E-kabin®

EAE
ELEKTROTEKNİK

# E-KABİN X SERIES

STAINLESS STEEL ELECTRICAL ENCLOSURES

STAINLESS STEEL ELECTRICAL ENCLOSURES

www.eaeelektroteknik.com

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# XS SERIE INTRODUCTION

## XS Serie Stainless Steel, Modular, Indoor, Floor Standing Enclosures

E-Kabin XS Serie modular floor standing enclosures are designed for indoor electrical applications. Their simple design provides functionality and economic solution for various applications. They have an extensible structure for multiple combinations.

| | |
|---|---|
| Application | : Indoor |
| Protection class | : IP55 |
| Environment class | : Acc. to EN 60721-3-3 IE33 |
| Standards | : IEC 61439-1<br>IEC 62208<br>IEC 60529<br>IEC 62262 |
| Material | : 304 grade stainless steel<br>- standard<br>316 grade stainless steel<br>- optional |

# XS SERIE FEATURES

## Clean and Smooth Surface

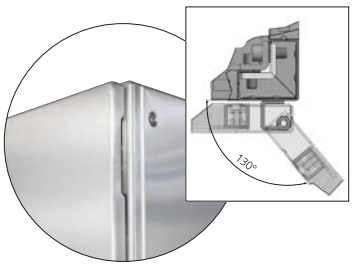
Production process is free from welded stud marks. In this way clean and smooth surface appearance is provided.

## IP55 Gasket Protection

Foam-in-place gasket behind the door does not lose its elasticity in time and provides protection against dust and water.


## Stainless Steel Lock

316 grade stainless steel lock.




## Robust Hidden Hinge

As standard 3 pcs. door hinge which is 3mm thick and 316 grade stainless steel, is designed in such a way that it is not visible from outside of the door. Thanks to this hinge the door can be opened up to 130°.

## E-Kabin Interior Accessories

All E-Kabin interior accessories such as mounting rails, mounting plates, cover plates etc, can also be used in stainless steel products.

## Useful Plinth

It's possible to increase enclosure height by mounting one more extra modular plinth on top of existing one.

# XS SERIE DIMENSIONS

| XS Serie Dimensions | | |
|---|---|---|
| **Height** | **Width** | **Depth** |
| 1400 | 400 | 400 |
| 1600 | 500 | 500 |
| 1800 | 600 | 600 |
| 2000 | 700 | 700 |
| 2200 | 800 | 800 |

**304/316**

304 grade stainless steel is standard.
Optionally, 316 grade stainless steel is available

**INOX / PLASTIC LOCK**

Standard lock is plastic.
Optionally 316 or 304 grade stainless steel lock is available.

**INTERIOR ACCESSORIES**

All E-Kabin interior accessories can also be used in stainless steel products.

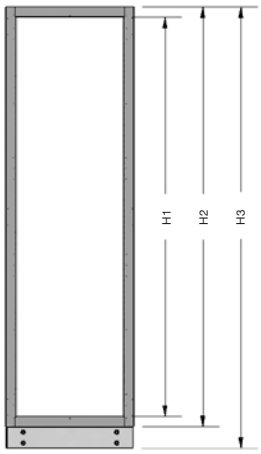
**MODIFICATION POSSIBILITIES ON STANDARD DESIGN**

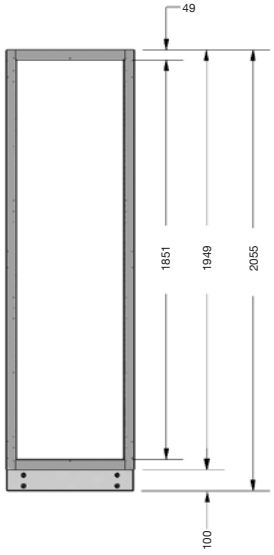
* Different dimensions (Based on standard product design)
* Different material thickness
* Hole processing

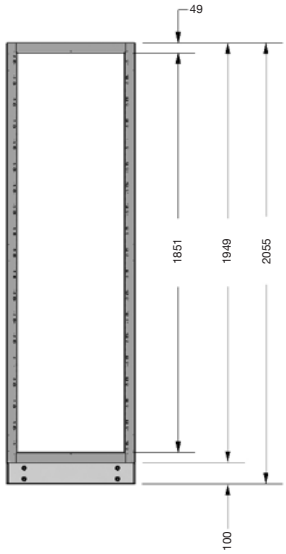
**OPTIONAL PAINTING**

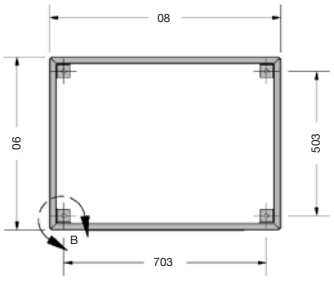
Optional, powder coating in any desired RAL colour codes or lacquer coating.

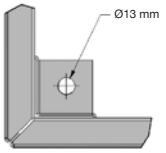
# XS SERIE DIMENSIONS



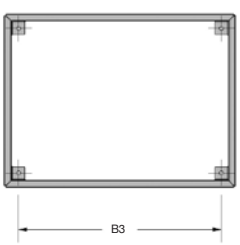



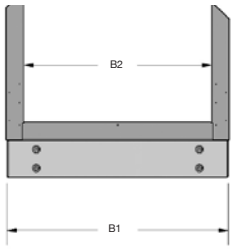



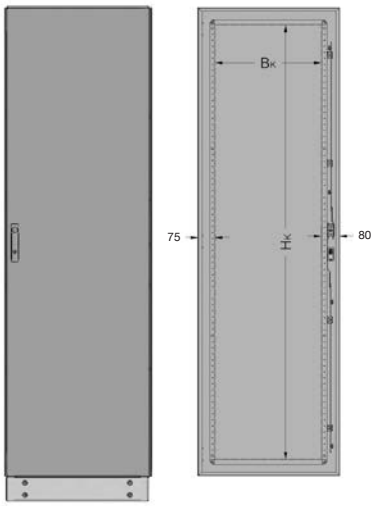




| Net Dimensions | Enclosure rated height | | |
|---|---|---|---|
| | 18 | 20 | 22 |
| H1 | 1749 mm | 1949 mm | 2149 mm |
| H2 | 1651 mm | 1851 mm | 2051 mm |
| H3 | 1855 mm | 2055 mm | 2255 mm |




| Net Dimensions | Enclosure rated width or depth | | | | |
|---|---|---|---|---|---|
| | 04 | 05 | 06 | 07 | 08 |
| B1 | 396 mm | 496 mm | 596 mm | 696 mm | 796 mm |
| B2 | 301 mm | 401 mm | 501 mm | 601 mm | 701 mm |
| B3 | 303 mm | 403 mm | 503 mm | 603 mm | 703 mm |




**Front door usage area height (Hk)**

| Dimension/$H_K$ | ES OK 18 | ES OK 20 | ES OK 22 |
|---|---|---|---|
| Net Dimension | 1610 mm | 1810 mm | 2010 mm |

