


Toroidal winding machines



<p>kleine Spulen mit Feindraht small coils with fine wire</p> <p>bare core size mm turns x Ø wire size mm wound coil size mm machine base roller table winding head + magazine</p>	 <p>6,7 x 6,7 x 4,8 37 x 0,20 7,3 x 1,9 x 5,3 MINI RW 111-MINI (F.B.) RW 60-MINI + 1,6</p>	 <p>7 x 3,2 x 3 150 x 0,08 bifilar 7,4 x 2,3 x 3,6 MINI RW 111-MINI (R.B.) RW 60-MINI + 1,6</p>	 <p>6,2 x 4,4 x 5,3 150 x 0,08 trifilar 7,4 x 2,3 x 3,6 MINI RW 111-MINI (R.B.) RW 45-MINI + 1,8</p>	 <p>6,6 x 3 x 2,9 1 layer x 0,112 bifilar 7,2 x 2,5 x 3,5 MINI RW 111-MINI (R.B.) RW 75-MINI + 1,8</p>	 <p>8 x 3,75 x 3,7 30 x 0,35 9,1 x 2,7 x 4,5 MINI RW 111-MINI (F.B.) RW 75-MINI + 2,0</p>	 <p>10,5 x 4 x 4,8 200 x 0,125 bifilar 11,2 x 3,1 x 5,5 MINI RW 111-MINI (R.B.) RW 75-MINI + 2,0</p>
<p>kleine Spulen mit Feindraht small coils with fine wire</p> <p>bare core size mm turns x Ø wire size mm wound coil size mm machine base roller table winding head + magazine</p>	 <p>9,5 x 4,8 x 3,2 61 x 0,18 x 37 x 0,3 1 0,8 x 2,9 x 4,6 MINI RW 111-MINI (F.B.) RW 100-MINI + 2,0</p>	 <p>13,5 x 7,8 x 2,8 580 x 0,1 14,5 x 5,5 x 4 MINI RW 111-MINI (S.S.) RW 100-MINI + 4,5</p>	 <p>16 x 4 x 8 1 layer x 0,1 16,5 x 2,9 x 9 RWE RW 111 (I.S.) RW 10 + 2,0</p>	 <p>16 x 8,5 x 6 800 x 0,3 18 x 5 x 8,9 RWE RW 111 (F.B.) RW 100-C + 2,5</p>	 <p>12 x 6 x 4,5 30 x 0,4 13 x 4,3 x 5,5 RWE RW 111 (F.B.) RW 100-C + 2,0</p>	 <p>15,5 x 9 x 5,5 17 x 0,5 bifilar 16 x 7 x 7 RWE RW 111-V RW 100 + 3,0</p>
<p>kleine Drossel und Filter mit dickem Draht small chokes and filters with heavy wire</p> <p>bare core size mm turns x Ø wire size mm wound coil size mm machine base roller table winding head + magazine</p>	 <p>13 x 7,7 x 8,5 23 x 0,8 16,8 x 4,2 x 10,5 RWE RW 111-V RW 100 + 3,0</p>	 <p>24 x 13 x 7 20 x 1,6 28,5 x 8,5 x 11,5 RWE RW 112 RW 200-V + 4,7</p>	 <p>20,5 x 12,5 x 6,5 35 x 1,15 24 x 6 x 11,5 RWE RW 112 RW 200-V + 4,2</p>	 <p>38,5 x 19,8 x 8,2 2 layer x 0,8 40,5 x 17 x 11 RWE RW 222-L RW 1 + 1/11</p>	 <p>40 x 24 x 15 11 x 1,32 trifilar 44 x 20 x 18 RWE RW 222-L RW 2 + 2/13</p>	 <p>33 x 17,5 x 11,5 100 x 1,0 39 x 9 x 18 RWE RW 112 RW 200-V + 6,3</p>
<p>kleine Drossel und Filter mit dickem Draht small chokes and filters with heavy wire</p> <p>bare core size mm turns x Ø wire size mm wound coil size mm machine base roller table winding head + magazine</p>	 <p>47 x 24 x 18,4 130 x 1,2 bank wound 55 x 9 x 28 RWE RW 222-VSO RW 300-V + 8,2</p>	 <p>38,2 x 25 x 16,4 3 sectors each 11 x 1,8 47 x 17 x 21 RWE RW 112 RW 200-VS + 7,4</p>	 <p>4 x 2,0 x 1,6 36 x 0,1 bifilar MINI RW 35-D-RO RW 111-D</p>	 <p>47 x 24 x 18,4 95 x 1,8 58 x 10 x 29 RWE RW 222-VSO RW 300-V + 8,2</p>	 <p>53 x 28 x 18 each sec. with 3 layers with bank wound x1,8 60 x 16 x 27 RWE RW 222-VSO RW 300-V + 9</p>	 <p>51 x 30 x 23,5 32 x 2,5 58 x 24 x 30,5 RWE RW 332-SO RW 3-V + 3/25</p>
<p>stromkompensierte Drossel balancing chokes</p> <p>bare core size mm turns x Ø wire size mm wound coil size mm machine base roller table winding head + magazine</p>	 <p>15,5 x 8 x 6 each sector 20 x 0,3 16,1 x 7,2 x 6,5 RWE RW 111-V (F.B.) RW 100-C + 2,5</p>	 <p>13,5 x 6 x 5,5 each sector 12 x 0,5 15 x 5 x 7 RWE RW 111-V (F.B.) RW 100-C + 2,5</p>	 <p>19 x 9 x 10 each sector 20 x 0,4 20 x 8 x 12 RWE RW 111-V RW 100-C + 4,0</p>	 <p>25 x 14 x 8 each sector 20 x 0,8 28 x 10 x 11 RWE RW 112 RW 200-V + 4,7</p>	 <p>26 x 14 x 10 each sector 9 x 1,4 30 x 10,5 x 14 RWE RW 112 RW 200-V + 5,1</p>	 <p>34,5 x 15 x 15 each sector 68 x 0,9 39 x 8,5 x 21 RWE RW 112 RW 200 + 5,0</p>
<p>kleine Sonderspulen small coils special</p> <p>bare core size mm turns x Ø wire size mm wound coil size mm machine base roller table winding head + magazine</p>	 <p>13 x 7,5 x 5 7 x 0,355 litz wire 15,3 x 6 x 6,6 RWE RW 111-V RW 100 + 3,0</p>	 <p>22,6 x 6,5 x 12 55 x 0,16 RWE RW 111-V (R.B.) RW 100-C + 2,0</p>	 <p>16,5 x 7 x 21,5 1 sector x 0,25 RWE RW 111-V (F.B.) RW 100-C + 2,5</p>	 <p>17 x 7 x 18,5 each sector 19 x 0,3 18 x 6 x 19,5 RWE RW 111-V (F.B.) RW 100-C + 2,5</p>	 <p>18 x 16 x 2,8 1 layer x 0,25 precision wound 18,8 x 14,6 x 3,5 RWE RW 222-L RW 0 + 10,0</p>	 <p>22 x 15,8 x 4 each sec. 1 layer prec. wound x 0,125 22,5 x 14,9 x 4,4 RWE Segment holder RW 0 + 10,0</p>
<p>Netztrafos power transformers</p> <p>bare core size mm turns x Ø wire size mm wound coil size mm machine base roller table winding head + magazine</p>	 <p>175 x 55 x 15,5 primary 3 layers x 0,9 180 x 48 x 21 RWE RW 222-VSO RW 30 + 30/1 6</p>	 <p>120 x 65 x 68 secondary 3 layers x 1,32 126 x 55 x 74 RWE RW 332 RW 4 + 4/50</p>	 <p>47 x 30 x 50 primary progressive/ wound x 0,335 50 x 24,5 x 55 RWE RW 222-VL RW 25+14</p>	 <p>81 x 44 x 26 primary 1500 x 0,315 83 x 40 x 30 RWE RW 222-VL RW 25+14</p>	 <p>84 x 39 x 31 secondary 90 x 1,32 87 x 36 x 33 RWE RW 222-VL RW 300 + 10/K</p>	 <p>sample of power transformer View or primary winding interlayer taping with copper foil and secondary winding</p>

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THE RUFF GROUP

Introduction to our company

Something very clever can emerge from small and innovative companies as various enterprises have proved. RUFF is also an example of such a company. Founded more than 60 years ago in a small barn building near

Munich, we have specialized in the production of high quality coil winding machines and have established ourselves as one of the world leaders in this field. We have sold over 15000 machines in more than 100 countries. These are

highly valued by our customers which recognize these machines as being of high quality, durable and the standard in the coil winding industry. RUFF has become a synonym for hi-tech coil winding equipment.

1. Our market position and modern manufacturing facilities

- advanced technical know how and decades of coil winding experience
- in house production of all mechanical parts in a 6000 m² manufacturing plant equipped with modern CNC production machines

2. Our intelligent concepts

- use of existing established stock room components, such as sophisticated PLC's, drive systems and self developed software programmes
- same-component-policy with standard components across the whole range of all RUFF coil winding machines
- modular design system, which allows for retrofitting on current and future machines
- compact sturdy design and construction

3. Our customer and market support system

- worldwide sales, service and support staff
- worldwide spare part service within 48 hours
- worldwide sales representation in more than 50 countries

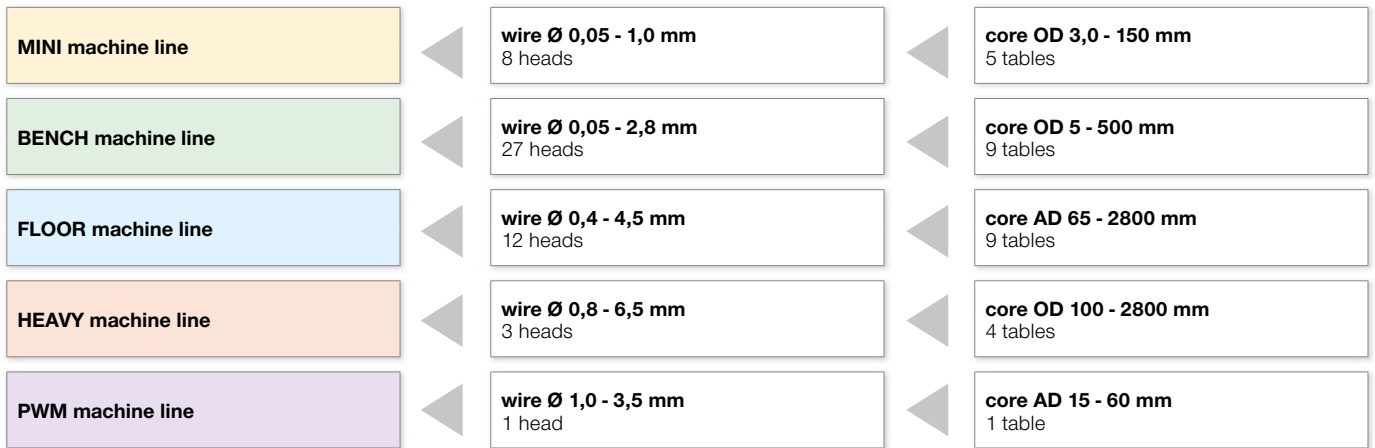
Again, these and other reasons allow us to be at the front with innovative developments and enable us to provide our customers with the most pioneering and future-orientated technology. Convince yourself!



How to find your ideal machine

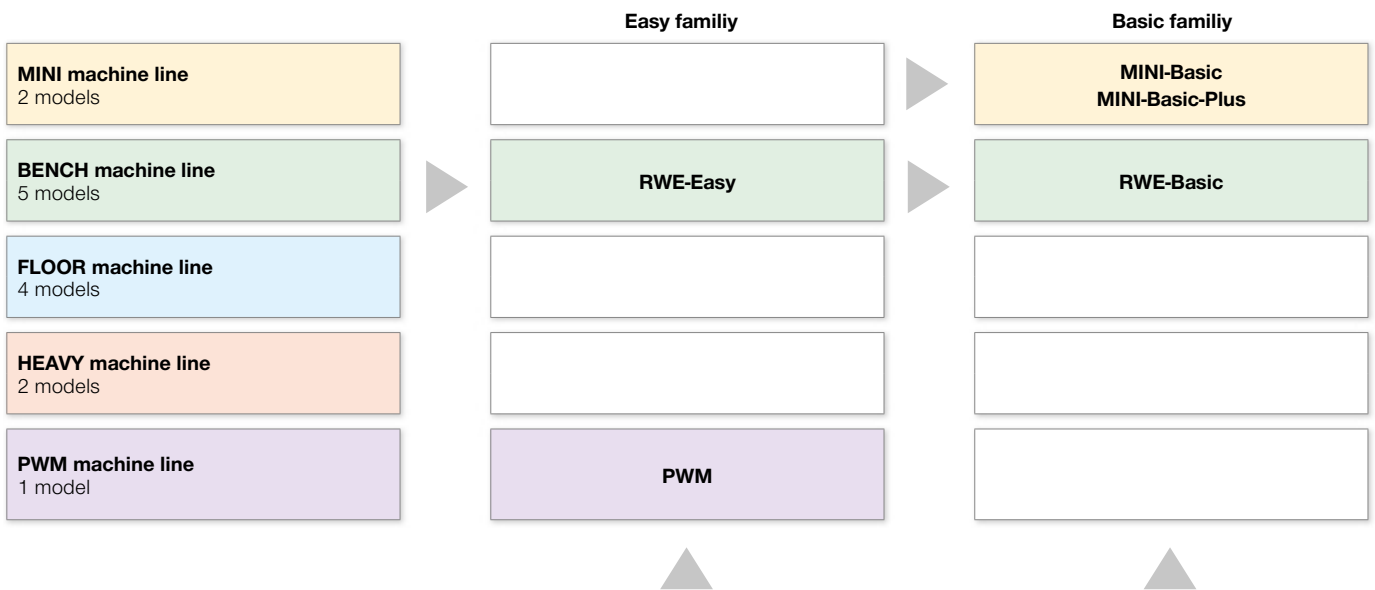
Step 1

Select the suitable machine line: RUFF offers four different machine lines and each machine line is extremely flexible with its own head and table changing system. Following graphic enables you to select the suitable machine line for your application. Please check wire range and core OD range.

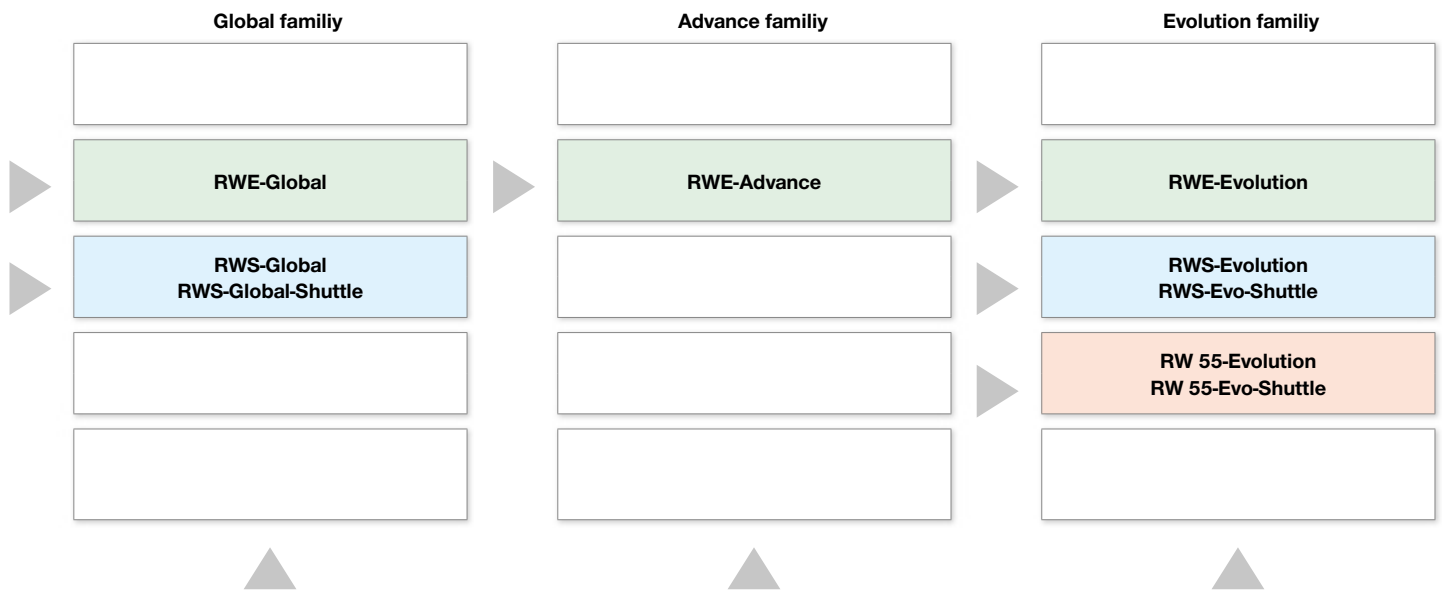
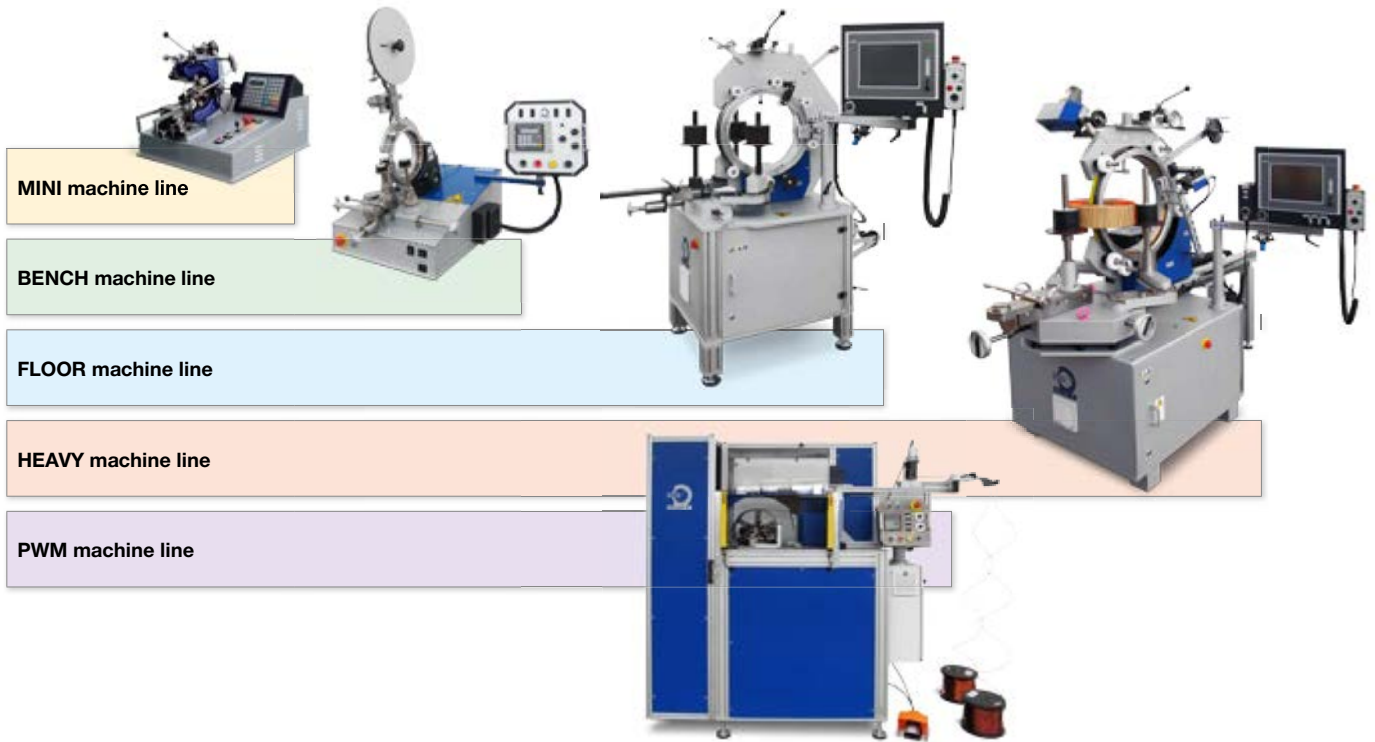


