

Substation Transformers	25-2
Three-phase Padmounted Transformers	25-4
Single-Phase Pole-Mounted Transformers	25-6
Network Transformers	25-7
Voltage Regulators	
VR-1	25-8
Bushing Potential Devices	25-11



Distribution Transformers-Medium and High Voltage Section 25 **Prolec GE Primary and Secondary** Substation Transformers

Prolec GE Substation transformers are designed and manufactured to meet our customer needs. As an innovative manufacturer, we are continuously implementing new technologies, using high grade of materials which allows flexibility in design and makes us the best in class of our manufacturing process and testing labs. This results in high reliability transformers meeting the following applicable standards:

- American National Standards Institute (ANSI)
- Institute of Electrical and Electronics Engineers, Inc. (IEEE)

Commercial

- Hospitals

- National Electrical Manufacturers Association (NEMA)
- Department of Energy (DOE)
- Canadian Standards Association (CSA)

Applications

Industrial	
------------	--

- Oil & Gas
- Paper
- Steel
- Airports Stores
- Minning
- Chemical
- Food

Features and Benefits

- Available up to 15 MVA Substation transformers with rectangular windings with our compression bounding process with excellent reliability, meeting or exceeding ANSI/IEEE short circuit performance.
- Pressurized winging shop to reduce the dust and moisture to extend the life of the insulation
- Tank design to meet full vacuum
- Capability to coordinate with electrical equipment such as HV Switch, switchboards, LIS, MCCs
- Optimizing system for each transformer combined with the great variety of materials, Prolec GE finds the best solution and price for our customers.
- High electrical grade conductors and the best insulation materials bring the high efficiency and reliability avoiding shut off
- Fluids high point of flammability to reduce fire risk
- Double welding and gaskets of high endurance to prevent spills and leaks
- High resistance materials and paint system to support UV

Specifications

Product scope

- 225 15,000 KVA
- 2400 69,000 V Primary voltages
- 220Y/127 34,500 V Secondary voltages
- 3 phase
- 60 or 50 Hz
- 65° C, 55/65° C
- ONAN, ONAN/ONAF, KNAN, KNAN/KNAF
- Mineral oil, FR3, Silicone, Beta Fluid, Alpha Fluid
- 3300 14850 FASL
- Copper or aluminum windings
- Standard impedance according ANSI C57.12.36

Specialties

- IBC/CBC certified up to 5 MVA
- UL listed
- CUL listed
- Factory mutual (FM) approved
- Retrofit
- Special impedance per customer request

Contact Information





Distribution Transformers-Medium and High Voltage Section 25 Prolec GE Primary and Secondary Substation Transformers

General construction features

- Design to meet all customer specification
- Flexibility in design
- Flexible core and coil enabled to dimensional requirements
- Efficient paint system to meet or exceed marine environments

Standard features

- De-energized external operation tap changer
- Side mounted HV segment 2 and LV bushings segment 4
- HV porcelain bushings
- LV epoxy bushings with NEMA spades
- Welded radiators
- HV and LV flanges
- HV and LV throats
- 5 mils thickness paint system, ANSI 61 finish color
- Liquid level gauge without alarm contacts
- Liquid temperature gauge without alarm contacts
- Pressure vacuum gauge without alarm contacts
- Pressure test valve
- Pressure relief device without alarm contacts above 2500 KVA
- Laser scribed anodized aluminum nameplate
- Stainless steel ground pads (4)
- Drain valve with sampling device
- Filter press provision
- Full vacuum design tank
- Audible sound level by NEMA standard

Optional features

- De-energized external operation tap changer up 7 positions
- LV porcelain bushings
- Removable radiators with shut off valves
- Stainless steel removable radiators with shut off valves
- Galvanized removable radiators with shut off valves
- HV and LV top or bottom air terminal chambers
- High corrosive paint system
- Liquid level gauge with 1 or 2 alarm contacts
- Liquid temperature gauge with 2 or 3 alarm contacts
- Winding temperature gauge with 2 or 3 alarm contacts
- Pressure vacuum gauge with 2 alarm contacts
- Pressure relief device with 1 or 2 alarm contacts
- Sudden pressure relay with 2 alarm contacts with or without seal in
- Scada
- Laser scribed stainless steel nameplate
- Copper ground pads
- Filter press valve
- Current transformers 2 per phase
- Lighting arresters on HV
- Neutral grounding resistor
- Low audible sound level
- Control boxes 3R, 4, 4X & 7

Contact Information

Distribution Transformers-Medium and High Voltage Section 25 Prolec GE Three-Phase Padmounted Transformers

Prolec GE commercial transformers are designed and manufactured to meet our customer needs.

