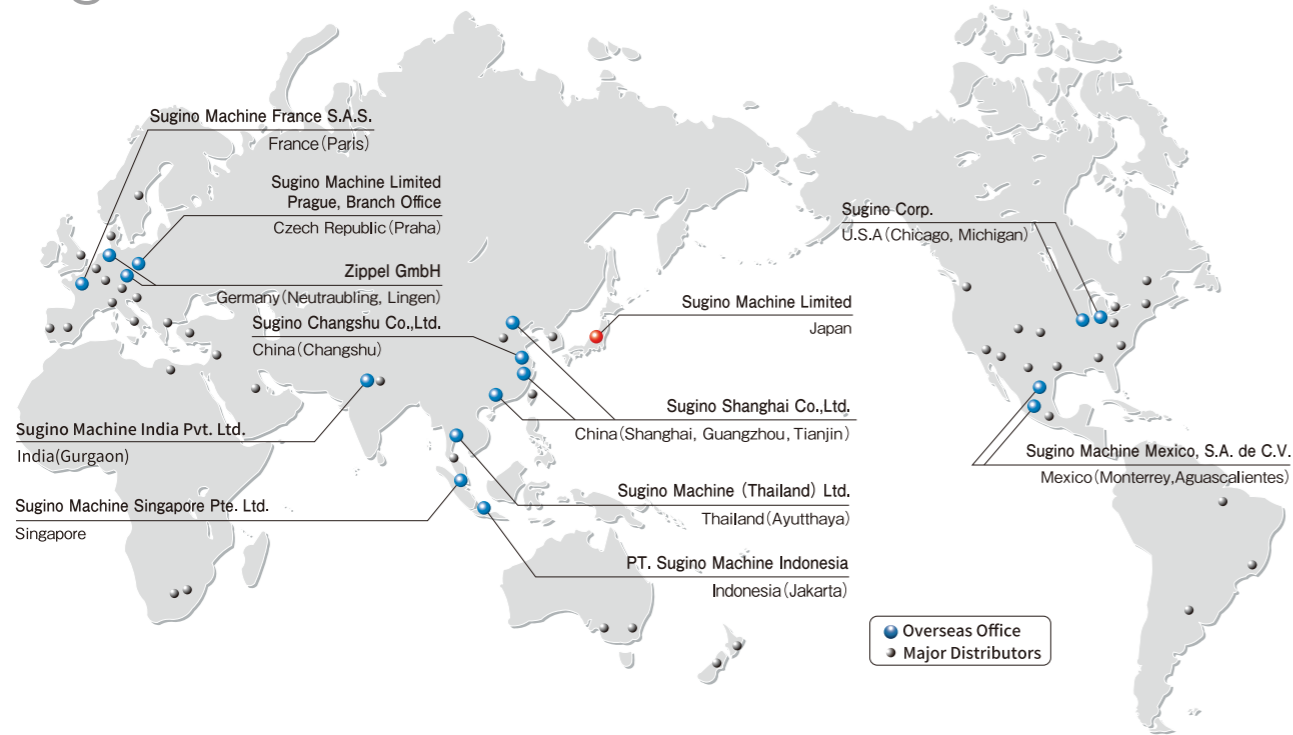


Sugino Global Network



Roller Burnishing Tool

SUPERROLL®



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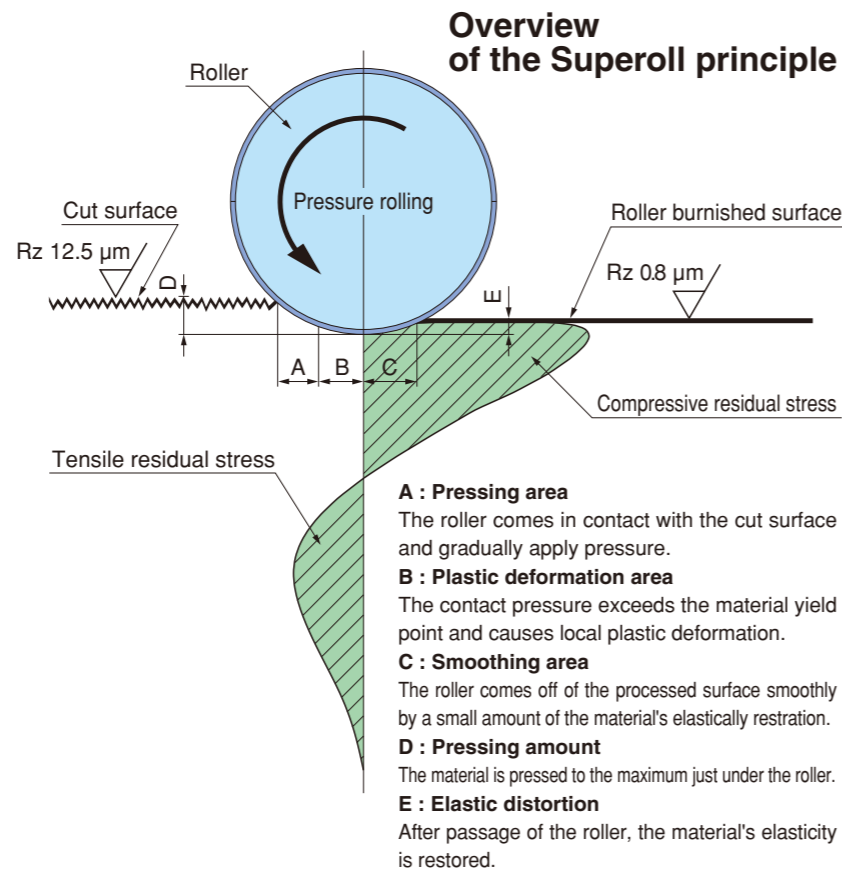
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Superroll realizes ultra-precision micro-plastic work.



How it works

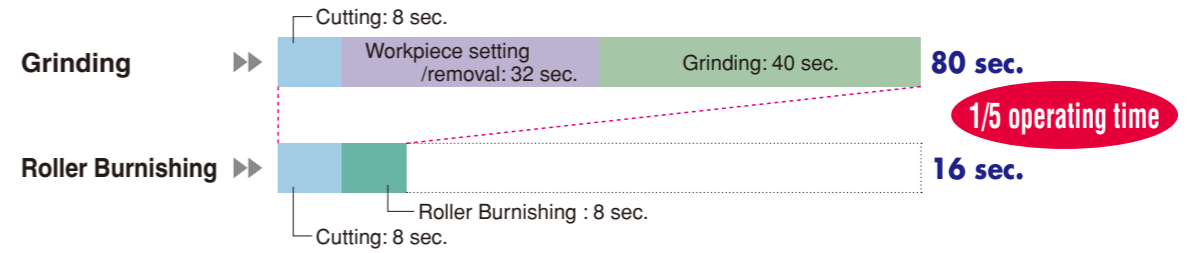
Superroll is roller burnishing tool that provides mirror finishing by pressing metal surface. Because plastic deformation is limited only to the surface, it realizes higher productivity, precise finishing and surface modification all at the same time.



Advantages and Benefits

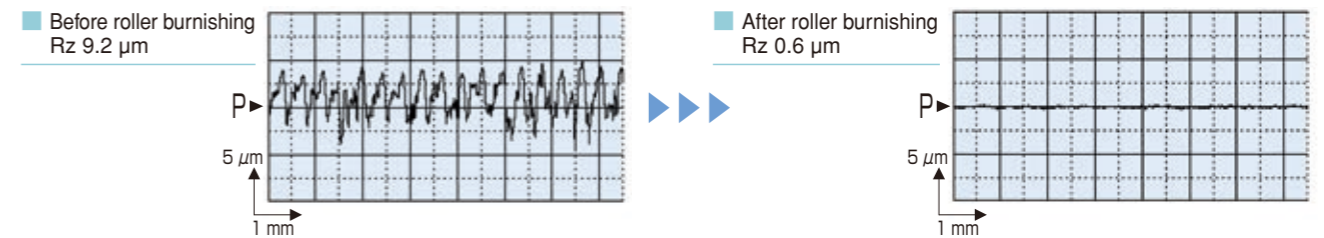
Save the time

Operation time reduced to 1/5-1/20 of that of grinding. Plural process integrated by finishing on the lathe or machining center.



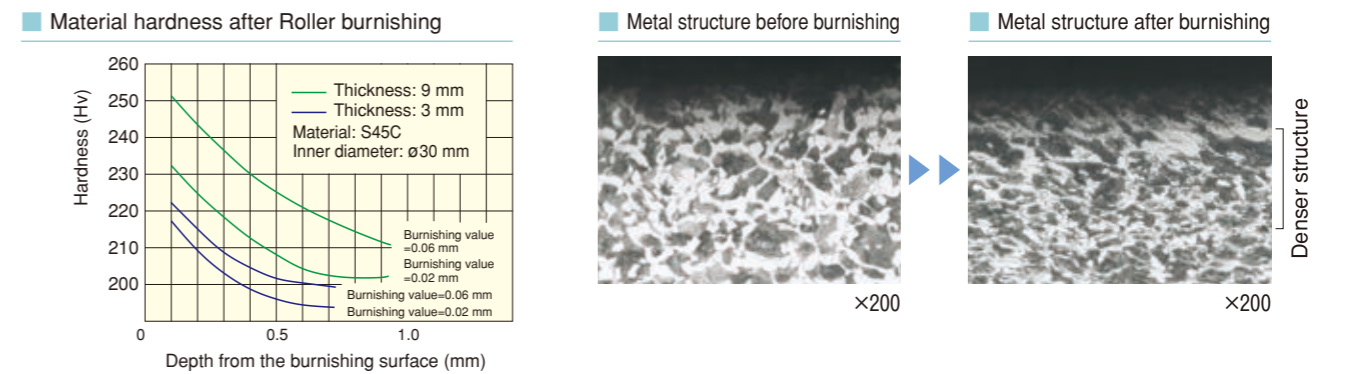
Hi-Speed finishing

It provides Rz 0.1 to 0.8 μm finishing in one pass. The finished surface without any sharp projection is suitable for slide or seal surface.



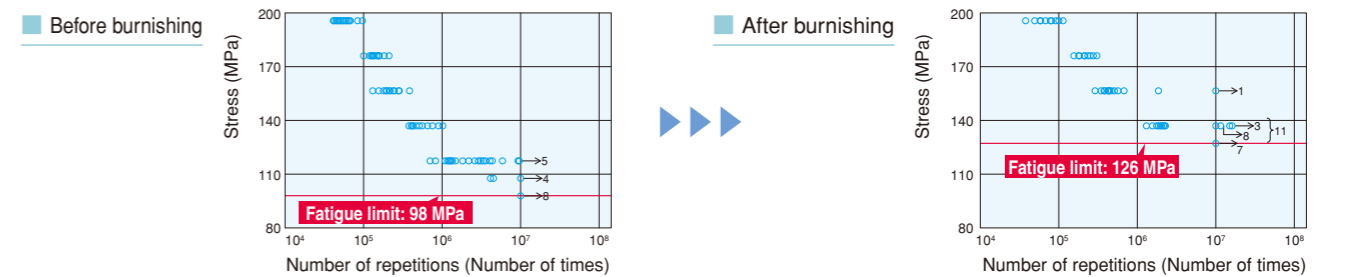
Improved abrasion resistance (to increased hardness)

The hardend surface by densification of metal structure leads to improved abrasion resistance.



Improved fatigue strength

Since compressive stress resided at the surface, fatigue strength is increased more than 30%.



No sludge produced

Since the grinding sludge is not produced, it needs no special treatment as industrial waste.



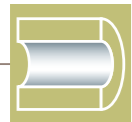
Superoll's mirror surface finishing meets every type of production needs.



Index

Select a Superoll type suitable for the processing part of your work and proceed to the indicated page.

Internal



Through-hole

Superoll SH type ▶▶ **P 6**

Cylinder, Motor stator, Connecting rod, etc.

Superoll MAC ▶▶ **P 14**

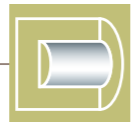
Bushing, Gas valve, Gear, Shock absorber, etc.

Bearingizer ▶▶ **P 23**

Engine pistons

Superoll ME type ▶▶ **P 24**

Motor core, Sizing such as stators



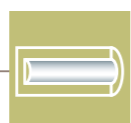
Blind-hole

Superoll SB type ▶▶ **P 6**

Brake cylinder, Bearing insertion surface, Piston housing, etc.

Superoll MAC ▶▶ **P 14**

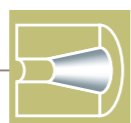
Bushing, Gas valve, Gear, Shock absorber, etc.



Small hole

Superoll Slim CSL type ▶▶ **P 10**

Pneumatic valves, Cylinders, Locker arm, etc.

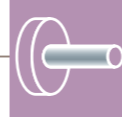


Internal taper

Superoll ST type ▶▶ **P 23**

Gas valve, Valve seat, etc.

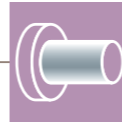
External



Thin Staged shaft

Superoll Slim CSA type ▶▶ **P 12**

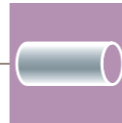
Gear shaft, Pin, Motor shaft, etc.



Staged shaft

Superoll SA type ▶▶ **P 13**

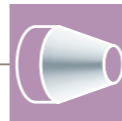
Shaft, Pin, Rod, Torque converter, etc.



Shaft, Pin

Superoll Mugen ▶▶ **P 26**

Printer guide shaft, Piston rod, Coil, Wire, etc.



External taper

Superoll SE type ▶▶ **P 23**

Gas cock, Connector, Ball stud, Valve, etc.

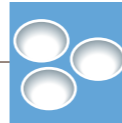


Spherical

Superoll SES type ▶▶ **P 24**

Ball stud (the sphere part)

Surface improvement



Internal, External, Flat surface

Micro-dimple molding tool ▶▶ **P 24**

Mold a micro dimple by machine operation

Flat surface



Flat surface and End surface

Superoll SF type ▶▶ **P 22**

Connector, flange surface, Clutch part, Semiconductor valve, etc.



Flat plate

Superoll Level ▶▶ **P 22**

Transmission part mating surface, Compressor part flat surface, Sensor connector tip surface, etc.

Radius

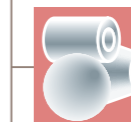


R surface

Superoll FD type ▶▶ **P 23**

Fittings for semiconductor mfg. units, Fitting for ultra high vacuum units, etc.

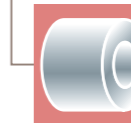
Multiple



Single Roller Superoll SR type ▶▶ **P 16**

CAT'S EYE ▶▶ **P 20**

Barriquan ▶▶ **P 25**



Single Roller Superoll SR•C type ▶▶ **P 18**

Single Roller Superoll SR 16M type ▶▶ **P 18**

Before using Superoll ▶▶ **P 28**

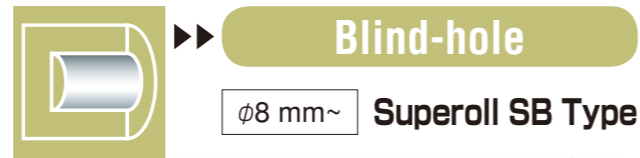
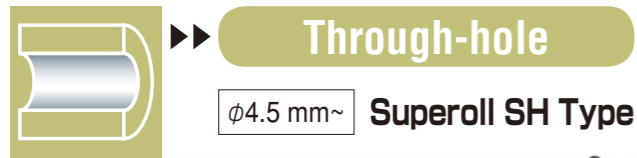
Superoll Oil ▶▶ **P 28**

Replacing consumables (For the SH and SB types) ▶▶ **P 30**

Superoll Inquiry Sheet ▶▶ **P 31**

The complete lineup of Superoll tools supports high quality finishing.





[Driving units]
Drilling machine Drilling unit
Lathe Machining center

Standard Internal tools are adjustable in increments of 0.0025 mm.
SH type for Through-hole, SB type for Blind-hole.

