

GreenT

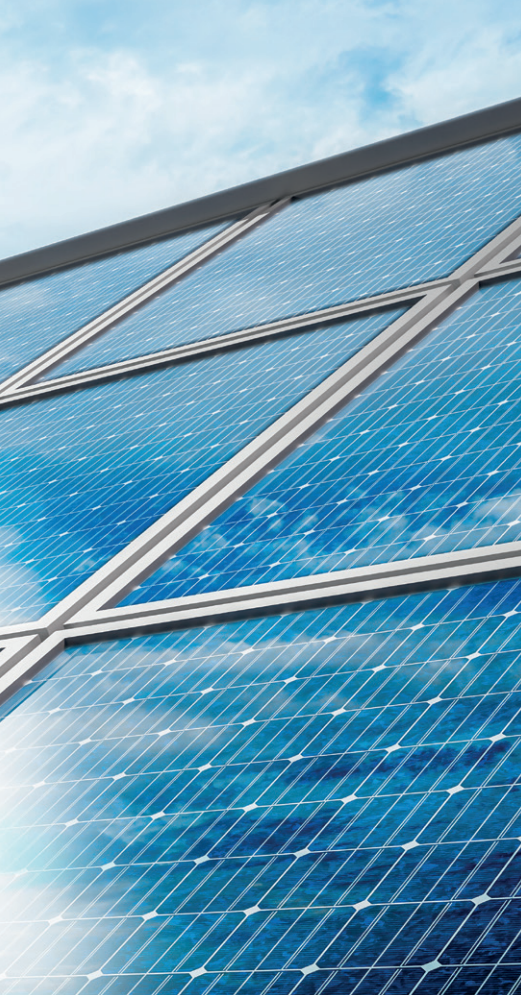
CAST RESIN TRANSFORMERS



THE GLOBAL SPECIALIST
IN ELECTRICAL AND DIGITAL BUILDING INFRASTRUCTURES

 **legrand**[®]





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Cast resin transformers GreenT

Legrand, taking advantage of its long experience, using new design and production technologies has developed a **new range of low losses transformers with innovative design.**

Legrand GreenT transformers guarantee a significant reduction in energy consumption, thus promoting significant economic savings and the reduction of CO₂ emissions into the atmosphere. The information in this catalogue refers to 50 Hz transformers.



GreenT transformers have been designed in compliance with the IEC 60076-11: 2018 Standard.



Classification

The classification of a cast resin transformer depends on the value of the no-load loss (P_0), as well as the load loss (P_k). More precisely, P_0 losses are independent from the loads and remain constant for the whole time the transformer is connected to the electrical grid. On the other hand, P_k losses only occur when the transformer is feeding a load and they are proportional to the square of the current.

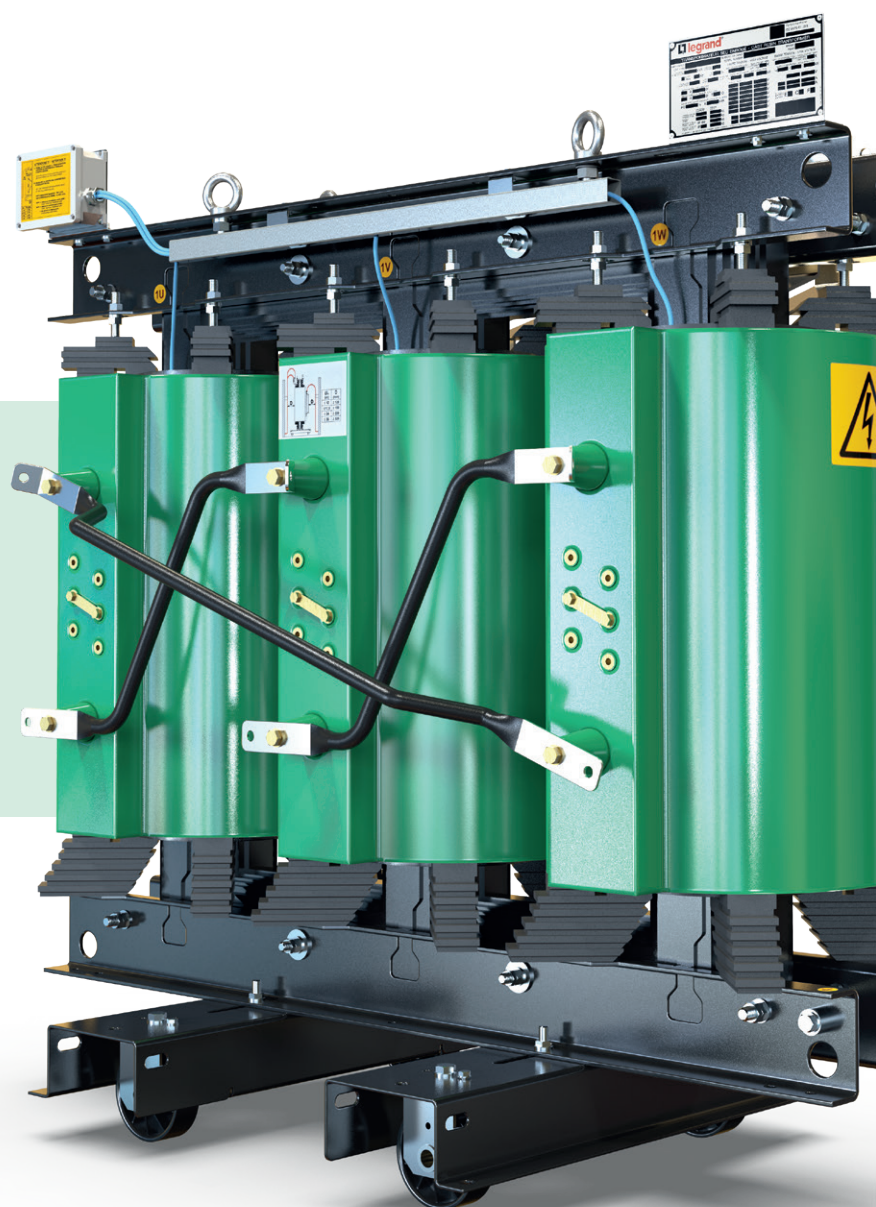
Legrand cast resin transformers have an average reduction in losses (compared to the previous Legrand ranges) of 15%.