As an innovative manufacturer, we are continuously implementing new technologies, using high grade of materials which allows flexibility in design and makes us the best in class of our manufacturing process and testing labs. This results in high reliability transformers meeting the following applicable standards:

- American National Standards Institute (ANSI)
- Institute of Electrical and Electronics Engineers, Inc. (IEEE)
- National Electrical Manufacturers Association (NEMA)
- Department of Energy (DOE)
- Canadian Standards Association (CSA)

Applications

- Hospitals
- Airports
- Schools and Universities
- Commercial buildings
- Industrial facilities

Features and Benefits

- Available up to 5 MVA commercial transformers with rectangular windings with our compression bounding process with excellent reliability, meeting or exceeding ANSI/IEEE short circuit performance.
- Optimizing system for each transformer, combined with the great variety of materials, Prolec GE finds the best solution and price for our customers.
- High electrical grade conductors and the best insulation materials bring the high efficiency and reliability to avoid shut off
- Fluids high point of flammability to reduce fire risk
- High resistance materials and paint system to support UV

Fuses

- Expulsion
- Bayonet
- Non load break dry well current limiting fuseholder
- Load break dry well current limiting fuseholder

Specifications

Product scope

- 45 5,000 KVA
- 2400 34,500 V Primary voltages
- 208Y/120 4,160 V Secondary voltages
- 3 phase
- 60 or 50 Hz
- 65° C, 55/65° C
- ONAN or KNAN
- Mineral oil, FR3, Silicone, Beta Fluid, Alpha Fluid
- 3300 FASL
- Aluminum or copper windings
- Standard impedance according to ANSI C57.12.26

Specialties

- IBC/CBC certified
- UL listed
- CUL listed
- Factory mutual (FM) approved
- Arc Flash
- Special impedance per customer request

Contact Information



Distribution Transformers-Medium and High Voltage Section 25 Prolec GE Three-Phase Padmounted Transformers

General construction features

- Design to meet all customer specification
- Flexibility in design
- Flexible core and coil enabled to dimensional requirements
- Flip top cabinet
- Electrostatic paint system
- Full protected, fuses and breakers

Standard features

- De-energized external operation tap changer
- HV bushings well
- LV epoxy bushings with NEMA spades
- Welded radiators
- 5 mils thickness paint system, Green Munsell 7Gy 3.29/1.5 finish color
- Liquid level gauge without alarm contacts
- Liquid temperature gauge without alarm contacts
- Laser scribed anodized aluminum nameplate
- Stainless steel ground pads
- Drain valve with sampling device
- Filter press provision
- Audible sound level by NEMA standard

Optional features

- De-energized external operation tap changer up 7 positions
- HV integral bushings
- Stainless steel radiators
- Galvanized radiators
- Liquid level gauge with 1 or 2 alarm contacts
- Liquid temperature gauge with 2 or 3 alarm contacts
- Winding temperature gauge with 2 or 3 alarm contacts
- Pressure vacuum gauge with 2 alarm contacts
- Pressure relief device with 1 or 2 alarm contacts
- Sudden pressure relay with 2 alarm contacts with or without seal in
- Scada
- Laser scribed stainless steel nameplate
- Copper ground pads
- Filter press valve
- $-\operatorname{Lighting}$ arresters on HV
- Low audible sound level
- Control boxes 3R, 4, 4X and 7

Contact Information

Distribution Transformers-Medium and High Voltage Section 25 Prolec GE Single-Phase Pole-Mounted Transformers

Prolec GE designs and manufactures a complete line of singlephase pole-type distribution transformers for installation on utility overhead systems. These highly reliable transformers are available in a wide variety of ratings and accessories combinations, meeting or exceeding applicable standards: — American National Standards Institute (ANSI)

- Institute of Electrical and Electronics Engineers, Inc. (IEEE)
- National Electrical Manufacturers Association (NEMA)
- Department of Energy (DOE)
- Rural Utility Service (RUS)

