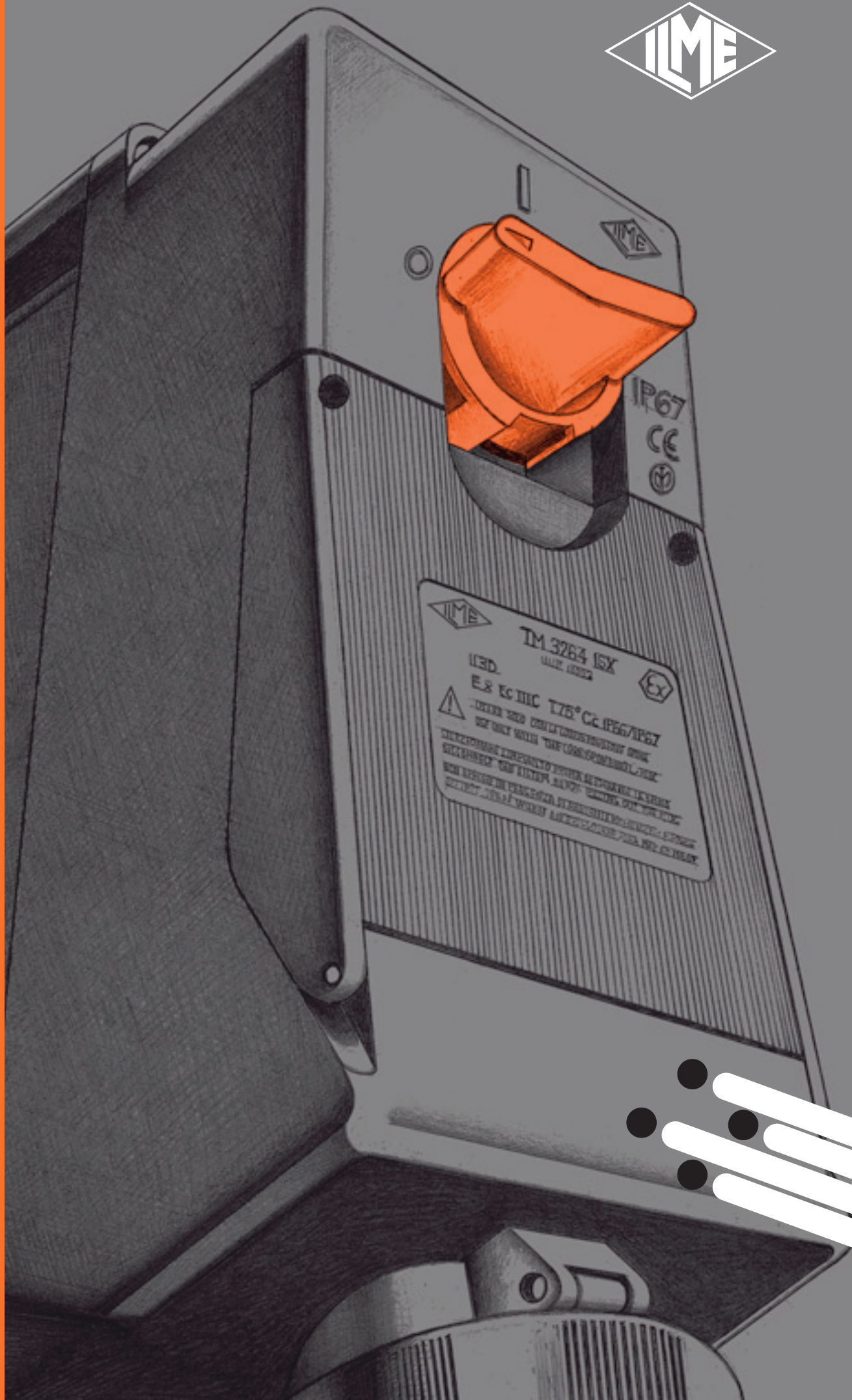


TM Ex

interlocked sockets



IIME
TM 3264 1SX
IIEC
E & EC III C 175° Cc IP66/IP67
... (small text) ...
... (small text) ...
... (small text) ...
... (small text) ...
... (small text) ...
... (small text) ...
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... (small text) ...

The Company and the Product

INDUSTRIA LOMBARDA MATERIALE ELETRICO SpA has been operating in Milan since 1938, in particular in the electrotechnical sector for the manufacturing of equipment for industrial installations.

ILME reflects the traditional **entrepreneurial spirit of Lombardy**, and has enjoyed continuous expansion for over half a century.

The company has carved an important role for itself in the main world markets, also operating directly in the countries that have assumed world leadership in the field of automation, including Germany and Japan.

In the **electrical connection** sector with applications in industrial automation, characterised by **top performance** and utmost **reliability needs**, ILME is today the acknowledged partner of many leading companies worldwide.

The company's fundamental values are:

product innovation, original solutions, excellent **price-quality ratio**,



a customer-oriented **sense of service**, ethical behaviour and an environmentally-friendly approach.

To promote the continuing improvement of its **qualitative results**, ILME has always encouraged its collaborators to work with utmost **responsibility and participation**.

The company focuses on a series of benefits to the user, including research into the most suitable materials, high quality and safe cabling, a rapid turnaround and readily available services.

CE marking

As from 1 January 1997, in order to launch electrical products on the European market the manufacturer must ensure these bear the relevant CE marking, in line with the Low Voltage Directive 73/23/EEC * (implemented in Italy as law 18-10-1977 no. 791) and its modification 93/68/EEC *.

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

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

Almost all ILME products fall under the Low Voltage Directive. A declaration of compliance is required before applying the CE marking. This document, to which the market is not directly entitled, must be made available to the control authorities (in Italy the Ministry for Industry, Commerce and Handicraft) at all times.

In it, the manufacturer declares the technical safety standard(s) followed to manufacture the product. These standards must be, in decreasing order of preference:

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

Compliance with harmonised technical standards (i.e. ratified by the CENELEC) constitutes presumed conformity to the directive's basic safety requirements.

The CE marking of ILME products results from said products' declaration of conformity to harmonised standards or international IEC standards.

Through the CE marking, ILME declares full compliance, not merely with the directive's basic safety requirements, but also with those international or national EU standards on which voluntary safety certification markings are based (e.g. IMQ and VDE).

In this way, ILME intends to award the CE marking the value of self-certification in terms of safety, given the loss in legal value of voluntary certifications issued by third parties, ratified by directive 93/68/EEC *.

Notwithstanding the above, practically all ILME products still bear voluntary conformity markings.

ATEX Directive 94/9/EC

The products described in this catalogue comply with the main health and safety requirements of ATEX Directive 94/9/EC and subsequent amendments. As they are classified as Ex components (symbol U on the nameplate), they are not marked CE in compliance with the ATEX Directive, but in compliance with the Low Voltage Directive 2006/95/EC.

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

* Note:

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

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



Certification ISO 9001: 2008
Design, manufacture and distribution of industrial electrical equipment (IAF 19, 29a)
Certificate No. 50 100 11133

All information contained in this catalogue is not binding and may be changed without notice

TM ATEX



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1 ILME's ATEX solution

To satisfy safety requirements in areas with potentially explosive atmospheres, particularly with **Zone 22** classified **combustible dusts**, ILME presents the new **TM-Ex series of interlocked sockets**. These socket outlets are classified in product category **II 3D** according to the **ATEX Directive 94/9/EC** and can be installed both directly onto a surface or onto a multiple back board in ATEX EX classified environments.

The **TM-Ex** series is based on the well-known TM series, modified in order to also satisfy the requirements for reference standards in compliance with **ATEX Directive 94/9/EC** for equipment and electrical components.

These outlets have been updated to the most recent product standards, particularly standard **EN 60309 4:2007** which in regards to sockets, continues to be governed by the now "classic" standards

EN 60309-1 and **EN 60309-2**, originally standardized by the **EEC**.

While adapting to the most recent EN 60309-4 product standard, Ex versions were only considered for designs with fuses that have the most functional "disconnecting"-type fuse carriers (standard EN 60947-3), in the following sizes: 10x38 (16A), 14x51 (32A), and 22x58 (63A).

To satisfy the essential health and safety requirements of the ATEX Directive 94/9/EC, the new **TM-Ex** interlocked sockets are also compliant with the most recent standards of the ATEX sector:

- the base standard **EN 60079-0:2009** now including requirements for both gases and dusts and the **EN 60079-31:2010** product standard concerning protection by "t" enclosures.

The **markings on the label** have therefore already been updated to the new system provided for by these standards, also obligatory as of 01-04-2012 for products already on the market.

1.1 Composition of the socket series

The **TM-Ex** series is composed of **switched Interlocked socket outlets, with or without fuses**, both in full box versions, ideal for wall installation (finished product) as well as in component versions (Ex component, U marking on the label).

Component versions are ideal for building socket batteries by using the complementary parts of the **Ex series**.

These consist of **junction boxes in five sizes**, two **modular backing plates** and three sizes of **base boxes** (single, double, triple) for use with the **TM-Ex** series.

NOTE: Installing additional devices into the interlocked socket that offer overload and overcurrent protection, including fuses, efficiently and economically satisfies the need to protect power supply lines for equipment powered downstream from the socket, compared to the more taxing configurations with magnetothermal switches installed upstream from the sockets.

In addition to the economic advantage, it is also worth noting that this "downstream" method offers better protection against short circuits, due to the higher level of breaking power provided compared to the more common configurations that include modular magnetothermal switches.

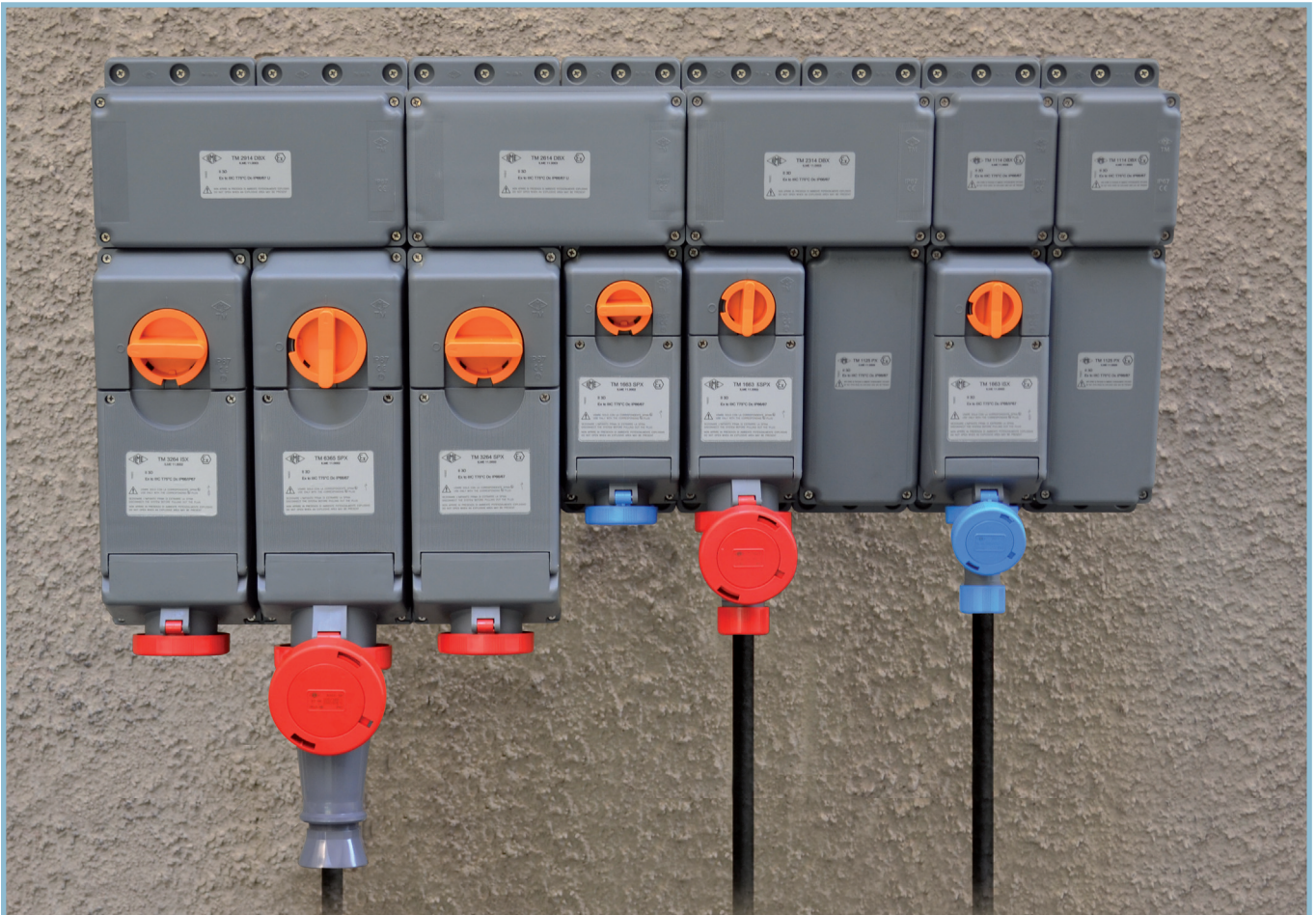
However, **TM-Ex** sockets are also available in a basic version without fuses.

As with the standard TM series, the **TM-Ex** series of switched interlocks come in two body sizes.

The "small" body size includes 16A sockets with or without fuses and 32A sockets without fuses. The larger body size includes 63A sockets with or without fuses and 32A sockets with fuses.

A version without the base box is available (Ex component) in the 16A and 32A sockets.

In accordance to product standard IEC/EN 60309-4 regarding the use of interlocked sockets, to prevent the incorrect use of the sockets, such as forcing the interlocking switch to close when a plug has not been inserted or attempting to remove a plug from a powered socket, each socket is provided with a supplemental instructional sign which carries the following warning: **WITH INTERLOCK**.



1.2 Installation accessories

1.2.1 Junction boxes TM-Ex II 3GD and Modular back plates TM

There are five sizes of **TM-Ex** series **junction boxes** which can be combined with one or more sockets according to their size.

These enclosures are Ex models of the original TM series boxes for unclassified locations, compliant with EN 60670-1 and EN 60670-22 product standards and modified to comply with **ATEX Ex II 3GD – Zone 2** (gases) and **Zone 22** (dusts).

These junction boxes can also be used independently from the sockets and can therefore be installed in locations classified as Zone 2.



1.2.2 Base boxes TM-Ex II 3D

There are three sizes of base boxes available separately for **Zone 22** (dusts) – : **basic**, (TM 1125 CSX), **double** (TM 2344 P2) or **triple** (TM 3444 P3X).

As these boxes are exclusively made to accompany **TM-Ex** series sockets, they are classified as **Ex II 3D components** for zone 22 (dusts), as are the sockets. These base boxes cannot be joined together. There is a **closing cover for unused compartments available**, supplied only with double and triple boxes (TM 1125 PX).



1.2.3 Coupler plugs PLUSO-Ex II 3D

Finally, new **Ex versions of PLUSO** connectors, called **PLUSO-Ex**, are supplied with the Zone 22 (dusts) - **TM-Ex II 3D** ATEX Ex series interlocked sockets, for 16A, 32A, and 63A nominal currents, in each of the three polarities: single phase 2P+⊕, three phase 3P+⊕ and three phase and neutral 3P+N+⊕. These have the IP66/IP67 rating for the 16A and 32A versions, or IP67 for the 63A versions, which is an essential part of the **Ex tc** protection type.



As clearly stated on the label, **all of the ATEX interlocked sockets in the TM-Ex series must only power devices equipped with a corresponding Ex power plug**, preferably ILME series **PLUSO-Ex**. This is also clearly indicated in the instruction sheets for both the **TM-Ex** sockets as well as the **PLUSO-Ex**, plugs as a special condition for installation and proper use.

For this reason, the ATEX Declaration of CE Conformity released by ILME is automatically nullified should these instructions for use not be scrupulously enforced by the person in charge of the site of installation and use during product operation.

1.3 TM-Ex interlocked socket-outlets ATEX II 3D – Zone 22 (dust)

1.3.1 General characteristics

The series of interlocked socket-outlets ATEX Ex Zone 22 **TM-Ex**, offer tested reliability and can be used, in combination with special complementary parts and industrial plugs ILME ATEX Zone 22 **PLUSO-Ex** series, as modular integrated systems to configure distribution systems with industrial socket-outlets for fixed installations in locations where the occurrence of an explosive atmosphere is possible due to the presence of combustible dusts, classified as **Zone 22**.

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 (in this case fixed) to determine the construction type of socket-outlets (in this case, wall-mounting or board-mounting for designs available in this model, to be completed with corresponding **TM-Ex** series accessories);
- The site of installation to determine the degree of protection (for Zone 22 Ex locations, the lowest level of protection required is at least IP6X, and therefore in this case IP66/IP67) and possibly the voltage (not in this case, as no output is expected with a safety transformer for those particular locations – e.g. restrictive conductive locations – for which installation standards require safety extra-low voltage (SELV) power).

In certain cases, **TM-Ex** sockets can be provided ([see chart with summary of series](#)) as an Ex device in a **wall-mounting** version, which is already supplied **with the corresponding base box** for wall mounting, or as an Ex component **board-mounting version, with no mounting box**, exclusively for single, double, or triple ILME **TM-Ex** series boxes (Ex accessories are provided separately). In reference to the catalogue article code, the following types of sockets are identified:

with insulating enclosure with base box:

- **TM...ISX** types with interlock and sectionable fuse carrier;
- **TM...SPX** types with interlock (without fuse carrier);

with insulating enclosure without base box (only for 16A and 32A compact, suffix K...):

- **TM...SISX** types with interlock and sectionable fuse carrier;
- **TM...SSPX** types with interlock (without fuse carrier).