How to use

SH and SB type of Superroll are used for normal rotation. The same results can be obtained even by fixing Superroll and rotating a workpiece. For the rotation speed and feed rate, see the right standard chart.

[Ref. parameters]

Hole size mm	Rotation speed min ⁻¹	Feed rate mm/rev	Torque N·m	Thrust kN
4.5 ~ 7.8	900 ~ 1,800	0.1 ~ 0.3	0.3 ~ 2.5	0.1 ~ 0.8
8.0 ~ 14.5	800 ~ 1,200	0.1 ~ 0.4	0.3 ~ 5.0	0.2 ~ 1.8
15.0 ~ 19.0	700 ~ 1,000	0.2 ~ 0.5	1.0 ~ 8.0	1.0 ~ 2.4
20.0 ~ 24.0	600 ~ 800	0.3 ~ 0.6	1.5 ~ 12.0	0.6 ~ 3.0
25.0 ~ 44.0	500 ~ 700	0.3 ~ 1.0	2.5 ~ 25.0	1.0 ~ 8.0
45.0 ~ 74.0	300 ~ 500	0.5 ~ 1.5	5.0 ~ 50.0	2.0 ~ 12.0

Un-processable area for SH/SB type

1. Roller tip radius section
2. Length from the roller tip to the frame tip (SH type)
3. Clearance between the roller or frame tip and the burnishing end surface. (0.5 mm)

SH type

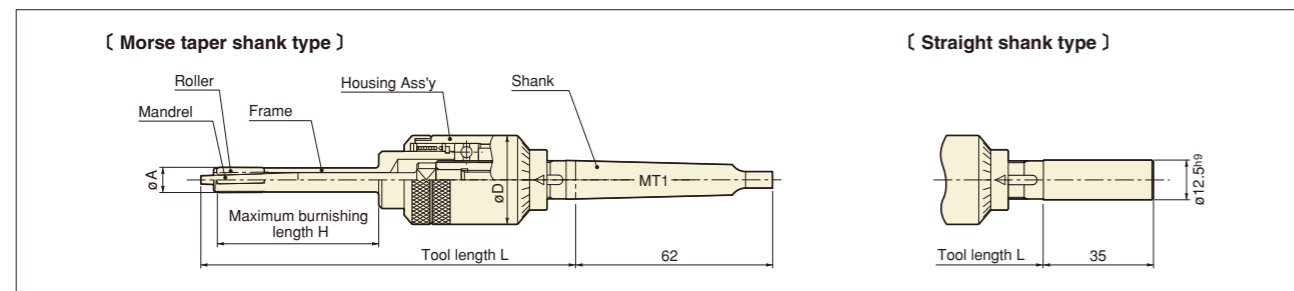
Hole size mm	Un-processable area mm
4.5 ~ 5.7	2.0
6.0 ~ 7.6	2.1
8.0 ~ 14.5	2.5
15.0 ~ 34.0	2.8
35.0 ~ 74.0	3.8

SB type

Specifications	Hole size mm	Un-processable area mm
Standard	8.0 ~ 14.5	1.5
	15.0 ~ 34.0	1.8
	35.0 ~ 74.0	1.8
Special	All sizes	0.8

Note 1. To minimize un-processable area, grind off the extrusion of the mandrel to the same position as the roller tip end after setting the tool diameter.
2. With the SB type, the un-processable area can be reduced to 0.8 mm by changing to special specification rollers.

Dimensions For hole size φ4.5-14.5 mm



Note: The maximum burnishing length H is the actual length of the tool. Please take 1 - 2 mm allowance for the actual usage.

Specifications For Through-hole/Blind-hole Hole size φ4.5-14.5 mm

(Standard)

Tool model No.		Tool diameter adjusting range A mm	Maximum burnishing length H mm	Tool length L mm		Housing number Housing diameter D mm	Rollers (quantity in one set)		Part model No.		
Through-hole	Blind-hole			Morse taper	Straight		Through-hole	Blind-hole	Mandrel	Shank	
SH450		4.45 ~ 4.80	50	118	115	HA1 28	R001(4)		M001	S01 (MT1)	S01R φ12.5 mm xL35 mm
SH475		4.70 ~ 5.05					M002				
SH500		4.95 ~ 5.30					M002				
SH525		5.20 ~ 5.55					M003				
SH550		5.45 ~ 5.80					M002				
SH575		5.70 ~ 6.05					M003				
SH600		5.95 ~ 6.45					M004				
SH640		6.35 ~ 6.85					M005				
SH680		6.75 ~ 7.25					M006				
SH720		7.15 ~ 7.65					M005				
SH760		7.55 ~ 8.05					M006				
SH800	SB800	7.95 ~ 8.55					M007				
SH850	SB850	8.45 ~ 9.05					M008				
SH900	SB900	8.95 ~ 9.55					M007				
SH950	SB950	9.45 ~ 10.05					M008				
SH1000	SB1000	9.95 ~ 10.55	M009								
SH1050	SB1050	10.45 ~ 11.05	M008								
SH1100	SB1100	10.95 ~ 11.55	M009								
SH1150	SB1150	11.45 ~ 12.05	M010								
SH1200	SB1200	11.95 ~ 12.55	M009								
SH1250	SB1250	12.45 ~ 13.05	M010								
SH1300	SB1300	12.95 ~ 13.55	M011								
SH1350	SB1350	13.45 ~ 14.05	M010								
SH1400	SB1400	13.95 ~ 14.55	M011								
SH1450	SB1450	14.45 ~ 15.05	M012								

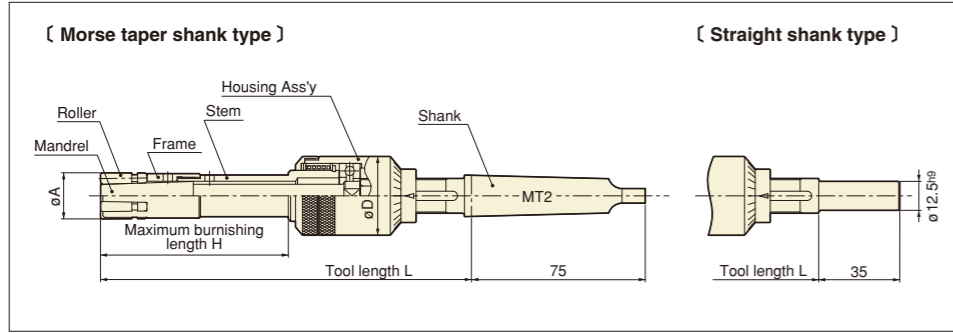
(Long)

Tool model No.		Tool diameter adjusting range A mm	Maximum burnishing length H mm	Tool length L mm		Housing number Housing diameter D mm	Rollers (quantity in one set)		Part model No.		
Through-hole	Blind-hole			Morse taper	Straight		Through-hole	Blind-hole	Mandrel	Shank	
SH600L		5.95 ~ 6.45	90	158	155	HA1 28	R004(4)		M004L	S01 (MT1)	S01R φ12.5 mm xL35 mm
SH640L		6.35 ~ 6.85					M005L				
SH680L		6.75 ~ 7.25					M006L				
SH720L		7.15 ~ 7.65					M005L				
SH760L		7.55 ~ 8.05					M006L				
SH800L	SB800L	7.95 ~ 8.55					M007L				
SH850L	SB850L	8.45 ~ 9.05					M008L				
SH900L	SB900L	8.95 ~ 9.55					M007L				
SH950L	SB950L	9.45 ~ 10.05					M008L				
SH1000L	SB1000L	9.95 ~ 10.55					M009L				
SH1050L	SB1050L	10.45 ~ 11.05					M008L				
SH1100L	SB1100L	10.95 ~ 11.55					M009L				
SH1150L	SB1150L	11.45 ~ 12.05					M010L				
SH1200L	SB1200L	11.95 ~ 12.55					M009L				
SH1250L	SB1250L	12.45 ~ 13.05					M010L				
SH1300L	SB1300L	12.95 ~ 13.55	M011L								
SH1350L	SB1350L	13.45 ~ 14.05	M010L								
SH1400L	SB1400L	13.95 ~ 14.55	M011L								
SH1450L	SB1450L	14.45 ~ 15.05	M012L								

[When selecting a tool]

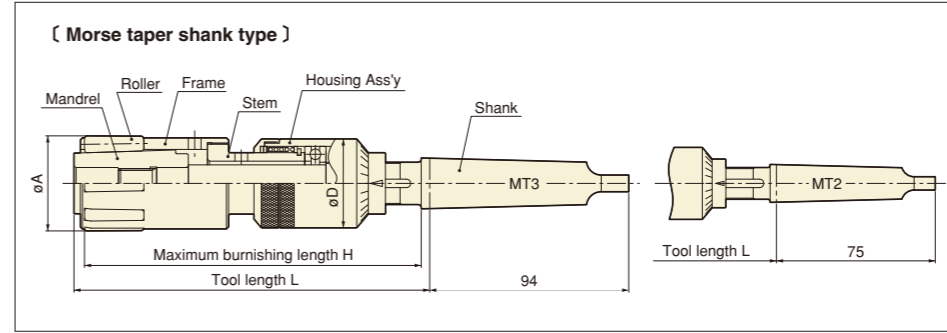
- Select SH type or SB type at first, and find tool diameter size.
- Select Standard or Long according to the hole length.
- For hole size φ4.5-34 mm, select a shank type suitable for your machine.
- When ordering a replacing part, specify the part name and the part model No.

Dimensions For hole size $\phi 15-34$ mm



- Note 1. The maximum burnishing length H is the actual length of the tool. Please take 1 - 2 mm allowance for the actual usage.
 Note 2. Frame and stem of SH/SB type Superroll for hole size $\phi 15$ mm or larger are separable.
 Note 3. Special Superroll with longer burnishing length is available upon request.

Dimensions For hole size $\phi 35-74$ mm



- Note 1. The maximum burnishing length H is the actual length of the tool. Please take 1 - 2 mm allowance for the actual usage.
 Note 2. For hole size $\phi 35-74$ mm, the outer diameter of the housing ass'y is smaller than the tool diameter. The maximum burnishing length can be extended by attaching Morse taper socket.
 Note 3. For hole size over $\phi 75$ mm are available upon request.

Specifications For Through-hole/Blind-hole Hole size $\phi 15-34$ mm

(Standard)

Tool model No.		Tool diameter adjusting range A mm	Maximum burnishing length H mm	Tool length L mm		Housing number Housing diameter D mm	Part model No.					
Through-hole	Blind-hole			Morse taper	Straight		Rollers (quantity in one set)		Mandrel	Stem	Shank	
							Through-hole	Blind-hole			Morse taper	Straight
SH1500	SB1500	14.9 ~ 16.1	50	130	127	HA2 34	R011(4)	B011(4)	M013	E1	S02 (MT2)	S02R $\phi 12.5$ mm $\times L35$ mm
SH1600	SB1600	15.9 ~ 17.1							M014	E2		
SH1700	SB1700	16.9 ~ 18.1							M015	E3		
SH1800	SB1800	17.9 ~ 19.1							M014	E2		
SH1900	SB1900	18.9 ~ 20.1					M015	E3				
SH2000	SB2000	19.9 ~ 21.1					R011(6)	B011(6)	M016	E4		
SH2100	SB2100	20.9 ~ 22.1							M017	E5		
SH2200	SB2200	21.9 ~ 23.1							M018	E6		
SH2300	SB2300	22.9 ~ 24.1							M017	E5		
SH2400	SB2400	23.9 ~ 25.1					R012(6)	B012(6)	M018	E6		
SH2500	SB2500	24.9 ~ 26.1							M019	E7		
SH2600	SB2600	25.9 ~ 27.1							M020			
SH2700	SB2700	26.9 ~ 28.1							M021			
SH2800	SB2800	27.9 ~ 29.1					R013(6)	B013(6)	M022			
SH2900	SB2900	28.9 ~ 30.1							M023			
SH3000	SB3000	29.9 ~ 31.1							M022			
SH3100	SB3100	30.9 ~ 32.1	M023									
SH3200	SB3200	31.9 ~ 33.1	R013(6)	B013(6)	M024	E8						
SH3300	SB3300	32.9 ~ 34.1			M025							
SH3400	SB3400	33.9 ~ 35.1			M026							

(Long)

Tool model No.		Tool diameter adjusting range A mm	Maximum burnishing length H mm	Tool length L mm		Housing number Housing diameter D mm	Part model No.					
Through-hole	Blind-hole			Morse taper	Straight		Rollers (quantity in one set)		Mandrel	Stem	Shank	
							Through-hole	Blind-hole			Morse taper	Straight
SH1500L	SB1500L	14.9 ~ 16.1	150	230	227	HA2 34	R011(4)	B011(4)	M013L	E1L	S02 (MT2)	S02R $\phi 12.5$ mm $\times L35$ mm
SH1600L	SB1600L	15.9 ~ 17.1							M014L	E2L		
SH1700L	SB1700L	16.9 ~ 18.1							M015L	E3L		
SH1800L	SB1800L	17.9 ~ 19.1							M014L	E2L		
SH1900L	SB1900L	18.9 ~ 20.1					M015L	E3L				
SH2000L	SB2000L	19.9 ~ 21.1					R011(6)	B011(6)	M016L	E4L		
SH2100L	SB2100L	20.9 ~ 22.1							M017L	E5L		
SH2200L	SB2200L	21.9 ~ 23.1							M018L	E6L		
SH2300L	SB2300L	22.9 ~ 24.1							M017L	E5L		
SH2400L	SB2400L	23.9 ~ 25.1					R012(6)	B012(6)	M018L	E6L		
SH2500L	SB2500L	24.9 ~ 26.1							M019L	E7L		
SH2600L	SB2600L	25.9 ~ 27.1							M020L			
SH2700L	SB2700L	26.9 ~ 28.1							M021L			
SH2800L	SB2800L	27.9 ~ 29.1					R013(6)	B013(6)	M022L			
SH2900L	SB2900L	28.9 ~ 30.1							M023L			
SH3000L	SB3000L	29.9 ~ 31.1							M022L			
SH3100L	SB3100L	30.9 ~ 32.1							M023L			
SH3200L	SB3200L	31.9 ~ 33.1					R013(6)	B013(6)	M024L	E8L		
SH3300L	SB3300L	32.9 ~ 34.1							M025L			
SH3400L	SB3400L	33.9 ~ 35.1							M026L			

Specifications For Through-hole/Blind-hole Hole size $\phi 35-74$ mm

(Standard)

Tool model No.		Tool diameter adjusting range A mm	Maximum burnishing length H mm	Tool length L mm	Housing number Housing diameter D mm	Part model No.					
Through-hole	Blind-hole					Rollers (quantity in one set)		Mandrel	Stem	Shank	
						Through-hole	Blind-hole			Morse taper	
SH3500	SB3500	34.9 ~ 36.1	127 or more	150	HA2 34	R014(6)	B014(6)	M027	S02P (MT2)		
SH3600	SB3600	35.9 ~ 37.1						M028			
SH3700	SB3700	36.9 ~ 38.1						M029			
SH3800	SB3800	37.9 ~ 39.1						M030			
SH3900	SB3900	38.9 ~ 40.1				M031					
SH4000	SB4000	39.9 ~ 41.1				R015(6)	B015(6)	M030		E10	
SH4100	SB4100	40.9 ~ 42.1						M031			
SH4200	SB4200	41.9 ~ 43.1						M032			
SH4300	SB4300	42.9 ~ 44.1						M033			
SH4400	SB4400	43.9 ~ 45.1				R014(8)	B014(8)	M034		E11	
SH4500	SB4500	44.9 ~ 46.1						M035			
SH4600	SB4600	45.9 ~ 47.1						M036			
SH4700	SB4700	46.9 ~ 48.1						M037			
SH4800	SB4800	47.9 ~ 49.1				R015(8)	B015(8)	M038		E12	
SH4900	SB4900	48.9 ~ 50.1						M039			
SH5000	SB5000	49.9 ~ 51.1						M038			
SH5100	SB5100	50.9 ~ 52.1	M039								
SH5200	SB5200	51.9 ~ 53.1	R016(8)	B016(8)	M040	E13					
SH5300	SB5300	52.9 ~ 54.1			M041						
SH5400	SB5400	53.9 ~ 55.1			M042						
SH5500	SB5500	54.9 ~ 56.1			M041						
SH5600	SB5600	55.9 ~ 57.1	R017(8)	B017(8)	M042	E14					
SH5700	SB5700	56.9 ~ 58.1			M043						
SH5800	SB5800	57.9 ~ 59.1			M044						
SH5900	SB5900	58.9 ~ 60.1			M045						
SH6000	SB6000	59.9 ~ 61.1	R017(8)	B017(8)	M046	E14					
SH6100	SB6100	60.9 ~ 62.1			M047						
SH6200	SB6200	61.9 ~ 63.1			M048						
SH6300	SB6300	62.9 ~ 64.1			M049						
SH6400	SB6400	63.9 ~ 65.1	R017(8)	B017(8)	M050	E14					
SH6500	SB6500	64.9 ~ 66.1			M047						
SH6600	SB6600	65.9 ~ 67.1			M048						
SH6700	SB6700	66.9 ~ 68.1			M049						
SH6800	SB6800	67.9 ~ 69.1	R017(8)	B017(8)	M050	E14					
SH6900	SB6900	68.9 ~ 70.1			M051						
SH7000	SB7000	69.9 ~ 71.1			M052						
SH7100	SB7100	70.9 ~ 72.1			M053						
SH7200	SB7200	71.9 ~ 73.1	R017(8)	B017(8)	M054	E14					
SH7300	SB7300	72.9 ~ 74.1			M055						
SH7400	SB7400	73.9 ~ 75.1			M056						

For Small hole

φ3~14.5 mm **Superroll Slim CSL type**
US.PAT.6568057

Installation on a CNC automatic lathe is enabled by down-sized tool diameter adjusting mechanism. The shank shape is standardized based on the typical CNC lathe.

