ENGLISH

BK interlocked switched socket-outlets for industrial use

The Company and the Product

INDUSTRIA LOMBARDA MATERIALE ELETTRICO SpA has been operating **in Milan since 1938,** in particular in the electrotechnical sector for the manufacturing of equipment for industrial installations.
ILME reflects the traditional **entrepreneurial spirit of Lombardy,** and has enjoyed continuous expansion for over half a century.
The company has carved an important role for itself in the main world markets, also operating directly in the countries that have assumed world leadership in the field of automation, including Germany and Japan.
In the **electrical connection** sector with applications in industrial automation, characterised by **top performance** and utmost **reliability needs,** ILME is today the acknowledged partner of many leading companies worldwide.

The company's fundamental values are: **product innovation,** original solutions, excellent **price-quality ratio,** a customer-oriented **sense of service,** ethical behaviour and an environmentally-friendly approach.

To promote the continuing improvement of its **qualitative results,** ILME has always encouraged its collaborators to work with utmost **responsibility and participation.**
The company focuses on a series of benefits to the user, including research into the most suitable materials, high quality and safe cabling, a rapid turnaround and readily available services.

CE marking

As from 1 January 1997, in order to launch electrical products on the European market the manufacturer must ensure these bear the relevant CE marking, in line with the Low Voltage Directive 73/23/EEC * (implemented in Italy as law 18-10-1977 no. 791) and its modification 93/68/EEC * (implemented in Italy as L. D. 25-11-1996 no. 626/96, published in the supplement to the Gazzetta Ufficiale of 14-12-1996).

Said marking must be placed on the product - or, if this is not possible, on the packaging, the instructions for use or the warranty certificate - and acts as a declaration by the manufacturer that the product complies with all relevant EU directives.

ILME products bear the CE marking on the product or packaging.

Almost all ILME products fall under the Low Voltage Directive. A declaration of compliance is required before applying the CE marking. This document, to which the market is not directly entitled, must be made available to the control authorities (in Italy the Ministry for Industry, Commerce and Handicraft) at all times. In it, the manufacturer declares the technical safety standard(s) followed to manufacture the product. These standards must be, in decreasing order of preference:

- a European standard (EN prefix)
- a European harmonisation document (HD prefix)
- an international IEC standard
- a national standard
- in the absence of reference standards, the manufacturer's internal specifications, guaranteeing compliance with the directive's basic safety requirements.

Compliance with harmonised technical standards (i.e. ratified by the CENELEC) constitutes presumtion of conformity to the directive's basic safety requirements.
The CE marking of ILME products results from said products' declaration of conformity to harmonised standards or international IEC standards.
Through the CE marking, ILME declares full compliance, not merely with the directive's basic safety requirements, but also with those international or national EU standards on which voluntary safety certification markings are based (e.g. IMQ and VDE).
In this way, ILME intends to award the CE marking the value of self-certification in terms of safety, given the loss in legal value of voluntary certifications issued by third parties, ratified by directive 93/68/EEC *.
Notwithstanding the above, practically all ILME products still bear voluntary conformity markings.

This EC declaration of conformity becomes null and void when the assembly of products includes one or more components not manufactured by us and without EC approval.

*** Note:** New legal reference for the Low Voltage Directive is 2006/95/EC which is the consolidated edition of Directive 73/23/EEC + Directive 93/68/EEC.

On March 29, 2014, the new Low Voltage directive 2014/35/EU has been published on the Official Journal of the European Union, as a recast of the previous directive 2006/95/EC. It will enter into force on April 20, 2016.

The Heavy Duty - BK series modular system

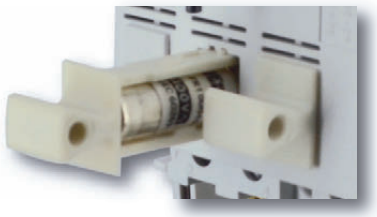
The Heavy Duty - BK series modular system allows the construction of distribution boards with IP66/IP67 degree of protection, particularly suitable for use under severe environmental conditions. Its unique construction features make the BK system suitable for applications including:

- manufacturing industry;
- service industry (stores, trade fairs etc.);
- agriculture and livestock;
- residential and similar installations (e.g.: common areas of condominiums, basements and garages, community buildings, kitchens, etc.).

The modular structure (114 x 228 mm) is common to all components, which can be inserted in the appropriate single or triple boxes. An advantage of the BK system is the possibility, initially, of installing the boxes only, to be activated at a later time with a wide range of equipment, covers and miscellaneous accessories.

The following types are available:
- **BE** and **BK** types
  equipped with interlocked switched industrial socket-outlets, without and with fuse holders, respectively;
- **BT** types
  equipped with extra-low voltage socket-outlet and a SELV safety transformer;
- **BP** and **BPR** types
  equipped with 63A simple industrial socket-outlets, without and with module holder and access port, respectively;
- **BC...Q** and **BC...RQ** types
  covers with module holder and access port enabled for simple industrial sockets (Pluso series, 16A and 32A **PEW...PQF/PQ** types);
- **BC...R** types
  covers equipped with module holder and access port;
- **BC...P** types
  cover caps for unused module holders.

A new combined switch-disconnector-fuse unit has been introduced in BK type socket-outlets for easy, quick and safe fuse cartridge insertion and removal.



SOCKET-OUTLETS 16A

interlocked switched

page 6

SOCKET-OUTLETS 32A

interlocked switched

page 6

SOCKET-OUTLETS 16A

interlocked switched socket-outlets and fuse carrier

page 7

SOCKET-OUTLETS 32A

interlocked switched socket-outlets and fuse carrier

page 7

COVER

with 63A socket-outlet

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COVER

with 63A socket-outlet and room for modular control equipment

page 8

SOCKET-OUTLETS WITH SAFETY TRANSFORMER

for class III portable lighting apparatus

page 9

COVERS

with built-in 16A and 32A socket-outlets

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COVERS

with room for modular control equipment

page 10

SOCKET-OUTLETS 16A

IP67 degrees of protection

page 11

SOCKET-OUTLETS 32A

IP67 degrees of protection

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SINGLE BOX

page 11

TRIPLE BOX

page 12

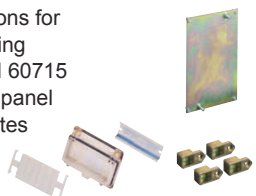
- Cover for boxes
- Joint cover plate

page 13

- Cover for triple box
- Cover for modular control equipment

page 13

- Mounting plate
- Climbing irons for wall-mounting
- DIN-rail EN 60715
- Cover with panel
- Closing plates



page 14

- Safety padlock with key
- Safety padlock for controls

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- Cable gland
- Sealing plugs including gasket
- Reduction nipples including gasket

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Degree of protection

The degree of protection should be chosen according to installation standard CEI 64-8 (that implements European harmonized documents CENELEC HD 60364 series and International Standards of IEC 60364 series), whose section 7 refers to specific types of installations, such as: construction and demolition sites, structures designed for agricultural or livestock breeding activities, restricted conductor areas, caravans and caravan sites, environments with higher fire hazards, public performance and entertainment areas, pools and fountains, and marinas and harbour areas.
BK enclosures for boards are made with a IP66/IP67 degree of protection. No further verification is needed if you install enclosures with an IP66/IP67 or higher class of protection and use covers with related gaskets, along with cable glands and conduit fittings with an IP66/IP67 or higher degree of protection. All equipment must be installed following state-of-the-art procedures and in compliance with the manufacturer's assembly instructions. If components with varying degrees of protections are installed, the degree of protection of the resulting distribution board corresponds to that of the unit with the lowest class of protection.

This has been assessed and applies:
- to socket-outlets when a plug with equivalent class is inserted or the cover is closed;
- to enclosures, when all covers are closed.

ILME accessories for the BK systems

ILME offers the following range of socket-outlets for enclosures:
- simple socket-outlets without interlock for industrial use in standard version with **IP67 degree of protection** (**PEW** types);
- interlocked socket-outlets for industrial use in standard version with **IP66/IP67 degree of protection:**
  - with switch-disconnector (**BE** types);
  - with switch-disconnector-fuse (**BK** types);
  - with safety transformer ⧈ SELV (**BT** types).

Socket-outlets with IP66/IP67 class of protection have a bayonet fastening cover, traditionally defined as "water-tight", and must be used with with IP66/IP67 plugs (with locking ring and gasket) to guarantee a high protection of the connected equipment (IP66/IP67). All enclosures, plugs and socket-outlets cover the installation requirements specified in standard CEI 64-8 (series Cenelec HD 60364, IEC 60364).

Protection against indirect contacts complete insulation*) ⧈

Article 7.4 of standard EN 61439-1 (class. CEI 17-13/1) defines the protective measures against electric shocks that have to be incorporated in the boards. Protection against indirect contacts can be guaranteed only by completely insulating the installation ⧈ (sub-clause 7.4.3.2.2), which implies complying with the following:

a) Units should be completely enclosed in insulated material. Enclosures should be marked with the ⧈ symbol, which must always been visible from the outside.
b) Enclosures must be made in insulating material suitable to withstand the mechanical, electric and thermal stresses to which they may be exposed during ordinary or extraordinary operating conditions and must be age-proof and flame resistant.
c) Enclosures should have no conducting parts to prevent fault voltages from being transmitted outside the unit.
d) The enclosure must have a degree of protection equivalent to at least IP3XD.
e) Exposed conductive parts inside the unit should not be connected to the protective earth conductor. These parts must always be connected to a protection system that implies the use of a protective conductor. This also applies to built-in units, even if they have a connection terminal for the protective earth circuit.
f) Doors and covers that can be opened without the use of wrenches or other tools must be protected by a barrier in insulating material in order to prevent accidental contact with accessible live parts and with units that are accessible only after the covers have been removed. This barrier must be removable with the use of specific tools only.

The metallic screws used for the assembly of socket-outlets and covers on enclosures for BK distribution boards are not connected to the inside of the board. If the wall mounting is carried out using suitable external metallic clamps (optional) or by internally installing the blanking plugs supplied, BK enclosures complying with the above prescriptions enable to configure systems that guarantee a full protection against indirect contacts.

*) According to sub-clause 413.2.1.1 of standard IEC 60364-4-41, it is equal to that of equipment of class II, see standard IEC 60536.

