handle

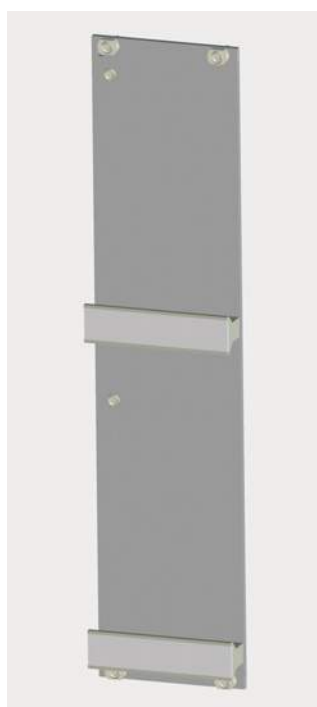


Profile front panel IEEE with injector/extractor handle

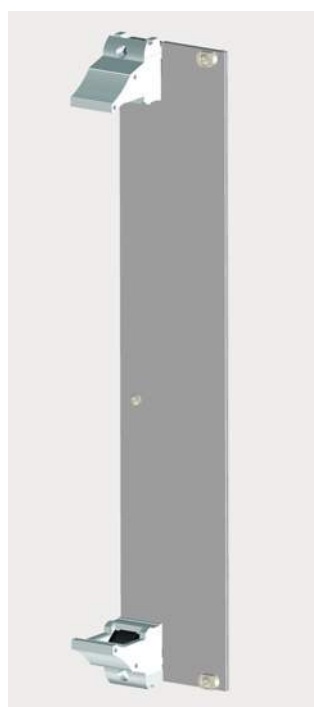
Front panels 6 U



Front panel Type A



Front panel Type C with handle



Front panel IEEE with injector/extractor handle



Profile front panel IEEE with injector/extractor handle



# IP degrees of protection

## IP degrees acc. to DIN EN 60529

All electronic devices and equipment must be protected from possible interference to ensure reliable operation. Enclosures and cabinets must therefore comply with certain protection requirements depending on their area of application. Standard DIN EN 60529 with its IP

degrees of protection (IP = international protection) specify these requirements.

Its digits specify the ability of an enclosure to protect integrated components from contact, for example from foreign objects and water. The first digit of the IP degree of protection indicates the degree of protection for shock protection and protection against foreign objects; the second

indicates protection against water. See the table below for explanations of the individual digits.

**IP 43**

Protects against water splash at up to 60° from the perpendicular

Protects against contact with tools, foreign objects and wires, with diameter greater than 1mm

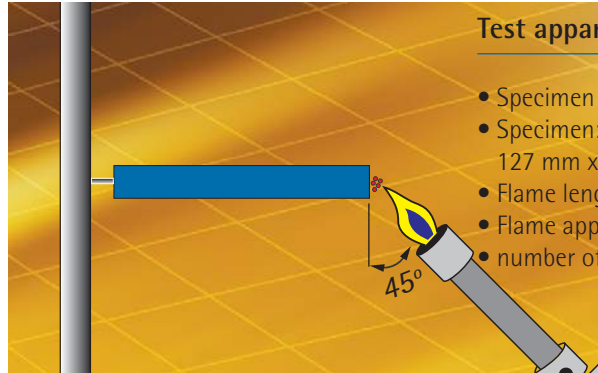
Degree of protection acc. to DIN EN 60529				
Protection against contact and foreign objects			Protection against water	
First digit	Contact	Foreign object	Second digit	Contact
0	No protection	No protection	0	No protection
1	Protects against contact with large surface area body parts	Protects against large foreign objects, diameter greater than 50mm 	1	Protects against vertical water droplets 
2	Protects against finger contact	Protects against mid-sized foreign objects, diameter greater than 12.5mm 	2	Protects against oblique falling water droplets; no more than 15° from the vertical 
3	Protects against contact with tools, foreign objects and wires, with diameter greater than 2.5mm	Protects against small foreign objects, diameter greater than 2.5mm 	3	Protects against water splash; no more than 60° from the vertical 
4	Protects against contact with tools, foreign objects and wires, with diameter greater than 1mm	Protects against granular foreign objects, diameter greater than 1mm 	4	Protects against water spraying on all sides 
5	Complete protection	Protects against dust deposits 	5	Protects against water jet on all sides 
6	Complete protection	Protects against dust entry at negative pressure of 20mbar inside the enclosure 	6	Protects against flooding 
			7	Protects against occasional submersion 
			8	Protects against permanent submersion 



