

OTEF

Voltage Transformers 72.5 kV to 420 kV

GE Vernova manufactures a complete range of high voltage oil-filled voltage transformers. OTEF is a tank-type inductive voltage transformer with post insulator.

Thousands of Grid Solutions' voltage transformers are in service worldwide, some for more than 30 years. In all types of climates and under the most severe conditions, they give full satisfaction to the most exacting customers.

Design

OTEF's design incorporates a primary coil housed in the tank at the unit's base. Internal insulation is provided by hermetically sealed oil and oil-impregnated paper system. Outer insulation consists of a one-piece post-type insulator.

High Quality Paper-Oil Insulation

The majority of the voltage transformers using GE Vernova technology have insulation paper that has been applied mechanically, ensuring a homogenous, high-density paper insulation. Defined grading layers with field-optimized electrode rings achieve a uniform field distribution along the insulator between line and ground. Surge protector devices are not necessary.

High quality mineral oil with excellent durability and gas-absorbing properties is used. The oil meets IEC 60296 requirements and contains no PCBs during the manufacturing process.

Controlled vacuum and temperature treatments withdraw humidity and gas from the paper insulation and insulation oil.

The impregnation process results in a high-grade dielectric system.

Built for Long Life

OTEF is built based on Grid Solutions' quality and technology. It is designed for system voltages up to 420 kV. Long life Insulation integrity is measured by a metallic diaphragm assembly that hermetically seals the oil from the atmosphere. All external parts are manufactured from corrosion-resistant material. Regular painting is not required.



Key Benefits

- Extensive field experience
- Operational security
- Easy installation - no special tools required
- Leak proof design and rugged construction for long service life
- Mineral oil-filled: no PCB
- Maintenance free



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Insulator

The outer insulation is manufactured from high-quality aluminum oxide porcelain in RAL brown or IEEE/ANSI grey. Composite insulators are available on request.

Windings and Ratings

One or two secondary windings can be provided for metering and protection purposes. An optional separate winding can be supplied for ground fault detection. A double ratio is achieved by a secondary tap. All IEC or ANSI accuracy classes for metering and protection purposes can be provided.

Thermal Burden Rating

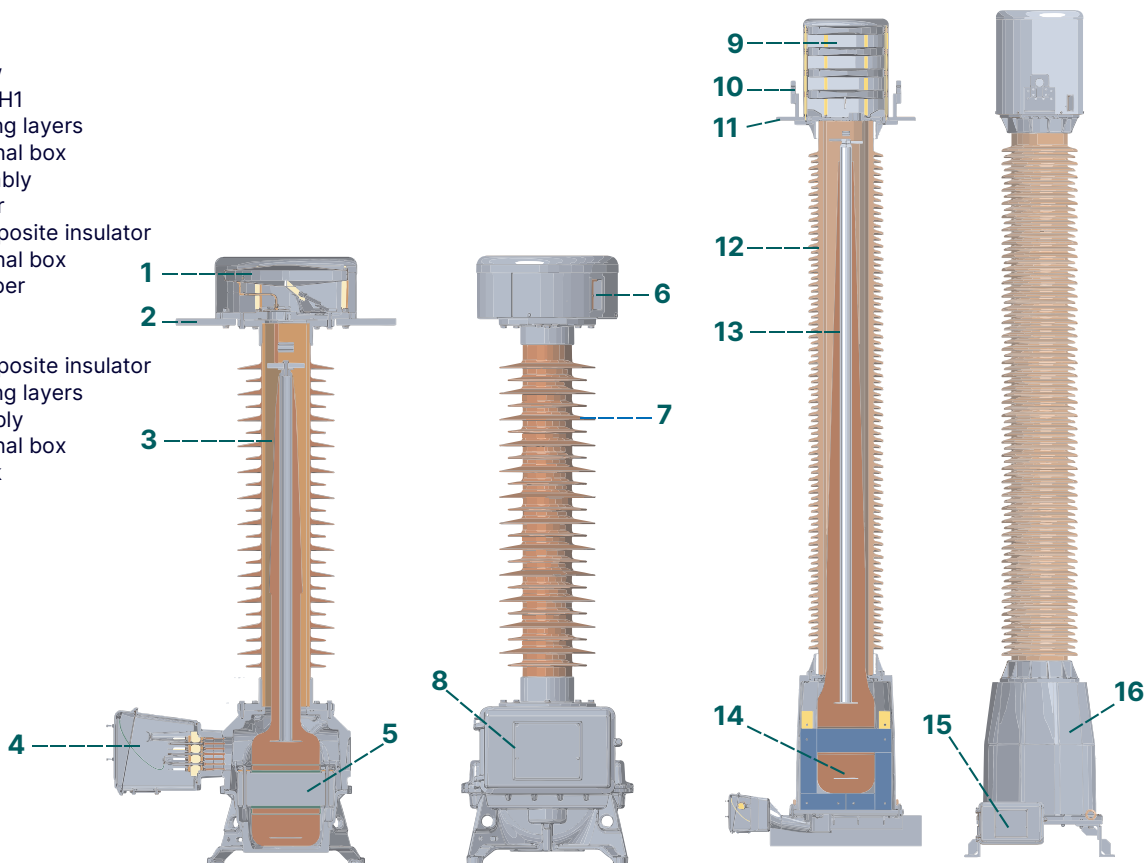
Typical thermal burden rating is 2,000 to 4,000 VA. Other values on request.

