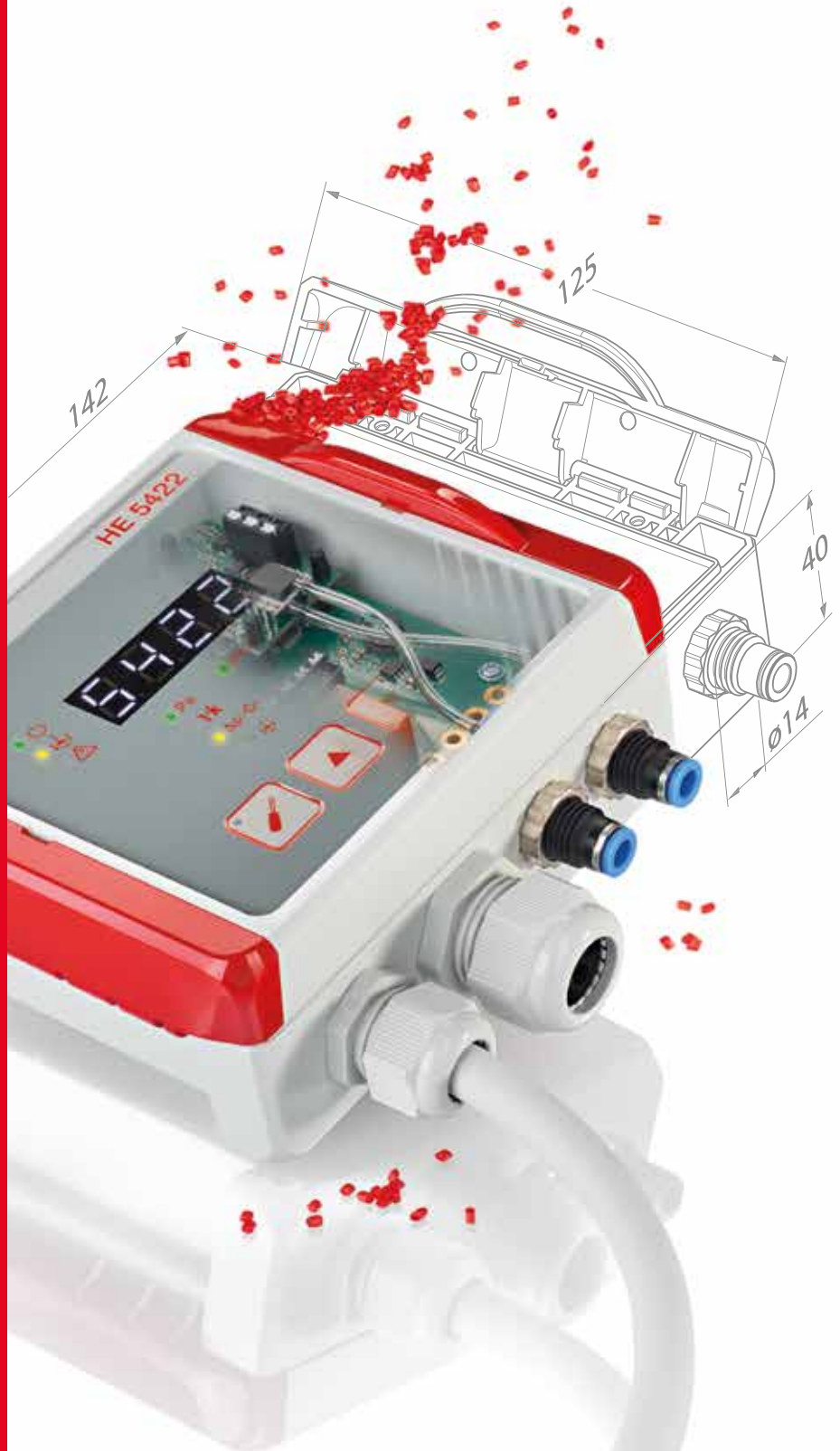




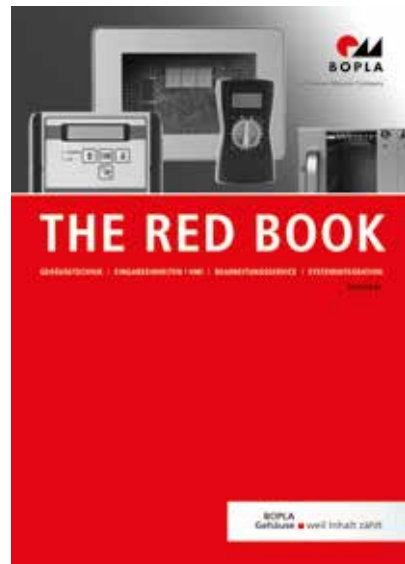
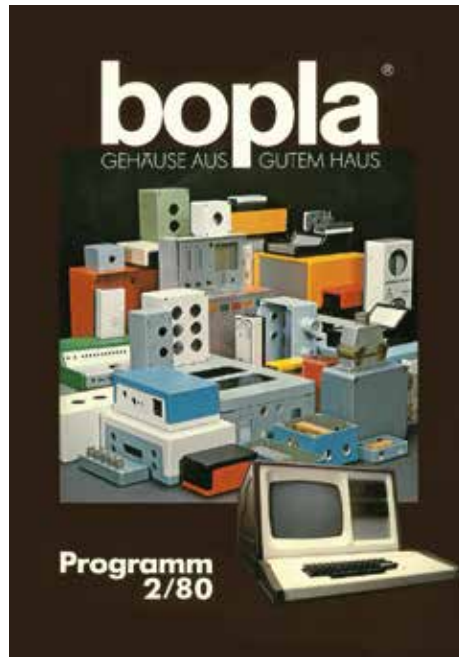
BOPLA

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THE RED BOOK 5.0



BOPLA
enclosures ■ content matters





THE RED BOOK 5.0 – Print and digital!

In our more than 50 years of company history, together with customers we have implemented countless development projects for all sectors which require electronics. Our printed THE RED BOOK catalogue has always been a faithful companion and reliable guide through our comprehensive range of products and services.

Now you have the new Edition 5.0 of THE RED BOOK in your hands – its concept is very different from that of earlier editions. In THE RED BOOK 5.0 catalogue, you make a pre-selection in accordance with field of application, design and technical characteristics. After that, our website will provide you with the very latest information about article numbers, data sheets, drawings and much more to ensure that you receive the enclosure which is tailor-made to your needs.

Your BOPLA team







BOPLA

A Phoenix Mecano Company

BOPLA – Enclosures which provide a home for electronics.

BOPLA enclosures stand out thanks to the excellent quality and design. Combining them with our customers' electronics creates something very special.

For more than 50 years, Bopla Gehäuse Systeme GmbH has been manufacturing and developing enclosures and membrane keypads for applications in the electronic and industrial markets including measurement and control, safety, automotive and medical technology sectors.

With our plastic or aluminium enclosures, we are always ahead of the competition. This is how innovations are created, or existing themes re-interpreted. In this way, BOPLA combines the virtues of a medium-sized company with the advantages provided by a group which operates world-wide. Fast, flexible, innovative and well networked, both locally and globally.

As the subsidiary of the Swiss company of Phoenix Mecano AG, which has around 7.000 employees, BOPLA has recourse to production and marketing sites in all the important markets. This simplifies logistics, and also makes it possible to meet even better our customers' requirements in their target markets.

However, what continues to be most important for BOPLA is protecting valuable electronic components in your application, this is what we develop and manufacture day after day.

BOPLA
enclosures ■ content matters

At home in every sector



Fire protection technology

Modern technology helps to minimise the risk of fire and to take protective measures. Flame-retardant and self-extinguishing polycarbonate enclosures in a UL 94 V-0 version are a good choice.



Environmental technology

Intelligent technology in controllers for refuse collection vehicles, particulate measuring equipment or toxicity testers plays its part in protecting our environment against pollution.



Sensor technology

The connectivity of the machines is very important for production. Our compact enclosures provide space for sensors, radio modules and the power supply.



Measurement, control and instrumentation applications

Whether devices are used for data capture, voltage tests or system control, the electronics must also be securely protected.



Water technology

The technical features of our enclosures, for example separable terminal compartments, guarantee high operator friendliness for water quality measuring devices, pump or filter control units.



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Laboratory technology

Electronic measuring devices and vacuum apparatus are important appliances in a laboratory, and they require a reliable enclosure.



Renewable energies

Electricity cannot get into the network without electronic control systems. In many cases, these systems are exposed to difficult weather conditions and UV radiation, which is why they need a high protection class.



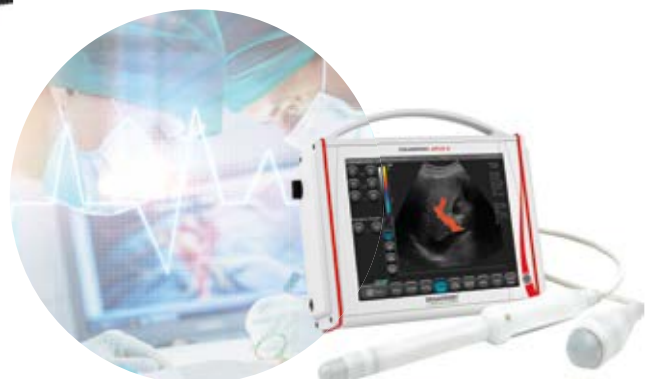
Agricultural technology

Modern agriculture without electronics? Inconceivable! Enclosures used in this sector must exhibit a good protection class and good impact resistance.



Audio, video and lighting technology

Controlling lighting systems and pyrotechnology, or the integration of audio amplifiers, require application-specific electronics enclosures.



Medical technology

Hygiene is the top priority in medical technology. For this reason, diagnostic or analysis devices used in operating theatres must have surfaces which are easy to clean.

Enclosure planner

1.

Applications

- INDUSTRY ENCLOSURES
- CONTROL ENCLOSURES
- ELECTRONIC ENCLOSURES
- CONSOLE ENCLOSURES
- **HANDHELD ENCLOSURES**
- PROFILE ENCLOSURES
- DESKTOP ENCLOSURES
- 19"-ENCLOSURES
- DIN RAIL ENCLOSURES
- CONTROL PANEL ENCLOSURES





2.


Enclosures


- **BOPAD**
- BOS-Streamline
- BOPLA-Arteb
- BOS
- Alubos
- BOS-Ecoline
- Alustyle

3.

Characteristics

-  **Protection class**
IP00 ... IP69
-  **Impact resistance**
IK00 ... IK 10
-  **Flame retardance**
UL94 V-0
-  **Variable sizes**
-  **EMC protection**
-  **Material complies with the railway standard**
DIN EN 45545
-  **Plastic with UV protection**
-  **Seawater resistance**
-  **Locking is possible**
-  **Wall mounting is possible**
-  **Mast mounting**
-  **Battery compartment**
-  **Hinged catch**

 As standard, applies to the product range and a few variants

 Achievable with accessories or by means of modification

4.

Enclosure sizes

5.

Accessories

6.

www.bopla.de

Dimensions



Model	A	B	C (Flat)	C (Console)
BOP 520	130	75	17.5	-
BOP 500	130	75	26	-
BOP 700	165	90	34	47.5
BOP 900	200	105	34	53.6
BOP 7.0	215	150	46	53
BOP 10.1	285	198	46	61.2

Variants

Model	Battery compartment	Console type	VESA fitting	Optimised touch/display
BOP 520	✓			2,4", 2,8"
BOP 500	✓			2,4", 2,8"
BOP 700	✓	✓		3,5", 4,3"
BOP 900	✓	✓	✓*	3,5", 4,3", 5,0"
BOP 7.0		✓	✓	7"
BOP 10.1		✓	✓	10,1"

* Additional processing of the enclosure is required

Enclosure colour

-  Black
RAL 9005
-  White
RAL 9016



● DESIGN SEAL

IMPACT PROTECTION

BATTERY COMPARTMENT

WALL FITTING

CABLE GLANDS

GENERAL ACCESSORIES

Colours



Our website contains the following details of all our products:

TECHNICAL DRAWINGS
(pdf, dxf, stp)

ARTICLE NUMBERS

MATERIAL DATA

WORKS TEST CERTIFICATES

ASSEMBLY INSTRUCTIONS

MATCHING ACCESSORIES

BASKET FUNCTION

Quick-Finder:

The Quick-Finder gets you there faster! Enter the code (e.g. #35) into the search box on our website, or add it to the address (e.g. www.bopla.de/35).



Applications

Industry enclosures



1	Bocube	46 - 49
2	Euromas II	50 - 53
3	Euromas ABS / PC / F05	54 - 57
4	Euromas Polymas	58 - 61
5	Euromas Polyester	62 - 65
6	Bocube Alu	66 - 69
7	Euromas Alu / F05	70 - 73
8	Polysafe	74 - 77
9	Bocard	80 - 83



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Controller enclosures



1	Bocard	80 - 83
2	RegloCard-Plus	84 - 87
3	CombiCard 5000-7000	88 - 91
4	CombiCard 1000-3000 / CombiSet 500	92 - 95

Applications

Electronic enclosures



1	BoLink	98 - 101
2	Circum	102 - 105
3	Unimas	106 - 109
4	Elesett / Eletec	110 - 113
5	Element / Universal	114 - 117
6	Elegant	118 - 121



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Console enclosures



1	Elegant-Pult	126 - 129
2	Ultrapult	130 - 133
3	Futura / Bopult	134 - 137
4	BoPad	140 - 143
5	Alu-Topline	174 - 177
6	Interzoll Case	218 - 221

Applications

Hand-held enclosures



1	BoPad	140 - 143
2	BOS-Streamline	144 - 147
3	BOPLA-Arteb	148 - 151
4	BOS	152 - 155
5	Alubos	162 - 165
6	BOS-Ecoline	166 - 169
7	Alustyle	158 - 161



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Profile enclosures



1	Alustyle	158 - 161
2	Alubos	162 - 165
3	BOS-Ecoline	166 - 169
4	Filotec	170 - 173
5	Alu-Topline	174 - 177
6	Aluplan	178 - 181
7	Intertego	184 - 187
8	Combirail	244 - 247
9	Alurail	240 - 243

Applications

Desktop enclosures



1	Intertego	184 - 187
2	Botego	188 - 191
3	Ultramas	192 - 195
4	Unimas	106 - 109
5	Internorm Stil	198 - 201
6	Interzoll Case	218 - 221
7	Internorm	202 - 205
8	Interzoll Plus	206 - 209



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19" enclosures



1	Intertego	184 - 187
2	Internorm Stil	198 - 201
3	Internorm	202 - 205
4	Interzoll Modul	210 - 213
5	Interzoll Plus	206 - 209
6	Interzoll	214 - 217
7	Interzoll Case	218 - 221

Applications

DIN rail enclosures



1	Alurail	240 - 243
2	CombiNorm-Control	236 - 239
3	CombiNorm-Classic	224 - 227
4	CombiNorm-Compact	228 - 231
5	CombiNorm-Connect	232 - 235
6	Combirail	244 - 247
7	Interzoll Case	218 - 221

Control panel enclosures



1	BoTouch	252 - 255
2	CombiCard 5000-7000	88 - 91
3	Interzoll Case	218 - 221
4	Uninorm	248 - 251

PRODUCTS	Profile-enclosures	Indicator-enclosures	Controller-enclosures	Industrial-enclosures	Elekctronic-enclosures	Touch screen enclosures	Hand-held enclosures	Console-enclosures	Table-enclosures	Control panel mounting enclosures	19" enclosures	Plastic	Aluminium
Bocube				•									
Euromas II				•									
Euromas ABS / PC / F05				•									
Euromas Polymas				•									
Euromas Polyester				•									
Bocube Alu				•									
Euromas Alu / F05				•									
Polysafe				•									
Bocard			•	•									
RegloCard-Plus			•	•									
CombiCard 5000-7000			•	•						•			
CombiCard 1000-3000		•	•	•						•			
BoLink													
Circum					•								
Unimas					•				•				
Elesett / Eletec					•								
Element / Universal					•								
Elegant					•								
Elegant-Pult								•					
Ultrapult								•					
Futura / Bopult								•					
BoPad						•	•	•					
BOS-Streamline							•						
BOPLA-Arteb							•						
BOS							•						
Alustyle	•						•						
Alubos	•						•						
BOS-Ecoline	•						•						
Filotec	•												
Alu-Topline	•							•					
Aluplan	•					•							
Intertego	•								•		•		
Botego									•				
Ultramas									•				
Internorm Stil									•		•		
Internorm									•		•		
Interzoll Plus									•		•		
Interzoll Modul									•		•		
Interzoll									•		•		
Interzoll Case		•				•		•	•	•	•		
Alurail	•	•											
CombiNorm-Control		•											
CombiNorm-Classic		•											
CombiNorm-Compact		•											
CombiNorm-Connect		•											
Combirail	•	•											
Uninorm										•			
BoTouch						•				•			

CONTENT

Alubos	162 - 165
Aluplan	178 - 181
Alurail	240 - 243
Alustyle	158 - 161
Alu-Topline	174 - 177
Bocard	80 - 83
Bocube	46 - 49
Bocube Alu	66 - 69
BoLink	98 - 101
BoPad	140 - 143
BOPLA-Arteb	148 - 151
BOS	152 - 155
BOS-Ecoline	166 - 169
BOS-Streamline	144 - 147
Botego	188 - 191
BoTouch	252 - 255
Circum	102 - 105
CombiCard 1000-3000 / CombiSet 500	92 - 95
CombiCard 5000-7000	88 - 91
CombiNorm-Classic	224 - 227
CombiNorm-Compact	228 - 231
CombiNorm-Connect	232 - 235
CombiNorm-Control	236 - 239
Combirail	244 - 247
Elegant	118 - 121
Elegant-Pult	126 - 129
Elesett / Eletec	110 - 113
Element / Universal	114 - 117
Euromas II	50 - 53
Euromas ABS / PC / F05-Gehäuse	54 - 57
Euromas Aluminium / F05-Gehäuse	70 - 73
Euromas Polyester	62 - 65
Euromas Polymas	58 - 61
Filotec	170 - 173
Futura / Bopult	134 - 137
Internorm	202 - 205
Internorm Stil	198 - 201
Intertego	184 - 187
Interzoll	214 - 217
Interzoll Case	218 - 221
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Polysafe	74 - 77
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Ultramas	192 - 195
Ultrapult	130 - 133
Unimas	106 - 109
Uninorm	248 - 251

Services

Page 22 - 43

Industrial enclosures

Page 46 - 77

Controller enclosures

Page 80 - 95

Electronic enclosures

Page 98 - 121

Console enclosures

Page 124 - 137

Hand-held enclosures

Page 140 - 155

Profile enclosures

Page 158 - 181

Desktop enclosures

Page 184 - 195

19" enclosures

Page 198 - 221

Enclosures for switch cabinets

Page 224 - 255

Cable glands / Accessories

Page 256 - 257

Technical information

Page 258 - 273

Services



Our enclosures are machine-finished on the premises. At BOPLA, we have an experienced workforce as well as state-of-the-art machine and systems. A combination that ensures you affordable production runs at a consistently high standard of quality.

We offer you a complete “All-round carefree package” with a wide range of intelligent services, tailor-made for your application.

For more than 50 years we have been your partner for sophisticated solutions, and we have constantly expanded and perfected our range of services. Form your own opinion of our know-how: machining service, membrane keypads / HMIs and system integration. We look forward to seeing you!





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Machining service



Quick-Finder:
www.bopla.de/14

Mechanical machining

Our highly-qualified employees carry out processing for you on modern CNC machines and equipment. This ensures constant and even quality of work.

In addition, the overall solution consisting of the enclosure and customer-specific processing results in optimal delivery times while reducing both the risk of rejects and transport costs.

Our range of services includes:

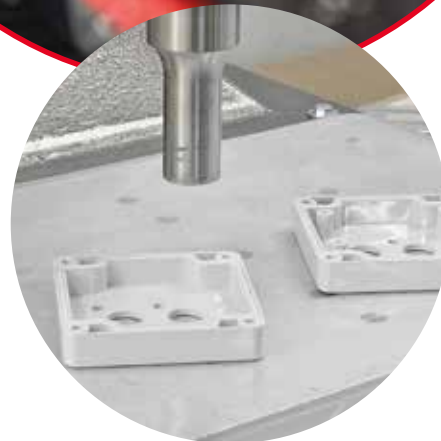
- Drilling
- Milling
- Counter-sinking
- Thread-cutting



Our highly-qualified and motivated employees saw extruded aluminium profiles in accordance with your specifications. This ensures optimal delivery times and a high level of quality for the products.

Profile processing:

- Scutting
- Sawing



Ultrasonic welding

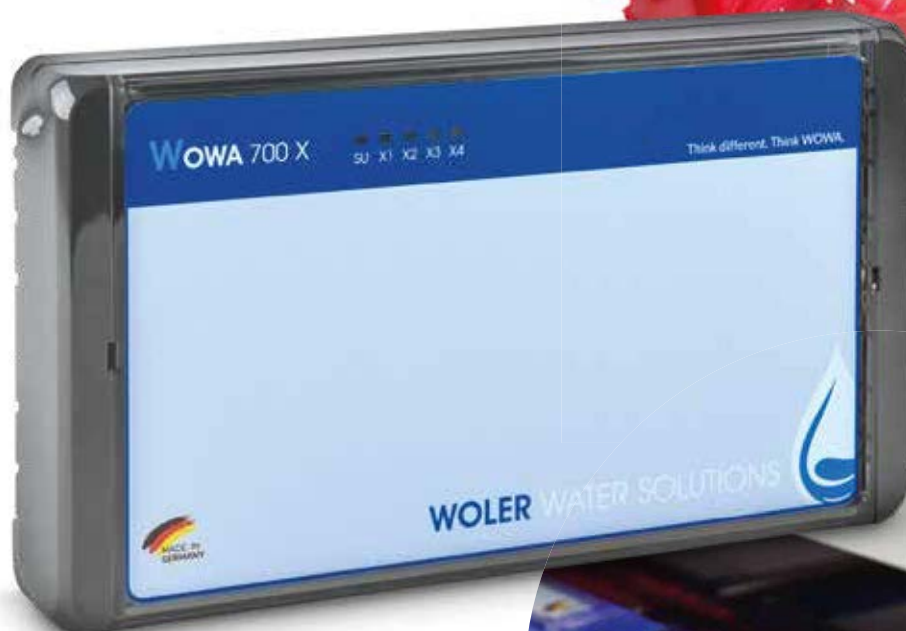
We use a special ultrasonic welding method to join the screw domes to our enclosures.

All our plastic enclosures are equipped with screw bosses made of plastic to fasten the mounting plates or PCBs. If you would like an additional fastening method at another position, then we can carry out this requirement by welding in a screw dome.

Services

Surface improvement

By “surface improvement” we mean all the technical processes used during production of a part in order to improve the surface characteristics. These characteristics may be functional or decorative, or a combination of both.



Digital printing

In principle all types of enclosures can be designed using digital printing. The digital printers which we use allow the printing of enclosures up to a weight of 8 kg and maximum dimensions of 690 x 490 x 150 mm (L x W x H). Depending on their size and weight, multiple enclosures can be printed at the same time.

Silk screen and pad printing

We use silk screen and pad printing in accordance with your specifications in RAL, Pantone or HKS colours. Our modern machinery and high-quality ink guarantee optimal print quality.

Your advantages:

- High level of coverage
- Special colours are available, e.g. gold, silver, etc.
- Extremely tough and durable





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Laser marking

Flexible, abrasion-resistant and environmentally-friendly. Thanks to the innovative laser process, even changing layouts during every marking procedure is not a problem. In addition, the method is extremely precise, including with narrow line thicknesses and small symbols, and it also offers absolute abrasion resistance to chemicals.



Lacquering

Lacquering is an additional method of refining our enclosures and components. Lacquers are liquid or powdery coating materials which can be applied thinly to our enclosures or components and, by means of chemical or physical processes such as the vaporisation of the solvent, result in the building up of a continuous, solid film.



Quick-Finder:
www.bopla.de/101



Powder-coating

Powder-coating is a process in which powder is applied to our metal enclosures. As part of the process, the enclosures are transported by a conveyor system. Powder-coated enclosures are extremely tough mechanically, and have better mechanical characteristics (impact and scratch resistance) than the untreated metal enclosures.



Engraving

Engraving involves the cutting of letters or images in aluminium and plastic components, for example in enclosures, part front panels, plug-in front panels and profiles.

Classical engraving takes place using a graver or a cutter on the surfaces. During this process, the rotating tools remove material, creating a visual contrast to the background.



EMC coating Plastic enclosures:

BOPLA is your competent partner when it is necessary to protect electronics against external interference. We provide three processes which offer you the necessary protection.

With plastic housings:

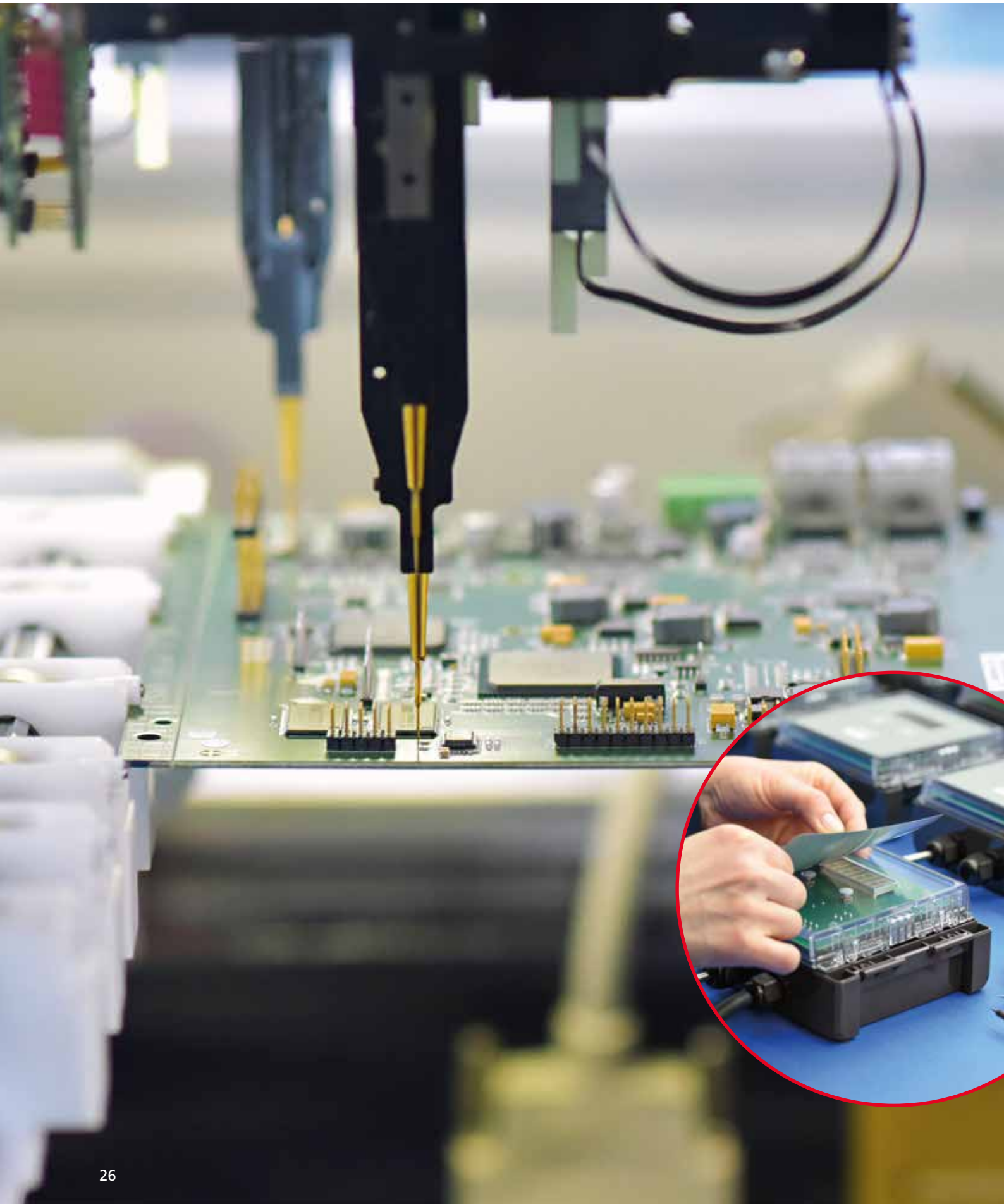
- Copper-chrome-nickel evaporation
- Aluminium evaporation
- Lacquering with conductive copper lacquer



Aluminium enclosures:

Even without any additional screening measures, the electrically conductive base material used for the aluminium enclosure provides good basic screening, and optional accessories can be used to optimise this.

Services





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Integration of electronics



Quick-Finder:
www.bopla.de/90

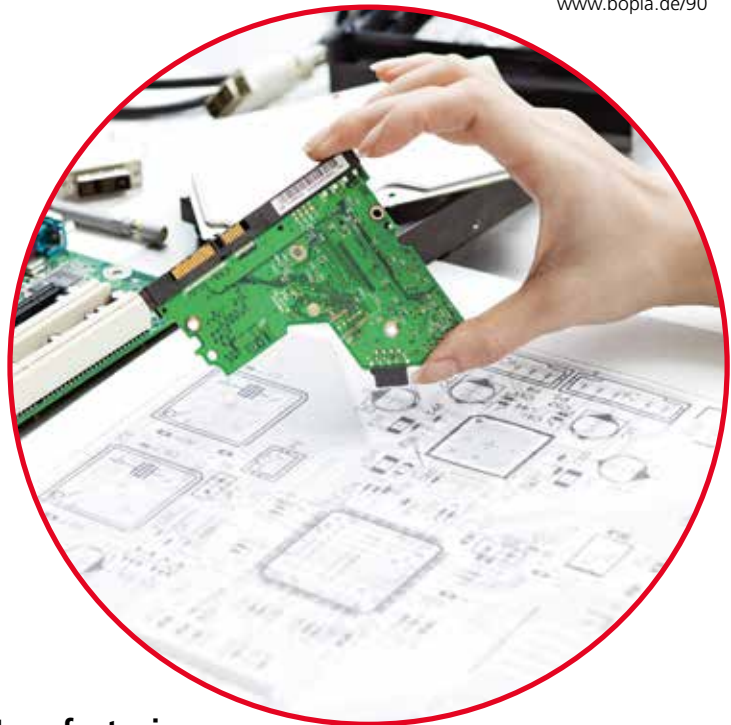
The heart of your product

We offer the full range of services, from development support for the electronic module to materials management and production up to complete assembly of your individual enclosure. A comprehensive end-of-line test is also one of our services.

Development support

Every project starts with a detailed concept phase in which we provide comprehensive advice and then define the tasks, requirements and workload. On the basis of these factors, we prepare a cost overview for your end product.

Our contact persons accompany you reliably during the entire process.



Manufacturing

You benefit from our electronics services as a result of economic efficiency and short delivery times. In addition, consistent quality management in order production ensures the constant high standard of the modules.

Extract from our services:

- SMD and THT insertion of all design shapes
- High-precision and performance automatic machines for all batch sizes
- Various soldering processes
- Conventional assembly of all designs
- Separate area for small and special series production

Completion / Testing

Following your instructions, we will gladly carry out the integration of:

- Electronic modules
- Electromechanical components
- Touch screens / display units
- Membrane keypads and decor foils
- Cables and connection leads
- EMC screening

Qualified technicians carry out the final assessment of the modules, with function and end tests.



Services





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Mounting / Testing / Packaging

The perfect result



Quick-Finder:
www.bopla.de/102

For mechanical processing, mounting of the enclosure parts or additional mechanical articles, terminal insertion, pre-wiring or the mounting of membrane keypads – this is how you minimise the amount of your in-house work, and we take over the risk of manufacturing faulty products.

For example, we take care of the following for you:

- Mounting of subracks
- Installation of cable glands
- Installation of DIN rails
- Soldering and bonding work
- completion

If there are special demands in respect of particle-free mounting of your optical, electronic and precision components, a work table is available which operates with a vertical flow of air and is assigned to purity class 6 according to DIN EN ISO 14644-1.



Protection type testing

Many of our enclosures already provide high levels of protection as standard. If these levels are not adequate for your application, we test the feasibility of a higher level of protection in our in-house laboratory.

Individual marking & packaging

In recent years there has been a considerable increase in the requirement for tailor-made packaging, especially in the integrated complete solution sector. We have worked hard to deal with these enquiries, and we offer our customers the necessary technical competence in order to meet their specific wishes. We will be happy to work closely with you as early as the offer phase of a project in order to define your requirements in detail with our logistics experts.

Individual enclosures



You are looking for ways to implement one of your own designs? Or do you want to develop your own individual enclosure in order to integrate specific functions?

We will gladly manufacture your individual enclosure. Make use of our many years of experience – we have already created many successful special solutions for a range of sectors. You benefit from our high levels of specialist knowledge, excellent product quality, and our experienced employees!

Our offer comprises:

Consultation



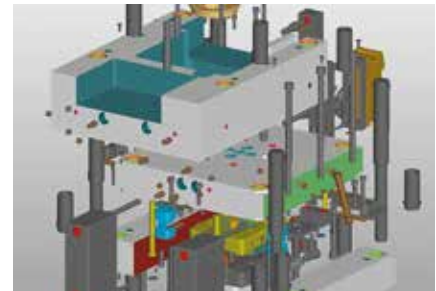
- Consultation
- Spezifikation
- Preliminary costing

Construction



- Preparation of drawing
- Filling study
- Prototype construction

Tool



- Tool drawing
- Tool manufacture

Production process



- Plastic injection moulding
- Aluminium profile extrusion
- Aluminium / zinc die casting
- Stamping and bending technology
- Further processing

Processing



- Milling
- Drilling
- Counter-sinking
- Punching
- Sawing

Refinement



- Printing
- (Powder) lacquering
- Engraving
- Laser marking
- EMC screening

Packaging



- HMI integration
- Assembly
- Wiring
- Cable assembly

Testing



- IP test
- IK test
- Climatic test
- EMV test

Packaging



- ESD-compliant packaging
- Individual packaging
- Returnable packaging
- Logistics concept

Individual enclosures



Technology

Plastic injection molded enclosures

Aluminium-/Zinc die-cast



Modified enclosures on 19" basis

Stamping and bending technology

Extrusion of aluminum profiles

Advantages

Advantages of plastic

Plastic injection-moulded enclosure:

- Individual design
- Low weight
- Low unit costs for large quantities
- In parts which are resistant to aggressive environmental influences (salt water)

Advantages of metal

Aluminium / zinc die casting:

- Reliable even under extreme conditions
- High impact resistance, stability and ingress protection
- Resistant to chemicals and temperature
- Very good heat dissipation
- Good EMC screening
- Low unit costs

Aluminium profile enclosures:

- Variable lengths (a "family" of enclosures can easily be created)
- Ideal for use in difficult environments (high chemical and temperature resistance)
- Good opportunities for EMC screening and conductive connections
- Very good heat dissipation
- Low tool costs
- High level of impact resistance
- Very good stability

Stamping and bending technology:

- Small quantities at lower cost than with plastic enclosures
- Good opportunities for EMC screening and conductive connections
- Ideal for use in difficult environments (high chemical and temperature resistance)
- Low-cost alterations to the enclosure design are possible
- Very good stability



Quick-Finder:
www.bopla.de/60

System integration

System integration allows us to deliver the perfect end product – developed together with you and expanded to series readiness.

For you, system integration means a complete “All-round carefree package” with a wide range of intelligent services tailor-made for your application.

For more than 50 years we have been your partner for sophisticated solutions, and we have constantly expanded and perfected our range of services. Form your own opinion of our know-how: machining service, membrane keypads / HMI and system integration. We look forward to seeing you!





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Here are the solutions!

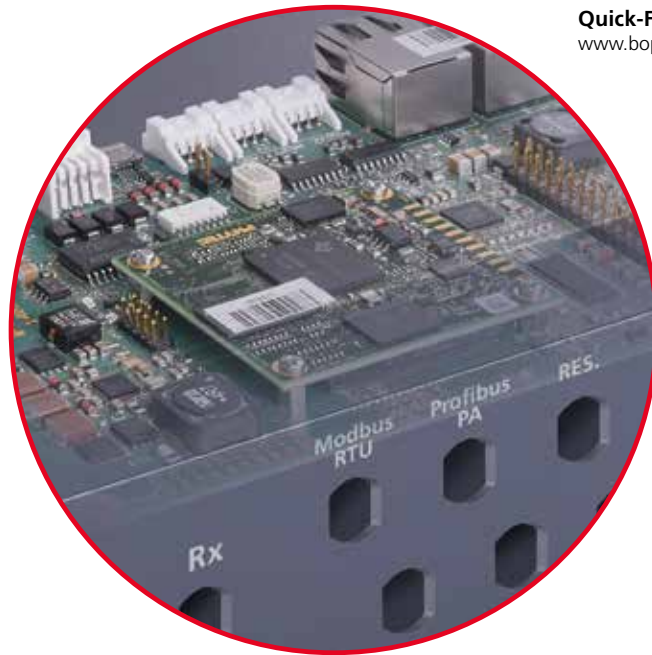


Quick-Finder:
www.bopla.de/77

All the components are brought together at this stage of the process, and your individual device is created!

Our range of services includes:

- Procurement and warehousing of all necessary components
- Insertion (THT / SMT)
- Module test (AOI / ICT)
- Function test
- Labelling and packing



The enclosure

BOPLA's enclosure sector product range is incredibly diverse and ranges from hand-held, desktop, console and wall-mounted enclosures to 19" applications. Select the suitable enclosure from our comprehensive product range.

The electronics

From procurement of all necessary components to insertion to the module test – it's what we do.



The processing

We excel in all standard processes: milling, drilling, countersinking, thread-cutting, sawing, ultrasonic welding, and many more. These include engraving and laser engraving, printing and lacquering, and powder and EMC coatings.



The HMI solution

We create HMI devices for every application. From simple membrane mounting to the complex integration of touch screens – all in impressive quality and with an appealing design!



Mounting / function test

The integration of highly-sensitive components / modules and the final check of the device by means of a function and end test is carried out by our qualified and expert personnel in our in-house laboratory.

Membrane keypads



The front membrane is the visual and tactile interface between your membrane keypad and the user. It can be labelled and surface-finished using a number of different printing and embossing methods.

The visual impression made is also of decisive importance for the appeal of your device! Various materials, including polyester and polycarbonate, combined with geometrical flexibility, colour and design, permit ergonomically rational flat membrane keypads for electronically controlled devices.

Our high-quality front membranes conform to high tightness and robustness standards. There are virtually no limits on design. The front membranes can be supplied with or without self-adhesive layers, depending on the customer's requirements. In addition, we can also offer key embossing and display windows, depending on your needs.

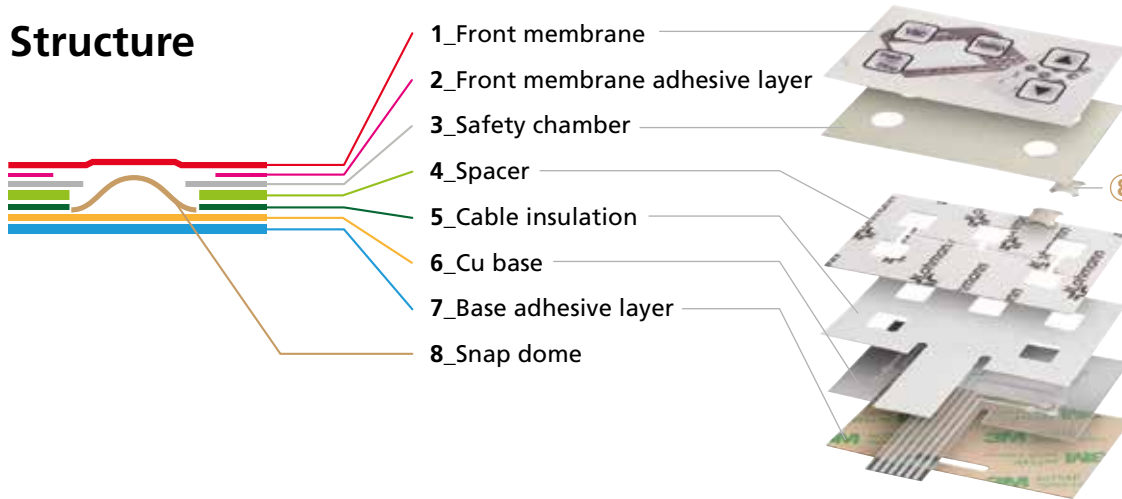


BOPLA

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The structure

Structure

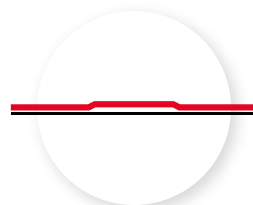


Quick-Finder:
www.bopla.de/72

Embossing

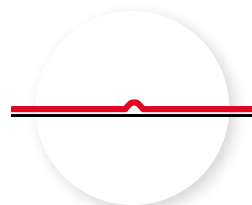
Membranes are embossed primarily to improve ease of use.

Series of keys are made "feelable", while the membrane effect of the embossing improves tactile feedback from the actuating elements.



Raised embossing

Height: approx. 0.3 - 0.5 mm*



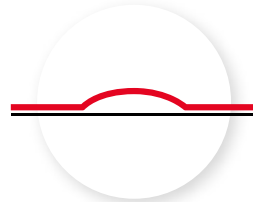
Cap embossing

Height: approx. 0.6 - 0.8 mm*



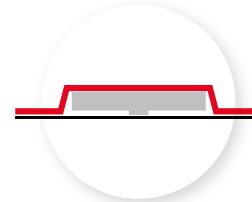
Rim embossing

Height: approx. 0.3 - 0.5 mm*



Dome embossing

Height: approx. 0.6 - 1.4 mm*



Profiline embossing

Height: approx. 1.0 - 1.5 mm*

* Dependent on the membrane material

Printing methods



Screen printing

Industrial screen printing is the most widely-used process for manufacturing all types of especially high-quality membrane keypads / HMIs. Digital printing can supplement or replace screen printing.



Digital printing

Previously unachieved flexibility in front membrane design.

- High-quality photos and graphics
- Various colour gradients and graphics possible
- Fast and flexible
- For short runs and individual printing
- Prototypes

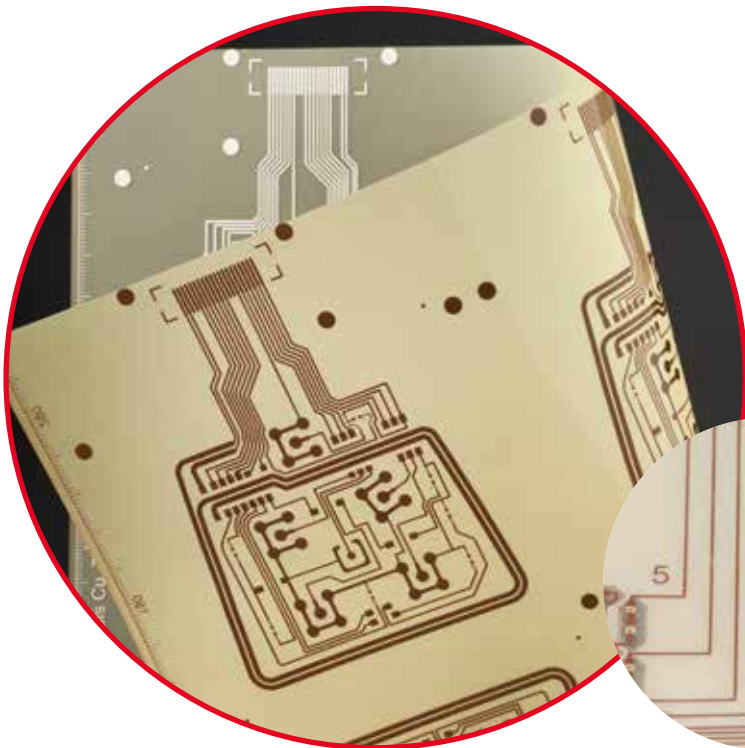


High-gloss technology

The design can be considerably upgraded by using a smooth membrane and a special textured lacquer in order to create glossy effects in the area of the keys.

Membrane keypads

Membranes with copper conductors



For demanding applications, we also create exclusive high-quality membrane keypads that incorporate the outstanding properties of surface-treated copper conductors.

Instead of using adhesives, as with printed silver technology, we can securely and permanently solder LEDs, photo diodes or other components. These are advantages which in practice frequently give our customers the necessary security when using membrane keypads.

Profiline membrane keypads

This technology succeeds in providing outstanding data-entry operation for a large range of industrial requirements. Customised design for every keypad!

Profiline embossing

Profiline embossing combined with an inlay generates the so-called "short-stroke feeling" to assure unequivocal tactile feedback. Can be executed in a range of different forms.

Improved user-friendliness thanks to:

- Unequivocal tactile feedback
- Exceptionally good key feel
- Freedom of design for key geometry
- Clearly designed key shaping, can also be implemented as a rocker switch and/or oversize key



Profiline membrane keypads
Height: approx. 1.0 - 1.5 mm*

* Dependent on the membrane material



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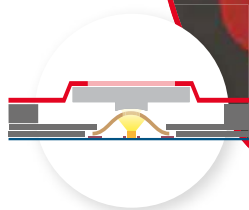
The technologies

Profiline illuminated

In poor light conditions, our illuminated membrane keypads simplify operations, and this ensures that operating errors are minimised.

Profiline illuminated

The use of special LEDs and special treatment of the inlay provides homogenous illumination, with long-lasting functionality naturally assured. The light from the LED passes through the aperture in the snap dome and into the integrated acrylic inlay, where it is correspondingly scattered.



Profiline embossing illuminated

Height: approx. 1.0 - 1.5 mm*

* Dependent on the membrane material

USB keypads

Plug & Play – the membrane keypad for immediate operation using the USB port. We use printed electronics to integrate configurable keypad controllers into the membrane keypad.

The ribbon cable can be connected directly to USB A sockets, so there is no need for additional hardware to operate traditional membrane keypads.

Advantages of a USB keypad:

- Cost, space and time-savings
- Optimum for connection to PC or embedded system
- 188 functions thanks to three control levels (FN keys)
- 19 macros, mouse function, multimedia keys
- Other bus interface possible



Touch / display integration

As a result of their widespread use in mobile telephones and tablets, many electronic devices are now also operated in industrial applications by means of a touch screen or a display. Convince yourself of the advantages of this versatile technology.

We support you in developing cost-effective, user-friendly devices with touch operation by integrating capacitive and resistive touch screens in standard and customers' own electronics enclosures.

The combination of a touch screen with a conventional membrane keypad is also possible. In addition, we offer solutions with a continuous front membrane (resistive touch screens) or a continuous cover glass (capacitive touch screens) for every application in which there must be no dirt-collecting edges – examples include the medical technology and foodstuffs sectors.



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The technologies

Capacitive touch screen

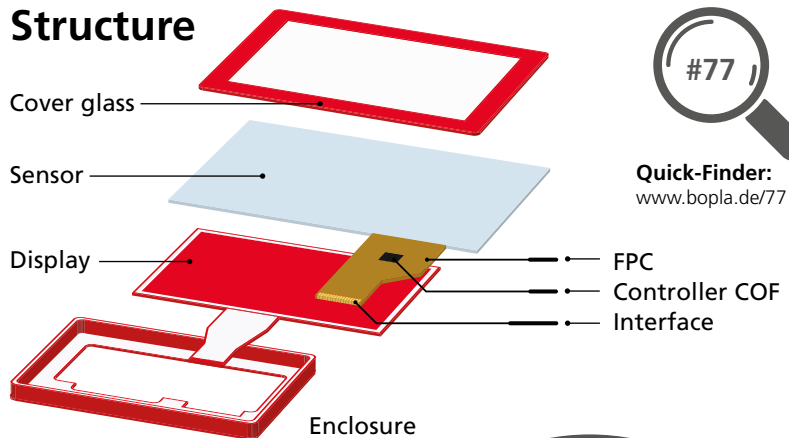
Until recently, membrane keypads and conventional resistive touch screen solutions have been used in the industrial environment, but capacitive touch screen technology is now increasingly taking over. Capacitive technology, definitively shaped by the consumer market, now meets the high demands made in all sectors of industry.

This technology is noted for its exceptionally high reliability, intuitive operation and unique functionality.

Additional advantages of a PCAP (projected capacitive) solution:

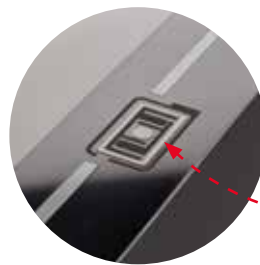
- Vandal-proof
- Easy cleaning
- Can be operated wearing gloves
- Temperature resistance
- UV resistance
- Operation in wet environments no problem
- Extremely high service-life

Structure



Quick-Finder:
www.bopla.de/77

Depending on the requirement, printed silver conductors can also be created, for example in the form of an additional key.



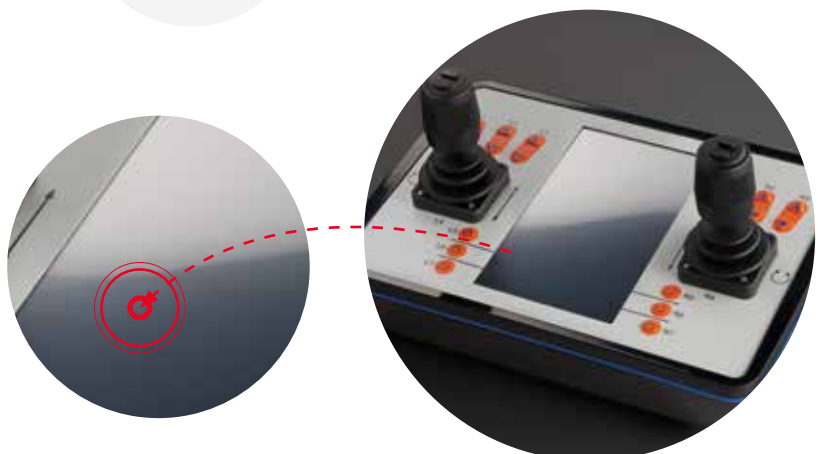
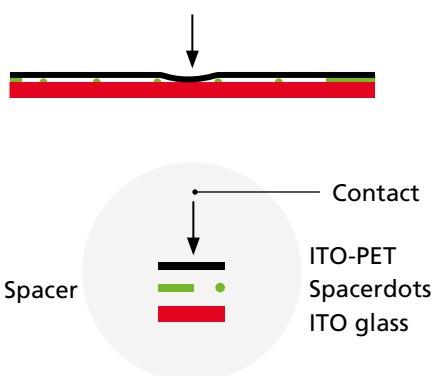
Resistive touch screen

Our flexible and rationally-priced touch screen solution for your product!

Selection of the optimum technology is of decisive importance, especially in the field of touch screen systems. We supply resistive and capacitive touch / display solutions, with their differing technical requirements, in numerous standard formats, or developed specifically to meet your individual needs.

This is why detailed analysis of the operating requirements, covering all mechanical components, is a vital necessity at the very start of device development. We are at the side of our customers' technical departments to provide support on all of these items.

Structure



Selection of our possible implementation routes:

- Full-surface lamination on a decorative foil
- Viewing windows cut out in the decorative foil
- Partial lamination on the decorative foil
- Rear installation in the enclosure
- Combination of touch screen with membrane keypad

Touch / display integration

Our solutions for all enclosures



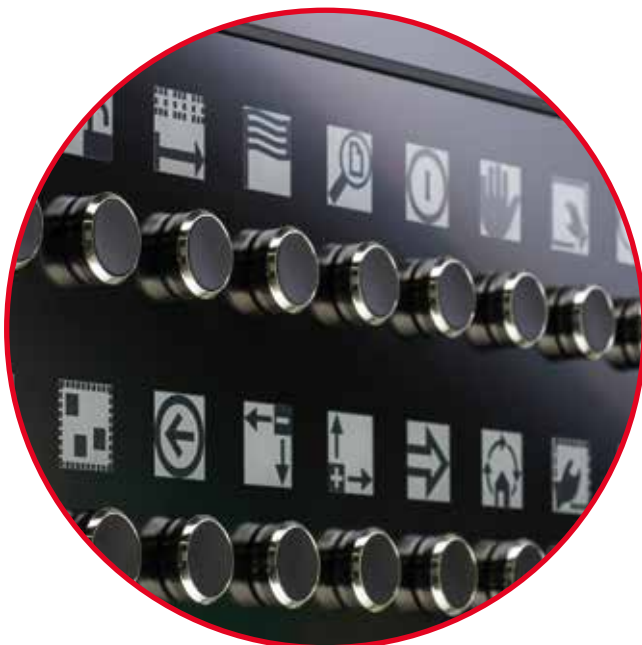
Individual enclosures, optimised for the installation of capacitive and resistive touch screens.

In addition to the integration of standard displays, our enclosures also make possible the installation of resistive and capacitive touch screens.

In both cases, the integration of the touch screen can be achieved in many ways. For applications in which dirt-collecting edges are not allowed to remain, we provide solutions behind glass or with a continuous front membrane – full-surface laminated or with rear spacer dots.

- Individual solutions for all types of enclosures
- Enclosure, front membrane or glass backprinted or printed for specific projects
- Special grouting compound technologies for optimal protection against harsh environment, shock and vibration

Digital Label System – DLS



DLS offers individual, exchangeable new marking of keys during ongoing operation.

By using DLS, keys can constantly be digitally re-marked. DLS can carry out multiple occupancies of keys, in addition to customised symbols or languages. The markings are also visible when the keys are voltage-free. By using e-paper displays, DLS operates energy-efficiently because energy is only needed when the markings are changed. Various interfaces allow new marking with the symbols available in the memory.

- Fewer keys
- Re-marking of keys
- Customised personalised marking
- Voltage-free display operation
- User-friendly configuration software

Printed electronics

Capacitive keypads

Touch sensor membranes convert nonconductive surfaces such as membranes, glass panels or, e.g., enclosures into a capacitive keypad.

Touch-sensor membranes

A touch-sensor membrane can, for instance, be bonded behind non-conductive surfaces in order to convert these surfaces into a membrane keypad. Direct printing of enclosure parts with touch-sensor systems makes it possible to efficiently combine production operations, save resources and reduce consumption of materials.

- Cost-savings
- Plug & Play sensor-surface and controller solution
- Reduced risk of failure
- Direct printing of alternative surfaces
- Good optical transparency
- No mechanical wear
- Easy cleaning thanks to sealed surfaces



Printed antennas

Antennas of various geometries are needed for RFID products, depending on the particular application – we design the antenna geometry needed for your application.



Ready to receive

We design the antenna geometry needed for your application and can print it using our tried-and-proven copper technology. Copper technology provides greater range, faster read potentials and higher data-transmission rates compared to conductive silver.

In addition, we use NFC and RFID chips to integrate a passive digital identification feature into the membrane for you.

- Range up to 7 cm thanks to copper technology
- Direct integration into front membranes and membrane keypads
- Password-protected memory contents
- Easy and cost-efficient integration into existing systems, even in small production runs

On request

Pressure sensor systems

- Low-profile and lightweight
- Combinations with other sensors possible
- Sensor electronics can be integrated for better scalability
- Integration of customer designs

Printed heaters

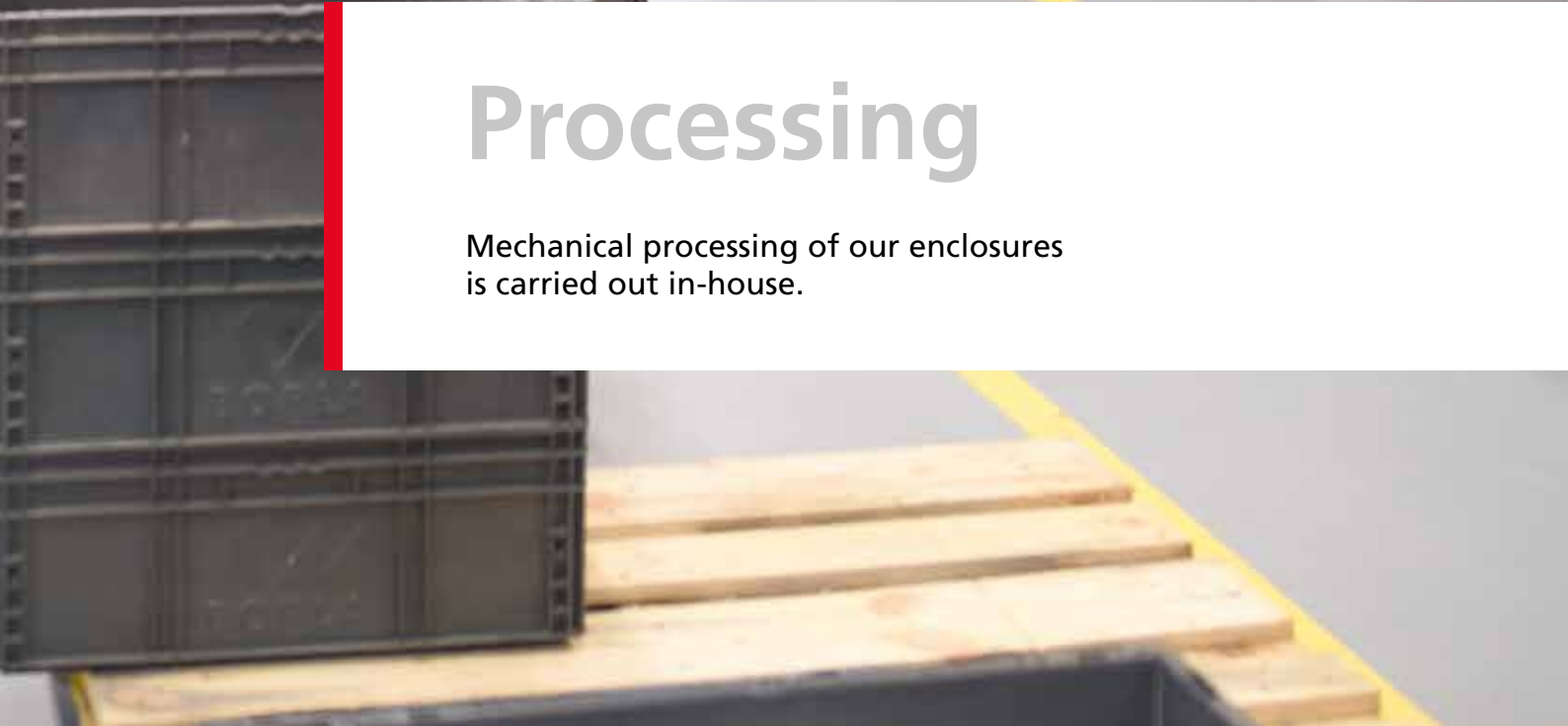
- Low-profile, lightweight and flexible
- Can be integrated into membrane keypads, glass and touch systems
- Self-regulating or with integrated measuring electronics
- Up to 200°C in continuous operation (depending on overall system)





Processing

Mechanical processing of our enclosures is carried out in-house.



The product advantages



The unique, patented hinged catch has two functions:

- Fast, easy, toolless fitting of the lid
- Swivel the lid open – your choice of hinge side



On request, the enclosures can also be screwed. The hinged catch conceals the screws.

Bocube has very few parts, so it is very light and easy to mount – toolless. Use a size 3 slotted-head screwdriver to open it.



The enclosures in 2 basic colours – optionally with a transparent lid – can be combined with coloured hinged catches as required. Alternatively, manually-operated catches are available.



The blanking plug allows selection of the side to be hinged. In this way, connections between the base and the lid can be protected against damage when the lid is opened.



Quick-Finder:
www.bopla.de/96

Examples of use





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Bocube

Industry



Colour:

- Light grey, similar to RAL 7035
- Graphite grey, similar to RAL 7024

Special colours on request

Protection class:

IP66 / IP68 (1.2 m - 2 h) DIN EN 60529

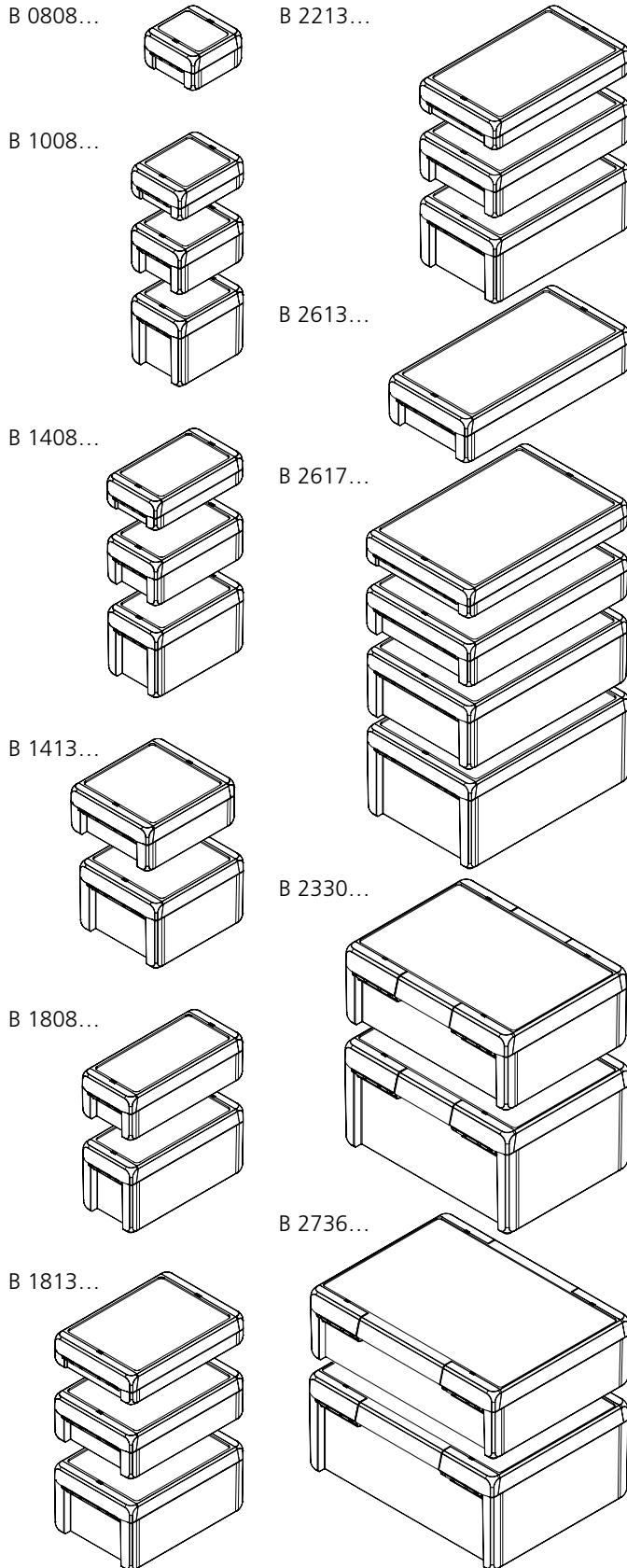
Material:

Enclosure: ABS or PC V-0
(material is suitable for outdoor use;
f1-listing according to UL 746C)
Seal: PU foamed

For details see technical information.



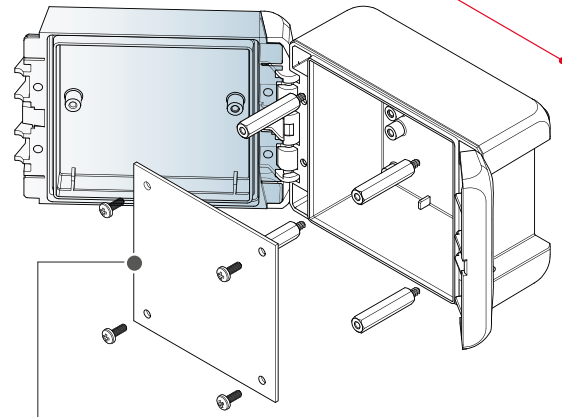
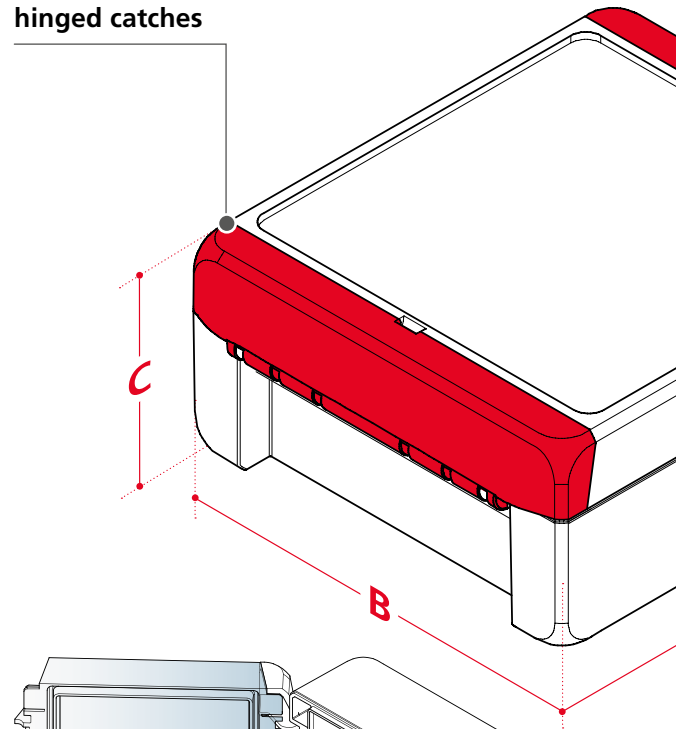
Enclosure sizes



Design types



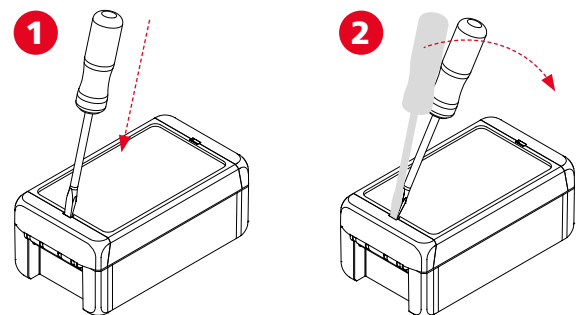
Coloured
hinged catches



Front panels

or PCBs can be mounted in the base and in the lid.

Easy opening of the hinge





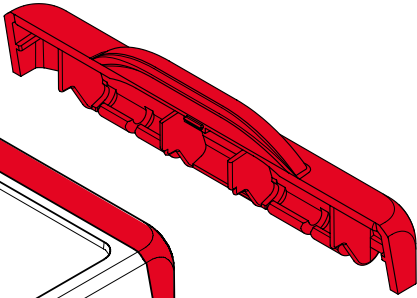
BOPLA

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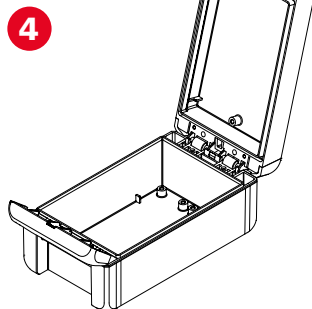
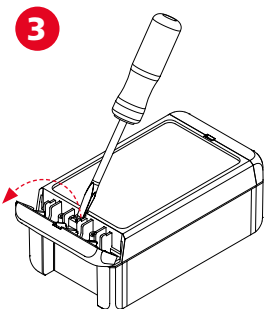
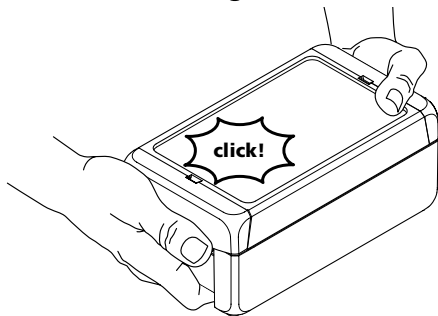
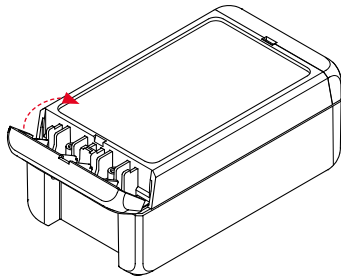
Bocube

Industry

Hinged catch for manual operation



Manual closing



Dimensions

Model	A	B	C
B 0808...	89	80	47
B 1008...	113	80	40 / 60 / 90
B 1408...	151	80	40 / 60 / 90
B 1413...	151	125	60 / 90
B 1808...	191	80	60 / 90
B 1813...	191	125	40 / 60 / 90
B 2213...	231	125	40 / 60 / 90
B 2613...	271	125	60
B 2617...	271	170	40 / 60 / 90 / 120
B 2330...	239	300	120 / 160
B 2736...	284	364	120 / 160

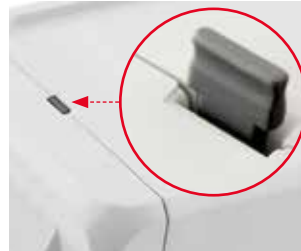
Accessories



Wall brackets



Pressure compensation membrane DAE



Blank plug to determine the hinge side



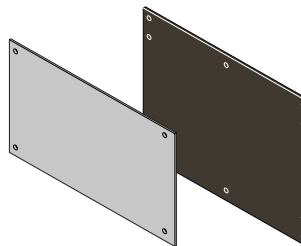
Distance bolt



DIN rails
TH 15, G 32, TH 35



Mast mounting



Front and mounting panels in different versions

The product advantages



Euromas II represents not only visually an alternative to the classic EUROMAS industrial enclosure. Special attention was paid to the numerous mounting opportunities for PCBs and keypads.



The F-versions have a recessed surface in the lid for the flush mounting of membrane keypads.



Fixing domes for PCBs are available not only in the base but also in the lid.



Depending on the model, the bases are equipped with additional specially matched fixings for DIN rails or integrated clamp profiles.



The LP versions are available for the vertical mounting of PCBs.



Quick-Finder:
www.bopla.de/62

Examples of use





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Euromas II

Industry



Colour:

● Light grey, similar to RAL 7035

Special colours on request

Protection class:

IP65 / DIN EN 60529

Material:

Enclosure: ABS or PC (UV stabilized)

Seal: CR

For details see technical information.



Enclosure sizes

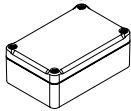
EM / ET 205



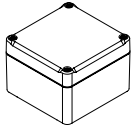
EM / ET 206



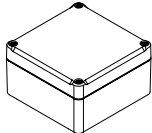
EM / ET 208



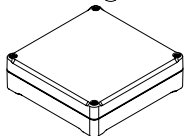
EM / ET 210



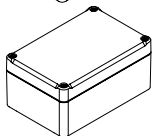
EM / ET 212



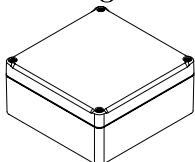
EM / ET 213



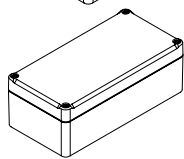
EM / ET 215



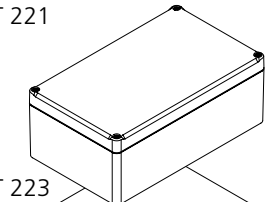
EM / ET 217



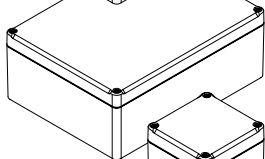
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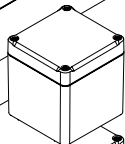
EM / ET 221



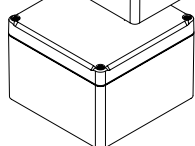
EM / ET 223



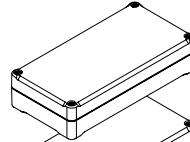
EM / ET 225



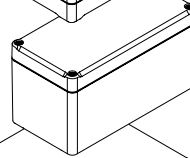
EM / ET 227



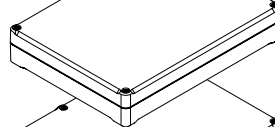
EM / ET 229



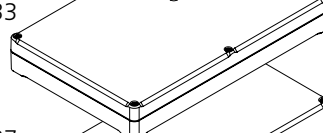
EM / ET 231



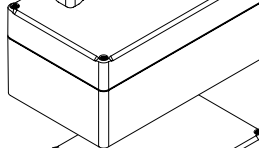
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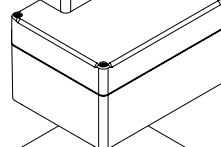
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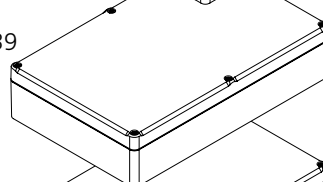
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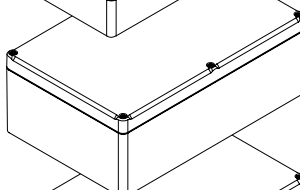
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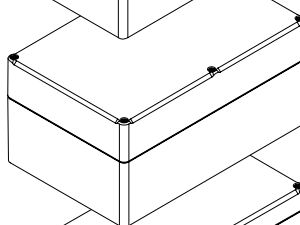
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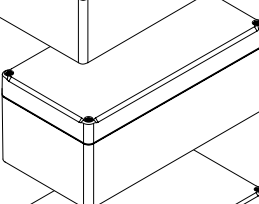
EM / ET 240



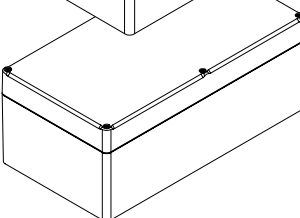
EM / ET 241



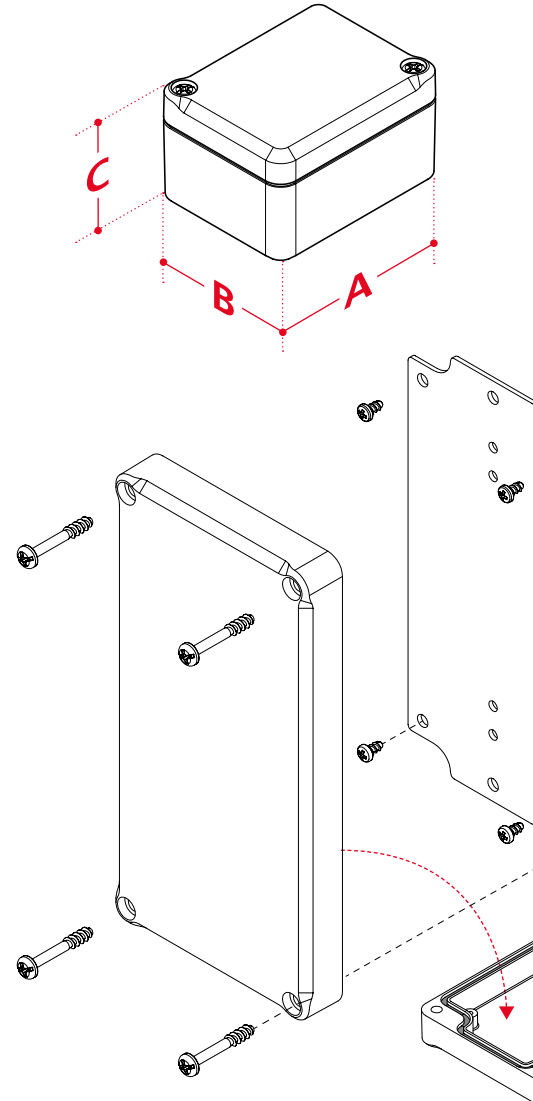
EM / ET 242



EM / ET 247

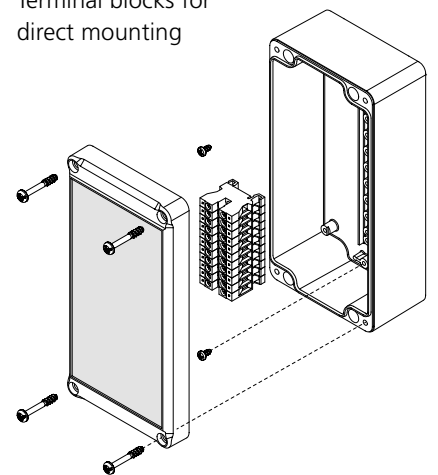


Design types



Integrated row of domes

Terminal blocks for direct mounting





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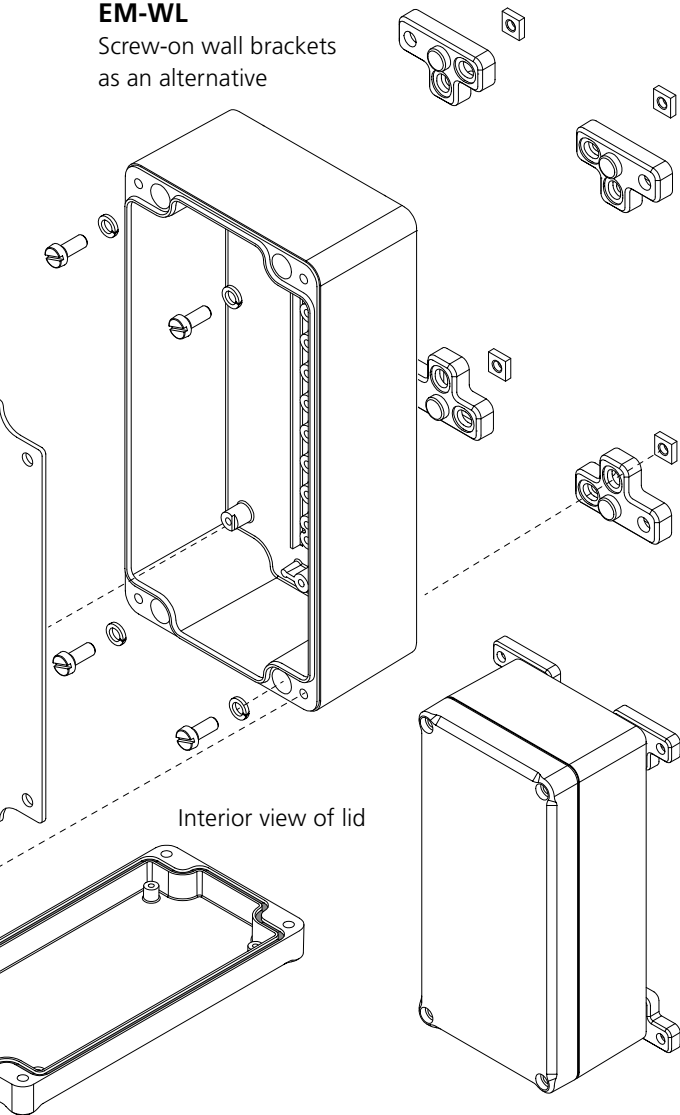
A Phoenix Mecano Company

Industry

Euromas II

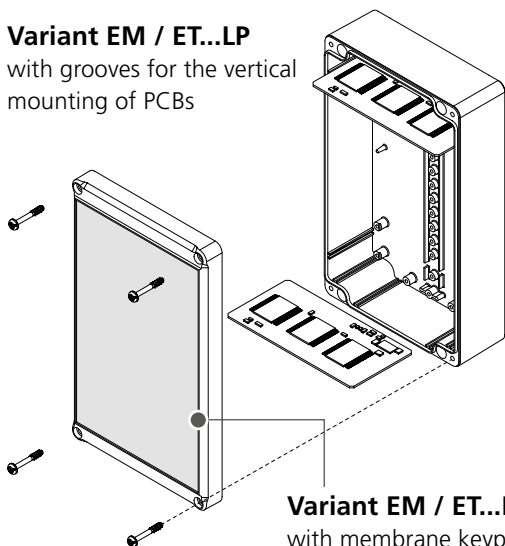
EM-WL

Screw-on wall brackets as an alternative



Variant EM / ET...LP

with grooves for the vertical mounting of PCBs



Variant EM / ET...F

with membrane keypad edge

Dimensions

Model	A	B	C	F	LP	F+LP
EM / ET 205	74	50	37	✓		
EM / ET 206	65	50	37	✓		
EM / ET 207	82	60	57		✓	✓
EM / ET 208	98	64	38	✓		
EM / ET 210	82	80	57	✓		
EM / ET 212	100	100	57	✓		
EM / ET 213	122	120	37	✓		
EM / ET 214	200	120	57		✓	✓
EM / ET 215	120	80	57	✓		
EM / ET 217	122	120	57	✓		
EM / ET 218	150	150	57		✓	✓
EM / ET 220	160	80	57	✓		
EM / ET 221	200	120	77	✓		
EM / ET 223	200	150	77	✓		
EM / ET 224	240	80	60		✓	✓
EM / ET 225	82	80	87	✓		
EM / ET 227	122	120	87	✓		
EM / ET 229	160	80	37	✓		
EM / ET 231	160	80	87	✓		
EM / ET 232	200	150	37	✓		
EM / ET 233	250	160	37	✓		
EM / ET 236	240	80	80		✓	✓
EM / ET 237	200	120	92	✓		
EM / ET 238	160	120	92	✓		
EM / ET 239	250	160	57	✓		
EM / ET 240	250	160	92	✓		
EM / ET 241	250	160	122	✓		
EM / ET 242	240	120	102	✓		
EM / ET 247	300	160	120		✓	✓

EM-F / ET-F versions: because of the membrane keypad edge on the lid, dimension C is 1 mm higher.

Accessories



Rubber feet



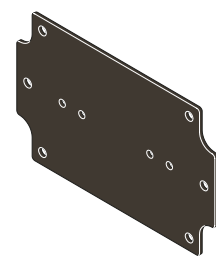
Screw covers



DIN rails
TH 15, G 32, TH 35



Mast mounting



Mounting panels in different versions

The product advantages

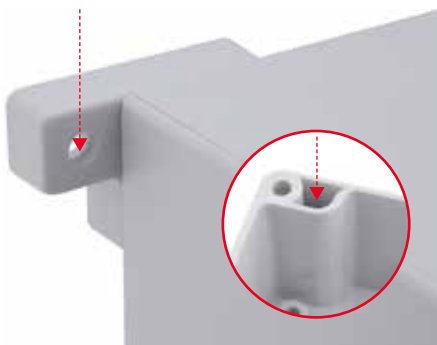


Euromas is a classic industrial enclosure which is available in three different material variants: ABS, polycarbonate and polycarbonate with UL 94 V-0 flame protection. A transparent cover allows a view into the enclosure.



