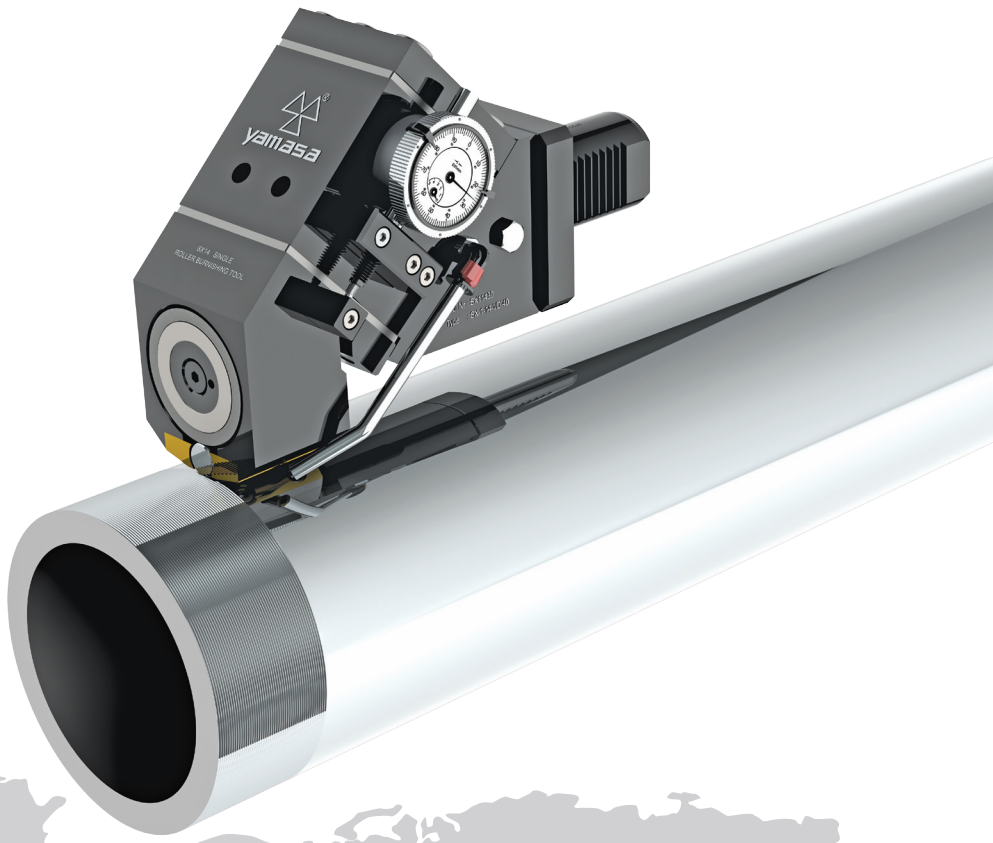


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*Brighten your future...*

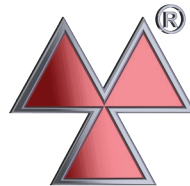
ROLLER BURNISHING | SKIVE BURNISHING | DEEP ROLLING  
**TOOLS AND MACHINES**

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## Since 1958

Our company has been operating since 1958. YAMASA is specialized in producing of Roller Burnishing, Skive-Burnishing and Deep Rolling Tools.

Our enterprise was carried on its growth within years. With the continuously developed technology and specialized staff, it increased the variety of the products and grew dynamically day by day. It has been one of the biggest enterprise as producer in this sector. YAMASA offers ideal solutions to the worldwide customers.

Our products are used in such as precise tube production, hydraulic-pneumatic, automotive industry, aircraft industry, all kind of machine production, agricultural vehicles, ship building industry, railway industry, light motorized vehicles, heavy duty machines, heating and cooling industry, information technologies industry, electronic household industry and defence industry. We meet the current requirements of our customers in these all sectors with our service and product quality and applied stable price policy.

### ***The properties which make YAMASA an ideal solution partner***

- Qualified and fast production of standard and special tools
- Qualified, fast technical service and support
- A wide variety of products
- Economic prices
- High stock capacity
- Delivery on time



### ***Our Mission***

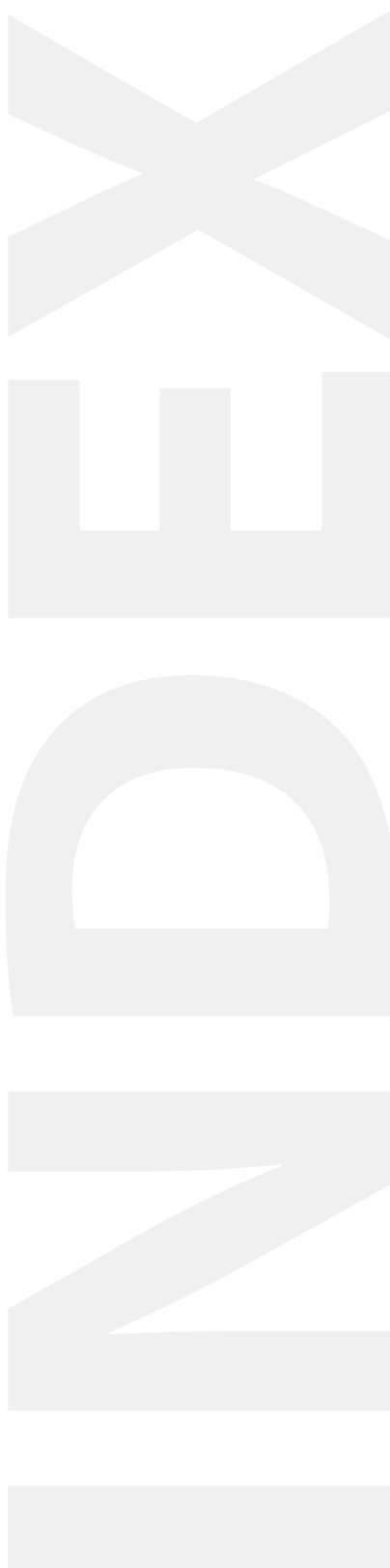
- To answer the needs and surpass all expectations of the customers with a higher quality
- To invest continuously in expertness and technology
- To know the worth of natural sources, to care the environment and ensure our future

### ***Our Vision***

- The unconditional satisfaction of our customers
- To prove the trustworthiness to the persons or companies we work with and to be preferred everytime



|                                     |   |              |
|-------------------------------------|---|--------------|
| <b>Roller burnishing technology</b> |   | <b>2-3</b>   |
| <b>Deep rolling technology</b>      |   | <b>4-5</b>   |
| <b>Skive-burnishing technology</b>  |   | <b>6-7</b>   |
| <b>DX Series</b>                    | <b>Internal roller burnishing tools - Multi roller</b><br><i>For cylindrical holes</i>  | <b>8-17</b>  |
|                                     | DX type between Ø005-014  | 10           |
|                                     | DX type between Ø015-021  | 11           |
|                                     | DX type between Ø022-031  | 12           |
|                                     | DX type between Ø032-034  | 13           |
|                                     | DX type between Ø035-049  | 14           |
|                                     | DX type between Ø050-080  | 15           |
|                                     | DX type between Ø081-160  | 16           |
|                                     | DX type between Ø161-350  | 17           |
| <b>MX Series</b>                    | <b>External roller burnishing tools - Multi roller</b><br><i>For cylindrical shafts</i>   | <b>18-25</b> |
|                                     | MX type between Ø001-014  | 20           |
|                                     | MX type between Ø015-024  | 21           |
|                                     | MX type between Ø025-049  | 22           |
|                                     | MX type between Ø050-085  | 23           |
|                                     | MX type between Ø086-110  | 24           |
|                                     | MX type between Ø111-160  | 25           |
| <b>MDX Series</b>                   | <b>Internal micro roller burnishing tools - Multi roller</b><br><i>For cylindrical holes</i>  | <b>26</b>    |
| <b>MXS Series</b>                   | <b>External micro roller burnishing tools - Multi roller</b><br><i>For cylindrical shafts</i>   | <b>27</b>    |
| <b>K Series</b>                     | <b>Taper-flat surface burnishing tools - Multi roller</b><br><i>For male-female tapers and flat surfaces</i>                              | <b>28-29</b> |
| <b>SX Series</b>                    | <b>Single roller burnishing tools</b>   | <b>30-35</b> |
|                                     | SX-5, SX-8 types<br><i>For cylindrical external surface, flat surfaces, tapers and holes</i>  | <b>30-31</b> |
|                                     | SX-14 type<br><i>For cylindrical external surface, flat surfaces, tapers and holes</i>  | <b>32-33</b> |
|                                     | SX-35M, SX-35D, SX-52D types<br><i>For limited length of holes, shafts and internal-external tapers</i>                                   | <b>34-35</b> |
| <b>RX Series</b>                    | <b>Single roller burnishing tools   RX-45, RX-45H types</b><br><i>For fillets, radii, contours, and spherical surfaces</i>                | <b>36-37</b> |
| <b>RXS Series</b>                   | <b>Single roller burnishing tools   RXS-45, RXS-90, RXS-90P types</b><br><i>For spherical surfaces, contours, radii and groove flanks</i> | <b>38-39</b> |
| <b>CEOS Series</b>                  | <b>Combined skive-burnishing tools</b><br><i>For hydraulic cylinders, tubes</i>   | <b>40-49</b> |
|                                     | CEOS type between Ø038-049  | 42           |
|                                     | CEOS type between Ø050-064  | 43           |
|                                     | CEOS type between Ø065-079  | 44           |
|                                     | CEOS type between Ø080-099  | 45           |
|                                     | CEOS type between Ø100-139  | 46           |
|                                     | CEOS type between Ø140-179  | 47           |
|                                     | CEOS type between Ø180-209  | 48           |
|                                     | CEOS type between Ø210-300  | 49           |
| <b>CX Series</b>                    | <b>Skive and roller burnishing tools   CX-R, CX-CS, CX-D types</b><br><i>For hydraulic cylinders, tubes</i>                               | <b>50</b>    |
| <b>UX Series</b>                    | <b>Multiple head roller burnishing tools</b><br><i>For stepped and axial holes</i>  | <b>51</b>    |
| <b>MXM Series</b>                   | <b>Roller burnishing machines   DVH, DPH, NC types</b><br><i>For cylindrical shafts</i>   | <b>52</b>    |



YAMASA Roller Burnishing is a method to make the workpiece, which has passed through the pre-machining, smooth and hard. It is possible to process any kind of metallic material by using this method. The roller burnishing is done by contacting of the rollers on the surface of the workpiece by the help of a precision mechanism. When such a contact is obtained, the workpiece or the tool turns at a specified speed, then the rollers go forward on the workpiece's surface by rotation. In addition, a pressure is applied on the surface of the workpiece with a certain force thus the process of roller burnishing is achieved. The effects that occur at the point where a single roller is contact to the surface of the workpiece are as follows;

The contact of the roller to the workpiece is obtained by pressure. At this point, while the protrusions on the surface are being pressed, the gaps in bottom are filled up simultaneously. This process that we call as plastic deformation is repeated as long as the rotation, pressing and feeding continues (fig.1). Therefore the smooth and bright surfaces are obtained.

The feeding speed of roller and the pressure applied on the workpiece is defined according to the surface roughness which is required to obtain. The roughness values decrease by slowing down the feeding speed and increasing the pressure. On the contrary, while the pressure decreases and the speed of feeding becomes faster, the surface roughness values will increase.

After the roller burnishing process, dimensional changes occur on the surface. Such a change is equal to the roughness value of the surface. So it is possible to say that such a change occurs in the shape and dimension of the workpiece remains inside the roughness limits.

It is possible to burnishing all kind of metallic materials up to 42-45 HRC with roller burnishing technology.

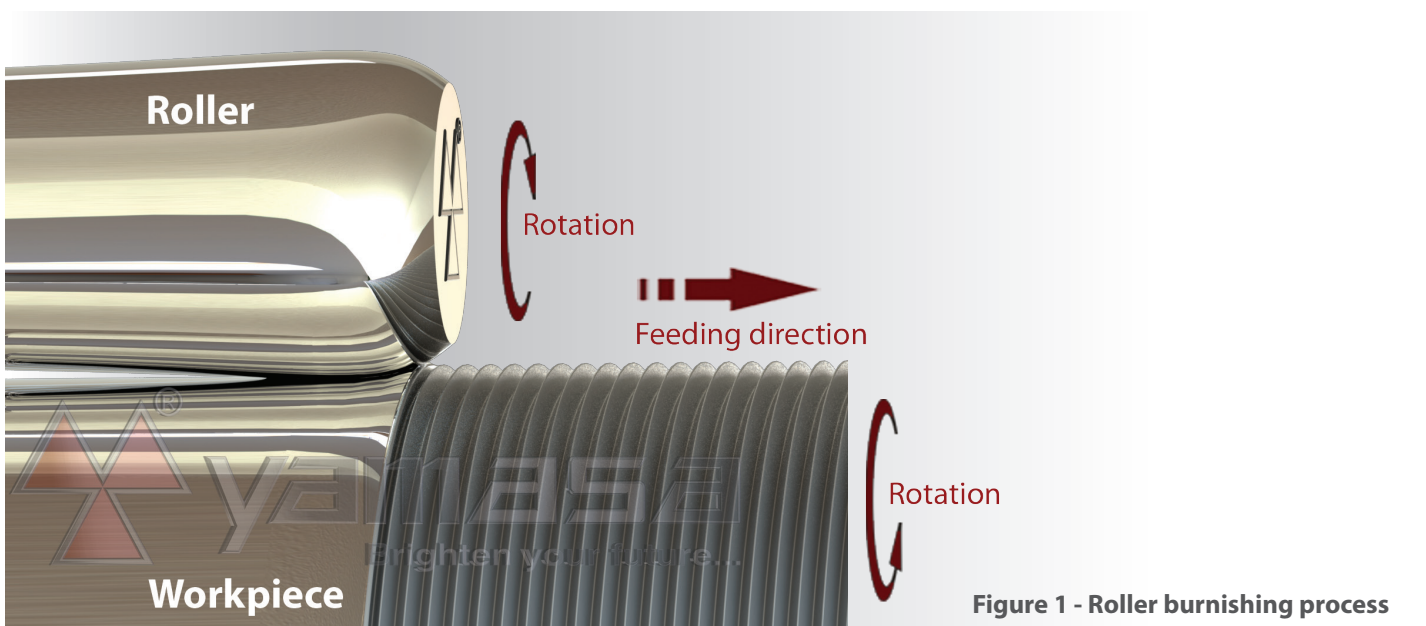


Figure 1 - Roller burnishing process

### Pre-machining for roller burnishing process

Surface of the workpiece must be made suitable for roller burnishing. For this, pre-machining is advised. Pre-machining is necessary for getting standard and good surface quality after roller burnishing. As pre-machining lathe, reaming, grinding or etc. processes can be applied.

On the workpiece, stock allowance is left for roller burnishing. Pre-machining is applied by considering this stock allowance. Roller burnishing doesn't pull off a piece from surface, only accumulates roughnesses of the surface on to each other, in this context we can say that generally roughness depth determines the stock allowance. Stock allowance equals to roughness depth (Rz). Thus, on the workpiece, stock allowance is left as roughness depth.

After pre-machining roughness depth must be between  $Rz = 5 - 30 \mu\text{m}$  (max.  $50 \mu\text{m}$ ) according to diameter and material type.

Before roller burnishing to obtain the most appropriate surface, you can use the lathing formula below;

Feed rate per revolution (mm/rev.) =  $0.5 \times$  cutter edge radius (mm)

The workpiece after pre-machining becomes ready for roller burnishing process. After the roller burnishing process, there is no roughness left on the surface (see figure).

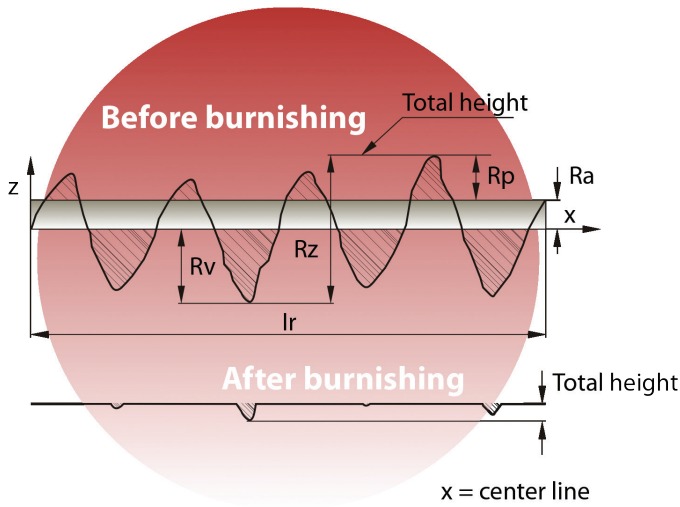


Figure 2 - Surface profiles after pre-machining and roller burnishing

**Sample application;**

| Workpiece      |           | Roller burnishing parameters |               |
|----------------|-----------|------------------------------|---------------|
| Diameter       | Ø40,00 mm | Revolution                   | 800 rev./min. |
| Rolling lenght | 60 mm     | Feeding                      | 0,9 mm/rev.   |
| Material       | Steel     | Process time                 | 5 sec.        |
| Pre-machining  | Lathe     |                              |               |



Figure 3 - Before and after roller burnishing surfaces

**Available surfaces**

Cylindrical holes, cylindrical external surfaces, internal and external tapers, fillets / radiuses, grooves, spherical and flat surfaces.

**Advantages of roller burnishing**

- The surfaces in quality of  $Rz < 1 \mu\text{m}$  /  $Ra < 0,16 \mu\text{m}$  can be obtained.
- It is possible to catch the desired size tolerance easily and rapidly.
- The surface harden in the same time. It ensures the processed surface to become stronger, more brilliant and slippery.
- It is too much economical, low spare part consumption, it saves time, money and energy.
- The process is completed by one pass. The process time is very short.
- No sawdust and residues occur. No noise and damage to the environment.
- Low lubrication and coolant.

**Surface roughness**

Before burnishing

After burnishing

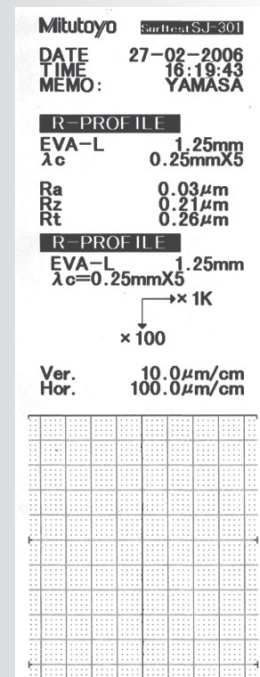
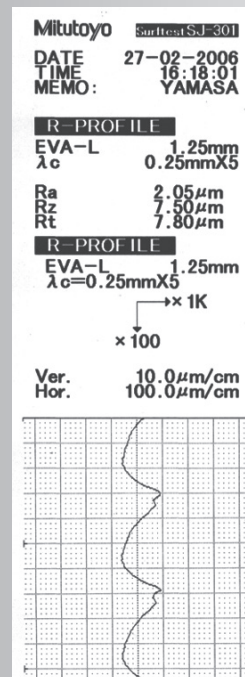
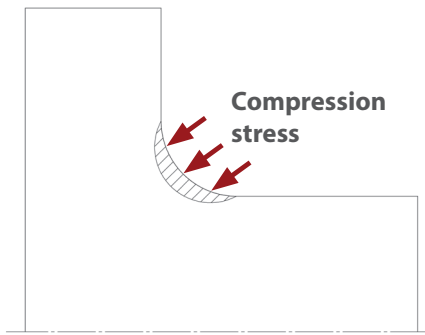


Figure 4 - Surface profiles





**Figure 5 - Compression stress after deep rolling**

This method increases fatigue strength of parts which are exposed to dynamic stress under high pressure or load and prevents or decreases cracks and fractures which may be derived from stress and depreciation.

The object resistance decreases due to the instantaneous changes in cross-section and cornered structure on the parts carrying loads or being exposed to loads (machine elements, shaft, axles etc.). To prevent this, round lines such as Radius are used. To a great extent, critical cross-section is usually found in these areas where notch effect exists. Materials are usually cracked or broken from these areas. The aim of deep rolling method is to decrease notch effect and prevent cracks and fractures by increasing the fatigue strength.

Deep rolling is the most suitable and fastest method of mechanical metal processing. The success of this method is ensured as a result of three distinct physical effects occurring at the same time.

1. With compression stress remained on the surface after deep rolling. This stress never decreases following deep rolling.
2. By increasing the resistance of the material.
3. By polishing the surface (by smoothing micro burrs that operations such as grinding etc. could not eliminate).

To become successful in the operation of deep rolling, it is necessary to use right parameters of operation. In this sense, the settings of rotation, feeding and rolling force are important.

During the operation of deep rolling, deep rolling roller is pressed onto the workpiece which it has contacts with. This operation plasticizes upper layer and changes micro structure of the surface. Deep rolling force which occurs on its contact point with the surface generates Hertzian contact force in the fringe area of the material. If this force is greater than tensile strength of material, the material begins to exude from the sideward of the surface. Compression strength which remains after operation stays in this area by increasing the fatigue strength.

If plastic deformation takes place under the level of room temperature or recrystallization, this is named as "cold working." The amount of produced cold-working depends on the rolling force, feeding speed, form of deep rolling roller and workpiece and properties of the material. Rolling force and feeding speed are the variable parameters. For instance, low rolling force causes low level cold-working.

Characteristic acquisitions are obtained depending on the amount of cold working and the properties of the material. Depth of compression stress which is constituted after deep rolling operation is subject to change.

For instance, when low rolling force or small deep rolling rollers are used, low values come up. Similarly, when high rolling force or big deep rolling rollers are used, immersion depth and compression stress depth increase.

### Rolling force

Rolling force deeply affects the amount of cold working and compression stress emerged on the surface of workpiece at the end of deep rolling. For this reason, implementing appropriate parameters of rolling force and controlling them increase the reliability of the operation.

### Advantages of deep rolling

- It decreases notch effect of dynamically operating workpieces; through increasing fatigue strength, it is the most effective way to prevent cracks and fractures.
  - The constant durability of workpieces having been processed in deep rolling increases at a rate of 400%.
  - During cold-working process, deep rolling is the single metal processing method that achieves high surface quality by polishing the surface of workpiece and provides remnant compression stress at the same time.
  - Cold-working realized with deep rolling increases surface hardness and eliminate all micro notches and burrs through polishing, makes the corrosion difficult.
- During processes other than deep rolling, micro notches and burrs remained on the workpieces may always cause tensile and depreciation fractures. In addition, the processes such as throwing ball cause notch on the surface and increases surface roughness. For this reason, the surface needs to be grinded during the second operation. Deep rolling removes the need of other time-consuming processes such as grinding which is used for elimination of notches and burrs.

- Deep rolling can be realized at a single calibration just after turning operation.
- Deep rolling is the most advanced and economical way among other systems to increase fatigue strengths and polish surfaces.
- It is the most reliable processing method among the others known so far.
- It is very useful with its miniature tools which are suitable for all machines.
- It provides savings from the material used in workpiece and its weight.
- It provides saving from heat treatment.

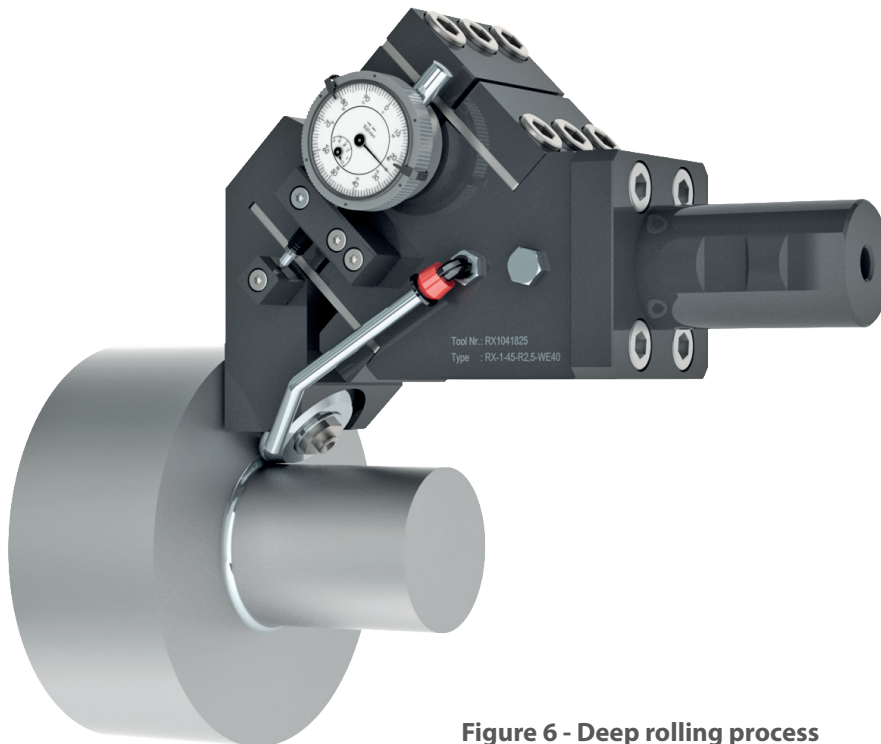


Figure 6 - Deep rolling process

### Deep rolling operation

This method is generally used in the operation of narrow and difficult-to-access surfaces having radius  $R < 4$  mm. Rolling force, through using profile deep rolling rollers, is implemented to radius, an area which will be exposed to metal fatigue. Adjustable deep rolling rollers, is automatically aligned with the slope of the workpiece. This considerably reliable operation calculates production tolerances and completely distributes remnant compression stress as it is demanded.

#### **The Operation is realized through two motions;**

1st Motion; Rotation: Workpiece rotates.

2nd Motion; Plunge-in: Deep rolling roller which is purpose-built according to radius profile is pressed onto radius with pre-determined force.

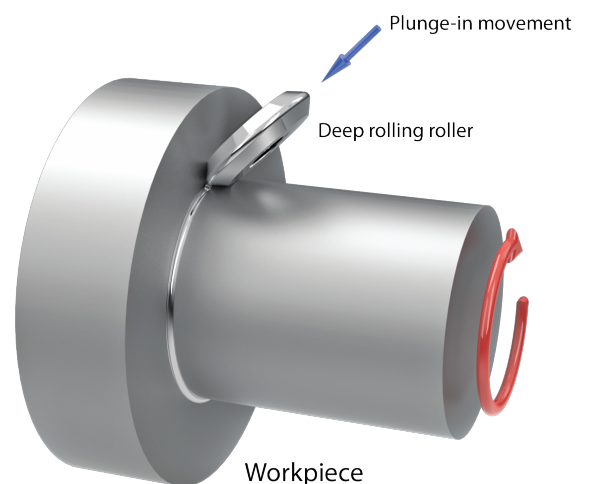


Figure 7 - Plunge-in process

Skive-Burnishing is used to finish process the inner surfaces of hydraulic-pneumatic cylinders and tubes. Tools complete skiving and burnishing operation in one pass. Since it is possible to produce quickly and economically high-quality tubes, this technology is preferred instead of honing method in serial production.

Roller burnished surfaces provide much more lower surface roughness according to the honed surfaces, in this case too low abrasion value occurs. Therefore, joints running through the cylinder are less worn and has long life. Also the optimal surface roughness is obtained too which is required for sealing. With this technology, tubes which have high surface quality, hardness and worn durable are produced, process time and costs are extremely decreased.

### Skive-burnishing operation

Tools have a processing capacity reaching up to 5 meters/minute speed. Tools perform skiving-burnishing operation simultaneously. Thanks to this ultra fast tools processing times are extremely short;

Operation is generally carried on deep hole drilling machine. Machine is equipped with equipment and tool suitable for workpiece diameter and adjusted.

Knives on skiving head are activated as hydraulic unit is engaged. Tool is speedily progressed towards inside of the tube. Guiding pads bears the tube. Cutters at the back determine the finishing diameter and tolerance while pre-cutters mounted to knives are skiving the rough surface. Each knife removes same amount of sawdust from the tube. Removed sawdust are pushed forward by the highly compressed cooling oil supplied from the back. In this way, skiving head in the front prepares optimal size and surface by skiving excessive sawdust up to adjusted diameter for roller burnishing operation ( $R_z$  5-20  $\mu\text{m}$ ).

Roller head located at the back eliminates roughness of the surface by performing roller burnishing process and ensures final finishing size. Support pads feed on the finish surface.

Knives and roller head are shut down hydraulically.

Tool speedily retracted and operation is completed with one pass without leading any damage on the surface.

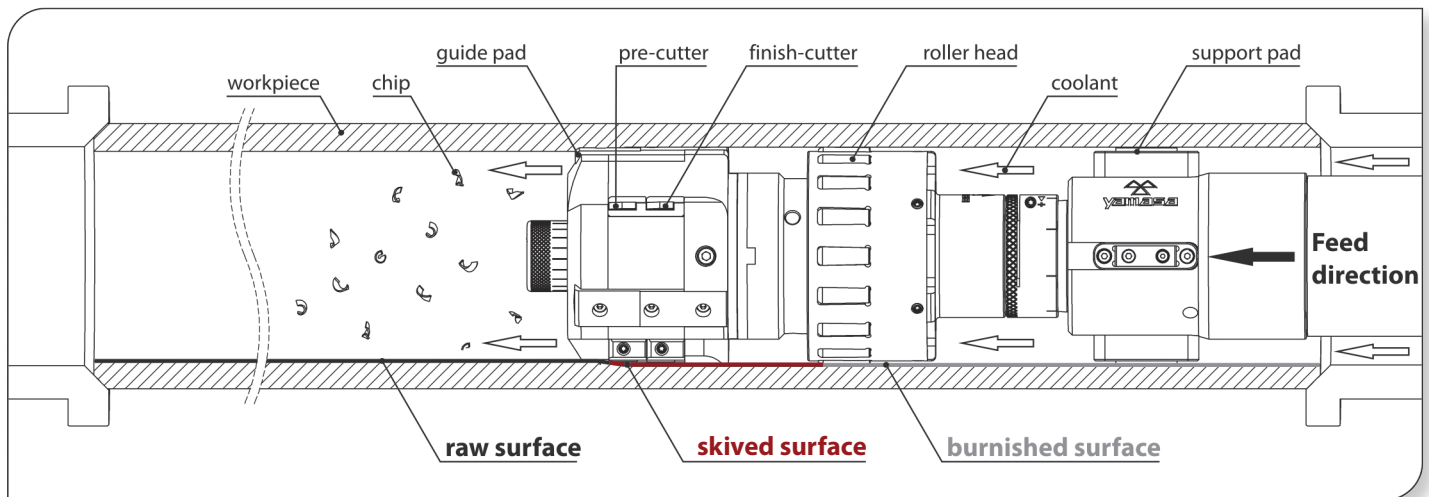


Figure 8 - Simultaneously skive-burnishing process

### YAMASA skive-burnishing technology provides you many advantages;

#### You will save from wear parts!

- Long life wear parts will decrease your consumption drastically!
- The money you spend for wear parts decrease drastically!
- Replacements are easy, anyone can do it, no need any professionalism.

#### You will save time!

- Diameter adjustment with indicator provide time saving and convenience.
- High cutting performance minimize the machining time.
- The replacement of spare parts with longer periods shorten the machine down time.
- Minimized replacement duration provides time savings.

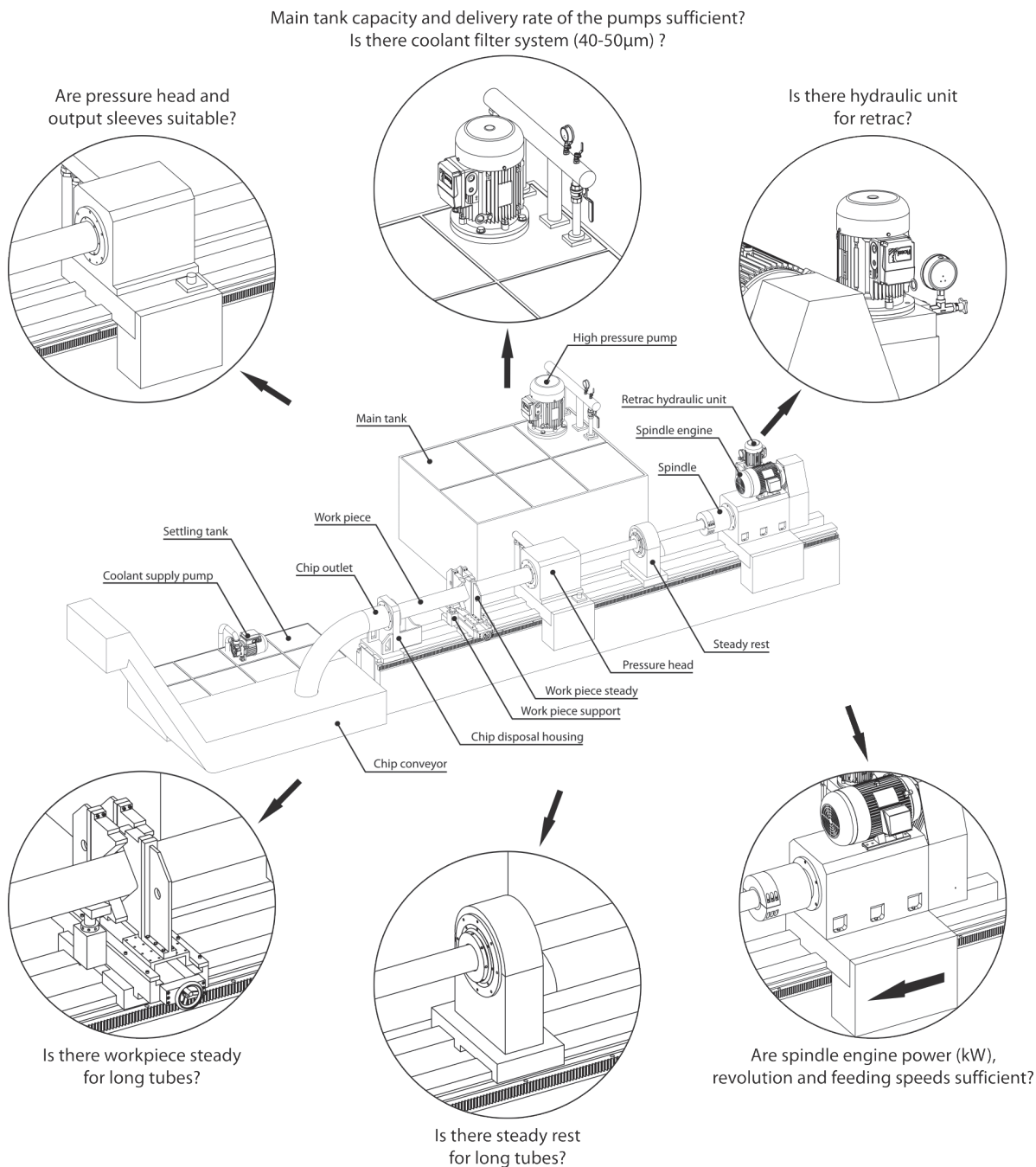
## Skive-Burnishing Technology

### You will produce high quality tubes in every conditions!!!

- It will produce quality tubes by eliminating rippling and axis alignment errors which source from machine.
- Excellent surface quality in one pass ( $R_z < 1 \mu\text{m}$  /  $R_a < 0,1 \mu\text{m}$ ).
- Provides improved cylindrical forms by reducing the circularity till 0,01 mm.
- Reduce rippling or remove completely.
- It can produce the tubes in large irregularities in one operation.
- High cutting depth offers a possibility of machining hot rolled tubes in one pass.

### Your production cost will decrease drastically!

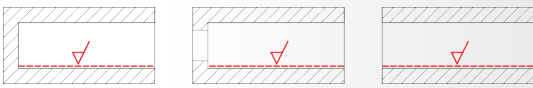
- When YAMASA CEO new generation combined skive-burnishing tools are began to used wear part needs and cost reduction immediately are noticed.
- Decrease in machine downtime and operation, increase in production amount affect production costs positively.



### For the first-time users!

You can consult us for checking whether your current machine is suitable for the skive-burnishing system, for the necessary revisions to make it suitable, or for determining the additions. If you have such a request, please contact us. Our technical staff will provide you necessary help and information.

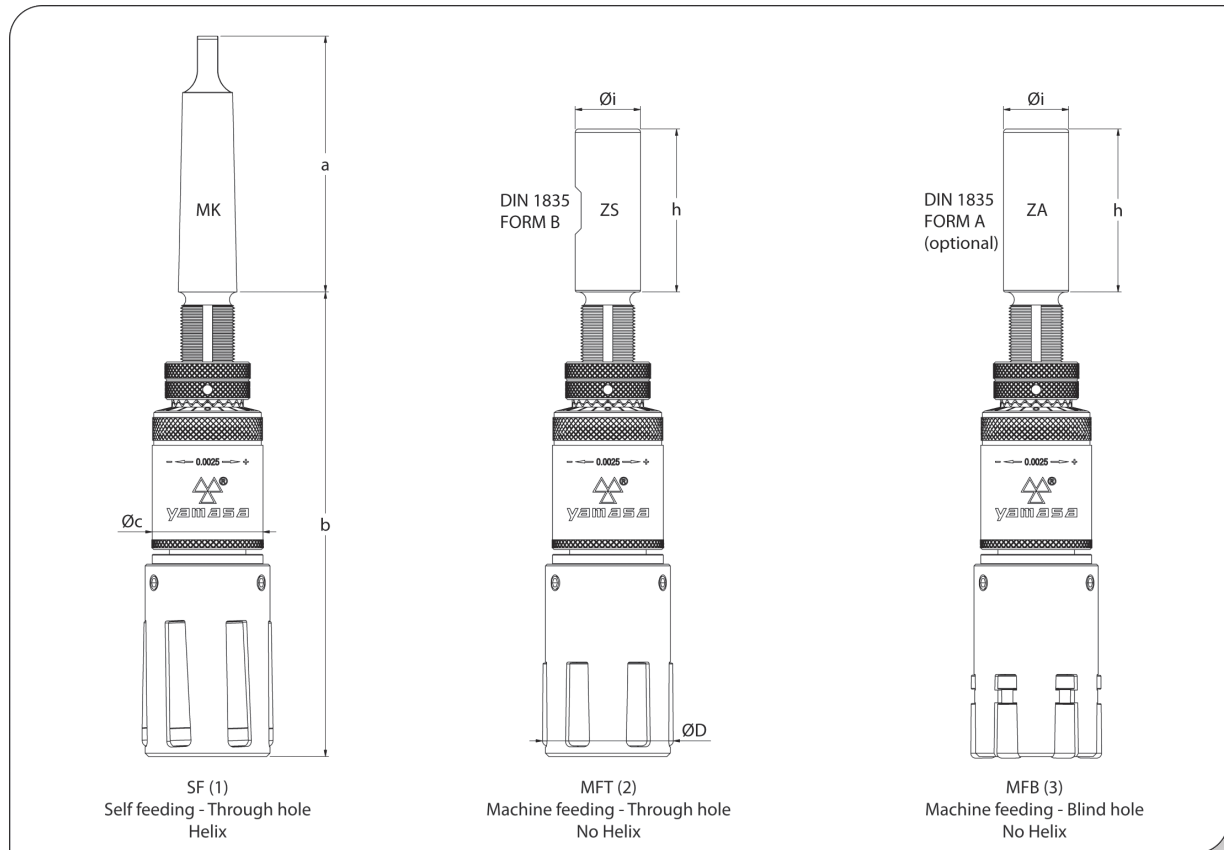




✓ Achievable surface roughness  $Rz < 1 \mu\text{m} / Ra < 0,16 \mu\text{m}$

### Application

- Tools are used for the aim of burnishing through holes, semi-blind hole and blind holes.
- Provide surface hardness and calibration (measurement accuracy).
- Used on all kinds of machining production machines such as CNC and universal lathe, machining centers, drilling or milling machines, etc.
- Pre-machining and burnishing is possible on same machine. Process is done in one pass after pre-machining.



