

# the products

plugs and couplers

with interlock

main application fields

**Pluso**  
page 11 to page 37

**SQ and SQ...**  
page 131 to page 143



domestic - services sector - construction sites - shopping centres - agriculture and livestock breeding - light industry



**PK, KI, PB...T1 and T2**  
page 67 to page 87



services sector - construction sites - exhibition centres - tourist resorts, recreational centres, sports and entertainment centres - shopping centres - agriculture and livestock breeding - light and heavy industry



**TM**  
page 39 to page 65



services sector - construction sites - exhibition centres - tourist resorts, recreational centres, sports and entertainment centres - shopping centres - agriculture and livestock breeding - light and heavy industry



**BE, BK, BA, BP, BI, BT and BC**  
page 150 to page 156



hospitals - large-scale catering - harbour and naval works - agriculture and livestock breeding - chemical industry - light and heavy industry



steel industry - large works - shipyards - large industries

## systems

**FM**
**cases for distribution boards**

light, resistant, compact and easy to handle structures with a large number of possible combinations

page 105 to page 129

may be combined with:  
the Pluso series  
the SQ and SQ... series


**FC**
**supports and cases for distribution boards**

strong, modular and articulated structure, supports for the groups

page 89 to page 104

may be combined with:  
the Pluso series  
the SQ and SQ... series  
the PK, KI series, PB...T1 and T2


**BK**
**modular system for distribution boards**

especially strong structures for use in severe, highly aggressive conditions with degree of protection IP67

page 145 to page 161

may be combined with:  
the Pluso series


**PK...PB5, PK...LL,  
PB...A1 and A2**
**socket-outlets in die-cast metallic enclosures**

strong structures for use in extremely severe ambients

pages 78-79-81-82

may be combined with:  
the Pluso series


**TM**
**interlocked switched socket-outlets and accessories for distribution boards and batteries**

strong structures for use in extremely severe ambients with degree of protection IP66/IP67

page 39 to page 65

may be combined with:  
the Pluso series



**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 **CEEel**. This is why still today this system of industrial sockets and plugs is traditionally called by many "EEC". 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, 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 EN 60309-1 and EN 60309-2. In 1999 the fourth editions of the IEC publications were adopted as EN by the CENELEC and published in Italy in 2000.

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 the 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.

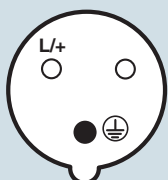
The 63A and 125A plugs have a pilot contact for operating an electric interlock.

**Hour Position (h)**

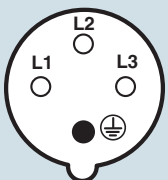
This position is determined by looking at the front of the socket and placing the major guiding groove at the 6 o'clock position and noting the hour position of the earthing contact.

Following are examples of three different polarities with the earth contact at the 6 o'clock position.

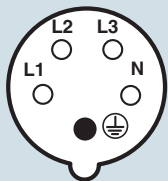
Socket - front view



▲ major key



▲ major key



▲ major key

**Low voltage over 50V up to 690V**

Number of poles	frequency	rated operating voltage	hour position (h) earthing contact (*)		colour
	Hz	V	16A and 32A	63A and 125A	
<b>2P+</b>	50 and 60	100 - 130	4	4	yellow
	50 and 60	200 - 250	6	6	blue
	50 and 60	380 - 415	9	9	red
	50 and 60	480 - 500	7	7	black
	50 and 60	supply from isol. transf.	12	12	(**)
	100 ÷ 300	> 50	-	-	(***)
	> 300 ÷ 500	> 50	2	-	(***)
	direct current	> 50 - 250	3	3	(**)
	direct current	> 250	8	8	(**)
	<b>3P+</b>	50 and 60	100 - 130	4	4
50 and 60		200 - 250	9	9	blue
50 and 60		380 - 415	6	6	red
60		440 - 460 ☆	11	11	red
50 and 60		480 - 500	7	7	black
50 and 60		600 - 690	5	5	black
50 60		380 440 *	3	-	red
100 ÷ 300		> 50	10	-	(***)
> 300 ÷ 500		> 50	2	-	(***)
<b>3P+N+</b>		50 and 60	57/100 - 75/130	4	4
	50 and 60	120/208 - 144/250	9	9	blue
	50 and 60	200/346 - 240/415	6	6	red
	50 and 60	277/480 - 288/500	7	7	black
	50 and 60	347/600 - 400/690	5	5	black
	60	250/440 - 265/460 ☆	11	11	red
	50 60	220/380 250/440 *	3	-	red
	100 ÷ 300	> 50	-	-	(***)
	> 300 ÷ 500	> 50	2	-	(***)
	<b>all types</b>	all rated operating voltages and/or frequencies not covered by other configurations		1	1

☆ Mainly for marine installations

\* Only for refrigerated containers (standardised by ISO)

(\*) The positions indicated with dashes "-" are not standardised

(\*\*) Colour according to voltage

(\*\*\*) 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

### The Provisions of the 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.

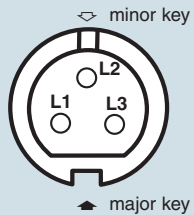
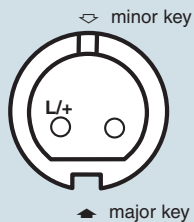
In the "extra-low voltage" versions with no earthing contact, the safety system is based on two references:

- a guiding groove (key way) on the plug that corresponds to a nib on the socket (major key) that is fixed at the 6 o'clock position
- another groove on the plug (minor key) and a nib on the socket (minor key) that can be positioned on different hours, according to the operating requirements.

### Hour Position (h)

This position is determined by looking at the front of the socket and placing the major key way at the 6 o'clock position and noting the hour position of the minor key. Following are examples of two different polarities with the minor key at the 12 o'clock position.

Socket - front view



### Extra low voltage up to 50V

Number of poles	frequency	rated operating voltage	hour position (h) minor key position (*)	colour	
	Hz	V	16A and 32A		
2P	50 and 60	20 - 25	no key way		violet
	50 and 60	40 - 50	12		white
	> 100 ÷ 200	20 - 25 and 40 - 50	4		(**)
	300	20 - 25 and 40 - 50	2		(**)
	400	20 - 25 and 40 - 50	3		(**)
	> 400 ÷ 500	20 - 25 and 40 - 50	11		(**)
	d.c.	20 - 25 and 40 - 50	10		white
3P	50 and 60	20 - 25	no key way		violet
	50 and 60	40 - 50	12		white
	> 100 ÷ 200	20 - 25 and 40 - 50	4		(**)
	300	20 - 25 and 40 - 50	2		(**)
	400	20 - 25 and 40 - 50	3		(**)
	> 400 ÷ 500	20 - 25 and 40 - 50	11		(**)

(\*) Positions 1, 8 and 9 are reserved for future standardisation. For constructional reasons, positions 5, 6 and 7 cannot be used.

(\*\*) If necessary, green may be used together with the colour of the operating voltage for frequencies higher than 60 Hz up to 500 Hz inclusive.

### Size of connectable conductors according to EN 60309-1

Conductor cross-sections in mm<sup>2</sup> usable in socket-outlets and plugs

rated operating voltage	rated current	fixed plugs* (rigid or semi rigid conductors)		plugs and couplers (rigid or semi fixed plugs rigid conductors)	
		min	max	min	max
over 50V up to 690V	16A	1.5	4	1	2.5
	32A	2.5	10	2.5	6
	63A	6	25	6	16
	125A	25	70	16	50
up to 50V	16A	4	10	4	10
	32A	4	10	4	10

For pilot contacts (63A ad 125A socket-outlets and plugs), refer to the conductors which can be used in the 16A socket-outlets and plugs with a rated voltage of over 50V.

\* It is also possible to connect flexible conductors to fixed sockets and plugs. The equivalent section of the flexible conductor is generally one size smaller than the rigid or the semi rigid conductor. Please refer to EN 60309-1 and -2 norms.

### Use of multipolar cables according to EN 60309-1

Min. and max. diameters of cables which clamped in couplers and plugs

rated operating voltage	rated current	approximate external cable ø in mm (cables type HO5 RR-F and HO7 RN-F)	
		min	max
over 50V up to 690V	16A	8.1	15.3
	32A	11.5	21.3
	63A	17.3	31.3
	125A	26.0	48.8
up to 50V	16A	13.5	22.8
	32A	13.5	22.8

## EN 60439-1<sup>1)</sup> and EN 60439-3 standards

The low voltage distribution boards, known as “assemblies” by the definitions in EN 60439 standard, contain the switchgear (for isolation, switching), protective devices (automatic circuit-breakers, fuses), and controlgear (for command, control and measurement), and are rarely suitable for mass-production.

The mass-production of these boards is not cost-effective, given the great number of installation possibilities which are unlikely to fall within a limited number of models.

In the past the board (defined a switchgear and controlgear assembly) used to be more often a typical custom-built production. The electrical, thermal and mechanical coordination requirements, with the exception of the implementation of anti-accident measures, were completely neglected, given the lack of technical standards which would define the state of the art.

The concept of state of the art was introduced as a legal term of reference (in Italy by law no. 186 of 1968) but for gassemblies it was left to the free judgement of the designer, the manufacturer and the installer of the board itself.

The Technical Committee 17 (Switchgear and Controlgear) of the Italian National Electrotechnical Committee (CEI) tried to compensate for this lack of reference with the first edition of the CEI 17-13 (1980) Italian standard, although this one only covered the “factory-built assemblies”, i.e. those mass-produced assemblies for which it was technically feasible and economically acceptable to introduce a series of type tests. For the first time the board was considered a product and not a miniature system.

The standardisation of the board equipment (switchgear and controlgear such as switches, disconnectors, automatic circuit-breakers, contactors, etc.) has in the meantime reached such level as to make the “modular” construction of the boards possible. The electrical, thermal and mechanical performance of these structures can be estimated by calculation within acceptable limits, thus avoiding costly tests and certifications.

Hence the need for a detailed standard, also applicable to custom-built boards, obtained by assembling components whose behaviour can be inferred by what is declared by their manufacturers or may refer to a prototype submitted to a full cycle of type tests.

The second edition of the Italian standard for gassemblies CEI-17-13 of 1991 is now a harmonised European Norm known as EN 60439-1. It introduced the classification of boards into **TTA** type-tested assemblies (more likely mass-produced<sup>2)</sup>) and **PTTA**, partially type-tested assemblies (more likely custom-built in small quantity or in a single unit<sup>3)</sup>). For the first of these (**TTA**), the standard prescribed costly and technically difficult laboratory tests, while for the second (**PTTA**), it prescribed checks consisting of simple instrumental measurements accessible to small manufacturers and/or installers, and of deductions gathered from the data of the manufacturers of the components (switchgear and controlgear devices and enclosures). The third edition of the EN 60439-1 standard (CEI 17-13/1, 1995), and more recently the fourth edition, improved this strategy<sup>4)</sup>. At the same time deductive methods were introduced for the **PTTA** boards to avoid carrying out the most difficult tests (technical report CEI17-52<sup>5)</sup>, short-circuit withstand; publication CEI 17-43<sup>6)</sup>, heating) starting from data of similar systems which have been submitted to type-tests (TTA boards). The standard bestows equal value to the boards tested by the manufacturer using type tests and those deriving from the latter, verified via calculations.

For the a.c. enclosed distribution boards (**DBU**) to be used indoors, with voltage to earth up to 300V a.c., which are stationary, intended to be used either in domestic (household) applications or in places where unskilled persons have access for their use, the particular prescriptions of standard EN 60439-3 of 1992 are applied, integrated by amendment EN 60439-3 A1 of 1995 and by the more recent amendment EN 60439-3/A2: 2001-10.

This norm deals with small and medium distribution boards of the type referred to above with input rated current up to 250A and currents on single output circuits up to 125A, and only of the fully type-tested type (also referred to as mass-produced) with type tests (TTA), but declared itself not applicable to **PTTA** boards.

If the general standard EN 60439-1 therefore allows fully type-tested assemblies (TTA) and partially type-tested assemblies (PTTA), the particular standard EN 60439-3 is stricter for **DBU** distribution boards with the aim of enhancing the safety of “unskilled persons”, or (IEC 64 8/2) those classified as instructed (with the necessary knowledge to prevent risk from an electric system) and advised (who have received the necessary information from an instructed person with the aim of preventing risk).

A distribution board to be classified as **DBU**, which may be used by a person who has not been instructed or advised, loses this negative feature simply by preventing its use by locking it up and giving the key to a trained person.

In this way, in homes and similar places, where a **DBU** board would be necessary, it is possible to install a **PTTA** board with suitably restricted access to the controls.

But the manufacturer of **PTTA** distribution boards lacks a set of reference standards except for EN 60439-1, that is, the general part.

## The experimental Italian standard CEI 23-51

Given the need to define safety prescriptions for **PTTA** distribution boards in order for them to be considered as state of the art in accordance with the Italian law (a need that in Italy has stemmed from law no. 46 of 1990 dealing with the safety of installations of any kind in buildings) SC23B/C of the Italian National Electrotechnical Committee CEI, based upon standard CEI 23-48<sup>9)</sup> drew up two experimental standards, namely **CEI 23-49**<sup>9)</sup> and **CEI 23-51**<sup>10)</sup>.

With CEI 23-51, in force in Italy since April 1st 1996 and recently extended to its second edition, the scope of CEI 23-48 is widened than in the original one which includes shunt boxes and flush-mounting boxes to hold switches and household socket-outlets, to cover also boxes for the so-called exchanges for household and similar installations (**I<sub>ng</sub> < 32A**) and distribution boards with three-phase power greater than 90 kW.

In fact, this standard applies to switchgear and controlgear assemblies with input rated current **I<sub>ne</sub>** not greater than 125A<sup>11)</sup>, to be used in alternate current with rated voltage no greater than 440V, with prospective rated short-circuit current not exceeding 10 kA, or protected by current limiters with limited current not exceeding 15 kA at their rated breaking capacity.

This standard establishes the prescriptions for the production, checking and testing of stationary distribution boards for household and similar use, consisting of an enclosure and one or more devices. In particular, it provides a deductive method for the check of the temperature-rise limits (30°K) knowing the maximum power dissipated by the enclosure **P<sub>inv</sub>** and that dissipated by the devices incorporated.

To make boards which include equipment with non-negligible thermal dissipation, the standard entails the use of enclosures complying with the experimental Italian standard CEI 23-49.

Standard CEI 23-49 adds to the safety prescriptions of the general standard CEI 23-48<sup>12)</sup> on enclosures for boards for household or similar use, the performance prescriptions, which oblige the manufacturer of the enclosure to verify and declare the maximum dissipating power of the enclosure **P<sub>inv</sub>** for the 30°C maximum permissible temperature gradient.

<sup>1)</sup> A radical review of the IEC 60439 standards is already at an advanced stage, and will be allocated the numbering IEC 61439.

<sup>2)</sup> **TTA** = type-tested assemblies

<sup>3)</sup> **PTTA** = partially type-tested assemblies

<sup>4)</sup> The fourth edition of standard **CEI EN 60439-1** has been in force since 1 January 2001, but up to 1 August 2002 it remained in force together with the 3<sup>rd</sup> edition. The few changes made relate to:

- details of the four segregation forms, useful to differentiate cases of access to the board for maintenance purposes, thus improving protection against direct contacts;
- specification of the direction of manoeuvre of the equipment to be determined on the basis of the risk of manoeuvring errors;
- exemption from the short circuit test for board circuits whose top current is limited to below 17 kA (previously 15 kA) with regard to the assumed maximum short circuit current at the terminals of the board's entry circuit;
- resistance between the protective earthing circuit and the board's exposed conductive parts below 0.1 Ω

<sup>5)</sup> **CEI 17-52** (1994, reprinted in 1997-08) *A method of assessing the ability of partially type-tested assemblies (PTTA) to withstand short-circuits*. It is equivalent to IEC 61117: 1992-2.

<sup>6)</sup> **CEI 17-43** (2000-08) *A method of temperature-rise assessment by extrapolation for partially type-tested assemblies (PTTA) of low voltage switchgear and controlgear*. It is equivalent to technical report IEC/TR3 60890:1987-07 + IEC/TR3 60890 EC:1988-03 + IEC/TR3 60890/A1:1995-05 and to document CENELEC HD 528 S2:1997-01.

<sup>7)</sup> Reprinted by CEI in consolidated form as CEI EN 60439-3 (1997-07), booklet 3445 C.

<sup>8)</sup> **CEI 23-48** (1998-02) Enclosures for stationary equipment for household and similar use - Part 1: General prescriptions. This is the non-amended reprint of the first edition 1995-12. It was published in Italy, with the authorisation of CENELEC, owing to the delay in the advancement of the European project prEN 60670 (equivalent to IEC 60670:1989-11 + IEC 60670/A1:1994-07). It was recently ratified by CENELEC, and therefore the new, equivalent standard **EN 60670-1**: 2004 will soon be published with amendments to standard IEC 60670-1:2002-12.

<sup>9)</sup> **CEI 23-49** (1996-03) Enclosures for stationary equipment for household and similar use - Part 2: Specific prescriptions for enclosures designed to contain protection devices and equipment which disperse considerable power during normal use. It is integrated by amendments CEI 23-49;V1 (2001-12) and CEI 23-49;V2 (2003-06).

