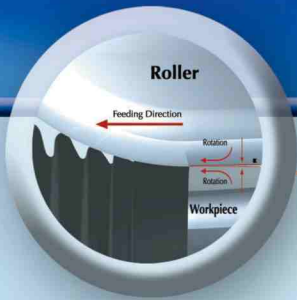


yamasa

**ROLLER BURNISHING
SKIVE-BURNISHING
DEEP ROLLING
TOOLS & MACHINES**



Brighten your future...



Roller Burnishing Technology

Page 2-3



**MX Type
External Roller Burnishing Tools**
For cylindrical shafts

Page 14-20



**SX Type
Single Roller Burnishing Tools**
For cylindrical external surfaces,
external tapers and flat surfaces

Page 22 - 23



**CSX, CX Type
Skive - Burnishing Tools**
For hydraulic cylinders,
tubes and inner surfaces

Page 26



**MXM Type
Roller Burnishing Machines**
For cylindrical shafts

Page 28-29



**DX Type
Internal Roller Burnishing Tools**
For cylindrical holes

Page 4-13



**RX Type
Single Roller Burnishing Tools**
For contours, fillets / radiuses,
conical and spherical surfaces

Page 21



**KI, KD, KA Type
K Series Roller Burnishing Tools**
For male - female tapers
and flat surfaces

Page 24-25



**UX Type
Multiple Head Burnishing Tools**
For stepped and axial holes

Page 27

Our company which is founded in 1958 in Izmir produces roller burnishing tools and full automatic roller burnishing machines under the brand of YAMASA. Our enterprise is carrying on its growth within years. With the developed technology and specialized staff, it increases the variety of the products and grows day by day. As one of the biggest producers, YAMASA offers ideal solutions to the worldwide customers.

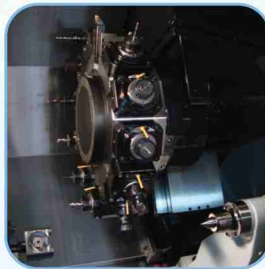
The properties which make YAMASA an ideal solution partner

- 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

The roller burnishing tools and machines, that we produce are used in

- Automotive industry
- Aircraft industry
- Machine production
- Agricultural vehicles
- Ship building industry
- Railway industry
- Light motorized two wheeled vehicles industry
- Heavy work vehicles industry
- Heating and cooling industry
- Hydraulic-pneumatic industry
- Electronic household goods
- Defence industry etc.

We cope the demands and needs of our customers in these sectors with our high service and product quality on the one hand and with stable prices on the other hand.



Our Mission

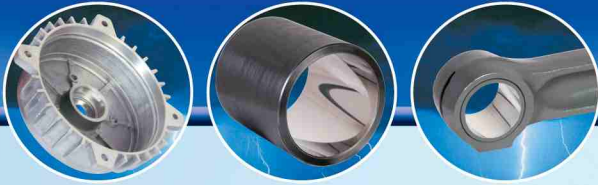
- To answer the needs and surpass all expectations of the customers with a higher quality
- To invest continuously in expertise and technology
- To know the worth of natural sources, to care the environment and ensure our future

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

Sales Network





Roller Burnishing

The 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 contacted 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.

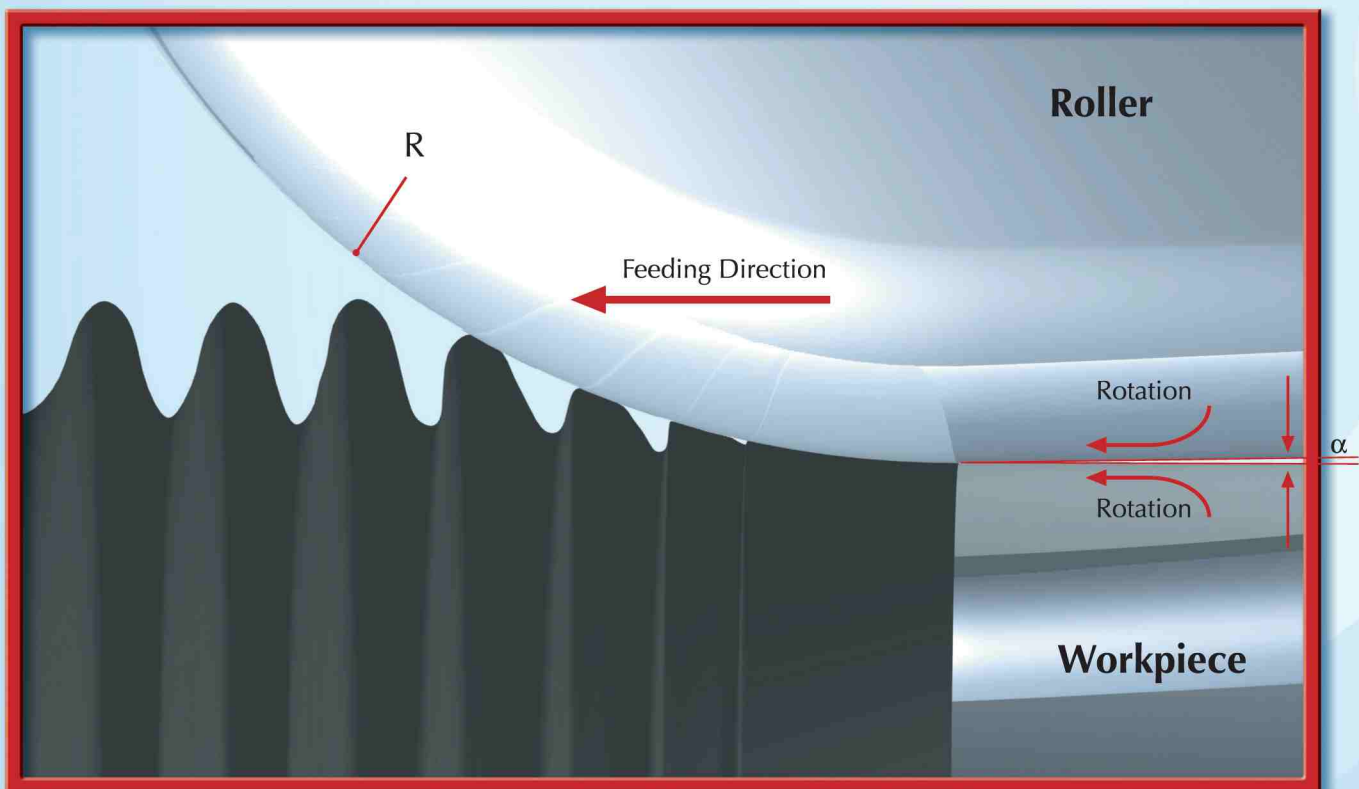


Fig.1 - Roller Burnishing Process

Advantages of Roller Burnishing

- The surfaces in quality of $R_z < 1\mu\text{m}$ ($R_a < 0,2\mu\text{m}$) can be obtained.
- It is possible to catch the desired size easily and rapidly.
- The process is completed by one pass. The process time is very short.
- The roller burnishing process hardens the surface in the same time. It ensures the processed surface to become stronger, more brilliant and slippery.
- Roller burnishing process makes the wear of the workpiece difficult and other components which work on the workpiece surface.
- It saves time, money and energy.
- No sawdust and residues occur. No noise and damage to the environment.
- It requires low lubrication and cooling.

Roller Burnishing Technology

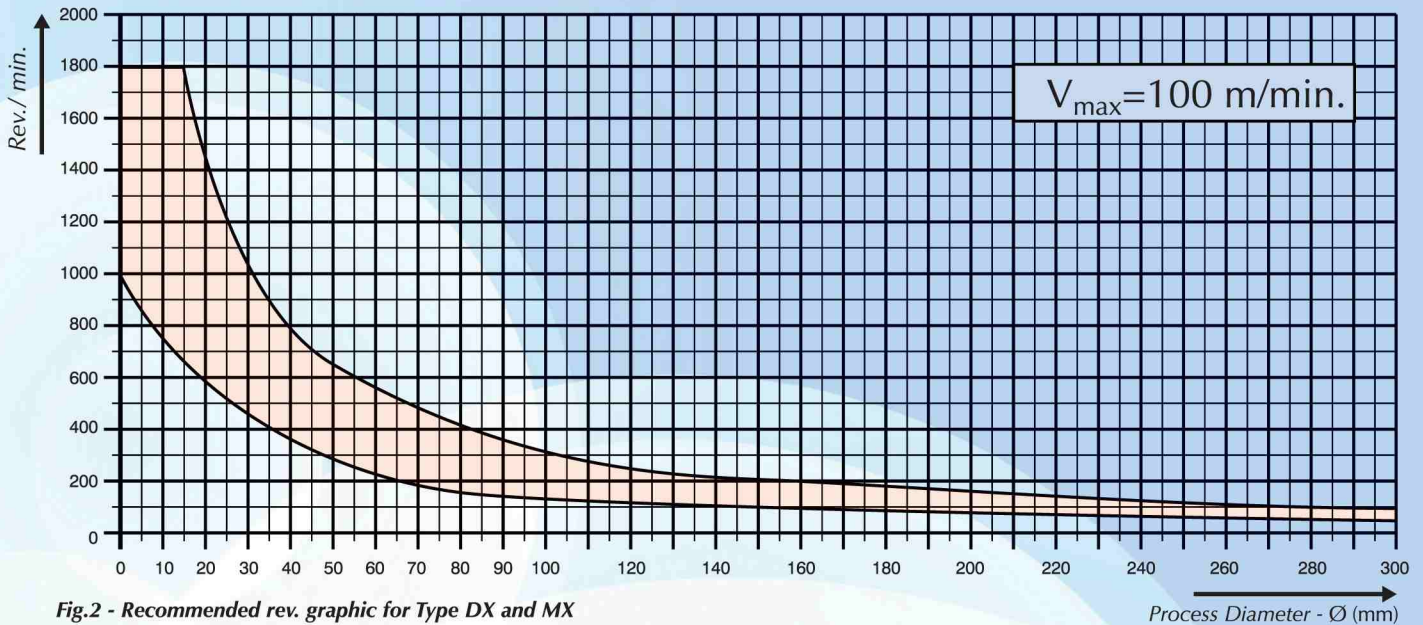


Fig.2 - Recommended rev. graphic for Type DX and MX

Pre-machining of Workpiece

All kinds of metallic materials can be burnished up to hardness of 42-45 HRC. The burnishing rollers do not remove the sawdust from the surface. It only accumulates the roughness on the surface on to each other. Therefore the roller burnishing tolerance \varnothing (mm) becomes equal to the roughness depth (R_z). The roughness depth in pre-machining can be selected between $R_z=5 \mu\text{m}$ and $R_z=50 \mu\text{m}$ depending on the material type.

The formula below is used to obtain the most appropriate pre-machined surface.

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 (Fig.3).