Standard sizes and voltages

- kVA: 10, 15, 25, 37.5, 50, 75, 100 and 167
- HV ratings: 4160GrdY/2400 to 34500GrdY/19920
- Dual voltages available
- BIL: 60 kV to 150 kV
- LV ratings: 240/120, 480/240 and 277

Please contact your GE sales representative for kVA sizes and voltage ratings not listed

Features and Benefits

- Available up to 167 kVA single-phase poles. Our compression bounding process have been effectively used with an excellent reliability, meeting or exceeding ANSI/IEEE short circuit performance
- Optimizing system for each transformer combined with the great variety of materials, Prolec GE finds the best solution and price for our customers
- High electrical grade conductors and the best insulation materials bring the high efficiency and reliability avoiding shut-off
- High resistance materials and paint system to support UV
- Mild steel tank with welded lifting lugs and hanger brackets for direct-to-pole mounting
- Single piece clamped cover band
- Low-voltage ground provisions
- Tank ground provision
- Insulated cover for wildlife protection
- Laser engraved aluminum nameplate
- Non-PCB insulating oil
- Arrester mounting nuts welded to tank (single bushing designs)
- One HV bushing with tank ground strap for grounded wye applications or two HV bushings for wye applications



Optional features and accessories

- Broad selection of design efficiencies to meet specific customer applications and DOE requirements
- Automatic pressure relief valve
- High-voltage taps with external tank mounted no load tap changer
- Dual high-voltage ratings (not available with taps)
- Stencils and labels according to customer requirements
- Low-voltage circuit breaker with reset (and optional overload signal light)
- Internal high-voltage expulsion fuse
- External tank mounted high-voltage lightning arrester
- Under oil arrester
- External low-voltage surge arrester
- Interlaced secondary windings (through 50 kVA ratings)
- Stainless steel tank, cover, clamping band
- Extra creep options for high-voltage bushings
- Variety of features available for wildlife protection
- Magnex™

Routine tests

- Leak test
- Polarity and phase relation
- Resistance
- No-load losses and excitation current
- Load losses and impedance
- Applied voltage
- Induced voltage
- Full wave impulse
- Ratio test

Contact Information



Distribution Transformers-Medium and High Voltage Section 25 GE Network Transformers

When the highest degree of service continuity is the Critical to Quality requirement the a-c secondary network system is the system to use. GE Network Transformers are also applied in some underground systems other than networks where superior sealing and corrosion protection are of primary importance. These non-network applications also include intertie (step) transformers for interconnecting two different voltage systems (300-3000 kVA, 60-200BIL high voltage, 60-95BIL low voltage). 208Y/120 volt secondaries are also available.

Network Transformers are designed in accordance with ANSI C57.12.40 and constructed with the corrosion resistance equivalent of copper bearing steel:

- —Cover and Base 0.50 in. thick
- $-\mathrm{Tank}$ wall and housings 0.312 in. thick

GE uses a special Network Transformers paint system for added corrosion resistance.

Features and Benefits

- –GE Six-Sigma quality initiative ensures superiority in design and manufacture
- -Designed for optimal corrosion resistance
- —High short-circuit strength
- –Low sound level
- -Positive sealing facilities
- -Insulation system for increased loading capacity
- –Designed to minimize losses
- —Smaller size
- —Smaller footprint
- -Designed to provide maximum kVA per cubic foot
- -Reduced weight

Specifications

Standard Ratings

- —300-2500 kVA three-phase
- $-2.5 \rm kV$ to 34.5 kV high voltage
- $-216 \ensuremath{\text{Y}}\xspace{/}125$ or $480 \ensuremath{\text{Y}}\xspace{/}277$ low voltage
- -55/65°C or 65°C
- Liquids Available
 - -Oil, Silicone, Envirotemp, or R'Temp fluids



Subway Type Network (below ground application-frequent/continuous submersion)

Subway Type Network Transformers are designed for frequent submersion and use flat panel radiators with the corrosion equivalence of 0.312 copper- bearing steel. Typical application is grid-type secondary network systems to serve high density load areas of cities.

The Subway Type Network Transformer may also be used in "dry" vault applications if desired.

