

RESIBLOC[®] Dry Type Distribution Transformers

250 kVA through 40,000 kVA

Preparing the Transformer Site for Indoor and Outdoor Installation





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Documents Purpose and Users

The users of these documents are those responsible for the transformers correct installation, and their workforce. This information is provided in order to correctly prepare the final installation site and its surrounding area, enabling the transformer to be commissioned directly on delivery.

Due to contractual or other reasons it may be necessary to first place the transformer into storage, at site or elsewhere, prior to its commissioning. If so, please refer direct to section "Storage Conditions".

During preparation and planning of the installation site, all local area and national building regulations, all regulations for electrical materials and their uses, all relevant safety regulations, as well as all valid pollution requirements and regulations must be followed.

We accept no responsibility of any damages or failures occurring as a result of these instructions not having been followed.

Should any questions arise from matters not dealt with in these instructions, please contact ABB Transformatoren, Brilon clearly stating the serial no. of the relevant transformers rating plate.

This document is portion of the complete documentation for RESIBLOC[®] cast resin transformers. Additionally, a transportation instruction will be issued with Operating Manual in the final documentation.

Please save and attach these documents together in the Operating Manual of the RESIBLOC[®].

Safety



Only qualified personnel can be in contact with the transformer and responsible for all the preparation. Everyone involved must observe the relevant site safety and accident prevention regulations.

A transport company experienced in the movement of transformers should be contracted for the transportation to its final location.



In the Operating Manual supplied on delivery with the transformers final documentation, a separate chapter deals with "Transport".

Only electricians, or assistants working under guidance of electricians should carry out any work in respect of the transformer. Everyone involved must have first read the Operating Manual, in particular the chapter dealing with "Safety".

We cannot accept any responsibilities or claims for any sort of damages, for any direct or indirect damage, fault or failure resulting from any transformer, installed or operated contrary to these instructions. This includes any installations where the general safety regulations have not been fully observed, even when these have not been fully provided in this document.

Regulations and Standards

The following Regulations and Standards should be observed during planning, preparation and commissioning of an electrically driven operation:

- All IEC Standards, in particular IEC 60076-11 & IEC 76: Dry Type & Distribution Power Transformers.
- DIN 57 100/VDE 0100: Erection of High Voltage equipment with nominal voltages up to 1000V.
- DIN 57 101/VDE 0101: Erection of High Voltage equipment with nominal voltages over 1000V.
- DIN 57 105/VDE 0105: VDE Regulations for the operation of High Voltage equipment.
- VDE 0108: Erection and Operation of High Voltage equipment in buildings suitable for the gathering of mankind and safe illumination of work places.
- DIN 57 141/VDE 0141: Earthing regulations for AC equipment for nominal voltages over 1.1kV.
- DIN 57 532/VDE 0532: Transformer and Reactor coils.
- VDI 2078: Calculating heat loads in Air Conditioned rooms.
- TA-Lärm (noise): Technical guidelines to noise protection.
- DIN 42 523: Three phase naturally cooled Cast Resin transformers for 50Hz, 100 – 2500 kVA, up to 24 kV.
- AGI J 12: Studium of the Industrial buildings committee (Arbeitsgemeinschaft Industriebau e. V.).
- ELT Bau VO : Electrical workroom regulations.
- Arb. Stätt. VO: Workplace regulations.
- Local authority regulations.

Site Requirements

To ensure problem free operation and a long transformer working life, the following conditions must all be followed. These conditions are applicable to our standard designs.



All serious deviations from standards requirements must be stated at the time of order placing, thereby forming part of the contract conditions, e.g. >1000m ASL, maximum ambient temperature >40°C, core and coils (IP00) with restricting enclosures supplied by others, tropical environment, additional mechanical loading (marine, moving cranes, seismic or sim. loads). The applicable standard must be stated.

Site The installation site is to be below 1000m ASL. On site a protection of not less than IP23 should be provided, and contact from direct sunlight must be avoided.

Foundation A transformer foundation must be provided of sufficient strength to be able to support its total weight, together with the added weight of all accessories. The regulations of all local building authority must be observed.