### Tool Versions

There are three versions of YAMASA DX burnishing tools according to the process type.

#### Version 1: SF - Self feeding for through holes

- Burnish the through holes. It makes the feeding self. If the revolution increases the feeding speed increases self in the same rate.
- It is suitable for use such on universal lathe, drilling, milling machines.

#### Version 2: MFT - Machine feeding for through holes

- Burnish the through holes.
- It can be used on all kind of machining production machines.
- Feed rate: 0,05 - 0,3 mm/rev. per roller

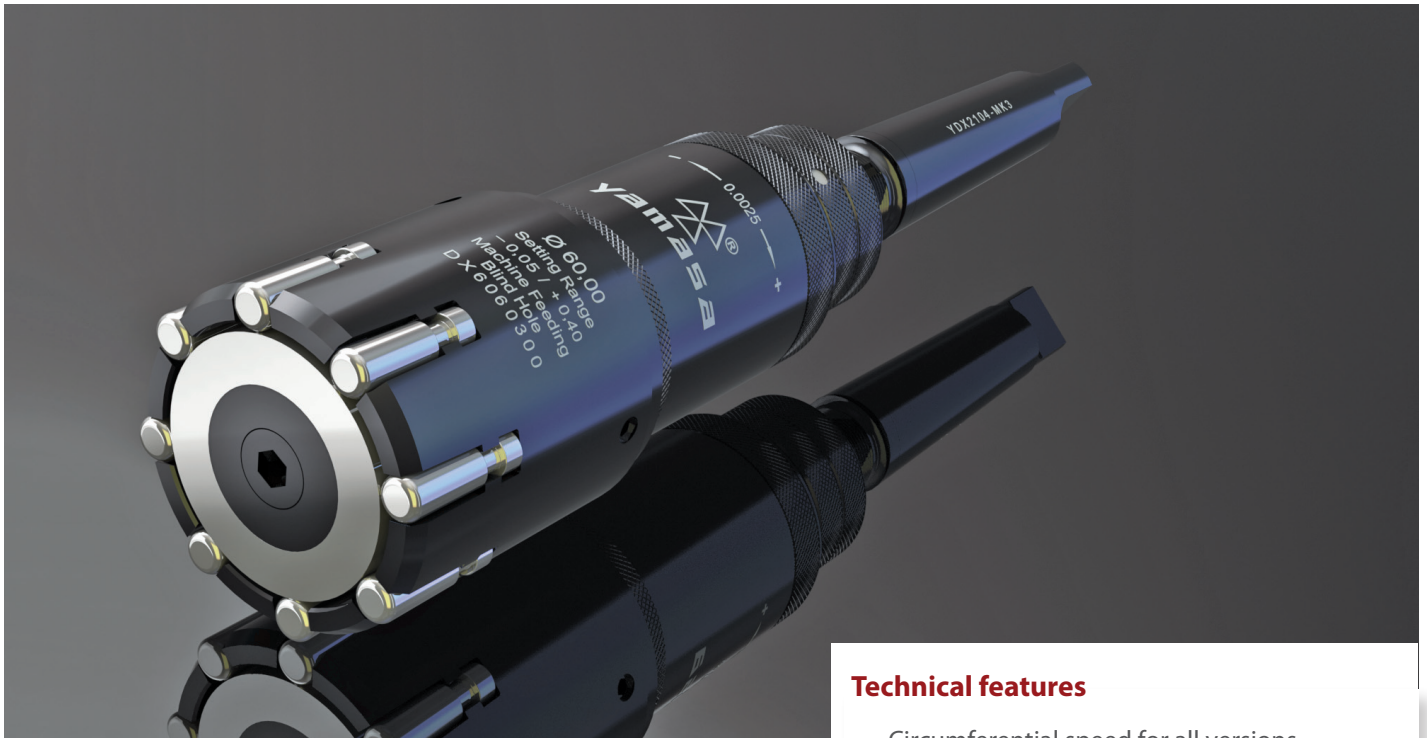
#### Version 3: MFB - Machine feeding for blind holes

- Burnish the blind holes up to end. It can be used for also through holes and semi-blind holes.
- It can be used on all kind of machining production machines.
- Feed rate: 0,05 - 0,3 mm/rev. per roller

| Tool body | Diameter range $\varnothing D$ | Shank                          |                                       | Setting range |               |               | Dimensions |       |    | Remarks                              |   |       |       |                              |   |
|-----------|--------------------------------|--------------------------------|---------------------------------------|---------------|---------------|---------------|------------|-------|----|--------------------------------------|---|-------|-------|------------------------------|---|
|           |                                | Morse taper                    | Cylindrical- $\varnothing i \times h$ | SF            | MFT           | MFB           | a          | b     | c  |                                      |   |       |       |                              |   |
| DX1.1     | 005,00                         | MK2<br>or<br>MK1<br>(optional) | ZS20- $\varnothing 20 h \times 50$    | -0,05 / +0,10 | -0,05 / +0,10 | -             | 78,5       | 146   | 34 | Standard<br>rolling length<br>50 mm. | Please look<br>tool selection<br>tables for<br>other rolling<br>lengths<br>options. |       |       |                              |   |
|           | 006,00 - 008,00                |                                |                                       | -0,05 / +0,20 | -0,05 / +0,20 | -0,05 / +0,20 |            |       |    |                                      |   |       |       |                              |   |
|           | 009,00 - 014,00                |                                |                                       | -0,10 / +0,40 | -0,10 / +0,40 | -0,05 / +0,40 |            |       |    |                                      |   |       |       |                              |   |
| DX1.2     | 015,00 - 021,00                |                                |                                       | -0,10 / +0,90 | -0,10 / +0,40 | -0,05 / +0,40 |            | 140   |    |                                      |   | 140   | 143,5 | Unlimited<br>rolling length. | Please ask for<br>special<br>situations.      |
|           | 022,00 - 031,00                |                                |                                       |               |               |               |            |       |    |                                      |   |       |       |                              |   |
| DX1.3     | 032,00 - 034,00                |                                |                                       | -0,10 / +0,90 | -0,10 / +0,40 | -0,05 / +0,40 |            | 143,5 |    |                                      |   | 143,5 | 143,5 | Unlimited<br>rolling length. | Please ask for<br>different shank<br>options. |
|           | 035,00 - 049,00                |                                |                                       |               |               |               |            |       |    |                                      |   |       |       |                              |   |
| DX2       | 050,00 - 080,00                | MK3                            | ZS25- $\varnothing 25 h \times 56$    | -0,10 / +0,90 | -0,10 / +0,40 | -0,05 / +0,40 | 98         | 177,5 | 48 | Unlimited<br>rolling length.         | Please ask for<br>different shank<br>options.                                       |       |       |                              |   |
| DX3       | 081,00 - 160,00                | MK4                            | ZS32- $\varnothing 32 h \times 60$    |               |               |               | 123        | 195   | 62 |                                      |   |       |       |                              |   |
| DX4       | 161,00 - 350,00                | MK5                            | ZS40- $\varnothing 40 h \times 70$    |               |               |               | 155,5      | 272,5 | 89 |                                      |   |       |       |                              |   |

All dimensions in mm. **SF(1):** Self feeding - through hole **MFT(2):** Machine feeding - through hole **MFB(3):** Machine feeding - blind hole

**Internal Roller Burnishing Tools**



**DX Series**  
Developed System

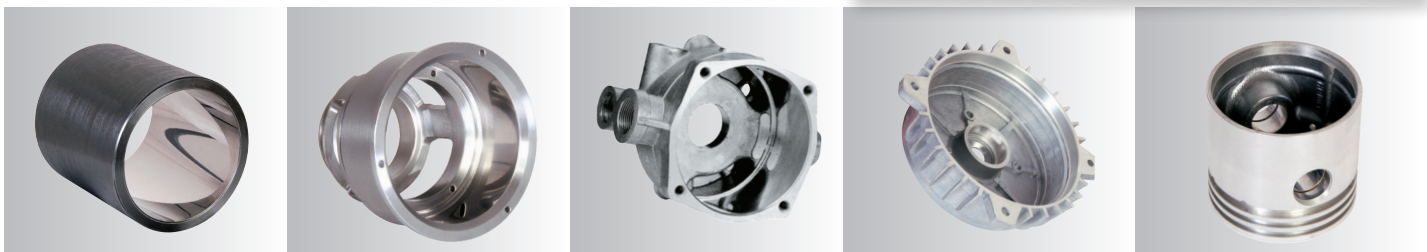


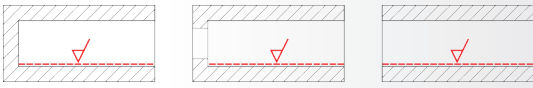
**Technical features**

- Circumferential speed for all versions maximum 250 m/min.
- Tools can be adjustable 0,15 - 1 mm according to type.
- Has a 0,0025 mm precise adjustment mechanism.
- Can burnish the holes up to H8-H9 tolerance with one adjustment.
- Burnishing all kinds of metallic materials up to the tensile strength of 1400N/mm<sup>2</sup> and to the hardness 42-45 HRC.
- Easy setting, long using life, low spare parts consumption. Every kind of spare part can be provided by YAMASA.

**Tool structure**

- Tool consists of a burnishing head and a body which has a precision adjustment mechanism.
- Burnishing head consists of a cage, cone and rollers. In the same time, these are consumables.
- It is possible to mount on the same type body the roller heads in different diameter.
- There are cylindrical and morse taper shank choices are available for machine connection (see table).

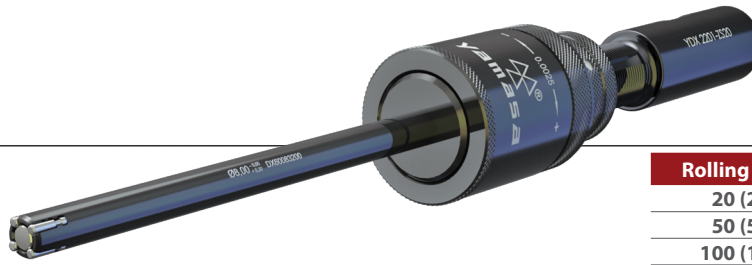




✓ Achievable surface roughness  $Rz < 1 \mu m / Ra < 0,16 \mu m$

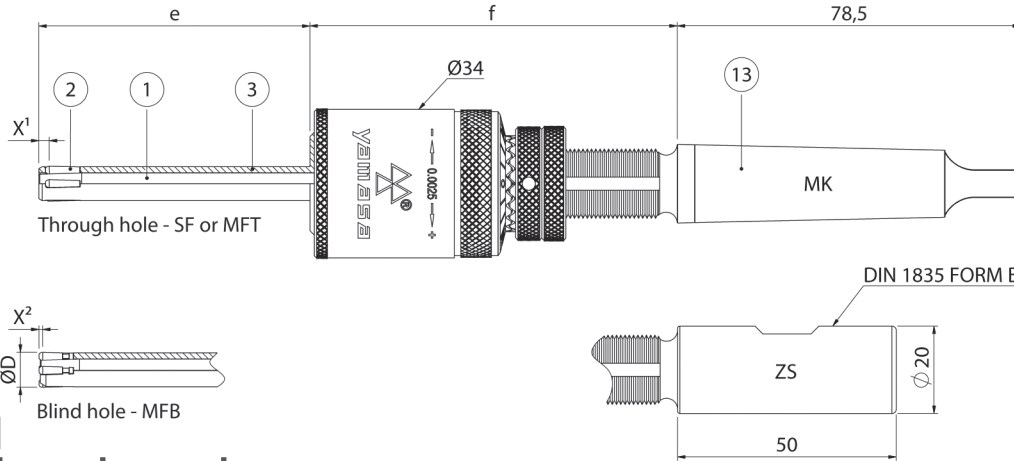
**DX Type** | Between  $\varnothing 5 - 14 \text{ mm}$

**Internal Roller Burnishing Tools**



| Rolling length | e   | f    |
|----------------|-----|------|
| 20 (23*)       | 27  | 74,5 |
| 50 (58*)       | 62  | 84   |
| 100 (108*)     | 112 | 84   |
| 150 (158*)     | 162 | 84   |

\*max. rolling length for blind hole tool



**Minimum edge**

| Diameter range | X <sup>1</sup> / SF | X <sup>1</sup> / MFT | X <sup>2</sup> / MFB |
|----------------|---------------------|----------------------|----------------------|
| 05,00          | 2,4                 | 2,4                  | -                    |
| 06,00 - 14,00  | 2,6                 | 2,6                  | 0,8                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.

- 1- Cone
- 2- Roller
- 3- Cage
- 13- Shank

**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share | Pre-machining roughness | Pre-machining    | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|---------------|-------------------------|------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload  |                         |                  |                 |
| 05,00               | 1000                 | 0,30               | 300              | CCW (M3)        | up to 0,02 mm | Rz = 5 - 15 $\mu m$     | Reaming or lathe | Oil or emulsion |
| 06,00 - 07,00       | 1000                 | 0,45               | 450              | Rapidly (G0)    | up to 0,05 mm |                         |                  |                 |
| 08,00 - 14,00       | 1000                 | 0,60               | 600              |                 |               |                         |                  |                 |

**Product selection**

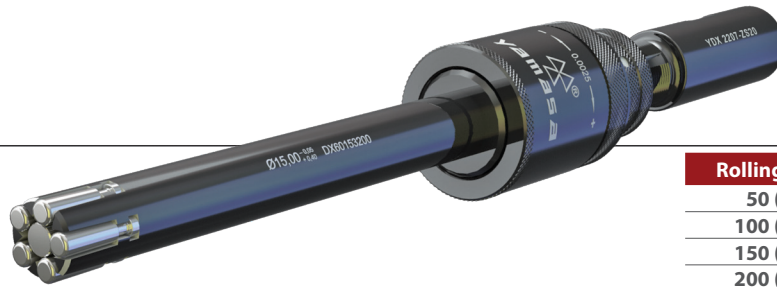
| DX Tool selection (complete) |                        |         |     |     |                     |                   | Spare part selection |                        |         |                |                        |         |                |    |        |         |                   |                     |        |   |   |                     |       |   |   |   |                     |        |       |        |       |       |       |
|------------------------------|------------------------|---------|-----|-----|---------------------|-------------------|----------------------|------------------------|---------|----------------|------------------------|---------|----------------|----|--------|---------|-------------------|---------------------|--------|---|---|---------------------|-------|---|---|---|---------------------|--------|-------|--------|-------|-------|-------|
| Tool body                    | Dia. $\varnothing$ -mm | Version |     |     | Rolling length      | Shank             |                      | DX Cage                |         |                |                        | DX Cone |                |    | Roller |         |                   | Qua.                |        |   |   |                     |       |   |   |   |                     |        |       |        |       |       |       |
|                              |                        | SF      | MFT | MFB |                     |                   |                      | Dia. $\varnothing$ -mm | Version | Rolling length | Dia. $\varnothing$ -mm | Version | Rolling length | SF | MFT    | MFB     |                   |                     |        |   |   |                     |       |   |   |   |                     |        |       |        |       |       |       |
| DX1.1                        | 5,00                   | 1       | 2   | 3   | 20 . 50             | MK2 or MK1 (opt.) | ZS20 or ZA20 (opt.)  | 1                      | 2       | 3              | 20 . 50                | 5,00    | 1              | 2  | 3      | 20 . 50 | 500115            | 500115              | -      | 3 |   |                     |       |   |   |   |                     |        |       |        |       |       |       |
|                              | 6,00                   |         |     |     | 20 . 50             |                   |                      |                        |         |                | 6,00                   | 6,00    |                |    |        | 20 . 50 | 500100            | 500100              | 500308 |   |   |                     |       |   |   |   |                     |        |       |        |       |       |       |
|                              | 7,00                   |         |     |     | 100                 |                   |                      |                        |         |                | 7,00                   | 7,00    |                |    |        | 100     | 500100            | 500100              | 500308 |   |   |                     |       |   |   |   |                     |        |       |        |       |       |       |
|                              | 8,00                   |         |     |     | 20 . 50 . 100 . 150 |                   |                      |                        |         |                | 1                      | 2       |                |    |        | 3       | MK2 or MK1 (opt.) | ZS20 or ZA20 (opt.) | 1      | 2 | 3 | 20 . 50 . 100 . 150 | 8,00  | 1 | 2 | 3 | 20 . 50 . 100 . 150 | 500108 | 50108 | 500300 | 4     |       |       |
|                              | 9,00                   |         |     |     |                     |                   |                      |                        |         |                |                        |         |                |    |        |         |                   |                     |        |   |   |                     | 9,00  |   |   |   |                     |        |       |        |       | 9,00  | 9,00  |
|                              | 10,00                  |         |     |     |                     |                   |                      |                        |         |                |                        |         |                |    |        |         |                   |                     |        |   |   |                     | 10,00 |   |   |   |                     |        |       |        |       | 10,00 | 10,00 |
|                              | 11,00                  |         |     |     |                     |                   |                      |                        |         |                |                        |         |                |    |        |         |                   |                     |        |   |   |                     | 11,00 |   |   |   |                     |        |       |        |       | 11,00 | 11,00 |
|                              | 12,00                  |         |     |     |                     |                   |                      |                        |         |                |                        |         |                |    |        |         |                   |                     |        |   |   |                     | 12,00 |   |   |   |                     |        |       |        | 12,00 | 12,00 |       |
|                              | 13,00                  |         |     |     |                     |                   |                      |                        |         |                |                        |         |                |    |        |         |                   |                     |        |   |   |                     | 13,00 |   |   |   |                     |        |       |        | 13,00 | 13,00 |       |
|                              | 14,00                  |         |     |     |                     |                   |                      |                        |         |                |                        |         |                |    |        |         |                   |                     |        |   |   |                     | 14,00 |   |   |   |                     |        |       |        | 14,00 | 14,00 |       |

**How to order | Order samples**

|   |                    |                    |               |
|---|--------------------|--------------------|---------------|
| DX1.1-12,00-1-50-MK2 Roller burnishing tool | 12,00-1-50 DX Cage | 12,00-1-50 DX Cone | 500102 Roller |
|---|--------------------|--------------------|---------------|

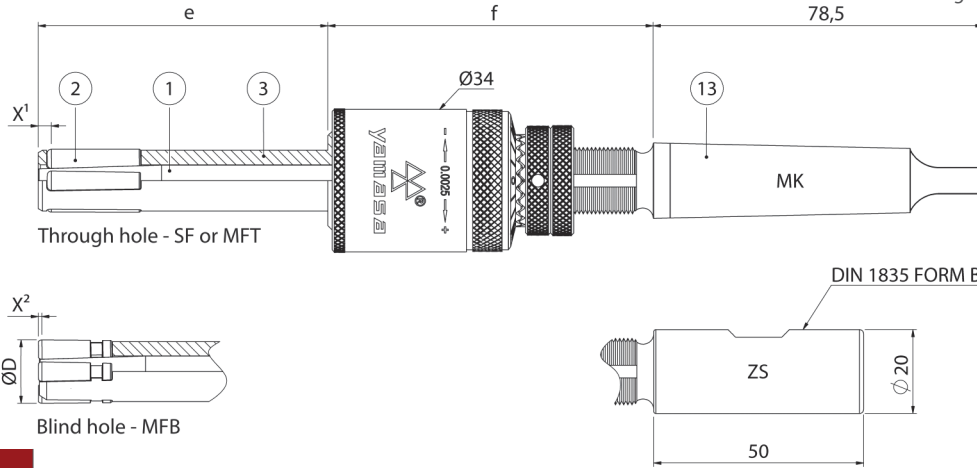
You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1)**: Self feeding - through hole **MFT(2)**: Machine feeding - through hole **MFB(3)**: Machine feeding - blind hole

**Internal Roller Burnishing Tools**



| Rolling length | e   | f    |
|----------------|-----|------|
| 50 (64*)       | 69  | 77   |
| 100 (114*)     | 119 | 78,5 |
| 150 (164*)     | 169 | 78,5 |
| 200 (214*)     | 219 | 78,5 |
| 250 (264*)     | 269 | 78,5 |

\*max. rolling length for blind hole tool



- 1- Cone
- 2- Roller
- 3- Cage
- 13- Shank

**Minimum edge**

| Diameter range | X <sup>1</sup> / SF | X <sup>1</sup> / MFT | X <sup>2</sup> / MFB |
|----------------|---------------------|----------------------|----------------------|
| 15,00 - 21,00  | 6,2                 | 3,5                  | 0,8                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.

**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share | Pre-machining roughness | Pre-machining    | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|---------------|-------------------------|------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload  |                         |                  |                 |
| 015,00 - 021,00     | 1000                 | 0,75               | 750              | CCW (M3)        | up to 0,02 mm | Rz = 5 - 15 µm          | Reaming or lathe | Oil or emulsion |
|                     |                      |                    |                  | Rapidly (G0)    | up to 0,05 mm |                         |                  |                 |

**Product selection**

| DX Tool selection (complete) |           |         |     |     |  |                            | Spare part selection         |           |         |                |                |  |                |      |     |                |    |        |        |        |   |
|------------------------------|-----------|---------|-----|-----|--|----------------------------|------------------------------|-----------|---------|----------------|----------------|--|----------------|------|-----|----------------|----|--------|--------|--------|---|
| Tool body                    | Dia. Ø-mm | Version |     |     | Rolling length                                     | Shank                      |                              | DX Cage   |         |                |                | DX Cone  |                |      |     | Roller         |    |        | Qua.   |        |   |
|                              |           | SF      | MFT | MFB |  |                            |                              | Dia. Ø-mm | Version | Rolling length | Dia. Ø-mm      | Version  | Rolling length | Code |     |                |    |        |        |        |   |
|                              |           |         |     |     |  |                            |                              | SF        | MFT     | MFB            | Rolling length |  | SF             | MFT  | MFB | Rolling length | SF | MFT    | MFB    |        |   |
| DX1.2                        | 15,00     | 1       | 2   | 3   | 50<br>•<br>100<br>•<br>150<br>•<br>200<br>•<br>250 | MK2<br>or<br>MK1<br>(opt.) | ZS20<br>or<br>ZA20<br>(opt.) | 15,00     | 1       | 2              | 3              | 50<br>•<br>100<br>•<br>150<br>•<br>200<br>•<br>250 | 15,00          | 1    | 2   | 3              | -  | 500129 | 500111 | 500310 | 5 |
|                              | 16,00     |         |     |     |  |                            |                              | 16,00     |         |                |                |  |                |      |     |                |    |        |        |        |   |
|                              | 17,00     |         |     |     |  |                            |                              | 17,00     |         |                |                |  |                |      |     |                |    |        |        |        |   |
|                              | 18,00     |         |     |     |  |                            |                              | 18,00     |         |                |                |  |                |      |     |                |    |        |        |        |   |
|                              | 19,00     |         |     |     |  |                            |                              | 19,00     |         |                |                |  |                |      |     |                |    |        |        |        |   |
|                              | 20,00     |         |     |     |  |                            |                              | 20,00     |         |                |                |  |                |      |     |                |    |        |        |        |   |
|                              | 21,00     |         |     |     |  |                            |                              | 21,00     |         |                |                |  |                |      |     |                |    |        |        |        |   |
|                              |           |         |     |     |  |                            |                              |           |         |                |                |  |                |      |     |                |    |        |        |        |   |

**How to order | Order samples**

|  |                    |                 |               |
|--|--------------------|-----------------|---------------|
| DX1.2-15,00-2-50-ZS20 Roller burnishing tool | 15,00-2-50 DX Cage | 15,00-2 DX Cone | 500111 Roller |
|--|--------------------|-----------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1)**: Self feeding - through hole **MFT(2)**: Machine feeding - through hole **MFB(3)**: Machine feeding - blind hole





✓ Achievable surface roughness  $Rz < 1 \mu\text{m}$  /  $Ra < 0,16 \mu\text{m}$

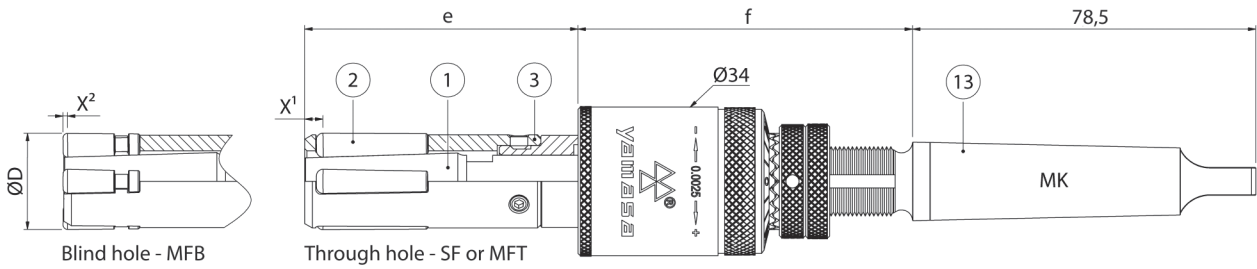
**DX Type** | Between  $\varnothing 22 - 31 \text{ mm}$

**Internal Roller Burnishing Tools**



| Rolling length | e     | f    |
|----------------|-------|------|
| 50 (59*)       | 63,5  | 76,5 |
| 100 (109*)     | 113,5 | 78   |
| 150 (159*)     | 163,5 | 78   |
| 200 (209*)     | 213,5 | 78   |
| 250 (259*)     | 263,5 | 78   |
| 300 (309*)     | 313,5 | 78   |

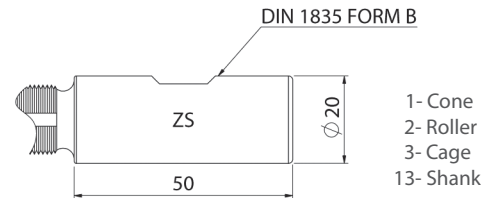
\*max. rolling length for blind hole tool



**Minimum edge**

| Diameter range | X <sup>1</sup> / SF | X <sup>1</sup> / MFT | X <sup>2</sup> / MFB |
|----------------|---------------------|----------------------|----------------------|
| 22,00 - 27,00  | 7,7                 | 5,5                  | 0,8                  |
| 28,00 - 31,00  | 9,3                 | 5,5                  | 0,8                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.



**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share | Pre-machining roughness   | Pre-machining    | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|---------------|---------------------------|------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload  |                           |                  |                 |
| 022,00 - 031,00     | 1000                 | 0,75               | 750              | CCW (M3)        | up to 0,03 mm | $Rz = 5 - 20 \mu\text{m}$ | Reaming or lathe | Oil or emulsion |
|                     |                      |                    |                  | Rapidly (G0)    | up to 0,06 mm |                           |                  |                 |

**Product selection**

| DX Tool selection (complete) |                        |         |     |     |  |                            | Spare part selection         |                        |         |                |                        |         |                |      |   |        |        |        |      |
|------------------------------|------------------------|---------|-----|-----|--|----------------------------|------------------------------|------------------------|---------|----------------|------------------------|---------|----------------|------|---|--------|--------|--------|------|
| Tool body                    | Dia. $\varnothing$ -mm | Version |     |     | Rolling length   | Shank                      |                              | DX Cage                |         |                |                        | DX Cone |                |      |   | Roller |        |        | Qua. |
|                              |                        | SF      | MFT | MFB |  |                            |                              | Dia. $\varnothing$ -mm | Version | Rolling length | Dia. $\varnothing$ -mm | Version | Rolling length | Code |   |        |        |        |      |
|                              |                        |         |     |     |  |                            |                              | SF                     | MFT     | MFB            |                        | SF      | MFT            | MFB  |   | SF     | MFT    | MFB    |      |
| DX1.2                        | 22,00                  | 1       | 2   | 3   | 50<br>·<br>100<br>·<br>150<br>·<br>200<br>·<br>250<br>·<br>300 | MK2<br>or<br>MK1<br>(opt.) | ZS20<br>or<br>ZA20<br>(opt.) | 1                      | 2       | 3              | -                      | 1       | 2              | 3    | - | 500130 | 500112 | 500311 | 5    |
|                              | 23,00                  |         |     |     |  |                            |                              |                        |         |                |                        |         |                |      |   |        |        |        |      |
|                              | 24,00                  |         |     |     |  |                            |                              |                        |         |                |                        |         |                |      |   |        |        |        |      |
|                              | 25,00                  |         |     |     |  |                            |                              |                        |         |                |                        |         |                |      |   |        |        |        |      |
|                              | 26,00                  |         |     |     |  |                            |                              |                        |         |                |                        |         |                |      |   |        |        |        |      |
|                              | 27,00                  |         |     |     |  |                            |                              |                        |         |                |                        |         |                |      |   |        |        |        |      |
|                              | 28,00                  |         |     |     |  |                            |                              |                        |         |                |                        |         |                |      |   |        |        |        |      |
|                              | 29,00                  |         |     |     |  |                            |                              |                        |         |                |                        |         |                |      |   |        |        |        |      |
|                              | 30,00                  |         |     |     |  |                            |                              |                        |         |                |                        |         |                |      |   |        |        |        |      |
|                              | 31,00                  |         |     |     |  |                            |                              |                        |         |                |                        |         |                |      |   |        |        |        |      |

**How to order | Order samples**

|  |                 |                 |               |
|--|-----------------|-----------------|---------------|
| DX1.2-22,00-3-50-ZS20 Roller burnishing tool | 22,00-3 DX Cage | 22,00-3 DX Cone | 500311 Roller |
|--|-----------------|-----------------|---------------|

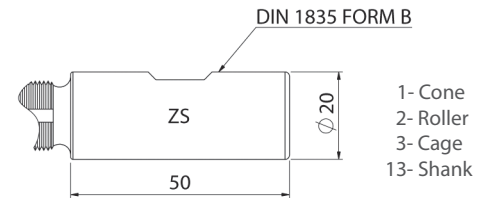
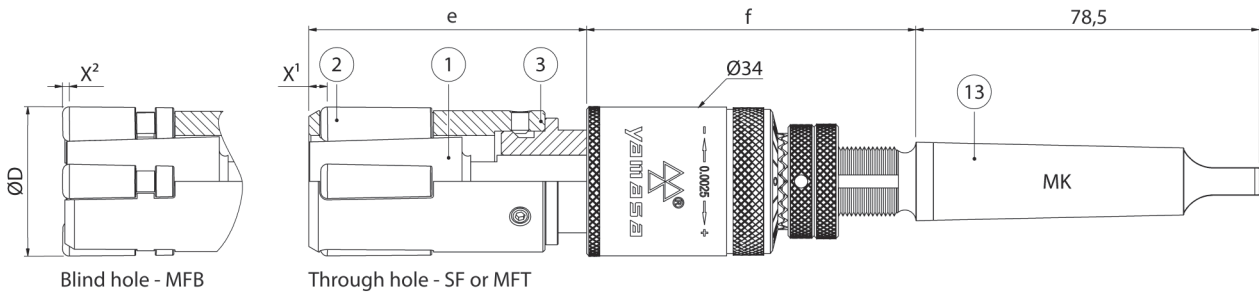
You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1)**: Self feeding - through hole **MFT(2)**: Machine feeding - through hole **MFB(3)**: Machine feeding - blind hole

**Internal Roller Burnishing Tools**



| Rolling length | e     | f    |
|----------------|-------|------|
| 50 (59*)       | 63,5  | 76,5 |
| 100 (109*)     | 113,5 | 78   |
| 150 (159*)     | 163,5 | 78   |
| 200 (209*)     | 213,5 | 78   |
| 250 (259*)     | 263,5 | 78   |
| 300 (309*)     | 313,5 | 78   |

\*max. rolling length for blind hole tool



**Minimum edge**

| Diameter range | X¹ / SF | X¹ / MFT | X² / MFB |
|----------------|---------|----------|----------|
| 32,00 - 34,00  | 9,3     | 5,5      | 0,8      |

X²: It is possible to come to near the edge more. Please ask for special situations.

**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share | Pre-machining roughness | Pre-machining    | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|---------------|-------------------------|------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload  |                         |                  |                 |
| 032,00 - 034,00     | 950                  | 0,75               | 710              | CCW (M3)        | up to 0,03 mm | Rz = 5 - 20 µm          | Reaming or lathe | Oil or emulsion |
|                     |                      |                    |                  | Rapidly (G0)    | up to 0,06 mm |                         |                  |                 |

**Product selection**

| DX Tool selection (complete) |           |         |     |     |  |                            | Spare part selection         |           |         |                |           |         |                |      |   |        |      |        |        |        |   |
|------------------------------|-----------|---------|-----|-----|--|----------------------------|------------------------------|-----------|---------|----------------|-----------|---------|----------------|------|---|--------|------|--------|--------|--------|---|
| Tool body                    | Dia. Ø-mm | Version |     |     | Rolling length   | Shank                      |                              | DX Cage   |         |                |           | DX Cone |                |      |   | Roller |      |        |        |        |   |
|                              |           | SF      | MFT | MFB |  |                            |                              | Dia. Ø-mm | Version | Rolling length | Dia. Ø-mm | Version | Rolling length | Code |   |        | Qua. |        |        |        |   |
|                              |           |         |     |     |  |                            |                              | SF        | MFT     | MFB            |           | SF      | MFT            | MFB  |   | SF     |      | MFT    | MFB    |        |   |
| DX1.3                        | 32,00     | 1       | 2   | 3   | 50<br>•<br>100<br>•<br>150<br>•<br>200<br>•<br>250<br>•<br>300 | MK2<br>or<br>MK1<br>(opt.) | ZS20<br>or<br>ZA20<br>(opt.) | 32,00     | 1       | 2              | 3         | -       | 32,00          | 1    | 2 | 3      | -    | 500128 | 500109 | 500307 | 5 |
|                              | 33,00     |         |     |     |  |                            |                              | 33,00     |         |                |           |         | 33,00          |      |   |        |      |        |        |        |   |
|                              | 34,00     |         |     |     |  |                            |                              | 34,00     |         |                |           |         | 34,00          |      |   |        |      |        |        |        |   |

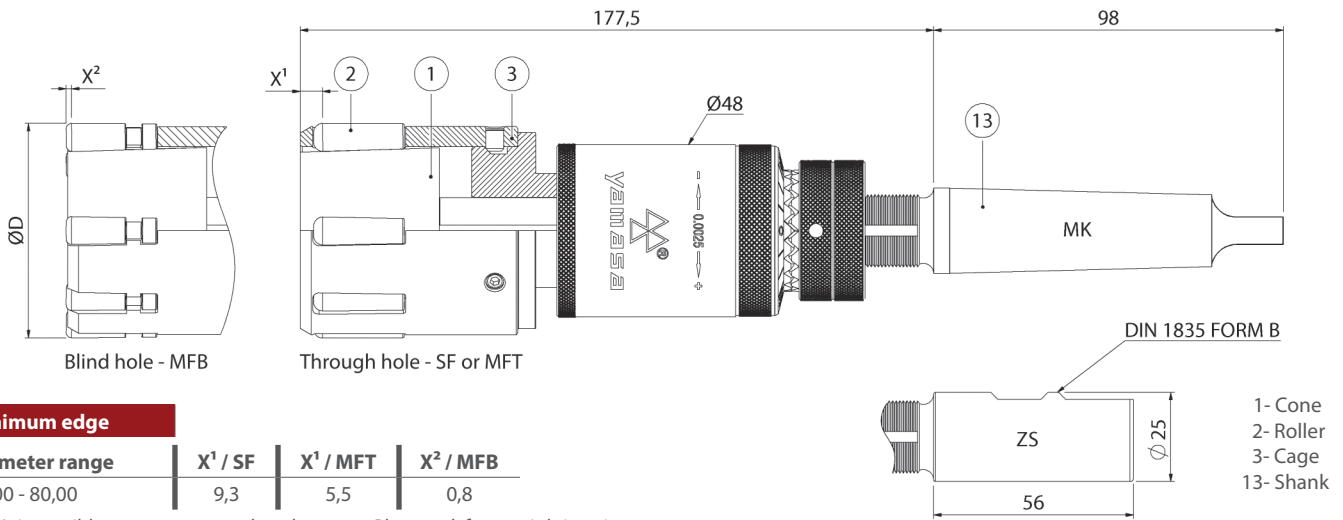
**How to order | Order samples**

|  |                 |                 |               |
|--|-----------------|-----------------|---------------|
| DX1.3-32,00-1-100-MK2 Roller burnishing tool | 32,00-1 DX Cage | 32,00-1 DX Cone | 500128 Roller |
|--|-----------------|-----------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1):** Self feeding - through hole **MFT(2):** Machine feeding - through hole **MFB(3):** Machine feeding - blind hole



**Internal Roller Burnishing Tools**



| Minimum edge   |                     |                      |                      |
|----------------|---------------------|----------------------|----------------------|
| Diameter range | X <sup>1</sup> / SF | X <sup>1</sup> / MFT | X <sup>2</sup> / MFB |
| 50,00 - 80,00  | 9,3                 | 5,5                  | 0,8                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.

