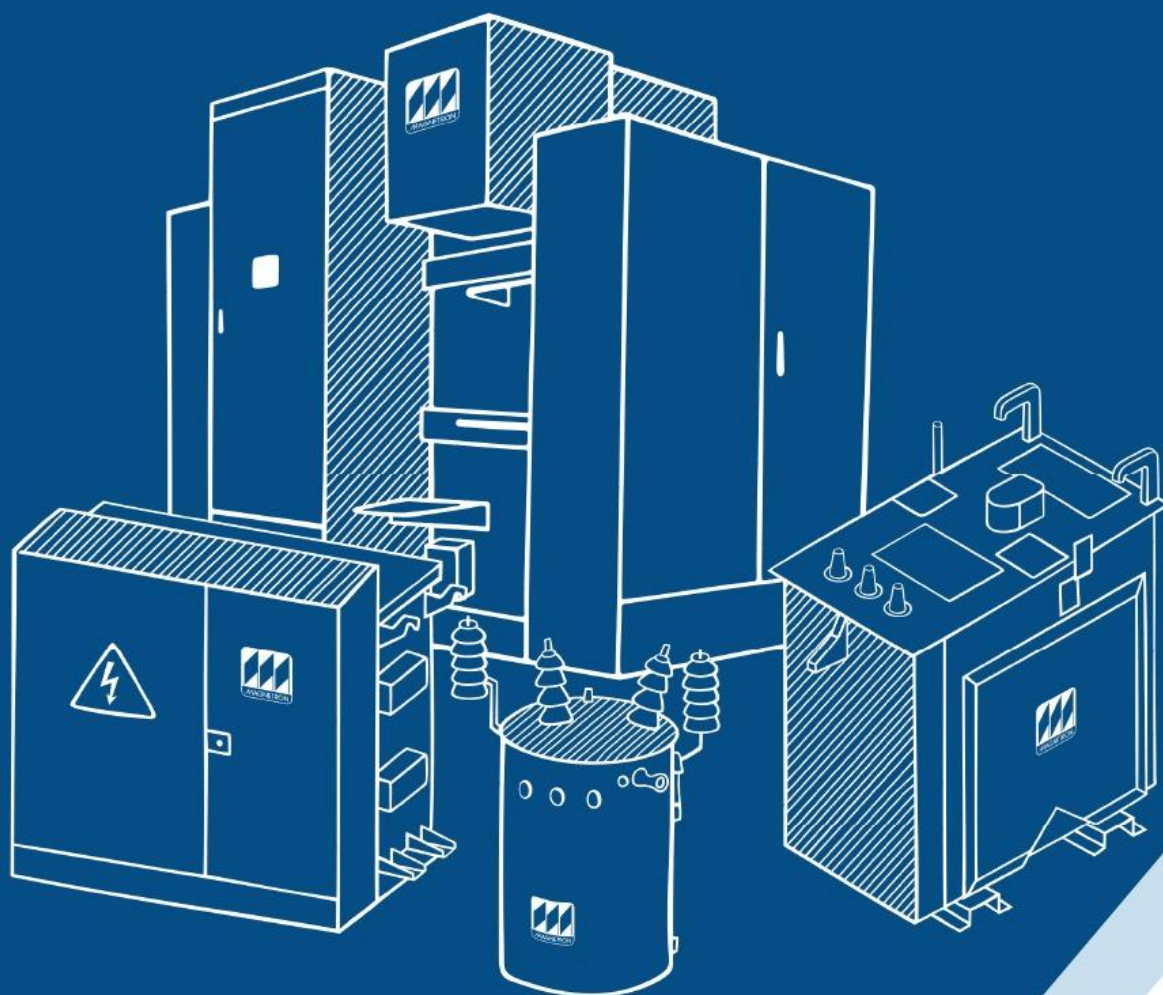




**WE TRANSFORM  
ENERGY INTO  
SUSTAINABLE GROWTH**



# HANDLING GUIDE



## 1. INTRODUCTION

These guidelines are intended to provide our customers as well as transport companies with general recommendations for the correct handling and transport of transformers.