## Flammability test UL94 HB

### Classified acc. to UL94 HB if:

- Burning rate  $\leq 76$  mm/min at specimen thickness of up to 3 mm  
Burning rate  $\leq 38$  mm/min at specimen thickness higher than 3 mm
- Combustion distance  $< 102$  mm



### Test apparatus:

- Specimen aligned horizontally
- Specimen: 127 mm x 12,7 mm x max. 12,7 mm
- Flame length: 25 mm
- Flame application time: 30 s
- number of specimen: 3

## Flammability test UL94 V-2/-1/-0

### Classified acc. to UL94 V-2 if:

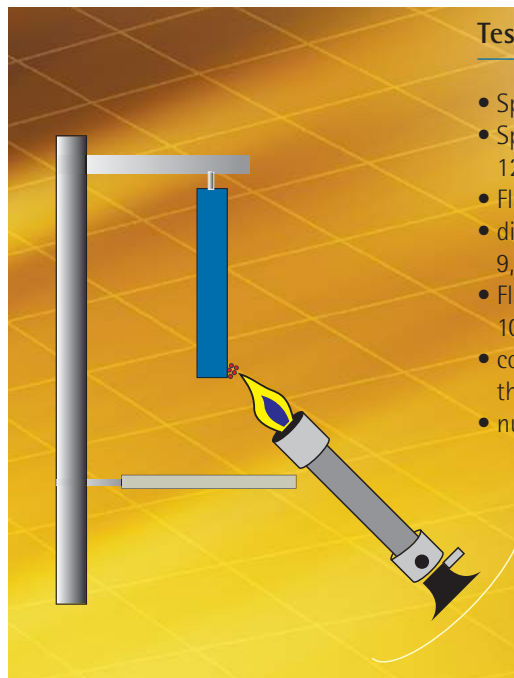
- Afterglow time  $\leq 30$  s
- Total afterglow time in 10 tests  $\leq 250$  s

### Classified acc. to UL94 V-1 if:

- Afterglow time  $\leq 30$  s
- No dripping of burning specimens
- Total afterglow time in 10 tests  $\leq 250$  s

### Classified acc. to UL94 V-0 if:

- Afterglow time  $\leq 10$  s
- No dripping of burning specimens
- Total afterglow time in 10 tests  $\leq 50$  s



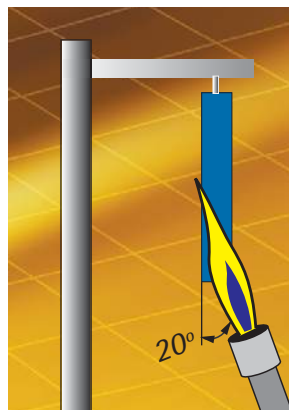
### Test apparatus:

- Specimen aligned vertically
- Specimen: 127 mm x 12,7 mm x max. 12,7 mm
- Flame length: 20 mm
- distance between flame and specimen: 9,5 mm
- Flame application time: 10 s, another 10 s after flame extinction
- cotton batting 305 mm below the specimen
- number of specimen: 5

## Flammability test UL94-5V

### Classified acc. to UL94-5V if:

- Afterglow time  $\leq 60$  s
- No dripping of burning specimens



### Test apparatus:

- Specimen aligned vertically
- Specimen: 127 mm x 12,7 mm x max. 12,7 mm
- Flame length: 127 mm
- Flame application time: 5 x 5 s with 5 s pause between
- number of specimen: 5

