How do we design a toroidal transformer? Concerning the mouse and the control buttons

You can use the mouse for everything.

The menu control can also be activated by means of the **Alt** key and the control letter for the menu option (after pressing the **Alt** key, it is normally visible in a different color). Some important menu options can be activated by means of the **F keys**.

Here is a survey of all control keys:

F1	On-line help
F2	It loads your last input file into the input mask in which all of the input data and the results of design are stored
F3	Loads the last input from the user, without any results of the design
F4	Starts design from the input data form
F5	Activates the test mode. This button cannot be pressed until after completion of design
F6	Designs in the test mode
F7	Indicates the loaded or calculated output data
F8	Prints out the loaded or calculated output data
F9	Activates the choice of core family and core with bobbin, and starts manual inputting of core, bobbin and casing
F11	Activates the choice of steel quality
F12	Activates the choice of wire family and wire
Ctrl-F1	Activates help for on-line help
Ctrl-Z	Reverses the last input
Ctrl-X	Stores all input data from a secondary into the internal memory. The cursor should be located in an input field of the secondary to be copied
Ctrl-C	Overwrites the input data of a secondary with the input data from the internal memory in which the cursor is located
Ctrl-V	Joins the input data from a secondary with the input data from the internal memory in which the cursor is located. The input data of the 8th secondary will consequently be lost
Ctrl-D	Deletes the selected secondary winding
PgDn/PgUp	Completes the input for primary voltages or secondary windings. Steps between the Primary , Secondary and Mask input groups
Arrows	Steps between the input fields in the input form and in the test mode
ТАВ	Steps between the input fields

Run RALE DESIGN System for toroidal transformers

👼 Rale_ENG Þ 🔀 Constant Voltage Transformers 👼 Rale_FRA 🚟 Large Dry Transformers ۲ 🜃 Small Chokes 👼 Rale_GER ۲ Small Transformers 👼 Rale_ITA Þ 👼 Rale_SPA **Toroidal Transformers** 🗟 Rale_USA Update

After installation of the RALE Design System, you see the Rale Design System program group on-screen.

Click on the Toroidal Transformers bottom

After clicking on the *Toroidal Transformers* bottom, the main menu for the Toroidal Transformers Program will appear on-screen.

			_ 🗆 ×
Input			
	Program Loading	78% done	
	·		
		Cancel	

This is followed by the input mask on screen with your input data

Input mask

TOROIDAL TRANSFORMER	RS/INPUT			
Input Material Bun Output	Edit Options Help			
DRTMARY II (M)	T (A) SPCONDARY			
Circuit -: 1 230	Circuit :1			_
Overvolt.*:1	careare			
Wire -:0	Voltage V:2	30		
Ins/L u:0	Current A:1			
Ins/E µ:250				
Formfactor: 1.11	Wire :0			
Freque.Hz:50	Ins/L µ:0			
dI/Io %:100	Ins/E µ:1	DO		
MASK				
Regulation %:50 S	teel -:2	Cooling *:1	Sectors -:0	
Udiode V:0.8 I	induction T:1.65	Force m/s:0	P/S-Order -:1	
dUdiode V:.1 R	Remanence *:0.35	Hole -:1	Rac/Rdc *:1.0	5
Ripple %:5.0 W	/kg *:1	- : 0	Space *:.9	
Temp.Amb. °C:40 V	/Ar/kg *: <mark>1</mark>	Chassis -: <mark>1</mark>	Vertical -:1	
Temp.rise *K:75 G	iap *:0	: 0	Horizontal -:1	
Time 1 Min: 30 A	nnealed -:1	Cu-Surface *:1	Impregnation-:3	
Load 1 *:1 S	stacking *:1	Rth-varnish *:1	Pitch -:1	
Time 2 Min: 30	:0	Rth-compoun.*:2	Selection -: U	
Load Z *: A	ssembly -:	case -:U	Criterion -:0	
DRK1.RLE AUT	O STEEL1. DAT	ORSI97	Min: 1 Max: 2	

(Numerical Characters =>Inputting), (Arrow, PgUp, PgDn, Mouse =>Move)

Your last input file will be loaded into the input mask. Here, you can create your input or incorporate the input data from an input data file and thus achieve drastic acceleration in the procedure for filling-in of the input mask.

B TOROIDAL TRANSFORMERS/INPUT	
New Toronom Ten Subor For Shapers Teb	
Circuit -: 230 Circuit :11	
Overvolt.*:1	
Wire -: 0 Voltage V:230	
Ins/L µ:0 Current A:1	
Ins/E µ:250 Formfactor:111 Wire	
Freque.Hz:50 Ins/L u:0	
dI/Io %:100 Ins/E µ:100	
MASK	
Regulation %:50 Steel -:2 Cooling *:1	Sectors -:0
Udiode V:0.8 Induction T:1.65 Force m/s:0	P/S-Order -:1
dUdiode V:.1 Remanence *:U.35 Hole -:1	Rac/Rdc *:1.05
Temp, Amb, °C:40 VAr/kg *:1 Chassis -:1	Vertical -:1
Temp.rise *K:75 Gap *:0 :0	Horizontal -:1
Time 1 Min: 30 Annealed -: 1 Cu-Surface *: 1	Impregnation-:3
Load 1 *:1 Stacking *:1 Rth-varnish *:1	Pitch -:1
Load 2 *:1 Assembly -:1 Case -:0	Criterion -:0
DRK1. RLE AUTO STEEL1. DAT ORSI97 Min	n: 1 Max: 2

TOROIDAL Input <u>M</u> ateria	TRANSFORM I <u>R</u> un <u>O</u> utput	ERS/INPUT <u>E</u> dit <u>O</u> ptions	<u>H</u> elp			<u>_ </u>
PRIMARY Circuit Overvolt. Wire Ins/L Ins/E Formfact Freque.H: dI/Io MASK Regulati Udiode	U (* Open File. Look in: Dat Dat Ksh Nscp_io User	7) I(A) SE	CONDARY		? X 편 	-:0 r -:1
dUdiode Ripple Temp.Amb Temp.ris Time 1 Load 1 Time 2 Load 2 DRK1.RL	File name: Files of type: Min: 30 *:1 E AU	Rale Input Files	(*.TR1) Fonly : U - : 1 : EEL1. DAT	Rth-compou Case ORSI97	 Open Cancel Selectio Criterio	*:1.05 *:.9 -:1 al -:1 tion-:3 -:1 on -:0 on -:0 Max: 2

(TAB=>Steps), (Click=>Marks), (Double click=>Selects)

In the installation of the Rale Design System, a RALE library of input data files has also been installed, with the distinction between two groups:

The first group helps in the design of transformers which are designed in accordance with regulation IEC 61558 (VDE 0551), paragraphs 15.3.2 and 15.3.3.