Step 2

Select the suitable machine model: RUFF offers different machine families. Following overview of models enable you to select your machine. Please check the characteristics:



Antrieb	roller tables with stepper motor winding heads with servo motor (PWM with three-phase motor)	roller tables with stepper motor winding heads with servo motor
controller	SPS M91	N.C. SIAX 110L
display	LCD display, with 2 text lines	LCD display, with 4 text lines
programming	simple programming, user friendly controller	simple programming, user friendly controller
applications	all standard winding jobs	all standard winding jobs



roller tables with servo motor winding heads with motor and inverter	roller tables with servo motor winding heads with servo motor	roller tables with servo motor winding heads with servo motor
N.C. SIAX 80 monochrom touch screen 5.7" monochrom touch screen	N.C. SIAX 100 touch screen 10,4" color touch screen, USB-connec- tion, ethernet interface, serial interface, all languages with Latin or Cyrillic characters	IPC EL2800 touch screen N.C. IPC EL870 touch screen 12" touchpanel with 4 funktion buttons, USB-connection, ethernet interface, PS/2 interface, RJ45, serial interface language, unitext (all characters e.g. Cyrillic etc.)
simple programming, user friendly con- troller with touch screen monitor	programming for sophisticated winding applications with industry-PC controller; clear text touch screen with graphical dis- play and automatically winding program calculation	programming for sophisticated winding applications with industry-PC controller; clear text touch screen with graphical dis- play and automatically winding program calculation
all standard winding jobs	all standard jobs and special resp. hi tech winding applications	all standard jobs and special resp. hi tech winding applications

MINI machine line

8 interchangeable winding heads and 5 interchangeable roller tables enable to apply the correct machine solution for your specific winding application.

Model MINI-Basic and MINI-Basic-Plus

Mini machine for small cores

The MINI-BASIC and MINI-Basic-Plus is a very good value machine with an user frendly controller. The machine is designed for mass production of small toroidal cores. It is easy to set up the machine and it has the approved RUFF modular system with several different winding heads and tables. Typical winding

jobs for this machines are: SMD-coils, small coils, small filters and transformers. The difference of the MINI-Basic and MINI-Basic-Plus is the programming, because the MINI-Basic-Plus is able to calculate the winding program.

Capability ranges

wire Ø	0,05 – 1 mm
finished core OD	3 - 150 mm
finished core ID	up from 1 mm
finished core H	max. 25 mm
controller	N.C. SIAX 110L - LCD Display
motor	roller tables with servo motor winding heads with servo motor
machine size	approx. 400 x 500 mm
machine wight	approx. 40 kg
supply voltages	1 Ph 230 V, 16 A



8 interchangeable heads for the Model MINI-Basic

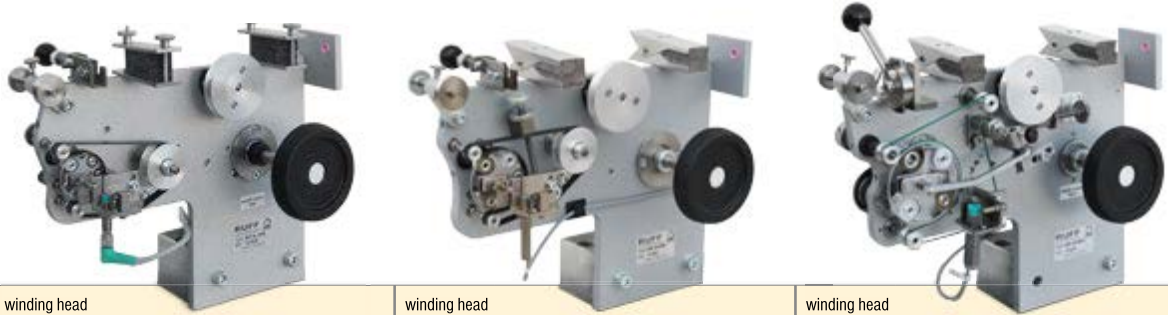
3 miniatur heads	RW 35-MINI	RW 45-MINI	RW 60-MINI
3 multisystem heads	RW 75-MINI	RW 100-MINI	RW 200-MINI
2 side slider heads	RW 10-SIMPLE	RW 20-SIMPLE	
1 taping head			RW 200B-MINI

5 interchangeable tables	RW 111-XMINI	RW 111-MINI RW 111-VXMINI	RW 111-VMINI RW 115-MINI
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Miniatur heads for the MINI models

The miniature winding heads are designed for winding fine wires onto very small cores. The heads work with the professional and problem free RUFF belt winding system. Very precision hi tech magazines enable you to wind down to the smallest final core ID. The

required wire tension for your specific application can be controlled with a very practical wire tension calibration device. The winding heads are designed for instant change over from flat belt to round belt system and features a large range of flat and round belts.



winding head data	winding head				winding head				winding head			
	RW 35-MINI				RW 45-MINI				RW 60-MINI			
	round belt		flat belt		round belt		flat belt		round belt		flat belt	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,06-0,10	38-42½	0,11-0,2	32-37	0,06-0,10	38-42½	0,11-2,5	30-37	0,06-0,11	34½-42½	0,12-0,6	22½-37
magazine diameter	35	1,4	35	1,4	45	1,8	45	1,8	60	2,4	60	2,4
finished core OD	3,0-6,0	0,118-0,236	3,0-6,0	0,118-0,236	5-10	0,138-0,393	5-10	0,138-0,393	5-14	0,2-0,55	5-14	0,2-0,55
finished core ID	1,3	0,05	1,0	0,04	1,4	0,06	1,4	0,06	1,6	0,062	1,6	0,062
finished core height	5	0,20	5	0,20	8	0,30	8	0,30	10	0,39	10	0,39
max. winding speed rpm	1550		1550		1580		1580		1700		1700	
compatible roller tables	RW 111-MINI, RW 111-XMINI		RW 111-MINI, RW 111-XMINI		RW 111-MINI, RW 111-XMINI		RW 111-MINI, RW 111-XMINI		RW 111-MINI, RW 111-XMINI		RW 111-MINI, RW 111-XMINI	

Magazine data base with wire length in meters: for wire length in feet, multiply by factor 3,28

magazine type	final hole		0,05	0,06	0,071	0,08	0,09	0,1	0,112	0,125	0,132	0,15	0,18	0,2	0,25	0,3	0,355	0,4	0,5	0,6	0,71	0,8	0,9	1,0	mm	
	mm	inch	44	42½	41	40	39	38	37	36	35½	34½	33	32	30	28½	27	26	24	22½	21	20	19	18	AWG	
35-MINI round and flat belt																										
0,8	1,0	0,039	2,4	1,68	1,2	0,96	0,72	0,56	0,48	0,4																
0,9	1,2	0,047	3,0	2,1	1,5	1,2	0,9	0,7	0,6	0,5	0,4															
1,0	1,4	0,055	3,6	2,5	1,7	1,4	1,1	0,9	0,7	0,6	0,5	0,4														
1,1	1,5	0,059	5,6	3,9	2,7	2,2	1,7	1,4	1,1	0,9	0,8	0,6	0,4	0,3												
45-MINI round and flat belt																										
1,0	1,4	0,055	3,8	2,7	2,0	1,6	1,3	1,0	0,8	0,7	0,6	0,5														
1,1	1,5	0,059	5,2	3,6	3,6	2,1	1,7	1,4	1,1	0,9	0,8	0,6	0,4													
1,2	1,6	0,062	6,3	4,4	4,4	2,6	2,0	1,6	1,3	1,1	1,0	0,8	0,5	0,4												
1,3	1,7	0,066	8,0	5,6	5,6	3,3	2,6	2,1	1,7	1,4	1,2	1,0	0,7	0,5	0,4											
1,4	1,8	0,070	11,3	7,8	7,8	4,6	3,7	3,0	2,4	2,0	1,8	1,4	1,0	0,8	0,5											
1,5	1,9	0,074	13,5	9,3	9,3	5,5	4,4	3,5	2,9	2,3	2,1	1,7	1,2	0,9	0,6											
1,6	2,0	0,078	15,6	10,8	10,8	6,4	5,1	4,1	3,3	2,7	2,4	1,9	1,3	1,1	0,7											
1,7	2,1	0,082	20,3	14,1	14,1	8,3	6,6	5,3	4,3	3,5	3,2	2,5	1,8	1,4	0,9											
1,8	2,2	0,086	25,4	17,7	17,7	10,4	8,3	6,7	5,4	4,4	4,0	3,1	2,2	1,7	1,1											
60-MINI round and flat belt																										
1,2	1,6	0,06	6,9	4,8	3,3	2,7	2,1	1,7	1,4	1,1	0,9	0,7														
1,3	1,7	0,063	8,2	5,8	4,0	3,2	2,6	2,1	1,7	1,4	1,2	1														
1,4	1,8	0,07	9,6	6,3	4,4	3,6	2,7	2,3	1,8	1,5	1,3	1,1														
1,5	1,9	0,071	13,7	9,6	6,8	5,4	4,3	3,6	2,9	2,3	2,1	1,6	1,2	0,9												
1,6	2	0,075	15,4	11,2	7,9	6,3	5,0	4,1	3,4	2,7	2,4	1,8	1,3	1,1												
1,7	2,1	0,079	18,9	13,2	9,3	7,5	5,9	4,9	4,0	3,2	2,9	2,3	1,6	1,3	0,8											
1,8	2,2	0,083	24,7	19,2	13,5	10,9	8,7	7,2	5,8	4,7	4,2	3,3	2,4	1,9	1,2	0,9										
1,9	2,3	0,086	28,8	20,2	14,3	11,5	9,1	7,5	6,1	4,9	4,4	3,5	2,5	2,0	1,3	0,98	0,71									
2,0	2,4	0,095	35,7	25,8	18,2	14,7	11,7	9,6	7,8	6,3	5,7	4,5	3,2	2,6	1,7	1,2	0,9	0,7								
2,5	2,9	0,111	66	50,5	35,7	28,8	22,8	18,9	15,3	12,4	11,2	8,8	6,3	5,2	3,4	2,4	1,7	1,3	0,9	0,6						
2,8	3,2	0,126	98	75	52	42	33	28	22	17	15	12	9	7,5	5	3,5	2,3	2	1,3	0,9						

Belt data base: list of different round belt lengths for the magazines

round belt type	belt length for RW 35-MINI	belt length for RW 45-MINI	belt length for RW 60-MINI
round short belt (e.g. thicker wires)	280 mm	325 mm	365 mm
round standard belt	300 mm	350 mm	400 mm
round long belt (e.g. thinner wires)	315 mm	365 mm	430 mm

Belt data base: list of flat and round belts for the magazines

winding head type	RW 35-MINI				RW 45-MINI									RW 60-MINI									inch			
magazine type	0,8	0,9	1,0	1,1	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,5	2,8		
flat belts	width 8 mm																									0,315
	length 346 mm	x	x	x	x																					13,622
	width 8 mm																									0,315
	length 372 mm					x	x	x	x	x	x	x	x													14,646
	width 9,5 mm																									0,374
	length 480 mm														x	x	x	x	x	x	x	x	x	x	x	18,897
round belts diameter	Ø 1,0 mm			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						0,03937	
	Ø 1,5 mm									x	x	x	x	x				x	x	x	x	x	x	x	0,05905	
	Ø 2,0 mm									x	x	x	x	x				x	x	x	x	x	x	x	0,07874	
	Ø 2,5 mm																						x	x	0,09842	

Multisystem winding heads for the MINI models

The multisystem winding heads are designed for winding wire sizes from 0,05 to 1,0 mm onto small and medium cores. Each head incorporate three different proven winding systems: round belt system, flat belt system and side slider system. This enables you

to select the correct winding system for your specific winding application and offers you maximum flexibility at a minimum of cost. Typical applications are EMI filters and primary winding of small power transformers.



winding head data	winding head RW 75-MINI						winding head RW 100-MINI						winding head RW 200-MINI					
	round belt		flat belt		side slider		round belt		flat belt		side slider		round belt		flat belt		side slider	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,06-0,15	34½-42½	0,15-0,71	21-34½	0,05-0,25	30-44	0,07-0,15	34½-41	0,15-0,71	21-34½	0,05-0,355	27-44	0,125-0,25	30-36	0,25-1,0	18-36	0,08-0,71	21-40
magazine diameter	75	3,0	75	3,0	75	3,0	92	3,7	92	3,7	99	3,9	145	5,7	145	5,7	150	
finished core OD	5-25	0,2-1,57	5-25	0,2-1,57	5-25	0,2-1,57	5-35	0,2-1,38	5-35	0,2-1,38	8-35	0,3-1,38	16-51	0,63-2,01	16-51	0,63-2,01	16-51	0,63-2,01
finished core ID	1,7	0,067	1,7	0,067	4,5	0,177	2,2	0,087	2,4	0,094	5,0	0,196	5,0	0,196	5,0	0,196	7,0	0,276
finished core height	13	0,51	13	0,51	13	0,51	20	0,79	20	0,79	20	0,79	25	0,98	25	0,98	25	
max. winding speed rpm	1800		1800		1800		1800		1800		2380		980		980		1570	
compatible roller tables	RW 111-MINI, RW 111-VMINI RW 111-XMINI, RW 111-VXMINI						RW 111-MINI, RW 111-VMINI RW 111-XMINI, RW 111-VXMINI						RW 111-MINI, RW 111-VMINI RW 111-XMINI, RW 111-VXMINI, RW 115-MINI					