Ambient temperature All standard transformers are designed to comply with the following ambient temperatures:

Daily average 30 °C

Annual average 20 °C

Maximum temperature 40 °C

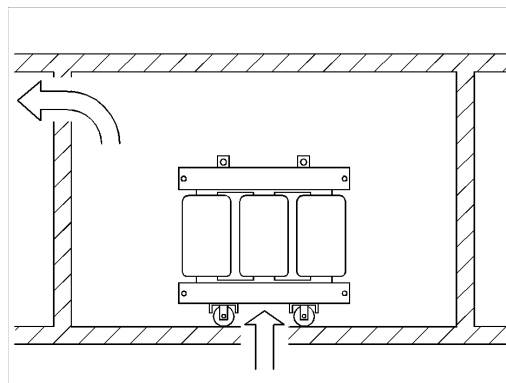
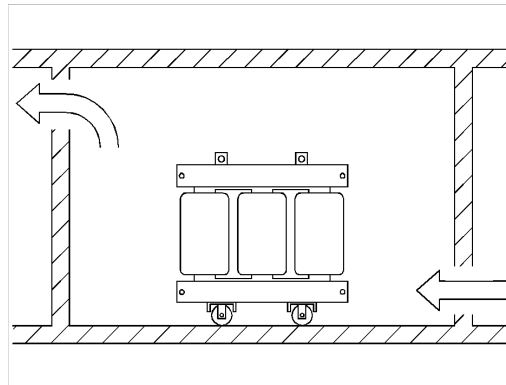
Minimum temperature - 60 °C

All accessories (temperature monitor devices, dial type thermometers, On Load Tap Changers, forced cooling fans etc.) are only rated to temperatures of minimum - 20°C. If lower temperatures than this are for any reason to be expected, please contact ABB Transformatoren GmbH, Brilon for advise.

Ventilation

All the transformers operational heat must be expelled. The most efficient cooling air flow must be established, a diagonal through flow pattern similar to those shown in the following diagrams.

Transformer cell ventilation

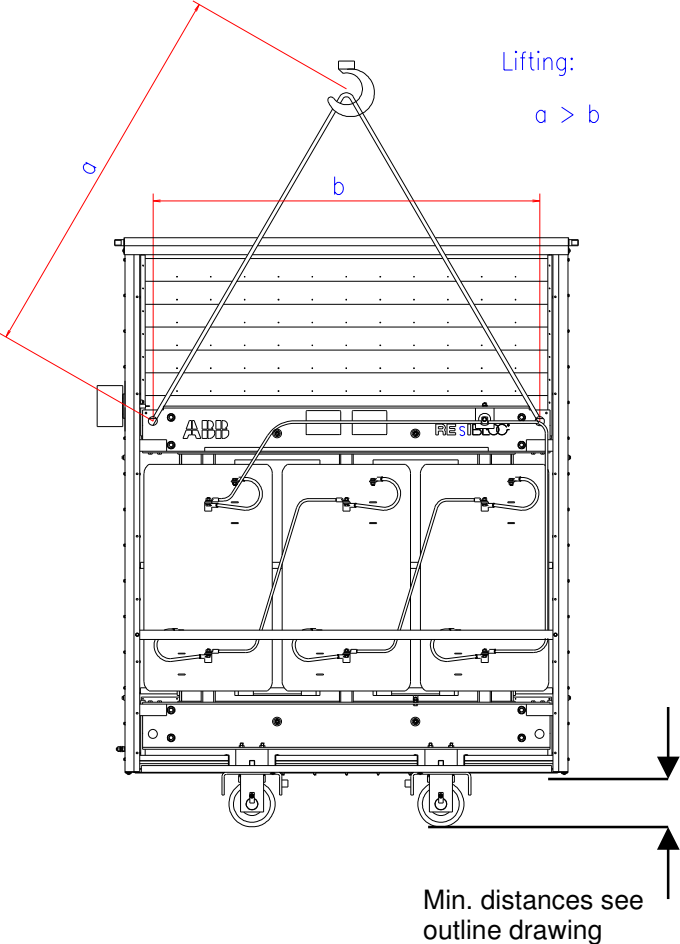


The minimum air flow is 4m³ cooling air / min / kW of the transformers dissipated heat loss can be used as a guide. An actual volume can be calculated from the data in the test reports.

Examples of calculations for transformer rooms can be found in the ABB Switchgear Manual 10th edition chapter 4.4.2 page 161.

Whenever installed in our standard transformer enclosure, sufficient air inflow must be guaranteed, therefore the enclosure base must be positioned a set distance above the floor. This distance cannot be less than the diameter the rollers supplied, and the exact distance is stated in the units outline drawing. This space is irrelevant if an air inlet of adequate cross section exists directly underneath the transformer.

In- & outlet ventilation grids must always be kept non-restricted, otherwise the cooling air flow will be effected.



