



GE Industrial Systems

GE Ventilated Dry-Type Transformers



**Secondary
Substation
Transformers –
5 and 15kV Class**

Safe, Convenient and Environmentally Sound!

GE Ventilated Dry-Type Transformers

GE ventilated dry-type transformers are designed for indoor or outdoor applications in schools, hospitals, industrial plants, commercial buildings and any place requiring safe and dependable power. Ventilated dry-type transformers offer an economical solution and are extremely reliable when properly installed and maintained.



Vent Dry Transformer; standard arrangement, (HV left) with forced air cooling

General Construction

Coils are vacuum-pressure-impregnated (VPI) with solventless polyester resin, ensuring complete impregnation of the windings and insulation. The finished VPI coils are incredibly strong, readily dissipate heat and are protected against moisture, dirt and most industrial contaminants.

Ventilated dry-type winding designs vary depending on the voltage, basic impulse level (BIL) and current of the individual winding and/or application of the transformer. For all units, the insulation system will be 220°C regardless of the average winding rise.



Core and Coil internal assembly

Safe, Convenient and Environmentally Sound

Installations of ventilated dry-type transformers do not require a liquid confinement area, automatic fire extinguishing system or fire vault. Dry-type transformers use no insulating liquids, virtually eliminating the risk of local environment contamination and simplifying routine maintenance by eliminating the need to check, replace or clean liquid. Dry-type units are relatively lightweight and can be conveniently installed on upper floors, balconies, roof trusses or roofs. Insurance companies generally offer lower premiums for installations of dry-types than for liquid-filled transformers.

Coils

Generally, low voltage (LV) windings less than 2,400 volts are either multi-conductor barrel or sheet conductor types. Multi-conductor windings may be more economical and preferred in smaller kVA low voltage applications in which the current and axial short circuit forces are relatively small. High voltage (HV) windings 2,400 volts or greater may be single-section barrel, multi-section barrel or disk types. Ventilated dry-type coils may be either round or rectangular through about 2,000 kVA. Transformers larger than 2,000 kVA generally are designed with round windings unless there are special considerations, such as limiting dimensions.



Outdoor NEMA 3R enclosure

Enclosure

The standard indoor enclosure is NEMA 1, Category C construction. Enclosures are suitable for lifting, jacking, rolling or skidding with provisions for lifting from the transformer base. High voltage and low voltage ANSI ground pads are provided. The enclosure paint finish is neat, clean and highly resistant to corrosion. Metal surfaces are thoroughly cleaned of scale, oil, grease, rust and other foreign matter before painting. Unless specified otherwise, paint color shall be ANSI 61 (light gray). NEMA 3R outdoor enclosures are available for applications that prohibit indoor installation.

Cores

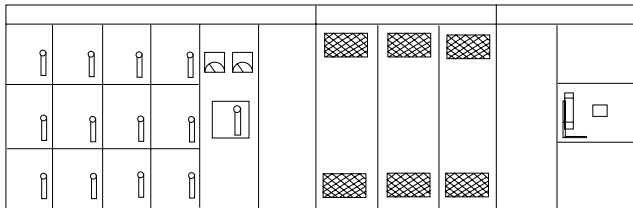
The transformer cores are constructed of non-aging, high grade, grain oriented silicon steel laminations with high magnetic permeability. Magnetic flux densities are kept well below the saturation point. Core laminations are free of burrs and stacked without gaps. Mitered and step-lap construction cores may be provided when specified. The core clamping brackets are designed to provide even distribution of clamping forces to the core yokes and legs. The core is electrically isolated except for the factory-installed core ground strap, which provides a single path from the core to ground.



Three-Phase Temperature Monitor
(Supplied monitor subject to change without notice.)

Forced Air Cooling

All units rated 750 kVA and higher have provisions for adding fans, including capacity in all current-carrying parts for the fan-cooled rating and capability to add a thermometer relay to control fans. When specified, the transformer shall be provided with fans to give a forced air-cooled rating of 33% above the self-cooled rating. Control wiring (wire markers included), a thermal sensor and a fan controller will be supplied.