Available Surfaces

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

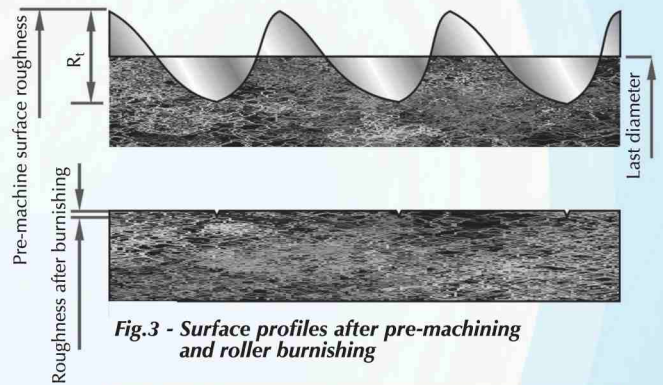


Fig.3 - Surface profiles after pre-machining and roller burnishing



Fig.4 During the process

After the process

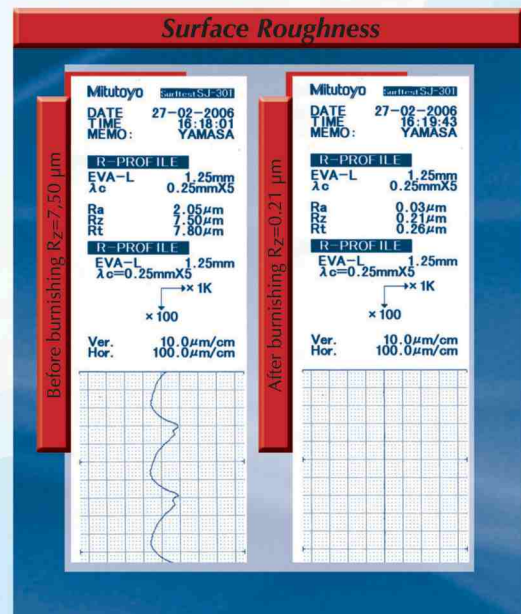
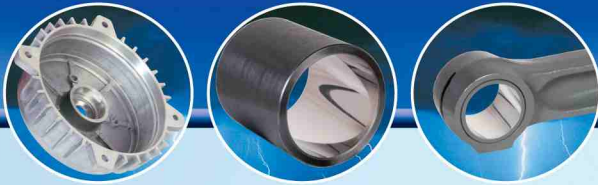


Fig.5

Internal Roller Burnishing Tools Type DX For Cylindrical Holes

Through hole between $\varnothing 5 - \varnothing 350$ mm
Blind hole between $\varnothing 6 - \varnothing 350$ mm



Application

YAMASA DX type tools are used for the aim of burnishing the cylindrical holes that have an open and closed end. The tools provide as well as surface hardness and 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.

There are three types of YAMASA DX burnishing tools according to the process type :

1) Through Hole Automatic (Self) Feeding

These burnishing tools process the holes that have an open end. The tools provide own feeding speed which is needed while it is processing the workpiece. Feeding occurs free from the machine.

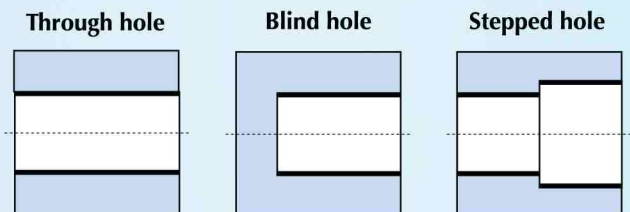
2) Through Hole Machine Feeding

These burnishing tools process the holes that have an open end. While the tools process the workpiece, the machine provides feeding speed which is needed.

3) Blind hole Machine Feeding

These burnishing tools process stepped or fully closed holes up to end. While the tools process the workpiece, the machine provides feeding speed which is needed.

The tool or the workpiece can be turned with the speed of 250 m/min. The machine feeding speed is possible from 0,1 mm/rev. to 0,3 mm/rev. for per roller.



Technical Features

The tools are adjusted. The adjustment capacity is changing according to the diameter and types between 0,25 mm and 1 mm. The tools have an adjustment mechanism which gives the possibility to adjust very high precision measurements. For $\varnothing 5 - \varnothing 80$ mm tools, adjustment precision is 0,0025 mm and for bigger than $\varnothing 80$ mm tools, adjustment precision is 0,0050 mm. YAMASA DX type roller burnishing tools can process the cylindrical holes up to H8 tolerance with a single adjustment. These tools are capable to process all kinds of metallic materials with 1400 N/mm² tensile strength and hardness up to max. 42-45 HRC. Tools work by turning to right. Either tool or workpiece may turn. These tools can be used on universal or CNC lathes, machining centers, drilling machines, milling machines or other machines which process by turning. The tools can be fixed to all machines easily and practically. Tools have rather a long life. It is possible to use the tools for a long time without size change due to abrasion.

Tool Body	Diameter Range $\varnothing D$	Tool Shank				Remarks		
		Morse Taper	Cylindrical ($\varnothing i \times h$)	a	b		c	g
DX1.1	005-014	MK2	$\varnothing 20 \text{ h6} \times 50$	78,5	34	Unlimited rolling length.	146	1,5
DX1.2	015-021						146	2
	022-031						139	2,5
DX1.3	032-034						139	3
	035-049						142,5	3
DX2	050-080	MK3	$\varnothing 25 \text{ h6} \times 56$	98	177,5	48	3,5	
DX3	081-160	MK4	$\varnothing 32 \text{ h6} \times 60$	123	195	62	4	
DX4	161-350	MK5	$\varnothing 40 \text{ h6} \times 80$	155,5	272,5	89	4,5	

All Dimensions in mm.

Tool Structure

YAMASA DX burnishing tools consist of a body and a roller head. The tool body has a precision adjustment mechanism. Cage, cone and rollers are the parts of the roller head. The roller heads fitting in to the same body can be changed. The tool shank may be morse taper or cylindrical. The tools, which are bigger than $\text{Ø}34$ have an unlimited rolling length, for the tools which are smaller than $\text{Ø}35$ exist standard rolling lengths (see table side). For special orders, tools with longer rolling lengths can be produced.

Samples of application

- Connecting rod • Brake cylinder • Valve body • Joints
- Pneumatic cylinder • Hole of piston housing • Cardan shafts • Locker arms • Gas valve • Gears • Air hammer parts • Solenoid valve • Shock absorber • Carburetors • Ring bushings • Pipes • Pistons
- Master cylinders • Motor stators • Cylinders etc.





YAMASA DX Type burnishing tools can process the various diameters in order to the adjustability specification. For example: DX1.2-025,00-1-50-MK2 type burnishing tool having a nominal size of $\text{Ø}25,00$ mm is capable to process all sizes between $\text{Ø}24,90$ mm and $\text{Ø}25,90$ mm.

YAMASA, DX type tools are produced in special diameters and sizes upon request. In addition, the tools with the special rolling length can also be produced.

You can use the information above to select the proper tool. If you want to take help for the tool selection, you can fill out the tool option form and send to us or to one of the related zone representation. So we can do proper tool selection for you.

Tool Selection

1-Tool Body Selection

At sight to the table, select the body number proper to the tool diameter.

2-Diameter Selection

Define the diameter accurately which you will process (for example 25,40 ...).

3-Process Type Selection

Select the process type according to machine and workpiece.

- 1: Automatic (self) feeding for through holes
- 2: Machine feeding for through holes
- 3: Machine feeding for blind holes

6



Order Sample

DX1.2-022,00-2-50-MK2
 DX1.2 : Tool body
 022,00 : Diameter (Ø)
 2 : Process type
 50 : Rolling length
 MK2 : Shank

4-Rolling Length Selection

Define the rolling length which is proper for the workpiece. It doesn't need to be stated for bigger than $\text{Ø}34$ mm diameter because they have unlimited rolling length but it must be stated smaller than $\text{Ø}35$ mm diameter. Standard rolling length is 50 mm for smaller than $\text{Ø}35$. For these diameters other rolling length options are 100, 150, 200, 250, 300 mm. For the diameters of smaller than $\text{Ø}35$ more longer rolling length demands will be considered specifically.

5-Tool Shank Selection

Prefer proper shank to your machine.

MK : Morse Taper Shank
 ZS : Cylindrical Shank

Internal Roller Burnishing Tools

Type DX For Cylindrical Holes

Through hole between $\varnothing 5 - \varnothing 14$ mm

Blind hole between $\varnothing 6 - \varnothing 14$ mm



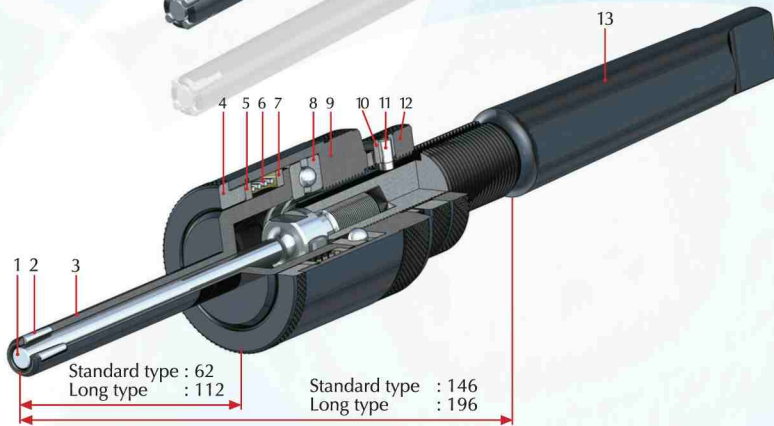
Recommended Machining Parameters

Burnishing allowance : $\sim +0,01$ to $+0,02$ mm
 Pre-machining : Reaming or lathening
 Pre-machining roughness : $R_z = 5-15 \mu\text{m}$
 Coolant : Oil emulsion or cutting oil

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
5,00-7,00	1000	0.45
8,00-14,00	1000	0.60



DX1.1-008,00-3-100-MK2



- 1 Cone
- 2 Roller
- 3 Cage
- 4 Housing nut
- 5 Thrust ring
- 6 Spring
- 7 Thrust ring
- 8 Ball Bearing
- 9 Housing
- 10 Adjustment gear
- 11 Pin
- 12 Adjustment nut lock
- 13 Shank

STANDARD TYPE

Tool Body	Diameter	Process Type			Rolling Length	Tool Shank		Setting Range			Roller		Quantity
		Through		Blind		Morse Taper	Cylindrical	Through	Blind	Roller Number			
		AF	MF	MF						Through	Blind	Piece	
DX1.1	005,00	1	2	3	50	MK2	ZS 20 Ø20 h6 x 50	-0,05 +0,20	-0,05 +0,20	-0,05 +0,20	500115	-	3
	006,00										500100	500308	
	007,00										500108	500300	
	008,00												
	009,00							-0,10 +0,40	-0,10 +0,40	-0,05 +0,40	500102	500301	4
	010,00												
	011,00												
	012,00												
013,00													
014,00													

