



XEBEC Self-Adjusting Sleeve™
XP-AUT25M / XP-AUT40M

User manual



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* Please also refer to a usage instruction video available on the "Product Support" page of our website.
<http://www.xebec-tech.com>

XEBEC Self-Adjusting Sleeve™ (XP-AUT25M/XP-AUT40M) Operational precautions

- Please make sure to read the user manual before use.
- In order to ensure safety, please observe the operator safety measures and operational precautions listed below.

[Operator safety measures]

[Wear Protective Equipment]

- Always wear safety glasses, protective gloves and masks when operating the tool. In addition, wear long sleeves and have the cuffs/bottom of the jacket properly closed to minimize skin exposure.

[Use Protective Cover]

- Install covers on the machine tool and special-purpose machine, and use them while they are protected safely with the covers. Implement sufficient safety measures in order to ensure one's physical safety in the unlikely event of fragments scattering.

[Beware of Grinding Powder]

- Grinding powder and burrs may scatter within an area around the work as the brush revolves; therefore, please collect dust using a dust collector and stay clear of this area.

[Caution to Your Surroundings]

- Because it could be dangerous if tool fragments and/or chip powder scatter while working, enclose the potentially dangerous work area to prevent other people from entering, or have those around the work area wear protective equipment.

If these safety measures are neglected, there are following risks.

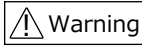
- If the tool fragments and/or chip powder gets into the eyes, there is the risk of losing eyesight in the worst case.
- If the tool fragments and/or chip powder hit the skin, there is the risk of getting injured.
- Dust generated by machining process may cause skin irritation or allergy.

[Safety precautions]

The precautions herein described are made available for the products to be used safely and to prevent injuries and/or damages from occurring to others. In order to specify the level of severity and urgency, they are classified as "warning" and "caution." Please observe the contents without fail, as all are related to safety.

" Warning" : Those with the potential to cause death or serious injury to people when mistakenly handled and/or those where property damage may be sustained.

" Caution" : Those with the potential to cause injuries to people when mistakenly handled and/or property damage can be presumed.



1. Never mount tools other than XEBEC Brush™ Surface.

This product is an optional tool exclusively equipped to be used for the XEBEC Brush™ Surface. There is the risk of damaging the main body and machine and/or sustaining an injury if furnished with a tool other than for use with the XEBEC Brush™ Surface because of inability to withstand the load.

2. Never use at a rotation speed exceeding the maximum rotation speed.

The maximum rotation speed of this product varies by the brush size being used (XP-AUT25M: MAX5000min⁻¹, XP-AUT40M: MAX3000min⁻¹). Using at or higher than the maximum rotation speed may result in breakage of the tool and machine and/or sustain an injury.

3. Never use this product with the shank not fully inserted all the way to the end of the chuck when mounting it to the machinery.

There is the risk of breaking and rupturing the shank section, damaging the machine, jigs, and work-pieces and/or sustaining an injury.

4. Tighten the setscrew at the flat section of the shank when fastening with the side-lock style.

Tightening it at any place other than the flat section is dangerous, as the sleeve may be disengaged from the machine, damaging the machine, jigs and work-pieces and/or sustaining an injury.

5. Never use any brush other than XEBEC Brush Surface that matches with the main body size.

It is dangerous since the brush may be disengaged from the main body, damaging the machine, jigs and work-pieces.

6. Conduct a trial run for one minute or more before starting work, and three minutes or more after changing the machine and/or replacing the tool. Immediately stop the operation with any sign of abnormality such as looseness in the mounting section of machinery or tools, or vibration.

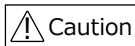
When the use continues, there is the risk of damaging the machine, jigs and work-pieces, and/or sustaining an injury due to the shank coming off, deforming, and/or breaking.

7. Immediately stop the operation with any sign of abnormality such as vibration while in use.

If use continues, there is the risk of damaging the machine, jigs and work-pieces and/or sustaining an injury due to the shank's coming off, deforming, and/or breaking.

8. Do not insert a hand into the gear area.

There is the risk of sustaining an injury by having the hand pinched.



1. Set the coolant to cover the tip of the brush when wet processing.

If having coolant on the main body is unavoidable, be careful to ensure that there is no abnormality in the actuator part, and if there were abnormalities, please implement a periodic maintenance in accordance with "5. How to clean sleeve main body" (P9).

