

# Toroidal winding machines



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

F.L. = Flat belt, R.B. = Round belt, S.S. = Side slider, I.S. = Inside slider



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Alle anderen Länder werden direkt von RUFF betreut.  
 All other countries will be served directly by RUFF.

## Hauptsitz und Produktion Head office and factory

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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 70 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 m<sup>2</sup> 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 it's 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.

|                           |                                         |                                          |
|---------------------------|-----------------------------------------|------------------------------------------|
| <b>MINI machine line</b>  | <b>wire Ø 0,05 - 1,0 mm</b><br>8 heads  | <b>core OD 3,0 - 150 mm</b><br>5 tables  |
| <b>BENCH machine line</b> | <b>wire Ø 0,05 - 2,8 mm</b><br>27 heads | <b>core OD 5 - 500 mm</b><br>9 tables    |
| <b>FLOOR machine line</b> | <b>wire Ø 0,4 - 4,5 mm</b><br>12 heads  | <b>core AD 65 - 2800 mm</b><br>9 tables  |
| <b>HEAVY machine line</b> | <b>wire Ø 0,8 - 6,5 mm</b><br>3 heads   | <b>core OD 100 - 2800 mm</b><br>4 tables |
| <b>PWM machine line</b>   | <b>wire Ø 1,0 - 3,5 mm</b><br>1 head    | <b>core AD 15 - 60 mm</b><br>1 table     |

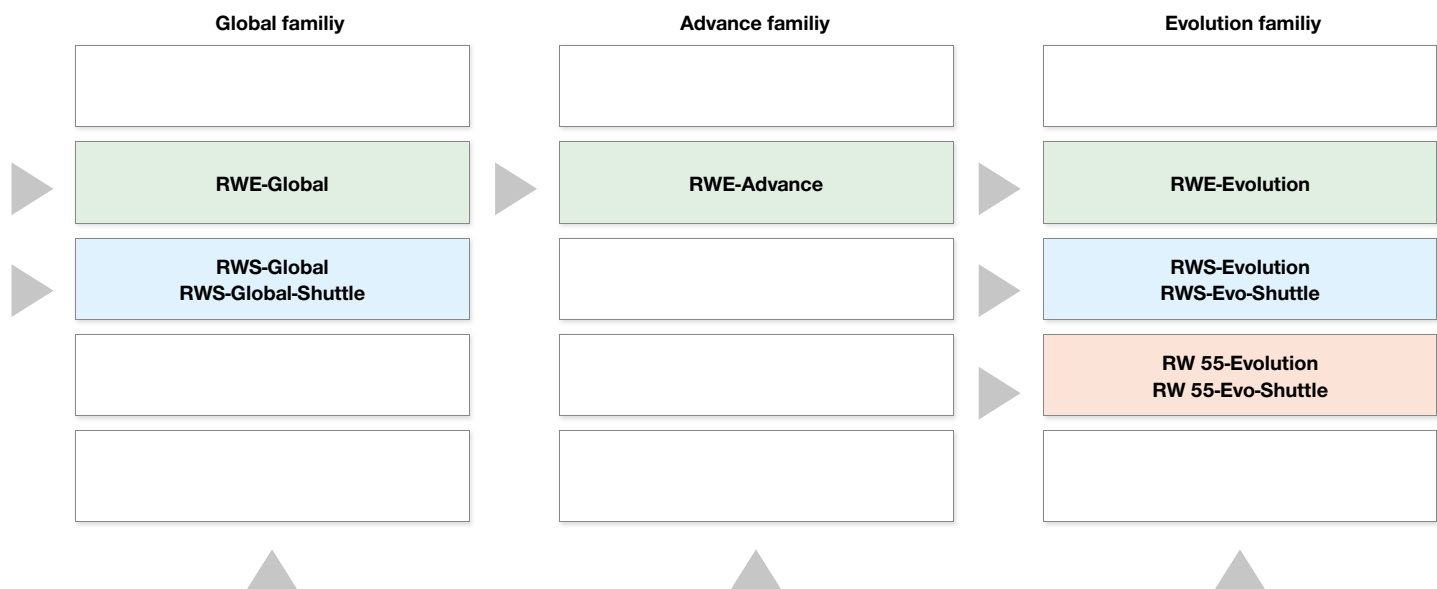
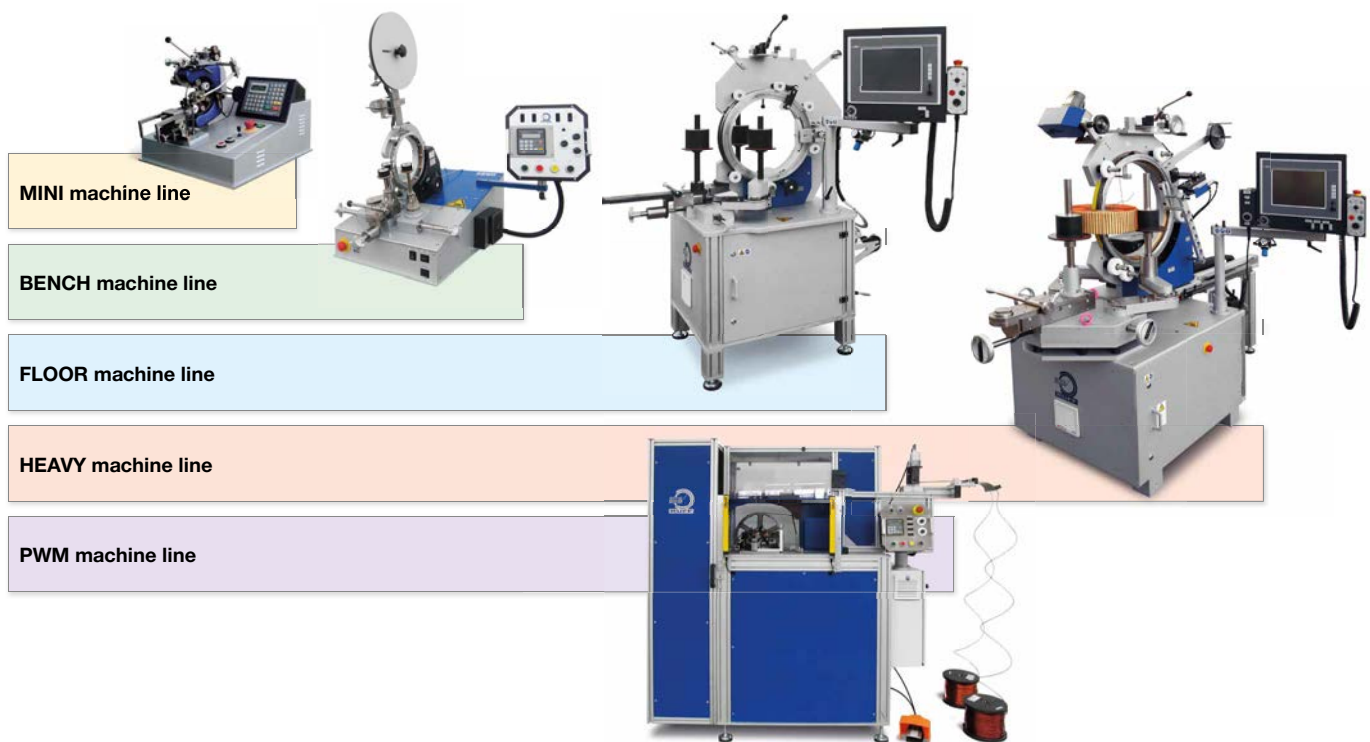
## Step 2

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

|                                       | Easy family     | Basic family                                |
|---------------------------------------|-----------------|---------------------------------------------|
| <b>MINI machine line</b><br>2 models  |                 | <b>MINI-Basic</b><br><b>MINI-Basic-Plus</b> |
| <b>BENCH machine line</b><br>5 models | <b>RWE-Easy</b> | <b>RWE-Basic</b>                            |
| <b>FLOOR machine line</b><br>4 models |                 |                                             |
| <b>HEAVY machine line</b><br>2 models |                 |                                             |
| <b>PWM machine line</b><br>1 model    | <b>PWM</b>      |                                             |

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





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

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



### 8 interchangeable heads for the Model MINI-Basic

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

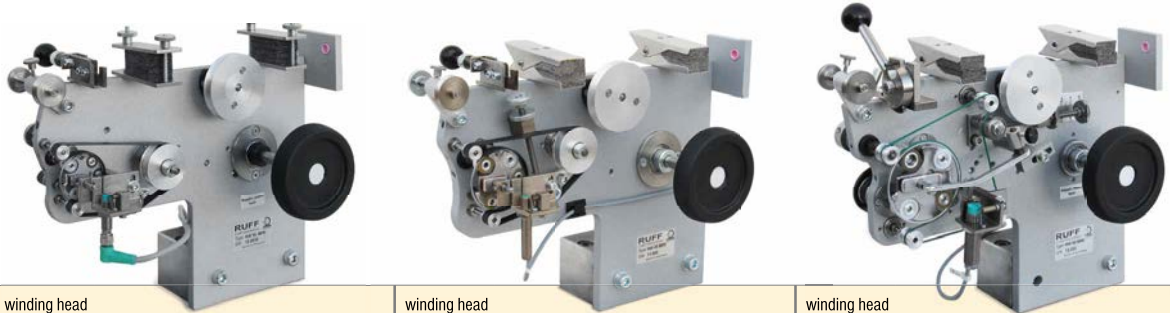
|                          |                     |                                            |                                           |
|--------------------------|---------------------|--------------------------------------------|-------------------------------------------|
| 5 interchangeable tables | <b>RW 111-XMINI</b> | <b>RW 111-MINI</b><br><b>RW 111-VXMINI</b> | <b>RW 111-VMINI</b><br><b>RW 115-MINI</b> |
|--------------------------|---------------------|--------------------------------------------|-------------------------------------------|



## 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 | 5-11                         | 0,2-0,43 | 5-11                         | 0,2-0,43 |
| 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,<br>RW 111-XMINI |             | RW 111-MINI,<br>RW 111-XMINI |             | RW 111-MINI,<br>RW 111-XMINI |             | RW 111-MINI,<br>RW 111-XMINI |             | RW 111-MINI,<br>RW 111-XMINI |          | RW 111-MINI,<br>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 |
| <b>35-MINI round and flat belt</b> |            |       |      |      |       |      |      |      |       |       |       |      |      |     |      |      |       |     |     |     |      |     |     |     |     |
| 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 |      |      |       |     |     |     |      |     |     |     |     |
| <b>45-MINI round and flat belt</b> |            |       |      |      |       |      |      |      |       |       |       |      |      |     |      |      |       |     |     |     |      |     |     |     |     |
| 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  |      |       |     |     |     |      |     |     |     |     |
| <b>60-MINI round and flat belt</b> |            |       |      |      |       |      |      |      |       |       |       |      |      |     |      |      |       |     |     |     |      |     |     |     |     |
| 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 lenght for<br>RW 35-MINI | belt lenght for<br>RW 45-MINI | belt lenght for<br>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                        |

