



CHARACTERISTICS

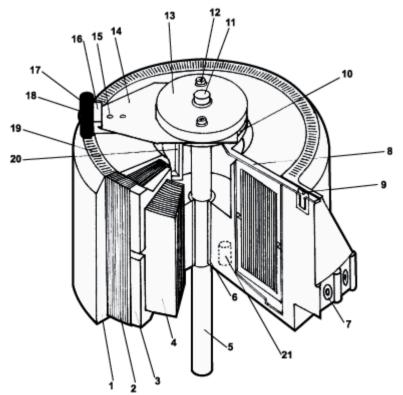
The toroidal variable auto-transformer is an essential component if we wish to control a variable A.C.voltage, from zero to the maximum, with a constant degree of current.

The Torivac variable auto-transformers are characterised by their mechanical ruggedness, high resolution allowing very precise voltage adjustments and the high quality of the materials used in their manufacturing. These characteristics, together with the quality control of 100% of all our variators, allow us to offer a degree of reliability recognised by the most demanding customers.

PRODUCTION SERIES

We have different models for each application:

Single, dual and triple-phase variable autotransformers (I, II, III). All models can be mounted in metal box and supply for manual regulation or motorized.





COMPONENTS OF THE VARIAC

The figure 1 shows clearly the parts of a variable autotransformer, in which we differentiate the core, the electric wound coil, the insulation and the rest of the components that shape it.

- 1- Epoxy resin
- 2- Electric coil (Wound Cu)
- 3- Bakelite capsules
- 4- Magnetic core
- 5- Shaft
- 6- Brass bearing
- 7- Connection terminal
- 8- Contact strip
- 9- Fastening screw and contact strip connection
- 10- Brass contact collector ring
- 11- Brush press terminal
- 12- Brush fastening screws
- 13- Brush fastening bracket
- 14- Carbon brush holder strip
- 15- Carbon brush holder rivet
- 16- Carbon brush holder
- 17- Graphite roller
- 18- Carbon brush glover fastener
- 19- Contact guide
- 20- Mechanical stop
- 21- Fastening terminals



TECHNICAL SPECIFICATIONS

The variable autotransformer is mainly comprised of a toroidal core manufactured using magnetic sheeting with very low loss and high permeability, wound at an angle of approx. 340°. The contact track is comprised of an evenly wound coil, that is trued up, polished and treated with a silver bath to improve the contact with the graphite brush. This treatment allows the reduction of the contact resistance and the rusting of the copper which leads to a longer useful life of the variable autotransformer.

The following factors work towards our variable autotransformer operating with an optimal degree of effectiveness and durability:

* A high number of turns per volt, which allow us to set extremely precise voltage values.

* The epoxy resin encapsulation packing allows for an improved dissipation of heat, avoiding the concentration of this at the contact point of the brush (as occurs with the air-wound variable autotransf.) and in addition it protects the variable autotransformer from the harsh environmental factors of certain harmful surroundings.

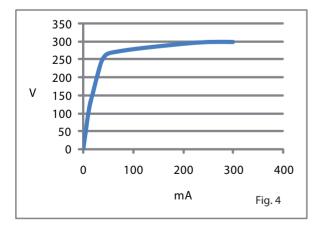
* The inside and outside friction contacts are generously designed to dissipate the maximum possible amount of heat with the minimum of wear.

* Both the motorisations and the mechanical stops have been subjected to mechanical resistance tests, which guarantee their effectiveness in the different applications they are used for.

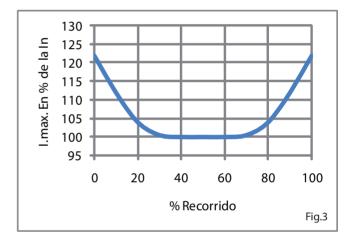
* The toroidal voltage variable autotransformer do not distort the sine-wave signal.

* The increase in the external non-metallic parts varies between 45°C and 60°C, above the environmental temperature at full load (Fig. 2), nevertheless, there are many means to reduce this temperature, such as an oil bath, fan cooling, although these systems are usually used in high-power variators.

* The variable autotransformers allows the adjustment of the voltage without surpassing the nominal current, except at the beginning and the end of the range which may be surpassed by up to 22%, as shown in the graph in figure 3.







MAGNETIC CHARACTERISTICS

The toroidal core is manufactured using top quality, of very low loss and high yield magnetic sheeting, and is subjected to a heat treatment in order to achieve an induction capacity of between 15.000 - 16,000 Gauss.

In figure 4 we can observe that the saturation curve of a variable autotransformer, is at approximately 15% of the nominal voltage rating of the transformer, assuming an imput voltage of 230V.

In the toroidal variable autotransformer the magnetic flow is concentrated within the core in an uniform manner, and as there are no intermediate metal parts, vibrations are eliminated. In addition, as the wire wind is spread over the entire surface of the core, the noise caused by magnetostriction practically disappears and the dissipation of heat is favoured, improving the yield.

The variable autotransformers manufactured by Torivac are designed to operate at 50/60 Hz., even though the quality of the magnetic sheeting and the heat treatment we subject it to allow it to operate at frequencies close to 400Hz, taking into account that the hysteresis losses increase considerably.



FIELDS OF APPLICATION

The variable autotransformers are used to adjust the voltage from 0 volts up to the maximum voltage for which they have been designed and among the most usual applications, there are the following:

- * Laboratory control equipment.
- * Lighting equipment.
- * Dielectric rigidity equipment.
- * Temperature controls.
- * Galvanic control process.
- * Power-assisted equipment for remote control.
- * Motor speed control.
- * Control of voltage stabilisers.
- * Control of other fixed transformers.











TYPES OF CONTROL

Manual control

By means of a control button on the shaft of the variator which allows to act on the brush and achieve the desired voltage. We have a wide range of available buttons and dials calibrated in % or in volts, applicable to the different power ratings.

Power-assisted control

Is mainly used to remotely control equipment or for stabiliser equipments.

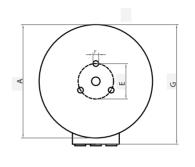
The high-powered voltage variators are also usually powerassisted, due to the greater comfort they offer in use. In this type of control the variator shaft is activated by a motor by using a manual switch, which allows increasing or reducing the output voltage. The power assisted control that Torivac installs in the variable Autotransformers stop without inertia; therefore they are ideal for remote control.

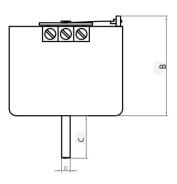
By order, we can make them stabilized and controlled by means of an electronic card, with a precision of about 2%. This electronic card allows to regulate the variable autotransformer by means of a potentiometer or by a continuous signal of 0-10Vcc.



SIZE & WEIGHT

	160 VA –	4000 VA		Input 230V Output 230/250V										
VA	In 230 (A)	In 250 (A)	А	В	С	D	E	F	G	Kg				
160	0.7	0.64	80	63	30	6	25	M-4	88	0.8				
220	0.95	0.88	87	67	30	6	25	M-4	- 99	1.2				
350	1.52	1.4	110	75	30	6	26	M-4	125	2.5				
350*	1.52	1.4	88	85	30	6	25	M-4	99	1.9				
500	2.17													
500*	2.17	2	88	103	30	6	25	M-4	- 99	2.4				
750	3.26	3	120	90	30	6	33.5	M-6	130	3.2				
1000	4.34	4	120	105	30	6	33.5	M-6	130	4				
1250	5.43	5	130	105	30	6	33.5	M-6	142	4.6				
1500	6.52	6	160	95	35	8	40	M-6	172	5.7				
2000	8.69	8	160	107	35	8	40	M-6	172	6.8				
2500	10.86	10	196	117	40	8	60	M-6	206	10				
3000														
4000 17.39 16 250 127 40 8 74 M-8 275 17														
* Limited dimensions In it refers to the nominal current of the variable autotransformers.														





5000 VA

0 0 0 0

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А

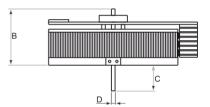
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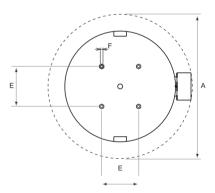
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С

6000 VA - 11000 VA



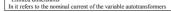


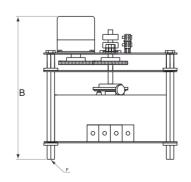
500	00 VA – 11	000 VA		Inp	ut 230V	Output	t 230/25	ØV	
VA	In 230 (A)	In 250 (A)	А	В	С	D	E	F	Kg
5000	21.73	20	320	140	60	10	74	M-8	19
6000	26.01	24	425	170	100	12	80	M-10	32
7000	30.43	28	445	170	100	12	80	M-10	37
8000	34.78	32	490	170	100	12	100	M-10	46
9000	39.13	36	520	170	100	12	100	M-10	55
10000	43.47	40	570	170	100	15	150	M-12	71
11000	47.85	44	610	180	100	15	150	M-12	86
In it refers	to the nominal	current of the	variable aut	otransform	ers				

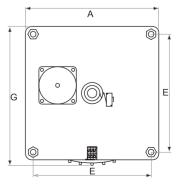
Single-Phase Variable Autotransformer (ManualControl)

Single-Phase Variable Autotransformer (Power-Assisted Control)

160 V	'A - 4000	VA	I	nput 230	V Outp	ut 230/250	v						
VA	In 230 (A)	In 250 (A)	А	В	Е	F	G	Kg					
160	0.7	0.64	90	211	75	M-5	92	1.8					
220	0.95	0.88	90	211	75	M-5	100	2.2					
350	1.52	1.4	155	185	100	M-6	130	4.5					
350*													
500	2.17	2.17 2 155 190 100 M-6 130 4.8											
500*	2.17	2	90	211	75	M-5	100	3.4					
750	3.26	3	155	200	100	M-6	130	5					
1000	4.34	4	155	210	100	M-6	130	6					
1250	5.43	5	135	210	112	M-6	140	6.7					
1500	6.52	6	165	205	135	M-6	175	8.6					
2000	8.69	8	165	215	135	M-6	175	9.5					
2500	10.86	10	220	235	170	M-8	230	14.5					
3000	13.04	12	235	245	195	M-8	242	18.5					
4000 17.39 16 285 300 255 M-8 295 25													
*Limited dimensions In it refers to the nominal current of the variable autotransformers													