- Average reduction losses (- 15%)
- CO₂ saved 450 (Tons/year)
- More than 30.000 equivalent of trees planted

Average load factor considered 30% for continuous use.

Once the transformer has ended its service life, all of the materials can be easily recycled or disposed of, as indicated in the PEP (Product Environmental Profile) document. This document describes the environmental impact of a product during its entire life cycle (from extraction of the needed raw materials to product disposal).



Product Environmental Profile
GreenTransformers

Advantages of the GreenT transformers

LOW partial discharges,
HIGH quality



Partial discharges are microscopic phenomena occurring inside insulating resin cavities are a factor in the speeding up of the ageing process of a transformer. Therefore, it is important that the values of such currents are limited.

GreenT transformers perform a partial discharge value <5 pC, significantly lower than 10 pC, which is the maximum value indicated by the product Standard IEC 60076-11:2018.

A low value of partial discharges represents the index of some positive factors, such as:

- proper and solid design criteria
- quality raw materials
- precision during conductor foil winding phases
- competence during the epoxy resin pouring around the high-voltage winding
- accuracy in final assembling of the complete assembly

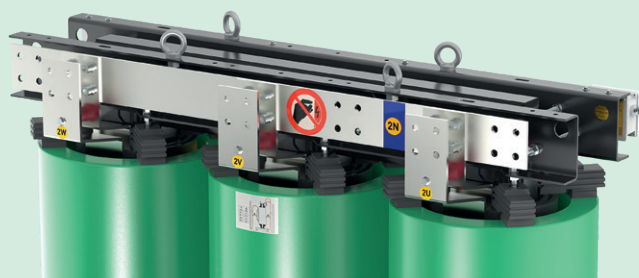
It is really easy to understand that a **lower** level of partial discharge leads to a **higher** resistance to work stresses and consequently to a higher life expectancy of the transformer under examination.

TYPE OF PARTIAL DISCHARGE

Depending on the type, discharges can be divided into:

- **Corona effect** (discharge mechanism occurring in correspondance of sharp ends in dielectric gas)
- **Superficial discharges**
- **Internal discharges** (representing the main cause of life-cycle decrease of the insulating material)
- **Treeing** (branched discharge channel): it is the pre-discharge channel due to the insulation deterioration leading to destructive discharge.





Updated LV terminals



Updated HV terminals

With GreenT series, Legrand offers its customers a very high-quality product, with excellent performance and reduced losses.

Thanks to the use of innovative materials and the measures taken during their design, the new transformers are characterised by the following distinctive features:

