



OIL-FILLED EXPANSION TANKS
AND HERMETIC TRANSFORMERS



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OIL-FILLED
EXPANSION TANKS
AND HERMETIC
TRANSFORMERS

2025



To be a pioneer in reliably, efficiently, and sustainably delivering energy to the future.

With our quality, safety, and innovation-focused approach, we aim to be the solution partner at the heart of transformers at every stage, from the production to the consumption of electrical energy. Our goal is not only to meet today's needs but also to shape the future of energy with transformers that are environmentally friendly, long-lasting, and highly efficient, guiding tomorrow's technologies.

In every project, we create lasting value in the industry by producing pioneering solutions in accordance with national and international standards, focusing on customer satisfaction, ensuring continuous technological development, and setting no limits on reliability.

Our vision is to be the leading transformer brand that makes energy safer, more efficient, and more sustainable.

To ensure the uninterrupted, safe, and efficient transmission of electrical energy, we: Our fundamental mission is to manufacture high-quality transformers, provide reliable maintenance, repair, and testing services, develop customized solutions for customer needs, guarantee compliance with national and international standards, create innovative products by investing in R&D and technological development, and support sustainability with an environmentally and socially conscious engineering approach.

Our mission is to be “the most reliable solution partner in the industry, operating safely at the heart of energy, prioritizing quality and innovation at every stage.”



DISTRIBUTION AND MEDIUM VOLTAGE POWER TRANSFORMERS

TARFO manufactures transformers of various voltage and power ratings, designed to meet a wide range of special requirements in line with customer needs.

TARFO's product range is as follows:

- Distribution Transformers (oil-immersed with conservator tank or hermetically sealed types) from 25 kVA to 2500 kVA, up to 36 kV voltage level
- Medium-Voltage Power Transformers from 2500 kVA to 31,500 kVA
- On-Load Tap Changer Transformers
- Auto-Transformers
- Step-Up and Step-Down Power Transformers for power generation facilities
- Electrostatic Shielded Transformers and Earthing (Grounding) Transformers

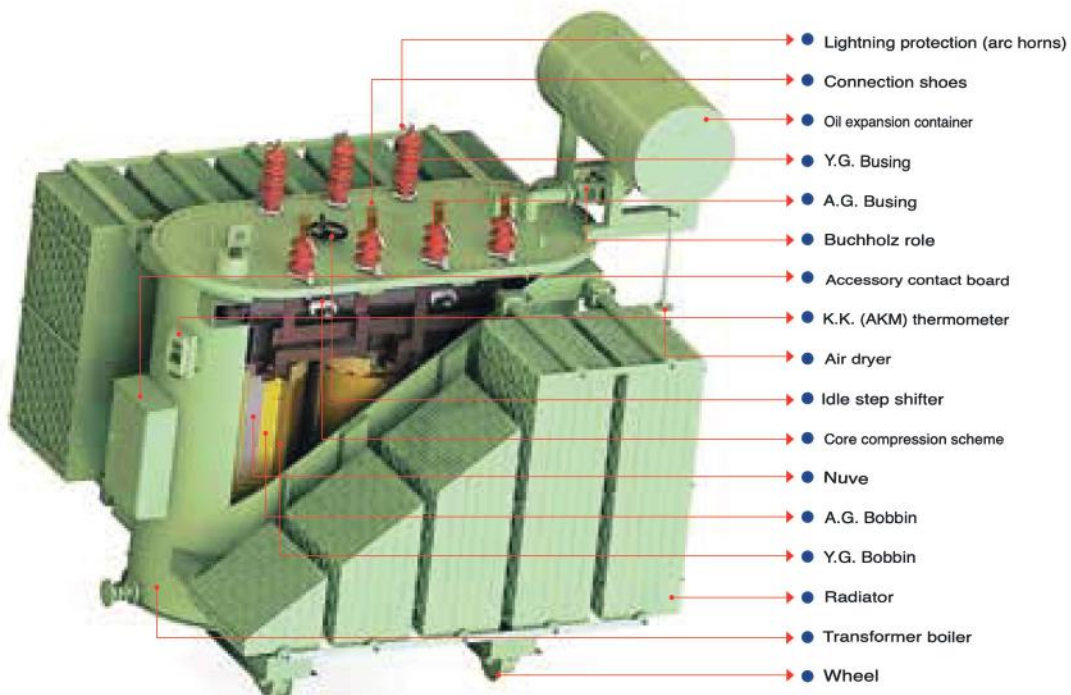
Compliance with International Standards:

TARFO transformers are manufactured in accordance with TS EN 60076, TS EN 50464-1, IEC 60354, IEC 60076, 42500 DIN, and other relevant international norms and standards.



GENERAL FEATURES OF STANDARD TRANSFORMERS

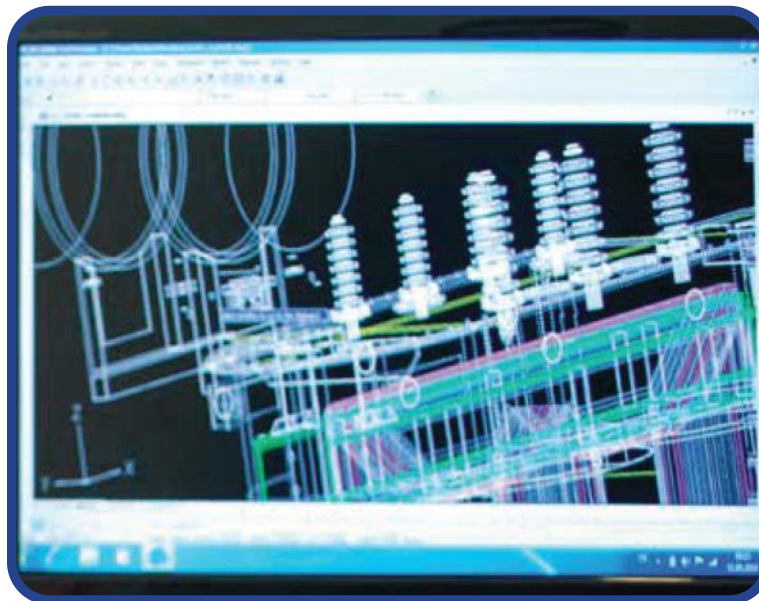
| GENERAL CHARACTERISTICS OF STANDARD TRANSFORMERS | |
|---|--|
| The thriller genre | 3-phase alternative |
| Operating frequency | 50 Hz |
| Type of service | Continuous service |
| From the sea level of the facility location height | Below 1000 m unless otherwise stated |
| Voltage adjustment | With 5-position, idle adjustable commutator by HV |
| Overvoltage | Ability to work continuously at 5% overvoltage |
| Temporarily overload | In accordance with IEC 60354 |
| The form of cooling | Natural with oil(YT) (ONAN) |
| Winding heating limit | 65K in accordance with TS EN 60076 |
| Connection type and group | Yzn or Dyn at powers up to 200 kVA, 250 kVA and in the greater powers Dyn. Connection group 5 or 1 1 |
| Iron and copper losses, short circuit voltage, idle current | As stipulated by TS and International standards |



DESIGN

With its experienced project and product development team, TARFO designs transformers that are highly efficient and durable enough to provide service for many years, in line with customer requirements and specifications.

High efficiency is fundamental to our products. To ensure this, advanced technological systems and high-quality materials are used throughout the design and manufacturing processes. Our research and development team works on tailor-made designs for customers, developing new products with high quality and durability.



TECHNICAL SPECIFICATIONS

CORE

The core, which is the main component of transformers and is also defined as the core, is produced from oriented magnetic silicon steel sheets. TARFO manufactures cores using conventional or high magnetic permeability (HB) materials, depending on the project specifications. TARFO always has a high level of HB material in stock. This enables TARFO to design and manufacture transformers that are rational, low-loss, and resistant to high magnetic induction. TARFO provides the basic infrastructure for core production with its Western-made coil slitting and cutting machines. Any potential damage during the processes of uncoiling, slitting, and cutting of rolled magnetic silicon steel sheets is remedied by additional heat treatment. This system and application, found in very few transformer manufacturers, is available and used at the TARFO factory. As a result of appropriate design and the meticulous work of experienced production personnel, the production of transformer cores with low losses and high magnetic flux density is achieved.



TECHNICAL SPECIFICATIONS

WINDING

In power and distribution transformers, cylindrical/elliptical coils, which are more resistant to the forces generated during short circuits, are used. With the exception of HV coils in small distribution transformers, LV and HV conductors are insulated using insulation materials with high insulation properties on the wire insulation machines in our factory.

Cellulose-based insulation materials that do not harm the environment are used in coil production. The conductors used are subjected to additional insulation according to their functions. The use of wires insulated with horizontal and vertical conductor insulation machines ensures that the transformers are resistant to atmospheric overvoltages. TARFO creates a difference by paying special attention to these aspects. In distribution transformers, LV coils are produced from strip or tape material, while HV coils are produced from flat or round conductors. In power transformers, various winding shapes such as layered winding, inverted winding, radial channel winding, etc. are applied.