The factory-fitted round cord seal can be replaced by a silicone seal with greater temperature resistance. Depending on the type, a higher protection class can also be achieved by using a moulded-in PU seal.

The lid screws – secured against falling out – are screwed into high-quality threaded bushings. No thread wear even when the enclosure is opened multiple times.



The enclosure can be fitted to the wall by means of the screw channels in the base or wall brackets.



Special versions with an F05 mounting flange in antistatic Vestamid plastic for applications on actuators and valves



Quick-Finder:
www.bopla.de/02

Examples of use



Euromas

ABS | PC | F05



Colour:

- Light grey, similar to RAL 7035
- V 215: Black, similar to RAL 9005

Special colours on request

Protection class:

Depending on the model IP65 or IP66 / DIN EN 60529
IP68 (1.2 m- 2 h) on request from some sizes possible

Material:

Enclosure: ABS or PC (UV-stabilisiert) such as selected sizes in PC UL 94 V-0
(other UL 94 V-0 versions on request)
V215: Vestamid
Seal: CR

For details see technical information.



Enclosure sizes

M / T 205
M / T 206



M / T 208



M / T 210
M / T 215
M / T 216



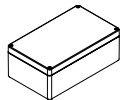
M / T 217



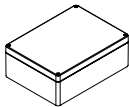
M / T 219
M / T 220



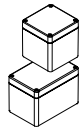
M / T 221



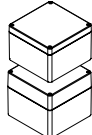
M / T 223



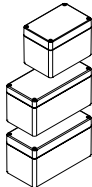
M / T 225
M / T 226



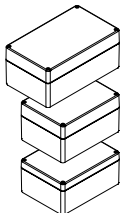
M / T 227
M / T 228



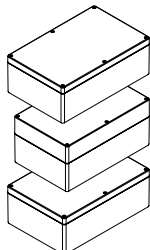
M / T 230
M / T 231
M / T 235



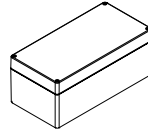
M / T 237
M / T 238
M / T 2381



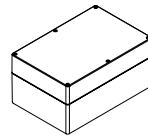
M / T 240
M / T 2401
M / T 241



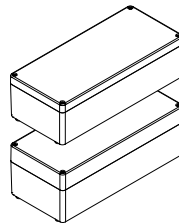
M / T 242



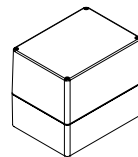
M / T 243



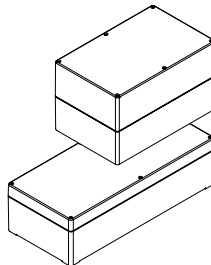
M / T 244
M / T 245



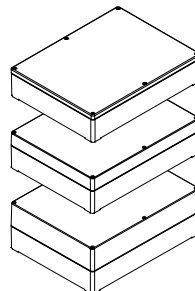
M / T 246



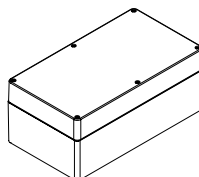
M / T 250
M / T 251



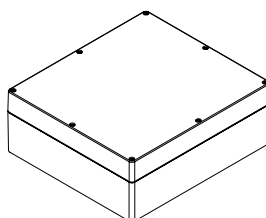
M / T 252
M / T 253
M / T 254



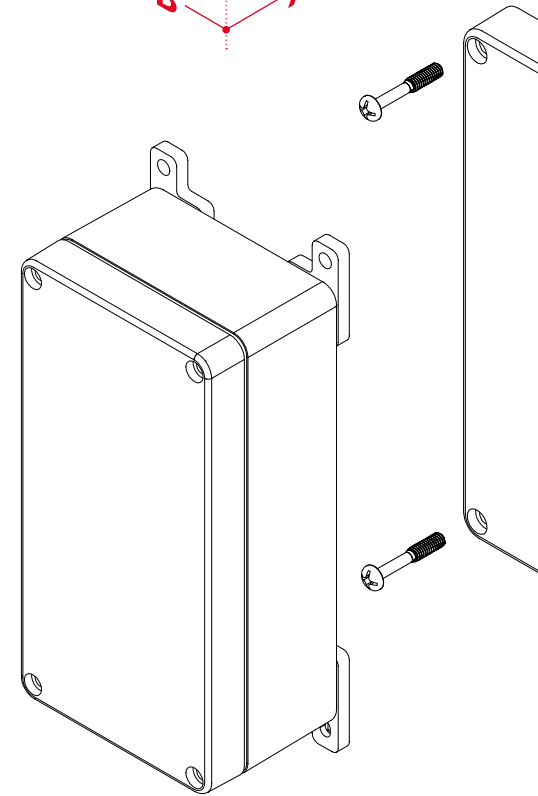
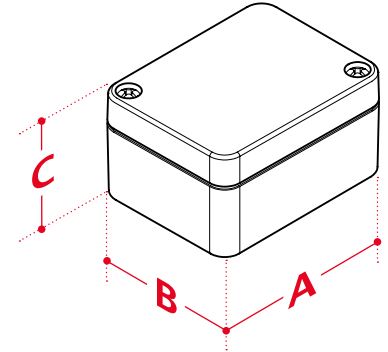
M / T 255



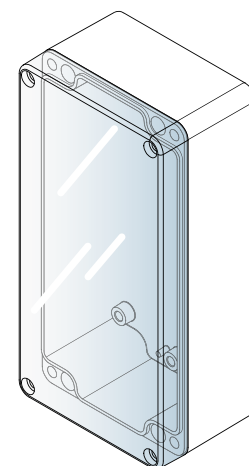
T 260



Design types

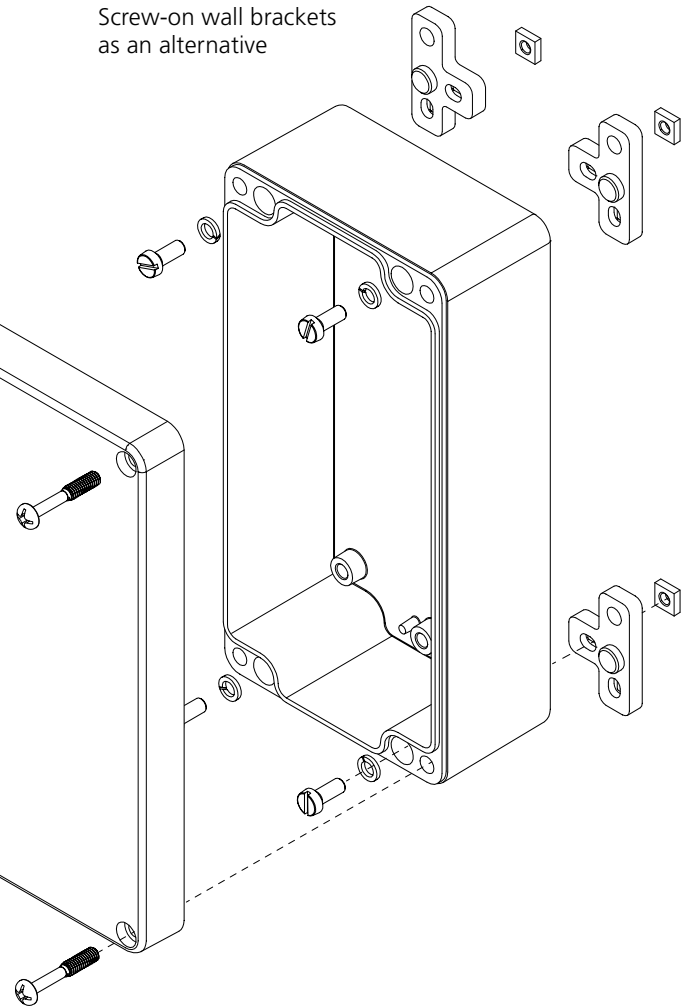


Crystal-clear cover (G)

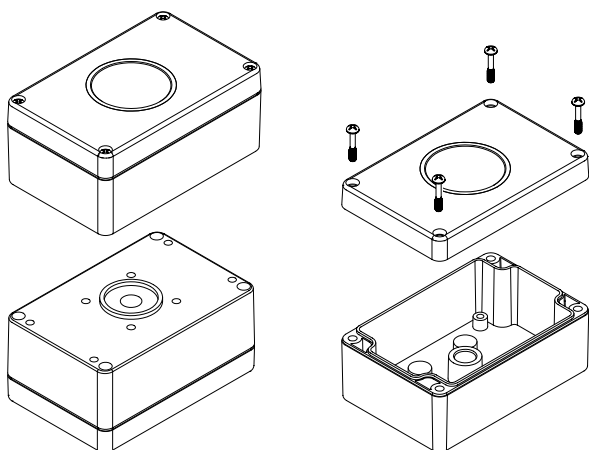


Euromas ABS | PC | F05

Screw-on wall brackets
as an alternative



V 215 F05
Variant with F05 holder



Dimensions

Modell	A	B	C	G	V0*
M / T 205	52	50	35	✓	✓
M / T 206	65	50	35	✓	✓
M / T 208	98	64	36.4		✓
M / T 210	82	80	55	✓	✓
M / T 215	120	80	55	✓	✓
M / T 216	120	80	60	✓	
M / T 217	122	120	55	✓	✓
M / T 219	160	80	60		
M / T 220	160	80	55	✓	✓
M / T 221	200	120	75	✓	✓
M / T 223	200	150	75	✓	✓
M / T 225	82	80	85	✓	✓
M / T 226	120	80	85	✓	✓
M / T 227	122	120	85	✓	✓
M / T 228	122	120	105	✓	✓
M / T 230	120	80	90		
M / T 231	160	80	85	✓	✓
M / T 235	160	80	90		✓
M / T 237	200	120	90	✓	
M / T 238	160	120	90	✓	✓
M / T 2381	160	120	75	✓	
M / T 240	250	160	90	✓	
M / T 2401	240.3	160.3	90	✓	✓
M / T 241	250	160	119		
M / T 242	240.5	120	100.5	✓	✓
M / T 243	240.3	160.3	120	✓	
M / T 244	340	150	100	✓	
M / T 245	340	150	120		
M / T 246	160	120	140	✓	
M / T 250	250	160	150		
M / T 251	360	160	100		
M / T 252	300	230	65		
M / T 253	300	230	85	✓	
M / T 254	300	230	110	✓	
M / T 255	360	200	149.5	✓	
T 260	360	400	150		
V 215 F05...	120	80	55		✓

* V0 = version using UL 94 V0 enclosure material

Accessories



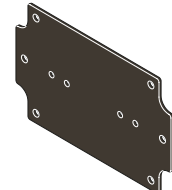
Knurled screws / Rubber feet



DIN rails
TH 15, G 32, TH 35



Mast mounting



Mounting panels in different versions

The product advantages



The glassbead-reinforced enclosure material provides especially high mechanical stability. SV version with quick-release fastener on request.



The tension range of the moulded-on cable glands is 8-10 mm.



Euromas Polymas has up to four moulded-on cable glands. This ensures that additional processing and mounting are unnecessary.



SV version with quick-release fastener on request.

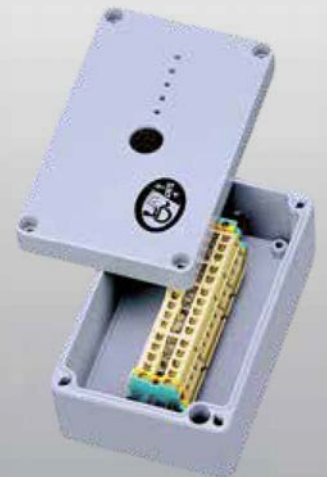


G version with crystal-clear lid on request.



Quick-Finder:
www.bopla.de/38

Examples of use





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A Phoenix Mecano Company

Euromas Polymas

Industry



Colour:

● Silver grey, similar to RAL 7001

Special colours on request

Protection class:

IP65 / DIN EN 60529; higher protection class on request

Material:

Enclosure: PA 6-GB 30

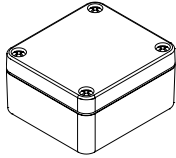
Seal: CR

For details see technical information.

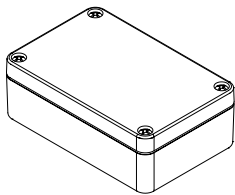


Enclosure sizes

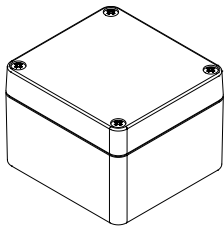
PK 101



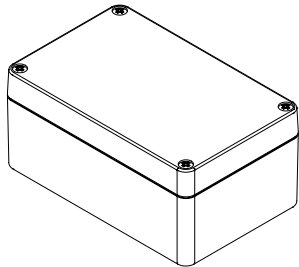
PK 102



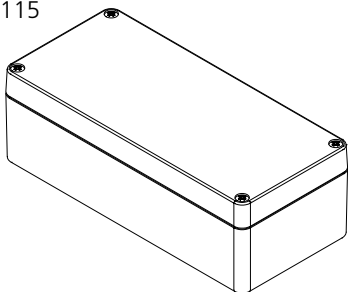
PK 105



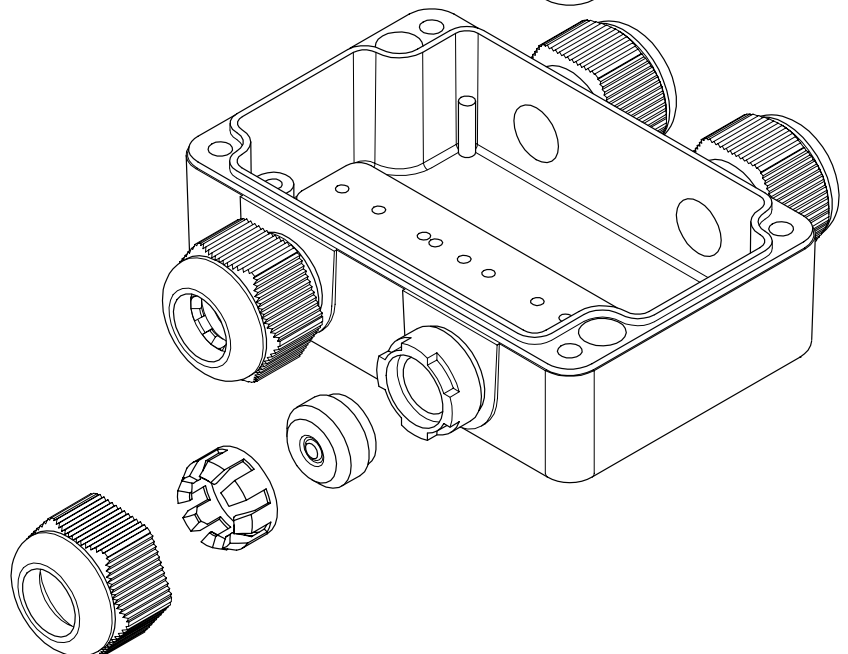
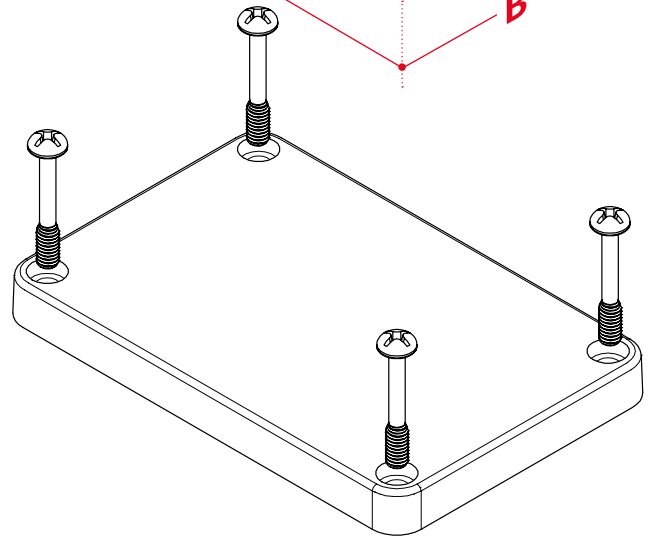
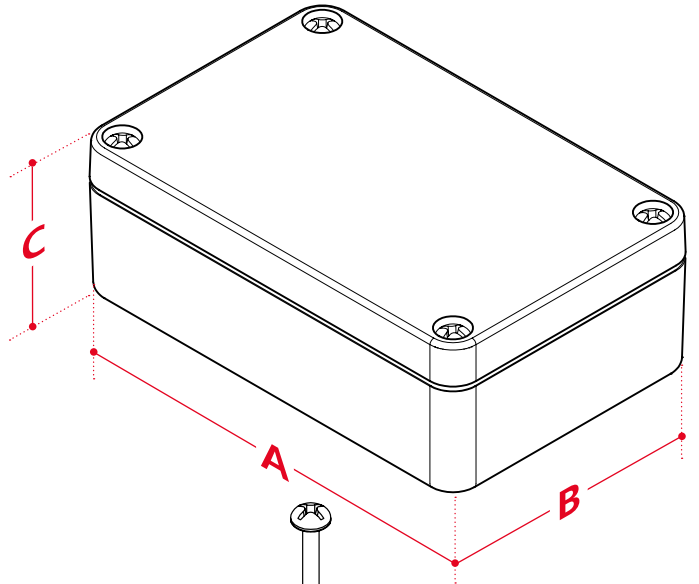
PK 110



PK 115



Design types





BOPLA

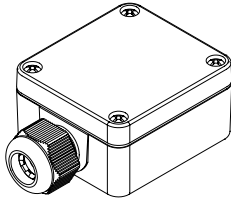
A Phoenix Mecano Company

Industry

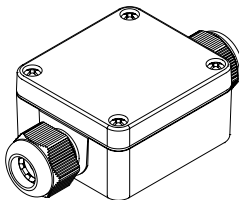
Euromas Polymas

Cable glands

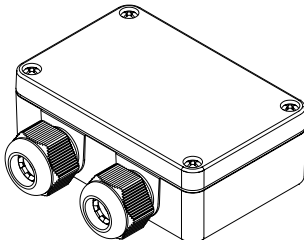
1 moulded-on cable gland
on PK 101-111



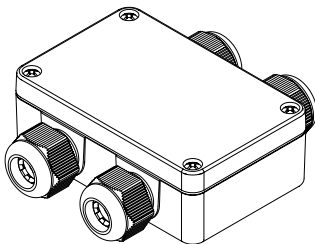
2 moulded-on cable glands
on PK 101-211



2 moulded-on cable glands on
PK 102-211



4 moulded-on cable glands
on PK 102-411



Dimensions

Model	A	B	C
PK 101...	58	64	34
PK 102...	98	64	34
PK 105...	75	80	57
PK 110...	125	80	57
PK 115...	175	80	57

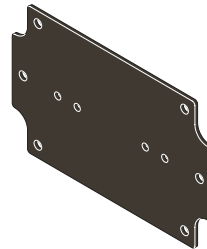
Accessories



DIN rails for PK 105 - 115



Mastbefestigung



Mounting panels in different versions

The product advantages



Polyester Euromas industrial enclosures are resistant to a large number of chemicals. This means that they are ideal for use in harsh outdoor environments.



When fitted with an optional silicone lid seal, the enclosure provides temperature resistance of up to 150°C.



Polyester has a much higher level of mechanical stability than ABS or PC, but is considerably lighter than aluminium and has insulating properties.



The enclosure can be fitted to the wall by means of the screw channels in the base or with wall brackets.



The enclosure screws are made of non-rusting stainless steel.



Quick-Finder:
www.bopla.de/04

Examples of use





BOPLA

A Phoenix Mecano Company

Euromas Polyester

Industry



Colour:

● Squirrel grey, similar to RAL 7000

Special colours on request

Protection class:

IP66 / DIN EN 60529; higher protection class on request

Material:

Enclosure: UP-GF 25-30%

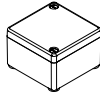
Seal: PU foamed

For details see technical information.

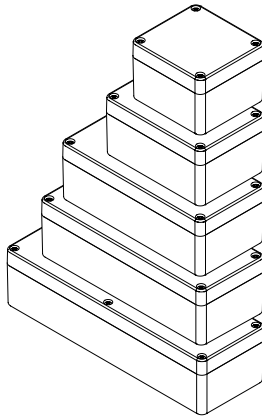


Enclosure sizes

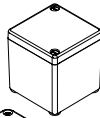
P 303



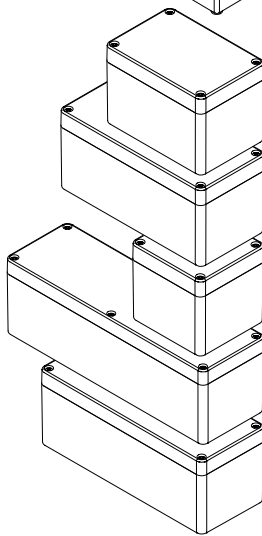
P 305
P 311
P 316
P 319
P 322



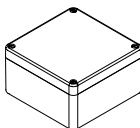
P 323



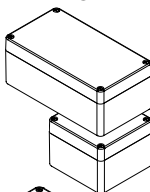
P 324
P 325
P 326
P 327
P 329



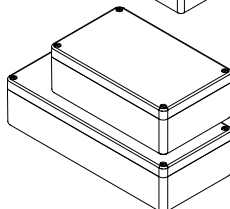
P 330



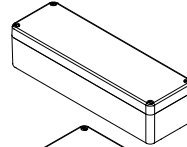
P 331
P 332



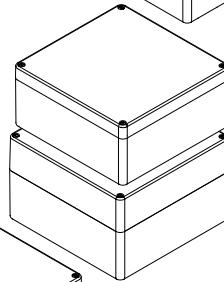
P 333
P 334



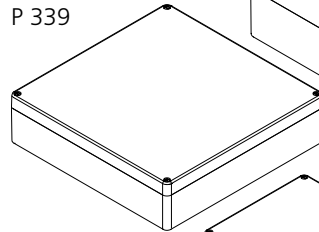
P 336



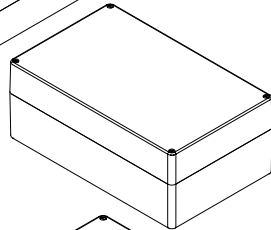
P 337
P 338



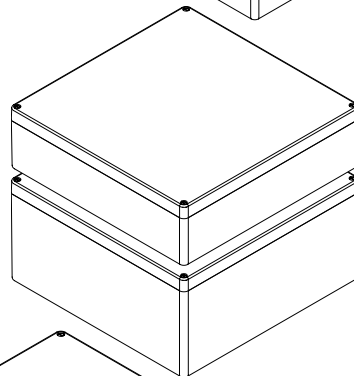
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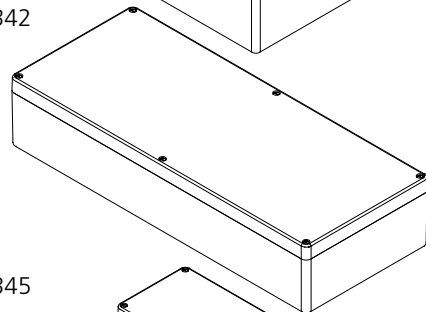
P 340



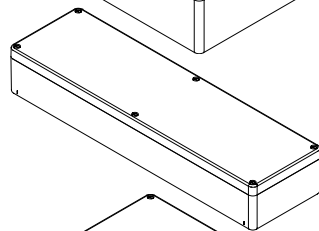
P 341
P 3412



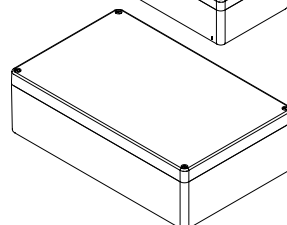
P 342



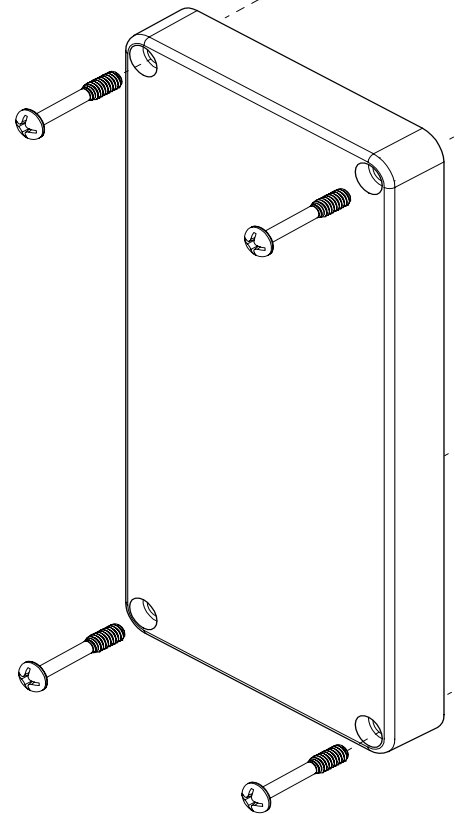
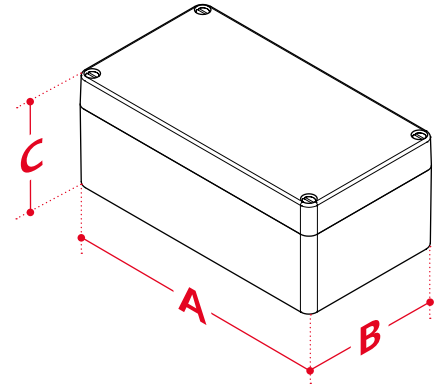
P 345



P 355



Design types



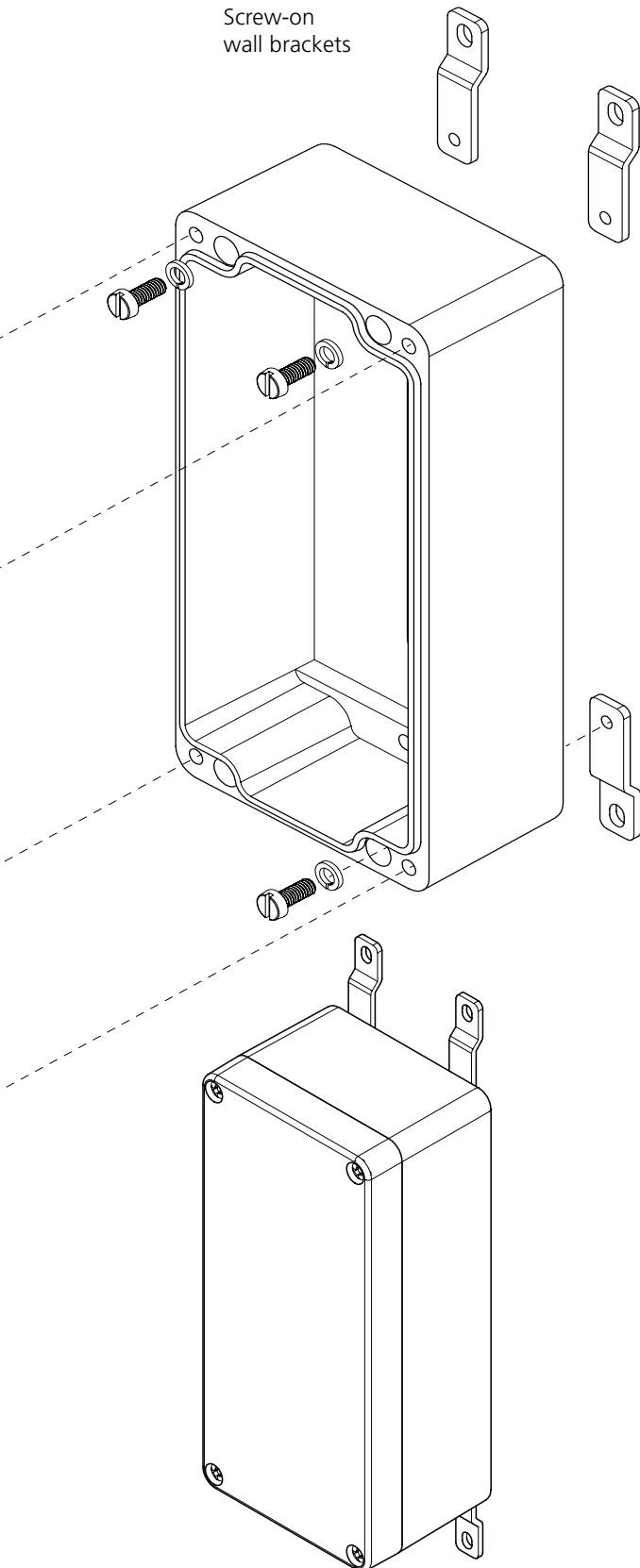


BOPLA

A Phoenix Mecano Company

Euromas Polyester

Industry



Dimensions

Model	A	B	C	SIL*
P 303	55	55	37.5	
P 305	80	75	56.5	✓
P 311	110	75	56.5	✓
P 316	160	75	56.5	✓
P 319	190	75	56.5	✓
P 322	230	75	56.5	✓
P 323	55	55	59	✓
P 324	110	75	75.5	✓
P 325	160	75	75.5	✓
P 326	80	75	75.5	✓
P 327	230	75	75.5	✓
P 329	190	75	75.5	✓
P 330	160	160	91	✓
P 331	220	120	91	✓
P 332	122	120	91	✓
P 333	260	160	91	✓
P 334	360	160	91	✓
P 336	320	100	81	✓
P 337	255	250	121	✓
P 338	255	250	161	✓
P 339	360	360	90.8	✓
P 340	400	250	161	✓
P 341	400	405	121	✓
P 3412	400	405	201	✓
P 342	600	250	121	✓
P 345	560	160	91	✓
P 355	400	250	121	✓

*SIL = with silicone lid seal

Accessories



Sealed capstan-headed screws



Earthing bar with terminal clamp



Wall brackets screw-on at rear



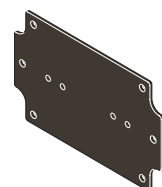
Set of hinges



DIN rails
TH 15, G 32, TH 35



Mast mounting



Mounting panels in different versions

The product advantages



With its modern design, Bocube Aluminium sets new design trends in the diecast enclosure sector. If required, the colour of the powder coating can be selected to match the application. Bocube aluminum - protects your electronics even in particularly harsh environments. NEW: discover the screwable version now!



The high protection class of IP69 is achieved with only two lid screws. As with all others, they are mounted invisibly under the design covers.



The integrated hinge ensures easy access to the interior, and wiring between the modules in the lid and base is perfectly protected.



The base has a moulded-on insertion opening for factory-activated pressure compensation membranes.



All the enclosure components are made of metal, so they are ideal for use in harsh environmental conditions



Quick-Finder:
www.bopla.de/00

Examples of use

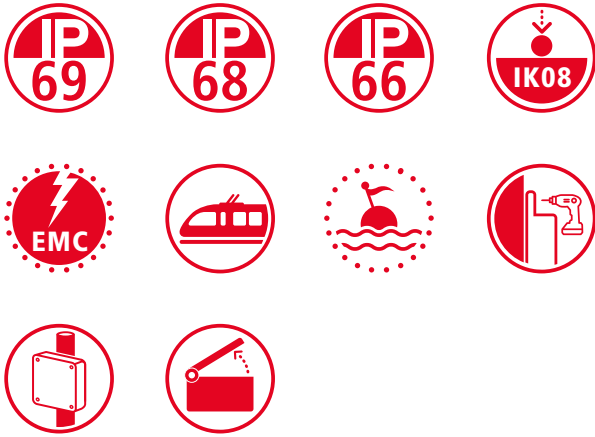




BOPLA

A Phoenix Mecano Company

Bocube Alu



Colour:

● Light grey, similar to RAL 7035

● Graphite grey, similar to RAL 7024

Special colours on request

Protection class:

IP66 / IP68 (1.2 m - 2 h) / IP 69 DIN EN 60529;

Higher protection class on request

Material:

Enclosure: GD Al Si 12

Seal: PU foamed

Hinges / covers: Al Mg Si 0,5

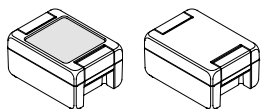
powder-coated or anodized in natural color

For details see technical information.

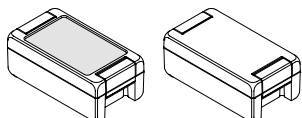


Enclosure sizes

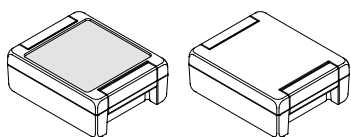
BA 100806



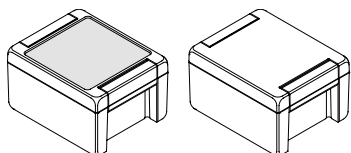
BA 140806



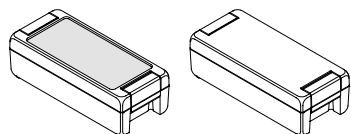
BA 141306



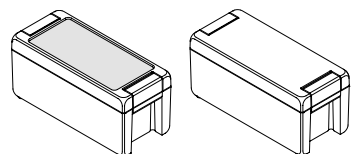
BA 141309



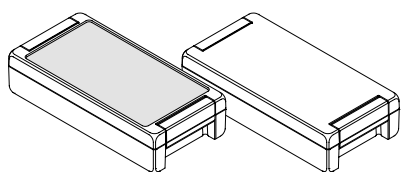
BA 180806



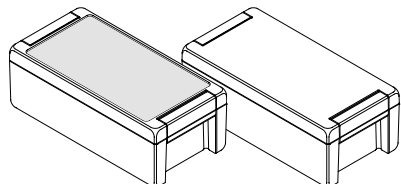
BA 180809



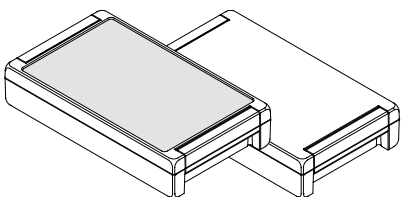
BA 241306



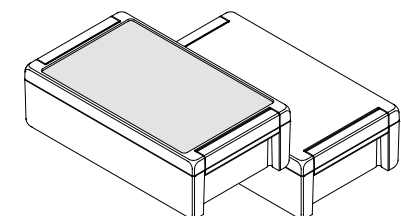
BA 241309



BA 281706

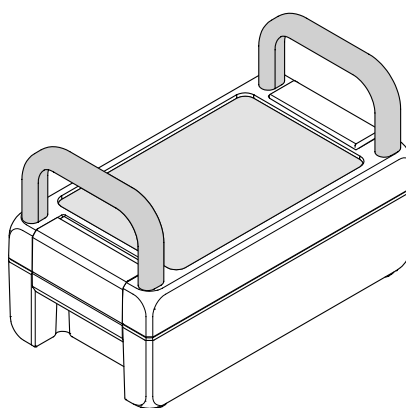
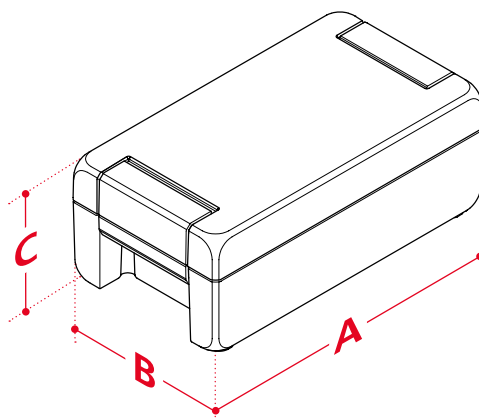
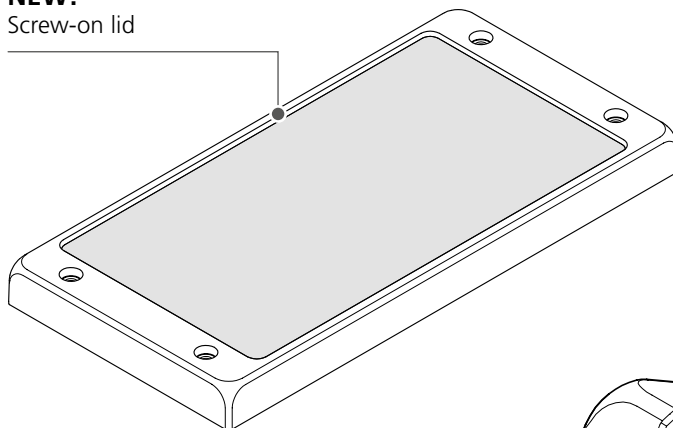


BA 281709



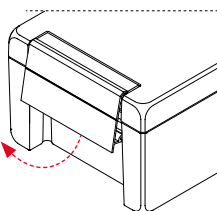
Design types

NEW!
Screw-on lid

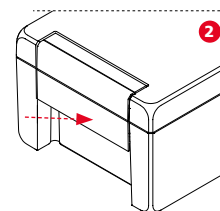
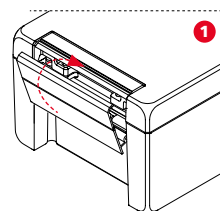


Optional quick-release fastener

Open



Close





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A Phoenix Mecano Company

Industry

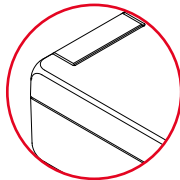
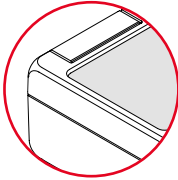
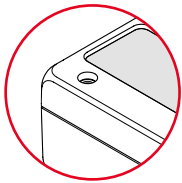
Bocube Alu

Lid variants

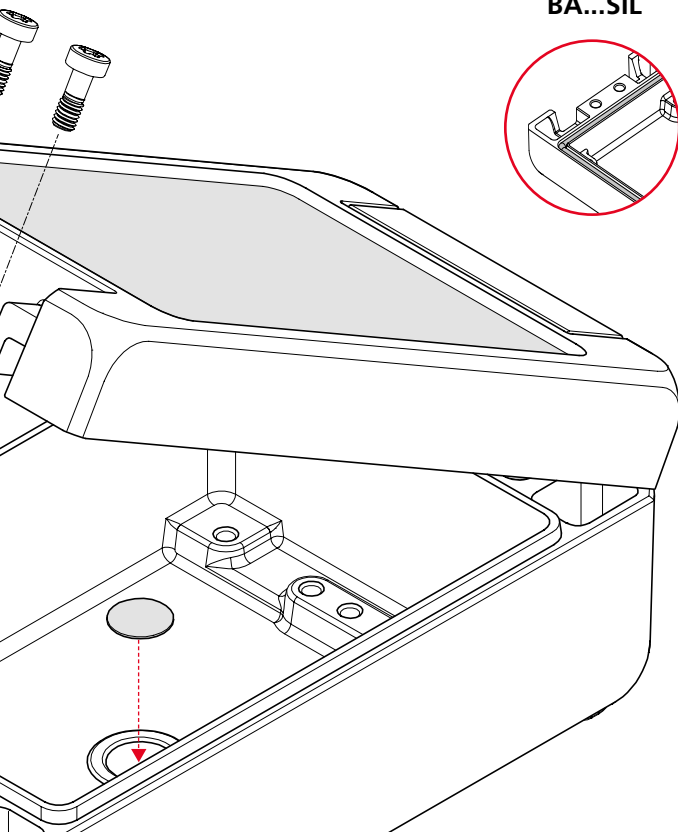
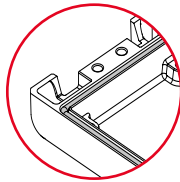
BA-S...

BA...F

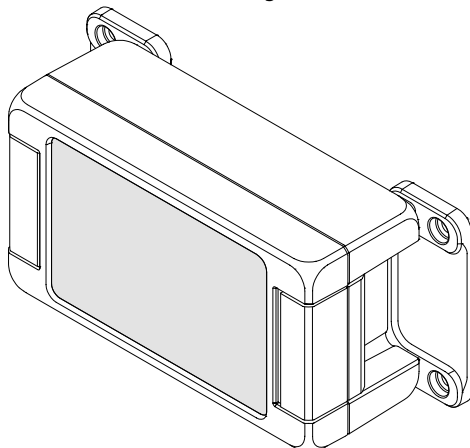
BA...



BA...SIL



Wall brackets
for screwing-on from the inside



Dimensions

Model	A	B	C	SIL*
BA 100806...	121	86	60	✓
BA 140806...	159	86	60	✓
BA 141306...	159	128	60	✓
BA 141309...	159	128	90	✓
BA 180806...	199	86	60	✓
BA 180809...	199	86	90	✓
BA 241306...	259	128	60	✓
BA 241309...	259	128	90	✓
BA 281706...	299	173	60	✓
BA 281709...	299	173	90	✓

*SIL = with silicone lid seal

Accessories



Wall brackets



Quick release



Set of handles



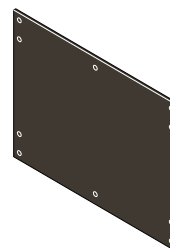
Pressure compensation membrane
DAE



DIN rails
TH 15, G 32, TH 35



Mast mounting



Mounting panels in different versions

The product advantages



Euromas Alu is an especially robust classic cast aluminium industrial enclosure. If required, the colour of the powder coating can be selected to match the application.



The foamed seal ensures a high protection class. Alternatively, higher temperature resistance can be achieved with a silicone seal. On request, a special EMC version is available which ensures a conductive connection between the lid and the base.

If required, a transparent lid allows a user to see inside the enclosure.



Circuit boards and DIN rails can be mounted in the base by using pre-cut threads. Earthing screws are included as standard in the scope of delivery.

Special versions with an FO5 mounting flange for applications on actuators and valves.



Quick-Finder:
www.bopla.de/01

Examples of use





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Euromas Alu | F05

Industry



Colour:

● Silver grey, similar to RAL 7001

Special colours on request

Protection class:

IP66 / DIN EN 60529;

Higher protection class on request

Material:

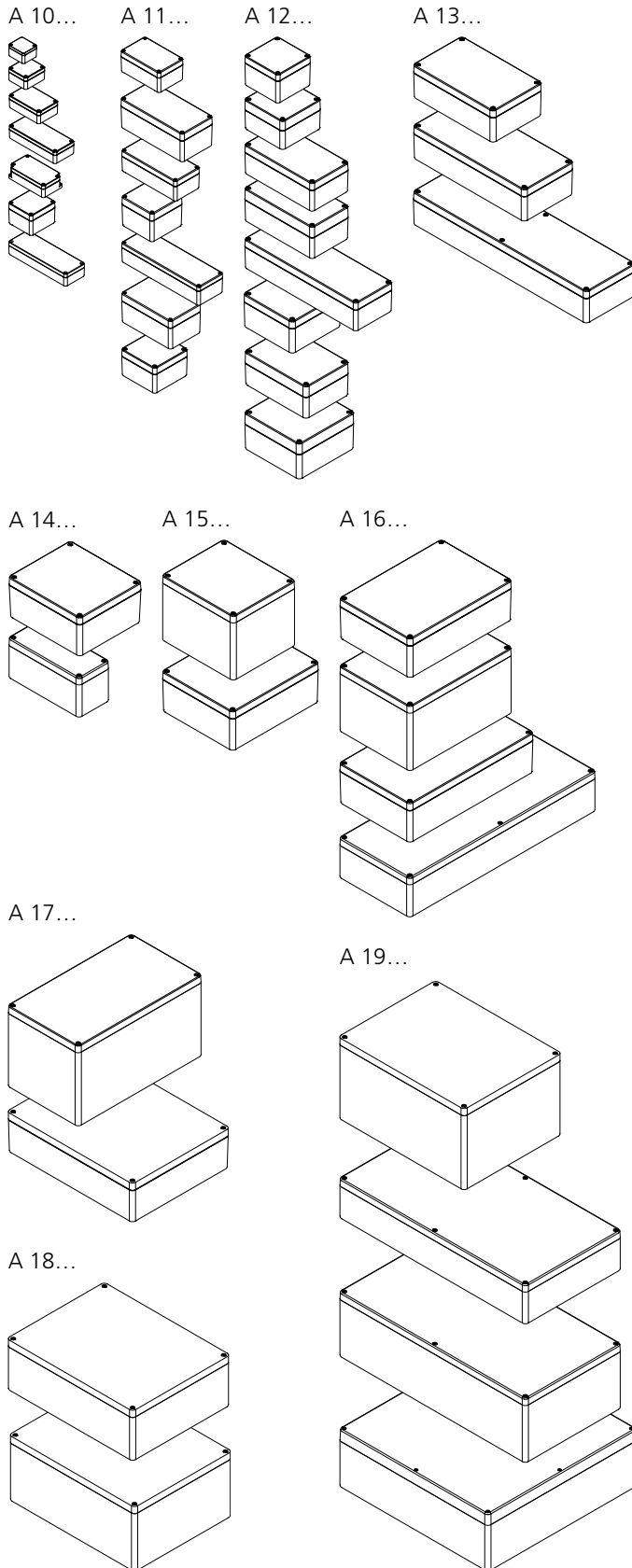
Enclosure: G Al Si 12

Seal: PU foamed

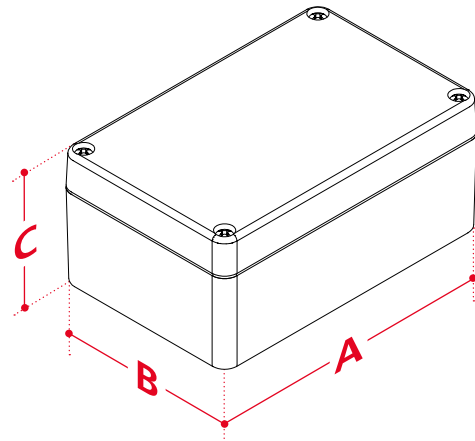
For details see technical information.



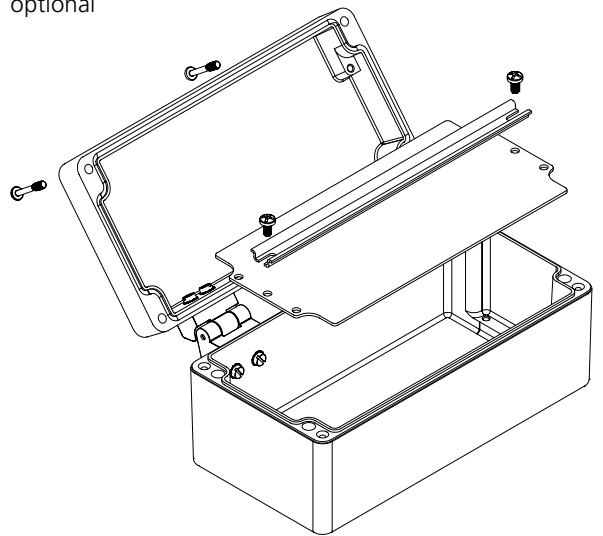
Enclosure sizes



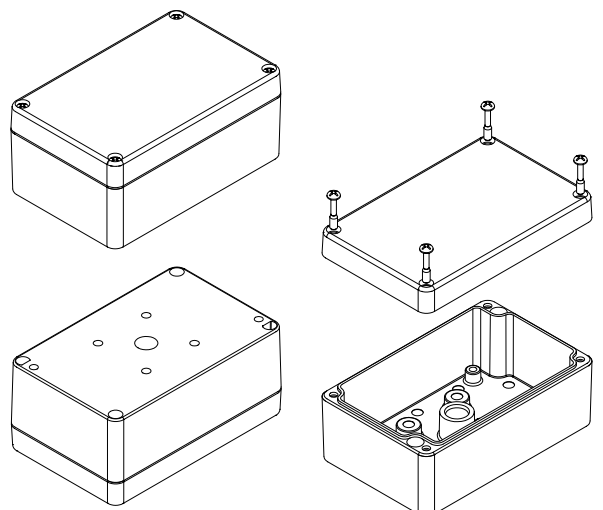
Design types



Variant with hinge
optional



Variant with F05 holder
V 215 F05



**BOPLA**

A Phoenix Mecano Company

Euromas Alu | F05

Accessories



Sealed capstan-headed screws



Hexagon socket screw (can be sealed)



Set of hinges



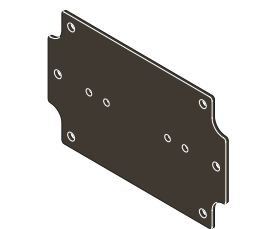
Wall brackets for screwing-on from the rear



Earthing bars with mounted terminal clamps



Mast mounting

DIN rails
TH 15, G 32, TH 35Mounting panels
in different versions

Dimensions

Model	A	B	C	SIL*
A 100	50	45	30	✓
A 101	58	64	34	✓
A 102	98	64	34	✓
A 103	150	64	34	✓
A 104	115	64	34.5	✓
A 105	75	80	57	✓
A 106	185.5	64	34.5	✓
A 110	125	80	57	✓
A 110 F05	125	80	57	
A 114	200	100	81	✓
A 115	175	80	57	✓
A 116	100	100	81	✓
A 117	250	80	52	✓
A 118	160	100	81	✓
A 119	122	120	81	✓
A 120	122	120	91	✓
A 121	140	140	91	✓
A 122	220	120	81	✓
A 123	220	120	91	✓
A 124	360	120	81	✓
A 125	160	160	91	✓
A 126	200	140	91	✓
A 127	180	180	101	✓
A 130	260	160	91	✓
A 131	280	180	101	✓
A 135	360	160	91	✓
A 138	560	160	91	✓
A 140	200	230	111	✓
A 145	230	100	111	✓
A 150	200	230	180	✓
A 155	280	230	111	✓
A 160	330	230	111	✓
A 165	330	230	181	✓
A 168	400	230	111	✓
A 169	600	230	111	✓
A 170	400	230	225	✓
A 175	400	310	111	✓
A 180	400	310	141	✓
A 185	400	310	181	✓
A 190	400	310	227	✓
A 196	600	310	111	✓
A 197	600	310	181	✓
A 198	600	600	202.5	✓

*SIL = with silicone lid seal

The product advantages



Polysafe consists of glass fibre reinforced polyester and provides an extremely high level of mechanical resistance to chemicals and UV irradiation. All the external components are made of plastic, which gives maximum protection against corrosion.



Easy disassembly of the door for mounting and servicing work. Internal hinges ensure high mechanical protection and stability.



A reliable locking system offers a protection class of up to IP66. Various locks are available, and the end user can replace a lock at any time.



External screw channels for direct wall mounting. Wall brackets are available as an option.



A protective cover integrated in the enclosure prevents penetration by dripping water when the door is opened.



Quick-Finder:
www.bopla.de/42





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Polysafe

Industry



Colour:

● Light grey, similar to RAL 7035

Protection class:

Depending on the model up to IP66 DIN EN 60529
Impact resistance IK10 according to IEC 62262

Material:

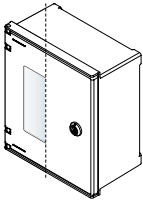
Enclosure: glass fiber reinforced polyester
Seal: PU foamed

For details see technical information.

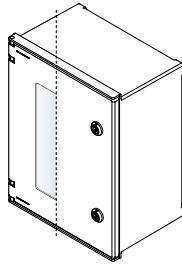


Enclosure sizes

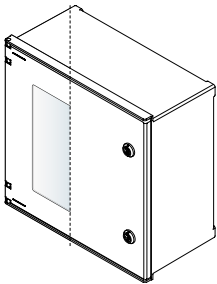
PS 321



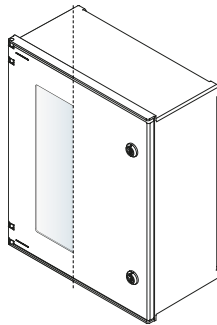
PS 432



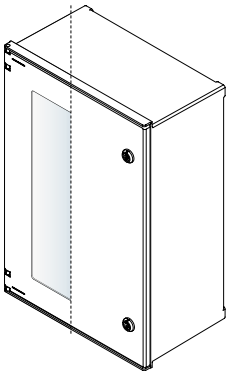
PS 442



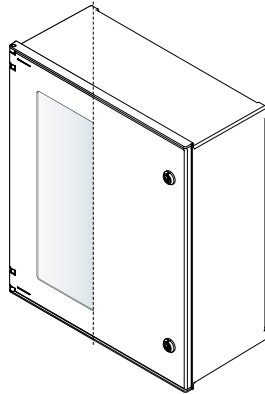
PS 542



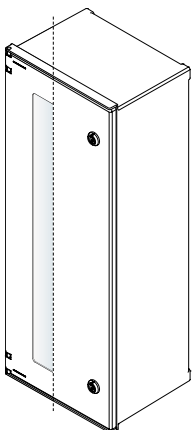
PS 642



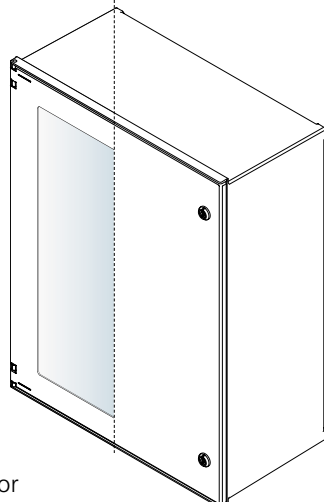
PS 652



PS 832

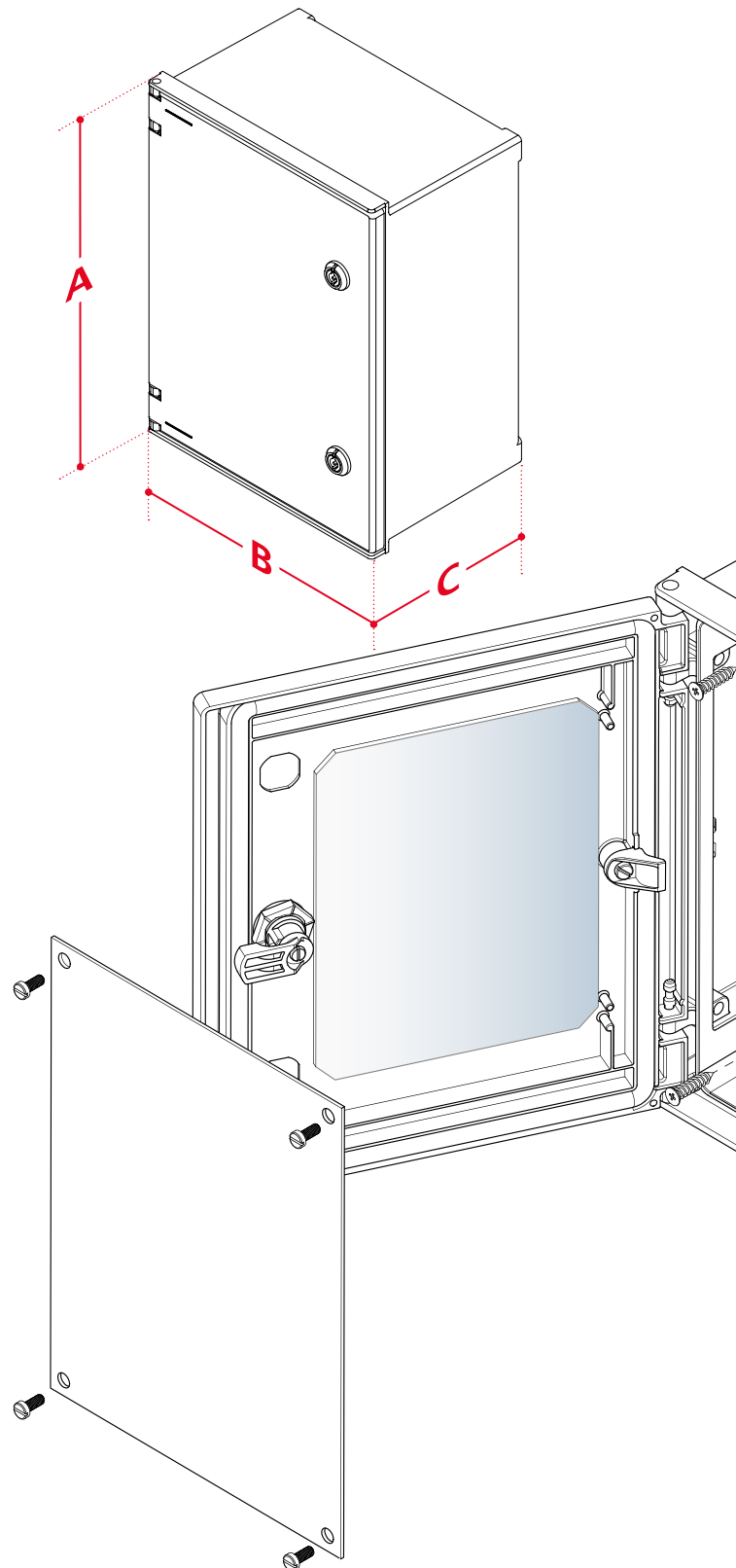


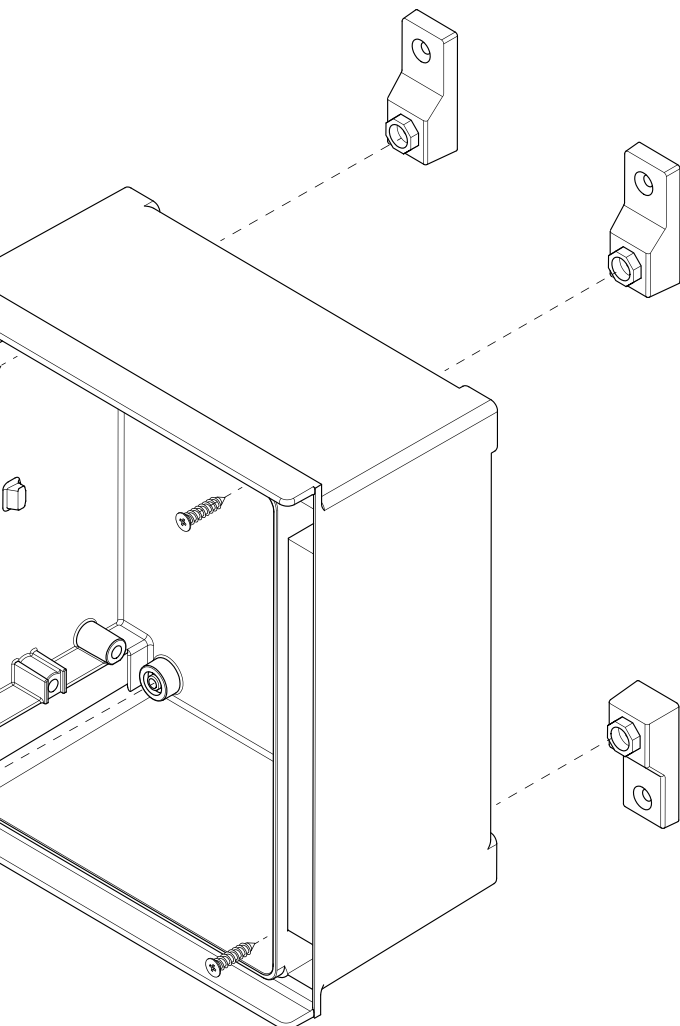
PS 863



The door is available closed or with an viewing window (-T).

Design types





Dimensions

Model	A	B	C
PS 321(-T)	300	250	140
PS 432(-T)	400	300	200
PS 442(-T)	400	400	200
PS 542(-T)	500	400	200
PS 642(-T)	600	400	230
PS 652(-T)	600	500	230
PS 832(-T)	800	300	230
PS 863(-T)	800	600	300

Accessories



Inner door with lock



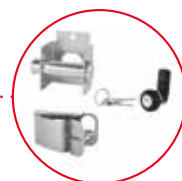
Metal frame for installation devices acc. to DIN



Door locking device



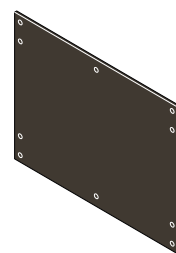
Various locks



Wall brackets



Mast mounting



Mounting panels in different versions





Automation

The very latest manufacturing technologies support all our manufacturing processes.



The product advantages



Bocard is a modular enclosure system with a large number of lid variants. From crystal-clear hinged lids to design covers for front panels, these can be combined with different bases.



For easy ordering, many configurations are available as a complete set. However, all enclosure parts are also available as individual components – ideal for creating individual colour combinations.

Bocard has an interior which can be flexibly divided with partitions and cover elements. Creating a separately accessible terminal compartment allows the connection of units without the need to open the electronics mounting space.



With matching accessories, the design-oriented enclosure system also looks special in applications other than in classic control technology.



The installation area (Type CF) can be mounted as an operating surface in a control panel. The rear-fitted sponge rubber seal creates a maximum IP65 seal to the control panel. Please note that combination with a base is not possible for this application.



Quick-Finder:
www.bopla.de/20

Examples of use





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Bocard



Colour:

- Graphite grey, similar to RAL 7024
- Light grey, similar to RAL 7035

Special colours on request

Protection class:

Depending on the model up to IP66 / IP68
(1.2 m - 2 h) DIN EN 60529

Material:

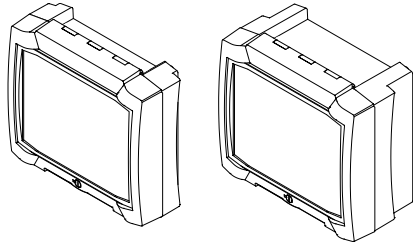
Enclosure: ABS
Seal: CR / PU foamed
V-0 versions on request

For details see technical information.

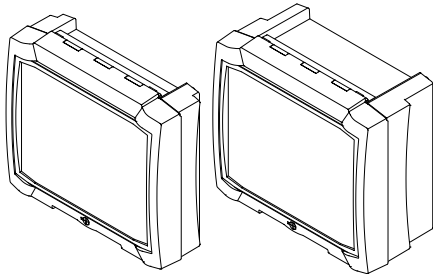


Enclosure sizes

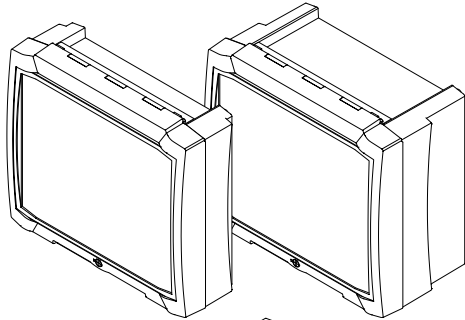
BCD 16...



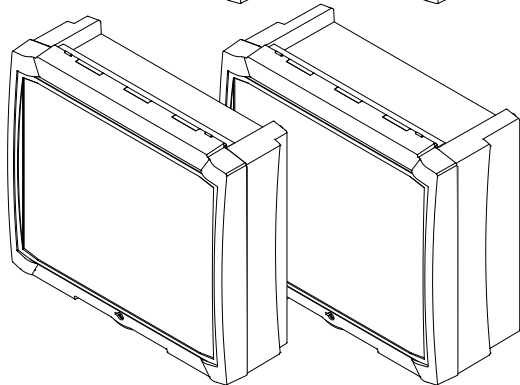
BCD 20...



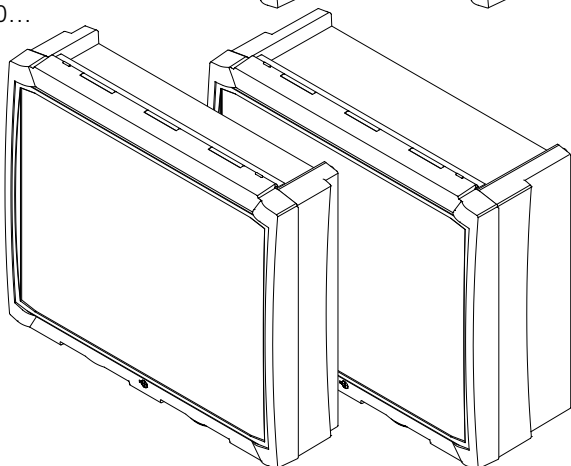
BCD 25...



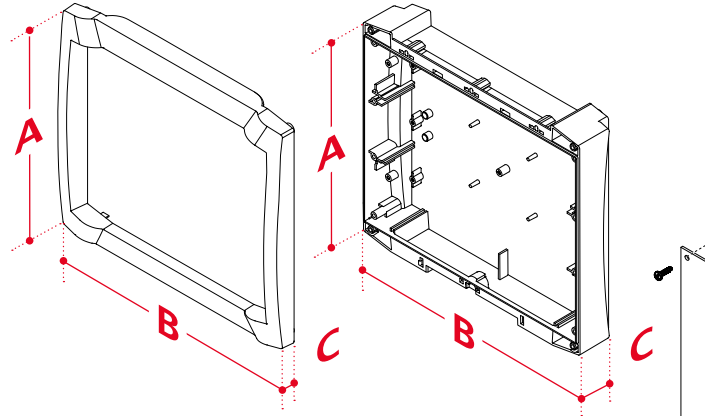
BCD 31...



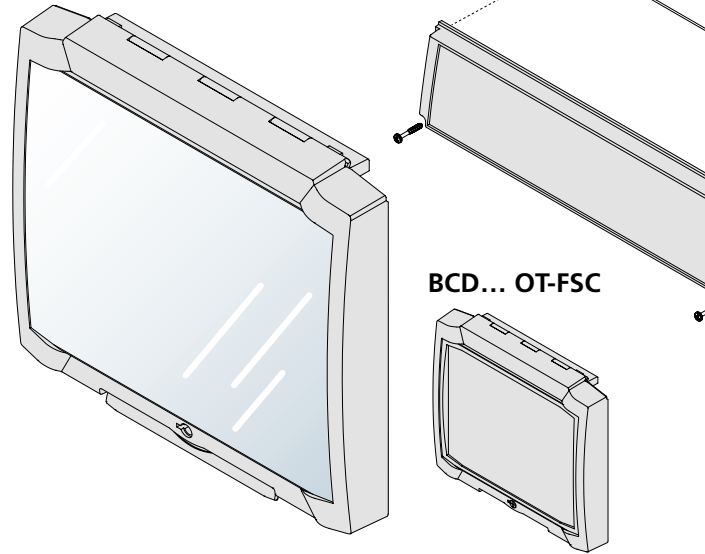
BCD 40...



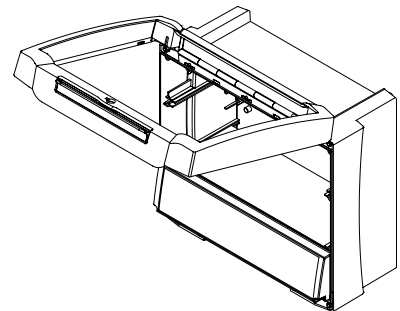
Design types



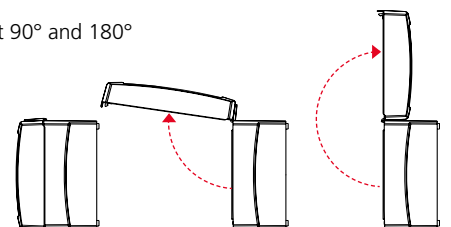
BCD... OT-G



Hinge



Detent position at 90° and 180°

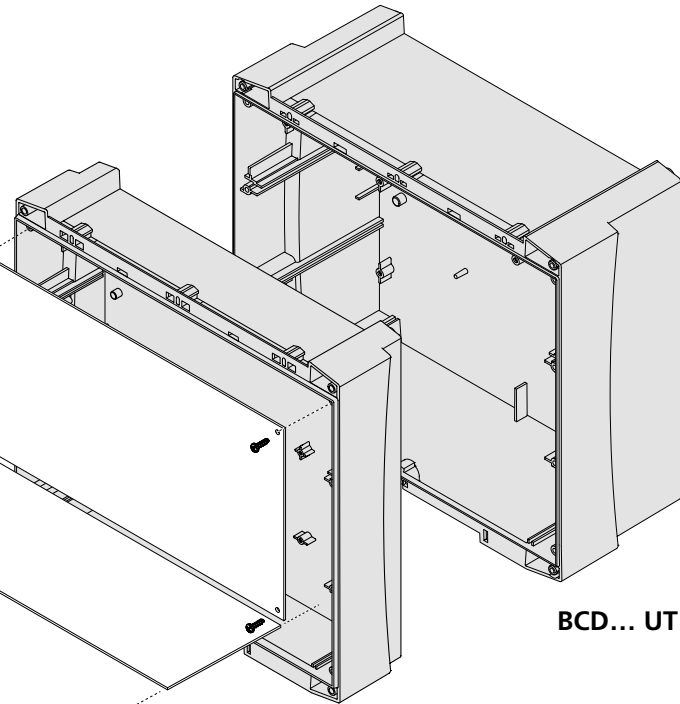




BOPLA

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Bocard



BCD... UT

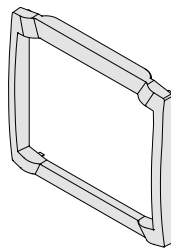
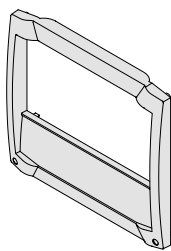
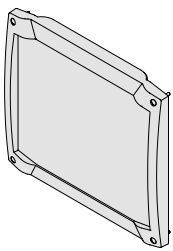


BCD... UT -0,5

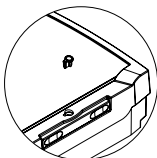
BCD... OT-F

BCD... FO-K

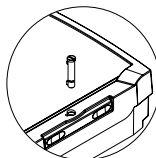
BCD... FO



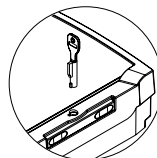
Lock



Blind plug

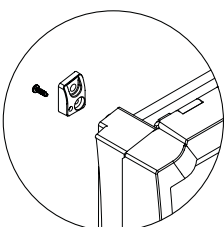


Catch

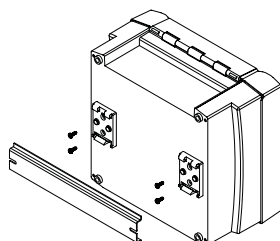


Cylinder lock

Wall fitting



DIN rail mounting



Dimensions

Model	A	B	C ¹	C ²
BCD 16... OT-G / OT-FSC	199	179.2	36.5	36.5
BCD 20... OT-G / OT-FSC	229	204.2	36.1	36.1
BCD 25... OT-G / OT-FSC	264	234.2	36	36
BCD 31... OT-G / OT-FSC	324	289.2	37.2	37.2
BCD 40... OT-G / OT-FSC	404	344.2	37.5	37.5
BCD 160 OT-F / FO-(K) / CF	199	177.85	19	19
BCD 200 OT-F / FO-(K) / CF	229	202.85	18.7	18.7
BCD 250 OT-F / FO-(K) / CF	264	232.85	18.7	18.7
BCD 160 UT...	195	173	35	70
BCD 200 UT...	225	198	40	80
BCD 250 UT...	260	228	50	105
BCD 310 UT...	320	283	71	105
BCD 400 UT...	400	338	71.5	120

C¹ = flat version / C² = high version

Cover

Model	OT-G	OT-FSC	OT-F	FO-K	FO
BCD 16...	✓	✓	✓	✓	✓
BCD 20...	✓	✓	✓	✓	✓
BCD 25...	✓	✓	✓	✓	✓
BCD 31...	✓	✓			
BCD 40...	✓	✓			

Accessories



Tip-up bow



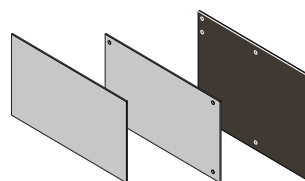
Handle



Cylinder lock for front lid



DIN rails
TH 15, G 32, TH 35



Front and part front panels and cover plates in different versions

The product advantages



RegloCard-Plus is a classic “L-shaped” control enclosure. It has a separately accessible terminal compartment which allows connection of the item without the need to open the electronics mounting space.

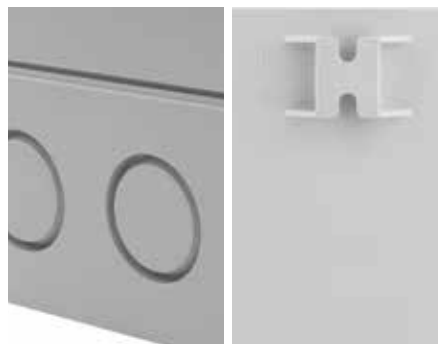


RCP XX0: For mounting front panels, with clip-on covering, IP40.

RCP XX00: Crystal-clear lid, hinged, with snap lock, IP65. A cylinder catch for retrofitting in the snap lock prevents unwanted access.



RCP F XXX: With screw-on front lid for membrane keypads, IP65.



All models are available with metric or Pg pre-punchings in the terminal compartment. A rear-fitted suspension unit ensures a secure fit on the wall.



Quick-Finder:
www.bopla.de/41

Examples of use



RegloCard-Plus Combifront



Colour:

● Light grey, similar to RAL 7035

Special colours on request

Protection class:

Depending on the model up to

IP65 / DIN EN 60529

Material:

Enclosure: ABS

Lid crystal clear: PC

Seal: EPDM

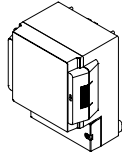
UL 94 V0 versions on request

For details see technical information.

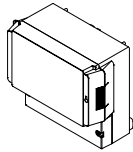


Enclosure sizes

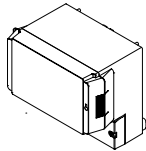
RCP(M) 1300 / RCP 130 F



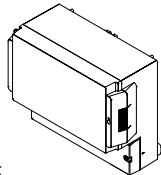
RCP(M) 1600 / RCP 160 F



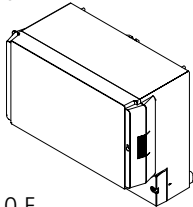
RCP(M) 1700 / RCP 170 F



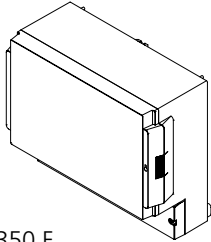
RCP(M) 2000 / RCP 200 F



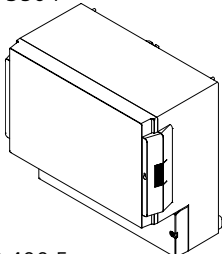
RCP(M) 2500 / RCP 250 F



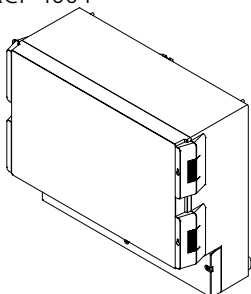
RCP(M) 3100 / RCP 310 F



RCP(M) 3500 / RCP 350 F

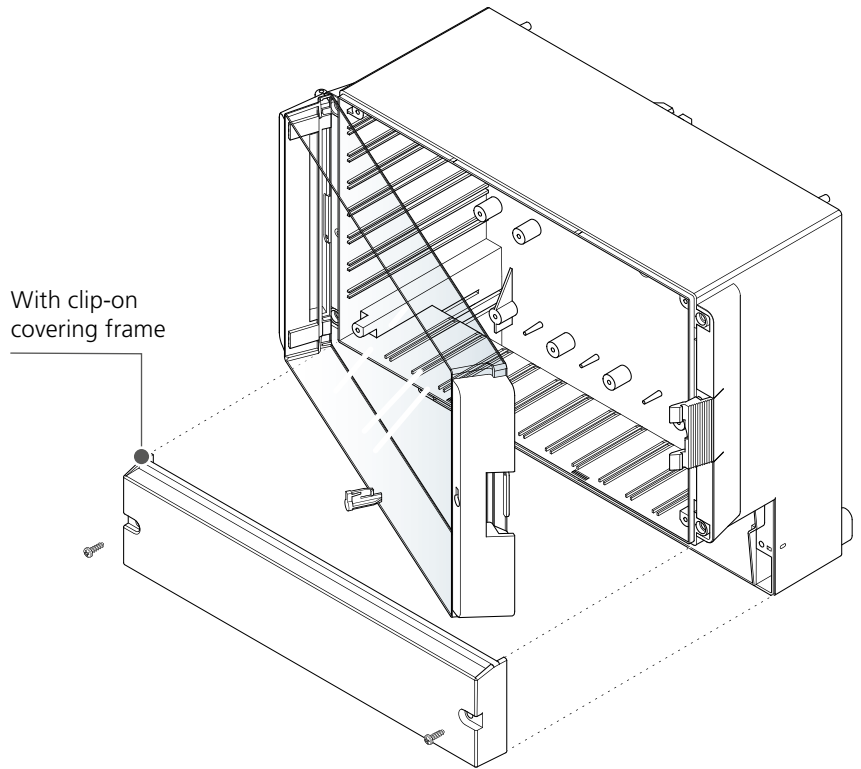


RCP(M) 4000 / RCP 400 F

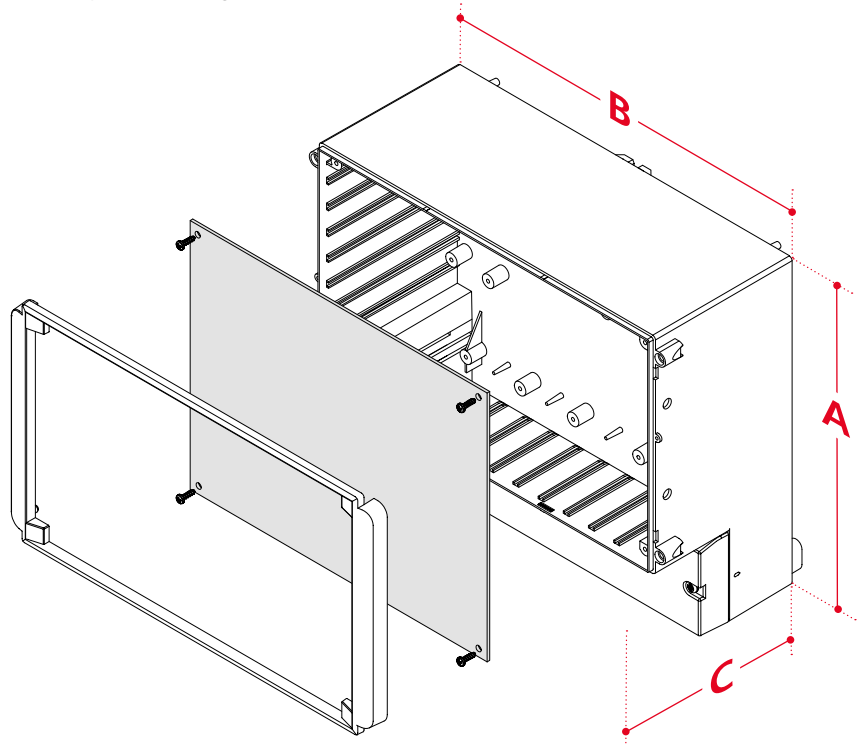


Design types

With crystal-clear lid hinged and with snap lock, IP65

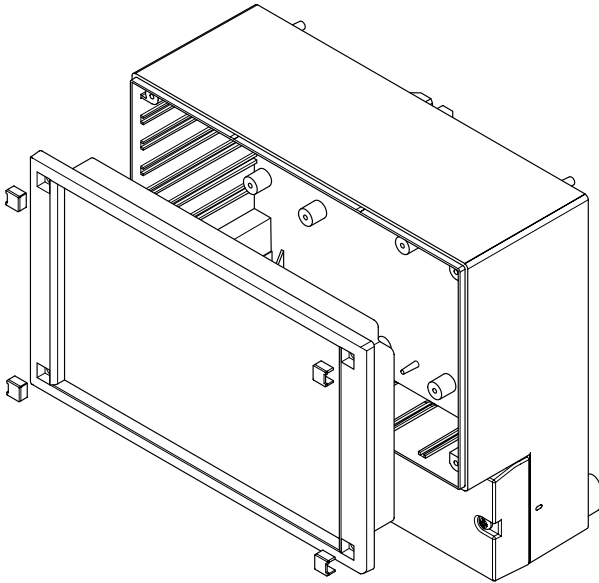


With clip-on covering frame

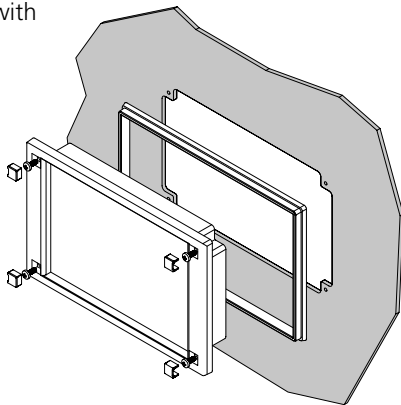


RegloCard-Plus Combifront

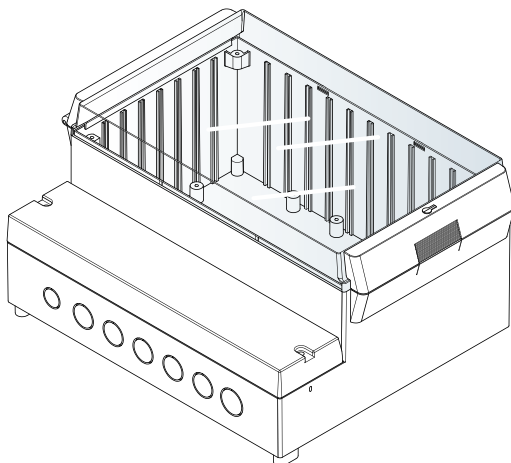
With screw-on front lid for membrane keypads,
max. IP65



Installation area with
continuous seal



Available with metric
or PG pre-punchings in the
terminal compartment



Dimensions

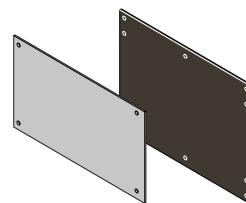
Model	A	B	C
With crystal-clear lid hinged and with snap lock, IP65			
RCP(M) 1300	131	186	103
RCP(M) 1600	166	161	93
RCP(M) 1700	166	161	121
RCP(M) 2000	213	185	104.5
RCP(M) 2500	257	217	132.5
RCP(M) 3100	296	261	132.5
RCP(M) 3500	296	281	158
RCP(M) 4000	363.4	318.6	150

Model	A	B	C
With clip-on covering frame			
RCP(M) 130	131	186	81
RCP(M) 160	166	161	71
RCP(M) 170	166	161	99
RCP(M) 200	213	185	82.5
RCP(M) 250	257	217	110.5
RCP(M) 310	296	261	110.5
RCP(M) 350	296	281	136
RCP(M) 400	363.4	318.6	128.5

Model	A	B	C
With screw-on front lid for membrane keypads, max. IP65			
RCP(M) 130 F	131	186	82.5
RCP(M) 160 F	166	161	72.5
RCP(M) 170 F	166	161	100.5
RCP(M) 200 F	213	185	84
RCP(M) 250 F	257	217	112
RCP(M) 310 F	296	261	112
RCP(M) 350 F	296	281	137.5
RCP(M) 400 F	363.4	318.6	130.5

Model	A	B	C
Installation area with continuous seal up to IP54			
CF 130	131	131	9.5
CF 160	166	106	9.5
CF 200	213	125	9.5
CF 250	257	157	9.5
CF 310	296	196	9.5
CF 400	363.6	233.6	11.5

Accessories



Front and mounting panels in
different versions



Wall brackets
screw-on at rear



Cylinder lock / hand lock for sub-
sequent mounting

The product advantages



CombiCard is a modular system which allows the assembly of individual enclosure configurations.

