

MGM



TRANSFORMER COMPANY



U.S. DEPARTMENT OF
ENERGY
DOE 2016 COMPLIANT



Custom 600 V Class, Dry Type General Purpose Distribution Transformers



Other Products



Dry
Substation
(Bulletin 30)



Liquid
Substation
(Bulletin 40)



600V
Dry Type
(Bulletin 10)

BULLETIN 10



Let MGM Transformer Company with 40 years of manufacturing experience design and deliver your next custom transformer! To meet the requirements of your special applications, we can develop units with any voltage combination, tap arrangements, winding options and enclosure types. Some examples of special projects are:

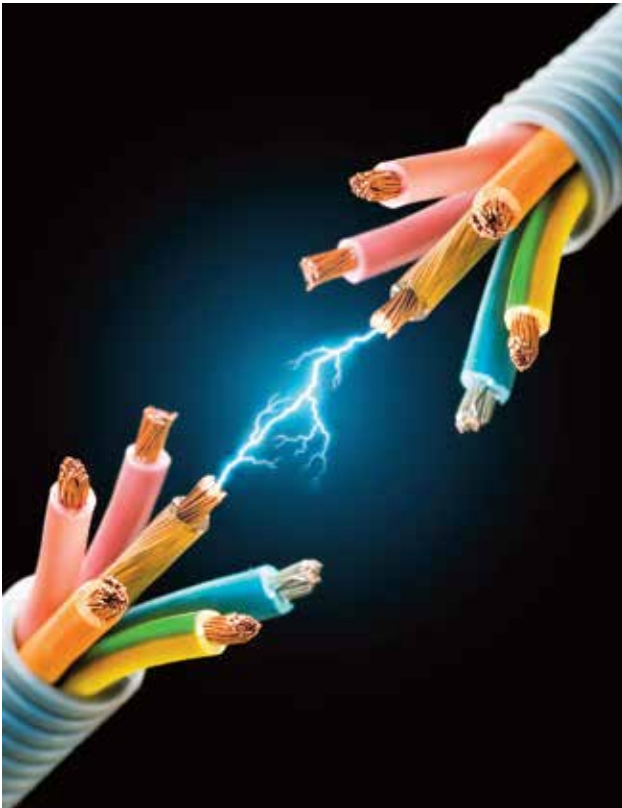
- ◆ Low noise level transformers for use in hospitals, schools and office buildings
- ◆ Marine duty application for use near shores, on docks and onboard ships and marine platforms
- ◆ Totally Enclosed Non-Ventilated (TENV) for use in adverse atmospheric environments
- ◆ Auto-transformers for machinery voltage conversions
- ◆ OSHPD seismic certified transformers to meet regulatory standards such as hospital installations



With our two state of the art manufacturing facilities we can offer quick turnaround time with free shipping throughout the continental United States. Ask about our Bull Rush program for expediting your order.

MGM Transformer Company can manufacture your units at our 120,000 square foot plant in the U.S. and source the raw materials solely from American companies if required. By doing so we can certify your units to be compliant with all of the various "Buy U.S." statutes (either state or federal). Please make sure to specify your requirements at the time of order.





GENERAL INFORMATION

MGM Dry type transformers are designed, manufactured and tested in accordance with all applicable NEMA, ANSI and IEEE standards and are designed with a 220°C insulation system.

MGM 600 Volt class transformers are UL and CUL listed in accordance to standards UL506 and UL1561 and are classified as isolation transformers.

AUTOTRANSFORMER

An autotransformer is an electrical transformer with only one winding. In an autotransformer, portions of the same winding act as both the primary and secondary sides of the transformer. In contrast, an ordinary transformer has separate primary and secondary windings which are not electrically connected. An autotransformer does not provide electrical isolation between its windings as an ordinary transformer does.

Since part of the winding does “double duty”, autotransformers have the advantages of often being smaller, lighter and cheaper than typical dual-winding transformers, but the disadvantage of not providing electrical isolation between primary and secondary circuits. Other advantages of autotransformers include lower leakage reactance, lower losses and lower excitation current.