The [type references](#) of these last types (printed on the socket cover label) is the same as those of models with boxes.

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, [following the instructions for installation, use, and maintenance provided along with each Ex classified product](#).

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
- Junction boxes for socket-outlets or boxes;
- Single or multiple boxes for the subsequent installation of **TM-Ex** socket-outlets for board mounting;
- cover for closing unused space (for double or triple boxes).

The knob on the switch disconnecter can be locked both in the open (for sectioned downstream use) and closed position (anti tamper-safety) using a Ø 5 mm archwire lock (standard EN 60309-4).

1.3.2 Electric characteristics

rated frequency:

from 50 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:

- 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 fuse carriers.

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. A label informs the user that: you can not the plug being removed while voltage is present or from being inserted when the socket-outlet is live. This is essential in Ex classified locations.

This explains why no breaking capacity is required.

NOTE – 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:

the equipment as sold, do not fall within the field of application of the EMC Directive.

- 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.

1.3.3 Mechanical characteristics**- mechanical resistance to impacts**

20 J (IK10 according to IEC/EN 62262)

- resistance to chemical agents

see Table on page 8 and 23

- degree of protection

IP66/IP67 according to IEC/EN 60529

- resistance to glow-wire

self-extinguishing capacity compliant with IEC 60695-2-11 (glow-wire) for enclosures 650 °C; for inserts 960 °C (value specified in standard: 850 °C)

- temperature

ambient: -20 °C / +40 °C; limit of materials: -40 °C / +85 °C

- self-extinguishing capacity (UL 94 classification):

- for enclosures (boxes and/or covers of fixed socket-outlets): **94V-2**
- for 16A, 32A and 63A inserts: **94V-2**

1.3.4 Materials

- Inserts in insulating self-extinguishing thermoplastic material (PA6 for 16A and 32A socket-outlets, PBT for 63A socket-outlets);
- Enclosures in insulating self-extinguishing thermoplastic material UL 94V-2 MIL.BOX[®] (reinforced PP) printed with BC-MUL[®], RAL 7012 grey;
- PBT socket covers;
- PA6 switch knob;
- Anti-aging elastomer gaskets: for cover and fuse carrier panels made on site out of PU, for NBR socket fastening cover;
- 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 and 63A socket-outlets with two fixing screws in the terminals as protection against accidental loss;
- Terminals of 63A socket-outlets fitted with lead protection plate in zinc-plated steel.

NOTE – For additional details regarding materials, see the Instructions for Installation, Use, and Maintenance supplied with every product.

1.3.5 CE marking – Declarations of CE Compliance – Instructions for Installation, Use, and Maintenance

The interlocked socket outlets **TM-Ex** series, compliant with the European harmonized safety standards EN 60309-4, EN 60309-1 and EN 60309-2 for the Low Voltage and EN 60079-0 and EN 60079-31 for explosive atmospheres, satisfy the applicable legislative requirements for EU Directives (2006/95/EC for the Low Voltage and 94/9/EC for ATEX) and for this reason, carry the **CE** marking.

Each socket is provided complete with Instructions for Installation, Use, and Maintenance, where the corresponding Declarations of CE Compliance appear (for the ATEX directive and for the Low Voltage Directive).

1.3.6 Supply extension

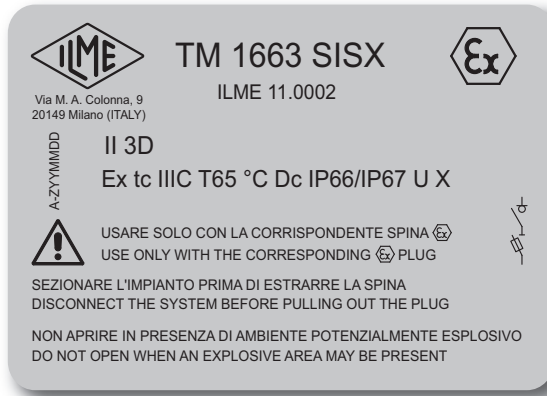
On request for interlocked sockets outlets complete with box base (Ex products) can be supplied with:

- **Junction boxes TM-Ex** series (DBX suffix), see 1.5.1 page 10;
- **Modular back plates** TM series, see 1.5.2 page 12.

On request for interlocked sockets outlets without box (Ex components) can be supplied with:

- **Base boxes** simple, double or triple **TM-Ex** series, to be ordered separately by reference to their codes of catalogue, see 1.5.3 page 12.

1.3.7 Example of nameplate products



1.3.8 Description of symbols on the nameplate

Note: these markings predominantly pertain to **Ex** compliance, and supplement the required label information for the respective product standards.

Symbol	Meaning
	Manufacturer's logo (I.L.M.E. SpA).
Via M. A. Colonna 9 20149 Milano (ITALY)	Manufacturer's address (mandatory for ATEX Directive 94/9/EC)
CE	CE marking (that indicates conformity with the Low Voltage Directive 2006/95/EC).
TM 1663 SISX	Reference to type of product (product code).
	Ex symbol that indicates the specific marking provided by the ATEX Directive 94/9/CE for the protection against the risk of explosion. This device belongs to group II, category 3 (see below), and to affix the CE marking, the manufacturer must follow the module "relating to internal control of production" (Annex VIII of Directive 94/9/EC) according to Article 8, point c, of ATEX Directive 94/9/EC.
Ex	Product suitable for use in explosive atmospheres.
II	Group, indicates the type of intended use for which the product is suitable: Group II = Surface industries (Group I = Mining sites).
3D	Category that identifies the equipment protection level: Category 3 = normal level (for Zone 22) D = Protection from dust This is a category 3 product for environments in which dust (D) is present with low risk of explosion. This product can be installed in Zone 22 classified zones, or zones in which the formation of explosive atmospheres in the form of dust clouds is not probable during normal operational activities, and when they do occur, it is only for short periods of time.
Ex tc	Protection type against explosive dust with enclosure "tc", for Equipment protection level EPL Dc. This product is classified as a "tc" type product in accordance with standards EN 60079-0 (dusts and gases) and EN 60079-31 (dusts), and is intended for locations with potentially explosive atmospheres due to the presence of combustible dusts.
IIIC	Group III of electrical equipment designed for explosive atmospheres containing dust other than mining sites, <u>for conductive dust</u> .
T65 °C	Value of the highest surface temperature assigned.
Dc	Protection level assigned for explosive atmospheres containing dust (D = Dust) EPL Dc Equipment Protection Level (EPL) equivalent to c ("increased").
IP66/IP67	IP protection degree against the penetration of dust (first characteristic digit) and liquids (second characteristic digit) in accordance with EN 60529 when the socket is properly installed, with cover closed or when connected to a corresponding Ex plug of an equal degree of protection: IP66 = Dust-tight and protected against powerful water jets; IP67 = Dust-tight and protected against temporary immersion in water.
U	Symbol that confirms that the product is classified as an Ex component (dust). Applicable to models with no base boxes (SISX, SSPX type suffix references), intended for multiple configurations through the use of enclosures TM-Ex articles TM 2344 P2X and TM 3444 P3X).
X	Symbol stating that the manufacturer has specified particular conditions for installation and use , in the instructions sheet.
A-ZYYMMDD	Traceability code that identifies the production lot (A = Product revision, Z = Code for internal use, YYMMDD = Production date (YY = Year, MM = Month, DD = Day)).
ILME 11.0002	Name of the subject that has issued the certificate of conformity to the applicable ATEX standards: self-certified ATEX component (ILME); 11 = Last two digits of the year in which the certificate has been issued; 0002 = Progressive number of the certificate issued in the specific year.
	Symbol provided for by EN 60309-4 product standard, identifying the actioning device associated with the socket's interlocking switch, specifically a <u>switch disconnecter</u> with a series a disconnecter-fuse (safety fuses not provided) (socket side). This symbol appears on sockets TM-Ex articles TM 1663 ISX, TM 1664 ISX, TM 1665 ISX (with fuse carrier 10x38 – small size), TM 3263 ISX, TM 3264 ISX, TM 3265 ISX (with fuse carrier 14x51 – large size) and TM 6363 ISX, TM 6364 ISX, TM 6365 ISX (with fuse carrier 22x58 – large size).
	Symbol provided for by EN 60309-4 product standard, identifying the actioning device associated with the socket's interlocking switch, specifically a switch disconnecter. This symbol appears on sockets TM-Ex articles TM 1663 SPX, TM 1664 SPX, TM 1665 SPX (without fuse carrier – small size), TM 3263KSPX, TM 3264KSPX, TM 3265KSPX (without fuse carrier – small size), TM 6363 SPX, TM 6364 SPX, TM 6365 SPX (without fuse carrier – large size).

1.4 pluso-Ex coupler plugs ATEX II 3D – Zone 22 (dust)

1.4.1 General characteristics

The range of **PLUSO-Ex** coupler plugs offered is complementary to the **TM-Ex** series interlocked sockets, Ex II 3D for Zone 22 (dusts) and is suited to cover a variety of installation needs in the context of Ex-classified locations such as Zone 22. More generally speaking, ILME coupler plugs, for their constructive characteristics, are suitable for the typologies of use including heavy duty:

- the mechanical industry
- the shipbuilding industry
- the chemical and petrochemical industry
- the services sector
- the building industry
- the agricultural and livestock breeding sector

The coupler plugs **pluso-Ex** are intended to be installed with a power supply cord for equipment designed for use in Zone 22 (dusts). This equipment can obviously be used in unclassified zones (non dangerous).

However, **pluso-Ex** coupler plugs are exclusively designed as a power coupling for ATEX interlocked sockets series **TM-Ex** II 3D.

The choice of the correct type of industrial plug Ex, particularly for those for use in Zone 22 classified locations (dusts) contribute to the following parameters:

- the rated current of the device to be powered by coupling plug Ex to the corresponding socket of the Ex series **TM-Ex**;
- the rated supply voltage and the 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 voltages or voltage ranges > 50V and frequencies or frequency ranges not covered by the standards;
- the type of installation: for the plugs in question, it is obviously mobile;
- the site of installation to determine of degree of protection: for the Ex plugs in question, it must be IP66/IP67 or IP67.

Straight plugs are exclusively found in the ATEX range of the **pluso-Ex** series (for so-called low voltage >50V up to 690V. As **TM-Ex** plugs are not meant for voltages higher than 500V, the limit for these is consistently 500V.

1.4.2 Electric characteristics

rated frequency: from 50 to 500 Hzz

rated operating voltage:

the standard identifies two main types of use;

- plugs at low voltage, for the rms values of voltage over 50V up to 690V (limited to 500V for structural reasons of the terminal sockets)

polarity:

models are designed with:

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

The plugs and sockets 63A also have an additional pilot contact.

rated current: with **16A, 32A, 63A** values (low voltage)

rated insulation voltage:

- **690V** for plugs and sockets to low voltage

minimum surface insulation distance: 10 mm (EN 60309-1)

minimum air insulation distance: 8 mm (for rated operating voltages higher than 500V)

breaking capacity:

1.25 times the rated current value (test performed at a voltage of 1.1 times the operating voltage)

1.4.3 Mechanical characteristics

- **mechanical resistance:** verified with the prescriptions of Article 24 of the standard EN 60309-1 (IEC 60309-1)

- **resistance to chemical agents:** see Table

Table of reactions to chemical agents

chemical agents	H ₂ O (t up to 23 °C)	Watery saline solution	Acids		Bases		Solvents				Ethyl alcohol (ethanol)	Oils			Fats		Animal organic solution	Fuels	
			concentrates	diluted 15% max	concentrated	diluted 15% max	aliphatic hydrocarbons (hexane)	aromatic hydrocarbon (benzene)	chlorinated hydrocarbons and acetone (ketones)	silicone		mineral	vegetable	animale	synthetic	unleaded		diesel	
pluso-Ex serie																			
articles series pluso-Ex 16A-32A	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●
articles series pluso-Ex 63A	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TM-Ex serie																			
all the items of the TM-Ex serie	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●

Legend: ● = resistant ○ = limited resistance

- **degree of protection:** IP67 (63A) or IP66/IP67 (16A and 32A) according to EN 60529

- **resistance to glow-wire**

compliant with IEC 60695-2-11: for enclosures 650 °C; for inserts 960 °C

- **ambient temperature:** -20 °C / +40 °C

- **self-extinguishing capacity**

UL 94 classification – for enclosures: 94V-2; for 16A, 32A, 63A inserts, 94V-2; no halogen present.

1.4.4 Materials

- Enclosures and inserts in self-extinguishing insulating thermoplastic material
- Anti-aging elastomer gaskets;
- Brass pins in nickel-plated;
- Fixing retainer screws in stainless steel
- Terminals with zinc-plated screws retained in their seats when unscrewed;
- 32A and 63A plugs with two fixing screws in the terminals as protection against accidental loss;
- Terminals of 63A plugs fitted with lead protection plate in zinc-plated steel.

NOTE – For additional details regarding materials, see the Instructions for Installation, Use, and Maintenance supplied with every product.

1.4.5 CE marking – Declarations of CE Compliance – Instructions for Installation, Use, and Maintenance

The coupler plugs ATEX **PLUSO-Ex** series, **II 3D** compliant with the European harmonized safety standards EN 60309-1 and EN 60309-2 for the Low Voltage and EN 60079-0 and EN 60079-31 for explosive atmospheres, satisfy the applicable legislative requirements for EU Directives (2006/95/EC for the Low Voltage and 94/9/EC for ATEX) and for this reason, carry the **CE** marking.

Each plug is provided complete with Instructions for Installation, Use, and Maintenance, where the corresponding Declarations of CE Compliance appear (for the ATEX directive and for the Low Voltage Directive).

1.4.6 Example of nameplate products



1.4.7 Description of symbols on the nameplate

Note: these markings predominantly pertain to **Ex** compliance, and supplement the required label information for the respective product standards.

Symbol	Meaning
	Manufacturer's logo (I.L.M.E. SpA) – appears on the handle body
CE	CE marking (that indicates conformity with the Low Voltage Directive 2006/95/EC). Appears on the plug next to the identifying label of the PLUSO series
PEW 1663 SVX	Reference to type of product (product code)
16-6h/200-250~	Nameplate of the plug according to EN 60309-2: - 16 = rated current 16A - 6h = hour position grounding pin - 200-250~ = field of rated voltage in alternating current
	Ex symbol that indicates the specific marking relative to the protection against the risk of explosion provided by the ATEX Directive 94/9/CE
II	Group, indicates the type of intended use for which the product is suitable: Group II = Surface industries (Group I = Mining sites)
3D	Category that identifies the equipment protection level: Category 3 = normal level (for Zone 22) D = Protection from dust
Ex tc	<u>Protection type against explosive dust with enclosure</u> "tc", for Equipment protection level EPL Dc.
IIIC	Group III of electrical equipment designed for explosive atmospheres containing dust other than mining sites, for conductive dust.
T60 °C	Maximum surface temperature assigned
Dc	Protection level assigned for explosive atmospheres containing dust (D = Dust) EPL Dc Equipment Protection Level (EPL) equivalent to c ("increased")
IP66/IP67	IP protection degree against the penetration of dust (first characteristic digit) and liquids (second characteristic digit) in accordance with EN 60529: IP66 = Dust-tight and protected against powerful water jets; IP67 = Dust-tight and protected against temporary immersion in water.
X	Symbol stating that the manufacturer has specified particular conditions for installation and use , in the instructions sheet.
Zip code [A-ZYYMMDD]	Traceability code that identifies the production lot: - A-Z = Code for internal use - YYMMDD = Production date (YY = Year, MM = Month, DD = Day)
ILME 11.0003	Name of the subject that has issued the certificate of conformity to the applicable ATEX standards: self-certified ATEX component (ILME); 11 = Last two digits of the year in which the certificate has been issued; 0003 = Progressive number of the certificate issued in the specific year.

1.5 Installation accessories for ATEX interlocked outlets series TM-Ex II 3D – Zone 22 (dust)

As a range of enclosures and backings for **ATEX sockets** Zone 22 series **TM-Ex**, ILME proposes:

- **junction boxes ATEX series TM-Ex II 3GD – Zone 2 (gases) and Zone 22 (dust)** – components EX – in five sizes (types TM...DBX);
- **modular back plates series TM** (types TM 1145 TB – “small” size and TM 1456 TB – “large” size);
- **boxes basic for installing single sockets ATEX Zone 2 series TM-Ex** “small” size in three sizes: single (types TM 1125 CSX), double (types TM 2344 P2X) and triple (types TM 3444 P3X).

All of the sockets, enclosures, and backings cover the installation situations provided for by Standard CEI 64-8 (CENELEC HD 384 series, IEC 60364) and by the standards for installation in environments with ATEX explosive atmospheres due to the present of combustible dusts, classified as **Zone 22**. The **TM-Ex** junction boxes, also designed for installation independent from interlocked sockets, are also suitable for installation in locations classified as Zone 2 (gases).

1.5.1 Junction boxes ATEX series TM-Ex II 3GD – Zone 2 (gases) and Zone 22 (dust)

1.5.1.1 Classification

In accordance with the ATEX 94/9/CE Directive, the junction boxes series **TM-Ex**, in addition to the product standards in the previous point, they are produced in compliance with ATEX **EN 60079-0:2009** standards (which supersede the previous standards concerning dusts, EN 61241-0:2006 and EN 61241-1:2004, as well as the previous edition of the standard EN 60079-0:2006 referred only to the general requirements for gas), to the standard **EN 60079-31:2009** (combustible dusts, mode of protection by enclosure “t”) and to the standard **EN 60079-15:200X** (gases, mode of protection “nA” non-sparking equipment).