TECHNICAL SPECIFICATIONS

TANK AND COVER

The production of tanks and covers for power and distribution transformers, excluding radiators and wave walls, is carried out in our factory. Cases and covers are manufactured in a short time and with high quality, in accordance with the drawings and technical specifications of the projects, using our modern machinery. Weld leak tests are performed on completed transformer cases before the primer coat is applied. Upon customer request, bushing housings or cable boxes can be manufactured in accordance with IEC and BS standards.

PAINT

After transformers successfully pass testing, they must be cleaned of oil, dirt, dust, and metal residues to enhance paint adhesion to the metal surface. To achieve this, the tanks and all metal parts undergo sandblasting. Metal parts are painted with one or more coats of special protective primer paint. Knowing that transformer tanks will be exposed to harsh weather conditions for many years, they are painted with a special paint that can withstand these harsh conditions, with a minimum thickness of 105 microns.



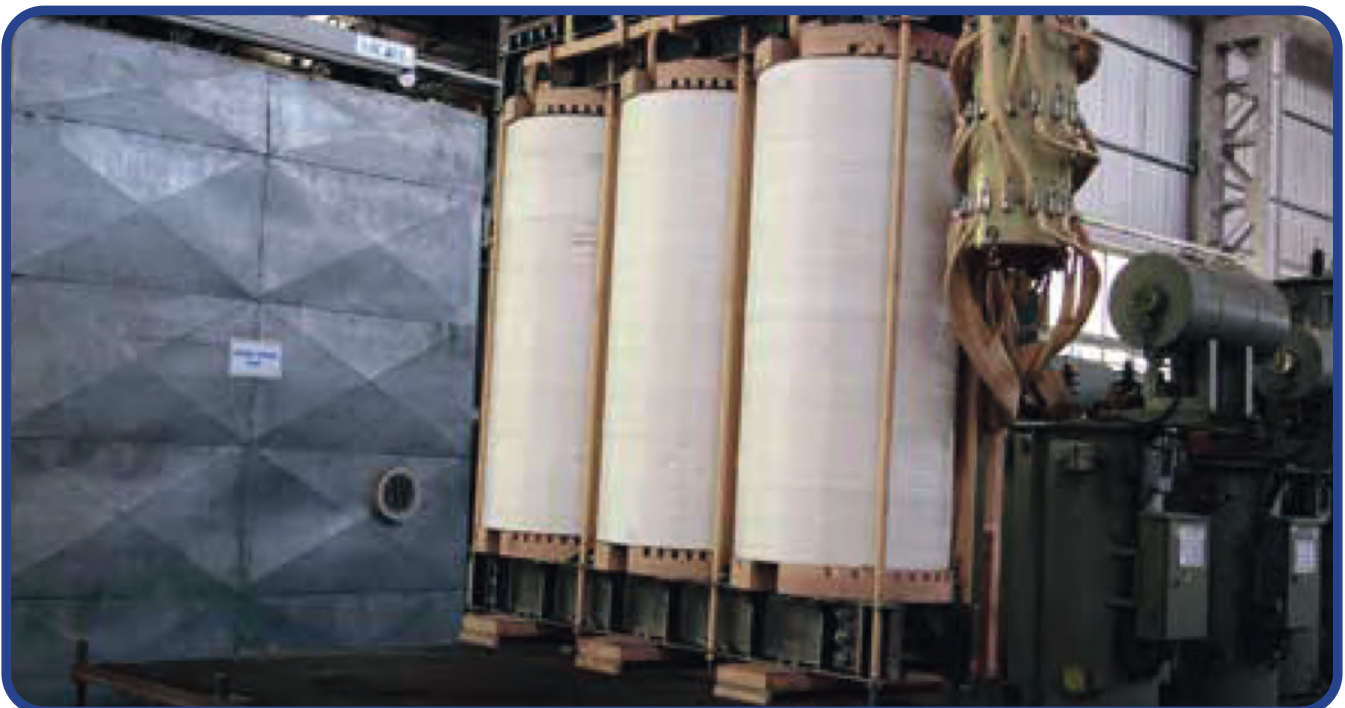
TECHNICAL SPECIFICATIONS

ASSEMBLY AND DRYING

The components that form the active part of the transformers are assembled in the assembly section. The coils are placed on the cores. The commutators, bushings, and all connections are made. Some sections are subjected to additional insulation against possible overvoltages. The active part is reinforced with additional supports to ensure its mechanical strength. The active part, once assembled, is subjected to a drying process in a solvent-vapor vacuum oven. The conventional drying process takes five times longer than drying in a solvent vapor vacuum oven. The long duration ages the insulation materials used in transformers. The short drying time in a solvent vapor vacuum oven prevents the aging of the insulation.

During the process, any unwanted objects such as oil, dirt, dust, or rust found anywhere in the transformer are cleaned by solvent spraying. The use of solvent vapor vacuum ovens capable of achieving high-grade vacuum in the production of hermetic and power transformers is very important for product quality.

TARFO uses solvent vapor vacuum ovens in all transformers it manufactures and repairs. Transformers that have completed the drying process are automatically filled with purified transformer oil under high vacuum (below 0.1 millibars).



ACCESSORIES



MAGNETIC AND CONTACT OIL LEVEL INDICATOR

These instruments are used to monitor the oil level in transformers, where transformer oil is filled for cooling and insulation purposes.

They are available in three types: prismatic indicator, magnetic indicator, and magnetic indicator with contact. In hermetically sealed transformers, the oil level is monitored pointwise.

For distribution transformers with expansion tanks, indicator-only type instruments are used as standard, while for power transformers, indicators with alarm and trip contacts are standard.

AIR BREATHER

In order to maintain the properties of the transformer oil, it must be kept free from moisture.

Air breathers are mounted on the surface of the expansion tank to absorb the moisture present in the air entering the transformer.

For high-capacity power transformers, upon customer request, a rubber-based elastic "Atmoseal" application can be implemented, which completely prevents the transformer oil from coming into contact with air.



PRESSURE RELIEF VALVE

In the event of sudden overloading and short-circuit conditions in transformers, the internal pressure of the tank increases. To prevent the tank pressure from exceeding the designed values, hermetic distribution transformers and power transformers are equipped with a "Pressure Relief Valve" as standard. Contact-type valves (dual-contact alarm and shut-off) are used in power transformers, while non-contact valves are used in small-capacity hermetic-type transformers. Distribution transformers used as internal-type with expansion tanks can also be equipped with a "Pressure Relief Valve" according to customer requirements.

ACCESSORIES



BUCHHOLZ RELAY

Sudden temperature increases caused by overloads in the active part, or temperature rises due to faults within the active part, generate gas inside the transformer tank.

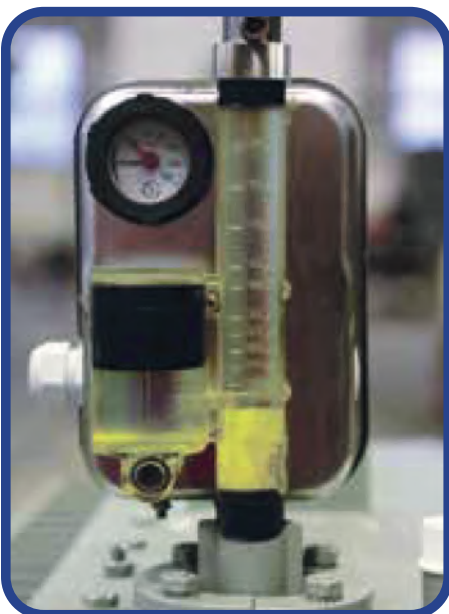
The Buchholz (Gas) Relay, which is installed between the tank and the expansion tank connection, provides either an alarm signal or a trip signal depending on the amount of gas formed.

This prevents the fault from progressing to a more severe level.

CONTACT-TYPE OIL TEMPERATURE THERMOMETER

Transformer oil should not exceed a certain temperature.

If the oil exceeds the appropriate temperature level for any reason, this device ensures that no other faults occur by signaling the unsuitable oil temperature with a level 1 contact and disconnecting the transformer's energized circuit with a level 2 contact. This equipment is standard on transformers with expansion tanks rated at 630 kVA and above. It can also be installed on transformers with lower power ratings upon request.