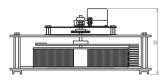


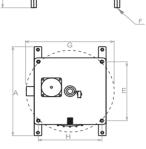


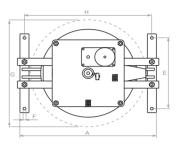
50	00 VA – 11	000 VA	E	ntrada/l	input 23	0V Salida/	Output	230/250	V		
VA	In 230 (A)	In 250 (A)	А	В	Е	F	G	Н	Kg		
5000	21.73	20	380	300	255	M-8	320	255	27		
6000	26.01	24	520	350	380	M-12	430	470	48		
7000	30.43	28	540	350	380	M-12	445	490	56		
8000	34.78	32	585	350	380	M-12	490	235	64		
9000	39.13	36	615	360	420	M-12	520	565	75		
10000	43.47	40	665	360	420	M-12	570	615	91		
11000	11000 47.85 44 685 360 420 M-12 610 635 106										
In it refers to	o the nominal c	current of the va	riable auto	transformer	s						



6000 VA - 11000 VA

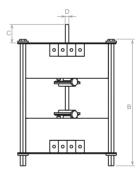


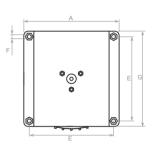




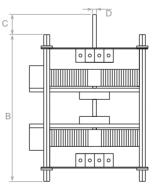
Double Variable Autotransformers (Manual Control)

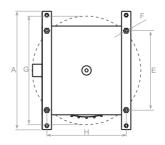
160	VA x 2 – 400	0 VA x 2	1	Entrada	/Input 2	30V S	Salida/O	utput 23	30/250V			
VA	In 230 (A)	In 250 (A)	А	В	С	D	Е	F	G	Kg		
160x2	0.7x2	0.64x2	90	180	50	6	75	M-5	92	2.9		
220x2	0.9 x2	0.88x2	90	180	50	6	75	M-5	100	3.7		
350x2	1.52x2	1.4x2	120	215	70	6	100	M-6	130	6.3		
350*x2	1.52x2	1.4x2	90	180	50	6	75	M-5	92	4		
500x2	2.17x2	2x2	120	220	70	6	100	M-6	130	6.9		
500*x2	2.17x2	2x2	90	180	50	6	75	M-5	92	4.5		
750x2	3.26x2	3x2	120	240	70	6	100	M-6	130	7.7		
1000x2	4.34x2	4x2	120	260	70	6	100	M-6	130	9		
1250x2	5.43x2	5x2	135	215	70	6	112	M-6	140	10.7		
1500x2	6.52x2	6x2	165	245	70	8	135	M-6	175	13.7		
2000x2	8.69x2	8x2	165	25	70	8	135	M-6	175	15.6		
2500x2	10.86x2	10x2	200	312	70	8	170	M-8	230	23.3		
3000x2	13.04x2	12x2	235	335	70	8	195	M-8	242	30		
4000x2	17.39x2	16x2	285	365	90	8	255	M-8	295	41		
*Limited dimer	*Limited dimensions In it refers to the nominal current of the variable autotransformers.											

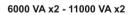


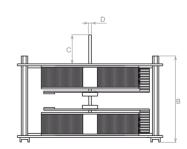


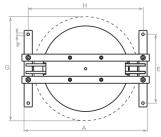
5000 VA x2









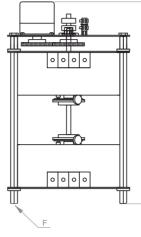


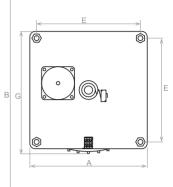
	5000 VA x 2	2 – 11000 V	'A x 2		Ir	iput 23	0V Out	put 230/2	50V		
VA	In 230 (A)	In 250 (A)	A	В	С	D	E	F	G	Н	Kg
5000x2	21.73x2	20x2	380	365	90	10	255	M-8	320	255	50
6000x2	26.01x2	24x2	520	460	155	12	380	M-10	430	470	80
7000x2	30.43x2	28x2	540	460	155	12	380	M-10	445	490	102
8000x2	34.78x2	32x2	585	460	155	12	380	M-10	490	535	115
9000x2	39.13x2	36x2	615	480	165	12	420	M-10	520	565	140
10000x2	43.47x2	40x2	665	480	165	15	420	M-12	570	615	182
11000x2	47.85x2	44x2	685	480	165	15	420	M-12	610	635	212



Double Variable Autotransformer (Power-Assisted Control)

160 VA x 2	2 – 4000 VA x	2	Input 2	30V Oı	itput 23	0/250V		
VA	In 230 (A)	In 250 (A)	А	В	Е	F	G	Kg
160x2	0.7x2	0.64x2	- 90	290	75	M-5	92	3.4
220x2	0.9 x2	0.88x2	- 90	290	75	M-5	100	4.2
350x2	1.52x2	1.4x2	120	275	100	M-6	130	8.6
350*x2	1.52x2	1.4x2	- 90	290	75	M-5	92	4.5
500x2	2.17x2	2x2	120	280	100	M-6	130	9.1
500*x2	2.17x2	2x2	90	290	75	M-5	92	5
750x2	3.26x2	3x2	120	300	100	M-6	130	9.2
1000x2	4.34x2	4x2	120	320	100	M-6	130	10.1
1250x2	5.43x2	5x2	135	285	112	M-6	140	11.7
1500x2	6.52x2	6x2	165	315	135	M-6	175	14.4
2000x2	8.69x2	8x2	165	335	135	M-6	175	17.1
2500x2	10.86x2	10x2	200	375	170	M-8	230	25.3
3000x2	13.04x2	12x2	235	395	195	M-8	242	33.5
4000x2	17.39x2	16x2	285	445	255	M-8	295	43.7
*Limited dimer	isions In it refe	rs to the nomin	al current c	of the variab	ole autotran	sformers		

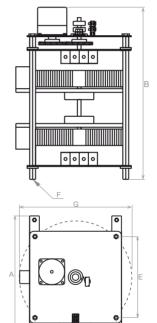




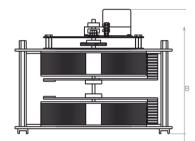
5000 VA x2

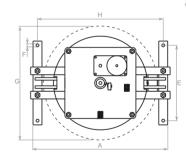
6000 VA x2 - 11000 VA x2

5000	VA x 2 – 110	000 VA x 2	:	Input 23	80V Outj	put 230/25	DV		
VA	In 230 (A)	In 250 (A)	А	В	Е	F	G	Н	Kg
5000x2	21.73x2	20x2	380	445	255	M-8	320	255	57
6000x2	26.01x2	24x2	520	575	380	M-10	430	470	87
7000x2	30.43x2	28x2	540	575	380	M-10	445	490	109
8000x2	34.78x2	32x2	585	575	380	M-10	490	535	122
9000x2	39.13x2	36x2	615	585	420	M-10	520	565	147
10000x2	43.47x2	40x2	665	585	420	M-12	570	615	189
11000x2	47.85x2	44x2	685	585	420	M-12	610	635	219
In it refers to th	e nominal current	of the variable	autotransfo	ormers.					



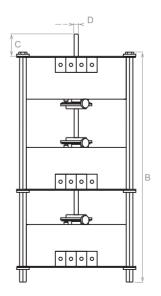
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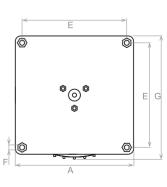


Three phase variable autotransformer (Manual Control)

4	80 VA - 1200	00 VA	Inp	out 400V	' Outpu	t 400/	430V				
VA	In 400 (A)	In 430 (A)	А	В	С	D	Е	F	G	Kg	
480	0.7x3	0.64x3	90	255	50	6	75	M-5	92	4.4	
660	0.9x3	0.88x3	90	255	50	6	75	M-5	100	5.6	
1000	1.52x3	1.4x3	120	305	70	6	100	M-6	130	9.4	
1000*	1.52x3	1.4x3	90	255	50	6	75	M-5	92	8	
1500	2.17x3	2x3	120	315	70	6	100	M-6	130	11	
1500*	2.17x3	2x3	90	255	50	6	75	M-5	92	10.4	
2250	3.26x3	3x3	120	345	70	6	100	M-6	130	11.5	
3000	4.34x3	4x3	120	375	70	6	100	M-6	130	13.5	
3750	5.43x3	5x3	135	375	70	6	112	M-6	140	16	
4500	6.52x3	6x3	165	360	70	8	135	M-6	175	20.5	
6000	8.69x 3	8x3	165	390	70	8	135	M-6	175	23.5	
7500	10.86x3	10x3	200	445	70	8	170	M-8	230	35	
9000	13.04x3	12x3	235	475	70	8	195	M-8	242	45	
12000	17.39x3	16x3	285	520	90	8	255	M-8	295	61	
In it refers to th	In it refers to the nominal current of the variable autotransformers.										