[Driving unit]

Lathe Machining Center

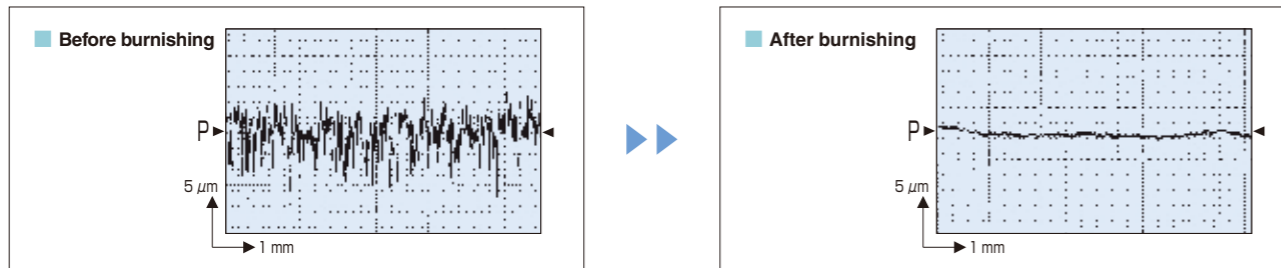


Sample of application



Pneumatic valve part

[Comparison of surface roughness]



[Ref. parameters]

Used tool model	CSL900A75L
Work piece material	C3604
Hole size	mm φ9×47L
Surface roughness	Rz μm Before burnishing 4.4 After burnishing 0.6
Rotation speed	min ⁻¹ 1,000
Feed rate	mm/rev 0.8
Machining time	sec. 4.6

How to use Slim CSL type

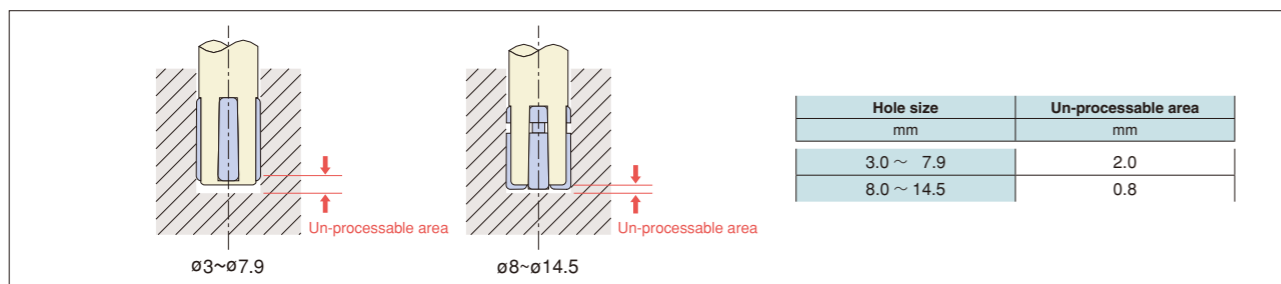
1. Attach a Slim CSL to a tool rest of equipment such as a CNC automatic lathe.
2. Machining in normal rotation at the predetermined speed and feed rate.
3. After reaching the machining end, switch to reverse rotation and retract at a rapid feed rate.

Note: Use a driving unit that can control rotations in both directions.

[Ref. parameters]

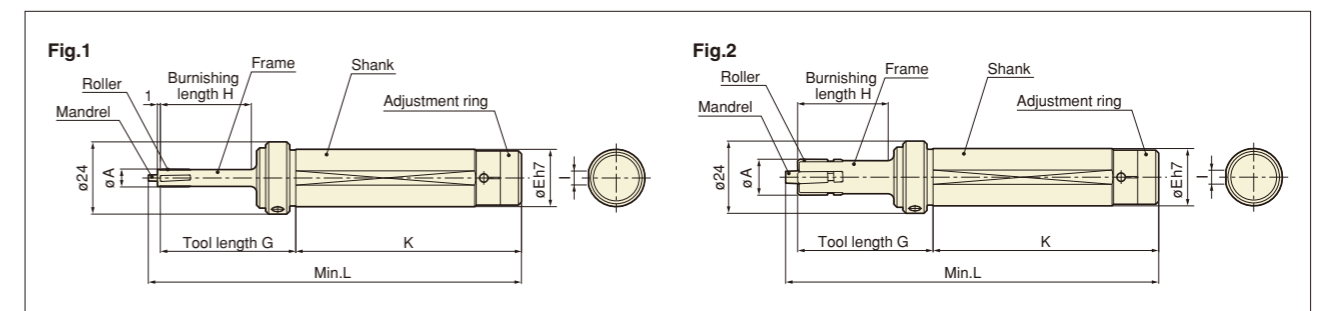
Hole size	Rotation speed	Feed rate
mm	min ⁻¹	mm/rev
3.0 ~ 4.5	1,200 ~ 2,200	0.2 ~ 0.6
4.5 ~ 6.0	1,000 ~ 1,800	0.4 ~ 0.8
6.0 ~ 8.0	900 ~ 1,500	0.5 ~ 1.0
8.0 ~ 10.5	800 ~ 1,200	0.5 ~ 1.0
10.5 ~ 14.5	800 ~ 1,200	0.5 ~ 1.5

Un-processable area by Slim CSL type



- Note 1. The un-processable areas above are values when the clearance of 0.5 mm is retained between the roller and the work end surface.
- Note 2. To minimize un-processable area, grind off the extrusion of the mandrel to the same position as the roller tip end after setting the tool diameter.

Dimensions (mm)



Note: The maximum burnishing length H is the actual length of the tool. Please take 1 - 2 mm allowance for the actual usage.

Specifications For small hole size φ3-14.5 mm

Tool model No.	Tool diameter adjusting range A		Burnishing length H		Shank diameter E	Shank length K	Tool length G		Overall length L		Rollers (quantity in one set)	Part model No.				Dimensions	
	Standard	Long	Standard	Long			Standard	Long	Standard	Long		Standard	Long	Standard	Long		
CSL 300 □□	CSL 300 □□ L	2.95 ~ 3.15															
CSL 350 □□	CSL 350 □□ L	3.45 ~ 3.65															
CSL 400 □□	CSL 400 □□ L	3.95 ~ 4.15															
CSL 450 □□	CSL 450 □□ L	4.45 ~ 4.65															
CSL 500 □□	CSL 500 □□ L	4.95 ~ 5.15															
CSL 550 □□	CSL 550 □□ L	5.45 ~ 5.65															
CSL 600 □□	CSL 600 □□ L	5.95 ~ 6.15															
CSL 650 □□	CSL 650 □□ L	6.45 ~ 6.65															
CSL 700 □□	CSL 700 □□ L	6.95 ~ 7.15															
CSL 750 □□	CSL 750 □□ L	7.45 ~ 7.65															
CSL 800 □□	CSL 800 □□ L	7.95 ~ 8.15															
CSL 850 □□	CSL 850 □□ L	8.45 ~ 8.65															
CSL 900 □□	CSL 900 □□ L	8.95 ~ 9.15															
CSL 950 □□	CSL 950 □□ L	9.45 ~ 9.65															
CSL1000 □□	CSL1000 □□ L	9.95 ~ 10.15															
CSL1050 □□	CSL1050 □□ L	10.45 ~ 10.65															
CSL1100 □□	CSL1100 □□ L	10.95 ~ 11.15															
CSL1150 □□	CSL1150 □□ L	11.45 ~ 11.65															
CSL1200 □□	CSL1200 □□ L	11.95 ~ 12.15															
CSL1250 □□	CSL1250 □□ L	12.45 ~ 12.65															
CSL1300 □□	CSL1300 □□ L	12.95 ~ 13.15															
CSL1350 □□	CSL1350 □□ L	13.45 ~ 13.65															
CSL1400 □□	CSL1400 □□ L	13.95 ~ 14.15															
CSL1450 □□	CSL1450 □□ L	14.45 ~ 14.65															

Note: Ask us about Shank sizes(E,K), Tool diameter adjusting ranges(A), and Burnishing length(H) not listed above.

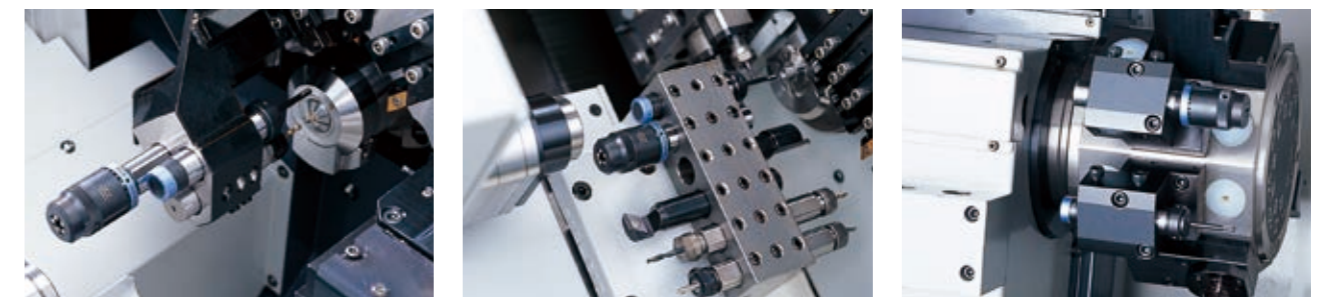
[Shank specifications]

Shank model No.	A	B	F	C	D	
Shank diameter E	mm	19.05	20	22	25	25.4
D-cut width I	mm	4.7	4.9	5.1	5.4	5.5

How to read a tool model No.

CSL 300 □ □ □ L — Burnishing length H (mm) / Standard : Blank Long: L
Shank diameter E (mm) / A,B,F,C,D
Shank length K (mm) / 75 or 115

Samples of application



Attaching to a vertical drilling holder

Attaching to a tool rest

Attaching to a turret tool rest

Thin staged shaft

φ3~14.5 mm **Superroll Slim CSA type**

Installation on a CNC automatic lathe is enabled by down-sized tool size.

Work through into the shank. Thus, the burnishing length is not limited.

[Driving unit]

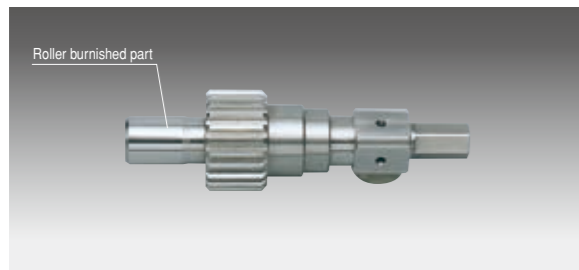
- Drilling machine Drilling unit
- Lathe Machining center



CSA1200C

Head front

Sample of application

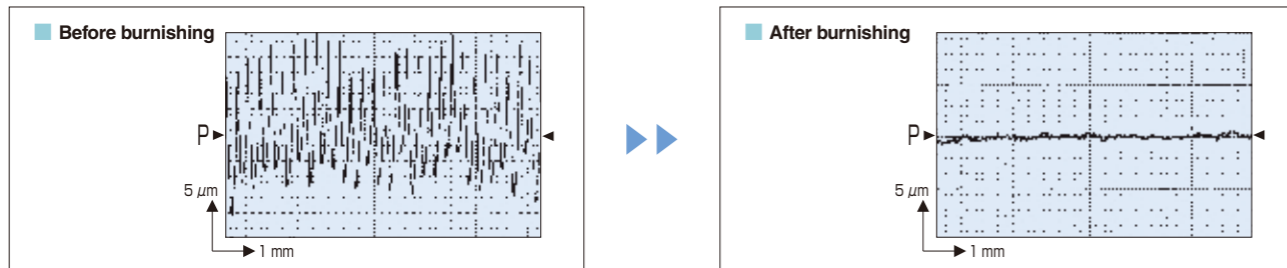


Gear shaft

[Ref. parameters]

Used tool model		CSA1200D
Work piece material		SUS303
Work size	mm	φ12x14L
Surface roughness	Rz μm	Before burnishing 7.3
		After burnishing 0.6
Rotation speed	min ⁻¹	710
feed rate	mm/rev	0.4
Machine time	sec.	3.3

[Comparison of surface roughness]



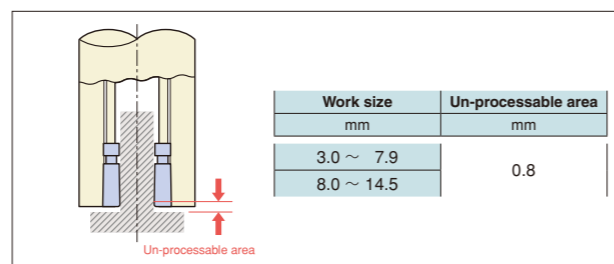
How to use Slim CSA type

1. Attach a Slim CSA to a driving unit such as a CNC automatic lathe.
2. Machining in normal rotation at the predetermined speed and feed rate.
3. After reaching the machining end, retract at a rapid feed rate in the same rotation direction.

[Ref. parameters]

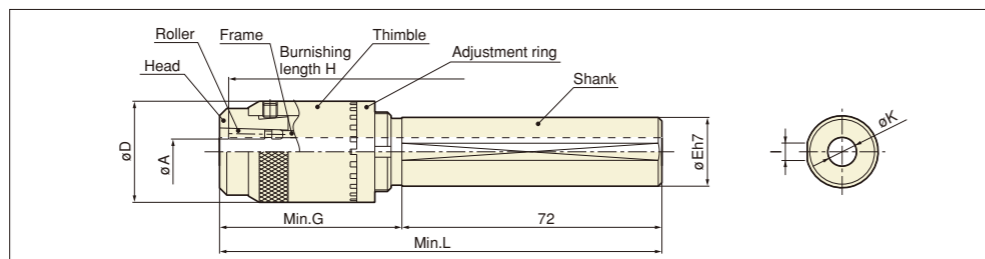
Work size mm	Rotation speed min ⁻¹	Feed rate mm/rev
3.0 ~ 7.0	800 ~ 1,200	0.2 ~ 0.4
7.5 ~ 14.5	600 ~ 800	0.2 ~ 0.6

Un-processable area by Slim CSA type



Note 1. The un-processable areas above are values when the clearance of 0.5 mm is retained between the roller and the work end surface.
 2. To minimize un-processable area, grind off the extrusion of the Head to the same position as the roller tip end after setting the tool diameter.