MULTIFUNCTIONAL HERMETIC PROTECTION DEVICE

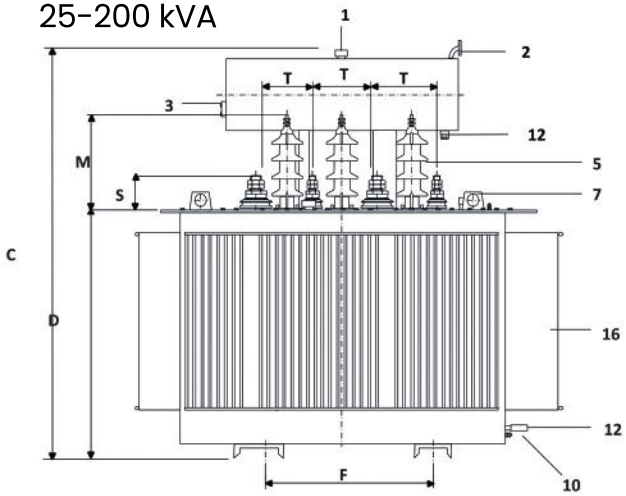
This is a compact protection and safety device that combines and performs all essential protection functions—such as oil level monitoring, pressure control, temperature measurement, and gas detection—in a single unit.

It is mounted on the cover of hermetic type transformers with power ratings from 630 kVA up to 2500 kVA, and can also be installed on transformers of lower ratings upon request.

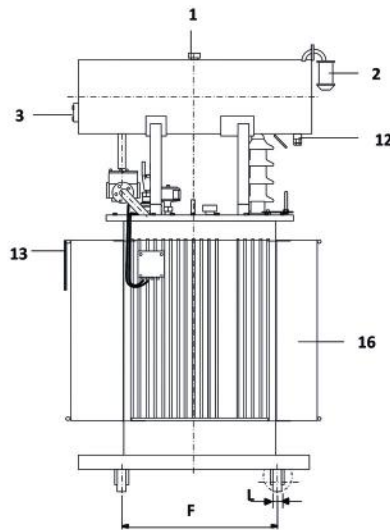
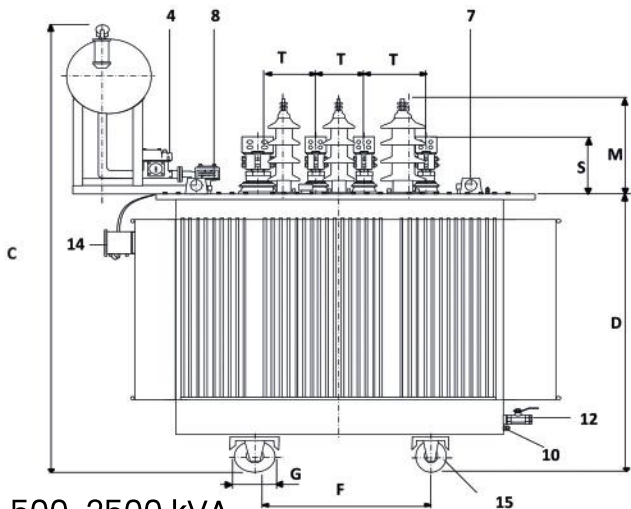
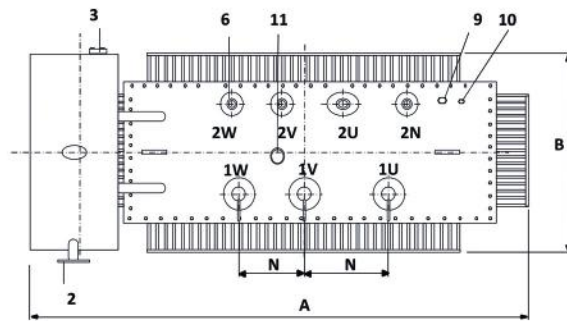
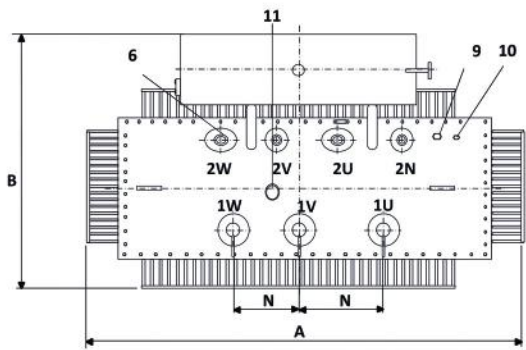
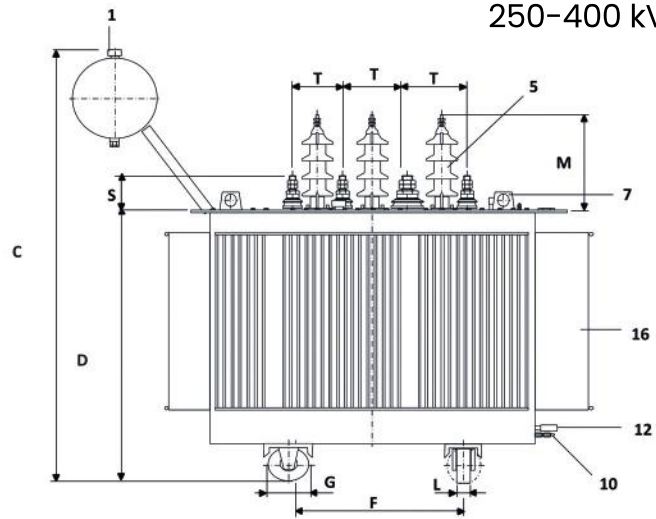
TECHNICAL SPECIFICATIONS OF OIL-FILLED EXPANSION TANK AND HERMETIC TYPE STANDARD TARFO DISTRIBUTION TRANSFORMERS