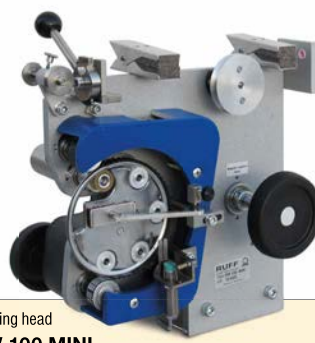
## Belt data base: list of flat and round belts for the magazines

| 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    | x          | x   | x   | x   |            |     |     |     |     |     |     |     |     |     |            |     |     |     |     |     |     |     |     |        | 0,315   |  |        |
|                         | length 346 mm |            |     |     |     |            |     |     |     |     |     |     |     |     |     |            |     |     |     |     |     |     |     |     |        |         |  | 13,622 |
|                         | width 8 mm    |            |     |     |     | x          | x   | x   | x   | x   | x   | x   | x   |     |     |            |     |     |     |     |     |     |     |     | 0,315  |         |  |        |
|                         | length 372 mm |            |     |     |     | x          | x   | x   | x   | x   | x   | x   | x   |     |     |            |     |     |     |     |     |     |     |     | 14,646 |         |  |        |
|                         | width 9,5 mm  |            |     |     |     |            |     |     |     |     |     |     |     |     | x   | x          | x   | x   | x   | x   | x   | x   | x   | x   | 0,374  |         |  |        |
|                         | length 480 mm |            |     |     |     |            |     |     |     |     |     |     |     |     | x   | x          | x   | x   | x   | x   | x   | x   | x   | x   | x      | 18,897  |  |        |
| round belts<br>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   | 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<br>RW 75-MINI                               |              |           |              |             |              | winding head<br>RW 100-MINI                              |              |           |              |             |              | winding head<br>RW 200-MINI                                           |              |           |              |             |              |
|--------------------------|----------------------------------------------------------|--------------|-----------|--------------|-------------|--------------|----------------------------------------------------------|--------------|-----------|--------------|-------------|--------------|-----------------------------------------------------------------------|--------------|-----------|--------------|-------------|--------------|
|                          | round belt                                               |              | flat belt |              | side slider |              | round belt                                               |              | flat belt |              | side slider |              | round belt                                                            |              | flat belt |              | side slider |              |
|                          | mm                                                       | inch/<br>AWG | mm        | inch/<br>AWG | mm          | inch/<br>AWG | mm                                                       | inch/<br>AWG | mm        | inch/<br>AWG | mm          | inch/<br>AWG | mm                                                                    | inch/<br>AWG | mm        | inch/<br>AWG | mm          | inch/<br>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<br>RW 111-XMINI, RW 111-VXMINI |              |           |              |             |              | RW 111-MINI, RW 111-VMINI<br>RW 111-XMINI, RW 111-VXMINI |              |           |              |             |              | RW 111-MINI, RW 111-VMINI<br>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

| magazi-<br>ne 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 <b>75-MINI</b>         |            |       |      |      |       |      |      |      |       |       |       |      |      |      |      |      |       |     |     |     |      |      |     |     |     |  |
| 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 <b>100-MINI</b>        |            |       |      |      |       |      |      |      |       |       |       |      |      |      |      |      |       |     |     |     |      |      |     |     |     |  |
| 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 <b>100-MINI/10-SIMPLE</b> |            |       |      |      |       |      |      |      |       |       |       |      |      |      |      |      |       |     |     |     |      |      |     |     |     |  |
| 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 <b>200-MINI</b>        |            |       |      |      |       |      |      |      |       |       |       |      |      |      |      |      |       |     |     |     |      |      |     |     |     |  |
| 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 <b>200-MINI/20-SIMPLE</b> |            |       |      |      |       |      |      |      |       |       |       |      |      |      |      |      |       |     |     |     |      |      |     |     |     |  |
| 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<br><b>RW 75-MINI</b> | belt length for<br><b>RW 100-MINI</b> | belt length for<br><b>RW 200-MINI</b> |
|----------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|
| 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           | <b>RW 100-MINI</b><br><b>RW 10-SIMPLE</b> | <b>RW 200-MINI</b><br><b>RW 20-SIMPLE</b> |            |               |
|-----------------------------|-------------------------------------------|-------------------------------------------|------------|---------------|
|                             |                                           | 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

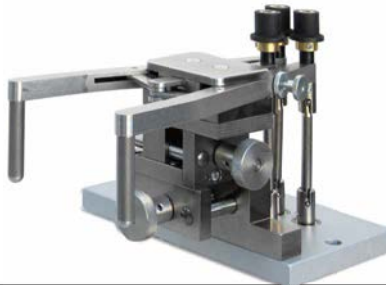
| winding head type                 |                  | RW 75-MINI |     |     |     |     |     |     |     |     |     | RW 100-MINI |      |     |     |     |     |     |     |     |     | RW 200-MINI |     |     |     |     |     |     |     |     |   |  |  |  |  |
|-----------------------------------|------------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-------------|-----|-----|-----|-----|-----|-----|-----|-----|---|--|--|--|--|
| 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<br>for thick<br>wires | 210XL 037        | x          | 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   | x |  |  |  |  |
| flat belt                         | width<br>9,5 mm  |            |     |     |     |     |     |     |     |     |     |             |      |     |     |     |     |     |     |     |     |             |     |     |     |     |     |     |     |     |   |  |  |  |  |
|                                   | length<br>513 mm | x          | x   | x   | x   | x   | x   |     |     |     |     |             |      |     |     |     |     |     |     |     |     |             |     |     |     |     |     |     |     |     |   |  |  |  |  |
| round belts<br>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   |             |     |     |     |     |     |     |     |     |   |  |  |  |  |

## 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.

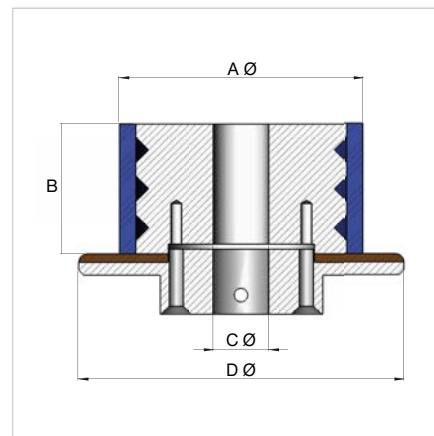
## Possible combination of winding heads and roller tables



| winding head type | core OD with<br>RW 111-MINI, RW111-XMINI | core OD with<br>RW 111-VMINI, RW111-VXMINI | core OD with<br>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<br>mm | B<br>mm | C<br>mm | D<br>mm | smallest core<br>OD mm | suitable winding head | typical use                   |
|-------------------|-------------|---------|---------|---------|---------|------------------------|-----------------------|-------------------------------|
| RW 111-MINI       | 2 pcs.      | 6       | 4       | 3       | 7,5     | 3,5                    | 35-MINI to 200-MINI   | extremely small<br>cores flat |
|                   | 1 pcs.      | 6       | 4       | 3       | 6       |                        |                       |                               |
| 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 diamter                                                                     | 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<br>RW 4         | RW 1<br>RW 4-V      | RW 2<br>RW 4-RZ    | RW 3               |
| 6 slider heads    | RW 10<br>RW 40       | RW 20<br>RW 40-V    | RW 25              | RW 30              |
| 6 belt heads      | RW 60-C<br>RW 200-V  | RW 100-C<br>RW 300  | RW 100             | RW 200             |
| 2                 | RW 01-ML<br>RW 03-ML |                     |                    |                    |
| 8 taping heads    | RW 0/B<br>RW 4/B     | RW 1/B<br>RW 4-RZ/B | RW 2/B<br>RW 200/B | RW 3/B<br>RW 300/B |

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

### Capability ranges

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

|                     |                                         |
|---------------------|-----------------------------------------|
| <b>controller</b>   | SPS M91 - LCD display with 2 text lines |
| <b>winding head</b> | three phase motor                       |
| <b>roller table</b> | servo 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 build with high quality components and enables to produce high quality coils. The controller with

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

|                     |                                                |
|---------------------|------------------------------------------------|
| <b>controller</b>   | N.C. SIAX 110L - LCD display with 4 text lines |
| <b>winding head</b> | three phase motor                              |
| <b>roller table</b> | 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.

|                     |                                                                |
|---------------------|----------------------------------------------------------------|
| <b>controller</b>   | 5.7" monochrom touchpanel with 2 function buttons (start/stop) |
| <b>language</b>     | all Latin characters                                           |
| <b>winding head</b> | three phase motor with inverter                                |
| <b>roller table</b> | 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.

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

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

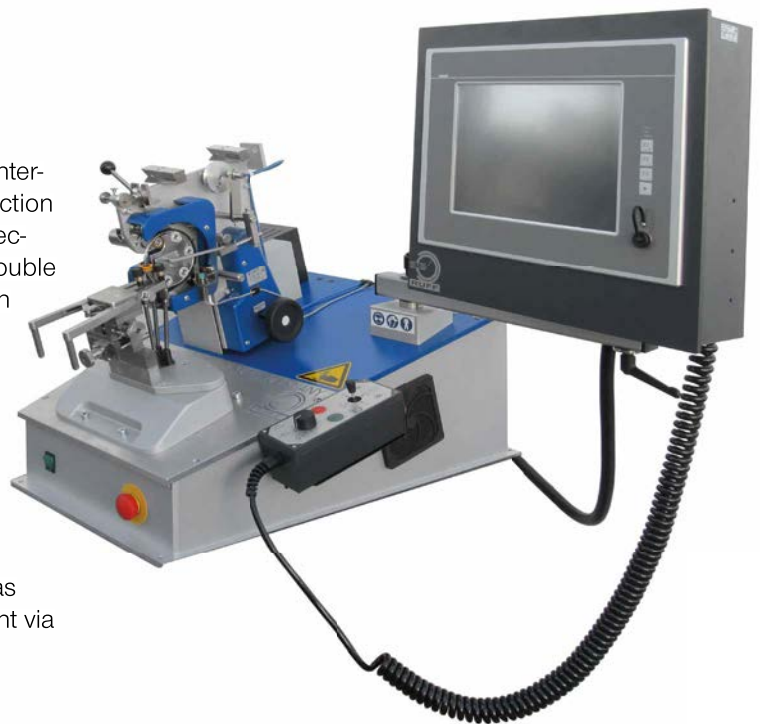


## Model RWE-Evolution

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.

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



## Your personal notes

This image shows a full page of blank graph paper. The grid consists of small, uniform squares formed by thin, light gray lines. There are no margins, text, or other markings on the page.