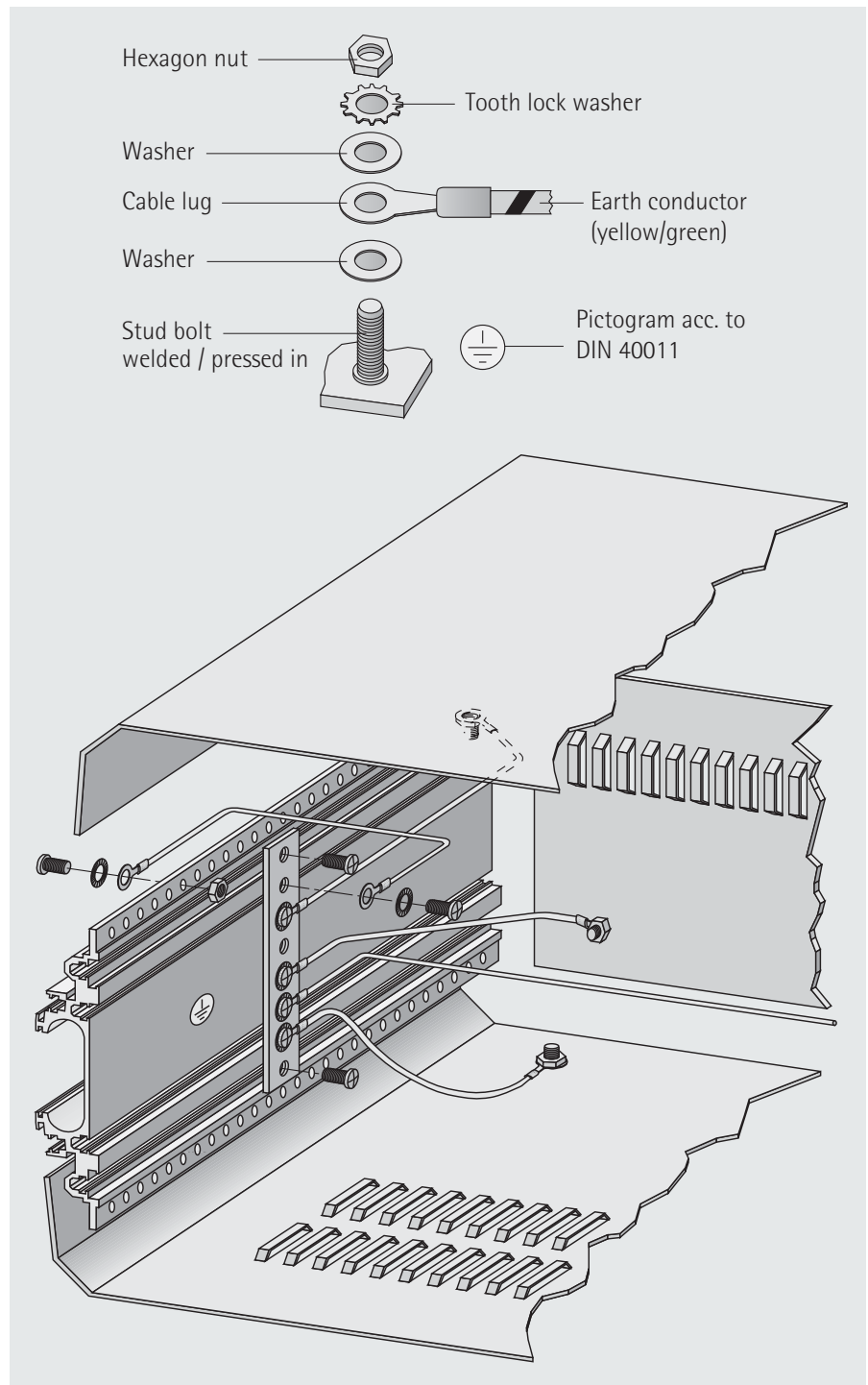




## Protective earthing

Electrical devices that are installed in 19" components (IEC 60297) have many sensitive metal pieces. If malfunctions occur, these inactive components can come into contact with the electrical circuit and can be electrified. All inactive components must be connected to an earth conductor to prevent operators from being injured. These components must have a contact resistance lower than 0.1 Ohm at their connection points in compliance with DIN EN 61010.

apra-norm solves this problem by using press or welded nuts respectively lugs for receptacles.



The series 140/280 earth conductor set has been tested by the German Technical Committee for Electrical Engineering of the Professional Association of Precision Mechanics and Electrical Engineering, Cologne, and complies with the following standards:

DIN 46008/01.87: contact surfaces for earthing and conductor screws

DIN EN 60204: electrical equipment of machines  
Part 1: general provisions

The earth connection must be made by a specialist in compliance with VDE regulation 0100, local regulations and the technical instructions.

The earth conductor screws must not be used for any other purpose, particularly for mechanically attaching structural parts.

The earth conductor system must not be interrupted when structural parts are removed.

The equipment manufacturer must make and check the earth connection from the equipment to the earth connection point. We only ensure the protective measures if the specified provisions are followed and our original parts are used.



## Certifications

Our personal commitment, feel for the requirements of the future market and high quality standard earn apra the trust of even the most demanding clients again and again. Know-how depends on the ability of people; apra-norm backs high-quality innovative products which form the basis for the constantly growing group of companies. A quality and environmental management system that functions well is therefore necessary.

This system is recognised outside of the apra-group through a certificate which is awarded when a company proves by an audit that they meet all DIN requirements.

One of these requirements is that all processes are clearly, transparently and completed documented.

The apra group has received certifications for quality and environmental management systems for all of its sites.

In addition, **DIN EN ISO 9001:2008** is a standard that describes the selection and introduction of a quality management system within a company.