**Front door usage area width (Bk)**

| Dimensions/$B_K$ | 03 | 04 | 05 | 06 | 07 | 08 |
|---|---|---|---|---|---|---|
| Net Dimension | 145 mm | 245 mm | 345 mm | 445 mm | 545 mm | 645 mm |

# XH SERIE INTRODUCTION

## XH Serie Stainless Steel, Modular, Outdoor, Floor Standing Electrical Enclosures

E-Kabin XH Serie Electrical Enclosures are designed for general purpose outdoor electrical applications. They have an extensible structure for multiple combinations.

| | |
|---|---|
| Application | : Outdoor |
| Protection class | : IP55 |
| Environment class | : According to -EN60721 - 3 - 3 IE37 |
| Standards | : IEC 61439-1<br>IEC 62208<br>IEC 60529<br>IEC 62262 |
| Material | : 304 grade stainless steel - standard<br>316 grade stainless steel - optional |
| Lock Set | : Stainless steel - standard |

# XH SERIE FEATURES

## Aesthetic Look

Modern exterior outlines, combined with internally accessible side and back panel connections clean surface treatment, provide aesthetic appearance.

## Modular Design-side-by-side Expandability

Thanks to modular design of framework and roof, expanding side by side is possible to form large combinations.

## Optional Eyebolts

Optional eyebolts enable fully loaded enclosure to be lifted up and carried for installation purposes.

## IP55 Gasket Protection

Foam-in-place gasket behind the door does not loose its elasticity in time and provides protection against dust and water.

## Under Canopy Fan Unit

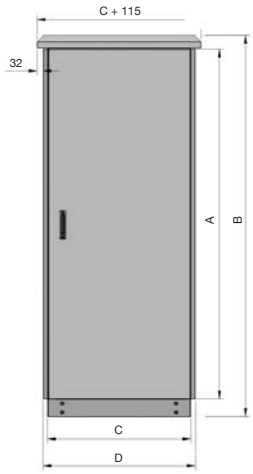
"Under Canopy Fan Unit" is accessible from inside the enclosure for easy service and maintenance.


## Stainless Steel Lock

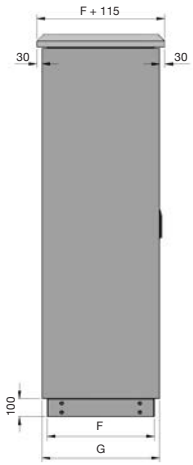
316 grade stainless steel lock is included in standard supply content.

# XH SERIE DIMENSIONS

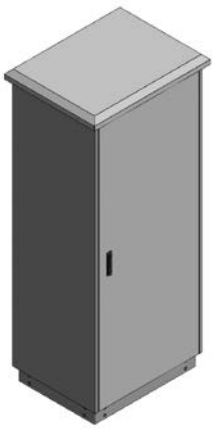
| ENCLOSURE RATED HEIGHT | A DIMENSION BODY HEIGHT | B DIMENSION EXTERNAL HEIGHT (A+180 mm) |
|---|---|---|
| 14-1400 | 1350 | 1530 |
| 16-1600 | 1550 | 1730 |
| 18-1800 | 1750 | 1930 |
| 20-2000 | 1950 | 2130 |
| 22-2200 | 2150 | 2330 |



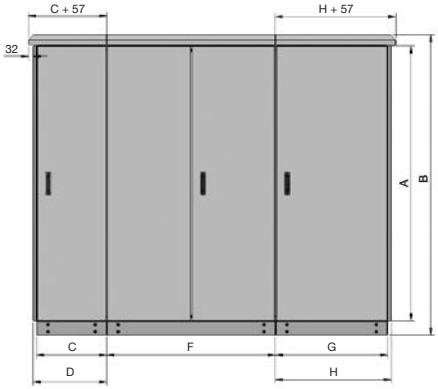

| ENCLOSURE RATED WIDTH | C DIMENSION BODY WIDTH | D DIMENSION ENCLOSURE WIDTH SIDE PANELS INCLUDED (C+50 mm) |
|---|---|---|
| 04-400 mm | 400 | 450 |
| 05-500 mm | 500 | 550 |
| 06-600 mm | 600 | 650 |
| 08-800 mm | 800 | 850 |
| 10-1000 mm | 1000 | 1050 |
| 12-1200 mm | 1200 | 1250 |

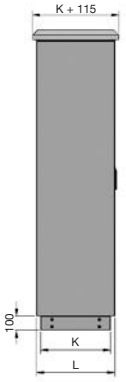


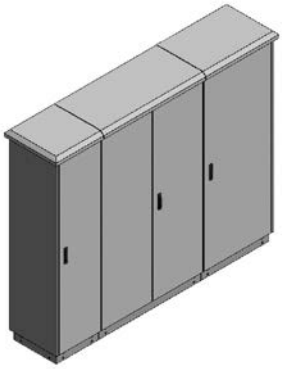

| ENCLOSURE RATED DEPTH | F DIMENSION BODY DEPTH | G DIMENSION ENCLOSURE DEPTH FRONT-REAR PANELS INCLUDED (F+55 mm) |
|---|---|---|
| 04-400 mm | 400 | 455 |
| 05-500 mm | 500 | 555 |
| 06-600 mm | 600 | 655 |
| 08-800 mm | 800 | 855 |



# XH SERIE DIMENSIONS

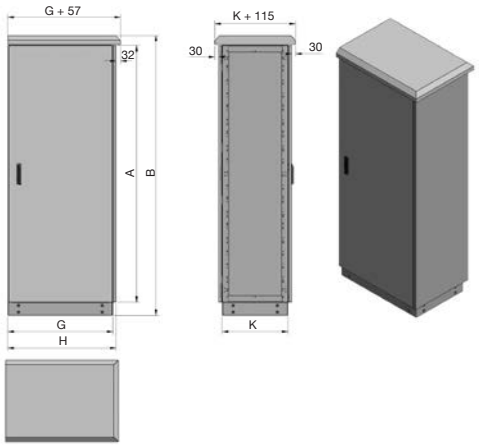


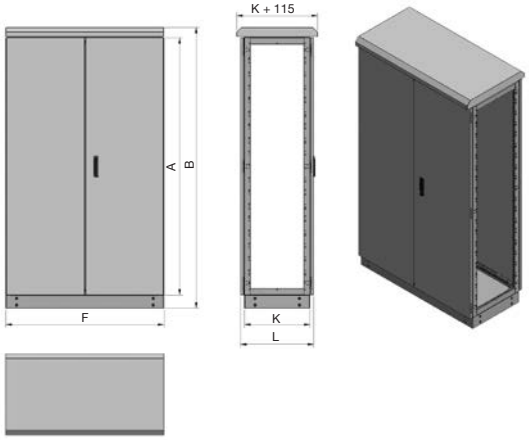




*Optional eyebolts dimensions.*

## Side Enclosure




## Middle Enclosure




| ENCLOSURE RATED HEIGHT | A DIMENSION BODY HEIGHT | B DIMENSION EXTERNAL HEIGHT (A+180 mm) |
|---|---|---|
| 14-1400 | 1350 | 1530 |
| 16-1600 | 1550 | 1730 |
| 18-1800 | 1750 | 1930 |
| 20-2000 | 1950 | 2130 |
| 22-2200 | 2150 | 2330 |