# 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)



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

| magazine<br>type | final hole<br>diameter |       | final hole d.<br>max. height |       | 0,1  | 0,2  | 0,32 | 0,4 | 0,5 | 0,6 | 0,71 | 0,8 | 0,9 | 1,0 | 1,12 | 1,125 | 1,32 | 1,4 | 1,5 | 1,6 | 1,7 | 1,8 | 1,9 | 2,0 | 2,12 | 2,24 | 2,36 | 2,5 | 2,65 | 2,8 | mm  |
|------------------|------------------------|-------|------------------------------|-------|------|------|------|-----|-----|-----|------|-----|-----|-----|------|-------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|-----|------|-----|-----|
|                  | mm                     | inch  | mm                           | inch  | 38   | 32   | 28   | 26  | 24  | 22½ | 21   | 20  | 19  | 18  | 17   | 16½   | 16   | 15½ | 15  | 14½ | 14  | 13½ | 13  | 12½ | 12   | 11½  | 11   | 10½ | 10   | 9½  | AWG |
|                  | mm                     | inch  | mm                           | inch  | 38   | 32   | 28   | 26  | 24  | 22½ | 21   | 20  | 19  | 18  | 17   | 16½   | 16   | 15½ | 15  | 14½ | 14  | 13½ | 13  | 12½ | 12   | 11½  | 11   | 10½ | 10   | 9½  | AWG |
| RW 0             |                        |       |                              |       |      |      |      |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 0/8KN            | 9                      | 0,354 | 14                           | 0,551 | 56   | 15   | 5    | 4   | 3   |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 0/10KN           | 11                     | 0,433 | 15                           | 0,59  | 83   | 21   | 8    | 6   | 4   |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 0/11KN           | 12                     | 0,472 | 18                           | 0,708 | 128  | 33   | 13   | 9   | 6   | 4   |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 0/12KN           | 13                     | 0,512 | 19                           | 0,748 | 160  | 41   | 16   | 11  | 7   | 5   |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 0/14KN           | 16                     | 0,630 | 20                           | 0,787 | 266  | 69   | 26   | 19  | 12  | 9   |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 0/16KN           | 18                     | 0,709 | 22                           | 0,866 | 396  | 103  | 39   | 28  | 18  | 13  |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 0/18KN           | 20                     | 0,787 | 25                           | 0,984 | 501  | 130  | 49   | 35  | 23  | 16  |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 0/22KN           | 24                     | 0,945 | 29                           | 1,142 | 774  | 200  | 76   | 54  | 35  | 25  |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| RW 1             |                        |       |                              |       |      |      |      |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/10KN/SN        | 13                     | 0,511 | 18                           | 0,708 | 207  | 53   | 20   | 14  | 9   | 7   |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/11KN           | 15                     | 0,59  | 20                           | 0,787 | 291  | 75   | 28   | 20  | 13  | 9   | 7    |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/11SN           | 15                     | 0,59  | 20                           | 0,787 | 255  | 66   | 25   | 18  | 12  | 8   | 6    |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/12KN           | 16                     | 0,63  | 23                           | 0,906 | 415  | 107  | 41   | 29  | 19  | 13  | 10   | 8   | 6   |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/12SN           | 16                     | 0,63  | 23                           | 0,906 | 411  | 106  | 40   | 29  | 19  | 13  | 10   | 8   | 6   | 2   |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/12G-KN         | 16                     | 0,63  | 23                           | 0,906 | 469  | 121  | 46   | 33  | 21  | 15  | 11   | 9   | 7   | 3   |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/14KN           | 18                     | 0,71  | 24                           | 0,95  | 598  | 155  | 58   | 42  | 27  | 19  | 14   | 11  | 9   | 3   |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/15KN           | 20                     | 0,787 | 25                           | 0,984 | 663  | 171  | 65   | 46  | 30  | 21  | 15   | 12  | 10  | 7   |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/15SN           | 20                     | 0,787 | 25                           | 0,984 | 666  | 172  | 65   | 47  | 30  | 21  | 15   | 12  | 10  | 1   |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/18KN           | 22                     | 0,866 | 28                           | 1,102 | 989  | 256  | 97   | 69  | 45  | 32  | 23   | 18  | 14  | 8   |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/18SN           | 22                     | 0,866 | 28                           | 1,102 | 993  | 257  | 97   | 70  | 45  | 32  | 23   | 18  | 15  | 12  |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/18G-KN         | 22                     | 0,866 | 28                           | 1,102 | 984  | 255  | 96   | 69  | 45  | 32  | 23   | 18  | 14  | 12  |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/22KN           | 26                     | 1,023 | 33                           | 1,30  | 1642 | 425  | 161  | 115 | 75  | 53  | 38   | 30  | 24  | 12  |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/22G-KN         | 26                     | 1,023 | 33                           | 1,30  | 1632 | 422  | 160  | 114 | 74  | 52  | 38   | 30  | 24  | 20  |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/30KN           | 31                     | 1,22  | 37                           | 1,456 | 2543 | 658  | 249  | 178 | 116 | 81  | 59   | 47  | 37  | 20  |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/30SN           | 31                     | 1,22  | 37                           | 1,456 | 2543 | 658  | 249  | 178 | 116 | 81  | 59   | 47  | 37  | 31  |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 1/37KN           | 37                     | 1,456 | 41                           | 1,614 | 3040 | 865  | 407  | 234 | 154 | 109 | 79   | 62  | 51  | 39  |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| RW 2             |                        |       |                              |       |      |      |      |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/12KN/SN        | 17                     | 0,669 | 24                           | 0,945 |      | 231  | 87   | 63  | 41  | 29  | 21   | 17  | 13  | 11  |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/12G-KN         | 17                     | 0,669 | 24                           | 0,945 |      | 219  | 83   | 59  | 39  | 27  | 20   | 16  | 12  | 10  |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/15KN           | 18                     | 0,709 | 26                           | 1,024 |      | 266  | 100  | 72  | 47  | 33  | 24   | 19  | 15  | 12  | 10   | 8     | 7    | 6   |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/15SN           | 18                     | 0,709 | 26                           | 1,024 |      | 267  | 101  | 72  | 47  | 33  | 24   | 19  | 15  | 12  | 10   | 8     | 7    | 6   |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/15G-KN         | 18                     | 0,709 | 26                           | 1,024 |      | 250  | 95   | 68  | 44  | 31  | 23   | 18  | 14  | 12  | 9    | 8     | 7    | 6   |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/16KN           | 19                     | 0,748 | 27                           | 1,063 |      | 266  | 101  | 72  | 47  | 33  | 24   | 19  | 15  | 12  | 10   | 8     | 7    | 6   |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/18KN           | 21                     | 0,827 | 29                           | 1,142 |      | 416  | 157  | 113 | 73  | 51  | 37   | 30  | 24  | 19  | 15   | 13    | 11   | 10  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/18SN           | 21                     | 0,827 | 29                           | 1,142 |      | 418  | 158  | 113 | 74  | 52  | 38   | 30  | 24  | 19  | 16   | 13    | 11   | 10  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/18G-KN         | 21                     | 0,827 | 29                           | 1,142 |      | 466  | 176  | 126 | 82  | 58  | 42   | 33  | 26  | 22  | 17   | 14    | 13   | 11  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/21KN           | 24                     | 0,945 | 31                           | 1,220 |      | 572  | 217  | 155 | 101 | 71  | 51   | 41  | 32  | 27  | 21   | 17    | 16   | 14  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/21SN           | 24                     | 0,945 | 31                           | 1,220 |      | 576  | 218  | 156 | 101 | 71  | 52   | 41  | 33  | 27  | 21   | 17    | 16   | 14  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/21G-KN         | 24                     | 0,945 | 31                           | 1,220 |      | 612  | 232  | 166 | 108 | 76  | 55   | 44  | 35  | 28  | 23   | 18    | 17   | 15  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/22KN           | 26                     | 1,024 | 33                           | 1,299 |      | 707  | 268  | 192 | 125 | 88  | 64   | 51  | 40  | 33  | 26   | 21    | 19   | 17  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/24KN           | 28                     | 1,102 | 35                           | 1,378 |      | 865  | 327  | 234 | 152 | 107 | 78   | 62  | 49  | 40  | 32   | 26    | 23   | 21  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/24SN           | 28                     | 1,102 | 35                           | 1,378 |      | 870  | 329  | 236 | 153 | 108 | 78   | 62  | 49  | 40  | 32   | 26    | 24   | 21  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/24G-KN         | 28                     | 1,102 | 35                           | 1,378 |      | 854  | 323  | 231 | 150 | 106 | 77   | 61  | 48  | 40  | 32   | 26    | 23   | 21  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/26KN           | 30                     | 1,181 | 37                           | 1,457 |      | 1140 | 431  | 309 | 201 | 141 | 103  | 81  | 65  | 53  | 42   | 34    | 31   | 28  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/30KN           | 31                     | 1,220 | 38                           | 1,496 |      | 1091 | 413  | 296 | 192 | 135 | 98   | 78  | 62  | 51  | 41   | 33    | 30   | 26  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/30SN           | 31                     | 1,220 | 38                           | 1,496 |      | 1091 | 413  | 296 | 192 | 135 | 98   | 78  | 62  | 51  | 41   | 33    | 30   | 26  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/30G-KN         | 31                     | 1,220 | 38                           | 1,496 |      | 876  | 331  | 237 | 154 | 108 | 79   | 63  | 50  | 41  | 33   | 26    | 24   | 21  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/32KN           | 33                     | 1,299 | 39                           | 1,535 |      | 1222 | 462  | 331 | 215 | 151 | 110  | 87  | 69  | 57  | 46   | 37    | 33   | 30  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/32G-KN         | 33                     | 1,299 | 39                           | 1,535 |      | 1229 | 465  | 333 | 216 | 152 | 111  | 88  | 70  | 57  | 46   | 37    | 33   | 30  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/33KN           | 34                     | 1,339 | 40                           | 1,575 |      | 1544 | 584  | 418 | 272 | 191 | 139  | 110 | 87  | 72  | 58   | 47    | 42   | 37  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/33SN           | 34                     | 1,339 | 40                           | 1,575 |      | 1544 | 584  | 418 | 272 | 191 | 139  | 110 | 87  | 72  | 58   | 47    | 42   | 37  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/33G-KN         | 34                     | 1,339 | 40                           | 1,575 |      | 1329 | 503  | 360 | 234 | 165 | 120  | 95  | 75  | 62  | 50   | 40    | 36   | 32  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/35KN           | 36                     | 1,417 | 50                           | 1,969 |      | 1715 | 649  | 465 | 302 | 212 | 154  | 122 | 97  | 80  | 64   | 52    | 46   | 41  |     |     |     |     |     |     |      |      |      |     |      |     |     |
| 2/35SN           | 36                     | 1,417 | 50                           | 1,969 |      | 1670 | 632  |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |      |      |      |     |      |     |     |

## 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 dereels 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 |
| <b>RW 10</b>                 |                     |       |      |       |       |      |      |      |      |      |      |      |      |      |      |     |      |      |     |
| 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   |      |      |      |      |      |      |     |      |      |     |
| <b>RW 20</b>                 |                     |       |      |       |       |      |      |      |      |      |      |      |      |      |      |     |      |      |     |
| 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  |      |      |     |      |      |     |
| <b>RW 25</b>                 |                     |       |      |       |       |      |      |      |      |      |      |      |      |      |      |     |      |      |     |
| 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   |     |      |      |     |
| <b>RW 30</b>                 |                     |       |      |       |       |      |      |      |      |      |      |      |      |      |      |     |      |      |     |
| 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 |      |      |     |
| <b>RW 40, RW 40-V</b>        |                     |       |      |       |       |      |      |      |      |      |      |      |      |      |      |     |      |      |     |
| 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  |     |

## Slider data base: list of slider for the magazines

| winding head type           | RW 10     | RW 20       |            |               |
|-----------------------------|-----------|-------------|------------|---------------|
|                             |           | 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     |