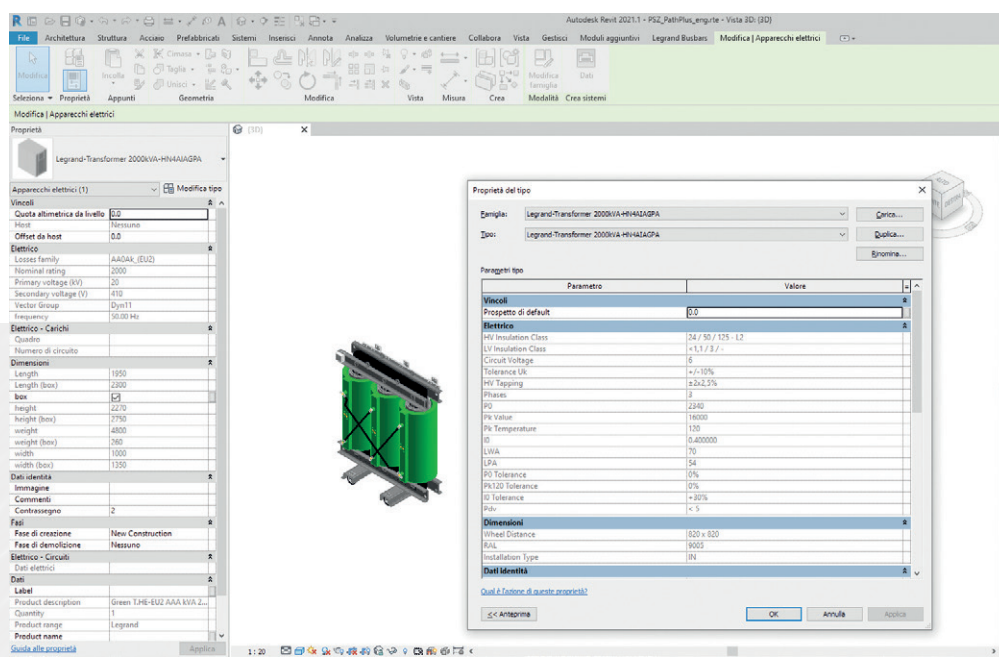
- **HV** (high voltage) and **LV** (low voltage) **terminals** have been modified and built to facilitate the connection of the product on both windings. The height of the LV terminals has been reduced and the connections are in an easier position for the installer.
- The HV windings are all made in **BIL LIST 2**, thanks to the **reinforced insulation** in the critical points of the unit.
- The innovative design of the magnetic core and the high quality of its materials, guarantee high-performance of GreenT transformers.

BIL: Basic Insulation Level.

Legrand Dry-type Power Transformers are made following the IEC standard 60076-11:2018.

K-factor is defined on the UL 1562 standard that is not applicable to the IEC transformer.

For more information on the K-factor, please request the dedicated documentation.



Revit models (.rfa) are available for the GreenT series in 5 different languages.

Extreme environmental conditions

The 60076-11:2018 standard identifies the environmental, climatic and fire behaviour classes of dry-type transformers with an alphanumeric code.

Thanks to the use of high-quality epoxy resins, all Legrand transformers minimize environmental impact and comply with the following classes:

- **Environmental class E3**
- **Climate class C2**
- **Fire behaviour class F1**

This means that they can be stored, transported and above all used under extreme environmental conditions:

- Ambient room temperature: -25 / +40°C
- Maximum relative humidity: 95%



E0
No condensation on the transformer, negligible pollution, installation in a clean and dry environment

E1
Occasional condensation and limited pollution

E2
The transformer is subjected to frequent condensation, light pollution, or both

E3
The transformer is subjected to medium pollution and frequent condensation with humidity above 95%

E4
On request, Legrand is also able to supply transformers with E4 environmental classification for heavy pollution



C1
The transformer is suitable for operation at temperatures not below -5°C but may be exposed during transport and storage to temperatures down to -25°C.

C2
The transformer can operate, be transported and stored at temperatures as low as -25°C.



F0
The risk of fire is not expected and no measures are taken to limit inflammability.


F1
The transformer is subject to the risk of fire and reduced inflammability is required. Fire on the transformer must be extinguished within laid-down limits.

Furthermore, in standard configuration, **GreenT** transformers guarantee a seismic resistance up to 0.2g* (light earthquakes) and can be fixed to the ground, thus avoiding any possibility of overturning.

On request, Legrand manufactures transformers that can be installed in areas with higher seismic hazard, up to 0.5g (AG5).

*g=9,81m/s² (gravitational acceleration)

Certified Quality



TESTING AUTHORIZATION

ACAE (Associazione per la Certificazione delle Apparecchiature Elettriche), Member of **LOVAG** (Low Voltage Agreement Group) authorizes the Laboratory **BTicino S.p.A.** based in **Via E. Ferrari, Z.I. Villa Zaccheo – 64020 Castellalto (TE)** Laboratory codification number: **IB 03**



to carry out the tests listed in the following, for the purpose to certify the products as stated in the Certificate n° 070B and its enclosure, issued to ACAE by ACCREDIA.

List of the authorized tests on the power transformers:
 Measurement of voltage ratio and check of phase displacement
 Measurement of winding resistance
 Separate-source AC withstand voltage test
 Induced AC voltage withstand test
 Measurement of no-load loss and current
 Measurement of short-circuit impedance and load loss
 Partial discharge measurement
 Insulation resistances measurement
 Temperature-rise test
 Lightning impulse test
 Measurement of sound level

The laboratory has demonstrated to the ACAE's inspector to fulfil the basic requirements of IEC EN 17025 Standard for the above purposes. ACAE will witness the tests according to its Quality Procedure PA 5.2.1 "Test supervision". The renewal of the authorization is subjected to annual audit.