<sup>10)</sup> **CEI 23-51** (2004-02, 2<sup>nd</sup> Ed.) Prescriptions for the production, checking and testing of stationary distribution boards for household and similar use. Published experimentally due to the CENELEC prohibition to publish autonomous national standards without prior notification to CENELEC. The regulations it contains are therefore valid only in Italy.

<sup>11)</sup> Sum of the rated current of all the protective and/or switching devices placed at the input, intended to be used simultaneously, multiplied by the simultaneity factor **K<sub>g</sub>** assumed equal to 0.85.

<sup>12)</sup> In the interest of safety, therefore of the presumed conformity to the Low Voltage directive 73/23/EEC and further modifications, conformity to standard CEI 23-48 is sufficient.

### Normal service conditions for electrical equipment

The standard EN 60439-1 applies to *low-voltage switchgear and controlgear assemblies*, commonly known as low-voltage boards, with rated voltage not exceeding 1000V (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 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 which is to be expected <sup>13)</sup>.

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

The **pollution degree 2** refers to a household 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.

<sup>13)</sup> 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.

<sup>14)</sup> The **IP66/IP67** degree of protection will officially be introduced in the next amendment 1 of the 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 HD384 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 and 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:

- 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).
- for cases, when all the covers are adequately 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 (1<sup>st</sup> digit), and protected against the *dangerous effects of water spray* from all directions (2<sup>nd</sup> 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 (1<sup>st</sup> digit) and protected against the *dangerous effects of water jets* with a nozzle from all directions (2<sup>nd</sup> digit).

**IP66:** total protection against *dust* and access to *dangerous parts* with an accessibility calibre of Ø 1 mm (1<sup>st</sup> digit), and protected against *powerful water jets* such as sea waves (2<sup>nd</sup> digit).

**IP67:** Total protection against *powder* and against *access to dangerous parts* with an access calibre of Ø 1 mm (1<sup>st</sup> digit) and protected against the *effects of temporary immersion* (30') in water at a maximum depth of 1 meter (2<sup>nd</sup> digit).

The socket-outlets with IP55 degree of protection and those with double degree of protection IP66/IP67 <sup>14)</sup> 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.

#### 1<sup>st</sup> characteristic numeral

Personal protection against contact with hazardous parts

IP	External solid foreign bodies	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		dust-protected
6		dust-tight

#### 2<sup>nd</sup> characteristic numeral

Protection of materials against harmful penetration of water

IP	Tests	Protection
0		none
1		against vertical drops of water
2		against drops of water at an angle of 15°
3		against drops of water at an angle of 60°
4		against water sprayed 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 effects of continuous immersion in water

### 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 <sub>2</sub> O (t up to 23 °C)	Watery saline solution	Acids		Bases		Solvents			Ethyl alcohol (ethanol)	Oils			Fats		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	Animal organic solution	Unleaded	Diesel
<b>Pluso plugs and socket-outlets</b>																		
precode <b>PE, PEW, PB</b>	●	●	X	X	X	X	●	○	●	●	●	●	●	●	●	●	○	
precode <b>SIP, SIPW</b>	●	●	X	●	●	●	X	○	●	X	○	○	○	○	○	○	●	
precode <b>PEM</b>	●	●	X	X	X	X	●	●	●	○	●	●	●	●	●	●	○	
interlocked switched socket outlets <b>SQ, SQx series</b> , socket-outlets with safety transformer <b>SQT</b>																		
precodes <b>SQ and SQx and SQT</b>	●	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	
interlocked switched socket outlets in insulated enclosure, <b>PK, KI series</b> , and plugs with safety transformer in insulated enclosure <b>PB</b>																		
series <b>PK...EB</b>	●	●	X	●	○	○	X	○	○	X	●	○	○	○	●	●	X	
series <b>KI...RI5 and KI...IB5</b>	●	●	●	●	○	●	●	○	○	●	○	●	●	○	●	●	○	
series <b>PK...IA</b>	●	●	●	●	○	●	●	○	○	●	●	●	●	●	●	○	●	
series <b>PB...T1 and T2</b>	●	●	X	●	○	○	X	○	○	X	●	○	○	○	●	●	X	
interlocked switched socket outlets in metallic enclosure, <b>PK series</b> , and plugs with safety transformer in metallic enclosure <b>PB</b>																		
series <b>PK...PB5</b>	●	●	○	●	X	○	●	○	X	●	●	●	●	●	●	○	○	
series <b>PK...LL</b>	●	●	○	●	X	○	●	○	X	●	●	●	●	●	●	○	○	
series <b>PB...A1 and A2</b>	●	●	○	●	X	○	●	○	X	●	●	●	●	●	●	○	●	
group support plates																		
codes <b>FC...TB</b>	●	●	○	●	○	●	●	X	X	●	●	○	○	X	○	○	X	
distribution enclosures and <b>FC</b> modular equipment for groups																		
codes <b>FC...DB / DB5 and GB5</b>	●	●	●	●	●	●	●	○	○	●	○	●	●	○	●	○	○	
<b>FC</b> board components																		
<b>FC</b> series enclosures	●	●	○	●	○	●	●	X	X	●	●	○	○	X	○	○	X	
<b>FM</b> board components																		
<b>FM</b> series enclosures	●	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	
<b>BK</b> board components																		
items of the <b>BK</b> series , except <sup>1)</sup>	●	●	○	●	●	●	●	●	○	●	●	●	●	●	●	●	●	
<b>TM</b> series																		
all the items of the <b>TM</b> series	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	

<sup>1)</sup> 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.**

## Use in electric systems in areas at risk of explosion

The electric systems which have come into existence since 1-7-2003 in work areas at risk of explosion due to the presence of gas, fumes, smoke or dangerous powders (excluding mines) must comply with European Directive 99/92/EC (a.k.a. ATEX 137). This is the so called "social" part of the ATEX Directive<sup>1)</sup>, adopted within the general directive 89/391/EC on the subject of safety at work, implemented in Italy as the well know Law Decree n. 626/94 which merged with Law Decree n. 233/03 under Title VIII-bis.

According to this directive (art. 8) employers must, among other things, develop and keep up to date the "Document regarding protection against explosions" in which they must state:

- that all explosion risks have been identified;
- what measures will be taken to avoid the danger of explosions;
- that the zones have been identified and classified (table A);
- that the work equipment is suited to the type of area and that it is used and maintained in adequate working order. The Directive specifies (art. 9) the implementation timescale: The minimum provisions of Attachment II, part A apply to any equipment already existing as at 30-6-2003; as regards work areas already in use as at 30-6-2003, said minimum provisions must be adapted by 30-6-2006. Finally, compliance with the provisions of Attachment II, Part A + B<sup>2)</sup> is required as regards equipment purchased after 30-6-2003 and new work areas in which explosive atmospheres may form.

The Directive does not apply to medical areas, gas equipment, explosive substances, mines and land, river or air transport vehicles (vehicles intended for use in explosive atmospheres are not excluded).

As regards equipment installed in the abovementioned locations, as from 1-7-2003 these must comply with Directive 94/9/EC (a.k.a. ATEX 95 and implemented in Italy as Presidential Decree n. 126 dated 23-3-1998). This applies to all equipment and protection systems intended for use in potentially explosive atmospheres (including mines). Two equipment groups are envisaged: group 1, intended for underground mine use or for overground mine works (firedamp and/or combustible dust); group 2, all other locations. Attachment 1 of Directive 94/9/EC defines categories M 1 and M 2 for group 1 equipment, and the following three categories for group 2 equipment:

- category 1 equipment (very high level of protection - zones 0 or 20);
- category 2 equipment (high level of protection - zones 1 or 21);
- category 3 equipment (normal level of protection - zones 2 or 22);

Ex material sold or installed after 30-6-2003 must be marked EC and be accompanied by the EC conformity declaration, on the basis of this directive.

Standard CEI 64-2 (1990-11, 4<sup>th</sup> edition, Booklet 1431) governed applications in locations at risk of explosions in a mainly industrial context. So far the following European Standards have been published in an effort to harmonise said standard throughout Europe:

### HAZARDOUS AREAS DUE TO THE PRESENCE OF INFLAMMABLE FUMES OR GAS (ex class C1 and C3 areas)

- CEI EN 60079-10 (2004-01, class CEI 31-30, 2<sup>nd</sup> Ed.) "Electrical assemblies aimed at explosive atmospheres due to the presence of gas - Part 10: Classification of hazardous locations", in force, regarding the classification of hazardous places due to the presence of inflammable fumes or gas<sup>3)</sup>;
- CEI EN 60079-14 (2004-05, class CEI 31-33) "Electrical assemblies aimed at explosive atmospheres due to the presence of gas - Part 14: Electrical systems in areas at risk of explosions due to the presence of gas (other than mines)" in force, regarding provisions concerning electrical systems in areas at risk of explosion due to the presence of gas (other than mines)<sup>4)</sup>;

### HAZARDOUS AREAS DUE TO THE PRESENCE OF COMBUSTIBLE DUST (ex class C2 areas)

- CEI EN 50281-3 (2003-06, class CEI 31-52) "Assemblies aimed at explosive atmospheres due to the presence of combustible dust - Part 3: Classification of areas where combustible dust is or could be present", in force since 1-7-2003, regarding the ex class C2 areas of standard CEI 64-2<sup>5)</sup>
- CEI EN 50281-1-2 (1999-09, class CEI 31-36) called "Electrical assemblies aimed at explosive atmospheres due to the presence of combustible dust - Part 1-2: Electrical assemblies protected by enclosures - Selection, installation and maintenance", definitively in force since 1-7-2003<sup>6)</sup>

These are the first of a large collection of CENLEC standards regarding electrical systems in areas at risk of explosion. They will be followed by other standards regarding the classification of actually or potentially explosive areas due to the presence of explosives (ex class C0 area of standard CEI 64-2) and by standards regarding the safety requirements of relating electrical systems, currently being developed by IEC and CENELEC. In particular, as from 1-1-1998 the definition of class C1 and C3 areas containing inflammable substances such as gas or inflammable liquids - i.e. excluding inflammable dust (class C2) and explosives (class C0) - is no longer in force: the relating chapters 3 and 5 of standard CEI 64-2 have been abolished and replaced by the abovementioned standard CEI EN 60079-10. This introduces zone classifications, thus replacing the existing quantitative differentiation by a more analytical approach based on the degree of emission (three levels: continuous, primary or secondary) and on the degree of ventilation (three levels: high, medium or low, with three further sublevels: good, average or poor). Zone extensions are determined through application guidelines and calculations.

**Zone 0:** area with a continuous or prolonged explosive atmosphere due to the presence of gas

**Zone 1:** area where an explosive atmosphere due to the presence of gas may occur in normal operational conditions

**Zone 2:** area where it is impossible for an explosive atmosphere due to the presence of gas to occur in normal operational conditions or where, should this occur, it may only occur infrequently and for short spaces of time. Standard CEI EN 60079-14 replaced standard CEI 64-2 as regards the requirements of the electrical systems installed in areas containing gas or inflammable liquids. In particular, since 30-11-1999 it has abolished chapters VII (AD-PE systems), VIII (AD-SI systems), IX (AD-I systems), XI (AD-FE systems) and XIII (AD-S systems), resulting therefore in the disappearance of the above types of safety electrical systems as described and defined by standard CEI 64-2. Standard CEI EN 50281-3 (2003-06, 1<sup>st</sup> ed.) resulted in the further abolishment of chapter IV of standard CEI 64-2<sup>7)</sup>, with standard EN 50281-1-2 (1999-09, 1<sup>st</sup> ed.) substituting all parts of the chapters I, II, VI, X, XII and XIV regarding provisions for areas where combustible dust is or may be present (class C2 areas). Therefore only chapters I, II, VI, X, XII and XIV of standard CEI 64-2 remain in force, concerning specific provisions for the presence or development of explosive substances (class C0) while awaiting corresponding European standards.

Standard CEI 64-2/A was abolished in 1-9-2001 with the publication of Guides CEI 31-35 (2001-01, 2<sup>nd</sup> ed.) and CEI 31-35/A (2001-01, 2<sup>nd</sup> ed.).

Therefore it is no longer possible to use withstanding functional safety systems (AD-FT) in ex C2 areas (ex chapter XII).

**Most of the situations that used to allow this installation solution are classified as non-explosive (NE), in line with the new area classification. Therefore, in these cases no particular adjustment is required either for new systems or for those existing before 30-6-2003, as these do not fall within Ex zone classifications in line with the latest ATEX directives.**

As regards areas that would now need to be classified as Ex in line with the abovementioned ATEX Directive 137 (99/92/EC) in force since 1-7-2003, such as zone 2 or 22, new systems require category 3 Ex electrical material, whereas systems existing before 30-6-2003 need to be adapted using said ATEX certified material by 30-6-2006.

Given that in any case existing electrical systems constructed in line with the provisions of standard CEI 64-2 provide the same level of safety as those constructed in line with the new standard CEI EN 60079-14, the table below contains indications for selecting AD-FT system components, exclusively for class C0 areas (presence of explosive substances), as inferred from standard CEI 64-2. Said table will remain valid until the publication of standards that abolish chapters I, II, VI, X, XII and XIV regarding said areas.

1) ATEX = ATmosphere Explosive.

2) Attachment II - Part B = equipment category selection criteria on the basis of the zone classification: zones 0 or 20 require category 1 equipment; zones 1 or 21 require category 1 or 2 equipment; zones 2 or 22 require category 1, 2, or 3 equipment.

3) The 1<sup>st</sup> 1996-10 edition, in force since 1-11-1996, will remain simultaneously in force until 1-10-05.

4) The 1<sup>st</sup> 1998-01 edition, in force since 1-03-1998, will remain simultaneously in force until 1-6-06.

5) Should be replaced with the European Standard prEN 61241-10 project "Electrical apparatus for use in the presence of combustible dust - Part 10: Classification of areas where combustible dust is or may be present", based on a similar IEC project.

6) Integrated by amendment EN 50281-1-2/A1 (2004-06), it should be replaced by the European Standard prEN 61241-14 project "Electrical apparatus for use in the presence of combustible dust - Part 14: Selection and installation"

7) Already reprinted by the CEI in March 2001, once again as 4<sup>th</sup> edition, Booklet 5964 C.



Tables for selecting the type of environment

class of the hazardous area (Italian standard CEI 64-2, Edition IV, 2001-03)	C0
qualification of the "AD" area <sup>1)</sup>	C0ZR
Minimum IP required by the standard	IP44

product series	degree of protection	items	product eligibility (see notes)
PLUSO socket-outlets	IP44	precode PE, SIP	● *)
	IP67	precode PEW, SIPW	○ *)
SQ... interlocked switched socket-outlets	IP44	precode SQ, SQE, SQV, SQA	●
	IP55	code SQE...5, SQV...5, SQA...5	○
PK / KI interlocked switched socket-outlets	IP44	code PK..EB	●
	IP55	code KI..RI5, KI..IB5, PK..PB5	○
BK interlocked switched socket-outlets	IP67	precode BK, BE, BA	○
TM interlocked switched socket-outlets	IP66/IP67	code TM...IT/IS/IR/SP/KIS/KIR/KSP	○
TM interlocked switched socket-outlets	IP66/IP67	code TM...SIT/SIS/SIR/SSP/KSIS/KSIR/KSSP <sup>2)</sup>	○
PK socket-outlets with electric interlock	IP55	code PK...IA, PK...LL	○
socket-outlets with safety transformer	IP44	code PB...T, PB...A	●
	IP55	code SQT 16220	○
	IP67	code BT 16220, BT 16380	○
	IP66/IP67	code TM 16220 T1/ST1 <sup>2)</sup>	○
FC distribution enclosures	IP44	code FC 1114 DB, FC 1414 DB	●
	IP55	code FC 1114 DB5, FC 1414 DB5	○
cases for modular equipment	IP55	code FC...GB5	○
FC series cases and components	IP55	all	○ **)
FM series cases and components	IP55	all	○ **)
BK series cases and modules	IP67	codes BC...	○
TM series cases and modules	IP66/IP67	codes TM...	○

1) Locations with explosion risks and the relating AD areas are classified by standard CEI 64-2, 4<sup>th</sup> edition.  
 2) When assembled on TM series ILME box (single, double or triple).

