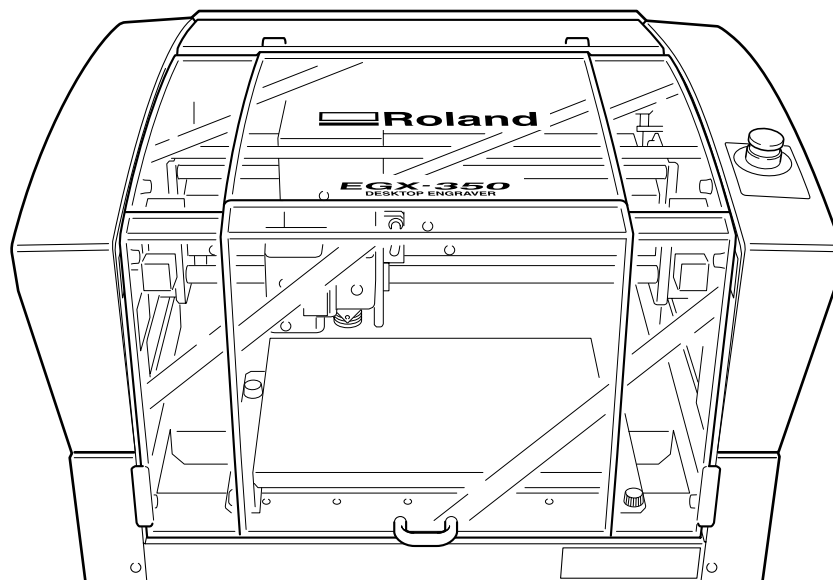

EGX-350

DESKTOP ENGRAVER

USER'S MANUAL



-
- 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.
-

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.

The I/O cables between this equipment and the computing device must be shielded.

NOTICE

Grounding Instructions

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

Check with 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 out cord immediately.

Operating Instructions

KEEP WORK AREA CLEAN. Cluttered areas and benches invites 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.

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

REDUCE THE RISK OF UNINTENTIONAL STARTING. Make sure the 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 LEAVE TOOL RUNNING UNATTENDED. TURN POWER OFF. Don't leave tool until it comes to a complete stop.

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.

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.

Roland DG Corp. has licensed the MMP technology from the TPL Group.

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
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.

 **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.

 **WARNING**

 **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.

 **This machine weighs 34 kg (75 lb.)**

 **CAUTION**



Unloading and emplacement are operations that must be performed by 2 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.

 **WARNING**

 **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.

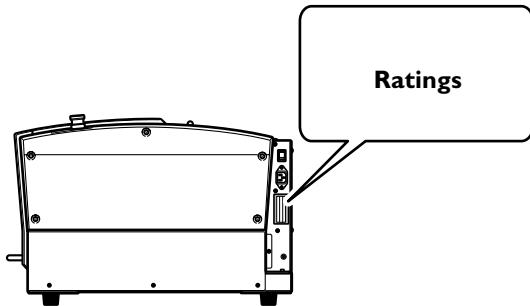
⚠ Danger of electrical short, shock, electrocution, or fire

⚠ WARNING



Connect to an electrical outlet that complies with this machine's ratings (for voltage and frequency).

Provide a power supply whose amperage is 1.3 A or higher (for 100 to 120V) or 0.6 A or higher (for 220 to 240V).



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.



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.

⚠ WARNING



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.

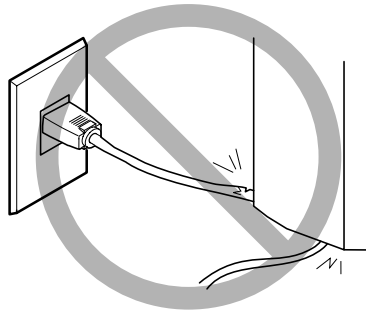
This machine is not compatible with a pneumatic blower. Cutting waste may get inside the machine and cause fire or electrical shock.



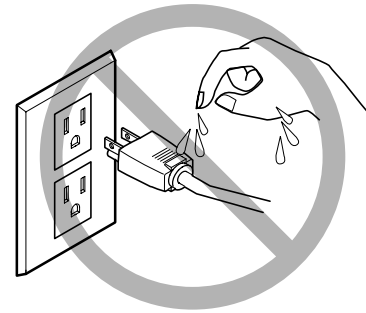
If sparking, smoke, burning odor, unusual sound, or abnormal operation occurs, immediately unplug the power cord. Never use if any component is damaged.

Continuing to use the machine may result in fire, electrical shock, or injury. Contact your authorized Roland DG Corp. dealer.

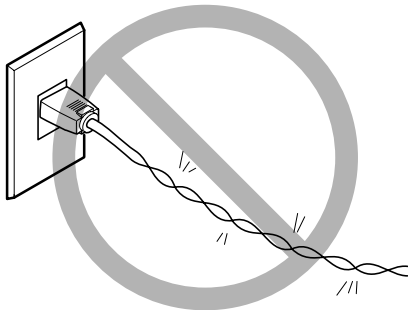
⚠ Important notes about the power cord, plug, and electrical outlet



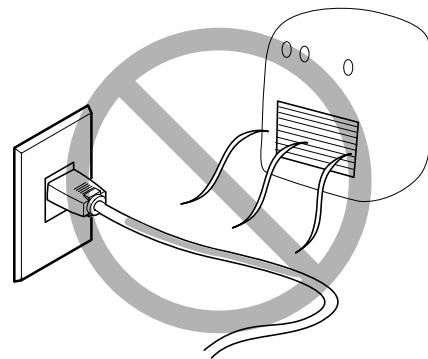
Never place any object on top or subject to damage.



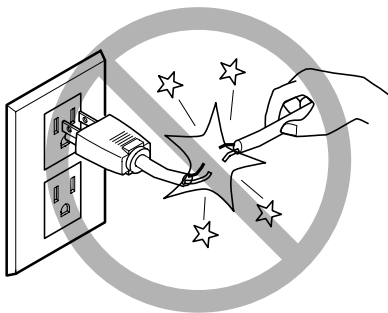
Never allow to get wet.



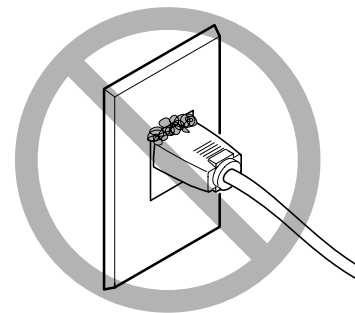
Never bend or twist with undue force.



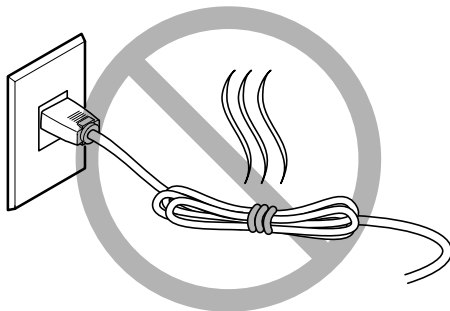
Never make hot.



Never pull with undue force.



Dust may cause fire.



Never bundle, bind, or roll up.

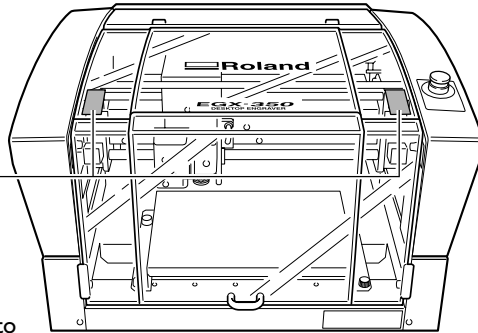
Warning Labels

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

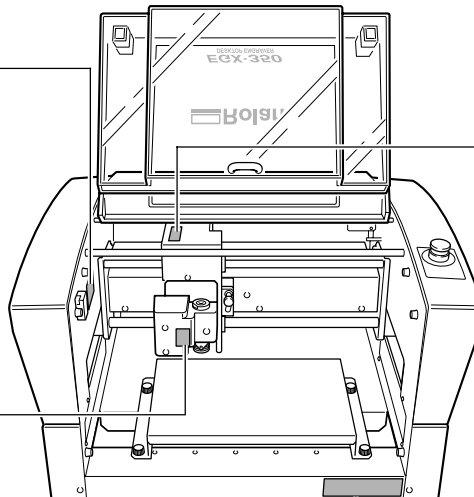
Be careful not to allow the fingers to become pinched when loading media or closing covers.



Top



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.



Front/Inside



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



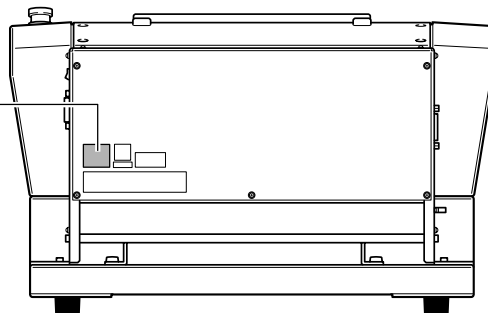
Caution: Sharp Tool
Inadvertent contact may cause injury.

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。



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 \triangle 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 \otimes 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 \bullet 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 34 kg (75 lb.)**

PRUDENCE




-  **Le déchargement et la mise en place doivent être faits par au moins 2 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.

 **ATTENTION**

 **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.

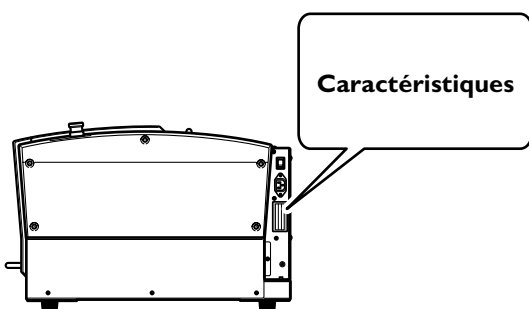
⚠ **Risque de décharge ou de choc électrique, d'électrocution ou d'incendie**

⚠ **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 1.3 A ou plus (pour 100 à 120 V) ou de 0.6 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'infiltrer 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.

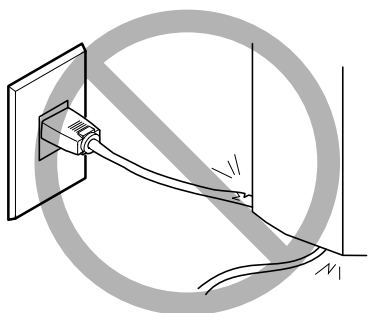
Cet appareil n'est pas conçu pour être nettoyé à l'aide d'un appareil soufflant. Des rognures de coupe peuvent s'infiltrer à l'intérieur et causer un incendie ou un choc électrique.



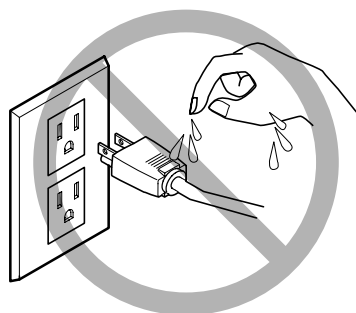
S'il se produit des étincelles, de la fumée, une odeur de brûlé, un bruit inhabituel ou un fonctionnement anormal, débrancher immédiatement le câble d'alimentation. Ne jamais utiliser si un composant est endommagé.

Continuer à utiliser l'appareil peut causer un incendie, un choc électrique ou des blessures. Communiquer avec le représentant Roland DG Autorisé.

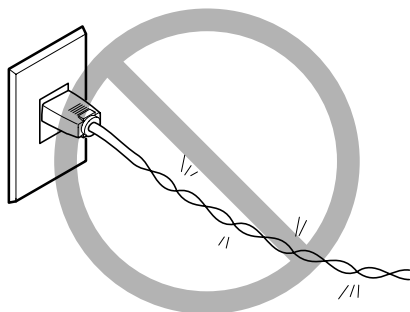
⚠ Remarques importantes à propos du câble d'alimentation, de la fiche et de la prise électrique



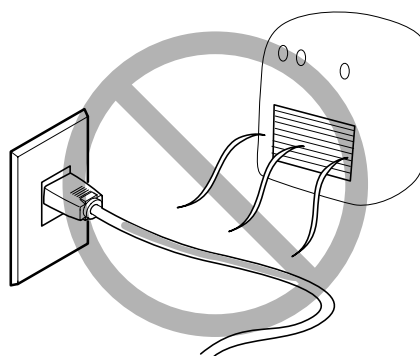
Ne jamais déposer aucun objet sur le câble, sur la fiche ou sur la prise car cela risque de les endommager.



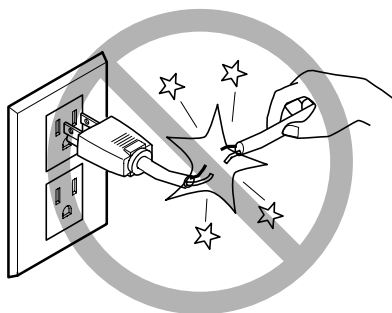
Ne jamais laisser l'eau toucher le câble, la fiche ou la prise.



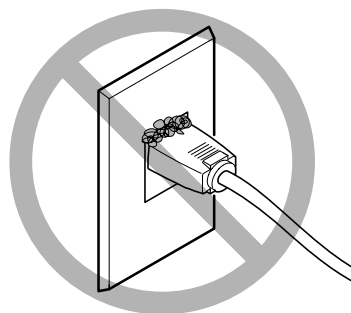
Ne jamais plier ni tordre le câble avec une force excessive.



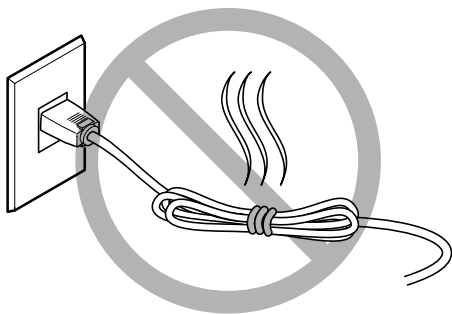
Ne jamais chauffer le câble, la fiche ou la prise.



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



La poussière peut causer un incendie.



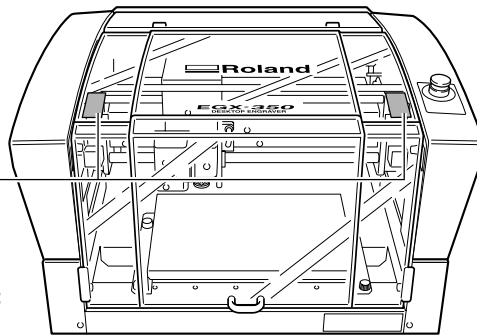
Ne jamais plier ni enrouler le câble.

⚠ 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.



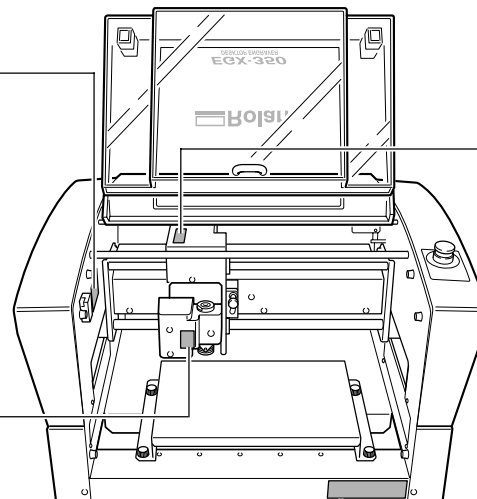
Attention : Risque de pincement
Faire attention de ne pas coincer les doigts pendant le chargement du support ou lors de la fermeture du couvercle.



Haut



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.



Avant/intérieur



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



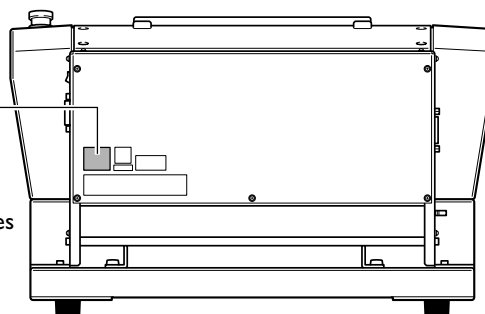
Attention : outil coupant
Un contact imprudent risque d'entraîner une blessure.

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。



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.
- Use within the range of specifications.
- Diligently keep clean of cutting waste.
- 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.

This machine becomes hot.

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

About Cutters

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

About the Documentation for This Machine

Documentation Included with the Machine

The following documentation is included with the machine.

User's Manual (this manual)

This describes important notes for ensuring safe use, and explains how to install and operate the machine. Be sure to read it first.

It does not describe how to operate your computer or how to use the programs.

Roland Software Package Software Guide

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

Be sure to read this, when connecting the machine to a computer.

Roland EngraveStudio Software Guide

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

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.

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.

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.

Chapter 1

Getting Started

I-I Machine Highlights

Features

➤ **Engraving and relief-cutting on a single machine**

This machine achieves expressive, high-quality engraving of a wide range of types, from flat engraving to three-dimensional reliefs.

➤ **Outstanding basic performance**

The spacious operating area measuring 40 millimeters high by 305 millimeters wide by 230 millimeters deep and the high-speed spindle that turns at up to 20,000 rpm make for rapid engraving. Workpieces up to 40 millimeters thick can be accommodated.

➤ **Accommodates a wide variety of engraving materials**

The machine can engrave a wide range of workpiece materials, from plastics, acrylics, and other resin-based materials to light metals such as aluminum and brass.

➤ **Designed for ease of use**

You control machine operation using a handy panel that is separate from the machine. This lets you control the machine from a location affording a clear view of the workpiece and tool. You can also make the settings for the machine simply and easily while viewing the display screen on the handy panel.

➤ **Automatic Z control feature**

The machine offers an automatic Z control feature that makes possible engraving at a uniform depth, even on workpieces with wavy surfaces.

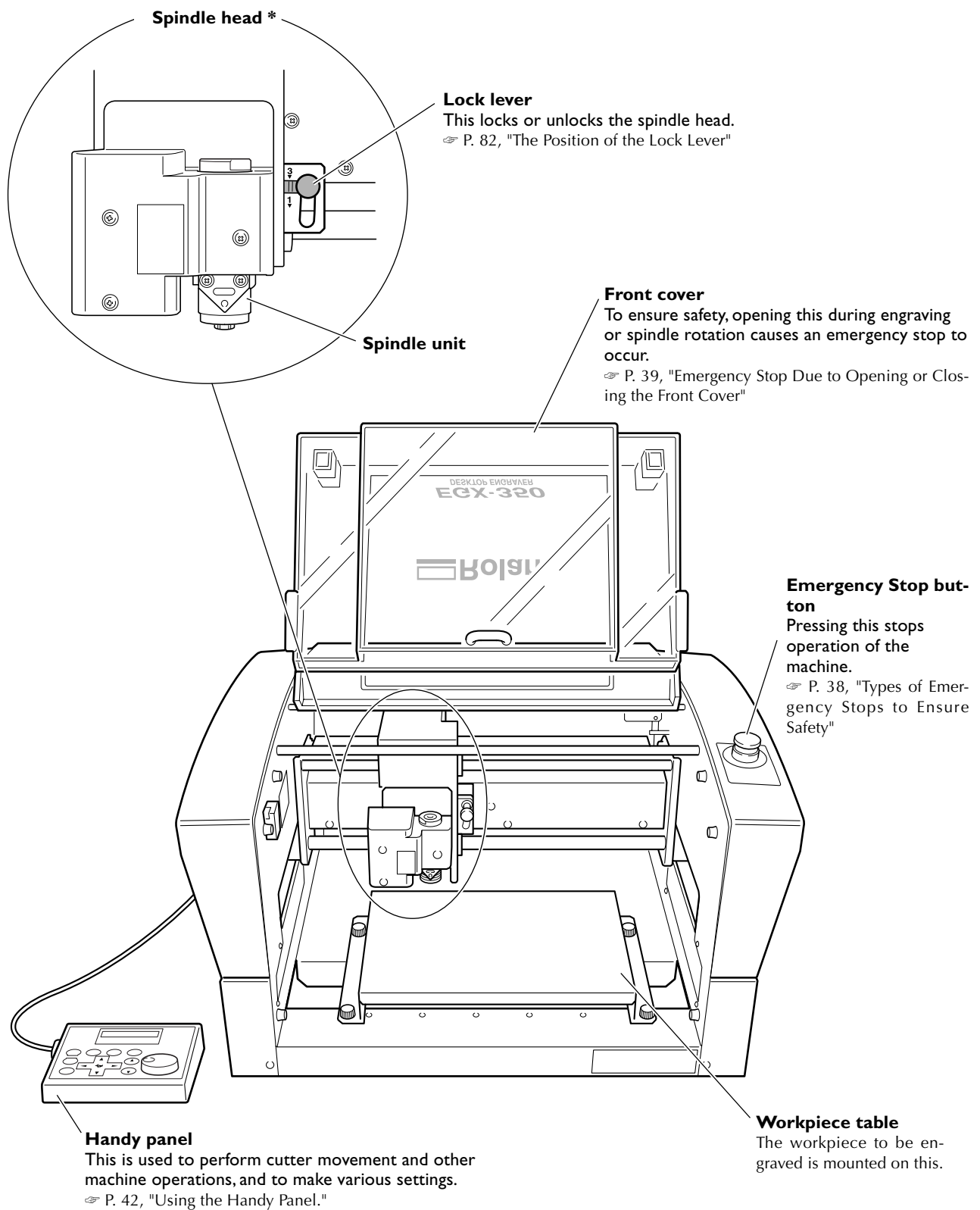
(Trackable undulation height: gentle undulations of about 1 millimeter)

➤ **High levels of safety**

A front cover and an emergency-stop button are standard features of the machine.

I-2 Part Names and Functions

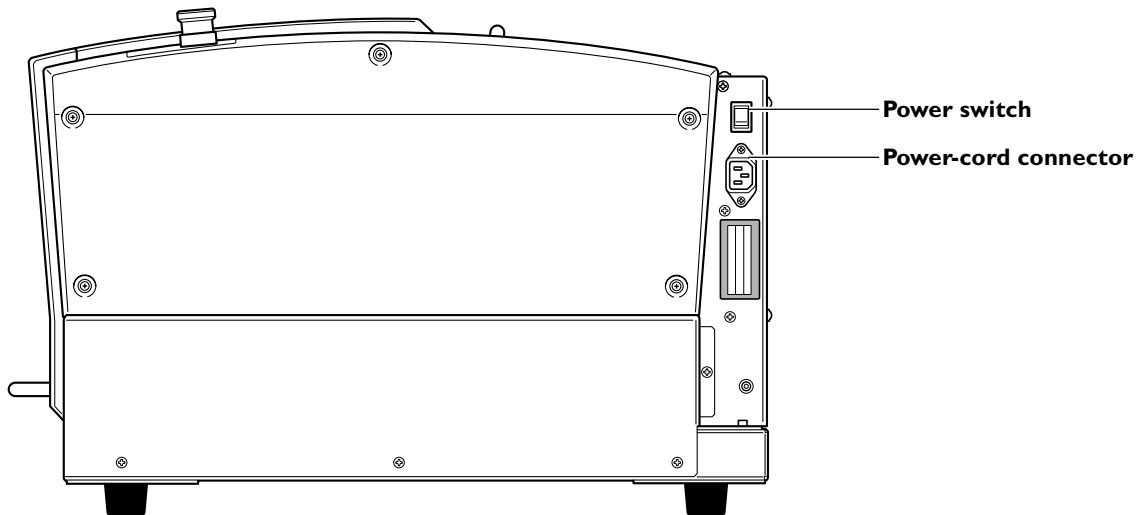
Front and Interior



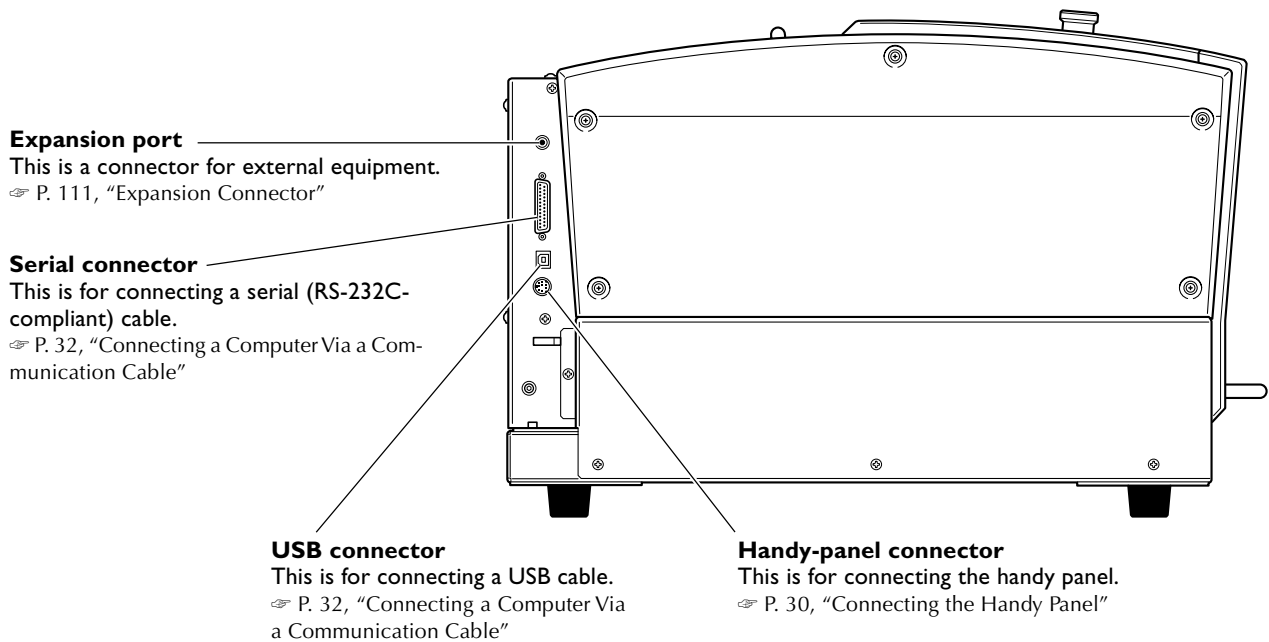
* In this manual, the mechanisms around the spindle unit, including the spindle motor, are called the "spindle head." Also, the rotary-axis area inside the spindle unit is called the "spindle."