Vault Type Networks

(above ground "dry" vaults -occasional submersion)

Vault Type Network Transformers are designed for "dry" vaults using lighter weight panel radiators with the corrosion equivalence of 0.093 copper-bearing steel. Typical applications are skyscrapers, high rise apartments, large office or manufacturing facilities where the reliability of a Network System is required.

Contact Information

GE Transformer, Shreveport Operation 7000 Bert Kouns Industrial Loop Shreveport, LA 71129 Phone: (877) 872-6852



Distribution Transformers-Medium and High Voltage Section 25 GE VR-1 Voltage Regulator

Variation of voltage can have detrimental effects on Utilities and their customers. To prevent customer complaints, loss of revenue due to sub-normal voltage, and increased costs due to higher line losses, GE has designed the VR-1 Voltage Regulator with the utilities in mind. With over 40 years of experience, GE has designed the most reliable regulator ever assembled.

Features and Benefits

Standard Features (External):

- –Weather resistant tank and finish
- -Three cover bushings
- -Hand-hole cover
- —Lifting lugs on the tank
- -Oil drain and sampling device
- -Minimum oil sight gage
- -Provisions for mounting line-to-ground surge arresters
- -Provisions for grounding tank with clamp-style terminals
- —Dial-type position indicator with drag hand and load bonus adjustment
- -Provisions for direct-to-pole mounting
- Diagrammatic anodized aluminum nameplate on tank and control cabinet

Standard Features (Internal):

- —Switching reactor
- Equalizer windings to balance reactor voltage where necessary
- -Self-contained voltage supply for motor and control devises
- —Oil level line inside tank to indicate 25°C oil level
- -Switching mechanism to have a quick-break, slow make operation, and be provided with electrostatic shielding
- -Core and coil assembly to be provided with patterned, epoxy-coated insulation paper and oven-bonded to provide short-circuit withstand as specified by ANSI C57.15.
- By-pass protection for series winding mounted internally using zinc-oxide disks
- -Self- contained voltage supply for motor and control devices
- -Current transformer

What makes a GE Regulator different?

- Reliability; expected switch life is 2 million operations resulting in up to 40 years of trouble free service
- -GE provides 3 control types (VR-1, GE-2011-B and GE-2011-C)
- -GE-2011 cabinet equipped with PT disconnect switch and CT shorting switch located in the cabinet, which allows the control/adapter panel to be changed-out with de-energizing the Regulator
- -The GE-2011C is equipped with RS-232, RS-485, and ST type connector for Fiber Optics. (RJ45 Ethernet port optional)
- -The GE-2011C is equipped with BECO 2200, BECO 2179, Cooper 2179, DNP3.0, Modbus, UCA2.0, and GP 2179 protocols for SCADA communications

- —Both GE-2011 controls can be programmed either from the panel or through a standard RS-232 connector using a serial "null modem" cable and GE-2029A Communications software
- -Both GE-2011 controls are equipped with a LCD display. (VFD display optional)
- -Motor Capacitor mounted inside the GE-2011 cabinet -Internal By-pass arrester
- -GE regulator is a sealed tank, cover suspended design that allows complete removal of all internals from the top
- -GE builds a true 55°C rated design that provides 12%
- extra continuous loading capability without undue loss of insulation life.

Optional Features

- —304L stainless steel
- -Galvanized sub-bases
- -Remote cables kits optional up to 50' for pole mounting applications.
- Provide polymer housed PDV-65 and PDV-100 arresters from 3KV through 27KV.
- Provide a variety of bushing terminals, 2-hole terminals, 4-hole terminals, sefcor 4-hole terminals, Anderson connectors suitable for #2-1000MCM conductor, and 1"-14 THD Studs.
- —Stainless Steel hardware
- -Control Heater with thermostat
- —Bird Guards
- —Extra Creep Bushings

Specifications

- Standard Ratings
 - —50 833 kVA
 - --Voltage from 2500 (for 2500/4330Y Volt Circuits, 60kV-BIL) to 19920 Volts (for 34,500 GrdY/19920 Circuits, 150kV-BIL)
- -50 hertz ratings at 10,500, 11,000, 20,000 21,000 and 24,000 up to 250 Amps

Contact Information

GE Transformer, Shreveport Operation 7000 Bert Kouns Industrial Loop Shreveport, LA 71129 Phone: (877) 872-6852