Notes

- \*) plugs usable together with interlocked sockets of eligible degree of protection
- \*\*\*) only types for assembling interlocked socket-outlets, in the event of creating distribution boards with sockets

Legend

- = eligible
- = greater than the requirement
- X = not eligible

According to standard CEI 64-2, so far devices with degree of protection IP44 or IP55 have been used in class 2 locations (presence of dust). In line with the new standards, we have introduced further requirements, such as thermal constraints, and the manufacturer must certify the device as an Ex product, according to the procedure indicated in the latest ATEX directive (94/9/CE, implemented in Italy as DPR 23-3-1998 no. 126). Standard EN 50281-1-2(class. CEI 31-36) relates to electrical assemblies protected by enclosures, due to the presence of dust, and contains the following zone classification:

- Zone 20:** area where an explosive atmosphere, in the form of a combustible dust cloud in the air, is present permanently or for long periods of time
- Zone 21:** area where an explosive atmosphere, in the form of a combustible dust cloud in the air, is likely to be occasionally present during normal operations
- Zone 22:** area where an explosive atmosphere, in the form of a combustible dust cloud in the air, is not likely to be occasionally present during normal operations but where, if this were to occur, it would only be present for a short space of time

Construction selection

Electric systems in ex class 3 areas

As we have already mentioned, class 3 locations (presence of gas or of inflammable liquids in small quantities) are no longer covered by the above new European standards. The standards EN 60079-14 (gas) and EN 50281-3 (dust) do not include systems of type AD-FT. With the new classification criteria, all well ventilated areas with second degree emission sources (most of the ex C3Z2 areas, for which the AD-FT system was allowed) are now considered non hazardous areas in terms of explosions (area 2 NE); **for these areas all ILME material indicated in the table is suitable with the new standard.**

The electrical systems in the ex C1ZR areas

The ex C1ZR areas, areas compliant (ZR) with class 1 locations containing gas or inflammable liquids, are no longer envisaged by the European Standard EN 60079-10. In most cases, as these areas are many metres away from the second degree emission sources (ex hazardous centres), in line with the new classification they are now non-hazardous areas in terms of explosions (area 2 NE); **as regards these areas, all ILME material is suitable with the new standard.**

The electrical systems in the ex C1Z2 areas

With the new classification, ex C1Z2 areas surrounding the second degree emission sources often become 2 NE areas. As a result, with the exception of the immediate areas surrounding the point of emission, the area is only dangerous because of "its increased fire risks" (standard CEI 64-8/7 Sez. 751). In this case, **all the ILME material indicated in the table is suitable with the new standard.**

Electric systems in vast areas containing gas or inflammable liquid emission sources

Unlike the old standard CEI 64-2, the latest European Standard EN 60079-10 does not envisage the extension of the AD area to the entire internal area. It specifies dilution volume calculations. As a result, at a certain distance from the emission centres the environment in these vast areas is no longer considered explosive. Here, where previously EEx assemblies were required, **now the ILME materials indicated in the table are suitable with the new standard.**

## General characteristics

This chapter illustrates the characteristics of TM series interlocked socket-outlets. These socket-outlets offer tested reliability and can be used, in combination with special complementary parts and PLUSO industrial plugs, as modular integrated systems to configure distribution systems with industrial socket-outlets. These socket-outlets are designed to be used for:

- Industrial applications
- Service applications (trade fairs, exhibitions, etc.)
- Agricultural and livestock breeding applications
- Residential and similar applications (i.e. common areas of condominiums, cellars, garages, community buildings, kitchens, etc.)

Socket-outlets and plugs for industrial use should be selected according to the following parameters:

- Rated current of the device to supply with the plug and socket-outlet coupling
- Rated supply voltage, type of current (AC or CD), rated frequency, and type of distribution (single or three-phase, with or without neutral) to determine the number of poles and hour position

The 1 hour position is available for all 50V voltages and voltage ranges > and for frequencies and frequency ranges not covered by standards

- Type of installation (fixed or mobile) to determine the construction type of plugs and socket-outlets (flush-mounting, straight or inclined, wall-mounting, mobile, mobile angled)
- The site of installation to determine the degree of protection (IP44 or IP67) and voltage (in some areas installation standards require very low safety voltage) TM socket-outlets come with base box for flush- or wall-mounting or without box for the assembly on single or multiple TM ILME boxes (available on request). This enables to configure distribution boards at a later stage. The following types of socket-outlets are available:

with insulating enclosure with base box:

- **TM..IT** types with interlock and plug-type fuse carrier
  - **TM..IS/KIS** types with interlock and sectionable fuse carrier
  - **TM..IR/KIR** types with interlock and compartment for modular units
  - **TM..SP/KSP** types with interlock (without fuse carrier)
  - **TM..T1** types with safety transformer (for extra-low voltage, SELV 24V AC)
- with insulating enclosure without base box (only for 16A and 32A socket-outlets):
- **TM..SIT** types with interlock and plug-type fuse carrier
  - **TM..SIS/KSIS** types with interlock and sectionable fuse carrier
  - **TM..SIR/KSIR** types with interlock and compartment for modular units
  - **TM..SSP/KSSP** types with interlock (without fuse carrier)
  - **TM..ST1** types with safety transformer (for extra-low voltage, SELV 24V AC)

The type references of these last types is the same as those of models with boxes. Types with base box can be wall-mounted or flush-mounted, if required.

The high solidity of boxes and materials used enable these products to be installed in reinforced concrete casts.

Installers shall be responsible for performing the electric connections, preparing the entry holes on the boxes using the centering points on the sides, and for completing the installation using hardware with a suitable degree of protection.

The class of IP protection of the equipment will be equivalent to that resulting from the compliance with workmanship procedures and from the use of cable entries with an equivalent or higher IP degree of protection.

The degree of protection of the equipment is always equivalent to the lowest one of the installed units.

Types without base boxes can be mounted on existing and installed single or multiple boxes or on new ones, which can be purchased separately.

Socket-outlets can also be fitted with specifically designed complementary parts to configure group distribution systems suitable to meet all possible installation needs. Socket-outlets can be fitted with:

- Back plates in two sizes (depending on the size of the socket-outlet enclosure), suitable for the assembly of socket-outlets with boxes or boxes for future expansion
- Boxes for modular units like protection and control equipment
- Junction boxes for socket-outlets or boxes
- Modular pre-assembled bases
- Single or multiple boxes for the subsequent installation of TM socket-outlets for board mounting

Socket-outlets and boxes for modular units (boxes with compartment for modular units) are suitable to be used to spring-lock modular units (17.5 mm base modules) with sized DIN-rail EN 60715 TH 35-7.5.

For information on the number of modules and maximum power that can be dissipated, see Table 1.

## Socket-outlet electric characteristics

### rated frequency:

0 Hz (direct current), and from 50 Hz to 500 Hz

### rated operating voltage:

the standard identifies two main types of use:

- Extra-low voltage socket-outlets (and related plugs), (SELV safety requirements, in accordance with the CEI 64-8 installation standard), for max. rms voltage values of 50V
- Low voltage socket-outlets (plugs) for rms voltage values above 50V, up to a maximum of 690V

### polarity:

models are designed with:

- 2 poles (extra-low voltage, 2P)
- 3, 4 and 5 poles (low voltage, 2P+⊕, 3P+⊕, 3P+N+⊕);

63A socket-outlets (and related plugs) also have an additional pilot contact

### rated current:

with 16A, 32A and 63A values (low voltage)

## rated insulation voltage:

- **690V** for low voltage socket-outlets parts. The rated insulating voltage of the whole assembly generally corresponds to that of the lowest component and is limited to 500V thanks to the presence of IS/SIS and IT/SIT fuse carriers.
- **50V** for extra-low voltage parts (T1/ST1 types always have an insulated transformer with a rated insulation voltage of 230V on the primary circuit)

### minimum surface insulation distance:

6 mm for max. rated operating voltages of 500V (EN 60309-1)

### minimum air insulation distance:

6 mm for maximum rated operating voltages of 500V

### breaking capacity:

socket-outlets have mechanical interlocks that prevent the plug being removed while voltage is present or from being inserted when the socket-outlet is live. This explains why no breaking capacity is required. The socket-outlets parts (inserts and holes) are the same as those of the Pluso series and have therefore a breaking power 1.25 times the rated current and 1.1 times the rated operating voltage.

### rated shortcircuit current based on fuse:

10kA

### electromagnetic compatibility:

these units do not fall within the field of application of the EMC Directive, except for socket-outlets with safety transformer (T1/ST1 types).

- Immunity: in ordinary operating conditions, these units are not affected by electromagnetic noise. This may not apply if the installer has fitted devices that are sensitive to electromagnetic noise in ordinary operating conditions.
- Emissions: all units are designed for continuous use and do not generate electromagnetic noise in ordinary operating conditions. This may not apply if the installer has fitted devices that generate electromagnetic noise in ordinary operating conditions.

## Mechanical characteristics

### - mechanical resistance to impacts

20J (IK10 in accordance with EN 50102)

### - resistance to chemical agents

see Table on page 8

### - degree of protection

IP66/IP67 according to EN 60529 (see information note on pages 7 and 40)

### - maximum dissipating power of the enclosure

see table on page 40

### - resistance to glow-wire

self-extinguishing capacity compliant with IEC 695-2-1 (glow-wire) for enclosures 650 °C; for inserts 960 °C (value specified in standard: 850 °C)

### - temperature

ambient: -25 °C - +40 °C; limit of materials: -40 °C - +125 °C

### - self-extinguishing capacity

UL 94 classification

- for enclosures (boxes and/or covers of fixed socket-outlets, enclosures of mobile plugs and socket-outlets): **94V-2** and **94HB**
- for 16A and 32A inserts (socket-outlet and plug): **94V-2**
- for 63A and 125A inserts (socket-outlet and plug): **94-5VA** and **94V-0**

## Materials

- Inserts in insulating self-extinguishing thermoplastic material
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL® system, RAL 7012 grey
- Anti-aging elastomer gaskets
- Self-centering elastic brass contact tubes with zinc-plated steel spring
- Fixing retainer screws in stainless steel with cylindrical head and mixed slots for 8x1 screwdrivers and Ph2 cross screwdrivers
- Terminals with zinc-plated screws retained in their seats when unscrewed
- 32A, 63A and 125A socket-outlets with two fixing screws in the terminals as protection against accidental loss
- Terminals of 63A and 125A socket-outlets fitted with lead protection plate in zinc-plated steel TM socket-outlets, compliant with the European harmonized safety standards EN 60309-1 and EN 60309-2 satisfy the law requirements of applicable directives (73/23/EEC and subsequent amendments). Types for low voltage (V>50V), that fall within the field of application of the above-mentioned directives, are marked EC. This marking was introduced as compulsory on January 1st 1997.

## Supply extension

### Socket-outlets without box can be supplied with:

- Boxes for the assembly of simple, double or triple socket-outlets (purchasable separately), insulating separators for the entry/shunting area and a panel with alveolated base

### Socket-outlets with boxes can be supplied with:

- Standard back plates
- Junction boxes
- Boxes for modular units
- Modular pre-assembled bases (with box for modular units)

**Degree of protection**

The degree of protection should be chosen according to installation standard **CEI 64-8** (that implements harmonized documents CENELEC series HD 384 and IEC 60364), whose section 7 refers to specific types of installations, such as: construction and demolition sites, structures designed for agricultural or livestock breeding use, restricted conductor areas, caravans and caravan sites, environments with higher fire hazards, public performance and entertainment areas, pools and, in the future, fountains and marinas and harbour areas.

TM interlocked socket-outlets have a double **IP6/IP67 degree of protection**. Socket-outlets with IP66/IP67 degree of protection have a bayonet fastening cover, traditionally defined as “water-tight”, and must be used with with IP67 plugs (with locking ring and gasket) to guarantee a high protection of the connected equipment. To be able to perform the required electric connections, it is necessary to drill holes on the boxes, using the centering holes, and use appropriate hardware for assembly purposes.

The class of IP protection of the equipment will be equivalent to that resulting from the compliance with workmanship procedures and from the use of cable entries with an equivalent or higher IP degree of protection. If components with different degrees of protection are installed, the degree of protection of the distribution board or system shall be equivalent to that of the component with the lowest degree of protection. If the degree of protection of cable entries (cable, pipe and gasket glands) is equivalent or above the one marked on the socket-outlets, the IP degree of protection shall be 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 TM socket-outlets**

TM socket-outlets can be used with the following range of plugs, back plates and enclosures:

- Pluso industrial socket-outlets in two standard versions with IP44 and IP67 degree of protection: PE and PEW, SIP and SIPW (phase inverters), PEM types (monobloc with 5 poles)
- Ordinary back plates (TM 1145 TB and TM 1456 TB types)
- Junction boxes (TM...DB types) in 5 sizes
- Boxes for modular units (TM...GB types) in 5 sizes
- Modular pre-assembled bases with two back plates and box for modular units (TM...DT types)
- Boxes for single socket-outlets (TM 1125 CS types), double boxes (TM 2344 T2 types) and triple boxes (TM 3444 T3 types).

All socket-outlets, back plates and enclosures cover the installation requirements specified in standard CEI 64-8 (series CENELEC HD 384, IEC 60364).



**Application of draft 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 draft standard CEI 23-49. Results are shown in Table 1.

**Maximum dissipating power of enclosure  $P_{inv}$  (CEI 23-49)**

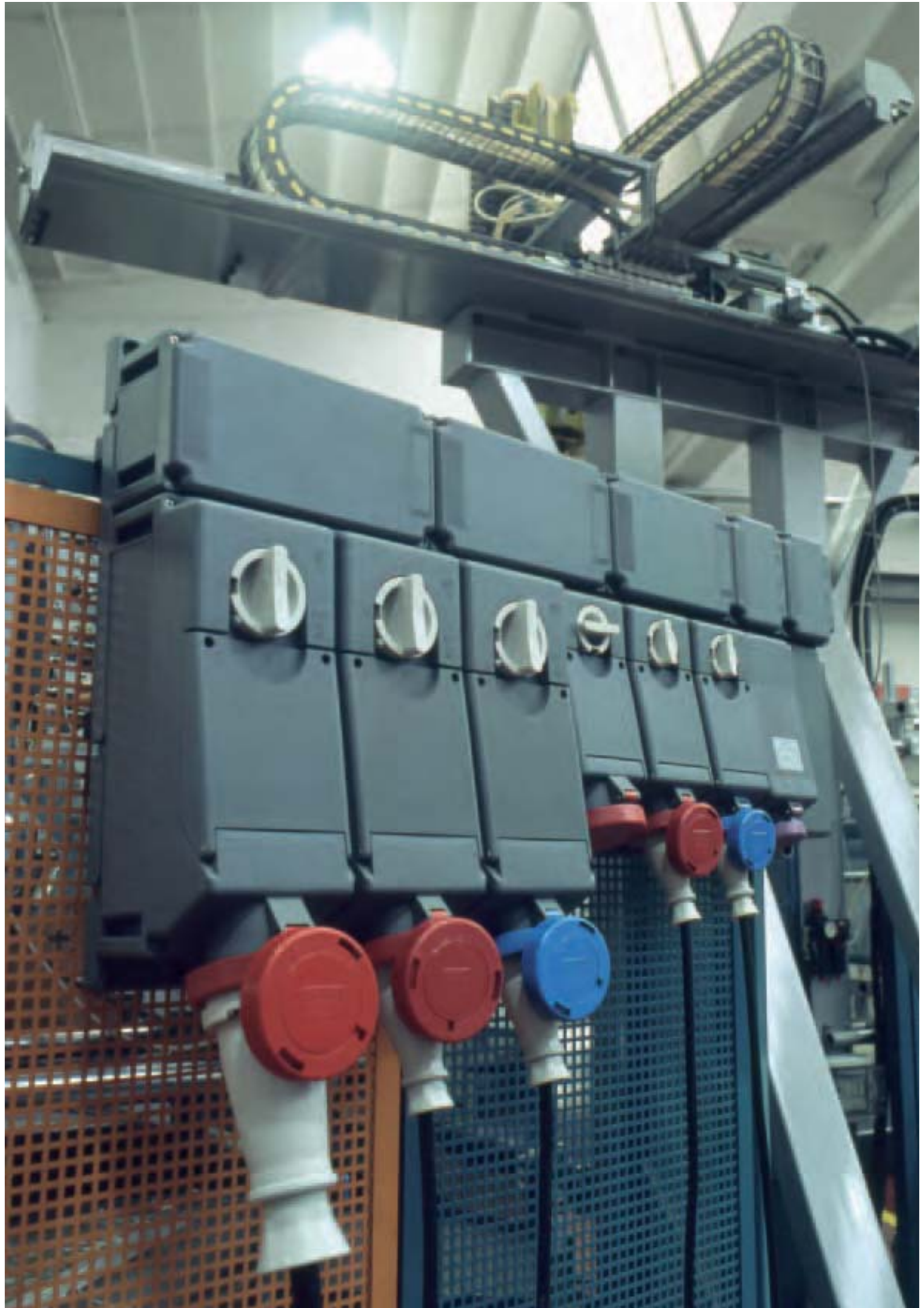
Table 1

Item	Description	Number of modules	$P_{inv}^{1)}$ (W) wall-mounting	$P_{inv}$ (W) flush-mounting
TM 1114 GB	115 x 144 mm box	4 units	8	10
TM 1414 GB	144 x 144 mm box	5.5 units	10	13
TM 2314 GB	230 x 144 mm box	10 units	13	16
TM 2614 GB	260 x 144 mm box	12 units	15	19
TM 2914 GB	290 x 144 mm box	13.5 units	17	22
TM 2344 T2	double box	10 units	13	18
TM 3444 T3	triple box	16.5 units	20	26

NOTE: the maximum power that can be dissipated,  $P_{inv}$ , is identified with suffix GB “box for modular units”, specifically designed to house modular units that can be assessed from the hinged door. The same amount of power can also be dissipated in models with DB suffix “junction box”.