| Power kVA | Rated Voltage kV | No-Load Current I_0 % | Load Losses W | No-Load Losses W | Impedance Voltage %U _k | Cos ϕ = 0,8 | | Cos ϕ = 1 | |
|--------------|---------------------|-------------------------------|------------------|---------------------|--------------------------------------|-----------------------------|---------------------------|-----------------------------|---------------------------|
| | | | | | | Full-Load Voltage Drop % | Full-Load Efficiency % | Full-Load Voltage Drop % | Full-Load Efficiency % |
| 25 | 6,3-10,5 | 2,50 | 550 | 65 | 4 | 3,773 | 97,02 | 2,255 | 97,60 |
| | 15,8 | 2,50 | 550 | 65 | 4 | 3,773 | 97,02 | 2,255 | 97,60 |
| | 33 | 3,15 | 700 | 110 | 4,5 | 4,360 | 96,11 | 2,862 | 96,86 |
| 40 | 6,3-10,5 | 2,40 | 650 | 80 | 4 | 3,512 | 97,77 | 1,691 | 98,21 |
| | 15,8 | 2,40 | 650 | 80 | 4 | 3,512 | 97,77 | 1,691 | 98,21 |
| | 33 | 2,92 | 900 | 135 | 4,5 | 4,153 | 96,87 | 2,325 | 97,48 |
| 50 | 6,3-10,5 | 2,30 | 750 | 90 | 4 | 3,446 | 97,94 | 1,568 | 98,35 |
| | 15,8 | 2,30 | 750 | 90 | 4 | 3,446 | 97,94 | 1,568 | 98,35 |
| | 33 | 2,76 | 1050 | 160 | 4,5 | 4,086 | 97,06 | 2,179 | 97,64 |
| 63 | 6,3-10,5 | 2,25 | 900 | 110 | 4 | 3,407 | 98,04 | 1,498 | 98,42 |
| | 15,8 | 2,25 | 900 | 110 | 4 | 3,407 | 98,04 | 1,498 | 98,42 |
| | 33 | 2,62 | 1225 | 195 | 4,5 | 4,012 | 97,26 | 2,026 | 97,80 |
| 80 | 6,3-10,5 | 2,20 | 1050 | 125 | 4 | 3,342 | 98,20 | 1,383 | 98,55 |
| | 15,8 | 2,20 | 1050 | 125 | 4 | 3,342 | 98,20 | 1,383 | 98,55 |
| | 33 | 2,50 | 1400 | 225 | 4,5 | 3,913 | 97,52 | 1,835 | 98,01 |
| 100 | 6,3-10,5 | 2,10 | 1250 | 145 | 4 | 3,306 | 98,29 | 1,322 | 98,62 |
| | 15,8 | 2,10 | 1250 | 145 | 4 | 3,306 | 98,29 | 1,322 | 98,62 |
| | 33 | 2,27 | 1650 | 270 | 4,5 | 3,859 | 97,66 | 1,737 | 98,12 |
| 125 | 6,3-10,5 | 2,00 | 1475 | 175 | 4 | 3,264 | 98,38 | 1,253 | 98,70 |
| | 15,8 | 2,00 | 1475 | 175 | 4 | 3,264 | 98,38 | 1,253 | 98,70 |
| | 33 | 2,14 | 1900 | 330 | 4,5 | 3,787 | 97,82 | 1,609 | 98,25 |
| 160 | 6,3-10,5 | 1,90 | 1700 | 210 | 4 | 3,193 | 98,53 | 1,136 | 98,82 |
| | 15,8 | 1,90 | 1700 | 210 | 4 | 3,193 | 98,53 | 1,136 | 98,82 |
| | 33 | 2,00 | 2150 | 390 | 4,5 | 3,686 | 98,05 | 1,435 | 98,44 |
| 200 | 6,3-10,5 | 1,90 | 2025 | 255 | 4 | 3,162 | 98,58 | 1,087 | 98,87 |
| | 15,8 | 1,90 | 2025 | 255 | 4 | 3,162 | 98,58 | 1,087 | 98,87 |
| | 33 | 1,90 | 2575 | 470 | 4,5 | 3,652 | 98,10 | 1,380 | 98,50 |
| 250 | 6,3-10,5 | 1,60 | 2350 | 300 | 4 | 3,117 | 98,69 | 1,015 | 98,95 |
| | 15,8 | 1,60 | 2350 | 300 | 4 | 3,117 | 98,69 | 1,015 | 98,95 |
| | 33 | 1,80 | 3000 | 550 | 4,5 | 3,600 | 98,26 | 1,294 | 98,60 |
| 315 | 6,3-10,5 | 1,50 | 2800 | 365 | 4 | 3,084 | 98,76 | 0,964 | 99,01 |
| | 15,8 | 1,50 | 2800 | 365 | 4 | 3,084 | 98,76 | 0,964 | 99,01 |
| | 33 | 1,70 | 3575 | 670 | 4,5 | 3,559 | 98,34 | 1,229 | 98,67 |
| 400 | 6,3-10,5 | 1,50 | 3250 | 430 | 4,4 | 3,034 | 98,86 | 0,889 | 99,09 |
| | 15,8 | 1,50 | 3250 | 430 | 4 | 3,034 | 98,86 | 0,889 | 99,09 |
| | 33 | 1,70 | 4150 | 790 | 4,5 | 3,498 | 98,48 | 1,133 | 98,78 |
| 500 | 6,3-10,5 | 1,40 | 3950 | 520 | 4 | 3,020 | 98,89 | 0,866 | 99,11 |
| | 15,8 | 1,40 | 3950 | 520 | 4 | 3,020 | 98,89 | 0,866 | 99,11 |
| | 33 | 1,60 | 4850 | 950 | 4,5 | 3,455 | 98,56 | 1,066 | 98,85 |
| 630 | 6,3-10,5 | 1,40 | 4600 | 600 | 4 | 2,980 | 98,98 | 0,807 | 99,18 |
| | 15,8 | 1,40 | 4600 | 600 | 4 | 2,980 | 98,98 | 0,807 | 99,18 |
| | 33 | 1,60 | 5500 | 1100 | 4,5 | 3,392 | 98,71 | 0,970 | 98,96 |
| 800 | 6,3-10,5 | 1,30 | 6000 | 650 | 6 | 4,264 | 98,97 | 0,927 | 99,18 |
| | 15,8 | 1,30 | 6000 | 650 | 6 | 4,264 | 98,97 | 0,927 | 99,18 |
| | 33 | 1,50 | 7000 | 1300 | 6 | 4,350 | 98,72 | 1,051 | 98,97 |
| 1000 | 6,3-10,5 | 1,20 | 7600 | 770 | 6 | 4,271 | 98,96 | 0,937 | 99,17 |
| | 15,8 | 1,20 | 7600 | 770 | 6 | 4,271 | 98,96 | 0,937 | 99,17 |
| | 33 | 1,40 | 8900 | 1450 | 6 | 4,360 | 98,72 | 1,066 | 98,98 |
| 1250 | 6,3-10,5 | 1,20 | 9500 | 950 | 6 | 4,271 | 98,97 | 0,937 | 99,17 |
| | 15,8 | 1,20 | 9500 | 950 | 6 | 4,271 | 98,97 | 0,937 | 99,17 |
| | 33 | 1,40 | 11500 | 1750 | 6 | 4,381 | 98,69 | 1,095 | 98,95 |
| 1600 | 6,3-10,5 | 1,10 | 12000 | 1200 | 6 | 4,264 | 98,98 | 0,927 | 99,18 |
| | 15,8 | 1,10 | 12000 | 1200 | 6 | 4,264 | 98,98 | 0,927 | 99,18 |
| | 33 | 1,30 | 14500 | 2200 | 6 | 4,371 | 98,71 | 1,082 | 98,97 |
| 2000 | 6,3-10,5 | 1,10 | 15000 | 1450 | 6 | 4,264 | 98,98 | 0,927 | 99,18 |
| | 15,8 | 1,10 | 15000 | 1450 | 6 | 4,264 | 98,98 | 0,927 | 99,18 |
| | 33 | 1,20 | 18000 | 2700 | 6 | 4,367 | 98,72 | 1,075 | 98,98 |
| 2500 | 6,3-10,5 | 1,0 | 18500 | 1750 | 6 | 4,257 | 99,00 | 0,917 | 99,20 |
| | 15,8 | 1,0 | 18500 | 1750 | 6 | 4,257 | 99,00 | 0,917 | 99,20 |
| | 33 | 1,1 | 22500 | 3200 | 6 | 4,367 | 98,73 | 1,075 | 98,98 |

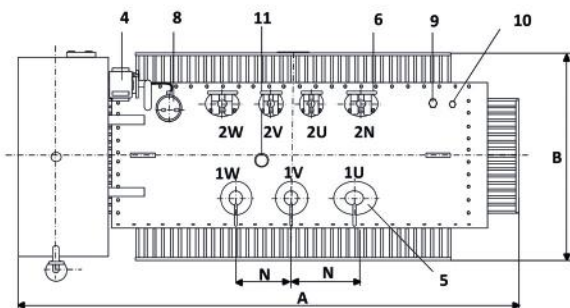
25-200 kVA



250-400 kVA



500-2500 kVA



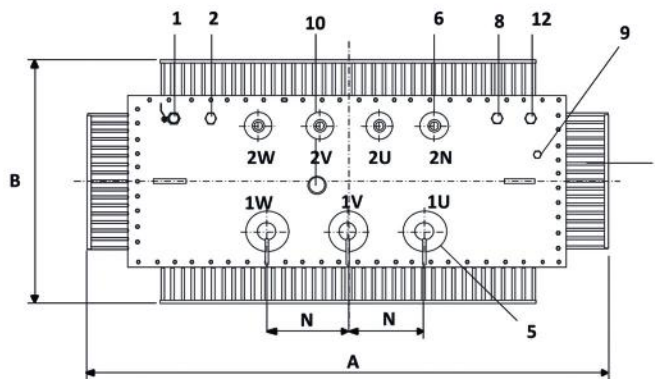
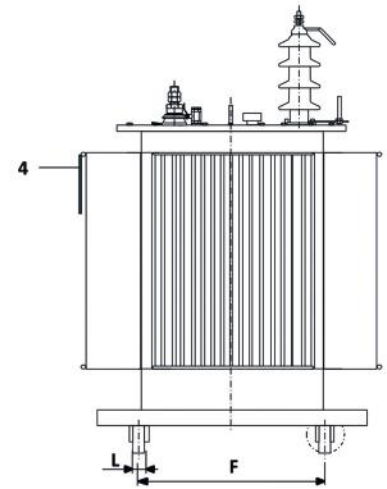
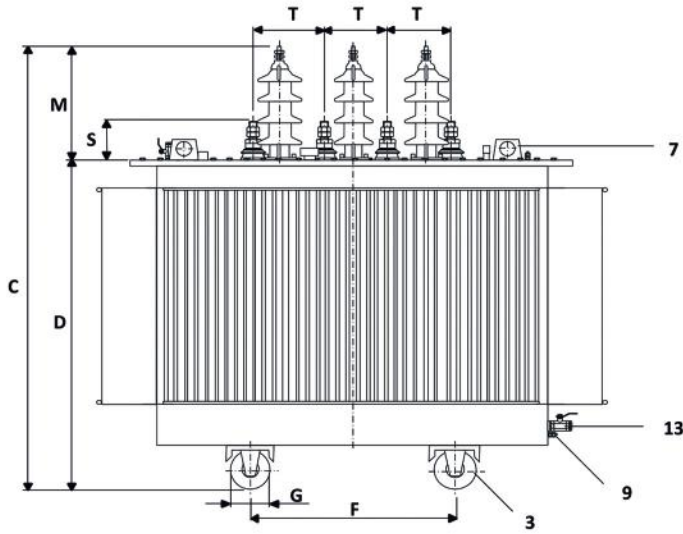
- | | |
|-------------------------|----------------------------------|
| 1 - Oil Filling Mouth | 9 - Alcoholic Thermometer Pocket |
| 2 - Air Dryer | 10- Grounding Bolt |
| 3 - Oil Level Indicator | 11- Idle Stage Changer |
| 4 - Buchholz Relay | 12- Oil Drain Plug |
| 5 - Y.G. Bushingi | 13- Sign Plate |
| 6 - A.G. Bushingi | 14- Terminal Box |
| 7 - Lifting Ring | 15- Wheel |
| 8 - Contact Thermometer | 16- Wave Wall |

Oil Expansion Tank
Three-Phase,
25-2500 kVA
Transformers

MAIN DIMENSIONS OF STANDARD EXPANSION TANK TYPE TRANSFORMERS (25–2500 KVA)

