



XEBEC®

DEBURRING
TECHNOLOGIES

XEBEC™ SELF-ADJUSTING SLEEVE

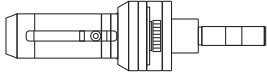
FEATURES

- Programmable length adjustment solution for XEBEC Brush™ Surface.
- Completely automated, allows for unmanned operations.
- Maintains optimal cutting efficiency with reduced downtime.
- A Lights-Out alternative to XEBEC Brush™ Sleeve.

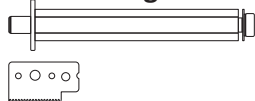
SPECIFICATIONS

Available for Sizes: **6, 15, 25 and 40mm diameter XEBEC Brush™ Surface**

Sleeve



Rack gear (Included)



FOR USE WITH THE FOLLOWING TOOLS:

Follow manufacturers instructions for proper mounting



Machining
Center



Combined
Lathe



Special
Machine



Robot



Lathe with
Milling



Always operate within the recommended range of maximum speed of rotation, depth of cut and feed rate.

PRECAUTIONS FOR USE

Do not exceed the maximum rotation speed for use.

Operating above the maximum rotation speed may result in tool breakage.

Ensure any dust or debris generated during processing is collected, and work area is kept clean.

Even if there is no abnormal condition observed in the test run, stop use immediately if an abnormality is observed.

Do not use the tool at an unreasonable angle or under excessive pressure.

Do not use the tool in any place with risk of fire or explosion.

Do not grind with, alter or fabricate the shaft.

CONDUCT A TEST

Conduct a test run for 1 minute or more before starting the operation and 3 minutes or more after changing a tool.

Check for any abnormality including excessive vibration or looseness in the mounting place of the tool.

OPERATOR SAFETY MEASURES

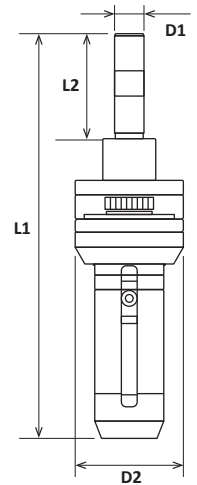
Use Protective Gear Always wear protective goggles, gloves and masks when operating the tool or entering the work area. Wear long sleeves, tight cuffs, and clothing to minimize skin exposure.

Take Caution Be cautious in surrounding area. Use of machines at high speed can cause flying debris within the work area. Dust or debris generated by operating process could be hazardous.



WARNING!

Use caution and follow all safety measures at all times. Failure to do so could result in injury. A tool or a part of a tool may crack, drop off, distort or break. Broken pieces of a tool or grinding dust may stick into skin or eyes and cause injury.



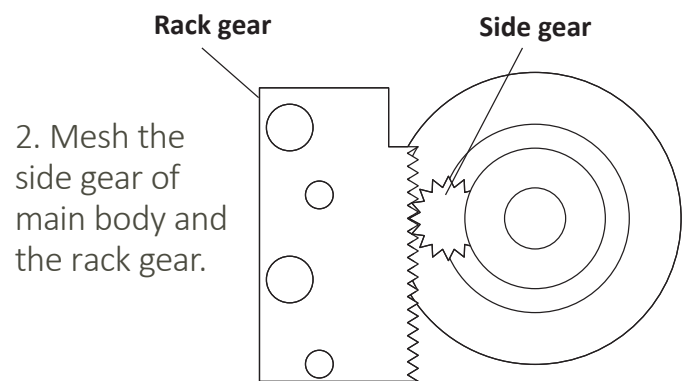
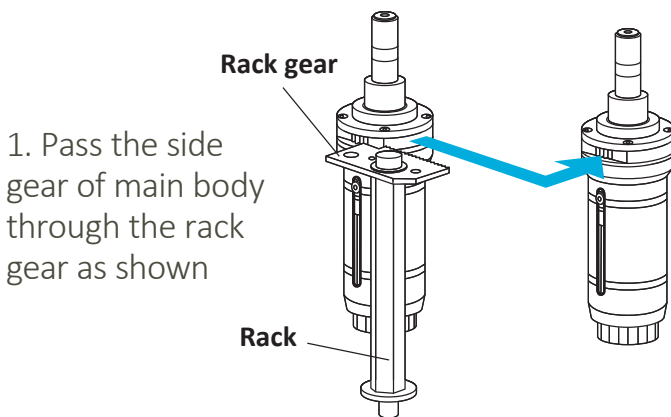
Selection