They are also compliant with the Low Voltage Directive 2006/95/CE as constructed in accordance with the relative product standards **EN 60670-1:2005** (classification CEI 23-48), **EN 60670-22:2006** (classification CEI 23-94) and – as applicable – to the standard experimental **CEI 23-49** (currently in force, pending the publication of a European standard equivalent to the current IEC 60670-24 standard).

Classification:

Group II components – Category 3GD

Identification marking used for protection types:

Ex II 3 GD

Ex nA IIC 65 °C (T6) Gc U

Ex tc IIIC T65 °C Dc IP66/IP67 U


Protection degree in accordance with EN 60529:

IP66/IP67

Max permitted surface temperature (dust):

65 °C

Electrical properties:

complete insulation 

1.5.1.2 Fields of applications

- Junction boxes: fixed installation in areas exposed to a potential risk of explosion, classified as **Zone 2 (gases) and Zone 22 (dust)**.

NOTA – The classification of areas should follow for dust the standard EN 60079-10-2:2009 (that has replaced EN 61241-10). For gases, the reference standard is EN 60079-10-1:2009.

They are highly resistance to atmospheric agents (sun light) and have a good resistance to a number of chemical agents (see Table on page 8 and 23).

1.5.1.3 Product features

Junction boxes and base boxes constructed out of strong insulated thermoplastic material, UL 94 V-2 self-extinguishing class, RAL 7012 dark gray color.

Supplied with:

- polyurethane elastomer seal made on site;
- AISI 304 stainless steel screws to fix the cover in place;
- installation, operation and maintenance instructions, EC declaration of conformity (Ex equipment) or Attestation of Conformity EC (Ex components).

Wall-mounting is possible thanks to the external brackets built into the base.

Every box is packaged individually.

Kits for internal fixings (DIN EN 60715 rails) are available on request (see the applicable catalogue page).

In addition to the markings required to certify compliance with product standards **CEI EN 60670-1** and **CEI EN 60670-22** (IP66/IP67 protection degree, trademark) and with the **CE marking** that confirms compliance is now the Low Voltage Directive 2006/95/EC that the Directive ATEX 94/9/EC, each box **TM-Ex** series has nameplate that lists the markings required by the latest editions of applicable ATEX standards [EN 60079-0 (general prescriptions), EN 60079-15 (gases) and EN 60079-31 (dust)] that integrate those required by the ATEX Directive.



TM-Ex series enclosures or enclosure parts are sold empty.

In compliance with Directive ATEX, as electric material they are therefore classified as **Ex components**.

They can be used only in combination with other electrical equipment.

Together require a **further ATEX certification that must be obtained by the end user**, to add to that issued by I.L.M.E. SpA.

1.5.1.4 Example of nameplate products



1.5.1.5 Description of symbols on the nameplate

Note: these markings predominantly pertain to **Ex** compliance, and supplement the required label information for the respective product standards.

Symbol	Meaning
	Manufacturer's logo (I.L.M.E. SpA).
Via M. A. Colonna 9 20149 Milano (ITALY)	Manufacturer's address (mandatory for ATEX Directive 94/9/EC).
	CE marking (that indicates conformity with the Low Voltage Directive 2006/95/EC). As Ex components, these products do not bear the CE marking pursuant to ATEX Directive 94/9/CE.
TM 1114 DBX	Reference to type of product (product code).
	Ex symbol that indicates the specific marking provided by the ATEX Directive 94/9/CE for the protection against the risk of explosion.
II	Group of belonging, indicates the type of intended use – secondo la classificazione prevista dalla Direttiva 94/9/CE – for which the product is suitable: Group II = Surface industries (Group I would point suitability for use in mines).
3GD	Category that identifies the equipment protection level: Category 3 = normal level – for Zone 2 (gas) and 22 (dust): G = protection relating to gas D = protection relating to dust.
Ex nA	"nA" type of <u>protection to protect against explosion in explosive atmospheres due to the presence of gases</u> by using "nA" non-sparking equipment, by level of protection for the EPL Gc.
IIC	Group II of electrical equipment designed for explosive atmospheres due to the presence of gases different from mine gases, in which a typical gas is hydrogen.
65 °C (T6)	Value of the highest surface temperature assigned.
Gc	Protection level assigned for explosive atmospheres containing gases EPL Gc (EPL = Equipment Protection Level) equivalent to c ("increased").
U	Symbol that confirms that the product is classified as an Ex component (gas).
Ex tc	Method of construction for <u>protection type against explosive dust</u> with enclosure "tc" for Equipment protection level EPL Dc.
IIIC	Group III of electrical equipment designed for explosive atmospheres containing dust other than mining sites, for conductive dust.
T65 °C	Value of the highest surface temperature assigned.
Dc	Protection level assigned for explosive atmospheres containing dust EPL Dc Equipment Protection Level (EPL) equivalent to c ("increased").
IP66/IP67	IP protection degree against the penetration of dust (first characteristic digit) and liquids (second characteristic digit) in accordance with EN 60529: IP66 = Dust-tight and protected against powerful water jets; IP67 = Dust-tight and protected against temporary immersion in water.
U	Symbol that confirms that the product is classified as an Ex component (dust).
X	Symbol stating that the manufacturer has specified particular conditions for installation and use , in the instructions sheet.
A-ZYYMMDD	Traceability code that identifies the production lot (A = Product revision, Z = Code for internal use, YYMMDD = Production date (YY = Year, MM = Month, DD = Day)).
ILME 11.0004	Name of the subject that has issued the certificate of conformity to the applicable ATEX standards: self-certified ATEX component (ILME); 11 = Last two digits of the year in which the certificate has been issued; 0004 = Progressive number of the certificate issued in the specific year.

1.5.2 Modular back plates TM series

1.5.2.1 Classification, product features and methods of use

The modular back plates TM series, available in two sizes: article **TM 1145 TB** – “small” size and article **TM 1456 TB** – “large” size, are unclassified Ex components, suitable for anywhere as they are completely external, to be used as modular back mounts for configurations with a **TM-Ex** junction box with one or two wall-mounting interlocked sockets (with base box) **TM-Ex** series, to create a configuration suitable as a fixed wall-mounted installation in **Zone 2** (dusts) ATEX **Ex II 3D** classified locations. These are not supplied with any Certification of CE Compliance or Declaration of CE Compliance. The product's CE marking states that it complies, where applicable, with the essential safety requirements of the Low Voltage Directive 2006/95/CE.

The material out of which the plates are constructed is the same for the junction boxes and enclosures for **TM-Ex** series interlocked sockets which function as accessories. For chemical compatibility warnings, reference the instructions for installation, use, and maintenance for **TM-Ex** series junction boxes and/or **TM-Ex** series wall-mounting interlocked sockets (with base box).

1.5.3 Base boxes for installing ATEX interlocked socket-outlets TM-Ex series, Ex II 3D (Zone 22)

1.5.3.1 Classification

In accordance with the ATEX 94/9/CE Directive, the base boxes **TM-Ex** series (single, double and triple), in addition to the product standards in the previous point, they are produced in compliance with ATEX **EN 60079-0:2009** standards (which supersede the previous standards concerning dusts, EN 61241-0:2006 and EN 61241-1:2004, as well as the previous edition of the standard EN 60079-0:2006 referred only to the general requirements for gas), to the standard **EN 60079-31:2009** (combustible dust, mode of protection by enclosures “t”).

They are also compliant with the Low Voltage Directive 2006/95/CE as constructed in accordance with the relative product standards **EN 60670-1:2005** (classification CEI 23-48), **EN 60670-22:2006** (classification CEI 23-94).

Classification:

Group II components – Category 3D

Identification marking used for protection types:

Ex II 3 D

Ex nA IIC 65 °C (T6) Gc U

Ex tc IIIC T65 °C Dc IP66/IP67 U


IP66/IP67

65 °C

Protection degree in accordance with EN 60529:

Max permitted surface temperature (dust):

Electrical properties:

complete insulation 

1.5.3.2 Fields of applications

- Base boxes (and related accessory cover closing plates unused compartments TM 1125 PX TM article): fixed installation in areas exposed to a potential risk of explosion, classified as **Zone 22** (dust).

NOTA – The classification of areas should follow for dust the standard EN 60079-10-2:2009 (that has replaced EN 61241-10). For gases, the reference standard is EN 60079-10-1:2009.

They are highly resistance to atmospheric agents (sun light) and have a good resistance to a number of chemical agents (see Table on page 8 and 23).

1.5.3.3 Product features

The base boxes ATEX series TM-Ex II 3D are components Ex (suffix on U label) constructed out of strong insulated thermoplastic material (reinforced polypropylene) UL 94V-2 self-extinguishing class, RAL 7012 dark gray color.

Supplied with:

- polyurethane elastomer seal made on site;
- AISI 304 stainless steel screws to fix the junction box cover and sockets;
- installation, operation and maintenance instructions, Attestation of Conformity EC (Ex components).

Wall-mounting is possible thanks to the external brackets built into the base.

Every box is packaged individually.

Kits for internal fixings (DIN EN 60715 rails) are available on request (see the applicable catalogue page).

In addition to the markings required to certify compliance with product standards **CEI EN 60670-1** and **CEI EN 60670-22** (P66/IP67 protection degree, trademark) and with the **CE marking** that confirms compliance is now the Low Voltage Directive 2006/95/EC (for the ATEX Directive 94/9/EC, as the **CE** marking is prohibited for Ex components) each box **TM-Ex** series has nameplate that lists the markings required by the latest editions of applicable ATEX standards [EN 60079-0 (general prescriptions) and EN 60079-31 (dust)] that integrate those required by the ATEX Directive.



TM-Ex series enclosures or enclosure parts are sold empty.

In compliance with Directive ATEX, as electric material they are therefore classified as **Ex components**.

They can be used only in combination with other electrical equipment.

Together require a **further ATEX certification that must be obtained by the end user**, to add to that issued by I.L.M.E. SpA.

1.5.3.4 Example of nameplate products



1.5.3.5 Description of symbols on the nameplate

Note: these markings predominantly pertain to **Ex** compliance, and supplement the required label information for the respective product standards.

Symbol	Meaning
	Manufacturer's logo (I.L.M.E. SpA).
Via M. A. Colonna 9 20149 Milano (ITALY)	Manufacturer's address (mandatory for ATEX Directive 94/9/EC).
CE	CE marking (that indicates conformity with the Low Voltage Directive 2006/95/EC). As Ex components, these products do not bear the CE marking pursuant to ATEX Directive 94/9/CE.
TM 2344 P2X	Reference to type of product (product code).
	Ex symbol that indicates the specific marking provided by the ATEX Directive 94/9/CE for the protection against the risk of explosion.
II	Group of belonging, indicates the type of intended use – secondo la classificazione prevista dalla Direttiva 94/9/CE – for which the product is suitable: Group II = Surface industries (Group I would point suitability for use in mines).
3D	Category that identifies the equipment protection level: Category 3 = normal level – for Zone 22 (dust): D = protection relating to dust.
Ex tc	Method of construction for <u>protection type against explosive dust</u> with enclosure "tc" for Equipment protection level EPL Dc.
IIIC	Group III of electrical equipment designed for explosive atmospheres containing dust other than mining sites, for conductive dust.
T65 °C	Value of the highest surface temperature assigned.
Dc	Protection level assigned for explosive atmospheres containing dust EPL Dc Equipment Protection Level (EPL) equivalent to c ("increased").
IP66/IP67	IP protection degree against the penetration of dust (first characteristic digit) and liquids (second characteristic digit) in accordance with EN 60529: IP66 = Dust-tight and protected against powerful water jets; IP67 = Dust-tight and protected against temporary immersion in water.
U	Symbol that confirms that the product is classified as an Ex component (dust).
X	Symbol stating that the manufacturer has specified particular conditions for installation and use , in the instructions sheet.
A-ZYYMMDD	Traceability code that identifies the production lot (A = Product revision, Z = Code for internal use, YYMMDD = Production date (YY = Year, MM = Month, DD = Day)).
ILME 11.0005	Name of the subject that has issued the certificate of conformity to the applicable ATEX standards: self-certified ATEX component (ILME); 11 = Last two digits of the year in which the certificate has been issued; 0005 = Progressive number of the certificate issued in the specific year.

1.6 TM-Ex – Accessories

1.6.1 Cover Closing Plate for Unused Compartments

The cover closing plates for unused compartments are an optional accessory exclusively for the double and triple back boxes.

1.6.1.1 Classification

This cover is produced in compliance with the ATEX **EN 60079-0:2009** standard, and standard **EN 60079-31:2009** (combustible dust, mode of protection by enclosures "t").

The cover is also compliant with the Low Voltage Directive 2006/95/EC, as it has been manufactured in accordance with the relative product standards **EN 60670-1:2005** (classification CEI 23-48), and **EN 60670-22:2006** (classification CEI 23-94).

<i>Classification:</i>	Group II components – Category 3 D
<i>Identification marking used for protection types:</i>	Ex II 3 D
	Ex tc IIIC T65 °C Dc IP66/IP67 U
<i>Protection degree in accordance with EN 60529:</i>	IP66/IP67
<i>Max permitted surface temperature (dust):</i>	65 °C
<i>Electrical properties:</i>	complete insulation <input type="checkbox"/>

1.6.1.2 Fields of applications

- Cover closing plate unused compartment article TM 1125 PX: paired exclusively with a compartment in **TM-Ex** series base box double article TM 2344 P2X or triple article TM 3444 P3X: fixed installation in areas exposed to a potential risk of explosion, classified as **Zone 22** (dust).

Note – The classification of areas should follow for dust the standard EN 60079-10-2:2009 (that has replaced EN 61241-10).

They are highly resistance to atmospheric agents (sun light) and have a good resistance to a number of chemical agents (see Table on page 8 and 23).

1.6.1.3 Product features

The closing cover for unused compartments in **TM-Ex** II 3D series ATEX base boxes is an Ex component (suffix on U label) constructed out of strong insulated thermoplastic material (reinforced polypropylene) with UL 94V-2 self-extinguishing class and RAL 7012 dark gray color.

Supplied with:

- polyurethane elastomer seal made on site;
- AISI 304 stainless steel screws to be mounted to the boxes' unused chamber;
- installation, operation and maintenance instructions, Attestation of Conformity EC (Ex components).

Every box is packaged individually.

In addition to the markings required to certify compliance with product standards **CEI EN 60670-1** and **CEI EN 60670-22** (P66/IP67 protection degree, trademark) and with the **CE marking that confirms compliance is now the Low Voltage Directive 2006/95/EC** (for the ATEX Directive 94/9/EC, as the **CE** marking is prohibited for Ex components) each cover closing plate unused compartment **TM-Ex** series has nameplate that lists the markings required by the latest editions of applicable ATEX standards [EN 60079-0 (general prescriptions) and EN 60079-31 (dust)] that integrate those required by the ATEX Directive.



TM-Ex series enclosures or enclosure parts are sold empty.

In compliance with Directive ATEX, as electric material they are therefore classified as **Ex components**.

They can be used only in combination with other electrical equipment.

Together require a **further ATEX certification that must be obtained by the end user**, to add to that issued by I.L.M.E. SpA.

1.6.1.4 ATEX cable glands

The ATEX cable glands offered in this catalogue are produced by WISKA.

Refer to the instructions for installation, use, and maintenance present in the minimal packaging of every product code, and for mounting on interlocked ATEX sockets **TM-Ex** series or in the junction boxes or in the base boxes **TM-Ex** series to the relative instruction sheets in the packaging of the products. For additional technical information, refer to the manufacturer's catalogue.

1.6.1.5 Union nipples

The DBX junction boxes are supplied complete with union nipples.

Refer to the instructions for installation, use and maintenance of these. For mounting into the sockets interlocked ATEX **TM-Ex** series or in junction boxes **TM-Ex** series.

2 Introduction

The name ATEX, although unofficial, is today universally used to refer to **European Directives 94/9/EC** and **1999/92/EC**. This acronym derives from the French term **AT**mosphère **EX**plosible.

- **Directive 94/9/EC** is also known as the "Directive on ATEX products" "**ATEX 95**" or alternatively "**ATEX 100a**", based on the articles of the Treaty that established the creation of the European Community (now European Union), which specifies that the Council may adopt, by means of directives, measures to support and regulate the internal market. This directive has been in force since 1-07-2003.

- **Directive 99/92/EC** is also known as the "social ATEX directive" or the "ATEX directive concerning workplaces" or "**ATEX 137**", based on the article of the Treaty that established the creation of the European Community, which specifies that the Council may adopt, by means of directives, minimum measures in order to promote the improvement of workplaces in particular so as to guarantee a higher level of safety and the health of workers. This directive has been in force since 1-07-2006.

The two ATEX directives define the safety rules that have to be implemented in workplaces exposed to the risks of explosion due to the presence of combustible gases/vapours/mists. In compliance with the treaties they have been acknowledged by the EU member states and converted into national laws and/or decrees, and therefore have value cogent, with provisions concerning the various levels of **responsibilities**.

2.1 Responsibilities

2.1.1 Manufacturer of electrical equipment

Equipment designed to be used in explosive atmospheres must be designed and manufactured so that it does not generate ignition sources. In Europe, electrical equipment designed to be installed in explosive atmospheres falls within the scope of Directive 94/9/EC (ATEX) and can be sold in Europe only if it complies with this directive.

The manufacturer must classify the equipment according to the safety levels guaranteed by the design principles used during manufacturing in order to allow end users to select the equipment that best suits the area of installation.

Based on the declared category, the manufacturer must verify that the equipment complies with the so-called "main safety requirements" (*EHSR Essential Health and Safety Requirements*) of the directive, prepare the technical file, define the safety instructions and apply the CE marking in compliance with Directive 94/9/EC. Finally draw up and sign the EC declaration of conformity.