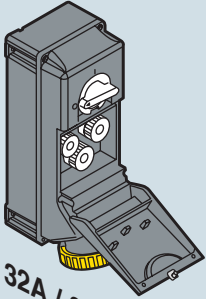
<sup>1)</sup> Determined for each enclosure size under the most severe load conditions provided for in the standard.

general

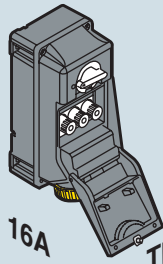


overview

Wall-mounting, with single box

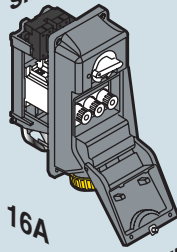


32A / 63A

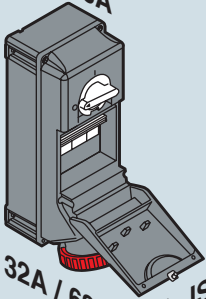


16A TM...IT

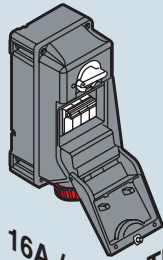
For assembly in single or multiple boxes



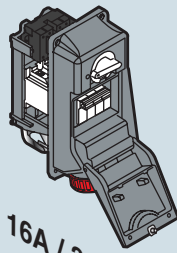
16A TM...SIT



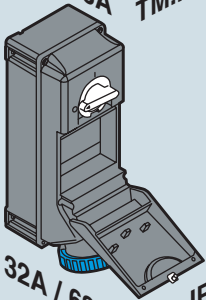
32A / 63A TM...IS



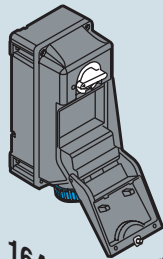
16A / 32A TM...IS/KIS



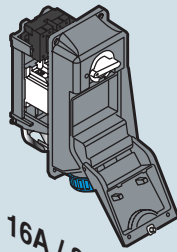
16A / 32A TM...SIS/KSIS



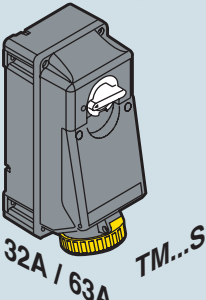
32A / 63A TM...IR



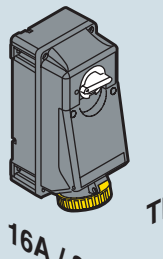
16A / 32A TM...IR/KIR



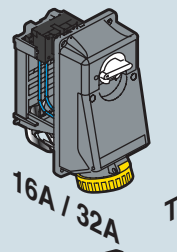
16A / 32A TM...SIR/KSIR



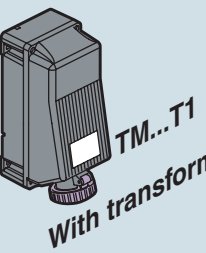
32A / 63A TM...SP



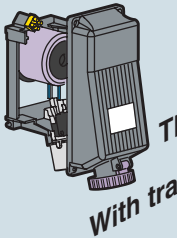
16A / 32A TM...SP/KSP



16A / 32A TM...SSP/KSSP

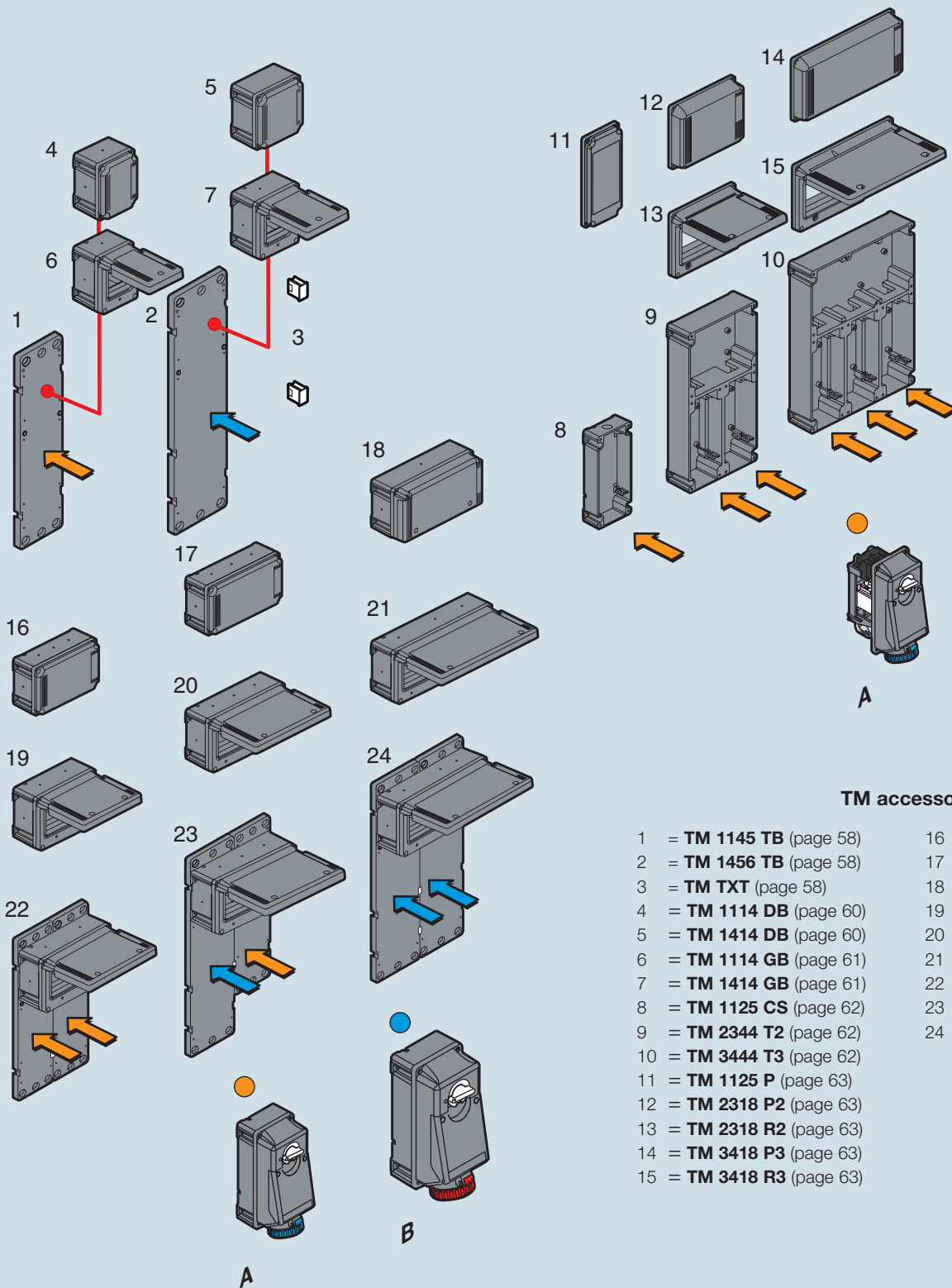


TM...T1  
With transformer



TM...ST1  
With transformer

TM...K.. = 32A socket-outlets with 255 x 114 mm fixing base



**TM accessories**

- |                                  |                                  |
|----------------------------------|----------------------------------|
| 1 = <b>TM 1145 TB</b> (page 58)  | 16 = <b>TM 2314 DB</b> (page 60) |
| 2 = <b>TM 1456 TB</b> (page 58)  | 17 = <b>TM 2614 DB</b> (page 60) |
| 3 = <b>TM TXT</b> (page 58)      | 18 = <b>TM 2914 DB</b> (page 60) |
| 4 = <b>TM 1114 DB</b> (page 60)  | 19 = <b>TM 2314 GB</b> (page 61) |
| 5 = <b>TM 1414 DB</b> (page 60)  | 20 = <b>TM 2614 GB</b> (page 61) |
| 6 = <b>TM 1114 GB</b> (page 61)  | 21 = <b>TM 2914 GB</b> (page 61) |
| 7 = <b>TM 1414 GB</b> (page 61)  | 22 = <b>TM 2345 DT</b> (page 58) |
| 8 = <b>TM 1125 CS</b> (page 62)  | 23 = <b>TM 2656 DT</b> (page 59) |
| 9 = <b>TM 2344 T2</b> (page 62)  | 24 = <b>TM 2956 DT</b> (page 59) |
| 10 = <b>TM 3444 T3</b> (page 62) |                                  |
| 11 = <b>TM 1125 P</b> (page 63)  |                                  |
| 12 = <b>TM 2318 P2</b> (page 63) |                                  |
| 13 = <b>TM 2318 R2</b> (page 63) |                                  |
| 14 = <b>TM 3418 P3</b> (page 63) |                                  |
| 15 = <b>TM 3418 R3</b> (page 63) |                                  |

**Legend**

The list above shows all the possible combinations of socket-outlets, back plates and enclosures that can be used to configure distribution systems. The coloured point near to the socket-outlets indicates their size, while the arrows (in the matching colour) indicate the assembly options.

- A** = Socket-outlets with 255 x 114 mm fixing base
- B** = Socket-outlets with 370 x 144 mm fixing base

- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 grey
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch with  $I_{th1} = 32A$  rating (in air) and  $I_{the} = 32A$  (in enclosure) for 16A and 32A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- Compartment with plug-type fuse carrier (fuses not supplied) and inspection panel openable only when the switch is off
- With Italian Quality Mark

16A  
IP66/IP67 degree of protection



Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour
2P+⊕	50 and 60	100 - 130	4	TM 1643 IT	
	50 and 60	200 - 250	6	TM 1663 IT	
	50 and 60	380 - 415	9	TM 1693 IT	
	50 and 60	480 - 500	7	TM 1673 IT	
	50 and 60	ins. transformer	12	TM 16123 IT	A.V.
	> 300 - 500 d.c.	> 50	2	TM 1623 IT	*)
	> 300 - 500 d.c.	> 50 - 250	3	TM 1633 IT	A.V.
3P+⊕	50 and 60	100 - 130	4	TM 1644 IT	
	50 and 60	200 - 250	9	TM 1694 IT	
	50 and 60	380 - 415	6	TM 1664 IT	
	60	440 - 460	11	TM 16114 IT	
	50 and 60	480 - 500	7	TM 1674 IT	
	50	380	3	TM 1634 IT	
	60	440	3	TM 1634 IT	
	100 - 300	> 50	10	TM 16104 IT	*)
	> 300 - 500	> 50	2	TM 1624 IT	*)
3P+N+⊕	50 and 60	57/100 - 75/130	4	TM 1645 IT	
	50 and 60	120/208 - 144/250	9	TM 1695 IT	
	50 and 60	200/346 - 240/415	6	TM 1665 IT	
	50 and 60	277/480 - 288/500	7	TM 1675 IT	
	60	250/440 - 265/460	11	TM 16115 IT	
	50	220/380	3	TM 1635 IT	
	60	250/440	3	TM 1635 IT	
	> 300 - 500	> 50	2	TM 1625 IT	*)

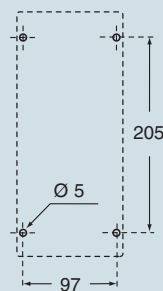
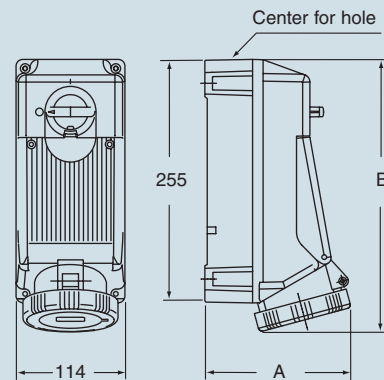
Legend

A.V. = Colour 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

Rated current socket part	Maximum operating current	Fuse carrier type
16A	16A	E16 - 25A-500V

Dimensions in mm



Poles	A	B
2P + ⊕	133	276
3P + ⊕	135	276
3P+N+⊕	140	277

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

- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 (32A) grey and white (63A)
- Socket-outlets with bayonet fastening cover
- 63A types with pilot contact
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch  $I_{th}= 80A$  (in air) and  $I_{the}= 63A$  (in enclosure) for 32A and 63A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- Compartment with plug-type fuse carrier (fuses not supplied) and inspection panel openable only when the switch is off
- @ With Italian Quality Mark

**32A**  
IP66/IP67 degree of protection



**63A**  
IP66/IP67 degree of protection



Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour	Part No.	Colour
2P+⊕	50 and 60	100 - 130	4	TM 3243 IT @	Yellow	TM 6343 IT @	Yellow
	50 and 60	200 - 250	6	TM 3263 IT @	Blue	TM 6363 IT @	Blue
	50 and 60	380 - 415	9	TM 3293 IT @	Red	TM 6393 IT @	Red
	50 and 60	480 - 500	7	TM 3273 IT @	Black	TM 6373 IT @	Black
	50 and 60	ins. transformer	12	TM 32123 IT @	A.V.	TM 63123 IT @	A.V.
	> 300 - 500	> 50	2	TM 3223 IT @	*) Green		*) Green
	d.c.	> 50 - 250	3	TM 3233 IT @	A.V.		A.V.
3P+⊕	50 and 60	100 - 130	4	TM 3244 IT @	Yellow	TM 6344 IT @	Yellow
	50 and 60	200 - 250	9	TM 3294 IT @	Blue	TM 6394 IT @	Blue
	50 and 60	380 - 415	6	TM 3264 IT @	Red	TM 6364 IT @	Red
	60	440 - 460	11	TM 32114 IT @	*) Red	TM 63114 IT @	*) Red
	50 and 60	480 - 500	7	TM 3274 IT @	Black	TM 6374 IT @	Black
	50	380	3	TM 3234 IT @	Red		Red
	60	440	3	TM 3234 IT @	Red		Red
	100 - 300	> 50	10	TM 32104 IT @	*) Green		*) Green
	> 300 - 500	> 50	2	TM 3224 IT @	*) Green		*) Green
	3P+N+⊕	50 and 60	57/100 - 75/130	4	TM 3245 IT @	Yellow	TM 6345 IT @
50 and 60		120/208 - 144/250	9	TM 3295 IT @	Blue	TM 6395 IT @	Blue
50 and 60		200/346 - 240/415	6	TM 3265 IT @	Red	TM 6365 IT @	Red
50 and 60		277/480 - 288/500	7	TM 3275 IT @	Black	TM 6375 IT @	Black
60		250/440 - 265/460	11	TM 32115 IT @	*) Red	TM 63115 IT @	*) Red
50		220/380	3	TM 3235 IT @	Red		Red
60		250/440	3	TM 3235 IT @	Red		Red
> 300 - 500		> 50	2	TM 3225 IT @	*) Green		*) Green

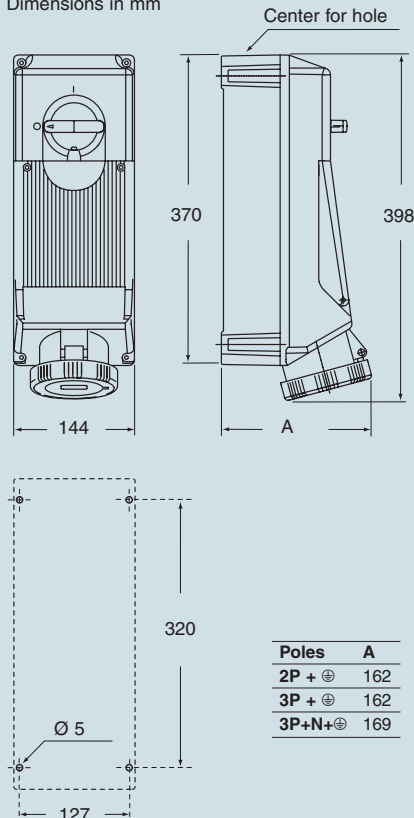
**Legend**

A.V. = Colour according to voltage

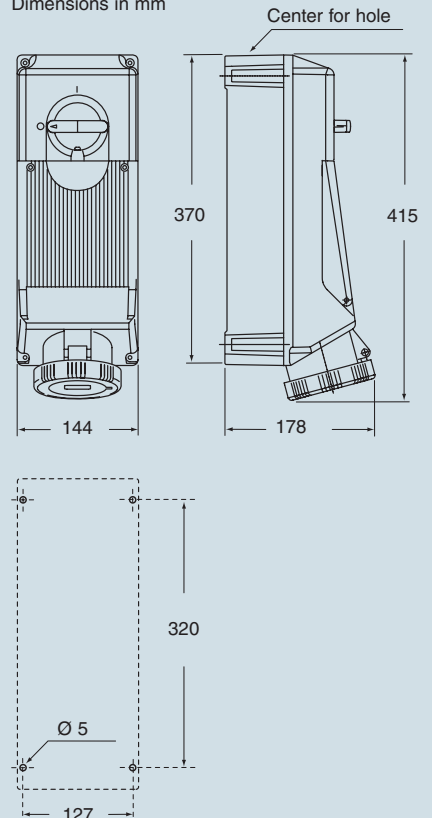
\*) Green may be used together with the colour of the operating range for frequencies above 60 Hz and up to a maximum of 500 Hz

Rated current	Fuse carrier type
32A	E33 - DIII - 35A-500V
63A	E33 - DIII - 63A-500V