**DIN EN ISO 14001:2009** is the environmental standard. It is awarded when a company fulfills all environmental aspects.

The management systems described in a management manual for quality and environment define all organisational measures that ensure all products comply with the provisions and regulations as stipulated in the contract and function according to provisions.

The apra group has agreed for example to observe environmental protection requirements and to continually improve environmental protection measures.

The observance of environmental protection policy is monitored on a regular basis. The TÜV will annually check the validity of awarded certificates.



## Approbations

	Verein Deutscher Elektrotechniker		Underwriters Laboratories
	Conformité Européenne		Canadian Standards Association
	Geprüfte Sicherheit		Technischer Überwachungsverein



### A

**anodizsd:**

an oxide layer is applied through electrochemical oxidation to increase protection against corrosion and/or to achieve high-quality finishes (e.g. front panels)

**ASA perforation:**

additional cut-outs in a 19" mounting bracket centred between the partitions

### B

**backplane:**

multilayer PCB with data, signal and supply lines and plug-in locations for plug-in modules on the rear wall of electronic equipment/enclosures

**BUS:**

manifold for transferring data and control information between different components or systems. A difference is made between serial and parallel busses.

Examples: serial BUS systems: Ethernet, CAN, Profibus, Interbus  
parallel BUS systems: VMEbus, CompactPCI

### C

**CPCI:**

Abbreviation for "Compact peripheral component interconnect". CompactPCI is an extension of the "peripheral component interconnect (PCI)-specification for industrial computers with the requirement of a smaller but more sturdy mechanical form factor compared to a common PC. The CPCI-Bus is based on the PICMG-specification 2.0 (Rev. 3.0) of the PCI Industrial Computer Manufacturer's Group (PICMG).

### E

**EMC:**

abbreviation for **electromagnetic compatibility**.

ability of electronic systems and components to function

- a) without being influenced by the electromagnetic environment
- b) without harming the environment with impermissible interference.

### I

**IEC:**

abbreviation for **International Electrotechnical Commission**;  
international body that prepares standards

**IEEE:**

abbreviation for **Institute of Electrical and Electronic Engineers**;  
American organization for promoting research and standards in the IT sector

### M

**metric construction:**

contrary to the 19" standard the construction defined in standard IEC 61917 uses only metric units like the 25mm increments of fixing holes in cabinet and enclosure mounting brackets.

### P

**PCI:**

abbreviation for **Peripheral Component Interconnect**; BUS system used independent from the processor; mainly used in expansion cards with high data throughput like hard drive controllers and graphics cards.

**plug & play:**

describes a system that is already pre-assembled or automatically configured so that the user can begin using the system immediately after it is switched on.

**powder coating:**

unlike traditional painting processes, powder in the desired colour is applied to the piece electrostatically and then baked in at approx. 200°C resulting in a very tough and resistant coating.

### R

**riser card:**

angular card (angular adapter) for turning a plug-in cards horizontally (up to 3 cards); as a butterfly riser card for plugging in opposite horizontal cards

### T

**transparent chromating / passivation:**

treatment of aluminium with chromic acid and fluoride; the emerging layer of approx. 0,1 to 1 µm improves conductivity of the surface and serves as pre-treatment of painting.

### U

**UPS:**

**Uninterruptible power supply** ensures system voltage in case of a blackout either by battery operation or emergency generator. Additionally, any voltage fluctuation within the electric power system is equalised.

### V

**VME-Bus:**

Multi-User Backplane-Bus for mounting in 19" systems with 96-pole connectors acc. to nach DIN 41612 and IEC 60603-2.





## A

<b>AC:</b>	Alternating current
<b>Al:</b>	Aluminium
<b>AlMg1:</b>	Alloying of aluminium and magnesium
<b>ANSI:</b>	American National Standard Institute
<b>ASA:</b>	American Standards Association (today: ANSI)
<b>ATX:</b>	Advanced technology extended

## C

<b>CAD:</b>	Computer-aided design
<b>CE:</b>	Conformité Européenne
<b>CSA:</b>	Canadian Standards Association
<b>Cu:</b>	Copper

## D

<b>dB:</b>	Decibel (measurement unit for screening effectiveness)
<b>dB (A):</b>	Decibel (measurement unit for noise level)
<b>DC:</b>	Direct current
<b>Dim:</b>	Dimension
<b>DIN:</b>	Deutsche Industrie Norm (German industrial standard)

## E

<b>EMC:</b>	Electromagnetic compatibility
<b>ESD:</b>	Electrostatic discharge

## F

<b>Fig.:</b>	Figure
--------------	--------

## G

<b>GHz:</b>	Gigahertz (measurement unit for frequency)
<b>GS:</b>	Geprüfte Sicherheit (approved security: approval of the German Technischer Überwachungsverein (Technical Control Board))