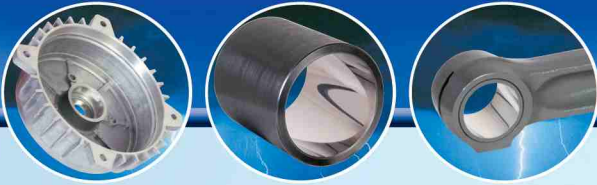
LONG TYPE

Tool Body	Diameter	Process Type			Rolling Length	Tool Shank		Setting Range			Roller		Quantity
		Through		Blind		Morse Taper	Cylindrical	Through	Blind	Roller Number			
		AF	MF	MF						Through	Blind	Piece	
DX1.1	006,00	1	2	3	100	MK2	ZS 20 Ø20 h6 x 50	-0,05 +0,20	-0,05 +0,20	-0,05 +0,20	500100	500308	3
	007,00										500108	500300	
	008,00												
	009,00										-0,10 +0,40	-0,10 +0,40	
	010,00												
	011,00												
	012,00												
	013,00												
014,00													

All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding

Internal Roller Burnishing Tools Type DX For Cylindrical Holes

Through hole between $\varnothing 15 - \varnothing 21$ mm
Blind hole between $\varnothing 15 - \varnothing 21$ mm



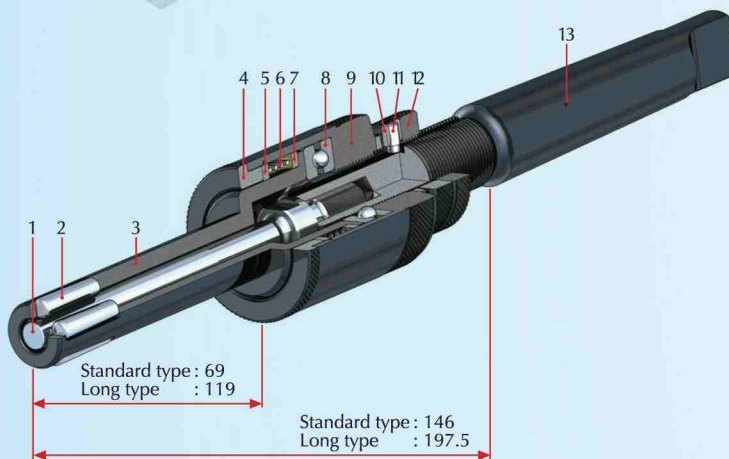
Recommended Machining Parameters

Burnishing allowance : $\sim +0,01$ to $+0,02$ mm
Pre-machining : Reaming or lathening
Pre-machining roughness : $R_z = 5-15 \mu\text{m}$
Coolant : Oil emulsion or cutting oil

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
15,00-21,00	1000	0.75



DX1.2-015,00-3-100-MK2



Standard type : 69
Long type : 119

Standard type : 146
Long type : 197.5

- 1 Cone
- 2 Roller
- 3 Cage
- 4 Housing nut
- 5 Thrust ring
- 6 Spring
- 7 Thrust ring
- 8 Ball Bearing
- 9 Housing
- 10 Adjustment gear
- 11 Pin
- 12 Adjustment nut lock
- 13 Shank

8

STANDARD TYPE

Tool Body	Diameter	Order Sample			Rolling Length	Tool Shank		Setting Range			Roller		Quantity	
		Process Type		Through		Blind	Morse Taper	Cylindrical	Through		Blind	Roller Number		
		AF	MF						MF	AF		MF		MF
DX1.2	015,00	1	2	3	50	MK2	ZS 20 $\varnothing 20$ h6 x 50	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500111	500310	5	
	016,00													
	017,00													
	018,00										500112	500311		
	019,00													
	020,00													
021,00														

LONG TYPE

Tool Body	Diameter	Order Sample			Rolling Length	Tool Shank		Setting Range			Roller		Quantity	
		Process Type		Through		Blind	Morse Taper	Cylindrical	Through		Blind	Roller Number		
		AF	MF						MF	AF		MF		MF
DX1.2	015,00	1	2	3	100	MK2	ZS 20 $\varnothing 20$ h6 x 50	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500111	500310	5	
	016,00													
	017,00													
	018,00										500112	500311		
	019,00													
	020,00													
021,00														

All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding

Through hole between Ø22 - Ø31 mm
Blind hole between Ø22 - Ø31 mm

Recommended Machining Parameters

Burnishing allowance : ~ +0,02 to +0,03 mm
Pre-machining : Reaming or lathening
Pre-machining roughness : $R_z = 5-20 \mu\text{m}$
Coolant : Oil emulsion or cutting oil

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
22,00-31,00	1000	0.75



- 1 Cone
- 2 Roller
- 3 Cage
- 4 Housing nut
- 5 Thrust ring
- 6 Spring
- 7 Thrust ring
- 8 Ball Bearing
- 9 Housing
- 10 Adjustment gear
- 11 Pin
- 12 Adjustment nut lock
- 13 Shank
- 14 Screw
- 15 Cage Sleeve

STANDARD TYPE

Tool Body	Diameter	Order Sample			Rolling Length	Tool Shank		Setting Range			Roller		
		Process Type		Morse Taper		Cylindrical	Through		Blind	Roller Number		Quantity	
		Through	Blind				AF	MF		MF	Through		Blind
DX1.2	022,00	1	2	3	50	MK2	ZS 20 Ø20 h6 x 50	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500112	500311	5
	023,00												
	024,00												
	025,00												
	026,00												
	027,00												
	028,00												
	029,00												
	030,00												
	031,00												

LONG TYPE

Tool Body	Diameter	Order Sample			Rolling Length	Tool Shank		Setting Range			Roller		
		Process Type		Morse Taper		Cylindrical	Through		Blind	Roller Number		Quantity	
		Through	Blind				AF	MF		MF	Through		Blind
DX1.2	022,00	1	2	3	100	MK2	ZS 20 Ø20 h6 x 50	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500112	500311	5
	023,00												
	024,00												
	025,00												
	026,00												
	027,00												
	028,00												
	029,00												
	030,00												
	031,00												

All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding

Internal Roller Burnishing Tools

Type DX For Cylindrical Holes

Through hole between Ø32 - Ø34 mm

Blind hole between Ø32 - Ø34 mm



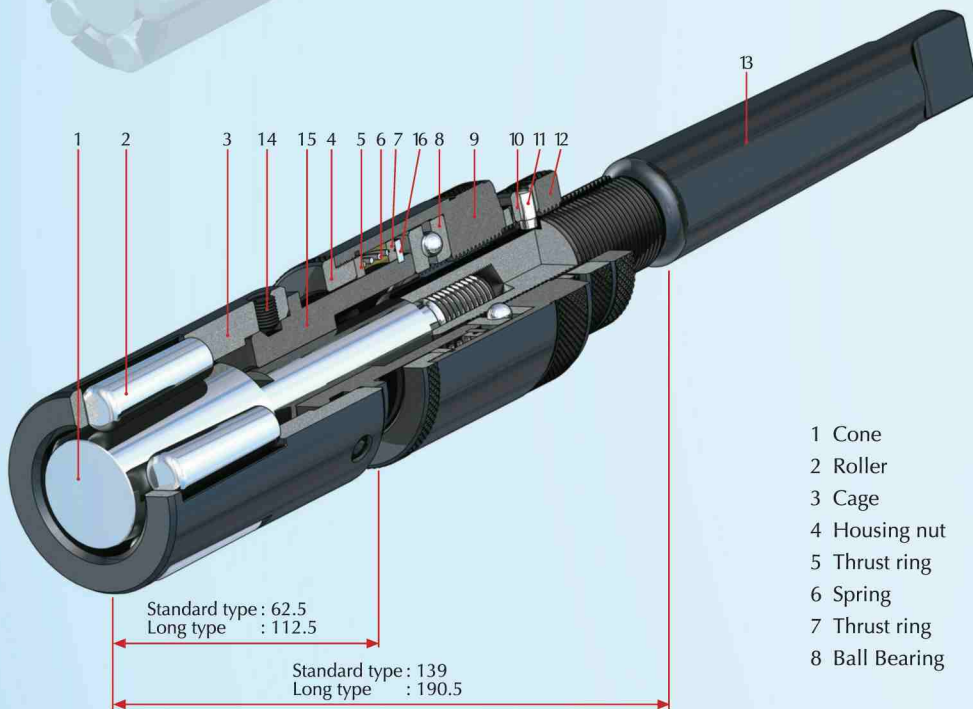
Recommended Machining Parameters

Burnishing allowance : ~ +0,02 to +0,03 mm
 Pre-machining : Reaming or lathening
 Pre-machining roughness : $R_z = 5-30 \mu\text{m}$
 Coolant : Oil emulsion or cutting oil

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
32,00-34,00	950	0.75



DX1.3-032,00-3-100-MK2



- 1 Cone
- 2 Roller
- 3 Cage
- 4 Housing nut
- 5 Thrust ring
- 6 Spring
- 7 Thrust ring
- 8 Ball Bearing
- 9 Housing
- 10 Adjustment gear
- 11 Pin
- 12 Adjustment nut lock
- 13 Shank
- 14 Screw
- 15 Cage sleeve
- 16 Locking Ring

Standard type : 62.5
 Long type : 112.5

Standard type : 139
 Long type : 190.5

STANDARD TYPE

Order Sample						Setting Range			Roller				
Tool Body	Diameter	Process Type			Rolling Length	Tool Shank		Through		Blind	Roller Number		Quantity
		Through	Blind	MF		Morse Taper	Cylindrical	AF	MF		Through	Blind	
DX1.3	032,00	1	2	3	50	MK2	ZS 20 Ø20 h6 x 50	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500109	500307	5
	033,00												
	034,00												

LONG TYPE

Order Sample						Setting Range			Roller				
Tool Body	Diameter	Process Type			Rolling Length	Tool Shank		Through		Blind	Roller Number		Quantity
		Through	Blind	MF		Morse Taper	Cylindrical	AF	MF		Through	Blind	
DX1.3	032,00	1	2	3	100	MK2	ZS 20 Ø20 h6 x 50	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500109	500307	5
	033,00												
	034,00												

All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding

Through hole between Ø35 - Ø49 mm
Blind hole between Ø35 - Ø49 mm

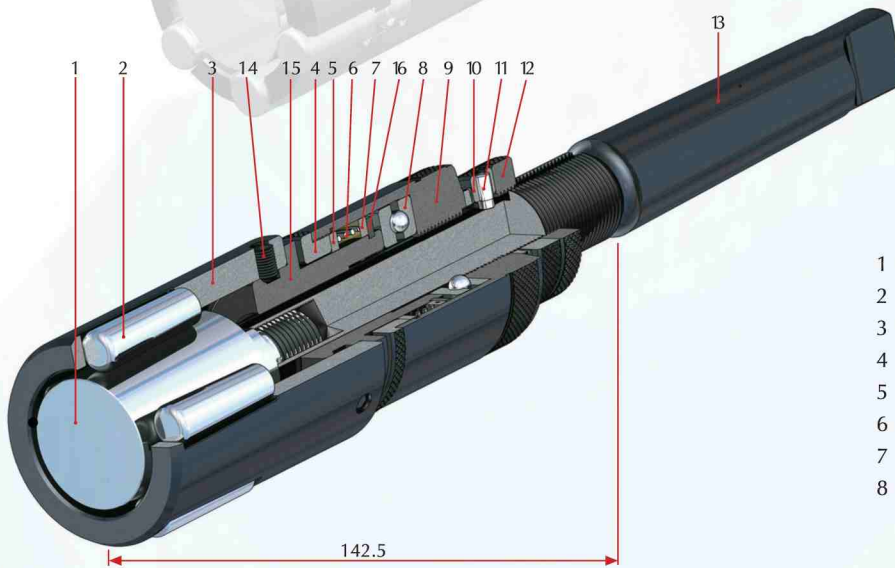
Recommended Machining Parameters

Burnishing allowance : ~ +0,02 to +0,03 mm
Pre-machining : Reaming or lathening
Pre-machining roughness : $R_z = 5-30 \mu\text{m}$
Coolant : Oil emulsion or cutting oil