Dimensions in mm



Dimensions in mm



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



- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 grey
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch with I<sub>th</sub>= 32A rating for 16A and 32A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- Compartment with sectionable fuse carrier (fuses not supplied) and inspection panel openable only when the switch is off
- With Italian Quality Mark

**16A**  
IP66/IP67 degree of protection



**32A**  
IP66/IP67 degree of protection



Poles	Frequency Hz	Voltage V	Earthing contact position h
2P+⊕	50 and 60	100 - 130	4
	50 and 60	200 - 250	6
	50 and 60	380 - 415	9
	50 and 60	480 - 500	7
	50 and 60	ins. transformer	12
	> 300 - 500 d.c.	> 50	2
	> 300 - 500 d.c.	> 50 - 250	3
3P+⊕	50 and 60	100 - 130	4
	50 and 60	200 - 250	9
	50 and 60	380 - 415	6
	60	440 - 460	11
	50 and 60	480 - 500	7
	50	380	3
	60	440	3
	100 - 300	> 50	10
	> 300 - 500	> 50	2
3P+N+⊕	50 and 60	57/100 - 75/130	4
	50 and 60	120/208 - 144/250	9
	50 and 60	200/346 - 240/415	6
	50 and 60	277/480 - 288/500	7
	60	250/440 - 265/460	11
	50	220/380	3
	60	250/440	3
	> 300 - 500	> 50	2

Part No.	Colour
TM 1643 IS	
TM 1663 IS	
TM 1693 IS	
TM 1673 IS	
TM 16123 IS	A.V.
TM 1623 IS	*)
TM 1633 IS	A.V.
TM 1644 IS	
TM 1694 IS	
TM 1664 IS	
TM 16114 IS	
TM 1674 IS	
TM 1634 IS	
TM 1624 IS	*)
TM 1634 IS	*)
TM 16104 IS	*)
TM 1624 IS	*)
TM 1645 IS	
TM 1695 IS	
TM 1665 IS	
TM 1675 IS	
TM 16115 IS	
TM 1635 IS	
TM 1635 IS	
TM 1625 IS	*)

Part No.	Colour
TM 3243KIS	
TM 3263KIS	
TM 3293KIS	
TM 32123KIS	A.V.
TM 3223KIS  (up to 400V)	*)
TM 3233KIS	A.V.
TM 3244KIS	
TM 3294KIS	
TM 3264KIS	
TM 3234KIS	
TM 32104KIS  (up to 400V)	*)
TM 3224KIS  (up to 400V)	*)
TM 3245KIS	
TM 3295KIS	
TM 3265KIS	
TM 3235KIS	
TM 3225KIS  (up to 400V)	*)

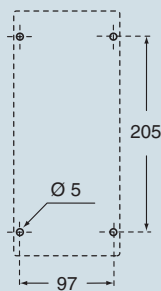
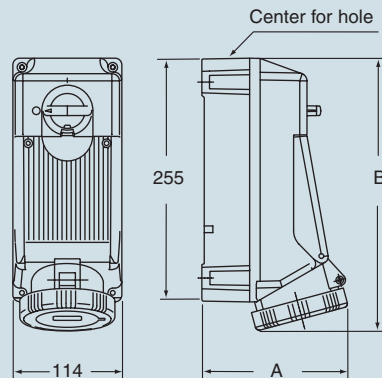
**Legend**

A.V. = Colour 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

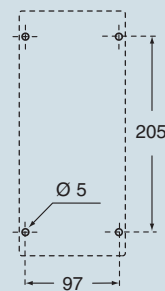
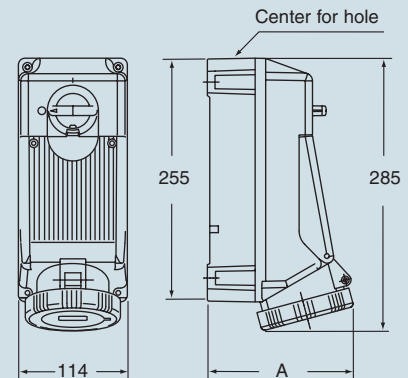
Rated current socket part	Maximum operating current	Fuse carrier type
16A	16A	10 x 38
32A	32A	10 x 38

Dimensions in mm



Poles	A	B
2P + ⊕	133	276
3P + ⊕	135	276
3P+N+⊕	140	277

Dimensions in mm



Poles	A
2P + ⊕	146
3P + ⊕	146
3P+N+⊕	151

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

- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 (32A) grey and white (63A)
- Socket-outlets with bayonet fastening cover
- 63A types with pilot contact
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch  $I_{th}= 80A$  (in air) and  $I_{the}= 63A$  (in enclosure) for 32A and 63A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- Compartment with sectionable fuse carrier (fuses not supplied) and inspection panel openable only when the switch is off
- Ⓢ With Italian Quality Mark

**32A**  
IP66/IP67 degree of protection



**63A**  
IP66/IP67 degree of protection



Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour	Part No.	Colour
2P+Ⓢ	50 and 60	100 - 130	4	TM 3243 IS Ⓢ	Yellow	TM 6343 IS Ⓢ	Yellow
	50 and 60	200 - 250	6	TM 3263 IS Ⓢ	Blue	TM 6363 IS Ⓢ	Blue
	50 and 60	380 - 415	9	TM 3293 IS Ⓢ	Red	TM 6393 IS Ⓢ	Red
	50 and 60	480 - 500	7	TM 3273 IS Ⓢ	Black	TM 6373 IS Ⓢ	Black
	50 and 60	ins. transformer	12	TM 32123 IS Ⓢ	A.V.	TM 63123 IS Ⓢ	A.V.
	> 300 - 500	> 50	2	TM 3223 IS Ⓢ	*) Green		*) Green
	d.c.	> 50 - 250	3	TM 3233 IS Ⓢ	A.V.		A.V.
3P+Ⓢ	50 and 60	100 - 130	4	TM 3244 IS Ⓢ	Yellow	TM 6344 IS Ⓢ	Yellow
	50 and 60	200 - 250	9	TM 3294 IS Ⓢ	Blue	TM 6394 IS Ⓢ	Blue
	50 and 60	380 - 415	6	TM 3264 IS Ⓢ	Red	TM 6364 IS Ⓢ	Red
	60	440 - 460	11	TM 32114 IS Ⓢ	*) Red	TM 63114 IS Ⓢ	*) Red
	50 and 60	480 - 500	7	TM 3274 IS Ⓢ	Black	TM 6374 IS Ⓢ	Black
	50	380	3	TM 3234 IS Ⓢ	Red		Red
	60	440	3	TM 3224 IS Ⓢ	*) Red		*) Red
	100 - 300	> 50	10	TM 32104 IS Ⓢ	*) Green		*) Green
	> 300 - 500	> 50	2	TM 3224 IS Ⓢ	*) Green		*) Green
	3P+N+Ⓢ	50 and 60	57/100 - 75/130	4	TM 3245 IS Ⓢ	Yellow	TM 6345 IS Ⓢ
50 and 60		120/208 - 144/250	9	TM 3295 IS Ⓢ	Blue	TM 6395 IS Ⓢ	Blue
50 and 60		200/346 - 240/415	6	TM 3265 IS Ⓢ	Red	TM 6365 IS Ⓢ	Red
50 and 60		277/480 - 288/500	7	TM 3275 IS Ⓢ	Black	TM 6375 IS Ⓢ	Black
60		250/440 - 265/460	11	TM 32115 IS Ⓢ	*) Red	TM 63115 IS Ⓢ	*) Red
50		220/380	3	TM 3235 IS Ⓢ	Red		Red
60		250/440	3	TM 3235 IS Ⓢ	*) Red		*) Red
> 300 - 500		> 50	2	TM 3225 IS Ⓢ	*) Green		*) Green

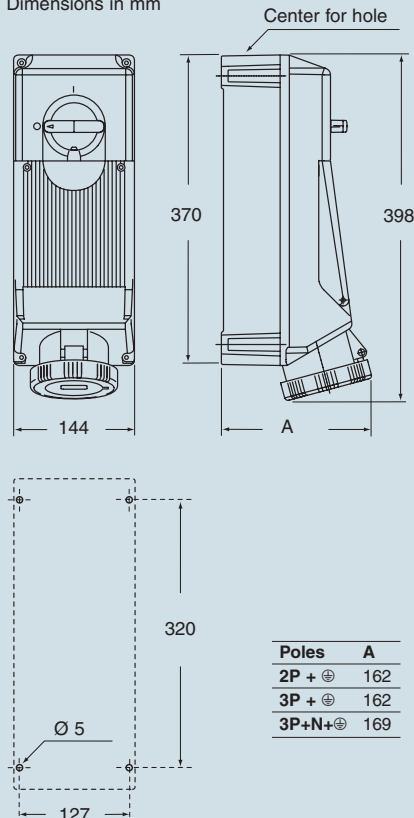
**Legend**

A.V. = Colour according to voltage

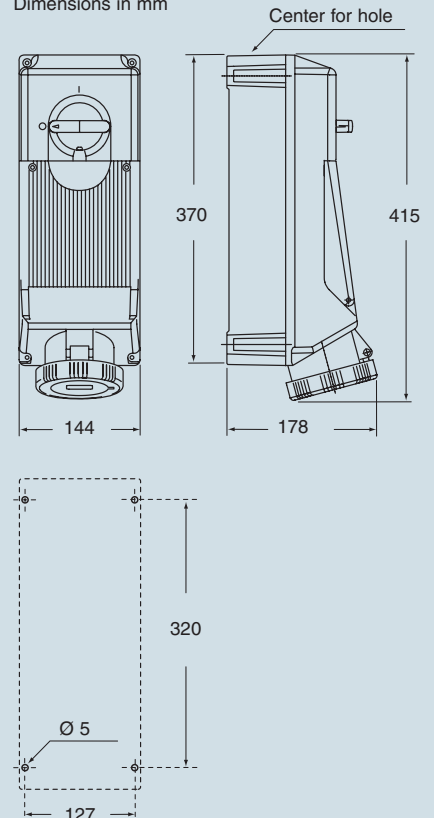
\*) Green may be used together with the colour of the operating range for frequencies above 60 Hz and up to a maximum of 500 Hz

Rated current	Fuse carrier type
32A	14 x 51
63A	22 x 58

Dimensions in mm



Dimensions in mm



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

- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 grey
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- Cable entry with drilling template
- “Zeta” switch with I<sub>th</sub>= 32A rating for 16A and 32A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- Compartment for modular units with DIN-rail EN 60715 (CEI 17-78) TH 35-7,5 and inspection panel that can be opened only when the switch is off
- With Italian Quality Mark

**16A**  
IP66/IP67 degree of protection



**32A**  
IP66/IP67 degree of protection



Poles	Frequency Hz	Voltage V	Earthing contact position h
2P+⊕	50 and 60	100 - 130	4
	50 and 60	200 - 250	6
	50 and 60	380 - 415	9
	50 and 60	480 - 500	7
	50 and 60	ins. transformer	12
	> 300 - 500	> 50	2
	d.c.	> 50 - 250	3
3P+⊕	50 and 60	100 - 130	4
	50 and 60	200 - 250	9
	50 and 60	380 - 415	6
	60	440 - 460	11
	50 and 60	480 - 500	7
	50	380	3
	60	440	3
	100 - 300	> 50	10
	> 300 - 500	> 50	2
3P+N+⊕	50 and 60	57/100 - 75/130	4
	50 and 60	120/208 - 144/250	9
	50 and 60	200/346 - 240/415	6
	50 and 60	277/480 - 288/500	7
	60	250/440 - 265/460	11
	50	220/380	3
	60	250/440	3
	> 300 - 500	> 50	2

Part No.	Colour
TM 1643 IR	
TM 1663 IR	
TM 1693 IR	
TM 1673 IR	
TM 16123 IR	A.V.
TM 1623 IR	*
TM 1633 IR	A.V.
TM 1644 IR	
TM 1694 IR	
TM 1664 IR	
TM 16114 IR	
TM 1674 IR	
TM 1634 IR	
TM 1634 IR	
TM 16104 IR	*
TM 1624 IR	*
TM 1645 IR	
TM 1695 IR	
TM 1665 IR	
TM 1675 IR	
TM 16115 IR	
TM 1635 IR	
TM 1635 IR	
TM 1625 IR	*

Part No.	Colour
TM 3243KIR	
TM 3263KIR	
TM 3293KIR	
TM 3273KIR	
TM 32123KIR	A.V.
TM 3223KIR	*
TM 3233KIR	A.V.
TM 3244KIR	
TM 3294KIR	
TM 3264KIR	
TM 32114KIR	
TM 3274KIR	
TM 3234KIR	
TM 3234KIR	
TM 32104KIR	*
TM 3224KIR	*
TM 3245KIR	
TM 3295KIR	
TM 3265KIR	
TM 3275KIR	
TM 32115KIR	
TM 3235KIR	
TM 3235KIR	
TM 3225KIR	*

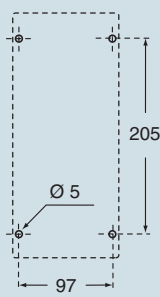
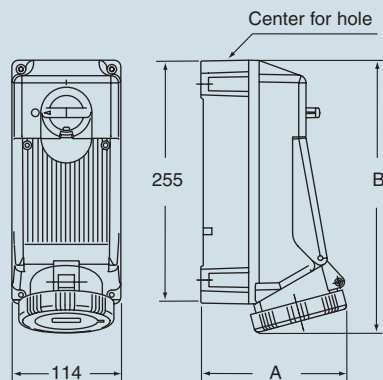
**Legend**

A.V. = Colour 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

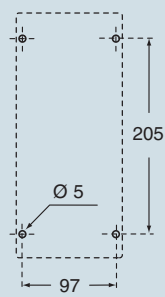
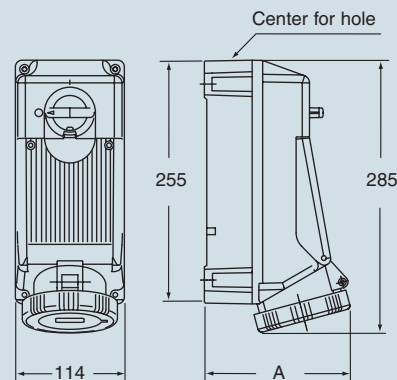
Rated of socket part	Maximum operating current	N. of modules DIN-rail
16A	16A	4.5
32A	32A	4.5

Dimensions in mm



Poles	A	B
2P + ⊕	133	276
3P + ⊕	135	276
3P+N+⊕	140	277

Dimensions in mm



Poles	A
2P + ⊕	146
3P + ⊕	146
3P+N+⊕	151

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

- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 (32A) grey and white (63A)
- Socket-outlets with bayonet fastening cover
- 63A types with pilot contact
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch  $I_{th}= 80A$  (in air) and  $I_{the}= 63A$  (in enclosure) for 32A and 63A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- Compartment for modular units with DIN-rail EN 60715 (CEI 17-78) TH 35-7,5 and inspection panel that can be opened only when the switch is off
- With Italian Quality Mark

**32A**  
IP66/IP67 degree of protection



**63A**  
IP66/IP67 degree of protection



Poles	Frequency Hz	Voltage V	Earthing contact position h
2P+⊕	50 and 60	100 - 130	4
	50 and 60	200 - 250	6
	50 and 60	380 - 415	9
	50 and 60	480 - 500	7
	50 and 60	ins. transformer	12
	> 300 - 500 d.c.	> 50	2
	> 300 - 500 d.c.	> 50 - 250	3
3P+⊕	50 and 60	100 - 130	4
	50 and 60	200 - 250	9
	50 and 60	380 - 415	6
	60	440 - 460	11
	50 and 60	480 - 500	7
	50	380	3
	60	440	3
	100 - 300	> 50	10
	> 300 - 500	> 50	2
	3P+N+⊕	50 and 60	57/100 - 75/130
50 and 60		120/208 - 144/250	9
50 and 60		200/346 - 240/415	6
50 and 60		277/480 - 288/500	7
60		250/440 - 265/460	11
50		220/380	3
60		250/440	3
> 300 - 500		> 50	2

Part No.	Colour
TM 3243 IR	
TM 3263 IR	
TM 3293 IR	
TM 3273 IR	
TM 32123 IR	A.V.
TM 3223 IR	*)
TM 3233 IR	A.V.
TM 3244 IR	
TM 3294 IR	
TM 3264 IR	
TM 32114 IR	
TM 3274 IR	
TM 3234 IR	
TM 3223 IR	
TM 32104 IR	*)
TM 3224 IR	*)
TM 3245 IR	
TM 3295 IR	
TM 3265 IR	
TM 3275 IR	
TM 32115 IR	
TM 3235 IR	
TM 3235 IR	
TM 3225 IR	*)

Part No.	Colour
TM 6343 IR	
TM 6363 IR	
TM 6393 IR	
TM 6373 IR	
TM 63123 IR	A.V.
TM 6344 IR	
TM 6394 IR	
TM 6364 IR	
TM 63114 IR	
TM 6374 IR	
TM 6345 IR	
TM 6395 IR	
TM 6365 IR	
TM 6375 IR	
TM 63115 IR	