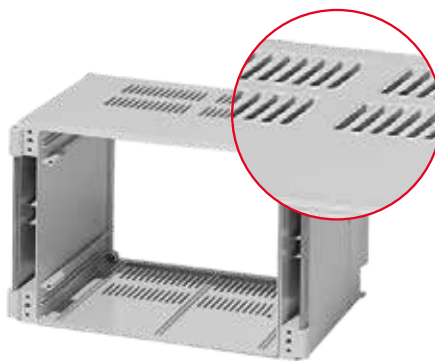


All front, basic and rear elements can be combined in one basic size. The combination of "front with rear lid" can be created even without a basic element.

The integrated hinged quick-release catches allow easy fitting and left-hand or right-hand opening between each system component.



19" subracks according to DIN EN 60297-3-101 can be fitted in suitable enclosure configurations.



With a suitable enclosure size, the basic elements with air vents can be positioned according to the convection requirements.



Quick-Finder:
www.bopla.de/79

Examples of use



CombiCard 5000-7000



Colour:

Side panels, front and base parts:

● Light grey, similar to RAL 7035

Front cover FD...G: crystal clear

Backs:

● Agate grey, similar to RAL 7038

Special colours on request

Protection class:

IP66 / DIN EN 60529

With ventilation slots IP30 / DIN EN 60529

Material:

Enclosure: ABS; PC (only FD...G)

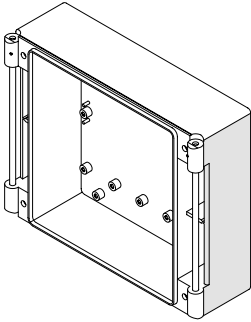
Seal: CR

For details see technical information.

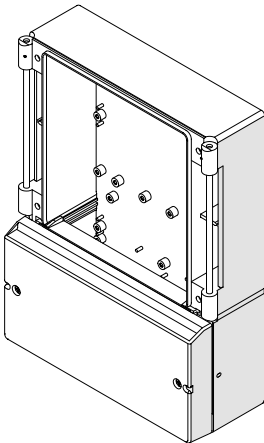


3 basic versions

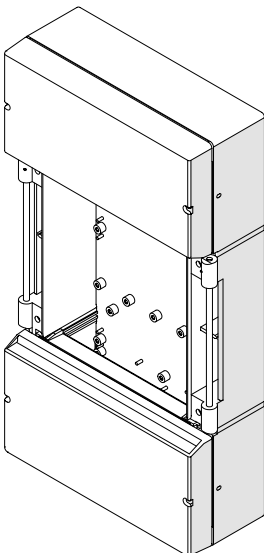
Rear lid



Rear lid with terminal compartment



Rear lid with terminal compartment on both sides

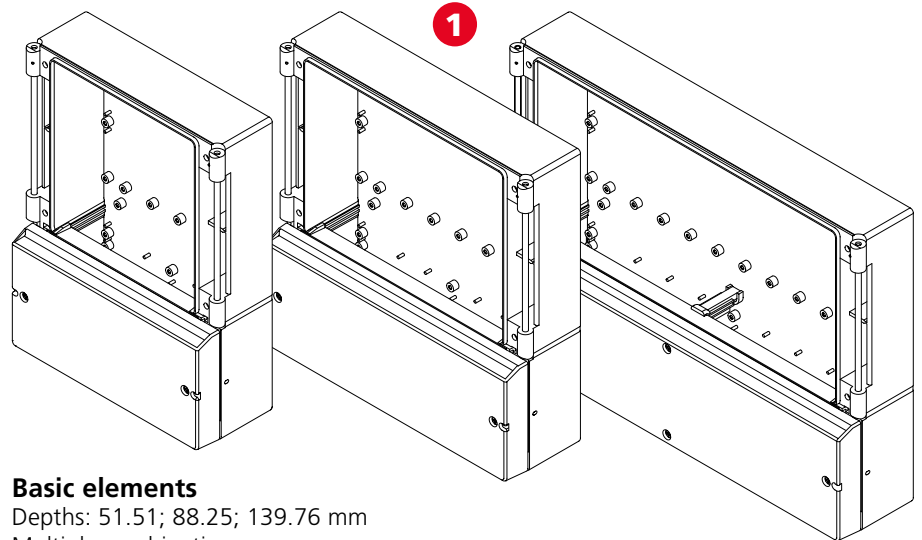


3 enclosure widths

CombiCard 5000

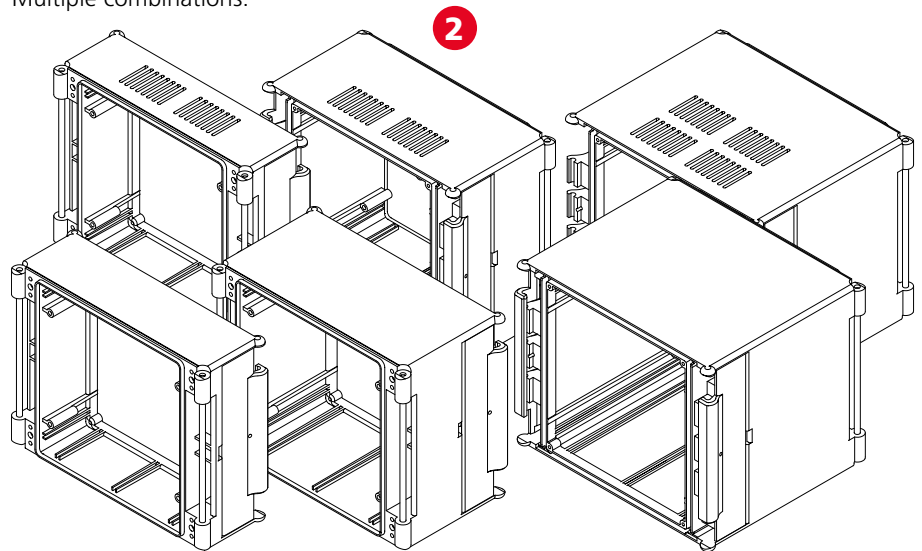
CombiCard 6000

CombiCard 7000

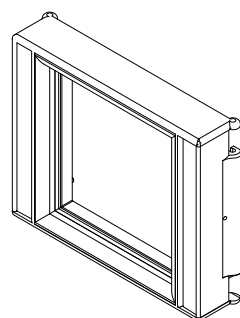


Basic elements

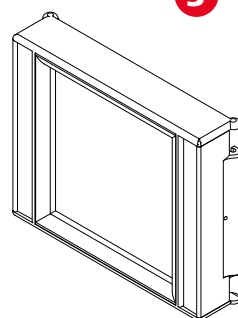
Depths: 51.51; 88.25; 139.76 mm
Multiple combinations.



Front frame

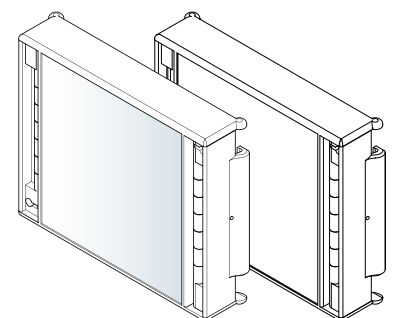


FO front frame, open, with seal



FR front frames, closed, for membrane keypads

Front lid



FD front frames, closed, for membrane keypads
FD...G front lid crystal-clear

CombiCard 5000-7000

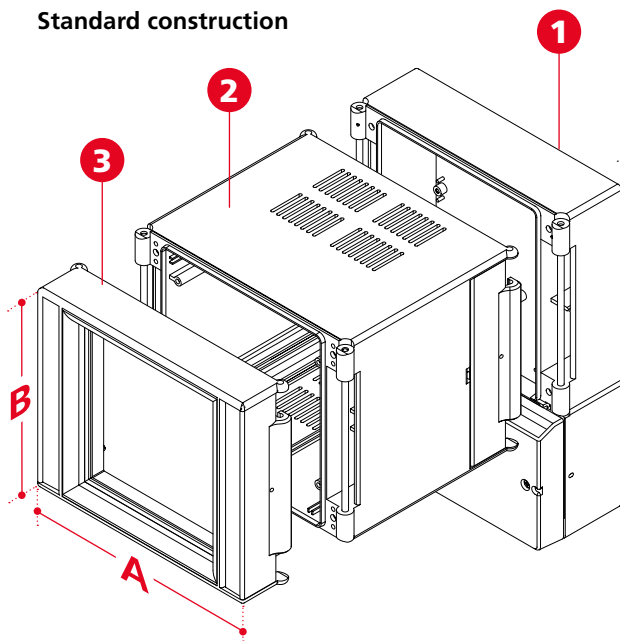


BOPLA

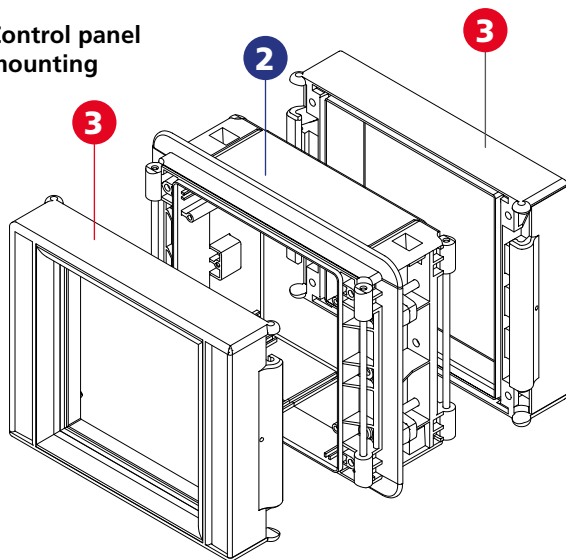
A Phoenix Mecano Company

Design types

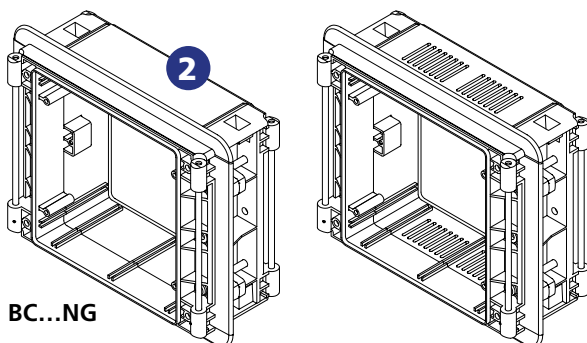
Standard construction



Control panel mounting



Basic element for control panel mounting



BC...NG

Dimensions

Model	A	B	C
CC 5000	175.7	146.7	dependent on the combination
CC 6000	226.5	146.7	dependent on the combination
CC 7000	323	146.7	dependent on the combination

C = dependent on the actual combination

Accessories



19" subracks according to
DIN EN 60297-3-101 aluminium



Handle



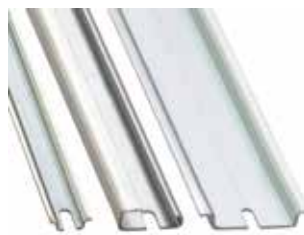
Lock bolt for basic elements



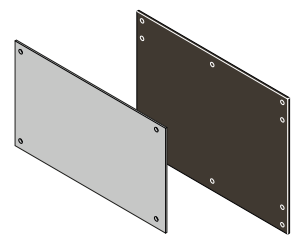
Wall brackets for rear lid



Cylinder lock for FD fronts



DIN rails
TH 15, G 32, TH 35



Front and mounting panels in
different versions

Control

The product advantages



CombiCard 1000-3000 is a modular system which allows the assembly of individual enclosure configurations.



All front, basic and rear panel elements of the same size can be combined individually. Front and rear elements can also be assembled directly without a base element.



Mounting of the enclosure components is by means of tie bars. This results in an optimal relationship between the external dimensions and the usable interior space.



Special matching system accessories allow the fitting of 19" internal constructions. Mounting in control panels is also possible if a special basic element is used.



Different hinge options for the system components provide access to the electronics. To ensure optimal functioning, we recommend factory-fitting of the hinges.



Quick-Finder:
www.bopla.de/19

Examples of use



CombiCard 1000-3000

CombiSet 500



Colour:

Base parts:

● Light grey, similar to RAL 7035

Front cover FD...G: crystal clear

Front and back parts:

● Graphite grey, similar to RAL 7024

Special colours on request

Protection class:

Depending on the version up to
IP65 / DIN EN 60529

Material:

Enclosure: ABS; PC (only crystal clear lids)

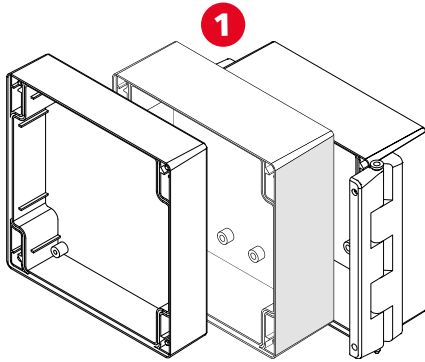
Seal: EPDM

For details see technical information.

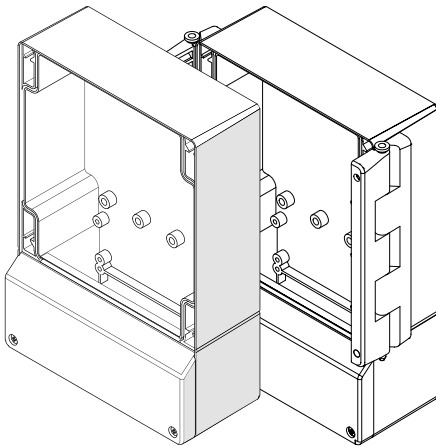


3 basic versions

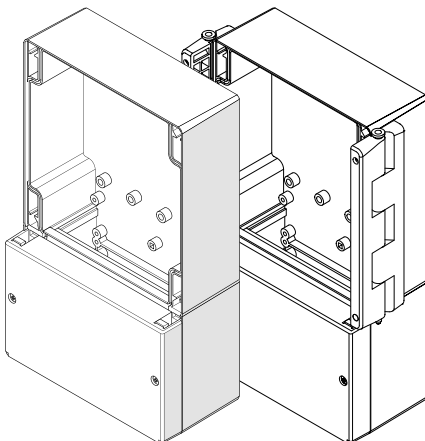
Rear lid



Rear lid, terminal compartment with and without hinge

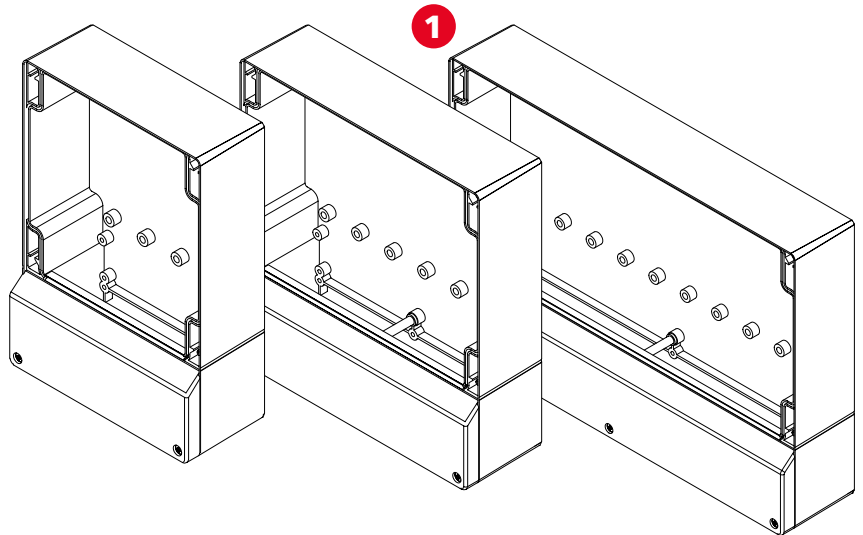


Rear lid, large terminal compartment with and without hinge



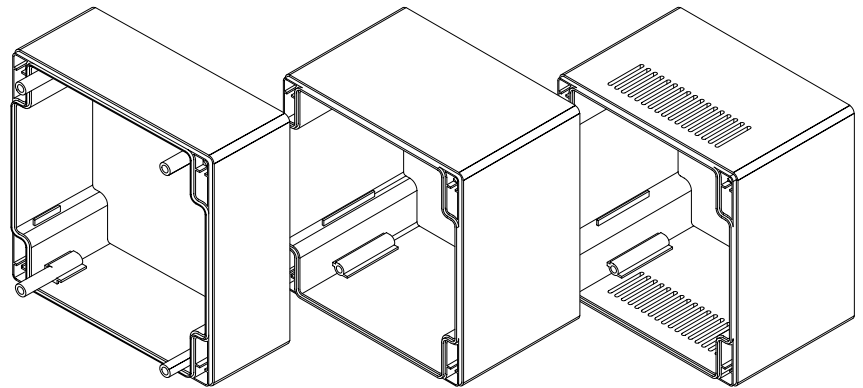
3 enclosure widths

CombiCard 1000 CombiCard 2000 CombiCard 3000

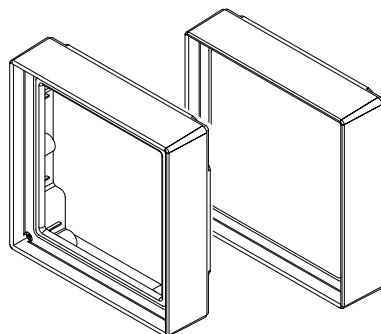


Basic elements

Combinable in multiples



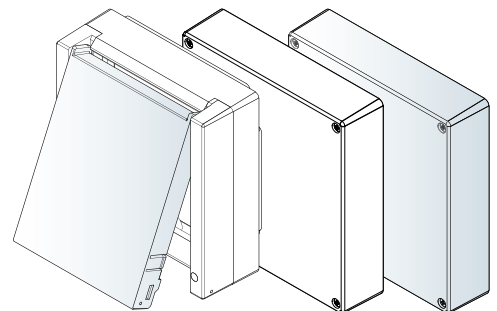
Front frame



FO front frame, open, with seal

FR front frames, closed, for membrane keypads

Front lid



3

FC...FP front frame with protective lid

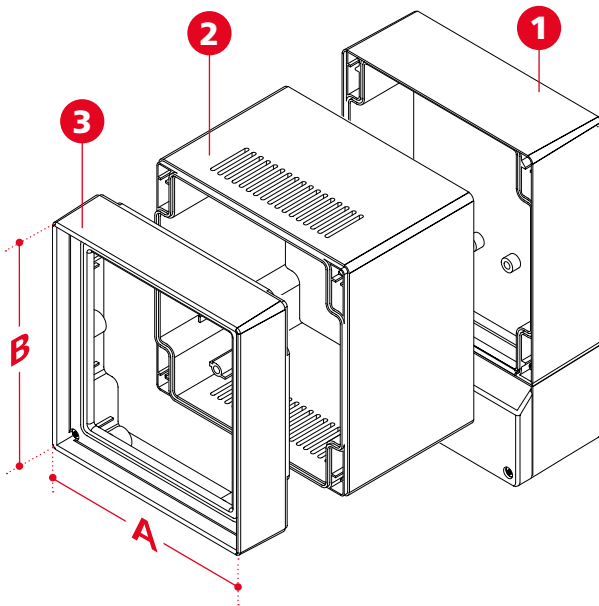
FD lid, closed
FD...G front crystal pure

CombiCard 1000-3000

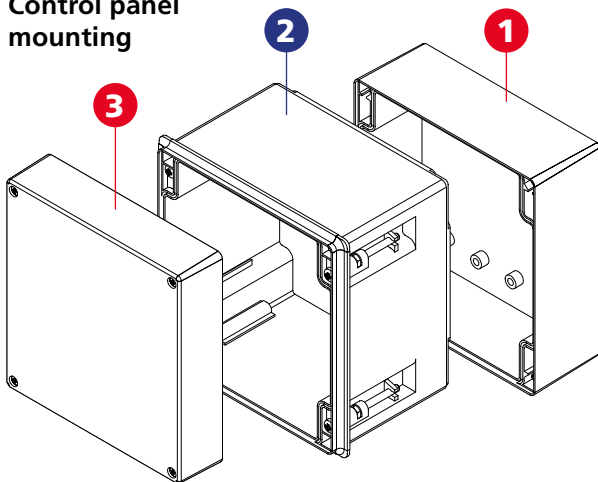
CombiSet 500

Design types

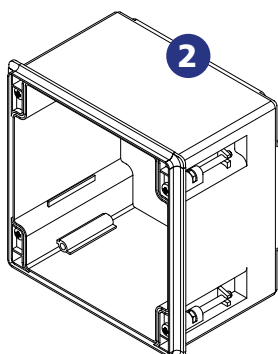
Standard construction



Control panel mounting



Basic element for control panel mounting



BC...NG

Dimensions

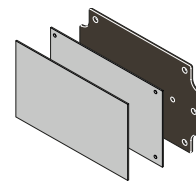
Model	A	B	C
Front frame			
FD 1000 (G)	133.4	138	34.1
FD 2000 (G)	184.2	138	34.1
FD 3000 (G)	280.72	138	34.1
FR 1000 / FO 1000	133.4	138	33.6
FR 2000 / FO 2000	184.2	138	33.6
FR 3000 / FO 3000	280.72	138	33.6
FCT 1000 FP	133.4	138	50
FCT 2000 FP	184.2	138	50
FCT 3000 FP	280.72	138	50
Basic element			
BC 1000 (L) / (NG)	133.4	138	87.5
BC 2000 (L) / (NG)	184.2	138	87.5
BC 3000 (L) / (NG)	280.72	138	87.5
BC 1000 N	133.4	138	51
BC 2000 N	184.2	138	51
BC 3000 N	280.72	138	51
Rear lid			
RD 1000	133.4	138	29.6
RD 2000	184.2	138	29.6
RD 3000	280.72	138	29.6
RD 1000 H / HSC	133.4	138	48
RD 2000 H / HSC	184.2	138	48
RD 3000 H / HSC	280.72	138	48
RD 1000 K / KSC	133.4	193	48
RD 2000 K / KSC	184.2	193	48
RD 3000 K / KSC	280.72	193	48
RD 1000 G-K / G-KSC	133.4	223	48
RD 2000 G-K / G-KSC	184.2	223	48
RD 3000 G-K / G-KSC	280.72	223	48

C = depending on the respective combination

Accessories



Cylinder lock for CC 500 TK / NGTK



Front and mounting panels in different versions



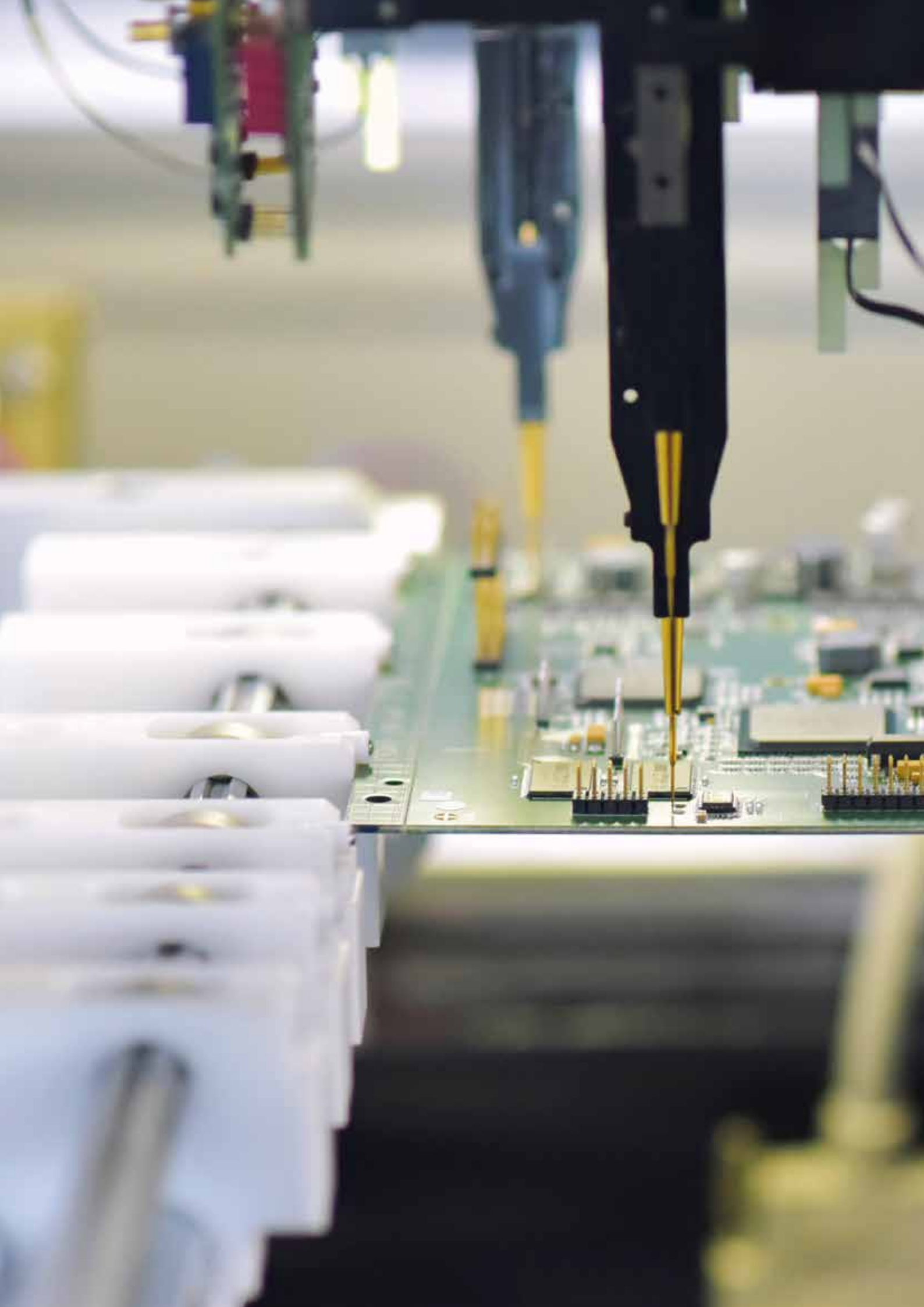
19" internal construction for connector DIN EN 60603-2

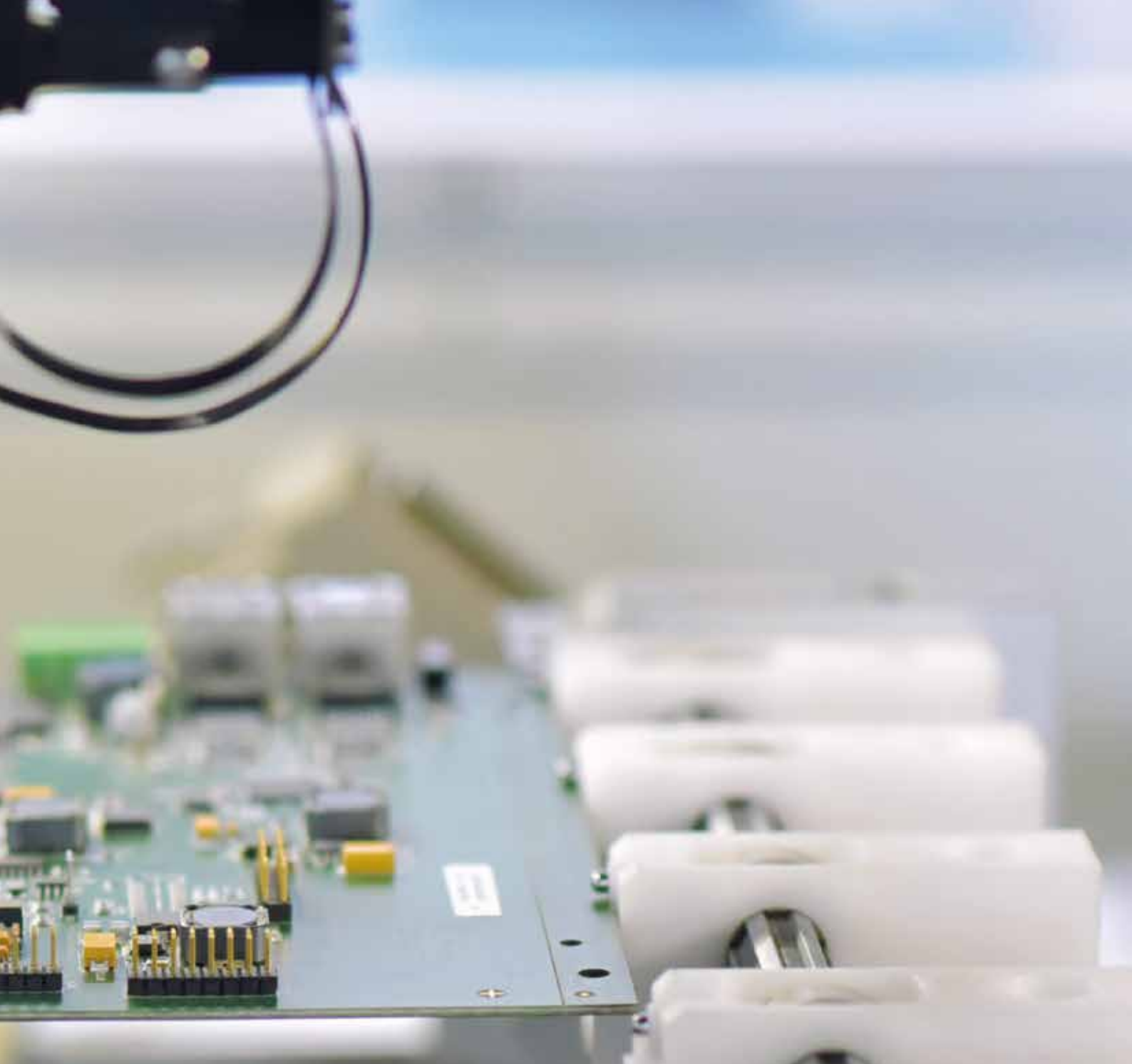


19" internal construction for backplane



19" front module rails for fixing 19" part front panels





Electronics

We support you while you develop your electronics – from your own idea right up to the product.

The product advantages



The different variants: With and without wall brackets, and screwing from the front and behind.



Pressure compensation by mounting the DAE-D11 pressure compensation membrane. For this purpose, drill (or punch) a hole in the moulded contour from the inside and glue the membrane in position.



Ingress protection IP65 by means of design seal; available in various colours. This increases the mounting height for the electronics by approx. 1.7 mm.



Other colours can be used depending on the project, for example translucent.

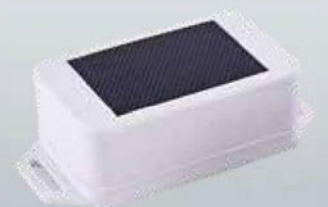


A 1.6 mm thick PCB can be clamped directly between the enclosure parts and optionally hot-caulked via two pins.



Quick-Finder:
www.bopla.de/16

Examples of use





BOPLA

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BoLink



Colour:

● Black, similar to RAL 9005

● White, similar to RAL 9003

Special colours on request

Protection class:

IP40, with seal: IP65 DIN EN 60529

Material:

Enclosure: PC V-0

PC V-0 material is flame-resistant, self-extinguishing and suitable for outdoor use (f1 listing acc. to UL 746C).

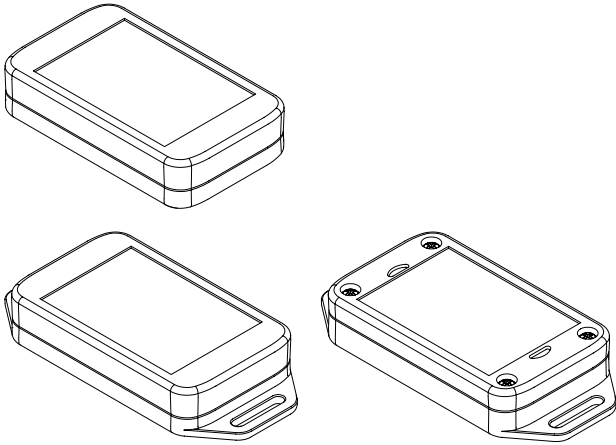
Seal: TPE

For details see technical information.

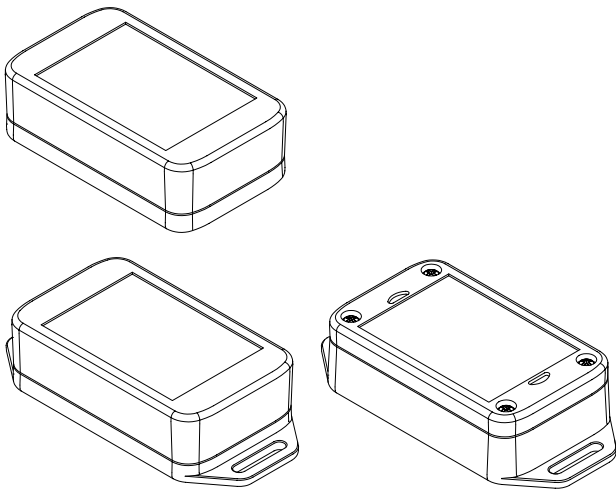


Enclosure size

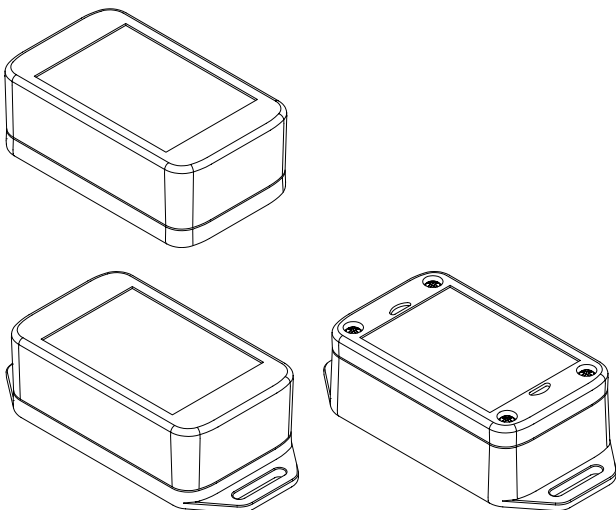
BL 704015...



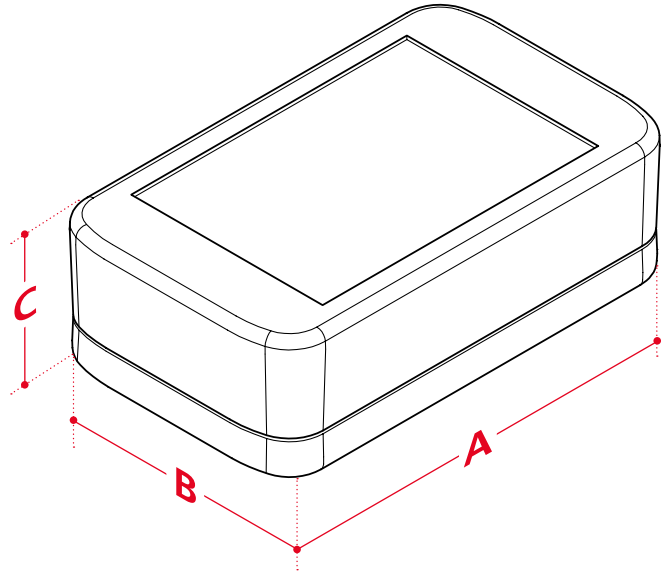
BL 704020...



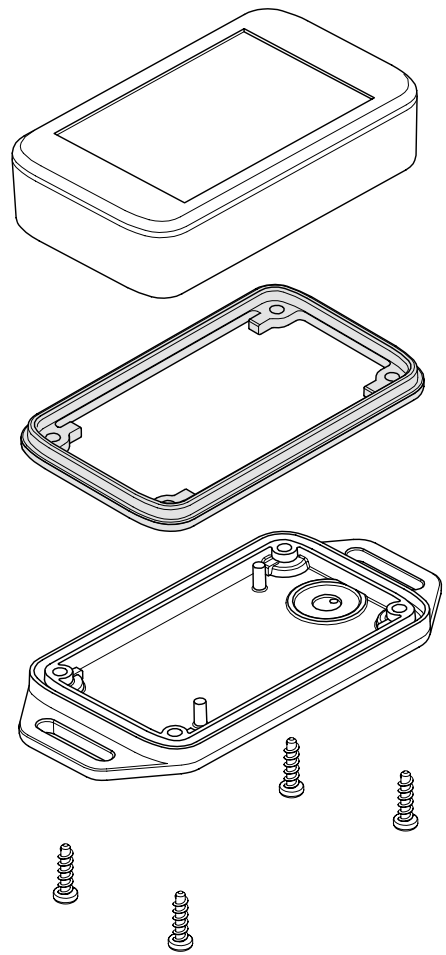
BL 704025...



Design type



Lid fixing below (BL...)





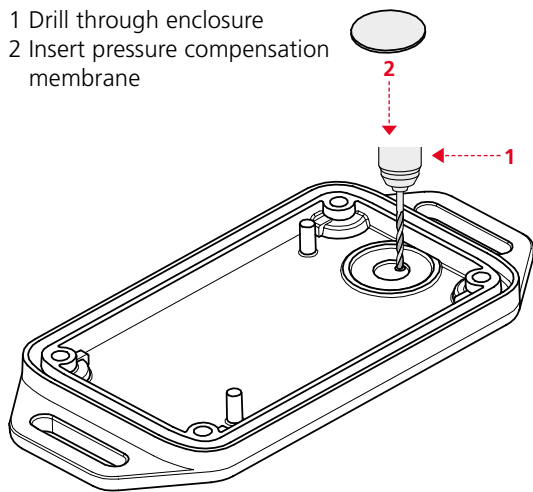
BOPLA

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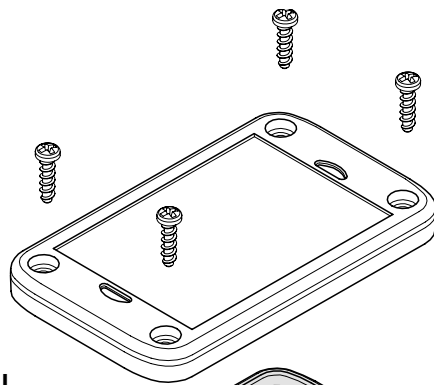
BoLink

Pressure compensation membrane DAE

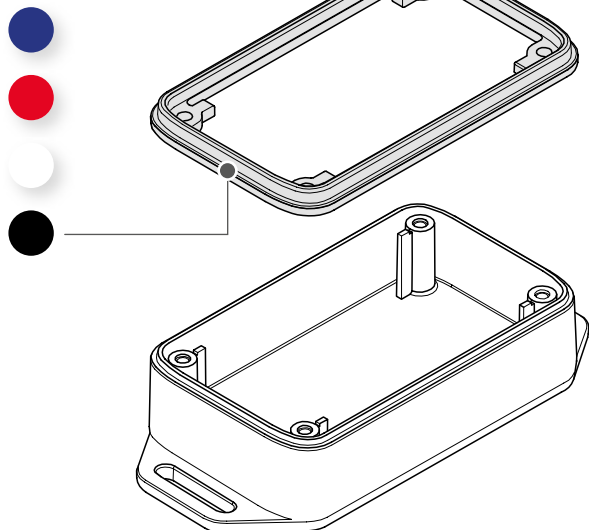
- 1 Drill through enclosure
- 2 Insert pressure compensation membrane



Lid fixing on top (BL...DO)



Design seal



Dimensions

Model	A	B	C
BL 704015...	70.4	42.4	15.5
BL 704020...	70.9	42.9	22
BL 704025...	71.2	43.2	26

Accessories



Pressure compensation membrane D11



Seals, IP65

The product advantages



Circum is a design-oriented electronics enclosure system. In addition to the standard version (F / F-FP), it is also available as a console type (P / P-FP) or for wall/control panel mounting (F-NG).



The enclosure screws are concealed under cover panels which are available in various colours. They can be used to create additional colour designs.

Depending on the situation, versions can be selected with integrated front panels (C...F / P) or plug-in front panels (C...F-FP / P-FP).



Wall mounting using the wall brackets is possible for variants F and F-FP. These can be mounted in two positions, as required.



The control panel version can be fixed to the wall with the use of a mounting frame.



Quick-Finder:
www.bopla.de/93

Examples of use



Circum



Colour:

● Graphite grey, similar to RAL 7024

● Agate grey, similar to RAL 7038

Special colours on request

Protection class:

IP40 / DIN EN 60529

Material:

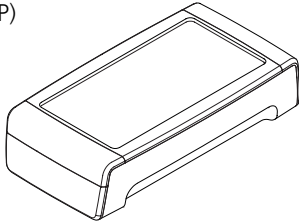
Enclosure: ABS

For details see technical information.

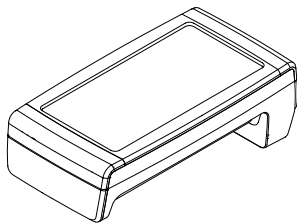


Enclosure sizes

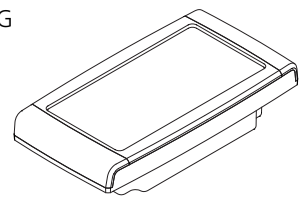
C 1435 F(-FP)



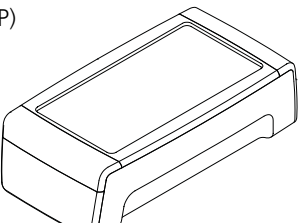
C 1435 P



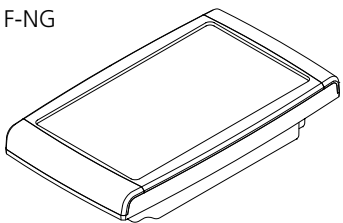
C 1435 F-NG



C 1440 F(-FP)



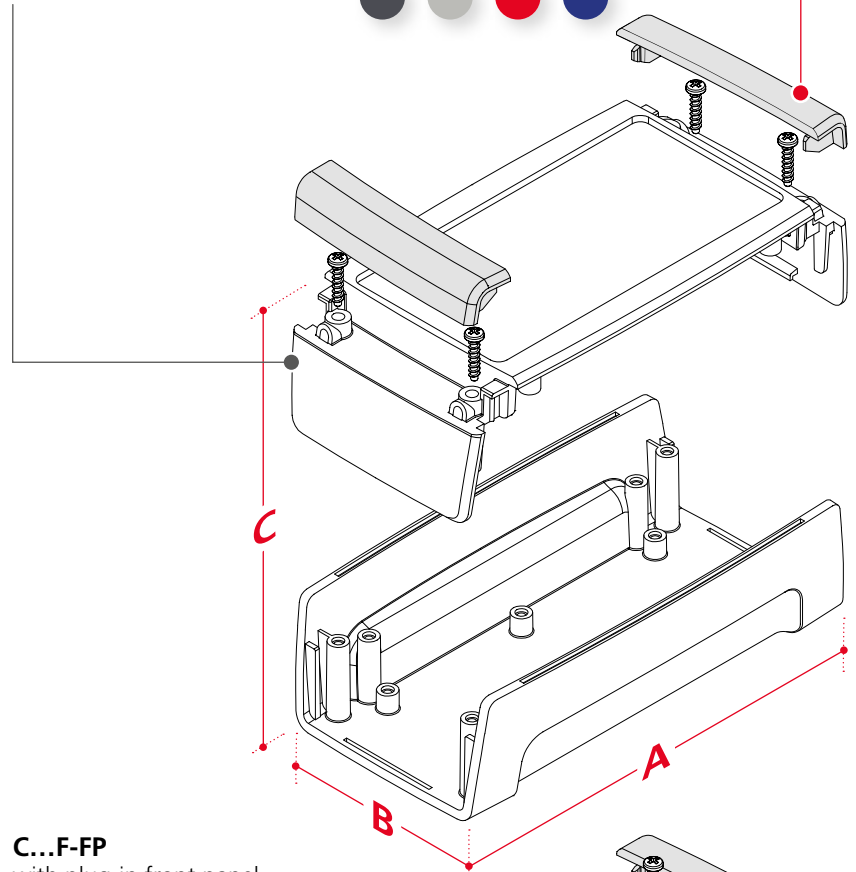
C 1735 F-NG



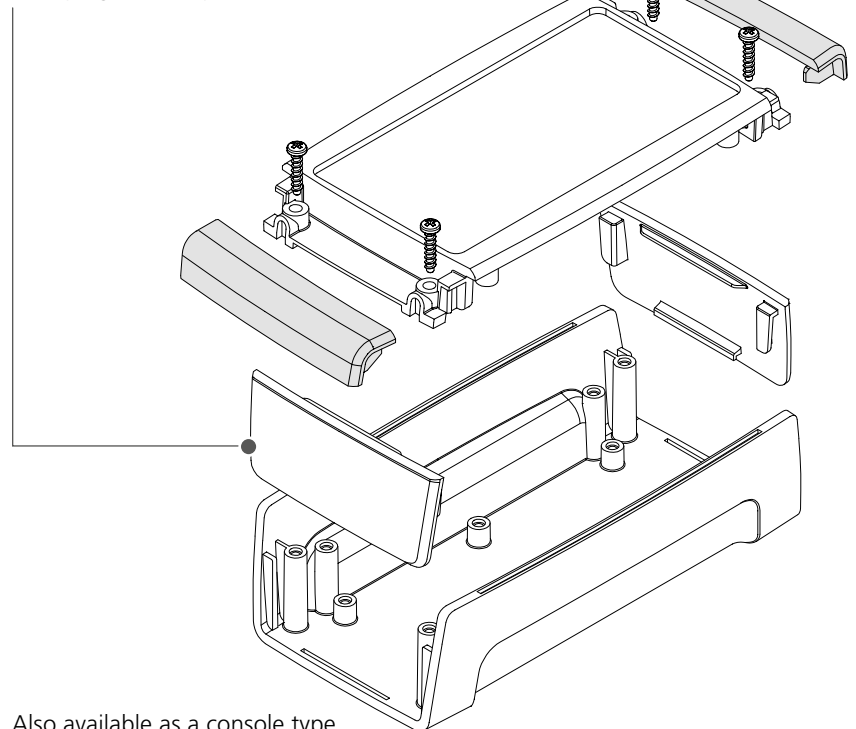
Bauvarianten

C...F
with integrated front panel

Colour variants



C...F-FP
with plug-in front panel



Also available as a console type.

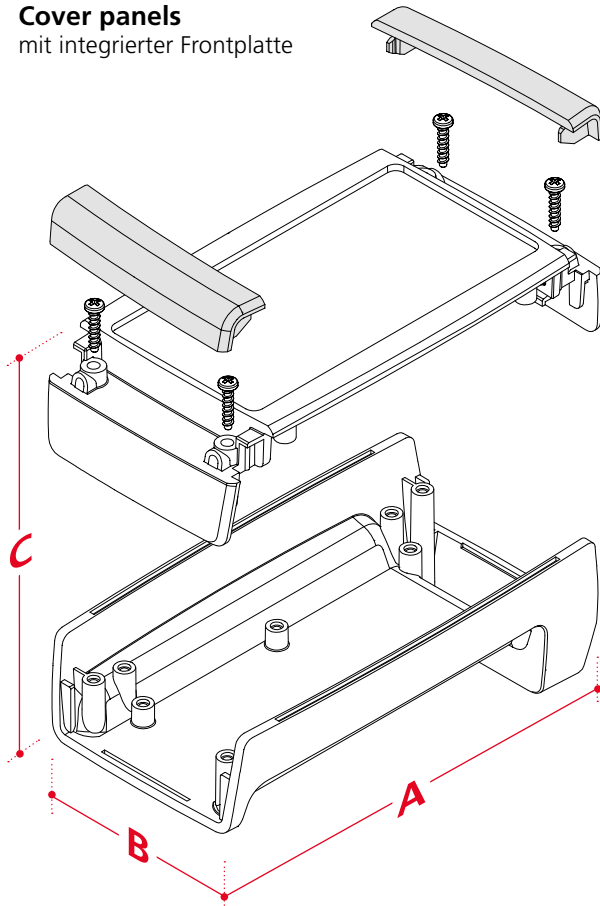


BOPLA

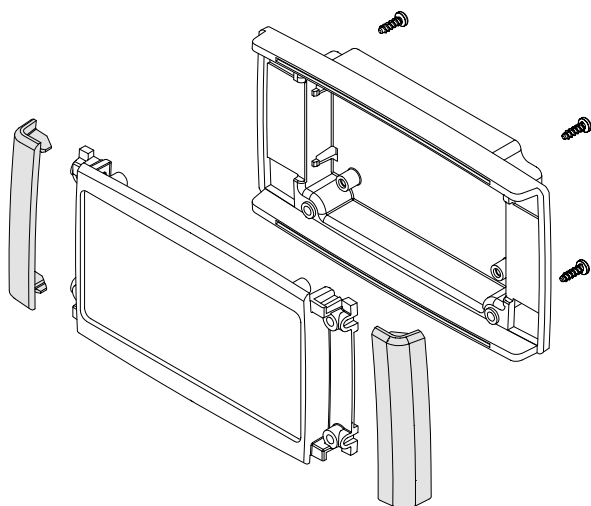
A Phoenix Mecano Company

Circum

Cover panels mit integrierter Frontplatte



Mounting frame for wall fitting



Dimensions

Model	A	B	C
C 1435 F(-FP) / P(-FP)	145.3	74.7	34
C 1435 F-NG	141.4	74.7	15
C 1440 F(-FP)	147	74.7	42
C 1735 F-NG	166.4	95.7	15

Accessories



Cover panels

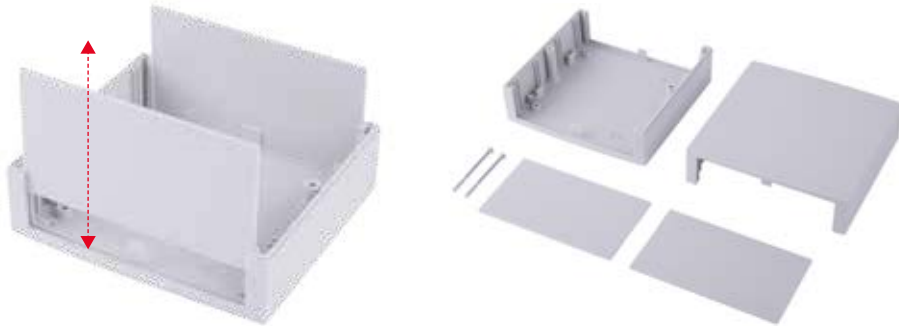


Wall brackets for C...F / C...F-FP

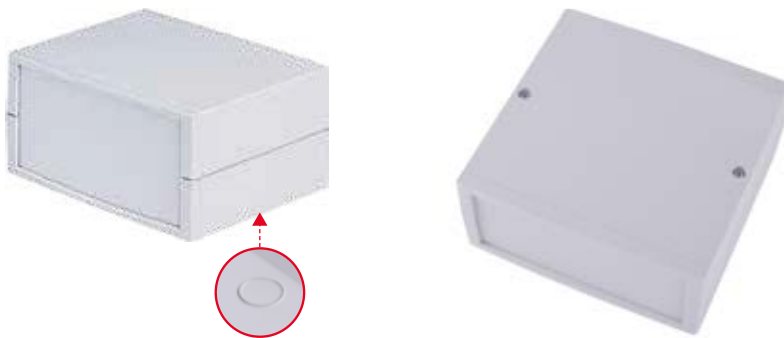


Wall frame for surface-mounting of the F-NG version

The product advantages



Separately removable front panels - plastic or aluminium, as required - ensure very easy modification of Unimas.



Concealed ("invisible") arrangement of screws on the underside of the enclosure.

Fast opening and closing – only two screws.



Slot-in options for vertical PCB mounting.



Depending on the design, screwless clicking into place of PCBs is possible. PCB mounting in the base and top section.



Quick-Finder:
www.bopla.de/26



Colour:

● Light grey, similar to RAL 7035

Special colours on request

Protection class:

IP40 / DIN EN 60529

Material:

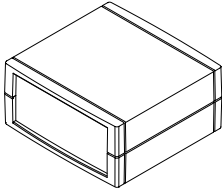
Enclosure: PS (polystyrene)

For details see technical information.

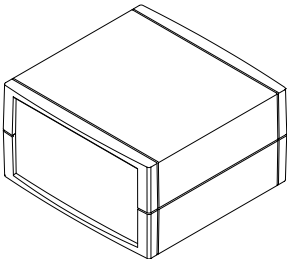


Enclosure sizes

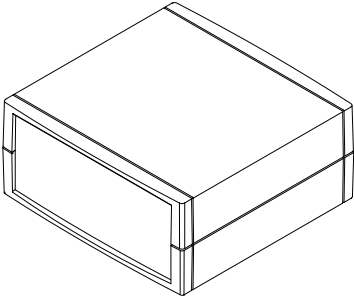
U 85



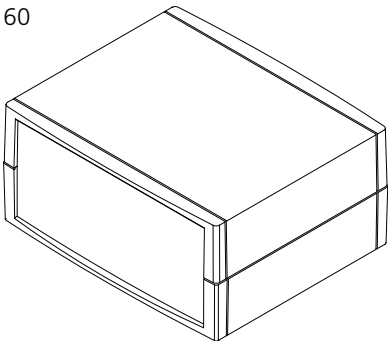
U 110



U 135

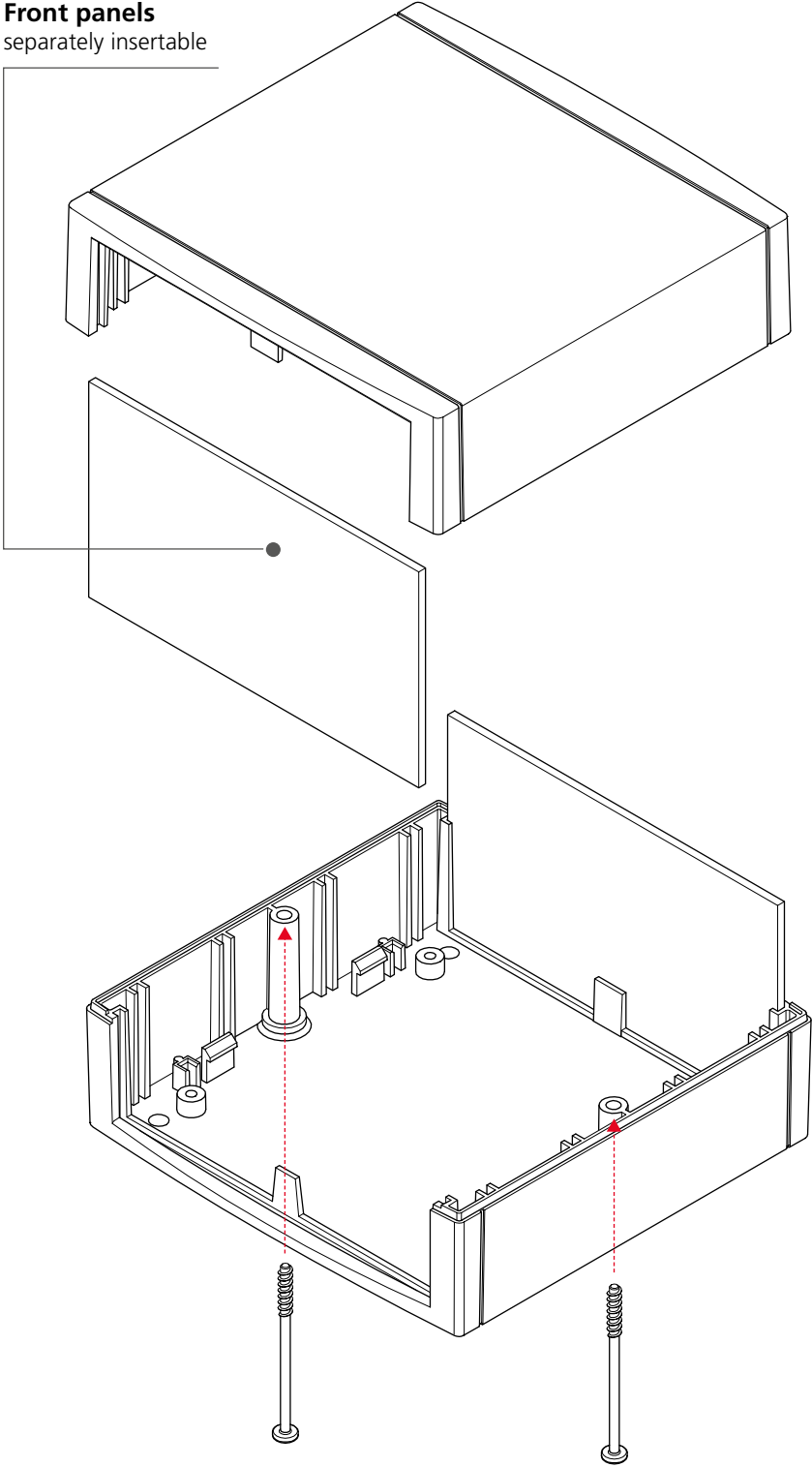


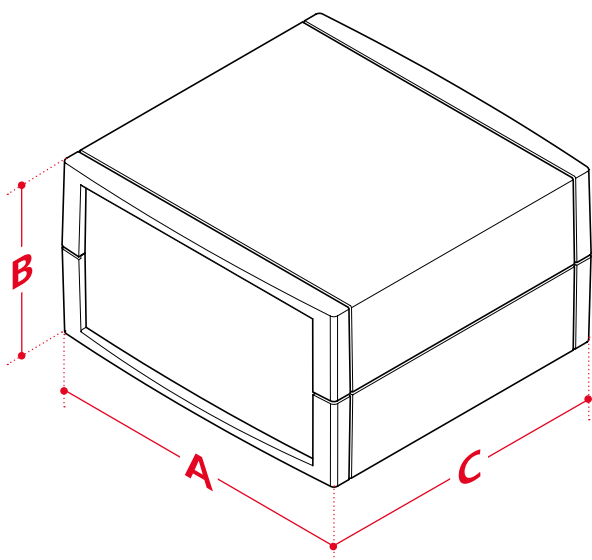
U 160



Design type

Front panels
separately insertable





Dimensions

Model	A	B	C
U 85-7035	85	40	81
U 110-7035	110	60	107
U 135-7035	135	60	132
U 160-7035	160	75	133

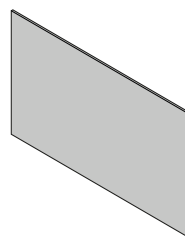
Accessories



Rubber feet



Screw covers



Front panel, aluminium

The product advantages



The connector enclosures are made of flame-resistant plastic, IP40 protected, and have successfully passed information test VDE 0624/IEC 884.



Quick-Finder:
www.bopla.de/43



Versions with and without earthing are available.



Half-shell technology ensures easy access to the electronics.



Additional variants, versions for different countries, different colours and enclosure heights are available on request.



The lid can also be fitted turned by 180°. This ensures optimal use of the mounting space and operating position.



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Elesett | Eletec



Colour:

● Traffic white, similar to RAL 9016

Special colours on request

Protection class:

IP40 / DIN EN 60529

IP20 / DIN EN 60529 with protective contact socket

Material:

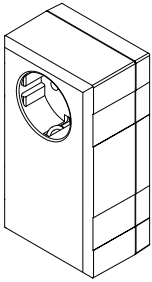
Enclosure: PC/ABS-Blend, flame retardant UL 94 V-0

For details see technical information.

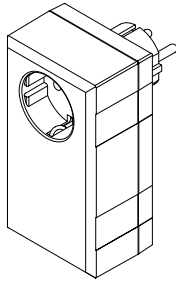


Enclosure sizes Elesett

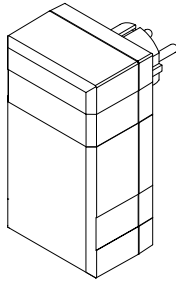
ESO 1250 E
ESU 1200



ESO 1250 E
ESU 1200 E/CEE

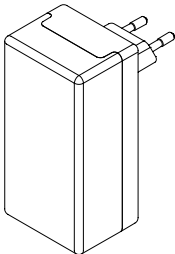


ESO 1250
ESU 1200 E/CEE

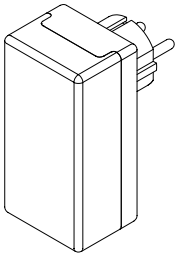


Enclosure sizes Eletec

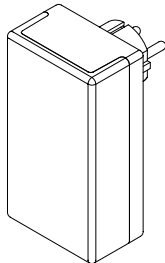
SE 420 EU



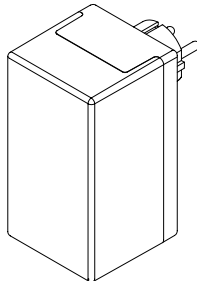
SE 420 E/CEE



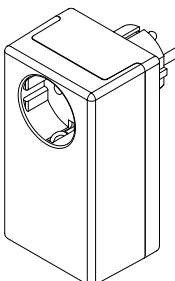
SE 430 E/CEE



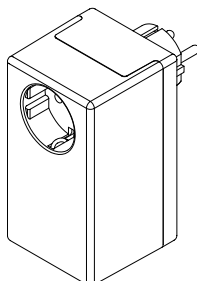
SE 435 E/CEE



SE 432 DE

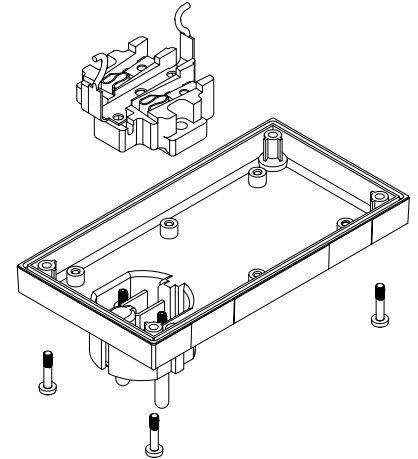
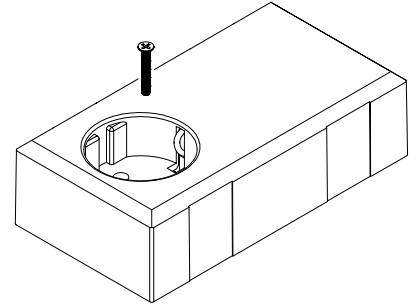
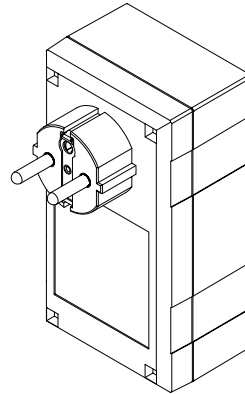


SE 435 DE

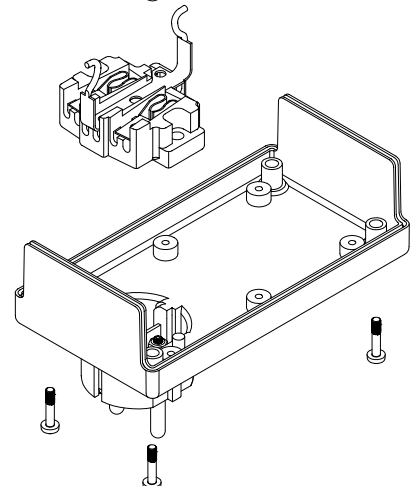
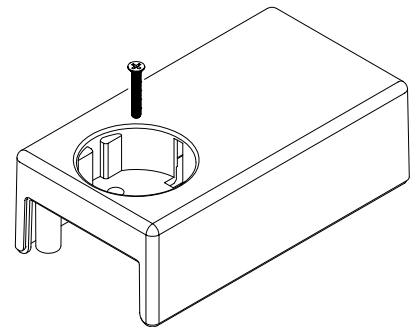
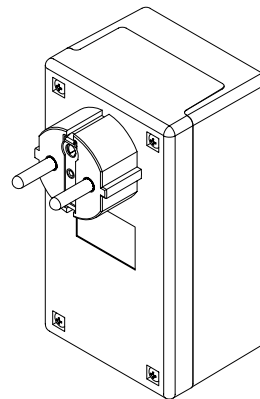


Design types

Elesett



Eletec

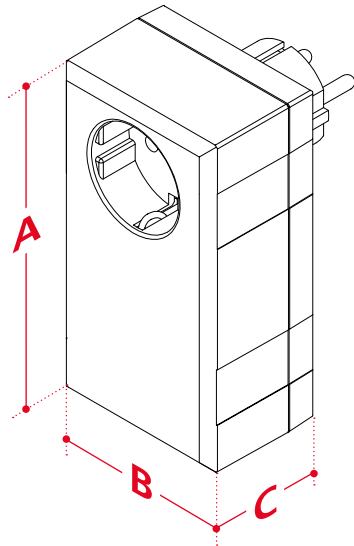




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Elesett | Eletec

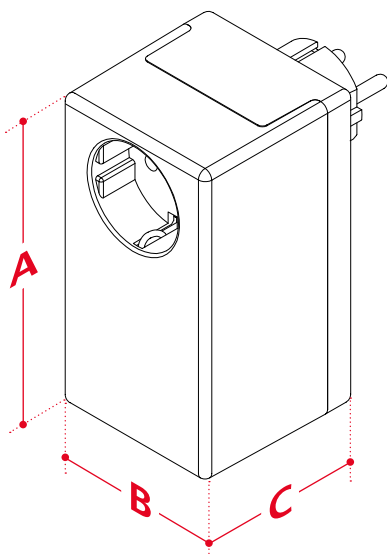


Dimensions Elesett

Model	A	B	C
ESO / ESU 1250...	125	67	50

Dimensions Eletec

Model	A	B	C
SE 420 EU	100	50	40
SE 430 E/CEE	120	65	40
SE 432 DE	120	65	50
SE 435 DE	120	65	66
SE 435 E/CEE	120	64	66



The product advantages



The front panel is moulded onto the base – the lid can be removed without dismantling the electronics.



Numerous lid variants are available and can be used to match membrane keypads and ventilation to the application.



Screwing from below conceals screws in the application.



The “Universal” variant consists of two identical half-shells which are easily latched together.



An optional quick-release fastener – suitable for retrofitting – allows opening and closing of the enclosure without screwing. This is a perfect addition to the moulded contours for wall mounting.



Quick-Finder:
www.bopla.de/05

Examples of use



Element Universal



Colour:

Top:

● Light grey, similar to RAL 7035

Lower part:

● Graphite grey, similar to RAL 7024

Special colours on request

Protection class:

Closed: IP40 / DIN EN 60529

With ventilation slots: IP30 / DIN EN 60529

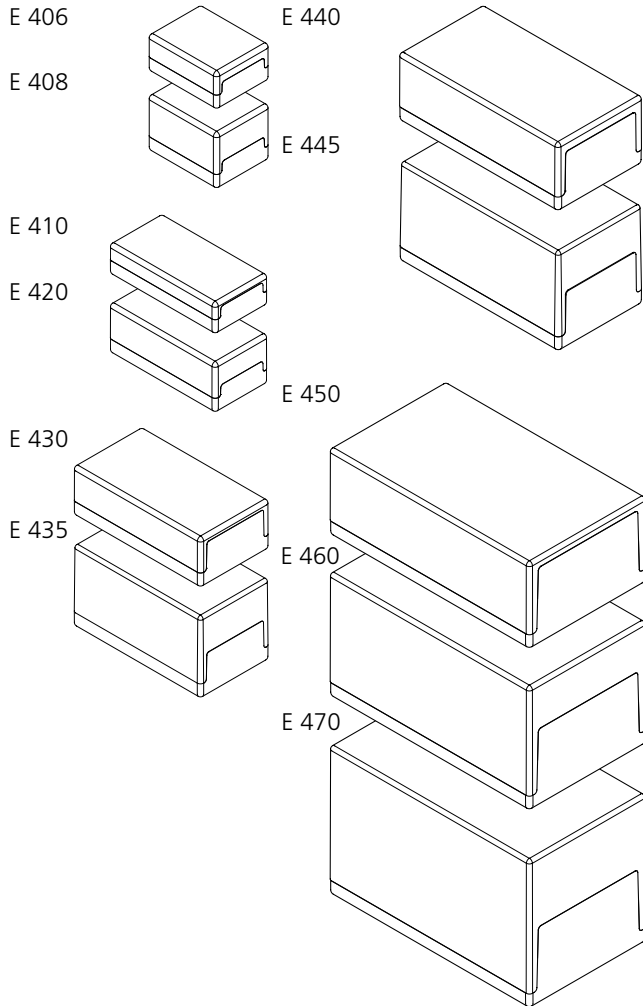
Material:

Enclosure: PS (polystyrene)

For details see technical information.

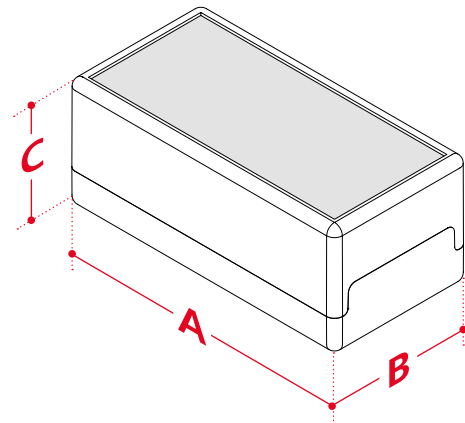


Enclosure sizes Element



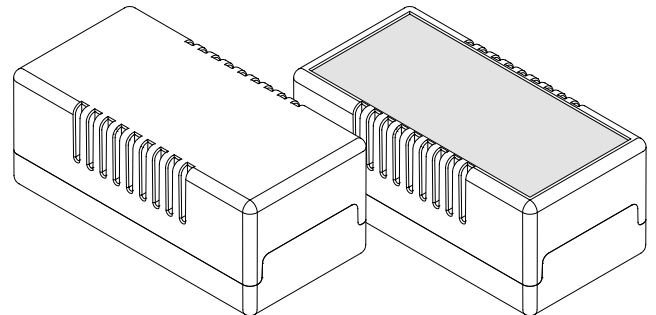
Design types Element

E...F

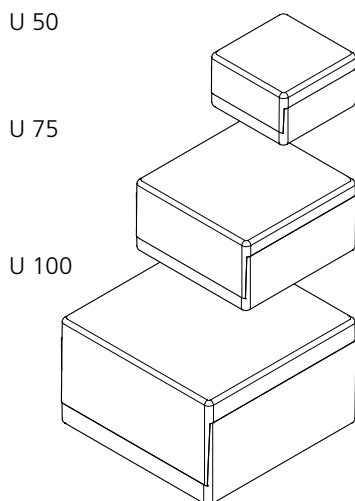


E...VL

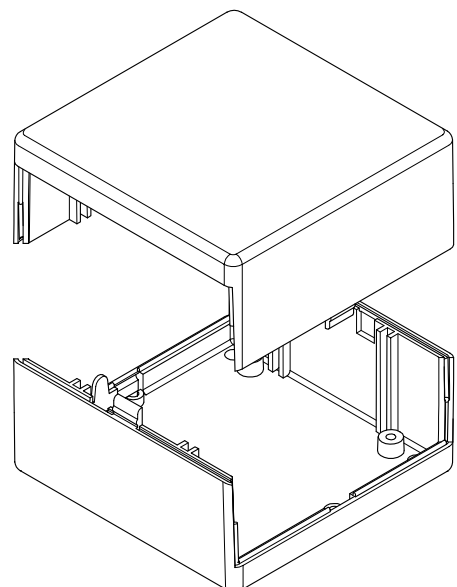
E...FVL



Enclosure sizes Universal

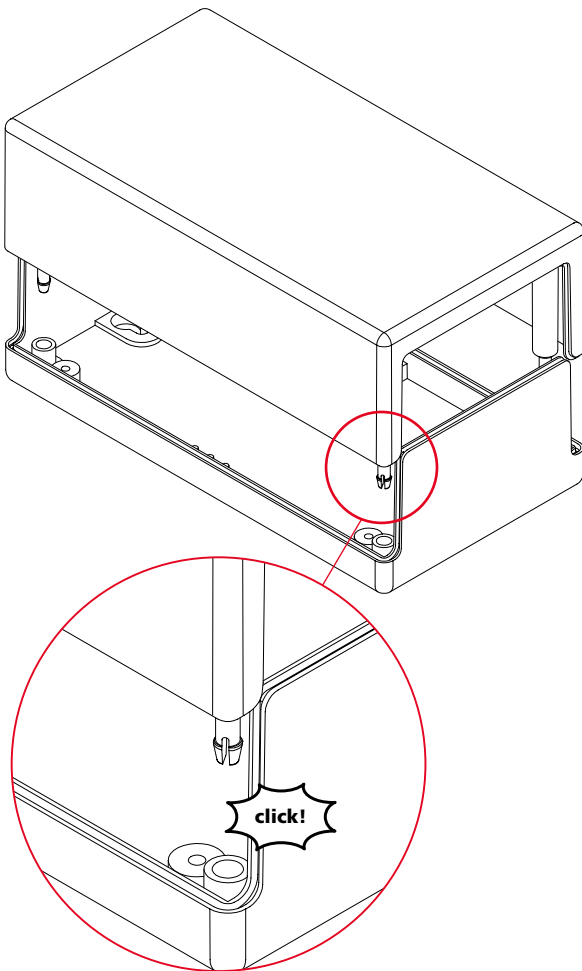


Design types Universal



Element Universal

Quick-release fastener



Dimensions Element

Model	A	B	C
E 406	65	50	30
E 408	65	50	45
E 410	100	50	25
E 420	100	50	40
E 430	120	65	40
E 435	120	65	65
E 440	150	80	55
E 445	150	80	80
E 450	188	110	70
E 460	188	110	100
E 470	188	110	120
E 434 S*	188	110	40
E 430 A**	120	65	40

S* Enclosure with quick-release fastener

A** Enclosure with front panel

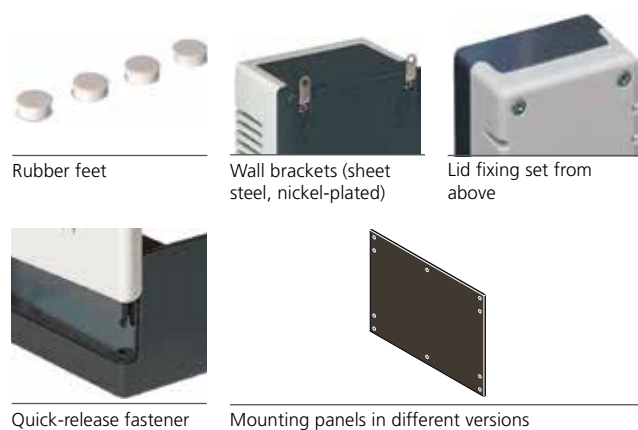
Additional variants

Model	VL	F	FVL
E 406	✓	✓	
E 408			
E 410		✓	✓
E 420		✓	✓
E 430		✓	
E 435			
E 440	✓	✓	
E 445			
E 450	✓	✓	✓
E 460			
E 470			

Dimensions Universal

Model	A	B	C
U 50	50	50	30
U 75	75	75	40
U 100	100	100	60

Accessories



Rubber feet

Wall brackets (sheet steel, nickel-plated)

Lid fixing set from above

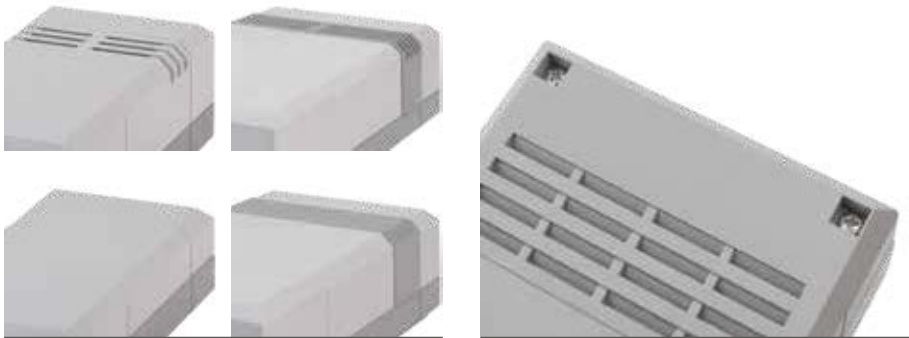
Quick-release fastener

Mounting panels in different versions

The product advantages



The lid and base contain mounting bosses and holders for PCBs. Separate front panels ensure easy modification.



Numerous lid variants are available with which membrane keypads, ventilation and access to the interior can be matched to the application..

Screwing from below conceals screws in the application.



A moulded contour is provided on the interior for wall mounting.



The front surfaces can be chosen closed or with removable front panels. The closed variants can be upgraded to protection class IP54 with a factory-fitted seal.



Quick-Finder:
www.bopla.de/32

Examples of use





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Elegant



Colour:

Top:

● Light grey, similar to RAL 7035

Lower part, panels, front panels:

● Agate grey, similar to RAL 7038

Special colours on request

Protection class:

IP40 / DIN EN 60529

Higher protection class (EG..., EG...F)
on request

Material:

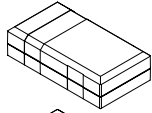
Enclosure: PS (polystyrene)

For details see technical information.

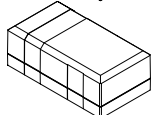


Enclosure sizes

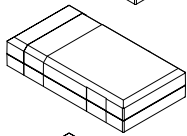
EG 1030



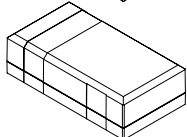
EG 1040



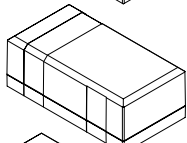
EG 1230



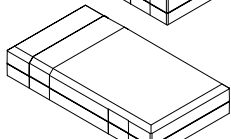
EG 1240



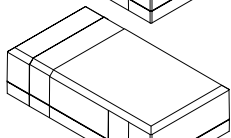
EG 1250



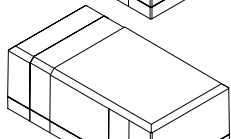
EG 1530



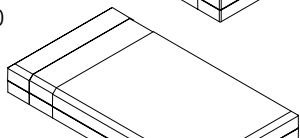
EG 1545



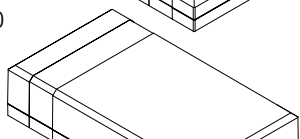
EG 1560



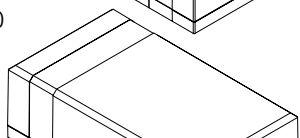
EG 2030



EG 2050

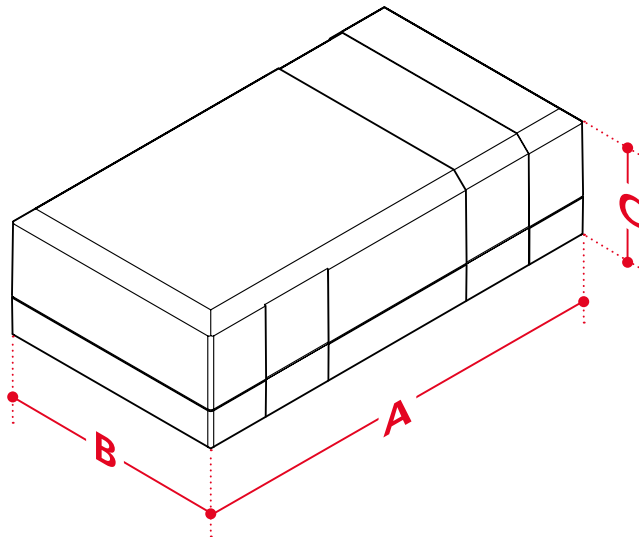


EG 2070



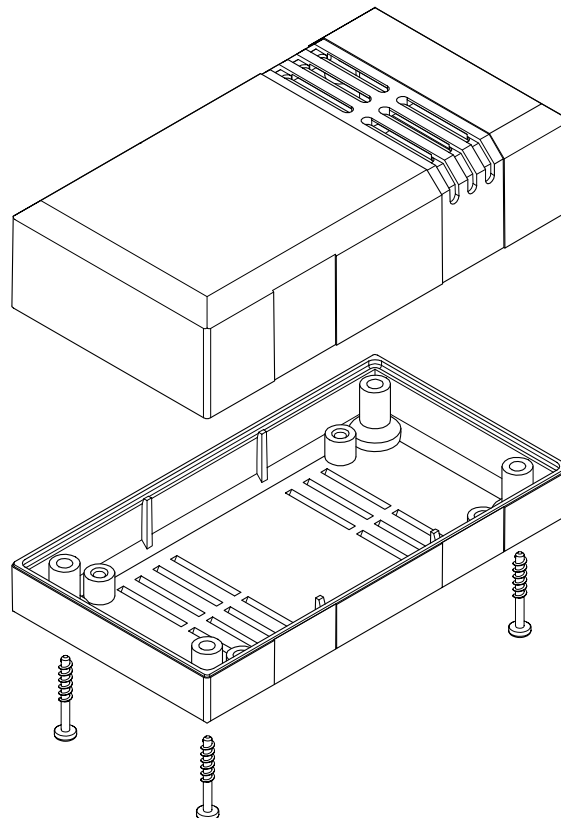
Design types

EG...