Dimensions (mm)



Specifications For Thin staged shaft seize φ3-14.5 mm

Tool model No.	Tool diameter adjusting range A mm	Burnishing length H mm	Tool diameter D mm	Shank diameter E mm	Tool length Min. G mm	Full length Min. L mm	Part model No.		
							Rollers (quantity in one set)	Head	Frame
CSA 300 □	3.05 ~ 2.85	Not limited. *See Note 2.	28	19.05 · 20 · 22 · 25 · 25.4	48	120	B007R(4)	CH300	FA300
CSA 350 □	3.55 ~ 3.35							CH350	FA350
CSA 400 □	4.05 ~ 3.85							CH400	FA400
CSA 450 □	4.55 ~ 4.35							CH450	FA450
CSA 500 □	5.05 ~ 4.85							CH500	FA500
CSA 550 □	5.55 ~ 5.35							CH550	FA550
CSA 600 □	6.05 ~ 5.85							CH600	FA600
CSA 650 □	6.55 ~ 6.35							CH650	FA650
CSA 700 □	7.05 ~ 6.85						CH700	FA700	
CSA 750 □	7.55 ~ 7.35						CH750	FA750	
CSA 800 □	8.05 ~ 7.85						CH800	FA800	
CSA 850 □	8.55 ~ 8.35						CH850	FA850	
CSA 900 □	9.05 ~ 8.85						CH900	FA900	
CSA 950 □	9.55 ~ 9.35						CH950	FA950	
CSA1000 □	10.05 ~ 9.85	B009R(5)	38	*See Note 3.	53	125	CH1000	FA1000	
CSA1050 □	10.55 ~ 10.35						CH1050	FA1050	
CSA1100 □	11.05 ~ 10.85						CH1100	FA1100	
CSA1150 □	11.55 ~ 11.35						CH1150	FA1150	
CSA1200 □	12.05 ~ 11.85						CH1200	FA1200	
CSA1250 □	12.55 ~ 12.35						CH1250	FA1250	
CSA1300 □	13.05 ~ 12.85						CH1300	FA1300	
CSA1350 □	13.55 ~ 13.35						CH1350	FA1350	
CSA1400 □	14.05 ~ 13.85						CH1400	FA1400	
CSA1450 □	14.55 ~ 14.35						CH1450	FA1450	

Note 1. Superroll Slim tools for tool diameter adjusting range not listed above are available upon request.
 2. Special shank sizes other than those listed above are available, but the burnishing length may be limited depending on conditions.
 3. The shank through hole diameter varies depending on the tool dimensions. Please see the table below for details.

[Shank specifications]

Shank type	A	B	F	C	D
Shank diameter E mm	19.05	20	22	25	25.4
D-cut width I mm	4.7	4.9	5.1	5.4	5.5
Shank through hole diameter K	CSA 300~700 8				
	CSA 710~1100 12				
	CSA1110~1450 16				

How to read a tool model No.

CSA 300 □ ——— Shank diameter E (mm) /A,B,F,C,D

For φ15 mm or larger work size

Staged shaft

φ15~64 mm **Superroll SA type**



[Driving unit]

- Drilling machine Drilling unit
- Lathe Machining center

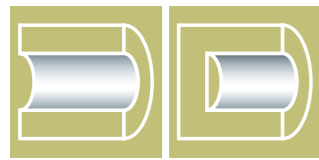
[Sample of application]
Shaft outer surface

Un-processable area by SA type

1. Roller tip radius section
 2. Clearance between the roller or frame tip and the burnishing end surface. (0.5 mm)
- *See the table below for dimensions.

Work size mm	Un-processable area mm
15 ~ 64	1.8

Note 1. The non-burnished areas above are values when the clearance of 0.5 mm is retained between the roller and the work end surface.
 2. To minimize the area not burnished by Superroll, grind off the extrusion of the head to the same position as the roller tip end after setting the tool diameter.



Through-hole **Blind-hole**

Superoll MAC

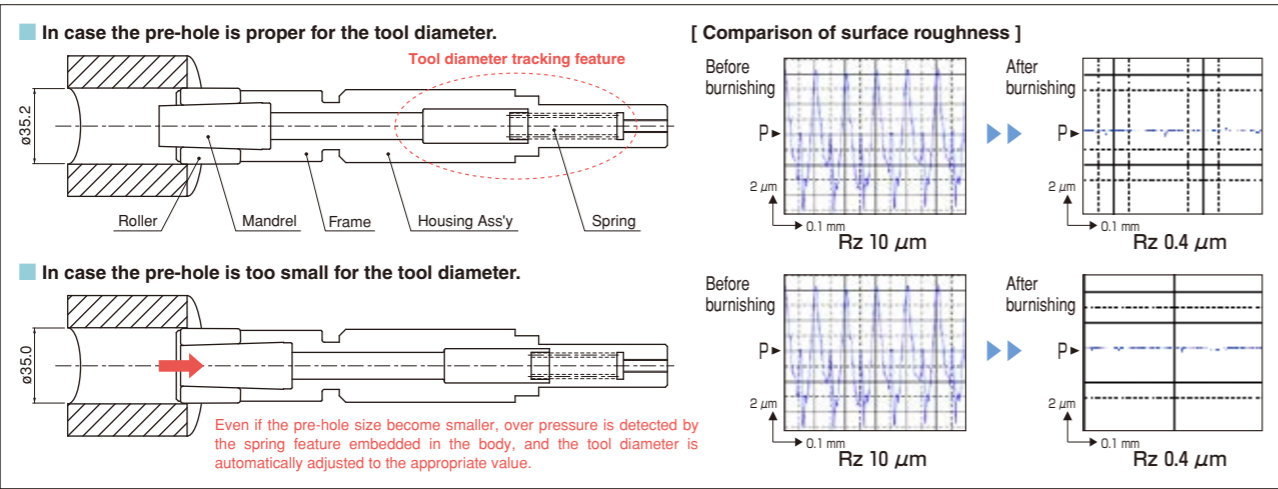
With an automatic tool diameter adjusting feature equipped, the tool diameter automatically tracks the pre-hole diameter, enabling stable finishing surface. This tool is suitable for finishing of works with inconsistent pre-hole diameters and die cast parts with draft angle. Tracking of up to 0.2 mm is possible.



[Driving unit]

- Drilling machine
- Drilling unit
- Lathe
- Machining center

Principle



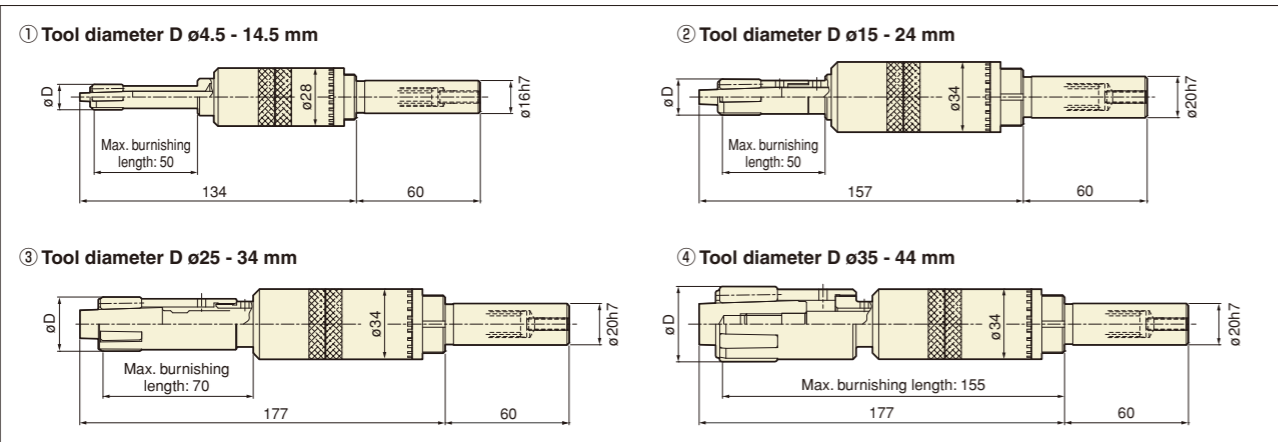
Un-processable area by Superoll MAC

Through-hole		Blind hole	
Hole size mm	Un-processable area mm	Specifications Hole size mm	Un-processable area mm
4.5 ~ 5.7	2.0+α	Standard 8.0 ~ 14.5	1.5+α
6.0 ~ 7.6	2.1+α	Standard 15.0 ~ 44.0	1.8+α
		Special All sizes	0.8+α

α = Fluctuation in work diameter x 16 - 1
*If α is a negative value, then α = 0.

Note: To minimize the un-processable area by Superoll, grind off the extrusion of the mandrel but leave α.

Dimensions (mm)



How to use

1. Use the tool with the diameter approximately 0.05 mm bigger than the expected maximum hole diameter.
2. Set the spring load. Have a test turn and adjust to a proper load by checking the finished condition.

Hole size mm	Rotation speed min ⁻¹	Feed rate mm/rev	Spring load N	
			Steel	Aluminum
4.5 ~ 7.6	900 ~ 1,800	0.1 ~ 0.3	10 ~ 60	3 ~ 30
8.0 ~ 14.5	800 ~ 1,200	0.1 ~ 0.4	20 ~ 120	4 ~ 40
15.0 ~ 19.0	700 ~ 1,000	0.2 ~ 0.5	35 ~ 210	7 ~ 70
20.0 ~ 24.0	600 ~ 800	0.3 ~ 0.6	60 ~ 360	12 ~ 120
25.0 ~ 34.0	500 ~ 700	0.3 ~ 1.0	80 ~ 480	16 ~ 160
35.0 ~ 44.0	400 ~ 600	0.3 ~ 1.0	90 ~ 540	20 ~ 200

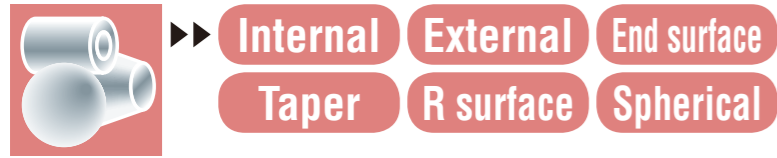
Specifications

Tool model No.	Tool diameter adjusting range A mm	Part model No.				
		Rollers (quantity in one set)		Mandrel	Frame	Stem
Through-hole	Blind-hole	For through hole	For blind hole	Through-hole	Blind-hole	
SH 450-CAT	4.45 ~ 4.80	R001(4)	—	M001	SH 450FR	—
SH 475-CAT	4.70 ~ 5.05	—	—	M002	SH 475FR	—
SH 500-CAT	4.95 ~ 5.30	R002(4)	—	M002	SH 500FR	—
SH 525-CAT	5.20 ~ 5.55	—	—	M003	SH 525FR	—
SH 550-CAT	5.45 ~ 5.80	R003(4)	—	M002	SH 550FR	—
SH 575-CAT	5.70 ~ 6.05	—	—	M003	SH 575FR	—
SH 600-CAT	5.95 ~ 6.45	—	—	M004	SH 600FR	—
SH 640-CAT	6.35 ~ 6.85	R004(4)	—	M005	SH 640FR	—
SH 680-CAT	6.75 ~ 7.25	—	—	M006	SH 680FR	—
SH 720-CAT	7.15 ~ 7.65	R005(4)	—	M005	SH 720FR	—
SH 760-CAT	7.55 ~ 8.05	—	—	M006	SH 760FR	—
SH 800-CAT	7.95 ~ 8.55	R006(4)	B006(4)	M007	SH 800FR	SB 800FR
SH 850-CAT	8.45 ~ 9.05	—	—	M008	SH 850FR	SB 850FR
SH 900-CAT	8.95 ~ 9.55	—	—	M007	SH 900FR	SB 900FR
SH 950-CAT	9.45 ~ 10.05	R007(4)	B007(4)	M008	SH 950FR	SB 950FR
SH1000-CAT	9.95 ~ 10.55	—	—	M009	SH1000FR	SB1000FR
SH1050-CAT	10.45 ~ 11.05	—	—	M008	SH1050FR	SB1050FR
SH1100-CAT	10.95 ~ 11.55	R008(4)	B008(4)	M009	SH1100FR	SB1100FR
SH1150-CAT	11.45 ~ 12.05	—	—	M010	SH1150FR	SB1150FR
SH1200-CAT	11.95 ~ 12.55	—	—	M009	SH1200FR	SB1200FR
SH1250-CAT	12.45 ~ 13.05	R009(4)	B009(4)	M010	SH1250FR	SB1250FR
SH1300-CAT	12.95 ~ 13.55	—	—	M011	SH1300FR	SB1300FR
SH1350-CAT	13.45 ~ 14.05	—	—	M010	SH1350FR	SB1350FR
SH1400-CAT	13.95 ~ 14.55	R010(4)	B010(4)	M011	SH1400FR	SB1400FR
SH1450-CAT	14.45 ~ 15.05	—	—	M012	SH1450FR	SB1450FR
SH1500-CAT	14.9 ~ 16.1	—	—	M013	SH1500FR	SB1500FR
SH1600-CAT	15.9 ~ 17.1	R011(4)	B011(4)	M014	SH1600FR	SB1600FR
SH1700-CAT	16.9 ~ 18.1	—	—	M015	SH1700FR	SB1700FR
SH1800-CAT	17.9 ~ 19.1	R012(4)	B012(4)	M014	SH1800FR	SB1800FR
SH1900-CAT	18.9 ~ 20.1	—	—	M015	SH1900FR	SB1900FR
SH2000-CAT	19.9 ~ 21.1	—	—	M016	SH2000FR	SB2000FR
SH2100-CAT	20.9 ~ 22.1	R011(6)	B011(6)	M017	SH2100FR	SB2100FR
SH2200-CAT	21.9 ~ 23.1	—	—	M018	SH2200FR	SB2200FR
SH2300-CAT	22.9 ~ 24.1	—	—	M017	SH2300FR	SB2300FR
SH2400-CAT	23.9 ~ 25.1	—	—	M018	SH2400FR	SB2400FR
SH2500-CAT	24.9 ~ 26.1	—	—	M019	SH2500FR	SB2500FR
SH2600-CAT	25.9 ~ 27.1	R012(6)	B012(6)	M020	SH2600FR	SB2600FR
SH2700-CAT	26.9 ~ 28.1	—	—	M021	SH2700FR	SB2700FR
SH2800-CAT	27.9 ~ 29.1	—	—	M022	SH2800FR	SB2800FR
SH2900-CAT	28.9 ~ 30.1	—	—	M023	SH2900FR	SB2900FR
SH3000-CAT	29.9 ~ 31.1	—	—	M022	SH3000FR	SB3000FR
SH3100-CAT	30.9 ~ 32.1	—	—	M023	SH3100FR	SB3100FR
SH3200-CAT	31.9 ~ 33.1	R013(6)	B013(6)	M024	SH3200FR	SB3200FR
SH3300-CAT	32.9 ~ 34.1	—	—	M025	SH3300FR	SB3300FR
SH3400-CAT	33.9 ~ 35.1	—	—	M026	SH3400FR	SB3400FR
SH3500-CAT	34.9 ~ 36.1	—	—	M027	SH3500FR	SB3500FR
SH3600-CAT	35.9 ~ 37.1	—	—	M028	SH3600FR	SB3600FR
SH3700-CAT	36.9 ~ 38.1	R014(6)	B014(6)	M029	SH3700FR	SB3700FR
SH3800-CAT	37.9 ~ 39.1	—	—	M030	SH3800FR	SB3800FR
SH3900-CAT	38.9 ~ 40.1	—	—	M031	SH3900FR	SB3900FR
SH4000-CAT	39.9 ~ 41.1	—	—	M030	SH4000FR	SB4000FR
SH4100-CAT	40.9 ~ 42.1	—	—	M031	SH4100FR	SB4100FR
SH4200-CAT	41.9 ~ 43.1	R015(6)	B015(6)	M032	SH4200FR	SB4200FR
SH4300-CAT	42.9 ~ 44.1	—	—	M033	SH4300FR	SB4300FR
SH4400-CAT	43.9 ~ 45.1	—	—	M034	SH4400FR	SB4400FR

How to read a tool model No.

