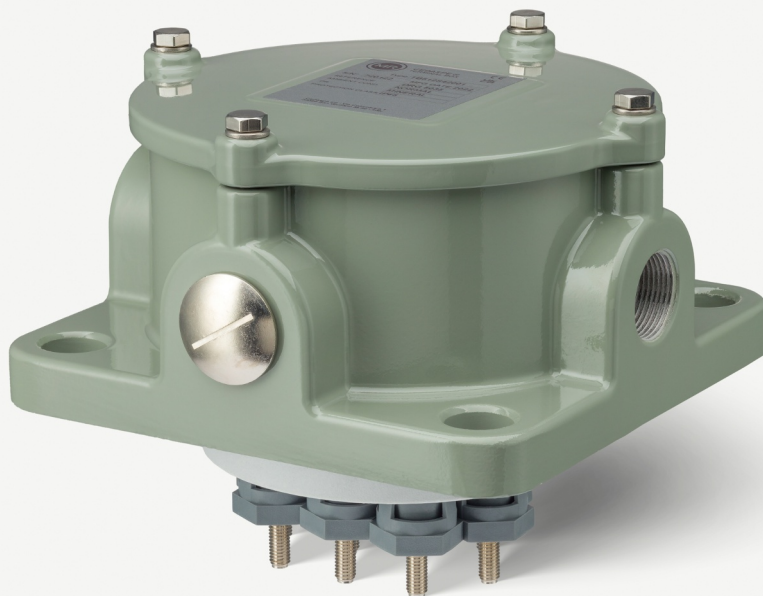




# Operating instructions CEDASPE® TBX CGX. Terminal box

---

11722312/00 EN



© All rights reserved by Maschinenfabrik Reinhausen

Dissemination and reproduction of this document and use and disclosure of its content are strictly prohibited unless expressly permitted.

Infringements will result in liability for compensation. All rights reserved in the event of the granting of patents, utility models or designs.

The product may have been altered since this document was published.

We reserve the right to change the technical data, design and scope of supply.

Generally the information provided and agreements made when processing the individual quotations and orders are binding.

The product is delivered in accordance with MR's technical specifications, which are based on information provided by the customer. The customer has a duty of care to ensure the compatibility of the specified product with the customer's planned scope of application.

The original operating instructions were written in German.

# Table of contents

<b>1</b>	<b>Introduction .....</b>	<b>5</b>
1.1	Manufacturer .....	5
1.2	Safekeeping.....	5
1.3	Notation conventions .....	5
1.3.1	Hazard communication system.....	5
1.3.2	Information system .....	6
1.3.3	Instruction system.....	7
1.3.4	Typographic conventions.....	7
<b>2</b>	<b>Security .....</b>	<b>9</b>
2.1	Intended use .....	9
2.2	Fundamental safety instructions .....	10
2.3	Personnel qualification .....	11
2.4	Personal protective equipment.....	13
<b>3</b>	<b>Product description.....</b>	<b>14</b>
3.1	Scope of delivery .....	14
3.2	Function description .....	14
3.3	Versions.....	14
3.4	TBX design .....	16
3.5	CGX design .....	18
3.6	Connection board.....	19
<b>4</b>	<b>Packaging, transport and storage .....</b>	<b>20</b>
4.1	Purpose .....	20
4.2	Suitability, structure and production .....	20
4.3	Markings .....	20
4.4	Transportation, receipt and handling of shipments .....	21
4.5	Storage of shipments.....	22
<b>5</b>	<b>Mounting.....</b>	<b>23</b>
5.1	Mounting the terminal box.....	23
5.1.1	Checking surfaces and fixing bolts .....	23
5.1.2	Recommended dimensions for drilled holes on the tank and hole circle diameter .....	24
5.1.3	Gasket requirements.....	25

5.1.4	Attaching the terminal box using bolt fixings.....	26
5.2	Electrical connection .....	27
5.2.1	Cable recommendation .....	27
5.2.2	Connecting the TBX cables .....	28
5.2.3	Connecting the CGX cables.....	30
<b>6</b>	<b>Commissioning .....</b>	<b>33</b>
6.1	Leak test .....	33
6.2	Connection inspection .....	33
<b>7</b>	<b>Maintenance and inspection .....</b>	<b>34</b>
<b>8</b>	<b>Disposal .....</b>	<b>35</b>
8.1	SVHC information in accordance with the REACH regulation.....	35
<b>9</b>	<b>Technical data.....</b>	<b>36</b>
<b>10</b>	<b>Drawings.....</b>	<b>38</b>
10.1	5034.....	39
10.2	5035.....	40
10.3	5039.....	41
10.4	5040.....	42
10.5	5036.....	43
10.6	5037.....	44
10.7	5038.....	45
	<b>Glossary .....</b>	<b>46</b>

# 1 Introduction

This technical file contains detailed descriptions on the safe and proper installation, connection, commissioning and monitoring of the product.

This technical document is intended solely for specially trained and authorized personnel.

## 1.1 Manufacturer

CEDASPE S.r.l.  
Via Colombara 1  
20098 S. Giuliano Milanese (MI)  
Italy

Tel.: +39 029 820 4411  
Internet: [www.reinhausen.com](http://www.reinhausen.com)  
MR Reinhausen customer portal: <https://portal.reinhausen.com>

Further information on the product and copies of this technical file are available from this address if required.

## 1.2 Safekeeping

Keep this technical file and all supporting documents ready at hand and accessible for future use at all times.

## 1.3 Notation conventions

### 1.3.1 Hazard communication system

Warnings in this technical file are displayed as follows.

### 1.3.1.1 Warning relating to section

Warnings relating to sections refer to entire chapters or sections, sub-sections or several paragraphs within this technical file. Warnings relating to sections use the following format:

#### **⚠ WARNING**



**Type of danger!**  
Source of the danger and outcome.

- > Action
- > Action

### 1.3.1.2 Embedded warning information

Embedded warnings refer to a particular part within a section. These warnings apply to smaller units of information than the warnings relating to sections. Embedded warnings use the following format:

**⚠ DANGER!** Instruction for avoiding a dangerous situation.

### 1.3.1.3 Signal words in warning notices

Signal word	Meaning
DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates measures to be taken to prevent damage to property.

Table 1: Signal words in warning notices

## 1.3.2 Information system

Information is designed to simplify and improve understanding of particular procedures. In this technical file it is laid out as follows:



Important information.

### 1.3.3 Instruction system

This technical file contains single-step and multi-step instructions.

#### Single-step instructions

Instructions which consist of only a single process step are structured as follows:

Aim of action

✓ Requirements (optional).

1. Step 1 of 1.

» Result of step (optional).

» Result of action (optional).

#### Multi-step instructions

Instructions which consist of several process steps are structured as follows:

Aim of action

✓ Requirements (optional).

1. Step 1.

» Result of step (optional).

2. Step 2.

» Result of step (optional).

» Result of action (optional).

### 1.3.4 Typographic conventions

Typographic convention	Purpose	Example
UPPERCASE	Operating controls, switches	ON/OFF
[Brackets]	PC keyboard	[Ctrl] + [Alt]

Typographic convention	Purpose	Example
<b>Bold</b>	Software operating controls	Press <b>Continue</b> button
...>...>...	Menu paths	Parameter > Control parameter
<i>Italics</i>	System messages, error messages, signals	<i>Function monitoring</i> alarm triggered
[▶ Number of pages]	Cross reference	[▶ Page 41].
Dotted underscore .....	Glossary entry, abbreviations, definitions, etc.	<u>Glossary entry</u>

Table 2: Typographic conventions used in this technical file



## 2 Security

Read this technical file through carefully to familiarize yourself with the product. This technical file is a part of the product.

- Read and observe the safety instructions provided in this chapter in particular.
- Observe the warnings in this technical file to avoid function-related dangers.

The product is manufactured based on state-of-the-art technology. Nevertheless, danger to life and limb for the user or impairment of the product and other material assets may arise in the event of improper use.

### 2.1 Intended use

The TBX terminal box connects circuits on the outside and inside of oil-filled transformer tanks.

The CGX terminal box connects ground connections on the outside and inside of oil-filled transformer tanks.

The product is designed solely for use in electrical energy systems and facilities.

If used as intended and in compliance with the requirements and conditions specified in this technical document as well as the warning notices contained in this technical document and attached to the product, the product does not pose risk of personal injury or damage to property or the environment. This applies throughout the entire service life of the product, from delivery, installation and operation to removal and disposal.

Intended use refers to the following:

- Only use the product for oil-filled power transformers.
- Only use the product to make electrical connections between oil-filled power transformers and ground
- Operate the product in accordance with this technical document, the agreed-upon delivery conditions and the technical data.

- Ensure that any necessary work is only performed by qualified personnel.
- Use the equipment and special tools supplied solely for the intended purpose and in accordance with the specifications of this technical document.

## 2.2 Fundamental safety instructions

To prevent accidents, malfunctions and damage as well as unacceptable adverse effects on the environment, those responsible for transport, installation, operation, maintenance and disposal of the product or parts of the product must ensure the following:

### Personal protective equipment

Loosely worn or unsuitable clothing increases the danger of becoming trapped or caught up in rotating parts and the danger of getting caught on protruding parts. This results in danger to life and limb.