| ENCLOSURE RATED DEPTH | K DIMENSION BODY DEPTH | L DIMENSION ENCLOSURE DEPTH FRONT-REAR PANELS INCLUDED (K+55 mm) |
|---|---|---|
| 04-400 mm | 400 | 455 |
| 05-500 mm | 500 | 555 |
| 06-600 mm | 600 | 655 |
| 08-800 mm | 800 | 855 |

| ENCLOSURE RATED WIDTH | C DIMENSION BODY WIDTH | D DIMENSION ENCLOSURE WIDTH SIDE PANELS INCLUDED (C+25 mm) | F DIMENSION BODY WIDTH | G DIMENSION BODY WIDTH | H DIMENSION ENCLOSURE WIDTH SIDE PANELS INCLUDED (G+25 mm) |
|---|---|---|---|---|---|
| 04-400 mm | 400 | 425 | 400 | 400 | 425 |
| 05-500 mm | 500 | 525 | 500 | 500 | 525 |
| 06-600 mm | 600 | 625 | 600 | 600 | 625 |
| 08-800 mm | 800 | 825 | 800 | 800 | 825 |
| 10-1000 mm | 1000 | 1025 | 1000 | 1000 | 1025 |
| 12-1200 mm | 1200 | 1225 | 1200 | 1200 | 1225 |

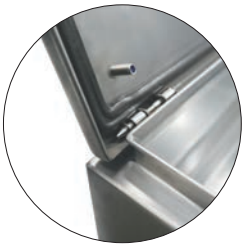
# XM SERIE INTRODUCTION

## XM Series Stainless Steel Monoblock, Indoor - Outdoor, Wall Mounted Electrical Enclosures

E-Kabin XM Serie electrical enclosures are designed for general purpose electrical applications. Clean and smooth surface appearance has been provided for welded surfaces.

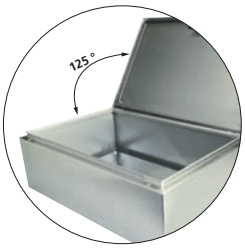
| | |
|---|---|
| Application | : Indoor, Outdoor |
| Protection class | : IP 66 |
| Installation Type | : Wall Mounted |
| Standards | : IEC 61439-1, IEC 62208<br>IEC 60529, IEC 62262 |
| Environment class | : According to -EN60721- 3-3 IE37 |
| Material | : 304 and 316 grade stainless steel standard |
| Lock Set | : Plastic - Standard<br>Stainless steel - Optional |

# XM SERIE FEATURES



## Polyurethane Gasket

Foam-in-place gasket, does not lose its elasticity over time and provides protection against dust and water.




## Stainless Steel Hinge

Thanks to stainles steel hinge the door can be opened up to 125° angle. This feature provides comfortable access into the enclosure.

## Optional Stainless Steel Bracket

With bracket set enclosure mounting on the wall can be done easily and quickly. Thanks to 90° swivel feature of the bracket, it's positioning can be chosen either horizontally or vertically. Bracket set is not included in standard supply contents, it should be ordered separately.

## Asymmetrical Canopy

It allows the use of bracket for wall mounting. Thanks to their reverse angle edge design above door threshold, rain water flows out of the enclosure.

## Optional Stainless Steel Lock

Instead of plastic lock, which has high chemical resistance, optionally 316 grade stainless steel lock can be used. Installed 316 grade lock do not exceed the door level.

# XM SERIE ORDER CODES

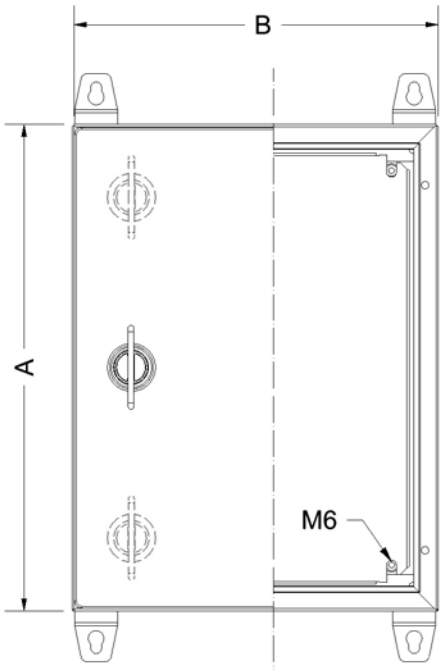
| XM SERIES STAINLESS STEEL MONOBLOCK ENCLOSURE | | | | | |
|---|---|---|---|---|---|
| **HEIGHT (A)** | **WIDTH (B)** | **DEPTH (C)** | **ORDER CODES (304)** | **ORDER CODES (316)** | **NUMBER of LOCK** |
| 400 | 300 | 200 | XM 40 30 20 D 304 | XM 40 30 20 D 316 | 1 |
| 400 | 600 | 200 | XM 40 60 20 D 304 | XM 40 60 20 D 316 | 1 |
| 500 | 400 | 200 | XM 50 40 20 D 304 | XM 50 40 20 D 316 | 1 |
| 600 | 400 | 200 | XM 60 40 20 D 304 | XM 60 40 20 D 316 | 1 |
| 600 | 600 | 300 | XM 60 60 30 D 304 | XM 60 60 30 D 316 | 1 |
| 700 | 500 | 200 | XM 70 50 20 D 304 | XM 70 50 20 D 316 | 1 |
| 700 | 500 | 300 | XM 70 50 30 D 304 | XM 70 50 30 D 316 | 1 |
| 800 | 600 | 200 | XM 80 60 20 D 304 | XM 80 60 20 D 316 | 2 |
| 800 | 600 | 300 | XM 80 60 30 D 304 | XM 80 60 30 D 316 | 2 |
| 800 | 800 | 200 | XM 80 80 20 D 304 | XM 80 80 20 D 316 | 2 |
| 1000 | 600 | 200 | XM 100 60 20 D 304 | XM 100 60 20 D 316 | 2 |
| 1000 | 600 | 300 | XM 100 60 30 D 304 | XM 100 60 30 D 316 | 2 |
| 1000 | 800 | 200 | XM 100 80 20 D 304 | XM 100 80 20 D 316 | 2 |
| 1200 | 600 | 300 | XM 120 60 30 D 304 | XM 120 60 30 D 316 | 2 |

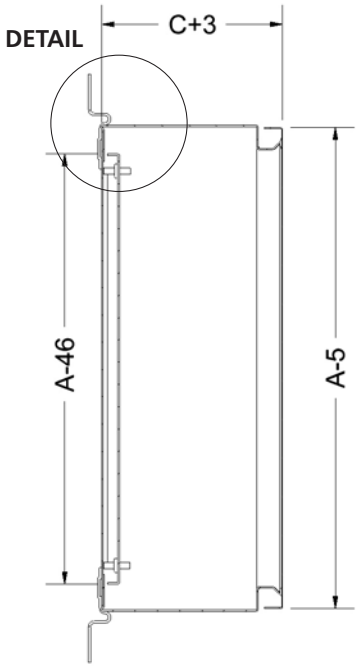
**Note:** Standard lock is plastic. If stainless steel lock is requested, please indicate it in your purchase order. Mounting plate is included in the standard supply content. Bracket set is not included in the standard supply content.