SH 800 - CAT

- SH: for through hole
- SB: for blind hole
- 800: Burnishing size (ex. 800 → ø8)
- CAT: This means Superoll MAC



Single Roller Superoll SR type

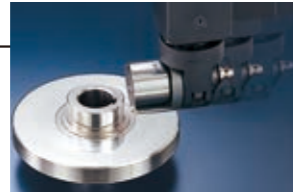
Capable of mirror finishing of inner, outer, end, tapered, R, and spherical surfaces of large works, Single Roller Superoll has great versatility. The Head assembly can be changed according to the user's need.

[Driving unit]

Lathe

SR5AL-S25(20)

For External/End surface burnishing



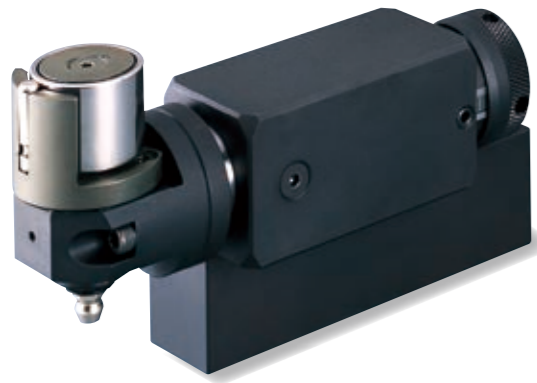
Sample of application

SR36M45°L-S25(20)

External/R surface burnishing



Sample of application



Samples of application



For groove bottom



For improving screw thread



Installation on a NC lathe

How to use SR type

1. Attach a Single Roller Superoll to a tool rest of a lathe.
2. Set the pressure-control spring with the preload adjusting knob to obtain the optimum surface roughness with 0.1 - 0.5 mm roller compression.
3. Apply the predetermined compression to the roller while rotating the work and feed the tool to finish the burnishing surface.

Note: Be sure to use lubricant for burnishing with Single Roller Superoll.

Un-processable area by SR type

SR5AL-S25(20)

Un-processable area (1.8 mm)

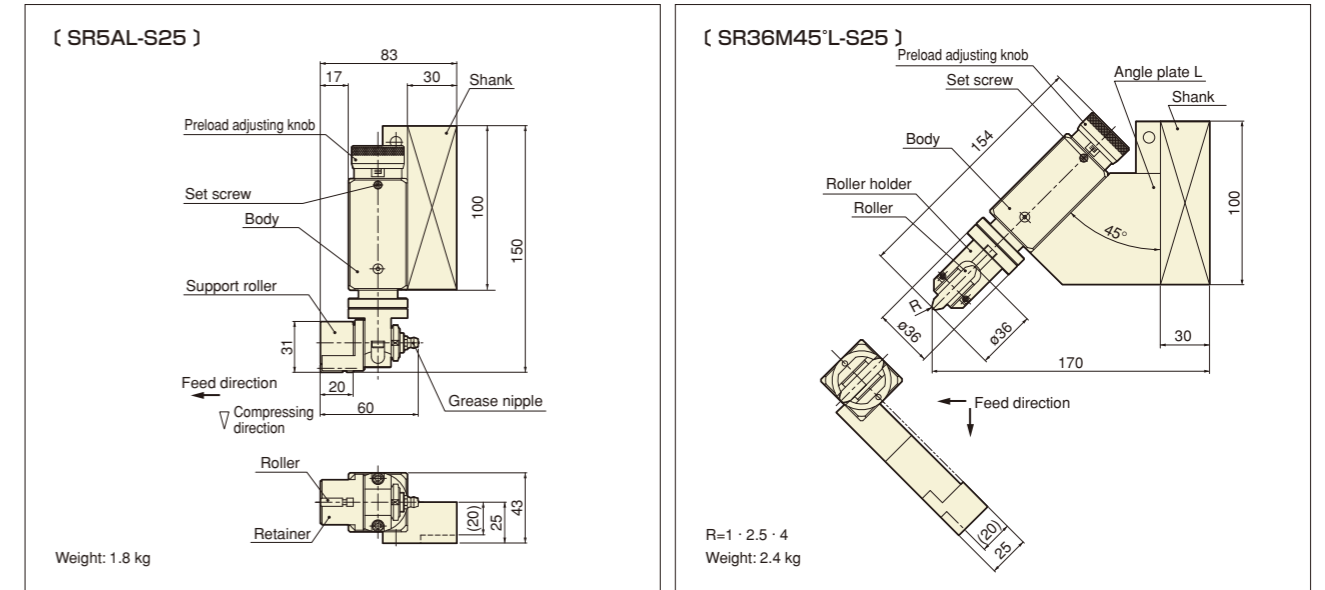
SR36M45°L-S25(20)

Un-processable area

Roller tip R mm	Un-processable area mm
R1	1.5
R2.5	3
R4	4.5

Note: The un-processable areas above are values when the clearance of 0.5 mm is retained between the roller and the work end surface.

Dimensions (mm)



Note: The figure above shows the specification facing the left.

[Ref. parameters]

Tool model No.	Work piece material	Peripheral speed	Feed rate	Preload
		m/min	mm/rev	N
SR5	Carbon steel	50 ~ 100	0.05 ~ 0.5	500 ~ 1,500
	Stainless steel			
	Cast iron			
	Aluminum / Light alloy	100 ~ 200	0.05 ~ 0.3	100 ~ 400
SR36M	Carbon steel	50 ~ 100	0.05 ~ 0.3	200 ~ 500
	Stainless steel			
	Cast iron			
	Aluminum / Light alloy	100 ~ 200		50 ~ 150

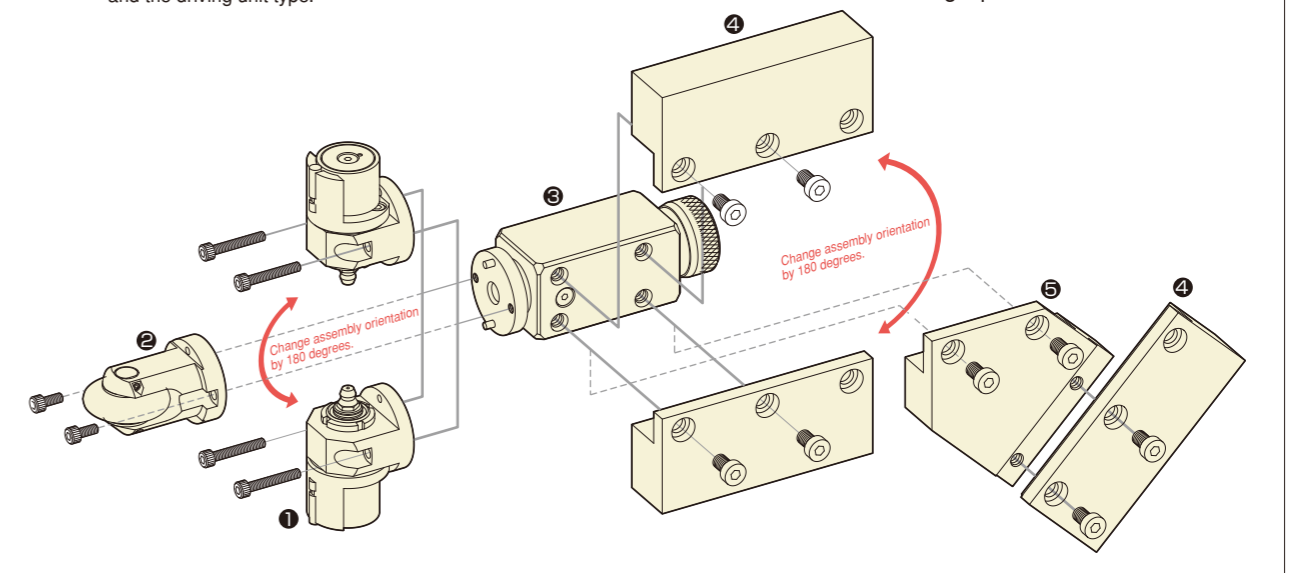
Note: Above list shown as reference. They may vary depending on pre-burnishing precision of the work, hardness, and required finishing precision.

Head assembly and shank assembly

[Example of assembly]

SR5AL-S25 (For External/End surface burnishing)	① + ③ + ④
SR36M45°L-S25 type (R surface burnishing)	② + ③ + ⑤ + ④

Note: Other types of assemblies are available depending on works to be burnished and the driving unit type.



Internal External For end surface
Single Roller Superoll SR·C type

Single Roller Superoll is an excellent light and compact burnishing tool capable of completing mirror finishing on inner, outer, and end surface just by its own.

[Driving unit]

Lathe



Samples of application



Roller burnishing sample



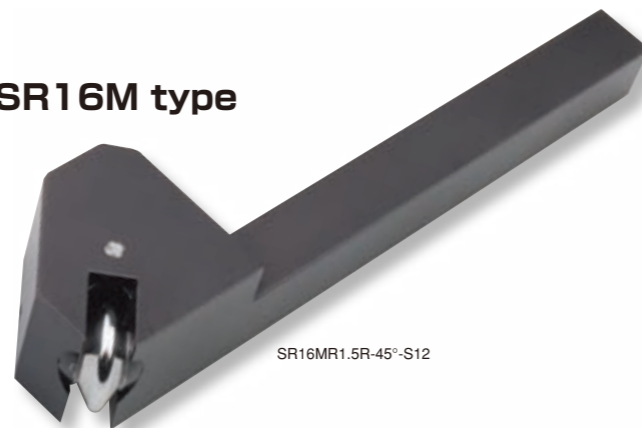
Installation on a NC lathe

External End surface
Single Roller Superoll SR16M type

This is a burnishing tool that can be installed to an automatic CNC lathe.

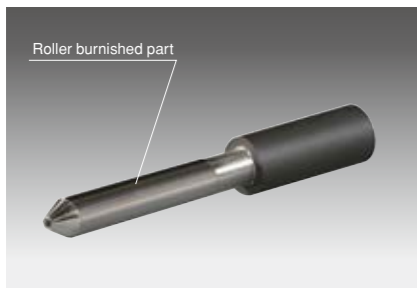
[Driving unit]

Automatic lathe



SR16MR1.5R-45°-S12

Samples of application



Roller burnishing sample



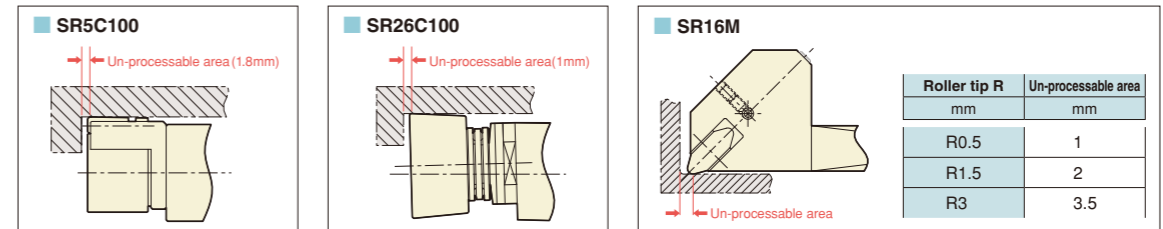
Installation on a CNC lathe

How to use SR·C type and SR16M type

1. Install a Single Roller Superoll to a tool rest (holder) of equipment such as a NC lathe.
2. Set the pressure-control spring with the preload adjusting knob to obtain the optimum surface roughness.
3. Apply the predetermined compression to the roller while rotating the work and feed the tool to finish the burnishing surface.

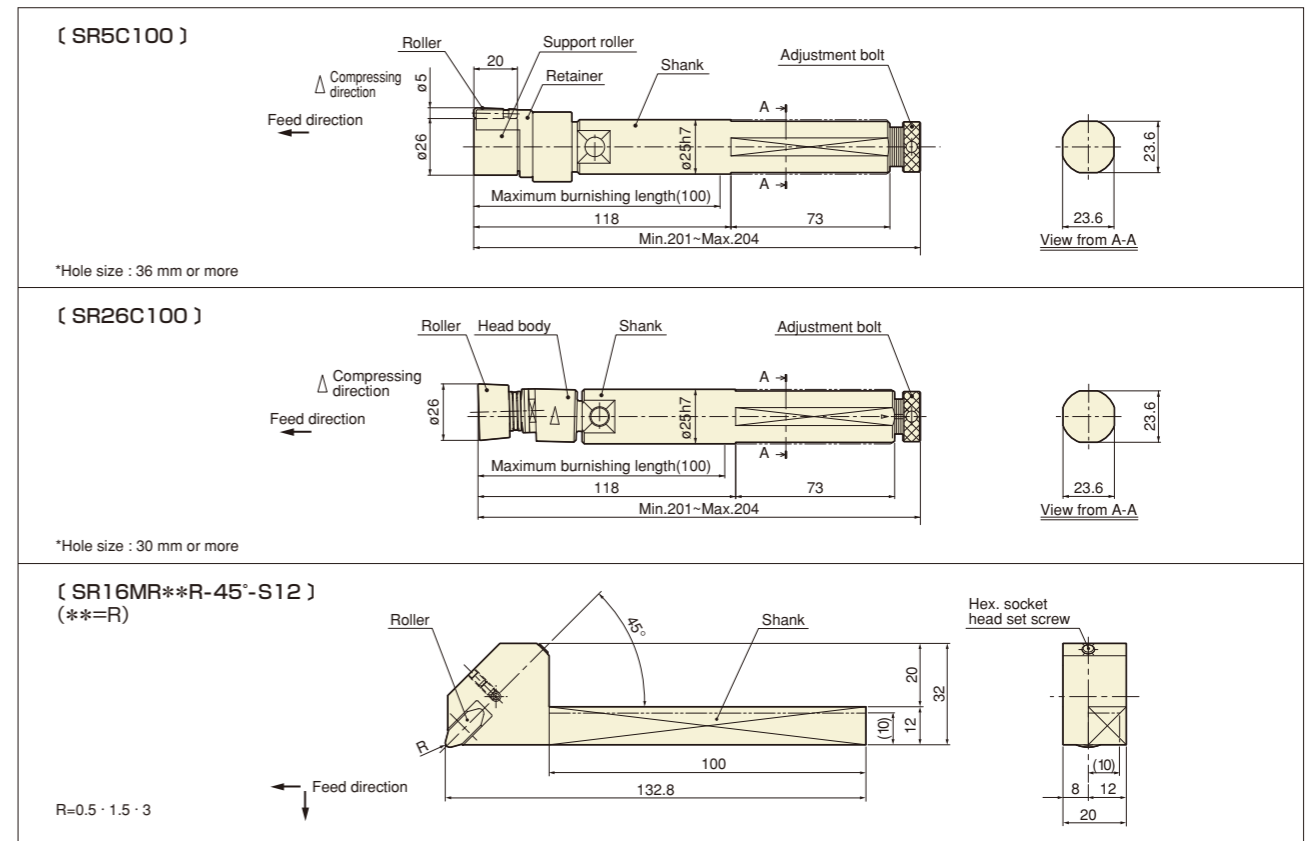
Note: Only SR26C100 type can be used to inner, outer, and edge surface burnishing without changing the orientation.

Un-processable area by SR5C100 type, SR26C100 type



Note: The un-processable areas above are values when the clearance of 0.5 mm is retained between the roller and the work end surface.