2. For dry processing, use a dust collector to collect the dust that may be generated during the processing.

There is the risk of worsening machining quality, damaging the main body, breaking the machine, jigs and work-pieces and/or sustaining an injury by causing a malfunction when dust gets inside the sleeve.

3. When attaching to the machining center, do not use a pull bolt with a through-hole (center through pull bolt).

There is the risk of worsening machining quality, damaging the main body, breaking the machine, jigs and work-pieces and/or sustaining an injury by causing a malfunction when the coolant intrudes inside the sleeve.

4. Install the rack gear in a position where peripheral devices (work-pieces, jigs, etc.) do not interfere when the main body passes through.

There is the risk of causing the main body to fail and/or damage, breaking the machine, jigs and work-pieces and/or sustaining an injury when interfering with the peripheral devices.

5. Use the feed rate within F=10,000mm/min. when the main body passes through the rack gear.

There is the risk of causing the main body as well as the rack to fail and/or incur damage, breaking the machine, jigs, work-pieces and/or sustaining an injury when used by exceeding the upper limit of the feed rate. (F=10000mm/min).

6. Confirm the orientation and angle of the rack by observing the procedures.

There is the risk of causing the main body as well as the rack gear to fail and/or incur damage, breaking the machine, jigs and work-pieces and/or sustaining an injury if the rack gear's orientation is wrong and/or its angle is significantly offset.

7. Tighten screws by using torque wrenches by fastening at 3N·m (for both XP-AUT25M and XP-AUT40M) when installing for the XEBEC Brush™ Surface.

When the tightening torque is low, there is the risk of causing damage to the machine, jigs and work-pieces and/or sustaining an injury by having the brush come off of the brush holder.

XEBEC Self-Adjusting Sleeve™ (XP-AUT25M/XP-AUT40M) User Manual

■ Product characteristics

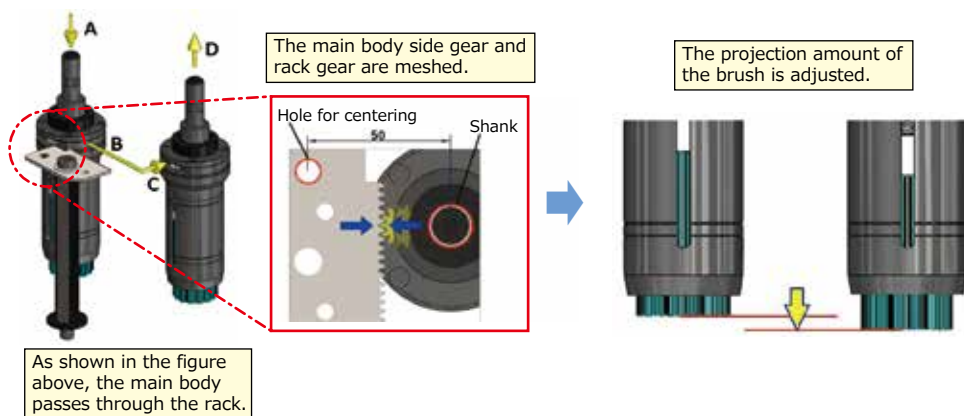
1. Manual projection work is no longer required.

The brush projection work by the operator is unnecessary until one brush is fully used by operating the brush projection work within the machine through the use of a rack & pinion mechanism. (Adjustment amount can be set every 0.05mm from 0.05mm to 1.0mm.)

2. Brush performance is stabilized.

Quality is stabilized by maintaining optimum projection.

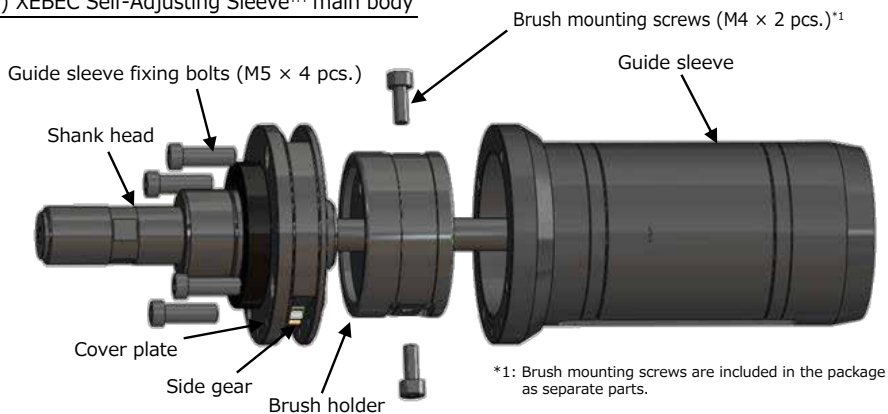
[Operation image]