## 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)<br>380 (Ø 1,1-1,6 mm) |          | 490 (Ø 0,3-1,0 mm)<br>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,<br>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 |
| <b>RW 100</b>                                                                                                           |                     |       |      |      |      |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>100/2</b>                                                                                                            | 3                   | 0,118 | 6    | 2,9  |      |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>2.25</b>                                                                                                             | 3                   | 0,118 | 5,7  | 2,7  | 1,5  |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>2,5</b>                                                                                                              | 3,5                 | 0,138 | 10   | 4,6  | 2,5  |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>3</b>                                                                                                                | 4                   | 0,158 | 14   | 6,6  | 3,8  | 2,5  |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>3,5</b>                                                                                                              | 5                   | 0,197 | 21   | 10   | 6    | 4    | 2,6  | 1,9  |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>4</b>                                                                                                                | 5,5                 | 0,217 | 28   | 13   | 8    | 5    | 3,5  | 2,5  | 2,4  | 1,9  |      |      |      |      |     |     |     |     |     |     |
| <b>4,5</b>                                                                                                              | 6                   | 0,236 | 37   | 18   | 10   | 7    | 5    | 3    | 3,2  | 2,5  |      |      |      |      |     |     |     |     |     |     |
| <b>5</b>                                                                                                                | 6,5                 | 0,256 | 46   | 22   | 13   | 9    | 6    | 4,5  | 3,4  | 2,7  |      |      |      |      |     |     |     |     |     |     |
| <b>5,5</b>                                                                                                              | 7,5                 | 0,295 | 60   | 29   | 17   | 11   | 8    | 5,5  | 4,8  | 3,8  |      |      |      |      |     |     |     |     |     |     |
| <b>6</b>                                                                                                                | 8                   | 0,315 | 77   | 36   | 21   | 14   | 10   | 7    | 5,5  | 4    |      |      |      |      |     |     |     |     |     |     |
| <b>RW 200</b>                                                                                                           |                     |       |      |      |      |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>200/3</b>                                                                                                            | 5                   | 0,197 |      | 11   | 6,5  |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>3,5</b>                                                                                                              | 5,5                 | 0,217 |      | 15   | 8,5  | 5,5  |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>4</b>                                                                                                                | 6                   | 0,236 |      | 20   | 12   | 8    |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>4,5</b>                                                                                                              | 6,5                 | 0,256 |      | 30   | 17   | 11   | 8    |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>5</b>                                                                                                                | 7                   | 0,276 |      | 36   | 21   | 14   | 10   | 7    | 5    | 4    |      |      |      |      |     |     |     |     |     |     |
| <b>5,5</b>                                                                                                              | 7,5                 | 0,295 |      | 47   | 27   | 18   | 12   | 9    | 7    | 6    | 5    |      |      |      |     |     |     |     |     |     |
| <b>6</b>                                                                                                                | 8                   | 0,315 |      | 58   | 33   | 22   | 15   | 11   | 9    | 7    | 6    |      |      |      |     |     |     |     |     |     |
| <b>6,5</b>                                                                                                              | 8,5                 | 0,335 |      | 75   | 42   | 28   | 19   | 14   | 11,9 | 9    | 8    |      |      |      |     |     |     |     |     |     |
| <b>7</b>                                                                                                                | 9                   | 0,355 |      | 87   | 60   | 33   | 23   | 17   | 13   | 11   | 9    |      |      |      |     |     |     |     |     |     |
| <b>7,5 (K)</b>                                                                                                          | 10,5                | 0,413 |      | 115  | 66   | 43   | 30   | 22   | 17,5 | 14   | 11   |      |      |      |     |     |     |     |     |     |
| <b>8</b>                                                                                                                | 11                  | 0,433 |      | 140  | 81   | 53   | 37   | 27   | 21   | 17   | 14   |      |      |      |     |     |     |     |     |     |
| <b>RW 200-V</b>                                                                                                         |                     |       |      |      |      |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>200-V/4,2</b>                                                                                                        | 6                   | 0,236 |      |      | 8    | 5,3  | 3,7  | 2,7  | 2,1  | 1,7  | 1,4  | 1,1  | 0,9  | 0,8  |     |     |     |     |     |     |
| <b>4,7</b>                                                                                                              | 7                   | 0,276 |      |      | 11   | 7,2  | 5    | 3,7  | 2,9  | 2,3  | 1,9  | 1,5  | 1,4  | 1,2  |     |     |     |     |     |     |
| <b>5,1</b>                                                                                                              | 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 |     |     |     |
| <b>5,8</b>                                                                                                              | 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 |     |     |     |
| <b>6,3</b>                                                                                                              | 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 |     |     |     |
| <b>6,6</b>                                                                                                              | 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 |     |     |     |
| <b>7,0 (K)</b>                                                                                                          | 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 |     |     |     |
| <b>7,4 (K)</b>                                                                                                          | 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 |     |     |     |
| <b>7,8 (K)</b>                                                                                                          | 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 |     |     |     |
| <b>8,3 (K)</b>                                                                                                          | 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   |     |     |     |
| <b>8,6 (K)</b>                                                                                                          | 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 |     |     |     |
| <b>RW 300</b>                                                                                                           |                     |       |      |      |      |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |
| <b>300/5</b>                                                                                                            | 8                   | 0,315 |      | 42   | 24   | 16   | 11   | 8    | 6,3  |      |      |      |      |      |     |     |     |     |     |     |
| <b>6</b>                                                                                                                | 9                   | 0,355 |      | 62   | 36   | 23   | 16,5 | 12   | 9,5  |      |      |      |      |      |     |     |     |     |     |     |
| <b>7</b>                                                                                                                | 10                  | 0,394 |      | 82   | 47   | 31   | 22   | 16   | 12,7 |      |      |      |      |      |     |     |     |     |     |     |
| <b>8</b>                                                                                                                | 11                  | 0,433 |      | 92   | 54   | 36   | 25   | 18   | 15   | 12   | 10   | 8    | 6    |      |     |     |     |     |     |     |
| <b>9</b>                                                                                                                | 12                  | 0,472 |      | 149  | 86   | 56   | 40   | 29   | 23   | 19   | 15,5 | 13   | 10   | 8    | 7   |     |     |     |     |     |
| <b>10 (S) (K)</b>                                                                                                       | 13                  | 0,512 |      | 213  | 123  | 81   | 57   | 42   | 33   | 27   | 22,5 | 19   | 16,5 | 13   | 10  | 8   | 6,5 | 5   | 4   |     |
| <b>11 (S) (K)</b>                                                                                                       | 14                  | 0,551 |      | 293  | 170  | 111  | 79   | 57   | 45   | 37   | 31   | 25   | 23   | 19   | 16  | 12  | 9   | 7   | 5   |     |
| <b>12 (S) (K)</b>                                                                                                       | 15                  | 0,591 |      | 381  | 219  | 145  | 102  | 74   | 59   | 48   | 40   | 33   | 30   | 25   | 21  | 16  | 12  | 9   | 6,5 |     |
| <b>13-S (K)</b>                                                                                                         | 17                  | 0,669 |      | 430  | 127  | 162  | 113  | 82   | 65   | 52   | 42   | 34   | 31   | 26   | 22  | 17  | 13  | 10  | 13  |     |
| <b>16-S (K)</b>                                                                                                         | 20                  | 0,788 |      | 480  | 277  | 180  | 127  | 92   | 73   | 58   | 47   | 38   | 34   | 27   | 24  | 21  | 19  | 17  | 15  |     |
| <b>20-S (K)</b>                                                                                                         | 22                  | 0,867 |      | 580  | 335  | 218  | 153  | 111  | 88   | 70   | 57   | 46   | 37   | 33   | 29  | 26  | 23  | 20  | 18  |     |
| <b>30-S</b>                                                                                                             | 24                  | 0,945 |      | 770  | 440  | 290  | 200  | 150  | 117  | 90   | 75   | 60   | 50   | 40   | 38  | 30  | 24  | 21  | 19  |     |
| <b>40-S</b>                                                                                                             | 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<br><b>RW 60-C</b> |          | flat belt system<br><b>RW 60-C</b> |          | round belt system<br><b>RW 100-C</b> |          |
|--------------------------|-------------------------------------|----------|------------------------------------|----------|--------------------------------------|----------|
|                          | 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<br><b>RW 100-C</b> |          | side slider system<br><b>RW 100-C</b> |          |
|--------------------------|-------------------------------------|----------|---------------------------------------|----------|
|                          | 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<br>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<br>flat belt<br>60-C/1,2  | 1,6                 | 0,062 |       | 4,8  | 3,3   | 2,7  | 2,1  | 1,7  | 1,4   | 1,1   | 0,9   | 0,7  |      |      |      |     |       |      |     |     |      |      |      |     |     |  |
|                                     | 1,8                 | 0,070 |       | 6,3  | 4,4   | 3,6  | 2,7  | 2,3  | 1,8   | 1,5   | 1,3   | 1    |      |      |      |     |       |      |     |     |      |      |      |     |     |  |
|                                     | 1,6                 | 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                 | 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                   | 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                 | 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                 | 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<br>flat belt<br>100-C/1,8 | 2,2                 | 0,087 |       |      | 27    | 21   | 17   | 14   | 11    | 9     | 8     | 6    |      |      |      |     |       |      |     |     |      |      |      |     |     |  |
|                                     | 2,5                 | 0,098 |       |      | 42    | 34   | 25   | 19   | 18    | 14    | 13    | 10   | 7,2  | 6    | 4    | 2,9 |       |      |     |     |      |      |      |     |     |  |
|                                     | 2,25                | 0,108 |       |      | 44    | 35   | 26   | 20   | 19    | 15    | 14    | 9,4  | 6,8  | 5,7  | 3,6  | 2,7 | 2     | 1,5  |     |     |      |      |      |     |     |  |
|                                     | 2,5                 | 0,118 |       |      | 70    | 57   | 45   | 37   | 30    | 24    | 22    | 17   | 12   | 10   | 6,8  | 4,8 | 3,5   | 2,6  |     |     |      |      |      |     |     |  |
|                                     | 3                   | 0,138 |       |      |       | 80   | 63   | 52   | 42    | 34    | 31    | 24   | 17   | 14,5 | 9,5  | 6,8 | 4,9   | 3,94 | 2,5 |     |      |      |      |     |     |  |
|                                     | 3,5                 | 0,177 |       |      |       | 120  | 95   | 77   | 63    | 51    | 46    | 36   | 25   | 21   | 14   | 10  | 7,2   | 6    | 4   | 2,6 | 1,3  |      |      |     |     |  |
|                                     | 4                   | 0,197 |       |      |       | 156  | 123  | 102  | 83    | 67    | 60    | 47   | 40   | 28   | 18   | 13  | 10,5  | 8    | 5   | 3,5 | 2,5  |      |      |     |     |  |
|                                     | 4,5                 | 0,217 |       |      |       | 185  | 148  | 122  | 99    | 80    | 72    | 57   | 41   | 37   | 22   | 18  | 11    | 10   | 7   | 5   | 3    |      |      |     |     |  |
|                                     | 5                   | 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<br>100-C                |                     |       |       |      |       |      |      |      |       |       |       |      |      |      |      |     |       |      |     |     |      |      |      |     |     |  |
|                                     | 10/4,5-SG           |       |       |      |       |      |      |      |       |       |       |      |      |      |      |     |       |      |     |     |      |      |      |     |     |  |
|                                     | 5-SG                | 5     | 0,217 | 166  | 116   | 82   | 66   | 52   | 43    | 35    | 28    | 25   | 20   | 14   | 12   | 7,9 | 5,6   |      |     |     |      |      |      |     |     |  |
|                                     | 6-SG                | 5,5   | 0,216 | 211  | 148   | 104  | 84   | 67   | 55    | 45    | 36    | 32   | 25   | 18   | 15   | 10  | 7     |      |     |     |      |      |      |     |     |  |
|                                     | 7-SG                | 7     | 0,276 | 260  | 185   | 130  | 110  | 84   | 80    | 56    | 45    | 41   | 35   | 23   | 22   | 15  | 10    |      |     |     |      |      |      |     |     |  |
|                                     | 8-SG                | 8     | 0,315 | 368  | 258   | 182  | 150  | 117  | 100   | 78    | 63    | 57   | 48   | 32   | 28   | 18  | 13    |      |     |     |      |      |      |     |     |  |
|                                     | 9-SG                | 9     | 0,355 | 500  | 350   | 148  | 200  | 158  | 130   | 107   | 86    | 77   | 63   | 56   | 37   | 24  | 17    | 14,5 |     |     |      |      |      |     |     |  |
|                                     | 10-SG               | 10    | 0,394 | 700  | 490   | 207  | 280  | 221  | 182   | 150   | 120   | 107  | 88   | 80   | 51   | 33  | 23,8  | 21,5 |     |     |      |      |      |     |     |  |
|                                     | 11-SG               | 11    | 0,433 | 1120 | 784   | 331  | 448  | 354  | 291   | 239   | 192   | 172  | 141  | 122  | 82   | 54  | 38    | 32,5 |     |     |      |      |      |     |     |  |
|                                     | 12-SG               | 12    | 0,472 | 1512 | 1058  | 447  | 604  | 478  | 393   | 323   | 260   | 232  | 190  | 133  | 111  | 72  | 51    | 42   |     |     |      |      |      |     |     |  |
|                                     | 13                  | 0,512 | 2192  | 1534 | 648   | 878  | 693  | 570  | 469   | 377   | 337   | 276  | 192  | 162  | 105  | 75  | 62    |      |     |     |      |      |      |     |     |  |

## 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. Therefore the minimum FID can be approx. 4 time wire dia. Typical applications are production of chocks and filters as well transformer secondary windings.