Dimensions



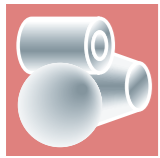
[Specifications and ref.parameters for SR·C type]

Tool model No.	Shank size mm	Maximum burnishing length mm	Work piece		Work piece material	Peripheral speed m/min	Feed rate mm/rev	Burnishing pressure N
			Internal mm	External mm				
SR5C100	ø25h7x100	100	ø36 or more	Unlimited	Carbon steel	50 ~ 100	0.05 ~ 0.2	300 ~ 400
					Stainless steel			
					Cast iron			
					Aluminum/Light alloy			
SR26C100	ø25h7x100	100	ø36 or more	Unlimited	Carbon steel	50 ~ 100	0.05 ~ 0.1	400 ~ 500
					Stainless steel			
					Cast iron		0.05	200 ~ 500
					Aluminum/Light alloy		100 ~ 200	0.05 ~ 0.1

[Ref.parameters for SR16M type]

Tool model No.	Work piece material	Peripheral speed m/min	Feed rate mm/rev	Embedded spring rate N/mm
SR16MR1.5R-45°-S10	Steel alloy	100~200	0.05~0.1	42.5 166
SR16MR1.5R-45°-S12				
SR16MR1.5L-45°-S10				
SR16MR1.5L-45°-S12				

1. Special roller shape and attachment angle is available upon request.
2. An embedded spring is selected from two standard types according to the material.



Internal **External** **End surface**
Taper **R surface** **Spherical**

CAT'S EYE US.PAT.7266873

This is a burnishing tool that can improve property of hard materials (HrC60 or less) with a diamond tip. Throw-away tip enables quick and easy replacement.

[Driving unit]

Lathe



CEH-4D1-R25

CEO-4D1R-S25

CEF-4D1R-S25

Sample of application



Outer surface

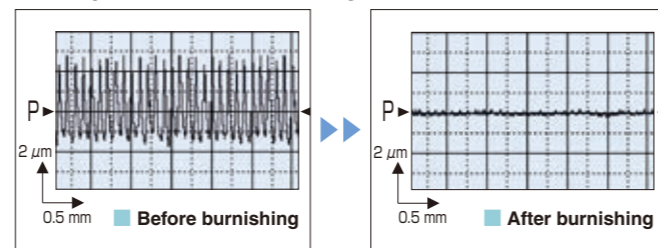


Installation on a NC lathe

[Ref. parameters]

Tool model No.		CEH-4D1-R25
Work piece material		SUJ2(HrC60)
Hole size	mm	ø23
Surface roughness	Rz μm	Before burnishing 4.0
		After burnishing 0.4
Peripheral speed	m/min	100
feed rate	mm/rev	0.05
Spring load	N	900

[Comparison of surface roughness]

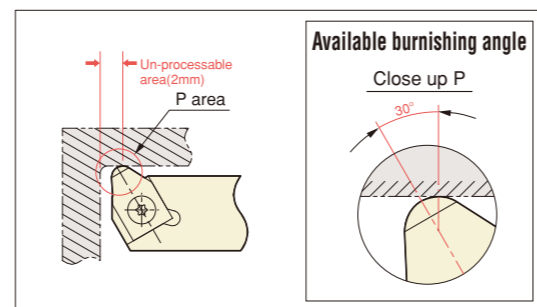


How to use CAT'S EYE

1. Install a CAT'S EYE (hereafter referred to as "the tool") to a tool rest of a lathe.
2. Set the pressure-control spring embedded in the tool.
3. Apply the predetermined compression to the rotating workpiece and feed the tool. Set the compression in the range of 0.1 - 0.3 mm for external or end surface and 0.3 - 0.5 mm for internal surface.
4. Stop the feed at the end position, then remove the diamond tip from the workpiece.

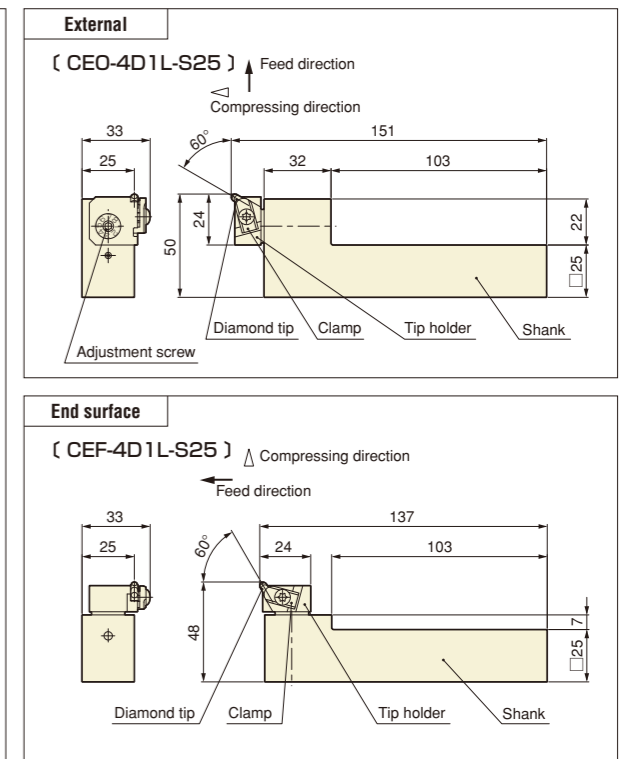
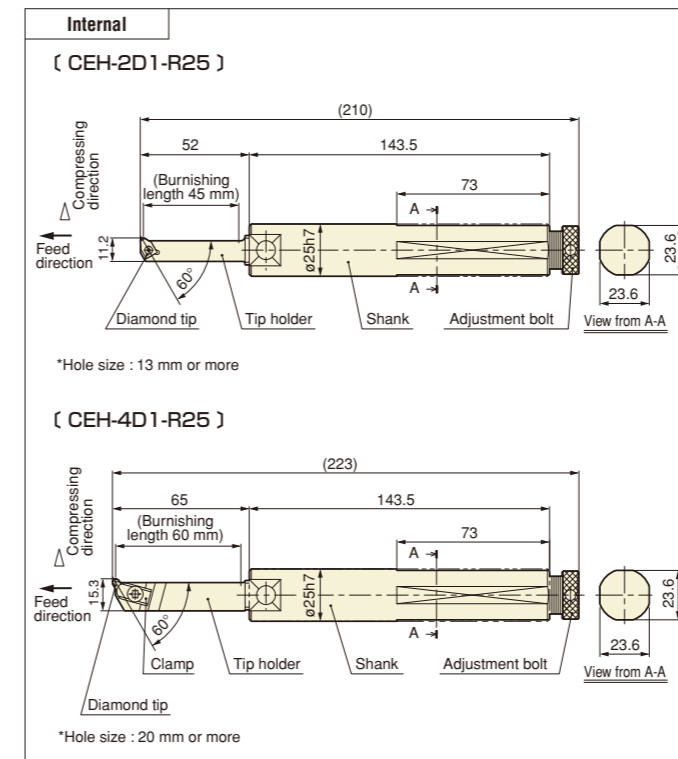
- Note 1. Tool rotation is not possible.
2. Be sure to rotate the work and use lubricant during burnishing. Do not stop rotating the work piece until it has been separated from the diamond tip.
3. Burnishing with one chuck from lathe cutting to burnishing is recommended.

Un-processable area by CAT'S EYE



Note: The un-processable areas above are values when the clearance of 0.5 mm is retained between the roller and the work end surface.

Dimensions (mm)



Specifications

[CEH]

Tool model No.	Burnishing part	Minimum hole size mm	Shank diameter mm	Maximum burnishing length mm	Tip model No.
CEH-2D1-R25	Internal	ø13	ø25	45	DT2D1
CEH-4D1-R25		ø20		60	DT4D1

Note: Upon your request, 25.4 mm (1") dia. shank is also available.

[CEO-CEF]

Tool model No.	Burnishing part	Shank size mm	Orientation	Tip model No.
CEO-4D1R-S25	External	□25	Right handed	DT4D1
CEO-4D1L-S25			Left handed	
CEF-4D1R-S25	End surface	□25	Right handed	
CEF-4D1L-S25			Left handed	

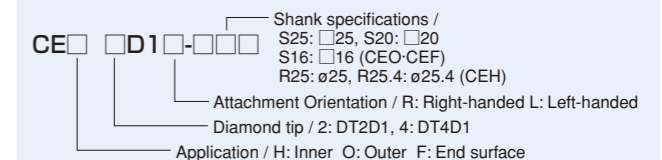
Note: 16 mm or 20 mm square shank is also available upon request.

[Ref. parameters]

Tool model No.	Burnishing part	Work piece hardness HrC	Burnishing pressure N	Peripheral speed m/min	Feed rate mm/rev	Surface roughness Before burnishing (Rz)
CEH-4D1-R25	Internal	45	180	50 ~ 200	0.05	4.0
		60	900			
CEO-4D1R-S25	External	45	40			
		60	200			
CEF-4D1R-S25	End surface	45	40			
		60	200			

Note : The ref. parameter above are for steel alloy.

How to read a tool model No.



Flat surface
Superroll Level

This tool enables mirror finishing on flat surface in the similar procedure as face milling operation (crosscut milling).
With unlimited burnishing range, this method is optimal for mating or seal surface of transmission parts.

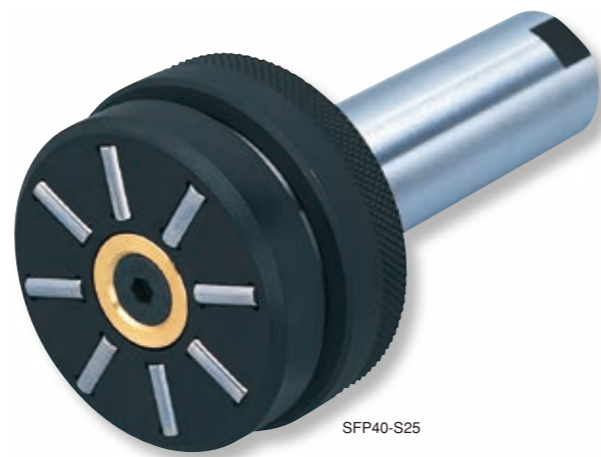
[Driving unit]
Machining center Milling center

How to use Superroll Level

1. Attach a Superroll Level to a machining center or milling center.
2. Set the Axis Z of the driving unit properly so that the roller compression is appropriated (stroke control).
3. Move the Superroll Level horizontally while rotating to press the work surface.

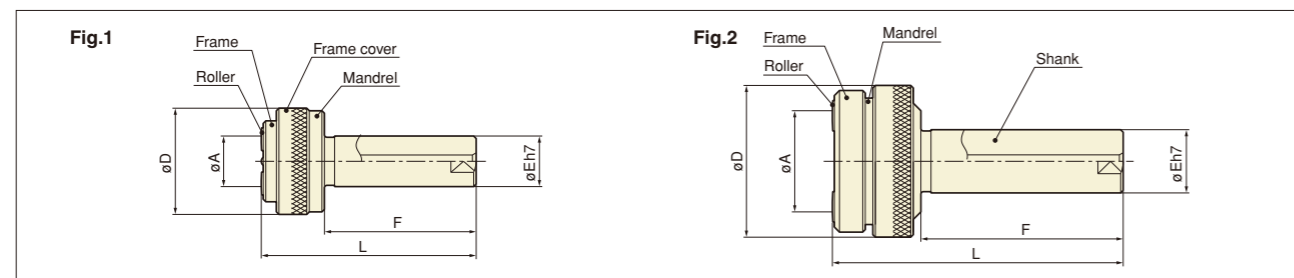
[Ref. parameter]

Tool model No.	Rotation speed min ⁻¹	Feed rate mm/rev	Compression mm
SFP20-S20	900 ~ 3,000	0.1 ~ 0.5	0.02 ~ 0.04
SFP40-S25	500 ~ 1,600	0.2 ~ 0.7	0.02 ~ 0.05
SFP60-S32	300 ~ 1,000	0.3 ~ 1.4	0.02 ~ 0.05



Attached to a milling center

Dimensions (mm)



Specifications

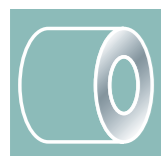
Tool model No.	Effective burnishing range A mm	Tool outer diameter D mm	Shank length F mm	Shank diameter E mm	Overall length L mm	Number of rollers pcs.	Dimensions
SFP20-S20	20	42	60	20	85	4	Fig.1
SFP40-S25	40	60	80	25	115	8	Fig.2
SFP60-S32	60	82	80	32	120	12	Fig.2

Note. The mandrel and the shank are integrated on SFP20-S20.

For other types of surface burnishing

Flat surface and End surface
Superroll SF type

The tool is suitable for mirror finishing of spline hubs, connector flanges, clutch parts, and semiconductor valves. The minimum diameter of flat surface applicable is 2 mm.



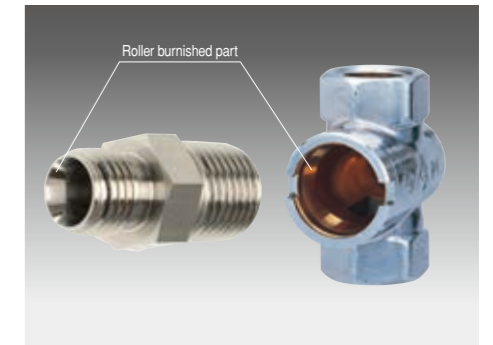
[Sample of application]
Body (joint for semiconductor manufacturing device)

[Special Superroll series]

Special Superrolls are designed and manufactured on your specifications.

Internal taper
Superroll ST type

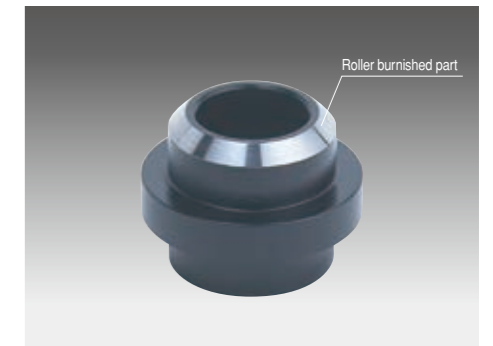
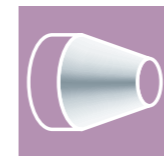
This tool is best-suited for mirror-like finishing of sealing surface such as valve seats. The minimum diameter of taper applicable is 3 mm.



[Sample of application]
Left: Body (stainless steel tube joint)
Right: Gas cock

External taper
Superroll SE type

This tool is best-suited for mirror-like finishing of sealing surface such as joints and valves. The minimum diameter of taper applicable is 1 mm.



[Sample of application] Joint

R surface
Superroll FD type

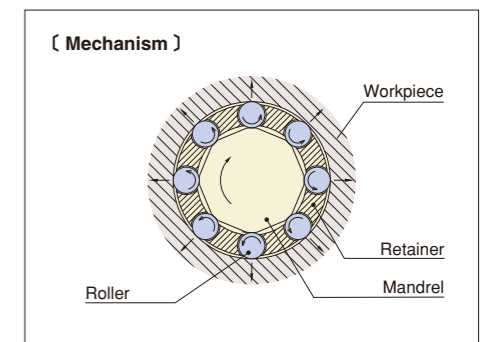
This tool is best-suited for mirror-like finishing of R seat surface of piping joint, etc.

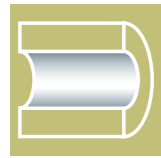


[Sample of application] Semiconductor joint

Internal through hole
Bearingizer

This tool is best-suited for inner finishing of pistol pin holes, etc. With the polygon cross section of the mandrel, the hardness of burnished surface is increased by Peening and rolling effects. Highly precise and durable surface is achieved.