ENCLOSURES

MGM ventilated transformers utilize a NEMA 2 rated drip proof metal enclosure with natural draft ventilation. MGM dual rated enclosures are suitable for indoor or outdoor applications and are standard on all models except the 225, 300, and 500 kVA transformers (optional Weather-shield Kits are available for these units). Our standard enclosures use cold rolled steel with standard ANSI 61 gray paint. We can also offer totally enclosed, non-ventilated (TENV) and stainless steel (304SS & 316SS) enclosures. All of our units can be ordered to comply with OSHPD seismic regulations.

TENV - NEMA 4 & 4X

Totally enclosed non-ventilated dry type transformers are for special applications. They are used mainly in adverse atmospheric conditions where it is desirable to use a dry type non-ventilated transformer vs. the ventilated standard unit, which has openings in its enclosure to allow air to flow directly over the core and coil. In applications where the atmosphere contains conductive, corrosive, or combustible materials, which might damage a transformer, or lint and dust particles which might block the ventilation passages, non-ventilated transformer is highly suited. It has no openings in the enclosure. Heat is dissipated by radiating from the surface area of the enclosure. Consequently, the enclosures are larger than those of the standard ventilated type. Non-ventilated transformers are suited for application in the textile, chemical, automotive, electrochemical, foundry, cement, food, paper, and other industries where the transformer is subject to spray or wash down conditions.

K-FACTOR

K-Factor Rated Transformers include several major design improvements that address the problems caused by non-linear loads and harmonics. They are designed to withstand the effects of harmonic currents without exceeding the temperature rating of the insulation system. K-Factor design compensates for the stresses on a transformer's winding insulation which prevents insulation breakdown and premature failure. The net result is longer transformer life.

Core Design

A high grade, non aging, grain-oriented silicon steel with high magnetic permeability provides reduced core induction levels, preventing saturation as a result of the higher frequency harmonics and resultant peak voltages. This core also provides reduced eddy currents or induced currents in the steel caused by the high ratios of peak-to-RMS currents and voltages found in harmonic loads.

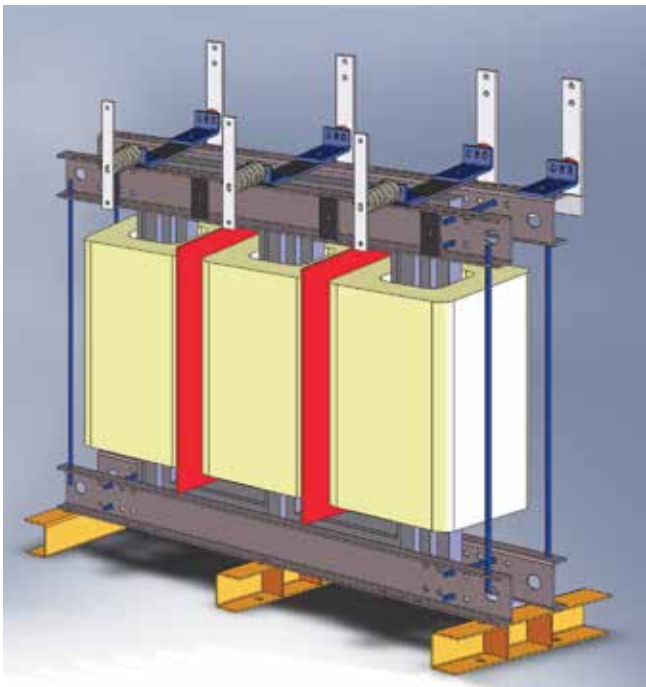
Neutral Bus

Neutral bus is sized and configured to accommodate at least 200% of the rated current. This compensates for the increased neutral currents found in non-linear loads thus reducing heat.



CORE & COIL

The basic purpose of a transformer is voltage transformation as near as practically possible to the load for economy and distribution of power. Typical loads for dry type distribution transformers include lighting, heating, air conditioners, fans, and machine tools. Such loads are found in commercial, institutional, industrial, and residential structures. Open core and coil assemblies are typically used by panel builders and equipment OEM customers who incorporate the entire transformer into their structures.



MARINE DUTY

MGM Transformer's single-phase and three-phase marine-duty transformers have been developed utilizing over 80 years of commercial and military experience in magnetic transformer design. This ABS (American Bureau of Shipping) Type Approved product line has been engineered to meet the unique requirements of marine applications including commercial and pleasure ships, offshore oil rigs, tankers, near shore and other harsh marine environments.