Example: R1532A4.TR1 or R1533E.TR1 **Captions:**

R	RALE by made
1532	IEC 61558 Paragraph 15.3.2
1533	IEC 61558 Paragraph 15.3.*
А	Insulation class A
Е	Insulation class E
В	Insulation class B
F	Insulation class F
Н	Insulation class H
4	Current rating of fuse < 4A
10	4> Current rating of fuse < 10A
25	10A > Current rating of fuse < 25A
63	25A > Current rating of fuse < 63A
99	63A > Current rating of fuse < 100A

For all input data files, an ambient temperature of 40°C has been used.

After loading of an input data file from this group, you now only have to enter the value for voltages and currents in the input mask.

The second group of input data files illustrates how it is possible to design certain specific transformers. All of these input data files are extensively discussed in the design examples.

The third group of input data files should be created by yourself in the course of time.

Input

The input mask consists of 5 areas:

1. Menu bar.

🔲 ΤΟΙ	ROIDAL T	RANS	SFORME	RS/II	NPUT	
Input	<u>M</u> aterial	<u>R</u> un	<u>O</u> utput	<u>E</u> dit	<u>O</u> ptions	<u>H</u> elp

2. Input form for primary data.

PRIMARY		U (V)	I (A) _
Circuit	-: <mark>1</mark>	230	C
Overvolt.	*:1		
Wire	-: <mark>0</mark>		N 1
Ins/L	μ: <mark>0</mark>		c
Ins/E	μ: <mark>250</mark>		
Formfacto	r:1.11		Di
Freque.Hz	: 50		I
dI/Io	%: 100		I

3. Input form for secondary data.

I (A)	SECONDA	RY				
	Circuit	: 11				
	Voltage	V: 230				
	Current	A:1				
	Wire	: 0				
	Ins/L	μ:Ο				
	Ins/E	μ:100				

4. Input form for general technological parameters.

MASK							
Regulatior	1 %: <mark>50</mark>	Steel	-:2	Cooling	*:1	Sectors	-:0
Udiode	V: <mark>0.8</mark>	Induction	T:1.65	Force m/	's:0	P/S-Order	-:1
dUdiode	V:.1	Remanence	*: <mark>0.35</mark>	Hole	-:1	Rac/Rdc	*: <mark>1.05</mark>
Ripple	%: 5.0	W/kg	*: <mark>1</mark>		-:0	Space	*:.9
Temp.Amb.	°C: <mark>40</mark>	VAr/kg	*:1	Chassis	-:1	Vertical	-:1
Temp.rise	°K:75	Gap	*:0		: O	Horizontal	-:1
Time 1	Min:30	Annealed	-:1	Cu-Surface	*:1	Impregnation	1 <mark>-:</mark> 3
Load 1	*:1	Stacking	*:1	Rth-varnish	*:1	Pitch	-:1
Time 2	Min:30		: <mark>0</mark>	Rth-compoun.	*:2	Selection	-:0
Load 2	*:1	Assembly	-:1	Case	-:0	Criterion	-:0

5. Status line



The 6 fields of the status line indicate, in sequence, the core family, the core, the iron quality family, iron quality, and the minimum and maximum values of the current input.

The input process for primary voltages and the secondary windings is concluded by means of the PgUp or PgDn keys

On-line Help

Key F1 plays an important part at this point, because each input field has a help text. Use ESC to quit on-line help.

👖 INPUT *** Rale De	sign Client Version	9.02 / 1.3.98			- 🗆 🗵
🐂 Help: 096					×
<u>C</u> ontents	<u>B</u> ack	His <u>t</u> ory	Со <u>р</u> у		
Duty Cycle 1					
Enter the dura below, in minu	ation of Duty utes.	Cycle 1, as s	hown in the f	⁼igure	
 Duty Cycle 1 During Duty If Load 1 = nominal dur 	L is used in a Cycle 1 the t 1, the output ing Duty Cycle	alculating te ransformer yi current (not 1.	mperature ris elds Load 1. power) is	5e.	
	Load1	Load2	Load1 Load2	2	
-					
	Load 1	r	Load 2		
	A010 3	TELECTURI Y	JUD JUA		

(Mouse, PgDn, PgUp, Arrow =>Move), (ESC=>Exit)

The input fields which are marked * are values with a unit of quantity (V, A, Hz,...) or multiplication factors. The input fields with - are code values. These can be entered or selected via the **Options** menu.

TOROIDAL TRANSFORMERS/INPUT			
Input <u>M</u> aterial <u>R</u> un <u>O</u> utput <u>E</u> dit	t <u>Options</u> <u>H</u> elp		
	Annealed after stamping 🔸		
$\begin{array}{c} PRIMARY & U(V) _ I \\ \hline \\$	Core assembly		
CIFCUIC -: 1 230	Hole		
Wire -:0	Transformer in case		
T_{ng}/T_{i} $u:0$	Sectors •		
Tns/E $\mu:250$	Position of primary		
Formfactor: 1.11	Tractive force		
Freque.Hz:50	Winding technique		
dI/Io %:100	Impregnation		
	Selection of core		
MASK Station	Criteria of calculation Regulation/Temperature rise		
Regulation 3:50 Stee	Regulation		
dudiada V:1 Dama	Appendix +: 0.35 Hold V Temperature rise		
Pipple 8.50 M/kc	$\frac{1}{2} = \frac{1}{2} = \frac{1}$		
Temp Amb °C·40 VAr/	/ka *:1 Chassis -:1 Vertical -:1		
Temp rise °K:75 Gan	*:0 :0 Horizontal -:1		
Time 1 Min: 30 Anne	ealed -:1 Cu-Surface *:1 Impregnation-:3		
Load 1 *:1 Stac	cking *:1 Rth-varnish *:1 Pitch -:1		
Time 2 Min: 30	:0 Rth-compoun.*:2 Selection -:0		
Load 2 *:1 Asse	embly -:1 Case -:0 Criterion -:2		
DRK1.RLE AUTO	STEEL1.DAT ORSI97 Min: 0 Max: 3		

(ESC=>Exit)

Wires and steel

The input fields for **Wire** type (not wire size) and **Steel** are a minor exception in this instance and can be selected in addition to manual input via the **Material/Wires/Fe** menu or selected by means of keys **F11** and **F12**.