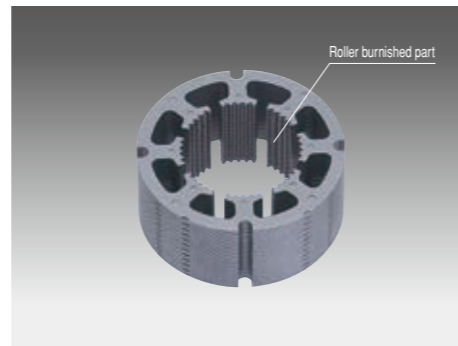




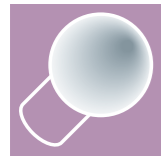
Internal through hole

Superroll ME type

This tool is best-suited for sizing of inner surface of motor stators. The roundness and cylindricity as well as sizing of laminated steel sheet are improved. As a result, the efficiency of the motor increases.



[Sample of application] Motor stator



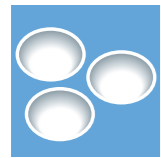
Spherical

Superroll SES type

This is a Superroll with motor that can burnish spherical works such as ball studs and tie rods. Spherical figures are processed by rotating both the work and the tool that is installed to the lathe.



[Sample of application] Ball stud

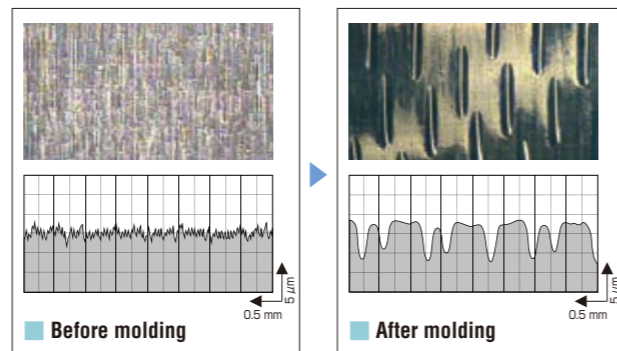


Molding micro dimples

Micro dimple molding tool

US.PAT.8931320

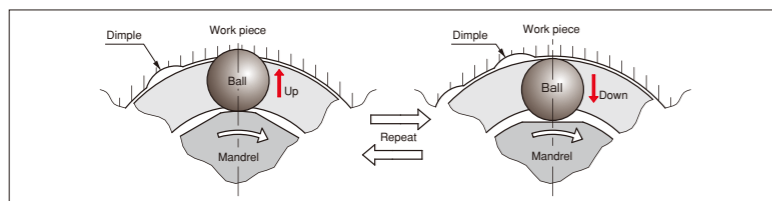
This is a tool to mold minute dimple (dent) of a few μm depth on metal surface. There are many types including inner, outer, and flat surfaces.



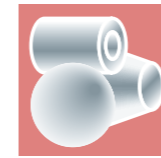
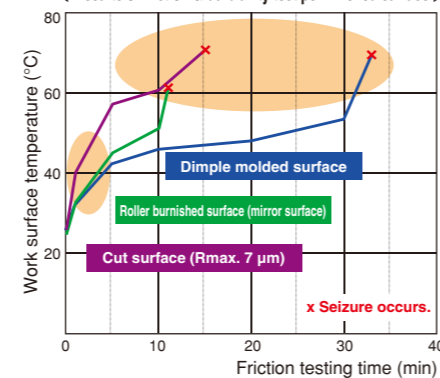
[condition] Internal of aluminum materials
Driving unit : Milling machine Work material: A2017
Rotation speed: 1,000 min-1, Feed rate: 1.5 mm/rev

Principle

This is technique to mold desired minute dimples (dent) on the metal surface. The molded surface has high abrasion resistance, seize resistance, and sliding property by the oilpot effect. The balls embedded in the micro-dimple tool project regularly by the specified rotation and feed and enable molding of dimples at high speed.



[Results of friction & durability test per finished surface]



Tool Holder for Deburring

Barriquan™

Featuring a built-in extension mechanism, Barriquan is a tool holder specifically designed for deburring. You can easily program the holder to remove burrs from die-cast parts, molded parts, and other intricate parts.

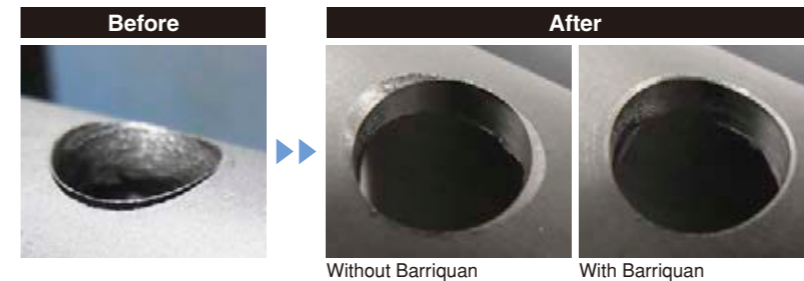
Product type

Pressing force adjustable type	Short type	Back side deburring type
<p>BC10-20</p>	<p>BC10-10</p>	<p>BCT10-10</p>

Specifications

Models	Weight	Pressing force adjustment	The permission number of rotations	Floating amount	Shank size
BC10-20	280 g	Hand adjustment (16 stages)	5000 min ⁻¹	10 mm	ø20×40L
BC10-10	140 g	Exchange Spring	8000 min ⁻¹		ø10×35L
BCT10-10	180 g	Exchange Spring			

Characteristics



Samples of application



Shaft, Pin
 ◻1 mm~ **Superroll Mugen**

This is a center-less roller burnishing unit used for mirror surface finishing for items such as pins, shafts and rods. Compared with grinding or buff polishing and ultra-finishing, it provides high abrasion resistance in a short operating time.



Sample of application

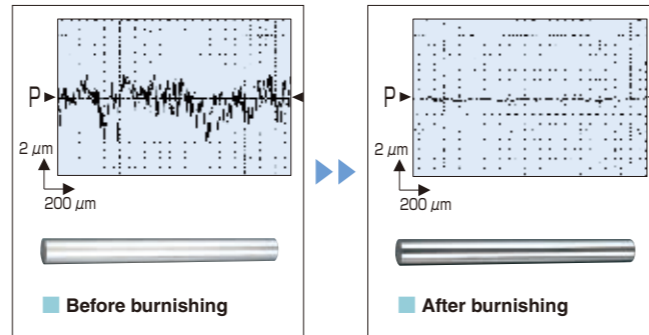


- Printer guide shaft
- Copier's photosensitive drum
- Guide roller for video tape recorder.
- Hydraulic cylinder piston rod
- Automobile brake piston
- Electric motor shaft
- Various types of coils and wires, etc.

[Ref. parameters]

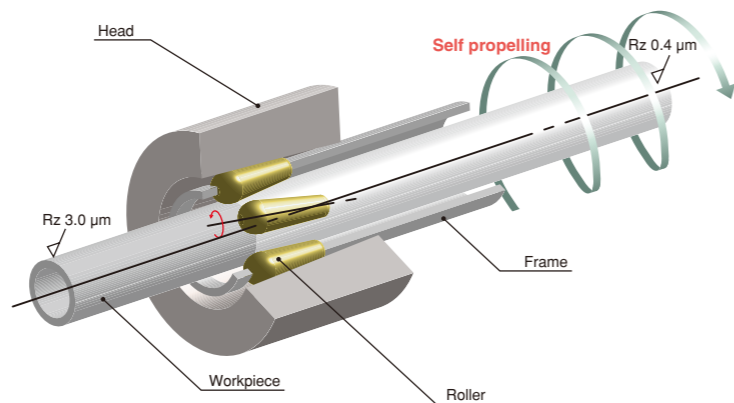
Work piece name		Printer shaft
Work piece material		SUM23L
Work piece size	mm	ø9×340
Surface roughness	Rz μm	Before burnishing 2.0
		After burnishing 0.3
Machining time	sec.	9

[Comparison of surface roughness]



Principle

Rollers installed the frame are inclined so that the work turns like a screw and discharges backward when the frame is rotated. (self propelling of work). The Superroll Mugen requires no special feeder. In principle, outer surface burnishing of unlimited length is possible.



Specifications

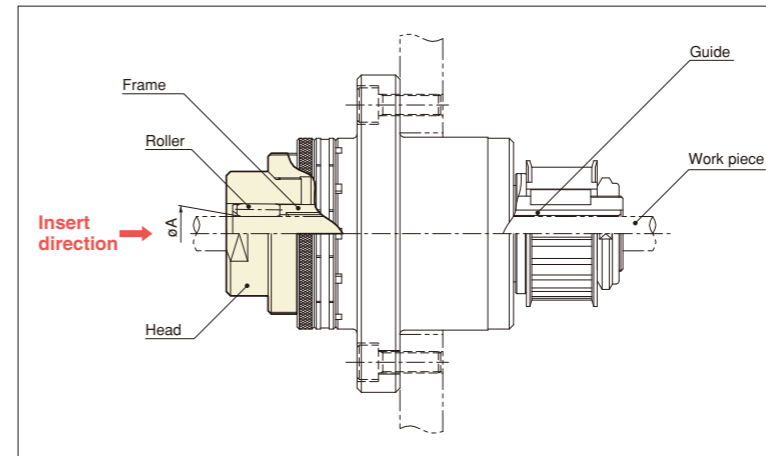
Unit model No.		SMH-2601
Work size	mm	ø1 ~ ø26
Feed speed	mm/sec	20 ~ 40
Superroll head	Motor	kW 0.75 (AC200V)
	Rotation speed	min ⁻¹ Variable 500 - 1,200 (inverter controlled)
Total weight	kg	400

Superroll head

This tool is equipped with a micro-adjustment mechanism by 0.0025 mm increments. Best-suited Superroll heads can be selected according to the work size.



Names of Superroll head components



Specifications of Superroll head

Model No.	Tool diameter adjusting range A mm	Roller Models	Head model No.	Frame model No.	Guide model No.	Model No.	Tool diameter adjusting range A mm	Roller Models	Head model No.	Frame model No.	Guide model No.
SO 300-∞LE	3.05 ~ 2.75	SPMR4X15	SPMH 300	SPMF 300	SPMG 300	SO1050-∞LE	10.55 ~ 10.25	SPMR5X20	SPMH1050	SPMF1050	SPMG1050
SO 325-∞LE	3.30 ~ 3.00		SPMH 325	SPMF 325	SPMG 325	SO1075-∞LE	10.80 ~ 10.50		SPMH1075	SPMF1075	SPMG1075
SO 350-∞LE	3.55 ~ 3.25		SPMH 350	SPMF 350	SPMG 350	SO1100-∞LE	11.05 ~ 10.75		SPMH1100	SPMF1100	SPMG1100
SO 375-∞LE	3.80 ~ 3.50		SPMH 375	SPMF 375	SPMG 375	SO1125-∞LE	11.30 ~ 11.00		SPMH1125	SPMF1125	SPMG1125
SO 400-∞LE	4.05 ~ 3.75		SPMH 400	SPMF 400	SPMG 400	SO1150-∞LE	11.55 ~ 11.25		SPMH1150	SPMF1150	SPMG1150
SO 425-∞LE	4.30 ~ 4.00		SPMH 425	SPMF 425	SPMG 425	SO1175-∞LE	11.80 ~ 11.50		SPMH1175	SPMF1175	SPMG1175
SO 450-∞LE	4.55 ~ 4.25		SPMH 450	SPMF 450	SPMG 450	SO1200-∞LE	12.05 ~ 11.75		SPMH1200	SPMF1200	SPMG1200
SO 475-∞LE	4.80 ~ 4.50		SPMH 475	SPMF 475	SPMG 475	SO1225-∞LE	12.30 ~ 12.00		SPMH1225	SPMF1225	SPMG1225
SO 500-∞LE	5.05 ~ 4.75		SPMH 500	SPMF 500	SPMG 500	SO1250-∞LE	12.55 ~ 12.25		SPMH1250	SPMF1250	SPMG1250
SO 525-∞LE	5.30 ~ 5.00		SPMR6X20	SPMH 525	SPMF 525	SPMG 525	SO1275-∞LE		12.80 ~ 12.50	SPMH1275	SPMF1275
SO 550-∞LE	5.55 ~ 5.25	SPMH 550		SPMF 550	SPMG 550	SO1300-∞LE	13.05 ~ 12.75	SPMH1300	SPMF1300	SPMG1300	
SO 575-∞LE	5.80 ~ 5.50	SPMH 575		SPMF 575	SPMG 575	SO1325-∞LE	13.30 ~ 13.00	SPMH1325	SPMF1325	SPMG1325	
SO 600-∞LE	6.05 ~ 5.75	SPMH 600		SPMF 600	SPMG 600	SO1350-∞LE	13.55 ~ 13.25	SPMH1350	SPMF1350	SPMG1350	
SO 625-∞LE	6.30 ~ 6.00	SPMH 625		SPMF 625	SPMG 625	SO1375-∞LE	13.80 ~ 13.50	SPMH1375	SPMF1375	SPMG1375	
SO 650-∞LE	6.55 ~ 6.25	SPMH 650		SPMF 650	SPMG 650	SO1400-∞LE	14.05 ~ 13.75	SPMH1400	SPMF1400	SPMG1400	
SO 675-∞LE	6.80 ~ 6.50	SPMH 675		SPMF 675	SPMG 675	SO1425-∞LE	14.30 ~ 14.00	SPMH1425	SPMF1425	SPMG1425	
SO 700-∞LE	7.05 ~ 6.75	SPMH 700		SPMF 700	SPMG 700	SO1450-∞LE	14.55 ~ 14.25	SPMH1450	SPMF1450	SPMG1450	
SO 725-∞LE	7.30 ~ 7.00	SPMH 725		SPMF 725	SPMG 725	SO1475-∞LE	14.80 ~ 14.50	SPMH1475	SPMF1475	SPMG1475	
SO 750-∞LE	7.55 ~ 7.25	SPMH 750		SPMF 750	SPMG 750	SO1500-∞LE	15.05 ~ 14.75	SPMH1500	SPMF1500	SPMG1500	
SO 775-∞LE	7.80 ~ 7.50	SPMH 775	SPMF 775	SPMG 775	SO1525-∞LE	15.30 ~ 15.00	SPMH1525	SPMF1525	SPMG1525		
SO 800-∞LE	8.05 ~ 7.75	SPMR5X20	SPMH 800	SPMF 800	SPMG 800	SO1550-∞LE	15.55 ~ 15.25	SPMR6X20	SPMH1550	SPMF1550	SPMG1550
SO 825-∞LE	8.30 ~ 8.00		SPMH 825	SPMF 825	SPMG 825	SO1575-∞LE	15.80 ~ 15.50		SPMH1575	SPMF1575	SPMG1575
SO 850-∞LE	8.55 ~ 8.25		SPMH 850	SPMF 850	SPMG 850	SO1600-∞LE	16.05 ~ 15.75		SPMH1600	SPMF1600	SPMG1600
SO 875-∞LE	8.80 ~ 8.50		SPMH 875	SPMF 875	SPMG 875	SO1625-∞LE	16.30 ~ 16.00		SPMH1625	SPMF1625	SPMG1625
SO 900-∞LE	9.05 ~ 8.75		SPMH 900	SPMF 900	SPMG 900	SO1650-∞LE	16.55 ~ 16.25		SPMH1650	SPMF1650	SPMG1650
SO 925-∞LE	9.30 ~ 9.00		SPMH 925	SPMF 925	SPMG 925	SO1675-∞LE	16.80 ~ 16.50		SPMH1675	SPMF1675	SPMG1675
SO 950-∞LE	9.55 ~ 9.25		SPMH 950	SPMF 950	SPMG 950	SO1700-∞LE	17.05 ~ 16.75		SPMH1700	SPMF1700	SPMG1700
SO 975-∞LE	9.80 ~ 9.50		SPMH 975	SPMF 975	SPMG 975	SO1725-∞LE	17.30 ~ 17.00		SPMH1725	SPMF1725	SPMG1725
SO1000-∞LE	10.05 ~ 9.75		SPMH1000	SPMF1000	SPMG1000	SO1750-∞LE	17.55 ~ 17.25		SPMH1750	SPMF1750	SPMG1750
SO1025-∞LE	10.30 ~ 10.00		SPMH1025	SPMF1025	SPMG1025	SO1775-∞LE	17.80 ~ 17.50		SPMH1775	SPMF1775	SPMG1775

Note: Superroll heads of up to ø26 mm are available.