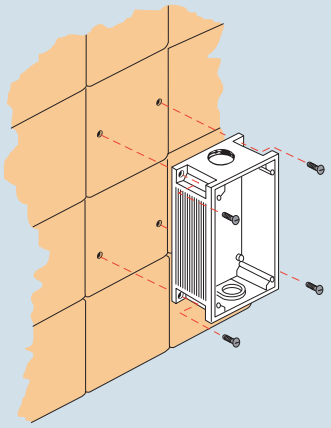


Figure 1 - Example of external mounting using the slots on the box.

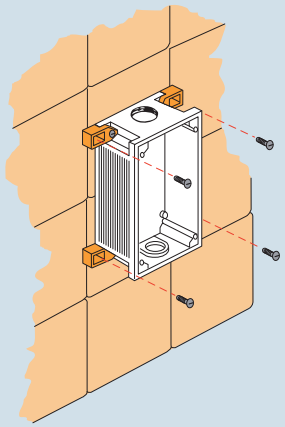


Figure 2 - Example of external mounting using the slots on the box. The brackets (optional), suitable to be mounted vertically and horizontally (recommended for triple boxes) simplify wall anchoring.

Application of the Italian "experimental" standard CEI 23-51

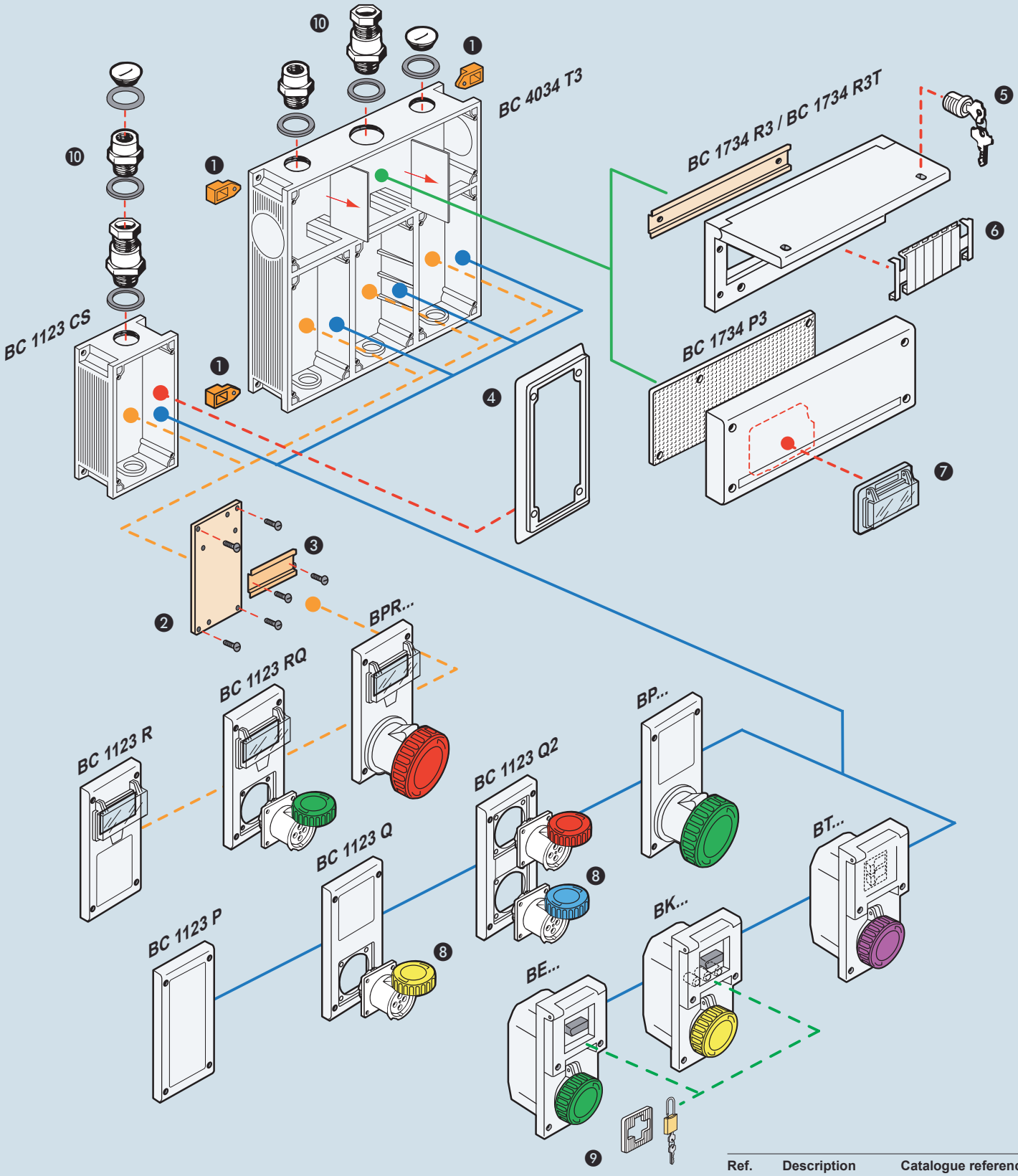
The maximum power that can be dissipated P_{inv} has been tested for each box in the most severe operating conditions using the method described in the Italian experimental standard CEI 23-49. Results are shown in **Table 1**.

Maximum power that can be dissipated in box P_{inv} (CEI 23-49)

Table 1

Item	Description	Number of modules	P_{inv} 1) (W) wall-mounting	P_{inv} 1) (W) flush-mounting
BC 1123 CS 2)	Single box	4.5 units	8	11
BC 4034 T3	Triple box	16 units	18	26

1) **Determined for each size of enclosure under the most severe load condition provided for in the standard**
2) **This standard does not apply to a single box with industrial socket-outlets that have been tested only according to EN 60309-1, -2 and -4. Data referred to single boxes apply only to installations with BC...R and BPR... modules.**



Ref.	Description	Catalogue reference
❶	BC SFT	page 14
❷	BC 1123 PF	page 14
❸	BC GD8	page 14
❹	BC 1123 ME	page 13
❺	BC CHT	page 15
❻	BC FR 62	page 14
❼	BC 45 ST	page 14
❽	PEW .. PQF/PQ	page 11
❾	BC BLC	page 15
❿	fittings	pages 16-17

Table of the characteristics of covers and modular equipment

Types of covers and modules / Description		BC 1123 P	BC 1734 P3	BC 1734 R3/R3T	BC 1123 Q	BC 1123 Q2	BC 1123 R	BC 1123 RQ	BP...	BPR...	BE...	BK...	BT...
Simple cover		●	●										
Cover with panel				●									
Cover for simple straight flush-mounting socket-outlets					●	●		●					
Cover with simple straight socket-outlets									●	●			
Cover with compartment for modular units							●	●		●			
Interlocked socket-outlets										●			
Interlocked socket-outlets with fuse holder												●	
Socket-outlets with safety transformer													●
For boxes	Single	●			●	●	●	●	●	●	●	●	●
	Triple	●	●	●	●	●	●	●	●	●	●	●	●
Rated current	**16A**				● [1]	● [1]		● [1]			●	●	● [2]
	32A				● [1]	● [1]		● [1]			●	●	●
	63A								●	●			
In this catalogue on page		**13**	**13**	**13**	**10**	**10**	**10**	**10**	**8**	**8**	**6**	**7**	**9**

[1] Using simple flush-mounting PQ and PQF socket-outlets (16A and 32A)
[2] Limited to 6A by the transformer power (144VA)

Selecting socket-outlets

Socket-outlets should be selected taking into account the following parameters:

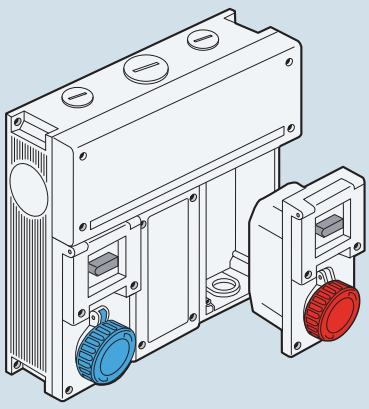
- rated current of the device to supply with the plug and socket-outlet coupling.
- Rated supply voltage and type of distribution (single or three-phase, with or without neutral) to determine the number of poles and clock position of socket-outlets. The 1 hour clock position is available for all > 50V voltages and voltage ranges and for frequencies and frequency ranges not covered by standards.
- Site of installation for the determination of the degree of protection; in some areas installation standards require a safety extra-low voltage (SELV).

BK systems have an IP66/IP67 degree of protection. Socket-outlets with IP66/IP67 or higher class of protection have a bayonet fastening cover, traditionally defined as “water tight”, and must be used with IP66/IP67 plugs (with locking nut and gasket). All equipment must be installed following state-of-the-art procedures and in compliance with the manufacturer’s assembly instructions. If components with varying degrees of protections are installed, the degree of protection of the resulting distribution board corresponds to that of the unit with the lowest degrees of protection.

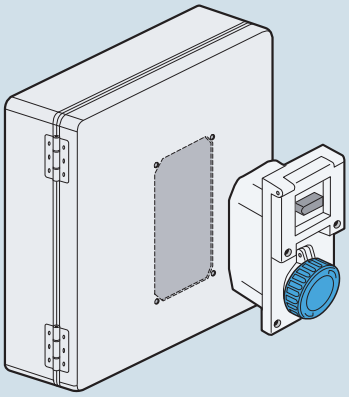
This has been assessed and applies:
- to socket-outlets when a plug with equivalent class is inserted or the cover is closed;
- to enclosures, when all covers are closed.

Type of installation

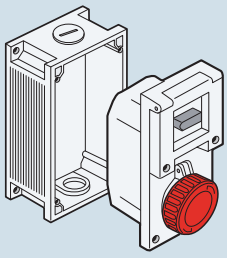
BK systems can be installed in four different types of configurations, as illustrated below:
- in triple boxes (**Figure 1**);
- on equipment or pre-assembled enclosures (**Figure 2**);
- in boxes for wall-mounting (**Figure 3**);
- in boxes for flush-mounting (**Figure 4**).