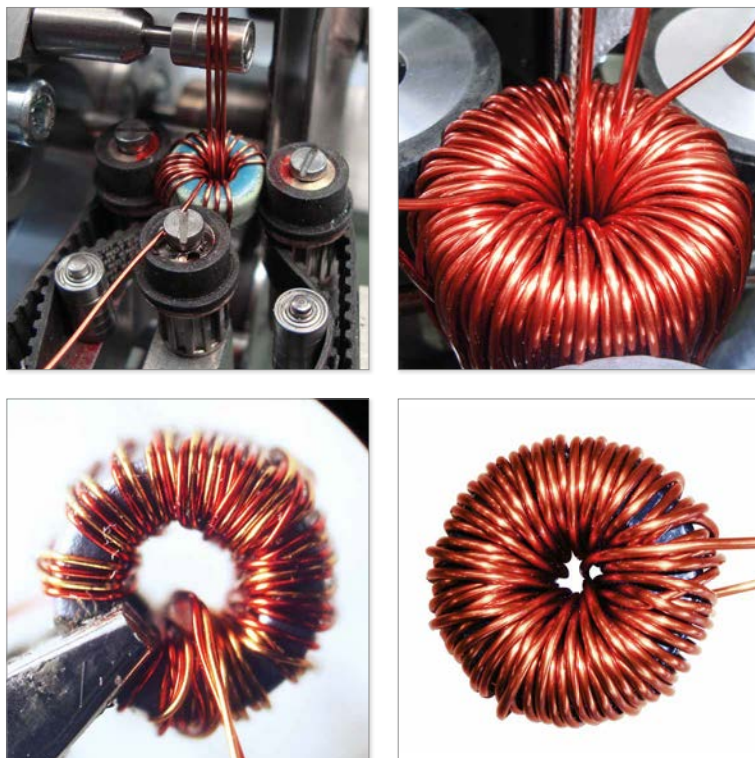
| winding head data          | RW 01-ML                 |            | RW 03-ML                 |          |
|----------------------------|--------------------------|------------|--------------------------|----------|
|                            | mm                       | inch/AWG   | mm                       | inch/AWG |
| wire range                 | 0,25 - 0,5               | 30 - 24    | 0,6 - 2,0                | 23 - 12  |
| length of one loading turn | 145                      | 5,7        | 970                      | 38       |
| finished core OD           | 4 - 30                   | 0,16 - 1,8 | 25 - 80                  | 1 - 3,1  |
| finished core ID           | 4 x wireØ                |            | 4 x wireØ                |          |
| finished core height       | 15                       | 0,6        | 70                       | 2,76     |
| max. winding speed rpm     | 200                      |            | 220                      |          |
| compatible roller tables   | RW 111-ML                |            | RW 222-PML               |          |
| compatible m/c bases       | all RWE – machine series |            | all RWE – machine series |          |
| max. wire length in meter  |                          |            | 16 : wireØ x 0,97 m      |          |

Information provided without guarantee





## Sample applications



## Gear rack tapping heads for the BENCH models

These tapping 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<br>RW 222-L, RW 222-P |                       | RW 222-L, RW 222-P, RW 222-VL,<br>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-

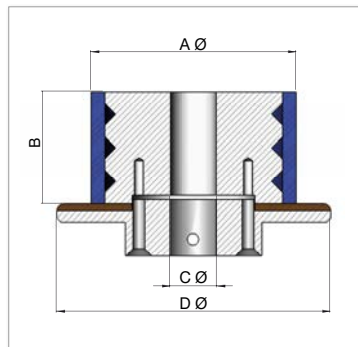
ber rollers are infinitely adjustable to clamp any size of core within their range. A large of parallel and tapered rollers are available to suit individual winding requirements and special extension and designs can be supplied upon request.

### Combination possibilities between roller tables and winding heads

|                                                                                    | coil ØD                                                     | head | 0,0/B   | 1,1/B   | 2,2/B   | 3,3/B    | 4,4V,<br>4RZ,4/B | 10        | 20        | 25        | 30      | 40,40V   | 60C       | 100,100C  | 200,200V,<br>200/B | 300,300V,<br>300/B |
|------------------------------------------------------------------------------------|-------------------------------------------------------------|------|---------|---------|---------|----------|------------------|-----------|-----------|-----------|---------|----------|-----------|-----------|--------------------|--------------------|
|   | 0,20-1,18<br><b>RW 111</b><br>5-30                          | inch |         |         |         |          |                  | 0,20-1,18 | 0,47-1,18 |           |         |          | 0,20-1,18 | 0,20-1,18 |                    |                    |
|                                                                                    |                                                             | mm   |         |         |         |          |                  | 5-30      | 12-30     |           |         |          | 5-30      | 5-30      |                    |                    |
|   | 0,40-1,58<br><b>RW 111-V</b><br>10-50                       | inch |         |         |         |          |                  |           | 0,63-2,0  |           |         |          |           | 0,43-2,0  | 0,63-2,0           |                    |
|                                                                                    |                                                             | mm   |         |         |         |          |                  |           | 16-50     |           |         |          |           | 11-50     | 16-50              |                    |
|  | Ø,71-2,75<br><b>RW 112</b><br>18-70                         | inch |         |         |         |          |                  |           |           | 0,71-2,75 |         |          |           |           | 0,71-2,75          |                    |
|                                                                                    |                                                             | mm   |         |         |         |          |                  |           |           | 18-70     |         |          |           |           | 18-70              |                    |
|  | 1,0-6,0<br><b>RW 222-L</b><br><b>RW 222-LP</b><br>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  |           |           | 1,0-6,0            | 1,38-6,0           |
|                                                                                    |                                                             | mm   | 25-150  | 25-150  | 25-150  | 25-150   |                  |           | 25-150    | 25-150    | 25-150  | 25-150   |           |           | 25-150             | 35-150             |
|  | 1,57-6,0<br><b>RW 222-VL</b><br><b>RW 222-VLP</b><br>40-150 | inch |         | 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             |
|  | 2,4-10,0<br><b>RW 332</b><br><b>RW 332-LP</b><br>60-254     | inch |         |         | 2,4-10  | 2,4-10   | 2,4-10           |           |           |           |         | 2,4-10   |           |           |                    |                    |
|                                                                                    |                                                             | mm   |         |         | 60-254  | 60-254   | 60-254           |           |           |           |         | 60-254   |           |           |                    |                    |
|  | 3,15-14<br><b>RW 332-L2</b><br><b>RW 332-L2P</b><br>60-420  | inch |         |         |         | 2,4-16,5 | 2,4-16,5         |           |           |           |         | 2,4-16,5 |           |           |                    |                    |
|                                                                                    |                                                             | mm   |         |         |         | 60-420   | 60-420           |           |           |           |         | 60-420   |           |           |                    |                    |

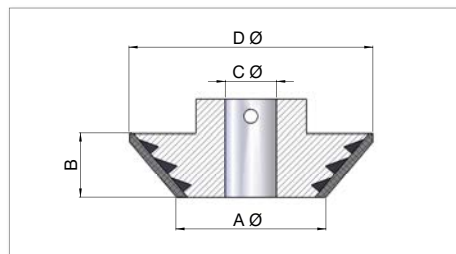
## Standard core transport rollers for roller tables for BENCH machines

| 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 19 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<br>RW 45-380     | RW 44-1<br>RW 45-EH      | RW 44-1V<br>RW 44-RZ        | RW 45<br>RW 45-VRZ        | RW 45-V |
| 1 side slider winding head   | RW 50                  |                          |                             |                           |         |
| 8 taping heads               | RW 33/B,<br>RW 44-RZ/B | RW 44/1B,<br>RW 45-VRZ/B | RW 45/B,<br>RW 45-VRZ/B-380 | RW 45-380/BU,<br>RW 45/BU |         |
| 1 magazine less winding head | RW 05-ML               |                          |                             |                           |         |

|                           |                       |                    |                |                         |                          |            |
|---------------------------|-----------------------|--------------------|----------------|-------------------------|--------------------------|------------|
| 10 interchangeable tables | RW 333<br>RW 333-V-13 | RW 333-V<br>RW 444 | RW 333-<br>PML | RW 333-V-SO<br>RW 444-P | RW 333-VS1<br>RW 444-PSR | RW 333-VS2 |
|---------------------------|-----------------------|--------------------|----------------|-------------------------|--------------------------|------------|

### Capability ranges

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



|                       |                                 |
|-----------------------|---------------------------------|
| <b>controller</b>     | 5.7" monochrom touchpanel       |
| <b>language</b>       | all Latin characters            |
| <b>winding head</b>   | three phase motor with inverter |
| <b>roller table</b>   | servo motor                     |
| <b>supply voltage</b> | 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.



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

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

or

### RWS-Evo-Shuttle

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



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

RUFF has designed a low cost standardised tapping station in order to replace the oneway special and expensive double head machine. It is a flexible tapping system that can be placed next to existing toroidal winding machines and therefore enables simultaneous winding and tapping 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.