Magazine data base with wire length in meters: for wire length in feet, multiply by factor 3,28

magazine type	final hole		0,05	0,06	0,071	0,08	0,09	0,1	0,112	0,125	0,132	0,15	0,18	0,2	0,25	0,3	0,355	0,4	0,5	0,6	0,71	0,8	0,9	1,0	mm	
	mm	inch	44	42½	41	40	39	38	37	36	35 ½	34½	33	32	30	28½	27	26	24	22½	21	20	19	18	AWG	
round and flat 75-MINI																										
1,4	1,8	0,070	12,1	8,5	6,0	4,8	3,8	3,1	2,6	2,1	1,9	1,4														
1,5	1,9	0,074	17,4	12,2	8,6	6,9	5,5	4,5	3,7	3,0	2,7	2,1	1,5													
1,6	2,0	0,078	19,6	13,8	9,7	7,8	6,2	5,1	4,2	3,4	3,0	2,4	1,7	1,4												
1,7	2,1	0,082	24,0	16,8	11,9	9,6	7,6	6,3	5,1	4,1	3,7	2,9	2,1	1,7	1,1											
1,8	2,2	0,086	31,5	22,1	15,6	12,6	10,0	8,2	6,7	5,4	4,9	3,8	2,7	2,2	1,5	1,0										
1,9	2,3	0,090	36,8	25,8	18,2	14,7	11,7	9,6	7,8	6,3	5,7	4,5	3,2	2,6	1,7	1,2	0,9									
2,0	2,5	0,098	45,6	32,0	22,6	18,2	14,4	11,9	9,7	7,9	7,1	5,6	4,0	3,3	2,1	1,5	1,1	0,8								
2,5	3,0	0,118	95,5	67,0	47,4	38,2	30,3	25,0	20,4	16,5	14,9	11,7	8,4	6,9	4,5	3,2	2,3	1,8	1,2	0,8						
3,0	3,5	0,137	147	103	73,0	58,9	46,7	38,6	31,5	25,4	22,9	18,0	12,9	10,6	7,0	5,0	3,6	2,8	1,8	1,3	0,9					
round and flat 100-MINI																										
1,8	2,2	0,087			27	21	17	14	11	9	8	6														
2,0	2,5	0,098			42	34	25	19	18	14	13	10	7,2	6	4	2,9										
2,25	2,75	0,108			44	35	26	20	19	15	14	9,4	6,8	5,7	3,6	2,7	2,0	1,5								
2,5	3,0	0,118			70	57	45	37	30	24	22	17	12	10	6,8	4,8	3,5	2,6								
3,0	3,5	0,138			80	63	52	42	34	31	24	17	14,5	9,5	6,8	4,9	3,94	2,5								
3,5	4,5	0,177			120	95	77	63	51	46	36	25	21	14	10	7,2	6	4	2,6	1,3						
4,0	5,0	0,197			156	123	102	83	67	60	47	40	28	18	13	10,5	8	5	3,5	2,5						
4,5	5,5	0,217			185	148	122	99	80	72	57	41	37	22	18	11	10	7	5	3						
5,0	6,0	0,236			243	193	159	130	105	95	74	62	46	29	22	16,5	13	9	6	4,5						
side slider 100-MINI/10-SIMPLE																										
4,5-SG	5,0	0,2	166	116	82	66	52	43	35	28	25	20	14	12	7,9	5,6										
5-SG	5,5	0,216	211	148	104	84	67	55	45	36	32	25	18	15	10	7										
6-SG	7,0	0,276	260	185	130	110	84	80	56	45	41	35	23	22	15	10										
7-SG	8,0	0,315	368	258	182	150	117	100	78	63	57	48	32	28	18	13										
8-SG	9,0	0,355	500	350	248	200	158	130	107	86	77	63	44	37	24	17	14,5									
9-SG	10,0	0,394	700	490	207	280	221	182	150	120	107	88	61	51	33	23,8	21,5									
10-SG	11,0	0,433	1120	784	331	448	354	291	239	192	172	141	98	82	54	38	32,5									
11-SG	12,0	0,473	1512	1058	447	604	478	393	323	260	232	190	133	111	72	51	42									
12-SG	13,0	0,512	2192	1534	648	878	693	570	469	377	337	276	192	162	105	75	62									
round and flat 200-MINI																										
200/3	5,0	0,197								59	53	42	30	24,5	16	11	8,5	6,5								
3,5	5,5	0,217								75	68	53	38	32	20	15	10,5	8,5	5,5							
4,0	6,0	0,236								103	93	74	52	43	28	20	16	12	8							
4,5	6,5	0,256								140	125	99	71	58	36	30	19	17	11	8						
5,0	7,0	0,276								170	153	120	86	72	46	36	24	21	14	10	7	5	4			
5,5	7,5	0,295								246	222	174	125	103	67	47	35	27	18	12	9	7	6	5		
6,0	8,0	0,315								290	262	206	148	122	80	58	41	33	22	15	11	9	7	6		
6,5	8,5	0,335								379	341	268	195	168	104	75	53	42	28	19	14	11,9	9	8		
7,0	9,0	0,355								462	415	327	234	193	127	87	65	60	33	23	17	13	11	9		
7,5 (K)	10,5	0,413								574	517	401	261	241	158	115	81	66	43	30	22	17,5	14	11		
8	11,0	0,433								712	640	504	362	298	196	140	100	81	53	37	27	21	17	14		
side slider 200-MINI/20-SIMPLE																										
6,0	7,0	0,276				115	94	77	63	51	46	36	26	21	14	10										
8,0	10,0	0,394				280	236	190	159	129	116	85	65	50	34	24	18	14	7							
10,0	12,0	0,472				440	357	300	240	194	175	140	98	80	54	38	27	22	15	10	7					
12,0	14,0	0,551				650	517	430	348	281	253	200	143	120	80	56	40	33	22	15	11					
14,0	16,0	0,623				1300	1029	860	693	560	505	400	285	240	160	110	79	65	43	30	23					
16,0	22,0	0,866				1950	1553	1300	1047	846	762	600	430	360	240	167	120	98	65	46	35					
20-S	25,0	0,984				3650	2895	2430	1950	1578	1421	1140	802	670	450	313	224	183	122	85	65					

Belt data base: list of different round belt lengths for the magazines

round belt type	belt length for RW 75-MINI	belt length for RW 100-MINI	belt length for RW 200-MINI
round short belt (e.g. thicker wires)	435 mm	540 mm	700 mm
round standard belt	470 mm	570 mm	750 mm
round long belt (e.g. thinner wires)	490 mm	600 mm	780 mm

Slider data base: list of slider for the magazines

winding head type	RW 100-MINI RW 10-SIMPLE	RW 200-MINI RW 20-SIMPLE		
		20/6-20/8-1	20/8-20/10	20/12-20/40-S
superfinished slider 1-tail	0,05-0,10	-	-	-
1-tail slider	0,08-0,15	0,08-0,15	0,08-0,20	0,08-0,20
2-tail slider	0,15-0,25	0,15-0,25	0,20-0,35	0,20-0,40
3-tail slider	-	-	0,35-0,60	0,40-0,70



Belt data base: list of tooth, flat and round belts for the magazines

winding head type	RW 75-MINI										RW 100-MINI										RW 200-MINI									
magazine type	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,5	3,0	1,8	2,0	2,25	2,5	3,0	3,5	4,0	4,5	5,0	3,0	3,5	4,0	4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0	
tooth belts for thick wires	210XL 037	x	x	x	x	x	x	x	x																					
	250XL 037												x	x	x	x	x	x												
	344XL 075																		x	x	x	x	x	x	x	x	x	x	x	
flat belt	width 9,5 mm	x	x	x	x	x	x																							
	length 513 mm																													
round belts standard	Ø 1,5 mm		x	x	x	x	x	x	x	x	x	x																		
	Ø 2,0 mm					x	x	x	x	x	x	x	x	x				x												
	Ø 2,5 mm								x				x	x	x	x		x	x											
	Ø 3,0 mm																	x	x	x	x									
	Ø 3,5 mm																	x	x	x	x	x								
	Ø 4,0 mm																				x	x	x	x						
	Ø 4,5 mm																					x	x	x	x	x				

Roller tables for the MINI models

RUFF supplies a choice of 5 different interchangeable roller tables. They are connected to the machine base and held with two fixing bolts which allow them to be changed in two minutes. The transport rollers are sitting on drive shafts which are connected directly to the drive motor. A large range of parallel and tapered transport rollers are available to suit individual core sizes. The roller tables

RW 111 and RW 111-V are constructed with a XY-coil moving slide unit which enables the operator to move the coil during the winding cycle. The roller tables RW 111 and RW 111-V with the specification „X“ are low cost models without coil moving slides and are suitable for such coils which do not need to be moved during the winding cycle.

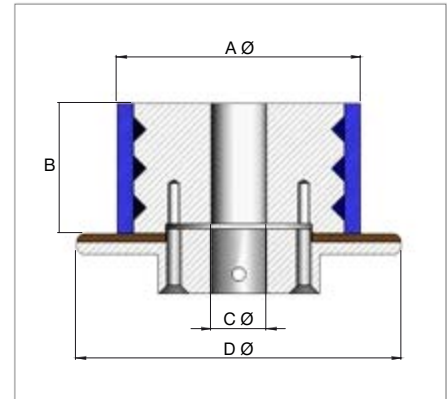
Possible combination of winding heads and roller tables



winding head type	core OD with RW 111-MINI, RW111-XMINI	core OD with RW 111-VMINI, RW111-VXMINI	core OD with RW 115-MINI
RW 35-MINI	3 - 6 mm	-	-
RW 45-MINI	5 - 10 mm	-	-
RW 60-MINI	5 - 12 mm	-	-
RW 75-MINI	5 - 30 mm	16 - 40 mm	-
RW 100-MINI	5 - 30 mm	16 - 40 mm	-
RW 200-MINI	5 - 30 mm	16 - 51 mm	47 - 150 mm
RW 200B-MINI	-	16 - 51 mm	47 - 150 mm

Standard core transport rollers

roller table type	qty per set	A	B	C	D	smallest core OD mm	suitable winding head	typical use
		mm	mm	mm	mm			
RW 111-MINI	3 pcs.	6	4	3	9	5	35-MINI to 200-MINI	small core flat
RW 111-MINI	3 pcs.	8	5	3	11	8	35-MINI to 200-MINI	small cores
RW 111-MINI	3 pcs.	8	10	3	12	12	45-MINI to 200-MINI	small cores high
RW 111-MINI	3 pcs.	9	20	3	18	15	75-MINI to 200-MINI	small cores very high
RW 111-VMINI	3 pcs.	17	10	6	18	10,5	75-MINI to 200-MINI	special rollers
RW 111-VMINI	3 pcs.	17	10	6	20	13	75-MINI to 200-MINI	medium cores flat
RW 111-VMINI	3 pcs.	17	15	6	23	15	75-MINI to 200-MINI	medium cores high
RW 111-VMINI	3 pcs.	23	15	6	28	18	75-MINI to 200-MINI	large cores
RW 115-MINI	3 pcs.	35	12	8	41	50	200-MINI	large cores



High-Speed taping head for the MINI models



taping head data	RW 200B-MINI	
	mm	inch/AWG
tape width	4 - 10	0,157 - 0,394
build up factor	+ 9	+ 0,354
magazine diameter	154	5,9
finished core OD	16 - 150	0,63 - 5,9
finished core ID	14 with 5 mm tape	0,512 with 0,157 tape
finished core height	50	1,97
max. taping speed rpm	350	
compatible roller tables	RW 111-VMINI, RW 111-VXMINI, RW 115-MINI	
compatible m/c bases	MINI-Basic, MINI-Basic Plus	
f.i.d calculation for all taping heads: tapewidth + build up factor = f.i.d required		

BENCH machine line

The RWE models are the world wide most used machines. Three machine bases are available. From a simple model up to a high end PLC-controlled machine with a high resolution touch-screen display. The approved RUFF modular system covers 29 winding heads and 11 roller tables for almost all winding requirements. The machine has a strong design and with the wedge-shape of the machine enables an ergonomically operation for the worker.

BENCH machine line RWE

Models RWE-Basic, RWE-Global, RWE-Evolution

27 interchangeable heads

7 gear rack heads	RW 0 RW 4	RW 1 RW 4-V	RW 2 RW 4-RZ	RW 3
6 slider heads	RW 10 RW 40	RW 20 RW 40-V	RW 25	RW 30
6 belt heads	RW 60-C RW 200-V	RW 100-C RW 300	RW 100	RW 200
2	RW 01-ML			
8 tapping heads	RW 0/B RW 4/B	RW 1/B RW 4-RZ/B	RW 2/B RW 200/B	RW 3/B RW 300/B

6 interchangeable tables mechanical	RW 111 RW 222-L	RW 111-V RW 222-VL	RW 112 RW 332	
3 interchangeable tables pneumatical	RW 222-P	RW 222-VP	RW 332-P	

Capability ranges

wire Ø monofilar	0,05 - 2,8 mm	tape size	4 - 25 mm
wire Ø bifilar	up to 2 x 1,8 mm	supply voltages	230 V / AC / 50 Hz / 16 A
finished core OD	5 - 500 mm	machine size	1100 x 700 mm
final hole	up from 1,5 mm	machine weight	approx. 95 kg
finished core H	up to 170 mm		

Modell RWE-Easy

The RWE-Easy is for simple applications and is developed for the mass production. The userfriendly programming of the machine allows a short programming and quick start of the machine. The machine has a similar design to our former very succesfull

model – RWE-Compact, but with a PLC for all the standard functions of a modern machine.

controller	SPS M91 - LCD display with 2 text lines
winding head	three phase motor
roller table	stepper motor



Model RWE-Basic

The RWE-BASIC is a simple machine. It is developed for the mass production of simple winding jobs. This machine is perfect for winding jobs, which allows some tolerances in the pitch. The RWE-BASIC is built with high quality components and enables to produce high quality coils. The controller with

numeric control is easy to understand and simple to create winding programs.

controller	N.C. SIAX 110L - LCD display with 4 text lines
winding head	three phase motor
roller table	servo motor



Model RWE-Global

The RWE-Global is for standard winding applications. The new NC controller with touch screen panel is user friendly and it is very easy to understand. Just a few inputs are needed for create a winding program. All standard winding methods are available e.g.: Tape-/ Wire winding, Index, Reverse winding. Several winding sequences can be written in one winding program. So for example different pitch and index etc. More than 200 pro-

grams can be saved on this control. All languages in Latin characters are available on this controller.

controller	5.7" monochrom touchpanel with 2 function buttons (start/stop)
language	all Latin characters
winding head	three phase motor with inverter
roller table	servo motor



Model RWE-Advance

The RWE-Advance is a sophisticated machine model with a userfriendly graphical display. By programming of the winding application, the controller calculates the loading turns, pitch and number of layers. The winding heads and roller tables can be selected in the machine data. The machine has a USB connection for export / import of winding programs and for SW update. The winding programs can be read and edited by Excel.

controller	10,4" touchpanel
system	Linux
language	all Latin and Cyrillic characters
interface	USB-connection, ethernet-interface
winding head	servo motor
roller table	servo motor

Teleservice by our technician via internet connection for trouble shooting is also possible.

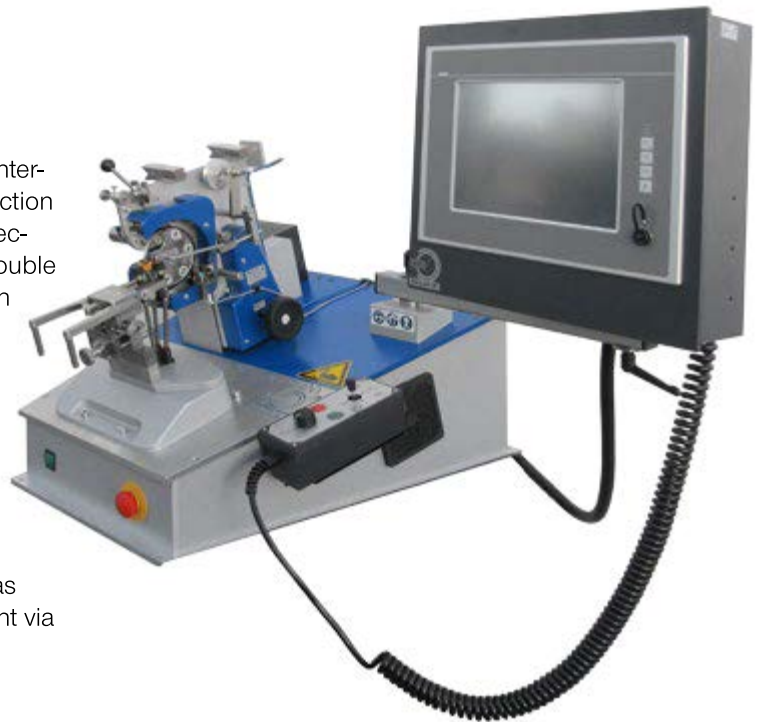


Model RWE-Evolution

The RWE-Evolution is the high end bench top toroidal winding machine base from RUFF. The new controller with innovative programming is user friendly and through the high resolution touch screen display it is simple to understand. Programs are saved in CSV-Format. Therefore, programs can be made externally by Excel. The Windows system allows own data management saved onto USB-Stick, or onto the CF-Card in a separate file on the machine. A central program management on an external PC (Server) is possible via Ethernet connection. Easy file structure can be created and every program can be reported with a text description. The machine can also be remote controlled by Ftp-connection. Teleservice by our techni-

cians via internet connection (Ftp-connection) for trouble shooting in the logic program. Update of PLC- and visual display software via USB-Stick, datas can be sent via E-mail.

controller	12" touchpanel with 4 function buttons
memory	Compact Flash 512 MB
system	Windows CE 5.0
language	Unitext (all characters)
interface	USB-connection, ethernet-interface 1x10/100 Mbit, RJ45, PS/2-interface, serial interface
PCI modul card	MC-CAN Dual Can Controller, hand control unit with 3 additional function buttons
winding head	servo motor
roller table	servo motor



Gear rack winding heads for the BENCH models

The gear rack winding heads are designed for precision layer winding with low built up factors. Typical applications are the production of variacs, potentiometers and transformer secondary windings. All the winding heads work with a robust gear rack and drive gear system, this allows the winding head to generate a large amount of torque which makes it suitable for large wire size. The wire is dereeled from the winding magazine via two guide rollers as it is layered on the core, the magazine itself is held back under con-

stant tension via the breaking system which is adjustable to suit each wire size. All gear rack winding heads can utilise two designs of magazines the „KN“ type has a quick opening facility and the „SN“ type which has a completely removeable section for taller cores. A range of narrow racks and multifilar wire guides can be supplied for reduced core I.D's and strip winding. Customised components for special applications can be supplied upon request.



winding head data	RW 0		RW 1		RW 2		RW 3	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,1-0,6	23-28	0,2-1,0	18-32	0,2-1,4	15½-32	0,4-2,12	12-26
magazine diameter	72	2,83	130	5,11	210	8,26	220	8,65
finished core OD	25-150	1,0-6,0	25-150	1,0-6,0	25-350	1,0-14,0	25-350	1,0-14
finished core ID	11	0,433	13	0,51	17	0,70	25	1,0
finished height	22	0,87	50	1,96	80	3,15	100 (120)	3,93 (4,72)
max. winding speed rpm	305		230		230		150	
compatible roller tables	RW 222-L, RW 222-P		RW 222-L, RW 222-VL, RW 222-P, RW 222-VP		RW 222-L, RW 222-VL, RW 222-P, RW 222-VP, RW 332-L, RW 332-P		RW 222-L, RW 222-VL, RW 222-P, RW 222-VP, RW 332-L, RW 332-P	
compatible m/c bases	all RWE machine series		all RWE machine series		all RWE machine series		all RWE machine series	



winding head data	RW 4		RW 4-V		RW 4-RZ	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,4-2,36	11-26	0,4-2,8	9½-26	0,4-2,0	12-26
magazine diameter	340	13,39	340	13,39	340	13,39
finished core OD	60-500	2,4-20	60-500	2,4-20	60-500	2,4-19,5
finished core ID	25	1,0	29	1,14	32	1,25
finished height	150 (170)	5,9 (6,69)	150	5,9	150 (170)	5,9 (6,69)
max. winding speed rpm	85		85		320	
compatible roller tables	RW 332-L, RW 332-P		RW 332-L, RW 332-P		RW 332-L, RW 332-P	
compatible m/c bases	all RWE machine series		all RWE machine series		all RWE machine series	

