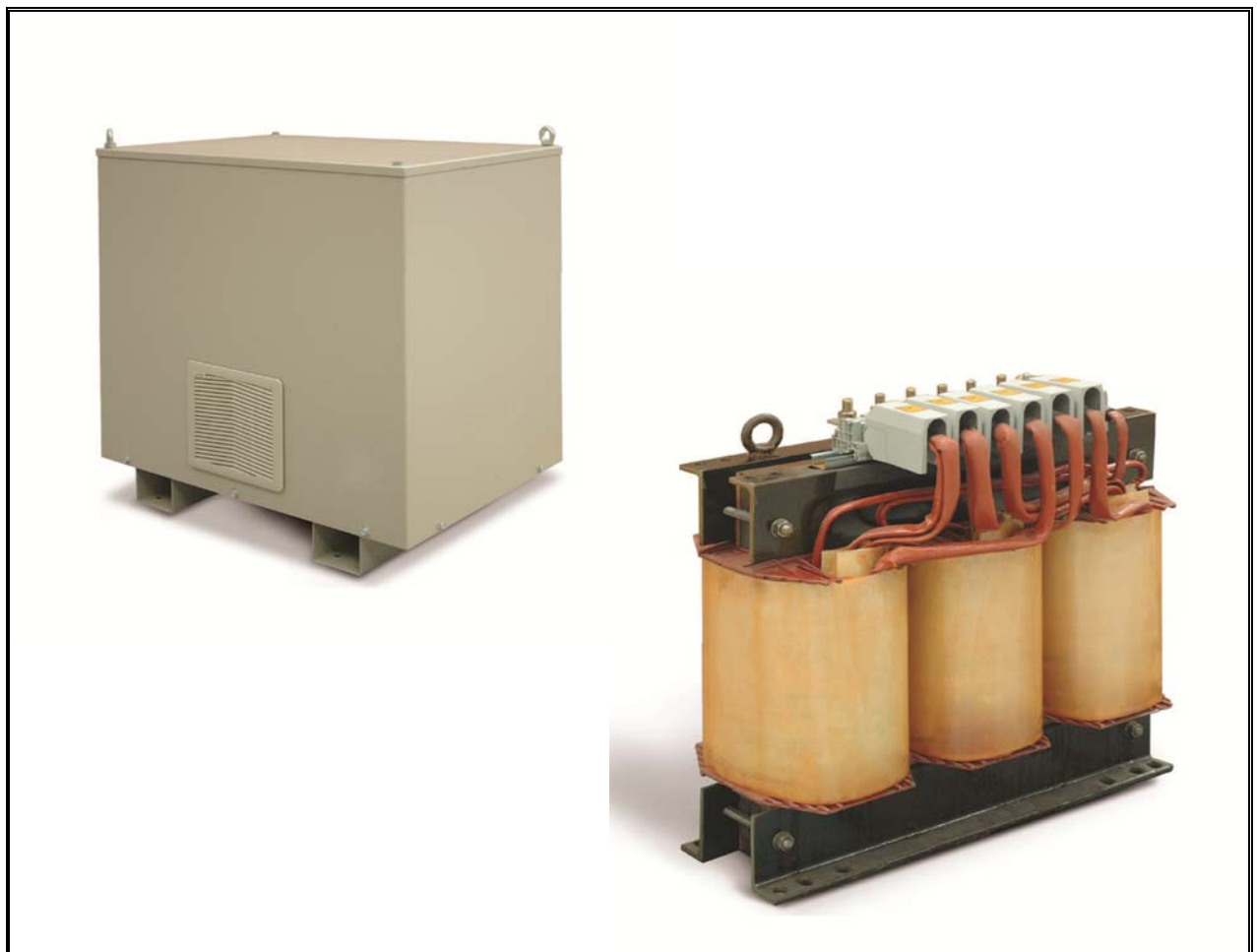


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INSTALLATION, OPERATION AND MAINTENANCE GUIDE FOR INDOOR THREE-PHASE ENCAPSULATED TRANSFORMER



The under described transformer is suitable for the industrial field and it is also in compliance with the standard norms.

Before starting the installation it is recommended to consult this manual and read with attention the plaques situated on the transformer.

General Precautions

1. Do not lift or move a transformer without proper equipment and experienced personnel
2. Do not connect the transformer until the electrical system has been completed
3. Use proper terminals for electrical connections
4. Connections must be in accordance with the nameplate and/or with the connection schemes
5. Make sure all power is disconnected before trying or conducting any work on the transformer
6. Make certain all ground connections are completed and tightened before energizing the transformer
7. Do not try to change any socket on primary and secondary, while the transformer is energized
8. Do not change connections when the transformer is energized
9. Do not adjust or remove any accessories or cover plates while the transformer is energized

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INSTALLATION, OPERATION AND MAINTENANCE GUIDE FOR INDOOR THREE-PHASE TRANSFORMER

1. GENERAL INFORMATION

Three-phase transformers enclosed and in free air are manufactured to provide optimum performance for uninterrupted service.

