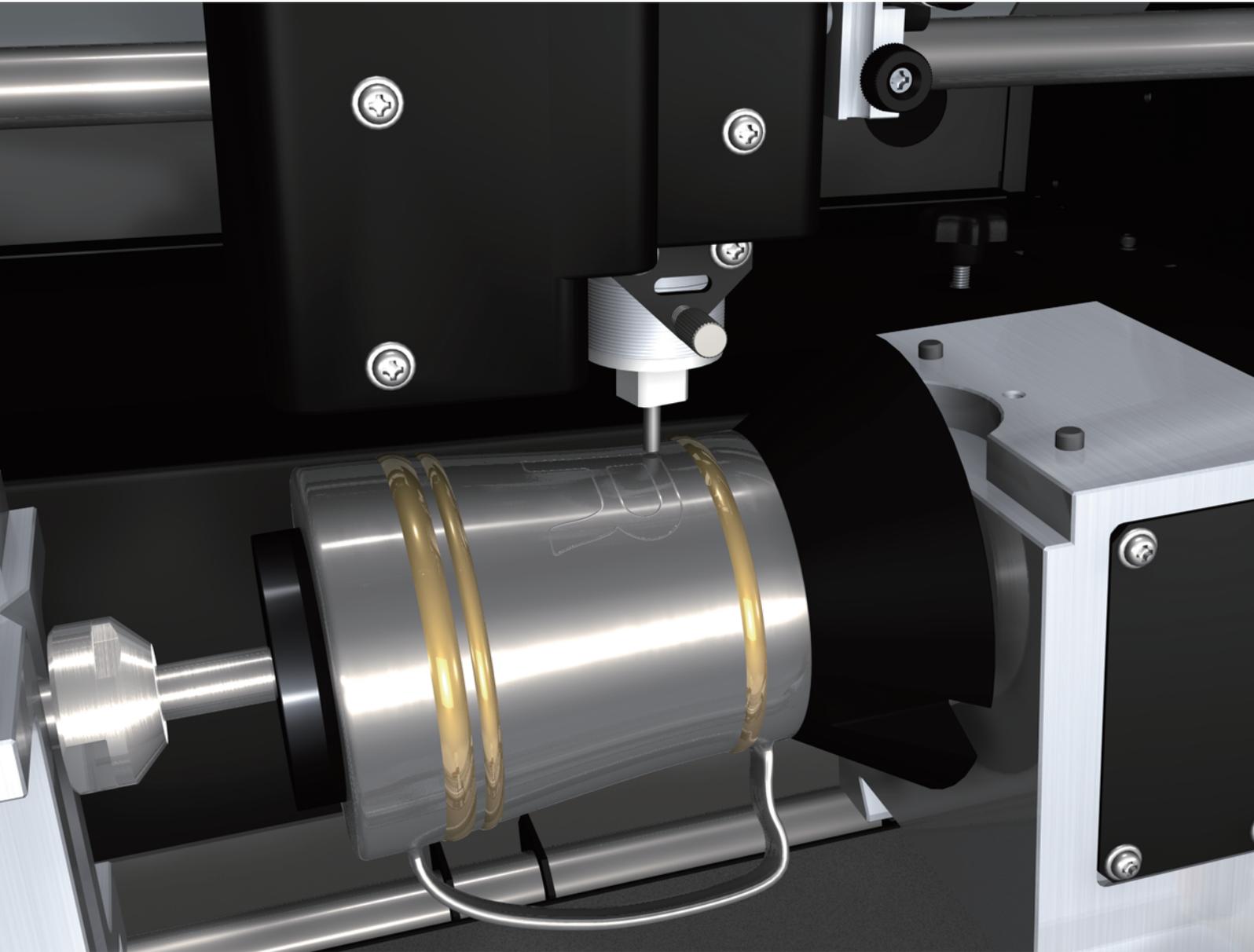


EGX-360

Gift Engraving Machine



Engraving Guide

For the USA

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Unauthorized changes or modification to this system can void the users authority to operate this equipment.

When the equipment requires a usb cable, it must be shielded type.

NOTICE

Grounding Instructions

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

Do not modify the plug provided - if it will not fit the outlet, have the proper outlet installed by a qualified electrician.

Improper connection of the equipment-grounding conductor can result in a risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.

Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.

Use only 3-wire extension cords that have 3-prong grounding plugs and 3-pole receptacles that accept the tool's plug.

Repair or replace damaged or worn cord immediately.

For Canada

CLASS A NOTICE

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

CLASSE A AVIS

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

For California

WARNING

This product contains chemicals known to cause cancer, birth defects and other reproductive harm, including lead.

This system (including the housing and safety device) is a Class 1 laser product.

Laser specifications of this system (including the housing)

Wavelength: 655 nm, maximum output: less than 46.5 μ W, pulse duration: 3.0 μ s

Complies with IEC 60825-1 Edition 2.0 (2007-03).

Complies with FDA performance standards for laser products except for deviations pursuant to Laser notice No.50 dated June 24, 2007.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in radiation exposure.

For EU Countries



Manufacturer:

ROLAND DG CORPORATION

1-6-4 Shinmiyakoda, Kita-ku, Hamamatsu-shi, Shizuoka-ken, 431-2103 JAPAN

The authorized representative in the EU:

Roland DG Corporation, German Office Halskestr. 7, 47877 Willich, Germany

For EU Countries

WARNING

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Operating Instructions

KEEP GUARDS IN PLACE and in working order.

REMOVE ADJUSTING KEYS AND WRENCHES. Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.

KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents.

DON'T USE IN DANGEROUS ENVIRONMENT. Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well lighted.

KEEP CHILDREN AWAY. All visitors should be kept safe distance from work area.

MAKE WORKSHOP KID PROOF with padlocks, master switches, or by removing starter keys.

DON'T FORCE TOOL. It will do the job better and safer at the rate for which it was designed.

USE RIGHT TOOL. Don't force tool or attachment to do a job for which it was not designed.

USE PROPER EXTENSION CORD. Make sure your extension cord is in good condition. When using an extension cord, be sure to use one heavy enough to carry the current your product will draw. An undersized cord will cause a drop in line voltage resulting in loss of power and overheating.

WEAR PROPER APPAREL. Do not wear loose clothing, gloves, neckties, rings, bracelets, or other jewelry which may get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.

USE SAFETY GLASSES, face or dust mask if cutting or cleaning operation is dusty. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses.

SECURE WORK. Use clamps or a vise to hold work when practical.

DON'T OVERREACH. Keep proper footing and balance at all times.

MAINTAIN TOOLS WITH CARE. Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.

DISCONNECT TOOLS before servicing; when changing accessories, such as blades, bits, cutters, and the like.

REDUCE THE RISK OF UNINTENTIONAL STARTING. Make sure switch is in off position before plugging in.

USE RECOMMENDED ACCESSORIES. Consult the owner's manual for recommended accessories. The use of improper accessories may cause risk of injury to persons.

NEVER STAND ON TOOL. Serious injury could occur if the tool is tipped or if the cutting tool is unintentionally contacted.

CHECK DAMAGED PARTS. Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function - check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.

NEVER LEAVE TOOL RUNNING UNATTENDED. TURN POWER OFF. Don't leave tool until it comes to a complete stop.

USE POWER SUPPLY CORD WHICH IS ATTACHED WITH PRODUCTS. Do not use other power supply cord.

-
- To ensure safe usage and full performance of this product, please be sure to read through this manual completely.
 - To ensure immediate access whenever needed, store this manual in a safe location.
 - Unauthorized copying, quotation, or translation of this manual, in whole or in part, without the written approval of Roland DG Corp., is prohibited.
 - The contents of this document and the specifications of this product are subject to change without notice.
 - Roland DG Corp. assumes no responsibility for any loss or damage relating to this product, regardless of any defect in this product or this manual. Such loss or damage, whether direct or indirect, includes, but is not limited to, that arising from the specifications or performance of this product, that due to failure of the product to perform, and that arising from any article made using this product.
-

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Company names and product names are trademarks or registered trademarks of their respective holders.

To Ensure Safe Use

Improper handling or operation of this machine may result in injury or damage to property. Points which must be observed to prevent such injury or damage are described as follows.

About WARNING and CAUTION Notices

 WARNING	Used for instructions intended to alert the user to the risk of death or severe injury should the unit be used improperly.
 CAUTION	Used for instructions intended to alert the user to the risk of injury or material damage should the unit be used improperly. Note: Material damage refers to damage or other adverse effects caused with respect to the home and all its furnishings, as well to domestic animals or pets.

About the Symbols

	The  symbol alerts the user to important instructions or warnings. The specific meaning of the symbol is determined by the design contained within the triangle. The symbol at left means "danger of electrocution."
	The  symbol alerts the user to items that must never be carried out (are forbidden). The specific thing that must not be done is indicated by the design contained within the circle. The symbol at left means the unit must never be disassembled.
	The  symbol alerts the user to things that must be carried out. The specific thing that must be done is indicated by the design contained within the circle. The symbol at left means the power-cord plug must be unplugged from the outlet.

 **Incorrect operation may cause injury.**

 **WARNING**

 **Be sure to follow the operation procedures described in this documentation. Never allow anyone unfamiliar with the usage or handling of the machine to touch it.**
Incorrect usage or handling may lead to an accident.

 **Keep children away from the machine.**
The machine includes areas and components that pose a hazard to children and may result in injury, blindness, choking, or other serious accident.

 **Never operate the machine while tired or after ingesting alcohol or any medication.**
Operation requires unimpaired judgment. Impaired judgment may result in an accident.

 **Conduct operations in a clean, brightly lit location.**
Working in a location that is dark or cluttered may lead to an accident, such as becoming caught in the machine as the result of an inadvertent stumble.

 **Never use the machine for any purpose for which it is not intended, or use the machine in an undue manner that exceeds its capacity.**
Doing so may result in injury or fire.

 **Never use a cutting tool that has become dull. Perform frequent maintenance to keep and use the machine in good working order.**
Unreasonable usage may result in fire or injury.

 **For accessories (optional and consumable items, power cord, and the like), use only genuine articles compatible with this machine.**
Incompatible items may lead to an accident.

 **WARNING**

 **Before attempting cleaning, maintenance, or attachment or detachment of optional items, disconnect the power cord.**
Attempting such operations while the machine is connected to a power source may result in injury or electrical shock.

 **Never attempt to disassemble, repair, or modify the machine.**
Doing so may result in fire, electrical shock, or injury. Entrust repairs to a trained service technician.

 **CAUTION**

 **Never climb or lean on the machine.**
The machine is not made to support a person. Climbing or leaning on the machine may dislodge components and cause a slip or fall, resulting in injury.

 **Install in a location that is level and stable.**
Installation in an unsuitable location may cause an accident, including a fall or tipover.

 **This machine weighs 84 kg (186 lb.)**

 **CAUTION**

 **Unloading and emplacement are operations that must be performed by 4 persons or more.**
Tasks that require undue effort when performed by a small number of persons may result in physical injury. Also, if dropped, such items may cause injury.

 **CAUTION**

 **Install in a location that is level and stable.**
Installation in an unsuitable location may cause an accident, including a fall or tipover.

 **The cutting waste or workpiece may catch fire or pose a health hazard.**

 **WARNING**

 **Never attempt to cut magnesium or any other such flammable material.**
Fire may occur during cutting.

 **Keep open flame away from the work area.**
Cutting waste may ignite. Powdered material is extremely flammable, and even metal material may catch fire.

 **When using a vacuum cleaner to take up cutting waste, exercise caution to prevent fire or dust explosion.**
Taking up fine cuttings using an ordinary vacuum cleaner may cause danger of fire or explosion. Check with the manufacturer of the vacuum cleaner. When the safety of use cannot be determined, clean using a brush or the like, without using the vacuum cleaner.

 **CAUTION**

 **Wear dust goggles and a mask. Wash away any cutting waste remaining on the hands.**
Accidentally swallowing or inhaling cutting waste may be hazardous to the health.

 **Danger of pinching, entanglement, and burns.**

 **WARNING**

 **Never attempt operation while wearing a necktie, necklace, loose clothing, or gloves. Bind long hair securely.**
Such items may become caught in the machine, resulting in injury.

 **Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind.**
Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

 **Exercise caution to avoid being pinched or becoming caught.**
Inadvertent contact with certain areas may cause the hand or fingers to be pinched or become caught. Use care when performing operations.

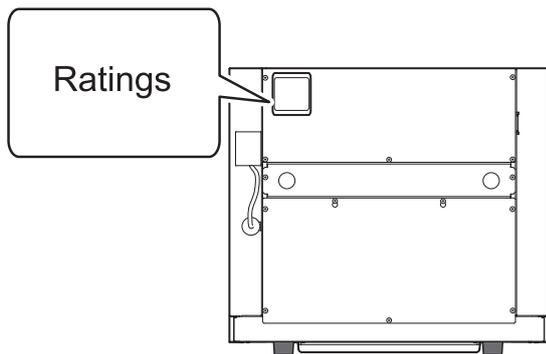
 **Caution: cutting tool.**
The cutting tool is sharp. To avoid injury, exercise caution.

 **Caution: high temperatures.**
The cutting tool and spindle motor become hot. Exercise caution to avoid fire or burns.

 **Danger of electrical short, shock, electrocution, or fire**

 **WARNING**

-  Connect to an electrical outlet that complies with this machine's ratings (for voltage and frequency). Provide a power supply whose amperage is 1.9 A or higher (for 100 to 120 V) or 0.8 A or higher (for 220 to 240 V).



-  **Never use out of doors or in any location where exposure to water or high humidity may occur. Never touch with wet hands.** Doing so may result in fire or electrical shock.

-  **Never allow any foreign object to get inside. Never expose to liquid spills.** Inserting objects such as coins or matches or allowing beverages to be spilled into the ventilation ports may result in fire or electrical shock. If anything gets inside, immediately disconnect the power cord and contact your authorized Roland DG Corp. dealer.

-  **Never place any flammable object nearby. Never use a combustible aerosol spray nearby. Never use in any location where gases can accumulate.** Combustion or explosion may be a danger.

 **WARNING**

-  **Handle the power cord, plug, and electrical outlet correctly and with care. Never use any article that is damaged.** Using a damaged article may result in fire or electrical shock.

-  **When using an extension cord or power strip, use one that adequately satisfies the machine's ratings (for voltage, frequency, and current).** Use of multiple electrical loads on a single electrical outlet or of a lengthy extension cord may cause fire.

-  **When the machine will be out of use for a prolonged period, disconnect the power cord.** This can prevent accidents in the event of current leakage or unintended startup.

-  **Connect to ground.** This can prevent fire or electrical shock due to current leakage in the event of malfunction.

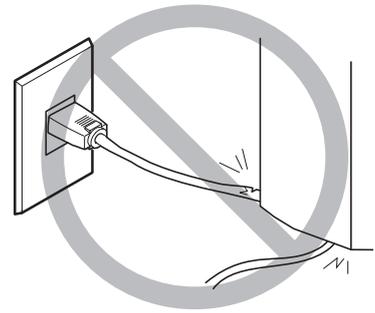
-  **Position so that the power plug is within immediate reach at all times.** This is to enable quick disconnection of the power plug in the event of an emergency. Install the machine next to an electrical outlet. Also, provide enough empty space to allow immediate access to the electrical outlet.

-  **Never use cutting oil.** This machine is not designed for the flow of cutting oil. Oil may get inside the machine and cause fire or electrical shock.

-  **Never use a pneumatic blower.** This machine is not compatible with a pneumatic blower. Cutting waste may get inside the machine and cause fire or electrical shock.

-  **If sparking, smoke, burning odor, unusual sound, or abnormal operation occurs, immediately unplug the power cord. Never use if any component is damaged.** Continuing to use the machine may result in fire, electrical shock, or injury. Contact your authorized Roland DG Corp. dealer.

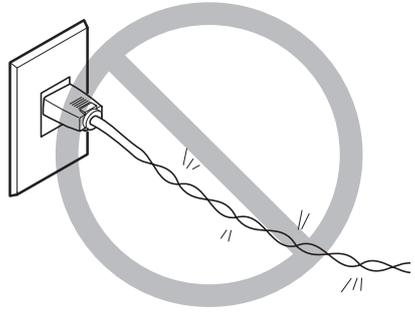
⚠ Important notes about the power cord, plug, and electrical outlet



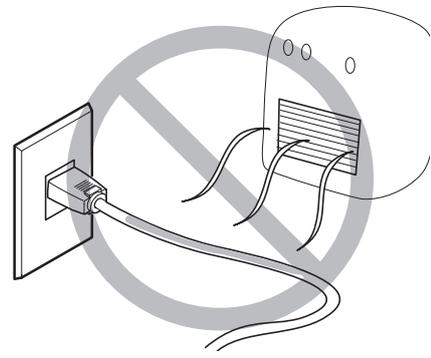
Never place any object on top or subject to damage.



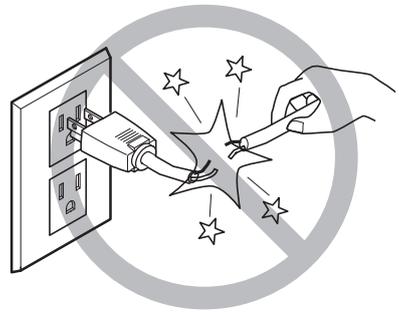
Never allow to get wet.



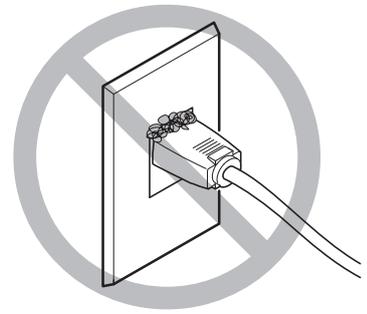
Never bend or twist with undue force.



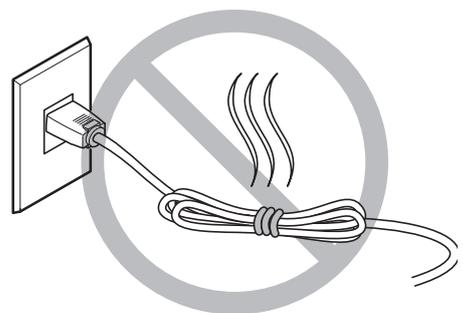
Never make hot.



Never pull with undue force.



Dust may cause fire.



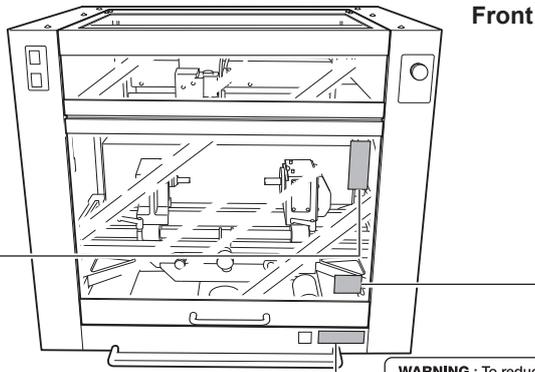
Never bundle, bind, or roll up.

⚠ Warning Labels

Warning labels are affixed to make areas of danger immediately clear. The meanings of these labels are as follows. Be sure to heed their warnings. Also, never remove the labels or allow them to become obscured.



Caution: Pinching Hazard
Be careful not to allow the fingers to become pinched when closing the cover.



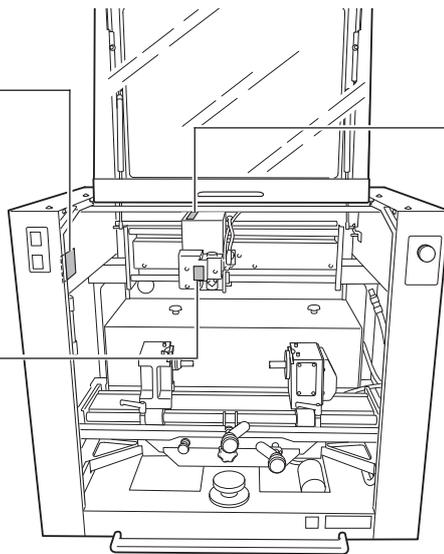
Front



WARNING : To reduce the risk of injury, user must read and understand user's manual.
AVERTISSEMENT : Afin de réduire le risque de blessures, l'utilisateur doit lire et bien comprendre le mode d'emploi.
警告 : 怪我を防ぐために、必ずユーザーズマニュアルをお読みください。



Never use a pneumatic blower.
This machine is not compatible with a pneumatic blower. Cutting waste may get inside the machine and cause fire or electrical shock.



Inside



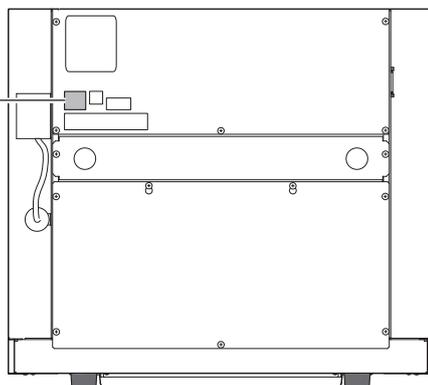
Caution: Pinching Hazard
Contact during operation may cause the hand or fingers to become pinched, resulting in injury.



Caution: Sharp Tool
Inadvertent contact may cause injury.



Caution: High Voltage
Cover removal may pose hazard of shock or electrocution due to high voltage



Rear



Pour utiliser en toute sécurité

La manipulation ou l'utilisation inadéquates de cet appareil peuvent causer des blessures ou des dommages matériels. Les précautions à prendre pour prévenir les blessures ou les dommages sont décrites ci-dessous.

Avis sur les avertissements

 ATTENTION	Utilisé pour avertir l'utilisateur d'un risque de décès ou de blessure grave en cas de mauvaise utilisation de l'appareil.
 PRUDENCE	Utilisé pour avertir l'utilisateur d'un risque de blessure ou de dommage matériel en cas de mauvaise utilisation de l'appareil. * Par dommage matériel, il est entendu dommage ou tout autre effet indésirable sur la maison, tous les meubles et même les animaux domestiques.

À propos des symboles

	Le symbole  attire l'attention de l'utilisateur sur les instructions importantes ou les avertissements. Le sens précis du symbole est déterminé par le dessin à l'intérieur du triangle. Le symbole à gauche signifie "danger d'électrocution."
	Le symbole  avertit l'utilisateur de ce qu'il ne doit pas faire, ce qui est interdit. La chose spécifique à ne pas faire est indiquée par le dessin à l'intérieur du cercle. Le symbole à gauche signifie que l'appareil ne doit jamais être démonté.
	Le symbole  prévient l'utilisateur sur ce qu'il doit faire. La chose spécifique à faire est indiquée par le dessin à l'intérieur du cercle. Le symbole à gauche signifie que le fil électrique doit être débranché de la prise.

L'utilisation incorrecte peut causer des blessures

ATTENTION

 **S'assurer de suivre les procédures d'utilisation décrites dans la documentation. Ne jamais permettre à quiconque ne connaît pas le fonctionnement ou la manutention de l'appareil de le toucher.**

L'utilisation ou la manutention incorrectes peuvent causer un accident.

 **Garder les enfants loin de l'appareil.**
L'appareil comporte des zones et des composants qui présentent un danger pour les enfants et qui pourraient causer des blessures, la cécité, la suffocation ou d'autres accidents graves.

 **Ne jamais faire fonctionner l'appareil après avoir consommé de l'alcool ou des médicaments, ou dans un état de fatigue.**

L'utilisation de l'appareil exige un jugement sans faille. L'utilisation avec les facultés affaiblies pourrait entraîner un accident.

 **Utiliser l'appareil dans un endroit propre et bien éclairé.**

Travailler dans un endroit sombre ou encombré peut causer un accident; l'utilisateur risque, par exemple, de trébucher malencontreusement et d'être coincé par une partie de l'appareil.

 **Ne jamais utiliser l'appareil à des fins autres que celles pour lesquelles il est conçu. Ne jamais l'utiliser de manière abusive ou d'une manière qui dépasse sa capacité.**

Le non-respect de cette consigne peut causer des blessures ou un incendie.

 **Ne jamais utiliser un outil de coupe émoussé. Procéder fréquemment aux travaux d'entretien pour garder l'appareil en bon état de fonctionnement.**

L'usage abusif peut causer un incendie ou des blessures.

 **Utiliser uniquement des accessoires d'origine (accessoires en option, articles consommables, câble d'alimentation et autres articles semblables), compatibles avec l'appareil.**

Les articles incompatibles risquent de causer des accidents.

ATTENTION

 **Débrancher le câble d'alimentation avant de procéder au nettoyage ou à l'entretien de l'appareil, et avant d'y fixer ou d'en retirer des accessoires en option.**

Tenter ces opérations pendant que l'appareil est branché à une source d'alimentation peut causer des blessures ou un choc électrique.

 **Ne jamais tenter de démonter, de réparer ou de modifier l'appareil.**

Le non-respect de cette consigne risque de provoquer un incendie, un choc électrique ou des blessures. Confier les réparations à un technicien ayant la formation requise.

PRUDENCE

 **Ne jamais grimper ni s'appuyer sur la machine.**

La machine n'est pas conçue pour supporter le poids d'une personne. Grimper ou s'appuyer sur la machine peut déplacer des éléments et causer un faux pas ou une chute, ce qui causerait des blessures.

 **Le poids de cet appareil est de 84 kg (186 lb.)**

 **PRUDENCE**

 **Le déchargement et la mise en place doivent être faits par au moins 4 personnes.** Les tâches qui exigent un effort trop grand si elles sont exécutées par un petit nombre de personnes peuvent être cause de blessures. La chute d'articles très lourds peut aussi causer des blessures.

 **PRUDENCE**

 **Installer l'appareil à un endroit stable et plat.** Installer l'appareil à un endroit inapproprié peut provoquer un accident grave comme le renversement ou la chute.

 **Les débris de coupe peuvent s'enflammer ou présenter un risque pour la santé.**

 **ATTENTION**

 **Ne jamais tenter de couper du magnésium ni aucun autre matériau inflammable.** Un incendie pourrait se produire pendant la coupe.

 **Ne pas approcher une flamme nue de l'espace de travail.** Les rognures de coupe peuvent s'enflammer. Les matériaux pulvérisés sont extrêmement inflammables et même le métal peut s'enflammer.

 **Si un aspirateur est utilisé pour ramasser les rognures de coupe, faire preuve de prudence pour empêcher que la poussière s'enflamme ou explose.** Ramasser des rognures fines à l'aide d'un aspirateur ordinaire peut créer un risque d'incendie ou d'explosion. Vérifier auprès du fabricant de l'aspirateur. Dans les cas où il est impossible de déterminer si un aspirateur peut être utilisé sans danger, se servir d'une brosse ou d'un article semblable plutôt que d'un aspirateur.

 **PRUDENCE**

 **Porter des lunettes de protection et un masque. Rincer toutes les rognures de coupe qui pourraient rester collées aux mains.** Avaler ou respirer accidentellement des rognures de coupe peut être dangereux pour la santé.

 **Certains éléments peuvent présenter un risque de pincement, d’emmêlement, de brûlure ou d’autres dangers.**

ATTENTION



Ne jamais faire fonctionner l’appareil si on porte une cravate, un collier ou des vêtements amples. Bien attacher les cheveux longs.

Ces vêtements ou ces objets peuvent être coincés dans l’appareil, ce qui causerait des blessures.



Fixer solidement l’outil de coupe et la pièce à travailler. Une fois qu’ils sont fixés solidement, s’assurer qu’aucun outil ni aucun autre objet n’a été laissé en place.

Si tel était le cas, ces objets pourraient être projetés avec force hors de l’appareil et causer des blessures.



Faire preuve de prudence pour éviter l’écrasement ou le coincement.

La main ou les doigts peuvent être écrasés ou coincés s’ils entrent en contact avec certaines surfaces par inadvertance. Faire preuve de prudence pendant l’utilisation de l’appareil.



Attention : outil de coupe.

L’outil de coupe est acéré. Faire preuve de prudence pour éviter les blessures.



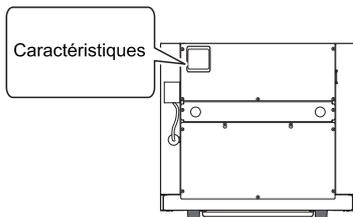
Attention : températures élevées.

L’outil de coupe et le moteur chauffent. Faire preuve de prudence pour éviter un incendie ou des brûlures.

⚠ Risque de décharge ou de choc électrique, d'électrocution ou d'incendie

⚠ ATTENTION

❗ Brancher à une prise électrique conforme aux caractéristiques de cet appareil (tension et fréquence).
Il faut prévoir une alimentation en courant dont l'intensité est de 1.9 A ou plus (pour 100 à 120 V) ou de 0.8 A ou plus (pour 220 à 240 V).



⊘ **Ne jamais utiliser à l'extérieur ni à un endroit où l'appareil risque d'être exposé à de l'eau ou à une humidité élevée. Ne jamais toucher l'appareil avec des mains mouillées.**
Le non-respect de cette consigne risque de provoquer un incendie ou un choc électrique.

⊘ **Ne jamais insérer d'objet étranger dans l'appareil. Ne jamais exposer l'appareil aux déversements de liquides.**
L'insertion d'objets comme des pièces de monnaie ou des allumettes, ou le déversement de liquides dans les orifices de ventilation peuvent causer un incendie ou un choc électrique. Si un objet ou du liquide s'infiltré dans l'appareil, débrancher immédiatement le câble d'alimentation et communiquer avec le représentant Roland DG autorisé.

⊘ **Ne jamais placer d'objet inflammable à proximité de l'appareil. Ne jamais utiliser de produit inflammable en aérosol à proximité de l'appareil. Ne jamais utiliser l'appareil dans un endroit où des gaz peuvent s'accumuler.**
Une combustion ou une explosion pourraient se produire.

⚡ **Mise à la terre.**
La mise à la terre peut prévenir un incendie ou un choc électrique dus à une fuite de courant en cas de défaillance.

⚠ ATTENTION

❗ **Manipuler le câble d'alimentation, la fiche et la prise électrique correctement et avec soin.**
Ne jamais utiliser un article endommagé, car cela pourrait causer un incendie ou un choc électrique.

❗ **Si une rallonge ou une bande d'alimentation électrique sont utilisées, s'assurer qu'elles correspondent aux caractéristiques de l'appareil (tension, fréquence et courant).**
L'utilisation de plusieurs charges électriques sur une prise unique ou une longue rallonge peut causer un incendie.

❗ **Si l'appareil doit rester inutilisé pendant une longue période, débrancher le câble d'alimentation.**
Cela peut prévenir les accidents en cas de fuite de courant ou de démarrage accidentel.

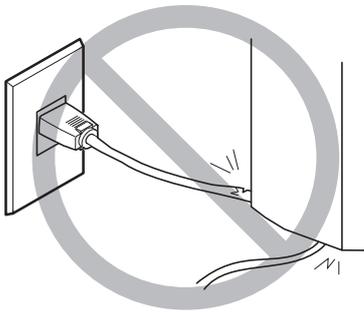
❗ **Placer l'appareil de façon à ce que la fiche soit facile d'accès en tout temps.**
Ainsi, l'appareil pourra être débranché rapidement en cas d'urgence. Installer l'appareil près d'une prise électrique. En outre, prévoir suffisamment d'espace pour que la prise électrique soit facile d'accès.

⊘ **Ne jamais utiliser d'huile de coupe.**
Cet appareil n'est pas conçu pour traiter l'huile de coupe. L'huile peut s'infiltrer à l'intérieur et causer un incendie ou un choc électrique.

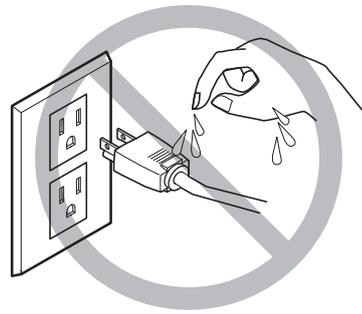
⊘ **Ne jamais utiliser d'air sous pression.**
Cet appareil n'est pas conçu pour être nettoyé à l'aide d'un appareil soufflant. Des rognures de coupe peuvent s'infiltrer à l'intérieur et causer un incendie ou un choc électrique.

❗ **S'il se produit des étincelles, de la fumée, une odeur de brûlé, un bruit inhabituel ou un fonctionnement anormal, débrancher immédiatement le câble d'alimentation. Ne jamais utiliser si un composant est endommagé.**
Continuer à utiliser l'appareil peut causer un incendie, un choc électrique ou des blessures. Communiquer avec le représentant Roland DG Autorisé.

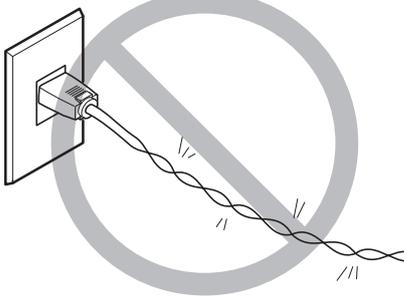
⚠ Remarques importantes à propos du câble d'alimentation, de la fiche et de la prise électrique



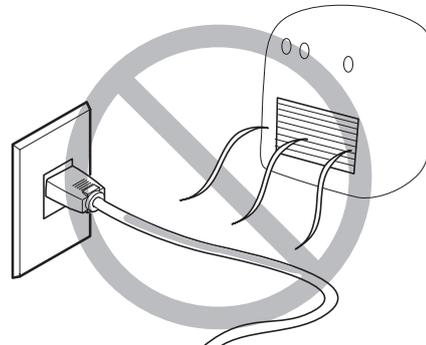
Ne jamais déposer aucun objet sur le câble, sur la fiche ou sur la prise car cela risque de les endommager.



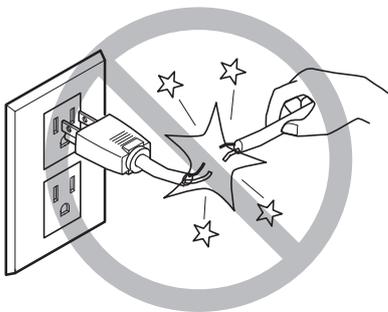
Ne jamais laisser l'eau toucher le câble, la fiche ou la prise.



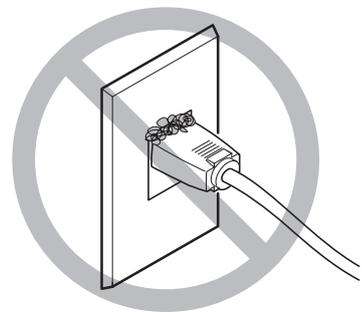
Ne jamais plier ni tordre le câble avec une force excessive.



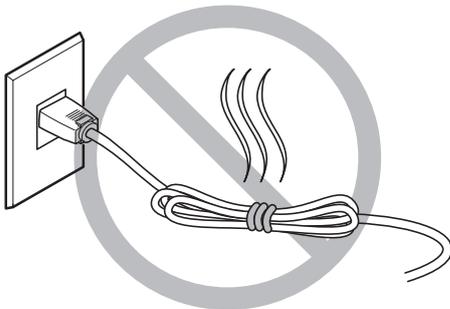
Ne jamais chauffer le câble, la fiche ou la prise.



Ne jamais tirer sur le câble ou la fiche avec une force excessive.



La poussière peut causer un incendie.



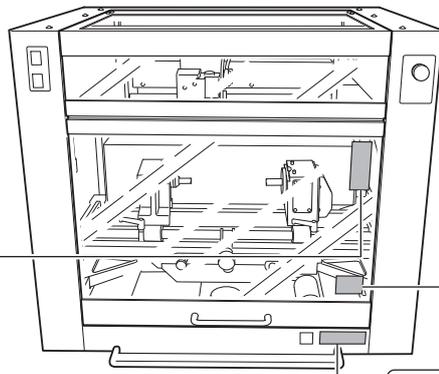
Ne jamais plier ni enrouler le câble.

⚠ Vignettes d'avertissement

Des vignettes d'avertissement sont apposées pour qu'il soit facile de repérer les zones dangereuses. La signification des vignettes est donnée ci-dessous. Respecter les avertissements. Ne jamais retirer les vignettes et ne pas les laisser s'encrasser.



Attention : risque de pincement
Faites attention de ne pas coincer les doigts lors de la fermeture du couvercle.



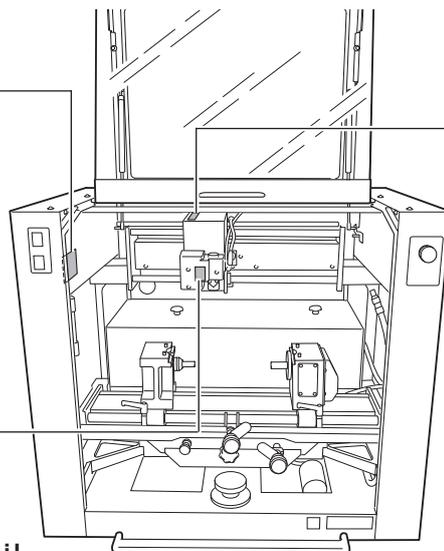
Avant



WARNING : To reduce the risk of injury, user must read and understand user's manual.
AVERTISSEMENT : Afin de réduire le risque de blessures, l'utilisateur doit lire et bien comprendre le mode d'emploi.
警告：怪我を防ぐために、必ずユーザーズマニュアルをお読みください。



Ne jamais utiliser d'air sous pression.
Cet appareil n'est pas conçu pour être nettoyé à l'aide d'un appareil soufflant. Des rognures de coupe peuvent s'infiltrer à l'intérieur et causer un incendie ou un choc électrique.



Intérieur



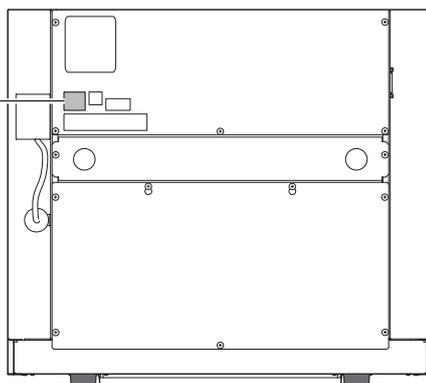
Attention : risque de pincement
Un contact pendant le fonctionnement peut coincer la main ou les doigts ce qui risque de causer des blessures.



Attention : outil coupant
Un contact imprudent risque d'entraîner une blessure.



Attention : voltage élevé
Il peut être dangereux de retirer le couvercle puisqu'il y aurait des risques de chocs électriques ou d'électrocution à cause du voltage élevé.



Arrière

Important Notes on Handling and Use

This machine is a precision device. To ensure the full performance of this machine, be sure to observe the following important points. Failure to observe these may not only result in loss of performance, but may also cause malfunction or breakdown.

This machine is a precision device.

- Handle carefully, and never subject the machine to impact or excessive force.
- Diligently keep clean of cutting waste.
- Use within the range of specifications.
- Never attempt to move the spindle head by hand with undue force.
- Never needlessly touch anywhere inside the machine except for locations specified in this manual.

Install in a suitable location.

- Install in a location that meets the specified conditions for temperature, relative humidity, and the like.
- Install in a quiet, stable location offering good operating conditions.
- Never install in out of doors.
- Never use the machine in an environment where silicone substances (oil, grease, spray, etc.) are present. Doing so may cause poor switch contact.

This machine becomes hot.

- Never cover the ventilation holes with cloth, tape, or anything else.
- Install in a well-ventilated location.

About Tools

- Use a cutter that is suitable for the workpiece and the cutting method.
- The tip of the tool is breakable. Handle with care, being careful not to drop it.

About the Documentation for This Machine

Documentation Included with the Machine

EGX-360 Startup and Maintenance Guide

This describes how to install and the basic usage of the machine, as well as providing more information on such matters as how to install and set up the included programs.

Be sure to read it first.

It also describes maintenance methods and setting menu items in detail.

For more information about engraving methods tailored to a wide variety materials and purposes, refer to the EGX-360 Engraving Guide (electronic-format manual).

EGX-360 Engraving Guide (electronic-format manual): this document

This describes engraving methods for a wide variety materials and purposes, including cylindrical engraving*1 and flat engraving*2, as well as engraving glass material, engraving the inner and outer surfaces of rings,*3 and more.

The manual is in electronic format, and no printed document is included. You can find it on the included Roland Software Package CD-ROM.

Roland EngraveStudio Software Guide

This explains how to install included program and other software and details.

Roland EngraveStudio User's Manual (electronic-format manual)

This is the documentation for using the included three-dimensional (relief) engraving program. It describes the steps from designing text and shapes to engrave on wooden signs and the like through to the engraving operations. Read it if you're using this program.

The manual is in electronic format, and no printed document is included. You can find it on the included Roland EngraveStudio CD-ROM.

Dr. Engrave User's Manual (electronic-format manual)

This manual explains how to use the included engraving program. It describes procedures ranging from how to design a nameplate or the like to engraving operations. Read it if you're using this program.

The manual is in electronic format, and no printed document is included. You can find it on the included Roland Software Package CD-ROM.

3D Engrave User's Manual (electronic-format manual)

This manual explains how to use the included program for three-dimensional engraving and for creating reliefs. It describes procedures ranging from how to design reliefs and the like to cutting operations. Read it if you're using this program.

The manual is in electronic format, and no printed document is included. You can find it on the included Roland Software Package CD-ROM.

Virtual MODELA User's Manual (electronic-format manual)

This is the documentation for a program that creates previews by simulating cutting using 3D Engrave. It describes all the steps from receiving data created using 3D Engrave to simulation of cutting operations. Read it if you're using this program.

The manual is in electronic format, and no printed document is included. You can find it on the included Roland Software Package CD-ROM.

*1: This is a method that uses a motorized vise jaw to engrave cylindrical workpieces.

*2: This is an engraving method employed when using a flat table or the like, without using the motorized vise jaw.

*3: Engraving glass material or the inner and outer surfaces of rings requires jigs and tools that are available separately.

About This Manual

What This Document Assumes

The explanations and procedures in this document are based on the assumption that the following operations have all been completed.

- Installation of the EGX-360 ("the machine"), cable connections, and other hardware setup tasks for the machine
- Connecting the machine to a computer, installing the required programs, and other software-related setup tasks for the machine

Before You Read This Document

This document assumes that you are familiar with the basic operation methods for the machine. This means that before you make use of this document, you should first be sure to read the Startup & Maintenance Guide to familiarize yourself thoroughly with the safe and correct use of the machine.

The Startup & Maintenance Guide also includes such information as daily and other periodic maintenance methods, and what to do if a problem occurs in the course of basic operation. To ensure the full use of the machine, we recommend reading this thoroughly.

Chapter 1

Cylindrical Engraving: Metal and Resin

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 - Verifying the Workpiece Size and Cuttable Area22
 - Verifying the Jigs and Cutting Tools Used25
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 - STEP5: Load the Workpiece36
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1-1 Check This First

Making Sure of the Material

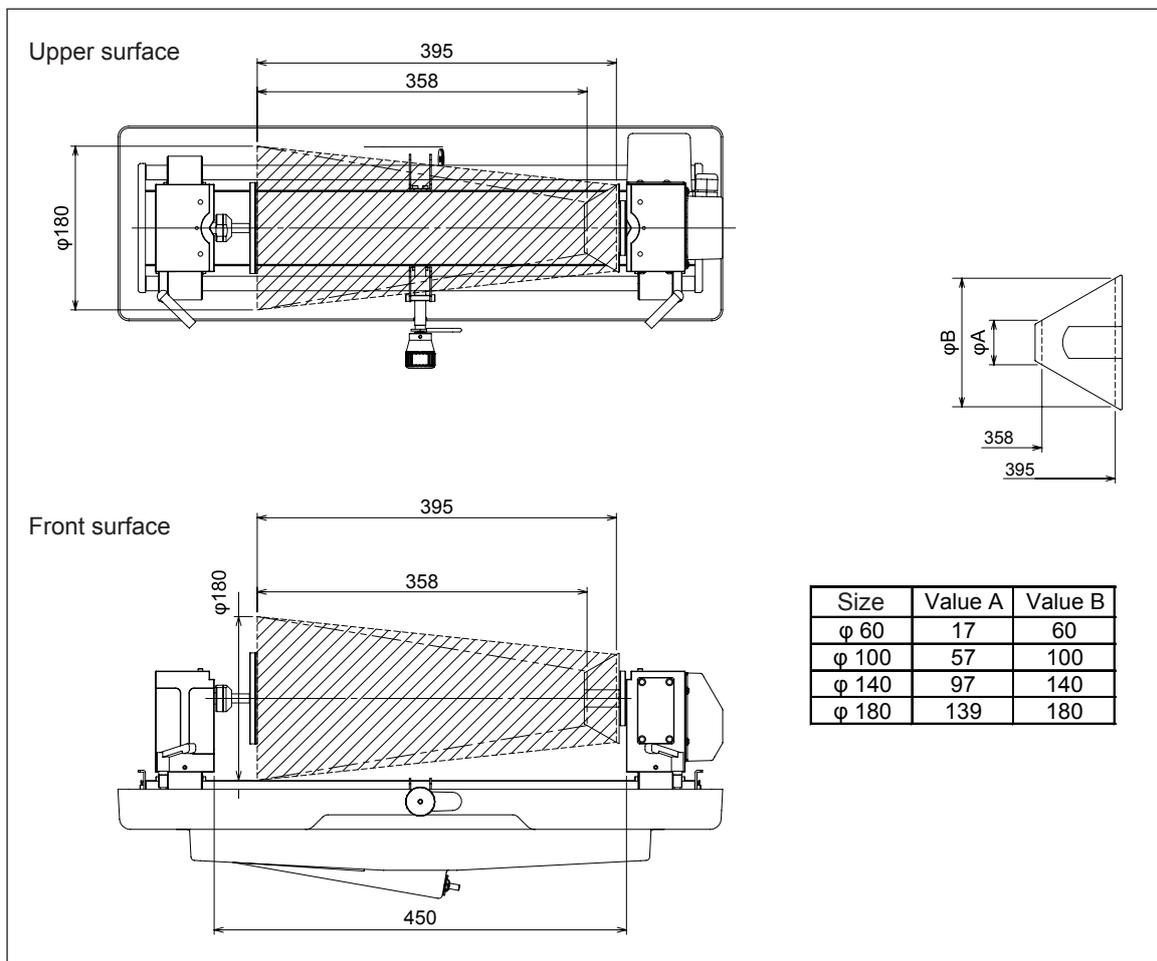
This section describes how to perform cylindrical engraving on metal or resin material. "Metal material" and "resin material" refer to the types of material described below.

- Metal: Aluminum, brass, stainless steel, and other light metals
- Resin: Acrylics

The material is assumed to be cylindrical in shape, but as long as the material can be loaded on the machine and engraved, it doesn't matter what shape any areas other than the engraved surface have. For information on what material is usable, refer to "Workpiece Size and Cuttable Area" in the following section.

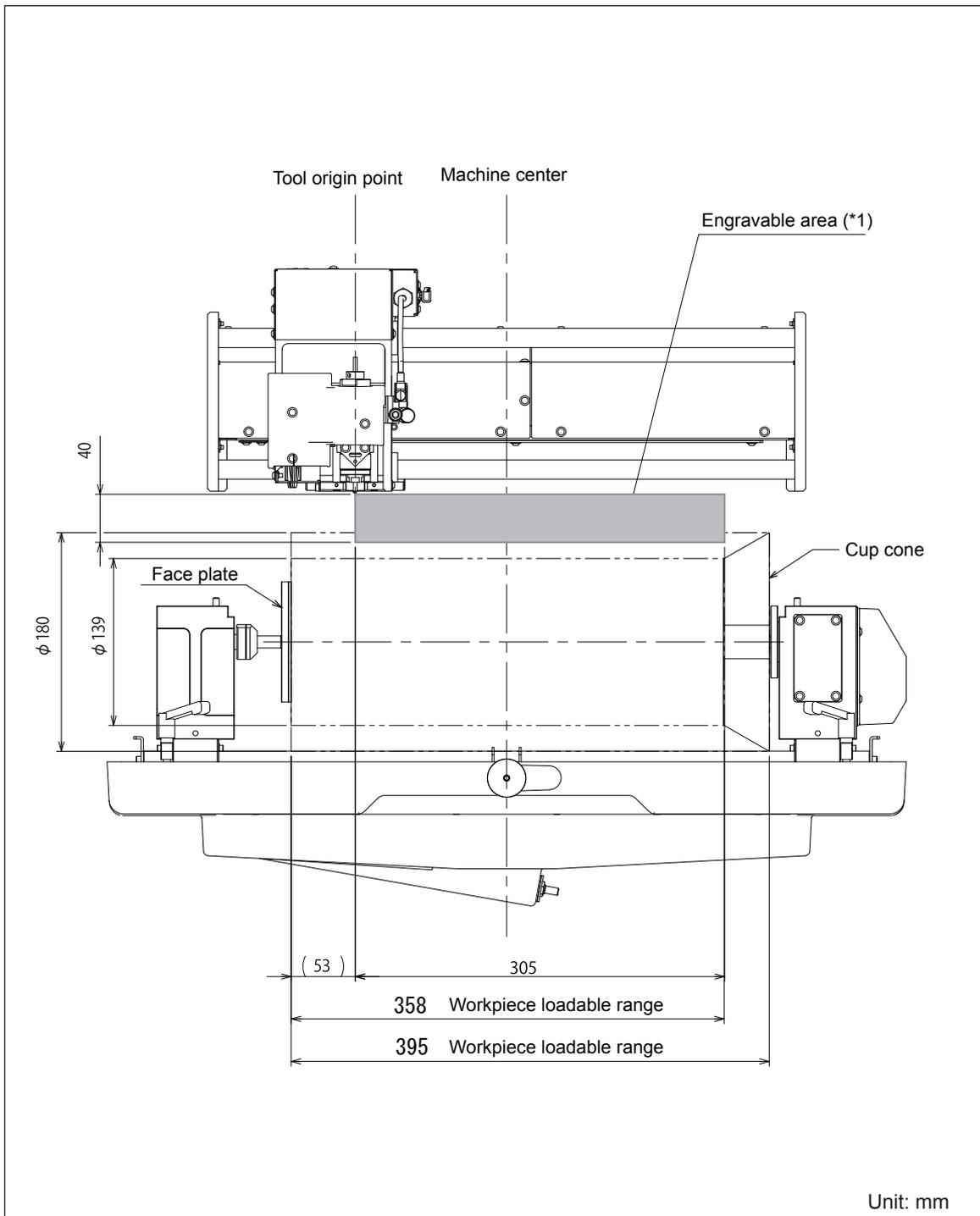
Verifying the Workpiece Size and Cuttable Area

Loadable Workpiece Size



Unit: mm

Cutable Area (When the Vise Unit Is Level and at Its Lowest Position)



*1 The actual area in which engraving is possible (the cutting area) is restricted by the length of the installed tool, the location where the nose unit is installed, the type of jig and shape of the workpiece, and the angle of the vise unit, and may be less than the values shown above.

1

Cylindrical :
Metal and Resin

2

Cylindrical :
Glass

3

Ring Engraving

4

Flat Engraving

5

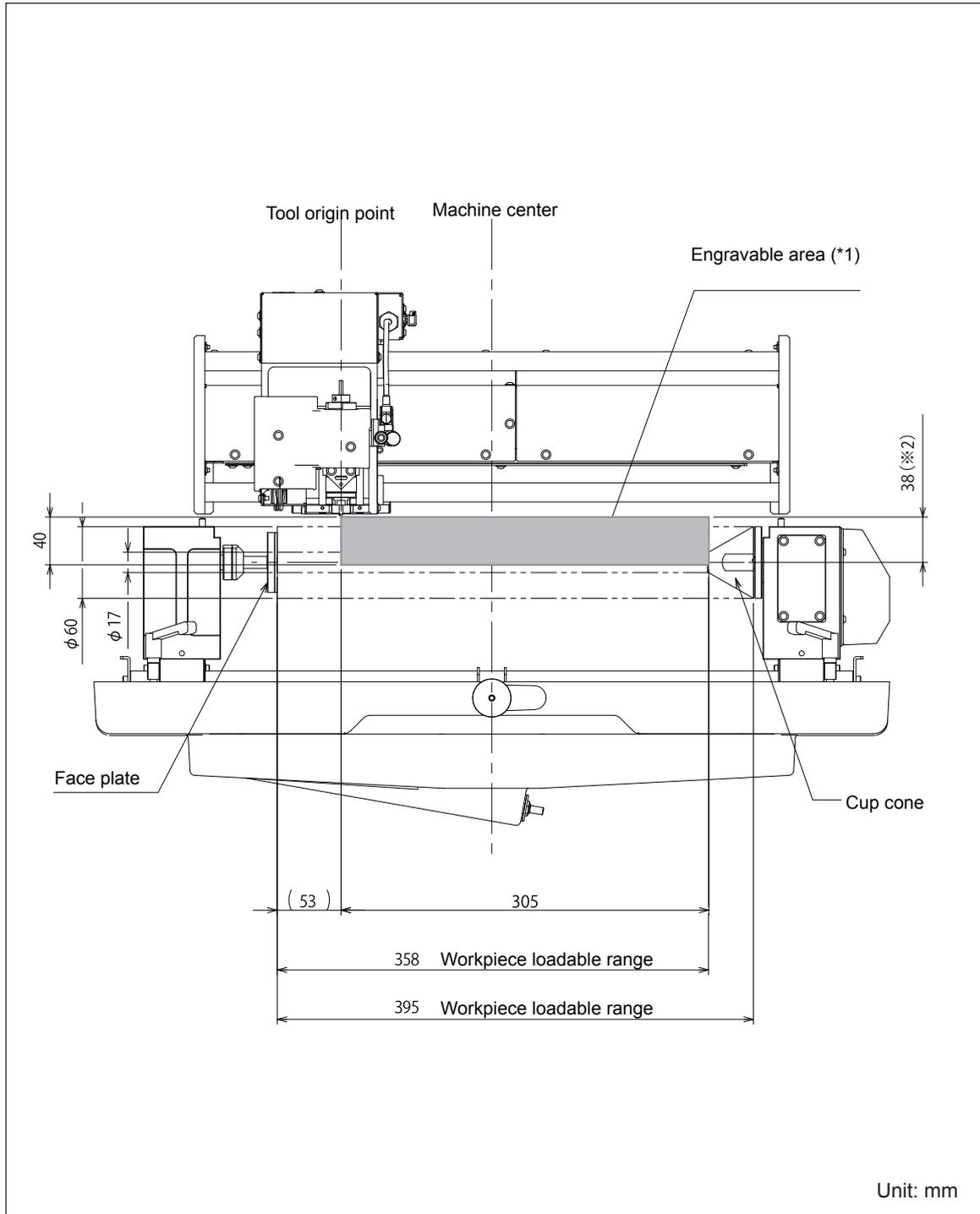
Feature
Reference

6

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Cutable Area (When the Vise Unit Is Level and at Its Highest Position)



*1 The actual area in which engraving is possible (the cutting area) is restricted by the length of the installed tool, the location where the nose unit is installed, and the type of jig and shape of the workpiece, and may be less than the values shown above.

*2 When the vise unit is at its highest position, interference with the tool will occur if the outer diameter of the workpiece is more than 76 millimeters.

1 Cylindrical : Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

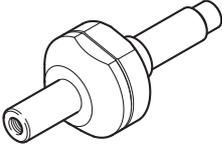
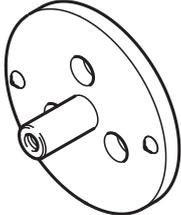
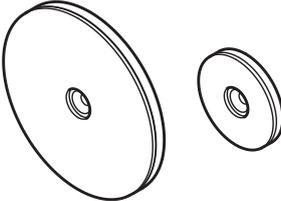
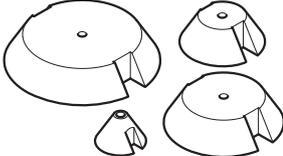
5 Feature Reference

6 Troubleshooting

Verifying the Jigs and Cutting Tools Used

Cylindrical engraving on metal or resin material makes use of the jigs and cutting tools described below. The different applications share the same jigs, but the cutting tools must be selected to match the material and the engraving method. Check the following chart and prepare cutting tools that match the purpose.

Any cutter, solid collet or burnishing attachment (ZB-20) other than the accessories can also be used as options. To purchase optional items, contact your authorized Roland DG Corp. dealer or Roland DG Corp.

Jigs			
			
Free-end spigot	Cup-cone spigot	Face plates (included items)	Cup cones (included items)
Cylindrical-engraving adapter (included items)			

*At factory shipment, the free-end spigot, the cup cone spigot, the face plate (100mm) and the cup cone (140mm) are attached to the main unit.

1

Cylindrical :
Metal and Resin

2

Cylindrical :
Glass

3

Ring Engraving

4

Flat Engraving

5

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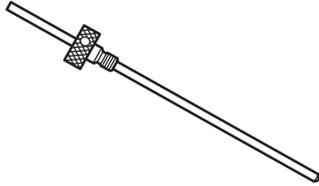
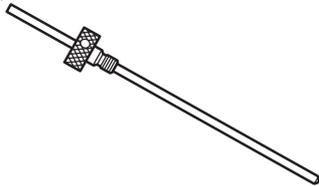
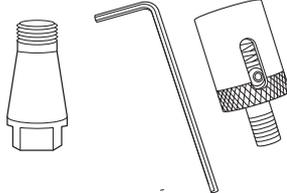
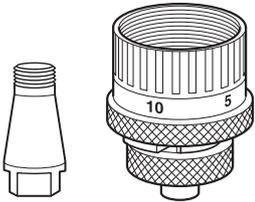
1-1 Check This First

Selecting material and engraving method

- You want to scribe aluminum, brass, stainless, etc. ⇒ ①
- You want to scribe as fine patterns as possible on aluminum, brass, stainless, etc. carefully. ⇒ ②
- You want to engrave acrylic. ⇒ ③

Important: When using diameter-4.36 mm cutters (including diamond scrapers)

Use diameter-4.36 mm cutters at speeds of 15,000 rpm or lower. Use at higher speeds poses danger of damage to the spindle unit due to vibration.

Cutting Tools			
	Material and engraving method used	Suitable cutter types	Other necessary cutting tools
①	Scribing metal material (aluminum, brass, or stainless steel)	Diamond scraper (diameter 4.36 mm, included item; ZDC-A4000) *1 	Solid collet for diamond scraper (φ 4.36 mm, included item) *2 
②		Diamond scraper (diameter 3.175 mm, optionally available; ZDC-A2000) *3 	Solid collet (diameter 3.175 mm, included item) Burnishing Attachment (optionally available; ZB-20) 
③	Engraving resin material (acrylics, etc.)	Character cutter (optionally available; ZEC-A2025, etc.)	Solid collet (included item) *4 Nose unit (included item) 

*1 The optional diameter 3.175 mm diamond scraper (ZDC-A2000) can be used as well.

*2 When using an optional diamond scraper (diameter 3.175 mm), use the provided solid collet (diameter 3.175mm).

*3 When using the burnishing attachment, only a cutter with diameter 3.175mm can be used.

*4 Use an appropriate collet for the cutter's diameter and type.

1-2 Getting Ready to Engrave

Step 1: Set the Cutting Parameters

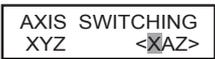
First you make the settings for the basic cutting parameters. The settings vary depending on the combination of cutting tools you're using. In this section, the descriptions of procedures contain, when necessary, the separate special-case information shown below. Give careful attention to these special-case notes when you make the settings.

Special-case Notes for Cutting Tools

- ① [Diamond Scraper]
- ② [Diamond Scraper + Burnishing Attachment]
- ③ [Character Cutter + Nose Unit]

Note: Use of the nose unit with metal material is not recommended because of the likelihood of damage to the material.

Procedure

- 1**  Press **MENU** several times to display the screen shown at left. Press **◀** or **▶** to select [OTHERS]. Press **ENTER/PAUSE**.
- 2**  Press **▶** to select [XAZ]. Press **ENTER/PAUSE** to confirm.
- 3**  Press **MENU** to display the screen shown at left. Press **◀** to select [OUTER]. Press **ENTER/PAUSE** to confirm.
- 4**  Press **MENU** to display the screen shown at left.
① [Diamond Scraper]
② [Diamond Scraper + Burnishing Attachment]
Press **▶** to select [OFF].
③ [Character Cutter + Nose Unit]
Press **◀** to select [ON].
Press **ENTER/PAUSE** to confirm.
- 5**  Press **MENU** to display the screen shown at left.
① [Diamond Scraper]
③ [Character Cutter + Nose Unit]
Press **◀** to select [ON].
② [Diamond Scraper + Burnishing Attachment]
Press **▶** to select [OFF].
Press **ENTER/PAUSE** to confirm.

1

Cylindrical :
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

Troubleshooting

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1-2 Getting Ready to Engrave (Cylindrical Engraving: Metal and Resin)

1
Cylindrical:
Metal and Resin

- 6 SET lock lever
to 1 or 2
- SET lock lever
to 3

Follow the displayed message to set the lock lever at position **1**, **2**, or **3**

After three seconds the message disappears and the original screen reappears.

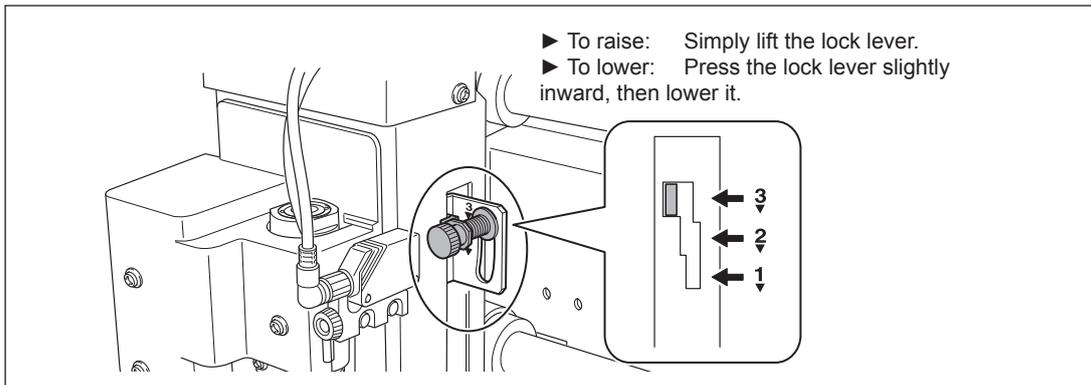
☞ For more information about the lock lever, see page 181, "The Positions of the Lock Lever."

① [Diamond Scraper], ③ [Character Cutter + Nose Unit]

⇒ go to **7**

② [Diamond Scraper + Burnishing Attachment]

⇒ go to **8**



2
Cylindrical:
Glass

- 7 AUTO Z CONTROL
UP <500>

Press **MENU** to display the screen shown at left.

Use **▲** and **▼** to select the value.

This makes the setting for the distance the cutter rises from the Z-axis origin point during cutting (the cut-out amount). When making this setting, take into account the shape of the workpiece and the time required for movement. Unless the shape of the workpiece makes an especially large cut-out amount necessary, it may be a good idea to set this at about 500 (5 millimeters).

Press **ENTER/PAUSE** to confirm.

3
Ring Engraving

- 8 X-30500 A-100.0
Z AUTO S OFF

Press **MENU** several times to display the main screen.

The screen that appears differs according to the settings.

① [Diamond Scraper]

X-30500 A-100.0
Z-3000 S OFF

② [Diamond Scraper + Burnishing Attachment]

X-30500 A-100.0
Z AUTO 20000RPM

③ [Character Cutter + Nose Unit]

4
Flat Engraving

5
Feature
Reference

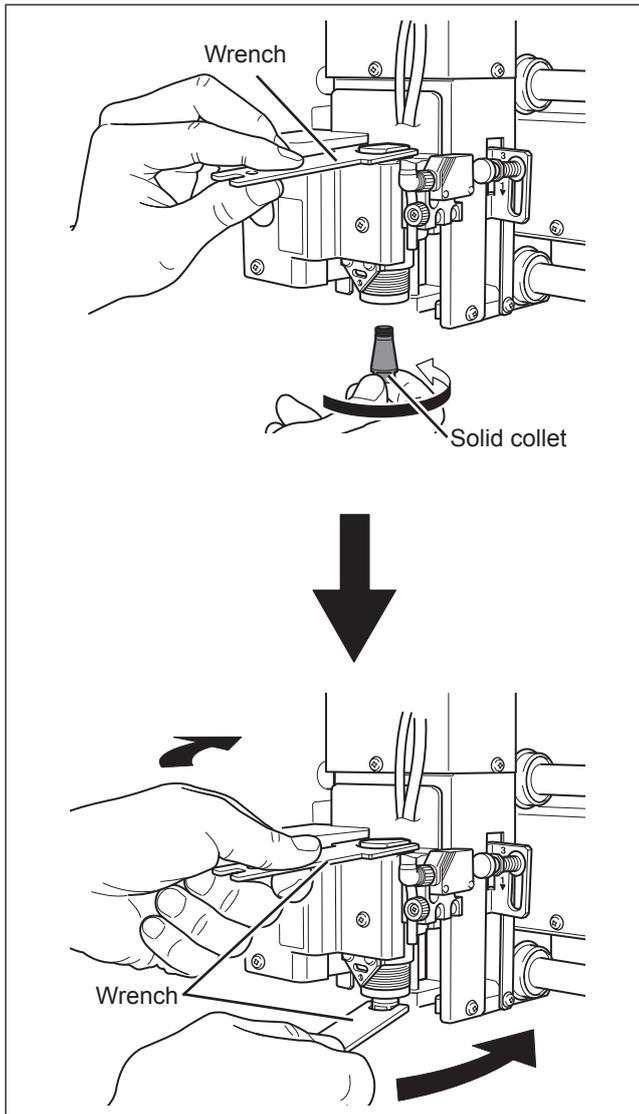
6
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STEP2: Install the Solid Collet and Nose Unit

You install a solid collet and the nose unit (only when using ③ [character cutter & nose unit]) on the end of the spindle unit. Use an appropriate solid collet that matches the diameter and type of the cutter.

Installing the Solid Collet



Tightening loosely

Grasp the solid collet and insert it into the spindle unit from below, then use a wrench to tighten the spindle unit until the solid collet is held in place.

Tightening fully.

Tighten the solid collet using two wrenches. The appropriate tightening torque is 3.2 N-m (32 kgf-cm).

1

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2

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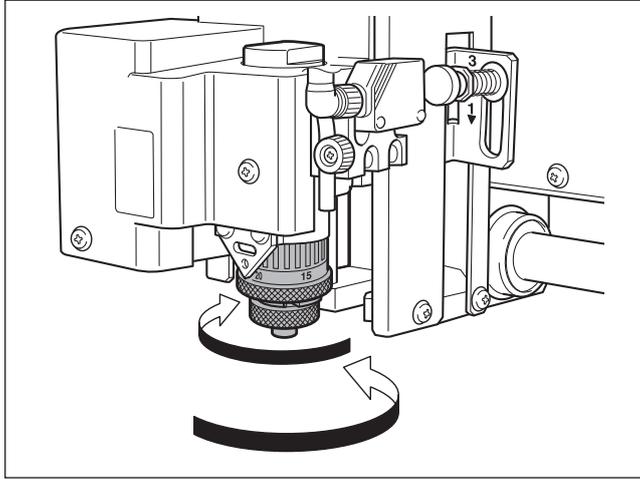
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Installing the Nose Unit

Note: Install this only when using ③ [character cutter & nose unit].

Note: Make sure that a solid collet is already installed.



Tighten until no further movement is possible, then loosen two turns.

Point

Make sure no cutting waste is present.

Before you install the nose unit, make sure no buildup of cutting waste or the like is present inside the nose unit or around the spindle unit. Any buildup of cutting waste that is allowed to remain may become jammed in when the nose unit is installed, making detachment impossible.

Tighten straight.

Use care especially when starting to tighten to ensure that the parts are not cross-threaded, and tighten slowly and straight. Using excessive force or tightening at an angle may damage the threads.

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Metal and Resin

2 Cylindrical :
Glass

3 Ring Engraving

4 Flat Engraving

5 Feature Reference

6 Troubleshooting



STEP3: Measure the Workpiece Size and Select the Jig

Measurement Sites and Purpose of Measurement

- Diameter at each end of the workpiece: This is for selecting a jig suited to the size.
- Diameter at the cutting area: You enter this into the program (Roland EngraveStudio or Dr. Engrave) and use it to set the cutting area and origin point. (☞ P. 40, "Step 6: Set the XA Origin Point")

Special Jigs Used

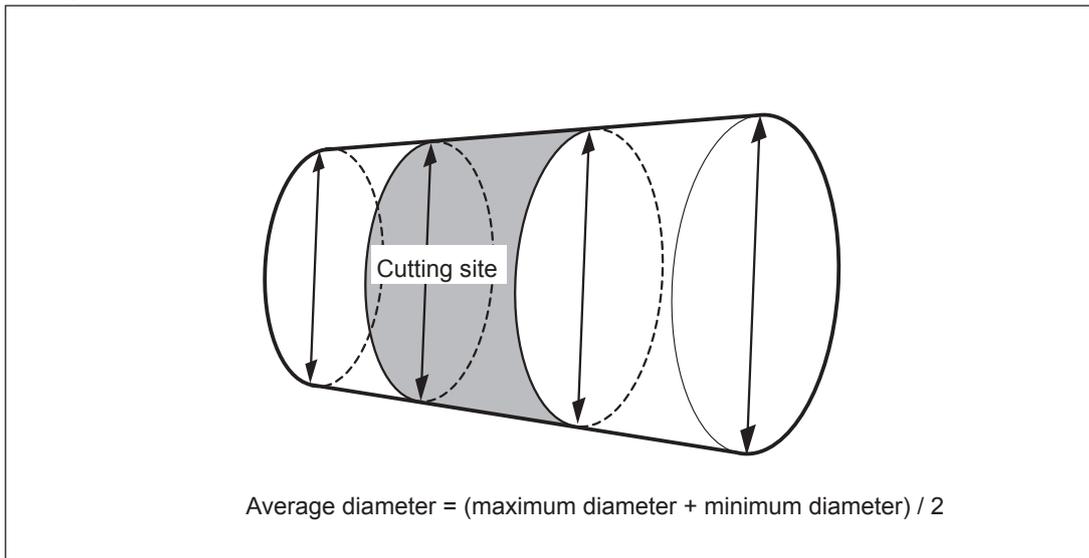
- Cup cone
- Face plate

Procedure

1 Measure the cutting site and the diameter at each end of the workpiece.

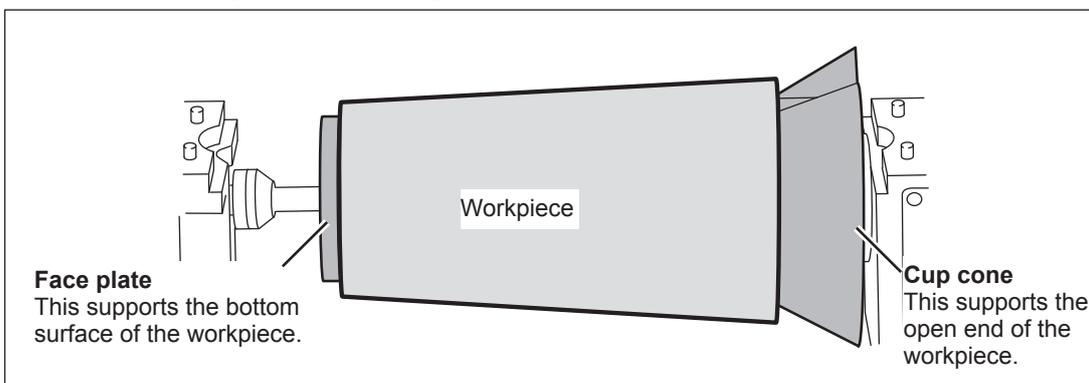
The diameter of the cutting site is entered into the program in "Step 6: Set the XA Origin Point" on page 40, so write down this value for later use.