Side

Right side



Left side

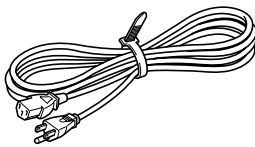
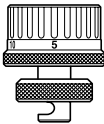

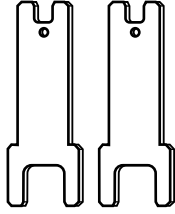
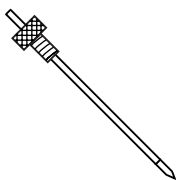
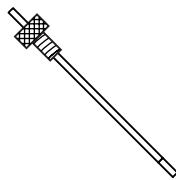

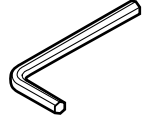


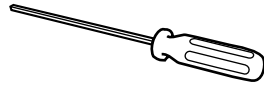
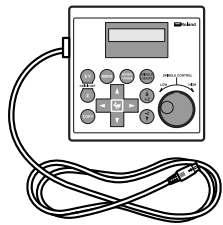
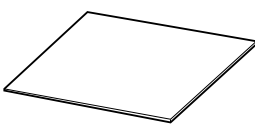
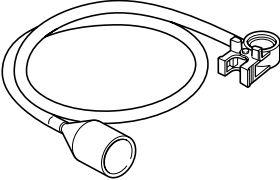
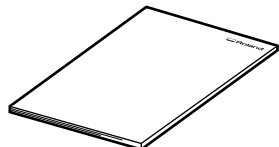
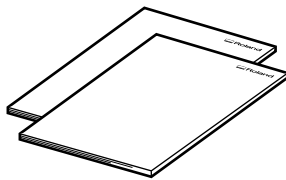




Chapter 2

Installation and Setup

2-1 Checking the Included Items

The following items are included with the machine. Make sure they are all present and accounted for.

 <p>Power cord</p>	 <p>Depth regulator nose (nose unit)</p>	 <p>Retaining screw Spring</p> <p>Noes-unit retainer</p>	 <p>Wrench</p>
 <p>Character cutter (diameter 3.175 mm, with cutter holder)</p>	 <p>Flat cutter (diameter 3.175 mm, with cutter holder)</p>	 <p>Spare tool retaining screw</p>	 <p>Hexagonal wrench</p>
 <p>Collet (diameter 3.175 mm)</p>	 <p>Collet (diameter 4.36 mm)*1,*2</p>	 <p>Hexagonal screwdriver</p>	 <p>Handy panel</p>
 <p>Adhesive sheet</p>	 <p>Vacuum-adaptor set</p>	 <p>User's Manual</p>	 <p>Software guide (Roland Software Package) (Roland Engrave Studio)</p>
 <p>Roland Software Package CD-ROM</p>	 <p>Roland Engrave Studio CD-ROM</p>		

*1: This is for diameter-4.36 mm character or flat cutters. It cannot be used with diamond scrapers or end mills.

*2: Never use a diameter-4.36 mm cutter at a spindle speed of 15,000 rpm or higher. There is danger of damage to the spindle unit due to vibration.

2-2 Installation

About Emplacement and Installation

- ⚠️ WARNING** Unloading and emplacement are operations that must be performed by 2 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.

The weight of the machine alone is 34 kg (75 lb.). Perform unloading and emplacement with care.

Installation Environment

Install in a quiet, stable location offering good operating conditions. An unsuitable location can cause accident, fire, faulty operation, or breakdown.

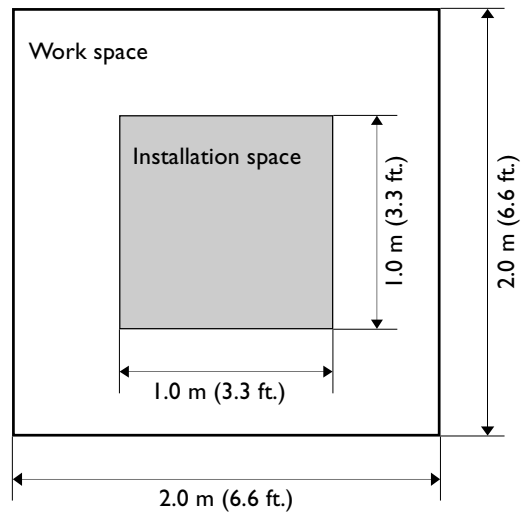
- ⚠️ WARNING** Install in a location that is level and stable.
Installation in an unsuitable location may cause an accident, including a fall or tipover.
- ⚠️ WARNING** Never install in a location exposed to open flame.
Cutting waste may ignite. Powdered material is extremely flammable, and even metal material may catch fire.
- ⚠️ WARNING** Never install close to any flammable object or in a gas-filled location.
Combustion or explosion may be a danger.
- ⚠️ WARNING** Never install out of doors or in any location where exposure to water or high humidity may occur.
Doing so may result in fire or electrical shock.
- ⚠️ WARNING** 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 install in a location subject to wide fluctuations in temperature or humidity.
- Never install in a location subject to shaking or vibration.
- Never install in a locations where the floor is tilted, not level, or unstable.
- Never install in a dusty or dirty location, or out of doors.
- Never install in a location exposed to direct sunlight or near air-conditioning or heating equipment.
- Never install in a location exposed to considerable electrical or magnetic noise, or other forms of electromagnetic energy.

2-2 Installation

Installation Space

Ensure that at least the following amount of space is available.



Height of Installation

The height of installation should be 0.6 m (23.7 in.) or higher above the work floor.

This machine is desktop type. Please decide the height of installation so that you can easily reach the emergency stop button when operating this machine.

Unpacking

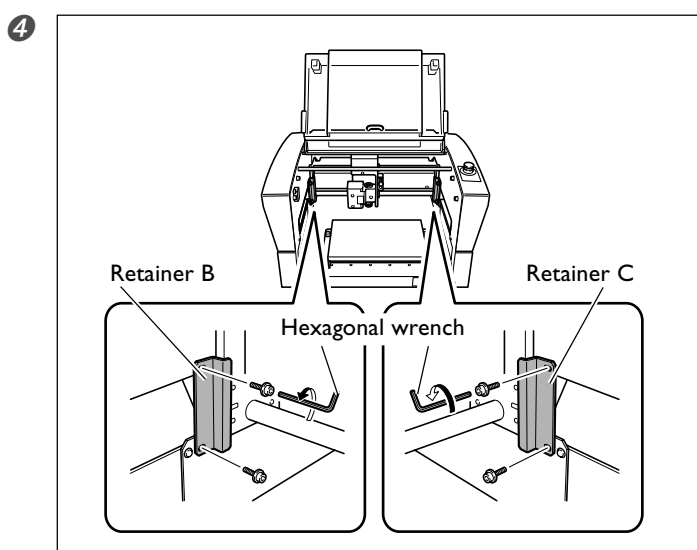
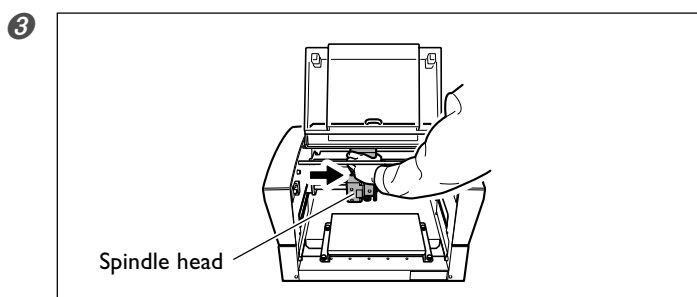
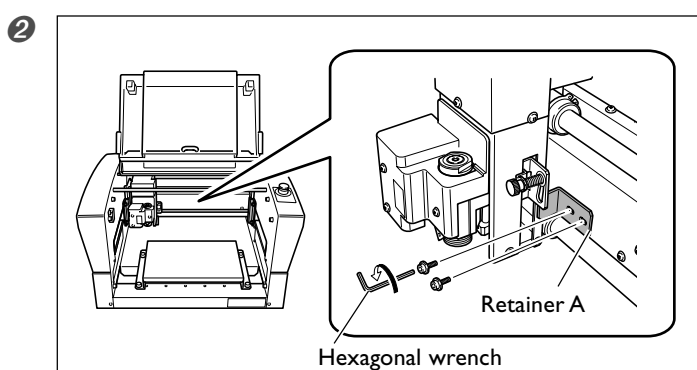
Retaining materials are attached to protect the machine from vibration during shipment. Remove these after emplacement.

- Remove all Retaining materials. Any that remain may cause faulty operation or breakdown when the power is switched on.
- The Retaining materials are required when moving the machine to a different location. Store them carefully so that they do not get misplaced.

⚠ WARNING Carry out these operations before you connect the power cord.
Inadvertent powerup may result in pinched hands or other injury.

Procedure

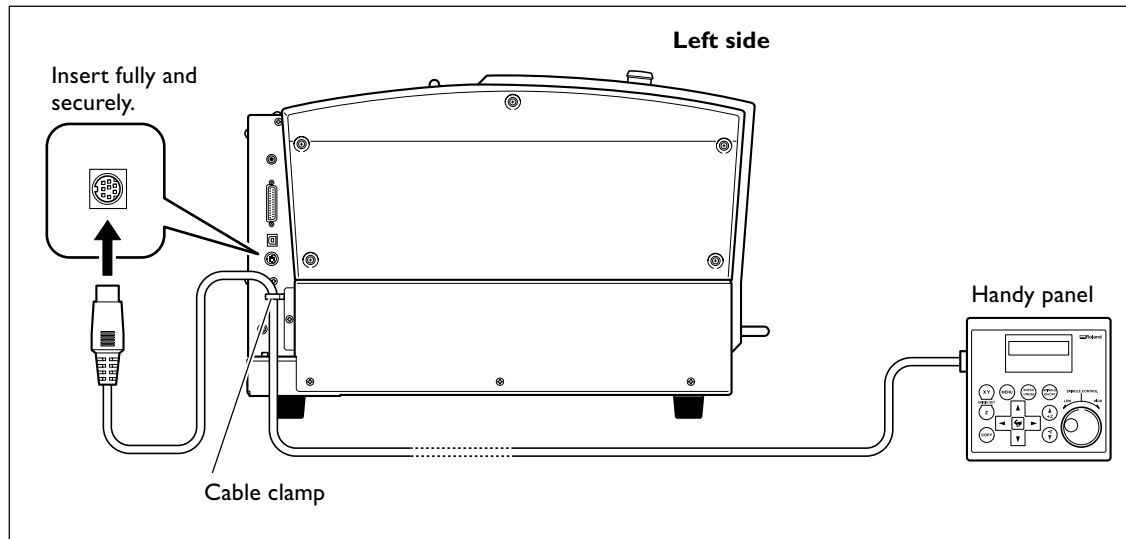
1 Make sure the power cord is not connected.



2-3 Cable Connections

Connecting the Handy Panel

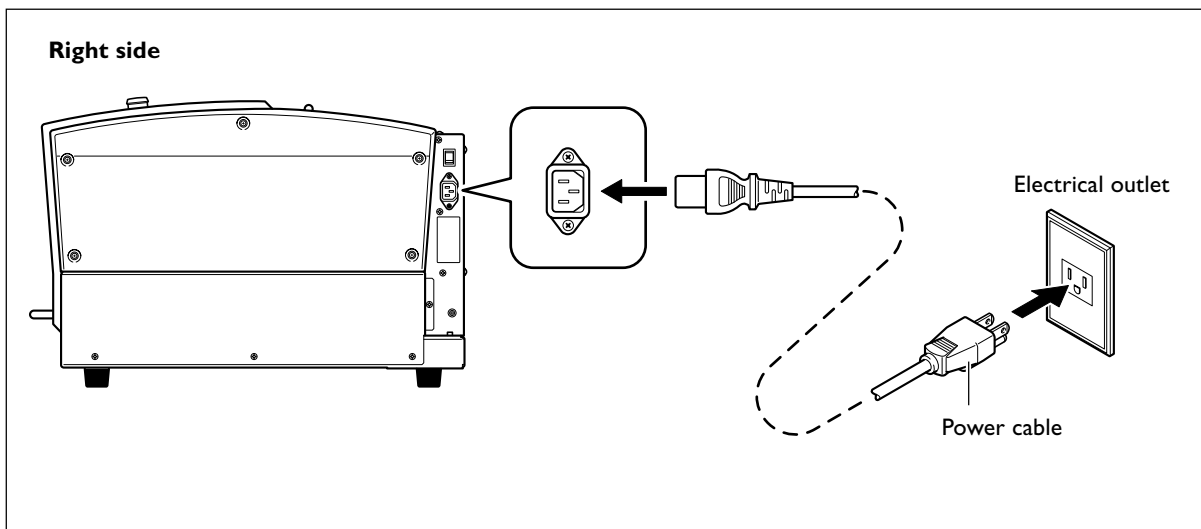
Make sure the power to the machine is switched off before attempting to connect or disconnect cables. Connecting the handy panel while the power is on makes the handy panel unusable.



Connecting the Power Cord

- ⚠ WARNING** **Connect to an electrical outlet that complies with this machine's ratings (for voltage and frequency).**
Incorrect voltage or insufficient current may cause fire or electrical shock.
- ⚠ 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.
- ⚠ WARNING** **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.
- ⚠ WARNING** **Connect to ground.**
This can prevent fire or electrical shock due to current leakage in the event of malfunction.
- ⚠ WARNING** **Connect to an electrical outlet. Never connect directly to a power distribution panel or other such fixed wiring equipment.**
Doing so increases the hazard of fire or electrical shock.

This machine requires a single-phase commercial power outlet, which rated at 1.3 A or higher (for 100 to 120 V) or 0.6 A or higher (for 220 to 240 V).



Connecting a Computer Via a Communication Cable

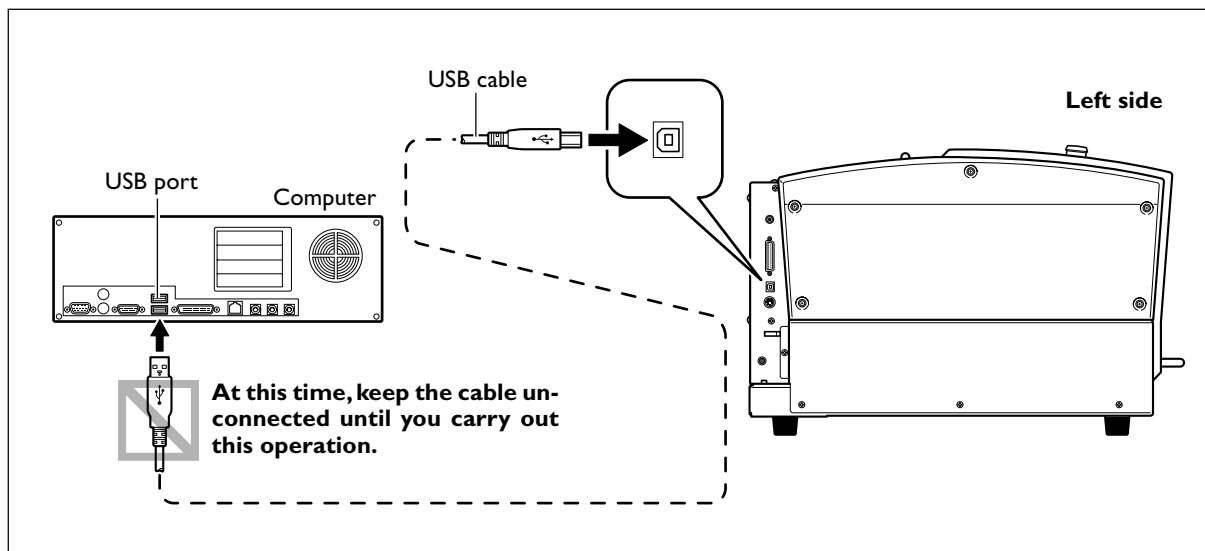
USB cable

At this time, keep the cable unconnected until you carry out this operation.

Follow the instructions in the separate Roland Software Package Software Guide to make the connection.

☞ P. 19, "About the Documentation for This Machine"

- Never connect two or more machines to one computer.
- Use a shielded USB cable having a length of 3 m (10 ft.) or less.
- Never use a USB hub.

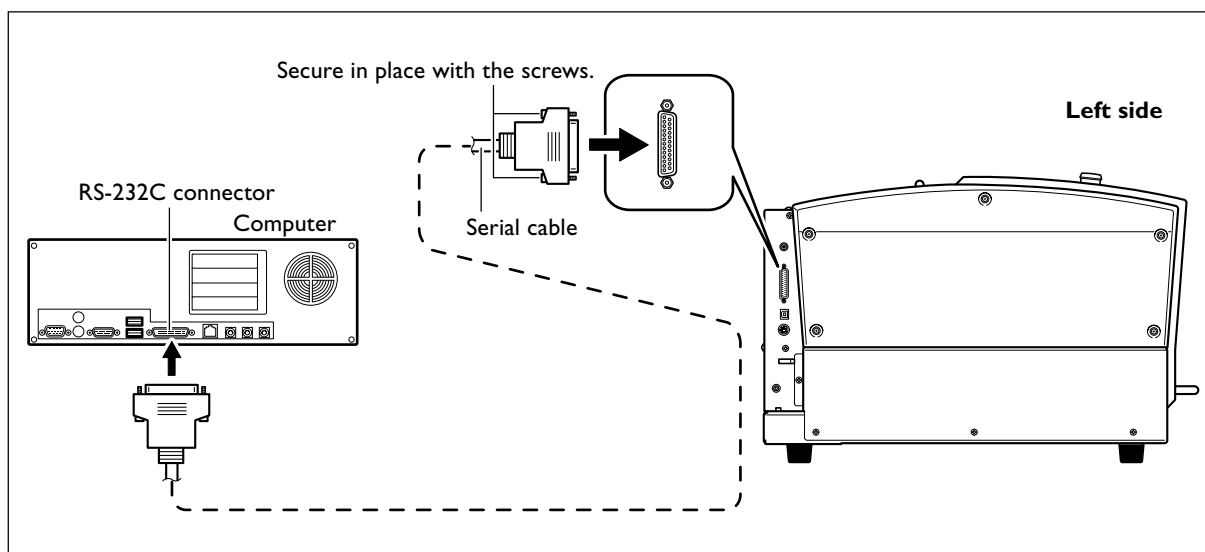


Serial cable

Using a serial cable requires making the settings for the communication parameters with the computer.

For the serial cable, use a separately available XY-RS-34 from Roland DG Corp.

☞ P. 85, "Submenus," p. 110, "Serial Connector"

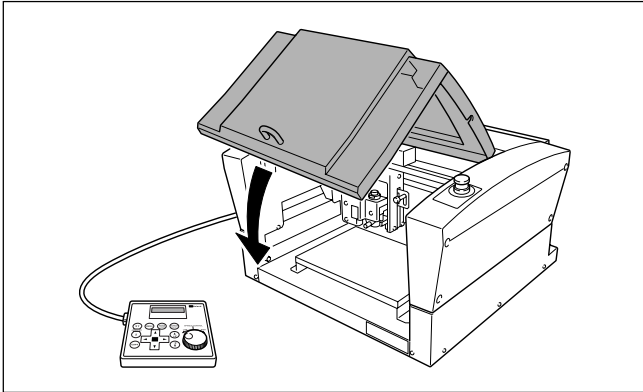


2-4 Selecting the Language

Selecting the Language Used for Text on the Display Screen

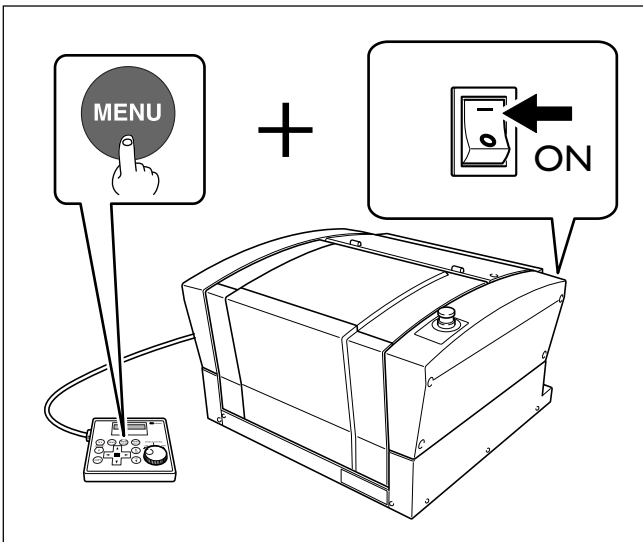
Procedure

①



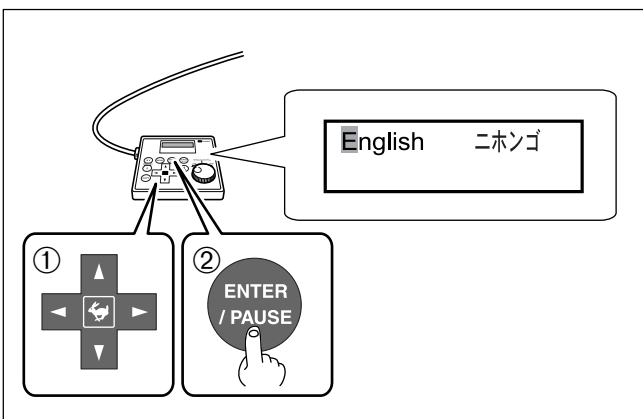
Close the front cover.

②



Hold down **MENU** and turn on the power switch.

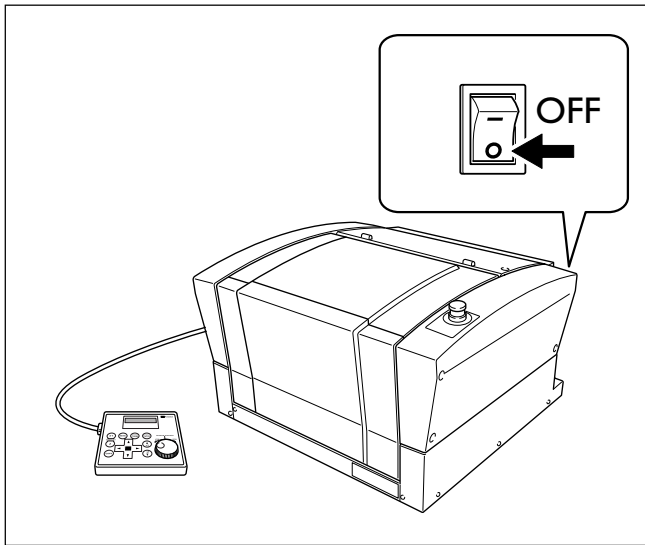
③



① Use **◀** or **▶** to select the language.

② Press **ENTER / PAUSE** to confirm.

4



Switch off the power switch.

2-5 Before Starting Operations

Spindle Run-in (Warm-up)

In any of the following cases, perform run-in (warm-up) operation for the spindle. Failure to do so may result in unstable spindle rotation.

- When using for the first time after purchase
- After moving the machine and reinstalling it at a different location
- After replacing the spindle unit
- When using in a low-temperature environment

How to Perform Run-in (Warm-up) Operation

Carry out the following steps 1 through 4.