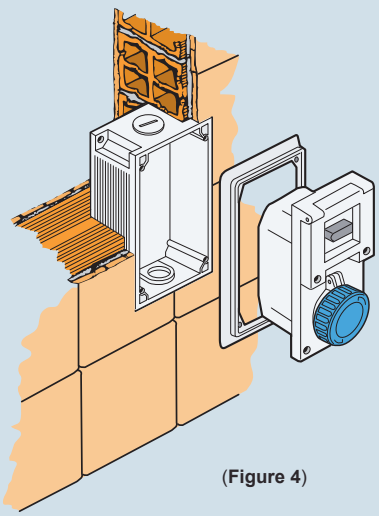
(**Figure 1**)



(**Figure 2**)



(**Figure 3**)



(**Figure 4**)

- Compliant with EN 60309 -1, -2 and -4
- Carrying structure in self-extinguishing, glass fibre reinforced polyester, UL approved, RAL 7035 grey
- Stainless steel retained fixing screws
- Socket-outlet module in insulating self-extinguishing thermoplastic material, UL approved
- Stainless steel pin and spring hinged cover, with bayonet insert, colour coded according to operating voltage
- Factory installed internal wiring
- "Zeta" series switch-disconnector with 32A rating, compliant with standard EN 60947-3, AC-22A
- Mechanical interlock that prevents:
  - the switch from being turned on without the plug inserted,
  - the plug from being removed while the switch is turned on,
  - the switch from being turned on when the panel is open.
- The socket outlets mounted on the boxes guarantee the compliance with IP66/IP67 degrees of protection requirements (EN 60529)

16A interlocked switched socket-outlets

32A interlocked switched socket-outlets

Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour	Part No.	Colour
2P+⏚	50 and 60	100 ÷ 130	4	BE 1643 ⓜ		BE 3243 ⓜ	
	50 and 60	200 ÷ 250	6	BE 1663 ⓜ		BE 3263 ⓜ	
	50 and 60	380 ÷ 415	9	BE 1693 ⓜ		BE 3293 ⓜ	
	50 and 60	480 ÷ 500	7	BE 1673		BE 3273	
	50 and 60	ins. transformer	12	BE 16123 ⓜ	A.V.	BE 32123 ⓜ	A.V.
	> 300 ÷ 500	> 50	2	BE 1623 ⓜ	(*)	BE 3223 ⓜ	(*)
	c.c.	> 50 ÷ 250	3	BE 1633 ⓜ	A.V.		
	❖	❖	1	BE 1613	A.V.	BE 3213	A.V.
3P+⏚	50 and 60	100 ÷ 130	4	BE 1644 ⓜ		BE 3244 ⓜ	
	50 and 60	200 ÷ 250	9	BE 1694 ⓜ		BE 3294 ⓜ	
	50 and 60	380 ÷ 415	6	BE 1664 ⓜ		BE 3264 ⓜ	
	60	440 ÷ 460	11	BE 16114 ⓜ		BE 32114 ⓜ	
	50 and 60	480 ÷ 500	7	BE 1674 ⓜ		BE 3274 ⓜ	
	50	380	3	BE 1634		BE 3234	
	60	440	3	BE 1634		BE 3234	
	100 ÷ 300	> 50	10	BE 16104 ⓜ	(*)	BE 32104 ⓜ	(*)
	> 300 ÷ 500	> 50	2	BE 1624 ⓜ	(*)	BE 3224 ⓜ	(*)
	❖	❖	1	BE 1614	A.V.	BE 3214	A.V.
3P+N+⏚	50 and 60	57/100 ÷ 75/130	4	BE 1645 ⓜ		BE 3245 ⓜ	
	50 and 60	120/208 ÷ 144/250	9	BE 1695 ⓜ		BE 3295 ⓜ	
	50 and 60	200/346 ÷ 240/415	6	BE 1665 ⓜ		BE 3265 ⓜ	
	50 and 60	277/480 ÷ 288/500	7	BE 1675 ⓜ		BE 3275 ⓜ	
	60	250/440 ÷ 265/460	11	BE 16115 ⓜ		BE 32115 ⓜ	
	50	220/380	3	BE 1635		BE 3235	
	60	250/440	3	BE 1635		BE 3235	
	> 300 ÷ 500	> 50	2	BE 1625 ⓜ	(*)	BE 3225 ⓜ	(*)
	❖	❖	1	BE 1615	A.V.	BE 3215	A.V.

Legend

ⓜ = With Italian Quality Mark

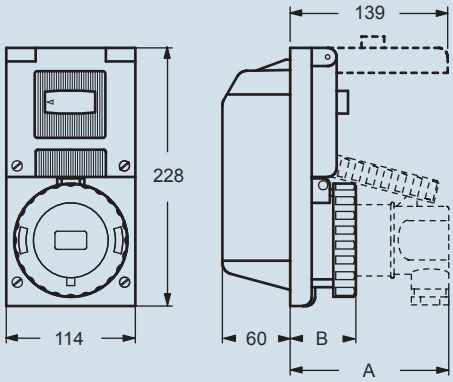
❖ = All rated operating voltages and/or frequencies not covered by other configurations

A.V. = Colour coded according to voltage

(*) = Green may be used together with the colour of the operating range for frequencies above 60 Hz and up to a maximum of 500 Hz.

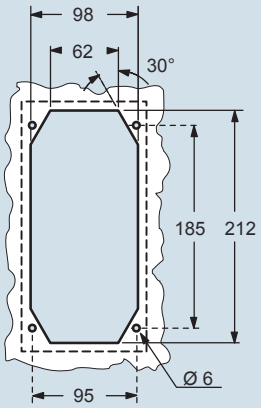
Dimensions indicated are not binding and may be changed without prior notice.

Dimensions in mm



BE		A	B
16A	2P + ⏚	105	50
	3P + ⏚	105	50
	3P + N + ⏚	110	50
32A	2P + ⏚	140	58
	3P + ⏚	140	58
	3P + N + ⏚	140	58

Panel cut-out in mm, for panel-mounting



- Compliant with EN 60309 -1, -2 and -4
- Carrying structure in self-extinguishing, glass fibre reinforced polyester, UL approved, RAL 7035 grey
- Stainless steel retained fixing screws
- Inserts in insulating self-extinguishing thermoplastic material, UL approved
- Cover with bayonet insert, colour coded according to operating voltage
- Factory installed internal wiring
- "Zeta" series switch-disconnector-fuse with 32A rating
- Fuse holders for cylindrical cartridges 10 x 38 (fuse-links not included)
- Mechanical interlock that prevents:
  - access to fuses when the switch is closed
  - the switch from being turned on without the plug inserted,
  - the plug from being removed while the switch is turned on,
  - the switch from being turned on when the panel is open
- The socket outlets mounted on the boxes guarantee the compliance with IP66/IP67 degrees of protection requirements (EN 60529)

16A interlocked switched socket-outlets and fuse holder

32A interlocked switched socket-outlets and fuse holder

Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour	Part No.	Colour
2P+⏚	50 and 60	100 ÷ 130	4	BK 1643 ♆		BK 3243 ♆	
	50 and 60	200 ÷ 250	6	BK 1663 ♆		BK 3263 ♆	
	50 and 60	380 ÷ 415	9	BK 1693 ♆		BK 3293 ♆	
	50 and 60	480 ÷ 500	7	BK 1673		BK 3273	
	50 and 60	ins. transformer	12	BK 16123 ♆	A.V.	BK 32123 ♆	A.V.
	> 300 ÷ 500	> 50	2	BK 1623 ♆	(*)	BK 3223 ♆	(*)
	c.c.	> 50 ÷ 250	3				
	❖	❖	1	BK 1613	A.V.	BK 3213	A.V.
3P+⏚	50 and 60	100 ÷ 130	4	BK 1644 ♆		BK 3244 ♆	
	50 and 60	200 ÷ 250	9	BK 1694 ♆		BK 3294 ♆	
	50 and 60	380 ÷ 415	6	BK 1664 ♆		BK 3264 ♆	
	60	440 ÷ 460	11	BK 16114 ♆		BK 32114 ♆	
	50 and 60	480 ÷ 500	7	BK 1674 ♆		BK 3274 ♆	
	50	380	3	BK 1634		BK 3234	
	60	440	3	BK 1634		BK 3234	
	100 ÷ 300	> 50	10	BK 16104 ♆	(*)	BK 32104 ♆	(*)
	> 300 ÷ 500	> 50	2	BK 1624 ♆	(*)	BK 3224 ♆	(*)
	❖	❖	1	BK 1614	A.V.	BK 3214	A.V.
3P+N+⏚	50 and 60	57/100 ÷ 75/130	4	BK 1645 ♆		BK 3245 ♆	
	50 and 60	120/208 ÷ 144/250	9	BK 1695 ♆		BK 3295 ♆	
	50 and 60	200/346 ÷ 240/415	6	BK 1665 ♆		BK 3265 ♆	
	50 and 60	277/480 ÷ 288/500	7	BK 1675 ♆		BK 3275 ♆	
	60	250/440 ÷ 265/460	11	BK 16115 ♆		BK 32115 ♆	
	50	220/380	3	BK 1635		BK 3235	
	60	250/440	3	BK 1635		BK 3235	
	> 300 ÷ 500	> 50	2	BK 1625 ♆	(*)	BK 3225 ♆	(*)
	❖	❖	1	BK 1615	A.V.	BK 3215	A.V.

Legend

♆ = With Italian Quality Mark

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A.V. = Colour coded according to voltage

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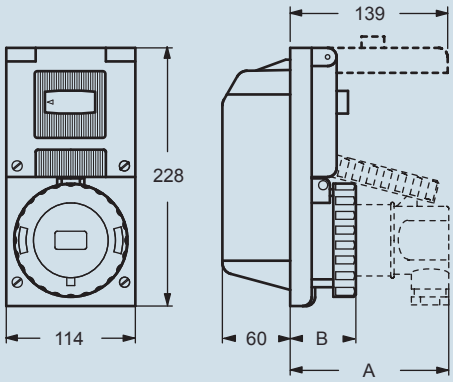
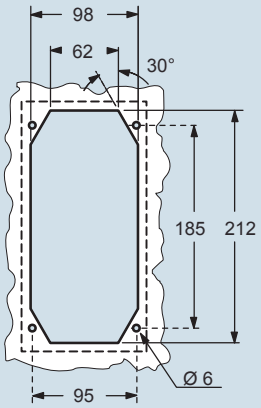


BK		A	B
16A	2P + ⏚	105	50
	3P + ⏚	105	50
	3P + N + ⏚	110	50
32A	2P + ⏚	140	58
	3P + ⏚	140	58
	3P + N + ⏚	140	58

Panel cut-out in mm, for panel-mounting



- Compliant with EN 60309 -1 and -2
- Carrying structure in self-extinguishing, glass fibre reinforced polyester, UL approved, RAL 7035 grey
- Stainless steel retained fixing screws
- Inserts in insulating self-extinguishing thermoplastic material, UL approved
- Cover with bayonet insert, colour coded according to operating voltage
- Socket-outlet with nickel-plated contacts and pilot contact
- With transparent cover (BPR socket-outlets) in self-extinguishing polycarbonate for the assembly of a maximum of 4/5 modular units, including closing plate, sized DIN-rail EN 60715 and fixing screws, to be placed on mounting plate BC 1123 PF
- The covers with the socket outlets mounted on the boxes guarantee the compliance with IP66/IP67 degrees of protection requirements (EN 60529)