If the cutting site is at an angle, measure the maximum and minimum diameters of the cutting site and calculate the average of their values.



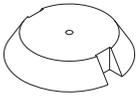
2 Select the jigs.

Based on the diameters of the two ends of the workpiece you measured in 1, select the size of the cup cone and face plate. You use these jigs as shown in the figure below.



1-2 Getting Ready to Engrave (Cylindrical Engraving: Metal and Resin)

Refer to the following table and select a cup cone and face plate of the appropriate size for the workpiece.

Type of jig		Jig size	Suitable workpiece size
Cup cone		Minimum diameter: 139 mm Maximum diameter: 180 mm	Inner peripheral diameter of the workpiece opening: 139 mm or more to 180 mm or less
		Minimum diameter: 97 mm Maximum diameter: 140 mm	Inner peripheral diameter of the workpiece opening: 97 mm or more to 140 mm or less
		Minimum diameter: 57 mm Maximum diameter: 100 mm	Inner peripheral diameter of the workpiece opening: 57 mm or more to 100 mm or less
		Minimum diameter: 17 mm Maximum diameter: 60 mm	Inner peripheral diameter of the workpiece opening: 17 mm or more to 60 mm or less
Face plate		Diameter: 100 mm	Diameter of the workpiece bottom: 100 mm or more
		Diameter: 50 mm	Diameter of the workpiece: 100 mm or less (However, if stability is lacking when this is installed, then use the jig having a diameter of 100 mm.)

Face-plate Selection for a Workpiece Whose Bottom Surface Measures 100 mm or Less in Diameter

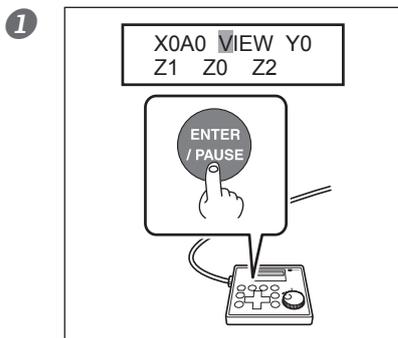
We recommend using a face plate of a size smaller than the diameter of the bottom surface of the workpiece, but if the bottom surface of the workpiece isn't flat and level, the workpiece may be unstable when it is secured in place. If such cases, use the face plate measuring 100 millimeters in diameter. Note, however, that if the face plate extends beyond the workpiece, it may interfere with the spindle head during cutting, which could damage the machine. If the face plate protrudes beyond the workpiece, take into account the movable area of the spindle head and the location where cutting is to be performed and take care to ensure no interference between the spindle head and the face plate.

☞ P. 22, "Verifying the Workpiece Size and Cuttable Area"

STEP4: Install the Jigs

- ⚠ WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠ WARNING** Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

Procedure

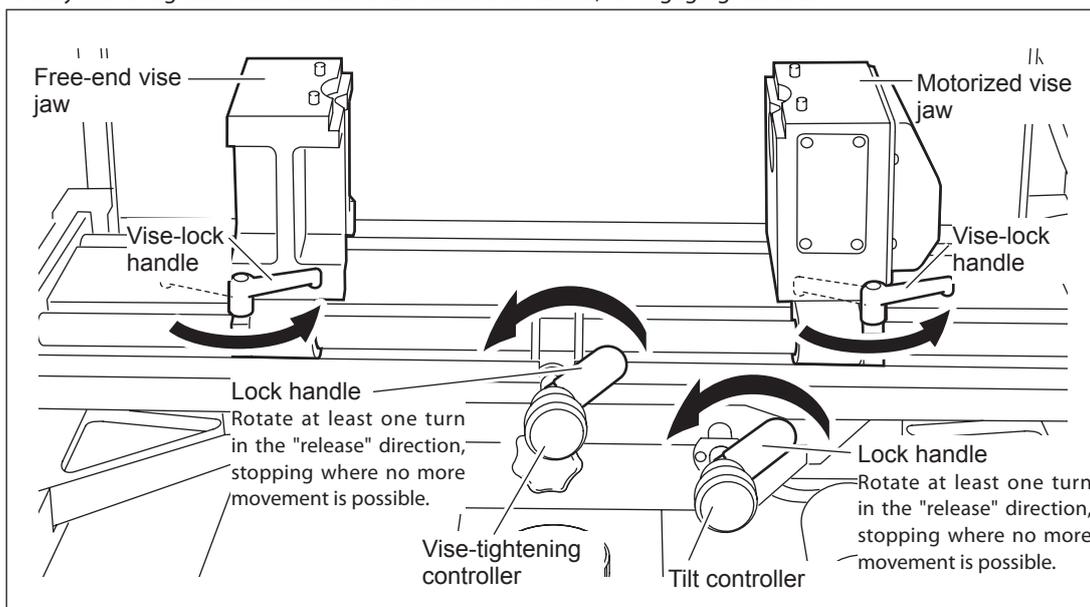


Close the front cover and move the spindle unit to the VIEW position.
When movement ends, open the front cover.

- 2** Unlock the free-end vise jaw, motorized vise jaw, vise-tightening controller, and tilt controller.

Release the vise-lock handles and the tilt-lock handle by turning them in the direction of the arrows shown in the figure below.

The locations of the vise-lock handle for the vise-tightening controller and the tilt-lock handle for the tilt controller vary depending on the positions and angles of the two vise jaws. Also, rotate each at least one turn in the "release" direction, stopping where no further movement is possible. If the vise-lock handle or tilt-lock handle is not rotated sufficiently, it may move together with the controller when it is turned, re-engaging the lock.



* At factory shipment, the cup cone spigot and the cup cone (140mm) are attached to the motorized vice jaw, and the free-end spigot and the face plate (100mm) are attached to the free-end vice jaw. This illustration shows the state where each jig has been removed.

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Cylindrical:
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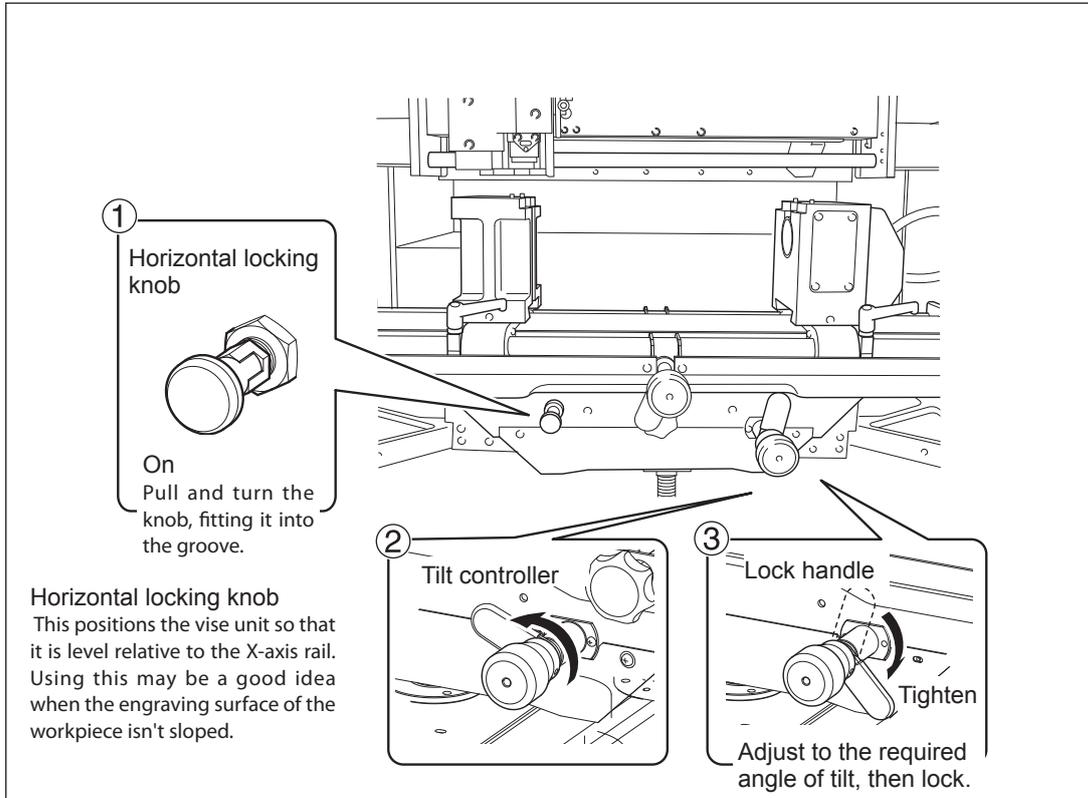
3
Ring Engraving

4
Flat Engraving

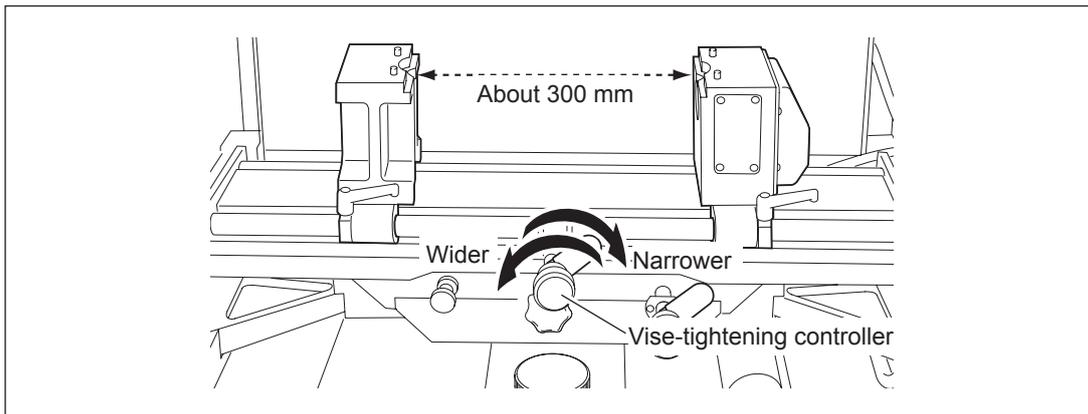
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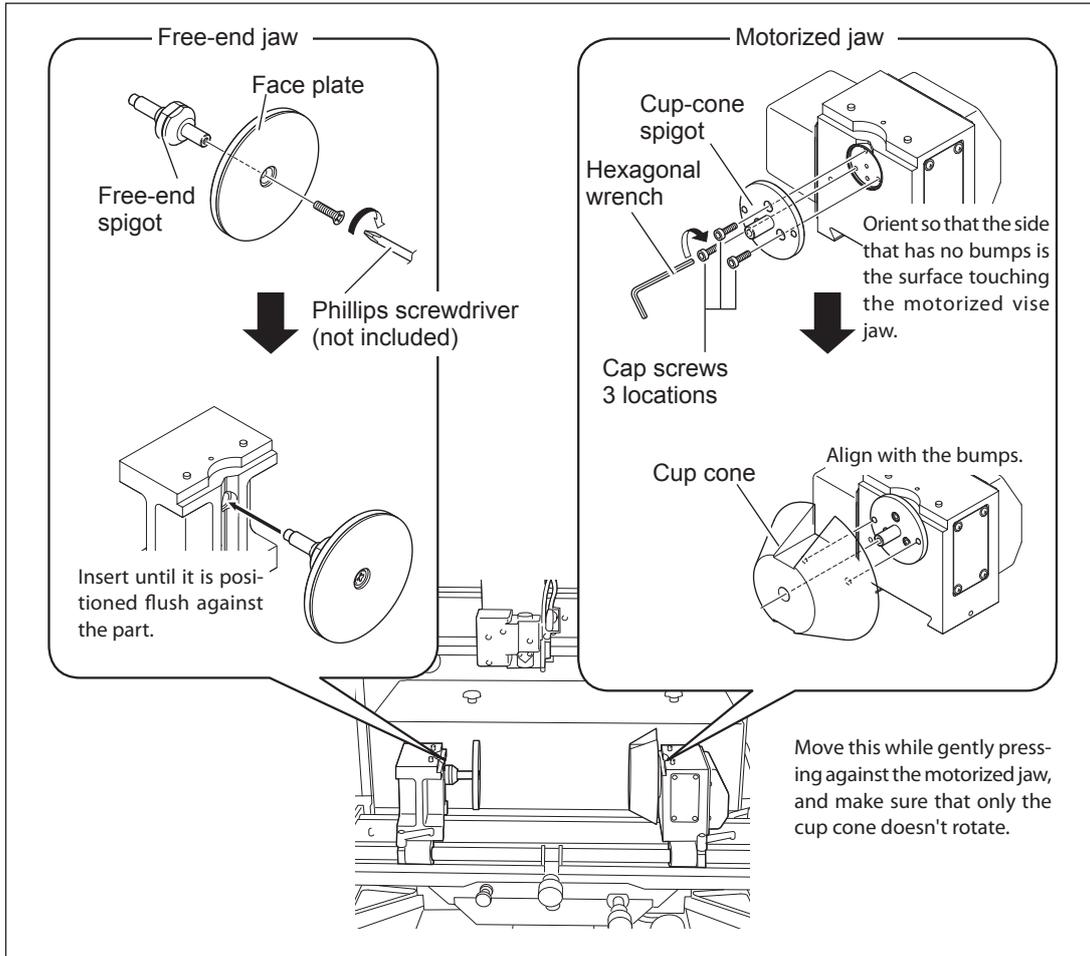
- 3 Adjust the angle of the vise unit so that it's level, then secure the vise unit in place.
- 1 Turn the tilt controller clockwise to tilt the vise unit to the right and engage the horizontal locking knob.
 - 2 Turn the tilt controller counterclockwise until the vise unit stops moving.
 - 3 Secure in place with the tilt-lock handle.



- 4 Widen the spacing between the free-end and motorized vise jaws.
- Turn the vise-tightening controller to widen the free-end and motorized vice jaws toward either side. Widen to an interval of about 300 millimeters to allow the cup cone and face plate to be installed.

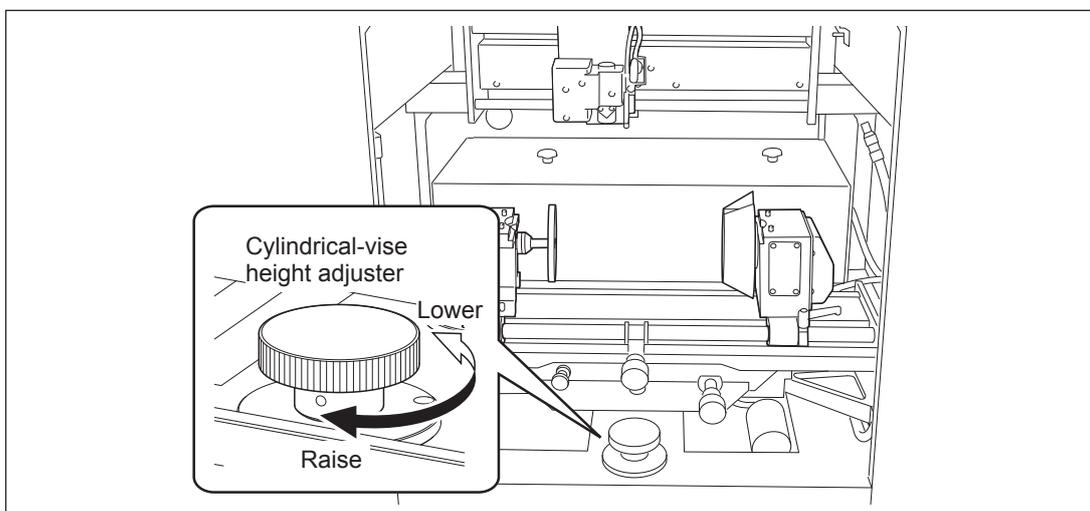


5 Install the face plate on the free-end vise jaw and the cup cone on the motorized vise jaw.



6 Moving down the vice unit.

Turn the cylindrical vice height adjuster to move down the vice unit. Then attach a workpiece and move the spindle head to the upper side (up in the air) of the workpiece. Move down the vice unit in advance to prevent the spindle head from hitting the workpiece. The moved down position may be determined depending on the position of the spindle head and the workpiece shape and size. However, it is recommended to move it down to the lowest position for first operation.



1 Metal and Resin Cylindrical :
 2 Glass Cylindrical:
 3 Ring Engraving
 4 Flat Engraving
 5 Feature Reference
 6 Troubleshooting

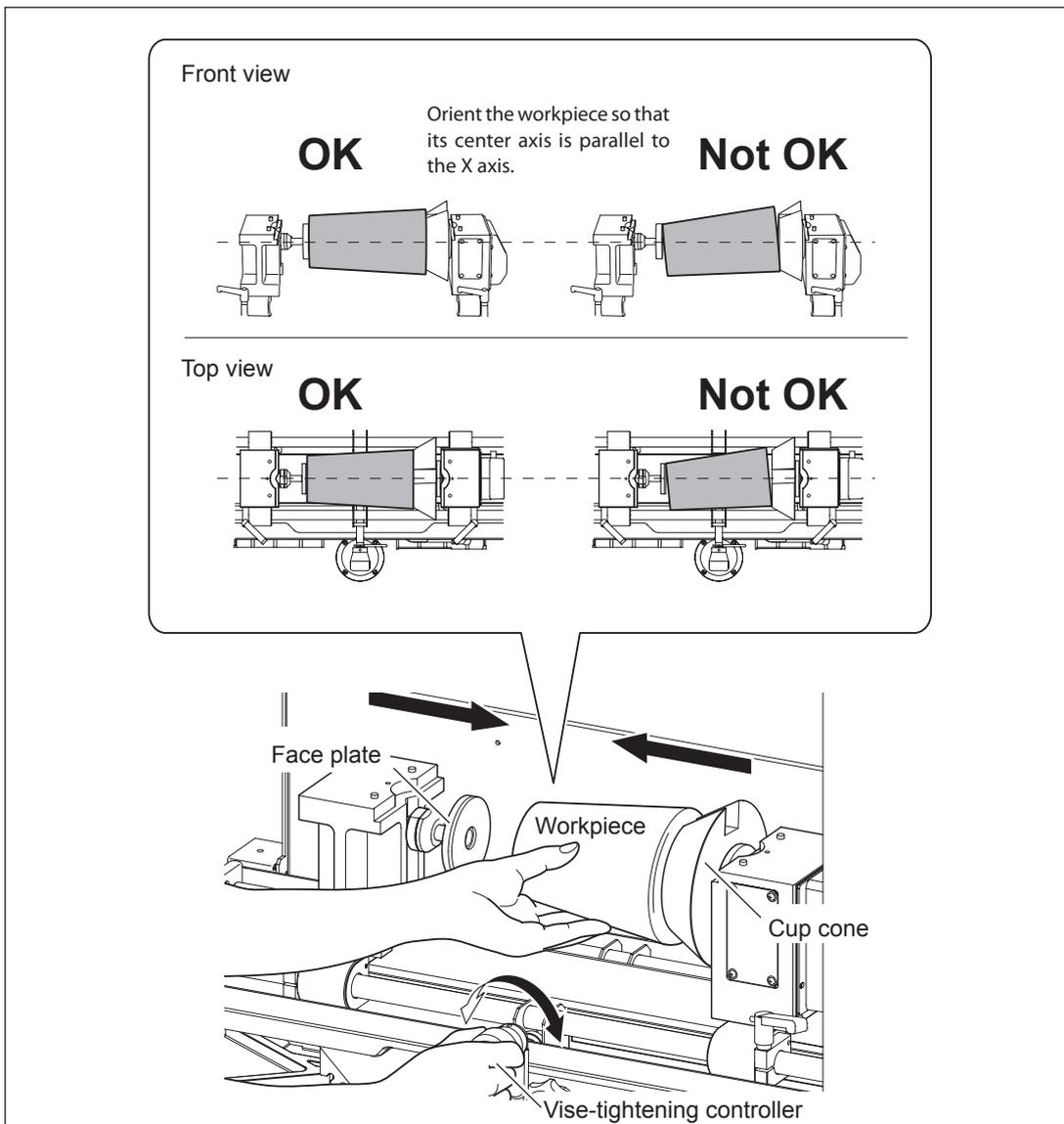
STEP5: Load the Workpiece

- ⚠ WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠ WARNING** Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

Procedure

1 Clamp the workpiece between the cup cone and the face plate.

Turn the vise-tightening controller to move the free-end and motorized vice jaws closer and clamp the workpiece between the cup cone and face plate. Orient the workpiece so that its center axis is parallel to the X axis. Also, to ensure that the workpiece doesn't slip out of place or fall when you're loading it, be careful not to let go of it before it is clamped in place.



1 Metal and Resin Cylindrical: Metal and Resin

2 Glass Cylindrical: Glass

3 Ring Engraving

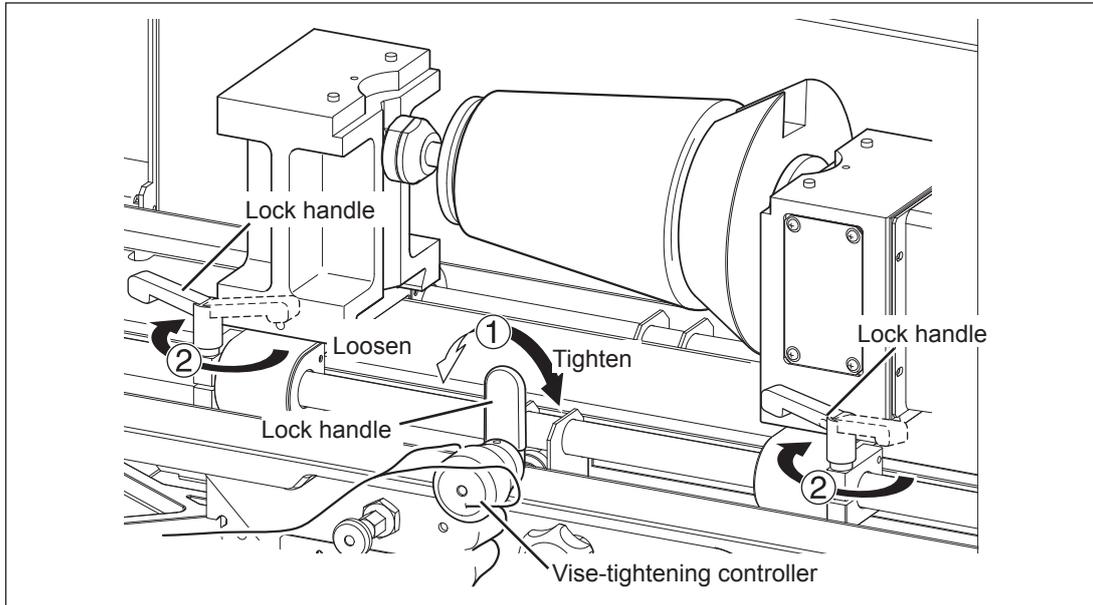
4 Flat Engraving

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- ② After positioning the vise jaws, secure in place in this sequence: ① the vise-tightening controller, then ② the motorized and free-end vise jaws.

To prevent the workpiece from slipping out of position, maintain your grip on the vise-tightening controller until the vise jaws are secured in place.



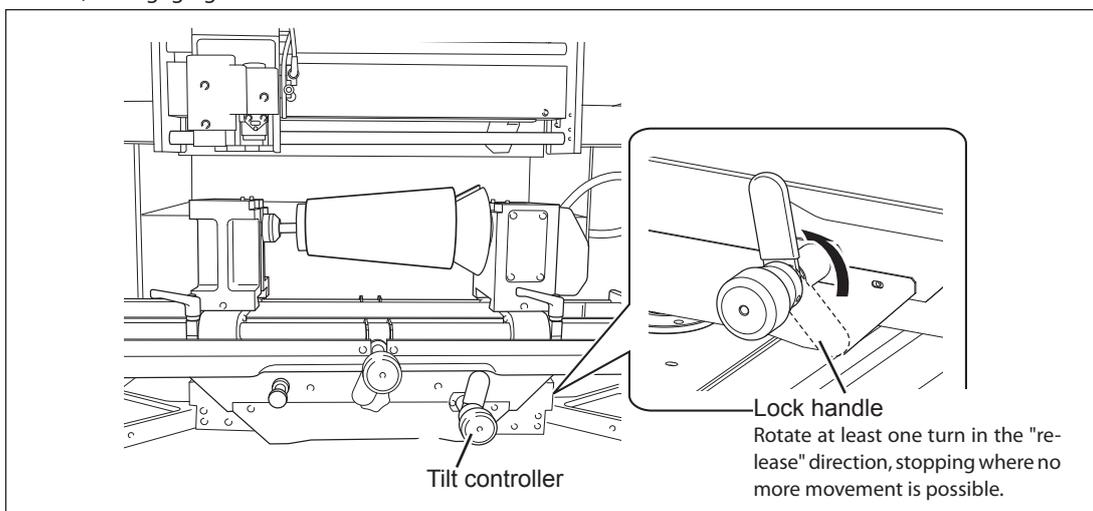
- ③ Press  or  to rotate the A axis and check how well the workpiece is loaded.

Make sure the center axis of the workpiece is parallel to the X axis. If it isn't parallel, the center axis shifts when the workpiece is rotated and the location of the origin point for cutting becomes misaligned, making it impossible to obtain the intended engraving results.

Rotate the A axis, and if the center axis of the workpiece remains at the same location as it turns, the center axis is parallel to the X axis. If the center axis of the workpiece moves up and down as the workpiece rotates, redo loading of the workpiece from step ①

- ④ Unlock the tilt controller.

Rotate lock handle of the tilt controller at least one turn in the "release" direction, stopping where no further movement is possible. If the tilt-lock handle is not rotated sufficiently, it may move together with the controller when it is turned, re-engaging the lock.



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5 Adjust the angle of the vise unit and secure the vise unit in place.

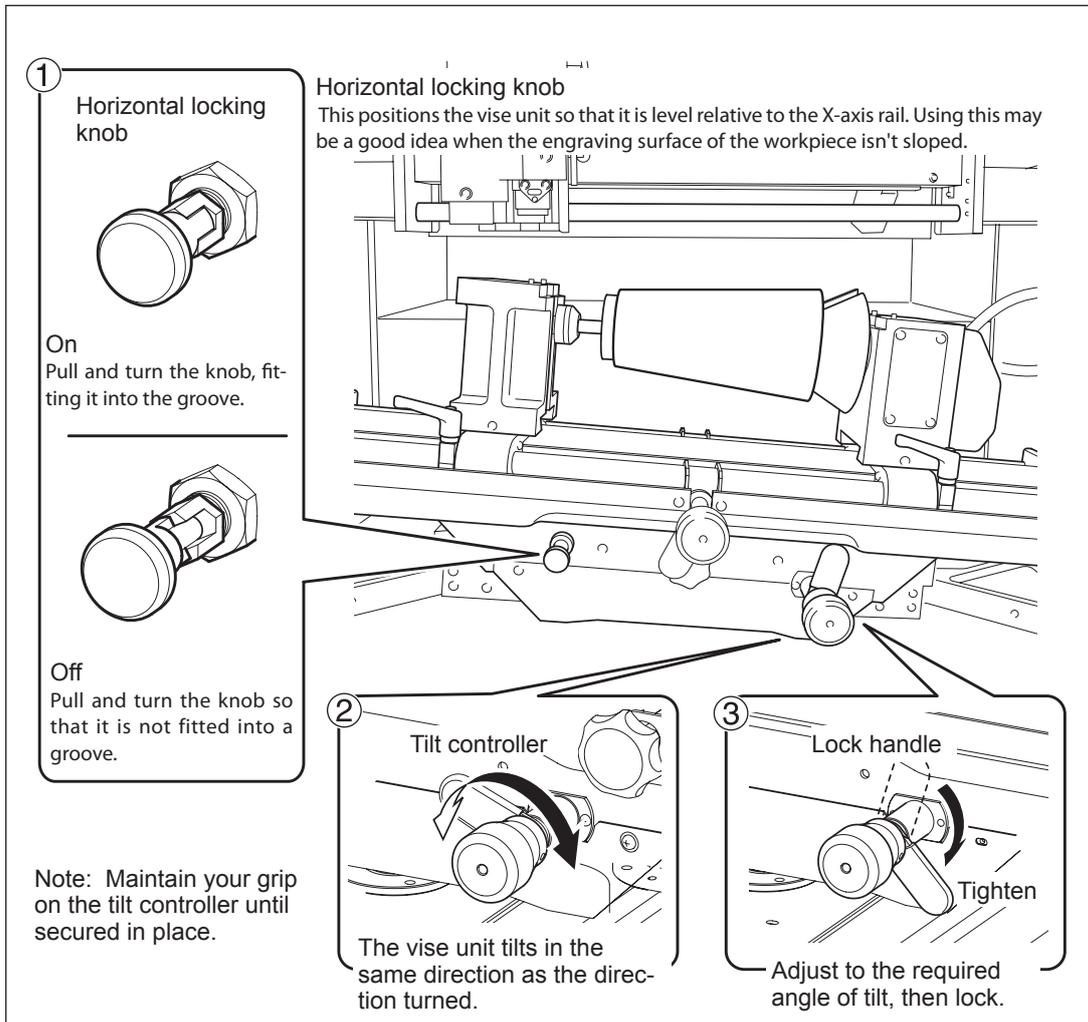
Maintain your grip on the tilt controller until the vise unit has been secured in place. Releasing it may allow the vise unit to tilt with force, causing the workpiece to become displaced and possibly damaging the machine.

If the Cutting Surface Is Sloped

- ① Turn the tilt controller clockwise to tilt the vise unit to the right, then engage the horizontal locking knob.
- ② Turn the tilt controller to tilt the vise unit and orient the cutting site on the workpiece so that it's parallel with the X-axis rail.
- ③ Secure in place with the tilt-lock handle.

If the Cutting Surface Isn't Sloped

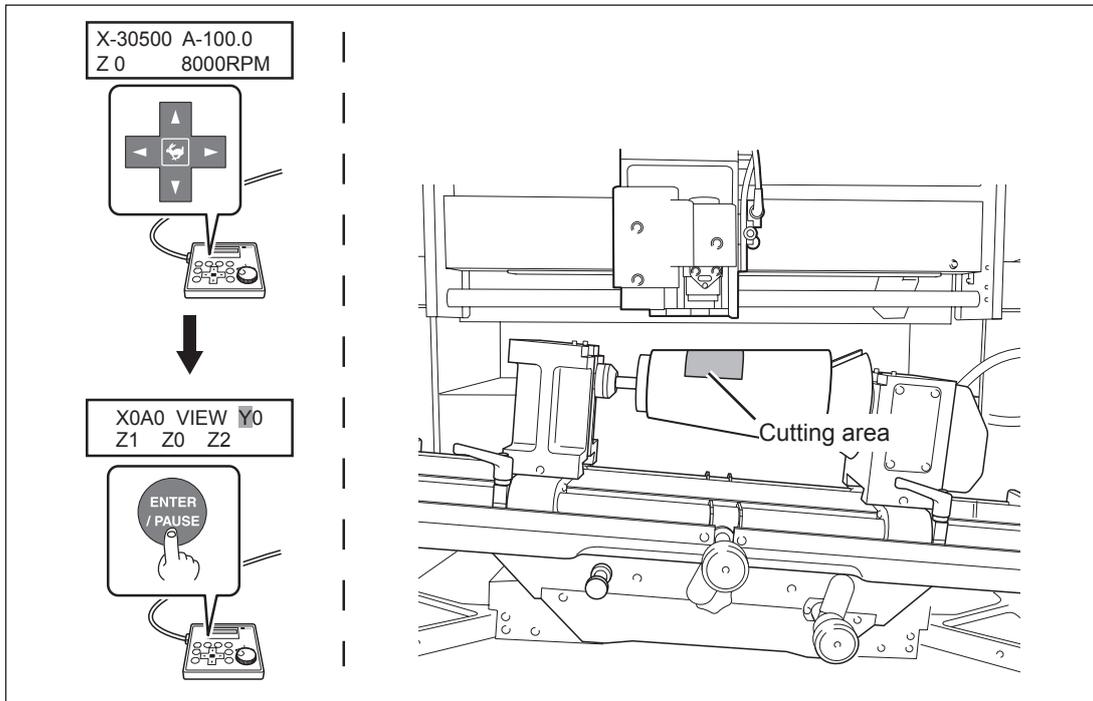
- ① Turn the tilt controller clockwise to tilt the vise unit to the right, then engage the horizontal locking knob.
- ② Turn the tilt controller clockwise to tilt the vise unit to the right, then engage the horizontal locking knob.
- ③ Secure in place with the tilt-lock handle.



6 Move the spindle head to the area above the cutting site on the workpiece.

Follow the sequence below to move, being careful not to make contact with the workpiece.

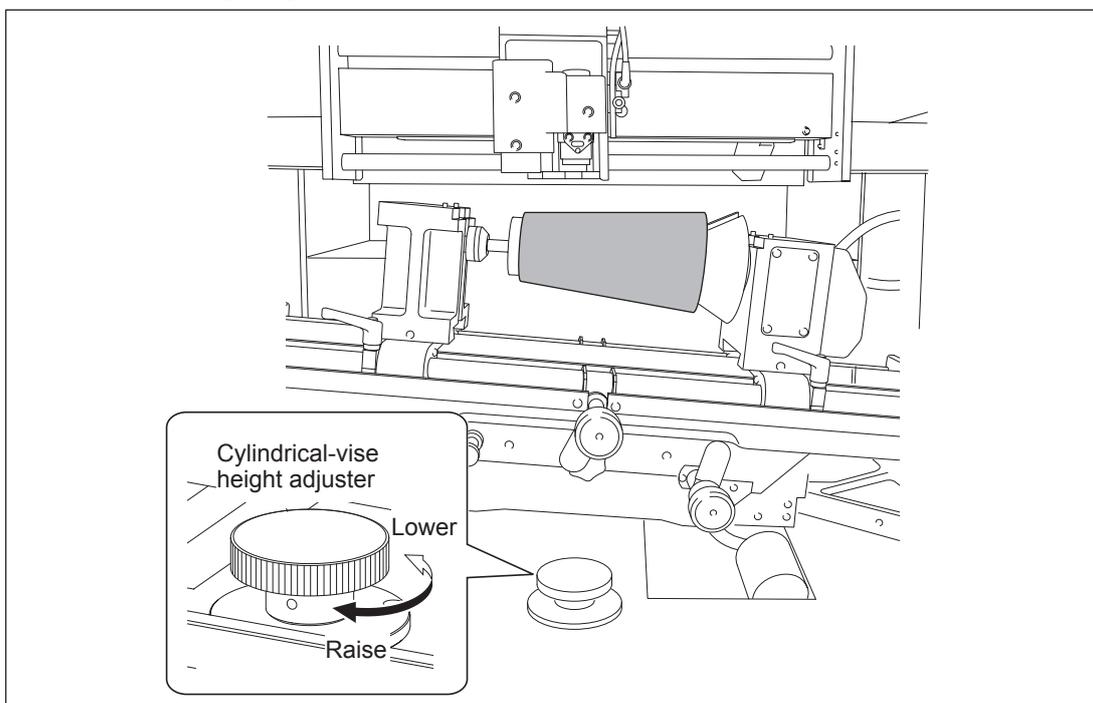
- ① Press  and  to move the spindle head.
- ② Close the front cover and move the spindle head to the Y0 position.



7 Open the front cover.

Adjust the height of the vise unit.

Turn the cylindrical-vise height adjuster to adjust the height of the vise unit (and therefore the height of the workpiece). Adjust so that the engraving surface on the workpiece is about 40 millimeters away from the tip of the spindle head.



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STEP6: Set the XA Origin Point

You specify the cutting area by using the laser pointer to identify the two points at the diagonally opposite angles of the square or rectangle, and set the XA origin point at the center of the specified area. (The XA origin is not specified directly.) After designating the cutting area, enter the diameter (or the average diameter value) (the value calculated in P.31 "Measure the workpiece size and select the jig") of the cutting section into the application. Then load the cutting area designated by the laser pointer into the application.

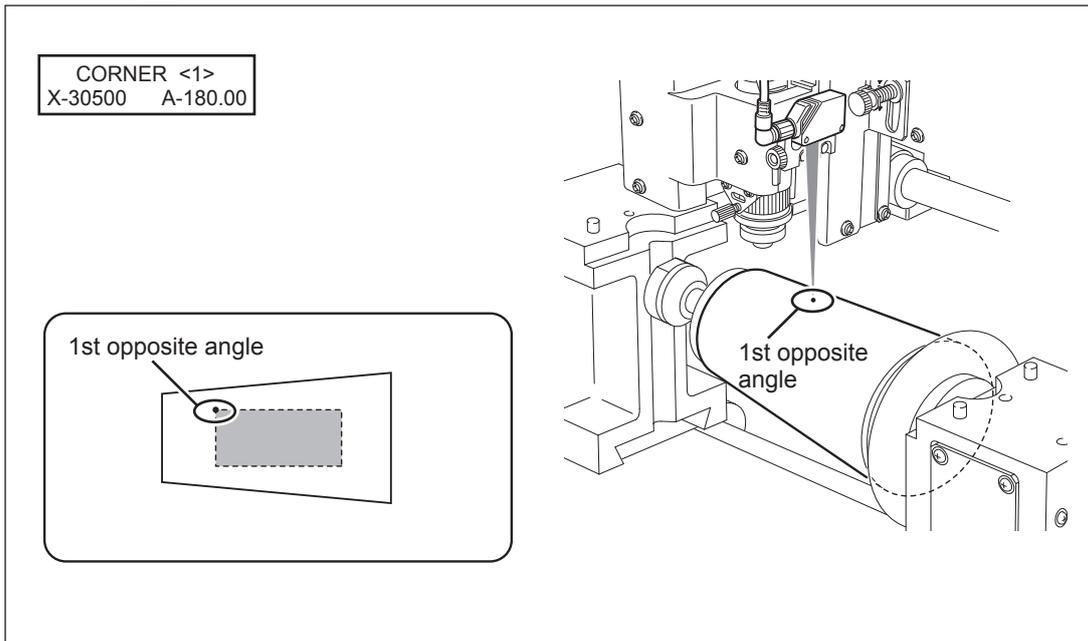
If you want to set the XA origin point at a location you select, see here [page 174](#), "Setting the XA or XY Origin Point Where You Choose."

1. Specify the cutting area using the laser pointer.

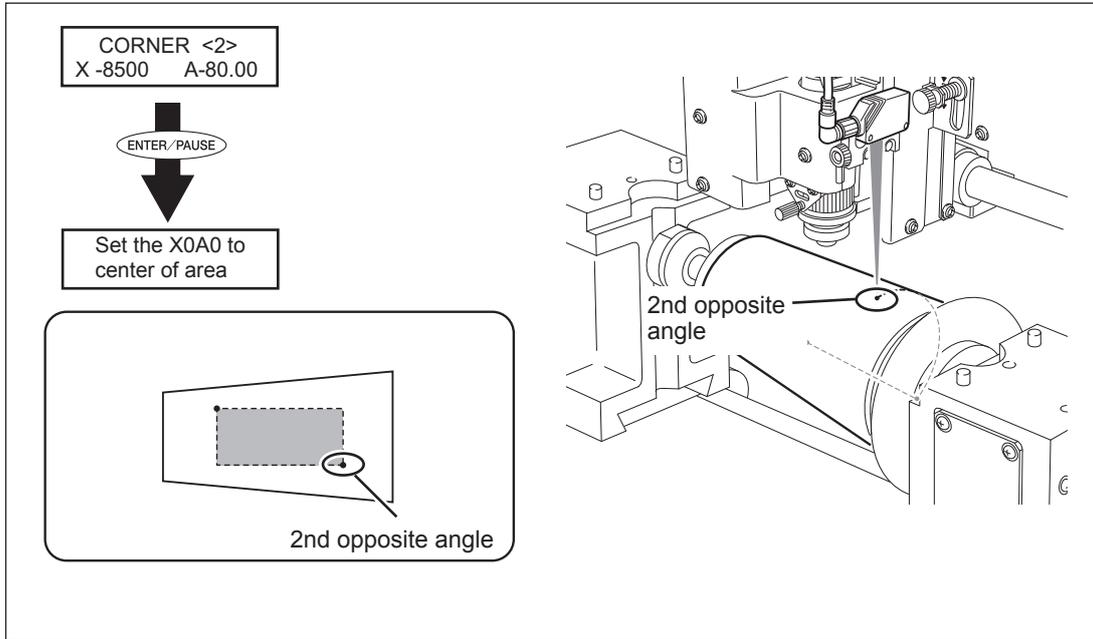
- | | |
|-----|--------|
| I/O | OTHERS |
| ADJ | AREA |

Press **MENU** several times to display the screen shown at left.
 Press **◀** or **▶** to select [AREA].
 Press **ENTER/PAUSE** to confirm.
 Laser emission starts.

- Press **▲**, **▼**, **◀**, and **▶** to align the laser pointer with the first opposite angle of the cutting area.
 Press **ENTER/PAUSE** to confirm.



- 3 Press **MENU**.
 Press **▲**, **▼**, **◀**, and **▶** to align the laser pointer with the second opposite angle of the cutting area.
 Press **ENTER/PAUSE** to confirm.



The message shown in the figure above is displayed for approximately three seconds, and then the original screen returns.

- 4 **CHECK AREA Hit "ENTER"** Press **MENU**.
 The message shown in the figure at left appears.

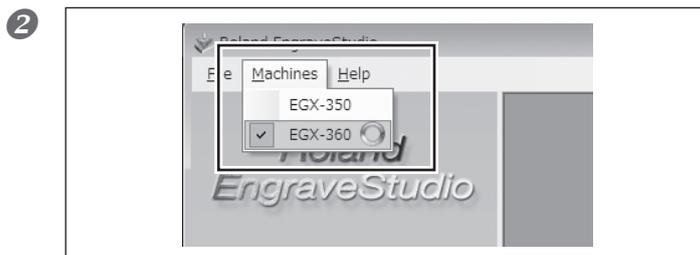
- 5 Close the front cover and press **ENTER/PAUSE**.
 Each press of **ENTER/PAUSE** makes the laser pointer indicate one side of the cutting area. This enables you to check whether the cutting area has been specified at the intended location.

- 6 **I/O OTHERS ADJ AREA** Press **MENU**.
 The message shown in the figure at left appears.

2. Acquire the cutting area with the program.

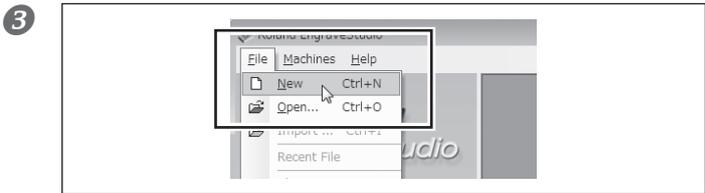
For Roland EngraveStudio

- 1 Start Roland EngraveStudio.

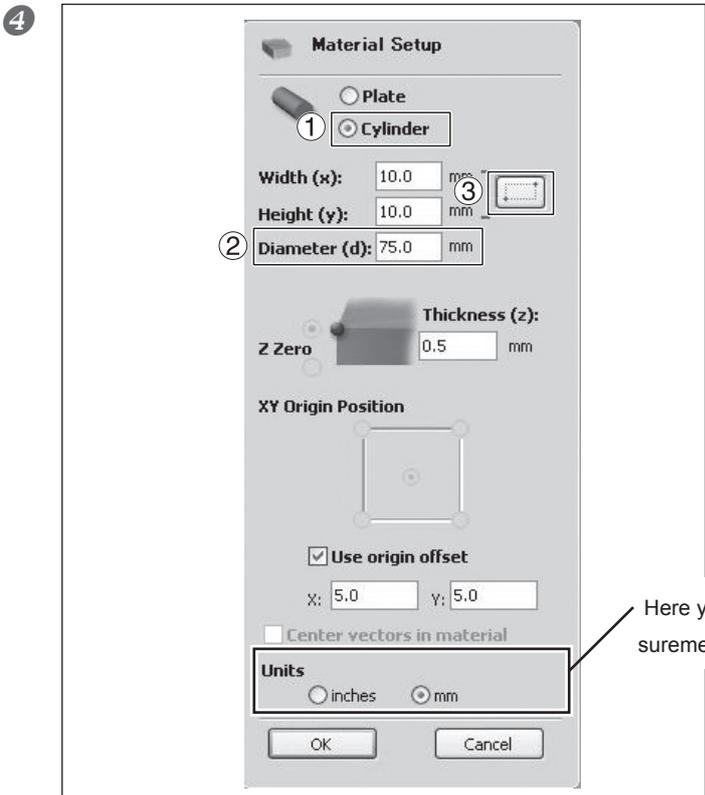


Click "Engraving machine," then select "EGX-360."

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- 2
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Click "File," then "New."

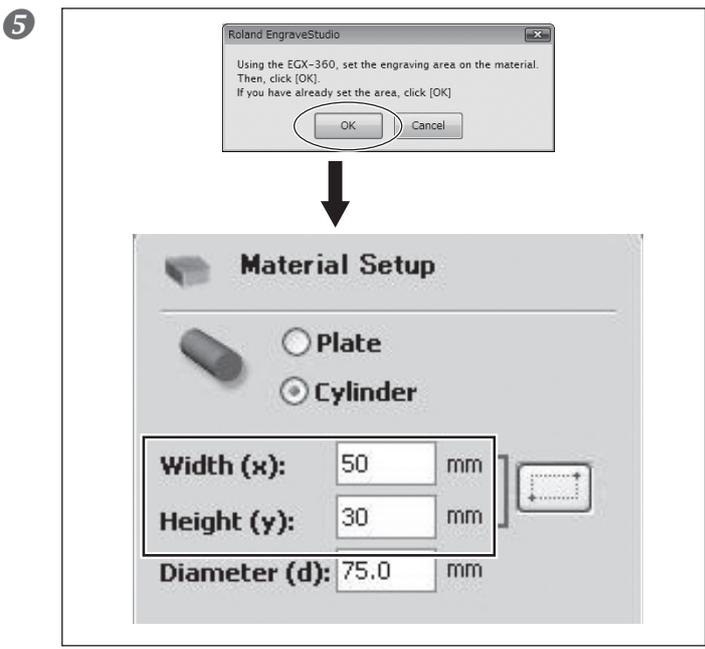


① Select the "Cylindrical material" check box.

② For "Diameter," enter the cutting-site diameter (or average diameter) you measured on page 31, "STEP3: Measure the Workpiece Size and Select the Jig."

③ Click the "Get from Unit" button ().

Here you can select the unit of measurement for indicating values.

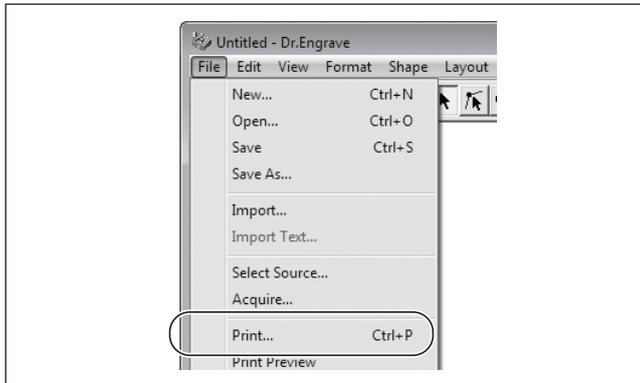


Click [OK]. EngraveStudio acquires the cutting area you specified on the machine.

For Dr. Engrave

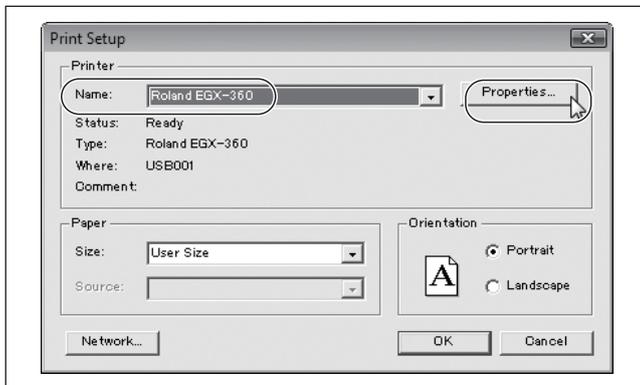
1 Start Dr. Engrave.

2



Click "File," then "Print Setup."

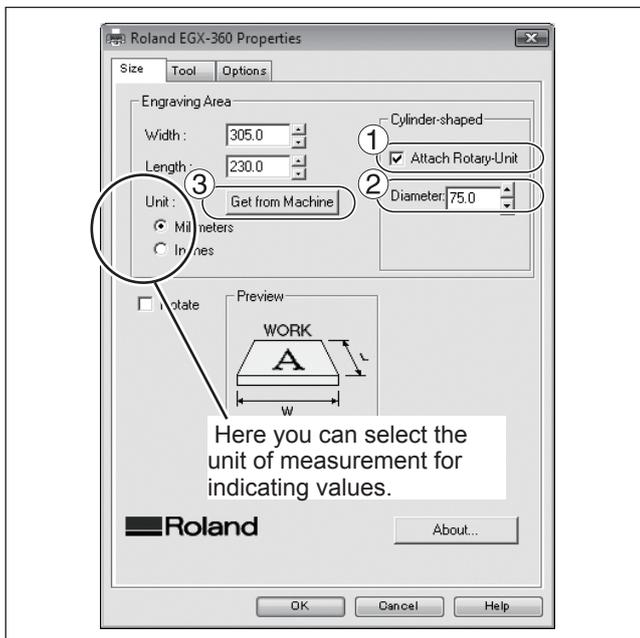
3



For "Printer Name," make sure that "Roland EGX-360" is selected, then click "Properties."

If "Roland EGX-360" is not selected, click the drop-down arrow next to "Printer Name" and select it from the list displayed.

4



1 Select the "Use rotary axis unit" check box.

2 For "Diameter," enter the cutting-site diameter (or average diameter) you measured on page 31, "STEP3: Measure the Workpiece Size and Select the Jig."

3 Click the "Get from Unit" button.

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1-2 Getting Ready to Engrave (Cylindrical Engraving: Metal and Resin)

1 Cylindrical :
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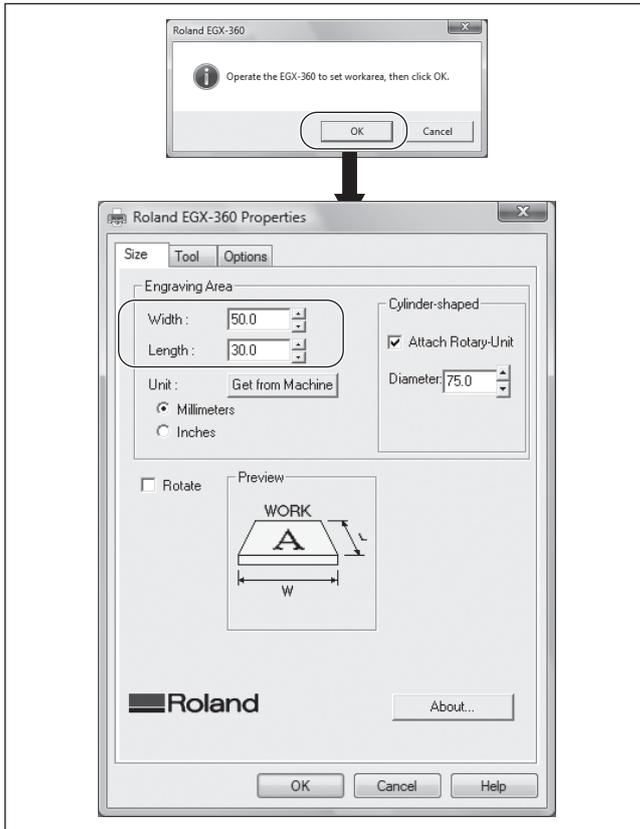
3 Ring Engraving

4 Flat Engraving

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Click [OK].

Dr. Engrave acquires the cutting area you specified on the machine.

6 Click [OK] twice to close the "Roland EGX-360 Properties" window and the "Print Setup" window.

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1-3 Starting Engraving

STEP1: Check the Cutting Path of the Cutter (Preview Feature)

Before you carry out actual cutting, you can use the laser pointer to preview and check the cutting path that the cutter is to take. The following two methods are available

- Path preview: This previews the actual cutting path.
- Area preview: This previews only the range of the cutting data.

Procedure

1 Close the front cover.

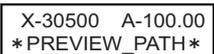
2  Send the cutting data from the computer.
The screen shown at left appears.

3  Use  or  to select "Path Preview" or "Area Preview."
Press  to confirm.



When You Select "Path Preview"

The screen shown below appears, the spindle unit rises to the highest point along the Z axis, and the laser pointer then indicates the cutting path that the cutter is to take.



When You Select "Area Preview"

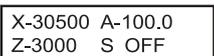
When the message shown below appears, press .

After the spindle unit has risen to the highest point along the Z axis, each press of  makes the laser pointer indicate one side of the range of the cutting data.

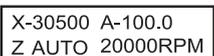


4  When you're finished previewing, press  to go back to the screen shown at left.

① [Diamond Scraper] The screen that appears differs according to the settings.



② [Diamond Scraper + Burnishing Attachment]



③ [Character Cutter + Nose Unit]

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STEP2: Install a Cutter

The attachment method differs depending on the cutting tool to be used. The following pages describe each attachment method.

- ① [Diamond Scraper] ⇨ P. 46 (this page)
- ② [Diamond Scraper + Burnishing Attachment] ⇨ P. 48
- ③ [Character Cutter + Nose Unit] ⇨ P. 50

① [Diamond Scraper]

⚠ WARNING Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.

⚠ WARNING Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

⚠ CAUTION **Caution: cutting tool.**
The cutting tool is sharp. To avoid injury, exercise caution.

Types of cutter to be used	Diamond scraper (diameter 4.36 mm, included:ZDC-A4000) *1
Other cutting tools	Solid collet for diamond scraper (diameter 4.36 mm, included) *2
Types of applicable workpieces	Metallic materials such as aluminum and stainless steel

*1 The optional diameter 3.175 mm diamond scraper (ZDC-A2000) can be used as well.

*2 When using an optional diamond scraper (diameter 3.175 mm), use the provided solid collet (diameter 3.175mm).

Procedure

- ① Make sure that a solid collet is already installed.

⇨ P. 29, "Step 2: Install the Solid Collet and Nose Unit"

②

X0A0 VIEW Y0
Z1 Z0 Z2

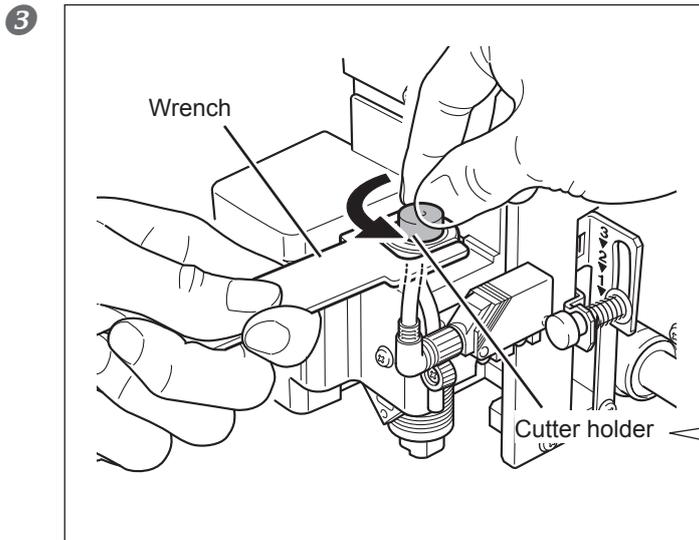
Close the front cover.

Press **(MENU)** several times to display the screen shown at left.

Use **(◀)** or **(▶)** to select "X0A0."

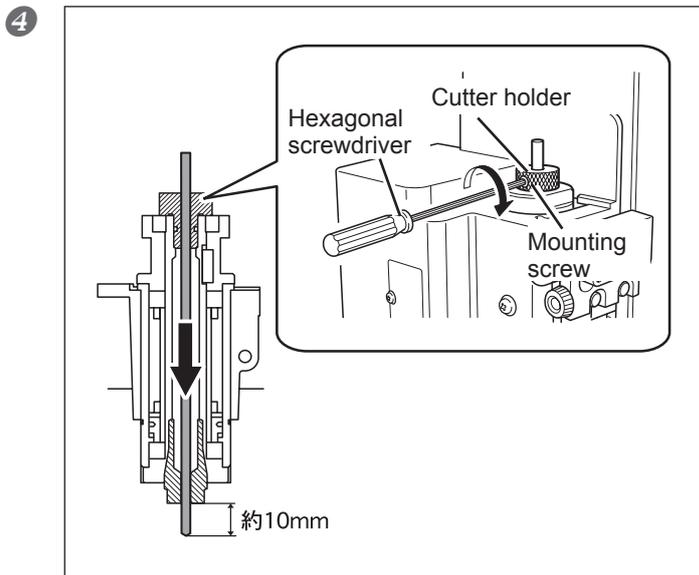
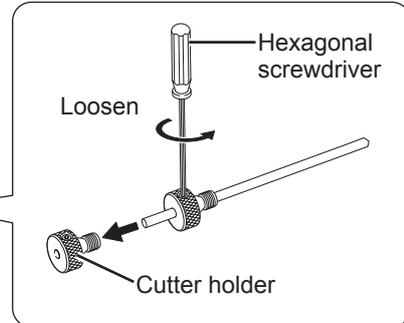
Press **(ENTER/PAUSE)** to confirm.

The spindle head moves to the XA origin point.



Open the front cover and install the cutter holder.

While holding the spindle unit immobile with a wrench, tighten the cutter holder. The cutter holder is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.



Insert the diamond scraper into the cutter holder and secure it in place.

Tighten the mounting screw for the cutter holder. For the amount of extension of the tip of the diamond scraper, a value of about 10 millimeters may work well.

If the Diamond Scraper is Difficult to Insert ⇨ p. 180, "Hints and Tips When Working with Cutting Tools"
How to Store the Diamond Scraper Measuring 3.175 mm in Diameter (Optional Item) ⇨ p. 180, "Hints and Tips When Working with Cutting Tools."

This completes installation of the diamond scraper. Go on to page 52, "Step 3: Start Engraving."

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② [Diamond Scraper + Burnishing Attachment]

⚠ WARNING Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.

⚠ WARNING Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

⚠ CAUTION **Caution: cutting tool.**
The cutting tool is sharp. To avoid injury, exercise caution.

Types of cutter to be used	Diamond scraper (doiameter 3.175 mm, optionally: ZDC-A2000) *1
Other cutting tools	Solid collet (diameter 3.175 mm, included) Buernishing Attachment (optionary: ZB-20)
Types of applicable workpieces	Metallic materials such as aluminum and stainless steel

*1 When using the burnishing attachment, only a cutter with diameter 3.175mm can be used.

Procedure

① Make sure that a solid collet is already installed.

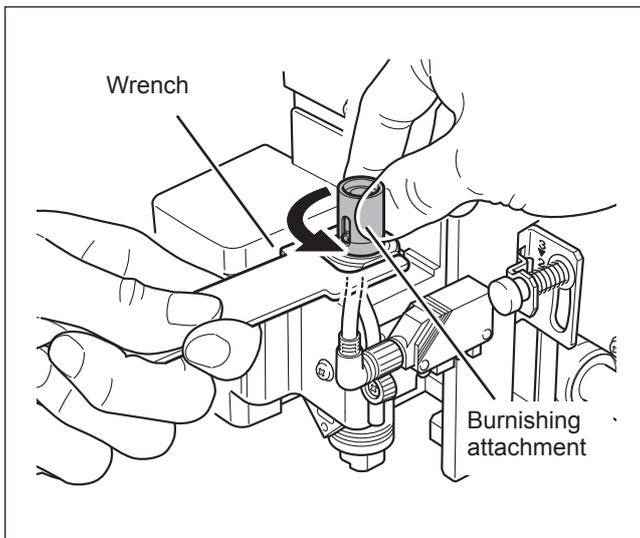
☞ P. 29, "Step 2: Install the Solid Collet and Nose Unit"

②



Close the front cover.
Press **MENU** several times to display the screen shown at left.
Use **◀** or **▶** to select "X0A0."
Press **ENTER/PAUSE** to confirm.
The spindle head moves to the XA origin point.

③

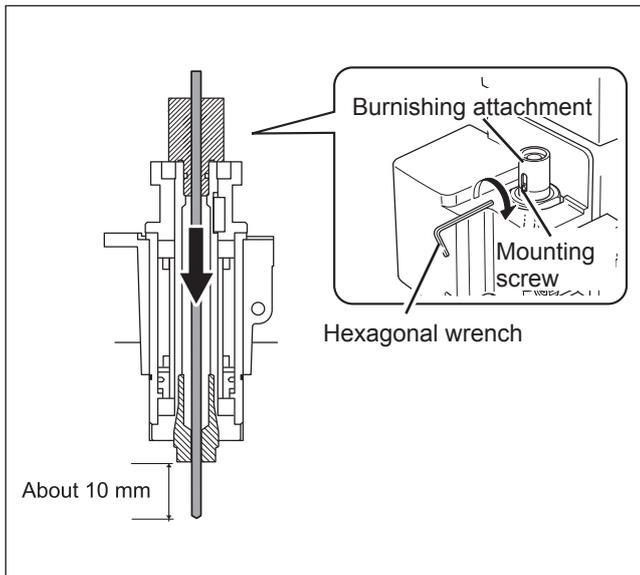


Open the front cover and install the burnishing attachment.

While holding the spindle unit immobile with a wrench, tighten the burnishing attachment. The burnishing attachment is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.

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4



Insert the diamond scraper into the burnishing attachment and secure it in place.

Tighten the mounting screw for the burnishing attachment. For the amount of extension of the tip of the diamond scraper, a value of about 10 millimeters may work well.

If the Diamond Scraper is Difficult to Insert [☞](#) p. 180, "Hints and Tips When Working with Cutting Tools"

How to Store the Diamond Scraper Measuring 3.175 mm in Diameter (Optional Item) [☞](#) p. 180, "Hints and Tips When Working with Cutting Tools"

This completes installation of the diamond scraper and burnishing attachment. Go on to page 52, "Step 3: Start Engraving."

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③[Character Cutter + Nose Unit]

⚠WARNING Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.

⚠WARNING Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

⚠CAUTION **Caution: cutting tool.**
The cutting tool is sharp. To avoid injury, exercise caution.

Types of cutter to be used	Character cutter (optionally: ZEC-A2025BAL, etc.)
Other cutting tools	Solid collet (included) *1
Types of applicable workpieces	Resin materials such as acrylic

*1 Use an appropriate collet for the cutter's diameter and type.

Procedure

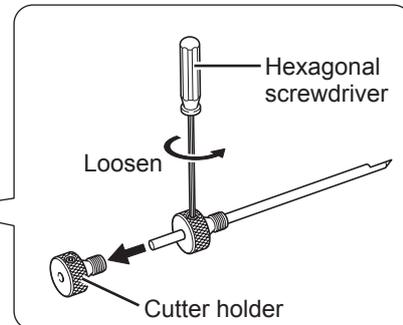
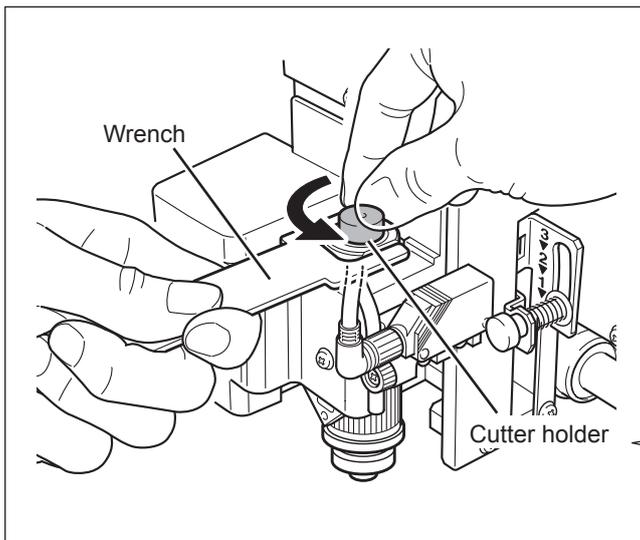
① Make sure that the solid collet and nose unit are already installed.

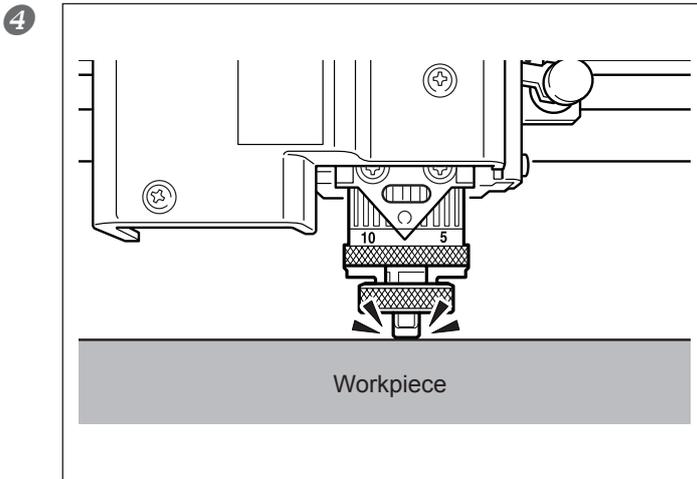
☞ P. 29, "Step 2: Install the Solid Collet and Nose Unit"

②  Close the front cover.
Press **MENU** several times to display the screen shown at left.
Use **◀** or **▶** to select "X0A0."
Press **ENTER/PAUSE** to confirm.
The spindle head moves to the XA origin point.

③ Open the front cover and install the cutter holder.

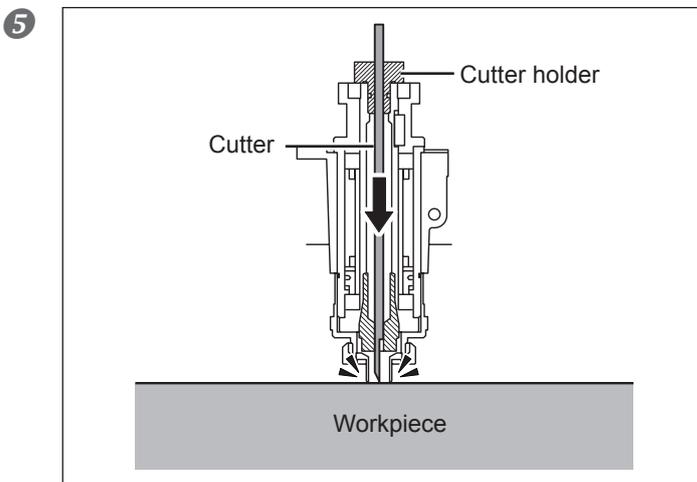
While holding the spindle unit immobile with a wrench, tighten the cutter holder. The cutter holder is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.



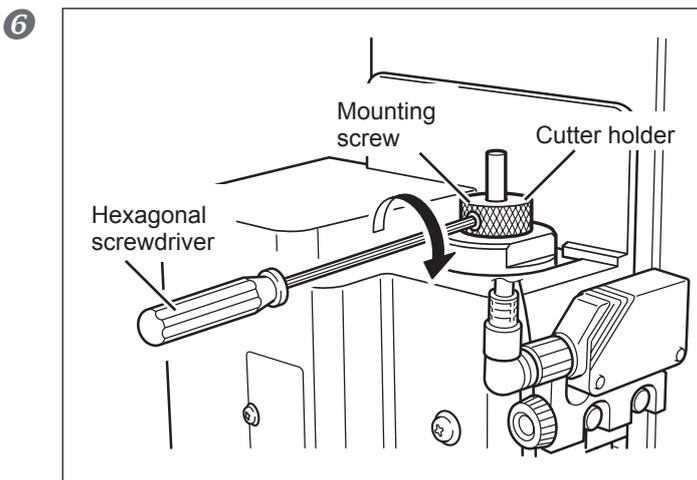


Press $\nabla -z$ to lower the spindle head to the location where it stops automatically.

The Z axis is set to use automatic control, so its descent stops automatically when the tip of the nose unit touches the workpiece.



Insert the cutter into the cutter holder and bring the tip into contact with the workpiece.



Tighten the mounting screw to secure the cutter in place.

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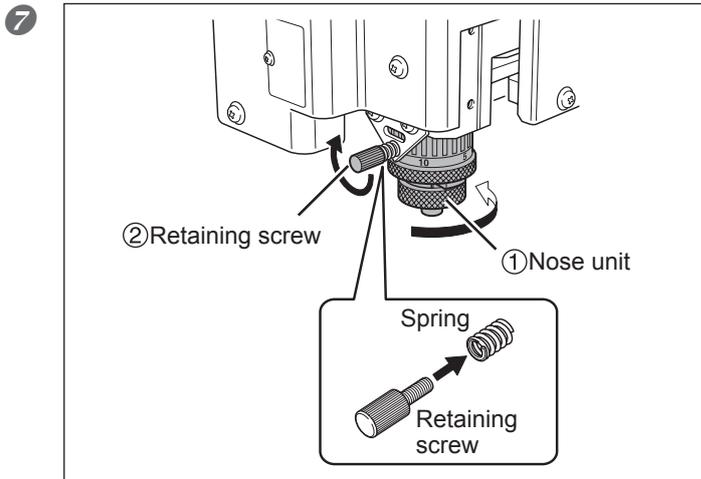
2 Cylindrical : Glass

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Make the setting for the cutting-in depth.