☞ P. 47, "Starting and Stopping Spindle Rotation"

Step 1

Speed : 5,000 rpm

Rotation time : 15 minutes

Step 2

Speed : 10,000 rpm

Rotation time : 10 minutes

Step 3

Speed : 15,000 rpm

Rotation time : 10 minutes

Step 4

Speed : 20,000 rpm

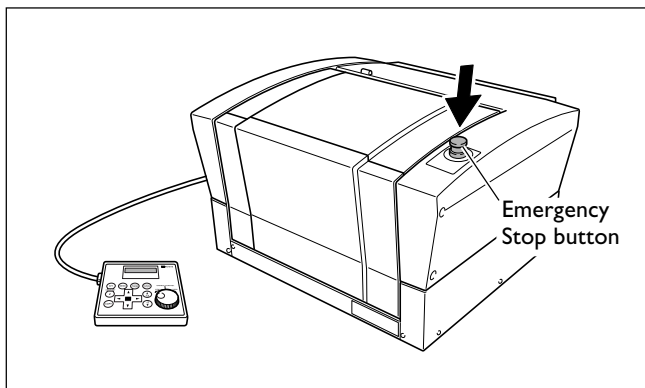
Rotation time : 15 minutes

Chapter 3

Basic Operation

3-1 Types of Emergency Stops to Ensure Safety

How to Perform an Emergency Stop

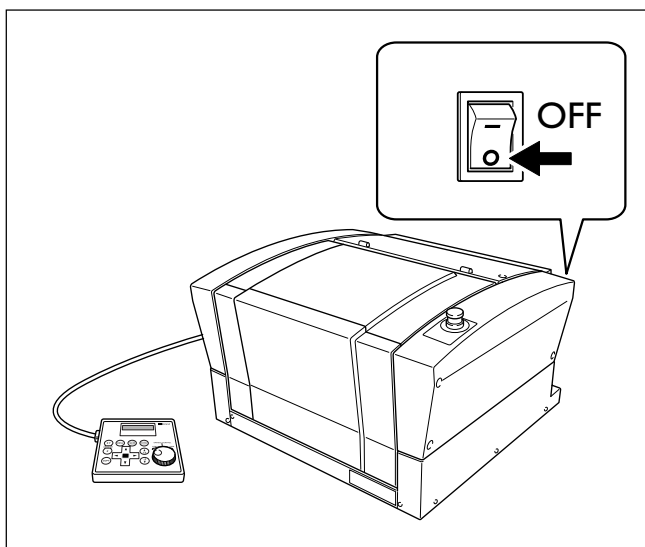


Press the Emergency Stop button.
Operation stops immediately.

To Cancel an Emergency Stop

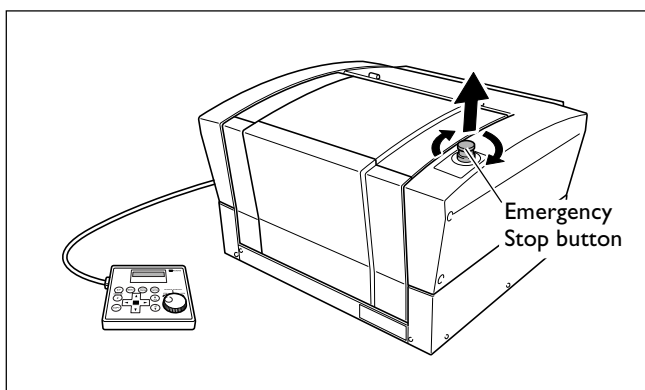
Procedure

1



Switch off the power switch.

2



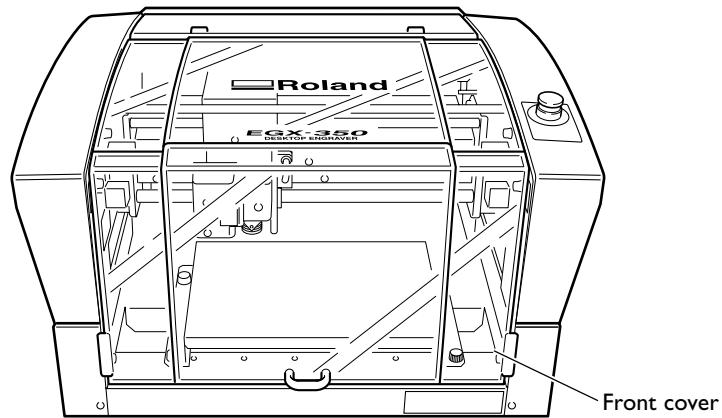
Turn the button in the direction of the arrows.

Emergency Stop Due to Opening or Closing the Front Cover

To ensure safety, opening the front cover during engraving or spindle rotation causes an emergency stop to occur, and the message shown below appears on the display screen. Operation cannot be resumed by closing the front cover. To resume, switch off the power, then start up again.

☞ P. 40, "Starting and Quitting"

Emergency Stop
COVER OPEN



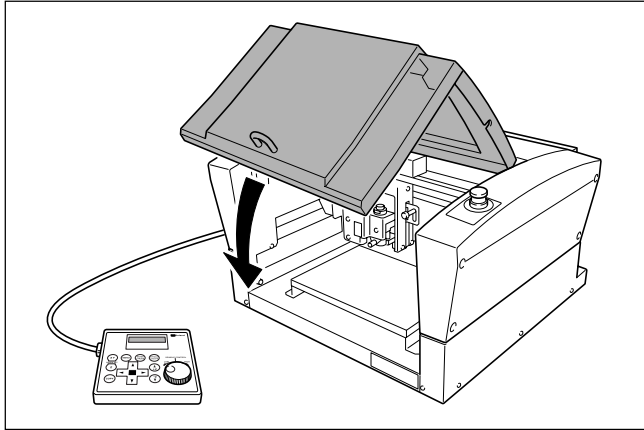
3-2 Starting and Quitting

How to Start the Machine

Follow the procedure below to start the machine. When startup is complete, the machine is ready for use.

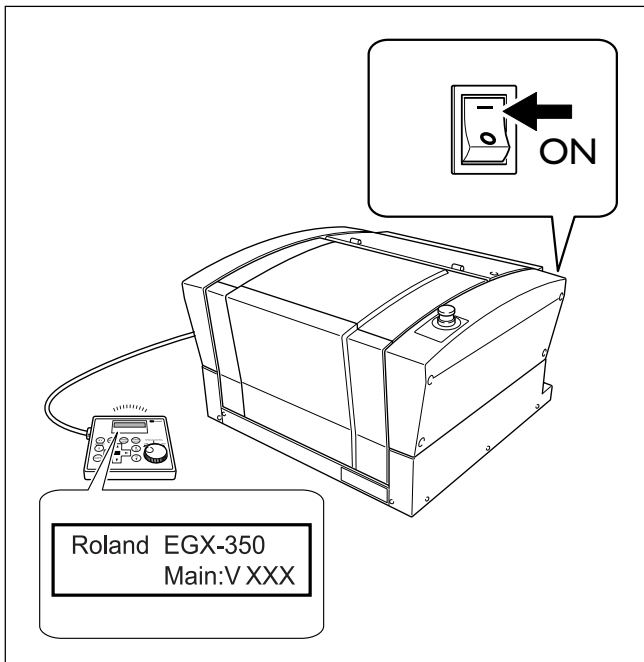
Procedure

1



Close the front cover.

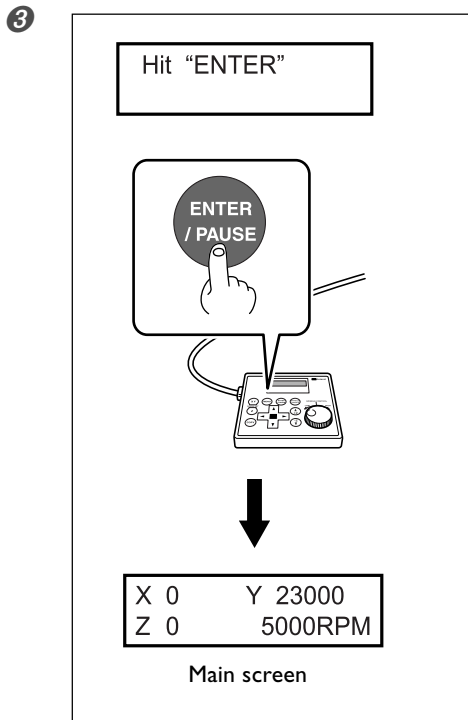
2



Switch on the power switch.

A message like the one shown in the figure appears on the handy panel's display screen.

Note: "XXX" indicates the version number of the machine's firmware.



When the screen shown in the figure at left appears after approximately three seconds, press **ENTER/PAUSE**.

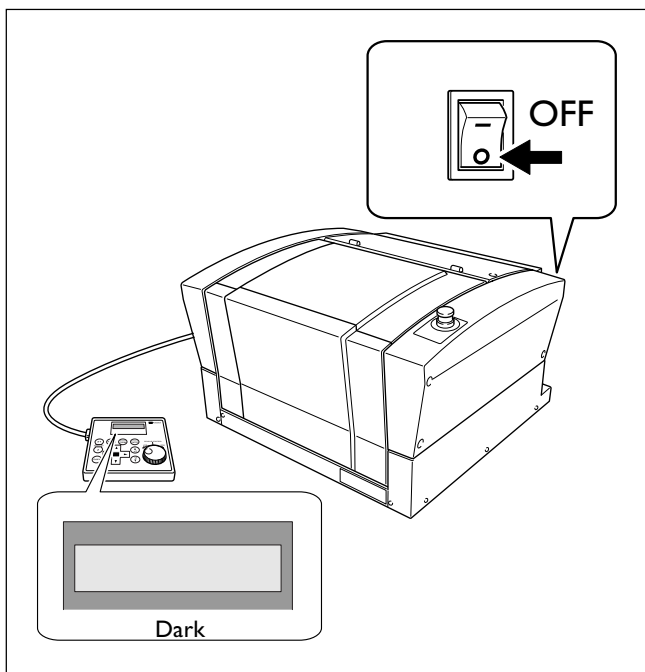
The spindle head moves to a location on the inner-left side of the machine. This operation is called "initialization."

The default for the language used for on-screen display is English. To change the display language to Japanese, refer to the page indicated below and change the language setting.

☞ P. 33, "Selecting the Language Used for Text on the Display Screen"

When initialization ends, the screen changes to a display like that shown at left (the mainscreen). This completes initialization.

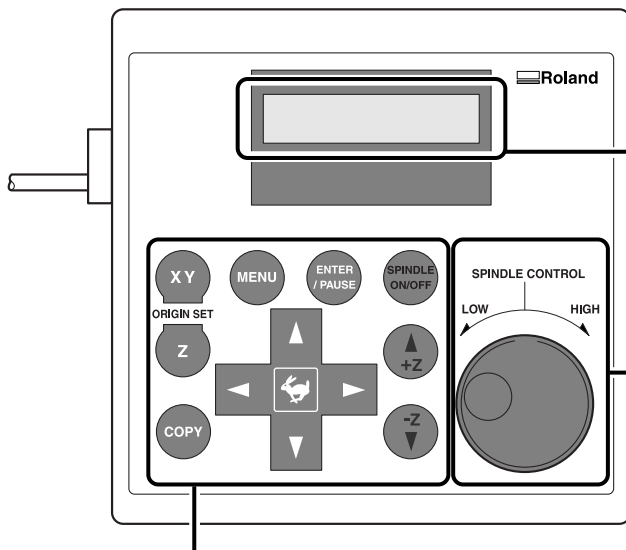
Shutdown




Make sure the machine is not in operation, then turn off the power switch.


The display screen on the handy panel goes dark.


3-3 Using the Handy Panel





Display screen
Menus, messages, and the like are displayed here.


Dial
This adjusts the spindle's speed of rotation. Indication used in this manual: 
☞ P. 48, "Adjusting the Spindle Speed"


MENU Button
Pressing this changes the menu screen. Also, pressing this when at the origin-setting menu returns the screen to the coordinate display view (the main menu).
Indication used in this manual: 

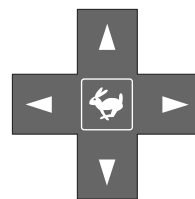
Enter/Pause button
This executes a selected on-screen item or confirms a selected item or value. Confirming an item or value displays the setting enclosed between angled brackets (" $\langle \rangle$ "). Pressing this during engraving pauses operation and displays the Pause menu.
Indication used in this manual: 


Spindle button
Holding this down for one second or longer while the spindle is stopped makes spindle rotation start. Pressing this during spindle rotation makes the rotation stop. (When rotation is stopped, holding the button down for one second or longer is not necessary.)
Indication used in this manual: 
☞ P. 47, "Starting and Stopping Spindle Rotation"

X/Y-axis Origin Set button
This sets the reference point for the cutting position.
Indication used in this manual: 
☞ P. 75, "Setting the XY Origin Point (Home Position)"


Z-axis Origin Set button
This sets the reference point for the cutting position.
Indication used in this manual: 
☞ P. 62, "Cutter Installation Method 2," p. 71, "Cutter Installation Method 4"

Copy button
This calls up the menu for the copy feature.
Indication used in this manual: 
☞ P. 78, "Executing Repeated Cutting"



Movement buttons
These move the cutter forward and backward, and to the left and right. You also use them to select items and change settings at menu screens.
Indication used in this manual: 
☞ P. 44, "Manual Movement"

Z-axis Movement buttons
These move the cutter up and down.
Indication used in this manual: 
☞ P. 44, "Manual Movement"

Feed button
Pressing a Movement or Z-axis Movement button while holding down this button makes the tool move rapidly.
Indication used in this manual: 
☞ P. 44, "Manual Movement"

3-4 Moving the Cutter

Terms Indicating the Cutter Position

This manual uses the following terms to indicate the position of the cutter.

➤ **Coordinates**

Numerical values indicating the location of the cutter

➤ **Origin**

The point of origin for the coordinates

➤ **X-axis coordinate**

The distance along the X axis from the origin point

➤ **Y-axis coordinate**

The distance along the Y axis from the origin point

➤ **Z-axis coordinate**

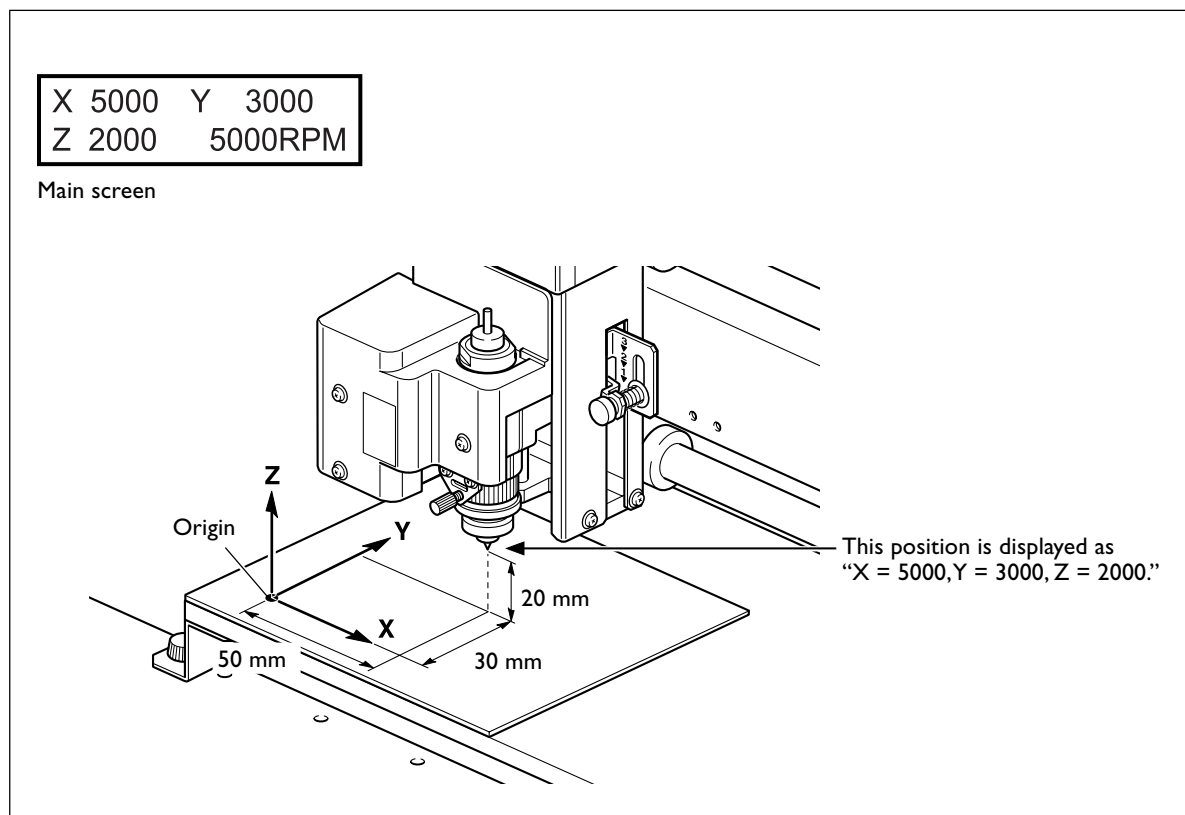
The distance along the Z axis from the origin point

Viewing the Cutter Position

The cutter position is displayed on the handy panel's main screen.

The figure below shows the main screen when the cutter has moved from the origin point by 50 millimeters along the X axis, 30 millimeters along the Y axis, and 20 millimeters along the Z axis.

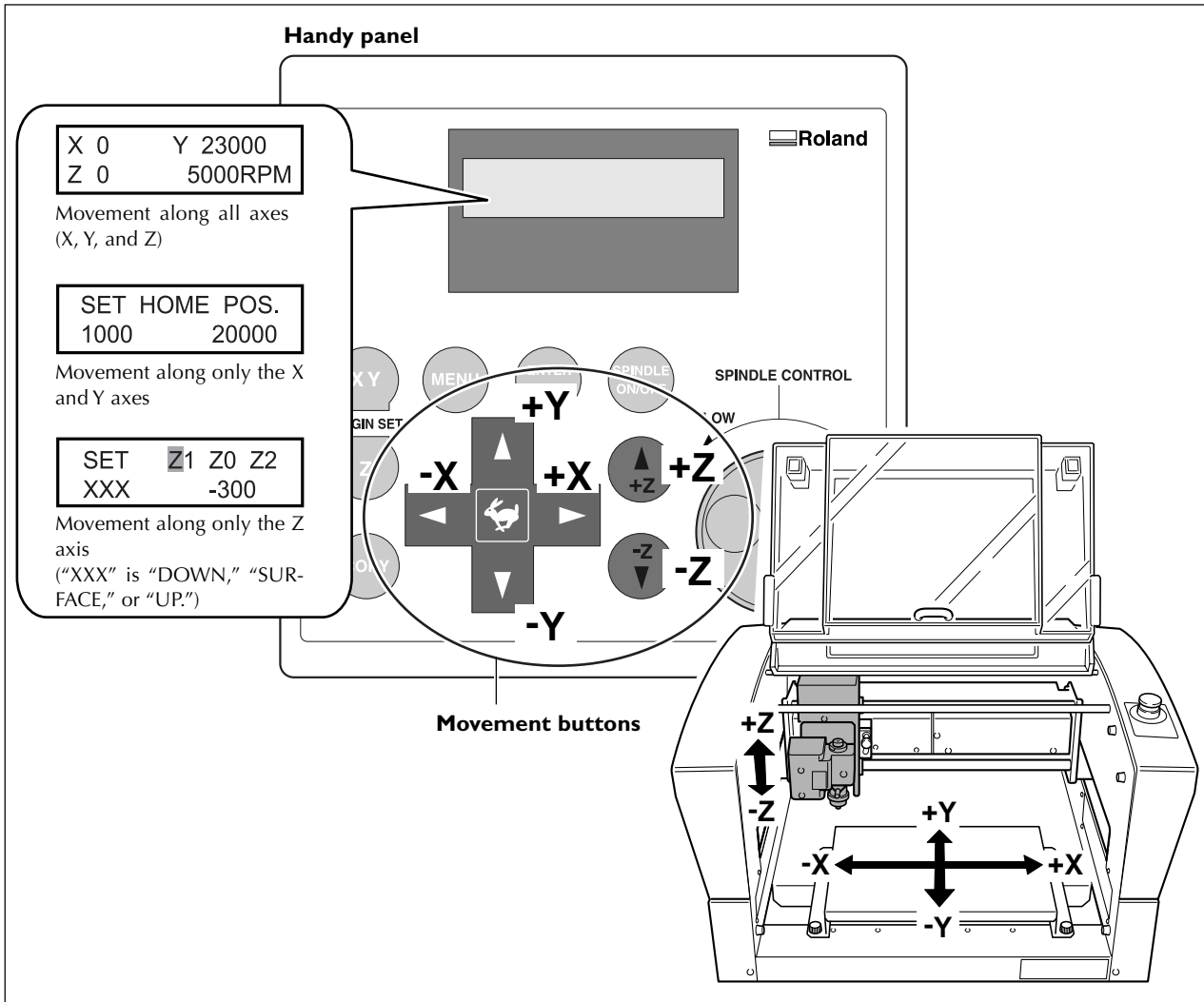
In the indication of coordinates used on this machine, a unit of "1" corresponds to 0.01 millimeter.



Manual Movement

When the screen on the handy panel displays any one of the messages shown in the figure below, you can move the cutter manually using the movement buttons.

☞ P.84, "Menu List"



- > Each single press of , , , , or performs movement by 0.01 millimeter.
- > Holding down , , , , or performs slow continuous movement.
- > Holding down while pressing and holding , , , , or performs rapid continuous movement.

Important!

This operation is not possible in the following cases.

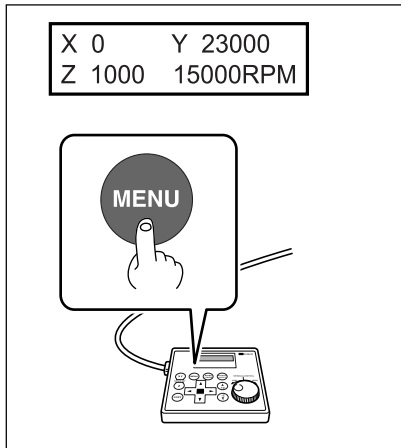
- > When engraving is in progress
- > When operation is paused

Moving to a Specific Position Automatically

Procedure

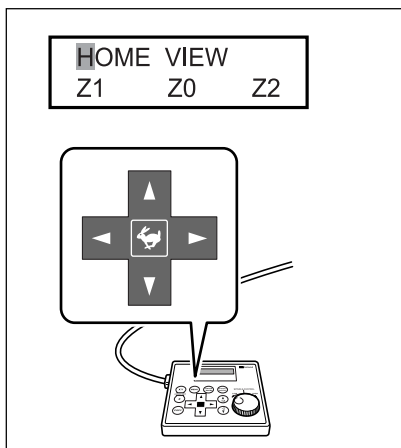
① Close the front cover.

②



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

③



Press **◀**, **▶**, **▲**, or **▼** to select the movement destination.

> HOME

This is the location where the X- and Y-axis coordinates are both "0" (the XY origin point). When movement by this operation is performed, to avoid contact with the workpiece, the machine first rises to the highest point along the Z axis, and then performs movement.

☞ P. 75, "Setting the XY Origin Point (Home Position)"

> VIEW

This is the inner-left location on the workpiece table. You use it in situations such as when mounting or removing a workpiece, or when checking the state of the workpiece.

> Z0

This is the location where the Z-axis coordinate is "0."

☞ P. 62, "Cutter Installation Method 2," p. 71, "Cutter Installation Method 4," and p. 92, "Origin-setting Menu"

> Z1

This is the location of the cutting-in depth when cutting the workpiece.

☞ P. 92, "Origin-setting Menu"

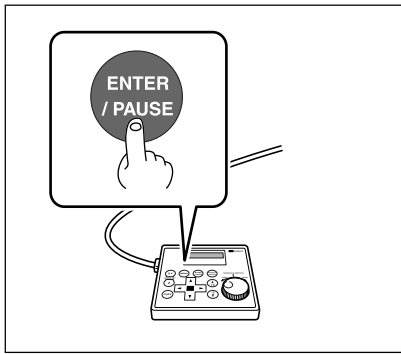
> Z2

This is the height location along the Z axis when performing no-load feed of the cutter during cutting.

☞ P. 92, "Origin-setting Menu"

3-4 Moving the Cutter

4



Press **ENTER/PAUSE**.

The cutter moves to the selected location.

When the front cover is open, the screen shown in the figure below is displayed, and the cutter doesn't move. After three seconds the message disappears and the screen returns to the original menu.

Please close
the cover

3-5 Spindle Operation

Starting and Stopping Spindle Rotation

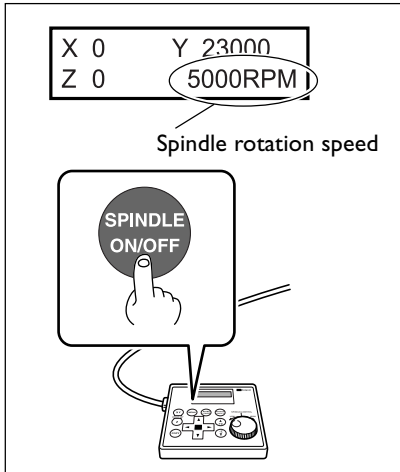
This manually starts and stops rotation of the spindle. You perform the operation using the handy panel.

⇨ P.35, "Spindle Run-in (Warm-up)"

Procedure

① Close the front cover.

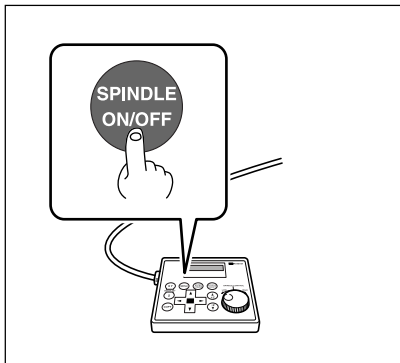
②



At the main screen, press and hold **SPINDLE** for one second or longer.

A beep is heard, and the spindle starts to turn.

③



Press **SPINDLE**.

The spindle stops turning, a beep is heard.