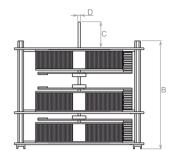


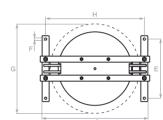
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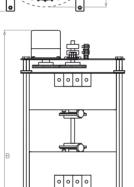




18000 VA - 30000 VA







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15000 VA

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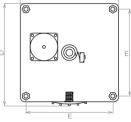
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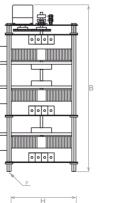
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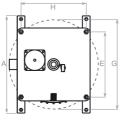
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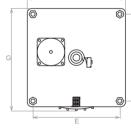


15000 VA

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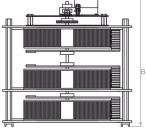




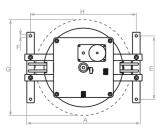




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18000 VA - 30000 VA



	15000 V	'A - 33000	VA	In	put 400						
VA	In 400 (A)	In 430 (A)	A	В	С	D	E	F	G	Н	Kg
15000	21.73x3	20x3	380	520	- 90	10	255	M-8	320	255	64.5
18000	26.01x3	24x3	520	645	155	12	380	M-10	430	470	119
21000	30.43x3	28x3	540	645	155	12	380	M-10	445	490	126
24000	34.78x3	32x3	585	645	155	12	380	M-10	490	535	157
27000	39.13x3	36x3	615	675	165	12	420	M-10	520	565	188
30000	43.47x3	40x3	665	675	165	15	420	M-12	570	615	220
33000	33000 47.85x3 44x3 685 675 165 15 420 M-12 610 635 275										275
In hace refer	rencia a la intensid	ad nominal del	variador/Ir	it refers to	the nomina	il current o	f the variabl	le autotransform	ners.		

Three Phase Variable Autotransformer (Power-Assisted Control)

VA	In 400 (A)	In 430 (A)	А	В	Е	F	G	K				
480	0.7x3	0.64x3	90	365	75	M-5	92	4.9				
660	0.9x3	0.88x3	90	365	75	M-5	100	6.				
1000	1.52x3	1.4x3	120	375	100	M-6	130	11.				
1000*	1.52x3	1.4x3	90	365	75	M-5	92	8.5				
1500	2.17x3	2x3	120	375	100	M-6	130	12.				
1500*	2.17x3	2x3	90	365	75	M-5	92	11				
2250	3.26x3	3x3	120	405	100	M-6	130	13				
3000	4.34x3	4x3	120	435	100	M-6	130	14.				
3750	5.43x3	5x3	135	445	112	M-6	140	17				
4500	6.52x3	6x3	165	430	135	M-6	175	21.				
6000	8.69x 3	8x3	165	460	135	M-6	175	25				
7500	10.86x3	10x3	200	525	170	M-8	230	37				
9000	13.04x3	12x3	235	555	195	M-8	242	48.				
12000 17.39x3 16x3 285 600 255 M-8 295 63.7												

15	5000 VA – 33	000 VA	Er	trada/I	nput 400)V Salida/(Output 4	00/430V	7	
VA	In 400 (A)	In 430 (A)	А	В	Е	F	G	Н	Kg	
15000	21.73x3	20x3	380	600	255	M-8	320	255	68	
18000	26.01x3	24x3	520	760	380	M-10	430	470	125	
21000	30.43x3	28x3	540	760	380	M-10	445	490	133	
24000	34.78x3	32x3	585	760	380	M-10	490	535	160	
27000	39.13x3	36x3	615	780	420	M-10	520	565	195	
30000	43.47x3	40x3	665	780	420	M-12	570	615	230	
33000	47.85x3	44x3								
In hace refer	In hace referencia a la intensidad nominal del variador/In it refers to the nominal intensity of the variable autotransformers.									

(7

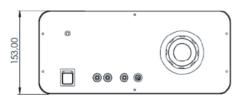


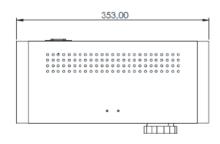
Desktop Variable Autotransformer 160-1250VA

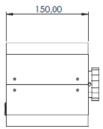










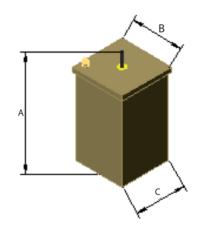




Installation in an oil bath

	1500 V	VA – 11000	VA	Entra	da/Inp	ut 230V			
		Sal	ida/Outpu	t 230/250	230/250V				
	VA	In 230 (A)	In 250 (A)	Α	В	С	Kg		
	5000	21.73	20	435	390	390	42		
~ ~ >	6000	26.01	24	450	590	495	63		
asico phase 250 1	7000	30.43	28	450	610	515	71		
	8000	34.78	32	450	655	480	79		
Monof Single	9000	39.13	36	450	685	580	90		
5	10000	43.47	40	510	735	640	105		
	11000	47.85	44	510	756	680	121		
	15000	21.73x3	20x3	725	390	390	98		
. >	18000	26.01x3	24x3	900	590	495	155		
⊂ ≈ ⊂	21000	30.43x3	28x3	900	610	515	163		
	24000	34.78x3	32x3	900	655	460	190		
Trifa Triple j 230V /	27000	39.13x3	36x3	960	685	580	225		
5	30000	43.47x3	40x3	960	735	640	260		
	33000	47.85x3	44x3	960	756	680	315		



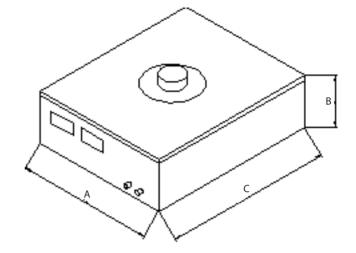




Single-phase Variable Autotransformer in Metallic Cabinet

1500	VA – 1100		Entrada/Input 230V out 230/250V			
VA	In 230 (A)	In 250 (A)	A	B	С	Kg
1500	6.52	6	300	300	200	10
2000	8.69	8	300	300	200	12
2500	10.86	10	300	300	200	14
3000	13.04	12	300	300	200	17
4000	17.39	16	400	400	200	21
5000	21.73	20	400	400	200	27
6000	26.01	24	600	600	250	57.6
7000	30.43	28	600	600	250	67.2
8000	34.78	32	600	600	250	76.8
9000	39.13	36	800	800	300	90
10000	43.47	40	800	800	300	109.2
11000	47.85	44	800	800	300	127.2
In hace reference of the variable a			variador/In	it refers to	the nomina	al current

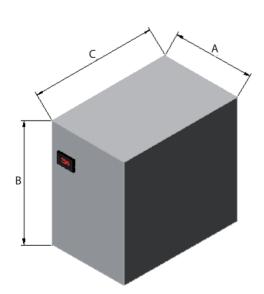






Three-phase Variable Autotransformer in Metallic Cabinet

480	VA - 3300	0 VA	Entr	ada/Inp	ut 400V	·
	Sa	alida/Outp	ut 400/43	30V -		
VA	In 230 (A)	In 250 (A)	А	В	С	Kg
480	0.7x3	0.64x3	250	250	150	6
660	0.9x3	0.88x3	250	250	150	8
1000	1.52x3	1.4x3	300	300	150	12.4
1500	2.17x3	2x3	300	300	150	13.5
2250	3.26x3	3x3	300	300	150	14.5
3000	4.34x3	4x3	400	400	200	17.5
3750	5.43x3	5x3	400	400	200	19
4500	6.52x3	6x3	400	400	250	24.5
6000	8.69x 3	8x3	400	400	250	27.5
7500	10.86x3	10x3	400	400	250	- 39
9000	13.04x3	12x3	600	600	300	52
12000	17.39x3	16x3	640	640	440	68
15000	21.73x3	20x3	640	640	440	71
18000	26.01x3	24x3	745	745	495	129
21000	30.43x3	28x3	745	745	495	136
24000	34.78x3	32x3	850	850	550	177
27000	39.13x3	36x3	850	850	550	208
30000	43.47x3	40x3	1000	1000	605	240
33000	47.85x3	44x3	1000	1000	700	295
	cia a la intensida autotransformer		variador/In	it refers to 1	the nominal	l current





SAFETY, WIRING AND MAINTENANCE

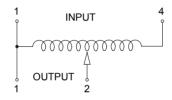


The voltage variators are in accordance with CE standards, if that they are installed inside a box or enclosure that isolates them from the outside, protecting the user from possible contact with active, electrical and mechanical parts of the variator. If the voltage variators are not installed inside a protection box or enclosure, contact between the user and the active parts, such as the contact track, connection terminals or the brush, must be avoided.

CONNECTION

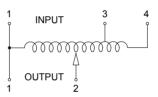
Connection modes for single-phase drives

Single-phase inverters without elevation:



Input: 1-4 Output: 1-2

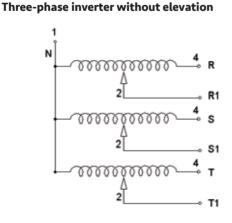
Single-phase inverters with elevation:



Input: 1-3 Output: 1-2

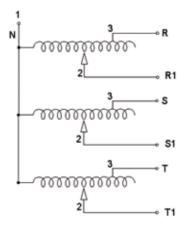
Connection modes for three-phase Inverters

Three-phase voltage inverters incorporate as standard a bridge between terminals 1-1-1 of each coil, corresponding to the neutral for a star connection, in order to avoid possible unbalances in the equipment.



Input in star: 1 - 4, 4, 4. Output: 1 - 2, 2, 2.

Three-phase inverter with elevation

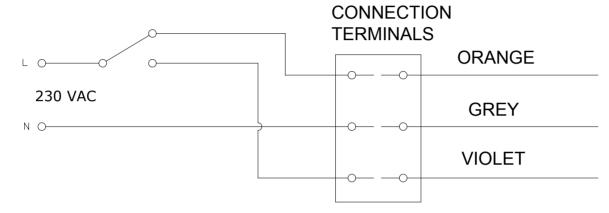


Input in star: 1 – 3, 3, 3. Output: 1 - 2, 2, 2.