**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share | Pre-machining roughness | Pre-machining    | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|---------------|-------------------------|------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload  |                         |                  |                 |
| 050,00 - 060,00     | 530                  | 1,20               | 630              | CCW (M3)        | up to 0,04 mm | Rz = 5 - 30 µm          | Reaming or lathe | Oil or emulsion |
| 061,00 - 070,00     | 450                  | 1,20               | 540              |                 |               |                         |                  |                 |
| 071,00 - 080,00     | 400                  | 1,20               | 480              | Rapidly (G0)    | up to 0,07 mm |                         |                  |                 |

**Product selection**

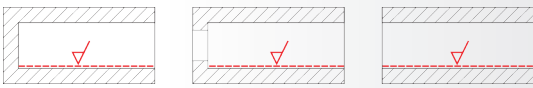
| DX Tool selection (complete) |           |         |     |     |                |        |        |       | Spare part selection |         |           |         |      |      |        |        |        |        |   |       |
|------------------------------|-----------|---------|-----|-----|----------------|--------|--------|-------|----------------------|---------|-----------|---------|------|------|--------|--------|--------|--------|---|-------|
| Tool body                    | Dia. Ø-mm | Version |     |     | Rolling length |        |        | Shank | DX Cage              |         |           | DX Cone |      |      | Roller |        |        | Qua.   |   |       |
|                              |           | SF      | MFT | MFB | SF             | MFT    | MFB    |       | Dia. Ø-mm            | Version | Dia. Ø-mm | Version | Code | Code | Code   |        |        |        |   |       |
| DX2                          | 50,00     | 1       | 2   | 3   | stand.         | stand. | stand. | MK3   | 1                    | 2       | 3         | 50,00   | 1    | 2    | 3      | 500128 | 500109 | 500307 | 8 |       |
|                              | U=163     |         |     |     | U=167          | U=173  | 50,00  |       |                      |         |           |         |      |      |        |        |        |        |   |       |
|                              | 55,00     |         |     |     | long           | long   | long   |       |                      |         |           |         |      |      |        |        |        |        |   | 55,00 |
|                              | 60,00     |         |     |     | 210            | 210    | 210    |       |                      |         |           |         |      |      |        |        |        |        |   | 60,00 |
|                              | 65,00     |         |     |     | 250            | 250    | 250    |       |                      |         |           |         |      |      |        |        |        |        |   | 65,00 |
|                              | 70,00     |         |     |     | 300            | 300    | 300    |       |                      |         |           |         |      |      |        |        |        |        |   | 70,00 |
|                              | 75,00     |         |     |     | 350            | 350    | 350    |       |                      |         |           |         |      |      |        |        |        |        |   | 75,00 |
|                              | 80,00     |         |     |     | 400            | 400    | 400    |       |                      |         |           |         |      |      |        |        |        |        |   | 80,00 |

**How to order | Order samples**

|   |                 |                 |               |
|---|-----------------|-----------------|---------------|
| DX2-52,00-3-U-ZS25 Roller burnishing tool | 52,00-3 DX Cage | 52,00-3 DX Cone | 500307 Roller |
|---|-----------------|-----------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1)**: Self feeding - through hole **MFT(2)**: Machine feeding - through hole **MFB(3)**: Machine feeding - blind hole

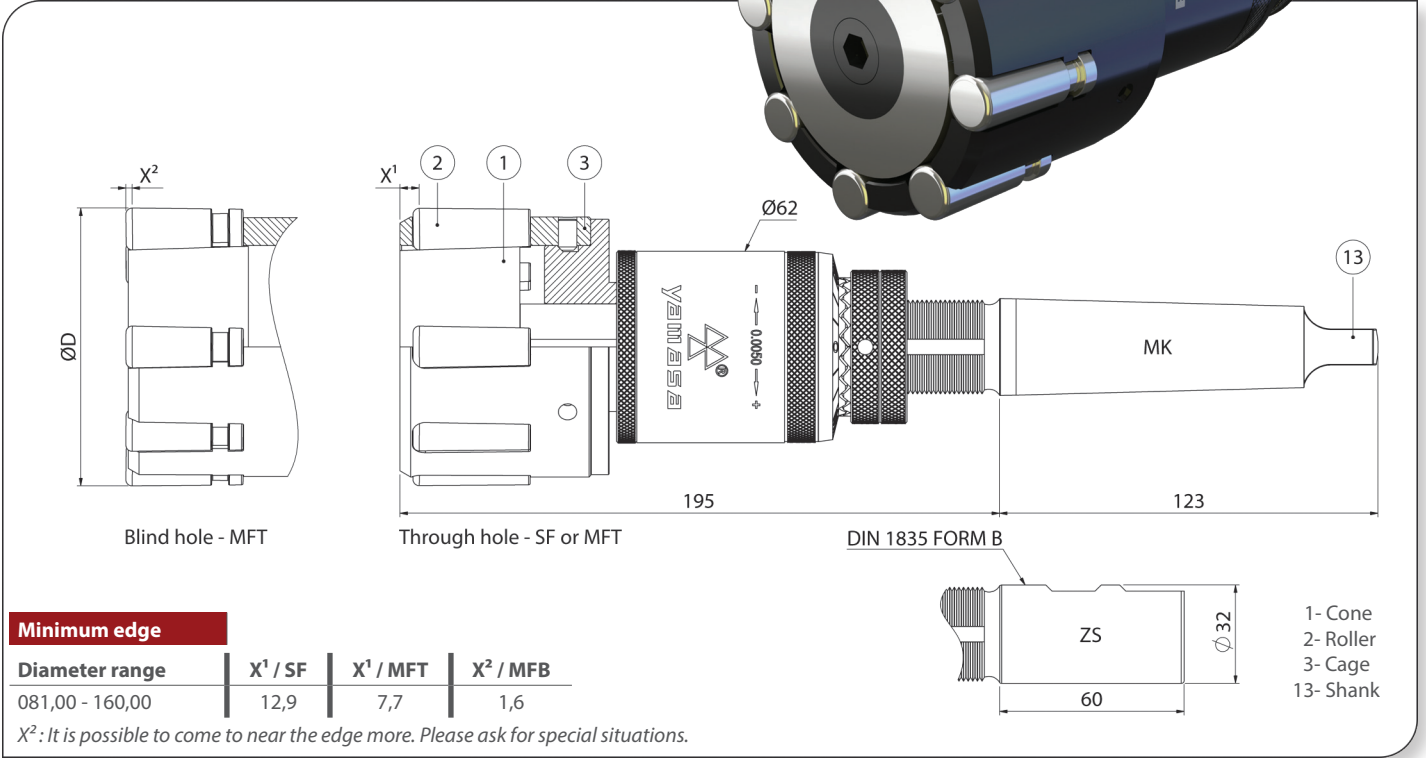




✓ Achievable surface roughness  $Rz < 1 \mu\text{m}$  /  $Ra < 0,16 \mu\text{m}$

**DX Type** | Between  $\varnothing 81 - 160 \text{ mm}$

**Internal Roller Burnishing Tools**



**Minimum edge**

| Diameter range  | X <sup>1</sup> / SF | X <sup>1</sup> / MFT | X <sup>2</sup> / MFB |
|-----------------|---------------------|----------------------|----------------------|
| 081,00 - 160,00 | 12,9                | 7,7                  | 1,6                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.

**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direction | Retreat      | Rolling share | Tool preload  | Pre-machining rough.      | Pre-machining    | Coolant         |
|---------------------|----------------------|--------------------|------------------|---------------------|----------------------|--------------------|------------------|--------------------|--------------|---------------|---------------|---------------------------|------------------|-----------------|
| 081,00 - 090,00     | 350                  | 1,20               | 420              | 121,00 - 140,00     | 230                  | 1,50               | 340              | CCW (M3)           | Rapidly (G0) | up to 0,05 mm | up to 0,10 mm | $Rz = 5 - 30 \mu\text{m}$ | Reaming or lathe | Oil or emulsion |
| 091,00 - 100,00     | 320                  | 1,20               | 380              | 141,00 - 150,00     | 210                  | 1,50               | 310              |                    |              |               |               |                           |                  |                 |
| 101,00 - 120,00     | 260                  | 1,20               | 310              | 151,00 - 160,00     | 200                  | 1,80               | 360              |                    |              |               |               |                           |                  |                 |

**Product selection**

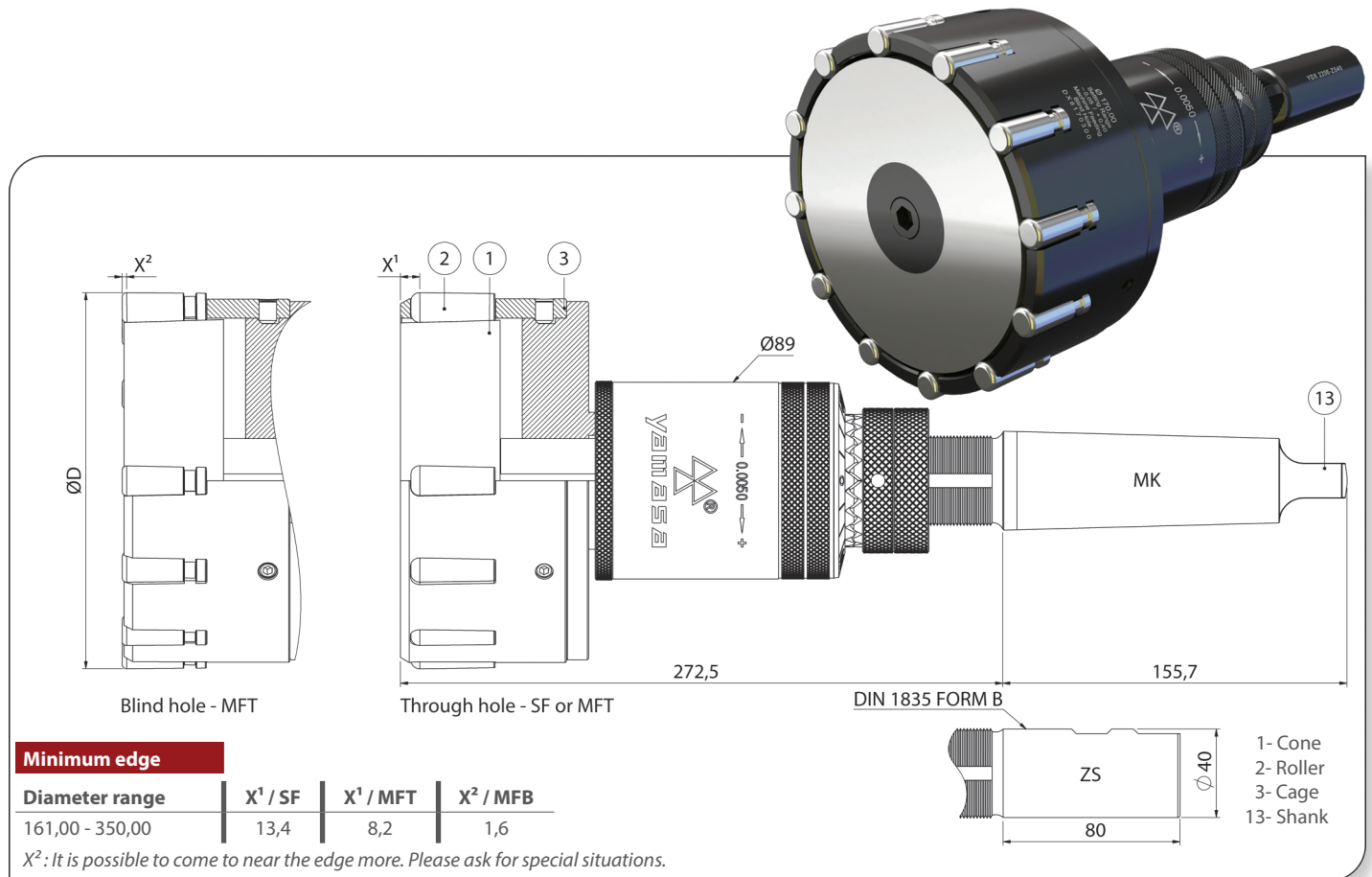
| DX Tool selection (complete) |                        |         |     |     |                 |                 |                 | Spare part selection |                              |         |   |                        |         |       |        | Qua. |     |        |        |        |   |
|------------------------------|------------------------|---------|-----|-----|-----------------|-----------------|-----------------|----------------------|------------------------------|---------|---|------------------------|---------|-------|--------|------|-----|--------|--------|--------|---|
| Tool body                    | Dia. $\varnothing$ -mm | Version |     |     | Rolling length  |                 |                 | Shank                | DX Cage                      |         |   | DX Cone                |         |       | Roller |      |     |        |        |        |   |
|                              |                        | SF      | MFT | MFB | SF              | MFT             | MFB             |                      | Dia. $\varnothing$ -mm       | Version |   | Dia. $\varnothing$ -mm | Version |       | SF     | MFT  | MFB |        |        |        |   |
| DX3                          | 081,00                 | 1       | 2   | 3   | stand.<br>U=177 | stand.<br>U=182 | stand.<br>U=190 | MK4                  | ZS32<br>or<br>ZA32<br>(opt.) | 81,00   | 1 | 2                      | 3       | 81,00 | 1      | 2    | 3   | 500132 | 500107 | 500306 | 8 |
|                              | 090,00                 |         |     |     |                 |                 |                 |                      |                              | 90,00   |   |                        |         |       |        |      |     |        |        |        |   |
|                              | 100,00                 |         |     |     |                 |                 |                 |                      |                              | 100,00  |   |                        |         |       |        |      |     |        |        |        |   |
|                              | 110,00                 |         |     |     |                 |                 |                 |                      |                              | 110,00  |   |                        |         |       |        |      |     |        |        |        |   |
|                              | 120,00                 |         |     |     |                 |                 |                 |                      |                              | 120,00  |   |                        |         |       |        |      |     |        |        |        |   |
|                              | 121,00                 |         |     |     |                 |                 |                 |                      |                              | 121,00  |   |                        |         |       |        |      |     |        |        |        |   |
|                              | 130,00                 |         |     |     |                 |                 |                 |                      |                              | 130,00  |   |                        |         |       |        |      |     |        |        |        |   |
|                              | 140,00                 |         |     |     |                 |                 |                 |                      |                              | 140,00  |   |                        |         |       |        |      |     |        |        |        |   |
|                              | 150,00                 |         |     |     |                 |                 |                 |                      |                              | 150,00  |   |                        |         |       |        |      |     |        |        |        |   |
|                              | 151,00                 |         |     |     |                 |                 |                 |                      |                              | 151,00  |   |                        |         |       |        |      |     |        |        |        |   |
|                              | 160,00                 |         |     |     |                 |                 |                 |                      |                              | 160,00  |   |                        |         |       |        |      |     |        |        |        |   |

**How to order | Order samples**

|   |                 |                 |               |
|---|-----------------|-----------------|---------------|
| DX3-85,00-3-U-ZS32 Roller burnishing tool | 85,00-3 DX Cage | 85,00-3 DX Cone | 500306 Roller |
|---|-----------------|-----------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1):** Self feeding - through hole **MFT(2):** Machine feeding - through hole **MFB(3):** Machine feeding - blind hole

**Internal Roller Burnishing Tools**



**Minimum edge**

| Diameter range  | X <sup>1</sup> / SF | X <sup>1</sup> / MFT | X <sup>2</sup> / MFB |
|-----------------|---------------------|----------------------|----------------------|
| 161,00 - 350,00 | 13,4                | 8,2                  | 1,6                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.

**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direction   | CCW (M3)         |
|---------------------|----------------------|--------------------|------------------|---------------------|----------------------|--------------------|------------------|----------------------|------------------|
| 161,00 - 170,00     | 190                  | 1,80               | 340              | 261,00 - 280,00     | 110                  | 3,00               | 330              | Retreat              | Rapidly (G0)     |
| 171,00 - 200,00     | 160                  | 2,10               | 330              | 281,00 - 310,00     | 100                  | 3,30               | 330              | Rolling share        | up to 0,06 mm    |
| 201,00 - 260,00     | 140                  | 2,40               | 330              | 311,00 - 350,00     | 95                   | 3,60               | 340              | Tool preload         | up to 0,10 mm    |
|                     |                      |                    |                  |                     |                      |                    |                  | Pre-machining rough. | Rz = 5 - 30 µm   |
|                     |                      |                    |                  |                     |                      |                    |                  | Pre-machining        | Reaming or lathe |
|                     |                      |                    |                  |                     |                      |                    |                  | Coolant              | Oil or emulsion  |

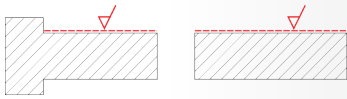
**Product selection**

| DX Tool selection (complete) |           |         |     |     |                |              |              |       | Spare part selection |         |           |         |      |        |        |     |   |        |        |        |    |
|------------------------------|-----------|---------|-----|-----|----------------|--------------|--------------|-------|----------------------|---------|-----------|---------|------|--------|--------|-----|---|--------|--------|--------|----|
| Tool body                    | Dia. Ø-mm | Version |     |     | Rolling length |              |              | Shank | DX Cage              |         |           | DX Cone |      |        | Roller |     |   | Qua.   |        |        |    |
|                              |           | SF      | MFT | MFB | SF             | MFT          | MFB          |       | Dia. Ø-mm            | Version | Dia. Ø-mm | Version | Code | SF     | MFT    | MFB |   |        |        |        |    |
| DX4                          | 161,00    | 1       | 2   | 3   | stand. U=254   | stand. U=259 | stand. U=266 | MK5   | ZS40 or ZA40 (opt.)  | 161,00  | 1         | 2       | 3    | 161,00 | 1      | 2   | 3 | 500132 | 500107 | 500306 | 12 |
|                              | 170,00    |         |     |     |                |              |              |       |                      | 170,00  |           |         |      | 14     |        |     |   |        |        |        |    |
|                              | 171,00    |         |     |     |                |              |              |       |                      | 171,00  |           |         |      | 14     |        |     |   |        |        |        |    |
|                              | 200,00    |         |     |     |                |              |              |       |                      | 200,00  |           |         |      | 16     |        |     |   |        |        |        |    |
|                              | 201,00    |         |     |     |                |              |              |       |                      | 201,00  |           |         |      | 16     |        |     |   |        |        |        |    |
|                              | 230,00    |         |     |     |                |              |              |       |                      | 230,00  |           |         |      | 16     |        |     |   |        |        |        |    |
|                              | 231,00    |         |     |     |                |              |              |       |                      | 231,00  |           |         |      | 18     |        |     |   |        |        |        |    |
|                              | 260,00    |         |     |     |                |              |              |       |                      | 260,00  |           |         |      | 18     |        |     |   |        |        |        |    |
|                              | 261,00    |         |     |     |                |              |              |       |                      | 261,00  |           |         |      | 20     |        |     |   |        |        |        |    |
|                              | 280,00    |         |     |     |                |              |              |       |                      | 280,00  |           |         |      | 20     |        |     |   |        |        |        |    |
|                              | 281,00    |         |     |     |                |              |              |       |                      | 281,00  |           |         |      | 22     |        |     |   |        |        |        |    |
|                              | 310,00    |         |     |     |                |              |              |       |                      | 310,00  |           |         |      | 22     |        |     |   |        |        |        |    |
|                              | 311,00    |         |     |     |                |              |              |       |                      | 311,00  |           |         |      | 24     |        |     |   |        |        |        |    |
|                              | 330,00    |         |     |     |                |              |              |       |                      | 330,00  |           |         |      | 24     |        |     |   |        |        |        |    |
|                              | 331,00    |         |     |     |                |              |              |       |                      | 331,00  |           |         |      | 26     |        |     |   |        |        |        |    |
|                              | 350,00    |         |     |     |                |              |              |       |                      | 350,00  |           |         |      | 26     |        |     |   |        |        |        |    |

**How to order | Order samples**

|  |                  |                  |               |
|--|------------------|------------------|---------------|
| DX4-161,00-3-U-ZS40 Roller burnishing tool | 161,00-3 DX Cage | 161,00-3 DX Cone | 500306 Roller |
|--|------------------|------------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1)**: Self feeding - through hole **MFT(2)**: Machine feeding - through hole **MFB(3)**: Machine feeding - blind hole



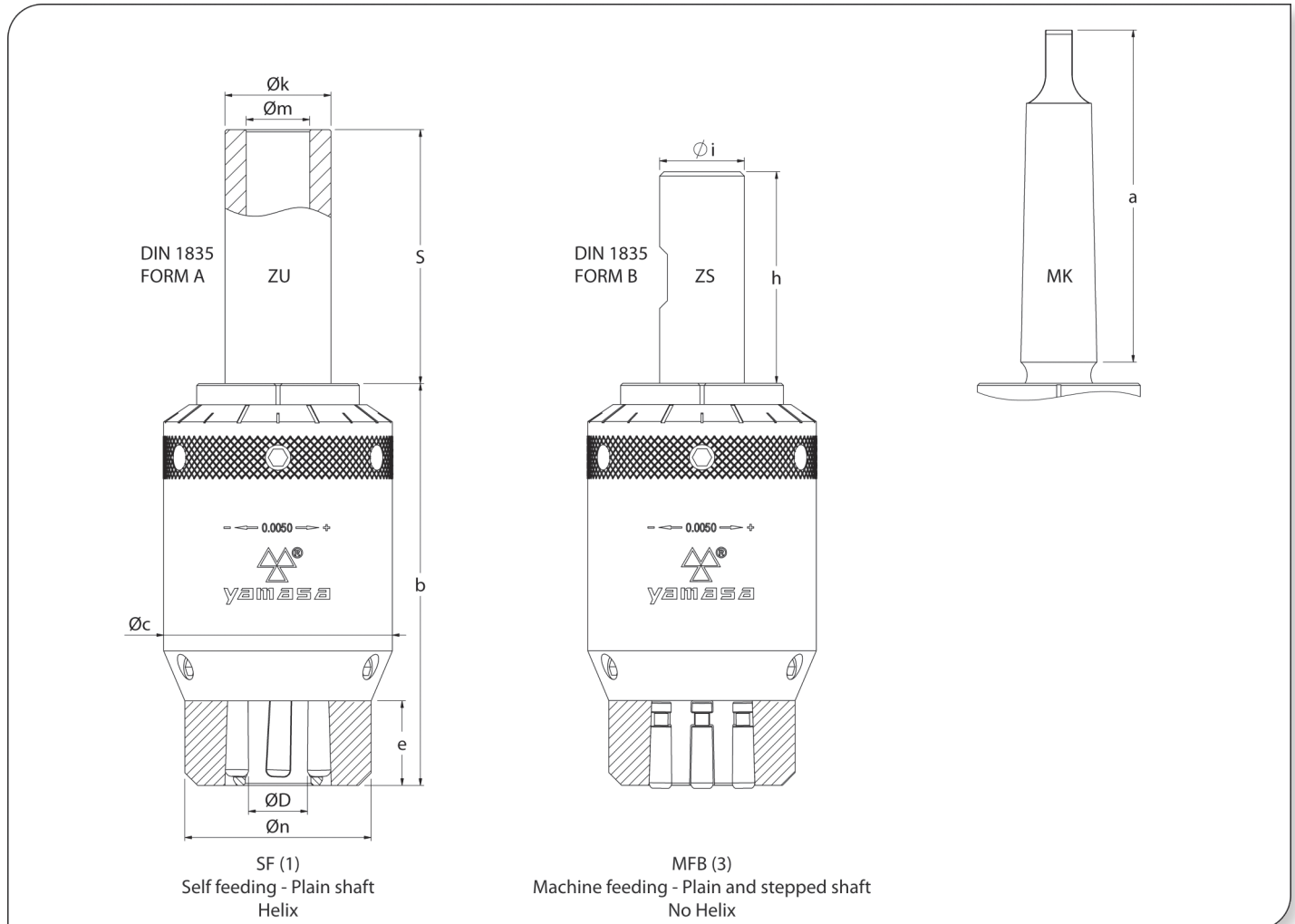
✓ Achievable surface roughness  $Rz < 1 \mu\text{m} / Ra < 0,16 \mu\text{m}$

# Explanations

## External Roller Burnishing Tools

### Application

- Tools are used for the aim of burnishing plain and stepped shafts.
- Provide surface hardness and at low rate calibration (measurement accuracy).
- Used on all kinds of machining production machines such as CNC and universal lathe machines, machining centers, drilling or milling machines.
- Pre-machining and burnishing is possible on same machine. Process is done in one pass after pre-machining.



### Tool Versions

There are two versions of YAMASA MX burnishing tools according to the process type.

#### Version 1: SF - Self feeding for plain shaft

- Burnish the plain shafts. It makes the feeding self. If the revolution increases the feeding speed increases self in the same rate.
- It is suitable for use such on universal lathe, drilling, milling machines.

#### Version 3: MFB - Machine feeding for plain-stepped shafts

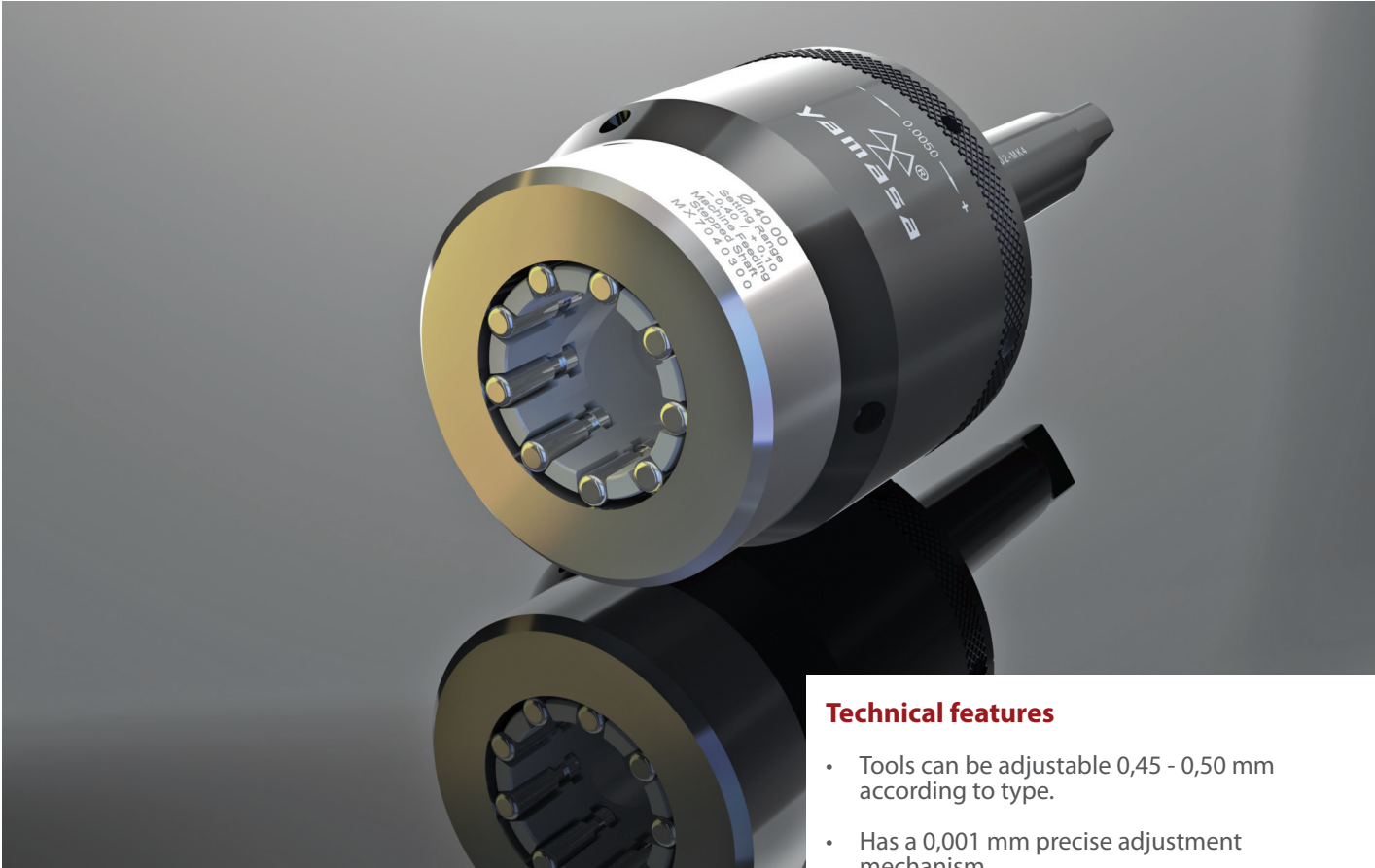
- Burnish the plain and stepped shafts up to the end.
- It can be used on all kind of machining production machines.
- Feed rate: 0,05 - 0,3 mm/rev. per roller

Circumferential speed for all versions: max. 250 m/min.

| Tool body | Dia.range<br>ØD | Shank       |                  |                       | Setting range |             | Dimensions |                   |     |    |     |
|-----------|-----------------|-------------|------------------|-----------------------|---------------|-------------|------------|-------------------|-----|----|-----|
|           |                 | Morse taper | Cylindrical-Øixh | Cylindrical-ØkxSxØm   | SF            | MFB         | a          | b                 | c   | e  | n   |
| MX1       | 001 - 014       | MK2         | ZS20-Ø20h6x50    | ZU25-Ø25h6x60xØ15     | -0,40/+0,10   | -0,40/+0,05 | 78,5       | min.095 - max.105 | 54  | 20 | 44  |
| MX2       | 015 - 024       | MK3         | ZS25-Ø25h6x56    | ZU40-Ø40h6x70xØ26     |               |             | 98         | min.100 - max.110 | 74  | 20 | 62  |
| MX3       | 025 - 049       | MK4         | ZS40-Ø40h6x70    | ZU80-Ø80h6x90xØ50     |               |             | 123        | min.119 - max.129 | 106 | 30 | 94  |
| MX4       | 050 - 085       |             |                  | ZU110-Ø110h6x110xØ87  |               |             | 123        | min.128 - max.138 | 149 | 30 | 138 |
| MX5       | 086 - 110       | MK5         | ZS50-Ø50h6x80    | ZU150-Ø150h6x120xØ112 |               |             | 155,5      | min.141 - max.151 | 193 | 37 | 177 |
| MX6       | 111 - 160       |             |                  | ZU180-Ø180h6x140xØ143 |               |             | 155,5      | min.155 - max.165 | 237 | 37 | 222 |
| MX7       | 141 - 160       |             |                  | ZU190-Ø190h6x150xØ163 |               |             | 155,5      | min.159 - max.169 | 267 | 37 | 252 |

All dimensions in mm. **SF(1):** Self feeding - plain shaft **MFB(3):** Machine feeding - plain and stepped shaft

**External Roller Burnishing Tools**



**Technical features**

- Tools can be adjustable 0,45 - 0,50 mm according to type.
- Has a 0,001 mm precise adjustment mechanism.
- Can burnish the shafts up to H7 tolerance with one adjustment.
- Burnishing all kinds of metallic materials up to the tensile strength of 1400N/mm<sup>2</sup> and to the hardness 42-45 HRC.
- Easy setting, long using life, low spare parts consumption. Every kind of spare part can be provided by YAMASA.

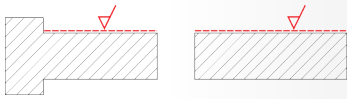
**Tool structure**

- Tool consists of a burnishing head and a body which has a precision adjustment mechanism.
- Burnishing head consists of a cage, cone and rollers. In the same time, these are consumables.
- It is possible to mount on the same type body the roller heads in different diameter.
- There are cylindrical and morse taper shank choices are available. Roller length is limited on the cylindrical and morse taper shanks choices. Please prefer ZU Shanks for unlimited roller lengths (see table).

**MX Series**  
Developed System







✓ Achievable surface roughness  $Rz < 1\mu\text{m} / Ra < 0,16\mu\text{m}$

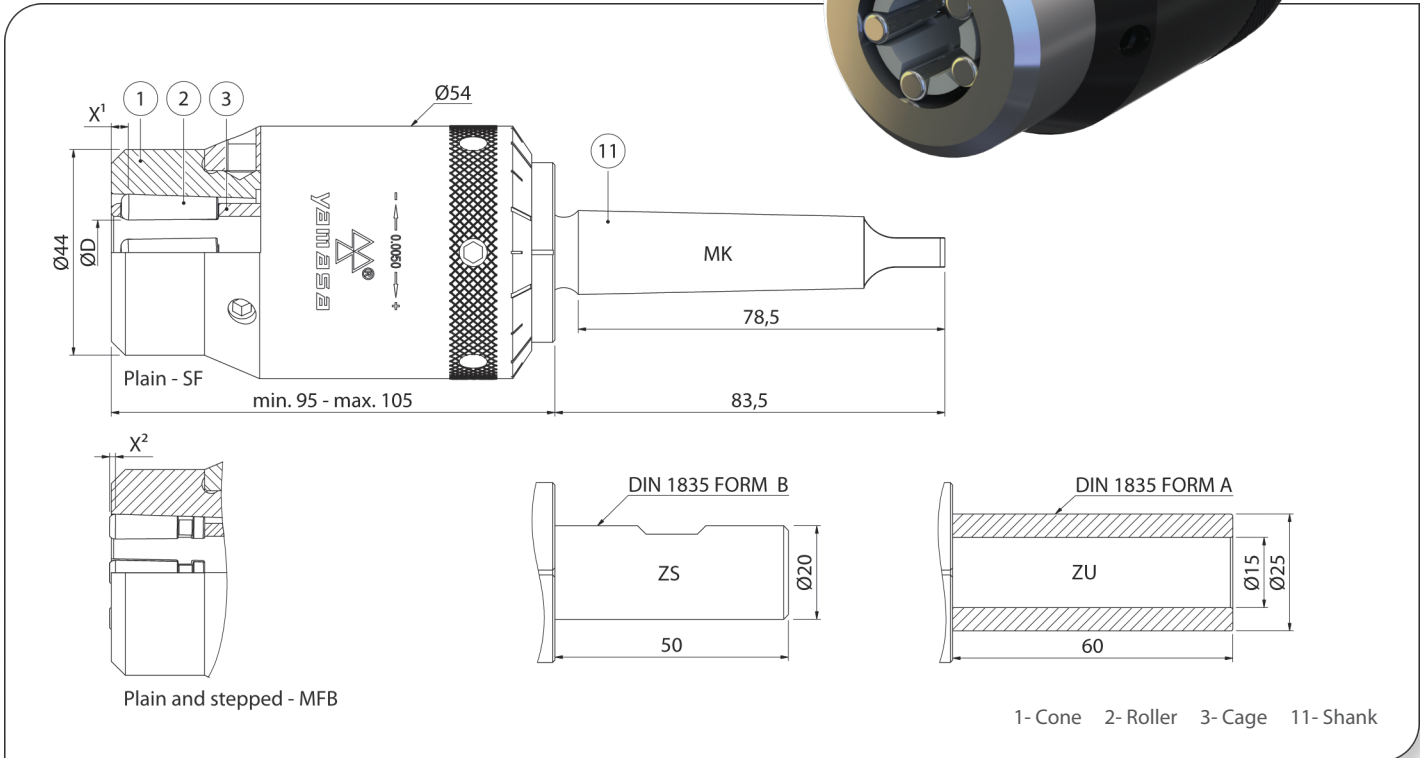
**External Roller Burnishing Tools**



**Minimum edge**

| Diameter range  | X <sup>1</sup> / SF | X <sup>2</sup> / MFB |
|-----------------|---------------------|----------------------|
| 001,00 - 004,00 | 3,2                 | 0,8                  |
| 005,00 - 014,00 | 7,2                 | 0,8                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.



**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc.                   | Rolling share  | Pre-machining roughness   | Pre-machining     | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------------------------|----------------|---------------------------|-------------------|-----------------|
|                     |                      |                    |                  | Retreat                           | Tool preload   |                           |                   |                 |
| 01,00 - 08,00       | 1000                 | 0,45               | 450              | CCW (M3)<br>-----<br>Rapidly (G0) | up to 0,015 mm | Rz = 5 - 15 $\mu\text{m}$ | Lathe or grinding | Oil or emulsion |
| 09,00 - 11,00       | 1000                 | 0,60               | 600              |                                   |                |                           |                   |                 |
| 12,00 - 14,00       | 1000                 | 0,75               | 750              |                                   |                |                           |                   |                 |

**Product selection**

| MX Tool selection (complete) |                        |         |     |                |     |       |      |      | Spare part selection   |         |                        |         |        |   |        |        |   |
|------------------------------|------------------------|---------|-----|----------------|-----|-------|------|------|------------------------|---------|------------------------|---------|--------|---|--------|--------|---|
| Tool body                    | Dia. $\varnothing$ -mm | Version |     | Rolling length |     | Shank |      |      | MX Cage                |         | MX Cone                |         | Roller |   | Qua.   |        |   |
|                              |                        | SF      | MFB | MK/ZS          | ZU  |       |      |      | Dia. $\varnothing$ -mm | Version | Dia. $\varnothing$ -mm | Version | Code   |   |        |        |   |
| MX1                          | 1,00                   | 1       | 3   | 75             | UNL | MK2   | ZS20 | ZU25 | 1,00                   | 1       | 3                      | 1,00    | 1      | 3 | 500102 | 500301 | 3 |
|                              | 2,00                   |         |     |                |     |       |      |      | 2,00                   |         |                        |         |        |   |        |        |   |
|                              | 3,00                   |         |     |                |     |       |      |      | 3,00                   |         |                        |         |        |   |        |        |   |
|                              | 4,00                   |         |     |                |     |       |      |      | 4,00                   |         |                        |         |        |   |        |        |   |
|                              | 5,00                   |         |     |                |     |       |      |      | 5,00                   |         |                        |         |        |   |        |        |   |
|                              | 6,00                   |         |     |                |     |       |      |      | 6,00                   |         |                        |         |        |   |        |        |   |
|                              | 7,00                   |         |     |                |     |       |      |      | 7,00                   |         |                        |         |        |   |        |        |   |
|                              | 8,00                   |         |     |                |     |       |      |      | 8,00                   |         |                        |         |        |   |        |        |   |
|                              | 9,00                   |         |     |                |     |       |      |      | 9,00                   |         |                        |         |        |   |        |        |   |
|                              | 10,00                  |         |     |                |     |       |      |      | 10,00                  |         |                        |         |        |   |        |        |   |
|                              | 11,00                  |         |     |                |     |       |      |      | 11,00                  |         |                        |         |        |   |        |        |   |
|                              | 12,00                  |         |     |                |     |       |      |      | 12,00                  |         |                        |         |        |   |        |        |   |
|                              | 14,00                  |         |     |                |     |       |      |      | 14,00                  |         |                        |         |        |   |        |        |   |
|                              |                        |         |     |                |     |       |      |      |                        |         |                        |         |        |   |        |        |   |
|                              |                        |         |     |                |     |       |      |      |                        |         |                        |         |        |   |        |        | 5 |

**How to order | Order samples**

|   |                 |                 |               |
|---|-----------------|-----------------|---------------|
| MX1-14,00-3-75-MK2 Roller burnishing tool | 14,00-3 MX Cage | 14,00-3 MX Cone | 500311 Roller |
|---|-----------------|-----------------|---------------|

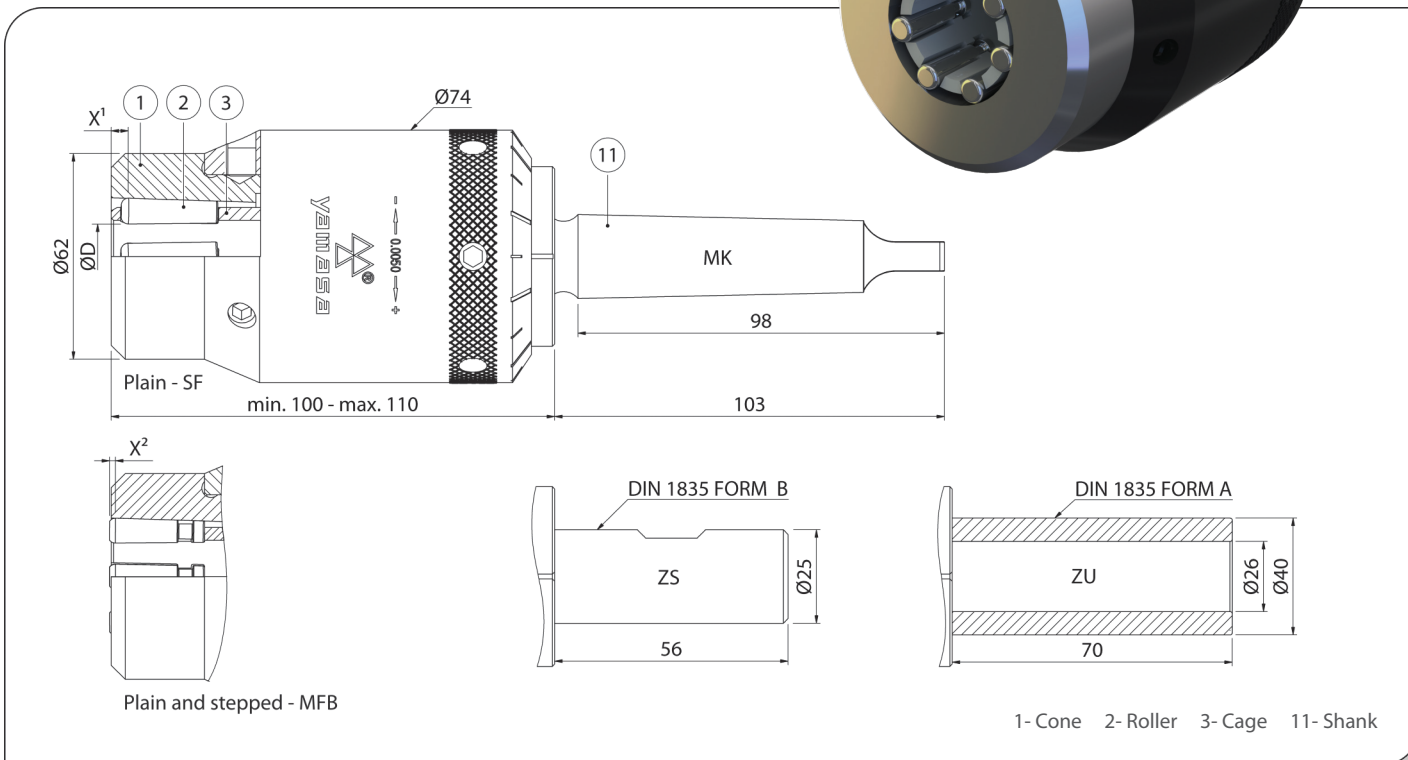
You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1):** Self feeding - plain shaft **MFB(3):** Machine feeding - plain and stepped shaft

**External Roller Burnishing Tools**

**Minimum edge**

| Diameter range  | X <sup>1</sup> / SF | X <sup>2</sup> / MFB |
|-----------------|---------------------|----------------------|
| 015,00 - 024,00 | 7,7                 | 0,8                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.