All heads are also available with pneumatic brake system. (optional)

High speed slider winding heads for the BENCH models

The high speed winding heads are designed for random layer winding. Typical applications are the production of transformer primary windings and windings where large amounts of turns are required in a short production time. All of the winding heads work with a side slider which dereeles the wire from the edge of the winding magazine. The magazine itself is driven by precision made friction rollers which enhance the life of the magazine. As the wire comes off

the magazine it is guided between two wire guide plates before being placed on to the core. All high speed winding heads feature the quick action magazine opening facility and a range of „S“ type magazines can be supplied for taller section cores. Customised components for special applications can be supplied upon request.



winding head data	RW 10		RW 20		RW 25	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,05-0,3	28½-44	0,08-0,7	21-40	0,08-1,0	18-40
magazine diameter	100	4	150	6	185	7,28
finished core OD	5-30	0,20-1,18	12-150	0,47-6,0	20-150	0,78-6,0
finished core ID	2,5	0,098	7	0,276	10	0,394
finished height	15	0,59	55	2,16	65	2,56
max. winding speed rpm	1570 (with inside slider 1160)		1410		1580	
compatible roller tables	RW 111		RW 111, RW 111-V, RW 222-L		RW 112, RW 222-L, RW 222-VL	
compatible m/c bases	all RWE machine series		all RWE machine series		all RWE machine series	



winding head data	RW 30		RW 40		RW 40-V	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,1-1,0	18-38	0,1-1,0	18-38	0,3-1,12	17½-28½
magazine diameter	210	8,26	385	15,15	385	15,15
finished core OD	25-150	1,0-6,0	25-150	1,0-10,0	25-150	1,0-10,0
finished core ID	10	0,394	12	0,472	12	0,472
finished height	80	3,15	120	4,72	120	4,72
max. winding speed rpm	1540		470		330	
compatible roller tables	RW 222-L, RW 222-VL, RW 332-L		RW 222-L, RW 222-VL, RW 332-L		RW 222-L, RW 222-VL, RW 332-L	
compatible m/c bases	all RWE machine series		all RWE machine series		all RWE machine series	

Magazine data base with wire length in meters: for wire length in feet, multiply by factor 3,28

magazine type	final hole diameter		0,05	0,08	0,10	0,15	0,20	0,25	0,30	0,40	0,50	0,60	0,71	0,80	0,90	1,0	1,06	1,12	mm
	mm	inch	44	40	38	34 ½	32	30	28 ½	26	24	22 ½	21	20	19	18	17 ½	17	AWG
RW 10																			
10/2 (with inside slider)	2,5	0,098	60	25															
2,5	3,0	0,118	100	40	28	13													
3	3,5	0,138	140	60	40	19	11	7											
3,5	4,0	0,157	190	80	50	25	15	10	7										
4	4,5	0,177	280	120	75	35	22	14	10										
10/4,5 SG (with side slider)	5,5	0,236	166	66	43	20	12	7,9	5,6										
5 SG	6,0	0,276	211	84	55	25	15	10	7										
6 SG	7,5	0,295	260	110	80	35	22	15	10										
7 SG	8,0	0,315	368	150	100	48	28	18	13										
8 SG	9,0	0,354	500	200	130	63	37	24	17										
RW 20																			
20/6	7	0,276		115	77	36	21	14											
8	10	0,394		280	190	85	50	34	24	14									
10	12	0,472		440	300	140	80	54	38	22	15	10							
12	14	0,551		650	430	200	120	80	56	33	22	15							
14	16	0,623		1300	860	400	240	160	110	65	43	30	23						
16	22	0,866		1950	1300	600	360	240	167	98	65	46	35						
20-S	25	0,984		3650	2430	1140	670	450	313	183	122	85	65						
25-S	30	1,181		4250	2840	1330	780	520	364	213	142	100	75						
30-S	35	1,378		6000	4000	1870	1100	730	514	300	200	140	107						
40-S	40	1,575		8800	5900	2740	1600	1080	750	440	295	205	156						
RW 25																			
25/8	10	0,394		347	235	105	62	42	30	17									
10	12	0,472		545	372	175	99	66	47	27	18	12							
12	14	0,551		806	533	248	148	99	69	40	27	18	12	9					
14	16	0,623		1612	1066	496	297	198	136	80	53	37	28	22					
16	20	0,787		2418	1612	744	446	297	207	121	80	57	43	36	29				
20-S	25	0,984		4526	3013	1413	830	558	388	226	151	105	80	55	46				
25-S	30	1,181		5270	3512	1649	967	644	451	264	176	124	93	70	58				
30-S	35	1,378		7440	4960	2318	1364	905	637	372	248	173	132	79	66				
40-S	40	1,575		10900	7316	3397	1984	1339	930	545	365	254	193	96	82				
RW 30																			
30/8	10	0,394			260	120	72	48	34	20									
10	12	0,472			410	190	113	75	53	30	20								
12	14	0,551			600	280	165	110	77	45	30	21	14	11	8				
14	16	0,623			1200	560	330	220	154	90	60	42	33	26	21				
16 (-S)	20	0,787			1900	890	520	350	245	140	95	66	53	42	33	27			
20 (-S)	25	0,984			3150	1470	865	578	405	235	158	110	84	63	53	45			
25 (-S)	30	1,181			3895	2875	1110	726	521	300	200	140	100	80	66	54			
30-S	35	1,378			4530	2120	1245	830	580	340	225	158	121	90	75	63			
40-S	40	1,575			5650	2640	1550	1035	725	425	280	198	150	110	94	80			
50-S	50	1,969			8190	3940	2332	1527	1096	631	416	294	213	169	138	114			
RW 40, RW 40-V																			
40/10	12	0,472			740	360	210	140	100	60	40								
12	14	0,551			1150	560	330	210	155	90	60								
14	16	0,623			2310	1100	650	430	310	180	117	83							
16 (-S)	20	0,787			3680	1770	1050	690	490	280	187	132	97	76	62	52			
20 (-S)	25	0,984			5660	2720	1610	1060	760	435	290	204	150	117	96	80			
25 (-S)	30	1,181			7060	3400	2010	1320	950	545	360	255	187	146	120	100			
30-S	35	1,378			8700	4070	2400	1580	1130	650	420	300	210	170	130	111			
40-S	40	1,575			11000	5100	3000	2000	1400	830	540	380	270	210	170	140			
55-S	50	1,969							2475	1430	930	650	475	377	299	245			
60-S	55	2,17							3171	1833	1192	838	608	483	383	314			
70-S (RW 40-V only)	65	2,56							4258	2460	1600	1123	815	648	514	420	375	337	
100-S (RW 40-V only)	75	2,95							6837	3951	2569	1805	1311	1041	824	676	602	542	

Flat belt winding heads for the BENCH models

The flat belt winding heads are designed for winding heavy wires into small internal diameters without the use of gear racks or side sliders. Typical applications are the production of chokes, filters and small transformer secondary windings. All of the winding heads work with a flat toothed belt which drives the magazine. The winding tension is varied by applying pressure on the smooth edge of the magazine where the wire is dereeled from. All of the belt winding heads feature a range

of robust split magazines together with the magazine quick opening device. For balancing type chokes there is a wire guide finger which aids in the production of equal start, finish windings. For the winding head type RW 300, „S“ type and „K“ type magazines can be supplied for taller section cores and transformer secondary windings. Customised components for special applications can be supplied upon request.



winding head data	RW 100		RW 200	
	mm	inch/AWG	mm	inch/AWG
wire range	0,2-0,9	21-32	0,3-1,0	18-28½
magazine diameter	97	3,8	145	5,7
finished core OD	5-35	0,2-1,58	16-150	0,63-6,0
finished core ID	3	0,12	5	0,197
finished core height	15	0,59	25	0,98
max. winding speed rpm	1400		960	
compatible roller tables	RW 111, RW111-V		RW 111-V, RW 112, RW 222-L	
compatible m/c bases	all RWE machine series		all RWE machine series	



winding head data	RW 200-V		RW 300	
	mm	inch/AWG	mm	inch/AWG
wire range	0,4-1,6	14-25	0,3-1,8	14-26
magazine diameter	145	5,7	210	8,27
finished core OD	16-150	0,63-6,0	35-150	1,38-6,0
finished core ID	6	0,236	8	0,315
finished core height	25	0,98	60	2,36
max. winding speed rpm	950 (Ø 0,4-1,0 mm) 380 (Ø 1,1-1,6 mm)		490 (Ø 0,3-1,0 mm) 180 (Ø 1,1-1,8 mm)	
compatible roller tables	RW 111-V, RW 112, RW 222-L, RW 222-P		RW 222-L, RW 222-VL, RW 222-P, RW 222-VP, RW 332-L, RW 332-P	
compatible m/c bases	all RWE machine series		all RWE machine series	

Magazine data base with wire length in meters: for wire length in feet, multiply by factor 3,28

magazine type	final hole diameter		0,20	0,30	0,40	0,50	0,60	0,71	0,80	0,90	1,0	1,12	1,25	1,32	1,4	1,5	1,6	1,7	1,8	mm
	mm	inch	32	28½	26	24	22½	21	20	19	18	17	16½	16	15½	15	14½	14	13½	AWG
RW 100																				
100/2	3	0,118	6	2,9																
2.25	3	0,118	5,7	2,7	1,5															
2,5	3,5	0,138	10	4,6	2,5															
3	4	0,158	14	6,6	3,8	2,5														
3,5	5	0,197	21	10	6	4	2,6	1,9												
4	5,5	0,217	28	13	8	5	3,5	2,5	2,4	1,9										
4,5	6	0,236	37	18	10	7	5	3	3,2	2,5										
5	6,5	0,256	46	22	13	9	6	4,5	3,4	2,7										
5,5	7,5	0,295	60	29	17	11	8	5,5	4,8	3,8										
6	8	0,315	77	36	21	14	10	7	5,5	4										
RW 200																				
200/3	5	0,197		11	6,5															
3,5	5,5	0,217		15	8,5	5,5														
4	6	0,236		20	12	8														
4,5	6,5	0,256		30	17	11	8													
5	7	0,276		36	21	14	10	7	5	4										
5,5	7,5	0,295		47	27	18	12	9	7	6	5									
6	8	0,315		58	33	22	15	11	9	7	6									
6,5	8,5	0,335		75	42	28	19	14	11,9	9	8									
7	9	0,355		87	60	33	23	17	13	11	9									
7,5 (K)	10,5	0,413		115	66	43	30	22	17,5	14	11									
8	11	0,433		140	81	53	37	27	21	17	14									
RW 200-V																				
200-V/4,2	6	0,236			8	5,3	3,7	2,7	2,1	1,7	1,4	1,1	0,9	0,8						
4,7	7	0,276			11	7,2	5	3,7	2,9	2,3	1,9	1,5	1,4	1,2						
5,1	7,5	0,295			14,6	9,5	6,7	4,8	3,8	3	2,5	2,1	1,8	1,6	1,4	1,3	1,1			
5,8	8,5	0,335			19,5	12,7	8,9	6,5	5,1	4	3,35	2,7	2,15	1,95	1,5	1,7	1,4			
6,3	9	0,355			25	16,2	11,4	8,3	6,6	5,2	4,2	3,4	2,78	2,5	2,2	1,9	1,7			
6,6	9,5	0,374			32,8	21,3	15	10,9	8,6	6,8	5,6	4,5	3,65	3,28	2,9	2,5	2,2			
7,0 (K)	10	0,394			39	25,6	18	13	10,4	8,2	6,7	5,4	4,38	3,9	3,5	3	2,7			
7,4 (K)	11	0,433			48	31,5	22,1	16	12,7	10	8,3	6,6	5,4	4,8	4,3	3,7	3,3			
7,8 (K)	11,5	0,453			65,5	42,6	29,9	21,7	17,2	13,6	11,2	9	7,3	6,5	5,8	5,1	4,5			
8,3 (K)	12	0,473			73,1	47,5	33,4	24,2	19,2	15,2	12,5	10	8,1	7,3	6,5	5,7	5			
8,6 (K)	12,5	0,493			91,8	59,7	41,9	30,5	24,2	19,2	15,7	12,6	10,2	9,1	8,2	7,1	6,3			
RW 300																				
300/5	8	0,315		42	24	16	11	8	6,3											
6	9	0,355		62	36	23	16,5	12	9,5											
7	10	0,394		82	47	31	22	16	12,7											
8	11	0,433		92	54	36	25	18	15	12	10	8	6							
9	12	0,472		149	86	56	40	29	23	19	15,5	13	10	8	7					
10 (S) (K)	13	0,512		213	123	81	57	42	33	27	22,5	19	16,5	13	10	8	6,5	5	4	
11 (S) (K)	14	0,551		293	170	111	79	57	45	37	31	25	23	19	16	12	9	7	5	
12 (S) (K)	15	0,591		381	219	145	102	74	59	48	40	33	30	25	21	16	12	9	6,5	
13-S (K)	17	0,669		430	127	162	113	82	65	52	42	34	31	26	22	17	13	10	13	
16-S (K)	20	0,788		480	277	180	127	92	73	58	47	38	34	27	24	17	13	10	15	
20-S (K)	22	0,867		580	335	218	153	111	88	70	57	46	37	33	29	26	23	20	18	
30-S	24	0,945		770	440	290	200	150	117	90	75	60	50	40	38	30	24	21	19	
40-S	30	1,182		881	509	331	232	169	134	106	87	70	56	50	45	39	35	31	27	

model 300/5 - 300/13 = split type, model 300/10K - 300/20K = hinge type (K), model 300/10S - 300/40S = segment type (S)

Miniatur and multisystem winding heads for BENCH models

The multisystem winding heads are designed for winding fine wires onto small cores. It incorporates three proven winding systems on one head, this gives you the best winding solution possible for each specific application, and offers you the maximum production capability with a minimum cost. Typical applica-

tions are the production of small pulse transformers, small primary windings and small chokes. The winding heads are designed for instant change over from one system to another and features a range of flat and round belts, side sliders and robust quick opening magazines.



winding head data	round belt system RW 60-C		flat belt system RW 60-C		round belt system RW 100-C	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,06 - 0,15	34½-42½	0,15-0,6	26-34½	0,07-0,5	25-41
magazine diameter	60	2,4	60	2,4	97	3,8
finished core OD	5-14	0,2-0,55	5-14	0,2-0,55	5-35	0,2-1,3
finished core ID	1,6	0,062	2,0	0,79	2,5	0,098
finished core height	10	0,39	10	0,39	15	0,59
max. winding speed rpm	1850		1850		1470	
compatible roller tables	RW 111		RW 111		RW 111, RW 111-V	
compatible m/c bases	Alle RWE-Baureihen		Alle RWE-Baureihen		Alle RWE-Baureihen	



winding head data	flat belt system RW 100-C		side slider system RW 100-C	
	mm	inch/AWG	mm	inch/AWG
wire range	0,15-0,71	21-34½	0,05-0,355	27-44
magazine diameter	97	3,8	99	3,9
finished core OD	5-35	0,2-1,3	8-35	0,3-1,3
finished core ID	3,0	0,118	7	0,276
finished core height	15	0,59	15	0,59
max. winding speed rpm	1470		2010	
compatible roller tables	RW 111, RW 111-V		RW 111, RW 111-V	
compatible m/c bases	Alle RWE-Baureihen		Alle RWE-Baureihen	

Magazine data base with wire length in meters: for wire length in feet, multiply by factor 3,28

magazine type	final hole diameter		0,05	0,06	0,071	0,08	0,09	0,1	0,112	0,125	0,132	0,15	0,18	0,20	0,25	0,3	0,355	0,4	0,5	0,6	0,71	0,80	0,90	1,0	mm	
	mm	inch	44	42½	41	40	39	38	37	36	35½	34½	33	32	30	28½	27	26	24	22½	21	20	19	18	AWG	
RW 60-C																										
round and flat belt 60-C/1,2																										
1,6	1,6	0,062		4,8	3,3	2,7	2,1	1,7	1,4	1,1	0,9	0,7														
1,4	1,8	0,070		6,3	4,4	3,6	2,7	2,3	1,8	1,5	1,3	1														
1,6	2,0	0,078		11,2	7,9	6,3	5	4,1	3,4	2,7	2,4	1,8	1,3	1,1												
1,8	2,2	0,086		19,2	13,5	10,9	8,7	7,2	5,8	4,7	4,2	3,3	2,4	1,9	1,2	0,9										
2	2,4	0,094		25,8	18,2	14,7	11,7	9,6	7,8	6,3	5,7	4,5	3,2	2,6	1,7	1,2	0,9	0,7								
2,5	2,89	0,114		50,5	35,7	28,8	22,8	18,9	15,3	12,4	11,2	8,8	6,3	5,2	3,4	2,4	1,7	1,3	0,9	0,6						
2,8	3,2	0,125		75	52	42	33	28	22	17	15	12	9	7,5	5	3,5	2,3	2,0	1,3	0,9						
RW 100-C																										
round and flat belt 100-C/1,8																										
2,2	2,2	0,087			27	21	17	14	11	9	8	6														
2	2,5	0,098			42	34	25	19	18	14	13	10	7,2	6	4	2,9										
2,25	2,75	0,108			44	35	26	20	19	15	14	9,4	6,8	5,7	3,6	2,7	2	1,5								
2,5	3	0,118			70	57	45	37	30	24	22	17	12	10	6,8	4,8	3,5	2,6								
3	3,5	0,138			80	63	52	42	34	31	24	17	14,5	9,5	6,8	4,9	3,94	2,5								
3,5	4,5	0,177			120	95	77	63	51	46	36	25	21	14	10	7,2	6	4	2,6	1,3						
4	5	0,197			156	123	102	83	67	60	47	40	28	18	13	10,5	8	5	3,5	2,5						
4,5	5,5	0,217			185	148	122	99	80	72	57	41	37	22	18	11	10	7	5	3						
5	6	0,236			243	193	159	130	105	95	74	62	46	29	22	16,5	13	9	6	4,5						
RW 100-C																										
side glider 100-C 10/4,5-SG																										
5	5	0,217	166	116	82	66	52	43	35	28	25	20	14	12	7,9	5,6										
5-SG	5,5	0,216	211	148	104	84	67	55	45	36	32	25	18	15	10	7										
6-SG	7	0,276	260	185	130	110	84	80	56	45	41	35	23	22	15	10										
7-SG	8	0,315	368	258	182	150	117	100	78	63	57	48	32	28	18	13										
8-SG	9	0,355	500	350	148	200	158	130	107	86	77	63	56	37	24	17	14,5									
9-SG	10	0,394	700	490	207	280	221	182	150	120	107	88	80	51	33	23,8	21,5									
10-SG	11	0,433	1120	784	331	448	354	291	239	192	172	141	122	82	54	38	32,5									
11-SG	12	0,472	1512	1058	447	604	478	393	323	260	232	190	133	111	72	51	42									
12-SG	13	0,512	2192	1534	648	878	693	570	469	377	337	276	192	162	105	75	62									

PATENTED

Magazine less winding head

The winding head without magazine is designed for winding heavy wires down to very small core ID. This technology allows a smaller final core ID as with standard winding heads at the market with magazine. The wire is fixed on a special

roller system. During wind the loaded wire get consumed, which reduce the needed ID. Therefor the minimum FID can be approx. 4 time wire dia. Typical applications are production of chocks and filters as well transformer secondary windings.