All of MGM's facilities are ISO9001 certified and have modern testing equipment to meet all the requirements of ABS, ANSI, CSA, NEMA and UL. Below are just a few of the enhanced design features of MGM marine duty transformers.

Core Design – Cores are manufactured from the highest quality non-aging, cold rolled, grain oriented silicon steel laminations using stacked, step core construction and designed to minimize voltage harmonics. All cores are protected in a vacuum pressure impregnated resin.

Steel Components – All steel parts (frames, base channels, brackets, rods, etc.), are either coated or plated to meet UL50 salt spray requirements. All hardware (bolts, nuts, washers, etc.), are fully protected in stainless steel or equivalent finish.

Insulation – 220°C insulation systems are fully vacuum impregnated and protected.

SCR & DRIVES ISOLATION

Drive isolation transformers are specifically designed for use with AC and DC adjustable speed drives. Two or three winding drive isolation transformers provide:

- Electrical isolation between the incoming line and the drive circuitry.
- Voltage conversion of input line to standard drive input voltages.
- Minimized line disturbances caused by SCR (silicon controlled rectifiers) firing.
- Reduced short circuit currents and voltage line transients.

Drive isolation transformers are specifically sized to the drive kVA requirements and are braced to withstand the mechanical stresses of current reversals and short circuits associated with SCR drives.

SERIES MULTIPLE WINDINGS (RECONNECTABLE)

To make the basic single-phase transformer more versatile, both the primary and secondary windings can be made in two equal parts. The two parts can be reconnected either in a series or in parallel. This provides added versatility as the primary winding can be connected for either 480 volts or 240 volts and the secondary winding can likewise be divided into two equal parts providing either 120 or 240 volts. (Note: there will be four leads per winding brought out to the terminal compartment rather than two). Either arrangement will not affect the capacity of the transformer. Secondary windings are rated with a slant such as 120/240 and can be connected in a series for 240V or in a parallel for 120V or 240/120V (for 3-wire operation). Primary windings rated with an "X" such as 240X480 can operate in series or parallel but are not designed for 3-wire operation. A transformer rated 240X480V primary, 120/240V secondary could be operated in 6 different voltage combinations.