Cover with 63A socket-outlet

Cover with 63A socket-outlet and room for modular control equipment

Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour	Part No.	Colour
2P+⊕	50 and 60	100 ÷ 130	4	BP 6343 ⓘ		BPR 6343 ⓘ	
	50 and 60	200 ÷ 250	6	BP 6363 ⓘ		BPR 6363 ⓘ	
	50 and 60	380 ÷ 415	9	BP 6393 ⓘ		BPR 6393 ⓘ	
	50 and 60	480 ÷ 500	7	BP 6373 ⓘ		BPR 6373 ⓘ	
	50 and 60	ins. transformer	12	BP 63123 ⓘ	A.V.	BPR 63123 ⓘ	A.V.
	c.c.	> 50 ÷ 250	3	BP 6333 ⓘ	A.V.	BPR 6333 ⓘ	A.V.
	c.c.	> 250	8	BP 6383	A.V.	BPR 6383	A.V.
	❖	❖	1	BP 6313 ⓘ	A.V.	BPR 6313 ⓘ	A.V.
3P+⊕	50 and 60	100 ÷ 130	4	BP 6344 ⓘ		BPR 6344 ⓘ	
	50 and 60	200 ÷ 250	9	BP 6394 ⓘ		BPR 6394 ⓘ	
	50 and 60	380 ÷ 415	6	BP 6364 ⓘ		BPR 6364 ⓘ	
	60	440 ÷ 460	11	BP 63114 ⓘ		BPR 63114 ⓘ	
	50 and 60	480 ÷ 500	7	BP 6374 ⓘ		BPR 6374 ⓘ	
	50 and 60	600 ÷ 690	5	BP 6354		BPR 6354	
	❖	❖	1	BP 6314 ⓘ	A.V.	BPR 6314 ⓘ	A.V.
3P+N+⊕	50 and 60	57/100 ÷ 75/130	4	BP 6345 ⓘ		BPR 6345 ⓘ	
	50 and 60	120/208 ÷ 144/250	9	BP 6395 ⓘ		BPR 6395 ⓘ	
	50 and 60	200/346 ÷ 240/415	6	BP 6365 ⓘ		BPR 6365 ⓘ	
	50 and 60	277/480 ÷ 288/500	7	BP 6375 ⓘ		BPR 6375 ⓘ	
	50 and 60	347/600 ÷ 400/690	5	BP 6355		BPR 6355	
	60	250/440 ÷ 265/460	11	BP 63115 ⓘ		BPR 63115 ⓘ	
	❖	❖	1	BP 6315 ⓘ	A.V.	BPR 6315 ⓘ	A.V.

Legend

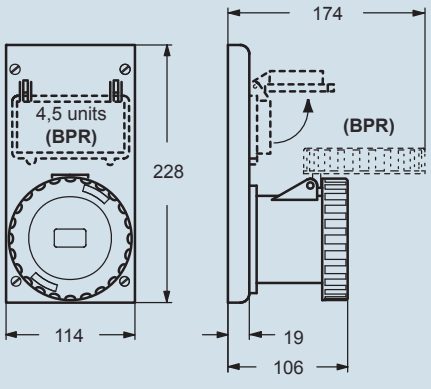
ⓘ = With Italian Quality Mark

❖ = All rated operating voltages and/or frequencies not covered by other configurations

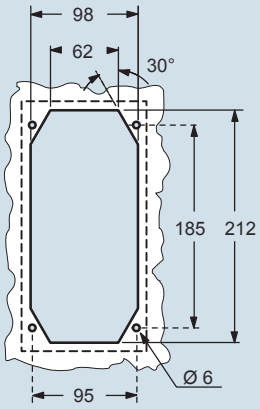
A.V. = Colour coded according to voltage

Dimensions indicated are not binding and may be changed without prior notice.

Dimensions in mm



Panel cut-out in mm, for panel-mounting

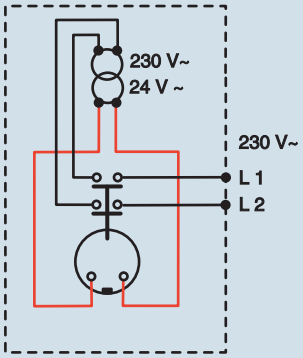


- Compliant with EN 60309 -1 and -2, and CEI EN 61558-2-9
- Carrying structure in self-extinguishing, glass fibre reinforced polyester, UL approved, RAL 7035 grey
- Stainless steel retained fixing screws
- Socket-outlet module in insulating self-extinguishing thermoplastic material, UL approved
- Stainless steel pin and spring hinged cover, with bayonet insert, colour coded according to operating voltage
- Factory installed internal wiring
- ⧈ safety transformer compliant with standard EN 61558-2-9, 144VA, continuous duty, activated by inserting the plug
- The socket outlets mounted on the boxes guarantee the compliance with IP66/IP67 degrees of protection requirements (EN 60529)

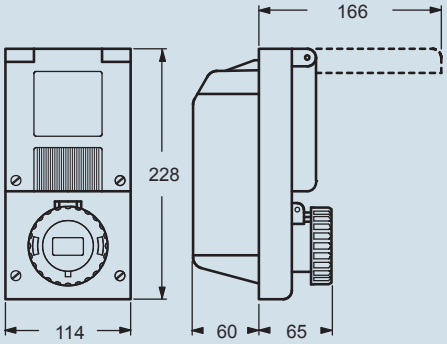
Socket-outlets with safety transformer for class III portable lighting equipment

Poles	Frequency Hz	Voltage V	Part No.
2P	50 and 60	230/24	**BT 16220**

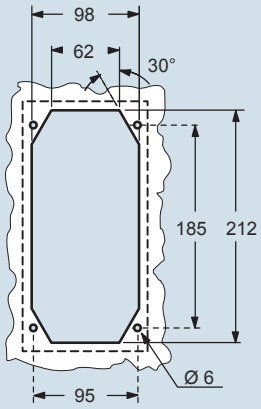
Wiring diagram



Dimensions in mm



Panel cut-out in mm, for panel-mounting



Dimensions indicated are not binding and may be changed without prior notice.

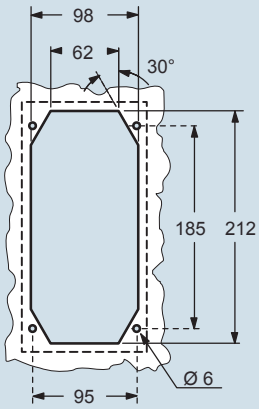
- Compliant with CEI 23-48 (IEC 60670) and with draft standard CEI 23-49
- Covers in self-extinguishing glass fibre reinforced polyester, UL approved, RAL 7035 grey
- Threaded seats for assembly of PQF and PQ socket-outlets
- Stainless steel retained fixing screws
- Oil resistant and anti-aging soft rubber gaskets
- Transparent hinged cover in self-extinguishing polycarbonate, with gasket, sized DIN-rail EN 60715, fixing screws and closing plates
- The covers mounted on the boxes guarantee the compliance with IP66/IP67 degrees of protection requirements (EN 60529)
- ⓜ With Italian Quality Mark (CEI 23-48, CEI 23-49)

Covers with built-in 16A and 32A socket-outlets

Covers with room for modular control equipment

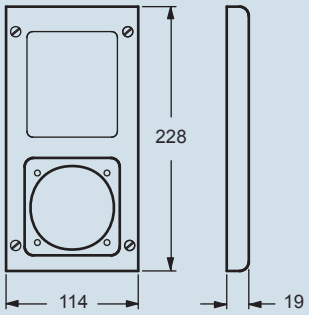
Description	Part No.	Part No.
Cover for one socket-outlet for PQF and PQ straight flush-mounting socket-outlets (see following page)	**BC 1123 Q** ⓜ	
Cover for two socket-outlets for PQF and PQ straight flush-mounting socket-outlets (see following page)	**BC 1123 Q** ⓜ	
Cover with compartment and panel for modular units (max. 4-5 units)		**BC 1123 R** ⓜ
Cover for one socket-outlet + compartment and panel for modular units (max. 4-5 units) Uses PQF and PQ straight flush-mounting socket-outlets (see following page)		**BC 1123 RQ** ⓜ

Panel cut-out in mm, for panel-mounting

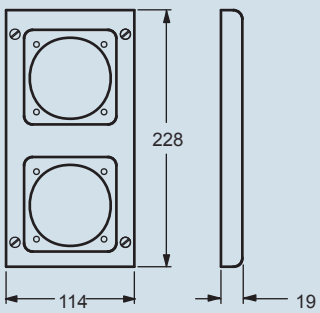


Dimensions in mm

BC 1123 Q

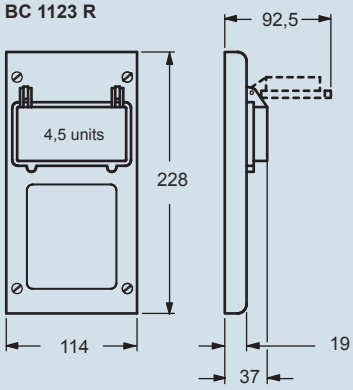


BC 1123 Q2

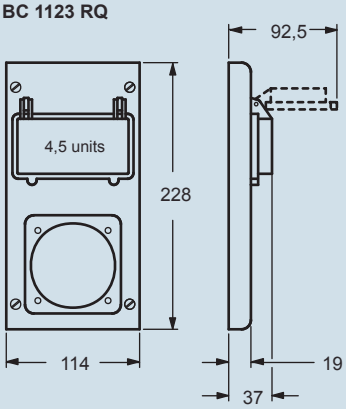


Dimensions in mm

BC 1123 R



BC 1123 RQ



Notes:
articles BC 1123 R and BC 1123 RQ include the BC 1123 PF assembly plate

Dimensions indicated are not binding and may be changed without prior notice.