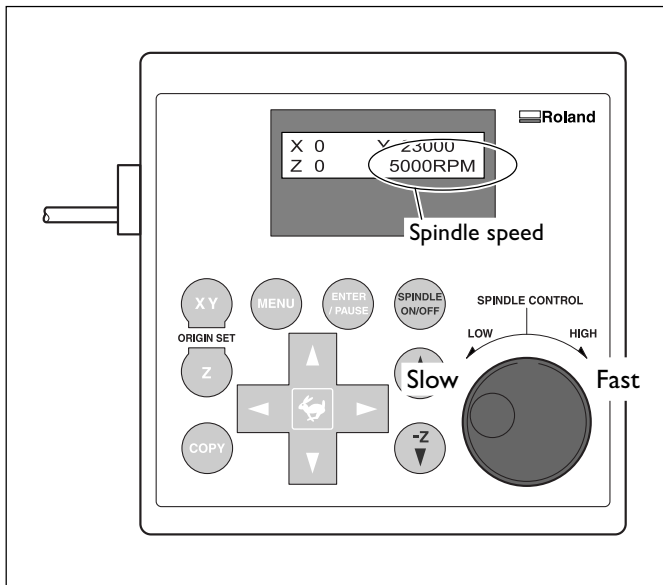
This operation cannot be performed in the following situations.


- When the machine is performing some operation
- When the front cover is open (in which case the screen shown in the figure below is displayed)

Please close
the cover

⇨ P. 103, "Responding to a Message"

Adjusting the Spindle Speed



To adjust the speed of spindle rotation, turn  on the handy panel.

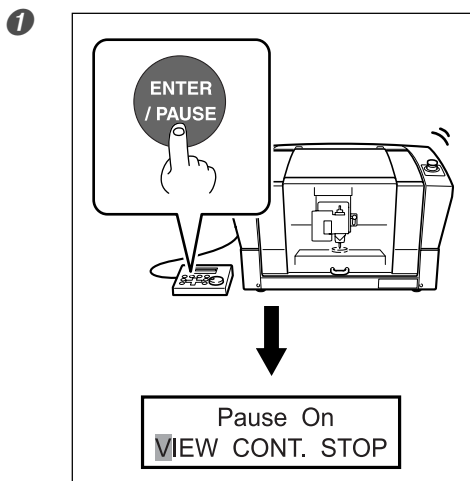
The setting for the spindle speed can be made only on the machine. Any setting made on the computer is ignored.

3-6 Pausing and Stopping Cutting

Pausing and Resuming Cutting

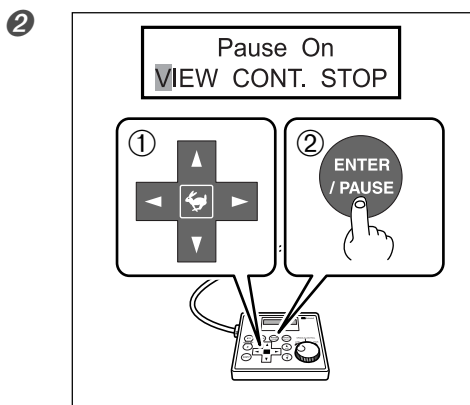
This pauses cutting through operation using the handy panel. This enables you to move the cutter to the VIEW position and check the status of the workpiece, then resume cutting at the location where you paused operation.

Procedure



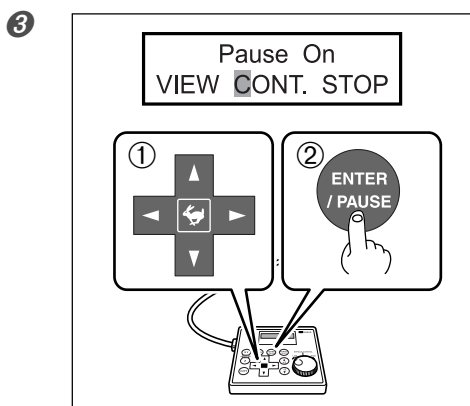
While cutting is in progress, press **ENTER/PAUSE**.
Movement of the cutter pauses. Rotation of the spindle does not stop at this time.

The display screen shown at left appears.



① Use **◀** to select “VIEW.”
② Press **ENTER/PAUSE** to confirm.
Rotation of the spindle stops, and the cutter moves to the VIEW position.

☞ P. 45, “Moving to a Specific Position Automatically”



① Use **◀** or **▶** to select “CONT.”
② Press **ENTER/PAUSE** to confirm.
The cutter returns to the location where paused, and cutting resumes.

Selecting “VIEW” or “CONT.” while the front cover is open makes the message shown in the figure below appear. After three seconds the message disappears and the screen returns to the original menu. Close the front cover, then redo the selection of the operation item.

Please close
the cover

Important!

Before opening the front cover while operation is paused, first make sure that rotation of the spindle is stopped. For safety, opening the front cover while the spindle is turning makes the machine perform an emergency stop. Be sure to note that if this happens, it's necessary to quit the operation and start over from the beginning.

☞ P. 39, "Emergency Stop Due to Opening or Closing the Front Cover"

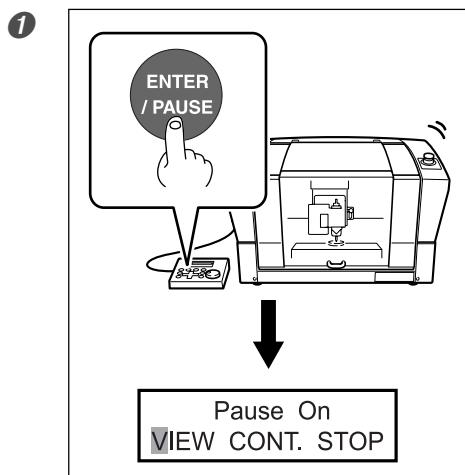
Other operations possible while paused

- Starting or stopping spindle rotation
 - ☞ P. 47, "Starting and Stopping Spindle Rotation"
- Changing the spindle speed
 - ☞ P. 48, "Adjusting the Spindle Speed"
- Changing the feed rate of the cutter
 - ☞ P. 77, "Adjusting the Cutter Feed Rate During Engraving (Override)"

Stopping Cutting

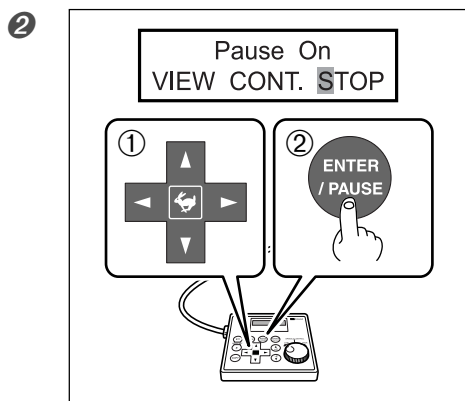
This stops cutting through operation using the handy panel. Unlike pausing operation, cutting cannot be resumed.

Procedure



While cutting is in progress, press **ENTER/PAUSE**.
Movement of the cutter pauses. Rotation of the spindle does not stop at this time.

The display screen shown at left appears.



- ① Use **▶** to select "STOP"
 - ② Press **ENTER/PAUSE** to confirm.
- The cutter moves to the highest location on the Z axis, then stops. If the spindle is rotating, its rotation stops here.

Chapter 4

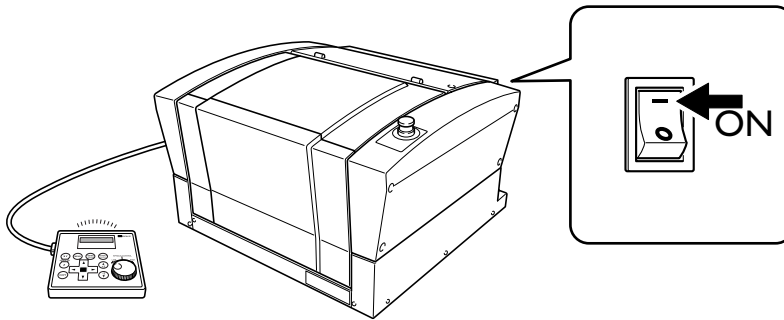
Engraving

4-1 Flow of Engraving Operations

1. Startup

Switch on the power switch to start the machine.

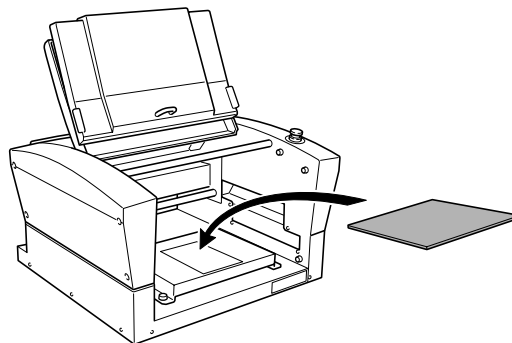
☞ P. 40, "How to Start the Machine"



2. Mounting the Workpiece

Mount the workpiece to engrave on the table.

☞ P. 54, "Mounting a Workpiece"



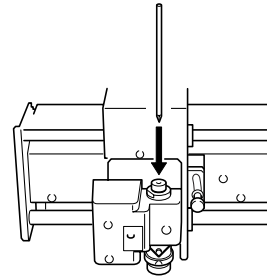
To next page



3. Cutter Installation and Basic Engraving Settings

Install the cutter to use for engraving. On this machine, you also set the Z-axis engraving origin point at this time. The methods you use for installation and the settings differ depending on whether you're using the nose unit and on the cutter type. This manual describes the following four variations. Use these as a reference to select the optimal cutter for the purpose and use the appropriate methods for installing the cutter and making the settings.

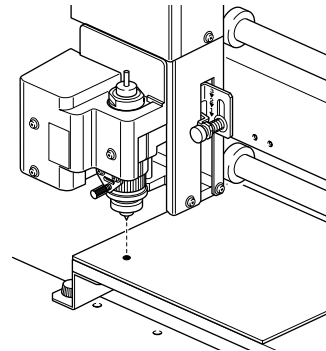
- Character cutter or flat cutter (with the nose unit)
 - ☞ P.56, "Cutter Installation Method 1 (With Nose Unit)"
- Character cutter or flat cutter (no nose unit)
 - ☞ P.62, "Cutter Installation Method 2 (No Nose Unit)"
- Diamond scraper
 - ☞ P.67, "Cutter Installation Method 3"
- End mill
 - ☞ P.71, "Cutter Installation Method 4 (End mill)"



4. Setting the XY Origin Point

Set the engraving origin point for the X and Y axes.

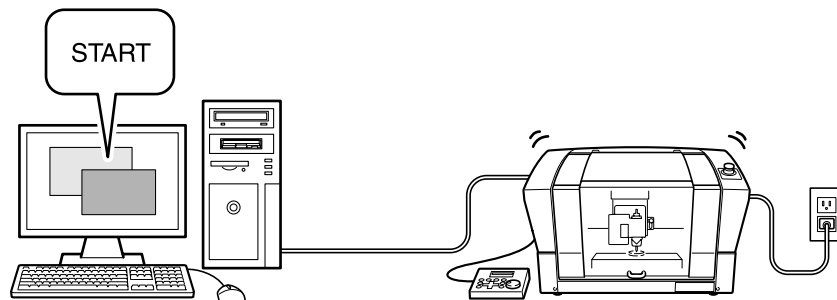
- ☞ P.75, "Setting the XY Origin Point (Home Position)"



5. Performing Engravings

When all the preparations are complete, send the engraving data from the computer and carry out engraving.

- ☞ P.76, "Performing Engraving"



4-2 Mounting a Workpiece

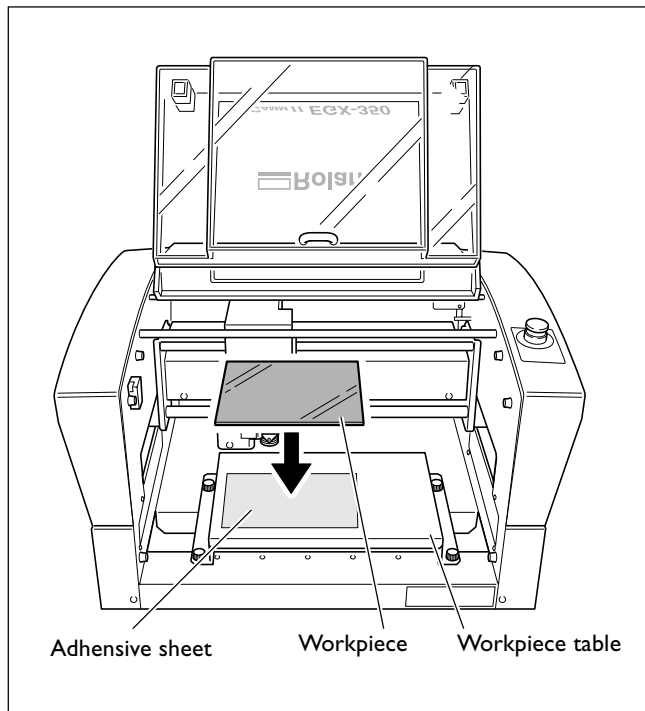
⚠ WARNING Never inadvertently touch the computer or handy panel while performing this task.

Unintended operation of the machine may result in injury.

⚠ CAUTION Caution: cutting tool.

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

When Using an Adhesive Sheet



Affix the adhesive sheet to the workpiece table, then place the workpiece on the adhesive sheet and press down on it from above to secure it in place.

On this machine, you can also use optionally available items to secure the workpiece in place: a center vise (ZV-23C) or a vacuum table (ZV-23A). For detailed information about these optional items, contact your authorized Roland DG Corp. dealer.

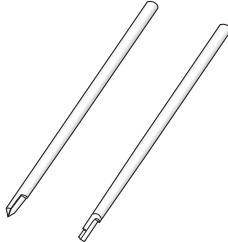
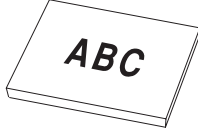

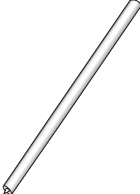

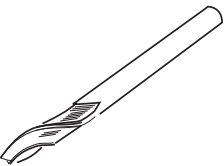

4-3 Selection of the Cutter (Usage Examples)

This machine can use cutters of a wide variety of types that have a diameter of 3.175 millimeters or 4.36 millimeters. Use an appropriate collet for the cutter's diameter and type. For other cutters that can be used with the machine, contact your authorized Roland DG Corp. dealer.

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

Important!

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.

Cutter	With nose unit	No nose unit
Character cutter Flat cutter (*1) 	◆ Engraving acrylic and other plastic plates (*2) ⇨ P. 56, "Cutter Installation Method 1" 	◆ Engraving plates of aluminum or brass ◆ Three-dimensional engraving and creating reliefs using plastic materials ⇨ P. 62, "Cutter Installation Method 2" 
Diamond scraper (*3) 	◆ Unsuitable	◆ Scribing plates of aluminum or brass ⇨ P. 67, "Cutter Installation Method 3" 
End mill (*4) 	◆ Unsuitable	◆ Creating reliefs and performing 3D cutting using plastic material ⇨ P. 71, "Cutter Installation Method 4" 

*1: Diameter-4.36 millimeter cutters are optionally available items.

*2: Use of the nose unit is not suitable for fill engraving at a width greater than the diameter of the nose-unit tip.

⇨ P. 61, "Important Notes When Using the Nose Unit"

*3: This is an optionally available item. Also, the diameter-4.36 millimeter diamond scraper cannot be used with the included solid collet. Provide a dedicated collet for diamond scrapers separately.

*4: This is an optionally available item. Provide a dedicated end-mill collet separately.

4-4 Cutter Installation Method I (With Nose Unit)

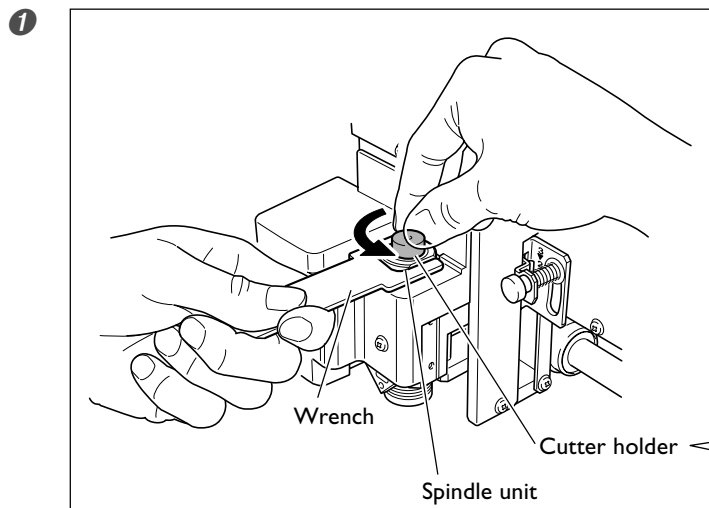
Installing a Character Cutter (With Nose Unit)

- ⚠ 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 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 or flat cutter
Nose-unit usage	Used
Suitable workpiece types	Acrylic and other plastic-resin panels Note: Aluminum, brass, and other easily scratched workpieces are not suitable.
Automatic Z-axis control	On
Spindle rotation	On
Lock-lever position	1 ↓ or 2 ↙

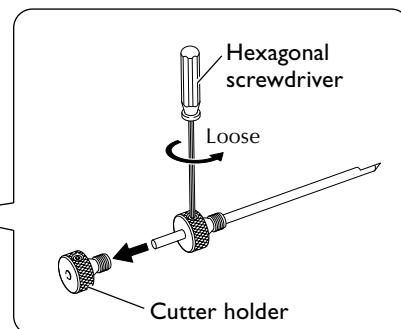
This performs engraving using the nose unit. When the tip of the nose unit touches the surface of the workpiece, the location is automatically detected as the Z origin point. This makes it possible to perform engraving at a uniform depth on a workpiece of uneven surface height. This also eliminates the need to set the Z-axis origin point each time when you're engraving a number of different workpieces.

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

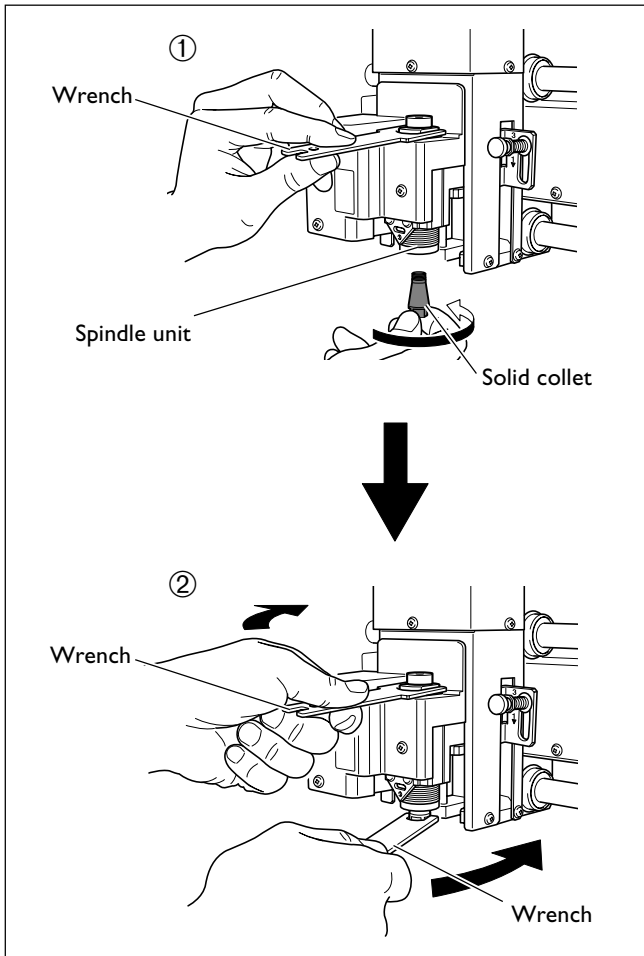


Install the cutter holder.

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.



2



Install the solid collet.

① **Loosely tighten the solid collet.**

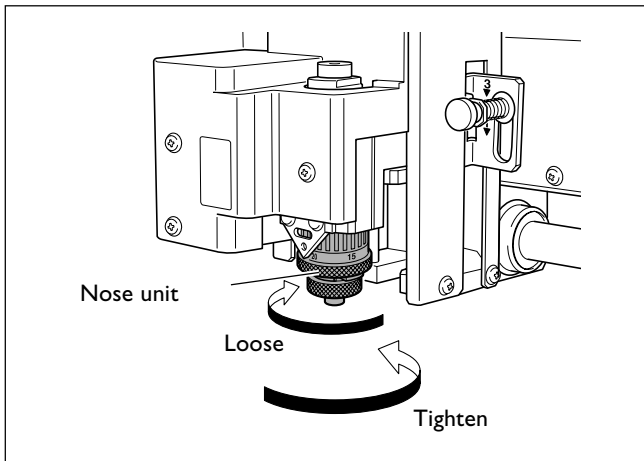
Insert the solid collet into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten loosely.

Use an appropriate solid collet for the cutter's diameter.

② **Fully tighten the solid collet.**

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

3

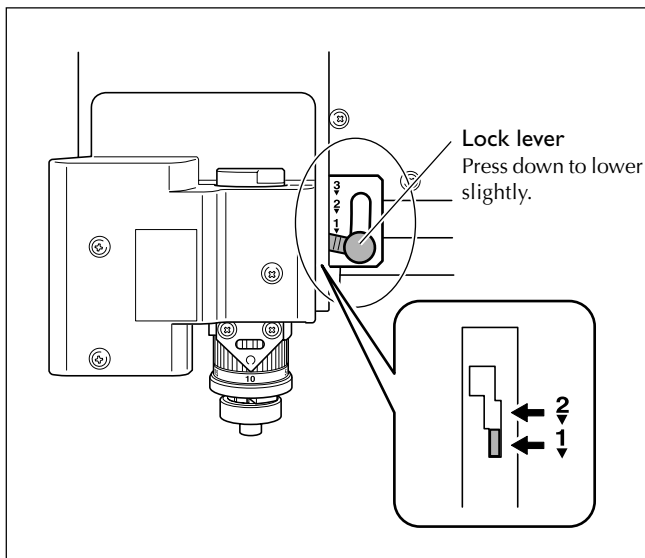


Install the nose unit.

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

☞ P. 61, "Important Notes When Using the Nose Unit"

2. Set the lock lever.



Set the lock lever at the $\downarrow 1$ or $\downarrow 2$ position.

For detailed information about the setting position for the lock lever, refer to the page indicated below.

☞ P. 82, "The Position of the Lock Lever"

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

1 I/O OTHERS
ADJUSTMENT

Press **MENU** several times to display the screen shown at left.
Use **◀** and **▶** 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 "ON."
The machine automatically determines the Z-axis origin during cutting according to the height of the workpiece.
Press **ENTER/PAUSE** to confirm.

SET lock lever
to 1 or 2

The message shown at left is displayed for three seconds, and then the original screen returns.

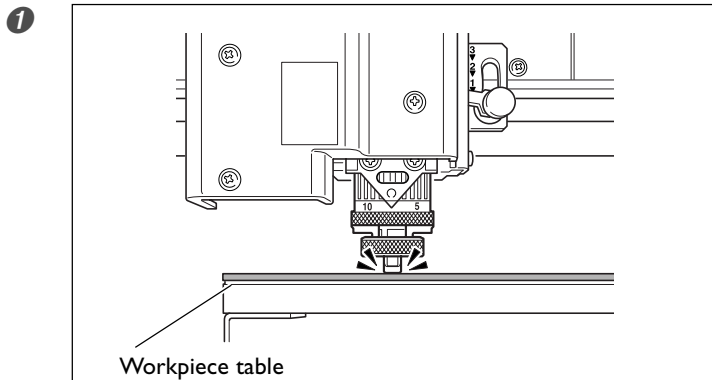
4 AUTO Z CONTROL
UP <500>

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

5 X 0 Y 23000
Z AUTO 5000RPM

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

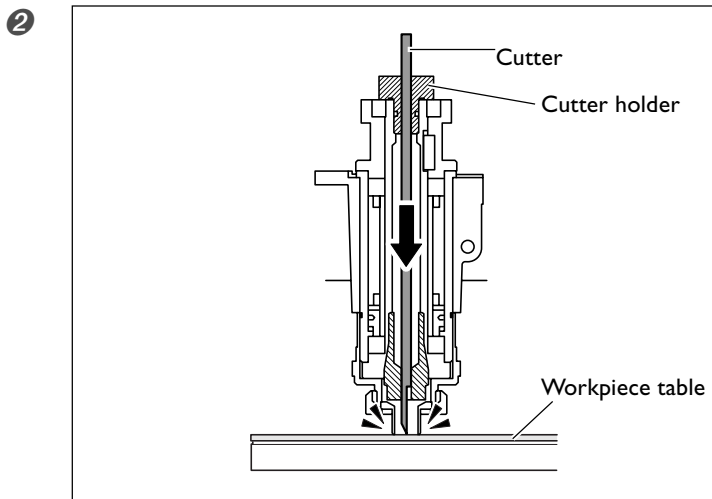
4. Install the cutter and make the setting for the cutting-in depth.



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.

☞ P. 44, "Manual Movement"

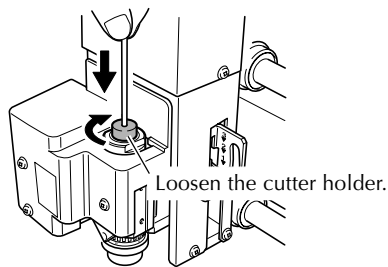


Insert the cutter into the cutter holder and bring the tip of the cutter into contact with the workpiece table.