- All necessary devices and personal protective equipment required for the specific task, such as a hard hat, safety footwear, etc. must be worn. Observe the "Personal protective equipment" [► Section 2.4, Page 13] section.
- Never wear damaged personal protective equipment.
- Never wear rings, necklaces or other jewelry.
- If you have long hair, wear a hairnet.

### Work area

Untidy and poorly lit work areas can lead to accidents.

- Keep the work area clean and tidy.
- Make sure that the work area is well lit.
- Observe the applicable laws for accident prevention in the relevant country.

### Explosion protection

Highly flammable or explosive gases, vapors and dusts can cause serious explosions and fire.

- Do not install or operate the product in areas where a risk of explosion is present.

### **Safety markings**

Warning signs and safety information plates are safety markings on the product. They are an important aspect of the safety concept. Safety markings are depicted and described in the chapter "Product description".

- Observe all safety markings on the product.
- Make sure all safety markings on the product remain intact and legible.
- Replace safety markings that are damaged or missing.

### **Ambient conditions**

To ensure reliable and safe operation, the product must only be operated under the ambient conditions specified in the technical data.

- Observe the specified operating conditions and requirements for the installation location.

### **Modifications and conversions**

Unauthorized or inappropriate changes to the product may lead to personal injury, material damage and/or operational faults.

- Only modify the product after consultation with CEDASPE S.r.l.

### **Spare parts**

Spare parts not approved by CEDASPE S.r.l. may lead to physical injury and damage to the product.

- Only use spare parts approved by the manufacturer.
- Contact CEDASPE S.r.l.

### **Working during operation**

You must only operate the product when it is in a sound operational condition. Otherwise it poses a danger to life and limb.

- Regularly check the operational reliability of safety equipment.
- Perform the inspection tasks described in this technical document regularly.

## **2.3 Personnel qualification**

The person responsible for assembly, commissioning, operation and inspection must ensure that personnel are sufficiently qualified.

### **Electrically skilled person**

The electrically skilled person has a technical qualification and therefore has the required knowledge and experience, and is also conversant with the applicable standards and regulations. The electrically skilled person is also proficient in the following:

- Can identify potential dangers independently and is able to avoid them.
- Is able to perform work on electrical systems.
- Is specially trained for the working environment in which (s)he works.
- Must satisfy the requirements of the applicable statutory regulations for accident prevention.

### **Electrically trained persons**

An electrically trained person receives instruction and guidance from an electrically skilled person in relation to the tasks undertaken and the potential dangers in the event of inappropriate handling as well as the protective devices and safety measures. The electrically trained person works exclusively under the guidance and supervision of an electrically skilled person.

### **Operator**

The operator uses and operates the product in line with this technical file. The operating company provides the operator with instruction and training on the specific tasks and the associated dangers arising from improper handling.

### **Technical Service**

We strongly recommend having repairs and retrofitting carried out by our Technical Service department. This ensures that all work is performed correctly. If a repair is not carried out by our Technical Service department, please ensure that the personnel who carry out the maintenance are trained and authorized by CEDASPE S.r.l. to carry out the work.

### **CEDASPE S.r.l**

Via Colombara 1  
20098 S. Giuliano Milanese (MI)  
Italy

Tel.: +39 029 820 4411  
Internet: [www.reinhausen.com](http://www.reinhausen.com)

## 2.4 Personal protective equipment

Personal protective equipment must be worn during work to minimize risks to health.

- Always wear the personal protective equipment required for the job at hand.
- Never wear damaged personal protective equipment.
- Observe information about personal protective equipment provided in the work area.

<b>Protective clothing</b>	Close-fitting work clothing with a low tearing strength, with tight sleeves and with no protruding parts. It mainly serves to protect the wearer against being caught by moving machine parts.
<b>Safety shoes</b>	To protect against falling heavy objects and slipping on slippery surfaces.
<b>Safety glasses</b>	To protect the eyes from flying parts and splashing liquids.
<b>Visor</b>	To protect the face from flying parts and splashing liquids or other dangerous substances.
<b>Hard hat</b>	To protect against falling and flying parts and materials.
<b>Hearing protection</b>	To protect against hearing damage.
<b>Protective gloves</b>	To protect against mechanical, thermal and electrical hazards.

Table 3: Personal protective equipment

# 3 Product description

## 3.1 Scope of delivery

The product is delivered as follows:

- Terminal box
- Fastening materials
- Technical documents

## 3.2 Function description

The TBX terminal box is attached to the cover or the side wall of the transformer tank. A connection to the circuits in the transformer tank is made via the terminal box. This allows external measuring systems to be connected, for example.

The CGX terminal box is attached to the cover or the side wall of the transformer tank. The core and housing of the transformer are connected to ground via the terminal box.

## 3.3 Versions

You will find more information in the technical data [► Section 9, Page 36].

CEDASPE® TBX:

Version	Maximum number of terminals	Cable bushings
SM4-D (XS)	6	2
SM4-C (S)	12	4
SM4-B (L)	36	3
SM4-A (XL)	53	4

Table 4: Versions

CEDASPE® CGX:

Version	Number of terminals
SM4-CFT	3
SM4-CGT	2
SM4-CGP	1

Table 5: Versions

### 3.4 TBX design

You can choose from several housing versions. For better clarity, not all housing versions are shown in diagrams in these instructions.

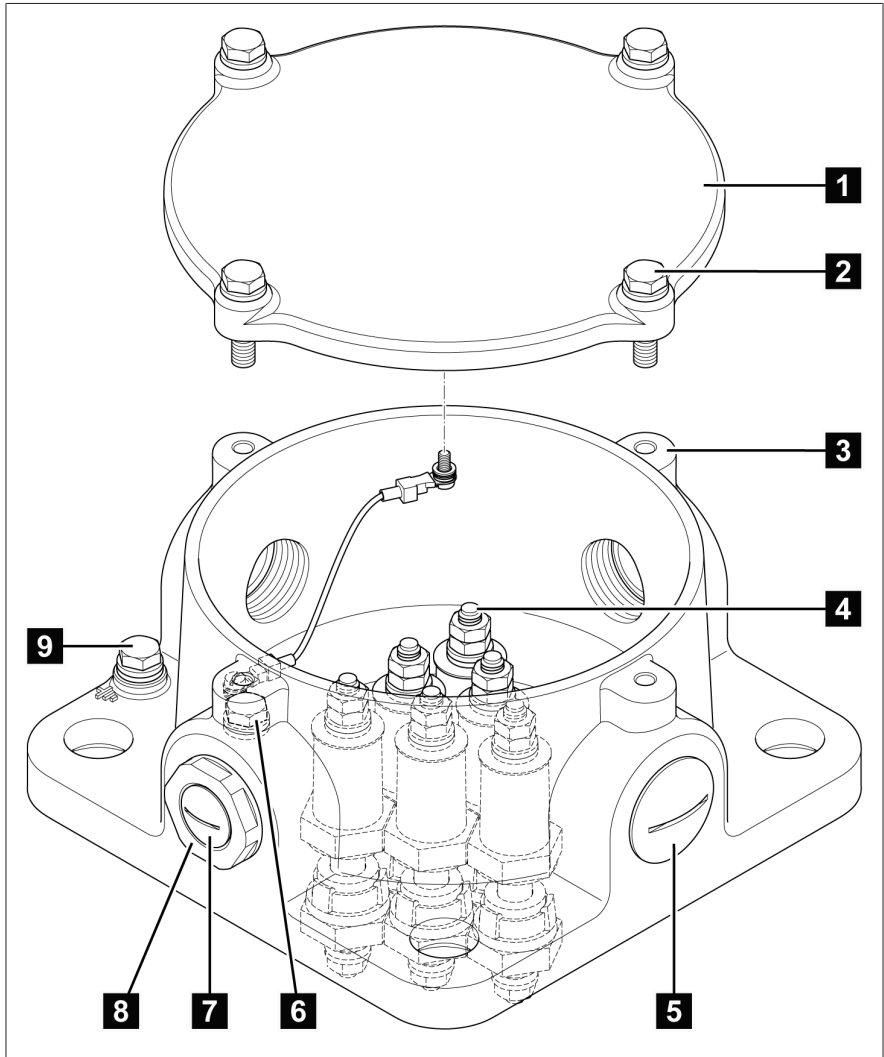


Figure 1: Design



1	Housing cover	2	Housing cover locking screw
3	Housing	4	M6 connection terminals
5	Bushing locking screw	6	Inner grounding screw
7	Locking screw reduction	8	Reduction
9	Outer grounding screw		

### 3.5 CGX design

You can choose from several connection versions. For better clarity, not all connection versions are shown in diagrams in these instructions.