PQF...PQ - Straight flush-mounting socket-outlets

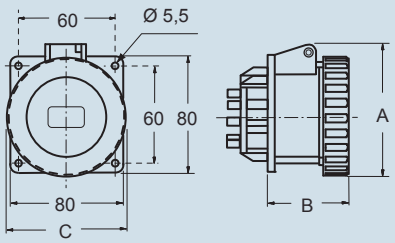
- Compliant with EN 60309 -1, -2 and -4
- Enclosure, insert and cover in insulating thermoplastic self-extinguishing material
- RAL 7035 grey enclosure, cover colour coded according to operating voltage
- Cover with locking ring and gasket
- Flange with anti-aging gasket
- Terminals with retained screws
- ⓜ With Italian Quality Mark

16A
IP67 degrees of protection

32A
IP67 degrees of protection

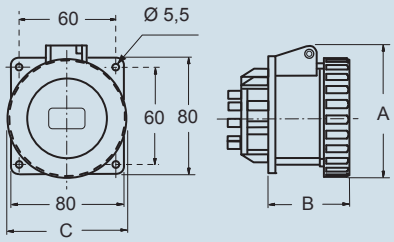
Description	Part No.	Part No.
100 - 130V ~ - 50 and 60 Hz - Yellow		
16A - 2P+⊕ - 4h - Panel cut-out 60 x 60 mm	**PEW 1643 PQF** ⓜ	
16A - 3P+⊕ - 4h - Panel cut-out 60 x 60 mm	**PEW 1644 PQF** ⓜ	
16A - 3P+N+⊕ - 4h - Panel cut-out 60 x 60 mm	**PEW 1645 PQ** ⓜ	
200 - 250V ~ - 50 and 60 Hz - Blue		
16A - 2P+⊕ - 6h - Panel cut-out 60 x 60 mm	**PEW 1663 PQF** ⓜ	
16A - 3P+⊕ - 9h - Panel cut-out 60 x 60 mm	**PEW 1694 PQF** ⓜ	
16A - 3P+N+⊕ - 9h - Panel cut-out 60 x 60 mm	**PEW 1695 PQ** ⓜ	
380 - 415V ~ - 50 and 60 Hz - Red		
16A - 2P+⊕ - 9h - Panel cut-out 60 x 60 mm	**PEW 1693 PQF** ⓜ	
16A - 3P+⊕ - 6h - Panel cut-out 60 x 60 mm	**PEW 1664 PQF** ⓜ	
16A - 3P+N+⊕ - 6h - Panel cut-out 60 x 60 mm	**PEW 1665 PQ** ⓜ	
480 - 500V ~ - 50 and 60 Hz - Black		
16A - 3P+⊕ - 7h - Panel cut-out 60 x 60 mm	**PEW 1674 PQF** ⓜ	
16A - 3P+N+⊕ - 4h - Panel cut-out 60 x 60 mm	**PEW 1675 PQ** ⓜ	
100 - 130V ~ - 50 and 60 Hz - Yellow		
32A - 2P+⊕ - 4h - Panel cut-out 60 x 60 mm		**PEW 3243 PQ** ⓜ
32A - 3P+⊕ - 4h - Panel cut-out 60 x 60 mm		**PEW 3244 PQ** ⓜ
32A - 3P+N+⊕ - 4h - Panel cut-out 60 x 60 mm		**PEW 3245 PQ** ⓜ
200 - 250V ~ - 50 and 60 Hz - Blue		
32A - 2P+⊕ - 6h - Panel cut-out 60 x 60 mm		**PEW 3263 PQ** ⓜ
32A - 3P+⊕ - 9h - Panel cut-out 60 x 60 mm		**PEW 3294 PQ** ⓜ
32A - 3P+N+⊕ - 9h - Panel cut-out 60 x 60 mm		**PEW 3295 PQ** ⓜ
380 - 415V ~ - 50 and 60 Hz - Red		
32A - 2P+⊕ - 9h - Panel cut-out 60 x 60 mm		**PEW 3293 PQ** ⓜ
32A - 3P+⊕ - 6h - Panel cut-out 60 x 60 mm		**PEW 3264 PQ** ⓜ
32A - 3P+N+⊕ - 6h - Panel cut-out 60 x 60 mm		**PEW 3265 PQ** ⓜ
480 - 500V ~ - 50 and 60 Hz - Black		
32A - 3P+⊕ - 7h - Panel cut-out 60 x 60 mm		**PEW 3274 PQ** ⓜ
32A - 3P+N+⊕ - 4h - Panel cut-out 60 x 60 mm		**PEW 3275 PQ** ⓜ

Dimensions in mm



types			A	B	C
PQF	**16A**	2P+⊕	82	52	70
		3P+⊕	86	52	78
PQ	**16A**	3P+N+⊕	93	52	86

Dimensions in mm



types			A	B	C
PQ	**32A**	2P+⊕	98	62	92
		3P+⊕	98	62	92
		3P+N+⊕	105	62	100

Dimensions indicated are not binding and may be changed without prior notice.

- Compliant with international standard IEC 60670 (Italian standard CEI 23-48) and Italian draft standard CEI 23-49
- Boxes in self-extinguishing, glass fibre reinforced polyester, UL approved, RAL 7035 grey
- Boxes can be wall- or flush-mounted
- Sides have threaded entry/exit holes
- Threaded seats in brass for assembly of covers and socket-outlets
- Boxes are supplied with closing plugs, cable glands, reduction nipples, gaskets and small parts
- IP66/IP67 class of protection (EN 60529)
- ⓜ With Italian Quality Mark (CEI 23-48, CEI 23-49)

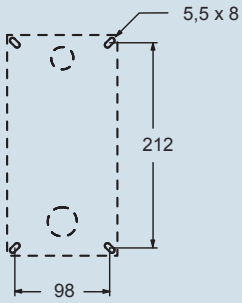
Single box

Triple box

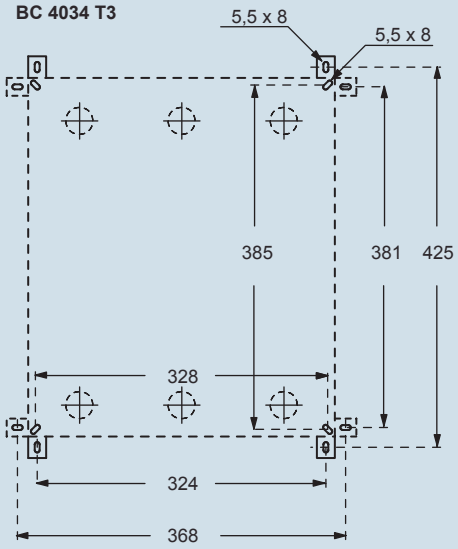
Description	Part No.	Part No.
Single box equipped with: - ARD 21 and ARD 29 plugs - Pg 21 and Pg 29 cable glands	**BC 1123 CS** ⓜ	
Single box equipped with: - ARD 29 and ARD 36 plugs - Pg 29 and Pg 36 cable glands - Insulating separators - Climbing irons for external box mounting		**BC 4034 T3** ⓜ

Panel cut-out in mm

BC 1123 CS

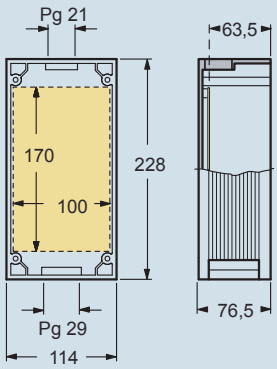


BC 4034 T3

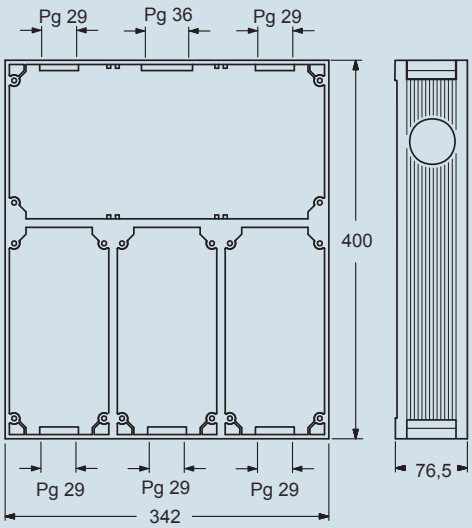


Dimensions indicated are not binding and may be changed without prior notice.

Dimensions in mm



Dimensions in mm



- Compliant with international standard IEC 60670 (Italian standard CEI 23-48) and Italian draft standard CEI 23-49
- Covers in self-extinguishing, glass fibre reinforced polyester, UL approved, RAL 7035 grey
- Stainless steel retained fixing screws
- External metallic parts (pins, springs, etc.) in stainless steel
- Oil resistant and anti-aging soft rubber gaskets
- The covers mounted on the boxes guarantee the compliance with IP66/IP67 degrees of protection requirements (EN 60529)
- ⓜ With Italian Quality Mark (CEI 23-48, CEI 23-49)

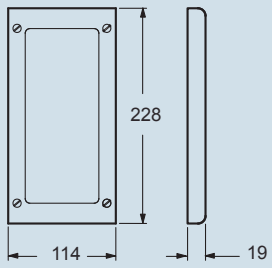
Cover for single and triple box
Joint cover plate

Cover for triple box
Cover for modular control equipment

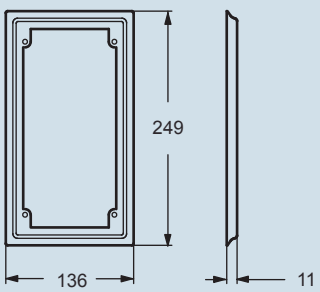
Description	Part No.	Part No.
Smooth cover for closing unused spaces or as support for accessories outside the box	**BC 1123 P** ⓜ	
Joint cover plate for wall flush-mounting of single modules on non uniform walls or tiled surfaces	**BC 1123 ME**	
Smooth cover Closes the top of the triple box Supplied with alveolated bottom		**BC 1734 P3** ⓜ
Cover with tilting panel **Cover with clear tilting panel** for the assembly of modular units (16) Supplied with 35 mm DIN-rail EN 60715, with closing plates for unused spaces		**BC 1734 R3** ⓜ **BC 1734 R3T** ⓜ

Dimensions in mm

BC 1123 P

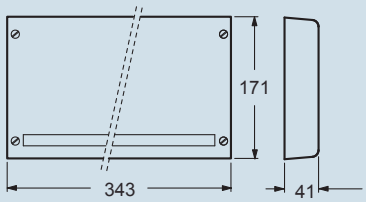


BC 1123 ME

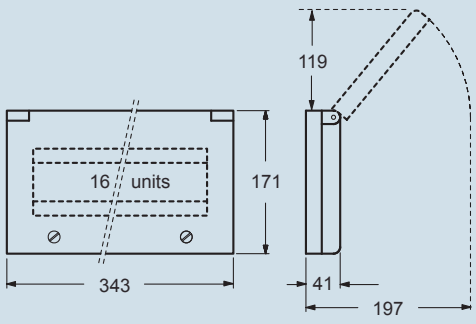


Dimensions in mm

BC 1734 P3



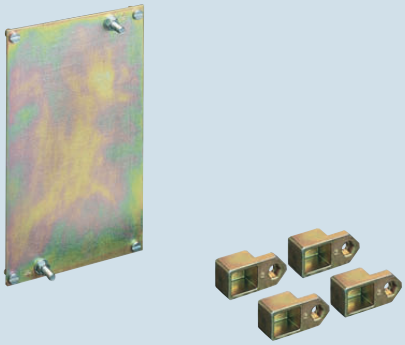
BC 1734 R3 and BC 1734 R3T



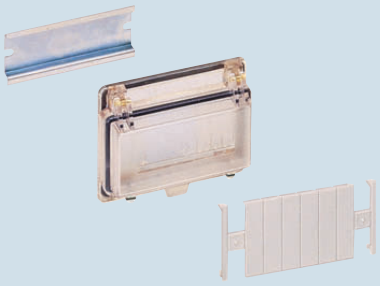
Dimensions indicated are not binding and may be changed without prior notice.