EG...L

Enclosure with air vents





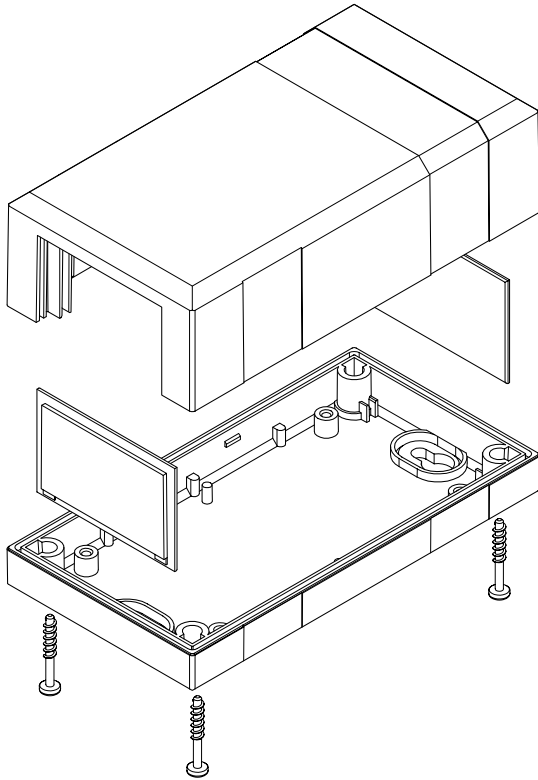
BOPLA

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Elegant

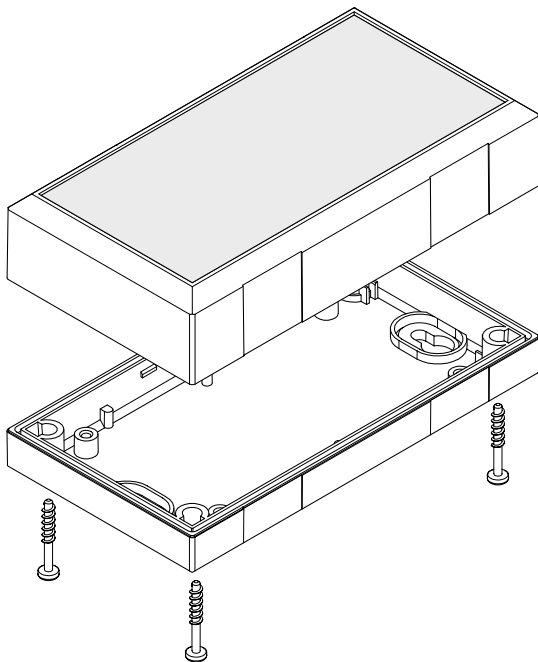
EG...FK

Enclosure with plastic front panels



EG...F

Enclosure with membrane keypad area



Dimensions

Model	A	B	C
EG 1030 (L)	100	54	30
EG 1040 (L)	100	54	40
EG 1230 (L)	125	67	30
EG 1240 (L) / (FK)	125	67	40
EG 1250 (L) / (FK)	125	67	50
EG 1530 (L)	150	82	30
EG 1545 (L) / (FK)	150	82	45
EG 1560 (L) / (FK)	150	82	60
EG 2030 (L)	200	112	30
EG 2050 (L) / (FK)	200	112	50
EG 2070 (L) / (FK)	200	112	70
EG 1230 F	125	67	31
EG 1240 F	125	67	41
EG 1250 F	125	67	51
EG 1530 F	150	82	31
EG 1545 F	150	82	46
EG 1560 F	150	82	61
EG 2030 F	200	112	31
EG 2050 F	200	112	51
EG 2070 F	200	112	71

Accessories



Wall brackets



Lid fixing set from above for EG 12.. - 20..



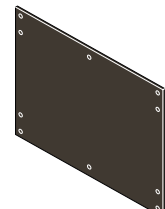
Screw cover, ABS



Covers for keyhole suspension



Rubber feet



Mounting panels



Tx

Modbus
RTU

Profibus
PA

A close-up photograph of a laser marking process. A laser beam is focused on a dark metal plate, creating a bright, glowing spot. The plate has several circular holes and is marked with text. The text includes "RES.", "Power supply 24VDC", "USB 2.0", "In PTC100", "OUT-1 4-20mA", and "OUT-2 4-20mA". The laser beam is positioned over the "OUT-2 4-20mA" marking.

Laser marking

The surfaces of all materials can be designed quickly, flexibly and individually by means of laser marking.



From other enclosure series.

BoPad



Page
138

Colour:

Enclosure

- Black, similar RAL 9005
- White, similar RAL 9016

Special colours on request

Seal / bumper protection



Protection class:

IP40, with seal: IP65 DIN EN 60529

Materials:

Enclosure: ABS
Seal / bumper protection: TPE

BOS-Streamline



Page
144

Colour:

Enclosure

- Graphite grey, similar RAL 7024
- Light grey, similar RAL 7035

Special colours on request

Decor seals



Protection class:

Depending on the model, up to IP65 / DIN EN 60529

Materials:

Enclosure: ABS
Decor seal: TPE



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Console enclosures

Alu-Topline



Page
174

Colour:

Enclosure

- Profile anodized in natural color

Plastic lid:

- Graphite grey, similar RAL 7024
- Black, similar RAL 9005

Special colours on request

Protection class:

IP40 / DIN EN 60529

IP54 / DIN EN 60529 optional

Materials:

Extruded profiles: Al Mg Si 0,5; anodized

Plastic lid: ABS

Seal: EPDM

Interzoll Case



Page
218

Colour:

- Individually according to your specifications

Protection class:

Depending on the construction up to IP40 / DIN EN 60529;

Project-specific higher degrees of protection on request

Materials:

Individually manufactured; for example made of aluminum, steel or stainless steel. Other materials and surface coatings at any time on request.

The product advantages



Elegant-Pult is available with a continuous membrane keypad area or with a display screen and membrane keypad area.



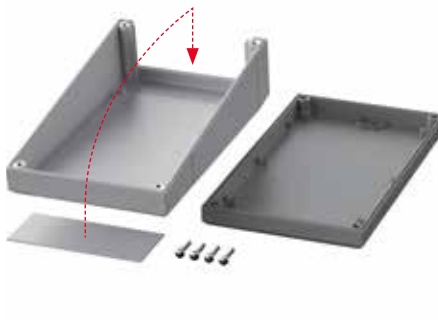
Screwing of the enclosure takes place from below, so no unsightly screws are visible on top.



The threaded bushings in the lid allow the enclosure to be opened and securely closed again many times.



A moulded contour is provided on the interior for wall mounting.



Removable rear front surface for easy fitting of connection and operating elements.



Quick-Finder:
www.bopla.de/36

Examples of use





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Elegant-Pult



Colour:

Top:

● Light grey, similar to RAL 7035

Lower part, panels, front panels:

● Agate grey, similar to RAL 7038

Special colours on request

Protection class:

IP40 / DIN EN 60529

Material:

Enclosure: PS (polystyrene)

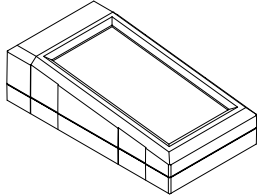
For details see technical information.

Console

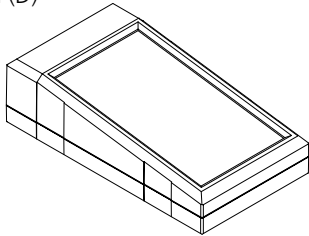


Enclosure sizes

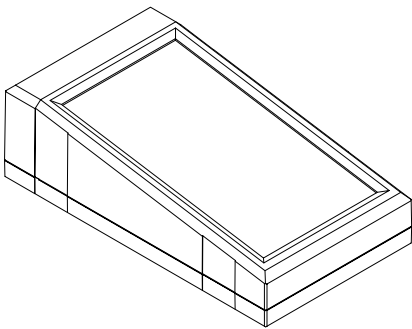
EG 1240 P(D)



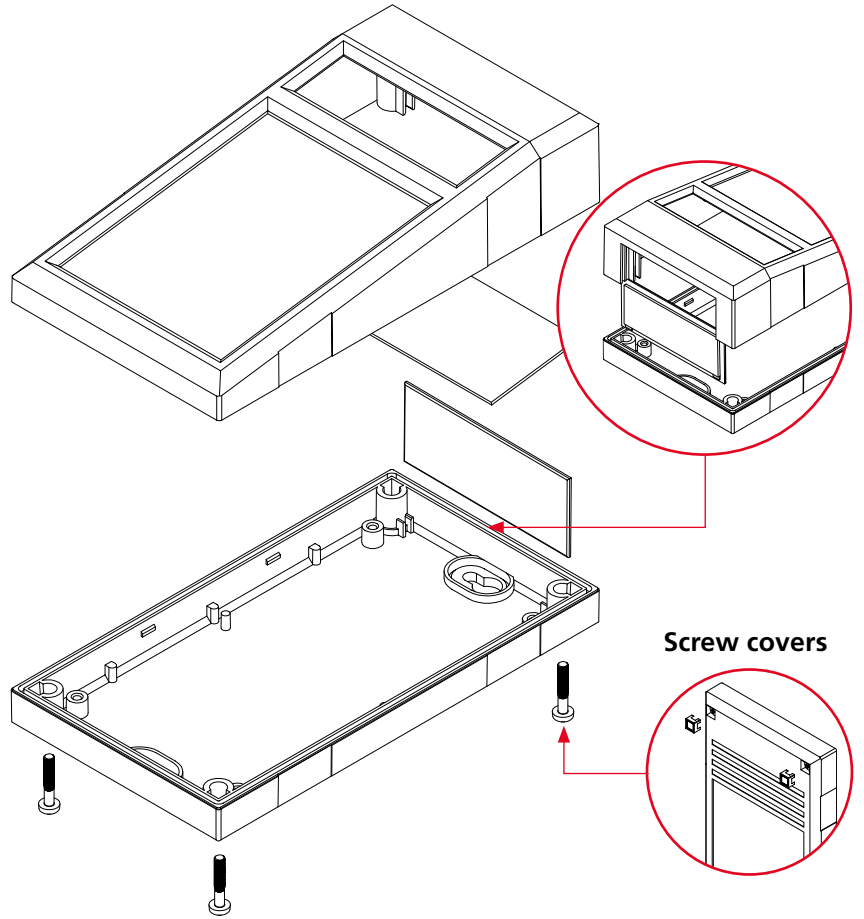
EG 1545 P(D)



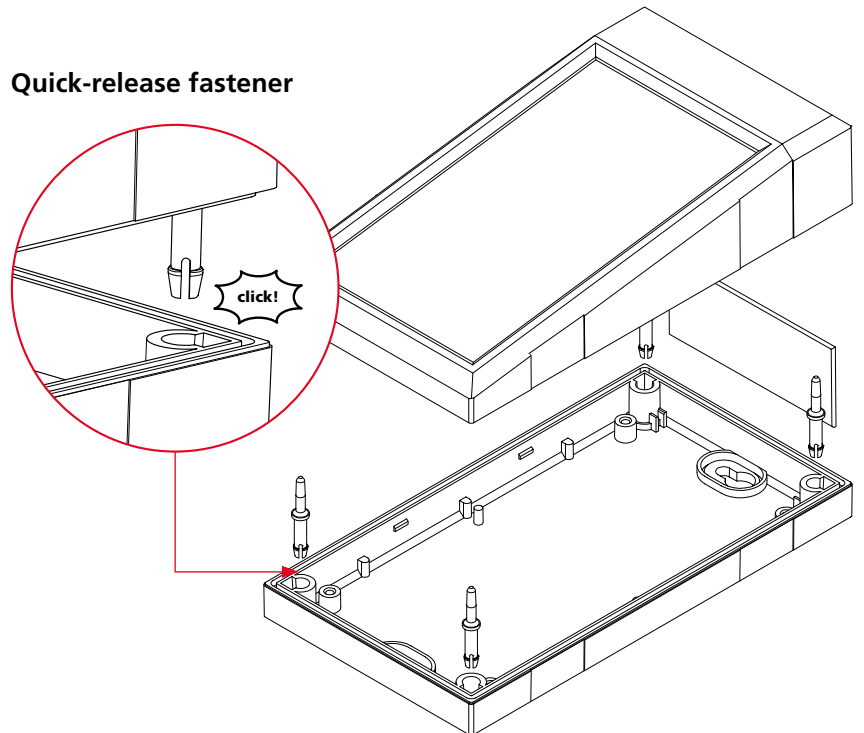
EG 2060 P(D)



Design types



Quick-release fastener



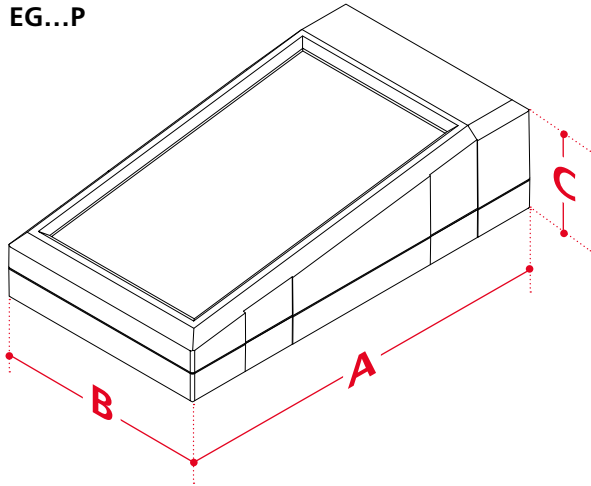


BOPLA

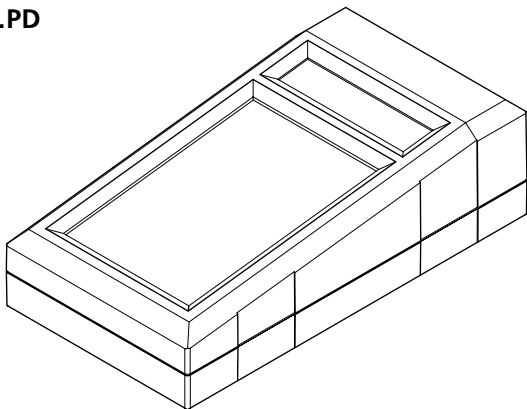
A Phoenix Mecano Company

Elegant-Pult

EG...P



EG...PD



Dimensions

Model	A	B	C
EG 1240 P(D)	125	67	40
EG 1545 P(D)	150	82	45
EG 2060 P(D)	200	112	64

Accessories



Wall brackets



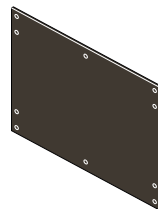
Screw covers, ABS



Cover caps fork eyehole suspension

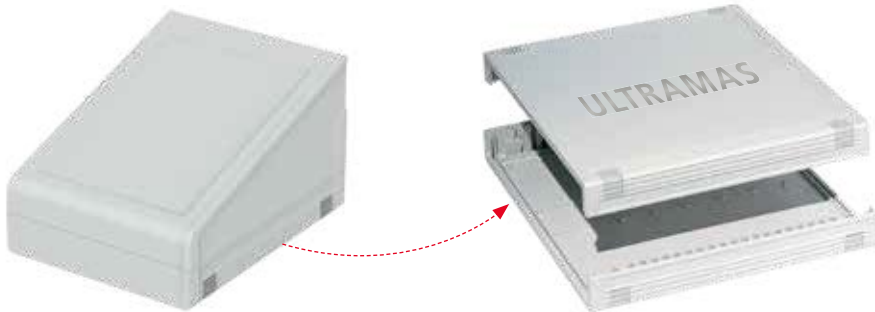


Rubber feet

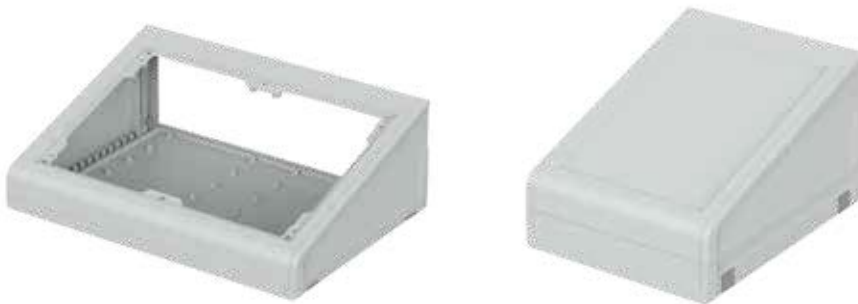


Mounting panels

The product advantages



The classic console enclosure is based on the Ultramas enclosure system. As a result, many components are compatible with each other.

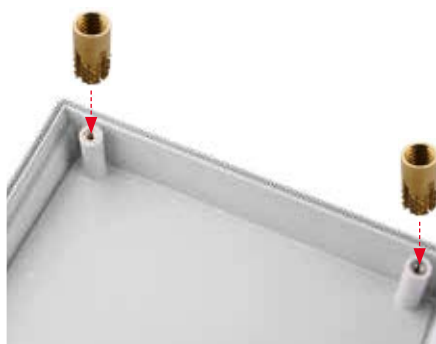


The two plastic half-shells are made of different front panels on the back and on the control surface.

Alternatively, there are also variants with closed top available.



The enclosure screws are concealed under snap-on covers.



All enclosure parts are screwed between each other with high-quality brass threaded inserts, which guarantees permanently reliable opening and closing.



Quick-Finder:
www.bopla.de/45

Examples of use





BOPLA

A Phoenix Mecano Company

Ultrapult



Colour:

Enclosure:

● Light grey, similar to RAL 7035

Cover caps:

● Agate grey, similar to RAL 7038

Special colours on request

Protection class:

IP40 / DIN EN 60529

Material:

Enclosure: ABS

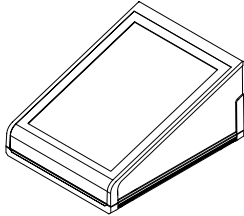
For details see technical information.

Console

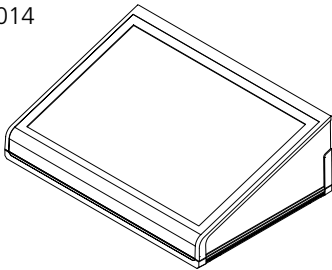


Enclosure sizes

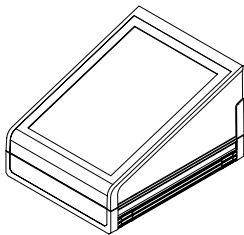
UMP 32014



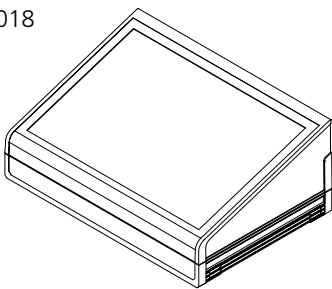
UMP 62014



UMP 32018



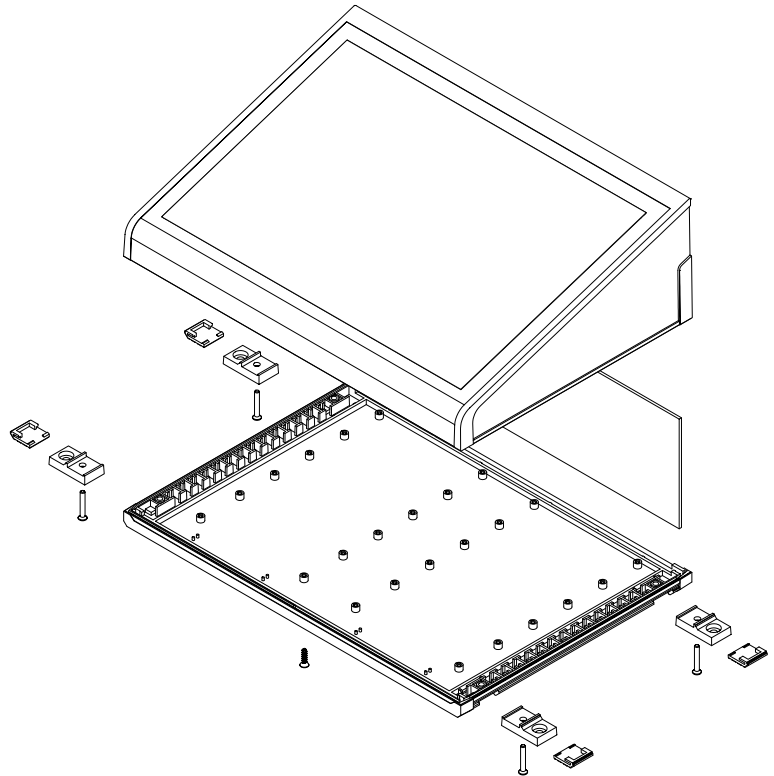
UMP 62018



Design types

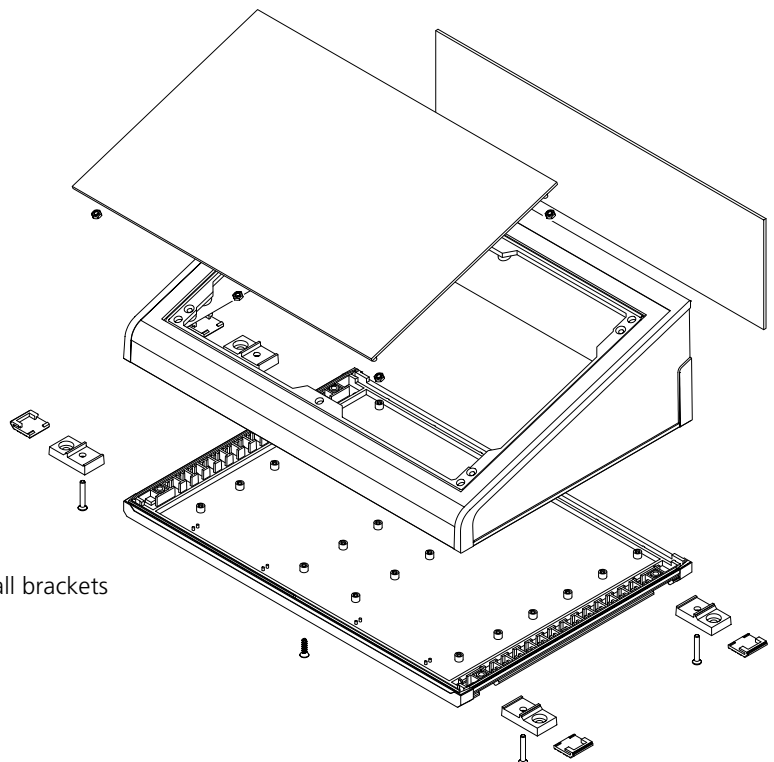
UMP

Enclosure with closed console area



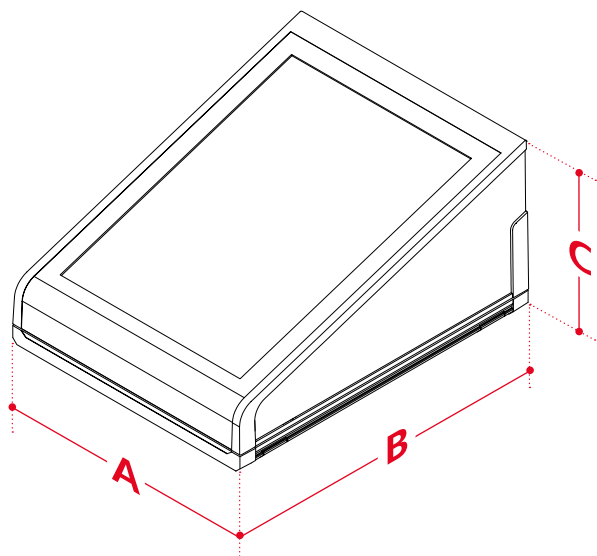
UMP... FP

Enclosure with open console area



Wall brackets

Ultrapult



Dimensions

Model	A	B	C
UMP 32014 (FP)	157.5	198.9	100.1
UMP 62014 (FP)	290.9	198.9	100.1
UMP 32018 (FP)	157.5	198.9	120.4
UMP 62018 (FP)	290.9	198.9	120.4

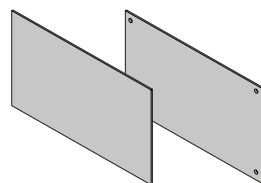
Accessories



Wall brackets for
UMP 32014 / 62014



Wall brackets for
UMP 32018 / 62018



Front panels in different versions

The product advantages



Our console enclosures are available in various designs and with different equipment features.



Thanks to a prepared sealing contour in the half-shells, Futura can be upgraded to IP54.



Futura enclosures consist of two identical half-shells which can be used as a console enclosure or desktop enclosure when turned by 180°.



In the elegant Bopult, the PCB is retained in place by the enclosure half-shells. No additional screwing necessary.



Quick-Finder:
www.bopla.de/47

Examples of use





BOPLA

A Phoenix Mecano Company

Futura | Bopult



Colour:

● Light grey, similar to RAL 7035

Special colours on request

Protection type:

Enclosure dependent: IP40 / DIN EN 60529

or IP54 / DIN EN 60529

Material:

Enclosure: ABS

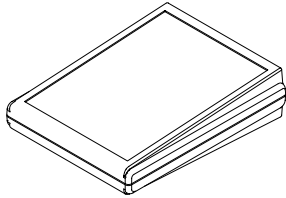
For details see technical information.



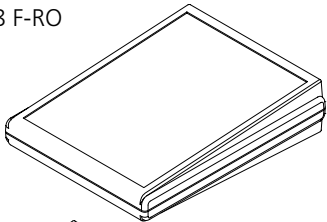
Console

Enclosure sizes Futura

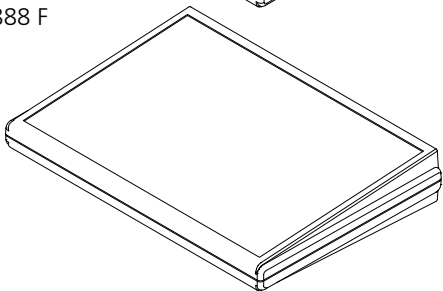
T 889 F



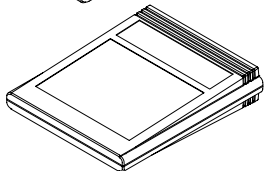
T 898 F / T 898 F-RO



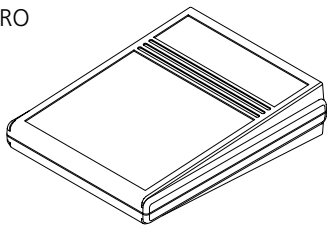
T 888 F



T 899

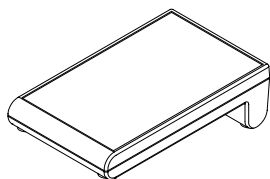


T 898 / T 898 RO



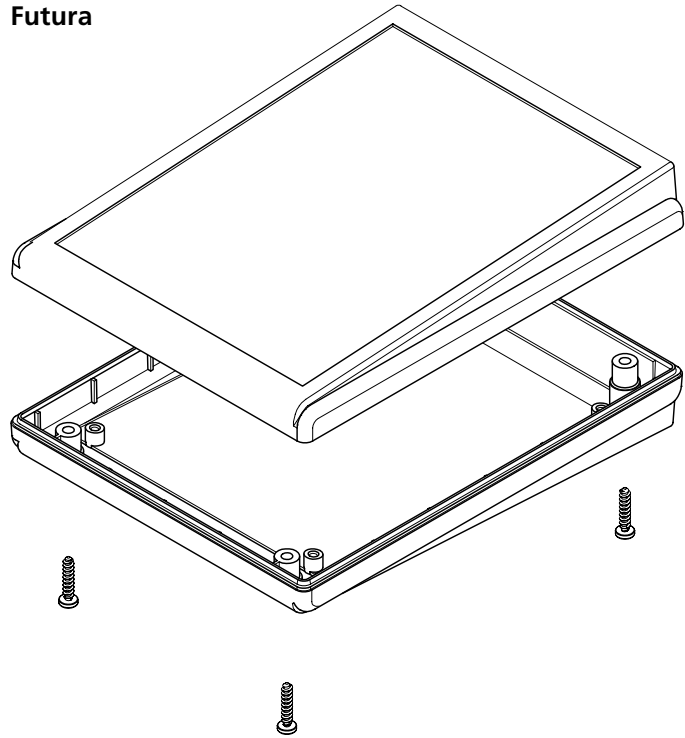
Enclosure sizes Bopult

BP 810

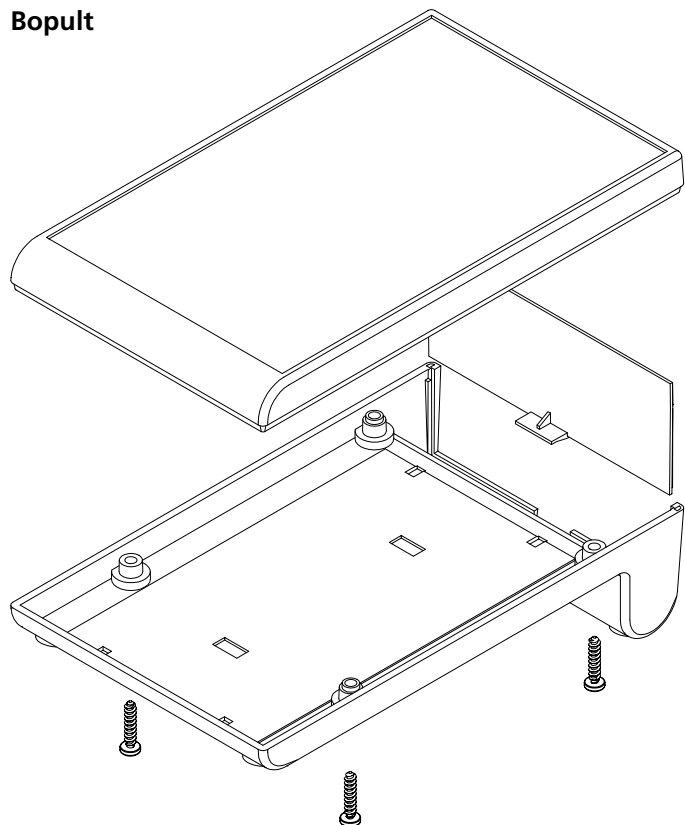


Design types

Futura



Bopult





BOPLA

A Phoenix Mecano Company

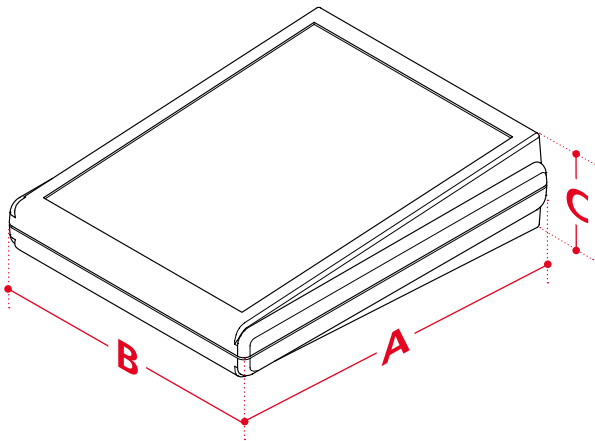
Futura | Bopult

Dimensions Futura

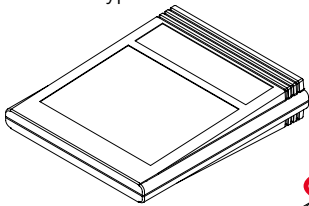
Model	A	B	C
T 888 F	275	195	48
T 889 F	132	170	44.9
T 898 (F) / (F-RO) / (RO)	151	195	48
T 899	125	150	30.7
T 890	300	225	50.6

Dimensions Bopult

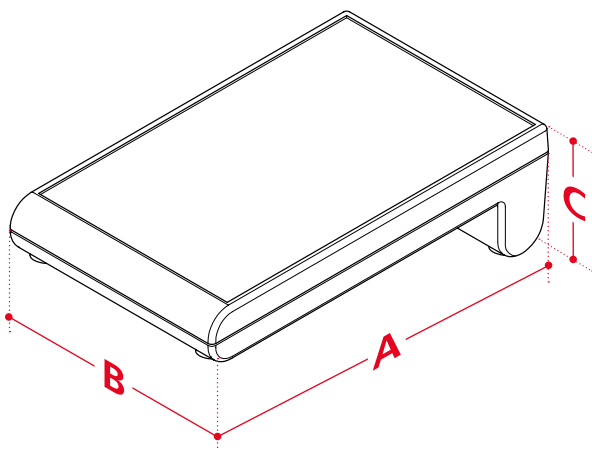
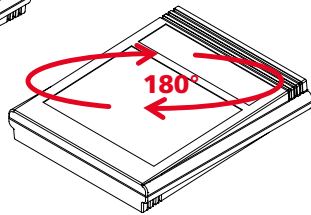
Model	A	B	C
BP 810	106	176	54.3

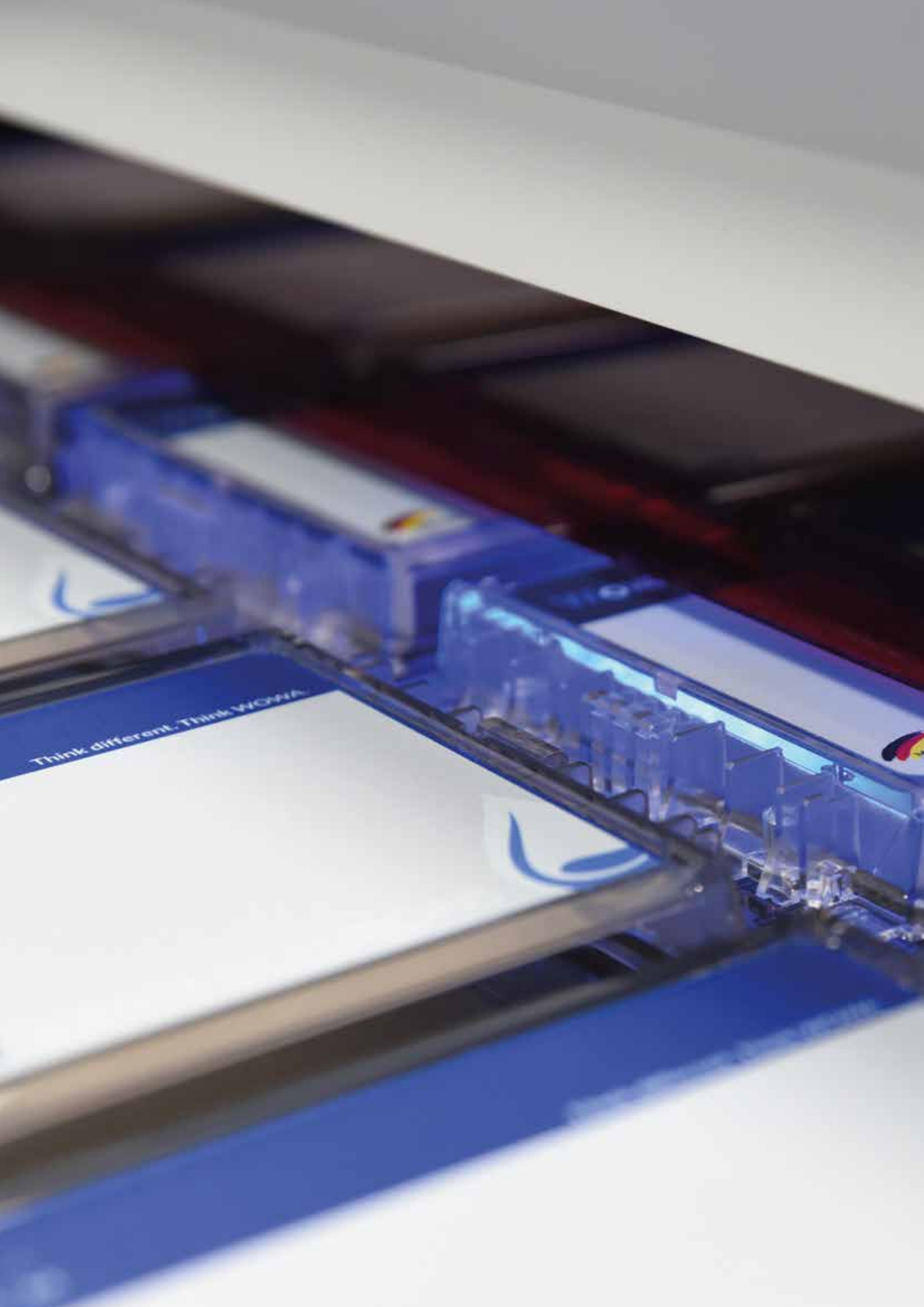


Console type



Desktop version





Think different. Think WGNH.

Digital printing

The flexible printing process for designing user-specific electronics enclosures.



The product advantages



Recessed area in the lid for the mounting of membrane keypads or display screens (BOP 500, 700, 900: 1.8 mm; BOP 7.0, BOP 10.1: 2.5 mm).



Variants with and without battery compartment (up to size BOP 900).



Enclosure protection by means of optional impact protection in combination with design seal; available in several colours. Ergonomic grip recesses on the enclosure and also on the impact protection (BOP 7.0 or BOP 10.1 respectively).



Integrated VESA mounting (75 x 75mm), also used for mounting the optional wall fitting (BOP 7.0, BOP 10.1).



Optimised for the integration of touch screens and Li-Ion rechargeable battery system 18650 (BOP 7.0 or BOP 10.1 respectively).



Quick-Finder:
www.bopla.de/35

Examples of use





BOPLA

A Phoenix Mecano Company

BoPad



Colour:

● Black, similar to RAL 9005

● White, similar to RAL 9016

Special colours on request

Protection class:

IP40, with seal: IP65 DIN EN 60529

Material:

Enclosure: ABS

Seal / impact protection: TPE

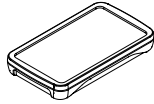
For details see technical information.



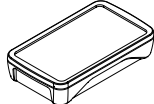
Hand-held

Enclosure sizes

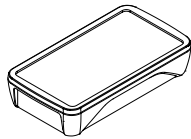
BOP 520



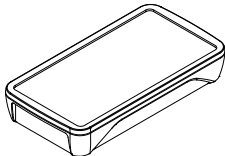
BOP 500



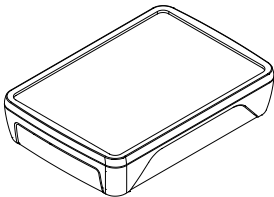
BOP 700



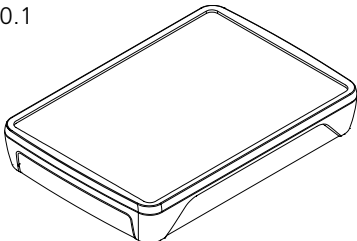
BOP 900



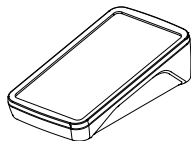
BOP 7.0



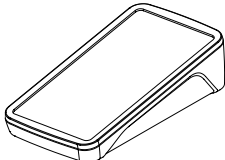
BOP 10.1



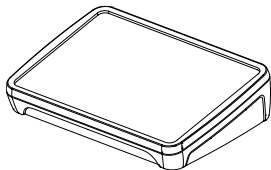
BOP 700 PH



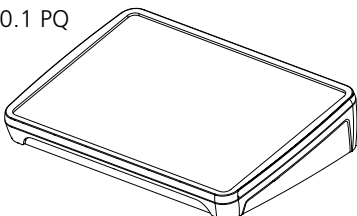
BOP 900 PH



BOP 7.0 PQ

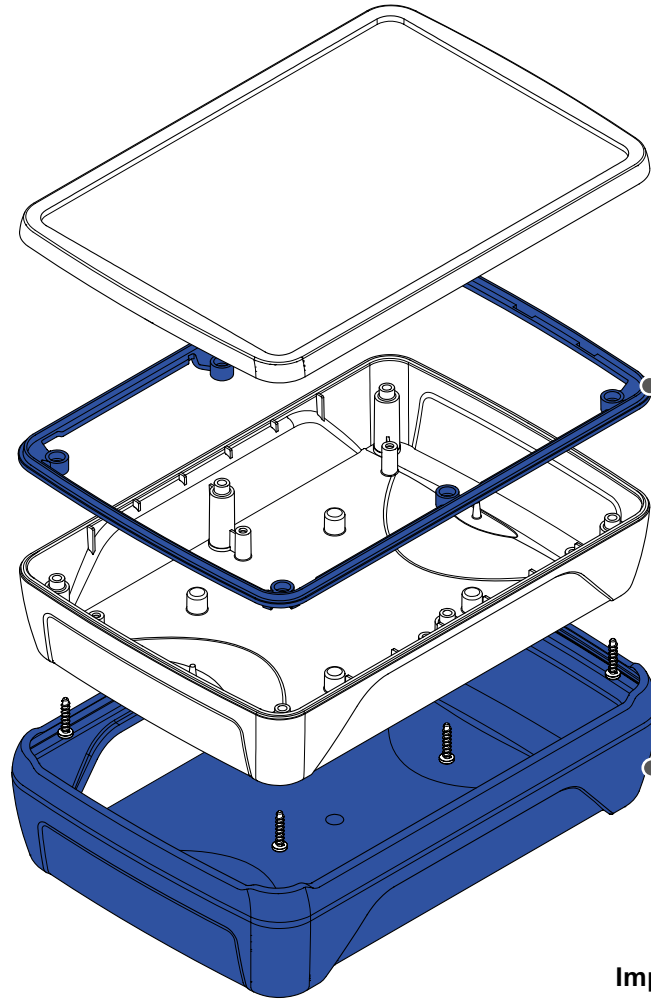


BOP 10.1 PQ



Design types

Dimensions



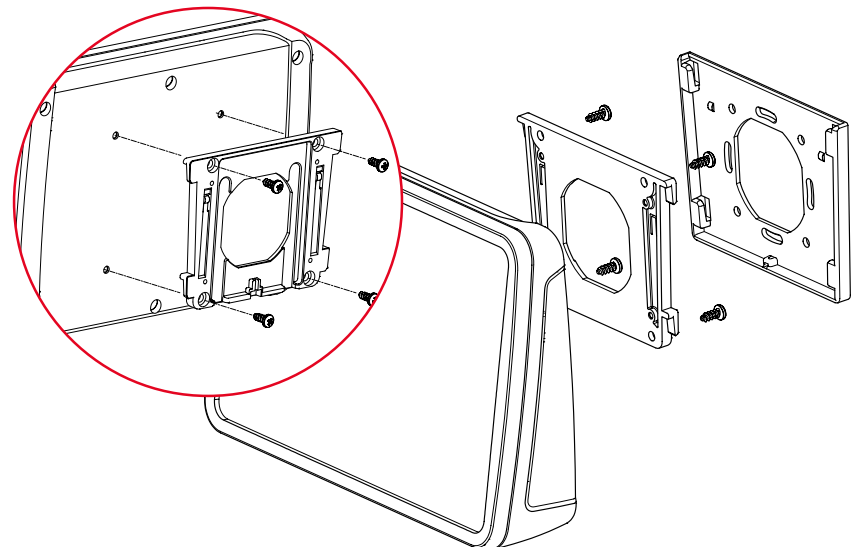
Design seal



Impact protection

Wall fitting

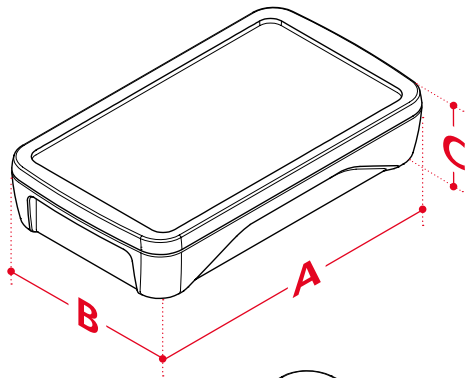
to VESA standard 75 x 75 mm



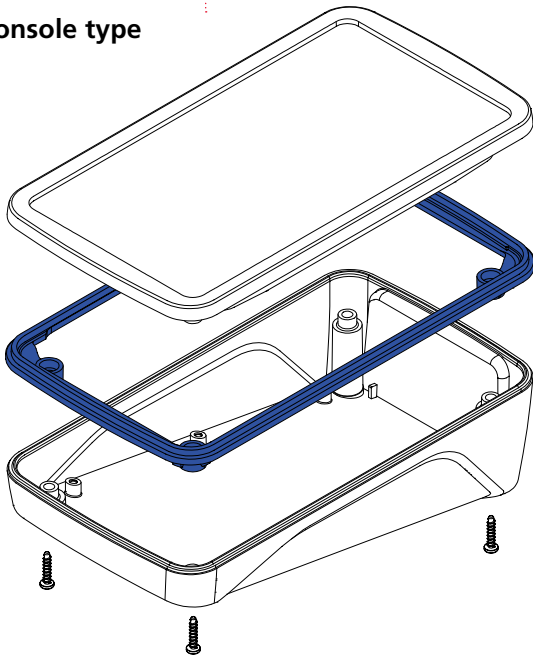
BoPad



BOPLA
A Phoenix Mecano Company

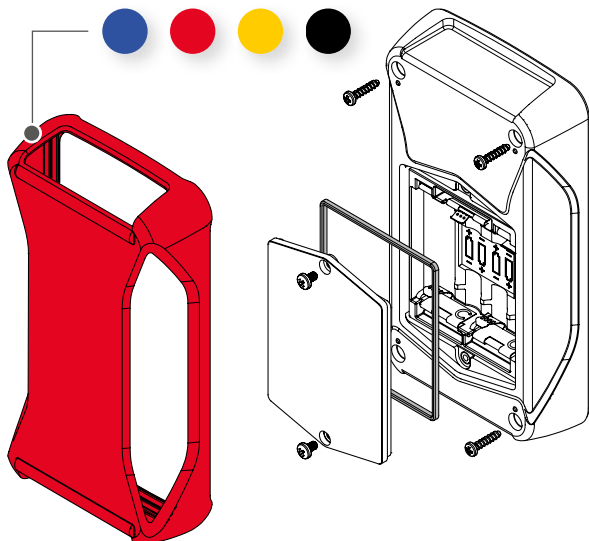


Console type



Impact protection

Battery compartment



Dimensions

Model	A	B	C (Flat)	C (Console)
BOP 520	130	75	17.5	-
BOP 500	130	75	26	-
BOP 700	165	90	34	47.5
BOP 900	200	105	34	53.6
BOP 7.0	215	150	46	53
BOP 10.1	285	198	46	61.2

Variants

Model	Battery compartment	Console type	VESA fitting	Touch/Display optimised
BOP 520	✓			2.4", 2.8"
BOP 500	✓			2.4", 2.8"
BOP 700	✓	✓		3.5", 4.3"
BOP 900	✓	✓	✓*	3.5", 4.3", 5.0"
BOP 7.0		✓	✓	7"
BOP 10.1		✓	✓	10.1"

* Additional processing of the enclosure is required

Accessories



Rechargeable battery holder for 18650 Li-Ion batteries for BOP 7.0 / BOP 10.1

Universal VESA standard (75 x 75) wall fitting, glass fibre reinforced polyamide



Screw covers for enclosure screws

The product advantages



BOS Streamline is an ergonomically-shaped hand-held enclosure which, on request, can be provided with a high level of ingress protection.



All enclosures have a recessed membrane keypad surface. In addition, five sizes are fitted with a display screen.



Turning the lid by 180° against the base allows the easy forming of console variants.



Optional decor seal ensures a high level of protection. Protects the enclosure if it is dropped. Offers colour design options.



Variants with an integrated battery compartment are available.



Quick-Finder:
www.bopla.de/82

Examples of use





BOPLA

A Phoenix Mecano Company

BOS-Streamline



Colour:

● Graphite grey, similar to RAL 7024

● Light grey, similar to RAL 7035

Special colours on request

Protection class:

Depending on the model up to
IP65 / DIN EN 60529

Material:

Enclosure: ABS

Decor seals: TPE

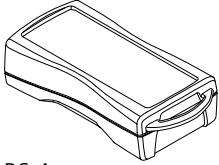
For details see technical information.



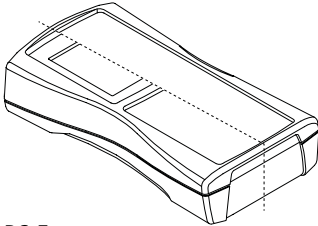
Hand-held

Enclosure sizes

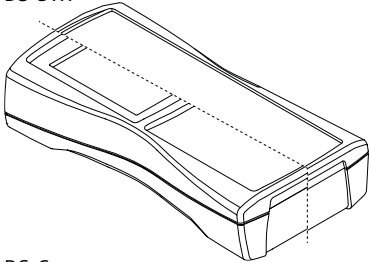
BS 2...



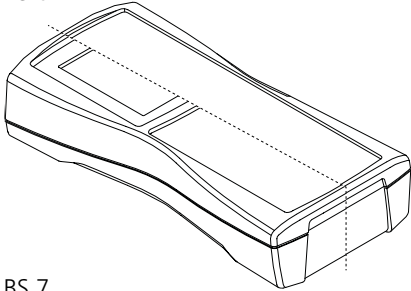
BS 4...



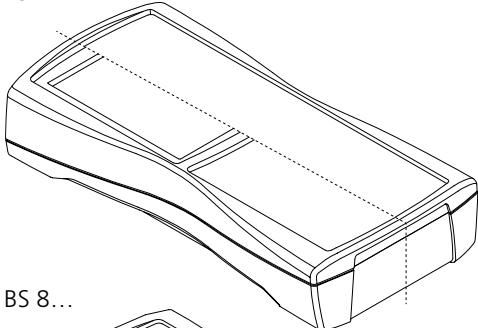
BS 5...



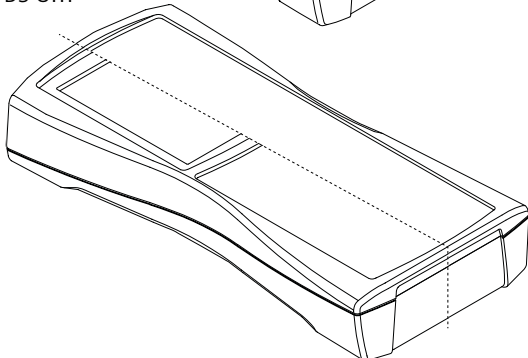
BS 6...



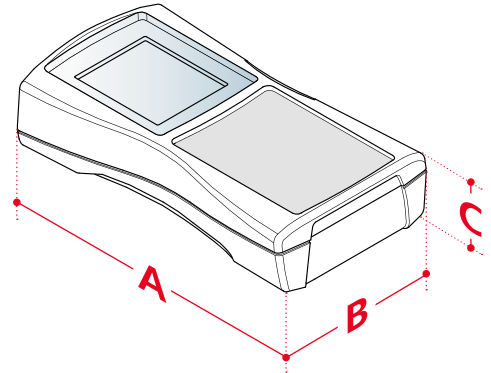
BS 7...



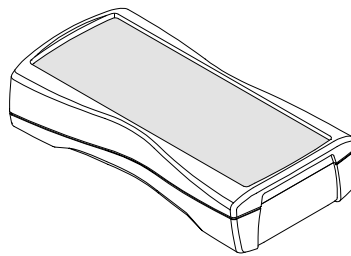
BS 8...



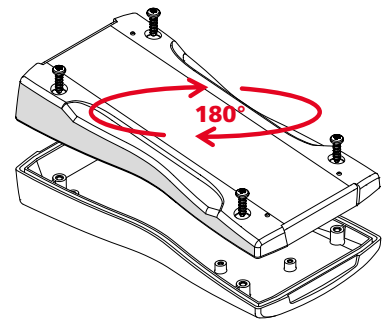
Design types



Flat version

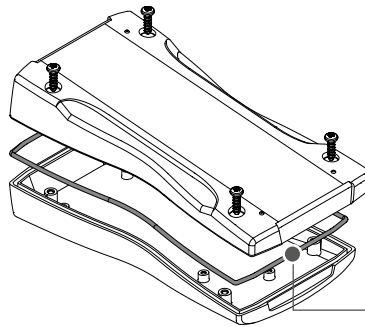


Console version

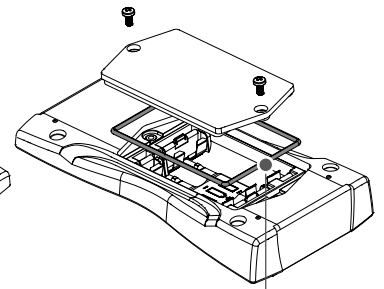


Decor seal options for protection class IP65

BS.02

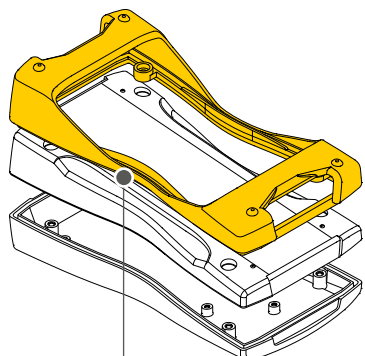


BS.04 + seal battery compartment

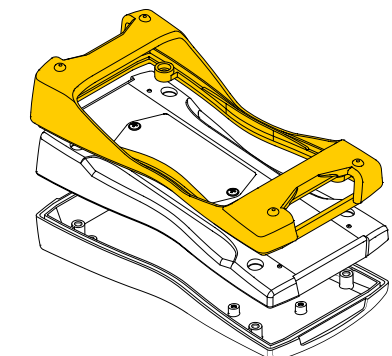


Seal to achieve the higher protection

BS.00



BS.03 + seal battery compartment



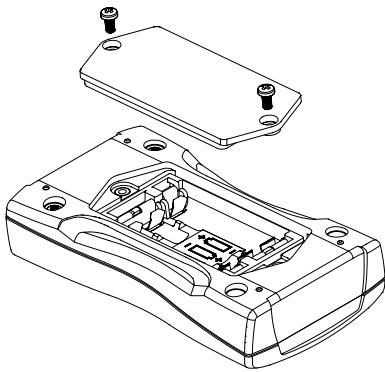


BOPLA

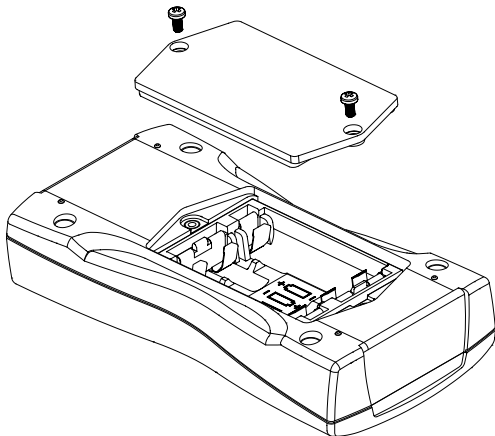
A Phoenix Mecano Company

BOS-Streamline

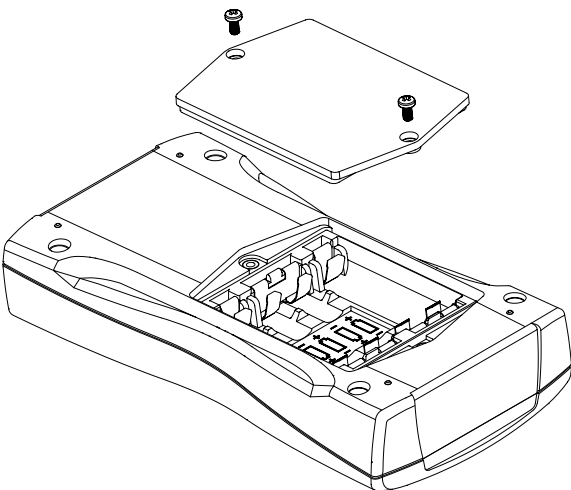
Battery compartment



Enclosure size BS 4... and BS 5...:
Battery compartment designed for 3x Micro AAA



Enclosure size BS 6...:
Battery compartment designed for 3x Micro AA



Enclosure size BS 7... and BS 8...:
Battery compartment designed for 4x Mignon AA

Dimensions

Model	A	B	C
BS 2...	79.4	44.1	22.2
BS 4...	119.3	64.9	26.5
BS 5...	140.3	72.9	31.3
BS 6...	159.4	77.9	33.5
BS 7...	184.3	93	35.4
BS 8...	209.3	98	34.8

Accessories



Decor seals



Screw covers for enclosure screws



Lanyard loop



Universal clip

The product advantages



All enclosure components can be completely latched without the use of tools. At the same time, protection class IP65 can be achieved with the use of an optional seal set.



With sizes 555, 655 and 865, definable access protection can be achieved by use of the caps: Tool opening, manual opening, or blocking.



Snap-on caps which can function as an enclosure cover are available in 6 colours and 1 infrared-permissive version. Colour combinations are also possible.



Versions with fitted battery compartments BE 30 (9V block or 2 mignon batteries) or BE 60 (2 9V block or 4 mignon batteries) are available on request for sizes 555, 655 and 865.



All sizes are available with a continuous membrane keypad area; 4 sizes additionally with display opening including a non-scratch window.



Quick-Finder:
www.bopla.de/34

Examples of use





BOPLA

A Phoenix Mecano Company

BOPLA-Arteb



Colour:

● Agate grey, similar to RAL 7038

Special colours on request

Schutzart:

IP40 / DIN EN 60529

ART 225 bis 865: can be upgraded with a sealing set to IP65 / DIN EN 60529

Material:

Enclosure and lids: ABS

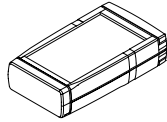
Seal: TPE

For details see technical information.

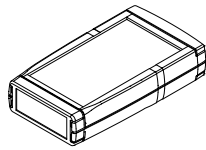


Basic sizes

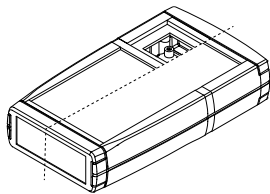
ART 115



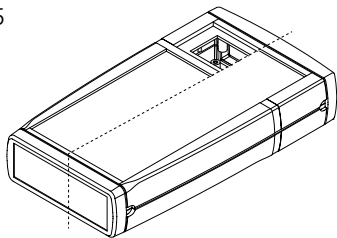
ART 225



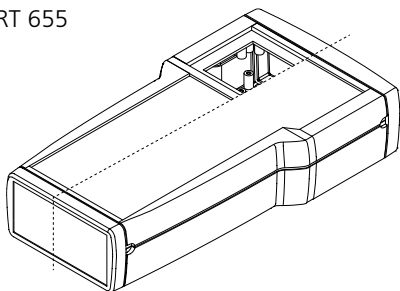
ART 335



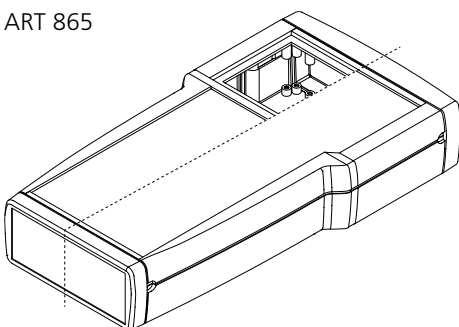
ART 555



ART 655

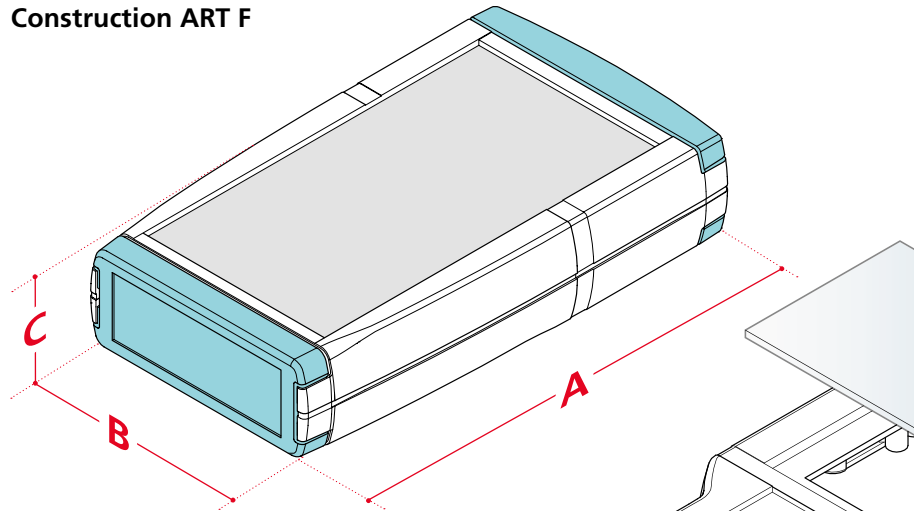


ART 865



Design types

Construction ART F

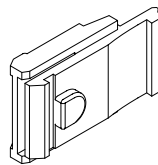


Caps in 6 colours

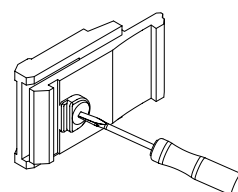


Snap-lock elements

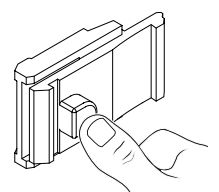
These elements are used to latch the enclosure half-shells together.



Catch



Tool-operated
(standard)



Hand-operated

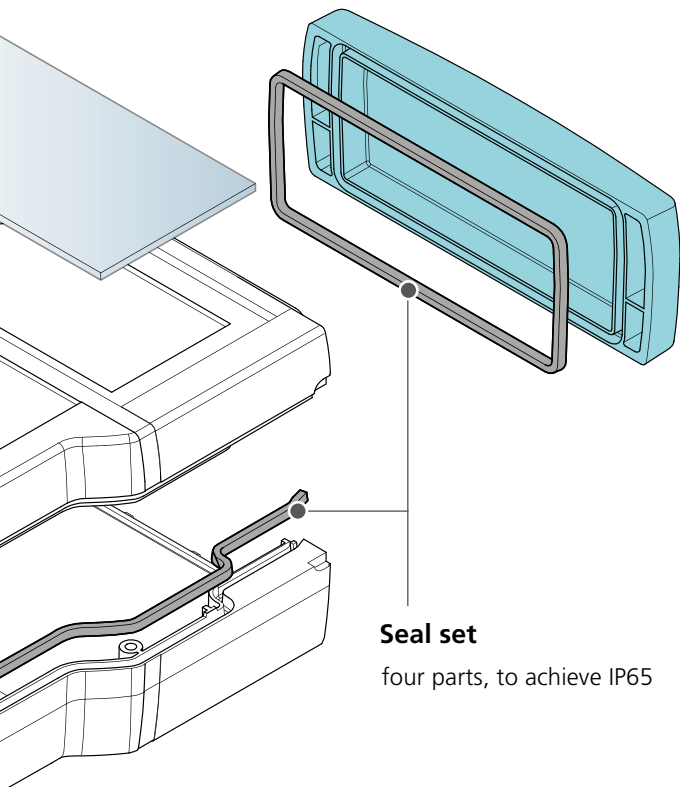


BOPLA

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BOPLA-Arteb

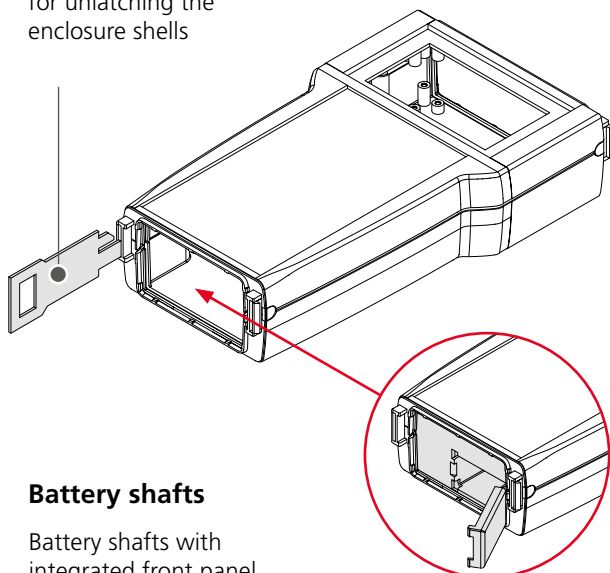
Construction ART DIS



Seal set
four parts, to achieve IP65

Unlatching ART DIS

Dismantling tool for unlatching the enclosure shells



Battery shafts

Battery shafts with integrated front panel

Dimensions

Model	A	B	C
ART 115	78	45	18
ART 225	98	55	20
ART 335	130	75	26
ART 555	165	92	30
ART 655	204	110	41
ART 865	236	125	41

Variants

Model	F	DIS	BE
ART 115	✓		
ART 225	✓		
ART 335	✓	✓	
ART 555	✓	✓	✓
ART 655	✓	✓	✓
ART 865	✓	✓	✓

Accessories



Partitions for battery compartments, ABS



Universal clip and tip-up clip



Wall fitting for clip and tip-up clip



BH 2MC



BH 4MC



BH 2MN



BH 3MN



BH 4MN



BH 4MN-BL



BH 4MN-BL



BH 6MN-BL



BH 6MN-BL



BH 9V-CLIP

Battery holder

Hand-held

The product advantages



BOS hand-held enclosures are available in various designs with different equipment features.



BOS 5.., BOS 7.., BOS 8.. Available with a membrane keypad and/or different display types.



BOS 4.. With continuous membrane keypad area. If required, a tip-up clip or a belt clip can be fitted (BOS 4.. ASC).



BOS 9.. With large display and slimline grip area – a version with a battery compartment is also available.



BOS 6.. With display screen, continuous keypad surface or integrated loudspeaker grille.



Quick-Finder:
www.bopla.de/33

Examples of use





Colours:

- Black, similar to RAL 9005
- Agate grey, similar to RAL 7038

Special colours on request

Protection class:

Depending on the model:
IP40 / DIN EN 60529 or
IP65 / DIN EN 60529

Material:

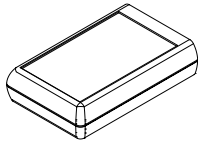
Enclosure: ABS
Seal: CR

For details see technical information.

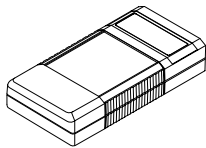


Enclosure sizes

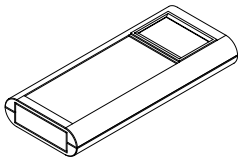
BOS 400 / 401



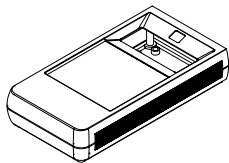
BOS 500-503



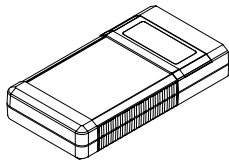
BOS 600-602



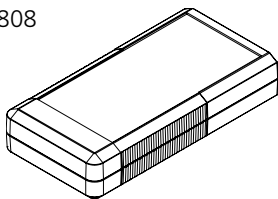
BOS 700-705



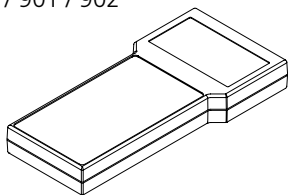
BOS 750-761



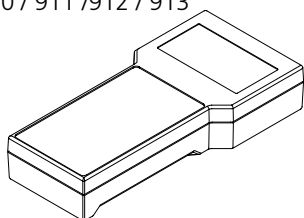
BOS 800-808



BOS 900 / 901 / 902

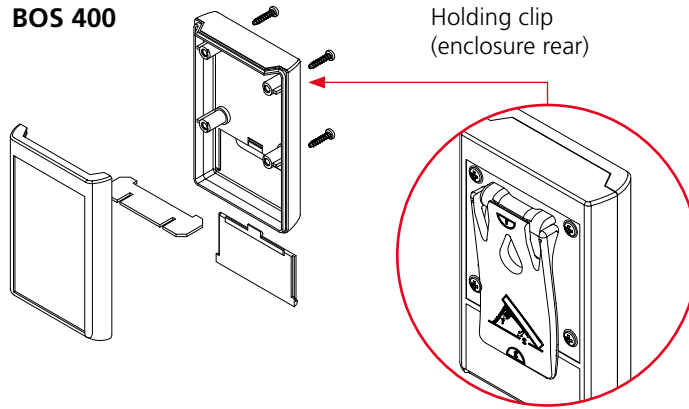


BOS 910 / 911 / 912 / 913

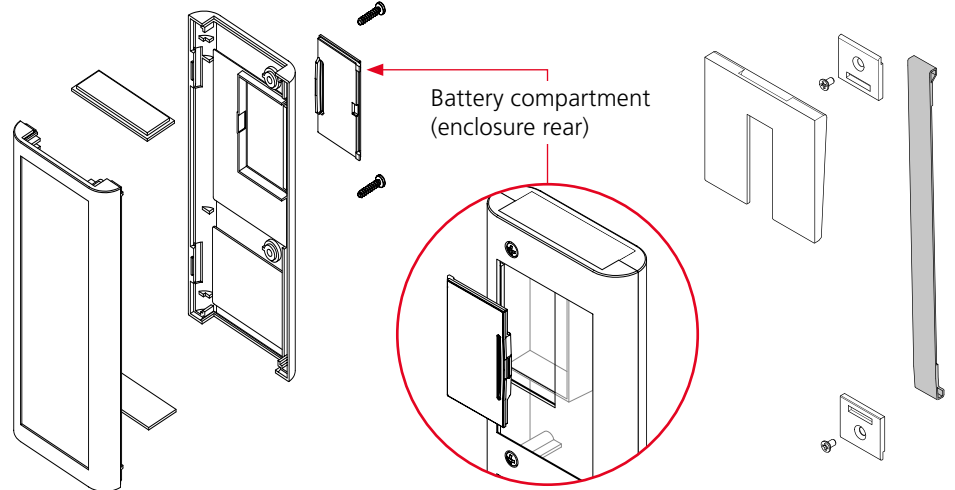


Design types

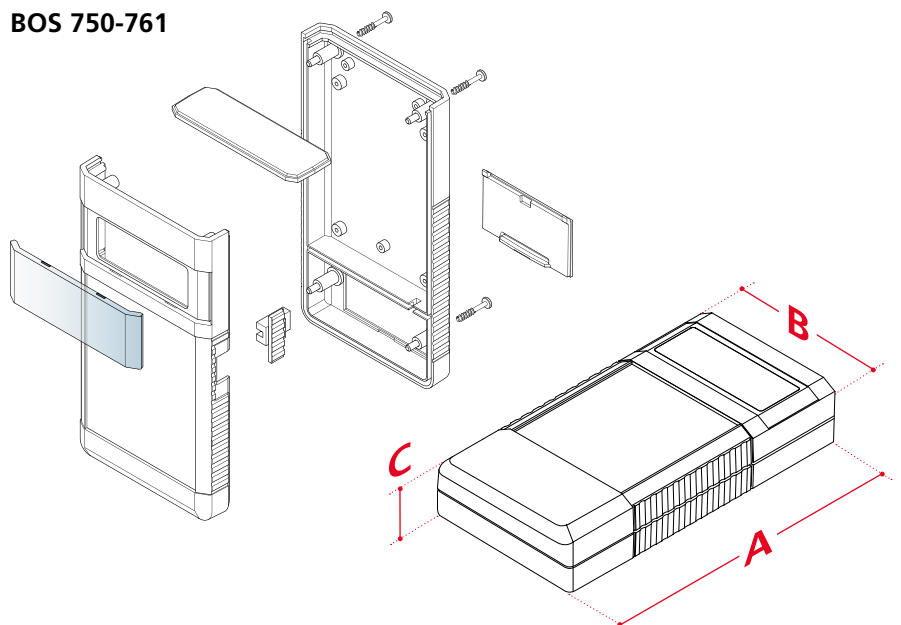
BOS 400



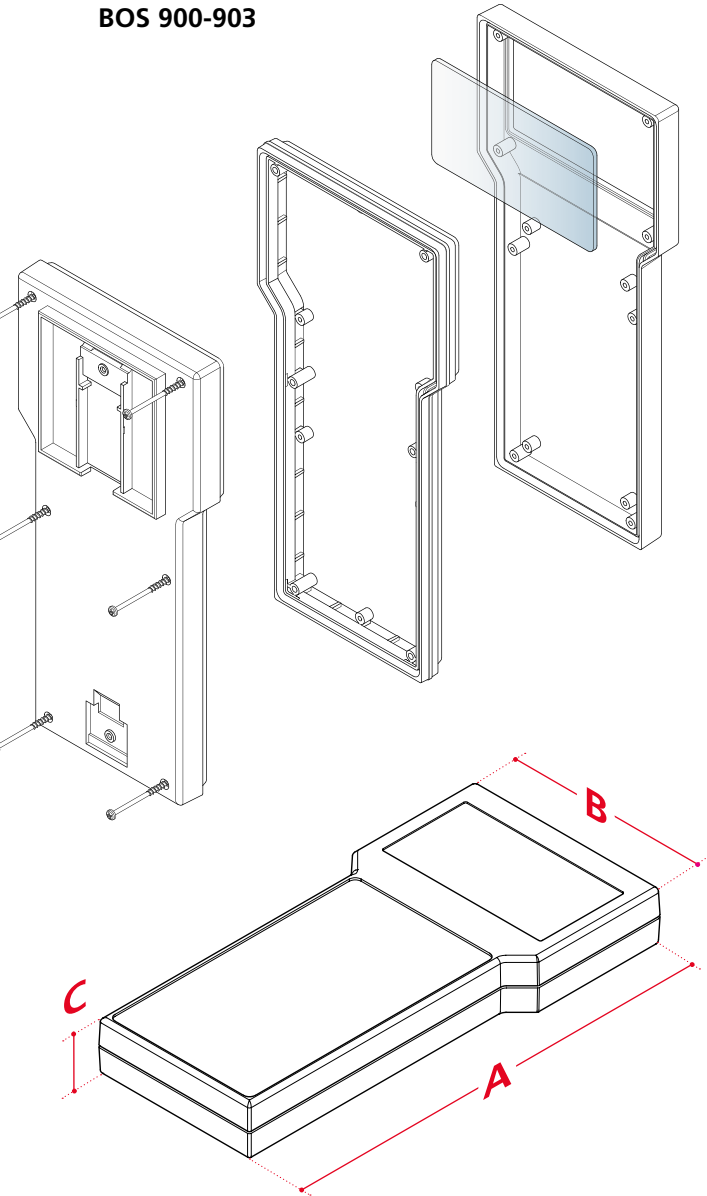
BOS 600-602



BOS 750-761



BOS 900-903



Dimensions

Model	A	B	C
BOS 400 (ASC) 401 (ASC)	100	65	24
BOS 500 - BOS 503	120	60	25
BOS 600 - BOS 602	172	77	25
BOS 700 - BOS 705	150	80	30
BOS 750 - BOS 761	157	84	30
BOS 800 - BOS 808	196	100	40
BOS 900 - BOS 903	211	100	26
BOS 910 - BOS 913	224	106	40

Accessories



Front panels BOS 500-503, ABS



Display screens BOS 700-705, polycarbonate



Display adapter BOS 910-913



Table stand BOS 90 -903, BOS 910-913



Intermediate frame BOS 900-903

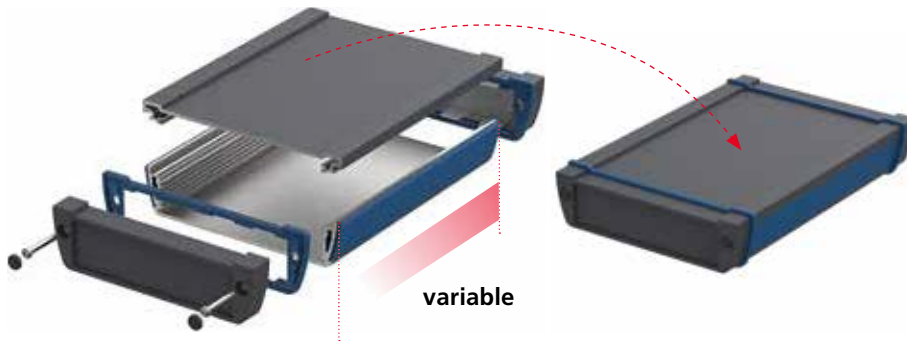




System integration

We complete your application in accordance
with your specifications!

The product advantages



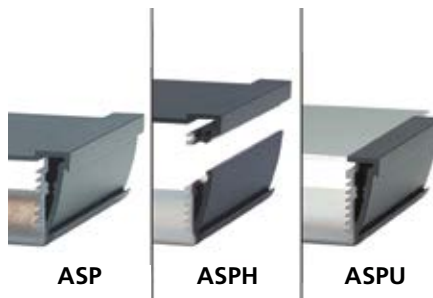
The enclosure body in the “stylish” asymmetric design consists of a powder-coated aluminium profile and can be designed in length and colour to match the application.



The system groove integrated in the profile allows the mounting of optional design and functional elements such as decor strips, wall fittings, tower and tip-up feet.



Contact surfaces which contact the lid to the profile guarantee good EMC protection. EMC seals are available if greater protection is required.



The profile variants – closed (ASP), horizontally divided (ASPH) or open on one side (ASPU) – provide a suitable enclosure solution for every installation situation.



Different lid variants with and without a hinge, and coloured seals, ensure a high level of protection and give access to the interior if required.



Quick-Finder:
www.bopla.de/94

Examples of use





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Alustyle



Colour:

● Graphite grey, similar to RAL 7024

● Silver, similar to RAL 9006

Special colours on request

Protection class:

ASP: up to IP66 / IP68 (1.2 m - 2 h) / DIN EN 60529
when using ASD

ASPH: IP65 / DIN EN 60529

ASPU: IP40 / DIN EN 60529

Material:

Extruded profiles: Al Mg Si 0,5 powder coated

Die-cast lid: zinc alloy Z410 / aluminium

GD Al Si 12 (ASD 1540 / 1835), powder coated

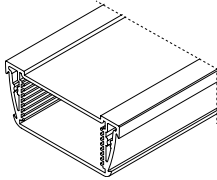
Seal: TPE

For details see technical information.