MOTORISED REGULATION

Voltage variators with motorised regulation have three connection terminals corresponding to the motorised supplement. To increase the output voltage on the inverter, 230 VAC voltage must be applied between the wired terminals Violet - Grey. To decrease the output voltage at the speed variator, 230 VAC voltage must be applied between the wired terminals Orange - Grey.



Under no circumstances a voltage must be applied between the orange - violet wired terminals.

MAINTENANCE

In order to extend the service life of the voltage variator, we recommend the following:

• If possible, place the inverter to prevent the accumulation of dust on the contact track.

• Periodically check the status of the contact carbons and replace them when necessary.

• Periodically, check the status of the contact track so that, if necessary, a complete overhaul of the voltage variator can be carried out at our facilities.

PROTECTION

• We recommend protect the voltage variator output by inserting a fuse with a value 10% higher than the rated current between terminal 2 and the load.

• If you wish to protect the input, a delayed-action fuse or circuit breaker should be placed between the mains and terminal 1, because of the high voltage peak that occurs when coils start up.

WARRANTY

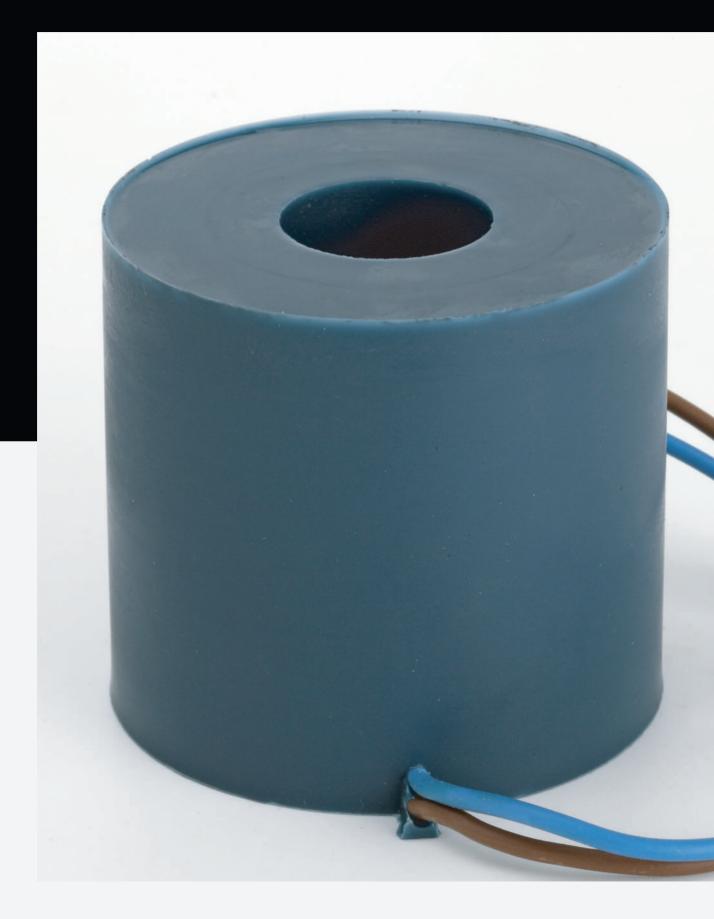
This product is guaranteed for a period of 12 months from the date of purchase. Damage caused by improper handling, as well as damage caused by the application of voltages or currents higher than those specified on the product label will not be subject to warranty.

SERVICE

If you have any queries, please contact our technical department on telephone number: +34 93 312 01 61.

PACHED ELECTRIC COILS





PACHED ELECTRIC COILS

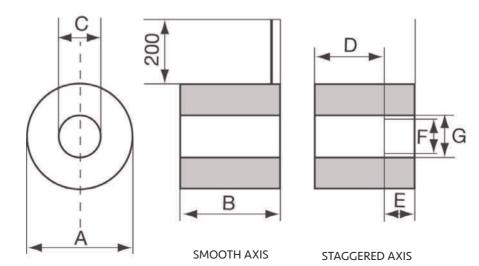


GENERAL CONSIDERATIONS

The coils for electromagnets, encapsulated in epoxi resin, offer a high degree of dielectric rigidity and an optimal magnetic properties due to their design and mechanical construction.

VA	Α	В	С	D	E	F	G	Kg
50	60	54	24					0.450
100	68	58		38	20	26	28	0.735
150	73	60	28					0.955
200	82	64		44	20	28	31	1.225
200	82	64	30					1.225





PACHED ELECTRIC COILS



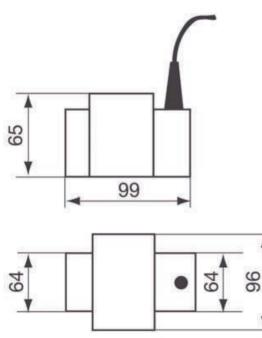
LAMINATED CORE ELECTROMAGNETS

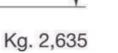
Partially Encapsulation

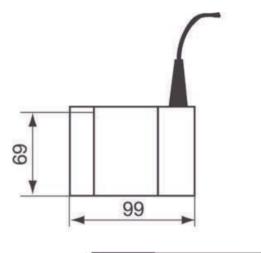
Complete Encapsulation

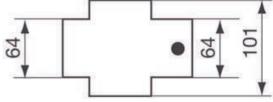












Kg. 2,750





3 AND SW WIRE WOUND POTENTIOMETERS

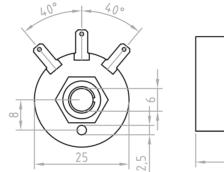
3W Potentiometer

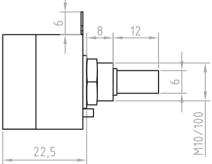
The 3W potentiometer is distinguished by its small diameter (25mm) in spite of its real dissipation of 3 W.Its 3% linearity makes it suitable for uses where a fine adjustment is required. Values according to the E-10 series, but we can furnish other values, by order.

Principal Characteristics

- * Terminals 3.2 x 0,5 mm
- *Hermetic against the dust
- * Polyamide 6 with fibreglass , 12mm shaft (Ø 6mm.)
- * Tilting slider providing great endurance
- * Resistance range: 5 Ω , to 22 k.
- * Rotation angle: 280º
- * Tolerance: 10%
- * Breakdown voltage over 1000v.
- * Net weight: 22 grs.
- * Operating temperature: -20º/+60º
- * UL rating: 94V-0
- * Packing: box of 25 pcs.





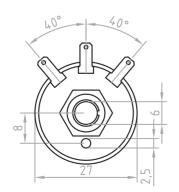


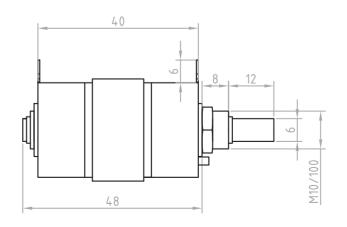
TWIN POTENTIOMETER

This twin, 2x3 W. wirewound potentiometer is a variant of our wellknown type 3W and designed for stereo equipments. Its electrical and physical characterisitics are the same as the mentioned 3W. Net weight: 40 grs.

Packing: Box of 25 pcs.









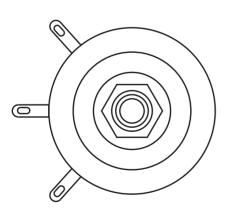
SW POTENTIOMETER

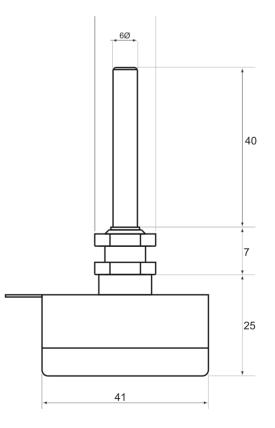
Our 5W. potentiometer distinguish themselves by the original design of the slider-contact. Its consists of a metallic roller on top of a tangential spring. The turning of the spring produces a hypocycloidal movement of the roller on the flat side of the resistor-strip, thus avoiding the abrasion of the wire. The ends of the resistor-strip are colloidal-silver painted so, that practically there is no residual resistance.

Characteristics

- * Terminals 3.2 x 0,5 mm
- * Power rating at 25°C: 5W
- * Resistance distribution: lin.
- * Resistance range: 5 Ω 50 K Ω
- * Tolerance: 6%
- * Breakdown voltage: > 1000v.
- * Mechanical angle of rotation: 264°C
- * Electrical angle of rotation: 250°C
- * Mech. breakdown of the stop: 8 kg/cm.
- * Standard shaft lenght: 40 mm.
- * Net weight: 40 grs.
- *Temperature increasing at full load: 75°C









CERAMIC RHEOSTATS (POTENTIOMETERS)

Our heavy potentiometers and rheostats are made in the following powers : 15-30-40-60-80-125-250-500 and 1000 Watts.

These nominal powers are applicable in good conditions of ventilation. If the installation becomes in closets or closed boxes, where ventilation is insufficient these powers are due to reduce until about 20%.

The ceramic core is made of hard non hygroscopic steatite, thus avoiding corrosion due to electrolysis. The core is wound with high quality copper-nickel or chrome-aluminium wire, according to the required ohmic value and power of the winding.

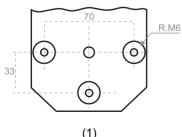
Each turn of the winding is hold firmly in place and protected against mechanical damages, by a hard, heat-resistant ceramic cement.

This cement coating which resists 900° C has a fast heat dissipation due to its good heat conductivity and matt radiating surface.

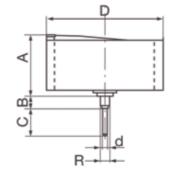
The slider is a fine-silver brush, according to the requirements. Besides linear windings, to order we can wind multi/sections windings, according to customer's needs or specifications, in order to provide a non-linear response.