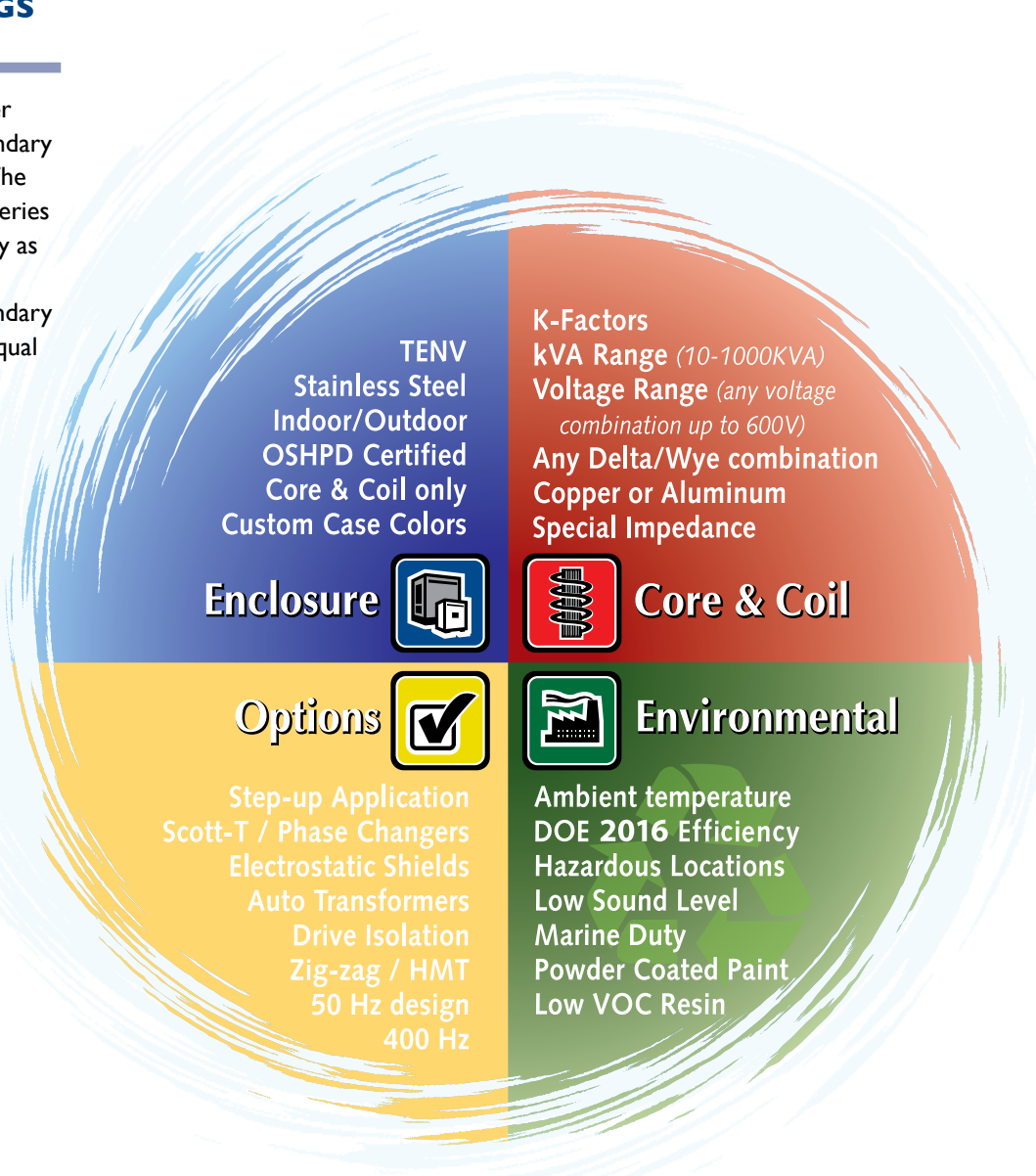
ELECTROSTATIC SHIELD

Electrostatically (faraday) shielded transformers are designed to protect sensitive electrical and electronic devices and systems from high frequency voltages (electrical noise) or transients that occur due to switching and loading on distribution lines. Electrical noise and transients are classified two ways: Normal Mode - noise which appears between the hot & neutral conductors. Common Mode - noise which appears between the ground wire and hot and neutral conductors. Common mode noise is more prevalent and should be the key criterion for any noise suppression device.

LOW SOUND LEVEL

Low sound transformers are designed to have average sound levels 3 dB below NEMA ST-20 standards. Depending on kVA rating and KV class, we may be able to reduce sound level up to 7 dB below NEMA ST-20 standard.

Note: Sound levels are measured in a sound room, not at the installation. These quieter transformers are ideal for noise sensitive installations such as schools, hospitals, libraries, and offices. Proper installation procedures should be used to achieve maximum benefit.