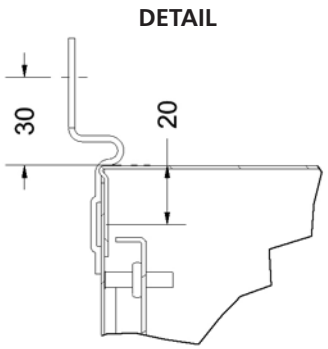
| XM SERIES STAINLESS STEEL MONOBLOCK ENCLOSURES WITH ASYMMETRICAL CANOPY | | | | | |
|---|---|---|---|---|---|
| **HEIGHT (A)** | **WIDTH (B)** | **DEPTH (C)** | **ORDER CODES (304)** | **ORDER CODES (316)** | **NUMBER of LOCK** |
| 400 | 300 | 200 | XM 40 30 20 DA 304 | XM 40 30 20 DA 316 | 1 |
| 400 | 600 | 200 | XM 40 60 20 DA 304 | XM 40 60 20 DA 316 | 1 |
| 500 | 400 | 200 | XM 50 40 20 DA 304 | XM 50 40 20 DA 316 | 1 |
| 600 | 400 | 200 | XM 60 40 20 DA 304 | XM 60 40 20 DA 316 | 1 |
| 600 | 600 | 300 | XM 60 60 30 DA 304 | XM 60 60 30 DA 316 | 1 |
| 700 | 500 | 200 | XM 70 50 20 DA 304 | XM 70 50 20 DA 316 | 1 |
| 700 | 500 | 300 | XM 70 50 30 DA 304 | XM 70 50 30 DA 316 | 1 |
| 800 | 600 | 200 | XM 80 60 20 DA 304 | XM 80 60 20 DA 316 | 2 |
| 800 | 600 | 300 | XM 80 60 30 DA 304 | XM 80 60 30 DA 316 | 2 |
| 800 | 800 | 200 | XM 80 80 20 DA 304 | XM 80 80 20 DA 316 | 2 |
| 1000 | 600 | 200 | XM 100 60 20 DA 304 | XM 100 60 20 DA 316 | 2 |
| 1000 | 600 | 300 | XM 100 60 30 DA 304 | XM 100 60 30 DA 316 | 2 |
| 1000 | 800 | 200 | XM 100 80 20 DA 304 | XM 100 80 20 DA 316 | 2 |
| 1200 | 600 | 300 | XM 120 60 30 DA 304 | XM 120 60 30 DA 316 | 2 |

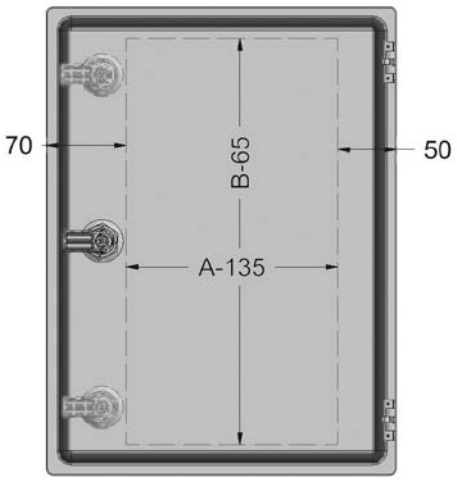
**Note:** Please contact with your Customer Representative for Enclosures with Canopy puchase orders.

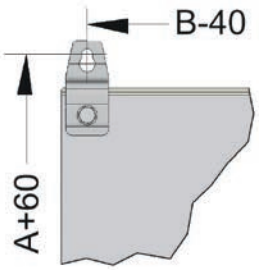
# XM SERIE DIMENSIONS

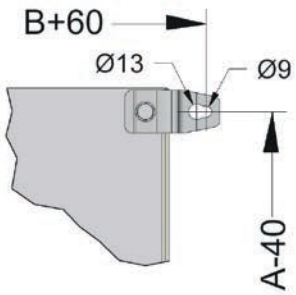


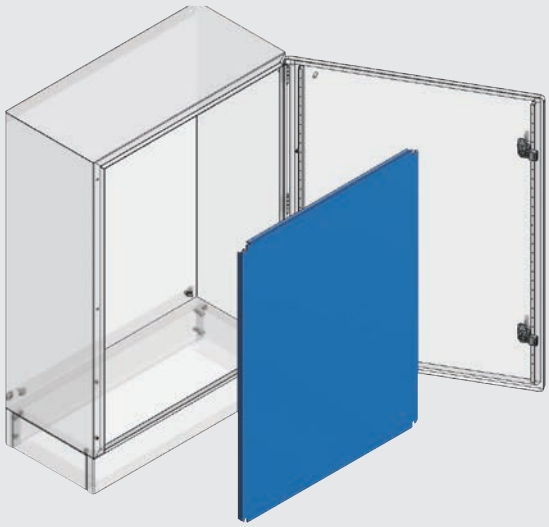



# XM SERIE ACCESSORIES

## EM MK FULL HEIGHT MOUNTING PLATES



**Suplly Contents**

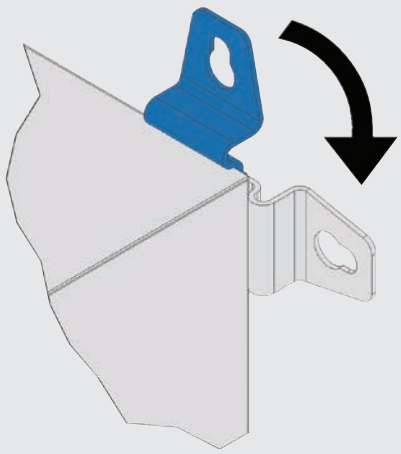
| | |
|---|---|
| EM MK Mounting Plate | 1 pc. |
| -Connection Accessories - | 1 Set |