## H

<b>HP:</b>	Horizontal pitches (5,08 mm)
------------	------------------------------

## I

<b>IEC:</b>	International Electrotechnical Commission
<b>IEEE:</b>	Institute of electrical and electronic engineers
<b>incl.:</b>	included
<b>IP:</b>	Internal protection (degree of protection)
<b>IPC:</b>	Industrial PC
<b>ISO:</b>	International Standards Organisation

## K

<b>KVM:</b>	Keyboard Video Mouse
-------------	----------------------

## L

<b>LCD:</b>	Liquid crystal display
<b>LED:</b>	Light emitting diode
<b>LSG:</b>	Laminated safety glass

## M

<b>MHz:</b>	Megahertz (measurement unit for frequency)
-------------	--------------------------------------------

## P

<b>pc:</b>	Piece
<b>PCI:</b>	Peripheral component interconnect
<b>PFC:</b>	Power factor correction
<b>PICMG:</b>	PCI Industrial computers manufacturers group
<b>Pos.:</b>	Position
<b>PU:</b>	Packaging unit

## T

<b>TFT:</b>	Thin film transistor
<b>TÜV:</b>	Technischer Überwachungsverein (German Technical Control Board)

## U

<b>U:</b>	Height unit (44,45 mm)
<b>UL:</b>	Underwriters Laboratories
<b>UPS:</b>	Uninterrupted power supply unit
<b>UTE:</b>	Union technique de l'électricité

## V

<b>VDE:</b>	Verein Deutscher Elektrotechniker (German Electrical Engineering Association)
<b>VdS:</b>	Verband der Sachversicherer (German association of insurance providers)
<b>VESA:</b>	Video Electronics Standards Association
<b>VME:</b>	Versa module Europe

# INDEX

## A

Adapter rail for X-dream .....	180
Adjusting feet .....	14
aprack, 19" cabinet .....	7
apra-line, 19" enclosure .....	37
apra-line, desktop enclosure .....	163
apra-lite, 19" enclosure .....	48
apra-TEK, 19" enclosure .....	46

## B

Bow-type handle .....	71
-----------------------	----

## C

Cabinet system aprack .....	7
Cable duct .....	30
Cable hoops .....	23
Cable routing panel .....	22
Card guide with IEEE coding .....	118
Card guide, divided .....	120
Card guide, standard .....	116
Card holder set .....	59
Cassette .....	146 / 147
Castor set for aprack cabinet .....	14
Castor set for Zenith enclosure .....	30
Click-case, small enclosure .....	187
Coding pin .....	119
Computer plug-in unit 19", EVO 2.0 .....	56
Connecting kit for subracks .....	122
Contact strip .....	115
Cover brackets .....	123
Cover bracket for subracks .....	104
Cover strips for power distribution subrack .....	97

## D

Desktop enclosure apra-line .....	163
-----------------------------------	-----

Desktop enclosure profi set 264 .....	151
DIN rail fixing clamp .....	75 / 187
Drawers, 19" .....	78

## E

Embedded PC enclosure .....	62
EMC cassette .....	144
EMC contact springs .....	113
EMC fabric gasket .....	113
EMC front panel .....	129
EMC sub-unit .....	138
Enclosure apra-lite .....	48
Enclosure apra-TEK .....	46
Enclosure profi set 264 .....	151
Enclosure Vitaro .....	31
Enclosure Zenith .....	27
EVO 2.0 computer plug-in unit 19" .....	56
Expansion kit, horizontal .....	110
Expansion kit, vertical .....	111
Extension kit for subracks .....	122
Extraction handle .....	121

## F

Fan .....	58 / 59
Fan module .....	20
Female connector fixing 32-pole .....	148
Flat module, 19" .....	76
Flex 310, wall-mounting enclosure .....	194
Frames for subracks .....	123
Front panel .....	128
Front panel, 19" .....	70
Front panel fastening .....	131
Front panel, fold-up .....	71
Front panel handle .....	71 / 103
Front bracket for subracks .....	103
Front bracket 19", for desktop enclosure profi set .....	161