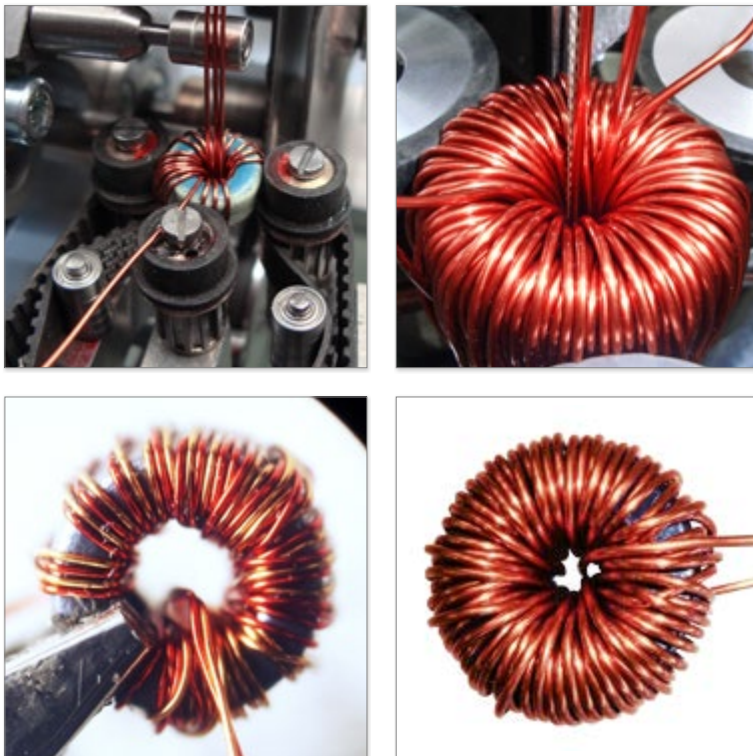


winding head data	RW 01-ML		RW 03-ML	
	mm	inch/AWG	mm	inch/AWG
wire range	0,25 - 0,5	30 - 24	0,6 - 1,6	23 - 14
length of one loading turn	145	5,7	970	38
finished core OD	4 - 30	0,16 - 1,8	25 - 150	1 - 6
finished core ID	4 x wireØ		4 x wireØ	
finished core height	15	0,6	70	2,76
max. winding speed rpm	200		200	
compatible roller tables	RW 111-ML		RW 222-PML	
compatible m/c bases	all RWE – machine series		all RWE – machine series	

Information provided without guarantee



Sample applications



Gear rack taping heads for the BENCH models

These taping heads work with a gear system similar to the gear rack winding heads but vary in one major way. That is as the tape is loaded on to the tape magazine it is also taped on to the core. A flat leather belt round the outside of the tape magazine controls the

taping tension and is infinitely variable. The tape is automatically cut when the correct length of tape is loaded for the complete operation. Customised components for special applications can be supplied upon request.



taping head data	RW 0/B		RW 1/B		RW 2/B	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
tape width	4-10	0,157-0,394	8-13	0,315-0,512	9-20	0,354-0,787
build up factor	+11	+0,433	+13	+0,512	+17	+0,669
magazine diameter	86	3,386	139	5,472	221	8,7
finished core OD	25-150	1-6	25-150	1-6	25-350	1-14
finished core ID	15	0,59	21	0,83	26	1,0
finished core height	22	1,38	45	1,97	80	3,15
max. taping speed rpm	305		230		230	
compatible roller tables	RW 222-L, RW 222-P		RW 222-L, RW 222-VL, RW 222-P, RW 222-VP		RW 222-L, RW 222-VL, RW 332-L, RW 222-P, RW 222-VP, RW 332-P	
compatible m/c bases	all RWE machine series		all RWE machine series		all RWE machine series	



taping head data	RW 3/B		RW 4/B	
	mm	inch/AWG	mm	inch/AWG
tape width	9-25	0,354-0,984	9-25	0,354-0,984
build up factor	+20	+0,787	+21	+0,827
magazine diameter	241	9,488	347	13,39
finished core OD	40-350	1,5-14	60-350	2,4-14
finished core ID	29	1,14	30	1,181
finished core height	100	3,94	150	5,9
max. taping speed rpm	150		85	
compatible roller tables	RW 222-L, RW 222-VL, RW 332-L, RW 222-P, RW 222-VP, RW 332-P		RW 332-L, RW 332-P	
compatible m/c bases	all RWE machine series		all RWE machine series	

High speed taping heads for the BENCH models

These taping heads work with a special belt drive system which enable them to work without the use of gear racks: this allows the belt taping heads to tape into smaller internal diameters at a higher speed. They all incorpo-

rates the RUFF quick action opening, closing system which reduces handling time. The taping operation is fully automatic and controlled from a foot switch.










taping head data	RW 200/B		RW 300/B	
	mm	inch/AWG	mm	inch/AWG
tape width	4 - 10	0,157 - 0,394	6 - 18	0,237 - 0,708
build up factor	+9	+0,354	+11	+0,433
magazine diameter	154	5,9	215	8,46
finished core OD	16 - 150	0,63 - 5,9	25 - 254	1 - 10
finished core ID	14 with 5 mm tape	0,512 with 0,157 tape	19 with 8 mm tape	0,748 with 0,315 tape
finished core height	50	1,97	80	3,15
max. taping speed rpm	350		275	
compatible roller tables	RW 111-V, RW 112 RW 222-L, RW 222-P		RW 222-L, RW 222-P, RW 222-VL, RW 222-VP, RW 332-L, RW 332-P	
compatible m/c bases	all RWE machine series		all RWE machine series	
f.i.d calculation for all taping heads: tape width + build up factor = f.i.d required				

Roller tables for the BENCH models

RUFF supplies a choice of seven different interchangeable roller tables. Their main purpose is to transport the core when winding or taping operations are carried out. They are connected to the machine base and held with two or four fixing bolts which allow them to be changed in some minutes. Three rub-

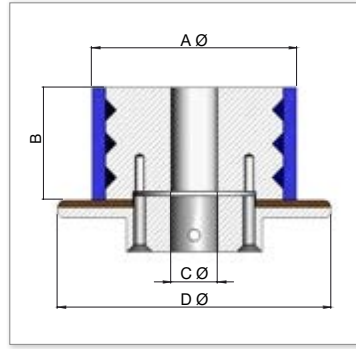
ber rollers are infinitely adjustable to clamp any size of core within their range. A large of parallel and tapered rollers are available to suit individual winding requirements and special extension and designs can be supplied upon request.

Combination possibilities between roller tables and winding heads

	coil OD	Kopf	0	1	2	3	4,4V, 4RZ	10	20	25	30	40, 40V, 60C, 100, 100C, 200, 200V	300	0/B	1/B	2/B	3/B	4/B	200/B	300/B	
	0,20-1,18 RW 111 5-30	inch						0,20-1,18	0,47-1,18			0,20-1,18									
		mm						5-30	1230			5-30									
	0,40-1,58 RW 111-V 10-50	inch							0,63-2,0			0,43-2,0								0,63-2,0	
		mm							16-50			11-50								16-50	
	0,71-2,75 RW 112 18-70	inch									0,71-2,75	0,71-2,75								0,71-2,75	
		mm								18-70	18-70									18-70	
	1,0-6,0 RW 222-L RW 222-LP 25-150	inch	1,0-6,0	1,0-6,0	1,0-6,0	1,0-6,0			1,0-6,0	1,0-6,0	1,0-6,0	1,0-6,0	1,38-6,0	1,0-6,0	1,0-6,0	1,0-6,0	1,0-6,0	1,0-6,0	1,0-6,0	1,0-6,0	1,0-6,0
		mm	25-150	25-150	25-150	25-150			25-150	25-150	25-150	25-150	25-150	35-150	25-150	25-150	25-150	25-150	25-150	25-150	25-150
	1,57-6,0 RW 222-VL RW 222-VLP 40-150	inch		1,5-6,0	15,6,0	1,5-6,0				1,5-6,0	1,5-6,0	1,5-6,0	1,5-6,0	1,5-6,0	1,5-6,0	1,5-6,0	1,5-6,0	1,5-6,0		1,5-6,0	
		mm		40-150	40-150	40-150				40-150	40-150	40-150	40-150	40-150	40-150	40-150	40-150	40-150	40-150		40-150
	2,4-10,0 RW 332 RW 332-LP 60-254	inch			2,4-10	2,4-10	2,4-10					2,4-10				2,4-10	2,4-10	2,4-10		3,5-10	
		mm			60-254	60-254	60-254					60-254				60-254	60-254	60-254		90-254	
	3,15-14 RW 332-L2 RW 332-L2P 60-420	inch				2,4-16,5	2,4-16,5					2,4-16,5					2,4-16,5	2,4-16,5			
		mm				60-420	60-420					60-420					60-420	60-420			

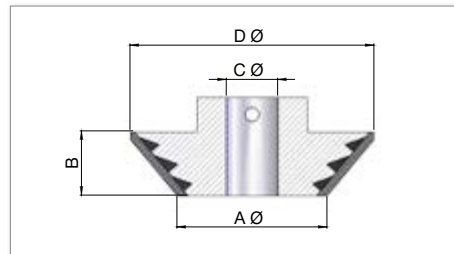
Standard core transport rollers for roller tables for BENCH machines

roller table type	A Ø mm	B Ø mm	C Ø mm	D Ø mm
RW 111	6	4	3	9
RW 111	8	5	3	11
RW 111	8	10	3	13
RW 111	9	20	3	18
RW 111-V	17	10	6	18
RW 111-V	17	15	6	23
RW 111-V	23	15	6	28
RW 112	35	20	8	43
RW 112	35	12	8	41
RW 222-L/-P	45	20	12	55
RW 222-L/-P	45	40	12	55
RW 222-L/-P	75	20	12	85
RW 222-L/-P	75	40	12	85
RW 222-L/-P	90	20	12	100
RW 222-VL/-P	65	40	17	80
RW 222-VL/-P	65	60	17	80
RW 222-VL/-P	75	40	17	85
RW 222-VL/-P	75	40	17	100
RW 222-VL/-P	90	20	17	100
RW 222-VL/-P	90	40	17	100
RW 332-L/-P	75	40	22	100
RW 332-L/-P	90	40	22	100
RW 332-L/-P	120	50	22	160 (200)
RW 332-L/-P	140	50	22	160 (200)



Tapered core transport rollers for roller tables for BENCH machines

roller table type	A Ø mm	B Ø mm	C Ø mm	D Ø mm
RW 222-L/-P	35	15	12	55
RW 222-VL/-P	60	11	17	75
RW 222-VL/-P	70	13	17	85
RW 222-VL/-P	55	25	17	105
RW 332-L/-P	70	13	22	85
RW 332-L/-P	55	25	22	105



FLOOR machine line

The RWS models are the floor machine line, which are in two versions available. This machines also have the RUFF modular system with 18 interchangeable winding heads and 10 roller tables for the largest flexibility. The sturdy construction with highest precision in production and best quality of material guaranties reliability and very long lifetime of the machines.

FLOOR machine line RWS

Models RWS-GLOBAL, RWS-EVOLUTION, RWS-GLOBAL-SHUTTLE, RWS-EVO-SHUTTLE, RWS-TAPE, RWS-Evolution-Tape

18 interchangeable heads

9 gear rack heads	RW 33 RW 45-380	RW 44-1 RW 45-EH	RW 44-1V RW 44-RZ	RW 45 RW 45-VRZ	RW 45-V
1 side slider winding head	RW 50				
8 taping heads	RW 33/B, RW 44-RZ/B	RW 44/1B, RW 45-VRZ/B	RW 45/B, RW 45-VRZ/B-380	RW 45-380/BU,	RW 45/BU
1 magazine less winding head	RW 05-ML				
7 taping heads	RW 44/1B RW 45-380/B-U	RW 44 RZ/B, RW 45/B RW 45/BU	RW 45 VRZ/B	RW 45 VRZ/B-380	

9 interchangeable tables	RW 333 RW 333-V-13	RW 333-V RW 444	RW 333-V-SO RW 444-P	RW 333-VS1 RW 444-PSR	RW 333-VS2
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Capability ranges

wire Ø monofilar	0.4 - 4.5 mm	tape size	9 - 25 mm
wire Ø bifilar	bis 2 x 2.8 mm	machine size	approx. 1100 x 700 mm Shuttle: 2000 x 700 mm
finished core OD	65 - 2800 mm	machine weight	approx. 200 kg
finished core ID	up from 25 mm		
finished core H	up to 380 mm		
compressed air	6 bar		

Model RWS-Global

The RWS-Global is for standard winding applications. The new NC controller with touch screen is user friendly and it is very easy to understand. Just a few inputs are needed for create a winding program. All standard winding methods are available e.g.: Tape-/Wire winding, Index, Reverse winding. Several winding sequences can be written in one winding program. So for example different pitch and index etc. More than 200 programs

can be saved on this control. All languages in Latin characters are available on this controller.



controller	5.7" monochrom touchpanel
language	all Latin characters
winding head	three phase motor with inverter
roller table	servo motor
supply voltage	1 PH / 230 V / 16 A

Model RWS-Evolution

The RWS-Evolution is the high end floor toroidal winding machine base from RUFF. The new controller with innovative programming is user friendly and through the high resolution touch screen display it is simple to understand. Programs are saved in CSV-Format. Therefore, programs can be made external by Excel. The Windows system allows own data management saved onto USB-Stick, or onto the CF-Card in a separate file on the machine. A central program management at an external PC (Server) is possible via Ethernet connection. Easy file structure can be created and every program can be reported with a text description. The machine can also be remote controlled by Ftp-connection.

Teleservice by our technicians via internet connection (Ftp-connection) for trouble shooting in the logic program. Update of PLC- and visual display software via

USB-Stick, datas can be sent via E-mail.



controller	12" touchpanel with 4 function buttons
memory	Compact Flash 512 MB
system	Windows CE 5.0
language	Unitext (all characters)
interface	USB-connection, ethernet-interface, 1x10/100 Mbit, RJ45, PS/2-interface, serial interface
PCI modul card	MC-CAN Dual Can Controller, hand control unit with 3 additional function buttons and joystick
supply voltage	3 PH / 400 V / 16 A
winding head	servo motor
roller table	servo motor

Models RWS-Global-Shuttle / RWS-Evo-Shuttle

The machine bases in Shuttle-Version have a slide system for the winding heads. It enables to move the winding heads out of the winding area for a comfortable load and unload the machine with toroidal cores

(e.g. with a crane). This system brings especially for very large or very heavy cores crucial advantages.



RWS-Global-Shuttle

controller	5.7" monochrom touchpanel
language	all Latin characters
winding head	three phase motor with inverter
roller table	servo motor
supply voltage	1 PH / 230 V / 16 A

or

RWS-Evo-Shuttle

controller	12" touchpanel with 4 function buttons
memory	Compact Flash 512 MB
system	Windows CE 5.0
language	Unitext (all characters)
interface	USB-connection, ethernet-interface, 1x10/100 Mbit, RJ45, PS/2-interface, serial interface
PCI modul card	MC-CAN Dual Can Controller, hand control unit with 3 additional function buttons and joystick
supply voltage	3 PH / 400 V / 16 A
winding head	servo motor
roller table	servo motor

Stand alone taping station to be combined with toroidal winding machines for double head applications - Model RWS-Tape

RUFF has designed a low cost standardised taping station in order to replace the oneway special and expensive double head machine. It is a flexible taping system that can be placed next to existing toroidal winding machines and therefore enables simultaneous winding and taping of transformers in the most economical method. The head is mounted on a ground plate which sits on sliding rails and enables to slide the head easily into the core. It incorporates the RUFF mod-

ular system and can be equipped with interchangeable heads. One or more working stations can be combined with a winding machine.