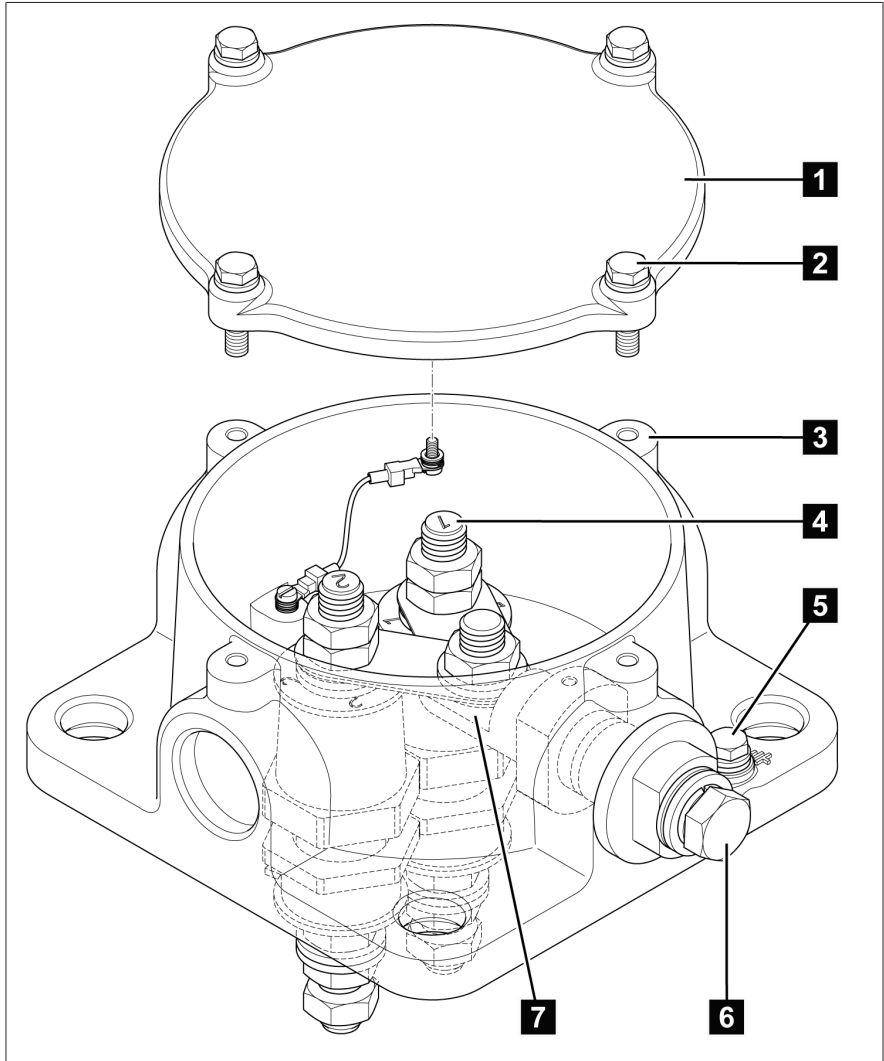


Figure 2: Design

1	Housing cover	2	Housing cover locking screw
3	Housing	4	M12 connection terminals
5	Grounding screw	6	M12 grounding screw
7	Connecting plates		

### 3.6 Connection board

There is a board on the inner side of the terminal box housing cover. This board can be used to resolve cable numbers that differ from the connections in the terminal box.

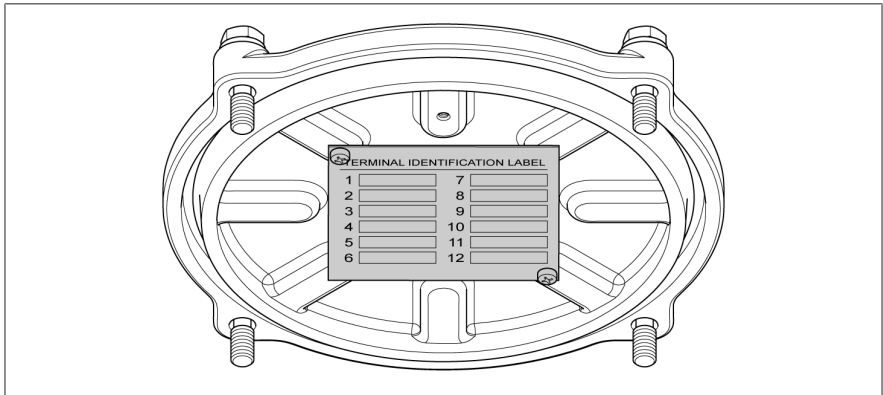


Figure 3: Connection board

# 4 Packaging, transport and storage

## 4.1 Purpose

The packaging is designed to protect the packaged product during transport, loading, unloading and during periods of storage in such a way that no detrimental changes occur. The packaging must protect the goods against permitted transport stresses such as vibration and knocks.

The packaging also prevents the packaged goods from moving impermissibly within the packaging.

## 4.2 Suitability, structure and production

The goods are packaged in a sturdy cardboard box. This ensures that the shipment is held securely in the intended transport position.

Inlays inside the box stabilize the goods, preventing impermissible changes of position, and protect them from vibration.

## 4.3 Markings

The packaging bears a signature with instructions for safe transport and correct storage. The following symbols apply to the shipment of non-hazardous goods. Adherence to these symbols is mandatory.


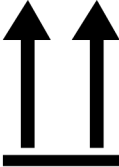

 <p>Protect against moisture</p>	 <p>Top</p>	 <p>Fragile</p>
---	--	--

Table 6: Shipping pictograms

## 4.4 Transportation, receipt and handling of shipments

In addition to vibrations, jolts must also be expected during transportation. In order to prevent possible damage, avoid dropping, tipping, knocking over and colliding with the product.

If the packaging tips over or falls, damage is to be expected regardless of the weight.

Every delivered shipment must be checked for the following by the recipient before acceptance (acknowledgment of receipt):

- Completeness based on the delivery slip
- External damage of any type.

The checks must take place after unloading when the cartons or transport container can be accessed from all sides.

### Visible damage

If external transport damage is found upon receipt of the shipment, proceed as follows:

- Immediately record the transport damage found in the shipping documents and have this countersigned by the carrier.
- In the event of severe damage, total loss or high damage costs, immediately notify CEDASPE S.r.l and the relevant insurance company.
- After identifying damage, do not modify the condition of the shipment further and retain the packaging material until an inspection decision has been made by the transport company or the insurance company.
- Record the details of the damage immediately on site together with the carrier involved. This is essential for any claim for damages.
- If possible, photograph damage to packaging and packaged goods. This also applies to signs of corrosion on the packaged goods due to moisture inside the packaging (rain, snow, condensation).
- Be absolutely sure to also check the sealed packaging.

### Hidden damage

When damage is not determined until unpacking after receipt of the shipment (hidden damage), proceed as follows:

- Make the party responsible for the damage liable as soon as possible by telephone and in writing, and prepare a damage report.
- Observe the time periods applicable to such actions in the respective country. Inquire about these in good time.

With hidden damage, it is very hard to make the transportation company (or other responsible party) liable. Any insurance claims for such damage can only be successful if relevant provisions are expressly included in the insurance terms and conditions.

## 4.5 Storage of shipments

When selecting and setting up the storage location, ensure the following:

- Store the product and accessories in the original packaging until installation.
- Protect stored goods against moisture (rain, flooding, water from melting snow and ice), dirt, pests such as rats, mice, termites etc. and against unauthorized access.
- Store crates and boxes on pallets, timber beams or planks as protection against ground moisture and for improved ventilation.
- Ensure that the foundation has sufficient load-bearing capacity.
- Keep entrance paths clear.
- Check the stored goods at regular intervals. Also take appropriate action after storms, heavy rain or snow etc.

# 5 Mounting

## **⚠ DANGER**



### **Electric shock!**

Danger of death due to electrical voltage when assembling/disassembling the device.

- > Switch off transformer on high-voltage side and low-voltage side.
- > Lock transformer to prevent unintentional restart.
- > Make sure that everything is de-energized.
- > Visibly connect all transformer terminals to ground (grounding leads, grounding disconnectors) and short circuit them.
- > Cover or cordon off adjacent energized parts.

## 5.1 Mounting the terminal box

### 5.1.1 Checking surfaces and fixing bolts

The surface of the transformer tank has to be even and clean and the fixing bolts need to be straight to achieve the highest possible sealing effect.

**NOTICE!** A gap between the transformer tank and the connecting flange of the device caused by unevenness can lead to damage to the connecting flange. Even slight unevenness can cause the connecting flange of the device to be curved too much, leading to cracks in the flange caused by the resulting transverse stress.

Therefore, check the following:

- Surfaces
  - Straight and even
  - Evenness deviation  $\leq 0.2$  mm
- Sealing surface
  - Clean and undamaged

- Without any damage along the radial surface such as scratches, dents or points of impact
- The quality of the sealing surface must be suitable for the gasket being used
- Fixing bolts
  - Welded at a 90° angle
  - The welding collar is seated correctly
- Installation material (screws, nuts, washers)
  - Clean and undamaged, particularly the threads and contact surfaces
- Gasket
  - Clean, undamaged and dry

## 5.1.2 Recommended dimensions for drilled holes on the tank and hole circle diameter

Version	Drilled holes on the tank Diameter	Hole circle diameter
SM4-D (XS)	84 mm	125 mm
SM4-C (S)	112 mm	180 mm
SM4-B (L)	176 mm	240 mm
SM4-A (XL)	202 mm	270 mm

Table 7: CEDASPE® TBX

Version	Drilled holes on the tank Diameter	Hole circle diameter
SM4-CFT	112 mm	180 mm
SM4-CGT		
SM4-CGP		

Table 8: CEDASPE® CGX



### 5.1.3 Gasket requirements

When selecting the gaskets, observe the following notices:

- Use new and clean gaskets.
- Use o-rings or flat gaskets in accordance with the following mounting description.
- Never use paper seals.
- Gasket material:
  - The material must be chemically resistant to the insulating fluid used to prevent later leaks due to chemical degradation.
  - The gasket material must be suitable for use at the intended ambient temperatures and operating temperatures.
  - The gasket material must be suitable for the relative humidity prevalent on site.
  - When mounted, elastomer gaskets must fill a maximum of 80% of the sealing groove. The remaining 20% is needed for the volumes of expansion.