## STAINLESS STEEL LOCK TYPES

316 Grade Stainless Steel Lock

316 Grade T Wing Lock

## XM BS STAINLESS STEEL BRACKET SET

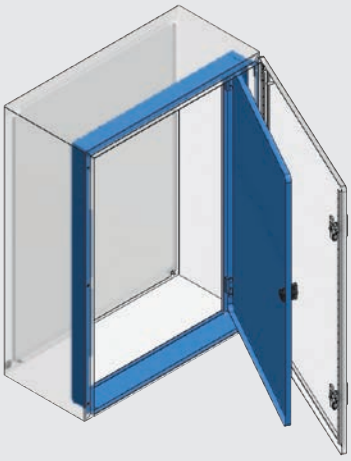


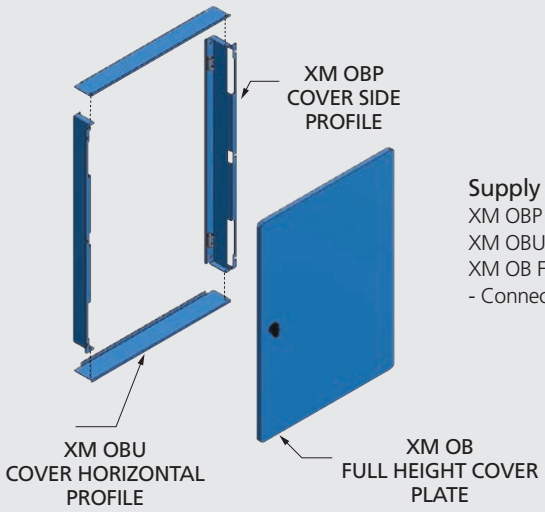
**Supply Content**

| | |
|---|---|
| XM BS Bracket (316 Grade) | 4 pcs. |
| - Connection Accessories- | 1 Set |

# XM SERIE ACCESSORIES

## XM OB STAINLESS STEEL FULL HEIGHT COVER PLATE






**Supply Content**

| | |
|---|---|
| XM OBP Profile (304 Grade) | 2 pcs. |
| XM OBU Profile (304 Grade) | 2 pcs. |
| XM OB Full Height Cover Plate (304 Grade) | 1 pc. |
| - Connection Accessories- | 1 Set |

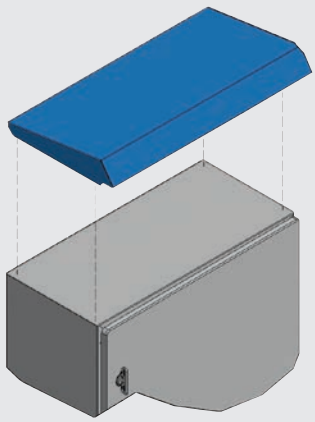
Note: Standard EM OB Full Height Cover Plate also can be used.

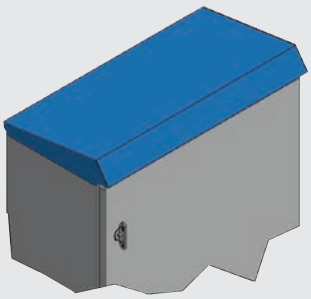
## XM ASYMMETRICAL CANOPY

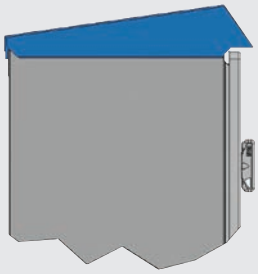
Brackets can be used for XM Asmmetrical Canopy applications.

**Supply Contents**

| | |
|---|---|
| XM Asymmetrical Canopy Main Frame | 1 pc. |
| -Connection Accessories- | 1 Set |







# XT SERIE INTRODUCTION

## XT Serie Stainless Steel, Monoblock, Indoor, Wall Mounted Terminal Boxes

E-Kabin XT Serie Terminal Boxes are designed for general purpose electrical applications. Clean and smooth surface appearance has been provided for welded surfaces.

| | |
|---|---|
| Application | : Indoor |
| Protection class | : IP 66 |
| Type of mounting | : Wall-mounted |
| Environment class | : According to -EN60721-3-3 IE33 |
| Standards | : IEC 62208, IEC 60529, IEC 62262 |
| Material | : 304 and 316 grade stainless steel standard |

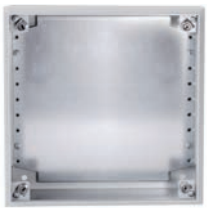
# XT SERIE FEATURES

## 270° Turn Fastening Screw

270° turn fastening screws, provide easy assembly.

## IP 66 Protection Class

Foam-in-place gasket behind the door does not loose its elasticity in time and provides protection against dust and water.



## Wide Box Opening

Large box opening provide easy access and installation, also maximize usage area.

## Useful Mounting Plate

Mounting plate allows to use maximum space inside the box.

## Stainless Steel Bracket Set

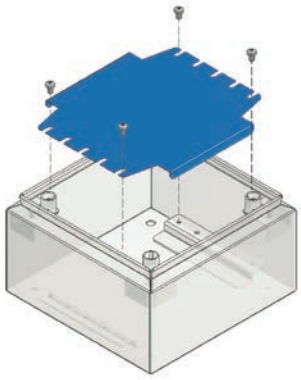
With bracket set enclosure mounting on the wall can be done easily and quickly. Thanks to 90° swivel feature of the bracket it's position can be choosen either horizontally or vertically.

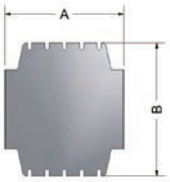
# XT SERIE ORDER CODES

| XT SERIE DIMENSIONS | | | | |
|---|---|---|---|---|
| HEIGHT (A) | WIDTH (B) | DEPTH (C) | ORDER CODES (304) | ORDER CODES (316) |
| 200 | 200 | 120 | XT 20 20-304 | XT 20 20-316 |
| 200 | 300 | 120 | XT 20 30-304 | XT 20 30-316 |
| 200 | 400 | 120 | XT 20 40-304 | XT 20 40-316 |
| 300 | 300 | 120 | XT 30 30-304 | XT 30 30-316 |
| 300 | 400 | 120 | XT 30 40-304 | XT 30 40-316 |
| 400 | 400 | 120 | XT 40 40-304 | XT 40 40-316 |

Note: 1 pc. Mounting Plate and 1 pc. Bracket Set are in standard supply content.