Distribution Transformers-Medium and High Voltage Section 25 GE VR-1 Voltage Regulator



2500 Volts - 60 kV BIL (for 2500/4330Y, 2400/4160Y Volt Circuits)

		Load Amps at Raise & Lower	Approx. Wt. (lbs) Including Oil		Gallons Oil ¹ net	Approximate Dimensions Over-all Inches		
kVA	Product No.	10% Regulation	Ship	Net	@ 7.45 lbs. per Gal.	Proj. Floor Space	Height	Туре
50	33D3050 ²	200	1330	1230	62	27 X 31	68	Pole
75	33D3075 ²	300	1490	1390	65	32 X 32	70	Pole
100	33D3100 ²	400	1930	1830	86	29 x 40	76	Pole/Station
167	33D3167	668	2200	2100	90	39 X 42	77	Station

5000 Volts - 75 kV (for 5000/8660Y, 4800/8310Y, 2500/4330Y Volt Circuits)

		Load Amps at Raise & Lower	Approx. Wt. (lbs) Including Oil		Gallons Oil ¹ net	Approximate Din Over-all Inc	nensions hes	
kVA	Product No.	10% Regulation	Ship	Net	@ 7.45 lbs. per Gal.	Proj. Floor Space	Height	Туре
50	33D4050 ²	100	1190	1090	46	24 X 31	66	Pole
100	33D4100 ²	200	1590	1490	61	32 X 37	69	Pole
167	33D4167 ²	334	2250	2150	88	33 X 38	76	Pole
250	33D4250 ³	500	2660	2560	92	34 X 46	83	Station
333	33D4333 ³	666	2900	2800	98	43 X 46	83	Station

¹All regulators are shipped oil-filled.

²These regulators have provisions for direct-to-pole, platform, or crossarm mounting. For crossarm mounting, suspension hooks will be required and may be obtained from hardware manufacturer.

³These regulators are furnished with taps in the control circuit to operate at 2500V and 4800V at rated current.



Distribution Transformers-Medium and High Voltage Section 25 GE VR-1 Voltage Regulator

7620 Volts - 95 kV BIL (for 7960/13,800Y, 7620/13,200Y, 7200/12470Y Volt Circuits)

		Load Amps at Raise & Lower	Approx. Wt. (lbs) Including Oil		Approx. Wt. (lbs) Including Oil Gallons Oil ¹ n		Gallons Oil ¹ net	Approximate Din Over-all Inc	
kVA	Product No.	10% Regulation	Ship	Net	@ 7.45 lbs. per Gal.	Proj. Floor Space	Height	Туре	
38.1	33D5038 ²	50	1100	1000	46	27 X 33	64	Pole	
76.2	33D5076 ²	100 ³	1380	1280	57	27 X 35	70	Pole	
114.3	33D5114 ²	150 ³	1700	1600	63	32 X 35	71	Pole	
167	33D5167 ²	219/232 ^{3,4}	2000	1900	67	34 X 43	75	Pole	
250	33D5250	328/347 ^{3,4}	2720	2620	95	38 X 42	83	Station	
333	33D5333	438/463 ^{3,4}	3080	2980	100	39 X 42	88	Station	
416	33D5416	548/578 ^{3,4}	3380	3280	106	41 X 41	91	Station	
509	33D5509	668 ³	3810	3710	125	45 X 45	93	Station	

13,800 Volts - 95 kV BIL (suitable for 13,800, 13,200 or 12,000 Volt Circuits at Rated Amperes)

		Load Amps at Raise & Lower	Approx. Wt. (lbs) Including Oil		Gallons Oil ¹ net	Approximate Din Over-all Inc	nensions hes	
kVA	Product No.	10% Regulation	Ship	Net	@ 7.45 lbs. per Gal.	Proj. Floor Space	Height	Туре
69	33D6069 ²	50	1380	1280	52	27 X 35	72	Pole
138	33D6138 ²	100	1890	1790	64	29 X 35	87	Pole
207	33D6207 ²	150	2600	2500	99	33 X 42	82	Pole
276	33D6276 ²	200	3120	3020	127	32 X 43	92	Pole/Station