First issue date: 2015-08-05 Current issue date: 2015-08-05

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 Mr. Virginio Scarioni

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Certifications

Legrand test lab "IB03" has recently received the qualification by ACAE to work in accordance to IEC EN 17025 standard on all routine tests and on some tests for medium-voltage transformers.

Such acknowledgement and qualification is a very important milestone obtained and Legrand, with a limited number of companies around the world, can offer this to their customers.

All Legrand transformers are individually tested before being delivered to the customer.

Thanks to the excellent quality of its transformers, Legrand offers to its customers the possibility of extending, upon request, the purchased product warranty.

ACCEPTANCE TESTS

■ Measurement of the winding resistance	IEC 60076-11 (clause 14.2.1)
■ Measurement of voltage ratio and check of phase displacement	IEC 60076-11 (clause 14.2.2)
■ Measurement of short-circuit impedance and load loss	IEC 60076-11 (clause 14.2.3)
■ Measurement of the no-load loss and the no-load current	IEC 60076-11 (clause 14.2.4)
■ Separate-source AC withstand voltage test	IEC 60076-11 (clause 14.2.5)
■ Induced AC withstand voltage test	IEC 60076-11 (clause 14.2.6)
■ Measurement of the partial discharges	IEC 60076-11 (clause 14.2.7)

TYPE TESTS (on request)

■ Atmospheric impulse test	IEC 60076-11 (clause 14.3.1)
■ Temperature-rise test	IEC 60076-11 (clause 14.3.2)

SPECIAL TESTS (on request)

■ Measurement of the noise level	IEC 60076-11 (clause 14.4.2)
■ Short-circuit test	IEC 60076-11 (clause 14.4.3)

For more information contact Legrand

INSULATION CLASS 12 kV

S _R [kVA]	Primary voltage [kV]	Secondary no-load voltage [V]	U _k [%]	P _o [W]	P _k [W] at 120 °C	I _o [%]	LwA-Acoustic Power [dB (A)]	Item*	Length (A) [mm]	Width (B) [mm]	Height (C) [mm]	Mass [kg]	Wheel centre line (E) [mm]	Wheel diameter (D) [mm]	Enclosure type**
100	6 - 6,3 -10 -11	400 - 420 -433	6	400	2700	1,4	57	TB2SIA ---	1100	750	1290	650	520 x 520	125	H1
160				420	3700	1,2	57	TC2SIA ---	1100	750	1280	660	520 x 520	125	H1
250				600	4300	1,1	60	TE2SIA ---	1200	780	1320	880	520 x 520	125	H1
315				750	4600	1	62	TF2SIA ---	1250	850	1410	1060	670 x 670	125	H2
400				900	5200	1	63	TG2SIA ---	1300	850	1490	1280	670 x 670	125	H2
500				1100	7000	0,9	64	TH2SIA ---	1350	850	1570	1400	670 x 670	125	H2
630				1300	7800	0,9	65	TI2SIA ---	1400	850	1680	1740	670 x 670	125	H2
800				1500	9100	0,8	67	TJ2SIA ---	1450	1000	1740	2020	820 x 820	160	H3
1000				1750	11300	0,8	68	TK2SIA ---	1500	1000	1940	2340	820 x 820	160	H3
1250				1900	11800	0,8	70	TL2SIA ---	1600	1000	1960	2860	820 x 820	160	H3
1600				2400	15000	0,7	71	TM2SIA ---	1650	1000	2130	3360	820 x 820	160	H4
2000				2900	18000	0,6	73	TN2SIA ---	1850	1000	2240	4180	820 x 820	160	H4
2500				3400	21000	0,5	74	TO2SIA ---	1900	1500	2300	4940	1070 x 1070	200	H5
3150				4400	25000	0,4	77	TP2SIA ---	2200	1500	2400	6500	1070 x 1070	200	H5

*The information is also valid for various transformer ratios and vector groups.
** Enclosure prefitted for accessories. For more information, please see page 14.