## 5.1.4 Attaching the terminal box using bolt fixings

When attaching the terminal box to the transformer tank, note the following information:

- The transformer tank must not be filled with oil when mounting the terminal box.
- The diameter of the drilled hole on the tank depends on the terminal box version. Select the diameter based on the information provided in chapter Recommended dimensions for drilled holes on the tank and hole circle diameter [► Section 5.1.2, Page 24].

### NOTICE

#### Leakage due to incorrect bolt selection

The fixing bolts and the hole circle diameter must match the terminal box version. Otherwise, there is a danger of leaks at the terminal box.

- The length of the fixing bolts and their hole circle diameter depends on the terminal box version. Select the hole circle diameter based on the information provided in chapter Recommended dimensions for drilled holes on the tank and hole circle diameter [► Section 5.1.2, Page 24].

To fasten the terminal box, proceed as follows:

1. Drill a hole in the transformer tank.
2. Weld the fixing bolt.
3. Insert the o-ring gasket included in the delivery underneath the device in the groove intended for this. **NOTICE!** Malfunction! An incorrectly seated o-ring gasket can result in leaks. When mounting, ensure that the o-ring gasket is seated correctly in the groove intended for this.
4. Place the device on the fixing bolts and insert into the hole.
5. Mount the device with suitable washers, spring washers and nuts using the holes in the device flange on the fixing bolts of the transformer.
6. Tighten the nuts hand-tight.
7. Tighten the nuts crosswise with 10% of the max. tightening torque.
8. Tighten the nuts crosswise with 30% of the max. tightening torque.
9. Tighten the nuts crosswise with 60% of the max. tightening torque.
10. Tighten the nuts crosswise with 100% of the max. tightening torque.

11. **NOTICE!** Damage to the holes due to a tightening torque that is too high. Tighten the nuts crosswise with 100% of the tightening torque and continue to retighten the nuts with 100% of the tightening torque until the screws can no longer be turned further.
12. Connect the grounding cable with cable shoe to the outer grounding screw.

## 5.2 Electrical connection

### **⚠ DANGER**



#### **Electric shock!**

Danger of death due to electrical voltage when assembling/disassembling the device.

- > Switch off transformer on high-voltage side and low-voltage side.
- > Lock transformer to prevent unintentional restart.
- > Make sure that everything is de-energized.
- > Visibly connect all transformer terminals to ground (grounding leads, grounding disconnectors) and short circuit them.
- > Cover or cordon off adjacent energized parts.

### 5.2.1 Cable recommendation

Please note the following recommendation when wiring the device:

- To make the connection, you need suitable ring cable lugs and cable glands that are not included in the scope of delivery.
- The cables used must be flame-resistant in accordance with IEC 60332-1-2 or UL 2556 VW-1.

Cable	Conductor cross-section	Connection
Protective conductor	≥ all other conductors	M6 thread

Table 9: Cable recommendation

## 5.2.2 Connecting the TBX cables

You can choose from several housing versions. For better clarity, not all versions are shown in diagrams in the following chapter.

To connect the cables, proceed as follows:

1. Connect the cables to the rear connections of the terminal box.

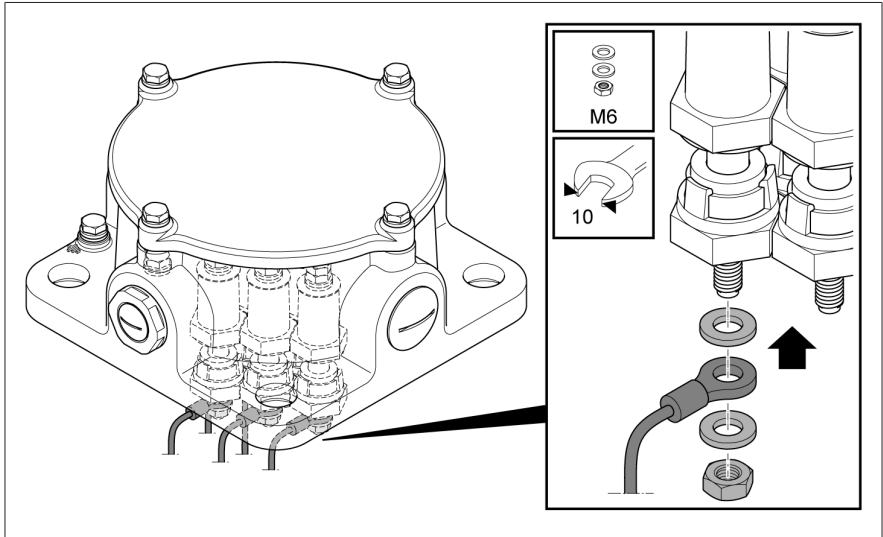


Figure 4: Connecting the terminals, rear

2. Remove the screws on the terminal box cover and remove the cover.
3. Remove the plastic bag with fastening materials for connection cables from the terminal box.
4. Depending on which side is to be connected, remove the dummy plug from the adapter (M20x1.5) or the housing (M25x1.5).
5. **NOTICE!** Damage to the terminal box due to IP degree of protection being too low. Screw the correct cable bushing into the adapter (M20x1.5) or the housing (M25x1.5).

6. Route the cables through the cable bushing and connect them to the terminals with the fastening material from the plastic bag.

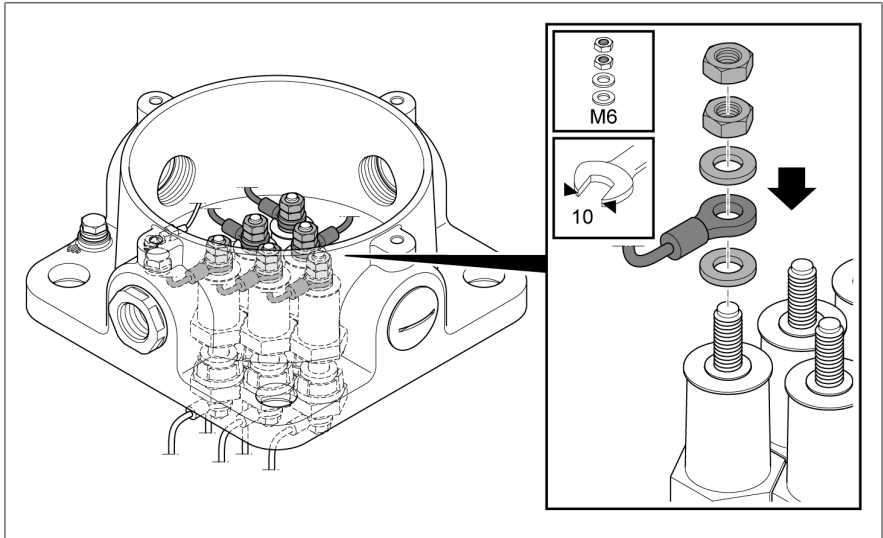


Figure 5: Connecting the terminals

7. Connect the inner grounding cable.

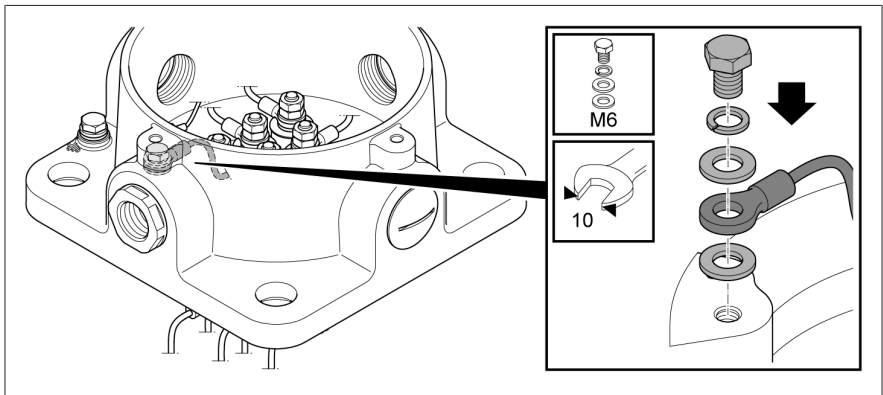


Figure 6: Connecting the inner grounding cable

8. Place the cover on the terminal box and screw it in place.

9. Connect the grounding cable to the outer grounding screw.

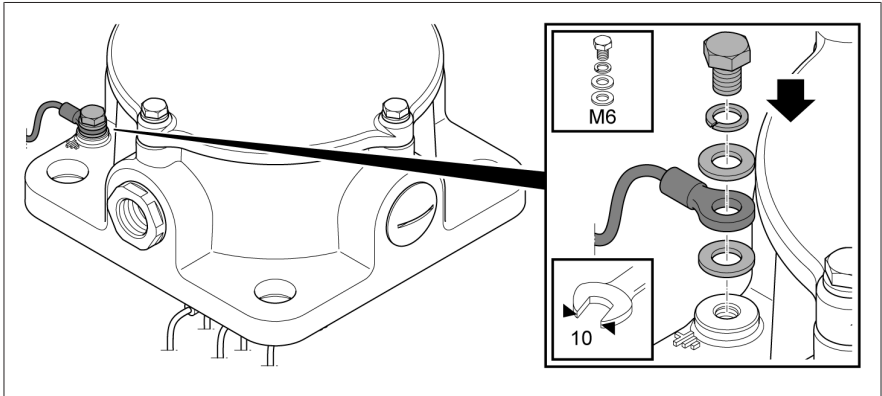


Figure 7: Connecting the outer grounding cable

### 5.2.3 Connecting the CGX cables

You can choose from several connection versions. For better clarity, not all versions are shown in diagrams in the following chapter.