Careful attention to the following instructions is recommended for safety and reliability.

Installation, operation and maintenance of transformer must be performed by qualified persons who have familiarity with electrical apparatus and the potential hazards involved.

Attention: Danger! There is the potential risk of electric shock whenever working on electrical equipment such as a transformer. Power must always be shut off before any work is conducted on a transformer and make sure that a reinsertion of it is avoid.

As for any electrical device, transformer must be installed according to the requirements of the national and local electrical codes. Referring to EN 60204-1 and EN 61558-1 for installation, application and maintenance of dry type transformer.

2. HANDLING

Transformers are either shipped in cartons or palletized. The units on pallets can either be lifted by forklift or moved by lifting equipment such as hydraulic-forklift.

Appropriate lifting equipment must be used relating to the size of each transformer. Transformer must not be lifted or moved unless using the appropriate anchor points indicated on the unit itself.

Please Note: If a transformer has been palletized, remove all of the bolts and screws, used for the transport, which are located inside the mounting holes, if there are many.

3. RECEIVING INSPECTION

Right after receiving the transformer, an inspection must be effectuated to verify any damage might be occurred during the transport and the correctness against the shipping documents.

The packaging must be analyzed to verify the existence of damages, dents or any other breaks.

If any aberration is noted on the packaging or on the unit itself, a claim must be filed immediately to the carrier and all pertinent information, relating to the order and the circumstances, must be addressed to our sales office.

4. STORAGE

Transformer, that will not be immediately installed and energized, must be stored in a dry place and away from atmospheric agent.

It is recommended that transformer be stored in a dry place and in its original packaging.

5. INSTALLATION

Mounting instructions:

- Select a location where installing the transformer to and that is on a non-combustible surface and possibly to put in level.
- The mounting location must allow the air circulation which permits the cooling of the unit. Refer to the minimum distances indicated on the ventilation section.
- Using an appropriate mounting template, safely linking the transformer on the host surface.
- Lift the transformer using an appropriate equipment in presence of bolts which are anchored to the concrete of the attachment substructure.
- Use mill washer, plain washer and eventually a rubber washer to fix the mounting bolts in the lower mounting hole.
- IP44 enclosed transformers needn't to be fixed by carpentry on the host surface.

6. VENTILATION

Transformers must be installed in an area where they can be cooled by the circulation of the air whose temperature should not exceed 40°C (104°F) but different specifications required by the customer during the planning phase.

A good ventilation of the transformer is essential in order to respect the properties specified on the nameplate.

Multiple transformers must be located at least 20 inches apart on units up to 10 kVA and at least 40 inches apart on units over 10 kVA, away from any obstructions to allow free and clean circulation of air.

7. ACCESSIBILITY

It is necessary that the transformer is accessible for a possible inspection.

However, transformers should not be located in areas where items could interfere with either air circulation or the capability to have them inspected.

Passage ways or other areas where people could be exposed to hazards during the inspection should also be avoided.

In order to avoid any risks, use suitable protections.

8. SOUND LEVELS

Transformers are electrically energized apparatus and, by their nature, emit sounds due to their component materials.

Concerning the maximum sound levels permitted, transformers must follow the general norms.

These sound level standards vary from 40 to 60 dB, hence, they can be annoying if they are located in proximity to where people work or reside.

It is necessary to pay attention where you are going to locate a transformer to, particularly to avoid sensitive areas like hospitals, classrooms, medical and office facilities.

Follow these guiding lines in case of installation that are close to houses:

- Units should be mounted away from corners or walls
- Protected cables and bus bars must be used to get appropriate connections.
- Acoustically absorbing materials should be considered for walls and ceilings that are located around the transformers
- The location of the unit should be located as far as practical from areas where sound levels could be considered undesirable

9. PROTECTIONS AND CABLE CONNECTIONS

1. Open the protective cover of the case taking rings, hex-head cap screws and the washers off. Avoiding any damages on the grounding connections, lifting up carefully the cover
2. Follow the electrical scheme or the nameplate to make the appropriate electrical connections; this includes the input connections and the ground
3. **IT IS FORBIDDEN** to modify the inner connections, it may cause the forfeiture of the warranty and its non-conformity declared on the nameplate by the creator
4. Connectors, sheaths and insulating materials put inside the electrical wires must be isolated properly
5. Make sure the connection clips are properly closed
6. Close the protective cover and verify the grounding cables haven't been crushed or ruined, after that make sure the screws and rings are tightly closed

To consider: load protection with fuse type AM or a residual Residual Current Breakers with Overload Protection class D to protect every primary phase. Lines protection with circuit breakers or with gG fuses. Regarding multiple loads, all of them must be protected and all the cable connections must be properly dimensioned considering the nominal current.