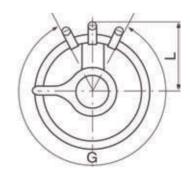


POTENCIA POWER	А	В	С	D	d	R	G	L	PESO (KG.) WEIGHT (KG.)	GAMA DE VALORES OHMIC VALUES
PC12	25	8	10	32	6	M-10	290°	25	0,028	$5\Omega-10k\Omega$
PC25	35	8	38	45	6	M-10	280°	30	0,125	$5\Omega - 20k\Omega$
PC35	40	12	32	55	6	M-10	278°	35	0,140	$5\Omega - 25k\Omega$
PC50	40	12	37	65	6	M-10	310°	41	0,150	$5\Omega - 25k\Omega$
PC75	43	12	37	73	6	M-10	317°	45	0,200	$5\Omega - 25k\Omega$
PC125	60	12	18	87	6	M-10	302°	53	0,360	$5\Omega - 15k\Omega$
PC250	60	12	18	117	6	M-10	314°	70	0,535	$5\Omega - 15k\Omega$
PC500	86	12	36	144	8	M-12	310°	85	1,225	$5\Omega - 10k\Omega$
PC1000	103	10	54	205	8	(1)	320°	115	2,700	$3\Omega - 10k\Omega$



(1) Anclaje Mod. PC-1000

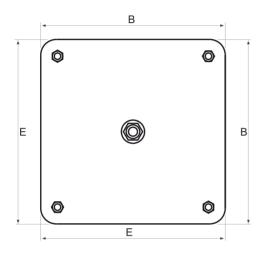


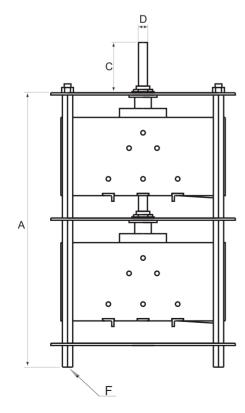




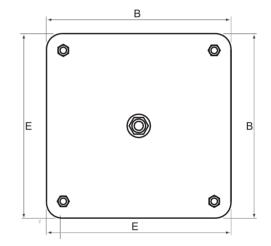
	REOSTATO TANDEM DOBLE								
POTENCIA	ļ	٩	В		C		D		F
POWER	MANUAL	MOTOR.		MANUAL	MOTOR.	MANUAL	MOTOR.	E	
2x250W	180	240	115	18		6		100	M-6
2x500W	230	300	165	36		8		125	M-6
2x1000W	270	350	235	54		8		195	M-8

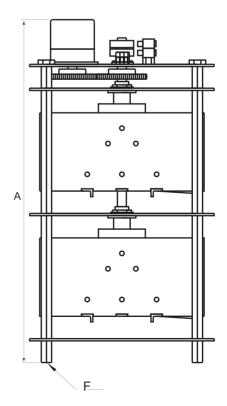
Manual Control





Power-assisted control



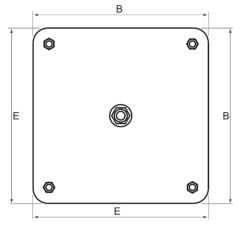


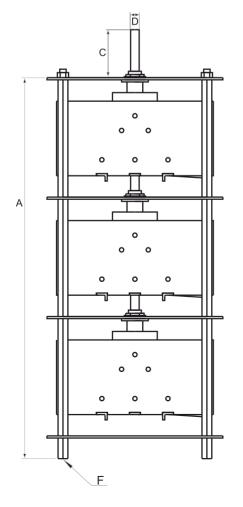


	REOSTATO TANDEM TRIPLE								
POTENCIA	1	4	В	C		D		Е	F
POWER	MANUAL	MOTOR.		MANUAL	MOTOR.	MANUAL	MOTOR.	Ŀ	I
3x250W	300	240	115	18		6		100	M-6
3x500W	370	300	165	36		8		125	M-6
3x1000W	430	350	235	54		8		195	M-8

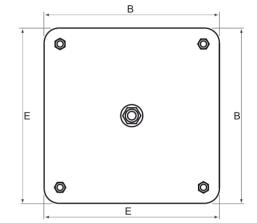
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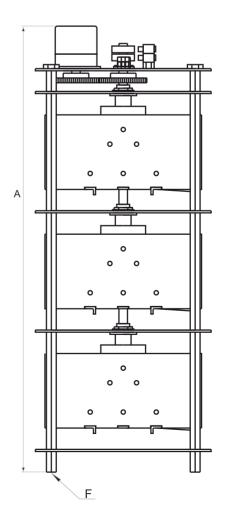
Manual Control











OPERATING KNOBS METAL BRACKETS FOR LED BINDING POST, BANANA SOCKETS & FUSE HOLDERS

ORiv



OPERATING KNOBS

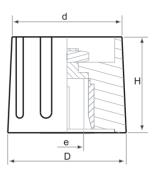


BO Series

MOD. TYPE	D	е	н	d
10	10	3 y 4	14	8,5
15	14,5	4,6	15	13
21	21	4,6	17	19,5
30	29,5	4,6	17,5	28
38	38	4,6,8	18,5	36,5

Can be manufactured to order 1/4" in all the models except Type 10



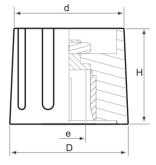


BO Series Lined

MOD. TYPE	D	е	н	d
10	10	3 y 4	14	8,5
15	14,5	4,6	15	13
21	21	4,6	17	19,5
30	29,5	4,6	17,5	28
38	38	4,6,8	18,5	36,5

Can be manufactured to order 1/4" in all the models except Type 10



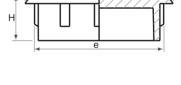


Caps			
MOD. TYPE	D	d	е
15	26	9,8	2,8
21	36	16	2,8
30	45	21,5	2,8
38	55	27	2,7

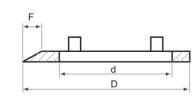
Ring With Pointers

MOD. TYPE	D	е	н
10	8	6,5	8,5
15	11	10	13
21	18	15,7	19,5
30	25,5	23,8	28
38	33,5	30,5	36,5

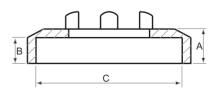




D







Nut Covers

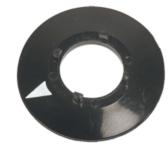
MOD. TYPE	А	В	D	
10	3,5	2,5	14	
15	4	3	17	

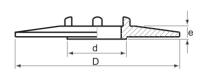
OPERATING HNOBS



Dials With Pointer

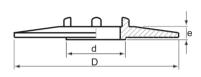
MOD. TYPE	D	d	е	
15	26	9,8	2,8	
21	36	16	2,8	
30	45	21,5	2,8 2,7	
38	55	27		





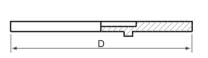
Graded Dials							
MOD. TYPE	D	d	е				
15	26	9,8	2,8				
21	36	16	2,8				
30	45	21,5	2,8				
38	55	27	2,7				





Startors						
CÓD. CODE	MOD. TYPE	D				
BOS014	15	26				
BOS021	21	36				
BOS029	30	44				



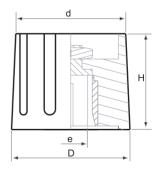


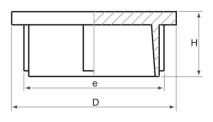
BM Series							
MOD. TYPE	D	е	н				
15	14,5	4,6,1/4"	16				
21	20,6	4,6,1/4"	19				

Matt Caps for BM Series

MOD. TYPE	D	е	н
15	12	4,6,1/4"	6,2
21	18,8	4,6,1/4"	7,4







OPERATING KNOBS

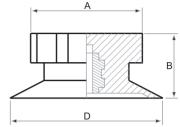


"DF" Knob Series

MOD. TYPE	Α	В	D	Е	
29DF	29	20	38	15,5	
38DF	38	22	52	17	
61DF	61	31	76	18	







Graded Dials

Código Code	Ø	Grabado Printed	Ángulo Rotat.Angle	Color Colour
CA0050180	50	0-100%	180°	Gris / Grey
CA0050270	50	0-100%	270°	Gris / Grey
CA0080270	80	0-100%	270°	Gris / Grey
CA0080305	80	0-100%	305°	Gris / Grey
CA0116270	116	0-100%	270°	Gris / Grey
CA0116310	116	0-100%	310°	Gris / Grey
CA0116330	116	0-100%	330°	Gris / Grey
CA0080230	80	0-230v	330°	Negro / Black
CA0080250	80	0-250v	340°	Negro / Black
CA0115230	116	0-230v	330°	Negro / Black
CA0115250	116	0-250v	330°	Negro / Black
CA0115330	116	0-100%	330°	Negro / Black
CA0160330	116	0-100%	328°	Azul / Blue

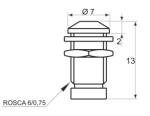


METAL BRACHETS FOR LED



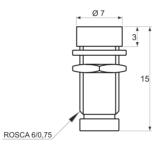
Metal Brackets for 3mm. LED





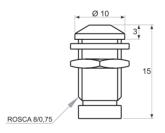
Metal Brackets for 3mm. LED





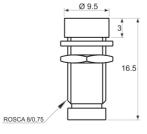
Metal Brackets for 5mm. LED





Metal Brackets for 5mm. LED



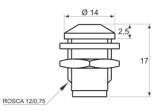


METAL BRACHETS FOR LED



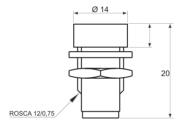
Metal Brackets for 8mm. LED





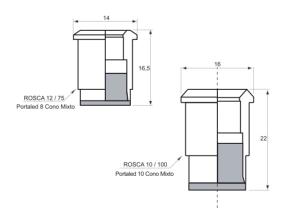
Metal Brackets for 8mm. LED





Metal Brackets for 10mm. LED



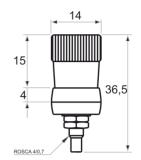


BINDING POST, BANANA SOCHETS & FUSE HOLDERS



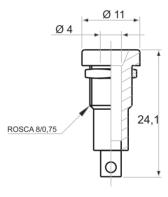
BPB - 30 A / 230V.