Moisture	Transformers and all accessories must not be subjected to dripping (condensation) or sprayed water. The installation site must be flood proof, and so designed that puddles or any form of static water can collect underneath the transformer. The transformer is designed for environmental class E2 according to IEC 60076-11.
Pollution/Dirt & Dust	Transformers should never be positioned near any dust creating work. When this cannot be avoided, tarpaulins must always be used for most protection, and the transformer must be cleaned afterwards. When installed in locations with strong dusty conditions i.e. in steel & rolling mills, quarries, building sites, or similar we strongly recommend regular cleaning. (see Operation & Maintenance Manual)
Min. Distance/Space Req.	<p>The transformer outline drawing can best be used for dimensions of the units.</p> <p>The ability to read all of the monitoring equipment must be considered when designing the transformer installation. The installation cell should be designed so that the rating plate and all monitoring equipment can be read without entering the cell.</p> <p>Minimum distances, as shown in following tables, must be maintained between all live parts and between live parts to earth.</p> <p>To ensure non-restricted circulation of air on all sides of the transformer, a 0.3m minimum distance to any wall must be maintained. Additional to this, distance must be allowed for installation and maintenance requirements.</p> <p>A distance greater than 0.5m must be maintained between two transformers.</p>

Minimum distances to be maintained

Low BIL level acc. IEC 60076-11, List I

Syst. High. Voltage U_m [kV]	Applied Pot. test AC [kV]	Basic Impulse level BIL [kV]	Minimum Distance [mm]
1,1	3	-	25
3,6	10	20	60
7,2	20	40	60
12	28	60	90
17,5	38	75	125
24	50	95	170
36	70	145	225

High BIL level acc. IEC 60076-11, List II

Syst. High. Voltage U_m [kV]	Applied Pot. test AC [kV]	Basic Impulse level BIL [kV]	Minimum Distance [mm]
1,1	3	-	25
3,6	10	40	60
7,2	20	60	90
12	28	75	125
17,5	38	95	170
24	50	125	225
36	70	170	315
40,5	85	190	370

Not according IEC 60076-11,
Recommended distance →

Protection against touch

Transformers supplied as only IP00 must be locked away under use, guaranteeing when energised they can never be touched. The transformers cast resin coil surface is *NOT* touch safe. Accidental touch protection could be provided through the installation of safety barriers, gates or similar.

Noise emission

Depending on actual installation site requirements, sound restraining measures may have to be used. Antivibration pads under the rollers are a possible answer. An additional noise source could be forced cooling fans. Transformers should always be placed as far away from walls as possible.

Earth termination

The earthing protections total resistance, must ensure the earthing monitoring system (i.e. safety fuses, trip switches) can always react. The earth link must be dimensioned (cross section) acc. to regulations and requirements of the installation sites.

Storage Conditions

Often the transformer is not placed immediately into its operation upon delivery. Maybe due to site conditions the transformer has to be placed into storage. During this time, all the conditions already mentioned must be observed, and in addition, the following points should be noted;

- Preferably, the transformers should be stored inside a building or storage shed, at least underneath a storage cover roof.
- The transformer must be given all protection against any mechanical damage (e.g. moving ladders, scaffolding or any building material).
- Accessories must be stored in a dry room, on palettes or similar, and never directly on the ground.
- The lowest storage temperature should be - 60°C. Accessories (dial type thermometers, temp. monitoring devices, cooling fans etc.) can only be stored to - 20°C.
- The storage area must be well ventilated.



Whenever any work resulting in dusts or pollution is performed in the transformers vicinity (i.e. concrete & stonework, overhead cable routing, cable finishing and termination etc.) tarpaulins must always be used to protect the transformer. Particular care must be taken that small parts, especially nuts & bolts, screws, rods & studs, and similar small items do not enter any part of the transformers coil windings.

Delivery Requirements

A crane should be engaged, prior to off-loading the transformer from the delivery truck. Suitable load carrying forklift and other lifting trucks should only lift transformers from the ground.



Early plans should be made to have assistants on hand, fully aware of the transformer full weight.

Delivery to building site: Observe and become aware of the conditions of site well before the delivery is made. Ensure the transformer can be off-loaded without any difficulties. If the transformer is to be shut away in its own cell, an off-load area must be provided beforehand, where the transformer downloaded, and then rolled into its own cell.

Placing of warning notices, order or prohibition signs

Acc. to DIN 8444 part 1, "Safety Identification", advises installers that dangers must be overall identified wherever, when despite protection through identification a safety risk still exists to other people. On our transformers as well as on the outside of all our enclosures, warning signs acc. to DIN standards are placed, warning of the high electrical voltages.

On site, the danger of entering any operating room must be warned. Additional to this special purpose signs must be used during shut down, during all repair work, service and maintenance performed

Appendix 1

Storage Conditions for accessories under - 20 °C

- On Load Tap Changer can be stored up to - 40 °C. If the temperatures are lower the space heaters must be switched on.
- The motor drive for the On Load Tap Changer and the temperature control for the transformer can be stored up to - 40 °C for 8 weeks. If the temperatures are lower or the storage time is longer than 8 weeks the space heaters must be switched on.



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