	ERS/INPUT		_ 🗆 🗙
PRTI Circ Steel Wires	F9 F1 F12 F12 F11 F12	1	
Wire -:0 Ins/L μ:0 Ins/E μ:250	Voltage V:2 Current A:1	30	
Formfactor:1.11 Freque.Hz:50 dI/Io %:100	Wire :0 Ins/L μ:0 Ins/E μ:1	00	
MASK Regulation %: 50	Steel -:2	Cooling *:1	Sectors -:0
Udiode V:0.8 dUdiode V:1	Induction T:1.65 Remanence *:0.35	Force m/s:0 Hole -:1	P/S-Order -:1 Rac/Rdc *:1.05
Ripple %:5.0 Temp.Amb. °C:40	W/kg *:1 VAr/kg *:1	-:0 Chassis -:1	Space *:.9 Vertical -:1
Time 1 Min: 30 Load 1 *:1	Annealed -:1 Stacking *:1	:0 Cu-Surface *:1 Rth-varnish *:1	HOFIZONTAL -:1 Impregnation-:3 pITCH -:1
Time 2 Min:30 Load 2 *:1	:0 Assembly -:1	Rth-compoun.*: <mark>2</mark> Case -: <mark>0</mark>	Selection -: <mark>0</mark> Criterion -: 0
DRK1.RLE AU	TO STEEL1.DAT	ORSI97 M	lin: O Max: 3

(Alt-M and F or F11only =>Fe-Quality), (Alt-M and W or F12 only =>Wires)

TOROIDAL TRANSFORMERS/INPUT		
Input Material Run Output Edit Options He	əlp	
Input Material Run Output Edit Options He Steel Families Steel - grain oriented Steel - cold rolled Ni-Fe Ferrites Amorphous	Selected Family: STEEL1.DAT 1 ORSI111 2 ORSI97 3 ORSI89 4 M6 / 0.014" 5 M5 / 0.012" 6 M4 / 0.011" 7 TRAFOPERM N2-0.1 (C-CORE 8 SUPERMANDUR 4 mil cut "C	<u>O</u> K <u>R</u> eset <u>P</u> rint



TOROIDAL TRANSFORMERS/INPUT		_ 🗆 ×
Input <u>Material Run Output Edit Options</u>	<u>H</u> elp	
<u>W</u> ire Families	Selected <u>F</u> amily:Draht0.DAT	
Round - Grade 1	1 .012 .012 .016 .016 🔺	
Round - Grade 2	2 .014 .014 .018 .018	<u>0</u> K
Round - Grade 3	3 .016 .016 .020 .020	
Round F.East- Grade 1	4 .018 .018 .022 .022	
Round F.East- Grade 2	5 .019 .019 .023 .023 -	<u>R</u> eset
	6 .020 .020 .025 .025	
	7 .021 .021 .026 .026	
	8 .022 .022 .027 .027	Print
	9 .023 .023 .028 .028	
	10 .024 .024 .029 .029	
	11 .025 .025 .031 .031	
	12 .027 .027 .033 .033	
	13 .028 .028 .034 .034	
	14 .030 .030 .037 .037	
	15 .032 .032 .039 .039	
	16 .034 .034 .041 .041	
	17 .036 .036 .044 .044	
	18 .038 .038 .046 .046	
	19 .040 .040 .049 .049	
	20 .043 .043 .052 .052	
	21 .045 .045 .055 .055 💽	

(TAB=>Move), (Click=>Mark), (Double click=>Select)

Core and bobbin unit

Using the menu option of Material/Cores or key F9, you can select a core with a given bobbin or set up your own preferred combination.

The distinction is drawn between 4 different approaches for selection of the core and of the bobbin:

Automatic selection (Selection = 0)

In this mode, you just know the core family for the core and the coil from which you have to choose. But you don't know which core is suitable for your application.

- Enter a **0** in the **Selection** input field.
- The core name in the status line must be AUTO.

Core and bobbin are selected (Selection = 1)

You wish to produce your application with a given core and a given bobbin from a given core family.

TOROIDAL TRANSFORMERS	RS/INPUT
<u>Input Material R</u> un <u>O</u> utput <u>E</u>	<u>E</u> dit <u>O</u> ptions <u>H</u> elp
DET <u>C</u> ore/Bobbin/Case F9	() SECONDARY
Circ Steel F11	1 Circuit :11
Ove Wires F12	2
Wire -:0	Voltage V:230
Ins/L µ:0	Current A:1
Ins/E µ:250	
Formfactor:1.11	Wire :0
Freque.Hz:50	Ins/L µ:0
dI/Io %: 100	Ins/E μ: 100
MASK	
Regulation %: <mark>50</mark> St	teel -:2. Cooling *:1 Sectors -:0
Udiode V: <mark>0.8</mark> In	nduction T:1.44 Force m/s:0 P/S-Order -:1
dUdiode V:.1 Re	emanence *:0.35 Hole -:1 Rac/Rdc *: 1.05
Ripple %: <mark>5.0</mark> W/	/kg *:1 -:0 Space *:.9
Temp.Amb. °C: <mark>40</mark> VA	Ar/kg *:1 Chassis -:1 Vertical -:1
Temp.rise [°] K: 75 Ga	ap *:0 :0 Horizontal -:1
Time 1 Min: 30 An	nnealed -:1 Cu-Surface *:1 Impregnation-:3
Load 1 *:1 St	tacking *:1 Rth-varnish *:1 pITCH -:1
Time 2 Min: 30	:U Rth-compoun.*:2 Selection -:U
	ssembly -: Case -: Criterion -: C
DRK1.RLE AUTO	STEEL1.DAT ORSI97 Min: 1 Max: 2

(Alt-M and C or just F9 =>Cores and Bobbins)

TOROIDAL TRANSFORMERS	S/INPUT	
Input <u>Material Run O</u> utput <u>E</u> u	dit <u>O</u> ptions <u>H</u> elp	
Core/ <u>B</u> obbin Families		
RALE 1	DRK1.RLE	<u> </u>
RALE 2	DRK2.RLE	
RALE 3	DRK3.RLE	
MAGNETICS	DRK4.MAG	<u>S</u> ave
VACUUMSCHMELZE	DRK5.VAC	
		Сору
]]		List
Selected Family:DRK1.	RLE	
0 AUTO		A 0/P
1 10/16x4		
2 10/16x5		
3 10/16x6.5		
4 10/16x8		Ca <u>s</u> e
5 12/20x5		
6 12/20x6.5		n · · ·
7 12/20x8		<u>P</u> rint
8 12/20x10		
9 16/26x6.5		•

(TAB=>Move), (Click=>Mar), (Double click=>Select)

- Select the Material/Cores menu option or press key F9.
- Select a core family.
- Use the mouse to click on the core you prefer.
- Click on the OK button. The **Selection** input field has automatically acquired the value of **1**.