Products must in fact be introduced in the market with the correct marking, and supplied with the necessary safety instructions and the EC declaration of conformity.

For ATEX ¹ components, the Directive provides for an EC Certificate of Conformity instead of a Declaration of CE Conformity or CE marking (which is prohibited for such components).

2.1.2 Employer

According to the provisions of Directive 99/92/EC, the employer must assess the risks to which workers may be exposed in explosive atmospheres.

In particular, the directive establishes that the employer must:

- Divide the working areas into zones (Zone 0, 1, 2, 20, 21, 22)
- Implement the minimum safety requirements (the main safety requirements indicated in the directive) in hazardous areas
- Implement organisational provisions and protective measures against explosions (including reference information on the choice of electric and non electrical equipment, as per Directive 94/9/EC)
- Inspect the electric equipment installed in Zones 0, 1, 20, and 21 (in Italy every 2 years, in accordance with Presidential Decree 462 ²).

The employer must also choose the correct type of electrical equipment on the basis of the type of hazardous area and prepare a document with information on the protection against explosions.

¹ Article 1.3(c) of **Directive 94/9/EC** defines "components" as "any item essential to the safe functioning of equipment and protective systems but with no autonomous function". **ATEX guidelines** (2009 Edition) furthermore specify that the following are two defining elements specific to components:

- they are essential to the safe operation of equipment and protective systems with respect to explosion protection (otherwise they would not need to be subject to the Directive);
- they are with no autonomous function (otherwise they would have to be regarded either as equipment, protective systems or as devices according to Article 1.2). A product is considered to be equipped for autonomous function if it can be used safely to perform, or be involved in performing, one or more of the functions stated in Article 1.2 or Article 1.3(a) or 1.3(b) of the ATEX Directive 94/9/EC, without having recourse to the addition of further parts. This does not preclude the necessity to follow its specific instructions for installation and use.

² Since January 23, 2002, Presidential Decree No. 462 of 10/22/2001 has been in force in Italy, the "Regulation to simplify the process of reporting protective systems and devices against lightning discharge, of grounding devices for electrical installations, and of dangerous electrical systems", which governs the monitoring of earthing installations, electrical installations in explosion danger zones, and installations which protect against lightning discharge.

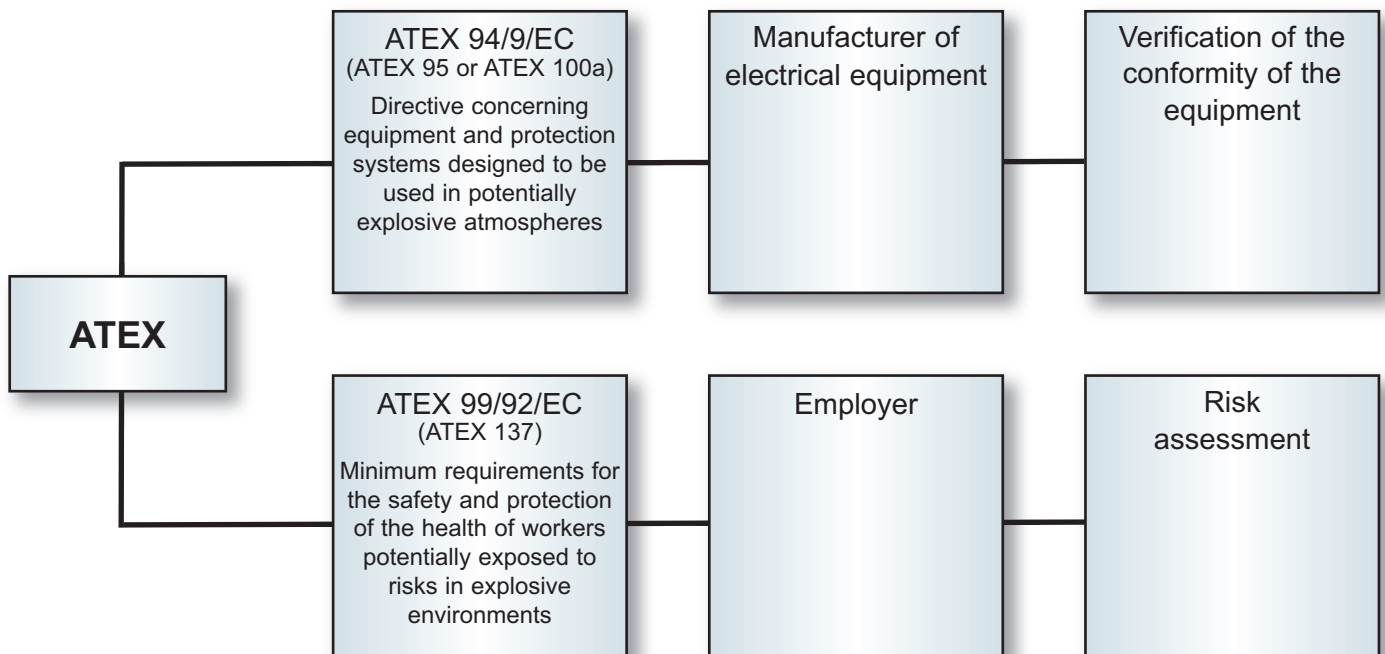
2.1.3 Designer

A project is always required for electrical equipment in zones at risk of explosion. The electrical installation designer, who must have specific experience in the design of electrical equipment and must be a regular member of a professional register, prepares the project on the employer's request.

The designer must design the electrical installation in accordance with the best working practices, that is in compliance with all applicable European harmonised standards. For electrical installations designed to be installed in explosive atmospheres, the best working practices are represented by the installation standards in force at the time of design phase. It is important to remember that the classification of working areas into zones (Zone 0, 1, 2, 20, 21 and 22) must be supplied by the employer, who is responsible by law for the same.

2.1.4 Installer

The installer must install the electrical plants in compliance with design technical specifications and the best working practices (installation standards in force at the time of installation), and observe the safety instructions provided by the manufacturer for equipment compliant with ATEX Directive 94/9/EC. Failure to follow these instructions may compromise the protection type of the equipment, resulting in the invalidity of conformity with the directive, without any responsibility on the manufacturer's side. At the end of the work, the installer must issue a declaration of conformity according to the law requirements applicable in the country of installation (in Italy the reference law is Ministerial Decree 37/08).



2.2 Declaration of EC Conformity - Declaration of EC Conformity - Instructions for installation, use and maintenance

Every **finished product Ex**, that complies with Directive 94/9/EC must be supplied with an **EC Declaration of Conformity** that must contain at least the following information:

- Name or trademark and address of the manufacturer;
- Description of the equipment;
- Provisions to which the equipment complies;
- Name, identification number and address of the Notified Body;
- "Type EC" certificate number;
- Identification data of the signee binding the manufacturer or the EU representative;
- Reference to: harmonised standards, technical specifications used and other EU directives applied.

When the Directive's compliance procedures do not provide for control by a Notified Body (e.g. for Group II, Category 3 equipment intended for installation in zones classified as zone 2 and/or zone 22 such as the products described in this catalogue), in the EC declaration of conformity there will be no reference to a notified body or to the "EC type" certificate.

For **Ex components**, with no autonomous function, and identified (where possible, given the dimensions) by the presence of a "U", symbol on the label, an EC Certificate of Conformity is required in place of a **Declaration of EC Conformity** and the CE marking is prohibited pursuant to the ATEX Directive 94/9/EC.

Instructions for use are very important because their correct application is a necessary condition to ensure the observance of the essential health and safety requirements (EHSR).

Therefore, the instructions for use must detail the operations that must be carried for a safe execution of the following: correct use (zone, environmental conditions, reference to safety signs, etc.); correct operation (forbidden, specific or limited conditions of use, if applicable); correct installation and/or adjustment; commissioning; commissioning; correct maintenance; installation and/or replacement of components.

3 Classifying locations

3.1 Generality

Choosing appropriate systems in such places is governed by the following standards:

- **EN 60079-10-1:2010-01** (class. CEI 31-87), "Explosive atmospheres – Part 10-1. Classifying locations. Explosive atmospheres for the presence of gas";
- **EN 60079-14:2010-02** (class. CEI 31-33), "Explosive atmospheres – Part 14. Planning, choice, and installation of electrical systems";

Classifying locations with explosive atmospheres due to the presence of combustible dust is most recently governed by the following standard:

- **EN 60079-10-2:2010-01** (class. CEI 31-88), "Explosive atmospheres – Part 10-2. Classifying locations. Explosive atmospheres for the presence of combustible dust";

The most recent standard for systems is now unified (EN 60079-14) for these locations as well.

The assessment of explosion risk is largely based on two circumstances:

- **classifying locations with explosion risk**, by means of assessing whether explosive atmospheres may occur, and therefore, it is possible to try to prevent them from forming or reducing their probability and duration;
- **assessing possible sources of ignition** (not only electric) and their prevention, also by means of special precautions in planning and constructing systems and the choice of components (safety requirements for systems and components)

It is always advisable to assess the preventable effects of an explosion in order to take precautions aimed at containing damages.

When classifying locations with explosion risk, three types of zones are referenced, based on the *probability of the explosive atmosphere to form*:

- **Zone 0 (20)**: An area in which an explosive atmosphere is present continuously or for long periods of time;
- **Zone 1 (21)**: An area in which it is probable for an explosive atmosphere to be occasionally created during normal activities;
- **Zone 2 (22)**: An area in which it is not probable for an explosive atmosphere to be created during normal activities, or should one occur, it lasts for a short time.

Where Zones 0, 1, and 2 identify areas with explosive atmospheres consisting of a mixture of air or flammable substances in the forms of gas, vapor, or mist, while Zones 20, 21, and 22 identify those with atmospheres in the form of combustible dust clouds.

In general and with some specificities in the case where gases or dusts are under consideration, the area classification procedure as provided for by the cited standards (EN 60079-10-1 for gases, EN 60079-10-2 for dusts) may be attributed to the following points:

- identifying sources of release;
- assigning degree of release to sources (considering that the simultaneous occurrence of multiple sources may be possible);
- calculation of the hypothetical volume of a potentially explosive atmosphere around a source of release;
- calculation of average concentration;
- assessing dwell time;
- determining the form and extent of the Zone.

Ventilation is rather important for Zone classification, whether natural or artificial, as it may influence the volume, concentration, dwell time, or other characteristics of the explosive cloud.

The type of zone is identified according to **Table 1** based on the degree of release and availability of ventilation, having made the following assumptions indicated by the standard.

Degree of source of release

- *continuous* degree: a release that is continuous or that may occur for long periods of time;
- *first* degree: a release that may occur periodically or occasionally during normal operation;
- *second* degree: a release that is not expected during normal operation, and when it occurs, it does so infrequently or for short periods of time.

NOTE: Despite the fact that Zone type definitions are very similar to the definitions of degrees of sources of release, one cannot pass directly for the other, as they play a substantial and determining role in evaluating whether ventilation is present.

Degree of ventilation

The degree of ventilation, which is indicative of the quantity of ventilation air that is delivered by the emission source in relation to the quantity of flammable substances emitted into the environment, has an effect on the concentration of the flammable substance, its dwell time in the environment, and its potential capacity to form layers of dust, thus influencing the Zone type itself.

The availability of ventilation conveys the reliability of the presence of ventilation that is considered:

- *good*: continuous ventilation is present;
- *adequate*: ventilation is present during normal operations;
- *poor*: ventilation is neither good nor adequate;

As shown in table 1, it can be considered that continuous emission sources create type 0 (20) Zones, first degree sources create type 1 (21) Zones, and second degree sources create type 2 (22) Zones; however, the influence of ventilation may affect both the identification of the zone itself as well as its size.

To more closely assess the factors that contribute to the formation of explosive atmospheres and identify zones according to the expected classification, it is necessary to approach the case of atmospheres containing gases, vapors, and clouds separately from those containing combustible dust.

Classification of areas		Description
Gas	Dust	
ZONE 0	ZONE 20	Area in which the explosive atmosphere is permanent, present for long periods of time or frequent
ZONE 1	ZONE 21	Area in which the explosive atmosphere is occasionally present during the ordinary use of equipment
ZONE 2	ZONE 22	Area in which the explosive atmosphere is unlikely to form during the ordinary use of equipment and, if present, persists for short period of time only

In particular for the products described in this catalogue in the ATEX Directive 99/92/EC (the so-called "social" directive, or concerning systems), **Zone 2** (gas) is defined as "Area in which during ordinary activities an explosive atmosphere consisting in a mixture of air and flammable substances in the form of gas, vapour or mist, is unlikely to form and, when this does, it is for a short period of time only" while the **Zone 22** (dust) is defined as "Area in which during ordinary activities an explosive atmosphere consisting in a cloud of combustible dust is unlikely to form and, when it does, it is for a short period of time only."

Le zone, i gruppi e le categorie di prodotti sono suddivisi come segue:

Flammable material	Zone (Directive 99/92/EC)	Group (Directive 99/92/EC)	Category (Directive 99/92/EC)
Methane, dust	Mining industry	I	M1
	Mining industry	I	M2 or M1
Gases, vapours	Zone 0: permanent, long-term or frequent explosive atmosphere	II	1G
	Zone 1: occasionally explosive atmosphere	II	2G or 1G
	Zone 2: explosive atmosphere that is unlikely to form or that persists for short periods of time	II	3G or 2G or 1G
Dust	Zone 20: permanent, long-term or frequent explosive atmosphere	II	1D
	Zone 21: occasionally explosive atmosphere	II	2D or 1D
	Zone 22: explosive atmosphere that is unlikely to form or that persists for short periods of time	II	3D or 2D or 1D

In Zones 0, 1, 20 and 21 only electrical equipment with an EX certification issued by third parties can be used. In Zone 0, it is however only possible to use equipment that has been specifically approved for use in this zone.

In Zones 2 and 22, it is possible to use electrical equipments that comply with the main safety requirements of ATEX Directive 94/9/EC and for which the manufacturer has issued a certificate of conformity.

For more detailed information, refer to the integral text of the two directives and to the Implementation Guidelines of the directives available on the European Union website, in addition to the law provisions in force in the member states, which may differ in terms of applicable sanctions.

For technical information concerning the design and manufacture of equipment, refer to the harmonised standard in force, which is continuously being amended and updated. The following section provides general information on the classification of ATEX areas for the presence of gas and those for the presence of combustible dust.

3.2 Classification of ATEX areas where gas, vapours or mists are present

Classification takes two main factors into consideration: emission of flammable substances into the air and the ventilation present in the environment. The type of danger zone can be identified through the combined analysis of these elements.

Analysis of emissions

- identifying flammable substances present and acquiring information pertaining to their chemical-physical size;
- identifying sources of release (point or part of the system from which a gas can escape in such a way that it may form a potentially explosive atmosphere);
- assessing the degree of each source of release (continuous, primary, and secondary, based on the greater or lesser probability that a source may effectively emit gas into the atmosphere);
- calculating the size of the release from each source (how much flammable material is effectively released into the atmosphere).

Analysis of environmental ventilation

- identifying and evaluating the ventilation present in the environment, whether natural or artificial (air change in relation to the volume of the environment);
- assuming degree of ventilation: greater or lesser quantity of ventilation capacity present to dilute flammable vapors and therefore avoid the formation of an atmosphere containing dangerous concentrations, which has a high probability of igniting to cause an explosion.

In detail, the degrees of ventilation can be understood as:

- *High*, if ventilation guarantees that a potentially explosive atmosphere cannot form;
- *Medium*, if ventilation is present but does not guarantee that a potentially explosive atmosphere cannot form;
- *Low*, if ventilation is so limited that it increases the probability of the formation of a consistent atmosphere that is potentially explosive.

Ventilation must not only be assessed in terms of quantity, but also in terms of quality, so as to define the so-called ventilation availability.

Ventilation availability is understood as substantially identifying the greater or lesser ventilation capacity that is continuously guaranteed. In detail, ventilation availability can be understood as:

- *Good*, if ventilation is almost continuously present (natural ventilation if considered with calm wind: always present despite any weather conditions);
- *Adequate*, if ventilation is normally guaranteed, but infrequent interruptions are possible for short periods of time (artificial ventilation with fault control);
- *Poor*, if ventilation does not correspond to the aforementioned criteria.

Environment classification

By comparing the values assigned to the three main reference sizes:

- degree of emission (continuous, primary, secondary);
- degree of ventilation (High, Medium, Low);
- ventilation availability (Good, Adequate, Poor);

the danger zone in the environment being analyzed can therefore be assessed (Table 1):

Once the type of danger zone is determined, its extent is assessed by calculating safety distance, and any openings are considered along with the possible spreading of the explosive atmosphere to surrounding environments.

These openings will be assessed as sources of release in regards to downstream environments, and in turn must be subjected to the procedure described above.

Ventilation		Degree of the emission source		
Degree	Availability	Continuous	Primary	Secondary
High	Good	Non-hazardous zone	Non-hazardous zone	Non-hazardous zone
	Adequate	Zone 2	Zone 2	Non-hazardous zone
	Poor	Zone 1	Zone 2	Zone 2
Medium	Good	Zone 0	Zone 1	Zone 2
	Adequate	Zone 0 + Zone 2	Zone 1 + Zone 2	Zone 2
	Poor	Zone 0 + Zone 1	Zone 1 + Zone 2	Zone 2
Low	Good	Zone 0	Zone 1 or Zone 0	Zone 1 and Zone 0 also
	Adequate			
	Poor			

Table 1 – Zone classification in relation to ventilation quality and degree of source of release

3.3 Classification of ATEX areas where combustible dust is present

The classification of these areas is based on the same approach used for explosive atmospheres where gases are present. However, the assessment of these areas is more direct because of the relatively consistent behaviour of the different types of dust, which is less varied as compared to the behaviour of flammable gases, vapours and mists.