600V, Dry Type, General Purpose Distribution Transformer

Catalog Numbering System

	1	2	3	4	5	6	7	8		9	10	11	12	13
Example:	H	T	112	A	3	B	2	SH	-	H	K1	060	LN0	01

1	Certifications H = UL Listed, CSA, 220° C Insulation System													
2	Phase S = Single Phase, rated max. 500 kVA T = Three Phase, rated max. 1500 kVA													
3	kVA: As called out in numerals. 9, 10, 15, 25, 30, 37½, 45, 50, 75, 100, 112½, 150, 225, 300, 500, or 1000. (Other numbers between 9 and 1000 may be used. Construction same as next larger number.)													
4 & 6	Primary & Secondary Voltage: Single Phase: A: 480 B: 120/240 C: 240 x 480 D: 240 E: 120 F: 600 G: 208 H: 230/460 J: 460 K: 277 P: 230/115 V: 110/220 W: 230 AZ: 450 BZ: 440 HZ: 115 Three Phase: A: 480D B: 208Y/120 C: 240D D: 480Y/277 E: 120D F: 600D G: 208D H: 230D J: 460D K: 240/120 4W L: 240Y/139 M: 380D N: 575D P: 230Y/133 Q: 400Y/231 R: 380Y/220 T: 240Y/139 U: 440D V: 220D W: 500D X: 320Y/185 AZ: 450D BZ: 440Y/254 CZ: 415D DZ: 240 X 480 EZ: 220Y/127 FZ: 416Y/240 GZ: 460Y/266 HZ: 115D JZ: 550D KZ: 280D LZ: 360D MZ: 160Y/93 NZ: 130Y/75 PZ: 240Y X 208Y RZ: 208D X 230D SZ: 277Y/160 TZ: 490D													
5	Taps 1: No Taps 2: 2 - 2½% FCAN and 2 - 2½% FCBN 3: 2 - 2½% FCAN and 4 - 2½% FCBN 4: 4 - 2½% FCBN 5: 1 - 5% FCAN and 1 - 5% FCBN 6: 2 - 5% FCBN 7: 2 - 2½% FCAN and 1 - 2½% FCBN 8: 1 - 5% FCAN and 2 - 5% FCBN													
7	Winding Material 1 = Copper 2 = Aluminum													
8	Special Features SH = Electrostatic Shield None (Blank) = No Shield													
9	Temperature C Rise H = 150°C (Standard) F = 115°C B = 80°C													
10	K-Factor K1: K01 (Standard) K4 = K04 K6 = K06 K9 = K09 K13 = K13 K20 = K20 K30 = K30 other numbers between K2 and K99 may be used													
11	Frequency 60 = 60 Hertz (Standard) 50 = 50 Hertz 400 = 400 Hertz													
12	Sound Level LN0 = NEMA ST-20 (Standard) LNI = 1 dB Below NEMA LN3 = 3 dB Below NEMA LN5 = 5 dB Below NEMA LN8 = 8 dB Below NEMA													
13	Enclosure Type 01 = NEMA 1 (Indoor) IX = NEMA (Indoor - SS) 3R = NEMA 3R (Outdoor) 3X = NEMA 3RX (Outdoor - SS) 04 = NEMA 4 (TENV) 4X = NEMA 4X (TENV - SS) CC = Core & Coil only													

* We can build units that fall outside of this cataloging scheme. Please contact us for details.

Department of Energy 2016 Efficiency Standards Low Voltage Distribution Transformers



A distribution transformer provides the final voltage transformation in the electric power distribution system by reducing the high voltage current from a power line to a lower voltage for use in a building. The Department of Energy (DOE) has regulated the energy efficiency level of low-voltage dry-type distribution transformers since 2007. Beginning in 2016, there will be newly amended, federally mandated, energy efficiency standards for distribution transformers. MGM Transformer Company is at the forefront of this new standard and will be offering the new efficiencies on its products starting on January 1, 2016.

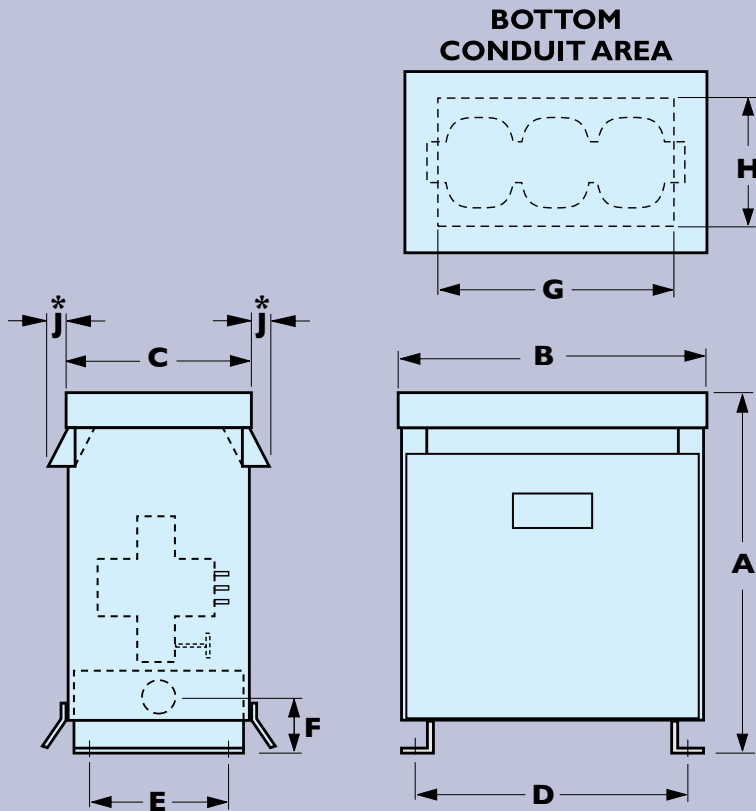
This ruling applies to three phase low voltage dry-type general purpose distribution transformers manufactured starting on January 1, 2016. Transformers that meet the current efficiency requirements in the U.S. (NEMA TP-1) that are physically in the U.S. can continue to be legally sold and installed after January 1, 2016. This includes units stored at manufacturers' warehouses, distributor stock, job sites, etc.