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
35,00-40,00	800	0.90
41,00-49,00	650	0.90



DX1.3-040,00-3-U-MK2



- 1 Cone
- 2 Roller
- 3 Cage
- 4 Housing nut
- 5 Thrust ring
- 6 Spring
- 7 Thrust ring
- 8 Ball Bearing
- 9 Housing
- 10 Adjustment gear
- 11 Pin
- 12 Adjustment nut lock
- 13 Shank
- 14 Screw
- 15 Cage sleeve
- 16 Locking ring

STANDARD TYPE

Tool Body	Diameter	Order Type			Rolling Length	Tool Shank		Setting Range			Roller		Quantity
		Through		Blind		Morse Taper	Cylindrical	Through		Blind	Roller Number		
		AF	MF	MF				AF	MF	MF	Through	Blind	
DX1.3	035,00				UNLIMITED	MK2	ZS 20 Ø20 h6 x 50	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500109	500307	6
	036,00												
	037,00												
	038,00												
	039,00												
	040,00												
	041,00												
	042,00	1	2	3									
	043,00												
	044,00												
	045,00												
	046,00												
	047,00												
048,00													
049,00													

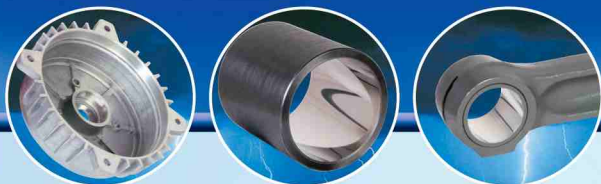
All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding

Internal Roller Burnishing Tools

Type DX For Cylindrical Holes

Through hole between Ø50 - Ø160 mm

Blind hole between Ø50 - Ø160 mm



Recommended Machining Parameters

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
50,00-60,00	530	1.20
61,00-70,00	450	1.20
71,00-80,00	400	1.20
81,00-90,00	350	1.20
91,00-100,00	320	1.20
101,00-120,00	260	1.20
121,00-140,00	230	1.50
141,00-150,00	210	1.50
151,00-160,00	200	1.80

Burnishing allowance : ~ +0,02 to +0,03 mm
 Pre-machining : Reaming or lathening
 Pre-machining roughness : $R_z = 5-30 \mu\text{m}$
 Coolant : Oil emulsion or cutting oil

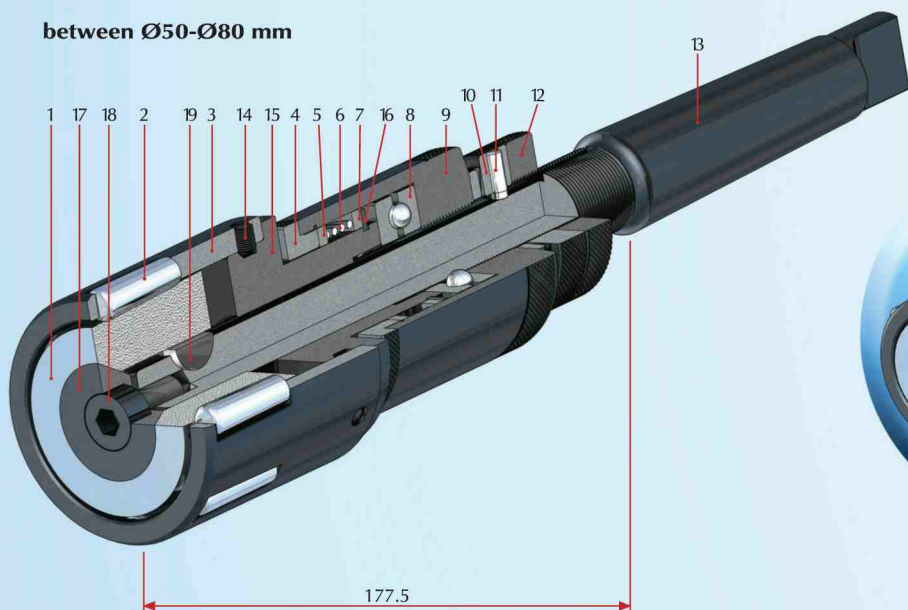


DX2-060,00-3-U-MK3

- 1 Cone
- 2 Roller
- 3 Cage
- 4 Housing nut
- 5 Thrust ring
- 6 Spring
- 7 Thrust ring
- 8 Ball Bearing
- 9 Housing
- 10 Adjustment gear
- 11 Pin
- 12 Adjustment nut lock
- 13 Shank
- 14 Screw
- 15 Cage sleeve
- 16 Locking ring
- 17 Conical ring
- 18 Screw
- 19 Wedge

12

between Ø50-Ø80 mm



between Ø81-Ø160 mm



STANDARD TYPE

Tool Body	Diameter	Process Type			Rolling Length	Tool Shank		Setting Range			Roller		Quantity
		Through		Blind		Morse Taper	Cylindrical	Through		Blind	Roller Number		
		AF	MF	MF				AF	MF		MF	Through	
DX2	050,00	1	2	3	UNLIMITED	MK3	ZS 25 Ø25 h6 x 56	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500109	500307	8
	060,00												
	070,00												
	080,00												
DX3	081,00	1	2	3	UNLIMITED	MK4	ZS 32 Ø32 h6 x 60	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500107	500306	10
	120,00												
	121,00												
	150,00												
	151,00												
160,00	12												

All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding

Through hole between Ø161 - Ø350 mm
Blind hole between Ø161 - Ø350 mm

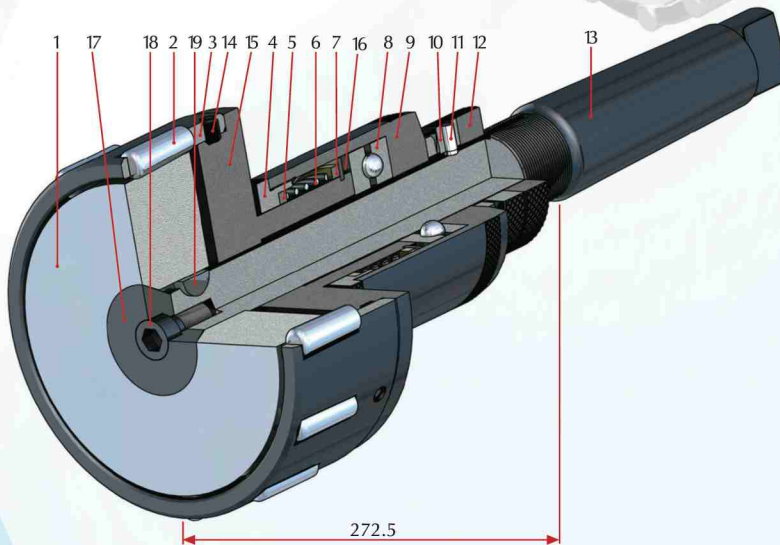
Recommended Machining Parameters

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
161,00-170,00	190	1.80
171,00-200,00	160	2.10
201,00-230,00	140	2.40
231,00-260,00	120	2.70
261,00-280,00	110	3.00
281,00-310,00	100	3.30
311,00-330,00	95	3.60
331,00-350,00	90	3.90

Burnishing allowance : ~ +0,02 to +0,03 mm
Pre-machining : Reaming or lathening
Pre-machining roughness : $R_z = 5-30 \mu\text{m}$
Coolant : Oil emulsion or cutting oil



DX4-170,00-3-U-MK5



- 1 Cone
- 2 Roller
- 3 Cage
- 4 Housing nut
- 5 Thrust ring
- 6 Spring
- 7 Thrust ring
- 8 Ball Bearing
- 9 Housing
- 10 Adjustment gear
- 11 Pin
- 12 Adjustment nut lock
- 13 Shank
- 14 Screw
- 15 Cage sleeve
- 16 Locking ring
- 17 Conical ring
- 18 Screw
- 19 Wedge

STANDARD TYPE

Tool Body	Diameter	Order Sample				Setting Range					Roller		Quantity
		Process Type		Rolling Length	Tool Shank		Through		Blind	Roller Number			
		Through	Blind		Morse Taper	Cylindrical	AF	MF		Through	Blind		
DX4	161	1	2	3	UNLIMITED	MK5	ZS 40 Ø40 h6 x 80	-0,10 +0,90	-0,10 +0,40	-0,05 +0,40	500107	500306	12
	170												14
	171												16
	200												18
	201												20
	230												22
	231												24
	260												26
	261												
	280												
	281												
	310												
	311												
	330												
331													
350													

All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding

External Roller Burnishing Tools

Type MX For Cylindrical Shafts

Plain shaft between $\varnothing 3 - \varnothing 110$ mm
 Stepped shaft between $\varnothing 3 - \varnothing 110$ mm



Application

YAMASA MX type tools are used for the aim of the burnishing the cylindrical stepped and plain shafts. The tools provide as well as surface hardness and at low rate calibration (measurement accuracy) beside of the burnishing. The tools provide time saving through a high processing power and speed and this is preference cause for the serial production.

There are three types according to the process type of YAMASA MX burnishing tools.

1) Plain Shaft Automatic (Self) Feeding

These burnishing tools process plain shafts. The tool provides own feeding speed which is needed while it is processing the workpiece. Feeding is occurred free from the machine.