In any case, protections and cables dimensions must be defined by the transformer primary and secondary winding construction features and it's under the total responsibility of the end user.

Please Note: Just in case the customer is going to buy a transformer without the protective box, follow the above mentioned instructions.

10. GROUNDING

All metal parts, that make the transformer up, are internally grounded. There is also available a free contact for the external grounding.

The box of the transformer must, for safety reasons, located on a firm-based surface, always considering its total weight.

The grounding must be in accordance with the National norms.

11. INSPECTION BEFORE ENERGIZATION

For getting a right check and also for the safe and a proper operation of the transformer, it is recommended to follow the under described items:

- a) Before energizing, connecting and the installation, please very the output voltage matches the nameplate specifications
- b) Ensure correct phase connections referring to the nameplate vector diagram
- c) Respect the output and input voltage datas specified on the terminals or the connecting bars
- d) The enclosure should be grounded with the appropriately sized conductor
- e) During the installation, make sure that the power is balanced with the 3 phases in order to ensure the required performance of the transformers winding. Each load, 3 phase or single phase, may be connected to the transformer but the kVA loading on each phase must not exceed 1/3 of the nameplate kVA
- f) The clearance and tightness of all electrical connections must be checked

12. OPERATION

Encapsulated and on air transformers will operate satisfactorily under normal conditions following the specified information on the nameplate, if loading and energizing conditions will be respected.

During the fully loaded operation, transformer may be very warm to the touch. In case of class F transformers the standards foreseen that the maximum surface contact temperature is 70°C, whereas in case of transformers in free air the winding surface temperature can reach a temperature up to 140°C.

Here under indicated in the scheme below the summary about the maximum temperature allowable for transformers in free air, function of the insulation class used for their construction:

Scheme n. 1 – Values of maximum temperatures during normal use

Parts	Temperatures °C
Windings, if the isolation system (coils and insulating materials that are in contact with them) is: <ul style="list-style-type: none"> - Class Ab - Class Eb - Class Bb - Class Fb - Class Hb - Other classes b 	100 115 120 140 165 -

Encapsulated transformers are designed to operate continuously at their full nameplate kVA rating.

- Datas connected to operating temperature of the transformer can vary depending on the environmental conditions where it works; these datas are essential for a proper operation of it and furthermore it is necessary the company knows all above mentioned during the planning phase
- Short time overload, as it relates to increasing operation temperature of the transformer, influences the loss of life of the unit itself
- Generally the overload reduces the life of the transformer significantly

If the transformer is experiencing increased temperatures, it is necessary to verify, the following problems regarding the applied load, immediately:

- Concerning motors, it is recommended the use of a transformer or a specific inductance for these kind of loads
- Over-excitation of the unit can be due to an excessive increasing of the electricity or to the line voltage
- Environmental temperatures over the standards for what the transformer has been designed

- Upper overload than the norms require
- Harmonic distortions of the line voltage and the power

13. MAINTENANCE


Under normal operating conditions and environments, IP 44 enclosed transformers require the cleaning of the upper refineries of the box and it can change by the place where the transformer is located (a bit dusty, dusty, too dusty). So, periodic care and inspection is a good practice, particularly if the unit is exposed to extreme environmental conditions.

During the operation of the transformer it can be conducted a cleaning action in order to take the dirt and the dust off by peripheral and external inspections. However, access cover must not be opened during this activity.

IP44 enclosed transformers will not get a bad effect caused by low temperatures and the accumulation of ice nearby the unit, and in any case, boxes must be located inside the structures which are protected from the atmospheric agents.

The accumulation of dirt, especially the dust, will bring problems during the cooling phase of the unit and it could become a potential fire hazard.

Internal maintenance must be performed with a transformer de-energized and make sure the grounding is efficient.

In accordance with Norm 2006/95/CE and labeling Norm CE 93/68/CEE of products.	
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WARNING! A wrong application of the product due to the in-observance of the above mentioned notes can cause harm to persons and things.

Warranty: All the products are guaranteed for one year starting from the sale date against all of manufacturing defects; damages due to a wrong application, unexpected external event and in-observance of the above mentioned points are abstained from warranty. The alteration of the product could void the manufacturer's warranty. Italweber Elettra S.r.l. will not be liable for damage due to equipments which are connected to our products.