Core and bobbin are incorporated from a single input data file

(Selection = 2)

We have already selected an input data file before accessing the input mask, or we have loaded an input data file from the input mask via the **Input/Open** menu option. In this instance, we incorporated the core and coil stored in this input data file. The input field for **Selection** has a value of **2**. Using this procedure, we have no further work to do with regard to core selection **on-line**.

TOROIDAL	TRANSFORM	ERS/INPUT <u>E</u> dit <u>O</u> ptions <u>H</u> elp	_	_	
PRIMARY Circuit Overvolt. Wire Ins/L	U (V - : 1 230 * : 1 Save File. Save in:)_I (A)SECONDARY Circuit	. 11		?×
Ins/E Formfacto Freque.Hz dI/Io MASK Regulatio Udiode	Backup Dat Inputs Ksh User				-:0 r -:1
dUdiode Ripple Temp.Amb. Temp.rise Time 1 Load 1 Time 2 Load 2	File <u>n</u> ame: Save as <u>t</u> ype:	A_Rale_Input_File Rale Input Files (*.TR1)		Open Cancel	*:1.05 *:.9 -:1 al -:1 tion-:3 -:1 n -:3 n -:0
DRK1.RL	E 64/10	0x32 STEEL1.DAT	ORSI97	Min: 1	Max: 2

(TAB=>Move), (Click=>Mark), (Double click=>Select)

The core and bobbin are manually entered

(Selection = 3)

You wish to achieve your application with a given core and a given bobbin, but the core does not exist in any core family.



(Numerical =>Input), (TAB, Mouse =>Move)

Note 1 : If you change the core sizes Di, Da and H the program will show you the maximal, optimal sizes of the transformer Diw, Daw and Hw.

Note 2 : If you change the sizes of the transformer Diw, Daw and Hw the program will show you the minimal, optimal sizes of the core Di, Da and H.



(Numerical=>Input), (TAB, Mouse=>Move)

- Select the Material/Cores menu option or press key F9.
- Select a core family which could include your core.
- Use the mouse to click on a core which is similar to yours.
- Use the mouse to click on the Copy button and then Yes.
- Change the core, the bobbin and/or the case.
- Click on the **OK** button. The **Selection** input field has automatically acquired the value of **3**.

Under this procedure, we have no further work to do **on-line** with regard to core selection.

Saving the input data file

TOROIDAL TRANSFOI Input <u>Material</u> <u>Bun</u> Out	RMERS/INPU tput <u>E</u> dit <u>O</u> j	J T otions <u>H</u> elp				
<u>L</u> ast F3 <u>C</u> urrent F2 <u>D</u> efault	J (V) _I (A) 30	SECONDA Circuit	RY : <mark>11</mark>			
<u>O</u> pen <u>S</u> ave		Voltage Current	V: 230 A: 1			
Test F5 Exit Shift+Orl+E12		Wire	:0			
dI/Io %:100	J	Ins/L Ins/E	μ:0 μ:100			
MASK Regulation %: <mark>50</mark>	Steel	-:2	Cooling	*:1	Sectors	-: <mark>0</mark>
Udiode V:0.8 dUdiode V:.1	Induct Remane	ion T:1. nce *:0.	65 Force 35 Hole	m/s:0 -:1	P/S-Order Rac/Rdc	-:1 *:1.05
Ripple %:5.0 Temp.Amb. °C:40	₩/kg VAr/kg	*:1 *:1	Chassis	-:0 -:1	Space Vertical	*:.9 -:1
Temp.rise [°] K: <mark>75</mark> Time 1 Min: 30	Gap Anneal	*:0 ed -:1	Cu-Surf	:0 ace *:1	Horizontal Impregnati	-:1 on-:3
Load 1 *: 1 Time 2 Min: 30	Stacki	ng *:1 :0	Rth-var Rth-com	nish *: <mark>1</mark> poun.*: 2	pITCH Selection	-:1 -:3
Load 2 *:1	Assemb	ly -:1	Case	-:0	Criterion	-:0

Your input is **COMPLETE!** It is recommended that you save your input data into an input file.

(Alt-I and S)

Input Materia	. TRANSFORMERS/INPUT al <u>R</u> un <u>O</u> utput <u>E</u> dit <u>O</u> ptions <u>H</u> elp	
PRIMARY Circuit Overvolt	U(V)_I(A)SECONDARY -:1230 Circuit :11	
Wire Ins/L Ins/E	Save File. ? X Save jn: C Rds32	
Formfact Freque.H dI/Io	Backup Dat Dat Inputs	
MASK Regulati Udiode	User	-:0 r -:1
dUdiode Ripple Temp.Amb		*:1.05 *:.9 -:1
Temp.ris Time 1 Load 1	File name: A_Rale_Input_File Save as type: Rale Input Files (*.TR1) Cancel	al -:1 tion-:3 -:1
Time 2 Load 2 DRK1.RI	□ Open as read-only E 64/100x32 STEEL1. DAT ORSI97 Min: 1	n -:3 n -:0 Max: 2

(TAB => Move), (Click => Mark), (Double click => Select)

- Select the Input/Save menu option
- Enter the name of your input data file (max.of 8 characters, and the extension .TK1 cannot be modified).
- Click on the **OK** button.

Run designing

Design is started via the Run/Start menu option or with key F4.