## Mounting Plate

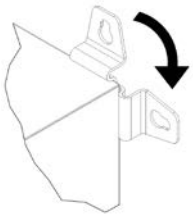





1 pc Mounting Plate

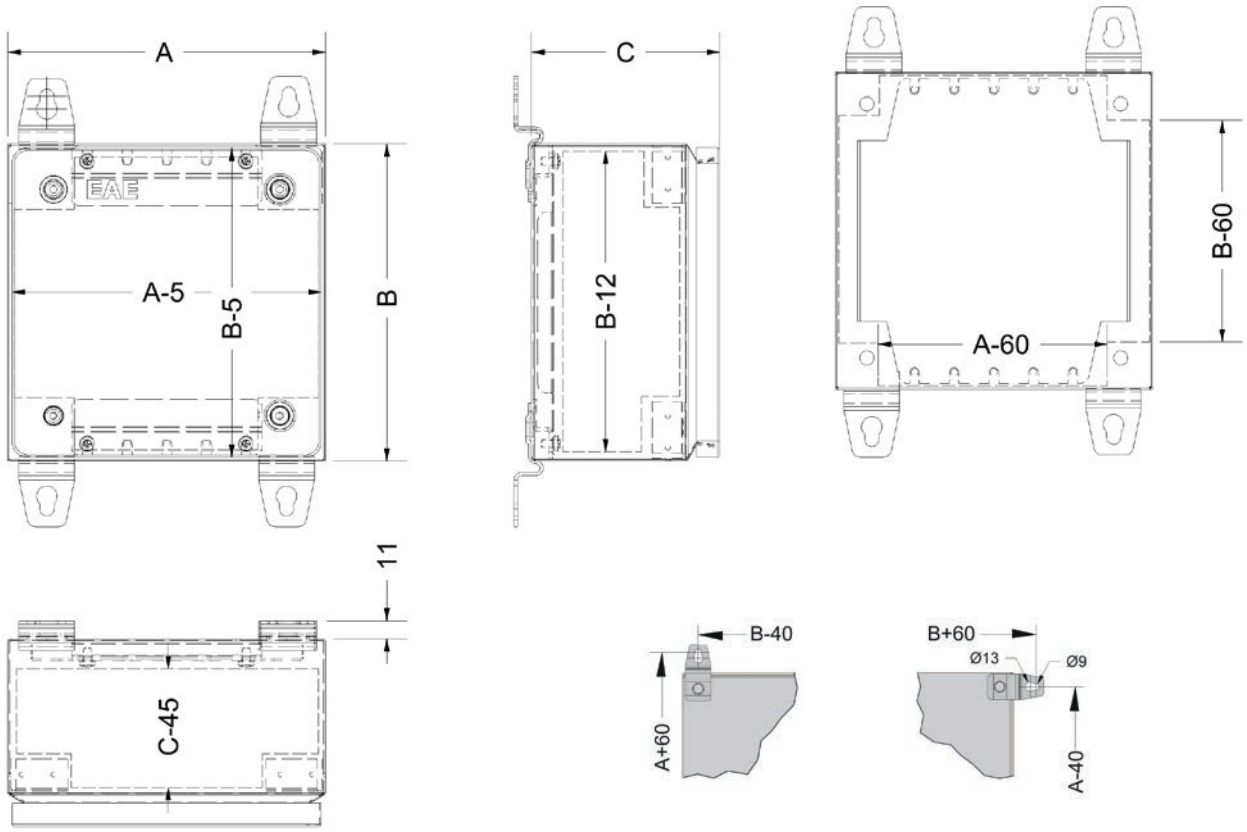
| DIMENSION A | DIMENSION B | ORDER CODE |
|---|---|---|
| 171 | 192 | ET MK 20 20 |
| 171 | 292 | ET MK 20 30 |
| 171 | 392 | ET MK 20 40 |
| 271 | 292 | ET MK 30 30 |
| 371 | 392 | ET MK 30 40 |

## Stainless Steel Bracket Set



4 pcs Bracket

# XT SERIE DIMENSIONS




| XT SERIES DIMENSIONS | | |
|---|---|---|
| **HEIGHT (A)** | **WIDTH (B)** | **DEPTH (C)** |
| 200 | 200 | 120 |
| 200 | 300 | 120 |
| 200 | 400 | 120 |
| 300 | 300 | 120 |
| 300 | 400 | 120 |
| 400 | 400 | 120 |

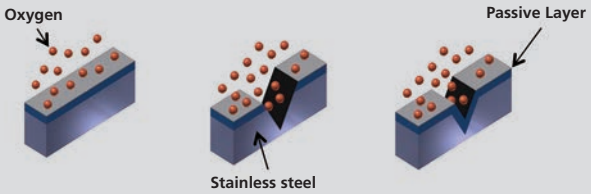
# WHITE PAPER
# STAINLESS STEEL ELECTRICAL ENCLOSURES

It is generally preferred that the electrical enclosures are manufactured from stainless steel material in various industrial applications where corrosion resistance is important. However, there are rules to be considered when selecting and using stainless steel materials.

**Stainless Steel Enclosures**
Stainless steel is a proven it's reliability in various industrial applications as electrical equipment enclosures. In the corrosion resistance of the stainless steel, the environment and its conditions of the application, the grade of steel and the surface treatment have determinant importance.

When the characteristics of stainless steel enclosures are determined for using in a project, by careful consideration of the factors stated here, the required level of corrosion protection and the overall success of the application can be possible.

**Stainless steel self-repair feature**




The metallic satin finish of the stainless steel makes itself passive, if a suitable environment is provided, i.e. sufficient oxygen and available rich chromium oxidation.

This reaction occurs spontaneously in very short time once the sufficient oxygen contacts on the surface, and the protective layer thus formed becomes thick over time.

The resistance against corrosion on the surface has the ability to repair itself in case of mechanical defection.

**Environment and its conditions;**
The climate of the area where the application will be, has a great effect on the corrosion resistance of the stainless steel material.

For example, 304 grade stainless steel is resistant to corrosion under a wide range of environment conditions and climate effects, but it is inevitable to experience corrosion in salt and other chloride environments. De facto, 304 grade stainless steel should not be used up to 10 km inside by the sea coast; but the actual length of this distance can be determined by evaluating the climatic

conditions according to the application area specifications. By this reason, it is not recommended to use 304 grade stainless steel in marine applications without taking special precautions. In cold climate zones, chlorides are used as defrosting chemicals and also, can cause point corrosion on 304 stainless steel surfaces.

In industrial environments, chlorides can be existing in smoke and flying ashes. These are dirt and debris deposits on non-washed, uncleaned surfaces and eventually they may cause point corrosion. Even if the right stainless steel is chosen, corrosive substances condensed in the accumulation of impurities in that way, may cause the protective passive layer on the stainless steel surface to be pierced. In such cases, cleaning is necessary. By this way, self-repairing of stainless steel material can be provided and the stainless steel surfaces can be prevented from condensation of sulfur-dioxide, chloride or ferrous deposits. In another particular attention should be paid not only to the general climatic conditions, but also to the specific micro-climatic conditions where the enclosure is to be mounted. The most obvious example to this, is the negative effect in the settlement areas especially in highways, where salt and chemicals are is used as de-icing, which can be carried up to a distance by the vehicles. Likewise, the effects of increased exhaust gas emission by the dense and stopped traffic on the underpass, in the tunnel or at the ticket office, can be evaluated in terms of attracting attention to the micro-climatic conditions.

**Which grade of stainless steel?**
304 grade stainless steel is the most widely used type in different applications where a special corrosion resistance is not required. More harsh environments require the use of 316 qualities which is more expensive grade of stainless steel. However, even for 316 grade stainless steel, chemicals, their concentration and their level of aggressiveness in the environment must be examined,

evaluated and observed in deep detail; because there may be cases where this grade is not sufficient.