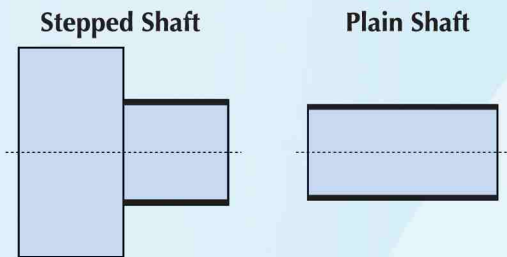
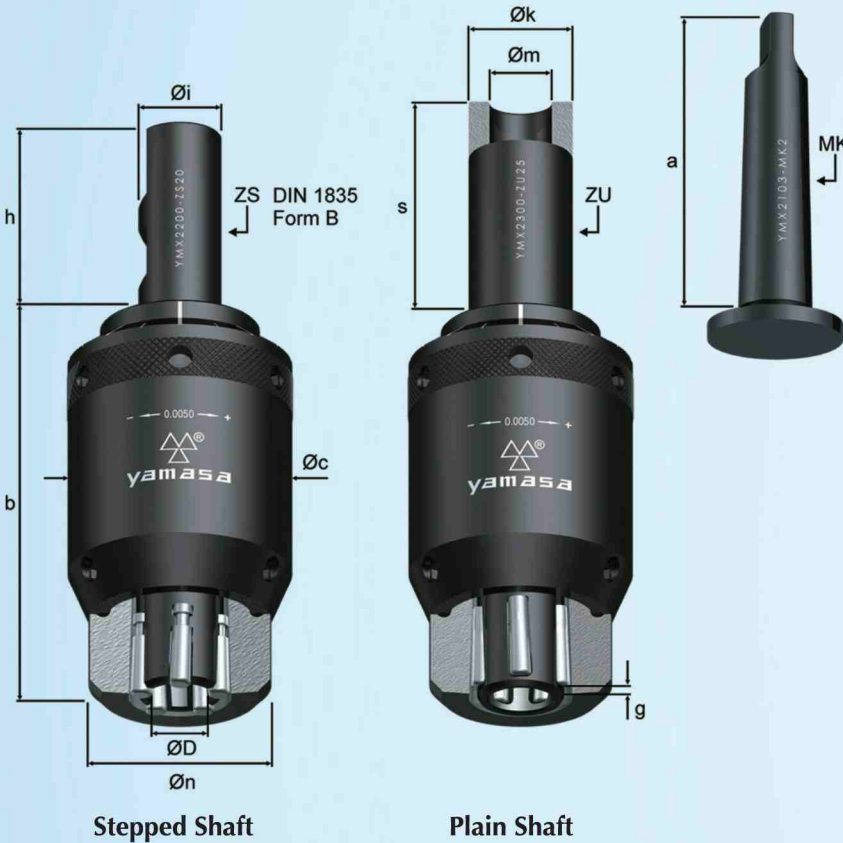
2) Plain Shaft Machine Feeding

These burnishing tools process plain shafts. While the tool processes the workpiece, machine provides feeding speed which is needed.

3) Stepped Shaft Machine Feeding

These burnishing tools process stepped shafts and plain shafts up to the end. While the tool processes the workpiece, machine provides feeding speed which is needed.

The tool or the workpiece can be turned with a speed of 250 m/min. Machine feeding speed is possible from 0,1 mm/rev to 0,3 mm/rev for per roller.



Technical Features

The tools are adjusted. The adjustment capacity for every diameter is 0,5 mm. The tools have an adjustment mechanism which gives the possibility to adjust very high precision measurements. This mechanism provides adjustment precision up to 0,005 mm. YAMASA MX type roller burnishing tools for cylindrical shafts can work in H8 tolerances with a single adjustment. These tools are capable to process all kinds of metallic materials with 1400 N/mm² tensile strength and hardness up to max. 42-45 HRC. Tools work by turning to right. Either tool or workpiece may turn. These tools can be used on universal or CNC lathes, machining centers, drilling machines or other machines which process by turning. The tools can be tied to all machines easily and practically. Tools have rather a long life. It is possible to use the tools for a long time without size change due to abrasion.

Tool Body	Diameter Range \varnothing	Tool Shank Morse Taper or Cylindrical Shank			b	c	g	n	a
		For Limited Rolling Length		For Unlimited Rolling Length					
		MK	ZS ($\varnothing i \times h$)	ZU ($\varnothing k \times s \times \varnothing m$)					
MX1	03-14	MK2	$\varnothing 20 \text{ h}6 \times 50$	$\varnothing 25 \text{ h}6 \times 60 \times \varnothing 15$	min 95 - max 105	54	2,0	44	78,5
MX2	15-24	MK3	$\varnothing 25 \text{ h}6 \times 56$	$\varnothing 40 \text{ h}6 \times 70 \times \varnothing 26$	min 100 - max 110	74	2,5	62	98
MX3	25-49	MK4	$\varnothing 40 \text{ h}6 \times 70$	$\varnothing 80 \text{ h}6 \times 90 \times \varnothing 50$	min 119 - max 129	106	3,0	94	123
MX4	50-85			$\varnothing 110 \text{ h}6 \times 110 \times \varnothing 87$	min 128 - max 138	149	3,5	138	123
MX5	86-110	MK5	$\varnothing 50 \text{ h}6 \times 80$	$\varnothing 150 \text{ h}6 \times 120 \times \varnothing 112$	min 141 - max 151	193	3,5	177	155,5

All Dimensions in mm.

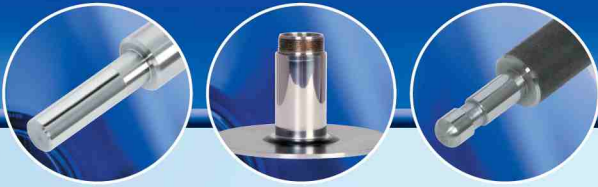
Tool Structure

YAMASA MX burnishing tools consist of a body and a roller head. The tool body has a precision adjustment mechanism. Cage, cone and rollers are the parts of the roller head. The roller heads fitting into the same body can be changed. The tool shank may be Morse taper or cylindrical. Rolling lengths are related to shank selection. ZU shanks have unlimited rolling length, but ZS and MK shanks are limited (see table side).

Samples of application

- Torque converters
- Air hammer parts
- Clutch parts
- Spline hubs
- Pulleys
- Rods
- Pins
- Shafts etc.





YAMASA MX Type burnishing tools can process the various diameters in order to the adjustment specification. As an example, MX3-030,00-1-100-MK3 model burnishing tool having a nominal size of Ø30,00 mm is capable to process all sizes between Ø29,60 mm and Ø30,10 mm.

YAMASA MX type tools are produced in special diameters and sizes upon request. In addition, the tools with the special rolling length can also be produced.

You can use the information above to select the proper tool. If you want to take help for the tool selection, you can fill out the tool option form and send to us or to one of the related zone representation. So we can do the proper tool selection for you.

Tool Selection

1-Tool Body Selection

At sight to the table, select the body number proper to the tool diameter.

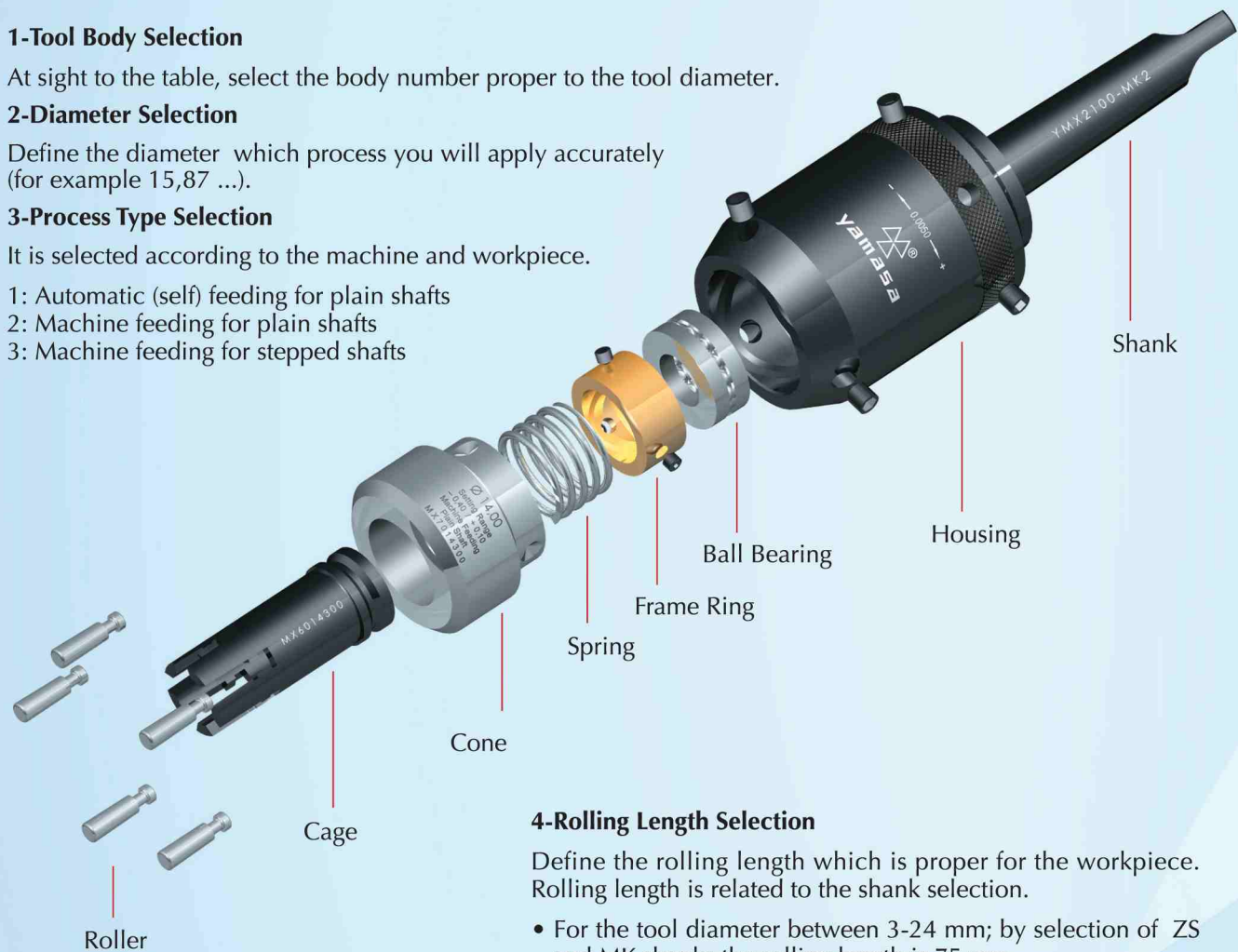
2-Diameter Selection

Define the diameter which process you will apply accurately (for example 15,87 ...).

3-Process Type Selection

It is selected according to the machine and workpiece.

- 1: Automatic (self) feeding for plain shafts
- 2: Machine feeding for plain shafts
- 3: Machine feeding for stepped shafts



Order Sample

MX2-014,00-3-75-MK2
 MX2 : Tool body
 014,00 : Diameter (Ø)
 3 : Process type
 75 : Rolling length
 MK2 : Shank

4-Rolling Length Selection

Define the rolling length which is proper for the workpiece. Rolling length is related to the shank selection.

- For the tool diameter between 3-24 mm; by selection of ZS and MK shanks the rolling length is 75 mm.
- For the tool diameter between 25-85 mm; by selection of ZS and MK shanks the rolling length is 100 mm.
- For the tool diameter between 86-110 mm; by selection of ZS and MK shanks the rolling length is 115 mm.
- For the tool diameter between 3-110 mm; by selection of ZU shank rolling length is an unlimited (U).

5-Tool Shank Selection

Prefer the proper shank to your machine.

