# Safety manual for field work, minimum requirements


Code: _____ Prepared by: Juan Carlos LM Date: 2024-02-03

## Content

# 1. Safety and risks

Read this safety manual carefully before operating on the product; failure to follow instructions may result in property damage, serious injury, or death.

Never work on or handle energized transformers.

When working with voltages, the first mistake can be the last.

This manual contains important information for the safety of personnel and the product.

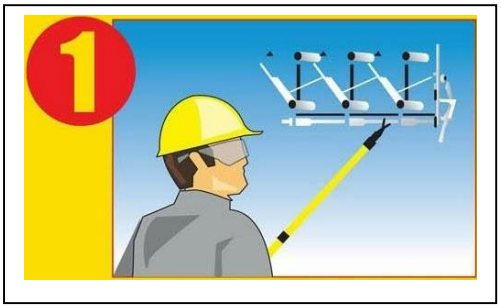
Under no circumstances should you work or manipulate energized transformers or control panels, your safety and well-being are non-negotiable, therefore, the necessary measures must be taken to preserve your safety.

It is well known that the systems used to energize or de-energize transformers vary depending on their nature and the cost of the investment.

When you need to perform work on transformers in the field, you MUST meet the following requirements:

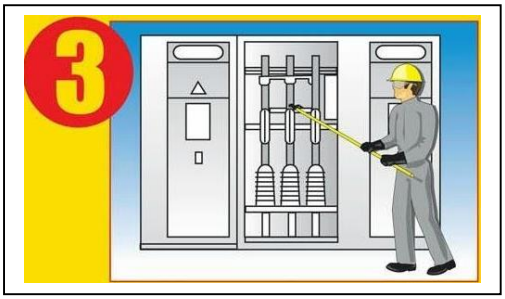
## 1.1 Apply the 5 GOLDEN rules

### 1.1.1 Effectively identify and cut off all sources of stress

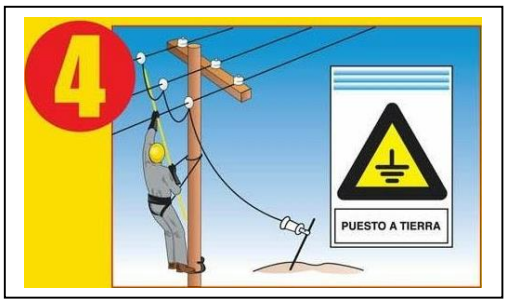



### 1.1.2 Lock the cutting devices in the open position


### 1.1.3 Check absence of tension



### 1.1.4 Ground and short circuit




### 1.1.5 Delimit and mark the work area


### 1.2 The transformer must be de-energized (cut off voltage source)

Power outage is an activity that is the responsibility of the customer.

The transformer must be out of service to be able to intervene.

### 1.3 Lock power supply and load

> If the blocking cannot be carried out, the transformer cannot be intervened.

When the disconnection system allows it, the power shut-off elements (disconnectors, totalizers, breaker, main switch, etc.) must be locked with a padlock.

Also, the load connection elements must be blocked.

Locking with a padlock or similar prevents accidental or malicious energization of the transformer.


Figure 1: Padlock block system

When there are crews or other people on the job site performing similar tasks, make sure that each crew or person has placed their own locking padlock.

The lock must be labeled with the name of the responsible person and their contact number.

This activity ensures that the transformer can only be energized when the last lock has been removed.

Figure 2: Block system with padlock for each gang

### 1.4 Check absence of tension

If the absence of voltage cannot be achieved, the transformer cannot be intervened.

Make sure that the transformer is de-energized, to do so, test the absence of voltage in the network (power supply) with an ABSENCE OF VOLTAGE METER.