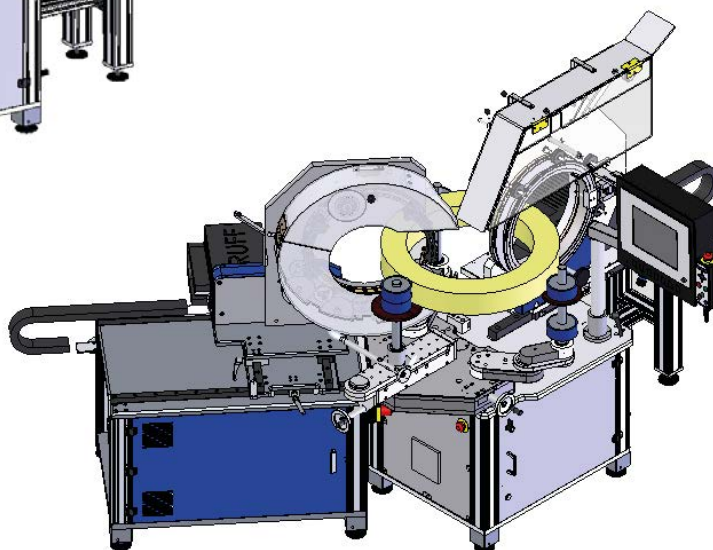
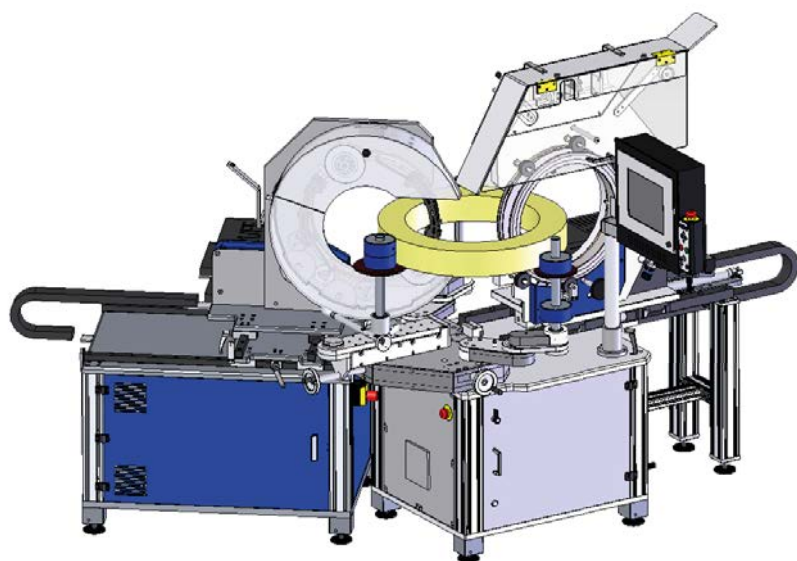
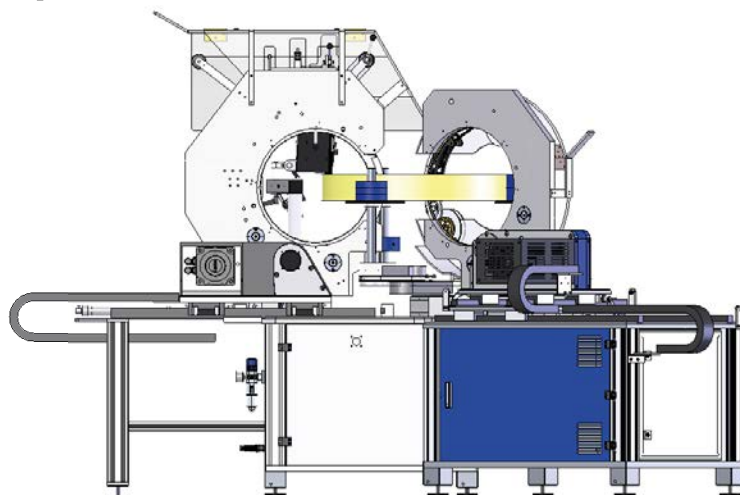
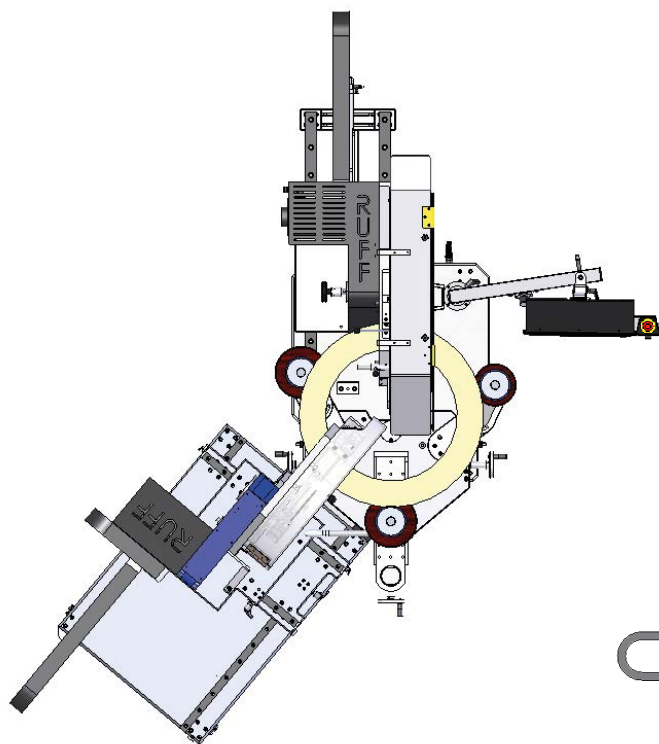
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|---------------------------------------------|--------|
| <b>Min. core ID with magazine system</b>    | 200 mm |
| <b>Min. core ID with tape roller system</b> | 330 mm |

## RWS-Evolution-Tape

|                           |                                                                                                |
|---------------------------|------------------------------------------------------------------------------------------------|
| <b>controller</b>         | controlled by RWS-Evolution /RWS-Evo-Shuttle                                                   |
| <b>taping speed</b>       | up to 140 rpm (stepless adjustable)                                                            |
| <b>core drive</b>         | not required as the core drive is given from toroidal winding machines which is placed next to |
| <b>winding head drive</b> | 3,6 kW Servomotor                                                                              |
| <b>supply voltages</b>    | 3 PH / 400 V / 16 A                                                                            |
| <b>machine size</b>       | 1100 x 700 mm                                                                                  |
| <b>machine weight</b>     | 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<br>RW 333-VL  |          | RW 333-L<br>RW 333-VL  |          | RW 333-VL, All versions of RW 333-V<br>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<br>+ 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<br>RW 444, RW 444-P, RW 444-PSR |          | RW 333-VL, All versions of RW 333-V<br>RW 444, RW 444-P, RW 444-PSR |          | RW 333-VL, All versions of RW 333-V<br>RW 444, RW 444-P, RW 444-PSR |          |
| compatible m/c bases     | all RWS machine series                                              |          | all RWS machine series                                              |          | all RWS machine series                                              |          |



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

## THE RUFF GROUP

## 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<br>RW 444, RW 444-P |           |
| compatible m/c bases     | all RWS machine series                                  |           |
| max. wire lenght         |                                                         |           |



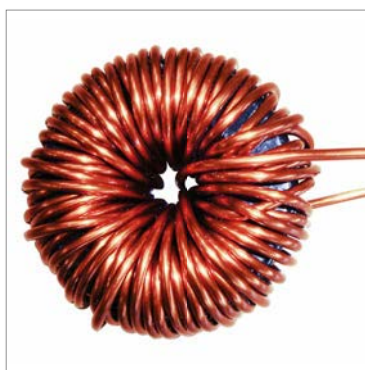
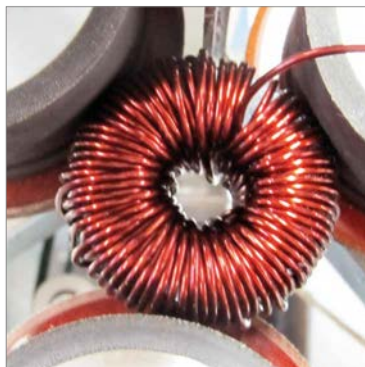
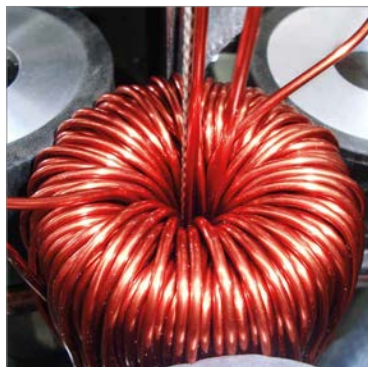
## Magazine less winding head for the FLOOR models

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. 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 05ML             |             |
|----------------------------|---------------------|-------------|
|                            | mm                  | inch/AWG    |
| wire range                 | 1 - 2,5             | 18,5 - 10   |
| length of one loading turn | 1200                | 47,24       |
| 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 lenght in meter  | 36 : wire Ø x 1,2 m |             |



## Gear rack tapping heads for the FLOOR models

These tapping 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 tapping 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<br>RW 333-VL<br>All versions of RW 333-V |             | RW 333-L<br>RW 333-VL<br>All versions of RW 333-V |             | RW 333-VL<br>All versions of RW 333-V<br>RW 444<br>RW 444-P<br>RW 444-PSR |             | RW 333-VL<br>All versions of RW 333-V<br>RW 444<br>RW 444-P<br>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<br>All versions of RW 333-V<br>RW 444<br>RW 444-P<br>RW 444-PSR |             | RW 333-VL<br>All versions of RW 333-V<br>RW 444<br>RW 444-P<br>RW 444-PSR |             | RW 333-VL<br>All versions of RW 333-V<br>RW 444<br>RW 444-P<br>RW 444-PSR |             |
| compatible m/c bases            | all RWS machine series                                                    |             | all RWS machine series                                                    |             | all RWS machine series                                                    |             |

## Your personal notes

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# Combination possibilities between roller tables and winding heads

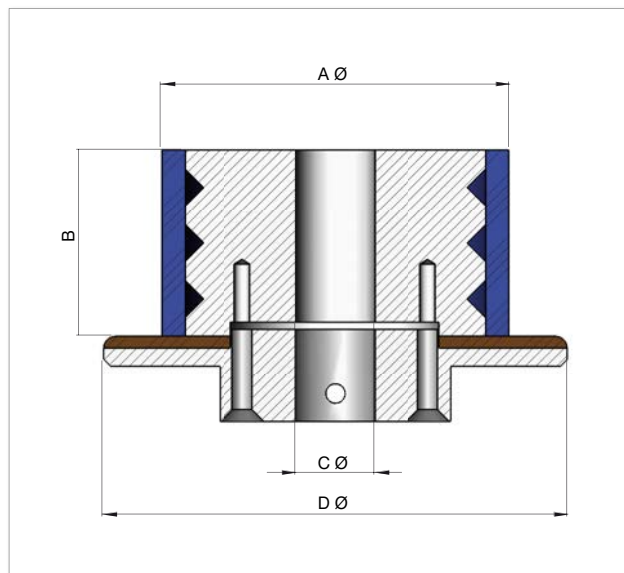


| finished core OD range                                                    |      | RW 33<br>RW 33-B    | RW 44-1, RW 44-1B,<br>RW 44-RZB, RW 44-RZ | RW 44-1V  | RW 45, RW 45-V,<br>RW 45-B, RW 50 | RW 45-380  | RW 45-EH,<br>RW 45-VRZ |
|---------------------------------------------------------------------------|------|---------------------|-------------------------------------------|-----------|-----------------------------------|------------|------------------------|
| <b>RW 333-L</b><br>with rubber rollers<br>Ø 75                            | inch | 3,15-14,0           | 4,35-14,0                                 | 4,92-14,0 | -                                 | -          | -                      |
|                                                                           | mm   | 80-350              | 110-350                                   | 125-350   | -                                 | -          | -                      |
| <b>RW 333-L</b><br>with rubber rollers<br>Ø 90                            | inch | 2,55-14,0<br>65-350 | 4,0-13,0                                  | 4,53-13,0 | -                                 | -          | -                      |
|                                                                           | mm   |                     | 100-330                                   | 100-330   | -                                 | -          | -                      |
| <b>RW 333-L</b><br>with rubber rollers<br>Ø 120                           | inch |                     | 3,54-11,8                                 | 4,0-11,8  | -                                 | -          | -                      |
|                                                                           | mm   |                     | 90-300                                    | 100-300   | -                                 | -          | -                      |
| <b>RW 333-VL</b><br>with rubber rollers<br>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                |
| <b>RW 333-VL</b><br>with rubber rollers<br>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                |
| <b>RW 333-VL</b><br>with rubber rollers<br>Ø 120                          | inch |                     |                                           | 4,92-14,0 | 3,54-14,0                         |            |                        |
|                                                                           | mm   |                     |                                           | 125-350   | 90-350                            |            |                        |
| <b>RW 333-VL-5</b><br>(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    |                        |
| <b>RW 333-VL-8</b><br>(with swivel arms)                                  | inch |                     |                                           |           | 9,84-39,37                        | 9,84-39,37 | 9,84-39,37             |
|                                                                           | mm   |                     |                                           |           | 250-1000                          | 250-1000   | 250-1000               |
| <b>RW 333-VL-13</b> (with<br>extra horizontal rollers for<br>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                |
| <b>RW 444</b><br>(with swivel arms)                                       | inch |                     |                                           |           | 3,94-32                           | 4,0-19,7   | 4,72-32                |
|                                                                           | mm   |                     |                                           |           | 100-800                           | 100-800    | 120-800                |
| <b>RW 444-P</b><br>(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,<br>RW 44-RZB, RW 44-RZ | RW 44-1V | RW 45, RW 45-V,<br>RW 45-B, RW 50 | RW 45-380 | RW 45-EH<br>RW 45-VRZ |
|-----------------------------------------|------|----------------|-------------------------------------------|----------|-----------------------------------|-----------|-----------------------|
| <b>RW 444-PSR</b><br>(with swivel arms) | inch |                |                                           |          | 16,7                              | 16,7      | 16,7                  |
|                                         | mm   |                |                                           |          | 500                               | 500       | 500                   |