Point

If cutter insertion is difficult

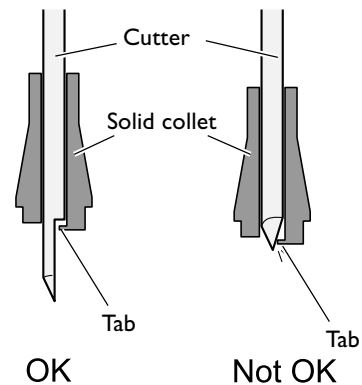
If the cutter catches on the solid collet and is difficult to insert, loosening the cutter holder makes insertion easier. Note that inserting it with undue force may result in damage to the workpiece. After inserting the cutter, tighten the cutter holder again.



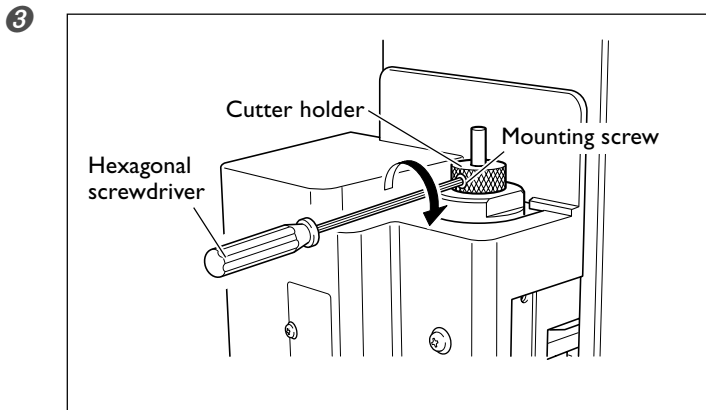
Point

When using a diameter-4.36 mm solid collet

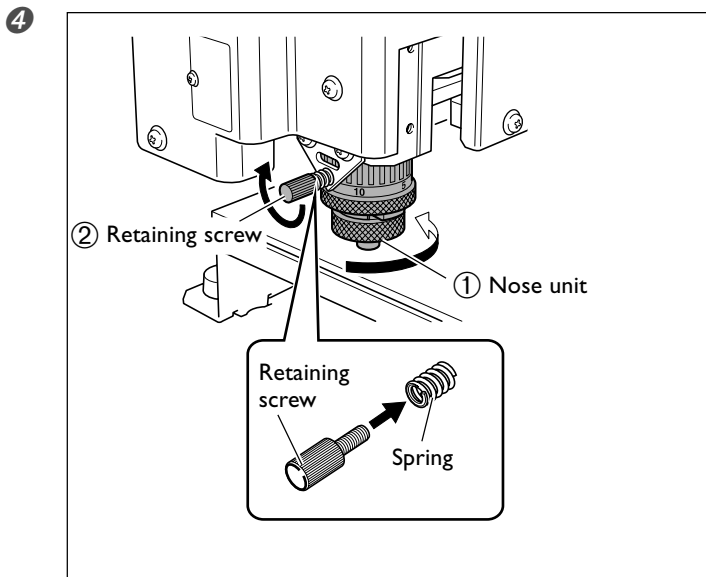
Be careful to orient the cutter correctly.



4-4 Cutter Installation Method I (With Nose Unit)



Secure the cutter in place.
Tighten the mounting screw for the cutter holder.



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 (0.001 in.)

1 full turn = 0.635 mm (0.025 in.)

An amount of 4 to 8 scale ticks corresponds to 0.1 to 0.2 mm (0.004 to 0.008 in.).

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

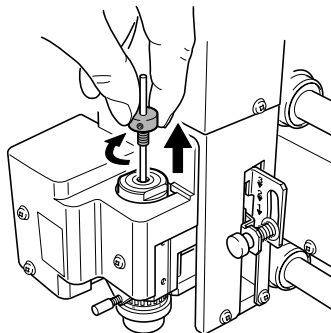
This completes the installation of the cutter. Go on to page 75, "Setting the XY Origin Point (Home Position)."

Point

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.



Remove the entire cutter-holder assembly from the spindle unit.



Store without changing the position of the cutter holder.

Important Notes When Using the Nose Unit

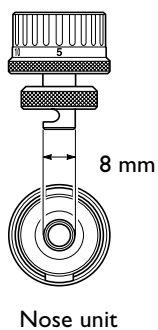
Amount of Height Displacement That Can Be Tracked

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.



4-5 Cutter Installation Method 2 (No Nose Unit)

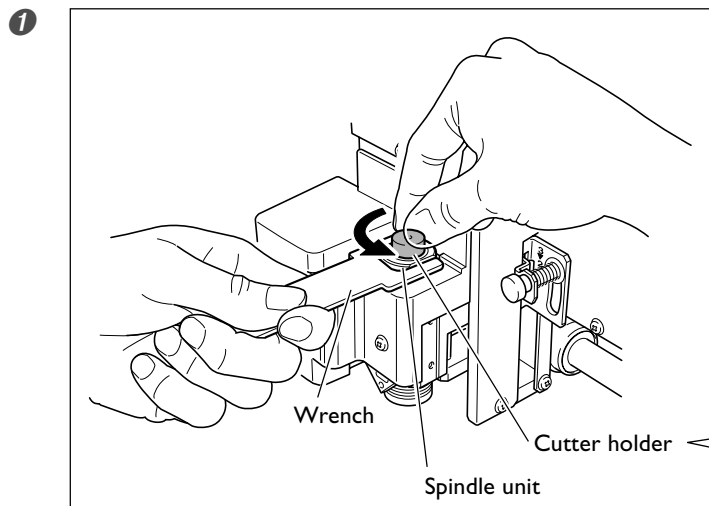
Installing a Character Cutter (With No Nose Unit)

- ⚠ 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 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 or flat cutter
Nose-unit usage	Not Used
Suitable workpiece types	Aluminum, brass
Automatic Z-axis control	Off
Spindle rotation	On
Lock-lever position	3 ▼

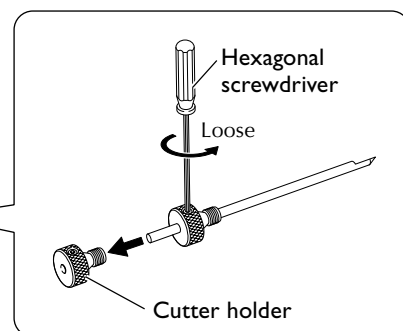
This performs engraving without using the nose unit. This method doesn't scrape the surface of the workpiece, so you can also use it with materials such as aluminum or brass. Note, however, that the Z-axis origin point is fixed and unchanging, so in order to obtain a uniform cutting-in depth, the thickness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

1. Install the cutter holder and solid collet.

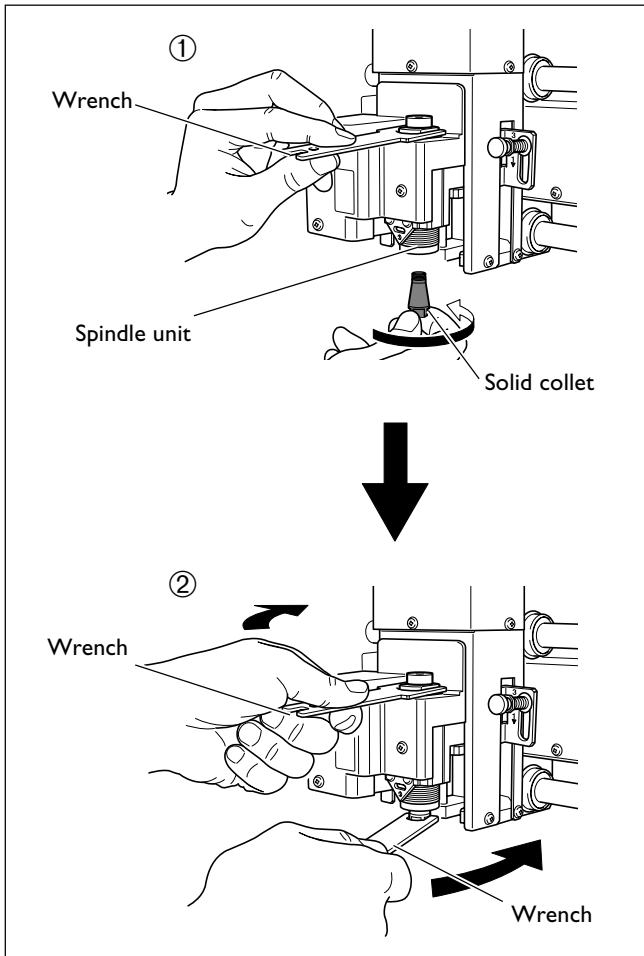


Install the cutter holder.

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.



②



Install the solid collet.

① Loosely tighten the solid collet.

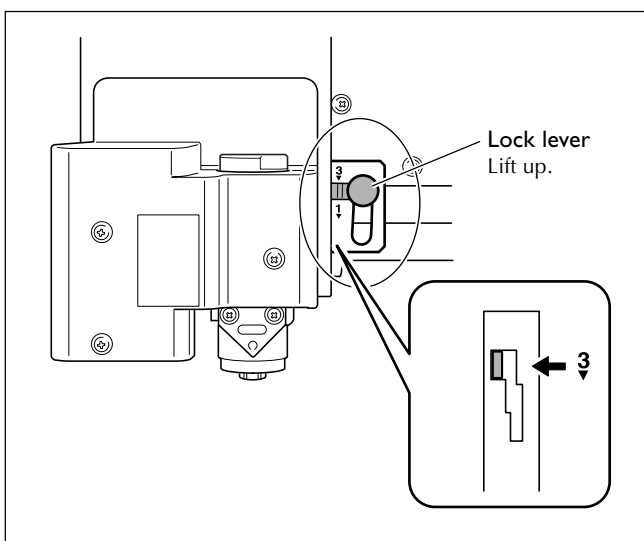
Insert the solid collet into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten loosely.

Use an appropriate solid collet for the cutter's diameter.

② Fully tighten the solid collet.

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

2. Set the lock lever.



Set the lock lever at the 3 position.

The spindle head is secured in place.

☞ P. 82, "The Position of the Lock Lever"

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



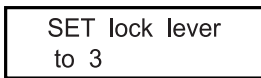
Press **MENU** several times to display the screen shown at left.
Use **◀** and **▶** to select [OTHERS].
Press **ENTER/PAUSE**.



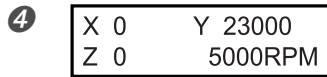
Use **◀** to select "ON."
Press **ENTER/PAUSE** to confirm.



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

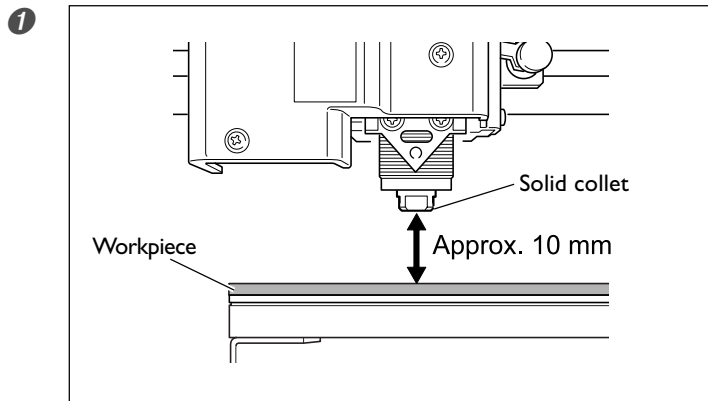


The message shown at left is displayed for three seconds, and then the original screen returns.



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

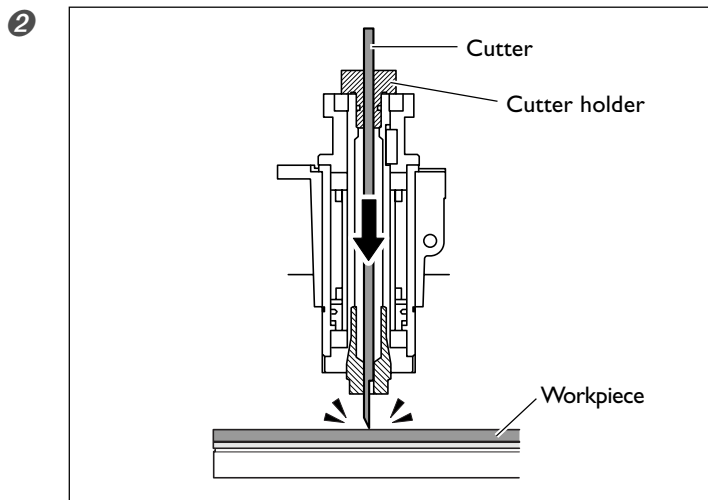
4. Install the cutter and set the Z-axis origin point.



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.

☞ P. 44, "Manual Movement"

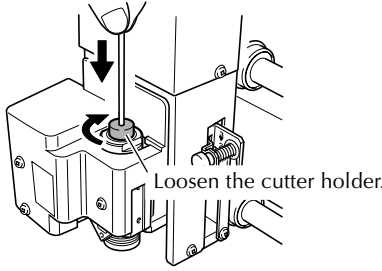


Insert the cutter into the cutter holder and bring the tip of the cutter into contact with the surface of the workpiece.

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.

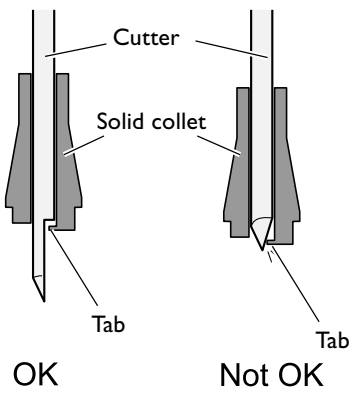
Point

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.

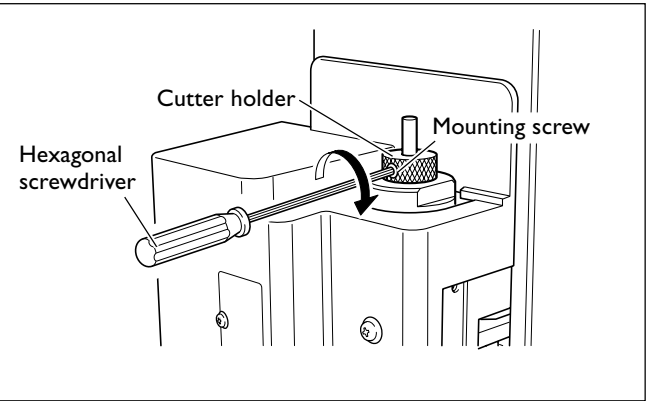


Point

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



3



Secure the cutter in place.
 Tighten the mounting screw for the cutter holder.

4 Press **Z**.



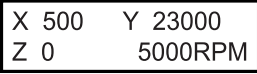
Use **Left Arrow** and **Right Arrow** to select [Z0].

6



Press **ENTER/PAUSE** to confirm.
 The Z-axis origin is set.

7



Press **MENU**.
 The main display appears. The coordinate values for Z is set to 0.

This completes the installation of the cutter. Go on to page 75, "Setting the XY Origin Point (Home Position)."

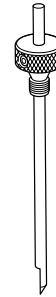
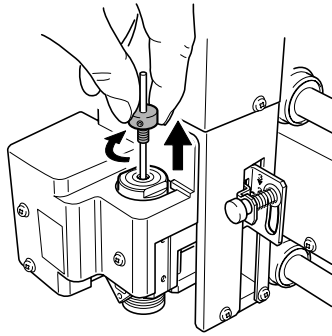


Point

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.



Remove the entire cutter-holder assembly from the spindle unit.

Store without changing the position of the cutter holder.

4-6 Cutter Installation Method 3 (Diamond Scraper)

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 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.

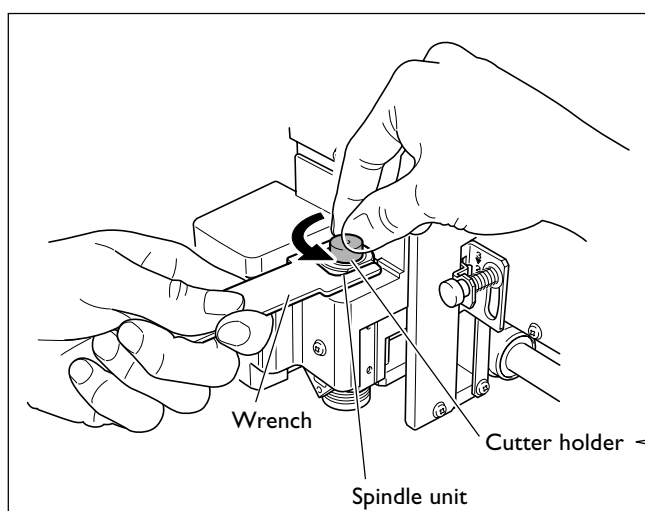
The cutting tool is sharp. To avoid injury, exercise caution.

Type of cutter used	Diamond scraper
Nose-unit usage	Not Used
Suitable workpiece types	Aluminum, brass
Automatic Z-axis control	On
Spindle rotation	Off
Lock-lever position	↓ or ↻

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.

- Diamond scrapers are optionally available items.
- Diameter-3.175 millimeter diamond scrapers can be used with the included solid collet.
- Diameter-4.36 millimeter diamond scrapers cannot be used with the included solid collet. Provide an optionally available dedicated diamond-scraper collet separately.

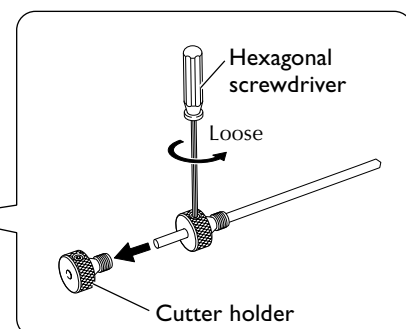
1. Install the cutter holder and solid collet.

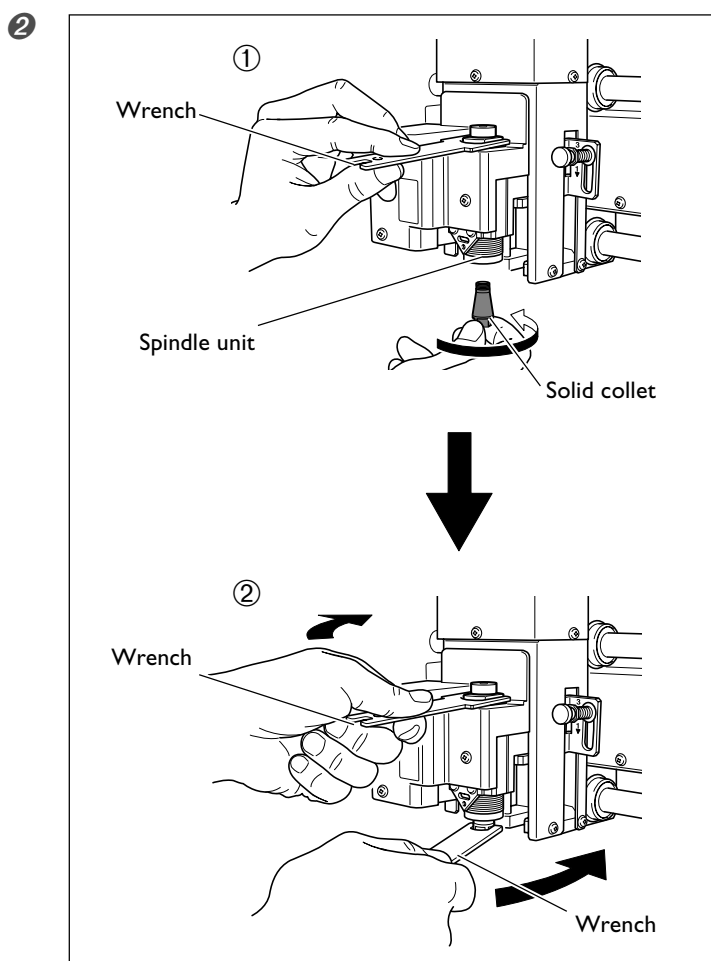


Install the cutter holder.

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.





Install the solid collet.

① Loosely tighten the solid collet.

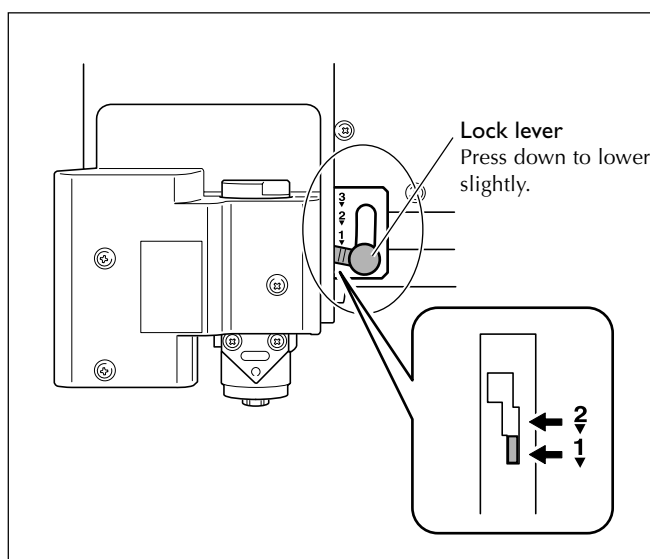
Insert the solid collet into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten loosely.

Diameter-4.36 millimeter diamond scrapers cannot be used with the included solid collet. Provide a dedicated diamond-scraper collet separately.

② Fully tighten the solid collet.

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

2. Set the lock lever.



Set the lock lever at the 1 or 2 position.

For detailed information about the setting position for the lock lever, refer to the page indicated below.

⇨ P. 82, "The Position of the Lock Lever"

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



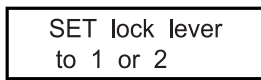
Press **MENU** several times to display the screen shown at left.
Use **◀** and **▶** to select [OTHERS].
Press **ENTER/PAUSE**.



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



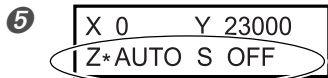
Press **MENU**.
Use **◀** to select "ON".
The machine automatically determines the Z-axis origin during cutting according to the height of the workpiece.
Press **ENTER/PAUSE** to confirm.



The message shown at left is displayed for three seconds, and then the original screen returns.

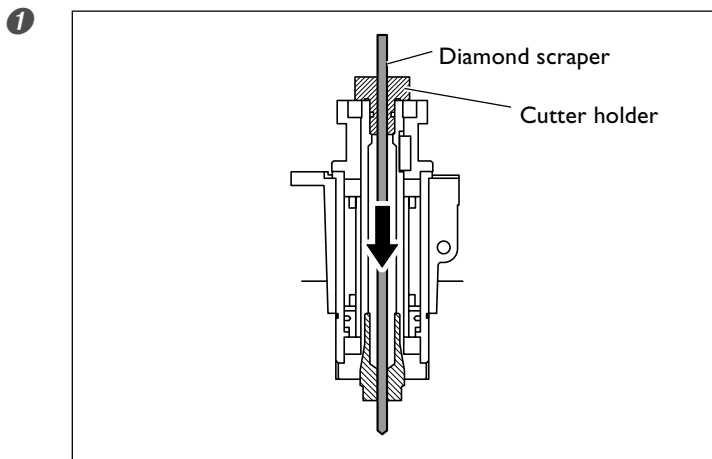


Press **MENU**.
Use **▲** and **▼** to select the value.
This makes the setting for the distance the cutter rises from the Z-axis origin point during cutting (the cut-out amount). When making this setting, take into account the shape of the workpiece and the time required for movement.
Press **ENTER/PAUSE** to confirm.



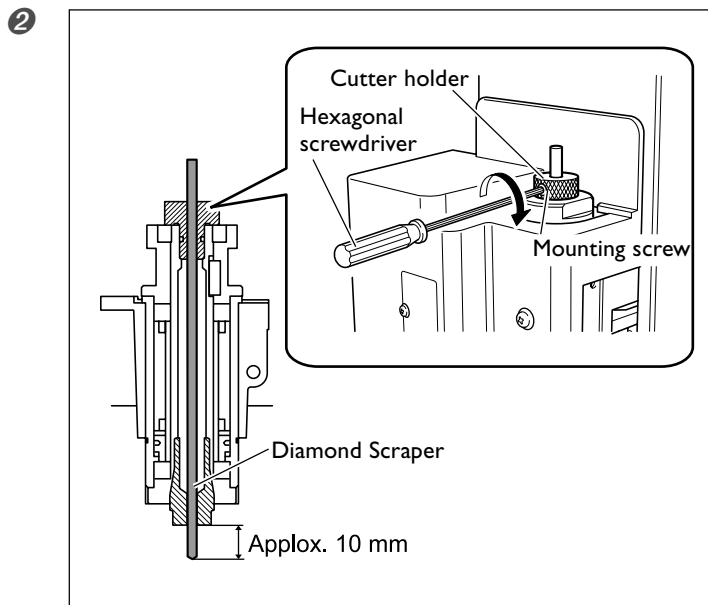
Press **MENU** several times to return to the main screen.
The Z-axis coordinate display changes to "AUTO" and the spindle-speed display changes to "S OFF."

4. Install the diamond scraper and determine the amount of extension.



Insert the diamond scraper into the cutter holder.