# INDEX

## G

Group lock extrusion ..... 121

## H

Handle ..... 21 / 30 / 71 / 103

Hard drive cage, internal ..... 58

Hard Box ..... 60

Heavy Load subrack ..... 94

## I

Industrial PC Enclosure ..... 61

Injector / Extractor handle ..... 137

Insulating strips ..... 115

IPC enclosure Hard-Box ..... 60

## K

Keyboard tray 1U, 19" ..... 63

Keyboard tray 2 U, 19" ..... 64

## M

Male connector fixing 32-pole ..... 148

Module rails ..... 105

Mounting plate, for aprack cabinet ..... 17

Mounting plate, for wall mounting enclosure Flex 310 ..... 194

Multiple socket strips ..... 21 / 55

## N

Neck screw ..... 131

## P

PC protection enclosure ..... 54

PCB cover ..... 133

PCB fixing ..... 132

PCB lock ..... 121

Plastic standard enclosure, Series D ..... 191

Plastic standard enclosure, Series DB ..... 192

Plastic standard enclosure, Series N2U ..... 193

Plug-in components ..... 134

Plug-in module R-Type ..... 96

Plug-in unit 19" ..... 65

Potential equalisation bar ..... 23

Power distribution subrack, 19" ..... 97

profi-case, small case ..... 183

Profiled front panel IEEE ..... 136

Profile semi-cylinder ..... 12

profi set 264, 19" plug-in unit ..... 158-160

profi set 264, desktop enclosure ..... 152-157

profi set cool, small case ..... 189

Prop-up handle ..... 173

Prop-up and carrying handle ..... 30 / 36 / 45 / 180 / 186

## Q

Quick closure for fastening front panels ..... 131

## R

Ruggedized subrack ..... 95

## S

Screw holder, plastic or brass ..... 131

Screw set M 5 ..... 17 / 30 / 36 / 45 / 49 / 74

Screw set M 6 ..... 17

Sealing frame IP66, for *X-Dream* ..... 180

Small case 414 ..... 188

Small case profi-case ..... 183

Small case X-Dream ..... 178

Small case X-Dream-mini ..... 181

Small profile case 414 ..... 188

Sliding rails ..... 17 / 29 / 34 / 45 / 49 / 74

Spring nut, M5 ..... 17



# INDEX

Subrack 245 .....	82 / 89
Subrack EMC .....	86
Subrack Heavy Load .....	94
Subrack Ruggedized .....	95
Sub-units .....	141 / 142
Support rail .....	106 / 112 / 194

## T

Temperature indicator / regulator module, 19" .....	21
Telescopic rail set .....	73
Telescopic rails extension set .....	59
TFT display bracket .....	21
Threaded inserts .....	107
Top hat rail support .....	75

## U

Universal plug-in unit 19" .....	69
Universal enclosure Vitaro .....	32
USB Hub .....	59

## V

Velcro strip .....	24
Ventilating front panel, 19" .....	68
Vitaro, 19" enclosure .....	31
Vitaro, universal enclosure .....	32
Vitaro, wall-mounting enclosure .....	32

## W

Wall-mounting enclosure Flex 310 .....	194
Wall-mounting enclosure Vitaro .....	32

## X







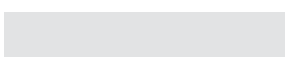



X-Dream, small case .....	178
X-Dream-mini, small case .....	181

## Z

Zenith, 19" enclosure .....	27
Z-Rail .....	114



## Standard colours

RAL 3002		Carmine red
RAL 5010		Gentian blue
RAL 5014		Pigeon blue
RAL 7001		Silver grey
RAL 7011		Iron grey
RAL 7032		Pebble grey
RAL 7035		Light grey
RAL 7037		Dusty grey
RAL 9002		Grey white
RAL 9005		Jet black

All painted items are available in the colours (powder coating) indicated above.

The structure of the powder coating is adjusted to the size of the enclosure or cabinet.

If you do not specify another colour when ordering, all cabinets and enclosures will be delivered in the standard colour indicated.

Due to printing reasons, the colours shown here do not match the actual colours 100%!



# General Terms and Conditions



## 1. Application

- 1.1 These terms and conditions of sale shall apply exclusively. Differing or contrary terms shall not apply except if expressly agreed upon in writing.
- 1.2 These terms and conditions of sale shall also govern all future transactions between the parties and shall also apply if we perform delivery despite our knowledge of differing or contrary terms.
- 1.3 These terms and conditions of sale shall only apply vis à vis entrepreneurs, governmental entities, or special governmental estates within the meaning of sec. 310 para. 1 BGB (German Civil Code).

## 2. Offer, Acceptance

- 2.1 Our offerings are subject to change, the agreement shall only come into effect upon receipt of our order confirmation or when the order is carried out. Changes in price or cost (e.g. salary increases as agreed by collective agreement or material cost increases) entitle us to adjust our prices. Provided such change occurs after an order confirmation, we are entitled to withdraw, as far as the customer does not agree to a price adjustment.
- 2.2 The cabinets and enclosures depicted are configuration examples. These are not identical with the scope of delivery. The right to make technical changes is reserved.