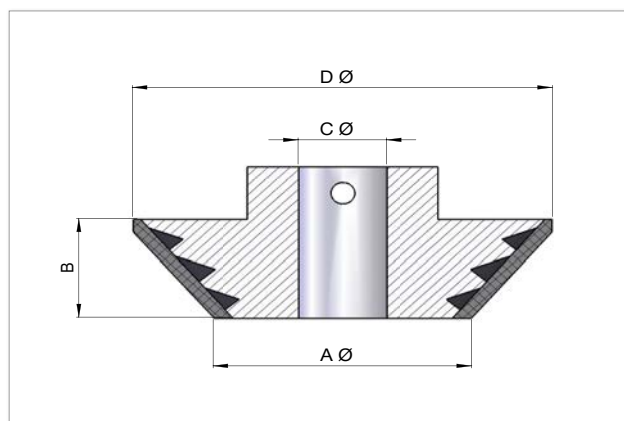
## Standard core transport rollers for roller tables for FLOOR machines

| 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     | 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<br>RW 555-1PSR | RW 555-1P<br>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.



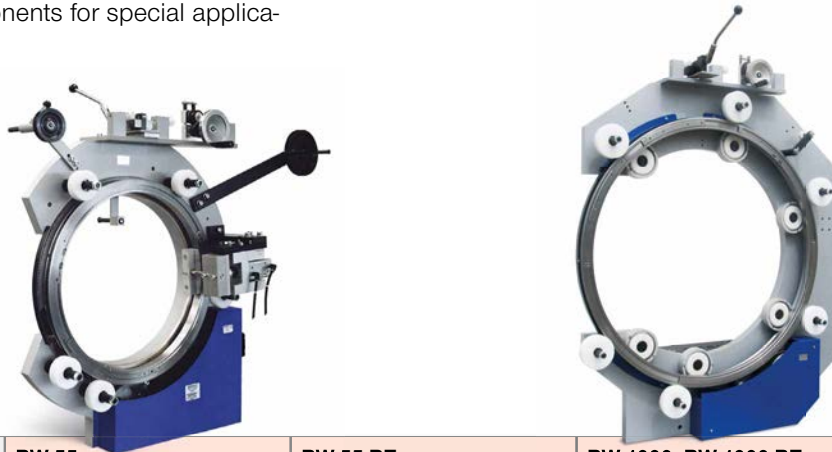
## Capability ranges

|                         |                                                                                             |                        |                         |
|-------------------------|---------------------------------------------------------------------------------------------|------------------------|-------------------------|
| <b>wire Ø monofilar</b> | 0.8 - 6.5 mm                                                                                | <b>compressed air</b>  | 6 bar                   |
| <b>wire Ø bifilar</b>   | up to 2x4 mm                                                                                | <b>tape size</b>       | 9 - 30 mm               |
| <b>flat wire</b>        | up to 5x12 mm                                                                               | <b>supply voltages</b> | 3 Ph / 400 V / 16 A     |
| <b>finished core OD</b> | 100 - 2800 mm                                                                               | <b>machine size</b>    | approx. 1630 x 1800 mm  |
| <b>finished core ID</b> | up from 60 mm                                                                               |                        | Shuttle: 1630 x 2700 mm |
| <b>finished core H</b>  | bis 300 mm                                                                                  | <b>machine weight</b>  | approx. 600 kg          |
| <b>operating panel</b>  | 12" touchpanel with 4 function buttons                                                      |                        |                         |
| <b>memory</b>           | Compact Flash 512 MB                                                                        |                        |                         |
| <b>system</b>           | Windows CE 5.0                                                                              |                        |                         |
| <b>language</b>         | Unitext (all characters)                                                                    |                        |                         |
| <b>interface</b>        | USB-connection, ethernet-interface, 1x10/100 Mbit, RJ45<br>PS/2-interface, serial interface |                        |                         |
| <b>PCI modul card</b>   | MC-CAN Dual Can Controller, hand control unit with<br>3 additional function buttons         |                        |                         |
| <b>winding head</b>     | servo motor                                                                                 |                        |                         |
| <b>roller table</b>     | 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<br>RW 555-1P<br>RW 555-S0 |           | RW 555-1<br>RW 555-1P<br>RW 555-S0 |           | RW 555-1<br>RW 555-1P<br>RW 555-S0 |           | RW 555-1<br>RW 555-1P<br>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<br>RW 555-1P<br>RW 555-S0<br>RW 555-1PSR |               | RW 555-1<br>RW 555-1P<br>RW 555-S0<br>RW 555-PSR |           | RW 555-1<br>RW 555-1P<br>RW 555-S0<br>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<br>RW 55 |          | winding head<br>RW 55/B |          | winding head<br>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. 1,4 m 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.

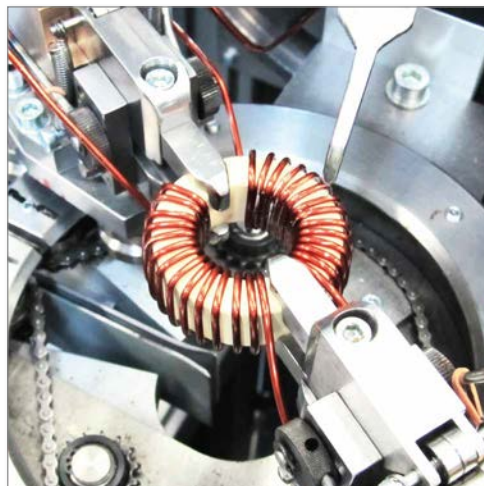
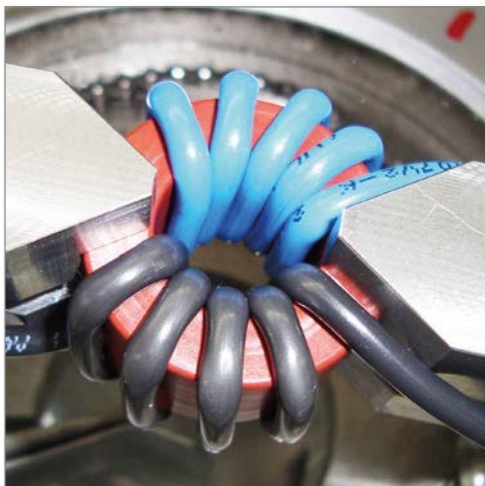
## PWM - Pull Winding Machine

- 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

|                         |                |                       |                          |
|-------------------------|----------------|-----------------------|--------------------------|
| <b>wire Ø</b>           | 1 - 3,5 mm     | <b>compressed air</b> | 6 bar                    |
| <b>max. wire length</b> | 1,4 m          | <b>supply voltage</b> | 230 V / AC / 50Hz / 16 A |
| <b>finished core OD</b> | 15 - 85 mm     | <b>machine size</b>   | 1850 x 750 mm            |
| <b>finished core ID</b> | 4 - 6 x wire Ø | <b>machine weight</b> | approx. 400 kg           |
| <b>finished core H</b>  | 50 mm          |                       |                          |



## Your personal notes

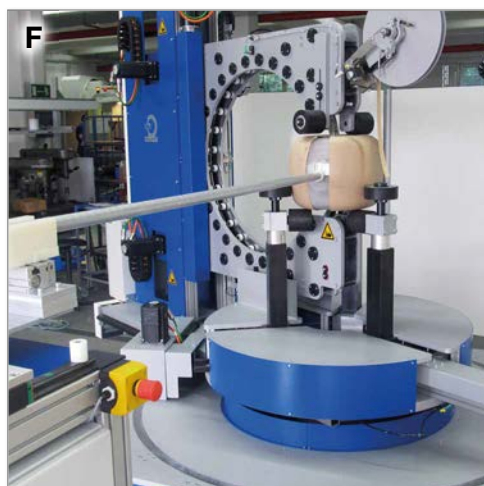
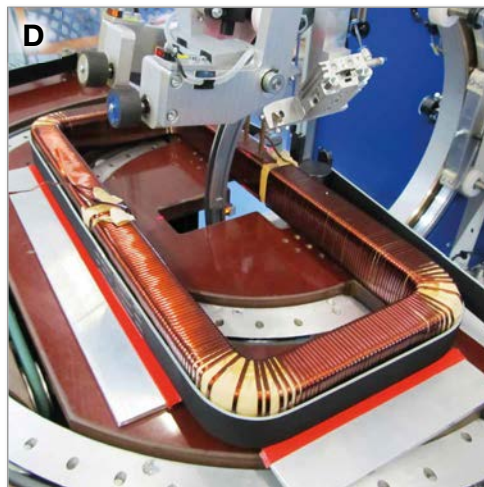
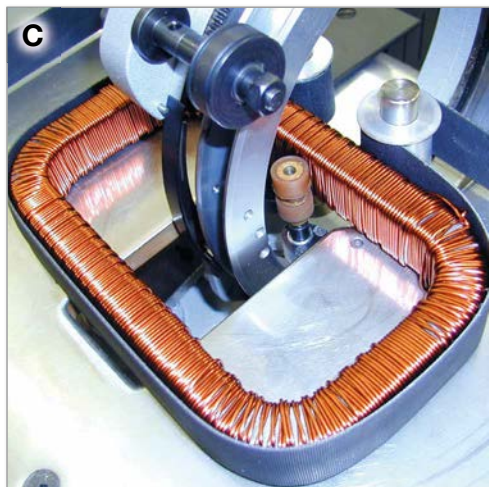
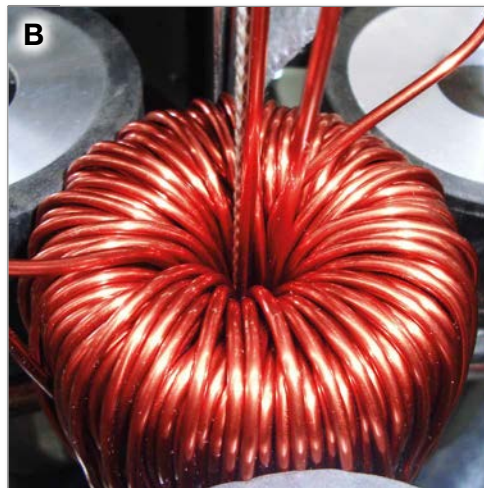
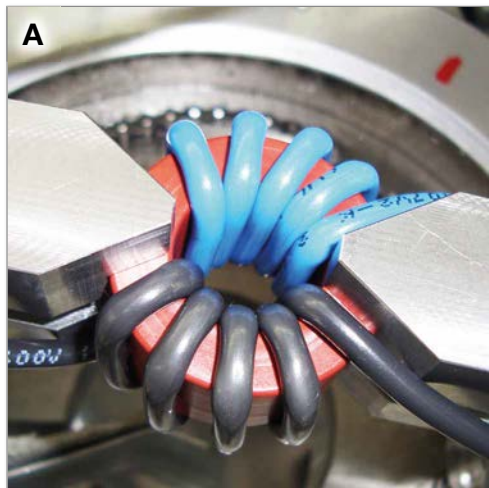
This image shows a full page of blank graph paper. The grid consists of small, uniform squares formed by thin, light gray lines. There are no margins, text, or other markings on the page.