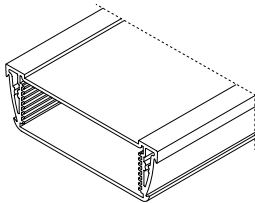


Profile cross-sections

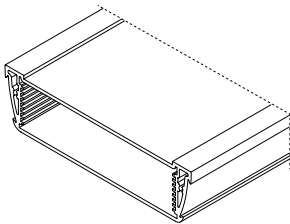
ASP...830



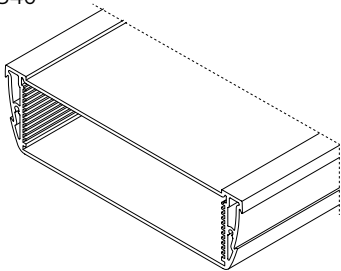
ASP...1030



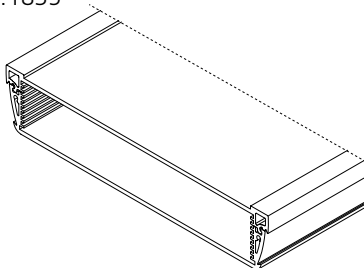
ASP...1230



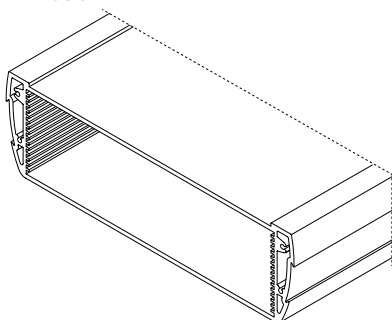
ASP...1540



ASP...1835

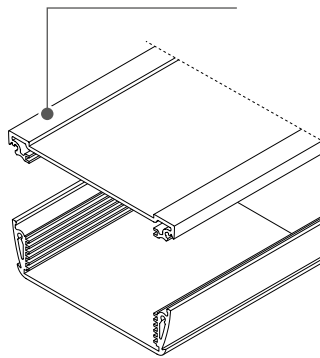


ASP...1850

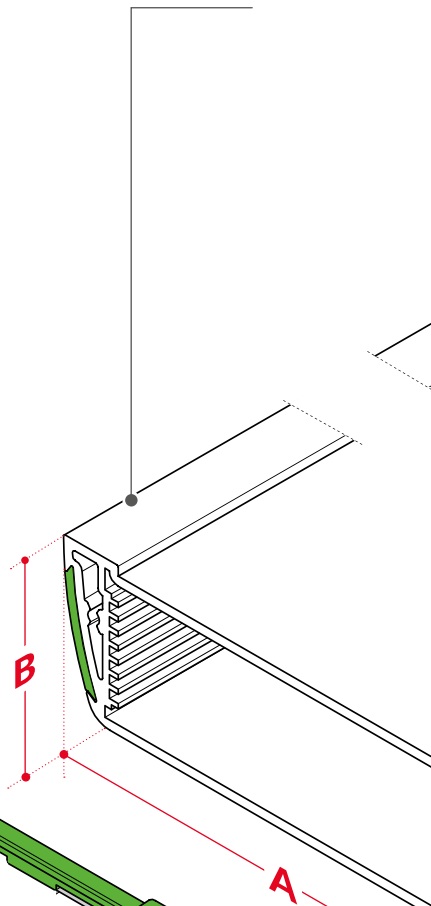


Enclosure versions

ASPH
(horizontally divided)



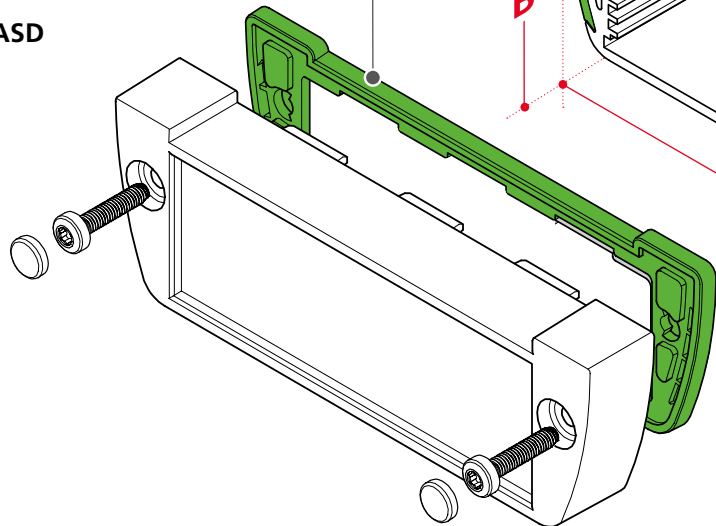
ASP
(closed)



Design seals

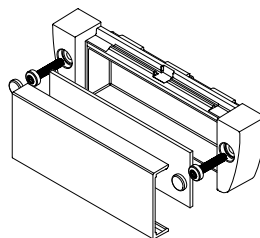


End covers
ASD

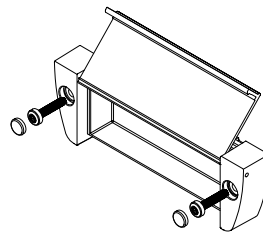


Lid variants

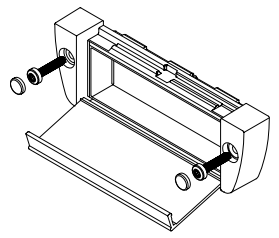
ASM-AL



ASM-SAL 1



ASM-SAL 2

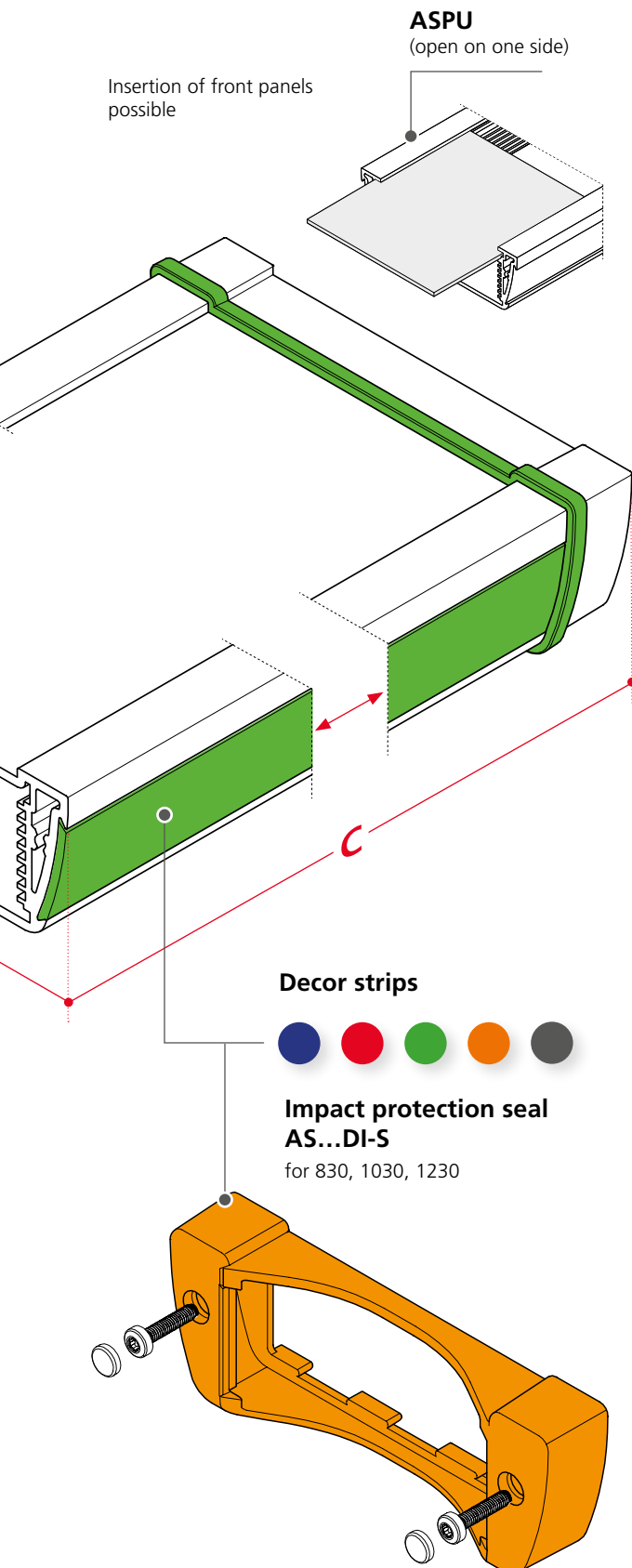




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Alustyle



Dimensions

Model	A	B	C
ASP...830	74	32.8	*
ASP...1030	98.5	32.8	*
ASP...1230	121	32.8	*
ASP...1540	154	44	*
ASP...1835	181.7	36.6	*
ASP...1850	187	54.6	*

* C = Standard lengths: 100 / 150 / 200 / 1000
Individual profile lengths on request.

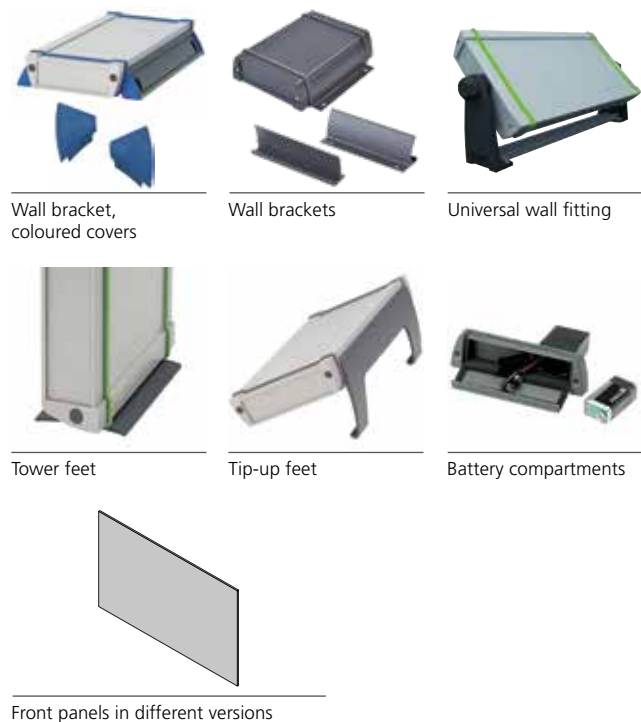
Profile cross-sections

Model	ASP	ASPH	ASPU
ASP...830	✓	✓	✓
ASP...1030	✓	✓	✓
ASP...1230	✓	✓	✓
ASP...1540	✓	✓	✓
ASP...1835		✓	
ASP...1850	✓	✓	✓

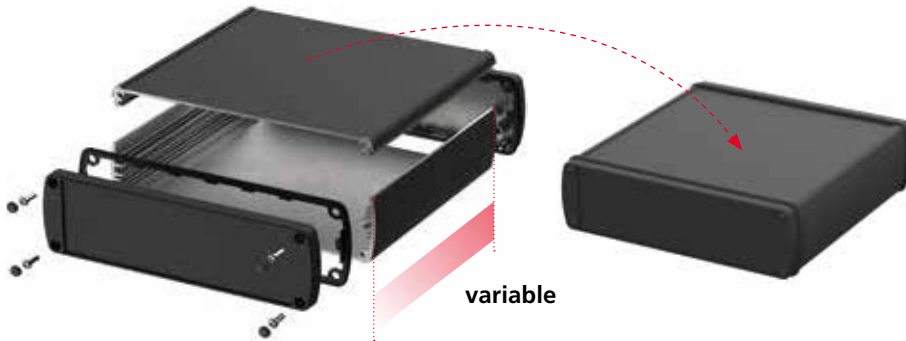
Lid variants

Model	ASD	ASM	ASM SAL
ASP...830	✓	✓	✓
ASP...1030	✓	✓	✓
ASP...1230	✓	✓	✓
ASP...1540	✓		
ASP...1835	✓		
ASP...1850	✓		

Accessories

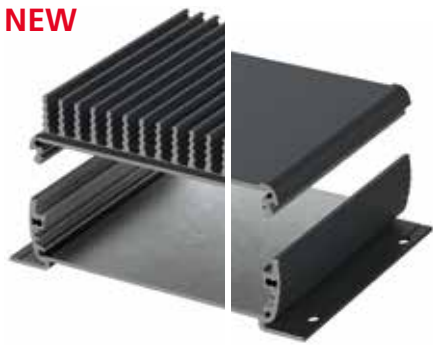


The product advantages

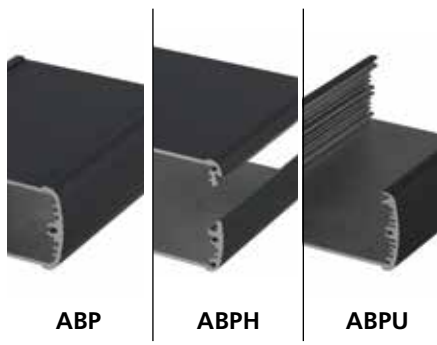


The enclosure body consists of a powder-coated aluminium profile and can be designed in length and colour to match the application.

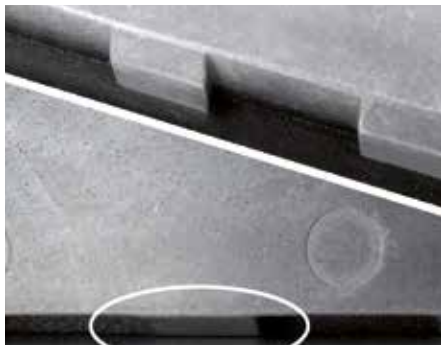
NEW



As an option, heat sink fins (ABPH-K) and wall bracket profiles ensure reliable heat dissipation and sturdy wall mounting.



The profile variants – closed (ABP), horizontally divided (ABPH) or open on one side (ABPU) – provide a suitable enclosure solution for every installation situation.



Good EMC protection by means of contact surfaces which connect the lid to the profile. Conductive EMC seals are available if greater protection is required.



Different lid variants with and without a hinge, and coloured seals, ensure a high level of protection and give access to the interior if required.



Quick-Finder:
www.bopla.de/84

Examples of use





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Alubos



Farbton:

● Black, similar to RAL 9005

Special colours on request

Protection class:

ABP, ABPH: bis IP65 / DIN EN 60529

ABPU: IP40 / DIN EN 60529

Material:

Extruded profiles: Al Mg Si 0,5 powder coated

Diecast lid: GD Al Si 12, powder coated

Seal: TPE

For details see technical information.

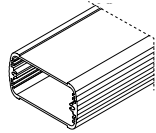


Profile

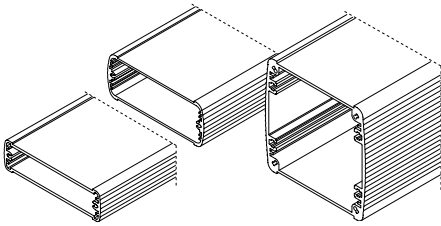


Profile cross-sections

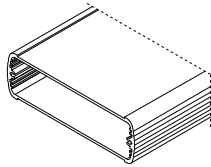
AB...600



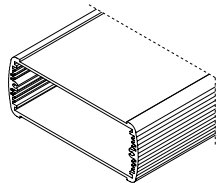
AB...820 / AB...800 / AB...880



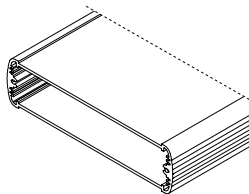
AB...1000



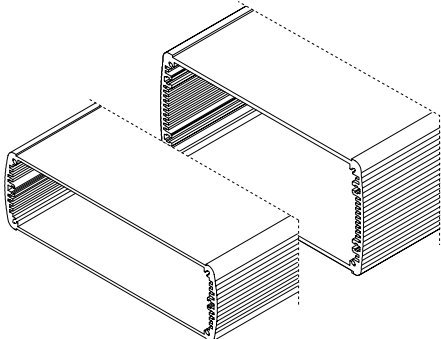
AB...1040



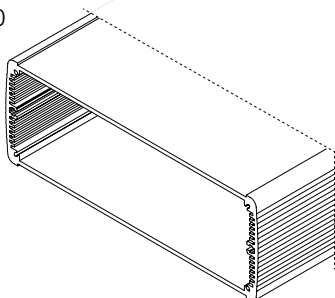
AB...1300



AB...1600 / AB...1680

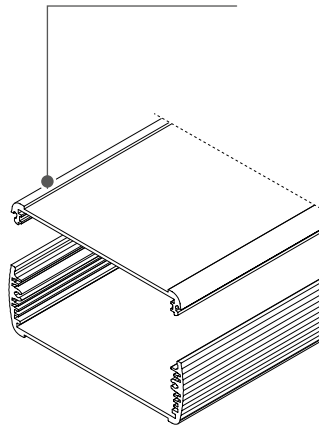


AB...2070

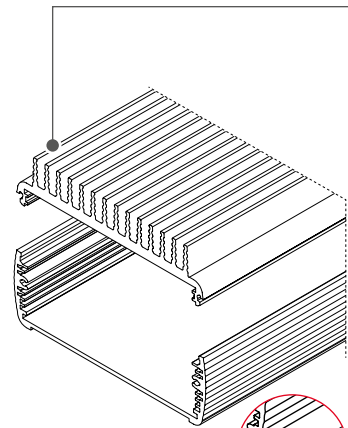


Enclosure versions

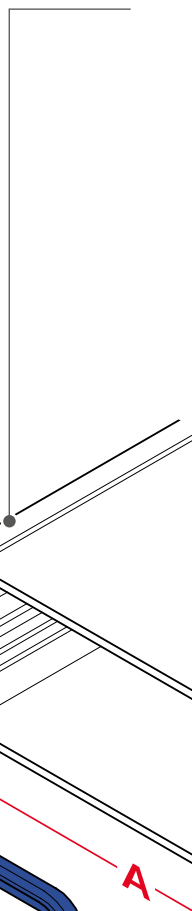
ABPH
(horizontally divided)



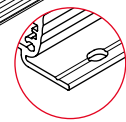
ABPH K
(horizontally divided, with heat sink)



ABP
(closed)



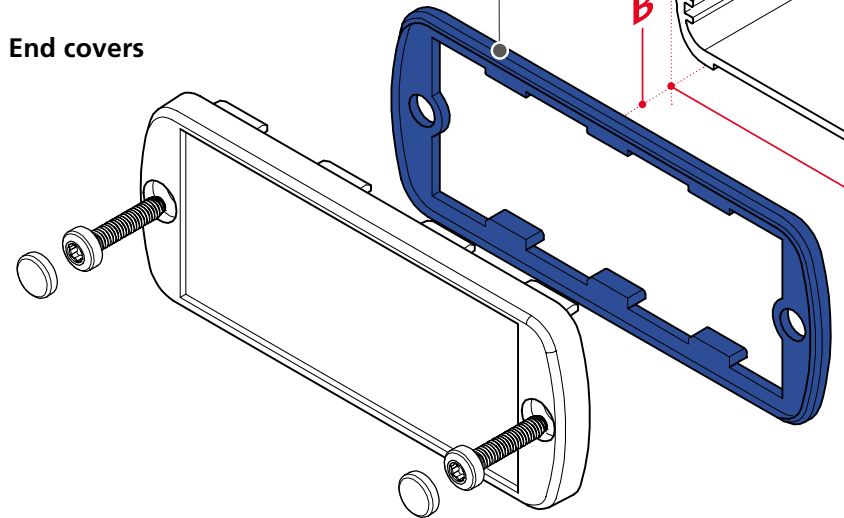
ABPH KWL
(horizontally divided, with heat sink and wall brackets)



Seals

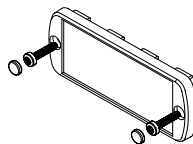


End covers

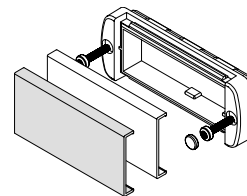


Lid variants

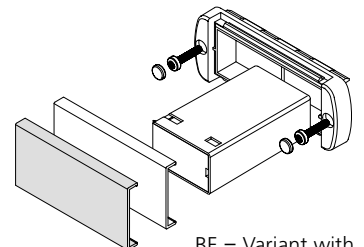
ABD



ABM-AL / ABM-IR



ABM-AL-BE / ABM-IR-BE



AL= aluminium cap
IR = infrared-permissive plastic cap

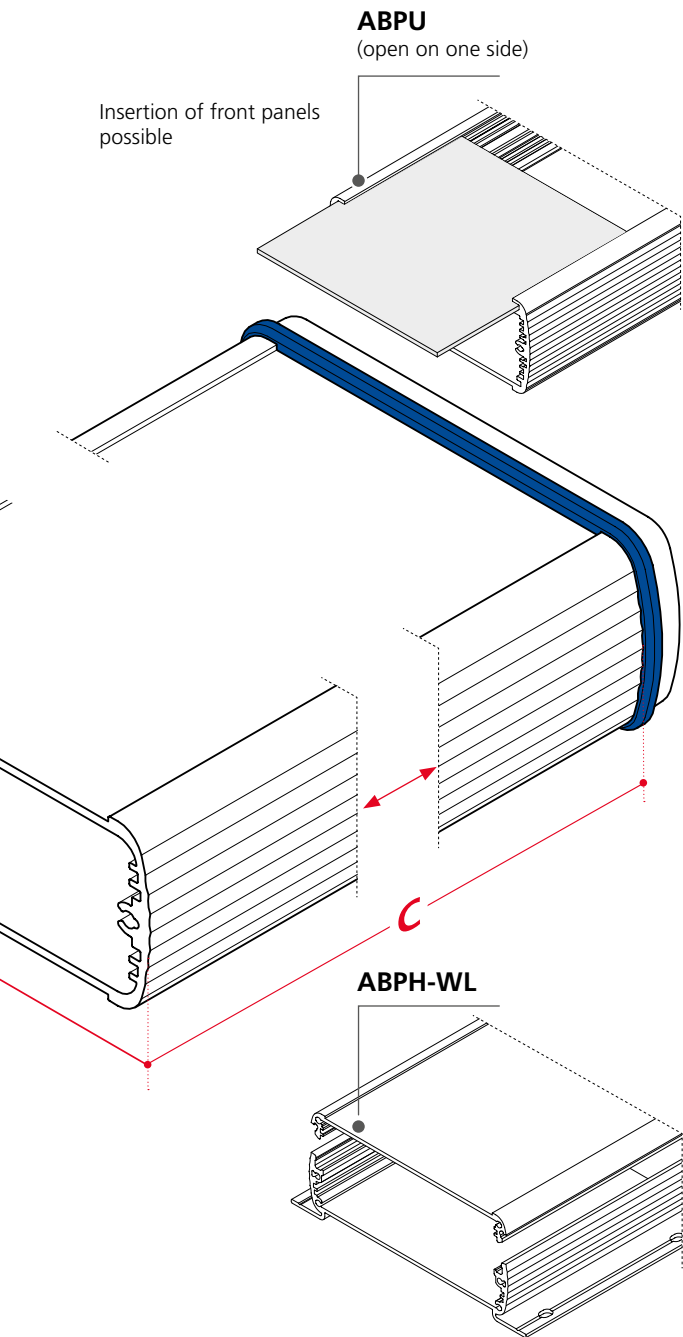
BE = Variant with battery compartment



BOPLA

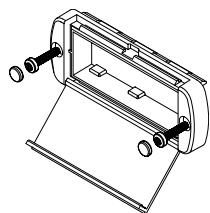
A Phoenix Mecano Company

Alubos

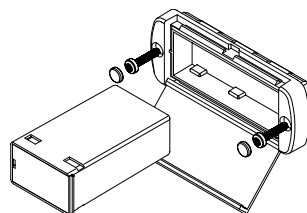


ABM-SAL

ABM-SAL-BE



Variant with hinged lid



BE = Variant with battery compartment

Dimensions

Model	A	B	C
ABP...600	57	32	*
ABP...800 / 820	82	32 / 22	*
ABP...880	84,5	82	*
ABP...1000	106	32	*
ABP...1040	108	42	*
ABP...1300	138	34	*
ABP...1600 / 1680	169	52 / 82	*
ABP...2070	210	74	*

* C = Standard lengths: 100 / 150 / 200 / 1000
individual profile lengths on request.

Profile variants

Model	ABP	ABPH WL	ABPH	ABPU	ABPH K (WL)
ABP...600	✓	✓	✓		✓
ABP...800	✓	✓	✓		
ABP...820	✓		✓	✓	
ABP...880	✓	✓			
ABP...1000	✓	✓	✓	✓	✓
ABP...1040	✓	✓	✓	✓	
ABP...1300	✓	✓	✓	✓	
ABP...1600	✓	✓	✓		✓
ABP...1680	✓	✓	✓	✓	
ABP...2070	✓				

Lid variants

Model	ABD	ABM-AL-IR	ABM-AL-IR +BE	ABM-SAL	ABM-SAL +BE
ABP...600	✓	✓	✓	✓	✓
ABP...800	✓	✓	✓	✓	✓
ABP...820 / 880	✓				
ABP...1000	✓	✓	✓	✓	✓
ABP...1040	✓			✓	
ABP...1300	✓			✓	
ABP...1600 / 1680	✓				
ABP...2070	✓				

Accessories



Wall brackets

Wall brackets, adjustable

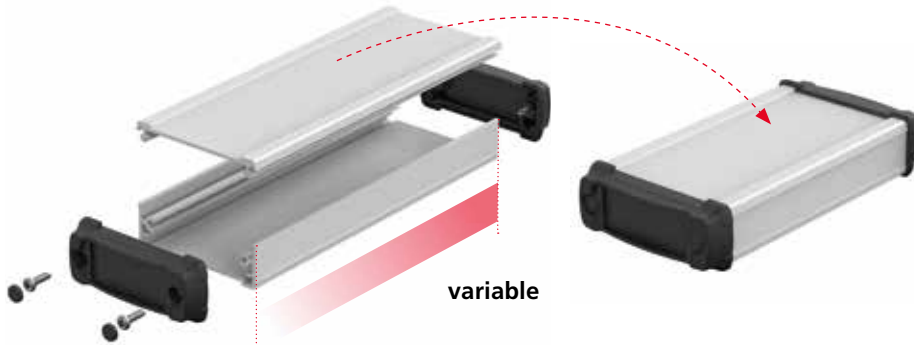
Handle / Tip-up bow



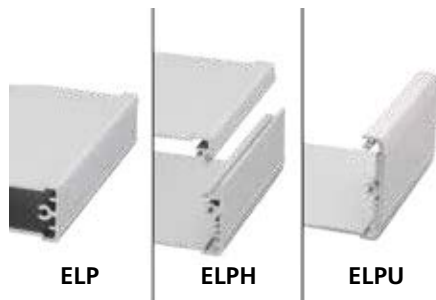
Mounting clamps

Front panels in different versions

The product advantages



The technically functional design of the enclosure body consists of anodised aluminium profile and, if required, can be adapted in any manner to the relevant application.



The variable lengths and the three profile variants closed (ELP), horizontally divided (ELPH) or open on one side (ELPU) provide the suitable enclosure for every application.



By using seal EL...DI, the protection class for profile variant ELPH can now be increased from IP40 to IP54. For ELPH, factory-executed mounting of an additional round cord seal is required.



Plastic lids in two standard colours (now also in black) are available as a profile end.



As an option, the lids have moulded-on brackets for wall fitting.



Quick-Finder:
www.bopla.de/83

Examples of use





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BOS-Ecoline



Colour:

Profile anodized in natural color

Plastic lid:

- Black, similar to RAL 9005
- Dust grey, similar to RAL 7037 and other special colours on request

Protection class:

IP40 / DIN EN 60529

ELP upgradeable to IP54 / DIN EN 60529 through optional seal ELPH with IP54 / DIN EN 60529 on request

Material:

Extruded profiles: Al Mg Si 0,5 anodized

Plastic lid: ABS

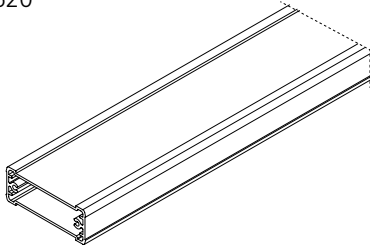
Sealing material: EPDM

For details see technical information.

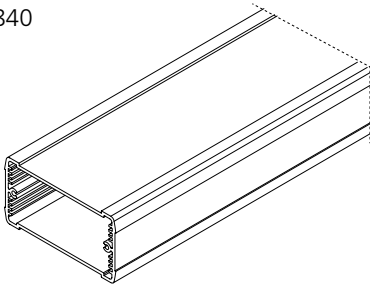


Profile cross-sections

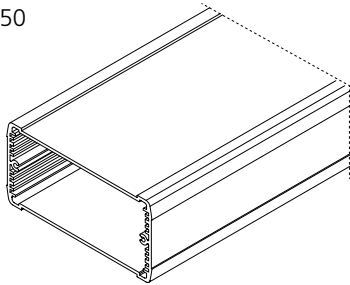
ELP...620



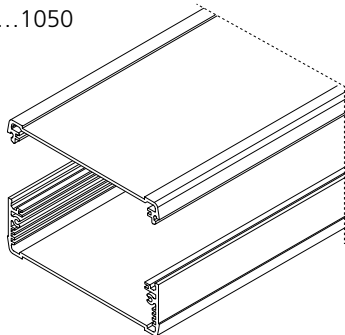
ELP...840



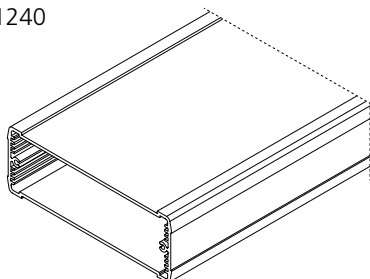
ELP...1050



ELPH-EU...1050

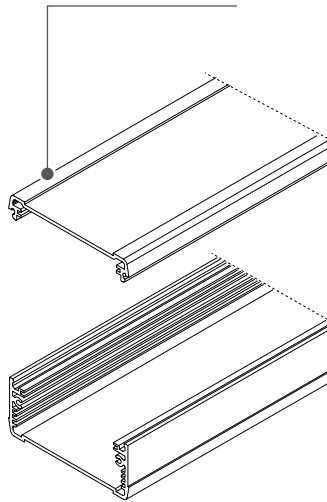


ELP...1240

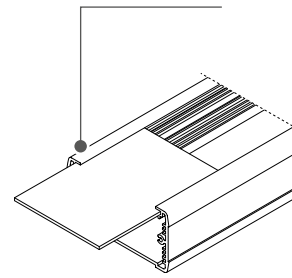


Enclosure versions

ELPH
(horizontally divided)

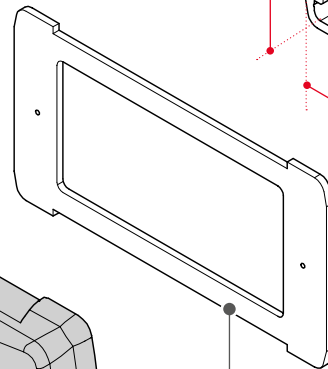
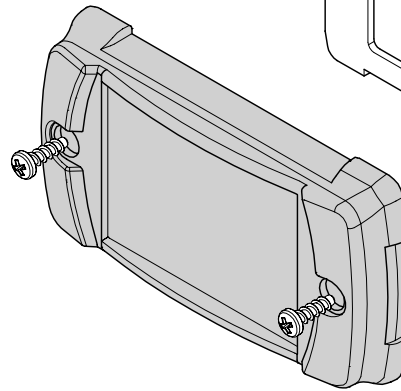
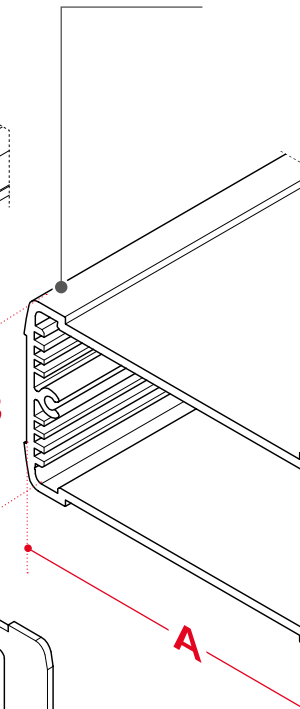


ELPU
(open on one side)



Insertion of
front panels possible

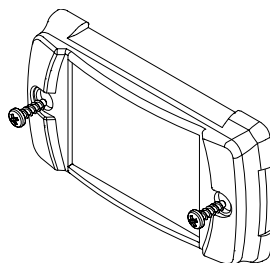
ELP
(closed)



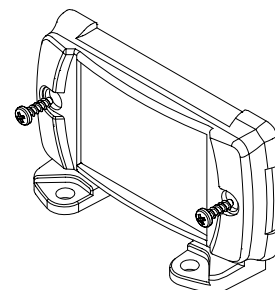
EL...DI
Seal to increase
the protection class

Lid variants

ELP...D



ELP...DW

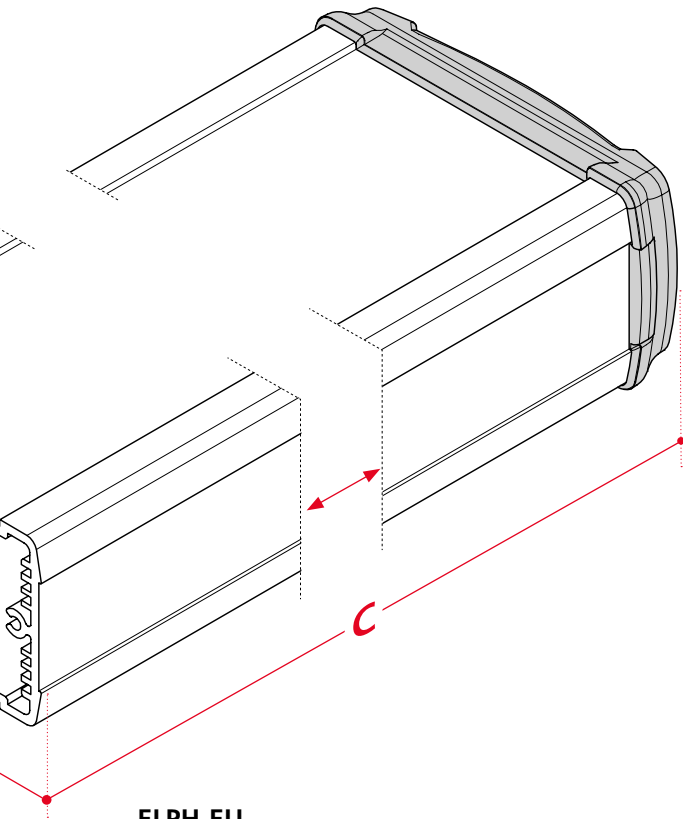




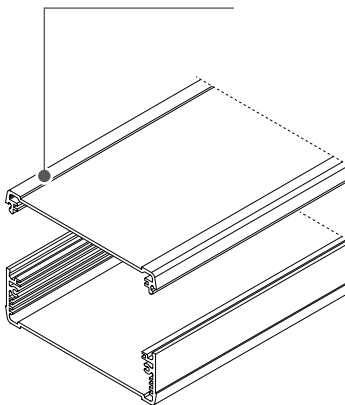
BOPLA

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BOS-Ecoline



ELPH-EU
(for Euro cards)



Dimensions

Model	A	B	C
ELP...620	57.5	22	*
ELP...840	80	42	*
ELPH-EU...1050	106	52	*
ELP...1050	106	52	*
ELP...1240	120	42	*

* C = Standard lengths: 100 / 150 / 200
Individual profile lengths on request.

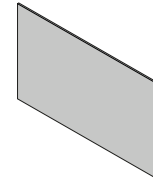
Profile cross-sections

Model	ELP	ELPH	ELPU
ELP...620	✓	✓	✓
ELP...840	✓	✓	✓
ELPH-EU...1050		✓	
ELP...1050	✓	✓	✓
ELP...1240	✓	✓	✓

Accessories



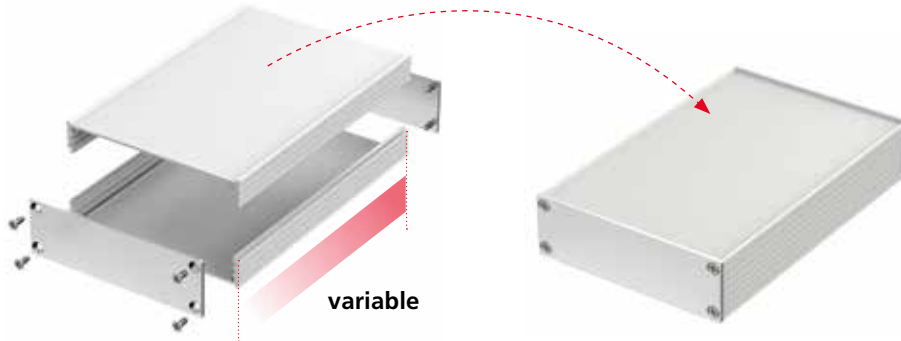
Seals EL...DI
to protection class IP 54, EPDM



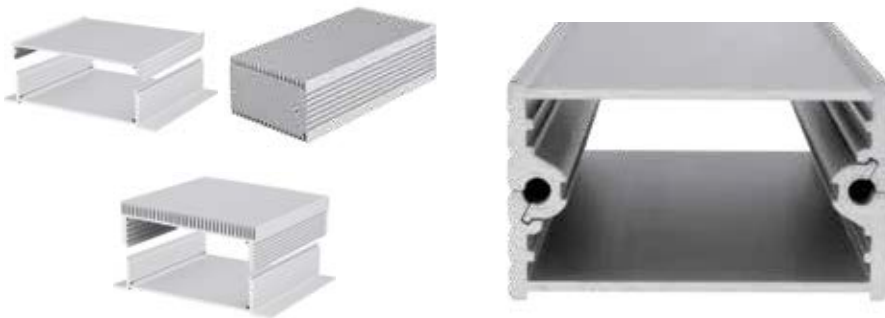
Front panels in different versions



The product advantages



Filotec is based on two anodised aluminium profile half-shells. This means that the enclosure system is variable in length and can, if necessary, be adapted flexibly to the relevant application.



In addition to the various heights, the F 5.. and F 10.. offer profiles with integrated wall brackets or cooling fins.

Filotec is available in different profile widths. Profiles of different heights can be combined with each other within a family in order to vary the height of the enclosures.



The enclosure lids consist of anodised sheet aluminium and provide plenty of space for fitting connectors, printing, etc.



During the mounting of the enclosure lid, the enclosure halves are automatically screwed together



Quick-Finder:
www.bopla.de/97

Examples of use





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Filotec



Colour:

Anodized in natural color

Protection class:

IP40 / DIN EN 60529

Material:

Enclosure: Al Mg Si 0,5; anodized

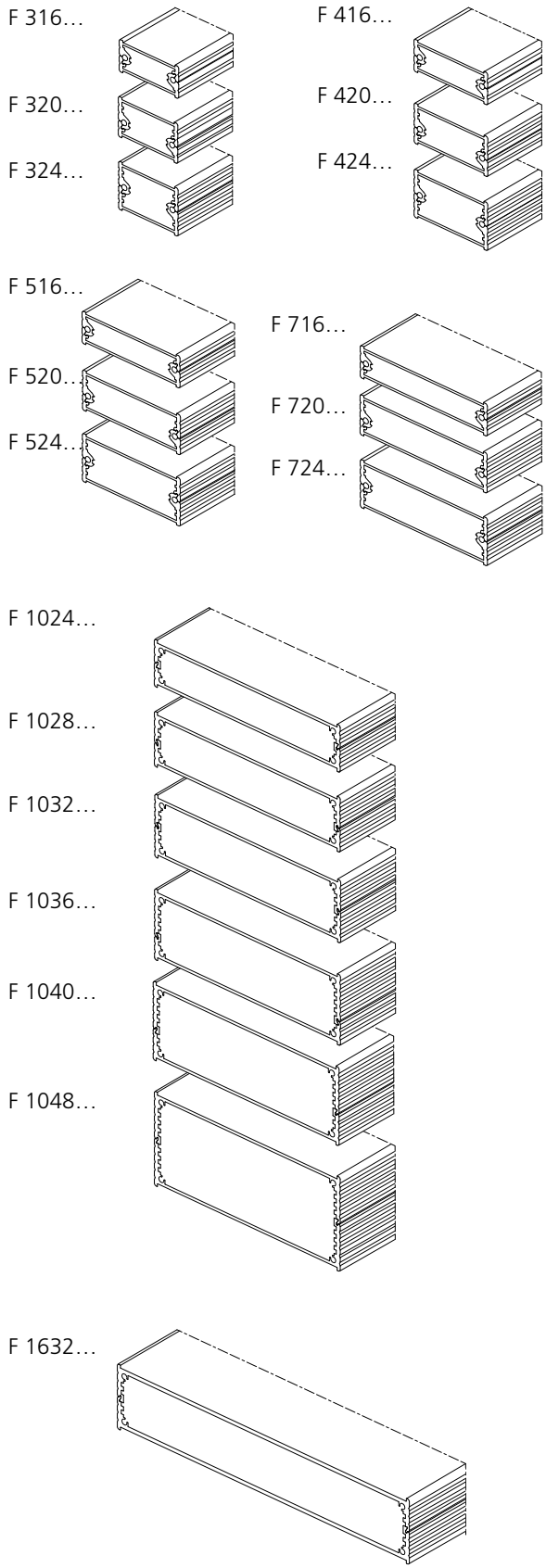
For details see technical information.



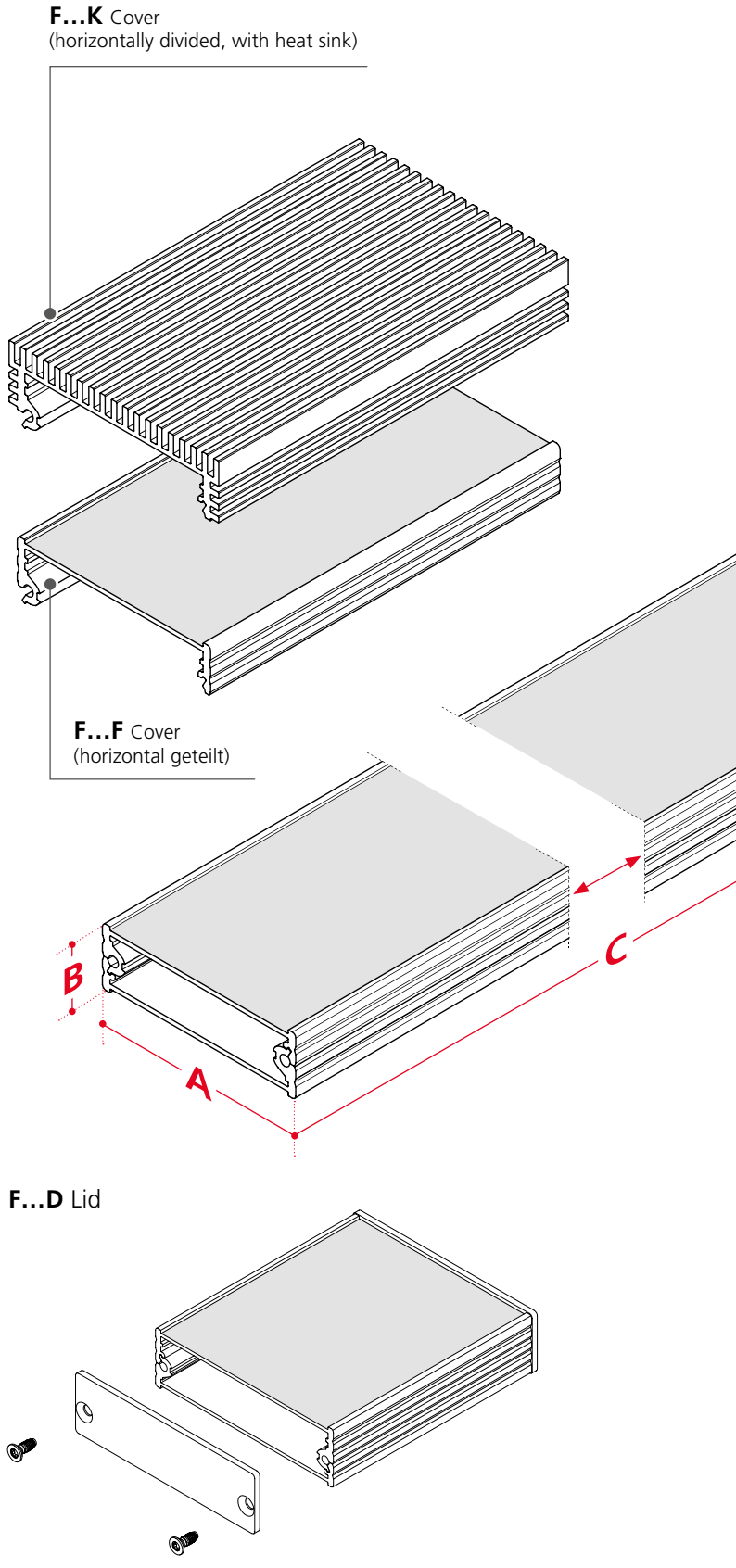
Profile



Profile cross-sections

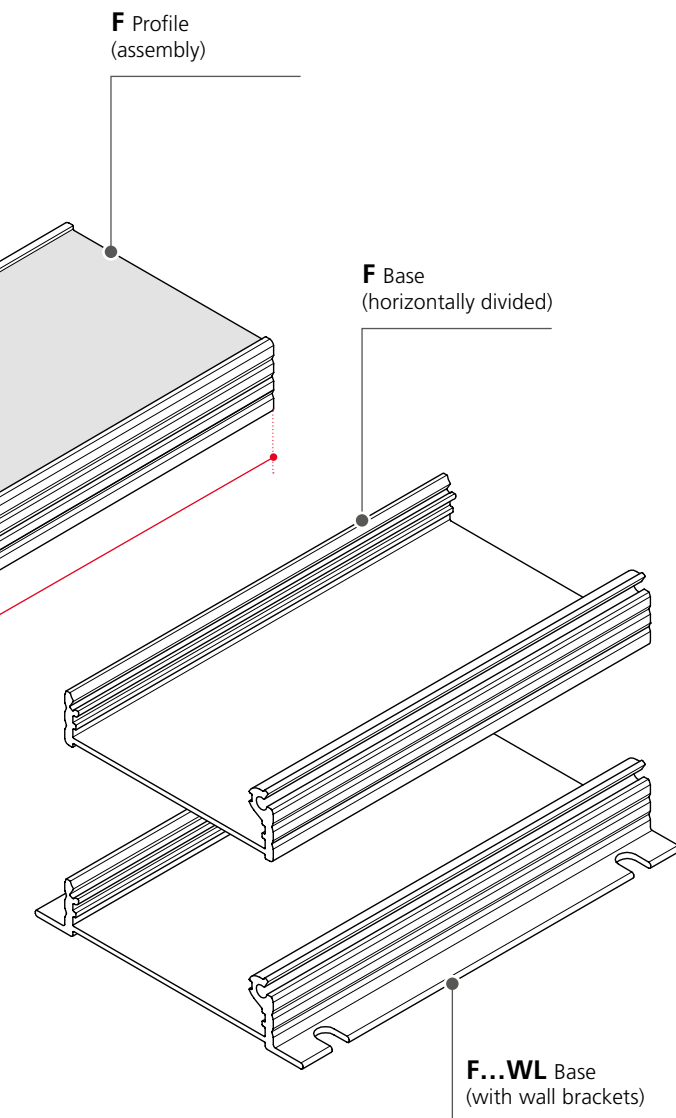


Enclosure versions



 **Note**

The lids and bases can be combined with each other.
For example: Lid with heat sink and base with wall brackets.



Dimensions

Model	A	B	C	WL	KWL	K
F 316...	33.6	16.4	*			
F 320...	33.6	20.4	*			
F 324...	33.6	24.4	*			
F 416...	41.6	16.4	*			
F 420...	41.6	20.4	*			
F 424...	41.6	24.4	*			
F 516...	55.3	16.4	*			
F 520...	55.3	20.4	*	✓		
F 524...	55.3	24.4	*	✓	✓	✓
F 716...	71.8	16.4	*			
F 720...	71.8	20.4	*			
F 724...	71.8	24.4	*			
F 1024...	105	24	*			
F 1028...	105	28	*			
F 1032...	105	32	*			
F 1036...	105	36	*	✓		
F 1040...	105	40	*	✓		
F 1048...	105	48	*	✓	✓	✓
F 1632...	165	33	*			

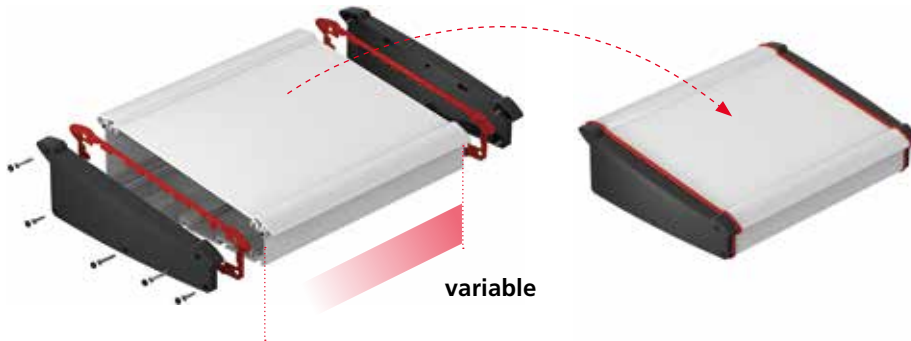
* C = Profile standard lengths depending on the mode 50 / 80 / 100 / 160 / 220 / 1000, special lengths on request.

Accessories



Aluminium cover, 2 mm
natural-coloured anodised

The product advantages



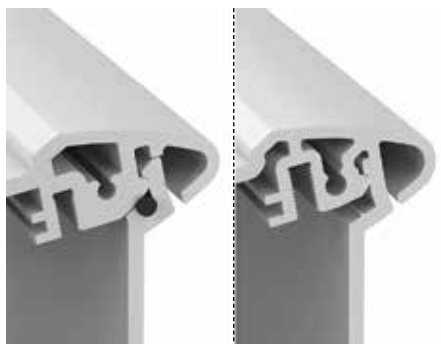
The enclosure body consists of anodised aluminium profiles and can be adapted to any application (coloured design seals only with the ATPH-IP variant).



Plastic lids are available as profile ends in three standard colours – and now also in black, as many customers have requested. The ATPH-IP variant also has a design seal.



The split enclosure profile allows easy access to the interior, and fast, problem-free mounting of the electronic components.



The factory-fitting of a round cord seal in combination with the AT...DI seal ensures that the ATPH variant (left) achieves protection class IP54. The ATPH-IP version (right) provides IP65 protection as standard.



The profiles are equipped with various plug-in slots and also screw channels for alternative uses for mounting circuit boards.



Quick-Finder:
www.bopla.de/92

Examples of use





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Alu-Topline



Colour:

Profile anodized in natural color

Plastic lid:

● Graphite grey, similar to RAL 7024

● Black, similar to RAL 9005

Special colours on request

Protection class:

ATPH: IP 40; optional IP 54 DIN EN 60529;

ATPH-IP: IP 65 DIN EN 60529

Material:

Extruded profiles: Al Mg Si 0,5; anodized

Plastic lid: ABS

Design seal: TPE

Seal: EPDM

For details see technical information.

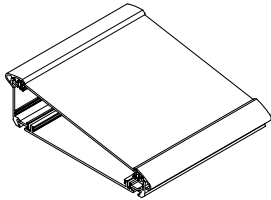


Profile

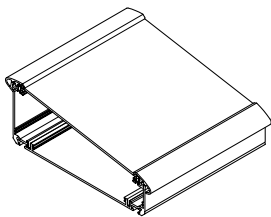


Cross-sections

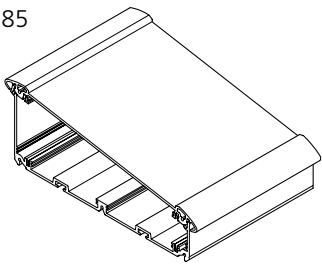
ATPH 1850



ATPH 1865

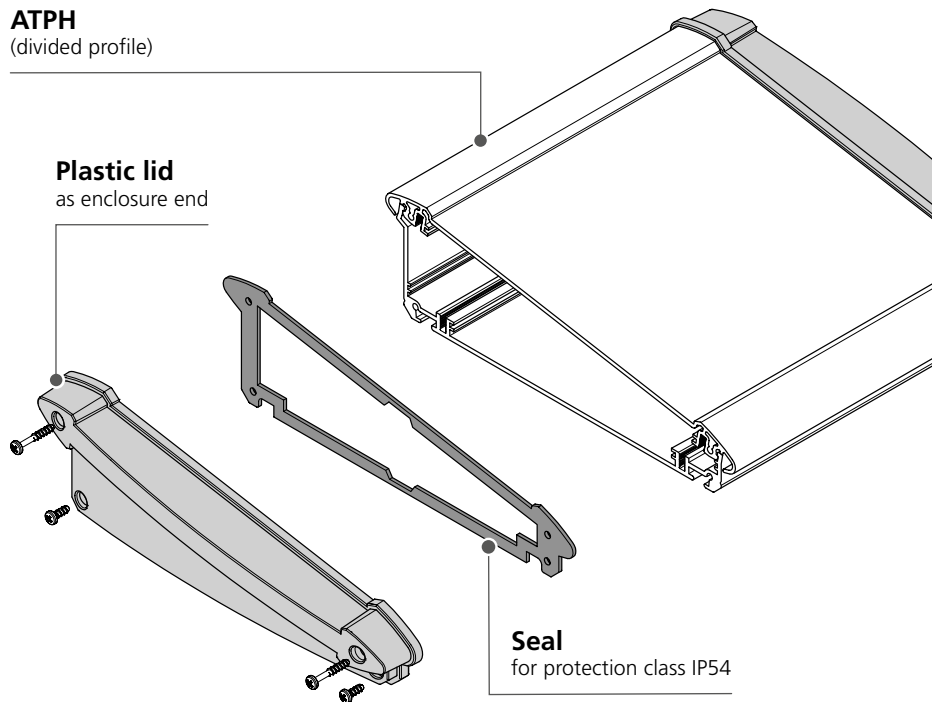


ATPH-IP 2385

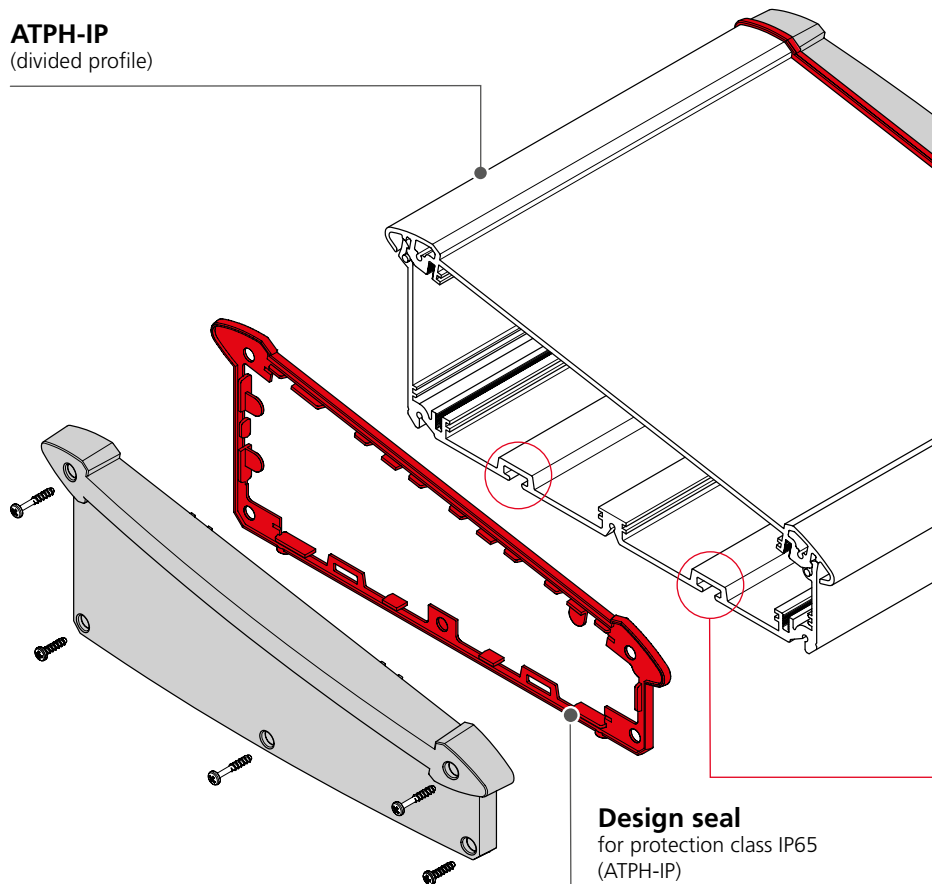


Enclosure versions

ATPH
(divided profile)



ATPH-IP
(divided profile)





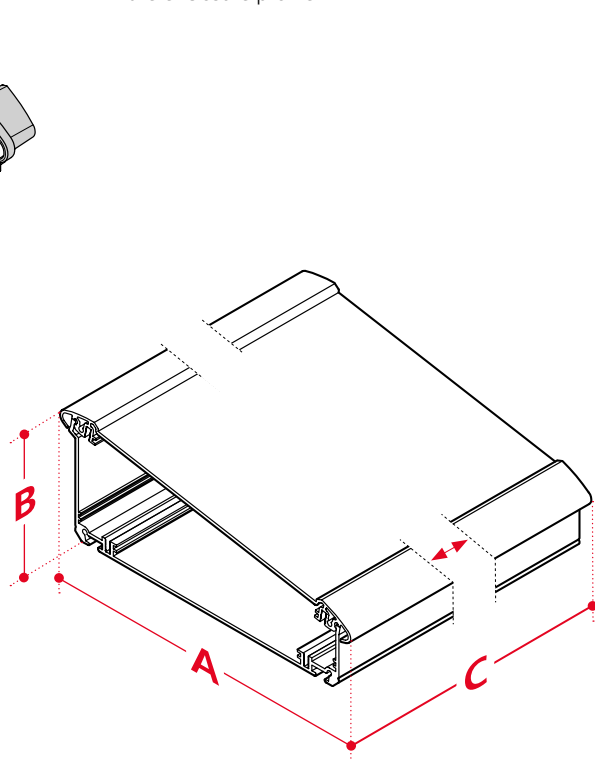
BOPLA

A Phoenix Mecano Company

Alu-Topline

! Note

For protection class IP54, in addition to seal AT...DI – available as an accessory – a round cord seal can be factory-fitted in the enclosure profile.



Dimensions

Model	A	B	C
ATPH 1850	181.2	53.2	*
ATPH 1865	181.2	68.2	*
ATPH-IP 2385	232,6	86,2	*

*C = standard lengths: 150 / 200 / 250 / 265 / 300
Special lengths on request.

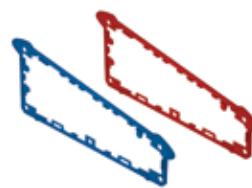
Accessories



Universal wall fitting



Rubber feet



Design seal for protection class IP65



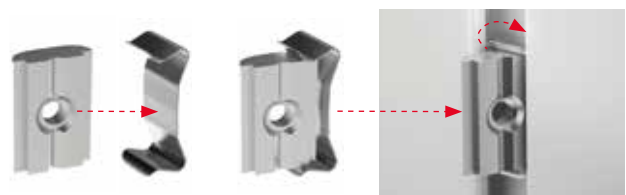
Seal for protection class IP54



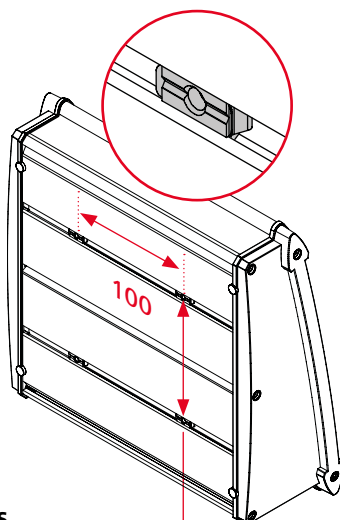
Aluminium wall mounting



Insulating strip



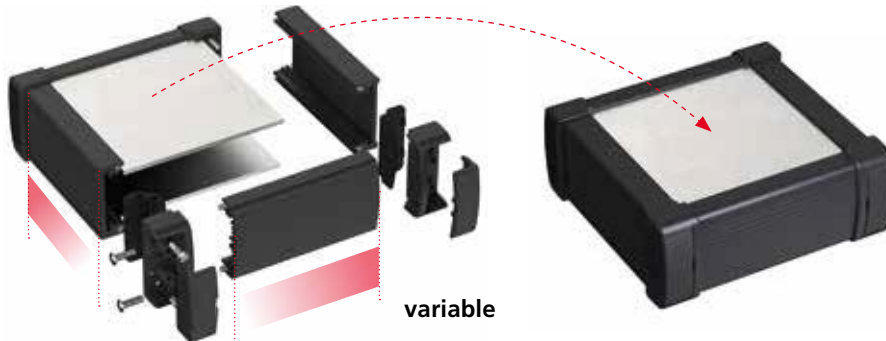
Slot nuts, swivellable, for VESA mounting ATPH-IP



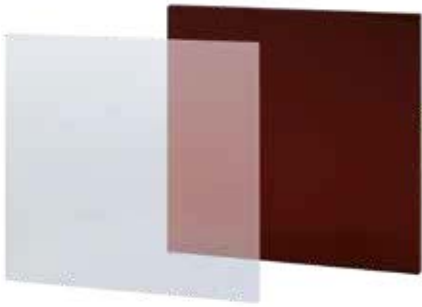
Inserts for slot nuts

e.g. for wall mounting using VESA 100

The product advantages



The frame construction consisting of powder-coated aluminium profiles and diecast corners permits assembly with varying widths and lengths.



Cover plates in different materials and surfaces adapt to the application and create interesting visual effects.



Two profile variants are available for enclosures with 50 mm and 100 mm height.



On the Aluplan 100, the cover plates can be removed without disassembly of the frame.



The high level of IP65 protection is achieved by the use of round cord seals in the profiles and pre-formed seals in the diecast corners.



Quick-Finder:
www.bopla.de/64

Examples of use





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Aluplan



Colour:

● Aluplan 50: Black, similar to RAL 9005

● Aluplan 100: Light grey, similar to RAL 7035

Special colours on request

Protection class:

IP65 / DIN EN 60529

Material:

Extruded profiles: Al Mg Si 0.5 powder coated

Diecast corners: Zinklegierung Z410, powder coated

Corner caps: PA-GF 15

Corner part seal: TPV / TPE

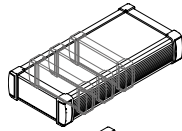
Seal in profile groove: EPDM

For details see technical information.

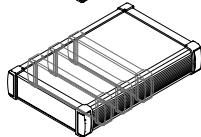


Enclosure sizes

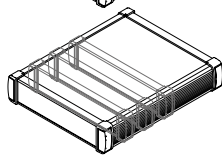
AP 510...



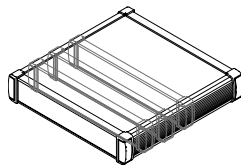
AP 515...



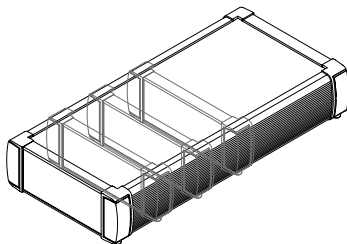
AP 520...



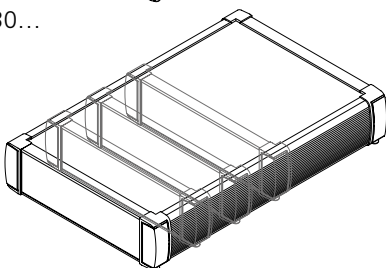
AP 525...



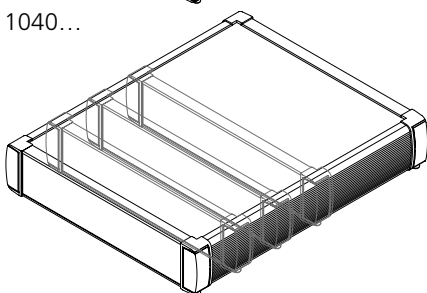
AP 1020...



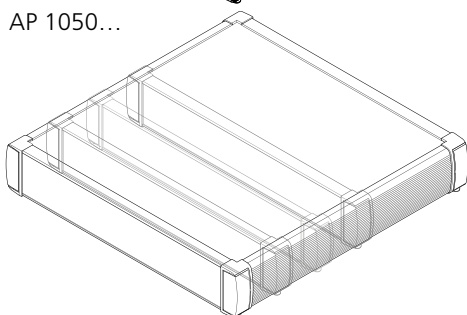
AP 1030...



AP 1040...

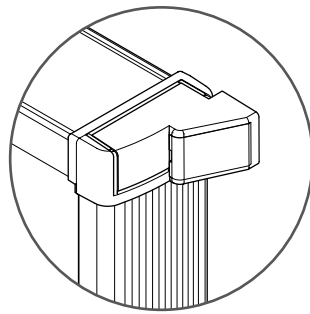


AP 1050...

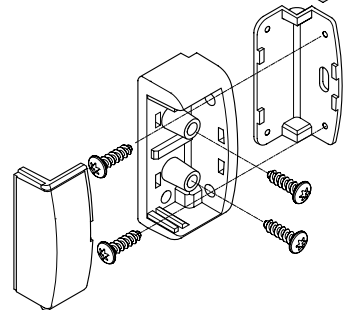
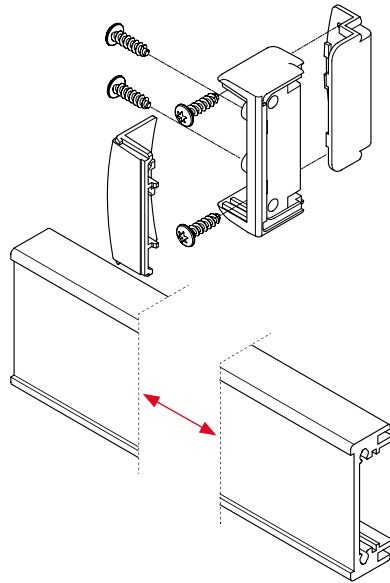
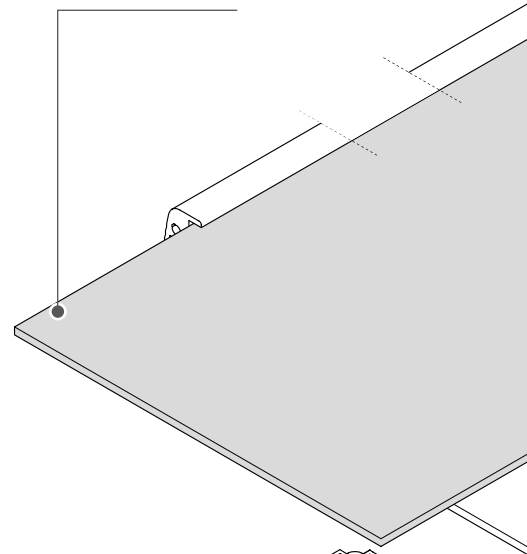


Enclosure design

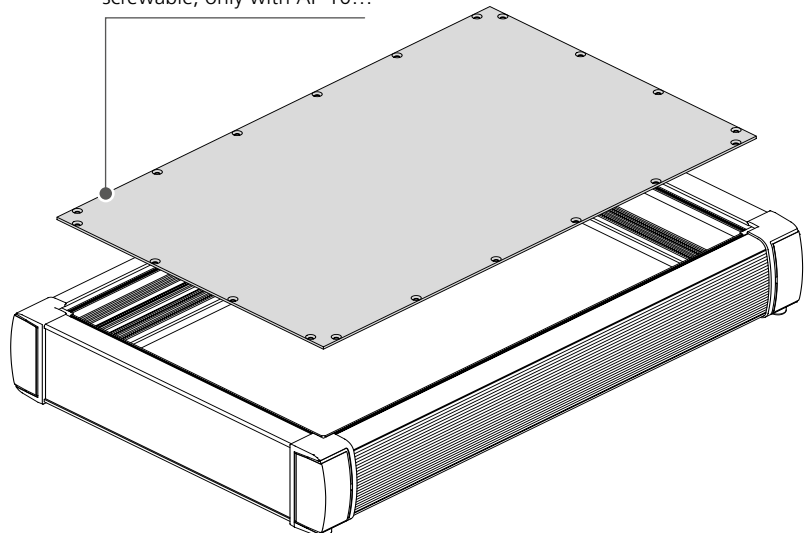
Wall bracket
AP 5... WL



Front panel
insertable



Frontplatte
screwable, only with AP 10...

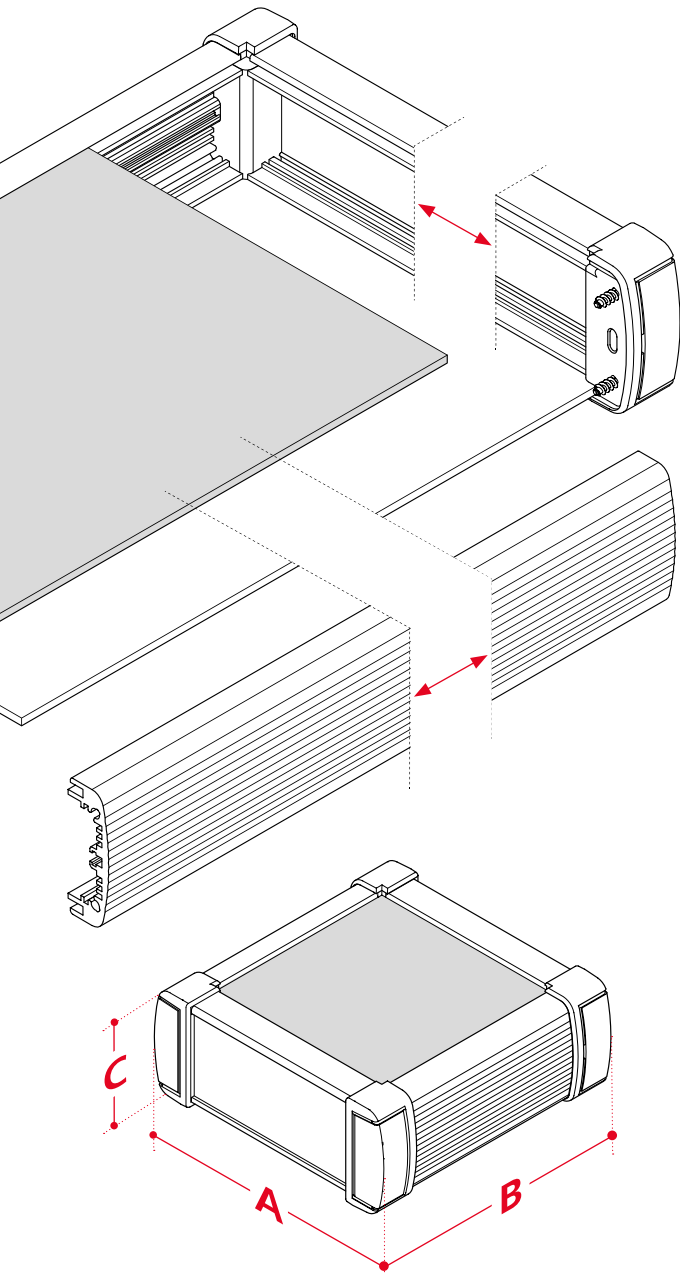


Aluplan

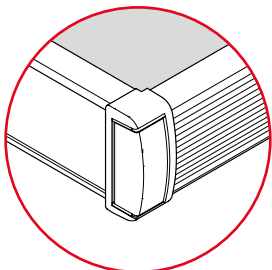


BOPLA

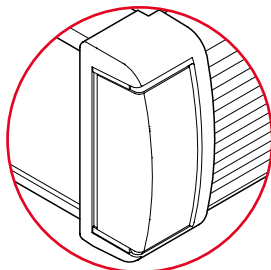
A Phoenix Mecano Company



Enclosure height
5... / 59 mm



Enclosure height
10... / 100 mm



Dimensions

Model	A	B	C
AP 51010	143	145	56
AP 51015	143	195	56
AP 51020	143	245	56
AP 51025	143	295	56
AP 51510	193	145	56
AP 51515	193	195	56
AP 51520	193	245	56
AP 51525	193	295	56
AP 52010	243	145	56
AP 52015	243	193	56
AP 52020	243	245	56
AP 52025	243	295	56
AP 52510	293	145	56
AP 52515	293	195	56
AP 52520	293	245	56
AP 52525	293	295	56
AP 102020	278	278	100
AP 102030	278	378	100
AP 102040	278	478	100
AP 102050	278	578	100
AP 103020	378	278	100
AP 103030	378	378	100
AP 103040	378	478	100
AP 103050	378	578	100
AP 104020	478	278	100
AP 104030	478	378	100
AP 104040	478	478	100
AP 104050	478	578	100
AP 105020	578	278	100
AP 105030	578	378	100
AP 105040	578	478	100
AP 105050	578	578	100

Individual profile lengths (A and B lengths) on request.

Accessories



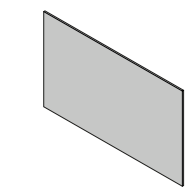
Handle



Wall bracket



Tip-up foot set



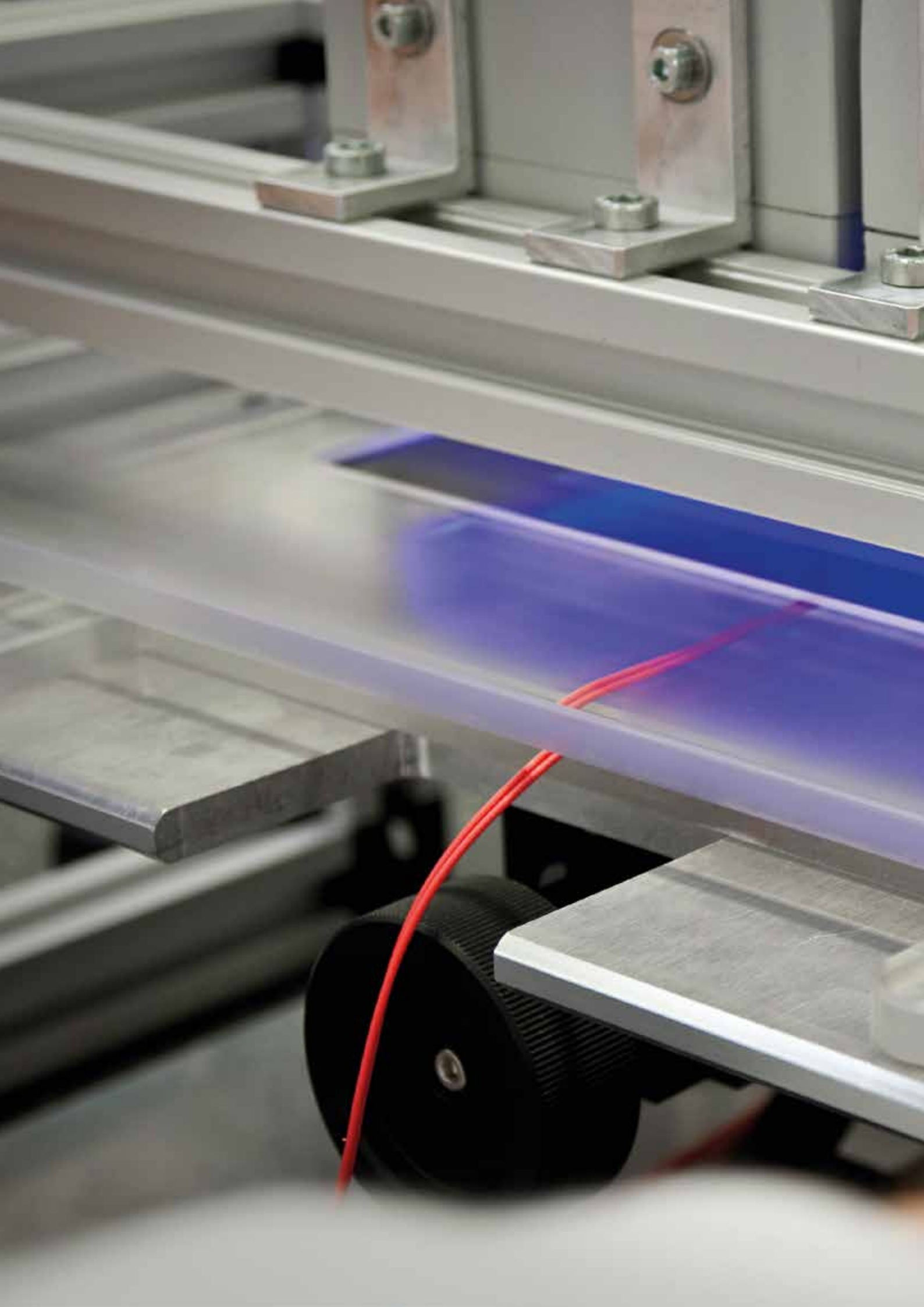
Front panels in different versions




Unit foot



Set of hinges AP 10

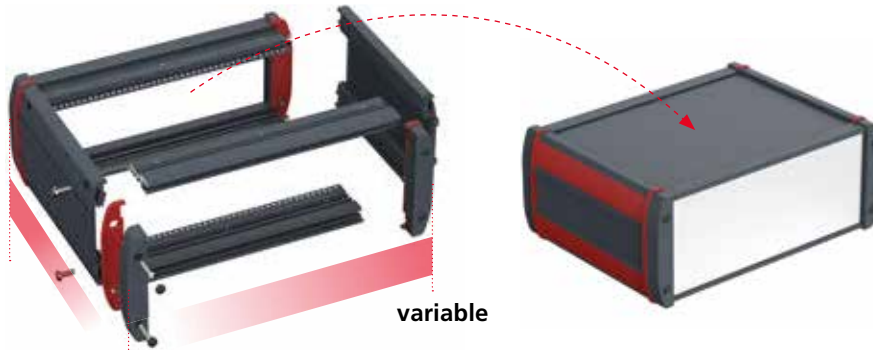


A close-up photograph of an industrial machine used for optical bonding. The machine is primarily grey and white. In the foreground, a blue-lit surface is visible, likely a conveyor belt or a work area. The machine has several metal brackets and bolts. On the right side, there are several safety warning icons: a red circle with a slash over a hand, a blue circle with a white face, and a yellow triangle with a black exclamation mark. The background is slightly blurred, showing more of the machine's structure.

Optical bonding

We join the glass front to the touch screen or display using the optical bonding process.

The product advantages



Intertego is an aluminium profile enclosure whose height and width are variable. The material and function of cover plates and front panels allow the creation of almost any design.



The EMC characteristics of the enclosure can be further upgraded by the use of special EMC components.



Intertego can be used in many situations and is especially suitable for the installation of 19" modules.



On request, the enclosure colour can be varied to meet the customers' specific requirements by means of the powder-coated surface.



The side system groove is used to hold decor strips for colour design and function components e.g. tip-up feet or wall-mounting brackets.



Quick-Finder:
www.bopla.de/95

Examples of use





BOPLA

A Phoenix Mecano Company

Intertego



Colour:

● Graphite grey, similar to RAL 7024

Special colours on request

Protection class:

IP40 / DIN EN 60529

With ventilation holes (ADL) IP20 / DIN EN 60529

Material:

Profiles: Al Mg Si 0,5,

Diecast corners: zinc alloy Z410

Decor elements: TPE

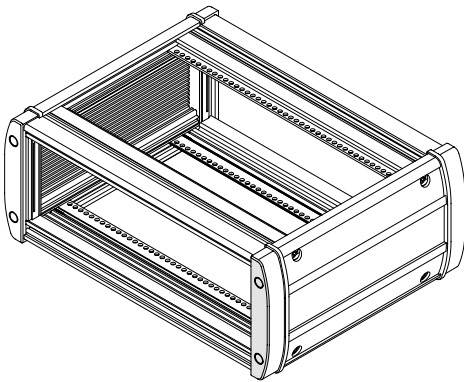
For details see technical information.



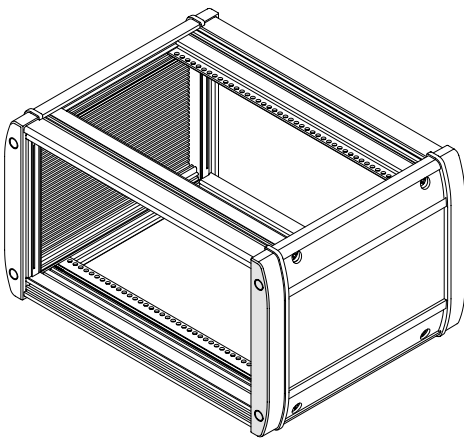
Desktop

Enclosure heights

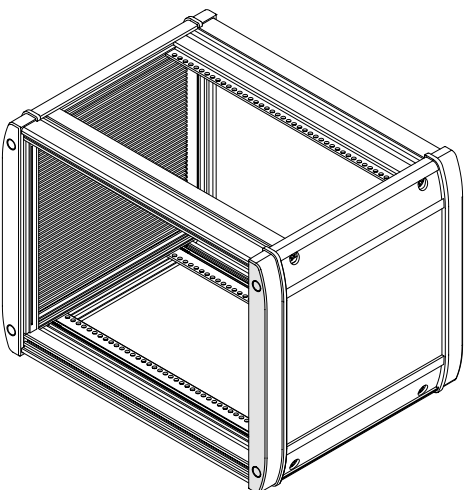
2U IT 10...



3U IT 15...

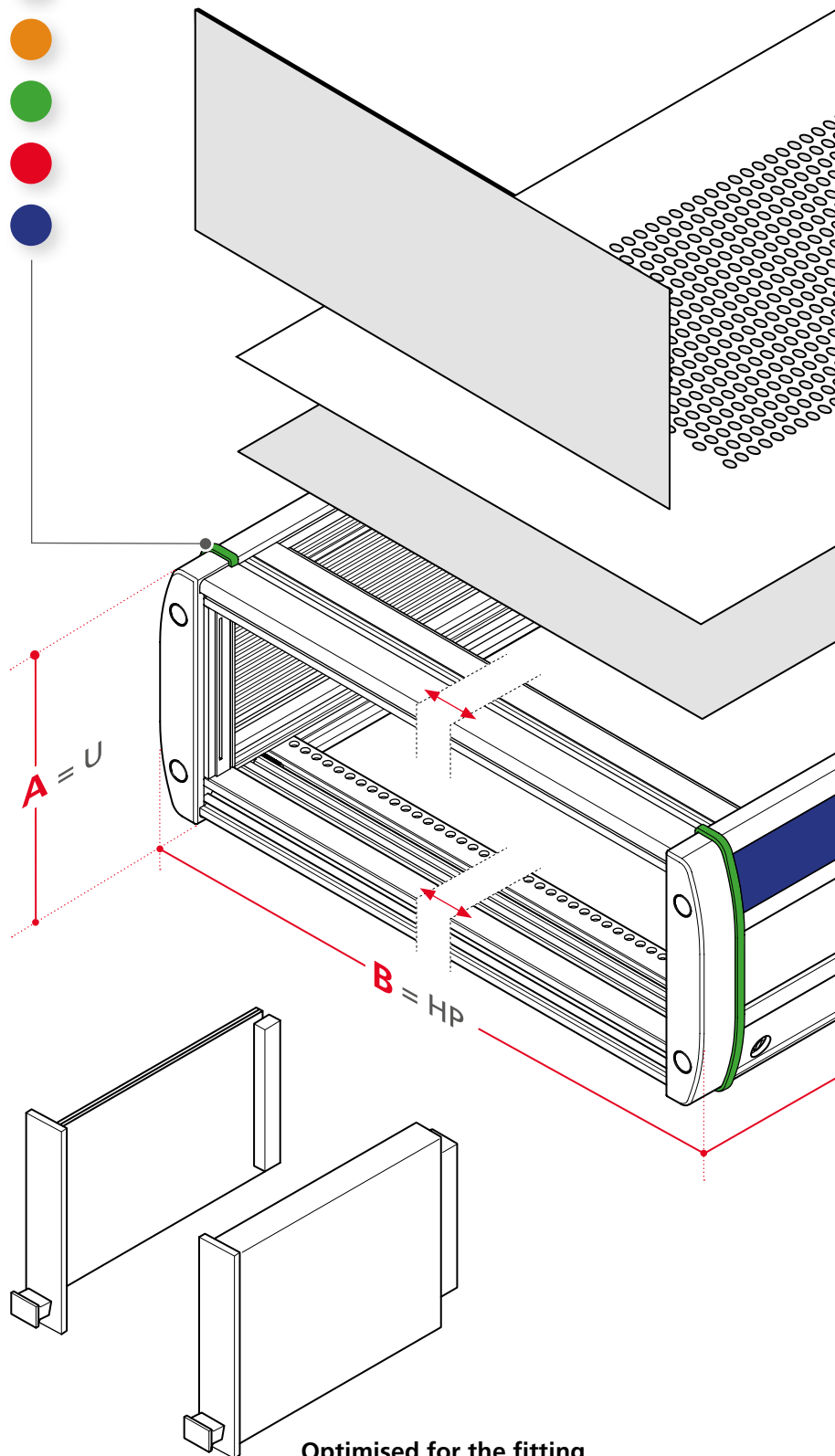


4U IT 20...