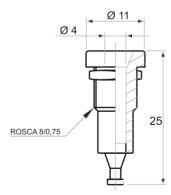
HB - 4





<u> HR - 4</u>

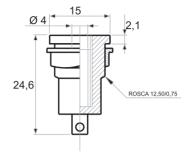




BINDING POST, BANANA SOCHETS & FUSE HOLDERS

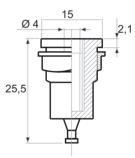






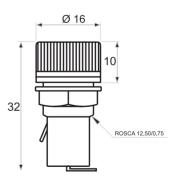
<u>HSR - 4</u>





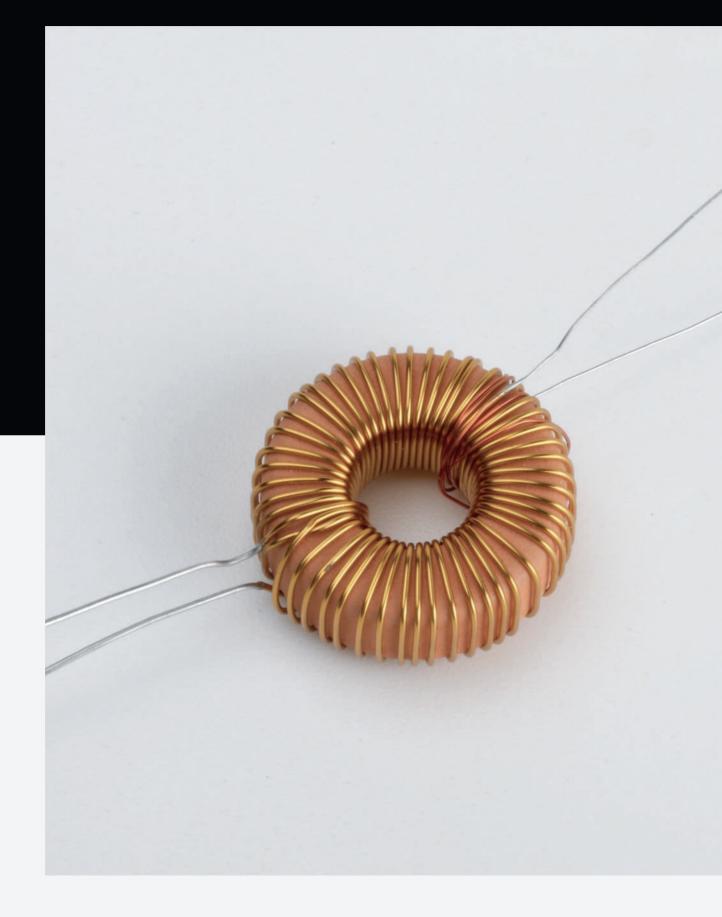
PF - 15











TOROIDAL BUFFERS



IRON POWDER TOROIDAL BUFFERS

The iron powder toroidal buffers are the ideal inductive components for the design and manufacture of DC/DC converters or switched AC/DC sources as well as for line filter applications , electromagnetic interference filters and low-frequency buffers range.

Their main characteristics are:

 * Low dispersion of the magnetic field, limiting the radiated fields to the minimum.

* High efficiency, allowing the filtration or storage of energy in a minimum space.

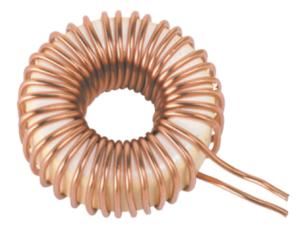
* Low loss level over the entire range of operating frequencies.

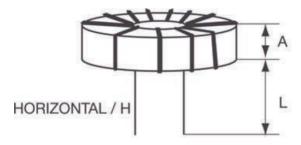
* High stability with different temperatures with a margin of -50°C to +90°C.

* High frequency range from 10Khz to 150Khz.

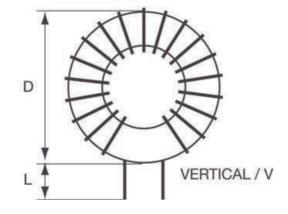
The family is comprised of 27 different inductance values that correspond to the standardised values of passive electronic components, and of 11different cores, thus obtaining 297 different references which allow for all design requirements to be covered in most cases.

We can manufacture other special inductive values even othertypes of core with different sizes, in specifications of each customer.





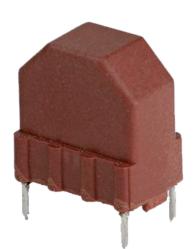
Dimensiones (mm.) Dimensions (mm.)							
Referencia Reference	D	Α	L				
1305	15	7	30				
1307	16	10	30				
1706	20	8	30				
2006	23	9	30				
2010	23	14	30				
2408	27	11	30				
2711	32	14	30				
3311	37	15	30				
3915	44	20	30				
4715	52	21	30				
5122	57	28	30				



TOROIDAL BUFFERS



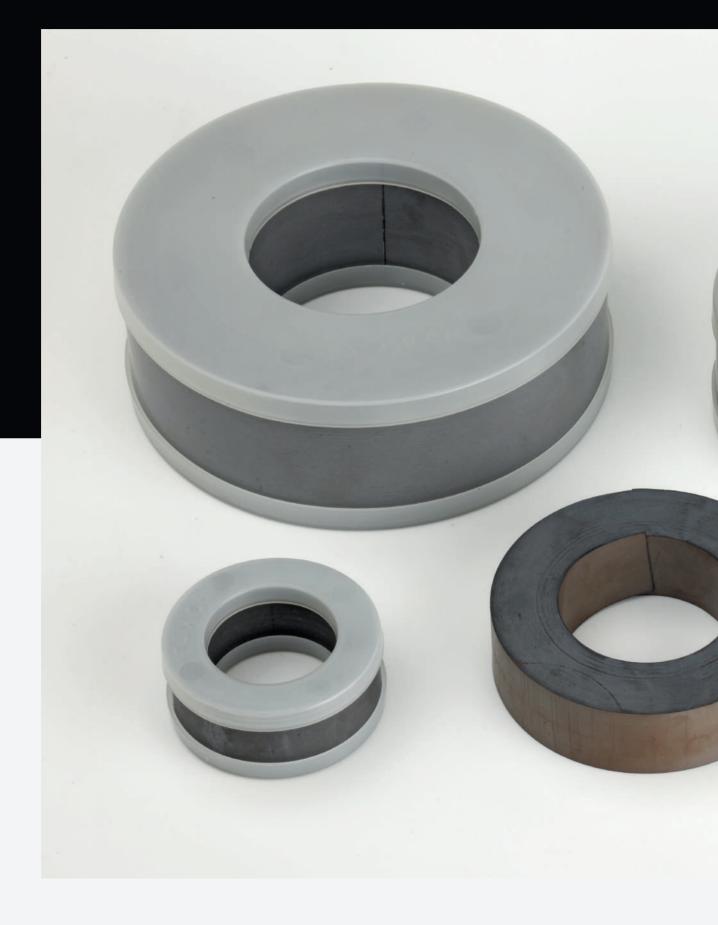
		INTENS	SIDAD S	EGÚN	MODE	LO/INT	ENSITY	DEPE	NDIG O	F TYPE	C
L (uH)	1305	1307	1706	2006	2010	2408	2711	3311	3915	4718	5122
10	4.7	6.3	9.4	11.8	16.7	16.1	21.0	28.3	40.4	56.6	80.0
12	4.3	5.8	8.6	10.8	15.3	14.7	19.2	25.8	38.9	51.6	73.0
15	3.8	5.2	7.7	9.7	13.7	13.7	17.1	23.1	32.9	46.2	65.3
18	3.5	4.7	7.0	3.3	12.5	12.0	15.6	21.1	30.1	42.2	59.6
22	3.2	4.3	6.3	8.0	11.3	10.9	14.1	19.1	27.2	38.1	53.9
27	2.8	3.9	5.7	7.2	10.2	9.8	12.8	17.2	24.6	34.4	48.7
33	2.6	3.5	5.2	6.5	9.2	8.9	11.6	15.6	22.2	31.1	44.0
39	2.4	3.2	4.8	3.0	8.5	8.2	10.6	14.3	20.4	28.6	40.5
47	2.2	2.9	4.3	5.5	7.7	7.4	9.7	13.1	18.6	26.1	36.9
56	2.0	2.7	4.0	5.0	7.1	6.8	8.9	12.0	17.1	23.9	33.8
68	1.8	2.4	3.6	4.5	6.4	6.2	8.1	10.9	15.5	21.7	30.7
75	1.7	2.3	3.4	4.3	3.1	5.9	7.7	10.3	14.7	20.7	29.2
82	1.6	2.2	3.3	4.1	5.8	5.6	7.3	9.9	14.1	19.8	27.9
100	1.5	2.0	3.0	3.7	5.3	5.1	6.6	8.9	12.8	17.9	25.3
120	1.3	1.8	2.7	3.4	4.8	4.7	6.1	8.2	11.7	16.3	23.1
150	1.2	1.6	2.4	3.1	4.3	4.2	5.2	7.3	10.4	14.6	20.7
180	1.1	1.5	2.2	2.8	3.9	3.8	4.9	6.7	9.5	13.3	18.9
220	1.0	1.4	2.0	2.5	3.5	3.4	4.5	6.1	8.6	12.6	17.1
270	0.9	1.2	1.8	2.3	3.2	3.1	4.0	5.4	7.8	10.8	15.4
330	0.8	1.1	1.6	2.1	2.9	2.8	3.7	4.9	7.0	9.9	13.9
390	0.7	1.0	1.5	1.9	2.7	2.6	3.4	4.5	6.5	9.1	12.8
470	0.7	0.9	1.4	1.7	2.4	2.3	3.1	4.1	5.9	8.3	11.7
560	0.6	0.9	1.2	1.6	2.2	2.1	2.8	3.8	5.4	7.6	10.7
680	0.6	0.8	1.1	1.4	2.0	1.9	2.5	3.4	4.9	6.9	9.7
750	0.5	0.7	1.1	1.4	1.9	1.8	2.4	3.3	4.7	6.5	9.2
820	0.5	0.7	1.0	1.3	1.8	1.8	2.3	3.1	4.5	6.2	8.8
1000	0.5	0.6	0.9	1.2	1.7	1.6	2.1	2.8	4.0	5.7	8.0





TOROIDAL CORES





TOROIDAL CORES



CHARACTERISTICS

The toroidal cores manufactured by Torivac are made from magnetic iron-silicon alloy sheet, of orientated grain, with very low loss levels and a high induction saturation, which are subjected to thermal treatment, thus improving their magnetic permeability by pproximately 40%. The specific materials used are the types M4 or M5, depending on the different applications.