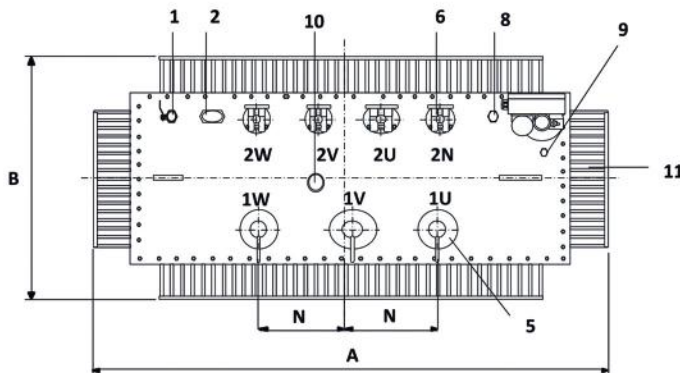
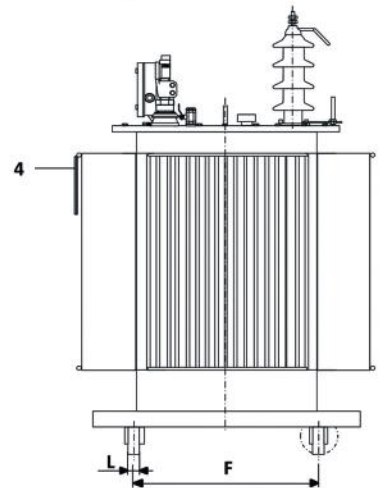
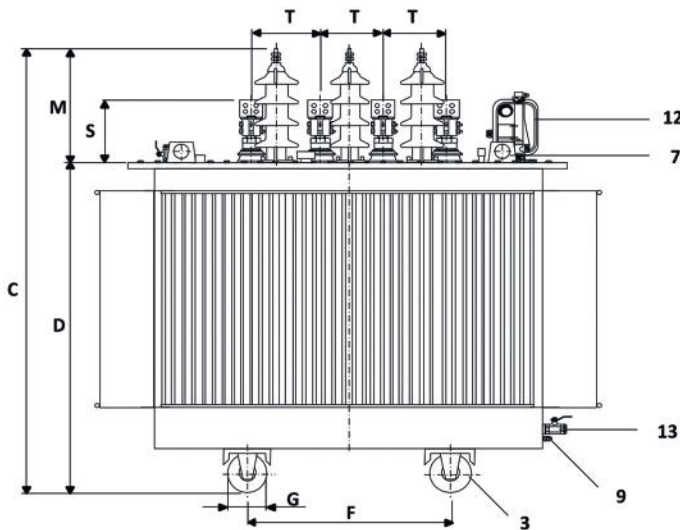
| Power | Rated Voltage | Oil Weight | Active Part Weight | Total Weight | Length A | Width B | Height C | D | F | ØG | L | M | N | S | T |
|-------|---------------|------------|--------------------|--------------|----------|---------|----------|------|------|-----|----|-----|-----|-----|-----|
| kVA | kV | kg | kg | kg | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| 25 | 6,3-10,5 | 130 | 295 | 540 | 935 | 680 | 1170 | 700 | | | | 310 | 210 | | |
| | 15,8 | 130 | 295 | 540 | 935 | 680 | 1245 | 700 | 520 | | | 385 | 220 | 138 | 150 |
| | 33 | 120 | 225 | 410 | 920 | 730 | 1365 | 720 | | | | 485 | 290 | | |
| 40 | 6,3-10,5 | 150 | 400 | 650 | 975 | 730 | 1230 | 760 | | | | 310 | 265 | | |
| | 15,8 | 150 | 400 | 650 | 975 | 730 | 1305 | 760 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 145 | 305 | 540 | 905 | 785 | 1450 | 805 | | | | 485 | 330 | | |
| 50 | 6,3-10,5 | 170 | 440 | 685 | 1000 | 750 | 1240 | 770 | | | | 310 | 265 | | |
| | 15,8 | 170 | 440 | 685 | 1000 | 750 | 1315 | 770 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 155 | 345 | 570 | 920 | 800 | 1470 | 825 | | | | 485 | 330 | | |
| 63 | 6,3-10,5 | 190 | 495 | 760 | 1025 | 750 | 1280 | 810 | | | | 310 | 265 | | |
| | 15,8 | 190 | 495 | 760 | 1025 | 750 | 1355 | 810 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 165 | 380 | 625 | 935 | 800 | 1490 | 845 | | | | 485 | 330 | | |
| 80 | 6,3-10,5 | 210 | 555 | 840 | 1055 | 750 | 1325 | 850 | | | | 310 | 265 | | |
| | 15,8 | 210 | 555 | 840 | 1055 | 750 | 1400 | 850 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 180 | 420 | 685 | 955 | 810 | 1510 | 865 | | | | 485 | 330 | | |
| 100 | 6,3-10,5 | 240 | 665 | 980 | 1100 | 750 | 1385 | 910 | | | | 310 | 265 | | |
| | 15,8 | 240 | 665 | 980 | 1100 | 750 | 1460 | 910 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 200 | 480 | 780 | 980 | 815 | 1540 | 895 | | | | 485 | 350 | | |
| 125 | 6,3-10,5 | 255 | 800 | 1155 | 1150 | 750 | 1425 | 950 | | | | 310 | 265 | | |
| | 15,8 | 255 | 800 | 1155 | 1150 | 750 | 1500 | 950 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 220 | 555 | 890 | 1010 | 820 | 1575 | 930 | | | | 485 | 350 | | |
| 160 | 6,3-10,5 | 280 | 975 | 1345 | 1210 | 750 | 1480 | 1000 | | | | 310 | 265 | | |
| | 15,8 | 280 | 975 | 1345 | 1210 | 750 | 1555 | 1000 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 245 | 650 | 1015 | 1060 | 830 | 1620 | 970 | | | | 485 | 350 | | |
| 200 | 6,3-10,5 | 300 | 1050 | 1450 | 1275 | 780 | 1525 | 1050 | | | | 310 | 265 | | |
| | 15,8 | 300 | 1050 | 1450 | 1275 | 780 | 1600 | 1050 | 520 | | | 385 | 265 | 178 | 150 |
| | 33 | 270 | 730 | 1130 | 1250 | 830 | 1645 | 990 | | | | 485 | 350 | | |
| 250 | 6,3-10,5 | 325 | 1140 | 1580 | 1355 | 700 | 1625 | 1105 | | | | 310 | 265 | | |
| | 15,8 | 325 | 1140 | 1580 | 1355 | 700 | 1700 | 1105 | 520 | | | 385 | 265 | 178 | 150 |
| | 33 | 295 | 815 | 1250 | 1550 | 700 | 1710 | 1015 | | | | 485 | 350 | | |
| 315 | 6,3-10,5 | 390 | 1405 | 1975 | 1500 | 720 | 1690 | 1170 | | | | 310 | 330 | | |
| | 15,8 | 390 | 1405 | 1975 | 1500 | 720 | 1765 | 1170 | 670 | 150 | 50 | 385 | 330 | 178 | 150 |
| | 33 | 360 | 995 | 1555 | 1590 | 765 | 1805 | 1105 | | | | 485 | 350 | | |
| 400 | 6,3-10,5 | 465 | 1700 | 2390 | 1660 | 740 | 1820 | 1250 | | | | 310 | 330 | | |
| | 15,8 | 465 | 1700 | 2390 | 1660 | 740 | 1895 | 1250 | 670 | 150 | 50 | 385 | 330 | 178 | 150 |
| | 33 | 440 | 1190 | 1875 | 1640 | 840 | 1950 | 1220 | | | | 485 | 350 | | |
| 500 | 6,3-10,5 | 510 | 1955 | 2750 | 1680 | 915 | 1835 | 1300 | | | | 310 | 330 | | |
| | 15,8 | 510 | 1955 | 2750 | 1680 | 915 | 1910 | 1300 | 670 | 150 | 50 | 385 | 330 | 263 | 200 |
| | 33 | 520 | 1440 | 2250 | 1700 | 895 | 2020 | 1270 | | | | 485 | 350 | | |
| 630 | 6,3-10,5 | 570 | 2235 | 3115 | 1700 | 1100 | 1875 | 1360 | | | | 310 | 330 | | |
| | 15,8 | 570 | 2235 | 3115 | 1700 | 1100 | 1950 | 1360 | 670 | 150 | 50 | 385 | 330 | 263 | 200 |
| | 33 | 605 | 1720 | 2650 | 1700 | 970 | 1950 | 1320 | | | | 485 | 350 | | |
| 800 | 6,3-10,5 | 630 | 2360 | 3245 | 1800 | 950 | 1980 | 1375 | | | | 310 | 330 | | |
| | 15,8 | 630 | 2360 | 3245 | 1800 | 950 | 2055 | 1375 | 820 | 150 | 50 | 385 | 330 | 263 | 220 |
| | 33 | 730 | 1980 | 3100 | 1840 | 1050 | 2155 | 1370 | | | | 485 | 350 | | |
| 1000 | 6,3-10,5 | 755 | 2890 | 4120 | 1950 | 980 | 2155 | 1545 | | | | 310 | 330 | | |
| | 15,8 | 755 | 2890 | 4120 | 1950 | 980 | 2230 | 1545 | 820 | 200 | 70 | 385 | 330 | 340 | 230 |
| | 33 | 770 | 2275 | 3525 | 2005 | 1035 | 2210 | 1425 | | | | 485 | 350 | | |
| 1250 | 6,3-10,5 | 810 | 3425 | 4700 | 1900 | 1100 | 2190 | 1580 | | | | 310 | 330 | | |
| | 15,8 | 810 | 3425 | 4700 | 1900 | 1100 | 2265 | 1580 | 820 | 200 | 70 | 385 | 330 | 340 | 240 |
| | 33 | 885 | 2440 | 3880 | 2000 | 1170 | 2255 | 1470 | | | | 485 | 350 | | |
| 1600 | 6,3-10,5 | 900 | 3395 | 4845 | 1900 | 1140 | 2215 | 1605 | | | | 310 | 330 | | |
| | 15,8 | 900 | 3395 | 4845 | 1900 | 1140 | 2290 | 1605 | 820 | 200 | 70 | 385 | 330 | 372 | 240 |
| | 33 | 1000 | 2825 | 4645 | 2070 | 1330 | 2410 | 1580 | | | | 485 | 350 | | |
| 2000 | 6,3-10,5 | 1100 | 4065 | 6030 | 2205 | 1300 | 2285 | 1625 | | | | 310 | 330 | | |
| | 15,8 | 1100 | 4065 | 6030 | 2205 | 1300 | 2360 | 1625 | 1000 | 200 | 70 | 385 | 330 | 372 | 250 |
| | 33 | 1085 | 3100 | 5240 | 2100 | 1385 | 2465 | 1630 | | | | 485 | 350 | | |
| 2500 | 6,3-10,5 | 1335 | 4765 | 7145 | 2150 | 1400 | 2315 | 1655 | | | | 310 | 330 | | |
| | 15,8 | 1335 | 4765 | 7145 | 2150 | 1400 | 2390 | 1655 | 1000 | 200 | 70 | 385 | 330 | 450 | 260 |
| | 33 | 1330 | 3915 | 6720 | 2270 | 1575 | 2485 | 1650 | | | | 485 | 350 | | |