How to dial the product code

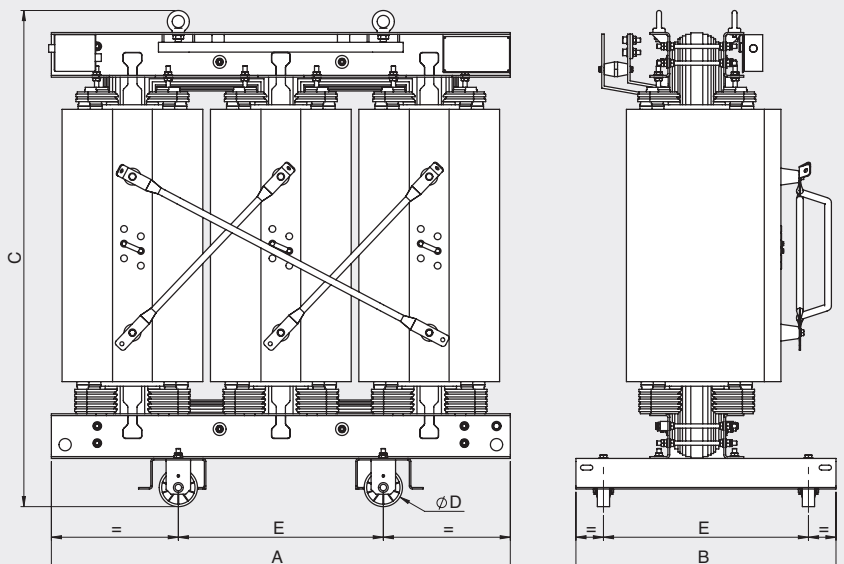
Example: 1000 kVA insulation class 12 kV			
Item	Primary voltage [kV]	Secondary no-load voltage [V]	Vector group
TK2SIA ---	B - 6	B - 400	A - Dyn11
	S - 6,3	S - 415	B - Dyn5
	C - 10	D - 420	C - Dyn1
	D - 11	E - 433	

Example

TK2SIACBA = GreenT 1000 kVA 10/0,4 kV Dyn11

CAST RESIN HV/LV GreenT

- Compliance with the standards: IEC 60076-11:2018
- Power: 100–3150 kVA
- Frequency: 50 Hz
- Tapping links, HV side: ± 2 x 2.5%
- Thermal class of the insulation system: 155 °C (F) / 155 °C (F)
- Temperature rise: 100 K / 100 K
- Environmental Class: E3-C2-F1



For combinations not available in this document, please contact the Legrand sales network.

INSULATION CLASS 17.5 kV

S _r [kVA]	Primary voltage [kV]	Secondary no-load voltage [V]	U _k [%]	P ₀ [W]	P _k [W] at 120 °C	I ₀ [%]	LwA-Acoustic Power [dB (A)]	Item*	Length (A) [mm]	Width (B) [mm]	Height (C) [mm]	Mass [kg]	Wheel centre line (E) [mm]	Wheel diameter (D) [mm]	Enclosure type**
100	12 - 13,2 - 13,8	400	6	430	2600	1,4	57	TB3SIA ---	1100	750	1310	680	520 x 520	125	H1
160				450	3600	1,2	57	TC3SIA ---	1100	750	1300	720	520 x 520	125	H1
250				650	4100	1,1	60	TE3SIA ---	1200	780	1340	920	520 x 520	125	H1
315				750	4500	1	62	TF3SIA ---	1300	850	1410	1080	670 x 670	125	H2
400				950	5300	1	63	TG3SIA ---	1300	850	1490	1220	670 x 670	125	H2
500				1100	6700	0,9	64	TH3SIA ---	1400	850	1570	1420	670 x 670	125	H2
630				1300	7800	0,9	65	TI3SIA ---	1400	850	1680	1660	670 x 670	125	H2
800				1500	9100	0,8	67	TJ3SIA ---	1500	1000	1730	2060	820 x 820	160	H3
1000				1750	10800	0,8	68	TK3SIA ---	1550	1000	1940	2360	820 x 820	160	H3
1250				1900	11800	0,8	70	TL3SIA ---	1600	1000	1960	2840	820 x 820	160	H3
1600				2400	15000	0,7	71	TM3SIA ---	1700	1000	2130	3480	820 x 820	160	H4
2000				2900	18000	0,6	73	TN3SIA ---	1850	1000	2220	4100	820 x 820	160	H4
2500				3400	21000	0,5	74	TO3SIA ---	1950	1500	2300	5040	1070 x 1070	200	H5
3150				4700	25000	0,4	77	TP3SIA ---	2250	1500	2450	6600	1070 x 1070	200	H5

* The information is also valid for various transformer ratios and vector groups.
 ** Enclosure prefitted for accessories. For more information, please see page 14

How to dial the product code

Example: 1000 kVA insulation class 17.5 kV			
Item	Primary voltage [kV]	Secondary no-load voltage [V]	Vector group
TK3SIA ---	E - 12	B - 400	A - Dyn11
	R - 13,2		B - Dyn5
	X - 13,8		C - Dyn1