- ZU : Cylinder Shank (for unlimited rolling length)
- ZS : Cylinder Shank (for limited rolling length)
- MK : Mors Taper Shank (for limited rolling length)

External Roller Burnishing Tools

Type MX For Cylindrical Shafts

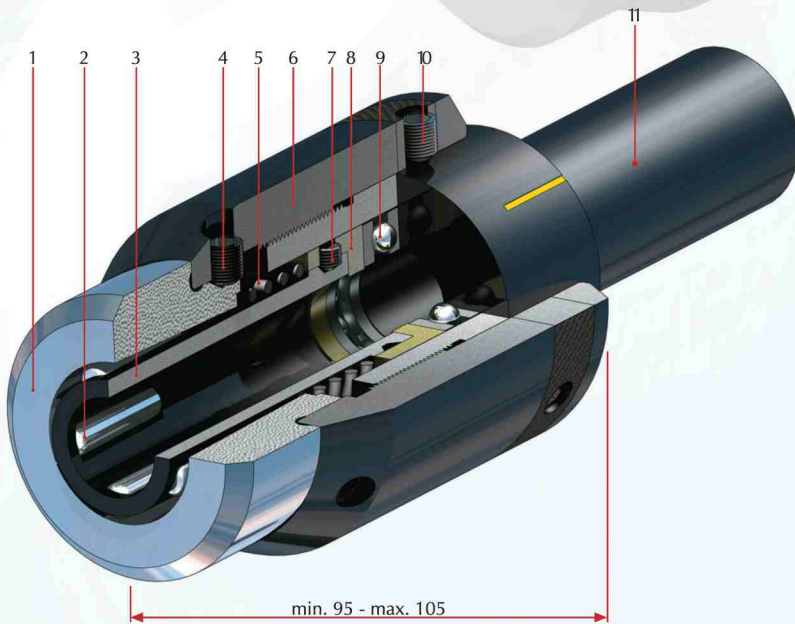
Plain shaft between Ø3 - Ø14 mm
 Stepped shaft between Ø3 - Ø14 mm



Recommended Machining Parameters

Burnishing allowance : ~ +0,005 to +0,02 mm
 Pre-machining : Precision lathening or grinding
 Pre-machining roughness : $R_z = 5-15 \mu\text{m}$
 Coolant : Oil emulsion or cutting oil

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
3,00-8,00	1000	0.45
9,00-11,00	1000	0.60
12,00-14,00	1000	0.75



- 1 Cone
- 2 Roller
- 3 Cage
- 4 Screw
- 5 Spring
- 6 Housing
- 7 Screw
- 8 Frame ring
- 9 Ball bearing
- 10 Screw
- 11 Shank

STANDARD TYPE

Order Sample											Setting Range		Roller		
Tool Body	Diameter	Process Type			Rolling Length			Tool Shank			Plain	Stepped	Roller Number		Quantity
		Plain	Stepped	MF	MK	ZS	ZU	Morse Taper	Cylindrical				Plain	Stepped	
		AF	MF	MF	MK	ZS	ZU	MK	ZS	ZU					Piece
MX1	003,00	1	2	3	75	75	UNLIMITED	MK2	ZS 20 Ø20 h6 x 50	ZU 25 Ø25 h6 x 60 x Ø15	-0,40 +0,10	-0,40 +0,05	500112	500311	3
	004,00														
	005,00														
	006,00														
	007,00														
	008,00														
	009,00														
	010,00														
	011,00														
	012,00														
013,00															
014,00	4														
	5														

All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding

External Roller Burnishing Tools

Type MX For Cylindrical Shafts

Plain shaft between $\varnothing 15 - \varnothing 24$ mm

Stepped shaft between $\varnothing 15 - \varnothing 24$ mm



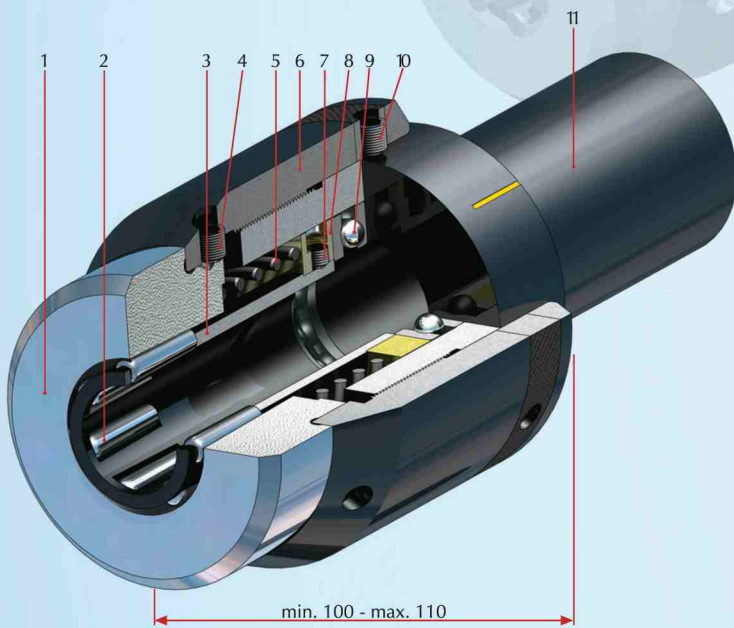
Recommended Machining Parameters

Burnishing allowance : $\sim +0,01$ to $+0,02$ mm
 Pre-machining : Precision lathening or grinding
 Pre-machining roughness : $R_z = 5-15 \mu\text{m}$
 Coolant : Oil emulsion or cutting oil

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
15,00-17,00	1000	0.75
18,00-21,00	1000	0.90
22,00-24,00	1000	1.05



MX2-020,00-3-75-MK3



- 1 Cone
- 2 Roller
- 3 Cage
- 4 Screw
- 5 Spring
- 6 Housing
- 7 Screw
- 8 Frame ring
- 9 Ball bearing
- 10 Screw
- 11 Shank

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STANDARD TYPE

Order Sample											Setting Range		Roller		
Tool Body	Diameter	Process Type			Rolling Length			Tool Shank			Plain	Stepped	Roller		
		Plain	Stepped	MF	MK	ZS	ZU	Morse Taper	Cylindrical				Plain	Stepped	Quantity
		AF	MF	MF	MK	ZS	ZU	MK	ZS	ZU			Plain	Stepped	Piece
MX2	015,00														5
	016,00														
	017,00														
	018,00														6
	019,00	1	2	3	75	75	UNLIMITED	MK3	ZS 25	ZU 40	-0,40	-0,40	500112	500311	
	020,00								$\varnothing 25$ h6 x 56	$\varnothing 40$ h6 x 70 x $\varnothing 26$	+0,10	+0,05			
	021,00														
	022,00														
023,00															
024,00														7	

All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding

Plain shaft between Ø25 - Ø49 mm
 Stepped shaft between Ø25 - Ø49 mm

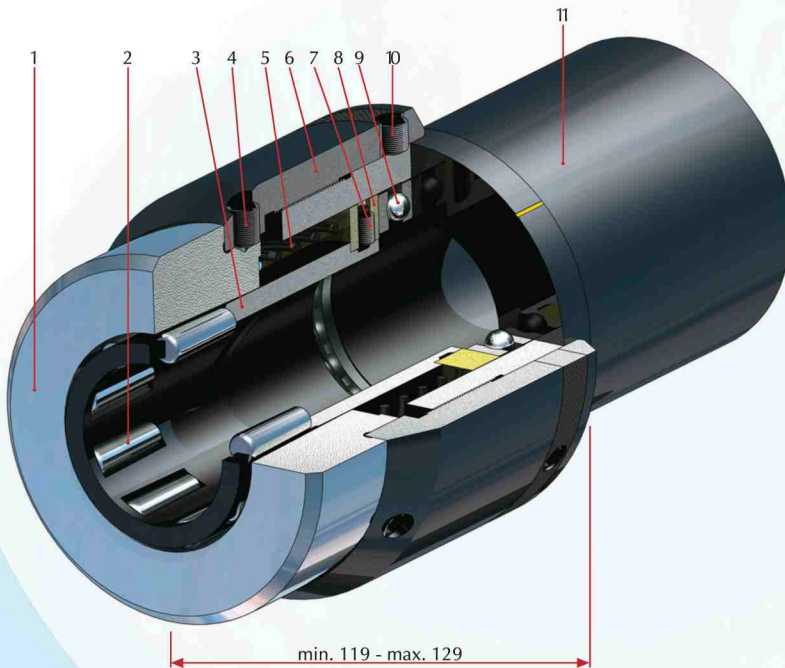
Recommended Machining Parameters

Burnishing allowance : ~ +0,01 to +0,02 mm
 Pre-machining : Precision lathening or grinding
 Pre-machining roughness : $R_z = 5-15 \mu\text{m}$
 Coolant : Oil emulsion or cutting oil

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
25,00-31,00	1000	1.05
32,00-38,00	840	1.05
39,00-49,00	650	1.35



MX3-040,00-3-100-MK4



- 1 Cone
- 2 Roller
- 3 Cage
- 4 Screw
- 5 Spring
- 6 Housing
- 7 Screw
- 8 Frame ring
- 9 Ball bearing
- 10 Screw
- 11 Shank

STANDARD
TYPE

Tool Body	Diameter	Order Sample						Setting Range		Roller					
		Process Type			Rolling Length			Tool Shank		Plain	Stepped	Roller Number	Quantity		
		AF	MF	MF	MK	ZS	ZU	Morse Taper	Cylindrical						
MX3	025,00	1	2	3	100	100	UNLIMITED	MK4	ZS 40 Ø40 h6 x 70	ZU 80 Ø80 h6 x 90 x Ø50	-0,40 +0,10	-0,40 +0,05	500109	500307	7
	038,00														
	039,00														
	049,00														9

All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding (Not-self Feeding)

External Roller Burnishing Tools Type MX For Cylindrical Shafts

Plain shaft between $\varnothing 50 - \varnothing 110$ mm
Stepped shaft between $\varnothing 50 - \varnothing 110$ mm



Recommended Machining Parameters

Burnishing allowance : $\sim +0,01$ to $+0,02$ mm
Pre-machining : Precision lathening or grinding
Pre-machining roughness : $R_z = 5-15$ μm
Coolant : Oil emulsion or cutting oil

Diameter Range (mm)	Revolution (rev/min)	Feeding (mm/rev)
50,00-51,00	620	1.35
52,00-69,00	460	1.65
70,00-85,00	370	1.95
86,00-95,00	330	1.35
96,00-110,00	290	1.65

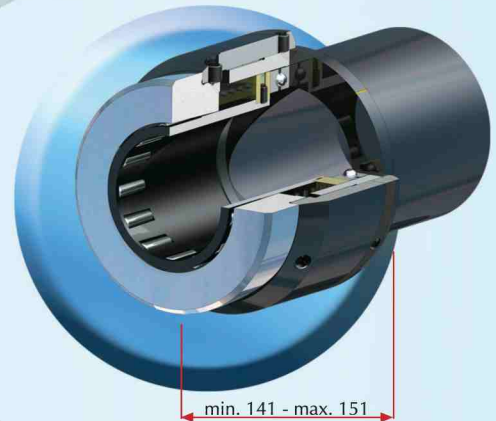


MX4-070,00-3-100-MK4

between $\varnothing 50 - \varnothing 85$ mm



between $\varnothing 86 - \varnothing 110$ mm



- 1 Cone
- 2 Roller
- 3 Cage
- 4 Screw
- 5 Spring
- 6 Housing
- 7 Screw
- 8 Frame ring
- 9 Ball bearing
- 10 Screw
- 11 Shank