① Tighten the nose unit to match the desired cutting-in depth.

The amount of extension of the cutter is the cutting-in depth.

1 scale tick = 0.0254 mm

1 turn = 0.635 mm

(4 to 8 scale ticks are approximately 0.1 to 0.2 mm)

② Secure the nose unit in place with the retaining screw.

This completes installation of the cutter. Go on to page 52, "Step 3: Starting Engraving."

☞ P. 180, "Nose Unit"

STEP3: Start Engraving

For detailed setting for cutting such as the rotation of the spindle and the depth of cut, refer to page 178, "Examples of Settings for Cutting and Tips for Fine-tuning."

Procedure

① Close the front cover.

② `SELECT OPR MODE>`
`CUT PREVIEW_BOX`

Send the cutting data from the computer.

The screen shown at left appears. Make sure that no heart symbol appears to the right of the "CUT" message. If a heart symbol is displayed, it means the lubricant pump switch is on. Switch off the lubricant pump switch.

For more information about creating cutting data, refer to the user's manual for the program that creates the cutting data.

To cancel the cutting data, press `MENU`.

③ `SELECT OPR MODE>`
`CUT PREVIEW_BOX`

Use `◀` or `▶` to select "CUT."

Press `ENTER/PAUSE` to confirm.

Engraving starts.

④ `X0A0 VIEW Y0`
`Z1 Z0 Z2`

When engraving ends, press `MENU` several times to display the screen shown in the figure, then press `◀` or `▶` to select "VIEW."

The spindle head moves to the VIEW position.

⑤ Open the front cover and remove the workpiece.

Releasing the vise-lock handle loosens the secured unlock. To keep the workpiece from falling, support the vise-tightening controller while releasing the vise-lock handles. When detaching the workpiece as well, to keep it from falling, support it while you open the motorized and free-end vise jaws.

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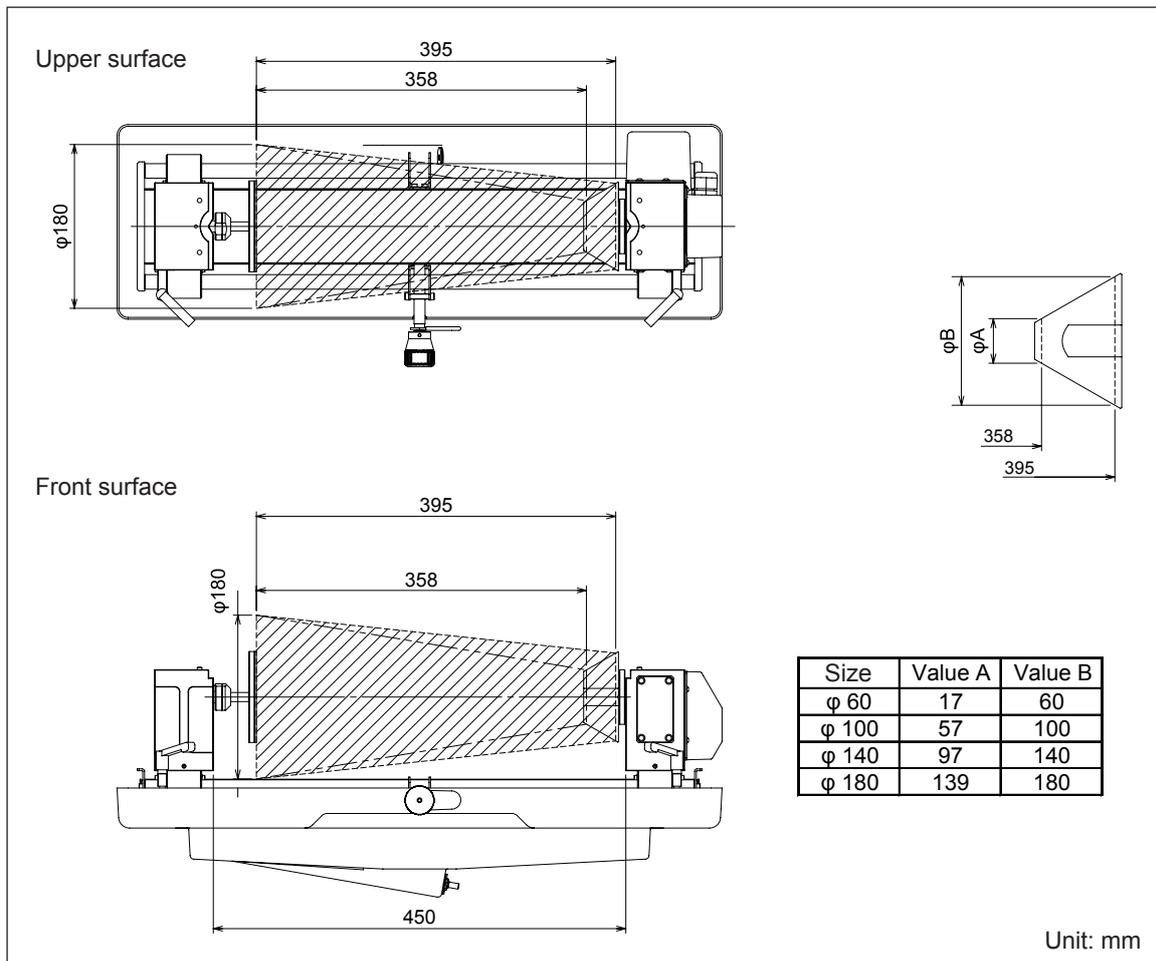
2-1 Check This First

Making Sure of the Material

This section describes how to engrave on glass materials in cylindrical engraving. On the condition that the material shape is cylindrical, any shape of the areas other than the engraved surface is acceptable as long as engraving is possible while it is attached. To check whether or not a material is usable, refer to "Workpiece Size and Cuttable Area."

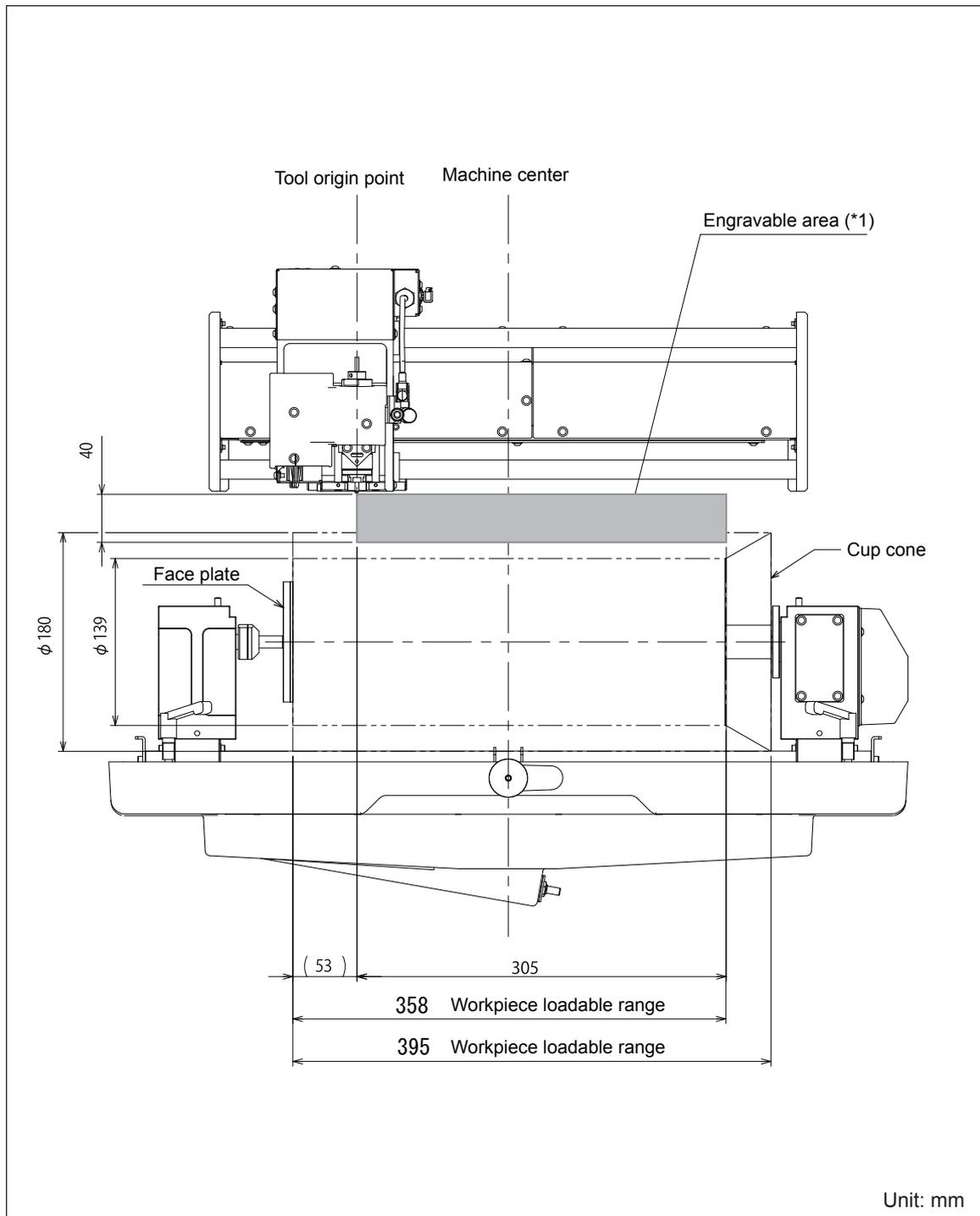
Verifying the Workpiece Size and Cuttable Area

Loadable Workpiece Size



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Cutable Area (When the Vise Unit Is Level and at Its Lowest Position)



*1 The actual area in which engraving is possible (the cutting area) is restricted by the length of the installed tool, the location where the nose unit is installed, the type of jig and shape of the workpiece, and the angle of the vise unit, and may be less than the values shown above.

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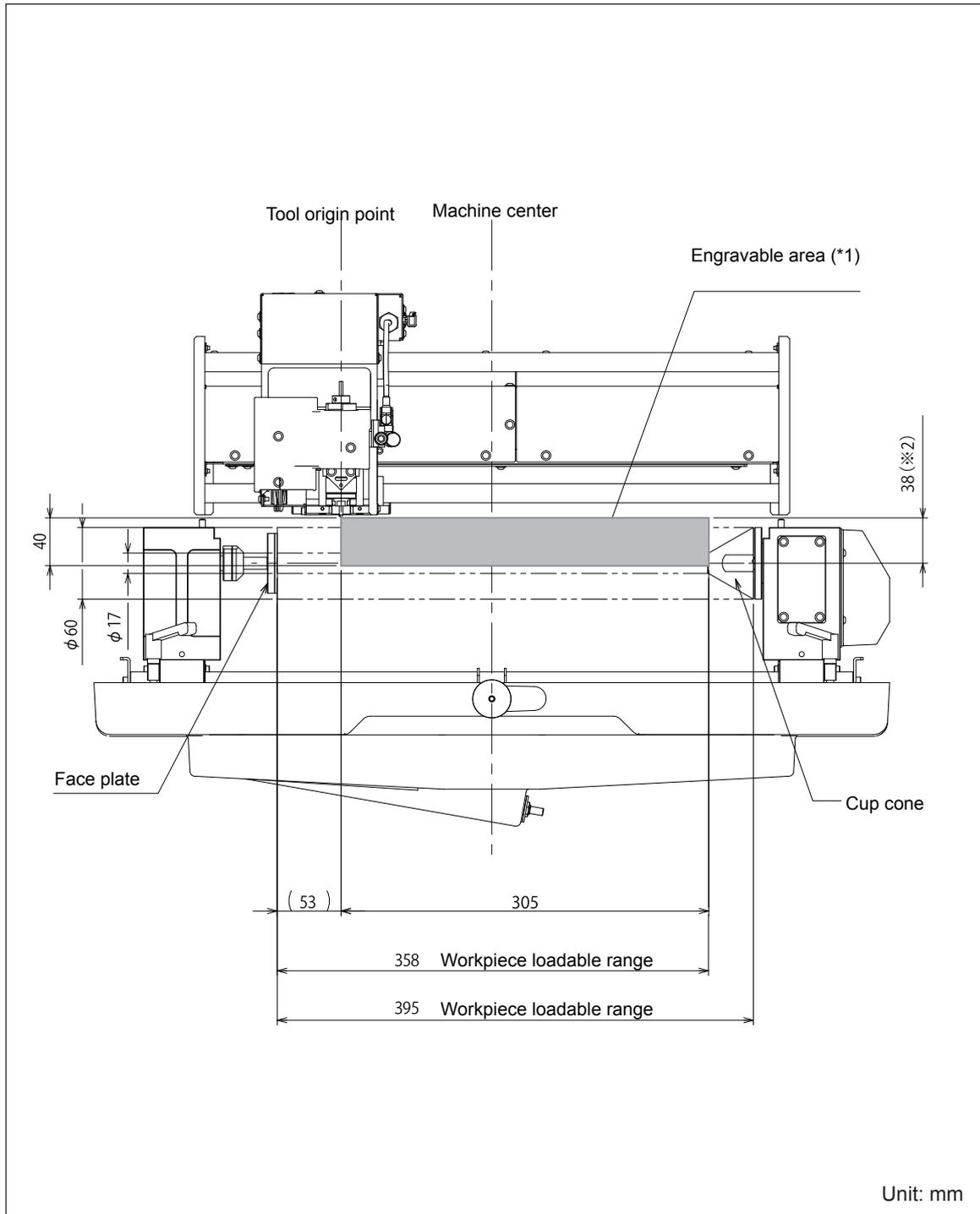
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Cutable Area (When the Vise Unit Is Level and at Its Highest Position)



*1 The actual area in which engraving is possible (the cutting area) is restricted by the length of the installed tool, the location where the nose unit is installed, and the type of jig and shape of the workpiece, and may be less than the values shown above.

*2 When the vise unit is at its highest position, interference with the tool will occur if the outer diameter of the workpiece is more than 76 millimeters.

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Lubricant Use and Maintenance

Lubricant Use

Engraving on glass material uses water as the lubricant during cutting. (Hereafter, this water is called simply "lubricant.") Because glass material is subject to large frictional resistance, engraving it using the same methods as for materials such as metal or resin yields coarse engraved surfaces and fails to obtain attractive results. For this reason, the lubricant is used to lessen friction so that the cutting tool moves smoothly. Using lubricant can also keep the glass chips produced during cutting from scattering.

Maintenance

Before you carry out glass engraving, fill the lubricant recycling tray with lubricant. Then after the operations have been finished, drain off the liquid that has collected and wipe away all water droplets from around the spindle and the vise unit. Allowing lubricant to remain may result in malfunction.

☞ P. 83, "Discharging Lubricant," and p. 85, "Cleaning the Interior of the Unit"

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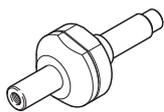
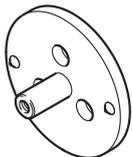
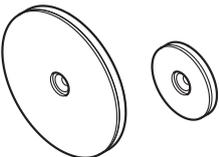
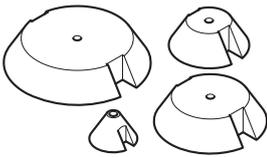
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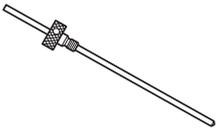
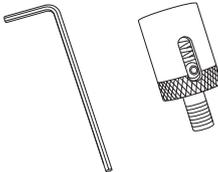
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Verifying the Jigs and Cutting Tools

Cylindrical engraving using glass employs the jigs and cutting tools shown below. Glass engraving requires the use of several optionally available items. To purchase these optional items, contact your authorized Roland DG Corp. dealer or Roland DG Corp.

Jigs			
			
Free-end spigot	Cup-cone spigot	Face plates (included items)	Cup cones (included items)
Cylindrical-engraving adapter (included items)			

*At factory shipment, the free-end spigot, the cup cone spigot, the face plate (100mm) and the cup cone (140mm) are attached to the main unit.

Cutting Tools	
Cutter types	Other necessary cutting tools
<p>Rotating diamond cutter (ZDC-A2000R, diameter 3.175 mm; included item)</p> 	<p>Burnishing attachment (ZB-20; optionally available)</p> 
	<p>Water nose attachment (included item)</p> 
	<p>Nose unit (included item)</p> 
	<p>Solid collet (diameter 3.175 mm; included item)</p> 

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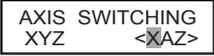
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2-2 Getting Ready to Engrave

STEP1: Set the Cutting Parameters

Here you make the settings for the basic cutting parameters to perform cylindrical engraving using glass. Even though this is also cylindrical engraving, some of the settings are different from the setting for cylindrical engraving on metal or resin.

Procedure

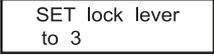
-  Press **MENU** several times to display the screen shown at left. Press **◀** or **▶** to select [OTHERS]. Press **ENTER/PAUSE**.
-  Press **▶** to select [XAZ]. Press **ENTER/PAUSE** to confirm.
-  Press **MENU** to display the screen shown at left. Press **◀** to select [OUTER]. Press **ENTER/PAUSE** to confirm.
-  Press **MENU** to display the screen shown at left. Press **◀** to select [ON]. Press **ENTER/PAUSE** to confirm.
Set the spindle's speed of rotation to a value of 10,000 rpm or less. (The recommended setting is 8,000 rpm.)

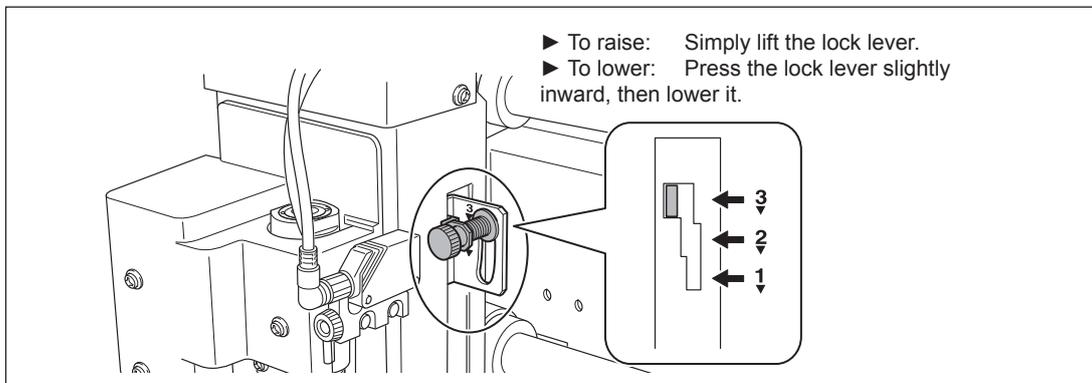
Notice

Spindle Speed During Glass Engraving

The speed of spindle rotation during glass engraving is subject to limitation. Exceeding this upper limit may cause spindle malfunction due to strong vibration. Exercise caution.

- Upper limit: 10,000 rpm
- Recommended: 8,000 rpm

-  Press **MENU** to display the screen shown at left. Press **▶** to select [OFF]. Press **ENTER/PAUSE** to confirm.
-  Follow the displayed message to engage the lock lever at position **3**.
After three seconds the message disappears and the original screen reappears.
☞ For more information about the lock lever, see page 181, "The Positions of the Lock Lever."



1

Cylindrical:
Metal and Resin

7 DWELL IN PD POS.
< 2.0 sec >

Press **MENU** several times to display the screen shown at left.
Use **▲** and **▼** to select the value. (The recommended value is 2.0 sec.)
Press **ENTER/PAUSE** to confirm.

This sets the interval from the time the tool makes contact with the material surface during cutting until engraving starts. Because the tool is prone to slipping in the case of glass material, this wait time must be set to help ensure that the tool is pressed firmly against the material so that it won't slip.

2

Cylindrical :
Glass

8 X-30500 A-100.0
Z 0 8000RPM

Press **MENU** several times to display the main screen.

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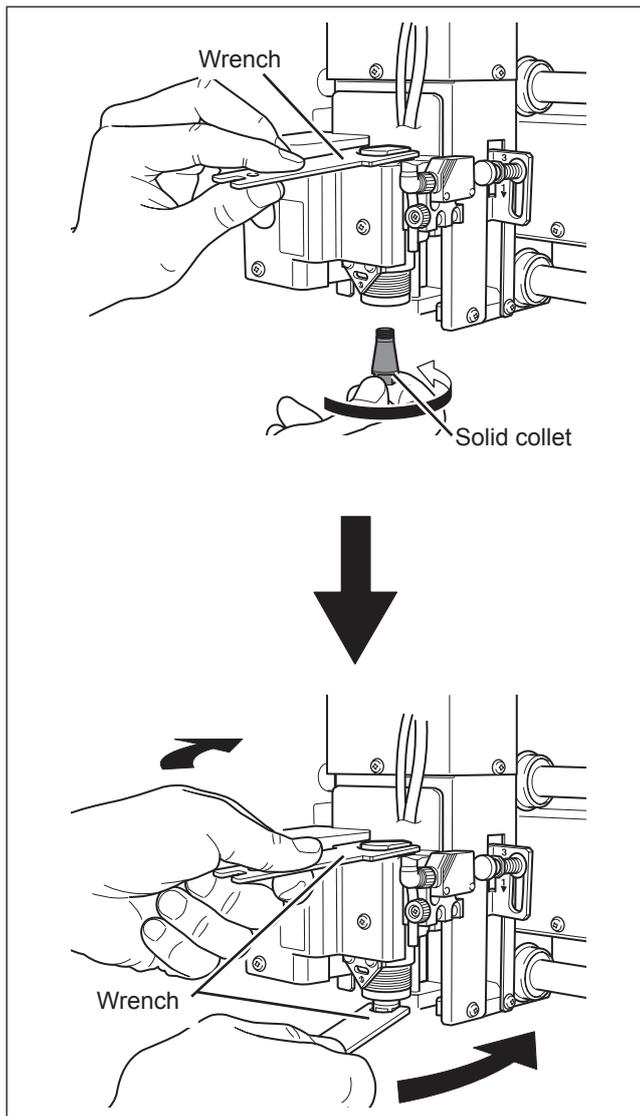
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STEP2: Install the Solid Collet and Water Nose Unit

You install the solid collet and the water nose unit on the end of the spindle unit. Use a solid collet that matches the diameter of the cutter. Use an appropriate solid collet for the cutter's diameter and type.

Installing the Solid Collet



Tighten loosely.

Grasp the solid collet and insert it into the spindle unit from below, then use a wrench to tighten the spindle unit until the solid collet is held in place.

Tighten fully.

Tighten the solid collet using two wrenches. The appropriate tightening torque is 3.2 N-m (32 kgf-cm).

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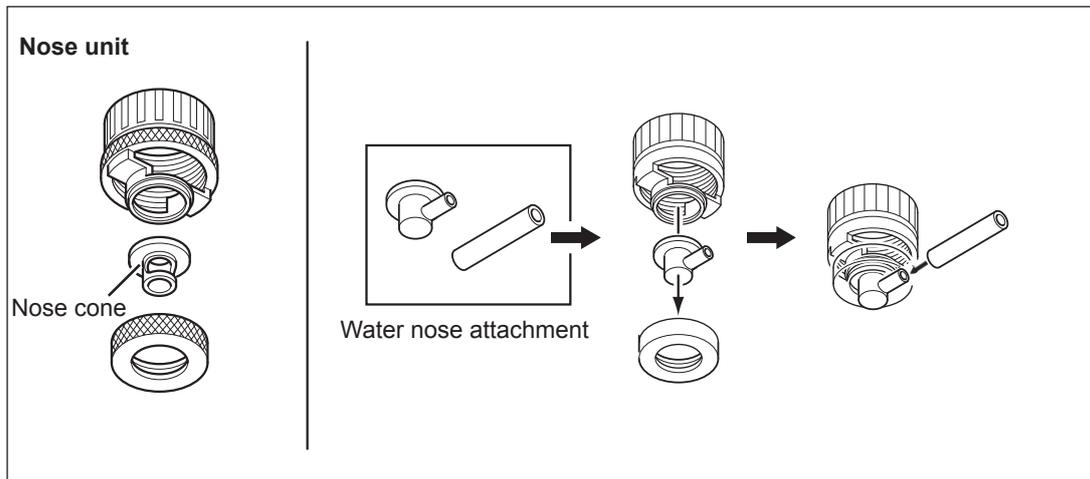
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Installing the Water Nose Unit

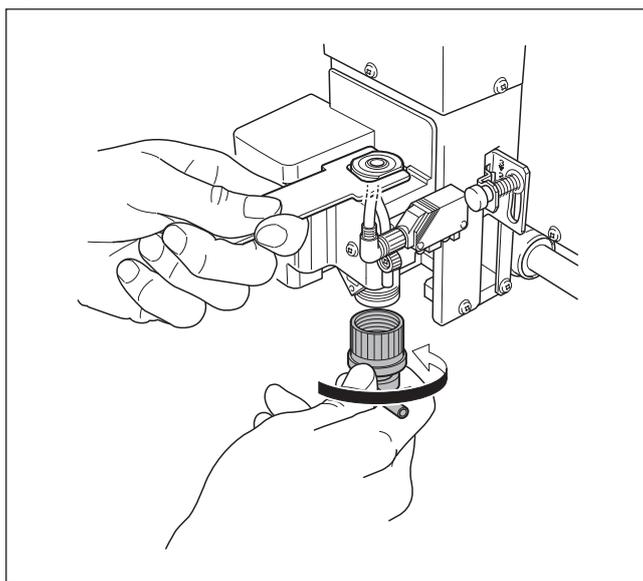
Note: Make sure that a solid collet is already installed.

Assembling the Water Nose Unit

Detach the nose cone from the nose unit and install the water nose attachment on the nose unit.



Installing the Water Nose Unit



Tighten until no further movement is possible, then adjust so that the hose attachment port is on the right side as seen from the machine.

Point

Make sure no cutting waste is present.

Before you install the water nose unit, make sure no buildup of cutting waste or the like is present inside the water nose unit or around the spindle unit. Any buildup of cutting waste that is allowed to remain may become jammed in when the water nose unit is installed, making detachment impossible.

Tighten straight.

Use care especially when starting to tighten to ensure that the parts are not cross-threaded, and tighten slowly and straight. Using excessive force or tightening at an angle may damage the threads.

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STEP3: Measure the Workpiece Size and Select the Jig

Measurement Sites and Purpose of Measurement

- Diameter at each end of the workpiece: This is for selecting a jig suited to the size.
- Diameter at the cutting area: You enter this into the program (Roland EngraveStudio or Dr. Engrave) and use it to set the cutting area and origin point. (☞ P. 72, "Step 7: Set the XA Origin Point")

Special Jigs Used

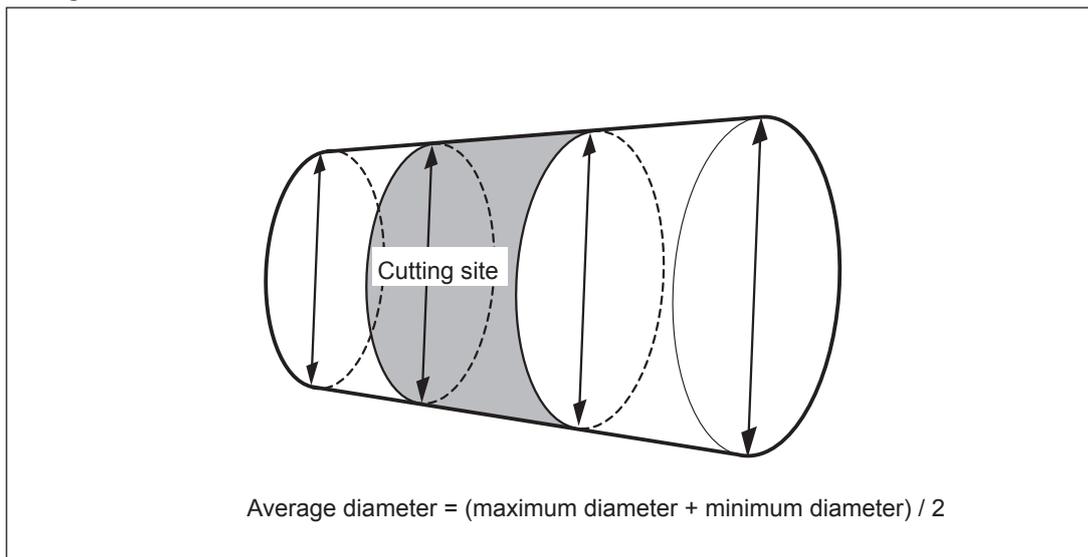
- Cup cone
- Face plate

Procedure

1 Measure the cutting site and the diameter at each end of the workpiece.

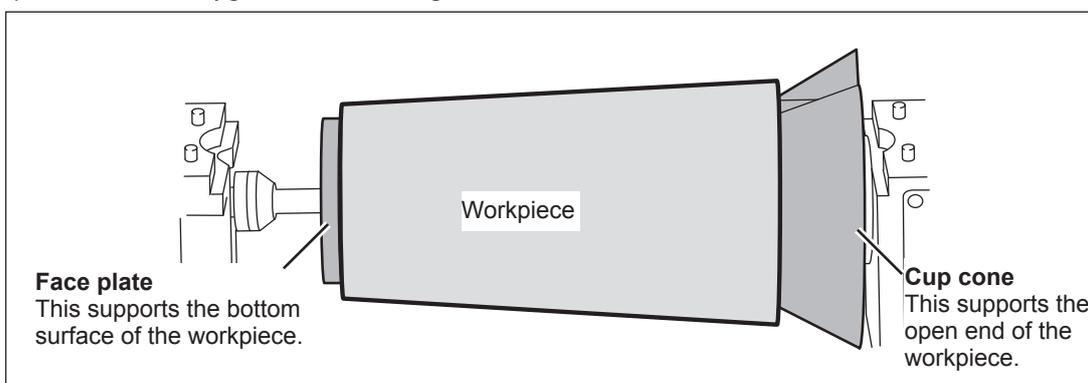
The diameter of the cutting site is entered into the program in "Step 7: Set the XA Origin Point" on page 72, so write down this value for later use.

If the cutting site is at an angle, measure the maximum and minimum diameters of the cutting site and calculate the average of their values.

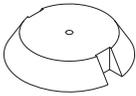


2 Select the jigs.

Based on the diameters of the two ends of the workpiece you measured in **1**, select the size of the cup cone and face plate. You use these jigs as shown in the figure below.



Refer to the following table and select a cup cone and face plate of the appropriate size for the workpiece.

Type of jig		Jig size	Suitable workpiece size
Cup cone		Minimum diameter: 139 mm Maximum diameter: 180 mm	Inner peripheral diameter of the workpiece opening: 139 mm or more to 180 mm or less
		Minimum diameter: 97 mm Maximum diameter: 140 mm	Inner peripheral diameter of the workpiece opening: 97 mm or more to 140 mm or less
		Minimum diameter: 57 mm Maximum diameter: 100 mm	Inner peripheral diameter of the workpiece opening: 57 mm or more to 100 mm or less
		Minimum diameter: 17 mm Maximum diameter: 60 mm	Inner peripheral diameter of the workpiece opening: 17 mm or more to 60 mm or less
Face plate		Diameter: 100 mm	Diameter of the workpiece bottom: 100 mm or more
		Diameter: 50 mm	Diameter of the workpiece: 100 mm or less (However, if stability is lacking when this is installed, then use the jig having a diameter of 100 mm.)

Face-plate Selection for a Workpiece Whose Bottom Surface Measures 100 mm or Less in Diameter

We recommend using a face plate of a size smaller than the diameter of the bottom surface of the workpiece, but if the bottom surface of the workpiece isn't flat and level, the workpiece may be unstable when it is secured in place. If such cases, use the face plate measuring 100 millimeters in diameter. Note, however, that if the face plate extends beyond the workpiece, it may interfere with the spindle head during cutting, which could damage the machine. If the face plate protrudes beyond the workpiece, take into account the movable area of the spindle head and the location where cutting is to be performed and take care to ensure no interference between the spindle head and the face plate.

☞ P. 54, "Verifying the Workpiece Size and Cuttable Area"

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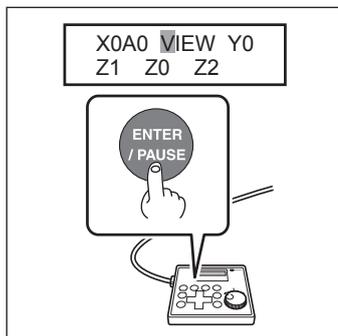


STEP4: Install the Jigs

- ⚠ WARNING** Never inadvertently touch the computer or handy panel while performing this task. Unintended operation of the machine may result in injury.
- ⚠ WARNING** Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

Procedure

1

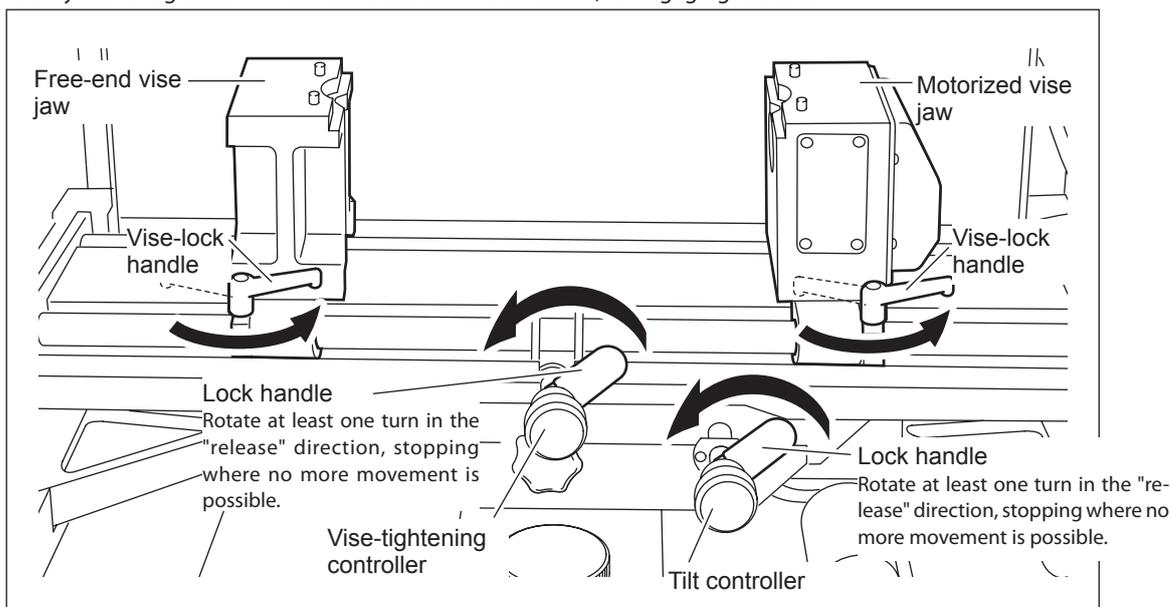


Close the front cover and move the spindle unit to the VIEW position. When movement ends, open the front cover.

- 2** Unlock the free-end vise jaw, motorized vise jaw, vise-tightening controller, and tilt controller.

Release the vise-lock handles and the tilt-lock handle by turning them in the direction of the arrows shown in the figure below.

The locations of the vise-lock handle for the vise-tightening controller and the tilt-lock handle for the tilt controller vary depending on the positions and angles of the two vise jaws. Also, rotate each at least one turn in the "release" direction, stopping where no further movement is possible. If the vise-lock handle or tilt-lock handle is not rotated sufficiently, it may move together with the controller when it is turned, re-engaging the lock.



* At factory shipment, the cup cone spigot and the cup cone (140mm) are attached to the motorized vice jaw, and the free-end spigot and the face plate (100mm) are attached to the free-end vice jaw. This illustration shows the state where each jig has been removed.

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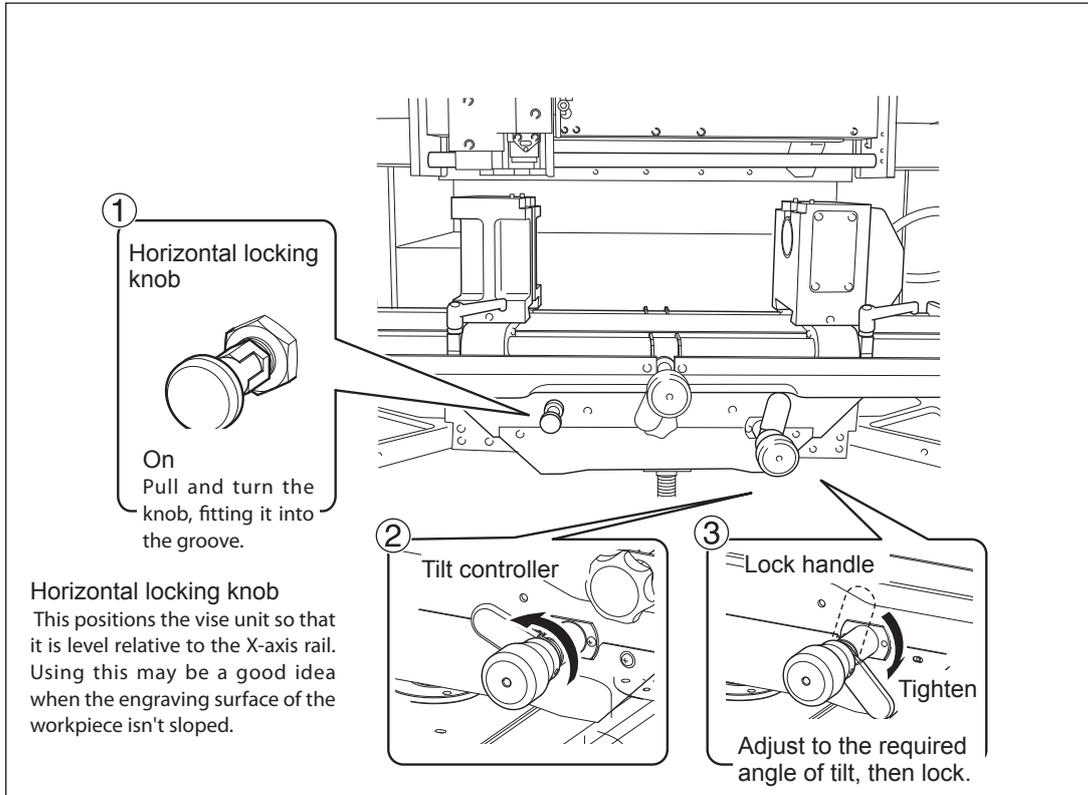
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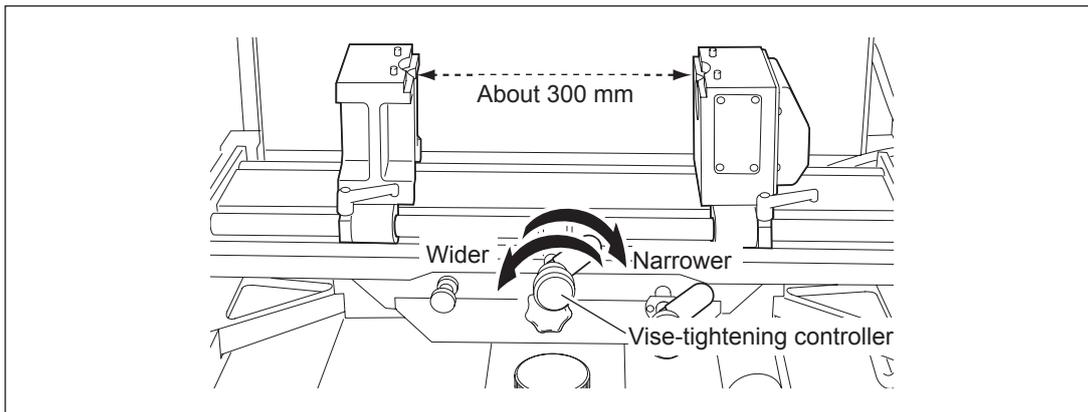
3 Adjust the angle of the vise unit so that it's level, then secure the vise unit in place.

- ① Turn the tilt controller clockwise to tilt the vise unit to the right and engage the horizontal locking knob.
- ② Turn the tilt controller counterclockwise until the vise unit stops moving.
- ③ Secure in place with the tilt-lock handle.



4 Widen the spacing between the free-end and motorized vise jaws.

Turn the vise-tightening controller to widen the free-end and motorized vice jaws toward either side. Widen to an interval of about 300 millimeters to allow the cup cone and face plate to be installed.



1
Cylindrical:
Metal and Resin

2
Cylindrical:
Glass

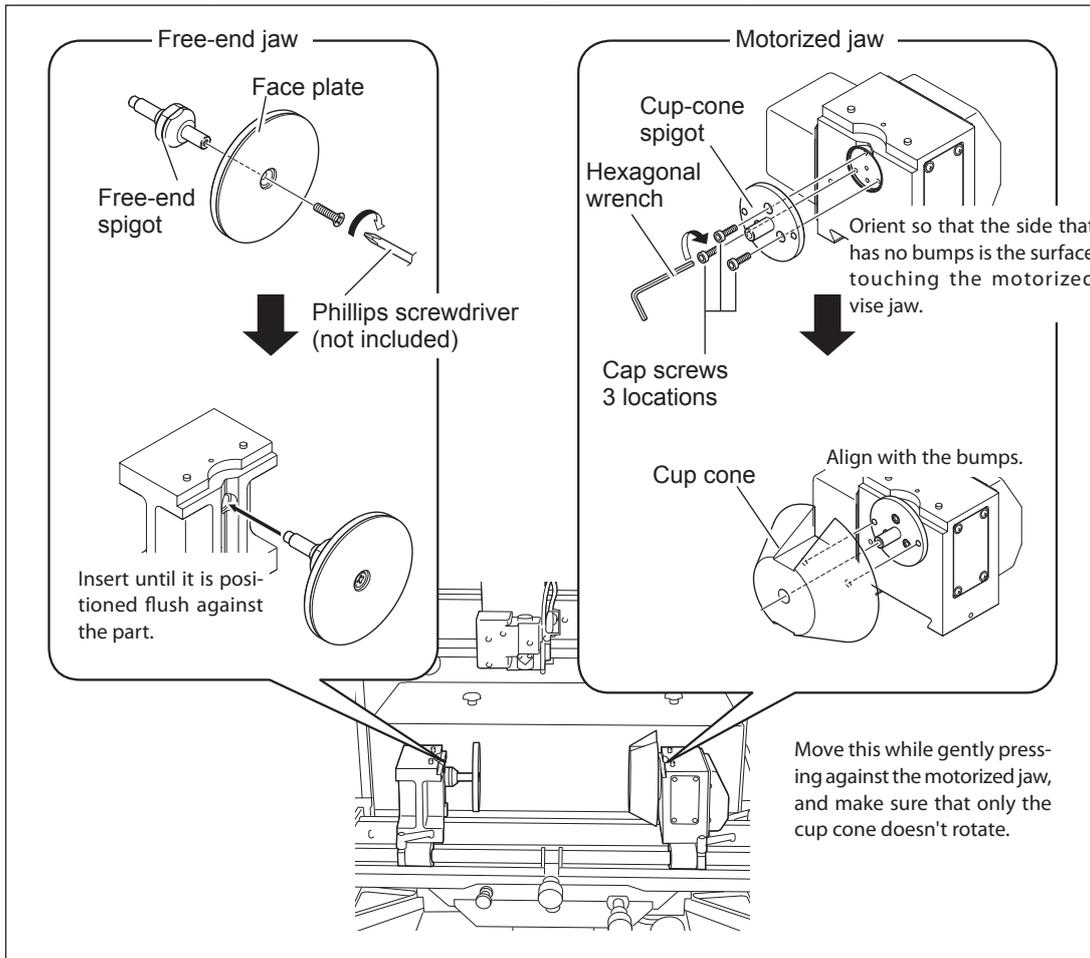
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5
Feature Reference

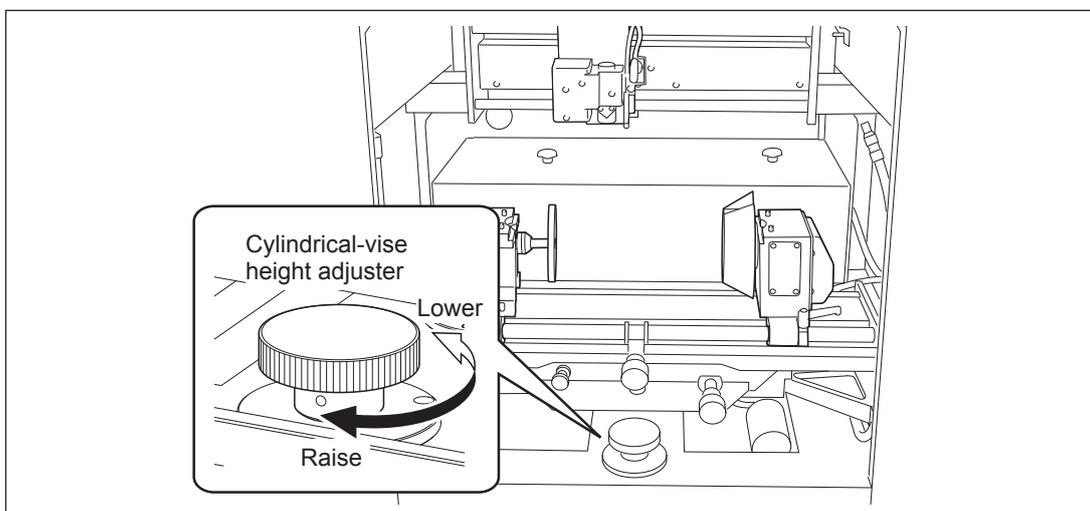
6
Troubleshooting

5 Install the face plate on the free-end vise jaw and the cup cone on the motorized vise jaw.



6 Moving down the vice unit.

Turn the cylindrical vice height adjuster to move down the vice unit. Then attach a workpiece and move the spindle head to the upper side (up in the air) of the workpiece. Move down the vice unit in advance to prevent the spindle head from hitting the workpiece. The moved down position may be determined depending on the position of the spindle head and the workpiece shape and size. However, it is recommended to move it down to the lowest position for first operation.



1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

5 Feature Reference

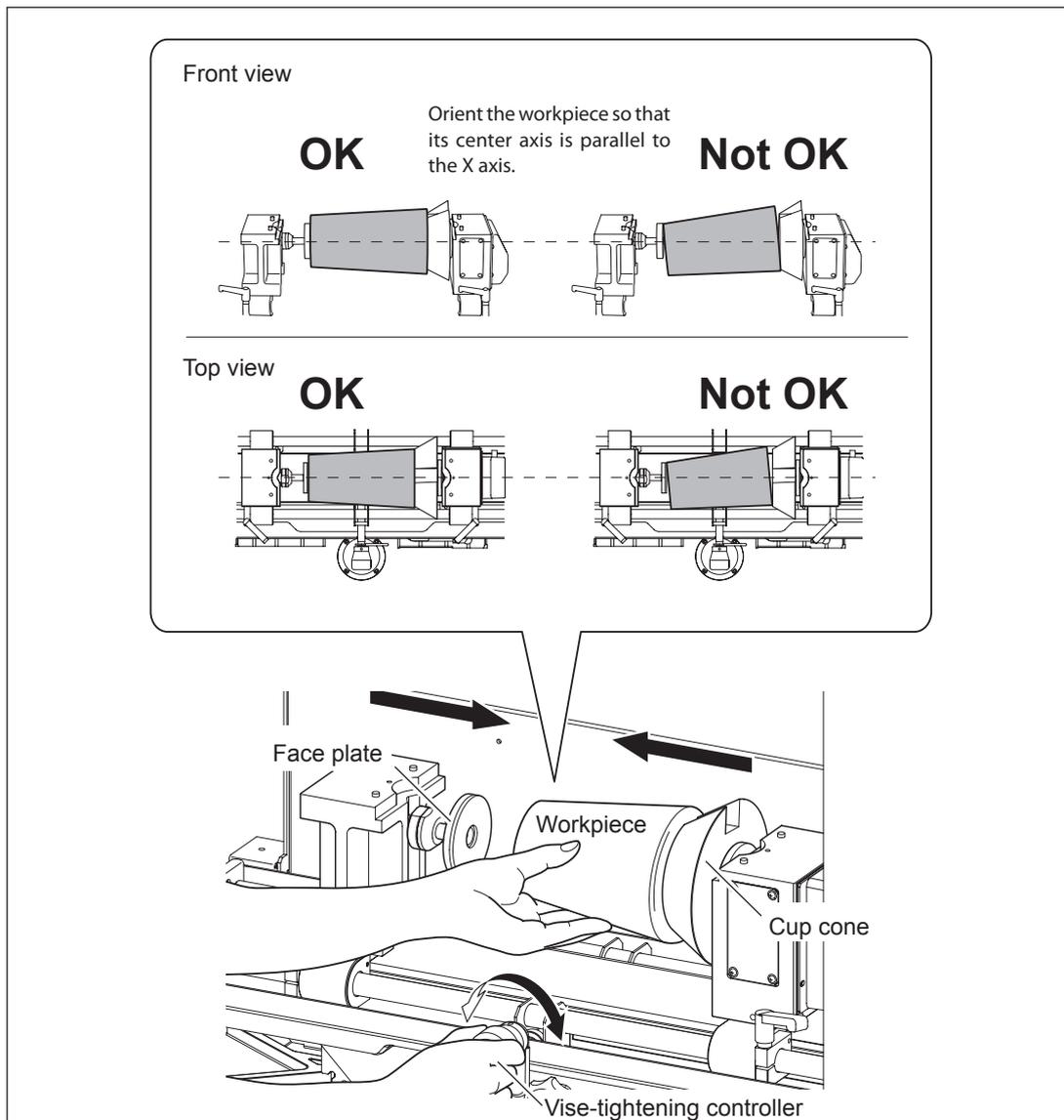
6 Troubleshooting

STEP5: Load the Workpiece

- ⚠ WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠ WARNING** Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

Procedure

- 1** Clamp the workpiece between the cup cone and the face plate.
Turn the vise-tightening controller to move the free-end and motorized vice jaws closer and clamp the workpiece between the cup cone and face plate. Orient the workpiece so that its center axis is parallel to the X axis. Also, to ensure that the workpiece doesn't slip out of place or fall when you're loading it, be careful not to let go of it before it is clamped in place.



1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

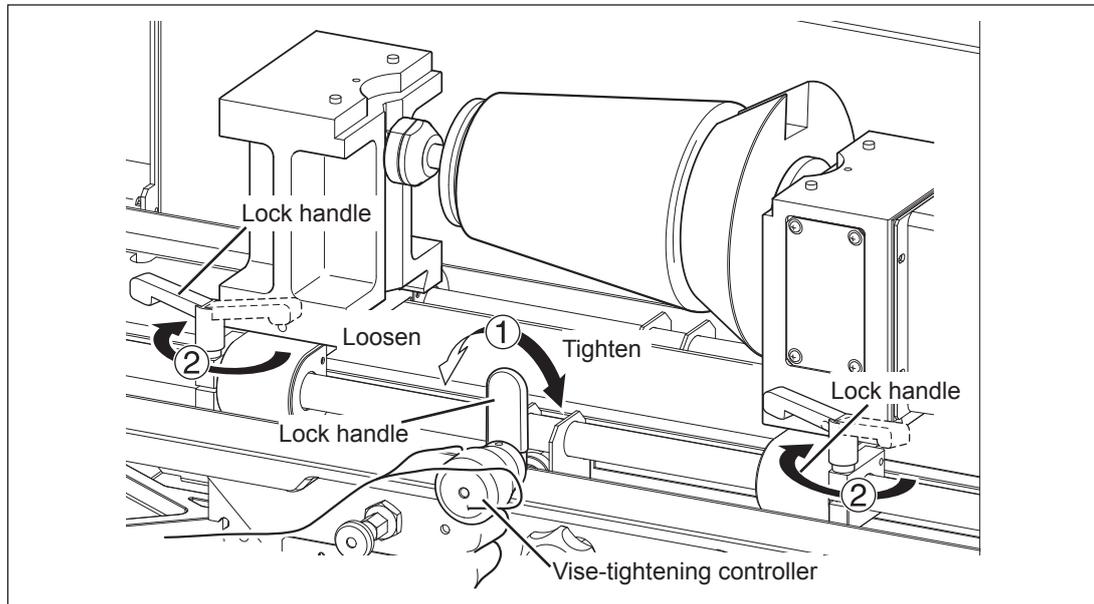
4 Flat Engraving

5 Feature Reference

6 Troubleshooting

- ② After positioning the vise jaws, secure in place in this sequence: ① the vise-tightening controller, then ② the motorized and free-end vise jaws.

To prevent the workpiece from slipping out of position, maintain your grip on the vise-tightening controller until the vise jaws are secured in place.



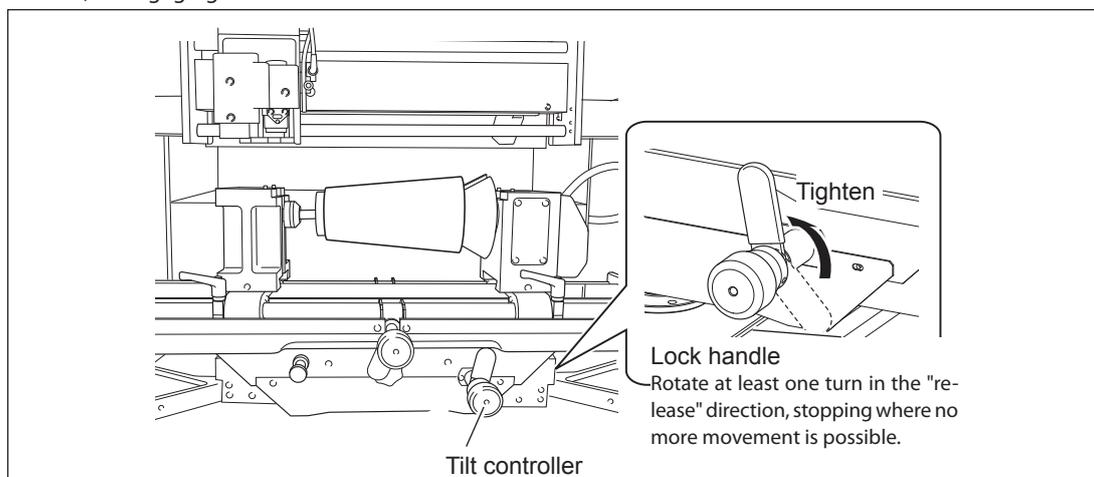
- ③ Press ▲ or ▼ to rotate the A axis and check how well the workpiece is loaded.

Make sure the center axis of the workpiece is parallel to the X axis. If it isn't parallel, the center axis shifts when the workpiece is rotated and the location of the origin point for cutting becomes misaligned, making it impossible to obtain the intended engraving results.

Rotate the A axis, and if the center axis of the workpiece remains at the same location as it turns, the center axis is parallel to the X axis. If the center axis of the workpiece moves up and down as the workpiece rotates, redo loading of the workpiece from step ①

- ④ Unlock the tilt controller.

Rotate lock handle of the tilt controller at least one turn in the "release" direction, stopping where no further movement is possible. If the tilt-lock handle is not rotated sufficiently, it may move together with the controller when it is turned, re-engaging the lock.



Lock handle
Rotate at least one turn in the "re-lease" direction, stopping where no more movement is possible.

STEP 6: Prepare the Lubricant

Here you prepare the lubricant required for engraving glass material. When using lubricant, be sure to comply with the following points.

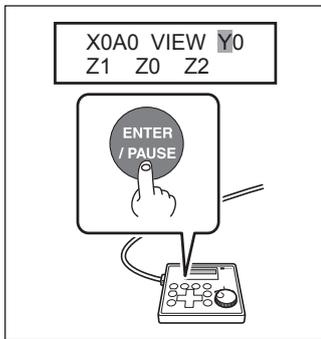
- Fill with 350 to 500 milliliters of lubricant.
A smaller amount may make an uninterrupted flow of water during cutting impossible. A greater amount may cause the lubricant recycling tray to overflow.
- With the solid collet, water nose unit, and burnishing attachment installed, rotate the spindle and check the flow of lubricant.
Starting cutting without making sure of the flow of lubricant could result in cutting during an interval of no lubricant flow and unintended engraving results.

Procedure

- 1 Make sure that the solid collet and water nose unit are already installed.

☞ P. 61, "Install the Solid Collet and Water Nose Unit"

2

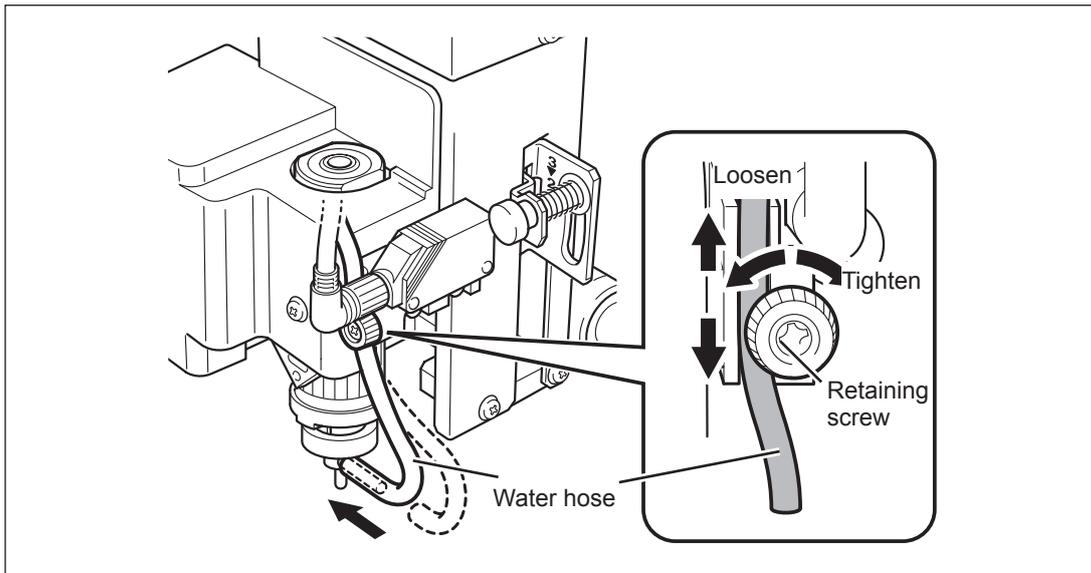


Close the front cover, and then move to the Y0 position.

- 3 Open the front cover.

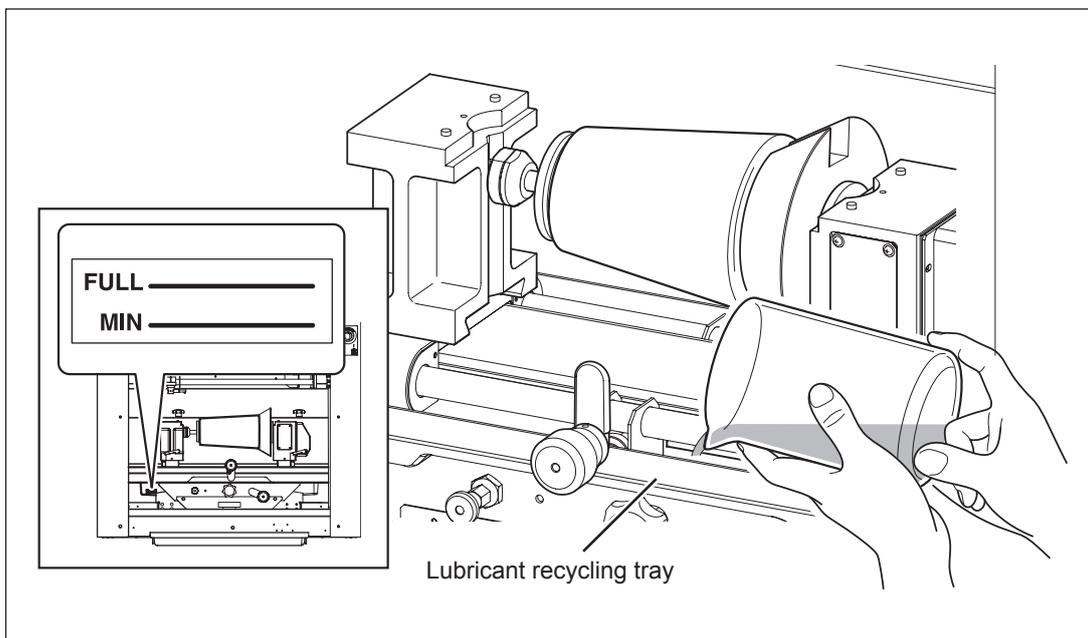
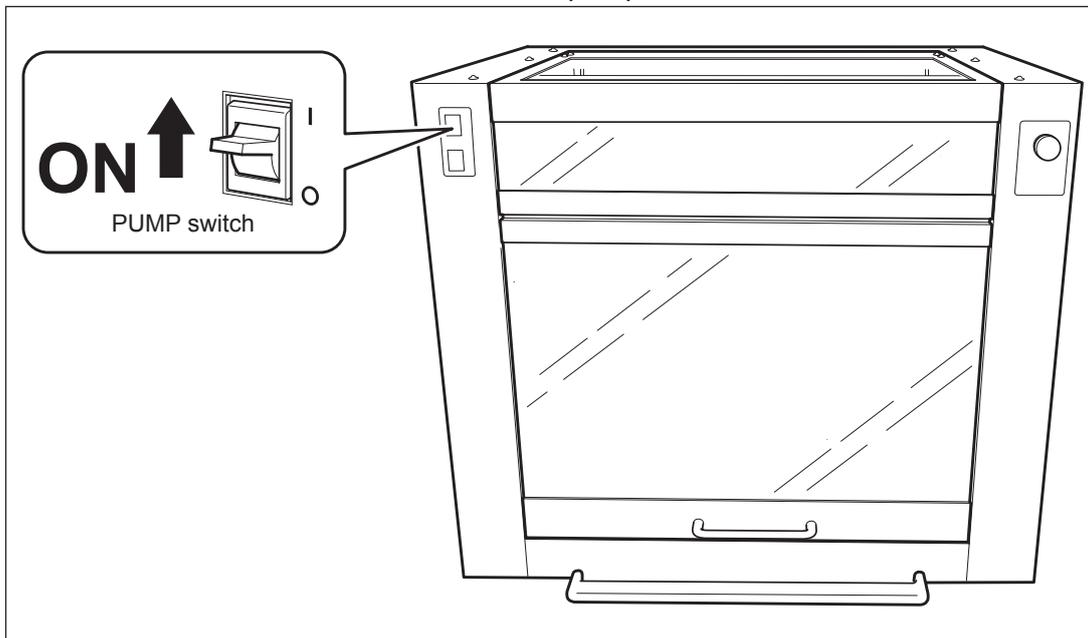
Attach the water hose to the water nose unit.

Loosen the retaining screw, pull out the water hose, and connect the hose to the water nose unit. After making the connection, retighten the retaining screw.



4 Fill the lubricant recycling tray with lubricant.

Taking care not to get water on the lubricant sponge filter, rails, or other components, fill the tray to a level between the "MIN" (350 milliliters) and "FULL" (500 milliliters) indications on the label affixed to the tray.

**5** Close the front cover and set the lubricant pump switch at ON.**6** Rotate the spindle.

Rotate the spindle until an appropriate amount of lubricant starts flowing. See the guidelines below.

- For the initial use (including the filter replacement): Approx. 15 seconds
- For the second time and later: Approx. 5 to 10 seconds

STEP7: Set the XA Origin Point

You specify the cutting area by using the laser pointer to identify the two points at the diagonally opposite angles of the square or rectangle, and set the XA origin point at the center of the specified area. (The XA origin is not specified directly.) You specify the cutting area by using the laser pointer to identify the two points at the diagonally opposite angles of the square or rectangle, and set the XA origin point at the center of the specified area. (The XA origin is not specified directly.)

If you want to set the XA origin point at a location you select, see here [☞](#) page 174, "Setting the XA or XY Origin Point Where You Choose."

1. Adjust the angle and height of the workpiece.

1 Open the front cover.

Adjust the angle of the vise unit and secure the vise unit in place.

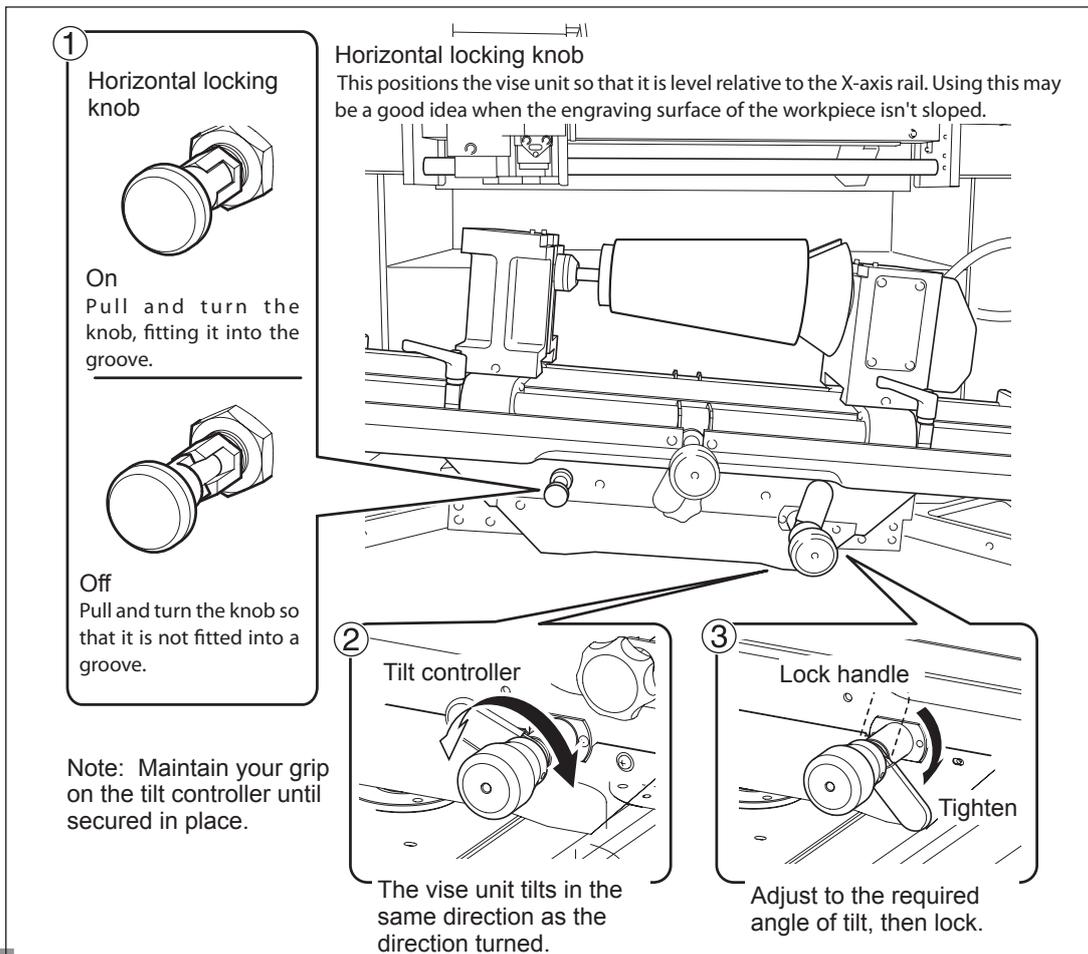
Maintain your grip on the tilt controller until the vise unit has been secured in place. Releasing it may allow the vise unit to tilt with force, causing the workpiece to become displaced and possibly damaging the machine.

If the Cutting Surface Is Sloped

- ① Turn the tilt controller clockwise to tilt the vise unit to the right, then engage the horizontal locking knob.
- ② Turn the tilt controller to tilt the vise unit and orient the cutting site on the workpiece so that it's parallel with the X-axis rail.
- ③ Secure in place with the tilt-lock handle.

If the Cutting Surface Isn't Sloped

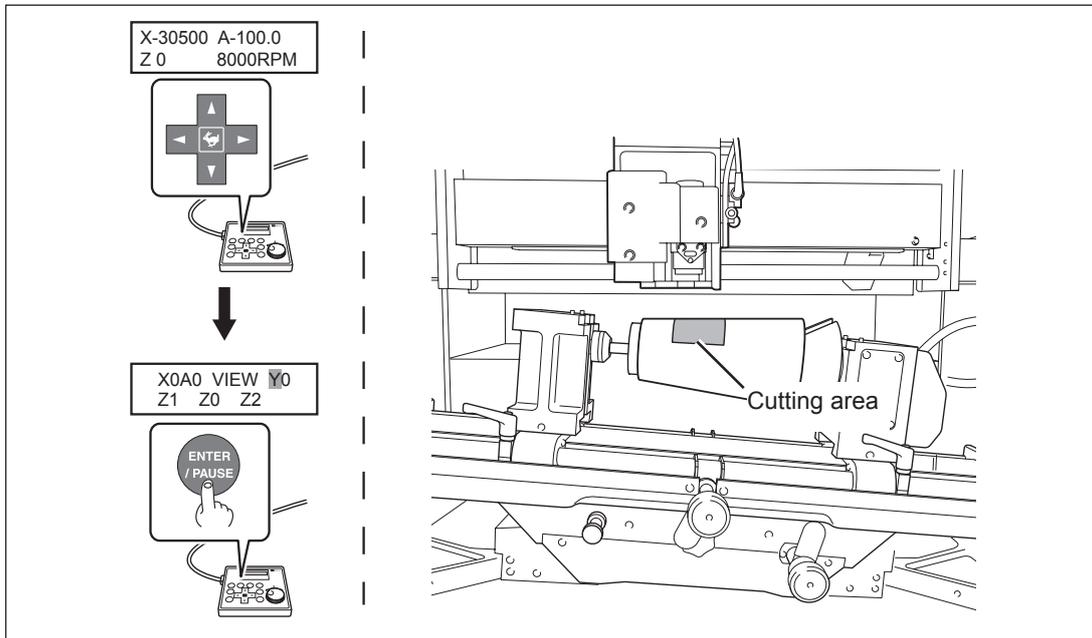
- ① Turn the tilt controller clockwise to tilt the vise unit to the right, then engage the horizontal locking knob.
- ② Turn the tilt controller clockwise to tilt the vise unit to the right, then engage the horizontal locking knob.
- ③ Secure in place with the tilt-lock handle.