4-6 Cutter Installation Method 3 (Diamond Scraper)



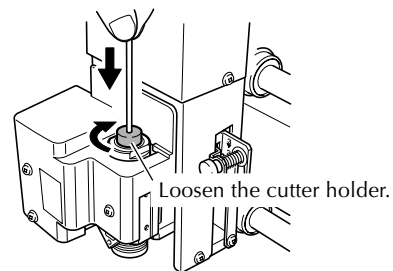
Secure the diamond scraper in place.
Tighten the mounting screw for the cutter holder. For the amount of extension of the tip of the diamond scraper, a value of about 10 millimeters may work well.

This completes the installation of the cutter. Go on to page 75, "Setting the XY Origin Point (Home Position)."

Point

If diamond scraper insertion is difficult

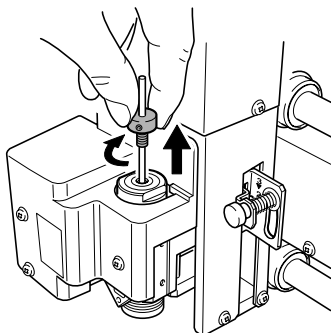
If the diamond scraper catches on the solid collet and is difficult to insert, loosening the cutter holder makes insertion easier. Note that inserting it with undue force may result in damage to the workpiece. After inserting the diamond scraper, tighten the cutter holder again.



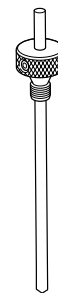
Point

Storage methods for diameter-3.175 mm cutters

When you want to perform repeated use while keeping the amount of extension of the diamond scraper tip constant, then once you've decided on the amount of extension, we recommend removing the cutter holder and diamond scraper 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.



Remove the entire cutter-holder assembly from the spindle unit.



Store without changing the position of the cutter holder.

4-7 Cutter Installation Method 4 (End mill)

Installing a End Mill

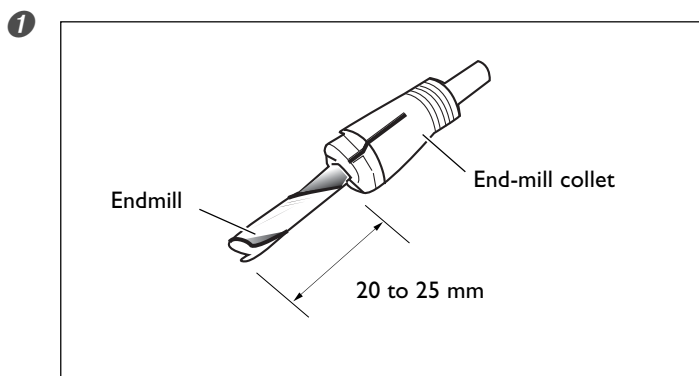
- ⚠️ WARNING** Never inadvertently touch the computer or handy panel while performing this task.
Unintended operation of the machine may result in injury.
- ⚠️ WARNING** Securely fasten the cutting tool and in place. After securing in place, make sure no wrenches or other articles have inadvertently 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 mill
Nose-unit usage	Not used
Suitable workpiece types	Plastic materials
Automatic Z-axis control	Off
Spindle rotation	On
Lock-lever position	3 ↓

This performs engraving using an end mill. This is suitable for creating reliefs and other examples of three-dimensional cutting.

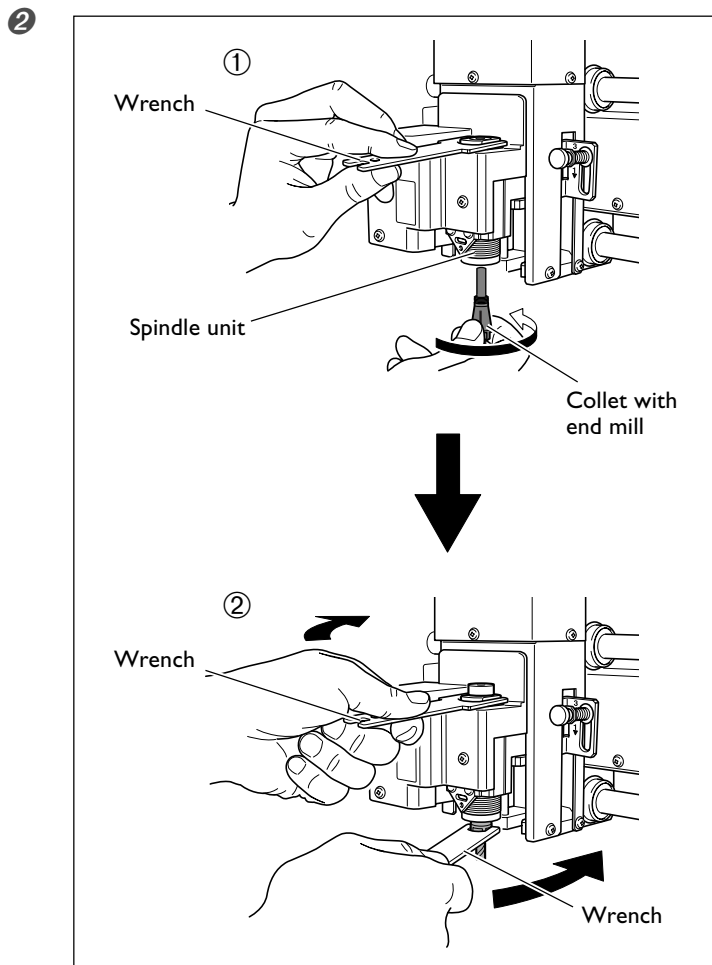
- End mills and end-mill collets are optionally available items.

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.

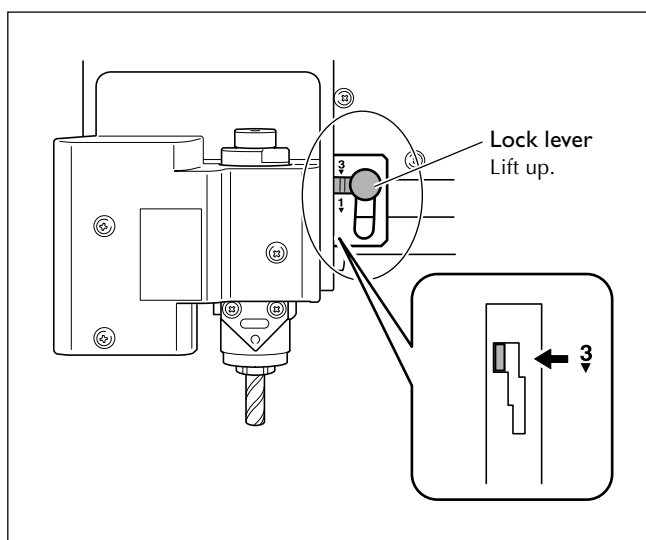
① Loosely tighten the collet with end mill.

Insert the collet with end mill into the spindle unit from below, then, while holding the spindle unit immobile with a wrench, tighten loosely.

② Fully tighten the collet with end mill.

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

2. Set the lock lever.



Set the lock lever at the 3 position. The spindle head is secured in place.

☞ P. 82, "The Position of the Lock Lever"

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



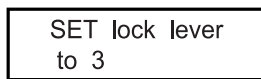
Press **MENU** several times to display the screen shown at left.
Use **◀** and **▶** to select [OTHERS].
Press **ENTER/PAUSE**.



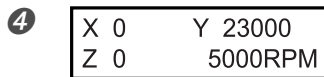
Use **◀** to select "ON."
Press **ENTER/PAUSE** to confirm.



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



The message shown at left is displayed for three seconds, and then the original screen returns.



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

4. Set the Z-axis origin point.

① Use **◀**, **▶**, **▲** and **▼** to move the end mill to a location above the workpiece.

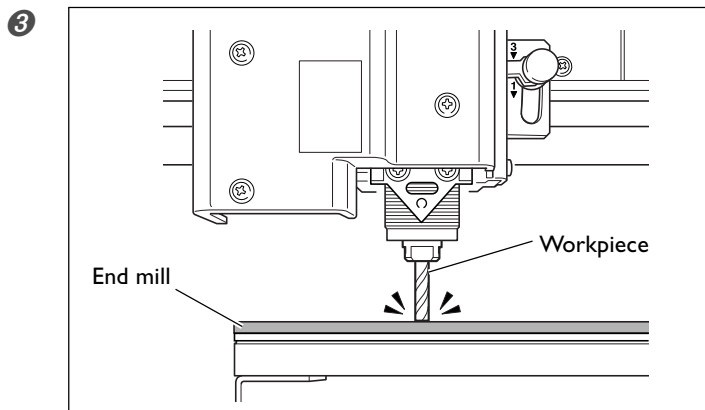
Next, perform a small amount of cutting into the workpiece. Move to a location where cutting will not cause any problems.

☞ P. 44, "Manual Movement"

② Close the front cover, then press and hold **SPINDLE** for at least one second.

The spindle rotates.

☞ P. 47, "Starting and Stopping Spindle Rotation"



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.

4-7 Cutter Installation Method 4 (End mill)

5 Press **Z**.

6

SET	Z1	Z0	Z2
SURFACE	-3000		

Use **←** and **←** to select [Z0].

7

SET	Z1	Z0	Z2
SURFACE	0		

Press **ENTER/PAUSE** to confirm.

The Z-axis origin point is set.

8

X	500	Y	23000
Z	0		5000RPM

Press **MENU**.

The main display appears. The coordinate values for Z is set to 0.

This completes the installation of the end mill. Go on to page 75, "Setting the XY Origin Point (Home Position)."

4-8 Setting the XY Origin Point

Setting the XY Origin Point (Home Position)

This sets the X- and Y-axis coordinates used as the origin point for cutting. This location is termed the XY origin point, which on this machine is called the “home position.” On this machine, you can set the XY origin anywhere within the operating range. Set it to match the engraving data and the position of the mounted workpiece.

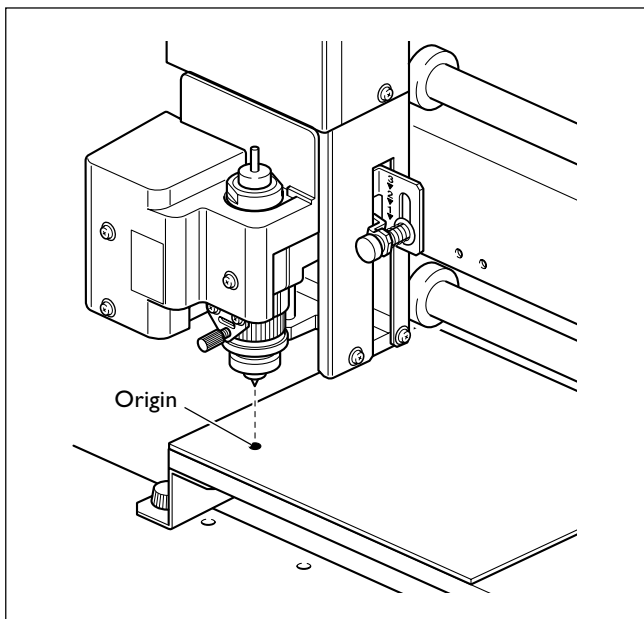
☞ P. 45, “Moving to a Specific Position Automatically.”

Procedure

- 1 Install a cutter and mount a workpiece.

☞ P. 54, “Mounting a Workpiece,” and p. 56 through 71, “Cutter Installation Method 1” through “Cutter Installation Method 4”

- 2



Move the cutter to the location you want to make the XY origin point (the home position).

☞ P. 44, “Manual Movement”

- 3

SET HOME POS.
1000 20000

Press **XY**.

- 4

SET HOME POS.
<1000> <20000>

Press **ENTER/PAUSE** to confirm.

The XY origin point (the home position) is set.

- 5

X 0 Y 0
Z 1000 5000RPM

Press **MENU**.

The main display appears. The coordinate values for X and Y are set to 0.

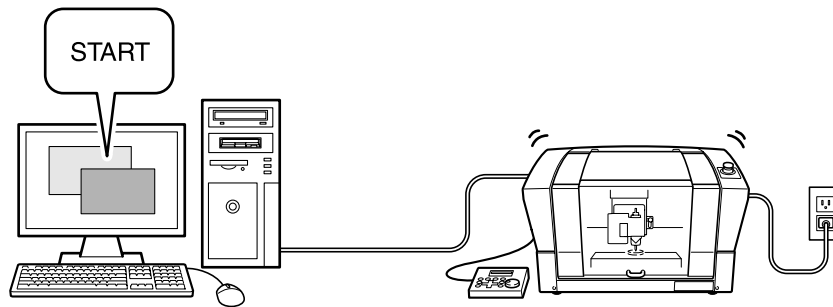
4-9 Performing Engraving

Performing Engraving

Make sure the following tasks have all been completed, then sent the engraving data from the computer and perform engraving.

- Mounting a Workpiece
 - ☞ P. 54, “Mounting a Workpiece”
- Cutter Installation
 - ☞ P. 56 through 71, “Cutter Installation Method 1” through “Cutter Installation Method 4”
- Setting the XY Origin Point
 - ☞ P. 75, “Setting the XY Origin Point (Home Position)”

For information about creating engraving data, refer to the documentation for the program you’re using to create the data.




Adjusting the Cutter Feed Rate During Engraving (Override)

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.

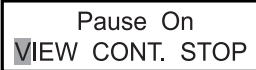
☞ P. 54, “Mounting a Workpiece”

- 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.” and press .

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)

Executing Repeated Cutting

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 (2 MB) cannot be copied.


Procedure


① Send the cutting data from the computer and execute cutting.

② Change the workpiece.

☞ P. 54, "Mounting a Workpiece"

③ Press **COPY**.

④  The image shows a rectangular control panel with a dark background. At the top, the word "Copy" is displayed in white. Below it, three options are listed: "GO", "CANCEL", and "CLEAR". The "GO" option is highlighted with a white rectangular border.

Use  to select "GO."

Press **ENTER/PAUSE** to confirm.

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.

Chapter 5

Feature reference

5-1 Attaching the Vacuum Adapter for Chip Cleaning

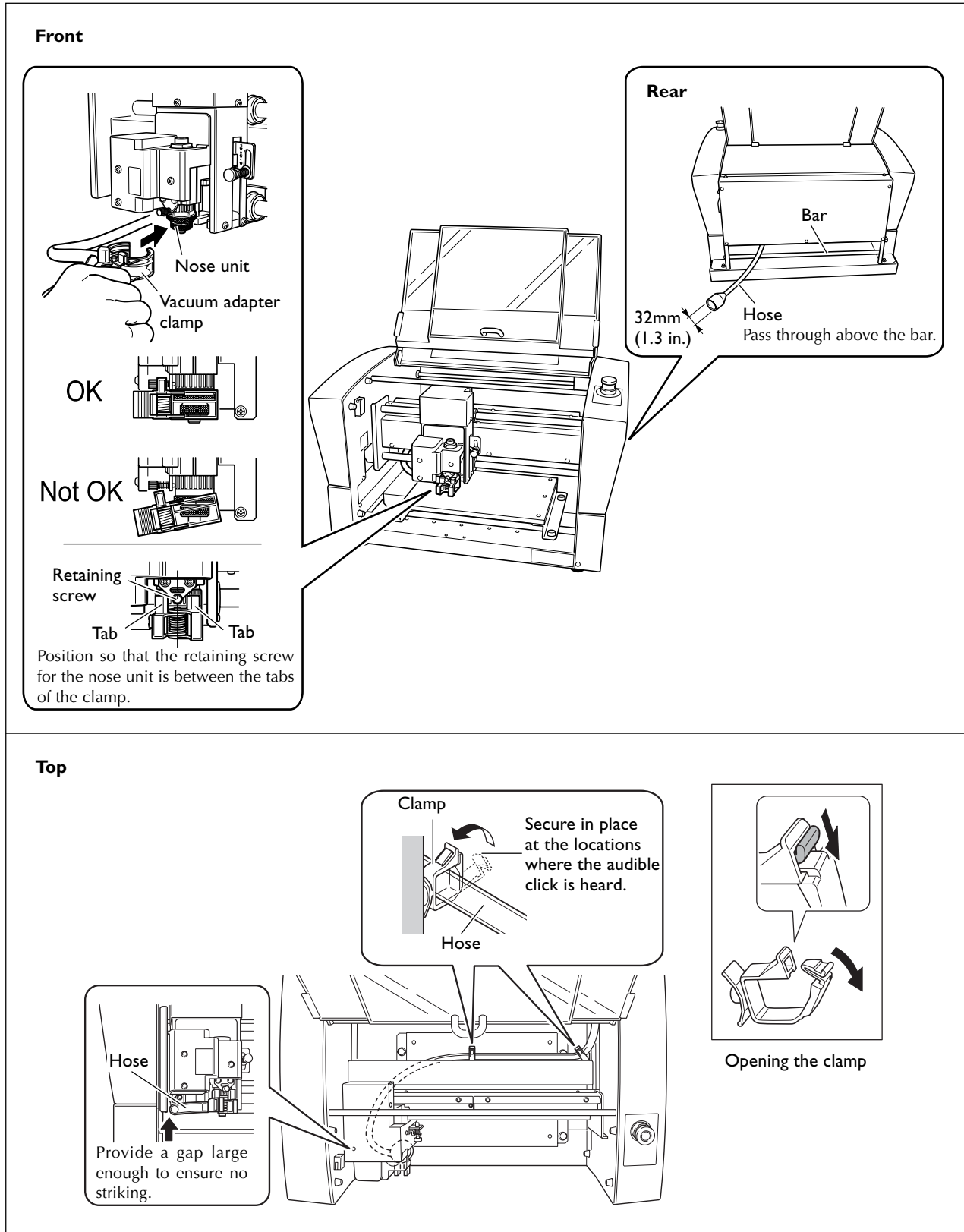
- ⚠ WARNING** **Exercise caution to prevent fire or dust explosion.**
Taking up fine cuttings using an ordinary vacuum cleaner may cause danger of fire or explosion. Check with the manufacturer of the vacuum cleaner. When the safety of use cannot be determined, never use the vacuum adapter and a vacuum cleaner.
- ⚠ WARNING** **Make the connection while exercising care not to touch the tip of the cutter.**
Contact with the blade may cause injury.
- ⚠ WARNING** **Never touch the spindle unit immediately after cutting.**
Doing so may cause burns.

Before Using the Vacuum Adapter, Be Sure to Verify the Following Points

- > 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.
☞ P.56, "Cutter Installation Method 1"
- > 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.).

Move the spindle head to the front left of the workpiece table, then attach the vacuum adapter for chip cleaning as shown in the figure. Using the vacuum adapter for chip cleaning enables the vacuum cleaner to take up cutting waste during cutting, which can help keep scattering of cutting waste to a minimum.

☞ P.44, "Manual Movement"



5-2 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.

☞ P.56 through 71, "Cutter Installation Method 1" through "Cutter Installation Method 4," and p.85, "Submenus"

Setting Position of the Lock Lever

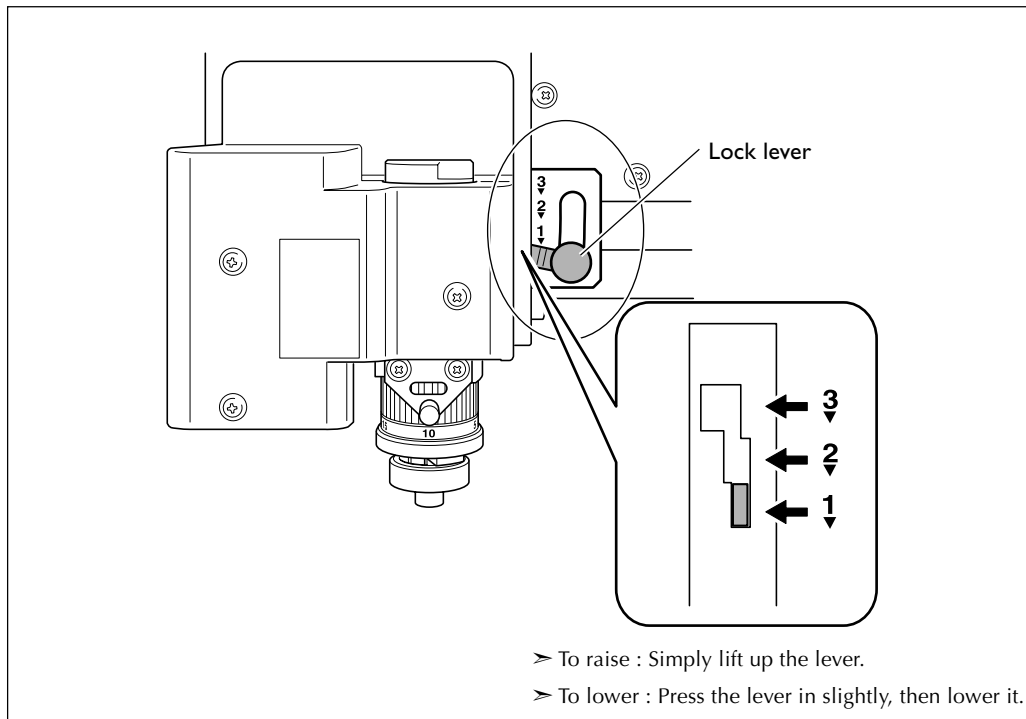
> 1 or 2

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.104, "Responding to an Error Message"



5-3 Surface Leveling of the Workpiece Table

This adjusts the flatness of the surface of the workpiece 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. A single surface-leveling operation takes about one hour. If uncut areas remain, perform surfacing a second time. Also, pausing this operation while in progress is possible, just as with ordinary cutting.

☞ P. 49, “Pausing and Resuming Cutting”

Verifying the Cutter Used and the Settings






- > Cutter used: Included flat cutter (ZEC-A2320)
- > Z-axis origin point (Z0 position): Surface of the workpiece-table center
- > Lock-lever position: 3
- > Spindle speed: 14,000 rpm*
- > 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.

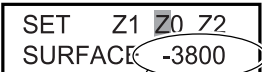
☞ P. 48, “Adjusting the Spindle Speed,” p. 62, “Cutter Installation Method 2”

Procedure

1 Carry out steps 1 and 2 on page 62 to 63, “Cutter Installation Method 2.”


2 Use , , , and  to move the cutter to the area above the center of the workpiece table, then press .

☞ P. 44, “Manual Movement”

3 

Z-axis coordinate

Use  or  to select [Z0].

Press  to lower the spindle head to the location where the Z-axis 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 64 and 65.


5 

Press  to confirm.

The Z-axis coordinate is set.

6 

Press  several times to display the view shown at left.

Use  to select [ADJUSTMENT].


Press .

7 

Press  twice.

Press .

8 

When the screen shown at left appears, press .

The cutting for surface leveling starts.

Pressing  before you press  returns you to the screen in step

7.

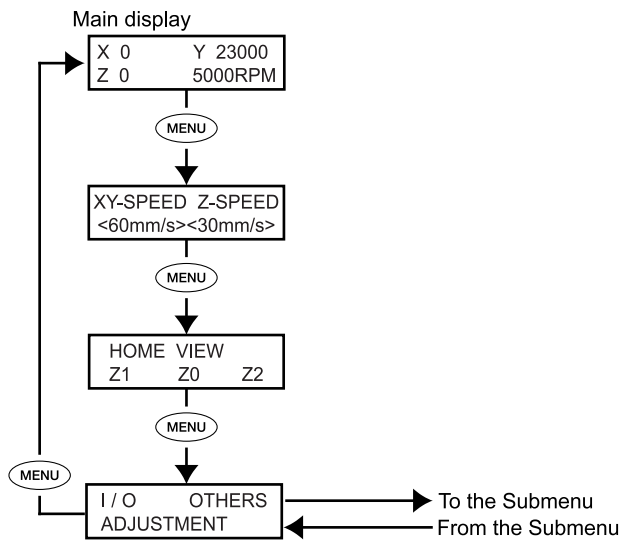
9 Check visually to ensure that no uncut areas remain.

If uncut areas are present, redo the procedure from step 2.