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STANDARD TYPE

Tool Body	Diameter	Order Sample							Setting Range		Roller		Quantity Piece		
		Process Type			Rolling Length			Tool Shank			Plain	Stepped			
		AF	MF	MF	MK	ZS	ZU	Morse Taper	Cylindrical					Plain	Stepped
MX4	050,00	1	2	3	100	100	UNLIMITED	MK4	ZS 40 $\varnothing 40$ h6 x 70	ZU 110 $\varnothing 110$ h6 x 110 x $\varnothing 87$	-0,40 +0,10	-0,40 +0,05	500109	500307	9
	051,00														11
	052,00														13
	069,00														13
	070,00														13
085,00	13														
MX5	086,00	115	115	UNLIMITED	115	115	MK5	ZS 50 $\varnothing 50$ h6 x 80	ZU 150 $\varnothing 150$ h6 x 120 x $\varnothing 112$	-0,40 +0,10	-0,40 +0,05	500107	500306	9	
	095,00													11	
	096,00													11	
	110,00													11	

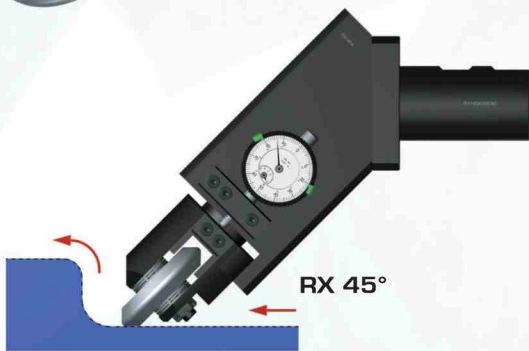
All Dimensions in mm. AF: Automatic Feeding (Self Feeding) MF: Machine Feeding (Not-self Feeding)

Single Roller Burnishing Tools

Type RX For contours, fillets / radiuses, conical and spherical surfaces



RX-1-45°-2.5R-WE40



RX 45°

Application

YAMASA RX Type Tools are used for the aim of burnishing the radiuses which are concurrent with cylindrical flat surface, conical, flat and spherical surfaces. The tools provide as well as surface hardness and at low rate calibration (measurement accuracy) beside of burnishing and also increase the strength against to sunderance, breaking, oxidation and cracking. The tools provide time saving through a high processing power and speed and this is a motive to prefer for the serial production.

Tool Structure

RX Type Single Roller Burnishing Tools consist of a connecting shank, precision body which is special designed, roller head which contains special mechanism parts for long using life and a dial gauges which is assembled for adjusting the force. According to the preference, shank is delivered as Square, Weldon or VDI Shank. All shanks are demountable.

Recommended Machining Parameters

Circumferential speed	: 100 m/min. (max.200)
Feeding	: between 0,1 – 0,3 mm/rev. (max.0,8)
Burnishing allowance	: ~ +0,005 to +0,02 mm
Pre-machining	: Precision lathening or grinding
Pre-machining roughness	: $R_z = 5-15 \mu m$
Coolant	: Oil emulsion or cutting oil

Technical Features and Advantages

- The surfaces in quality of $R_z < 1 \mu m$ ($R_a < 0,2 \mu m$) can be obtained.
- It is possible to burnish in different sizes with same tool.
- Used on CNC, Universal and lathe machines which has copy system.
- Tool shank and indicator have a special right and left interchange. So the tool can used both on Universal and CNC Machines.
- Tools don't require settings and when the tool is fixed to the machine it is ready to use.
- During the operation the tool is fixed and workpiece rotates. Rotation is possible in two directions.
- Roller burnishing force can be adjusted. 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.
- Roller burnishing of shoulders and other edges is possible up to the end.
- It is capable to burnish all kinds of metallic materials up to the tensile strength of 1400N/mm and to the hardness 42-45 HRC.
- It is easy to change the spare part.
- Process time is short.
- It removes the second machine and personnel requirements.
- It is enough few lubrication (oil or emulsion).
- It does not make sawdust.



RX-1-90°-2.5R-WE40

Samples of application

- front axle of car
- back axle housing of long vehicle
- axles
- shafts

Order Sample

RX-1-90°-2.5R-WE40

RX : Type
1 : Version
90° : Angle
2.5R : Roller radius
WE40 : Shank
VDI = DIN 69880
WE = DIN 1835 Weldon
SL = Square



RX 90°

Single Roller Burnishing Tools

Type SX For cylindrical external surfaces, external tapers and flat surfaces

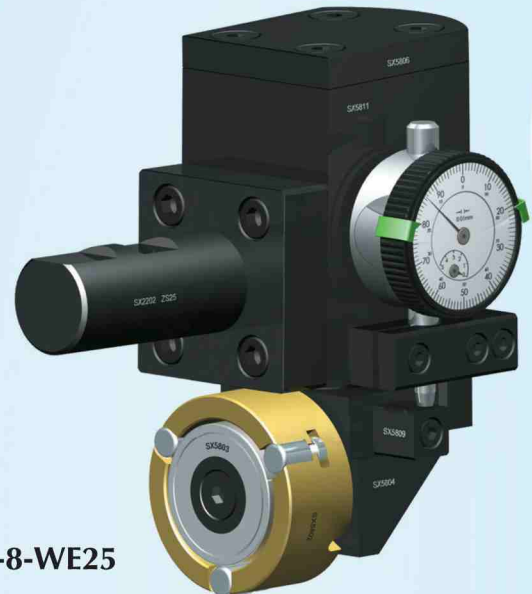


Application

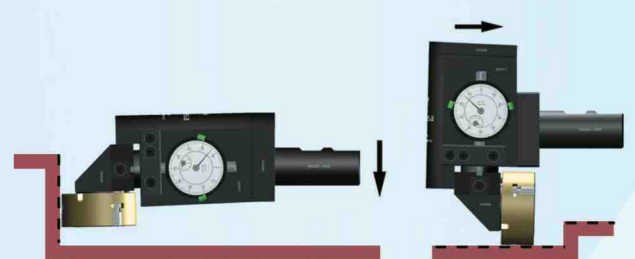
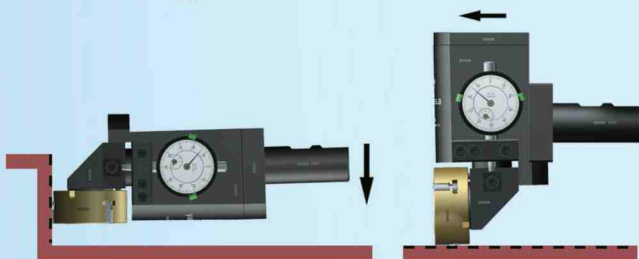
YAMASA SX Type Tools are used for the aim of burnishing the stepped-plain shafts, female tapers and flat surfaces. The tools provide as well as surface hardness and at low rate calibration (measurement accuracy) beside of burnishing. The tools provide time saving through a high processing power and speed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



SX-1-8-WE25



SX-2-8-WE25



Technical Features and Advantages

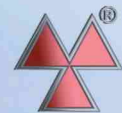
- The surfaces in quality of $Rz < 1 \mu\text{m}$ ($Ra < 0,2 \mu\text{m}$) can be obtained.
- It is possible to burnish in different sizes with same tool.
- Tools can be used in two different ways by changing the shank. Shank of the tool can be disassemble and can be interchanged on the body. So with same tool both shafts and flat surfaces can be burnished. For this reason it does not require to have two other tools for two different surfaces.
- Used on CNC and Universal Lathe Machines.
- Tool shank and indicator have a special right and left interchange. So the tool can used both on Universal and CNC Machines.
- Tools don't require settings and when the tool is fixed to the machine it is ready to use.
- During the operation the tool is fixed and workpiece rotates. Rotation is possible in two directions.
- Roller burnishing force can be adjusted. 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.

- Roller burnishing of shoulders and other edges is possible up to the end.
- It is capable to burnish all kinds of metallic materials up to the tensile strength of 1400N/mm₂ and to the hardness 42-45 HRC.
- It is easy to change the spare part.
- Process time is short.
- It removes the second machine and personnel requirements.
- It is enough a little lubrication (oil or emulsion)
- It does not make sawdust.



Samples of application

- Telescopic cylinders • Hydraulic cylinders • Rods
- Axle shafts • Clutch parts • Brake disks • Spline hubs
- Pulleys • Torque converters • Shafts etc.



yamasa

- SX 5** ~ Ø10 - Ø40 mm
- SX 8** ~ Ø12 - Ø150 mm
- SX 14** ~ Ø30 - Ø2000 mm

Recommended

Machining Parameters

	SX 5	SX 8	SX 14
Recommended dia.range	: External surfaces ~Ø10-40 mm Flat surfaces ~Ø1-40 mm	External surfaces ~Ø12-150 mm Flat surfaces ~Ø1-150 mm	External surfaces ~Ø30-2000 mm Flat surfaces ~Ø1-2000 mm
Circumferential speed	: 80 m/min. (max.150)	100 m/min. (max.150)	100 m/min. (max.200)
Feeding	: between 0,1 - 0,3 mm/rev. (max.0,6)	between 0,1 - 0,3 mm/rev. (max.0,6)	between 0,1 - 0,3 mm/rev. (max.1)
Burnishing allowance	: ~ +0,005 to +0,02 mm	~ +0,005 to +0,02 mm	~ +0,005 to +0,02 mm
Pre-machining	: Precision lathening or grinding	Precision lathening or grinding	Precision lathening or grinding
Pre-machining roughness	: R _z = 5-15 µm	R _z = 5-15 µm	R _z = 5-15 µm
Coolant	: Oil emulsion or cutting oil	Oil emulsion or cutting oil	Oil emulsion or cutting oil

Tool Structure

SX Type Single Roller Burnishing Tools consist of a connecting shank, precision body which is special designed, roller head which contains special mechanism parts for long using life and a dial gauges which is assembled for adjusting the force. According to the preference, shank is delivered as Square, Weldon or VDI Shank. All shanks are demountable.