# 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

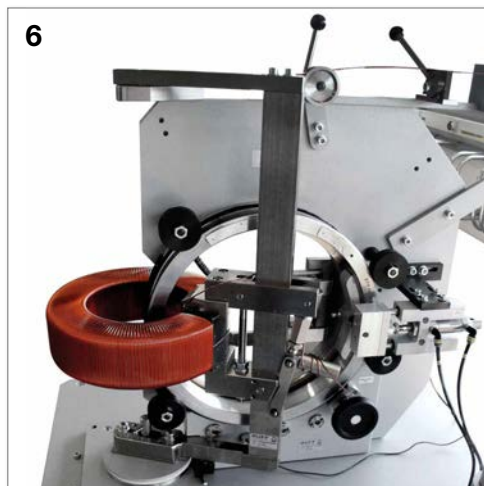
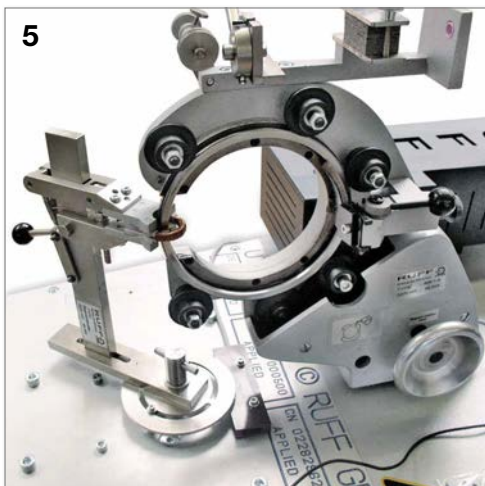
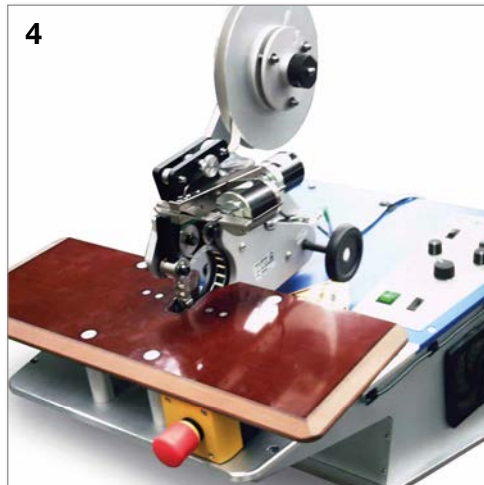
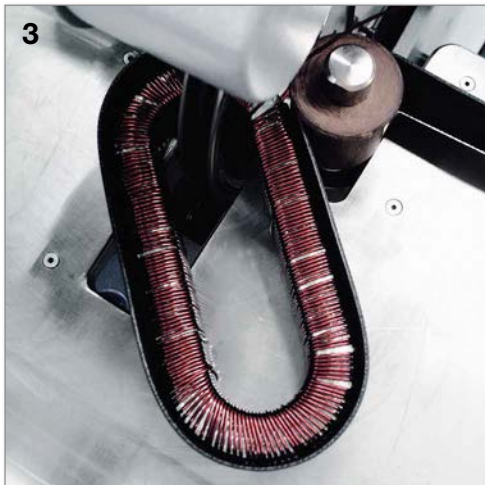
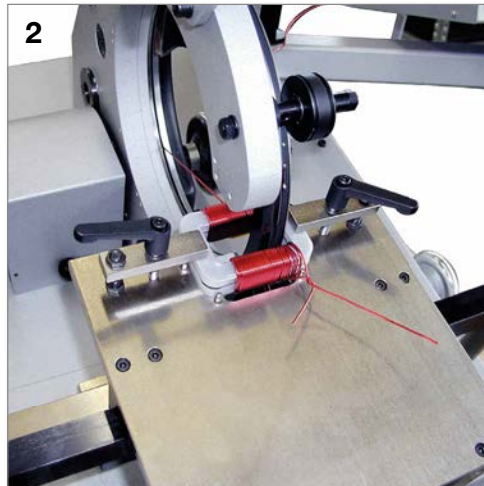
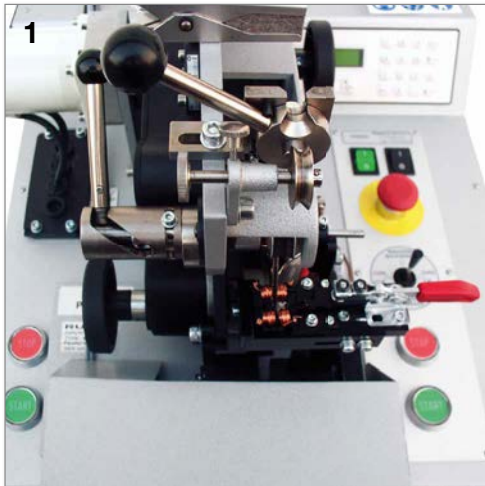




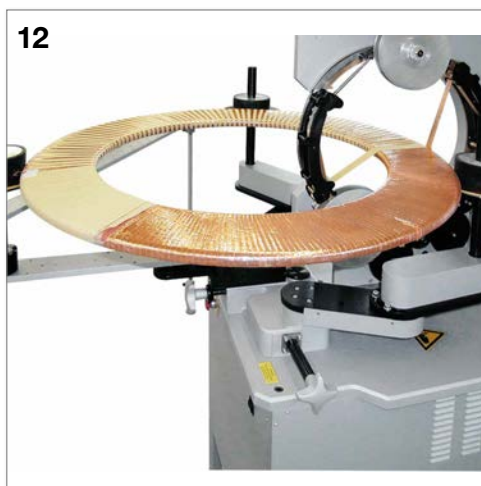
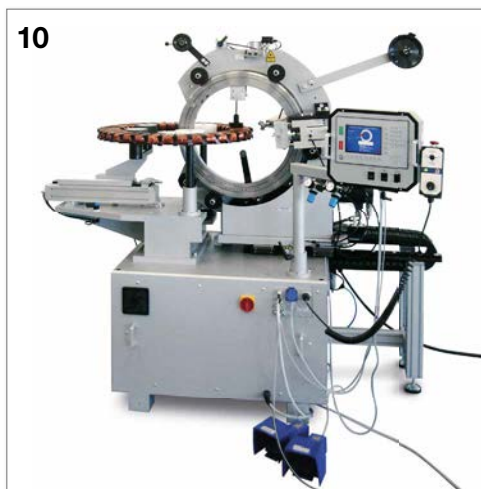
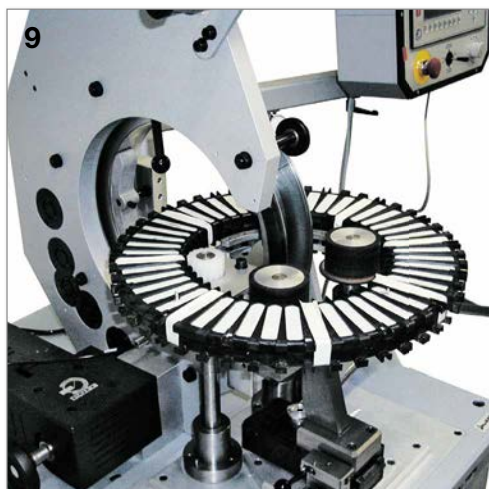
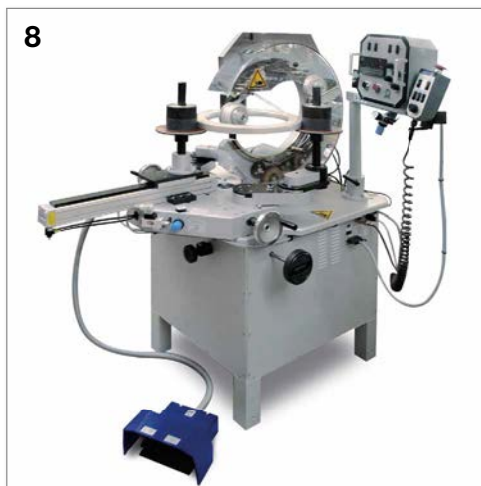
# Accessories

## 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 \_\_\_\_\_

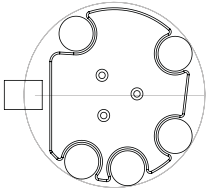
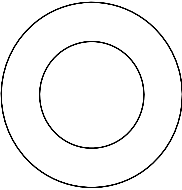
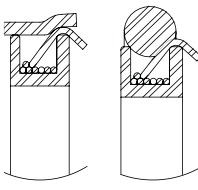
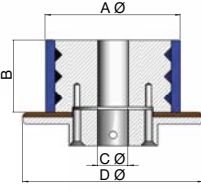
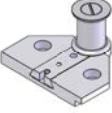
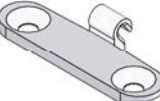
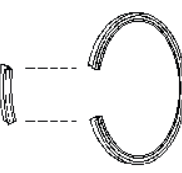
total winding time \_\_\_\_\_

machine base \_\_\_\_\_

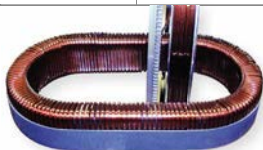
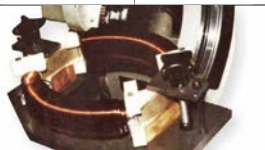
winding head \_\_\_\_\_

magazine \_\_\_\_\_

roller table \_\_\_\_\_

| wire guide plate type                                                                                                                                                                                                                                                                                                                                                                            | winding performance                                                                 |                                                                                     | belt type                                                                                                                                                                                             | core transport rollers type                                                                                                                                                                                                          |                                                                                       |                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                               |  |                                                                                     |                                                                                                                    |  <div style="display: flex; flex-direction: column; align-items: flex-end;"> <div>A =</div> <div>B =</div> <div>C =</div> <div>D =</div> </div> |                                                                                       |                                                                                       |
| slider type                                                                                                                                                                                                                                                                                                                                                                                      | guide pulley type                                                                   |                                                                                     | guide roller with backplate                                                                                                                                                                           | magazine types                                                                                                                                                                                                                       |                                                                                       |                                                                                       |
| 1 pc type <br>2 pc type <br>3 pc type <br>4 pc type  | standard V-groove                                                                   | flat or U-groove                                                                    | <br><div>wire guide hook</div>  | KN / KN                                                                                                                                                                                                                              | SN / SN                                                                               | Split type                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |                                                                                                                                                                                                       |                                                                                                                                                 |  |  |



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

## **RUFF GmbH**

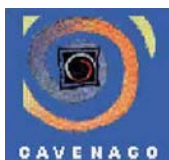
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