## 3. Prices, Payment

- 3.1 Except as otherwise stated under the terms of any quotation or unless otherwise agreed in writing all prices are ex works („ex works“, Inco-terms® 2010), exclusive of the respective statutory VAT and exclusive of costs for packaging. Transport and packaging costs will be calculated separately, and the respectively applicable VAT applied separately.
- 3.2 The purchase price is due and payable net within 30 days from the date of the invoice. From the due date default interest in the amount of 9% above the respective base interest rate p. a. shall accrue. We reserve all rights to claim further damages for delay.
- 3.3 Payments to agents or our employees shall only be effective if a written authorization to receive money or a receipt from us is submitted.
- 3.4 First orders to new clients shall generally only be made with cash on delivery (standard products) or with advance payment (customized products). We reserve the right to specify the terms of payment for future deliveries after submission of a completed customer dataset and credit assessment.

## 4. Offset, Retainer

The customer shall be entitled to offset or to claim retainer rights only insofar as the customer's counterclaim is acknowledged, undisputed or assessed in a legally binding judgment. Additionally, the customer is entitled to claim retainer rights only to the extent such rights are based on the same transaction.

## 5. Delivery

- 5.1 Delivery of the goods shall be made by the customer collecting the goods at our premises after we have notified the customer that the goods are ready for collection („ex works“, Inco-terms® 2010) or, if agreed otherwise by us delivering the goods to the agreed place. Delivery is conditioned upon timely and proper performance of all duties of the customer. Defences based on non-performance of the contract are reserved.
- 5.2 In case of default in acceptance or other breach of duties to cooperate by the customer we are entitled to claim any resulting damage including but not limited to additional expenses, if any. Further damages are reserved. In this case, the risk of loss or damage to the goods passes to the customer at the time of such default or breach of duty to cooperate.
- 5.3 In the event that the financial circumstances of the ordering party deteriorate significantly (e.g. protest of bill of exchange, application to open insolvency proceedings, submission of affidavit, etc.) as well as any disclosure of insufficient credit worthiness, we are entitled to request advance payments or the provision of security or to withdraw from the agreement.

## 6. Passing of Risk, Shipment

- 6.1 Risk of loss or damage to the goods shall pass to the customer as follows:
  - In the case of goods to be delivered otherwise than at our premises, at the time of delivery, or if the customer wrongfully fails to take delivery of the goods, the time when the seller has tendered delivery of the goods;
  - In the case of goods to be delivered at our premises („ex works“. Incoterms® 2010) at the time we notify the customer that the goods are available for collection.
- 6.2 Unless otherwise specifically agreed upon, the means of transportation (shipping company, package service, post, etc.) shall be selected by us.
- 6.3 The delivery deadline is kept if, by its expiration, the subject of the agreement has left the factory or if we have declared that the subject of the agreement is ready for dispatch.
- 6.4 If we fall in default of delivery, we shall have an extension period of two weeks. In the case of force majeure (e.g. operational failures, difficulties with raw materials, war, strikes, etc.), we are released from the delivery deadline.

## 7. Withdrawal, Request of Partial Delivery

- 7.1 If our contractual partner withdraws unauthorized from the agreement or unauthorized refuses satisfaction of the agreement, the contractual partner shall be obligated to pay 15% of the gross value of the order as a lump sum in compensation unless it can prove that no damages were incurred or that damages were not incurred in this amount. The right to claim further damages is expressly retained.
- 7.2 Orders may then only be requested for delivery in partial quantities if this has been expressly previously agreed. Partial deliveries are excluded if the total order value is less than € 2,500.00 net, the term of the order is over six months and a single request for delivery amounts to a delivery value of less than € 1,000.00 net. If the ordering party withdraws unauthorized from the agreement, refuses satisfaction of the agreement or we are entitled to claim for damages, the regulations of aforementioned paragraph 1 shall apply. If we request neither satisfaction nor damages, we reserve the right to recalculate the prices of the quantities requested for standard parts, at the prices which would have been calculated had the order been restricted to this quantity at the onset. If the order concerns customized

products, we insist on satisfaction of the order in any eventuality. Prices offered or confirmed for larger procurement quantities can not be claimed for smaller quantities. Decreased or increased efficiency of 10% of the order volume is permissible for customized products.