Input Material Run Output Edit Options Help PRIMARY Stat F4 I (A) SECONDARY Image: Second and the second a
Stat F4 Test F8I (A) SECONDARYCircuit-Circuit :11Overvolt.*:1-Wire-:0VoltageV:230Ins/Lµ:0CurrentA:1Ins/Eµ:250Formfactor:1.11WireWire:0Freque.Hz:50Ins/Lµ:100Ins/EWASKRegulation%:50Steel-:2Cooling*:1Sectors-:0UdiodeV:0.8InductionT:1.65Forcem/s:0P/S-Order-:1Rac/Rdc*:1.05Binple%:50W/kg*:1-:0Space*:9
Circuit
Overvolt.*:1 Voltage V:230 Mire -:0 Voltage V:230 Ins/L µ:0 Current A:1 Ins/E µ:250 Formfactor:1.11 Wire :0 Freque.Hz:50 Ins/L µ:0 dI/Io %:100 Ins/E µ:100 MASK Regulation %:50 Steel -:2 Cooling *:1 Sectors -:0 Udiode V:0.8 Induction T:1.65 Force m/s:0 P/S-Order -:1 dUdiode V:1 Remanence *:0.35 Hole -:1 Rac/Rdc *:1.05 Binple %:50 W/kg *:1 -:0 Space *:9
Wire -:0 Voltage V:230 Ims/L
Ins/L µ:0 Current A:1 Ins/E µ:250 Formfactor:1.11 Wire :0 Freque.Hz:50 Ins/L µ:0 dI/Io %:100 Ins/E µ:100 MASK Regulation %:50 Steel -:2 Cooling *:1 Sectors -:0 Udiode V:0.8 Induction T:1.65 Force m/s:0 P/S-Order -:1 Udiode V:.1 Remanence *:0.35 Hole -:1 Rac/Rdc *:1.05 Binple %:50 W/kg *:1 -:0 Space *:9
Ins/E μ: 250 Formfactor: 1.11 Wire :0 Freque. Hz: 50 Ins/L μ: 0 dI/Io %: 100 Ins/E μ: 100 MASK Regulation %: 50 Steel -: 2 Cooling *: 1 Sectors -: 0 Udiode V: 0.8 Induction T: 1.65 Force m/s: 0 P/S-Order -: 1 Udiode V: 1 Remanence *: 0.35 Hole -: 1 Rac/Rdc *: 1.05 Binple %: 50 W/kg *: 1 -: 0 Space *: 9
Formfactor:1.11 Wire :0 Ins/L µ:0 Freque.Hz:50 Ins/L µ:0 Ins/L µ:0 dI/Io %:100 Ins/E µ:100 Ins/E P:100 MASK Regulation %:50 Steel -:2 Cooling *:1 Sectors -:0 Udiode V:0.8 Induction T:1.65 Force m/s:0 P/S-Order -:1 dUdiode V:.1 Remanence *:0.35 Hole -:1 Rac/Rdc *:1.05 Binple %:50 W/kg *:1 -:0 Space *:9
Freque.Hz:50 Ins/L μ:0 dI/Io %:100 Ins/E μ:100 MASK Regulation %:50 Steel -:2 Cooling *:1 Sectors -:0 Udiode V:0.8 Induction T:1.65 Force m/s:0 P/S-Order -:1 dUdiode V:1 Remanence *:0.35 Hole -:1 Rac/Rdc *:1.05 Binple %:50 W/kg *:1 -:0 Space *:9
dI/Io %:100 Ins/E μ:100 MASK Regulation %:50 Steel -:2 Cooling *:1 Sectors -:0 Udiode V:0.8 Induction T:1.65 Force m/s:0 P/S-Order -:1 dUdiode V:.1 Remanence *:0.35 Hole -:1 Rac/Rdc *:1.05 Binple %:50 W/kg *:1 -:0 Space *:9
MASK Regulation %:50 Steel -:2 Cooling *:1 Sectors -:0 Udiode V:0.8 Induction T:1.65 Force m/s:0 P/S-Order -:1 dUdiode V:.1 Remanence *:0.35 Hole -:1 Rac/Rdc *:1.05 Finple %:50 W/kg *:1 -:0 Space *:9
Regulation %:50 Steel -:2 Cooling *:1 Sectors -:0 Udiode V:0.8 Induction T:1.65 Force m/s:0 P/S-Order -:1 dUdiode V:.1 Remanence *:0.35 Hole -:1 Rac/Rdc *:1.05 Binple %:50 W/kg *:1 -:0 Space *:9
Udiode V:0.8 Induction T:1.65 Force m/s:0 P/S-Order -:1 dUdiode V:.1 Remanence *:0.35 Hole -:1 Rac/Rdc *:1.05 Ripple %:50 W/kg *:1 -:0 Space *:9
dUdiode V:.1 Remanence *:0.35 Hole -:1 Rac/Rdc *:1.05
Ripple $\$ \cdot 50 \ \square / ka$ $\star \cdot 1$ $- \cdot 0 \ Space$ $\star \cdot 9$
Alphic field wind the phase the
Temp.Amb. °C:40 VAr/kg *:1 Chassis -:1 Vertical -:1
Temp.rise K:75 Gap *:0 :0 Horizontal -:1
Time 1 Min: 30 Annealed -: 1 Cu-Surface *: 1 Impregnation-: 3
Load 1 *: Stacking *: Rth-varnish *: pITCH -:
Time 2 Min: JU :U Rth-Compoun.*: 2 Selection -: 3
Load Z Assembly -: Case -: Criterion -: Case -: Case -: Case -: Criterion -: Case
DRK1.RLE 64/100x32 STEEL1.DAT ORSI97 Min: 1 Max: 2

(Alt-R and S or just F4)

If you have not already selected a core, the program starts automatic search in accordance with one of your requirements from the core size as per your inputting, from the selected core data file.

The program starts searching at the first core of the core family and passes through to the last core in the family in sequence. You are invited to approve the first core which is adequately large for your application.

TOROIDAL TRANSFORM	ERS/INPUT				_ 🗆 🗵
Input					
PRIMARY U()	Z) I (A) SE	CONDARY			
Circuit -:1 230	Cir	cuit :11			
Overvolt.*:1					
Wire -:0	Vol	tage V: 230			
Ins/L µ:0	Cur	rent A:1			
Ins/E µ:250					
Formfactor: 1.11	Wir	e :0			
Freque.Hz:50	Ins.	/ь µ:0			
dI/Io %: 100	Ins	Run Time Messag	e 🗵		
MASK			4 14 00 40		
Regulation %:50	Steel	Selected Core :: Selected Stack cr	04/100×40	Sectors	-:0
Udiode V:0.8	Induction	Calculated Stack c	m:1.78 /s:0	D P/S-Order	-:1
dUdiode V:.1	Remanence		-:1	Rac/Rdc	*:1.05
Ripple %:5.0	W/kg	OK Car	ncel -: C) Space	*:.9
Temp.Amb. °C: 40	VAr/kg	·······	— -:1	Vertical	-:1
Temp.rise °K: <mark>75</mark>	Gap	*:U	: () Horizontal	-:1
Time 1 Min: 30	Annealed	-:1 Cu-S	urface *:1	Impregnati	on-:3
Load 1 *:1	Stacking	*:1 Rth-	varnish *:1	PITCH	-:1
Time 2 Min: 30		:0 Rth-	compoun.*:2	2 Selection	-:0
Load 2 *:1	Assembly	-:1 Case	-:() Criterion	-: 0
DRK1.RLE AU	TO STE	EL1.DAT	ORSI97	Min: 1	Max: 2