- Mounting plate in zinc-plated steel with PE earth connections, threaded inserts and fixing screws on the bottom of the boxes
- Metal alloy brackets with screws for assembly on boxes
- Cover in self-extinguishing polycarbonate with transparent inspection door and gasket
- Snap-fit closing plaques including half modules (6 3/4 + 2 1/4 of module)
- DIN-rail EN 60715, in zinc-plated steel, sized, with fixing screws

Mounting plate
Brackets for wall-mounting



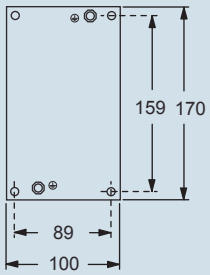
DIN-rail EN 60715
Transparent snap-fit closing plaques
Cover with hinged door



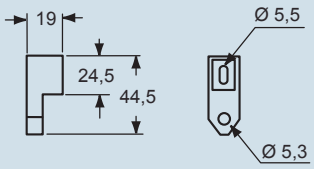
Description	Part No.	Part No.
Mounting plate for single or triple boxes	**BC 1123 PF**	
Brackets for wall mounting for single and triple boxes	**BC SFT**	
DIN-rail EN 60715 For BC 1123 PF assembly plates		**BC GD8**
Transparent cover with hinged door for modular units (max. 4-5 units), screw-locking		**BC 45 ST**
Snap-fit closing plaques for unused modular openings		**BC FR 62**

Dimensions in mm

BC 1123 PF

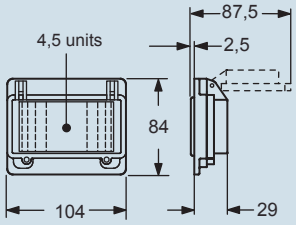


BC SFT

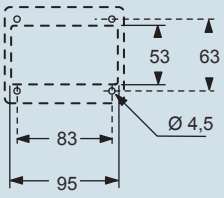


Dimensions in mm

BC 45 ST



Panel cut-out in mm, for panel-mounting



Dimensions indicated are not binding and may be changed without prior notice.

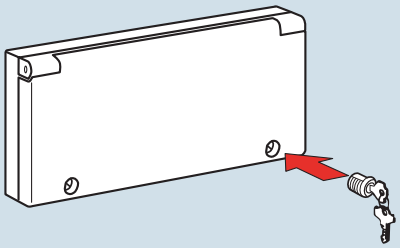
- BC CHT
  - Security padlock that prevents access to the door closing screws
  - Supplied with two sets of keys
- BC BLC
  - Kit comprising insert and padlock that enables to lock controls in open or closed position
  - Supplied with two sets of keys

Security padlock with key
Security padlock for controls

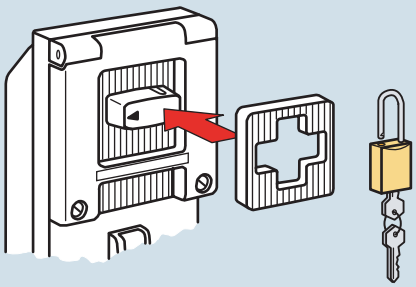
Description	Part No.
Security padlock for the door of BC 1734 R3 covers	**BC CHT**
Security device For BE and BK socket-outlets and BI switches	**BC BLC**

Dimensions in mm

BC CHT



BC BLC



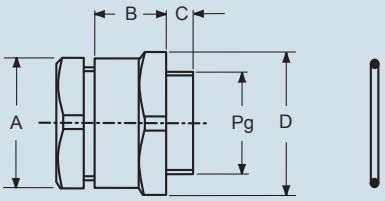
Dimensions indicated are not binding and may be changed without prior notice.

- In insulating thermoplastic material, grey RAL 7035
- Anti-aging rubber gasket

Cable gland

Description		Part No.
Cable glands		
- Thread Pg 11	Rubber hole Ø 7.5-10-12.5 mm	**ARC 11**
- Thread Pg 13.5	Rubber hole Ø 7.5-10-12.5 mm	**ARC 13.5**
- Thread Pg 16	Rubber hole Ø 7.5-10-12.5-15 mm	**AFT 16**
- Thread Pg 21	Rubber hole Ø 10-13-16-19 mm	**AFT 21**
- Thread Pg 29	Rubber hole Ø 18-21-24-27 mm	**AFT 29**
- Thread Pg 36	Rubber hole Ø 24-27-30-33 mm	**AFT 36**
- Thread Pg 42	Rubber hole Ø 30-33-36-39 mm	**ARC 42**
- Thread Pg 48	Rubber hole Ø 36-39-42-45 mm	**ARP 48**

Dimensions in mm



Part No.	A	B	C	D	Pg
ARP 11	19	20	9	24	11
ARP 13.5	22	19,5	9	26	13,5
AFP 16	24	21	10	29	16
AFP 21	30	26	10	39	21
AFP 29	41	29,5	10	50	29
AFP 36	50	33,5	10	58	36
ARP 42	54	28	12,5	60	42
ARP 48	64	41,5	13,5	77	48

Dimensions indicated are not binding and may be changed without prior notice.

Complementary parts and accessories

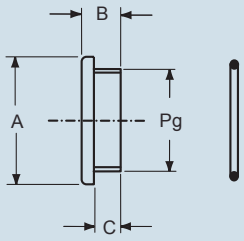
- In insulating thermoplastic material, grey RAL 7035
- Anti-aging rubber gasket

Sealing plugs including gasket

Reduction nipples including gasket

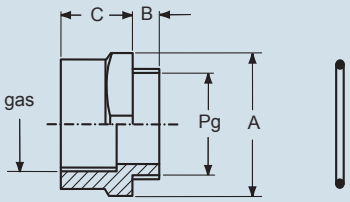
Description	Part No.	Part No.
Sealing plugs		
- For holes Pg 11	**ARD 11**	
- For holes Pg 13.5	**ARD 13.5**	
- For holes Pg 16	**ARD 16**	
- For holes Pg 21	**ARD 21**	
- For holes Pg 29	**ARD 29**	
- For holes Pg 36	**ARD 36**	
- For holes Pg 42	**ARD 42**	
- For holes Pg 48	**ARD 48**	
Reduction nipples Pg - gas		
- Thread Pg 21 - Ø 3/4" gas pipes		**ARE 2134**
- Thread Pg 29 - Ø 1" gas pipes		**ARE 291**
- Thread Pg 36 - Ø 1 1/2" gas pipes		**ARE 3612**
Reduction nipples Pg - MB		
- Thread Pg 21 - Ø M25 pipes		**ARE 2125**
- Thread Pg 29 - Ø M32 pipes		**ARE 2932**
- Thread Pg 36 - Ø M40 pipes		**ARE 3640**

Dimensions in mm

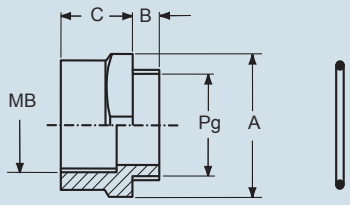


Part No.	A	B	C	Pg
ARD 11	22	7,5	6	11
ARD 13.5	24	7,5	6	13,5
ARD 16	26	7,5	6	16
ARD 21	35	10	8	21
ARD 29	44	10	8	29
ARD 36	54	12	10	36
ARD 42	64	14	12	42
ARD 48	70	14	12	48

Dimensions in mm



Part No.	A	B	C	Pg	gas
ARE 2134	36	11	24	21	3/4"
ARE 291	46	12	28	29	1"
ARE 3612	60	12	32	36	1" 1/2



Part No.	A	B	C	Pg	MB
ARE 2125	36	11	24	21	M25
ARE 2932	46	12	28	29	M32
ARE 3640	60	12	32	36	M40

Dimensions indicated are not binding and may be changed without prior notice.

EN 60309-1 and EN 60309-2 standards

In 1990, **CENELEC** (European Electrotechnical Standards Committee) introduced the provisions of the international publications IEC 60309-1 and IEC 60309-2 into the two corresponding European standards EN 60309-1 and EN 60309-2 (classification CEI 23-12/1 and 23-12/2). **IEC** (*International Electrotechnical Commission*), the worldwide organisation for electrotechnical standardisation, had adopted these publications basing them almost entirely on the EEC 17 Publication of 1958, now withdrawn, issued by the now dissolved organisation **CEEél**. This is why still today this system of industrial sockets and plugs is traditionally called "EEC" by many. The European standards EN 60309-1 and -2 were then compulsorily adopted as national standards by all the CENELEC member states (which as from 1 May 2004, with the expansion of the EU, include Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Iceland, Iceland, Italy, Latvia, Lithuania, Luxembourg, Malta, Norway, Holland, Poland, Portugal, United Kingdom, Czech Republic, Slovakia, Slovenia, Spain, Sweden, Switzerland and Hungary). All conflicting national standards have at the same time been abolished.

Today, therefore, the manufacture of plugs and socket-outlets for industrial use has been harmonised throughout Europe. Before its termination, CEEel's members also included Bulgaria, Israel, former Yugoslavia (today Bosnia, Croatia, Macedonia, Serbia with Montenegro, Slovenia) and the former Soviet Union (today the Russian Federation).