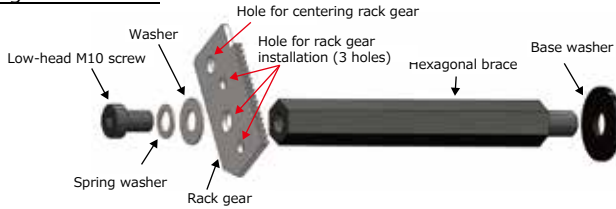
■ Product structure

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

1) XEBEC Self-Adjusting Sleeve™ main body



2) Rack gear stand set



■ Specifications

[Self-adjusting sleeve main body external dimensions]



(XP-AUT25M)



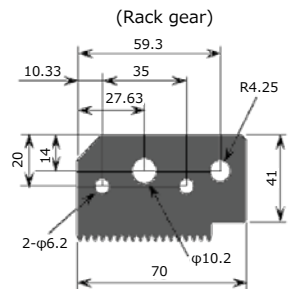
(XP-AUT40M)

Product code	Overall length (mm)	Shank length (mm)	Outermost diameter (mm)	Shank diameter (mm)	Main body weight (g)	Maximum rotation speed (min ⁻¹)	Supporting brush
XP-AUT25M	189	41.5	φ60	φ16	795	5000	A11-CB25M, A21-CB25M, A31-CB25M
XP-AUT40M	189	41.5	φ60	φ16	910	3000	A11-CB40M, A21-CB40M, A31-CB40M

⚠ The maximum rotation speed of this product varies by the brush size being used. Using at or higher than the maximum rotation speed may result in breakage of the tool and machine and/or sustain an injury.

⚠ There is the risk of causing the main body as well as the rack gear to fail and/or damage, breaking the machine, jigs and work-pieces and/or sustaining an injury when used by exceeding the feed rate's upper limit (F=10000mm/min) when passing through the rack gear.

[Accessory's external dimensions]



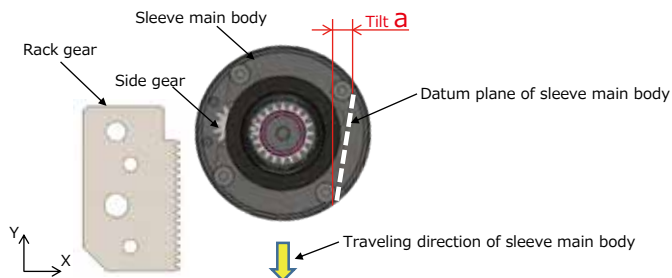
■ Usage

1. How to set XEBEC Self-Adjusting Sleeve™ (hereinafter referred to as “sleeve main body”)

<Example> If sleeve main body travels in Y-direction of rack gear

With the main spindle at its normal orientation angle, mount the tool assembly on the main spindle so that the side gear of the sleeve main body is directed towards the rack gear. Then, check that the datum plane of the sleeve main body is parallel to the Y-axis.

Please ensure to adjust the “Tilt α ” below 0.5mm. (Fig. 1)



⚠ There is a risk of damaging the main body or the machine if the main body is mounted with the side gear not facing the rack gear or the Tilt is over 0.5mm, as the main body might interfere with the rack gear.

2. How to mount rack gear

(1) Rack gear mounting position

Please mount the rack gear away from interferers (jigs, etc.) and in a position where an operating area (tool interfering area) can be ensured as shown in Fig. 2.

⚠ Please securely fasten the hexagonal brace at the torque 40N·m on the slide table and the rack gear to the hexagonal brace at the torque 15N·m by using torque wrenches. There is the risk of damaging the main body and/or the machine unless securely fastened when the main body is misaligned under a load when it passes through the rack gear.

(2) Rack gear mounting accuracy

As shown in Fig. 3, inclination of the longitudinal direction of the rack gear to the slide axis has to be below 0.1mm.

⚠ There is the risk of damaging the main body and/or the machine if the rack gear orientation is incorrect or there is a tilt exceeding 0.1mm as the main body interferes with the rack gear.