## 8. Retention of Title

- 8.1 We retain title to the delivered goods until receipt of all payments in full regarding the purchase agreement. In case of breach of contract by the customer including, without limitation, default in payment, we are entitled to take possession of the goods.
- 8.2 Aforementioned title retention shall also apply to all claims from current and future business connections with the customers, including any current accounts.
- 8.3 The customer shall handle the goods with due care, maintain suitable insurance for the goods and, to the extent necessary, service and maintain the goods.
- 8.4 As long as the purchase price has not been completely paid, the customer shall immediately inform us in writing if the goods become subject to rights of third persons or other encumbrances.
- 8.5 The customer may resell goods subject to the above retention of title only in the course of his regular business. For this case, the customer hereby assigns all claims arising out of such resale, whether the goods have been processed or not, to us. Notwithstanding our right to claim direct payment the customer shall be entitled to receive the payment on the assigned claims. To this end, we agree to not demand payment on the assigned claims to the extent the customer complies with all his obligations for payment and does not become subject to an application for insolvency or similar proceedings or to any stay of payments. Storage of goods delivered under retention of title shall be at the cost and risk of the customer. Decrease in value of such goods shall be borne by the customer.
- 8.6 Insofar as the above securities exceed the secured claim by more than 20%, we are obligated, upon our election, to release such securities upon the customer's request.

## 9. Warranty

- 9.1 The customer is obligated to inspect the goods immediately upon receipt of delivery and to submit defects or deviations in quantity without delay - at least within 5 days of receipt of delivery - to us in writing. The deadline shall be met by receipt of the report of defects to us. Otherwise, the goods shall be deemed as accepted and approved regarding such defect or deviation in quantity. If defects or deviation in quantity are not recognized during the inspection mentioned above and are established later, declaration thereof must be made without delay within one week after discovery at the latest. Otherwise, the goods shall be deemed as accepted and approved also as regards such defect or deviation in quantity.
- 9.2 In the event of founded complaints, we resolve at our discretion pursuant to sec. 439 BGB (German Civil Code) the defect or deliver a replacement. If resolution of a defect fails, the ordering party can demand delivery of a defect-free product or reduction of the purchase price or withdraw from the agreement.
- 9.3 If inspection of a complaint determines no defect, we are entitled to charge the ordering party for the costs incurred.
- 9.4 The customer is obligated to inform us without delay of any expected claims resulting from a supply chain. Complaints concerning a part of a delivery do not justify complaints regarding the entire delivery.
- 9.5 Warranty claims expire by limitation within 12 months after delivery of goods.

## 10. Liability

- 10.1 Any liability not expressly provided below-mentioned shall be disclaimed as far as permitted by law.
- 10.2 In case of intent or gross negligence on our part or by our agents or assistants in performance we are liable according to the provisions of applicable law; the same applies in case of breach of fundamental contract obligations. To the extent the breach of contract is unintentionally our liability for damages shall be limited to the typically predictable damage.
- 10.3 Our liability for culpable damage to life, body or health as well as our liability under the Product Liability Act shall remain unaffected.

## 11. Customer's Obligations

- 11.1 The customer accepts the obligation to dispose properly of the delivered goods after the end of usage at its own cost and in accordance with legal regulations. The customer is obligated to keep us indemnified against all obligations under sec. 10, para. 2 ElektroG (Electrical and Electronic Equipment Act) (Take-back obligation of the Producer) and from any claims to which third parties are entitled thereunder.
- 11.2 The ordering party shall bear partial costs for special tools and related machinery and programs. The partial cost for tools shall be due at the latest upon presentation of the sample produced with the tool and must be paid in the net amount within 10 days of the date of invoice. These special tools, machinery and programs shall remain our unlimited property.

## 12. Final Clauses

- 12.1 This contract shall be governed by the laws of the Federal Republic of Germany excluding the Convention on Contracts for the International Sale of Goods (CISG).
- 12.2 If the conditions for a court agreement pursuant to sec. 38 ZPO (German Code of Civil Procedure) have been met, then the court of jurisdiction for all claims by the contractual partner shall be - depending on the value of the subject matter - Amtsgericht (District Court) Daun or Landgericht (County Court) Trier. We are entitled at our discretion to file an action against the customer at all his places of jurisdiction whether to German law or the national law of the customer.
- 12.3 If any individual provision herein is or becomes ineffective, the validity of the remaining provisions shall remain unaffected thereby. Contractual partners shall be obligated to replace an ineffective provision with a new provision that is as close as possible to the fiscal meaning and purpose of the ineffective provision.
- 12.4 In case of doubt to the interpretation of these general terms and provisions the German version shall obtain.





Important notes:

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Questions to our sales team:

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