In virtue of the correspondence with the IEC publications, this industrial plugs and socket-outlets system is widely known and appreciated in leading non-European countries such as Argentina, Australia, Brazil, Canada, China, Korea, Egypt, Japan, India, South Africa, Turkey and the USA.
In Italy the above harmonisation is regulated by standards CEI EN 60309-1 and CEI EN 60309-2. In 1999, the fourth editions of the IEC publications were adopted as EN by CENELEC and published in Italy in 2000.

In 2007, Amendment EN 60309-1/A1 (IEC 60309-1 Amd 1, implemented by CEI in February 2008 and in force as from 1st November 2009) introduced technical updates, such as:
- addition of construction and test requirements for terminals and screwless terminals (spring type) and IDC terminals for 16 A accessories (prior to their development) and compliance with the requirements of SC 23F standards (EN 60999-1, EN 60999-2);
- cancellation of the "drop" and "triangle" symbols and the confirmed use of only IP degrees of protection provided for by standard EN 60529;
- introduction of possible alternative nominal current values to the classic 16A, 32A, 63A, 125A and 250A: 6A, 10A, 25A, 40A, 50A, 80A, 90A, 150A, 160A and updating, where necessary, of all test requirements in order to take into account the new nominal capacities;
- restriction on sizes of metric cables and conductors with ban on North American AWG/MCM sizes.

Again in 2007, the Amendment EN 60309-2/A1 extended the construction requirements and tests regarding accessories with screwless terminals (springs) or IDC terminals up to 32A nominal current, though only for Italy and Germany. A "versatile" degree of protection has been introduced, IP66/IP67 (fastenings, covers, retainers with degree of protection IP67), and for very low voltage ≤ 50V socket-outlets and plugs, the 8h position for accessories at 25V - 32A for portable electric incubators has been standardised, for use at 12V d.c. or 24V d.c. aboard ambulances or helicopters (covered by the relative ISO standard).

In 2012, Amendment EN 60309-1/A2 (IEC 60309-1 Amd 2) implemented by CEI in November 2012, in force as from 1st December 2012 – for existing products as from 13-07-2015, introduced further technical modifications in numerous points, the more important being: an increase in the max nominal voltage from 690V d.c. or a.c. to 1 000V d.c. or a.c.; an increase in the max nominal voltage from 250A to 800A, with the relative extensions regarding the sizes of the connectable conductors for the new preferential nominal current values of 315A, 400A, 630A and 800A; the restriction as regards the installation of these devices exclusively by informed personnel (IEV 60050-195:1998, Amendment 1:2001, definition 195-04-02) or appropriately trained personnel (IEC 60050-195:1998, Amendment 1:2001, definition 195-04-01); the extension of the usability of the screwless terminals (spring or IDC type) from 16A up to 32A for the series (that allowed in the EU by CENELEC); update of all test methods required to cover the above amendments.

Still in 2012, Amendment EN 60309-2/A2 2012-04, published by CEI in August 2012 and in force as from 1st September 2012, introduced an amendment to art. 1 "Field of application", in particular to raise the max voltage to 1 000 V a.c. or d.c., art. 3 "Reference standards", Table 104, introducing a supplementary paragraph 16.101 and modifying standardisation Sheets 2-I, 2-II, 2-III and 2-IIIa, 2-IVa, as well as Attachment ZA.

The technical notes below and the products illustrated in the present booklet refer to series 1 versions, used in Europe on the basis of said European Standards and in countries of European technical-cultural origin (e.g. most of Latin America, Australia, South Africa). A series 2 also exists, which differs for its rated current, voltage and frequency values and for its polarity and pole marking, adapting to North American installation standards and those of countries that have adopted this system (e.g. Mexico, Japan).

The provisions of standards

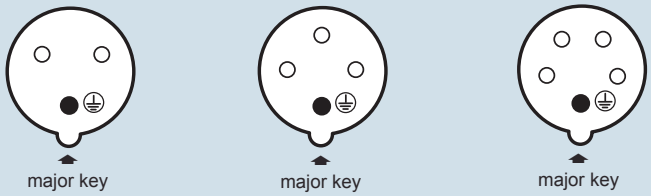
Each model of plug and socket is unique and has a specific use. Each model has safety devices that make it impossible to insert a plug into a socket made for a different capacity, voltage, frequency and number of poles. In the "low voltage" versions, the safety system is based on two references:
- a guiding groove on the socket that corresponds to a nib on the plug;
- an earthing contact of increased capacity with respect to the other contacts, and located in different hour positions according to the voltages used.

The 63A and 125A plugs have a pilot contact for operating an electric interlock.

Hour position (h)

This position is determined by looking at the front of the socket and placing the major guiding groove at the 6 o'clock position and noting the hour position of the earthing contact. Following are examples of three different polarities with the earthing contact at the 6 o'clock position.

Socket - front view



Low voltage over 50V up to 1000V

Number of poles	*Frequency (Hz)*	*Rated operating voltage (V)*	*Hour position (h) earthing contact* [1]		*Colour*
			16A and 32A	*63A and 125A*	
2P+⏚	50 and 60	100 ÷ 130	4	4	yellow
		200 ÷ 250	6	6	blue
		380 ÷ 415	9	9	red
	50 and 60	480 ÷ 500	7	7	black
		supply from ins. transf.	12	12	[5]
	100 ÷ 300	> 50	10	10	[4]
	> 300 ÷ 500	> 50	2	2	[4]
	direct current	> 50 ÷ 250 [6]	3	3	[5]
		> 250	8	8	[5]
3P+⏚		supply from ins. transf.	12	12	[5]
	50 and 60	100 ÷ 130	4	4	yellow
		200 ÷ 250	9	9	blue
		380 ÷ 415	6	6	red
	60	440 ÷ 460 [2]	11	11	red
	50 and 60	480 ÷ 500	7	7	black
		600 ÷ 690	5	5	black
	50	380	3	3	red
	60	440 [3]	3	3	red
	50 and 60	1000	—	8	black
	100 ÷ 300	> 50	10	10	[4]
	> 300 ÷ 500	> 50	2	2	[4]
3P+N+⏚		57/100 ÷ 75/130	4	4	yellow
		120/208 ÷ 144/250	9	9	blue
	50 and 60	200/346 ÷ 240/415	6	6	red
		277/480 ÷ 288/500	7	7	black
		347/600 ÷ 400/690	5	5	black
	60	250/440 ÷ 265/460 [2]	11	11	red
	50	220/380	3	3	red
	60	250/440 [3]	3	3	red
	50 and 60	supply with insul. transf.	12	12	[5]
	100 ÷ 300	> 50	10	10	[4]
	> 300 ÷ 500	> 50	2	2	[4]
all types	All rated operating voltages and/or frequencies not covered by other configurations. In addition, this hour position can be used in special applications where a distinction is required with respect to the other standardised positions.		1	1	[5]

[1] The positions indicated with dashes "-" are not standardised.
[2] Mainly for marine installations.
[3] Only for refrigerated containers (standardised by ISO).
[4] If necessary, green may be used together with the colour of the operating voltage for frequencies of over 60 Hz up to 500 Hz inclusive.
[5] Colour according to voltage.
[6] This configuration must have an earthing contact as it covers voltages higher than the upper limits of the ELV (d.c.) according to IEC 60364-4-41.

Normal service conditions for electrical equipment

The standard EN 61439-1 applies to low-voltage switchgear and control gear assemblies, commonly known as low-voltage boards, with rated voltage not exceeding 1000V eff. a.c. (with frequency not exceeding 1 kHz, although boards for greater frequencies are allowed under further specific prescriptions) or 1500V in d.c.
This standard defines the equipment (boards) for indoor and outdoor use in accordance with the installation conditions. The normal service conditions are in fact defined for indoor and outdoor use.
These normal conditions are also used as reference in standard EN 60664-1 (basic safety publication) for the coordination of insulation. This coordination consists of the definition of the rated insulation values (the air and surface distances between conductors of different voltages) of electrical equipment and the corresponding components relating to:

- dielectric characteristics of the insulating materials used
- degree of pollution in the environment where they are to be used
- overvoltage category of the point at which they are connected to the network (distance from the generating centres).

1. Ambient air temperature
In normal indoor service conditions, the temperature should not be lower than -5 ˚C or greater than +40 ˚C and the average value over 24 h should not exceed +35 ˚C. For outdoor installations the minimum value is -25 ˚C in mild climates and -50 ˚C in Arctic climates (with the possibility of an agreement between manufacturer and user in the latter case).

2. **Altitude**
The altitude of the installation site should not exceed 2000 m. For equipment to be used at higher altitudes, it is necessary to consider the reduction of dielectric rigidity and the cooling effect of the air. For installations in different conditions, refer to the manufacturer.

3. Atmospheric conditions:

Humidity and pollution
The relative humidity of the air should not exceed 50% at a maximum temperature of 40 ˚C. Higher relative humidity values are allowed at lower temperatures, for example: 90% at +20 °C. For outdoor installations, the relative humidity may reach 100% at a maximum temperature of +25 ˚C.

Degrees of pollution

The pollution degrees define the environmental conditions. To go in more detail, standard IEC 60664-1 clarifies that pollution is defined as any contribution of foreign matter, whether a solid, liquid or gaseous (ionised gas), that may negatively affect the dielectric strength of the surface resistivity of the insulating material.
Four degrees of pollution are defined and are described by conventional numbers based on the quantity of polluting agent or on the frequency with which the phenomenon occurs that reduces the dielectric strength and/or the surface resistivity.

- **pollution degree 1**: no pollution or only dry non-conductive pollution. The pollution has no influence.
- **pollution degree 2**: only non-conductive pollution except that occasionally a temporary conductivity caused by condensation is to be expected.
- **pollution degree 3**: conductive pollution occurs or dry non conductive pollution occurs which becomes conductive due to condensation [7].

The **pollution degree 2** refers to a household or similar environment.
The **pollution degree 3** refers to an industrial or similar environment.

The third edition and the forthcoming fourth edition of EN 60309-1 standard (IEC 60309-1) specifies that the normal use environment for the industrial plugs and socket-outlets complying with this standard has a pollution degree 3 according to standard IEC 60664-1.

[7] Pollution degree 4 was eliminated in the new standard edition as clearly illogical: conditions of persistent conductivity caused for example by conductive dust, rain or snow are definitely to be avoided throughout the project, and no isolating distance is capable of withstanding them.

[8] The **IP66/IP67** degree of protection has been introduced in the Amendment 1 of standards EN 60309-1 and EN 60309-2 (and of the relating IEC standards). It is already accounted for in the IP degree of protection standard EN 60529 as a "versatile" form of protection, covering the fact that the temporary immersion resistance test (protection IPX7) does not automatically comply with the two lower degrees of protection IPX6 and IPX5, tested with the respective jet tests. If the end user requires the equipment to resist both against temporary immersions and pressurized water jets, declaredly IP66/IP67 devices with double marking must be selected.