All the cores are soldered at the end of the wound coil, in order to avoid possible vibrations and they are subsequently insulated using polyamide-6 capsules with 30% of fibre glass, ideal for withstanding temperatures of close to 150°C.



			PESO (KG)	
Α	В	С	WEIGHT (KG)	CM ₂
60	40	20	0.235	2
60	40	25	0.293	2.5
60	40	30	0.352	3
60	40	35	0.411	3.5
65	40	20	0.307	2.5
65	40	25	0.400	3.13
65	40	30	0.480	3.76
65	40	32	0.512	4
70	40	20	0.386	3
70	40	22	0.425	3.3
70	40	25	0.483	3.75
70	40	32	0.618	4.8
70	45	22	0.365	2.75
70	45	25	0.415	3.13
75	40	13	0.314	2.28
75	40	15	0.362	2.63
80	50	25	0.570	3.75
80	50	30	0.684	4.5
80	50	35	0.798	5.25
80	50	40	0.912	6
85	40	13	4.280	2.93
90	50	20	0.652	4
90	50	22	0.717	4.4
90	50	25	0.815	5
90	50	30	0.978	6
95	50	40	1.527	9
100	60	25	0.940	5
100	60	30	1.130	6

			PESO (KG)	
Α	В	С	WEIGHT (KG)	CM ₂
100	60	35	1.318	7
100	60	38	1.430	7.6
100	60	40	1.500	8
101	55	25	1.050	5.75
101	55	30	1.260	6.9
101	55	35	1.058	8.05
101	55	38	1.148	8.74
101	55	40	1.208	9.2
105	65	35	1.392	7
105	65	45	1.790	9
108	48	20	1.095	6
108	58	25	1.215	6.25
108	58	30	1.458	7.5
108	58	38	1.847	9.5
108	58	40	1.944	10
108	58	45	2.187	11.3
135	70	35	2.728	11.4
135	70	40	3.118	13
135	70	45	3.507	14.63
135	70	50	3.897	16.3
135	70	53	4.130	17.2
140	70	70	6.025	24.5
150	75	35	3.455	13.13
150	75	40	3.950	15
150	75	45	4.444	16.9
150	75	50	4.937	18.8
150	75	60	5.925	22.5
150	75	75	6.912	26.3





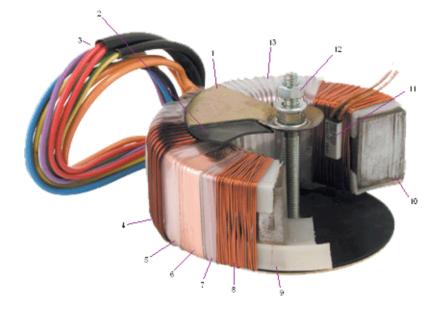
PRESENTATION

Torivac has over thirty years of experience in manufacturing all types of toroidal transformers.

The toroidal transformer represents, like no others, the ideal design for a transformer. In fact, Faraday designed and wound the first transformer on a toroidal core. The toroidal cores manufactured by Torivac are made of magnetic sheet metal with very low loss levels and high induction saturation, which when heat treated allow for reaching saturation values of up to 16,000 gauss. In the toroidal transformer the magnetic flow is evenly concentrated in the core and, due to the absence of intermediate metal parts, vibrations are eliminated.

Similarly, as all the wound coils are spread over the surface of the core, the noise caused by magnetostriction practically disappears, which favours the dissipation of heat. These features substantially improve the characteristics and yield of the toroidal transformers with respect to conventional ones.





CHARACTERISTICS

Efficiency

Is the ratio between the output and the input power ratings that is variable depending on the size of the transformer and the working conditions, but which is almost always higher than that of conventional transformers of a similar power rating. The typical efficiency of our standard transformers, from 20VA to 3000VA varies between 82% and 96% (see diagram).

The efficience of a toroidal transformer is mainly conditioned by the resistive losses of the copper wire and the losses in the core. The resistive losses are always less in the toroidal transformer that in the conventional ones by the lower quantity of copper used in the windings. With regards to the core losses, by hysteresis, are reduced to 0,98W / Kg, at an induction of 1.6T, by means of an appropriate heat treatment of recrystallization and the losses induced by Foucault's currents are practically negligible in our cores made from M4 and M5 magnetic sheet.

110 100 90 80 % Poténcia de salida 70 60 1 KVA 50 300 VA 40 30 VA 30 20 10 0 20 40 60 80 100 % Poténcia nominal

1. Metallic disc

- 2. Sochet-pan of rubber
- 3. Out
- 4. Wound secondary
- 5. Kerb betwen shielded and secondary
- 6. Electrostatic shielded
- 7. Kerb film polyester betwueen primary and shielded
- 8. Wound primary
- 9. Cover toroidal with nylon
- 10. Screw, nut and socket-pans
- 11. Magnetic core
- 12. Thermostat
- 13. Final kerb or foreing covering



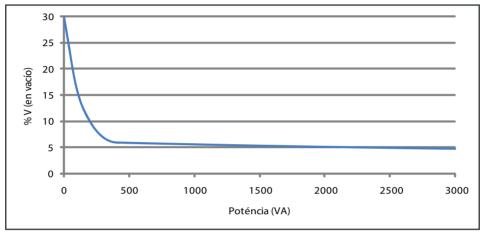
TECHNICAL SPECIFICATIONS

Voltage Variation "No Load"/"Full Load"

The voltage drop of a transformer is determinate by the quotient between "no load" and "full load" secondary voltage. This rate is an important parameter to be taken into consideration when designing the transformer. It allows an approximate calculation of the nominal load voltage.

The rate changes with the size of the transformer. At greater power ratings there is generally less resistance in the copper wires used in the wound coils and better characteristics can be achieved.

The attached diagram reflects the increase in no load voltage (%), with respect to the nominal load voltage, based on the power rating of the transformer.



Radiation

The absence of air-gaps in the construction of the core, its heat treatment, the painstaking design and the meticulous winding techniques used, allow achieving of very low magnetic dispersion, which is almost insignificant when compared with that generated by conventional transformers. When it is required that magnetic dispersion must be totally eliminated, one can add electromagnetic screens or shielding.

The application of the toroid transformers in the stages of power supply and power drawing is ideal as a good signal/noise ratio can be achieved.

Electrostatic shielding

The electrostatic screens are constructed using a copper layer winding coil, insulated with polyester, which covers completely the primary winding and has the function of filtering out the electrostatic interferences from the mains power supply, when the voltage is transformed and to derive to ground in case of failure of the main isolation.

Start up transitory electric currents

The toroidal transformers usually have higher transitory electric currents on starting up than conventional ones due to the absence of air-gaps in the core. For this reason we recommend you to protect the power supply with slow melting fuses or controlled starting systems.

Temperature increase

The working temperature of ours toroidal transformers varies, depending on the percentage load used, as can be seen in the attached diagram. In the permanent working mode, these may increase between 55oC and 60oC, above the surrounding environmental temperature, even though the outside temperature of the transformer does not display increases in excess of 45oC.

Shape factor

These types of transformers allow as no others to achieve low profiles and adapt the size to the dimensions called for in each application, adjusting the diameter and height of the cores to the final requirements.

Advantages

* High efficiency * Low noise level * Low dispersion field * Less heating * Low weight and size * Easy assembly



FIELDS OF APPLICATION

The toroidal transformers have numerous fields of application, and among these we can emphasize as the most usual the followings:

- * Consumer electronics *Electro medicine.
- * Converters
- * Power supply systems * Audio systems
- * Security
- * Telecommunications
- * Low voltage lighting
- * Any equipment that may require an optimal efficiency.

PRODUCTION SERIES

Standard by order

This series is conceived for a 230V primary and a secondary of any voltage and power ratings between 20VA and 5 KVA, according with the following table.

By order, we can manufacture them adding screens, thermal winding protectors and other configurations.

The standard lengths of the output leads are of 16 cm up to 500 VA, 20 cm for 600 to 1000VA and 25 cm fir higher powers.

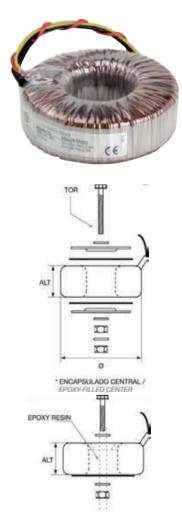
Regulación motorizada

Utilizada fundamentalmente para regular los equipos a distancia ó para equipos estabilizadores. También se suelen motorizar los variadores de tensión de grandes potencias, por la comodidad de uso que proporcionan. En este tipo de regulación el eje del variador es accionado por un motor-reductor, mediante un conmutador manual que permite elevar o reducir la tensión de salida.