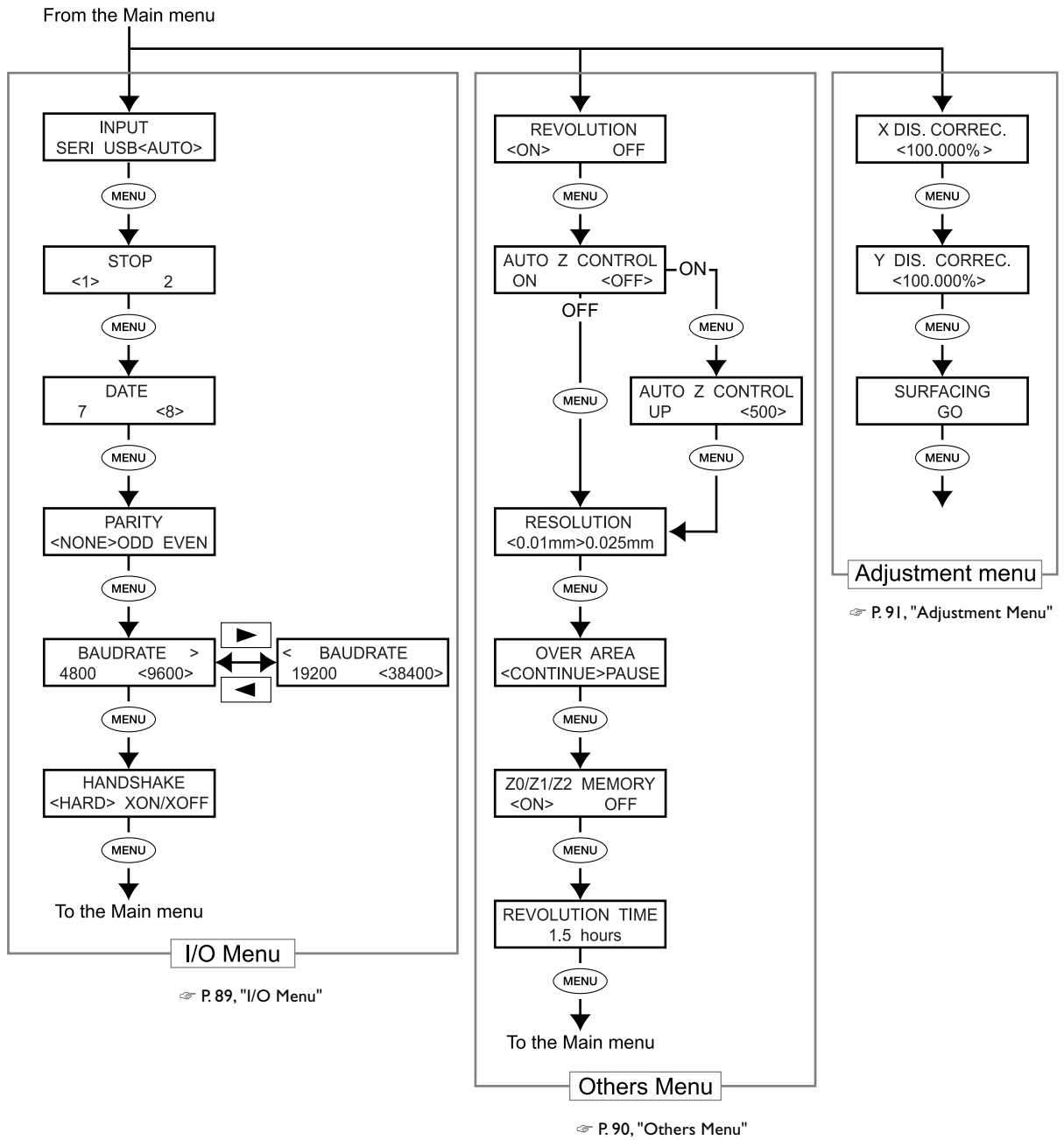
5-4 Menu List

Main Menu

☞ P. 88, "Main Menu" (Descriptions of Menu Items)

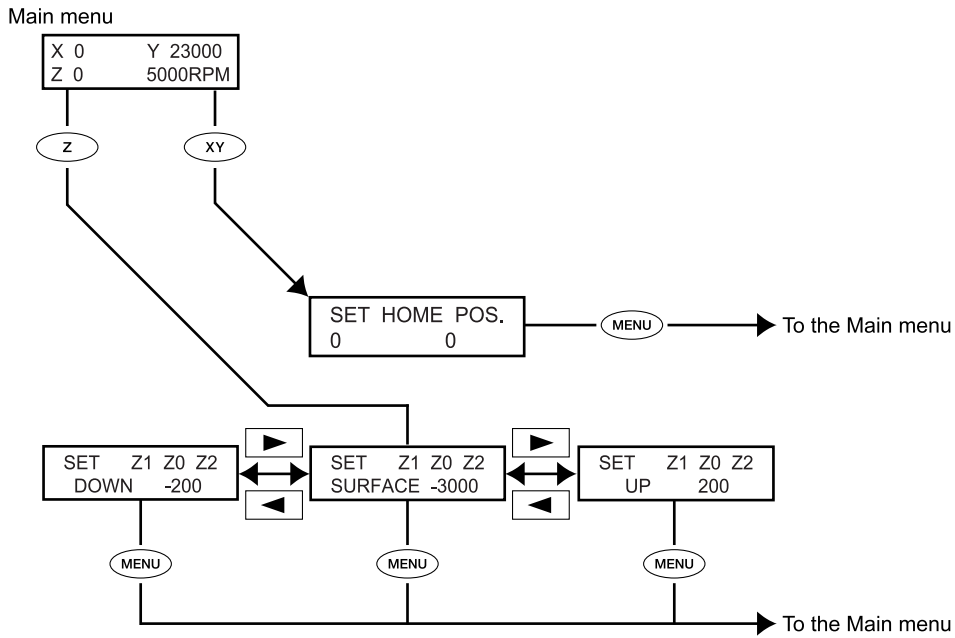


Submenus



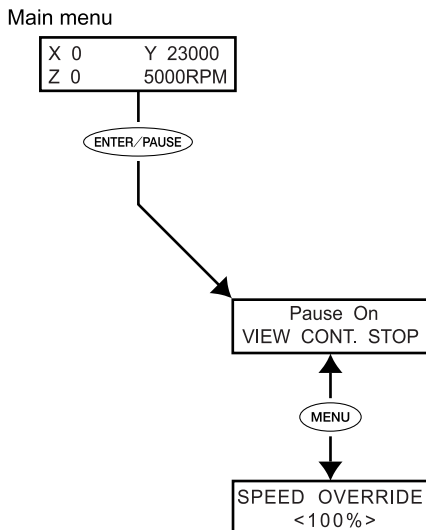
Origin-setting Menu

☞ P. 92, "Origin-setting Menu" (Descriptions of Menu Items)



Pause Menu

☞ P. 93, "Pause Menu" (Descriptions of Menu Items)



Copy Menu

☞ P. 93, "Copy Menu" (Descriptions of Menu Items)

Main menu

X 0	Y 23000
Z 0	5000RPM

COPY

Copy
GO CANCEL CLEAR

MENU

To the Main menu

5-5 Description of Menu Items

Main Menu

☞ P. 84, "Main Menu" (Menu List)

<pre>X 0 Y 23000 Z 0 5000RPM</pre>	<p>This is the main screen. This screen is displayed at startup and when executing cutting.</p> <p>When [AUTO Z CONTROL] is set to "ON," the Z-axis coordinate display changes to "AUTO." When [REVOLUTION] is set to "OFF," the spindle-speed display changes to "S OFF."</p> <p>☞ P. 90, "Others Menu"</p>
<pre>X Y-SPEED Z-SPEED <60mm/s><30mm/s></pre>	<p>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."</p> <p>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.</p> <ul style="list-style-type: none"> ➤ Settable change ratio 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)
<pre>H O M E V I E W Z 1 Z 0 Z 2</pre>	<p>The spindle head moves to the selected location.</p> <p>☞ P. 45, "Moving to a Specific Position Automatically"</p>
<pre>I / O O T H E R S A D J U S T M E N T</pre>	<p>These call up the corresponding submenus.</p> <p>☞ P. 89, "I/O Menu," p. 90, "Others Menu," p. 91, "Adjustment Menu"</p>

I/O Menu (Submenu)


This selects the communication port for communication with the computer and makes the settings for the communication parameters when using a serial connection. When you're using a USB connection, simply selecting the communication port completes the settings you have to make. The setting menus for items other than the communication port are displayed only when "SERI" or "AUTO" has been selected as the communication port. Select the setting values to match the communication parameters for the program you're using.

⇨ P. 85, "Submenus"

<div style="border: 1px solid black; padding: 5px; text-align: center;"> INPUT [SERI] USB<AUTO> </div>	<p>This selects the connector for connection to a computer. Commands from the computer are received via the connector you specify here. When this is set to [AUTO], the connector through which commands are first received after powerup is enabled automatically. To change the port enabled when "AUTO" is selected, either redo the selection of "SERI" or "USB," or switch off the machine's power and redo the operation from the beginning.</p> <p>When this is set to [SERI] or [AUTO], the menu for setting the serial communication parameters appears.</p> <ul style="list-style-type: none"> ➤ Default setting: AUTO
<div style="border: 1px solid black; padding: 5px; text-align: center;"> STOP <1> 2 </div>	<p>This makes the setting for the number of stop bits, one of the serial communication parameters. This is displayed only when [INPUT] is set to [SERI] or [AUTO].</p> <ul style="list-style-type: none"> ➤ Default setting: 1
<div style="border: 1px solid black; padding: 5px; text-align: center;"> DATA 7 <8> </div>	<p>This makes the setting for the data bit length, one of the serial communication parameters. This is displayed only when [INPUT] is set to [SERI] or [AUTO].</p> <ul style="list-style-type: none"> ➤ Default setting: 8
<div style="border: 1px solid black; padding: 5px; text-align: center;"> PARITY <NONE> ODD EVEN </div>	<p>This makes the setting for parity, one of the serial communication parameters. This is displayed only when [INPUT] is set to [SERI] or [AUTO].</p> <ul style="list-style-type: none"> ➤ Default setting: NONE
<div style="border: 1px solid black; padding: 5px; text-align: center;"> BAUDRATE > 4800 <9600> </div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 5px;"> < BAUDRATE 19200 38400 </div>	<p>This makes the setting for the baud rate, one of the serial communication parameters. This is displayed only when [INPUT] is set to [SERI] or [AUTO].</p> <ul style="list-style-type: none"> ➤ Default setting: 9600
<div style="border: 1px solid black; padding: 5px; text-align: center;"> HANDSHAKE <HARD> XON/XOFF </div>	<p>This makes the setting for handshaking (flow control), one of the serial communication parameters. [HARD] indicates hardware handshaking, and [XON/OFF] indicates XON/XOFF handshaking. This is displayed only when [INPUT] is set to [SERI] or [AUTO].</p> <ul style="list-style-type: none"> ➤ Default setting: HARD

Others Menu (Submenu)

☞ P. 85, "Submenus"

<div style="border: 1px solid black; padding: 5px; width: fit-content;"> REVOLUTION <ON> OFF </div>	<p>This determines whether the spindle is rotated during cutting. When this is set to "OFF," scribing (cutting without rotation of the spindle) is performed.</p> <ul style="list-style-type: none"> > Default setting: ON
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> AUTO Z CONTROL ON <OFF> </div>	<p>Set this to "ON" in cases such as when you're using the nose unit. Setting this to "ON" enables automatic detection of the Z origin point as the position where the tip of the nose unit or cutter touches the surface of the workpiece. When the lock lever is positioned at , set this to "OFF." Leaving this set at "ON" may cause an error and make operation impossible to continue.</p> <ul style="list-style-type: none"> > Default setting: OFF
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> AUTO Z CONTROL UP <500> </div>	<p>This is displayed when [AUTO Z CONTROL] is set to "ON." This sets the cut-out amount when [AUTO Z CONTROL] is set to "ON."</p> <ul style="list-style-type: none"> > Default setting: 500 (5 mm)
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> RESOLUTION <0.01mm>0.025mm </div>	<p>This selects a resolution that matches the program used to create the engraving data. When you're performing output from the included Windows-based driver, set this to "0.1mm."</p> <ul style="list-style-type: none"> > Default setting: 0.01 mm
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> OVER AREA <CONTINUE>PAUSE </div>	<p>The cutter stops moving when a command is received that specifies movement outside the range of operation for the X and Y axes. Movement starts again when a command to return from that location to the range of operation is received. You can select either of the following as the response taken when this occurs.</p> <ul style="list-style-type: none"> > [CONTINUE]: When a command for return to the range of operation is received, operation resumes immediately. > [PAUSE]: When a command for return to the range of operation is received, operation is paused and the Pause menu appears on the display screen. Use the operation panel to select the operation to perform thereafter. <p>☞ P. 49, "Pausing and Resuming Cutting"</p> <ul style="list-style-type: none"> > Default setting: CONTINUE

<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Z0/Z1/Z2 MEMORY <ON> OFF </div>	<p>This selects whether the Z0, Z1, and Z2 locations are saved in memory on the machine.</p> <ul style="list-style-type: none"> ➤ Default setting: ON <p>☞ P. 78, "Executing Repeated Cutting," p.92, "Origin-setting Menu"</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> REVOLUTION TIME 1.5 hours </div>	<p>This displays the working time of the spindle motor. Use it as a guide for determining the service life of the spindle unit.</p> <p>☞ P. 98, "Spindle Maintenance"</p>

Adjustment Menu (Submenu)

☞ P. 85, "Submenus"

<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 5px;"> X DIS. CORREC. <100.000%> </div> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Y DIS. CORREC. <100.000%> </div>	<p>You can apply correction for X- and Y-axis movement distances.</p> <ul style="list-style-type: none"> ➤ Default setting: 100% ➤ Setting range: 99.5 to 100.5%
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> SURFACING GO </div>	<p>Executing this menu item performs surface-leveling cutting to adjust the flatness and parallelism of the table surface.</p> <p>☞ P. 83, "Surface Leveling of the Workpiece Table"</p>

Origin-setting Menu

☞ P. 86, "Origin-setting Menu"

XY Origin-setting Menu

<pre>SET HOME POS. 1000 2000</pre>	<p>This makes the setting for the X- and Y-axis origin point. On this machine, this location is called the "home position."</p> <p>☞ P. 75, "Setting the XY Origin Point (Home Position)"</p>
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Z Origin-setting Menu

Before making these settings, make sure of the following points.

> [AUTO Z CONTROL] must be set to "OFF."

If it is set to "ON," pressing **Z** displays the message shown in the figure below. After three seconds, the message disappears and the original menu returns.

```
Turn the AUTO Z
CONTROL off
```

☞ P. 82, "The Position of the Lock Lever," p. 71, "Cutter Installation Method 4"

<pre>SET Z1 Z0 Z2 SURFACE -3000</pre>	<p>Z0: This is the Z-axis origin point during cutting. Set this to match the workpiece and the cutting data. The lock lever is normally set at position 3.</p> <p>☞ P. 62, "Cutter Installation Method 2," p. 71, "Cutter Installation Method 4"</p>
<pre>SET Z1 Z0 Z2 SURFACE -200</pre>	<p>Z1: This sets the cutting-in depth during cutting as the distance from the Z0 position. This means that a change in the Z0 position makes the Z1 position change as well. Because this cannot be set at a location higher than the Z0 position, the value of the setting must be negative. If the spindle head is at a higher location than Z0, the screen displays "****" for the Z-axis coordinate. The lock lever is normally set at position 3. When you've made the setting on the computer, the computer's setting takes precedence. Making this setting is not required.</p>
<pre>SET Z1 Z0 Z2 UP 200</pre>	<p>Z2: This sets the height along the Z axis when performing no-load feed of the cutter during cutting as the distance from the Z0 position. This means that a change in the Z0 position makes the Z2 position change as well. Because this cannot be set at a location lower than the Z0 position, the value of the setting must be positive. If the spindle head is at a lower location than Z0, the screen displays "****" for the Z-axis coordinate. The lock lever is normally set at position 3. When you've made the setting on the computer, the computer's setting takes precedence, and so making this setting is not necessary.</p>

Pause Menu

☞ P. 86, "Pause Menu"

<p>Pause On VIEW CONT. STOP</p>	<p>Pressing ENTER/PAUSE while a cutting operation is in progress pauses cutting and displays the screen shown in the figure at left. You can select an operation such as resuming or quitting cutting. ☞ P. 49, " Pausing and Stopping Cutting"</p>
<p>SPEED OVERRIDE <100%></p>	<p>This adjusts the feed rate of the cutter when cutting is paused ☞ P. 77, "Adjusting the Cutter Feed Rate During Engraving (Override)"</p>

Copy Menu

☞ P. 87, "Copy Menu"

<p>Copy GO CANCEL CLEAR</p>	<p>This repeats cutting using the cutting data saved in the machine. ☞ P. 78, "Executing Repeated Cutting"</p>
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Chapter 6

Maintenance

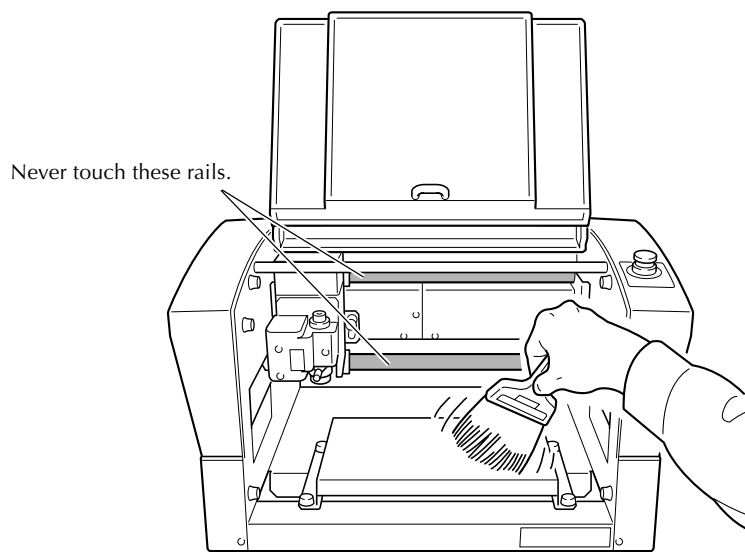
6-1 Daily Care

Cleaning

- ⚠️ WARNING** **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.
 - ⚠️ WARNING** **Never use a solvent such as gasoline, alcohol, or thinner to perform cleaning.**
Doing so may cause fire.
 - ⚠️ 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.
 - ⚠️ WARNING** **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** **Caution: high temperatures.**
The cutting tool and spindle motor become hot. Exercise caution to avoid fire or burns.
 - ⚠️ CAUTION** **When performing maintenance, be sure to keep the tool detached.**
Contact with the blade may cause injury.
- Carefully clean away cutting waste. Operating the machine with a large amount of cutting waste present may cause malfunction.
 - Never apply lubrication anywhere except at specified locations.

Cleaning Inside the Front Cover

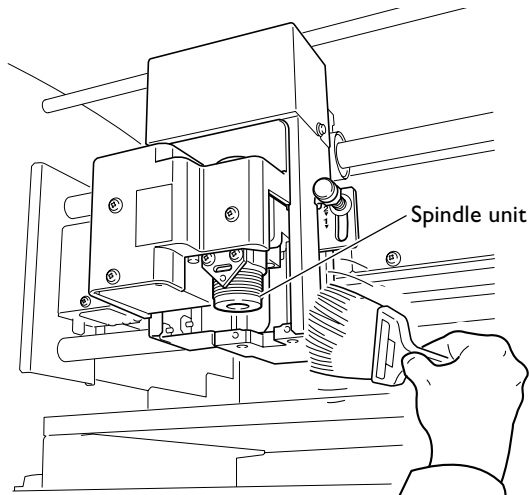
Open the front cover and clean away any buildup of cutting waste inside.



Cleaning Around the Spindle

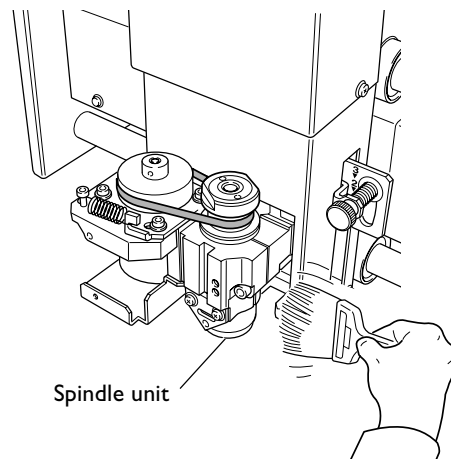
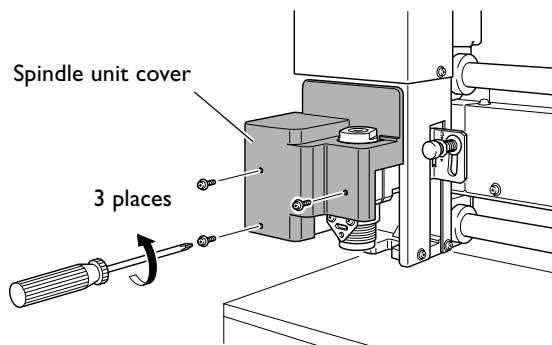
Cleaning the Spindle Nose

Uninstall the nose unit, collet, and cutter, and remove any cutting waste that has collected in areas such as the spindle nose.



Cleaning Inside the Spindle Unit Cover

Detach the spindle unit cover and clean away any buildup of cutting waste inside.



6-2 Maintenance and Inspection

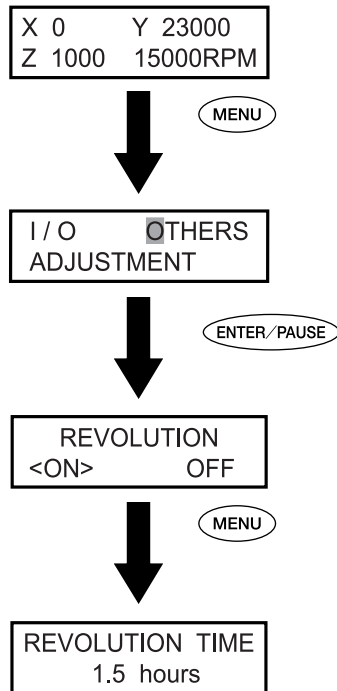
Spindle Maintenance

The spindle unit and the belt are parts that wear out. The replacement cycle varies according to usage conditions, but as a general guide, you should replace them after every 2,000 hours of use.

This machine is provided with a feature for displaying the total working time of the spindle unit. Refer to this to determine when replacement is needed.

For information on how to perform replacement, refer to the documentation included with the ZS-35 replacement spindle.

☞ P. 85, "Submenus"



Chapter 7

Troubleshooting

7-1 Troubleshooting (Engraving)

The cutting-in depth is not uniform (when using the nose unit).

Try revising the cutting parameters as described below.

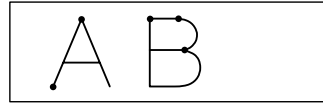
- Is automatic Z control set to "ON" with the lock lever at position **1** or **2** ?
 - ☞ P. 82, "The Position of the Lock Lever," p. 85, "Submenus"
- Is the cutter holder, the cutter-holder mounting screw, or the collet loose?
 - ☞ P. 56, "Cutter Installation Method 1"
- Is the X- and Y-axis feed rate too fast for the workpiece, or is the speed of spindle rotation too slow for it?
 - ☞ P. 48, "Adjusting the Spindle Speed," p. 77, "Adjusting the Cutter Feed Rate During Engraving (Override)"
- Is the cutter worn? Try replacing the cutter.
- 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. 56, "Cutter Installation Method 1," p. 80, "Attaching the Vacuum Adapter for Chip Cleaning"

The cutting-in depth is not uniform (when not using the nose unit).

Try revising the cutting parameters as described below.

- If possible, perform engraving while using the nose unit.
 - ☞ P. 56, "Cutter Installation Method 1"
- 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 workpiece table is an issue, carry out surface leveling for the workpiece table.
 - ☞ P. 83, "Surface Leveling of the Workpiece Table"
- Is automatic Z control set to "ON" with the lock lever at position **3** ?
 - ☞ P. 62, "Cutter Installation Method 2," p. 82, "The Position of the Lock Lever"
- Is the cutter holder, tool retaining screw, or collet loose?
 - ☞ P. 62, "Cutter Installation Method 2"

The cutter leaves tracks at places where cutting-in starts or where lines change direction.



Try revising the cutting parameters as described below.

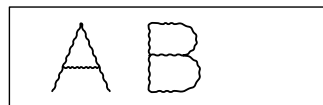
- The spindle rotating speed is too slow with respect to the feed rate. Try reducing the spindle speed.
 - ☞ P. 48, "Adjusting the Spindle Speed"
- Is the cutter worn? Try replacing the cutter.

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.
 - ☞ P. 48, "Adjusting the Spindle Speed," p. 77, "Adjusting the Cutter Feed Rate During Engraving (Override)"
- Refasten the workpiece securely so that it does not come loose or slip.
 - ☞ P. 54, "Mounting a Workpiece"
- 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? Try replacing the cutter.
- 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.
 - ☞ P. 56 through 71, "Cutter Installation Method 1" through "Cutter Installation Method 4"
- Refasten the workpiece securely so that it does not come loose or slip.
 - ☞ P. 54, "Mounting a Workpiece"
- Check to make sure the cutter diameter matches the collet diameter.

7-2 Troubleshooting (Operation)

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.

☞ P. 38, "To Cancel an Emergency Stop"

Initialization is not performed or initialization fails

Isn't the cover open?

Keep the cover closed during an initialization. If the cover is open, this machine stops the initialization on the way.

Isn't a foreign object caught on the spindle or XYZ axes?

Check for foreign objects on the spindle or XYZ axes and remove it.

Operations are ignored.

Is the cable connected?

Connect the cable securely.

☞ P. 30, "Cable Connections"

Isn't the cover open?

While the cover is open, some operations are restricted. Close the cover.

Hasn't the Emergency Stop button been pressed?

When the Emergency Stop button is pressed, machine operation is not possible. Release the Emergency Stop button.

☞ P. 38 "To Cancel an Emergency Stop"

Isn't operation paused?

When the machine is paused, cutting stops and some operations are restricted. Cancel the paused state.

☞ P. 49, "Pausing and Resuming Cutting"

Isn't a large amount of cutting waste present?

Clean away any cutting waste. Clean especially carefully inside the spindle cover in particular.

☞ P. 97, "Cleaning Around the Spindle"

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.

☞ P. 30, "Cable Connections," p. 40, "Starting and Quitting"

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.