To connect the cables, proceed as follows:

1. Connect the cables to the rear connections of the terminal box.

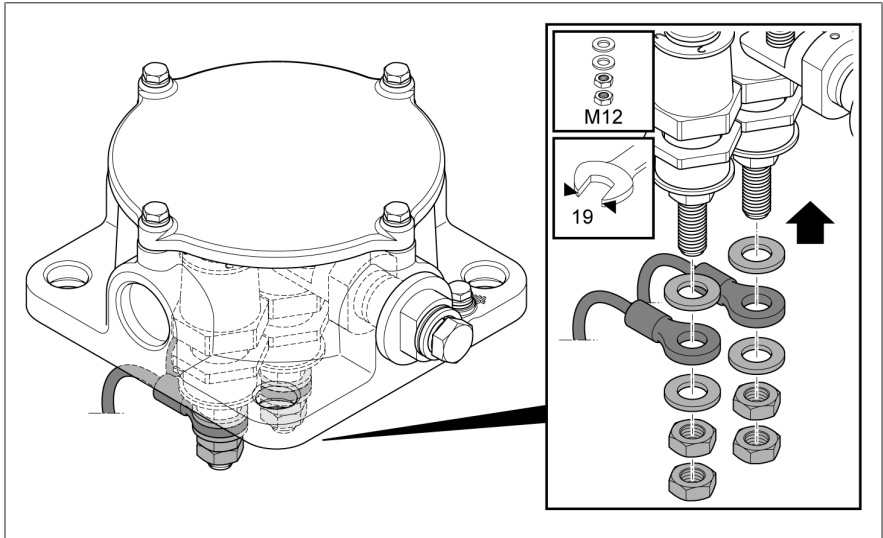


Figure 8: Connecting the terminals, rear

2. Remove the screws on the terminal box cover and remove the cover.
3. Remove the plastic bag with the connecting plates from the terminal box.

4. Fasten the connecting plates on the connections in the terminal box.

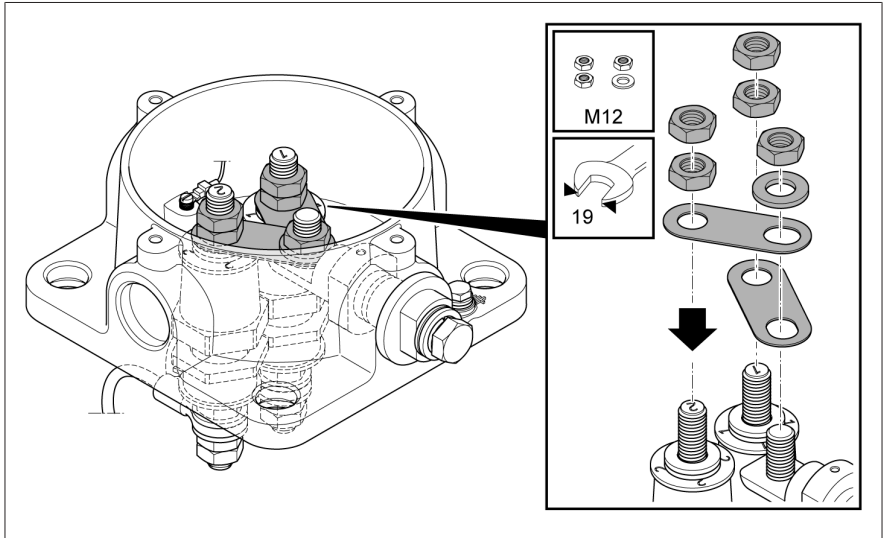


Figure 9: Connecting plates

5. Connect the system-side grounding cable to the M12 grounding screw on the terminal box housing.

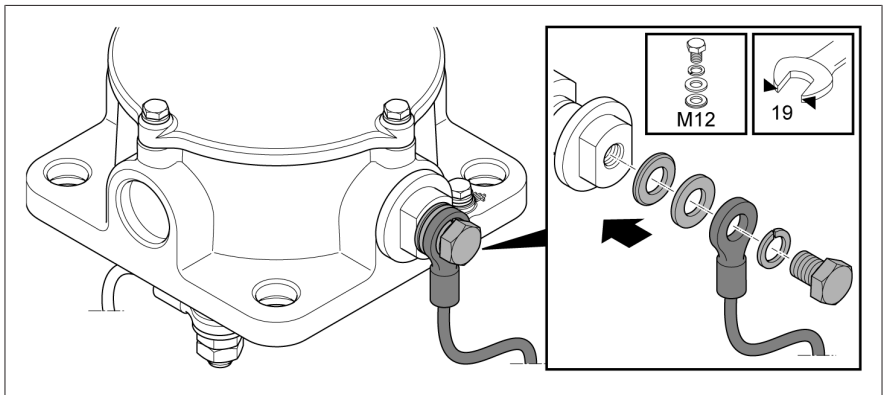


Figure 10: Grounding screw

6. Place the cover on the terminal box and screw it in place.



## 6 Commissioning

Prior to commissioning the transformer, perform the following checks. If anything is unclear regarding the checks or troubleshooting, please contact CEDASPE S.r.l. [► Section 1.1, Page 5].

### 6.1 Leak test

- ✓ The transformer tank is filled with insulating fluid.
  1. Check the tightness of the flange connection.
  2. If the connection is not tight, lower the oil level in the transformer, check the gasket and replace it if necessary.
    - » The test is complete.

### 6.2 Connection inspection

- ✓ The cables are connected to the terminal box and the terminal box is grounded.
  1. Make sure that the connections cannot become unscrewed on their own.
  2. Tighten loose connections.
    - » The test is complete.

# 7 Maintenance and inspection

## Maintenance

The device does not require maintenance.

## Inspection

Depending on the conditions of use of the device and the national regulations in the respective country of use, the transformer manufacturers can specify different inspection intervals.

- Observe the inspection intervals defined in CIGRE Publication No. 445 "Guide for Transformer Maintenance" or the inspection intervals specified by the transformer manufacturer.

During each transformer inspection, check the following:

1. Check the external condition of the device for contamination, damage (e.g. broken glass, electrical connection) and corrosion.
2. Check the tightness of the flange connection.
3. Check connections. [▶ Section 6.2, Page 33]

## 8 Disposal

Observe the national disposal regulations in the country of use.

### 8.1 SVHC information in accordance with the REACH regulation

This product complies with the provisions of European Regulation 1907/2006/EC dated December 18, 2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

The following components of the product contain > 0.1% [w/w] of the SVHC substance lead (CAS no. 7439-92-1):

- Aluminum alloy
- Brass alloy

## 9 Technical data

Basic materials	
Housing/cover	Cast aluminum, 2-layer paint system (epoxy and polyurethane), standard RAL 7031 or 7033 (other colors on request); seawater-resistant version (offshore) on request
Specifications	
Setup	Indoors and outdoors, tropic-proof
Ambient air temperature	-50 °C...+80 °C
Storage temperature	-40 °C...+80 °C
Operating temperature	-40 °C...+115 °C
Insulating fluid temperature	-25 °C...+105 °C (up to +115 °C in transformer over-load operation) Temperature ranges for alternative insulating fluids on request
Degree of protection	IP 65 in accordance with DIN EN 60529
Weight	Approx. 2 kg (SM4-C)
Power	
Current rating (permanent)	50 A (TBX)
Current rating (permanent)	250 A (CGX)
Current rating (short-term, 10 seconds)	400 A (CGX)
Electrical connection	
Cable bushing	M25 x 1.5 (others on request)
Connection terminals	M6 thread (TBX)
Connection terminals	M12 thread (CGX)
Grounding screw	M6 screw

## Insulating fluid

- Unused insulating oils derived from petroleum products<sup>1)</sup> in accordance with IEC 60296 and ASTM D3487 (equivalent standards on request)
- Unused insulating oils derived from other virgin hydrocarbons in accordance with IEC 60296, or blends of these oils with petroleum products<sup>1)</sup> in accordance with IEC 60296, ASTM D3487 or equivalent standards on request
- Alternative insulating fluids, such as natural and synthetic esters or silicone oils, on request

<sup>1)</sup> Gas-to-liquid oils (GTL oils) are understood in this context as petroleum products

# 10 Drawings

CEASPE S.r.l. COPYRIGHT RESERVED  
THE REPRODUCTION, DISTRIBUTION AND UTILIZATION OF THIS DOCUMENT AS WELL AS THE COMMUNICATION OF ITS CONTENTS TO OTHERS WITHOUT EXPRESS AUTHORIZATION IS PROHIBITED. OFFENDERS WILL BE HELD LIABLE FOR THE PAYMENT OF DAMAGES. ALL RIGHTS RESERVED IN THE EVENT OF A PATENT, UTILITY MODEL OR DESIGN.