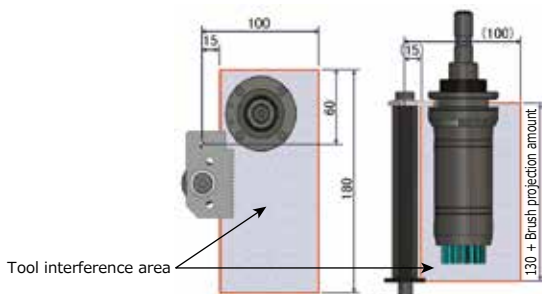


Fig. 2

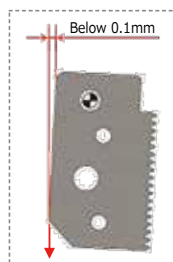


Fig. 3

3. Operation

(1) Preparation work

Please measure and calculate the following machine coordinates and distance for program instructions.

1) Coordinates on the rack gear installation position

X-axis: X-axis machine coordinates at the center of hole for centering rack gear (Fig. 4)

Y-axis: Y-axis machine coordinates at the center of hole for centering rack gear (Fig. 4)

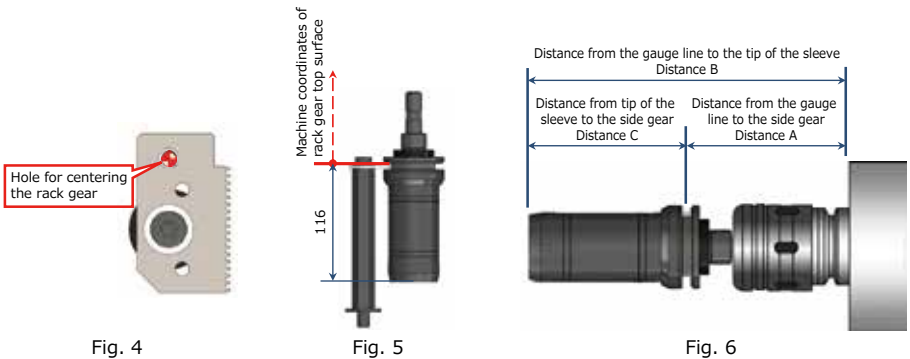
Z-axis: Machine coordinates at rack gear top surface (Fig. 5)

2) Distance from gauge line to side gear

Please measure Distance B up to the sleeve's tip from the gauge line.

Next, calculate Distance A from the gauge line to the side gear by subtracting 116mm (Distance C from sleeve tip to the side gear) from the measured results. (Fig. 6)

<Calculation equation> Distance A = Distance B – Distance C



(2) Operating program

⚠ Confirm without fail before operating via the program that the rack gear and side gear are facing each other after completing the main-spindle orientation commands.

⚠ In the case of confirming operation initially, render it by reducing the moving speed adequately and confirming that there is no interference with the work-pieces or jigs when approaching/allowing relief on the rack gear.

<Program example>

To have a +0.5mm automatic brush projection with the coordinates of racking gear mounting positions and distance from the gauge line to the side gear as follows:

X-axis machine coordinates at the center of hole for centering : X-200.000

Y-axis machine coordinates at the center of hole for centering: Y-150.000

Z-axis machine coordinates at rack gear top surface: Z-514.000

Distance from gauge line to side gear: 136.5mm

<Sub program for automatic brush projection> ... Operation trajectory (Fig. 7)

G91G28Z0M9 ; ...Retract to first origin in Z axis and coolant OFF.

G0G90G53X[-200.0+50.0]Y[-150.0+25.0] ; ...Position to X50.0 Y25.0 from the rack gear datum hole/ centering hole. (X axis is at the travel start position) (Fig.8)

G0G90G53Z[-514.0+136.5] ; ...Position to Z136.5 from the top surface of the rack gear . (Z axis is at the position where the rack gear and side gear mesh) (Fig.9)

M19 ; ...Main spindle orientation command.*1

G1G91X0Y-25.0F2000 ; ...Feed into position with an incremental move in the Y axis, feed rate 2000mm/min. (Y axis is at the travel start position)

Y-31.415F10000 ; ...Feed in the correct direction for brush projection for 31.415mm of travel from the start position*2 , feed rate 10000mm/min.*3

X15.0F2000 ; ...Move away in the X axis direction still in incremental, feed rate 2000mm/min.