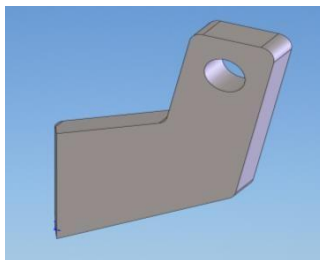
## 2. TRANSFORMER TYPES

- Small power
- Single-phase transformers
- Three-phase transformers
- Pad-mounted transformers
- Dry-type transformers
- Submersible transformers
- Transformers for the oil industry

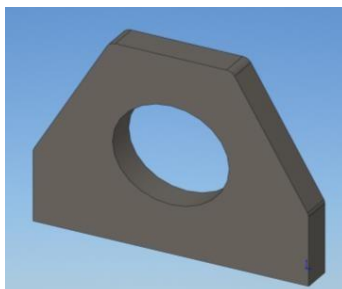
## 3. TRANSFORMER HANDLING ACCESSORIES

These accessories refer to the elements required for proper and correct handling and operation of the transformer.

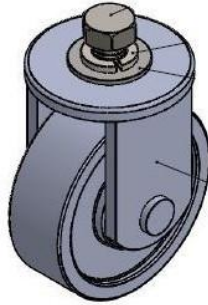
Tank lifting lug



Cover lifting lug



Casters



## 1. HANDLING AND TRANSPORT

The transformer is transported in accordance with a prior mutual agreement between Magnetron and the customer.

It is important to consider road conditions and possible traffic restrictions resulting from the size and weight of the transformer.

### 1.1. Reception

Before unloading the transformer from the vehicle, verify that it has arrived in perfect condition, as it may have been damaged during transport. Please contact the factory immediately if you detect any damage.

If you receive a transformer and any accessories are not installed, verify that they have not suffered any mechanical damage during transport.

Check whether the transformer may have been accidentally dropped or if the safeguards or pipes have been damaged.

Check for any hardware that may have become loose.

Review the condition of the control instruments attached to the main tank (if any)

If the transformer is shipped without oil, verify that the pressure gauge shows a positive pressure reading, to ensure that no moisture has entered the active part during transport. (If available)

Check the nameplate information, making sure that it matches the transformer delivery document.

Verify that all transformer accessories are securely attached and that there are no cracks or chips.

The tank and radiators (if any) must be free of dents, scratches, oil leaks, or stains.

The transformer terminals and grounding points must be duly identified.

The input voltage indicated on the transformer nameplate must match the voltage of the system to which it will be connected.

The transformer must be either securely mounted on a wooden or metal pallet, or properly crated.

If the transformer has a cabinet, make sure that the opening key is included, that the doors can be opened, and that the locking system operates properly.

Verify that any accessories shipped separately match those shown on the delivery slip or packing list submitted by the shipper.

## 1.2. Handling

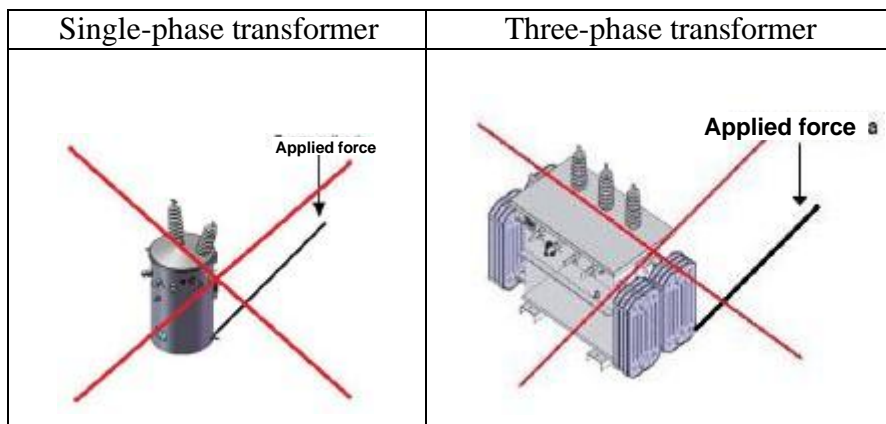
**SAFETY:** The transformers must be handled, installed, and operated by qualified personnel, in compliance with the applicable standards at the site of installation.