**304 Grade Stainless Steel**
**SEA 304-304L / EN 1.4301-1.4303**
Classified as 304 grade by the American Society of Automotive Engineers - SAE, stainless steel contains 18-20% chromium and 8-10.5% nickel. The 304 grade sometimes referred to as '18 -8 ', is widely used as standard stainless steel grade in different industrial applications. The most common application where the use of 304 quality stainless steel is inconvenient, is the outdoor applications in the coastal areas where the salt is deposited on the surfaces by flying.

In the food and beverage industry, it is necessary for the enclosures to be washed frequently without worrying about rusting. 304 grade stainless steel is used extensively here. Due to its high resistance to various acids found in meat, milk, fruits and vegetables, 304 grade stainless steel has become the ideal raw material for control and control equipment enclosures of machines used in food and beverage processes. Nevertheless, a stronger stainless steel grade may be required, if the environment has excessive chloride usage, or cleaning procedures require high corrosion resistance solvents.

The use of 304 grade stainless steel may be sufficient in a majority of waste treatment and clean water treatment plants. However, in some clean water treatment plants, chlorine gas is used as a disinfectant and sulfur dioxide is used to remove the residues of used chlorine. When the nature of the environment with high humidity and the corrosive effect of these gases are combined together, the capabilities of 304 grade stainless steel are exceeded. Some municipalities put efforts to use less chemicals with environment friendly approaches and apply ultraviolet treatment for water treatment. 304 quality stainless steel can be used, due to no chemical usage in such facilities.

**316 Grade Stainless Steel**
**SEA 316-316L / EN 1.4401-1.4404**
The second most widely used grade of stainless steel is 316 when the limits of 304 are reached. In general, 316 quality stainless steel, which is 25-35% more expensive, has a higher nickel content and an additive molybdenum content of 2-3%. Molybdenum additive provides increase of corrosion resistance especially against chlorides.
The rate of chloride contained in water is the most determinant factor in the selection of stainless steel enclosure material for water treatment plants. 304 grade stainless steel is able to withstand against the corrosive effect of water containing up to 100 ppm of chloride. On the contrary, in the 316 grade stainless steel material,

this limit is up to 1000 ppm of chloride. In addition to chlorides, there are other substances that affect the corrosive behavior of the water. Especially, attention should be paid to halides such as bromides or iodides which are not chlorides. Another important factor is the presence of water oxidizers (e.g. ozone); the risk of point corrosion is also increasing as long as water oxidizing power increases. In such some cases, 316 grade stainless steel is also insufficient.

316 grade stainless steel commonly known as the marine standard, cannot withstand to be presented in continuous saline water (equivalent to 19,000 ppm chlorine). However, it can be used in overwater applications such as temporary and short-term salt spray applications. It should not be forgotten to take various precautions for the application areas with narrow and closed low airflow a difficult harsh environment conditions with low pH or high temperature. 316 grade stainless steel is generally considered as an adequate enclosure for marine applications such as ships and oil platforms and even for salt mines. Essentially, the stainless steel grade is 316 which should be used mainly in corrosive environments where high chloride levels are present.

316 grade stainless steel should be preferred because of having high chloride resistance in food processing plants using excessive acidic chemicals and concentrated chloride salts. 316 grade stainless steel having considerable degree of resistance against sulfuric acid solutions (<10%) and sulfur-containing gases, is used as the raw materials for the enclosures used in industries where they are frequently found. For example, 316 grade stainless steel is used in the paper industry. Similarly, in other industries such as vulcanization process for the rubber or gun powder manufacturing, it is also widely used.

**Nitric and hydrochloric acid**
As a general rule, 316 grade stainless steel enclosures are more resistant to aggressive chemical environments than

304 grade. Nitric acid is at the top of special cases which does not suit this rule. Nitric acid is especially used in fertilizer production, pharmaceutical industry and explosive production; also, it can be used in synthetic yarn and polymer manufacturing or in water treatment plants.

All stainless steel grades have a slight resistance to nitric acid, but in industries where the use of nitric acid is widespread, 304 grade stainless steel should be preferred due to its high resistance against this substance. In this case, the self-passive ability of the stainless steel is enhanced by the strong oxidizing effect of nitric acid and the corrosion resistance of the stainless steel is increased.

It is important to consider that neither the 304 grade nor the 316 grade stainless steel will be able to withstand against the chemical corrosion caused by hydrochloric acid. This acid destroys the passive surface and leaves the metal vulnerable.

**Swimming pool environments**
The swimming pool atmosphere is generally characterized by at a relative humidity approximately 60-70% together with chlorine and chlorine compounds relatively high levels. The original "pool smell" is existent due to these. These substances can be spread to the entire space as both steam and aerosol. In addition to sodium chloride, relatively high amounts of calcium and magnesium chloride are found in many applications. Typical values are 2-5% for the chloride ratio and 3-4 for the pH value. The high relative humidity rate fluctuates by depending on the intensity of swimming activity, the temperature changes during the day and resulting in the accumulation of deposits at various locations with the switched off air conditioning system in the nights. The evaporation of chloride-containing liquids and the increase of chloride concentration in the contact zones considerably increase the likelihood of corrosion.

It is necessary to pay special attention to the selection of the right material in swimming pool applications. Especially, attention should be paid to the selection of materials for enclosures placed in closed areas such as machine rooms of pools. Special precautions such as micro climate air quality, should be taken in these applications. It is obvious that the selection of 316 grade stainless steel will not sufficient alone in the presence of oxidizing substances such as ozone or where disinfectant chemicals are stored. In this case application of lacquer coating or 316 quality stainless steel or both is required.

**Surface treatment**
Grinding is common surface treatment for stainless steel enclosures used in industrial applications. The protective film as the purpose of masking, adhered on the outer surfaces of the enclosures is kept to the very last of the manufacturing steps, after removing the film and the possible adhesive residues are cleaned with special chemicals, the enclosure is packed with an air-permeable material before last packaging.

In addition to the surface treatment quality, the direction of grinding of the stainless steel surface is also important in terms of corrosion resistance. The vertically oriented grinding allows cleaning to be done easily and in case of outdoor applications, rain water can flow down itself with help of gravity. Some stainless steel enclosures can be painted. Especially, it is known that outdoor stainless steel enclosures exposed to intense solar radiation can be 10 degrees cooler, if they are painted with a light color. It is also possible to consider the paint as an additional layer of protection for extremely corrosive environments. Stainless steel can be painted by using standard paint process.

**Hygienic applications**
Stainless steel enclosures are also preferred for their superior hygienic features in addition to their corrosion resistance. It is more difficult to stick and reproduce for bacterias and microbes on stainless steel surfaces (assuming to have appropriate surface smoothness). The smooth and though surface of the stainless steel allows for easier and more effective cleaning.

**Precautions for storage and construction site environment**
In order to ensure that the surface qualities of stainless steel enclosures are also protected under storage and site conditions, some precautions might be needed to be taken in addition to the manufacturer's precautions such as product packaging.