2 Move the spindle head to the area above the cutting site on the workpiece.

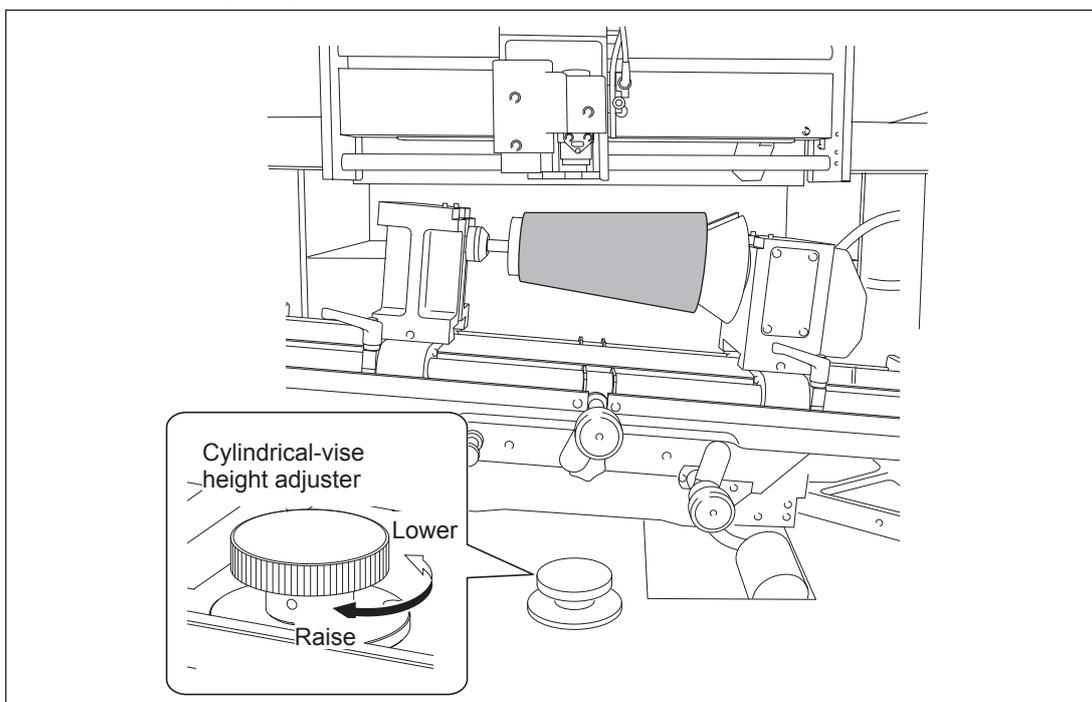
Follow the sequence below to move, being careful not to make contact with the workpiece.

- ① Press  and  to move the spindle head.
- ② Close the front cover and move the spindle head to the Y0 position.



3 Open the front cover.
Adjust the height of the vise unit.

Turn the cylindrical-vise height adjuster to adjust the height of the vise unit (and therefore the height of the workpiece). Adjust so that the engraving surface on the workpiece is about 40 millimeters away from the tip of the spindle head.



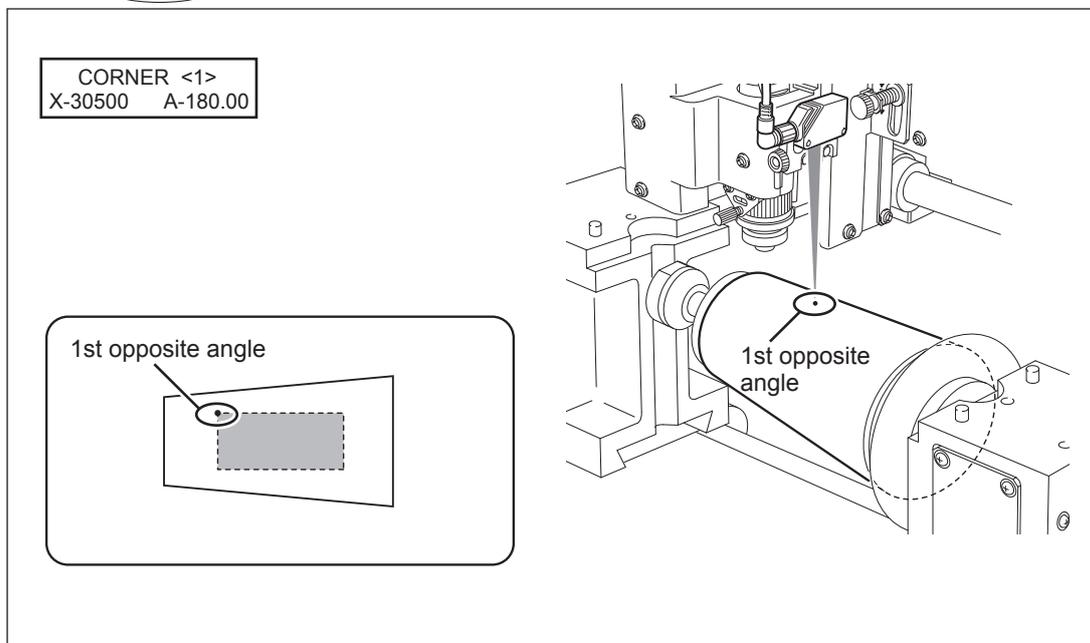
2. Specify the cutting area using the laser pointer.

- 1  Press  several times to display the screen shown at left. Press  or  to select [AREA]. Press  to confirm. Laser emission starts.

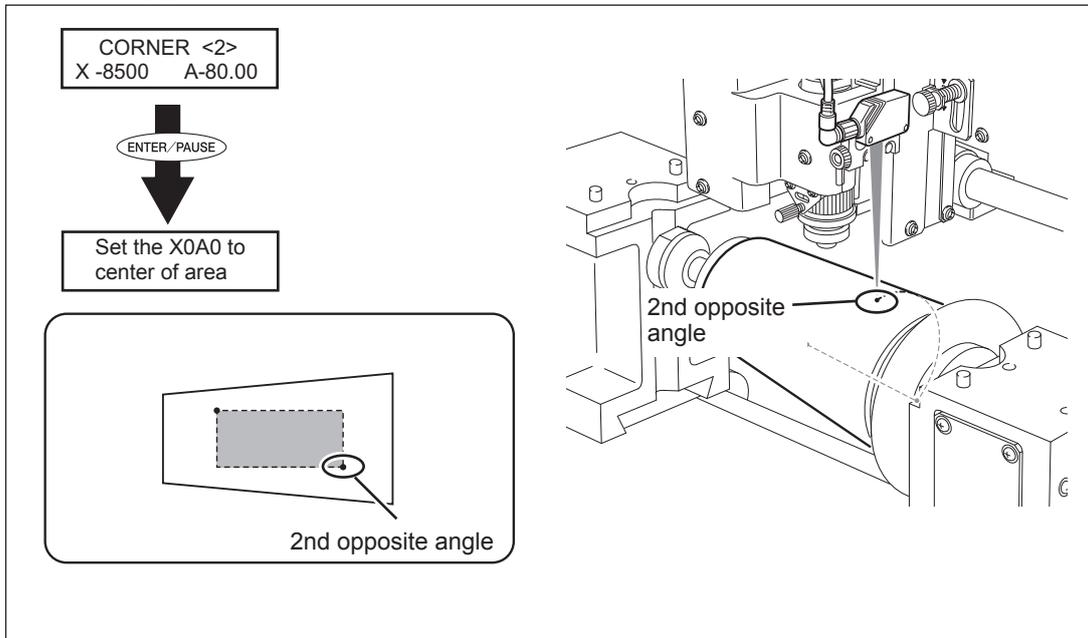
Point

When the glass is colorless and transparent, the laser light passes through it. Accordingly, try affixing opaque paper to the back of the portion that will become the cutting area. This makes the laser beam visible.

- 2 Press , , , and  to align the laser pointer with the first opposite angle of the cutting area. Press  to confirm.



- 3 Press **MENU**.
 Press **▲**, **▼**, **◀**, and **▶** to align the laser pointer with the second opposite angle of the cutting area.
 Press **ENTER/PAUSE** to confirm.



The message shown in the figure above is displayed for approximately three seconds, and then the original screen returns.

- 4 **CHECK AREA Hit "ENTER"** Press **MENU**.
 The message shown in the figure at left appears.

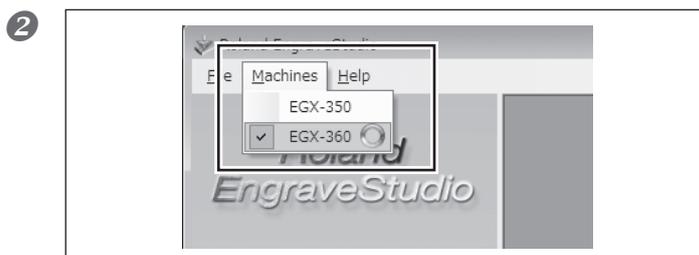
- 6 Close the front cover and press **ENTER/PAUSE**.
 Each press of **ENTER/PAUSE** makes the laser pointer indicate one side of the cutting area. This enables you to check whether the cutting area has been specified at the intended location.

- 6 **I/O OTHERS
 ADJ AREA** Press **MENU**.
 The message shown in the figure at left appears.

2. Acquire the cutting area with the program.

For Roland EngraveStudio

- 1 Start Roland EngraveStudio.



Click "Engraving machine," then select "EGX-360."

1
Cylindrical:
Metal and Resin

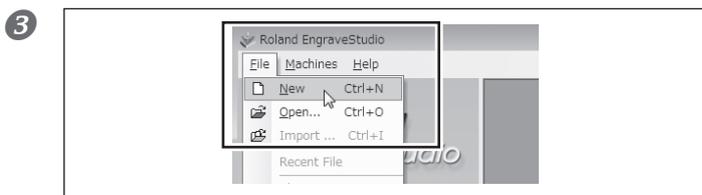
2
Cylindrical :
Glass

3
Ring Engraving

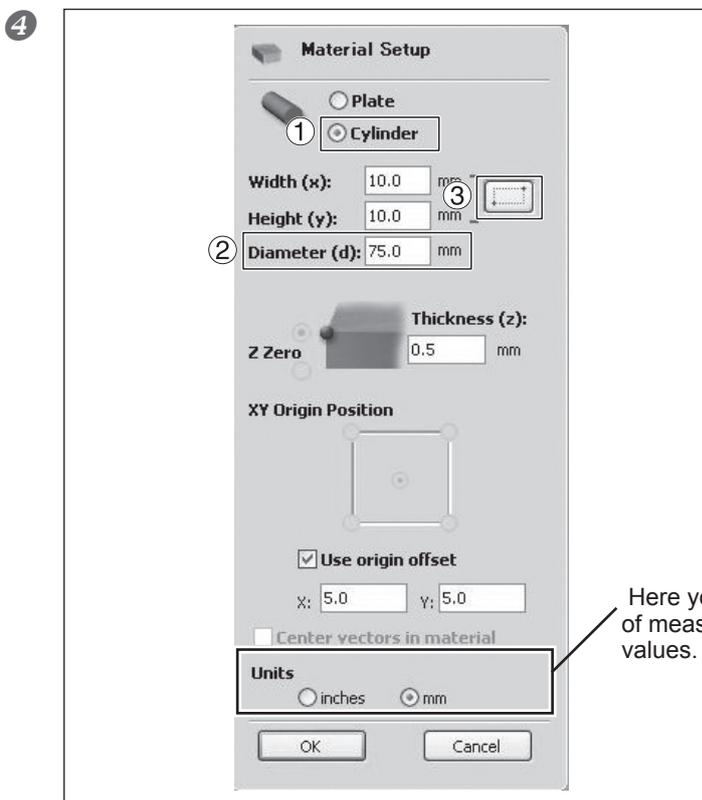
4
Flat Engraving

5
Feature
Reference

6
Troubleshooting



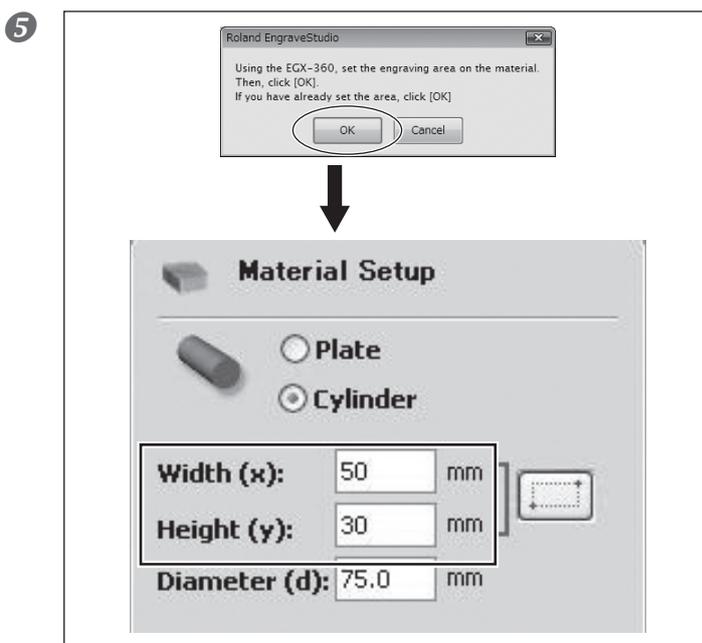
Click "File," then "New."



① Select the "Cylindrical material" check box.

② For "Diameter," enter the cutting-site diameter (or average diameter) you measured on page 63, "STEP 3: Measure the Workpiece Size and Select the Jig."

③ Click the "Get from Unit" button ().



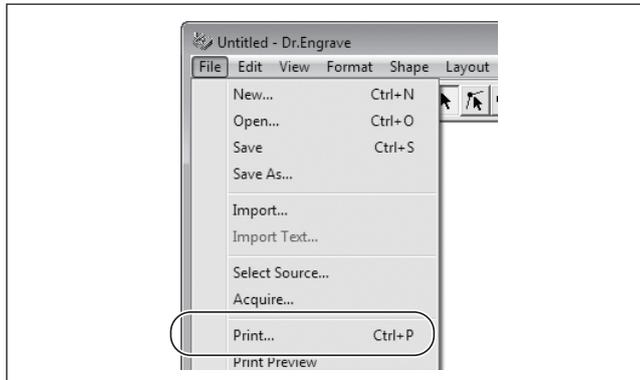
Click [OK].

EngraveStudio acquires the cutting area you specified on the machine.

For Dr. Engrave

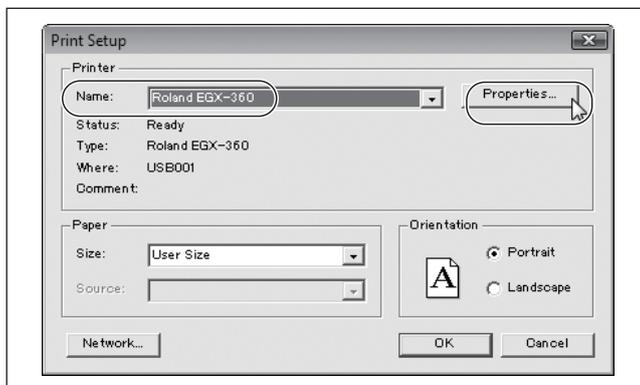
1 Start Dr. Engrave.

2



Click "File," then "Print Setup."

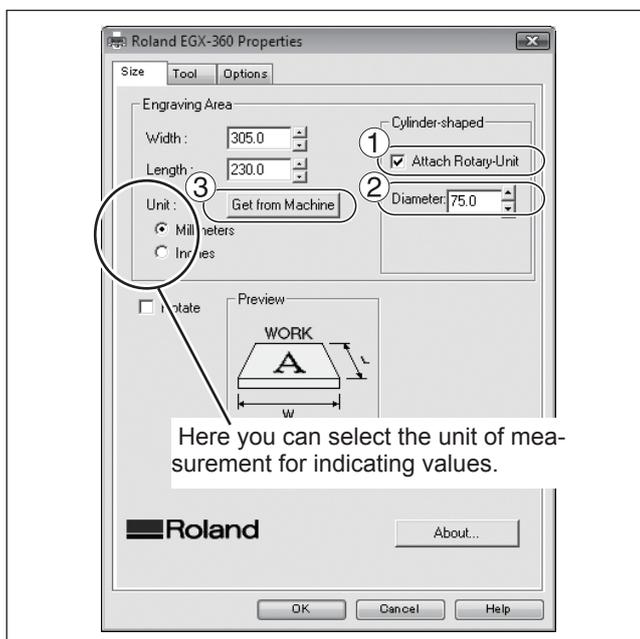
3



For "Printer Name," make sure that "Roland EGX-360" is selected, then click "Properties."

If "Roland EGX-360" is not selected, click the drop-down arrow next to "Printer Name" and select it from the list displayed.

4



1 Select the "Use rotary axis unit" check box.

2 For "Diameter," enter the cutting-site diameter (or average diameter) you measured on page 63, "STEP 3: Measure the Workpiece Size and Select the Jig."

3 Click the "Get from Unit" button.

1
Cylindrical:
Metal and Resin

2
Glass
Cylindrical :

3
Ring Engraving

4
Flat Engraving

5
Feature
Reference

6
Troubleshooting

1
Cylindrical:
Metal and Resin

2
Cylindrical:
Glass

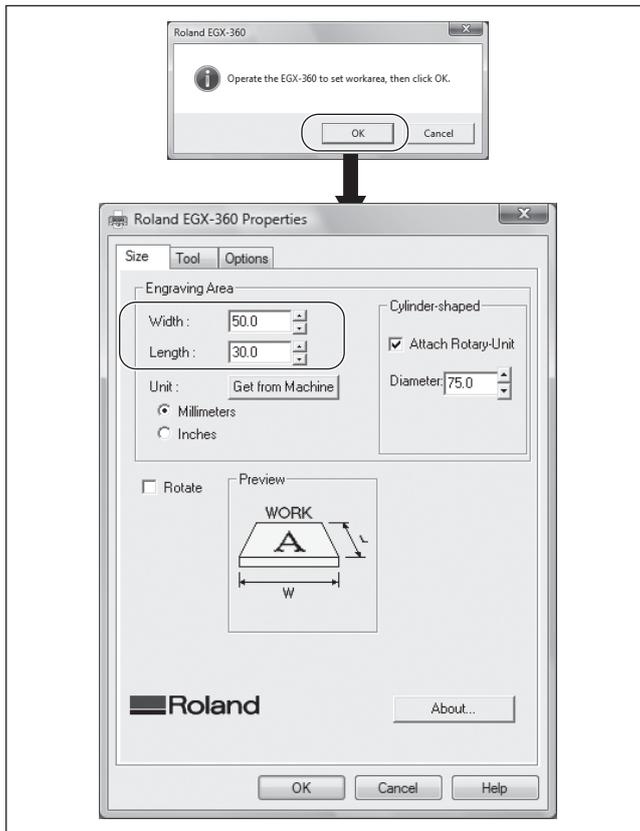
3
Ring Engraving

4
Flat Engraving

5
Feature
Reference

6
Troubleshooting

5



Click [OK].

Dr. Engrave acquires the cutting area you specified on the machine.

6 Click [OK] twice to close the "Roland EGX-360 Properties" window and the "Print Setup" window.

2-3 Starting Engraving

STEP1: Check the Cutting Path of the Cutter (Preview Feature)

Before you carry out actual cutting, you can use the laser pointer to preview and check the cutting path that the cutter is to take. The following two methods are available

- Path preview: This previews the actual cutting path.
- Area preview: This previews only the range of the cutting data.

Procedure

1 Close the front cover.

2  Send the cutting data from the computer.
The screen shown at left appears.

3  Use  or  to select "Path Preview" or "Area Preview."
Press  to confirm.



When You Select "Path Preview"

The screen shown below appears, the spindle unit rises to the highest point along the Z axis, and the laser pointer then indicates the cutting path that the cutter is to take.

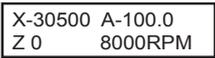


When You Select "Area Preview"

When the message shown below appears, press .

After the spindle unit has risen to the highest point along the Z axis, each press of  makes the laser pointer indicate one side of the range of the cutting data.



4  When you're finished previewing, press  to go back to the screen shown at left.

1 Cylindrical:
Metal and Resin

2 Cylindrical :
Glass

3 Ring Engraving

4 Flat Engraving

5 Feature
Reference

6 Troubleshooting

STEP2: Install the Rotating diamond cutter

⚠️WARNING Never inadvertently touch the computer or handy panel while performing this task.

Unintended operation of the machine may result in injury.

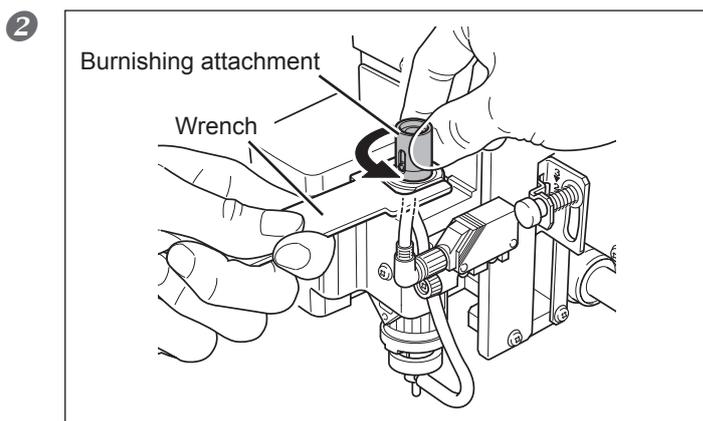
⚠️WARNING Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

⚠️CAUTION **Caution: cutting tool.**
The cutting tool is sharp. To avoid injury, exercise caution.

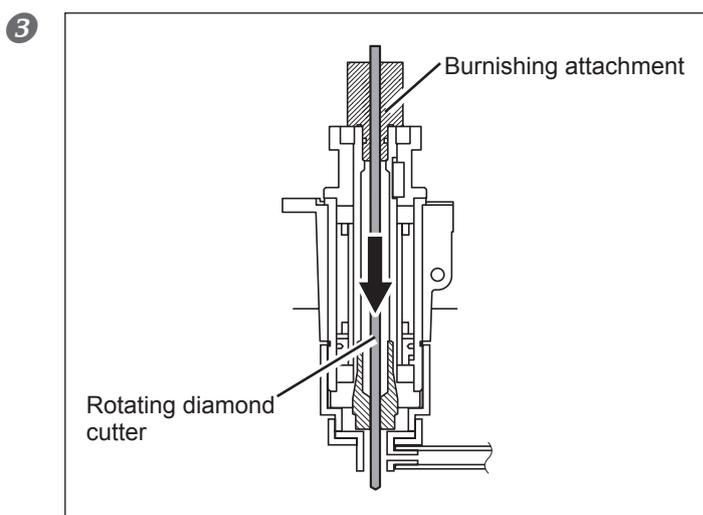
Procedure

- 

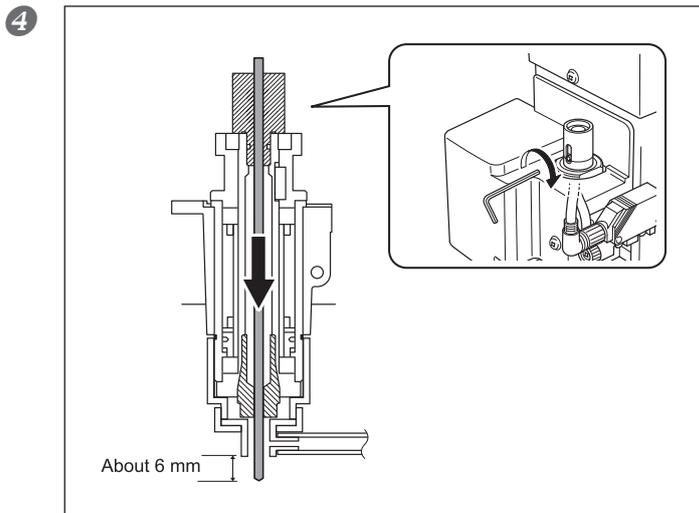
Press **MENU** several times to display the screen shown at left. Use **◀** or **▶** to select "X0A0." Press **ENTER/PAUSE** to confirm. The spindle head moves to the XA origin point.



Open the front cover. Install the burnishing attachment. While holding the spindle unit immobile with a wrench, tighten the burnishing attachment. The burnishing attachment is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.



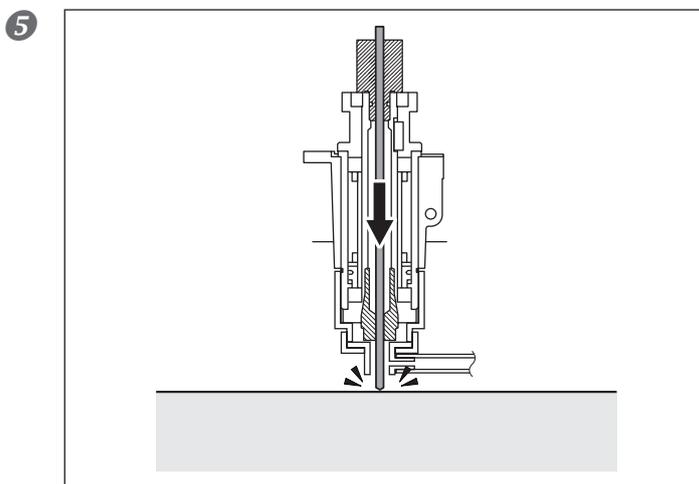
Insert the rotating diamond cutter into the burnishing attachment.



Determine the amount of extension of the rotating diamond cutter, then secure the rotating diamond cutter in place.

With the rotating diamond cutter positioned so that its tip extends by about 6 millimeters, tighten the mounting screw on the burnishing attachment.

Please note that the amount to which water scatters increase in proportion to the extension of the tip of the cutter.



Press $\nabla -z$ to bring the tip of the rotating diamond cutter into contact with the cutting surface on the workpiece.

It may be a good idea to cover the workpiece with a light cloth or the like to keep it from being damaged.

6

SET	Z1	Z0	Z2
SURFACE <-3000>			

Press z to display the screen shown at left, then press \blacktriangleleft or \blacktriangleright to select "Z0."

7

SET	Z1	Z0	Z2
SURFACE <<-3000>			

Press ENTER/PAUSE to confirm. The Z-axis origin has now been set.

8

X-30500	A-100.0
Z 0	8000RPM

Press MENU . The display returns to the main screen. The value of the Z-axis coordinate is now "0" (zero).

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

5 Feature Reference

6 Troubleshooting

STEP3: Start Engraving

⚠ CAUTION

Never touch the work immediately after cutting by bare-handed.

The glass powder adheres to the work after cutting. Touching by bare-handed may cause injury. When handling the work after cutting, please wear gloves, and wash it in water.

When you're engraving glass, making a single pass may only cut faint lines, without cutting deeply into the glass. To cut lines that are more clearly defined, use the machine's copy feature to repeat the same engraving.

☞ P. 177 "Copy Engraving (Repeat Engraving)"

For detailed setting for cutting such as the rotation of the spindle and the depth of cut, refer to page 178, "Examples of Settings for Cutting and Tips for Fine-tuning"

Procedure

1 Close the front cover.

2 

Send the cutting data from the computer.

The screen shown at left appears. The screen shown at left appears. Make sure that the heart symbol is displayed to the right of the "CUT" message. If no heart symbol is displayed, the lubricant pump switch is off. Switch on the lubricant pump switch.

For more information about creating cutting data, refer to the user's manual for the program that creates the cutting data.

To cancel the cutting data, press **MENU**.

3 

Use **◀** or **▶** to select "CUT."

Press **ENTER/PAUSE** to confirm.

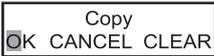
Engraving starts.

4 

When Engraving Has Finished

When This Completes the Engraving

Press **MENU** several times to display the screen shown in the figure, then press **◀** or **▶** to select "VIEW." ☞ Go on to step 7.



When Repeating Engraving to Cut Deeper Lines

Press **COPY** to display the screen shown in the figure, then press

◀ to select "OK."

Press **ENTER/PAUSE** to confirm.

5 

When the screen shown at left appears, press **◀** or **▶** to select "CUT."

Press **ENTER/PAUSE** to confirm.

The same engraving is repeated.

☞ Go back to step 4.

6 Open the front cover and remove the workpiece.

Releasing the vise-lock handle loosens the secured unlock. To keep the workpiece from falling, support the vise-tightening controller while releasing the vise-lock handles. When detaching the workpiece as well, to keep it from falling, support it while you open the motorized and free-end vise jaws.

2-4 Maintenance After Glass Engraving

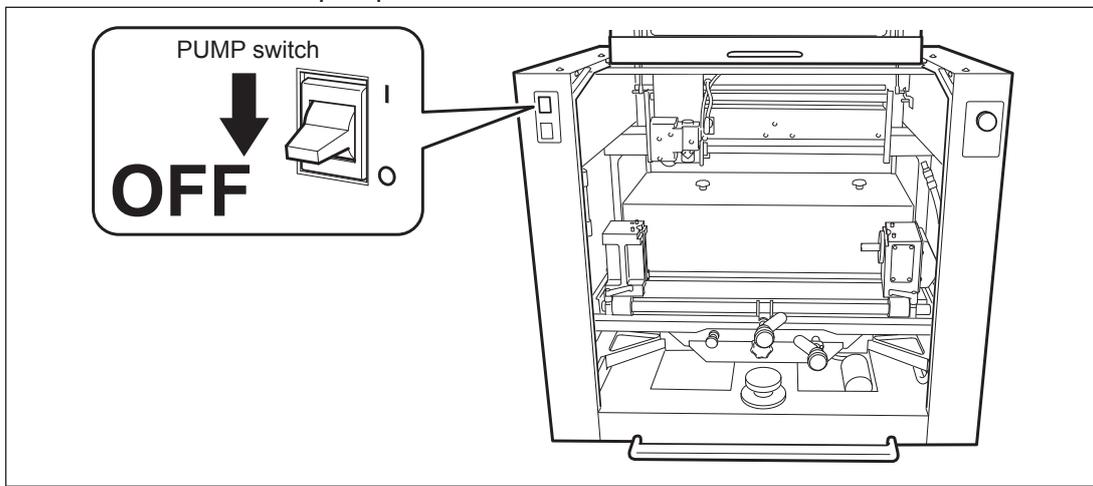
Discharging Lubricant

- ⚠️ WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠️ CAUTION** Important. Be sure to wear gloves while performing these operations.
Buildup of glass chips may cause injury.

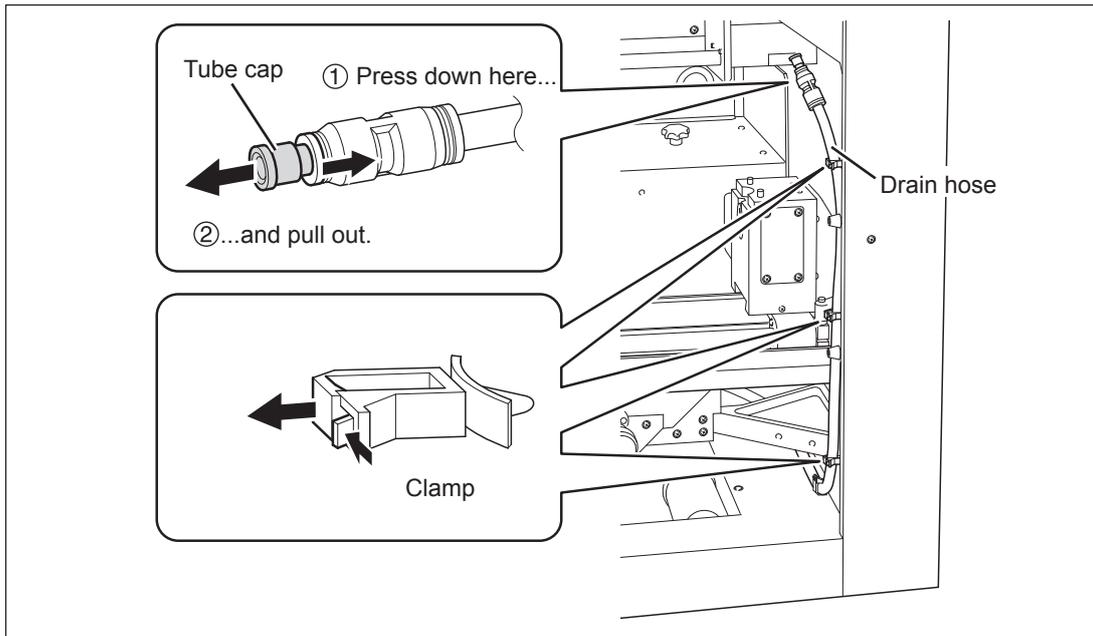
When engraving on glass material has been completed, drain off the lubricant. Allowing the water to remain may cause the machine to malfunction. Be sure to discharge the water completely.

Procedure

- 1 Switch off the lubricant pump switch.



- 2 Remove the tube cap from the drain hose and detach the drain hose from the clamps.



1 Cylindrical:
Metal and Resin

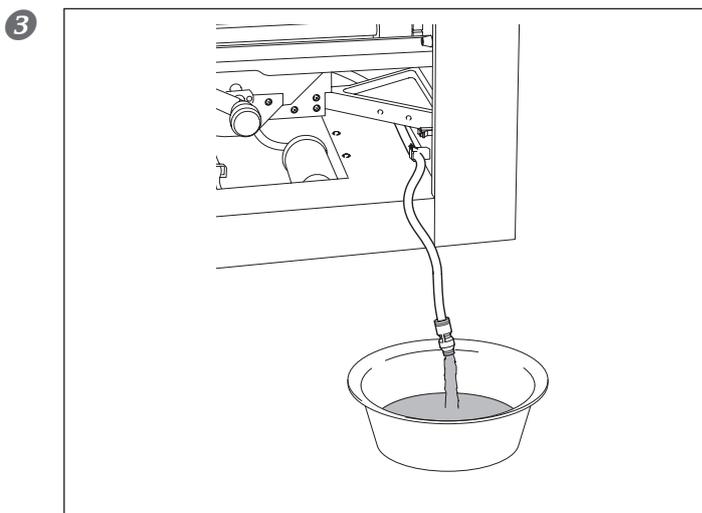
2 Cylindrical :
Glass

3 Ring Engraving

4 Flat Engraving

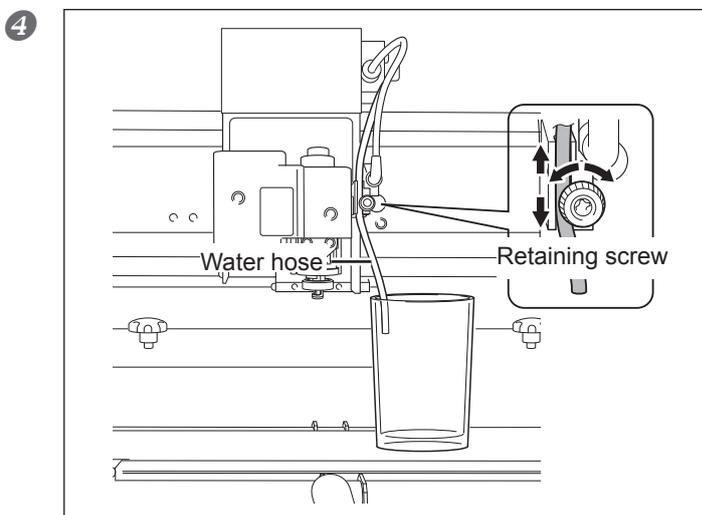
5 Feature Reference

6 Troubleshooting



Drain off the water.

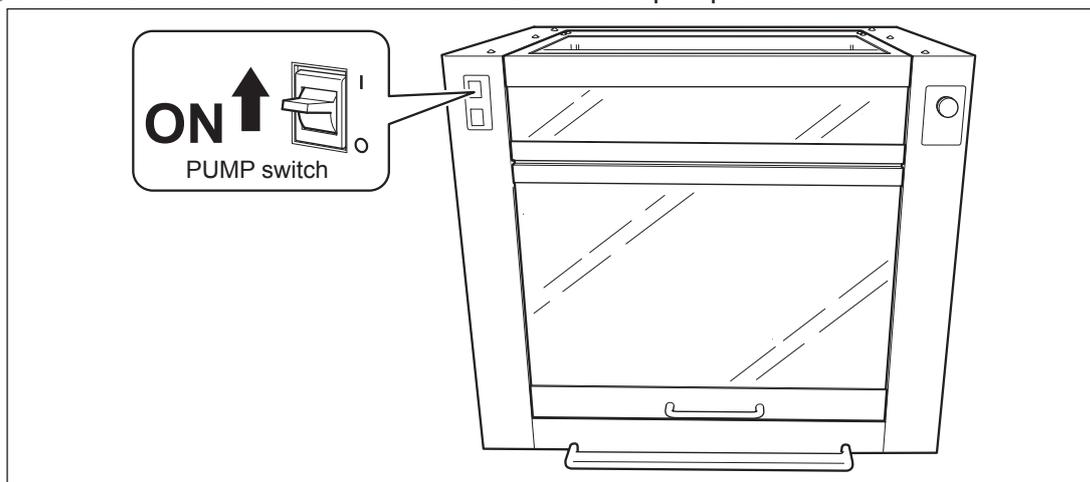
Angle the drain hose downward and discharge the liquid into a bucket or other receptacle. After drain, attach the tube cap to the drain hose and put it back into place.



Drain off any lubricant remaining in the water hose.

Loosen the retaining screw, pull out the water hose a sufficient distance, and let it hang into a receptacle placed on the lubricant recycling tray. Use a receptacle that can hold at least 120 cubic centimeters.

5 Close the front cover and switch on the lubricant pump switch.



- 6 Rotate the spindle to discharge any water remaining in the water hose.
Keep rotating the spindle until no more water is discharged.
- 7 If no more water is coming out, turn OFF
 - o the rotation of the spindle, and
 - o the PUMP switch.

Note

Dispose of drained water appropriately, in compliance with local laws and ordinances.

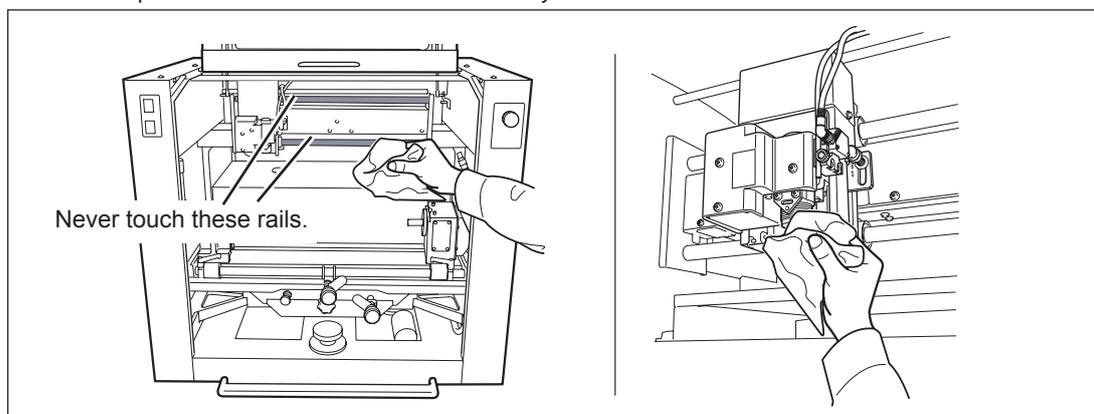
Cleaning the Interior of the Unit

- ⚠ WARNING** **Disconnect the power cord before performing cleaning or maintenance.** Attempting such operations while the machine is connected to a power source may result in injury or electrical shock.
- ⚠ CAUTION** **When performing maintenance, be sure to keep the tool detached.** Contact with the blade may cause injury.
- ⚠ CAUTION** **Important. Be sure to wear gloves while performing these operations.** Buildup of glass chips may cause injury.

After drain is complete, remove cutting waste and waterdrop from the inside of the body and the cutting tools with a cloth. Allowing the water to remain may cause the machine to malfunction. Be sure to clean carefully.

Procedure

- 1 Switch off the power switch.
- 2 Open the front cover and remove the cutting tool (water nose unit, collet, diamond scraper, burnishing attachment, or combination of these) and jigs (cup cone, face plate, cup-cone spigot, free-end spigot, or combination of these).
Remove waterdrop and cutting waste from each tool with a dry cloth.
- 3 Clean the interior of the unit.
Using a dry cloth, wipe away any buildup of water droplets or cutting waste inside the unit. Also carefully clean the tip area of the spindle unit and the area around the vise jaws.



Chapter 3

Ring Engraving

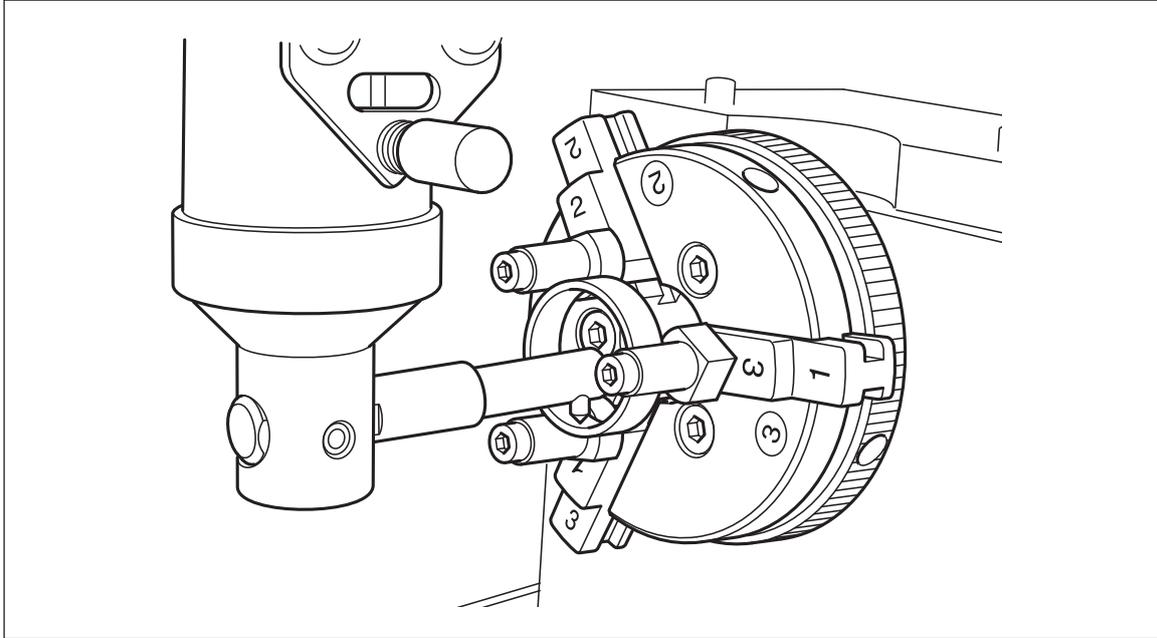
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Verifying the Jigs and Cutting Tools Used	92
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Start Engraving (Inner-surface engraving).....	122
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3-1 Check This First

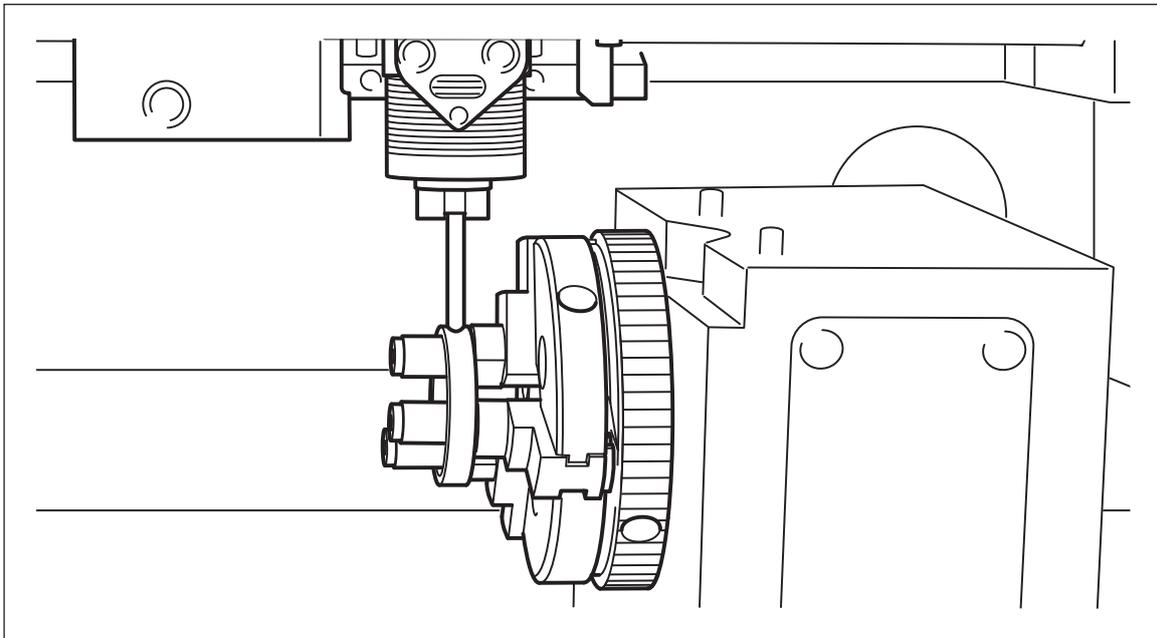
Making Sure of the Material

This chapter describes how to engrave ring materials made from brass, silver, etc. This machine enables engraving on both the outer and inner surfaces of a ring. However, its engravable size is limited, so that you must refer to the “workpiece size and engravable area” in the following section.

Engraving the Inner Surface of a Ring



Engraving the Outer Surface of a Ring

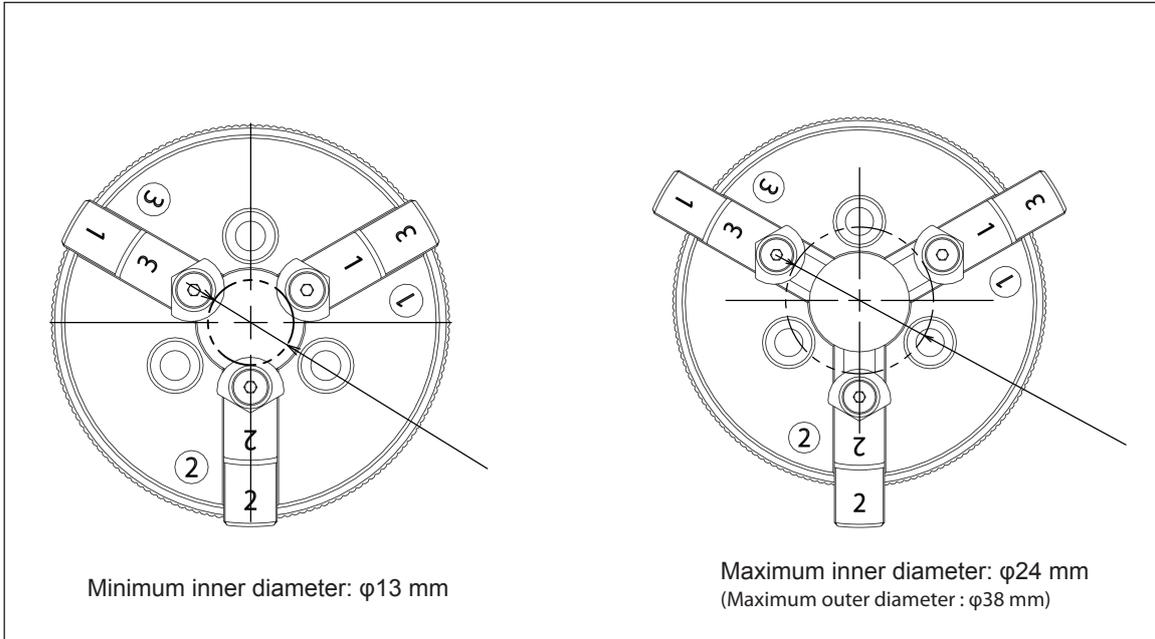


- 1 Cylindrical: Metal and Resin
- 2 Cylindrical: Glass
- 3 Ring Engraving
- 4 Flat Engraving
- 5 Feature Reference
- 6 Troubleshooting

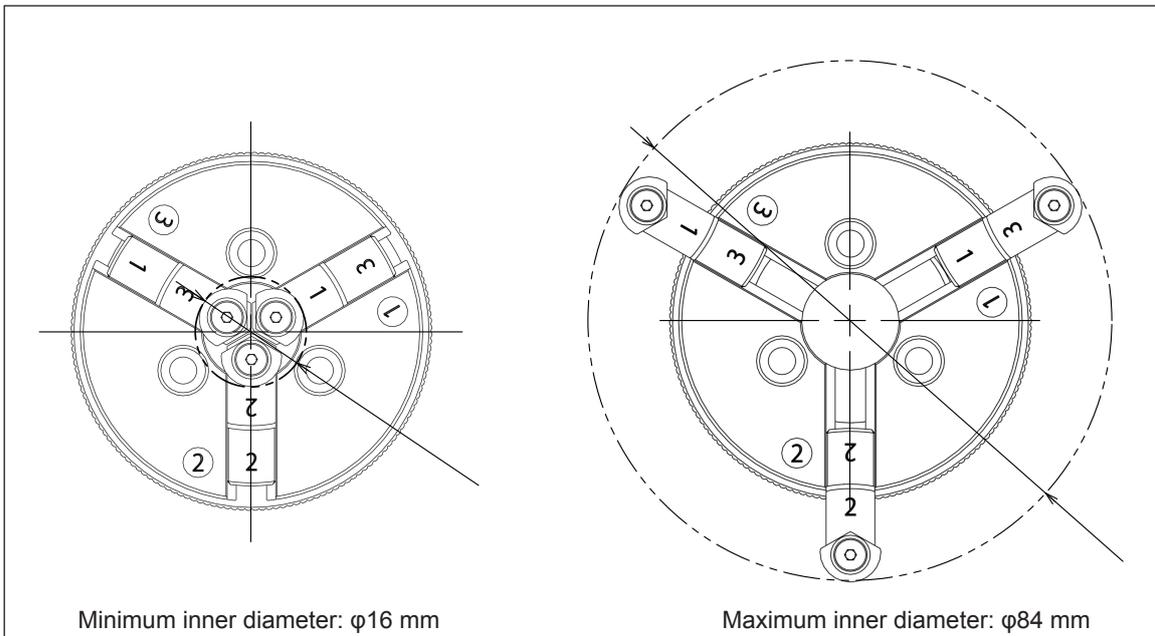
Verifying the Workpiece Size and Cuttable Area

Loadable Workpiece Size

Inner-surface Engraving



Outer-surface Engraving



1

Cylindrical:
Metal and Resin

2

Cylindrical :
Glass

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Ring Engraving

4

Flat Engraving

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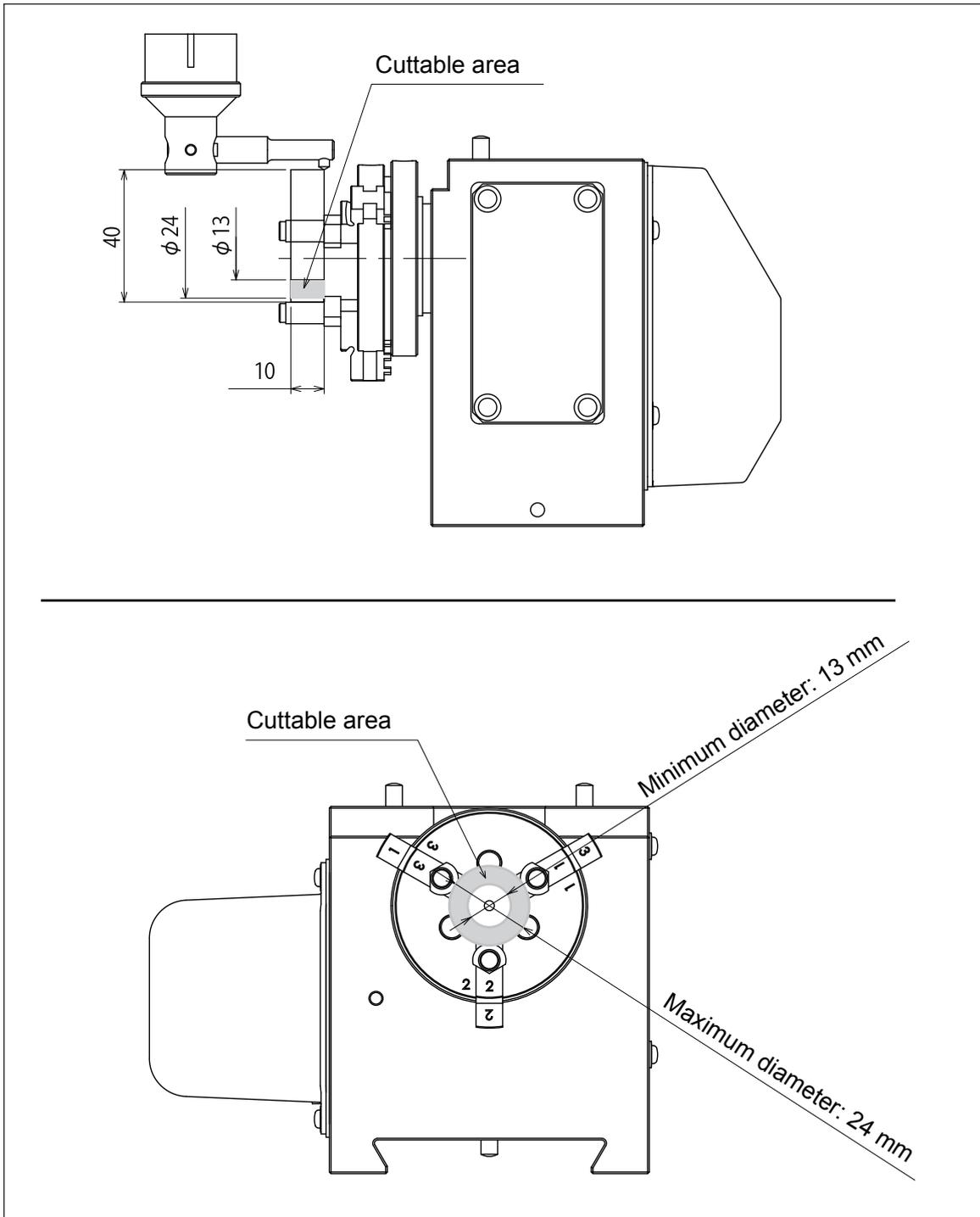
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Cuttable area

Inner-surface Engraving



1
Cylindrical:
Metal and Resin

2
Cylindrical:
Glass

3
Ring Engraving

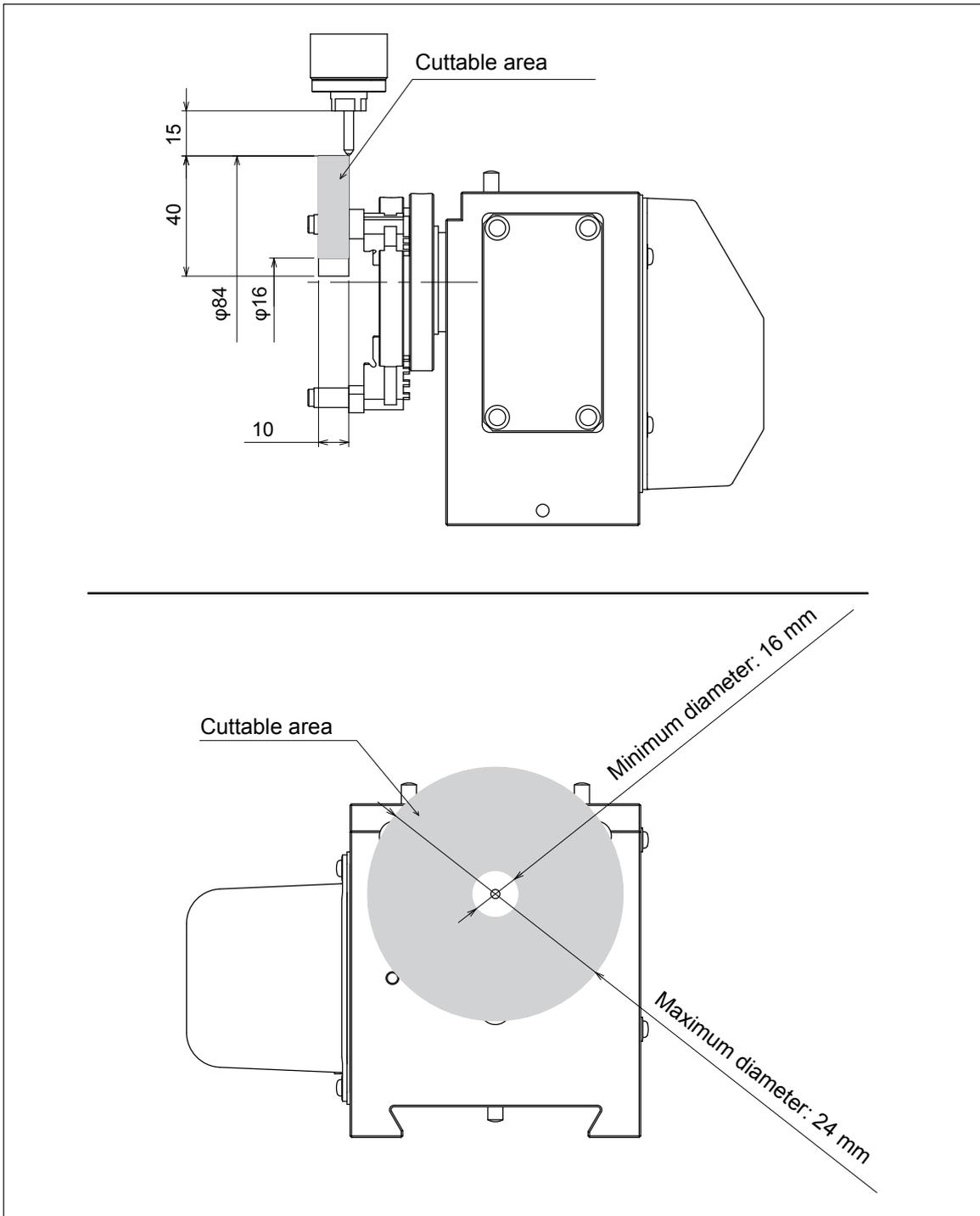
4
Flat Engraving

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Outer-surface Engraving



1

Cylindrical:
Metal and Resin

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Reference

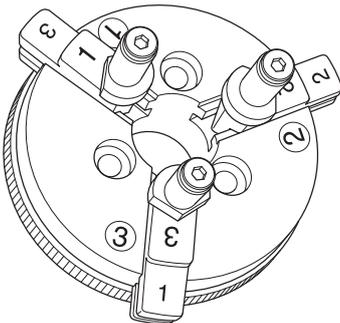
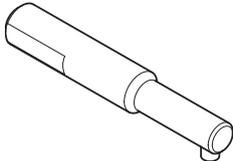
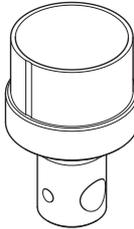
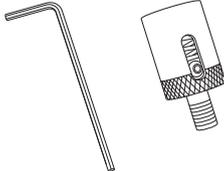
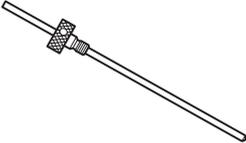
6

Troubleshooting

TOC

Verifying the Jigs and Cutting Tools Used

Engraving on a ring employs the jigs and cutting tools shown below. You need some optional items. To purchase these optional items, contact your authorized Roland DG Corp. dealer or Roland DG Corp.

Jigs		
Ring chuck (ZRC-36; optionally available)		
		
Ring chuck unit	Cap screws (M4 x 25 mm)	
Cutting Tools		
For inner-surface engraving		
		
Inside ring drug diamond (ZDC-N8000; optionally available)	Tool holder (ZTH-36; optionally available)	
For outer-surface engraving		
		
Burnishing attachment (ZB-20; optionally available)	Diamond scraper (ZDC-A2000, diameter 3.175 mm; optionally available)	Solid collet (diameter 3.175 mm; included item)

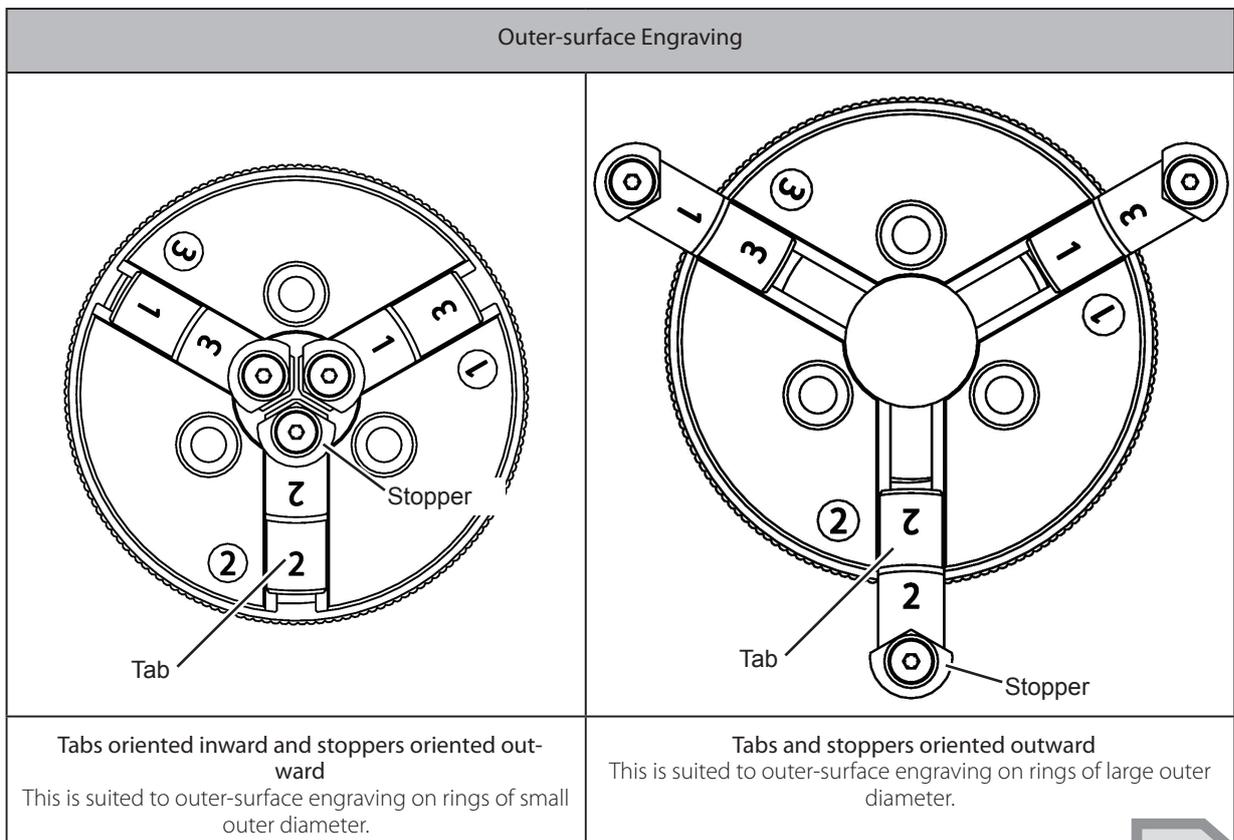
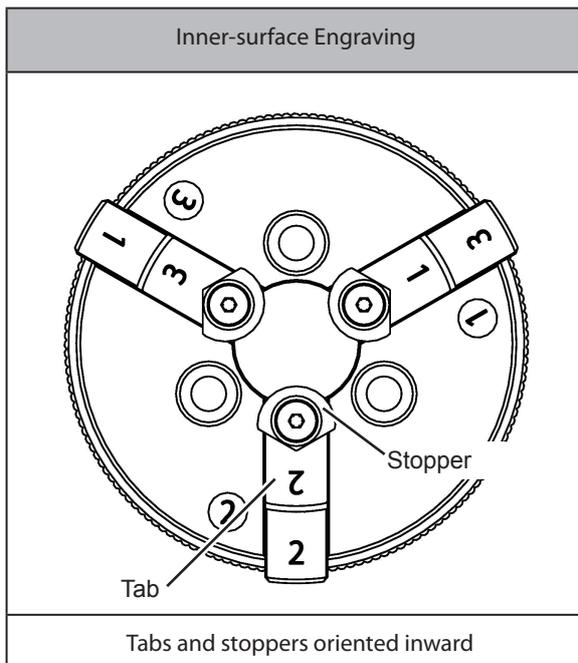
* When using the burnishing attachment, only a cutter with diameter 3.175mm can be used.

Using the Ring chuck

For the ring chuck, orientations of the tab and the stopper are changed depending on the following two points.

- Engraving style: inner-surface engraving or outer-surface engraving
- Workpiece size

The ring chuck is used in the following three styles (one style for the inner-surface engraving and two for the outer-surface engraving)



1	Cylindrical: Metal and Resin
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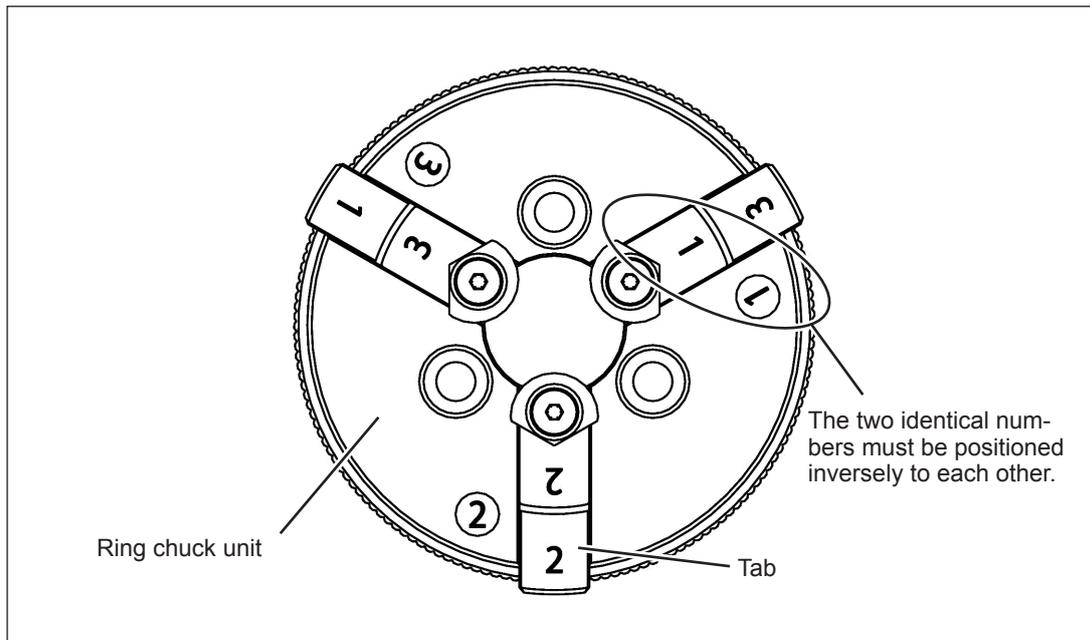
Location and Sequence of Tab Attachment

The attachment position in the ring chuck is determined by the tab attachment direction. The numbers on the ring chuck and the tab show their positions.

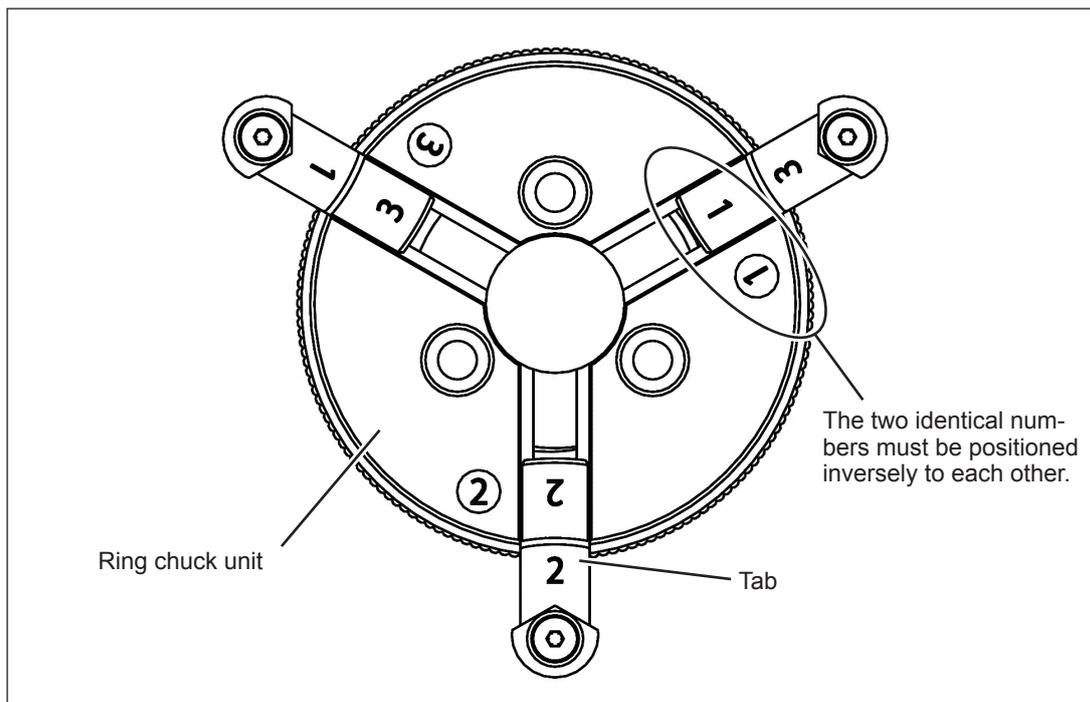
The attachment position rule is that **“the two identical numbers must be positioned inversely to each other.”**

Wrong position and sequence will disable proper attachment, displacing the ring center position when it is grabbed. Refer to the next page for the actual attachment procedure.