, TOROIDAL TRANSF nput	ORMERS/INPU	JT					
PRIMARY	U(V) I(A)	SECONDARY					
Circuit -: <mark>1</mark>	230	Circuit :	11				
Overvolt.*:1							
Wire -: <mark>O</mark>		Voltage V:	230				
Ins/L µ:0		Current A:	1				
Ins/E µ: <mark>250</mark>							
Formfactor:1.11		Wire :	0				
Freque.Hz:50		Ins/L u:	0			1	
MASK	dT-Optimizi	ng Transform	er	41%	done		
Regulation %							-:U
Udiode V						er	-: 1
auaioae v∟ Dinnla °				· · · · · · · · · · · · · · · · · · ·			^:I.U5 +. 0
Rippie s				Cance	el	1	^3 1
Temp. Amb. C				<u> </u>			1
Temp.118e K Time 1 Min.3		ad -:1	Cu-Surfac	• <u> </u>	Tmpreg	Juai netior	
Load 1 $\star \cdot 1$	Stacki	aα	Rth-verni	\approx \cdot \cdot	ттргед	acro.	-•1
Time 2 Min:3	n beacki	·9 ·1	Rth-compo	$\frac{1}{100} \times 2$	Select	ion	0
Load 2 *:1	- Assemb	.5 Ly -:1	Case	-:0	Criter:	ion	-:0
DDW1 DTD	AUTO		OPETO	7 M	in: 1	М	ov. 9

This is followed by the design operation. Note that there are 2 criteria of the optimizing: $dT \Rightarrow$ temperature rise or $dU \Rightarrow$ Regulation

Data page for winding

After the design procedure, a summary of the main results will appear on-screen.

4×0	DIAGNOSE	Page 0
Name	: 1 X 64/100×40	
Steel	-: ORS 197	
Di/Da/H of transformer	cm:5.01 / 11.06 / 5.26	
Di/Da/H of transformer max	< cm:3.07 / 11.46 / 6.455	
max.Cu-Fill Factor	%: 40.	
Number of Sectors	-:0	
max. parallel Wires	:1	
Induction on Load	T:1.65	
Max. Induction	T:1.726	
Max. Cu-Temp. Under Load	°C:74.9 / 71.8	
Max. Cu-Temp No Load	°C:8.8	
Regulation	8.9×8	
I^Inrush/I^nom-Factor	*:29.5	
Input Current No-Load	×:3.9	
03-05-2000/11:46:49	Input and Circuit	Page 1

(Mouse, control bar, Arrows, PgUp, PgDn=>Move)

The continuation of the above screen illustrates the extensive display of the design results. Each designed value is allocated with an appropriate explanatory text.

If you should need further information, please locate the cursor on the size value and press key **F1**. This activates on-line help.



(Mouse, PgDn, PgUp, Arrows=>Move), (ESC=>Exit)

Press Key "1"..."9" to jump to the other screens or press F8 to print the calculated results :

03-05-2000/12:06:55	Input and Circuit	Page 1
$\begin{array}{llllllllllllllllllllllllllllllllllll$	<pre>A) SECOND. 1 2 3 4 5 6 Circuit-:11 Uolta. U:230. Curre. A:1. Wire :0 I/L p:0.0 I/E p:100.</pre>	. 7 8
Regulat. ≥:50.0 State Udiode U:0.8 Ind dUdiode U:.1 Ref Ripple ≥:5. U/I Tmp. Amb.°C:40 UA Tmp.rise °K:75 Gaj Time 1 Min:30.0 Am Load 1 *:1.0 State Time 2 Min:30.0 Ass	$ \begin{array}{c ccccc} \text{sel} & -:2 & \text{Cooling *:1.00} & \text{Sectors} \\ \text{force } \text{m/s:0.00} & \text{F/S-Orde} \\ \text{force } \text{m/s:0.00} & \text{F/S-Orde} \\ \text{force } \text{m/s:0.00} & \text{F/S-Orde} \\ \text{force } \text{m/s:0.00} & -:0 & \text{Space} \\ \text{force } \text{m/s:0.00} & -:0 & \text{Space} \\ \text{force } \text{m/s:0.00} & \text{force } \text{m/s:0.00} \\ \text{for ealed } \text{-:1} & \text{Cu-Surface*:1.00} & \text{Horizont} \\ \text{force } \text{sching } \text{s:1.00} & \text{Rth-varni.*:1.00} & \text{Fitch} \\ \text{force } \text{m/s:0} & \text{Sth-comp. } \text{s:2.00} & \text{Sectors} \\ \text{for ealed } \text{-:1} & \text{Case } \text{-:0} & \text{Criteric} \\ \end{array} $	-:0 +:1 +:1.05 +:0.90 -:1 :al -:1 :t:3 -:1 m -:0 m -:0
CIRCUIT: 230. U A		30. U A U A U A U A U A U A U A
		U A



03-05-2000/12:06:55	General	Data	Seite 3
NOMINAL OPERATION Output Power on Load Cu Losses Short-Circuit-Uolt. Instantaneous pow. dT Fe average Surfa dT Surface average	at Temperature ° d W:229.3 W:19.26 cold X:5.77 .5/95& W:427.2 ace °K:74.6 °K:67.6	C 109.5 and Overvolta Output Power of Transfo Fe-Losses active Regulation Efficiency of Transform dT primary dT secondary	ge 1.00 r. W:229.3 W:1.3 Z:8.38 er Z:91.77 °K:72.5 °K:66.5
8.33 3.93 0 1 211.6 R 230. U 100 % 100 %	2 R 0.358R 221. 3 × 0.17 × 96.1 3508 R 1657. × .087 A	U 8.077R 0.358R 2 3.82 2 0.17 2 10948 R 212.2 U 5174. 2 92.27 2 . MH .25 1.081 A T 100 2] 196.3 ກີ 92.8 ຂ
DUTY CYCLE OPERATION dT Fe average Surfa dT Gehäuse av. Surfa	N at Amb.Tempera ace °K:74.6 ace °K:.	ture °C 40. and Overvol dT primary dT secondary	tage 1.00 °X:72.5 °X:66.5
NO LOAD OPERATION Losses active Current factor dT Fe average Surfa dT Gehäuse av. Surfa	at Amb.Tempera W:2.38 X:2.98 ace °K:10.2 ace °K:.	ture °C 40. and Overvol Losses reactive Induction dT primary	tage 1.00 UAr:7.05 T:1.716 °X:7.7
SHORT-CIRCUIT OPERA Losses active Current factor cold dT Fe average Surfa dT Gehäuse av. Surfa	TION at Amb.Tempe W:4324. Z:1732. ace °K:1185. ace °K:.	rature °C 40. and Overv Losses reactive Induction dT primary dT secondary	oltage 1.00 UAr:254.3 T:.816 °K:1185. °K:881.4
PRIMARY (Tap:1) Uoltage Input/Output Out. Voltage no load Current Input/Output Current in segment Icc-Current cold Io -Current peak ' Inrush Current peak ' Inrush Current rms Cu-Losses Resistance cold Reactance Eddy-Current Factor	1 2 3- U:230. U: A:1.087 A:1.087 A:18.83 A:0.032 A:47.23 A:19.47 U:9.8 A:6.108 A:.3582 :1.	4 5 6 7-	8
SECONDARY Output Voltage Output Current Out. Voltage no load Sec. Voltage Sec. Current Sec. Voltage cold Sec. Load Icc cold Cu-Losses warm Resistance cold Reactance Eddy-Current Factor Capacitor	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4 5 6 7-	8

If you are not satisfied with the results of design, you can :

- Return to the input form via the **Input/Current** menu option or by means of key **F2**, and reconfigure the input data on-line
- Or pass to the test mode via the Input/Test menu option or with key F5.