25-400 kVA



- 1 - Oil filling valve
- 2 - Pressure Safety Valve
- 3 - Wheel
- 4 - Sign Plate
- 5 - Y.G. Bushingi
- 6 - A.G. Bushingi
- 7 - Lifting Ring
- 8 - Alcohol Thermometer Pocket
- 9 - Grounding Bolt
- 10- Idle Step Changer
- 11- Wave Wall
- 12- Oil Level Indicator
- 13- Oil Draining and tas. Valve

500-2500 kVA

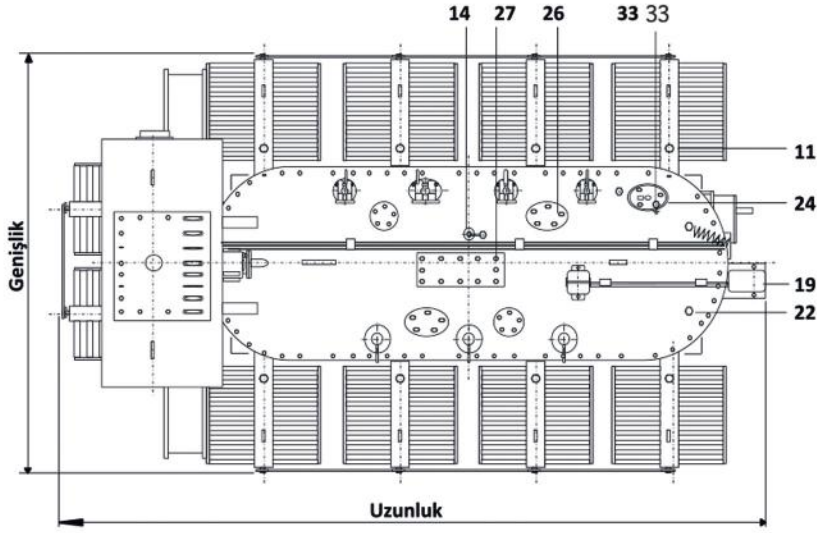
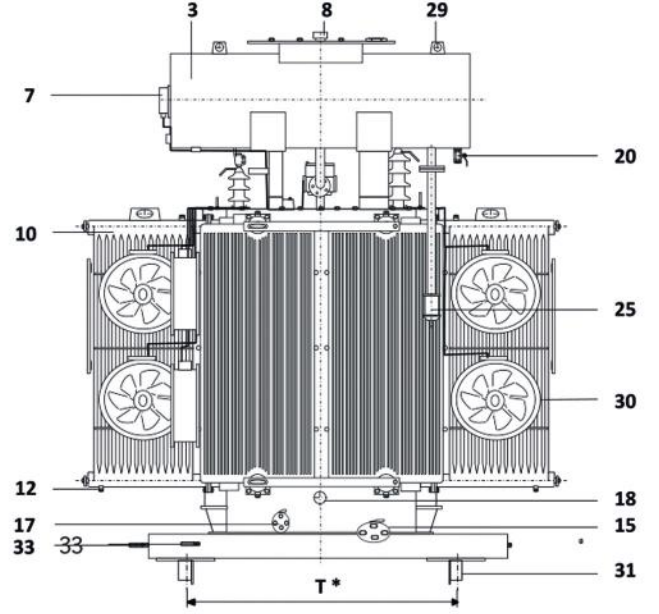
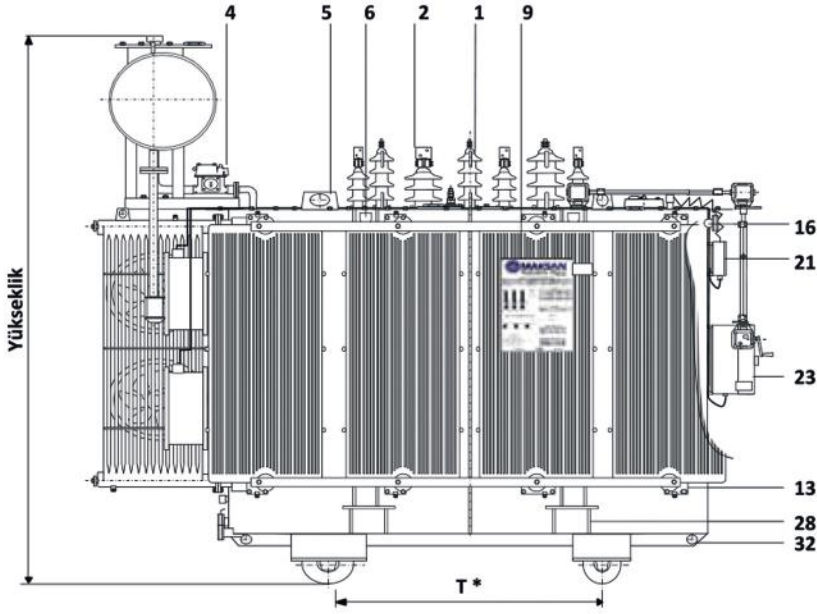


- 1 - Oil filling valve
- 2 - Pressure Safety Valve
- 3 - Wheel
- 4 - Sign Plate
- 5 - Y.G. Bushingi
- 6 - A.G. Bushingi
- 7 - Lifting Ring
- 8 - Alcohol Thermometer Pocket
- 9 - Grounding Bolt
- 10- Idle Step Changer
- 11- Wave Wall
- 12- Multifunctional Protection Relay
- 13- Oil Draining and tas. Valve

