



TRANSFORMERS FOR SOLAR APPLICATIONS



The generation of energy through renewable sources has been consolidating worldwide. Rymel, aware of new technologies and committed to caring for the environment, has developed special transformers designed to work with inverters in solar applications.

The Rymel brand line of solar transformers offers equipment with the capacity to withstand the harmonics produced by the inverters. The insulation system of its windings is designed to withstand voltages that contain high voltage slopes coming from the inverter and are manufactured with very low loss magnetic sheet, which increases efficiency, minimizes losses and no-load currents, maintaining a very low level of audible noise.

Special features include an electrostatic shield between the windings, which enables capacitive decoupling of high-frequency pulses from the network, protecting electronic circuits. On the other hand, the transformers are designed to have the appropriate impedances that allow coupling with the inverters and have a thermal design that allows them to work in places with high ambient temperatures.

Transformers for solar applications are manufactured in two configurations:

- Pad mounted transformers.
- Dry type transformers.



OIL IMMERSSED PAD MOUNTED TRANSFORMERS

Pad-mounted transformers for solar applications have their active part immersed in dielectric oil and use dead-front terminals, which means they do not have exposed energized parts and are located inside a cabinet, with safety-sealed compartments, with doors and locks. both for the low voltage side and for the high voltage side, which makes it a very safe device. In addition, the pad mounted transformer has built-in connection, protection and maneuver elements typical of a substation that protect the equipment.

TECHNICAL CHARACTERISTICS		
	ONE PHASE	THREE PHASES
CAPACITY	From 10 kVA up to 500 kVA	From 30 kVA up to 5000 kVA
PHASES	1	3
TENSION	Up to 36 kV	
BIL	Up to 200 kV	
WINDING MATERIAL	Aluminum or copper	
COOLING CLASS	ONAN	ONAN-ONAF
FREQUENCY	60 0 50 Hz	
TAP CHANGER	± 2, 2.5% or according to customer requirements.	
TYPE	Loop Feed o Radial Feed.	
TEMPERATURE RAISE	Typically 65/65°C, or according to customer requirements.	
K FACTOR	K1, K2, K4, K6, K9, K13, K20 or according to customer requirements.	
TYPE OF EFFICIENCY	Class A, B, C; DOE.	
TYPE OF INSULATION	Mineral or Biodegradable.	
TANK	Manufactured with Cold Rolled and Hot Rolled sheet steel with a design that allows it to withstand internal pressure and mechanical stress, or stainless steel.	
PAINT SYSTEM	Special electrostatic paint of great resistance and durability, especially for outdoors and corrosive environments.	
GASKET	Highly durable and compatible with dielectric oil, to guarantee the life of the equipment	
ELECTROSTATIC SHIELD	Special electrostatic screen, to eliminate high frequency pulses, with a design that minimizes losses due to the Eddy effect.	
ACCESSORIES	<ul style="list-style-type: none"> - Dead front type high tension bushings (wells, inserts, elbows). - Low tension bushings. - Support for parking hubs in HV. - Pressure relieve valve. - Oil level. - Drain valve with sampling device. - Ground connection. - Lifting and fixing devices. - Nameplate made of high-strength anodized aluminum. - Tap switch. - High and low voltage cabinets with doors and locks. 	
STANDARD	IEEE C57.12.34, IEEE C57.12.28, IEEE C57.12.29, IEEE C57.12.38, NTC 3997, NTC 5074 and RETIE.	