IP degree of protection and the EN 60529 standard

The minimum IP degree of protection is regulated by the CEI 64-8 installation standards (inclusion of the harmonisation documents of the CENELEC HD 60364 series and the IEC 60364 publication) which, in part 7, cover a number of special environments: construction and demolition sites, structures designed for agricultural or livestock breeding use, restricted conductor areas, caravans and caravan sites, environments with a greater risk in case of fire, public performance and entertainment areas, pools and, in the future, fountains, marinas and harbour areas. The standard is applicable to enclosures for electric materials with a rated power no greater than 72.5 kW.
All the equipment must be installed according to state of the art rules and must comply with any manufacturer's assembly instructions. When components of different degrees of protection are assembled, the resulting board or distribution system will assume the lowest degree of protection of the mounted components.
This has been assessed and applies to:
- socket-outlets, when a plug of the same degree of protection is inserted or when the cover is closed (with counternuts tightened for IP67).
- plugs (with counternuts tightened for IP67).
- enclosures, when all covers are closed

The range of ILME products presented in this catalogue offers the following range of protection:

IP44: protection against the *penetration of solid foreign objects* with a diameter equal to or greater than 1 mm for protection against the intrusion of dangerous parts with an access calibre of Ø 1 mm (1st digit), and protected against the *dangerous effects of water spray* from all directions (2nd digit).
IP55: Protection against the *penetration of harmful quantities* of powder and against *access to dangerous* parts with an access calibre of Ø 1 mm (1st digit) and protected against the *dangerous effects of water jets* with a nozzle from all directions (2nd digit).
IP66: total protection against *dust* and access to *dangerous parts* with an accessibility calibre of Ø 1 mm (1st digit), and protected against powerful *water jets* such as sea waves (2nd digit).
IP67: total protection against *powder* and against *access to dangerous parts* with an access calibre of Ø 1 mm (1st digit) and protected against the *effects of temporary immersion* (30') in water at a maximum depth of 1 metre (2nd digit).
IP69: total protection against *dust* and access to *dangerous parts* with an accessibility calibre of Ø 1 mm (1st digit), and protected against powerful *water jets, such as sea waves, and high temperatures* (2nd digit).

The socket-outlets with IP55 degree of protection and those with double degree of protection IP66/IP67 [8] have a bayonet jointed lid, traditionally defined as "water-tight" and require plugs with IP67 degree of protection (with counternut and gasket) to preserve the degree of protection marked on the apparatus.

1st digit
Personal protection against contact with hazardous parts

IP	External solid objects	Protection
0		none
1		against solid foreign objects with Ø greater or equal to 50 mm (e.g. hand)
2		against solid foreign objects with Ø greater or equal to 12 mm (e.g. finger)
3		against solid foreign objects with Ø greater or equal to 2.5 mm (e.g. tools and wires)
4		against solid foreign objects with Ø greater or equal to 1 mm (e.g. fine tools and wires)
5		against dust (no harmful deposit)
6		total against dust

2nd digit
Protection of materials against harmful penetration of water

IP	Tests	Protection
0		none
1		against vertical drops of water
2		against drops of water with an inclination of 15° from the vertical
3		against drops of water with an inclination of 60° from the vertical
4		against splashing water from all directions
5		against jets of water from all directions
6		against powerful jets of water (such as sea waves)
7		against the effect of temporary immersion in water at a depth of 1 metre
8		against the effect of prolonged immersion in water (duration and/or depth according to requirements)
9		against jets of water at high pressure and high temperature

Resistance to chemical agents

The information given below is valid for conditions of application at environmental temperatures no greater than 40 °C.
The data provided in the table should be considered merely as a guide because the resistance of technopolymers that come upon contact with chemical agents depends upon the concentration of the agent, the temperature at the time of contact, the mechanical stress involved and the duration of the contact.
If the accessories and equipments are to be used in the presence of acids, bases, solvents or high concentration oils, contact our Technical Service Department.

Table of reactions to chemical agents

chemical agents / items	H_2O (t up to 23 °C)	Watery saline solution	Acids		Bases		Solvents			Ethyl alcohol (ethanol)	Oils			Fats		Animal organic solution	Fuels	
			Concentrates	Diluted 15% max	Concentrated	Diluted 15% max	Aliphatic hydrocarbons (hexane)	Aromatic hydrocarbon (benzene)	Chlorinated hydrocarbons and acetone (ketones)		Silicone	Mineral	Vegetable	Animal	Synthetic		Unleaded	Diesel
BK board components																		
items of the **BK** series , except [1]	●	●	○	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●

[1] BP, BPR, Q, Q2 and RQ type modules (see reactions of the Pluso socket-outlets); BC 1734 R3T (see reactions of FM series).

Legend

● = resistant
○ = limited resistance
X = not resistant

Corrosion and resistance to rust

The new edition of standard EN 60309-1 recommends for corrosion and resistance to rust the use of IP67 plugs and socket-outlets wherever corrosion could create problems on electrical parts and advises the manufacturer to consider the product specifically in terms of resistance to corrosion under specific operating conditions.
To this end, socket-outlets and plugs with nickel-plated contacts are available upon request for applications in permanently dusty environments (e.g. cement and tile factories) or in environments with animal organic liquids (e.g. farms, agricultural and food processing industries). **These socket-outlets and plugs and sockets have a greater resistance to corrosion** and greater sliding capacity, allowing the plug to be removed from the socket even under difficult conditions.

Contact our sales offices for availability and price quotes.

Best quality-price balance

IB6/FC Series

- IP66 degree of protection
- mechanical resistance: IK 10
- insulating enclosure
- 16A, 32A, 63A models
- installation: single wall mount or with FC series
- cable entry: top or rear
- bottom plug entry
- versions: without fuses; with fuses; with transformer

SQV/FM Series

- IP44/IP55 degree of protection
- mechanical resistance: 6 J
- insulating enclosure
- 16A, 32A models
- installation: wall / flush mount
- cable entry: top or rear
- plug entry 15° angled
- versions: without fuses; with fuses; with transformer

FM PI/PQ Series

- IP44 and IP55 degree of protection
- mechanical resistance: 6 J
- insulating enclosure
- 16A, 32A, Schuko®
- modular

PB5 Series, die-cast aluminium alloy

- IP55 degree of protection
- mechanical resistance: IK 10
- die-cast aluminium alloy enclosure
- 16A, 32A, 63A,125A models
- installation: wall mount
- cable entry: top or rear
- bottom plug entry
- versions: without fuses; with fuses; with transformer

Extremely robust

TM Series

- IP66/IP67 degree of protection
- mechanical resistance: IK 10
- insulating enclosure, robust construction
- 16A, 32A, 63A models
- installation: wall / flush mount
- cable entry: top, bottom or rear
- bottom plug entry
- versions: without fuses; with fuses; with transformer

TM Ex Series

- IP66/IP67 degree of protection
- mechanical resistance: IK 10
- insulating enclosure, robust construction
- 16A, 32A, 63A models
- installation: wall mount
- cable entry: top or rear
- bottom plug entry
- versions: without fuses; with fuses

TM PI Series

- IP44 and IP66/IP67 degree of protection
- mechanical resistance: IK 10
- insulating enclosure, robust construction
- 16A, 32A models
- installation: wall / flush mount
- cable entry: top, bottom or rear
- plug entry 15° angled
- versions: standard PLUSO plugs

BK Series

- IP66/IP67 degree of protection
- mechanical resistance: IK 10
- UL 94 V0 insulating enclosure
- 16A, 32A, 63A models
- installation: wall / flush mount
- cable entry: top, bottom or rear
- plug entry: front
- versions: without fuses; with fuses; with transformer

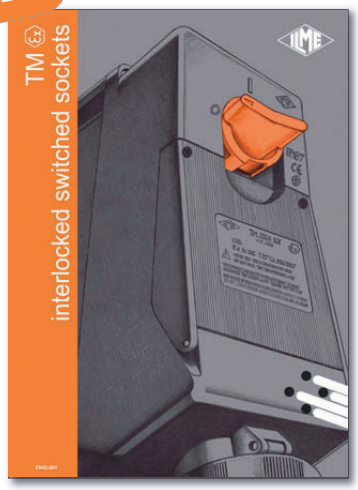
NEW

PES
Save time - Squich® connection

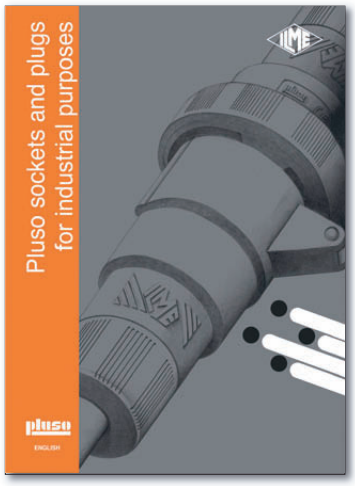
NEW

IB6
Tradition renews itself

NEW

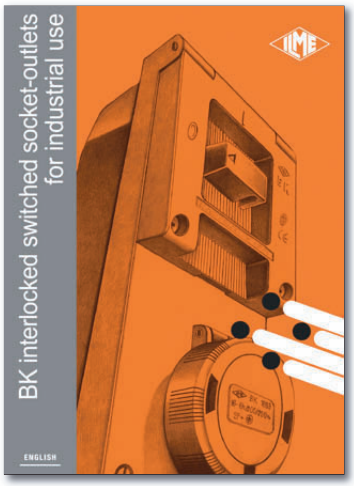


TM ATEX
Potentially explosive atmospheres

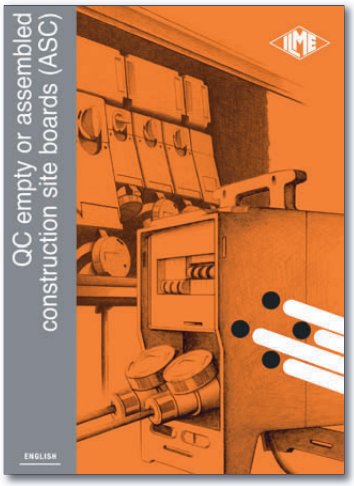


PLUSO
Sockets and Plugs

SQV
Interlocked switched socket-outlets



BK
Interlocked switched socket-outlets



QC
Site boards

TM
Interlocked switched sockets

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