1- Cone 2- Roller 3- Cage 11- Shank

**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share | Pre-machining roughness | Pre-machining     | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|---------------|-------------------------|-------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload  |                         |                   |                 |
| 15,00 - 17,00       | 1000                 | 0,75               | 750              | CCW (M3)        | up to 0,02 mm | Rz = 5 - 20 µm          | Lathe or grinding | Oil or emulsion |
| 18,00 - 21,00       | 1000                 | 0,90               | 900              |                 |               |                         |                   |                 |
| 22,00 - 24,00       | 1000                 | 1,05               | 1050             | Rapidly (G0)    | up to 0,05 mm |                         |                   |                 |

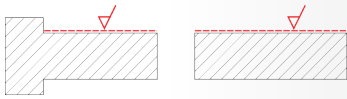
**Product selection**

| MX Tool selection (complete) |           |         |     |                |     |       |      |      | Spare part selection |         |           |         |        |   |        |        |   |
|------------------------------|-----------|---------|-----|----------------|-----|-------|------|------|----------------------|---------|-----------|---------|--------|---|--------|--------|---|
| Tool body                    | Dia. Ø-mm | Version |     | Rolling length |     | Shank |      |      | MX Cage              |         | MX Cone   |         | Roller |   | Qua.   |        |   |
|                              |           | SF      | MFB | MK/ZS          | ZU  |       |      |      | Dia. Ø-mm            | Version | Dia. Ø-mm | Version | Code   |   |        |        |   |
|                              |           |         |     |                |     |       |      |      |                      |         |           |         |        |   |        |        |   |
| MX2                          | 15,00     | 1       | 3   | 75             | UNL | MK3   | ZS25 | ZU40 | 15,00                | 1       | 3         | 15,00   | 1      | 3 | 500130 | 500311 | 5 |
|                              | 16,00     |         |     |                |     |       |      |      | 16,00                |         |           |         |        |   |        |        |   |
|                              | 17,00     |         |     |                |     |       |      |      | 17,00                |         |           |         |        |   |        |        |   |
|                              | 18,00     |         |     |                |     |       |      |      | 18,00                |         |           |         |        |   |        |        |   |
|                              | 19,00     |         |     |                |     |       |      |      | 19,00                |         |           |         |        |   |        |        |   |
|                              | 20,00     |         |     |                |     |       |      |      | 20,00                |         |           | 6       |        |   |        |        |   |
|                              | 21,00     |         |     |                |     |       |      |      | 21,00                |         |           |         |        |   |        |        |   |
|                              | 22,00     |         |     |                |     |       |      |      | 22,00                |         |           |         |        |   |        |        |   |
|                              | 23,00     |         |     |                |     |       |      |      | 23,00                |         |           |         |        |   |        |        |   |
|                              | 24,00     |         |     |                |     |       |      |      | 24,00                |         |           |         |        |   |        |        | 7 |

**How to order | Order samples**

|   |                 |                 |               |
|---|-----------------|-----------------|---------------|
| MX2-15,00-1-UNL-ZU40 Roller burnishing tool | 15,00-1 MX Cage | 15,00-1 MX Cone | 500130 Roller |
|---|-----------------|-----------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1):** Self feeding - plain shaft **MFB(3):** Machine feeding - plain and stepped shaft



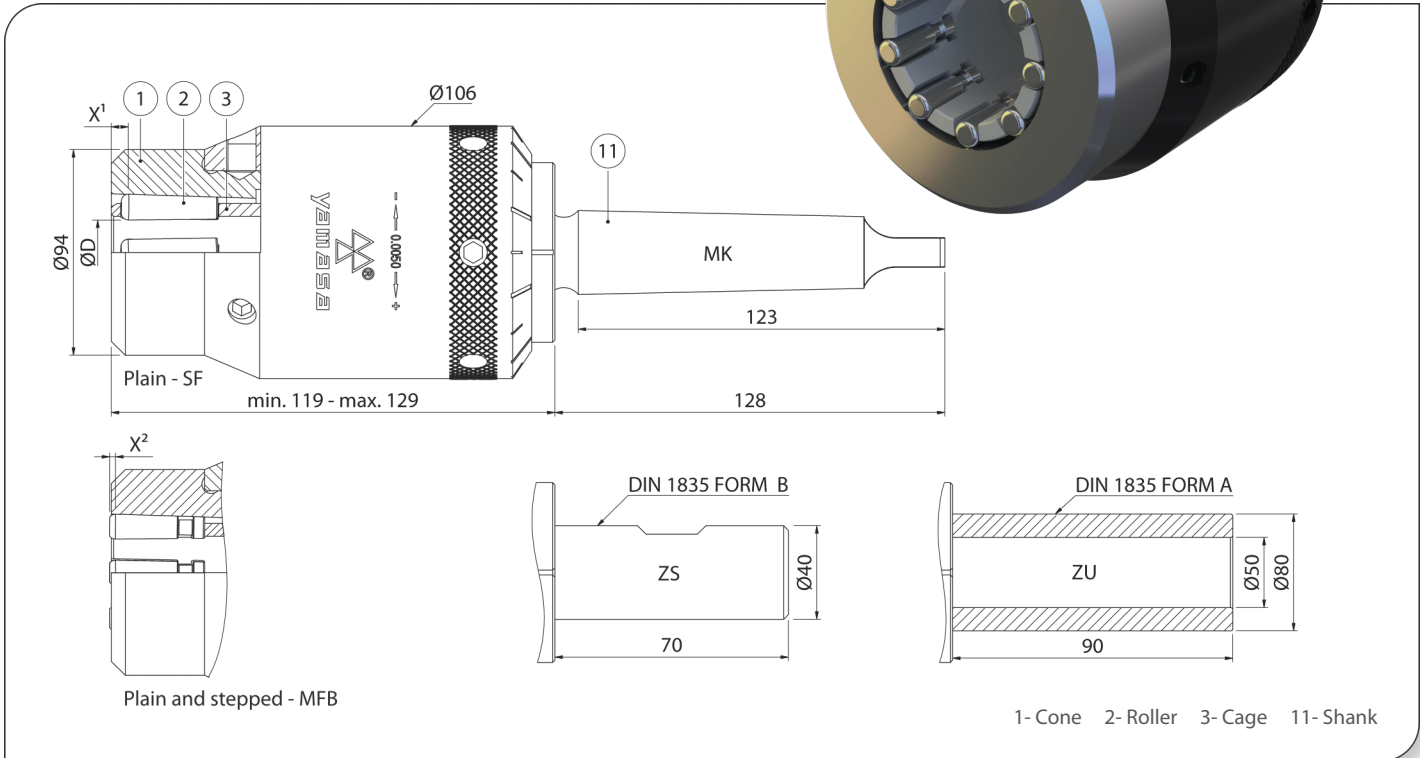
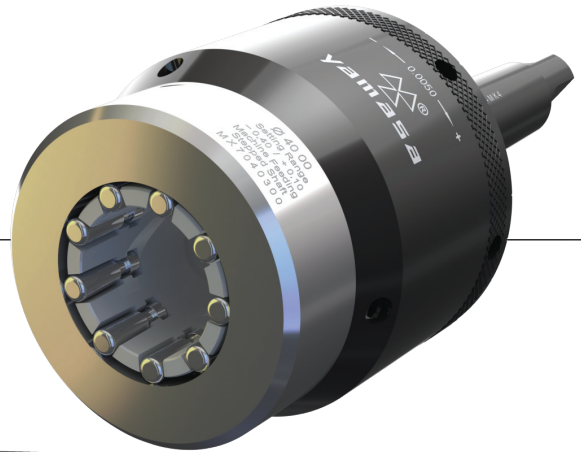
✓ Achievable surface roughness  $Rz < 1\mu\text{m} / Ra < 0,16\mu\text{m}$

**External Roller Burnishing Tools**

**Minimum edge**

| Diameter range  | X <sup>1</sup> / SF | X <sup>2</sup> / MFB |
|-----------------|---------------------|----------------------|
| 025,00 - 049,00 | 8,8                 | 0,8                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.



**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc.                   | Rolling share | Pre-machining roughness  | Pre-machining     | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------------------------|---------------|--------------------------|-------------------|-----------------|
|                     |                      |                    |                  | Retreat                           | Tool preload  |                          |                   |                 |
| 25,00 - 31,00       | 1000                 | 1,05               | 1050             | CCW (M3)<br>-----<br>Rapidly (G0) | up to 0,02 mm | $Rz = 5 - 20\mu\text{m}$ | Lathe or grinding | Oil or emulsion |
| 32,00 - 38,00       | 840                  | 1,05               | 880              |                                   |               |                          |                   |                 |
| 39,00 - 49,00       | 650                  | 1,35               | 870              |                                   |               |                          |                   |                 |

**Product selection**

| MX Tool selection (complete) |                        |         |     |                |     |       |      |      |                        | Spare part selection |                        |         |        |   |        |        |   |  |
|------------------------------|------------------------|---------|-----|----------------|-----|-------|------|------|------------------------|----------------------|------------------------|---------|--------|---|--------|--------|---|--|
| Tool body                    | Dia. $\varnothing$ -mm | Version |     | Rolling length |     | Shank |      |      | MX Cage                |                      | MX Cone                |         | Roller |   | Qua.   |        |   |  |
|                              |                        | SF      | MFB | MK/ZS          | ZU  |       |      |      | Dia. $\varnothing$ -mm | Version              | Dia. $\varnothing$ -mm | Version | Code   |   |        |        |   |  |
| MX3                          | 25,00                  | 1       | 3   | 100            | UNL | MK4   | ZS40 | ZU80 | 25,00                  | 1                    | 3                      | 25,00   | 1      | 3 | 500128 | 500307 | 7 |  |
|                              | 26,00                  |         |     |                |     |       |      |      | 26,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 27,00                  |         |     |                |     |       |      |      | 27,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 28,00                  |         |     |                |     |       |      |      | 28,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 29,00                  |         |     |                |     |       |      |      | 29,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 30,00                  |         |     |                |     |       |      |      | 30,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 32,00                  |         |     |                |     |       |      |      | 32,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 34,00                  |         |     |                |     |       |      |      | 34,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 36,00                  |         |     |                |     |       |      |      | 36,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 38,00                  |         |     |                |     |       |      |      | 38,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 39,00                  |         |     |                |     |       |      |      | 39,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 45,00                  |         |     |                |     |       |      |      | 45,00                  |                      |                        |         |        |   |        |        |   |  |
|                              | 49,00                  |         |     |                |     |       |      |      | 49,00                  |                      |                        |         |        |   |        |        |   |  |
|                              |                        |         |     |                |     |       |      |      |                        |                      |                        |         |        |   |        |        |   |  |

**How to order | Order samples**

|   |                 |                 |               |
|---|-----------------|-----------------|---------------|
| MX3-25,00-3-100-ZS40 Roller burnishing tool | 25,00-3 MX Cage | 25,00-3 MX Cone | 500307 Roller |
|---|-----------------|-----------------|---------------|

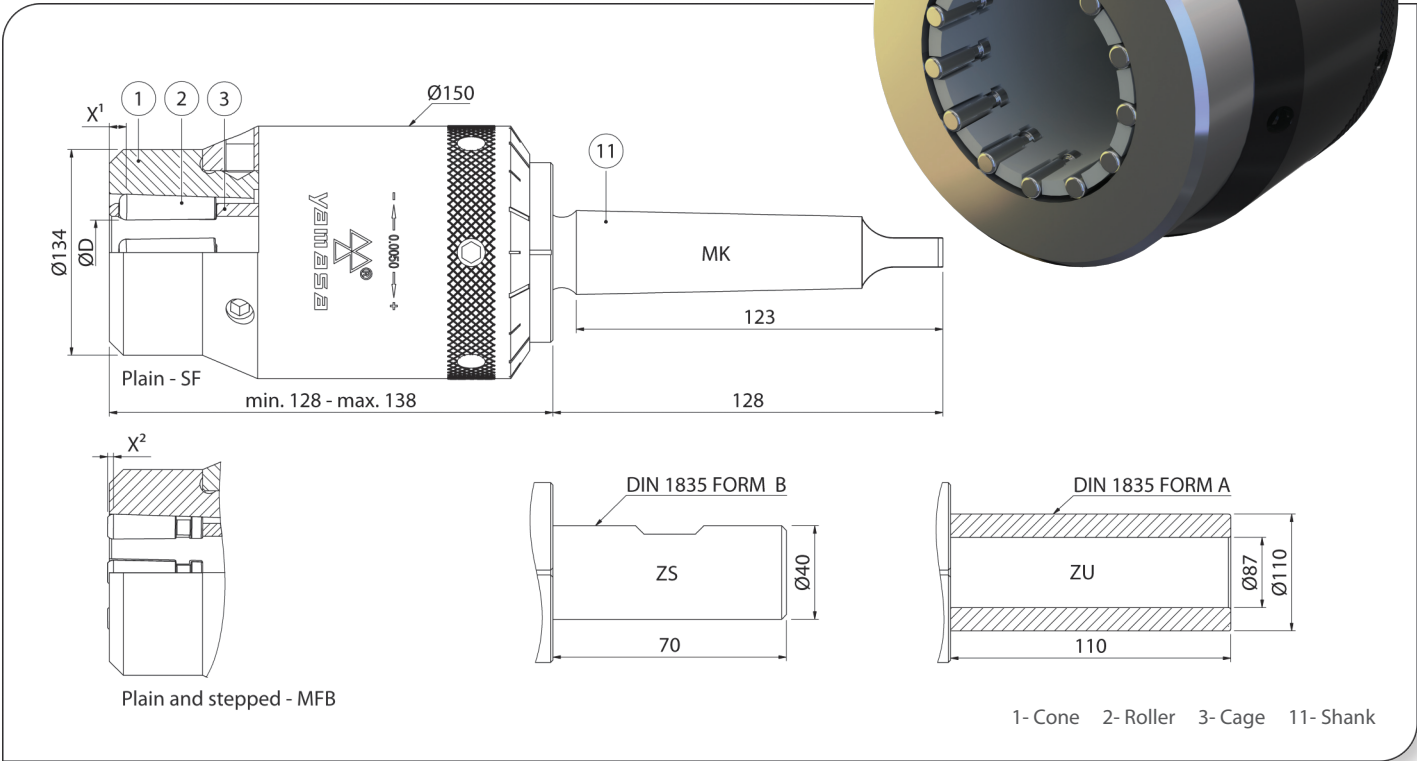
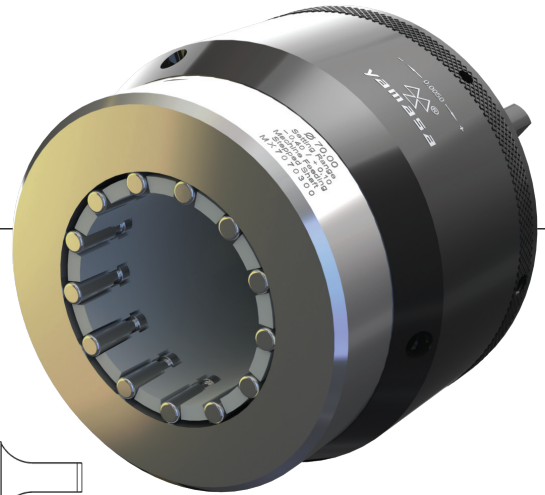
You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1)**: Self feeding - plain shaft **MFB(3)**: Machine feeding - plain and stepped shaft

**External Roller Burnishing Tools**

**Minimum edge**

| Diameter range  | X <sup>1</sup> / SF | X <sup>2</sup> / MFB |
|-----------------|---------------------|----------------------|
| 050,00 - 085,00 | 9,3                 | 0,8                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.



**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share | Pre-machining roughness | Pre-machining     | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|---------------|-------------------------|-------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload  |                         |                   |                 |
| 50,00 - 51,00       | 620                  | 1,35               | 830              | CCW (M3)        | up to 0,02 mm | Rz = 5 - 20 µm          | Lathe or grinding | Oil or emulsion |
| 52,00 - 69,00       | 460                  | 1,65               | 760              |                 |               |                         |                   |                 |
| 70,00 - 85,00       | 370                  | 1,95               | 720              | Rapidly (G0)    | up to 0,06 mm |                         |                   |                 |

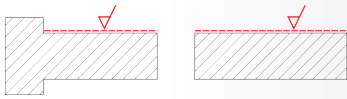
**Product selection**

| MX Tool selection (complete) |           |         |     |                |     |       |      |       | Spare part selection |         |           |         |        |   |        |        |   |
|------------------------------|-----------|---------|-----|----------------|-----|-------|------|-------|----------------------|---------|-----------|---------|--------|---|--------|--------|---|
| Tool body                    | Dia. Ø-mm | Version |     | Rolling length |     | Shank |      |       | MX Cage              |         | MX Cone   |         | Roller |   | Qua.   |        |   |
|                              |           | SF      | MFB | MK/ZS          | ZU  |       |      |       | Dia. Ø-mm            | Version | Dia. Ø-mm | Version | Code   |   |        |        |   |
| MX4                          | 50,00     | 1       | 3   | 100            | UNL | MK4   | ZS40 | ZU110 | 50,00                | 1       | 3         | 50,00   | 1      | 3 | 500128 | 500307 | 9 |
|                              | 51,00     |         |     |                |     |       |      |       | 51,00                |         |           |         |        |   |        |        |   |
|                              | 52,00     |         |     |                |     |       |      |       | 52,00                |         |           |         |        |   |        |        |   |
|                              | 54,00     |         |     |                |     |       |      |       | 54,00                |         |           |         |        |   |        |        |   |
|                              | 56,00     |         |     |                |     |       |      |       | 56,00                |         |           |         |        |   |        |        |   |
|                              | 58,00     |         |     |                |     |       |      |       | 58,00                |         |           |         |        |   |        |        |   |
|                              | 60,00     |         |     |                |     |       |      |       | 60,00                |         |           | 11      |        |   |        |        |   |
|                              | 65,00     |         |     |                |     |       |      |       | 65,00                |         |           |         |        |   |        |        |   |
|                              | 69,00     |         |     |                |     |       |      |       | 69,00                |         |           |         |        |   |        |        |   |
|                              | 70,00     |         |     |                |     |       |      |       | 70,00                |         |           | 13      |        |   |        |        |   |
|                              | 75,00     |         |     |                |     |       |      |       | 75,00                |         |           |         |        |   |        |        |   |
|                              | 80,00     |         |     |                |     |       |      |       | 80,00                |         |           |         |        |   |        |        |   |
|                              | 85,00     |         |     |                |     |       |      |       | 85,00                |         |           |         |        |   |        |        |   |

**How to order | Order samples**

|   |                 |                 |               |
|---|-----------------|-----------------|---------------|
| MX4-50,00-3-100-ZS40 Roller burnishing tool | 50,00-3 MX Cage | 50,00-3 MX Cone | 500307 Roller |
|---|-----------------|-----------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1):** Self feeding - plain shaft **MFB(3):** Machine feeding - plain and stepped shaft



✓ Achievable surface roughness  $Rz < 1 \mu\text{m} / Ra < 0,16 \mu\text{m}$

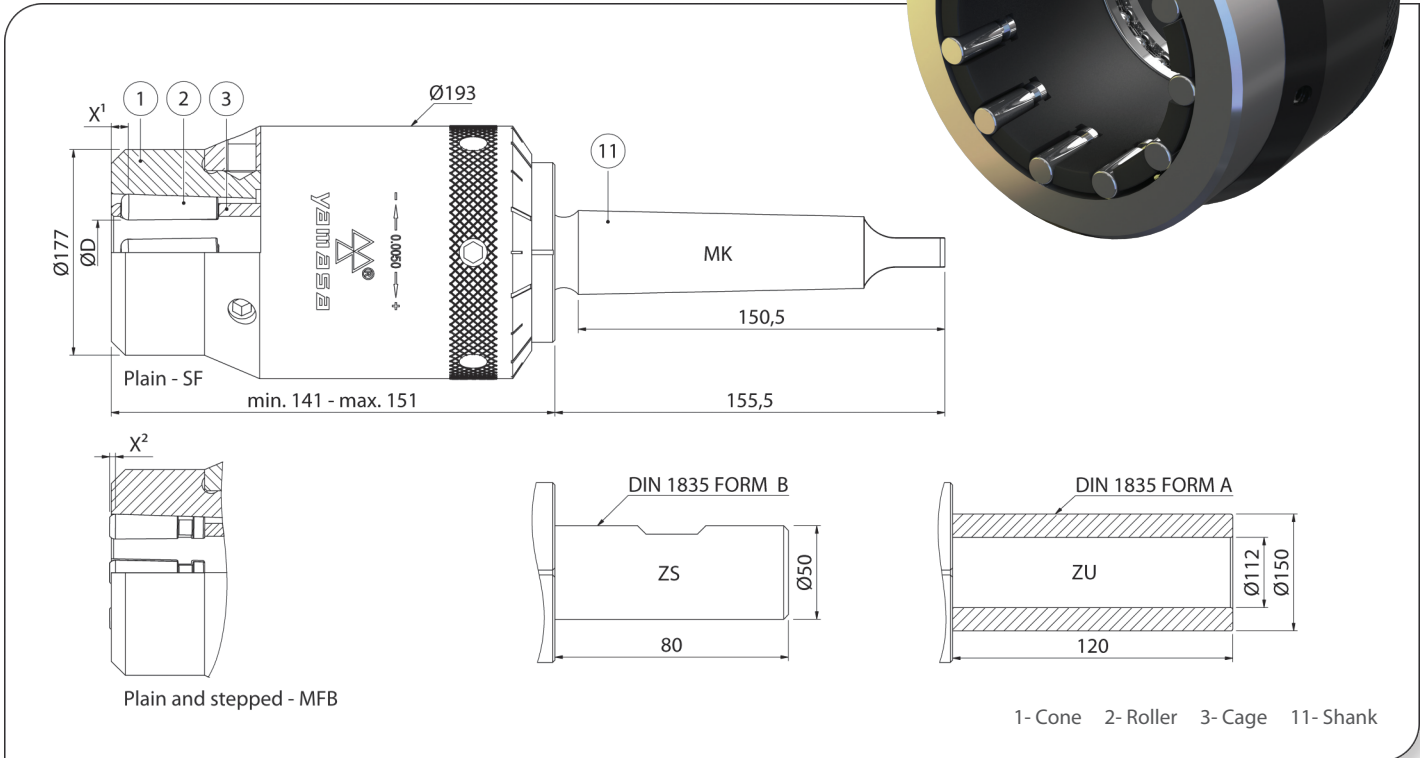
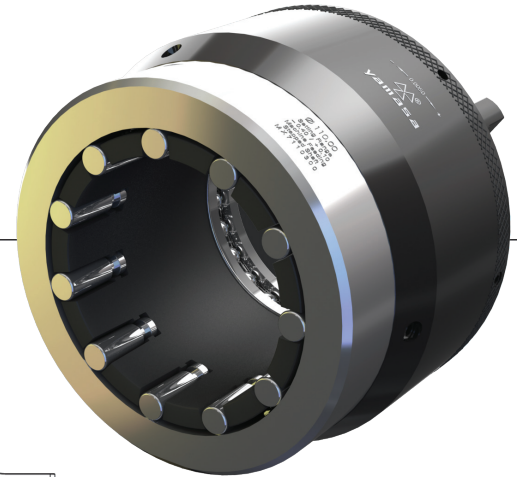
**MX Type** | Between  $\varnothing 86 - 110 \text{ mm}$

**External Roller Burnishing Tools**

**Minimum edge**

| Diameter range  | X <sup>1</sup> / SF | X <sup>2</sup> / MFB |
|-----------------|---------------------|----------------------|
| 086,00 - 110,00 | 12,9                | 1,6                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.



**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share | Pre-machining roughness   | Pre-machining     | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|---------------|---------------------------|-------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload  |                           |                   |                 |
| 086,00 - 095,00     | 330                  | 1,35               | 440              | CCW (M3)        | up to 0,03 mm | Rz = 5 - 30 $\mu\text{m}$ | Lathe or grinding | Oil or emulsion |
| 096,00 - 110,00     | 290                  | 1,65               | 480              | Rapidly (G0)    | up to 0,08 mm |                           |                   |                 |

**Product selection**

| MX Tool selection (complete) |                        |         |     |                |     |       |      |       |                        | Spare part selection |                        |         |        |   |        |        |   |
|------------------------------|------------------------|---------|-----|----------------|-----|-------|------|-------|------------------------|----------------------|------------------------|---------|--------|---|--------|--------|---|
| Tool body                    | Dia. $\varnothing$ -mm | Version |     | Rolling length |     | Shank |      |       | MX Cage                |                      | MX Cone                |         | Roller |   | Qua.   |        |   |
|                              |                        | SF      | MFB | MK/ZS          | ZU  |       |      |       | Dia. $\varnothing$ -mm | Version              | Dia. $\varnothing$ -mm | Version | Code   |   |        |        |   |
|                              |                        |         |     |                |     |       |      |       |                        |                      |                        |         |        |   |        |        |   |
| MX5                          | 086,00                 | 1       | 3   | 115            | UNL | MK5   | ZS50 | ZU150 | 086,00                 | 1                    | 3                      | 086,00  | 1      | 3 | 500132 | 500306 | 9 |
|                              | 088,00                 |         |     |                |     |       |      |       | 088,00                 |                      |                        |         |        |   |        |        |   |
|                              | 090,00                 |         |     |                |     |       |      |       | 090,00                 |                      |                        |         |        |   |        |        |   |
|                              | 092,00                 |         |     |                |     |       |      |       | 092,00                 |                      |                        |         |        |   |        |        |   |
|                              | 095,00                 |         |     |                |     |       |      |       | 095,00                 |                      |                        |         |        |   |        |        |   |
|                              | 096,00                 |         |     |                |     |       |      |       | 096,00                 |                      |                        |         |        |   |        |        |   |
|                              | 098,00                 |         |     |                |     |       |      |       | 098,00                 |                      |                        |         |        |   |        |        |   |
|                              | 100,00                 |         |     |                |     |       |      |       | 100,00                 |                      |                        |         |        |   |        |        |   |
|                              | 102,00                 |         |     |                |     |       |      |       | 102,00                 |                      |                        |         |        |   |        |        |   |
|                              | 104,00                 |         |     |                |     |       |      |       | 104,00                 |                      |                        |         |        |   |        |        |   |
|                              | 106,00                 |         |     |                |     |       |      |       | 106,00                 |                      |                        |         |        |   |        |        |   |
|                              | 108,00                 |         |     |                |     |       |      |       | 108,00                 |                      |                        |         |        |   |        |        |   |
|                              | 110,00                 |         |     |                |     |       |      |       | 110,00                 |                      |                        | 11      |        |   |        |        |   |

**How to order | Order samples**

|   |                 |                 |               |
|---|-----------------|-----------------|---------------|
| MX5-86,00-3-115-ZS50 Roller burnishing tool | 86,00-3 MX Cage | 86,00-3 MX Cone | 500306 Roller |
|---|-----------------|-----------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1)**: Self feeding - plain shaft **MFB(3)**: Machine feeding - plain and stepped shaft

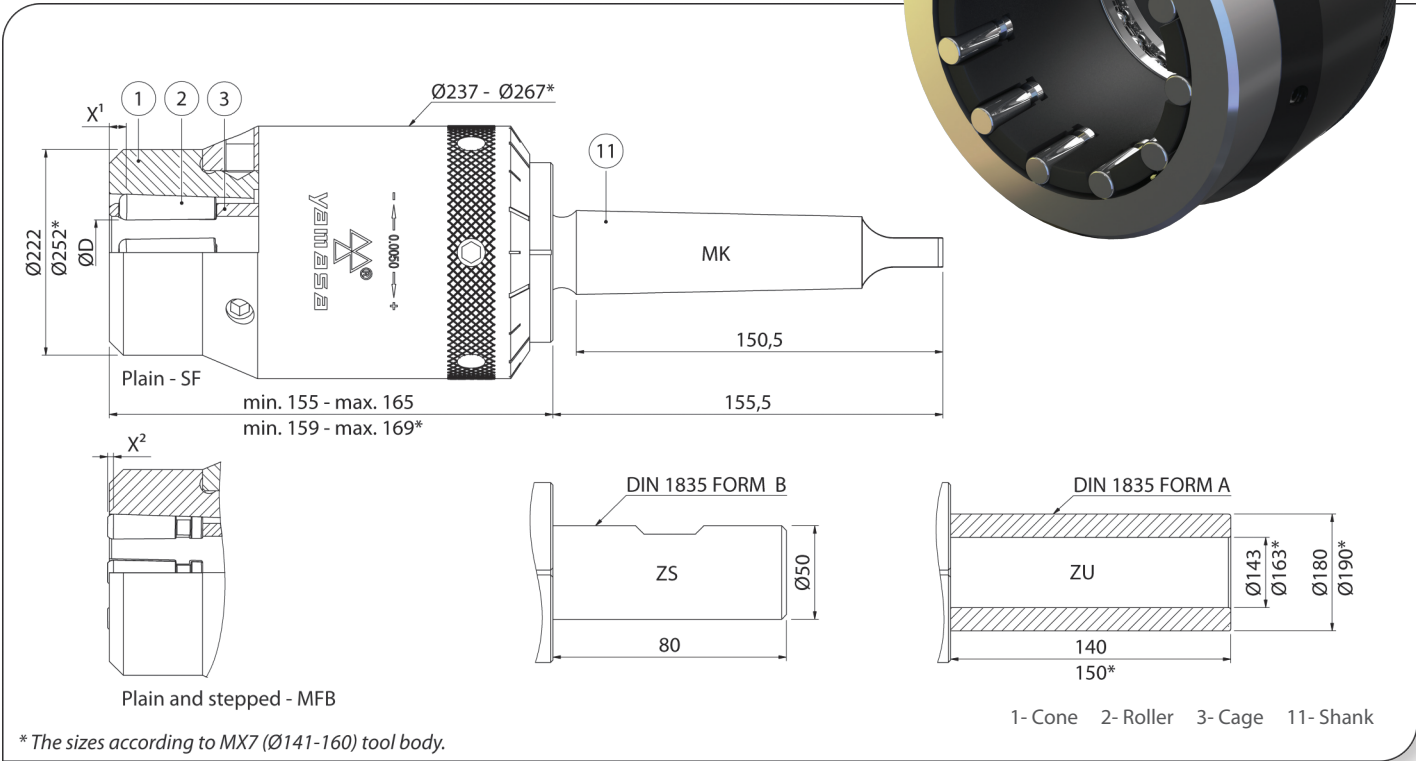
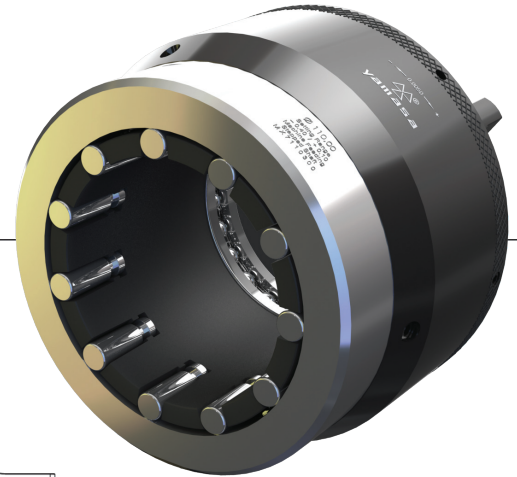


**External Roller Burnishing Tools**

**Minimum edge**

| Diameter range  | X <sup>1</sup> / SF | X <sup>2</sup> / MFB |
|-----------------|---------------------|----------------------|
| 111,00 - 160,00 | 12,9                | 1,6                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.



**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share | Pre-machining roughness | Pre-machining    | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|---------------|-------------------------|------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload  |                         |                  |                 |
| 111,00 - 120,00     | 270                  | 1,65               | 445              | CCW (M3)        | up to 0,03 mm | Rz = 5 - 30 µm          | Reaming or lathe | Oil or emulsion |
| 121,00 - 140,00     | 230                  | 1,95               | 448              |                 |               |                         |                  |                 |
| 141,00 - 160,00     | 200                  | 1,95               | 390              | Rapidly (G0)    | up to 0,08 mm |                         |                  |                 |

**Product selection**

| MX Tool selection (complete) |           |         |     |                |     |       |      |       | Spare part selection |         |           |         |        |   |        |        |    |
|------------------------------|-----------|---------|-----|----------------|-----|-------|------|-------|----------------------|---------|-----------|---------|--------|---|--------|--------|----|
| Tool body                    | Dia. Ø-mm | Version |     | Rolling length |     | Shank |      |       | MX Cage              |         | MX Cone   |         | Roller |   | Qua.   |        |    |
|                              |           | SF      | MFB | MK/ZS          | ZU  |       |      |       | Dia. Ø-mm            | Version | Dia. Ø-mm | Version | Code   |   |        |        |    |
|                              |           |         |     |                |     |       |      |       |                      |         |           |         |        |   |        |        |    |
| MX6                          | 111,00    | 1       | 3   | 130            | UNL | MK5   | ZS50 | ZU180 | 111,00               | 1       | 3         | 111,00  | 1      | 3 | 500132 | 500306 | 11 |
|                              | 120,00    |         |     |                |     |       |      |       | 120,00               |         |           |         |        |   |        |        |    |
|                              | 121,00    |         |     |                |     |       |      |       | 121,00               |         |           |         |        |   |        |        |    |
|                              | 140,00    |         |     | 140,00         | 13  |       |      |       |                      |         |           |         |        |   |        |        |    |
|                              | 141,00    |         |     | 141,00         |     |       |      |       |                      |         |           |         |        |   |        |        |    |
|                              | 160,00    |         |     | 160,00         |     |       |      |       |                      |         |           |         |        |   |        |        |    |
| MX7                          | 141,00    | 1       | 3   | 135            | UNL | MK5   | ZS50 | ZU190 | 141,00               | 1       | 3         | 141,00  | 1      | 3 | 500132 | 500306 | 13 |
|                              | 160,00    |         |     |                |     |       |      |       | 160,00               |         |           |         |        |   |        |        |    |

**How to order | Order samples**

|   |                  |                  |               |
|---|------------------|------------------|---------------|
| MX6-140,00-1-UNL-ZU180 Roller burnishing tool | 140,00-1 MX Cage | 140,00-1 MX Cone | 500132 Roller |
|---|------------------|------------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **SF(1)**: Self feeding - plain shaft **MFB(3)**: Machine feeding - plain and stepped shaft



✓ Achievable surface roughness  $Rz < 1\mu m / Ra < 0,16\mu m$

**COMPACT DESIGN**

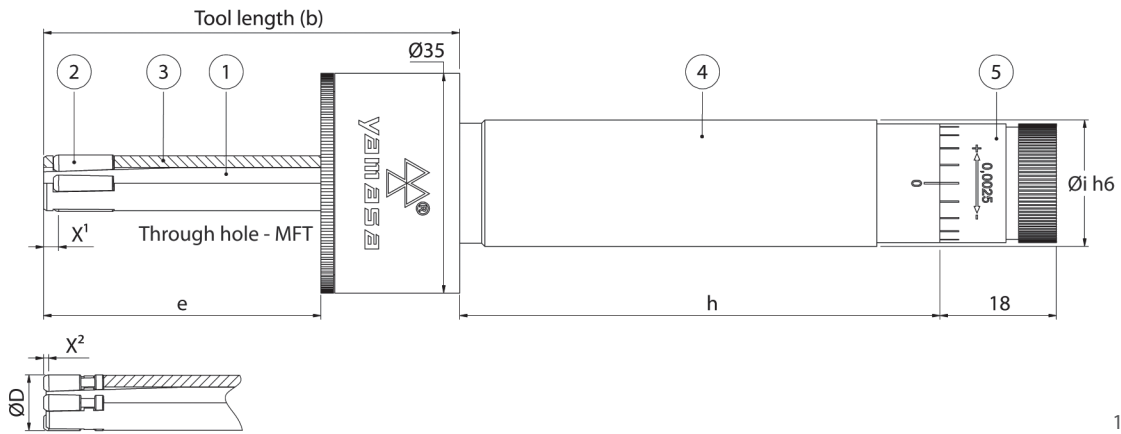
**For swiss and multi-spindle automatic type machines.**

Circumferential speed: max. 250 m/min.  
 Feed rate: 0,05 - 0,3 mm/rev. per roller  
 Machinable hardness: max. 42 - 45 HRC  
 Adjustment precision: 0,0025 mm



| Rolling length | Tool length (b) | e  |
|----------------|-----------------|----|
| 30 (25*)       | 50              | 32 |
| 50 (45*)       | 70              | 52 |

\*rolling length for through hole tool



- 1- Cone
- 2- Roller
- 3- Cage
- 4- Shank
- 5- Adjusting housing

**Minimum edge**

| Diameter range | X¹ / MFT | X² / MFB |
|----------------|----------|----------|
| 05,00          | 2,4      | -        |
| 06,00 - 14,00  | 2,6      | 0,8      |

X²: It is possible to come to near the edge more. Please ask for special situations.