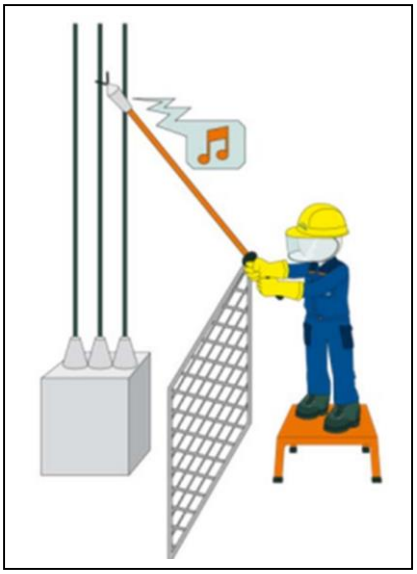


Figure 3: Verification of the absence of voltage


Figure 4: Voltage absence meters

**Note:** The voltage absence meter must match to the mains voltage requirements.

### 1.5 Disconnect the HIGH and LOW voltage terminals of the transformer

If the connection system allows it, the customer must disconnect the power cables (source) and the load cables from the transformer.

**Important:** If the customer does not disconnect, this condition must be reported to MAGNETRON S.A.S. or the responsible person or entity, and approval to intervene on the equipment must be given in writing.

The cables that feed the transformer and those of the load must be short-circuited and connected to ground.

If due to the complexity of the connections it is not possible to disconnect the HV and LV terminals, these must be short-circuited and connected to the same

grounding system of the transformer (see figure 6).

**Note:** The cables used for shorting and grounding must be enough with the capacity of the transformer.

An example of equipment for shorting and grounding the transformer is illustrated in Figure 6.

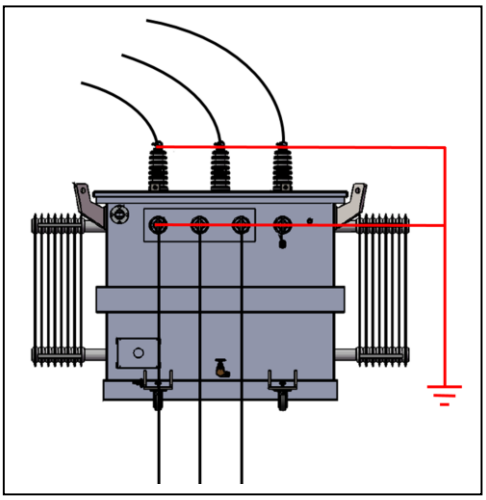


Figure 5: Short circuit and ground connection of HV and LV terminals

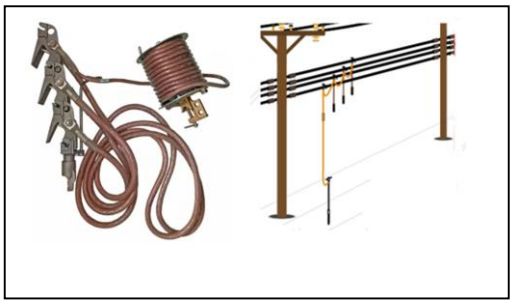


Figure 6: Example of equipment for short-circuiting and grounding voltage sources.

### 1.6 Delimit and mark the work area or area

Delimiting and marking the work area appropriately restricts the access of personnel outside the area, avoiding the potential occurrence of accidents.

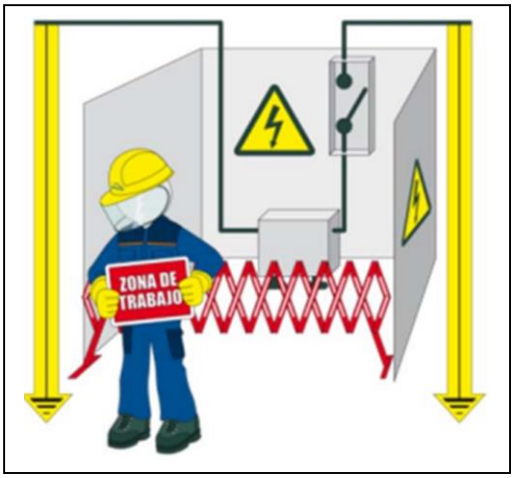



Figure 7: Short circuit and ground connection of HV and LV terminals

### 1.7 Special considerations

When working on site, it is very important to previously inquire with those in charge of the area about the conditions of the environment.