An explosion of dust produces a rapid combustion, which releases energy in the form of heat and overpressure.

The conditions that may lead to the formation of a potentially explosive atmosphere can be summarised as follows:

- Dust must be combustible;
- Dust must be dispersed in air;
- The granulometry of dust must permit the propagation of flames;
- The concentration of dust must fall within the so-called *flammability limit*;
- An ignition source with sufficient energy must be present;
- A sufficient amount of combustible agent (oxygen) must be present to enable combustion.

To determine if these conditions may occur, it is necessary to follow the procedure described below.

Analysis of emissions

- Assessment of the substances used and identification of combustible dusts;
- Acquisition of all data on the chemical-physical properties of the combustible dusts involved and as required for assessment purposes;
- Identification of the emission sources, intended as points or parts of a processing plant from which combustible dust may leak causing the formation of a potentially explosive atmosphere;

Note: a layer of dust may represent a source of emission because it could cause the dispersion of a cloud in the presence of air flows. The dust may also act as ignition source in existing explosive atmospheres;

- Assessment of the emission degree for each emission source.

As for gases, the emission degrees of dust can be classified as follows:

- **Continuous:** if the emission is continuous or can occur for long periods of time during the ordinary use of processing equipment (inside storage equipment, silos, hoppers);
- **First:** if the emission can occur periodically or occasionally during the ordinary use of the processing equipment (samplings, areas where loading and discharge operations are carried out);
- **Second:** if the emission is unlikely to occur during the ordinary use of processing equipment, but can occur occasionally and only for short periods of time, for example due to a fault (flanges, bag discharge units).

For combustible dust there is a rather direct transition between the degree of the emission source and the type of dangerous zone that forms:

- **Zone 20** Area around continuous degree emissions;
- **Zone 21** Area around first degree emissions;
- **Zone 22** Area around second degree emissions.

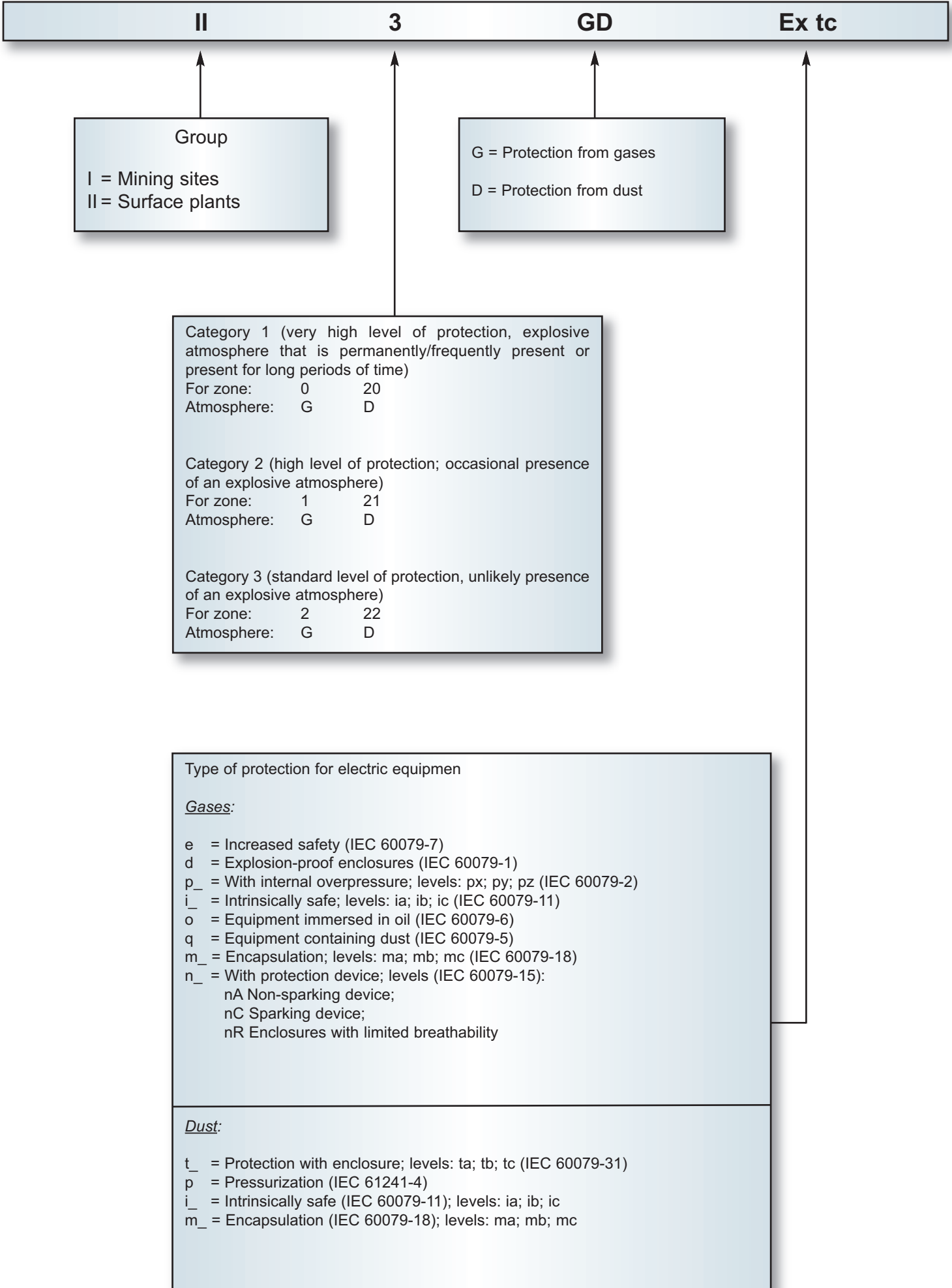
The presence of a suction system is extremely important to maintain the areas clean. If the suction system is adequate and guaranteed, it is possible to reduce the classification of zones because this type of equipment prevents the formation of layers, thus reducing the emission sources and the extent of the dangerous area.

After determining the type of dangerous zone, it is necessary to determine its extension in accordance with the requirements of the standard. At present the reference standard is **EN 60079-10-2**.

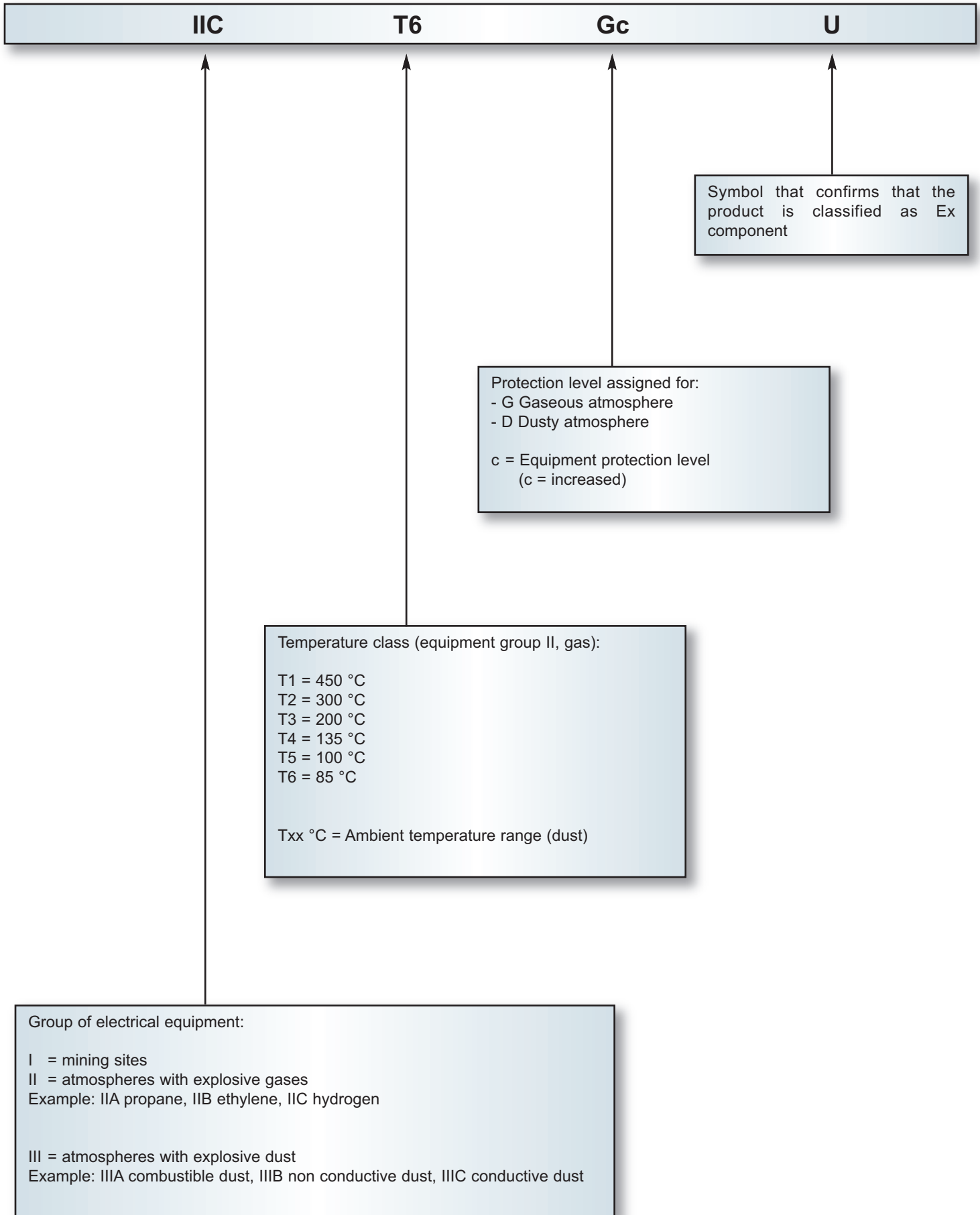
Table 1 – Categories of ATEX products and application zone

Category	Protection level	Presence and duration of the explosive atmosphere	ZONE (gases)	ZONE (dust)
1	- Very high - Two protection barriers - Safety guaranteed even with two faults	- Permanent, frequent or for long periods of time during the ordinary use of equipment	Zone 0	Zone 20
2	- High - One protection barrier - Safety guaranteed even with one fault	- Occasionally, probable during the ordinary use of equipment	Zone 1	Zone 21
3	- Normal - Safety guaranteed during the use of the equipment normal	- Unlikely during the ordinary use of the equipment - For short periods only	Zone 2	Zone 22

Example of equipment classification:



Example of equipment classification:



TM interlocked socket-outlets for industrial use

The TM Series has been developed using innovative design ideas and the latest production technology methods (patented BC-MUL System) characterizing the ILME solution to the latest market needs.

The **optimum quality/price** ratio combined with an **easy to use system**, offers a **wide range of installation solutions**.

TM Series uses electrical components (switches, fuse carriers, female inserts) of **tested quality**, fixed on a **robust supporting frame (die cast)** with **safety blocks to provide reliability in service**.

Innovative technology

Stability, rigid sections and high mechanical resistance to shocks up to 20J are some of the main features of the cases.

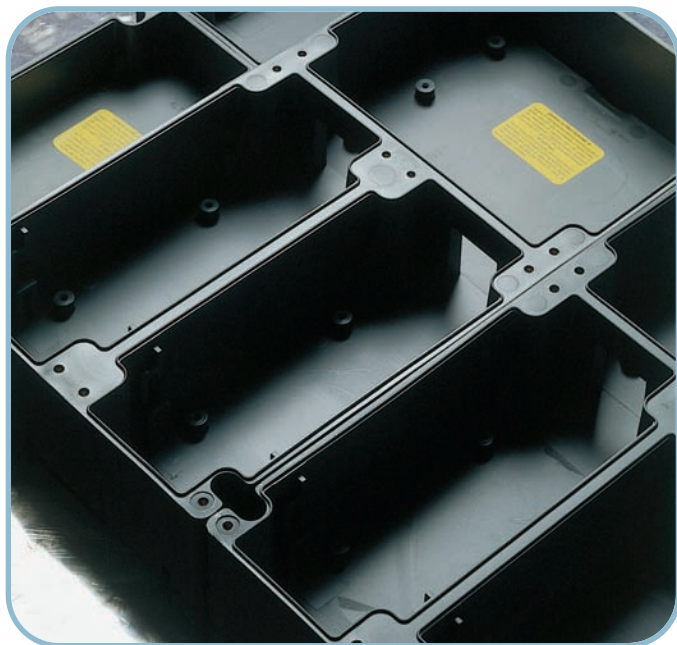
The **double degree of protection IP66/IP67**, together with the thermoplastic material used (MIL.BOX) and the external stainless steel screws, ensures a **high protection against atmospheric and aggressive chemical agents, as well as against UV rays**.

Case

The cases provide protection independently from the frame supporting the electrical components.

The 5 mm thick case walls, captive metric screws brass threaded holes, are some of the exclusive features of the series.

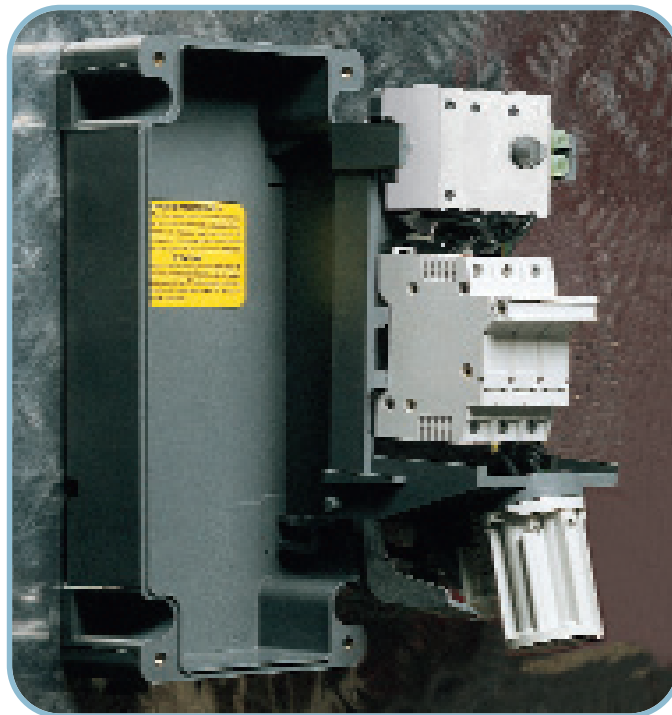
The wide range of interlocked socket-outlets and accessories (boxes and plates for set mounting) allows several combinations.



Frame

The frame supporting the electrical components **can be removed from the cases and allows easy installation** of the empty cases and external wiring accessories.

Once the cases are installed, it is very easy to fix the frame by means of a hinge and then proceed with the wiring operation.



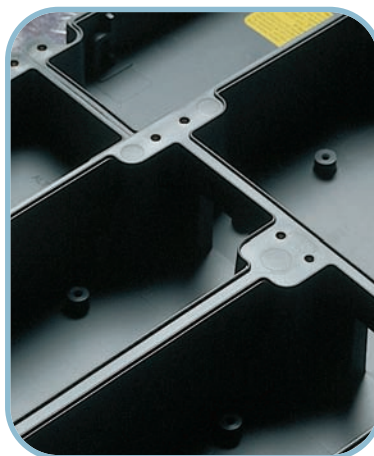
Features of the series

The TM Series offers many **innovative design features for safety and practical applications**.

Design features:

- Non deformable blocks (die cast).
- Double insulation.
- Brass threaded holes.
- Safety lock systems on fuse carrier cover.
- Lockable handle in open/closed position.
- Cover for fuse carrier with seats for spare fuses.
- Pre-wired conductors to allow the mounting of automatic devices.
- 32A/63A controls with pre-load (that ensure a greater robustness in case of improper use without plug).
- External screws available in two sizes, in stainless steel.