DATE	DOCUMENT NO.	NAME
DIFTR. 29/03/22	5034	Curti M.
CHKD. 29/03/22	SCALE	Giorgi A.
STAND. 29/03/22	02	Giorgi A.

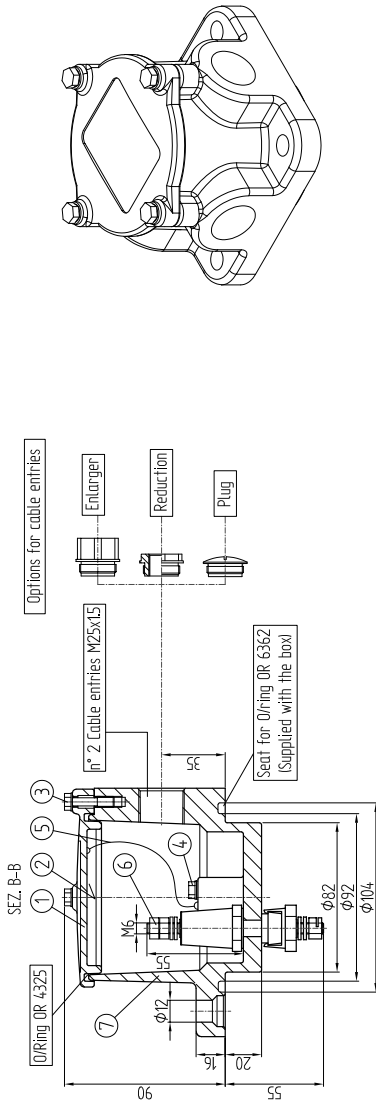
DIMENSION  
IN mm  
EXCEPT AS  
NOTED



## Terminal box type SM4-D (XS)

SERIAL NUMBER

MATERIAL NUMBER SHEET  
1/1

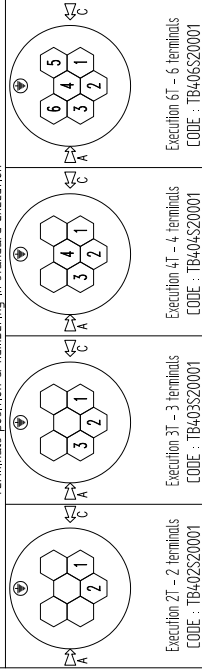


Pos.	Description
1	Terminal box cover
2	Terminal identification label
3	Cover assembly screw
4	Ground terminal
5	Cover holding wire
6	Terminal
7	Terminal box housing
8	Terminal box identification label

Execution according to IEC 60076-22-7

Painting: RAL7033  
- Corrosive class: C4-H  
- Execution for Oil mineral origin  
- IP protection class: IP65  
- withstand insulation voltage between terminals & between terminals and ground: 25 kV a.c.  
- Current rating (continuous): 50 A

terminals position & numbering in standard execution



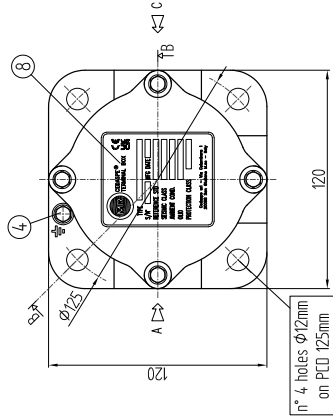
Execution 2T - 2 terminals  
CODE : TB402S20001

Execution 3T - 3 terminals  
CODE : TB403S20001

Execution 4T - 4 terminals  
CODE : TB404S20001

Execution 6T - 6 terminals  
CODE : TB406S20001

Average weight: ~15 Kg



DATE	NAME	DOCUMENT NO.
DFTR. 29/03/22	Curti M.	5035
CHKD. 29/03/22	Giorgi A.	CHANGE NO.
STAND. 29/03/22	Giorgi A.	03
		SCALE
		1:2

DIMENSION  
 IN mm  
 EXCEPT AS  
 NOTED



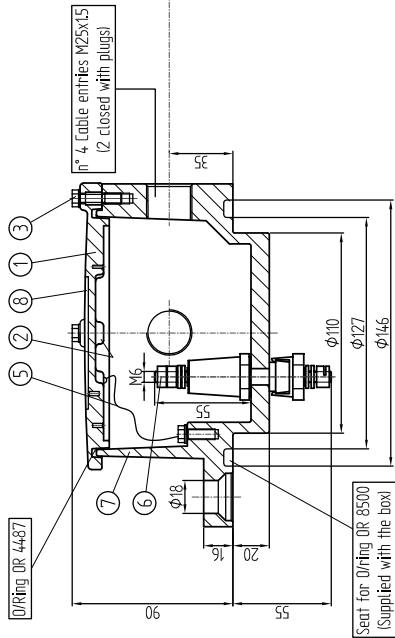
Terminal box  
 type SM4-C (S)

SERIAL NUMBER

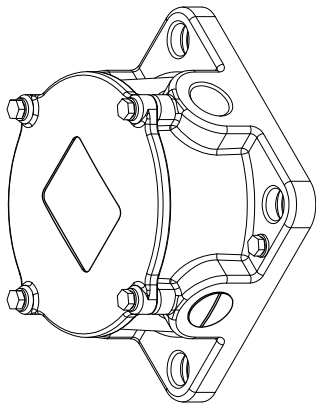
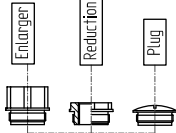
MATERIAL NUMBER

SHEET  
 1/1

SEZ. B-B



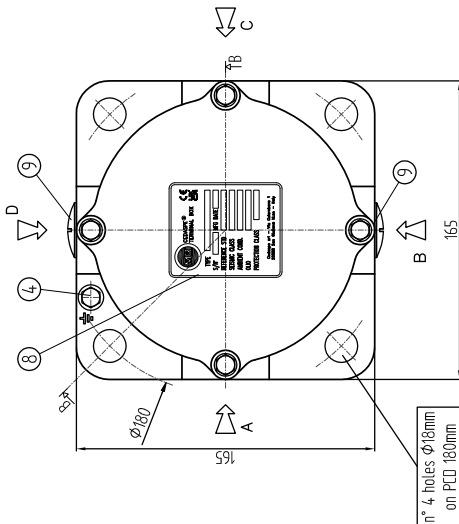
Options for cable entries



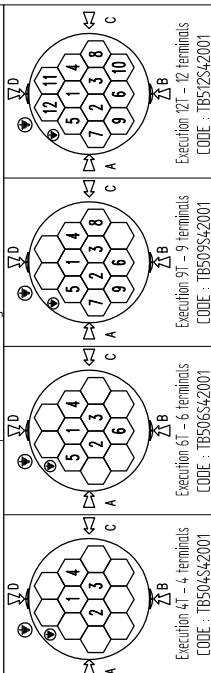
Pos.	Description
1	Terminal box cover
2	Terminal identification label
3	Cover assembly screw
4	Ground terminal
5	Cover holding wire
6	Terminal
7	Terminal box housing
8	Terminal box identification label
9	Plug M25x15

Execution according to IEC 60076-22-7

- Painting: RAL7033
- Corrosive class: C4-H
- Execution for Oil mineral origin
- IP protection class: IP65
- Withstand insulation voltage between terminals & between terminals and ground : 2.5 kV a.c.
- Current rating (continuous): 50 A



Terminals position & numbering in standard execution





DATE	NAME	DOCUMENT NO.
02/03/22	Curti M.	5039
29/03/22	Giorgi A.	CHANGE NO.
29/03/22	Giorgi A.	05
SCALE	1:2	