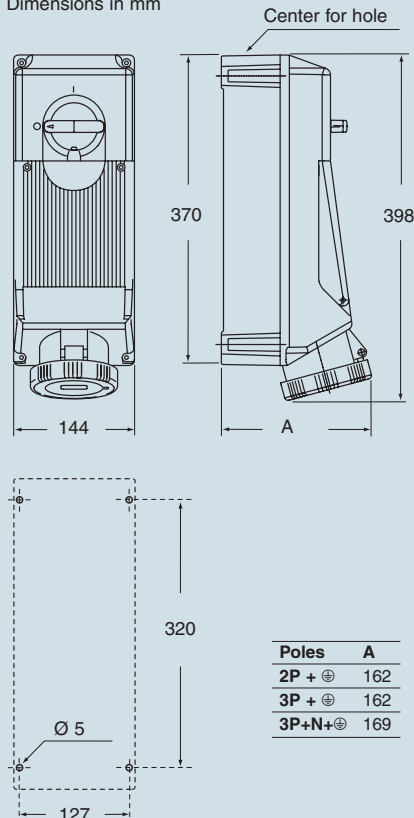
**Legend**

A.V. = Colour according to voltage

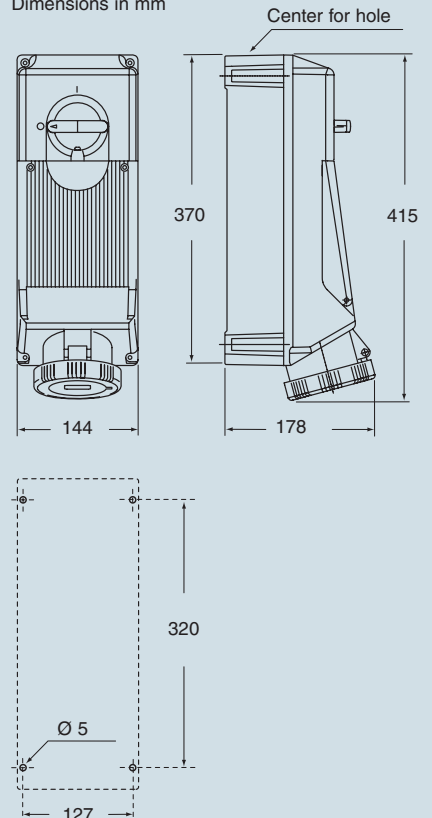
\*) Green may be used together with the colour of the operating range for frequencies above 60 Hz and up to a maximum of 500 Hz

Rated of socket part	N. of modules DIN-rail
32A	6
63A	6

Dimensions in mm



Dimensions in mm



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- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 grey
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch with I<sub>th</sub> = 32A rating for 16A and 32A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- ⊕ With Italian Quality Mark

**16A**  
IP66/IP67 degree of protection



**32A**  
IP66/IP67 degree of protection



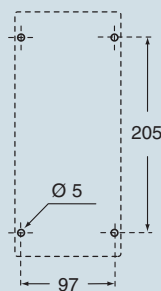
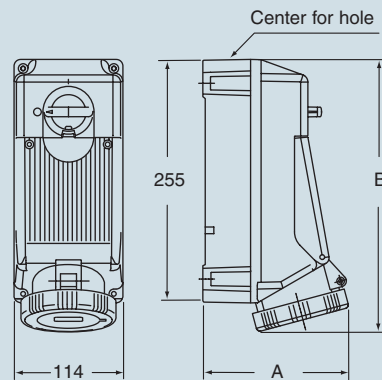
Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour	Part No.	Colour
2P+⊕	50 and 60	100 - 130	4	TM 1643 SP ⊕	Yellow	TM 3243KSP ⊕	Yellow
	50 and 60	200 - 250	6	TM 1663 SP ⊕	Blue	TM 3263KSP ⊕	Blue
	50 and 60	380 - 415	9	TM 1693 SP ⊕	Red	TM 3293KSP ⊕	Red
	50 and 60	480 - 500	7	TM 1673 SP ⊕	Black	TM 3273KSP ⊕	Black
	50 and 60	ins. transformer	12	TM 16123 SP ⊕	A.V.	TM 32123KSP ⊕	A.V.
	> 300 - 500	> 50	2	TM 1623 SP ⊕	*) Green	TM 3223KSP ⊕	*) Green
	d.c.	> 50 - 250	3	TM 1633 SP ⊕	A.V.	TM 3233KSP ⊕	A.V.
3P+⊕	50 and 60	100 - 130	4	TM 1644 SP ⊕	Yellow	TM 3244KSP ⊕	Yellow
	50 and 60	200 - 250	9	TM 1694 SP ⊕	Blue	TM 3294KSP ⊕	Blue
	50 and 60	380 - 415	6	TM 1664 SP ⊕	Red	TM 3264KSP ⊕	Red
	60	440 - 460	11	TM 16114 SP ⊕	Red	TM 32114KSP ⊕	Red
	50 and 60	480 - 500	7	TM 1674 SP ⊕	Black	TM 3274KSP ⊕	Black
	50	380	3	TM 1634 SP ⊕	Red	TM 3234KSP ⊕	Red
	60	440	3	TM 1634 SP ⊕	Red	TM 3234KSP ⊕	Red
	100 - 300	> 50	10	TM 16104 SP ⊕	*) Green	TM 32104KSP ⊕	*) Green
	> 300 - 500	> 50	2	TM 1624 SP ⊕	*) Green	TM 3224KSP ⊕	*) Green
	3P+N+⊕	50 and 60	57/100 - 75/130	4	TM 1645 SP ⊕	Yellow	TM 3245KSP ⊕
50 and 60		120/208 - 144/250	9	TM 1695 SP ⊕	Blue	TM 3295KSP ⊕	Blue
50 and 60		200/346 - 240/415	6	TM 1665 SP ⊕	Red	TM 3265KSP ⊕	Red
50 and 60		277/480 - 288/500	7	TM 1675 SP ⊕	Black	TM 3275KSP ⊕	Black
60		250/440 - 265/460	11	TM 16115 SP ⊕	Red	TM 32115KSP ⊕	Red
50		220/380	3	TM 1635 SP ⊕	Red	TM 3235KSP ⊕	Red
60		250/440	3	TM 1635 SP ⊕	Red	TM 3235KSP ⊕	Red
> 300 - 500		> 50	2	TM 1625 SP ⊕	*) Green	TM 3225KSP ⊕	*) Green

**Legend**

A.V. = Colour according to voltage

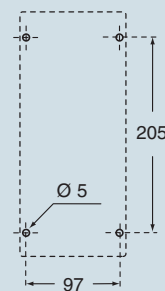
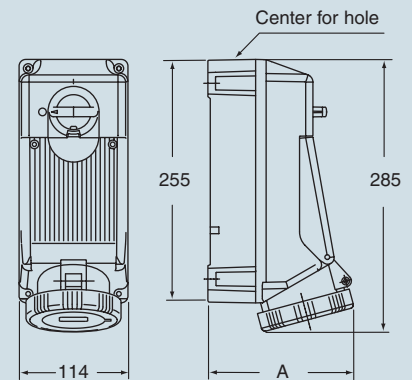
\*) Green may be used together with the colour of the operating range for frequencies above 60 Hz and up to a maximum of 500 Hz

Dimensions in mm



Poles	A	B
2P + ⊕	133	276
3P + ⊕	135	276
3P+N+⊕	140	277

Dimensions in mm



Poles	A
2P + ⊕	146
3P + ⊕	146
3P+N+⊕	151

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

- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 (32A) grey and white (63A)
- Socket-outlets with bayonet fastening cover
- 63A types with pilot contact
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch  $I_{th}$ = 80A (in air) and  $I_{the}$ = 63A (in enclosure) for 32A and 63A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- With Italian Quality Mark

**32A**  
IP66/IP67 degree of protection



**63A**  
IP66/IP67 degree of protection



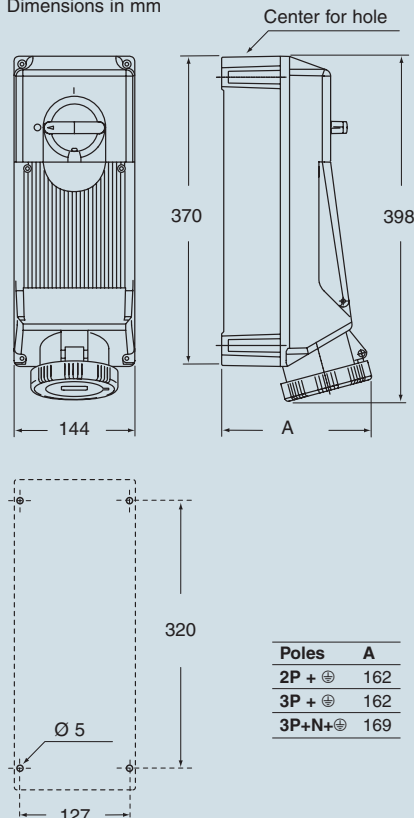
Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour	Part No.	Colour
2P+⊕	50 and 60	100 - 130	4	TM 3243 SP		TM 6343 SP	
	50 and 60	200 - 250	6	TM 3263 SP		TM 6363 SP	
	50 and 60	380 - 415	9	TM 3293 SP		TM 6393 SP	
	50 and 60	480 - 500	7	TM 3273 SP		TM 6373 SP	
	50 and 60	ins. transformer	12	TM 32123 SP	A.V.	TM 63123 SP	A.V.
	> 300 - 500	> 50	2	TM 3223 SP			
	d.c.	> 50 - 250	3	TM 3233 SP	A.V.		
3P+⊕	50 and 60	100 - 130	4	TM 3244 SP		TM 6344 SP	
	50 and 60	200 - 250	9	TM 3294 SP		TM 6394 SP	
	50 and 60	380 - 415	6	TM 3264 SP		TM 6364 SP	
	60	440 - 460	11	TM 32114 SP		TM 63114 SP	
	50 and 60	480 - 500	7	TM 3274 SP		TM 6374 SP	
	50	380	3	TM 3234 SP			
	60	440	3	TM 3234 SP			
	100 - 300	> 50	10	TM 32104 SP			
	> 300 - 500	> 50	2	TM 3224 SP			
3P+N+⊕	50 and 60	57/100 - 75/130	4	TM 3245 SP		TM 6345 SP	
	50 and 60	120/208 - 144/250	9	TM 3295 SP		TM 6395 SP	
	50 and 60	200/346 - 240/415	6	TM 3265 SP		TM 6365 SP	
	50 and 60	277/480 - 288/500	7	TM 3275 SP		TM 6375 SP	
	60	250/440 - 265/460	11	TM 32115 SP		TM 63115 SP	
	50	220/380	3	TM 3235 SP			
	60	250/440	3	TM 3235 SP			
> 300 - 500	> 50	2	TM 3225 SP				

**Legend**

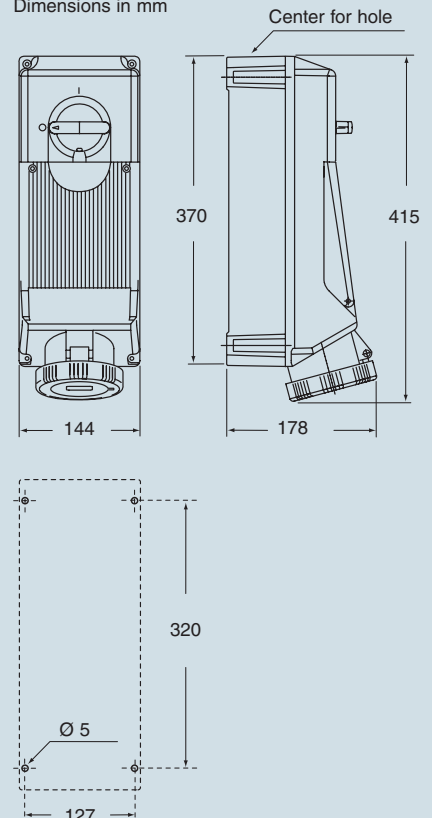
A.V. = Colour according to voltage

\*) 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 in mm



Dimensions in mm



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

- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 grey
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- "Zeta" switch with  $I_{th} = 32A$  rating (in air) and  $I_{the} = 32A$  (in enclosure) for 16A and 32A socket-outlets
- Mechanical interlock that prevents:
  - the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- Compartment with plug-type fuse carrier (fuses not supplied) and inspection panel openable only when the switch is off
- With Italian Quality Mark

**16A**  
**IP66/IP67 degree of protection**



Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour
2P+⊕	50 and 60	100 - 130	4	TM 1643 SIT	
	50 and 60	200 - 250	6	TM 1663 SIT	
	50 and 60	380 - 415	9	TM 1693 SIT	
	50 and 60	480 - 500	7	TM 1673 SIT	
	50 and 60	ins. transformer	12	TM 16123 SIT	A.V.
	> 300 - 500 d.c.	> 50	2	TM 1623 SIT	*)
	> 300 - 500 d.c.	> 50 - 250	3	TM 1633 SIT	A.V.
3P+⊕	50 and 60	100 - 130	4	TM 1644 SIT	
	50 and 60	200 - 250	9	TM 1694 SIT	
	50 and 60	380 - 415	6	TM 1664 SIT	
	60	440 - 460	11	TM 16114 SIT	
	50 and 60	480 - 500	7	TM 1674 SIT	
	50	380	3	TM 1634 SIT	
	60	440	3	TM 1634 SIT	
	100 - 300	> 50	10	TM 16104 SIT	*)
	> 300 - 500	> 50	2	TM 1624 SIT	*)
3P+N+⊕	50 and 60	57/100 - 75/130	4	TM 1645 SIT	
	50 and 60	120/208 - 144/250	9	TM 1695 SIT	
	50 and 60	200/346 - 240/415	6	TM 1665 SIT	
	50 and 60	277/480 - 288/500	7	TM 1675 SIT	
	60	250/440 - 265/460	11	TM 16115 SIT	
	50	220/380	3	TM 1635 SIT	
	60	250/440	3	TM 1635 SIT	
	> 300 - 500	> 50	2	TM 1625 SIT	*)

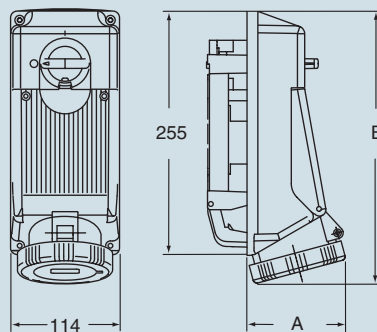
**Legend**

A.V. = Colour 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

Rated current socket part	Maximum operating current	Fuse carrier type
16A	16A	E16 - 25A-500V

Dimensions in mm



Poles	A	B
2P + ⊕	83	276
3P + ⊕	85	276
3P+N+⊕	90	277

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

TM..SIT



- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 grey
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- "Zeta" switch with I<sub>th</sub>= 32A rating for 16A and 32A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- Compartment with sectionable fuse carrier (fuses not supplied) and inspection panel openable only when the switch is off
- With Italian Quality Mark

**16A**  
IP66/IP67 degree of protection



**32A**  
IP66/IP67 degree of protection



Poles	Frequency Hz	Voltage V	Earthing contact position h
2P+	50 and 60	100 - 130	4
	50 and 60	200 - 250	6
	50 and 60	380 - 415	9
	50 and 60	480 - 500	7
	50 and 60	ins. transformer	12
	> 300 - 500 d.c.	> 50	2
	> 300 - 500 d.c.	> 50 - 250	3
3P+	50 and 60	100 - 130	4
	50 and 60	200 - 250	9
	50 and 60	380 - 415	6
	60	440 - 460	11
	50 and 60	480 - 500	7
	50	380	3
	60	440	3
	100 - 300	> 50	10
	> 300 - 500	> 50	2
	3P+N+	50 and 60	57/100 - 75/130
50 and 60		120/208 - 144/250	9
50 and 60		200/346 - 240/415	6
50 and 60		277/480 - 288/500	7
60		250/440 - 265/460	11
50		220/380	3
60		250/440	3
> 300 - 500		> 50	2

Part No.	Colour
TM 1643 SIS	
TM 1663 SIS	
TM 1693 SIS	
TM 1673 SIS	
TM 16123 SIS	A.V.
TM 1623 SIS	*)
TM 1633 SIS	A.V.
TM 1644 SIS	
TM 1694 SIS	
TM 1664 SIS	
TM 16114 SIS	
TM 1674 SIS	
TM 1634 SIS	
TM 1623 SIS	
TM 16104 SIS	*)
TM 1624 SIS	*)
TM 1645 SIS	
TM 1695 SIS	
TM 1665 SIS	
TM 1675 SIS	
TM 16115 SIS	
TM 1635 SIS	
TM 1635 SIS	
TM 1625 SIS	*)

Part No.	Colour
TM 3243KSIS	
TM 3263KSIS	
TM 3293KSIS	
TM 32123KSIS	A.V.
TM 3223KSIS  (up to 400V)	*)
TM 3233KSIS	A.V.
TM 3244KSIS	
TM 3294KSIS	
TM 3264KSIS	
TM 3234KSIS	
TM 32104KSIS  (up to 400V)	*)
TM 3224KSIS  (up to 400V)	*)
TM 3245KSIS	
TM 3295KSIS	
TM 3265KSIS	
TM 3235KSIS	
TM 3225KSIS  (up to 400V)	*)