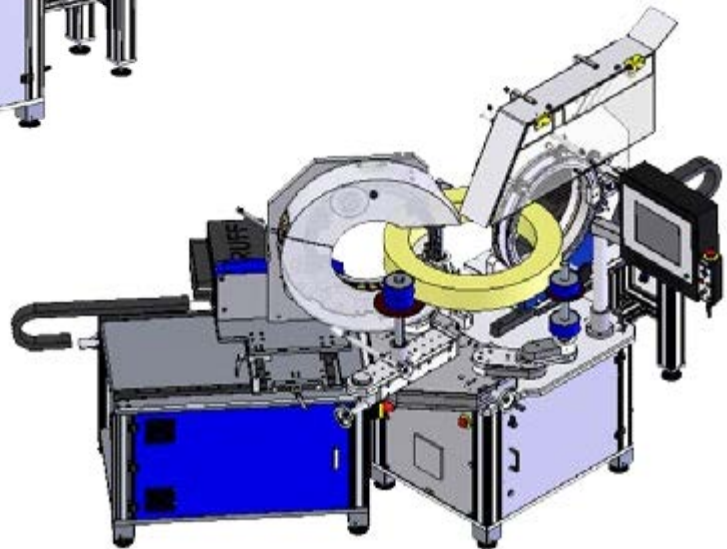
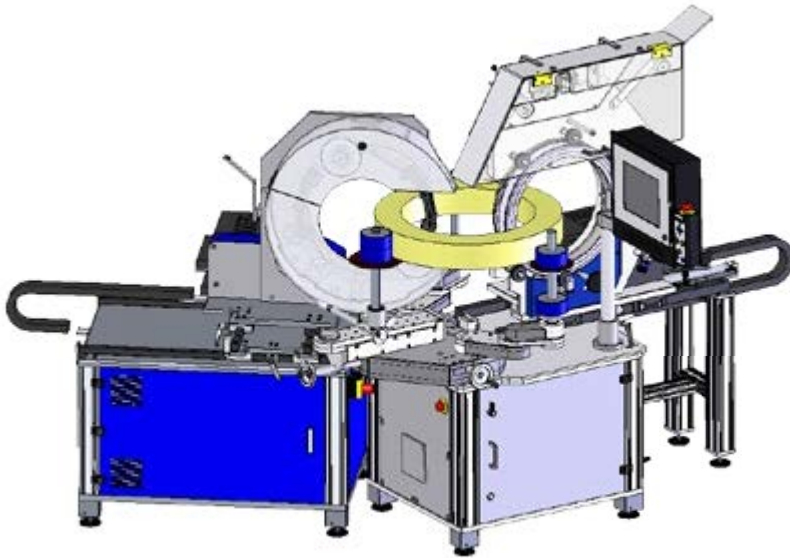
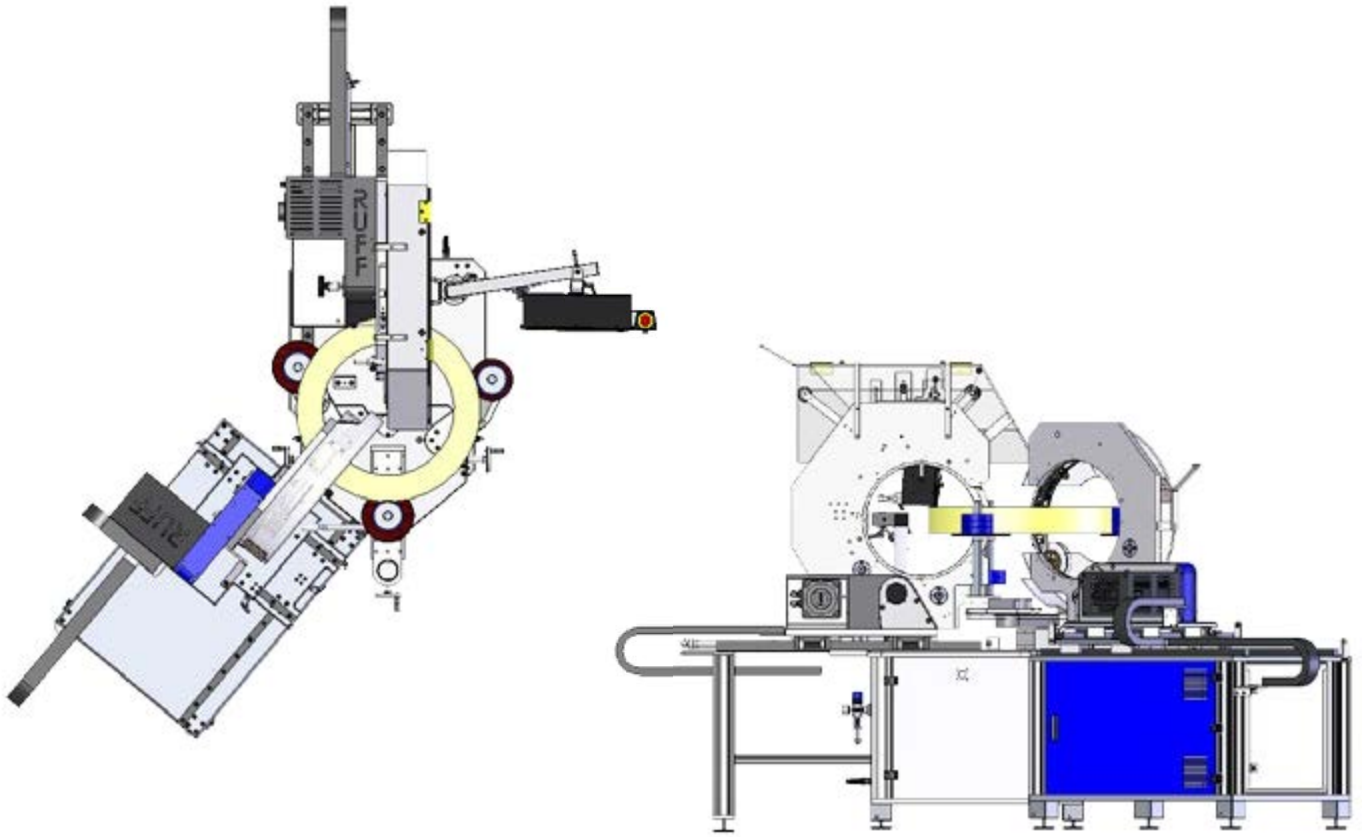
- Min. core ID with magazine system** 200 mm
- Min. core ID with tape roller system** 330 mm

RWS-Evolution-Tape

- controller** controlled by RWS-Evolution /RWS-Evo-Shuttle
- taping speed** up to 140 rpm (stepless adjustable)
- core drive** not required as the core drive is given from toroidal winding machines which is placed next to
- winding head drive** 3,6 kW Servomotor
- supply voltages** 3 PH / 400 V / 16 A
- machine size** 1100 x 700 mm
- machine weight** 150 kg net, 270 kg gross



Simultaneous taping and winding operation



Gear rack winding heads for the FLOOR models

The gear rack winding heads are designed for precision layer winding with low build up factors. Typical applications are the production of variacs, potentiometers and heavy transformer windings. All the winding heads work with a robust gear rack and drive train gear system, this allows the winding head to generate a large amount of torque which makes it suitable for large wire size. The wire is dereeled from the winding magazine via two guide rollers as it is layered on the core, the magazine itself is held back under con-

stant tension via the braking system which is adjustable to suit each wire size. All gear rack winding heads can utilise two designs of magazines: the „KN“ type has a quick opening facility and the „SN“ type which has a completely removeable section for taller cores. A range of narrow racks and multifilar wire guides can be supplied for reduced core ID's and strip winding. Customised components for special applications can be supplied upon request.



winding head data	RW 33		RW 44-1		RW 44-1V		RW 45	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,4-2,5	10-26	0,4-3,0	8½-26	0,4-3,55	7-26	0,5-2,65	9½-24
magazine diameter	220	8,66	340	13,39	340	13,39	490	19,29
finished core OD	65-350	2,55-14	90-500	3,54-20	100-500	4-20	90-1000	3,54-39
finished core ID	25	10-26	35	1,38	50	1,97	40	1,57
finished core height	100	3,94	170	6,7	170	6,7	250	9,84
max. winding speed rpm	140		140		100		100	
compatible roller tables	RW 333-L		RW 333-L RW 333-VL		RW 333-L RW 333-VL		RW 333-VL, All versions of RW 333-V RW 444, RW 444-P	
compatible m/c bases	all RWS machine serie		all RWS machine series		all RWS machine series		all RWS machine series	



winding head data	RW 45-V		RW 45-380		RW 45-EH + 30 mm to FID of RW 45	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,4-3,55	7-26	0,5-2,65	9½-24	0,4-4,5	5½-24
magazine diameter	490	19,29	490	19,29	490	19,29
finished core OD	100-1000	4-39	90-1000	3,54-39	100-1000	4-39
finished core ID	50	1,97	40	1,57	100	1,97
finished core height	250	9,84	380	14,96	250	9,84
max. winding speed rpm	80		100		80	
compatible roller tables	RW 333-VL, All versions of RW 333-V RW 444, RW 444-P, RW 444-PSR		RW 333-VL, All versions of RW 333-V RW 444, RW 444-P, RW 444-PSR		RW 333-VL, All versions of RW 333-V RW 444, RW 444-P, RW 444-PSR	
compatible m/c bases	all RWS machine series		all RWS machine series		all RWS machine series	

High speed slider winding head for the FLOOR models

The high speed winding head RW 50 is designed for winding of big toroidal cores with large number of turns in a short production time. The magazine is driven by special friction roller, which enable to reach high magazine rotation speed. The required wire

tension is by side slider. Customized components for special applications, special side slider and tailor made magazine can be supplied upon request. Typical applications are the production of HV windings.



winding head data	RW 50	
	mm	inch/AWG
wire range	0,4 - 1,32	16 - 26
magazine diameter	490	19,29
finished core OD	90 - 1000	3,54 - 39
finished core ID	40	1,57
finished core height	250	9,84
max. winding speed rpm	460	
compatible roller tables	RW 333-VL, all versions of RW 333-V RW 444, RW 444-P	
compatible m/c bases	all RWS machine series	
max. wire length		



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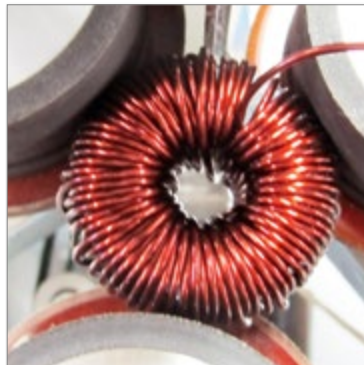
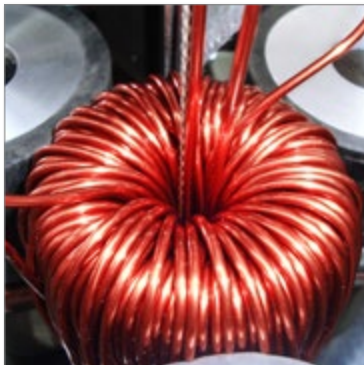
Magazine less winding head for the FLOOR models

The winding head without magazine is designed for winding heavy wires down to very small core ID. This technology allows a smaller final core ID as with standard winding heads at the market with magazine. The wire is fixed on a

special roller system. During wind the loaded wire get consumed, which reduce the needed ID. Therefore the minimum FID can be approx. 4 times wire dia. Typical applications are production of chocks and filters as well transformer secondary windings.



winding head data	RW 05ML	
	mm	inch/AWG
wire range	1 - 2,5	18,5 - 10
magazine diameter	-	-
finished core OD	32 - 200	1,25 - 7,87
finished core ID	Ø x 4	
finished core height	110	4,33
max. winding speed rpm	120 rpm	
compatible roller tables	RW 333-PML	
compatible m/c bases	RWS- Evolution	
max. wire length	36 : wire Ø x 1,2	



Gear rack taping heads for the FLOOR models

These taping heads work with a gear rack system similar to the gear rack winding heads but vary in one major way. The tape is loaded on the tape magazine and it is also taped on the core at the same time. A flat leather belt round the outside of the tape

magazine controls the taping tension and is infinitely variable. The tape is automatically cut when the correct length of tape is loaded as in the complete operation. Customised components for special applications can be supplied upon request.



winding head data	RW 33/B		RW 44/1B		RW 45/B		RW 45-B-380	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
tape range	9-20	0,354-0,787	9-25	0,354-0,984	9-25	0,354-0,984	2-25	0,354-0,984
Zuschlag für Restlochberechnung	+20	+0,787	+25	+0,984	+25	+0,984	+25	+0,984
magazine diameter	220	8,66	340	13,39	490	19,29	490	12,29
finished core OD	65-350	2,55-14	90-500	3,54-20	90-2800	3,54-110	90-2800	3,54-110
finished core ID	29	1,44	34	1,34	34	1,34	34	1,34
finished core height	100	3,94	170	6,69	250	9,842	380	14,96
max. winding speed rpm	140		140		120		120	
compatible roller tables	RW 333-L RW 333-VL All versions of RW 333-V		RW 333-L RW 333-VL All versions of RW 333-V		RW 333-VL All versions of RW 333-V RW 444 RW 444-P RW 444-PSR		RW 333-VL All versions of RW 333-V RW 444 RW 444-P RW 444-PSR	
compatible m/c bases	all RWS machine series		all RWS machine series		all RWS machine series		all RWS machine series	

winding head data	RW 44 RZ/B		RW 45-VRZ/B		RW 45-VRZ/B-380	
	mm	inch/AWG	mm	inch / AWG	mm	inch / AWG
tape range	9-25	0,354-0,984	9-25	0,354-0,984	9-25	0,354-0,984
Zuschlag für Restlochberechnung	+33	+1,29	+33	+1,29	+33	+1,29
magazine diameter	340	13,39	490	19,29	490	19,29
finished core OD	90-500	3,54-20	90-2800	3,54-110	90-2800	3,54-110
finished core ID	42	1,65	42	1,65	42	1,65
finished core height	170	6,69	250	9,842	250	9,842
max. winding speed rpm	320		270		270	
compatible roller tables	RW 333-VL All versions of RW 333-V RW 444 RW 444-P RW 444-PSR		RW 333-VL All versions of RW 333-V RW 444 RW 444-P RW 444-PSR		RW 333-VL All versions of RW 333-V RW 444 RW 444-P RW 444-PSR	
compatible m/c bases	all RWS machine series		all RWS machine series		all RWS machine series	

Combination possibilities between roller tables and winding heads

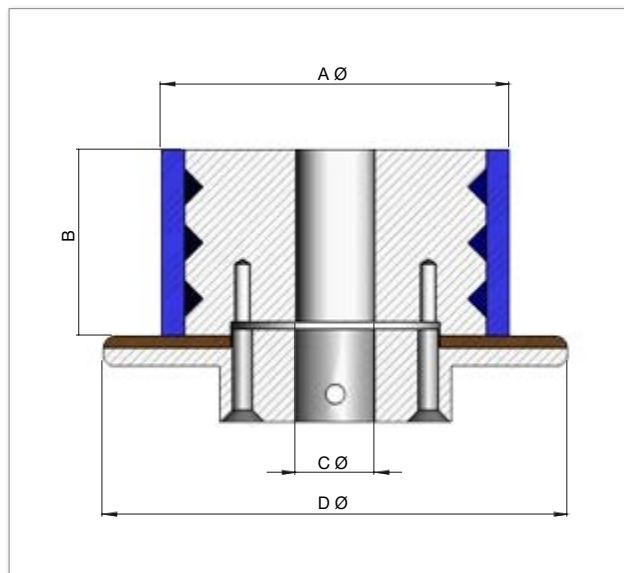


finished core OD range		RW 33 RW 33-B	RW 44-1, RW 44-1B, RW 44-RZB, RW 44-RZ	RW 44-1V	RW 45, RW 45-V, RW 45-B, RW 50	RW 45-380	RW 45-EH, RW 45-VRZ
RW 333-L with rubber rollers Ø 75	inch	3,15-14,0	4,35-14,0	4,92-14,0	-	-	-
	mm	80-350	110-350	125-350	-	-	-
RW 333-L with rubber rollers Ø 90	inch	2,55-14,0 65-350	4,0-13,0	4,53-13,0	-	-	-
	mm		100-330	100-330	-	-	-
RW 333-L with rubber rollers Ø 120	inch		3,54-11,8	4,0-11,8	-	-	-
	mm		90-300	100-300	-	-	-
RW 333-VL with rubber rollers Ø 75	inch	4,0-14,0	5,12-14,0	5,12-14,0	5,12-14,0	5,12-14,0	5,12-14,0
	mm	100-350	130-350	130-350	130-350	130-350	130-350
RW 333-VL with rubber rollers Ø 90	inch	3,35-13,0	4,72-13,0	5,51-14,0	4,72-13,0	4,72-13,0	4,72-13,0
	mm	85-330	120-330	140-330	120-330	120-330	120-330
RW 333-VL with rubber rollers Ø 120	inch			4,92-14,0	3,54-14,0		
	mm			125-350	90-350		
RW 333-VL-5 (with swivel arms)	inch		4,33-19,7	4,33-19,7	4,33-19,7	4,33-19,7	
	mm		110-500	110-500	110-500	110-500	
RW 333-VL-8 (with swivel arms)	inch				9,84-39,37	9,84-39,37	9,84-39,37
	mm				250-1000	250-1000	250-1000
RW 333-VL-13 (with extra horizontal rollers for heavy cores)	inch		4,0-19,7	4,0-19,7	4,0-19,7	4,0-19,7	4,0-19,7
	mm		100-500	100-500	100-500	100-500	100-500
RW 444 (with swivel arms)	inch				3,94-32	4,0-19,7	4,72-32
	mm				100-800	100-800	120-800
RW 444-P (with swivel arms)	inch				3,94-39,3	3,94-39,3	4,72-39,3
	mm				100-1000	100-1000	120-1000

min. Kerninnendurchmesser		RW 33, RW 33/B	RW 44-1, RW 44-1B, RW 44-RZB, RW 44-RZ	RW 44-1V	RW 45, RW 45-V, RW 45-B, RW 50	RW 45-380	RW 45-EH RW 45-VRZ
RW 444-PSR (with swivel arms)	inch				16,7	16,7	16,7
	mm				500	500	500