Threaded seats



Metal locking lever



Ammonium acetate	●	Cresol	○	Potassium persulphate	○
Fatty acids	●	Potassium di-chromate	○	Petroleum	●
Boric acid	●	Di-ethyl Phtalate	●	Kitchen salt, aqueous solution	●
Boric acid, 10% aqueous solution	●	Di-isononyl Phtalate	●	Tallow	●
Lactic acid	●	Sulphur dioxide (sulphurous anhydride)	○	Sodium silicate	●
Oleic acid	●	Di-optyl Phtalate	●	Ammonium sulphate	●
Oxalic acid	●	Ephane	○	Calcium sulphate	●
Stearic acid	●	Hexane	○	Potassium sulphate	○
Succinic acid (butanedioic acid)	●	Petrol ether	○	Copper sulphate 10% aqueous solution	●
Tartaric acid	●	Diluted Phenol	○	Sodium sulphate	●
Water	●	Ammonium phosphate	●	Sodium sulphide	●
Boric water	●	Sodium phosphate	●	Cresolic solution	○
Sea water	●	Diesel Oil	○	Solution for photographic processing	●
Amyl alcohol	○	Gypsum (see calcium sulphate)	●	Soap solution	○
White alcohol (isopropanol + ethanol)	○	Glycerine	●	Fruit juices	●
Ethyl alcohol	●	Diluted Glycerine	●	Sodium Thiosulphate (photographic fixer)	●
Isopropyl alcohol	○	Ethylene-glycol or propylene-glycol	●	Trichresyl phosphate	●
Methyl alcohol, diluted 50%	○	Diluted Glycol	●	Diluted urea	●
Alum	●	Diluted Glucose	●	Urine	●
Aqueous amid	●	Hydrogen sulphide	○	Sulphur	●
Gaseous ammonia	○	Sodium hydroxide 12,5% (liscivia)	○		
Ammonia, 10% aqueous solution	●	Ink	●		
Aniline	○	Potassium iodide	○		
Mothballs (naphthalene, paradichlorobenzene)	○	Mercury	●		
Asphalt	○	Naphthalene	○		
Normal (low octane) gasoline (petrol)	○	N-Butanol (butyl alcohol)	●		
Petroleum spirit (dry cleaning)	○	Ammonium nitrate	●		
Sodium bicarbonate (oxide)	●	Calcium nitrate	●		
Beer	●	Potassium nitrate	○		
Sodium disulphate, aqueous solution	●	Sodium nitrate	●		
Borax	○	Sodium nitrite	○		
Butane, gas	○	Fuel oils	○		
Butane, liquid	○	Mineral oils (un-tasteful)	●		
Ammonium carbonate	●	Lubricating engine oil	○		
Potassium carbonate	●	Mineral based oil	●		
Sodium carbonate (washing soda)	●	Grinding oil	○		
Tar	○	Cutting oil	○		
Potassium cyanide, aqueous solution	●	Linseed oil	●		
Cyclo-hexane	○	Paraffin oil	●		
Potassium chlorate	●	Silicon oil	●		
Sodium chlorate	●	IRM oil 901, 20 °C	●		
Ammonium chloride	●	IRM oil 902, 20 °C	○		
Calcium chloride, diluted suspension	●	Lubricating oil	●		
Calcium chloride	●	Transformer oil (dielectric)	●		
Calcium chloride, 10% aqueous solution	●	Vegetal oil	●		
Potassium chloride	●	Octane	○		
Sodium chloride (kitchen salt)	●	Sodium perborate	●		

● = resistant

○ = limited resistance

* The classification herewith provided is only a generic reference guidance in order to enable a first selection. It is based on literature data provided by the suppliers of the raw materials used, which are related to tests made on specimens under test conditions which are not always homogeneous and involving accelerating techniques, therefore not necessarily describing real operational conditions. The actual behaviour of products in the field may therefore be positively or negatively influenced by several variable environmental parameters like temperature, relative humidity, presence at the same time of a plurality of substances and their concentration, exposure time, dynamic or static application condition, and so on. The accuracy of transferring the indications given herein to the actual conditions of use is therefore merely indicative and does not imply any guarantee or responsibility by ILME.

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, 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.

In 2007, the Amendment **EN 60309-1/A1** (IEC 60309-1 Amd 1, implemented by CEI in February 2008, in force since 1 November 2009) provided technical updates, such as:

- addition of the construction and testing requirements for screwless terminals and terminations (spring-type and insulation piercing) limited to accessories rated 16A (previously under consideration) and alignment with the requirements contained in the standards of IEC SC 23F (IEC 60999 -1, IEC 60999-2);
- cancellation of Symbols "drop" and "triangle" and the final use of only the IP degree of protection of IEC 60529;
- introduction of possible values of rated current alternative to the classical (16A, 32A, 63A, 125A and 250A): 6A, 10A, 25A, 40A, 50A, 80A, 90A, 150A, 160A and adaptation, where necessary, of all the test requirements to take into account the new rated current values;
- limitation to dimension of cables and conductors with metric size only, with the ban of the size AWG/MCM North American sizes.

Also in 2007, the Amendment **EN 60309-2/A1** further extended up to the 32A rated current, but only for Italy and Germany, the construction and test requirements for accessories with screwless terminals (either spring-type or IDC). The "versatile" degree of protection IP66/IP67 was introduced (constructional type of socket-outlet entrances, of covers with bayonet locking, of retaining means are equal to those with IP67), and for the plugs and socket-outlets with extra-low voltage $\leq 50V$ it was normalized the 8h clock position for accessories 25V – 32A for portable electric incubators – used at 12V dc or 24V dc in ambulances or helicopters (covered by the relevant ISO standard).

In 2012, a further Amendment **EN 60309-1/A2** (IEC 60309-1 Amd 2), in force since December 1, 2012 – for existing products from July 13, 2015 – made further technical upgrades in many points, among which the most important are: the increase of the nominal voltage from 690V dc or ac to 1 000V dc or ac; the increase the maximum nominal current from 250A to 800A, with its extensions regarding the size of the wires connected to the new nominal values of preferred rated current 315A, 400A, 630A and 800A; the restriction of installability of these devices exclusively by informed persons (IEC 60050-195:1998, Edit 1:2001, definition 195-04-02) or expert persons (IEC 60050-195:1998, Edit 1:2001, definition 195-04-01); the extension of the usability of screwless terminals (spring or IDC) from 16A to 32A for the Series I (the one permitted by CENELEC in the EU); the update of all the test methods to cover the changes listed above.

Also during 2012, the Amendment **EN 60309-2/A2** 2012-04, in force since September 1, 2012, introduced amendments to clause 1 "Scope", in particular to raise the maximum voltage to 1 000V ac or dc, and clause 3 "Normative references", Table 104, introduced an additional paragraph 16.101 and made changes to the unification Sheets 2-I, 2-II, 2-III and 2-IIIa, 2-IVa, as well as Annex ZA.

The technical notes below and the products illustrated in the present booklet refer to series 1 versions, used in Europe on the basis of said European Standards and in countries of European technical-cultural origin (e.g.: most of Latin America, Australia, South Africa).

A series 2 also exists, which differs for its rated current, voltage and frequency values and for its polarity and pole marking, adapting to North American installation standards and those of countries that have adopted this system (e.g. Mexico, Japan).

The Provisions of 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.

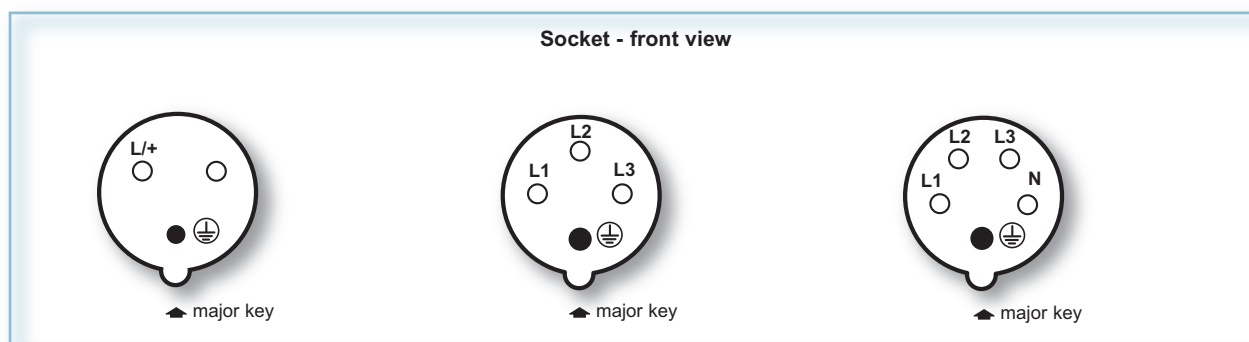
Low voltage over 50V up to 1000V

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

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

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.



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 ¹⁾.

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.

¹⁾ 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.

²⁾ 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 the 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 (1st digit), and protected against the *dangerous effects of water spray* from all directions (2nd digit).

IP55: Protection against the *penetration of harmful quantities of powder* and against *access to dangerous parts* with an access calibre of Ø 1 mm (1st digit) and protected against the *dangerous effects of water jets* with a nozzle from all directions (2nd digit).

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

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

IP69: total protection against *dust* and access to *dangerous parts* with an accessibility calibre of Ø 1 mm (1st digit), and protected against *powerful water jets, such as sea waves, and high temperatures* (2nd digit).

The socket-outlets with IP55 degree of protection and those with double degree of protection IP66/IP67 ²⁾ have a bayonet jointed lid, traditionally defined as "water-tight" and require plugs with IP67 degree of protection (with counternut and gasket) to preserve the degree of protection marked on the apparatus.

1st characteristic numeral

Personal protection against contact with hazardous parts

IP	External solid foreign bodies	Protection
0		nessuna
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

2nd 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
9		against jets of water at high pressure and high temperature

wall-mounting,
with single box

for assembly
in single or multiple boxes



32A / 63A

TM...ISX



16A

TM...SISX



TM...SPX/KSPX



16A / 32K

TM...SSPX/KSSPX



TM...SPX

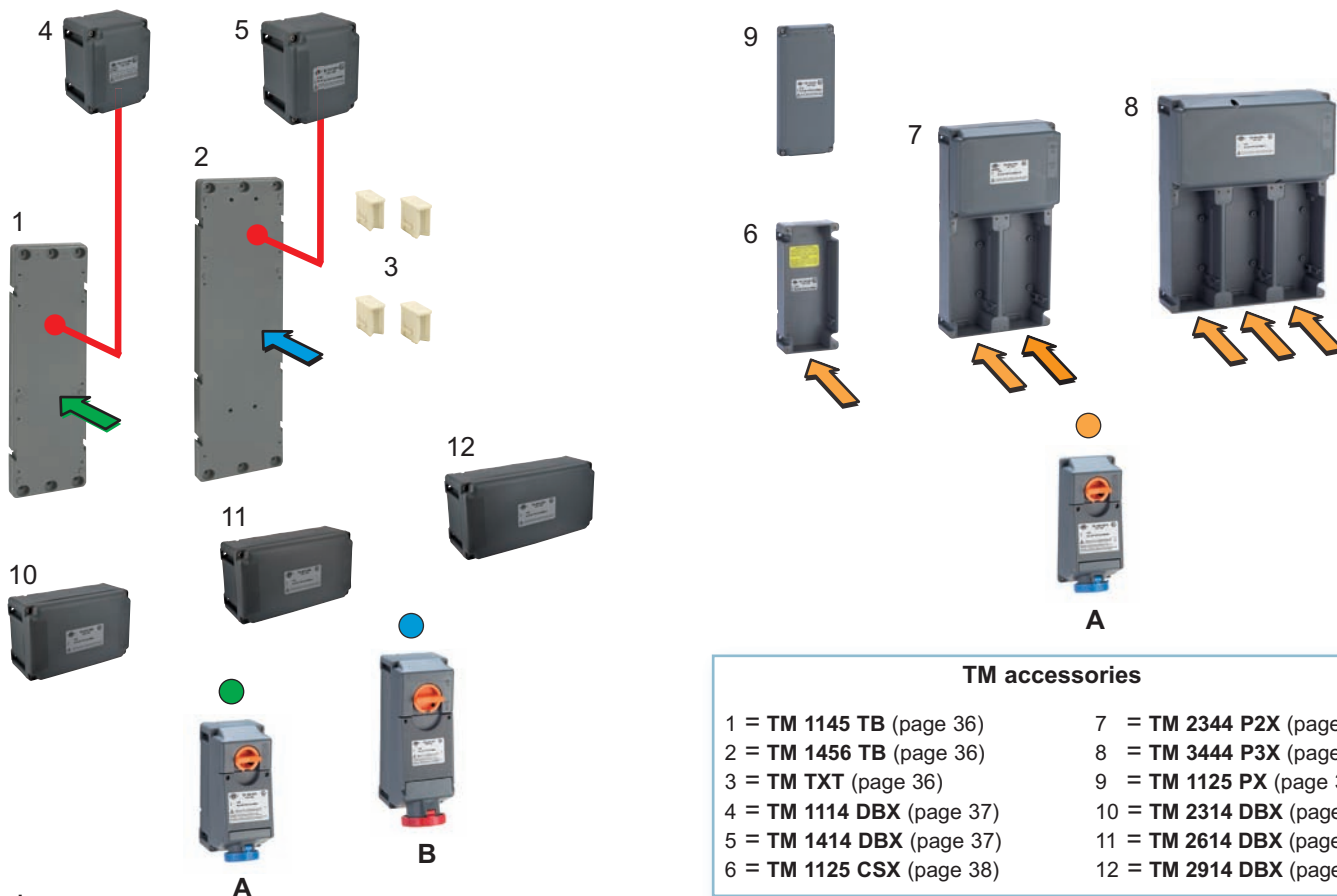


63A

16A / 32K

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

complementary parts for group mounting



TM accessories

- | | |
|---------------------------|----------------------------|
| 1 = TM 1145 TB (page 36) | 7 = TM 2344 P2X (page 38) |
| 2 = TM 1456 TB (page 36) | 8 = TM 3444 P3X (page 38) |
| 3 = TM TXT (page 36) | 9 = TM 1125 PX (page 39) |
| 4 = TM 1114 DBX (page 37) | 10 = TM 2314 DBX (page 37) |
| 5 = TM 1414 DBX (page 37) | 11 = TM 2614 DBX (page 37) |
| 6 = TM 1125 CSX (page 38) | 12 = TM 2914 DBX (page 37) |

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 (16A and 32K)
B = Socket-outlets with 370 x 144 mm fixing base (32A and 63A)

- Compliant with ATEX EN 60079-0 and EN 60079-31 (dusts)
- Compliant with EN 60309-1, -2 and -4
- Enclosures in insulating self-extinguishing thermoplastic material, RAL 7012 grey
- Mechanical resistance to impacts: 20 J (IK 10 as EN 62262)
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch with $I_{th} = 32A$ rating for 16A 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

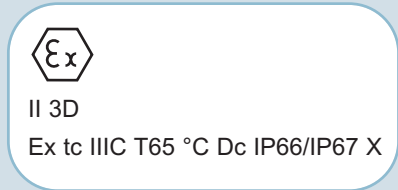
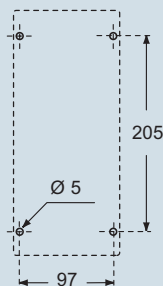
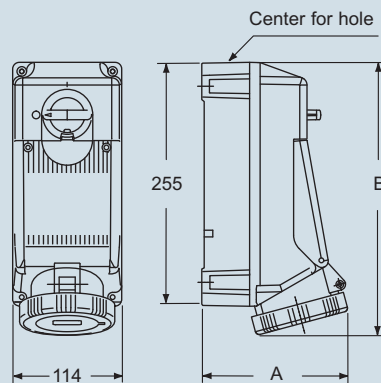
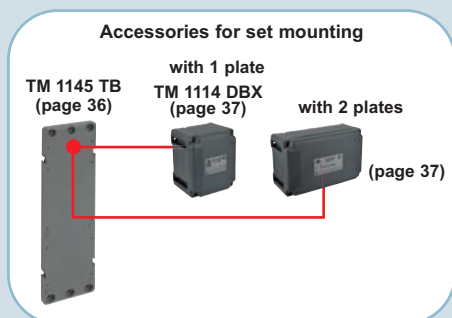
16A
IP66/IP67 degree of protection



Number of poles	Frequency Hz	Voltage V	Earthing contact position h	part No.	Colour
2P+⊕	50 and 60	200 ÷ 250	6	TM 1663 ISX	
3P+⊕	50 and 60	380 ÷ 415	6	TM 1664 ISX	
3P+N+⊕	50 and 60	200/346 ÷ 240/415	6	TM 1665 ISX	

Rated of socket part	Maximum operating current	Fuse carrier Type CH
16A	16A	10 x 38

dimensions in mm



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

dimensions shown are not binding and may be changed without notice

- Compliant with ATEX EN 60079-0 and EN 60079-31 (dusts)
- Compliant with EN 60309-1, -2 and -4
- Enclosures in insulating self-extinguishing thermoplastic material, RAL 7012 grey
- Mechanical resistance to impacts: 20 J (IK 10 as EN 62262)
- 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

32A IP66/IP67 degree of protection



63A IP66/IP67 degree of protection



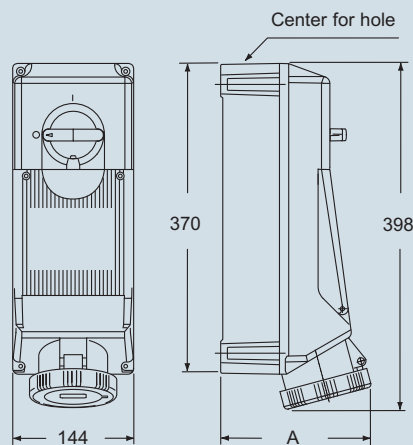
Number of poles	Frequency Hz	Voltage V	Earthing contact position h
2P+⊕	50 and 60	200 ÷ 250	6
3P+⊕	50 and 60	380 ÷ 415	6
3P+N+⊕	50 and 60	200/346 ÷ 240/415	6

part No.	Colour
TM 3263 ISX	
TM 3264 ISX	
TM 3265 ISX	

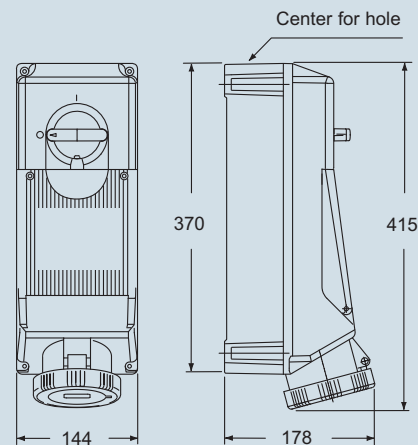
part No.	Colour
TM 6363 ISX	
TM 6364 ISX	
TM 6365 ISX	

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

dimensions in mm



dimensions in mm

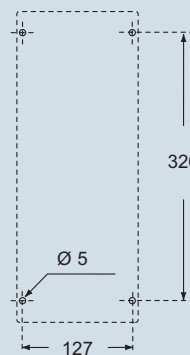
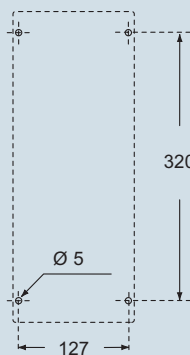