DIMENSION  
IN mm  
EXCEPT AS  
NOTED

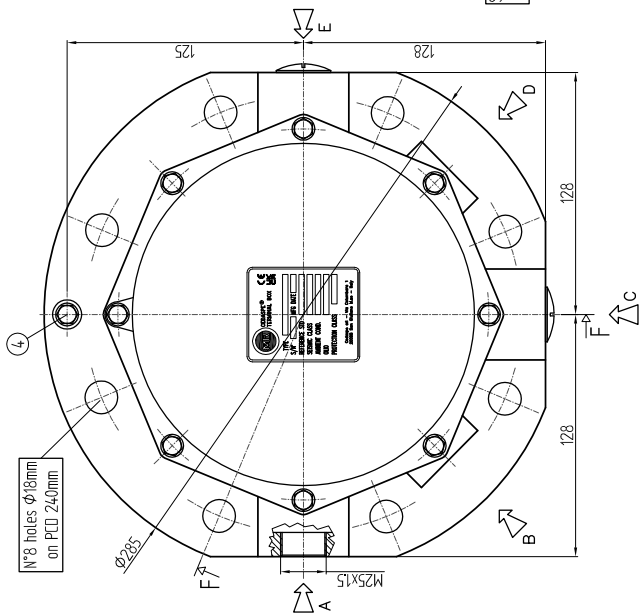


### Terminal box type SM4-B (L)

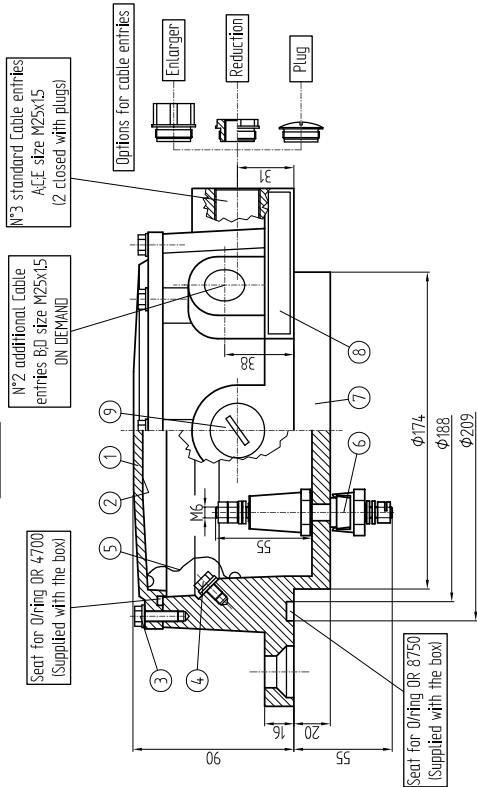
SERIAL NUMBER

MATERIAL NUMBER

SHEET  
1/1



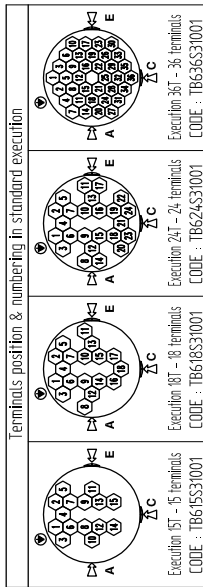
### Sez. F-F



Pos.	Description
1	Terminal box cover
2	Terminal identification label
3	Cover assembly screw
4	Ground terminal
5	Cover holding wire
6	Terminal
7	Terminal box housing
8	Terminal box identification label
9	Plug M25x15

Execution according to IEC 60076-22-7

- Painting: RAL7033
- Corrosive class: C4-H
- Execution for Oil mineral origin
- IP protection class: IP65
- Withstand insulation voltage between terminals & between terminals and ground: 25 kV ac.
- Current rating (continuous): 50 A



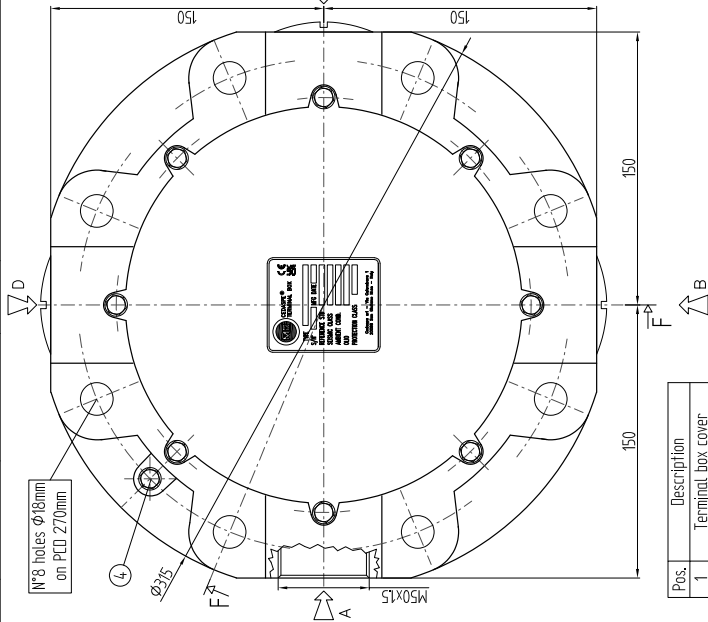
GEDASPE S.r.l. COPYRIGHT RESERVED  
 THE REPRODUCTION, DISTRIBUTION AND UTILIZATION OF THIS DOCUMENT AS WELL AS THE COMMUNICATION OF ITS CONTENTS TO OTHERS WITHOUT EXPRESS AUTHORIZATION IS PROHIBITED. OFFENDERS WILL BE HELD LIABLE FOR THE PAYMENT OF DAMAGES. ALL RIGHTS RESERVED IN THE EVENT OF A PATENT, UTILITY, MODEL OR DESIGN.

DATE	NAME	DOCUMENT NO.
DFTR. 29/03/22	Curti M.	5040
CHKD. 29/03/22	Giorgi A.	CHANGE NO.
STAND. 29/03/22	Giorgi A.	05
		SCALE
		1:2

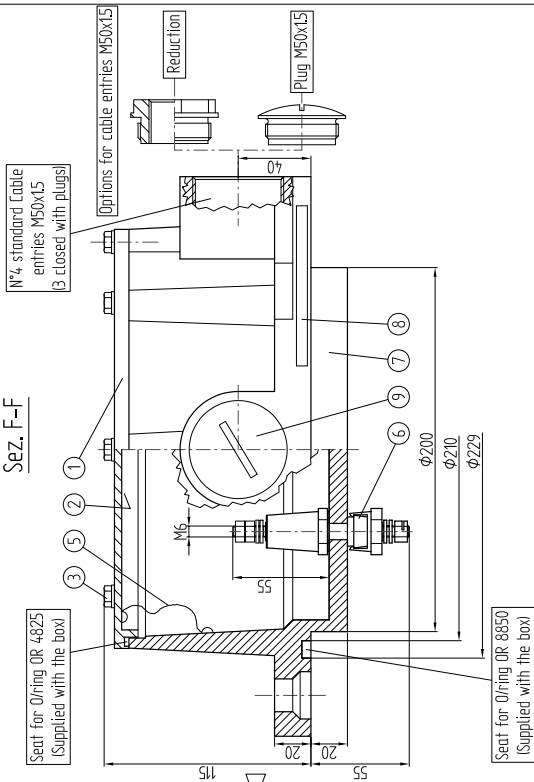
DIMENSION  
 IN mm  
 EXCEPT AS  
 NOTED



### Terminal box type SM4-A (XL)



### Sez. F-F

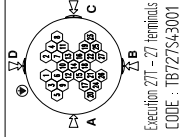


Pos.	Description
1	Terminal box cover
2	Terminal identification label
3	Cover assembly screw
4	Ground terminal
5	Cover holding wire
6	Terminal
7	Terminal box housing
8	Terminal box identification label
9	Plug M50x15

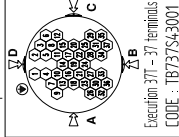
Execution according to IEC 60076-22-7

- Painting: RAL7033
- Corrosive class: L4-H
- Execution for Oil: mineral origin
- IP protection class: IP65
- Withstand insulation voltage between terminals & between terminals and ground: 25 kV ac.
- Current rating (continuous): 50 A

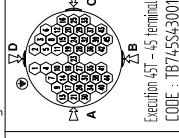
Terminals position & numbering in standard execution



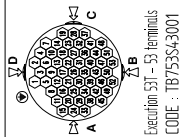
Execution 27T-27 terminals  
 CODE: IB72754-3001



Execution 37T-37 terminals  
 CODE: IB73754-3001



Execution 45T-45 terminals  
 CODE: IB74554-3001



Execution 53T-53 terminals  
 CODE: IB75354-3001

SERIAL NUMBER

MATERIAL NUMBER

SHEET  
 1/1

DATE	29/03/22	DOCUMENT NO.	5036
NAME	Curti M. Giorgi A. Giorgi A.	CHANGE NO.	03
DFTR.	29/03/22	SCALE	1:2
CHKD.			
STAND.			

DIMENSION  
IN mm  
EXCEPT AS  
NOTED

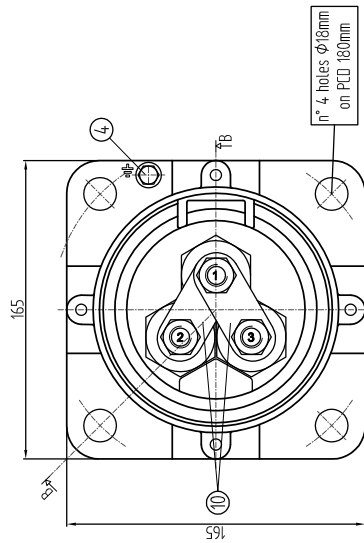
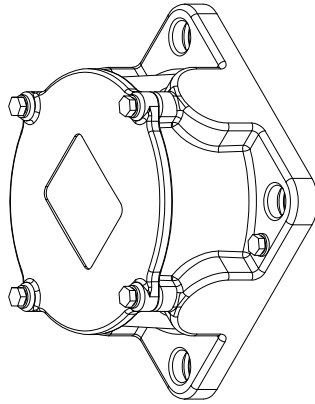
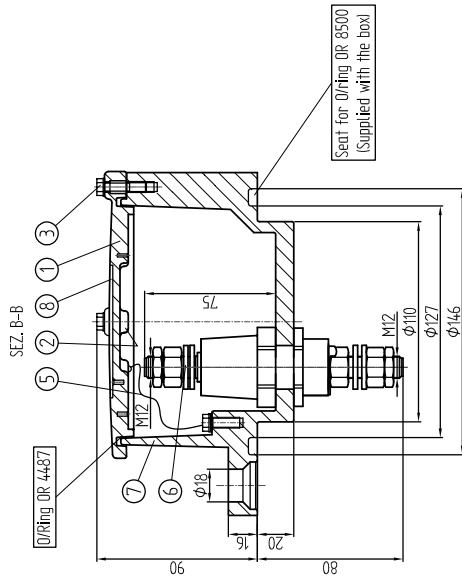