Typical Close-Coupled Reverse Arrangement (HV Right)
Load-Center Unit Substation with Ventilated Dry-Type Transformer

Product Coordination

When specified, transformers can be close-coupled to a multitude of GE equipment, including but not limited to Power Break®, AKD-10 Switchgear, POWER/VAC® Switchgear, Limitamp® Motor Control, SCP Switchboards, Spectra Series™ Switchboards, AV Switchboards, Motor Control Centers, Spectra Series Busway, and Medium Voltage Load Interrupter Switchgear (MVS).

Audio Sound Levels

The transformer shall be designed to meet ANSI and NEMA sound levels for dry-type transformers. As an option, transformers designed at -3dB below ANSI and NEMA standard sound levels are available.

Vent-Dry Sound Levels: (dB)

Equivalent Two Winding Base kVA	Self-Cooled dB	Fan-Cooled dB
500	60	N/A
750	64	67
1000	64	68
1500	65	69
2000	66	71
2500	68	71
3000	68	73

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Ventilated Dry-Type Case Outline



Shown with High Voltage and Low Voltage
Air Terminal Compartments

NOTES:

1. Coordination to GE Equipment may require Transition/Throats.
2. Depth dimensions may increase approximately 4" to 8" each and height dimension may increase up to 4" each for outdoor NEMA 3R enclosures.
3. Add 400 lbs. for each 18" ATC or Transition section required.
4. Add 600 lbs. for each 30" to 40" wide ATC.
5. Dimensions may vary depending on switchgear connections and special requirements.
6. Dimensions and weights are subject to change without notice and should not be used for construction purposes.

Approximate Enclosure Dimensions and Weights

Based on 15kV class, 150°C rise, Al windings and NEMA 1

kVA	Height inches	Width* inches	Depth inches	Weight lbs.
225	90	56	50	2,400
300	90	56	50	2,650
500	90	72	50	3,600
750	90	80	50	4,550
1000	90	90	50	5,550
1500	90	90	50	7,800
2000	100	100	60	9,200
2500	108	108	60	11,150
3000	108	108	60	13,150

*Add 18" to width for each ATC.

Vent-Dry Basic Impulse Ratings

Nominal System Voltage kV	Standard HV BIL kV	Option HV BIL kV	LV BIL kV
1.2	10	30	10
2.5	20	30, 45	20
5.0	30	45, 60, 75	30
8.7	45	60, 75, 95	N/A
15.0	60	75, 95, 110	N/A

Dry-Type Standard Features

- Vacuum Pressure Impregnated (VPI) windings
- 80°, 115°, 150°C average winding rise ratings
- 60 Hz operation
- 220°C insulation system
- Aluminum or copper windings
- ANSI ground pads
- Core ground strap
- Indoor ventilated enclosure – NEMA 1
- Paint – ANSI 61 finish
- Provisions for future fans (750 kVA & up)
- Provisions for lifting
- Removable front and rear panels
- Vibration isolating pads
- (2) 2 1/2 % full capacity taps above and below nominal

Dry-Type Accessories or Options

- Electrostatic shield
- Enclosure – hinged panels
- Enclosure – knockdown
- Fans for 133% FA kVA rating
- Future fan wiring and control
- Ground bus - full length copper
- Impact indicator – mechanical
- Outdoor enclosure NEMA 3R
- Paint – polyurethane overcoat
- Special paint
- Screened ventilation openings
- Temperature monitor/fan controller
- Space heaters
- Thermostat for space heaters
- UL listing

Special Design or Application

- Low loss designs
- Rectifier transformer designs
- Special ambient designs
- High overload capacity designs
- Special/low sound level designs
- 50 Hz designs
- Seismic zone IV designs
- Five-legged core designs
- Series/parallel windings
- HV Wye connection to LV Delta
- Retrofit to specific dimensions
- K-factor ratings
- TP-1 efficiency

Testing

Each transformer shall receive the following standard production tests in accordance with ANSI C57.12.91

- Resistance test
- Polarity & phase relation test
- Turns ration test
- No-load loss & exciting current test
- Impedance and load-loss test
- Applied potential test
- Induced potential test

Test results, when requested, are available by transformer serial number. In addition, the following special tests can be performed on each transformer in accordance with applicable ANSI standards at an additional cost.

- Temperature test
- Impulse test
- Sound test
- Insulation power factor test
- Partial discharge test

For additional information contact your local GE Industrial Systems Salesperson.



GE Industrial Systems

General Electric Company
41 Woodford Avenue, Plainville, CT 06062
www.GEindustrial.com

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