Hermetic Type
Three-Phase,
25-2500 kVA
Transformers

MAIN DIMENSIONS OF HERMETIC TYPE STANDARD TRANSFORMERS (25–2500 KVA)

| Power | Rated Voltage | Oil Weight | Active Part Weight | Total Weight | Length A | Width B | Height C | D | F | ØG | L | M | N | S | T |
|-------|---------------|------------|--------------------|--------------|----------|---------|----------|------|------|-----|----|-----|-----|-----|-----|
| kVA | kV | kg | kg | kg | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| 25 | 6,3-10,5 | 130 | 295 | 530 | 900 | 670 | 1010 | 700 | | | | 310 | 210 | | |
| | 15,8 | 130 | 295 | 530 | 900 | 670 | 1085 | 700 | 520 | | | 385 | 220 | 138 | 150 |
| | 33 | 120 | 225 | 410 | 840 | 660 | 1205 | 720 | | | | 485 | 290 | | |
| 40 | 6,3-10,5 | 155 | 395 | 650 | 980 | 670 | 1070 | 760 | | | | 310 | 265 | | |
| | 15,8 | 155 | 395 | 650 | 980 | 670 | 1145 | 760 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 145 | 310 | 545 | 895 | 680 | 1290 | 805 | | | | 485 | 330 | | |
| 50 | 6,3-10,5 | 175 | 435 | 705 | 995 | 690 | 1080 | 770 | | | | 310 | 265 | | |
| | 15,8 | 175 | 435 | 705 | 995 | 690 | 1155 | 770 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 155 | 335 | 580 | 910 | 670 | 1310 | 825 | | | | 485 | 330 | | |
| 63 | 6,3-10,5 | 190 | 495 | 790 | 1020 | 695 | 1120 | 810 | | | | 310 | 265 | | |
| | 15,8 | 190 | 495 | 790 | 1020 | 695 | 1195 | 810 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 165 | 375 | 635 | 925 | 675 | 1330 | 845 | | | | 485 | 330 | | |
| 80 | 6,3-10,5 | 215 | 565 | 880 | 1050 | 700 | 1160 | 850 | | | | 310 | 265 | | |
| | 15,8 | 215 | 565 | 880 | 1050 | 700 | 1235 | 850 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 180 | 415 | 700 | 950 | 680 | 1350 | 865 | | | | 485 | 330 | | |
| 100 | 6,3-10,5 | 240 | 665 | 1030 | 1100 | 705 | 1220 | 910 | | | | 310 | 265 | | |
| | 15,8 | 240 | 665 | 1030 | 1100 | 705 | 1295 | 910 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 195 | 480 | 780 | 975 | 690 | 1380 | 895 | | | | 485 | 350 | | |
| 125 | 6,3-10,5 | 255 | 810 | 1210 | 1145 | 715 | 1260 | 950 | | | | 310 | 265 | | |
| | 15,8 | 255 | 810 | 1210 | 1145 | 715 | 1335 | 950 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 210 | 555 | 885 | 1015 | 700 | 1415 | 930 | | | | 485 | 350 | | |
| 160 | 6,3-10,5 | 275 | 975 | 1405 | 1200 | 725 | 1310 | 1000 | | | | 310 | 265 | | |
| | 15,8 | 275 | 975 | 1405 | 1200 | 725 | 1385 | 1000 | 520 | | | 385 | 265 | 138 | 150 |
| | 33 | 235 | 645 | 1010 | 1060 | 720 | 1455 | 970 | | | | 485 | 350 | | |
| 200 | 6,3-10,5 | 290 | 1055 | 1505 | 1210 | 730 | 1360 | 1050 | | | | 310 | 265 | | |
| | 15,8 | 290 | 1055 | 1505 | 1210 | 730 | 1435 | 1050 | 520 | | | 385 | 265 | 178 | 150 |
| | 33 | 255 | 720 | 1135 | 1090 | 760 | 1475 | 990 | | | | 485 | 350 | | |
| 250 | 6,3-10,5 | 310 | 1150 | 1635 | 1180 | 735 | 1415 | 1105 | | | | 310 | 265 | | |
| | 15,8 | 310 | 1150 | 1635 | 1180 | 735 | 1490 | 1105 | 520 | | | 385 | 265 | 178 | 150 |
| | 33 | 285 | 810 | 1275 | 1135 | 810 | 1500 | 1015 | | | | 485 | 350 | | |
| 315 | 6,3-10,5 | 385 | 1390 | 1995 | 1275 | 790 | 1480 | 1170 | | | | 310 | 330 | | |
| | 15,8 | 385 | 1390 | 1995 | 1275 | 790 | 1555 | 1170 | 670 | 150 | 50 | 385 | 330 | 178 | 150 |
| | 33 | 350 | 990 | 1570 | 1200 | 855 | 1590 | 1105 | | | | 485 | 350 | | |
| 400 | 6,3-10,5 | 465 | 1675 | 2390 | 1400 | 865 | 1560 | 1250 | | | | 310 | 330 | | |
| | 15,8 | 465 | 1675 | 2390 | 1400 | 865 | 1635 | 1250 | 670 | 150 | 50 | 385 | 330 | 178 | 150 |
| | 33 | 425 | 1190 | 1880 | 1280 | 915 | 1705 | 1220 | | | | 485 | 350 | | |
| 500 | 6,3-10,5 | 510 | 1920 | 2700 | 1425 | 930 | 1610 | 1300 | | | | 310 | 330 | | |
| | 15,8 | 510 | 1920 | 2700 | 1425 | 930 | 1685 | 1300 | 670 | 150 | 50 | 385 | 330 | 263 | 200 |
| | 33 | 495 | 1395 | 2200 | 1370 | 940 | 1755 | 1270 | | | | 485 | 350 | | |
| 630 | 6,3-10,5 | 560 | 2200 | 3045 | 1455 | 1005 | 1670 | 1360 | | | | 310 | 330 | | |
| | 15,8 | 560 | 2200 | 3045 | 1455 | 1005 | 1745 | 1360 | 670 | 150 | 50 | 385 | 330 | 263 | 200 |
| | 33 | 580 | 1710 | 2660 | 1445 | 1010 | 1805 | 1320 | | | | 485 | 350 | | |
| 800 | 6,3-10,5 | 615 | 2355 | 3300 | 1560 | 1020 | 1685 | 1375 | | | | 310 | | | |
| | 15,8 | 615 | 2355 | 3300 | 1560 | 1020 | 1760 | 1375 | 820 | 150 | 50 | 385 | 400 | 263 | 220 |
| | 33 | 715 | 1980 | 3120 | 1570 | 1100 | 1860 | 1370 | | | | 485 | | | |
| 1000 | 6,3-10,5 | 750 | 2875 | 4120 | 1600 | 1060 | 1855 | 1545 | | | | 310 | | | |
| | 15,8 | 750 | 2875 | 4120 | 1600 | 1060 | 1930 | 1545 | 820 | 200 | 70 | 385 | 400 | 340 | 230 |
| | 33 | 750 | 2245 | 3550 | 1685 | 1095 | 1910 | 1425 | | | | 485 | | | |
| 1250 | 6,3-10,5 | 790 | 3420 | 4700 | 1690 | 1090 | 1890 | 1580 | | | | 310 | | | |
| | 15,8 | 790 | 3420 | 4700 | 1690 | 1090 | 1965 | 1580 | 820 | 200 | 70 | 385 | 400 | 340 | 240 |
| | 33 | 870 | 2465 | 4020 | 1760 | 1210 | 1955 | 1470 | | | | 485 | | | |
| 1600 | 6,3-10,5 | 875 | 3390 | 4840 | 1790 | 1160 | 1915 | 1605 | | | | 310 | | | |
| | 15,8 | 875 | 3390 | 4840 | 1790 | 1160 | 1990 | 1605 | 820 | 200 | 70 | 385 | 400 | 372 | 240 |
| | 33 | 970 | 2765 | 4570 | 1810 | 1330 | 2065 | 1580 | | | | 485 | | | |
| 2000 | 6,3-10,5 | 1080 | 4060 | 6035 | 1880 | 1340 | 1935 | 1625 | | | | 310 | | | |
| | 15,8 | 1080 | 4060 | 6035 | 1880 | 1340 | 2010 | 1625 | 1000 | 200 | 70 | 385 | 400 | 372 | 250 |
| | 33 | 1095 | 3100 | 5415 | 1860 | 1465 | 2120 | 1630 | | | | 485 | | | |
| 2500 | 6,3-10,5 | 1305 | 4755 | 7165 | 2080 | 1440 | 1965 | 1655 | | | | 310 | | | |
| | 15,8 | 1305 | 4755 | 7165 | 2080 | 1440 | 2040 | 1655 | 1000 | 200 | 70 | 385 | 400 | 450 | 260 |



1. H.V. Bushing
2. L.V. Bushing
3. Oil Expansion Tank
4. Buchholz Relay
5. Lifting Lug (for Active Part)
6. Lifting Lug (for Complete Unit)
7. Oil Level Indicator
8. Oil Filling Cap
9. Nameplate
10. Radiator
11. Radiator Air Vent Plug
12. Radiator Oil Drain Valve
13. Bolted Flange
14. Earthing Bushing
15. Oil Drain Valve
16. Oil Filtering Valve (Upper)
17. Oil Filtering Valve (Lower)
18. Oil Sampling Valve
19. Operating Mechanism at Chest Level
20. Oil Expansion Tank Drain Valve
21. Contact Thermometer
22. Pocket for Contact Thermometer
23. Control Panel
24. Pressure Relief Valve
25. Air Breather
26. Inspection Holes
27. Viewing Window
28. Jack Support Point
29. Expansion Tank Lifting Lug
30. Fan
31. Wheel
32. Transformer Pulling Lug
33. Earthing Bolt

*(T) Wheelbase: 1440mm. Center-to-center distance, for 8 MVA and smaller capacities: 1490mm. For transformers with capacities above 8 MVA, center-to-center distance: 1505mm.