Tabs Oriented Inward



Tabs Oriented Outward



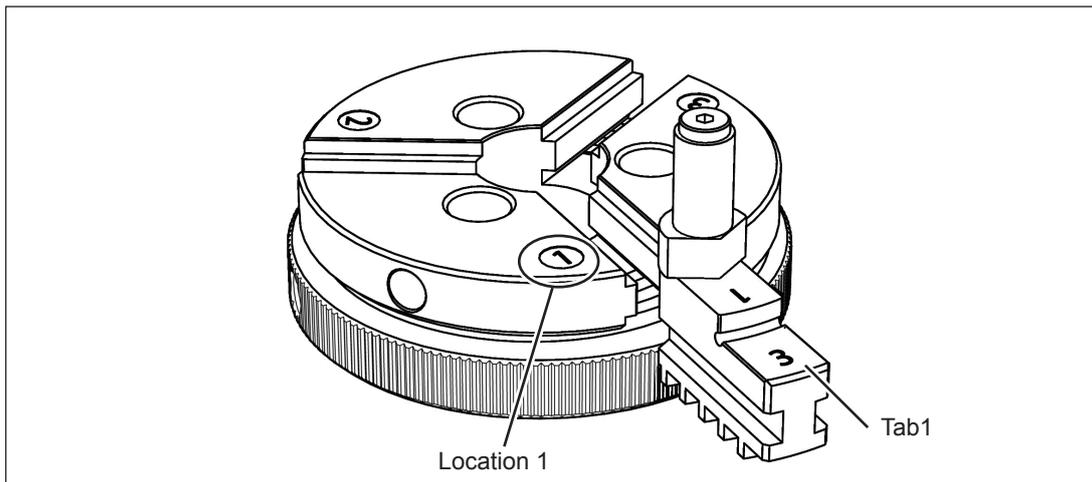
Attaching the Tabs

This describes how to attach the tabs. This illustration shows “tabs oriented inward.” The rule of “placing the two identical numbers must be placed inversely to each other” can also be applied to “tabs oriented outward.”

Procedure

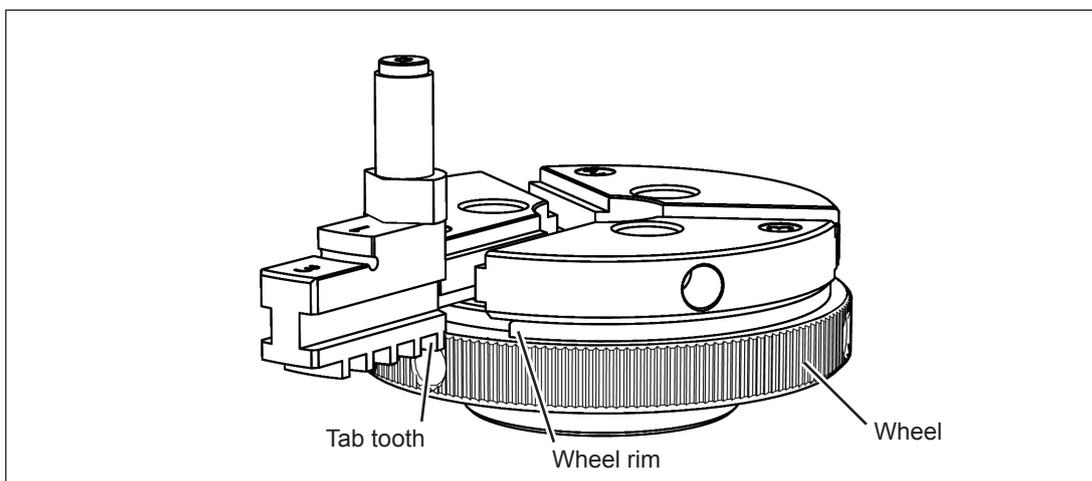
- 1 Fit tab 1 into mounting location 1 on the Ring chuck unit.

Select the place where the two identical numbers are positioned inversely to each other.



- 2 Rotate the wheel on the Ring chuck unit so that the teeth on the tab engage fit onto the rim of the wheel.

Turning the wheel while gently pressing the tab toward the center of the Ring chuck unit may facilitate engagement with the rim.



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Metal and Resin

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Cylindrical:
Metal and Resin

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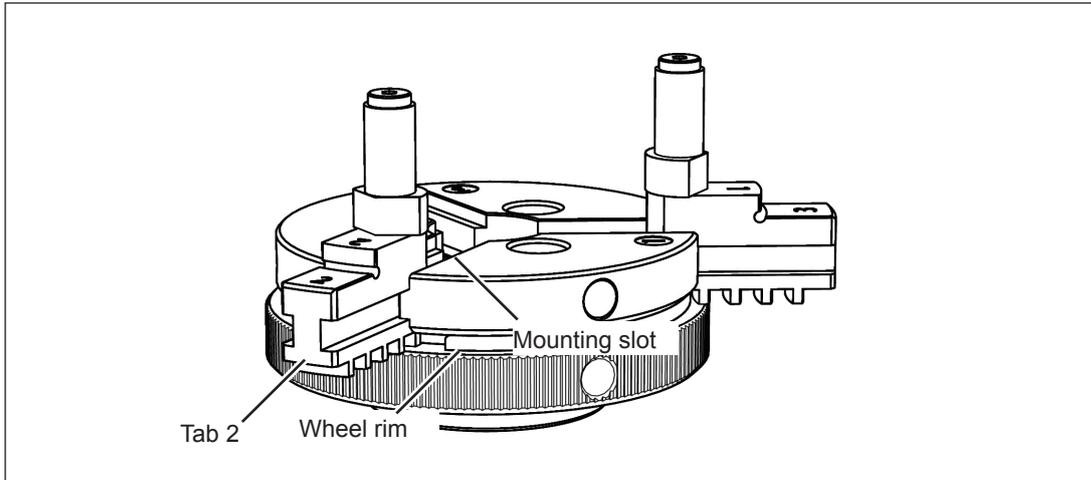
Feature
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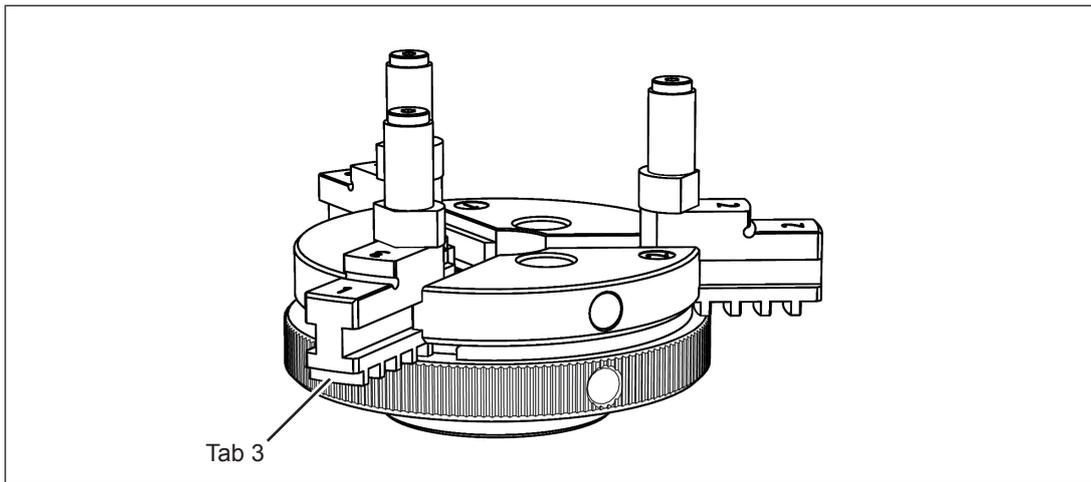
3 Next, attach tab 2.

Attach using the same method as for tab 1. However, attach it before the wheel rim passes the mounting slot for tab 2. Be careful to note that it becomes impossible to attach the tab correctly if the rim is allowed to make one full turn.



4 Next, attach tab 3.

Attach in the same way as for tab 2.



5 Adjust the orientation of the stoppers.

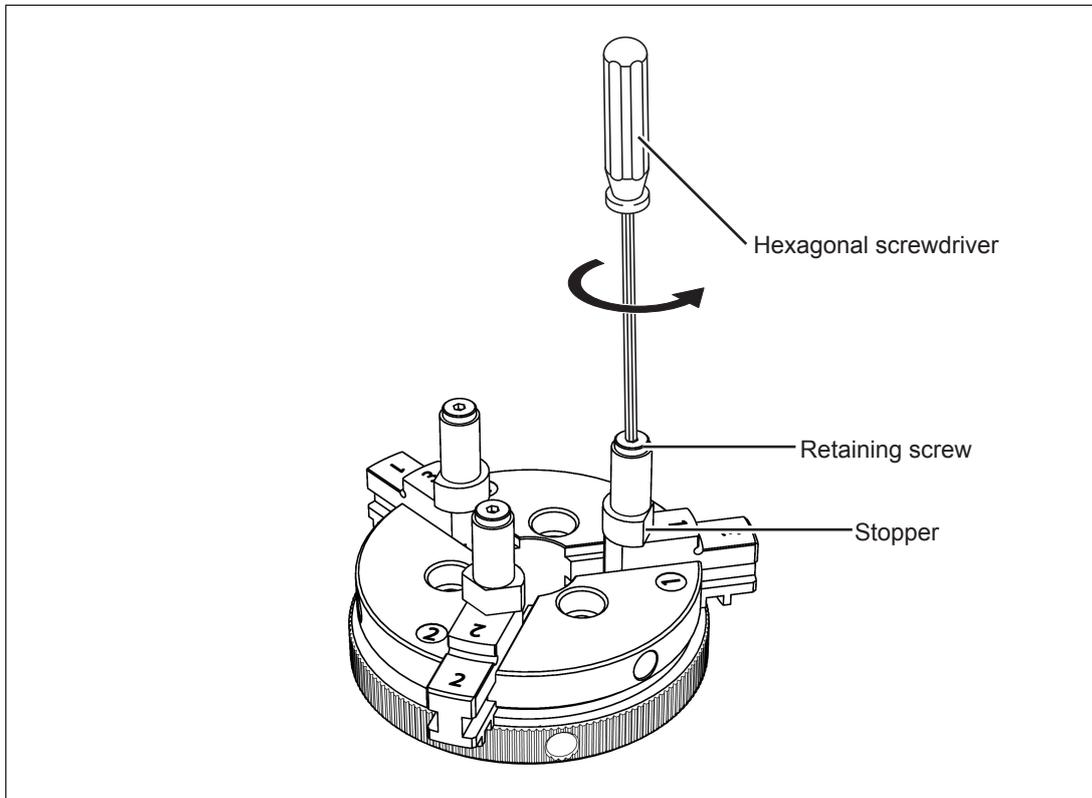
Using the hexagonal wrench (included), loosen the retaining screw for the stopper and adjust the stopper's orientation.

For inner-surface engraving:

Orient the round end of the stopper toward the inner side.

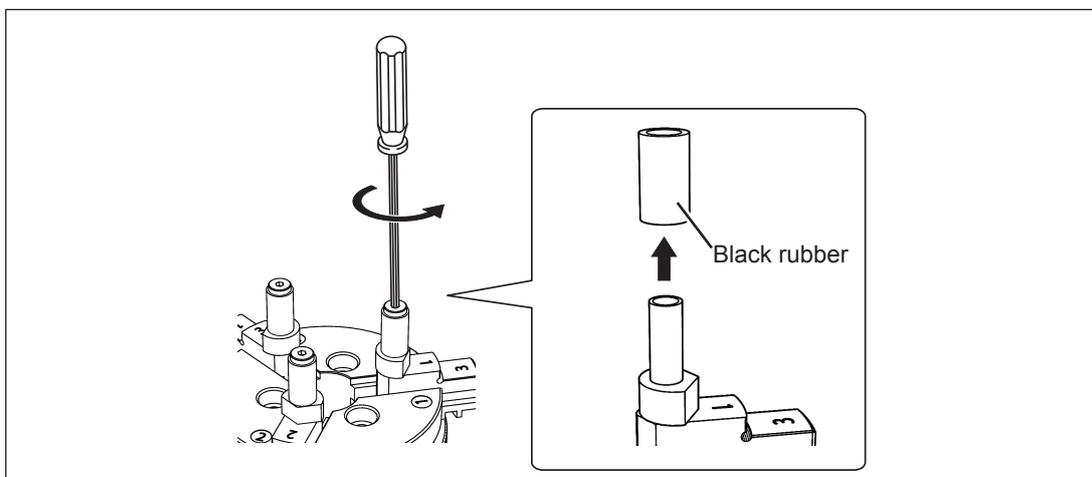
For outer-surface engraving:

Orient the round end of the stopper toward the outer side.



Replacing the rubber

The black rubber holding the ring is a consumable part. Replace it depending on its service condition.



1

Cylindrical:
Metal and Resin

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Cylindrical:
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Troubleshooting

3-2 Getting Ready

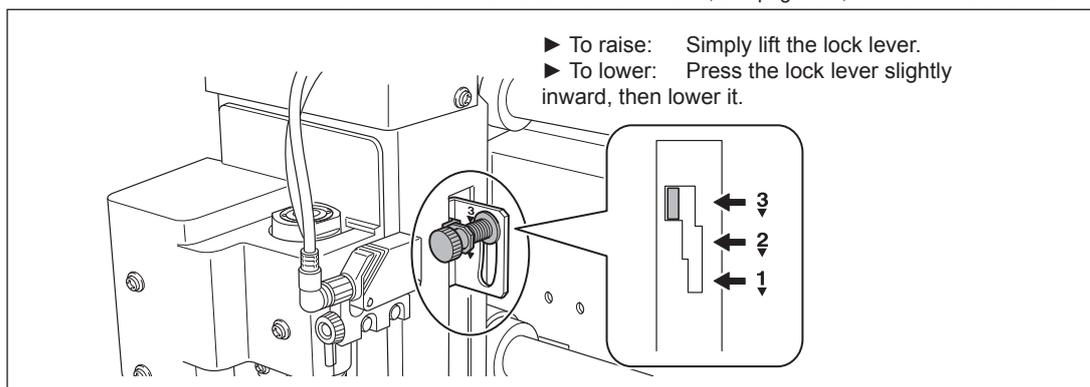
STEP1: Set the Cutting Parameters

Here you make the settings for the basic cutting parameters to perform ring engraving. Be careful to note that the setting for the cutting location ("CUT LOCATION"; step 3) differs depending on whether you're engraving the ring's inner surface (ring inner-surface engraving) or outer surface of the ring (ring outer-surface engraving).

Procedure

- | | |
|--|---|
| <p>1</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> I/O <input type="radio"/> OTHERS
 ADJ AREA </div> | <p>Press MENU several times to display the screen shown at left.
 Press ◀ or ▶ to select [OTHERS].
 Press ENTER/PAUSE.</p> |
| <p>2</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> AXIS SWITCHING
 XYZ <XAZ> </div> | <p>Press ▶ to select [XAZ].
 Press ENTER/PAUSE to confirm.</p> |
| <p>3</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> CUT I N
 ◀INSIDE> OUTSIDE </div>
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> CUT I N
 INSIDE<◀OUTSIDE> </div> | <p>Press MENU to display the screen shown at left.
 [Engraving the Inner Surface of a Ring]
 Press ▶ to select [INNER].
 Go to Procedure 5.
 [Engraving the Outer Surface of a Ring]
 Press ◀ to select [OUTER].
 Press ENTER/PAUSE to confirm.
 Go to Procedure 4.</p> |
| <p>4</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> REVOLUTION
 ON <OFF> </div> | <p>Press MENU to display the screen shown at left.
 Press ▶ to select [OFF].
 Press ENTER/PAUSE to confirm.</p> |
| <p>5</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> AUTO Z CONTROL
 ON <OFF> </div> | <p>Press MENU to display the screen shown at left.
 Press ▶ to select [OFF].
 Press ENTER/PAUSE to confirm.</p> |
| <p>6</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> SET lock lever
 to 3 </div> | <p>Follow the displayed message to engage the lock lever at position 3.
 After three seconds the message disappears and the original screen reappears.</p> |

☞ For more information about the lock lever, see page 181, "The Positions of the Lock Lever."



- 7**
- X-30500 A-100.0
 Z-3000 S OFF
- Press **MENU** several times to display the main screen.
 The displayed spindle speed changes to "S OFF."

STEP2: Measure the Workpiece Size

You measure the size of the workpiece and the cutting area and enter these values into the program (Roland EngraveStudio or Dr. Engrave). Be careful to note that the values you measure and enter differ depending on whether you're performing inner-surface or outer-surface engraving. This section uses the following special-case notes where required. Give careful attention to these special-case notes when you enter the values.

- [Inner-surface Engraving]
- [Outer-surface Engraving]

1. Measure the workpiece's inner or outer diameter and the cutting area.

- [Inner-surface Engraving]
 - Measure the workpiece's inner diameter and the cutting area.
 - The cutting area is specified by entering the values for "width" and "height." Accordingly, measure the cutting area as a square or rectangle. Cutting areas for shapes other than these cannot be entered into the program.
- [Outer-surface Engraving]
 - Measure the outer diameter of the workpiece.
 - You enter this value at page 113, "Step 5 (Ring Outer-surface Engraving): Set the XA Origin Point."

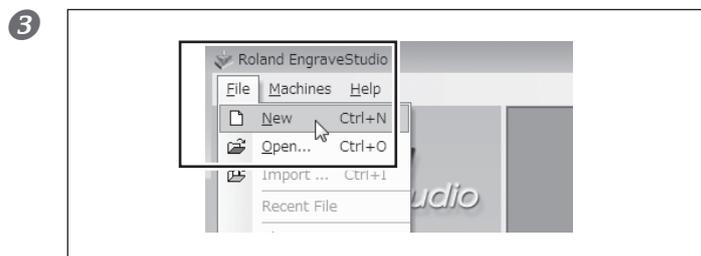
2. Enter the value you measures in 1. into the program.

For Roland EngraveStudio

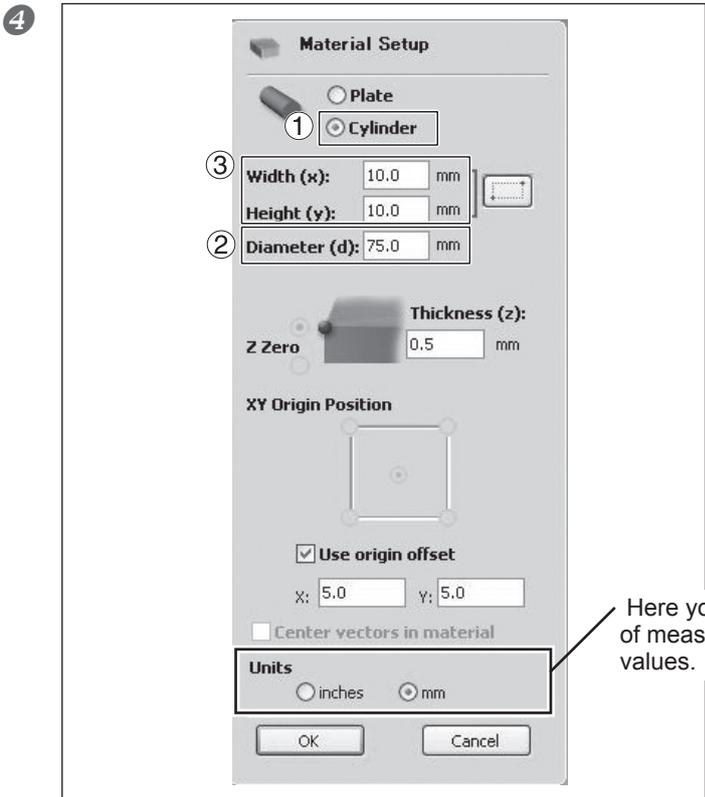
- 1 Start Roland EngraveStudio.



Click "Engraving machine," then select "EGX-360."



Click "File," then "New."



① Select the "Cylindrical material" check box.

② For "Diameter," type in the inner or outer diameter you measured in 1..

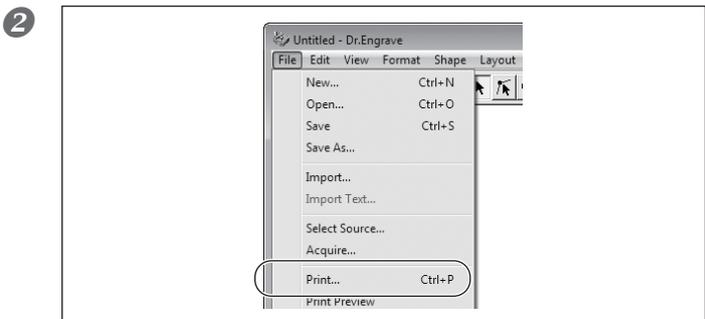
➤ [Inner-surface Engraving]
 ③ For "Width" and "Height," type in the cutting area you measured in 1..

For "Width," enter the value along the width of the ring. For "Height," enter the value along the circumference of the ring.

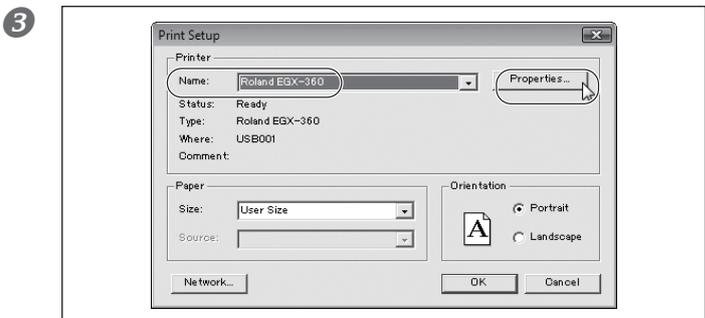
➤ [Outer-surface Engraving]
 Here you don't enter any values. You enter the settings at page 113, "Step 5 (Ring Outer-surface Engraving): Set the XA Origin Point."

For Dr. Engrave

① Start Dr. Engrave.

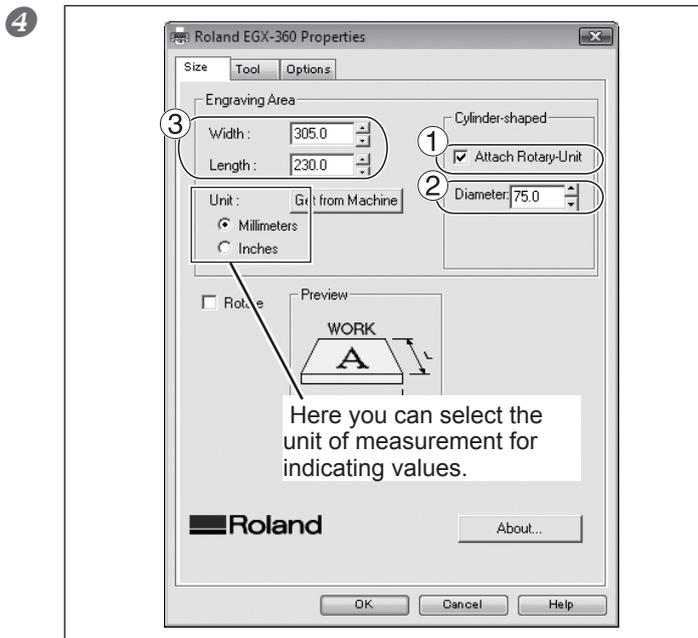


Click "File," then "Print Setup."



For "Printer Name," make sure that "Roland EGX-360" is selected, then click "Properties."

If "Roland EGX-360" is not selected, click the drop-down arrow next to "Printer Name" and select it from the list displayed.



① Select the "Use rotary axis unit" check box.

② For "Diameter," type in the inner or outer diameter you measured in *L*.

➤ **[Inner-surface Engraving]**

③ For "Width" and "Height," type in the cutting area you measured in *L*.

For "Width," enter the value along the width of the ring. For "Height," enter the value along the circumference of the ring.

➤ **[Outer-surface Engraving]**

Here you don't enter any values. You enter the settings at page 113, "Step 5 (Ring Outer-surface Engraving): Set the XA Origin Point."

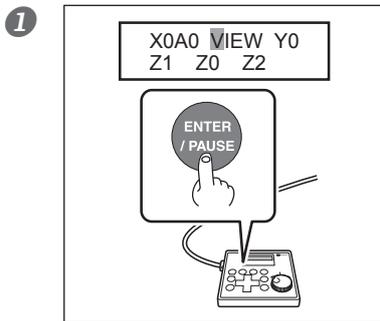
5 Click [OK] twice to close the "Roland EGX-360 Properties" window and the "Print Setup" window.

STEP3: Install the Jigs

⚠ WARNING Never inadvertently touch the computer or handy panel while performing this task. Unintended operation of the machine may result in injury.

⚠ WARNING Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

Procedure

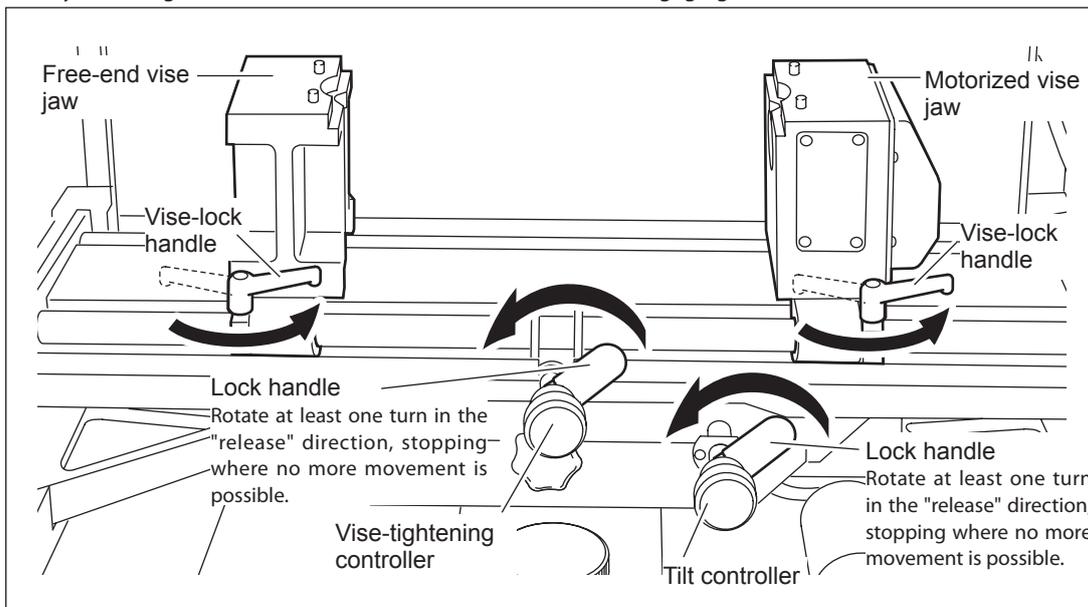


1 Close the front cover and move the spindle unit to the VIEW position. When movement ends, open the front cover.

2 Unlock the free-end vise jaw, motorized vise jaw, vise-tightening controller, and tilt controller.

Release the vise-lock handles and the tilt-lock handle by turning them in the direction of the arrows shown in the figure below.

The locations of the vise-lock handle for the vise-tightening controller and the tilt-lock handle for the tilt controller vary depending on the positions and angles of the two vise jaws. Also, rotate each at least one turn in the "release" direction, stopping where no further movement is possible. If the vise-lock handle or tilt-lock handle is not rotated sufficiently, it may move together with the controller when it is turned, re-engaging the lock.



* At factory shipment, the cup cone spigot and the cup cone (140mm) are attached to the motorized vice jaw, and the free-end spigot and the face plate (100mm) are attached to the free-end vise jaw. This illustration shows the state where each jig has been removed.

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1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

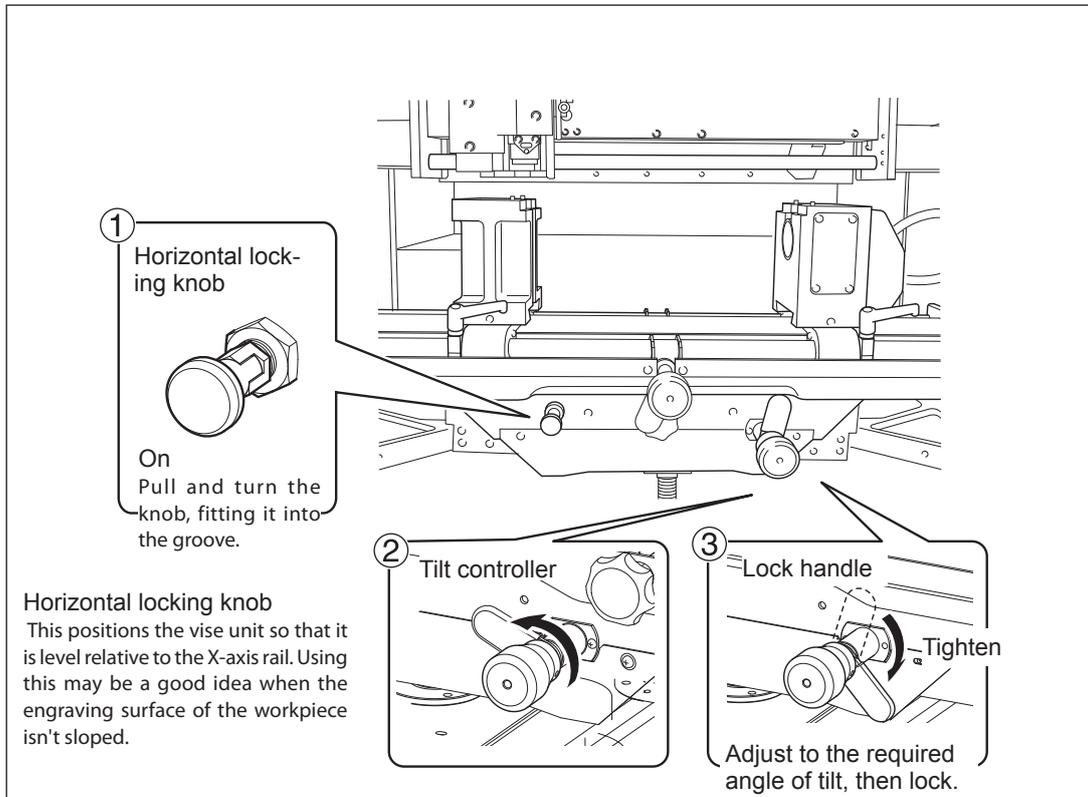
4 Flat Engraving

5 Feature Reference

6 Troubleshooting

3 Adjust the angle of the vise unit so that it's level, then secure the vise unit in place.

- ① Turn the tilt controller clockwise to tilt the vise unit to the right and engage the horizontal locking knob.
- ② Turn the tilt controller counterclockwise until the vise unit stops moving.
- ③ Secure in place with the tilt-lock handle.



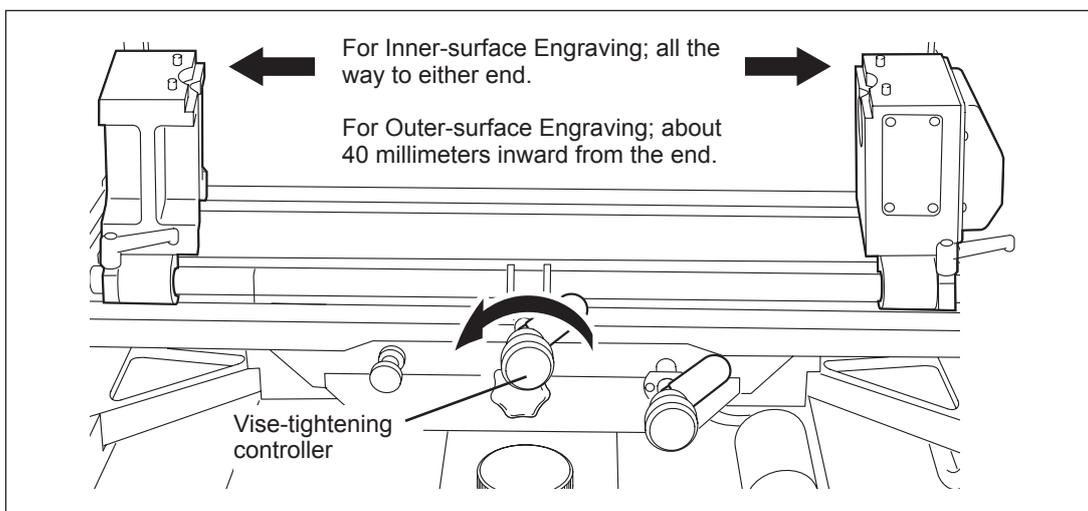
4 Widen both the free-end and motorized vise jaws outward toward either end.

For Inner-surface Engraving

Turn the vise-tightening controller to widen both vise jaws all the way to either end.

For Outer-surface Engraving

Turn the vise controller until the clearance between the free-end vise jaw and the motorized vise jaw is broadened to approximately 400mm.



1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

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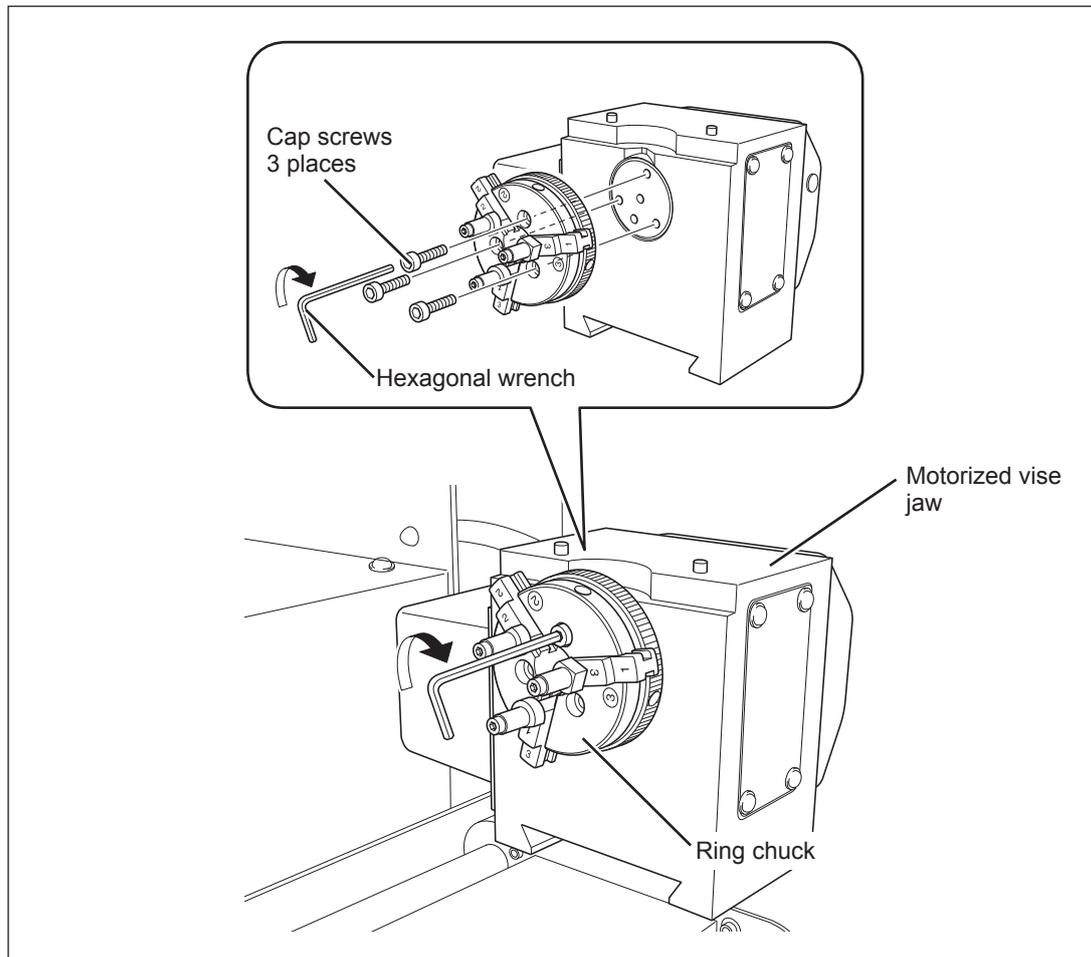
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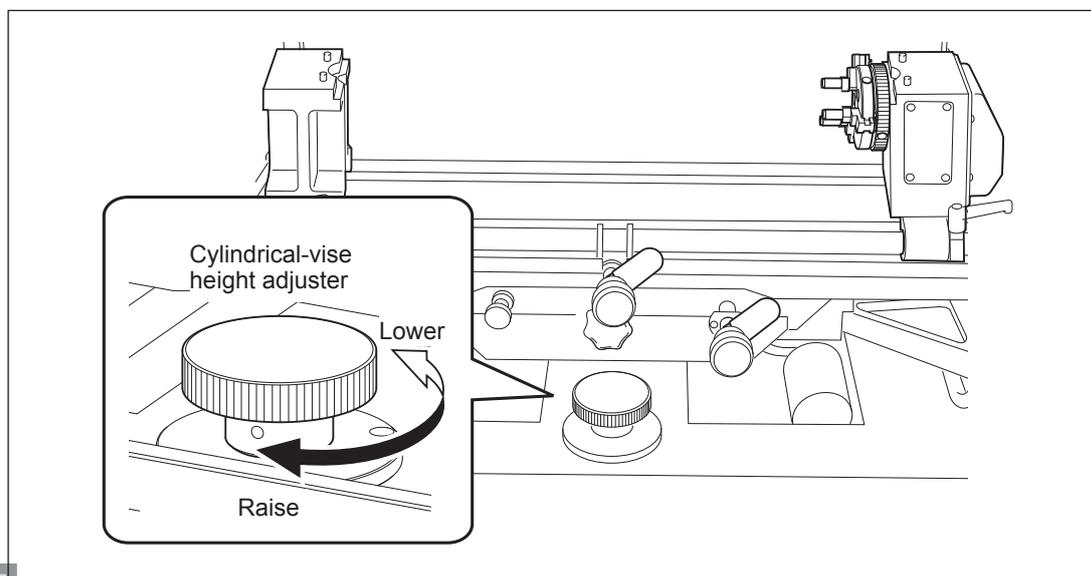
5 Assemble the ring chuck to match the engraving method, then install the ring chuck.

☞ P. 93, "Using the Ring chuck"



6 Move the vice unit to the highest position.

Turn the cylindrical vice height adjuster to move the vice unit to the highest position. In case of inner-surface engraving, the tool cannot reach a workpiece if the vice unit is not in the highest position. In case of outer-surface engraving, readjust the height finely when setting the origin.



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STEP4: Load the Workpiece

⚠WARNING Never inadvertently touch the computer or handy panel while performing this task.

Unintended operation of the machine may result in injury.

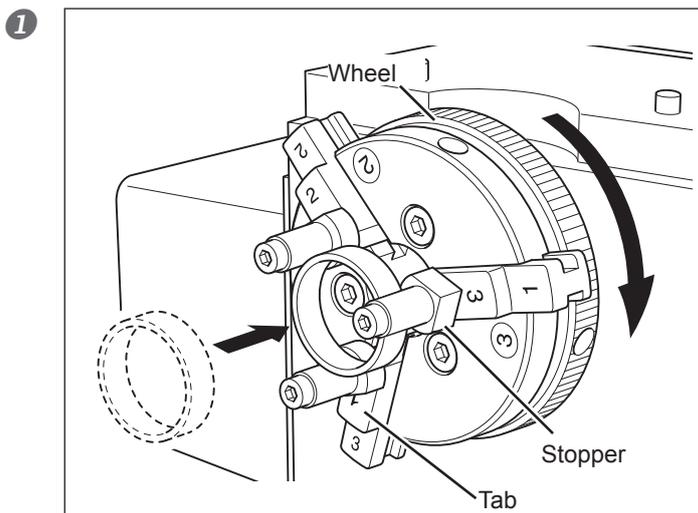
⚠WARNING Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

The method you use to load the workpiece differs for inner-surface engraving and outer-surface engraving.

- Loading the workpiece for inner-surface engraving: ☞ P. 105 (this page)
- Loading the workpiece for outer-surface engraving: ☞ P. 106

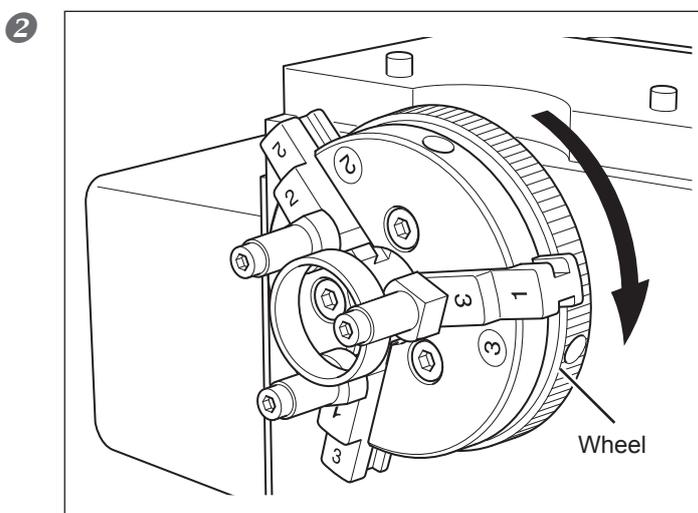
Loading the Workpiece for Inner-surface Engraving

Procedure



Place the ring inside the tabs of the ring chuck and butt it flush against the stoppers.

Press the ring against the stopper while adjusting the opening of the tab by turning the ring chuck wheel by hand. Positioning the ring flush with the stoppers keeps the ring from becoming tilted at an angle.



Turn the ring chuck wheel to fix the ring to the degree where it tightens the ring softly.

Secure the ring in place just enough to keep it from easily coming loose. Turning the wheel more than necessary may tighten the ring with more force than intended. In some cases, this may deform the ring. Use care.

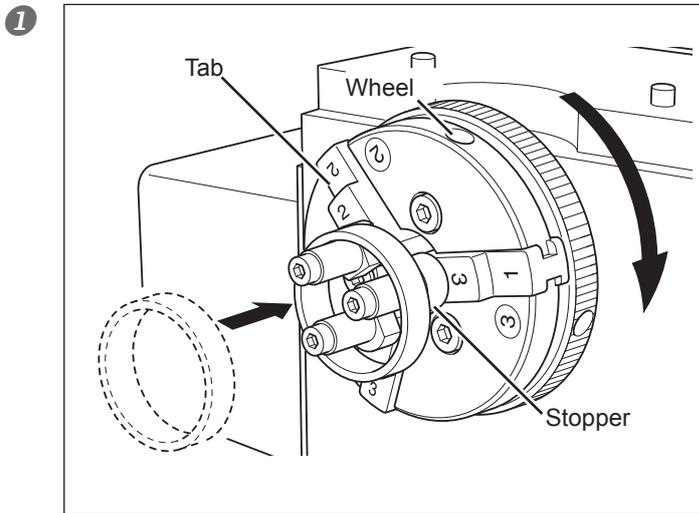
⚠CAUTION

Be sure to turn the ring chuck wheel by hand. Do not apply excessive force to the ring chuck wheel.

If it is turned with strong force, the ring may deform or the rotary axis may be broken due to excessive force.

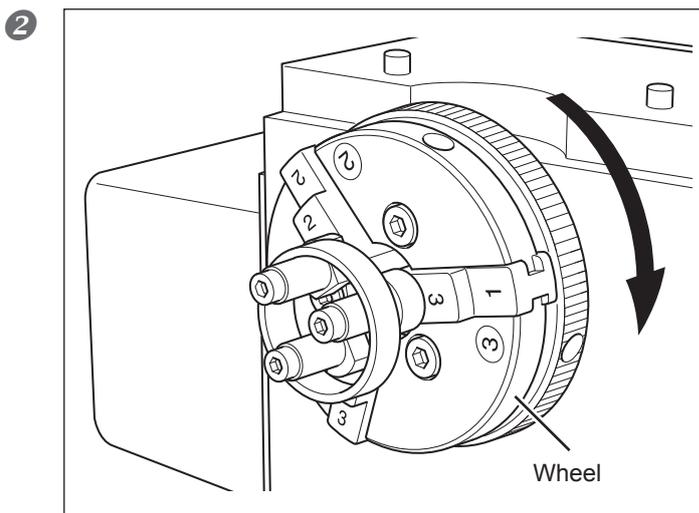
Loading the Workpiece for Outer-surface Engraving

Procedure



Place the ring outside the tabs of the ring chuck and butt it flush against the stoppers.

Press the ring against the stopper while adjusting the opening of the tab by turning the ring chuck wheel by hand. Positioning the ring flush with the stoppers keeps the ring from becoming tilted at an angle.



Turn the ring chuck wheel by hand to fix the ring with a rather strong supporting force.

Secure the ring in place just enough to keep it from easily coming loose. Turning the wheel more than necessary may apply more force than intended to the ring. In some cases, this may deform the ring. Use care.

CAUTION

Be sure to turn the ring chuck wheel by hand. Do not apply excessive force to the ring chuck wheel.

If it is turned with strong force, the ring may deform or the rotary axis may be broken due to excessive force.

Starting with Step 5 on the following page, the procedures for inner-surface engraving and outer-surface engraving are different. Go on to the page indicated below that matches the engraving method you're using.

Engraving the Inner Surface of a Ring

STEP5: Install a Cutter ☞ P. 107

STEP6: Set the XA and Z-axis Origin Points ☞ P. 109

Engraving the Outer Surface of a Ring

STEP5: Set the XA Origin Point ☞ P. 113

STEP6: Check the Cutting Path of the Cutter (Preview Feature) ☞ P. 118

STEP7: Install a Cutter ☞ P. 119

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

5 Feature Reference

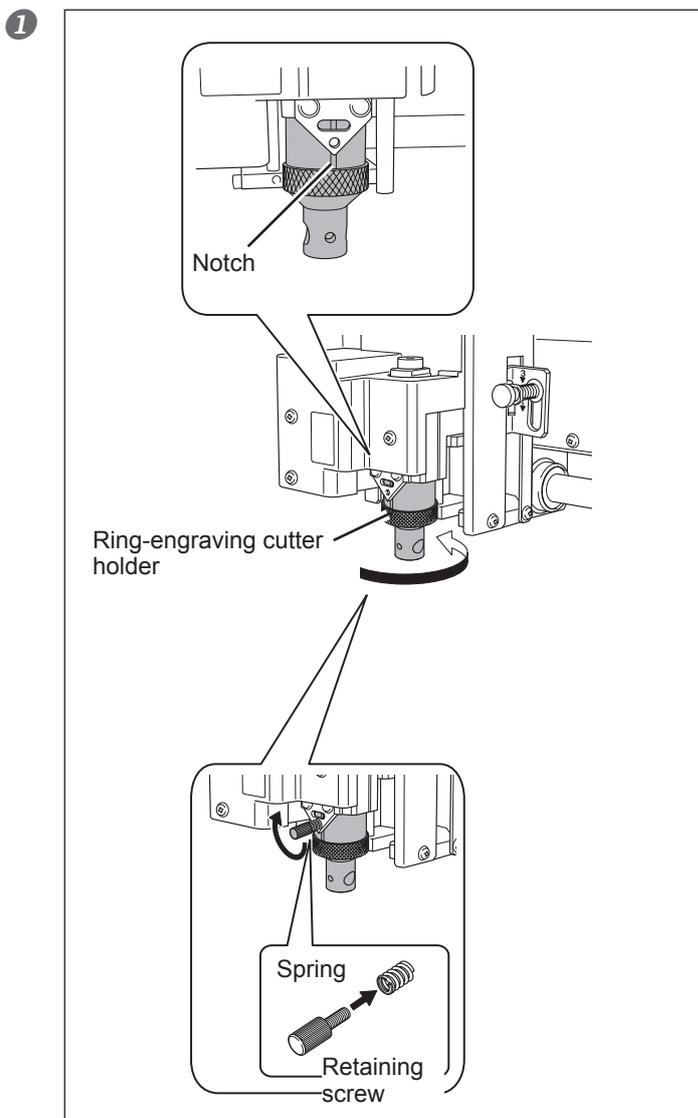
6 Troubleshooting

STEP5(Ring Inner-surface Engraving): Install a Cutter

- ⚠WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠WARNING** Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.
- ⚠CAUTION** **Caution: cutting tool.**
The cutting tool is sharp. To avoid injury, exercise caution.

This is the method for installing the cutter to engrave the inner surface of a ring.

Procedure



Install the cutter holder for ring engraving.

Screw it in all the way, then unscrew just until the notch in the cutter holder is at the front, and secure in place using the retaining screw.

1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

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1
Cylindrical:
Metal and Resin

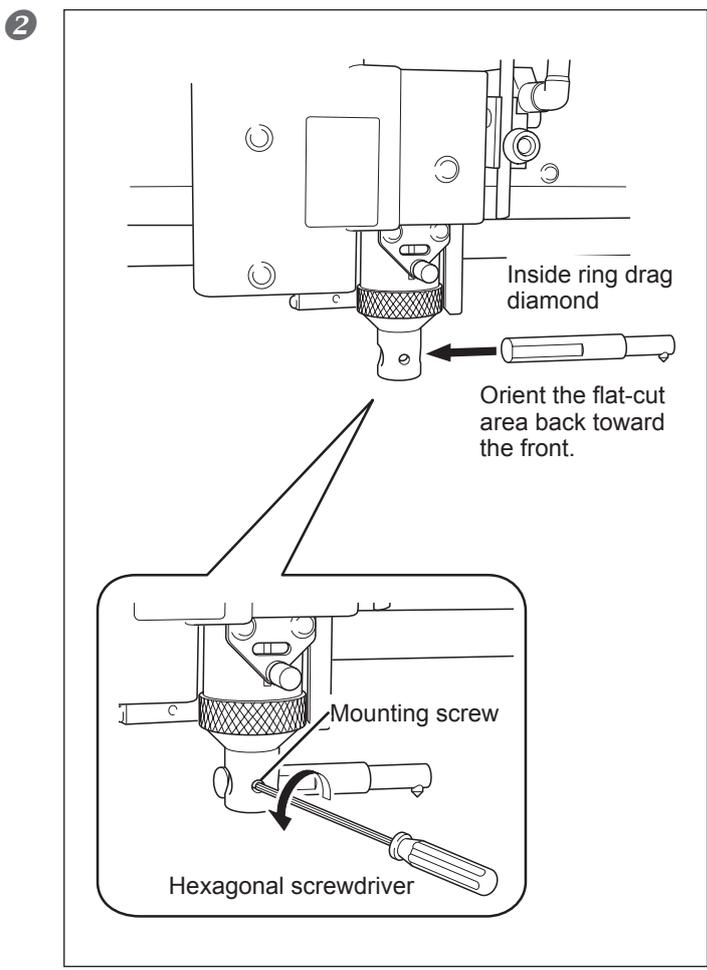
2
Cylindrical:
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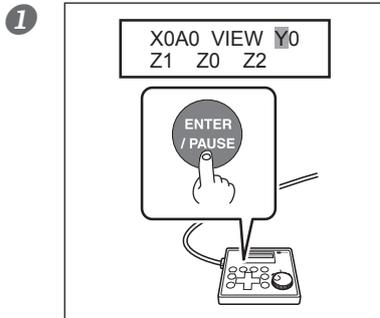


Install the inside ring drag diamond.
With the flat-cut area oriented back toward the front, insert the cutter holder into the hole and secure it in place using the mounting screw. Adjust it to a position where the center of the flat-cut box is at the location where the mounting screw has been tightened.

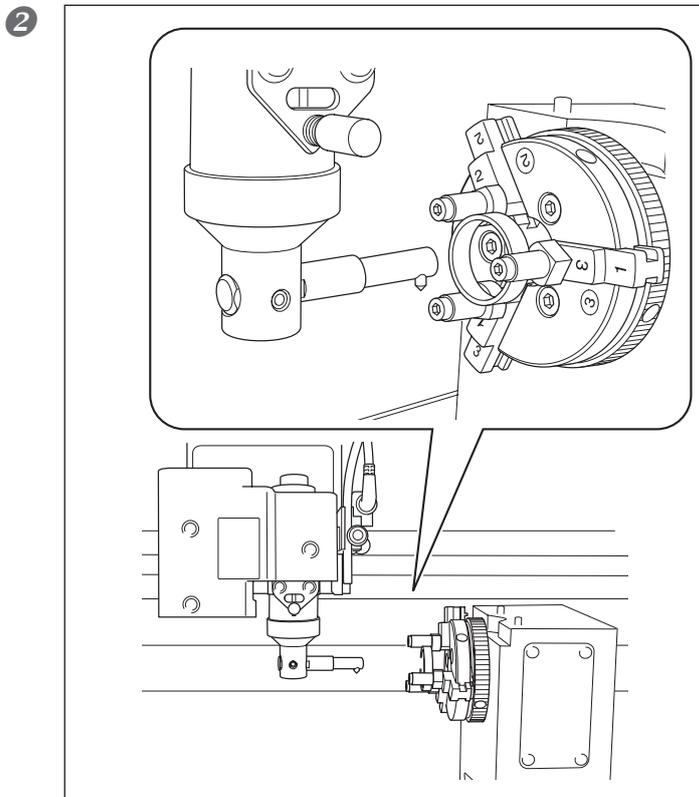


STEP6 (Ring Inner-surface Engraving): Set the XA and Z-axis Origin Points

1. Set the XA Origin Point.



Close the front cover, and then move the inside ring drag diamond (which we'll call "the tool") to the Y0 position. When movement ends, open the front cover.



Using $\nabla -z$ and $\blacktriangle +z$, move the tool end to the height where it can be placed inside the ring.

1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

Troubleshooting

1
Cylindrical:
Metal and Resin

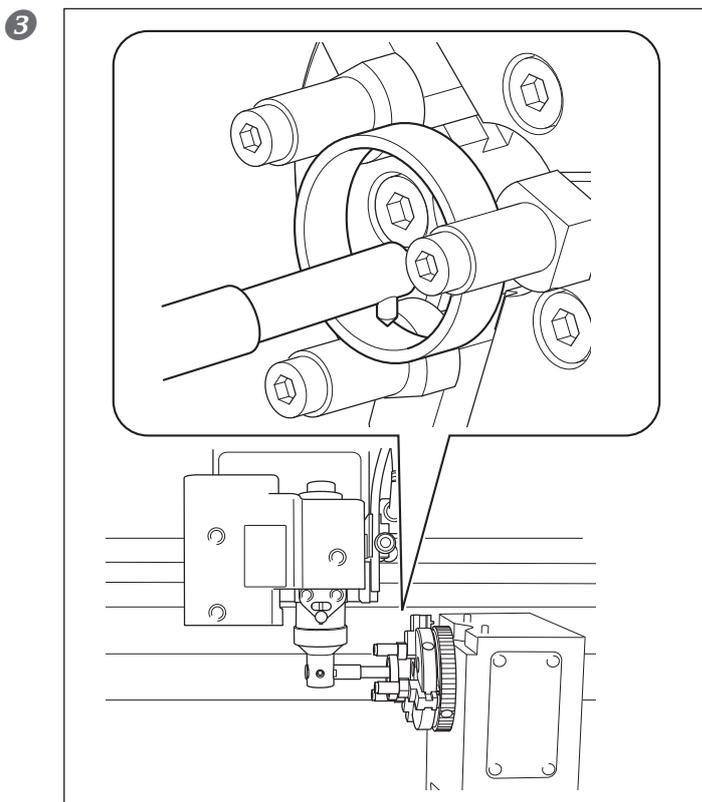
2
Cylindrical:
Glass

3
Ring Engraving

4
Flat Engraving

5
Feature
Reference

6
Troubleshooting



Using , , , and , move the tool tip to a position at the center of the cutting area.

4
SET XA ORIGIN
30000 0.00

Press .

5
SET XA ORIGIN
<30000> <0.00>

Press  to confirm.
The location of the XA origin point has now been set.

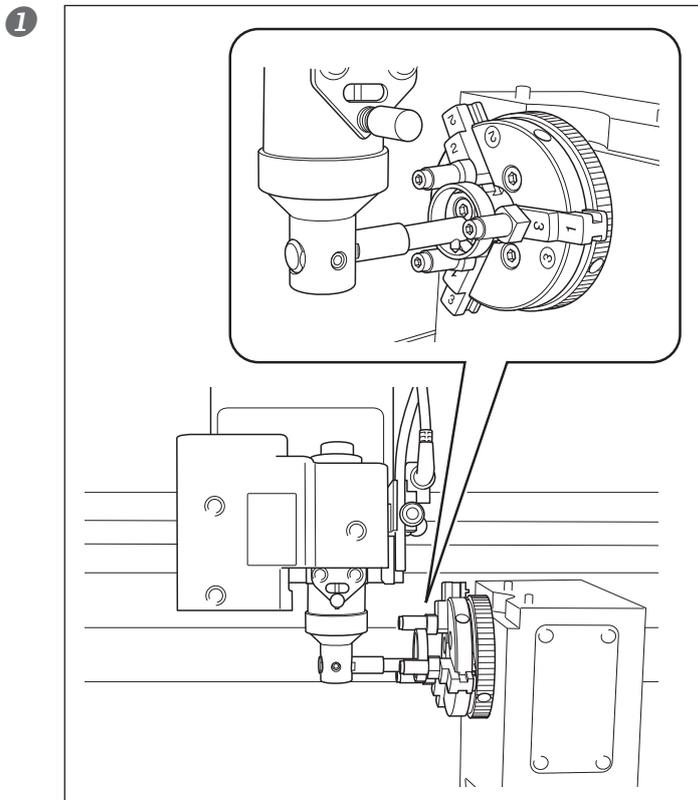
6
X 0 A 0.0
Z-30500 S OFF

Press .

The display returns to the main screen. The X-axis and A-axis coordinate values are set to "0" (zero).



2. Set the Z-axis origin point.



Use $\nabla -z$ to bring the tip of the tool into contact with the workpiece. Placing a thin sheet of paper on the workpiece may prevent damage to the workpiece when the tool touches it. In this case, however, take the thickness of the paper into account when you set the Z-axis origin.

2 SET Z1 Z0 Z2
SURFACE -3500

Press z to display the screen shown at left, then press \blacktriangleleft or \blacktriangleright to select "Z0."

3 SET Z1 Z0 Z2
SURFACE<-3500>

Press ENTER/PAUSE to confirm.
The Z-axis origin has now been set.

4 SET Z1 Z0 Z2
UP 200

Use \blacktriangleleft or \blacktriangleright to select Z2.
Use $\blacktriangle +z$ and $\blacktriangledown -z$ to select the value for the Z2 position.

You set the Z-axis height for no-load feed during cutting as the distance from Z0. Take into account the inner diameter of the ring and the size of the tool and select a value that will not cause the tool to strike the ring.

Press ENTER/PAUSE to confirm.
The Z2 position has now been set.

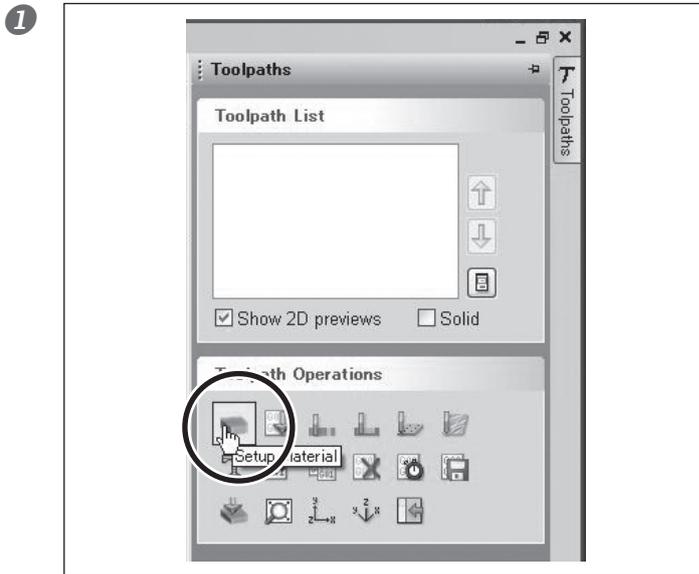
5 X 0 A 0.0
Z 373 S OFF

Press MENU .
The display returns to the main screen.

When creating cutting data using EngraveStudio, go to Procedure 3.

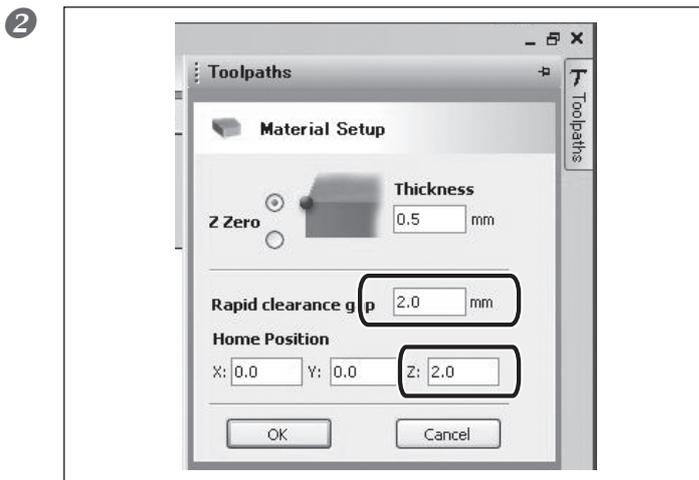
When using Dr.Engrave, preparation for the ring inner-surface engraving is complete. Go to page 122 "Start Engraving (Inner-surface engraving)."

3. Setting EngraveStudio



Click  from the Tool Path Operation window.

The material setup screen appears.



Enter the values for "Z2 position" set in Procedure 2. - 4 into "Rapid clearance gap" and "Home Position."

If these input values are not correct, tools may hit workpieces and jigs when starting cutting.

When using EngraveStudio, preparation for the ring inner-surface engraving is complete. Go to page 122 "Start Engraving (Inner-surface engraving)."

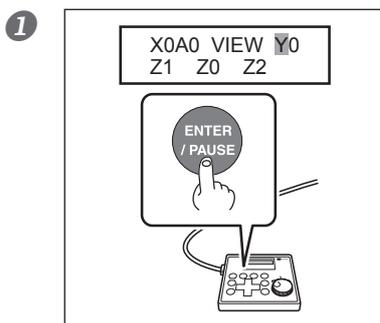
- 1 Cylindrical: Metal and Resin
- 2 Cylindrical: Glass
- 3 Ring Engraving
- 4 Flat Engraving
- 5 Feature Reference
- 6 Troubleshooting

STEP5(Ring Outer-surface Engraving): Set the XA Origin Point

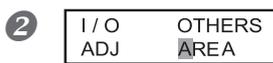
You specify the cutting area by using the laser pointer to identify the two points at the diagonally opposite angles of the square or rectangle, and set the XA origin point at the center of the specified area. (The XA origin is not specified directly.) After designating the cutting area, enter the external dimension of the workpiece (the value calculated in P. 99 "STEP2: Measure the Workpiece Size") into the application.

If you want to set the XA origin point at a location you select, see here [page 174](#), "Setting the XA or XY Origin Point Where You Choose."

1. Specify the cutting area using the laser pointer.



Close the front cover, and then move to the Y0 position. When movement ends, open the front cover.

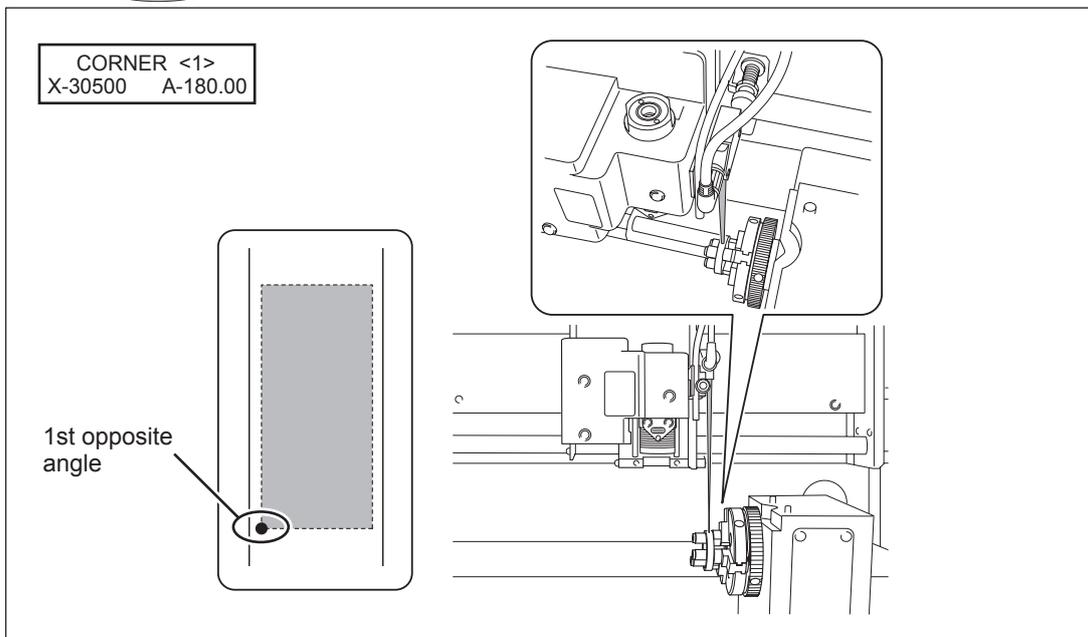


Press **MENU** several times to display the screen shown at left. Press **◀** or **▶** to select [AREA]. Press **ENTER / PAUSE** to confirm.

Laser emission starts.

3 Set the first opposite angle of the cutting area.

Press **▲**, **▼**, **◀**, and **▶** to align the laser pointer with the first opposite angle of the cutting area. Press **ENTER / PAUSE** to confirm.



- 1
- 2
- 3
- 4
- 5
- 6

Cylindrical:
Metal and Resin

Cylindrical:
Glass

Ring Engraving

Flat Engraving

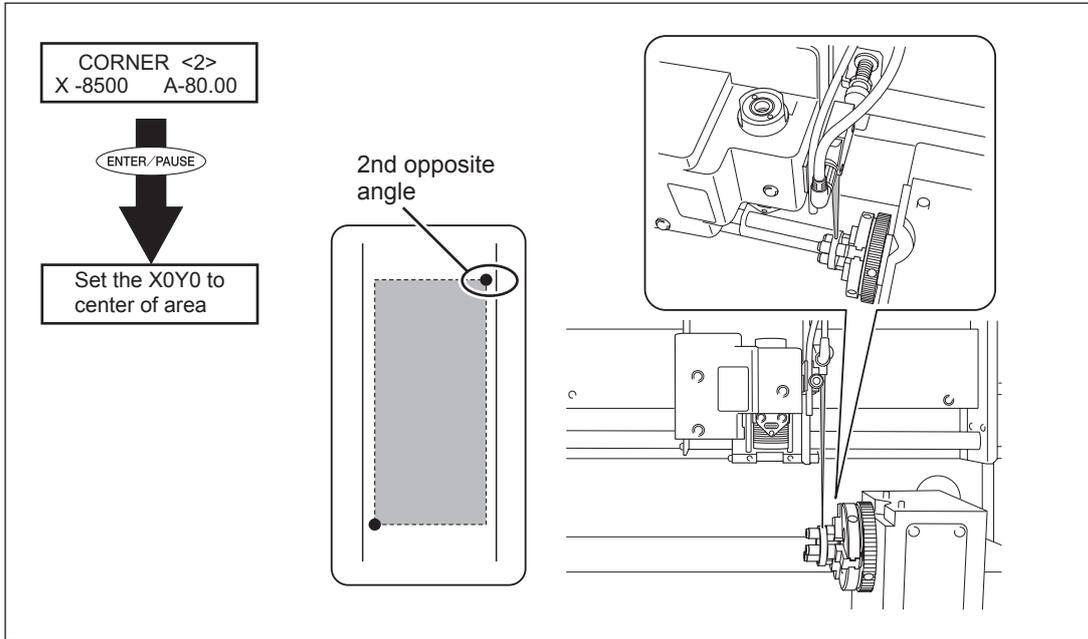
Feature Reference

Troubleshooting

4 Press **MENU**.

Set the first opposite angle of the cutting area.

Press **▲**, **▼**, **◀**, and **▶** to align the laser pointer with the first opposite angle of the cutting area.
Press **ENTER/PAUSE** to confirm.



The message shown in the figure above is displayed for approximately three seconds, and then the original screen returns.

5 **CHECK AREA**
Hit "ENTER"

Press **MENU**.

The message shown in the figure at left appears.

6 Close the front cover and press **ENTER/PAUSE**.

Each press of **ENTER/PAUSE** makes the laser pointer indicate one side of the cutting area. This enables you to check whether the cutting area has been specified at the intended location.

7 **I/O OTHERS**
ADJ AREA

Press **MENU**.

The message shown in the figure at left appears.

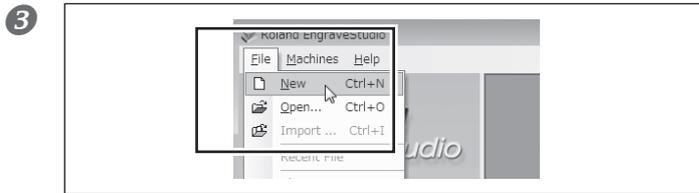
2. The program acquires the engraving area.

For Roland EngraveStudio

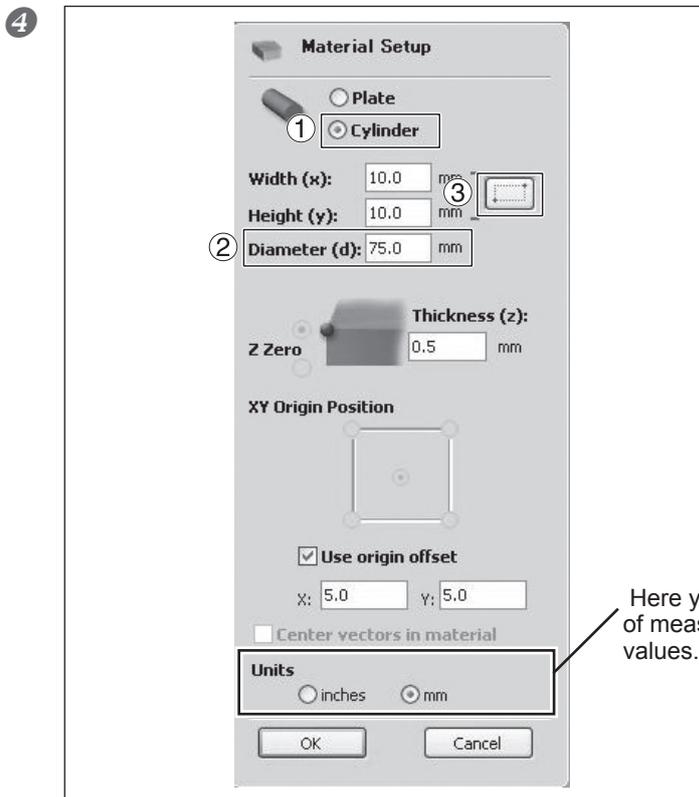
1 Start Roland EngraveStudio.