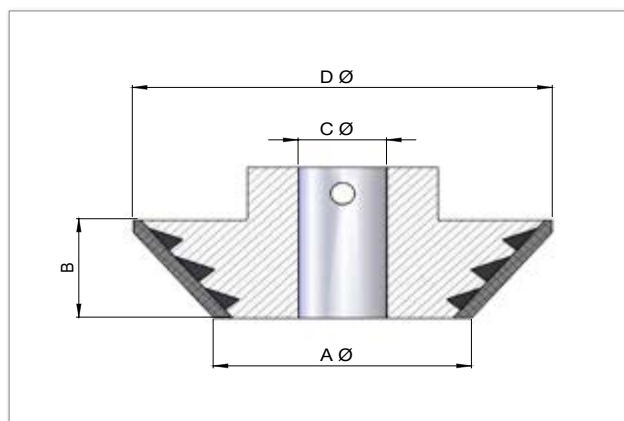
Standard core transport rollers for roller tables for FLOOR machines

roller table type	A Ø mm	B Ø mm	C Ø mm	D Ø mm
RW 333-L / -P	75	40	22	100
RW 333-L / -P	90	40	22	100
RW 333-L / -P	120	50	22	160
RW 333-L / -P	140	50	22	160
RW 333-VL	120	50	30	160
RW 333-VL	140	50	30	160
RW 333-VL	120	50 <td 30	200	
RW 333-VL	140	50	30	200
RW 444/-P/-PSR	120	50	35	160
RW 444/-P/-PSR	140	50	35	160
RW 444/-P/-PSR	120	50	35	200
RW 444/-P/-PSR	140	50	35	200



Tapered core transport rollers for roller tables for FLOOR machines

roller table type	A Ø mm	B Ø mm	C Ø mm	D Ø mm
RW333-L / -P	55	25	22	105
RW333-L / -P	112	27	22	167
RW 333-VL	55	25	30	105
RW 333-VL	112	27	30	167
RW444/-P/-PSR	112	27	35	167



EXTRA HEAVY machine line

The RW 55 is the largest and heaviest toroidal winding machine. The modular system covers 3 winding heads and 4 roller tables. These machines are designed for extra heavy applications, with strong wires and very heavy toroidal cores. The extra sturdy construction and the strong motors of the machine guarantees always a sufficient performance.

EXTRA HEAVY floor machine line RW 55

Models RW 55-Evolution, RW 55-Evo-Shuttle

8 interchangeable heads

5 gear rack heads	RW 55	RW 1000	RW 55-RZ	RW 1000 RZ	RW 1000
3 gear rack heads	RW 55/B	RW 55/BU	RW 1000-RZ/BU		
4 interchangeable tables	RW 555-1 RW 555-1PSR	RW 555-1P RW 555-SO			

Models RW 55-Evolution / RW 55-Evo-Shuttle

The machine bases are available in two versions: RW 55-Evolution with a fixed winding head and RW 55-Evo-Shuttle with a moveable winding head. The machine base in Shuttle-Version has a slide system for the winding heads. It enables to move the winding heads out of the winding area for a comfortable load and unload the machine with toroidal cores (e.g. with a crane). This system brings especially for very large or very heavy cores crucial advantages. Programs are saved in CSV-Format. Therefore programs can be made externally by Excel. The Windows system allows own data management saved onto USB-Stick, or onto the CF-Card in a separate file on the machine. A central program management on an external PC

(Server) is possible via Ethernet connection. Easy file structure can be created and every program can be reported with a text description. The machine can also be remote controlled by Ftp-connection. Teleservice by our technicians via internet connection (Ftp-connection) for trouble shooting in the logic program. Update of PLC- and visual display software via USB-Stick, datas can be sent via E-mail.



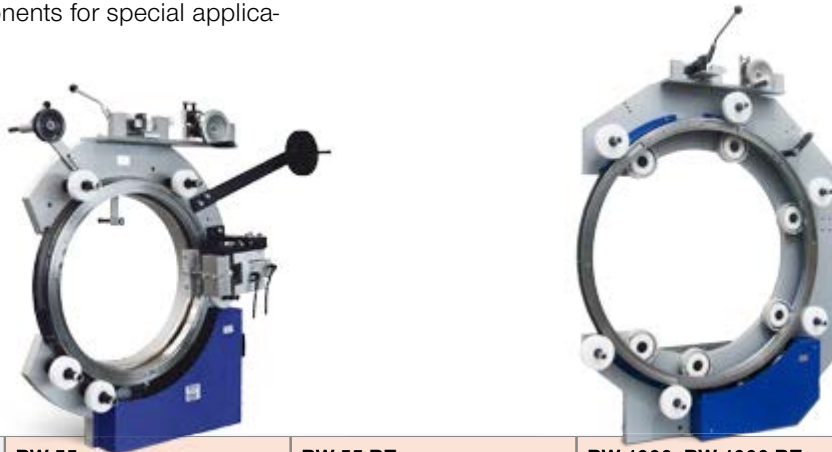
Capability ranges

wire Ø monofilar	0.8 - 6.5 mm	compressed air	6 bar
wire Ø bifilar	up to 2x4 mm	tape size	9 - 30 mm
flat wire	up to 5x12 mm	supply voltages	3 Ph / 400 V / 16 A
finished core OD	100 - 2800 mm	machine size	approx. 1630 x 1800 mm
finished core ID	up from 60 mm		Shuttle: 1630 x 2700 mm
finished core H	bis 300 mm	machine weight	approx. 600 kg
operating panel	8" touchpanel with 4 function buttons		
memory	Compact Flash 512 MB		
system	Windows CE 5.0		
language	Unitext (all characters)		
interface	USB-connection, ethernet-interface, 1x10/100 Mbit, RJ45 PS/2-interface, serial interface		
PCI modul card	MC-CAN Dual Can Controller, hand control unit with 3 additional function buttons		
winding head	servo motor		
roller table	servo motor		

Heads for the EXTRA HEAVY floor models

The RW55 machine models can be supplied with one winding head and two taping heads. All of these heads work with a gear rack drive system. The winding head has a range of 6 standard interchangeable magazines with suitable wire guide rollers. Specially designed components for special applica-

tions such as multifilar or strip windings can be supplied upon request. The taping head works automatically from a foot switch for load and tape in one operation. The winding head can also be converted for direct tape dispensing if required.



head data	RW 55		RW 55-RZ		RW 1000, RW 1000 RZ		RW 55-B	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	0,8 - 6,5	4½ - 20	0,8 - 3,55	7½ - 20	0,8 - 6	8½ - 20	-	-
tape widths	-	-	-	-	-	-	15-30	
build up factor	-	-	-	-	-	-	+ 35	
magazine diameter	650	25,59	650	25,59	1000	39,37	650	25,59
finished core OD	up from 100	up from 4	up from 100	up from 4	up from 100	up from 4	up from 100	up from 4
finished core ID	60	2,36	60	2,36	80	3,15	50	25,59
finished core height	300	11,8	300	11,8	500	11,8	300	11,8
max. winding taping speed rpm	120		200		50 (80 RW 1000 RZ)		120	
compatible roller tables	RW 555-1 RW 555-1P RW 555-S0		RW 555-1 RW 555-1P RW 555-S0		RW 555-1 RW 555-1P RW 555-S0		RW 555-1 RW 555-1P RW 555-S0	
compatible m/c base	RW 55		RW 55		RW 55		RW 55	


head data	RW 55/BU		RW 55-RZ/BU		RW 1000-RZ/BU	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
wire range	-	-	-	-	-	-
tape widths	20-50	0,79-1,97	20-50	0,79-1,97	20-50	0,79-1,97
build up factor	-	-	-	-	-	-
magazine diameter	-	-	-	-	-	-
finished core OD	up from 500	up from 19,68	up from 100	up from 4	up from 100	up from 4
finished core ID	400	15,75	400	15,75	400	15,75
finished core height	300	11,8	300	11,8	400	11,8
max. winding taping speed rpm	120		200		80	
compatible roller tables	RW 555-1 RW 555-1P RW 555-S0 RW 555-1PSR		RW 555-1 RW 555-1P RW 555-S0 RW 555-PSR		RW 555-1 RW 555-1P RW 555-S0 RW 555-PSR	
compatible m/c base	RW 55		RW 55		RW 55	

Magazine data base with wire length in meters: for wire length in feet, multiply by factor 3,28

magazine type	smallest final hole		0,8	0,9	1,0	1,12	1,25	1,32	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,12	2,24	mm
			20	19	18	17	16½	16	15½	15	14½	14	13½	13	12½	12	11½	AWG
	mm	inch/AWG																
55/65SN	60	2,36	257	204	167	134	109	97	87	76	67	60	53	48	43	39	35	
55/70SN	70	2,76	814	645	529	425	344	309	276	241	213	189	169	153	138	123	110	
55/90SN	90	3,54	1012	802	657	528	427	384	343	300	265	235	211	190	171	153	137	
55/100SN	100	3,94	1416	1123	920	739	598	537	479	420	370	329	295	265	239	214	192	
55/120SN	120	4,72	1999	1584	1299	1042	844	758	677	592	523	465	416	375	338	302	271	
55/135SN	135	5,31	4268	3383	2773	2226	1802	1619	1445	1265	1116	993	888	800	721	645	579	
55/140SN	140	5,51	5485	4347	3563	2860	2316	2080	1857	1625	1434	1276	1142	1028	926	829	744	
55/150SN	150	5,90		5137	4211	3380	2737	2458	2194	1921	1695	1508	1349	1215	1095	979	879	
55/200SN	200	7,87			7406	5945	4814	4324	3859	3378	2981	2652	2373	2137	1925	1723	1545	

magazine type	smallest final hole		2,36	2,5	2,65	2,8	3,0	3,15	3,35	3,55	3,75	4	4,25	4,5	4,75	5	mm
			11	10½	10	9½	9	8½	8	7½	7	6½	6	5½	5	4½	AWG
	mm	inch/AWG															
55/65SN	60	2,36	31	28	25	22	20	18	16	14	13	11	10	9	8	7	
55/70SN	70	2,76	105	94	84	75	66	60	53	47	42	31	33	30	26	24	
55/90SN	90	3,54	132	118	105	94	82	75	66	59	53	47	42	37	33	30	
55/100SN	100	3,94	173	155	138	124	108	99	87	78	70	62	57	52	46	41	
55/120SN	120	4,72	244	219	195	175	153	139	123	110	99	87	79	71	63	57	
55/135SN	135	5,31	522	468	417	373	326	297	262	234	212	187	171	156	139	124	
55/140SN	140	5,51	670	601	536	479	418	382	337	301	272	240	219	201	179	159	
55/150SN	150	5,90	792	711	634	567	495	451	399	355	322	283	257	230	206	185	
55/200SN	200	7,87	1393	1250	1115	996	870	794	701	625	566	498	448	400	358	306	

Roller tables for the EXTRA HEAVY floor models



head finished core OD range	winding head RW 55		winding head RW 55/B		winding head RW 55/BU	
	mm	inch/AWG	mm	inch/AWG	mm	inch/AWG
roller table RW 555-1	100-800	3,94-32	100-800	3,94-32	500-800	19,7-32
roller table RW 555-1P	100-800	3,94-32	100-800	3,94-32	500-800	19,7-32
roller table RW 555-1PSR	-	-	-	-	ab 500	ab 19,7
roller table RW 555-S0	200-1500	7,87-59	200-1500	7,87-59	500-1500	19,7-59

Other clamping size on request

Other clamping size on request

PWMmaschine line

The brand new RUFF toroidal winding machine is an automated version of a hook winding machine. It is designed for strong wires up from 1 mm to 3,5 mm copper wire diameter. The max. wire length for winding is approx. 1,2 mm wire (2 m possible, if winding will be started from the middle of the winding). The FID depends on the wire diameter with the needed hook and is approx. 4-6 time wire diameter. The machine has a small PLC with a 2-line LCD and can be programmed by a very user friendly and easy programming surface. Winding process: manual inserting of toroidal core, fixing of start wire, cut the wire, automatic winding cycle. Typical winding applications are chokes and filters.

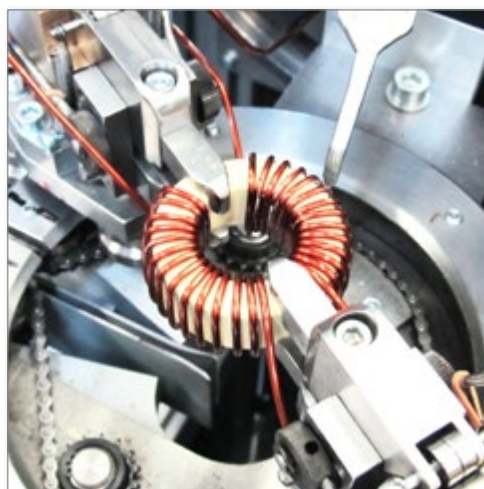
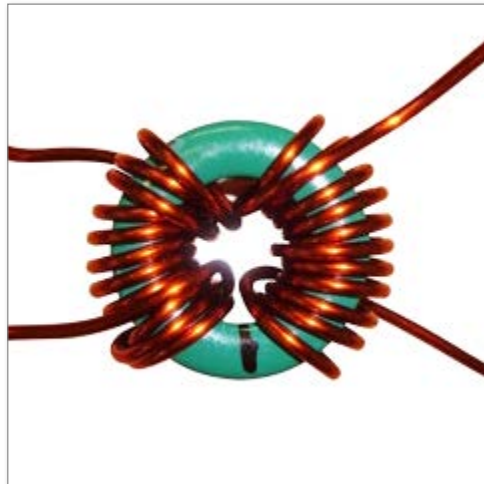
PWM - Pull Winding Machine

- operating panel:
 - PLC controller with LCD modul with 2 program lines
 - 2 push buttons for start / stop
 - push button for core movement
 - push button for manual mode
 - 2 potentiometer for speed preset of: wind, slow turns
- memory: Capacity of 32 programs
- language: English / German
- motor: motor for core drive motor for hook
- Machine includes one hook and one set of clamps for fixing toroidal core.

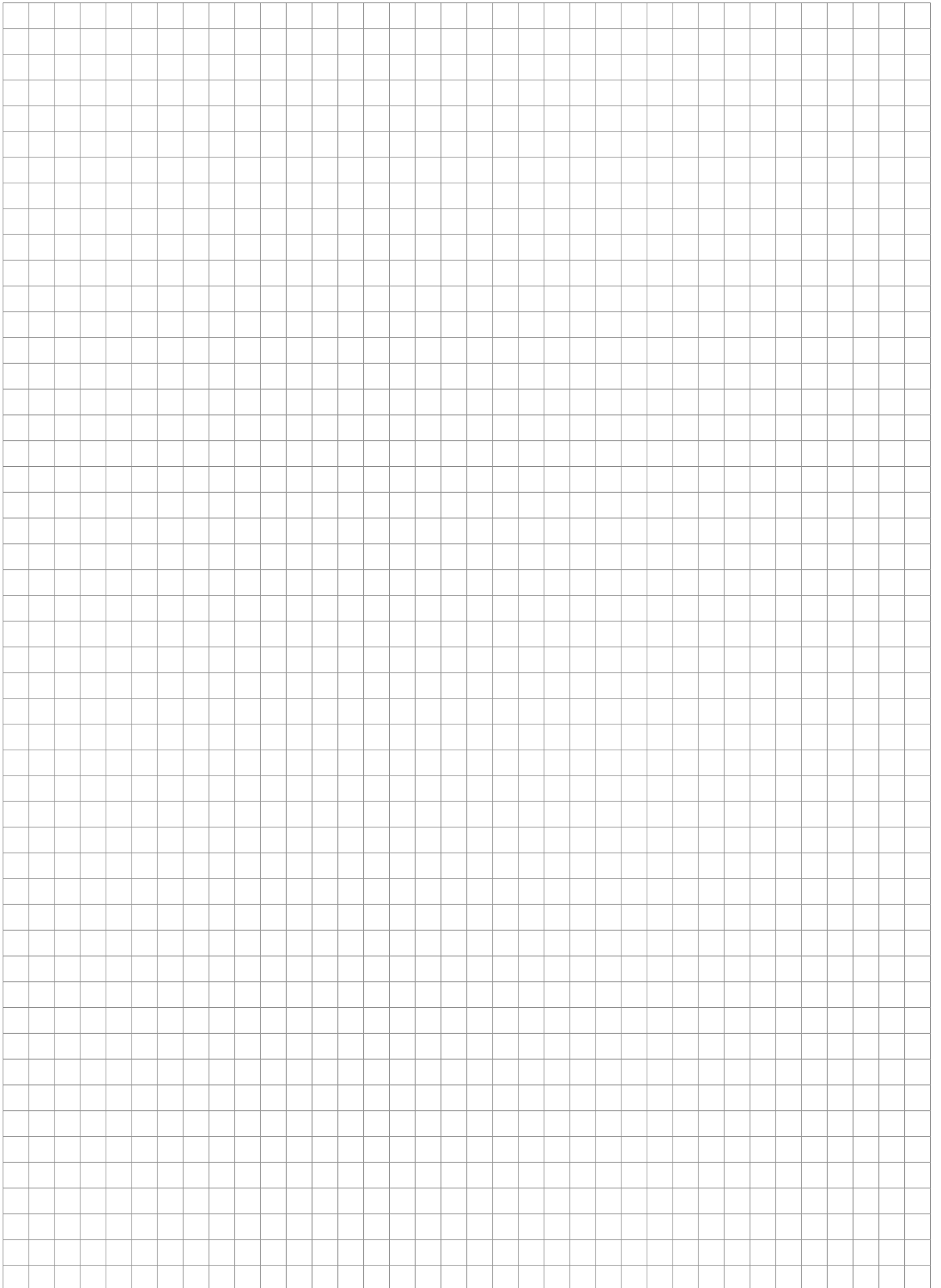


Capability ranges

wire Ø	1 – 3,5 mm	compressed air	6 bar
max. wire length	1,2 m	supply voltage	230 V / AC / 50Hz / 16 A
finished core OD	15 – 60 mm	machine size	1850 x 750 mm
finished core ID	4 – 6 x wire Ø	machine weight	approx. 400 kg
finished core H	50 mm		