**Setting range**

| Diameter range | MFT           | MFB           |
|----------------|---------------|---------------|
| 05,00          | -0,05 / +0,10 | -             |
| 06,00 - 08,00  | -0,05 / +0,20 | -0,05 / +0,20 |
| 09,00 - 14,00  | -0,10 / +0,40 | -0,05 / +0,40 |

**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc.          | Rolling share | Pre-machining roughness | Pre-machining    | Coolant         |
|---------------------|----------------------|--------------------|------------------|--------------------------|---------------|-------------------------|------------------|-----------------|
|                     |                      |                    |                  | Retreat                  | Tool preload  |                         |                  |                 |
| 05,00               | 1000                 | 0,30               | 300              | CCW (M3)<br>Rapidly (G0) | up to 0,02 mm | Rz = 5 - 15 $\mu m$     | Reaming or lathe | Oil or emulsion |
| 06,00 - 07,00       | 1000                 | 0,45               | 450              |                          | up to 0,05 mm |                         |                  |                 |
| 08,00 - 14,00       | 1000                 | 0,60               | 600              |                          | up to 0,05 mm |                         |                  |                 |

**Product selection**

| MDX Tool selection (complete) |                        |         |     |                |     |                                   | Spare part selection |     |     |     |                   |       |     |     |        |     |        |        |        |
|-------------------------------|------------------------|---------|-----|----------------|-----|-----------------------------------|----------------------|-----|-----|-----|-------------------|-------|-----|-----|--------|-----|--------|--------|--------|
| Tool type                     | Dia. $\varnothing$ -mm | Version |     | Rolling length |     | Cyl. shank ZA( $\varnothing$ ixh) | MDX Cage             |     |     |     | MDX Cone          |       |     |     | Roller |     | Qua.   |        |        |
|                               |                        | MFT     | MFB | MFT            | MFB |                                   | MFT                  | MFB | MFT | MFB | $\varnothing$ -mm | MFT   | MFB | MFT | MFB    | MFT |        | MFB    |        |
| MDX                           | 5,00                   | 2       | 3   | 25             | 30  | ZA19,05x76                        | 5,00                 | 2   | 3   | 25  | 30                | 5,00  | 2   | 3   | 25     | 30  | 500115 | -      | 3      |
|                               | 6,00                   |         |     |                |     | ZA19,05x115                       | 6,00                 |     |     |     |                   | 6,00  |     |     |        |     | 500100 | 500308 |        |
|                               | 7,00                   |         |     |                |     | ZA20x76                           | 7,00                 |     |     |     |                   | 7,00  |     |     |        |     | 50108  | 500300 |        |
|                               | 8,00                   |         |     |                |     | ZA20x115                          | 8,00                 |     |     |     |                   | 8,00  |     |     |        |     |        |        |        |
|                               | 9,00                   |         |     |                |     | ZA22x76                           | 9,00                 |     |     |     |                   | 9,00  |     |     |        |     |        |        |        |
|                               | 10,00                  |         |     |                |     | ZA22x115                          | 10,00                |     |     |     |                   | 10,00 |     |     |        |     |        |        |        |
|                               | 11,00                  |         |     |                |     | ZA25x76                           | 11,00                |     |     |     |                   | 11,00 |     |     |        |     |        |        |        |
|                               | 12,00                  |         |     |                |     | ZA25x115                          | 12,00                |     |     |     |                   | 12,00 |     |     |        |     |        |        |        |
|                               | 13,00                  |         |     |                |     | ZA25,40x76                        | 13,00                |     |     |     |                   | 13,00 |     |     |        |     |        |        | 500102 |
|                               | 14,00                  |         |     |                |     | ZA25,40x115                       | 14,00                |     |     |     |                   | 14,00 |     |     |        |     |        |        |        |

**How to order | Order samples**

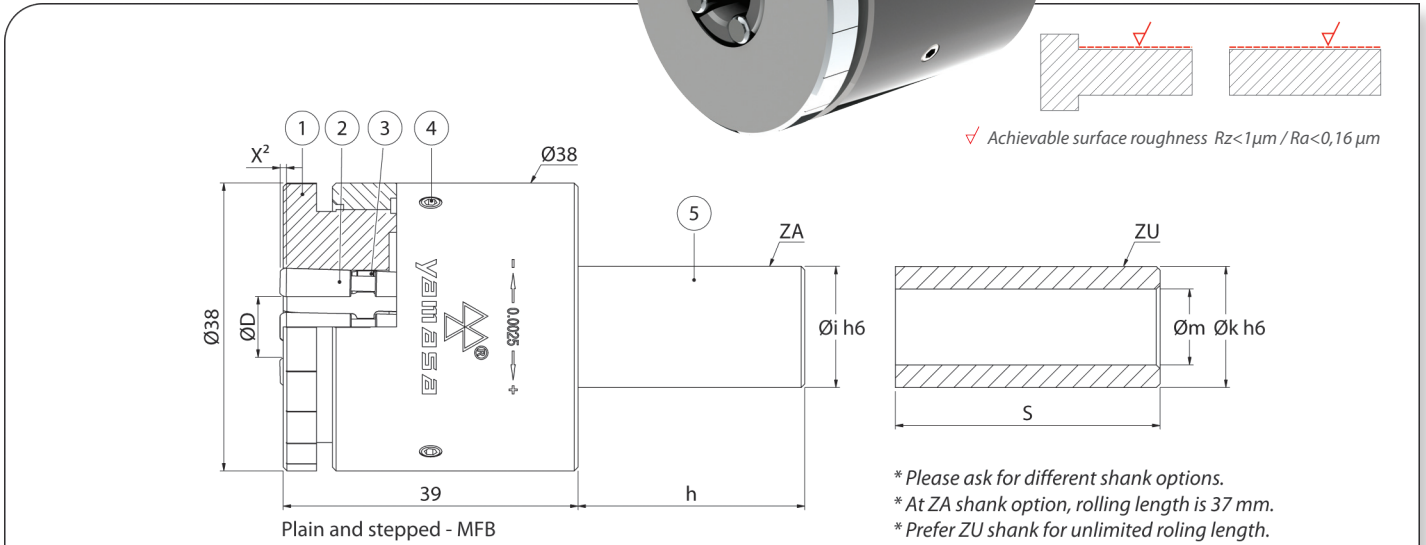
|  |                    |                    |               |
|--|--------------------|--------------------|---------------|
| MDX-6,00-3-30-ZA20x76 Roller Burnishing Tool | 6,00-3-30 MDX Cage | 6,00-3-30 MDX Cone | 500308 Roller |
|--|--------------------|--------------------|---------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **MFT(2)**: Machine feeding - through hole **MFB(3)**: Machine feeding - blind hole

**External Micro Burnishing Tools**

**COMPACT DESIGN - internal coolant**  
**For swiss and multi-spindle automatic type machines.**

Circumferential speed: max.250 m/min.  
 Feed rate: 0,05 - 0,3 mm/rev. per roller  
 Machinable hardness: max. 42 - 45 HRC  
 Adjustment precision: 0,0025 mm



**Minimum edge**

| Diameter range | X <sup>2</sup> / MFB |
|----------------|----------------------|
| 01,00 - 14,00  | 0,8                  |

X<sup>2</sup>: It is possible to come to near the edge more. Please ask for special situations.

**Setting range**

| Diameter range | MFB           |
|----------------|---------------|
| 01,00 - 014,00 | -0,10 / +0,05 |

- 1- Cone
- 2- Roller
- 3- Cage
- 4- Screw
- 5- Shank

**Recommended machining parameters**

| Diameter range (mm) | Revolution (rev/min) | Feed rate (mm/rev) | Feeding (mm/min) | Rotation direc. | Rolling share  | Pre-machining roughness | Pre-machining     | Coolant         |
|---------------------|----------------------|--------------------|------------------|-----------------|----------------|-------------------------|-------------------|-----------------|
|                     |                      |                    |                  | Retreat         | Tool preload   |                         |                   |                 |
| 01,00 - 05,00       | 1000                 | 0,45               | 450              | CCW (M3)        | up to 0,015 mm | Rz = 5 - 15 µm          | Lathe or grinding | Oil or emulsion |
| 06,00 - 08,00       | 1000                 | 0,60               | 600              |                 |                |                         |                   |                 |
| 09,00 - 14,00       | 1000                 | 0,75               | 750              | Rapidly (G0)    | up to 0,04 mm  |                         |                   |                 |

**Product selection**

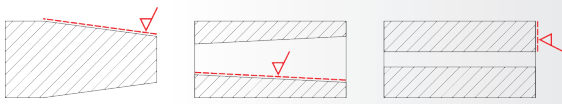
| MXS Tool selection (complete) |           |             |                 |                 |   | Spare part selection  |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------------|-----------|-------------|-----------------|-----------------|---|---|-----------|-------------|-----------|-------------|----------|------|--|--|--|--|--|--|--|--|--|--|--|
| Tool body                     | Dia. Ø-mm | Version MFB | Rolling length  |                 | Cylindrical shank*  |   | MXS Cage  |             | MXS Cone  |             | Roller   |      |  |  |  |  |  |  |  |  |  |  |  |
|                               |           |             | ZA- int.coolant | ZU              | ZA(Øixh)  | ZU(ØkxSxØm)   | Dia. Ø-mm | Version MFB | Dia. Ø-mm | Version MFB | Code MFB | Qua. |  |  |  |  |  |  |  |  |  |  |  |
| MXS1                          | 1,00      | 3           | 37              | UNL (Unlimited) | ZA12x40<br>• ZA16x40<br>• ZA19,05x40<br>• ZA20x40<br>• ZA22x40<br>• ZA25x40<br>• ZA25,40x40 | ZU19,05x76x12<br>• ZU19,05x115x12<br>• ZU20x76x12<br>• ZU20x115x12<br>• ZU22x76x12<br>• ZU22x115x12<br>• ZU25x76x15<br>• ZU25x115x15<br>• ZU25,40x76x15<br>• ZU25,40x115x15 | 1,00      | 3           | 1,00      | 3           | 500301   | 3    |  |  |  |  |  |  |  |  |  |  |  |
|                               | 2,00      |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 3,00      |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 4,00      |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 5,00      |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 6,00      |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 7,00      |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 8,00      |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 9,00      |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 10,00     |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 11,00     |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               | 14,00     |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |
|                               |           |             |                 |                 |   |   |           |             |           |             |          |      |  |  |  |  |  |  |  |  |  |  |  |

UNL at ZU25 or 25,4 shank. Other ZU shanks 37 mm.

**How to order | Order samples**

|   |                 |                 |               |
|---|-----------------|-----------------|---------------|
| MXS1-2,00-3-37-ZA20x40 Roller burnishing tool | 2,00-3 MXS Cage | 2,00-3 MXS Cone | 500301 Roller |
|---|-----------------|-----------------|---------------|

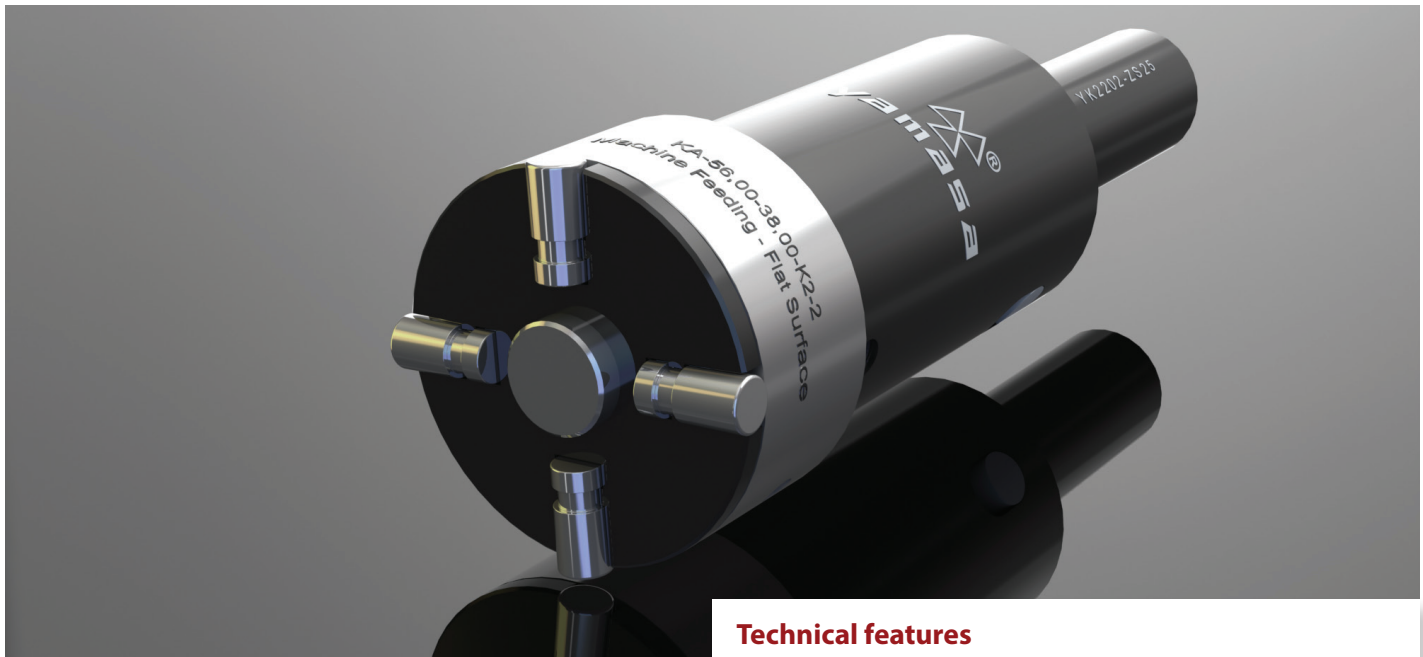
You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side. All dimensions in mm. **MFB(3):** Machine feeding - plain and stepped shaft



✓ Achievable surface roughness  $Rz < 1 \mu\text{m}$  /  $Ra < 0,16 \mu\text{m}$

# Explanation

## Taper-Flat Surface Burnishing Tools



**COMPACT DESIGN**  
For swiss and multi-spindle automatic type machines.



MKI Micro roller burnishing tool

### Technical features

These tools are used to process the interior-outer conics and flat surfaces. They are suitable to roller burnish for all workpieces requiring precision. The tool body is equipped with a special spring system. This spring system enables the pressure, which is applied on the workpiece, adjusted specifically. At the same time, this spring system provides the tool a safety stroke (safety distance). The safety stroke prevents overload on the workpiece and the machine. Furthermore it helps to get a standard and perfect surface quality. The spring system which is designed specially for each tool, gives the opportunity to apply the same pressure everytime to the workpiece which is processed, thus a precision and standard size is obtained.

Any adjustment mechanism is not mentioned in tools. The roller burnishing process occurs when the roller head, which is prepared specially due to the sizes of workpiece, is contacted to the workpiece with a certain force. During the process either the tool or the workpiece may turn. These tools are capable to process all kinds of metallic materials with 1400 N/mm<sup>2</sup> tensile strength and hardness up to max. 42-45 HRC. Tools work by universal or CNC lathes, machining centers, drilling machines, milling machines or other machines which process by turning.

### Machining parameters

|                              |                           |
|------------------------------|---------------------------|
| Circumferential speed        | max.40 m/min.             |
| Feed rate                    | 0,1 - 0,3 mm/rev.         |
| Rolling share                | up to 0,01 mm             |
| Machinable material hardness | max. 42 - 45 HRC          |
| Pre-machining roughness      | $Rz = 5 - 20 \mu\text{m}$ |
| Pre-machining                | lathe or reaming          |
| Coolant                      | Oil or emulsion           |



Tapered internal surface  
KI type



Tapered external surface  
KD type

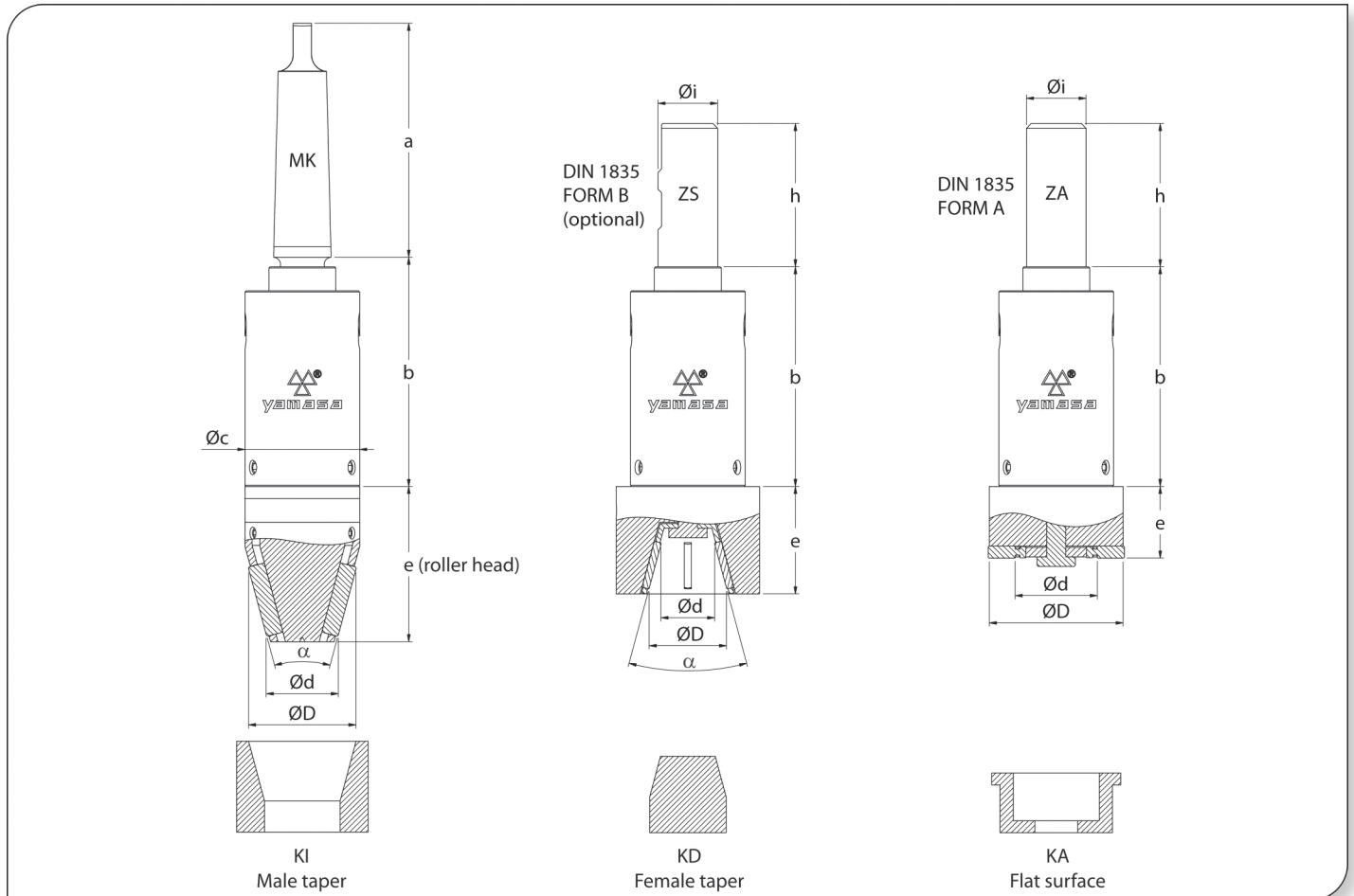


Flat surface  
KA type

## Taper-Flat Surface Burnishing Tools

### Tool structure

K Series tools consist of a body and a roller head. The tool body consists of a shank and a precision housing equipped with the pressurized spring system. The special spring system is designed due to the requirements of the work suitability. The tool is sent with Morse taper or cylindrical shank due to the preference. The roller head consists of cage, cone and rollers. These parts are designed and produced due to the dimensions of the workpiece. Later the roller heads are assembled to the proper body. As the roller heads are designed upon the specifications of the desired work, it is not possible to keep these parts in stock.



### Product selection

| K Series tool selection (complete) |    |    |             |             |          |                          | Dimensions           |            |     |      |    |                 |  |
|------------------------------------|----|----|-------------|-------------|----------|--------------------------|----------------------|------------|-----|------|----|-----------------|--|
| Tool type                          |    |    | Diameter ØD | Diameter Ød | Angle* α | Shank                    | Shank                |            | a   | b    | c  | e (roller head) |  |
|                                    |    |    |             |             |          |                          | Cylindrical (Øi x h) | MK         |     |      |    |                 |  |
| KI                                 | KD | KA | x,xx        | x,xx        | x°       | MK<br>·<br>ZS<br>·<br>ZA | K1                   | Ø20h6 X 50 | MK2 | 78,5 | 62 | 33              | it can be changed according to the workpiece and surface dimensions. |
|                                    |    |    |             |             |          |                          | K2                   | Ø25h6 X 56 | MK3 | 98   | 85 | 48              |  |
|                                    |    |    |             |             |          |                          | K3                   | Ø32h6 X 60 | MK4 | 123  | 93 | 65              |  |

\* Only for KI and KD tools. All dimensions in mm.

### How to order | Order samples

KI-35,00-15,00-30°-ZA Roller Burnishing Tool

You can create order codes of the tool by looking at the product selection table. For this, please rank the requested product features side by side.

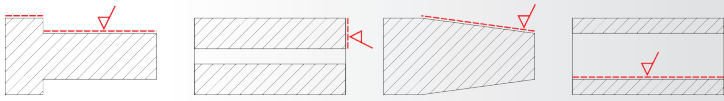
Tool body selection is made by YAMASA according to material features and sizes of workpiece. Roller heads are designed according to workpiece sizes.

It is enough to send us order code of your selected product together with following informations. After that we will inform you the suitable tool configuration for your work.

### Needed informations for tool configuration

- Material:
- Material hardness (HRC etc.):
- Material yield strength (N/mm<sup>2</sup>):
- Workpiece technical drawing



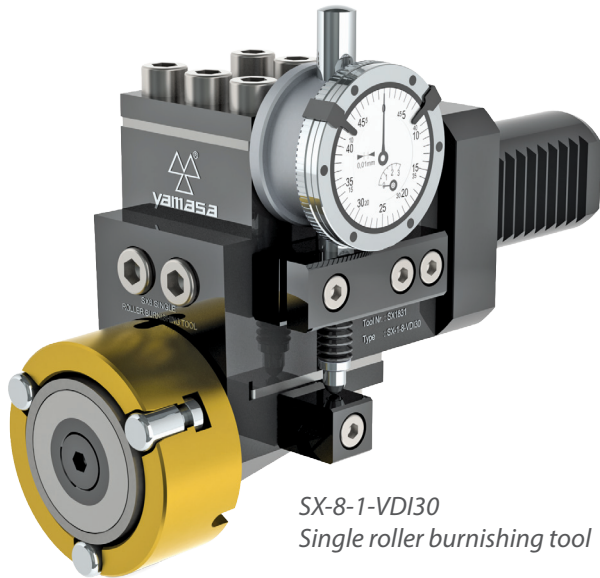


✓ Achievable surface roughness  $Rz < 1 \mu\text{m}$  /  $Ra < 0,16 \mu\text{m}$

## Cylindrical external surfaces, flat surfaces, tapers and holes

### Application

YAMASA SX type tools are used for the aim of burnishing the stepped-plain shafts, tapers, flat surfaces and holes. The tools provide as well as surface hardness and at low rate calibration (measurement accuracy) beside of burnishing. The tools provide time saving through a high processing power and speed and this is a motive to prefer for the serial production.



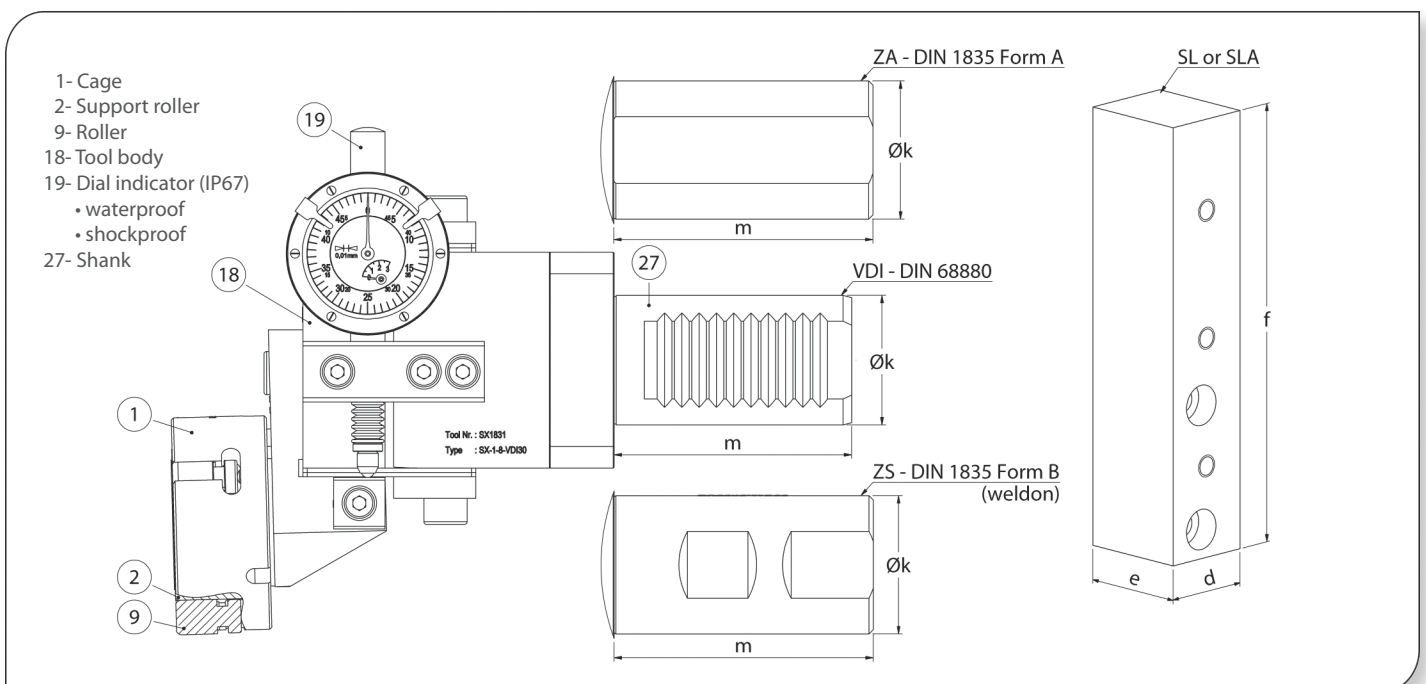
SX-8-1-VDI30  
Single roller burnishing tool

### Technical features and advantages

- Burnishing different sizes with same tool.
- Used on CNC and universal lathe machines.
- Tool design allows either right or left hand operation.
- Don't require settings and when the tool is fixed to the machine, it is ready to use.
- Roller burnishing force is adjustable, so it is possible to achieve high quality and standard roughness values.
- Special design and spring system apply rolling force consistently. So it provides high quality and standard work flow.
- Burnishing all kinds of metallic materials up to the tensile strength of  $1400\text{N/mm}^2$  and to the hardness 42-45 HRC.
- Easy to change the spare part.
- Process time is short.
- Needs min. lubrication (oil or emulsion).
- It does not make sawdust.

### Hole machining

| Tool type | min. diameter (mm) | Hole dept (mm) |
|-----------|--------------------|----------------|
| SX5       | $\varnothing 51$   | $\leq 20$      |
|           | $\varnothing 104$  | $> 20$         |
| SX8       | $\varnothing 53$   | $\leq 20$      |
|           | $\varnothing 106$  | $> 20$         |



### Tool structure

- Tools consist of a connecting shank, precision body, roller head and a dial indicator which shows rolling force.
- Dial indicator is IP67 protected and has a waterproof-shockproof structure.
- Square, cylindrical or VDI shanks are available. Whole shanks are demountable.

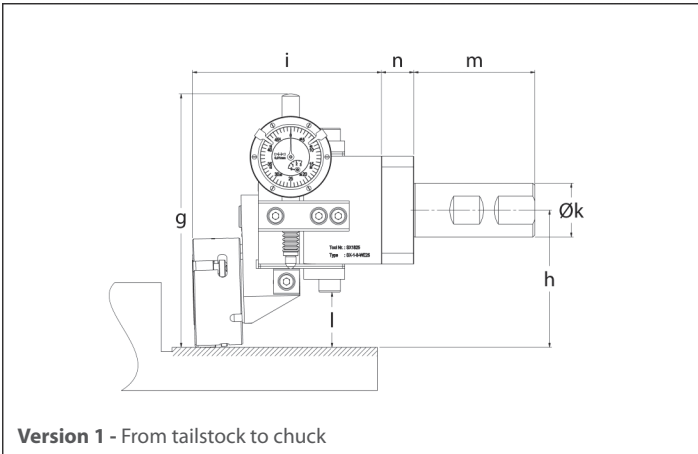
**Single Roller Burnishing Tools**

**SX5 - Machining parameters**

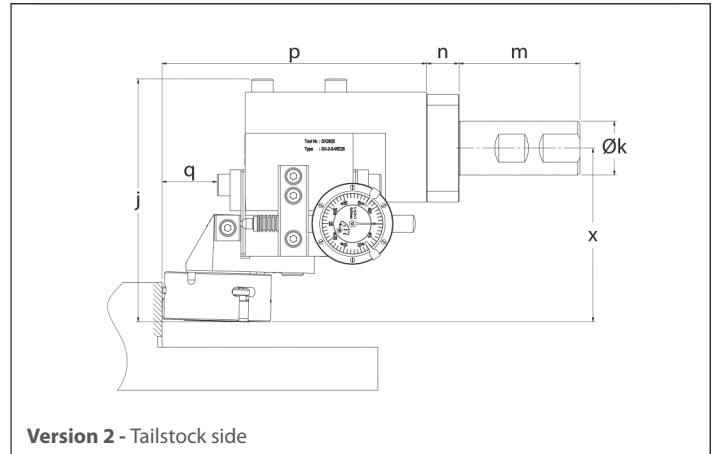
|                         |                        |
|-------------------------|------------------------|
| Working range           | Ø ≥ 10 (up to Ø 80 mm) |
| Circumferential speed   | max. 150 m/min.        |
| Feed rate               | max. 0,6 mm/rev.       |
| Rolling share           | up to 0,02 mm          |
| Rolling force           | max. 5000 Newton       |
| Pre-machining roughness | Rz = 5 - 20 µm         |
| Pre-machining           | lathe or grinding      |
| Coolant                 | Oil or emulsion        |

**SX8 - Machining parameters**

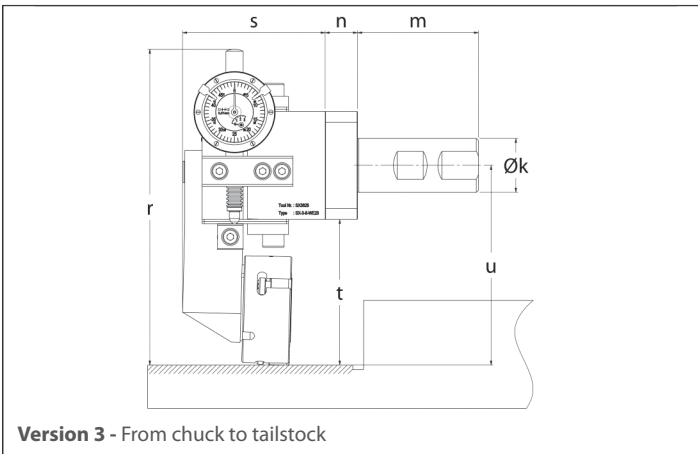
|                         |                        |
|-------------------------|------------------------|
| Working range           | Ø > 12 (up to Ø200 mm) |
| Circumferential speed   | max. 150 m/min.        |
| Feed rate               | max. 0,6 mm/rev.       |
| Rolling share           | up to 0,02 mm          |
| Rolling force           | max. 5000 Newton       |
| Pre-machining roughness | Rz = 5 - 20 µm         |
| Pre-machining           | lathe or grinding      |
| Coolant                 | Oil or emulsion        |



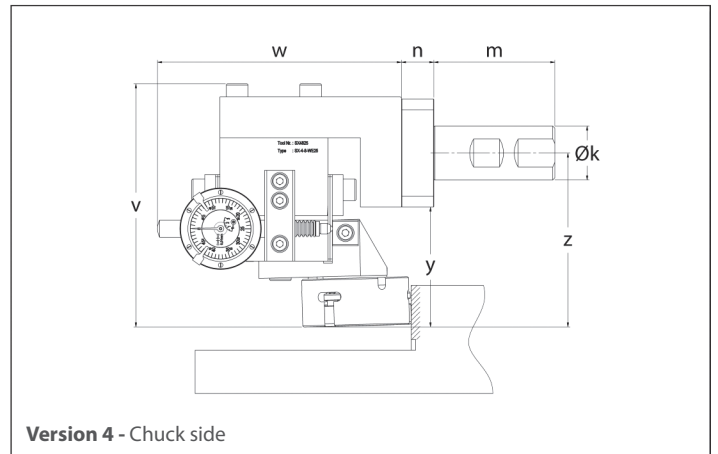
Version 1 - From tailstock to chuck



Version 2 - Tailstock side



Version 3 - From chuck to tailstock

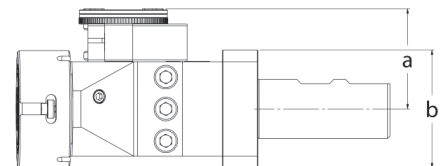


Version 4 - Chuck side

**Dimensions**

| Tool type | Design | Height |    | Version 1 |    |    |    | Version 2 |    |     |    | Version 3 |    |    |    | Version 4 |     |    |    |    |
|-----------|--------|--------|----|-----------|----|----|----|-----------|----|-----|----|-----------|----|----|----|-----------|-----|----|----|----|
|           |        | a      | b* | g         | h  | i  | l  | j         | x  | p   | q  | r         | s  | t  | u  | v         | w   | y  | z  | n  |
| SX        | 5      | 43     | 50 | 115       | 60 | 88 | 22 | 113       | 80 | 120 | 22 | 144       | 66 | 64 | 89 | 113       | 113 | 55 | 80 | 15 |
|           | 8      |        |    | 118       | 63 | 88 | 25 | 113       | 81 | 123 | 25 | 147       | 66 | 67 | 92 | 113       | 113 | 55 | 80 | 15 |

\* b=60 mm for the tools with Ø40 mm VDI and cylindrical shank.  
There is not "n" size at square shank tools.



**Product selection**

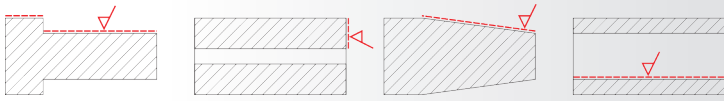
| SX Tool selection (complete) |             |         |                      |                       |                       | Spare part selection |                  |         |                   |                    |                |        |             |        |
|------------------------------|-------------|---------|----------------------|-----------------------|-----------------------|----------------------|------------------|---------|-------------------|--------------------|----------------|--------|-------------|--------|
| Tool type                    | Design      | Version | Shank                |                       |                       | Tool type            | Design           | Version | SX Cage           |                    | Support roller |        | Roller      |        |
|                              |             |         | VDI                  | Cylindrical           |                       |                      |                  |         | Square            |                    | Tool type      | Design | Tool type   | Design |
|                              |             |         | DIN69880<br>(Øk x m) | DIN1835 A<br>(Øk x m) | DIN1835 B<br>(Øk x m) |                      |                  |         | SL<br>(d x e x f) | SLA<br>(d x e x f) |                |        |             |        |
| SX                           | 5<br>•<br>8 | 1       | VDI20(Ø20x40)        | ZA20(Ø20x50)          | ZS20(Ø20x50)          | SL16(16x30x120)      | SLA16(16x60x120) | SX      | 5<br>•<br>8       | SX                 | 5<br>•<br>8    | SX     | 5<br>•<br>8 |        |
|                              |             | 2       | VDI25(Ø25x48)        | ZA25(Ø25x56)          | ZS25(Ø25x56)          | SL20(20x30x120)      | SLA20(20x60x120) |         |                   |                    |                |        |             |        |
|                              |             | 3       | VDI30(Ø30x55)        | ZA32(Ø32x60)          | ZS32(Ø32x60)          | SL25(25x30x120)      | SLA25(25x60x120) |         |                   |                    |                |        |             |        |
|                              |             | 4       | VDI40(Ø40x63)        | ZA40(Ø40x70)          | ZS40(Ø40x70)          | SL32(32x30x120)      | SLA32(32x60x120) |         |                   |                    |                |        |             |        |

All dimensions in mm.

**How to order | Order samples**

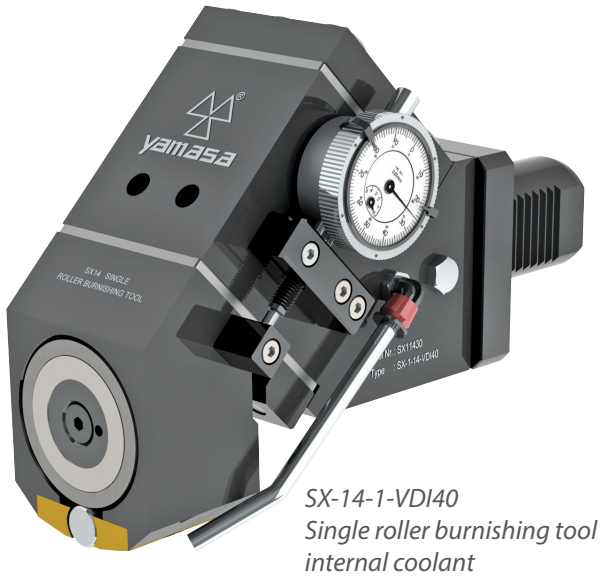
|   |             |                 |             |
|---|-------------|-----------------|-------------|
| SX-8-1-ZS25 Single roller burnishing tool | SX-8-1 Cage | SX-8 Sup.roller | SX-8 Roller |
|---|-------------|-----------------|-------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side.