Click "Engraving machine," then select "EGX-360."



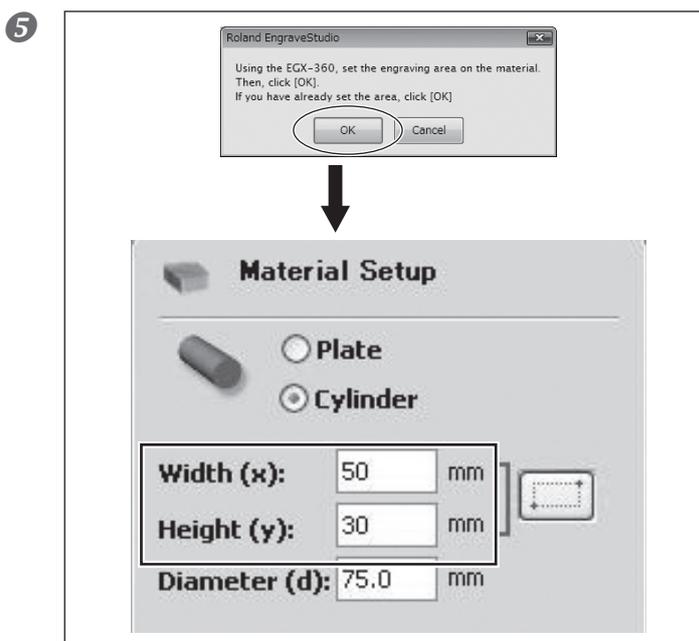
Click "File," then "New."



① Select the "Cylindrical material" check box.

② For "Diameter," enter the outer diameter of the workpiece you measured on page 99, "STEP 2: Measure the Workpiece Size."

③ Click the "Get from Unit" button ().



Click [OK].

EngraveStudio acquires the cutting area you specified on the machine.

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

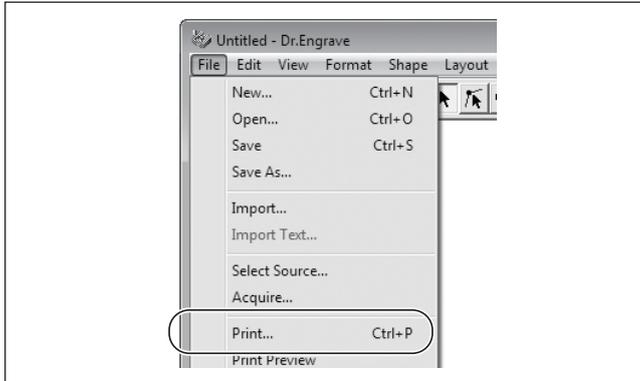
5 Feature Reference

6 Troubleshooting

For Dr. Engrave

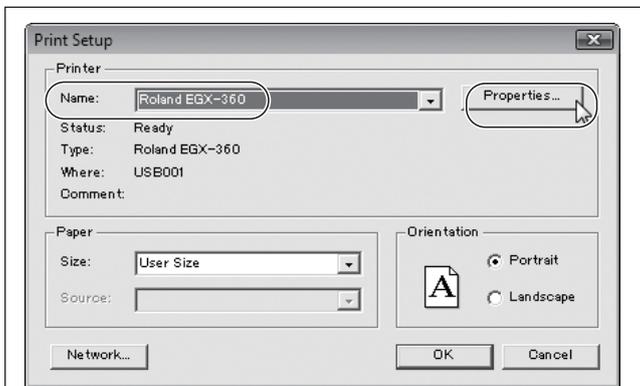
1 Start Dr. Engrave.

2



Click "File," then "Print Setup."

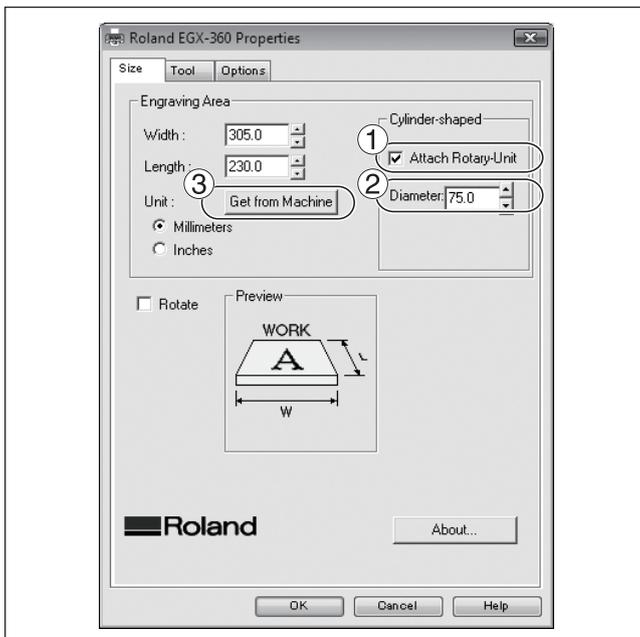
3



For "Printer Name," make sure that "Roland EGX-360" is selected, then click "Properties."

If "Roland EGX-360" is not selected, click the drop-down arrow next to "Printer Name" and select it from the list displayed.

4



1 Select the "Use rotary axis unit" check box.

2 For "Diameter," enter the outer diameter of the workpiece you measured on page 99, "STEP 2: Measure the Workpiece Size."

3 Click the "Get from Unit" button.

1

Cylindrical:
Metal and Resin

2

Cylindrical :
Glass

3

Ring Engraving

4

Flat Engraving

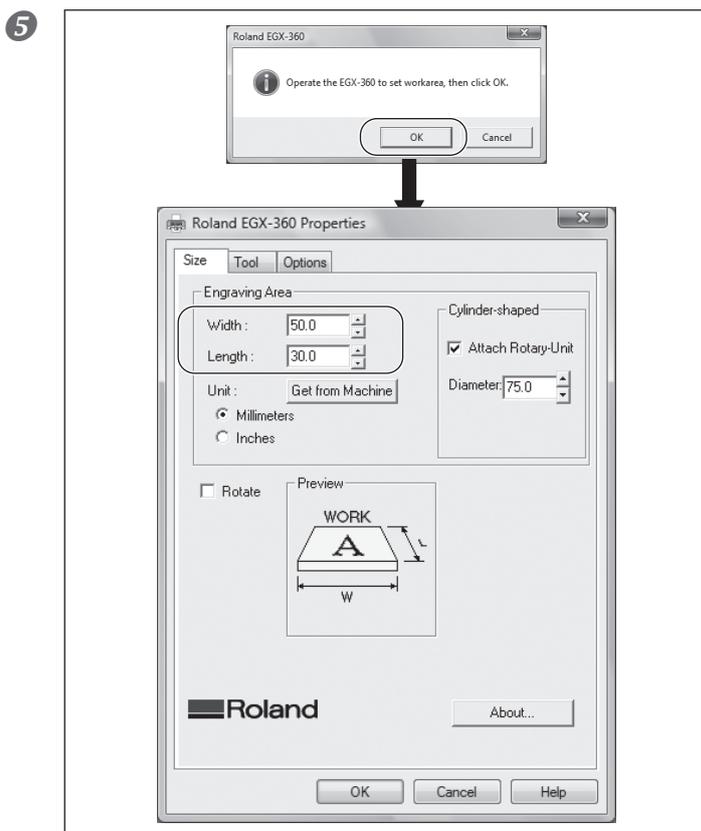
5

Feature Reference

6

Troubleshooting





Click [OK].

Dr. Engrave acquires the cutting area you specified on the machine.

- 6 Click [OK] twice to close the "Roland EGX-360 Properties" window and the "Print Setup" window.

1 Cylindrical:
Metal and Resin

2 Cylindrical:
Glass

3 Ring Engraving

4 Flat Engraving

5 Feature
Reference

6 Troubleshooting

STEP6(Ring Outer-surface Engraving): Check the Cutting Path of the Cutter (Preview Feature)

Before you carry out actual cutting, you can use the laser pointer to preview and check the cutting path that the cutter is to take. The following two methods are available

- Path preview: This previews the actual cutting path.
- Area preview: This previews only the range of the cutting data.

Procedure

1 Close the front cover.

2  Send the cutting data from the computer.
The screen shown at left appears.

3  Use  or  to select "Path Preview" or "Area Preview."
Press  to confirm.



When You Select "Path Preview"

The screen shown below appears, the spindle unit rises to the highest point along the Z axis, and the laser pointer then indicates the cutting path that the cutter is to take.

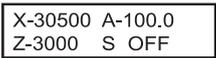


When You Select "Area Preview"

When the message shown below appears, press .

After the spindle unit has risen to the highest point along the Z axis, each press of  makes the laser pointer indicate one side of the range of the cutting data.



4  When you're finished previewing, press  to go back to the screen shown at left.

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

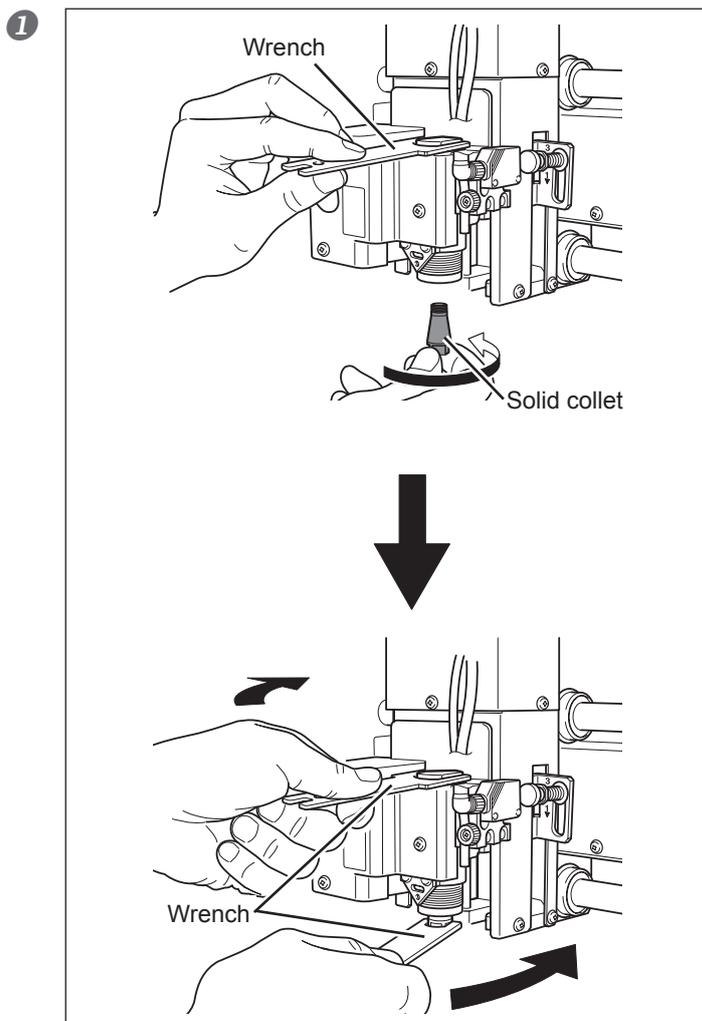
5 Feature Reference

6 Troubleshooting

STEP7(Ring Outer-surface Engraving): Install a Cutter

For engraving the outer surface of a ring, you use the burnishing attachment (ZB-20) and diamond scraper (ZDC-A2000). These are optionally available items. To purchase them, contact your authorized Roland DG Corp. dealer or Roland DG Corp.

1. Install the solid collet and burnishing attachment.



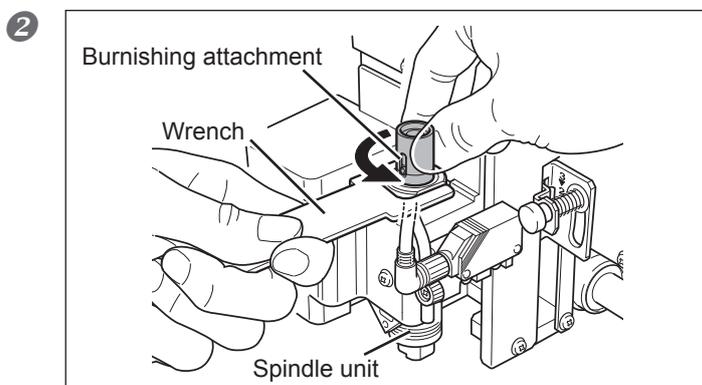
Install the solid collet.

Tighten loosely.

Grasp the solid collet and insert it into the spindle unit from below, then use a wrench to tighten the spindle unit until the solid collet is held in place.

Tighten fully.

Tighten the solid collet using two wrenches. The appropriate tightening torque is 3.2 N-m (32 kgf-cm).



Install the burnishing attachment.

While holding the spindle unit immobile with a wrench, tighten the burnishing attachment. The burnishing attachment is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.

1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

Troubleshooting

2. Install the diamond scraper and set the Z-axis origin point.

1

X0A0 VIEW Y0
Z1 Z0 Z2

Close the front cover.

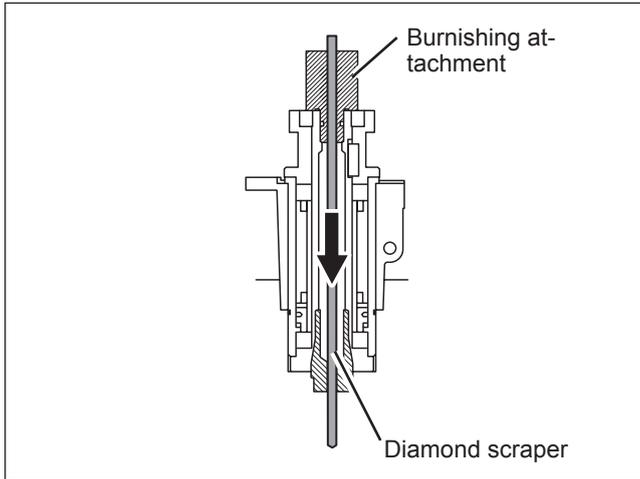
Press **MENU** several times to display the screen shown at left.

Use **◀** or **▶** to select "X0A0."

Press **ENTER/PAUSE** to confirm.

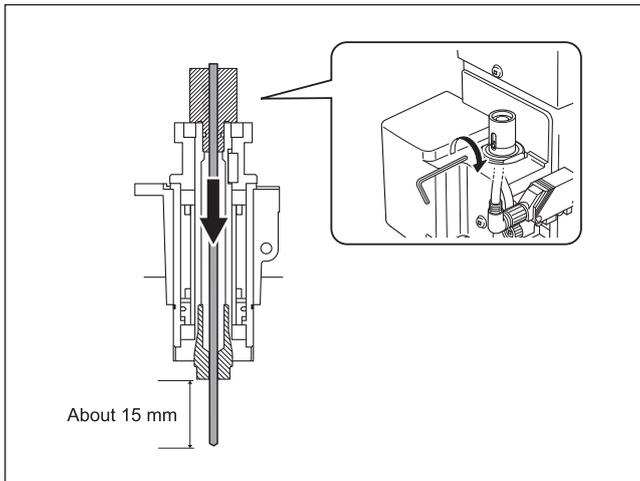
The spindle head moves to the XA origin point.

2



Open the front cover, and then Insert the diamond scraper into the burnishing attachment.

3

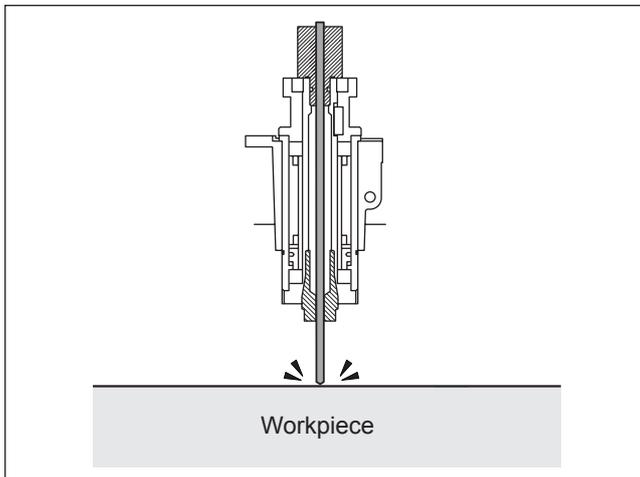


Determine the amount of extension of the diamond scraper, then secure the diamond scraper in place.

With the diamond scraper positioned so that its tip extends by about 15 millimeters, tighten the mounting screw on the burnishing attachment.

Caution: Depending on the ring size, when projection amount of the diamond scraper is 15mm or less, the diamond scraper may hit the ring chuck during cutting.

4



Press **▼-Z** to bring the tip of the diamond scraper into contact with the surface of the workpiece.

It may be a good idea to cover the workpiece with a light cloth or the like to keep it from being damaged.

5

SET	Z1	Z0	Z2
SURFACE -3000			

Press **Z** to display the screen shown at left, then press **◀** or **▶** to select "Z0."

6

SET	Z1	Z0	Z2
SURFACE -3000			

Press **ENTER/PAUSE** to confirm.
The Z-axis origin has now been set.

7

X-30500	A-100.0
Z 0	S OFF

Press **MENU**.
The display returns to the main screen. The value of the Z-axis coordinate is now "0" (zero).

- 1
Metal and Resin
Cylindrical:
- 2
Glass
Cylindrical:
- 3
Ring Engraving
- 4
Flat Engraving
- 5
Reference
Feature
- 6
Troubleshooting

3-3 Start Engraving

Start Engraving (Inner-surface engraving)

Engraving the inner surface of a ring starts. For detailed setting for cutting such as the rotation of the spindle and the depth of cut, refer to page 178, "Examples of Settings for Cutting and Tips for Fine-tuning."

Procedure

1 Close the front cover.

2 Perform cutting "ENTER" to start

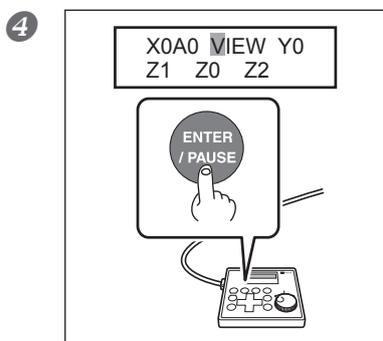
Send the cutting data from the computer.

The screen shown at left appears.

For more information about creating cutting data, refer to the user's manual for the program that creates the cutting data.

To cancel the cutting data, press **MENU**.

3 Press **ENTER/PAUSE**.
Engraving starts.



4 When engraving ends, move the spindle head to the VIEW position.

5 Open the front cover and remove the workpiece.

Start Engraving(Outer-surface engraving)

Start outer-surface engraving. For detailed setting for cutting such as the rotation of the spindle and the depth of cut, refer to page 178, "Examples of Settings for Cutting and Tips for Fine-tuning."

Procedure

1 Close the front cover.

2 SELECT OPR MODE>
CUT PREVIEW_BOX

Send the cutting data from the computer.

The screen shown at left appears. Make sure that no heart symbol appears to the right of the "CUT" message. If a heart symbol is displayed, it means the lubricant pump switch is on. Switch off the lubricant pump switch.

For more information about creating cutting data, refer to the user's manual for the program that creates the cutting data.

To cancel the cutting data, press **MENU**.

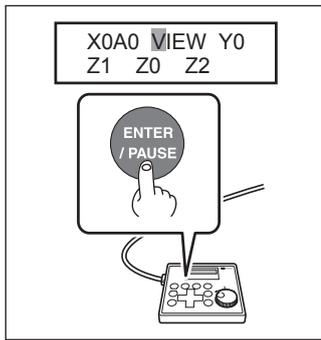
3 SELECT OPR MODE>
CUT PREVIEW_BOX

Use **◀** or **▶** to select "CUT."
Press **ENTER/PAUSE** to confirm.

Engraving starts.

1 Cylindrical: Metal and Resin
2 Cylindrical: Glass
3 Ring Engraving
4 Flat Engraving
5 Feature Reference
6 Troubleshooting

4



When engraving ends, move the spindle head to the VIEW position.

5 Open the front cover and remove the workpiece.

1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

Troubleshooting

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Chapter 4

Flat Engraving (Metal, Resin, and Glass)

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4-1 Check This First

Jigs Used in Flat Engraving

1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

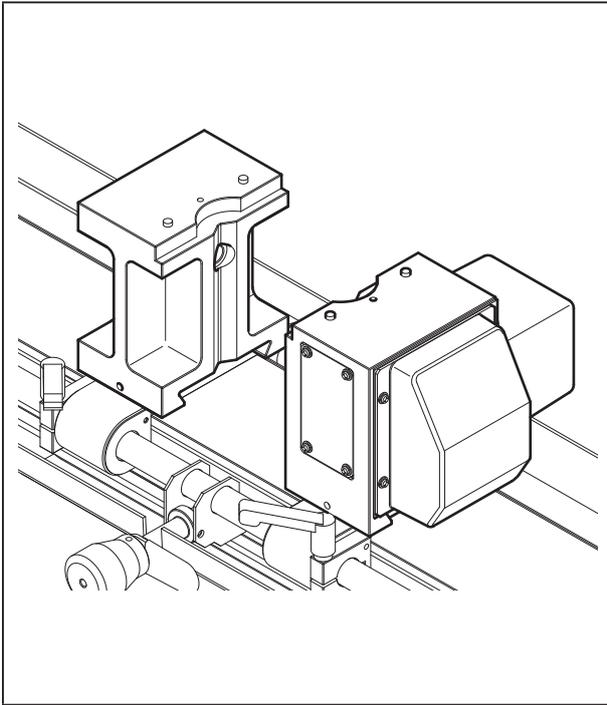
Flat Engraving

5

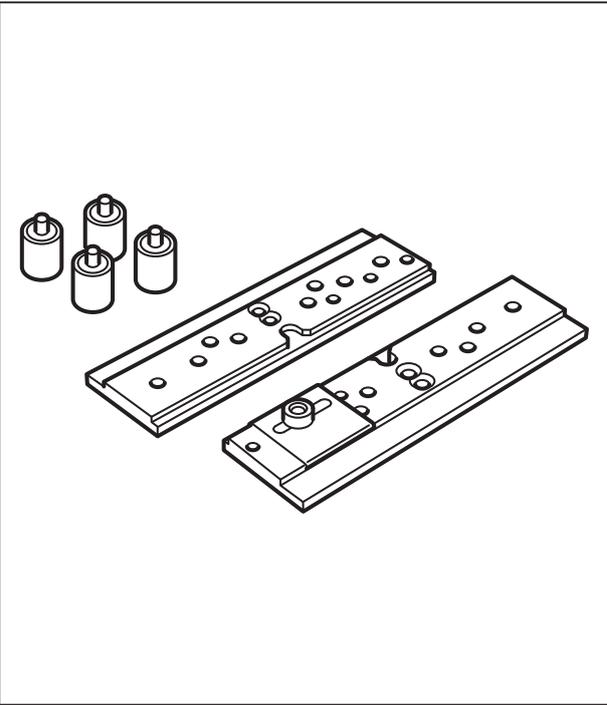
Feature Reference

6

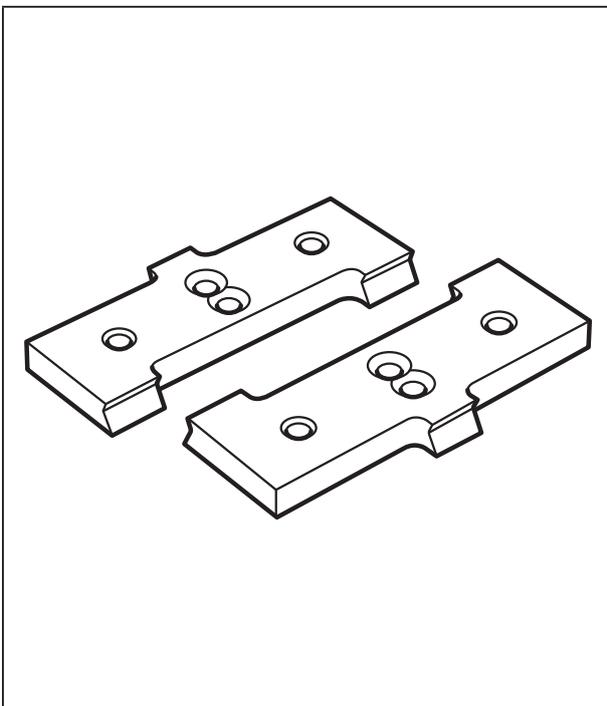
Troubleshooting



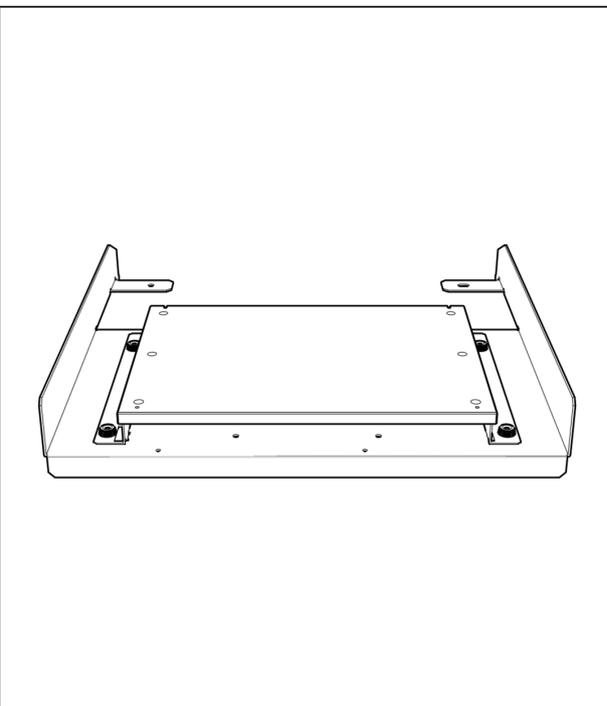
Motorized vise jaw / free-end vise jaw



Standard jigs / pin jigs



Pen jig



Flat table

TOC

What to Do First

When you're performing flat engraving, then before you install the jigs and load the workpiece, carry out the following adjustments and settings.

- Adjust the angle of tilt and the height of the vise unit.
- Move the spindle head to the VIEW position.
- Set "AXIS SWITCHING" to [XYZ].

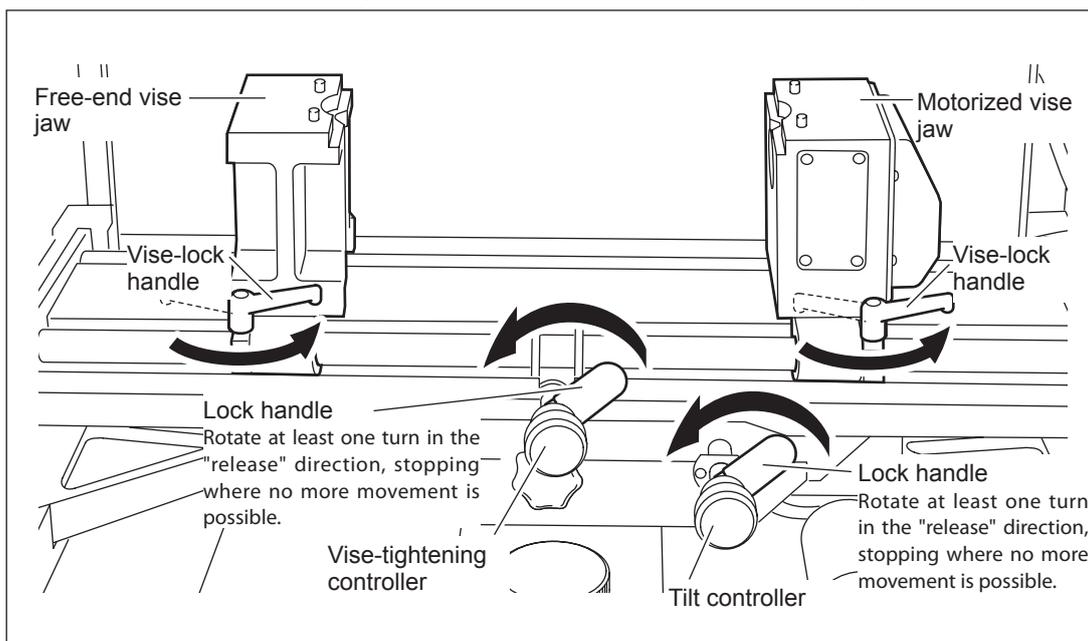
1. Adjust the angle of tilt and the height of the vise unit.

1 Open the front cover and remove all jigs for machine-turned engraving.

2 Unlock the free-end vise jaw, motorized vise jaw, vise-tightening controller, and tilt controller.

Release the vise-lock handles and the tilt-lock handle by turning them in the direction of the arrows shown in the figure below.

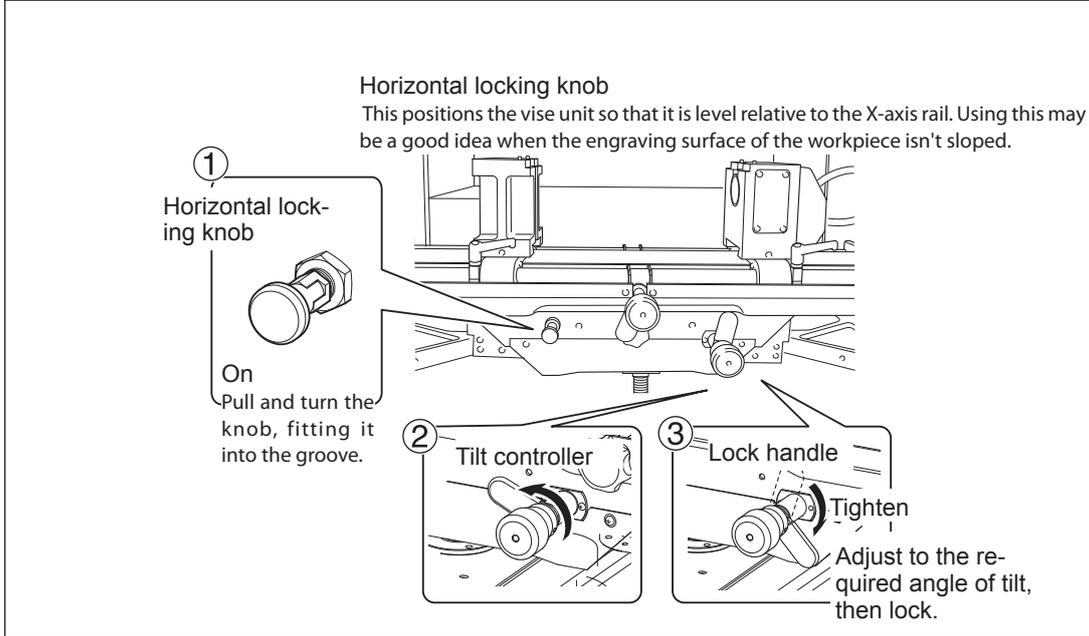
The locations of the vise-lock handle for the vise-tightening controller and the tilt-lock handle for the tilt controller vary depending on the positions and angles of the two vise jaws. Also, rotate each at least one turn in the "release" direction, stopping where no further movement is possible. If a vise-lock handle or tilt-lock handle is not rotated sufficiently, it may move together with the controller when it is turned, re-engaging the lock.



- 1
Cylindrical:
Metal and Resin
- 2
Cylindrical:
Glass
- 3
Ring Engraving
- 4
Flat Engraving
- 5
Feature
Reference
- 6
Troubleshooting

3 Adjust the angle of the vise unit so that it's level, then secure the vise unit in place.

- ① Turn the tilt controller clockwise to tilt the vise unit to the right and engage the horizontal locking knob.
- ② Turn the tilt controller counterclockwise until the vise unit stops moving.
- ③ Secure in place with the tilt-lock handle.



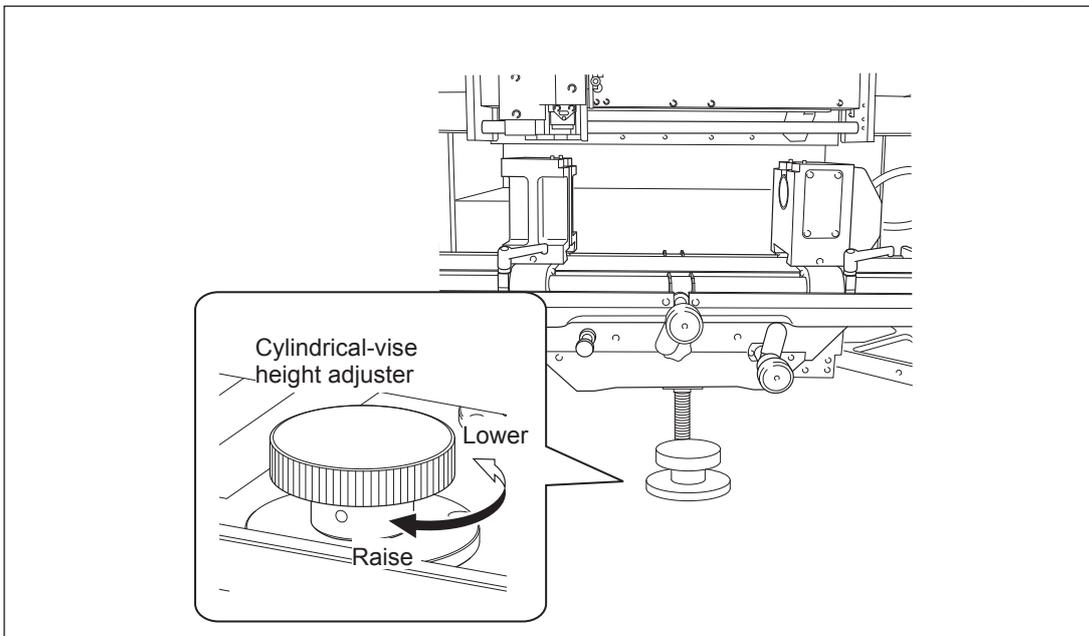
4 Adjust the height of the vise unit.

When using the vise unit.

It is recommended to set the vise unit in the position that is 30mm lower than the highest position. Adjust the position finely according to the workpiece size and the Z origin later.

When using a flat table

Move the vise unit to the lowest position. The vise unit will lie in the way when attaching or removing the flat table.



2. Move the spindle head to the VIEW position.

① Close the front cover.

②

X	5000	Y	3000
Z	2000		5000RPM

At the main screen, press **MENU** twice.

③

X0A0	VIEW	Y0
Z1	Z0	Z2

Press **◀**, **▶**, **▲**, and **▼** to select [VIEW].
Press **ENTER/PAUSE** to confirm.

The spindle head moves in place to the highest location along the Z axis, then moves along the Y axis all the way toward the back.

If "AXIS SWITCHING" is set to [XYZ], then at the screen shown at left, select [VIEW].

HOME	VIEW	
Z1	Z0	Z2

3. Set "AXIS SWITCHING" to [XYZ].

Note: This step is not needed when [XYZ] has already been selected.

①

I/O	OTHERS
ADJ	AREA

Press **MENU** to display the screen shown at left.

Press **◀** or **▶** to select [OTHERS].

Press **ENTER/PAUSE**.

②

AXIS SWITCHING	
<XYZ>	XAZ

Press **◀** to select [XYZ].

Press **ENTER/PAUSE** to confirm.

③

X	5000	Y	3000
Z	2000		5000RPM

Press **MENU** several times to display the main screen.

1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

Troubleshooting

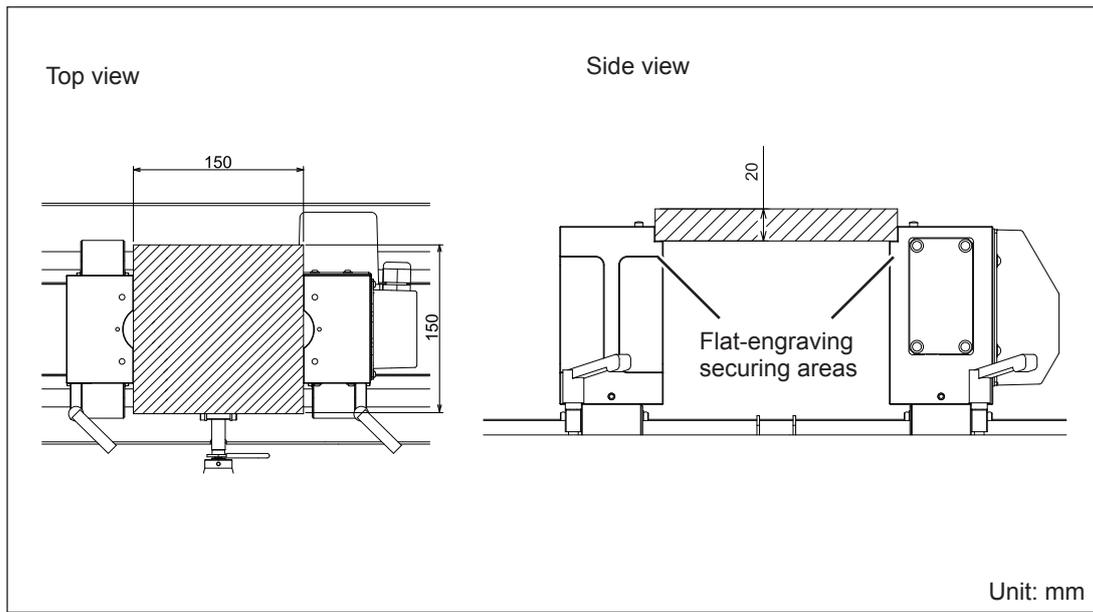
4-2 Installing the Jigs and Loading the Workpiece

The Motorized Vise Jaw and the Free-end Vise Jaw

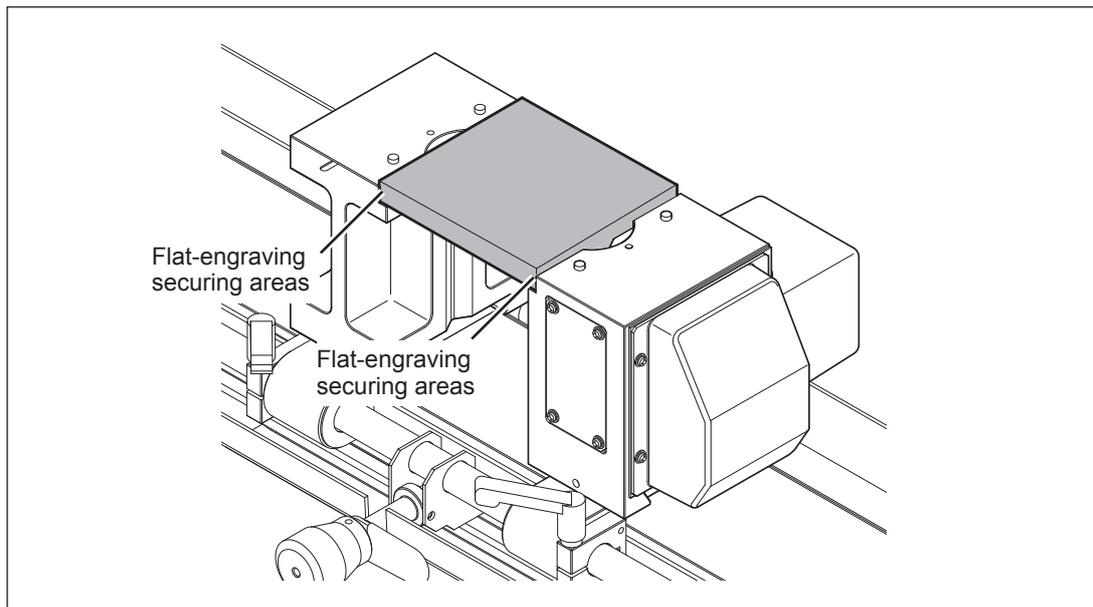
Overview

This method secures the workpiece in place using the motorized vise jaw and the free-end vise jaw. The workpiece is held in place using the flat-engraving securing areas for each of the vise jaws. The workpiece cannot be secured in place at locations other than these securing areas.

Loadable Workpiece Size



Loading the Workpiece



- 1 Cylindrical: Metal and Resin
- 2 Cylindrical: Glass
- 3 Ring Engraving
- 4 Flat Engraving
- 5 Feature Reference
- 6 Troubleshooting

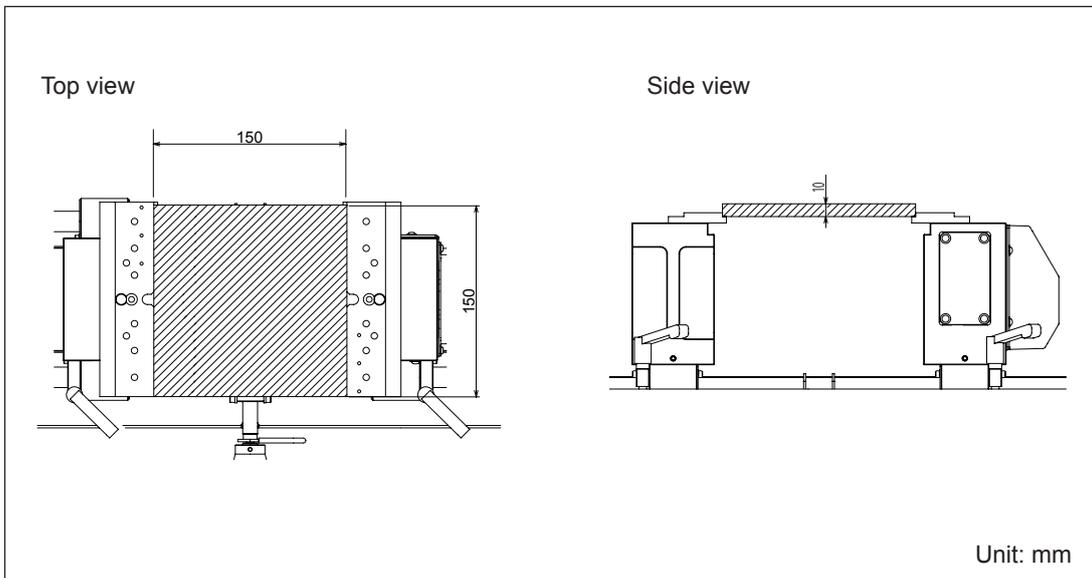
Standard Jigs and Pin Jigs

Overview

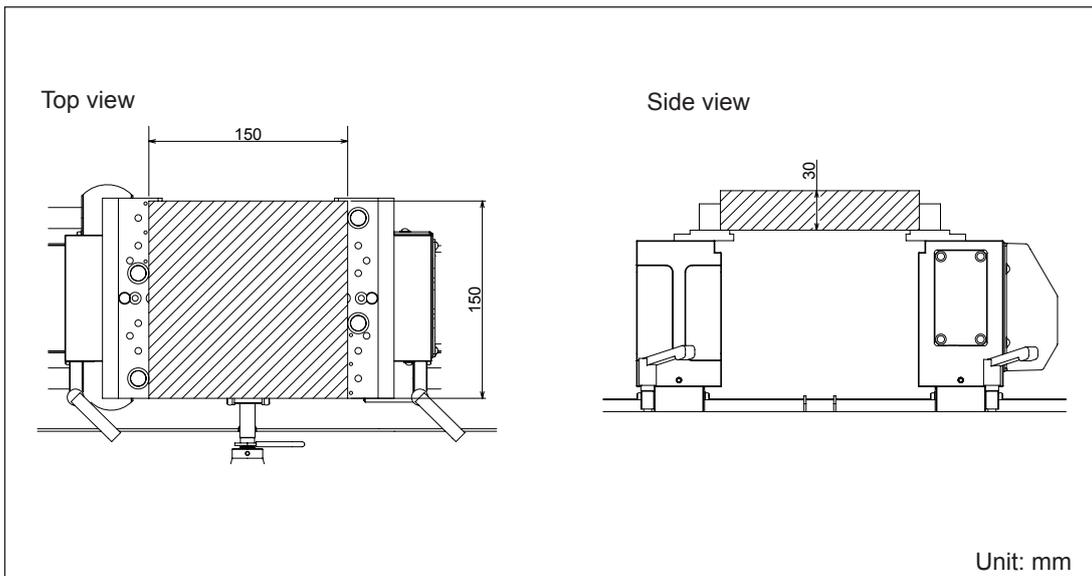
The standard jigs are installed on the motorized vise and free-end vise jaws for use. Also, using a positioning plate enables you to carry out repeated engraving of workpieces of identical configuration without having to spend time to perform positioning. What's more, using pin jigs enables you to secure in place workpieces that can't be held in place by just the vise jaws and standard jigs.

Loadable Workpiece Size

Standard Jigs



Standard Jigs with Pin Jigs



1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

5

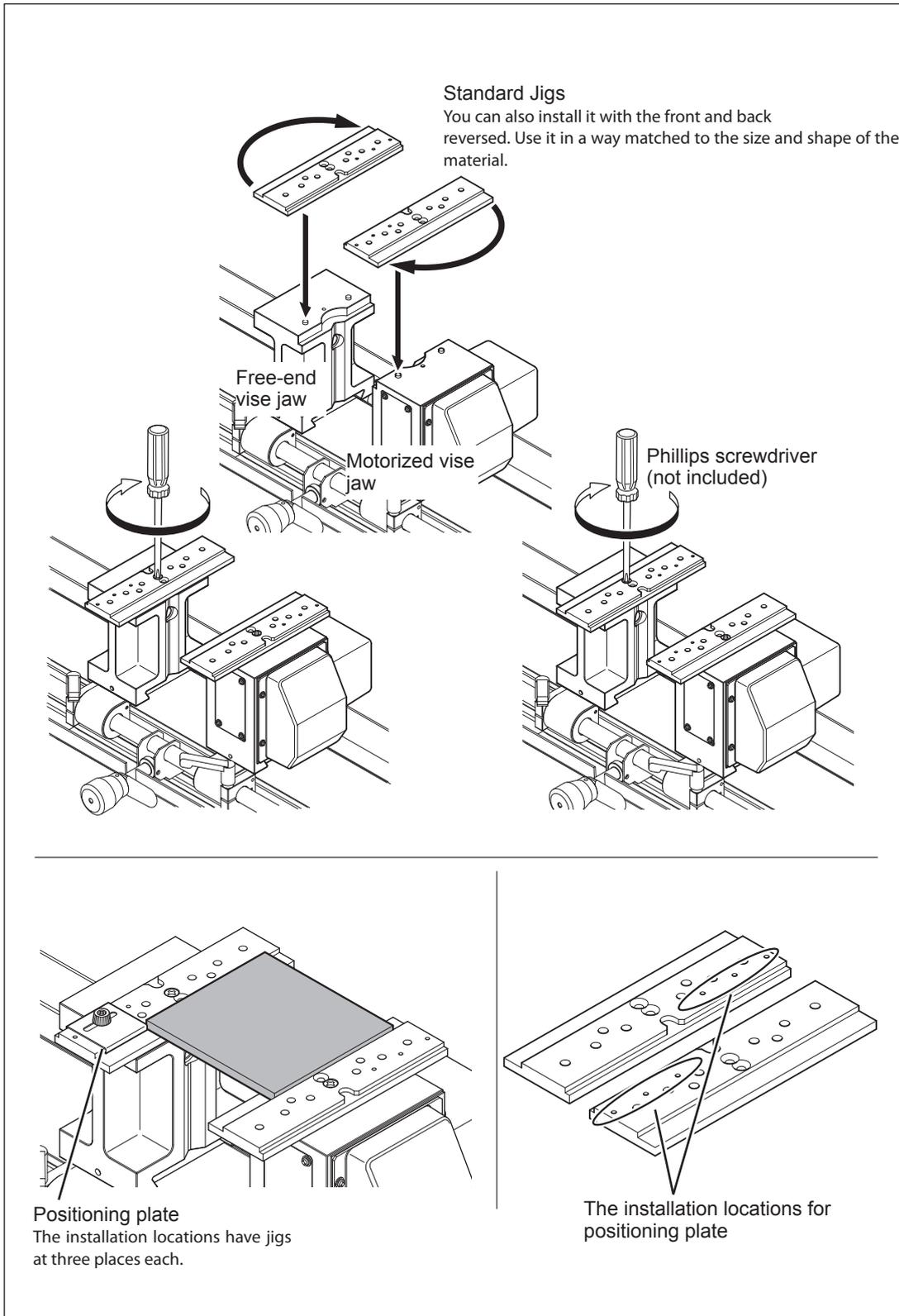
Feature
Reference

6

Troubleshooting

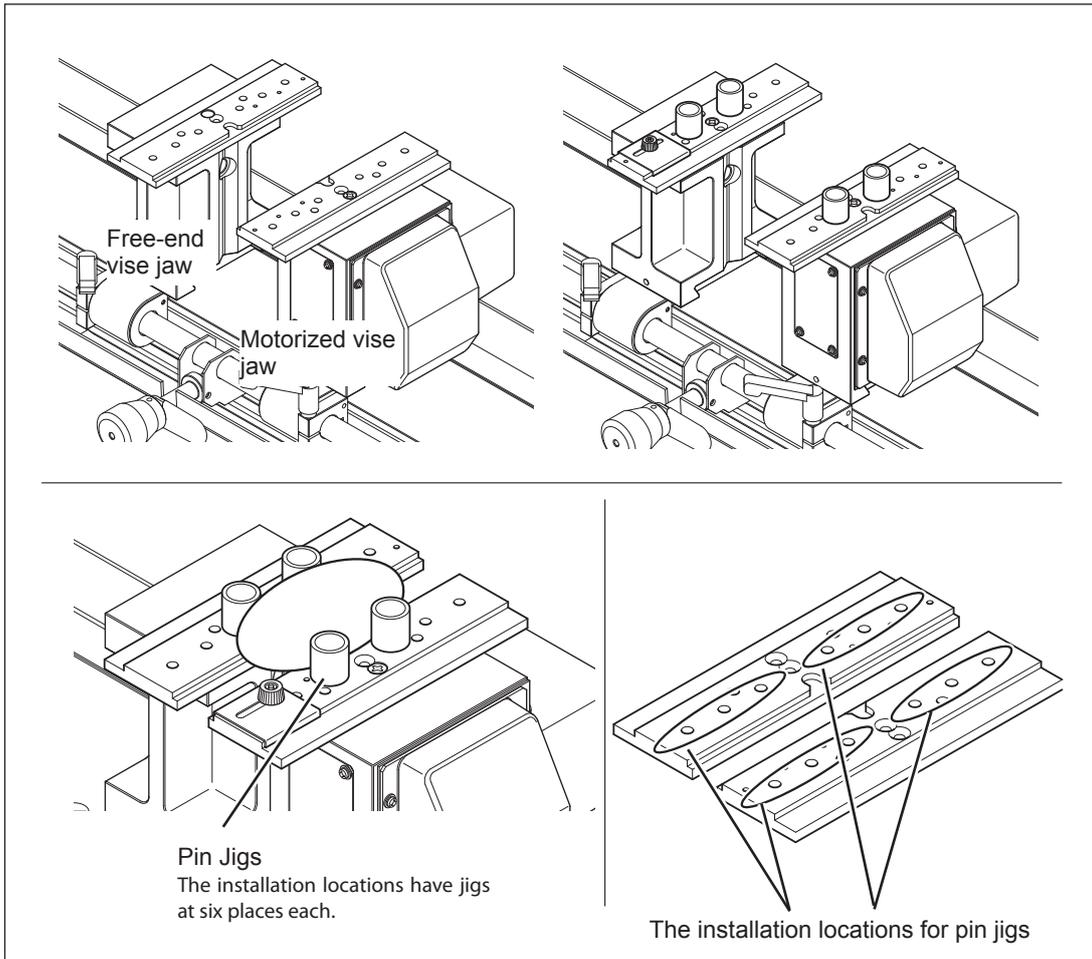
Installing Jigs and Loading the Workpiece

Standard Jigs



- 1
Cylindrical:
Metal and Resin
- 2
Cylindrical:
Glass
- 3
Ring Engraving
- 4
Flat Engraving
- 5
Feature
Reference
- 6
Troubleshooting

Standard Jigs with Pin Jigs



1

Cylindrical:
Metal and Resin

2

Cylindrical :
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

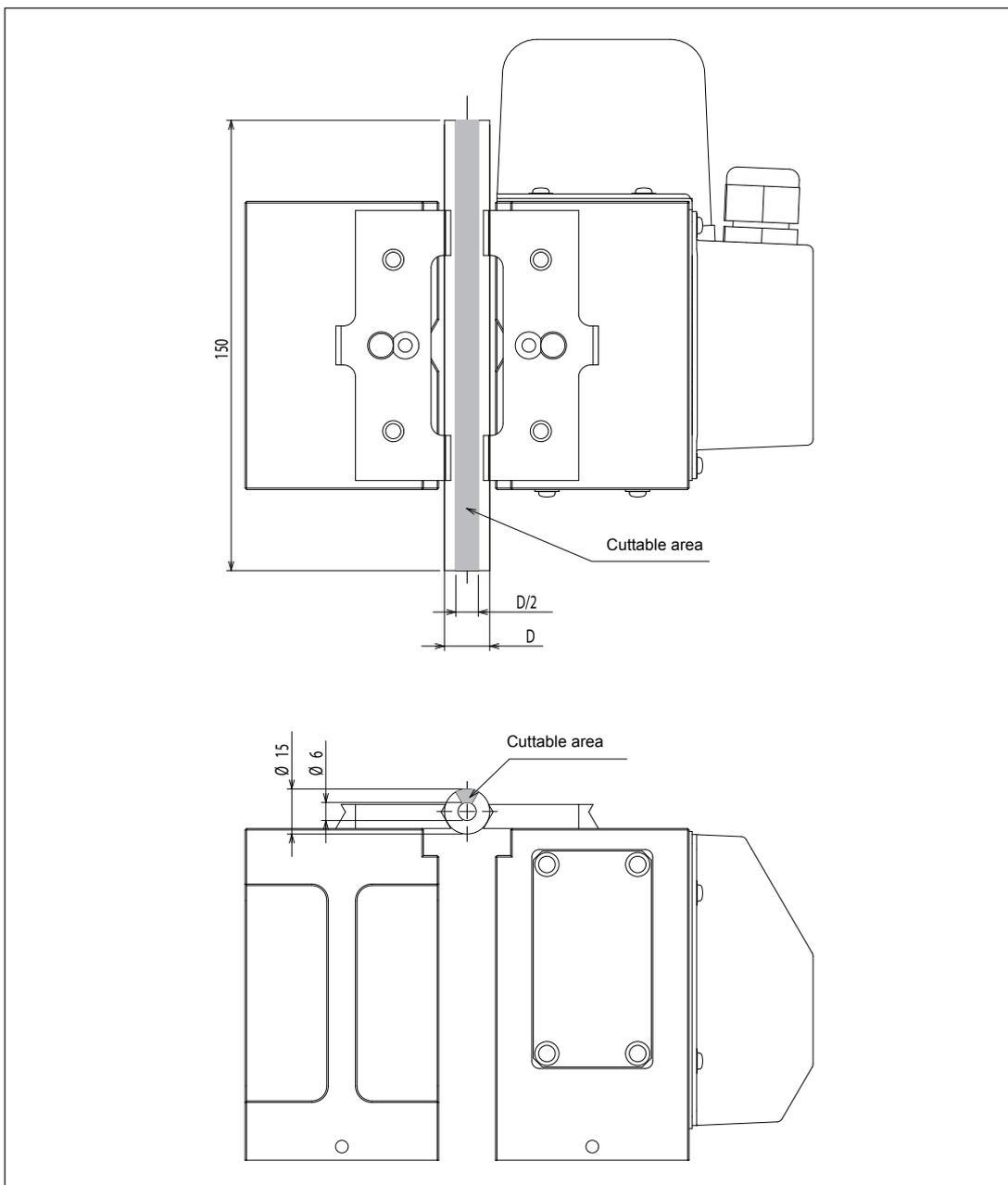
Troubleshooting

Pen Jigs

Overview

These jigs are suitable for securing in place a long, thin object, such as a ballpoint pen. You use them mounted on the motorized and free-end vise jaws.

Loadable Workpiece Size



1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

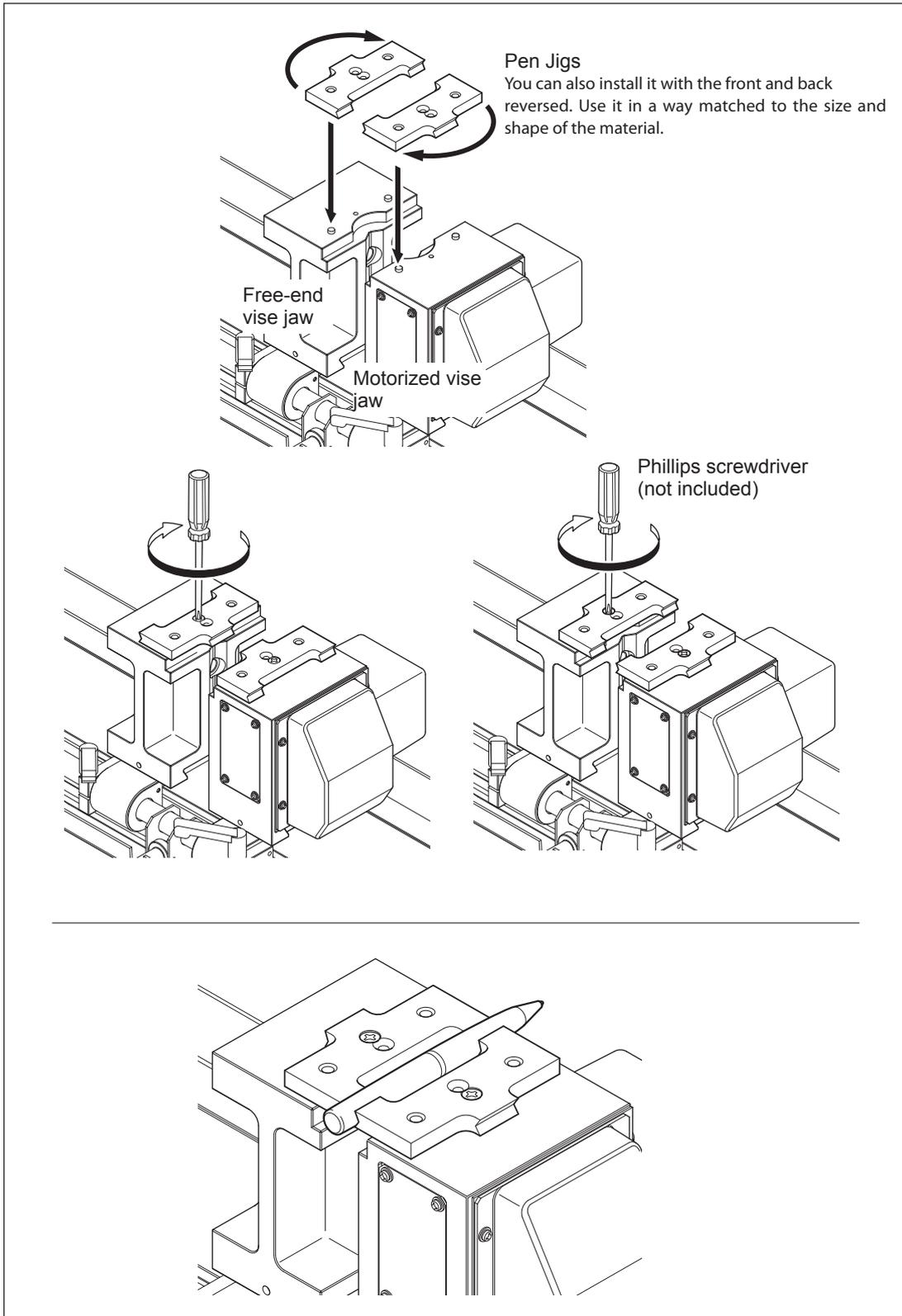
5

Feature Reference

6

Troubleshooting

Installing Jigs and Loading the Workpiece



1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

Troubleshooting

TOC

Flat Table (Bakelite Table or Table Base)

Glass material cannot be engraved when the flat table is used.

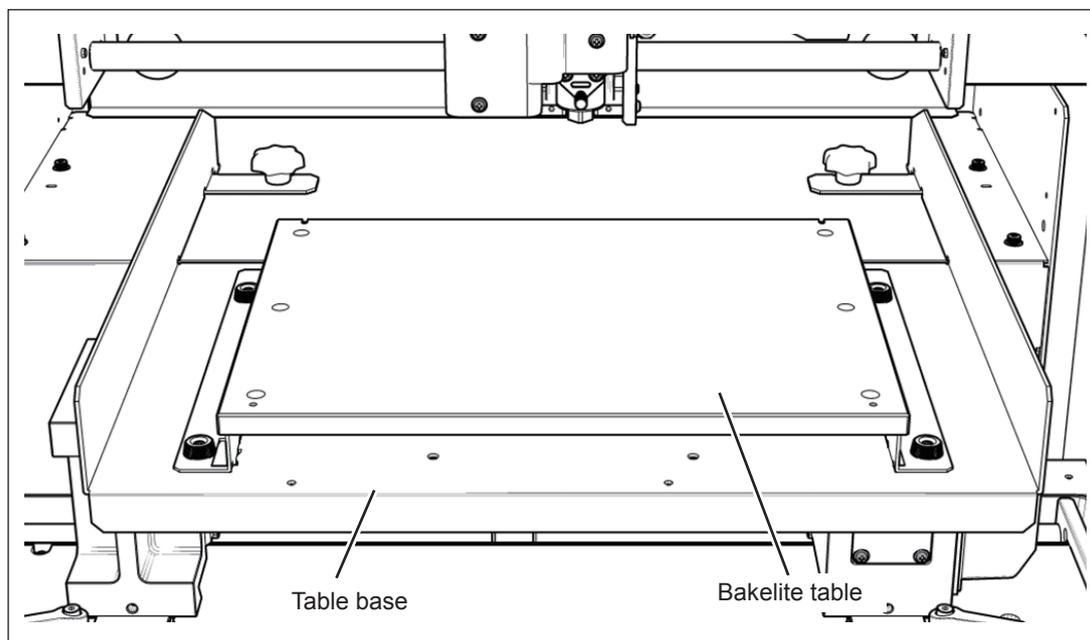
When the flat table is employed, the lubricant recycling tray cannot be used, and so engraving glass material is not possible.

Overview

The flat table is used mounted on the rear stays located behind the machine's vise unit. The flat table is composed of a Bakelite table and a table base. You can also detach the Bakelite table and use only the table base. Take into account the respective cuttable areas and use selectively according to the thickness of the workpiece.

To load a workpiece, use the included adhesive sheet. When using this, move the vise unit to the very lowest position along the movable range and detach all jigs and fixtures other than the flat table.

☞ P. 127 "What to Do First"



1

Cylindrical:
Metal and Resin

2

Cylindrical :
Glass

3

Ring Engraving

4

Flat Engraving

5

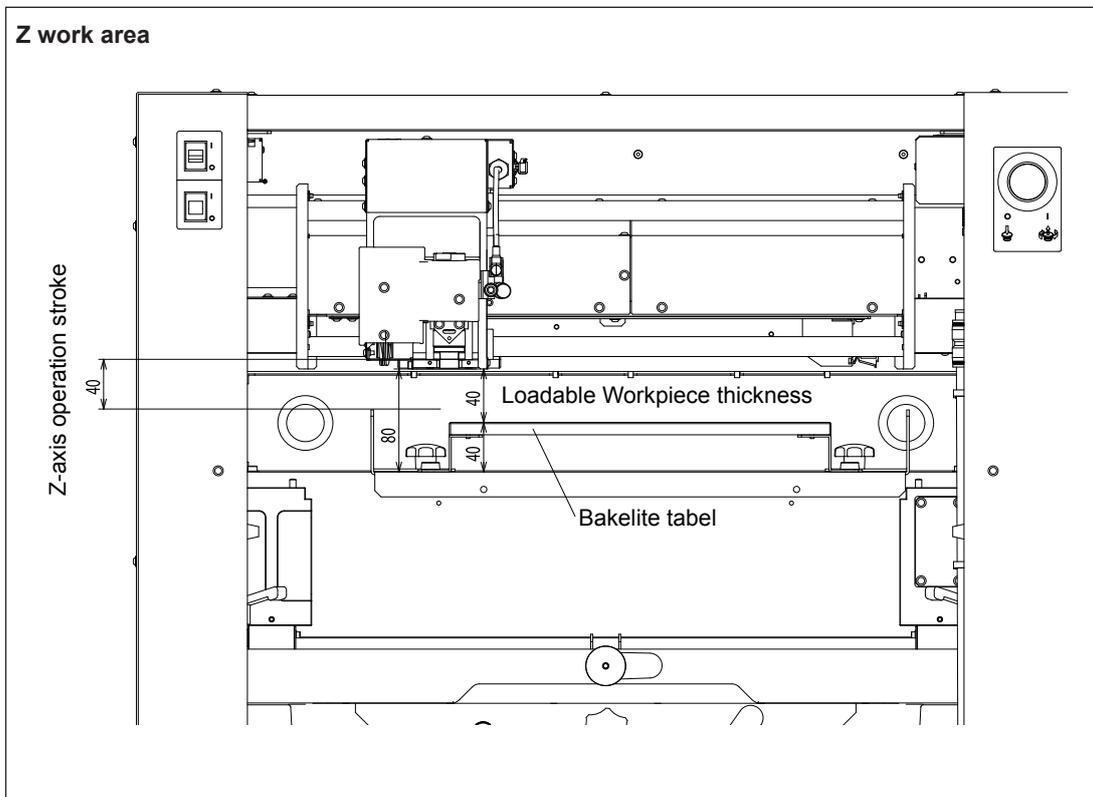
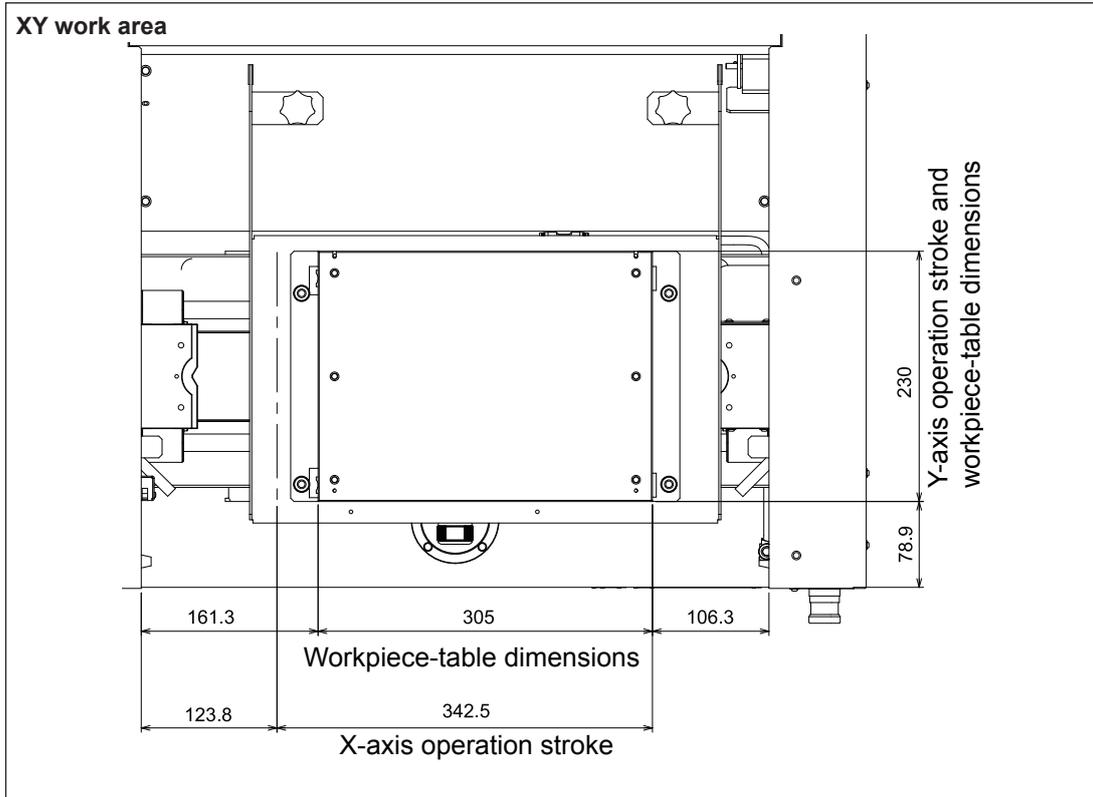
Feature
Reference

6

Troubleshooting



Loadable Workpiece Size



Note: When the Bakelite table is detached, the maximum workpiece thickness is 80 millimeters. Other parameters are unchanged.