SX-1-14-SL25



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Application of Rod Roller Burnishing

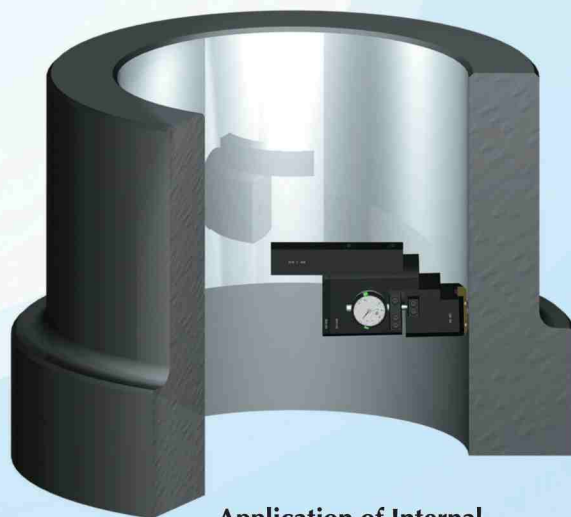
Order Sample

SX-1-14-VDI40

- SX : Type
- 1 : Version
- 14 : Type of the roller
- VDI : Shank
- VDI = DIN 69880
- WE = DIN 1835 Weldon
- SL = Square

SX Table of Tool Selection

Dia. Range ~	Surface	Machining Direction	Type
10 - 40	External	From tailstock to chuck	SX-1-5
10 - 40	External	From chuck to tailstock	SX-2-5
1 - 40	Flat	side of tailstock	SX-1-5 / SX-2-5
12 - 150	External	From tailstock to chuck	SX-1-8
12 - 150	External	From chuck to tailstock	SX-2-8
1 - 150	Flat	side of tailstock	SX-1-8 / SX-2-8
30 - 2000	External	From tailstock to chuck	SX-1-14
30 - 2000	External	From chuck to tailstock	SX-2-14
1 - 2000	Flat	side of tailstock	SX-1-14 / SX-2-14



Application of Internal Roller Burnishing

K Series Roller Burnishing Tools

Type KI, KD, KA

For Male - Female Tapers
and Flat Surfaces



Application

These tools are used to process the internal-external tapers and flat surfaces. They are suitable to roller burnish for all workpieces requiring sensitivity. 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.

Technical Datas

Revolution : approx. 200 to 700 rpm
Pre-machining : precision lathening
Pre-machining Roughness : $R_z = 5-15 \mu\text{m}$
Coolant : Oil emulsion or cutting oil



Type KI

For tapered internal surfaces

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^2 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.

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Type KD

For external tapered surfaces

Technical Datas

Revolution : approx. 200 to 700 rpm
Pre-machining : precision lathening
Pre-machining Roughness : $R_z = 5-15 \mu\text{m}$
Coolant : Oil emulsion or cutting oil

Tool Structure

KI, KD and KA type tools consist of a body and a roller head. The tool body consists of a shank and a very sensitive housing equipped with the pressurized spring system. The special spring system is designed due to the requirements of the work suitability. The tool is given 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 head 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.



Type KA

For flat surfaces

Technical Datas

Revolution : approx. 200 to 700 rpm
Pre-machining : precision lathening
Pre-machining Roughness : $R_z = 5-15 \mu\text{m}$
Coolant : Oil emulsion or cutting oil

Samples of application

- Taper seat surfaces of valve bodies • Ball stud • Gas cock • Clutch Parts • Valve seat surface • Top end of sensor connector • Joint flange surface • Plain surfaces of compressor parts • Mating surface of transmission parts • Top end of sensor connector • Semicondutor valves • Joints etc.



Order Requirements

The tool bodies and roller heads are designed in according to the sizes of the workpieces and the material type. In order to produce the most proper tool, it is necessary to submit the technical drawing and the informations such as the material type and material hardness. If it is impossible to send the technical drawings, at least the surface sizes of the workpiece and the material type should be informed definitely.

Order Sample

- KI-47,00-33,20-30°-MK3
- KI : Type
- 47,00 : ϕD
- 33,20 : ϕd
- 30° : Angle(only KI and KD)
- MK3 : Shank

Tool Body	Diameter Range ϕD	Tool Shank		a	b	c	e
		Morse Taper	Cylindrical ($\phi_i \times h$)				
K1	006,00 - 044,99	MK2	$\phi 20 \text{ h}6 \times 50$	78,5	65	25	It can be changed according to the workpiece and surface dimensions which will be operated.
K2	045,00 - 099,99	MK3	$\phi 25 \text{ h}6 \times 56$	98	92	48	
K3	100,00 - 149,99	MK4	$\phi 32 \text{ h}6 \times 60$	123	107	63	

Skive - Burnishing Tools

Type CSX, CX

For hydraulic cylinders, tubes and inner surfaces



CSX Type Combined Skive - Burnishing Tools

Combined Skive -Burnishing Tools skive and burnish the internal surface of the cylinders in one pass. These tools provide low cost working and environment friendly. Tools are developed for processing the internal surface of the tubes in a little while. Combined Skive-Burnishing Tools are designed for the aim of burnishing after skiving process of seamless and welded cold drawn precision tubes (contain welded and drawn DOM Tubes, seamless cold drawn DIN EN 10305-1 Tubes or hot drawn steel tubes).

While skiving head skive the internal surface of the cylinder in exact size and in desired way, roller head which follow the operation from behind burnish the tube. The skiving and burnishing operation which occur at the same time provide very short process time. While providing precision measurement and low surface roughness, this process increase surface hardness too. Thus, cylinders which have more slippery and more strength surfaces according to honed cylinder, can be obtained.

Skive-Burnishing Tools can use on Tube Skive-Burnishing Machine or Special Deep Drilling Machine, which has BTA System.

Automatic Knife Closing System

There is available an automatic knife closing system on the tools. This system automatically discharge by pulling back the skiving knife and roller head after finish the process. So the tool withdraw without giving any damage to the machined surface. Thus, do not need to assemble and disassemble after every cylinder process. This, beside of extra time saving it provides otomation and process convenience.



Type CSX
Combined Skive -
Burnishing Tools

CX Type Skiving Tools

CX Type Skiving Tools machine seamless and welded Precision steel cylinders with CDX Type roller burnishing tools in two different operation.

In first operation, CX skiving head skive the cylinder; in the second operation, CDX tool roller burnish the surface. So the operation is completed in two pass. Depending upon cylinder, end of the process H8 or H9 diameter allowance and also the surface quality of $R_z < 1 \mu\text{m}$ ($R_a < 0,2 \mu\text{m}$) are obtained.

Samples of application

- Hydraulic and pneumatic cylinders
- Telescopic cylinders
- ST52 or ST35 stainless steel tubes
- Welded precision tube (ST37)
- Stainless cold drawn DIN EN 10305-1 Tubes or hot drawn steel tubes
- Welded and drawn DOM Tubes
- DIN SHE 1020
- DIN SHE 1026 and USA Material

Type CX
Skiving 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.

Technical Features and Advantages

- The surfaces in quality of $Rz < 1 \mu\text{m}$ ($Ra < 0,2 \mu\text{m}$) 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^2 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 manuell.
- 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 and workpiece rotate.
- Roller burnishing of shoulders and other edges is possible up to the end.
- The tool is automatically discharge 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.



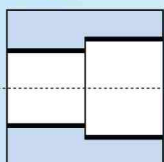
Technical Datas

Circumferential speed	: max. 250 m/min.
Feeding	: per roller 0,1 – 0,3 mm/rev.
Pre-machining	: Reaming or lathening
Coolant	: Oil emulsion or cutting oil

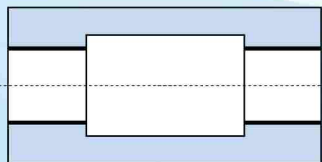
Tool Structure

UX Type Tools consist of a very precision body which is special designed and roller head. The bodies of the tools have a very 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.

Stepped hole



Axial hole



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.

Centerless Roller Burnishing Machines Types MXM For Cylindrical Shafts

Plain and stepped shafts between $\varnothing 3 - \varnothing 40$ mm



Technical Datas

Burnishing allowance : $\sim +0,005$ to $+0,02$ mm
Pre-machining : Precision lathening or grinding
Pre-machining roughness : $R_z = 5-15 \mu\text{m}$

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^2 tensile strength and hardness up to max. 42-45 HRC. Super finish surfaces up to $R_a = 0,02 \mu\text{m}$ 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.

Design and Function

MXM Roller Burnishing Machines are capable to process any kind of diameter between $\varnothing 3 - \varnothing 40$ 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 precise and fast adjustment can be done through the adjustment mechanism.
- No sawdust and residues occur.

Samples of application

- Shock absorber shafts • Pneumatic cylinder shafts
- HDD shafts • Coil • Powered tooth brush drive shafts
- Printer guide shafts • Piston rods • Air hammer parts
- Air condition shafts • Pump shafts • Motor shafts
- Optical drum for copying machine • Wire etc.





PROCESSING PROPERTIES	MODELS					
	MXM-1 NC HORIZONTAL	MXM-1 DPH HORIZONTAL	MXM-1 DVH HORZ.-VERT	MXM-2 NC HORIZONTAL	MXM-2 DPH HORIZONTAL	MXM-2 DVH HORZ.-VERT
Diameter range (mm)	Ø3 - Ø 20	Ø3 - Ø 20	Ø3 - Ø 20	Ø3 - Ø 40	Ø3 - Ø 40	Ø3 - Ø 40
Workpiece processing length (mm)	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Max. feed rate (mm/rev.)	2	2	2	2	2	2
Achieved min. roughness (Ra / μm)	0.02	0.02	0.02	0.02	0.02	0.02
Stepped workpiece processing possibility	x	x	x	x	x	x
POWER PROPERTIES						
Motor power	1.5 kW	1.5 kW	1.5 kW	2.2 kW	2.2 kW	2.2 kW
Electrical connection	380 V	380 V	380 V	380 V	380 V	380 V
Speed control	1.5 kW	1.5 kW	1.5 kW	2.2 kW	2.2 kW	2.2 kW
Oil pump	90 W	90 W	-	90 W	90 W	-
COMMAND - CONTROL						
Lighting	x	x	x	x	x	x
Discharging system for tightened piece	x	x	x	x	x	x
Emergency stop	x	x	x	x	x	x
Control panel	x	x	x	x	x	x
Speed control	x	x	x	x	x	x
Automatic emergency stop	x	x	x	x	x	x
Electronic revolution indicator	x	x	x	x	x	x
Lubrication	x	x	-	x	x	-
Oil lessen/out alarm	x	-	-	x	-	-
Colored LCD computerized control panel	x	-	-	x	-	-
Daily piece counter indicator	x	-	-	x	-	-
Total piece counter indicator	x	-	-	x	-	-
Processing period indicator (optional)	x	-	-	x	-	-
Memory by operation	x	-	-	x	-	-
Program and receipt print	x	-	-	x	-	-
Digital revolution setting system	x	-	-	x	-	-
Additional module possibility	x	-	-	x	-	-
Automatic loading system Integrated possibility	x	x	x	x	x	x
Commanding and programming piece loading system with the present computerized panel	x	-	-	x	-	-
CHANGEABLE PARTS						
Roller head	x	x	x	x	x	x
Input-middle-output centering apparatus	x	x	x	x	x	x
COOLING TANK						
Lubrication	x	x	-	x	x	-
Oil level indicator	x	x	-	x	x	-
Filtering	x	x	-	x	x	-
Capacity (Liter)	30	30	-	30	30	-
DIMENSIONS						
Width (mm)	780	780	500	780	780	500
Length (mm)	1400	1400	1000	1400	1400	1000
Height (mm)	1200	1200	550	1200	1200	550



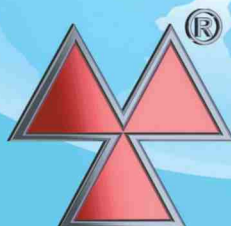
YMX302-ZU8

0.0050



YAMASA

Ø 40.00
Setting Range
- 0.40 / + 0.10
Machine Feeding
Stepped Shaft
MX 7040300



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