### Grounding terminal box type SM4-CFT

SERIAL NUMBER

MATERIAL NUMBER

SHEET  
1/1



Pos.	Description
1	Terminal box cover
2	Terminal identification label
3	Cover assembly screw
4	Ground terminal
5	Cover holding wire
6	Terminal
7	Terminal box housing
8	Terminal box identification label
10	Terminal connection link

Execution according to IEC 60076-22-7

- Painting: RAL7033
- Corrosive class: C4-H
- Execution for Oil mineral origin
- IP protection class: IP65
- Withstand insulation voltage between terminals & between terminals and ground: 10 kV ac.
- Current rating (continuous): 250 A
- Short time current (10s): 400 A

LEDASPE ordering code: 1B503C00001

DATE	NAME	DOCUMENT NO.
29/03/22	Curti M.	5037
29/03/22	Giorgi A.	CHANGE NO.
29/03/22	Giorgi A.	SCALE
STAND.	04.	1:2

DIMENSION  
IN mm  
EXCEPT AS  
NOTED

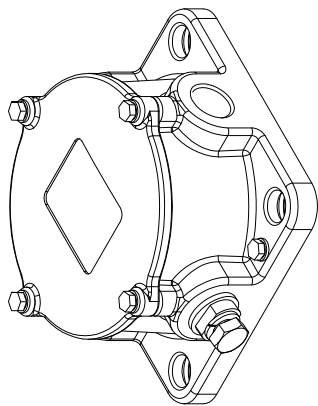
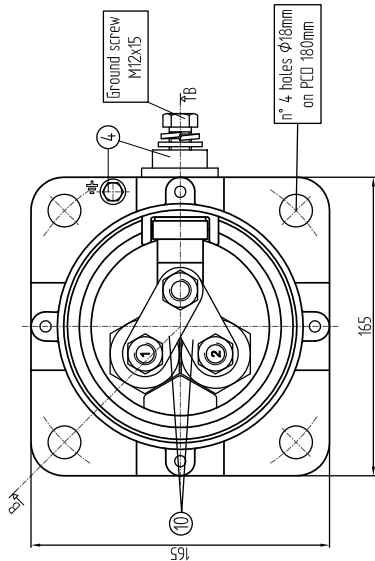
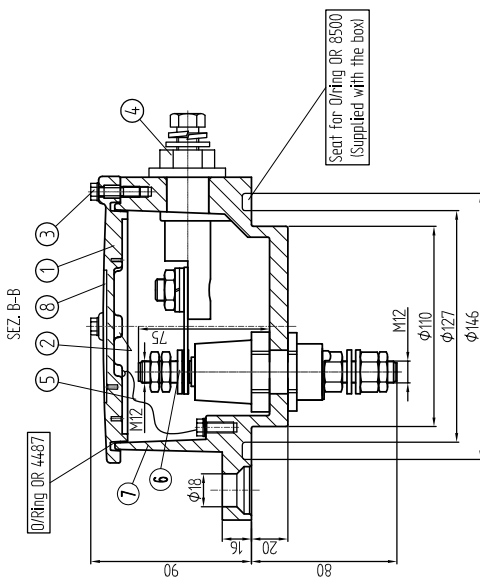


### Grounding terminal box type SM4-CGT (2T+GNT M12)

SERIAL NUMBER

MATERIAL NUMBER

SHEET  
1/1



Pos.	Description
1	Terminal box cover
2	Terminal identification label
3	Cover assembly screw
4	Ground terminal
5	Cover holding wire
6	Terminal
7	Terminal box housing
8	Terminal box identification label
10	Terminal connection link

Execution according to IEC 60076-22-7

Painting: RAL7033

Corrosive class: C4-H

Execution for Oil mineral origin

IP protection class: IP65

Withstand insulation voltage between

terminals & between terminals and ground : 10 kV ac.

Current rating (continuous): 250 A

Short time current (I0S): 400 A

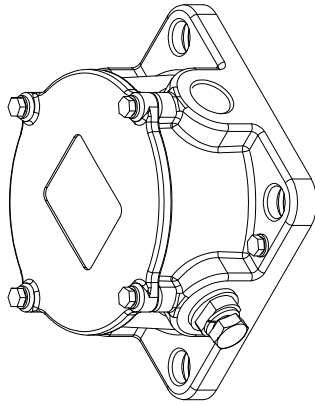
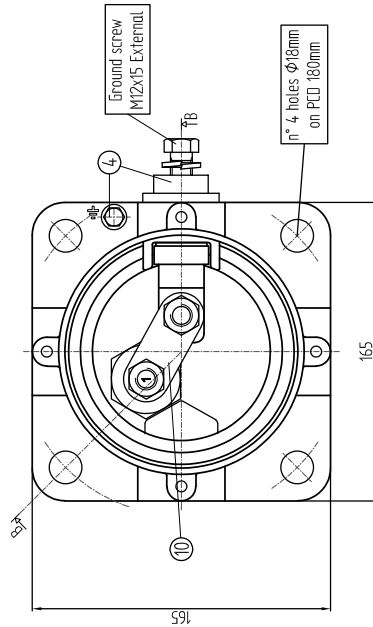
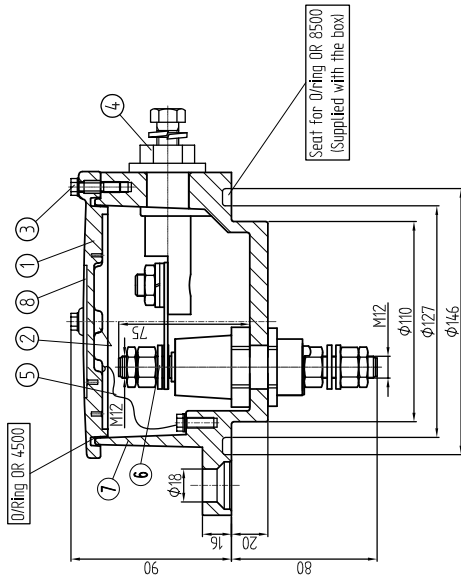
LEDASPE ordering code: TB502C00001

GEDASPE S.r.l. COPYRIGHT RESERVED

THE REPRODUCTION, DISTRIBUTION AND UTILIZATION OF THIS DOCUMENT AS WELL AS THE COMMUNICATION OF ITS CONTENTS TO OTHERS WITHOUT EXPRESS AUTHORIZATION IS PROHIBITED. OFFENDERS WILL BE HELD LIABLE FOR THE PAYMENT OF DAMAGES. ALL RIGHTS RESERVED IN THE EVENT OF THE GRANT OF A PATENT, UTILITY MODEL OR DESIGN.

DATE	DOCUMENT NO.	NAME	CHANGE NO.	SCALE
DFTR. 29/03/22	5038	Curti M.		
CHKD. 29/03/22		Giorgi A.		
STAND. 29/03/22	02	Giorgi A.		1:2

SEZ. B-B



Pos.	Description
1	Terminal box cover
2	Terminal identification label
3	Cover assembly screw
4	Ground terminal
5	Cover holding wire
6	Terminal
7	Terminal box housing
8	Terminal box identification label
10	Terminal connection link

Execution according to IEC 60076-22-7

Painting: RAL7033

Corrosive class: C4-H

Execution for oil mineral origin

IP protection class: IP55

Withstand insulation voltage between terminals & between terminals and ground: 10 kV ac.

Current rating (continuous): 250 A

Short time current (0.5s): 400 A

Gedaspe ordering code: TB50TC00001

DIMENSION  
IN mm  
EXCEPT AS  
NOTED



Grounding terminal box  
type SM4-CGP (1T+GNT M12)

SERIAL NUMBER

MATERIAL NUMBER

SHEET  
1/1

# Glossary

## **Ambient air temperature**

Permissible temperature of the air in the surroundings of the equipment in operation on which the device is installed.

## **Insulating fluid temperature**

Permissible temperature of the insulating fluid in the product or directly on the product.

## **Operating temperature**

Permissible temperature in the immediate surroundings of the device during operation taking ambient influences, for example due to the equipment and installation location, into consideration.

## **Storage temperature**

Permissible temperature for storing the device in an unmounted state or in a mounted state so long as the device is not in operation.

## **Maschinenfabrik Reinhausen GmbH**

Falkensteinstrasse 8

93059 Regensburg

Germany

+49 941 4090-0

info@reinhausen.com

**reinhausen.com**

Please note:

The data in our publications may differ from the data of the devices

delivered. We reserve the right to make changes without notice.

11722312/00 EN - CEDASPE<sup>®</sup> TBX CGX Operating instructions -

02/25

Maschinenfabrik Reinhausen GmbH 2025



THE POWER BEHIND POWER.