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

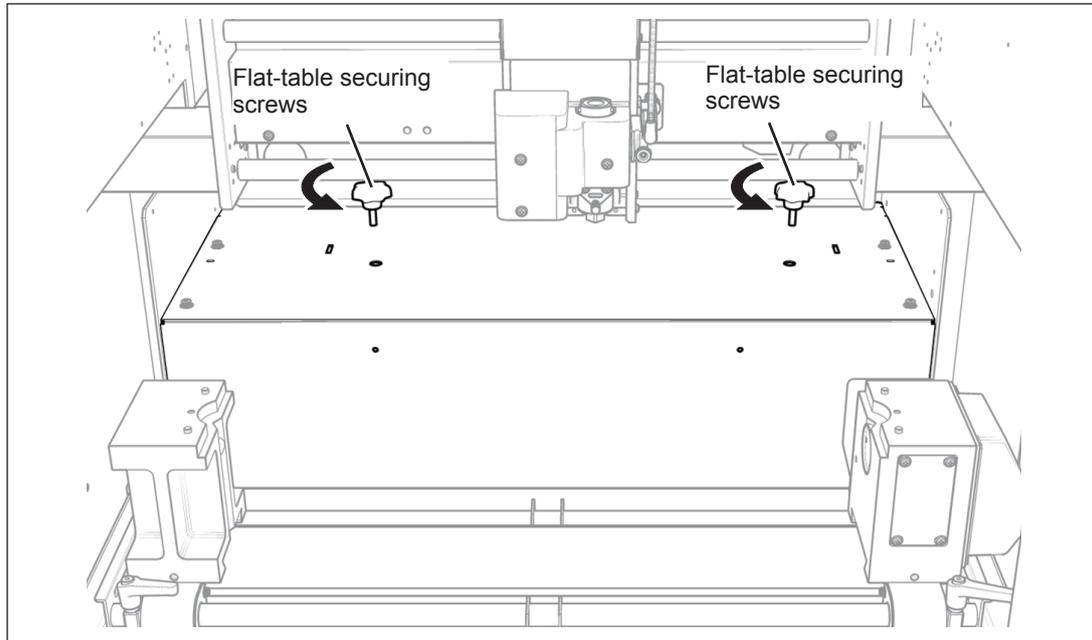
5 Feature Reference

6 Troubleshooting

Installing the Flat Table

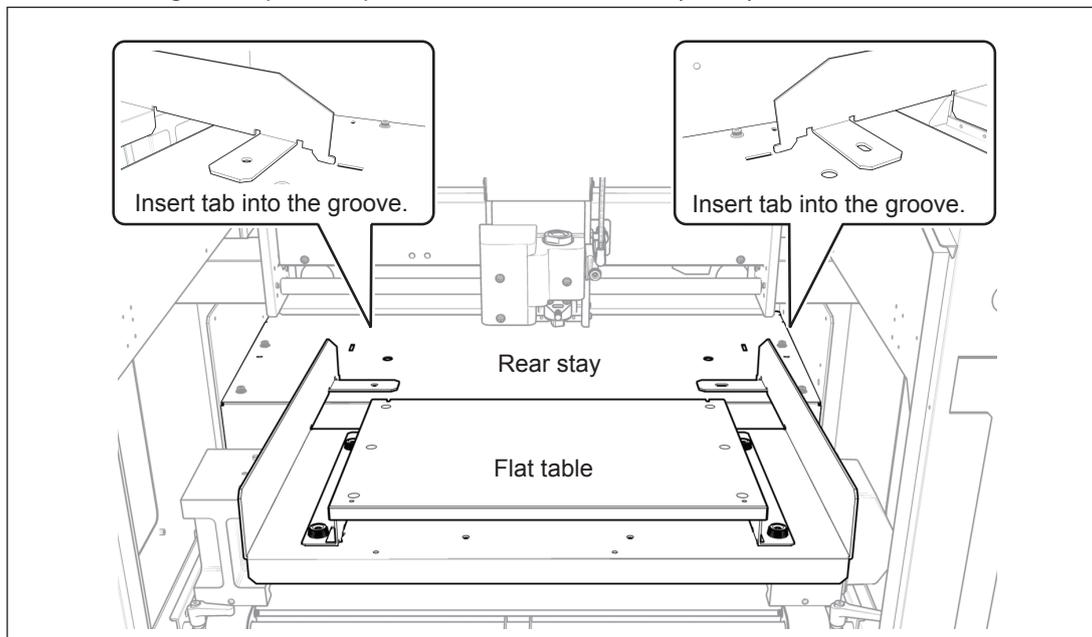
Procedure

- 1 Remove securing screws from the flat table.



- 2 Attach the flat table to the rear stay.

Insert the tab at the end of the handle of the flat table into the groove of the rear stay until it hits to the deepest end. While it is hitting the deepest end, place the handle on the rear stay slowly.



1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

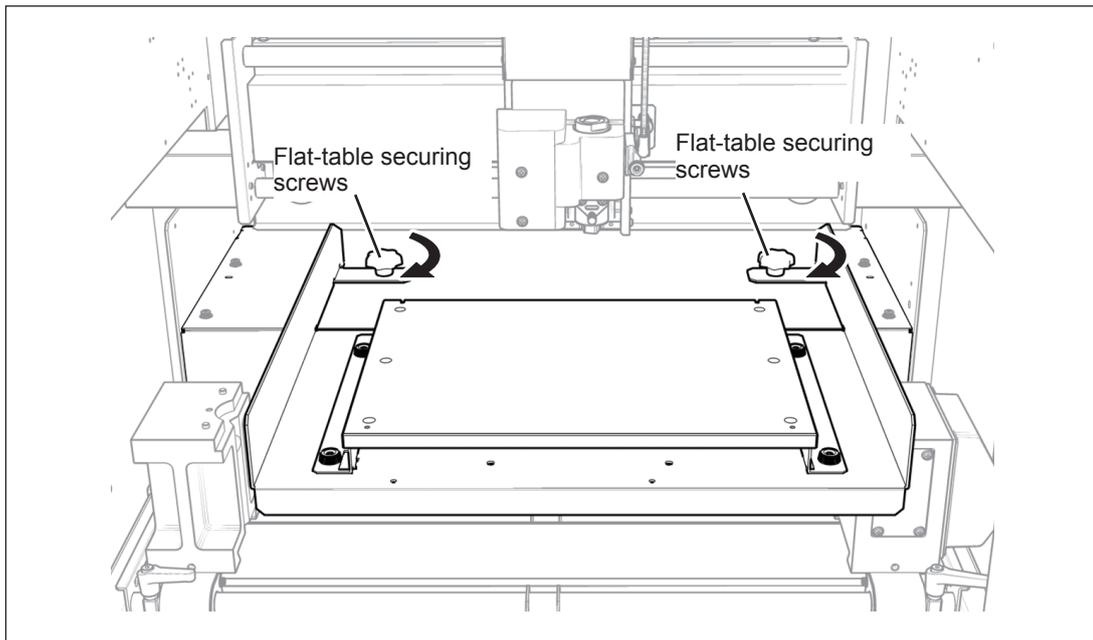
4 Flat Engraving

5 Feature Reference

6 Troubleshooting

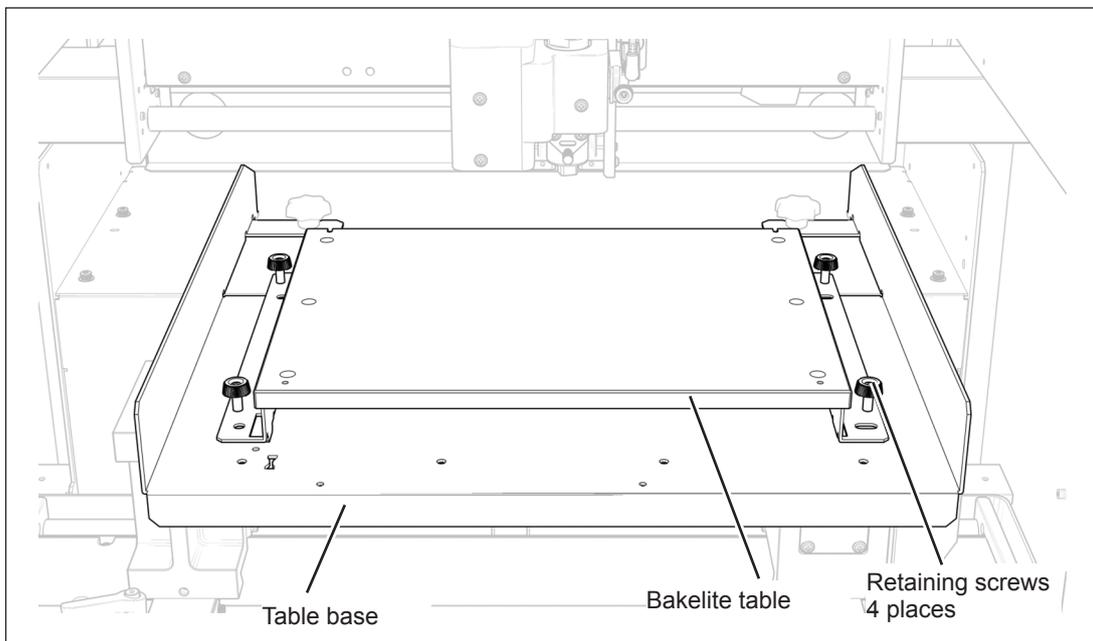
3 Fix the flat table.

Fix the flat table with the securing screws that have been removed previously.



Attaching or Detaching the Bakelite Table

The Bakelite table can be removed from the table base by removing the securing screws.



1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

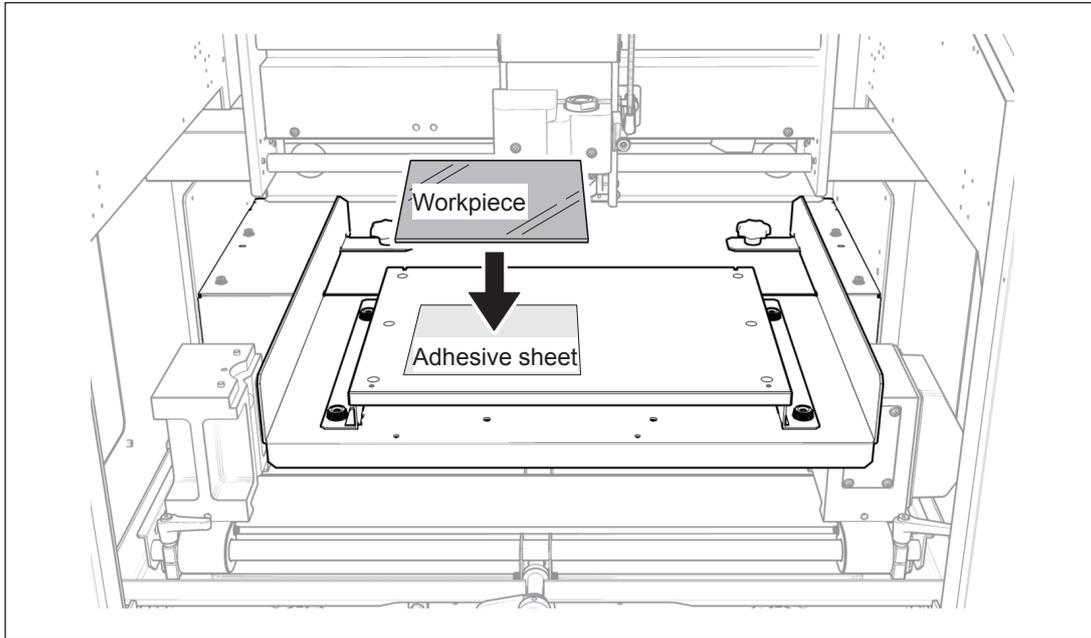
4 Flat Engraving

5 Feature Reference

6 Troubleshooting

Loading Workpiece

Paste a pressure sensitive adhesive sheet on the Bakelite table or the table base. Place and press a workpiece on it.



1

Cylindrical:
Metal and Resin

2

Cylindrical :
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

Troubleshooting

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4-3 Setting the XY Origin Point and Preview Feature

Setting the XY Origin Point

You specify the cutting area by using the laser pointer to identify the two points at the diagonally opposite angles of the square or rectangle, and set the XY origin point at the center of the specified area. (The XY origin is not specified directly.)

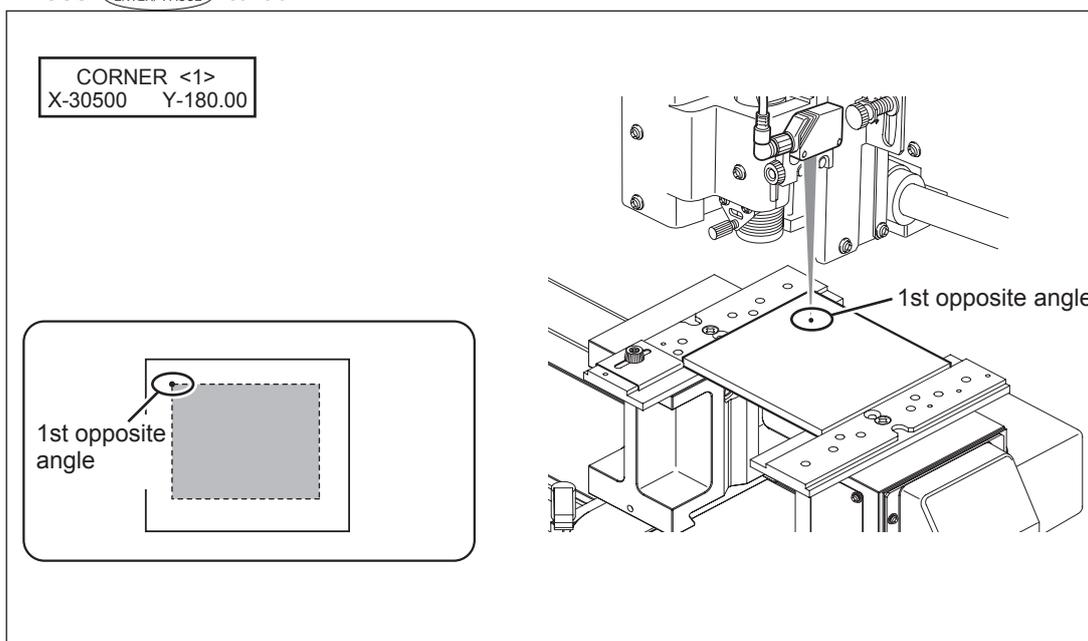
You specify the cutting area by using the laser pointer to identify the two points at the diagonally opposite angles of the square or rectangle, and set the XY origin point at the center of the specified area. (The XY origin is not specified directly.)

If you want to set the XY origin point at a location you select, see here [page 174](#), "Setting the XA or XY Origin Point Where You Choose."

1. Specify the cutting area using the laser pointer.

- 1 Press Press several times to display the screen shown at left. Press or to select [AREA]. Press to confirm. Laser emission starts.

- 2 Press , , , and to align the laser pointer with the first opposite angle of the cutting area. Press to confirm.



1 Cylindrical: Metal and Resin

2 Glass Cylindrical:

3 Ring Engraving

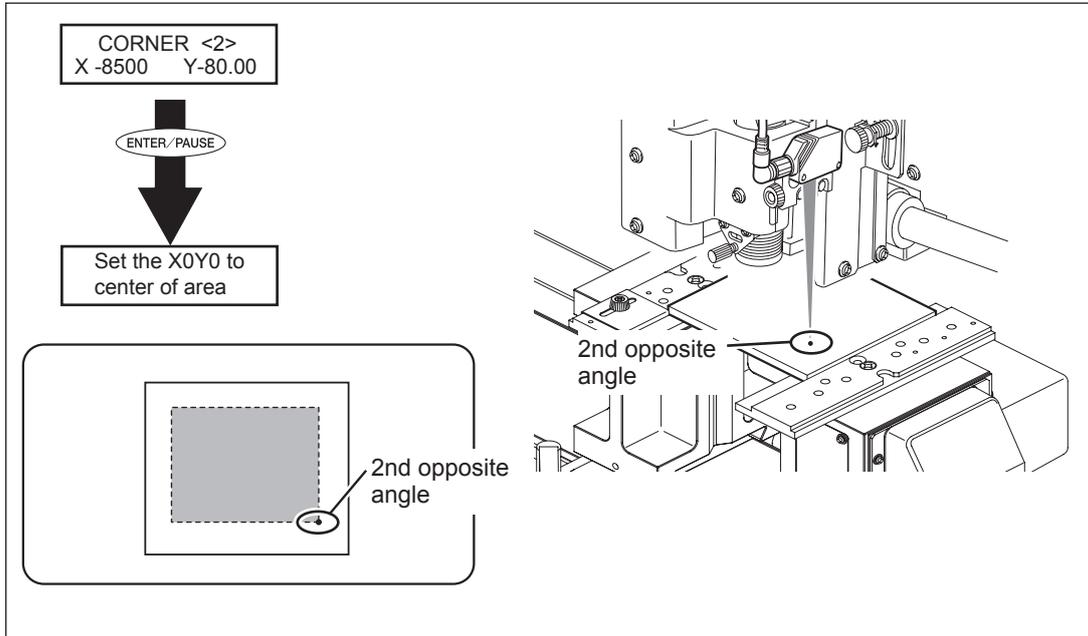
4 Flat Engraving

5 Feature Reference

6 Troubleshooting

- 1
- 2
- 3
- 4
- 5
- 6

- 3 Press **MENU**.
 Press **▲**, **▼**, **◀**, and **▶** to align the laser pointer with the second opposite angle of the cutting area.
 Press **ENTER/PAUSE** to confirm.



The message shown in the figure above is displayed for approximately three seconds, and then the original screen returns.

- 4 **CHECK AREA Hit "ENTER"** Press **MENU**.
 The message shown in the figure at left appears.

- 5 Close the front cover, and press **ENTER/PAUSE**.
 Each press of **ENTER/PAUSE** makes the laser pointer indicate one side of the cutting area. This enables you to check whether the cutting area has been specified at the intended location.

- 6 **I/O OTHERS ADJ AREA** Press **MENU**.
 The message shown in the figure at left appears.

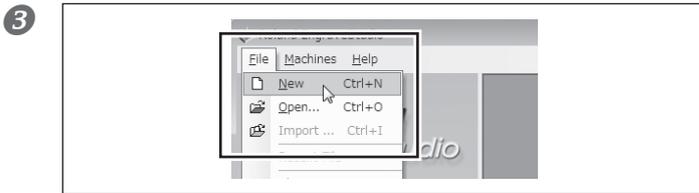
2. Acquire the cutting area with the program.

For Roland EngraveStudio

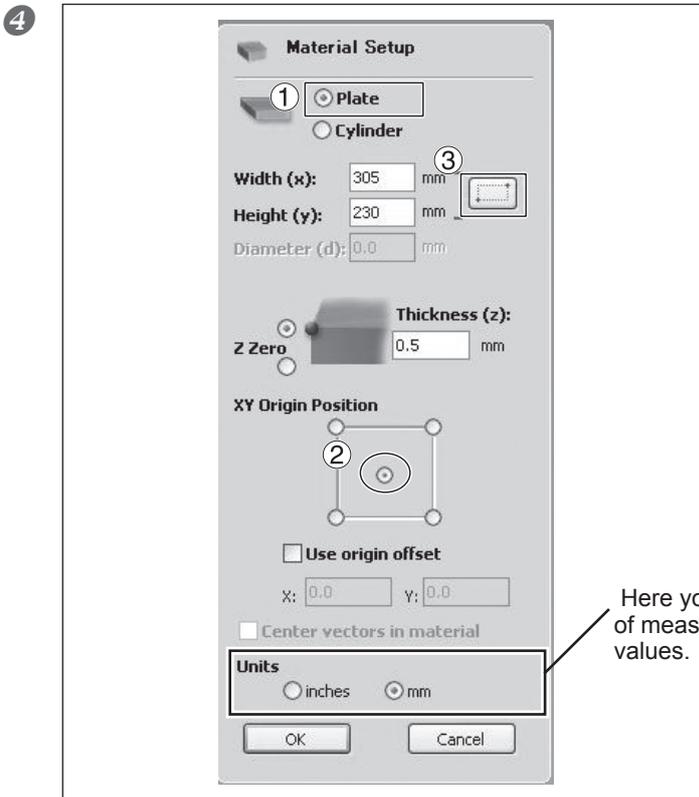
- 1 Start Roland EngraveStudio.



Click "Engraving machine," then select "EGX-360."



Click "File," then "New."

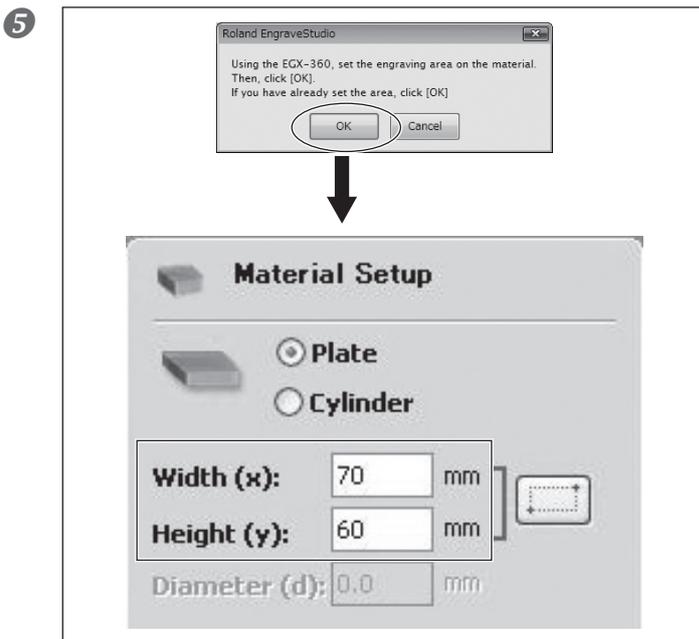


① Select the "Cylindrical material" check box.

② Set the XY origin in the center of the cutting area.

③ Click the "Get from Unit" button ().

Here you can select the unit of measurement for indicating values.



Click [OK].

EngraveStudio acquires the cutting area you specified on the machine.

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

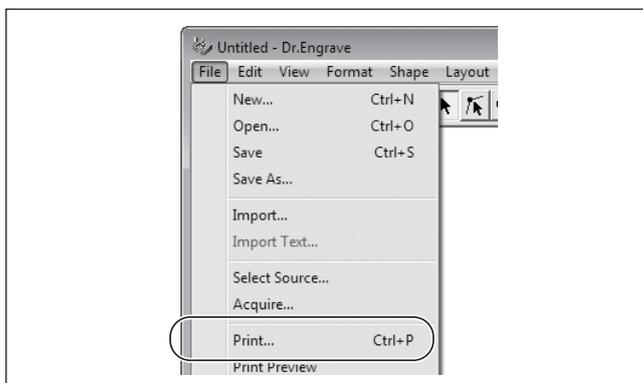
5 Feature Reference

6 Troubleshooting

For Dr. Engrave

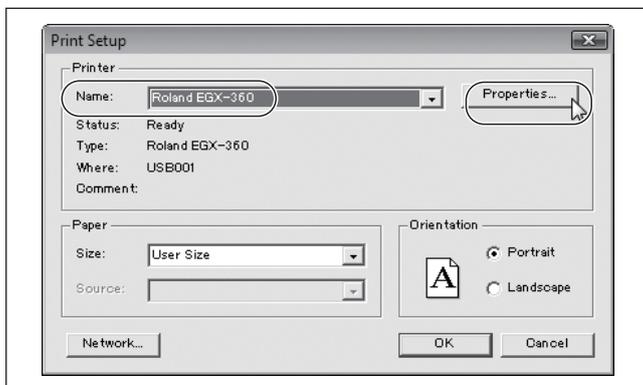
1 Start Dr. Engrave.

2



Click "File," then "Print Setup."

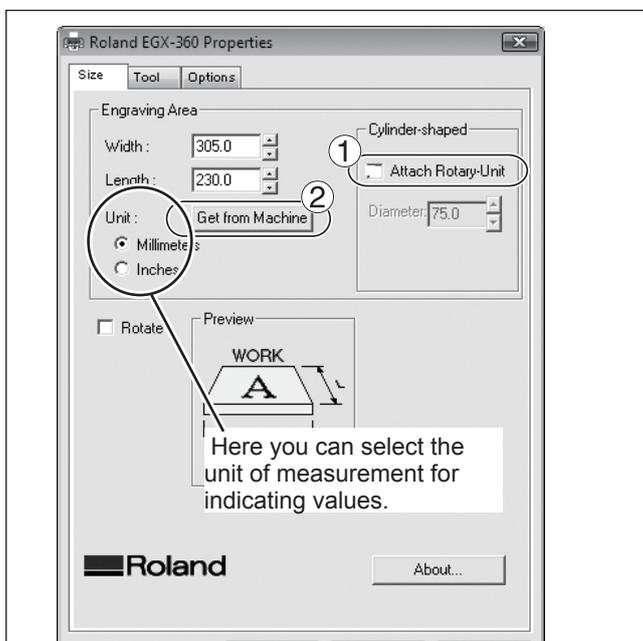
3



For "Printer Name," make sure that "Roland EGX-360" is selected, then click "Properties."

If "Roland EGX-360" is not selected, click the drop-down arrow next to "Printer Name" and select it from the list displayed.

4



1 Clear the selection for the "Use rotary axis unit" check box.

2 Click the "Get from Unit" button.

1 Cylindrical: Metal and Resin

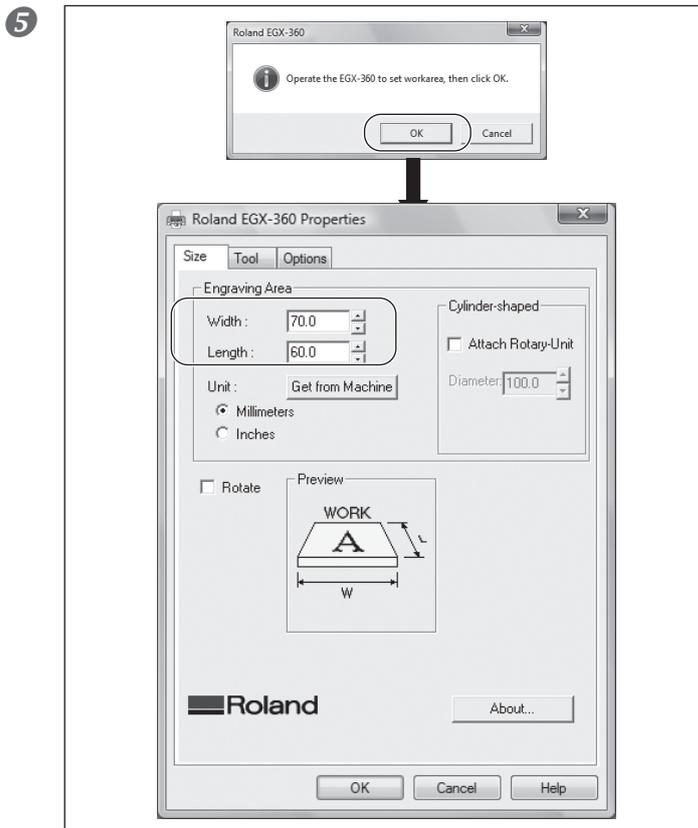
2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

5 Feature Reference

6 Troubleshooting



Click [OK].

Dr. Engrave acquires the cutting area you specified on the machine.

- 6 Click [OK] twice to close the "Roland EGX-360 Properties" window and the "Print Setup" window.

1 Cylindrical:
Metal and Resin

2 Cylindrical:
Glass

3 Ring Engraving

4 Flat Engraving

5 Feature
Reference

6 Troubleshooting

Check the Cutting Path of the Cutter (Preview Feature)

Before you carry out actual cutting, you can use the laser pointer to preview and check the cutting path that the cutter is to take. The following two methods are available

- Path preview: This previews the actual cutting path.
- Area preview: This previews only the range of the cutting data.

Procedure

1 Close the front cover.

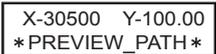
2  Send the cutting data from the computer.
The screen shown at left appears.

3  Use  or  to select "Path Preview" or "Area Preview."
Press  to confirm.



When You Select "Path Preview"

The screen shown below appears, the spindle unit rises to the highest point along the Z axis, and the laser pointer then indicates the cutting path that the cutter is to take.

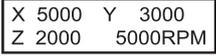


When You Select "Area Preview"

When the message shown below appears, press .

After the spindle unit has risen to the highest point along the Z axis, each press of  makes the laser pointer indicate one side of the range of the cutting data.



4  When you're finished previewing, press  to go back to the screen shown at left.

4-4 Selecting and Installing a Cutter

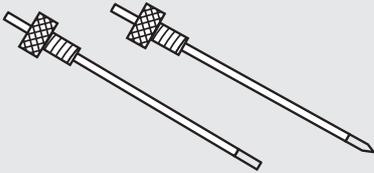
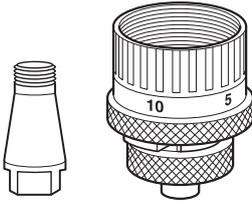
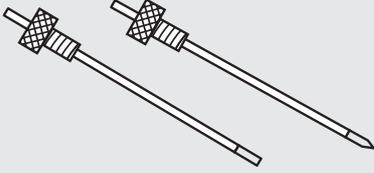
Selecting the Cutter to Match the Purpose

When performing flat engraving on this machine, you can use a wide variety cutters that have a diameter of 3.175 millimeters or 4.36 millimeters. The following chart shows examples of selections of cutters matched to particular purposes. Refer to this chart to select a cutter and the necessary cutting tools for the material and engraving method you're using. Use a collet that matches the cutter type and diameter. To purchase cutter that can be used with this machine, contact your authorized Roland DG Corp. dealer or Roland DG Corp. Call Center.

The table below shows samples of cutter usage, including use with or without a nose unit.

Important: When using diameter-4.36 mm cutters (including diamond scrapers)

Use diameter-4.36 mm cutters at speeds of 15,000 rpm or lower. Use at higher speeds poses danger of damage to the spindle unit due to vibration.

Material and engraving method used	Suitable cutter types	Other necessary cutting tools	Page to see
Engraving on resin material (such as acrylics)	Character cutter (optional: ZEC-A2025) Flat cutter (optional: ZEC-A2320) 	Solid collet (included) Nose unit (included) *1 	P. 149
Engraving on metal material (such as aluminum or brass) Relief creation or other three-dimensional engraving on resin material	Character cutter (optional: ZEC-A2025) Flat cutter (optional: ZEC-A2320) 	Solid collet (included) 	P. 153

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

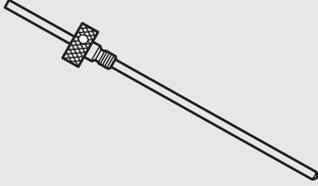
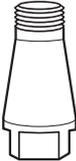
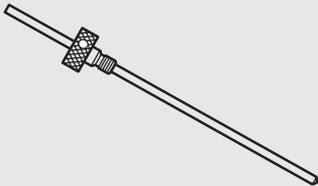
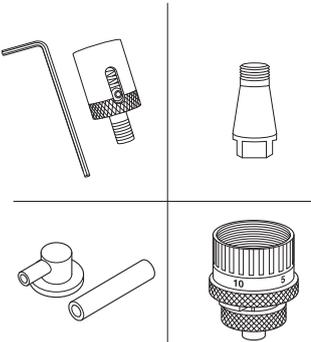
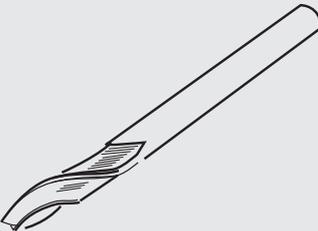
3 Ring Engraving

4 Flat Engraving

5 Feature Reference

6 Troubleshooting

4-4 Selecting and Installing a Cutter

Material and engraving method used	Suitable cutter types	Other necessary cutting tools	Page to see
1 Cylindrical: Metal and Resin	Diamond scraper (diameter 4.36 mm, included: ZDC-A4000) *2 	Solid collet for diamond scraper (diameter 4.36 mm, included) *3 	P. 157
2 Cylindrical: Glass	Rotating diamond cutter (diameter 3.175 mm, optional: ZDC-A2000R) 	Burnishing attachment (optional) Solid collet (diameter 3.175 mm, included) Water nose attachment (included) Nose unit (included) 	P. 161
3 Ring Engraving	End mill (optional) 	Special end-mill collet (optional) 	P. 166
4 Flat Engraving	Three-dimensional cutting on resin material (such as wood)		
5 Feature Reference			
6 Troubleshooting			

*1 Use of the nose unit is not suitable for fill engraving at a width greater than the diameter of the nose-unit tip.
 ⇨ P. 180, "Nose Unit."

*2 The optional diameter 3.175 mm diamond scraper (ZDC-A2000) can be used as well.

*3 When using an optional diamond scraper (diameter 3.175 mm), use the provided solid collet (diameter 3.175mm).

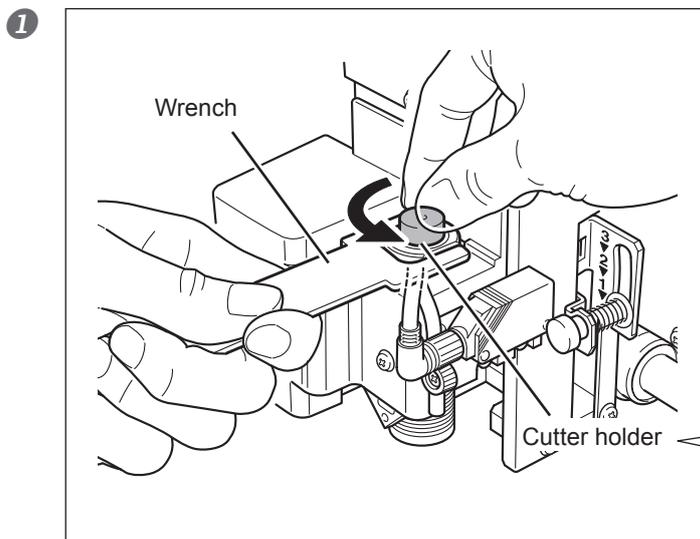
Installing a Character Cutter or Flat Cutter (With Nose Unit)

- ⚠ WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠ WARNING** Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.
- ⚠ CAUTION** **Caution: cutting tool.**
The cutting tool is sharp. To avoid injury, exercise caution.

Type of cutter used	Character cutter (optional: ZEC-A2025) Flat cutter (optional: ZEC-A2320)
Other cutting tools	Solid collet (included), Nose unit (included)
Suitable workpiece types	Resin material such as acrylics Note: Aluminum, brass, and other easily scratched workpieces are not suitable.
Spindle rotation	On
Automatic Z-axis control	On
Lock-lever position	1 ↓ or 2 ↓

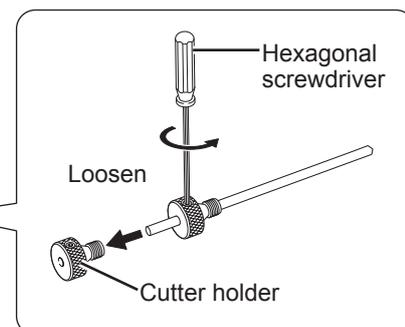
This performs engraving without using the nose unit. This method doesn't scrape the surface of the workpiece, so you can also use it with materials such as aluminum or brass. Note, however, that the Z-axis origin point is fixed and unchanging, so in order to obtain a uniform cutting-in depth, the thickness of the workpiece must also be uniform.

1. Install the cutter holder, solid collet, and nose unit.



Install the cutter holder.

While holding the spindle unit immobile with a wrench, tighten the cutter holder. The cutter holder is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.



1
Cylindrical:
Metal and Resin

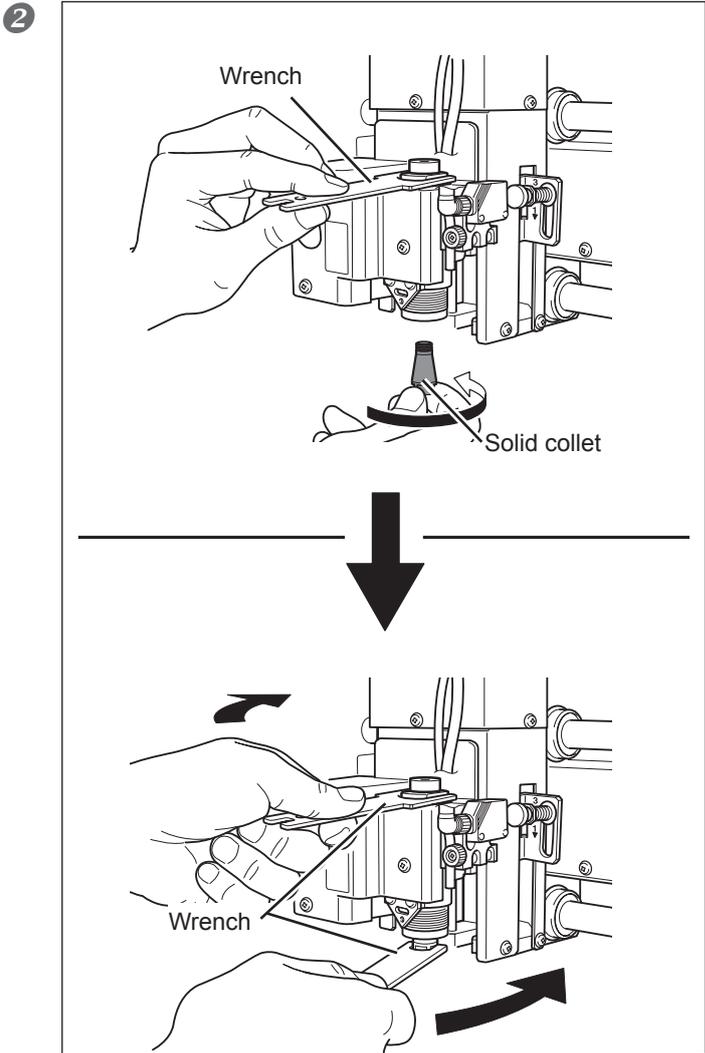
2
Cylindrical:
Glass

3
Ring Engraving

4
Flat Engraving

5
Feature
Reference

6
Troubleshooting

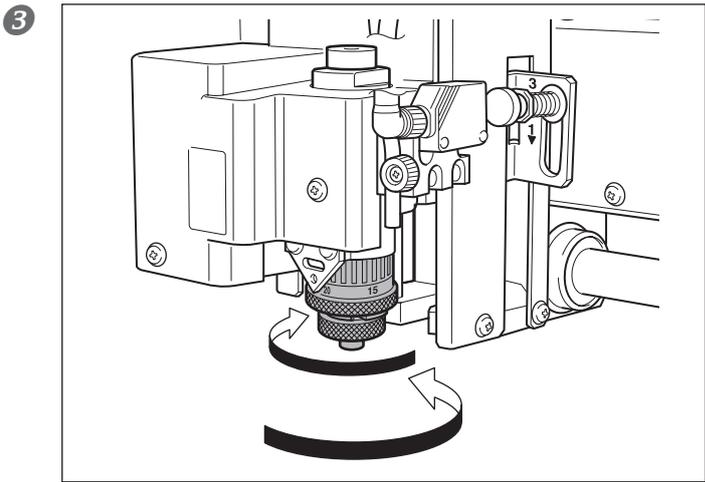


Install the solid collet.
Tighten loosely.

Insert the solid collet into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten loosely. Use an appropriate solid collet for the cutter's diameter and type.

Tighten fully.

Using two wrenches, tighten the solid collet fully. The appropriate tightening torque is 3.2 N-m (32kgf-cm).



Install the nose unit.
Tighten until no further movement is possible, then loosen two turns.
☞ P. 180, "Nose Unit"

Point

Make sure no cutting waste is present.

Before you install the nose unit, make sure no buildup of cutting waste or the like is present inside the nose unit or around the spindle unit. Any buildup of cutting waste that is allowed to remain may become jammed in when the nose unit is installed, making detachment impossible.

Tighten straight.

Use care especially when starting to tighten to ensure that the parts are not cross-threaded, and tighten slowly and straight. Using excessive force or tightening at an angle may damage the threads.

2. Make the settings for spindle speed and Z-axis control.



Press **MENU** several times to display the screen shown at left.
Press **◀** or **▶** to select [OTHERS].
Press **ENTER/PAUSE**.



Press **◀** to select "ON."
Press **ENTER/PAUSE** to confirm.

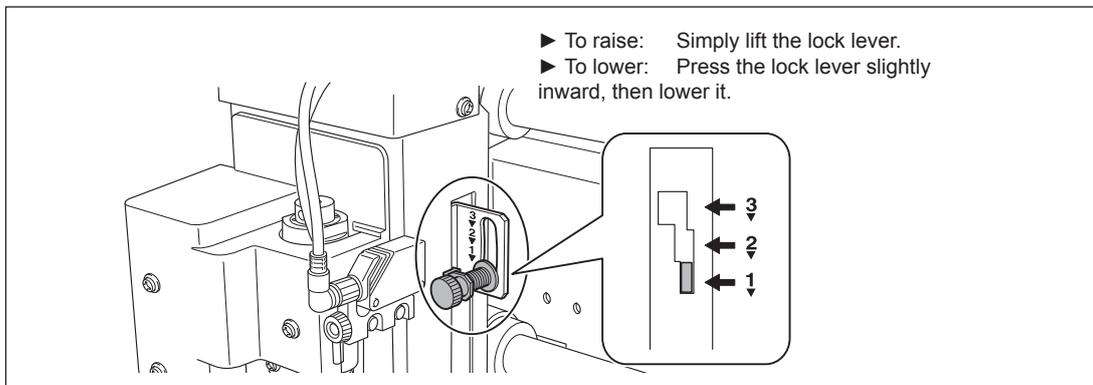


Press **MENU**.
Press **◀** to select "ON."
Press **ENTER/PAUSE** to confirm.



Follow the displayed message to engage the lock lever at position **1** or **2**.

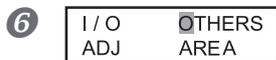
After three seconds the message disappears and the original screen reappears.
For more information about the lock lever, see page 181, "The Positions of the Lock Lever."



Press **MENU**.
Use **▲** and **▼** to select the value.

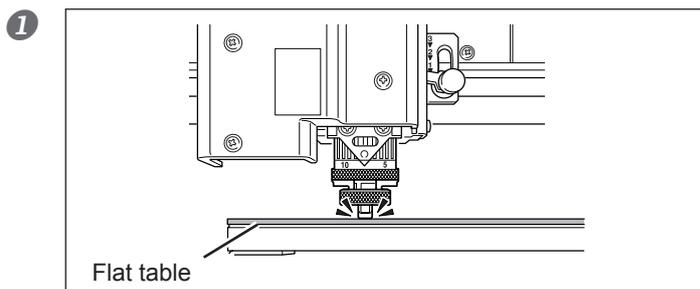
This makes the setting for the distance the cutter rises from the Z-axis origin point during cutting (the cut-out amount). When making this setting, take into account the shape of the workpiece and the time required for movement. Unless the shape of the workpiece makes an especially large cut-out amount necessary, it may be a good idea to set this at about 500 (5 millimeters).

Press **ENTER/PAUSE** to confirm.



Press **MENU** several times to display the main screen.
The Z-axis coordinate display changes to "AUTO."

3. Install the cutter and make the setting for the cutting-in depth.

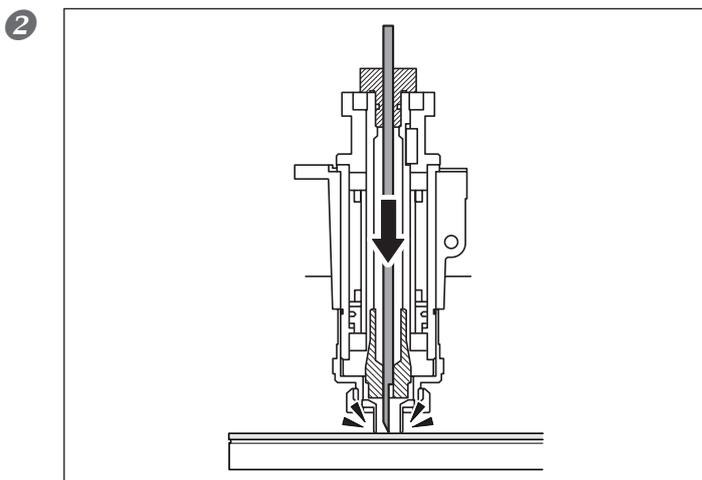


Use **◀**, **▶**, **▲**, and **▼** to move the spindle head to the area above the workpiece, then press **▼-Z** to lower the spindle head.

Descent stops automatically when the tip of the nose unit touches the workpiece table.

4-4 Selecting and Installing a Cutter

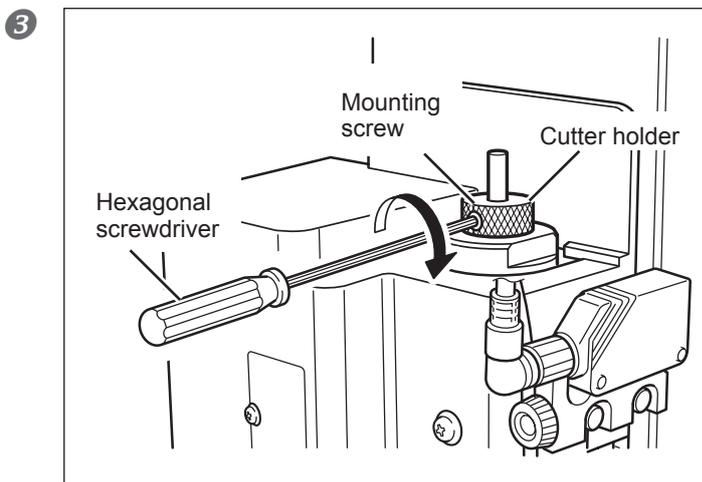
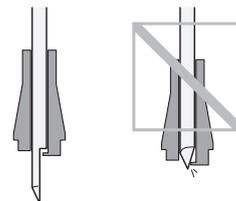
- 1
- Cylindrical:
Metal and Resin
- 2
- Cylindrical:
Glass
- 3
- Ring Engraving
- 4
- Flat Engraving
- 5
- Feature Reference
- 6
- Troubleshooting



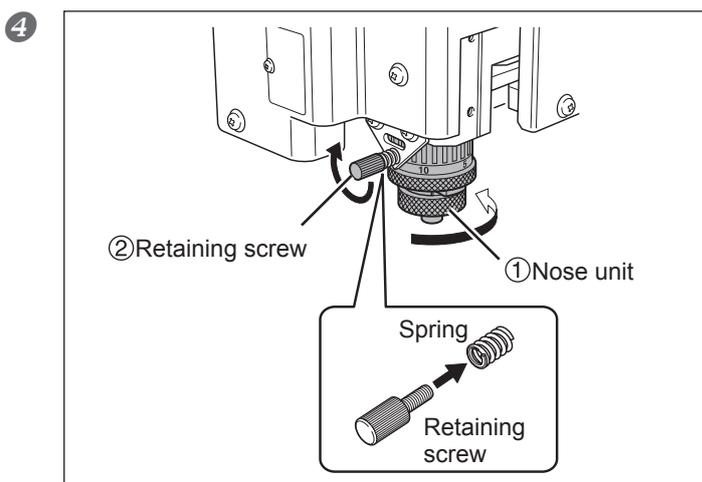
Insert the cutter into the cutter holder and bring the tip of the cutter into contact with the workpiece table.

Point

When using a diameter-4.36 mm solid collet
Be careful to orient the cutter correctly.



Tighten the mounting screw to secure the cutter in place.



Make the setting for the cutting-in depth.

① Tighten the nose unit to match the desired cutting-in depth.

The amount of extension of the cutter is the cutting-in depth.

1 scale tick = 0.0254 mm

1 turn = 0.635 mm

(4 to 8 scale ticks are approximately 0.1 to 0.2 mm)

② Secure the nose unit in place with the retaining screw.

This completes the installation of the cutter. Go on to page 171, "Start Engraving."

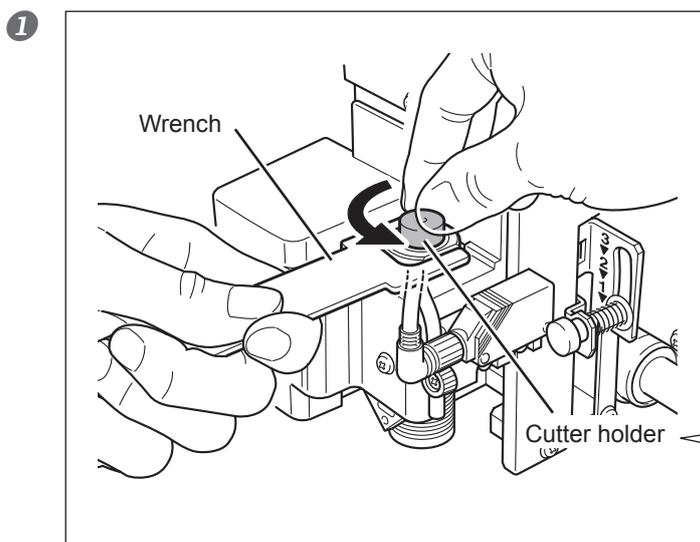
Installing a Character Cutter or Flat Cutter (With No Nose Unit)

- ⚠ WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠ WARNING** Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.
- ⚠ CAUTION** Caution: cutting tool.
The cutting tool is sharp. To avoid injury, exercise caution.

Type of cutter used	Character cutter (optional: ZEC-A2025-BAL, etc.) Flat cutter(optional: ZEC-A2025, etc.)
Other cutting tools	Solid collet (included)
Suitable workpiece types	Aluminum, brass, acrylics, etc.
Spindle rotation	On
Automatic Z-axis control	Off
Lock-lever position	3 ▼

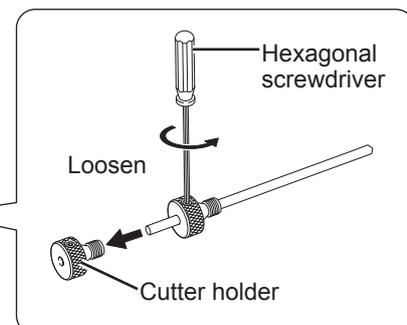
This performs engraving without using the nose unit. This method doesn't scrape the surface of the workpiece, so you can also use it with materials such as aluminum or brass. Note, however, that the Z-axis origin point is fixed and unchanging, so in order to obtain a uniform cutting-in depth, the thickness of the workpiece must also be uniform.

1. Install the cutter holder and solid collet.



Install the cutter holder.

While holding the spindle unit immobile with a wrench, tighten the cutter holder. The cutter holder is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.



1
Cylindrical:
Metal and Resin

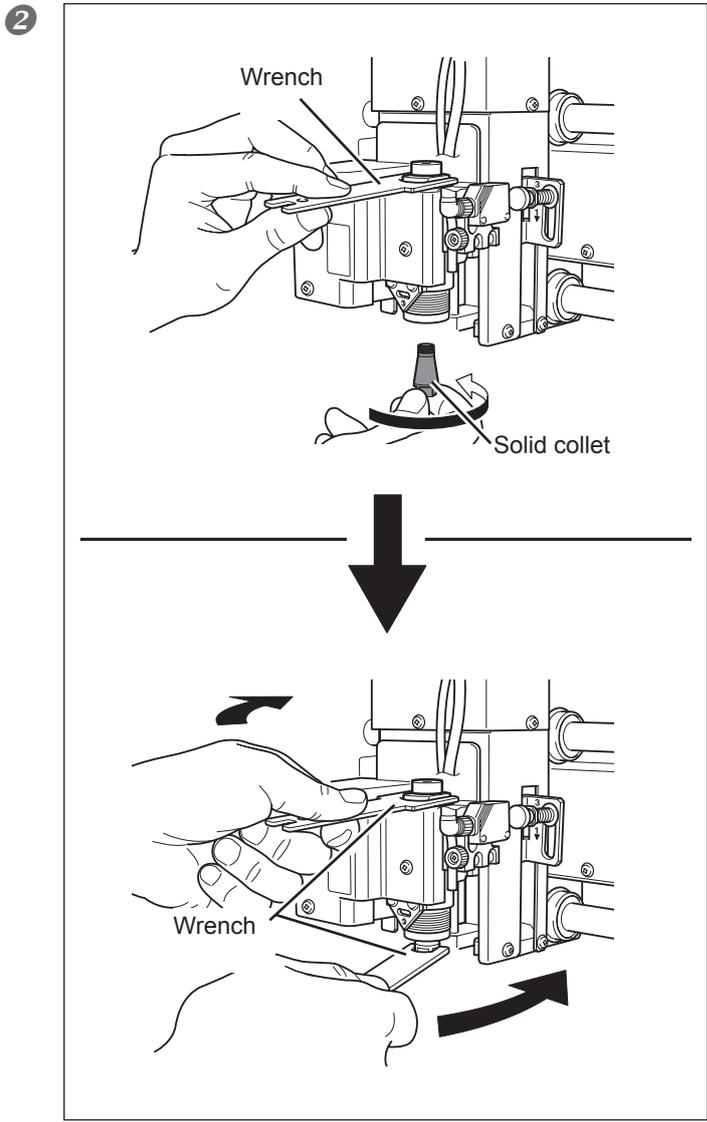
2
Cylindrical:
Glass

3
Ring Engraving

4
Flat Engraving

5
Feature
Reference

6
Troubleshooting



Install the solid collet.
Tighten loosely.
Insert the solid collet into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten loosely. Use an appropriate solid collet for the cutter's diameter and type.

Tighten fully.
Using two wrenches, tighten the solid collet fully. The appropriate tightening torque is 3.2 N-m (32kgf-cm).

2. Make the settings for spindle speed and Z-axis control.

- 1

I/O ADJ	OTHERS AREA
------------	----------------

Press **MENU** several times to display the screen shown at left.
Press **◀** or **▶** to select [OTHERS].
Press **ENTER/PAUSE**.
- 2

REVOLUTION <ON>	OFF
--------------------	-----

Press **◀** to select "ON."
Press **ENTER/PAUSE** to confirm.
- 3

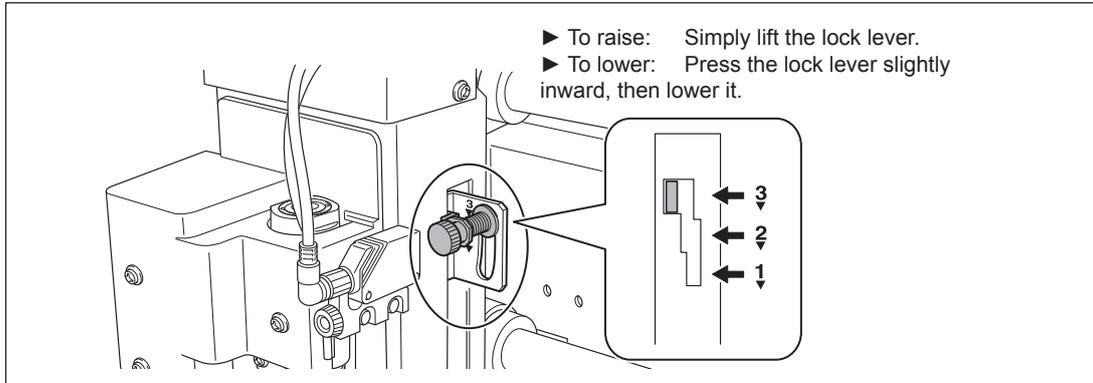
AUTO Z CONTROL ON	<OFF>
----------------------	-------

Press **MENU**.
Use **▶** to select "OFF."
Press **ENTER/PAUSE** to confirm.

4 SET lock lever to 3

Follow the displayed message to engage the lock lever at position 3.

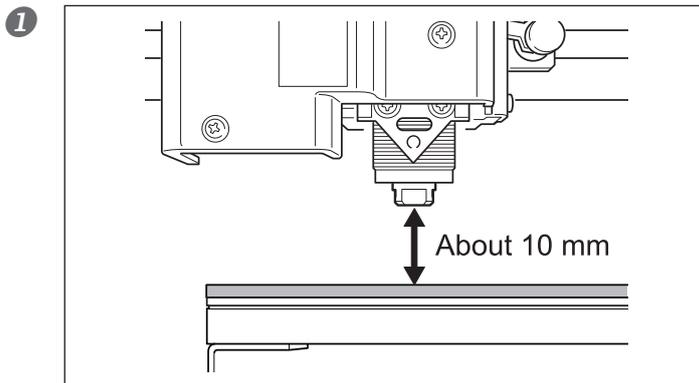
After three seconds the message disappears and the original screen reappears.
For more information about the lock lever, see page 181, "The Positions of the Lock Lever."



5 X 0 Y 23000
Z 0 5000RPM

Press **MENU** several times to display the main screen.

3. Install the cutter and set the Z-axis origin point.



Use **◀**, **▶**, **▲**, and **▼** to move the spindle head to the area above the workpiece, then press **▼ -Z** to lower the spindle head.

Stop at a position where the tip of the solid collet is approximately 10 millimeters from the surface of the workpiece.

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

5 Feature Reference

6 Troubleshooting

4-4 Selecting and Installing a Cutter

1 Cylindrical:
Metal and Resin

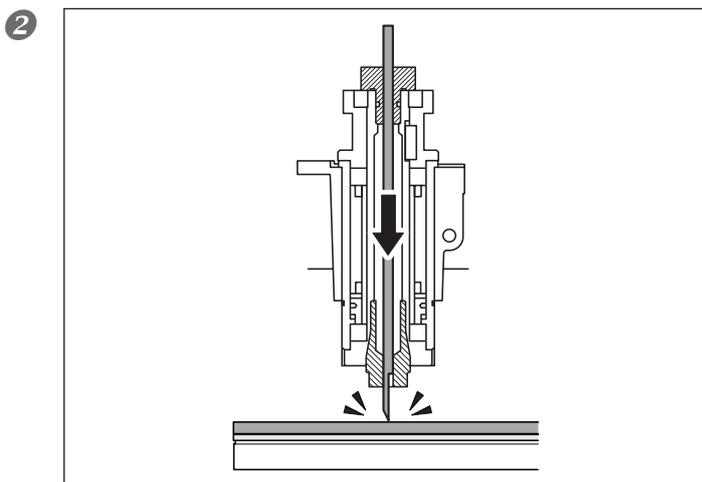
2 Cylindrical:
Glass

3 Ring Engraving

4 Flat Engraving

5 Feature Reference

6 Troubleshooting



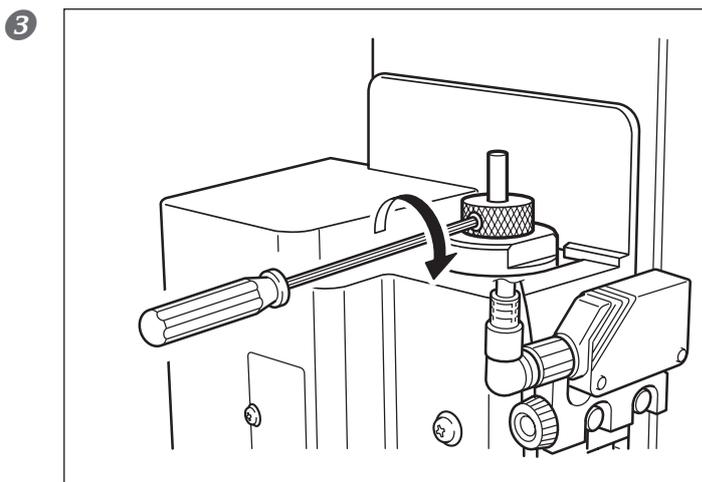
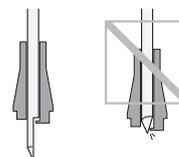
Insert the cutter into the cutter holder and bring the tip of the cutter into contact with the surface of the workpiece.

Placing a thin sheet of paper on the workpiece can prevent damage to the workpiece when the cutter touches it. However, take the thickness of the paper into account when you set the Z-axis origin.



Point

When using a diameter-4.36 mm solid collet Be careful to orient the cutter correctly.



Tighten the mounting screw to secure the cutter in place.

7 SET Z1 **Z0** Z2
SURFACE -3000

Press **Z** to display the screen shown at left, then press **◀** or **▶** to select "Z0."

8 SET Z1 **Z0** Z2
SURFACE<-3000>

Press **ENTER/PAUSE** to confirm.
The Z-axis origin has now been set.

9 X 500 Y 23000
Z 0 5000RPM

Press **MENU**.
The display returns to the main screen. The value of the Z-axis coordinate is now "0" (zero).

This completes the installation of the cutter. Go on to page 171, "Start Engraving."

Installing a Diamond Scraper

- ⚠ WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠ WARNING** Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.
- ⚠ CAUTION** Caution: cutting tool.
The cutting tool is sharp. To avoid injury, exercise caution.

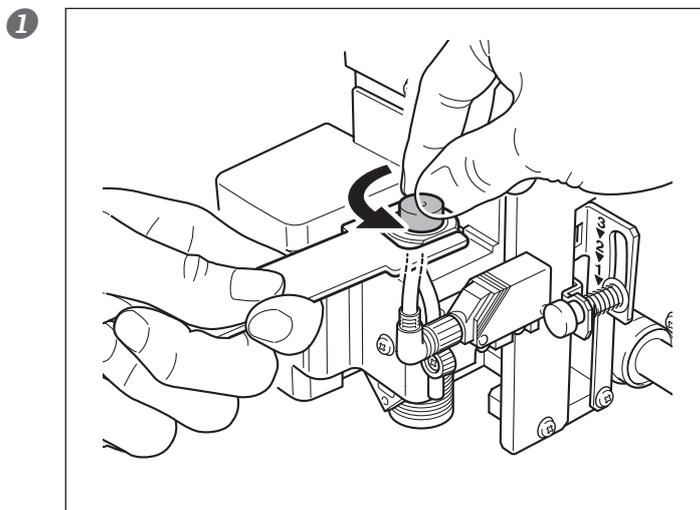
Type of cutter used	Diamond scraper (diameter 4.36 mm, included: ZDC-A4000)
Other cutting tools	Solid collet for diamond scraper(diameter 4.36 mm,included) *2
Suitable workpiece types	Metal materiaks such as aluminum, ot brass
Spindle rotation	Off
Automatic Z-axis control	On
Lock-lever position	1 ↓ or 2 ↓

*1 The optional diameter 3.175 mm diamond scraper (ZDC-A2000) can be used as well.

*2 When using an optional diamond scraper (diameter 3.175 mm), use the provided solid collet (diameter 3.175mm).

This performs scribing using a diamond scraper. With scribing, cutting is carried out by scraping the workpiece without rotating the spindle. Because automatic Z control is set to "on," the cutting-in depth for the workpiece is determined by the pressure of the cutter. For this reason, this method is not suitable for deep engraving.

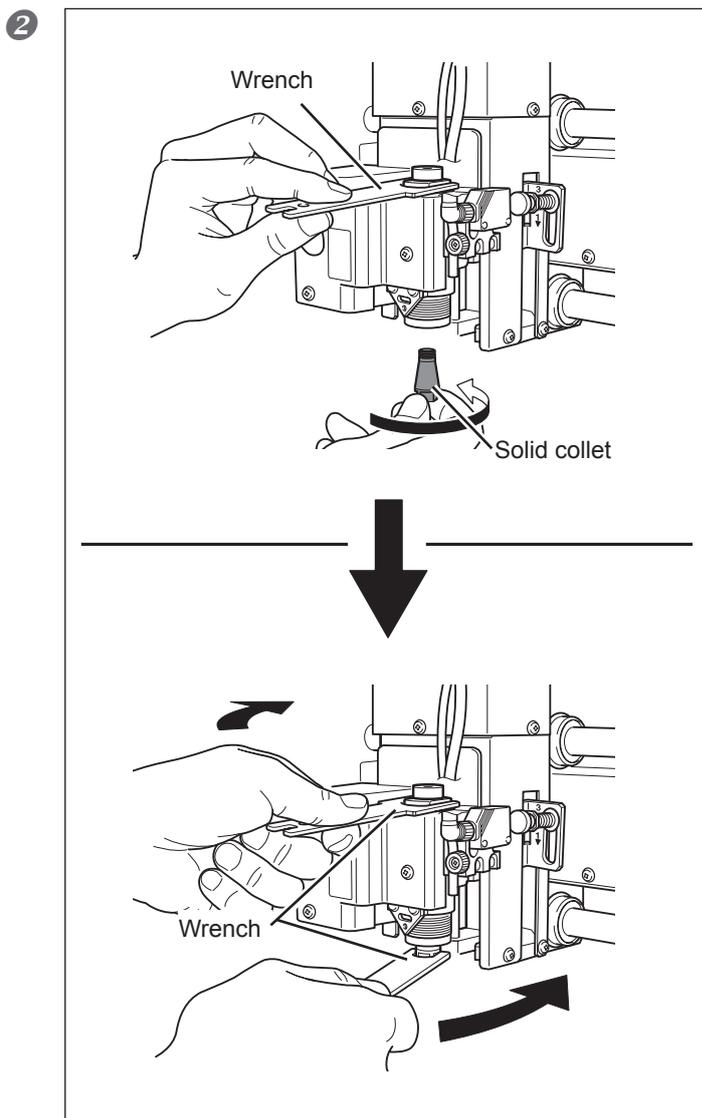
1. Install the cutter holder and solid collet.



Install the cutter holder.

While holding the spindle unit immobile with a wrench, tighten the cutter holder. The cutter holder is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.

- 1
Cylindrical:
Metal and Resin
- 2
Cylindrical:
Glass
- 3
Ring Engraving
- 4
Flat Engraving
- 5
Feature
Reference
- 6
Troubleshooting



**Install the solid collet.
Tighten loosely.**

Insert the solid collet into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten loosely. Use an appropriate solid collet for the cutter's diameter and type.

Tighten fully.

Using two wrenches, tighten the solid collet fully. The appropriate tightening torque is 3.2 N-m (32kgf-cm).

2. Make the settings for spindle speed and Z-axis control.

- 1

I/O ADJ	<input type="radio"/> OTHERS AREA
------------	--------------------------------------

Press **MENU** several times to display the screen shown at left.
Press **◀** or **▶** to select [OTHERS].
Press **ENTER/PAUSE**.
- 2

REVOLUTION ON	<input type="radio"/> OFF
------------------	---------------------------

Use **▶** to select "OFF."
Press **ENTER/PAUSE** to confirm.
- 3

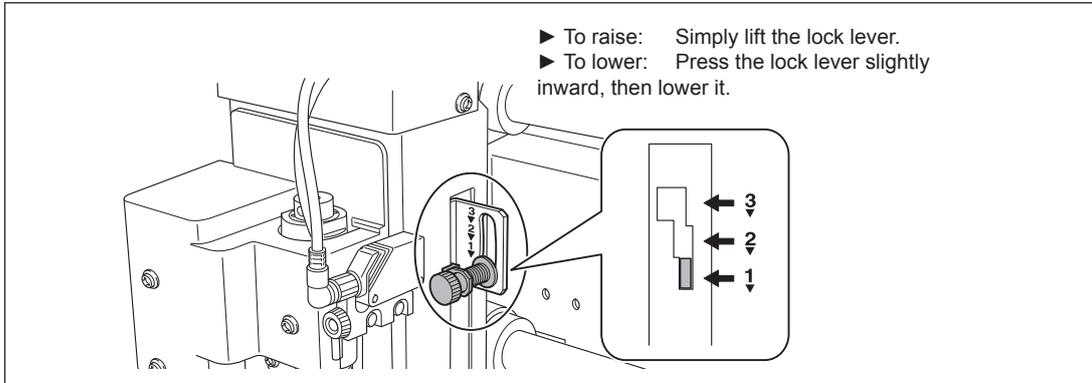
AUTO Z CONTROL <ON>	OFF
------------------------	-----

Press **MENU**.
Press **◀** to select "ON."
Press **ENTER/PAUSE** to confirm.

4 SET lock lever to 1 or 2

Follow the displayed message to engage the lock lever at position 1 or 2.

After three seconds the message disappears and the original screen reappears. For more information about the lock lever, see page 181, "The Positions of the Lock Lever."



5 AUTO Z CONTROL UP <500>

Press **MENU**. Use **▲** and **▼** to select the value.

This makes the setting for the distance the cutter rises from the Z-axis origin point during cutting (the cut-out amount). When making this setting, take into account the shape of the workpiece and the time required for movement. Unless the shape of the workpiece makes an especially large cut-out amount necessary, it may be a good idea to set this at about 500 (5 millimeters).

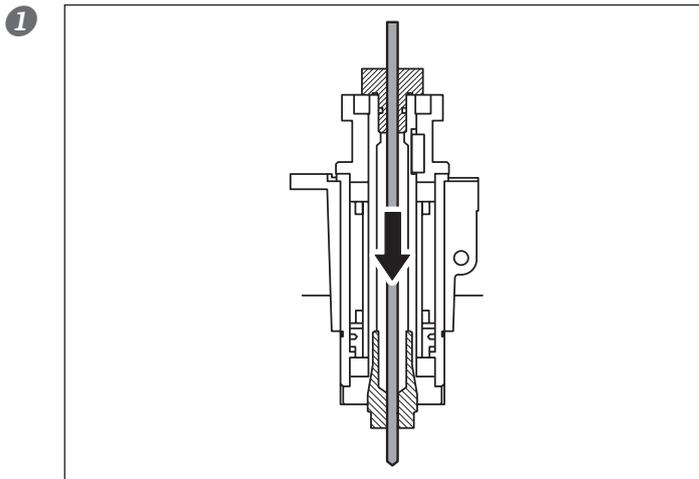
Press **ENTER/PAUSE** to confirm.

6 X 0 Y 23000 Z AUTO S OFF

Press **MENU** several times to display the main screen.

The Z-axis coordinate display changes to "AUTO" and the spindle-speed display changes to "S OFF."

3. Install the diamond scraper and determine the amount of extension.



Insert the diamond scraper into the cutter holder.

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

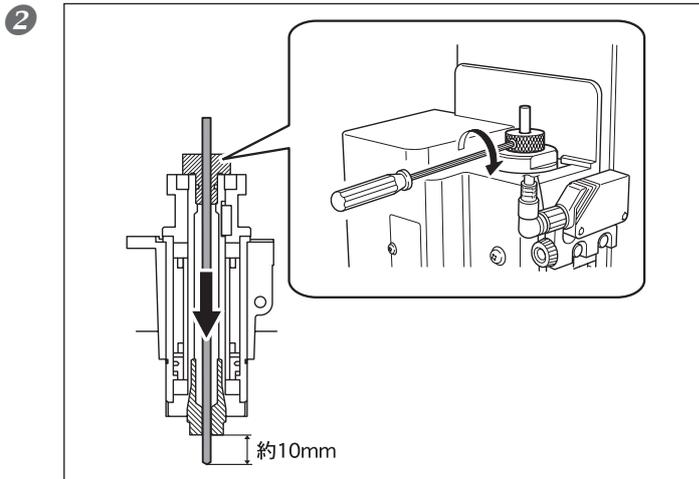
3 Ring Engraving

4 Flat Engraving

5 Feature Reference

6 Troubleshooting

4-4 Selecting and Installing a Cutter



Tighten the mounting screw for the cutter holder, and secure the diamond scraper in place.

For the amount of extension of the tip of the diamond scraper, a value of about 10 millimeters may work well.

This completes the installation of the diamondscraper. Go on to page 171, "Start Engraving."