Activate the Input/Test menu option or press key F5.

Test mode

TOROIDAL TRANSFOR	MERS/OUTPUT		l ×
<u>Input Material Run Outp</u>	ut <u>E</u> dit <u>O</u> ptions <u>H</u> elp		
Last F3			
<u>C</u> urrent F2	DIAGNOSE	Page 0	
<u>D</u> efault			
<u>O</u> pen	: 1 X 64∕100×32		
<u>S</u> ave	-: 0RS 197		
Test F5	nsformer cm:4.29 / 11.35 / 4.99		
<u>a</u>	nsformer max cm:2.84 / 11.51 / 5.752		
E <u>x</u> it Shift+Ctrl+F12 <mark>P</mark>	ctor %: 58 .5		
number of sect	ors -:0		
max. parallel	Wires :1		
Induction on L	oad 1:1.649		
Max. Induction	T:1.716		
Max. Cu-Temp.	Under Load C:72.5 / 67.6		
Max. Cu-Temp N	o Load C:7.7		
Regulation	2:8.4		
	Frater v:30.0		
I Inrushzi num	Fractor *.30.0 No Lood VIZ		
Input Current	NU-LUda Z.J.		
03-05-2000/12:0	6:17 Input and Circuit	Page 1	

(Alt-I and T or F5 only)

In the test mode you can test a designed transformer and manually change its parameters

TOROIDAL TRANSFORMERS/TEST										
<u>I</u> nput <u>M</u> aterial	<u>R</u> un <u>O</u> ut	t put <u>E</u> dit	<u>O</u> ptions	<u>H</u> elp						
PRIMARY	1	2	3	4	5	6	7	8	FormFact.:	1.11
Turns :	1096.								V input *:	1.00
Family :	0								FREQ. Hz:	50
Number :	75								T amb. °C:	40.0
Parallel :	1								tl on Min:	30.0
Ins/L µ:	0.0								Load 1 *:	1.00
Load									t2 on Min:	30.0
f-thic mm:	0.67								Load 2 *:	1.00
Hole cm:	5.493								STEEL -:	2
Layers :	5.00								Pitch -:	1.0
SECONDARY	1	2	3	4	5	6	7	8	Case -:	0
Turns :	1186.								Тар -:	1
Family :	0								RWH %:	58.5
Number :	76								dT-rise°K:	72.5
Parallel :	1								dU %:	8.4
Ins/L µ:	0.0								IO %:	2.98
Load O:	230.0								Ii^/In^ :	30.8
f-thic mm:	0.71								PFe W:	1.3
Hole cm:	4.289								PCu W:	19.27
Layers :	7.00								Bn T:	1.649
U sec V:	229.6								во т:	1.716
UO sec V:	248.8								Br T:	.577
I sec A:	1.								64/100x32	

(Numerical =>Input), (TAB, Arrows, PgUp, PgDn, Mouse=>Moved)

The input fields with the white background can be modified. For instance, if you want to change the wire size you have to move the cursor to the wire number:

TOROIDAL TRANSFORMERS/TEST									_ 🗆 ×	
<u>I</u> nput <u>M</u> aterial	<u>R</u> un <u>O</u> ut	put <u>E</u> dit	<u>O</u> ptions	<u>H</u> elp						
PRIMARY	1	2	3	4	5	6	7	8	FormFact.:	1.11
Turns :	<mark>1096.</mark>								U input *:	1.00
Family :	0								FREQ. Hz:	50
Number :	75								T amb. °C:	40.0
Parallel :	1								tl on Min:	30.0
Ins/L µ:	0.0								Load 1 *:	1.00
Load									t2 on Min:	30.0
f-thic mm:	0.67								Load 2 *:	1.00
Hole cm:	5.493								STEEL -:	2
Layers :	5.00								Pitch -:	1.0
SECONDARY	1	2	3	4	5	6	7	8	Case -:	0
Turns :	1186.								Тар -:	1
Family :	0								RWH %:	58.5
Number :	76								dT-rise°K:	72.5
Parallel :	1								dU %:	8.4
Ins/L µ:	0.0								IO %:	2.98
Load O:	230.0								Ii^/In^ :	30.8
f-thic mm:	0.71								PFe W:	1.3
Hole cm:	4.289								PCu W:	19.27
Layers :	7.00								Bn T:	1.649
U sec V:	229.6								во т:	1.716
UO sec V:	248.8								Br T:	.577
I sec A:	1.								64/100x32	

Click the menu option Material/Wires or press F12 to open the list with the wires

TOROIDAL TRANSFORMERS/TEST										
Input Material	<u>R</u> un <u>O</u> utp	put <u>E</u> dit	<u>O</u> ptions	<u>H</u> elp						
PRIM <u>C</u> ore/Bo	bbin/Case	F9	3	4	5	6	7	8	FormFact.:	1.11
Tur: <u>S</u> teel		F11							U input *:	1.00
Fam. <u>W</u> ires		F12							FREQ. Hz:	50
Number :	75		7						T amb. °C:	40.0
Parallel :	1								tl on Min:	30.0
Ins/L µ:	0.0								Load 1 *:	1.00
Load									t2 on Min:	30.0
f-thic mm:	0.67								Load 2 *:	1.00
Hole cm:	5.493								STEEL -:	2
Layers :	5.00								Pitch -:	1.0
SECONDARY	1	2	3	4	5	6	7	8	Case -:	0
Turns :	1186.								Tap -:	1
Family :	0								RWH %:	58.5
Number :	76								dT-rise°K:	72.5
Parallel :	1								dU %:	8.4
Ins/L µ:	0.0								IO %:	2.98
Load O:	230.0								Ii^/In^ :	30.8
f-thic mm:	0.71								PFe W:	1.3
Hole cm:	4.289								PCu W:	19.27
Layers :	7.00								Bn T:	1.649
U sec V:	229.6								во т:	1.716
UO sec V:	248.8								Br T:	.577
I sec A:	1.								64/100x32	