G91G28Z0 ; ...Retract to first origin in Z axis

M99 ; ...Return to main program

- ⚠ *1 Set the main spindle orientation retention state by commanding main spindle orientation without fail before the rack gear passing operation. Additionally, main spindle excitation torque in the retention state requires a torque that exceeds 0.5N·m. There is the risk of possibly damaging the main body/rack gear/machine by having the main spindle rotate at the time of passing the rack gear if it is not set.
- ⚠ *2 Please do not operate the main body in the brush draw-in direction (gear reverse direction) because the gear and/or rack gear can break down.(Fig.10) Tabel1 shows the relation of the main body's travel passing through the rack gear and brush projection amount.
- ⚠ *3 There is the risk of causing failure and damaging the main body as well as the rack gear, damaging the machine, jigs and work-pieces and/or sustaining an injury when used by exceeding the feed rate's upper limit (F=10000mm/min).



Fig. 7

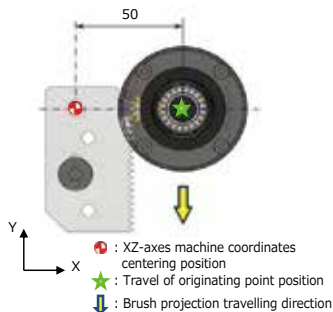


Fig. 8

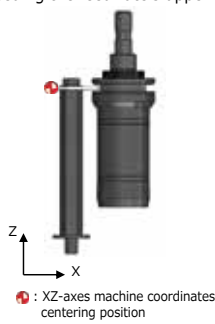


Fig. 9

Table 1: Relationship of sleeve travel and brush projection amount (mm)

Sleeve travel	Projection amount
3.142	0.05
6.283	0.10
9.425	0.15
12.566	0.20
15.708	0.25
18.849	0.30
21.991	0.35
25.132	0.40
28.274	0.45
31.415	0.50
34.557	0.55
37.698	0.60
40.840	0.65
43.981	0.70
47.123	0.75
50.264	0.80
53.406	0.85
56.547	0.90
59.689	0.95
62.830	1.00

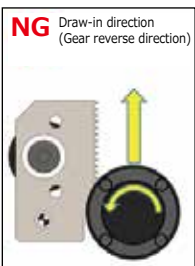
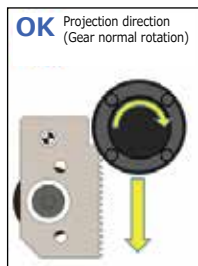
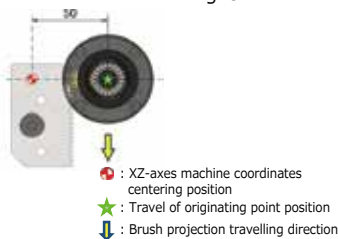


Fig. 10



The starting point of the sleeve travel on Table 1 is where the spindle of the sleeve main body is on the spindle of the rack gear starting point and at the position located 50mm away from the point.

(3) How to determine sleeve travel with automatic projection amount

<Example 1>

Case of brush to wear 0.2mm with processing of 100 work-pieces:
Sleeve travel on brush automatic projection amount 0.2mm is 12.566mm (refer to Table 1).

<Example 2>

Case of brush to wear 0.05mm with processing of one work-piece:
Sleeve travel on brush's automatic projection amount 0.05mm is 3.142mm (refer to Table 1).

4. How to mount and replace brush

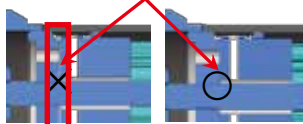
(1) How to mount brush

- 1) Align the brush screw holes with the brush holder screw holes. Match the screw holes by rotating the brush holder if the brush holder's screw holes are deviated. (Fig. 11)
- 2) While inserting the brush into the brush holder, fasten brush fixed screws (M4 × 2 pcs.) by mutually tightening both sides evenly without fail to prevent the deviation (prevent run-out), then tighten the screws with the torque 3N·m by using torque wrenches at the end. (Fig. 12)
At this time, please ensure that there is no gap between the brush bottom surface and brush holder inner surface to prevent run-out of the brush. (Fig. 13)



Fig. 11

Push the brush on the inner surface of the brush holder.



Please ensure that no gaps are generated.