For Brush Diameter	EDP	Part No.	D1		D2		L1		L2		Weight (lbs)	Max RPM	Compatible Brush (EDP)
			Shank Diameter	Neck Diameter	Overall Length	Shank Length	MM	INCHES	MM	INCHES			
6 mm Brush	50010	XP-AUT06M	10	0.394	37	1.457	124.1	4.886	35.0	1.378	0.485	10,000	30015, 30006, 30012, 30045
15 mm Brush	50011	XP-AUT15M	10	0.394	37	1.457	136.3	5.366	35.0	1.378	0.595	6,000	30013, 30005, 30011, 30044
25 mm Brush	50012	XP-AUT25M	16	0.630	60	2.362	189.0	7.441	41.5	1.634	1.753	5,000	30004, 30010, 30043
40 mm Brush	50013	XP-AUT40M	16	0.630	60	2.362	189.0	7.441	41.5	1.634	2.006	3,000	30003, 30009, 30042

How to Use

Automated Brush Length Projection

Predetermined brush length is automatically projected when the embedded side gear passes the rack gear which is mounted in a machine.



ADDITIONAL LEARNING RESOURCES AVAILABLE ON OUR WEBSITE

3D Files (STEP, DXF), Dimensional Drawings and Safety Data Sheets (SDS)
deburringtechnologies.com/technical

Product Demonstration Videos
deburringtechnologies.com/video

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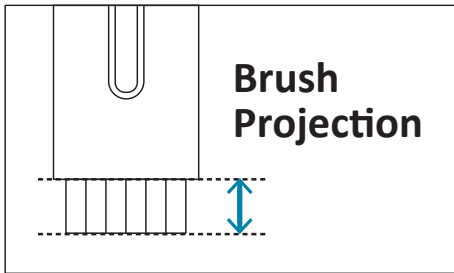
Setup

APPLICABLE EQUIPMENT

Self-Adjusting Sleeve must be mounted on the equipment in a way that enables it to stop and hold the sleeve at a fixed position.

BRUSH PROJECTION AMOUNT

Predetermined length can be adjusted between 0.05mm to 1mm in 0.05mm increments in a single action. The projection amount is adjusted at the predetermined intervals according to wear volume.



Setting Brush Projection

Brush Size Diameter	6 mm	15 mm	25 mm	40 mm	60 mm	100 mm
Brush Projection All Grades (in)	0.3125-0.375"	0.375-0.5625"	0.5-0.625"	0.5-0.625"	0.5-0.75"	0.5-0.75"

Brush projection below 0.2" increases grinding power and may affect finish

How to decide projection adjustment cycle

1. Figure out the amount of brush wear by process quantity or travel length.
2. Set and execute the macro program so that the projection amount is adjusted at the predetermined intervals.

If cycle time is more important, use process quantity

Example: Deburring an aluminium part

Travel length: 200mm per workpiece

Condition

Brush wear: 2µm per workpiece
or 0.2mm per 100 workpieces
(Total travel length 20,000mm)

Adjustment cycle

Set the cycle to every 100 workpiece
(0.2mm brush wear)

If processing quality is more important, use travel length

Example: Finish processing of a cast-iron part's edges

Travel length: 1,500mm per workpiece

Condition:

Brush wear 50µm
(0.05mm) per workpiece

Adjustment cycle:

Set the cycle to every 1,500mm
(50µm brush wear)

Choose an Operating Pattern

PATTERN 1: ONE-TIME PROCESSING/ONE-TIME ADJUSTMENT

This is a method to adjust only the part that is worn out by one-time processing immediately after processing. By passing the side gear of main body through the rack gear immediately after processing, the brush projection amount is reset to the initial condition.