14,400 Volts - 150 kV BIL5 (for 14,400/24940Y volt circuits, also 7200/12,470 GRDY circuits at Rated Amperes)

		Load Amps at Raise & Lower	Approx. Wt. (lbs) Including Oil		Gallons Oil ¹ net	Approximate Dimensions Over-all Inches		
kVA	Product No.	10% Regulation	Ship	Net	@ 7.45 lbs. per Gal.	Proj. Floor Space	Height	Туре
72	33D7072 ²	50	1920	1820	96	29 X 38	79	Pole
144	33D7144 ²	100	2480	2380	102	33 X 40	88	Pole
288	33D7288	200	3290	3190	127	39 X 45	96	Station
333	33D7333	231	4010	3910	161	42 X 47	103	Station
416	33D7416	289	4020	3920	161	43 X 45	103	Station
432	33D7432	300	4340	4240	169	48 X 49	103	Station
500	33D7500	347	4870	4770	168	42 X 49	109	Station
576	33D7576	400	5060	4960	172	48 X 49	109	Station
667	33D7667	463	5450	5350	172	50 X 49	109	Station
720	33D7720	500	5550	5450	194	54 X 53	109	Station

19,920 Volts - 150 kV BIL5 (for 34,500 GRDY/19,920 Volt Circuits)

		Load Amps at Raise & Lower	Approx. Wt. (lbs) Including Oil		Load Amps at Approx. Wt. (lbs) Raise & Lower Including Oil		Gallons Oil ¹ net	Approximate Din Over-all Inc	nensions hes	
kVA	Product No.	10% Regulation	Ship	Net	@ 7.45 lbs. per Gal.	Proj. Floor Space	Height	Туре		
100	33D8100 ²	50.2	2330	2230	110	29 X 36	94	Pole		
200	33D8200	100.4	3040	2940	132	31 X 41	101	Station		
333	33D8333	167	4040	3940	160	42 X 49	103	Station		
400	33D8400	201	4250	4150	165	48 X 49	103	Station		
500	33D8500	251	5490	5390	174	53 X 49	109	Station		
667	33D8667	335	5590	5490	177	56 X 51	109	Station		
833	33D8833	418 (65C)	5680	5580	197	58 X 53	109	Station		

¹All regulators are shipped oil-filled.

²These regulators have provisions for direct-to-pole, platform, or crossarm mounting. For crossarm mounting, suspension hooks will be required and may be obtained from hardware manufacturer.

³Three 7620V regulators can be operated at 7960V, 7620V, 7200V, 5000V, 4800V, 4330V, 4160V, 2500V and 2400V at rated amperes. Units shipped connected for 7200V operation.

⁴These regulators are capable of operation at voltages from 7960V to 2500V. Can apply currents up to the current determined by the rated kVA and the voltage level, provided the operating voltage is from 7200V to 7960V. For voltages below 7200V, the current is limited to the value determined for 7200V operation. ⁵150 kV BIL on S and L, 95 kV BIL on SL.



25-10

Distribution Transformers-Medium and High Voltage Section 25 Bushing Potential Device KA-108

The General Electric Type KA-108 Bushing Potential Device is a voltage transforming device for the operation of instruments and relays from high-voltage circuits, 115 kV and above designed with optimal safety, reliability and savings in mind.

Greater Safety

- -This potential device has several safety features:
- $-\mathrm{A}$ ground switch for removing high-voltage from the device.
- A spark gap that protects the device circuit from abnormally high surge voltages.
- —A flexible metal covered cable that connects the device to the bushing, so that no live circuits are exposed.

Features and Benefits

- -Economical
- -High-flexibility
- -Adjustable to a variety of HV bushings
- -Constant burden capacity
- -Rugged construction

Application

The KA-108 bushing potential device is well suited to operate the usual types of relays, synchroscopes, volt-meters, indicating lamps, wattmeters, and similar instruments requiring a potential source of essentially constant ratio and phase relation with respect to the high-voltage circuit. The device's major field of application is in protection and control equipment for generating plants, substations, and transmission lines.

Contact Information

GE Parts Super Center 7602 Woodland Drive Suite 200 Indianapolis IN 46278 800-331-0436 fax: 513-774-2924 www.partsdirect.ge.com





NOTES:	

Distribution Transformers-Medium and High Voltage Section 25



25-12