Example

TK3SIAEBC = GreenT 1000 kVA 12/0,4 kV Dyn1

INSULATION CLASS 24 kV

S _R [kVA]	Primary voltage [kV]	Secondary no-load voltage [V]	Uk [%]	Po [W]	Pk [W] at 120 °C	Io [%]	LwA-Acoustic Power [dB (A)]	Item*	Length (A) [mm]	Width (B) [mm]	Height (C) [mm]	Mass [kg]	Wheel centre line (E) [mm]	Wheel diameter (D) [mm]	Enclosure type**
100	20 - 22 - 23	400 - 420	6	550	2700	1,4	57	TB4SIA ---	1250	750	1320	800	520 x 520	125	H1
160				550	2700	1,2	57	TC4SIA ---	1250	750	1310	860	520 x 520	125	H1
250				650	4300	1,1	60	TE4SIA ---	1250	780	1350	980	520 x 520	125	H1
315				900	4700	1	62	TF4SIA ---	1300	850	1440	1140	670 x 670	125	H2
400				950	5000	1	63	TG4SIA ---	1400	850	1520	1360	670 x 670	125	H2
500				1100	6700	0,9	64	TH4SIA ---	1400	850	1550	1520	670 x 670	125	H2
630				1350	8000	0,9	65	TI4SIA ---	1450	850	1680	1780	670 x 670	125	H2
800				1600	9100	0,8	67	TJ4SIA ---	1500	1000	1750	2100	820 x 820	160	H3
1000				1900	10800	0,8	68	TK4SIA ---	1550	1000	1920	2480	820 x 820	160	H3
1250				2000	11800	0,8	70	TL4SIA ---	1650	1000	1990	3000	820 x 820	160	H3
1600				2500	15000	0,7	71	TM4SIA ---	1750	1000	2140	3600	820 x 820	160	H4
2000				2900	18000	0,6	73	TN4SIA ---	1850	1000	2240	4100	820 x 820	160	H4
2500				3800	21000	0,5	74	TO4SIA ---	2000	1500	2350	5340	1070 x 1070	200	H5
3150				5000	26000	0,4	77	TP4SIA ---	2300	1500	2450	6700	1070 x 1070	200	H5

*The information is also valid for various transformer ratios and vector groups.

** Enclosure prefitted for accessories. For more information, please see page 14.

How to dial the product code

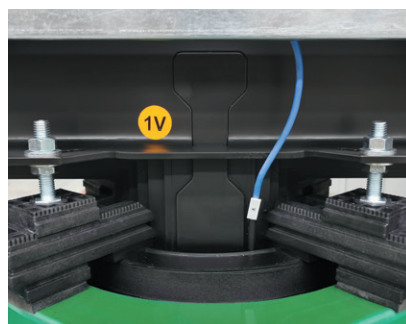
Example: 1000 kVA insulation class 24 kV			
Item	Primary voltage [kV]	Secondary no-load voltage [V]	Vector group
TK4SIA ---	G - 20	B - 400	A - Dyn11
	K - 22	D - 420	B - Dyn5
	H - 23		C - Dyn1

Example

TK4SIKBA = GreenT 1000 kVA 22/0,4 kV Dyn11

GreenT - Cast resin transformers

Accessories



Item	TEMPERATURE MEASUREMENT PROBES				
	The probes are supplied mounted on the transformer and wired to a robust IP66 die-cast aluminium junction box.				
Type	Range [kVA]	No.	Δt [°C]	Mounting	
200073	Pt100	≤2000	3	-	on the LV windings (3)
200074	Pt100	≥2500	3	-	on the LV windings (3)
200137	Pt100	≤2000	3+1	-	on the LV windings (3) + on the core (1)
200138	Pt100	≥2500	3+1	-	on the LV windings (3) + on the core (1)
CB00120	PTC	-	3+3	130-140	on the LV windings (3 pairs) for alarm and trip.
CB02400	PTC	-	3+3	110-120	on the LV windings (3 pairs) for alarm and trip.
CB0272	PTC	-	3+3+3	130-140 - 90	on the LV windings (3 pairs) for fan control, for alarm and trip.

CONTROL UNITS		
The control units are supplied loose		
Type	Description	
220002	T154 temperature control for 3 or 4 Pt100 probes	
220023	MT200 L temperature control for 3 or 4 Pt100 probes	
220197	NT935 AD temperature control for 3 or 4 Pt100 probes with analogue and MODBUS output	
220211	MT200 LITE S temperature control for 3 or 4 Pt100 probes with MODBUS output	
220219	NT935 ETH temperature control for 3 or 4 Pt100 probes with Ethernet output	
220218	MT200 LITE E temperature control for 3 or 4 Pt100 probes with Ethernet output	
220212	NT538 AD temperature control up to 8 Pt100 probes with MODBUS output	
220004	T 119 temperature control for PTC probes	
220010	T119 DIN temperature control for PTC probes preset for DIN rail mounting	
220024	MT300 temperature control for PTC probes preset for DIN rail mounting	
220035	VRT200 ventilation bar control	
220174	AT100 ventilation bar control	

Item	VENTILATION BARS		
	The ventilation busbars temporarily increase the rated power (under normal service conditions). According to standard IEC 60076-11:2018, a transformer is called AN even if it is equipped with discontinuous ventilation. If a transformer with AF continuous duty power is required, please contact Legrand.		
	Range [kVA]	Δ Power [%]	Notes
CB02444	100 - 250	+ 40	Temporary increase in nominal conditions (50Hz)
CB02454	315 - 630	+ 40	
CB02464	800 - 1000	+ 40	
CB01414	1250 - 2000	+ 40	
CB01412	2500 - 3150	+ 40	