Advantages

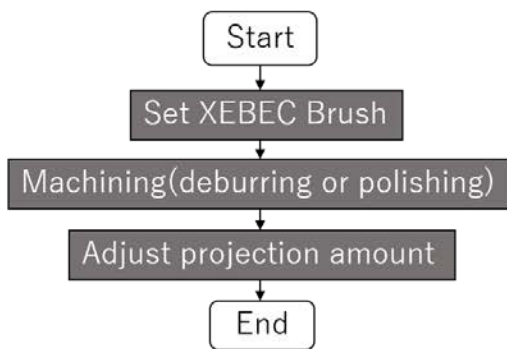
1. The concept and program are simple.
2. Just one counter is required (for tool life).

Disadvantages

1. As the minimum adjustment amount is 50 μm, the wear volume per one-time processing must be more than 50 μm.
2. Cycle time gets longer due to every projection adjustment.
3. Recognition of the wear volume in advance is necessary.
4. (The wear volume of friction is a predicted value)

*Essential conditions

- The wear volume per one-time machining must be more than 50 μm.
- Tool life must be maintained.



-XEBEC Brush Surface (+XEBEC Self-Adjusting Sleeve) set on the main spindle.

-Machining processed. **The brush projection amount decreases** as the brush gets worn out.

-**The brush projection amount is reset to the initial condition** by passing the rack through the sleeve

PATTERN 2: SEVERAL-TIME PROCESSING/ONE-TIME ADJUSTMENT

This is a method to adjust the cumulative wear volume generated by several processing at once. By passing the side gear of main body through the rack gear once every several processing, the brush projection amount is reset to the initial condition.

Advantages

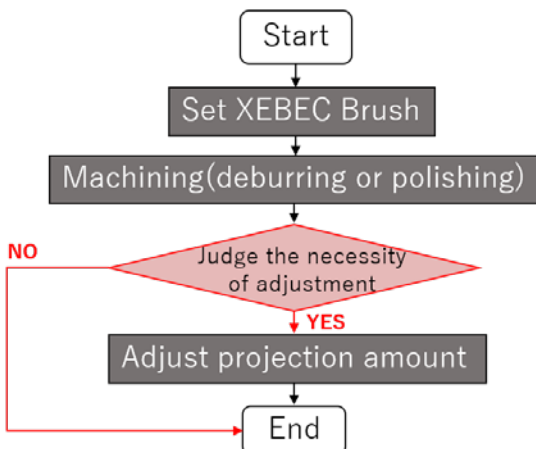
1. No minimum wear volume (wear volume: less than 50um/per time).
2. It might be possible to shorten the cycle time of pattern 1 (Every-time projection adjustment is not necessary).

Disadvantages

1. A complicated macro program is required. (A program which decides whether adjustment is necessary or not).
2. At least two counters are necessary.(for tool life and for judging projection adjustment) .
3. Recognition of the wear volume in advance is necessary.
4. (The wear volume is a predicted value)

*Essential conditions

- Wear volume per one-time processing needs to be clear.
- Frequency of brush adjustment needs to be decided.
- Tool life must be maintained.



-XEBEC Brush Surface (+XEBEC Self-Adjusting Sleeve) set on the main spindle.

-Machining processed. **The brush projection amount decreases** as the brush gets worn out.

-Judges whether the adjustment is necessary or not. **A macro-program is required** at this point.

-**The brush projection amount is reset to the initial condition for the predicted amount** by passing the rack through the sleeve.

PATTERN 3: ONE-TIME PROCESSING/ONE-TIME MEASUREMENT AND OCCASIONAL ADJUSTMENT

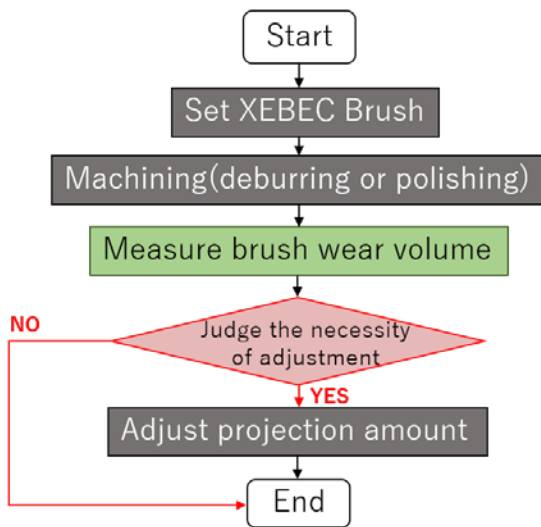
This is a method to measure the brush wear volume using the sensor inside the machine and adjust only when a certain amount is worn out. After processing, the sensor inside the machine measures the brush wear volume and decides whether adjustment is necessary. If necessary, the brush projection amount is reset to the initial condition.