Before using Superroll

About pre-burnishing

Pre-burnishing surface roughness

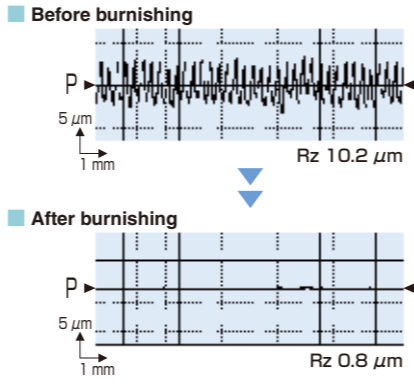
Superroll is a roller burnishing tool that creates mirror-like surface by compressing metal surface. Pre-burnishing surface condition is important to obtain excellent finished surface. The surface with regular feed pattern of single point cutting by lathe or boring is able to obtain good finished surface. However, the process which leaves deep cuts is not ideal.(e.g. drilling) Deep cuts are impossible to be compressed completely.

Pre-burnishing dimensions

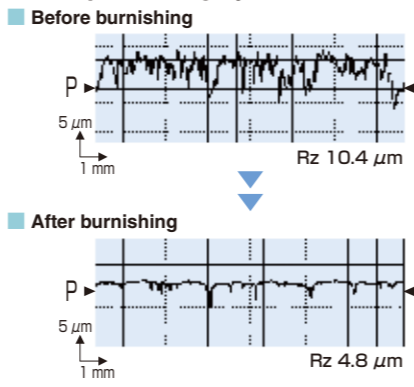
In inner surface Superroll burnishing, the inner diameter of each work increases for the amount that the metal surface is deformed. (It decreases in outer surface burnishing.) In order to finish within the required dimension tolerance, it is necessary to set the pre-burnishing dimension with this change taken into consideration. It varies depending on material, hardness, and burnishing amount. Test with the first few pieces to define the optimum value before starting consecutive burnishing.

Work size mm	Estimated inner diameter increase range mm
4.5 ~ 7.6	0.005 ~ 0.020
8.0 ~ 14.5	0.007 ~ 0.025
15.0 ~ 24.0	0.015 ~ 0.035
25.0 ~ 44.0	0.020 ~ 0.040
45.0 ~ 74.0	0.025 ~ 0.045
75.0 ~ 200.0	0.030 ~ 0.060

{ Pre-processing by boring }



{ Pre-processing by drill }



Superroll Oil

This lubricant with high fluidity prevents wear on consumables and extends Superroll service life. A 1-liter can and 18-liter can are available.

Superroll Oil (oil-based)

Add this oil to kerosene or light oil to constitute 5%. With phosphoric ester as the main component, it offers excellent oil film strength as well as rust prevention.



Superroll Oil (water-soluble)

Dilute this solution-type soluble oil to 5% for use. It has excellent permeability, coolability, washability, separation of mixed oil, and anti-corrosiveness. EP agents (chlorine, sulfur) are not used.



Drive unit and lubricant

Driving device

Superroll can be used with any machine that can provide specified rotation speed and feed and does not require a special driving unit. Unlike cutting, small power is required for the driving unit as high torque is not required. It can be attached to and easily used on equipment such as universal drilling machine, lathe, turret machine, boring machine, and drilling unit. If performing Superroll consecutively with cutting by NC lathe, automatic CNC lathe, or machining center, cutting chips must be removed completely by washing with coolant, etc.

Lubrication and washing

Roller burnishing generates a small amount of metal powder. Thus, use a high-fluidity lubricant for washing. We offer exclusive Superroll Oil. The cleanliness of the lubricant affects finished roughness and Superroll lifetime. Use of a filter is recommended if using lubricant in circulation. Select filter accuracy in a range of 5 - 40 μm according to the finished surface roughness.

Burnishing area

Hardness

In general, HRC40 is the limit of work hardness that can be burnished with Superroll. CAT'S EYE (pages 20 & 21) is recommended for highly-hard works heat-treated by induction hardening or carbonizing treatment. Use the Superroll Inquiry Sheet on page 31 to ask us about other special usage.

Thickness

Burnished section must have sufficient thickness to tolerate pressure by Superroll (20% or more of the inner diameter.) If not thick enough, the section may be deformed or its roundness is affected. The following are some measures:

1. Burnish with a special Superroll with additional rollers. Use the Superroll Inquiry Sheet on page 31.
2. Improve pre-burnishing surface roughness to reduce the burnishing amount.
3. Perform Superroll burnishing before reducing the wall thickness.

Configuration

When there is a large cross hole or key groove on the burnishing area, fine surface finish may not be obtained. In such a case, a special Superroll with additional rollers can be applied.

Specials

Superroll with special specifications, such as those listed below, may also be available. Use the Superroll Inquiry Sheet on page 31 to contact us.

1. Burnishing with a special driving unit
2. Special shank shape
3. Coolant-through type
4. Burnishing of thin works
5. Intermittent or multi-step simultaneous burnishing

Relationship between burnishing amount and surface roughness/expansion of inner diameter

The graphs on the right show relationships of burnishing amount with surface roughness and that with expansion of inner diameter on various metals. Surface roughness improves with burnishing amount. The optimum burnishing amount and expansion of inner diameter vary among materials. Refer to the figures on the right to set the optimum conditions.

$$\text{Burnishing Value} = [\text{Tool diameter}] - [\text{Pre-burnishing inner diameter}]$$

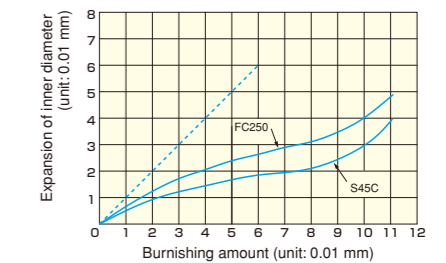
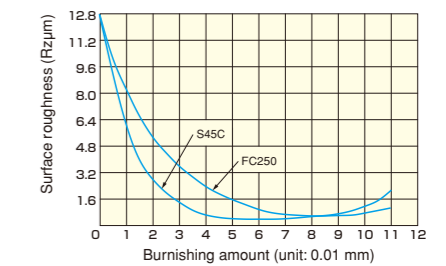
$$\text{Expansion of inner diameter} = [\text{Post-burnishing inner diameter}] - [\text{Pre-burnishing inner diameter}]$$

{ Burnishing conditions }

Dimensions:
O.D. 50 x I.D. 30 - length 45 (mm)
Pre-processing: Boring
Tool: SH3000 SUPERROLL
Rotation speed: 530 min⁻¹
Feed rate: 0.5 mm/rev

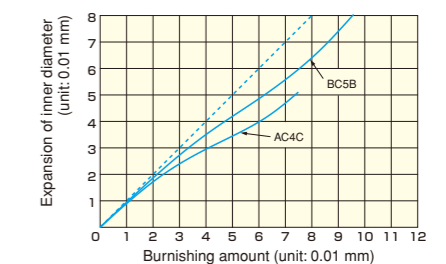
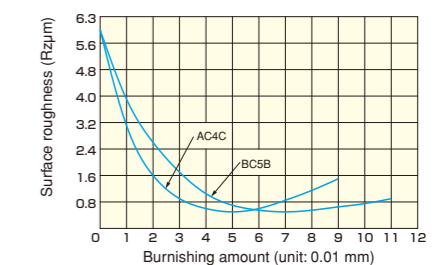
Iron-based

Materials: S45C, FC250



Non-iron based

Materials: AC4C, BC5B



Replacement of consumable parts (SH/SB type)



The following are procedures to replace consumable parts of the SH and SB type Superroll.
For other Superroll types, refer to the relevant Instruction Manual.

1. Replacement of rollers

Turn the housing nut counter-clockwise to remove it from the housing. The frame and the stem come off as one unit.
Take off the rollers from the inner side of the frame and replace them with new ones.

Notes 1. Assemble rollers with their larger diameter side set at the tool tip.
2. Be sure to replace the whole set of rollers at once. Using new and old rollers together may cause abnormal abrasion or accuracy defects.

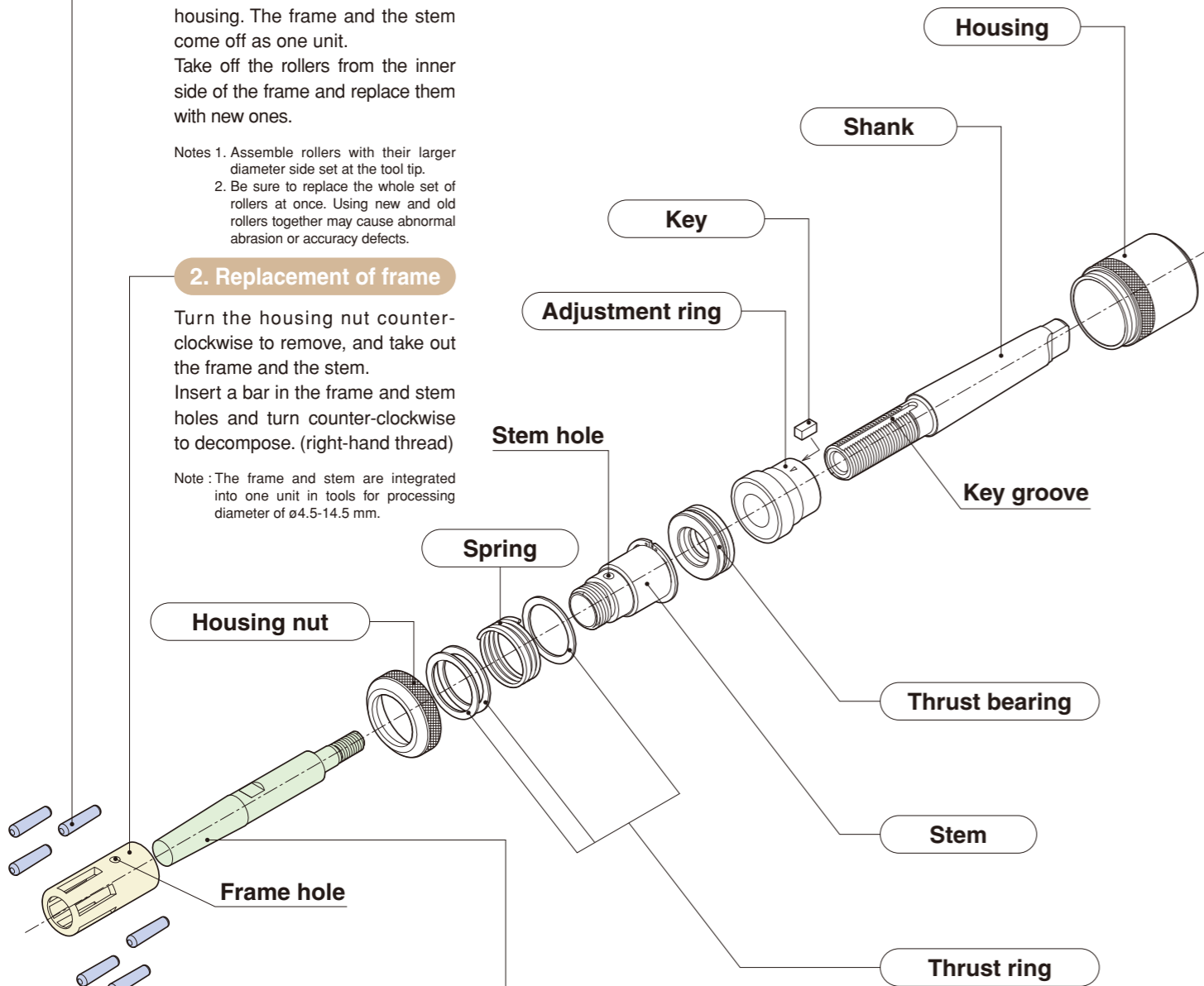
2. Replacement of frame

Turn the housing nut counter-clockwise to remove, and take out the frame and the stem.
Insert a bar in the frame and stem holes and turn counter-clockwise to decompose. (right-hand thread)

Note : The frame and stem are integrated into one unit in tools for processing diameter of $\phi 4.5-14.5$ mm.

3. Replacement of mandrel

The mandrel is screwed in the shank.
Hold the shank and turn the parallel flat part of the mandrel counter-clockwise with a wrench to remove it from the shank. (right-hand thread)



Superroll Inquiry Sheet

Send to: Sugino Machine Ltd.

FAX +81-537-24-8184

● Contact information (Fields with * are required.)

*Name	
*Company Name	
Division	
*Company Address	

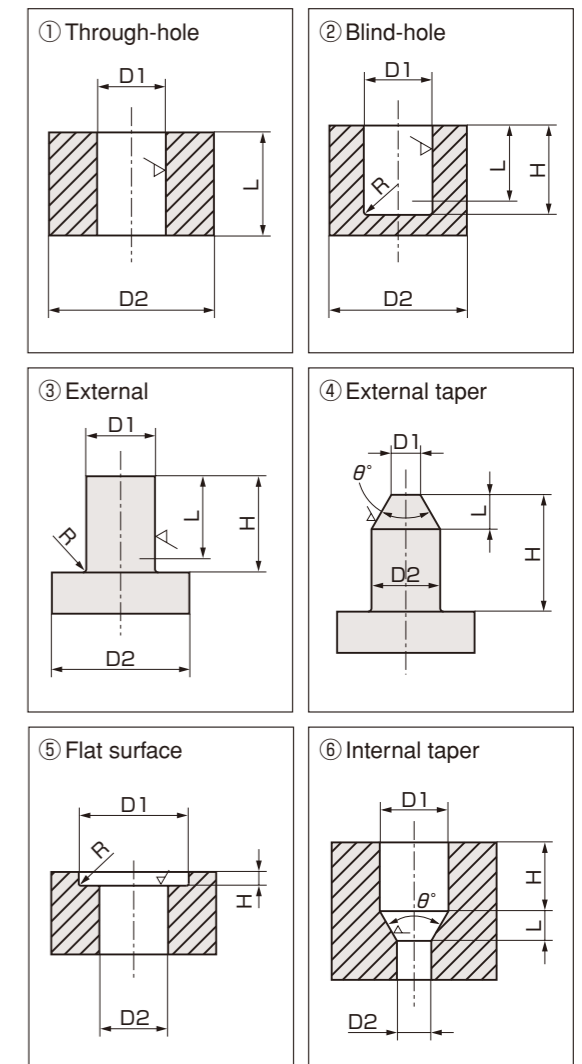
Requested response due date:

*Phone	
Fax	
E-mail Address	

● Fill in the following contents.

Workpiece name		
Workpiece material		
Workpiece hardness	(HRC, Hv, HB, Others)	
Workpiece form	① ② ③ ④ ⑤ ⑥	▶▶ Work configuration
Diameter $\phi D1$	ϕ	Tolerance
Diameter $\phi D2$	ϕ	Tolerance
Length L		Tolerance
Interference height H		Tolerance
Corner R		
Angle θ°	degree	Tolerance
Required shank form		
Tool length limitation	(shank length not included)	
Driving unit in use		
Purpose of use	(Circle one or more.) ·Improvement of surface roughness ·Hardness improvement ·Dimensional correction ·Others	

Special tools for work configurations not shown below can be produced.



● Clarify the unit. (e.g., μm , mm, Rz, HRC, Hv, HB)

Surface roughness	Before burnishing	After burnishing
Hardness improvement	Before burnishing	After burnishing
Dimensional correction	Before burnishing	After burnishing
Other accuracy	Before burnishing	After burnishing
Work piece drawing	(Please attach a drawing of the work in order to check interference between the tool and the work.) Attached / Not attached	

Remarks

Visit by our salesperson (Check here if requesting.)