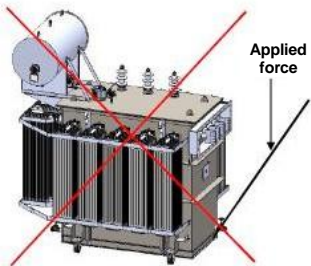
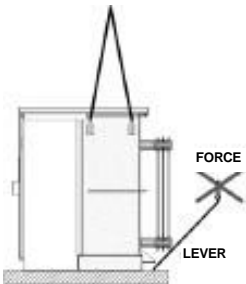
### **WARNINGS:**

- If the transformer cannot be handled using a crane or chain hoist, it may be moved by sliding it on skids or rollers, using forklifts or a pallet jack, taking care to avoid damage to the base and to prevent excessive tilting.
- The wooden pallet on which the transformer is shipped can be used for moving it with a forklift or pallet jack. Keeping the transformer on the pallet until it reaches the installation site provides additional protection.
- Never allow the transformer to be dragged directly along the floor, since this could cause damage to the tank or to the painted surfaces, increasing the risk of corrosion.



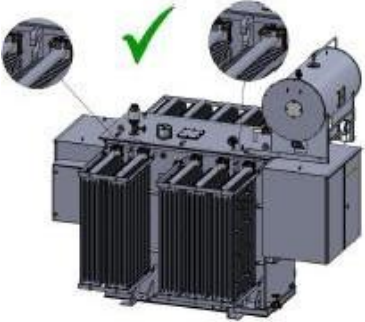

- The transformers are provided with hoisting devices or lifting lugs, which are used to manipulate them with a crane. Wherever possible, try to use fiber slings rather than metallic chains or slings, to prevent damage to the anticorrosion coating. If you must use metallic chains or slings, make sure that the points of contact with the transformer are covered to avoid damage to the paint finish. Avoid hitting the tank or radiators with the slings, since doing so could damage the coated surfaces and result in tank deformation or leaks.
- Never try to lift or move a transformer from the high-voltage and/or low voltage terminals or any other accessory other than the provided lifting lugs, to prevent damage to these very fragile parts.
- Dry-type transformers are protected against rain, dust, or excessive moisture during transport by wrapping them with stretch film.
- Dry-type transformers must be transported in fully covered vehicles. Ensure that the tarpaulin covering the top and sides of the vehicle is free from holes or cracks. **DO NOT** transport them in vans or containers as this generates a greenhouse effect.
- When loading and transporting dry-type transformers, make sure they are loaded widthwise, since a different loading scheme may cause structural fractures due to oscillation during transport.
- Never lift or move a transformer by placing levers or jacks under accessories, radiator connections or other devices, or try to slide or lift it by leveraging against the housing (coils and connections for dry-type transformers) since the structure is not designed to withstand this type of stress and oil leaks, ruptures or deformations may occur.

Examples of improper handling procedures

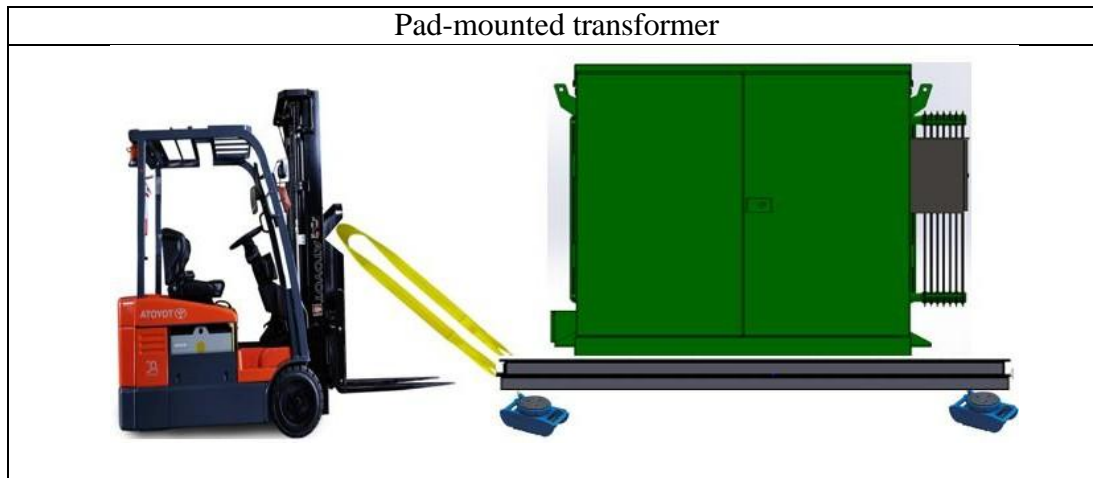


Small power transformer	Pad-mounted transformer
	

Examples of proper handling procedures

Pad-mounted transformer	Submersible transformer
	
Small power transformer	Dry-type transformer
	





### 1.3. Transport and loading

**SAFETY:** The transformers must be handled by qualified personnel, in compliance with all applicable standards in force at the site of installation.