Advantages

1. Accurate projection adjustment based on measurement is possible.
2. Only one counter is required (for tool life)
3. Recognition of the wear volume in advance is not necessary.
4. No minimum wear volume (wear volume: less than 50um/per time).

Disadvantages

1. The sensor inside the machine is necessary.
2. Cycle time gets longer due to sensing.
3. Micro program for some points is necessary.



*Essential conditions

- **Wear volume per one-time processing needs to be clear.**
- **Frequency of brush adjustment needs to be decided.**
- **Tool life must be maintained.**

-XEBEC Brush Surface (+XEBEC Self-Adjusting Sleeve) set on the main spindle.

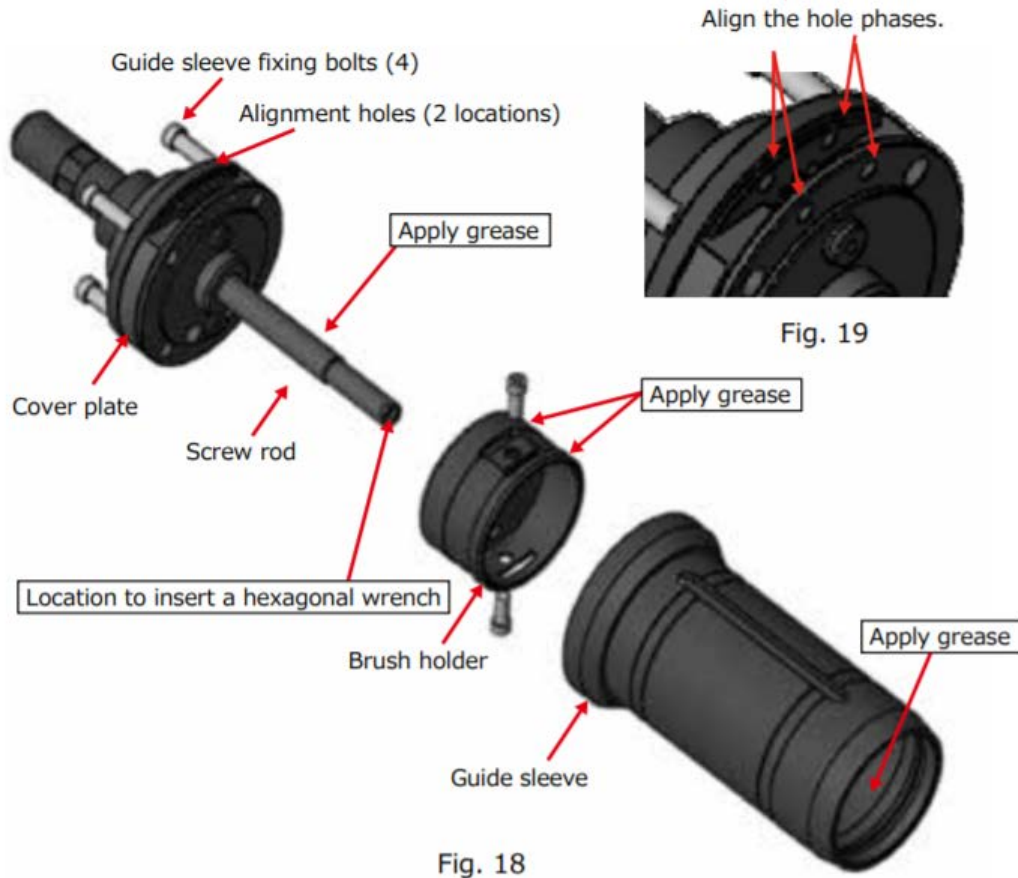
-Machining processed. **The brush projection amount decreases** as the brush gets worn out.

-**The wear volume is measured** with a sensor inside the machine.

-Judges whether the adjustment is necessary or not. **A macro-program is required** at this point.