Hermetic Sealing System

The active part of the transformer is hermetically sealed. Changes in oil volume, resulting from temperature variations, are compensated for by one or more stainless steel expansion chambers. Movements in the compensation system are registered by an oil level indicator located behind a window in the transformer head.

OTEF 72.5 to 420 kV

- 1 Expansion bellow
- 2 Primary terminal H1
- 3 Capacitive grading layers
- 4 Secondary terminal box
- 5 Core / coil assembly
- 6 Oil-level indicator
- 7 Porcelain or composite insulator
- 8 Secondary terminal box
- 9 Expansion chamber
- 10 Lifting eye
- 11 Primary terminal
- 12 Porcelain or composite insulator
- 13 Capacitive grading layers
- 14 Core/Coil assembly
- 15 Secondary terminal box
- 16 Transformer tank



Optimal Protection Against Bursting

Optimized insulation structures and appropriate structural designs ensure a long life and high-grade dielectric. The following additional measures are taken to prevent the porcelain from bursting in the event of an inner insulation breakdown (e.g., in case of lightning strikes):

- The active part is located below the porcelain in an aluminum housing.
- There is an internal fault current connection between the primary terminal and the primary winding and onto the ground terminal located on the base.
- There is a selective wire fuse for each secondary winding which responds in case of a secondary short circuit between the transformer terminals and the marshalling box.
- A pressure relief plate is located in the area of the expansion body on the head.
- Upon customer request: a composite insulator consisting of a fiber-glass reinforced tube and silicone rubber sheds can be supplied.

Service Life and Maintenance

OTEF voltage transformers have been designed for a 30 year life-time and, thanks to the soundness of our technical concepts, many well out-live this service life. They have no specific maintenance requirements and need no painting:

- All hardware is made of stainless steel.
- Housing are made of corrosion-proof aluminum alloy.
- Porcelain fittings are made from spherical or hot-dip galvanized graphite or malleable iron.
- Angle brackets are made of cast aluminum.

Besides regular transformer surface cleaning, no routine maintenance is required. The hermetic seal alleviates the need for oil sampling or moisture checks.

Transportation and Installation

OTEF can be transported horizontally or vertically depending on the permitted transportation height.

The OTEF is supplied ready for energizing and can be simply connected to the system.

No special tools are required.



Additional Information

Rating plates are made from metallic anodized weather-proof aluminum or stainless steel.

Ambient Temperature

-35°C...+40°C on a 24 hour average.

Other values are available on request

Seismic withstand capability to 0.5 g

Higher values possible on request.

Transient Overvoltages

Less than 1,600 V peak according to IEC standard.

Frequency

50 Hz, 60 Hz or 16 ²/₃ Hz.

Other values on request.

Radio Influence Voltage (RIV)

Less than 2500 µV at 1.1 U_m.

Other values on request.

Dielectric Loss Factor

Tan δ smaller than 0.005 up to the power-frequency test voltage.

Inner Partial Discharge

- Less than 10 pC at 1.2 U_m

- Less than 5 pC at 1.2 U_m/√3

Mechanical Strength

According to IEC 61869-1 & -3

Other values on request.

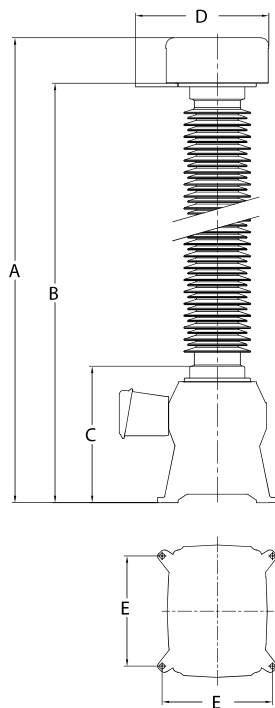
Dimensions

The following dimensions refer to standard versions. Other U_m values affect other dimensions. The size of the base tank will change with the greater output requirements and/or frequencies smaller than 50 Hz. Creepage and insulator clearance distances can be adapted to the customer's needs.

Dimensions in mm

TYPE		OTEF 72	OTEF 123	OTEF 145	OTEF 170	OTEF 245	OTEF 362	OTEF 420
Maximum system voltage (U_m)	kV	72.5	123	145	170	245	362	420
Impulse test voltage (BIL)	kV	350	550	650	750	1050	1300	1425
Minimum creepage distance	mm	1813	3150	3750	4583	6300	10418	10720
Dimensions		mm	mm	mm	mm	mm	mm	mm
	A	1503	1873	2108	2550	3287	4787	5287
	B	1293	1675	1911	2345	2855	4342	4782
	C	569	569	641	763	763	1200	1260
	D	484	484	484	550	550	560	912
	E	450	450	450	600	600	900	900
Total Weight (approx.)	kg	235	265	335	552	590	1180	1729
Weight of oil (approx.)	kg	33	38	49	126	139	353	429

Indicative values only - All indicated dimensions must be confirmed with order. Other values on request



Inquiry Check List

- Applicable standards
- Rated frequency
- Highest system voltage
- Power-frequency withstand test voltage
- Lightning impulse test voltage
- Switching impulse test voltage, if applicable (above 245 kV)
- Overvoltage factor
- Voltage ratio
- Number of secondaries
- Accuracy class and rated burden for each secondary winding
- Thermal burden
- Required creepage distance in mm or in mm/kV
- HV terminal (material and dimensions)
- Composite insulator (light grey)
- Environmental conditions (altitude, temperature, site pollution, seismic conditions...)
- Secondary terminal box heater or fuses
- High voltage and ground connectors
- Options as required

For more information, visit
gevernova.com/grid-solutions

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