Accessories for set mounting

with 1 plate
 TM 1456 TB (page 36) TM 1414 DBX (page 37)

with 2 plates
 (page 37)

II 3D
 Ex tc IIIC T65 °C Dc IP66/IP67 X



Poles	A
2P+⊕	162
3P+⊕	162
3P+N+⊕	169

dimensions shown are not binding and may be changed without notice

- Compliant with ATEX EN 60079-0 and EN 60079-31 (dusts)
- Compliant with EN 60309-1, -2 and -4
- Enclosures in insulating self-extinguishing thermoplastic material, RAL 7012 grey
- Mechanical resistance to impacts: 20 J (IK 10 as EN 62262)
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch with I_{th} = 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

16A IP66/IP67 degree of protection



32A IP66/IP67 degree of protection



Number of poles	Frequency Hz	Voltage V	Earthing contact position h
2P+⊕	50 and 60	200 ÷ 250	6
3P+⊕	50 and 60	380 ÷ 415	6
3P+N+⊕	50 and 60	200/346 ÷ 240/415	6

part No.	Colour
TM 1663 SPX	
TM 1664 SPX	
TM 1665 SPX	

part No.	Colour
TM 3263KSPX	
TM 3264KSPX	
TM 3265KSPX	

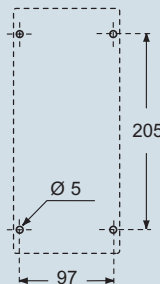
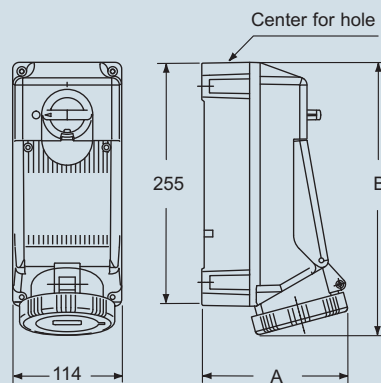
Accessories for set mounting

with 1 plate
 TM 1145 TB (page 36) TM 1114 DBX (page 37)

with 2 plates (page 37)

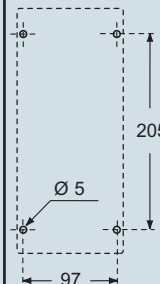
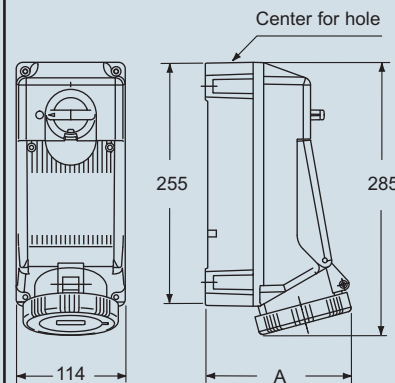
II 3D
 Ex tc IIIC T65 °C Dc IP66/IP67 X

dimensions in mm



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

dimensions in mm

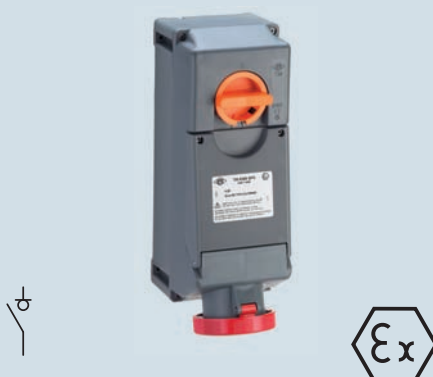


Poles	A
2P+⊕	146
3P+⊕	146
3P+N+⊕	151

dimensions shown are not binding and may be changed without notice

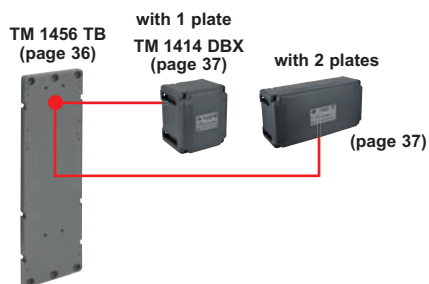
- Compliant with ATEX EN 60079-0 and EN 60079-31 (dusts)
- Compliant with EN 60309-1, -2 and -4
- Enclosures in insulating self-extinguishing thermoplastic material, RAL 7012 grey
- Mechanical resistance to impacts: 20 J (IK 10 as EN 62262)
- Socket-outlets with bayonet fastening cover
- 63A types with 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 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

63A IP66/IP67 degree of protection



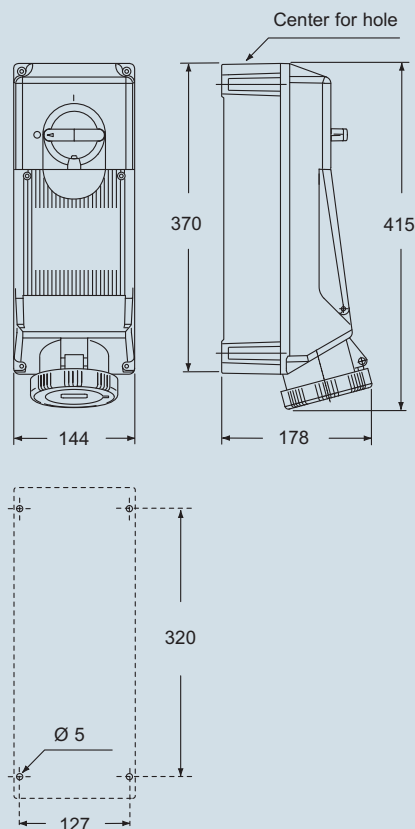
Number of poles	Frequency Hz	Voltage V	Earthing contact position h	part No.	Colour
2P+⊕	50 and 60	200 ÷ 250	6	TM 6363 SPX	
3P+⊕	50 and 60	380 ÷ 415	6	TM 6364 SPX	
3P+N+⊕	50 and 60	200/346 ÷ 240/415	6	TM 6365 SPX	

Accessories for set mounting



II 3D
Ex tc IIIC T65 °C Dc IP66/IP67 X

dimensions in mm



dimensions shown are not binding
and may be changed without notice

- Compliant with ATEX EN 60079-0 and EN 60079-31 (dusts)
- Compliant with EN 60309-1, -2 and -4
- Enclosures in insulating self-extinguishing thermoplastic material, RAL 7012 grey
- Mechanical resistance to impacts: 20 J (IK 10 as EN 62262)
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- "Zeta" switch with $I_{th} = 32A$ rating for 16A 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

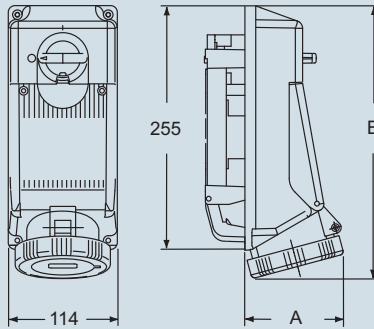
16A
IP66/IP67 degree of protection



Number of poles	Frequency Hz	Voltage V	Earthing contact position h	part No.	Colour
2P+⊕	50 and 60	200 ÷ 250	6	TM 1663 SISX	
3P+⊕	50 and 60	380 ÷ 415	6	TM 1664 SISX	
3P+N+⊕	50 and 60	200/346 ÷ 240/415	6	TM 1665 SISX	

Rated of socket part	Maximum operating current	Fuse carrier Type CH
16A	16A	10 x 38

dimensions in mm



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

Accessories for set mounting



TM 1125 CSX (page 38)

TM 2344 P2X (page 38)



TM 3444 P3X (page 38)



II 3D
Ex tc IIIC T65 °C Dc IP66/IP67 U X

dimensions shown are not binding and may be changed without notice

TM.. SSPX/KSSPX interlocked socket-outlets without base box



- Compliant with ATEX EN 60079-0 and EN 60079-31 (dusts)
- Compliant with EN 60309-1, -2 and -4
- Enclosures in insulating self-extinguishing thermoplastic material, RAL 7012 grey
- Mechanical resistance to impacts: 20 J (IK 10 as EN 62262)
- Socket-outlets with bayonet fastening cover
- Factory installed internal wiring
- Cable entry with drilling template
- "Zeta" switch with I_{th} = 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

16A IP66/IP67 degree of protection

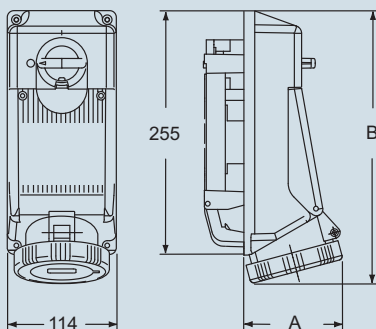


32A IP66/IP67 degree of protection



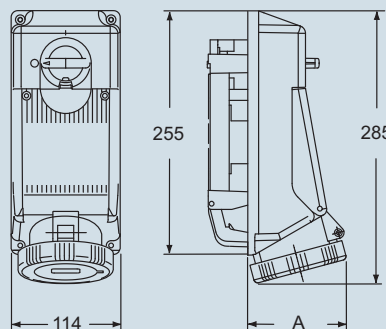
Number of poles	Frequency Hz	Voltage V	Earthing contact position h	part No.	Colour	part No.	Colour
2P+⊕	50 and 60	200 ÷ 250	6	TM 1663 SSPX		TM 3263KSSPX	
3P+⊕	50 and 60	380 ÷ 415	6	TM 1664 SSPX		TM 3264KSSPX	
3P+N+⊕	50 and 60	200/346 ÷ 240/415	6	TM 1665 SSPX		TM 3265KSSPX	

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

Accessories for set mounting



TM 1125 CSX
(page 38)

TM 2344 P2X
(page 38)



TM 3444 P3X
(page 38)



II 3D
Ex tc IIIC T65 °C Dc IP66/IP67 U X

dimensions shown are not binding
and may be changed without notice

PEW...SVX coupler plugs, low voltage from over 50V up to 690V



- Compliant with ATEX EN 60079-0 and EN 60079-31 (dusts)
- Temperature range: from -40 °C to +100 °C
- Compliant with EN 60309-1 and -2
- Enclosure, insert and locking ring in insulating, thermoplastic, self-extinguishing material
- PEW...SVX types (IP66/IP67), entry with cable gland colour coded according to the operating voltage, RAL 7012 grey enclosure, locking ring with gasket colour coded according to the operating voltage
- Terminals with retained screws
- Stainless steel insert fixing screws
- Nickel-plated contacts as standard
- IP66/IP67 degrees of protection (EN 60529)

16A IP66/IP67 degrees of protection



32A IP66/IP67 degrees of protection

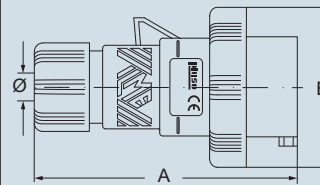


Number of poles	Frequency Hz	Voltage V	Earthing contact position h	part No.	Colour	part No.	Colour
2P+⊕	50 and 60	200 ÷ 250	6	PEW 1663 SVX		PEW 3263 SVX	
3P+⊕	50 and 60	380 ÷ 415	6	PEW 1664 SVX		PEW 3264 SVX	
3P+N+⊕	50 and 60	200/346 ÷ 240/415	6	PEW 1665 SVX		PEW 3265 SVX	

II 3D
Ex tc IIIC T60 °C Dc
IP66/IP67 X

dimensions in mm

(16 / 32A) PEW ... SVX



PEW...SVX	A	B	ø min	ø max
16A 2P+⊕	129	70	7	16
3P+⊕	129	77	7	16
3P+N+⊕	129	86	8	24
32A 2P+⊕	150	92	8	24
3P+⊕	150	92	8	24
3P+N+⊕	150	100	8	24

dimensions shown are not binding
and may be changed without notice

63A
IP66/IP67 degrees of protection



part No.	Colour
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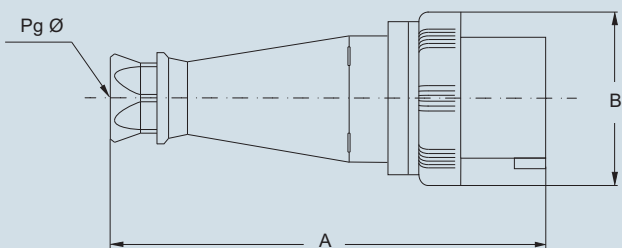
PEW 6363 SVX	
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PEW 6364 SVX	
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PEW 6365 SVX	
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dimensions in mm

(63A) PEW ... SVX

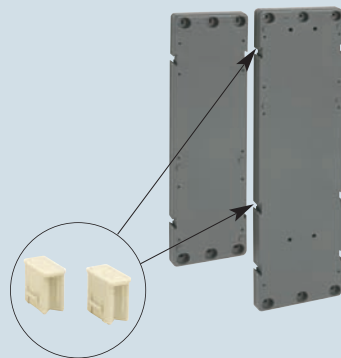


PEW...SVX	A	B	Pg ø
63A 2P+⊕	264,5	112	36
3P+⊕	264,5	112	36
3P+N+⊕	264,5	112	36

dimensions shown are not binding
 and may be changed without 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 RAL 7012 grey
- Plates with fixing plugs and fixing screws for socket-outlets

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



description

part No.

Plates with fixing plugs

- Small (115 x 450 x 30 mm) ¹⁾
- Large (145 x 565 x 30 mm) ²⁾

TM 1145 TB
TM 1456 TB

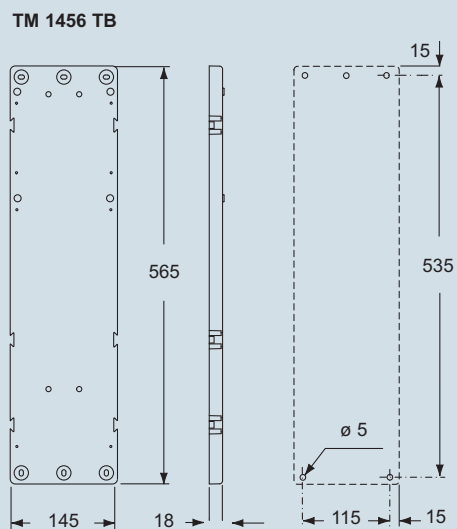
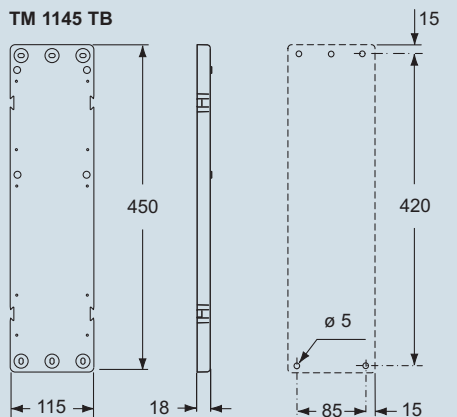
Fixing plugs for plates

TM TXT

Legend

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

dimensions in mm



dimensions shown are not binding
and may be changed without notice

- Compliant with ATEX EN 60079-0, EN 60079-15 (gases) and EN 60079-31 (dusts)
- Compliant with international standard IEC 60670 (Italian standard CEI 23-48)
- In insulating self-extinguishing thermoplastic material RAL 7012 grey
- Mechanical resistance to impacts: 20 J (IK 10 as EN 62262)
- 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
- Supplied complete with union nipples

Junction boxes - IP66/IP67



Junction boxes - IP66/IP67



description

part No.

part No.