SURGE ARRESTER KIT		
	HV* [kV]	Ur [kV]
130075D	6 - 6,3	9
130054D	10-11	12
130055D	13,2 - 13,8	18
130056D	20	24
130114D	12	15
130073D	22-23	27

*other HV values available on request
Ur: rated voltage of the surge arrester

ANTI-VIBRATION PADS		
	Range [kVA]	Description
130117		Isolated support
170019**	≤2000	Anti-vibration pads supplied for mounting under the transformer wheels
170020**	≥2500	Anti-vibration pads supplied for mounting under the transformer wheels

** order 4 anti-vibration pads, one for each wheel

CUPAL PLATES		
CUPAL is a bimetal sheet made up of one copper sheet and one aluminium sheet welded together through a special mechanical procedure.		
	Range [kVA]	Description
030014 ***	≤ 160	40 x 40 CUPAL plate
030008 ***	250	50 x 50 CUPAL plate
030009 ***	≥ 315 and ≤ 500	60 x 60 CUPAL plate
030010 ***	630	80 x 80 CUPAL plate
030011 ***	800	100 x 100 CUPAL plate
030012 ***	≥ 1000	120 x 120 CUPAL plate

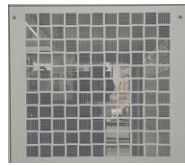
*** the codes refer to a single CUPAL plate

EXAMPLE:

For a transformer with a power of 1250 kVA, the correct CUPAL plate is product code 030012.
- 1 Cupal has 2 plates (1 Aluminium and 1 Copper) therefore for quantity calculation:
2 plates x 4 LV terminals = 8 CUPAL plates

GreenT - Cast resin transformers

Accessories



Enclosure ventilation grid IP31/IP21



Enclosure ventilation grid IP23

ENCLOSURES

There are 9 enclosure sizes available, with the possibility to choose 2 types of ventilation grill for each one, IP31/IP21 and IP23.

It is also possible to choose the transformer with the enclosure either mounted or dismantled, to be assembled on site. All the indicated protection enclosures are compatible with the installation of Legrand Busbar Trunking System.

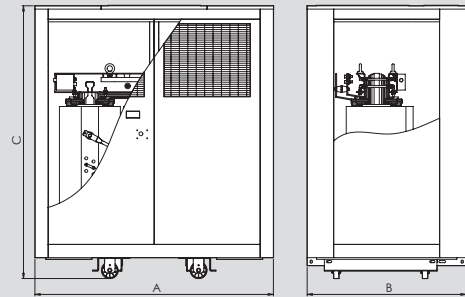
It is also possible to provide customized solutions based on specific requirements: please contact Legrand.