Design type

Decor elements



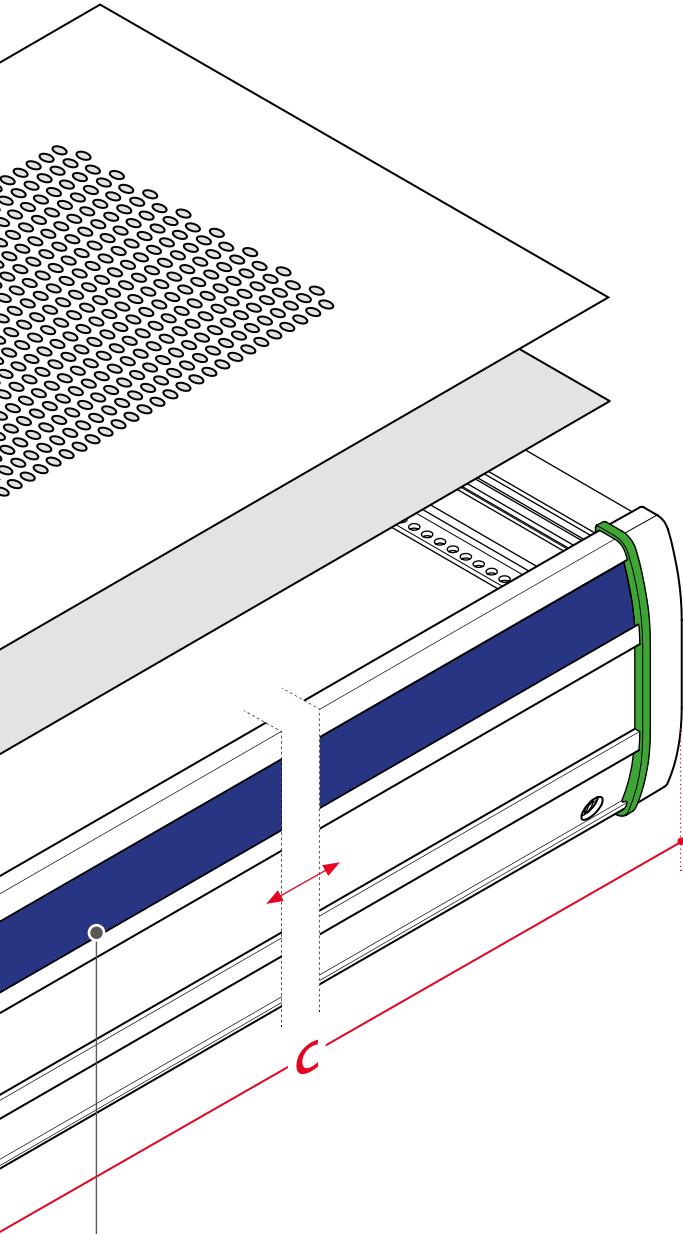
Optimised for the fitting
of 19" components



BOPLA

A Phoenix Mecano Company

Intertego



Decor strips



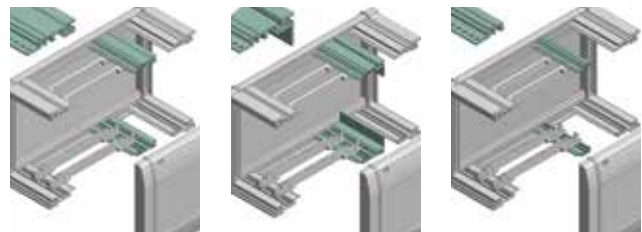
Dimensions

Model	A	B	C*	HP
2U				
IT 1025...	99.85	250.36	*	42
IT 1035...	99.85	357.04	*	63
IT 1044...	99.85	443.4	*	80
IT 1045...	99.85	463.72	*	84
3U				
IT 1525...	144.3	250.36	*	42
IT 1535...	144.3	357.04	*	63
IT 1544...	144.3	443.4	*	80
IT 1545...	144.3	463.72	*	84
4U				
IT 2025...	188.75	250.36	*	42
IT 2035...	188.75	357.04	*	63
IT 2044...	188.75	443.4	*	80
IT 2045...	188.75	463.72	*	84

*C = 184,4, 244,4, 304,4 mm

Individual length and width dimensions on request.

Accessories



Bus, rear and snap profiles for the fitting of 19" components



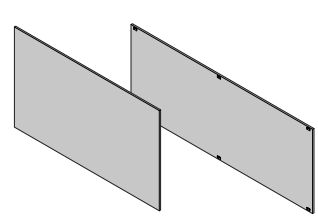
Handle / Tip-up bow



Tip-up feet / Unit feet

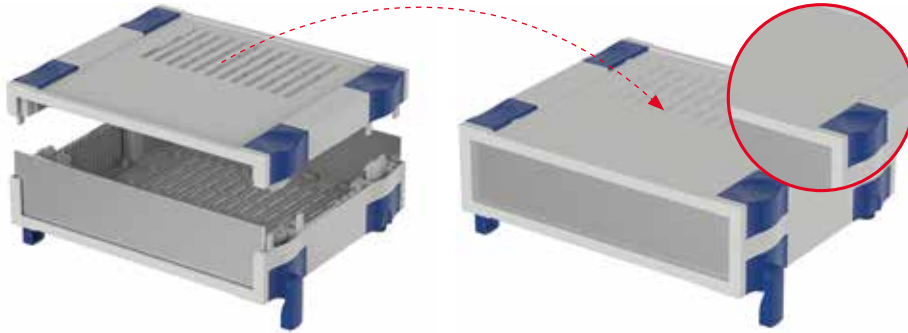


Handle shell

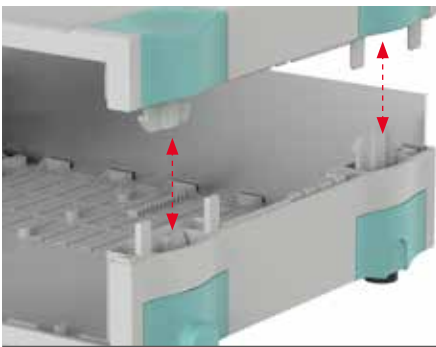


Front and part front panels and cover plates in different versions

The product advantages



The desktop enclosure system consists of two plastic half shells and front panels made of different materials. Ventilation of the interior of the version fitted with air vents can be optimised by turning the half-shells against each other.



Sturdy snap-lock technology makes possible fast, toolless mounting. As an option, the half-shells can be screwed together.



The enclosure height (or width in vertical use) can be extended by using 45.72 mm grid extension sets (9 HP). Gradations of 15.24 mm (3 HP) can be achieved in connection with the two available basic heights.



Many slots for PCBs are available in the interior. Even the installation of complete 19" subracks is possible.



The snap locks are concealed with coloured caps. Additional design elements are also available. This allows individual design of the shape, colour and function of the enclosure.



Quick-Finder:
www.bopla.de/68

Examples of use





BOPLA

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Botego



Colour:

● Light grey, similar to RAL 7035

Special colours on request

Protection class:

Closed: IP40 / DIN EN 60529

With ventilation slots: IP30 / DIN EN 60529

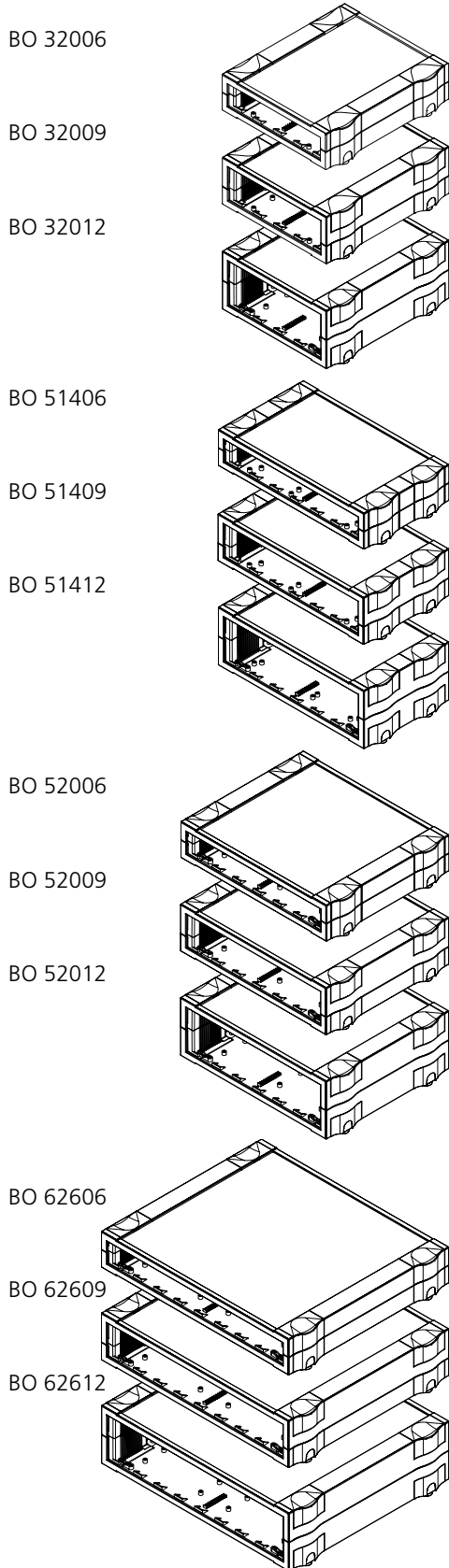
Material:

Enclosure: ABS

For details see technical information.

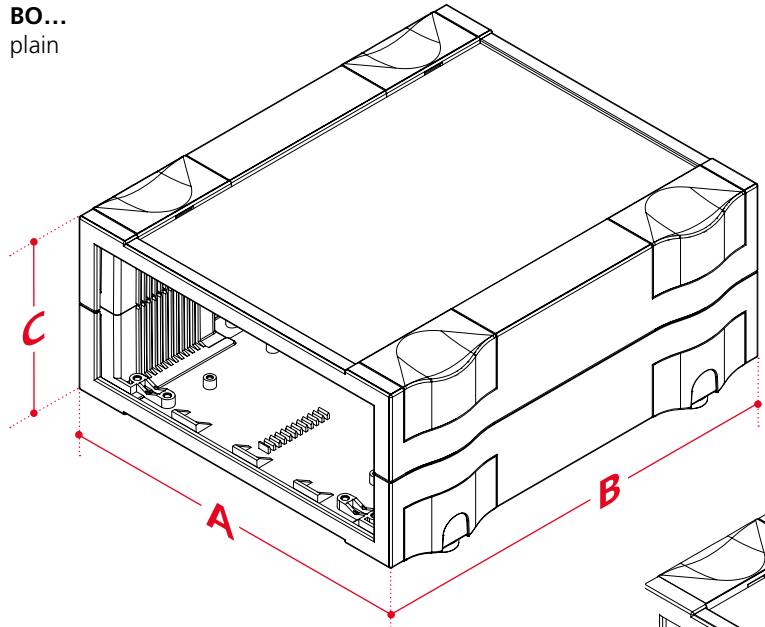


Enclosure sizes

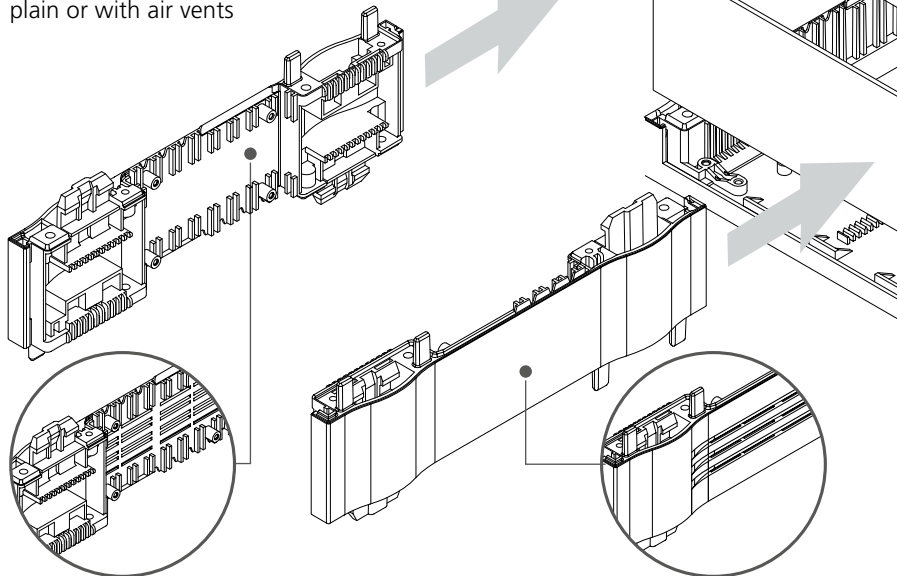


Design types

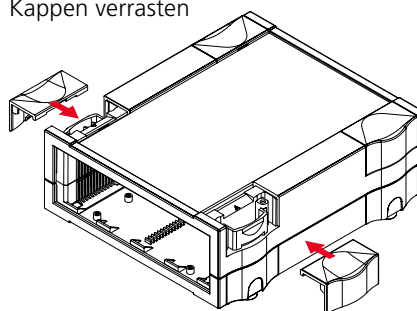
BO...
plain



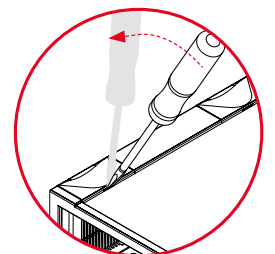
Optional extension sets (9 HP)
plain or with air vents



Kappen verrasten



Release caps using slotted-head screwdriver





BOPLA

A Phoenix Mecano Company

Botego

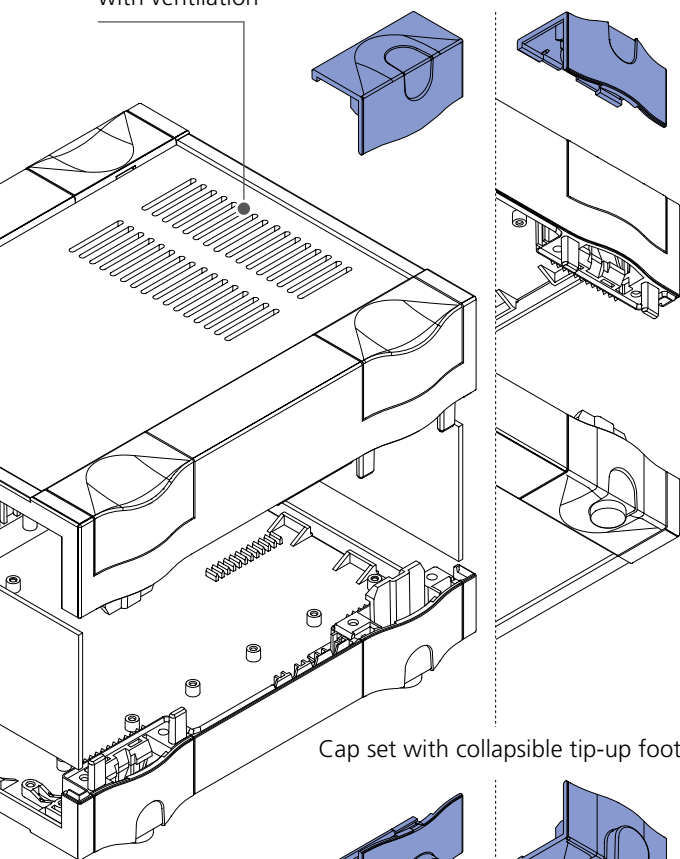
Cap variants

Top view

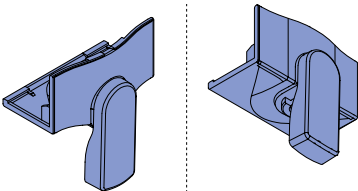
View from underneath

BO...L
with ventilation

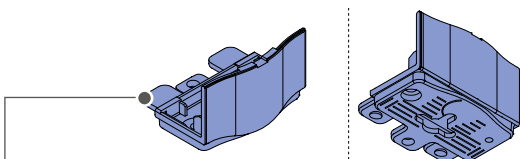
Cap set for desktop use



Cap set with collapsible tip-up foot



Cap set for wall mounting



Cap colours



Dimensions

Model	A	B	C*
BO 32006 (L)	174	196.9	49.96
BO 32009 (L)	174	196.9	65.2
BO 32012 (L)	174	196.9	80.44
BO 51406 (L)	240.68	136.9	49.96
BO 51409 (L)	240.68	136.9	65.2
BO 51412 (L)	240.68	136.9	80.44
BO 52006 (L)	240.68	196.9	49.96
BO 52009 (L)	240.68	196.9	65.2
BO 52012 (L)	240.68	196.9	80.44
BO 62606 (L)	307.35	256.9	49.96
BO 62609 (L)	307.35	256.9	65.2
BO 62612 (L)	307.35	256.9	80.44

*C = the height can be increased in 9 HP steps (45.36 mm) by using the extension sets as required.

Accessories



Angled front



Handle



Filling profile set for subrack, aluminium



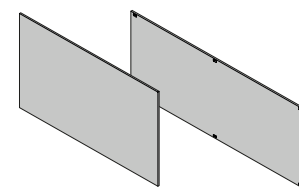
Profile set U



Design elements

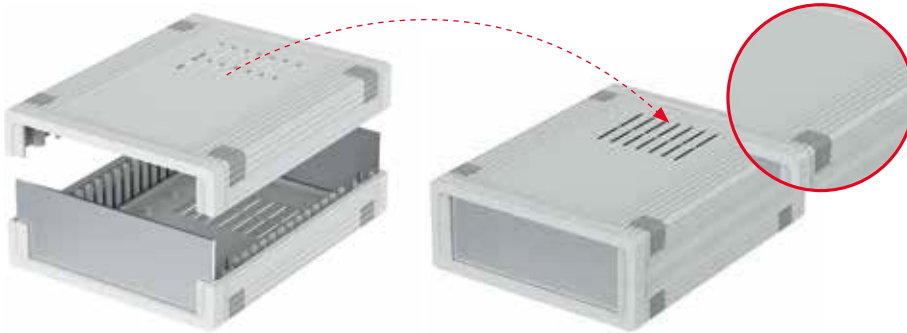


Caps



Front and part front panels in different versions

The product advantages



The classic desktop enclosure system consists of two plastic half-shells and front panels in different materials. Ventilation of the interior of the version fitted with air vents can be optimised by turning the half-shells against each other.



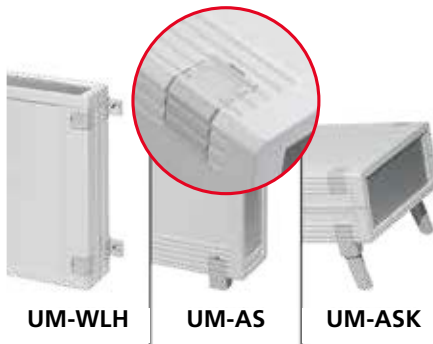
All enclosure parts are screwed together using high-quality brass thread inserts. This ensures permanently reliable opening and closing.



The enclosure height can be increased with optional extension sets by 15.24 mm (3 HP) or 45.72 mm (9 HP), as required. Combining these extension sets allows gradations of 15.24 mm (3 HP) to be achieved.



Many slots for PCBs (horizontal and vertical) are available in the interior.



The enclosure screws are concealed under snap-on covers. These can be replaced by the optionally available wall brackets tip-up or collapsible feet.



Quick-Finder:
www.bopla.de/55

Examples of use





BOPLA

A Phoenix Mecano Company

Ultramas



Colour:

Enclosure:

● Light grey, similar to RAL 7035

Screw covers, tabs, feet:

● Agate grey, similar to RAL 7038

Special colours on request

Protection class:

Closed: IP40 / DIN EN 60529

With ventilation slots: IP30 / DIN EN 60529

Material:

Enclosure: ABS

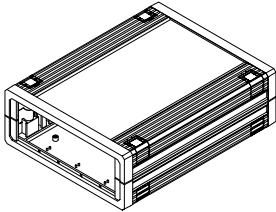
For details see technical information.



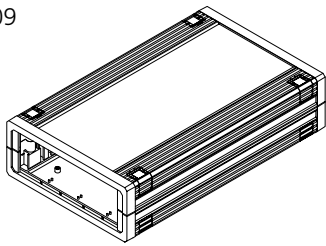
Desktop

Enclosure sizes

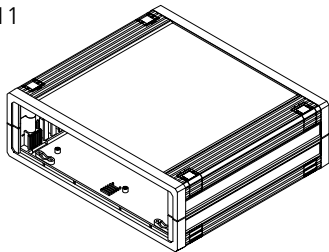
UM 32009



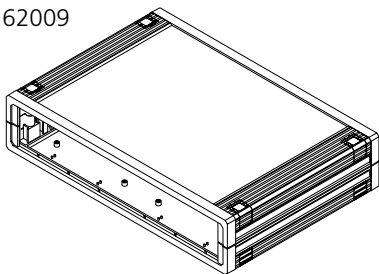
UM 32609



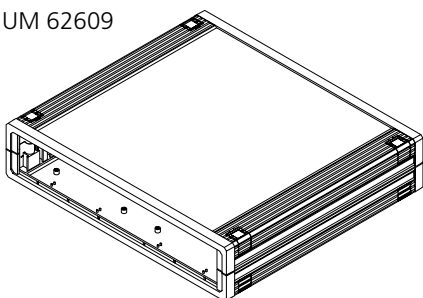
UM 52011



UM 62009

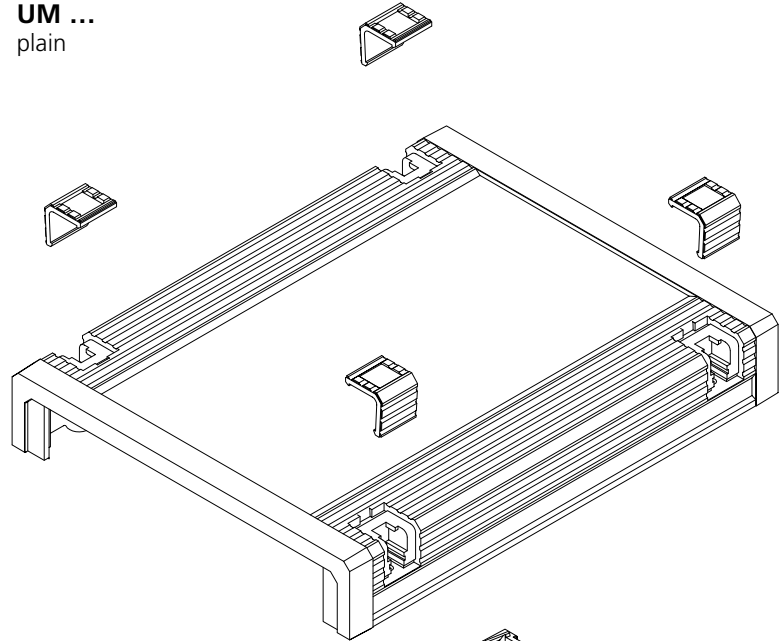


UM 62609

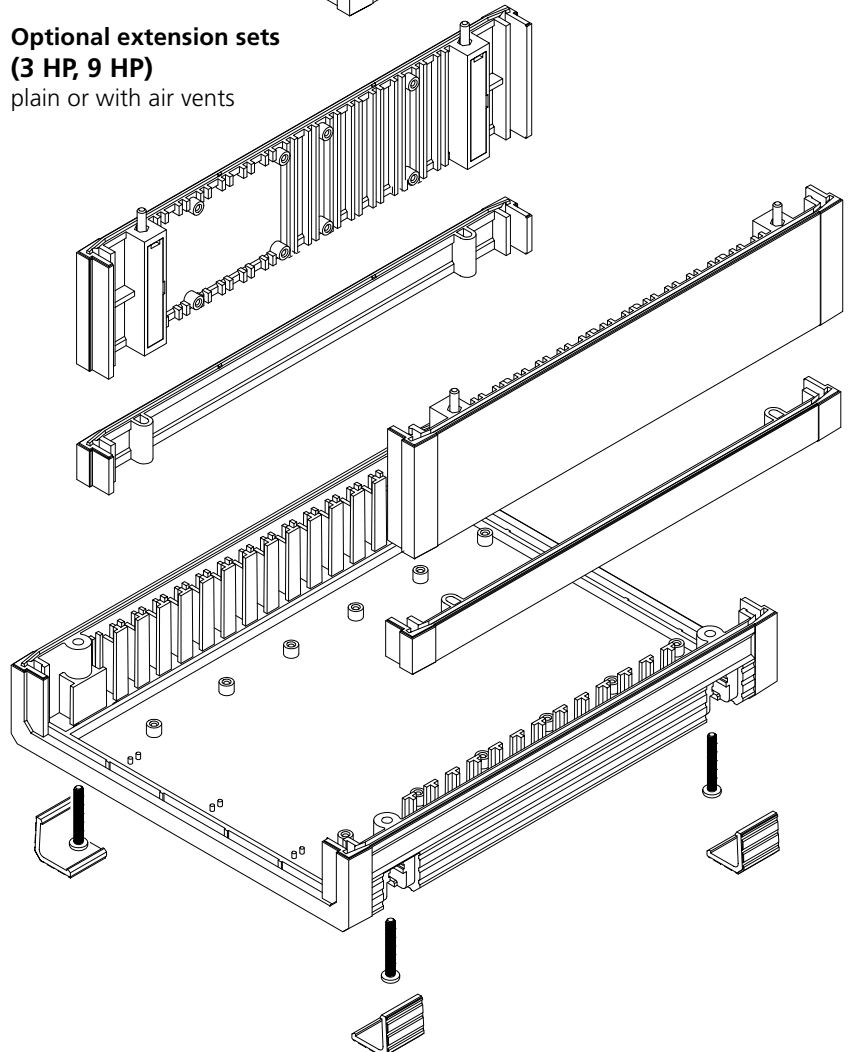


Design types

UM ...
plain



Optional extension sets
(3 HP, 9 HP)
plain or with air vents

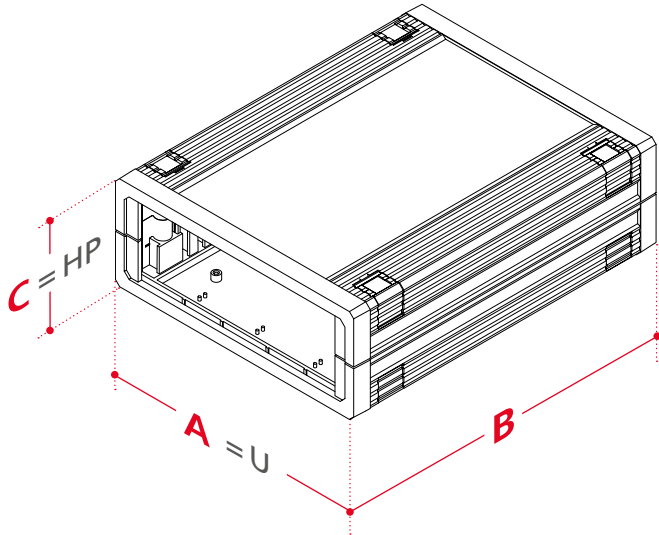




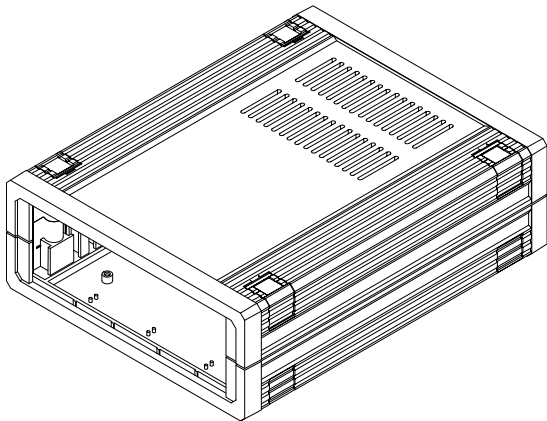
BOPLA

A Phoenix Mecano Company

Ultramas



Variant with ventilation



Dimensions

Model	A	B	C
UM 32009 (L)	157.5	198.9	62.2
UM 32609 (L)	157.5	258.9	62.2
UM 52011 (L)	224.2	198.9	72.4
UM 62009 (L)	290.9	198.9	62.2
UM 62609 (L)	290.9	258.9	62.2

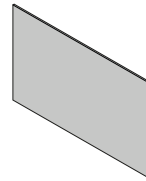
Accessories



Tip-up foot set



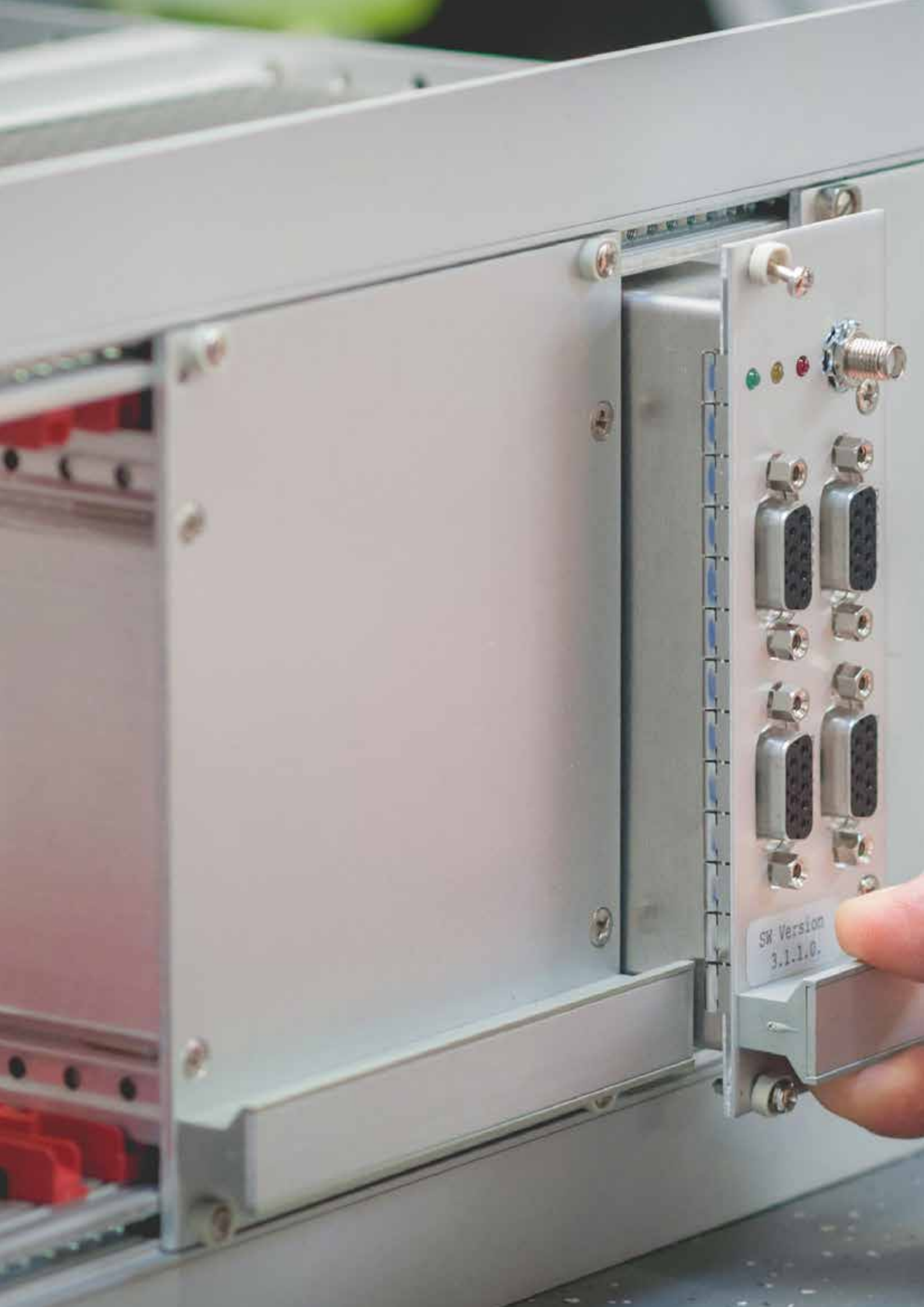
Tip-up foot set, collapsible



Front panels in different versions



Wall brackets



SW: Version
3.1.1.0.



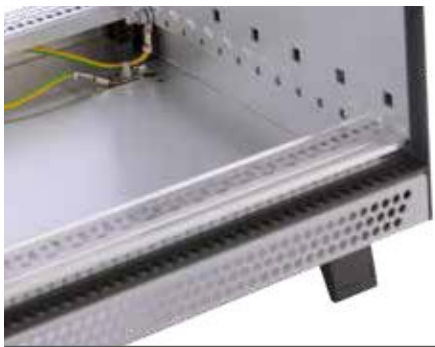
19 inch Completion

Our 19" enclosures are put together, mounted and packaged according to your specifications.

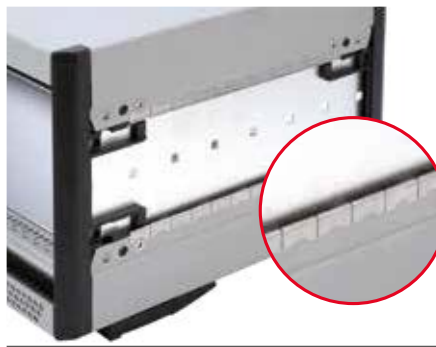
The product advantages



The 19" Internorm Stil desktop enclosure system consists of powder-coated aluminium components and is compatible with the accessory components and profiles in the Interzoll Modul product range.



We recommend the ventilated enclosure if electronic components generate high temperatures. In this way, the airflow is conducted from "below at the front" to "top at the rear".



The standard enclosure design provides good EMC characteristics, which can be upgraded by the use of optional EMC components.



Thanks to the various equipment options such as handles and tip-up feet, Internorm Stil can be flexibly adapted to the relevant application.



As an option, handles or 19" flanges can be fitted on the front side for switch cabinet installation.



Quick-Finder:
www.bopla.de/86

Examples of use





BOPLA

A Phoenix Mecano Company

Internorm Stil



Colour:

Enclosure:

● White aluminum, similar to RAL 9006

Profiles, feet:

● Anthracite grey, similar to RAL 7016

Protection class:

IP20 / DIN EN 60529

Material:

Profiles: Al Mg Si 0,5, anodized

Covers: diecast aluminum

Front handles / flanges: diecast aluminum

Side walls, cover and side panels:

passivated aluminium

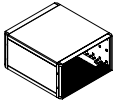
For details see technical information.



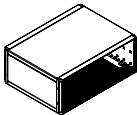
Enclosure sizes

3 U

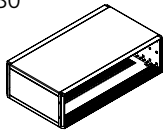
INS 24340



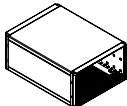
INS 24360



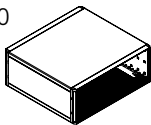
INS 24380



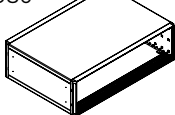
INS 30340



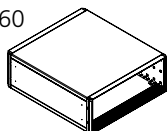
INS 30360



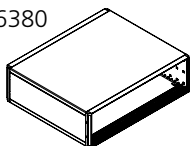
INS 30380



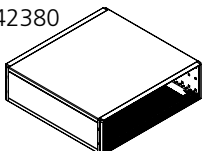
INS 36360



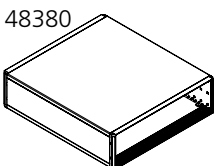
INS 36380



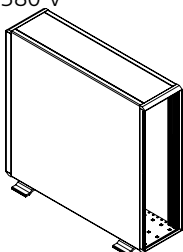
INS 42380



INS 48380

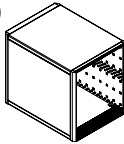


INS 48380 V

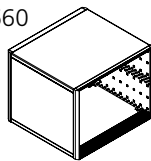


6 U

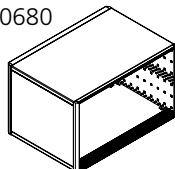
INS 30640



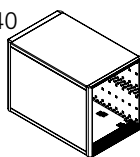
INS 30660



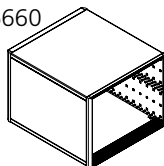
INS 30680



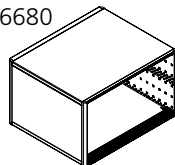
INS 36640



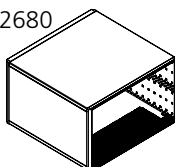
INS 36660



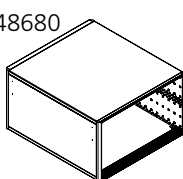
INS 36680



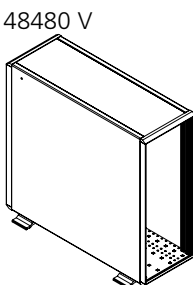
INS 42680



INS 48680

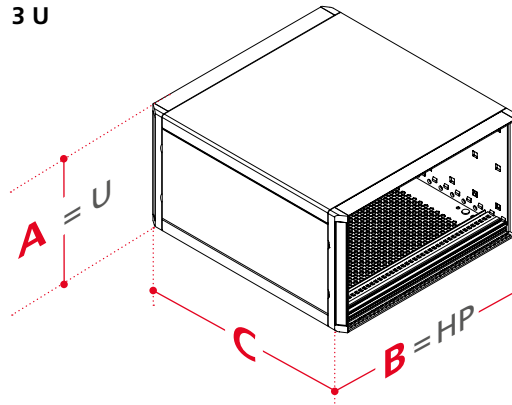


INS 48480 V



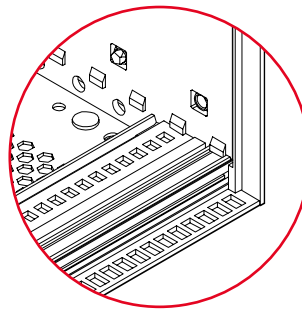
Design types

3 U

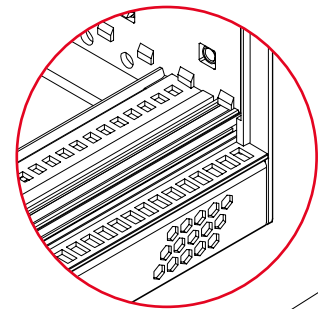


B + C = Profile lengths individually selectable

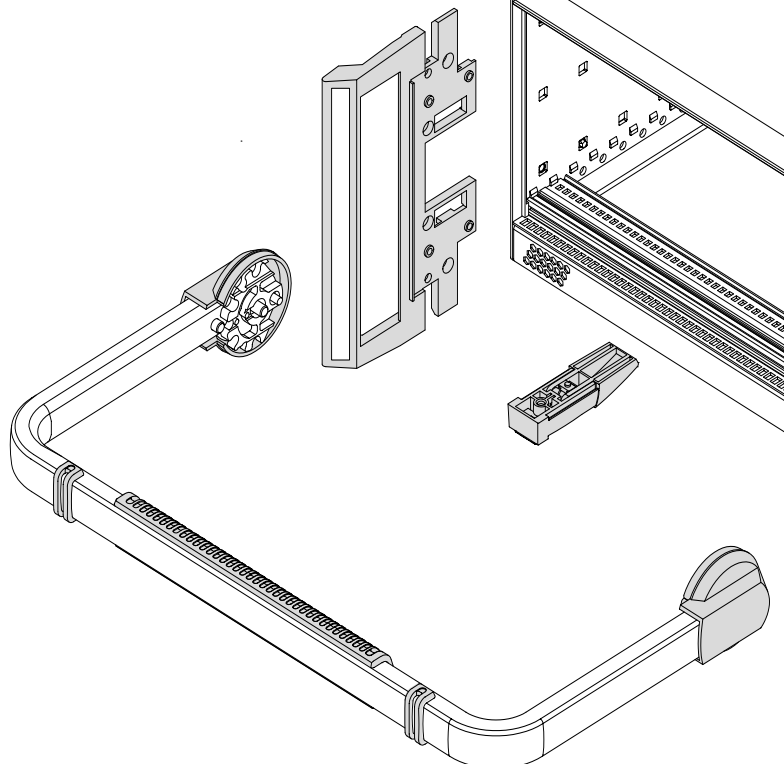
Without ventilation



With ventilation



All enclosure sizes are available with and without ventilation.





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A Phoenix Mecano Company

Internorm Stil

Dimensions

Model	A	B	C	HP
3 U				
	Without / with ventilation			
INS 24340 (-L)	132.55 / 177	235.54	255.5	42
INS 24360 (-L)	132.55 / 177	342.02	255.5	63
INS 24380 (-L)	132.55 / 177	448.7	255.5	84
INS 30340 (-L)	132.55 / 177	235.54	315.5	42
INS 30360 (-L)	132.55 / 177	342.02	315.5	63
INS 30380 (-L)	132.55 / 177	448.7	315.5	84
INS 36360 (-L)	132.55 / 177	342.02	375.5	63
INS 36380 (-L)	132.55 / 177	448.7	375.5	84
INS 42380 (-L)	132.55 / 177	448.7	435.5	84
INS 48380 (-L)	132.55 / 177	448.7	495.5	84
6 U				
	Without / with ventilation			
INS 30640 (-L)	265.9 / 310.35	235.54	315.5	42
INS 30660 (-L)	265.9 / 310.35	342.02	315.5	63
INS 30680 (-L)	265.9 / 310.35	448.7	315.5	84
INS 36640 (-L)	265.9 / 310.35	235.54	375.5	42
INS 36660 (-L)	265.9 / 310.35	342.02	375.5	63
INS 36680 (-L)	265.9 / 310.35	448.7	375.5	84
INS 42680 (-L)	265.9 / 310.35	448.7	435.5	84
INS 48680 (-L)	265.9 / 310.35	448.7	495.5	84
Tower enclosure				
	Without ventilation			
INS 48380 V	132.55 (3 U)	448.7	495.5	84
INS 48480 V	177 (4 U)	448.7	495.5	84

Accessories



Strap handles incl. lateral trim



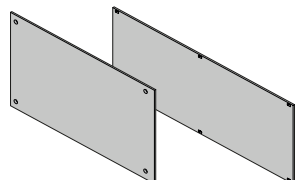
Flange with handle, screwable in place of the cover strips



Plug-in stack adapter

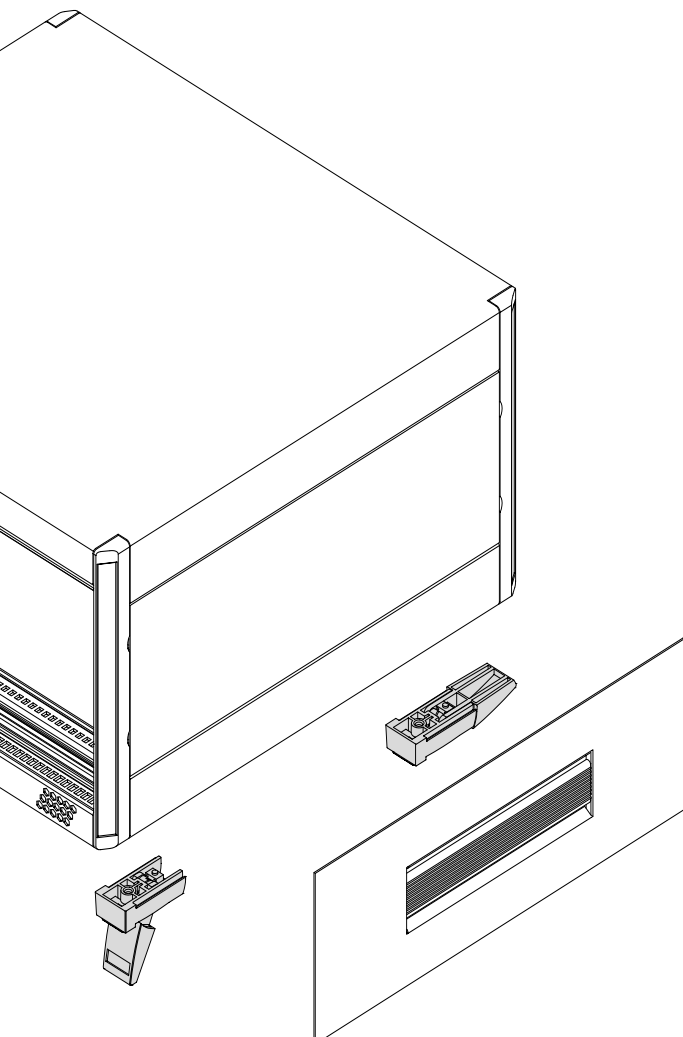
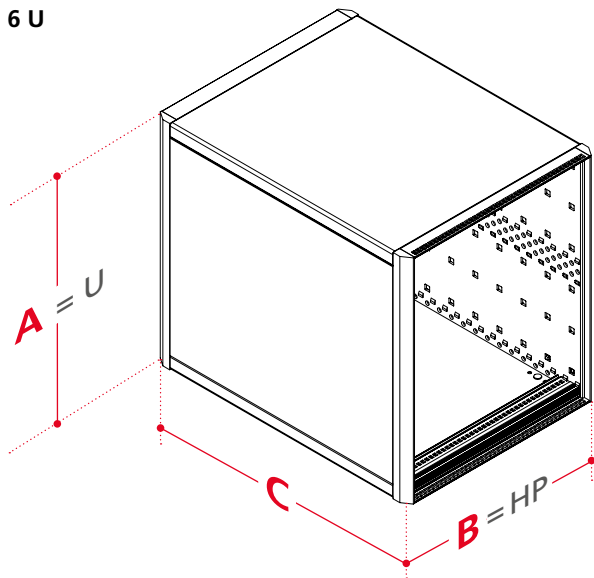


EMC springs for horizontal shielding between cover plates and side panels



Front and part front panels in different versions

6 U



The product advantages



By using an Internorm enclosure, a 19" subrack can be converted into a sturdy desktop device. The enclosure half-shells – made of impact-resistant plastic – are screwed together using variable-length aluminium profiles.



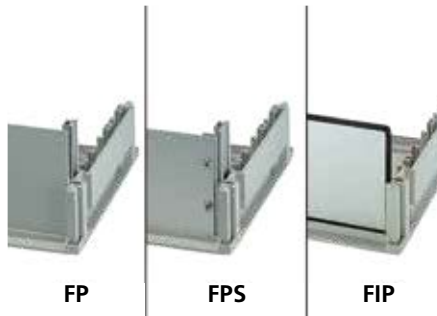
The enclosure screws are under hinged covers opened by means of a pushbutton. This principle is used for the tip-up feet on the underside of the enclosure.



The height of both half-shells (basic height: 3 U) can be extended in 1 U steps with extension sets.



The enclosure can be upgraded to protection class IP54 by the use of seals and IP front panels or lockable doors.



Different front and rear panels allow adaptation of the enclosure to a very wide range of applications.



Quick-Finder:
www.bopla.de/30

Examples of use





BOPLA

A Phoenix Mecano Company

Internorm



Colour:

Enclosure:

● Light grey, similar to RAL 7035

Corner profiles, cover caps, Door:

● Silver grey, similar to RAL 7001

Protection class:

IP40 / DIN EN 60529

IP54 / DIN EN 60529 optional

Material:

Enclosure: PS (polystyrene)

Seal: CR / TPE

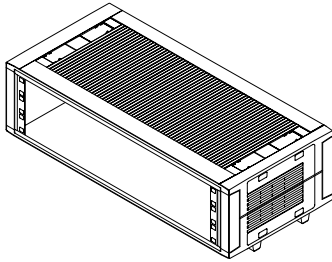
(Round cord / FIP seal)

For details see technical information.

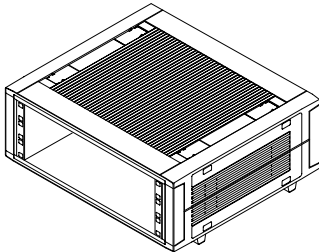


Enclosure sizes

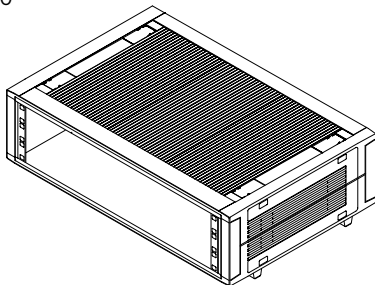
IN 25060



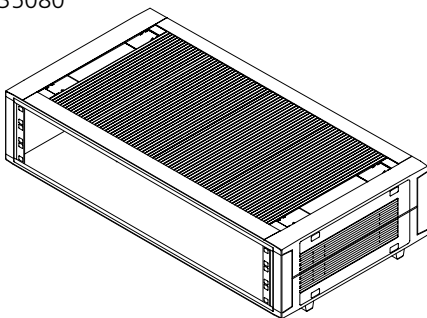
IN 35040



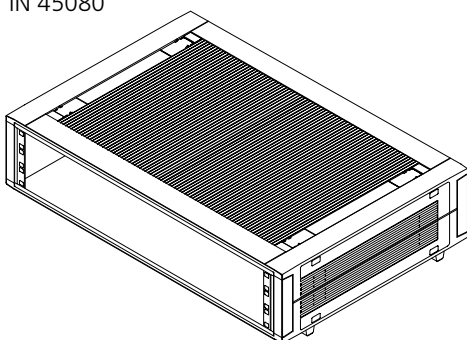
IN 35060



IN 35080

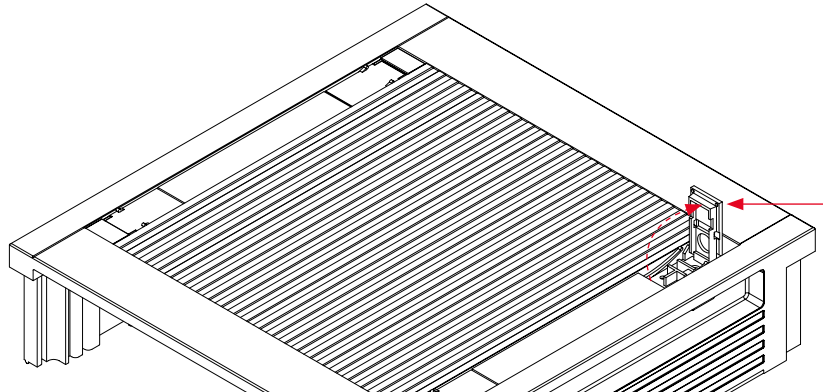


IN 45080

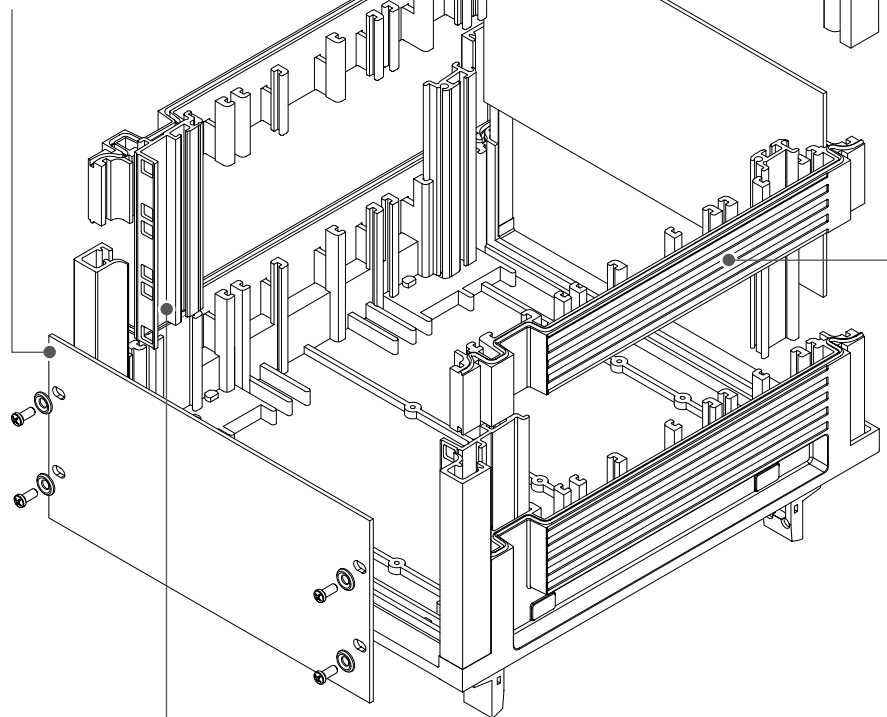


Design types

3 U



FPS ...
Front / back panels
screwable



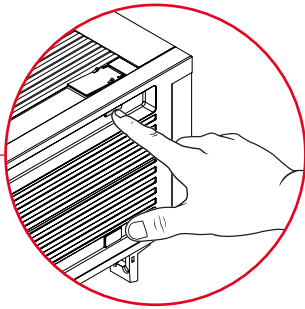
PZ ...
19" profile sets for fitting of subracks
or screw-on front panels.



BOPLA

A Phoenix Mecano Company

Internorm



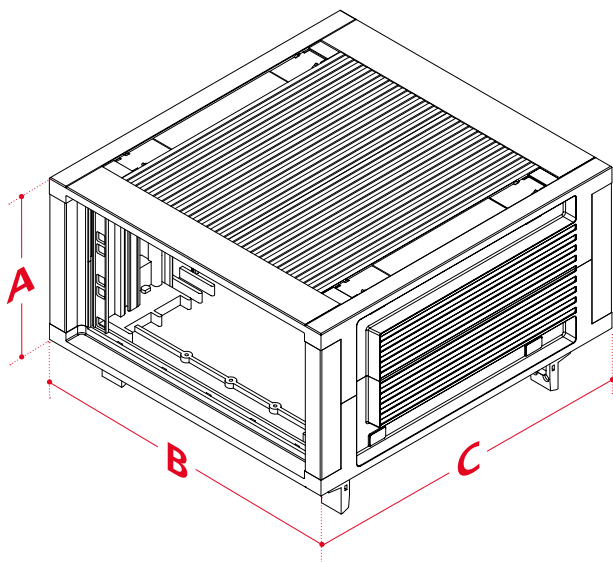
Press to open!

PEK ...

corner profile sets for pushing or latching onto the enclosure corners. Optionally also available with moulded-on wall bracket.

AB ...

One extension set raises the enclosure by one HP. Extensions sets with air vents on request.



Dimensions

Model	A	B	C	HP
3 U				
IN 25060	169	434	250	63
IN 35040	169	327	350	42
IN 35060	169	434	350	63
IN 35080	169	540	350	84
IN 45080	169	540	450	84

Accessories



Wall corner profile sets



Seal IP 54 / EMC seal for enclosures and extension sets



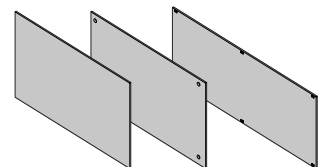
Extension sets 1 HP



Snap-in outlet filter



Handles / tip-up bows, hinged

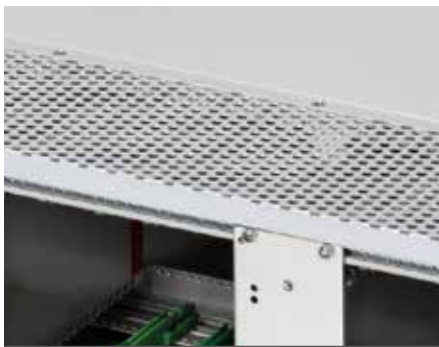


Front and part front panels in different versions

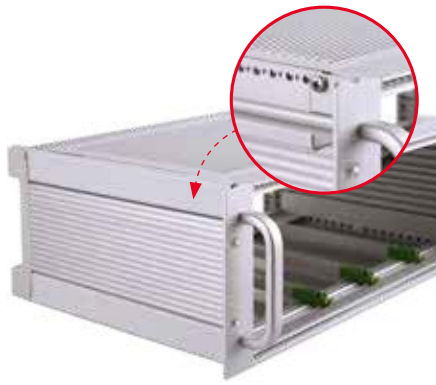
The product advantages



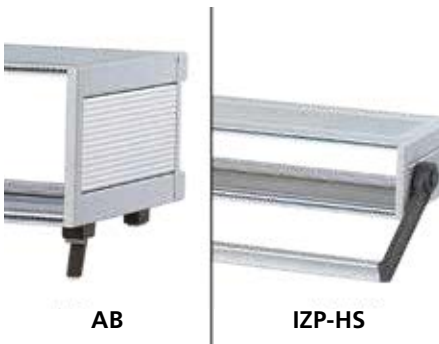
The 19" Interzoll Plus desktop enclosure system is compatible with the accessory components from the Interzoll product range.



Interzoll Plus has sheet steel covers on top and underneath. Different colours can be achieved by using powder lacquering.



The side parts consist of an anodised aluminium profile onto which the plastic covers for the enclosure screws can be snapped.



Optional tip-up feet or handles allow use as a desktop enclosure.

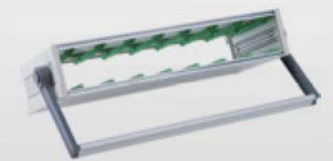


Interzoll Plus has integrated tip-up feet on the back, so in mobile use it can be securely positioned upright and rear exits are protected mechanically.



Quick-Finder:
www.bopla.de/29

Examples of use





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Interzoll Plus



Colour:

Enclosure:

● Light grey, similar to RAL 7035

Or natural color anodized, special colours on request

Protection class:

IP40 / DIN EN 60529

IP20 / DIN EN 60529 with ventilation (ADG...-L)

Material:

Profiles: Al Mg Si 0,5, anodized

Cover plates: sheet steel

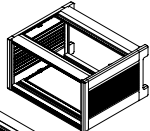
Plastic panels, covers: ABS / PVC V-1

For details see technical information.

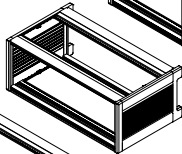


Enclosure sizes

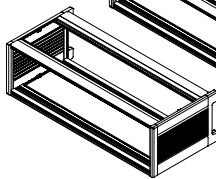
IZP 18340



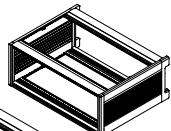
IZP 18360



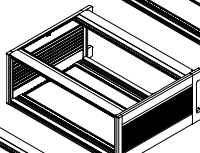
IZP 18380



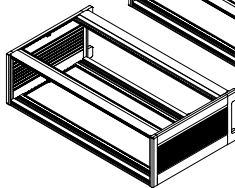
IZP 24340



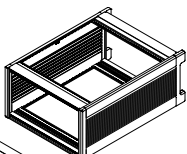
IZP 24360



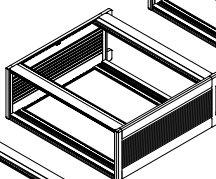
IZP 24380



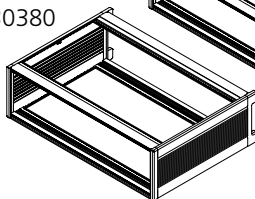
IZP 30340



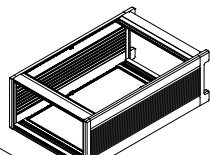
IZP 30360



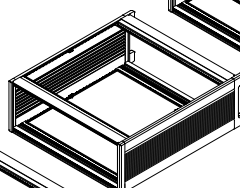
IZP 30380



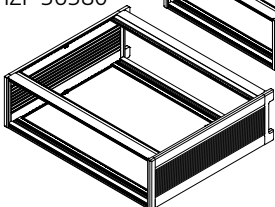
IZP 36340



IZP 36360

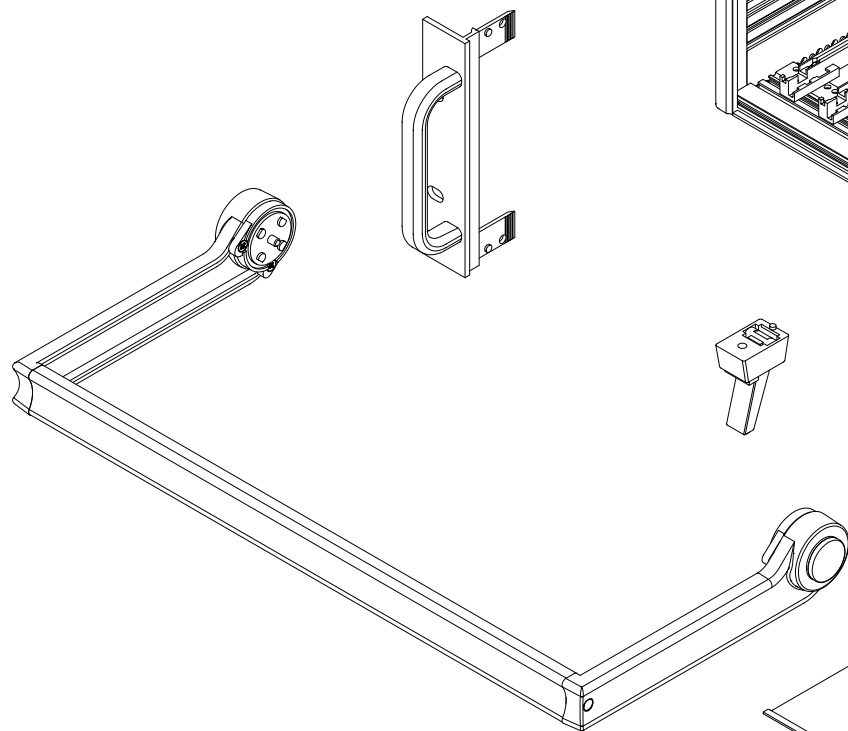
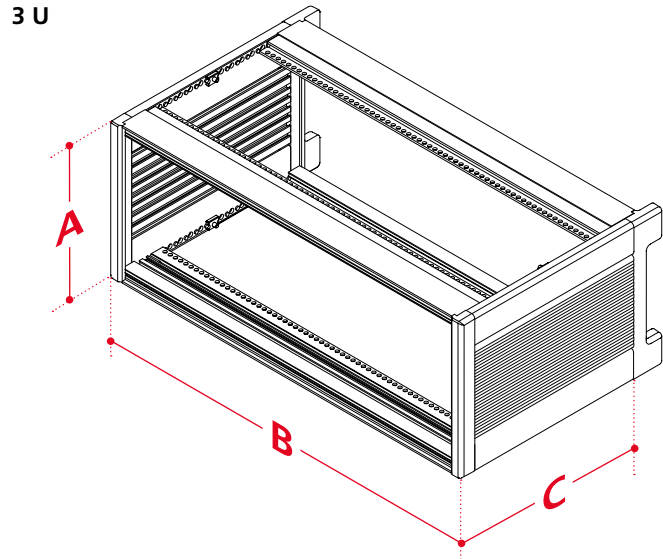


IZP 36380



Design types

3 U





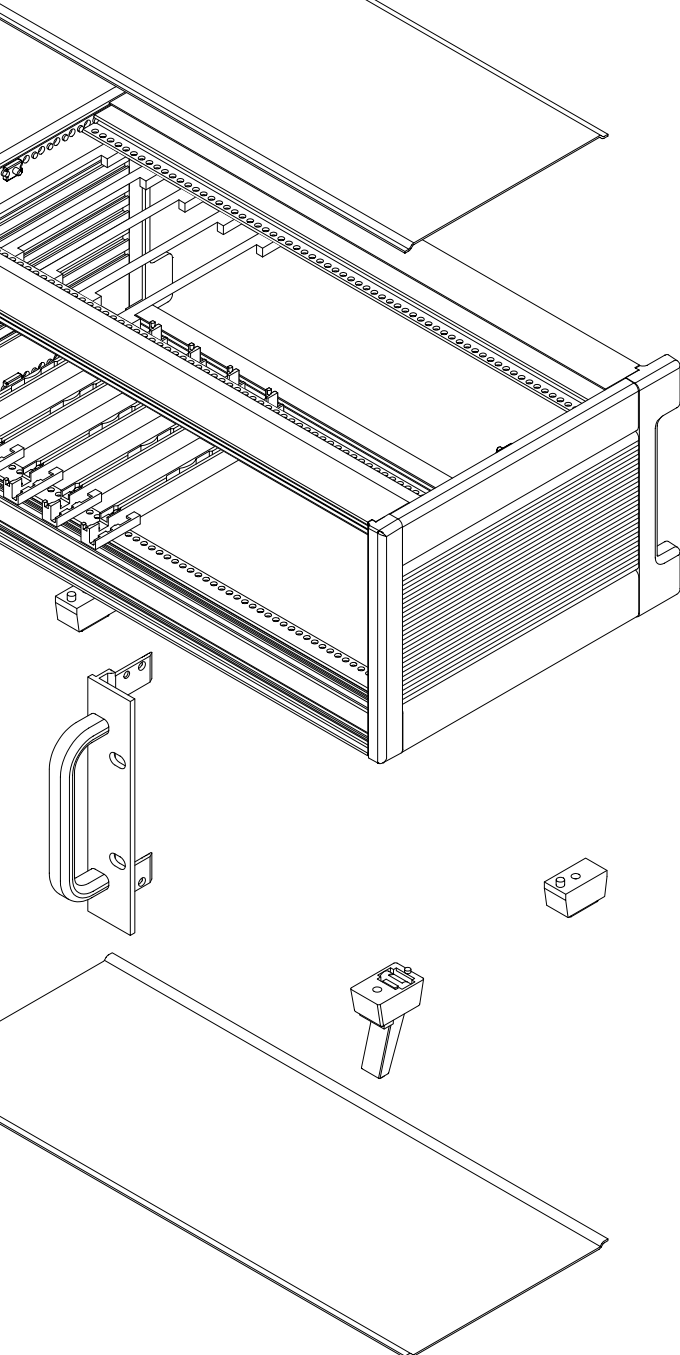
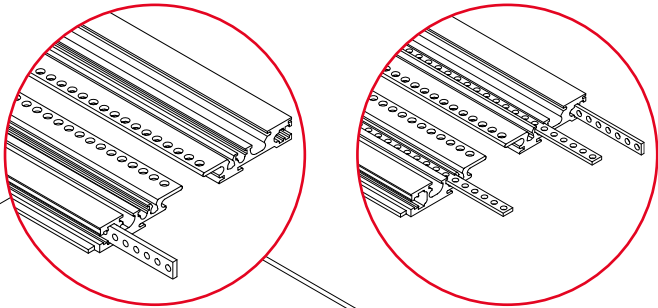
BOPLA

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Interzoll Plus

Tapped strips GS I

Tapped strips GS II



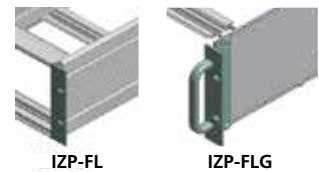
Dimensions

Model	A	B	C	HP
3 U				
Izp 18340	132.7	235.84	197.2	42
Izp 18360	132.7	342.52	197.2	63
Izp 18380	132.7	449.2	197.2	84
Izp 24340	132.7	235.84	257.2	42
Izp 24360	132.7	342.52	257.2	63
Izp 24380	132.7	449.2	257.2	84
Izp 30340	132.7	235.84	317.2	42
Izp 36360	132.7	342.52	317.2	63
Izp 30380	132.7	449.2	317.2	84
Izp 36340	132.7	235.84	377.2	42
Izp 36360	132.7	342.52	377.2	63
Izp 36380	132.7	449.2	377.2	84

Accessories



Card guide, one and three parts



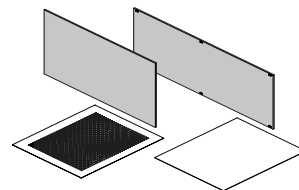
Subrack flange, aluminium, silver-coloured anodised



Clamp profile sets for fitting of split cover plates



Bus and rear profiles



Front and part front panels and cover plates in different versions

The product advantages



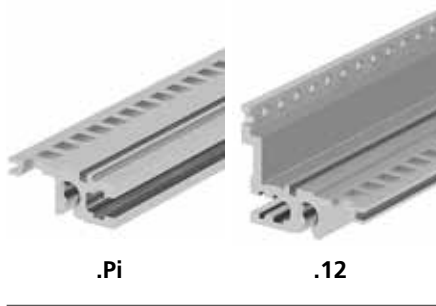
The subracks in the Interzoll Modul series have the option of continuous EMC screening. All enclosure components can be connected conductively by means of specially-matched EMC accessories.



Interzoll Modul provides a matching card guide for every situation – and with mechanical coding on request. To unlock, apply side pressure.



Subracks and accessories with the BN designation are certified for use in buses and rail vehicles.



Versions for backplane technology (.Pi) for direct screw-on connectors (.12) acc. to DIN EN 60603-2, and for plug-in units acc. to IEC 60297-3-101.



The support brackets are firmly pressed to the side panel to cope with extreme mechanical loads. All side panels are passivated and have a conductive function.



Quick-Finder:
www.bopla.de/85

Examples of use





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Interzoll Modul



Colour:

Anodized in natural color

Production class:

IP40 / DIN EN 60529

IP20 / DIN EN 60529 with ventilation (ADG...-L)

Material:

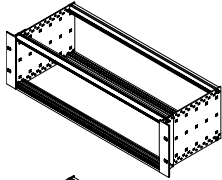
Profiles: Al Mg Si 0,5, anodized

For details see technical information.

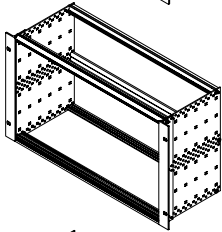


Enclosure sizes

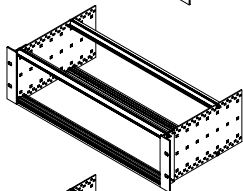
BGT M 18380



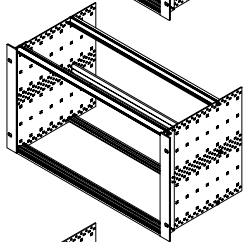
BGT M 18680



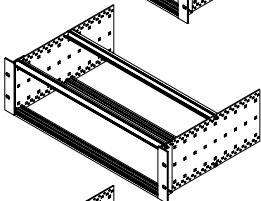
BGT M 24380



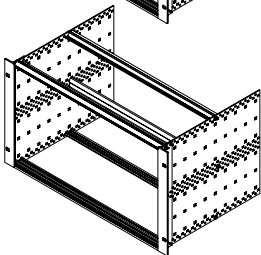
BGT M 24680



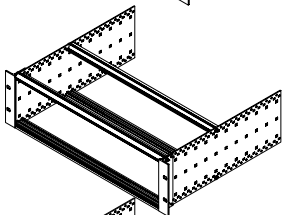
BGT M 30380



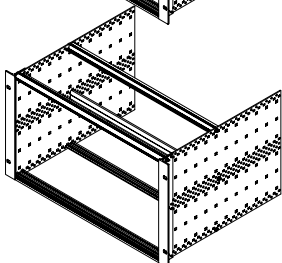
BGT M 30680



BGT M 36380

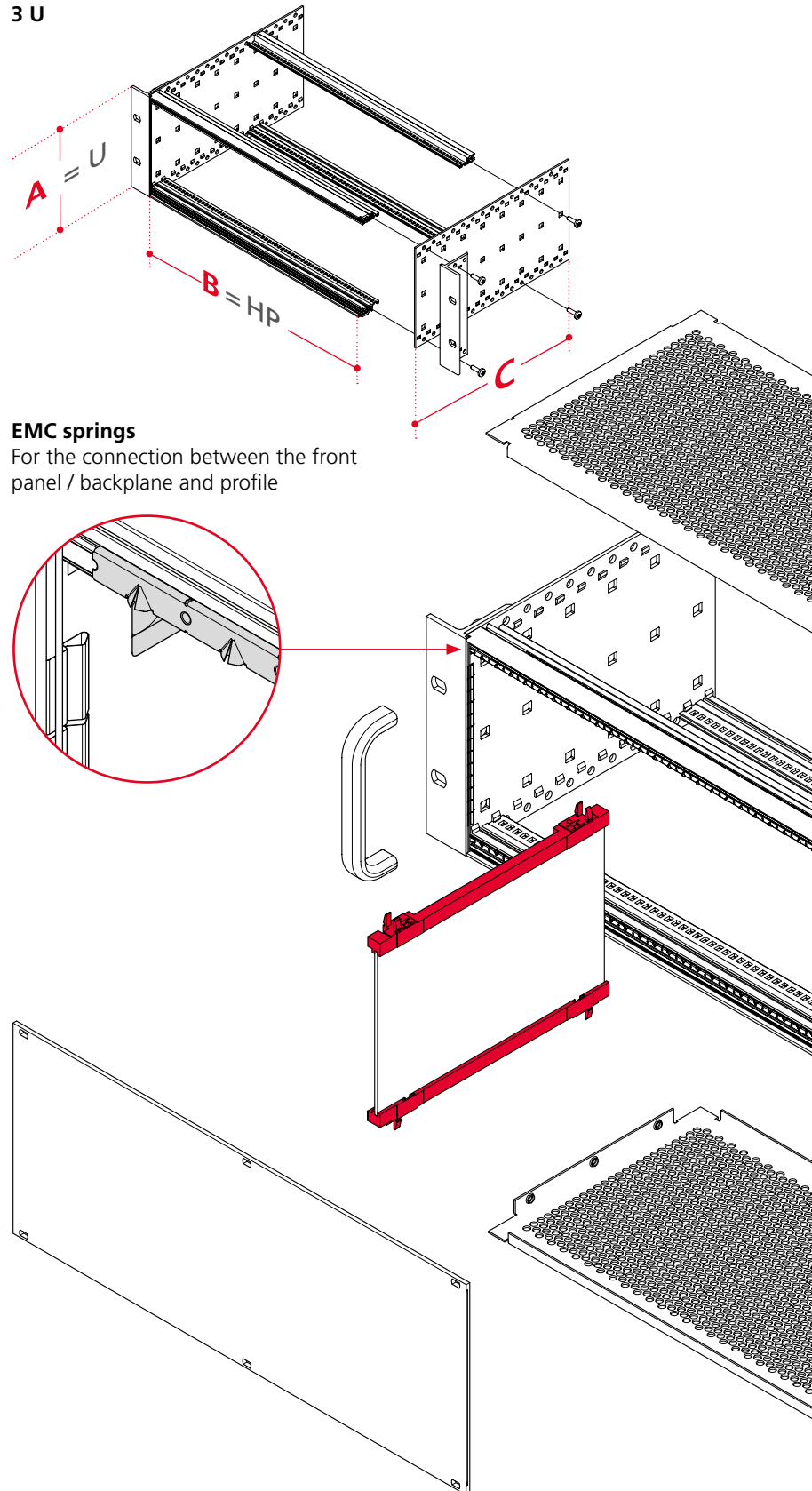


BGT M 36680



Design types

3 U

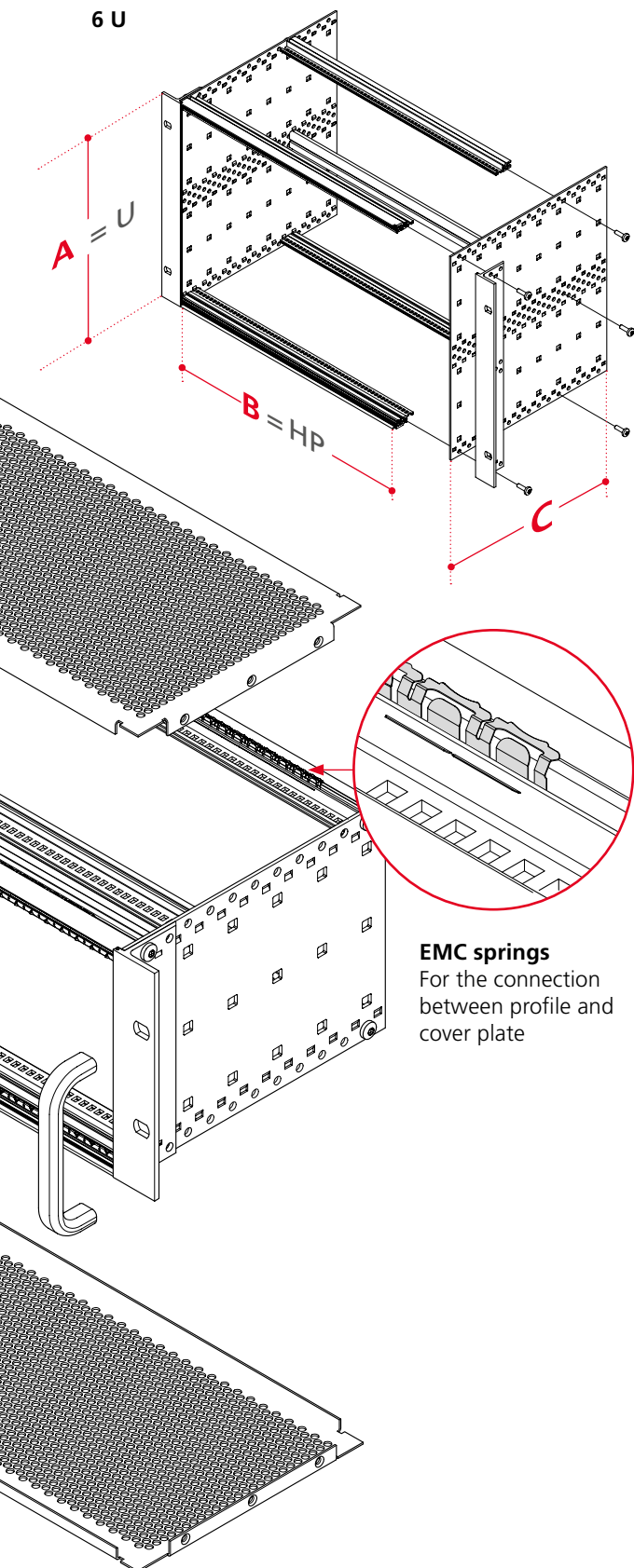




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Interzoll Modul



EMC springs
For the connection
between profile and
cover plate

Dimensions

Model	A	B	C	HP
3 U For backplanes (.Pi) or connectors(.12)				
BGT / M 18340	132.5	269.24	178	42
BGT / M 24340	132.5	269.24	238	42
BGT / M 30340	132.5	269.24	298	42
BGT / M 36340	132.5	269.24	358	42
BGT / M 18360	132.5	375.92	178	63
BGT / M 24360	132.5	375.92	238	63
BGT / M 30360	132.5	375.92	298	63
BGT / M 36360	132.5	375.92	358	63
BGT / M 18380	132.5	482.6	178	84
BGT / M 24380	132.5	482.6	238	84
BGT / M 30380	132.5	482.6	298	84
BGT / M 36380	132.5	482.6	358	84
6 U For backplanes (.Pi) or connectors (.12)				
BGT / M 18640	265.9	269.24	178	42
BGT / M 24640	265.9	269.24	238	42
BGT / M 30640	265.9	269.24	298	42
BGT / M 36640	265.9	269.24	358	42
BGT / M 18660	265.9	375.92	178	63
BGT / M 24660	265.9	375.92	238	63
BGT / M 30660	265.9	375.92	298	63
BGT / M 36660	265.9	375.92	358	63
BGT / M 18680	265.9	482.6	178	84
BGT / M 24680	265.9	482.6	238	84
BGT / M 30680	265.9	482.6	298	84
BGT / M 36680	265.9	482.6	358	84

Accessories



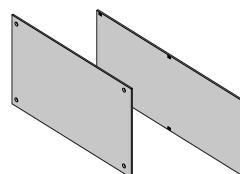
Shielded rear hood

Card guide

Handles / Flanges



Various profiles e.g. front profiles, (double) bus profiles, rear profiles, double connector profiles, snap profiles, end profiles



Front and part front panels in different versions

The product advantages



The subracks in the Interzoll ranges are especially suitable for basic applications in which no measures are required for EMC screening. For EMC requirements we recommend the Interzoll Modul range.



Selected variants are equipped with aluminium profile single-piece side panels fitted with an integrated mounting flange. This guarantees a high level of mechanical stability coupled with excellent cost effectiveness.



Double profiles ensure fast, efficient mounting.



Subracks and accessories with BN designations are certified for use in buses and rail vehicles.



Locking of the card guides is by means of snap bolts which can easily be released by finger activation. Easy operation even when slot positions are close together.



Quick-Finder:
www.bopla.de/53

Examples of use





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Interzoll



Colour:

Profiles aluminium, anodized in natural color

Protection class:

Up to IP40 / DIN EN 60529 to the built-in front

Material:

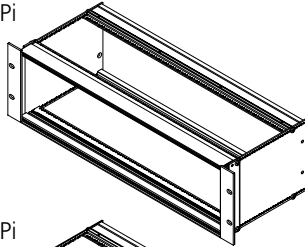
Profiles: Al Mg Si 0,5

For details see technical information.