Water which may accumulate during storage and transport, especially under heat shrinkage or under the plastic packaging of the stretch-film construction, may cause corrosion. This is the case when the packaged product is left in a humid environment for a long time. Strong acids (chloride based) which can be used for cleaning after ground work, especially stone or ceramic laying in new buildings, should be prevented from getting in contact with stainless steel surfaces. Any cleaning or rinsing fluid must not be interacted with the surrounding metals.

During storage, transfer, positioning and assembling in construction site environment, contamination of stainless steel enclosures' surfaces with carbon steel or iron must be avoided. For example, metal machining, grinding or welding around stainless steel enclosures should be avoided or precautions should be taken. Carbon steel metal burrs or slag splashing on the stainless steel surfaces will cause corrosion of splinters.

**Cleaning before delivery**
The stainless steel electrical enclosures manufactured by EAE, are delivered in an air-permeable package material, after the protective film is stripped and the surface is cleaned with flying chemicals which have protective features for stainless steel. Before the final delivery against the contamination, it is necessary to clean the surface defections which may be occurred in the workshop environment or the construction site environment. Mortars and cement particles can be cleaned with 10-15% phosphoric acid. The solution should be applied hot onto the surface, subsequently, neutralized by the ammonia solution, finally rinsed with water purified from the minerals. Cleaning products manufacturers offer some special products for this type of cleaning. The superficial light stains can be removed by gentle cleaning creams and polishing pastes which are available in the market. These cleaning products contain substances that can penetrate the surface together with calcium carbonate. Household cleaners are also based on lemon acid and suitable for cleaning.

Grinding powders containing iron adhering to the surface in a short time ago, should be cleaned with saturated solutions of oxalic acids. Firstly, it must be applied to the surface without pressing hardly with a soft cotton cloth or cotton-based polishing pad and waited for a few minutes. Thus, as a rule, it is ensured that the particles are separated from the surface without scratches and damages on the surface. Moderate level rust stains are cleaned using cleaning products containing phosphoric acid. Careful cleaning is done without damaging the surface and changing color. Alternatively, small amounts of iron particles treated on the surface are successfully cleaned with slenderized nitric acid. It is only possible to clean the surface treated with rust thoroughly with acid processing and / or passivation to be done professionally. The acid cleaning process should be considered as a thin layer removal from the surface. For this, a mixture of nitric acid and hydrofluoric acid is generally used. Passivation process is a controlled and accelerated reconstitution of the impaired passive layer on the surface in the nitric acid environment. However, first of all, the oil and organic soils on the surface must be cleaned.

**Maintenance**
For all stainless steel applications, periodic surface maintenance should be planned and applied during operation.

**304 and 316 grades raw material discrimination test:**

304 316

A fine liquid from Monil 304-316 separator solution is dropped on the surface (under room temperature). 20-25 minutes to be waited. The colour of drop is watched. On the tested surface, in 5 minutes, yellow-green-brown color changes in sequence as the proof of 316 grade stainless steel. For 316L grade stainless steel, more than 5 minutes to be waited.

**Some of the most important environmental pollutants in different environments (ISO 9223: 2012 Annex B, IEC 60721-3-3: 2002, IEC 60721-2-5: 1991)**

| Environmental pollutant | ISO 9223 Condensation/ Residue (annual mean value) (µg / m3) | IEC 60721-3-3 | | ISO 9223 | ISO 9223 Sources of Residue |
|---|---|---|---|---|---|
| | | Referance Value (µg/m³) | Class | Environment | |
| $SO_2$ | 2-15 | 10 | | rural | The main reasons of $SO_2$ are the usage of coal and fuel with the emissions of industrial plants. |
| | 5-100 | 100 max. | 3C1L 3C1 | urban | |
| | 50-400 | 300 | 3C2 | industrial | |
| $NO_2$ | 2-25 | 100 max. | 3C1L | rural | The main reason of $SO_2$ is traffic. |
| | 20-150 | | 3C1 | urban | |
| $HNO_3$ | 0,1-0,7 | | | rural | $HNO_3$ is in correlation with $NO_2$. High concentrated $NO_2$ organic compound and UV light concentration will increase. |
| | 0,5-4 | | | industrial | |
| $O_3$ | < 10 | 10 max. | 3C1L 3C1 | | $O_3$ occurs with the interaction of sunlight, oxygen and environmental pollutants in the atmosphere. Concenrations are higher in dirty rural atmosphere but, in urban areas with high traffic is lower. |
| | 10 < X < 20 | 10 max. | 3C1L | | |
| | 20-90 | 50 | 3C2 | | |
| $H_2$ S | 1-5 | 10 max. | 3C1L 3C1 | in normal | There are some natural resources such as swamps and volcanic activities. Pulp, paper industry and agriculture produce the highest concentrations. |
| | 20-250 | 100 | 3C2 | indusrial & animal shelters | |
| $Cl_2$ | 0,1 | | | in normal | Main sources are the emissions of paper and pulp industries. |
| | 20'ye kadar | | | some industrial plants | |
| Cl | 0,1-200 | 10 max. | 3C1L 3C1 | | The main sources are the defrosting of ice in the oceans and the roads. Depending on the geographical location - in the marine environment. |
| | | 100 | 3C2 | | |
| | 300-1500 | 600 | 3C4 | | |
| $NH_3$ | < 20 | | | low concentration in normal | The emissions sourced from food production and fertilizing industry in agriculture provide the highest average values. |
| | < 300 | 300 max. | 3C1L 3C1 | close to source | |
| | 300 to 1000 | | | close to source | |
| | 1000 to 3000 | 1000 | 3C2 | close to source | |
| Particles $PM_{10}$ | 10-25 | | | rural | Largely, ineffective components |
| | 30-70 | | | urban | High density traffic, corrosive ingredients |
| | | | | industrial | Emissions caused from production at high concentration. |

Note: This table indicates the general limits of the concentrations of pollutants. Actual ranges can be variated in some certain regions of the world depending on the level of industrialization and the implementation of precautions for reducing pollution. (legal precautions, exhaust emission technologies, etc.)

## OTHER PRODUCTS

| | |
|---|---|
| **E-KABİN S** | **Floor Standing Modular Enclosures**<br>**IP 41 - IP 55** |
| **E-KABİN D** | **Floor Standing Modular Enclosures**<br>**IP 41 - IP 55** |
| **E-KABİN L** | **Floor Standing Modular Enclosures**<br>**IP 55** |
| **E-KABİN M** | **Wall Mounted Monoblock Enclosures**<br>**IP 66** |
| **E-KABİN O** | **Wall Mounted Monoblock Enclosures**<br>**IP 66** |
| **E-KABİN E** | **Wall Mounted Monoblock Distribution Enclosures**<br>**IP 55** |
| **E-KABİN H** | **Outdoor Enclosures**<br>**IP 41 - IP 55 - IP 66** |
| **E-KABİN K** | **Monoblock Console**<br>**IP 55** |
| **E-KABİN T** | **Terminal Boxes**<br>**IP 66** |
| **E-KABİN B** | **Busbar Supports**<br>**“Short Circuit Type Tested”** |

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IEC 61439-1/2
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