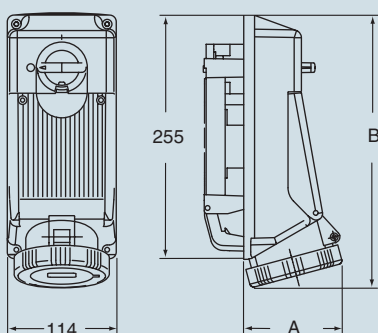
**Legend**

A.V. = Colour 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

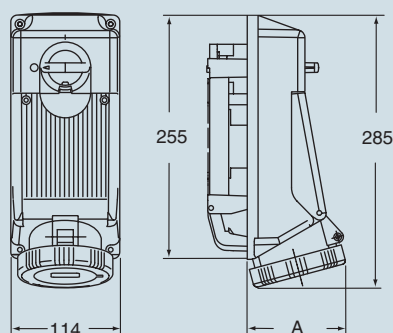
Rated current socket part	Maximum operating current	Fuse carrier type
16A	16A	10 x 38
32A	32A	10 x 38

Dimensions in mm



Poles	A	B
2P +	83	276
3P +	85	276
3P+N+	90	277

Dimensions in mm



Poles	A
2P +	96
3P +	96
3P+N+	101

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





- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 grey
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- "Zeta" switch with I<sub>th</sub>= 32A rating for 16A and 32A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- Compartment for modular units with DIN-rail EN 60715 (CEI 17-78) TH 35-7,5 and inspection panel that can be opened only when the switch is off
- With Italian Quality Mark

**16A**  
IP66/IP67 degree of protection



**32A**  
IP66/IP67 degree of protection



Poles	Frequency Hz	Voltage V	Earthing contact position h
2P+⊕	50 and 60	100 - 130	4
	50 and 60	200 - 250	6
	50 and 60	380 - 415	9
	50 and 60	480 - 500	7
	50 and 60	ins. transformer	12
	> 300 - 500	> 50	2
	d.c.	> 50 - 250	3
3P+⊕	50 and 60	100 - 130	4
	50 and 60	200 - 250	9
	50 and 60	380 - 415	6
	60	440 - 460	11
	50 and 60	480 - 500	7
	50	380	3
	60	440	3
	100 - 300	> 50	10
> 300 - 500	> 50	2	
3P+N+⊕	50 and 60	57/100 - 75/130	4
	50 and 60	120/208 - 144/250	9
	50 and 60	200/346 - 240/415	6
	50 and 60	277/480 - 288/500	7
	60	250/440 - 265/460	11
	50	220/380	3
	60	250/440	3
> 300 - 500	> 50	2	

Part No.	Colour
TM 1643 SIR	
TM 1663 SIR	
TM 1693 SIR	
TM 1673 SIR	
TM 16123 SIR	A.V.
TM 1623 SIR	*
TM 1633 SIR	A.V.
TM 1644 SIR	
TM 1694 SIR	
TM 1664 SIR	
TM 16114 SIR	
TM 1674 SIR	
TM 1634 SIR	
TM 1634 SIR	
TM 16104 SIR	*
TM 1624 SIR	*
TM 1645 SIR	
TM 1695 SIR	
TM 1665 SIR	
TM 1675 SIR	
TM 16115 SIR	
TM 1635 SIR	
TM 1635 SIR	
TM 1625 SIR	*

Part No.	Colour
TM 3243KSIR	
TM 3263KSIR	
TM 3293KSIR	
TM 3273KSIR	
TM 32123KSIR	A.V.
TM 3223KSIR	*
TM 3233KSIR	A.V.
TM 3244KSIR	
TM 3294KSIR	
TM 3264KSIR	
TM 32114KSIR	
TM 3274KSIR	
TM 3234KSIR	
TM 3234KSIR	
TM 32104KSIR	*
TM 3224KSIR	*
TM 3245KSIR	
TM 3295KSIR	
TM 3265KSIR	
TM 3275KSIR	
TM 32115KSIR	
TM 3235KSIR	
TM 3235KSIR	
TM 3225KSIR	*

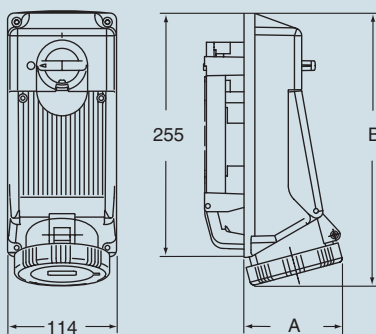
**Legend**

A.V. = Colour 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

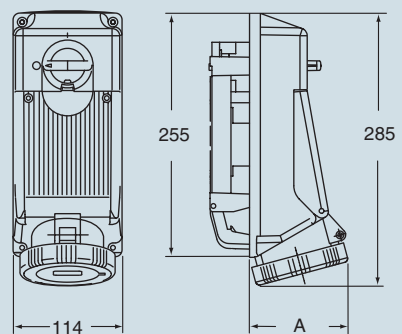
Rated of socket part	Maximum operating current	N. of modules DIN-rail
16A	16A	4.5
32A	32A	4.5

Dimensions in mm



Poles	A	B
2P + ⊕	83	276
3P + ⊕	85	276
3P+N+⊕	90	277

Dimensions in mm



Poles	A
2P + ⊕	96
3P + ⊕	96
3P+N+⊕	101

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

- Compliant with EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 grey
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- "Zeta" switch with I<sub>th</sub>= 32A rating for 16A and 32A socket-outlets
- Mechanical interlock that prevents: the switch from being turned on without the plug inserted and the plug from being removed while the switch is on
- Knob lockable in positions O and I
- With Italian Quality Mark

**16A**  
IP66/IP67 degree of protection



**32A**  
IP66/IP67 degree of protection



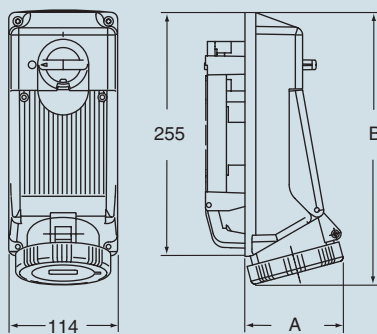
Poles	Frequency Hz	Voltage V	Earthing contact position h	Part No.	Colour	Part No.	Colour
2P+	50 and 60	100 - 130	4	TM 1643 SSP		TM 3243KSSP	
	50 and 60	200 - 250	6	TM 1663 SSP		TM 3263KSSP	
	50 and 60	380 - 415	9	TM 1693 SSP		TM 3293KSSP	
	50 and 60	480 - 500	7	TM 1673 SSP		TM 3273KSSP	
	50 and 60	ins. transformer	12	TM 16123 SSP	A.V.	TM 32123KSSP	A.V.
	> 300 - 500	> 50	2	TM 1623 SSP	*	TM 3223KSSP	*
	d.c.	> 50 - 250	3	TM 1633 SSP	A.V.	TM 3233KSSP	A.V.
3P+	50 and 60	100 - 130	4	TM 1644 SSP		TM 3244KSSP	
	50 and 60	200 - 250	9	TM 1694 SSP		TM 3294KSSP	
	50 and 60	380 - 415	6	TM 1664 SSP		TM 3264KSSP	
	60	440 - 460	11	TM 16114 SSP		TM 32114KSSP	
	50 and 60	480 - 500	7	TM 1674 SSP		TM 3274KSSP	
	50	380	3	TM 1634 SSP		TM 3234KSSP	
	60	440	3	TM 1634 SSP		TM 3234KSSP	
	100 - 300	> 50	10	TM 16104 SSP	*	TM 32104KSSP	*
> 300 - 500	> 50	2	TM 1624 SSP	*	TM 3224KSSP	*	
3P+N+	50 and 60	57/100 - 75/130	4	TM 1645 SSP		TM 3245KSSP	
	50 and 60	120/208 - 144/250	9	TM 1695 SSP		TM 3295KSSP	
	50 and 60	200/346 - 240/415	6	TM 1665 SSP		TM 3265KSSP	
	50 and 60	277/480 - 288/500	7	TM 1675 SSP		TM 3275KSSP	
	60	250/440 - 265/460	11	TM 16115 SSP		TM 32115KSSP	
	50	220/380	3	TM 1635 SSP		TM 3235KSSP	
	60	250/440	3	TM 1635 SSP		TM 3235KSSP	
> 300 - 500	> 50	2	TM 1625 SSP	*	TM 3225KSSP	*	

**Legend**

A.V. = Colour according to voltage

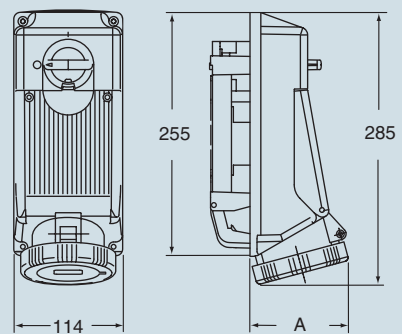
\*) Green may be used together with the colour of the operating range for frequencies above 60 Hz and up to a maximum of 500 Hz

Dimensions in mm



Poles	A	B
2P +	83	276
3P +	85	276
3P+N+	90	277

Dimensions in mm



Poles	A
2P +	96
3P +	96
3P+N+	101

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

- Compliant with CEI EN 60309 -1 and -2
- Enclosures in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Inserts in insulating self-extinguishing thermoplastic material, RAL 7035 grey
- Socket-outlets with bayonet fastening cover
- Toroid safety transformer with self-resetting thermal protection, 230V/24V~, for the supply of Class III portable lamps, compliant with EN 60742
- Electric interlock with button to disconnect the primary circuit of the transformer if the plug is off
- Factory installed internal wiring
- The cable entry of models with base box requires the drilling of holes
- With Italian Quality Mark

**With base box  
IP66/IP67 degree of protection**



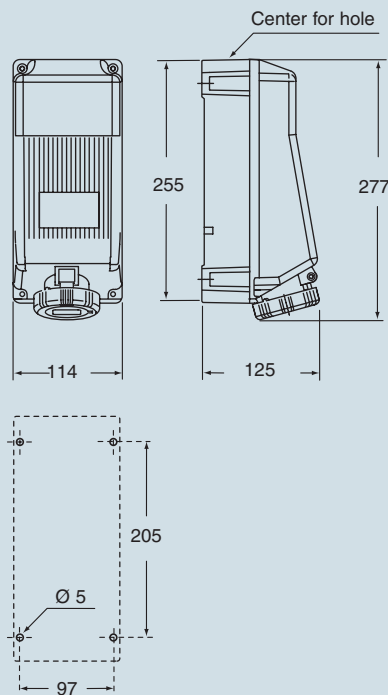
**Without base box  
IP66/IP67 degree of protection**



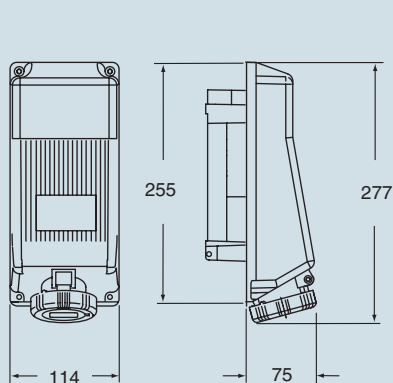
TM..T1/ST1

Description	Part No.	Colour	Part No.	Colour
<b>Socket-outlet with base box</b> 16A - 2P - 24V~ - 144VA - Continuous duty	<b>TM 16220 T1</b>			
<b>Socket-outlet without base box</b> 16A - 2P - 24V~ - 144VA - Continuous duty			<b>TM 16220 ST1</b>	

Dimensions in mm



Dimensions in mm

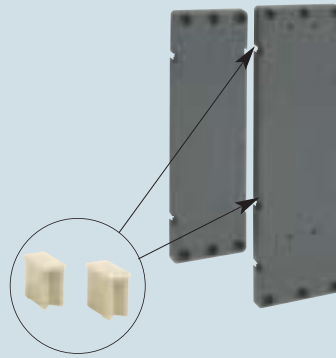


Dimensions indicated are not binding and may be changed without prior notice.

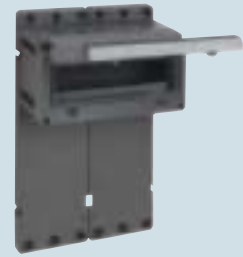


- Enclosures and parts of enclosures compliant with IEC 60670 (Italian standard CEI 23-48) and with Italian draft standard CEI 23-49
- In insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Plates with fixing plugs and fixing screws for socket-outlets
- Boxes for modular units with sized DIN-rail EN 60715 TH 35-7,5 with closing plates and fittings
- With Italian Quality Mark (CEI 23-48)

**Modular back plates for the assembly of groups of socket-outlets**



**“Small” assembled modular base for two socket-outlets and enclosure for modular units**



Description	Part No.	Part No.
<b>Plates with fixing plugs</b> - Small (115 x 415 x 30 mm) <sup>1)</sup> - Large (145 x 532 x 30 mm) <sup>2)</sup>	<b>TM 1145 TB</b> <b>TM 1456 TB</b>	
<b>Fixing plugs for plates</b>	<b>TM TXT</b>	
<b>Includes:</b> - 2 TM 1145 TB plates <sup>1)</sup> - 1 TM 2314 GB box for modular unites (10.5 units)		<b>TM 2345 DT </b>

Legend	Dimensions in mm	Dimensions in mm
<b>1)</b> For socket-outlets with TM box, 114x255 mm <b>2)</b> For socket-outlets with TM box, 144x370 mm	<p><b>TM 1145 TB</b></p> <p><b>TM 1456 TB</b></p>	<p><b>Panel cut-out in mm</b></p>

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

- Enclosures and parts of enclosures compliant with IEC 60670 (Italian standard CEI 23-48) and with Italian draft standard CEI 23-49
- In insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Plates with fixing plugs and fixing screws for socket-outlets
- Boxes for modular units, with sized DIN-rail EN 60715 TH 35-7.5, closing plates, fittings and fixing screws
- With Italian Quality Mark (CEI 23-48)

“Mixed” assembled modular base for two socket-outlets and enclosure for modular units



“Large” assembled modular base for two socket-outlets and enclosure for modular units



Description

Part No.

Part No.

Includes:

- 1 TM 1456 TB plate <sup>2)</sup>
- 1 TM 1145 TB plate <sup>1)</sup>
- 1 TM 2614 GB box for modular unites (12 units)

TM 2656 DT

Includes:

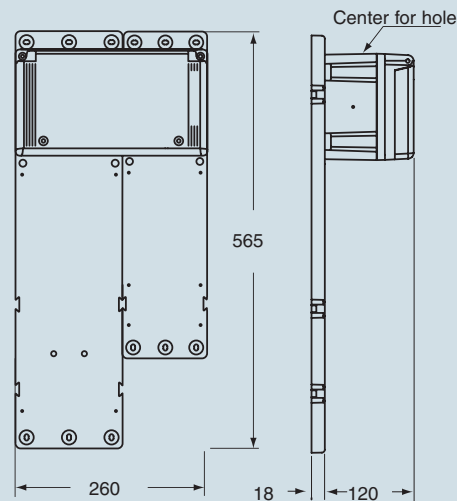
- 2 TM 1456 TB plates <sup>2)</sup>
- 1 TM 2914 GB box for modular units (13.5 units)

TM 2956 DT

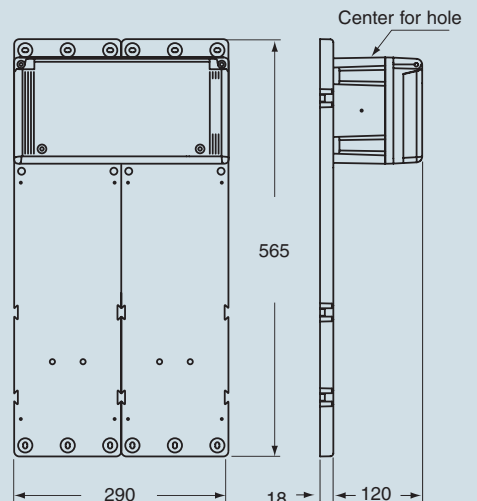
Legend

- 1) For socket-outlets with TM box, 114x255 mm
- 2) For socket-outlets with TM box, 144x370 mm

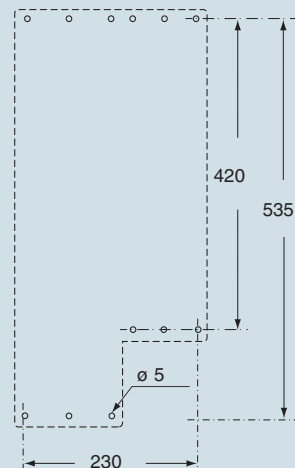
Dimensions in mm



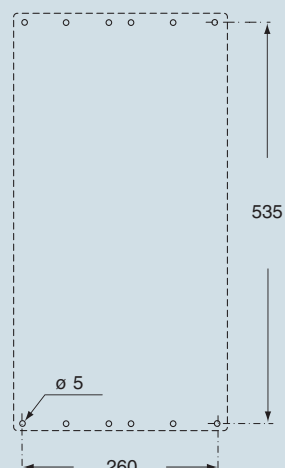
Dimensions in mm



Panel cut-out in mm



Panel cut-out in mm



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

- Compliant with international standard IEC 60670 (Italian standard CEI 23-48)
- In insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Junction boxes suitable for the assembly of fixing plates or DIN-rail
- Fixing plates in zinc-plated steel with fixing screws
- Blind plug-type, fixed cover
- ☉ With Italian Quality Mark (CEI 23-48)