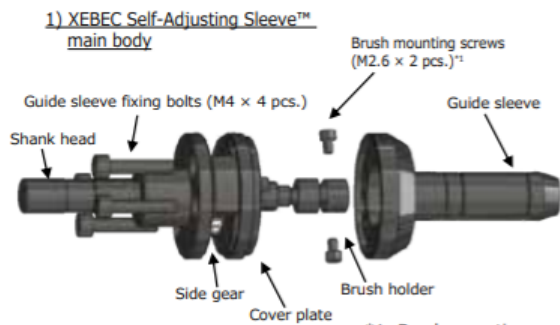
-**The brush projection amount is reset to the initial condition for the measured amount** by passing the rack through the sleeve

Maintenance



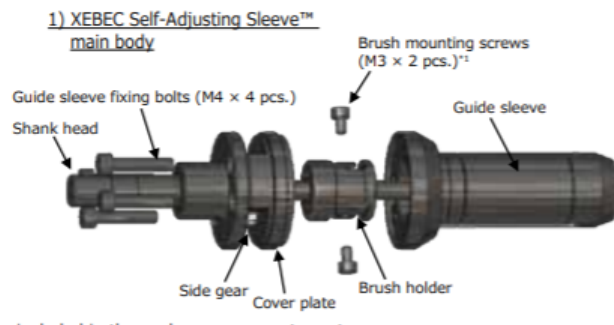
(XP-AUT06M)

- 1) XEBEC Self-Adjusting Sleeve™ main body
- 2) Rack gear stand set



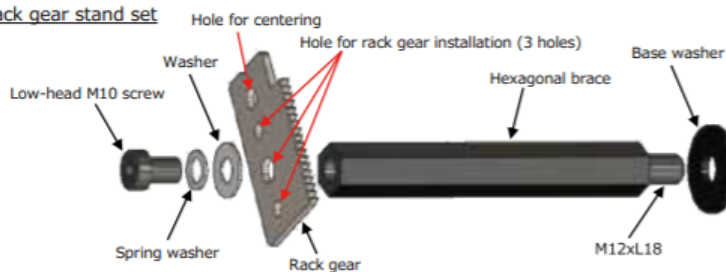
(XP-AUT15M)

- 1) XEBEC Self-Adjusting Sleeve™ main body
- 2) Rack gear stand set



*1: Brush mounting screws are included in the package as separate parts.