Enclosure colour: RAL 7035

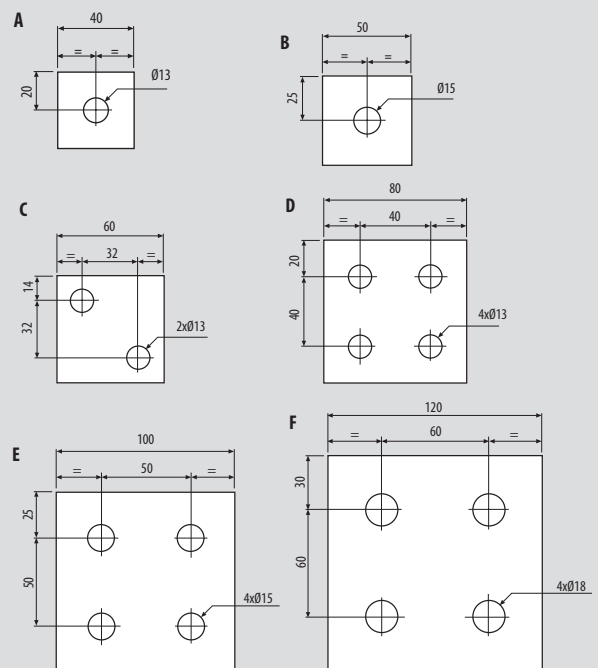
ENCLOSURES

IP index	Item	Mounted (M)/ Dismantled (S)	Power [kVA]	Enclosure type	Dimensions [mm]			Mass [kg]
					Length (A)	Width (B)	Height (C)	
12 kV-17.5 kV-24 kV CLASSES								
IP31	BXM31H1	M	100 - 160	H1	1800	1150	1800	160
	BXS31H1	S	250					
	BXM31H2	M	315 - 400	H2	1800	1200	2100	180
	BXS31H2	S	500 - 630					
	BXM31H3	M	800 - 1000	H3	2100	1300	2450	230
	BXS31H3	S	1250					
	BXM31H4	M	1600 - 2000	H4	2300	1350	2750	270
	BXS31H4	S						
	BXM31H5	M	2500 - 3150	H5	2600	1500	2750	370
BXS31H5	S							
IP23	BXM23H1	M	100 - 160	H1	1800	1150	1800	170
	BXS23H1	S	250					
	BXM23H2	M	315 - 400	H2	1800	1200	2100	190
	BXS23H2	S	500 - 630					
	BXM23H3	M	800 - 1000	H3	2100	1300	2450	240
	BXS23H3	S	1250					
	BXM23H4	M	1600 - 2000	H4	2300	1350	2750	290
	BXS23H4	S						
	BXM23H5	M	2500 - 3150	H5	2600	1500	2750	390
BXS23H5	S							

ENCLOSURE DIMENSIONS



DIMENSIONS AND HOLES OF THE LV CONNECTION TERMINALS



STANDARD HOLE DETAILS

The LV connection terminals are made of aluminium.

Appropriate CUPAL bimetal plates are also available for copper connections

Drawing	Range [kVA]	Thickness [mm]
A	100	4
	160	
B	250	5
C	315	6
	400	
	500	
D	630	8
E	800	8
F	1000	8
	1250	10
	1600	12
	2000	16
	2500	20
	3150	24

All the data given may be modified without warning for reasons of technical production or product improvement.

TECHNICAL GLOSSARY

Rated Power S_r [kVA]

Rated power is the conventional value of the power assigned to a winding which, together with the rated voltage, it allows to calculate the rated current.

Rated voltage of a winding U_r [kV or V]

Voltage assigned to be applied, or developed at no-load, between the terminals of a winding. For a three-phase winding transformer, it is the voltage between line terminals.

HV (high-voltage) winding

The winding having the highest rated voltage.

LV (low-voltage) winding

The winding having the lowest rated voltage.

Primary winding

A winding which, in service, receives active power from the supply network.

Secondary winding

A winding which, in service, delivers active power to the load circuit.

Connection symbol

A conventional notation indicating the connections of the high-voltage and low-voltage windings and their relative phase displacement expressed as a combination of letters and clock-hour figure. The star, delta, or zigzag connection of a set of phase windings of a three-phase transformer shall be indicated by the capital letters Y, D or Z for the high-voltage (HV) winding and small letters y, d or z for the low-voltage (LV) winding. Letter symbols for the different windings of a transformer are noted in descending order of rated voltage independently of the intended power flow.

Short-circuit voltage U_k (%)

It is the voltage to be applied between the winding line terminals so that the rated current circulates between them when the terminals of the other winding are in short-circuit. This voltage may be divided into a resistive component and an inductive component. This voltage value allows calculation of the short circuit current (I_{cc}) at the secondary terminals if the impedance upstream is neglected, according to the formula: $I_{cc} = 100 * I_n / U_k$. The transformer impedance is also calculated with this magnitude. It is necessary to calculate this short-circuit current in the Low-Voltage distribution system according to the formula: $Z = U_k \% * V_n / 100 * I_n$. The transformer short-circuit currents are a function of the transformer power and are standardised on the values 4% and 6%.

No-load current (I_0)

It is the magnetic circuit magnetisation current which is established in a winding when this is supplied at rated voltage and frequency (the other winding is open circuit). This current value is expressed in % of the transformer rated current. The magnetic circuit is made up of insulated laminations.

Inrush current ($x I_n$)

It is the pick-up current peak which occurs when the transformer is powered. Its initial value can be even 8 – 10 times the winding rated current. The pick-up current of a transformer must be known to determine the calibrations for the associated protection devices.

Noise [dB(A)]

It is caused by magnetostriction of the magnetic circuit laminations. The noise is a function of the transformer magnetic work induction and the quality of the laminations.

The noise level can be expressed in terms of **sound power L_{WA} - Acoustic power [dB(A)]** and it is independent of the load.

No-load loss P_0 [W]

They represent the active power absorbed by the transformer when the rated voltage is applied at the rated frequency to one of the two windings and with the other winding with open circuit. No-load losses, also called iron losses, are independent of the load and are equivalent to the sum of the losses caused by the hysteresis and the eddy currents (Foucault).

Load loss P_k [W] at 120°C

They are the losses due to the ohmic currents on the main circuits, to the additional losses in the windings and to the losses on the metallic masses. These losses are proportional to the square of the load current and are expressed at a standardised reference current of 75°C for oil transformers and 120°C for cast resin transformers.

Routine test

It is a test to which each individual transformer is subjected.

Type test

It is a test made on a transformer which is representative of other transformers, to demonstrate that these transformers comply with the specified requirements not covered by the routine tests: a transformer is considered to be representative of others if it is built with the same drawings using the same techniques and materials in the same factory.

Special test

It is a test other than a type test or a routine test, agreed by the manufacturer and the purchaser.



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