Junction boxes - IP66/IP67



Junction boxes - IP66/IP67

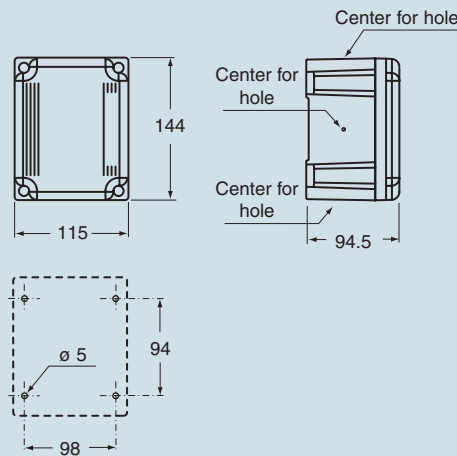


accessories

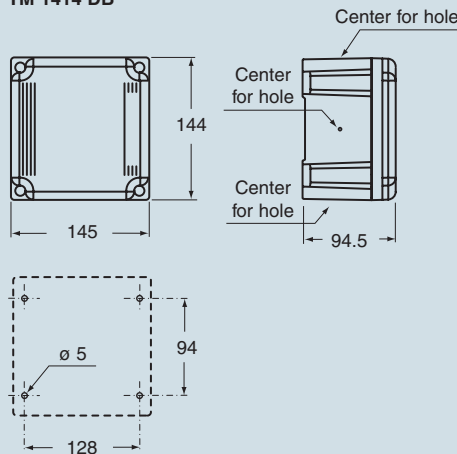
Description	Part No.	Part No.
<b>For TM 1145 TB plate</b> - IP66/67 degree of protection (EN 60529) <b>For TM 1456 TB plate</b> - IP66/67 degree of protection (EN 60529)	<b>TM 1114 DB ☉</b>  <b>TM 1414 DB ☉</b>	
<b>For 2 TM 1145 TB plates</b> - IP66/67 degree of protection (EN 60529) <b>For 1 TM 1145 TB plate + 1 TM 1456 TB plate</b> - IP66/67 degree of protection (EN 60529) <b>For 2 TM 1456 TB plates</b> - IP66/67 degree of protection (EN 60529)		<b>TM 2314 DB ☉</b>  <b>TM 2614 DB ☉</b>  <b>TM 2914 DB ☉</b>

Dimensions in mm

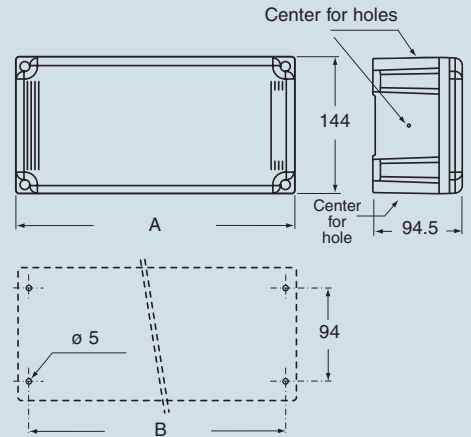
TM 1114 DB



TM 1414 DB



TM ... DB



Part No.	A	B
TM 2314 DB	230	213
TM 2614 DB	260	243
TM 2914 DB	290	273

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

- Compliant with international standard IEC 60670 (Italian standard CEI 23-48)
- In insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Boxes for modular units with DIN-rail EN 60715
- Fixing plates in zinc-plated steel with fixing screws
- Cover with hinged tilting door
- With Italian Quality Mark (CEI 23-48)

Boxes for modular units - IP66/IP67



Boxes for modular units - IP66/IP67



**Description**

**For TM 1145 TB plate**  
- IP66/67 degree of protection (EN 60529)

**For TM 1456 TB plate**  
- IP66/67 degree of protection (EN 60529)

**For 2 TM 1145 TB plates**  
- IP66/67 degree of protection (EN 60529)

**For 1 TM 1145 TB plate + 1 TM 1456 TB plate**  
- IP66/67 degree of protection (EN 60529)

**For 2 TM 1456 TB plates**  
- IP66/67 degree of protection (EN 60529)

**Part No.**

**TM 1114 GB**

**TM 1414 GB**

**Part No.**

**TM 2314 GB**

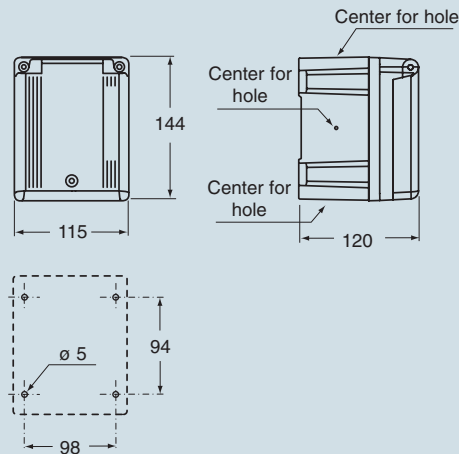
**TM 2614 GB**

**TM 2914 GB**

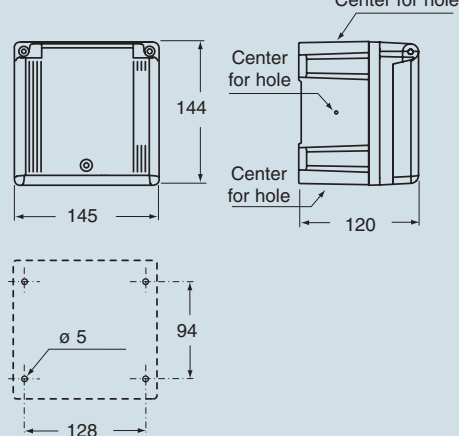
Part No.	N. of modules
	<b>17.5 mm</b>
<b>TM 1114 GB</b>	4 units
<b>TM 1414 GB</b>	5.5 units
<b>TM 2314 GB</b>	10 units
<b>TM 2614 GB</b>	12 units
<b>TM 2914 GB</b>	13.5 units

Dimensions in mm

**TM 1114 GB**

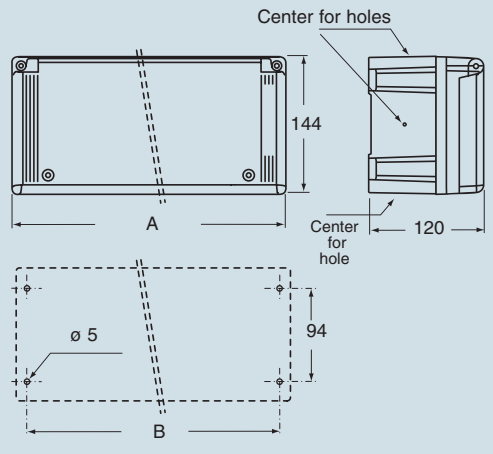


**TM 1414 GB**



Dimensions in mm

**TM ... GB**



Part No.	A	B
<b>TM 2314 GB</b>	230	213
<b>TM 2614 GB</b>	260	243
<b>TM 2914 GB</b>	290	273

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



- Compliant with international standard IEC 60670 (Italian standard CEI 23-48)
- Boxes in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 grey
- Boxes can be wall- or flush-mounted
- Closed walls with drilling template for cable entry
- Threaded seats in brass for assembly of covers and socket-outlets
- IP66/IP67 degree of protection (CEI EN 60529)
- With Italian Quality Mark (CEI 23-48)
- For TM socket-outlets without box, 114x255 mm

Single box



Double and triple boxes



Description

Part No.

Part No.

Single box

TM 1125 CS

Double box

TM 2344 T2

Triple box

TM 3444 T3

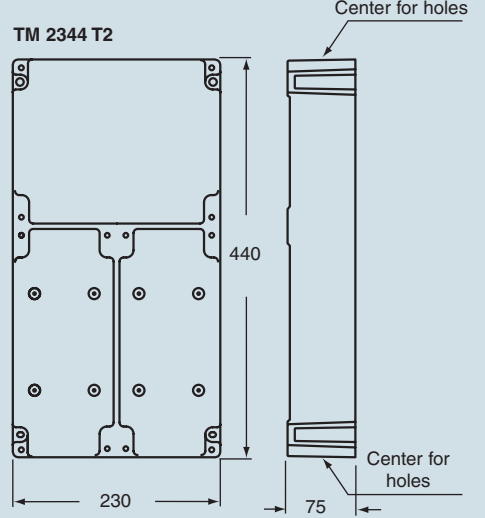
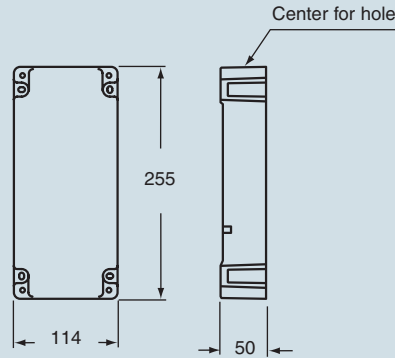
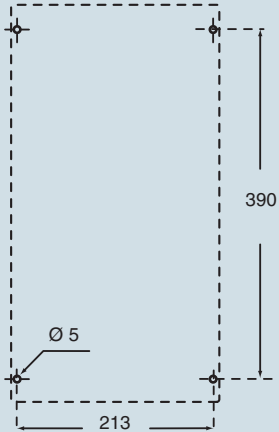
Suitable for the assembly of DIN-rails and bases

Panel cut-out in mm

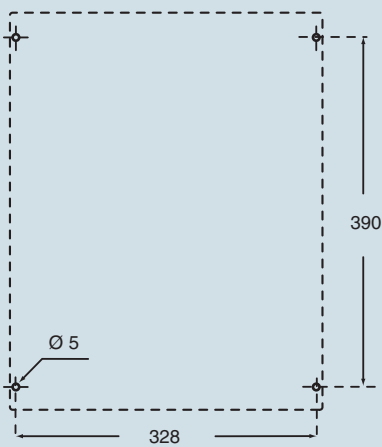
Dimensions in mm

Dimensions in mm

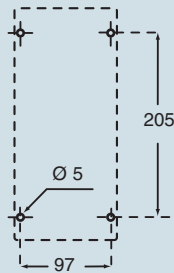
TM 2344 T2



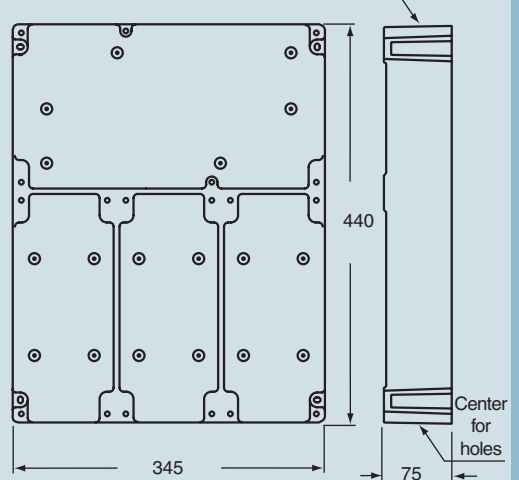
TM 3444 T3



Panel cut-out in mm



TM 3444 T3



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

boxes

- Compliant with international standard IEC 60670 (Italian standard CEI 23-48)
- Covers in insulating self-extinguishing thermoplastic material MIL.BOX®, printed with BC-MUL®, RAL 7012 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 IP67 degree of protection requirements (CEI EN 60529)
- With Italian Quality Mark (CEI 23-48)

**Cover with closing plates for boxes unused compartments**

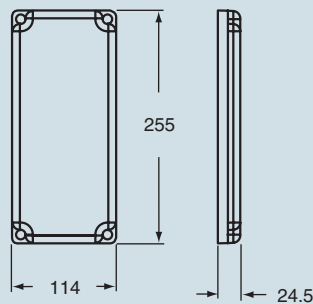


**Covers to close compartments to close cable entries/shunts for double and triple boxes**

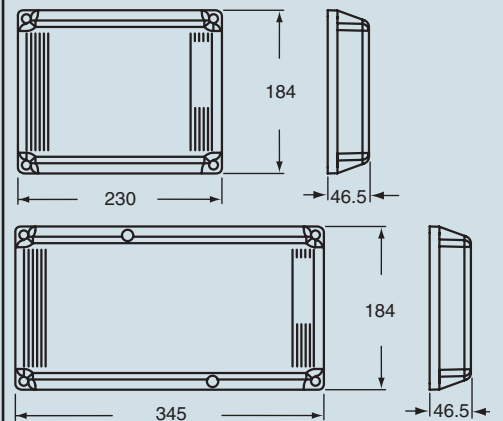


Description	Part No.	Part No.
<b>Smooth cover</b> for closing unused spaces or as support for accessories outside the box	<b>TM 1125 P</b>	
<b>Smooth cover</b> For double box For triple box Closes the upper section of the boxes Supplied with sized DIN-rail EN 60715 TH 35-7.5		<b>TM 2318 P2</b> <b>TM 3418 P3</b>
<b>Cover with hinged tilting door</b> For double box For triple box For the assembly of modular units (10 and 16.5 units), a sized DIN-rail EN 60715 TH 35-7.5 and closing plates for unused spaces are provided		<b>TM 2318 R2</b> <b>TM 3418 R3</b>

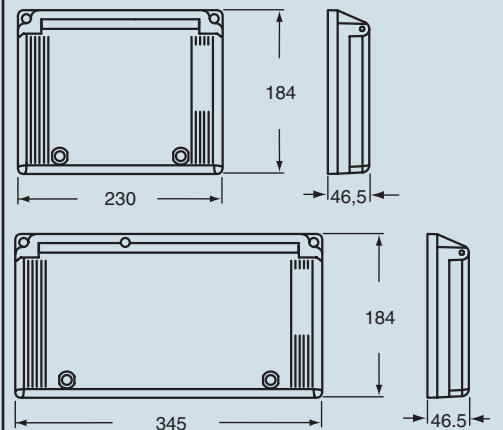
Dimensions in mm  
**TM 1125 P**



Dimensions in mm  
**TM 2318 P2 - TM 3418 P3**



**TM 2318 R2 - TM 3418 R3**



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

- Assembly plate in zinc-plated steel with earth connections and fixing screws on the bottom of the boxes
- Closing plates including half modules (6 <sup>3</sup>/<sub>4</sub> + 2 <sup>1</sup>/<sub>4</sub> of module)
- DIN-rail EN 60715 TH 35-7.5, in zinc-plated steel, sized, with fixing screws

**Assembly plate fixing plates**



**DIN-rail EN 60715 closing plates**

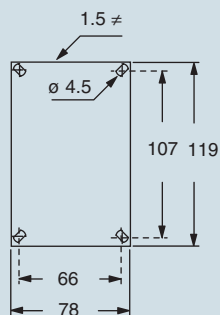


accessories

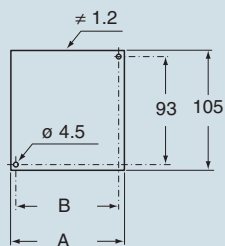
Description	Part No.	Part No.
<b>Assembly plate</b> For double or triple boxes	<b>TM 1125 PF</b>	
<b>Fixing plates</b> For TM 1114 DB junction boxes For TM 1414 DB junction boxes For TM 2314 DB junction boxes For TM 2614 DB junction box For TM 2914 DB junction box	<b>TM 1114 PF</b> <b>TM 1414 PF</b> <b>TM 2314 PF</b> <b>TM 2614 PF</b> <b>TM 2914 PF</b>	
<b>DIN-rail EN 60715 TH 35-7.5</b> For TM 1114 DB junction boxes For TM 1414 DB junction boxes For TM 2314 DB junction boxes For TM 2614 DB junction boxes For TM 2914 DB junction boxes		<b>TM GD8</b> <b>TM GD10</b> <b>TM GD18</b> <b>TM GD21</b> <b>TM GD24</b>
<b>Closing plates</b> For unused modular openings		<b>BC FR 62</b>

Dimensions in mm

**TM 1125 PF**



**TM xx14 PF**



Part No.	A	B
<b>TM 1114 PF</b>	70	58
<b>TM 1414 PF</b>	100	88
<b>TM 2314 PF</b>	180	168
<b>TM 2614 PF</b>	210	198
<b>TM 2914 PF</b>	240	228

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

- BC CHT
  - Safety padlock that prevents access to the door closing screws
  - Supplied with two sets of keys

Safety padlock with key



Description

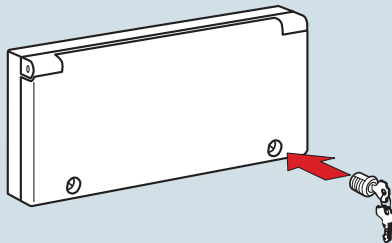
Part No.

**Safety padlock**  
For the doors of TM 2318 R2 and TM 3418 R3 covers

**BC CHT**

Dimensions in mm

**BC CHT**



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