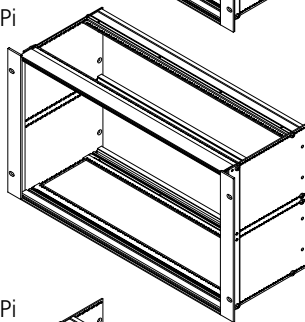


Enclosure sizes

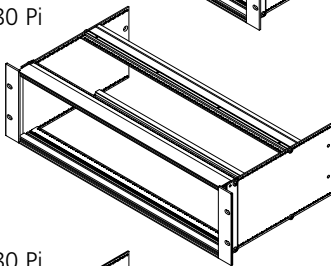
BGT M 18380 Pi



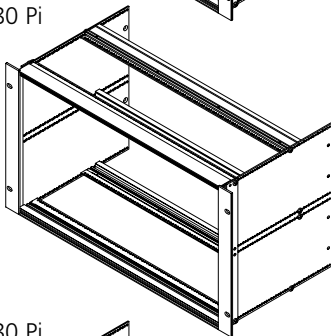
BGT M 18680 Pi



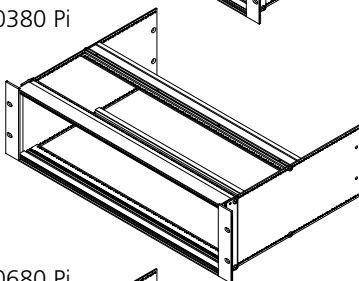
BGT M 24380 Pi



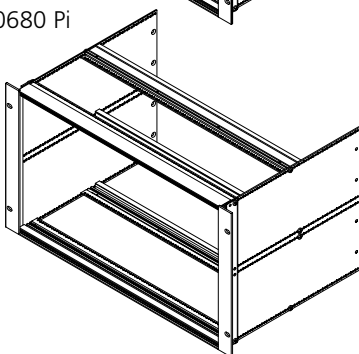
BGT M 24680 Pi



BGT M 30380 Pi

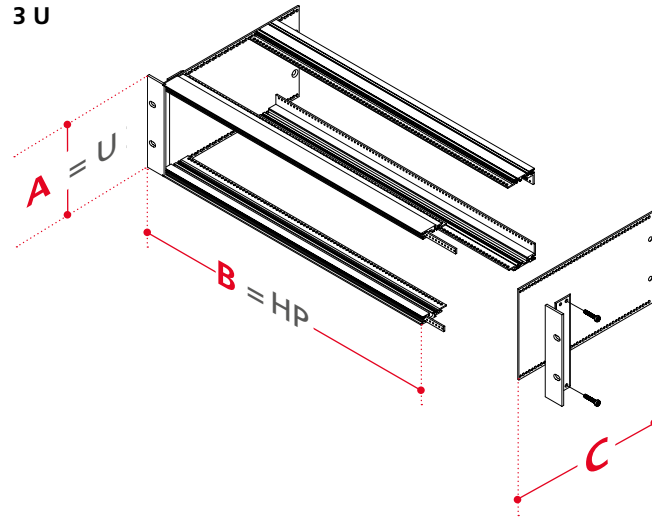


BGT M 30680 Pi



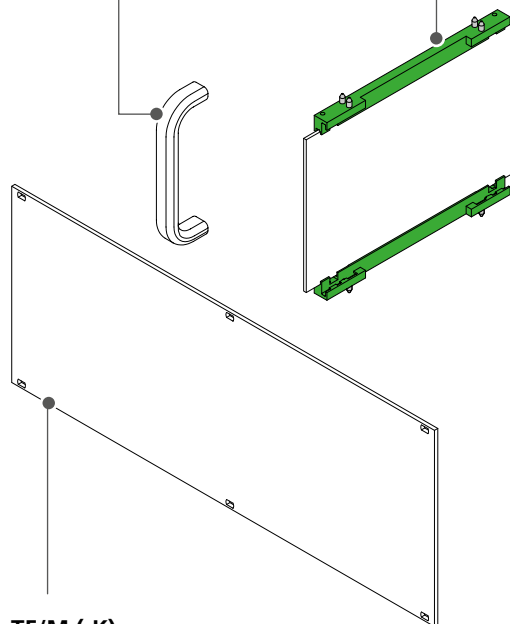
Design types

3 U



KF
Snap-in card guide
(screwable option)

GR
Handles for flanges



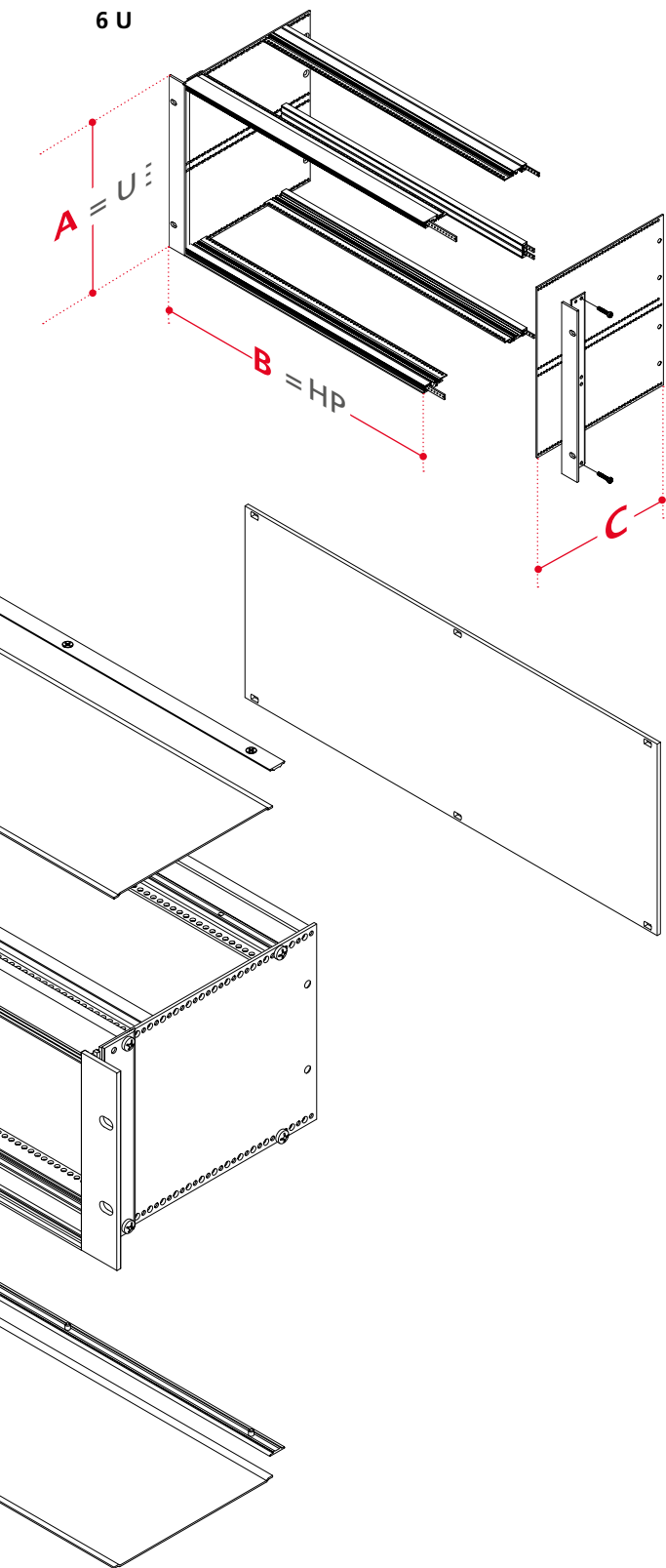
TF/M (-K)
Part front panels
(collapsible option)



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Interzoll



Dimensions

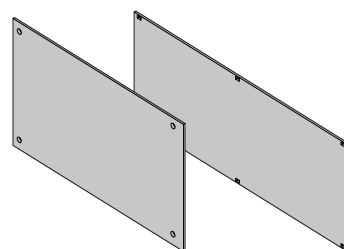
Model	A	B	C	HP
3 U For backplanes (.Pi) or connectors (.12)				
BGT 18340	132.5	269.24	178.24	42
BGT 24340	132.5	269.24	238.24	42
BGT 30340	132.5	269.24	298.24	42
BGT 18360	132.5	375.92	178.24	63
BGT 24360	132.5	375.92	238.24	63
BGT 30360	132.5	375.92	298.24	63
BGT 18380	132.5	482.6	178.24	84
BGT 24380	132.5	482.6	238.24	84
BGT 30380	132.5	482.6	298.24	84
3 U With profile side panel for backplanes or connectors (BN 411 002)				
BGT 22340(-BN)	132.5	269.24	218.24	42
BGT 22360(-BN)	132.5	375.92	218.24	63
BGT 22380(-BN)	132.5	482.6	218.24	84
6 U For backplanes (.Pi) or connectors (.12)				
BGT 18640	265.85	269.24	178.24	42
BGT 24640	265.85	269.24	238.24	42
BGT 30640	265.85	269.24	298.24	42
BGT 18660	265.85	375.92	178.24	63
BGT 24660	265.85	375.92	238.24	63
BGT 30660	265.85	375.92	298.24	63
BGT 18680	265.85	482.6	178.24	84
BGT 24680	265.85	482.6	238.24	84
BGT 30680	265.85	482.6	298.24	84
6 U With profile side panel for backplanes or connectors				
BGT 22640	265.85	269.24	218.24	42
BGT 22660	265.85	375.92	218.24	63
BGT 22680	265.85	482.6	218.24	84

Accessories



Handles / Flanges

Various profiles e.g. front profiles, (double) bus profiles, rear profiles, double connector profiles, snap profiles, end profiles



Front and part front panels in different versions



Card guide, one and three parts

The product advantages



Interzoll Case is a series of tailor-made enclosures manufactured for specific projects and in sheet aluminium or steel using stamping and bending technology. Standard designs exist for manufacturing numerous enclosure types from 19" switch cabinet enclosures to elegant display enclosures.



Enclosure break-throughs and holders for PCBs are integrated in the enclosure directly during the production process. Later reworking is no longer necessary.

The standard designs are available for downloading as 3D-CAD files on www.bopla.de and could be manufactured directly as a "standard product". However, they can also be used as a basis for completely individual designs.



Many surface coatings and colours are available for the external design. Interzoll Case can be given an even more individual design by using printing (even under anodised surfaces).

Optional contact areas between the enclosure components ensure optimal EMC screening.



Quick-Finder:
www.bopla.de/28

Examples of use





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Interzoll Case



Colour:

 Individually according to your specifications

Protection class:

Depending on the enclosure construction up to IP40 / DIN EN 60529;
higher degrees of protection project-specific on request

Material:

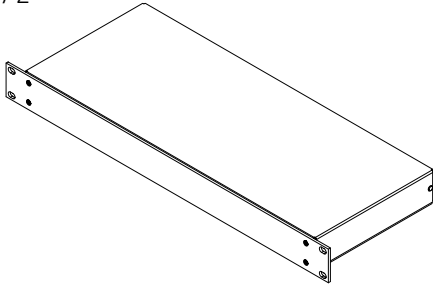
Individually manufactured; for example made of aluminum, steel or stainless steel. Other materials and surface coatings are always possible on request.

For details see technical information.

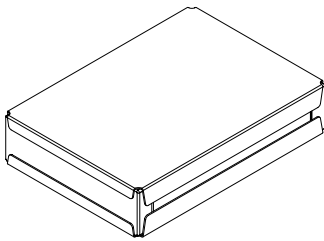


Housing shapes

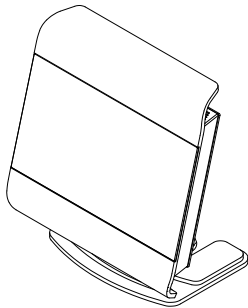
IC / Z



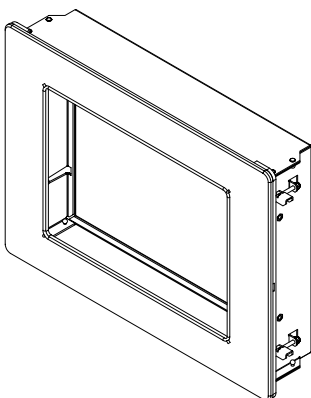
IC / P / T / H



IC / M-7

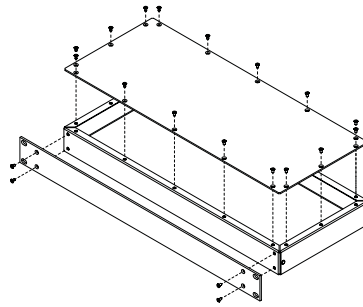


IC / E 10.1

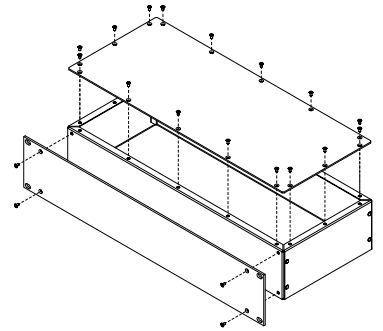


Design types

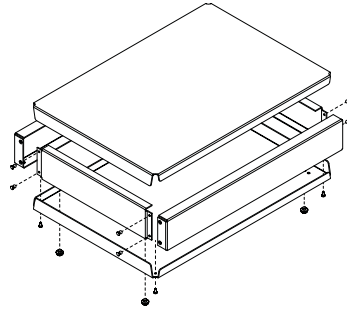
19" enclosure 1 U



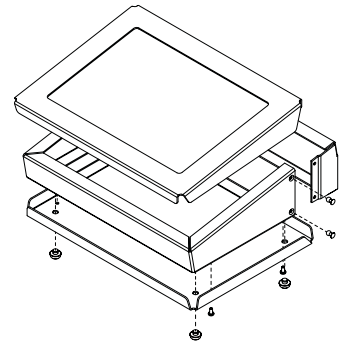
19" enclosure 2 U



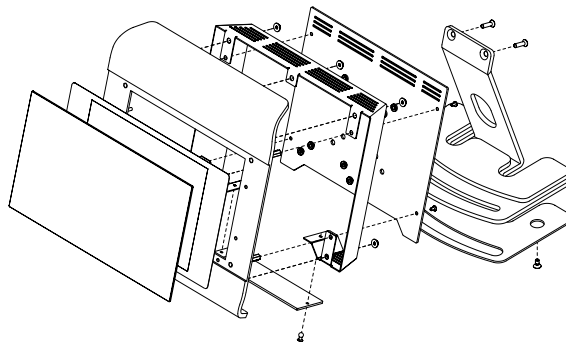
Desktop enclosures



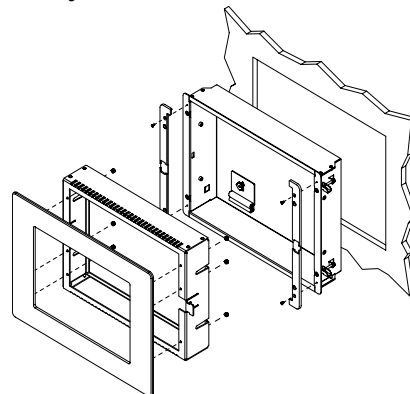
Console enclosures



Monitor enclosures



Cavity wall installation enclosures



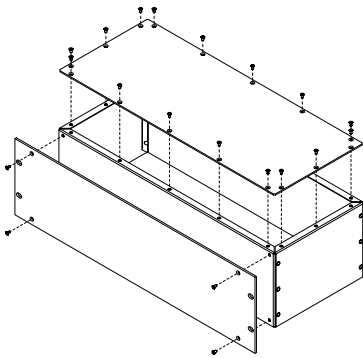
IC / E 10.1 panel

**BOPLA**

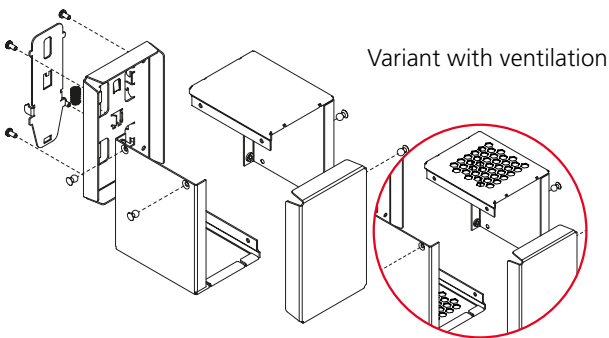
A Phoenix Mecano Company

Interzoll Case

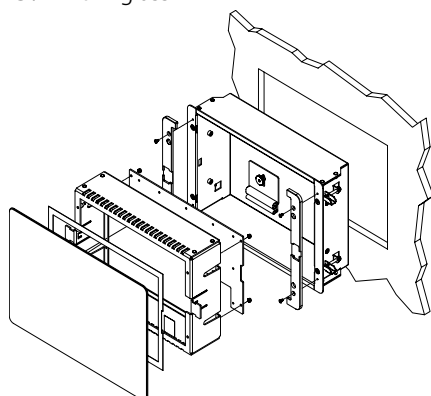
19" enclosure 3 U



DIN rail enclosures



IC / E 10.1 glass



Dimensions

Model	A	B	C
19" enclosures			
IC/Z 18180 (-EMC)	43.6	482.6	482.6
IC/Z 24180 (-EMC)	43.6	482.6	482.6
IC/Z 30180 (-EMC)	43.6	482.6	482.6
IC/Z 18280 (-EMC)	88.1	482.6	482.6
IC/Z 24280 (-EMC)	88.1	482.6	482.6
IC/Z 30280 (-EMC)	88.1	482.6	482.6
IC/Z 18380 (-EMC)	132.5	482.6	482.6
IC/Z 24380 (-EMC)	132.5	482.6	482.6
IC/Z 30380 (-EMC)	132.5	482.6	482.6
Console enclosures			
IC/P 180312	180	32	121.5
IC/P 180324	180	32	243
IC/P 180336	180	32	364.5
IC/P 220315	228	32	155
IC/P 220331	228	32	310
IC/P 220346	228	32	465
IC/P 260318	260	32	180
IC/P 260336	260	32	360
IC/P 260354	260	32	540
Desktop enclosure			
IC/T 280620	280	60	200
IC/T 280640	280	60	400
IC/T 281220	280	120	200
IC/T 281240	280	120	400
IC/T 281825	280	180	250
IC/T 281850	280	180	500
DIN rail enclosures			
IC/H 041118 (-L)	40	110	182.5
IC/H 081006 (-L)	80.5	102.5	63.5
IC/H 081013 (-L)	80.5	102.5	130
IC/H 101005 (-L)	100.5	102.5	51.5
IC/H 101605 (-L)	100.5	162.5	51.5
IC/H 161005 (-L)	160.5	102.5	51.5
Monitor enclosures			
IC/M 7"	266.4	245	164.6
IC/M 10.1"	309.8	305	209.6
Cavity wall installation enclosures			
IC/E 10,1" panel	398	297	75.5
IC/E 12,1" panel	428	335	75.5
IC/E 15,6" panel	536	366	85.5
IC/E 7,0" glass	248	173	75.5
IC/E 10,1" glass	308	215	75.5





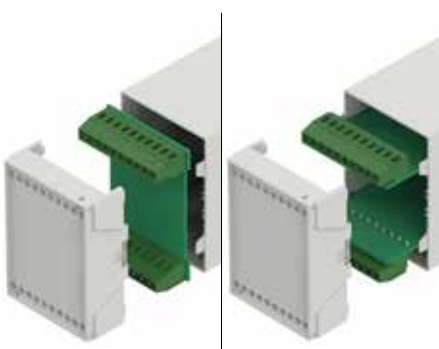
Testing and packaging

Your enclosures do not leave our company until they have been securely packaged and thoroughly tested in our in-house laboratory.

The product advantages



CombiNorm Classic is an enclosure system with a very functional design and for mounting on DIN rails acc. to DIN EN 60715 TH 35. The cuboid shape provides an optimally usable interior coupled with a compact design.



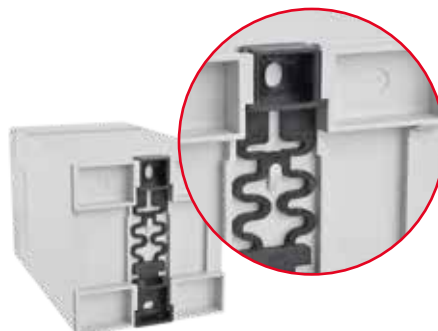
Screw-type terminals matched to the enclosure support two different installation situations for PCBs: inserted horizontally, and mounted parallel to the enclosure front.



A plug-in solution exists for horizontal PCBs and is used for extra-fast replacement of defective devices during servicing. Note that the STL-adaptor CNA 100 must be fitted in order to support the PCB.



The enclosure front can be covered with a transparent hood which protects sensitive operating elements. This can be opened upwards or downwards, according to choice, or completely removed.



CombiNorm Classic is also suitable for direct wall mounting. To do this, simply rotate the DIN rail adapter by 180°.



Quick-Finder:
www.bopla.de/65

Examples of use



CombiNorm-Classic



Colour:

● Light grey, similar to RAL 7035

Special colours on request

Protection class:

Enclosure: IP40 / DIN EN 60529

Terminal blocks: IP20 / DIN EN 60529

Material:

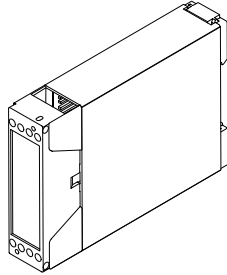
Enclosure: ABS, V-0 material on request

For details see technical information.

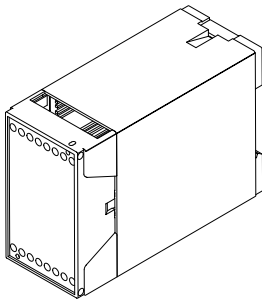


Enclosure sizes

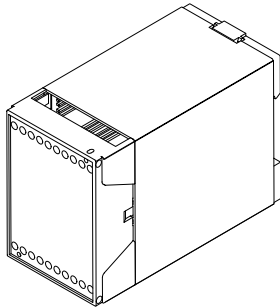
CN 22 AK



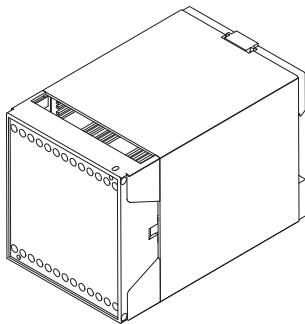
CN 45 AK



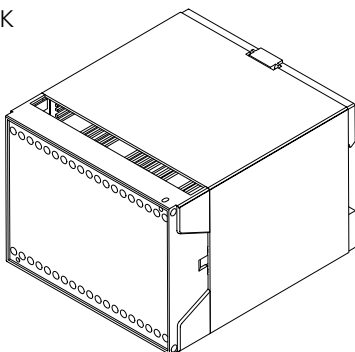
CN 55 AK



CN 70 AK

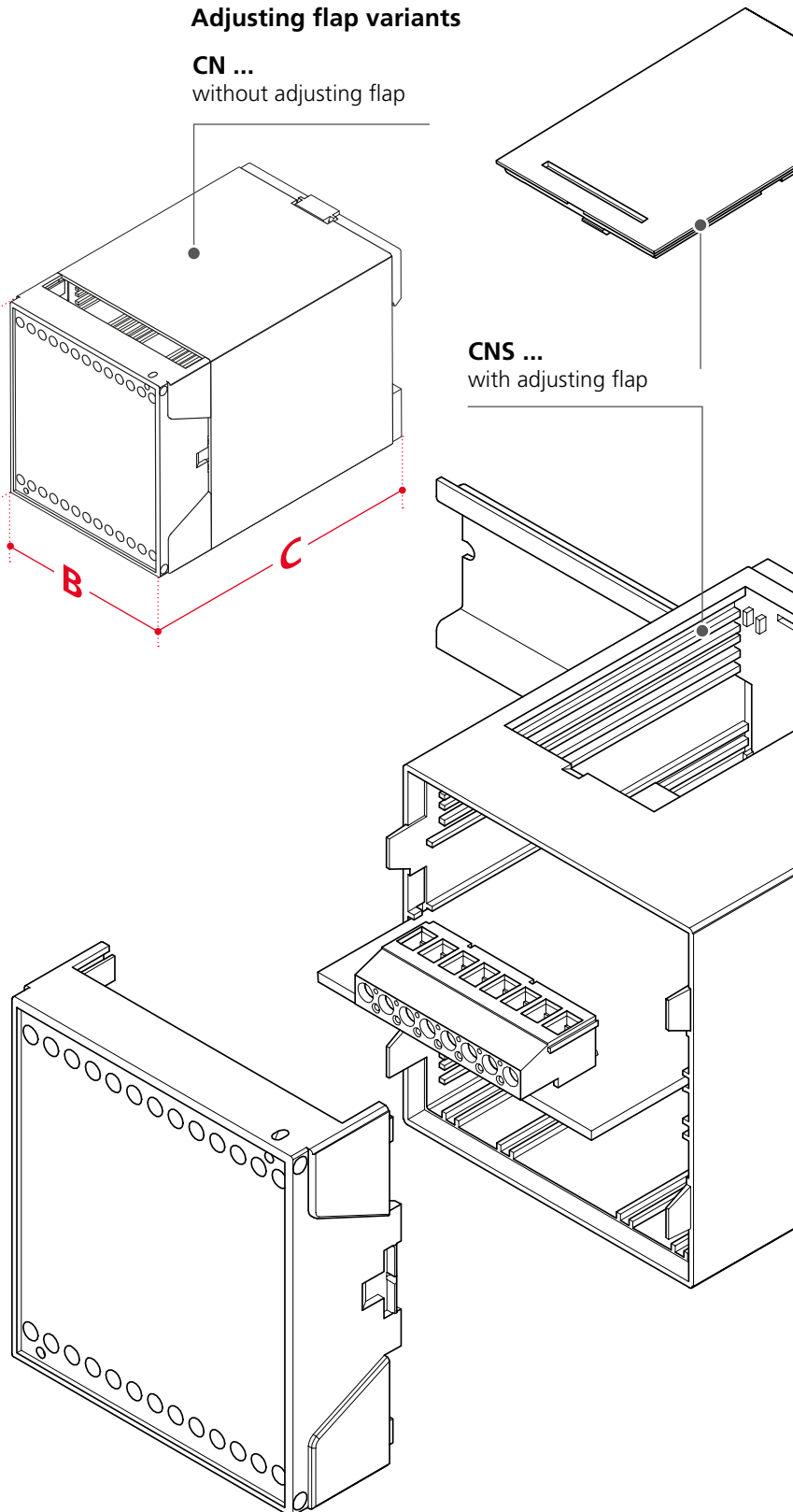
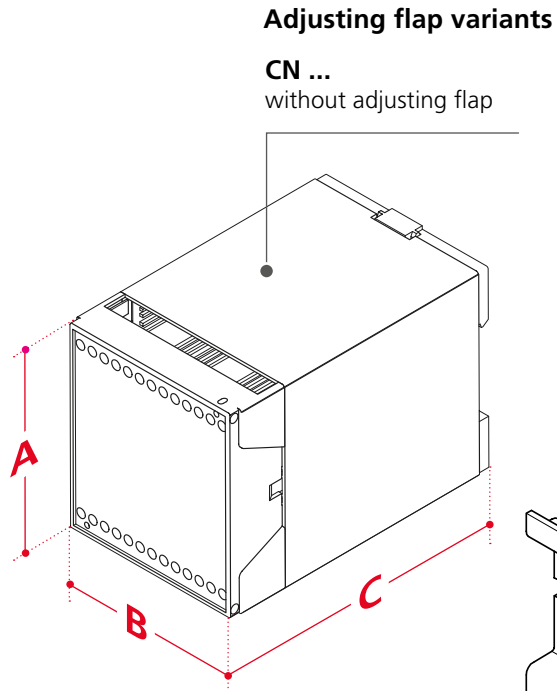


CN 100 AK

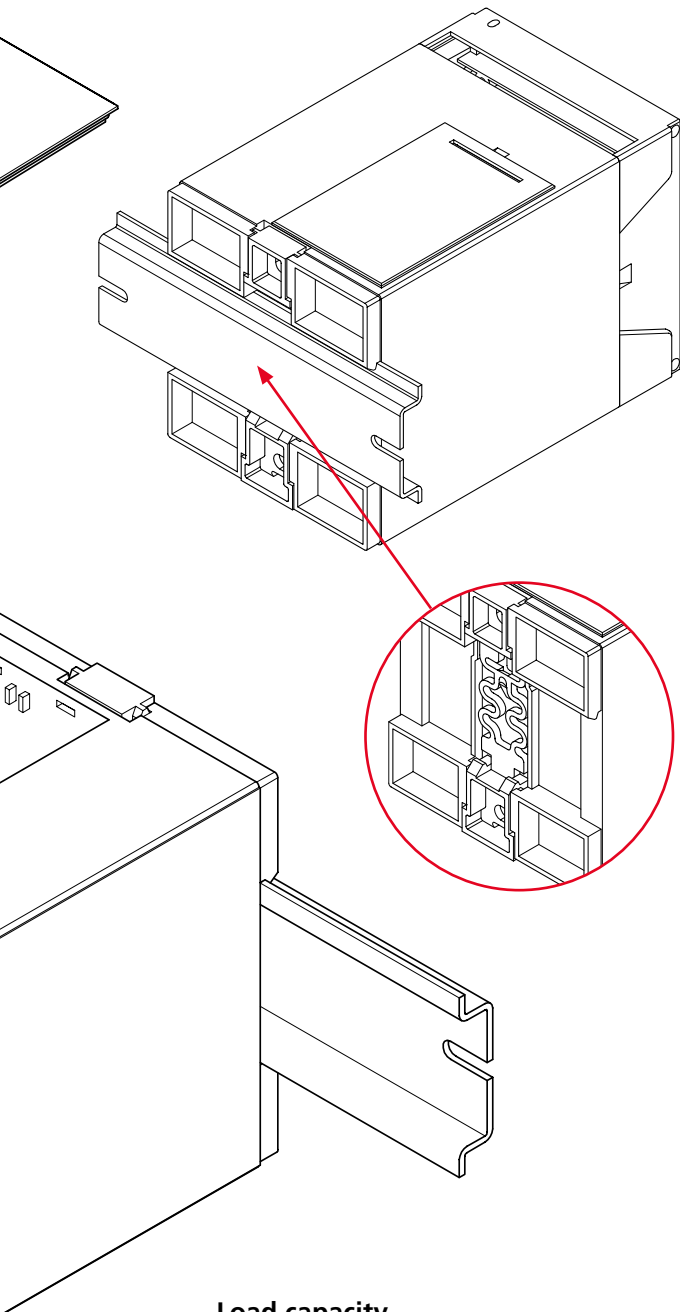


Design example

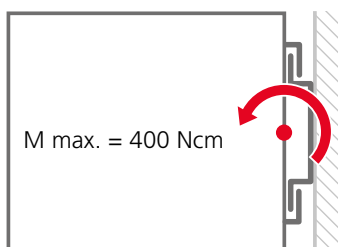
Basic profile



CombiNorm-Classic



Load capacity of DIN rail holder



Dimensions

Model	A	B	C
CN(S) 22 AK	22.5	75	109.5
CN(S) 45 AK	45	75	109.5
CN(S) 55 AK	55	75	109.5
CN(S) 70 AK	70	75	109.5
CN(S) 100 AK	100	75	109.5

Accessories



Connection terminals for front-insertable parallel and horizontal PCBs, and connector strips for soldering onto horizontally-inserted PCBs.



Hinged hoods



Terminal identification strip, self-adhesive



Blind plate for covering unused terminal locations, 19 parts, can be broken off

The product advantages



With its two rows of stepped terminals, CombiNorm Compact provides a large number of connections in minimal width enclosures. In particular, this allows the positioning of modular systems with minimal space requirement on the DIN rail.



The stepped arrangement of the PCBs requires a matching PCB contour. Enclosure variants for applications with especially cost-effective rectangular PCBs are also available, one of which is designed as a universal enclosure without pre-specified terminal positions.



The PCB plug-in slot is positioned parallel to the front panel for the fitting of front operating elements etc.



The terminal blocks are designed specifically for use in CombiNorm Compact. In each case, 2-pole and 3-pole variants are available.



Front panels are mounted fixed or removable, as required. A transparent version allows a direct view into the interior of the enclosure.



Quick-Finder:
www.bopla.de/66


Examples of use



CombiNorm-Compact



Colour:

 Light grey, similar to RAL 7035

Special colours on request

Protection class:

Enclosure: IP40 / DIN EN 60529

Enclosure: IP30 / DIN EN 60529 with ventilation slots

Terminal blocks: IP20 / DIN EN 60529

Material:

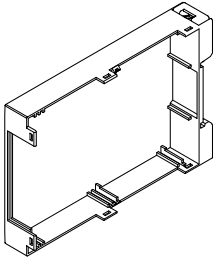
Enclosure: PA 6.6-FR (V-0)

For details see technical information.

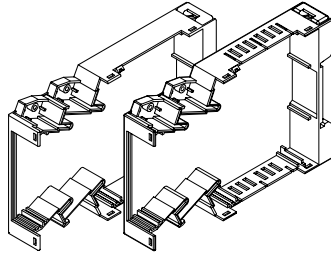


Enclosure sizes

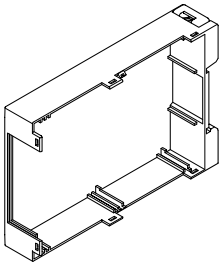
CN 19 GU



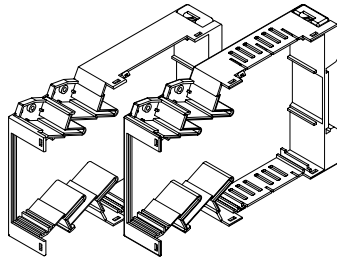
CN 19 GK / CN 19 GK-L



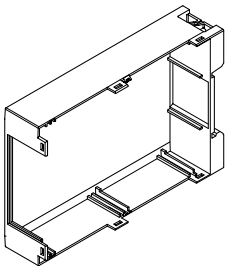
CN 22 GU



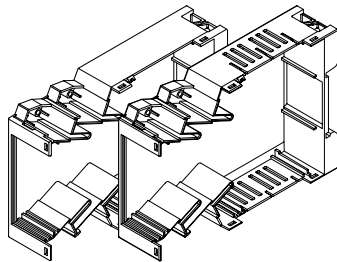
CN 22 GK / CN 22 GK-L



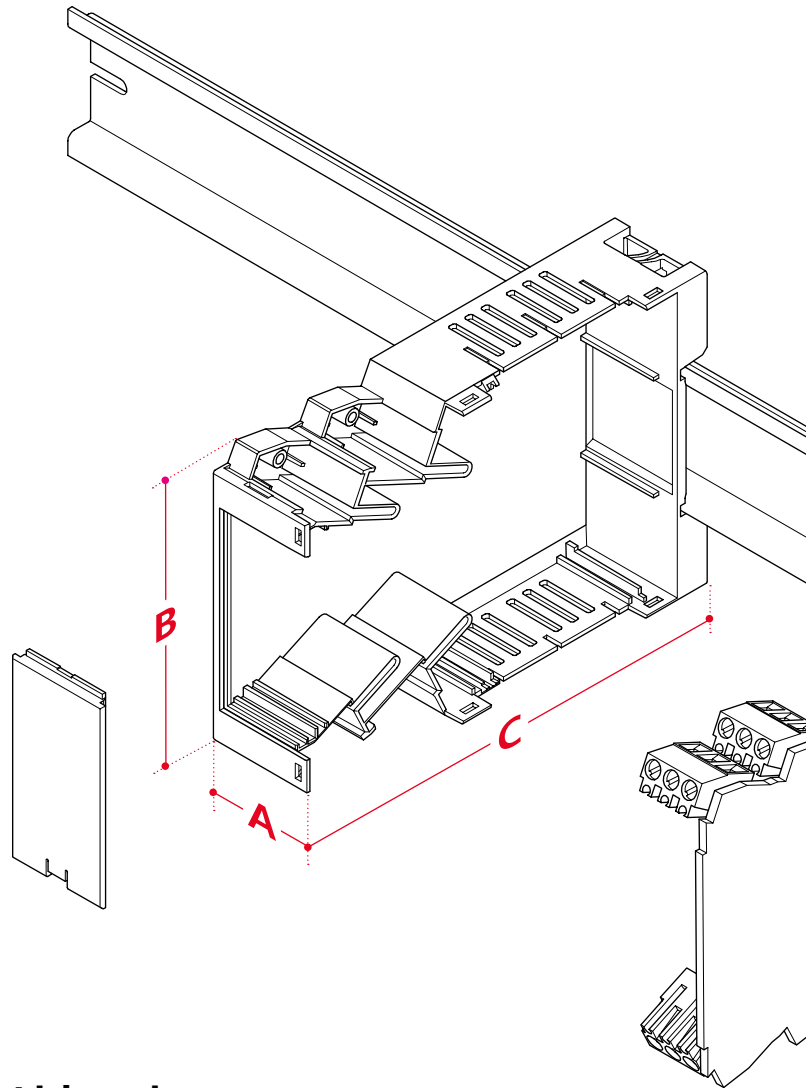
CN 26 GU



CN 26 GK / CN 26 GK-L

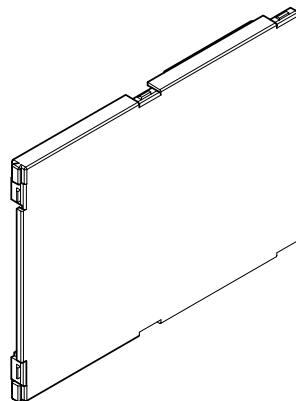


Design example

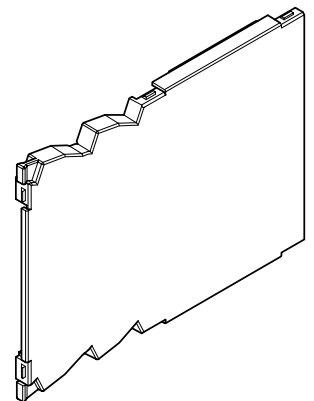


Lid variants

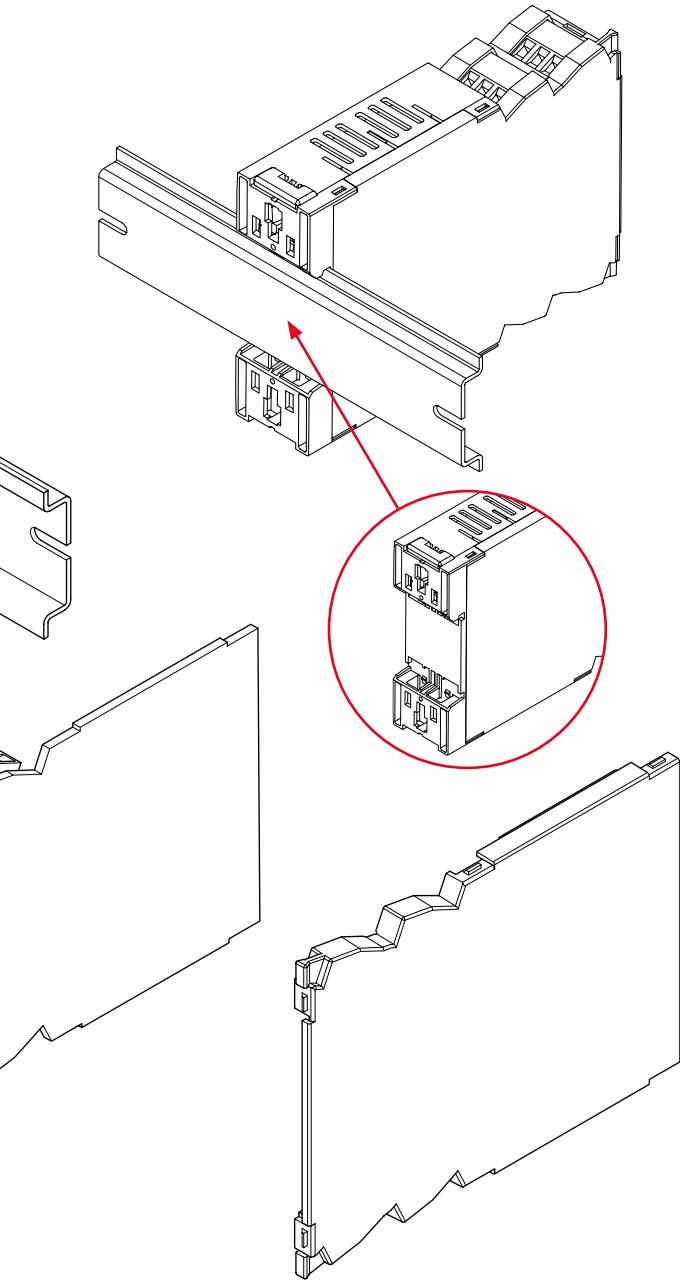
CN-DU
for rectangular PCBs



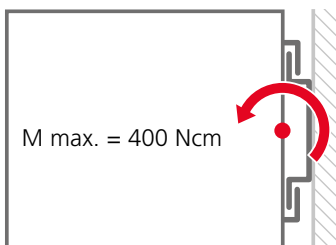
CN-DK
for contoured PCBs



CombiNorm-Compact



Load capacity of DIN rail holder



Dimensions

Model	A	B	C
CN 19 GK (-L) / GU	19	75	110.8
CN 22 GK (-L) / GU	22.5	75	110.8
CN 26 GK (-L) / GU	26	75	110.8

Accessories



Marking plate for clipping onto upper and lower section of enclosure front



Covers for unused terminal locations for CN..GK (L) PA 6.6-FR



Terminal blocks



Front flap, snap-on, crystal-clear



Plug-in front panel, PA



Plug-in front panel, PA



Wall adapter for all CN-Compact enclosures

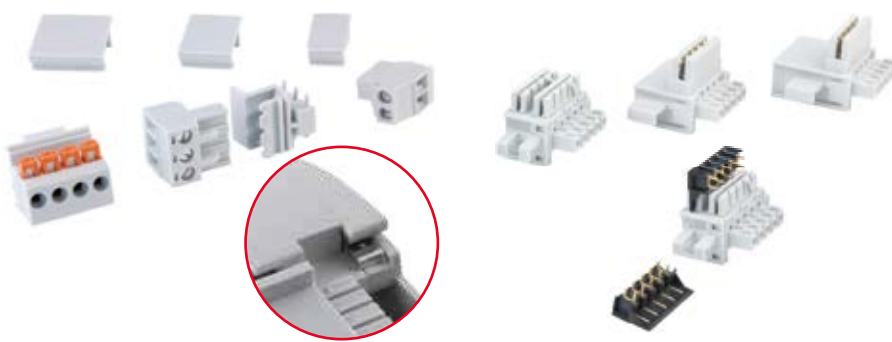


Terminal identification strip, self-adhesive

The product advantages

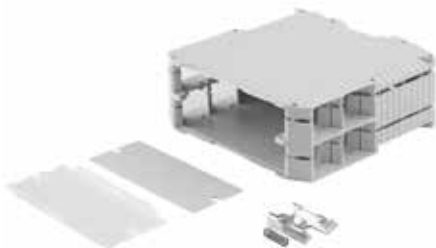


CombiNorm Connect is a modular DIN rail enclosure which makes possible external plug-in contacting of the PCB in the area of the DIN rail adapter.



A selection of different spring-cage and screw terminals for wiring modules is available. Optionally, a conductive connection between the PCB and DIN rail can be created via an earthing contact.

The modules are connected to each other by means of special DIN rail bus connectors. In this way, supply and signal voltages are transmitted through the complete system. Individual modules can be removed without interrupting the connection to the other devices.



All enclosure components can be locked together without the use of tools.



The enclosure components are available in many variants and can be combined with each other in almost any way required.



Quick-Finder:
www.bopla.de/67

Examples of use



CombiNorm- Connect



Colour:

● Light grey, similar to RAL 7035

Special colours on request

Protection class:

IP20 / DIN EN 60529

Material:

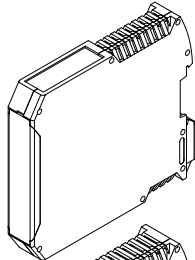
Enclosure: polyamide UL 94 V-0

For details see technical information.

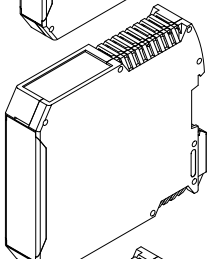


Enclosure sizes

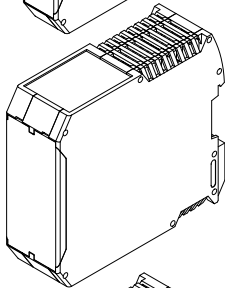
CNT 17



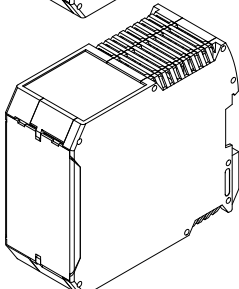
CNT 22



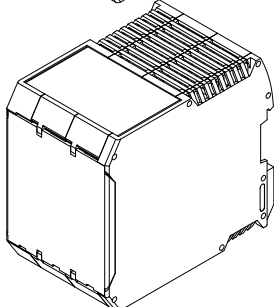
CNT 35



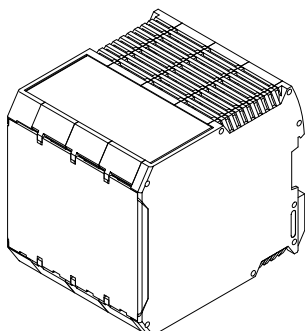
CNT 45



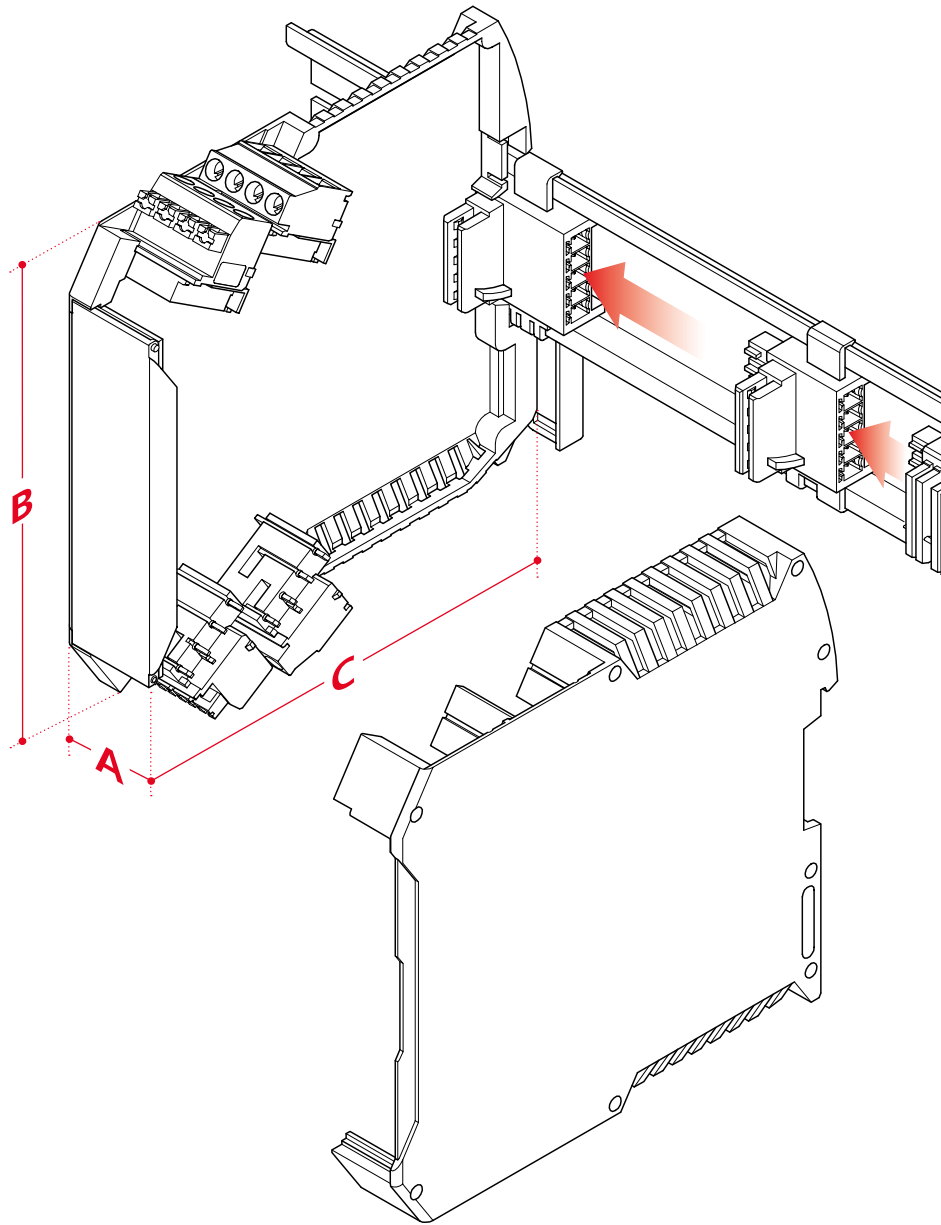
CNT 67



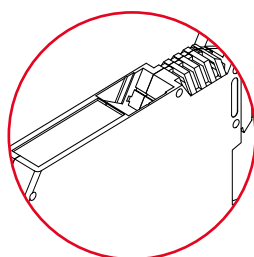
CNT 90



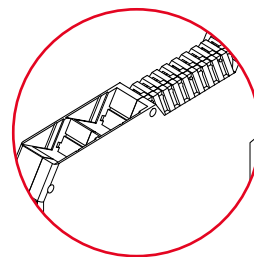
Design example



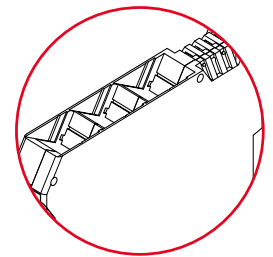
Terminal variants



One connection level



Two connection levels



Three connection levels

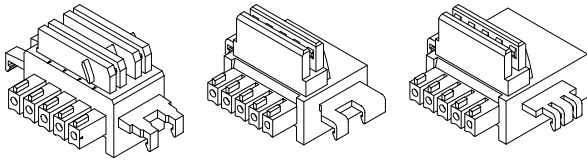
CombiNorm-Connect

Bus connector

CNT-BV 12/2-5

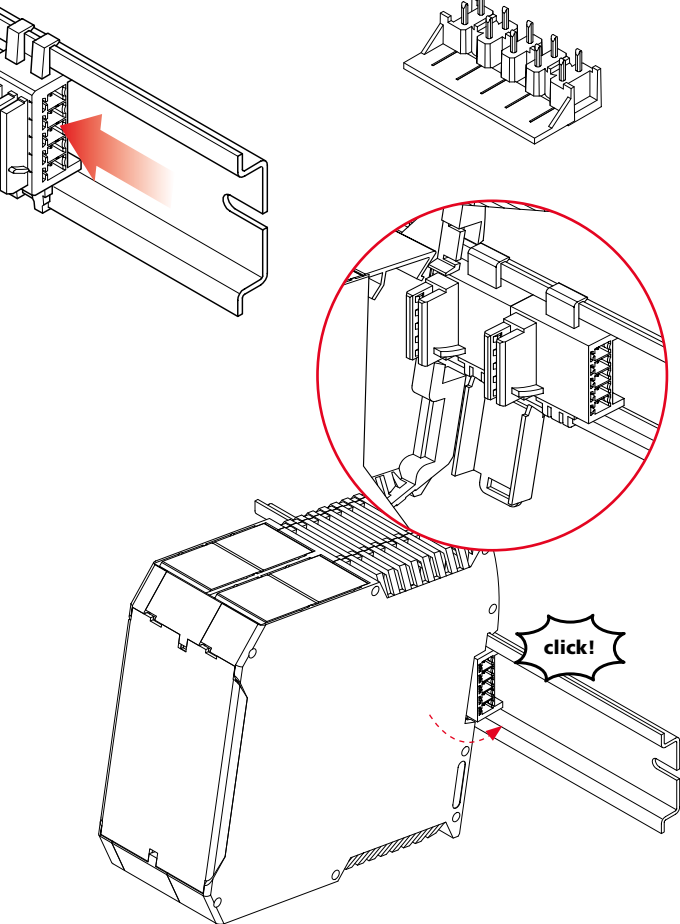
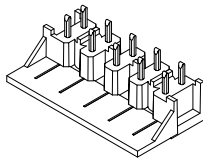
CNT-BV 17/1-5

CNT-BV 22/1-5

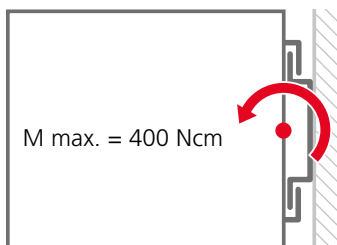


Pin strip

CNT-STL



Load capacity of DIN rail holder



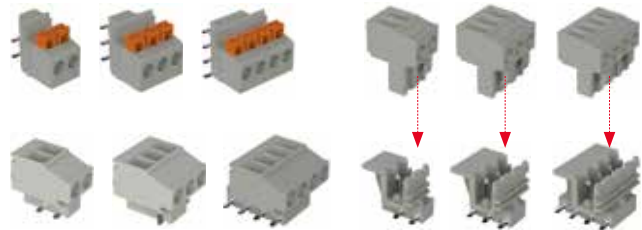
Dimensions

Model	A	B	C
CNT 17/1-3 TB (-L)	17.5	99	114.5
CNT 22/1-4 TB (-L)	22.5	99	114.5
CNT 35/1-2-3 TB (-L)	35	99	114.5
CNT 45/1-2-4 TB (-L)	45	99	114.5
CNT 67/1-3-4 TB (-L)	67.5	99	114.5
CNT 90/1-4-4 TB (-L)	90	99	114.5
CNT 17/4-3 TB (-L)	17.5	99	114.5
CNT 22/4-4 TB (-L)	22.5	99	114.5
CNT 35/4-2-3 TB (-L)	35	99	114.5
CNT 45/4-2-4 TB (-L)	45	99	114.5
CNT 12/6-2...	12.5	99	114.5
CNT 17/6-3 TB (-L)	17.5	99	114.5
CNT 22/6-4 TB (-L)	22.5	99	114.5
CNT 35/6-2-3 TB (-L)	35	99	114.5
CNT 45/6-2-4 TB (-L)	45	99	114.5

Bus connector / Pin strip

Model	Note
CNT-STL	Pin strip, 5-pole, for CNT-BV 12/2-5, to solder into the PCB
CNT-BV 12/2-5	5-pole, to CNT-BV 12
CNT-BV 17/1-5	5-pole, to CNT-BV 17 and 35
CNT-BV 22/1-5	5-pole, to CNT-BV 22, 45, 67 and 90

Accessories



Screw connection terminal blocks, single / double section and spring-cage terminal blocks, single section

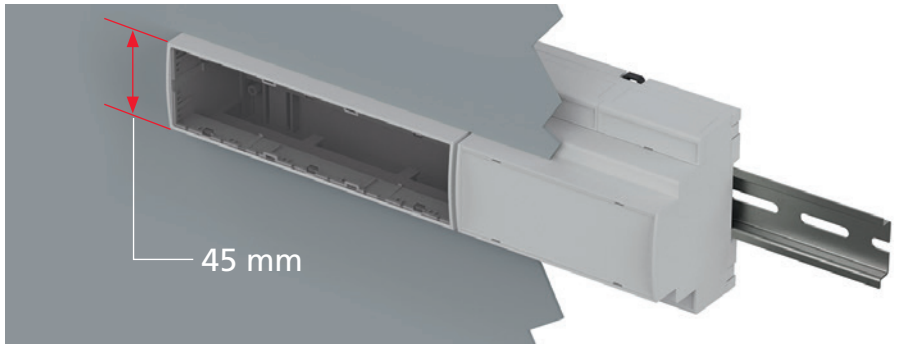


Functional earth ground contact

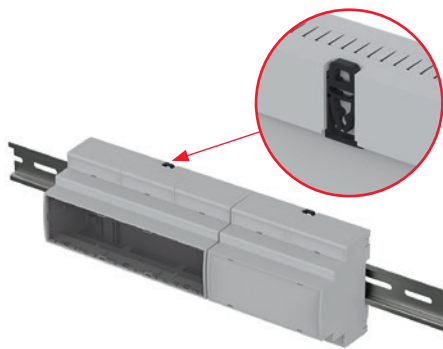


Filler plug

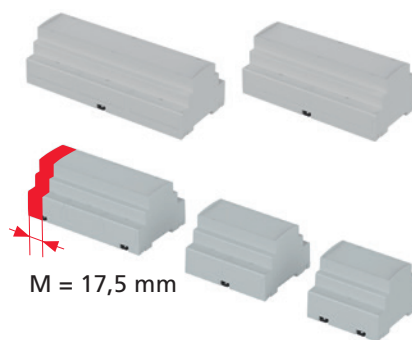
The product advantages



CombiNorm Control is a modular enclosure system for electronic devices with a form factor acc. to DIN 43880.



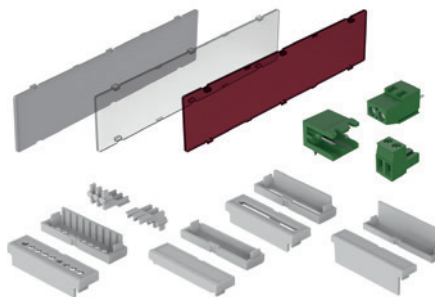
The integrated top hat rail mounting permits fast, efficient mounting on a TS35 top hat rail according to DIN EN 60715.



Enclosures in various module widths are available (5 HP/M, 6 HP/M, 8 HP/M, 9 HP/M, 10 HP/M, 12 HP/M).



The basic body consists of few individual components which snap together completely – no need for tools.



The enclosure can be adapted flexibly to the application by means of a wide range of terminals, front panels and covers.



Quick-Finder:
www.bopla.de/69



CombiNorm- Control



Colour:

● Light grey, similar to RAL 7035

Special colours on request

Protection class:

IP20 / DIN EN 60529;

Terminal blocks IP20 / DIN EN 60529

Material:

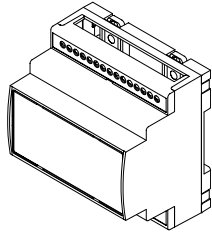
Enclosure: ABS flame retardant

For details see technical information.

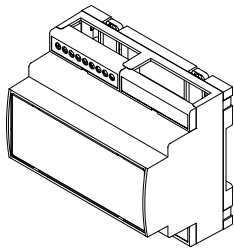


Enclosure sizes

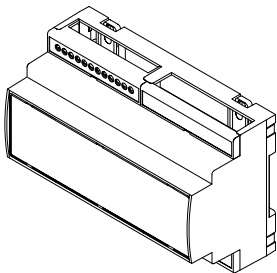
CNC 87.5



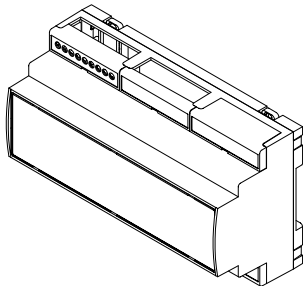
CNC 105.0



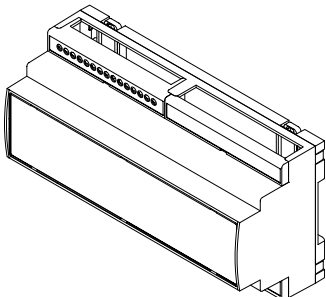
CNC 140.0



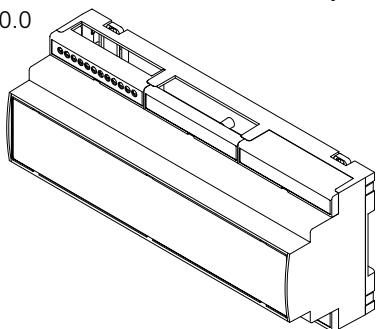
CNC 157.5



CNC 175.0

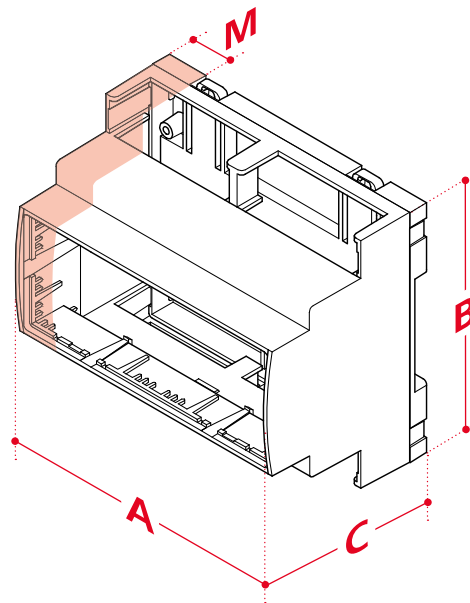


CNC 210.0



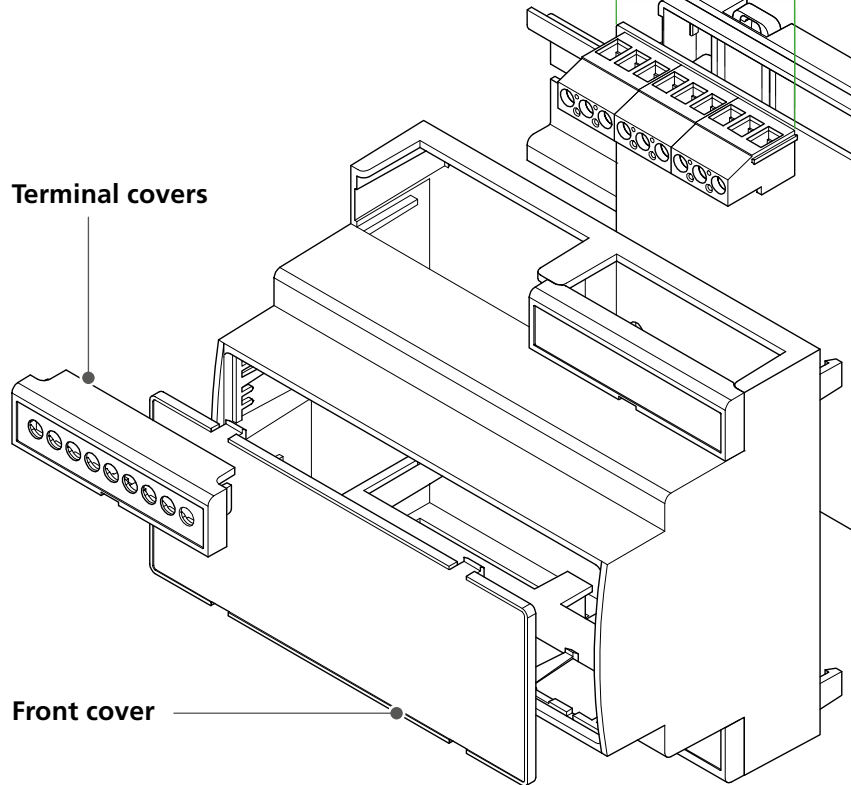
Design example

Enclosure



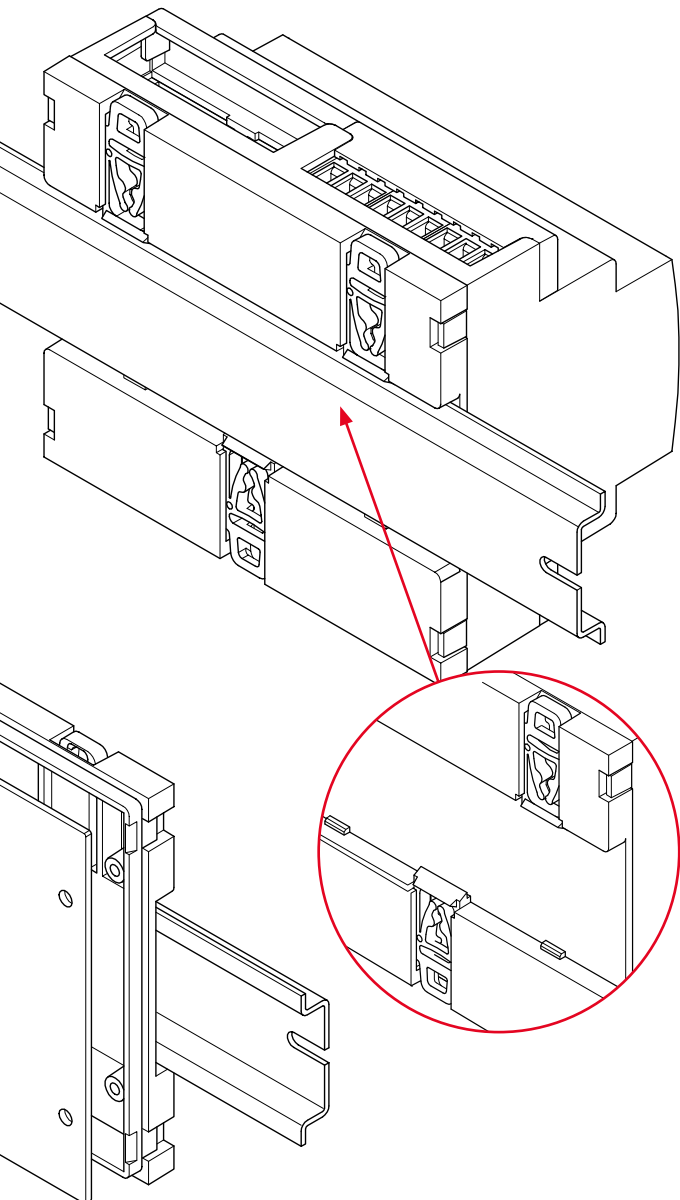
! Other sizes
in preparation

Terminal covers

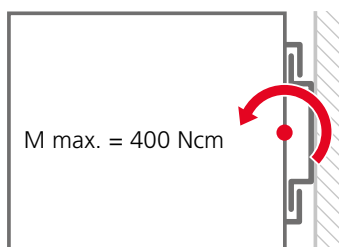


Front cover

CombiNorm- Control



Load capacity of DIN rail holder



Dimensions

Model	A	B	C	M	P
Enclosures					
CNC 87.5	89.2	89.8	65.2	5	30
CNC 105.0	107	89.8	65.2	6	36
CNC 140.0	159.8	89.8	65.2	8	48
CNC 157.5	159.8	89.8	65.2	9	54
CNC 175.0	177.8	89.8	65.2	10	60
CNC 210.0	213.8	89.8	65.2	12	72

M = Module width (HP)
P = maximum number of poles

Enclosure sets



Pre-defined sets are available for a fast project start.

Accessories



Terminal blocks



Front panels in light grey, crystal-clear or IR-permeable, red

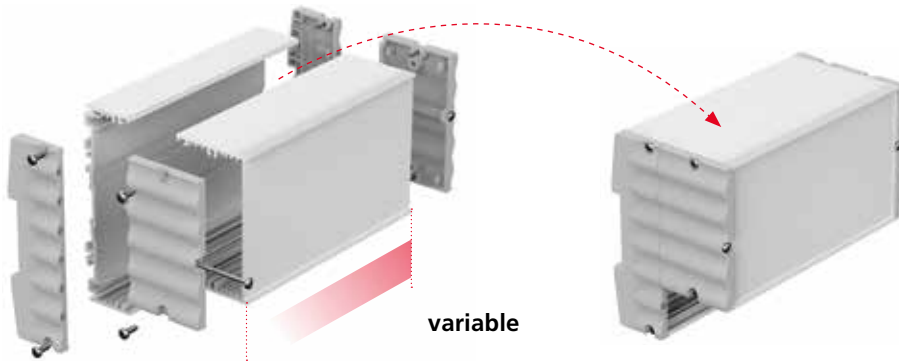


Terminal covers open on top, open in front, 5.08 grid or closed



Cover plug for terminal covers

The product advantages



The enclosure body consists of anodised aluminium profiles and can be adapted to any application.



Divided profile variants are available for even more design freedom or the contact-free installation of PCBs with connectors and operating elements.



Combining basic profiles with module profiles which can be mounted in different ways makes it possible to create individual enclosure configurations.



Plastic end profile caps create a visually standardised appearance. We also manufacture anodised sheet aluminium application-specific lids for especially creative configurations.



Easy mounting on a DIN rail acc. to DIN EN 60715 TH 35 by means of a moulded-on holding device and reliable snap-lock elements.



Quick-Finder:
www.bopla.de/87

Examples of use





BOPLA

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Alurail



Colour:

Profile anodized in natural color

Profile caps:

● Light grey, similar to RAL 7035

Special colours on request

Protection class:

Depending on the enclosure structure
up to IP40 / DIN EN 60529

Material:

Extruded profiles: Al Mg Si 0,5 anodized

Profile caps: polyamide 6.6 FR

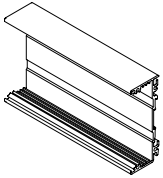
For details see technical information.



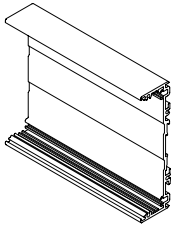
Components

Basic profile

ARP 75/31

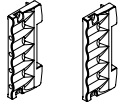


ARP 105/31



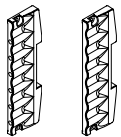
Basic profile caps

AR 75/31



KS 1 KS 2

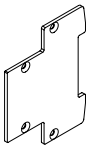
AR 105/31



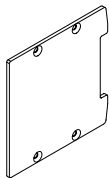
KS 1 KS 2

Side panels for basic profile

AR 75/45
KS-AL



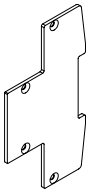
AR 75/75
KS-AL



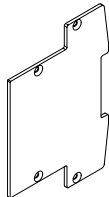
AR 75
KS-AL



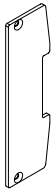
AR 105/45
KS-AL



AR 105/75
KS-AL

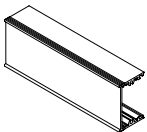


AR 105
KS-AL

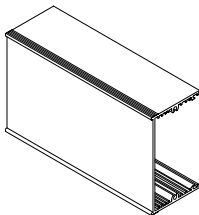


Module profile

ARPM 45/27



ARPM 75/42



Module profile caps

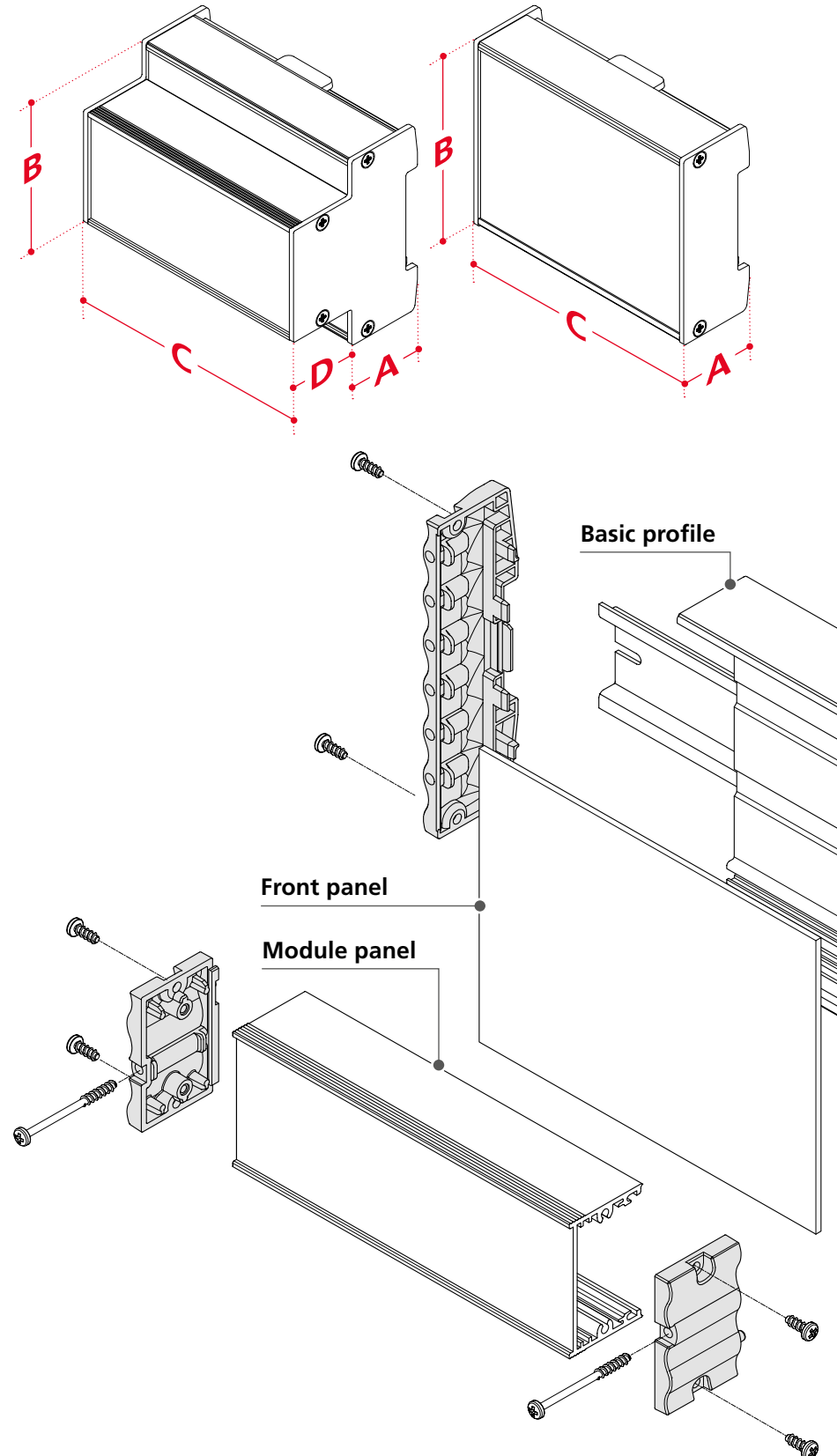
ARM 45/27



ARM 75/42



Design example

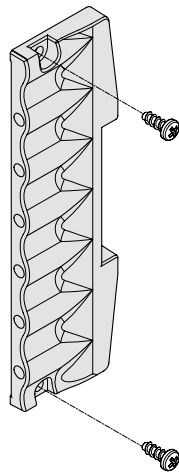
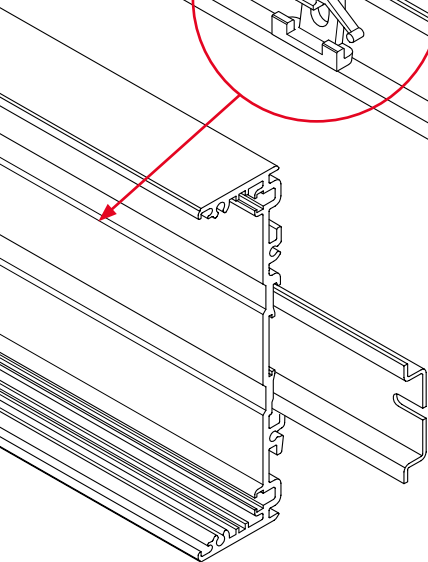
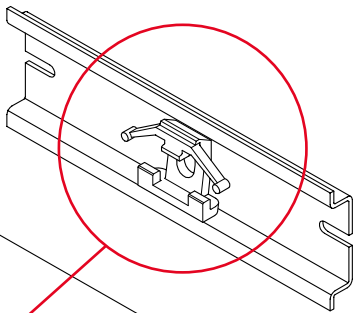
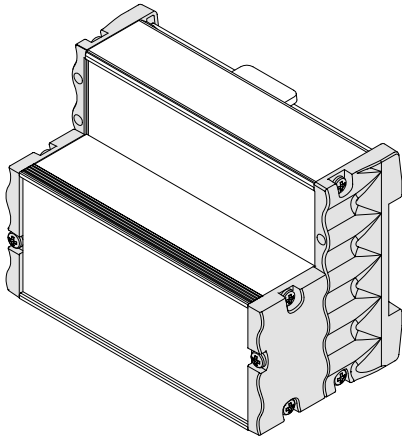




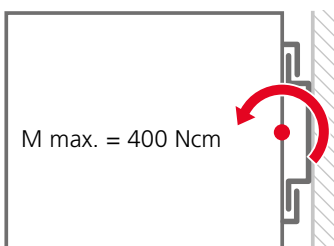
BOPLA

A Phoenix Mecano Company

Alurail



Load capacity of DIN rail holder



Dimensions

Model	A	B (ARP(G) 75...)	B (ARP 105...)	C
Basic profile				
ARP(G) .../31-52.5	25.5	75	105	42.5
ARP(G) .../31-70	25.5	75	105	60
ARP(G) .../31-105	25.5	75	105	95
ARP(G) .../31-140	25.5	75	105	130
ARP(G) .../31-175	25.5	75	105	165
ARP(G) .../31-210	25.5	75	105	200
ARP(G) .../31-245	25.5	75	105	235
ARP(G) .../31-1000	25.5	75	105	990
Module profile				
		D	B	C
ARPM(G) 45/27-35		28.1	45	25
ARPM(G) 45/27-52.5		28.1	45	42.5
ARPM(G) 45/27-70		28.1	45	60
ARPM(G) 45/27-105		28.1	45	95
ARPM(G) 45/27-140		28.1	45	130
ARPM(G) 45/27-175		28.1	45	165
ARPM(G) 45/27-210		28.1	45	200
ARPM(G) 45/27-245		28.1	45	235
ARPM(G) 45/27-1000		28.1	45	990
ARPM(G) 75/42-35		43.1	75	25
ARPM(G) 75/42-52.5		43.1	75	42.5
ARPM(G) 75/42-70		43.1	75	60
ARPM(G) 75/42-105		43.1	75	95
ARPM(G) 75/42-140		43.1	75	130
ARPM(G) 75/42-175		43.1	75	165
ARPM(G) 75/42-210		43.1	75	200
ARPM(G) 75/42-245		43.1	75	235
ARPM(G) 75/42-1000		43.1	75	990

Accessories



Wall fitting for basic profile



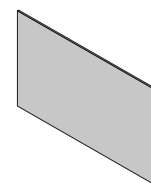
Snap-on element for basic profile



Earthing set or basic profile

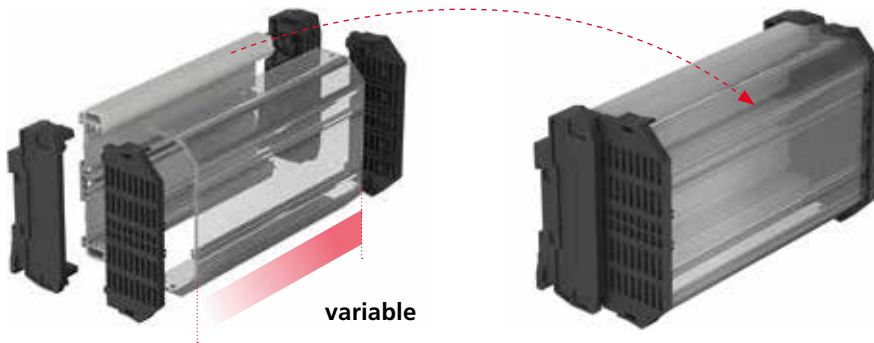


Reinforcing spring for snap-on element



Front panels in different versions

The product advantages



The enclosure body consists of a metal-look plastic profile whose length can be match to the specific application.



The PCBs can be mounted on three levels. The lower ones are inserted into guide grooves, and the upper ones fixed on the profile by means of locking elements.



Defined sections on a circuit board are protected by a crystal-clear hood. Free access to other sections is still possible.



The inserted PCB can be given electrical connectivity with the DIN rail by means of the potential earthing contact (available as an accessory).



The lateral elements with integrated foot catch snap onto the enclosure profile. The optional foot elements increase mechanical stability for long profiles or high loads.



Quick-Finder:
www.bopla.de/46

Examples of use





BOPLA

A Phoenix Mecano Company

Combirail



Colour:

Profiles:

● Light grey, similar to RAL 7035

Side panels:

● Black, similar to RAL 9005

Special colours on request

Material:

Extruded profiles: polyamide PA-GF HT, V0

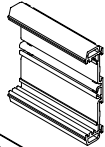
Side panels: polyamide PA, V-0

For details see technical information.

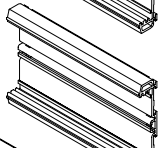


Enclosure sizes

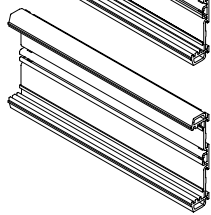
CRP 72...



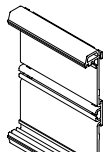
CRP 72...



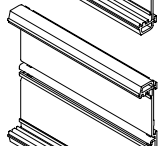
CRP 72...



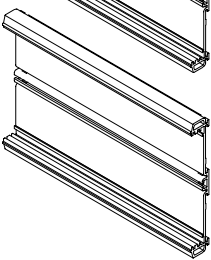
CRP 108...



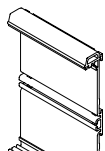
CRP 108...



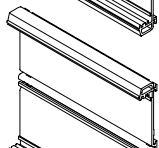
CRP 108...



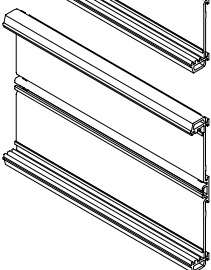
CRP 122...



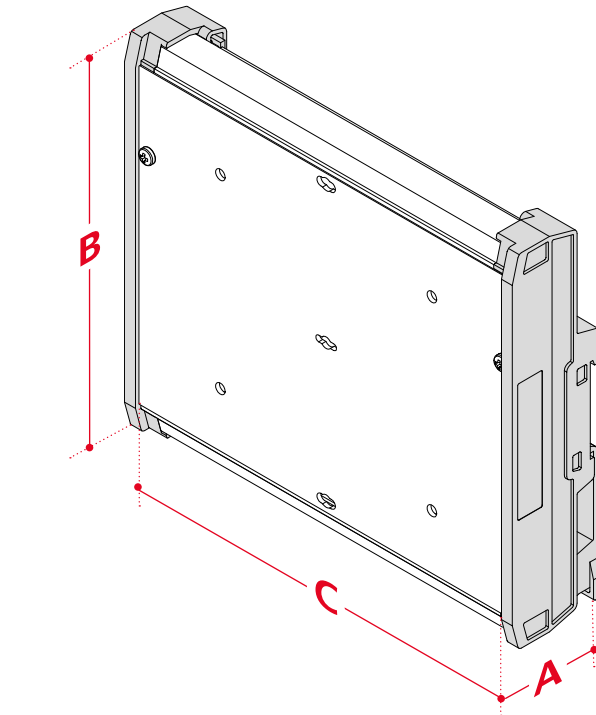
CRP 122...