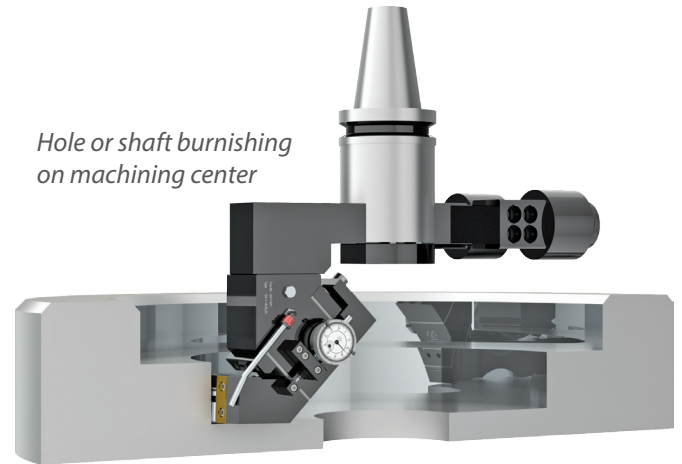


✓ Achievable surface roughness  $Rz < 1 \mu\text{m}$  /  $Ra < 0,16 \mu\text{m}$

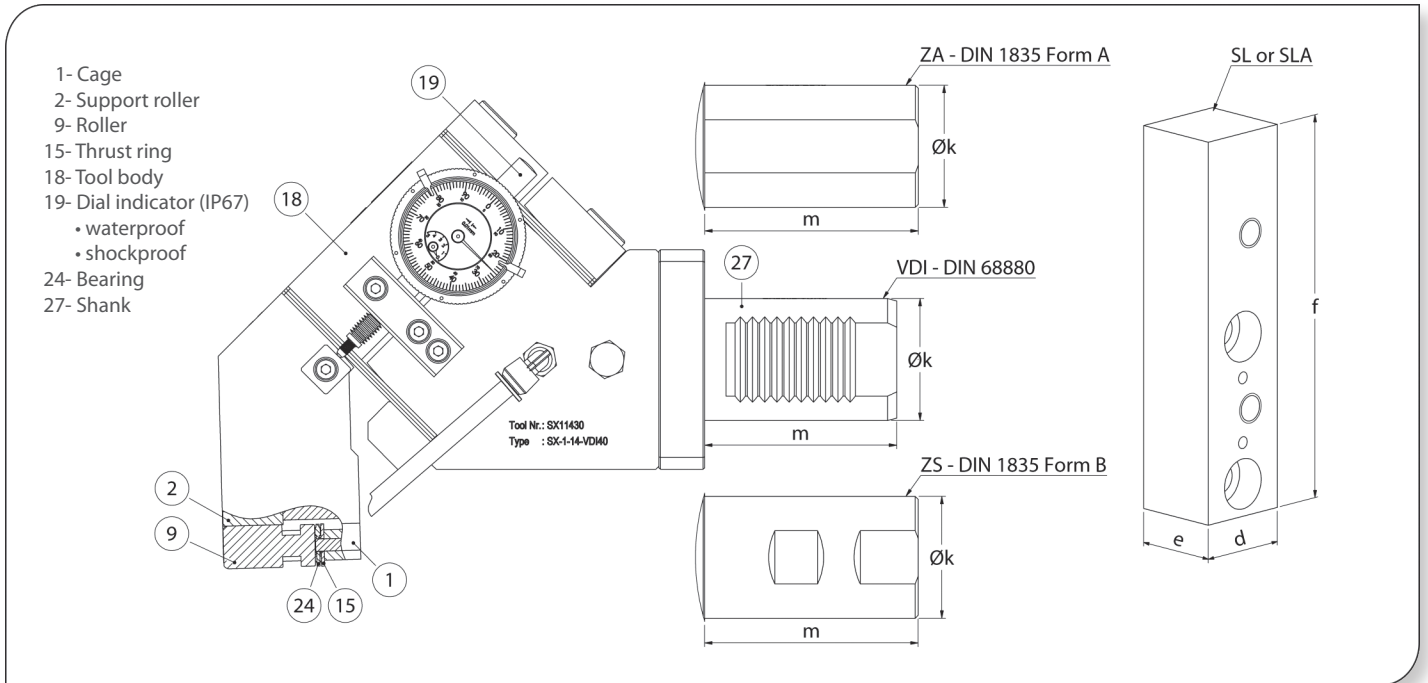
## Cylindrical external surfaces, flat surfaces, tapers and holes



**SX-14-1-VDI40**  
Single roller burnishing tool  
internal coolant

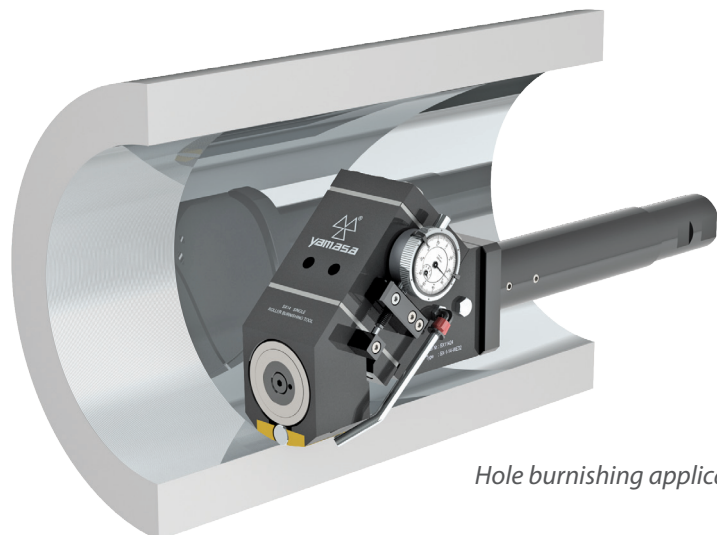


Hole or shaft burnishing  
on machining center



### Hole machining

| Tool type | min. diameter (mm) | Hole dept (mm) |
|-----------|--------------------|----------------|
| SX 14     | Ø110               | ≤ 30           |
|           | Ø151               | ≤ 80           |
|           | Ø160               | Unlimited      |

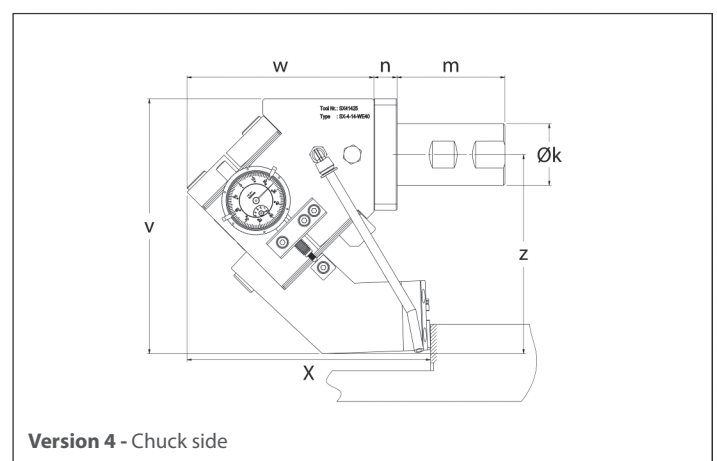
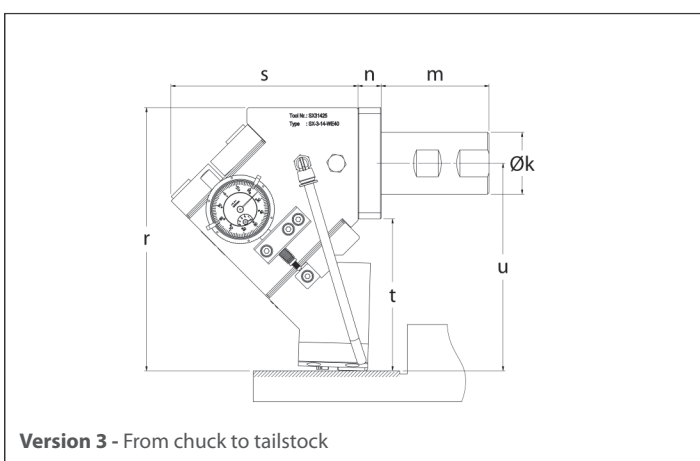
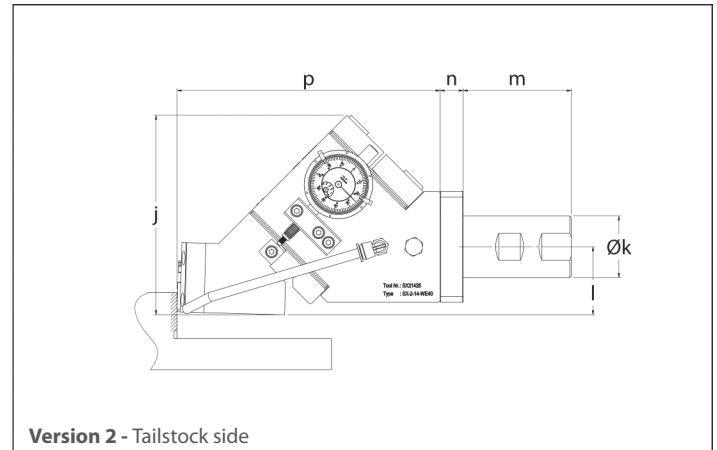
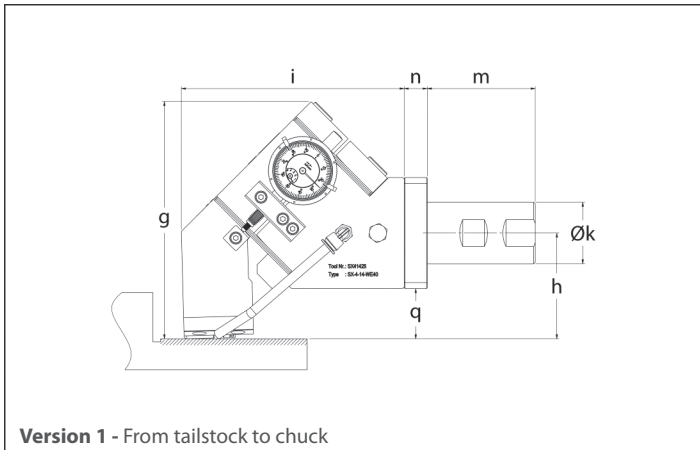


Hole burnishing application

**Single Roller Burnishing Tools**

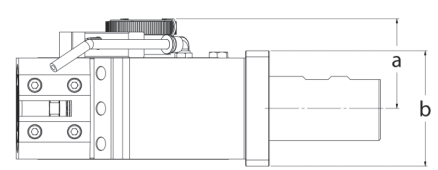
**SX14 - Machining parameters**

|                       |   |                         |                           |
|-----------------------|---|-------------------------|---------------------------|
| Working range         | $\varnothing \geq 30$ (up to $\varnothing 5000$ mm) | Rolling force           | max. 10000 Newton         |
| Circumferential speed | max. 200 m/min.                                     | Pre-machining roughness | Rz = 5 - 20 $\mu\text{m}$ |
| Feed rate             | max. 1 mm/rev.                                      | Pre-machining           | lathe or grinding         |
| Rolling share         | up to 0,03 mm                                       | Coolant                 | Oil or emulsion           |



**Dimensions**

| Tool type | Design | Shank     | Height |     | Version 1 |    | Version 2 |    | Version 3 |     | Version 4 |     |     |    | n   |     |     |     |     |    |   |
|-----------|--------|-----------|--------|-----|-----------|----|-----------|----|-----------|-----|-----------|-----|-----|----|-----|-----|-----|-----|-----|----|---|
|           |        |           | a      | b*  | g         | h  | i         | q  | j         | l   | p         | r   | s   | t  |     | u   | v   | w   | x   | z  |   |
| SX        | 14     | all types | 56     | 72  | 154       | 68 | 145       | 32 | 129       | 44  | 170       | 171 | 122 | 98 | 134 | 165 | 122 | 158 | 129 | 15 |   |
|           |        | VDI40     |        | 83  |           |    |           |    |           |     |           |     |     |    |     |     |     |     |     |    |   |
|           |        | VDI50     |        | 100 |           |    |           |    |           | 134 | 49        |     |     |    |     |     |     |     |     |    | - |
|           |        | VDI60     |        | 123 |           |    | 165       |    | 139       | 54  | 177       |     |     |    |     |     |     |     |     |    |   |



There is not "n" size at square tools

**Product selection**

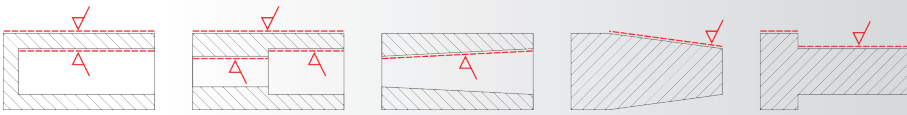
| SX Tool selection (complete) |        |         |                                     |                                    |                                    |                                   |                                    |        |    | Spare part selection |        |                |        |           |        |
|------------------------------|--------|---------|-------------------------------------|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|--------|----|----------------------|--------|----------------|--------|-----------|--------|
| Tool type                    | Design | Version | Shank                               |                                    |                                    |                                   |                                    |        |    | SX Cage              |        | Support roller |        | Roller    |        |
|                              |        |         | VDI                                 |                                    |                                    | Cylindrical                       |                                    | Square |    | Tool type            | Design | Tool type      | Design | Tool type | Design |
|                              |        |         | DIN69880                            | DIN1835 A                          | DIN1835 B                          | SL                                | SLA                                |        |    |                      |        |                |        |           |        |
|                              |        |         | ( $\varnothing k \times m$ )        | ( $\varnothing k \times m$ )       | ( $\varnothing k \times m$ )       | (d x e x f)                       | (d x e x f)                        |        |    |                      |        |                |        |           |        |
| SX                           | 14     | 1       | VDI30( $\varnothing 30 \times 55$ ) | ZA32( $\varnothing 32 \times 60$ ) | ZS32( $\varnothing 32 \times 60$ ) | SL25( $25 \times 30 \times 130$ ) | SLA25( $25 \times 60 \times 130$ ) | SX     | 14 | SX                   | 14     | SX             | 14     |           |        |
|                              |        | 2       | VDI40( $\varnothing 40 \times 63$ ) | ZA40( $\varnothing 40 \times 70$ ) | ZS40( $\varnothing 40 \times 70$ ) | SL32( $32 \times 30 \times 130$ ) | SLA32( $32 \times 60 \times 130$ ) |        |    |                      |        |                |        |           |        |
|                              |        | 3       | VDI50( $\varnothing 50 \times 78$ ) | ZA50( $\varnothing 50 \times 80$ ) | ZS50( $\varnothing 50 \times 80$ ) |                                   |                                    |        |    |                      |        |                |        |           |        |
|                              |        | 4       | VDI60( $\varnothing 60 \times 94$ ) | ZA63( $\varnothing 63 \times 90$ ) | ZS63( $\varnothing 63 \times 90$ ) |                                   |                                    |        |    |                      |        |                |        |           |        |

All dimensions in mm.

**How to order | Order samples**

|   |            |                  |              |
|---|------------|------------------|--------------|
| SX-14-1-VDI40 Single roller burnishing tool | SX-14 Cage | SX-14 Sup.roller | SX-14 Roller |
|---|------------|------------------|--------------|

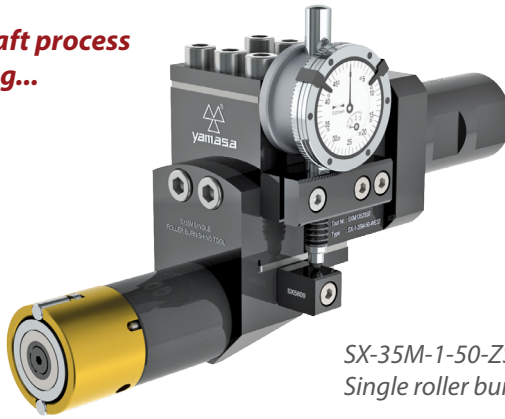
You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side.



✓ Achievable surface roughness  $Rz < 1 \mu\text{m}$  /  $Ra < 0,16 \mu\text{m}$

## Limited length of holes, shafts and internal-external tapers

**Hole and shaft process in one setting...**



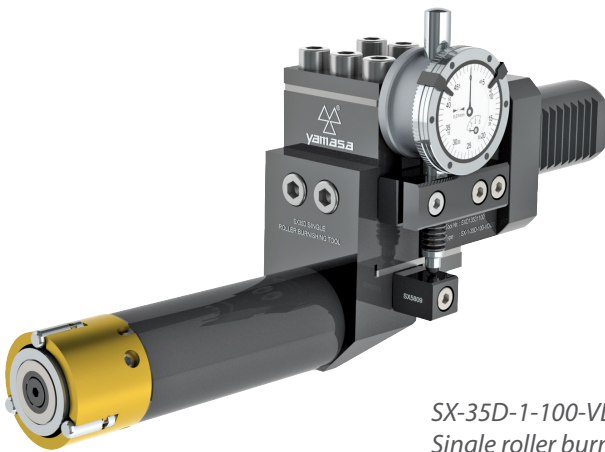
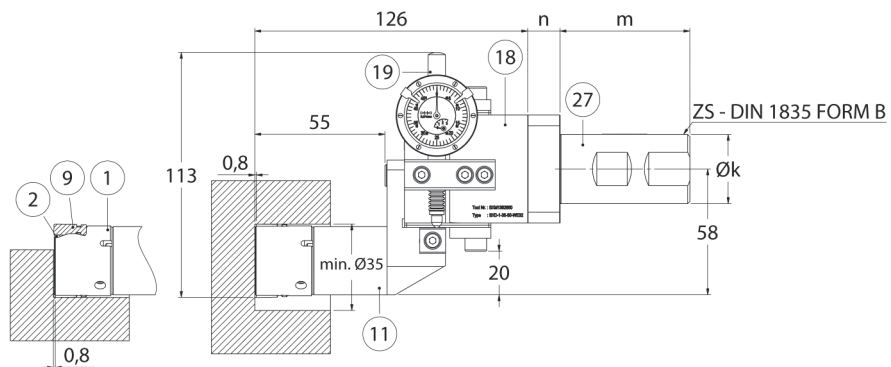
**SX-35M-1-50-ZS32**  
Single roller burnishing tool

### SX-35M Processing properties and parameters

|                           |  |
|---------------------------|--|
| Processable surface       | Holes, shafts, internal and external tapers* |
| Working range             | $\varnothing \geq 35$                        |
| Circumferential speed     | max. 150 m/min.                              |
| Feed rate                 | max. 0,6 mm/rev.                             |
| Rolling share (int./ext.) | up to 0,03 / 0,02 mm                         |
| Rolling force             | max. 5000 Newton                             |
| Pre-machining roughness   | $Rz = 5 - 20 \mu\text{m}$                    |
| Pre-machining             | lathe or reaming                             |
| Coolant                   | Oil or emulsion                              |

\* Taper setting should be made for taper process.

- 1- Cage
- 2- Support roller
- 9- Roller
- 11- Roller head carrier
- 18- Tool body
- 19- Dial indicator (IP67)
  - waterproof
  - shockproof
- 27- Shank



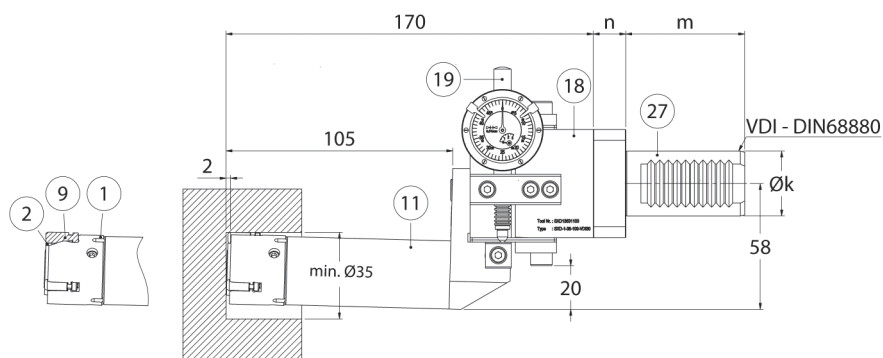
**SX-35D-1-100-VDI30**  
Single roller burnishing tool

### SX-35D Processing properties and parameters

|                         |                            |
|-------------------------|----------------------------|
| Processable surface     | Holes and internal tapers* |
| Working range           | $\varnothing \geq 35$      |
| Circumferential speed   | max. 150 m/min.            |
| Feed rate               | max. 0,6 mm/rev.           |
| Rolling share           | up to 0,03 mm              |
| Rolling force           | max. 5000 Newton           |
| Pre-machining roughness | $Rz = 5 - 20 \mu\text{m}$  |
| Pre-machining           | lathe or reaming           |
| Coolant                 | Oil or emulsion            |

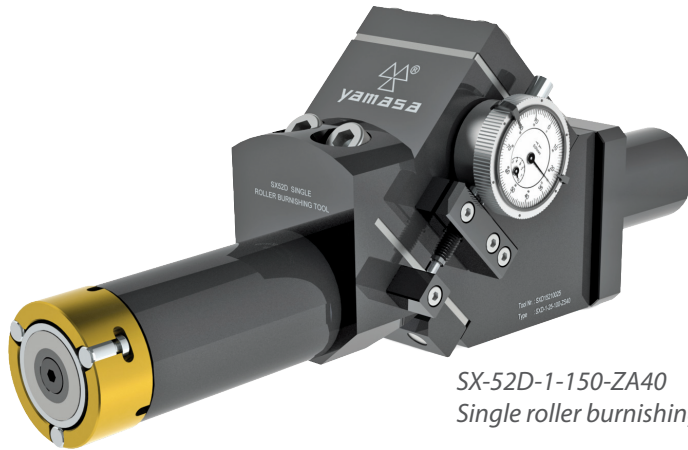
\* Taper setting should be made for taper process.

- 1- Cage
- 2- Support roller
- 9- Roller
- 11- Roller head carrier
- 18- Tool body
- 19- Dial indicator (IP67)
  - waterproof
  - shockproof
- 27- Shank





**Single Roller Burnishing Tools**

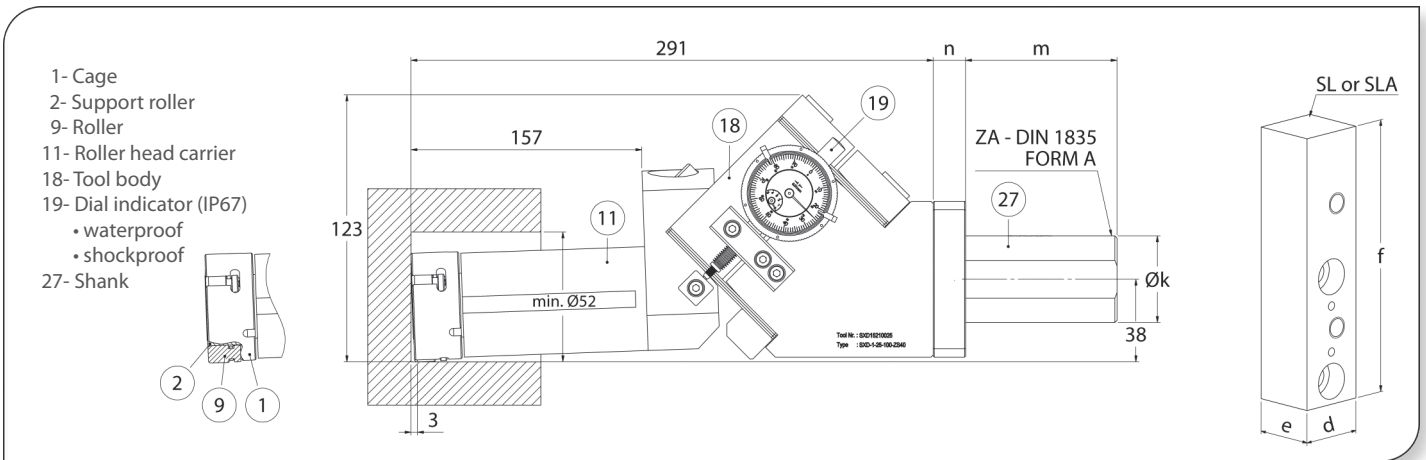


SX-52D-1-150-ZA40  
Single roller burnishing tool

**SX-52D Processing properties and parameters**

|                           |  |
|---------------------------|--|
| Processable surface       | Holes, shafts, internal and external tapers* |
| Working range             | Ø ≥ 52                                       |
| Circumferential speed     | max. 150 m/min.                              |
| Feed rate                 | max. 0,6 mm/rev.                             |
| Rolling share (int./ext.) | up to 0,04 / 0,02 mm                         |
| Rolling force             | max. 10000 Newton                            |
| Pre-machining roughness   | Rz = 5 - 20 µm                               |
| Pre-machining             | lathe or reaming                             |
| Coolant                   | Oil or emulsion                              |

\* Taper setting should be made for taper process.



**Hole machining**

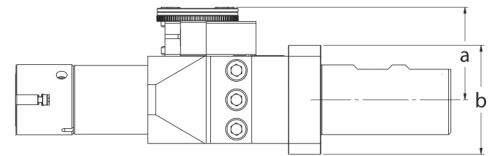
| Tool type | Design | Hole depth (mm) |     |      |      |      |      | Work-piece     |
|-----------|--------|-----------------|-----|------|------|------|------|----------------|
|           |        | <40             | <60 | <80  | <100 | <125 | <150 |                |
| SX        | 35M    | 35              | 35  | 35   | 35   | 35   | 35   | min. hole Ø-mm |
|           | 35D    | 35              | 36  | 36,5 | 37   | 37,5 | 38   |                |
|           | 52D    | 52              | 53  | 53,5 | 54   | 55   | 56   |                |

\* b = 60 mm for Ø40 mm cyl. and VDI shanks (SX-35M / SX-35D).  
\* b = 83 mm for Ø40 mm VDI shank (SX-52D).

**Dimensions**

| Tool type | Design | Height |    |    |
|-----------|--------|--------|----|----|
|           |        | a      | b* | n  |
| SX        | 35M    | 43     | 50 | 15 |
|           | 35D    | 43     | 50 | 15 |
|           | 52D    | 56     | 72 | 15 |

\* b = 100 mm for Ø50 mm VDI shank (SX-52D)  
\* b = 123 mm for Ø60 mm VDI shank (SX-52D)



There is not "n" size at square shank tools.

**Product selection**

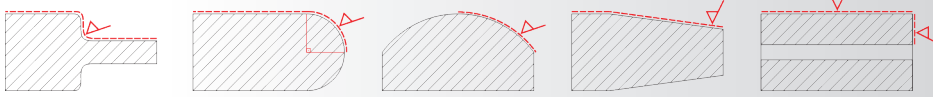
| SX Tool selection (complete) |            |                |                   |                      |                       | Spare part selection  |                   |                    |           |            |             |            |           |            |
|------------------------------|------------|----------------|-------------------|----------------------|-----------------------|-----------------------|-------------------|--------------------|-----------|------------|-------------|------------|-----------|------------|
| Tool type                    | Design     | Ver-<br>sion   | Rolling<br>length | Shank                |                       |                       |                   |                    | SX Cage   |            | Sup. Roller |            | Roller    |            |
|                              |            |                |                   | VDI                  | Cylindrical           |                       | Square            |                    | Tool type | Design     | Tool type   | Design     | Tool type | Design     |
|                              |            |                |                   | DIN69880<br>(Øk x m) | DIN1835 A<br>(Øk x m) | DIN1835 B<br>(Øk x m) | SL<br>(d x e x f) | SLA<br>(d x e x f) |           |            |             |            |           |            |
| SX                           | 35M<br>35D | 1              | 50<br>100<br>150  | VDI20(Ø20x40)        | ZA20(Ø20x50)          | ZS20(Ø20x50)          | SL16(16x30x120)   | SLA16(16x60x120)   | SX        | 35M<br>35D | SX          | 35M<br>35D | SX        | 35M<br>35D |
|                              |            |                |                   | VDI25(Ø25x48)        | ZA25(Ø25x56)          | ZS25(Ø25x56)          | SL20(20x30x120)   | SLA20(20x60x120)   |           |            |             |            |           |            |
|                              |            |                |                   | VDI30(Ø30x55)        | ZA32(Ø32x60)          | ZS32(Ø32x60)          | SL25(25x30x120)   | SLA25(25x60x120)   |           |            |             |            |           |            |
|                              |            |                |                   | VDI40(Ø40x63)        | ZA40(Ø40x70)          | ZS40(Ø40x70)          | SL32(32x30x120)   | SLA32(32x60x120)   |           |            |             |            |           |            |
|                              |            |                |                   | VDI30(Ø30x55)        | ZA32(Ø32x60)          | ZS32(Ø32x60)          | SL25(25x30x130)   | SLA25(25x60x130)   |           |            |             |            |           |            |
|                              |            |                |                   | VDI40(Ø40x63)        | ZA40(Ø40x70)          | ZS40(Ø40x70)          | SL25(25x30x130)   | SLA25(25x60x130)   |           |            |             |            |           |            |
|                              | 52D        | VDI150(Ø50x78) | ZA50(Ø50x80)      | ZS50(Ø50x80)         | SL32(32x30x130)       | SLA32(32x60x130)      | 52D               | 52D                | 52D       | 52D        |             |            |           |            |
|                              |            | VDI160(Ø60x94) | ZA63(Ø63x90)      | ZS63(Ø63x90)         |                       |                       |                   |                    |           |            |             |            |           |            |

All dimensions in mm.

**How to order | Order samples**

|  |             |               |              |
|--|-------------|---------------|--------------|
| SX-35M-1-50-ZS32 Single roller burnishing tool   | SX-35M Cage | SX-35M S.Rol. | SX-35M Roll. |
| SX-35D-1-100-VDI30 Single roller burnishing tool | SX-35D Cage | SX-35D S.Rol. | SX-35D Roll. |
| SX-52D-1-150-ZA40 Single roller burnishing tool  | SX-52D Cage | SX-52D S.Rol. | SX-52D Roll. |

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side.

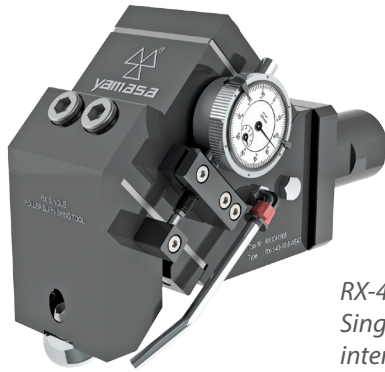


✓ Achievable surface roughness  $Rz < 1 \mu\text{m}$  /  $Ra < 0,16 \mu\text{m}$

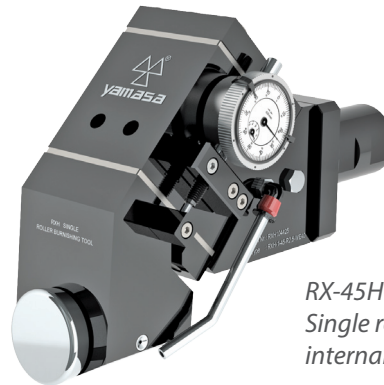
## Fillets, Radii, contours, and spherical surface

### Application

- Tools burnish contours, radii, cylindrical, spherical, tapered and flat surfaces.
- Provide time saving through a high processing power and speed.
- Provide surface hardness and at low rate calibration (measurement accuracy).
- Easy to change the spare parts.
- Short process time. No sawdust.
- Needs min. lubrication (oil or emulsion),



**RX-45-1-R2,5-ZS40**  
Single roller burnishing tool  
internal coolant



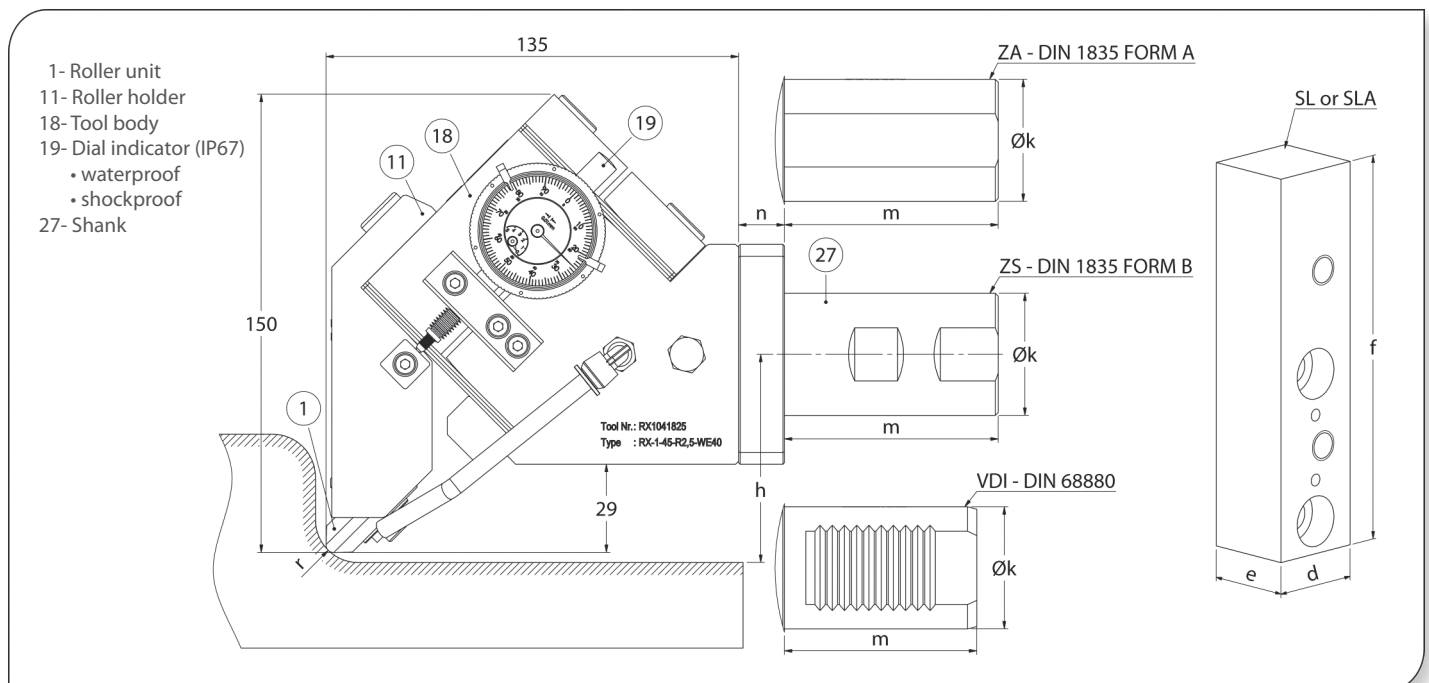
**RX-45H-1-R2,5-ZS40**  
Single roller burnishing tool  
internal coolant

#### RX-45 Processing properties and parameters

|                         |                                      |
|-------------------------|--------------------------------------|
| Processable surfaces    | Cylindrical and radii up to the face |
| Machinable materials    | low and midlevel strength            |
| Circumferential speed   | max. 300 m/min.                      |
| Feed rate               | max. 1 mm/rev.                       |
| Rolling share           | up to 0,03 mm                        |
| Rolling force           | max. 4000 Newton                     |
| Pre-machining roughness | $Rz = 5 - 30 \mu\text{m}$            |
| Coolant                 | Oil or emulsion                      |

#### RX-45H Processing properties and parameters

|                         |                                 |
|-------------------------|---------------------------------|
| Processable surfaces    | Cylindrical and radii up to 75° |
| Machinable materials    | High strength                   |
| Circumferential speed   | max. 300 m/min.                 |
| Feed rate               | max. 1 mm/rev.                  |
| Rolling share           | up to 0,03 mm                   |
| Rolling force           | max. 10000 Newton               |
| Pre-machining roughness | $Rz = 5 - 30 \mu\text{m}$       |
| Coolant                 | Oil or emulsion                 |



**RX tools are available for deep rollig applications. Please ask.**

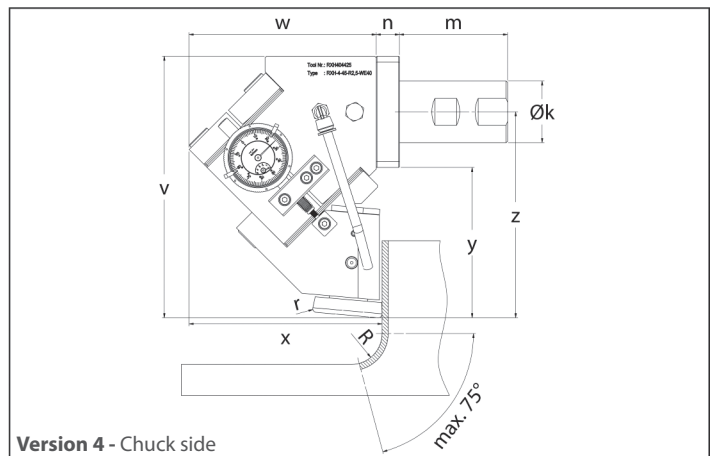
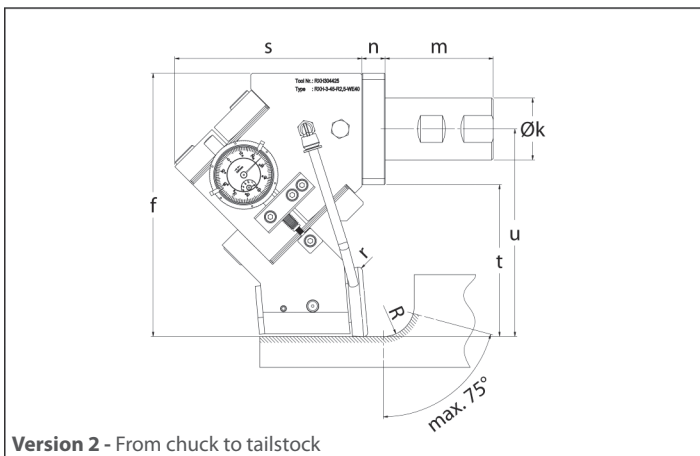
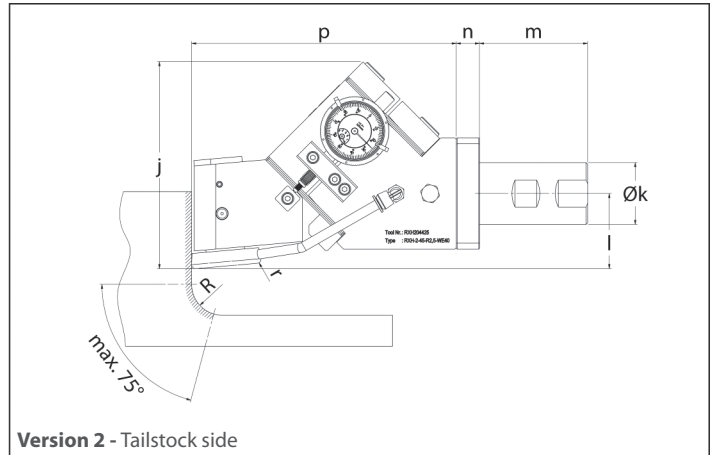
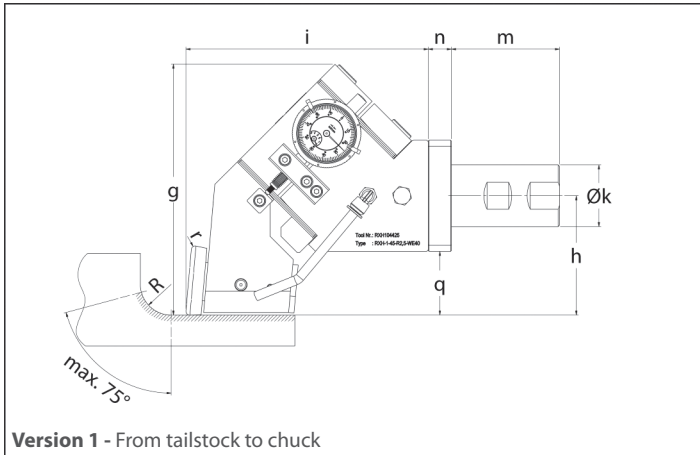
### Technical features and advantages

- Burnishing different sizes with same tool.
- Used on CNC, universal and lathe machines with copy systems.
- Tool design allows either right or left hand operation.
- Don't require settings and when the tool is fixed to the machine, it is ready to use.
- Roller burnishing force is adjustable, so it is possible to achieve high quality and standard roughness values.
- Spring system apply rolling force consistently. So it provides high quality and standard work flow.
- Shoulders and other edges is possible up to the end.
- Burnishing all kinds of metallic materials up to the tensile strength of 1400N/mm<sup>2</sup> and to the hardness 42-45 HRC.

## Single Roller Burnishing Tools

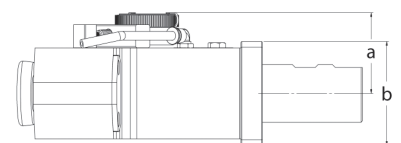
### Tool structure

- Tools consist of a connecting shank, precision body, roller head and a dial indicator which shows rolling force.
- Dial indicator is IP67 protected and has a waterproof-shockproof structure.
- Square, cylindrical or VDI shanks are available.



### Dimensions

| Tool type | Design    | Shank     | Height |     | Version 1 |    | Version 2 |    | Version 3 |    | Version 4 |     |     |    |     | n   |     |     |     |    |    |  |
|-----------|-----------|-----------|--------|-----|-----------|----|-----------|----|-----------|----|-----------|-----|-----|----|-----|-----|-----|-----|-----|----|----|--|
|           |           |           | a      | b*  | g         | h  | i         | q  | j         | l  | p         | f   | s   | t  | u   |     | v   | w   | x   | z  | y  |  |
| RX        | 45<br>45H | all types | 56     | 72  | 163       | 77 | 157       | 41 | 134       | 49 | 172       | 171 | 122 | 98 | 134 | 170 | 122 | 125 | 133 | 97 | 15 |  |
|           |           | VDI40     |        | 83  |           |    |           |    |           |    |           |     |     |    |     |     |     |     |     |    |    |  |
|           |           | VDI50     |        | 100 |           |    |           |    |           |    |           |     |     |    |     |     |     |     |     |    |    |  |
|           |           | VDI60     |        | 123 |           |    | 165       |    |           |    | 177       |     | 129 |    |     |     |     |     |     |    |    |  |



There is not "n" size at square shank tools.