Keep the following in mind:

- If animals are present, use the required protective equipment (snake bite guards, gaiters, etc.).
- Take safety measures according to the weather conditions of the area (hydration, long-sleeved cotton shirt, etc.).

## 2. Personal security

The activities listed in this manual must be carried out by qualified personnel.

Personal protective equipment must be in good condition.

When working with transformers, operators are exposed to a series of risks and dangers; it is very important to know them to eliminate or minimize situations or conditions that may cause damage.

- Stop any activity if working conditions are unsafe.

- All team members must know the instructions in this manual, established workplace safety practices, and applicable laws.

- Use clothing and personal protective equipment appropriate to the work to be done.

✓ Long-sleeved cotton shirt (fireproof).
✓ Dielectric safety boots.
✓ Bait or dielectric gloves.
✓ Latex gloves (taking samples of the insulating liquid).
✓ Latex gloves (handling tools).
✓ Safety glasses.
✓ Dark glasses for sun protection (field activities).
✓ Helmet.
✓ Avoid wearing loose clothing.
✓ Do not wear rings, watches, chains, earrings or any personal item that could cause harm.
✓ Do not wear tennis shoes, shorts, short-sleeved shirts and headphones.
✓ Snake bite guards.
✓ Gaiters.

### 2.1 Types of risks

#### 2.1.1 Physical risks

It refers to all environmental factors that depend on the physical properties of the bodies and that act on the tissues and organs of the worker's body; they can produce harmful effects according to their intensity and exposure time.

They are related to the imminent probability of suffering bodily harm with or without direct contact, they can be classified as occupational or environmental.

They are the most common and can be caused by dangerous conditions at work:

✓ Noises,
✓ Lightning,
✓ Temperature,
✓ Moisture,
✓ Radiation,
✓ Vibrations,
✓ Electricity.

Below are some activities that must be carried out:

- Install localized lighting in those workplaces that require it, when

general lighting is moderate and may be insufficient.

- Avoid dead flow areas (where air does not circulate).
- Use work equipment that generates low noise levels.
- Locate noisy equipment or sources in out-of-the-way locations, if possible.
- Reduce exposure time.
- Establish a workplace shift rotation system.
- Use protective screens or shielding for radioactive sources.

### 2.1.2 Mechanical risks

They are associated with the set of physical factors that can give rise to an injury due to the mechanical action of elements of machines, tools, work pieces or projected materials, solid or fluid.

Mechanical risk can occur in any operation that involves handling hand tools, machinery, handling vehicles, and using lifting devices.

- ✓ Collision against moving or stationary objects,
- ✓ Hits,
- ✓ Cuts,
- ✓ Entrapments due to overturning of machines or vehicles,
- ✓ Entrapments by or between objects,
- ✓ Projection of fragments or particles,
- ✓ Falls of objects during handling.

Below are some activities that must be carried out:

- Train workers in preventive matters, theoretically and practically, on the work equipment necessary for their job.
- Guarantee the conditions and correct way of using machinery, based on the manufacturer's instructions.
- Promote consultation and participation of workers in aspects related to mechanical risks.
- Guarantee periodic monitoring of the health status of workers.
- In the event of accidents or occupational illnesses due to mechanical risks, the necessary corrective measures must be investigated and applied so that they do not occur again.

## 3. Contact Us

For more information or to provide you with technical support, contact us through the following means:

| | |
|---|---|
|  | externalservice.magnetron.com.co |
| | customerservice.magnetron.com.co |
|  | (57) 3187117456<br><br>(57) 3157100 extension 101 |