1

Cylindrical:
Metal and Resin

2

Cylindrical :
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

Troubleshooting

TOC

Using the Burnishing Attachment and Diamond Scraper Together

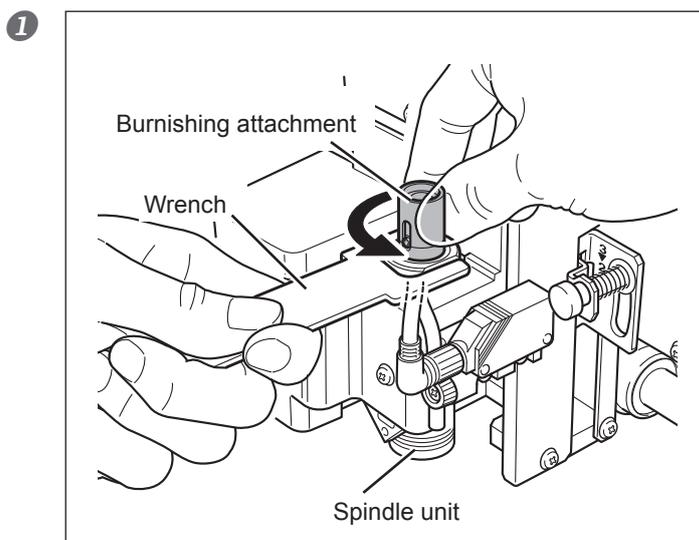
- ⚠ WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠ WARNING** Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.
- ⚠ CAUTION** Caution: cutting tool.
The cutting tool is sharp. To avoid injury, exercise caution.

Type of cutter used	Rotating diamond cutter (diameter 3.175 mm, optional: ZDC-A2000R)
Other cutting tools	Bunishing attachment (Optional), solid collet (diameter 3.175 mm, optional), water nose attachment (optional), nose unit (optional)
Suitable workpiece types	Glass
Spindle rotation	On
Automatic Z-axis control	Off
Lock-lever position	3 ▼

This performs engraving on glass materials using a rotating diamond cutter and burnishing attachment. This method require water as the lubricant during cutting just same as performing engraving on cylindrical glass materials.

☞ P. 169, "Preparing the Lubricant (Glass Material Only) "

1. Install the burnishing attachment, solid collet, and water nose unit.



Install the burnishing attachment.

While holding the spindle unit immobile with a wrench, tighten the burnishing attachment. The burnishing attachment is reverse-threaded (that is, you turn it counterclockwise to tighten it). Be careful to turn it in the correct direction.

1
Cylindrical:
Metal and Resin

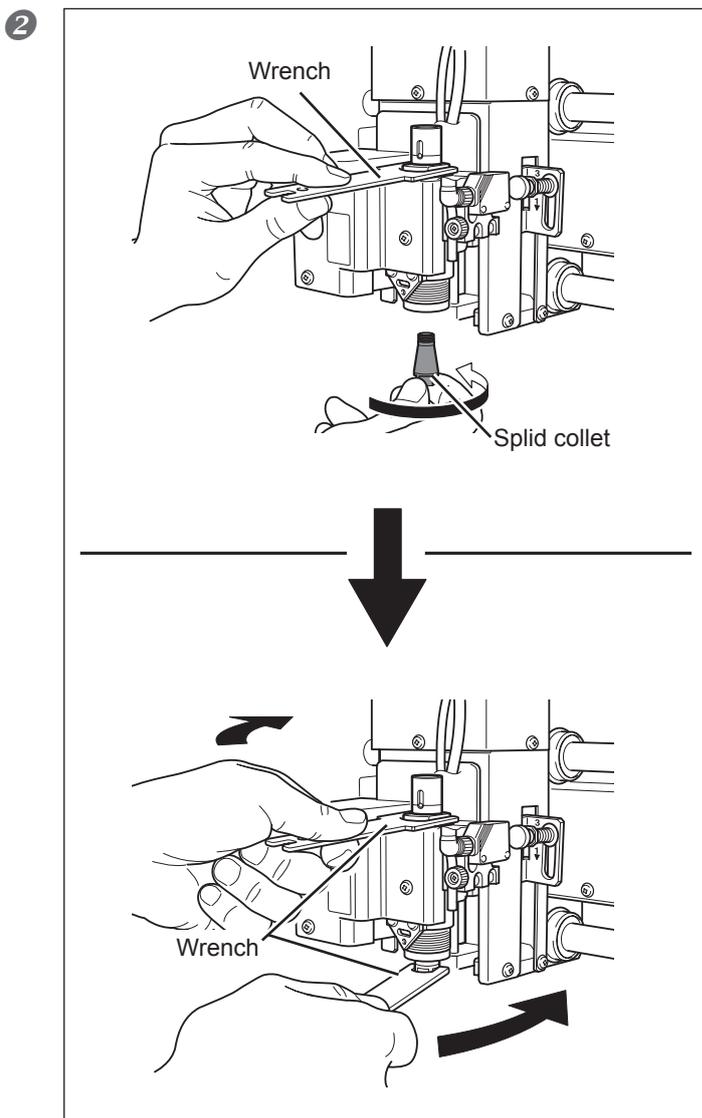
2
Cylindrical:
Glass

3
Ring Engraving

4
Flat Engraving

5
Feature
Reference

6
Troubleshooting



**Install the solid collet.
Tighten loosely.**

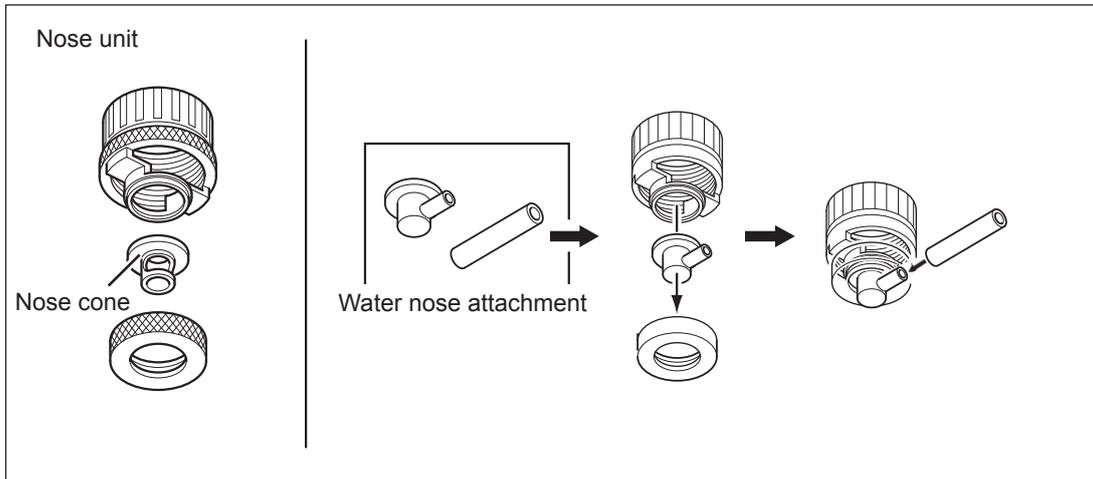
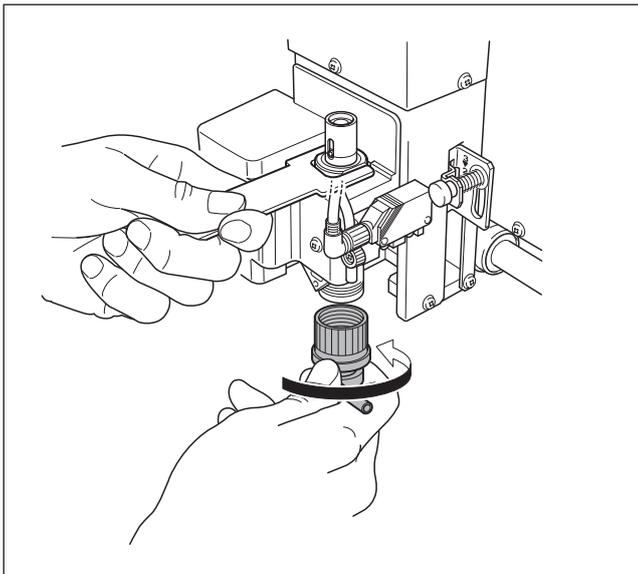
Insert the solid collet into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten loosely. Use an appropriate solid collet for the cutter's diameter and type.

Tighten fully.

Using two wrenches, tighten the solid collet fully. The appropriate tightening torque is 3.2 N-m (32kgf-cm).

3 Install the water nose unit.**Assembling the Water Nose Unit**

Detach the nose cone from the nose unit and install the water nose attachment on the nose unit.

**Installing the Water Nose Unit**

Tighten until no further movement is possible, then adjust so that the hose attachment port is on the right side as seen from the machine.

Adjust to a position allowing easy attachment of the hose.

**Point****Make sure no cutting waste is present.**

Before you install the nose unit, make sure no buildup of cutting waste or the like is present inside the nose unit or around the spindle unit. Any buildup of cutting waste that is allowed to remain may become jammed in when the nose unit is installed, making detachment impossible.

Tighten straight.

Use care especially when starting to tighten to ensure that the parts are not cross-threaded, and tighten slowly and straight. Using excessive force or tightening at an angle may damage the threads.

1

Cylindrical:
Metal and Resin

2

Cylindrical:
Glass

3

Ring Engraving

4

Flat Engraving

5

Feature
Reference

6

Troubleshooting

2. Make the settings for spindle speed and Z-axis control.

1  Press **MENU** several times to display the screen shown at left.
Press **◀** or **▶** to select [OTHERS].
Press **ENTER/PAUSE**.

2  Press **◀** to select "ON."
Press **ENTER/PAUSE** to confirm.
Set the spindle's speed of rotation to a value of 10,000 rpm or less. (The recommended setting is 8,000 rpm.)

Notice

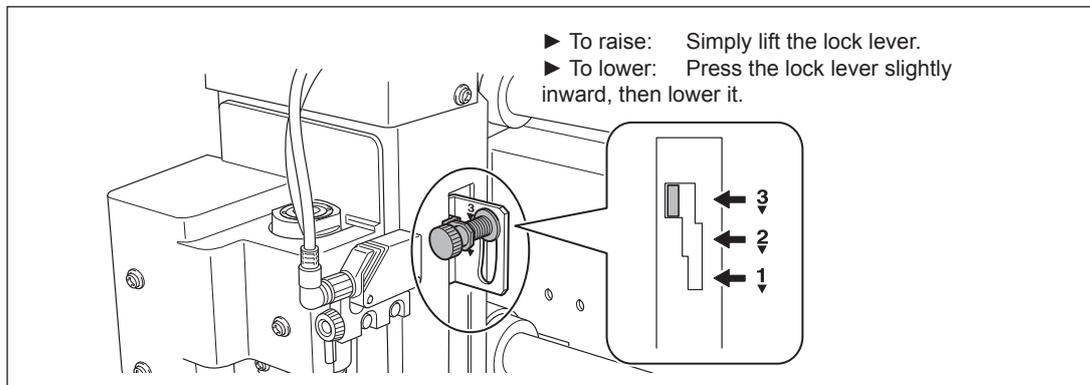
Spindle Speed During Glass Engraving

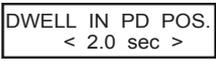
The speed of spindle rotation during glass engraving is subject to limitation. Exceeding this upper limit may cause spindle malfunction due to strong vibration. Exercise caution.

- Upper limit: 10,000 rpm
- Recommended: 8,000 rpm

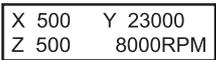
3  Press **MENU**.
Use **▶** to select "OFF."
Press **ENTER/PAUSE** to confirm.

4  Follow the displayed message to engage the lock lever at position **3**.
After three seconds the message disappears and the original screen reappears.
For more information about the lock lever, see page 181, "The Positions of the Lock Lever."

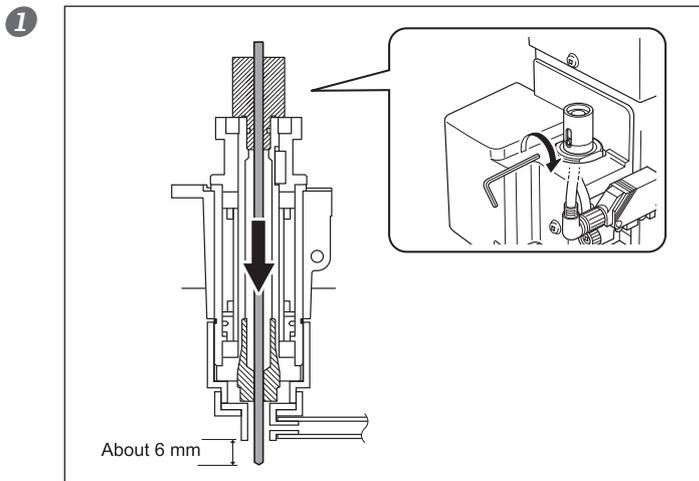


5  Press **MENU** several times to display the screen shown at left.
Use **▲** and **▼** to select the value. (recommend: 2.0 sec.)
Press **ENTER/PAUSE** to confirm.

This sets the interval from the time the tool makes contact with the material surface during cutting until engraving starts. Because the tool is prone to slipping in the case of glass material, this wait time must be set to help ensure that the tool is pressed firmly against the material so that it won't slip.

6  Press **MENU** several times to display the main screen.

3. Install the rotating diamond cutter and determine the amount of extension.

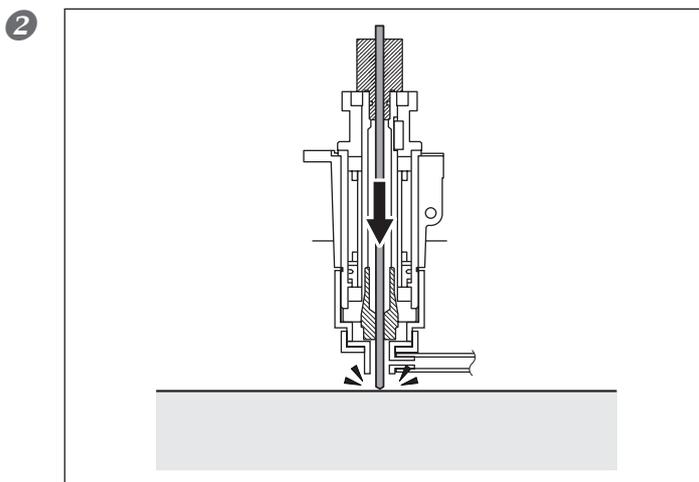


Insert the rotating diamond cutter into the burnishing attachment.

Tighten the mounting screw for the burnishing attachment, and secure the rotating diamond cutter in place.

For the amount of extension of the tip of the rotating diamond cutter, a value of about 6 millimeters may work well.

Please note that the amount to which water scatters increase in proportion to the extension of the tip of the cutter.



Press $\nabla -z$ to bring the tip of the rotating diamond cutter into contact with the cutting surface on the workpiece.

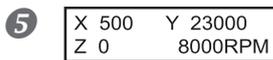
It may be a good idea to cover the workpiece with a light cloth or the like to keep it from being damaged.



Press Z to display the screen shown at left, then press \leftarrow or \rightarrow to select "Z0."



Press ENTER/PAUSE to confirm. The Z-axis origin has now been set.



Press MENU . The display returns to the main screen. The value of the Z-axis coordinate is now "0" (zero).

This completes the installation of the burnishing attachment and rotating diamond cutter. Go on to page 169. "Preparing the Lubricant (Glass Material Only)."

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

4 Flat Engraving

5 Feature Reference

6 Troubleshooting

Instalng a End Mill

⚠ WARNING Never inadvertently touch the computer or handy panel while performing this task.

Unintended operation of the machine may result in injury.

⚠ WARNING Securely fasten the cutting tool and workpiece in place. After securing in place, make sure no wrenches or other articles have inadvertently been left behind. Otherwise such articles may be thrown from the machine with force, posing a risk of injury.

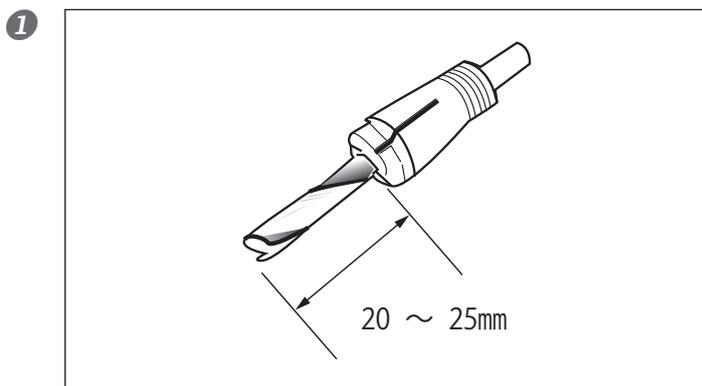
⚠ CAUTION **Caution: cutting tool.**
The cutting tool is sharp. To avoid injury, exercise caution.

Type of cutter used	End mil (optional)
Other cutting tools	Collet for end mil(optional)
Suitable workpiece types	Resin
Spindle rotation	On
Automatic Z-axis control	Off
Lock-lever position	3 ▼

This performs engraving using an end mill. This is suitable for creating reliefs and other examples of three-dimensional cutting.

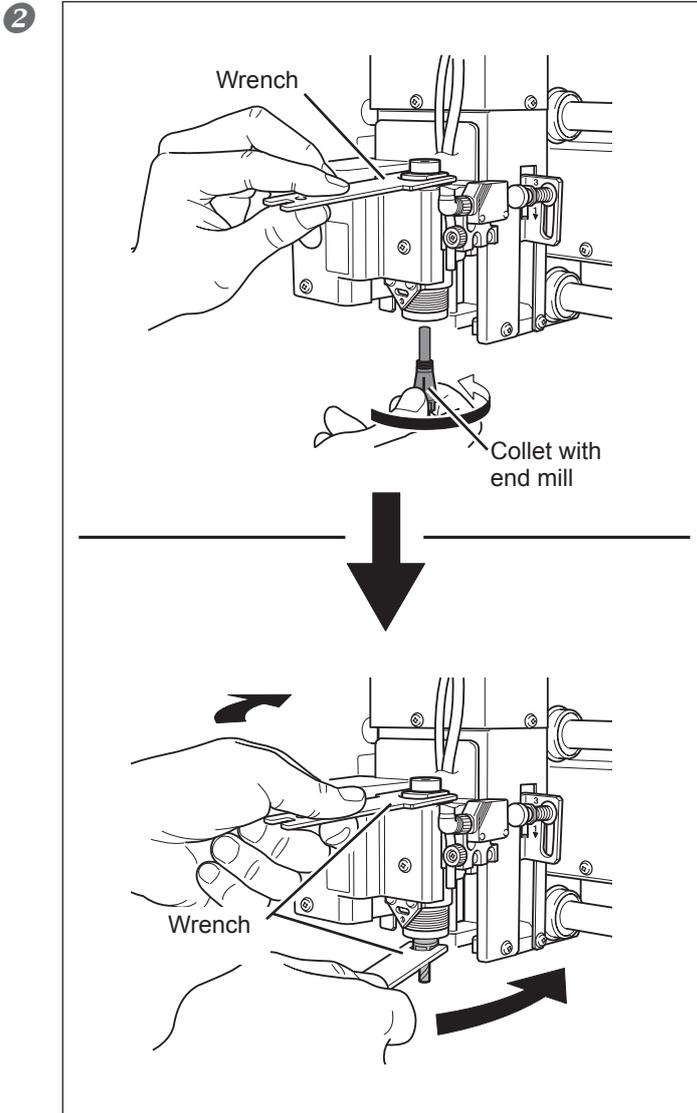
➤ End mills and end-mill collets are optionally available items.

1. Install the end mill.



Insert the end mill into the end-mill collet.

The amount of extension of the end-mill tip differs according to the end mill and the workpiece type, but as a general guide, an amount of about 20 to 25 millimeters may work well.



Install the collet with the attached end mill.

Tighten loosely.

Insert the collet with end mill into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten loosely.

Tighten fully.

Using two wrenches, tighten the collet fully. The appropriate tightening torque is 3.2 N-m (32kgf-cm).

2. Make the settings for spindle speed and Z-axis control.

- 1

I/O ADJ	<input checked="" type="radio"/> OTHERS AREA
------------	---

Press **MENU** several times to display the screen shown at left.
 Press **◀** or **▶** to select [OTHERS].
 Press **ENTER/PAUSE**.
- 2

REVOLUTION <ON>	OFF
--------------------	-----

Press **◀** to select "ON."
 Press **ENTER/PAUSE** to confirm.
- 3

AUTO Z CONTROL ON	<OFF>
----------------------	-------

Press **MENU**.
 Use **▶** to select "OFF."
 Press **ENTER/PAUSE** to confirm.

1 Cylindrical: Metal and Resin

2 Cylindrical: Glass

3 Ring Engraving

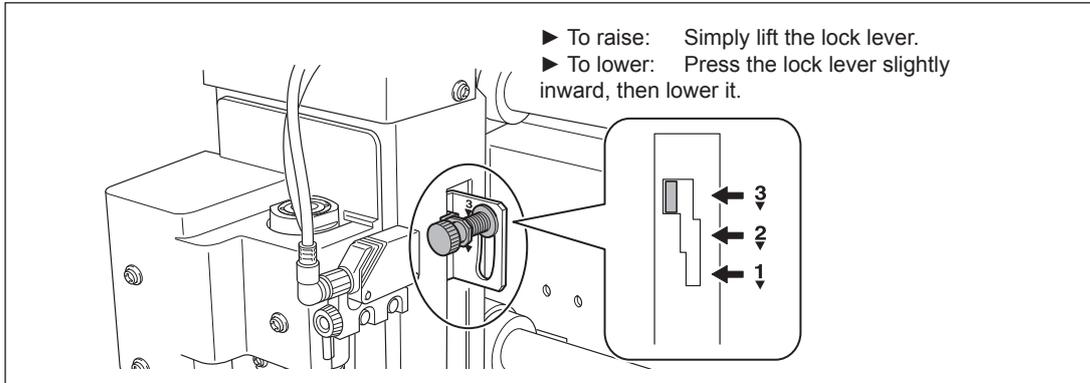
4 Flat Engraving

5 Feature Reference

6 Troubleshooting

- 1
 - 2
 - 3
 - 4
 - 5
 - 6
- Cylindrical: Metal and Resin
 Cylindrical: Glass
 Ring Engraving
 Flat Engraving
 Feature Reference
 Troubleshooting

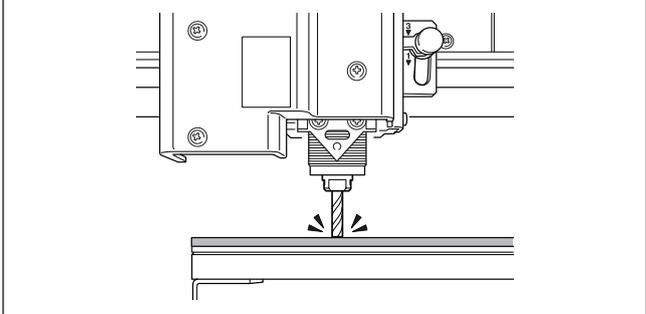
- 4** SET lock lever to 3 Follow the displayed message to engage the lock lever at position **3**.
 After three seconds the message disappears and the original screen reappears.
 For more information about the lock lever, see page 181, "The Positions of the Lock Lever."



- 5** X 0 Y 23000
Z 0 5000RPM Press **MENU** several times to display the main screen.

3. Set the Z-axis origin point.

- 1** Use **◀**, **▶**, **▲**, and **▼** to move the end mill to a location above the workpiece. Next, perform a small amount of cutting into the workpiece. Move to a location where cutting will not cause any problems.
- 2** Close the front cover, then press and hold **SPINDLE** for at least one second. The spindle rotates.

- 3**  Press **▼-z** to lower the end mill to a location where the workpiece is cut by a slight amount.

- 4** Press **SPINDLE**. The spindle stops.
- 5** SET Z1 **Z0** Z2
SURFACE -3000 Press **Z** to display the screen shown at left, then press **◀** or **▶** to select "Z0."
- 6** SET Z1 **Z0** Z2
SURFACE<-3000> Press **ENTER/PAUSE** to confirm. The Z-axis origin has now been set.
- 7** X 500 Y 23000
Z 0 5000RPM Press **MENU**. The display returns to the main screen. The value of the Z-axis coordinate is now "0" (zero).

This completes the installation of the end mil. Go on to page 171, "Start Engraving."

4-5 Starting Engraving

Preparing the Lubricant (Glass Material Only)

Here you prepare the lubricant required for engraving glass material. When using lubricant, be sure to comply with the following points.

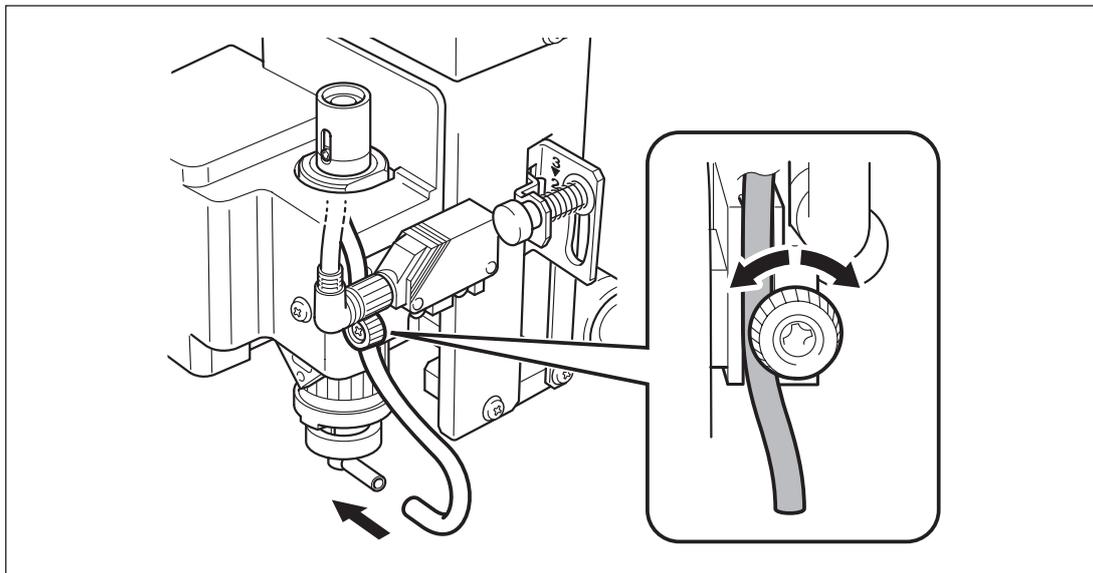
- Fill with 350 to 500 milliliters of lubricant.
A smaller amount may make an uninterrupted flow of water during cutting impossible. A greater amount may cause the lubricant recycling tray to overflow.
- With the solid collet, water nose unit, and burnishing attachment installed, rotate the spindle and check the flow of lubricant.
Starting cutting without making sure of the flow of lubricant could result in cutting during an interval of no lubricant flow and unintended engraving results.

Caution: When the flat table is used, engraving glass material is not possible.

When the flat table is used, no lubricant flows into the tray, and so lubricant cannot be used. This means that glass material cannot be engraved.

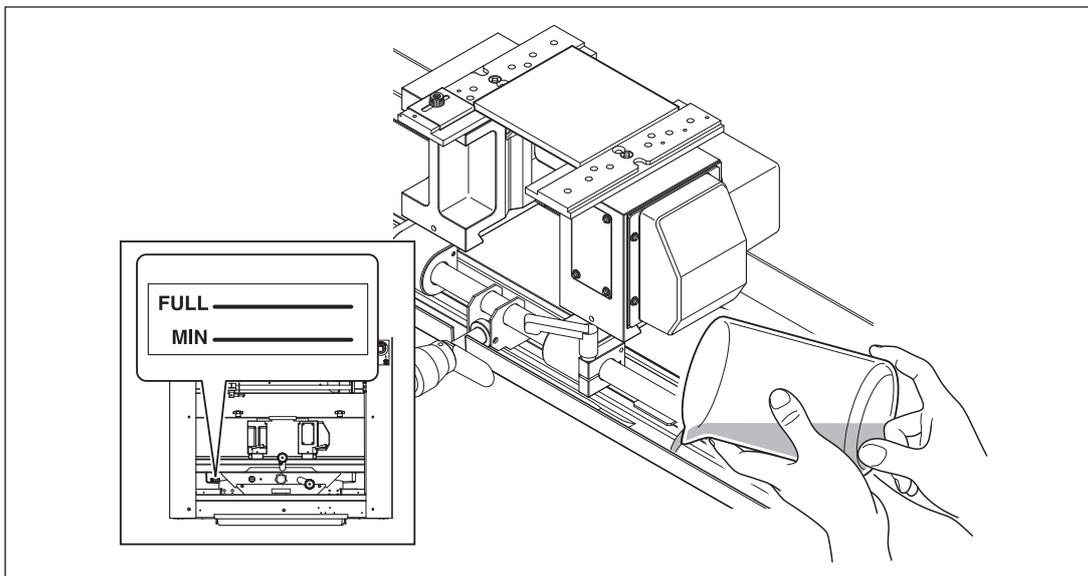
Procedure

- 1 When you install the burnishing attachment or other tools for engraving glass, make sure that setting the cutting parameters has been completed.
☞ P. 161, "Using the Burnishing Attachment and Diamond Scraper Together"
- 2 Press , , , and  to move the diamond scraper to the area above the workpiece.
- 3 Open the front cover, and then attach the water hose to the water nose unit.
Loosen the retaining screw, pull out the water hose, and connect the hose to the water nose unit. After making the connection, retighten the retaining screw.

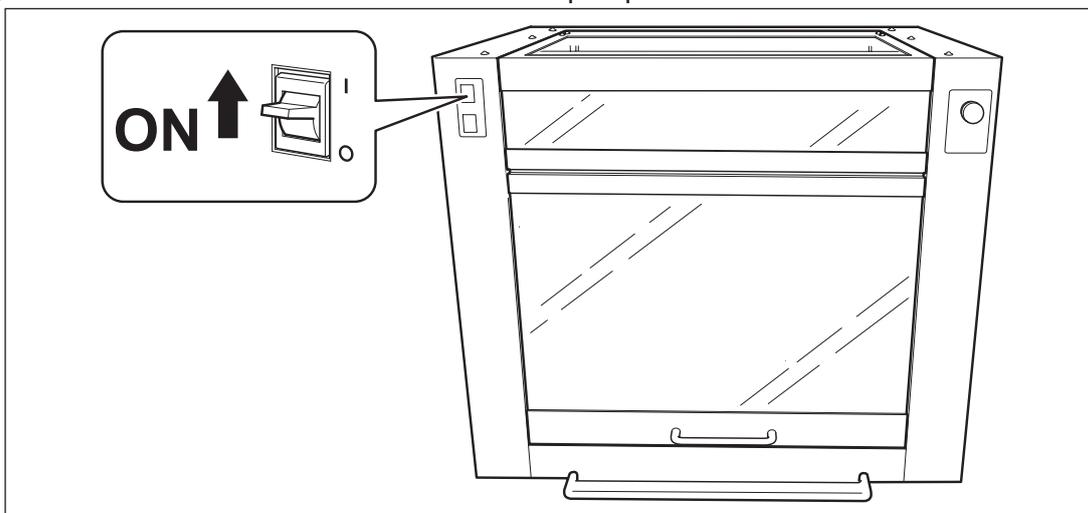


4 Fill the lubricant recycling tray with lubricant.

Taking care not to get water on the lubricant sponge filter, rails, or other components, fill the tray to a level between the "MIN" (350 milliliters) and "FULL" (500 milliliters) indications on the label affixed to the tray.



5 Close the front cover and set the lubricant pump switch at ON.



5 Rotate the spindle.

Rotate the spindle until an appropriate amount of lubricant starts flowing. See the guidelines below.

- For the initial use (including the filter replacement): Approx. 15 seconds
- For the second time and later: Approx. 5 to 10 seconds

Start Engraving

Here you install the jigs, load the workpiece, attach the cutting tools, and then, after finishing setting the cutting parameters, you start engraving.

For detailed setting for cutting such as the rotation of the spindle and the depth of cut, refer to P. 178, "Examples of Settings for Cutting and Tips for Fine-tuning."

Procedure

① Close the front cover.

② 

Send the cutting data from the computer.

The screen shown at left appears.

For more information about creating cutting data, refer to the user's manual for the program that creates the cutting data.

③ 

Use  or  to select "CUT."

 Press ^a to confirm.

Engraving starts.

④ 

When engraving ends, press  several times to display the screen shown in the figure, then press  or  to select "VIEW."

The spindle head moves to the VIEW position.

⑤ Open the front cover and remove the workpiece.

[Using free-end vise and motorized vise]

Releasing the vise-lock handle loosens the secured unlock. To keep the workpiece from falling, support the vise-tightening controller while releasing the vise-lock handles.

Maintenance After Engraving Glass Material

After carrying out engraving on glass material, drain off the lubricant and also carefully wipe away any water droplets or the like remaining inside the machine. Allowing the water to remain may cause the machine to malfunction. Be sure to discharge the water completely.

For more information about how to perform such tasks as draining off water and wiping away moisture, refer to page 83, "2-4 Maintenance After Engraving Glass Material."

Chapter 5

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(for Advanced Use)

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5-1 Setting the XA or XY Origin Point Where You Choose

Methods for Setting the XA or XY Origin Point

The following two methods are available for setting the XA or XY origin point on this machine.

- ① Specifying the cutting area using the laser pointer and making the center of the area the XA or XY origin point
- ② Specifying the XA or XY origin point directly

Method ① is described in chapters 1 through 4 as the standard way to set the XA or XY origin point on this machine (except for the ring inner-surface engraving covered in chapter 3). When the location you want to engrave and the engraving area there are clearly determined, you can make the center of the area the XA or XY origin point. Briefly, this method may be appropriate when the cutting area (the site to engrave) has priority, and you want to make the size of the engraving design fit within the cutting area.

With method ②, however, you specify any location that you want to make the XA or XY origin point. This method may be appropriate in cases where the size of the engraving design has already been decided. If you want to use Method ① when you already have an engraving design size in mind, you need to designate the cutting area accurately with a laser pointer according to the design size. This may rather require you great care. In such cases, we recommend setting the XA or XY origin point using method ②.

Setting the XA or XY Origin Point Where You Choose

This section explains how to specify any location you select as the place you want to make the XA or XY origin point. The timing with which you make the setting is the same as when you specify the cutting area and make its center the XA or XY origin point.

Pages where you'll find descriptions of the timing for making the setting for the respective engraving methods

- Cylindrical engrave (metal or resin): Page 40, 1-2 -- Step 6.
- Cylindrical engraving (glass): Page 72, 2-2 -- Step 7
- Ring outer-surface engraving: Page 113, 3-2 -- Step 5
- Flat Engraving: Page 141, 4-3 -- "Setting the XY Origin Point"

Note: For ring inner-surface engraving, the laser pointer cannot be used. Setting the XA origin point can be accomplished only by using the method described on page 109 in "Step 6 (Ring Inner-surface Engraving): Set the XA and Z-axis Origin Points."

Procedure

①

X-30500	A-100.0
Z 0	8000RPM

[Cylinder, Ring]

X 500	Y 23000
Z 0	5000RPM

[Flat]

Press **MENU** several times to display the screen shown at left (the main screen).
(The main screen that is displayed may differ depending on the cutting parameters that have been set.)

②

SET XA ORIGIN	
30000	00.0

[Cylinder, Ring]

SET XY ORIGIN	
30000	20500

[Flat]

Press **XY/XA**.
The screen shown at left appears and laser emission starts.

- 3
- | |
|---|
| SET XA ORIGIN
<30000> <00.0>
[Cylinder, Ring] |
| SET XY ORIGIN
<30000> <20500>
[Flat] |

Press , , , and  to align the laser pointer with the location to make the XA or XY origin point. Press  to confirm.

The screen shown at left appears.

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5-2 Override / Copy Engraving

Override (Adjusting the Cutter Feed Rate During Engraving)

While engraving is in progress, you can pause operation and adjust the feed rate for the cutter. You adjust the feed rate by specifying a ratio of change relative to the present feed rate. This feature is called "override."

The feed rate can be adjusted only within the machine's settable feed-rate range. If a feed rate that falls outside the settable range is set by an override, the actual feed rate is limited to the maximum or minimum feed rate.

Procedure

1 While engraving is in progress, press .
Engraving pauses.

2  Press .
Use  and  to set the ratio for feed-rate adjustment.
Press  to confirm.

3  Press .
The screen shown at left returns.

4  Use  or  to select "CONT."
Press  to confirm.
Engraving resumes.

- Settable change ratios
10 to 200% (in steps of 10%)
- Settable range for feed rate
X- and Y-axis directions: 0.1 to 60 mm/sec (0.004 to 2.4 in./sec)
Z-axis direction: 0.1 to 30 mm/sec (0.004 to 1.2 in./sec)

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Copy Engraving (Repeat Engraving)

A single set of cutting data is saved in the machine's memory until the next set of data is sent from the computer. You can use this data to repeat the same cutting by operating just the machine.

Note, however, that cutting data that exceeds the machine's memory capacity (4 MB) cannot be copied.

Procedure

1 Send the cutting data from the computer and execute cutting.

2 Change the workpiece.

3 Close the front cover.

4 Press **COPY**.

5 

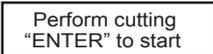
Use  to select "OK."
Press  to confirm.

6 

[Cylindrical Engraving], [Engraving the Outer Surface of a Ring], [Flat Engraving]

When the screen shown in the figure at left appears, use  and  to select "CUT."

Press  to confirm.



[Engraving the Inner Surface of a Ring]

When the screen shown in the figure at left appears, Press .

Cutting is performed again using the cutting data used for execution just before.

Operation When Other Items Are Selected

➤ "CANCEL"

This returns you to the original menu without performing cutting again.

➤ "CLEAR"

This deletes the cutting data saved in the machine.

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5-3 Examples of Settings for Cutting and Tips for Fine-tuning

Examples of Settings for Cutting Parameters

This machine lets you perform cutting using a wide variety of workpiece materials and cutters. However, the optimal cutting parameters that yield the desired cutting results for these combinations vary widely.

The chart below shows recommended suggestions for values to use for the spindle speed and other settings in the respective engraving methods of flat or cylindrical engraving, ring inner-surface engraving, and ring outer-surface engraving. Refer to these when setting the cutting parameters. Note, however, that factors such as material quality may make slight adjustment necessary, so before you perform actual cutting, carry out cutting tests and make any adjustments needed.

Flat or Cylindrical Engraving

Material	Cutter type	Spindle speed (rpm)	Cutting-in amount (mm)	X- and Y-axis feed rate (mm/sec.)	Z-axis feed rate (mm/sec.)
Acrylic	ZEC-A2025	10000	0.2	15	5
Aluminum	ZEC-A2025-BAL	12000	0.1	5	1
	ZDC-A4000	No rotation	---	10	1
Brass	ZEC-A2025-BAL	12000	0.1	5	1
	ZDC-A4000	No rotation	---	10	1
Stainless steel	ZDC-A4000	No rotation	---	10	1
Glass*1	ZDC-A2000R	8000*2	2*3	5	1

*1: A setting for "DWELL IN PD POS." must also be made.

☞ P. 59, "Step 1: Set the Cutting Parameters"

*2: When using the burnishing attachment, set the spindle speed at 10,000 rpm or lower.

*3: When using the burnishing attachment, you can vary the pressure during engraving by changing the value for the cutting-in amount. The cutter may not necessarily actually cut into the material by an amount equal to the cutting-in amount that has been set. Large values may leave a rounded trace at the start point.

Ring Inner-surface Engraving

Material	Cutter type	Spindle speed (rpm)	Cutting-in amount (mm)	X- and Y-axis feed rate (mm/sec.)	Z-axis feed rate (mm/sec.)
Brass	ZDC-N8000	Rotation not possible	0.1*1	5	1
Silver	ZDC-N8000	Rotation not possible	0.1*1	5	1

*1: Larger values for the cutting-in amount may fail to yield attractive cutting results. When you want to perform deep cutting, set the cutting-in amount at 0.1 millimeters or less per pass and repeat the identical cutting a number of times.

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Ring Outer-surface Engraving

Material	Cutter type	Spindle speed (rpm)	Cutting-in amount (mm)	X- and Y-axis feed rate (mm/sec.)	Z-axis feed rate (mm/sec.)
Brass	ZDC-A2000	No rotation	2*1	5	1
Silver	ZDC-A2000	No rotation	2*1	5	1

*1: When using the burnishing attachment, you can vary the pressure during engraving by changing the value for the cutting-in amount. The cutter may not necessarily actually cut into the material by an amount equal to the cutting-in amount that has been set. Large values may leave a rounded trace at the start point.

Tips for Fine-tuning

The optimal cutting parameters are determined by a balance of such factors as the hardness of the material, the feed rate, the spindle rotating speed, the cutting-in depth, and the capacity of the cutter. Refer to the following tips and try fine-tuning the parameters.

Spindle Rotating Speed

In general, faster rotation provides increased cutting capacity. However, a feed rate that is too slow with respect to the spindle speed may lead to melting of the workpiece due to heat, or to increased burring or roughness. Roughness may also occur at some places because feed stops momentarily at places where the direction of engraving changes (that is, at corners). Lower the spindle speed. It may also be a good idea to use faster settings for narrower cutters and slower settings for wider cutters.

Feed Rate

Faster speeds result in shorter cutting times, but the cutting load also increases accordingly. The load may overcome the strength with which the workpiece is secured in place, resulting in crooked lines or a nonuniform cutting-in depth. Also, a feed rate that is too fast for the spindle rotating speed may result in roughness or a raised nap. Lower the feed rate.

Cutting-in Depth

Deeper cutting-in results in a greater cutting load, and roughness becomes more likely. When you make the cutting-in deeper, it is a good idea to raise the spindle speed and lower the feed rate accordingly. Note, however, that there is a limit to the maximum depth. When deep cutting-in is required, it is a good idea to perform double cutting and reduce the amount of cutting-in per pass.

5-4 Hints and Tips When Working with Cutting Tools

Nose Unit

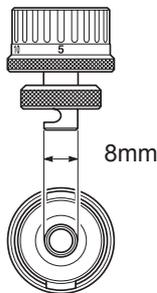
Amount of Height Displacement That Can Be Tracked

When automatic Z control is set to "ON," then as long as the tip of the nose unit is in contact with the surface of the workpiece, the cutting-in depth can be kept uniform even if the height of the material changes. However, there is an upper limit to the amount of height displacement that can be tracked. Before you do the actual engraving, carry out an engraving test to make sure the desired engraving can be accomplished.

(Trackable undulation height: gentle undulations of about 1 millimeter)

Limitations on Cutting

Care is needed when performing fill engraving (flat-drag cutting inside the contour lines of characters and shapes) over a wide surface area. With fill engraving that is broader than the diameter of the nose unit, the nose unit may track the surface that has already been cut and cut the surface further.



Various Cutters (Including the Diamond Scrapers)

If cutter insertion is difficult

If the cutter catches on the solid collet and is difficult to insert, loosening the cutter holder makes insertion easier. Note that inserting it with undue force may result in damage to the workpiece. After inserting the cutter, tighten the cutter holder again.

Storage methods for diameter-3.175 mm cutters

When you want to perform repeated use while keeping the amount of extension of the cutter tip constant, then once you've decided on the amount of extension, we recommend removing the cutter holder and cutter from the spindle unit without separating them from one another. Storing the assembly without changing the position of the cutter holder eliminates the need to determine the amount of cutter extension each time with every use.

Note, however, that this method cannot be used with the included diameter-4.36 millimeter solid collet.

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The Position of the Lock Lever

You change the position at which the lock lever is set to match the setting for automatic Z control.

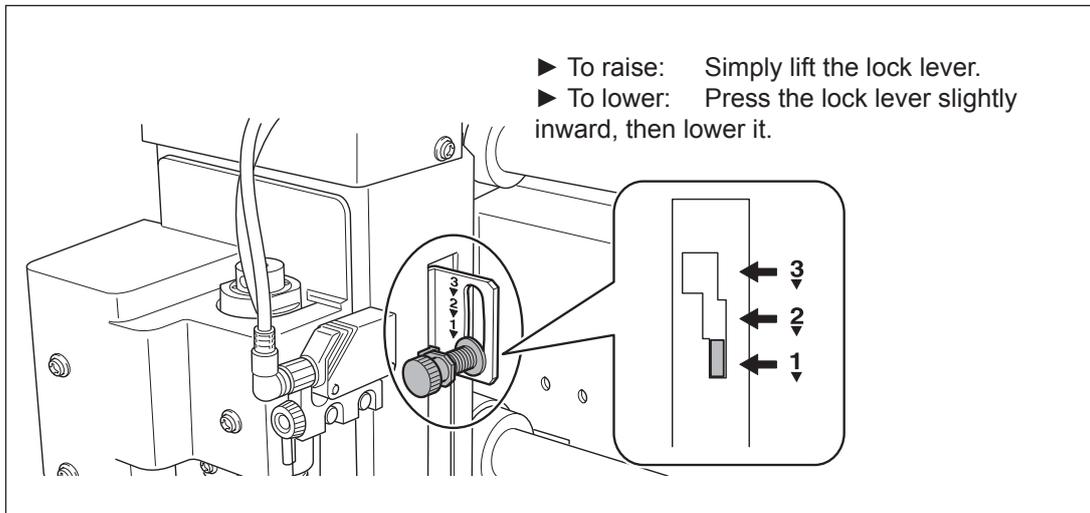
➤ 1 or 2

When automatic Z control is set to "ON," you set the lock lever at one of these positions. The spindle head is put into a floating state, and the Z-axis origin point is determined by the height of the workpiece surface. The 2 setting applies greater pressure to the workpiece than 1.

➤ 3

When automatic Z control is set to "OFF," you set the lock lever at this position. The spindle head is locked, and so the setting for the Z-axis origin point must be made via the menu items. Setting the lock lever at this position when automatic Z control is set to "ON" causes errors when making the origin-point settings or performing cutting, making the machine perform an emergency stop.

☞ P. 196 "Handling an Error Message"



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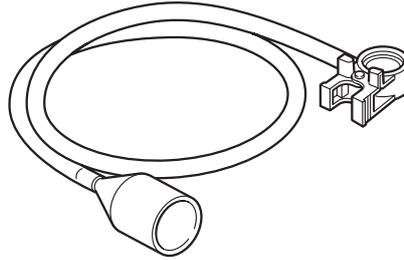
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Using Vacuum Adapter

What's a Vacuum Adapter?

The vacuum adapter is used with its clamp section attached to the tip of the spindle unit (the nose unit is required for this) and the end of its hose connected to a vacuum cleaner. This enables the vacuum cleaner to take up cutting waste during cutting, keeping scattered cuttings to a minimum. This can make it easier to monitor the state of the workpiece during cutting and reduce the bother of clean-up after cutting.



Before Using the Vacuum Adapter, Be Sure to Verify the Following Points

⚠ CAUTION

Exercise caution to prevent fire or dust explosion.

Taking up fine cuttings using an ordinary vacuum cleaner may cause danger of fire or explosion. Check with the manufacturer of the vacuum cleaner. When the safety of use cannot be determined, never use the vacuum adapter and a vacuum cleaner.

⚠ CAUTION

Make the connection while exercising care not to touch the tip of the cutter.

Contact with the blade may cause injury.

⚠ CAUTION

Never touch the spindle unit immediately after cutting.

Doing so may cause burns.

- Use a vacuum cleaner that allows adjustment of the suction force and is equipped with an overload protector.
To prevent fire or explosion, carefully check the specifications of your vacuum cleaner before use, including contacting the manufacturer if necessary.
- Be sure to use the nose unit.
The vacuum adapter cannot be attached unless the nose unit is installed.
- Install so as to leave at least 30 centimeters (11.9 in.) of free space at the back of the machine.
Malfunction may occur if the hose cannot move freely.
- Be sure to use a vacuum-cleaner hose having a diameter that allows connection with the vacuum adapter.
The diameter of the vacuum adapter is 32 millimeter (1.3 in.).

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Installation

Use the handy panel to move the spindle head back toward the front of the machine, then install the vacuum adapter as shown in the figure.

Upper surface

Secure in place at the locations where the audible click is heard.

Opening the clamp

The clamps are on the back side of the carriage of the spindle head. (Two clamps)

Rear

Remove the rubber cap from the left side of the rear surface and run the hose through the hole there.

Notice

Before using a dust collection adapter, remove the rubber cap to enable free movement of the hose. When the dust collection adapter is not used, keep the rubber cap attached to prevent cutting waste from scattering.

32 mm

Nose unit

Vacuum adapter clamp

Retaining screw

Tab

Tab

Position so that the retaining screw for the nose unit is between the tabs of the clamp.

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Surface Leveling of the Flat Table

This adjusts the flatness of the surface of the flat table by cutting the table surface to a uniform depth. This operation is called "surface leveling" or "surfacing." This can be useful in cases where rigorously precise flatness is required, such as for plate engraving performed without using the nose unit. Also, pausing this operation while in progress is possible, just as with ordinary cutting.

Note: Surface leveling is possible only for the Bakelite table. It is not possible for the table base.

Verifying the Cutter Used and the Settings

- Cutter used: Flat cutter (optionally: ZEC-A2320)
- Spindle speed: 14,000rpm*
- Cutting-in amount: 0.3 mm (invariable)
- Cut-out amount: 1 mm (invariable)
- Feed rate: 15 mm / sec (invariable)
- Cutting area: Entire X- and Y-axis operating range (invariable)

* The speed of spindle rotation at the time surface-leveling cutting starts is always 14,000 rpm. Watch the status of cutting and modify this as required.

1. Prepare for flat-surface engraving and attach the flat-surface table.

1 Prepare for flat-surface engraving.

☞ P. 127, "What to Do First"

2 Attach the flat-surface table.

☞ P. 138, "Installing the Flat Table"

2. Attach the cutter and set for surface leveling.

1 Carry out steps 1 and 2 on page 153, "Installing a Character Cutter or Flat Cutter (With No Nose Unit)."

☞ P. 153, "Installing a Character Cutter or Flat Cutter (With No Nose Unit)"

2 Use , , , and to move the cutter to the area above the center of the workpiece table, then press .

3 | | | | | |---------|----|-------|----| | SET | Z1 | Z0 | Z2 | | SURFACE | | -3800 | | Use or to select [Z0]. Press to lower the spindle head to the location where the Zaxis coordinate is "-3800."

4 Insert a flat cutter (ZEC-A2320) into the cutter holder, bring the tip of the cutter into contact with the surface of the workpiece table, and secure the cutter in place.

For information on how to secure the cutter in place, refer to page 156.

5 | | | | | |---------|----|---------|----| | SET | Z1 | Z0 | Z2 | | SURFACE | | <-3800> | | Press . The Z-axis origin has now been set.

3. Start "surface leveling."

1 | | | |------------|--------| | I/O | OTHERS | | ADJUSTMENT | | Press several times to display the screen shown at left. Use to select [ADJUSTMENT]. Press .

2 | | |-----------| | SURFACING | | GO | Press twice. Press .

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- 3 ARE YOU READY?
"ENTER" to start Press **ENTER/PAUSE** .
The cutting for surface leveling starts.
Pressing **MENU** before you press **ENTER/PAUSE** returns you to the screen in step .
- 4 Check visually to ensure that no uncut areas remain.
If uncut areas are present, redo the procedure from step 2. – 2.

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Troubleshooting

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6-1 Troubleshooting

Troubleshooting (Operation)

This chapter describes trouble-shootings for the basic machine operation. Most trouble-shootings described here are found in "EGX-360 Startup and Maintenance Guide." When you encounter such troubles, please check the "EGX-360 Startup and Maintenance Guide" again to use the machine safely.

The power does not come on

Hasn't the emergency stop button been pressed?

Pressing the emergency stop button automatically turns off the power. Cancel the emergency stop.

Initialization is not performed or initialization fails

Isn't the front cover open?

Keep the front cover closed during an initialization. If the front cover is open, this machine stops the initialization on the way.

Is anything caught in an operation axis such as the spindle head, X-axis or Y-axis?

Check for foreign objects on the spindle or XYZ axes and remove it.

Operations are ignored.

Is the cable connected?

Connect the cable securely.

Was the machine started according to the correct procedure?

Simply switching on the power does not enable operation. Start the machine using the correct procedure.

Isn't the front cover open?

While the front cover is open, some operations are restricted.
Close the cover.

Isn't operation paused?

When the machine is paused, cutting stops and some operations are restricted. Cancel the paused state.

Isn't a large amount of cutting waste present?

Clean away any cutting waste. Clean especially carefully inside the spindle cover in particular.

Is the handy panel connected correctly?

Before inserting or removing the connector cable for the handy panel, switch off the power to the machine. The connection is not detected if made while the power is on.

Is the driver installed correctly?

If the connection to the computer is not made in the sequence described, the driver may fail to be installed correctly. Check again to ensure that the connection was made using the correct procedure.

Are the parameter settings for communication with the computer correct?

The machine cannot communicate with the computer if the parameters for communication with the computer are not set correctly. Switch the power off and back on, revise the settings such as the communication parameters for the program you're using to make sure the settings are correct, then redo the operation from the beginning.

Isn't an error message displayed in the display screen?

☞ P. 194, "Handling an Error Message"

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Abnormal cutting is performed

Is the location of the origin set correctly?

Check whether the origin has been set correctly. An incorrect origin location may result in cutting at an unintended position. This machine requires different origin settings depending on the engraving method and cutting tool to be used. Please read the description of each engraving method again to set the origin properly.

The spindle doesn't rotate during engraving.

Is a front cover open?

For safety, the spindle does not rotate when a front cover is open. Close the front covers.

Is [REVOLUTION] set to the "ON" setting?

Go to the [OTHERS] menu and set [REVOLUTION] to "ON."

Descent doesn't stop (when automatic Z control is on).

Switch off the main power and shut down the machine. Next, make sure that automatic Z control is set to "ON" and that the lock lever is at the  or  position. If the same problem persists even when the setting for automatic Z control and the position of the lock lever are correct, the cause may be a motor error or the like. Switch off the main power to shut down the machine, and contact your authorized Roland DG Corp. dealer.

The feed rate or spindle speed is wrong.

Has an override been set?

An override changes the feed rate or spindle speed. Check the settings for overrides. Unless you have a special reason for changing them, leave all overrides set at 100%.

☞ P. 176, "Override (Adjusting the Cutter Feed Rate During Engraving)"

The USB cable came loose during engraving.

If the machine succeeded in receiving all the engraving data, the engraving is carried out to the end of the operation. If the machine did not receive all the engraving data, engraving is carried out for the portion received, and then the cutter rises and stops at a location away from the workpiece. The message [Command Not Recognized] may be displayed at this time. If this happens, switch off the power and redo the operation from the beginning

☞ P. 196, "Handling an Error Message"

Installation is impossible

If installation quits partway through, or if the wizard does not appear when you make the connection with a USB cable, take action as follows.

Windows Vista

1. If the [Found New Hardware] appears, click [Cancel] to close it. Disconnect any USB cables for printers or other such equipment other than this machine.
2. Click the [Start] menu, then right-click [Computer]. Click [Properties].
3. Click [Device Manager]. The [User Account Control] appears, click [Continue]. The [Device Manager] appears.
4. At the [View] menu, click [Show hidden devices].
5. In the list, find [Printers] or [Other device], then double-click it. When the model name you are using or [Unknown device] appears below the item you selected, click it to choose it.
6. Go to the [Action] menu, and click [Uninstall].

7. In "Confirm Device Uninstall" window, select [Delete the driver software for this device.], then click [OK]. Close the [Device Manager].
8. Detach the USB cable connected to the printer, and the restart Windows.
9. Uninstall the driver. Carry out the steps from step 3 in page 96 "Uninstall the Driver Windows Vista (Start up & Maintenance Guide)" to uninstall the driver.
10. Install the driver again according to the procedure in page 47 "Installing the Windows-based Driver (Start up & Maintenance Guide)."

Windows 2000/XP

1. If the [Found New Hardware Wizard] appears, click [Finish] to close it. Disconnect any USB cables for printers or other such equipment other than this machine.

2.

Windows XP

Click the [Start] menu, then right-click [My Computer]. Click [Properties].

Windows 2000

Right-click [My Computer] on the desktop. Click [Properties].

3. Click the [Hardware] tab, then click [Device Manager]. The [Device Manager] appears.
4. At the [View] menu, click [Show hidden devices].
5. In the list, find [Printers] or [Other device], then double-click it. When the model name you are using or [Unknown device] appears below the item you selected, click it to choose it.
6. Go to the [Action] menu, and click [Uninstall].
7. In "Confirm Device Uninstall" window, click [OK].
8. Close the [Device Manager] and click [OK].
9. Detach the USB cable connected to the printer, and the restart Windows.
10. Uninstall the driver. Carry out the steps from "Uninstall the Driver Windows 2000/XP" on "Start up & Maintenance Guide" to uninstall the driver.
11. Install the driver again according to the procedure in page 47 "Installing the Windows-based Driver (Start up & Maintenance Guide)."

Uninstalling the Driver

When uninstalling the driver, perform following operation.

Windows Vista

1. Before you start uninstallation of the driver, unplug the USB cables from your computer.
2. Log on to Windows as "Administrators" right.
3. From the [Start] menu, click [Control Panel]. From the [Hard-ware and Sound] group, click [Printer]. [Printer] folder opens.
4. Click the model name's icon you are using. From the [Organize] menu, click [Delete]. The [User Account Control] appears, click [Continue].
5. A message prompting you to confirm deletion appears. Click [Yes].
6. In the [Printers] folder, right-click any location where no printer icon is present. From the [Run as administrator] menu, select [Server Properties]. The [User Account Control] appears, click [Continue].
7. Click the [Drivers] tab, then from the [Installed printer drivers] list, choose the machine to delete. Click [Remove].
8. The [Remove Driver And Package] appears, select [Remove driver and driver package]. Click [OK].
9. When the prompt message appears, click [Yes].
10. The package and driver to delete are displayed. Make sure that what is displayed is the machine you want to delete, then click [Delete].
11. The items that have been deleted are displayed. Click [OK].
12. Click [Close] on [Remove Driver And Package] window.
13. From the [Start] menu, choose [All Programs], then [Accessories], then [Run], and then click [Browse].
14. Choose the name of the drive or folder where the driver is located. (*)

15. Select "SETUP.EXE" and click [Open], then click [OK].
16. The [User Account Control] appears, click [Allow].
17. The Setup program for the driver starts.
18. Click [Uninstall] to choose it. Select the machine to delete, then click [Start].
19. If it is necessary to restart your computer, a window prompting you to restart it appears. Click [Yes].
20. The uninstallation finishes after the computer restarts.

(*) When using the CD-ROM, specify the folder as shown below (assuming your CD-ROM drive is the D drive).

D:\Drivers\25D\WINVISTA

If you're not using the CD-ROM, go to the Roland DG Corp. website (<http://www.rolanddg.com/>) and download the driver for the machine you want to delete, then specify the folder where you want to expand the downloaded file.

Windows 2000/XP

1. Before you start uninstallation of the driver, unplug the USB cables from your computer.
2. Log on to Windows as "Administrators" right.
- 3.

Windows XP

From the [Start] menu, click [Control Panel]. Click [Printers and Other Hardware], then click [Printers and Faxes].

Windows 2000

From the [Start] menu, click [Setting]. Then click [Printers].

4. Click the model name's icon you are using. From the [File] menu, choose [Delete].
5. A message prompting you to confirm deletion appears. Click [Yes].
6. Go to [File] and select [Server Properties].
7. Click the [Driver] tab, then from the [Installed printer drivers] list, choose the machine to delete.
8. Click [Delete]. When the prompt message appears, click [Yes].
9. From the [Start] menu, select [Run], then click [Browse].
10. From the [File Locations] list, choose the name of the drive or folder where the driver is located. (*)
11. Select "SETUP.EXE" and click [Open], then click [OK].
12. The Setup program for the driver starts.
13. Click [Uninstall] to choose it. Select the machine to delete, then click [Start].
14. If it is necessary to restart your computer, a window prompting you to restart it appears. Click [Yes].
15. The uninstallation finishes after the computer restarts.

(*) When using the CD-ROM, specify the folder as shown below (assuming your CD-ROM drive is the D drive).

D:\Drivers\25D\WIN2KXP

If you're not using the CD-ROM, go to the Roland DG Corp. web-site (<http://www.rolanddg.com/>) and download the driver for the machine you want to delete, then specify the folder where you want to expand the downloaded file.

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Cylindrical:
Metal and Resin

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Flat Engraving

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Troubleshooting (Engraving)

The cutting-in depth is not uniform (when using the nose unit).

Try revising the cutting parameters as described below.

- Is automatic Z control set to "ON" with the lock lever at position $\downarrow 1$ or $\downarrow 2$?
 - ☞ P. xx, "The Position of the Lock Lever"
- Is the cutter holder, the cutter-holder mounting screw, or the collet loose?
- Is the X- and Y-axis feed rate too fast for the workpiece, or is the speed of spindle rotation too slow for it?
 - ☞ P. 176, "Override (Adjusting the Cutter Feed Rate During Engraving)," p. 178, "Examples of Settings for Cutting and Tips for Fine-tuning."
- Is the cutter worn? If the cutter is worn away, replace it with a new one.
- When the cutting-in depth is extremely shallow, the effects of cutting waste can become large. Try using a cutter with a narrow blade width, along with increasing the cutting-in depth. Alternatively, use the vacuum adapter for chip cleaning.
 - ☞ P. 182, "Using Vacuum Adapter"

The cutting-in depth is not uniform (when not using the nose unit).

Try revising the cutting parameters as described below.

- Use the nose unit for engraving if possible, although the situation differs depending on the engraving method and the material.
- Is the surface of the workpiece level? Revise the mounting method and other such factors to mount the workpiece so that its surface is level. Also, if the flatness or levelness of the flat table is an issue, carry out surface leveling for the workpiece table.
 - ☞ P. 184, "Surface Leveling of the Flat Table"
- Is automatic Z control set to "ON" with the lock lever position $\downarrow 3$?
 - ☞ P. 181, "The Position of the Lock Lever"
- Is the cutter holder, tool retaining screw, or collet loose?

The cutter leaves tracks at places where cutting-in starts or where lines change direction.

Try revising the cutting parameters as described below.

- The spindle rotating speed is too slow with respect to the feed rate. Try reducing the spindle speed.
- Is the cutter worn? If the cutter is worn away, replace it with a new one.

An engraved bottom surface is rough or burring remains.

Try revising the cutting parameters as described below.

- The spindle rotating speed is too slow with respect to the feed rate. Try increasing the spindle speed or making the feed rate slower.
- Refasten the workpiece securely so that it does not come loose or slip.
- Try performing cutting a second time to finish the bottom surface and remove any burring. Making the cutting-in depth about 0.02 to 0.05 mm deeper for the second pass may yield better results.
- Is the cutter worn? If the cutter is worn away, replace it with a new one.
- Check to make sure the cutter diameter matches the collet diameter.

Engraved lines are uneven or wavy.

Try revising the cutting parameters as described below.

- The cutter holder, tool retaining screw, or collet is loose, and the cutter is out of control. Tighten securely.
- Refasten the workpiece securely so that it does not come loose or slip.
- Check to make sure the cutter diameter matches the collet diameter.

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6-2 Handling Messages / Error Messages

Handling an Message

These are the most common messages that appear on the machine's display to prompt correct operation. They do not indicate any error. Follow the prompts and take action accordingly.

[Please close the cover]

Close the front cover.

To ensure safety, the machine does not operate when the front cover is open. However, operations using the movement buttons on the handy panel are possible while the front cover is open.

[Stop performing COVER OPEN]

Close the front cover.

The spindle head stopped its movement for safety since the front cover opened while the spindle head was moving (other than the operation using the travel button on the handy panel, such as moving to the Y0 position). After three seconds this message disappears and the screen returns to the original menu.

[Pause On COVER OPEN]

Close the front cover.

This is displayed in the following cases.

- Engraving data was sent while the front cover was open.
- "VIEW" was selected at the Pause menu, and the cover was opened during movement to the VIEW position.

Closing the front cover returns the display to the Pause menu.

[Canceling data...]

The data received from the computer is being discarded. After processing to delete the data finishes, the message disappears. When the amount of data is large, it may take some time for the message to disappear.

This message appears in the following cases.

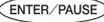
- Cutting data was sent during initial movement.
- [STOP] was selected during pause.
-  key was pressed while [Pause On Cannot Move *] message was displayed.

[Turn the AUTO Z CONTROL off]

After three seconds this message disappears and the screen returns to the original menu.

This was displayed because an attempt was made to set the Z0, Z1, or Z2 position even though automatic Z control is on.

[Pause On Cannot Move *]

[Canceling data...] appears by pressing . This message disappears when data cancellation is complete.

This message appeared when cutting data containing the Y-axis movement was sent when the axis was set to XAZ, or cutting data containing the A-axis movement was sent when the axis was set to XYZ.

The machine does not receive any cutting data containing the Y-axis movement when XAZ is selected. It does not receive any cutting data containing the A-axis movement when XYZ is selected.

* is any of X, Y, Z or A.

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[Cannot repeat too big data]

This is displayed when an attempt was made using the Copy menu to perform engraving again, but the engraving data just received was too large for the machine's memory capacity. After three seconds this message disappears and the screen returns to the original menu.

☞ P. 177, "Copy Engraving (Repeat Engraving)"

[Cannot repeat buffer empty]

This is displayed when an attempt is made using the Copy menu to perform engraving again while no engraving data is saved in the machine. After three seconds this message disappears and the screen returns to the original menu.

☞ P. 177, "Copy Engraving (Repeat Engraving)"

[Cannot set the area of 0]

This message appears when the cutting area designated by the laser pointer is 0 (zero). This message disappears in approx. 3 seconds and the original menu returns.

☞ P. 40, "STEP6: Set the XA Origin Point," p. 72, STEP7: Set the XA Origin Point," p. 113, "STEP5: (Ring Outer-surface Engraving): Set the XA Origin Point," p. 141, "Setting the XY Origin Point."

[Cannot set Out of Area]

This message appears when the laser pointer tries to designate the cutting area outside of the cutting possible area. Re-designate the cutting area by reviewing the cutting possible area for the machine.

☞ P. 40, "STEP6: Set the XA Origin Point," p. 72, STEP7: Set the XA Origin Point," p. 113, "STEP5: (Ring Outer-surface Engraving): Set the XA Origin Point," p. 141, "Setting the XY Origin Point."

[Move the tool to Y0]

This message appears when you try to set the origin while the axis is set to XAZ (cylinder engraving or ring engraving) and the spindle head is not in the Y0 position.

The message disappears in approx. 3 seconds and the original menu returns. Move the spindle head to the Y0 position.

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Handling an Error Message

This describes the error messages that may appear on the machine's display screen, and how to take action to remedy the problem. If the action described here does not correct the problem, or if an error message not described here appears, contact your authorized Roland DG Corp. dealer.

[Emergency Stop COVER OPEN]

An emergency stop occurred because the front cover was opened while the spindle was rotating. Operation cannot be continued. Switch the power off and back on, then redo the operation from the start.

[Emergency Stop S-overload[*]]

An emergency stop occurred because of a spindle-motor error. This is caused by prolonged high load on the motor or by excessive torque being applied momentarily. Resuming is not possible. Switch the power off and back on, revise the cutting parameters, then redo the operation from the start. If this message persists even after revising the cutting parameters, contact your authorized Roland DG Corp. dealer.

Note: The kind of load applied is indicated as "S" (short), "L" (long), "P" (peak), or "T" (temperature).

[Emergency Stop RPM error]

An emergency stop occurred because rotation of the spindle failed to reach the specified rpm. Operation cannot be continued. The cause is a motor error or the like. Switch off the power and contact your authorized Roland DG Corp. dealer.

[Cannot find *- LIMIT SW]

An emergency stop occurred because initialization failed. Switch the power off, remove any cutting waste or other obstructions impeding operation of the spindle head, then redo the operation from the start. If the message persists even after redoing the operation from the beginning, contact your authorized Roland DG Corp. dealer.

*"X,""Y,""Z," or "A"

[I/O Err:Framing/Parity Error]

This is displayed when the parameter settings for communication with the computer are unsuitable. The machine goes into the pause state. It may start moving unintentionally, so that it is recommended to press **ENTER/PAUSE** to display the pause menu and select [STOP] to stop operation once.

Revise the communication parameters on the machine and the computer (the settings for baud rate, parity, number of stop bits, and data bit length). When a serial connection is used, this error message may appear if the computer is restarted while the machine is powered up.

[I/O Err:Buffer Overflow]

The machine's memory experienced an overflow. The machine goes into the pause state. It may start moving unintentionally, so that it is recommended to press **ENTER/PAUSE** to display the pause menu and select [STOP] to stop operation once. Possible causes include unsuitable communication parameters for a serial connection. Revise the communication parameters on the machine and the computer (the settings for baud rate, parity, number of stop bits, and data bit length).

[Command Not Recognized]

An emergency stop occurred because the machine received a command that could not be interpreted from the computer. The machine goes into the pause state. It may start moving unintentionally, so that it is recommended to press **ENTER/PAUSE** to display the pause menu and select [STOP] to stop operation once.

This is caused by program settings that do not match the machine's command set. Check the program's settings and other values, and redo the operation from the beginning. This message may also be displayed when a faulty connection in the connector cable to the computer occurs. Eliminate the causes, then redo the operation from the beginning. If this message continues to appear, contact your authorized Roland DG Corp. dealer.

[Wrong Number of Parameters]

The number of parameters for a command received from the computer was incorrect.

The machine goes into the pause state. It may start moving unintentionally, so that it is recommended to press **ENTER/PAUSE** to display the pause menu and select [STOP] to stop operation once.

Check to make sure the program you're using is compatible with the machine.

[Cannot find Rotary Axis]

Connection is disabled due to connector coming off the rotary axis or cable damage.

You cannot restart operation. Turn the power OFF and contact us or the dealer where you purchased the machine.

[Tool did not sense anything]

The machine cannot restart. The machine might have been in any of the following conditions.

- ① When the automatic Z control was "ON," the spindle unit was locked (the lock lever was in the 3 position).
- ② When the automatic Z control was "ON," the tool end did not reach to the workpiece.

Turn the power OFF and take any of the following measures to restart.

In case of ①: Set the lock lever to the 1 or 2 position.

In case of ②: The workpiece position is too low. Review the workpiece attachment position or lower the vise unit to the position where the tool is reachable.

If this message still appears even after taking respective measures, contact us or the dealer where you purchased the machine.

☞ P. 181, "The Position of the Lock Lever," p. 178, "Examples of Settings for Cutting Parameters."

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