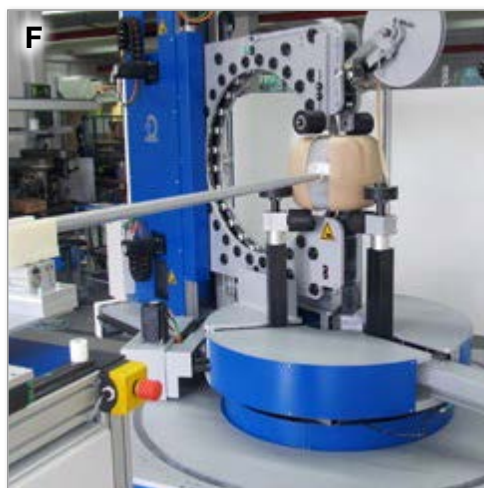
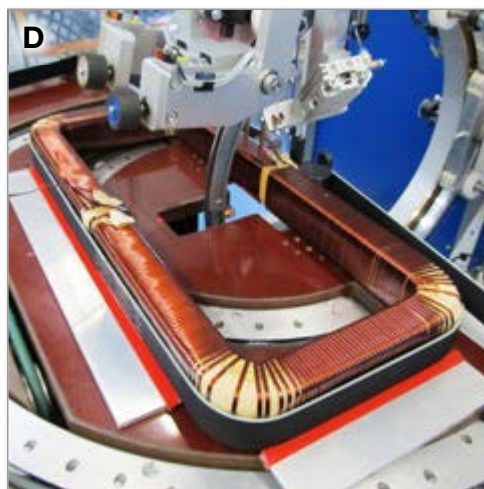
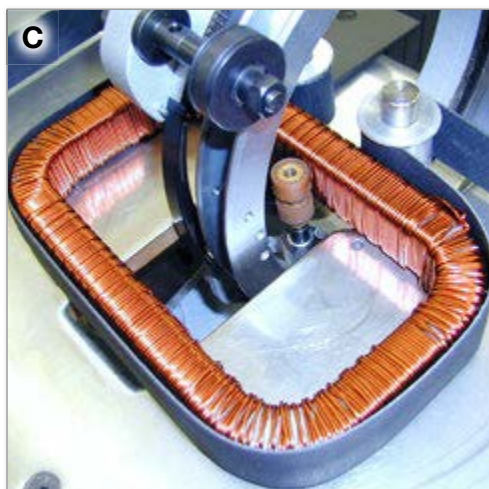
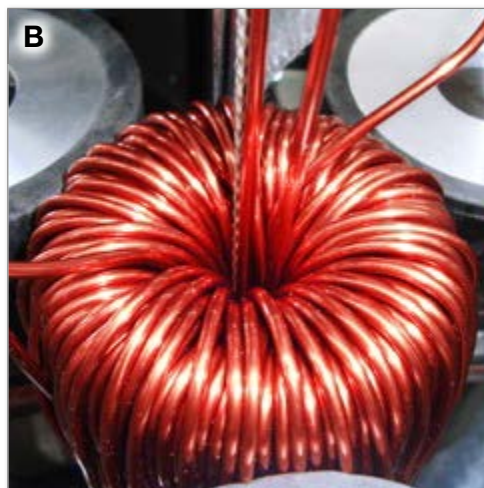
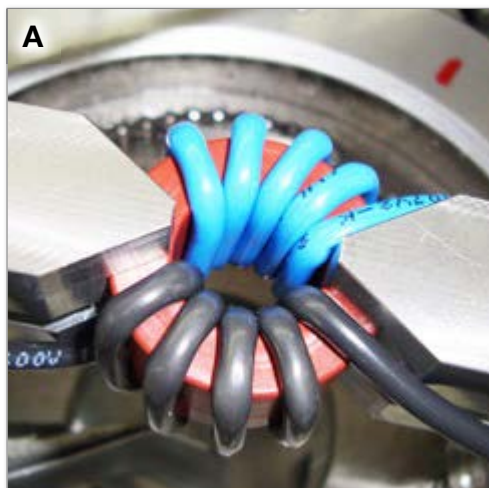
Your personal notes



Accessories

and special devices

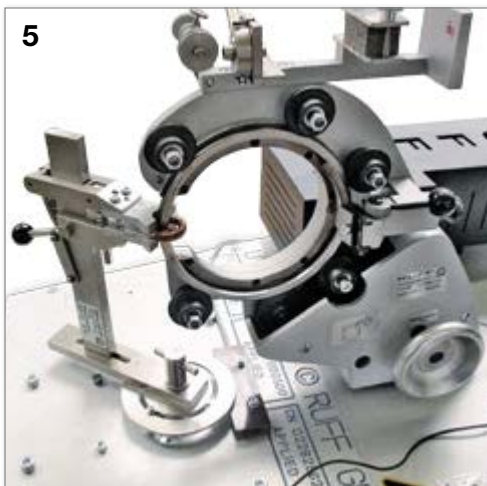
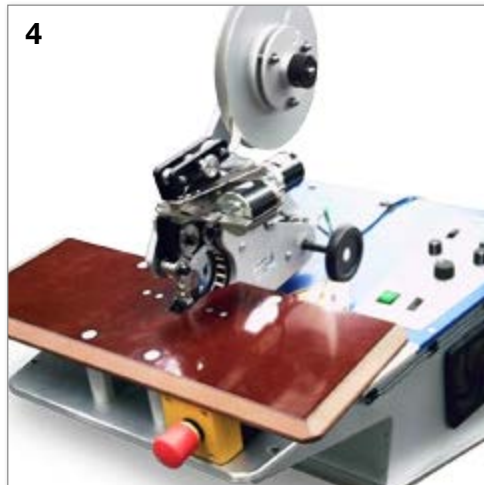
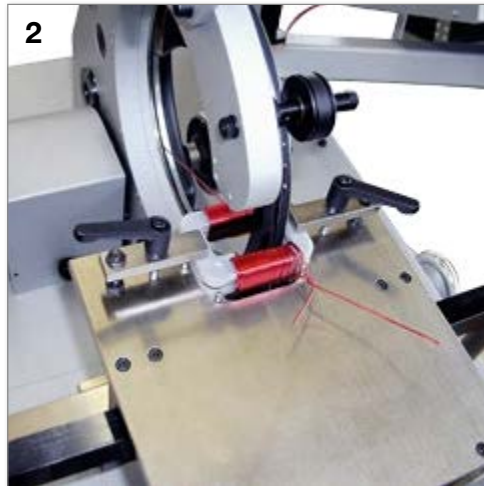
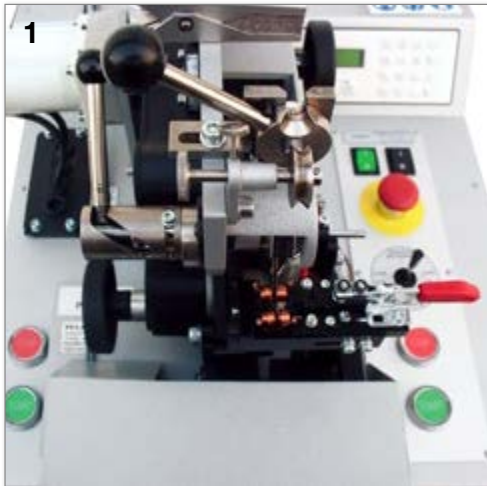
- A) PWM
- B) RW 05-ML
- C) SWT roller table
- D) REWT roller table for rectangular core
- E) Automated toroidal winding machine
- F) RWKCT special machine



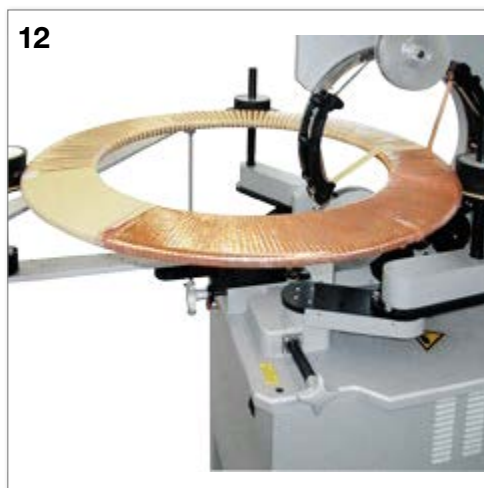
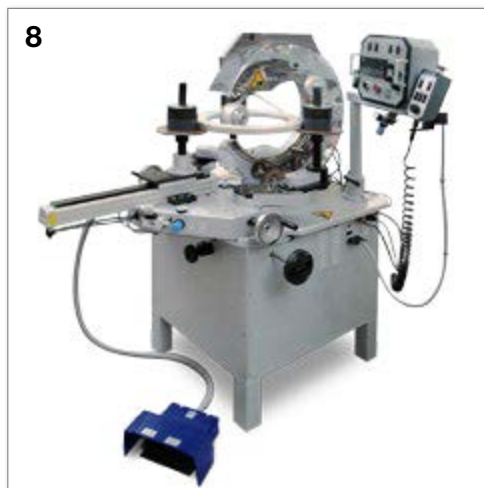
Accessories

and special devices

- 1) Parallel winding device for MINI machines
- 2) Parallel winding device for BENCH machines
- 3) Roller table for stadion- / oval cores
- 4) RWE-Simple-Tape-Ergo for taping of field coils
- 5) Segment holder for BENCH machines
- 6) Segment holder for FLOOR machines



- 7) Taping machine for U-shaped coils
- 8) Roller table RW 444-1P
- 9) Stator winding machine
- 10) Extra heavy stator winding machine
- 11) Taping machine for helical coils
- 12) Circulating tape dispenser system



Questionnaire for toroidal winding machines

Please fill in the following table carefully:

customer _____

product type _____

core dimensions
before winding OD: _____ ID: _____ H: _____

wire Ø _____

no. of turns _____

winding sector _____

core dimensions
after winding OD: _____ ID: _____ H: _____

The following points are for internal use only:

no. of layers _____

wire length _____

pitch value _____

wire layering method _____

winding speed _____

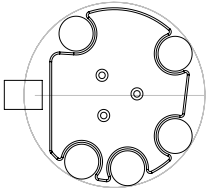
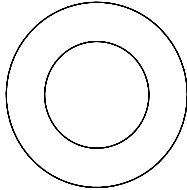
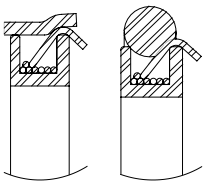
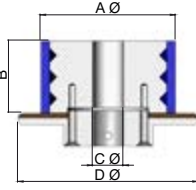
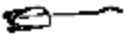
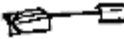

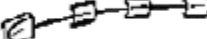







total winding time _____























machine base _____

winding head _____

magazine _____

roller table _____

wire guide plate type	winding performance		belt type	core transport rollers type		
				 <p>A = _____ B = _____ C = _____ D = _____</p>		
slider type	guide pulley type		guide roller with backplate	magazine types		
1 pc type  2 pc type  3 pc type  4 pc type 	standard V-groove	flat or U-groove	 wire guide hook 	KN / KN	SN / SN	Split type
						

<p>Netztrafos power transformers</p> <p>primary secondary taping machine base roller table application</p>	 <p>Winding head RW 20 Winding head RW 1 Taping head RW200/B RWE RW 222-L 20 VA</p>	 <p>Winding h. RW 25 Winding h. RW 300 Taping h. RW300/B RWE RW 222-VL 100 VA</p>	 <p>Winding h. RW 30 Winding h. RW 2 Taping h. RW300/B RWE RW 222-VL 200 VA</p>	 <p>Winding h. RW 30 Winding h. RW 3 Taping h. RW3/B RWE RW222-VL+RW332 500 VA</p>	 <p>Winding h. RW 30 Winding h. RW 3 Taping h. RW3/B RWE RW222-VL+RW332 1000 VA</p>	 <p>Winding h. RW 40 Winding h. RW 4 Taping h. RW4/B RWE RW 332 1500 VA</p>
<p>Strom- und Messwandler current and instrument transformers</p> <p>bare core size mm turns x Ø wire size mm wound coil size mm machine base roller table winding head + magazine</p>	 <p>48 x 35 x 18 600 x 0,40 51 x 32 x 18 RWE RW 222-L RW 20 + 20/16</p>	 <p>49 x 39 x 26 1 layer x 1,0 bifilar 52 x 35,5 x 28 RWS RW 222-VL RW 2 + 2/21</p>	 <p>120 x 60 x 38 30 x 2,8 bifilar 130 x 52 x 45 RWS RW 333-V RW 44-1 + 44/50</p>	 <p>120 x 50 x 50 1 sec.x1,7+ 1 sec.x2,8 128 x 45 x 57 RWS RW 333 RW 44-1 + 44/50 KN</p>	 <p>160 x 100 x 47 1 layer x 4,5 170 x 90 x 57 RWS RW 555-1 RW 55 + 55/70</p>	 <p>45 x 37 x 22 1 layer x 1,32 47,8 x 34 x 24,6 RWE RW 222-VL RW 2 + 2/21</p>
<p>Regeltrafos auto transformers</p> <p>bare core size mm turns x Ø wire size mm wound coil size mm machine base roller table winding head + magazine</p>	 <p>71 x 40 x 61 1 layer x 0,45 (325°) 72,3 x 37,5 x 62,3 RWE segment holder RW 2 + 2/18</p>	 <p>145 x 70 x 80 1 layer x 1,12 (320°) 147,5 x 64,5 x 83 RWE segment holder RW 3 + 3/60</p>	 <p>180 x 86 x 67 1 layer x 1,4 (340°) 184 x 80 x 75 RWS RW 333-V RW 33 + 33/80</p>	 <p>220 x 110 x 65 1 layer x 2,0 (320°) 225 x 105 x 69,5 RWS segment holder RW 44-1 + 44/10</p>	 <p>300 x 170 x 80 1 layer x 2,36 trif. + 305 x 160 x 85 RWS RW 333-V RW 44-1V + 44/100</p>	 <p>Final application sample RWS segment holder RW 44-1 + 44/50</p>
<p>Statoren stators</p> <p>application machine base roller table winding head</p>	 <p>coil with 4 sectors, each sector precision bank wound wire Ø 0,125 RWE RW 222-L RW 0</p>	 <p>coil with 4 sectors, each sector bank wound wire Ø 0,2 RWE segment holder RW 20</p>	 <p>coil with 36 sectors sector precision bank wound wire Ø 2,24 SWM - RW 55 special table special head</p>	 <p>coil with 12 sectors, each sector random bank wound wire Ø 0,4 RWE segment holder RW 0</p>	 <p>coil with 36 sectors, each sector random wound wire Ø 0,5 SWM-PC special table RW 1</p>	 <p>coil with 2 sectors, each sector precision bank wound wire Ø 1,2 RWE segment holder RW 2</p>
<p>Sonderspulen special coils</p> <p>application machine base roller table winding head</p>	 <p>core type 100x50x30 mm, 1 layer wound with litz wire Ø 30 x 0,6 mm RWE RW 332 RW 3</p>	 <p>coil with 180° body precision bank wound with wire Ø 0,6 mm RWE segment holder RW 1</p>	 <p>potentiometer resistance wire Ø 0,35 RWE segment holder RW 0</p>	 <p>special coil with balance winding RWE segment holder RW 20</p>	 <p>rogowski coil, 1 layer precision wound with wire size 0,2 RWE RW 222-L RW 0</p>	 <p>special current transformer, 2 sectors bank wound, wire size 1,4 RWE special segm. holder RW 2</p>
<p>Bandagen tapings</p> <p>core size mm machine base roller table taping head</p>	 <p>34 x 13,5 x 17 1 layer mylar 5 mm wide RWE RW 112 RW 200/B</p>	 <p>field coil 25 x 30 mm 1 layer 50% overlapped cotton tape 15 mm RWE coil support table FB 0</p>	 <p>110 x 50 x 30 mm 1 layer cotton tape 15 mm RWE RW 222-VL RW 300/B</p>	 <p>155 x 80 x 45 1 layer with CT paper Tape 20 mm wide RWE RW 332 RW 2/B</p>	 <p>150 x 65 x 75 2 layers with cotton tape 25 mm wide RWE RW 332 RW 33/B</p>	 <p>150 x 100 x 35 multilayer taping with CT paper Tape 16 mm wide RWE coil support table RW 2/B</p>
<p>ovale Spulen oval coils</p> <p>core size mm machine base roller table taping head</p>	 <p>Oval coil Multilayer wire Ø 0,7 mm RWE RW 222-V-SWT RW 30</p>	 <p>Oval coil Multilayer flat wire RWS RW 333-V-SWT RW 44-1</p>	 <p>Oval coil Multilayer precision winding RWE special table RW 3</p>			

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