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

TM 1114 DBX
TM 1414 DBX

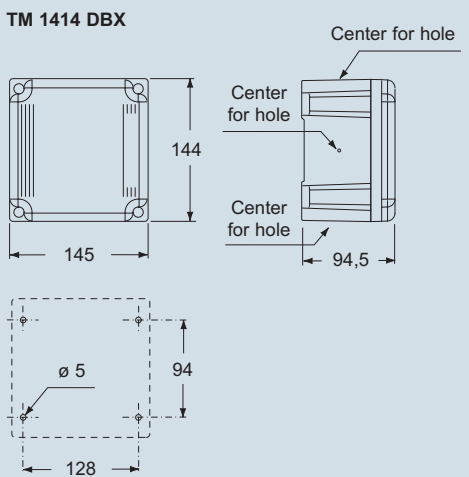
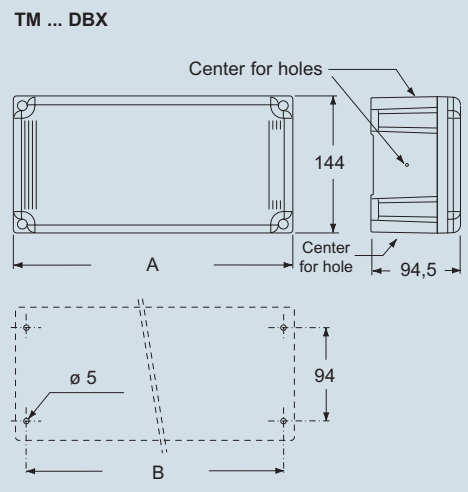
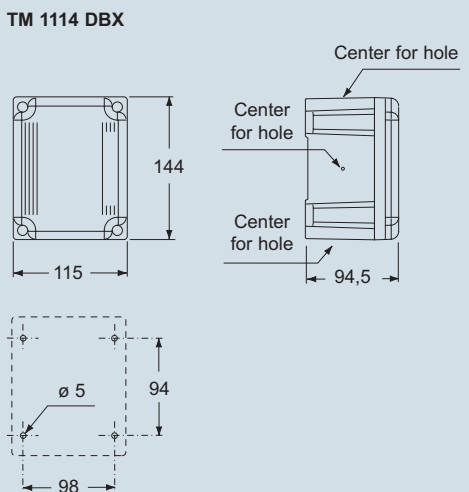
For 2 TM 1145 TB plates
- IP66/67 degree of protection (EN 60529)
For 1 TM 1145 TB plate + 1 TM 1456 TB plate
- IP66/67 degree of protection (EN 60529)
For 2 TM 1456 TB plates
- IP66/67 degree of protection (EN 60529)

TM 2314 DBX
TM 2614 DBX
TM 2914 DBX

dimensions in mm

dimensions in mm

II 3GD
Ex nA IIC 65 °C (T6) Gc U X
Ex tc IIIC T65 °C Dc IP66/IP67 U X



part No.	A	B
TM 2314 DBX	230	213
TM 2614 DBX	260	243
TM 2914 DBX	290	273

dimensions shown are not binding and may be changed without notice

- Compliant with ATEX EN 60079-0 and EN 60079-31 (dusts)
- Compliant with international standard IEC 60670 (Italian standard CEI 23-48)
- Boxes in insulating self-extinguishing thermoplastic RAL 7012 grey
- Mechanical resistance to impacts: 20 J (IK 10 as EN 62262)
- 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 (EN 60529)
- For TM socket-outlets without box, 114x255 mm

Single box



double and triple boxes with covers to close compartment

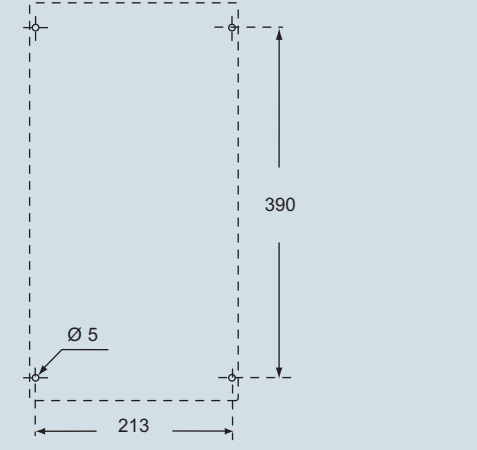


description	part No.	part No.
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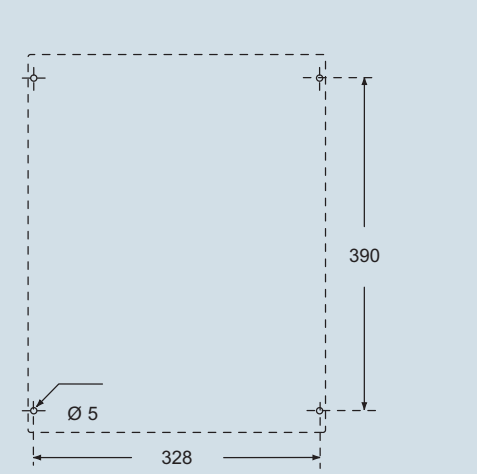
Single box Box with covers to close compartments Double box Triple box Suitable for the assembly of DIN-rails and bases	TM 1125 CSX	TM 2344 P2X TM 3444 P3X
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Panel cut-out in mm

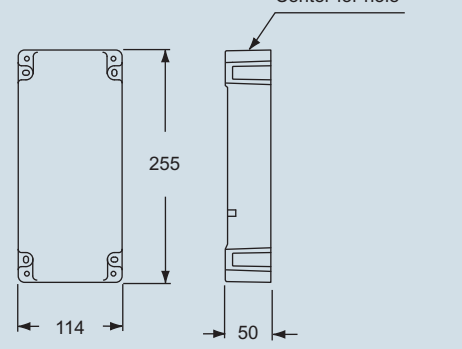
TM 2344 P2X



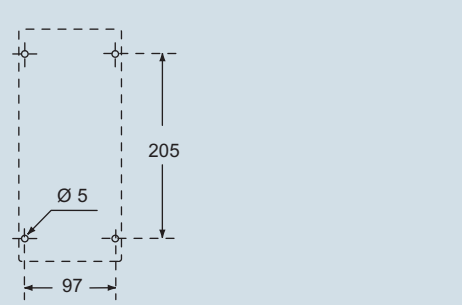
TM 3444 P3X



dimensions in mm



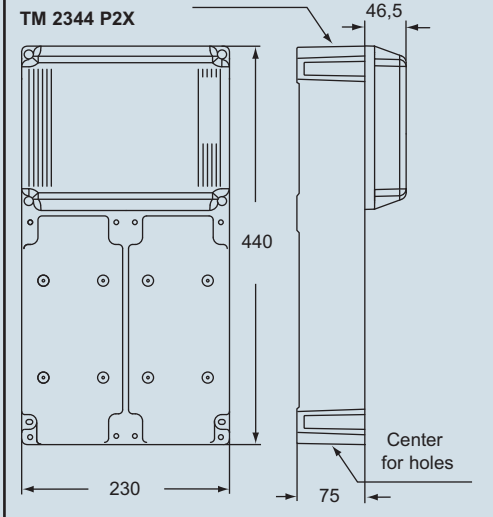
Panel cut-out in mm



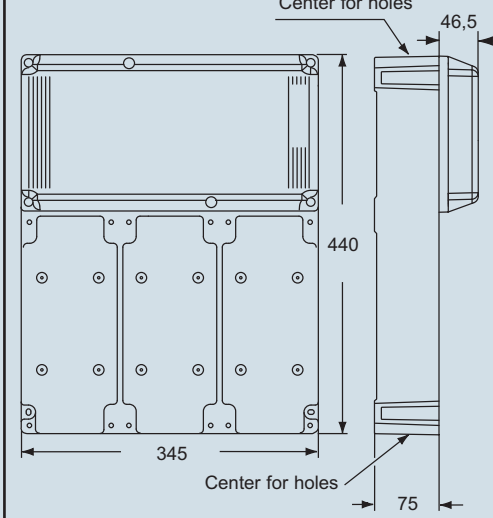
Smooth cover
 For double box
 For triple box
 Closes the upper section of the boxes
 Supplied with sized DIN-rail EN 60715 TH 35-7,5

II 3D
 Ex tc IIIC T65 °C Dc IP66/IP67 U X

dimensions in mm



TM 3444 P3X



dimensions shown are not binding and may be changed without notice

- Compliant with ATEX EN 60079-0 and EN 60079-31 (dusts)
- Compliant with international standard IEC 60670 (Italian standard CEI 23-48)
- Covers in insulating self-extinguishing thermoplastic RAL 7012 grey
- Mechanical resistance to impacts: 20 J (IK 10 as EN 62262)
- Stainless steel retained fixing screws
- External metallic parts (pins, springs, etc.) in stainless steel
- Oil resistant and anti-aging soft rubber gaskets
- The covers mounted on the boxes guarantee the compliance with IP66/IP67 degree of protection requirements (EN 60529)

Cover with closing plates for boxes unused compartments



description

part No.

Smooth cover
for closing unused spaces or as support
for accessories outside the box

TM 1125 PX

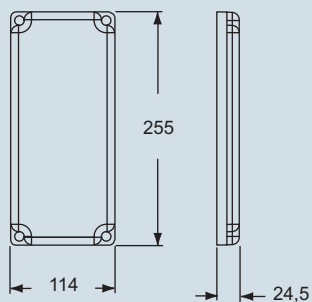


II 3D

Ex tc IIIC T65 °C Dc IP66/IP67 U X

dimensions in mm

TM 1125 PX



dimensions shown are not binding
and may be changed without notice

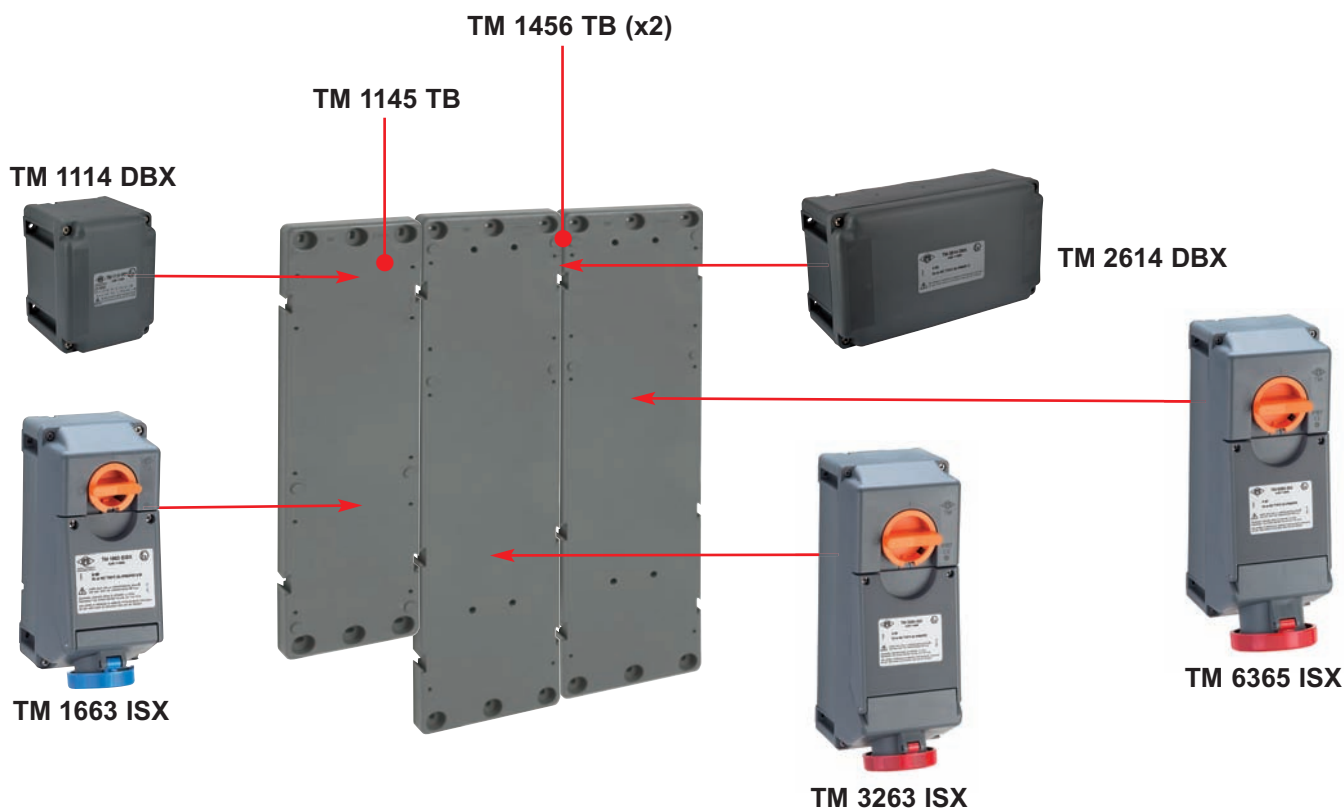
Example box for 3 sockets with interlocked switched and base fuse carrier, composed:

- 1 socket 16A 250V 2P+⊕
- 1 socket 16A 400V 3P+⊕
- 1 socket 16A 400V 3P+N+⊕



Example battery for 3 sockets with interlocked switched and base fuse carrier, composed:

- 1 socket 16A 250V 2P+⊕
- 1 socket 32A 400V 3P+⊕
- 1 socket 63A 400V 3P+N+⊕



- Protection degree in accordance with (EN 60529) IP66/IP68, 5 bar 30 min
- Temperature range: -40 °C / +75 °C
- Metric threading in accordance with EN 60423 and EN 50262
- In thermoplastic material

complete insulating cable gland



description

part No.

threading

- for Ø 10,0 - 17,0 mm cables
- for Ø 13,0 - 21,0 mm cables
- for Ø 17,0 - 28,0 mm cables
- for Ø 23,0 - 35,0 mm cables

AW M25INX
AW M32INX
AW M40INX
AW M50INX

M 25
M 32
M 40
M 50

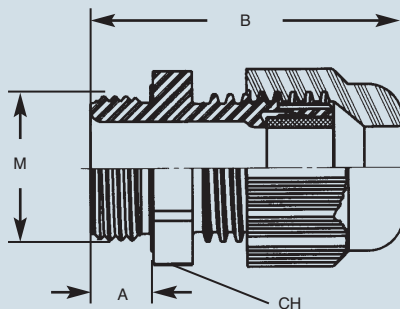


II 2 G Ex e IIC Gb



II 2 D Ex tb IIIC Db IP68

dimensions in mm

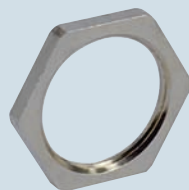


AW M..INX	A	B min	B max	CH
25	10,0	38,0	47,0	29,0
32	12,0	42,0	51,0	36,0
40	12,0	52,0	65,0	46,0
50	14,0	59,0	72,0	55,0

dimensions shown are not binding
and may be changed without notice

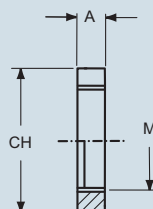
- Metric threading in accordance with EN 60423 and EN 50262

lock nuts in nickel-plated brass



description	part No.	threading
- for M 25 threading	AW M25NX	M 25
- for M 32 threading	AW M32NX	M 32
- for M 40 threading	AW M40NX	M 40
- for M 50 threading	AW M50NX	M 50

dimensions in mm



Part No.	A	CH
AS M25NX	11	8
AS M32NX	13,5	10
AS M40NX	14	10
AS M50NX	17	12

dimensions shown are not binding
and may be changed without notice



Part No.	page
AW M25INX	41
AW M32INX	41
AW M40INX	41
AW M50INX	41
AW M25NX	42
AW M32NX	42
AW M40NX	42
AW M50NX	42
PEW 1663 SVX.....	34
PEW 1664 SVX.....	34
PEW 1665 SVX.....	34
PEW 3263 SVX.....	34
PEW 3264 SVX.....	34
PEW 3265 SVX.....	34
PEW 6363 SVX.....	35
PEW 6364 SVX.....	35
PEW 6365 SVX.....	35
TM 1114 DBX	37
TM 1125 CSX	38
TM 1125 PX.....	39
TM 1145 TB.....	36
TM 1414 DBX	37
TM 1456 TB.....	36
TM 1663 ISX	28
TM 1663 SISX.....	32
TM 1663 SPX	30
TM 1663 SSPX	33
TM 1664 ISX	28
TM 1664 SISX.....	32
TM 1664 SPX	30
TM 1664 SSPX	33
TM 1665 ISX	28
TM 1665 SISX.....	32
TM 1665 SPX	30
TM 1665 SSPX	33
TM 2314 DBX	37
TM 2344 P2X	38
TM 2614 DBX	37
TM 2914 DBX	37
TM 3263 ISX.....	29
TM 3263KSPX.....	30
TM 3263KSSPX	33
TM 3264 ISX	29
TM 3264KSPX.....	30
TM 3264KSSPX	33
TM 3265 ISX.....	29
TM 3265KSPX.....	30
TM 3265KSSPX	33
TM 3444 P3X	38
TM 6363 ISX	29
TM 6363 SPX	31
TM 6364 ISX	29
TM 6364 SPX	31
TM 6365 ISX	29
TM 6365 SPX	31
TM TXT	36

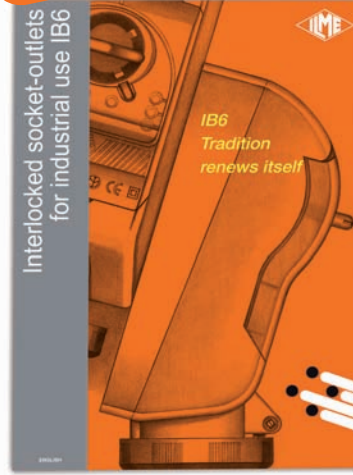
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PES - Squich® connection
a timesaver

NEW



IB6 - Tradizion
renews itself

NEW



TM ATEX - Potentially
explosive
atmospheres



TM

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www.ilme.com

Sales organization

Head office

I.L.M.E. SpA
via Marco Antonio Colonna, 9
20149 Milano - Italy
☎ +39 02345605.22 - fax +39 0233105813
www.ilme.com

France

ILME FRANCE S.A.R.L.
Rue Roland Garros - BP 125
Parc d'Activités de l'Aéroport
42163 Andrézieux-Bouthéon
☎ +33 (0) 4 77 36 23 36 - fax +33 (0) 4 77 36 97 97
e-mail: ilme-france@ilme.fr - www.ilme.fr

Germany

ILME GmbH
Max-Planck-Straße 12 - 51674 Wiehl
☎ +49 (0)2261 - 7955-0
fax +49 (0)2261 - 7955-5 (Auftragsannahme) - +49 (0)2261 - 7955-9 (Vertrieb)
e-mail: technik@ilme.de - www.ilme.de

United Kingdom

ILME UK LIMITED
50 Evans Road, Venture Point
Speke, Merseyside L24 9PB
☎ +44 (0) 151 3369321 - fax +44 (0) 151 3369326
e-mail: sales@ilmeuk.co.uk - www.ilmeuk.co.uk

Sweden and Nordic countries

ILME NORDIC AB
Transportvägen 18
24642 Löddeköpinge (Sweden)
☎ +46 46 18 28 00 - fax +46 46 18 28 10
e-mail: info@ilme.se - www.ilme.se

Japan

ILME JAPAN CO., LTD.
Kobe International Business Center 511 - 650-0047, 5-2, 5 - Chome,
Minatojima Minami-Machi - Chuo-Ku, Kobe Japan
☎ +81 7830 22005 - fax +81 7830 22060
www.ilme.jp

China

ILME CHINA REP. OFFICE
Room 201 Universal Centre, no. 175 XiangYan NanLu, - 200031 Shanghai
☎ +86 - 21 - 62489961 - fax +86 - 21 - 62489961
www.ilmechina.com

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