This is he current wire size

TOROIDAL TRANSFORMERS/TEST		_ 🗆 ×
Input Material Run Output Edit Options He	elp	
<u>W</u> ire Families	Selected Family:Draht0.DAT	
Round - Grade 1 Round - Grade 2 Round - Grade 3	63 .355 .355 .392 .392 ▲ 64 .375 .375 .414 .414 65 .400 .400 .439 .439	<u>о</u> к
Round F.East- Grade 1 Round F.East- Grade 2	66 .425 .466 .466 67 .450 .491 .491 68 .475 .519 .519	<u>R</u> eset
	69 .500 .544 .544 70 .530 .530 .580 .580 71 .560 .611 .611	Print
	72 .600 .600 .653 .653 73 .630 .630 .684 .684 74 .650 .650 .703 .703 75 .670 .726 .726	
	76 .710 .710 .767 .767 77 .750 .750 .809 .809	
	79 .850 .850 .913 .913 80 .900 .900 .965 .965 81 .950 .950 1.01 1.01	
	82 1.00 1.00 1.07 1.07 83 1.06 1.06 1.13 1.13 .	

Select the wire size which you want and pres Alt-O or click OK

TOROIDAL TRANSFORMERS/TEST		
<u>Input Material Run Output Edit Options H</u>	<u>f</u> elp	
<u>W</u> ire Families	Selected Family:Draht0.DAT	
Round - Grade 1 Round - Grade 2 Round - Grade 3	55 .236 .236 .268 .268 ▲ 56 .250 .250 .282 .282 57 .265 .265 .297 .297	<u>o</u> ĸ
Round F.East- Grade 1 Round F.East- Grade 2	58 .280 .312 .312 59 .290 .290 .313 .313 60 .300 .300 .334 .334	<u>R</u> eset
	61 .315 .315 .349 .349 62 .335 .335 .372 .372 63 .355 .355 .392 .392 64 .375 .375 .414 .414	<u>P</u> rint
	65 .400 .400 .439 .439 66 .425 .425 .466 .466 67 .450 .450 .491 .491	
	68 .475 .519 .519 69 .500 .500 .544 .544 70 .530 .530 .580 .580	
	71 .560 .560 .611 .611 72 .600 .600 .653 .653 73 .630 .630 .684 .684 74 .650 .650 .703 .703	
	75 .670 .670 .726 .726	

Re-design in the test mode is activated via the **Run/Test** menu option or by means of key **F6**.

📕 TOROIDAL TR	RANSFOR	RMERS/	TEST							_ 🗆 ×
<u>I</u> nput <u>M</u> aterial	<u>Run</u> Out	put <u>E</u> dit	<u>O</u> ptions	<u>H</u> elp						
PRIMARY	<u>S</u> tart F4		3	4	5	6	7	8	FormFact.:	1.11
Turns :	<u>T</u> est F6								U input *:	1.00
Family :	0								FREQ. Hz:	50
Number :	78								T amb. °C:	40.0
Parallel :	1								tl on Min:	30.0
Ins/L µ:	0.0								Load 1 *:	1.00
Load									t2 on Min:	30.0
f-thic mm:	0.8								Load 2 *:	1.00
Hole cm:	5.181								STEEL -:	2
Layers :	6.00								Pitch -:	1.0
SECONDARY	1	2	3	4	5	6	7	8	Case -:	0
Turns :	1186.								Tap -:	1
Family :	0								RWH %:	66.8
Number :	76								dT-rise°K:	64.1
Parallel :	1								dU %:	7.2
Ins/L µ:	0.0								IO %:	2.95
Load O:	230.0								Ii^/In^ :	38.
f-thic mm:	0.71								PFe W:	1.36
Hole cm:	3.977								P Cu ₩:	17.
Layers :	7.00								Bn T:	1.669
U sec V:	232.0								во т:	1.717
UO sec V:	248.7								Br T:	.584
I sec A:	1.01								64/100x32	



TOROIDAL TRANSFORMERS/TEST									<u>_ 0 ×</u>		
PRIMARY	1	2	3	4	5	6	7	8	Form	Fact.:	1.11
Turns :	<mark>1096.</mark>								Uinj	out *:	1.00
Family :	0								FREQ	. Hz:	50
Number :	78								T aml	₀. °C:	40.0
Parallel :	1								t1 o	n Min:	30.0
Ins/L µ:	0.0								Load	1 *:	1.00
Load									t2 oi	n Min:	30.0
f-thic mm:	0.8								Load	2 *:	1.00
Hole cm:	5.181									բ –։	2
Layers :	6									n -:	1.0
SECONDARY	1 1	esting	l ransto	rmer			4	5% don	e	-:	0
Turns :	11									-:	1
Family :										<u></u> ؛ ا	66.8
Number :	76									lse°K:	64.1
Parallel :	1						[7	ક:	7.2
Ins/L µ:	0.							Cancel		ક:	2.95
Load O:	23									tn^ :	38.
f-thic mm:	0.71								P Fe	W:	1.36
Hole cm:	3.977								P Cu	W:	17.
Layers :	7.00								Bn	т:	1.669
Usec V:	232.0								BO	т:	1.717
UU sec V:	248.7								Br	Т:	.584
I sec A:	1.01								64/1	00x32	

Help in test mode

In order to get on-line help in the test mode place the cursor where you need help and press F1

🛋 Help: 210				×
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Frequ gener	uency Activ Prim.	re son		
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Printing

The printing is performed via the **Output/Print** menu option or by means of key **F8**. After activation of the print process, the data, totalling approx 16kB (3 pages), is printed on your printer. You can too save the results of design on your PC and load them and print out later. The procedure for saving of the designed data looks like this:

Saving of results of design

Saving of the designed data which you can load and print out **later** on the data page for the winding, is activated via the **Output/Save** menu option.

(Alt-A and S)Enter a name for the output file in which the designed data is to be saved.

TOROIDAL	TRANSFORMERS/TEST	_ 🗆	×
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03-05-	Save as type: Rale Input Files (*.TR2) Cancel	Page 1	Ţ

(TAB=>Move), (Click=>Mark), (Double click=>Select)

Quitting your RALE Design System for toroidal transformers

Select the Input/exit menu option or press key Crtl-F12 and then click on the Yes button.

Important note:

In this context, we have just discussed the procedure for design of the toroidal transformer. There is extensive coverage of the technical aspect of design, within the design examples.

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