### Product selection

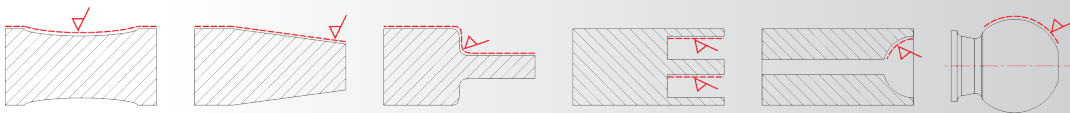
| Tool selection (complete) |        |         |                   |               |              |              |                 |                  |           | Spare roller unit |                   |     |
|---------------------------|--------|---------|-------------------|---------------|--------------|--------------|-----------------|------------------|-----------|-------------------|-------------------|-----|
| Tool type                 | Design | Version | Roller radii (R*) | Shank         |              |              |                 |                  | Tool type | Design            | Roller radii (R*) |     |
|                           |        |         |                   | VDI           | Cylindrical  |              | Square          |                  |           |                   |                   |     |
|                           |        |         |                   | DIN69880      | DIN1835 A    | DIN1835 B    | SL              | SLA              |           |                   |                   |     |
|                           |        |         |                   | (Øk x m)      | (Øk x m)     | (Øk x m)     | (d x e x f)     | (d x e x f)      |           |                   |                   |     |
| RX                        | 45     | 1       | 0,8               | VDI30(Ø30x55) | ZA32(Ø32x60) | ZS32(Ø32x60) |                 |                  | RX        | 45                | 0,8               |     |
|                           |        |         | 1,2               | VDI40(Ø40x63) | ZA40(Ø40x70) | ZS40(Ø40x70) | SL25(25x30x130) | SLA25(25x60x130) |           |                   | 1,2               |     |
|                           |        |         | 1,6               | VDI50(Ø50x78) | ZA50(Ø50x80) | ZS50(Ø50x80) | SL32(32x30x130) | SLA32(32x60x130) |           |                   | 1,6               |     |
|                           |        |         | 2,5               | VDI60(Ø60x94) | ZA63(Ø63x90) | ZS63(Ø63x90) |                 |                  |           |                   | 2,5               |     |
|                           | 45H    | 1       | 2,5               |               |              |              |                 |                  |           |                   |                   | 2,5 |
|                           |        |         | 3                 |               |              |              |                 |                  |           |                   |                   | 3   |
|                           |        |         | 4                 |               |              |              |                 |                  |           |                   |                   | 4   |
|                           |        |         | 6,0               |               |              |              |                 |                  |           |                   |                   | 6,0 |

\* Roller Radii max. R4,0 is possible for RX-45 type. All dimensions in mm.

### How to order | Order samples

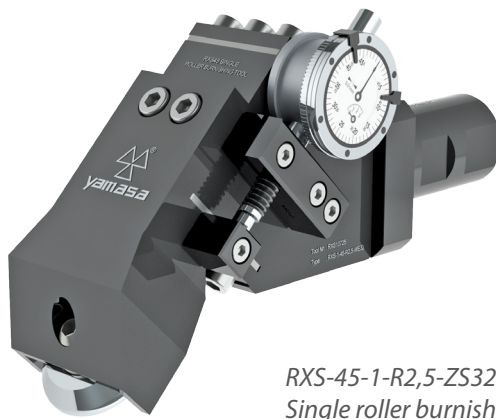
|   |                         |
|---|-------------------------|
| RX-45H-1-R2,5-VDI40 Single roller burnishing tool | RX-45H-R2,5 Roller unit |
|---|-------------------------|

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side.

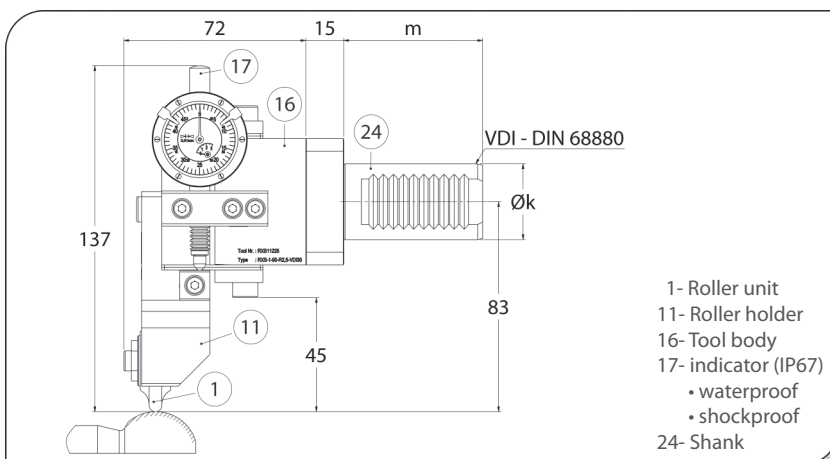
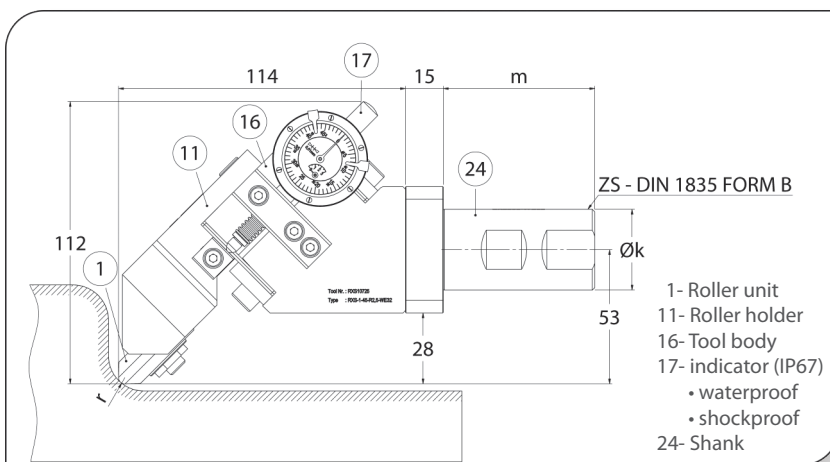


## Spherical surfaces, contours, radii, fillets and groove flanks

✓ Achievable surface roughness  $Rz < 1 \mu\text{m}$  /  $Ra < 0,16 \mu\text{m}$



**RXS-45-1-R2,5-ZS32**  
Single roller burnishing tool



**RXS-90-1-R2,5-VDI30**  
Single roller burnishing tool

### RXS-45 Processing properties and parameters

|                         |  |
|-------------------------|--|
| Processable surfaces    | Cylindrical and radii up to the plane face |
| Machinable materials    | low and midlevel strength                  |
| Circumferential speed   | max. 300 m/min.                            |
| Feed rate               | max. 0,8 mm/rev.                           |
| Rolling share           | up to 0,02 mm                              |
| Rolling force           | max. 4000 Newton                           |
| Pre-machining roughness | $Rz = 5 - 20 \mu\text{m}$                  |
| Coolant                 | Oil or emulsion                            |

### Application

- Tools burnish spherical surfaces, contours, cylindrical surfaces with connecting radius up to the flat surface, groove flanks, tapered and flat surfaces.
- Process is done in one pass after pre-machining.
- Provide surface hardness and at low rate calibration (measurement accuracy).

### Technical features and advantages

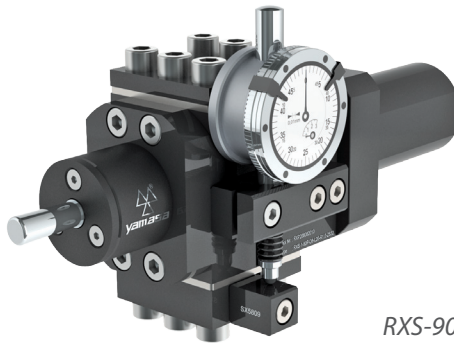
- Burnishing different sizes with same tool.
- Used on CNC and Universal lathe machines.
- Tool design allows either right or left hand operation.
- Don't require settings and when the tool is fixed to the machine, it is ready to use.
- Roller burnishing force is adjustable, so it is possible to achieve high quality and standard roughness values.
- Spring system apply rolling force consistently. So it provides high quality and standard work flow.
- Shoulders and other edges is possible up to the end.
- Burnishing all kinds of metallic materials up to the tensile strength of  $1400\text{N}/\text{mm}^2$  and to the hardness 45 HRC.
- Easy to change the spare parts.
- Short process time.
- Needs min. lubrication (oil or emulsion).
- No sawdust.

### RXS-90 Processing properties and parameters

|                         |                                |
|-------------------------|--------------------------------|
| Processable surfaces    | Spherical surface and contours |
| Machinable materials    | low and midlevel strength      |
| Circumferential speed   | max. 300 m/min.                |
| Feed rate               | max. 0,8 mm/rev.               |
| Rolling share           | Up to 0,02 mm                  |
| Rolling force           | max. 4000 Newton               |
| Pre-machining roughness | $Rz = 5 - 20 \mu\text{m}$      |
| Coolant                 | Oil or emulsion                |



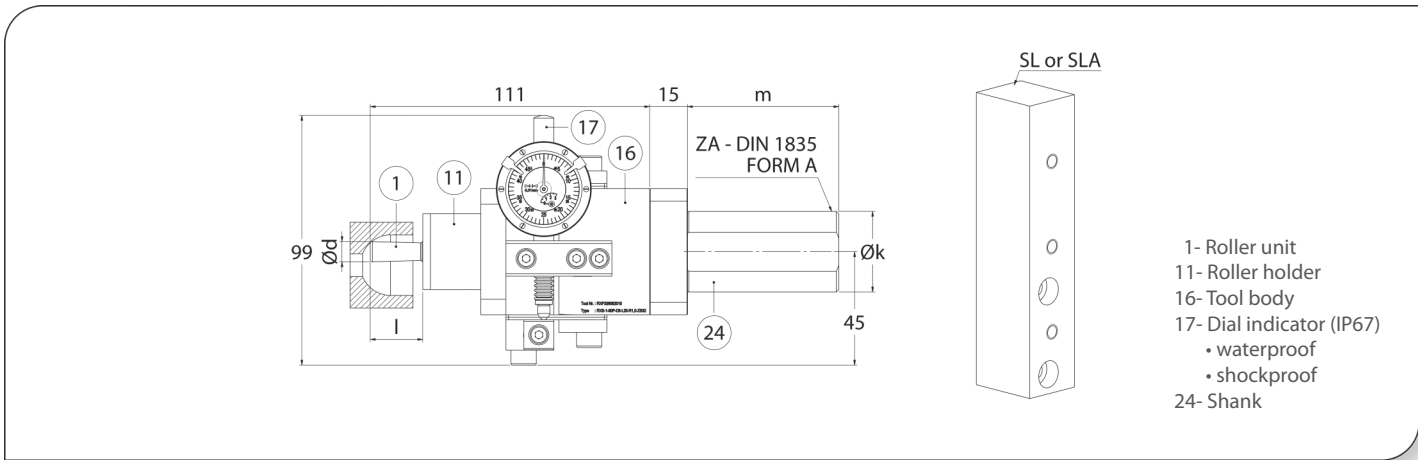
**Single Roller Burnishing Tools**



RXS-90P-1-8x20-ZA32  
Single roller burnishing tool

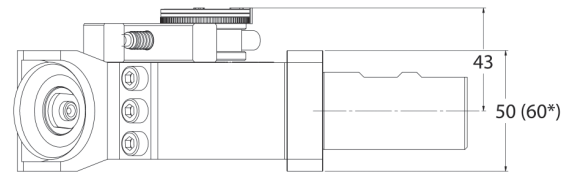
**RXS-90P Processing properties and parameters**

|                         |   |
|-------------------------|---|
| Processable surfaces    | Spherical holes, groove flanks, circular ring areas |
| Machinable materials    | low and midlevel strength                           |
| Circumferential speed   | max. 150 m/min.                                     |
| Feed rate               | max. 0,4 mm/rev.                                    |
| Rolling share           | up to 0,02 mm                                       |
| Rolling force           | max. 4000 Newton                                    |
| Pre-machining roughness | Rz = 5 - 20 µm                                      |
| Coolant                 | Oil or emulsion                                     |



**Tool structure**

- Tools consist of a connecting shank, precision body, roller head and a dial indicator which shows rolling force.
- Dial indicator is IP67 protected, has a waterproof-shockproof structure.
- Square, cylindrical or VDI shanks are available.



\*60: for the tools with Ø40 mm VDI and cylindrical shank.

**Product selection**

| Tool type         | Design             | Version            | Roller radii (R*) | Tool selection (complete) |              |              |                   |                  | Spare roller unit |        |                   |
|-------------------|--------------------|--------------------|-------------------|---------------------------|--------------|--------------|-------------------|------------------|-------------------|--------|-------------------|
|                   |                    |                    |                   | Shank                     |              |              |                   |                  | Tool type         | Design | Roller radii (R*) |
|                   |                    |                    |                   | VDI                       | Cylindrical  |              | Square            |                  |                   |        |                   |
| DIN69880 (Øk x m) | DIN1835 A (Øk x m) | DIN1835 B (Øk x m) | SL (d x e x f)    | SLA (d x e x f)           | Tool type    | Design       | Roller radii (R*) |                  |                   |        |                   |
| RXS               | 45                 | 1                  | 0,8               | VDI20(Ø20x40)             | ZA20(Ø20x50) | ZS20(Ø20x50) | SL16(16x30x120)   | SLA16(16x60x120) | RXS               | 45     | 0,8               |
|                   |                    |                    | 1,2               |                           |              |              |                   |                  |                   |        | 1,2               |
|                   |                    |                    | 1,6               |                           |              |              |                   |                  |                   |        | 1,6               |
|                   | 90                 |                    | 2,5               | VDI25(Ø25x48)             | ZA25(Ø25x56) | ZS25(Ø25x56) | SL20(20x30x120)   | SLA20(20x60x120) |                   | 90     | 2,5               |
|                   |                    |                    | 4,0               |                           |              |              |                   |                  |                   |        | 4,0               |
|                   |                    |                    | (Ødxl)            |                           |              |              |                   |                  |                   |        | (Ødxl)            |
|                   | 90P                |                    | 08x20             | VDI40(Ø40x63)             | ZA40(Ø40x70) | ZS40(Ø40x70) | SL32(32x30x120)   | SLA32(32x60x120) |                   | 90P    | 08x20             |
|                   |                    |                    | 11x30             |                           |              |              |                   |                  |                   |        | 11x30             |
|                   |                    |                    | (Ødxl)            |                           |              |              |                   |                  |                   |        | (Ødxl)            |

All dimensions in mm.

**How to order | Order samples**

|   |                          |
|---|--------------------------|
| RXS-45-1-R2,5-ZS32 Single roller burnishing tool  | RXS-45-R2,5 Roller unit  |
| RXS-90-1-R2,5-VDI30 Single roller burnishing tool | RXS-90-R2,5 Roller unit  |
| RXS-90P-1-8x20-ZA32 Single roller burnishing tool | RXS-90P-8x20 Roller unit |

You can create order codes of the tool and spare parts by looking at the product selection table. For this, please rank the requested product features side by side.





✓ Achievable surface roughness  $Rz < 1 \mu\text{m} / Ra < 0,16 \mu\text{m}$

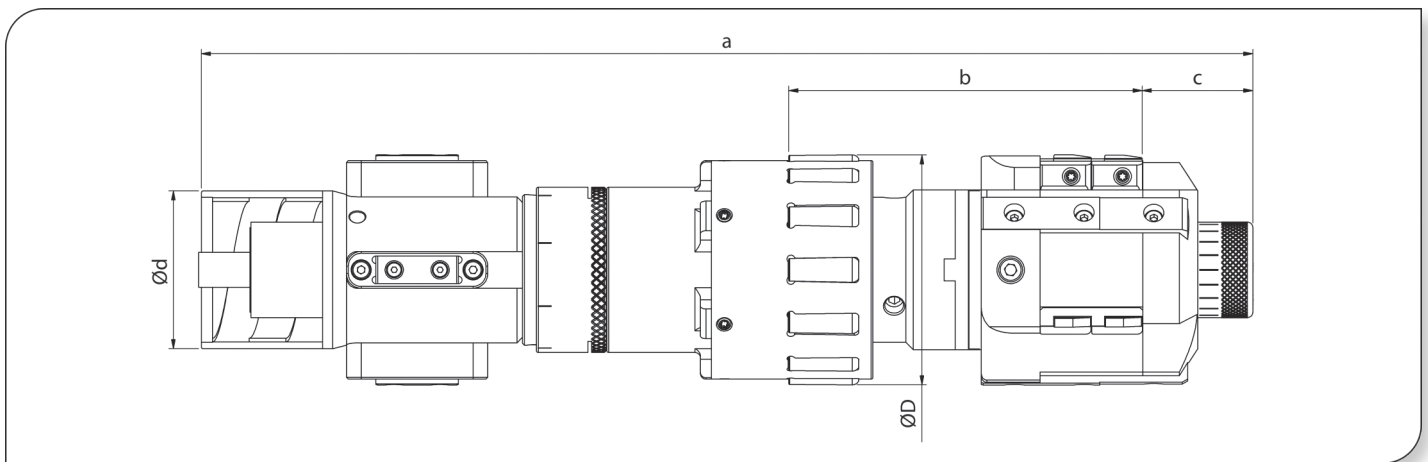
### Technical features

CEOS type combined skive-burnishing tools simultaneously skive and burnish the cold drawn and hot rolled tubes. The tools are produced between  $\varnothing 38-400$  mm and as standard with 2 and 3 skiving knives. Cutting depth is possible up to 3 mm in diameter.

The diameter of tools is adjustable, adjust capacity is changing between 0.3-0.8 mm. Skiving head and roller head is adjusted independently from each other, adjustment mechanism is very precisely, and allows setting to be made in 0.01 mm increments.

CEOS tools, can produce finished tubes with the help of high precisely knife system which can machine rough finish process in one adjustment and one pass till H7 tolerances. Improved integrated roller head harden the inner surface of the tube and burnish it in  $Ra < 0,1 \mu\text{m}$  roughness like a mirror.

Both side retract system is available on tools. After retract any scratching problem never occurs. There is a system on CEOS type combined skive-burnishing tools which eliminates misalignments, axis failures and wobbling. It is possible to produce with these tools 0,4 - 20 meter long tubes. The tools have long using life, and it is possible to use the tools for a long time without size change due to abrasion.



| Tool type | Diameter range | BTA* boring bar | Tool connection system |                  | Setting range  |                  | Main dimensions |     |    |
|-----------|----------------|-----------------|------------------------|------------------|----------------|------------------|-----------------|-----|----|
|           | ØD             | Ød              | International          | Europe           | Skive head     | Roller head      | a               | b   | c  |
| CEOS      | 038 - 049      | 33              | IR033 BTA Female       | ER033 BTA Female | NominalØ ±0,15 | Nom.Ø +0,25/-0,1 | 438             | 154 | 47 |
|           | 050 - 064      | 43              | IR043 BTA Female       | ER043 BTA Female | NominalØ ±0,25 | NominalØ ±0,25   | 439             | 154 | 47 |
|           | 065 - 079      | 56              | IR056 BTA Female       | ER056 BTA Female | NominalØ ±0,25 | NominalØ ±0,25   | 444             | 163 | 47 |
|           | 080 - 099      | 68              | IR068 BTA Female       | ER068 BTA Female | NominalØ ±0,25 | NominalØ ±0,25   | 464             | 165 | 47 |
|           | 100 - 139      | 82              | IR082 BTA Female       | ER082 BTA Female | NominalØ ±0,40 | NominalØ ±0,40   | 573             | 193 | 60 |
|           | 140 - 179      | 118             | IR118 BTA Female       | ER118 BTA Female | NominalØ ±0,40 | NominalØ ±0,40   | 573             | 193 | 60 |
|           | 180 - 209      | 142             | IR142 BTA Female       | ER142 BTA Female | NominalØ ±0,40 | NominalØ ±0,40   | 573             | 193 | 60 |
|           | 210 - 300      | 178             | IR178 BTA Female       | ER178 BTA Female | NominalØ ±0,40 | NominalØ ±0,40   | 573             | 193 | 60 |

\*It is possible to produce the tools for boring bars with different sizes.

All Dimensions in mm.

### Tool connection and hydraulics control

BTA connection system is available on tools. The tool is connected and disconnected only one movement on the boring bar. There are two types of control systems available on the tools that meet the requirements in the market.

#### 1-) International system

- Activation cylinder is integrated on the tool.
- Tool can be controlled in hydraulics and pneumatics or both system.
- System works with 40-100 hydraulic bar pressure.

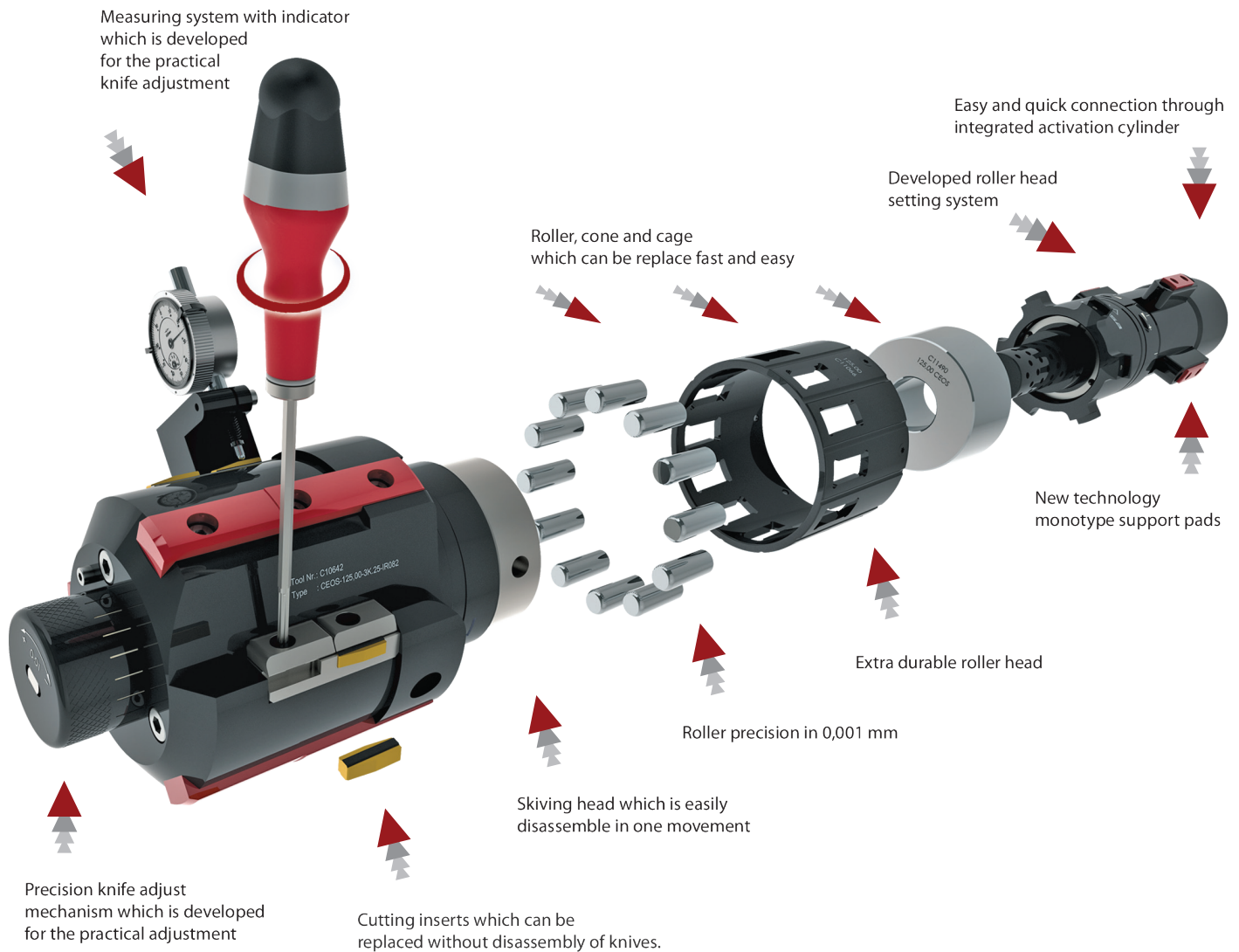
#### 2-) Europe system

- Activation cylinder is integrated on boring bar.
- Control is done from boring bar.
- System works with approx. 20 bar pressure.

**Combined Skive-Burnishing Tools**

**Developed system**

YAMASA CEOS new generation combined skive-burnishing tools offer many innovations. These tool offers high performance and eliminate many problems experienced with the customary tools. YAMASA CEOS is a competitive tools which reduce the production costs extremely.

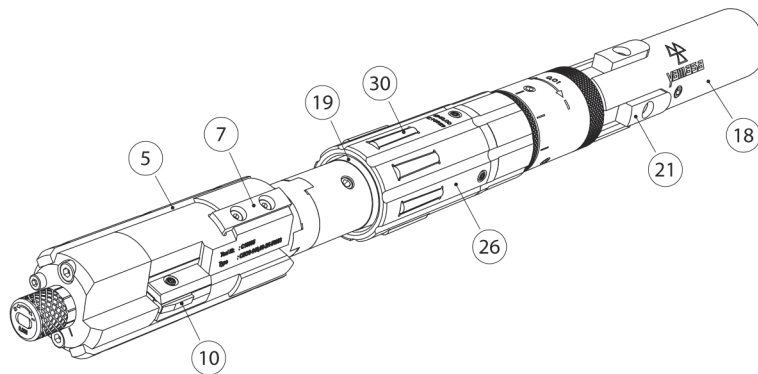
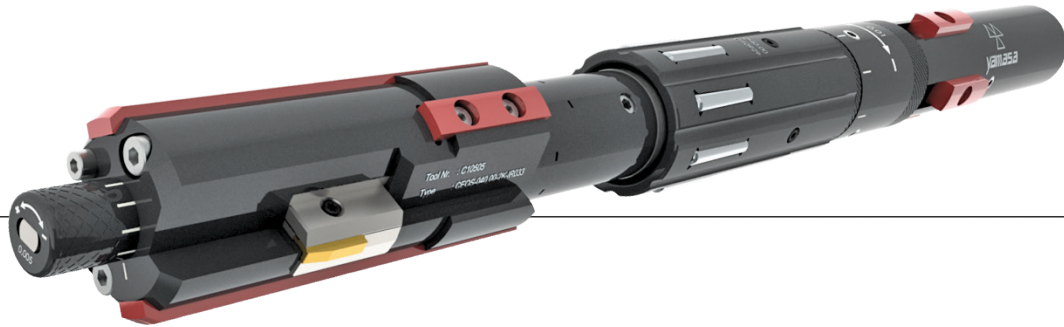


- Minimized process time (Vc=300 m/min, Feeding=up to 5mm/rev)
- Cutting depth up to 3 mm in diameter, high cutting performance
- Pneumatic and hydraulic control with integrated switch system
- Excellent oil flow design, maximum coolant
- Improved knife mechanism, eliminate the scratch problems after retract
- H7 tolerance, 0,01 mm circular shape and minimized longitudinal wavyness with improved skiving technology
- Avoidance or reduction of rippling
- Excellent knife system which machine irregular holes in one pass
- Simple and quick replacement of the spare parts! minimum waste of time!



✓ Achievable surface roughness Rz<1µm / Ra<0,16 µm

**Combined Skive-Burnishing Tools**



- 5- Guide pad (front)
- 7- Guide pad (back)
- 10- Cutting insert
- 18- Shank
- 19- Cone
- 21- Support pad
- 26- Cage
- 30- Roller

**Recommended machining parameters**

| Dia.Range | Revolution | Feeding | Coolant flow | Cutting depth      | Torque | Motor power | Attainability     |                 |
|-----------|------------|---------|--------------|--------------------|--------|-------------|-------------------|-----------------|
| Ø-mm      | rev/min    | mm/rev  | L/min        | Ø-mm               | Nm     | kW          | Tolerance         | up to H7        |
| 38 - 40   | 1500       | 2       | 120 - 160    | 0,5 (max.1,5 opt.) | 40     | 20          | Circle regularity | up to 0,01 mm   |
| 41 - 49   | 1200       | 2       | 150 - 200    | 0,5 (max.1,5 opt.) | 50     |             | Roughness         | Ra<0,1 / Rz<1µm |

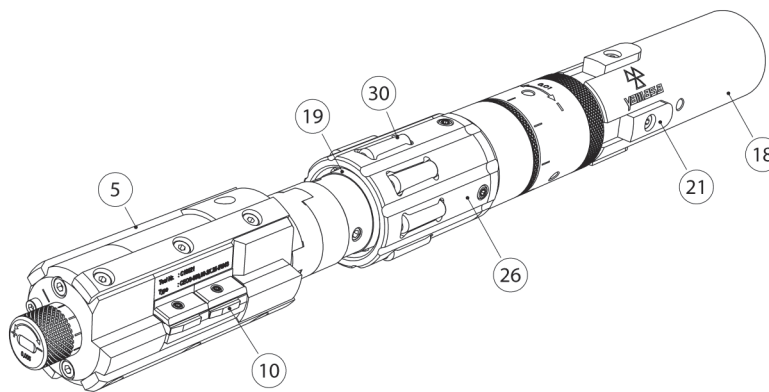
**Product selection**

| CEOS tool selection |        |                        |                        | Spare part selection |    |                |    |                          |    |             |    |        |        |        |    |
|---------------------|--------|------------------------|------------------------|----------------------|----|----------------|----|--------------------------|----|-------------|----|--------|--------|--------|----|
| Complete tool       |        | Connection system      |                        | Roller               |    | Cutting insert |    | Guide pad                |    | Support pad |    | Cone   |        | Cage   |    |
| Ø-mm                | Code   | International          | Europe                 | Code                 | Pc | Code           | Pc | Code                     | Pc | Code        | Pc | Code   | Pc     | Code   | Pc |
| 38,00               | C10501 | IR033<br>BTA<br>Female | ER033<br>BTA<br>Female | C11886               | 8  | C11883         | 2  | C11773 (5)<br>C11774 (7) | 2  | 4           | 1  | C11781 | C11349 | C10925 | 1  |
| 39,00               | C10503 |                        |                        |                      |    |                |    |                          |    |             |    | C11783 | C11351 | C10927 |    |
| 40,00               | C10505 |                        |                        |                      |    |                |    |                          |    |             |    | C11785 | C11353 | C10929 |    |
| 41,00               | C10506 |                        |                        |                      |    |                |    |                          |    |             |    | C11786 | C11354 | C10930 |    |
| 42,00               | C10508 |                        |                        |                      |    |                |    |                          |    |             |    | C11788 | C11356 | C10932 |    |
| 43,00               | C10510 |                        |                        |                      |    |                |    |                          |    |             |    | C11790 | C11358 | C10934 |    |
| 44,00               | C10511 |                        |                        |                      |    |                |    |                          |    |             |    | C11791 | C11359 | C10935 |    |
| 45,00               | C10513 |                        |                        |                      |    |                |    |                          |    |             |    | C11793 | C11361 | C10937 |    |
| 46,00               | C10514 |                        |                        |                      |    |                |    |                          |    |             |    | C11794 | C11362 | C10938 |    |
| 47,00               | C10516 |                        |                        |                      |    |                |    |                          |    |             |    | C11796 | C11364 | C10940 |    |
| 48,00               | C10518 |                        |                        |                      |    |                |    |                          |    |             |    | C11798 | C11366 | C10942 |    |
| 49,00               | C10519 |                        |                        |                      |    |                |    |                          |    |             |    | C11799 | C11367 | C10943 |    |

**How to order | Order samples**

It is enough to inform the code and quantities of the product you wish to order. For example C11883 x 8 pc. Please ask interval sizes which do not exist on the tables. On the choice of Europe connection system, letter "E" is added at the end of the complete tool code. Such as C10501E.

**Combined Skive-Burnishing Tools**



- 5- Guide pad
- 10- Cutting insert
- 18- Shank
- 19- Cone
- 21- Support pad
- 26- Cage
- 30- Roller

**Recommended machining parameters**

| Dia.Range | Revolution      | Feeding   | Coolant flow | Cutting depth    | Torque | Motor power | Attainability                     |
|-----------|-----------------|-----------|--------------|------------------|--------|-------------|-----------------------------------|
| Ø-mm      | rev/min         | mm/rev    | L/min        | Ø-mm             | Nm     | kW          |                                   |
| 50 - 57   | 1100 (max.1700) | 2 (max.4) | 170 - 230    | 0,7 (max.2 opt.) | 60     | 20 - 30     | Tolerance   up to H7              |
| 58 - 64   | 1000 (max.1500) | 2 (max.4) | 190 - 260    | 0,7 (max.2 opt.) | 65     |             | Circle regularity   up to 0,01 mm |
|           |                 |           |              |                  |        |             | Roughness   Ra<0,1 / Rz<1µm       |

**Product selection**

| CEOS tool selection |        |                        |                        | Spare part selection |    |                |    |           |    |             |    |        |    |        |    |
|---------------------|--------|------------------------|------------------------|----------------------|----|----------------|----|-----------|----|-------------|----|--------|----|--------|----|
| Complete tool       |        | Connection system      |                        | Roller               |    | Cutting insert |    | Guide pad |    | Support pad |    | Cone   |    | Cage   |    |
| Ø-mm                | Code   | International          | Europe                 | Code                 | Pc | Code           | Pc | Code      | Pc | Code        | Pc | Code   | Pc | Code   | Pc |
| 50,00               | C10521 | IR043<br>BTA<br>Female | ER043<br>BTA<br>Female | C11887               | 8  | C11883         | 4  | C11775    | 4  | C11801      | 4  | C11369 | 1  | C10945 | 1  |
| 51,00               | C10523 |                        |                        |                      |    |                |    |           |    | C11803      |    | C11371 |    | C10947 |    |
| 52,00               | C10524 |                        |                        |                      |    |                |    |           |    | C11804      |    | C11372 |    | C10948 |    |
| 53,00               | C10526 |                        |                        |                      |    |                |    |           |    | C11806      |    | C11374 |    | C10950 |    |
| 54,00               | C10528 |                        |                        |                      |    |                |    |           |    | C11808      |    | C11376 |    | C10952 |    |
| 55,00               | C10529 |                        |                        |                      |    |                |    |           |    | C11809      |    | C11377 |    | C10953 |    |
| 56,00               | C10531 |                        |                        |                      |    |                |    |           |    | C11811      |    | C11379 |    | C10955 |    |
| 57,00               | C10532 |                        |                        |                      |    |                |    |           |    | C11812      |    | C11380 |    | C10956 |    |
| 58,00               | C10534 |                        |                        |                      |    |                |    |           |    | C11814      |    | C11382 |    | C10958 |    |
| 59,00               | C10536 |                        |                        |                      |    |                |    |           |    | C11816      |    | C11384 |    | C10960 |    |
| 60,00               | C10537 |                        |                        |                      |    |                |    |           |    | C11817      |    | C11385 |    | C10961 |    |
| 61,00               | C10539 |                        |                        |                      |    |                |    |           |    | C11819      |    | C11387 |    | C10963 |    |
| 62,00               | C10541 |                        |                        |                      |    |                |    |           |    | C11821      |    | C11389 |    | C10965 |    |
| 63,00               | C10542 |                        |                        |                      |    |                |    |           |    | C11822      |    | C11390 |    | C10966 |    |
| 64,00               | C10544 |                        |                        |                      |    |                |    |           |    | C11824      |    | C11392 |    | C10968 |    |

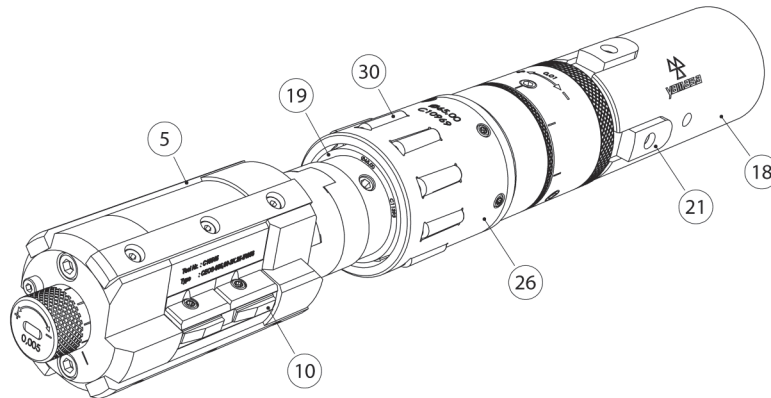
**How to order | Order samples**

It is enough to inform the code and quantities of the product you wish to order. For example C11883 x 8 pc. Please ask interval sizes which do not exist on the tables. On the choice of Europe connection system, letter "E" is added at the end of the complete tool code. Such as C10501E.



✓ Achievable surface roughness Rz<1µm / Ra<0,16 µm

**Combined Skive-Burnishing Tools**



- 5- Guide pad
- 10- Cutting insert
- 18- Shank
- 19- Cone
- 21- Support pad
- 26- Cage
- 30- Roller

**Recommended machining parameters**

| Dia.Range | Revolution     | Feeding    | Coolant flow | Cutting depth  | Torque | Motor power | Attainability     |                 |
|-----------|----------------|------------|--------------|----------------|--------|-------------|-------------------|-----------------|
| Ø-mm      | rev/min        | mm/rev     | L/min        | Ø-mm           | Nm     | kW          | Tolerance         | up to H7        |
| 65 - 72   | 900 (max.1400) | 2,5(max.4) | 210 - 290    | 1 (max.3 opt.) | 75     | 30 - 40     | Circle regularity | up to 0,01 mm   |
| 73 - 79   | 800 (max.1200) | 2,5(max.4) | 240 - 320    | 1 (max.3 opt.) | 80     |             | Roughness         | Ra<0,1 / Rz<1µm |

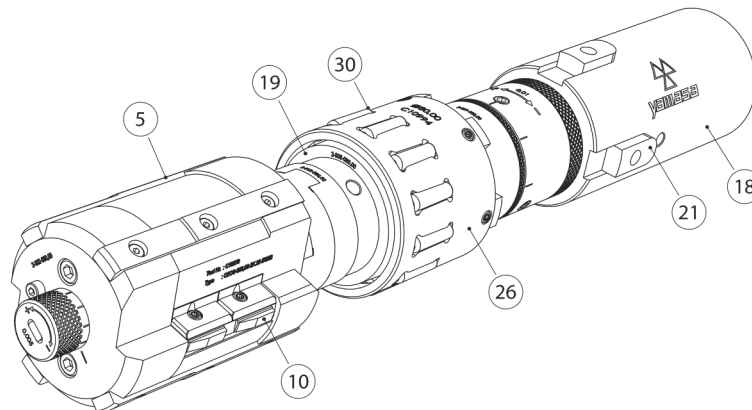
**Product selection**

| CEOS tool selection |        |                        |                        | Spare part selection |    |                |    |           |    |             |    |        |    |        |    |
|---------------------|--------|------------------------|------------------------|----------------------|----|----------------|----|-----------|----|-------------|----|--------|----|--------|----|
| Complete tool       |        | Connection system      |                        | Roller               |    | Cutting insert |    | Guide pad |    | Support pad |    | Cone   |    | Cage   |    |
| Ø-mm                | Code   | International          | Europe                 | Code                 | Pc | Code           | Pc | Code      | Pc | Code        | Pc | Code   | Pc | Code   | Pc |
| 65,00               | C10545 | IR056<br>BTA<br>Female | ER056<br>BTA<br>Female | C11887               | 10 | C11884         | 4  | C11776    | 4  | C11825      | 4  | C11393 | 1  | C10969 | 1  |
| 66,00               | C10547 |                        |                        |                      |    |                |    |           |    | C11827      |    | C11395 |    | C10971 |    |
| 67,00               | C10549 |                        |                        |                      |    |                |    |           |    | C11829      |    | C11397 |    | C10973 |    |
| 68,00               | C10550 |                        |                        |                      |    |                |    |           |    | C11830      |    | C11398 |    | C10974 |    |
| 69,00               | C10552 |                        |                        |                      |    |                |    |           |    | C11832      |    | C11400 |    | C10976 |    |
| 70,00               | C10554 |                        |                        |                      |    |                |    |           |    | C11834      |    | C11402 |    | C10978 |    |
| 71,00               | C10555 |                        |                        |                      |    |                |    |           |    | C11835      |    | C11403 |    | C10979 |    |
| 72,00               | C10557 |                        |                        |                      |    |                |    |           |    | C11837      |    | C11405 |    | C10981 |    |
| 73,00               | C10558 |                        |                        |                      |    |                |    |           |    | C11838      |    | C11406 |    | C10982 |    |
| 74,00               | C10560 |                        |                        |                      |    |                |    |           |    | C11840      |    | C11408 |    | C10984 |    |
| 75,00               | C10562 |                        |                        |                      |    |                |    |           |    | C11842      |    | C11410 |    | C10986 |    |
| 76,00               | C10563 |                        |                        |                      |    |                |    |           |    | C11843      |    | C11411 |    | C10987 |    |
| 77,00               | C10565 |                        |                        |                      |    |                |    |           |    | C11845      |    | C11413 |    | C10989 |    |
| 78,00               | C10567 |                        |                        |                      |    |                |    |           |    | C11847      |    | C11415 |    | C10991 |    |
| 79,00               | C10568 |                        |                        |                      |    |                |    |           |    | C11848      |    | C11416 |    | C10992 |    |

**How to order | Order samples**

It is enough to inform the code and quantities of the product you wish to order. For example C11883 x 8 pc. Please ask interval sizes which do not exist on the tables. On the choice of Europe connection system, letter "E" is added at the end of the complete tool code. Such as C10501E.