☞ "Roland Software Package Software Guide"

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.

☞ P. 85, "Submenus"

Isn't an error message displayed in the display screen?

☞ P. 104, "Responding to an Error Message"

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.

☞ P. 56 through 71, "Cutter Installation Method 1" through "Cutter Installation Method 4," and p. 75, "Setting the XY Origin Point (Home Position)"

The spindle doesn't rotate during engraving.

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 $\downarrow 1$ or $\downarrow 2$ 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.

☞ P. 40, "Starting and Quitting," p. 82, "The Position of the Lock Lever," p. 90, "Others Menu"

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. 40, "Starting and Quitting," p. 104, " Responding to an Error Message"

7-3 Responding to a 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 cover is open.

[Stop performing COVER OPEN]

Close the front cover.

The front cover was opened while the cutter was moving to a reference point, and so operation of the cutter stopped to ensure safety.

[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.

☞ P. 49 "Pausing and Resuming Cutting"

[Canceling data...]

This is displayed if engraving data is sent during initialization. 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.

[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.

[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. 78 "Executing Repeated Cutting"

[Turn the AUTO Z CONTROL off]

This was displayed because an attempt was made to set the Z0, Z1, or Z2 position even though automatic Z control is on.

After three seconds this message disappears and the screen returns to the original menu.

☞ P. 92 "Origin-setting Menu"

7-4 Responding to 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.

☞ P. 40, "Starting and Quitting"

[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).

☞ P. 40, "Starting and Quitting"

[Emergency Stop Z AXIS error]

An emergency pause occurred because Z-axis descent failed to stop.

Resuming is not possible. The spindle head may be locked while automatic Z control is set to "ON." Switch the power off and back on, then check the position of the lock lever for the spindle head. After checking, redo the operation from the beginning.

If this message continues to appear, contact your authorized Roland DG Corp. dealer.

☞ P. 40, "Starting and Quitting," p. 82, "The Position of the Lock Lever," and p. 108, "Examples of Settings for Cutting Parameters"

[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.

☞ P. 41, "Shutdown"

[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," or "Z"

☞ P. 40, "Starting and Quitting"

[I/O Err:Framing/Parity Error]

This is displayed when the parameter settings for communication with the computer are unsuitable.


Pressing  pauses the machine. Because unintended operation may occur, we recommend using the "pause" menu displayed on the screen to select "STOP" and quit operation.

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.

☞ P. 50, "Stopping Cutting," p. 85, "Submenus"

[I/O Err:Buffer Overflow]

The machine's memory experienced an overflow.


Pressing  pauses the machine. Because unintended operation may occur, we recommend using the "pause" menu displayed on the screen to select "STOP" and quit operation.

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).

☞ P. 50, "Stopping Cutting," p. 85, "Submenus"

[Command Not Recognized]

An emergency stop occurred because the machine received a command that could not be interpreted from the computer.


Pressing  pauses the machine. Because unintended operation may occur, we recommend using the “pause” menu displayed on the screen to select “STOP” and quit operation.

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.

☞ P. 40, "Starting and Quitting," p. 50, "Stopping Cutting"

[Wrong Number of Parameters]

The number of parameters for a command received from the computer was incorrect.


Pressing  pauses the machine. Because unintended operation may occur, we recommend using the “pause” menu displayed on the screen to select “STOP” and quit operation.

Check to make sure the program you’re using is compatible with the machine.

☞ P. 50, "Stopping Cutting"

[Bad Parameter]

The parameter for a command received from the computer was out of range.

Pressing  pauses the machine. Because unintended operation may occur, we recommend using the “pause” menu displayed on the screen to select “STOP” and quit operation.

Check to make sure the program you’re using is compatible with the machine.

☞ P. 50, "Stopping Cutting"

Chapter 8

Appendix

8-1 Examples of Settings for Cutting Parameters

Example Settings

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 table below shows suggested cutters and cutting parameters suited to various types of workpieces. Refer to these when selecting the cutting parameters. Before you perform actual cutting, carry out a cutting test and adjust the parameters as needed.

Workpiece composition	Cutter type	Spindle speed (rpm)	Cutting-in amount (mm)	Cutter feed rate	
				X- and Y-axis feed rate (mm/sec.)	Z-axis feed rate (mm/sec.)
Acrylic	ZEC-A2025	10000	0.2	15	5
	ZEC-A2320	10000	0.2	15	5
Aluminum	ZEC-A2025-BAL	12000	0.1	5	1
	ZDC-A2000	No rotation	-	10	1
Brass	ZEC-A2025-BAL	12000	0.1	5	1
	ZDC-A2000	No rotation	-	10	1
Chemical wood	ZEC-A2025	12000	0.4	30	20
	ZEC-A2320	10000	0.5	30	5
Modeling wax	ZEC-A2025	10000	0.5	30	10
	ZEC-A2320	10000	0.8	30	5

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.

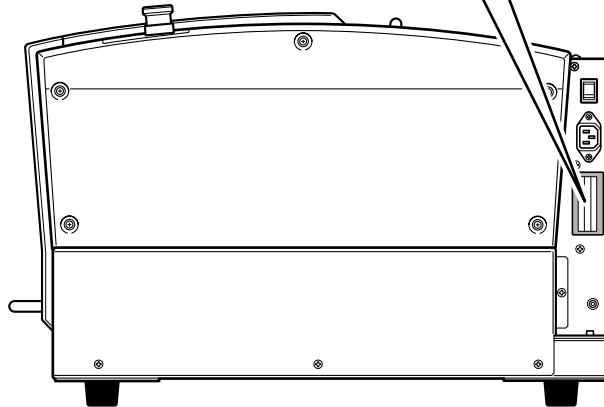
8-2 Location of Power Rating and Serial Number Label

Serial Number

This is required when you seek maintenance or support. Never peel off.

Power Rating

Use an electrical outlet that meets the requirements for voltage and frequency given here. Provide a power supply whose amperage is 1.3 A or higher (for 100 to 120 V) or 0.6 A or higher (for 220 to 240 V).

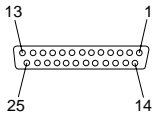


8-3 Interface Specifications

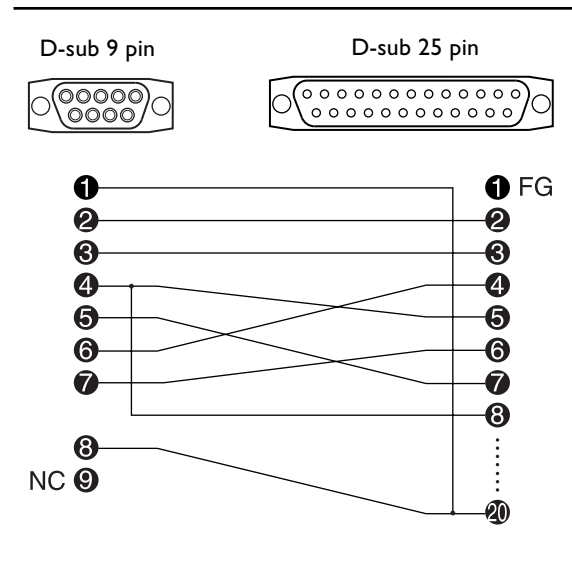
Serial Connector

Standard	RS-232C specification
Transmission method	Asynchronous, duplex data transmission
Transmission speed	4800, 9600, 19200, 38400
Parity check	Odd, Even, None
Data bits	7 or 8 bits
Stop bits	1 or 2 bits
Handshake	Hardware or Xon/Xoff

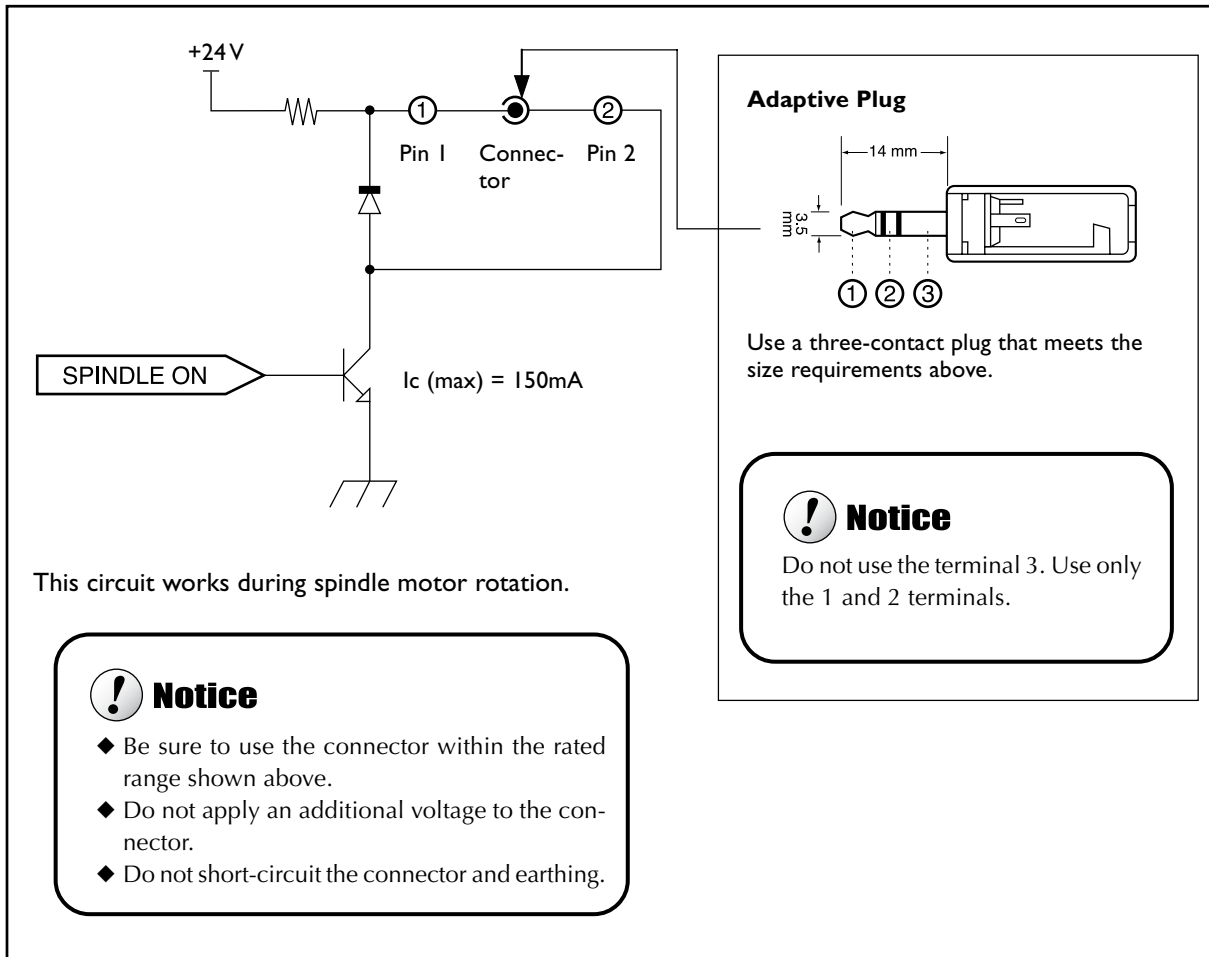
Serial connector (RS-232C)

Signal number	Terminal number	Signal number	Pin connection
NC	25	13	
NC	24	12	
NC	23	11	
NC	22	10	
NC	21	9	
DTR	20	8	
NC	19	7	
NC	18	6	
NC	17	5	
NC	16	4	
NC	15	3	
NC	14	2	
	1	FG	

XY-RS-34/I4 cable connection



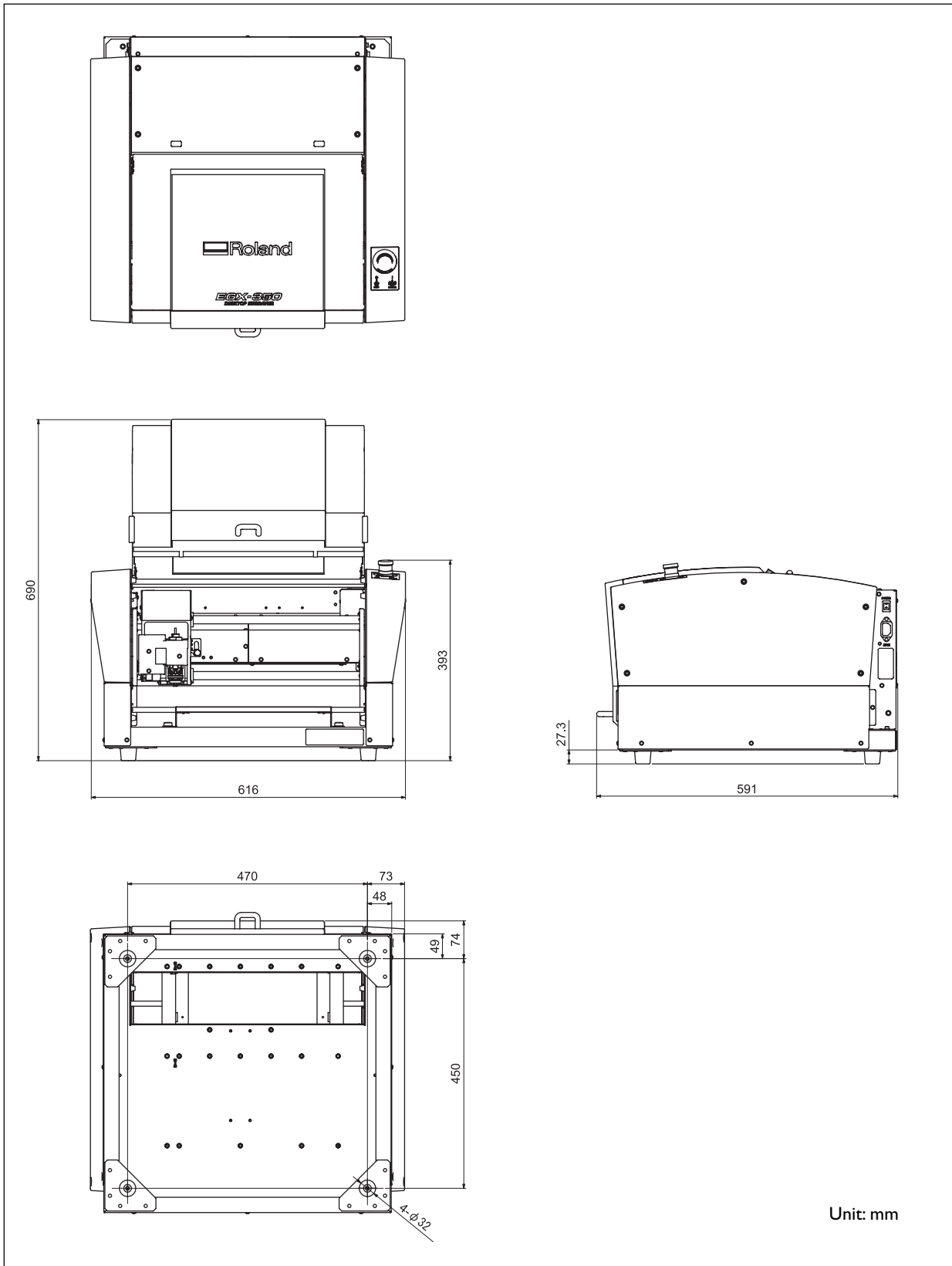
Expansion Connector



Note: We are not responsible for devices connected to this connector.

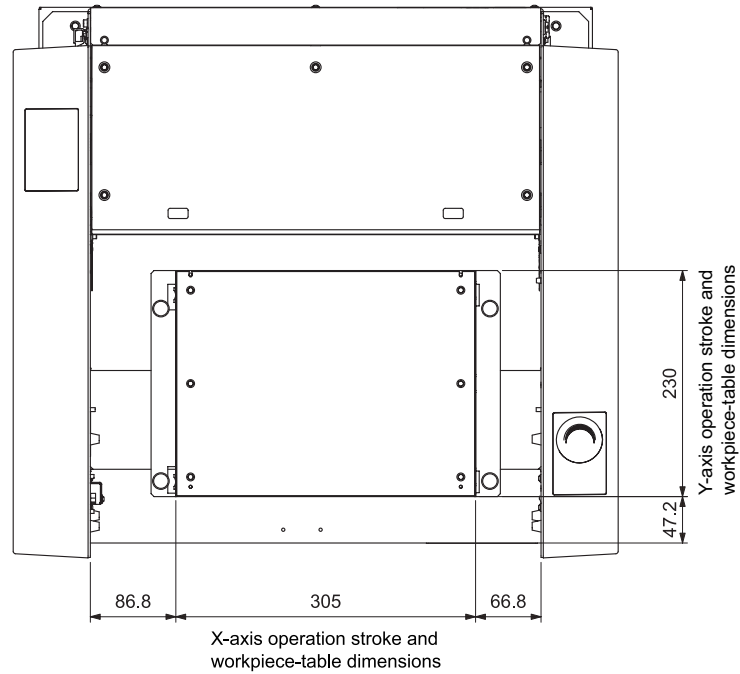
8-4 Main Unit Specification

Dimensions of Outline



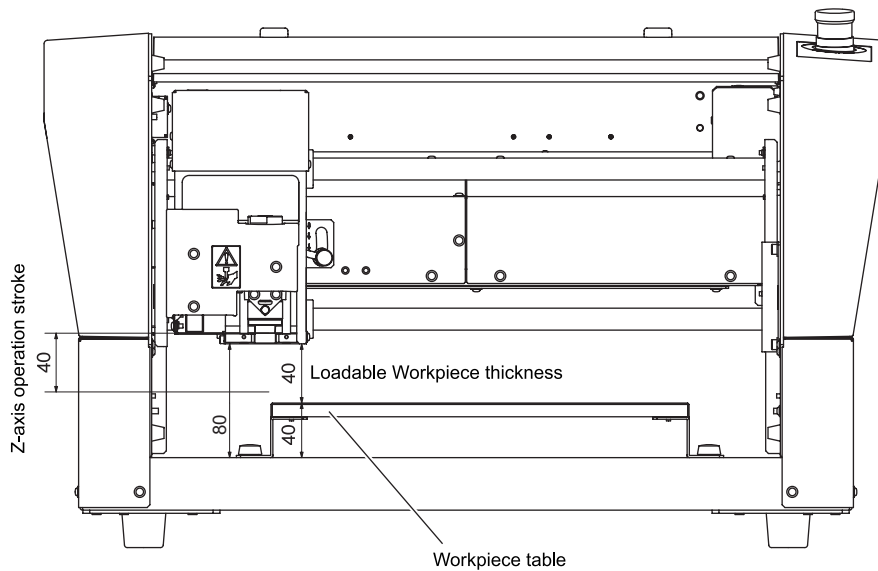
Work area

XY work area



Unit: mm

Z work area

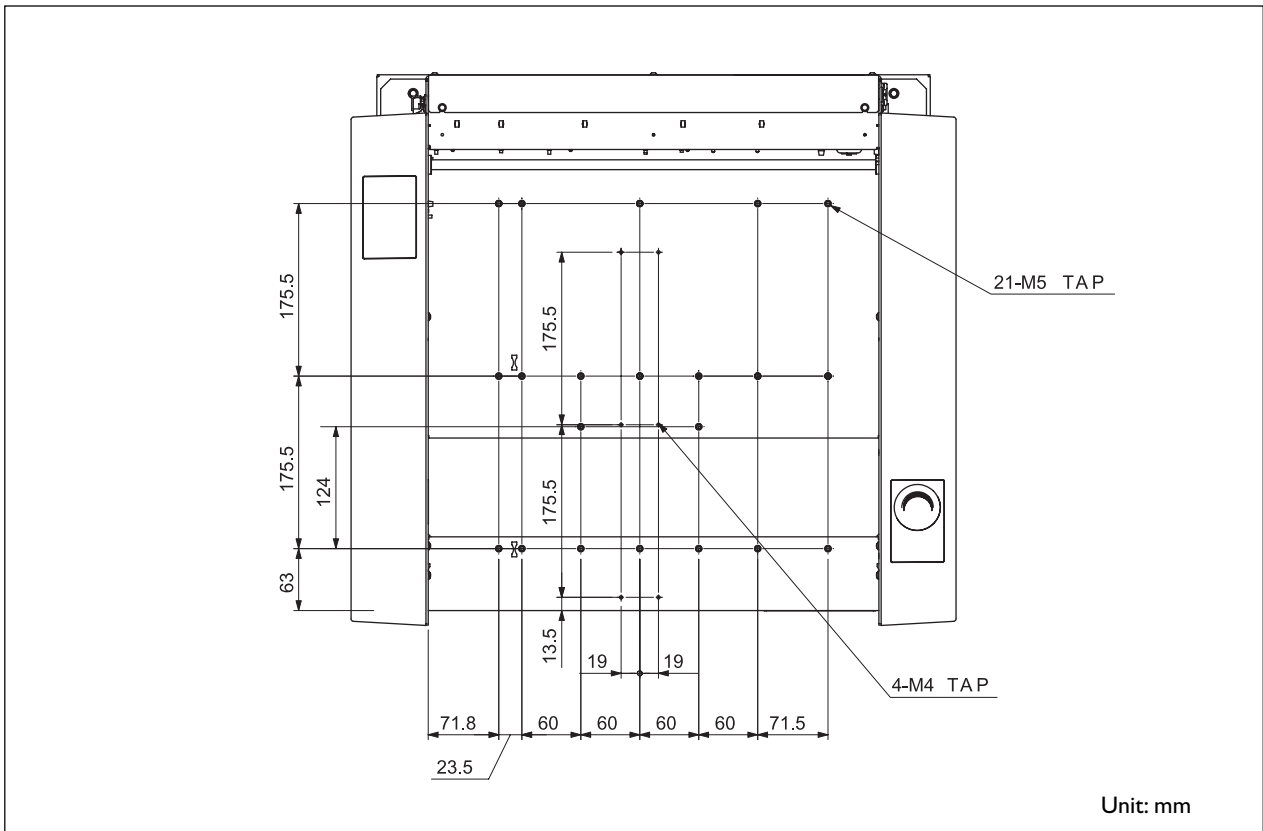


Note: Maximum workpiece thickness when the nose unit is used is 38 mm.

Note: The area in which engraving can actually be performed (the engraving area) is restricted by the length of the installed cutter and the location where the nose unit is installed, and is smaller than the range indicated above.

Unit: mm

Workpiece-table Installation-area Dimensional Drawing



Main Specifications

	EGX-350
Workpiece-table size	Width x depth: 305 x 230 mm (12 x 9.1 in.)
X, Y, and Z operation strokes	X, Y, and Z: 305 x 230 x 40 mm (12 x 9.1 x 1.6 in.)
X-, Y-, and Z-axis drive system	Stepping motor, 3-axis simultaneous control
Operating speed	X and Y axes: 0.1 to 60 mm/sec. (0.004 to 2.4 in./sec) Z axis: 0.1 to 30 mm/sec. (0.004 to 1.2 in./sec)
Software resolution	0.01 mm/step or 0.025 mm/step (0.0004 in./step or 0.001 in./step)
Mechanical resolution	X and Y axes: 0.0025 mm/step (0.0001 in./step) Z axis: 0.00125 mm/step (0.0005 in./step)
Spindle motor	brushless DC motor, maximum 50 W
Spindle speed	5,000 to 20,000 rpm
Tool chuck	Cutter holder, collet method
Loadable workpiece thickness	Maximum 40 mm (1.6 in.) (38 mm (1.5 in.) when nose unit is used)
Interface	USB (compliant with Universal Serial Bus Specification Revision 1.1) Serial (RS-232C-compliant)
Internal memory capacity	2 MB
Control command set	RML-1
Required power-supply amperage	Voltage and frequency: AC 100 to 120 V/220 to 240 V \pm 10%, 50/60 Hz (overvoltage category II, IEC 60664-1) Required power capacity: 1.3 A (100 to 120 V)/0.6 A (220 to 240 V)
Power consumption	122 W
Operating noise	During operation: 60 dB(A) or less (when not cutting), during standby: 40 dB(A) or less (as specified by ISO 7779)
External dimensions	Height x width x depth: 393 x 616 x 591 mm (15.5 x 24.3 x 23.3 in.)
Weight	34 kg (75 lb)
Installation Environment	Operating environment: Temperature of 5 to 40°C (41 to 104 °F), 35 to 80% relative humidity (no condensation) Ambient pollution degree: 3 (as specified by IEC 60664-1)
Included items	Power cord, depth regulator nose (nose unit), nose-unit retainer (retaining screw, spring), spare mounting screw (for the cutter holder), character cutter (diameter 3.175 mm), flat cutter (diameter 3.175 mm), wrench, solid collet (diameter 3.175 mm), solid collet (diameter 4.36 mm), hexagonal wrench, hexagonal screwdriver, handy panel, adhesive sheet, vacuum adapter for chip cleaning, Roland Software Package CD-ROM, Roland EngraveStudio CD-ROM, Roland Software Package Program Guide, Roland EngraveStudio Program Guide, and User's Manual (this document)

System Requirements for USB Connection

Computer	Model preinstalled with Windows Vista, XP, 2000, Me or 98SE (Second Edition), or upgraded computer originally preinstalled with Windows 98SE or later
USB cable	Use a shielded cable up to three meters (10 ft.) in length.



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