TECHNICAL DATA TABLE OF POWER TRANSFORMERS

| Rated Power MVA ONAN(ONAF) | Rated Voltage kV/kV | Vector Group | Impedance % Uk | Losses | | No-Load Current Io % | Noise Level dB | Length mm | Width mm | Height mm | Oil Weight kg | Active Part Weight kg | Total Weight kg | Efficiency tam yük |
|----------------------------------|------------------------|--------------|-------------------|-------------|-------------|----------------------------|-------------------|--------------|-------------|--------------|------------------|--------------------------|--------------------|-----------------------|
| | | | | Boşta kW | Yükte kW | | | | | | | | | |
| 3,15 | 33/15,8 | Dyn5 | 6 | 4,5 | 28 | 1 | 75 | 2650 | 2250 | 2750 | 1700 | 4600 | 8250 | 98,97 |
| 4 | 33/15,8 | Dyn5 | 6 | 5,5 | 33 | 1 | 77 | 2950 | 2600 | 2900 | 2050 | 5400 | 10100 | 99,04 |
| 4(5) | 33/15,8 | Dyn5 | 7 | 6,5 | 38 | 0,9 | 78 | 3050 | 2500 | 3050 | 2200 | 6000 | 10400 | 99,11 |
| 5 | 33/15,8 | Dyn5 | 7 | 6,5 | 38 | 0,9 | 78 | 3050 | 2650 | 3050 | 2400 | 6000 | 11050 | 99,11 |
| 5(6,25) | 33/15,8 | Dyn5 | 7 | 7,7 | 45 | 0,9 | 80 | 3200 | 2650 | 3100 | 2650 | 8150 | 13700 | 99,16 |
| 8 | 33/15,8 | Dyn5 | 7 | 9,5 | 54 | 0,9 | 82 | 3300 | 2650 | 3250 | 2850 | 9100 | 14650 | 99,21 |
| 8(10) | 33/15,8 | Dyn5 | 7 | 11 | 63 | 0,8 | 84 | 3350 | 2650 | 3400 | 3000 | 9700 | 15500 | 99,26 |
| 10 | 33/15,8 | Dyn5 | 7 | 11 | 63 | 0,8 | 84 | 3350 | 2850 | 3400 | 3300 | 9700 | 16800 | 99,26 |
| 10(12,5) | 33/15,8 | Dyn5 | 10 | 10 | 65 | 0,5 | 79 | 3650 | 2650 | 3650 | 3850 | 13050 | 20400 | 99,40 |
| 16 | 33/15,8 | Dyn5 | 10 | 12 | 80 | 0,5 | 80 | 3900 | 3100 | 3850 | 4650 | 15700 | 25750 | 99,43 |
| 16(20) | 33/15,8 | Dyn5 | 10 | 14 | 95 | 0,5 | 83 | 3900 | 3000 | 4000 | 5050 | 16750 | 26800 | 99,46 |
| 20 | 33/15,8 | Dyn5 | 10 | 14 | 95 | 0,4 | 83 | 3900 | 3500 | 4000 | 5500 | 16750 | 29000 | 99,46 |
| 20(25) | 33/15,8 | Dyn5 | 10 | 16 | 110 | 0,4 | 85 | 4100 | 3600 | 4600 | 8250 | 22500 | 38500 | 99,46 |
| 25 | 33/15,8 | Dyn5 | 10 | 16 | 110 | 0,4 | 85 | 4250 | 4150 | 4600 | 9000 | 22500 | 42000 | 99,46 |
| 31,5 | 33/15,8 | Dyn5 | 10 | 25 | 150 | 0,4 | 90 | 4400 | 4250 | 4900 | 9500 | 26000 | 44000 | 99,44 |

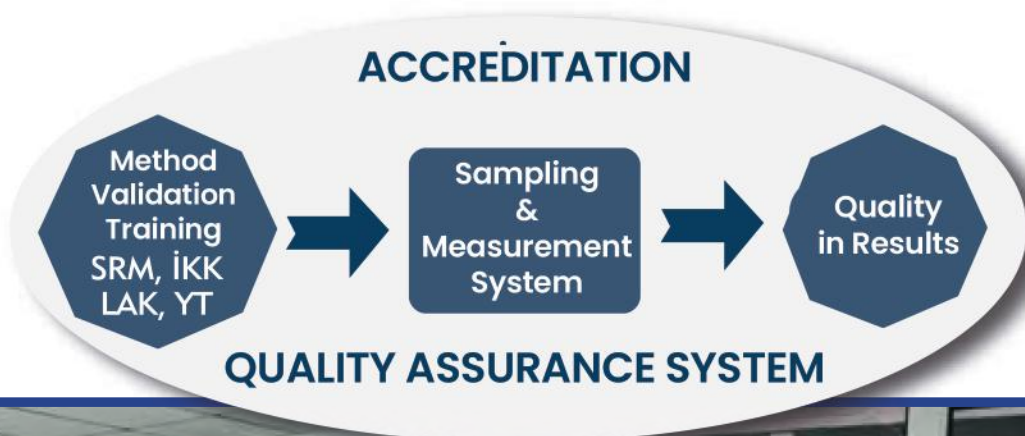


TEST

The TARFO Test Laboratory was accredited by TÜRKAK in 2011 after meeting the requirements of the ISO 17025 standard.

In our test laboratory, all tests required by the IEC and TS EN 60076-1 standards can be performed, except for mechanical strength testing against short circuits. Tests applied to transformers are classified into three main categories: routine tests, type tests, and special tests.

TARFO Inc. Test Laboratory has taken an important step towards becoming an "Element of Trust in the Global Market" through its accreditation.



ROUTINE TESTS

In accordance with TS EN 60076-1 and IEC standards, the following tests are applied to every transformer after production is completed:

- 1. Measurement of Turns Ratio and Determination of Vector Group**
- 2. Measurement of Winding Resistance**
- 3. Applied Voltage Test (Separate Source AC Withstand Voltage Test)**
- 4. Induced Voltage Test (Short Duration Induced AC Voltage Withstand Test)**
- 5. Measurement of No-Load Losses and No-Load Current**
- 6. Measurement of Load Losses and Short-Circuit Voltage**
- 7. Measurement of Loss Angle ($\tan \delta$) and Capacitance**
- 8. Measurement of DC Insulation Resistance**
- 9. Tests on On-Load Tap Changers (if present)**
- 10. Pressure Leakage Test**

TYPE TESTS

These tests are carried out on one transformer from a group of transformers with the same specifications, based on customer request:

- 1. Temperature Rise Test**
- 2. Lightning Impulse Test**
- 3. Sound Level Measurement Test**
- 4. Measurement of No-Load Losses and Current at 90% and 110% of Rated Voltage**
- 5. Measurement of Power Consumption of Fans and Oil Pump Motors**

SPECIAL TESTS

These tests are determined in mutual agreement with the customer:

- 1. Measurement of Zero-Sequence Impedance**
- 2. Measurement of No-Load Current and Harmonic Components**
- 3. Measurement of Oil Dielectric Strength and Power Factor**
- 4. Functional Tests of Protection, Alarm, and Control Equipment**
- 5. Paint Thickness and Quality Control Test**

Our Test Laboratory is dedicated to providing reliable and timely results in accordance with national and international standards.

Using modern equipment, valid test methods, and experienced personnel, we ensure the highest level of accuracy and quality.

We strictly maintain confidentiality, impartiality, and reliability in all testing processes.

All transformer test reports are securely archived, and thanks to our advanced system, reports from the past 25 years can be retrieved upon customer request.

QUALITY CONTROL SYSTEM

TARFO began implementing Quality Management Systems institutionally as one of the first companies in the country to be certified under the (now obsolete) TS 1055 and TS 267 standards. Although these were product standards, they formed the basis for management system documentation.

Adopting the policy of producing transformers that not only meet but exceed customer expectations, TARFO manufactures in compliance with legal regulations and national and international standards, using modern technology. The company first received its ISO 9001 Quality Certificate in 1995, and later added the ISO 14001 Environmental Management System Certificate in 2003, continually improving both systems since then.

In recognition of its efforts in quality, TARFO was awarded the “50th Year Quality Award” by TSE in 2004. Short-circuit mechanical withstand type tests, which determine product quality, have been conducted and certified for all product groups by internationally recognized laboratories such as ICMET and CESI.

At TARFO, quality control activities are carried out at every stage of production. In addition to the awareness and participation of all employees, inspections are performed by trained quality control personnel at input, process, and final stages to ensure compliance with quality plans, technical drawings, and specifications.

All management systems at TARFO are continuously improved using tools such as internal audits, management review meetings, data analysis, and corrective/preventive action programs.

With a customer-oriented approach and over 40 years of experience, TARFO continues to move confidently toward the future.

www.tarfotrafo.com



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