Fig. 13



Fig. 12

(2) How to adjust brush projection level

- 1) Insert a hexagonal wrench into the hexagonal wrench notch at the tip of the rod to adjust the amount of projection. (Fig. 14)

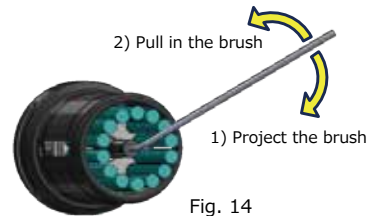


Fig. 14

(3) How to replace brush

- 1) Remove the brush mounting screws at two locations. (Fig. 15)
- 2) Remove the brush from the brush holder. (Fig. 16)
- 3) Pass a brush mounting screw through one of the brush mounting screw holes of the brush holder to prevent the brush from rotating, and rotate the screw rod with a hexagonal wrench to fix the brush at a desired position while paying attention to the screw not to fall out. (Fig. 17)
- 4) For reassembly please refer back to 4 (1) Brush mounting method.



Fig. 15



Fig. 16

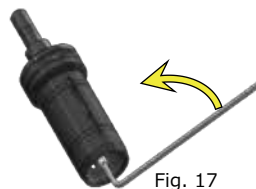
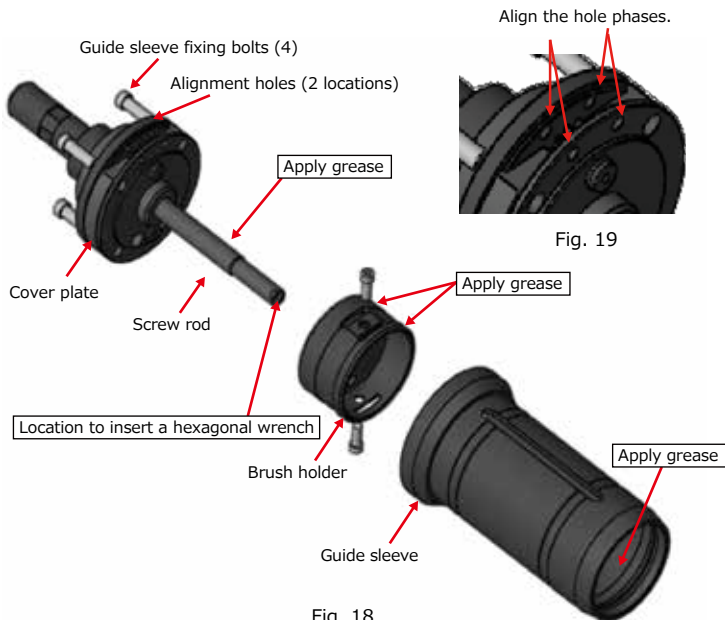


Fig. 17

5. How to clean sleeve main body

Clean inside of the guide sleeve and outside of the brush holder. (Fig. 18)

- 1) Remove the guide sleeve by loosening four pieces of the guide sleeve fixing bolts
- 2) Remove the brush holder
- 3) Apply grease after cleaning/wiping outside of the screw rod/brush holder and inside of the guide sleeve with parts cleaner.
*Our company's recommended grease: lithium soap grease (NLGI No. 2)
- 4) Return the brush holder to the screw rod and mount by aligning the phases of the guide sleeve and cover plate. (Fig. 19)
- 5) Tighten four pieces of M5 bolts to fasten the guide sleeve at the torque 3N·m by using torque wrenches.
- 6) Please confirm in advance that there is no run-out before usage. Please confirm also that there are no loose screws, etc. after machining for a while.



6. Remarks

- * When removing and re-assembling the guide sleeve please do so carefully as the clearance is minimal and lack of care can result in binding and hence damage.
- * If storing for any time without use please ensure to clean and grease the sliding fit so the unit does not seize whilst not in use.
- * Please inquire through your procurement source if any abnormalities are sensed in the mechanism area.
- * Please inquire regarding maintenance parts through your procurement source.

Other

- * This product is an optional tool for $\phi 25$ or $\phi 40$ XEBEC Brush™ Surface.
- * Please fasten screws with specified tightening torques by using torque wrenches.
- * Please use upon confirming that there are no loose screws before usage.
- * Specifications and shapes of the product may change without prior notice.



XEBEC Technology Co., Ltd.

Fuerte Kojimachi 1-7 Building 8F, 1-7-25 Kojimachi, Chiyoda-ku,
Tokyo 102-0083 TEL +81-(0)3-3239-3481 FAX +81-(0)3-5211-8964
URL <http://www.xebec-tech.com> Email info@xebec-tech.co.jp