- 5- Guide pad
- 10- Cutting insert
- 18- Shank
- 19- Cone
- 21- Support pad
- 26- Cage
- 30- Roller

**Recommended machining parameters**

| Dia.Range | Revolution     | Feeding   | Coolant flow | Cutting depth  | Torque | Motor power | Attainability                     |
|-----------|----------------|-----------|--------------|----------------|--------|-------------|-----------------------------------|
| Ø-mm      | rev/min        | mm/rev    | L/min        | Ø-mm           | Nm     | kW          |                                   |
| 80 - 89   | 700 (max.1100) | 3 (max.4) | 270 - 360    | 1 (max.3 opt.) | 90     | 30 - 40     | Tolerance   up to H7              |
| 90 - 99   | 640 (max.1000) | 3 (max.4) | 300 - 400    | 1 (max.3 opt.) | 100    |             | Circle regularity   up to 0,01 mm |
|           |                |           |              |                |        |             | Roughness   Ra<0,1 / Rz<1µm       |

**Product selection**

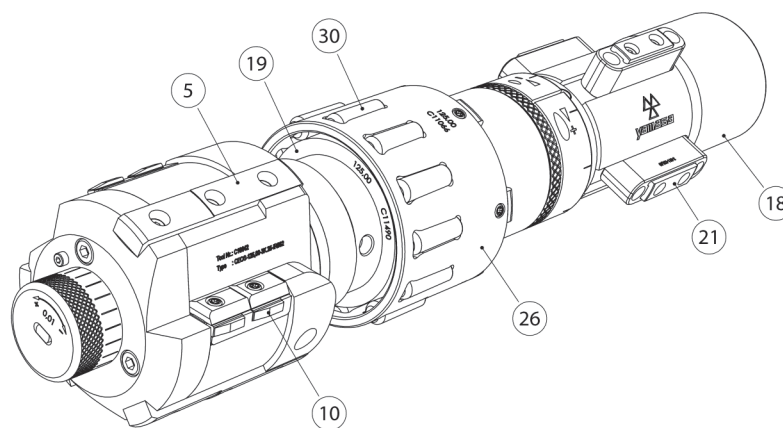
| CEOS tool selection |        |                        |                        | Spare part selection |    |                |    |           |    |             |    |        |    |        |    |
|---------------------|--------|------------------------|------------------------|----------------------|----|----------------|----|-----------|----|-------------|----|--------|----|--------|----|
| Complete tool       |        | Connection system      |                        | Roller               |    | Cutting insert |    | Guide pad |    | Support pad |    | Cone   |    | Cage   |    |
| Ø-mm                | Code   | International          | Europe                 | Code                 | Pc | Code           | Pc | Code      | Pc | Code        | Pc | Code   | Pc | Code   | Pc |
| 80,00               | C10570 | IR068<br>BTA<br>Female | ER068<br>BTA<br>Female | C11887               | 12 | C11884         | 4  | C11776    | 4  | C11850      | 4  | C11418 | 1  | C10994 | 1  |
| 81,00               | C10572 |                        |                        |                      |    |                |    |           |    | C11852      |    | C11420 |    | C10996 |    |
| 82,00               | C10573 |                        |                        |                      |    |                |    |           |    | C11853      |    | C11421 |    | C10997 |    |
| 83,00               | C10575 |                        |                        |                      |    |                |    |           |    | C11855      |    | C11423 |    | C10999 |    |
| 84,00               | C10576 |                        |                        |                      |    |                |    |           |    | C11856      |    | C11424 |    | C11000 |    |
| 85,00               | C10578 |                        |                        |                      |    |                |    |           |    | C11858      |    | C11426 |    | C11002 |    |
| 86,00               | C10580 |                        |                        |                      |    |                |    |           |    | C11860      |    | C11428 |    | C11004 |    |
| 87,00               | C10581 |                        |                        |                      |    |                |    |           |    | C11861      |    | C11429 |    | C11005 |    |
| 88,00               | C10583 |                        |                        |                      |    |                |    |           |    | C11863      |    | C11431 |    | C11007 |    |
| 89,00               | C10585 |                        |                        |                      |    |                |    |           |    | C11865      |    | C11433 |    | C11009 |    |
| 90,00               | C10586 |                        |                        |                      |    |                |    |           |    | C11866      |    | C11434 |    | C11010 |    |
| 91,00               | C10588 |                        |                        |                      |    |                |    |           |    | C11868      |    | C11436 |    | C11012 |    |
| 92,00               | C10589 |                        |                        |                      |    |                |    |           |    | C11869      |    | C11437 |    | C11013 |    |
| 95,00               | C10594 |                        |                        |                      |    |                |    |           |    | C11874      |    | C11442 |    | C11018 |    |
| 99,00               | C10601 |                        |                        |                      |    |                |    |           |    | C11881      |    | C11449 |    | C11025 |    |

**How to order | Order samples**

It is enough to inform the code and quantities of the product you wish to order. For example C11883 x 8 pc. Please ask interval sizes which do not exist on the tables. On the choice of Europe connection system, letter "E" is added at the end of the complete tool code. Such as C10501E.



✓ Achievable surface roughness Rz<1µm / Ra<0,16 µm



- 5- Guide pad
- 10- Cutting insert
- 18- Shank
- 19- Cone
- 21- Support pad
- 26- Cage
- 30- Roller

**Attainability**

|                   |                 |
|-------------------|-----------------|
| Tolerance         | up to H7        |
| Circle regularity | up to 0,01 mm   |
| Roughness         | Ra<0,1 / Rz<1µm |

**Recommended machining parameters**

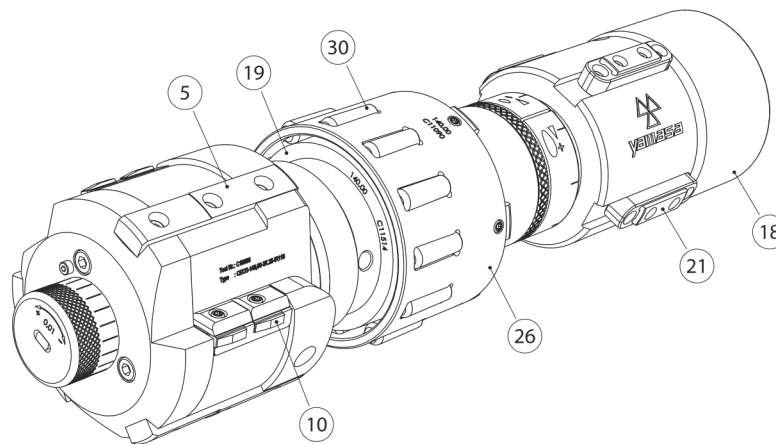
| Dia.Range | Revolution    | Coolant flow | Torque | Dia.Range | Revolution    | Coolant flow | Torque | Feeding (mm/rev)     | 3,5 (max.4)    |
|-----------|---------------|--------------|--------|-----------|---------------|--------------|--------|----------------------|----------------|
| Ø-mm      | rev/min       | L/min        | Nm     | Ø-mm      | rev/min       | L/min        | Nm     | Cutting depth (Ø-mm) | 1 (max.3 opt.) |
| 100 - 109 | 580 (max.900) | 330 - 440    | 180    | 120 - 129 | 500 (max.750) | 390 - 520    | 220    | Motor power (kW)     | 40 - 50        |
| 110 - 119 | 530 (max.800) | 360 - 480    | 200    | 130 - 139 | 450 (max.700) | 420 - 560    | 230    |                      |                |

**Product selection**

| CEOS tool selection |        |                        |                        | Spare part selection |    |                |    |           |    |             |    |        |    |        |    |
|---------------------|--------|------------------------|------------------------|----------------------|----|----------------|----|-----------|----|-------------|----|--------|----|--------|----|
| Complete tool       |        | Connection system      |                        | Roller               |    | Cutting insert |    | Guide pad |    | Support pad |    | Cone   |    | Cage   |    |
| Ø-mm                | Code   | International          | Europe                 | Code                 | Pc | Code           | Pc | Code      | Pc | Code        | Pc | Code   | Pc | Code   | Pc |
| 100,00              | C10602 | IR082<br>BTA<br>Female | ER082<br>BTA<br>Female | C11888               | 10 | C11884         | 6  | C11777    | 3  | C11882      | 4  | C11450 | 1  | C11026 | 1  |
| 105,00              | C10610 |                        |                        |                      |    |                |    |           |    |             |    | C11458 |    | C11034 |    |
| 109,00              | C10616 |                        |                        |                      |    |                |    |           |    |             |    | C11464 |    | C11040 |    |
| 110,00              | C10618 |                        |                        |                      |    |                |    |           |    |             |    | C11466 |    | C11042 |    |
| 115,00              | C10626 |                        |                        |                      |    |                |    |           |    |             |    | C11474 |    | C11050 |    |
| 120,00              | C10634 |                        |                        |                      |    |                |    |           |    |             |    | C11482 |    | C11058 |    |
| 125,00              | C10642 |                        |                        |                      |    |                |    |           |    |             |    | C11490 |    | C11066 |    |
| 130,00              | C10649 |                        |                        |                      |    |                |    |           |    |             |    | C11497 |    | C11073 |    |
| 135,00              | C10658 |                        |                        |                      |    |                |    |           |    |             |    | C11506 |    | C11082 |    |
| 139,00              | C10664 |                        |                        |                      |    |                |    |           |    |             |    | C11512 |    | C11088 |    |

**How to order | Order samples**

It is enough to inform the code and quantities of the product you wish to order. For example C11883 x 8 pc. Please ask interval sizes which do not exist on the tables. On the choice of Europe connection system, letter "E" is added at the end of the complete tool code. Such as C10501E.



- 5- Guide pad
- 10- Cutting insert
- 18- Shank
- 19- Cone
- 21- Support pad
- 26- Cage
- 30- Roller

**Attainability**

|                   |                 |
|-------------------|-----------------|
| Tolerance         | up to H7        |
| Circle regularity | up to 0,01 mm   |
| Roughness         | Ra<0,1 / Rz<1µm |

**Recommended machining parameters**

| Dia.Range | Revolution    | Coolant flow | Torque | Dia.Range | Revolution    | Coolant flow | Torque | Feeding (mm/rev) | Cutting depth (Ø-mm) | Motor power (kW) |
|-----------|---------------|--------------|--------|-----------|---------------|--------------|--------|------------------|----------------------|------------------|
| Ø-mm      | rev/min       | L/min        | Nm     | Ø-mm      | rev/min       | L/min        | Nm     |                  |                      |                  |
| 140 - 149 | 430 (max.650) | 450 - 600    | 250    | 160 - 169 | 380 (max.570) | 510 - 680    | 285    | 3,5 (max.4)      | 1 (max.3 opt.)       |                  |
| 150 - 159 | 400 (max.600) | 480 - 640    | 270    | 170 - 179 | 360 (max.540) | 540 - 720    | 300    | 40 - 50          |                      |                  |

**Product selection**

| CEOS tool selection |        |                        |                        | Spare part selection |    |                |    |           |    |             |    |        |    |        |    |
|---------------------|--------|------------------------|------------------------|----------------------|----|----------------|----|-----------|----|-------------|----|--------|----|--------|----|
| Complete tool       |        | Connection system      |                        | Roller               |    | Cutting insert |    | Guide pad |    | Support pad |    | Cone   |    | Cage   |    |
| Ø-mm                | Code   | International          | Europe                 | Code                 | Pc | Code           | Pc | Code      | Pc | Code        | Pc | Code   | Pc | Code   | Pc |
| 140,00              | C10666 | IR118<br>BTA<br>Female | ER118<br>BTA<br>Female | C11888               | 14 | C11884         | 6  | C11778    | 3  | C11882      | 4  | C11514 | 1  | C11090 | 1  |
| 145,00              | C10674 |                        |                        |                      |    |                |    |           |    |             |    | C11522 |    | C11198 |    |
| 149,00              | C10680 |                        |                        |                      |    |                |    |           |    |             |    | C11528 |    | C11104 |    |
| 150,00              | C10682 |                        |                        |                      |    |                |    |           |    |             |    | C11530 |    | C11106 |    |
| 155,00              | C10690 |                        |                        |                      |    |                |    |           |    |             |    | C11538 |    | C11114 |    |
| 160,00              | C10698 |                        |                        |                      |    |                |    |           |    |             |    | C11546 |    | C11122 |    |
| 165,00              | C10706 |                        |                        |                      |    |                |    |           |    |             |    | C11554 |    | C11130 |    |
| 169,00              | C10713 |                        |                        |                      |    |                |    |           |    |             |    | C11561 |    | C11137 |    |
| 170,00              | C10715 |                        |                        |                      |    |                |    |           |    |             |    | C11563 |    | C11139 |    |
| 175,00              | C10723 |                        |                        |                      |    |                |    |           |    |             |    | C11571 |    | C11147 |    |
| 179,00              | C10729 | C11577                 | C11553                 |                      |    |                |    |           |    |             |    |        |    |        |    |

**How to order | Order samples**

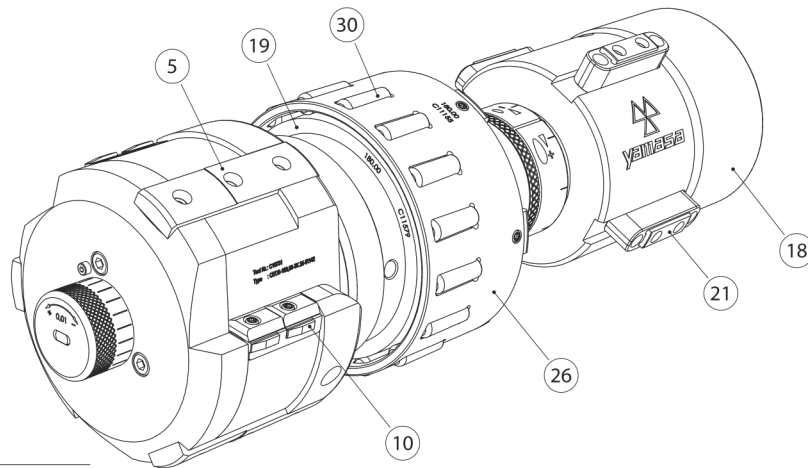
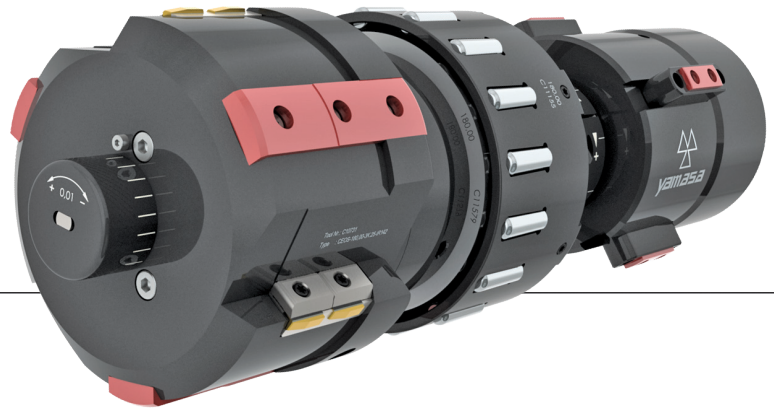
It is enough to inform the code and quantities of the product you wish to order. For example C11883 x 8 pc. Please ask interval sizes which do not exist on the tables. On the choice of Europe connection system, letter "E" is added at the end of the complete tool code. Such as C10501E.



✓ Achievable surface roughness Rz < 1 μm / Ra < 0,16 μm

# CEOS Type | Between Ø180 - 209 mm

## Combined Skive-Burnishing Tools



- 5- Guide pad
- 10- Cutting insert
- 18- Shank
- 19- Cone
- 21- Support pad
- 26- Cage
- 30- Roller

### Attainability

|                   |                      |
|-------------------|----------------------|
| Tolerance         | up to H7             |
| Circle regularity | up to 0,01 mm        |
| Roughness         | Ra < 0,1 / Rz < 1 μm |

### Recommended machining parameters

| Dia.Range | Revolution    | Coolant flow | Torque | Dia.Range | Revolution    | Coolant flow | Torque | Feeding (mm/rev) | Cutting depth (Ø-mm) | Motor power (kW) |
|-----------|---------------|--------------|--------|-----------|---------------|--------------|--------|------------------|----------------------|------------------|
| Ø-mm      | rev/min       | L/min        | Nm     | Ø-mm      | rev/min       | L/min        | Nm     |                  |                      |                  |
| 180 - 184 | 350 (max.520) | 550 - 740    | 310    | 190 - 199 | 320 (max.480) | 600 - 800    | 335    | 4 (max.5)        | 1 (max.3 opt.)       | 40 - 50          |
| 185 - 189 | 340 (max.510) | 570 - 760    | 320    | 200 - 209 | 310 (max.460) | 630 - 840    | 350    |                  |                      |                  |

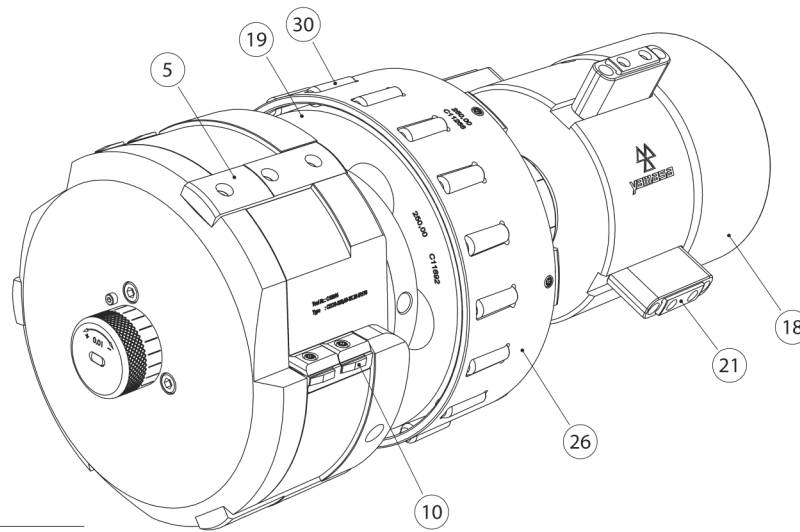
### Product selection

| CEOS tool selection |        |                        |                        | Spare part selection |    |                |    |           |    |             |    |        |    |        |    |
|---------------------|--------|------------------------|------------------------|----------------------|----|----------------|----|-----------|----|-------------|----|--------|----|--------|----|
| Complete tool       |        | Connection system      |                        | Roller               |    | Cutting insert |    | Guide pad |    | Support pad |    | Cone   |    | Cage   |    |
| Ø-mm                | Code   | International          | Europe                 | Code                 | Pc | Code           | Pc | Code      | Pc | Code        | Pc | Code   | Pc | Code   | Pc |
| 180,00              | C10731 | IR142<br>BTA<br>Female | ER142<br>BTA<br>Female | C11888               | 16 | C11884         | 6  | C11779    | 3  | C11882      | 4  | C11579 | 1  | C11155 | 1  |
| 185,00              | C10739 |                        |                        |                      |    |                |    |           |    |             |    | C11587 |    | C11163 |    |
| 190,00              | C10747 |                        |                        |                      |    |                |    |           |    |             |    | C11595 |    | C11171 |    |
| 195,00              | C10755 |                        |                        |                      |    |                |    |           |    |             |    | C11603 |    | C11179 |    |
| 199,00              | C10762 |                        |                        |                      |    |                |    |           |    |             |    | C11610 |    | C11186 |    |
| 200,00              | C10763 |                        |                        |                      |    |                |    |           |    |             |    | C11611 |    | C11187 |    |
| 205,00              | C10772 |                        |                        |                      |    |                |    |           |    |             |    | C11620 |    | C11196 |    |
| 209,00              | C10778 |                        |                        |                      |    |                |    |           |    |             |    | C11626 |    | C11202 |    |

### How to order | Order samples

It is enough to inform the code and quantities of the product you wish to order. For example C11883 x 8 pc. Please ask interval sizes which do not exist on the tables. On the choice of Europe connection system, letter "E" is added at the end of the complete tool code. Such as C10501E.





- 5- Guide pad
- 10- Cutting insert
- 18- Shank
- 19- Cone
- 21- Support pad
- 26- Cage
- 30- Roller

**Attainability**

|                   |                 |
|-------------------|-----------------|
| Tolerance         | up to H7        |
| Circle regularity | up to 0,01 mm   |
| Roughness         | Ra<0,1 / Rz<1µm |

**Recommended machining parameters**

| Dia.Range | Revolution    | Coolant flow | Torque | Dia.Range | Revolution    | Coolant flow | Torque |
|-----------|---------------|--------------|--------|-----------|---------------|--------------|--------|
| Ø-mm      | rev/min       | L/min        | Nm     | Ø-mm      | rev/min       | L/min        | Nm     |
| 210 - 229 | 280 (max.420) | 690 - 920    | 380    | 250 - 269 | 240 (max.360) | 810 - 1080   | 445    |
| 230 - 249 | 260 (max.390) | 750 - 1000   | 410    | 270 - 300 | 210 (max.320) | 900 - 1200   | 490    |

|                             |                |
|-----------------------------|----------------|
| <b>Feeding (mm/rev)</b>     | 4 (max.5)      |
| <b>Cutting depth (Ø-mm)</b> | 1 (max.3 opt.) |
| <b>Motor power (kW)</b>     | 40 - 50        |

**Product selection**

| CEOS tool selection |        |                        |                        | Spare part selection |    |                |    |           |    |             |    |        |    |        |    |
|---------------------|--------|------------------------|------------------------|----------------------|----|----------------|----|-----------|----|-------------|----|--------|----|--------|----|
| Complete tool       |        | Connection system      |                        | Roller               |    | Cutting insert |    | Guide pad |    | Support pad |    | Cone   |    | Cage   |    |
| Ø-mm                | Code   | International          | Europe                 | Code                 | Pc | Code           | Pc | Code      | Pc | Code        | Pc | Code   | Pc | Code   | Pc |
| 210,00              | C10780 | IR178<br>BTA<br>Female | ER178<br>BTA<br>Female | C11888               | 18 | C11884         | 6  | C11779    | 3  | C11882      | 4  | C11628 | 1  | C11204 | 1  |
| 215,00              | C10788 |                        |                        |                      |    |                |    |           |    |             |    | C11636 |    | C11212 |    |
| 220,00              | C10796 |                        |                        |                      |    |                |    |           |    |             |    | C11644 |    | C11220 |    |
| 225,00              | C10804 |                        |                        |                      |    |                |    |           |    |             |    | C11652 |    | C11228 |    |
| 230,00              | C10811 |                        |                        |                      |    |                |    |           |    |             |    | C11659 |    | C11235 |    |
| 235,00              | C10820 |                        |                        |                      |    |                |    |           |    |             |    | C11668 |    | C11244 |    |
| 240,00              | C10828 |                        |                        |                      |    |                |    |           |    |             |    | C11676 |    | C11252 |    |
| 245,00              | C10836 |                        |                        |                      |    |                |    |           |    |             |    | C11684 |    | C11260 |    |
| 250,00              | C10844 |                        |                        |                      |    |                |    |           |    |             |    | C11692 |    | C11268 |    |
| 260,00              | C10859 |                        |                        |                      |    |                |    |           |    |             |    | C11707 |    | C11283 |    |
| 270,00              | C10876 |                        |                        |                      |    |                |    |           |    |             |    | C11724 |    | C11300 |    |
| 280,00              | C10892 |                        |                        |                      |    |                |    |           |    |             |    | C11740 |    | C11316 |    |
| 290,00              | C10908 |                        |                        |                      |    |                |    |           |    |             |    | C11756 |    | C11332 |    |
| 300,00              | C10924 |                        |                        |                      |    |                |    |           |    |             |    | C11772 |    | C11348 |    |

**How to order | Order samples**

It is enough to inform the code and quantities of the product you wish to order. For example C11883 x 8 pc. Please ask interval sizes which do not exist on the tables. On the choice of Europe connection system, letter "E" is added at the end of the complete tool code. Such as C10501E.



**Skive & Roller Burnishing Tools**

**Application**

CX type skiving tools machine the hydraulic cylinders in two different operation with CX-D type roller burnishing tools. In first operation, CX skiving tool skive the cylinder; in the second operation, CX-D tool roller burnish the surface.

The tools are retracted after process and rapidly pullback without damaging the surface.

Depending upon cylinder, process result H7 - H8 diameter allowance and also the surface quality of  $Rz < 1 \mu m$  ( $Ra < 0,16 \mu m$ ) are obtained. Short process time provides time savings.

Tools have precise diameter adjustment. Spare parts can be changed easily. The skiving tool's inserts can be changed without disassemble the knives. The tools can be connected and removed quickly.



*CX-R Skiving tool  
For short and long cylinders*

**CX-R Processing properties and parameters**

|                                 |                             |
|---------------------------------|-----------------------------|
| Used machines                   | Deep hole drilling machines |
| Processing length               | $\leq 20$ m                 |
| Circumferential speed           | 150 - 300 m/min.            |
| Feed rate                       | 1 - 5 mm/rev.               |
| Attainability tolerance         | up to H7                    |
| Attainability circle regularity | up to 0,01 mm               |
| Attainability roughness         | $Rz = 5 - 30 \mu m$         |
| Coolant                         | Oil or emulsion             |



*CX-CS Skiving tool - internal coolant  
For used lathe machines and short cylinders*

**CX-CS Processing properties and parameters**

|                                 |  |
|---------------------------------|--|
| Used machines                   | CNC-universal lathe, machining centers |
| Processing length               | $L/\varnothing \leq 15$                |
| Circumferential speed           | 150 - 300 m/min.                       |
| Feed rate                       | 1 - 5 mm/rev.                          |
| Attainability tolerance         | up to H7                               |
| Attainability circle regularity | up to 0,01 mm                          |
| Attainability roughness         | $Rz = 5 - 30 \mu m$                    |
| Coolant                         | Oil or emulsion                        |



*CX-D Roller burnishing tool  
For short and long cylinders  
internal or external coolant*

**CX-D Processing properties and parameters**

|                                 |  |
|---------------------------------|--|
| Used machines                   | Deep hole drilling, CNC-universal lathe, machining centers |
| Processing length               | $\leq 20$ m  |
| Circumferential speed           | max. 250 m/min.  |
| Feed rate (per roller)          | 0,05 - 0,3 mm/rev.   |
| Attainability tolerance         | up to H6   |
| Attainability circle regularity | up to 0,001 mm   |
| Attainability roughness         | $Rz < 1 / Ra < 0,16 \mu m$                                 |
| Coolant                         | Oil or emulsion  |

**Multiple Head Burnishing Tools**

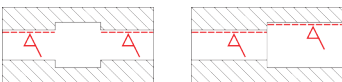


**Application**

YAMASA UX type tools can burnish two different hole sizes at the same time. Beside of this, tools are used for the aim of providing a precision measurement and surface quality by keeping axiality. The tools provide as well as surface hardness and calibration (measurement accuracy) beside of the burnishing. The tools provide time saving through a high processing power and speed and this is a motive to prefer for the serial production.

**Machining parameters**

|                         |                                |
|-------------------------|--------------------------------|
| Circumferential speed   | max.250 m/min.                 |
| Feed rate               | 0,10 - 0,30 mm/rev. per roller |
| Pre-machining roughness | Rz = 5 - 20 μm                 |
| Pre-machining           | Reaming or lathe               |
| Coolant                 | Oil or emulsion                |



✓ Achievable surface roughness  
Rz < 1 μm / Ra < 0,16 μm



**Technical features and advantages**

- The surfaces in quality of Rz < 1 μm (Ra < 0,16 μm) can be obtained.
- With same setting it can burnish till H8 hole allowance.
- It is capable to burnish all kinds of metallic materials up to the tensile strength of 1400N/mm<sup>2</sup> and to the hardness 42-45 HRC.
- Used on universal and CNC Controlled lathe machines, machining centers, milling, drilling etc. machines and also production centers and machines which controlled manual.
- Roller burnishing force can be adjusted, so it is possible to achieve high quality and standard roughness values.
- Diameter adjustments are independent from each other.
- During the operation, the tool or workpiece rotate.
- Roller burnishing of shoulders and other edges is possible up to the end.
- The tool is automatically retracted for do not damage the surface while pulling back .
- It is easy to change the spare part.
- Short process time, provides time saving.
- It removes the second or third tool, machine and personnel requirements.
- It is enough a few lubrication (oil or emulsion).
- It does not make sawdust.

**Tool structure**

UX type tools consist of a precision body which is special designed and roller head. The bodies of the tools have a special mechanism which enables to make adjustment independent from each other of the roller heads. The roller head consists of cage, cone and rollers. Roller head is specially designed according to workpiece measurements. According to the preference, shank is delivered as morse taper or cylindrical.

**Rolling length**

Rolling length and step increment are designed specially according to workpiece dimensions. While machining the workpiece, the roller heads of this tools which remove the plenty of tool using and provide time saving are designed to machine max. 3 steps.

## Roller Burnishing Machines

### Application

YAMASA MXM type machines are used for the aim of burnishing the cylindrical stepped and plain shafts. The machine provides as well as surface hardness and low rate calibration (measurement accuracy) beside of burnishing. Because of the high processing power and speed ability, it provides time saving. These are the preference causes for the serial production.

### Technical features

YAMASA MXM roller burnishing machines can process the cylindrical shafts up to H8 tolerances with a single adjustment. These machines are capable to process all kinds of metallic materials with 1400 N/mm<sup>2</sup> tensile strength and hardness up to max. 42-45 HRC. Super finish surfaces up to Ra= 0,02 µm can be obtained.

With MXM type burnishing machines, part feeding and tolerance adjustment can be done automatically. The machine takes the workpiece and then removes out after the burnishing process is completed. The machine has full automatic specifications. It is capable to achieve a rapid production in order to the automatic feeding system. It can be integrated to each production line for every kind of serial production. As well as automatic loading system can be integrated.

### Desing and function

MXM roller burnishing machines are capable to process any kind of diameter between Ø3-Ø40 mm by changing the roller heads. One roller head is used for each nominal diameter. Each roller head has an adjustment capacity of 0,5 mm. The nominal diameter of the roller head can be adjusted with the tolerance between -0,40 and +0,10.

### Advantages

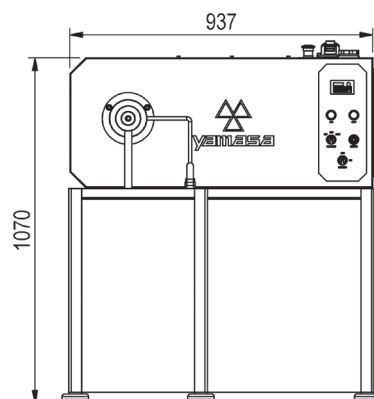
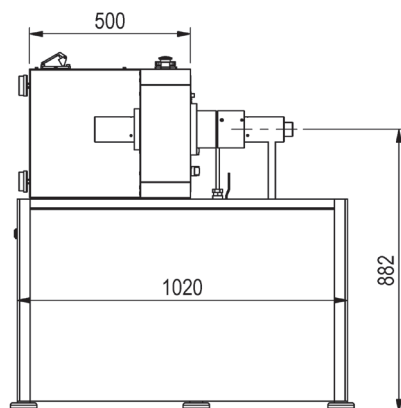
- It is capable to achieve a rapid and serial production.
- Saves time, money and energy.
- The roller heads can be replaced easily and rapidly.
- A precision and fast adjustment can be done through the adjustment mechanism.
- No sawdust and residues occur.

### MXM Models, properties and parameters

| MXM Models            | DVH-1                                | DVH-2 | DPH-1                                     | DPH-2 | NC-1                  | NC-2 |
|-----------------------|--------------------------------------|-------|---|-------|-----------------------|------|
| Working range (Ø-mm)  | 1-20/25*                             | 1-40  | 1-20/25*                                  | 1-40  | 1-20/25*              | 1-40 |
| Control panel         | Dijital                              |       | Digital                                   |       | Numarical control(NC) |      |
| Coolant system        | Manuel or spraying                   |       | Continuously lubrication-internal coolant |       |                       |      |
| Coolant               | Oil                                  |       | Oil or emulsion                           |       |                       |      |
| Coolant tank capacity | -                                    |       | 30 Liter (including filter)               |       |                       |      |
| Electric connection   | 400 V 50 Hz                          |       |   |       |                       |      |
| Processable surfaces  | Plain/stepped shafts                 |       |   |       |                       |      |
| Proccesing length     | Unlimited                            |       |   |       |                       |      |
| Revolution            | 0-1400 rev./min (with speed control) |       |   |       |                       |      |
| Feed rate             | 0,9 - 3 mm/rev.                      |       |   |       |                       |      |
| Pre-machining rough.  | Rz= 5 - 20 µm                        |       |   |       |                       |      |
| Burnishing allowance  | up to 0,02 mm                        |       |   |       |                       |      |

\* Optional

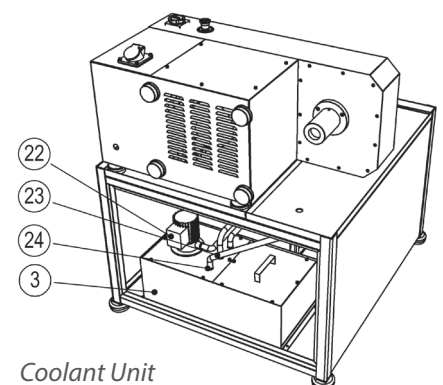
**MXM DVH-1**  
**Roller burnishing machine**  
Manuel lubrication or minimal lubrication spraying system



**MXM DPH-1**  
**Roller burnishing machine**  
internal coolant system

### Sample of applications

Shock absorber shafts, pneumatic cylinder shafts, HDD shafts, coil, powered tooth brush drive shafts, printer guide shafts, air hammer parts, air condition shafts, pump shafts, motor shafts, optical drum for copying machine, wire etc.

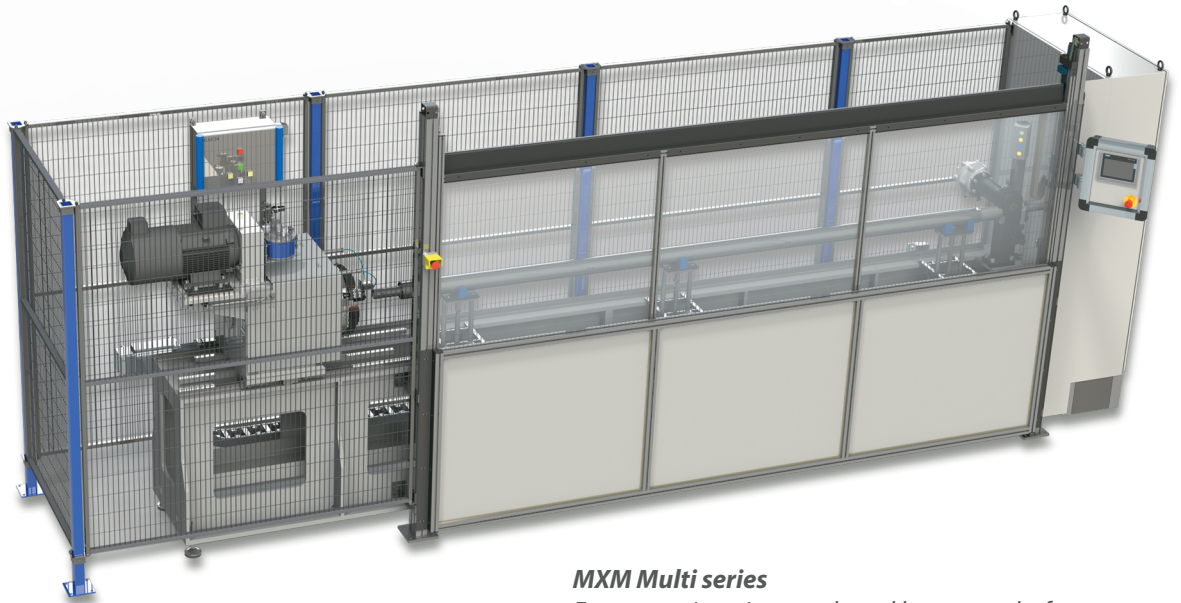


Coolant Unit



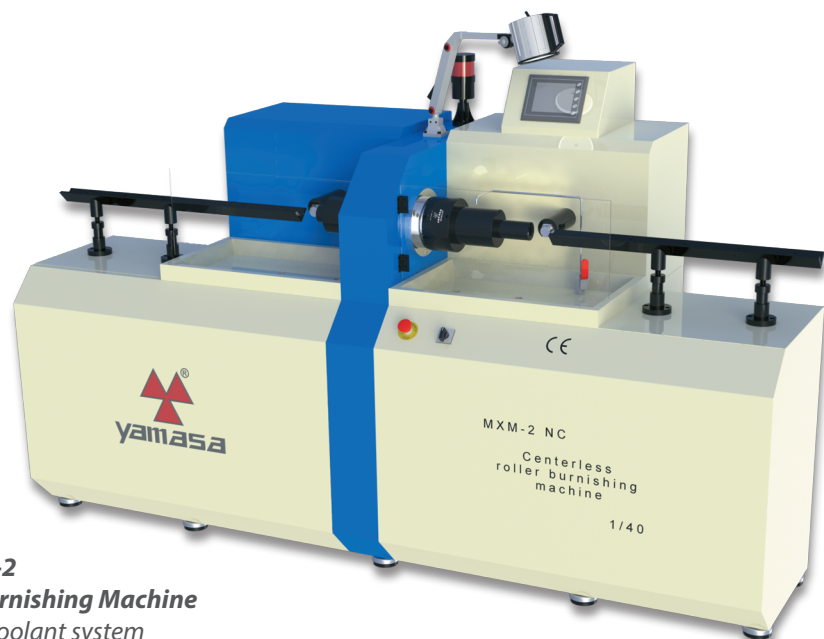
**MXM Series** | For cylindrical shafts

**Roller Burnishing Machines**



**MXM Multi series**

*For processing piston rods and long type shafts*



**MXM NC-2**  
**Roller burnishing Machine**  
*internal coolant system*