**WARNINGS:**

Transformers may be transported in stacks of up to two levels. It is recommended that this practice be limited to 5, 10, 15, 25, 37.5 and 50 kVA transformers with a maximum gross weight of **400 kg** and only for crated items.

A suitable vehicle must be selected for this type of loading. MAGNETRON recommends a vehicle where transformer stability and proper strap fixing can be guaranteed. Care must be taken not to exceed the maximum height.

Wooden planks must be placed under the equipment to cushion it and prevent displacement during transport. It is also important to ensure that the straps keep the equipment from moving in the vehicle or container; alternatively, the transformer base itself can be used as a wedge to prevent displacement.

Whenever possible, use slings that support double the gross weight of the load. This will ensure that they meet the purpose of supporting and stabilizing the load during transport.

Prior to handling any load, verify that the specification of the equipment you are going to use covers and exceeds the weight of the cargo to be handled, this will avoid swing effects from handling and possible damages due to falls.

Example of improper loading

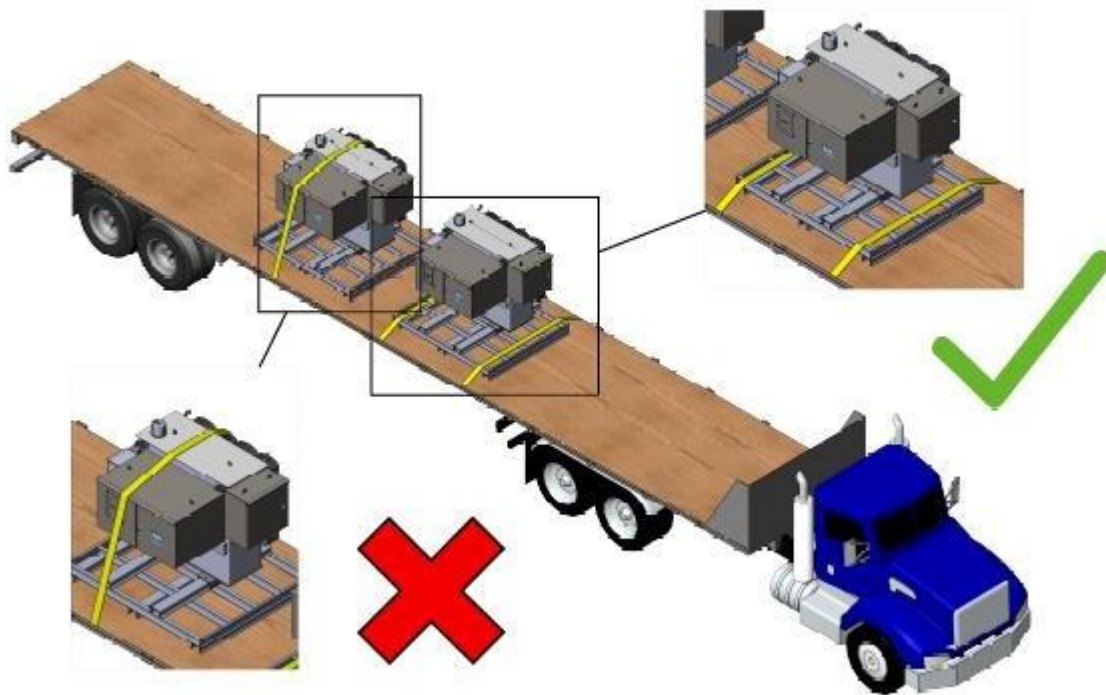


Example of proper loading





Avoid making ties that may compromise the structure of the transformer (tank, cabinets); use the straps to anchor the bases or handling elements designed for that purpose (lifting lugs)



Example of proper loading of a dry-type transformer (widthwise):



Example of improper loading of a dry-type transformer (lengthwise):





**WE TRANSFORM  
ENERGY INTO  
SUSTAINABLE  
GROWTH**

**GENERATING  
WEALTH WITH  
SOCIAL CONSCIENCE**

**[WWW.MAGNETRON.COM.CO](http://WWW.MAGNETRON.COM.CO)**