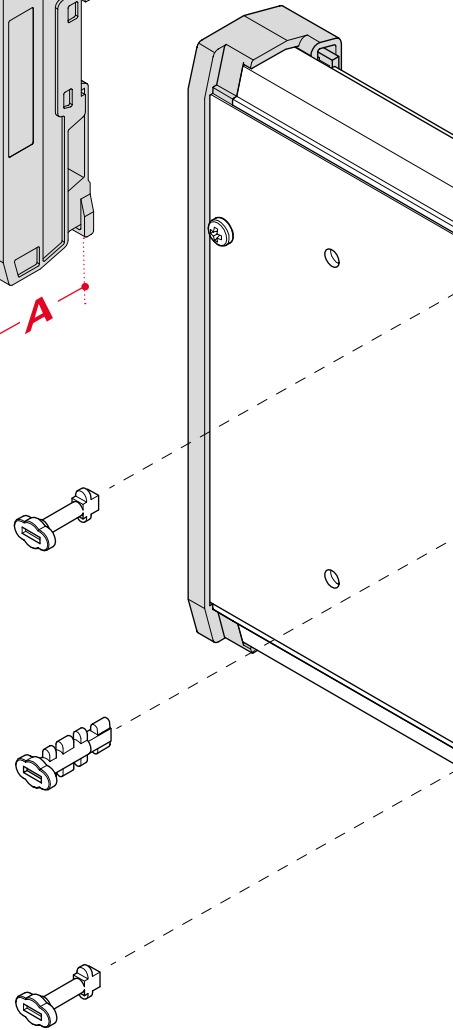
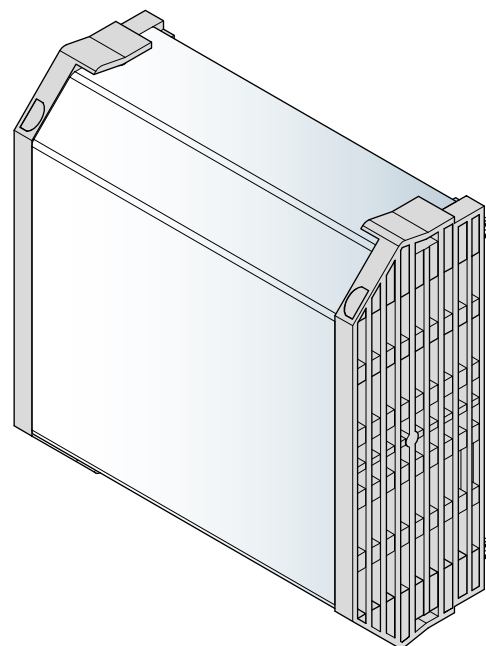
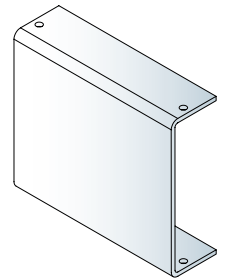
CRP 122...



Design example



CRPM 73/24...
Module cover



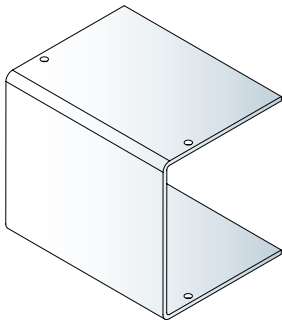


BOPLA

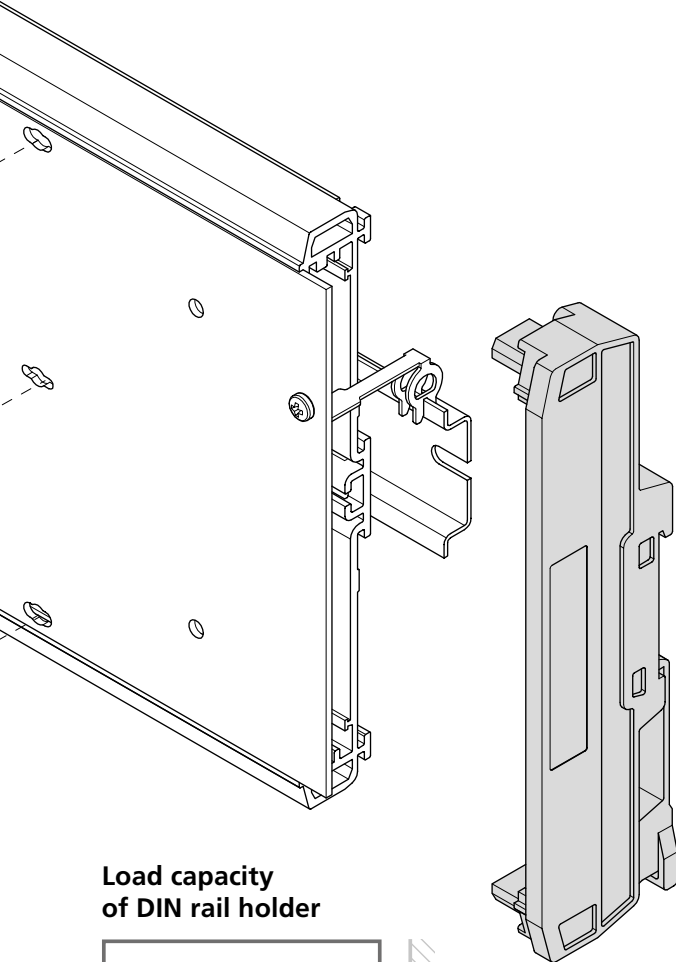
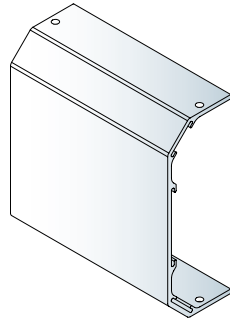
A Phoenix Mecano Company

Combirail

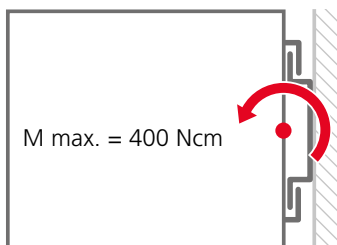
CRPM 73/63...
Module cover



CRPM 92/34...
Module cover



**Load capacity
of DIN rail holder**



Dimensions

Model	A	B	C
CRP 72-100	32.45	88.5	84
CRP 72-160	32.45	88.5	144
CRP 72-220	32.45	88.5	204
CRP 108-100	32.45	124	84
CRP 108-160	32.45	124	144
CRP 108-220	32.45	124	204
CRP 122-100	32.45	138.5	84
CRP 122-160	32.45	138.5	144
CRP 122-220	32.45	138.5	204

Accessories



Foot element



PE contact metals



Locking element for fixing the PCB



Wall brackets
for direct wall mounting



Cap set



Lateral elements

The product advantages



Uniform enclosures are compatible with standardised control panel cut-outs acc. to DIN IEC 61554. The thin-walled but simultaneously sturdy enclosure body is made of fibre glass reinforced plastic and provides maximum mounting space for PCBs.



Three solutions are available in different price categories for mounting purposes in the control panel, from the standardised retaining clasp acc. to DIN 43835 to a screw clamp to the spring snap-lock element.



Optional seals are available to seal the enclosure front and the seal between the enclosure and the control panel. If flexible transparent PVC hoods are used, push-buttons and switches can be operated through the hood and are protected up to IP65.



The enclosure's rear panel is fixed by means of screws in the enclosure, so it can be removed for easy mounting and diagnosis. PCBs can be fitted in the enclosure by means of horizontal or vertical guide grooves.



Front panels are available in various materials, with cover frames and, if required, even a crystal-clear hinged lid. The enclosure front can be adapted to the application in many ways. Unauthorised access can be prevented by means of an optional cylinder lock.



Quick-Finder:
www.bopla.de/17

Examples of use





BOPLA

A Phoenix Mecano Company

Uninorm



Colour:

● Black, similar to RAL 9005

Special colours on request

Protection class:

Depending on the structure

IP40 / DIN EN 60529 or

IP65 / DIN EN 60529

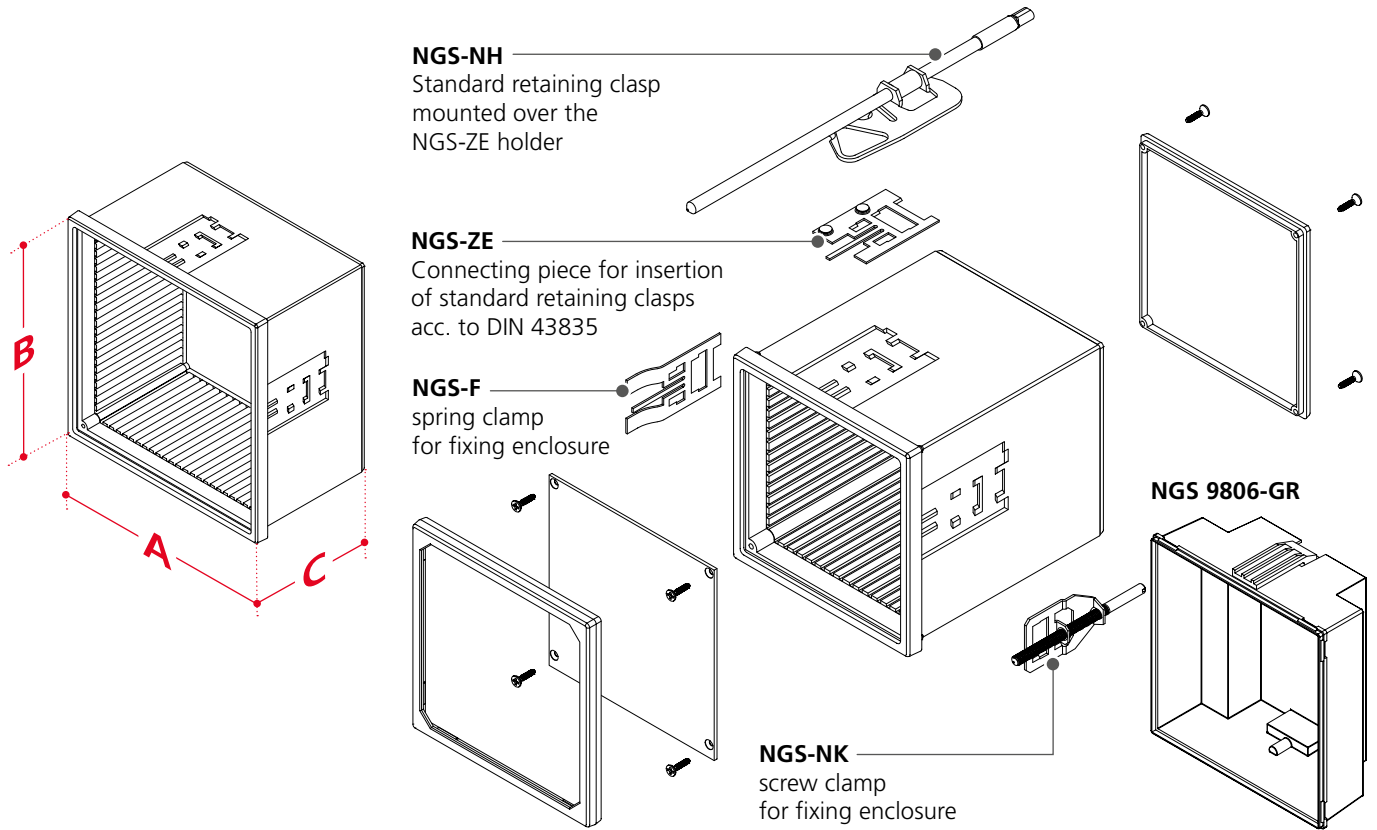
Material:

Enclosure: modified PPE+PS (SE1 GFN1)

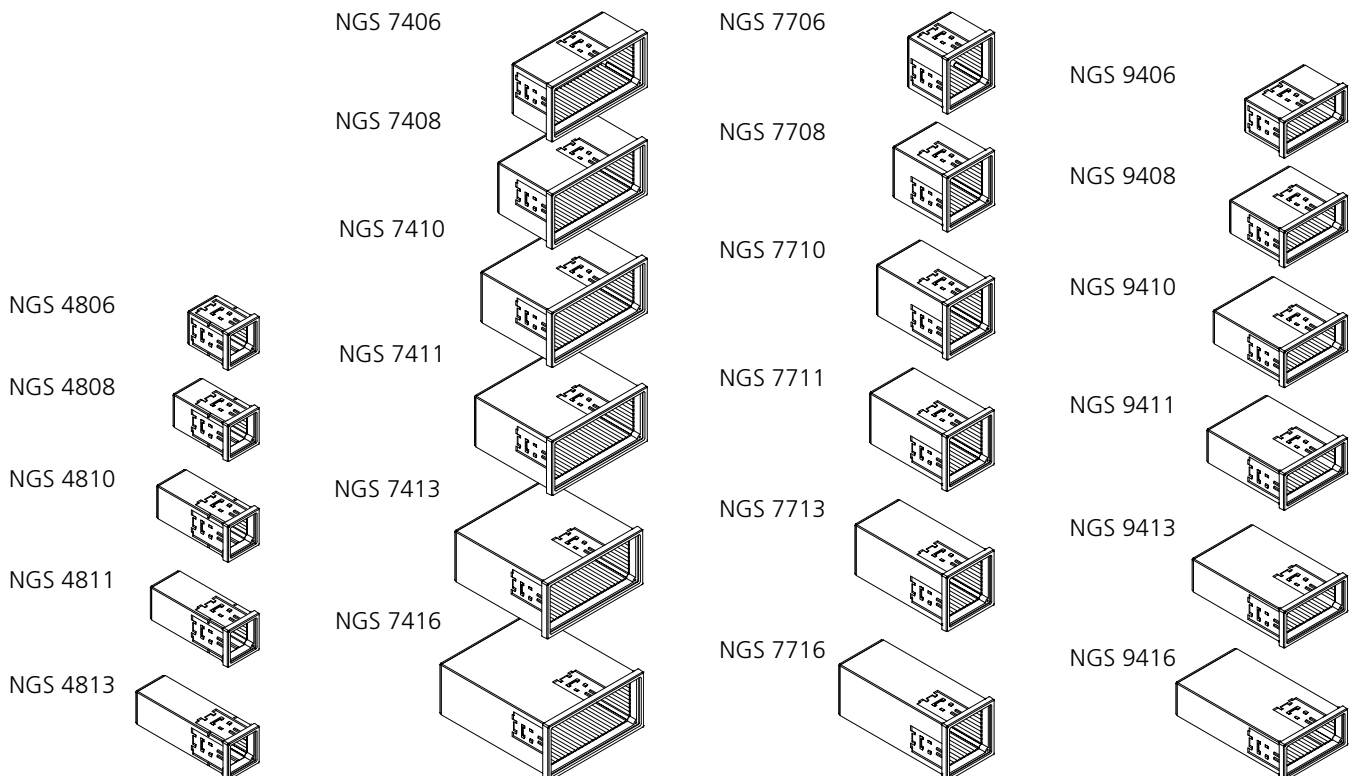
For details see technical information.



Design example



Enclosure sizes





BOPLA

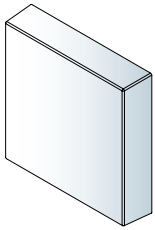
A Phoenix Mecano Company

Uninorm

Lid variants

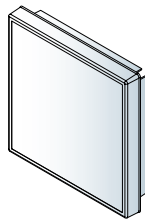
NGS... AH

Crystal-clear hood, snap-on



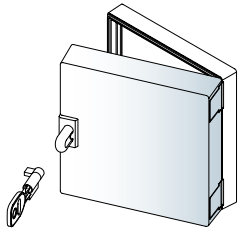
NGS... GHN

Clear hood cover, flexible



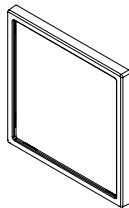
NGS... TK

Crystal-clear front door, snap-on, with knob

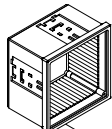


NGS... F

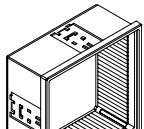
Front lid with membrane keypad, snap-on



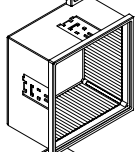
NGS 9606



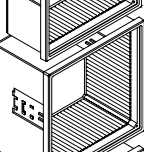
NGS 9806



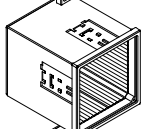
NGS 9608



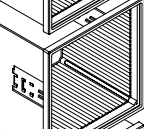
NGS 9808



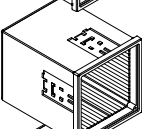
NGS 9610



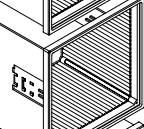
NGS 9810



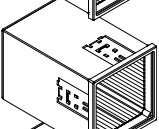
NGS 9611



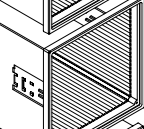
NGS 9811



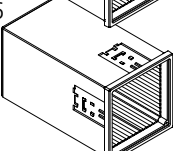
NGS 9613



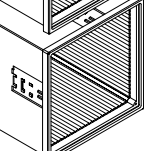
NGS 9813



NGS 9616



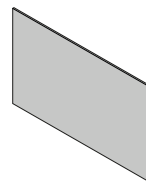
NGS 9816



Dimensions

Model	A	B	C
NGS 4806	48	48	63
NGS 4808	48	48	85
NGS 4810	48	48	109.5
NGS 4811	48	48	119
NGS 4813	48	48	141
NGS 7406	144	72	64
NGS 7408	144	72	86
NGS 7410	144	72	110.5
NGS 7411	144	72	120
NGS 7413	144	72	142
NGS 7416	144	72	166.5
NGS 7706	72	72	63
NGS 7708	72	72	85
NGS 7710	72	72	109.5
NGS 7711	72	72	119
NGS 7713	72	72	141
NGS 7716	72	72	165.5
NGS 9406	96	48	63
NGS 9408	96	48	85
NGS 9410	96	48	109.5
NGS 9411	96	48	119
NGS 9413	96	48	141
NGS 9416	96	48	165.5
NGS 9606	96	96	63
NGS 9608	96	96	85
NGS 9610	96	96	109.5
NGS 9611	96	96	119
NGS 9613	96	96	141
NGS 9616	96	96	165.5
NGS 9806	144	144	64
NGS 9808	144	144	85
NGS 9810	144	144	110.5
NGS 9811	144	144	120
NGS 9813	144	144	142
NGS 9816	144	144	166.5
NGS 9806-GR	144	144	66

Accessories



Front panels, anodised aluminium



Crystal-clear hoods



Plastic front panels, translucent



Cylinder lock

Product benefits



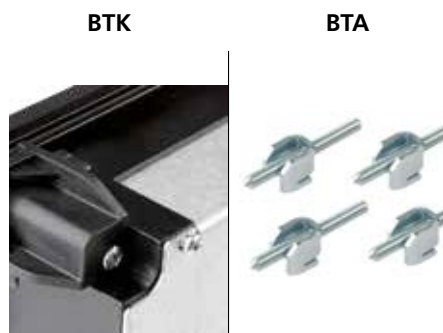
BoTouch is designed as a control panel mounting enclosure especially for the integration of touch displays. The plastic version of BTK stands out thanks to its cost-effectiveness, and the milled-aluminium BTA provides plenty of design opportunities for specific projects.



A continuous seal and suitable assembly give the entire enclosure front protection class IP65 towards the control panel. The BTK-IP variant provides this all the way round.



Integration of the display is project-specific and is carried out with BOPLA's own trademarked mounting process. The individual design of front membranes and cover glasses is part of the scope of delivery.



Clamps ensure that the enclosure fits securely in the control panel.



Depending on customer requirements, the sturdy galvanised sheet steel rear hood can be supplied with break-throughs for connectors and operating elements. Printing of the hood is also an option.



Quick-Finder:
www.bopla.de/78

Examples of use





BOPLA

A Phoenix Mecano Company

BoTouch



Colour:

- Black BTK*: similar RAL 9005
- Colour BTA**: customer specific
- * BTK = BoTouch plastic
- ** BTA = BoTouch aluminium

Protection class:

- BTK-IP: IP 65/DIN EN 60529
- BTK / BTA: up to IP 65/DIN EN 60529 to the built-in front

Material:

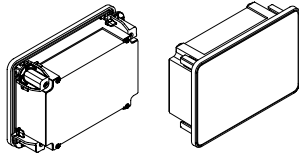
- Rear hood: galvanised sheet steel
- Rear panel: aluminium anodised
- BTK enclosure frame: PC UL 94 V-0
- PC UL 94 V-0 material corresponds to the requirement set R 22 according to DIN EN 45545-2 of HL3 hazard level.
- BTK-IP enclosure frame: PA 6.6 GF 30 UL 94 V-0
- BTA front frame: aluminium anodised or powder-coated
- Seal: PU foamed

For details see technical information.

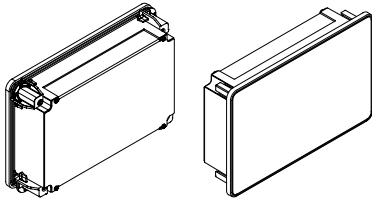


Enclosure sizes BTK

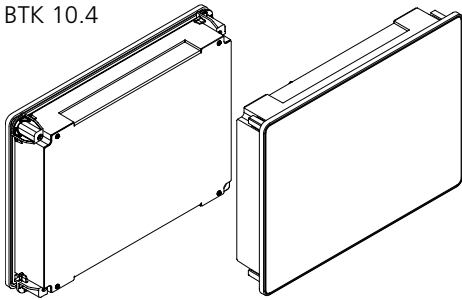
BTK 5"



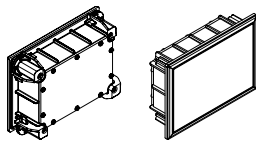
BTK 7"



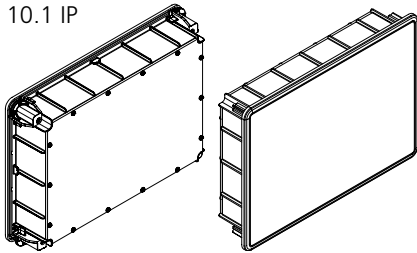
BTK 10.4



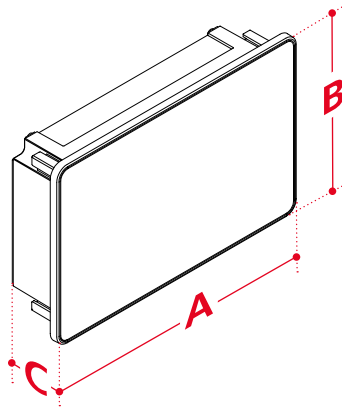
BTK 4.3 IP / FP



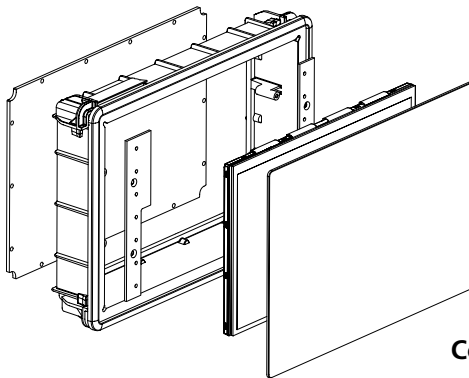
BTK 10.1 IP



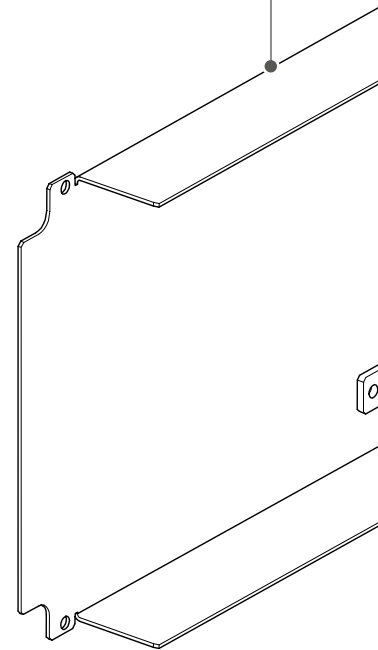
Design example



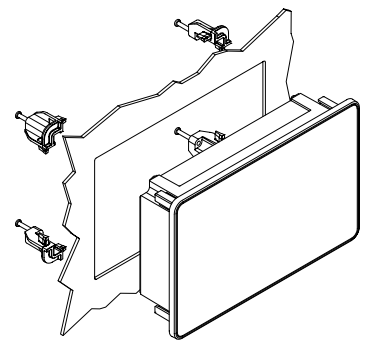
IP design



Rear hood

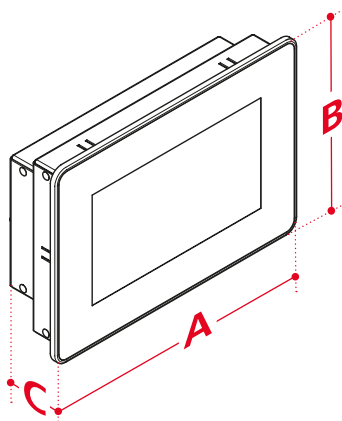
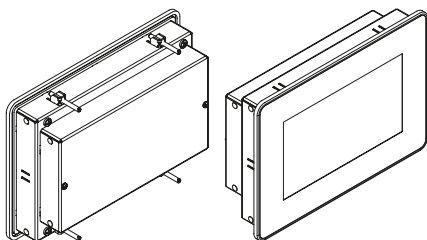


Control panel mounting

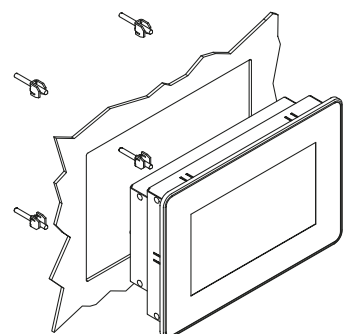


Enclosure sizes BTA

BTA 10.1 IP



Control panel mounting





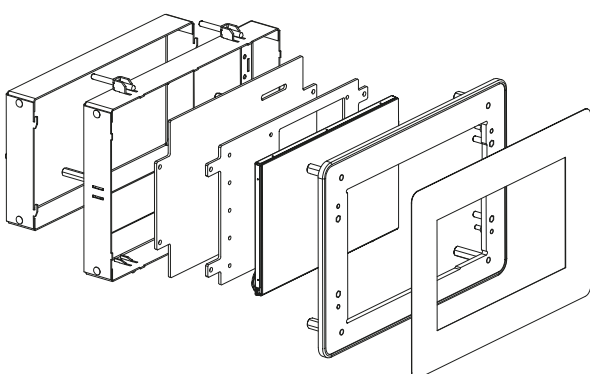
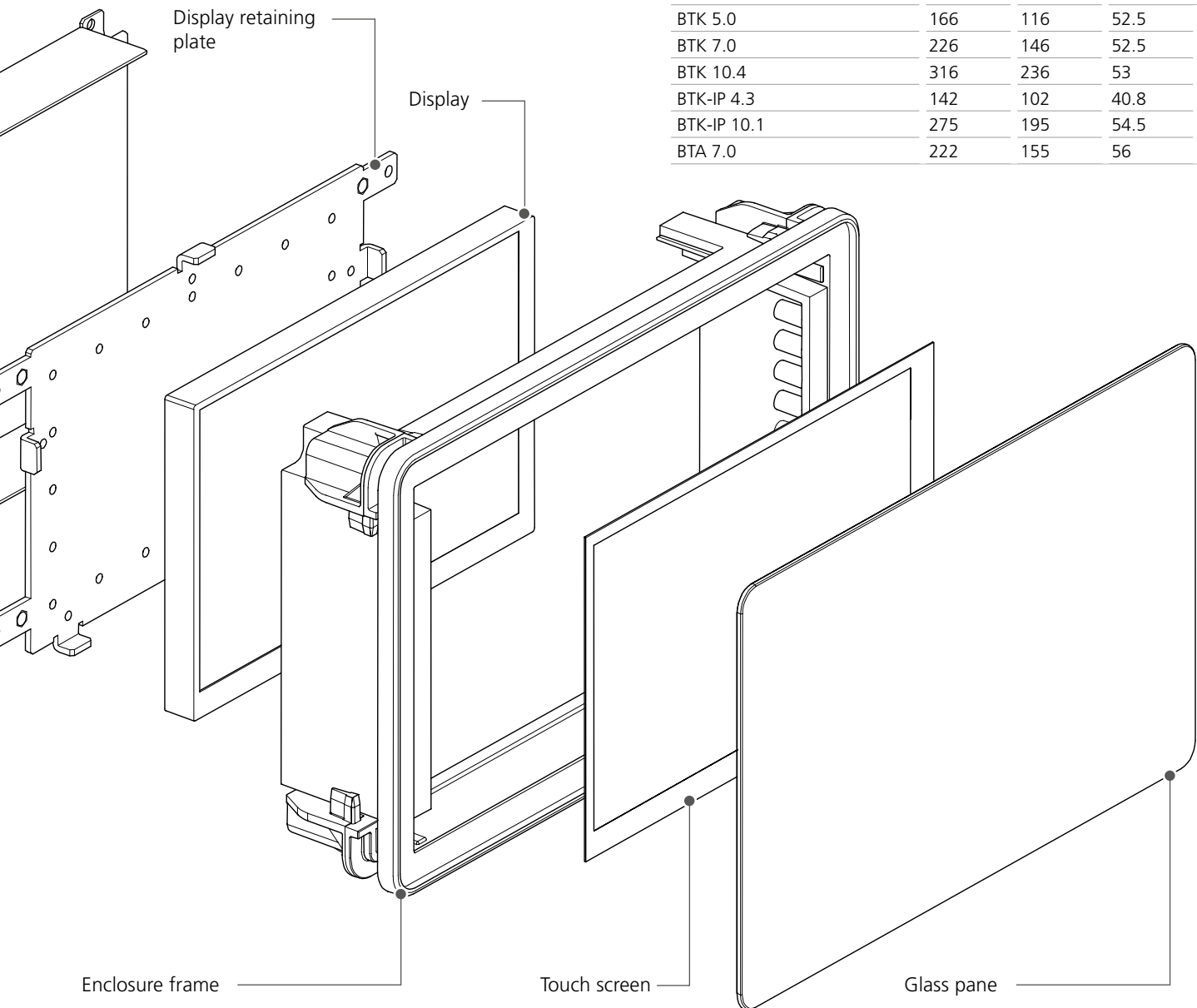
BOPLA

A Phoenix Mecano Company

BoTouch

Dimensions

Model	A	B	C
BTK 5.0	166	116	52.5
BTK 7.0	226	146	52.5
BTK 10.4	316	236	53
BTK-IP 4.3	142	102	40.8
BTK-IP 10.1	275	195	54.5
BTA 7.0	222	155	56



The enclosures are manufactured individually according to requirements and matched to the display dimension which you require.

Cable glands

Pressure compensation elements and glands



DAE-MBF



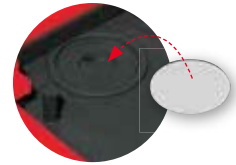
DAE-MSBF



DAE M6



DAE M12



Pressure compensation
membrane DAE
DAE-D05 / DAE-D11

Cable glands, plastic



MBF



BF



POZ



POZB



BFK / MBFK



Pg Pg cable glands

M Metric cable glands

Cable glands, brass



MSBF



MSS



MSD



MSK

Special screw connections



S-MBF
for quick assembly



MEMV
for EMC



M(S)BF RJ45/USB
for made-up
cables



PST
for plug-in
assembly



MZI
flat design



Other accessories such as sealing and blind plugs, grommets, lock nuts, You can find sealing rings and rubber seals on our website.



Quick-Finder:
www.bopla.de/10



BOPLA

A Phoenix Mecano Company

General accessories



Our universal brackets enable reliable wall mounting - also in the VESA standard.



Universal mast mounting in 5 standard sizes with different mounting spacings for fitting enclosures to the mast.



Because of the various settings (fixed detent position every 10°), the universal wall fitting can be used on a wall or as a foot. The length of the profiles can be adapted to every enclosure.



Every hand-held enclosure can be fitted with a universal holding clip.



The universal clip and tip-up clip can be retrofitted to all enclosures.



By using the universal screw-on lanyard loop, hand-held enclosures can easily be carried round the neck.



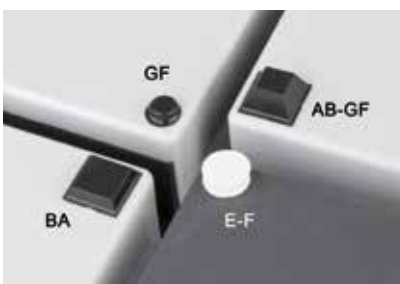
The swivelling handle allows the flexible-width handle to be used both as a carrying handle and a tip-up bow.



These clips ensure reliable mounting of the enclosure on the mounting rail and are available for different loads.



With different battery compartments almost every type of enclosure can be used as a hand-held enclosure.



Universal enclosure feet ensure a stability on all surfaces.



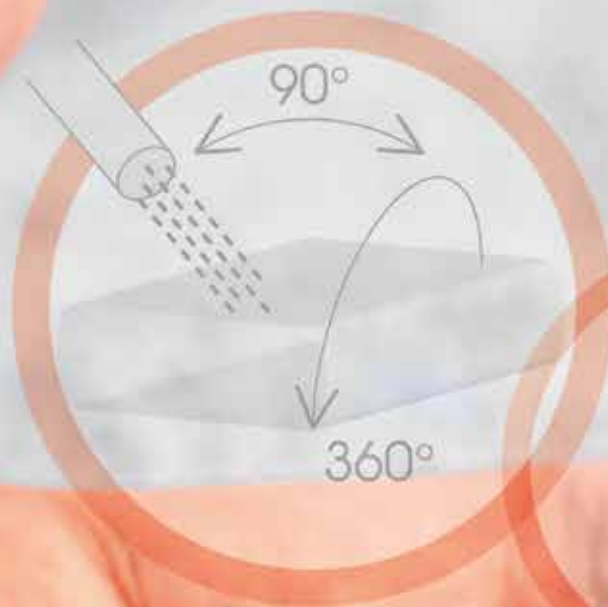
With the UDS, power and data connections can be implemented for mobile devices.



Screws and spacers for mounting cams in plastic enclosures.



Quick-Finder:
www.bopla.de/11



$V = P^2 + b^2 + h^2$ (spatial)



	Neoprene CR	Polyurethana PU	EPDM	SW
Acetic acid	0	0	+	
Formic acid	0	Δ	+	
Acrylonitrile	+	—	+	
Benzene	0	+	—	
Styrene-butadi	0	Δ	0	
Butane	Δ	+	—	
Butanol	+	—	+	
Calcium chloride	Δ	+	+	
Chlorine benzole	—	—	—	
Diesel oil	0	+	—	
Acetic acid	75 %	Δ	+	
Formaldehyde	+	+	+	
Fiber 113	0	Δ	—	

Technical Information

The following pages include all the important technical information about our products.

Lactic acid	+	+	+
Mineral oils	0	0	—
Engine oils	0	0	—
Sodium carbonate	Δ	Δ	+
Sodium chloride	+	Δ	+
Sodium hydroxide	50 %	—	+
Soda lye	50 %	—	+
Nitric acid	—	—	10 %
Hydrochloric acid	0	—	+
Lubricating oil	0	0	—
Carbon disulphide	—	0	—
Sulphuric acid	50 %	—	10 %
Soap suds	—	+	+
Detergents	0	+	+
Turpentine oil	—	—	—
Hydrocarbon extract	—	—	—
Toluol	—	—	—
Trichloroethylene	—	—	—
Water (distilled/river/rain/sea)	+	+	+
Tartaric acid	—	Δ	—
Xylo	—	—	—
Zinc carbonate	Δ	Δ	—



Technical Information | Protection classes

Important: We assume no liability for cited standards!

The degree of protection offered by an enclosure is shown by the letters IP (Ingress Protection) and two indexes. The first index indicates two factors (protection for persons and equipment), the second index indicates only one factor (protection against water).

Example: IP 54

- └ = protection against splashing water
- └ = protection against dust and wire contact with dangerous parts

DIN EN 60529; VDE 0470-1 : 2014-09

First index: Protection against contact and foreign objects

Symbol	Index	Protection against contact		Protection against foreign objects	
		Brief description	Definition	Brief description	Definition
	0	Not protected	–	Not protected	–
	1	Protection against the back of the hand touching dangerous parts	The object probe, a >50 mm diameter sphere, must be at a sufficient distance from dangerous parts	Protection against a solid foreign object of 50 mm or more in diameter	The object probe, a >50 mm diameter sphere, must not fully penetrate
	2	Protection against a finger touching dangerous parts	The test finger, jointed, >12 mm in diameter and 80 mm long, must be at a sufficient distance from dangerous parts	Protection against a solid foreign object of 12.5 mm or more in diameter	Protection against a solid foreign object of 12.5 mm or more in diameter
	3	Protection against a tool touching dangerous parts	The object probe, >2.5 mm in diameter, must not be able to penetrate	Protection against a solid foreign body of 2.5 mm or more in diameter	The object probe, a >2.5 mm diameter sphere, must not penetrate at all
	4	Protection against a wire touching dangerous parts	The object probe, >1.0 mm in diameter, must not be able to penetrate	Protection against a solid foreign object of 1.0 mm or more in diameter	The object probe, a >1.0 mm diameter sphere, must not penetrate at all
	5	Protection against a wire touching dangerous parts	The object probe, 1.0 mm in diameter, must not be able to penetrate	Protection against dust	Dust penetration is not completely prevented ¹⁾
	6	Protection against a wire touching dangerous parts	The object probe, 1.0 mm in diameter, must not be able to penetrate	Dust-tight	No ingress of dust





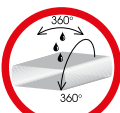
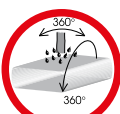
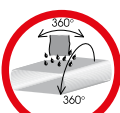

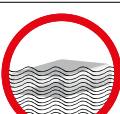
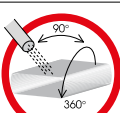
An enclosure must only be designated with the **first index** (protection against penetration) for a degree of protection when it also meets all lower degrees of protection.

1) Dust must not penetrate in sufficient quantities to prevent the equipment from operating satisfactorily or to impair safety.

Up to index 6, the **second index** (protection against water) must only be used for a degree of protection for an enclosure if it also meets all lower degrees of protection. However, an enclosure which is only designated with the second index 7, 8 (protection against immersion) or 9K (protection against a jet of steam) is considered to be unsuitable for use with a jet of water (index 5 or 6). This means that it does not need to meet the requirements indicated by indexes 5 or 6. Only an enclosure with a double designation meets the requirements regarding resistance to a jet of water and to immersion/jet of steam.

Important note: The degrees of protection given for the enclosures refer to unmachined enclosures as supplied. In the case of protection against water in particular (second index), the test conditions will be met if during the given time for the experiment no water has penetrated, or not in harmful quantities. The protection classifications do not take into account the effects of ageing and so cannot be guaranteed throughout the lifetime of the enclosure. Additionally, changes in temperature and atmospheric conditions can create loss of pressure in the enclosure, and moisture may be absorbed through the seal area. BOPLA can fit the enclosure with a pressure compensation element for enclosures to be deployed in these environments.

Second index: Protection against water

Symbol	Index	Brief description	Definition
	0	Not protected	–
	1	Protection against falling drops of water	Drops of water falling vertically onto the enclosure must not have any harmful effects.
	2	Protection against falling drops of water when the enclosure is tilted at any angle of up to 15°	Drops of water falling vertically onto the enclosure must not have any harmful effects if the enclosure is tilted at any angle of up to 15° on both sides of the vertical.
	3	Protection against spraying water, spray nozzle: 10 l/min; 5 min	Water sprayed onto the enclosure at an angle of up to 60° on both sides of the vertical must not have any harmful effects.
	4	Protection against splashing water, spray nozzle: 10 l/min; 5 min	Water splashed onto the enclosure from any direction must not have any harmful effects.
	5	Protection against water jets, jet nozzle: 12.5 l/min; 3 min	Water projected in jets against the enclosure from any direction must not have any harmful effects.
	6	Protection against powerful water jets, jet nozzle: 100 l/min; 3 min	Water projected in powerful jets against the enclosure from any direction must not have any harmful effects.
	7	Protection against the effects of temporary immersion in water 1 m; 30 min	Water must not enter in a quantity which results in harmful effects if the enclosure is temporarily immersed in water under standardised pressure and time conditions.
	8	Protection against the effects of continuous immersion in water > IPx7; definition acc. to agreement	
	9	Protection against high water jet temperatures and high water pressure from a flat jet nozzle	Water directed at high pressure and at high temperatures onto the enclosure from any direction must not have any harmful effects.



Technical information | Impact resistance

Important: We assume no liability for cited standards!

The **IK classification** is an international standard which describes suitability for the widest range of ambient conditions. It states how resistant articles such as enclosures are to mechanical stress. The official classification with IK codes of 00 to 10 specifies impact resistance up to a defined minimum level of impact energy which the enclosure must withstand. This code is expressed by means of the letters IK and a two-digit code number.

Example: IK 08

└ = impact energy up to 5 joules

IEC 62262:2002; IEC 60068-2-75:2015

Index: Resistance to mechanical stress

		Resistance to collision and impact	
Symbol	Index	Brief description	Definition
	00	No impact resistance	–
	01-05	Protection against blows with an impact energy of 0.15 joules to 0.7 joules	Defines an impact from a light tool (polyamide)
	06	Protection against blows with an impact energy of up to 1 joule	Defines an impact from a 500 g tool (polyamide) from a distance of 20 cm
	07	Protection against blows with an impact energy of up to 2 joules	Defines an impact from a 500 g tool (steel) from a distance of 40 cm
	08	Protection against blows with an impact energy of up to 5 joules	Defines an impact from a 1.7 kg tool (steel) from a distance of 29.5 cm
	09	Protection against blows with an impact energy of up to 10 joules	Defines an impact from a 5 kg tool (steel) from a distance of 20 cm
	10	Protection against blows with an impact energy of up to 20 joules	Defines an impact from a 5 kg tool (steel) from a distance of 40 cm

Technical information | Flame resistance






Standard 94 of the Underwriters Laboratories (UL94) is accepted worldwide as the predominant standard for classifying the flame retardance of plastics. The procedure according to UL94 is to test the ability of the material to extinguish itself after flaming. The classification is according to the speed of burning and the extinguishing time, droplet formation, and the duration of afterglow time. Depending on the wall thickness, several classifications are possible for each material. The basis for the appropriate specification of a material should correspond to the thickness of the moulding's main wall. Information on the UL 94 classification is only comparable and meaningful if it specifies the relevant wall thickness.

The flammability category always refers to the raw material, tested using ideal test pieces. In the case of manufactured parts, deviations caused by different material thicknesses and the effects of processing are unavoidable.



Quick-Finder:
www.bopla.de/116

Index: Flame retardance of plastics

Symbol	Index	Brief description	Definition												
	HB	The test specimen is held horizontally. For wall thicknesses up to 3 mm, the rate of combustion must be 76 mm/min, and less than 38 mm/min for wall thicknesses of 3 mm.	Often misunderstood: Non-flame-retardant qualities (or materials which are not intended for flame-retardant applications) do not automatically meet horizontal burning criteria. Although the least rigorous, UL 94 HB is a category of flammability and can only be achieved by means of testing.												
	V-2	Test specimen vertical, flame height 20 mm; self-extinguishing up to 30 s after the flame has been removed; no burning droplets; afterglow = max. 60 s.	Cotton wool under the test specimen may ignite.												
	V-1	Test specimen vertical, flame height 20 mm; self-extinguishing up to 10 s after the flame has been removed; no burning droplets; afterglow = max. 60 s.	Cotton wool under the test specimen may not ignite.												
	V-0	Test specimen vertical, flame height 20 mm; self-extinguishing up to 10 s after the flame has been removed; no burning droplets; afterglow = max. 30 s.	Cotton wool under the test specimen may not ignite.												
	V-5	Fire test to determine flammability classes UL 94 5VB and UL 94 5VA. Plastics which comply with at least V0 classification can also be tested; in this case, the flame height is 125 mm.	The process exposes a vertically-mounted specimen 5 times for a period of 5 seconds with pauses of 5 seconds. In addition to the test criteria as per UL 94 V, this flammability test also takes into consideration the formation of holes in panels.												
			<table border="1"> <thead> <tr> <th></th> <th>UL 94 5VB</th> <th>UL 94 5VA</th> </tr> </thead> <tbody> <tr> <td>Afterflame time / afterglow time of the test specimens after the 5th flame application [sec]</td> <td>< 60</td> <td>< 60</td> </tr> <tr> <td>Burning droplets</td> <td>no</td> <td>no</td> </tr> <tr> <td>Hole formation (in panels)</td> <td>no</td> <td>yes</td> </tr> </tbody> </table>		UL 94 5VB	UL 94 5VA	Afterflame time / afterglow time of the test specimens after the 5th flame application [sec]	< 60	< 60	Burning droplets	no	no	Hole formation (in panels)	no	yes
	UL 94 5VB	UL 94 5VA													
Afterflame time / afterglow time of the test specimens after the 5th flame application [sec]	< 60	< 60													
Burning droplets	no	no													
Hole formation (in panels)	no	yes													



Technical information | Plastics

Tolerances on plastics according (DIN 16901)

Deviations from the nominal dimensions are unavoidable in the manufacture of plastic mouldings.

There are various reasons for these deviations:

- a) Processing parameters. These depend on
- the evenness of the moulding compounds
 - the setting of the machine
 - the temperature of the tools
 - the distortion of the tool under pressure.

The tolerances for this standard have been laid down taking into account these factors and numerous measurements in practice.

Nominal measuring range

over	0	1	3	6	10	15	22	30	40	53	70
up to	1	3	6	10	15	22	30	40	53	70	90
A	±0.18	±0.19	±0.20	±0.21	±0.23	±0.25	±0.27	±0.30	±0.34	±0.38	±0.44
B	±0.08	±0.09	±0.10	±0.11	±0.13	±0.15	±0.17	±0.20	±0.24	±0.28	±0.34

over	90	120	160	200	250	315	400	500	630	800	
up to	120	160	200	250	315	400	500	630	800	1000	
A	±0.51	±0.60	±0.70	±0.90	±1.10	±1.30	±1.60	±2.00	±2.50	±3.00	
B	±0.41	±0.50	±0.60	±0.80	±1.00	±1.20	±1.50	±1.90	±2.40	±2.90	

A = Dimensions which are not tool-specific are those formed by the interaction of movable tool parts, e.g. wall thickness, floor thickness or dimensions which are affected by additives or slide bars.

B = Tool-specific dimensions are those in the same part of the tool.

The plastics in this standard are divided into tolerance rows. All the plastics used by BOPLA for standard enclosures are in row 130, for which the tolerances given below apply. The tolerances apply on the basis of the machining shrinkage worked into the tool only for the appropriate enclosure with the standard material stated.

- b) The condition of the tool:
- manufacturing tolerances for tool dimensions
 - wear on tools
 - deviations in the position of movable tool parts.

Information on membrane keypad tolerances:

The installation areas for membrane keypads are dimensioned in the catalogue illustrations (Internet) with the tolerances which are present during manufacture. These tolerances are already restricted in comparison with DIN 16901.

As the membrane dimensions are also furnished with manufacturing tolerances, this may result in undesirable crack dimensions (greatest dimension of enclosure and the smallest dimension of membrane). In the case of membrane keypads developed by BOPLA, this is reduced to a minimum.

The material properties of plastics

Material properties	Unit	Test specification	PS	ABS	PC	SE1 GFN1	PC/ABS-blend	PA6.6 FR	PA6 FR (NV12)	PA6 GF 15	UP-GF
Impact strength + 20 °C	KJ/m ²	ISO 179	-	60	without breaking	30	-	-	without breaking	36	49
Impact strength - 30 °C		DIN 53453	-	40		30	-	-		-	-
Notched impact str. (Charpy) + 20 °C	KJ/m ²	ISO 179	7	10	25	-	-	-	3,5	55	-
Notched impact str. (Charpy) - 30 °C		DIN 53453	4	4	10	-	-	-	-	-	-
Max. bending stress	N/mm ²	ISO 178 DIN 53452	-	64	> 70	110	-	-	-	-	> 100
Round body pressure stress	°C	ISO 335-1 DIN 0471/2-5	-	75	125	125	125	-	125	-	-
Retention of shape under heat ¹⁾ A	°C	ISO 75	75	80	125	120	120	90	70	150	150
Retention of shape under heat ¹⁾ B		DIN 53461	-	85	135	130	130	215	190	210	-
Thermal conductivity	W/mK	DIN 52612 ASTM C 177	0.17	0.18	0.2	0.23	-	-	-	-	0.6
Glow hot wire test	°C with mm	ISO 695 DIN 0471/2-1	-	650/2	850/1	960/3,2	960/2	-	850/1	-	-
Combustibility	Grade from mm	UL 94	HB/1.47	HB/1.6	V2/1.14	V1/1.47	V0/1.6	V0/1	V2/1.6	HB/1.6	V0/4
Water absorption	%	ISO 62 DIN 53495 ASTM D 570	< 0.1	0.4	0.35	0.22	-	2.2	2.5	2.2	0.7
Surface resistivity	Ohm	IEC 93	> 10 ¹³	> 10 ¹⁴	> 10 ¹⁵	> 10 ¹⁵	-	> 10 ¹⁵	> 10 ¹²	-	> 10 ¹²
Special volume resistivity	Ohm x cm	IEC 93 DIN 53482 VDE 303 T3 ASTM 27	> 10 ¹⁶	> 10 ¹⁵	> 10 ¹⁶	> 10 ¹⁵	-	> 10 ¹⁵	> 10 ¹⁵	> 10 ¹²	> 10 ¹³
Dielectric strength	KV/mm	IEC 243 DIN EN 53481 VDE 303 T2 ASTM 149	-	-	28	26	-	-	-	-	18

¹⁾ The ability of the enclosures to maintain their shape when subject to heat depends on a seal being inserted. The temperature resistance can still be affected by mechanical stress.

All the above data are for guidance only. They have been determined using standardized test pieces and can vary within normal tolerances. The combustibility classification always refers to the raw material, which was tested on ideal test pieces. In the case of manufactured parts, deviations caused by different material thicknesses and the effects of processing are unavoidable.

Outdoor capabilities

BOPLA plastic enclosures qualified for outdoor use are produced from granulates tested for outdoor applications.

The corresponding materials have all been subjected to testing in accordance with the UL746C standard „Polymeric Materials - Use in Electrical Equipment“. This materials testing program also includes artificial weathering:

1. 1000 hours under exposure to xenon-arc weathering
2. Seven-day water immersion test at 70 °C

Prior to and after weathering, the material is tested for all relevant properties, such as flammability, mechanical parameters, etc.. The results of the tests are recorded in two categories on the material's Yellow Card (citation from UL test documentation):

(f1): This footnote indicates that the material meets both the UV and the moisture and immersion-test requirements of UL 746C.

(f2): This footnote indicates that the material has been tested only partially for exposure to UV radiation, moisture and/or underwater conditions or that it has passed these tests only to a restricted extent.

Material characteristics of seals

Test specifications: DIN 53461	Neoprene CR	Polyurethane PU	EPDM	Silicone Si	Perbunan N NBR	TPE
Permitted temperature range	- 30 to + 90 °C	- 40 to + 100 °C	- 35 to + 120 °C	- 60 to + 200 °C	- 35 to + 100 °C	- 40 to + 70 °C

Technical information | Plastics

Chemical resistance of plastics

	PS	ABS	PC	PC/ABS- blend	PA	UP-GF Polyester
Acetone	---	---	---	---	+	---
Formic acid	40 %	---	---	---	---	10 %
Ammonia	+	25 %	---	---	10 %	---
Benzene	---	---	o	---	+	---
Brake fluid	Δ	o	---	---	+	+
Butane	---	+	+	+	+	Δ
Butanol	Δ	Δ	Δ	Δ	+	+
Calcium chloride	+	+	+	Δ	10 %	+
Chlorine benzole	---	---	---	---	+	+
Diesel oil	---	+	o	Δ	+	+
Acetic acid	50 %	25 %	10 %	10 %	5 %	10 %
Formaldehyde	40 %	30 %	Δ	Δ	o	30 %
Frigen 113	Δ	---	+	---	+	+
Fruit juice	Δ	Δ	+	Δ	+	+
Glycerine	+	+	o	Δ	+	+
Heating oil	---	o	o	Δ	+	+
Hydraulic oil	Δ	Δ	+	---	+	+
Caustic potash solution	50 %	50 %	---	---	50 %	---
Potassium chloride	+	Δ	+	Δ	10 %	+
Potassium hydroxide	Δ	Δ	Δ	Δ	Δ	---
Linseed oil	+	+	+	+	+	+
Methanol	Δ	Δ	---	Δ	o	---
Methylene chloride	---	---	---	---	o	---
Lactic acid	80 %	80 %	+	+	o	+
Mineral oils	Δ	Δ	+	Δ	+	+
Engine oils	o	+	+	Δ	+	+
Sodium carbonate	+	+	+	Δ	10 %	+
Sodium chloride	+	+	+	+	---	+
Sodium hydroxide	Δ	+	Δ	Δ	Δ	---
Soda lye	50 %	50 %	---	---	+	40 %
Nitric acid	10 %	---	10 %	Δ	---	10 %
Hydrochloric acid	10 %	o	20 %	Δ	---	---
Lubricating oil	Δ	Δ	+	Δ	+	+
Carbon disulphide	---	---	---	---	+	---
Sulphuric acid	50 %	50 %	50 %	50 %	---	---
Soap suds	Δ	Δ	o	Δ	Δ	+
Detergents	Δ	Δ	+	+	Δ	Δ
Turpentine oil	---	Δ	o	Δ	+	+
Hydrocarbon tetrachloride	---	---	Δ	---	+	+
Toluol	---	---	---	---	+	---
Trichloroethylene	---	---	---	---	+	---
Water (distilled, river, tap, sea)	+	+	+	+	+	+
Tartaric acid	+	+	+	+	10 %	+
Xylol	---	---	---	---	+	+
Zinc sulphate	+	+	+	+	Δ	+
Citric acid	+	+	10 %	+	Δ	+

Symbols

- + resistant to all concentrations °C resistant to this max. °C
- % resistant to this max. percentage concentration
- o resistant under certain conditions
- not resistant
- Δ no information available

Unless otherwise stated, the tests were carried out at room temperature.
If different media coincide, the resistances may change and consequently we cannot accept any liability for these data.



The chemical resistance of seals

	Neoprene CR	Polyure- thene PU	EPDM	Silicone Si	Perbunane N NBR	TPE
Aceton	o	o	+	o	---	---
Formic acid	o	Δ	+	o	Δ	o at 10 %
Ammonia	+	---	+	+	+	+
Benzene	o	+	---	+	o	Δ
Brake fluid	o	Δ	o	+	o	Δ
Butane	Δ	+	---	---	+	Δ
Butanol	+	---	+	Δ	+	Δ
Calcium chloride	Δ	+	+	Δ	+	Δ
Chlorine benzole	---	---	---	---	---	Δ
Diesel oil	o	+	---	o	+	Δ
Acetic acid	75 %	Δ	+	---	---	5 %
Formaldehyde	+	+	+	+	40 %	Δ
Frigen 113	o	Δ	---	Δ	+	Δ
Fruit juice	+	+	+	+	---	+
Glycerine	+	+	+	+	+	+
Heating oil	o	+	---	o	+	Δ
Hydraulic oil	---	+	---	o	o	Δ
Caustic potash solution	+	Δ	+	Δ	o	Δ
Potassium chloride	Δ	Δ	+	+	+	Δ
Potassium hydroxide	+	---	+	o	o	+
Linseed oil	+	+	---	o	+	Δ
Methanol	+	---	+	+	+	Δ
Methylene chloride	---	---	---	---	---	Δ
Lactic acid	+	+	+	Δ	+	o
Mineral oils	o	o	---	+	+	Δ
Engine oils	o	o	---	+	+	Δ
Sodium carbonate	Δ	Δ	+	Δ	+	Δ
Sodium chloride	+	Δ	+	+	+	Δ
Sodium hydroxide	50 %	---	+	o	o	+
Soda lye	50 %	---	+	---	o	50 %
Nitric acid	---	---	10 %	---	---	+
Hydrochloric acid	o	---	+	Δ	---	+
Lubricating oil	o	Δ	---	+	+	Δ
Carbon disulphide	---	o	---	+	---	Δ
Sulphuric acid	50 %	---	20 %	25 %	o	+
Soap suds	---	+	+	+	+	Δ
Detergents	o	+	+	+	+	Δ
Turpentine oil	---	---	---	---	+	Δ
Hydrocarbon tetrachloride	---	---	---	---	---	Δ
Toluol	---	---	---	---	---	Δ
Trichloroethylene	---	---	---	---	---	Δ
Water (distilled, river, tap, sea)	+	+	+	+	+	+
Tartaric acid	o	Δ	+	+	---	Δ
Xylol	---	---	---	---	---	Δ
Zinc sulphate	Δ	Δ	+	+	+	Δ
Citric acid	Δ	Δ	+	+	---	Δ

Symbols

- + resistant to all concentrations °C resistant to this max. °C
- % resistant to this max. percentage concentration
- o resistant under certain conditions
- not resistant
- Δ no information available

Unless otherwise stated, the tests were carried out at room temperature.
If different media coincide, the resistances may change and consequently we cannot accept any liability for these data.



Technical information | Aluminium

Anodisation

Many BOPLA products are based on aluminium profiles and panel materials, and in many cases the metallic look is used as a design feature.

However, an untreated aluminium surface is reactive, and when subjected to ambient influences it can form layers of oxidation and corrosion which can quickly dull the look. Moreover, an untreated aluminium surface is very sensitive to scratches and other mechanical damage.

During anodisation, the surface of the material is chemically converted and – in contrast to other processes – is given a coating. By means of the **Electrolytic Oxidation of Aluminium**, a sealed and mechanically very stable oxide layer (ELOXAL) is created which protects the surface of the material against mechanical damage and corrosion.

Anodised surfaces can be produced in various colours, but perfect reproducibility is not always guaranteed in the case of different manufacturing batches. For this reason, on request we offer only the anodised colour “black” as an alternative to our natural-coloured anodised aluminium surfaces..

Passivation

An anodised surface is the optimal choice for the great majority of enclosure applications, because it protects against mechanical environmental influences. At the same time, it is not conductive. For some applications - especially when, for purposes of EMC screening, enclosure components must be connected conductively to each other – the non-conductive anodised layer interferes with the process or is even unsuitable.

We achieve reliable corrosion protection with a conductive surface by means of chemical passivation designed especially for use with aluminium. The process also results in considerably improved paint adhesion on aluminium. For this reason, we also use low concentration chemical passivation for the pre-treatment of all powder-coated aluminium surfaces.

Our standard powder-coating processes are:

- a) Degreasing
- b) Powder-coating
 - Depth of layer > 50 µm
 - Base: polyester amino-resin
 - Pigment: lead, chromate-free
 - Surface: structured, silicone-free

Our standard lacquering has shown good resistance to chemicals: mineral oils, motor fuels, drilling emulsions, cleaning fluids, weak acids and lyes, weak solvents and weathering. On request, we can also use other lacquers or processes. A different surface structure or gloss can also be obtained.

On principle, always take into consideration that the various aluminium casting processes result in different surface qualities. While die casting gives a smooth, even surface and chill casting results in a slightly grainy surface. This affects special requirements regarding surface quality, e.g. for screen-printing, engraving, etc.

Seawater-resistant version

SBGL: Seawater-resistant primed and lacquered. This version has a special lacquer and the following design:

- Seawater-resistant priming
- 2K - PUR lacquer or as per specification

SWB: This version is powder-coated:

- Polyester powder, silk gloss (fine) / structure (coarser) or as per specification
- Internal parts completely powder-coated

Before being coated to give corrosion protection, these parts are either passivated (Cr(III)-based) or depending on specification and release, yellow-chromated (Cr(VI)-based). These parts also meet the salt spray test according to DIN EN ISO 9227 NSS (1000 hours).

These lacquering processes are only suitable for aluminium parts. Polyester enclosures cannot be supplied in seawater-resistant primed and lacquered (SBGL) or seawater-resistant (SWB) versions because the temperatures needed to burn on the lacquers are too hot for the material.



The properties of aluminium alloys

Properties	Units	GD-Al Si 9 CU 3 (diecasting)	GD-Al Si 12 (diecasting)	GK-Al Si12 (chill casting)	Al Mg Si 0,5 (wrought alloy)
Density	g/cm ³	2.65	2.65	2.65	2.7
App. yielding point	N/mm ²	140	130	80	160
Tensile strength	N/mm ²	240	240	170	215
Ductile yield	%	< 1	1	6	12
Brinell hardness	HB	80	60	55	no inform. avail.
Electr. resistivity	m/Ohm mm ²	no inform. avail.	17 - 27	17 - 27	28 - 34
Therm. conductivity	W/mK	110 - 120	130 - 160	140 - 170	190 - 210
Heat resistance	°C	200	200	200	200
Cold resistance	°C	-100	-100	-100	-100

The chemical resistance of aluminium

	Reaction	Remarks
Acetone	+	
Formic acid	o	
Ammonia	+	
Benzene	+	
Benzole	o	contains no H ₂ O = + contains H ₂ O = o
Drilling oil, cutting oil	+	
Butane	+	
Calcium chloride	+	
Chlorine benzole	+	
Acetic acid	+	
Fat, wax	+	
Formaldehyde	+	free of formic acid
Glycerine	+ ---	contains NaCl = ---
Heating oil	+	
Potassium chloride	o	
Potassium hydroxide	---	
Linseed oil	+	< 250 °C
Methanol	+	
Methylene chloride	+	
Lactic acid	+	
Sodium carbonate	o	

	Reaction	Remarks
Sodium chloride	o	
Sodium hydroxide	+	free of H ₂ when molten
Petroleum	+	
Propane	+	
Nitric acid	+	
Lubricating oil	+	
Soap suds	+	
Carbon disulphide	+	
Sulphuric acid	o	
Hydrocarbon tetrachloride	+	
Toluol	+	
Trichloroethylene	+	light metal tri
Water vapour	+	
Hydrogen	+	
Xylol	+	
Zinc sulphate	o	
Citric acid	+	

Symbols:

+ resistant

o resistant under certain conditions

--- not resistant

Unless otherwise stated, the tests were carried out at room temperature.

If different media coincide, the resistances may change and consequently we cannot accept any liability for these data.

Technical information | Aluminium

Tolerances for pressure die castings (DIN 1688, part 4 : 1986-08)*

Tolerances of dimensions not related to the shape, linear dimensions

(lengths, widths, heights, central distances, diameters, roundings)

Spatial diagonal area ¹	Degree of accuracy	Shape dependency	Nominal measuring range													
			up to 18	over 18 to 30	over 30 to 50	over 50 to 80	over 80 to 120	over 120 to 180	over 180 to 250	over 250 to 315	over 315 to 400	over 400 to 500	over 500 to 630	over 630 to 800	over 800 to 1000	over 1000 to 1250
up to 180	GTA 13	shape-related	±0.14	±0.17	±0.20	±0.23	±0.27	±0,32								
		non-shape-related	±0.24	±0.27	±0.30	±0.33	±0.37	±0.42								
over 50 to 500	GTA 13/5	shape-related	±0.17	±0.20	±0.25	±0.30	±0.35	±0.40	±0.45	±0.50	±0.55	±0.60				
		non-shape-related	±0.32	±0.35	±0.40	±0,45	±0.50	±0.55	±0.60	±0.65	±0.70	±0.75				
over 180	GTA 14	shape-related	±0.22	±0.26	±0.31	±0.37	±0.44	±0.50	±0.60	±0.65	±0.70	±0.80	±0.90	±1.00	±1.20	±1.30
		non-shape-related	±0.42	±0,46	±0.51	±0.57	±0.64	±0.70	±0.80	±0.85	±0.90	±1.00	±1.10	±1.20	±1.40	±1.50
over 500	GTA 14/5	shape-related	±0.25	±0.35	±0.40	±0.45	±0.55	±0.65	±0.75	±0.80	±0.85	±0.95	±1.10	±1.20	±1.40	±1.60
		non-shape-related	±0.55	±0.65	±0.70	±0.75	±0.85	±0.95	±1.00	±1.10	±1.10	±1.20	±1.40	±1.50	±1.70	±1.90

Dimensional cast variations for thicknesses

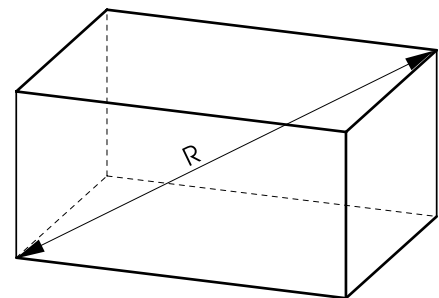
(wall thicknesses, fins, ribs)

Spatial diagonal area ¹	Degree of accuracy	Shape dependency	Nominal measuring range		
			up to 18	over 18 to 30	over 30 to 50
up to 180	GTA 13	shape-related	±0.15	±0.20	±0.20
		non-shape-related	±0.25	±0.30	±0.30
over 50 to 500	GTA 13/5	shape-related	±0.20	±0.25	±0.30
		non-shape-related	±0.35	±0.40	±0.45
over 180	GTA 14	shape-related	±0.25	±0.30	±0.35
		non-shape-related	±0.45	±0.50	±0.55
over 500	GTA 14/5	shape-related	±0.30	±0.40	±0.45
		non-shape-related	±0.55	±0.65	±0.70

1) Determining the spatial diagonal:

The spatial diagonal R is determined by the extreme points of the casting. It is calculated from the nominal dimensions of the prismatic body which delimits the casting whatever its shape.

$$R = \sqrt{l^2 + b^2 + h^2} \text{ (spatial diagonal)}$$



Shape-related dimensions are those in the same parts of the tool. Non-shape-related dimensions are those created by the interaction of movable tool components, e.g. wall thicknesses, base thicknesses and dimensions affected by additives or slides.

* Important: We assume no liability for cited standards!

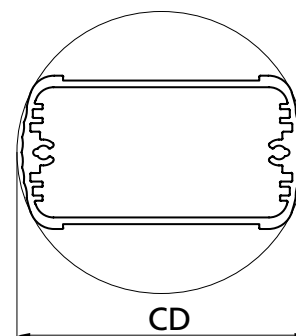
Tolerances for aluminium profiles (DIN EN 12020-2 : 2001-07)*

Cross-section dimensions

(General information)

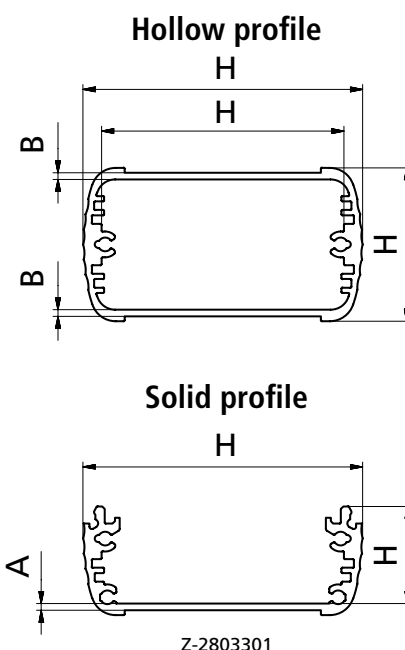
The limit deviations of the following dimensions are specified in the corresponding tables.

- A: Wall thicknesses, except for those which enclose the hollow spaces in hollow profiles
- B: Wall thicknesses which enclose the hollow spaces in hollow profiles, except for wall thicknesses between two hollow spaces
- H: All dimensions except for wall thickness
- CD: Circumscribing circle
- L: Profile length



Limit deviations for dimensions other than wall thickness

Dimension H		Limit deviations for H
over	up to	
–	10	±0.15
10	15	±0.20
15	30	±0.25
30	45	±0.30
45	60	±0.40
60	90	±0.45
90	120	±0.60
120	150	±0.80
150	180	±1.0
180	240	±1.2
240	300	±1.5



Limit deviations of wall thicknesses

Nominal wall thickness A and B		Limit deviations for			
		Wall thickness A (Circumscribing circle)		Wall thickness B (Circumscribing circle)	
over	up to	CD ≤ 100	100 < CD ≤ 300	CD ≤ 100	100 < CD ≤ 300
–	1.5	±0.15	±0.20	±0.20	±0.30
1.5	3	±0.15	±0.25	±0.25	±0.40
3	6	±0.20	±0.30	±0.40	±0.60
6	10	±0.25	±0.35	±0.60	±0.80

Tolerance for the profile length (cut) $L \pm 0.2$ mm (standard), ± 0.1 mm (on request at an extra charge).



Overview of standards | Defined standards in the 19" sector

Tolerances for processing work and equipment (DIN ISO 2768-m)

We specialise in the processing of enclosures and the integration of electronic components. To do this, we carry out all the necessary work stages on the most up-to-date machines and plant. Our standard tolerances for processing and equipment comply with DIN ISO 2768-m.

Nominal size range

from 0.5 to 3	over 3 up to 6	over 6 up to 30	over 30 up to 120	over 120 up to 400	over 400 up to 1000
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8

Overview of standards for 19" products:

Our 19" enclosures comply with a large number of international standards which cover not only mechanical but also electromagnetic compatibility and vibration resistance.

Internal and external dimensions comply with: IEC 60297-3-101 /DIN EN 60297-3-101) / IEEE 1101.1 (subracks and plug-in units)	Refers to product group Intertego (in part sections), Internorm Stil, Interzoll Plus, Internorm (for fitting 19" plug-in units), Interzoll Modul, Interzoll, part front and plug-in front panels, extractor handles (HGS), frame-type plug-in units
IEC 60297-3-102 (DIN EN 60297-3-102) / IEEE 1101.10/11 (injector/extractor handles)	Internorm Stil, Interzoll Modul, extractor handles (HGS)
IEC 60297-3-103 (DIN EN 60297-3-103) (coding and alignment pin)	Internorm Stil, Interzoll Modul, extractor handles (HGS)
Earth conductor connections comply with: DIN EN 50178 / VDE 0160 DIN EN 60950 Teil 1 / VDE 0805 Part 1 DIN EN 61010-1 / VDE 0411 Part 1	Refers to product group Internorm Stil Internorm Stil Internorm Stil
EMC test acc. to: VG 95373 Part 15 IEC 61587-3	Refers to product group Intertego, Internorm Stil Interzoll Modul
Shock and vibration test acc. to: IEC 61587-2 BN 411002 BN 411003 EN 50155 DIN EN 45545-1	Refers to product group Interzoll Modul Interzoll Modul, Interzoll Interzoll Modul Interzoll Modul Interzoll Modul, Internorm Stil
Fire protection behavior acc. to: DIN EN 45545-2	Refers to product group Interzoll Modul, Internorm Stil
For direct screw-type connectors acc. to: IEC 60603-2 (DIN EN 60603-2, formerly: DIN 41612)	Refers to product group Internorm Stil, Interzoll Plus, Interzoll Modul, Interzoll, Intertego, CombiCard 1000-7000
For plug-in units acc. to: IEC 60297-3-101 (DIN EN 60297-3-101)	Refers to product group Internorm Stil, Interzoll Plus, Interzoll Modul, extractor handles (HGS), plug-in front panels, frame-type plug-in units, Interzoll, Intertego, Combi-Card 1000-7000
For plug-in units with insertion and extraction function acc. to: IEC 60297-3-102 (DIN EN 60297-3-102) / IEEE 1101.10/11	Refers to product group Internorm Stil, Interzoll Modul, extractor handles (HGS)
IP classification: DIN EN 60529; VDE 0470-1	Refers to product group Internorm Stil (IP 20), Internorm (IP 54), Interzoll Modul (IP 20), Interzoll (IP 20), Interzoll Plus (IP 20), Intertego (IP 40 / 20 – with ventilation)

Electro-magnetic compatibility

European EMC directive 2004/108/EC was developed within the framework of the standardization of national regulations and has been in force since 20th July 2007. This makes it necessary to submit to EMC tests not only radio equipment but also all electrical and electronic equipment, plants and systems. The purpose of this test is to obtain the awarding of the CE mark which is the pre-condition for the operation of all electrical equipment.

If electro-magnetic compatibility cannot be achieved by means of EMC compatible circuit design and/or metallic internal encapsulation, appropriate measures can be taken in respect of the enclosure. For the choice of an enclosure, this means that an electrical component with EMC can be used in any desired enclosure in 90% of cases without any further work or costs. To achieve shielding, there is no need to sacrifice the essential advantages of plastic enclosures:

- an attractive design
- considerable price savings
- much lighter and more variable

Shielding with plastic enclosures

Plastic enclosures can also be screened effectively without losing the advantages of plastic. Shielding is also achieved by adding a metal coating inside or outside the enclosure.

We prefer to use copper conductive lacquer for reasons of cost and time. In view of the regulations relating to the disposal of electrical scrap, these costs now have to be taken into consideration when calculations are made. Please note that we are unable to take back enclosures which have been specially coated at the customer's request. The aluminium vapour-blasting process is performed in high-vacuum plants. We use a coating of at least 2.5 µm as standard. However, greater thicknesses are possible at any time depending on the enclosure material.

The mechanical properties of the plastic are not altered by the vapourblasting, so no brittleness or tears will result. The new type of copperchrome-nickel coating (CU/Ni/Cr) gives the modular and fully-insulated enclosures an increased level of EMC protection. Coating masks are now available for most of our standard enclosures so that these can be screened at very low cost. In all cases where the procedures described above are not sufficient to provide shielding, the use of contact seals may increase the shielding efficiency. We can recommend or specify these special seals and then deliver them on the basis of customer-specific requirements as well as the type of enclosure used.

Another effective screening measure is to provide an inner metal cap for components, component groups or the entire electronics, if these parts are highly sensitive to radiation interference. This capping can also intensify the screening measures described above.

To complete EMC measures, for cable insertion we supply the appropriate plastic or metal cable glands with the possibility of connecting the cable screening to the enclosure earthing connection. If you require information on the damping values for various BOPLA enclosures with the appropriate screening, please ask for our specific EMC information.

Shielding in the case of aluminium enclosures

Under certain circumstances, the material used for aluminium enclosures may provide some EMC reduction. However, the joints (tongue and groove) need to be fitted with the appropriate conductive seals for optimal EMC applications. Please also note that the lacquer coatings must be bridged. This can be done with the appropriate conductive seals or by removing the lacquer coatings. The amount of work involved must be made clear when the requirements are specified. If necessary, we will give you the addresses of competent contact persons and institutes who will help you with EMC problems. They will carry out the necessary tests and measurements for you and can issue certificates.

IMPORTANT

All technical details are provided to the best of our knowledge but do not release the user from the obligation to test the suitability of these details in respect of the intended processes and purposes.

The customer bears the responsibility with regard to the suitability and use for the intended purpose of our products.

All liability on the part of Bopla Gehäuse Systeme GmbH in connection with technical information of any kind whatsoever is excluded. We reserve the right to optimise products, to change materials and to amend drawings.



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80-89, 94

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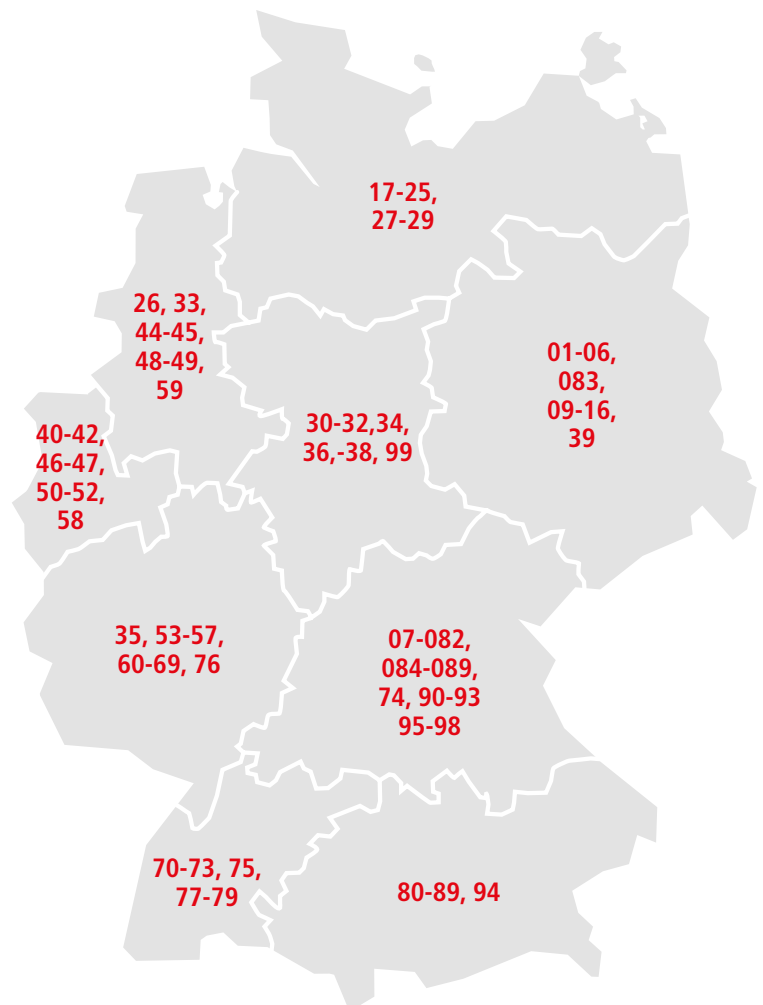
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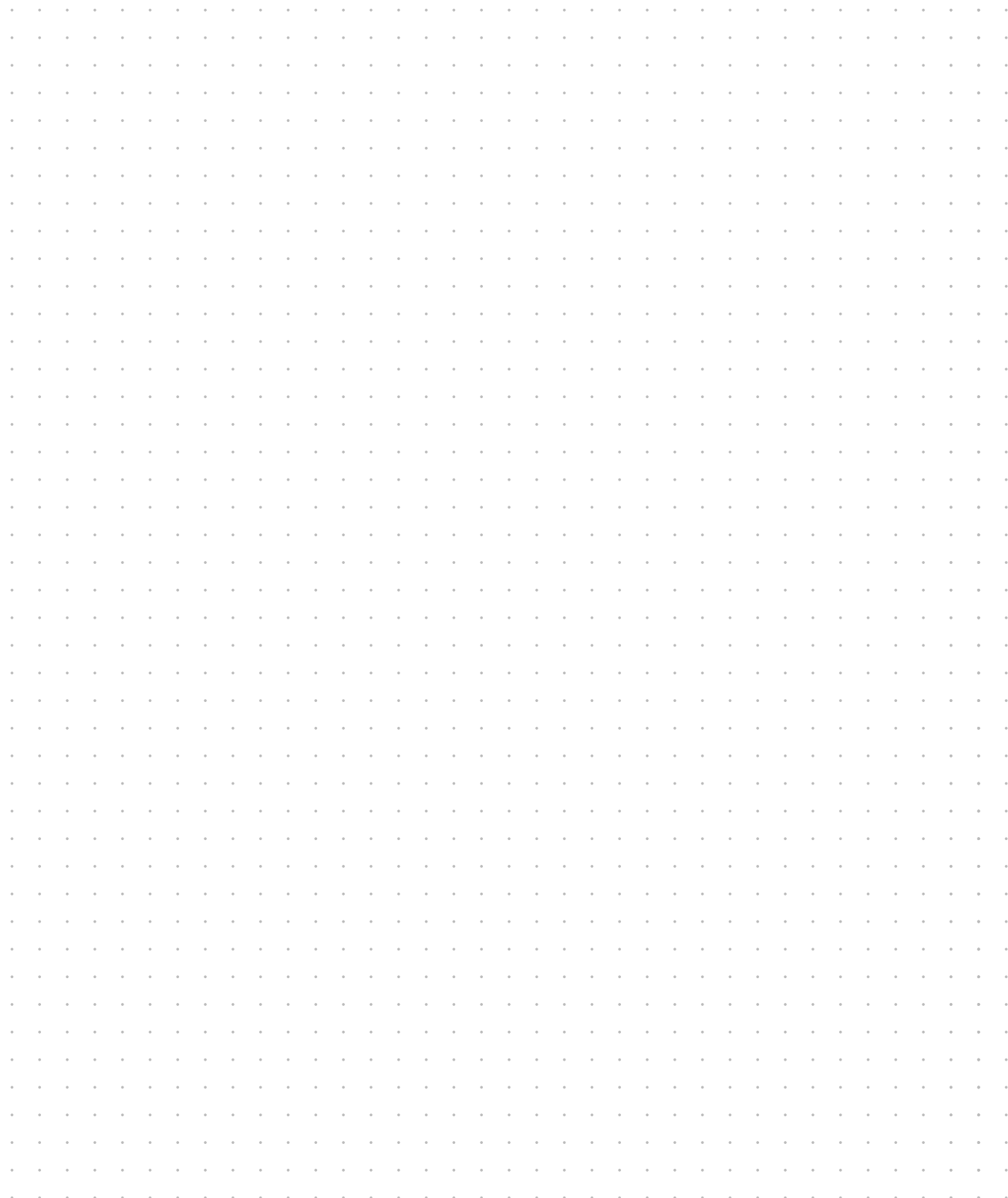
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