Comparison of various efficiency standards: NEMA TP-1, NEMA PREMIUM CSL-3 & DOE 2016

The table below lists the minimum efficiencies of low-voltage dry-type three phase distribution transformers required for their kVA rating. The standards for transformers manufactured on or after January 1, 2007 are known as NEMA TP-1 (or Energy Star labeled). On May of 2010 The NEMA CSL-3 standards were introduced with higher efficiency ratings than NEMA TP-1. The benefits of CSL-3 transformers are reduced electrical & heat losses, lower total cost of ownership (TCO), greater energy savings and green/LEED design. These features are beneficial for data centers, healthcare installations, schools & colleges, green applications, LEED buildings and government projects. The CSL-3 efficiency standard was never federally mandated. Transformers manufactured on or after January 1, 2016 are required to meet the minimum DOE 2016 efficiencies listed below. These standards will be federally mandated.

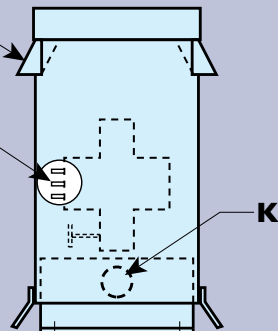
KVA (Three Phase)	NEMA TP-1 (Energy Star) Federally Mandated	DOE 2016 Standards Federally Mandated
15 kVA	97.0	97.89
30 kVA	97.5	98.23
45 kVA	97.7	98.40
75 kVA	98.0	98.60
112.5 kVA	98.2	98.74
150 kVA	98.3	98.83
225 kVA	98.5	98.94
300 kVA	98.6	99.02
500 kVA	98.7	99.14
750 kVA	98.8	99.23
1000 kVA	98.9	99.28

Note: All efficiency values are at 35 percent of nameplate-rated load, determined according to the DOE Test Method for Measuring the Energy Consumption of Distribution Transformers under Appendix A to Subpart K of 10 CFR part 431.



Weather-shields
(optional)

Primary taps



AVAILABLE ACCESSORIES

Bottom Mount Wall Bracket
Side Mount Wall Bracket
OSHPD Seismic Kits
Rain Hoods/Weather Shield Kits
Rodent/Bird Screen

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quotes@mgmtransformer.com

KVA	DIMENSIONS (Inches)										Wall Bracket	Weather Shield	Enclosure
	A	B	C	D	E	F	G	H	J	K			
9 - 15	28	21	14	18 $\frac{1}{2}$	11 $\frac{1}{2}$	-	17	10	-	-	WB1/NWB	†	GPA
25 - 50	32	26 $\frac{1}{2}$	17	23	14	-	22	13	-	-	WB1/NWB	†	GPB
75	38 $\frac{1}{2}$	28 $\frac{1}{2}$	20	28 $\frac{1}{2}$	17 $\frac{1}{2}$	-	26	16 $\frac{1}{2}$	-	-	WB2/NWB	†	GPB+
112.5	40 $\frac{1}{2}$	31 $\frac{1}{2}$	21 $\frac{3}{4}$	28 $\frac{1}{2}$	19	-	26	16 $\frac{1}{2}$	-	-	-	†	GPC
150	40 $\frac{1}{2}$	36 $\frac{1}{2}$	21 $\frac{3}{4}$	33 $\frac{1}{2}$	19	-	31	16 $\frac{1}{2}$	-	-	-	†	GPC+
225 - 300	51 $\frac{1}{2}$	40 $\frac{1}{2}$	26 $\frac{1}{2}$	37	21	10 $\frac{1}{2}$	35	19	4 $\frac{5}{8}$	5"	-	RH5*	GPD
500	66	50 $\frac{1}{2}$	32	47 $\frac{1}{2}$	24	11 $\frac{3}{4}$	44	24	4 $\frac{5}{8}$	2-5"	-	RH6*	GPE

*GPD and GPE enclosures require weather shield kits for outdoor (NEMA 3R) installations.

† Dual rated enclosures suitable for indoor or outdoor installations. (NEMA 1, NEMA 3R)