2) Rack gear stand set

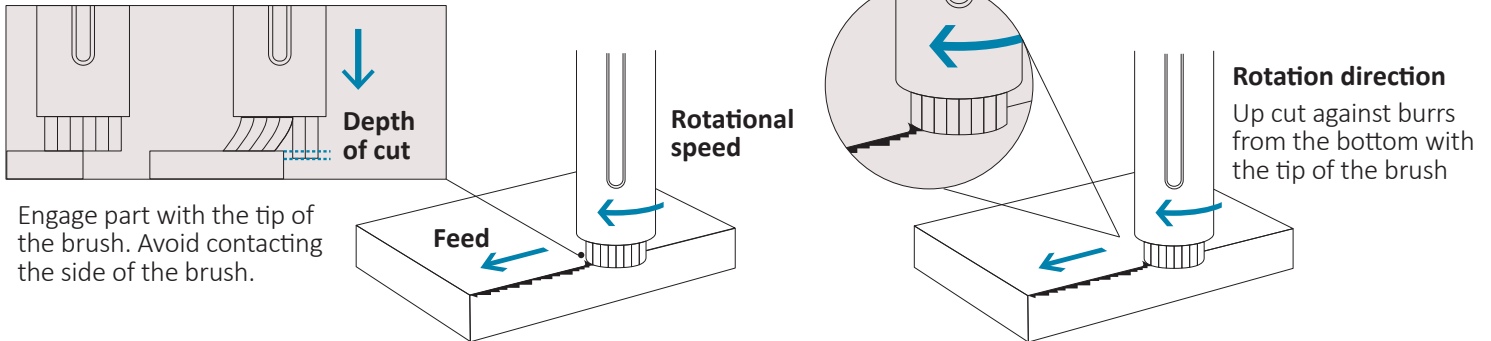


Starting Operating Parameters for Automated Machining with Surface Brush

Material	SFPM	Brush Size (Diameter)		6 mm	15 mm	25 mm	40 mm	60 mm	100 mm	Feed Rate		
		1st Choice	2nd Choice	Initial Brush Projection	0.3125-0.375"	0.375-0.5625"	0.5-0.625"	0.5-0.625"	0.5-0.75"	0.5-0.75"	Finishing	Deburring
				Maximum RPM	10,000	6,000	5,000	3,000	2,000	1,000		
				RPM	RPM	RPM	RPM	RPM	RPM	IPM	IPM	
Low Carbon Steel	600	○ White	● Blue	9,707	3,883	2,330	1,456	971	582	47	94	
Medium Carbon Steel	550	○ White	● Blue	8,898	3,559	2,136	1,335	890	534	40	80	
High Carbon Steel	500	○ White	● Blue	8,089	3,236	1,941	1,213	809	485	34	67	
Cast Steel	450	● Blue	○ White	7,280	2,912	1,747	1,092	728	437	27	54	
300 Series Stainless	525	○ White	● Red	8,494	3,397	2,038	1,274	849	510	47	94	
400 Series Stainless	575	○ White	● Red	9,303	3,721	2,233	1,395	930	558	47	94	
Grey Cast Iron	400	● Blue	○ White	6,471	2,589	1,553	971	647	388	54	107	
Ductile Cast Iron	350	● Blue	○ White	5,662	2,265	1,359	849	566	340	47	94	
Alloy Cast Iron	300	● Blue	○ White	4,854	1,941	1,165	728	485	291	40	80	
Aluminum Cast Alloys	700	● Red	○ White	10,000	4,530	2,718	1,699	1,132	679	80	161	
Aluminum Diecast Alloys	800	● Red	○ White	10,000	5,177	3,106	1,941	1,294	777	74	147	
Aluminum Wrought Alloys	900	● Red	○ White	10,000	5,824	3,495	2,184	1,456	874	67	134	
Zinc Diecastings	800	● Red	○ White	10,000	5,177	3,106	1,941	1,294	777	67	134	
Copper	600	● Red	○ White	9,707	3,883	2,330	1,456	971	582	60	121	
Brass, Free Machining	600	● Red	○ White	9,707	3,883	2,330	1,456	971	582	74	148	
Cast Bronze	500	● Red	○ White	8,089	3,236	1,941	1,213	809	485	47	94	
Nickel Alloys	200	● Blue	○ White	3,236	1,294	777	485	324	194	40	80	
Titanium Alloys	200	● Blue	○ White	3,236	1,294	777	485	324	194	40	80	
Plastic, Thermosetting	500	○ Pink	● Red	8,089	3,236	1,941	1,213	809	485	80	161	
Plastic, Thermoplastic	800	○ Pink	● Red	10,000	5,177	3,106	1,941	1,294	777	80	161	

How to Use Surface Brush

Workpiece Engagement



Starting Depth of Cut

All Brush Grades (Inches)

Polishing	Vertical Burr	Horizontal Burr	Heavy Burr
0.012"	0.020"	0.040"	0.060"

Maximizing Performance

Maximizing Deburring Operation

- 1** Increase RPM to the maximum allowed
- 2** Decrease feed rate in 10% increments
- 3** Do not change original parameters, but increase number of passes
- 4** Try a more aggressive brush that will increase grinding power

Use of Coolant/Oil will optimize results

- It will Extend Tool Life
- Improves Surface Finish

Maximizing Tool Life

- 1** Decrease RPM in 10% increments
- 2** Increase feed rate by 10% increments
- 3** Try another brush color A13 Pink, A21 White, A11 Red, A32 Blue with the same parameters

Adjustments for Improved Results

If burrs or cutter marks remain

- 1 Increase Rotational Speed**
In increments of 25%, Do not exceed Maximum RPM
- 2 Increase the Number of Passes**
Each pass will improve finish by approximately one half
- 3 Decrease Feed Rate**
In increments of 10 to 20%
- 4 Use more aggressive Color of Brush**
(Pink=Least Aggressive, Blue=Most Aggressive)

Increase Grinding Power		
Feed Rate	Rotational Speed	Depth of Cut
▼	▲	▲
Decrease Grinding Power		
Feed Rate	Rotational Speed	Depth of Cut
▲	▼	▼