Las motorizaciones que ensambla TORIVAC carecen de inercia, por lo que son ideales para control remoto.

Bajo demanda se fabrican modelos estabilizados por medio de una placa electrónica con una precisión del 2%. La incorporación de dicha placa permite regular el variador por medio de un potenciómetro o una señal continua de 0-10Vcc.

Estándar bajo demanda/Standad to order (Entrada/Input 230V)									
VA	Ø	Altura mm.	Voltaje mín.	Rdto.	cdt	Ø	Va	Fijación	
٧A	mm.	Height mm.	Voltage min.	EffiC.	cai	Acce.	Kg.	Mounting	
15	66	29	2	82	18	50	0.37	M5x40 mm.	
20	67	32	3	82	18	50	0.4	M5x40 mm.	
	69	36	11	83	17	50	0.5	M5x45 mm.	
30	75	32	11	83	17	50	0.55	M5x40 mm.	
	83	25	11	83	17	65	0.60	M5x35 mm.	
	69	50	5	84	16	50	0.65	M5x60 mm.	
40	79	33	5	84	16	50	0.60	M5x45 mm.	
	83	26	5	84	16	65	0.70	M5x35 mm.	
	70	43	5	85	15	50	0.70	M5x55 mm.	
50	79	34	5	85	15	65	0.75	M5x45 mm.	
	94	27	5	85	15	65	0.8	M5x35 mm.	
60	79	38	6	86	14	65	0.85	M6x55 mm.	
00	87	34	6	86	14	65	0.90	M6x50 mm.	
80	90	38	7	86	13	65	0.90	M6x50 mm.	
80	99	34	7	86	13	80	1.00	M6x50 mm.	
100	90	45	8	87	12	65	1.25	M6x55 mm.	
100	100	38	8	87	12	80	1.30	M6x50 mm.	
120	100	40	9	87	11	80	1.40	M6x55 mm.	
120	110	38	8	87	11	80	1.45	M6x50 mm.	
150	100	44	10	88	10	80	1.60	M6x60 mm.	
	120	33	10	88	10	80	1.70	M6x50 mm.	
160	113	43	9	80	10	80	1.65	M6x55 mm.	
200	110	42	10	89	9	80	1.80	M6x60 mm.	
250	120	52	10	89	9	80	2.00	M6x70 mm.	
	120	62	12	90	9	80	2.80	M6x80 mm.	
300	123	58	13	90	9	80	3.00	M6x80 mm.	
	135	55	12	90	9	100	3.50	M6x70 mm.	
330	125	62	12	90	9	80	3.00	M6x80 mm.	
400	150	50	13	91	8	100	3.90	M8x70 mm.	
500	150	60	15	92	8	100	4.40	M8x80 mm.	
600	150	70	15	93	8	100	5.70	M8x90 mm.	
750	165	67	18	93	7	127	6.00	M8x90 mm.	
1.000	165	77	22	93	7	127	7.10	M8x100 mm.	
1.200	170	95	22	94	6	140	9.70	M8x110 mm.	
1.500	185	90	24	94	6	140	10.80	M8x110 mm.	
	220	70	24	94	6	140	12.34	M8x90 mm.	
2.000	250	80	30	95	6	En. Int.	15.00	M10x100 mm.	
2.500	255	85	35	95	5	En. Int.	18.00	M10x110 mm.	
3.000	260	105	40	95	4	En. Int.	23.00	M10x130 mm.	
4.000	270	115	50	96	3	En. Int.	28.00	M12x140 mm.	
5.000	280	125	60	96	2	En. Int.	33.00	M12x160 mm.	





This series is made for a 230V primary and two identical secondaries, that can be connected in series or parallel and to double the voltage or the current, in a range of power ratings between 20VA and 220VA. They are supplied with individual boxes and the assembly accessories. The usual voltages are as in the following table:

NOTE: Other voltages can be manufactured by order

Series connection: Connecting yellow with white we will obtain twice the voltage between red and black with the nominal current.

Parallel connection: By connecting red with white and yellow with black we will obtain the nominal voltage with twice current. Standard length : 20Cm.



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Serie T.T. (Estandar, en stock) 230 V Secundarios en serie o paralelo									
T.T Serie (Standard in stock) 230 V Secondaries in serially or in parallel									
CODIGO	VA	v	А	Rdto.	Cdt %	Ø	Altura mm	Kg.	Fijación
CODE				EffiC.		mm.	Height mm.	-	Mounting
TT0020210	20	2x10	2x1	82	18	67	32	0.4	M4x35
TT0020212	20	2x12	2x0.83	82	18	67	32	0.4	M4x35
TT0020215	20	2x15	2x0.66	82	18	67	32	0.4	M4x35
TT0030210	30	2x10	2x1.5	83	17	69	36	0.5	M5x40
TT0030212	30	2x12	2x1.25	83	17	69	36	0.5	M5x40
TT0030215	30	2x15	2x1	83	17	69	36	0.5	M5x40
TT0030218	30	2x18	2x0.83	83	17	69	36	0.5	M5x40
TT0050210	50	2x10	2x2.5	85	15	79	34	0.7	M5x40
TT0050212	50	2x12	2x2.08	85	15	79	34	0.7	M5x40
TT0050215	50	2x15	2x1.66	85	15	79	34	0.7	M5x40
TT0050218	50	2x18	2x1.38	85	15	79	34	0.7	M5x40
TT0080210	80	2x10	2x4	86	13	89	35	0.9	M6x45
TT0080212	80	2x12	2x3.33	86	13	89	35	0.9	M6x45
TT0080215	80	2x15	2x2.66	86	13	89	35	0.9	M6x45
TT0080218	80	2x18	2x2.22	86	13	89	35	0.9	M6x45
TT0100212	100	2x12	2x4.16	87	12	100	38	1.3	M6x45
TT0100215	100	2x15	2x3.33	87	12	100	38	1.3	M6x45
TT0100222	100	2x22	2x2.27	87	12	100	38	1.3	M6x45
TT0120212	120	2x12	2x5	87	11	110	38	1.4	M6x45
TT0120215	120	2x15	2x4	87	11	110	38	1.4	M6x45
TT0120222	120	2x22	2x2.72	87	11	110	38	1.4	M6x45
TT0160212	160	2x12	2x6.66	88	10	113	43	1.7	M6x50
TT0160215	160	2x15	2x5.33	88	10	113	43	1.7	M6x50
TT0160222	160	2x22	2x3.63	88	10	113	43	1.7	M6x50
TT0220215	220	2x15	2x7.33	89	9	120	52	2	M6x55
TT0220222	220	2x22	2x5	89	9	120	52	2	M6x55
TT0220230	220	2x30	2x3.66	89	9	120	52	2	M6x55
TT0220235	220	2x35	2x3.14	89	9	120	52	2	M6x55

Ø Discos metálicos/ metallic disc					
20 VA	50 mm				
30 VA	50 mm				
50 VA	65 mm				
80 VA	65 mm				
100 VA	65 mm				
120 VA	80 mm				
160 VA	80 mm				
220 VA	80 mm				

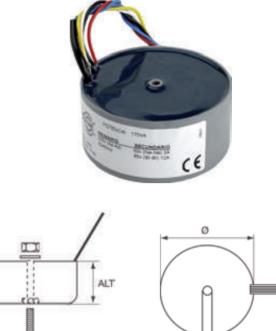




TE Series (Resin packed)

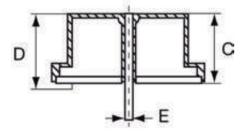
These are transformers of the TT series, packed into PVC boxes and filled with epoxi resin, which allow the extension of the useful life and improve the insulation of the transformer. These are ideal for dusty or humid atmospheres.

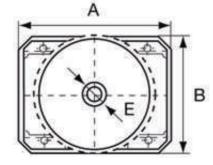
Transformadores encapsulados en cajas Transformers packed in casing						
VA	Ø mm.	Altura mm Height mm.	Kg.	Fijación Mounting		
15	73	35.4	0.5	M5x45		
20	73	35.4	0.5	M5x45		
30	73	39.1	0.6	M5x50		
40	81.5	39.1	0.7	M5x50		
50	81.5	39.1	0.7	M5x50		
60	87.3	41.7	0.9	M5x55		
60	91	40.5	0.9	M5x55		
80	96.7	37.1	1	M6x50		
100	104.2	44	1.2	M6x60		
120	104.2	44	1.2	M6x60		
150	104.2	52.1	1.6	M6x70		
200	115	53.2	2	M6x70		
250	125.4	52.4	2.1	M6x70		
300	125.4	65.3	2.3	M6x80		
400	139.6	65.7	3.5	M8x80		
500	148	90	4.2	M8x110		
600	151.2	82.8	6.1	M8x100		
750	154.4	100.3	7.5	M8x110		



TOR db



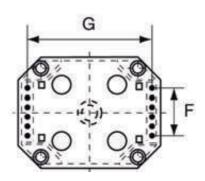




TCI Series (packed for P.C.)

These are transformers of the TT series, packed in epoxy resin, in PVC boxes which are connected internally to the pins for their use directly on printed circuits. The raster between the pins is of 5 mm and their number varies in accordance with the box size . The connections can be configured in accordance with the customers requirements.

Transformadores encapsulados en cajas Transformers packed in casing								
VA	А	В	С	D	Е	F	G	Kg.
15	80	63.1	43.3	47.3	5.1	5x5	70	0.6
30	90.2	73.2	43.4	47.4	5.1	7x5	80	0.7
60	100	83.5	43.4	47.4	5.1	9x5	90	1
100	110	93.3	50.5	54.5	6.1	11x5	100	1.3
200	120	103.3	55.5	59.5	6.1	13x5	110	2.1
400	160	125.6	72.8	76.8	8.2	-		3.8



18