For more information, please contact a Rymel Consultant

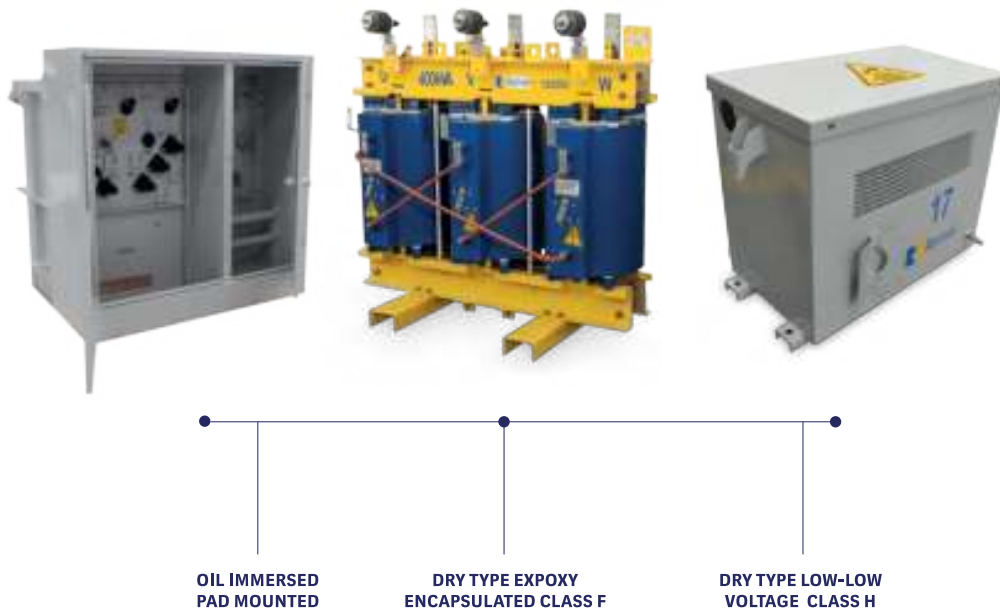
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DRY TYPE TRANSFORMERS

Transformers for solar applications with dry-type insulation can be of the Low-Low or medium voltage type with their windings encapsulated in epoxy resin through an injection process under vacuum conditions, which guarantees a minimum level of partial discharges and makes them very reliable and maintenance free.

Rymel brand dry-type transformers use fire-resistant and self-extinguishing materials, which minimizes the risk of fire in an installation, also because they do not use dielectric oil, it facilitates their installation indoors, allowing for space optimization.



TECHNICAL CHARACTERISTICS		
	DRY TYPE EPOXY ENCAPSULATED CLASS F	DRY TYPE LOW-LOW VOLTAGE CLASS H
CAPACITY	Up to 1.500 kVA	Up to 500 kVA
TENSION	Up to 36 kV	Up to 1.1 kV
BIL	Up to 145 kV	Up to 10 kV
WINDING MATERIAL	Aluminum	Aluminum or Copper
COOLING CLASS	AN - AF	AN
FREQUENCY	60 0 50 Hz	
TAP CHANGER	± 2, 2.5% or according to customer requirements.	± 2, 2.5% or according design requeriments.
TEMPERATURE RAISE	100 °C	125 °C
THERMAL CLASS	F (155°C)	H (180°C)
K FACTOR	K1, K2, K4, K6, K9, K13, K20 or according to customer requirements.	
TYPE OF EFFICIENCY	Class A or B; DOE	Class A, B , C, D; DOE
IRONWORK	Manufactured with Cold Rolled and Hot Rolled sheet steel with a design that allows it to withstand internal pressure and mechanical stress, or stainless steel.	
PAINT SYSTEM	Special electrostatic paint of great resistance and durability, especially for outdoors and corrosive environments.	
TYPE OF INSTALATION	Indoor.	
TYPE OF INSULATION	Epoxy resin encapsulated windings.	Windings with dielectric varnish coating.
ELECTROSTATIC SHIELD	Special electrostatic screen, to eliminate high frequency pulses, with a design that minimizes losses due to the Eddy effect.	
ACCESSORIES	<ul style="list-style-type: none"> - Primary and secondary terminals. - Surge arresters. - Temperature controller with three PT100 sensors. - Scroll wheels. - Grounded. - Lifting device. - Nameplate made of high-strength anodized aluminum. - Tap switch. - Forced ventilation system (optional at the request of the client). 	<ul style="list-style-type: none"> - Primary and secondary terminals. - Grounded. - Lifting device - Nameplate made of high-strength anodized aluminum. - Tap changer. - Indoor type protection cabinet or cell. - External type protection cell (optional at the request of the client).
STANDARD	NTC 3654, NTC3445, IEC 60076, IEEE Std C57.12.01 and RETIE.	
ADVANTAGES	<ul style="list-style-type: none"> - Fire resistant and self-extinguishing materials. - Low noise, low loss magnetic core with dielectric coating. - Space optimization - Minimum level of partial discharges. 	<ul style="list-style-type: none"> - Fire resistant and self-extinguishing materials. - Low noise, low loss magnetic core with dielectric coating. - Space optimization.